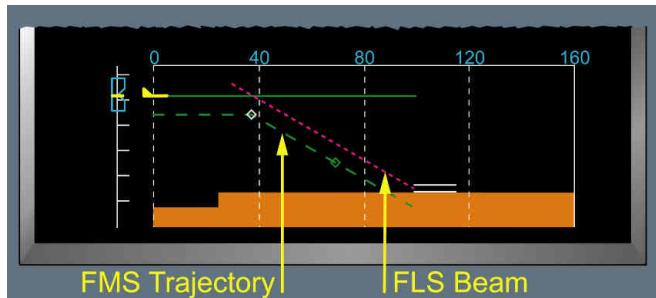


is higher than the true altitude. If the aircraft follows this altitude target, the aircraft is then higher than the FMS predicted trajectory.

If the aircraft flies an ILS(GLS) approach in cold weather, the information on the VD may not be consistent.

Cold Weather with FLS Function



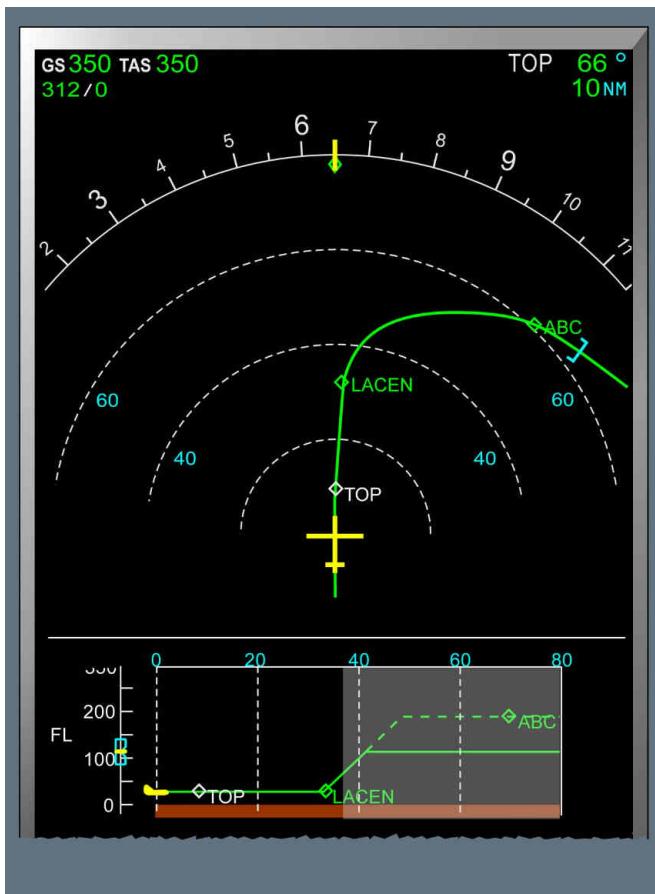
AFTER GLIDE CAPTURE

During the glide capture, the FMS vertical trajectory is corrected in relation to the external temperature. The FLS beam (if any), the FMS trajectory, the terrain and the runway are correctly displayed.

GREY AREA

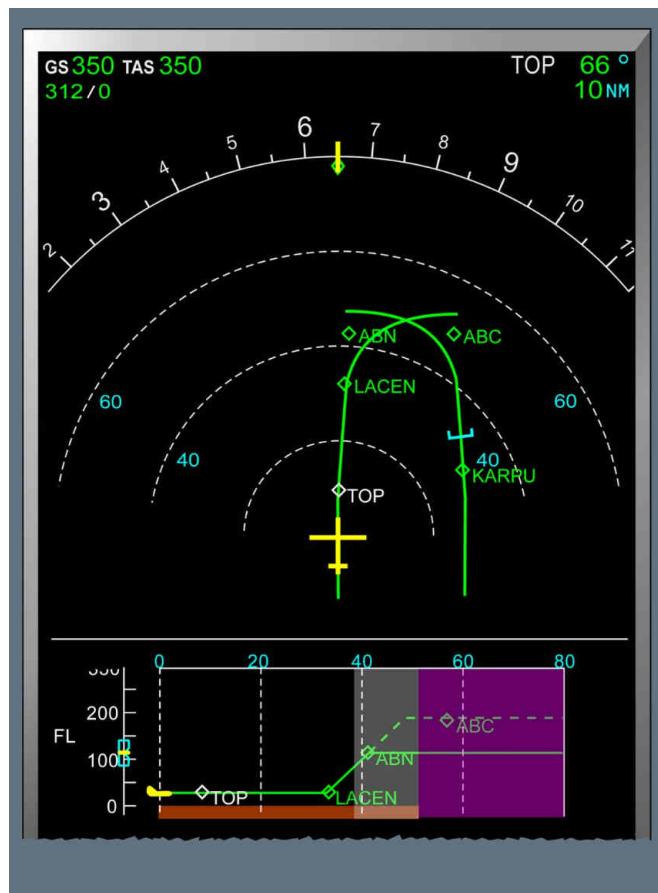
If the aircraft follows the active flight plan, the grey area indicates that the next track turns by more than 3 °. The terrain displayed in this grey area, no longer corresponds to the terrain that is located directly in front of the aircraft.

- The SURV system defines the grey area. Therefore, in the case of a system failure, the grey area is no longer displayed.

Grey AreaMAGENTA AREA

The magenta area indicates the area where the TAWS (of the SURV system) stops displaying the terrain on the VD.

- [2] In some cases, the FMS may not be able to compute a continuous trajectory for the display on the ND. This creates a gap (sometimes not visible) on the flight plan that is displayed on the ND. However, this has no impact on the guidance. In this case, the SURV stops displaying the terrain and the weather on the VD, ahead of the gap up to the destination runway.

Magenta Area



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EFIS - VD

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EFIS - VD

VD Messages

INDEX

Applicable to: ALL

Refer to *CHECK ALT*

Refer to *NO TERR & WX DATA AVAILABLE*

Refer to *SAFETY ALTS PARTLY DISPLAYED*

Refer to *TERR INOP*

Refer to *TRAJ NOT AVAIL*

Refer to *VD MODE CHANGE*

Refer to *VD RANGE CHANGE*

Refer to *VIEW ALONG AZIM XX°*

Refer to *VIEW ALONG ACFT TRACK*

Refer to *WX NOT SEL*

Refer to *WXR INOP*

FMS MESSAGES

Applicable to: ALL

SAFETY ALTS PARTLY DISPLAYED

Appears when the safety altitude type and/or numeric values are not available.

TRAJ NOT AVAIL

Appears when:

- The VD MODE CHANGE, or the VD RANGE CHANGE message is displayed, for more than 6 s, or
 - The ground speed is not valid, or
 - The FMS trajectory is not available.
- The FMS provides the TRAJ NOT AVAIL message.

SURV MESSAGES

Applicable to: ALL

NO TERR AND WX DATA AVAILABLE

Appears when the flight crew:

- Selects PLAN mode on the EFIS CP, or
- Sets to **OFF** the TERR SYS button on the SURV CONTROLS page of the MFD.
[L2] The VD does not display the weather when the TERR function is not available, because it cannot locate the weather vertically (i.e. with respect to the terrain).

TERR INOP

Appears when:

- The TAWS has failed, or
- The flight crew turns off the TAWS, via the SURV page of the MFD, or
- The aircraft is flying in the polar zone.

VIEW ALONG AZIM XX°

The message is associated with the azimuth value, when the flight crew selects the manual AZIM mode.

- [L2]**
- The VD is computed along the selected azimuth.

WX NOT SEL

Appears, when the flight crew:

- Presses the WX pb on the EFIS CP
- Sets the WX ON VD button to OFF on the SURV/CONTROLS page of the MFD.

WXR INOP

Appears, when the flight crew presses the WX pb on the EFIS CP, and:

- The WXR (on the SURV system) is failed, or
- The aircraft is flying in the polar zone.

VD DISPLAY MESSAGES

Applicable to: ALL

CHECK ALT

Appears when the CDS detects a difference between the Captain's and the First Officer's altitude parameters, and this difference is more than:

- 500 ft , if the flight crew selects the STD barometric setting, or
- 250 ft , if the flight crew selects the QNH barometric setting.

L2 The message flashes for 9 seconds, then remains steady.

L1 For more information about the warning and the procedure that are associated with this message, Refer to *NAV CAPT AND F/O ALT DISAGREE* .

VD MODE CHANGE

Appears when the FMS mode and ND mode of the EFIS CP are temporarily different (e.g. due to a change of mode).

VD RANGE CHANGE

Appears when the FMS range and ND range of the EFIS CP are temporarily different (e.g. due to a change of range).

VIEW ALONG ACFT TRK

Appears when the vertical cut for the VD is defined along the aircraft track, but the ND does not display a track line.

L3 Note: *Appears:*

- *In managed mode, when the aircraft deviates from the flight plan or from the LS beam, or*
- *During the transition from HDG to LOC mode, or*
- *When the GA TRK mode is engaged, or*
- *When the aircraft is flying a manual leg, or*
- *At takeoff, when there is no ILS associated with the runway.*

In this case, the RWY mode does not engage, and the VD also displays the flight path arrow symbol.

The VD recovers the flight plan trajectory after a few seconds, when one of the NAV mode, the RWY mode, the TRK mode , or the HDG mode is engaged.



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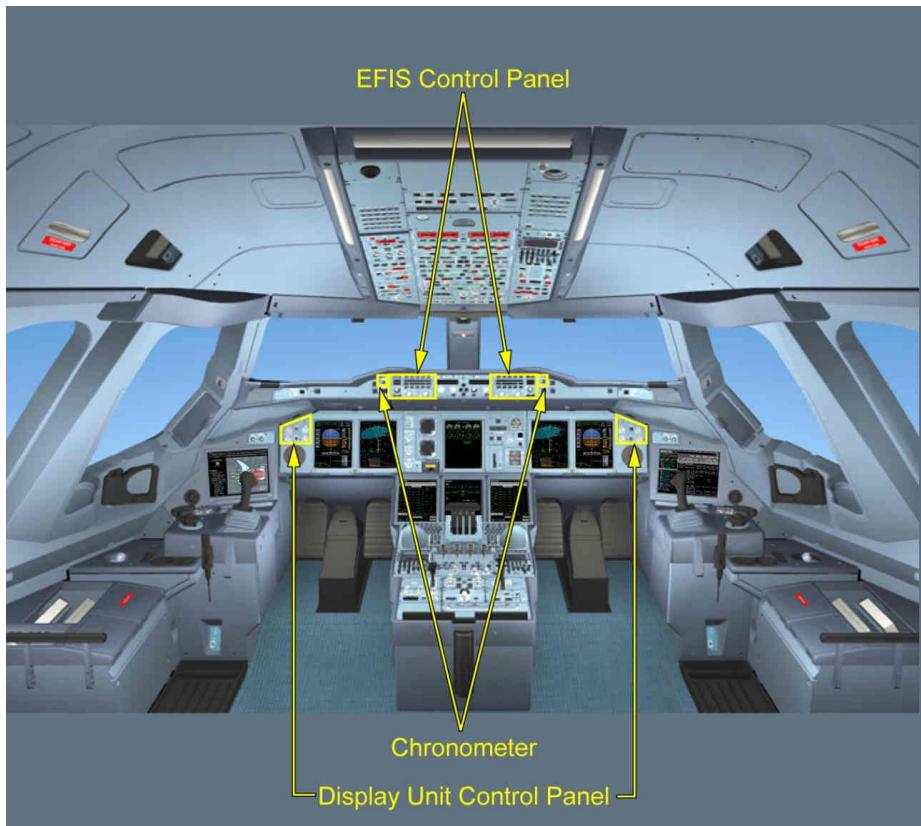
AIRCRAFT SYSTEMS
31 - INDICATING/RECORDING

EFIS - VD

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COCKPIT VIEW

Applicable to: ALL

Cockpit View

The flight crew can access the EFIS CP backup from the MFD , at any moment, or if an EFIS CP failure occurs. For more information, Refer to *FLIGHT GUIDANCE / ABNORMAL OPERATIONS / FCU BACKUP* .

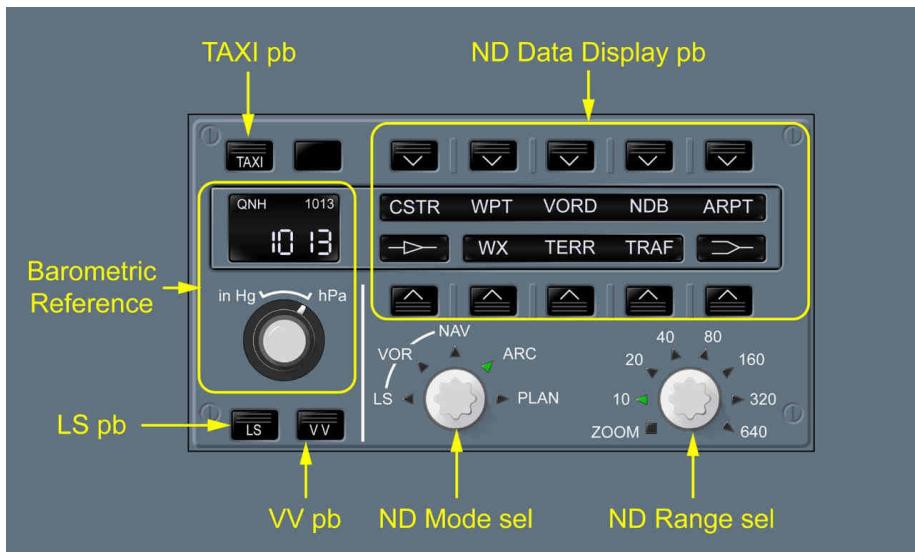
EFIS CONTROL PANEL

Applicable to: ALL

There are two identical EFIS Control Panels (EFIS CP s):

- One on the Captain's side
- One on the First Officer's side.

Each EFIS CP is associated with the onside PFD and ND .

EFIS CP

In the case of abnormal operations of the EFIS CP , the flight crew should use the FCU backup on the MFD . For more information, Refer to FLIGHT GUIDANCE / ABNORMAL OPERATIONS / FCU backup .

Taxi pb

The onside PFD does not display the ETACS videos.



The onside PFD displays the ETACS videos.

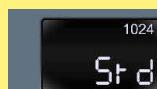
Impacted DU: 00000371 Barometric Reference

BAROMETRIC REFERENCE**Barometric Reference****BAROMETRIC REFERENCE WINDOW**

The barometric reference is QNH 1 024 hPa.

The range of QNH is from 745 hPa(22.00 inHg) to 1 100 hPa(32.48 inHg).

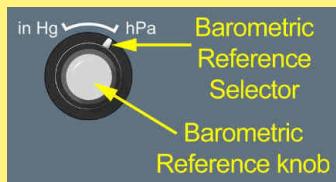
Note: *The flight should not preset the limit values (i.e. 745 hPa and 1 100 hPa, or 22.00 inHg and 32.48 inHg) to avoid the loss of FMS vertical functions.*



The barometric reference is STD. If the flight crew selects the QNH barometric reference, the barometric reference is automatically set to the preset value, i.e. 1 024 hPa.

BAROMETRIC REFERENCE CONTROLS

The barometric reference controls have an outer selector, and an inner knob.

Barometric Reference Controls

The flight crew uses the barometric reference selector to select the barometric unit (hectoPascal, or mercury inches) that is associated with the values displayed in the barometric reference window.

Note: The PFDs do not display the selected barometric unit.

The flight crew uses the barometric reference knob to select the barometric reference value. At the EFIS CP power-up, the barometric reference value starts at 1 013 hPa, or at 29.92 inHg, depending on the selected barometric unit.

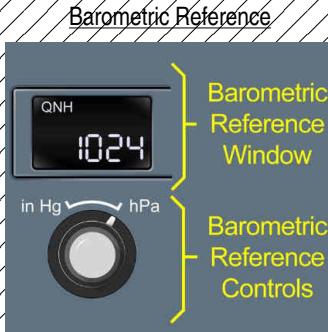
When flight crew:

- Presses the barometric reference knob, the barometric reference is set to STD. The flight crew can turn the barometric reference knob to preset a QNH value. Then, when the flight crew reverts to the QNH barometric reference, the barometric reference automatically displays this preset value.
- Pulls the barometric reference knob, the barometric reference is set to QNH, and the preset value is selected.

Note: The selected value appears in the barometric reference window, and under the altitude scale on the PFD.

Impacted by TDU: 00024027 Barometric Reference

BAROMETRIC REFERENCE



BAROMETRIC REFERENCE WINDOW

L12



The barometric reference is QNH 1 024 hPa.
The range of QNH is from 745 hPa(22.00 inHg) to 1 100 hPa(32.48 inHg).

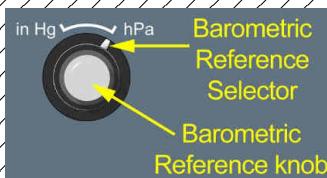


The barometric reference is STD. If the flight crew selects the QNH barometric reference, the barometric reference is automatically set to the preset value, i.e. 1 024 hPa.

BAROMETRIC REFERENCE CONTROLS

The barometric reference controls have an outer selector, and an inner knob.

Barometric Reference Controls



The flight crew uses the barometric reference selector to select the barometric unit (hectoPascal, or mercury inches) that is associated with the values displayed in the barometric reference window.

Note: The PFDs do not display the selected barometric unit.

The flight crew uses the barometric reference knob to select the barometric reference value. At the EFIS CP power-up, the barometric reference value starts at 1 013 hPa, or at 29.92 inHg, depending on the selected barometric unit.

When flight crew:

- Presses the barometric reference knob, the barometric reference is set to STD. The flight crew can turn the barometric reference knob to preset a QNH value. Then, when the flight crew reverts to the QNH barometric reference, the barometric reference automatically displays this preset value.
- Pulls the barometric reference knob, the barometric reference is set to QNH, and the preset value is selected.

Note: The selected value appears in the barometric reference window, and under the altitude scale on the PFD.

VV pb

The Captain's (First Officer's) PFD displays the Velocity Vector (VV).



The Captain's (First Officer's) PFD does not display the VV.

When TRK-FPA is selected, both PFD s automatically display the Flight Path Vector (FPV).

- [L3] When TRK-FPA is selected, pressing the VV pb has no effect: Both PFD s continue to display the FPV , and the VV light remains on.
- [L1] When HDG-V/S is selected, the PFD s do not automatically display the VV. However, the Captain (First Officer) can display the VV on their PFD by pressing the VV pb .

The PFDs no longer display the FPV (VV), when:

- The flight crew changes from TRK-FPA to HDG-V/S
For more information on HDG-V/S / TRK-FPA selection, *Refer to AP/FD Modes / HDG-V/S / TRK-FPA Selection*.
- The flight crew performs a go-around.

LS pb

L12



The Captain's (First Officer's) PFD displays the following landing system data in accordance with the approach selected on the FMS ARRIVAL page: Deviation scales, deviation signals, course pointer, information.

For information on the landing system data, *Refer to PFD / Approach Guidance*

If the flight crew selected an NPA on the FMS ARRIVAL page, and the FMS flight phase is descent or approach, the Captain's (First Officer's) FMA displays the FLS capability.

However, the FLS capability will not appear, if the **NO FLS FOR THIS APPR** message appeared on the MFD.

- Note:
1. If the direct distance to the destination airport is more than 300 nm , only the deviation scales appear.
 2. The LS light automatically comes on when LOC , LOC B/C or F-LOC arms.



The Captain's (First Officer's) PFD does not display the landing system data.

ND MODE selector

L12



The flight crew can select one of the following navigational modes:

- PLAN mode
For more information, *Refer to PLAN mode*
If the flight crew selects the PLAN mode, the ND does not display terrain, weather, or traffic information.
- ARC mode
For more information, *Refer to ARC mode*
- ROSE-NAV mode
For more information, *Refer to ROSE-NAV mode*
- ROSE-VOR mode
For more information, *Refer to ROSE-VOR mode*
- ROSE-LS mode.
For more information, *Refer to ROSE-LS mode*

ND range selector

The flight crew selects the range for the ND and the VD , in nautical miles.

When the flight crew sets the ND range selector to ZOOM, the ND displays the moving airport map. For more information, *Refer to Airport Navigation* .

L3 **Note:** *The VD range is limited to 160 nm .*

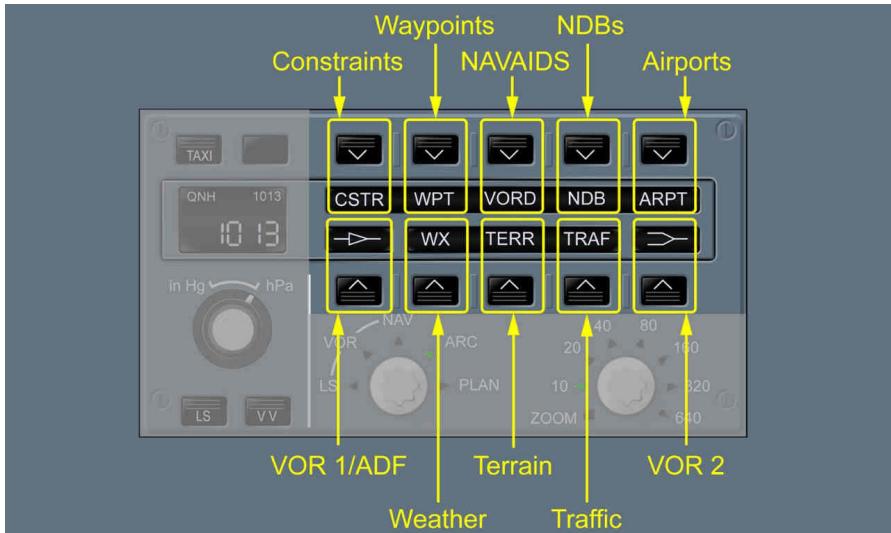
The ND can only display the weather, if the selected range is below, or equal to, 320 nm

If the flight crew sets the ND range selector to ZOOM, the VD display is no longer available.

L2 If the flight crew changes ND mode from ARC to one of the ROSE or PLAN modes, the ND range automatically increases to the next value. Therefore, the distance in front of the aircraft mock-up remains the same. If the flight crew changes ND mode to ARC mode, the ND range automatically decreases to the previous range value.

ND DATA DISPLAY

The flight crew can use the following pushbuttons to display associated optional data on the ND and/or on the VD :

ND Data Display**CONSTRAINTS**

The ND displays:

- The constraint values associated with the flight plan waypoints
The constraints values are the speed, altitude and time constraints.
For more information, *Refer to ND / FMS DATA / Flight Plan Waypoints*.
- The Minimum Off Route Altitudes (MORA).
If the flight crew selects a range that is equal to 20 nm or 10 nm , the MORA value is no longer displayed on the ND . For more information, *Refer to ND / FMS DATA /MORA or Offset* .

WAYPOINTS

L12



The ND displays all the waypoints that are stored in the navigation database and in the pilot stored database.

The flight crew can only press one of the WPT pb , VORD pb or NDB pb at the same time.

NAVAIDS

L12



The ND displays all the VOR s and the DME s of the navigation database and all the pilot stored NAVAIDS.

The flight crew can only press one of the WPT pb , VORD pb or NDB pb at the same time.

NDBS

L12



The ND displays all the non-directional beacons of the navigation database.

The flight crew can only press one of the WPT pb , VORD pb or NDB pb at the same time.

AIRPORTS

The ND displays all the airports of the navigation database, that are different from the origin or destination airports.

WEATHER

L12



Both ND and VD display the weather information.
If the flight crew has set the WX on VD option on the MFD to OFF, the VD does not display the weather information.
The flight crew cannot select the WXR pb and the TERR pb at the same time.
For more information, *Refer to SURV / WXR / ND.*

TRAFFIC

The ND displays all of the surrounding aircraft that have a transponder.
For more information, *Refer to SURV / TCAS / ND.*

TERRAIN

L12



The ND displays the terrain representation, and the TAWS messages.
The flight crew cannot select the WXR pb and the TERR pb at the same time.
For more information, *Refer to SURV / TAWS / ND.*

VOR1 / ADF

When pressed, the ND displays the following selected VOR 1 characteristics:
- The VOR 1 pointers, on the heading scale
- The VOR 1 station characteristics, on the lower left corner of the ND .

**VOR 2**

When pressed two times, the ND displays the following selected ADF characteristics:

- The ADF pointers, on the heading scale
- The ADF station characteristics, on the lower left corner of the ND .

CHRONOMETER

Applicable to: ALL

When pressed one time, the ND displays and starts the chronometer.

When pressed two times, the ND freezes the time that appears on the ND.

When pressed three times, the ND resets the chronometer, and the ND no longer displays the time.

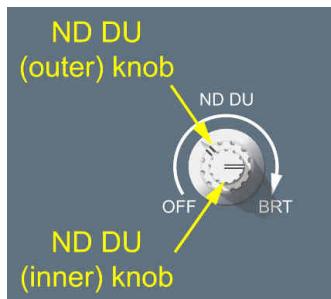
DISPLAY UNIT CONTROL PANEL

Applicable to: ALL

Display Unit Control Panel**PFD DU knob**

When turned, turns on or off the PFD screen, and adjusts the brightness of the PFD display unit.

The two light sensors that are located on the bottom of the display unit enable the automatic tuning of the brightness (in a limited range), according to the ambient lighting in the cockpit.

ND DU knobND DU Knob

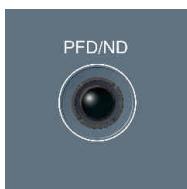
The inner knob:

- Turns on or off the ND
- Adjusts the brightness of the ND

The two light sensors that are located on the bottom of the display unit enable the automatic tuning of the brightness (in a limited range), according to the ambient lighting in the cockpit.

The outer knob controls the brightness of both the weather radar image and the terrain display.

- [L2] In the case of a terrain alert, the background lighting is set to 75 % of the overall lighting, regardless of the position of the ND DU knob. After the alert, the lighting returns to its default value.

PFD/ND pb

When pressed, exchanges the onside PFD and the ND, regardless of their default position.



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AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

EFIS - CONTROLS AND INDICATORS

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GENERAL**Applicable to: ALL**

There are two Keyboard and Cursor Control Units (KCCUs) on the center pedestal. There is one for the Captain and one for the First Officer.

The KCCUs are used to:

- Interface with the Navigation Display (ND), the Multifunction Display (MFD), and the System Display (SD)
- Select and/or modify parameters.

 The two units are functionally identical.

Cockpit Presentation

[1] Each KCCU has a:

- Keyboard, to enter alphanumeric information.
- The keyboard also has shortcut keys that provide direct access to specific pages on a display unit.
- Cursor control device, that has a Validation pb, a wheel, a trackball and four control keys.

[2] The keyboard and the cursor control device are independent of each other: The failure of one does not affect the other.

The Captain KCCU

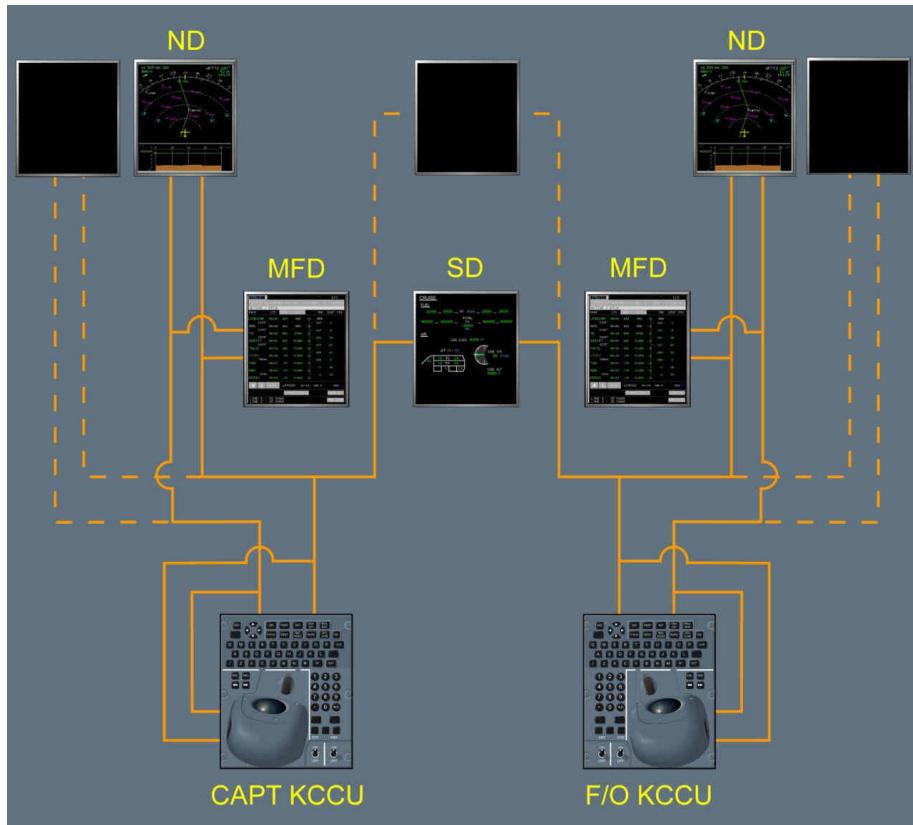


ARCHITECTURE

Applicable to: ALL

The KCCU's are directly-connected to the ND, MFD, and SD. They are also connected to the other display units for reconfiguration purposes (Refer to Reconfiguration description).

- They are connected via two redundant Controller Area Network (CAN) busbars.

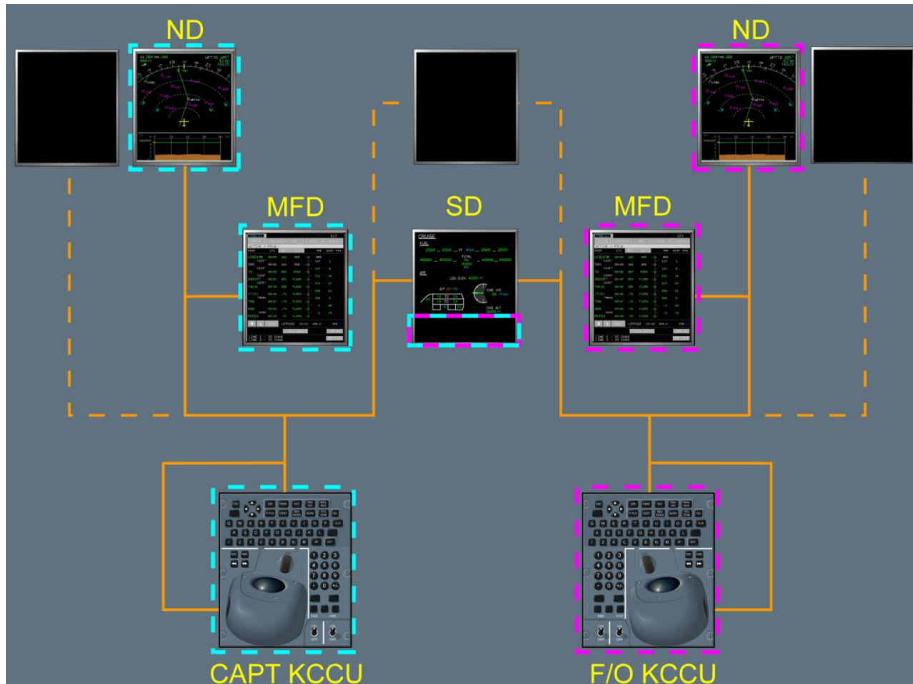
Architecture

INTERACTION WITH DISPLAY UNITS

Applicable to: ALL

Each KCCU enables the flight crew to directly interact with:

- The onside ND
- The onside MFD
- The mailbox section of the SD.

Interaction with the Display Units

Caption:

- Cyan dashed line: Display Unit Interacting with CAPT KCCU
- Magenta dashed line: Display Unit Interacting with F/O KCCU

Note: The KCCU continues to interact with the ND, MFD, and SD, irrespective of the display unit reconfiguration.

CURSOR DISPLAY

Each KCCU displays a different cursor.

The Captain's cursor is :



The First Officer's cursor is :



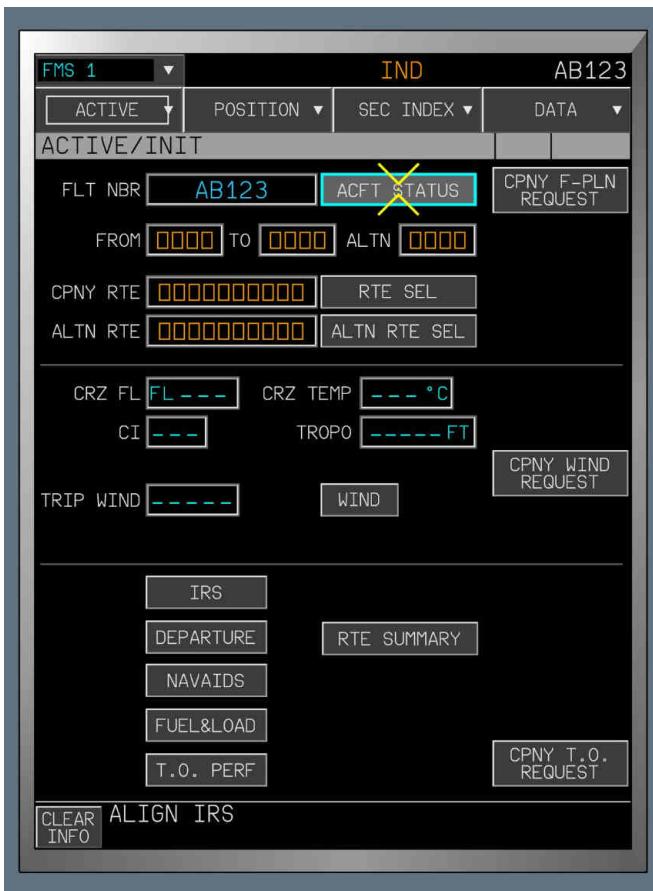
Both cursors can appear in the mailbox section of the SD at the same time. However, only one KCCU can interact with the SD at one time. The active KCCU is the one that last interacted with the SD.

The KCCU is active on the display that shows the cursor.

However, the cursor may disappear when the KCCU is not used for an extended period of time. It reappears, when the flight crew uses any key, or the trackball of the KCCU.

INTERACTIVE ZONES

The flight crew can use the KCCU to interact with the objects on the different display units.

Interactive Zone

When the cursor is moved over a modifiable field of the display unit, a blue box appears around that field.

INTERACTION WITH THE ND

The lateral navigation part is the only interactive part of the ND.

The interactive objects are:

- The aircraft symbol
- All displayed waypoints

- All displayed navaids
- All displayed airports.

The KCCU can be used to perform the following functions:

- Direct To
- Insert or delete a waypoint
- Access data on any displayed airport
- Insert, erase, or undo the temporary flight plan.

For the Direct To and the Insert functions, an interactive dialog box replaces the vertical display part of the ND. This dialog box enables the flight crew to enter parameters with the KCCU.

The ND





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AIRCRAFT SYSTEMS

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KCCU - SYSTEM DESCRIPTION

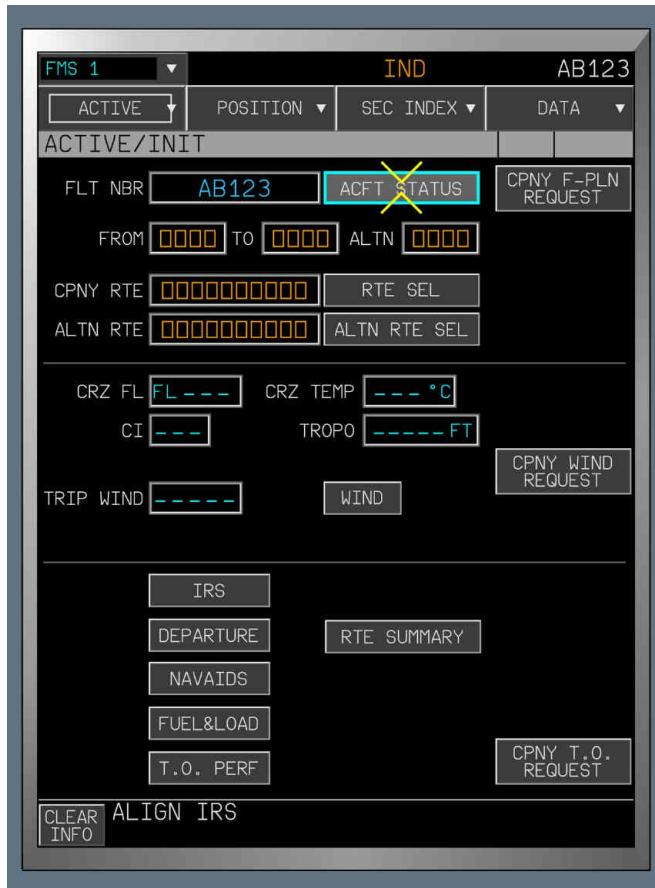
INTERACTION WITH THE MFD

The entire MFD screen is interactive.

The MFD displays the pages of the following applications:

- FMS

The MFD enables to manage the flight planing functions of the aircraft.

FMS

- SURV(eillance)

The MFD enables to manage the surveillance functions of the aircraft (TAWS, WXR, TCAS, XPDR).

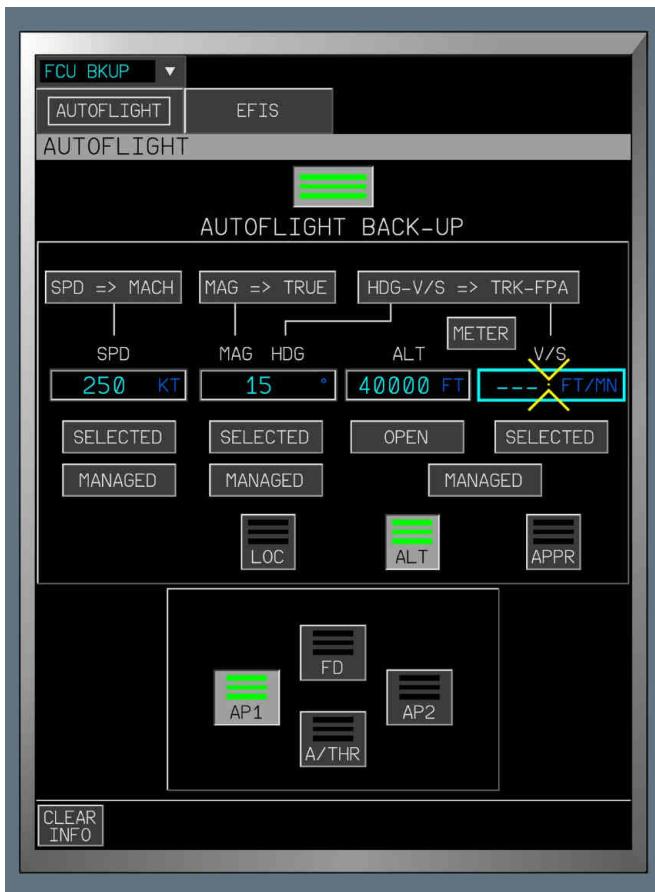
SURV

- ATC COM

The MFD enables to manage the ATC functions of the aircraft.

ATC COM**- FCU backup.**

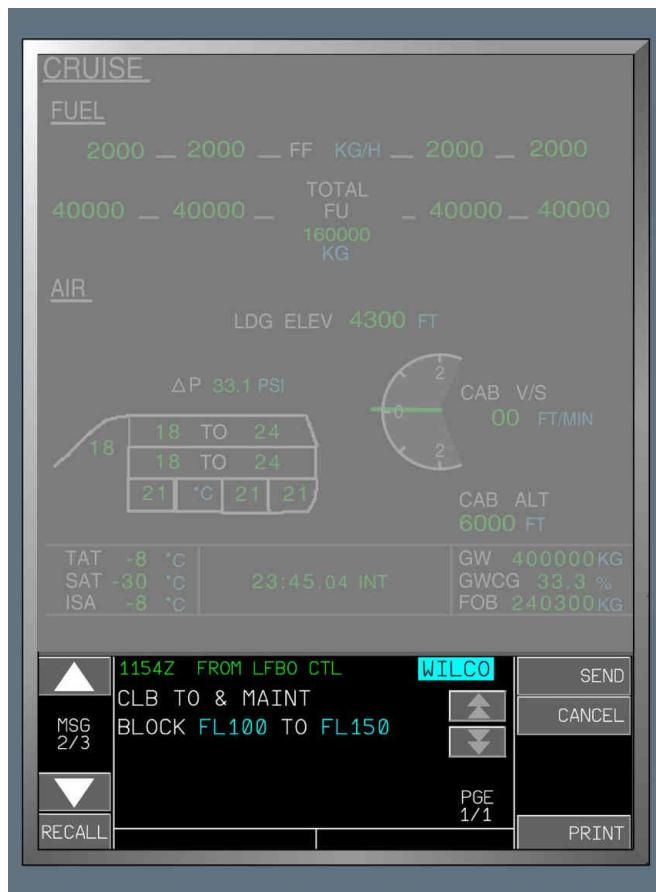
The MFD enables to recover all EFIS CP and/or all AFS CP functionalities through two dedicated pages.

FCU Backup**INTERACTION WITH THE SD**

The ATC mailbox section is the only interactive part of the SD.

The flight crew can use the KCCU to:

- Write, select and send messages to the ATC
- Select and read messages from the ATC.

The SD



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KCCU - SYSTEM DESCRIPTION

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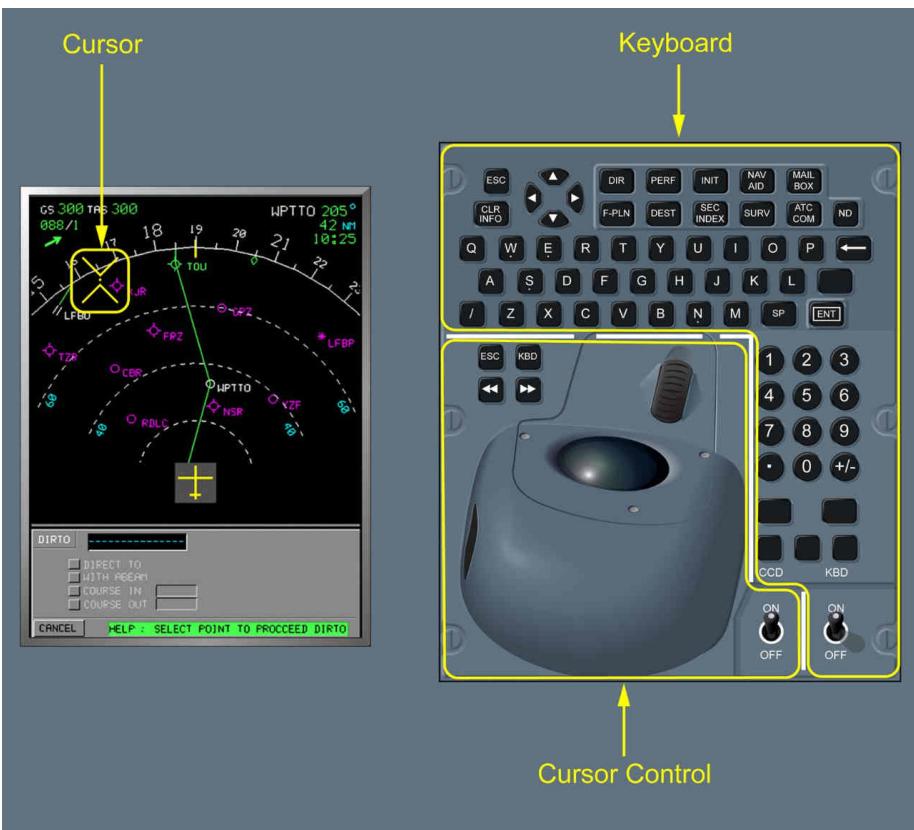
GENERAL

Applicable to: ALL

The KCCU has a:

- Keyboard
- Cursor control device.

The KCCU keys are backlit.

KCCU Parts

CURSORS**Applicable to: ALL**

Each KCCU has a unique cursor. The symbol changes to indicate the status of the cursor.



The Captain's cursor is active.



The Captain's cursor is not active.

This only occurs when both cursors appear on the mailbox (on SD), and the First Officer's cursor is active.



The First Officer's cursor is active.



The First Officer's cursor is not active.

This only occurs when both cursors appear on the mailbox (on SD), and the Captain's cursor is active.



Appears:

- Before the cursor is displayed: The circle becomes increasingly smaller, until it disappears. Then, the cursor is active.
- When the flight crew selects a different page on the MFD, or moves the cursor to a different display unit.

KEYBOARD

Applicable to: ALL

Keyboard



The keyboard module has:

- Shortcut keys
- One Backspace key
- One ENT key
- Numeric keys
- One ON/OFF sw
- Alphabet keys

- One CLR INFO key
- One ESC key
- Four direction arrow keys.

DIR KEY

When pressed:

- Displays the FMS DIRECT TO page on the MFD (*Refer to FMS - DIRECT TO page*)
- Moves the cursor back to the MFD if it was on an other display before.

PERF KEY

When pressed:

- Displays the FMS ACTIVE / PERF page (on the panel that corresponds to the active flight phase) on the MFD (*Refer to FMS - PERF page*)
- Moves the cursor back to the MFD if it was on an other display before.

INIT KEY

When pressed:

- Displays the FMS ACTIVE / INIT page on the MFD (*Refer to FMS - INIT page*)
- Moves the cursor back to the MFD if it was on an other display before.

NAVAID KEY

When pressed:

- Displays the FMS POSITION / NAVAIDS page on the MFD (*Refer to POSITION / NAVAIDS page*)
- Moves back the cursor to the MFD if it was on an other display before.

F-PLN KEY

When pressed:

- Displays the top of the flight plan on the FMS ACTIVE / F-PLN page on the MFD , (*Refer to FMS - F-PLN page*)
- Moves the cursor back to the MFD if it was on an other display (ND , or ATC Mailbox) before.

DEST KEY

When pressed:

- Displays the bottom of the primary flight plan on the FMS ACTIVE / F-PLN page on the MFD (*Refer to FMS - F-PLN page*)
- Moves the cursor back to the MFD if it was on an other display before.

SEC INDEX KEY

When pressed:

- Displays the FMS SEC / INDEX page on the MFD (*Refer to FMS - SEC / INDEX page*)
- Moves the cursor back to the MFD if it was on an other display before.

SURV KEY

When pressed:

- Displays the SURV CONTROLS page on the MFD (*Refer to SURV - CONTROLS page*)
- The cursor moves back to the MFD if it was on an other display before.

Mailbox KEYWhen pressed, the cursor moves to the mailbox section of the SD (*Refer to Mailbox*), if it was on an other display before.**ATC COM KEY**

- Displays the ATC COM REQUEST page on the MFD (*Refer to ATC COM REQUEST page*)
- Moves the cursor back to the MFD if it was on an other display before.

ND KEY

When pressed, moves the cursor to the ND.

ENT KEY

Operates the same way as the Validation pb of the cursor control device.

- Edits an entry field:
 - The cursor is positioned in the field, and is ready for a new entry
 - When data is entered, another click validates the entry, and the cursor moves to the field, or to the action-button, that is most likely to be used next.
- Edits an option-list:
 - The option-list opens to the first option that is selected
 - The flight crew uses the wheel, or the direction arrow keys, to change the selected option, if required
 - Another click validates the selection, and the cursor moves to the field, or to the action-button, that is most likely to be used next.
- Activates an action-button.

← KEY

- Clears the entry field, if the entire field is selected, or

Example of Selection Clear



Note: In some entry fields, such as NAVAIDS, clearing a previously entered value will set the entry field to the default value.

- Clears the entry field, one character at a time, from right to left.

Example of Character Clear



NUMERIC KEYS**NUMBER KEYS**

Inserts a number at the cursor position in the entry field.

+/- KEY

Inserts a plus or minus sign in front of the edited value.

. KEY

Inserts a “.” (decimal point) at the cursor position in the entry field.

ALPHABET KEYS**LETTER KEYS**

Inserts an alphabet character at the cursor position in the entry field.

The alphabet keys are organized in the “QWERTY” (US keyboard) layout.

N, E, S, W (CARDINAL POINT) KEYS

Inserts a cardinal point (N, E, S, W) in fields, when applicable.

There is a dot under these letters. This dot helps the flight crew to easily find these keys.

/ KEY

Inserts a “/” (slash) at the cursor position in the entry field.

SP KEY

Inserts a space at the cursor position in the entry field.

ON/OFF sw

The KCCU keyboard is active.



The KCCU keyboard is not active.

CLR INFO KEY

When pressed, the information message that is currently displayed in the FMS, ATC COM, or Surveillance message area is cleared.

ESC KEY

When pressed, cancels the current field edition. The field returns to the last valid value.

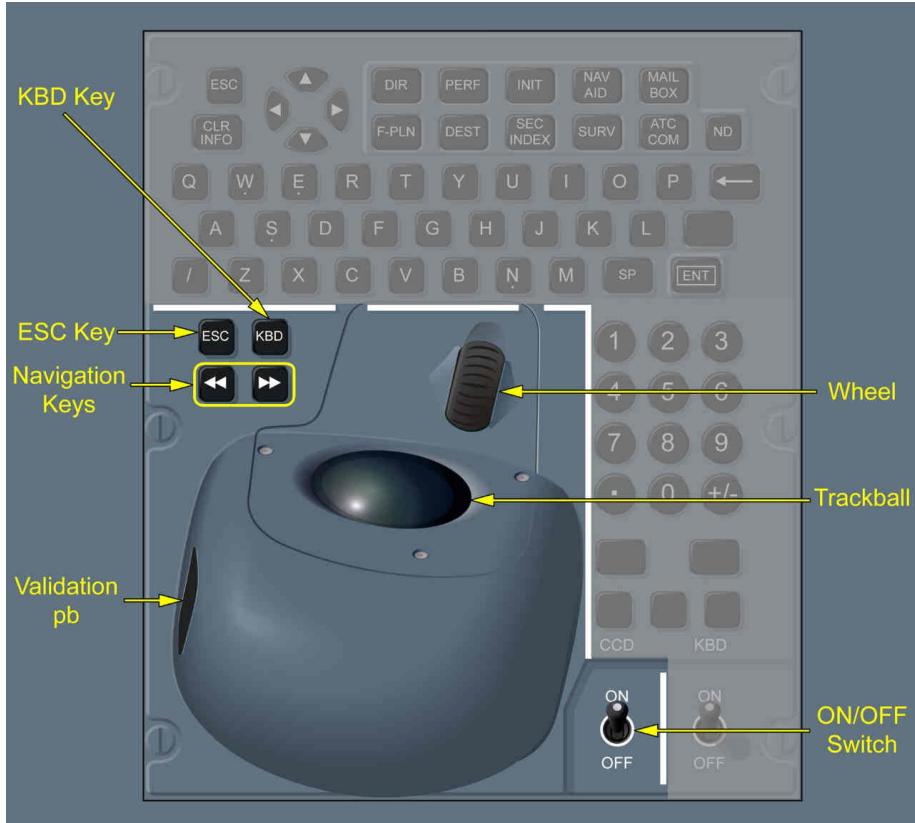
There is a similar key on the cursor control device.

DIRECTION ARROW KEYS

- Move the cursor from one field to another in the direction of the pressed key. The cursor remains in the selected display unit.
These keys operate in the same way as the trackball on the cursor control device.
- Move the blue selection box in the option-list, in the direction of the pressed key. These keys operate in the same way as the wheel on the cursor control device.

CURSOR CONTROL

Applicable to: ALL

Cursor Control

The cursor control device has:

- One wheel
- One trackball
- One ON/OFF sw
- One Validation pb
- Two navigation keys

- One ESC key
- One KBD key.

WHEEL

Enables the flight crew:

- To change the selection in an option-list
- To scroll to a specific page display, for example, to the F-PLN or to the message list
- To increment a value in an entry field.

TRACKBALL

Operates the same way as the direction arrow keys on the keyboard.
Enables the flight crew to move the cursor over the interactive section of the selected display unit.

ON/OFF sw

The KCCU cursor control device is active.



The KCCU cursor control device is not active.

Validation pb

Operates the same way as the ENT key of the keyboard.

Enables the flight crew to:

- Edit an entry field:
 - The cursor is positioned in the field, and is ready for a new entry
 - When data is entered, another click validates the entry, and the cursor moves to the field, or to the action-button, that is most likely to be used next.
- Edit an option-list:
 - The option-list opens to the first option that is selected
 - The flight crew uses the wheel, or the direction arrow keys, to change the selected option, if required
 - Another click validates the selection, and the cursor moves to the field, or to the action-button, that is most likely to be used next.
- Activates an action-button.

NAVIGATION KEYS

Moves the cursor to the display unit that is to the right, or to the left, of the one that is currently selected (if applicable).

ESC KEY

When pressed, cancels the current field edition. The field returns to the last valid value.

There is a similar key on the keyboard.

KBD KEY

L12



When pressed, displays the soft keyboard on the MFD.

By default, it appears in the lower part of the MFD, unless the field to be edited is in the lower part of the display unit.

The soft keyboard acts a backup to the KCCU keyboard.

When pressed again, the soft keyboard disappears from the MFD.

Note: *If the keyboard fails, or is switched off, the soft keyboard automatically appears, when the flight crew modifies an entry field.*

LOSS OF KEYBOARD

Applicable to: ALL

KEYBOARD BACKUP

In case of a total or partial loss of the keyboard, the flight crew can use a soft keyboard as a backup.

The soft keyboard has:

- Alphabet softkeys
 - “A” to “Z” keys, organized in a “QWERTY” layout.
- Numeric softkeys
 - “0” to “9”, “.” (decimal point) and “+/-” (plus and minus) keys.
- A CLR softkey
- An ENT softkey
- A “/” (slash) softkey
- An SP softkey
- An ESC softkey
- N, E, S, W softkeys

These insert cardinal points. There is a dot under these letters. This dot helps the flight crew to easily find these keys.

- Left and right arrow softkeys

These softkeys operate in the same way as the left and right keys of the direction arrow keys.

SOFT KEYBOARD DISPLAY

The soft keyboard appears in either the upper, or lower, part of the MFD:

- Automatically, if the hard keyboard fails, as soon as the flight crew edits any field
- If the flight crew presses the KBD key on the cursor control device.

It appears in the lower part of the MFD by default, unless the field to be edited is in the lower part of the display unit.

Note: *The soft keyboard cannot be used to edit an entry field on the ND, even if the flight crew can continue to interact with the ND, via the cursor control device.*

Therefore, when the hard keyboard fails, it is not recommended to access the FMS functions via the ND, but to use the MFD instead.

SOFT KEYBOARD EXIT

The soft keyboard is no longer displayed on the MFD:

- When the flight crew presses the ENT key or the ESC key
- When the flight crew presses the KBD key on the cursor control device, while the soft keyboard is displayed

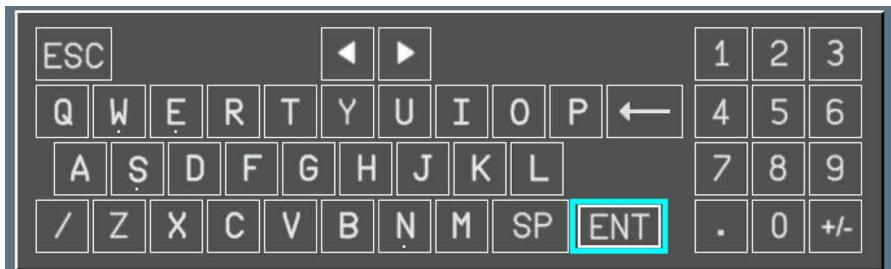
[L3] *Note: Pressing the KBD key to remove the soft keyboard from the MFD, will leave the cursor in its current position.*

[L1] - In case of a display unit reconfiguration involving the MFD.

USE OF THE SOFT KEYBOARD

When the soft keyboard is displayed, the “ENT” softkey is highlighted by a blue outline around the softkey.

Soft Keyboard



The blue box highlights the currently-selected softkey. The flight crew can change the selection with the trackball of the cursor control device.

Only one softkey is highlighted at a time.

When the flight crew presses the cursor control Validation pb, the selected character is entered in the active entry field.



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KCCU - ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

CDS CAPT (F/O) CURSOR CTL FAULT (*Refer to Procedure*)

CDS CAPT (F/O) CURSOR CTL+KEYBOARD FAULT (*Refer to Procedure*)

CDS CAPT (F/O) KEYBOARD FAULT (*Refer to Procedure*)

CDS CAPT (F/O) MAILBOX ACCESS FAULT (*Refer to Procedure*)



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KCCU - ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Subsystem | Electrical Supply |
|--------|-------------------------------------|-------------------|
| KCCU | CAPT KCCU Keyboard | DC ESS / DC 1 |
| | CAPT KCCU Cursor and Control Device | DC ESS |
| | F/O KCCU Keyboard | DC 1 / DC 2 |
| | F/O KCCU Cursor and Control Device | DC 2 |



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AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

ECAM - SYSTEM DESCRIPTION

GENERAL

Applicable to: ALL

Electronic Centralized Aircraft Monitoring (ECAM) provides necessary information to the flight crew, for both normal and abnormal operations. It displays this information on the:

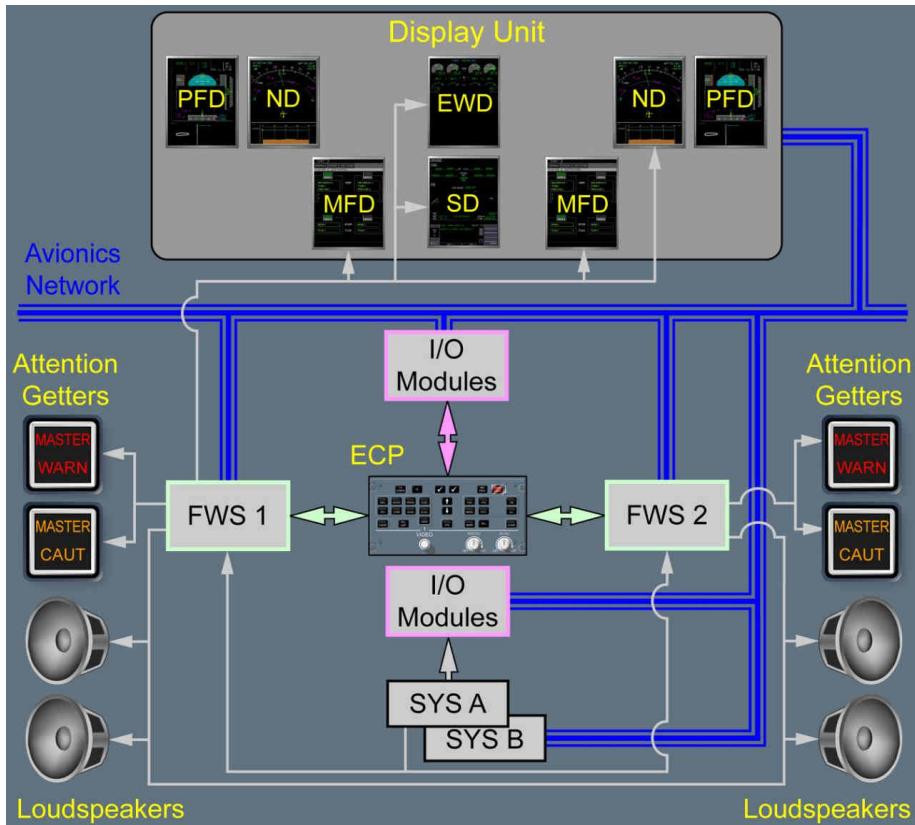
- Engine and Warning Display (EWD):
For normal checklists, abnormal and emergency procedures, limitations, and memos
- System Display (SD):
For system displays, aircraft status, and permanently-displayed data
- Primary Flight Display (PFD):
For limitations that have an immediate impact on the flight, or to increase the flight crew awareness on memos.

ECAM ARCHITECTURE

Applicable to: ALL

The ECAM has:

- Two FWS s
 - [L2] These FWS s collect data from aircraft systems, and trigger applicable alerts. When an alert is triggered, the FWS s send the information for display to the display units.
 - [L1] - An ECAM Control Panel (ECP)
 - [L2] The flight crew uses the ECP to interface with the ECAM .
 - [L1] - Four attention-getters, referred to as master-lights.
 - [L2] These master lights include two MASTER CAUT lights, and the two MASTER WARN lights, that are on the cockpit glareshield.
 - [L1] - Four loudspeakers
 - [L2] There are two loudspeakers on the Captain's side, and two on the First Officer's side.
 - [L1] - Can display information on the EWD , the SD , and the PFD .

ECAM Architecture**FLIGHT WARNING SYSTEM (FWS)**

The ECAM monitors most aircraft systems, triggers alerts, and provides operational information to the flight crew.

The ECAM has two identical FWS s that:

- Monitor aircraft systems, and aircraft configuration.

Both FWS s receive information from aircraft systems, and compute alerts (warnings and cautions) in real time.

- [L3] The FWS receives this information directly, via the avionics network. Systems that do not support direct avionics network connection, transmit the parameters via the assigned IMA input/output modules.
In the case of an avionics network failure, conventional buses ensure direct communication, and act as a backup between the ECAM and specific systems.
- [L1] - Operate independently, and in parallel. Therefore, if one FWS fails, the remaining FWS is sufficient to perform all functions, and there is no operational impact.
 - Trigger failure messages and applicable alerts, and manage alert priority and flight phase inhibition (*Refer to DSC-31-40-10 Alert Types and Levels*).The ECAM also computes the flight phases that determine when alerts are displayed, if required.
 - Display recovery procedures and, if required, associated limitations, aircraft status, memos, and system display pages.
 - Produce applicable aural warnings, and visual attention-getters.
- [L2] These are linked to alerts, and attract the flight crew's attention, or emphasize the severity.
- [L1] - Provide not-sensed abnormal procedures (not detected by the FWS), when selected by the flight crew via the ECP .
 - [L2] Some system failures that the ECAM cannot detect, or some aircraft configurations, may require the flight crew to access specific procedures. The flight crew can manually display this procedure on the EWD , by using the ABN PROC pb on the ECP .
 - [L1] - Provide normal checklists, when requested by the flight crew.
 - [L2] The flight crew can, at any time, display the normal checklists, and the deferred procedures, if any, by using the C/L pb on the ECP .
 - [L1] If procedures are deferred to all phases or to the approach or landing phases, these deferred procedures will automatically appear during the approach phase.
 - Emit automatic altitude callouts and audio indicators.
- [L3] The two FWS s are installed on two distinct CPIOM-C s.
- [L1] Each FWS has three databases:

- A database with all ECAM procedures of a FWS standard, abnormal, emergency, normal checklists (C/L), memos and limitations

[L3] This database contains all the logics and procedures to ensure ECAM functions.

[L1] - A temporary quick change database, to enable Airbus to update ECAM procedures in between two FWS standards, if necessary.

This database is also referred to as the Airbus Temporary Quick Change (ATQC) database. An ECAM procedure modified, or updated via the ATQC database is temporary, and remains applicable until the appropriate technical solution is applied to the aircraft (new FWS standard, or new system standard).

[L3] The ATQC enables Airbus to:

- Modify abnormal and emergency procedures
- Modify aircraft status, memos and limitations.

[L1] - A customization database, to enable Operators to customize some of the ECAM procedures, if necessary.

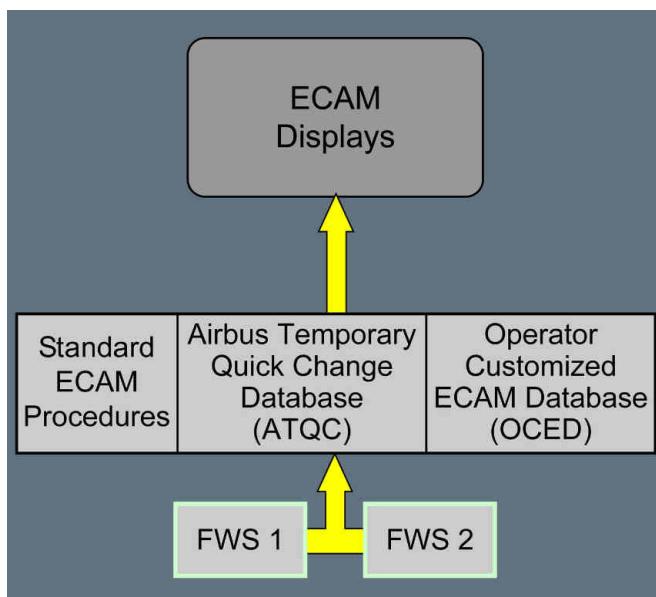
This database is also referred to as the Operator Customized ECAM Database (OCED).

[L3] The OCED enables Operator to:

- Modify the normal C/L
- Add not sensed abnormal procedures
- Add more information to a not sensed abnormal procedure or to an alert.
- The ATQC and the OCED databases have separate domains. Any parts of the ECAM procedures that are modified by one database, ATQC or OCED , cannot be modified by the other database.

[L1] All ECAM displays take the three databases into account.

- If the ATQC database is not compatible with the FWS standard, the ECAM alert FWS ATQC DATABASE REJECTED is triggered on ground only at electrical power-up. For more information on this alert *Refer to DSC-31-40-60-10 FWS ATQC DATABASE REJECTED*
- If the OCED database is not compatible with the FWS standard, the ECAM alert FWS AIRLINE CUSTOMIZATION REJECTED is triggered on ground only at electrical power-up. For more information on this alert *Refer to PRO-ABN-ECAM-10-31-165 FWS AIRLINE CUSTOMIZATION REJECTED* .

FWS Databases**ECAM CONTROL PANEL (ECP)**

The ECAM Control Panel (ECP) enables the flight crew to:

- Select and interface with the procedures and checklists displayed on the EWD
- Select the system display pages
- Control the video system.

Refer to DSC-31-40-20-AAA ECAM Control Panel .

ATTENTION-GETTERS

There are two attention-getters on the glareshield of each flight crew member's station: One MASTER WARN light , and one MASTER CAUT light , depending on the severity of the failure. These attention-getters inform the flight crew of an alert.

When pressed, the lights go off and the associated aural warnings stop.

MASTER WARN flashes in the case of emergency situations (e.g. emergency procedure displayed on the EWD).

MASTER CAUT lights up in the case of abnormal situations (e.g. abnormal procedure displayed on the EWD).

Note: In the case of multiple failures, both *MASTER WARN* lights and *MASTER CAUT* lights may come on at the same time.

Refer to *ECAM - Glareshields Controls*.

LOUDSPEAKERS

There are four loudspeakers in the cockpit: Two on the left, and two on the right side of the cockpit.

The loudspeakers can emit audio indicators, including synthetic voice messages.

- Note:***
1. The volume control knobs of the loudspeakers cannot adjust the volume of FWS audio indicators. These knobs can only adjust the volume of radio communication broadcasts.
 2. The ECAM controls the emission of aural indicators by managing priorities.

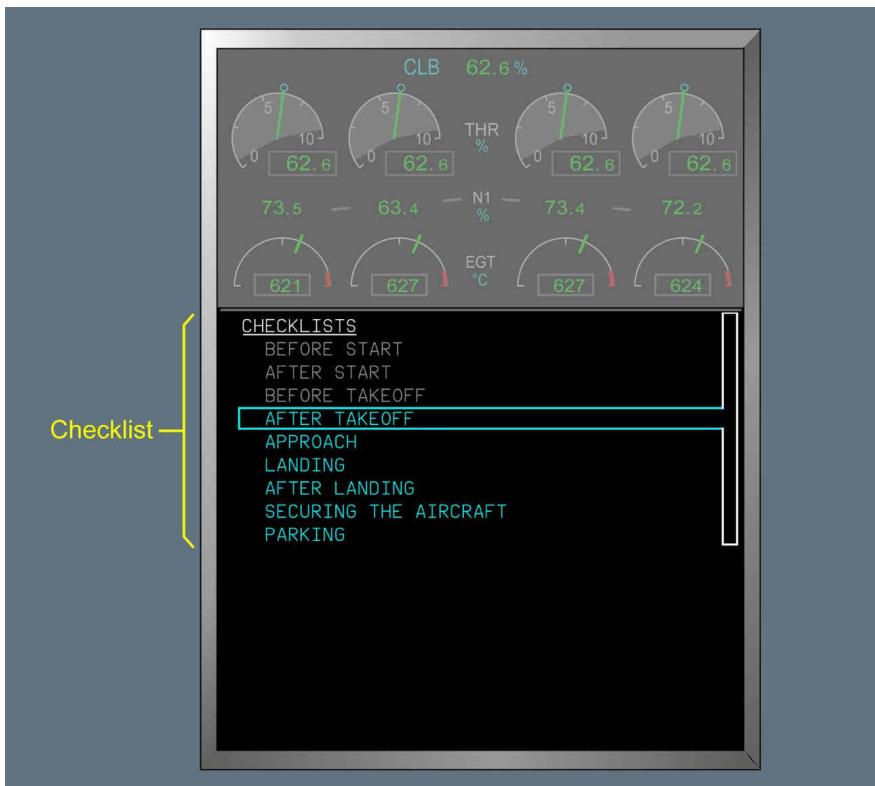
DISPLAY UNITS

The ECAM displays information on the Display Units:

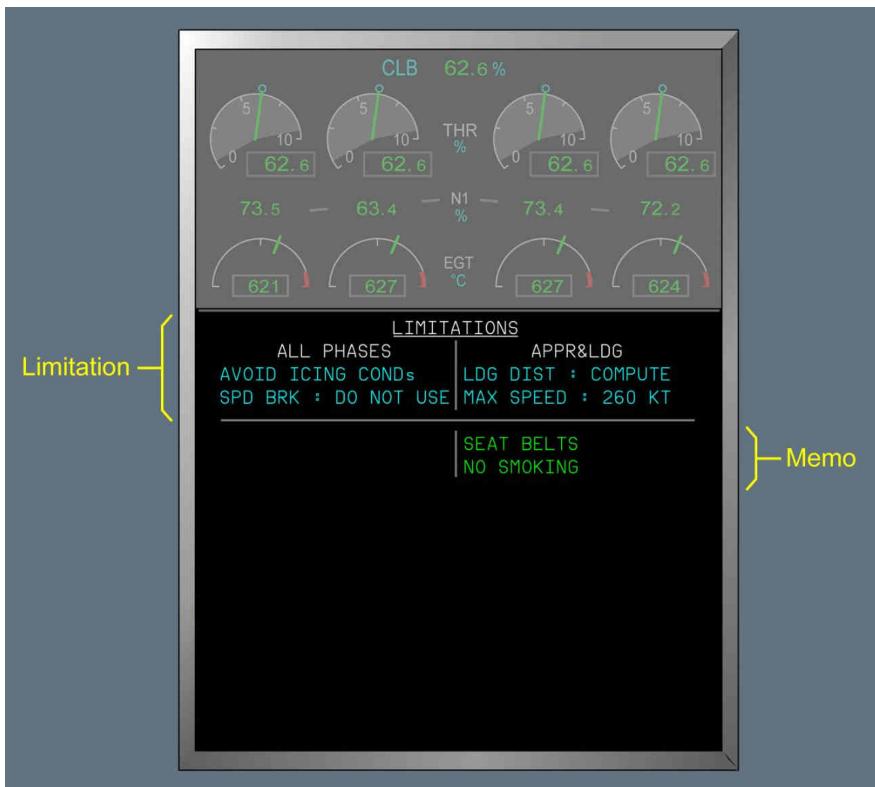
- Engine and Warning Display (EWD)
- System Display (SD)
- Lower part of the Primary Flight Display (PFD).

EW

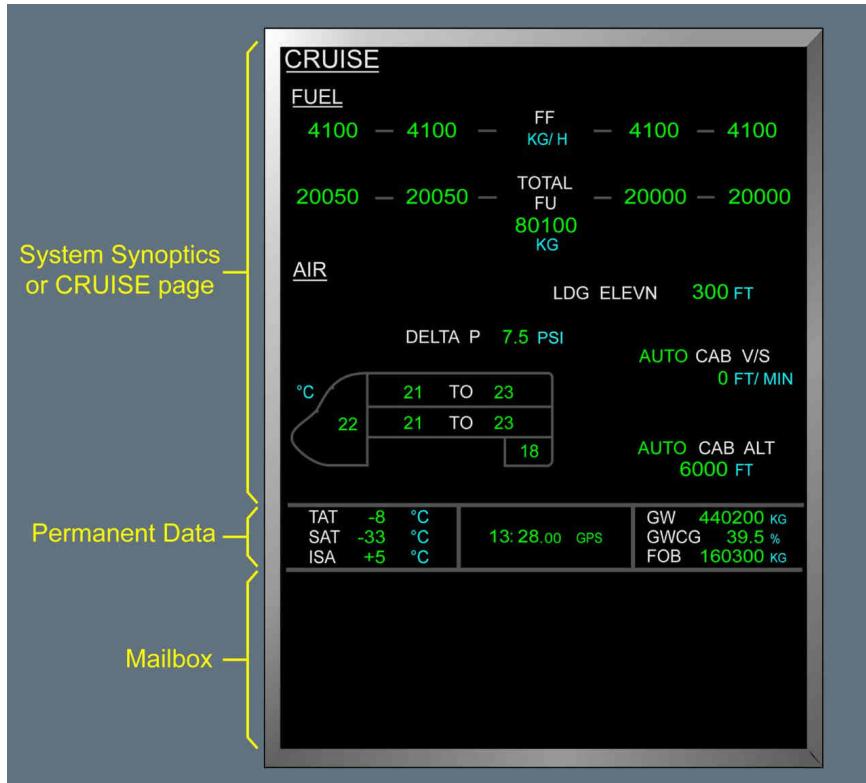
The EWD displays alerts, not-sensed procedures, memos, and checklists. Refer to *ECAM Display on the EWD*.

Checklist Display on the EWD

Alert Display on the EWD

Memo and Limitation Display on the EWD**SD**

The SD displays aircraft status, STATUS pages, and system pages. Refer to *ECAM Display on the SD*.

ECAM Display on the SD — GENERAL**PFD**

The lower part of the PFD displays memos (*Refer to DSC-31-40-10 Memos*) and limitations (*Refer to DSC-31-40-10 Limitations*).

ECAM on the PFD — GeneralECAM COLOR CODES

Applicable to: ALL

The ECAM displays information in various colors. Each color indicates the importance of the displayed information, or of the failure.

- RED**
- For configurations, or failures, that require immediate action.
 - For specific limitations (e.g. LAND ASAP), or specific memo items (e.g. AP OFF).

- | | |
|---------|--|
| AMBER | - For configurations, or failures, that the flight crew should be aware of, but that do not require immediate action. However, when time and situations permit, these cautions should be considered without delay, to prevent any further degradation of the affected system or of any other related system. |
| GREEN | - For specific limitations (e.g. LAND ANSA), or specific memo items (e.g. A/THR OFF). |
| WHITE | - For information in the procedure, or in the STATUS page. - For checklist items completed by the flight crew. - For memo items. - For a procedure completed by the flight crew. - For submenus, condition lines, and titles. - For more information item on the STATUS MORE page. - For a completed deferred procedure title in the checklist menu. |
| BLUE | - For actions to be completed, limitations to be followed, checklist items to be checked, or for not completed checklists in the checklist menu. |
| MAGENTA | - For a specific memo (e.g. TO or LDG inhibition). |
| GREY | - For checklists completed by the flight crew. - For an action not yet validated by the flight crew (e.g. condition items or a not-sensed procedure that are not activated). |

ALERT TYPES AND LEVELS

Applicable to: ALL

ALERT

Alert : An alert is a visual, or aural, signal that helps the flight crew to detect and identify a system fault, the abnormal operation of a system, or a degraded condition of the aircraft.

ALERT LEVELS

The ECAM receives information from aircraft systems, computes alerts (warnings, and cautions) in real time, and displays or sounds these alerts in the cockpit. These alerts are organized, according to their level of importance, and the priority of required actions.



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ECAM - SYSTEM DESCRIPTION

| Alert Level | Color | Description | Aural Signals | Visual Signals |
|----------------------|-------|--|---|---|
| Warning (Level 3) | Red | For an emergency situation, that requires immediate flight crew action, because: <ul style="list-style-type: none"> - The aircraft is in a dangerous configuration, or in a limiting flight condition - Failure of a system that impacts the safety of the flight | Continuous Repetitive Chime (CRC), or a specific sound, or a synthetic voice. | <ul style="list-style-type: none"> - MASTER WARN light, and/or specific local red light. - Red warning displayed on EWD. - Applicable system page automatically displayed on SD, if any. |
| Caution (Level 2) | Amber | For an abnormal situation, that the flight crew should be aware of, but that does not require immediate action, because the failure does not immediately impact the flight. However, when time and situations permit, these cautions should be considered without delay, to prevent any further degradation of the affected system, or of any other associated system. | Single Chime (SC) | <ul style="list-style-type: none"> - Steady MASTER CAUT light. - Amber caution displayed on EWD. - Applicable system page automatically displayed on SD, if any. |
| Caution (Level 1) | Amber | For a situation that requires the flight crew to be informed (crew awareness), but does not require a flight crew action (e.g. redundancy loss, or system degradation). | None | Amber caution message displayed on EWD without a procedure. |

PRIORITY OF ALERTS

There are three levels of priority associated with warnings and cautions:

- Warnings (level 3)
- Caution (level 2)
- Caution (level 1).

Level 3 warnings have priority over level 2 cautions, that have priority over the level 1 cautions. In addition, if the ECAM detects multiple alerts that have the same level, it displays these alerts in their descending order of priority. In all cases, the ECAM will first display the alert that has the highest priority, and that should be treated first.

ALERT TYPES

There are three different types of alerts. They are classified by their potential impact on other systems.

| Alert Type | ECAM Display | Description |
|-------------|---|--|
| Independent | <u>Independent Alert</u> F/CTL PRIM 1 FAULT | For a failure that affects an isolated system, but does not degrade other aircraft systems. |
| Primary | <u>Primary Failure</u> HYD G SYS PRESS LO | For a failure that affects a system, and causes the loss of other systems, or other system equipments. |
| Secondary | <u>Secondary Alert</u> *F/CTL | For the loss of a system, or a system reconfiguration , or a system limitation, that is the result of a primary failure. Affected parts of the failed system are indicated on the associated SD page. |

ECAM FLIGHT PHASES**Applicable to: ALL**

The ECAM defines the flight phases for each flight.

- Each flight is divided into 12 flight phases. Flight phases change according to the aircraft configuration and system input.

Flight Phase Inhibition

- The ECAM uses flight phases to improve overall operational efficiency during each flight:

- During high workload phases, e.g. takeoff and landing, the ECAM inhibits warnings and cautions that can be delayed to a more appropriate time. This is also referred to as flight phase inhibition
- The ECAM displays the system page that corresponds to the current flight phase, unless there is an aircraft system failure
- The ECAM displays the applicable takeoff and landing memos.

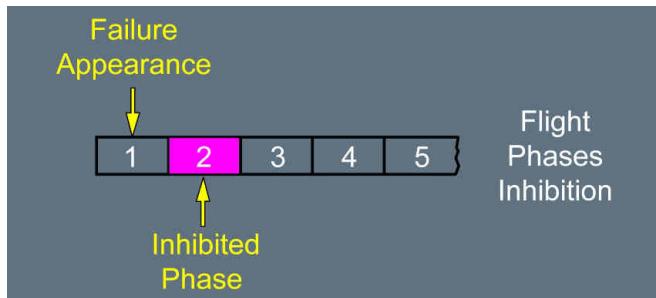
- L2 Note:**
1. These ECAM flight phases are different and independent from the ones used by the FMS.
 2. They are also different from the flight phases in the checklist menu.
 3. In flight phase 7, if the thrust is reduced (thrust levers at CL), the flight phase changes from 7 to 9. When the aircraft crosses 1 500 ft, the flight phase will then change from 9 to 8.

L1 FLIGHT PHASE INHIBITION

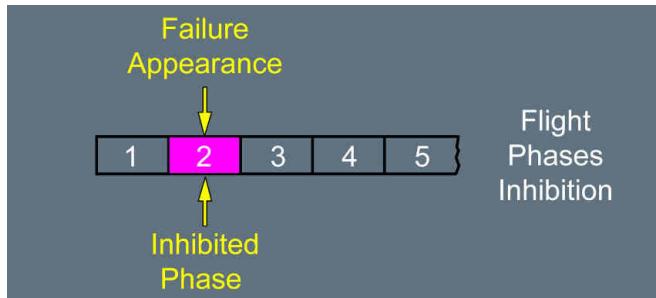
When the ECAM detects a failure, an applicable alert is either triggered immediately, or delayed to a more appropriate time.

Flight phase inhibition is defined for each system fault.

- L2 Note:** The annunciation sections of the FCOM procedures indicate the flight phases that are inhibited for each system fault.



The failure occurs during phase 1: The EWD immediately displays the alert, and continues to display it, as long as the failure is present (even if the next phase is inhibited).



The failure occurs during phase 2: The ECAM inhibits the alert. The EWD only displays the alert, when the aircraft exits phase 2.

AUDIO INDICATORS**Applicable to: ALL**

The FWS generates audio indicators:

- Sounds, such as Single Chime (SC) or Continuous Repetitive Chime (CRC)
- Synthetic voice messages
- Auto callouts.

For more information about the audio indicators generated by the FWS , *Refer to DSC-31-40-20 FWS Audio Indicators .*

Other systems generate aural alerts:

- TAWS , *Refer to DSC-34-20-60-130-GAURA TAWS Aural Alerts*
- WXR , *Refer to DSC-34-20-60-130-GAURA WXR Aural Alerts*
- TCAS , *Refer to DSC-34-20-60-130-GAURA TCAS Aural Alerts .*

ECAM DISPLAY ON EWD**Applicable to: ALL**

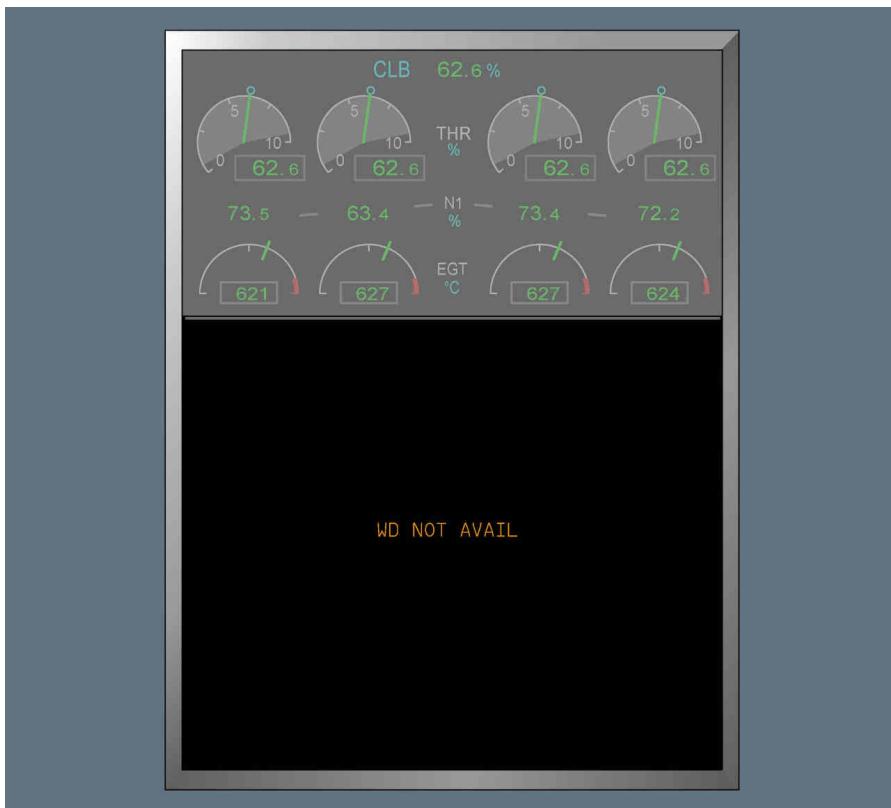
The EWD screen has two horizontal sections:

- The top section displays the engine parameters of the four engines
- The bottom section, called Warning Display (WD), displays either the:
 - Checklist menus and items, requested by the flight crew, or
 - Alerts, or
 - Not—Sensed Procedures and associated menus, requested by the flight crew, or
 - Memos and limitations, if any.

An advisory () indication may also appear, when a monitored parameter deviates from its defined operational range.

WD NOT AVAILABLE

The WD DISPLAY NOT AVAIL message appears when the WD can no longer display ECAM.

WD NOT AVAIL

- The CDS displays this message, in case of a communication failure between the FWS and the display unit of the WD.

CHECKLIST (C/L)

Applicable to: ALL

A checklist (C/L) is a reminder of normal operation items, and should be performed in a specific flight phase in accordance with the Standard Operating Procedures (SOP). At any time during the flight, the flight crew can access, and display a checklist on the EWD .

CHECKLIST MENU

The checklist menu lists all checklists by flight phase.

Checklists are:

- In blue , when they have not been completed by the flight crew
- In grey , when they have been completed by the flight crew.

The C/L Menu

The checklist menu:



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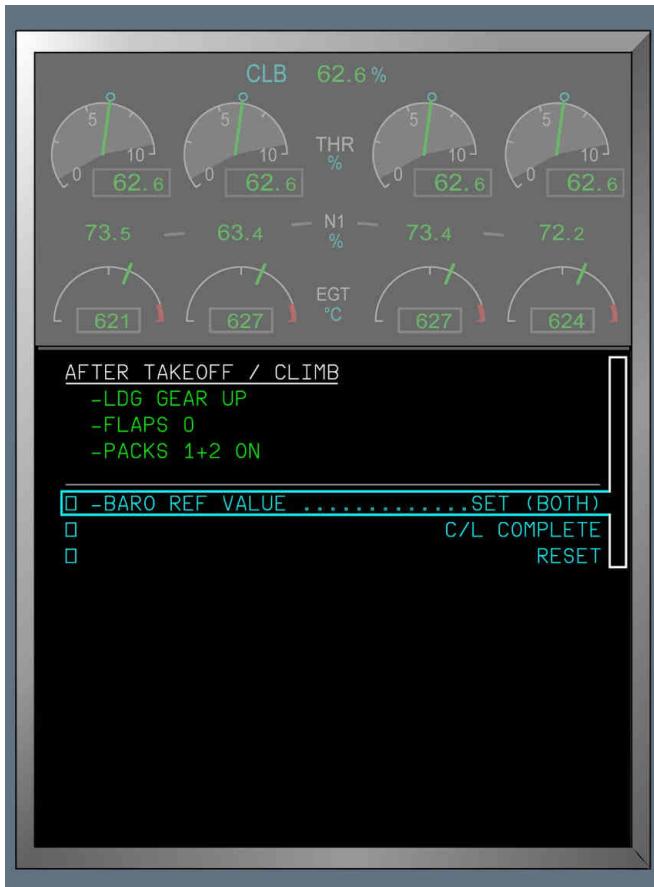
31 - INDICATING/RECORDING

ECAM - SYSTEM DESCRIPTION

- Can be manually requested by flight crew, as required (Refer to DSC-31-40-40 How to Handle the Checklists)
 - Automatically appears, if there is an active deferred procedure, when all alerts are cleared from the EWD
 - Automatically appears during approach, if there is an active deferred procedure.
- L2** The automatic display occurs during approach, when the slats are extended, or a barometric pressure altitude is selected.
- L3** The approach condition is activated, when the aircraft is below 20 000 ft .

ECAM BLUE BOX

A blue box appears below the last completed checklist, and surrounds the title of the next applicable checklist.

CHECKLISTSample C/L**CHECKLIST TITLE**

When the flight crew selects a checklist, the checklist title appears on the first line.

ECAM BLUE BOX

A blue box surrounds the applicable checklist item. When the flight crew validates or completes the checklist item, the next applicable checklist item is automatically surrounded by a blue box.



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ECAM - SYSTEM DESCRIPTION

CHECKLIST ITEM LINE - SENSED BY ECAM

The item lines of the checklist appear:

- In blue , when the action is not completed by the flight crew

Action Line-Not Completed

-PACKS 1+2 ON

- In green , when the action is completed by the flight crew

Action Line — Completed

-PACKS 1+2 ON

CHECKLIST ITEM LINE - NOT- SENSED BY ECAM

A square appears before the item lines of the checklist :

- In blue , when the action is not completed by the flight crew

Action Line, Not-Sensed — Not Completed

-BARO REF VALUE SET (BOTH)

- In green , when the action is completed by the flight crew.

Action line, Not-Sensed — Completed

-BARO REF VALUE SET

CHECKLIST COMPLETE LINE INDICATION

A C/L COMPLETE line is displayed below the last item of the checklist.

The flight crew completes this line, when the checklist is completed.

When the C/L COMPLETE line is completed, the items of the checklist become grey , and the corresponding checklist in the checklist menu also becomes grey .

Note: The flight crew can validate C/L COMPLETE line , and consider the checklist completed, even if they voluntarily did not validate some checklist items. This may be the case after a system failure that prevents the completion of some checklist items.

Checklist Complete**CHECKLIST RESET LINE INDICATION**

The RESET line is the last item of the checklist.

If flight crew validates the RESET line, the checklist resets automatically. When reset, any checklist items that were not-sensed by the ECAM are no longer validated and any checklist items that were previously sensed by the ECAM remain validated.

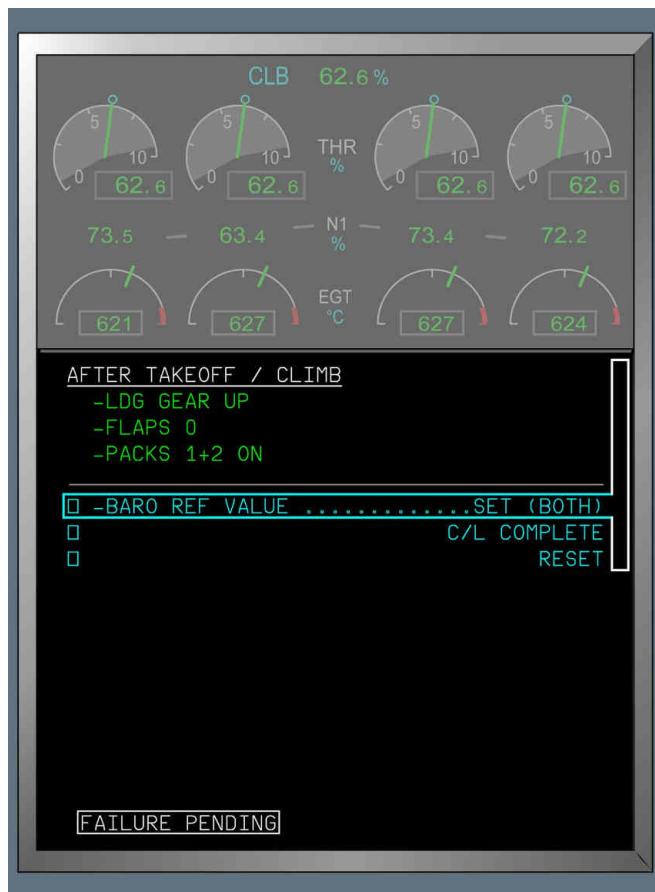
Note: *The flight crew can also reopen a previously completed checklist, and reset it via the RESET line.*

Note: *An automatic checklist reset can also occur in some conditions. For more information on automatic reset of a checklist, Refer to DSC-31-40-40 How to Handle the Checklists .*

FAILURE PENDING INDICATION

If flight crew displays the checklist menu or a checklist when a procedure (sensed or a not-sensed) is displayed, **FAILURE PENDING** reminder is displayed.

When the checklist menu or the checklist is cleared, the procedure reappears on the EWD .

C/L Open with an Alert Not Cleared

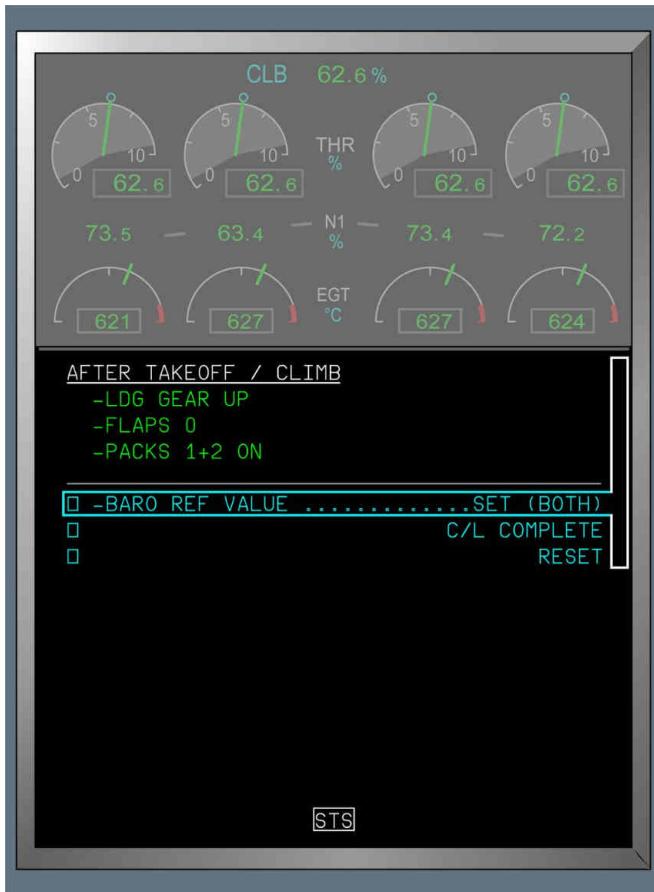
If flight crew displays the checklist menu or a checklist when an alert is triggered, the EWD displays the alert.

When the flight crew clears the procedure, the checklist menu or checklist reappears on the EWD .

STS**INDICATION**

Appears on the checklist when all of the following apply:

- The STATUS page is not empty.
- The STATUS page is not displayed on the SD .

C/L Open with STATUS Page Not Empty



A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

ECAM - SYSTEM DESCRIPTION

ECAM PROCEDURE TYPES

Applicable to: ALL

The EWD displays the following ECAM procedures below the permanent engine parameters section:

- Sensed Procedures : Sensed Procedures are abnormal/emergency procedures (also referred to as alert) that are automatically displayed by the ECAM .
- Not-Sensed Procedures : Not-Sensed Procedures are abnormal/emergency procedures (also referred to as not-sensed ABN PROC) that are manually requested by flight crew by pressing the ABN PROC pb on the ECP (for more details Refer to DSC-31-40-50 How to Activate a Not-Sensed ABN PROC).

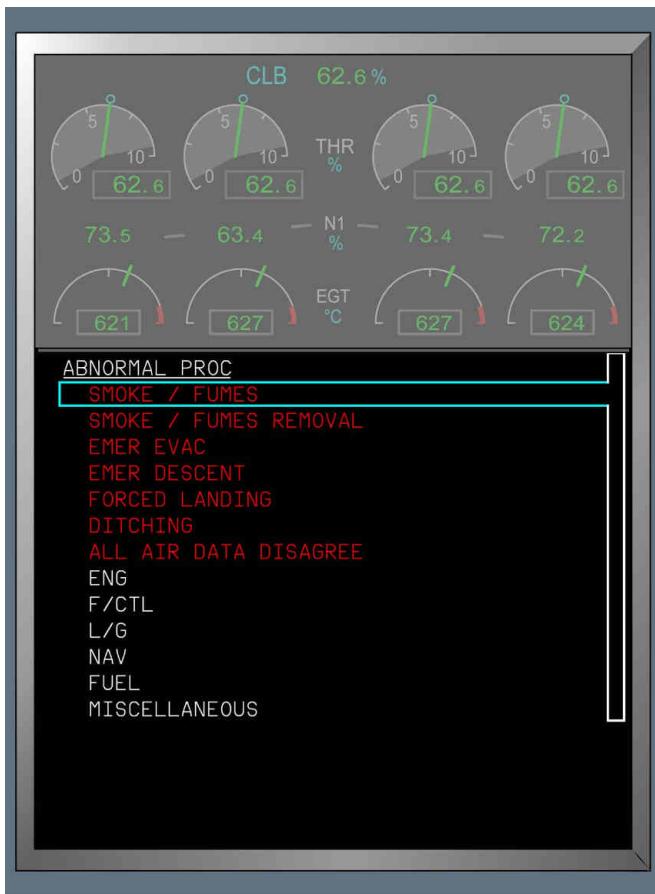
NOT-SENSED ABN PROC

NOT-SENSED ABN PROC MENU

The not-sensed ABN PROC menu has the following two parts:

- The first provides the procedures that require the flight crew immediate access. These procedures are usually red procedures (warnings).
- The second displays the system submenus that enable the flight crew to access other abnormal procedures (cautions). These submenus appears in white.

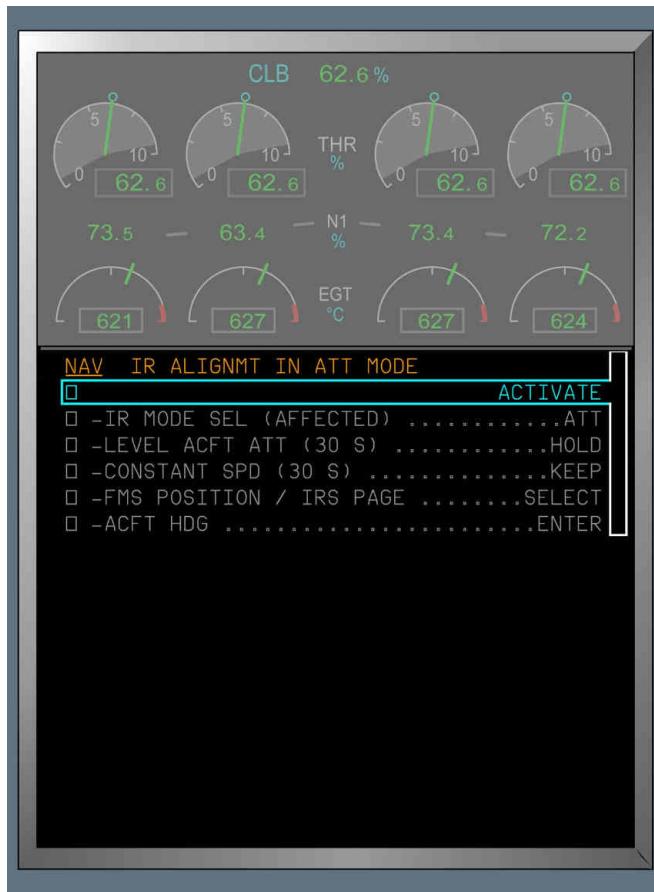
Note: When the flight crew selects a not-sensed ABN PROC , there is neither an attention-getter, nor an aural alert.

Not-Sensed ABN PROC Menu**ACTIVATE A NOT-SENSED ABN PROC**

When flight crew selects a not-sensed ABN PROC , the ACTIVATE line is the first line of the procedure. Until a not-sensed ABN PROC is activated, all the other lines of the procedure are in grey . (Refer to DSC-31-40-50 How to Activate a Not-Sensed ABN PROC)

If the EWD cannot display the not-sensed procedures on a single page, the flight crew must validate the procedure to access to the lines that are not visible. Refer to DSC-31-40-10 Overflow Indication .

If aircraft limitations, memos and/or deferred procedures are associated to a not-sensed ABN PROC , they will become applicable after the flight crew manually activates the procedure.

Not-Sensed ABN PROC Sample

When the flight crew validates the ACTIVATE line, the procedure is activated, and the lines of the procedure appear in their applicable colors.

Not-Sensed ABN PROC Activated**DEACTIVATION OF A NOT-SENSED ABN PROC**Automatic

An **ACTIVE** not-sensed ABN PROC is automatically deactivated at engine shutdown or at aircraft electrical power-up.

[2]

A not-sensed ABN PROC is automatically deactivated 15 minutes after the last engine shutdown, or 10 minutes after aircraft electrical power-up.



A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

ECAM - SYSTEM DESCRIPTION

L1

Manual

When an **ACTIVE** not-sensed ABN PROC is no longer applicable (e.g. no more turbulence), it may be necessary to deactivate it, in order to remove any aircraft limitations, memos and deferred procedures associated with the procedure.

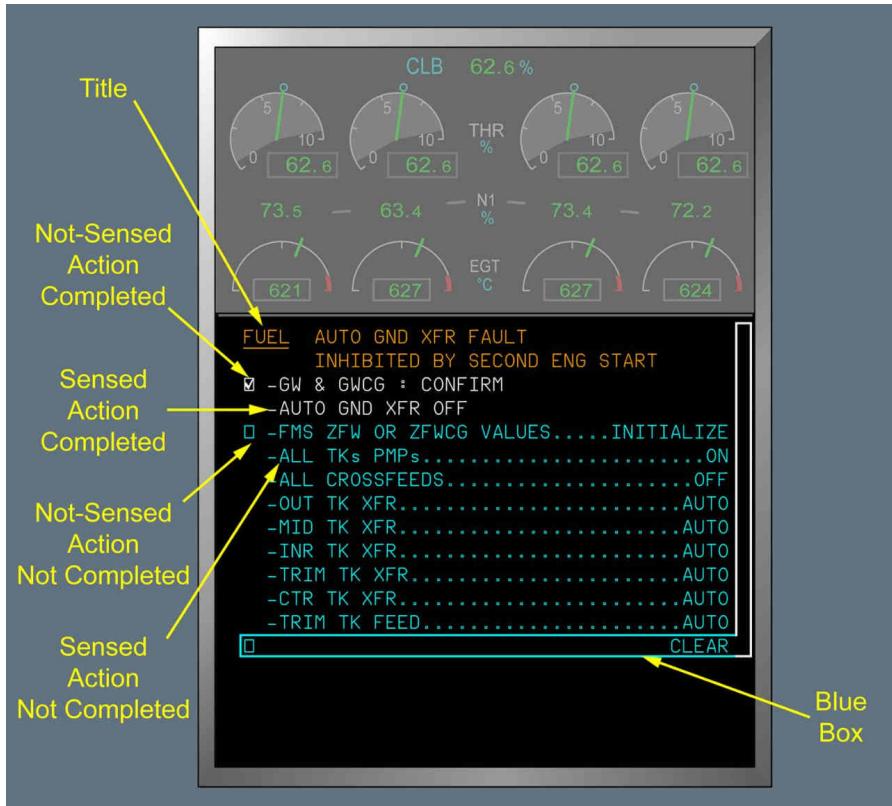
Some **ACTIVE** not-sensed ABN PROC are no longer applicable after the flight crew complete the procedure (e.g. ENG RELIGHT IN FLT). In such case, the flight crew must manually deactivate the not-sensed ABN PROC in order to remove any aircraft imitations, memos and deferred procedures associated with the procedure.

The flight crew can deactivate a not-sensed ABN PROC by deselecting the ACTIVATE line that appears on the first line of the procedure. (*Refer to DSC-31-40-50 How to Deactivate a Not-Sensed ABN PROC*)

PROCEDURE DESCRIPTION

Applicable to: ALL

PROCEDURE DESCRIPTION

SAMPLE ECAM PROCEDURE

ECAM PROCEDURE TITLE

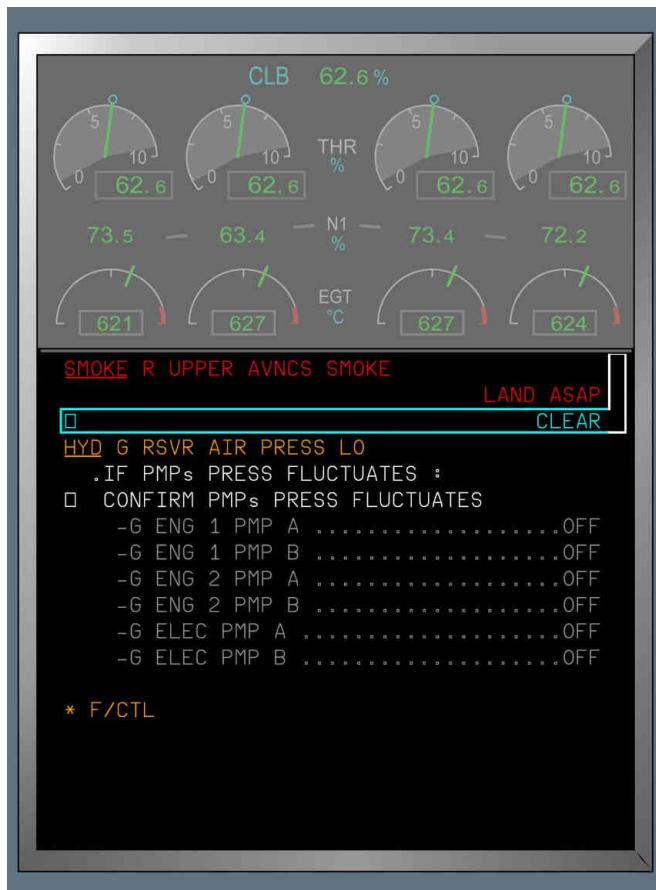
When an alert or a not-sensed ABN PROC is displayed, the title of the ECAM procedure appears on the first line, in:

- Red , for warnings
- Amber , for cautions.

Multiple ECAM Procedures

The EWD may display more than one ECAM procedure at a time. The number of procedure displayed is limited by the size of the screen.

The ECAM procedures appear in decreasing order of importance.

Multiple ECAM Procedures**LAND ASAP / LAND ANSA**

In some failure cases, the ECAM may recommend landing at the next suitable airport.

In such cases, it will indicate, below the title:

- LAND ASAP (As Soon As Possible) , land as soon as possible at the nearest suitable airport at which a safe approach and landing can be made.
- LAND ANSA (At Nearest Suitable Airport) , advice to the flight crew to consider landing at the nearest suitable airport.

ECAM BLUE BOX

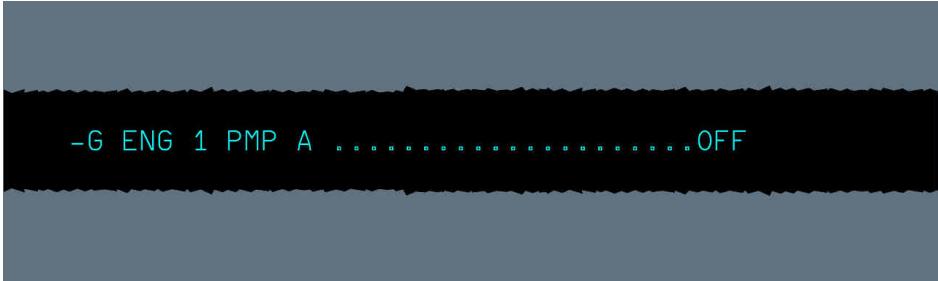
A blue box surrounds the applicable procedure line. When the flight crew validates or completes the procedures lines, the next applicable procedure line is automatically surrounded by the blue box.

ACTION LINE SENSED BY THE ECAM

The ECAM procedures have action lines that can be sensed by ECAM , and they appear as follows:

- When the action is not completed, the action line is in blue .

Action Line - Not Completed



-G ENG 1 PMP A OFF

- When the action is completed, the format of the action line changes, and appears in white .

Action Line - Completed

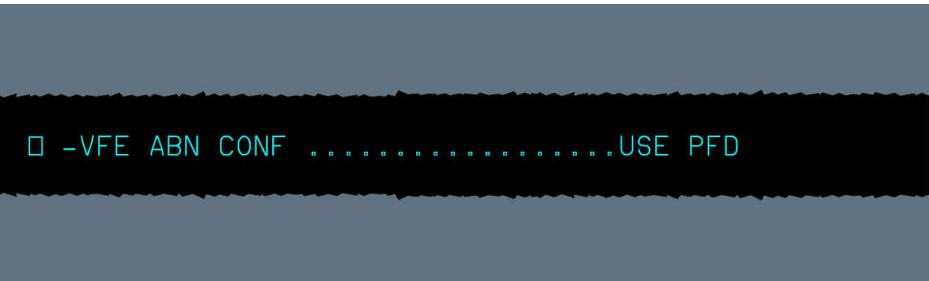


-G ENG 1 PMP A OFF

ACTION LINE NOT-SENSED BY THE ECAM

Some ECAM procedures have action lines that cannot be detected by the ECAM . A square appears before these action lines:

- When the action is not completed, the action line is in blue .

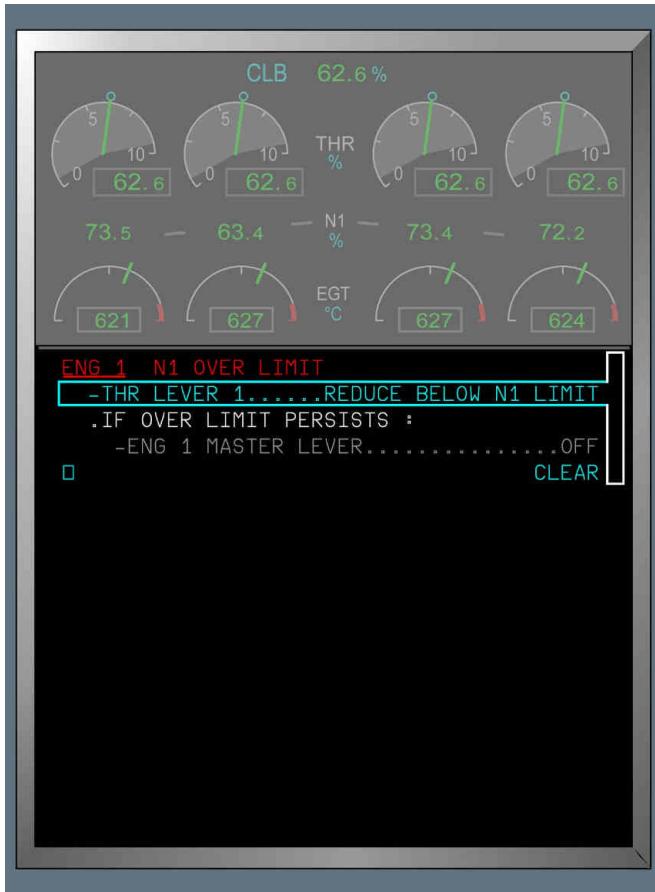
Action Line Not Completed

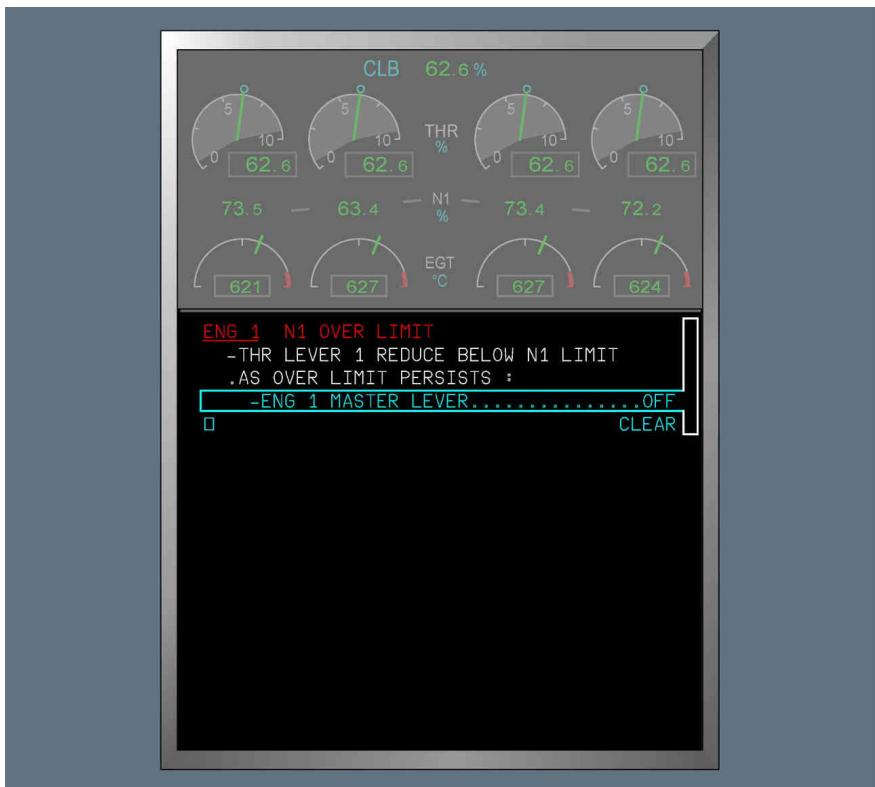
- When the action is completed, and validated by the flight crew, the format of the action line changes, and appears in white .

Action Line Completed**CONDITION SENSED BY THE ECAM**

A condition that is sensed by the ECAM appears in white .

All subsequent actions lines appears in their applicable color, when the condition is true. If the condition is not true, all subsequent and applicable action lines appear in grey .

Condition Sensed by the ECAM : Not Completed

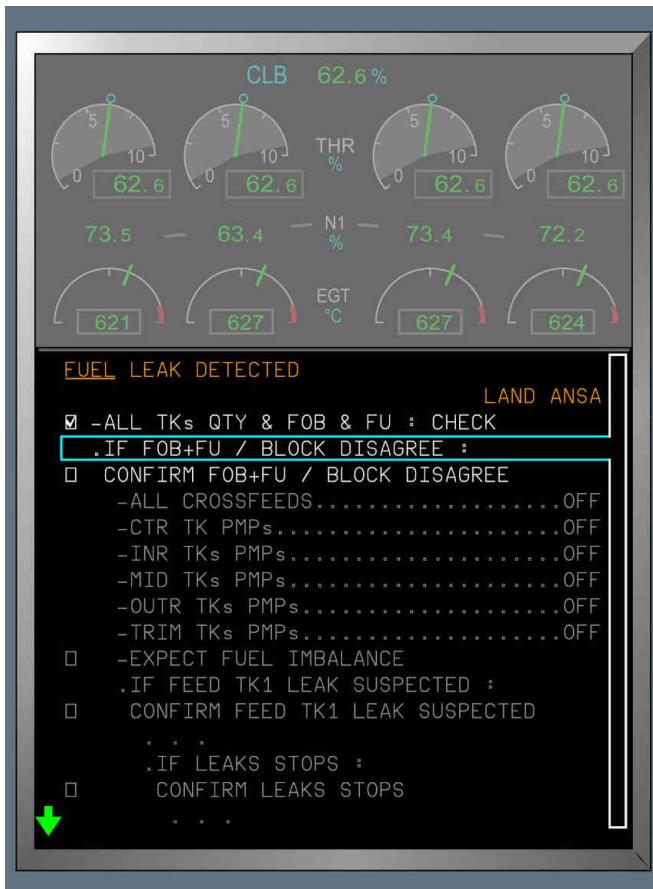
Condition Sensed by the ECAM : Completed

CONDITION NOT-SENSED BY THE ECAM

- Condition not-sensed by the ECAM that requires the flight crew to confirm a condition appears in white. All subsequent and applicable action lines appear in grey or may be replaced by until the flight confirms the condition.

When the flight crew confirms the condition, all subsequent action lines appear in their applicable color.

Condition Not-Sensed by the ECAM : Not Confirmed by the Flight Crew

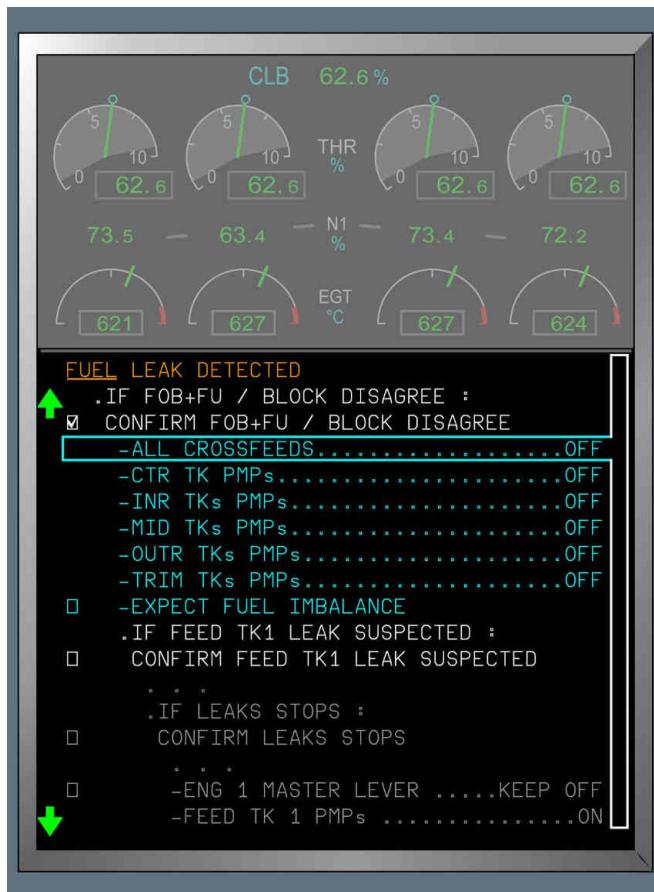


For long procedures containing conditions that requires the flight crew to perform a choice in between conditions, the actions lines linked to the conditions are not displayed to improve the

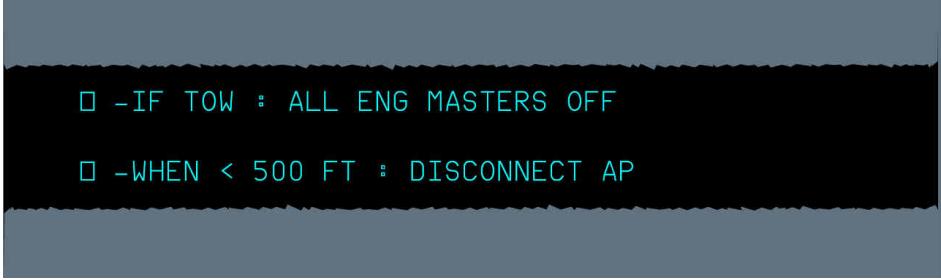
readability. In that case actions lines are replaced by [REDACTED].

When the flight crew confirms the condition, the actions lines appear in their applicable color, instead of the [REDACTED].

Condition Not-Sensed by the ECAM : Confirmed



- Condition not-sensed by the ECAM that do not have a **CONFIRM** line appears in blue. The action linked to the condition is displayed on the same line, after the condition.

Condition Not-Sensed by the ECAM : Without Confirm Line

□ -IF TOW : ALL ENG MASTERS OFF

□ -WHEN < 500 FT : DISCONNECT AP

"PROC APPLY" OR "PROC CONSIDER" ACTION LINE

Some ECAM alerts contain an action line to request the flight crew to refer to an other procedure.

The action line displayed on the ECAM appears differently:

- Name of the not-sensed ABN PROC.....APPLY

The flight crew stops the current ECAM procedure and immediately apply the referred not-sensed ABN PROC . The flight crew will finish the current ECAM procedure once the flight crew has performed the not-sensed ABN PROC .

To perform the action line, the flight crew will display the not-sensed ABN PROC menu to select, and to perform the applicable procedure (*Refer to DSC-31-40-50 How to Activate a Not-Sensed ABN PROC*).

- Name of the not-sensed ABN PROC.....CONSIDER

The flight crew should consider application of the not-sensed ABN PROC depending on circumstances (e.g. remaining flight time, flight conditions, or when time permit after the accomplishment of the current ECAM procedure). The flight crew can acknowledge the action line without performing immediately the not-sensed ABN PROC .

- [QRH] name of the procedure.....APPLY

The flight crew stops the current ECAM procedure and immediately apply the paper procedure in the Quick Reference Handbook (QRH). The flight crew will finish the current ECAM procedure once the flight crew has completed the paper procedure.

Refer to PROC Action Line Sample

- LDG WITH ABNORM L/G PROCAPPLY
- ENG 1 RELIGHT PROCCONSIDER
- [QRH] SMOKE/FUMES PROCAPPLY

INFORMATION BETWEEN BRACKETS IN THE ACTION LINE

Some ECAM procedures have action lines with information between brackets.

Information between brackets indicates:

- The associated MFD page to perform the ECAM action, in order to guide the flight crew towards the applicable cockpit interface (e.g the interface is not frequently used by the flight crew, or when there are several cockpit interfaces dealing with the same functions), or
- That the procedure of the ECAM action is part of the Quick Reference Handbook (QRH).

Information in Brackets Sample

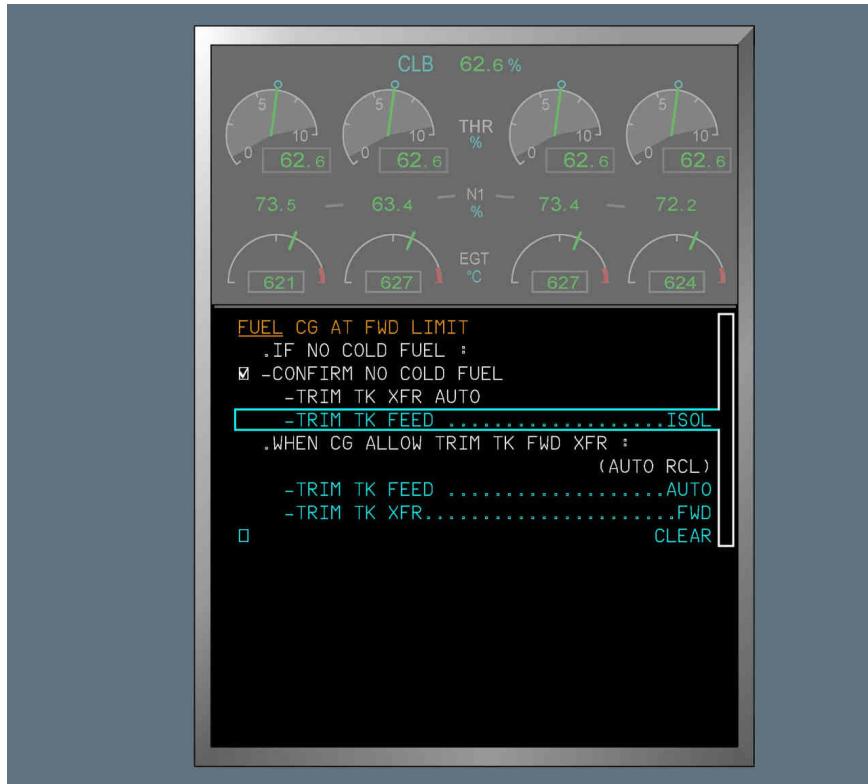
- [MFD SURV] GPWS FLAP MODE.....OFF
- [QRH] SMOKE/FUMES PROC.....APPLY

In the above example, the flight crew must set the GPWS FLAP MODE to OFF on the MFD SURV page, or the flight crew must use the paper procedure in the QRH .

AUTO RECALL (AUTO RCL) INDICATION AND FUNCTION

An **(AUTO RCL)** indication next to a condition line of an ECAM procedure indicates that the procedure will automatically reappears when the applicable condition is met. After the flight crew performs all applicable actions, the flight can clear the procedure. When the condition becomes applicable, the ECAM will automatically displays again the procedure to remind the flight crew to complete the relevant action steps.

The ECAM uses the **(AUTO RCL)** function for all actions that may take a long time to perform.

(AUTO RCL) Indication


The following is a list of procedures, that use the AUTO RECALL function:

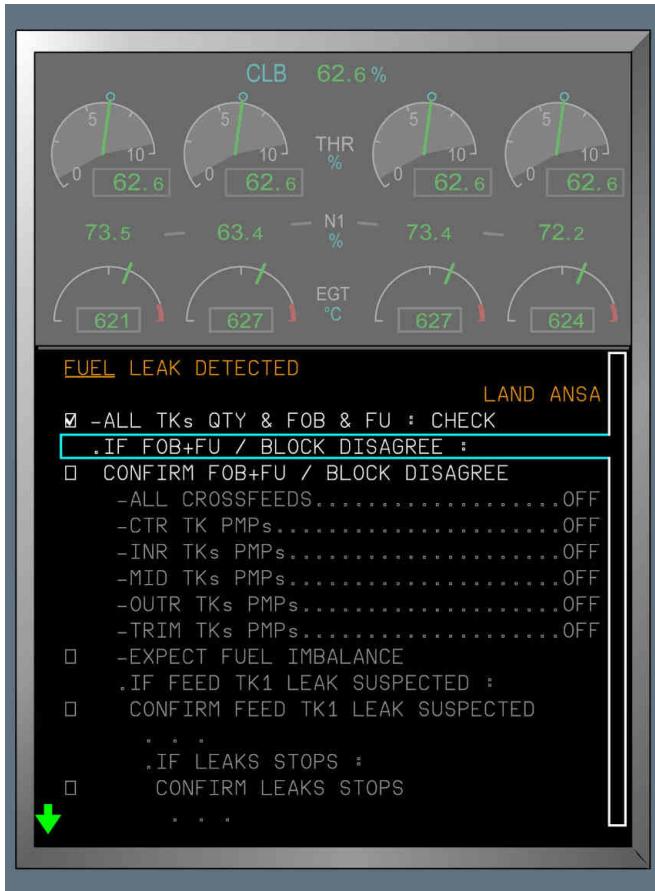
- FUEL PREDICTED CG OUT OF RANGE (*Refer to procedure*)
- FUEL NORM XFR FAULT (*Refer to procedure*)
- FUEL MAN XFR PROCEDURE (*Refer to procedure*)
- FUEL CG AT FWD LIMIT (*Refer to procedure*)
- AVIONICS NETWORK ALL SWITCHES FAULT (*Refer to procedure*)
- FUEL JETTISON (*Refer to procedure*)
- AIR PACK 1(2) REGUL FAULT (*Refer to procedure*).

OVERFLOW INDICATION**Applicable to: ALL**

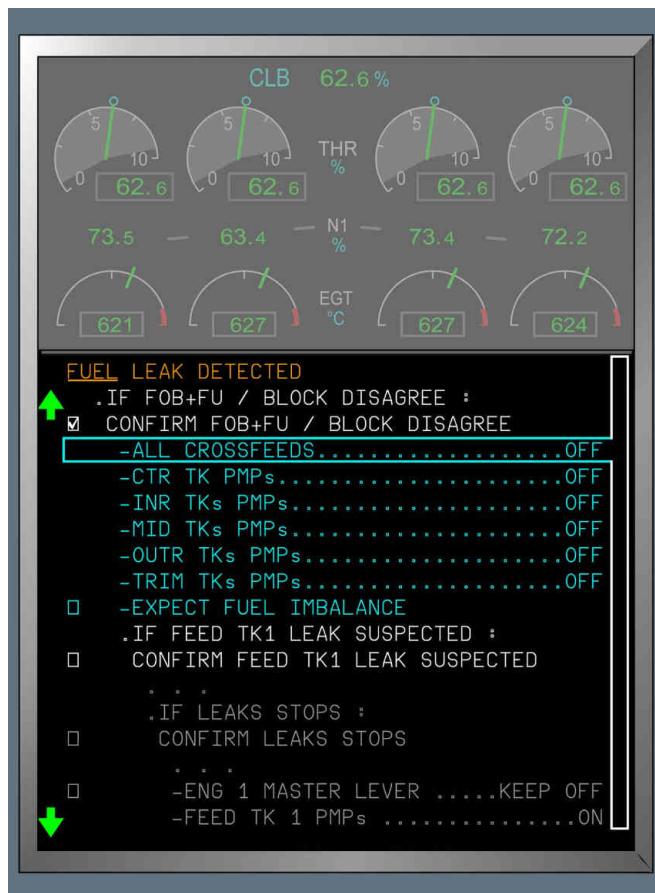
When an alert, a not-sensed ABN PROC, or a checklist contains many item lines, or when several alerts occur simultaneously, the EWD may not be able to display all lines at the same time. In such cases, a down-arrow symbol appears at the bottom left of the screen to indicate that the procedure continues below the current display.

The down-arrow symbol appears on the ECAM:

- In green () , or
- In grey () , until the flight crew validates the not-sensed ABN PROC.

Down-Arrow Symbol

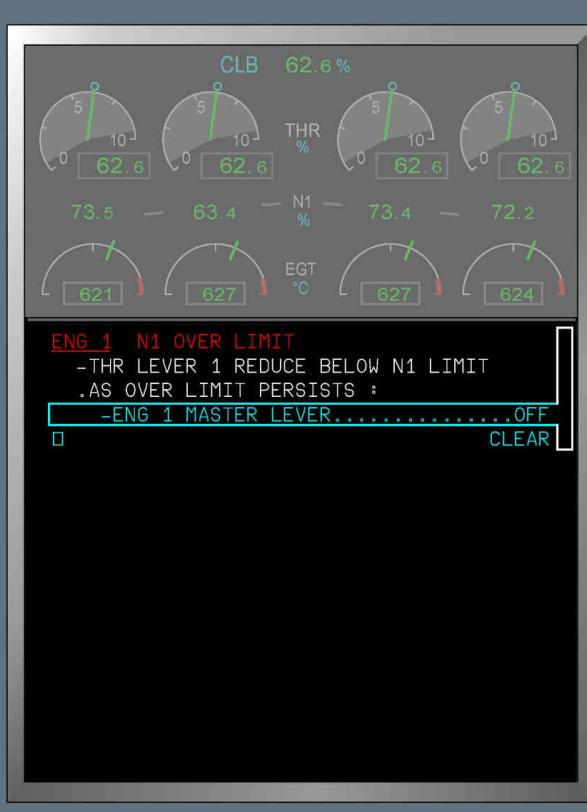
When the flight crew scrolls down, a green up-arrow symbol () appears at the top left of the procedure, below the title of the procedure, to indicate that the procedure starts above the current display. The title of the procedure always appears.

Up-Arrow Symbol

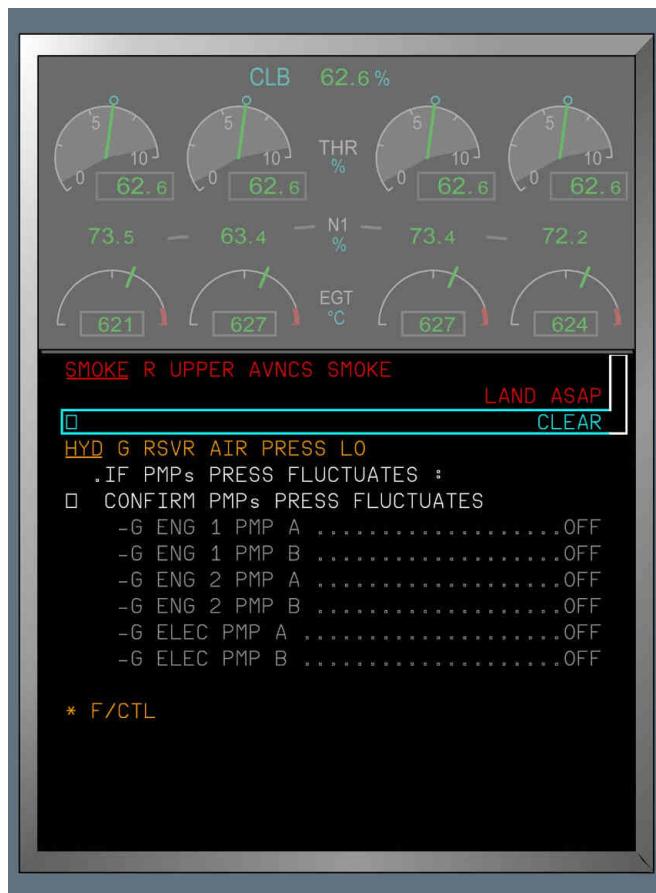
If the next selectable item of a procedure is in overflow, the EWD will automatically scroll down line by line to display the next items.

VERTICAL BAR INDICATION**Applicable to: ALL**

A vertical bar appears on the right side of the EWD or SD to indicate the items that will be cleared, when the flight crew presses the CLEAR pb on the ECP.

Condition Sensed by the ECAM: Completed

If the EWD displays multiple or secondary failures, a vertical bar appears on the right side of the screen, next to the first ECAM procedure that the flight crew should take into account. When the flight crew completes or clears the ECAM procedure, the vertical bar moves to the next procedure. The flight crew performs the procedure in decreasing order of importance.

Multiple ECAM Procedures**ADVISORY**

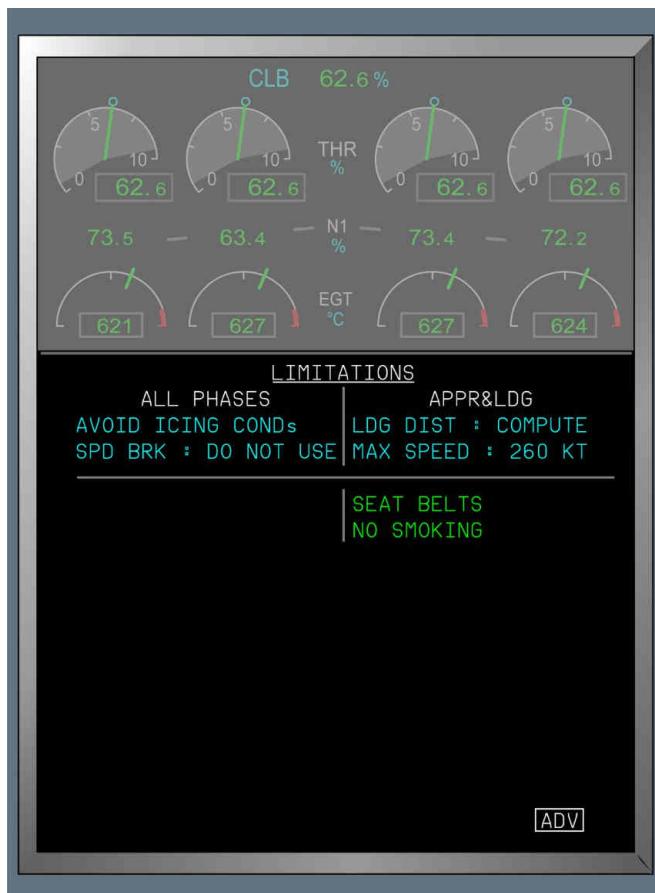
Applicable to: ALL

An advisory indicates that a monitored parameter from an aircraft system is going outside from its normal operational range but has not reached a level that would trigger an alert.

An advisory is triggered when the affected parameter pulses in green on the applicable SD page. The parameter pulses in green as long as aircraft system is outside of its normal operating range.

When there is an advisory condition for a system, the SD displays the applicable page, as follows:

- If the SD displays a flight phase page (*Refer to DSC-31-40-30 System Display Page*) : If there is an advisory condition, the SD automatically displays the associated system display page, and the associated pushbutton on the ECP comes on.
- If the SD displays a page that has been manually selected by the flight crew, the associated pushbutton on the ECP flashes until the flight crew presses it.
- If the SD displays a system display page following an ECAM alert or following a flight crew manual selection, there is no indication on the EWD and on SD until the flight crew clears the procedure or the SD displays the system pages associated to the flight phase.
- If the EWD displays memos and/or limitations, an  indication appears, and pulses at the bottom right of the screen.

ADV on the EWD**[ADV]**

The EWD no longer displays the **[ADV]** indication, when:

- The flight crew presses the associated pushbutton on the ECP , or
- The parameter, source of the advisory indication, returns to its defined operational range.

FLIGHT CREW RESPONSE TO ADVISORIES

Engines, pressurization, and APU systems have ECAM advisory conditions.

When the EWD displays an advisory, the flight crew should only monitor how the affected parameter evolves on the applicable SD page.

ENGINE

| Parameters | System Display | Conditions |
|---------------------|----------------|---|
| Oil quantity | ENG | The oil quantity dropped below 4 quarts, that corresponds to the first white dash. The needle and the digital indication pulse in green. The advisory is inhibited: <ul style="list-style-type: none">- At takeoff or go-around, or- When the reversers are selected, or- In alpha floor mode. |
| Nacelle temperature | | The nacelle temperature is above 300 °C, that corresponds to the first white dash. The needle and the digital indication pulse green. |
| Oil Temperature | | The indication pulses green when the oil temperature is above 163 °C. |
| Vibration | | The indication pulses when the rotor vibration level of N1, or N2 is above the following thresholds: <ul style="list-style-type: none">- N1 VIB, above 5 units- N2 VIB, above 5 units. |

Engine - ECAM Advisories

PRESSURIZATION

| Parameters | System Display | Conditions |
|------------|----------------|--|
| Delta P | CAB PRESS | The green needle pulses during final approach, when the differential pressure is between 1.5 PSI and 8.92 PSI. It stops pulsing, when it is less than 1 PSI. The differential pressure stops pulsing, when: <ul style="list-style-type: none">- The differential pressure is less than 1 PSI, or- The aircraft is no longer in final approach. |
| | CRUISE | The differential pressure value pulses, when: <ul style="list-style-type: none">- The differential pressure is between 1.5 PSI and 8.92 PSI- The aircraft is in final approach. |

Continued on the following page

Continued from the previous page

| | | |
|----------------|-----------|--|
| | CAB PRESS | The cabin vertical speed needle pulses in green, if: - The cabin vertical speed is above 1 800 ft/min, and below 6 350 ft/min. The needle stops pulsing, if: - The cabin vertical speed is less than 1 600 ft/min, and above -6 350 ft/min. |
| Vertical Speed | CRUISE | The cabin vertical speed arrow, and the CAB V/S indication pulse, if: - The cabin vertical speed ranges from -6 350 ft/min to -1 800 ft/min, and is less than, or equal to -1 600 ft/min for more than 5 s - The cabin vertical speed ranges from 1 800 ft/min to 6 350 ft/min, and is above, or equal to 1 600 ft/min for more than 5 s. The cabin vertical speed needle stops pulsing, when it ranges from -1 650 ft/min to 1 650 ft/min. |
| CAB ALT | CAB PRESS | The cabin altitude needle pulses in green, if: - The cabin altitude is above 8 300 ft, and below 9 550 ft. The needle stops pulsing, if: - The cabin altitude is less than 8 100 ft. |
| | CRUISE | The CAB ALT indication pulses, if the cabin altitude value ranges from 8 300 ft to 9 550 ft, for more than 5 s. The CAB ALT indication stops pulsing, when the cabin altitude is below 8 100 ft. |

Pressurization - ECAM Advisories
APU

| Parameters | System Display | Conditions |
|------------|----------------|--|
| OIL LVL LO | APU | Pulses, when the APU oil level is below 2.38 US Gal. |

APU - ECAM Advisory
LIMITATIONS
Applicable to: ALL

A limitation is an operational constraint that is applicable after a system failure.

DISPLAY OF LIMITATIONS

Limitations appear in blue on the lower part of the PFD , and/or on the EWD .

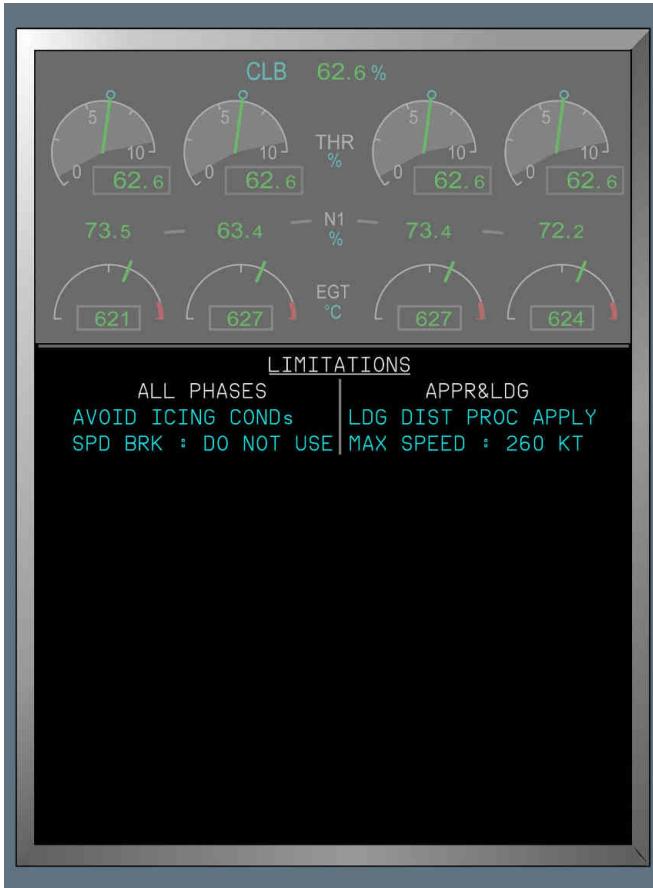
A limitation will appear on both the EWD and the PFD , when immediate action is required, or when the limitation has an immediate impact on the flight (e.g. MAX FL or MAX SPEED).

In all other cases (e.g. ATC COM VOICE ONLY), limitations will appear on the EWD only.

- [L2] When both the PFD and EWD display limitations, and the EWD indicates an overflow, the limitations then appear on the PFD only.

L1 LIMITATIONS ON THE EWD

Limitations on the EWD



The EWD displays limitations in two columns.

The title of the left column is (**ALL PHASES**), and this column displays the limitations applicable to all flight phases.

The title of the right column is (**APPR & LDG**), and this column displays only the limitations that are applicable to the APPROACH and/or LANDING phase(s).

The first line of each column displays the most important limitation. The other limitations appear in decreasing order of importance.

L13

Note: 1. In some flight phases, the EWD may temporarily clear some limitations from the screen, in order to optimize the information display. This may occur, for example, when the TO and LDG memos are displayed, because there is not sufficient space on the screen to display all the memos and limitations.

The EWD clears limitations:

- If they are also duplicated on the PFD
- According to an increasing order of importance.

2. The EWD does not display limitations, if:

- The flight crew requests either a checklist, or the ABN PROC menu.
- The flight crew requests the display of the contents of a checklist.
- The EWD displays a procedure, after the ECAM detects a system failure, or after the flight crew manually requests the display of this procedure.

LIMITATIONS ON THE PFD

L2

The PFD can display a maximum of 8 limitation lines.

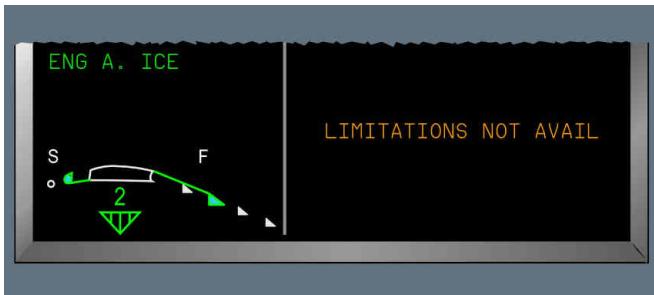
L1

The first line displays the most important limitation. The other limitations appear in decreasing order of importance.

Note: On ground, before takeoff and after landing, this area of the PFD displays the pitch trim settings (Refer to DSC-31-20-20-160 Limitations and Pitch Trim).

Limitations on the PFD



LIMITATIONS NOT AVAILABLELIMITATION NOT AVAIL

The LIMITATIONS NOT AVAIL message appears when the PFD can no longer display limitations.

- [2] The CDS displays this message, in the case of a communication failure between FWS and PFD display unit.

MEMO**Applicable to:** ALL

Memo : A memo indicates the state of an aircraft system.

It usually appears:

- After a specific flight crew action or selection to remind the flight crew of the selection
- To indicate an automatic system function.

Note: Memos usually appear in green. However, some memo may be in amber (e.g. A/THR OFF), in red (e.g. AP OFF), or in magenta (e.g. T.O INHIBIT or LDG INHIBIT).

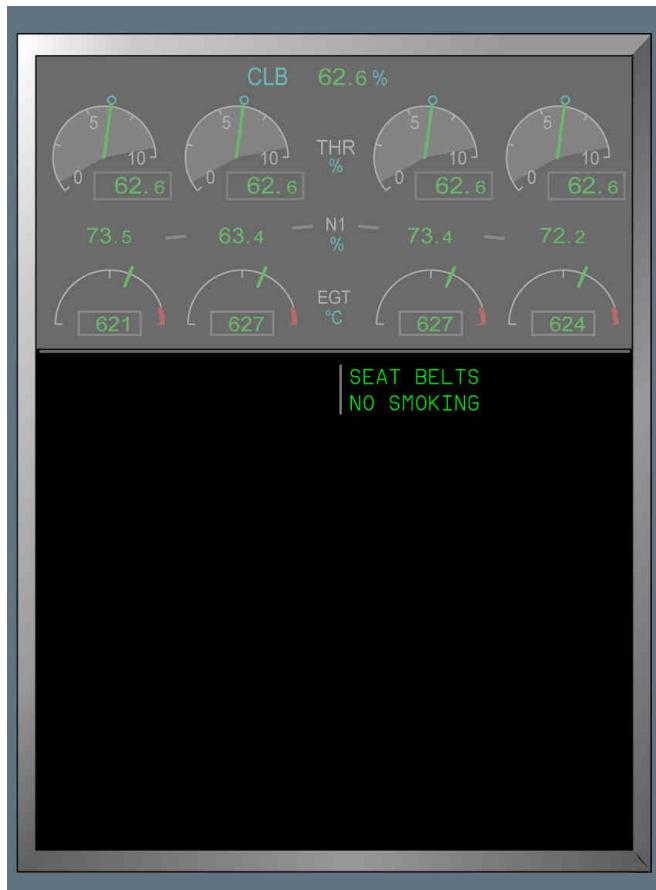
MEMO DISPLAY

Memos appear on the EWD, and on the lower part of the PFD.

A memo can appear on the EWD only, or on both the PFD and EWD.

- Memos that appear on both display units are memos to increase the flight crew awareness (e.g. A/THR OFF, AP OFF, or anti-ice)
- Other memos (e.g. seat belts) will appear only on the EWD.

The EWD displays memos in two columns: The left column displays the Takeoff (T.O) and Landing (LDG) memos. The right column displays all other memos.

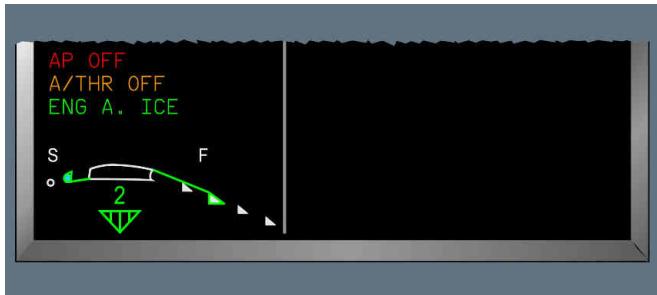
MEMOS ON THE EWDMemos on the EWD

Note: The EWD does not display memos, when:

- The flight crew requests the display of a checklist menu , or the not-sensed ABN PROC menu.
- The flight crew requests the display of the contents of a checklist.
- The EWD displays a procedure, after the ECAM detects a system failure, or after the flight crew manually requests the display of this procedure.

MEMOS ON THE PFD

- [L2] The PFD displays a maximum of three memo lines .
[L1] The first line displays the most important memo. The other memos appears in decreasing order of importance.

Memo on PFD**T.O AND LDG MEMOS**

T.O and LDG memos provide the flight crew with the list of actions to be accomplished before takeoff and landing.

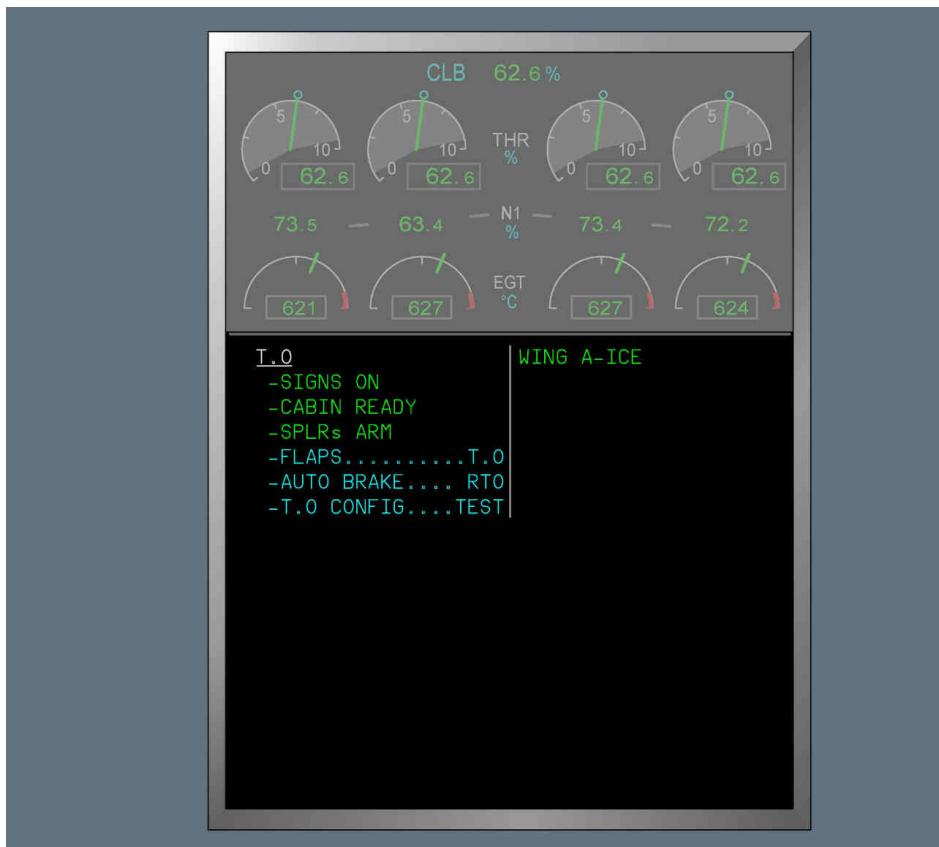
- The T.O memo automatically appears after the flight crew starts the engines.

L2 Memos appear two minutes after the flight crew starts the third engine.

L1 If the flight crew has not yet performed the applicable actions, the listed items appear in blue. When the flight crew has performed the applicable actions, the listed items appear in green.

Note: In accordance with the SOP, the flight crew must ensure that all memos are in green before takeoff.

The T.O memo disappears, when the flight crew sets the takeoff power.

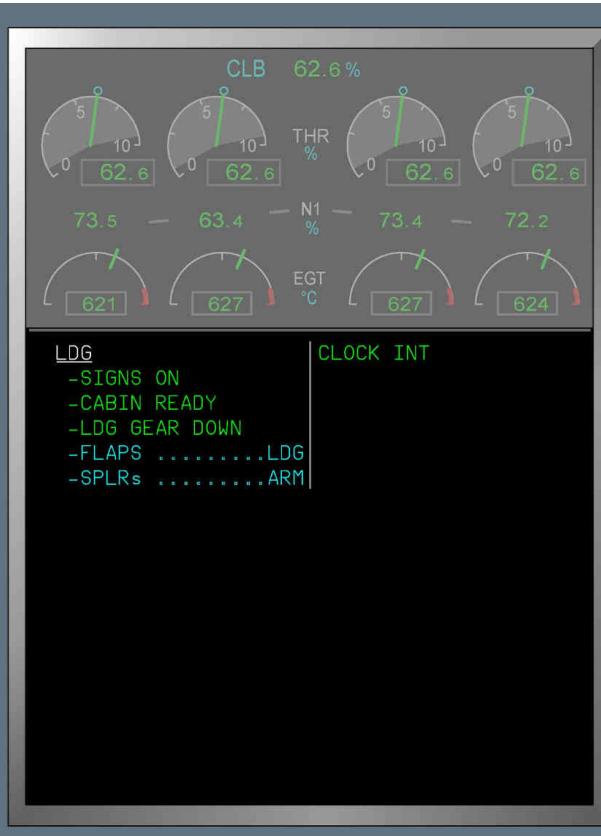
TO Memo

The T.O memo also appears in the BEFORE TAKEOFF checklist.

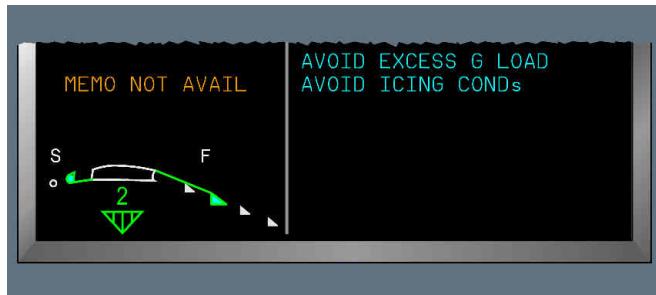
- The LDG memo automatically appears, when the aircraft is below 2 000 ft. RA.
If the flight crew has not yet performed the applicable actions, the listed items appears in blue.
When the flight crew has performed the applicable actions, the listed items appears in green.

Note: In accordance with the SOP, the flight crew must ensure that all memos are in green before landing.

The LDG memo disappears during landing roll, at approximately 80 kt.

LDG Memo

The LDG memo also appears in the LANDING checklist.

MEMO NOT AVAILABLE**Memo Not Avail**

The MEMO NOT AVAIL message appears when the PFD can no longer display memos.

- [L2] The CDS displays this message in the case of a communication failure between the FWS and the PFD display units.

LANDING PERFORMANCE INDICATIONS**Applicable to: ALL****LANDING PERFORMANCE INDICATIONS**

When a failure has an impact on landing performance, the ECAM provides the flight crew with the appropriate information in the applicable procedure for landing performance computation.

The ECAM displays landing performance information in the applicable procedure, and also in the limitation section of the EWD .

Performance information depends on the impact that the failure, or the combination of failures, has on landing performance.

The following table summarizes the various landing performance ECAM indications, and their corresponding conditions:

| ECAM Displays | Conditions |
|---|---|
| Procedure & Limitations: LDG DIST AFFECTED STATUS page: LDG DIST COEF < 1.XX ON DRY RUNWAY | <ul style="list-style-type: none">- Single failure- No VAPP increase- Landing distance penalty below 1.XX. The penalty applies to the Actual Landing Distance (ALD) . |

Note: XX indicates a variable value, and has a value of 40, or 45, or 50.

Continued on the following page

Continued from the previous page

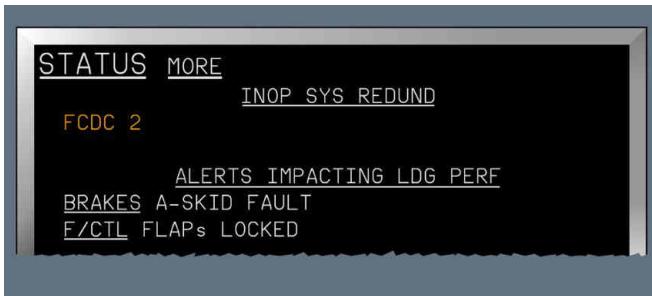
| ECAM Displays | Conditions |
|--|--|
| Procedure & Limitations: LDG DIST AFFECTED Deferred Procedure: LDG DIST COMPUTATION CONFIRM | <ul style="list-style-type: none"> - No VAPP increase but landing distance penalty at 1.50 or above, or - No VAPP increase but multiple failures affecting the landing distance. |
| Procedure & Limitations: LDG PERF AFFECTED Deferred Procedure: LDG PERF COMPUTATION CONFIRM | VAPP increase and landing distance penalty (regardless it is). |
| Procedure: LDG PERF : COMPUTE Limitations: LDG PERF AFFECTED | <ul style="list-style-type: none"> - Slats or flaps failure - VAPP increase and landing distance penalty. <p><i>A slats or flaps failure can happen after takeoff or in approach during slats/flaps retraction or extension.</i></p> <p>Note: <i>As a consequence, the procedure directly requests the computation of the landing distance as it should be done at that time.</i></p> |
| Procedure: LDG DIST IMPACT ON WET/CONTAM RWY ONLY | One or both thrust reversers are failed |

Management of failures and ECAM procedures are described in the FCTM . For more information, *Refer to FCTM/AO-10 Landing Computation .*

STATUS PAGE INDICATIONS

All ECAM alerts that have an impact on landing performance are listed on the STATUS MORE page of the SD . For more details, *Refer to DSC-31-40-10-00000661 More pages on System Display .*

STATUS MORE — LDG Performance Alerts Example



To compute the LDG distance and VAPP , the flight crew uses the alerts listed in the STATUS MORE page to select the applicable failures in the OIS LDG PERF application. For more

information on how to compute landing penalties with a list of inoperative systems, *Refer to Landing Determination Conditions for In Flight.*

LANDING PERFORMANCE AND DISPATCH UNDER MEL

When an aircraft is dispatched under MEL , with an inoperative item that impacts landing performance, the flight crew must always use the OIS LDG PERF application, if an additional in flight failure that affects the landing performance occurs.

This is applicable, even if the ECAM displays LDG DIST COEFF < 1.XX ON DRY RUNWAY and the destination runway is dry because the ECAM cannot combine MEL items with in-flight failures.

DEFERRED PROCEDURE

Applicable to: ALL

If a system fails, the ECAM may postpone some actions to a more appropriate time, later in flight. These actions are called deferred procedures.

Deferred procedures:

- Are related to, and grouped in the checklist menu as: Approach, landing, or all phases
- Appear in amber , when they have not been completed
- Appears in white , when they have been completed.

Actions may be deferred:

- Before approach:

They appear in the checklist menu, and are referred to as FOR APPROACH : DEFERRED PROCEDURE

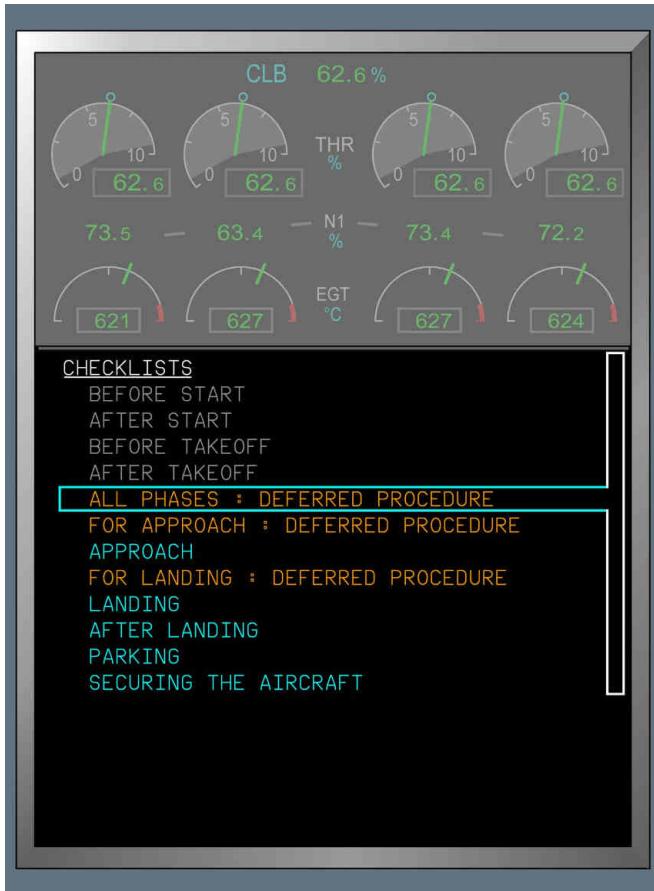
- Before landing:

They appear in the checklist menu, and are referred to as FOR LANDING : DEFERRED PROCEDURE

- In all other flight phases:

They appear in the checklist menu, and are referred to as ALL PHASES : DEFERRED PROCEDURE .

For more details on the management of deferred procedures, *Refer to DSC-31-40-50 Handling Procedure - Deferred proc .*

Deferred Procedure

After the flight crew clears all ECAM procedures from the EWD , the EWD displays the checklist menu, if there are any applicable deferred procedures.

If there is any deferred procedures, the checklist menu will automatically appear during approach.

[2] Automatic display during approach occurs, when either the slats are extended, or when the flight crew selects a barometric pressure altitude.

[3] The approach condition is activated, when aircraft is below 20 000 ft .



A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

ECAM - SYSTEM DESCRIPTION

TIME LIMITED FAILURE

Applicable to: ALL

Time-limited failures are failures that do not have an impact on flight operations, or on flight dispatch. These failures are for maintenance action only, and must be repaired within a defined period of time. When a time-limited failure occurs, an automatic countdown begins. This countdown ends on the deadline by which this failure must be repaired, and provides maintenance personnel with enough time to repair the failure when convenient.

However, if the failure is not repaired within the defined period of time, the ECAM triggers when the aircraft is on ground:

- MAINTENANCE TIME LIMITED ITEM alert for a system failure
- ENG TIME LIMITED ITEM for an engine failure

In this case, the aircraft may be dispatched under MEL for a time-limited period, without conditions. For more information about this caution, and about the associated dispatch assessment, *Refer to MEL/ME-ECAM-45 MAINTENANCE TIME LIMITED ITEM*, or *Refer to MEL/ME-ECAM-70-80-26 ENG 1(2)(3)(4) TIME LIMITED ITEM*.

TAKEOFF CONFIGURATION TEST

Applicable to: ALL

At any time between engine start and takeoff, when the aircraft is ready for takeoff, the flight crew can request a takeoff configuration test. This test simulates the application of takeoff power, and triggers alerts, if any of the aircraft systems are not in the correct takeoff configuration.

In accordance with the SOP, this test is performed before takeoff.

The takeoff memo reminds the flight crew to perform this test.

"T.O CONFIG.....TEST" line in the T.O memo disappears when the configuration test is completed and is correct, and "T.O CONFIG NORMAL" appears instead.

The test is requested again, if the configuration becomes abnormal.

When the flight crew sets the takeoff power, the test will automatically run again.

If the test is not successful, any of the following alerts may be triggered:

- CONFIG SLATS (FLAPS) NOT IN T.O CONFIG , *Refer to procedure*
- CONFIG RUDDER TRIM NOT IN T.O RANGE , *Refer to procedure*
- CONFIG PITCH TRIM NOT IN T.O RANGE , *Refer to procedure*
- CONFIG SPD BRKs NOT RETRACTED , *Refer to procedure*
- CONFIG L(R) SIDESTICK FAULT (BY TAKE-OVER) , *Refer to procedure*
- DOOR POS DET FAULT , *Refer to procedure*
- DOOR MAIN 1(2)(3)(4)(5) R(L) NOT CLOSED , *Refer to procedure*
- DOOR UPPER 1(2)(3)(4) R(L) NOT CLOSED , *Refer to procedure*
- DOOR MAIN 1(2)(4)(5) R(L) POS DET FAULT , *Refer to procedure*

- DOOR UPPER 1(2)(3)(4) R(L) POS DET FAULT , *Refer to procedure*
- DOOR FWD(AFT)(MAIN)(UPPER)(BULK) CARGO NOT CLOSED , *Refer to procedure*
- DOOR AVNCS NOT CLOSED , *Refer to procedure*
- DOOR CKPT SLIDING WINDOW NOT CLOSED , *Refer to procedure*
- BRAKES BRAKES HOT , *Refer to procedure*
- ELEC DRIVE 1(2)(3)(4) DISCONNECTED , *Refer to procedure*
- ELEC GEN 1(2)(3)(4) FAULT , *Refer to procedure*
- ELEC GEN 1(2)(3)(4) OFF , *Refer to procedure*
- ENG 1(2)(3)(4) OIL TEMP LO , *Refer to procedure*
- F/CTL PITCH TRIM/FMS/CG DISAGREE , *Refer to procedure*
- F/CTL T.O FLAPS/FMS DISAGREE , *Refer to procedure*
- NAV T.O SPEEDS NOT INSERTED , *Refer to procedure* .

ECAM DISPLAY ON THE SYSTEM DISPLAY**Applicable to: ALL**

The SD screen has three horizontal sections:

- The top section provides the system display page, the STATUS page, or the STATUS MORE page.

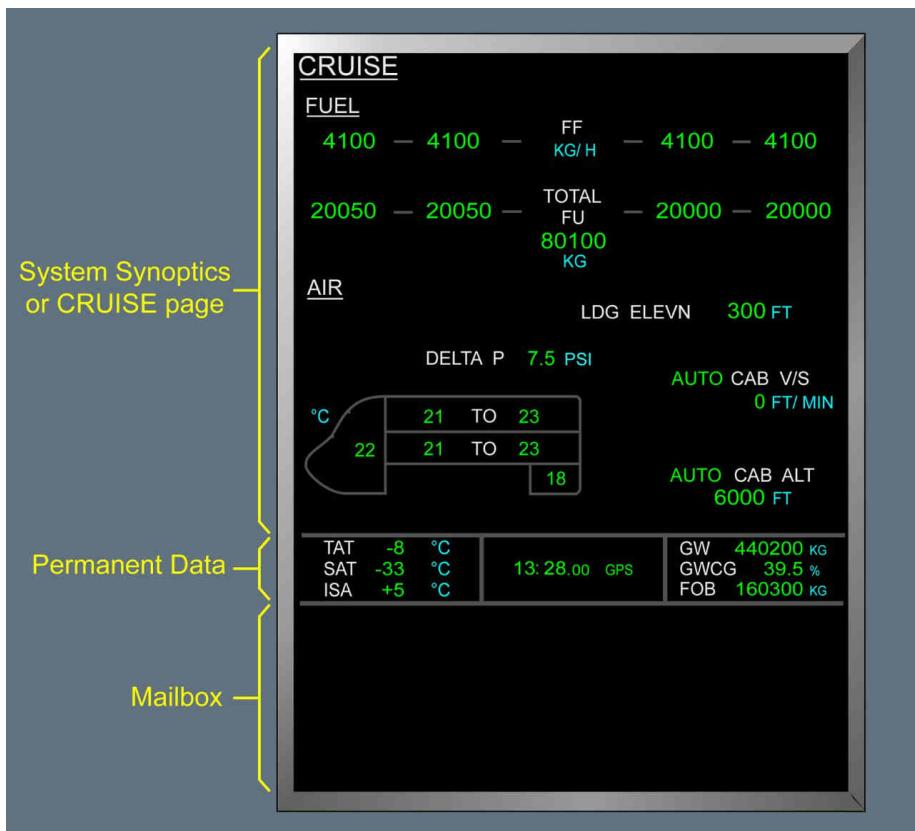
In normal operation, the SD provides system display pages. The system display pages appear:

- Automatically, depending on the flight phase. For more details *Refer to Normal Operation* , or
- When manually-selected by the flight crew. For more details *Refer to ECP* .

- The middle section displays permanently-displayed data such as: External temperature, time, aircraft weight, CG , and Fuel On Board (FOB).
- The bottom section displays the mailbox (*Refer to ECP*).

In addition, after an alert due to a system failure, the SD displays:

- The applicable system display page, if any.
- The aircraft STATUS page after the flight crew clears the alert from the EWD, if the STATUS page is not empty.

ECAM Display on the SD — GENERAL

The System Display (SD) pages appear on the SD in the following decreasing order of priority:

- SD page that the flight crew manually selects (*Refer to ECP System Page Pushbuttons*)
- SD page that appears after an alert, (*Refer to SD Display - Abnormal Operation*)
- SD page that automatically appears when there is an advisory, (*Refer to Advisory*)
- SD page that automatically appears depending on the flight phases, (*Refer to SD Display - Normal Operation*).

CRUISE PAGE

The CRUISE page provides the flight crew with information about the fuel system and air system.

The flight crew cannot select the CRUISE page via the ECP. It is automatically displayed at 1 500 ft AGL or at the thrust reduction, whichever occurs the first until L/G extension in approach.

The CRUISE page provides the following information about the fuel system:

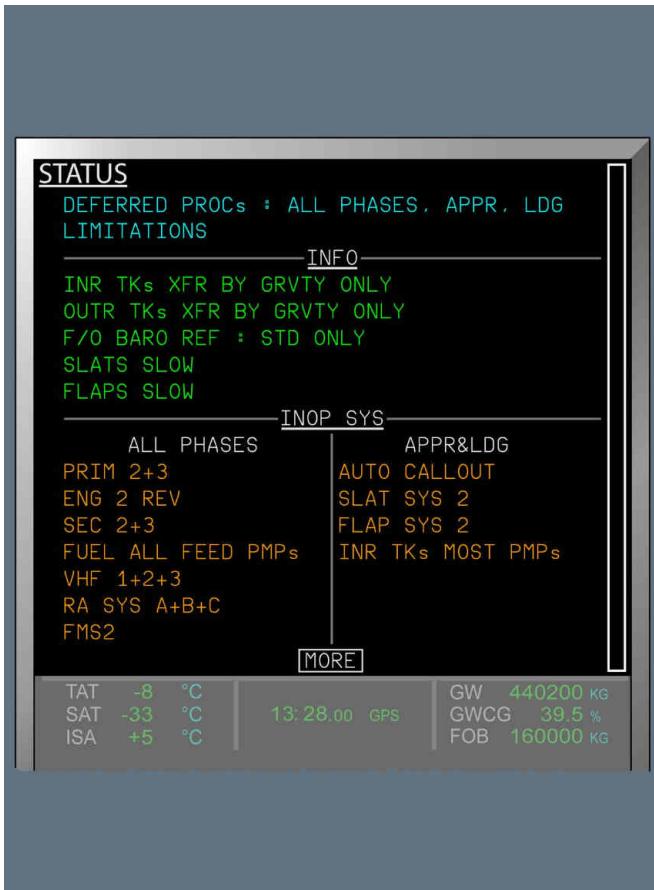
- Current fuel flow per engine
- Fuel used per engine
- Total fuel used by the four engines.

The CRUISE page provides the following information about the air system:

- Overall cabin temperature per deck, and cargo hold temperature
- Cabin pressure altitude and vertical speed
- Landing Elevation (LDGELEVN) indication
- Differential pressure.

Cruise Page**STATUS PAGE**

The STATUS page provides an operational summary of the aircraft status after the EWD has displayed a failure.

STATUS Page

The SD displays the STATUS page, to:

- Indicate, if there are DEFERRED PROCs and the phases in which phase they apply. Deferred procedures appear in the checklist menu
- Indicate if any LIMITATIONS apply. These limitations appear on the EWD and/or PFD
- Provide information on any degraded aircraft system in the **INFO** section.

- Provide all inoperative systems in the **INOP SYS** section in two columns.
The title of the left column is (**ALL PHASES**), and this column displays the inoperative system applicable to all flight phases
The title of the right column is (**APPR & LDG**), and this column displays the inoperative system that are applicable to the APPROACH and/or LANDING phases.
The inoperative systems are displayed in amber and in decreasing order of importance.
- Indicate if a STATUS MORE page exists (**MORE**) , in order to provide additional information related to the flight crew about the aircraft status (system redundancy losses, cautions canceled, or MORE INFO to a procedure).

The STATUS page:

- Automatically appears, if the STATUS is not empty, or if there is MORE INFO to a procedure in the STATUS MORE page, when the flight crew clears (via the CLEAR pb on the ECP) or cancels (via the EMER CANC pb on the ECP) the last alert on the EWD
- Automatically appears, if it is not empty, during approach
 - [L2] The automatic display occurs during approach, when either the slats are extended or the flight crew selects a barometric pressure altitude.
 - [L3] The approach condition is activated, when the aircraft is below 20 000 ft.
 - [L1] - Can be manually displayed at any time by the flight crew, by pressing the STS pb on the ECP. If the flight crew requests the STATUS page, but there is no STATUS information to display, then NORMAL appears.

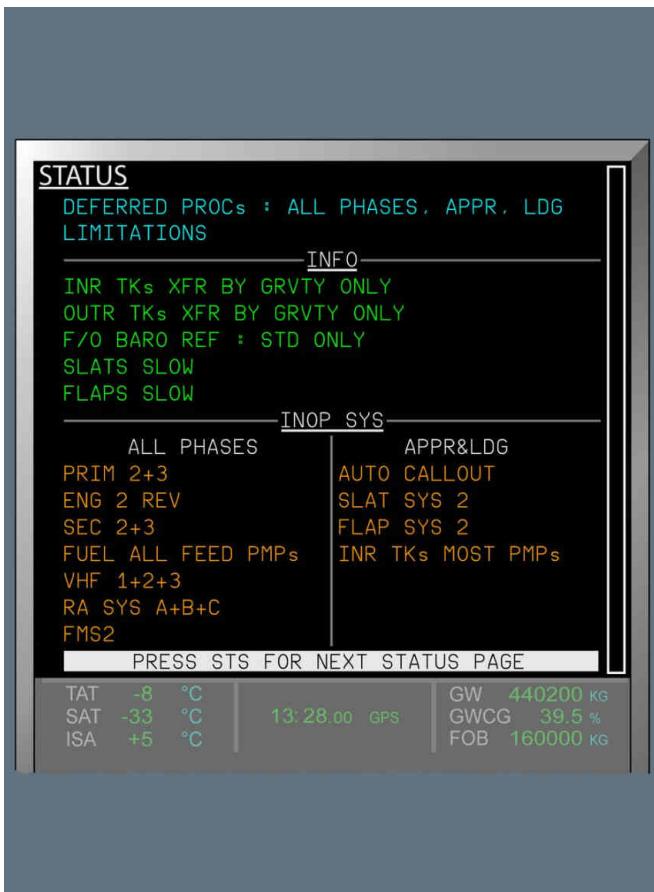
OVERFLOW INDICATION

When the screen size does not enable the display of all information, only a part of this information appears.

In such cases, PRESS STS FOR NEXT STATUS PAGE appears on the bottom of the page to indicate the overflow below and that STATUS continues on the next page.

To erase the current displayed lines and to access the next page, the flight crew presses the STS pb on the ECP.

- [L2] Flight crew can access to the next page by pressing the CLEAR pb, if the vertical line is displayed on STATUS page.
If the memo/limitations page is not displayed, the flight crew should not use the CLEAR pb, in order to avoid inadvertently deleting the information displayed on EWD.

Overflow Indication

L1

STS**INDICATION**

Appears on the EWD, when all of the following apply:

- The STATUS is not empty
- The STATUS page does not appear on the SD
- The EWD displays either memo/limitations or a checklist.

STS Indication

STATUS NOT AVAILABLESTATUS NOT AVAIL

The STATUS NOT AVAIL message appears when the SD can no longer display the STATUS page.

- L2 The CDS displays this message in case of a communication failure between the FWS and the SD display unit.

STATUS MORE PAGE

When **[MORE]** appears on the bottom of the STATUS page, it indicates that additional aircraft status information is available.

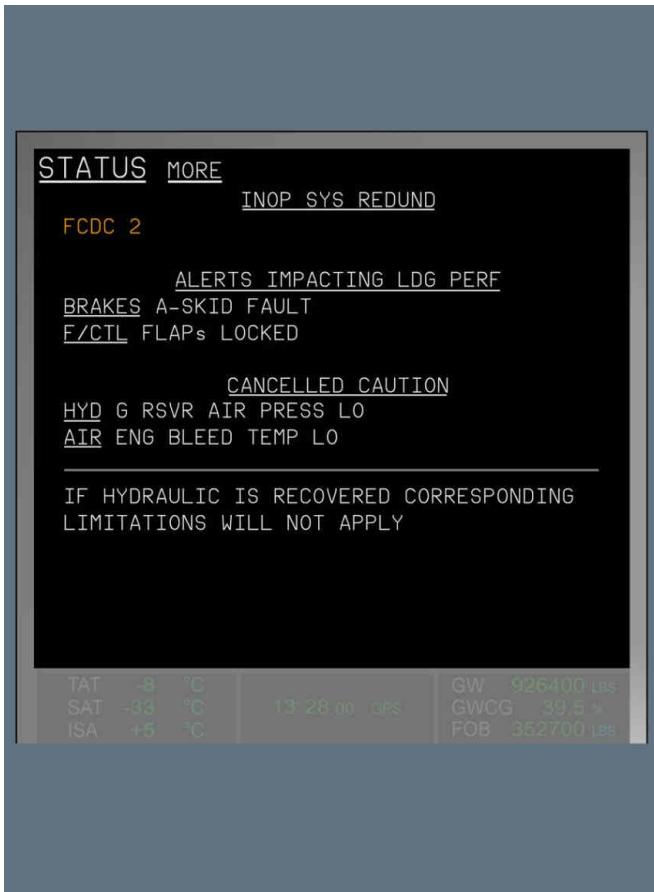
The flight crew can manually display a STATUS MORE page, if **[MORE]** appears at the bottom of the STATUS page, by pressing MORE pb on the ECP.

STATUS MORE

A STATUS MORE page is indicated by **[MORE]**.

The STATUS MORE page:

- Indicates, in the **[INOP SYS REDUND]** section, the system redundancy losses that may occur following some alerts or not-sensed procedures.
System redundancy losses appear in amber and in decreasing order of importance.
 - Indicates, in the **[ALERTS IMPACTING LDG PERF]** section, the alerts associated with performance
 - Lists, in the **[CANCELLED CAUTION]** section, any cautions that were canceled with the EMER CANC pb.
Cancelled cautions appear in **[white]** and in decreasing order of importance.
 - Provides, in **[white]**, additional procedural information. This section also refers to as MORE INFO.
- When there is at least one **[CANCELLED CAUTION]**, a separation line appears above the MORE INFO.

Status-More Sample


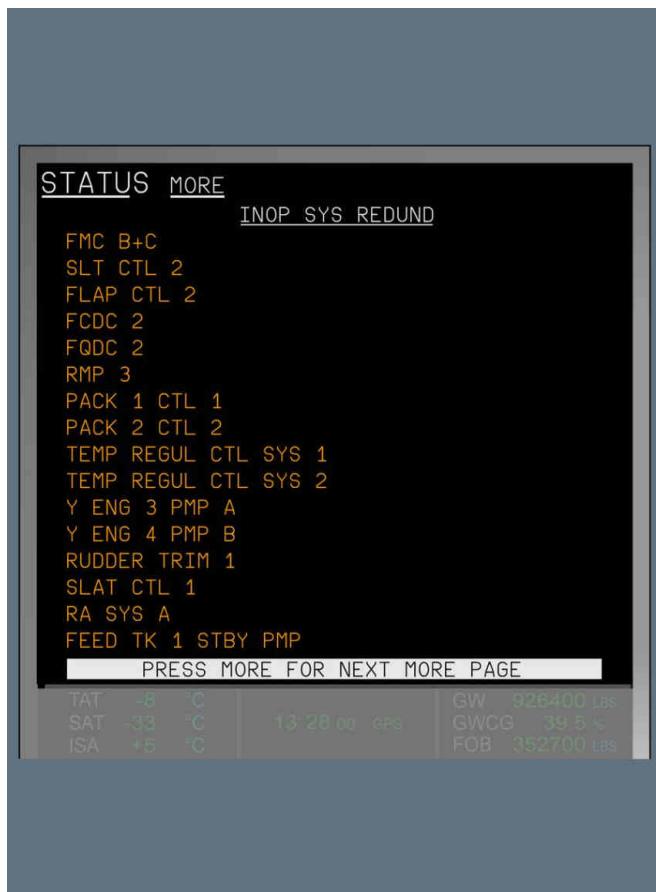
OVERFLOW INDICATION

When the screen size does not enable the display of all information, the PRESS MORE FOR NEXT MORE PAGE message appears at the bottom of the page to indicate that the **STATUS MORE** continues on the next page.

To clear the currently display and to access the next pages, the flight crew presses MORE pb on the ECP.

- [L2] Flight Crew can access to the hidden information by pressing the CLEAR pb, if the vertical line is displayed on STATUS MORE page.

If memo/limitations page is not displayed, the flight crew should not use the CLEAR pb in order to avoid inadvertently deleting information displayed on EWD.

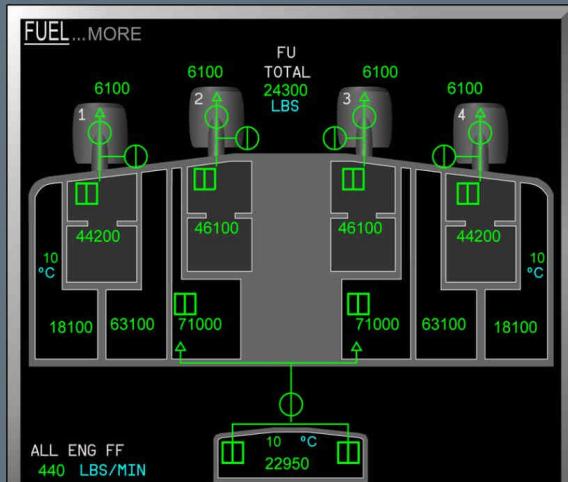
Overflow Indication**[1] MORE ON SYSTEM DISPLAY PAGE**

Some systems displays have two pages available to provide additional information on the

...MORE

applicable system. In such a case, [] appears after the name of the system.

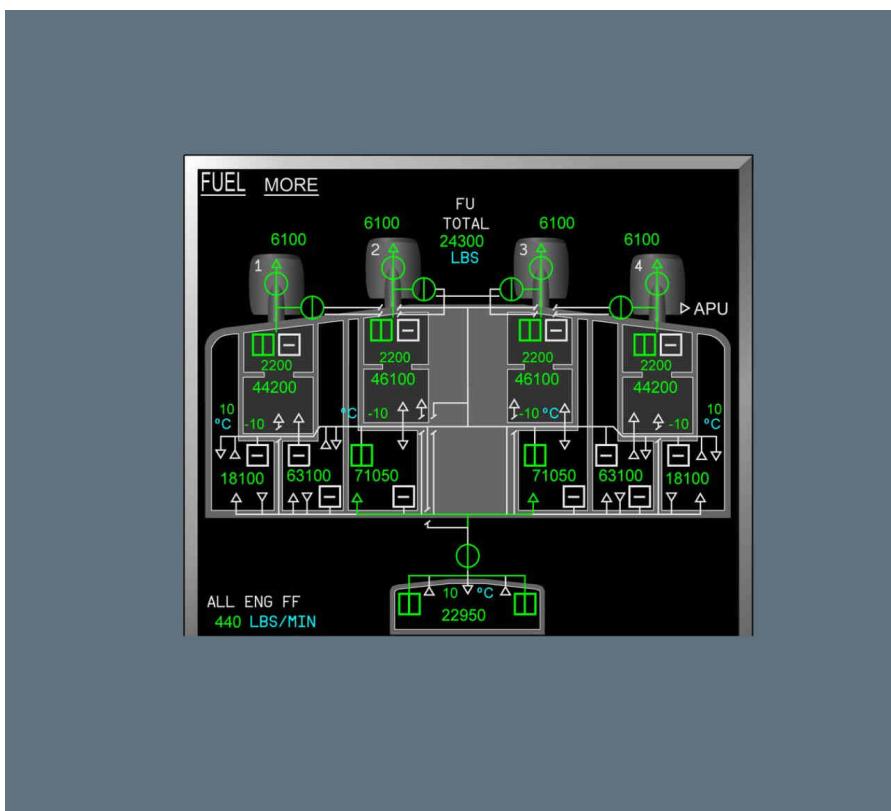
Landing gear and fuel systems have two pages of information.

FUEL System Display

The MORE title, at the top left corner of the ECAM page, becomes

MORE

underlined, [REDACTED], when the flight crew presses MORE pb on the ECP
Parts of the system that are not active appear in grey.

FUEL MORE System Display**PERMANENT DATA ON SYSTEM DISPLAY****Applicable to: ALL**

The SD permanently displays the following data, in three columns:

- Temperature
- Time
- Aircraft gross weight, center of gravity, and fuel data.

Permanently—displayed Data


TEMPERATURE DATA

The left column displays the external air temperature values in degrees Celsius.

These values include:

- The Total Air Temperature (TAT)
- The Static Air Temperature (SAT)
- The International Standard Atmosphere (ISA) deviation.

[L3] The ADIRS provides both TAT and SAT data.

The CDS computes the ISA deviation using the SAT.

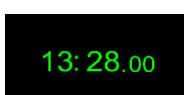
- [L1] The applicable plus and minus signs always appears..

TIME DATA

The second line of the middle column on the SD displays the Universal Time Coordinated (UTC).

- [L3] The clock provides the displayed UTC information. When the clock data is not valid, the time source of the ADIRS is used and provides the displayed UTC information. For information on time-reference, *Refer to Clock*.

[L1]



Normal UTC display. The format is HH : MM . SS



The clock is set to INT mode.

[L13]



The clock is set to GPS mode.

If the clock can no longer provide the time-reference, the GPS time-reference of the ADIRS , provides UTC .



All time sources are not valid.

[L13]



Degraded accuracy of the time data.

The dash lines appear when:

- The internal time-reference of the clock provides UTC , while clock is set to GPS mode, or
- If the clock can no longer provide the time-reference, the internal time-reference of the ADIRS provides UTC .



Clock is in SET mode.

G LOAD DATA

In case the measured G load exceeds a specific range, the first line of the middle column indicates an abnormal G load.

- [L3] The ADIRS provide G LOAD data.

L1

G LOAD +1.5
13: 28.00 GPS

The aircraft becomes airborne, and the G LOAD is less than 0.7 g , or greater than 1.4 g , for longer than 2 seconds.

After the G load returns to normal, G LOAD data remains visible for 5 seconds.

The plus and minus signs are always displayed.

G LOAD XX
13: 28.00 GPS

An abnormal G LOAD value has been measured, but the value is not available.

DISPLAY SYSTEM VERSIONS DISAGREE

The three lines of the middle column on the SD may display a “DISPLAY SYSTEM VERSIONS DISAGREE” message. This message is defined for maintenance purposes only.

This message is triggered when the aircraft is on ground.

L3 This message is normally triggered at power-up or during rollout when the aircraft speed is below 80 kt , or after the last engine shutdown.

L12

**DISPLAY SYSTEM
VERSIONS
DISAGREE**

The CDS detects differences between the display unit versions.

The CDS checks that all display units have the same version of:

- Hardware
- Software

GW, GWCG, AND FOB DATA

The right column on the SD displays the aircraft Gross Weight (GW), the aircraft Gross Weight Center of Gravity (GWCG), and the Fuel On Board (FOB).

L3 The Fuel Quantity Management System (FQMS) provides the GW , the GWCG , and the FOB values.

If the GW , or the FOB value from the FQMS is no longer available, the FMS provides the GW , or the FOB value.

For more information on GW calculation from the FMS , Refer to *DSC-22-FMS-20-30-22FMS502BM Gross Weight*.

For more information on FOB calculation from the FMS , Refer to *DSC-22-FMS-20-30-22FMS502BM Fuel on Board*.

If the GWCG value from the FQMS is no longer available, the Weight and Balance Backup Computer (WBBC) provides the GWCG value.

L1 GW and FOB values are rounded off to the nearest hundred.



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FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

ECAM - SYSTEM DESCRIPTION

| | | |
|------|--------|-----|
| GW | 970000 | LBS |
| GWCG | 39.5 | % |
| FOB | 352000 | LBS |

Normal.

| | | |
|------|--------|-----|
| GW | 970000 | LBS |
| GWCG | 39.5 | % |
| FOB | 352000 | LBS |

Value accuracy is degraded.

| | | |
|------|--------|-----|
| GW | -- | LBS |
| GWCG | -- | % |
| FOB | 352000 | LBS |

The flight crew did not enter the ZFW , ZFWCG in the FMS .

| | | |
|------|----|-----|
| GW | XX | LBS |
| GWCG | XX | % |
| FOB | XX | LBS |

Data is not valid.

| | | |
|------|--------|-----|
| GW | 970000 | LBS |
| GWCG | 48.0 | % |
| FOB | 352000 | LBS |

GWCG appears in red, in the case of a FUEL EXCESS AFT CG (Refer to PRO-ABN-ECAM-10-28-440 FUEL EXCESS AFT CG).

| | | |
|------|--------|-----|
| GW | 970000 | LBS |
| GWCG | 29.0 | % |
| FOB | 352000 | LBS |

GWCG appears in amber, in the case of:

- A CG OUT OF RANGE (Refer to PRO-ABN-ECAM-10-28-520 FUEL CG OUT OF RANGE), or
- A CG AT FWD LIMIT (Refer to PRO-ABN-ECAM-10-28-460 FUEL CG AT FWD LIMIT).

| | | |
|------|--------|-----|
| GW | 960000 | LBS |
| GWCG | 33.3 | % |
| FOB | 349000 | LBS |

Appears, in the case of a tank fuel is not usable.



A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

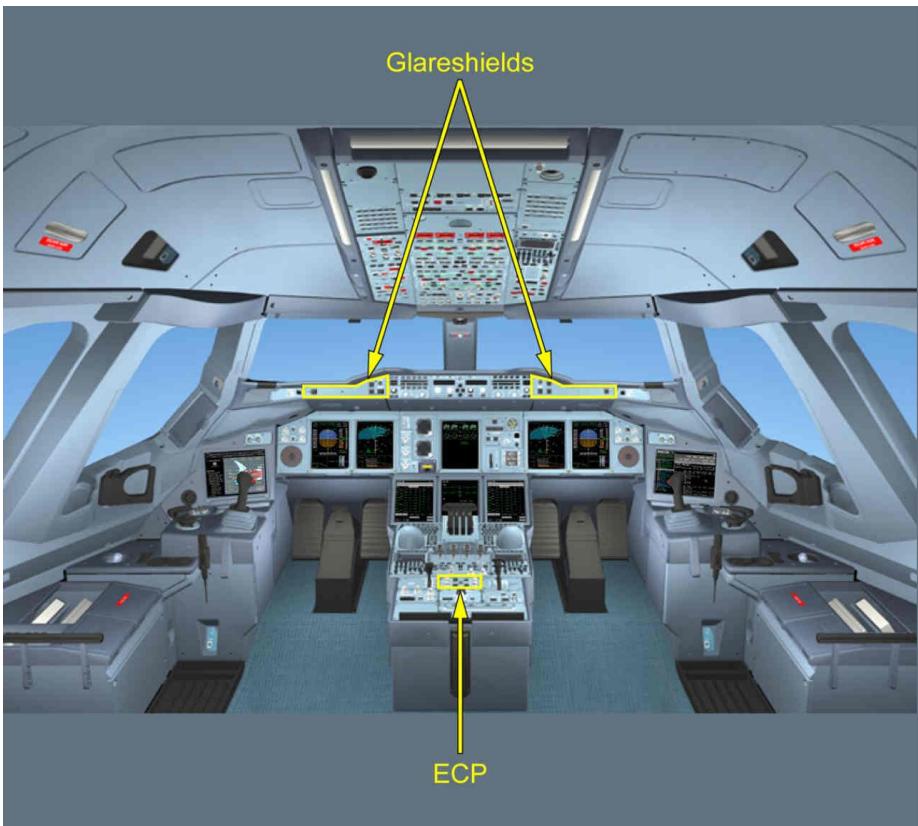
31 - INDICATING/RECORDING

ECAM - SYSTEM DESCRIPTION

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ECAM CONTROLS

Applicable to: ALL

ECAM Controls**ECAM CONTROL PANEL**

Applicable to: ALL

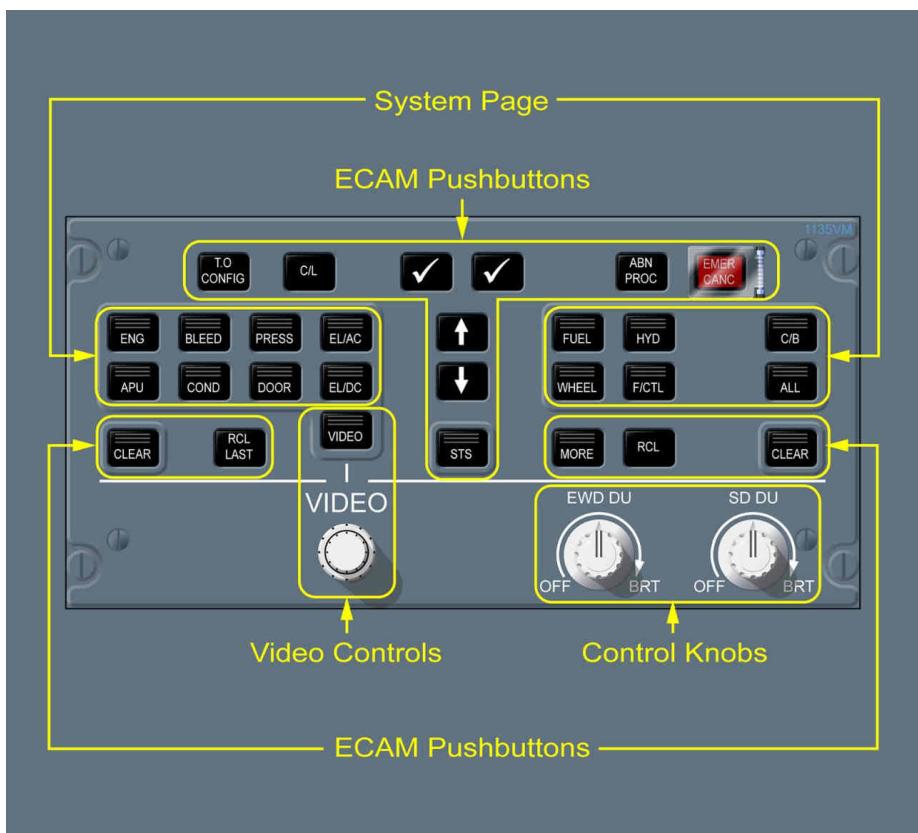
The flight crew uses the ECAM Control Panel (ECP) to interface with the ECAM system. There is one ECP , and it is located on the central pedestal.

The ECP provides keys that enables the flight crew to:

- Navigate in a menu list, checklist, and/or procedure
- Select an item in a menu list
- Activate an item in a checklist and/or procedure
- Activate the takeoff configuration test
- Clear or cancel alerts
- Access some system pages
- Access normal checklists
- Access not-sensed ABN PROC
- Access STATUS page
- Access STATUS MORE page
- Access additional information system pages.

In addition, the ECP provides:

- Rotary selectors to turn the EWD and SD on and off, and to adjust their brightness
- Video display selection and control.

ECP**SYSTEM PAGE PUSHBUTTONS**

The flight crew can manually access each of the system pages on the SD via the associated pushbuttons on the ECP . When pressed, the pushbutton lights up, and the corresponding system page appears on the SD , and the light on the pushbutton goes off.



The SD displays the ENGINE system page. Refer to DSC-70-90-60 System Display .



The SD displays the APU system page. *Refer to DSC-49-20-40 APU System Display*



The SD displays the BLEED system page. *Refer to DSC-36-20-20 BLEED System Display*.



The SD displays the Air Conditioning (COND) system page. *Refer to DSC-21-10-20 COND System Display* .



The SD displays the Cabin Pressurization (CAB PRESS) system page. *Refer to DSC-21-10-20-80 CAB PRESS System Display* .



The SD displays the DOOR/OXYGEN system page. *Refer to DSC-35-20-20-D Oxygen indications on DOOR System Display* .



The SD displays the Electrical (ELEC) AC system page. *Refer to DSC-24-20-50 ELEC AC System Display: In-Flight Configuration* .



The SD displays the Electrical (ELEC) DC system page. *Refer to DSC-24-20-70 ELEC DC System Display* .



The SD displays the FUEL system page. *Refer to DSC-28-20 FUEL SYSTEM DISPLAY*.



The SD displays the WHEEL system page. *Refer to DSC-32-20-30 WHEEL System Display*



The SD displays the Hydraulic (HYD) system page. *Refer to DSC-29-20-DSC2920C HYDRAULIC SYSTEM DISPLAY* .



The SD displays the Flight Controls (FCTL) system page. *Refer to DSC-27-10-20-272001 F/CTL System Display* .



The SD displays the list of all the tripped circuit breakers. *Refer to DSC-24-20 C/B System Display* .

ALL pb

When pressed and maintained, each system display page consecutively appears on the SD, for three seconds.

When released, the last system display page remains, until a new display is either requested by the flight crew, or prompted by the ECAM.

TO CONFIG pb

- : Simulates the application of takeoff power, by initiating a takeoff configuration test. A warning triggers, if any monitored system is not in the correct takeoff configuration. For more details *Refer to DSC-31-40-10 Takeoff Configuration Test*.
If the test is successful, the EWD displays a T.O CONFIG NORMAL message in the takeoff memo section.

C/L

- : The EWD displays the normal checklist menu.

VALID (TICK) pb

- : When pressed, validates/devalidates the item that is surrounded by a blue box on the EWD.
 - Validates/devalidates a checklist item or procedure item, that is not detected by the ECAM.
 - Selects one item of a checklist menu or procedure menu.

ABN PROC pb

- : The EWD displays the menu of not-sensed emergency or abnormal procedures. The ECAM cannot detect these procedures. Therefore, the flight crew manually requests their display, when necessary.

EMER CANC pb

- L2 The EMER CANC pb is a guarded pushbutton.

L1



- : - Cancels the audio indicator and turns off the MASTER WARN light associated with an ECAM warning.
However, the associated procedure remains displayed on the EWD. The audio indicator and MASTER WARN light are not canceled for the remainder of the flight. If the ECAM warning is triggered a second time, the audio indicator and MASTER WARN light appear again
- Cancels the SC, the procedure on the EWD, and turns off the MASTER CAUT light, associated with an ECAM caution. The ECAM caution is canceled for the remainder of the flight, even if the triggering conditions occur again
 - Cancels all the audio indicators and aural alerts. If the triggering conditions occur again, the audio indicators and the aural alerts sound again
 - Deactivates any activated not-sensed procedure.

Note:

- a. All the alerts that are still active and canceled via the EMER CANC pb appear again on the EWD when the flight crew presses the RCL pb on the ECP for more than three seconds.
- b. When pressed and if there is no alert that the flight crew can cancel, the EWD displays the **EMERGENCY CANCEL ON** message.

UP-ARROW pb



- : The blue box moves up to the previous selectable item on the EWD screen. The blue box cannot surrounds a grey line (except on the checklist menu).

DOWNS-ARROW pb



- : The blue box moves down to the next selectable item on the EWD screen. The blue box cannot surrounds a grey line (except on the checklist menu).

STS pb



- : The SD displays the STATUS page, if applicable. The SD displays NORMAL, if the STATUS page is empty. If the SD displays a STATUS page, the STS pb comes on. If pressed again, when the SD displays the STATUS page, the page is cleared.

CLEAR pb

- : On EWD or SD clears the lines indicated by the displayed vertical bar. The CLEAR pb light comes on, when there is an alert to clear on EWD.

Note: *The CLEAR pb does not cancel any aural alerts associated with a caution/warning, and does not deactivate a Not-Sensed ABN PROC.*

RCL LAST pb

- : Cancels the last CLEAR pb action on an alert.

MORE pb

- : The SD displays the MORE information page that is available when MORE appears on the system display pages and STATUS page. When the SD already displays the MORE information page, pressing again this pushbutton clears the MORE information page.

RCL pb

- : - When pressed, all alerts previously performed and still active, and all not-sensed ABN PROC that are still active appear on the EWD.
- When pressed for more than three seconds, all alerts that were previously cancelled via the EMER CANC pb or cleared or inhibited by the current aircraft flight phase appear on the EWD.

Note: *When there is no alert to recall, NORMAL appears for 3 seconds.*

CONTROL knob

Turns the EWD or SD on/off, and adjusts the brightness of the applicable display unit.

VIDEO knob

Displays the selected video on the applicable display unit. For more information, *Refer to Video Controls*.

ECAM - GLARESHIELD CONTROLS

Applicable to: ALL

MASTER WARNING

The MASTER WARN light flashes, and the continuous repetitive chime sounds when the ECAM triggers a warning.

When pressed, the light goes off, and the continuous repetitive chime associated with the MASTER WARN light is cancelled.

L3



- : Each FWS controls half of the MASTER WARN light. If one FWS is inoperative, a warning is triggered and the remaining FWS turns on the applicable MASTER WARN light.

MASTER CAUTION

L13



The MASTER CAUT light comes on, and the single chime sounds when the FWS triggers a caution.

The MASTER CAUT light remains steady.

When pressed, the light goes off, and the single chime associated with the caution is canceled.

L3



- : Each FWS controls half of the MASTER CAUT light. If one FWS is inoperative, a warning is triggered and the remaining FWS turns on the applicable MASTER CAUT light .

MEMO

Applicable to: ALL

- T.O : The FWS inhibits some warnings and/or cautions to avoid unnecessarily alerting the INHIBIT flight crew during takeoff.

Note: The EWD displays this memo even if no warnings and/or cautions are activated.

Flight Phase Inhibition



LDG : The FWS inhibits some warnings and/or cautions to avoid unnecessarily alerting the INHIBIT flight crew during Landing.

Note: This EWD displays this memo even if no warnings and/or cautions are activated.

Flight Phase Inhibition



XX DISPLAY ON THE SD

Applicable to: ALL

If a parameter value on any SD page is not available for display, XX appears, instead of the value.

AUDIO INDICATORS

Applicable to: ALL

The following table provides the aural alerts generated by the FWS :



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| Audio Indicator | Meaning or Cause | Duration, or Quantity ⁽¹⁾ |
|-------------------------------------|--|---|
| Single Chime (Sound) | Caution (Amber). | Sounds 1 time |
| Continuous Repetitive Chime (Sound) | Warning (Red). | Sounds until the flight crew presses any MASTER WARN light pb |
| Buzzer C (Sound) | MECH CALL (<i>Refer to DSC-23-20-05 Internal Communication Transmission Keys and Reception Knobs</i>). | <ul style="list-style-type: none"> - Sounds until the flight crew presses either the MECH key or the RST key on RMP , or - Stops automatically after 60 s . |
| | SELCAL (<i>Refer to DSC-23-10-30-30 SELCAL</i>). | Sounds until the flight crew presses either the transmission key or the RST key on RMP . |
| Buzzer Norm (Sound) | CABIN CALL (<i>Refer to DSC-23-20-05 Internal Communication Transmission Keys and Reception Knobs</i>). | <ul style="list-style-type: none"> - Sounds until the flight crew presses either the ATT key or the RST key on RMP , or - Stops automatically after 60 s . |
| Buzzer Emergency (Sound) | EMER CABIN CALL (<i>Refer to DSC-23-20-70 EMER Pb-sw</i>). | Sounds 1 time |
| Cavalry Charge (Low Volume Sound) | AP disconnection because the flight crew pressed the sidestick pb one time (<i>Refer to DSC-22-FG-40-30 Disengagement Annunciations and Warnings</i>). | <ul style="list-style-type: none"> - Sounds until the flight crew presses any MASTER WARN light pb or the sidestick pb a second time, or - Stops automatically after 0.8 s , and Cavalry charge high volume after 1.8 s . |
| Cavalry Charge (High Volume Sound) | AP disconnection due to: <ul style="list-style-type: none"> - Failure, or - Pedal movements, or - Sidestick deflection. | Sounds until the flight crew presses any MASTER WARN light pb , or presses the sidestick pb a second time |
| Triple Click (Sound) | <ul style="list-style-type: none"> - Landing capability change, or - Automatic mode reversion of AP / FD and A/THR , or - AP cannot hold VS / PFA target. | Sounds 1 time |
| Cockpit Door (Synthetic Voice) | Cabin requests the opening of cockpit door. | Sounds 1 time |
| Cockpit Door Emergency (Sound) | Cabin requests an emergency opening of the cockpit door. | <ul style="list-style-type: none"> - Sounds until the flight crew locks or unlocks the door, or - Until the door automatically unlocks. |

Continued on the following page



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31 - INDICATING/RECORDING

ECAM - CONTROLS AND INDICATORS

Continued from the previous page

| Audio Indicator | Meaning or Cause | Duration, or Quantity ⁽¹⁾ |
|-----------------------------------|--|--|
| C Chord (Sound) | Altitude alerts (Refer to <i>Refer to DSC-31-20-20-60 Altitude Alerts</i>). | <ul style="list-style-type: none"> - Stops automatically after 1.5 s , when the aircraft approaches the selected altitude, or - Sounds when the aircraft altitude deviates from the selected altitude, until the flight crew presses any MASTER WARN light pb , or selects a new ALTITUDE, or the aircraft returns to the selected ALTITUDE. |
| Ring (Sound) | ATC messages (<i>Refer to DSC-46-10-20-70 ATC MSG pb</i>). | Sounds 1 time |
| Dual Input (Synthetic voice) | Both flight crew members simultaneously move the sidesticks. | Sounds 1 time |
| Pitch (Synthetic voice) | Pitch attitude alert: The aircraft has an excessive pitch attitude at landing. | Sounds 2 times |
| Priority Left (Synthetic voice) | The CAPT presses the sidestick pb . | Sounds 1 time |
| Priority Right (Synthetic voice) | The F/O presses the sidestick pb . | Sounds 1 time |
| Speed (Synthetic voice) | LOW ENERGY alert (<i>Refer to DSC-22-27-20 Low Energy Protection</i>). | Sounds 3 times |
| Cricket + Stall (Synthetic voice) | Speed protection alert: The aircraft speed reaches $V_{\alpha_{sw}}$ protection (In alternate law or in direct law). | Sounds until the aircraft speed goes above the $V_{\alpha_{sw}}$ protection speed |
| V1 (Synthetic Voice) | The aircraft reaches V1 speed. | Sounds 1 time |
| Retard (Synthetic voice) | The flight crew has not set the thrust levers in to the IDLE position for landing. | Sounds 1 time at 20 ft (10 ft in autoland with A/THR ON), then sounds until the flight crew sets the thrust levers to IDLE |
| Windshear (Synthetic voice) | WINDSHEAR alert (<i>Refer to DSC-22-27-20 Reactive Windshear Alert</i>). | Sounds 3 times |
| Company Alert (Synthetic Voice) | Company alert: The flight crew receives an urgent company message. | Sounds 1 time |
| Company Message (Synthetic Voice) | Company message: The flight crew receives a company message. | Sounds 1 time |
| Time Marker (Synthetic Voice) | Timemarker in 30 s . | Sounds 1 time |

(1) All audio indicators can be cancelled by pressing the EMER CANC pb on the ECP .

Note: FWS also provides RA announcements. (*Refer to Automatic Callouts*).



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AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

ECAM - NORMAL OPERATIONS

GENERAL

Applicable to: ALL

NORMAL OPERATIONS

In normal operations, the ECAM displays:

- System display pages on the SD
- Memos (e.g. SEAT BELTS, ENG A-ICE, **T.O** and **LDG** memos) on the EWD and the PFD.

The EWD displays the normal checklist, upon flight crew request.

In approach, the ECAM manages aural altitude callouts, and decision-height announcements.

SYSTEM DISPLAY PAGE

Applicable to: ALL

SD DISPLAY — NORMAL MODE

In normal operations, the SD displays system display pages.

These system display pages appear:

- Automatically on the SD, depending on the flight phase. The following table provides the system display pages that appear during specific flight phase
- When manually-selected by the flight crew from the ECP.

Note: An SD page manually-selected by the flight crew has priority over an SD page that automatically appears depending on the flight phase.

AUTOMATIC DISPLAY OF SYSTEM DISPLAY PAGES - ACCORDING TO FLIGHT PHASE

| Display Conditions | System Display Page on the SD |
|--|-------------------------------|
| - Before engine start, or - During 5 min after last engine is shutdown. | DOOR |
| When the APU MASTER sw is set to ON. No longer appears when: - APU is AVAIL for 10 s, or - The APU MASTER sw is set to OFF. | APU |
| - When the ENG START selector is set to IGN START, until the end of the engine start sequence, or - When at least one engine is in cranking, or - During takeoff, until 1 500 ft AGL or at the thrust reduction, whichever occurs the first. | ENG |

Continued on the following page



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ECAM - NORMAL OPERATIONS

Continued from the previous page

| Display Conditions | System Display Page on the SD |
|---|-------------------------------|
| - During taxi-out, until takeoff thrust is set, or - After landing gear extension, until last engine shutdown. | WHEEL |
| During flight control checks. | F/CTL |
| At 1 500 ft AGL or at the thrust reduction, whichever occurs the first until landing gear extension in approach. | CRUISE |

HOW TO HANDLE THE CHECKLISTS

Applicable to: ALL

DISPLAYING THE CHECKLIST MENU

At any time during the flight, the flight crew can access and display the checklist menu on the EWD, by pressing the C/L pb on the ECP.

Checklist Menu

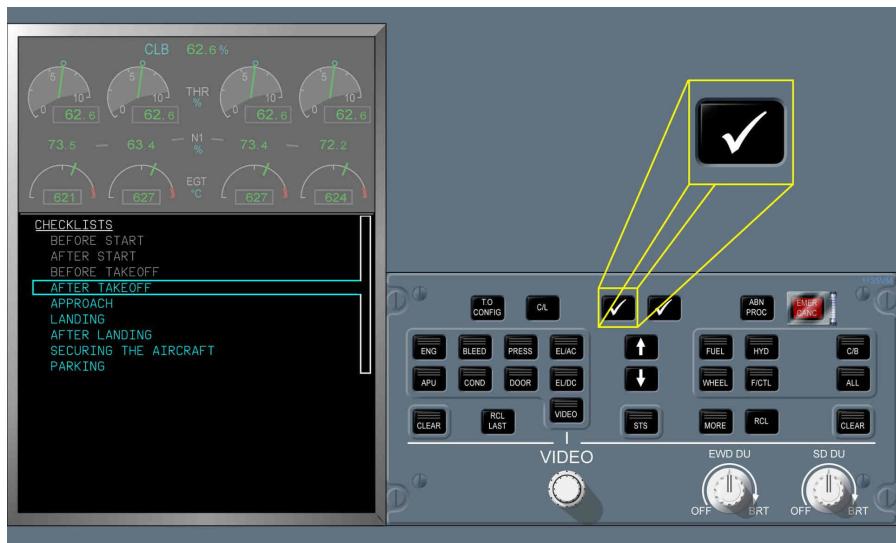
A blue box appears below the last completed checklist, and surrounds the title of the next applicable checklist.

The C/L Menu

The flight crew can change the checklist selection in the menu, with the , or with



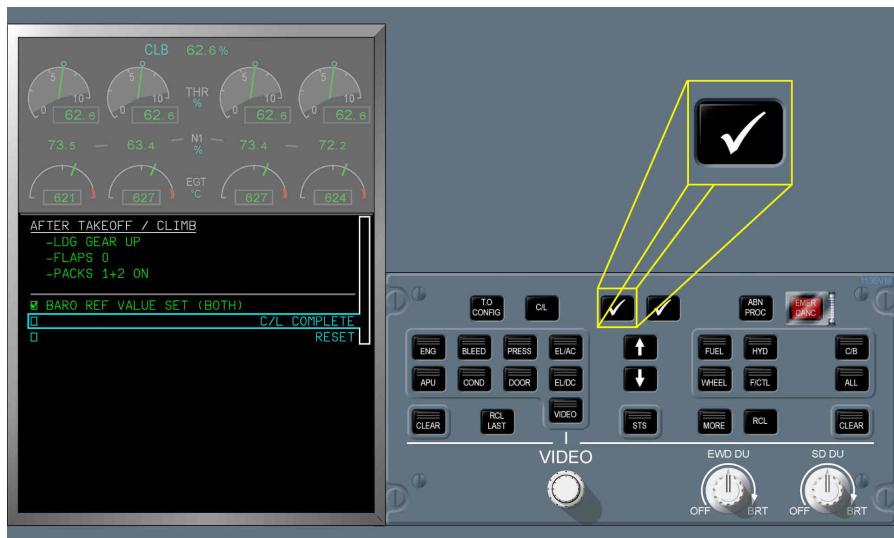
the . The flight crew confirms the selection by pressing the pb.

Selecting a checklist in the MenuDISPLAYING A CHECKLIST

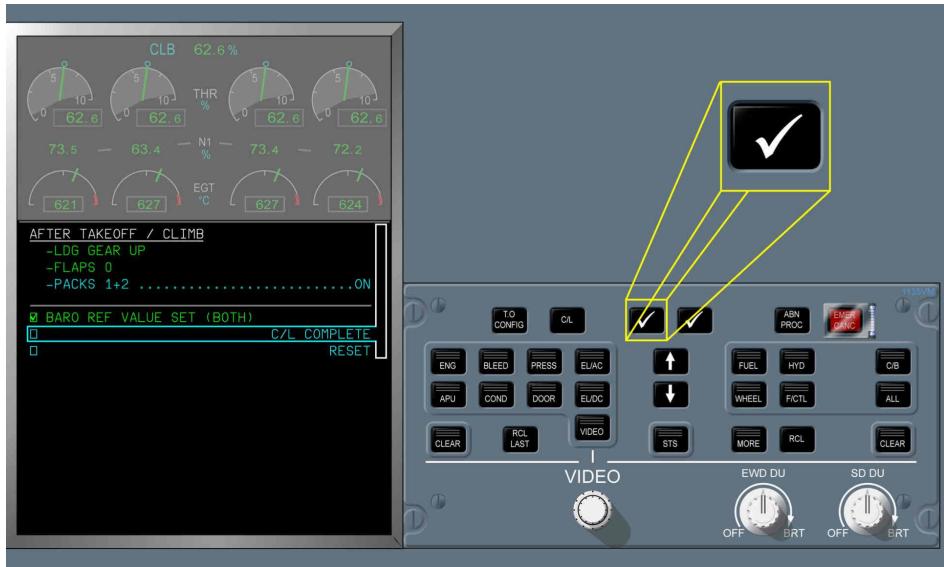
After the flight crew selects a checklist from the menu, it appears on the EWD. Completed checklist items, sensed by the ECAM, appear in green. The flight crew must validate any not-sensed items with the tick pb.

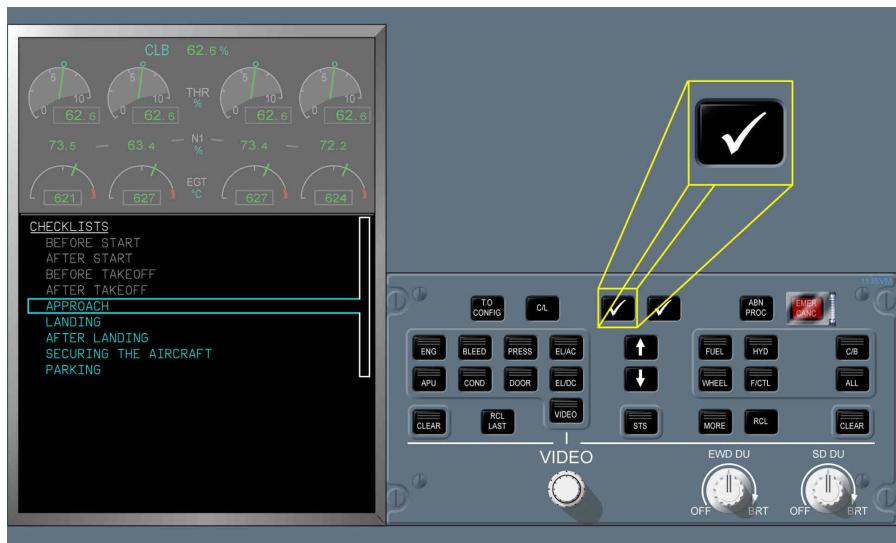
Sample Checklist

When the blue box surrounds C/L COMPLETED line, and the flight crew validates it with the tick pb, the checklist is completed and cleared. The checklist menu indicates that it is completed.

Validate the C/L COMPLETED Line

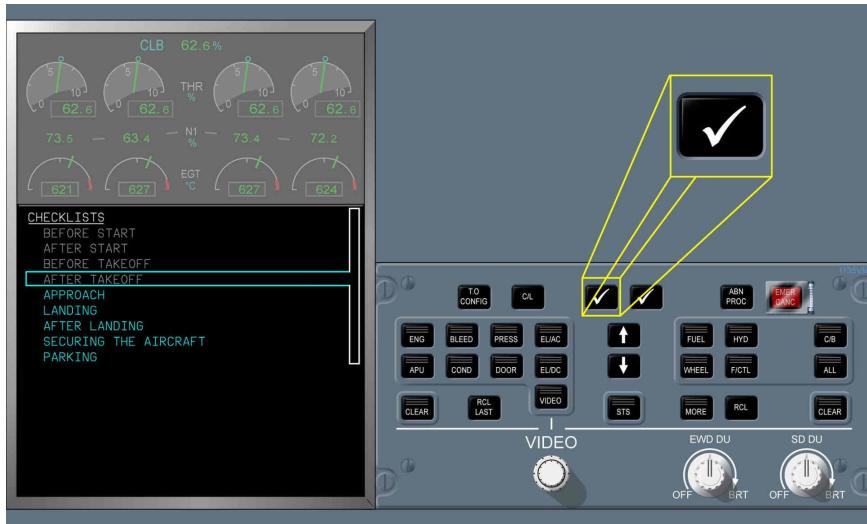
Note: However, if the flight crew intentionally does not validate some checklist items, the flight crew can still validate the C/L COMPLETED line, and the checklist will still be considered as completed. This may be the case after a system failure, that may prevent the flight crew from performing some checklist items.

C/L Complete, but not all Items Validated


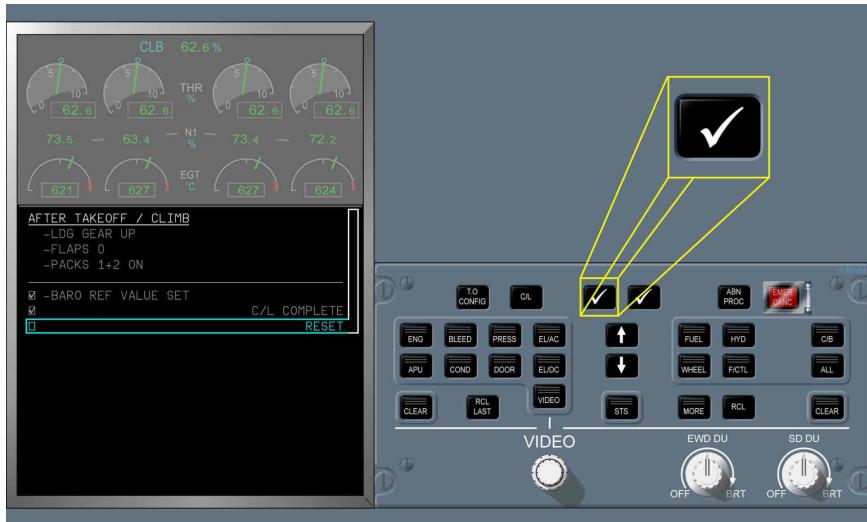
C/L Menu after C/L Completion**RESETTING A CHECKLIST****MANUAL RESET**

In some cases, it may be necessary for the flight crew to verify a checklist that has already been completed, by manually resetting the checklist.

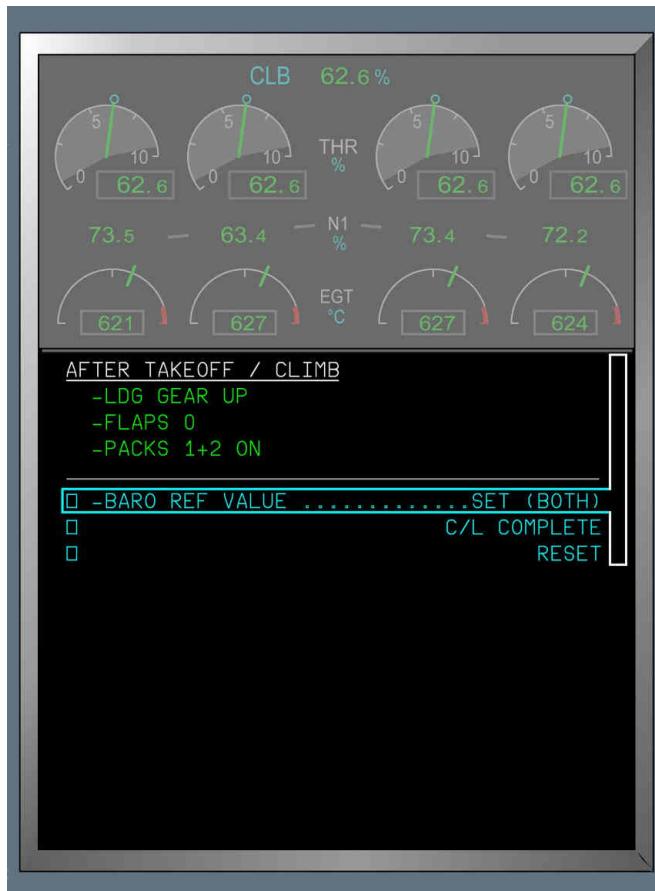
The flight crew can also reset all checklists, by manually resetting the first checklist of the menu. To reset a checklist, the flight crew selects a completed checklist on the checklist menu, and validates it with the tick pb.

Selecting a Completed Checklist


RESET appears on the last line of the completed checklist.

Resetting an Open Checklist


If the flight crew validates the RESET line, the entire checklist, and all of the subsequent checklists, are reset. The color of all checklist items changes from grey to the color that is applicable to their status.

Checklist Reset**AUTOMATIC RESET OF THE CHECKLISTS**

An automatic reset of the checklists may occur, in the following cases:

- At aircraft power-up, or
- When the flight crew manually resets a checklist, all subsequent checklists, completed or not completed are automatically reset, or

- In the case of a go-around, AFTER TAKEOFF checklist and subsequent checklists are automatically reset, or
 - At the end of the flight, if the aircraft remains powered and the flight crew does not manually reset a checklist.
- The checklists are automatically reset 50 min after the last engine shutdown.

L2

GENERAL

Applicable to: ALL

ABNORMAL OPERATIONS

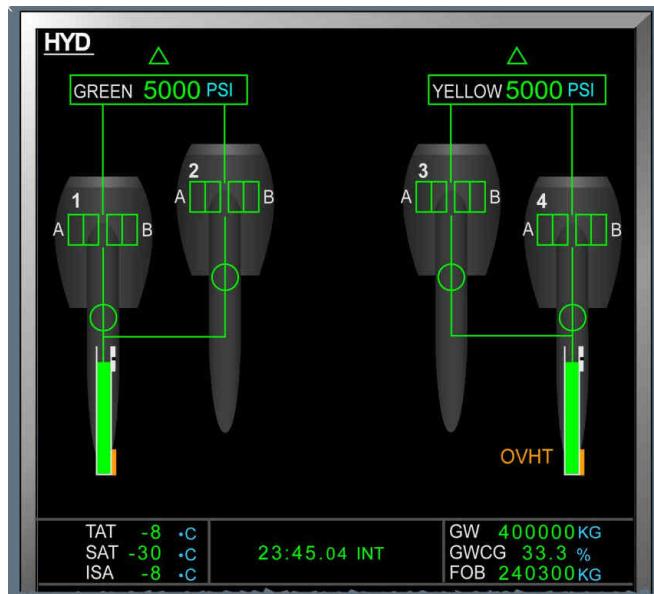
If the ECAM detects a failure, it informs the flight crew, and displays the applicable procedures. In addition, the ECAM displays not-sensed ABN procedures, upon flight crew request.

SYSTEM DISPLAY

Applicable to: ALL

SD DISPLAY — ABNORMAL OPERATIONS

In the case of a system failure, the SD automatically displays associated with the procedure that appears on the EWD (if any), and provides the configuration of the system with the faulty element.

ECAM System Display Page Sample

In the case of multiple failures, the SD changes the system display page corresponding to the procedure that appears on the EWD.

At the end of the procedure, if there are secondary failures:

- The system display page, associated with each secondary failure, appears on the SD
- The CLEAR pb on the ECP clears the secondary failures on the EWD, and the associated system display page on the SD, one after the other.

HOW TO ACTIVATE A NOT-SENSED ABN PROC

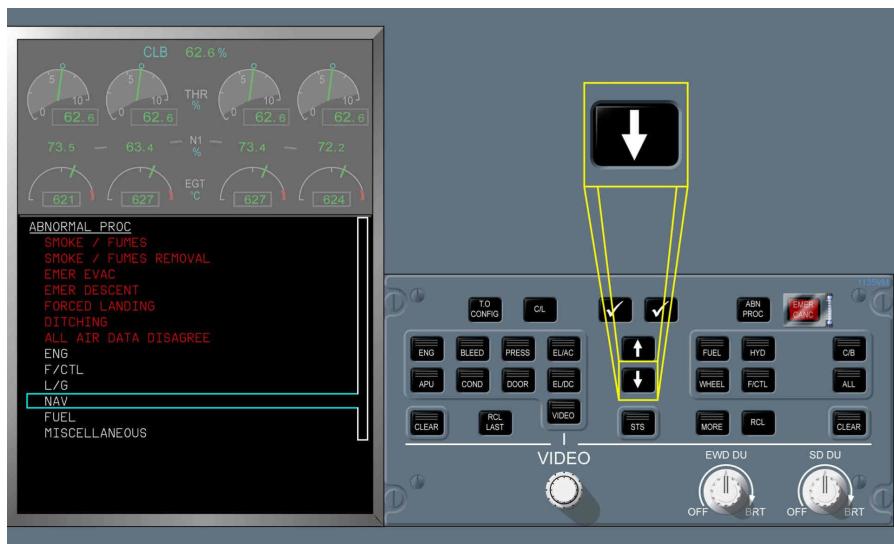
Applicable to: ALL

HOW TO ACTIVATE A NOT-SENSED ABN PROC

The flight crew can access and display the not-sensed ABN PROC menu on the EWD , by pressing the ABN PROC pb on the ECP .

Display the Not-Sensed ABN PROC Menu

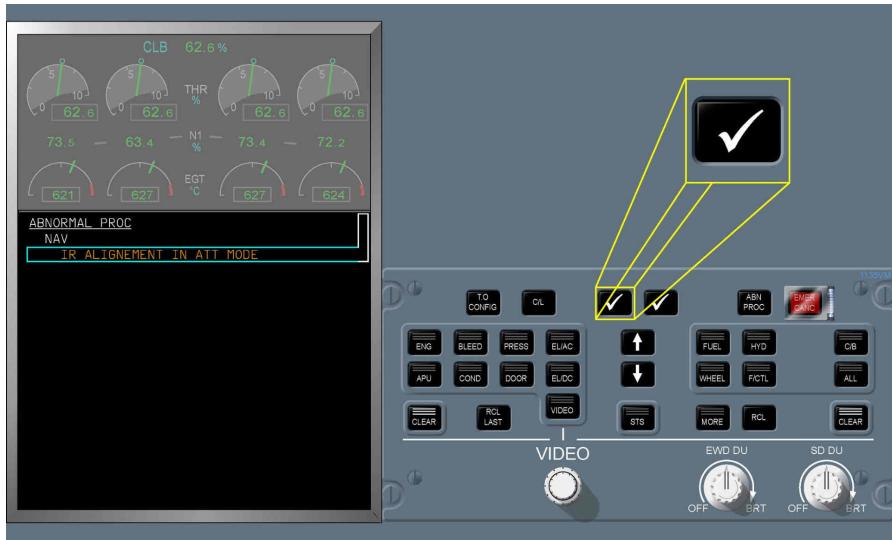


Not-Sensed ABN PROC menu


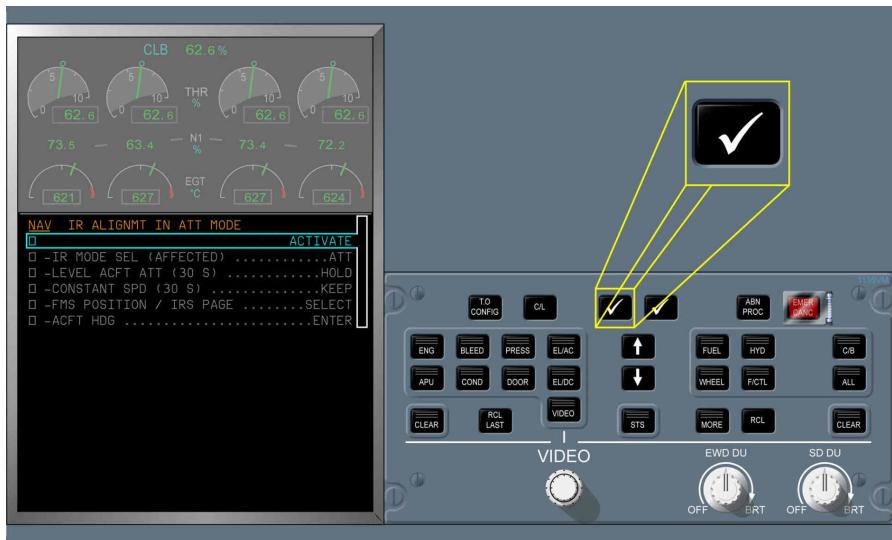
A blue box appears on the first procedure.

The flight crew selects a procedure in the menu or in a submenu, with the , or with the .

. This selection is then confirmed with .

Not-Sensed ABN PROC Submenu


When the flight crew selects a procedure, it appears on the EWD .

Activation of a not-sensed ABN PROC Procedure




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To apply a not-sensed ABN PROC , the flight crew must activate the procedure. If the flight crew applies a not-sensed ABN PROC , that is not activated, the limitations and/or memos associated with the procedure will not appear.

To activate the procedure, the flight crew presses the tick pb on the ECP , when the blue box is on the ACTIVATE line of the procedure.

Note: Some not-sensed ABN PROC may have many lines, and the EWD may not display the procedure on a single display. In such case, if the flight crew applies the procedures, while the procedure is not activated, the flight will not have access to the lines of the procedure in the overflow.

Active not-sensed ABN PROC Procedure

When the procedure is activated, the action lines of the procedure change from grey to the applicable colors, and the flight crew can start to perform the action lines.

The SD displays the associated system display page, if any.

Note: If the ECAM already displays a procedure when the flight crew activates a not-sensed ABN PROC, the ECAM will present the not-sensed ABN PROC as the first procedure to be considered by the flight crew, whatever the priority of the not-sensed ABN PROC. However, if an alert is triggered, while the flight crew performs a not-sensed ABN PROC procedure, the ECAM will display the procedures in the order the flight crew must apply them.

Note: Some **ACTIVE** not-sensed ABN PROC are no longer applicable after the flight crew complete the procedure (e.g. ENG RELIGHT IN FLT). In such case, the flight crew must manually deactivate the not-sensed ABN PROC in order to remove any aircraft limitations and memos associated with the procedure (Refer to DSC-31-40-50 How to Deactivate a Not-Sensed ABN PROC).

HOW TO DEACTIVATE A NOT-SENSED ABN PROC

Applicable to: ALL

HOW TO DEACTIVATE A NOT-SENSED ABN PROC

When an **ACTIVE** not-sensed ABN PROC is no longer applicable (e.g. no more turbulence), it may be necessary to deactivate it, in order to remove any aircraft limitations, memos and deferred procedures associated with the procedure.

The flight crew can deactivate a not—sensed ABN PROC, either by redisplaying it on the EWD, and canceling the **ACTIVE** item with the tick pb on the ECP, or by pressing the EMER CANC pb.

HANDLING ECAM PROCEDURE - FLIGHT CREW ACTIONS

Applicable to: ALL

FLIGHT CREW ACTIONS

For all ECAM procedures (alert, not-sensed ABN PROC), the flight crew performs ECAM actions, by performing the action lines that appear on the EWD.

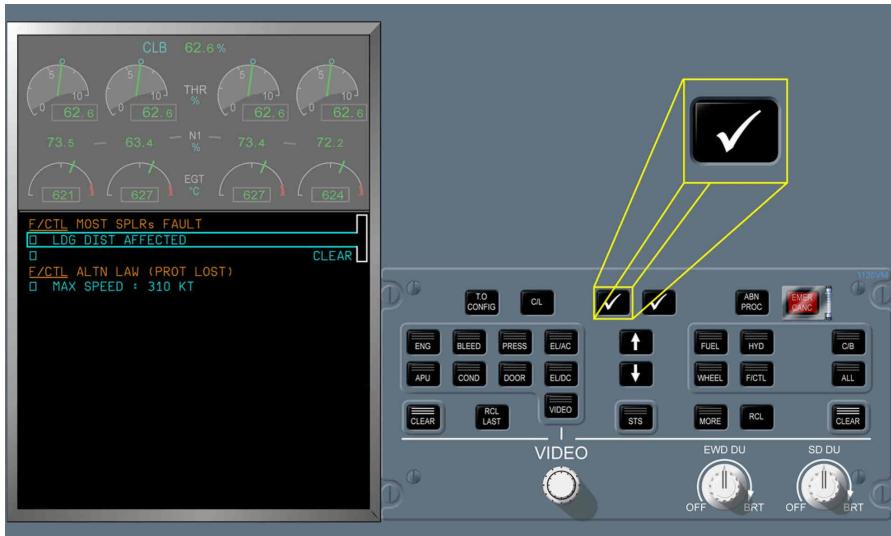
For action lines that are not-sensed by the ECAM, the flight crew must validate the action with the tick pb. The flight crew validates the action line, the blue box surrounds the next applicable item.

For actions that are sensed by the ECAM, the blue box selects the next applicable action line, when the flight crew has performed the action.

At the end of the procedure, when all actions are completed, the flight crew clears the procedure with the CLEAR pb or by validating the CLEAR item with the tick pb.

After the flight crew clears the ECAM procedure from the EWD, the EWD displays the C/L menu, if there are any applicable deferred procedures, or memos and limitations, if any.

Note: The flight crew can always cancel the completed state of a not-sensed action line by selecting the action line with the up and down-arrows and by pressing the tick pb.

Flight Crew Action**HANDLING ECAM PROCEDURES - STATUS ON SYSTEM DISPLAY**

Applicable to: ALL

STATUS PAGE ON THE SD

After the flight crew clears the ECAM procedure, the STATUS page, if not empty, automatically appears on the SD .

The flight crew reviews the STATUS page, if not empty, and analyzes the different sections:

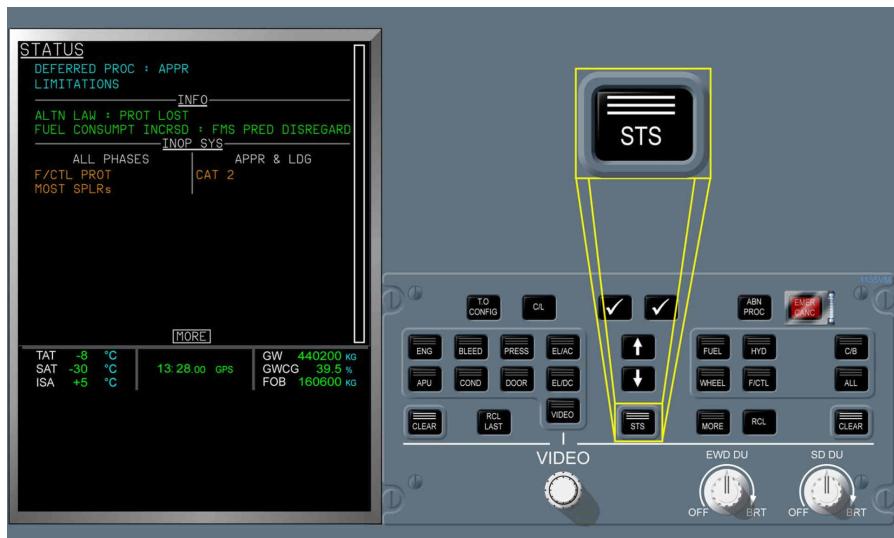
- DEFERRED PROCs , if any (Refer to DSC-31-40-50 Handling Procedure - Deferred proc)
After the flight crew clears the ECAM procedure, the EWD displays the checklist menu, if there are any applicable deferred procedures.
- LIMITATIONS , if any
To review the limitations, the flight crew must display the memos and limitations page on the EWD (Refer to DSC-31-40-50 Handling Procedure - Memos and Limitations).
- INFO , if any

- **[INOP SYS]**, if any
- If the display indicates MORE, the flight crew can consult additional information about the aircraft status (Refer to DSC-31-40-50 Handling Procedure - Status More on SD).

The flight crew can remove the STATUS page by pressing the STS pb on ECP .

- [L2] The Flight crew can remove the STATUS page by pressing the CLEAR pb , if the vertical line appears on the STATUS page.
If memos/limitations page is not displayed, the flight crew should not use the CLEAR pb to remove the STATUS page, in order to avoid inadvertent deletion of information displayed on EWD .

Status Review



HANDLING ECAM PROCEDURES - STATUS MORE PAGE

Applicable to: ALL

MORE INFORMATION ON THE STATUS

If there is additional information about the aircraft status, the display indicates MORE at the bottom of the STATUS page.

The flight crew can manually:

- Display the STATUS MORE page, by pressing the MORE pb on the ECP.
- Remove the STATUS MORE page, after display, by pressing the MORE pb on ECP, to revert to the STATUS page.

[L2] The flight crew can remove the STATUS MORE page by pressing the CLEAR pb, if the vertical line appears on the STATUS MORE page.

If memos/limitations page is not displayed, the flight crew should not use the CLEAR pb to remove the STATUS MORE page, in order to avoid inadvertent deletion of information displayed on EWD.

Status More Page



HANDLING ECAM PROCEDURES - DEFERRED PROC

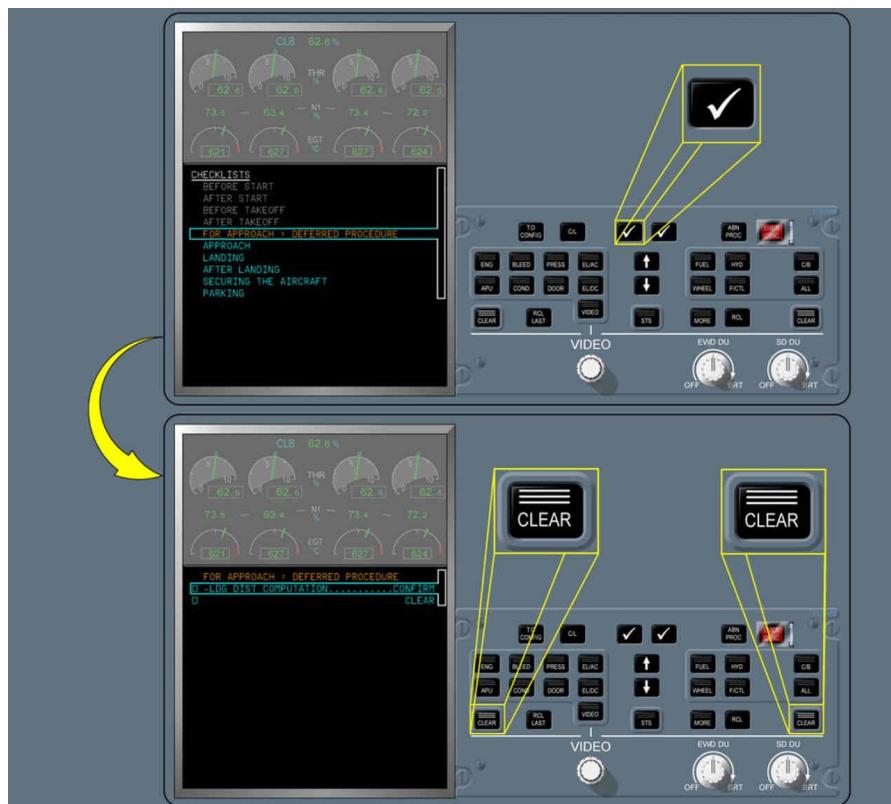
Applicable to: ALL

DEFERRED PROCEDURES ON THE EWD

After the flight crew clears the ECAM procedure from the EWD, the EWD displays the checklist menu, if there are any applicable deferred procedures.

The flight crew selects the appropriate item in the checklist menu, in order to read the deferred procedures and to assess the most appropriate time in the flight to perform the actions.

When the flight crew has reviewed all the actions, the flight crew clears the deferred procedure from the EWD with the CLEAR pb and checklist menu appears.

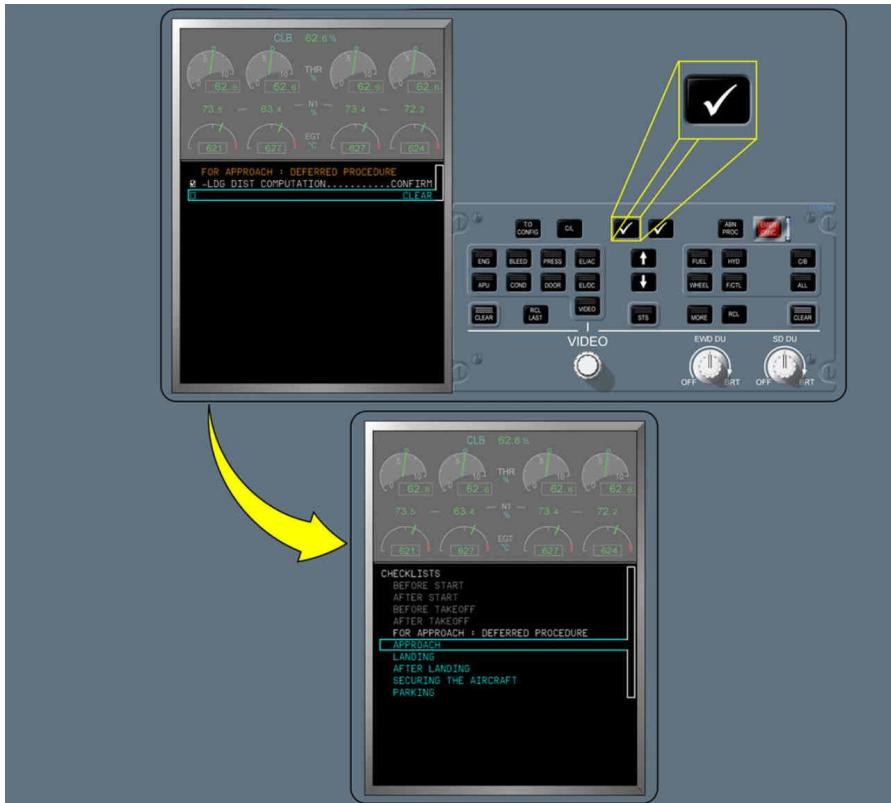
Deferred Procedure Review

When the flight crew has to perform the deferred procedure, the flight crew displays the checklist menu to select and to display the deferred procedure on the EWD . For more information on how to access to the checklist menu *Refer to DSC-31-40-40 How to Handle the Checklists* .

When the flight has completed all the actions, the deferred procedure in the checklist menu changes from amber to white.

For more details on deferred procedure handling, *Refer to FCTM/OP-40-40-3-40-3-2 Tasksharing Rules* .

Deferred Procedure Review

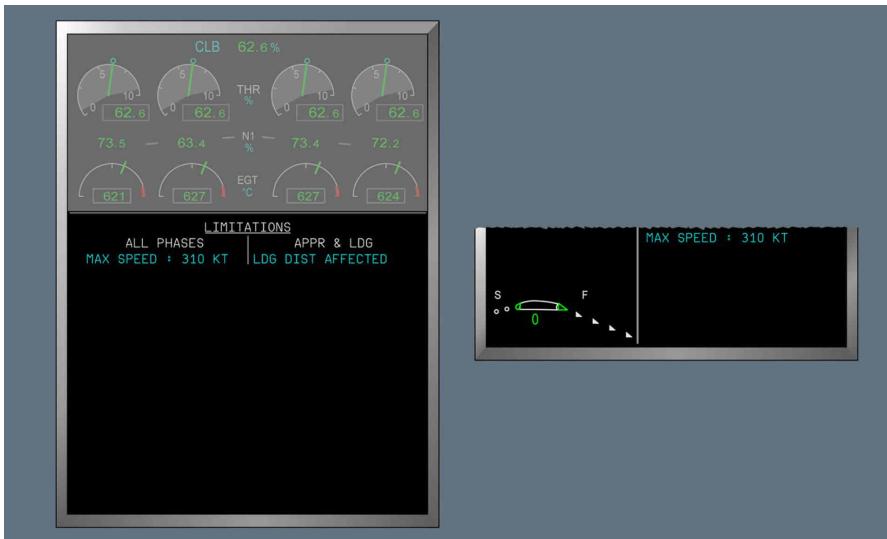


HANDLING ECAM PROCEDURES - MEMOS AND LIMITATIONS

Applicable to: ALL

MEMOS AND LIMITATIONS ON THE EWD AND THE PFD

After the flight crew clears the ECAM procedure and the checklist menu (and deferred procedures, if any) from the EWD, the EWD display memos and limitations, if any.

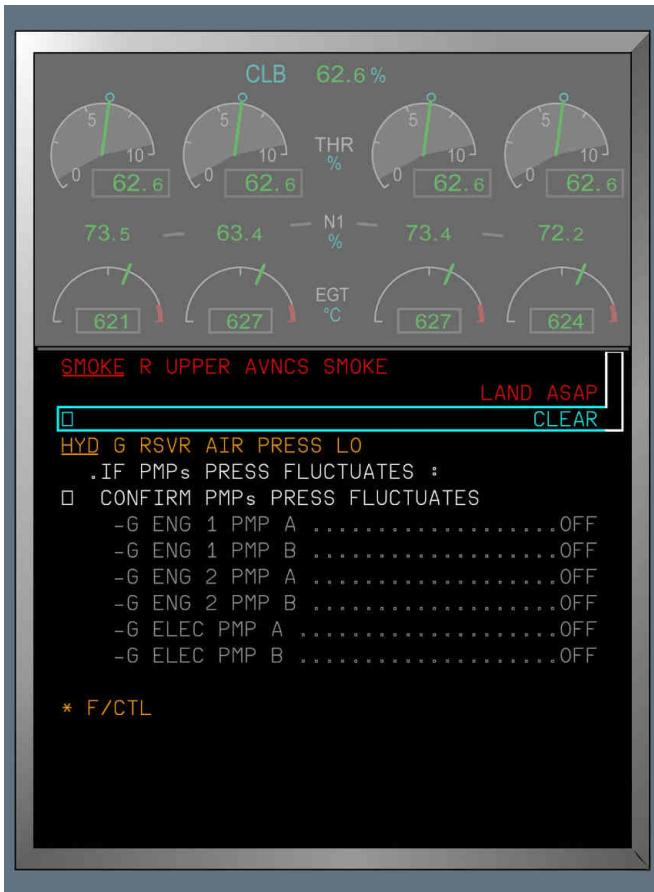
Limitation**HANDLING ECAM PROCEDURE - MULTIPLE ECAM PROCEDURES**

Applicable to: ALL

MULTIPLE ECAM PROCEDURES

When the ECAM displays more than one procedure at the same time, the flight crew must perform the procedures in the order the EWD presents the alerts. The alert that the flight crew must consider is indicated by the vertical bar on the right side of the EWD .

Unless the ECAM procedure contains AUTO RCL indication next to a condition line, the flight crew must not start to perform a new procedure, until the flight crew completes the on-going procedure. For more information on the AUTO RCL function, *Refer to DSC-31-40-10 Procedure Description* . If the EWD cannot display all the alerts on a single display (overflow indication displayed), the flight must not attempt to see the other alerts or action lines of a procedure, that are not visible, by clearing the procedures not yet performed.

Multiple ECAM Procedures



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ECAM - ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

FWS AIRLINE CUSTOMIZATION REJECTED (*Refer to PRO-ABN-ECAM-10-31-165 FWS AIRLINE CUSTOMIZATION REJECTED*)

CDS FWS 1+2 & CPIOM FAULT (*Refer to procedure*)

CDS FWS 1+2 & FCDC 1+2 FAULT (*Refer to procedure*)

FWS FWS 1+2 FAULT (*Refer to procedure*)

FWS ATQC DATABASE REJECTED *Refer to procedure*)

FWS AUDIO FUNCTION LOSS (*Refer to procedure*)

FWS ECP FAULT (*Refer to procedure*)

FWS FWS 1(2) FAULT (*Refer to procedure*)

MAINTENANCE TIME LIMITED ITEM (*Refer to procedure*)



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AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

ECAM - ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Subsystem | Electrical Supply |
|--------|--------------------|------------------------------|
| ECAM | FWS 1 | DC ESS and BAT 1 and ESS BAT |
| | FWS 2 | DC 2 |
| | ECP | DC ESS |
| | MASTER WARN lights | DC ESS and DC 2 |
| | MASTER CAUT lights | DC ESS and DC 2 |

- One half of the MASTER lights is powered by the DC ESS, and the second half is powered by the DC 2.



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AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

ECAM - ELECTRICAL SUPPLY

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A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

MFD

MFD - OVERVIEW

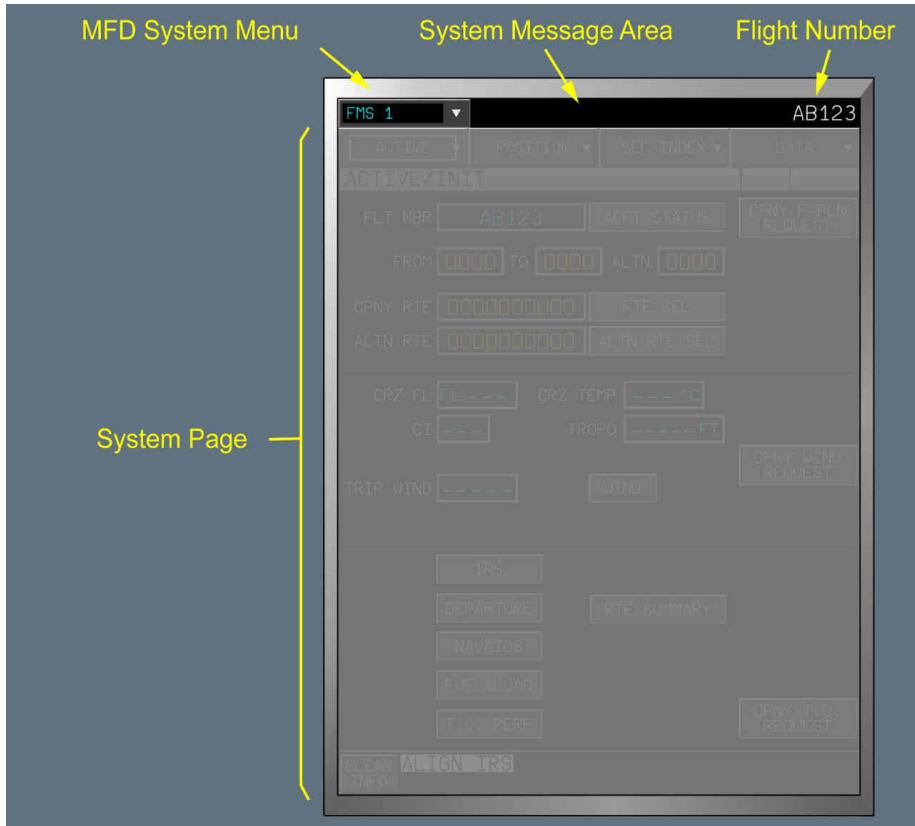
Applicable to: ALL

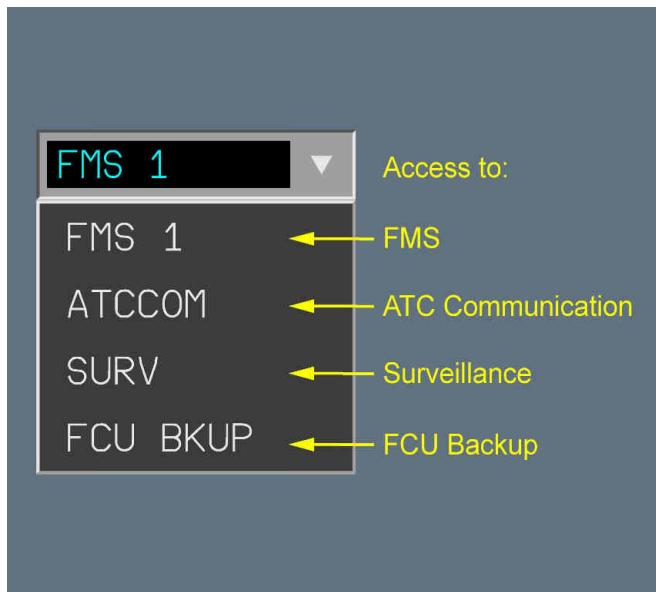
There are two Multi Function Displays (MFD s). There is one for the Captain and one for the First Officer.

The MFD displays:

- The FMS pages (FMS)
- The ATC Communication pages (ATC COM)
- The surveillance pages (SURV)
- The FCU backup (FCU BKUP)

The MFD is interactive: The flight crew can navigate through the pages, and can consult, enter or modify the data via the KCCU . (*Refer to KCCU*)

Multi Function Display (MFD)

MFD SYSTEM MENUMFD System Menu

Indicates the system identifier that is actually displaying data on the MFD .

The menu list displays all systems that can display data on the MFD :

FMS

Gives access to the FMS pages.

[L2] The identifier is different on the captain's side and first officers's side, and depends on which FMC is providing data for display on the MFD .

Refer to More Information On the FMS Abnormal Operations

Refer to More Information on the FMS Selector

On the captain's side:

| | |
|---------|---|
| FMS 1 | Normal configuration: FMC -A provides data for FMS 1. |
| FMS 1-C | Abnormal configuration: FMC -C provides data for FMS 1. |

Continued on the following page

Continued from the previous page

| | |
|---------|--|
| FMS 2 | Abnormal Configuration: The flight crew has selected BOTH ON 2 on the FMS Source Select Switch. FMC -B provides data for FMS 2, and the data from side 2 is displayed on side 1. |
| FMS 2-C | Abnormal Configuration: The flight crew has selected BOTH ON 2 on the FMS Source Select Switch. FMC -C provides data for FMS 2, and the data from side 2 is displayed on side 1. |

On the first officer's side:

| | |
|---------|--|
| FMS 2 | Normal configuration: FMC -B provides data for FMS 1. |
| FMS 2-C | Abnormal configuration: FMC -C provides data for FMS 2. |
| FMS 1 | Abnormal Configuration: The flight crew has selected BOTH ON 1 on the FMS Source Select Switch. FMC -A provides data for FMS 1, and the data from side 1 is displayed on side 2. |
| FMS 1-C | Abnormal Configuration: The flight crew has selected BOTH ON 1 on the FMS Source Select Switch. FMC -C provides data for FMS 1, and the data from side 1 is displayed on side 2. |

L1 ATC COM

Gives access to the ATC communication pages.

Refer to ATCCOM Pages Overview

SURV

Gives access to the surveillance pages.

Refer to SURV Pages Overview

FCU BKUP

Gives access to the FCU backup pages.

Refer to FCU Backup Pages Overview

SYSTEM MESSAGE AREA

The System Message Area displays three different messages to get the attention of the flight crew on an FMS or ATCCOM event, when the MFD actually not displays the FMS, or ATCCOM pages:

- NEW ATIS RECEIVED:

Indicates that a new ATIS report is received, and the MFD displays an application other than ATCCOM. This message is removed when the flight crew accesses an ATCCOM page.

- ATIS SYS MSG:

Indicates that a ATIS FSM message is received, and the MFD displays an application other than ATC COM. This message is removed when the flight crew accesses an ATC COM page.

- CHECK FMS MESSAGE:

Indicates that an amber FMS message is pending, and the MFD displays an application other than FMS. This message is removed when the flight crew accesses an FMS page.

FLIGHT NUMBER

Indicates the flight number that the flight crew has entered on the FMS ACTIVE / INIT page. (
Refer to Page)

SYSTEM PAGE

In this area, the MFD displays:

- The FMS pages (FMS)

Refer to FMS Pages Overview

- The ATC Communication pages (ATC COM)

Refer to ATCCOM Pages Overview

- The surveillance pages (SURV)

Refer to SURV Pages Overview

- The FCU backup (FCU BKUP)

Refer to FCU BKUP page Overview .

MFD BRIGHTNESS KNOB

Applicable to: ALL

MFD Brightness Knob

Turns the PFD screen on or off, and adjust its brightness.

The brightness is also automatically tuned (in a limited range) according to the ambient light in the cockpit, via the two light sensors that are located on the bottom of the DU.



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OPERATING MANUAL

AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

HUD - GENERAL

GENERAL

Applicable to: ALL

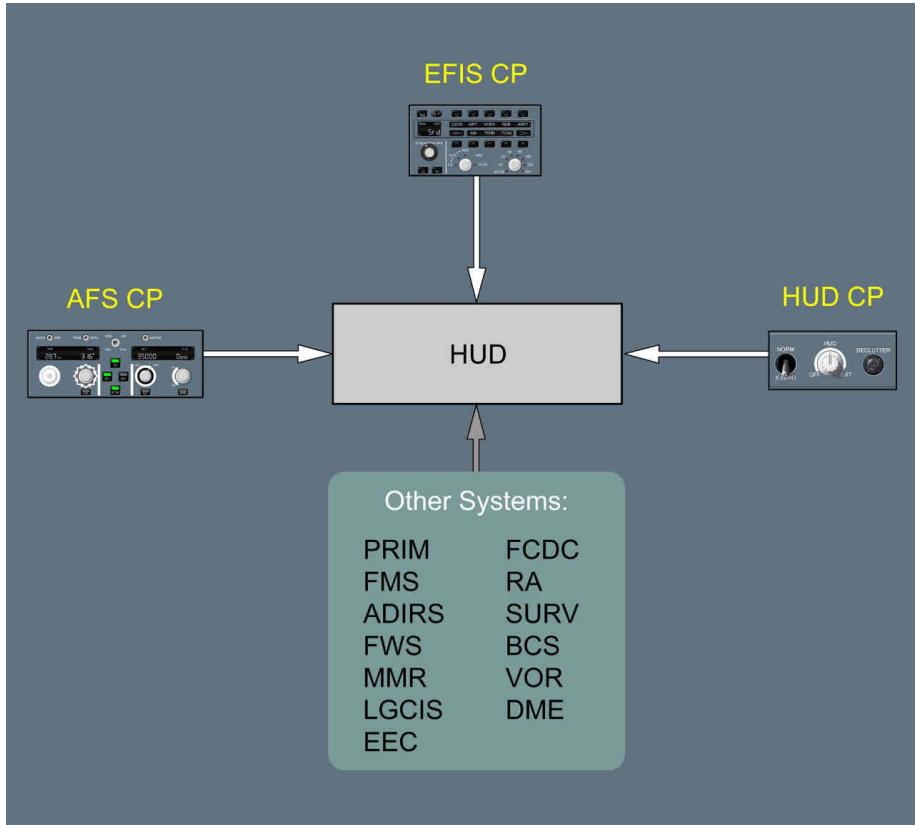
The Head-Up Display (HUD) provides flight data and/or images in the flight crew's field of view. The flight data is superimposed to the outside view. This enables the flight crew to adapt the flight, in relation to external parameters (e.g. terrain, runway surface, clouds, etc.).

ARCHITECTURE

Applicable to: ALL

The HUD includes:

- A Head-Up Display Computer (HUDC) that generates the display of the symbols
The HUDC is located in the avionics compartment.
- [L2] The HUDC uses the same source as the onside PFD .
- [L1]- An Head-Up Projection Unit (HPU)
The unit is located above the flight crew, and projects the symbols on the Head-Up Combiner Unit (HCU).
- A Head-Up Combiner Unit (HCU).
The unit is located in the flight crew's field of view, and superimposes the symbols to the outside view.



HUD CONTROL PANEL

The HUD CP enables the flight crew to adapt the HUD display in accordance with the flight conditions.

For more information, *Refer to DSC-31-60-30-GHUDC HUD Control Panel*.

AFS CONTROL PANEL

The flight crew uses the AFS CP for the flight guidance management.

For more information on the AFS CP , *Refer to 22-FG/CONTROLS AND INDICATORS/AFS CP*.

EFIS CONTROL PANEL

The flight crew uses the EFIS CP to select:

- The landing configuration, via the LS pb
- The barometric setting
- The VOR / ADF display, via the VOR/ADF pb .

For more information about the EFIS CP , Refer to 31/EFIS/CONTROLS AND INDICATORS/EFIS CP .

L3 OTHER SYSTEMS

The HUD also interfaces with the following systems:

AIR DATA AND INERTIAL REFERENCE SYSTEM (ADIRS)

The ADIRS provide data for the display logics and animation.

The HUD uses inputs from ADIRS1 (or ADIRS3, if the onside ATT HDG selector is set to ADIRS3 on the ADIRS CP).

PRIMARY FLIGHT CONTROL AND GUIDANCE COMPUTER (PRIM)

The PRIMs provide data from the flight guidance, the flight envelope and the reactive windshear function.

The HUD uses inputs from the master PRIM.

FLIGHT CONTROL DATA CONCENTRATOR (FCDC)

The HUD receives data for the FMA display.

FLIGHT MANAGEMENT SYSTEM (FMS)

The FMS provides data for approach and runway displays.

The HUD uses inputs from:

- FMS1 (or FMS3, if FMS1 is inoperative), or
- FMS2, if the FMS selector is set to BOTH ON 2.

RADIO ALTIMETERS (RA)

The RAs provide data for approach and runway displays.

The HUD uses:

- The median value, if all the RAs are operative, or
- The average value, if one RA is inoperative, or
- The remaining value, if two RAs are inoperative.

FLIGHT WARNING SYSTEM (FWS)

The FWS provides and receives data for the triggering of alerts.

The HUD uses inputs from FWS1 (FWS2, if FWS1 is inoperative).

MULTI MODE RECEIVER (MMR)

The MMR provides data for takeoff, approach, and runway displays.

The HUD uses inputs from MMR1.

DME, VOR

The HUD receives radio position data.

The HUD uses inputs from DME1.

SURVEILLANCE SYSTEM (SURV)

The SURV provides TAWS and TCAS warnings.

The HUD uses inputs from the master AEES.

ENGINE ELECTRONIC CONTROLLER (EEC)

The EEC provides data for the FMA, and for TOGA computation.

BRAKING CONTROL SYSTEM (BCS)

The BCS provides ground deceleration information.

The HUD uses inputs from the active BCS.

LANDING GEAR CONTROL AND INDICATION SYSTEM (LGCIS)

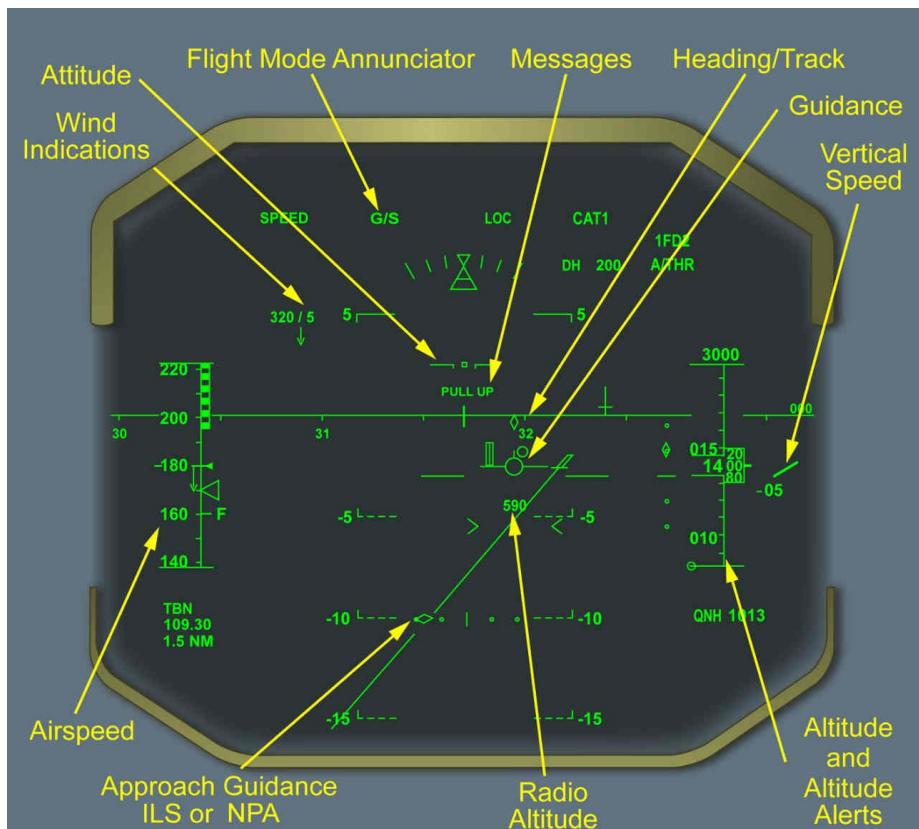
The LGCIS provides the aircraft on ground information.

The HUD uses inputs from the active LGCIS.

Overview

OVERVIEW

Applicable to: ALL

Overview

Some indications only appear on ground: *Refer to DSC-31-60-20-20 On Ground Indications .*

The flight crew can adapt the display to:

- The visibility conditions: *Refer to DSC-31-60-20-150 Declutter Modes*
- The wind conditions: *Refer to DSC-31-60-20-150 Crosswind Mode .*



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FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

HUD - SYSTEM DESCRIPTION

Intentionally left blank



A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

HUD - SYSTEM DESCRIPTION

On Ground Indications

ON GROUND INDICATIONS

Applicable to: ALL

The HUD automatically adapts the symbols to the following flight phases:

- Taxi: *Refer to DSC-31-60-20-20-GTAXI Taxi Mode*
- Takeoff: *Refer to DSC-31-60-20-20-GTAKE Takeoff Mode*
- Rollout or rejected takeoff: *Refer to DSC-31-60-20-20-GROLL Roll Out or Rejected Takeoff Mode .*

TAXI MODE

Applicable to: ALL

When the aircraft is taxiing, the HUD displays:

- Less information, for better visibility of the external environment
- Additional information useful for aircraft alignment on the taxiways and the runways.

The taxi mode appears, if the aircraft is on ground, and at a speed less than 40 kt .

The flight crew can select one of the following display modes, via the DECLUTTER pb :

- Normal mode
- Declutter mode.

For more information on the taxi declutter mode, *Refer to DSC-31-60-20-150 Declutter Modes .*

During taxi, the flight crew cannot display the crosswind mode.

Taxi Normal Mode**GROUND SPEED**

[L3] The ADIRS use the GPS and the IRS data for GS computation.

[L1] **GS 39** Indicates the current Ground Speed (GS).

LOC DEVIATION

Indicates the LOC deviation in relation to the ILS axis.

Enables the flight crew to check that:

- The aircraft is aligned on the runway selected in the FMS
- The lateral guidance is available.

[L2] Appears if the LOC is aligned with the runway heading (QFU).

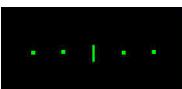
[L3] The MMR provides the LOC deviation information.

[L1] **QNH 1013** The LOC deviation is within the scale.





The LOC deviation is not within the scale.



The MMR is on standby.

L12**LOC**

Appears, instead of the LOC scale, when the LOC receiver on the same side is failed.

Flashes for 9 s, then remains steady.

INVERTED T**L12**

Indicates the offset pitch rotation symbol.

The difference between the inverted T and the aircraft indicates the target pitch attitude for rotation:

- 12.5° , if all engines are operative
- 10° in the case of an engine failure.

No longer appears after liftoff:

- Above 100 ft radio altitude, or
- 1 s after the Flight Path Director (FPD) appears.

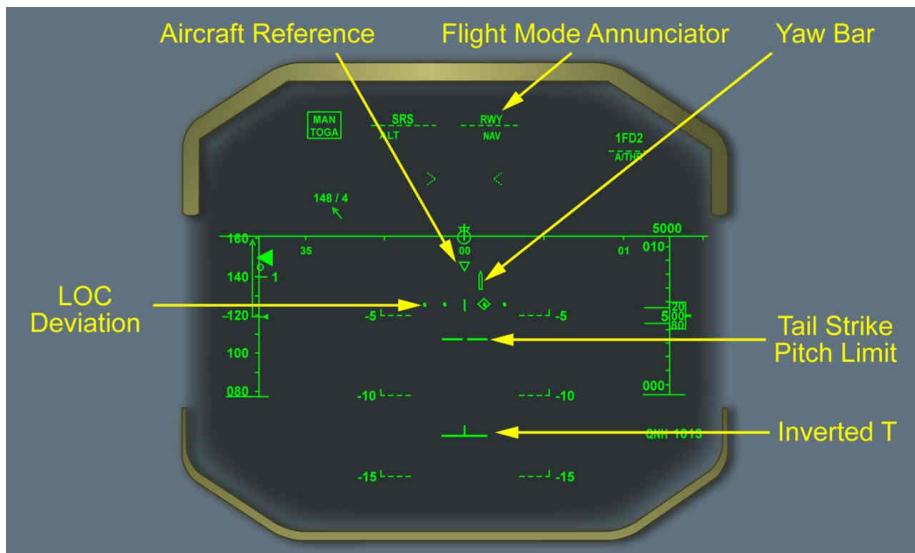
TAKEOFF MODE**Applicable to: ALL**

The takeoff mode provides useful information for the lateral control of the aircraft in low visibility conditions, when the aircraft is on ground.

L2 The takeoff mode appears, if the aircraft is on ground, at the takeoff power selection.

The takeoff mode no longer appears, if the aircraft is flying above 50 ft radio altitude.

L1 In the takeoff mode, the flight crew cannot display the crosswind mode or the declutter mode. As soon as the flight crew selects the takeoff thrust, the takeoff mode appears on the HUD, even if the declutter mode was previously selected.

Takeoff ModeAIRCRAFT REFERENCE

L12



Indicates the aircraft axis, as a reference for the yaw bar.
Appears on ground, if the flight crew engages the FD.

YAW BAR

L3

The PRIMs provide the yaw orders.

L12



Indicates the yaw orders of the Flight Director (FD), in order for the flight crew to maintain the aircraft on the runway centerline.
Appears on ground, if the flight crew engages the FD.

Note: *The yaw bar is only available if the runway has a LOC aligned with the runway centerline.*

L12



When one engine fails during takeoff, indicates the yaw orders of the Flight Director (FD), in order for the flight crew to maintain the aircraft on the runway centerline.

Appears when the difference between engine 1(2) N1 and engine 4(3) N1 is more than 10 %.

LOC DEVIATION

Indicates the LOC deviation in relation to the ILS axis.

Enables the flight crew to check that:

- The aircraft is aligned on the runway selected in the FMS
- The lateral guidance is available.

L2 Appears if the LOC is aligned with the runway heading (QFU).

L3 The MMR provides the LOC deviation information.

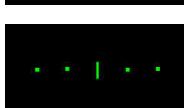
L1



The LOC deviation is within the scale.



The LOC deviation is not within the scale.



The MMR is on standby.

L12

LOC

Appears, instead of the LOC scale, when the LOC receiver on the same side is failed.

Flashes for 9 s, then remains steady.

INVERTED T

L12



Indicates the offset pitch rotation symbol.

The difference between the inverted T and the aircraft indicates the target pitch attitude for rotation:

- 12.5 °, if all engines are operative
- 10 ° in the case of an engine failure.

No longer appears after liftoff:

- Above 100 ft radio altitude, or
- 1 s after the Flight Path Director (FPD) appears.

TAIL STRIKE PITCH LIMIT

L3 The PRIMs provide the tail strike limit information.

L12



Indicates the maximum pitch attitude, in order to avoid tail strike during takeoff.

The indication moves from the pitch limit value, with the main landing gear compressed (i.e. 12 °), to the pitch limit value, with the main landing gear not compressed (i.e. 13.5 °).

No longer appears 3 s after liftoff.

FLIGHT MODE ANNUNCIATOR (FMA)

The Flight Mode Annunciator (FMA) indicates:

- The status of the A/THR
- The AP / FD vertical and lateral modes
- The approach capability
- The AP / FD and A/THR engagement status
- The autobrake arming status.

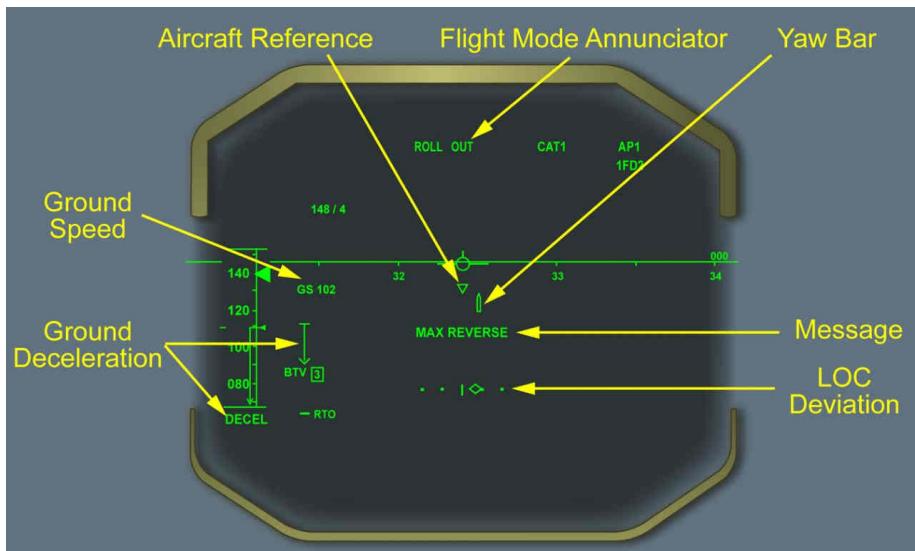
Messages from the Flight Guidance, the Flight Controls, and the FMS can also appear below the FMA .

For more information about guidance indications on the FMA , Refer to 22-FG/CONTROLS AND INDICATORS/FMA .

ROLL OUT OR REJECTED TAKEOFF MODE

Applicable to: ALL

- L2** The roll out or rejected takeoff mode appears, if:
- The aircraft is on ground at a speed higher than 40 kt
 - The thrust levers are not set to TOGA or FLEX.
- L1** In the roll out or rejected takeoff mode, the flight crew can not display the crosswind mode, or the declutter mode.

AIRCRAFT REFERENCE**L12**

Indicates the aircraft axis, as a reference for the yaw bar.
Appears on ground, if the flight crew engages the FD.

YAW BAR

- L3** The PRIMs provide the yaw orders.

L12



Indicates the yaw orders of the Flight Director (FD), in order for the flight crew to maintain the aircraft on the runway centerline.

Appears on ground, if the flight crew engages the FD.

Note: *The yaw bar is only available if the runway has a LOC aligned with the runway centerline.*

LOC DEVIATION

Indicates the LOC deviation in relation to the ILS axis.

Enables the flight crew to check that:

- The aircraft is aligned on the runway selected in the FMS
- The lateral guidance is available.

L2 Appears if the LOC is aligned with the runway heading (QFU).

L3 The MMR provides the LOC deviation information.

L1  The LOC deviation is within the scale.

 The LOC deviation is not within the scale.

 The MMR is on standby.

L12 LOC Appears, instead of the LOC scale, when the LOC receiver on the same side is failed.
Flashes for 9 s, then remains steady.

GROUND SPEED

L3 The ADIRS use the GPS and the IRS data for GS computation.

L1  Indicates the current ground speed (GS).

GROUND DECELERATION

- L3 The IRS provide the ground deceleration information, based on the longitudinal acceleration of the aircraft. The BCS provides the selected autobrake mode. The PRIM provides the BTV status.

L12



The BTV function is engaged.

Indicates the current deceleration of the aircraft.

No longer appears, if the autobrake function is failed.

L12



The autobrake is active in the RTO mode.

Indicates the current deceleration of the aircraft.

The deceleration arrow may not reach the RTO indication, even if the RTO mode provides the maximum braking performance.

No longer appears, if the autobrake function is failed.

L12

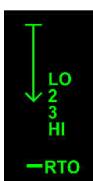


The autobrake is active.

Indicates the current deceleration of the aircraft.

No longer appears, if the autobrake function is failed.

L1



The autobrake is not active.

Indicates the current deceleration of the aircraft

L123

DECCEL

The autobrake is active, and the aircraft decelerates as selected via the AUTO BRK mode selector.

Appears, when the aircraft deceleration is at least 80 % of the selected deceleration.

No longer appears, when the aircraft deceleration is less than 70 % of the selected deceleration.

The BCS provides the DECEL information.

Note: *On a slippery runway, the A-SKID may be activated before the aircraft reaches the selected deceleration. Therefore, the DECEL indication may not appear, even if the autobrake is active.*

FLIGHT MODE ANNUNCIATOR (FMA)

The Flight Mode Annunciator (FMA) indicates:

- The status of the A/THR
- The AP / FD vertical and lateral modes
- The approach capability
- The AP / FD and A / THR engagement status
- The autobrake arming status.

Messages from the Flight Guidance, the Flight Controls, and the FMS , can also appear below the FMA .

For more information about guidance indications on the FMA , Refer to 22-FG/CONTROLS AND INDICATORS/FMA .

MESSAGE

L3

The PRIM provides the ROP status.

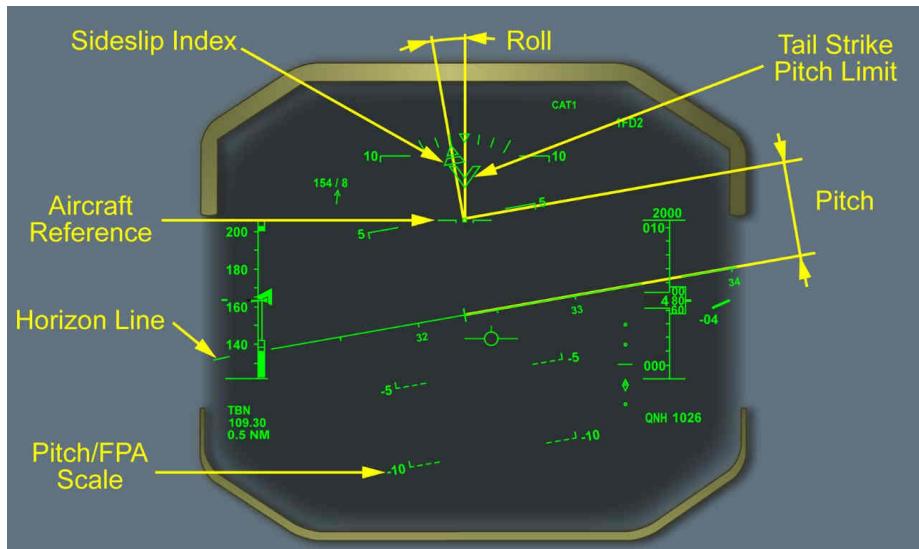
L12

MAX REVERSE The Runway Overrun Protection (ROP) function is engaged.
Flashes for 9 s, then remains steady.

Attitude

ATTITUDE

Applicable to: ALL

Attitude**HORIZON LINE**

The horizon line is superimposed to the real horizon, and provides:

- An intuitive perception of the attitude of the aircraft
- The zero pitch angle/FPA information.

- [L3] The ADIRS provide pitch and roll data that are necessary for the display of the horizon line.
- [L2] Appears as a dotted line, if the line is no longer superimposed to the real horizon.

No longer appears if:

- The bank angle is more than 71° , or less than -71° , or
- The pitch attitude is more than 39° , or less than -25° .

AIRCRAFT REFERENCE

L12



Indicates the fixed reference position of the aircraft.

Appears, when the aircraft is above 100 ft radio altitude:

- In normal mode or declutter 1 mode
- In declutter 2 mode, if the tailstrike margin is below 1 °.

ROLL

Indicates the bank angle of the aircraft.

L3 The ADIRS provide the bank angle information.

L1



The bank angle of the aircraft is between ±35 °.

Degrees are indicated in increments of 10 ° up to ±30 °.

L12



The bank angle of the aircraft is above ±35 °.

The roll scale increases up to ±65 °.

Indicates the bank angle protection limit in normal law.

L12



The bank angle of the aircraft is above ±35 °, and the bank angle protection is lost. The aircraft is in alternate, or direct law.

The roll scale increases up to ±65 °.

L2 The roll scale and pointers no longer appear if:

- The pitch attitude is more than 39 °, or less than -25 °, or
- The bank angle is more than 71 °, or less than -71 °, or
- The aircraft is on ground.

PITCH/FPA SCALE

The scale indicates the pitch attitude, and the Flight Path Angle (FPA) of the aircraft.

L3 The ADIRS provide the pitch attitude and the flight path angle information.

L1 Degrees are indicated in increments of 5 °. The horizon line indicates the zero reference of the pitch/FPA scale.

L2 Appears as dotted lines for negative values.

L12



Indicates that the pitch attitude is too high, and the direction to take in order to reduce it.

Appears, when the pitch attitude of the aircraft is:

- More than 34 °, or
- Less than -20 °.

The pitch/FPA scale no longer appears on the HUD.

SIDESLIP INDEX

L2 No longer appears when the aircraft is on ground.

L123



- On ground, indicates the aircraft lateral acceleration
 - In flight, indicates the sideslip of the aircraft.
If the sideslip is not available, indicates the lateral acceleration of the aircraft.
- The ADIRS provide the sideslip and the lateral acceleration.

L12



Both sideslip and lateral acceleration indications are not valid.
Flashes for 9 s, then remains steady.

L13



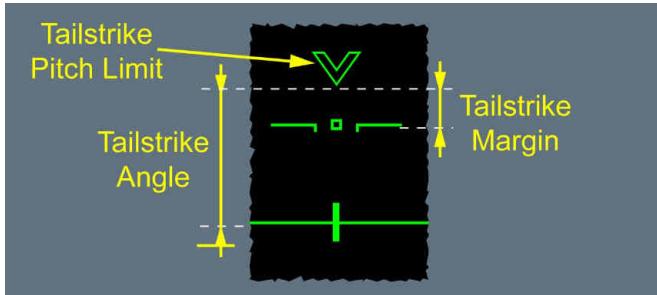
Appears when one engine fails during takeoff, or go-around.
The sideslip index then corresponds to the beta target.

Appears, when:

- The flight crew selects CONF 1, 2, or 3
- The N1 of at least one engine is above 80 %
- The difference between the N1 of two engines is above 40 %.

The PRIMs provide the beta target information.

The sideslip index also appears below the FPV.

TAIL STRIKE PITCH LIMITTail strike Pitch Limit

Indicates the maximum pitch attitude, in order to avoid tail strike at landing.

[L2] Pulses, if the tail strike margin is less than 1 °.

Appears, when the aircraft is below 400 ft radio altitude, at 12 ° corresponding to the tailstrike pitch attitude with compressed main landing gear.

No longer appears:

- When the ground speed is less than 50 kt, or
- 4 s after a go-around is initiated.

[L3] The PRIMs provide the tail strike limit indication.



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AIRCRAFT SYSTEMS

31 - INDICATING/RECORDING

HUD - SYSTEM DESCRIPTION

Airspeed

AIRSPEED

Applicable to: ALL

The following general indications concerning the airspeed of the aircraft appear during all flight phases:

- The speed reference line
- The airspeed target
- The speed trend arrow
- The Mach number.

Refer to DSC-31-60-20-40-GGEN General Airspeed Indications .

The following airspeed indications appear in flight:

- During takeoff:

- V1
- VR
- V2
- The short term managed speed
- VFE next
- F speed
- S speed
- Green dot
- The automatic retraction speed.

Refer to DSC-31-60-20-40-GTAKE Airspeed Indications During Takeoff

- During descent:

- Lower and upper speed range limits.

Refer to DSC-31-60-20-40 Airspeed Indications During Descent

- After touchdown:

Refer to DSC-31-60-20-40 Airspeed Indications After Touchdown

During the flight, the airspeed scale also displays the following protection speeds:

- VMAX, and the high speed protection indication
- VLS
- $V_{\alpha \text{ prot}}$ (in normal law)

- $V_{\alpha_{max}}$ (in normal law)
- $V_{\alpha_{sw}}$ (in alternate and direct law).

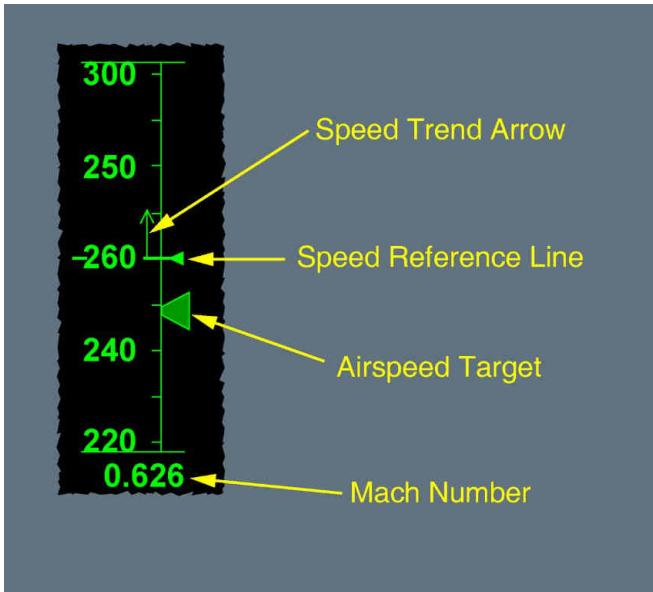
Refer to DSC-31-60-20-40 Airspeed Protections

GENERAL AIRSPEED INDICATIONS

Applicable to: ALL

L2 The airspeed scale has markers every 10 kt , and starts at 30 kt .

General Airspeed Indications



L12

SPD

Appears, instead of the airspeed scale, when no speed information is available.
Flashes for 9 s , then remains steady.

L12



Appears, when characteristic speeds computation is no longer available.

The following airspeed indications do not appear on the airspeed scale:

- VLS
- S speed
- F speed
- Green dot speed
- Speed trend arrow
- VFE next
- $V\alpha_{sw}$.

Appears, when:

- The three PRIMs are lost, or
- Both SFCC slats channels are lost, or
- Both SFCC flaps channels are lost.

Flashes for 9 s, then remains steady.

SPEED REFERENCE LINE

L13



Indicates the current airspeed of the aircraft.

The ADRs provide the current airspeed information.

SPEED TREND ARROW

L123



Indicates the airspeed that the aircraft will reach in 10 s, if its current acceleration(deceleration) remains constant.

Appears, when the speed trend is more than 2 kt.

No longer appears, when the speed trend is less than 1 kt.

The PRIMs provide the speed trend information.

AIRSPEED TARGET

Indicates the airspeed target, or the airspeed corresponding to the Mach target.

L3 The PRIMs provide the airspeed target information. If all three PRIMs are lost, the FCU backup provides the airspeed target information.

L1



- The flight crew selects the airspeed target (manually selected on the AFS CP, or manually entered in the FMS)
- The airspeed target is within the airspeed scale.

300
220

- The flight crew selects the airspeed target (manually selected on the AFS CP, or manually entered in the FMS)
- The airspeed target is not within the airspeed scale.

300
220

- The airspeed target is managed (computed by the FMS)
- The airspeed target is within the airspeed scale.

300
220

- The airspeed target is managed (computed by the FMS)
- The airspeed target is not within the airspeed scale.

L12

SPD SEL

The airspeed selected on the AFS CP is not available.
Flashes for 9 s, then remains steady.

MACH NUMBER

L3 The ADIRS provide the Mach number information.

L1 220
0.626

Appears below the airspeed scale, if the aircraft speed is more than M 0.5.
No longer appears, if the aircraft speed is less than M 0.45.

L12

MACH

The Mach data is not available.
Flashes for 9 s, then no longer appears.

AIRSPEED INDICATIONS DURING TAKEOFF

Applicable to: ALL

BEFORE LIFTOFF

L3 The FMS provides V1, VR , and V2 information.

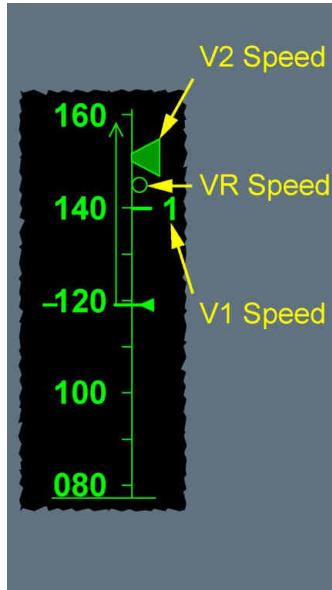
L1



During the takeoff roll, V1, and V2 are outside the airspeed scale.

For more information about V1, Refer to 22-27/Operating Speeds .

For more information about V2, Refer to 22-27/Operating Speeds .



Indicate the takeoff speeds that the flight crew manually enters in the T.O panel of the FMS ACTIVE/PERF page (V1, the rotation speed VR, and V2).

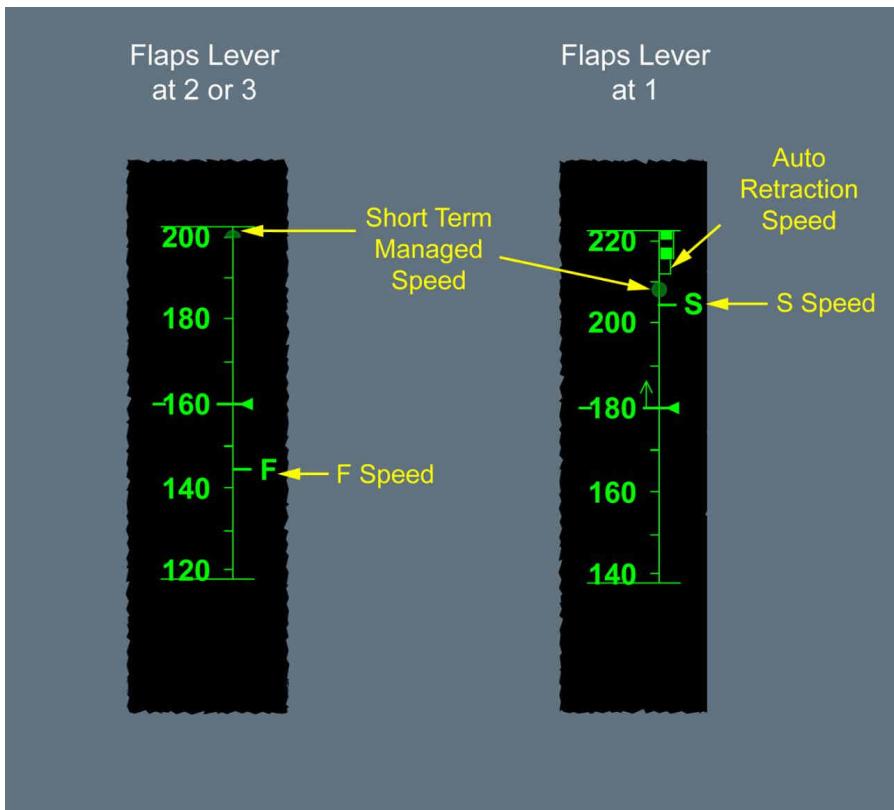
For more information about VR, Refer to 22-27/Operating Speeds .

[L2] V1 and VR indications no longer appear after liftoff.

[L12]

V1
INOP

V1 is not valid.
Flashes for 9 s , then remains steady.

AFTER LIFTOFFAfter Liftoff

- [L3] The PRIM provides these speeds.

- [L1]



In managed speed/Mach, the short-term managed speed indicates the current speed target in accordance with the configuration of the aircraft.

In selected speed/Mach, the short-term managed speed is the speed/Mach target, that would be used if the flight crew engages the managed speed/Mach control.

For more information about the short-term managed speed, *Refer to 22-FG/Speed-Mach Control/Managed Speed/Short-term Managed Speed*.



When the FLAPS lever is set to 2 or 3, indicates the target speed in managed mode, also referred to as F speed.

For more information about F speed, *Refer to 22-27/Operating Speeds/Characteristic Speeds/F*.



When the FLAP lever is set to 1 (CONF 1+F), indicates the Automatic Retraction Speed (ARS).

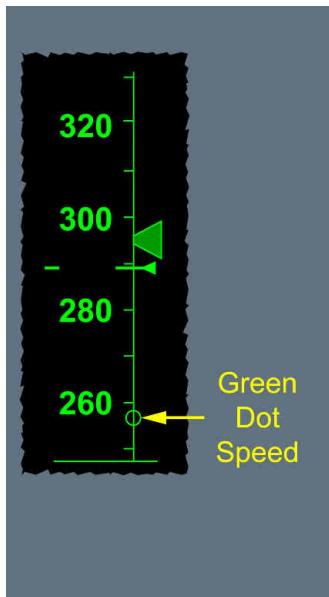
For more information about the automatic retraction speed, *Refer to 27/Slats-Flaps/Configurations/ARS*.



When the FLAPS lever is set to 1, indicates the target speed in managed mode, also referred to as S speed.

For more information about S speed, *Refer to 22-27/Operating Speeds/Characteristic Speeds/S*.

IN CLEAN CONFIGURATION



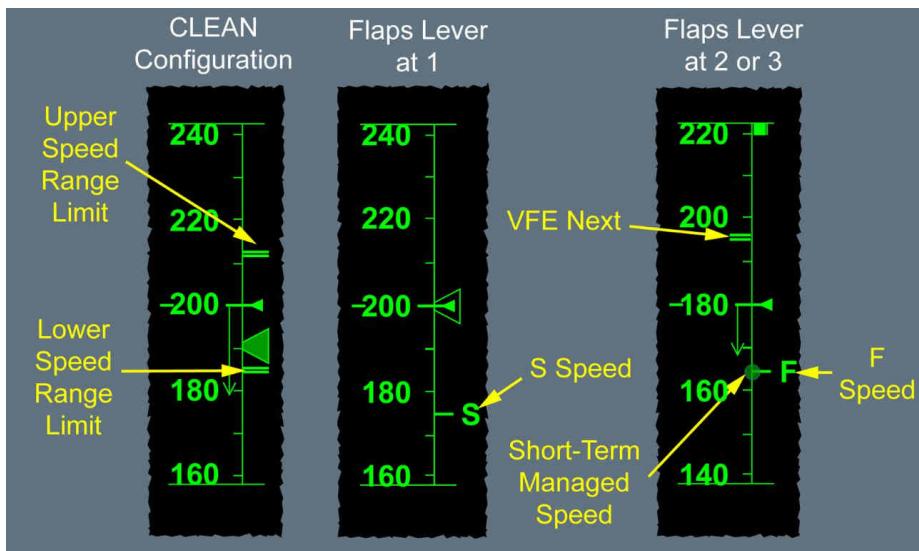
In clean configuration:

- The S speed no longer appears
- The green dot speed appears.

For more information about the green dot speed, *Refer to 22-27/Operating Speeds/Characteristic Speeds/Green Dot*.

AIRSPEED INDICATIONS DURING DESCENT

Applicable to: ALL



L123



Indicates the possible values of the aircraft speed, in order for the flight crew to maintain the appropriate vertical trajectory.

Appears during a managed descent.

The PRIM provides the speed range limits.

Note: When the FMS flight phase is the descent phase, and the DES mode is engaged, the FG does not accurately maintain the ECON speed/Mach(ECON-RTA speed/Mach). However, the managed speed/Mach should not go beyond the high and low speed margins. For more information on high and low speed margins, Refer to 22-FMS/System Description/Performance/Flight Phases and Speed Profiles .



When the FLAPS lever is set to 1, indicates the target speed in managed mode, also referred to as S speed.

For more information about S speed, Refer to 22-27/Operating Speeds/Characteristic Speeds/S .



When the aircraft is below 20 000 ft , indicates the next flap limiting speed, also referred to as VFE next.

For more information about VFE next, *Refer to 22-27/Operating Speeds/Limit Speeds/VFE next*.



In managed speed/Mach, the short-term managed speed indicates the current speed target in accordance with the configuration of the aircraft.

In selected speed/Mach, the short-term managed speed is the speed/Mach target, that would be used if the flight crew engages the managed speed/Mach control.

For more information about the short-term managed speed, *Refer to 22-FG/Speed-Mach Control/Managed Speed/Short-term Managed Speed*.

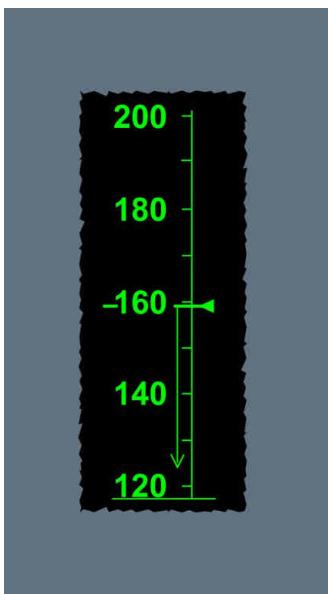


When the FLAPS lever is set to 2 or 3, indicates the target speed in managed mode, also referred to as F speed.

For more information about F speed, *Refer to 22-27/Operating Speeds/Characteristic Speeds/F*.

AIRSPEED INDICATIONS AFTER TOUCHDOWN

Applicable to: ALL



After touchdown, the only indications that appear on the airspeed scale are:

- The current airspeed
- The speed trend arrow.

AIRSPEED PROTECTIONS**Applicable to: ALL**

- L3** The PRIM s provide speed protection information. If all three PRIM s are lost, the ADIR s provide the VMO / MMO information.

L1 VMAX

Indicates the VMAX speed, that is the lowest of the following speeds:

- VMO , or the speed corresponding to MMO
- VLE
- VFE .

For more information on the VMAX definition, *Refer to 22-27/Operating Speeds/Protection Speeds/VMAX*.

In normal law, when the aircraft reaches the speed indicated by the symbol , the high speed protection activates.

For more information about high speed protection, *Refer to 22-27/Protections/High Speed Protections* .

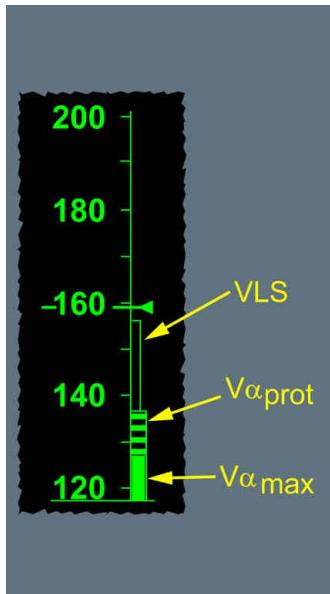


In alternate or direct law, the VMAX indication remains displayed, but the high speed protection is not available.

appears, instead of the high speed protection symbol.

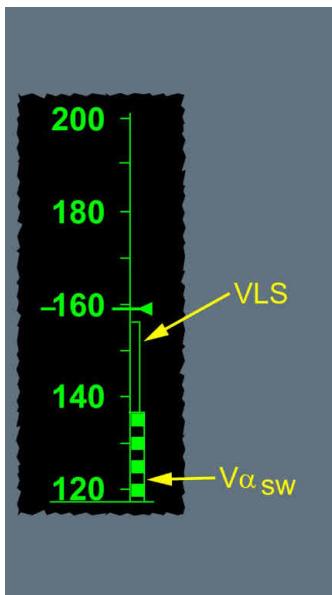
MINIMUM SPEEDS

L12



The protection speeds, with flight controls in normal law, are:

- The minimum selectable speed, also referred to as the VLS
It provides an appropriate margin for the stall speed.
For more information on the VLS , Refer to 22-27/Operating Speeds/Characteristic Speeds/VLS .
No longer appears on ground.
- The alpha protection speed, also referred to as $V\alpha_{prot}$
At this speed, the Angle-of-Attack of the aircraft activates the alpha protection.
For more information on the $V\alpha_{prot}$, Refer to 22-27/Operating Speeds/Protection Speeds/ $V\alpha_{prot}$.
- The alpha max speed, also referred to as $V\alpha_{max}$.
It provides the speed associated with the maximum Angle-of-Attack that the aircraft can attain, in pitch normal law.
For more information on the $V\alpha_{max}$, Refer to 22-27/Operating Speeds/Protection Speeds/ $V\alpha_{max}$.



The protection speeds, with flight controls in alternate law, or in direct law, are the following:

- The VLS
 - The stall warning speed, also referred to as $V\alpha_{SW}$.
- For more information on $V\alpha_{SW}$, Refer to 22-27/Operating Speeds/Protection Speeds/ $V\alpha_{SW}$.



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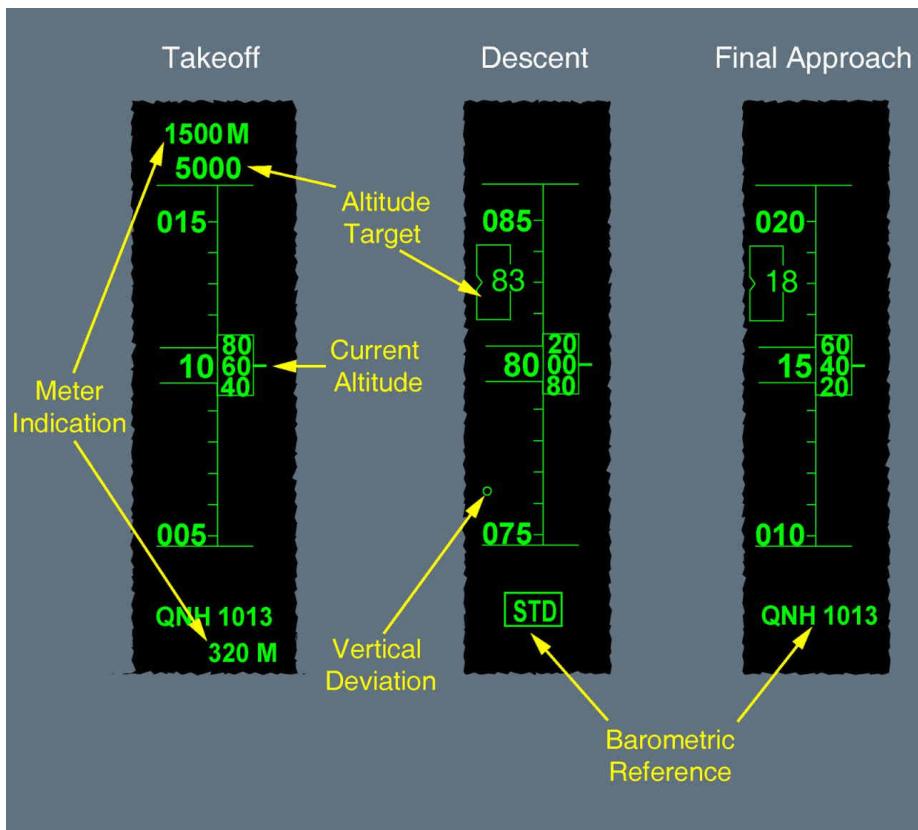
31 - INDICATING/RECORDING

HUD - SYSTEM DESCRIPTION

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Altitude**ALTITUDE**

Applicable to: ALL

Altitude**CURRENT ALTITUDE**

- [L3] The ADRs provide the current altitude information.

L12



Indicates the current altitude.

Pulses, when the difference between the current altitude and the selected altitude:

- Decreases
- Is between 200 ft and 750 ft.

Flashes, when the difference between the current altitude and the selected altitude:

- Increases
- Is above 200 ft.

L12

BARO

The aircraft flies a Non-Precision Approach, and the current altitude is equal to, or less than the Minimum Descent Altitude (MDA) (Minimum Descent Height (MDH)).

Pulses for 5 s, then remains steady.

The current altitude is negative.

L1



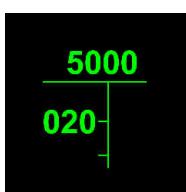
ALTITUDE TARGET

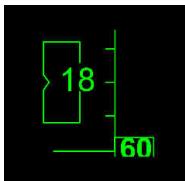
L3 The PRIMs provide the altitude target. If all three PRIMs are lost, the FCU backup provides the altitude target.

L1 Indicates:

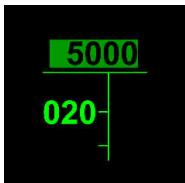
- Altitude, if the selected barometric reference is QNH, or
- FL, if the selected barometric reference is STD.

- Indicates the AFS CP selected altitude if the vertical guidance is either selected or managed
- The altitude target is not within the altitude scale.

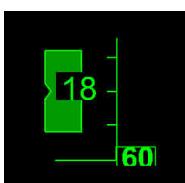




- Indicates the AFS CP selected altitude if the vertical guidance is either selected or managed
- The altitude target is within the altitude scale.



- Indicates an altitude constraint if the vertical guidance is managed
- The next altitude target is not within the altitude scale.



- Indicates an altitude constraint if the vertical guidance is managed
- The next altitude target is within the altitude scale.

Note: If a vertical approach mode is engaged, the altitude target has no green background when the flight crew selects the go-around altitude on the AFS CP.

L12

ALT SEL

Appears, when the following information cannot be displayed:

- The altitude selected by the flight crew on the AFS CP
- The altitude selected by the flight crew on the FCU backup
- The altitude constraint from the FMS.

Flashes for 9 s, then remains steady.

VERTICAL DEVIATION

L3 The FMS provides the vertical deviation.

L12



Indicates the vertical deviation between the current altitude of the aircraft, and the altitude that corresponds to the theoretical vertical profile of the FMS , within a range of +/- 570 ft .

When the vertical deviation is above 570 ft (or 200 ft in crosswind mode or declutter mode), the symbol remains at the range limit, and the exact value of the vertical deviation appears on the DES and APPR panels of the FMS PERF page.

Appears when:

- The aircraft reaches the Top of Descent (T/D), or
- The FMS flight phase is descent, or approach.

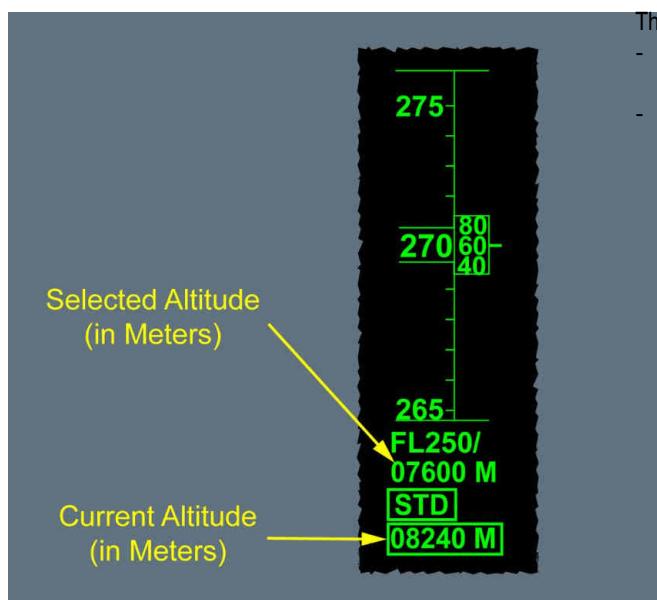
L2 **Note:** When the aircraft is in a holding pattern, the vertical deviation is the difference between the altitude of the aircraft, and the altitude of the holding exit. Refer to 22-FMS/System Description/Flight Planning/Lateral Revisions/Hold .

METER INDICATION

The selected altitude and the current aircraft altitude indications appear in meters, when the flight crew presses the METER pb on the AFS CP.

L3 The PRIMs provide the meter indication.

L1



The flight crew:

- Presses the METER pb on the AFS CP
- Selects an altitude target on the AFS CP.

BAROMETRIC REFERENCE

- [L3] The ADRs provide the barometric reference.
- [L1] QNH 1013 The flight crew selects the QNH pressure reference on the barometric reference knob of the EFIS CP.
- QNH 28.60 The flight crew selects the QNH pressure reference (in inches of mercury) on the barometric reference knob of the EFIS CP.
-  STD The flight crew selects the standard pressure reference on the barometric reference knob of the EFIS CP.
- [L2] Flashes, when the flight crew selected:
- QNH on the AFS CP, and the aircraft is in the climb phase, above the transition altitude, or
- STD on the AFS CP, and the aircraft is in the approach phase, below the transition flight level.
- Note:* If the transition altitude(flight level) is not available from the FMS, the default transition altitude(flight level) is automatically set to 2 500 ft radio altitude.



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31 - INDICATING/RECORDING

HUD - SYSTEM DESCRIPTION

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AIRCRAFT SYSTEMS

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HUD - SYSTEM DESCRIPTION

Altitude Alerts

ALTITUDE ALERTS

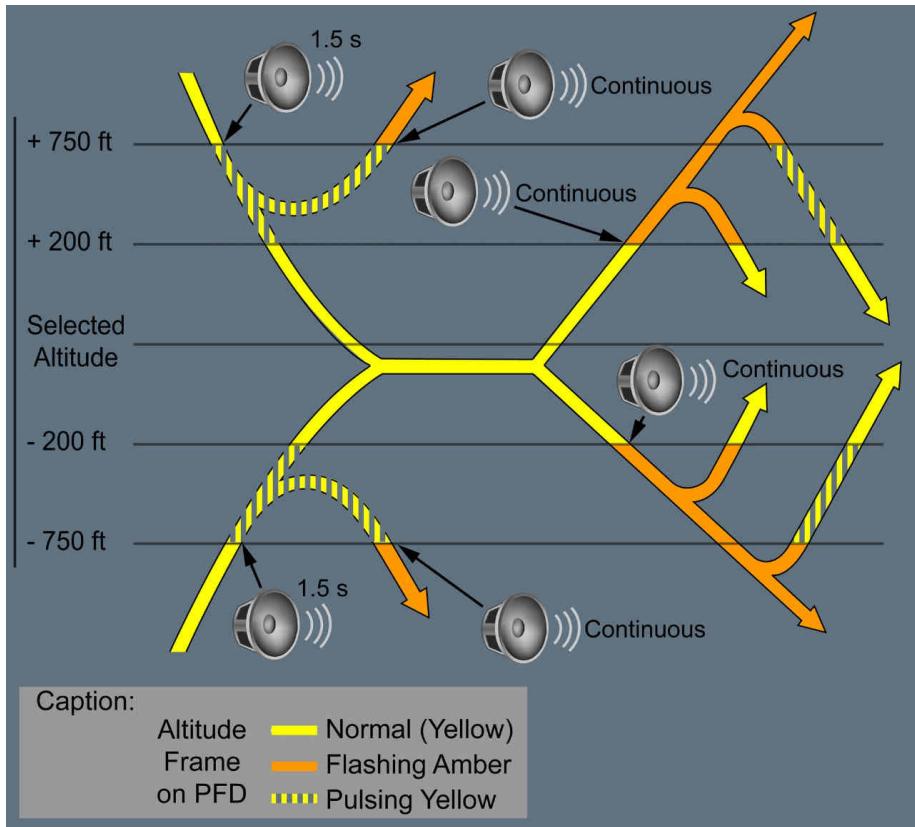
Applicable to: ALL

In manual flight, and when the aircraft approaches the selected altitude(flight level), or when the aircraft significantly deviates from the selected altitude(flight level), the ECAM generates an altitude alert:

- The altitude frame pulses, or flashes
- The C chord sound is generated.

C Chord Sound

Altitude alerts are triggered, when the altitude provided by the ADIRS is different from the altitude selected on the AFS CP.

Altitude Alerts

- The C chord sound no longer appears, when the flight crew:

- Selects a new altitude target, or
- Presses the EMER CANCEL pb on the ECAM CP, or
- Presses the MASTER WARN pb.

The altitude frame stops pulsing(flapping), when the flight crew selects a new altitude target.

This alert is inhibited:

- In approach, when the aircraft captures the glideslope, or
- When the landing gear is set to down, and the slats are extended, or



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- When the landing gear is locked down.

- When the AP/FD TCAS mode engages upon a Resolution Advisory order.

L3 If the altitude alert is triggered just after the aircraft is clear of conflict, and the AP is engaged, the C chord sound is inhibited.

If the altitude alert is triggered just after the aircraft is clear of conflict, and the AP is not engaged, a C chord sound is generated during 1.5 s.



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HUD - SYSTEM DESCRIPTION

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Radio Altitude**RADIO ALTITUDE****Applicable to: ALL**

- [L3] The radio altitude value changes:

- Every 10 ft, above 50 ft
- Every 5 ft, between 5 ft and 50 ft
- Every foot below 5 ft.

- [L2] The radio altitude indication no longer appears when:

- The aircraft is on ground, or
- The attitudes of the aircraft are excessive, or
- The aircraft is above 2 500 ft radio altitude.

[L1]



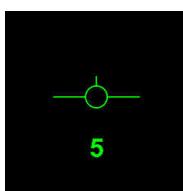
Indicates the radio altitude, when the aircraft is:

- Below 2 500 ft
- Above 400 ft.



Indicates the radio altitude, when the aircraft is:

- Below 400 ft
- Above the minimum entered on the MFD (on the APPR panel of the FMS PERF page) + 100 ft.



Appears when the aircraft is below:

- The minimum entered on the MFD (on the APPR panel of the FMS PERF page) + 100 ft, or
- 400 ft, if the flight crew did not enter a minimum on the MFD (on the APPR panel of the FMS PERF page).

[L12]



Appears when the aircraft is below the minimum entered on the MFD (on the APPR panel of the FMS PERF page) .

Pulses for 5 s, then remains steady.

L12

**RA**

- The three radio altimeters (i.e. RA A, RA B, and RA C) are failed
 - The aircraft is below the transition altitude.
- Flashes for 9 s, then remains steady.

Note: If the flight crew entered NO, NONE, NO DH, or NODH as the minimum on the MFD (on the APPR panel of the FMS PERF page), the minimum default value is zero.

Vertical Speed**VERTICAL SPEED****Applicable to: ALL**

The vertical speed scale ranges from -6 000 ft/min to 6 000 ft/min.

L2 The vertical speed indicated on the HUD is based on the baro inertial vertical speed from the IRs.

L3 Note: To compute the baro inertial vertical speed, each IR mixes its own inertial data to the barometric data received from one ADR:

- In normal configuration, each IR uses its own ADR (IR 1 uses ADR 1, IR 2 uses ADR 2 and IR 3 uses ADR 3).
- The IR 1(2) changes its ADR source based on the ADR status (operative or failed), independently from the position of the AIR DATA and the ATT HDG selectors.
- The IR 3 changes its ADR source based on the position of the AIR DATA and the ATT HDG selectors and on the ADR status (operative or failed).

L2 If the baro inertial vertical speed from the IRs is no longer available, the vertical speed indicated on the HUD is based on a pure barometric vertical speed, provided by the ADRs.

L12

Indicates the vertical speed of the aircraft.

Note: The digital indication only appears, when the vertical speed is:

- More than 200 ft/min, or
- Less than -200 ft/min.

If the vertical speed is more than 6 000 ft/min (less than -6 000 ft/min), the pointer remains on the top (bottom) of the scale.

Flashes, if the vertical speed is:

- Equal, or more than 6 000 ft/min, or less than -6 000 ft/min, or
- Less than -2 000 ft/min, and the aircraft is descending between 1 000 ft and 2 500 ft, or
- Less than -1 200 ft/min, and the aircraft is descending below 1 000 ft.

L12

The vertical speed is no longer based on the baro inertial vertical speed from the IRs: It is based on the barometric vertical speed from the ADRs.

There is a time lag between the vertical speed that appears on the HUD, and the current vertical speed of the aircraft.

L12

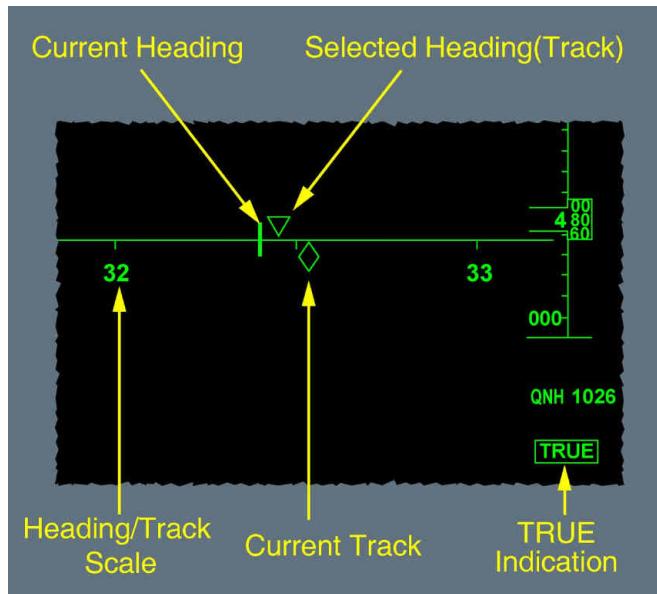


The vertical speed information is not available, neither from the IRs, nor from the ADRs.

Flashes for 9 s, then remains steady.

Heading/Track**HEADING/TRACK**

Applicable to: ALL

Heading/Track**HEADING/TRACK SCALE**

Appears on the horizon line, in the MAG or TRUE reference.

Degrees are indicated in increments of 5° , with a numerical value every 10° .

- [L2] The heading/track scale is in the TRUE reference, when:
 - The flight crew presses the TRUE/MAG pb , on the AFS CP
 - At high latitudes, the ADIRS automatically changes the MAG north reference to the TRUE north reference.

For more information on the polar navigation, *Refer to DSC-22-FMS-10-30-30 Introduction* .

- [L3] The ADIRS provide the heading information.

CURRENT HEADING

L13



Indicates the current heading of the aircraft, on the heading scale.
The ADIRS provide the heading value, in the TRUE or MAG reference,
depending on the MAG/TRUE pb selection.

CURRENT TRACK

L123



Indicates the current track of the aircraft, on the heading scale.
No longer appears, if the FPV is close to the horizon line, because it also
provides the track information.
The ADIRS provide the current track information.

SELECTED HEADING(TRACK)

L3 If all three PRIMs are lost, the FCU backup provides the selected heading(track) information. In all other cases, the PRIMs provide the selected heading(track) information.

L12



Indicates the heading(track) that the flight crew selected on the AFS CP.
Appears, when:
- The HDG/TRACK mode is engaged, or
- The APs and FDs are off.

L1



The selected heading(track) is not within the display area, the numerical value
appears instead of the symbol on the right(left) side of the heading/track scale.

TRUE INDICATION

L123



The heading reference is TRUE north.

Appears when:

- The flight crew presses the TRUE/MAG pb , on the AFS CP
- At high latitudes, the ADIRS automatically change the MAG north reference to the TRUE north reference.

The aircraft is at high latitude:

- Above 82.5 ° North, or
- Above 73.5 ° North, with a longitude between 117.5 ° West, and 92.5 ° West, or
- Below 60.5 ° South.

When the aircraft approaches high latitudes, the SELECT TRUE NORTH REF message appears on the ND , and requests that the flight crew selects the TRUE north reference.

For more information on the polar navigation, *Refer to 22/AFS-FLIGHT MANAGEMENT SYSTEM/NAVIGATION FUNCTIONS/POLAR NAVIGATION*. Flashes for 9 s , then remains steady when the slats are extended.



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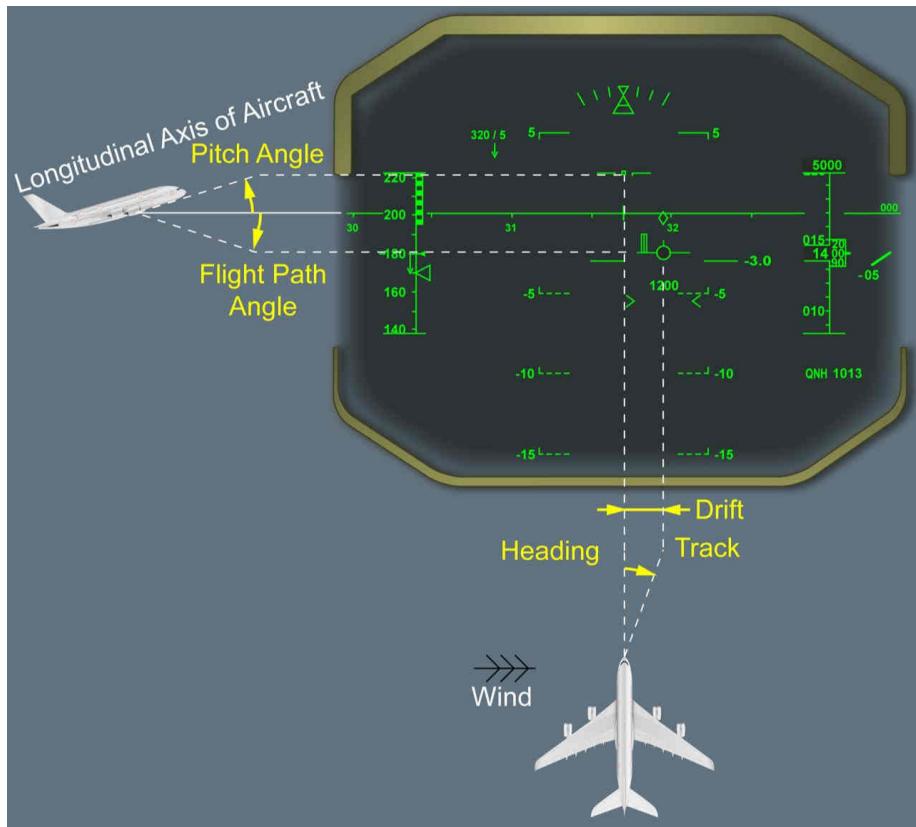
31 - INDICATING/RECORDING

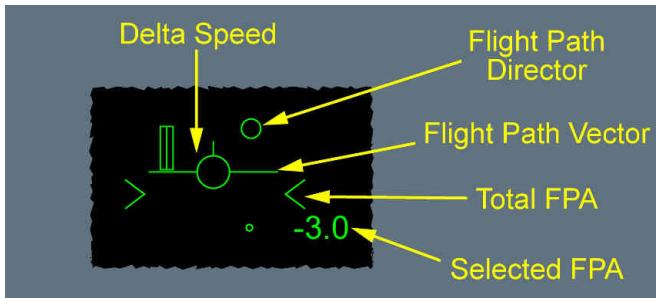
HUD - SYSTEM DESCRIPTION

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Guidance**GUIDANCE**

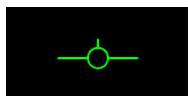
Applicable to: ALL

Guidance

Guidance**FLIGHT PATH VECTOR (FPV)**

- [L3] The ADIRS provide the flight path angle that is necessary in order to display the FPV.
The ADIRS and the GPIRS provide the current drift.

[L123]



The Flight Path Vector (FPV) indicates:

- The Flight Path Angle (FPA) on the vertical axis
- The current track on the lateral axis.

The current track is computed by using the hybrid position between IRS and GPS. If the GPIRS position is not valid, the IRS provides the current track, and the FPV IRS message appears on the HUD.

Appears as a dotted line at the edge of the display, if the FPV is not within the display area of the HUD.

The FPV is fixed at zero:

- On ground
- Under 60 kt.

[L13]



Appears when one engine fails during takeoff, or go-around.

The sideslip index then corresponds to the beta target.

Appears, when:

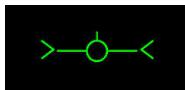
- The flight crew selects CONF 1, 2, or 3
- The N1 of at least one engine is above 80 %
- The difference between the N1 of two engines is above 40 %.

TOTAL FLIGHT PATH ANGLE (FPA)

Indicates the total energy of the aircraft. The position of the chevrons indicates whether the aircraft accelerates, or decelerates on the current flight path.

- [L2] Appears as a dotted line, at the edge of the display, if the FPV is not within the display area of the HUD.
- [L3] The PRIMs provide the total FPA.

[L1]



The aircraft is at a constant speed.



The aircraft will decelerate, if the flight crew maintains the current thrust.



The aircraft will accelerate, if the flight crew maintains the current thrust.

Note: When the aircraft is on ground, during the taxi and the takeoff roll, the same symbol indicates the acceleration/deceleration of the aircraft.

FLIGHT PATH DIRECTOR (FPD)

- [L3] The PRIMs provide the FPD information.

L12



Indicates the Automatic Flight System (AFS) guidance in relation to the flight path vector.

Appears after liftoff, if the flight crew engaged the FD .

Pulses for 5 s :

- After liftoff, or
- During a go-around.

Flashes, when one of the FD bars flashes on the PFD . For more information on the conditions that lead to the FD flashing, *Refer to DSC-22-FG-30-50 Pitch and Roll Bar Flashing* .

Appears as a dotted line at the edge of the display, if the FPD is not within the display area of the HUD .

No longer appears:

- If the attitudes of the aircraft are excessive, or
- During flare, except during autoland.

DELTA SPEED

Indicates the difference between the current airspeed and the selected or managed airspeed target.



The current airspeed is equal to the airspeed target.



The current airspeed is less than the airspeed target, and the delta speed is below 10 kt.



The current airspeed is more than the airspeed target, and the delta speed is below 10 kt.



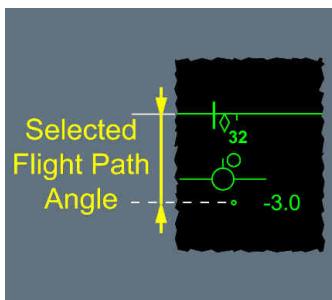
The current airspeed is more than the airspeed target, and the delta speed is more than 10 kt but below 20 kt.



The current airspeed is more than the airspeed target, and the delta speed is more than 20 kt.

SELECTED FLIGHT PATH ANGLE

L12



Indicates the FPA that the flight crew selects on the AFS CP.

Appears, when:

- The flight crew selects TRK-FPA on the AFS CP
- The flight crew engages the FD
- • The FPA mode is engaged, and the flight crew changes the selected FPA on the AFS CP, or The selected FPA appears for 5 s.
- The FPA mode is not engaged, and the flight crew preselects the FPA value on the AFS CP.

No longer appears when the FPA mode engages, or if any other AFS mode engages.



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HUD - SYSTEM DESCRIPTION

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Approach Guidance

ILS APPROACH

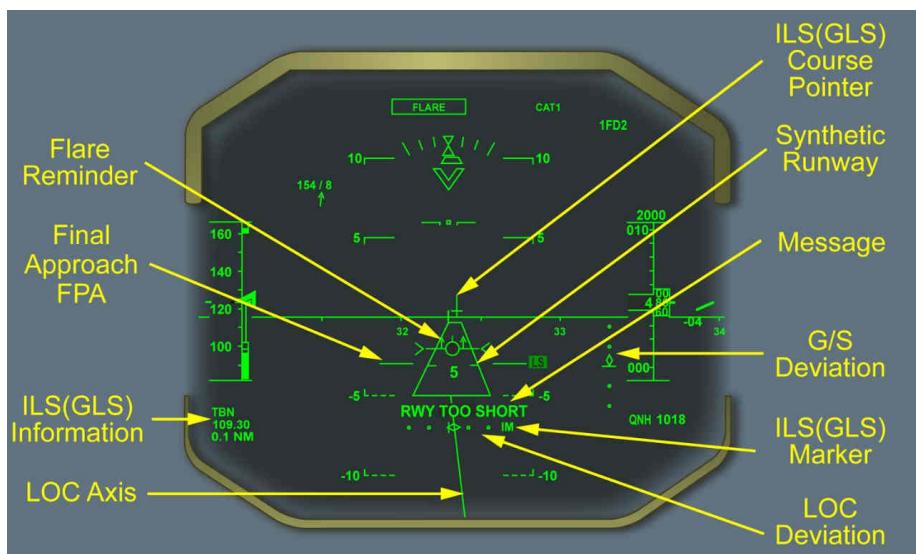
Applicable to: ALL

To perform an ILS (GLS) approach, the flight crew must:

- Select an ILS (GLS) approach on the FMS ARRIVAL page
- Press the LS pb on the EFIS CP .

L2 Note: If an ILS (GLS) is manually-tuned on the FMS POSITION/NAVAIDS page:

- The approach selected on the FMS ARRIVAL page is automatically disregarded
- The LOC and G/S modes flies the manually-tuned ILS (GLS).

**FLARE REMINDER**

- L3** The radio altimeters provide the radio altitude that is necessary for the display of the flare reminder.

L12



Indicates that it is necessary to flare.
Appears and pulses for 3 s, below 40 ft radio altitude.
No longer appears on ground.

LOC DEVIATION

- L3 The MMR provides the LOC deviation.
- L2 Flashing, and continues to flash if:
- The aircraft is between 15 ft and 1 000 ft
 - CAT2 or CAT3 appears on the FMA
 - LOC, LAND, or FLARE is engaged
 - The deviation exceeds one quarter dot.

L1



The LOC deviation is within the scale.



The LOC deviation is not within the scale.



The flight crew selects a back beam course.



The MMR is on standby.

L12

- LOC Appears, instead of the LOC scale, when the LOC receiver on the same side is failed.
Flashes for 9 s, then remains steady.

G/S DEVIATION

- L2 Appears if the flight crew did not select a back beam course.
- L3 The MMR provides the G/S deviation.
- L2 Flashing, and continues to flash if:
- The aircraft is between 100 ft and 1 000 ft
 - CAT2 or CAT3 appears on the FMA

- G/S or LAND is engaged
- The deviation exceeds one dot.

L1



The G/S deviation is within the scale.



The G/S deviation is not within the scale.



The MMR is on standby.

L12



Appears, instead of the G/S scale, when:

- The G/S receiver on the same side is failed, or
 - The MMR sends inconsistent information about the selected approach.
- Flashes for 9 s, then remains steady.

ILS(GLS) COURSE POINTER

L3 The MMR and the PRIM provide the ILS(GLS) course pointer information.

L12



Indicates the QFU of the ILS(GLS) course on the heading scale.

Note: If an ILS(GLS) is manually-tuned on the FMS POSITION/NAVAIDS page, the approach selected on the FMS ARRIVAL page is disregarded. Therefore, the LS course symbol indicates the LS course of the manually-tuned ILS(GLS) .

LOC AXIS

- [L3] The MMR provides the LOC axis information. The ADIRS provide the barometric altitude and settings that are necessary to display the LOC axis.
- [L1] Indicates a view of the LOC axis on the ground.
- [L2] Appears if:
 - The flight crew did not select a back beam course
 - The LOC is aligned on the runway heading (QFU).

Flashes, and continues to flash if:

- The aircraft is between 15 ft and 1 000 ft
- CAT2 or CAT3 appears on the FMA
- LOC, LAND, or FLARE is engaged
- The deviation exceeds one quarter dot.

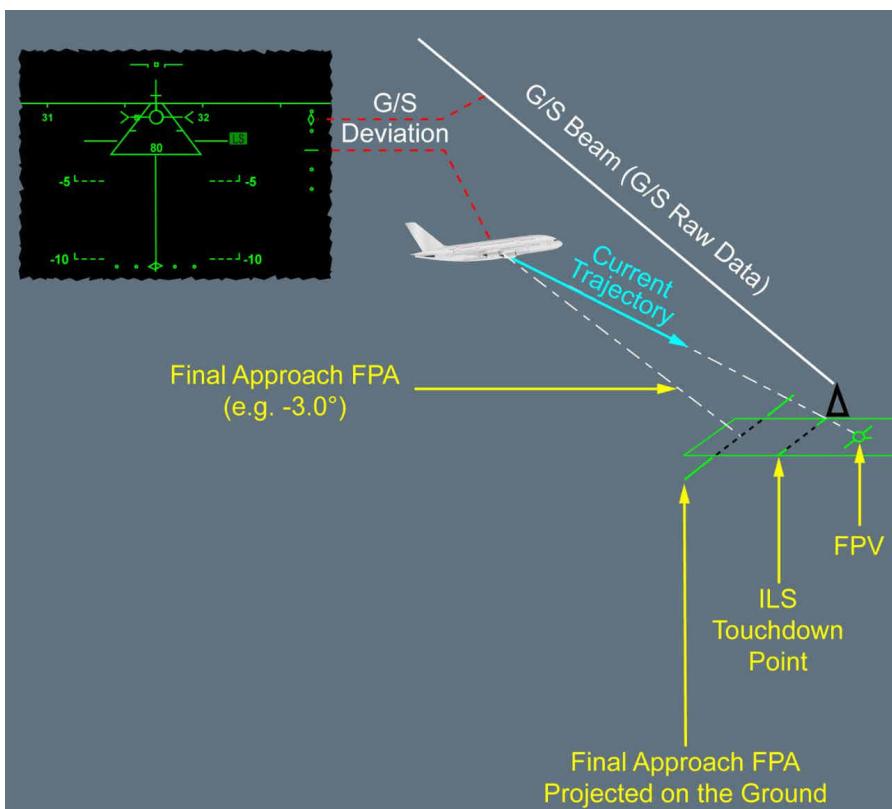
No longer appears, if the aircraft descends below:

- The minima, or
- 50 ft in the case of NO DH minima, or
- 400 ft above the runway threshold.

SYNTHETIC RUNWAY

Indicates the destination runway and the touchdown point.

- [L3] The MMR and the FMS provide the necessary information for the display of the destination runway and of the touchdown point.

Synthetic Runway

- Appears when the flight crew did not select a back beam course.

Appears as a dotted line when:

- The runway computation is less precise (i.e. using GPS data, instead of LOC and G/S deviations), or
- The difference between the LOC axis and the runway QFU is more than 2 °.

No longer appears, if the aircraft descends below:

- The minima, or
- 50 ft, in the case of NO DH minima, or
- 400 ft above the runway threshold elevation.

The touchdown point flashes, if the G/S deviation is excessive.

FINAL APPROACH FPA

- [L3] The FMS provides the final approach FPA.

[L12]



Indicates the reference slope of the G/S beam.

When the aircraft is on the G/S beam, the touchdown point is aligned with the final approach FPA symbol.

No longer appears during the flare, and if the slope of the vertical beam is not available in the navigation database.

ILS(GLS) MARKER INDICATION

- [L2] Appears when:

- The LS pb is pressed
- The aircraft flies over the marker beacon.

- [L3] The VOR provides the marker beacon information.

[L1]

OM The aircraft is flying over the outer marker of the ILS(GLS) approach.

MM The aircraft is flying over the middle marker of the ILS(GLS) approach.

IM The aircraft is flying over:

- Either the inner marker of the ILS(GLS) approach, or
- An airway marker.

ILS(GLS) INFORMATION

- [L3] The MMR, the DME, and the FMS provide the ILS(GLS) information.

[L13]

TBN
109.30
2.5 NM

Indicates the following information about the ILS(GLS):

- The ILS(GLS) identification
- The ILS(GLS) identification is decoded by the receiver.
- The ILS Frequency (in MHz), or the GLS channel
- The aircraft distance to the DME, if the ILS has a DME, or the aircraft distance to the threshold (GLS approach).

[L12]

ILS

Appears, when one of the following is not available during an ILS approach:

- The LOC signal, or
- The G/S signal.

Flashes for 9 s, then remains steady.

L12

GLS Appears, when one of the following is not available during a GLS approach:
• The LOC signal, or
• The G/S signal.
Flashes for 9 s, then remains steady.

L12

DME Appears, if:
- The ILS has a DME
- The distance to the DME is not available.
Flashes for 9 s, then remains steady.

L12

LS The approach mode is armed(engaged), and the flight crew did not press the LS pb on the EFIS CP.
Flashes for 9 s, then remains steady.

MESSAGE

L12

RWY TOO SHORT The Runway Overrun Warning (ROW) function computes that if the runway is dry, the landing distance is too short.
Flashes for 9 s, then remains steady.

L12

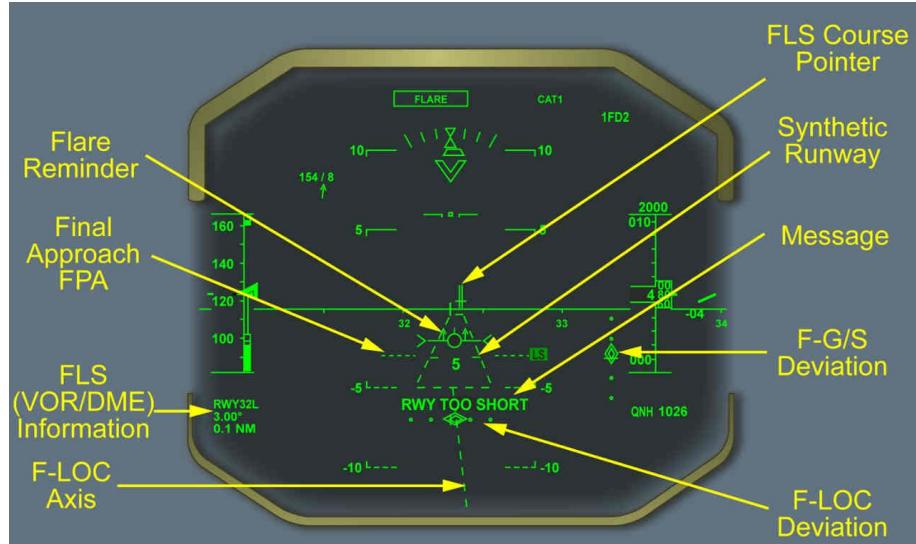
IF WET: RWY TOO SHORT The ROW function computes that if the runway is wet, the landing distance is too short.
Flashes for 9 s, then remains steady.

NON-PRECISION APPROACHES**Applicable to: ALL**

To perform a VOR , VOR / DME , or RNAV approach with the FLS function, the flight crew must:

- Select a VOR , or RNV / GPS approach on the FMS ARRIVAL page
- Press the LS pb on the EFIS CP
- Press the APPR pb .

L2 **Note:** *When the AP s and the FD s are lost, it is not necessary for the flight crew to press the APPR pb .*



FLARE REMINDER

- [L3] The radio altimeters provide the radio altitude that is necessary for the display of the flare reminder.

[L12]



Indicates that it is necessary to flare.
Appears and pulses for 3 s, below 40 ft radio altitude.
No longer appears on ground.

F-LOC DEVIATION

- [L3] The MMR provides the F-LOC deviation.

[L1] Appears, when:

- The flight crew pressed the LS pb
- The flight crew selected the FLS function
- The F-LOC deviation is valid.

[L12]



The F-LOC deviation is within the scale.
The F-LOC deviation pulses, when the approach capability is RAW ONLY:
The flight crew must press the LS pb.



The F-LOC deviation is not within the scale.



The MMR is on standby.

L123

F-LOC

Appears, instead of the F-LOC scale, when the F-LOC deviation is not valid.
The F-LOC deviation is not available when the FLS function of the MMR on the same side is lost.
Flashes for 9 s, then remains steady.

F-G/S DEVIATION

L3 The MMR provides the F-G/S deviation.

L12



The F-G/S deviation is within the scale.

The F-G/S deviation pulses, when the approach capability is RAW ONLY: The flight crew must press the LS pb.

L1



The F-G/S deviation is not within the scale.



The MMR is on standby.

L12



Appears, instead of the F-G/S scale, when:

- The F-G/S deviation is not available, or
- The MMR sends inconsistent information about the selected approach.
Flashes for 9 s, then remains steady.

FLS COURSE POINTER

L3 The MMR and the PRIM provide the FLS course pointer information.

L12



Indicates the FLS course for a Non-Precision Approach (NPA), flown with the FLS function.

Appears, when the flight crew:

- Selects a VOR, or a RNAV/GPS approach on the FMS ARRIVAL page
- Presses the LS pb on the EFIS CP.

F-LOC AXIS

L3 The MMR provides the F-LOC axis information. The ADIRS provide the barometric altitude and settings that are necessary to display the F-LOC axis.

L1 Indicates a view of the F-LOC axis on the ground.

L2 Flashes if the F-LOC deviation exceeds two dots for more than 2 s.

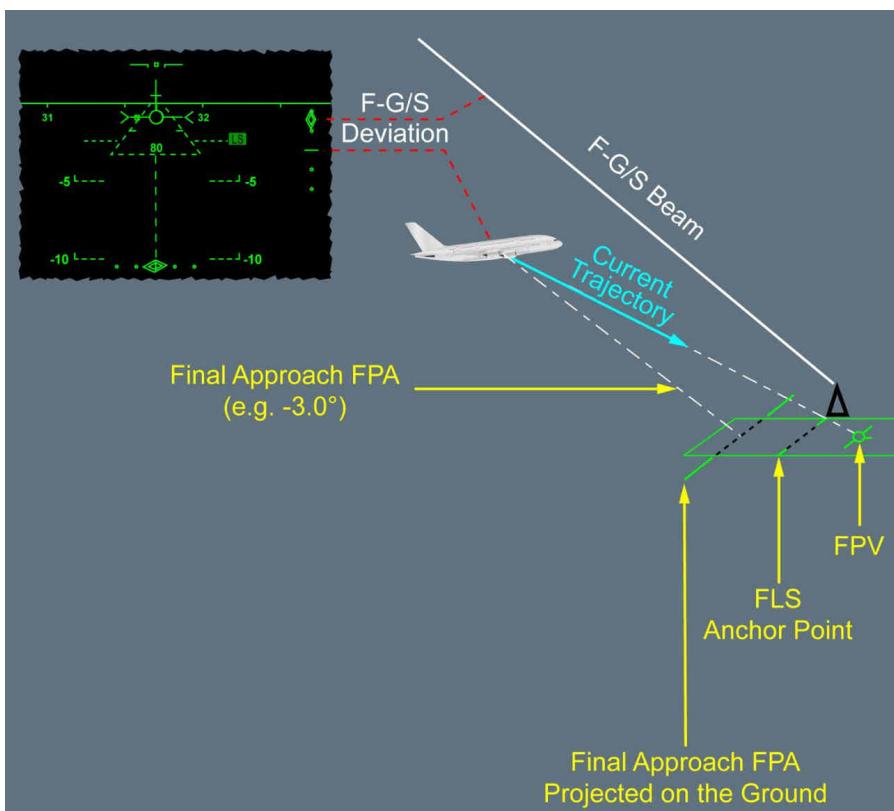
No longer appears, if the aircraft descends below:

- The minima, or
- 50 ft, in the case of NO DH minima, or
- 400 ft above the runway threshold.

SYNTHETIC RUNWAY

Indicates the destination runway and the anchor point.

L3 The MMR and the FMS provide the necessary information for the display of the destination runway and the anchor point.

Synthetic Runway

- [L2] No longer appears, if the aircraft descends below:
- The minima, or
- 50 ft, in the case of NO DH minima, or
- 400 ft above the runway threshold elevation.

FLS(VOR/DME) INFORMATION**RWY32L
3.0°**

- When the flight crew flies a NPA with the FLS function, indicates:
The FLS anchor point identification, when the anchor point is on the runway threshold
- The FLS beam slope.

EP32L
3.0°

When the flight crew flies a NPA with the FLS function, indicates:

The anchor point is not located on the runway threshold: In this case, the anchor point is also referred to as End Point (EP)

- The FLS beam slope to the end point.

[L12]

VOR1
TOU
5.5 NM

When the flight crew flies a NPA without the FLS function, and presses the 'OR pb on the EFIS CP, indicates:

- The side of the selected VOR
- The ident of the VOR/DME
 - If the navigation station ident is not valid, the HUD displays the station frequency, instead of the ident.
 - If the VOR frequency is not valid, the HUD displays the DME frequency, instead of the VOR frequency.
 - The HUD displays nothing, if both the identifier and the frequency are not valid.
- The distance from the aircraft to the selected VOR/DME beacon.

[L12]

LS

The approach mode is armed(engaged), and the flight crew did not press the LS pb on the EFIS CP.

Flashes for 9 s, then remains steady.

[L12]

FLS

Appears, when one of the following is not available:

- The FLS function, or
- The F-LOC signal, or
- The F-G/S signal, or
- The distance to the anchor point.

Flashes for 9 s, then remains steady.

[L12]

LOC/FLS

Appears, when one of the following is not available:

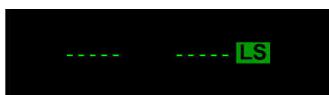
- The LOC/FLS function, or
- The LOC signal, or
- The F-G/S signal, or
- The distance to the anchor point.

Flashes for 9 s, then remains steady.

FINAL APPROACH FPA

[L2] No longer appears during the flare.

L123



The flight crew flies the NPA with the FLS function.

Indicates the reference slope of the F-G/S beam.

Appears when the flight crew presses the LS pb on the EFIS CP.

The MMR provides the reference slope of the F-G/S beam.

L1



The flight crew flies the NPA without the FLS function.

Indicates the default value -3° .



The flight crew flies the NPA without the FLS function.

Indicates the FPA selected by the flight crew on the AFS CP.

MESSAGE

L12

RWY TOO SHORT

The Runway Overrun Warning (ROW) function computes that if the runway is dry, the landing distance is too short.
Flashes for 9 s, then remains steady.

L12

IF WET: RWY TOO
SHORT

The ROW function computes that if the runway is wet, the landing distance is too short.
Flashes for 9 s, then remains steady.



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HUD - SYSTEM DESCRIPTION

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Flight Mode Announcer**FLIGHT MODE ANNUNCIATOR (FMA)****Applicable to: ALL**

The Flight Mode Announcer (FMA) indicates:

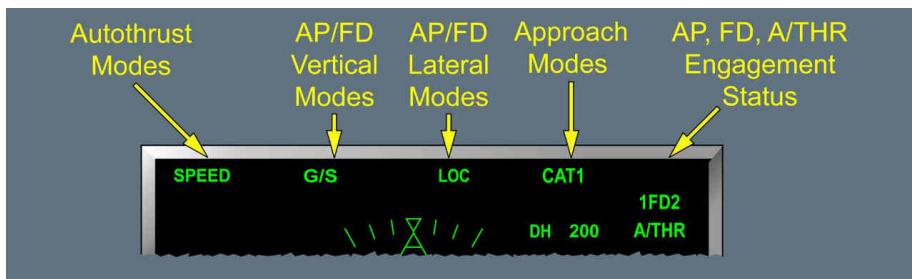
- The status of the A/THR
- The AP / FD vertical and lateral modes
- The approach capability
- The AP / FD and A / THR engagement status
- The autobrake arming status.

Messages from the Flight Guidance, the Flight Controls, and FMS can also appear below the FMA .

[2] No longer appears when:

- The bank angle is more than 45 ° , or less than - 45 ° , or
- The pitch attitude is more than 25 ° , or less than - 13 ° .

[1] For more information on guidance indications on the FMA , Refer to 22-FG/CONTROLS AND INDICATORS/FMA .

FMA



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Wind Indications**WIND INDICATIONS**

Applicable to: ALL

L13



Indicates the current wind direction (in degrees, TRUE North reference) and the current wind speed (in knots).

If the wind speed is above 2 kt, the HUD also displays a green arrow that indicates the wind direction.

The IRS provide the wind information.



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HUD - SYSTEM DESCRIPTION

Intentionally left blank

Messages**MESSAGES**

Applicable to: ALL

L12

ALT

Appears, instead of the altitude scale, when the altitude data, with the reference selected on the AFS CP, is not available.
Flashes for 9 s, then remains steady.

L12

ATT

No attitude data is available. The attitude and guidance indications no longer appear.
Flashes for 9 s, then remains steady.

L12

CHECK ALT

The altitude indicated on both PFDs is different.

Appears, when:

- The barometric reference selected by the Captain is the same as the barometric reference selected by the First Officer
- The difference between the two PFDs altitude indications is:
 - Above 250 ft, when the barometric reference is QNH, or
 - Above 500 ft, when the barometric reference is STD.

Flashes for 9 s, then remains steady.

L12

CHECK ATT

Attitude data on both PFDs differs by more than 5 °.
Flashes for 9 s, then remains steady.

L12

CHECK FPV

FPA data in the two selected IRS differs by more than 1 °.
Flashes for 9 s, then remains steady.

L12

CHECK HDG

Heading information on both PFDs differs by more than 5 °.
Flashes for 9 s, then remains steady.

COMBINER UNLOCKED

The Head-up Combiner Unit is deployed and unlocked.

L12

EXCESSIVE ATT

The attitudes of the aircraft are excessive.

Appears when:

- The bank angle is more than, or equal to 71 °, or less than or equal to -71 °, or
- The pitch attitude is more than, or equal to 34 °, or less than or equal to -20 °.

L12

HDG

Appears, instead of the heading scale, when the heading information is not available.

Flashes for 9 s, then remains steady.

L12

IF WET: RWY TOO SHORT

During the approach, the ROW function computes that if the runway is wet, the landing distance is too short.

Flashes for 9 s, then remains steady.

L12

MAX REVERSE

During the rollout, the Runway Overrun Protection (ROP) function is engaged.

Flashes for 9 s, then remains steady.

L12

PULL UP

The TAWS function of the SURV system triggers a PULL UP aural alert.

Flashes for 9 s, then remains steady.

L12

REVERT TO PFD

The flight crew must revert to the PFD.

Appears when:

- EXCESSIVE ATT appears, or
- TCAS RA appears.

Flashes for 9 s, then remains steady.

L12

RWY TOO SHORT

During the approach, the Runway Overrun Warning (ROW) function computes that if the runway is dry, the landing distance is too short.

Flashes for 9 s, then remains steady.

L12

TCAS RA

The TCAS function of the SURV system triggers a resolution advisory.

Flashes for 9 s, then remains steady.



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L12

WINDSHEAR

The PRIMs trigger a reactive windshear alert.
Flashes for 9 s, then remains steady.



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HUD - SYSTEM DESCRIPTION

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HUD Reduced Display Modes

DECLUTTER MODES

Applicable to: ALL

The flight crew can remove some information displayed on the HUD, in order to improve the observation of external parameters.

The flight crew can select different levels of declutter, according to the flight phase:

- In the taxi phase, there is one level of declutter
- In the approach phase, there are two levels of declutter: D1 and D2
- In all other flight phases, there is one level of declutter.

TAXI

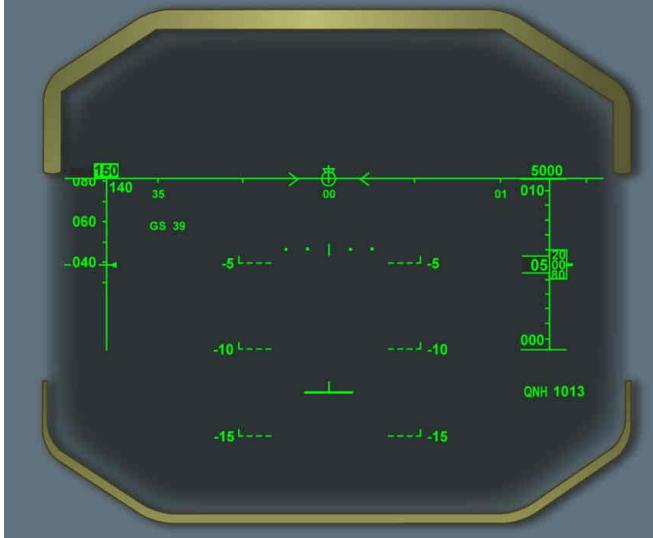
The flight crew can remove the following symbols, by pressing the DECLUTTER pb on the HUD CP:

- The pitch scale
- The airspeed scale
- The altitude scale
- The barometric setting.



(Click on the DECLUTTER pb to Change the Display)

Normal Mode



When the flight crew selects the takeoff thrust, the HUD automatically displays the normal mode for takeoff.

IN FLIGHT

- In normal mode, "N" appears on the HUD
- In declutter 1 mode, "D" appears on the HUD.

In normal and declutter 1 mode, the flight crew can also select the crosswind mode in order to reduce the speed and altitude scales.

In declutter 2 mode, altitude and speed scales are already reduced, therefore the XWIND pb has no effect on the display.

During the approach phase, the flight crew can remove the following approach symbols, by pressing the DECLUTTER pb one time on the HUD CP:

- The synthetic runway
- The approach axis
- The touchdown point, or the anchor point.

The flight crew can reduce the display by maintaining only the following symbols, by pressing the DECLUTTER pb two times in the approach phase, or one time in the other flight phases:

- The flight path vector
- The flight path director
- The current heading
- The selected heading (track)
- The horizon line
- The aircraft reference, if the tail strike margin is less than 1 °
- Part of the pitch scale
- The reduced airspeed scale
- The reduced altitude scale
- The flare reminder
- The approach tail strike symbol, if the tail strike margin is less than 1 °
- The total FPA
- The selected FPA
- The final approach FPA
- The delta speed
- The radio altitude
- The A/THR messages and modes, and the annunciations within boxes on the FMA
- Messages in the case of alerts.



In the case of a go-around, the HUD automatically displays the normal mode.

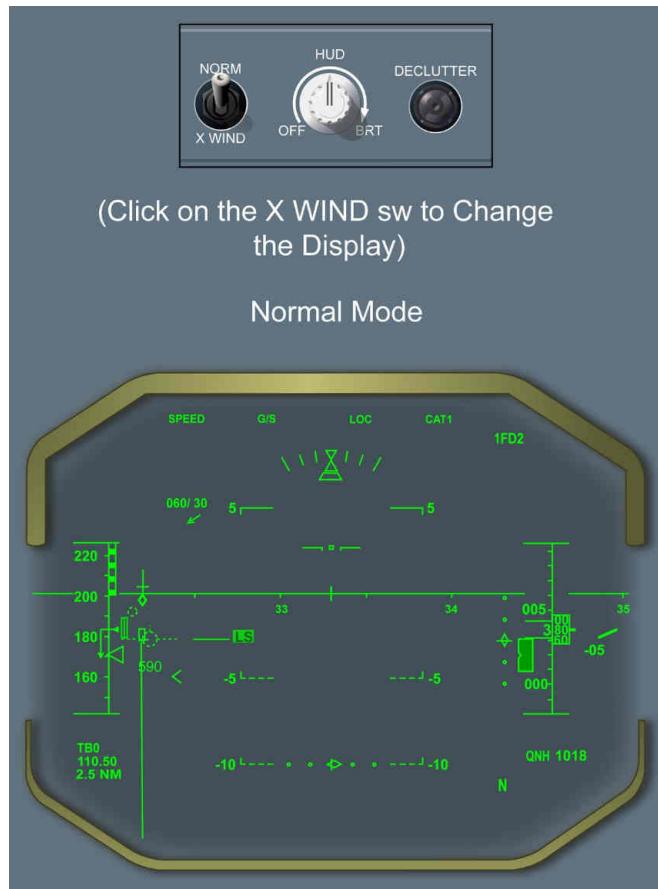
CROSSWIND MODE

Applicable to: ALL

When flying in crosswind conditions, the aircraft trajectory and guidance symbols may reach the border of the display zone.

In flight, the flight crew can reduce the speed and altitude scales, by using the XWIND sw on the HUD CP, in order to maintain adequate visibility of the symbols.

If the flight crew sets to X WIND the XWIND sw on ground, it has no effect on the HUD display until the aircraft reaches 30 ft radio-altimeter.

Crosswind

During approach, the flight crew can combine the declutter 1 mode and the crosswind mode. In other declutter modes when altitude and speed scales are already reduced, therefore the XWIND pb has no effect on the display.



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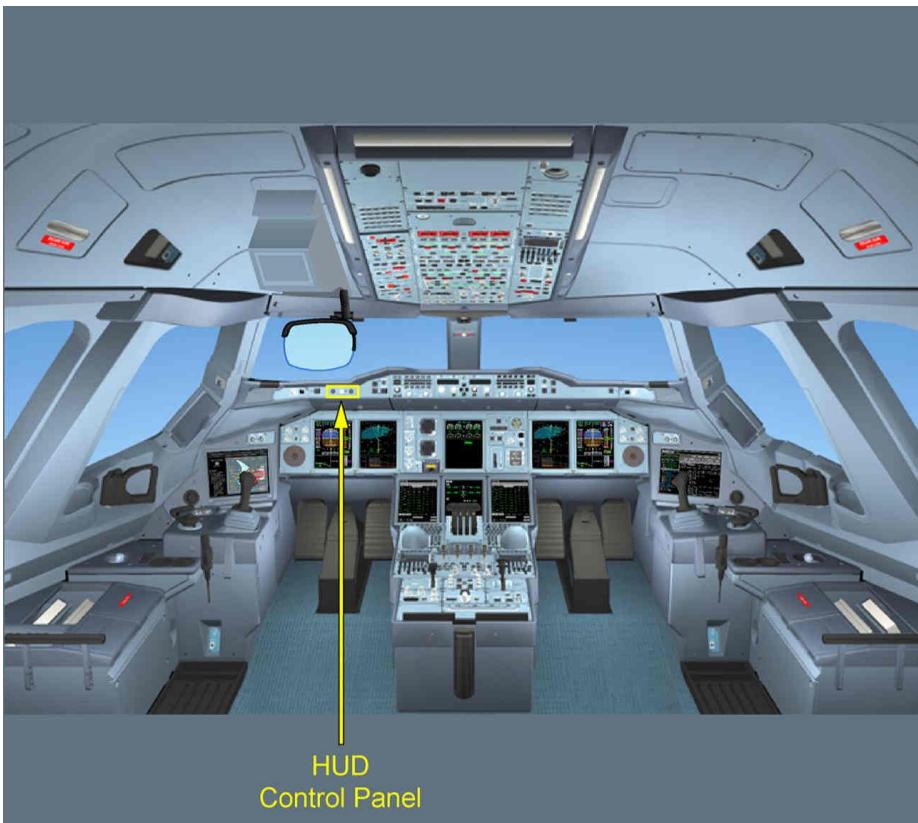
31 - INDICATING/RECORDING

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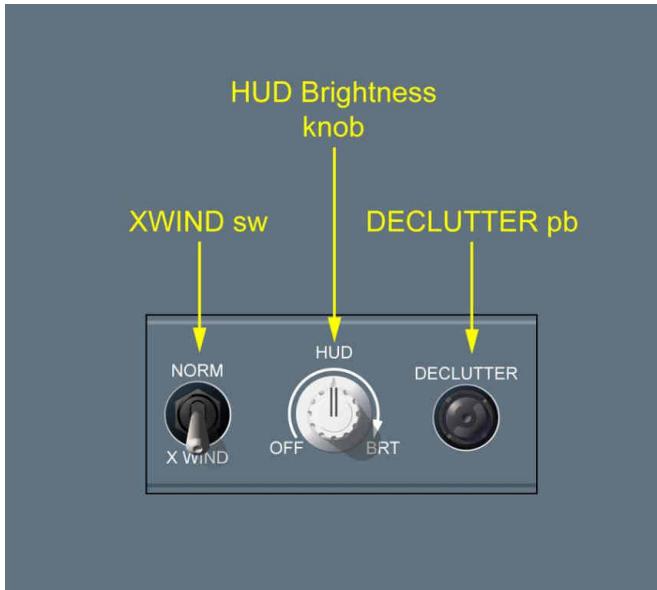
COCKPIT VIEW

Applicable to: ALL

Cockpit View

HUD CONTROL PANEL

Applicable to: ALL

HUD CP

The HUD Control Panel (HUD CP) is located on the Captain's side.

XWIND sw

The flight crew selects the normal mode of the HUD .

L12



The flight crew selects the crosswind mode of the HUD .
The XWIND sw reduces the speed and altitude scales , only if the aircraft is in flight.

For more information on the crosswind mode, *Refer to DSC-31-60-20-150 Crosswind Mode* .

HUD Brightness knob

When turned, turns the HUD on or off, and adjust its brightness.

Declutter pb

L12



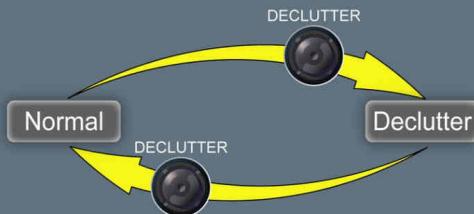
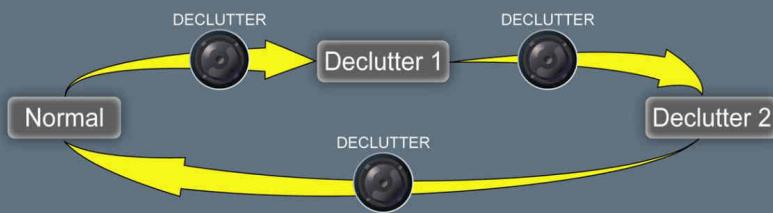
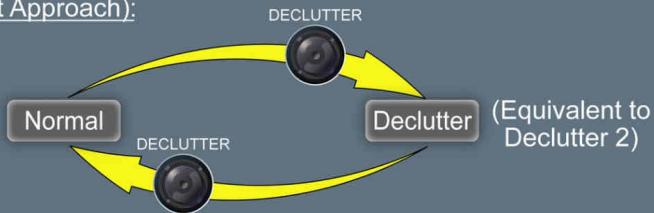
The flight crew presses the DECLUTTER pb to reduce the HUD display.

The DECLUTTER pb changes the display, if HUD is in:

- Taxi phase, or
- Flight phase.

For more information on the declutter modes, *Refer to DSC-31-60-20-150 Declutter Modes* .

Display Sequence in Relation to the Flight Phase

Taxi:In Flight (During Approach):In Flight (Except Approach):



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HUD - NORMAL OPERATIONS

NORMAL OPERATIONS

Applicable to: ALL

In normal operations, the HUD has two positions:

- Fully deployed and locked
 - The HCU is in the flight crew's field of view, and the HUD displays the symbols.
- Stowed.
 - The HCU is retracted, and the HUD does not display any symbol.

For more information on how to use the HUD, *Refer to FCTM/SI/Use of HUD.*



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HUD - NORMAL OPERATIONS

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HUD - ABNORMAL OPERATIONS

ABNORMAL OPERATIONS

Applicable to: ALL

The HUD has two abnormal positions:

- Partly deployed and unlocked

The HCU is in the flight crew's field of view. The HCU displays the COMBINER UNLOCKED message.

- Breakaway position.

When already deployed, the HCU automatically moves forward and upward, and remains locked in this position, when the flight crew inadvertently bumps the HCU.

The breakaway position avoids a possible injury of the flight crew's head.



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HUD - ABNORMAL OPERATIONS

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HUD - ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

NAV HUD FAULT (*Refer to procedure*)

NAV HUD FPV DISAGREE (*Refer to procedure*)



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HUD - ECAM ALERTS

Intentionally left blank



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HUD - ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Subsystem | Electrical Supply |
|--------|-----------|-------------------|
| HUD | HUD CAPT | AC 2 |



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HUD - ELECTRICAL SUPPLY

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GENERAL**Applicable to: ALL**

There is a clock in the cockpit. It is on the main panel, and it provides the time-reference for the operation of applicable aircraft systems.

The clock displays the time in Coordinated Universal Time (UTC). It has a CHRonometer (CHR), and a function to measure the Elapsed Time (ET). In addition, the clock can display the date.

Cockpit View

ARCHITECTURE**Applicable to: ALL**

The GPS provides the time and the date to the clock.

The clock is connected to GPS 1.

The clock provides the time-reference for the operation of the:

- Navigation systems

The main user is the FMS

- Communication systems

The main user is the Air Traffic Control (ATC)

- Flight data recorder and voice recorder systems

The main users are the Digital Flight Data Recorder (DFDR) and the Cockpit Voice Recorder (CVR)

- Permanent data display of the E/WD

The Control and Display System (CDS) enables the permanent data display

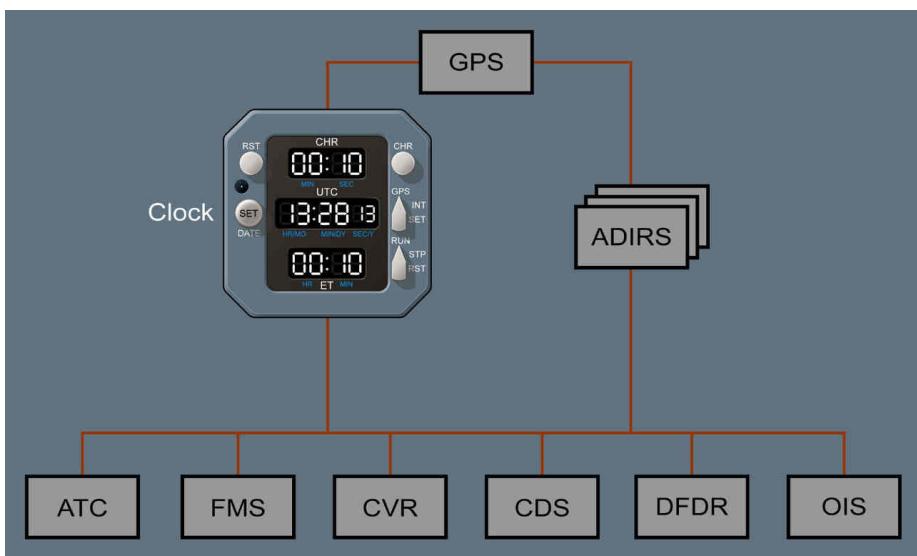
- On-board Information System (OIS).

The clock provides the time-reference via two IOMs and the aircraft network.

The ADIRS acts as a backup to the clock, when:

- The clock is set to SET

- The clock can no longer provide the time-reference.

Architecture**OPERATING MODES****Applicable to: ALL**

The clock has two operating modes:

- GPS mode: The clock's time-reference is synchronized with the GPS.
- INT mode: The clock internally computes the time, and its time-reference is not synchronized with the GPS.

The flight crew can select the operating mode using the selector on the clock.

The standard operating mode is GPS mode. However, the clock can provide the time-reference to the various aircraft systems, in any mode.

The selected mode has no effect on the operation of the ET or the CHR.

GPS MODE

In GPS mode, the GPS continuously provides the clock with the UTC time and date.

- [L3] The GPS provides this data every second.
- [L2] If the clock does not receive a GPS signal, the clock internally computes the time and date automatically, by using the latest synchronized information it received.
- [L3] The internal clock deviates from the GPS by a maximum of one second every 24 h.

- [2] When the GPS signal resumes, the clock automatically synchronizes with the GPS.

INT MODE

In INT mode, the clock internally computes the time and date.

The clock's internal time and date are based on:

- The latest information received from the GPS, or
- The manually-set time and date.

INT TIME AND DATE INITIALIZATION

Applicable to: ALL

The flight crew can manually set the time and date, by turning the operating mode selector to SET.

Operating Mode Selector



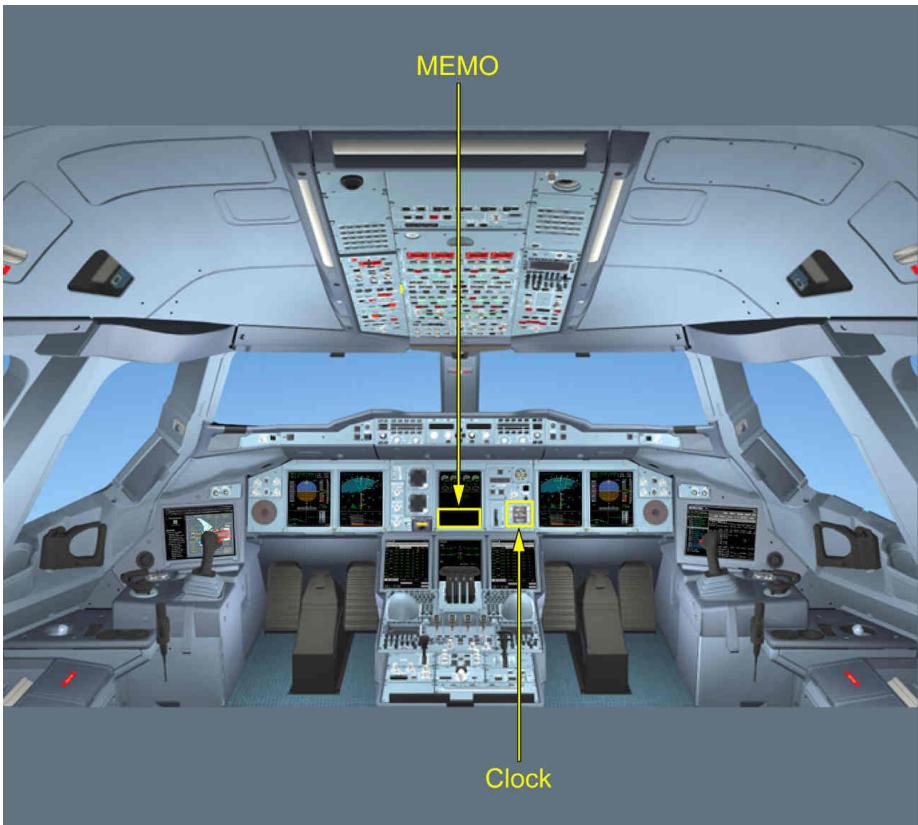
When the operating mode selector is set to SET, the seconds are blank, and the minutes flash to indicate that they can be changed:

- If the DATE/SET pb is turned clockwise, the minutes increase
- If the DATE/SET pb is turned counterclockwise, the minutes decrease
- When the DATE/SET pb is pressed, the values can be changed in the following order:
 - Hour
 - Year
 - Month
 - Day.

When the operating mode selector is set to INT, the clock starts and the seconds appear as "00".

GENERAL

Applicable to: ALL

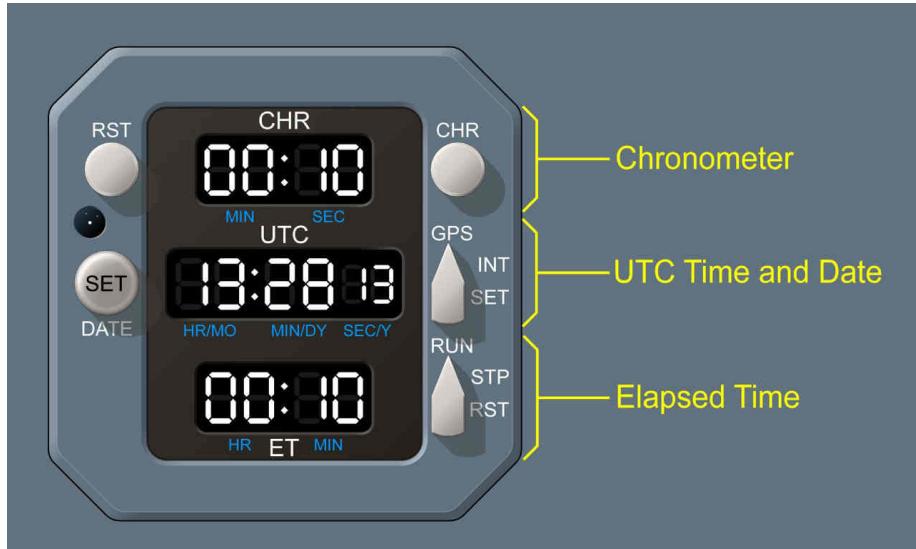
General**CLOCK**

Applicable to: ALL

The clock digitally displays the:

- UTC Time as hours (HR), minutes (MIN), and seconds (SEC)
- Date as month (MO), day (DY), and year (Y)

- Elapsed Time (ET) as hours (HR), and minutes (MIN)
- CHRONOMETER (CHR) value as minutes (MIN), and seconds (SEC).

Clock**[L2] BRIGHTNESS OF THE DISPLAY**

A photocell, on the face of the clock, detects cockpit lighting. Then, the brightness of the display automatically adjusts to the cockpit lighting.

CHRONOMETER**Applicable to: ALL****CHRONOMETER (CHR) DISPLAY****L12**

The chronometer time is in minutes and seconds.

The chronometer values range from 00 minutes and 00 seconds, to 99 minutes and 59 seconds.



The chronometer is reset, and is not running.

CHR pb

When pressed, starts the chronometer.

When pressed again, stops the chronometer.

When the chronometer stops, it displays the latest value. This value remains displayed until the chronometer is reset.

RST pb

When pressed, and if the chronometer is stopped, the display resets.

UTC TIME AND DATE

Applicable to: ALL

UTC TIME AND DATE DISPLAY

L12



Displays either the time in hours, minutes, and seconds, or the date in month, day, and year.

The UTC time values range from 00 hour, 00 minutes and 00 seconds, to 23 hours, 59 minutes and 59 seconds.

When the operating mode selector is set to SET, the flashing value indicates the value to be changed.

L13



There is no GPS signal at engine power-up, and the operating mode selector is set to GPS.

When the DATE/SET pb is pressed, the latest version (date) of the clock appears.



There is no GPS signal at engine power-up, and the operating mode selector is set to INT.

OPERATING MODE SELECTOR

The operating mode selector has three positions.

Two of these positions correspond to operating modes



GPS mode: The time and date synchronize with the GPS .



INT mode: The clock internally computes the time and date. (associated with memo *Refer to CLOCK INT* .



SET: The flight crew manually sets the time and date.

DATE/SET pb



If the operating mode selector is set to GPS or INT:

- When the DATE/SET pb is pressed, and until it is released, the date appears.

If the operating mode selector is set to SET:

- When the DATE/SET pb is pressed, it selects the time or date to be changed the selected value will flash
- If the DATE/SET pb is turned clockwise, the selected value increases
- If the DATE/SET pb is turned counterclockwise, the selected value decreases.

ELAPSED TIME

Applicable to: ALL

ELAPSED TIME (ET) DISPLAY

L12



The ET is in hours and minutes.

The ET values range from 00 hours and 00 minutes, to 99 hours and 59 minutes.



The ET is reset, and is not running.

ELAPSED TIME (ET)SELECTOR

The counter starts.



The counter stops.

The latest ET value is displayed, and remains until reset.



The counter resets.

When the ET selector is released, it returns to STP.

MEMO

Applicable to: ALL

CLOCK INT

the operating mode selector is manually set on INT. The memo should guide the flight crew to set the operating mode selector back on GPS position.



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CLOCK - CONTROLS AND INDICATORS

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CLOCK - ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Subsystem | Electrical Supply |
|--------|-----------|-------------------|
| Clock | N/A | DC ESS |
| | N/A | HOT BUS 1 |



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OPERATING MANUAL

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CLOCK - ELECTRICAL SUPPLY

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OVERVIEW**Applicable to: ALL**

The Concentrator and Multiplexor for Video (CMV) enables videos, provided by different systems, to be displayed on some display units.

The CMV has the following two main functions:

- Adapts the video format of all aircraft videos to the format of the applicable display units
- Enables the flight crew to select the video system to be displayed on the applicable display units.

The CMV manages the following video systems:

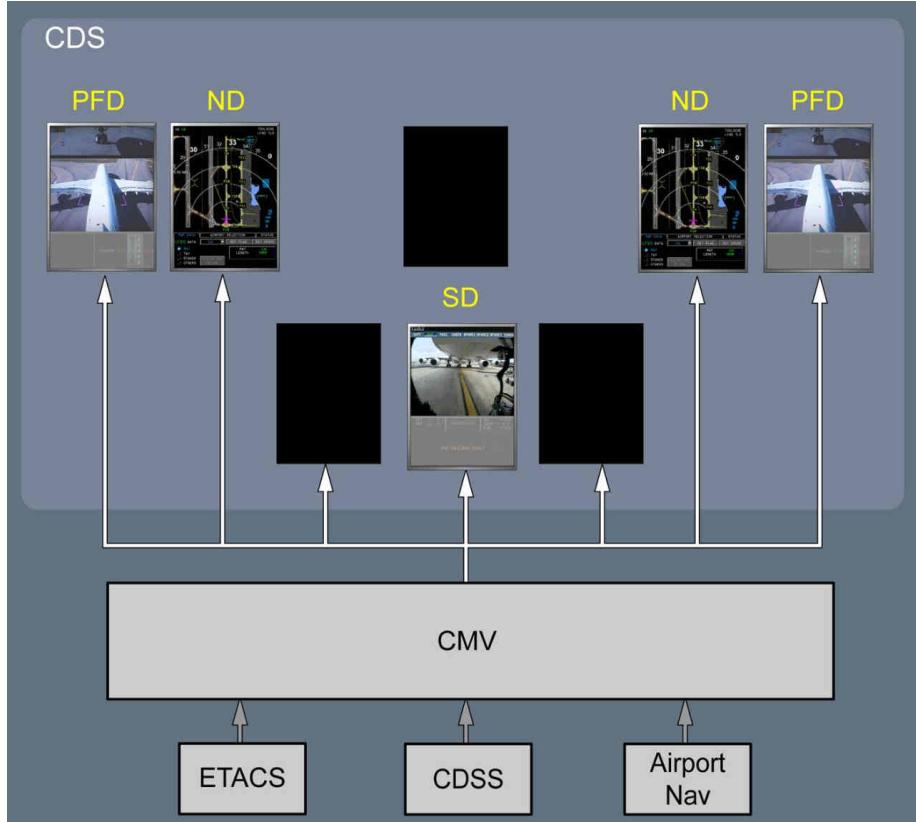
- The External and Taxiing Aid Camera System (ETACS)
- The Airport Navigation System (Airport NAV)
- The Cabin Video Monitoring System (CVMS)
- The Cockpit Door Surveillance System (CDSS).

CMV



ARCHITECTURE

Applicable to: ALL

CMV Architecture

CMV

The Concentrator and Multiplexer for Video (CMV) :

- Manages the following systems:
 - The External and Taxiing Aid Camera System (ETACS)
 - The Airport Navigation System (Airport NAV)
 - The Cockpit Door Surveillance System (CDSS).
- Displays the video on the applicable Display Units (i.e. ND , PFD , or SD)
 - [L2] In the case of a video failure, the corresponding part of the display is black (*Refer to 00023562 **Not found***).
 - [L1] - Manages the display priority of video systems.
 - [L2] When the flight crew presses the VIDEO pb on the ECAM Control Panel, the CMV displays the last selected video image.
If the cabin crew requests a cockpit access, the CMV automatically displays as a priority the video image from CDSS on the SD .

[L12]

Note: *Depending on the situation (e.g. flight phase, current SD page), the CDS and the FWS can prevent the display of the video image.*
This priority management ensures that the flight crew can rapidly access to the relevant video image in accordance with the flight situation.

PFD

The PFD displays the ETACS videos.

ND

The ND displays the moving airport map of the Airport NAV.

SD

The VIDEO SD page displays video images from:

- The CDSS
- The ETACS

EXTERNAL AND TAXIING AID CAMERA SYSTEM**Applicable to: ALL**

The ETACS provides the flight crew with an external view of the aircraft, in order to make taxiing easier. There are two cameras on the exterior of the aircraft that provide the external view of the aircraft in the cockpit.

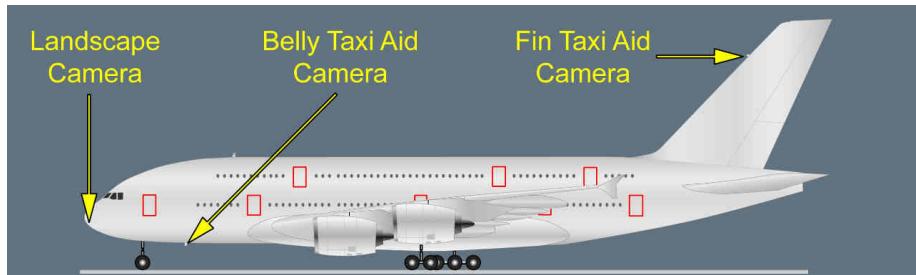
These cameras are:

- The Fin Taxi Aid Camera (FTAC)
- The Belly Taxi Aid Camera (BTAC).

Note: *There is also a landscape camera that enables to display forward external views of the aircraft for passengers.*

The flight crew can inhibit live video images transmission from this camera by using the LANDSCAPE CAMERA pb.

ETACS Cameras



The FTAC and BTAC help the flight crew:

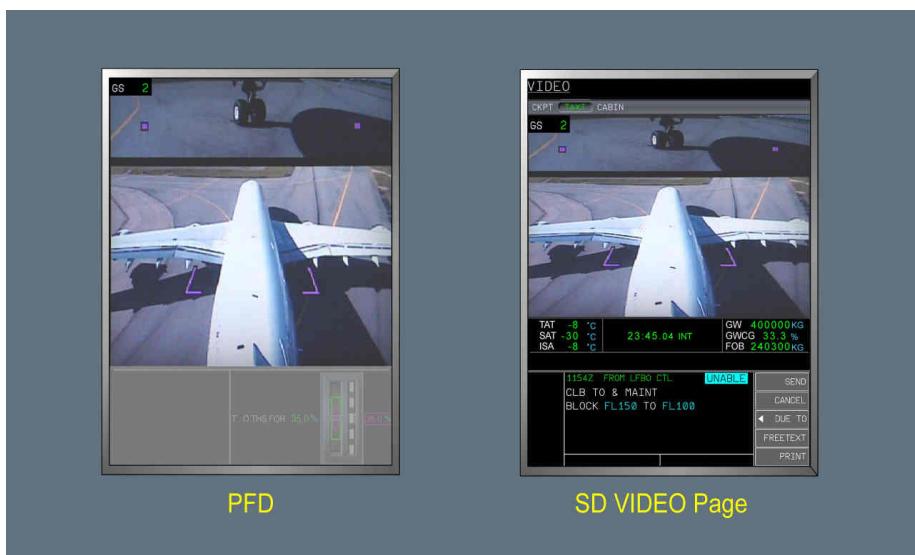
- To taxi the aircraft on the runway/taxiway centerline
- To evaluate the margin between the landing gear and the runway/taxiway edge for any maneuvers (e.g. a 180 ° turn).

The live video images from FTAC and BTAC can be displayed on:

- The PFDs, when the aircraft is on ground and the speed below 60 kt
- The SD, on ground or in flight.

The live video images from FTAC and BTAC are displayed as follows:

- The top 1/3 of the display provides the video from the BTAC
- Two squares, one on each side of the Nose Landing Gear (NLG), indicate a lateral 5 m distance from the NLG.
- The bottom 2/3 of the display provides the video from the FTAC.
- A position indicator on each side of the Main Landing Gear (MLG) indicates the outer edge of the MLG and helps the flight crew to determine the landing gear position in relation to the runway centerline.

ETACS Display

The FTAC is also connected to the IFE that enables to display the live video images from FTAC for passengers. The flight crew can inhibit live video images transmission from FTAC by using the LANDSCAPE CAMERA pb.

AIRPORT NAVIGATION SYSTEM**Applicable to: ALL**

The Airport Navigation System (Airport NAV) enables the flight crew to visualize the aircraft's location, in relation to a moving airport map.

The Airport NAV is displayed on the Captain and/or F/O ND, by using the range selector of the onside EFIS Control Panel (Refer to DSC-31-80-20-20 ND Range Selector).

Airport NAV Display

For more information, Refer to *Airport NAV Description* .

COCKPIT DOOR SURVEILLANCE SYSTEM

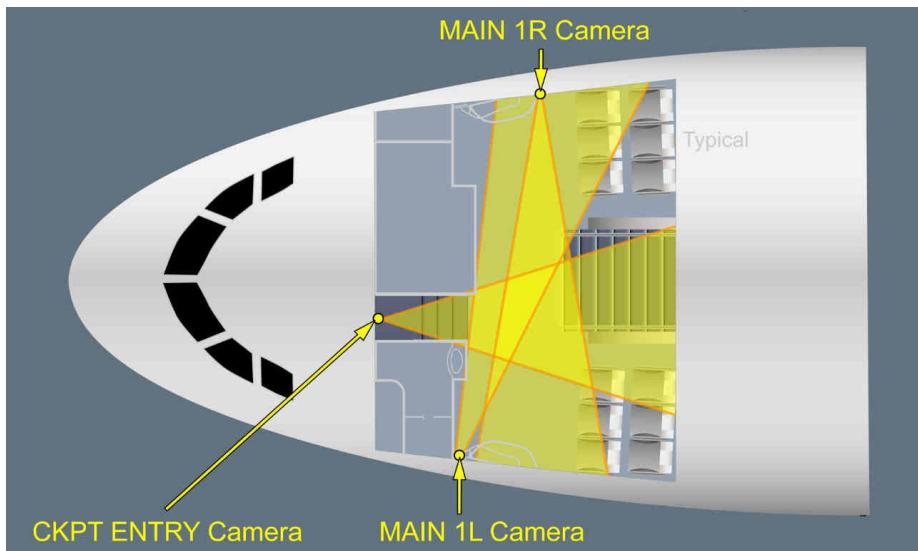
Applicable to: ALL

The Cockpit Door Surveillance System (CDSS) enables the flight crew to identify who is requesting entry to the cockpit, before authorizing (or not) their access.

The CDSS has three cameras:

- The CKPT ENTRY camera to monitor the area in front of the cockpit door
- The MAIN 1R camera and the MAIN 1L camera to monitor the cross-aisle between the M1R and M1L doors.

CDSS camera location



The video images from these three cameras appear on the SD (i.e. on the VIDEO SD page), in one of the following views :

- A full image of CKPT ENTRY camera, or
- Two separate images of the MAIN 1R camera and the MAIN 1L camera.

Video SD Page

CKPT ENTRY Camera



MAIN 1R and MAIN 1L Cameras

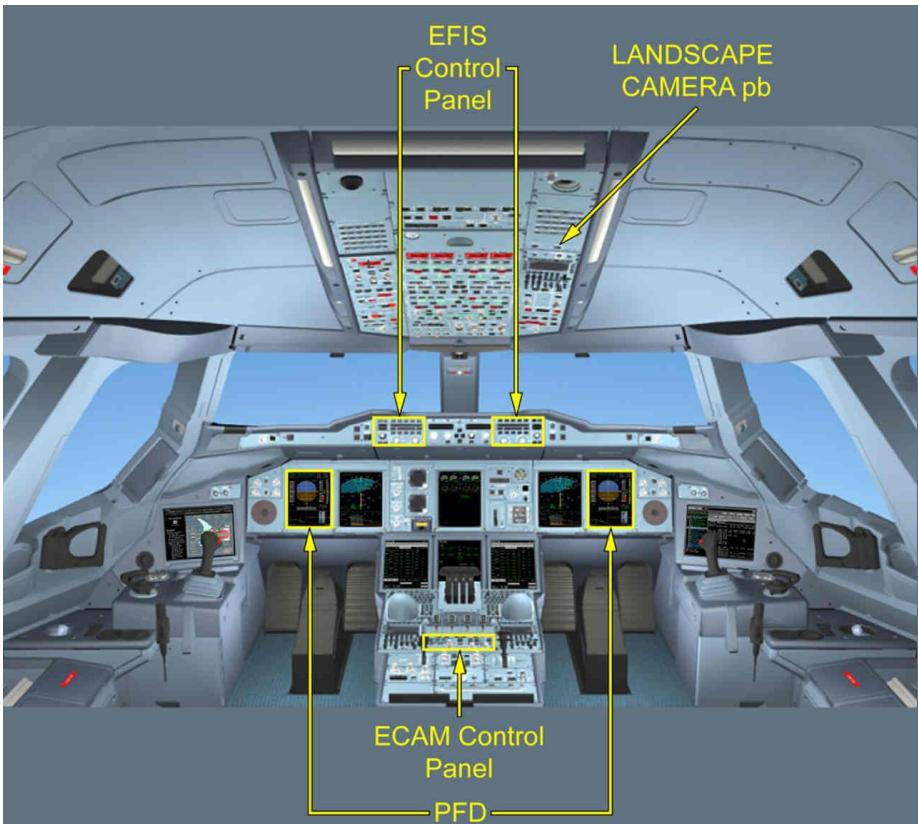
The SD automatically displays the video image of the CKPT ENTRY camera, if:

- The emergency cockpit access is requested, or
- In flight, the routine cockpit access is requested, and the ECAM displays the CRUISE page.

The flight crew can also display the CDSS images without a request for cockpit access. For more information, *Refer to 00007420 **Not found***).

OVERVIEW

Applicable to: ALL

Controls and Indicators

ECAM CONTROL PANEL

Applicable to: ALL

ECAM Control PanelVideo pb

The SD does not displays VIDEO page.



The SD displays the VIDEO page.

VIDEO knob

The outer part of the VIDEO knob enables the flight crew to select a different video system to be displayed on the SD.

The inner part of the VIDEO knob enables the flight crew to select a video camera, as applicable.

EFIS CONTROL PANEL

Applicable to: ALL

EFIS Control PanelND Range selector

The onside ND displays the moving airport map of the Airport NAV.

Taxi pb

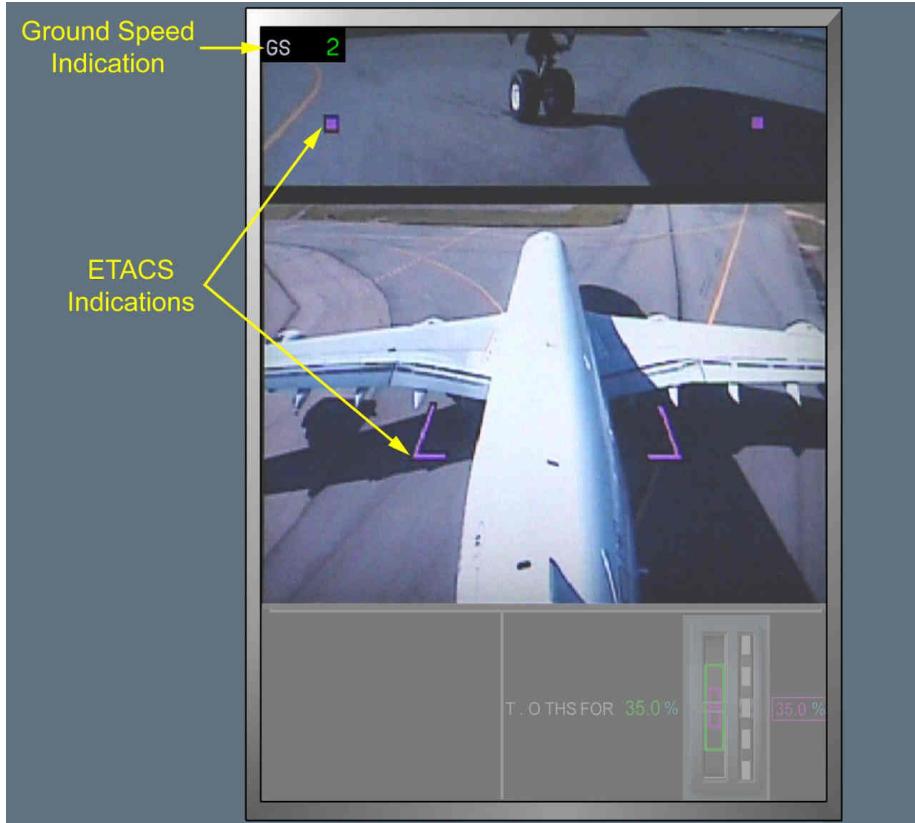
The onside PFD does not display the ETACS videos.



The onside PFD displays the ETACS videos.

PFD

Applicable to: ALL

PFD

Note: The same information can be displayed on the SD VIDEO page.

ETACS INDICATIONS

These squares indicate:

- The starting points for performing a nosewheel steering maneuver, in order to guide the flight crew in turning the aircraft
- A lateral distance of 5 meters from the Nose Landing Gear (NLG).



These lines indicate:

- The position of the Main Landing Gear (MLG), in order to guide the flight crew in the case of reduced visibility
- The left and right outer edges of the MLG.

GROUND SPEED INDICATION



No ground speed data is transmitted.



The ground speed data is not valid.



Indicates the ground speed.

LANDSCAPE CAMERA PB-SW

Applicable to: ALL



Normal position.

The In-Flight Entertainment (IFE) system receives live video images from the landscape camera and the Fin Taxi Aid Camera (FTAC).

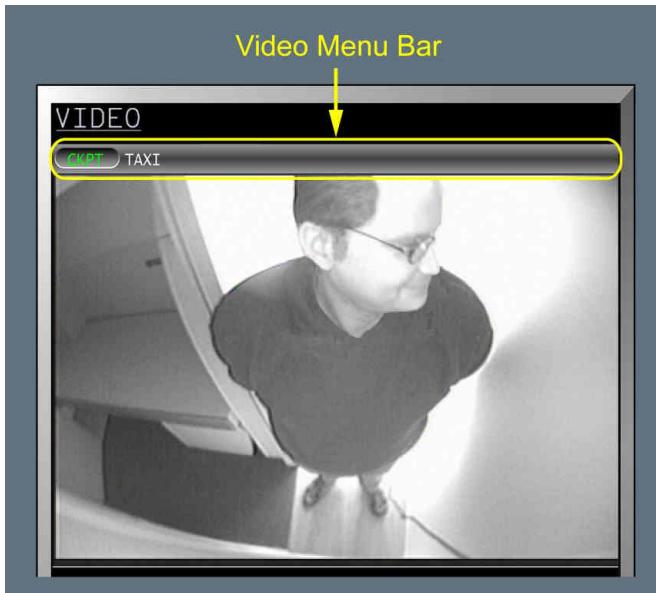


When pressed the transmission of live video from the landscape camera and the FTAC on the IFE is shut off.

VIDEO SD PAGE**Applicable to: ALL**

A video menu bar indicates the video system selection:

- CKPT indicates the CDSS selection
- TAXI indicates the ETACS selection.

Video Menu Bar**VIDEO MESSAGES****Applicable to: ALL****L12****PLEASE WAIT**

The video display is not ready
This message may appear for a short period of time, when the video synchronizes.

L12**NOT AVAIL**

The video display is not available
When the video display is a combination of several videos, this message does not appear in the case of video failure.



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VIDEO - ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

VIDEO MULTIPLEXER FAULT (*Refer to procedure*)



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VIDEO - ECAM ALERTS

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VIDEO - ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Electrical Supply |
|--------|-------------------|
| CMV | 28 V DC1 |



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VIDEO - ELECTRICAL SUPPLY

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OVERVIEW**Applicable to: ALL**

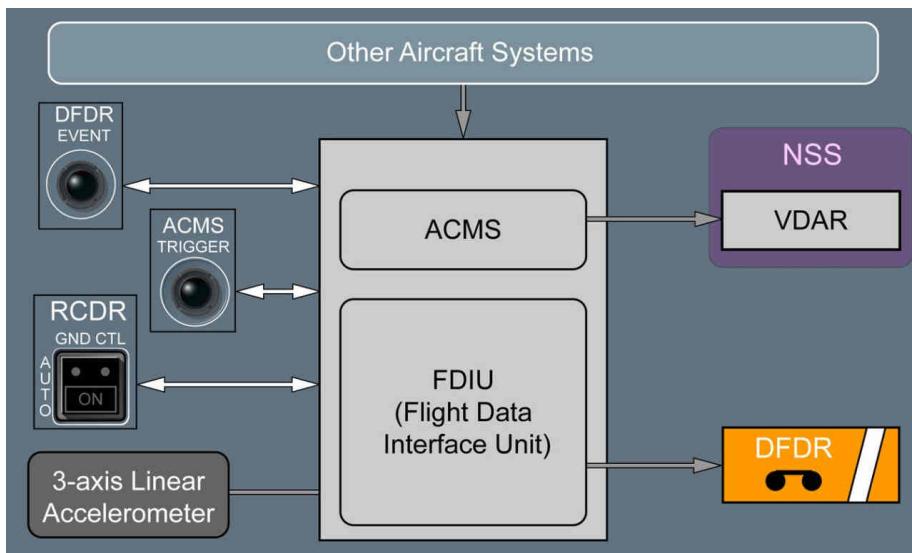
There are two recorders systems:

- The Flight Data Recording System (FDRS) that records all flight parameters
- The Cockpit Voice Recorder System (CVRS) that records all the conversations and sounds in the cockpit.

FLIGHT DATA RECORDING SYSTEM (FDRS)**Applicable to: ALL**

The Flight Data Recording System (FDRS) records all mandatory flight data parameters on:

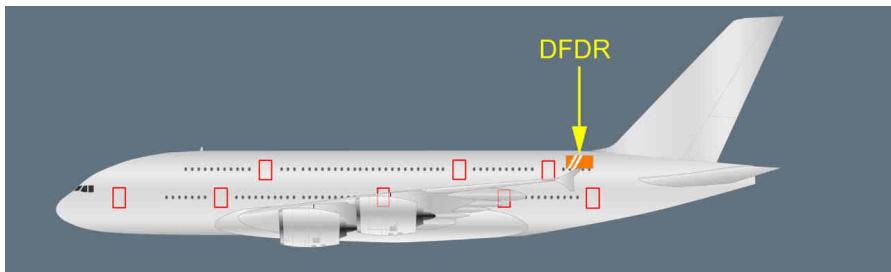
- The Digital Flight Data Recorder (DFDR)
- The Virtual Digital ACMS Recorder (VDAR)

FDRS Architecture**DIGITAL FLIGHT DATA RECORDER**

The DFDR records flight parameters and data from various aircraft systems.

- [L3] The DFDR stores the data supplied in a crash protected memory (this memory keeps all the recorded data for at least the last 25 h of its operation). An underwater locator beacon is attached to the DFDR .

DFDR Location



- [L1] The flight crew uses the DFDR EVENT pb to point an event in the recorded data, *Refer to DFDR EVENT pb* .

VIRTUAL DIGITAL ACMS RECORDER (VDAR)

The VDAR receives a copy of all the data recorded by the ACMS.

- [L3] The VDAR is on the Network Server System (NSS) and stores the data sent by the ACMS on a hard disk (this memory keeps all the recorded data for at least the last 16 h of its operation). The Operator can customize the recorded parameters.

LINEAR 3-AXIS ACCELEROMETER

The accelerometer provides longitudinal, vertical, and lateral aircraft acceleration data to the recorder.

AIRCRAFT CONDITIONING MONITORING SYSTEM (ACMS)

The ACMS function provides a real-time monitoring of the aircraft parameters.

The ACMS can generate system reports, that can be:

- Printed: Automatically or via the ACMS TRIGGER pb on the pedestal (*Refer to ACMS TRIGGER pb*), and/or
- Sent via ACARS or Gatelink, and/or
- Stored on the NSS .

- [L3] Default ACMS reports and triggering conditions are available at aircraft delivery. The Operator can customize the content and the triggering conditions of the reports.



FLIGHT DATA INTERFACE UNIT (FDIU)

The FDIU performs the following functions:

- Acquires avionics data and processes parameters from peripheral systems such as: FMS, FCDC, FQMS, HSMU, FWS, FADEC, LGERS, the Clock and other systems before storage in the DFDR
- [L3] Transmits parameters and data via the aircraft network. The following systems use ARINC 429 data buses: ADIRS, PRIM, FWS, MMR (as a backup).
- [L1] • Provides the CVR with UTC time reference from the clock in order to synchronize the recordings

COCKPIT VOICE RECORDER SYSTEM (CVRS)

Applicable to: ALL

The cockpit Voice Recording System (CVRS) records:

- All voice communication to and from the flight deck between the aircraft and any other station or aircraft.
- All voice communication between crew members
- All aural warnings
- The cockpit environment
- Datalink communication

The CVRS records information from aircraft systems such as the FWS and communication system.

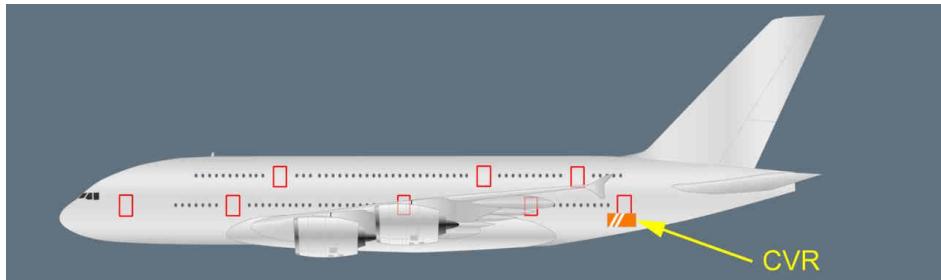
The CVRS has:

- A Cockpit Voice Recorder (CVR)

The CVR stores all the audio and datalink communications.

- [L3] The CVR stores the data supplied in a crash protected memory (this memory keeps all the recorded data for at least the last 2 h of its operation). An underwater locator beacon is attached to the CVR.

CVR Location



- [L1] - A Cockpit Area Microphone (CAM).

The CAM collects all cockpit sounds such as voice communications, aural warnings and all ambient noises.

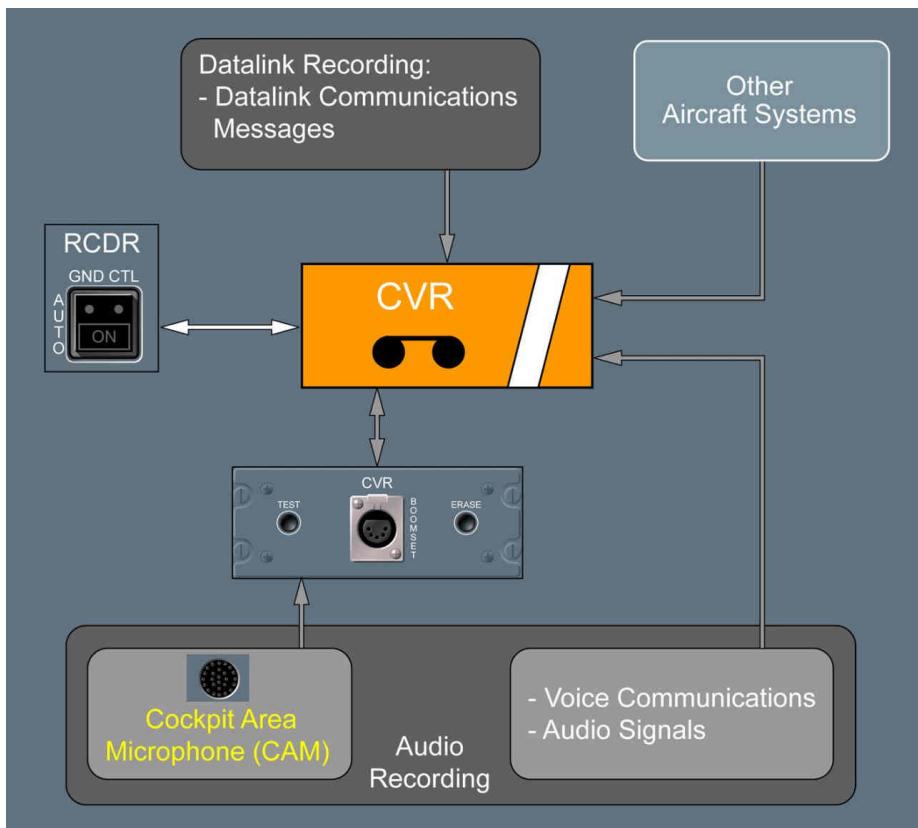
- [L2] The CAM is above the standby compass at the bottom of the overhead panel.

- [L1] - A control panel, on the overhead panel

The flight crew uses this control panel to test the CVR, to erase the audio recording and to connect a boomset via a boomset jack.

- A RCDR GND CTL pb

The flight crew uses this pushbutton to manually start and stop the recorder on ground, when all engines are shut down (provided that the aircraft is electrically powered)

CVR Architecture



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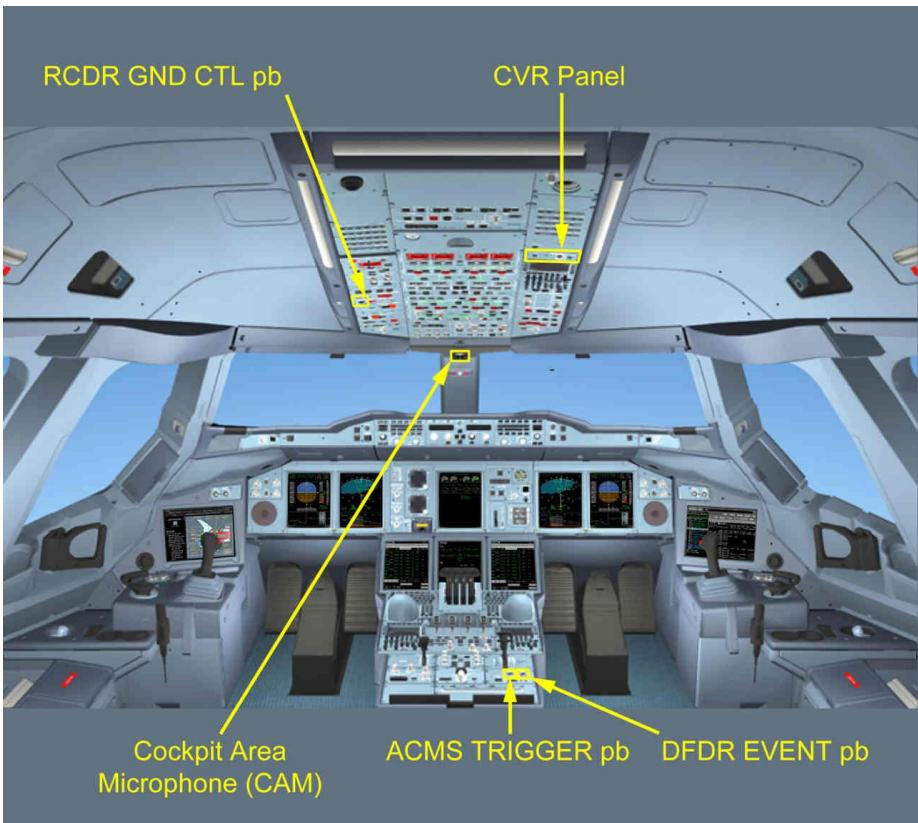
31 - INDICATING/RECORDING

RECORDERs - SYSTEM DESCRIPTION

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COCKPIT VIEW

Applicable to: ALL

Cockpit View

RCDR GND CTL PB

Applicable to: ALL

RCDR GND CTL PanelRCDR GND CTL pb

All recorders operate automatically.

For more details on recorders operations, *Refer to DSC-31-90-30 Overview*

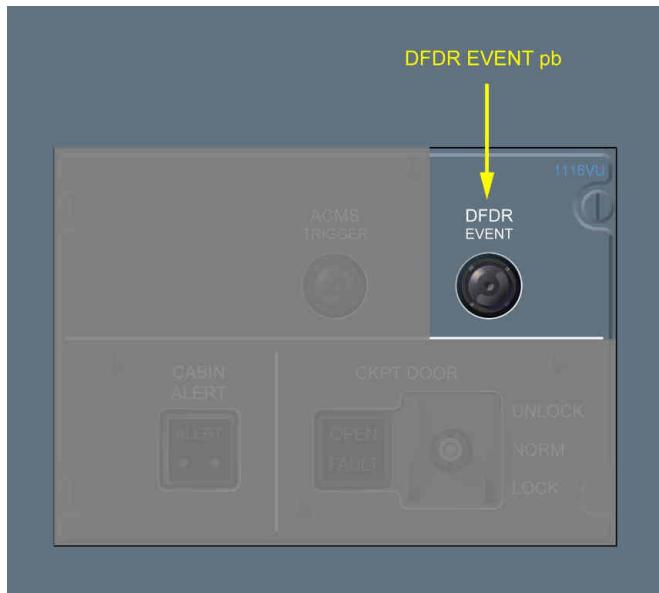


The flight crew has manually started the recorders.

The system automatically switches from ON to AUTO, when the first engine is started.

DFDR EVENT PB

Applicable to: ALL

**DFDR EVENT pb**

When pressed, it points an event in the recorded DFDR data.

ACMS TRIGGER PB

Applicable to: ALL

**ACMS TRIGGER PB**

L13



When pressed, prints a specific ACMS report and/or triggers the recording of some specific parameters.
The Operator can customize the content and the triggering conditions of the ACMS reports.

CVR PANEL

Applicable to: ALL

**Test pb**

L123



When pressed, tests the CVR.

If a boomset is connected to the BOOMSET jack, the flight crew will hear a low frequency signal.

If the test is not successful, the ECAM triggers a RECORDER CVR FAULT alert 5 s after the pushbutton is pressed.

To perform this test, the recorder must be on.

ERASE pb

L123



When pressed for 2 seconds, the audio recording is erased, if the aircraft is on ground, and the parking brake is on.

Note: Data recording cannot be erased.

If a boomset is connected into the BOOMSET jack, the flight crew will hear a low frequency signal.

To erase audio recording, the recorder must be in use.

BOOMSET JACK

When a boomset is plugged in the BOOMSET jack:

- Cockpit sounds detected by the microphone are audible
- The test tone is audible, when the TEST pb is pressed
- The erase tone is audible, when the ERASE pb is pressed.

COCKPIT AREA MICROPHONE (CAM)

Applicable to: ALL



Records all the cockpit sounds.



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RECORDERS - NORMAL OPERATIONS

OVERVIEW

Applicable to: ALL

The recording system operates automatically:

- On ground
 - During aircraft power up, the recording system will run for 5 minutes then stop
 - As soon as the first engine is started, the recording system will run and continue to record until 5 minutes after the last engine is shut down.
- In flight (with or without engines operative).

The flight crew can use the RCDR GND CTL pb to start or stop the recorders.

It is not possible to stop the recorders in flight.



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RECORDERs - ECAM ALERTs

ECAM ALERTs

Applicable to: ALL

RECORDER ACCELMTR FAULT *Refer to Procedure*

RECORDER CVR FAULT *Refer to Procedure*

RECORDER DFDR FAULT *Refer to Procedure*

RECORDER SYS FAULT *Refer to Procedure*



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RECORDERs - ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: MSN 0059-0075

L13

| System | Subsystem | Electrical Supply |
|--------------------------------------|-------------------------------------|-------------------|
| Flight Data Recording System (FDRS) | Digital Flight Data Recorder (DFDR) | AC ESS |
| | 3-Axis Linear Accelerometer | DC ESS |
| | Flight Data Interface Unit (FDIU) | DC ESS |
| Cockpit Voice Recorder System (CVRS) | Cockpit Voice Recorder (CVR) | DC ESS or DC 1 |
| | Cockpit Voice Recorder CTL | DC ESS |

ELECTRICAL SUPPLY

Applicable to: HL7611, HL7612

L13

| System | Subsystem | Electrical Supply |
|--------------------------------------|-------------------------------------|-------------------|
| Flight Data Recording System (FDRS) | Digital Flight Data Recorder (DFDR) | AC ESS |
| | 3-Axis Linear Accelerometer | DC ESS |
| | Flight Data Interface Unit (FDIU) | DC ESS |
| Cockpit Voice Recorder System (CVRS) | Cockpit Voice Recorder (CVR) | DC ESS |
| | Cockpit Voice Recorder CTL | DC ESS |



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32 - LANDING GEAR

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A380
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AIRCRAFT SYSTEMS

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A380
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OPERATING MANUAL

AIRCRAFT SYSTEMS

32 - LANDING GEAR

SYSTEM DESCRIPTION - OVERVIEW

OVERVIEW

Applicable to: ALL

The aircraft has:

- One Nose Landing Gear (NLG)
- Two Wing Landing Gears (WLG)
- Two Body Landing Gears (BLG)

The following systems are associated with the landing gear:

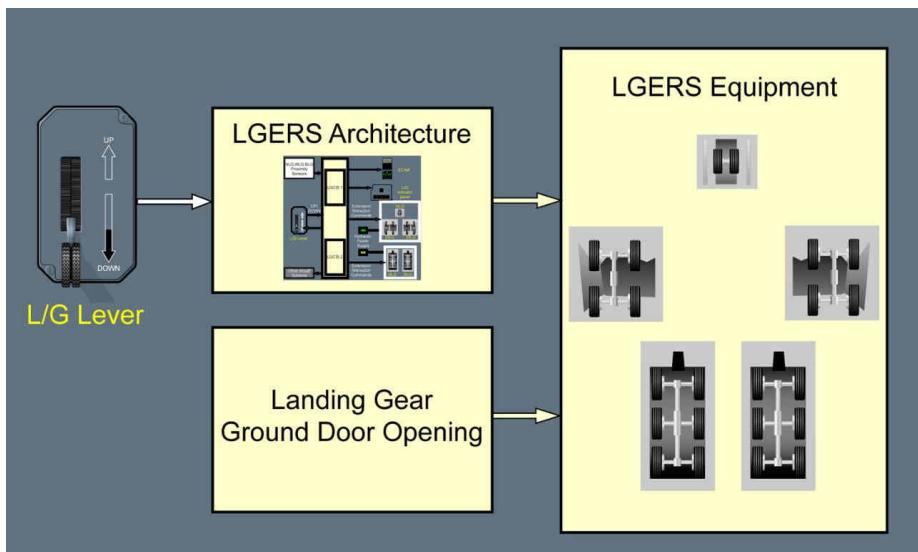
- The Landing Gear Extension and Retraction System (LGERS)
- The braking system
- The steering system
- The Tire Pressure Indicating System (TPIS)
- The Brake Temperature Monitoring System (BTMS)
- The Oleo Pressure Monitoring System (OPMS).

Landing Gear - General

OVERVIEW**Applicable to: ALL**

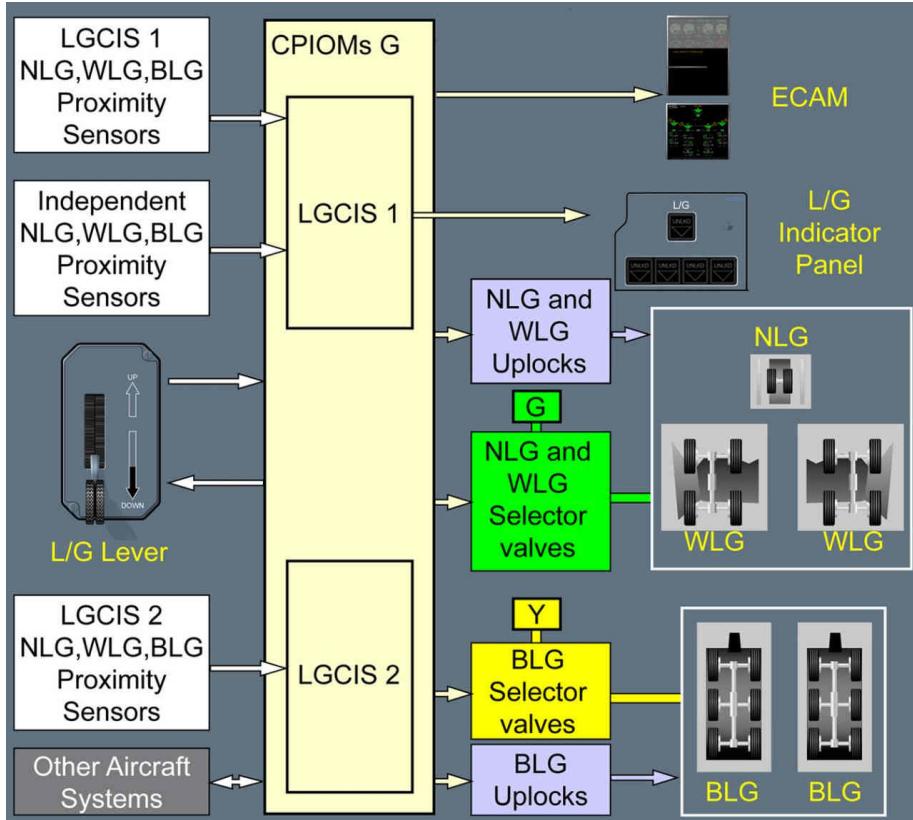
In normal operation, the flight crew selects the extension/retraction of the landing gear, via the landing gear lever.

The Landing Gear Extension Retraction System (LGERS) uses hydraulic power to actuate the landing gear, and the landing gear doors.

Overview

ARCHITECTURE

Applicable to: ALL

ArchitectureLANDING GEAR CONTROL AND INDICATION SYSTEM (LGCIS)

The Landing Gear Control and Indication System (LGCIS) controls the LGERS and has two redundant control systems referred to as LGCIS 1 and LGCIS 2.

One LGCIS is active and controls the LGERS, while the other is a backup.

[L2] The backup LGCIS activates automatically if the active LGCIS fails.

[L3] The active LGCIS also changes after each landing gear extension.

Both LGCIS are hosted by the CPIOM s G.

- [L1] When the flight crew sets the L/G lever to UP or DOWN, the active LGCIS generates and sends the appropriate electrical commands in sequence to:
- Retract and secure the landing gear in the retracted position (uplock), or
 - Extend and secure the landing gear in the extended position (downlock).

[L2]

Note: It takes about 1 min to extend or retract the landing gear.

*The landing gear retraction is allowed only when all the initial conditions are satisfactory.
All gears are retracted simultaneously.*

Initial conditions:

- The NLG shock absorber is fully extended and nose wheel steering centred
- Both WLG shock absorbers are fully extended
- Both BLG shock absorbers are fully extended
- Both WLG bogies are in the dip position
- The BLG bogies are in the dip position.

To cope with all possible in flight failures, the NLG and the WLG are extended first. After WLG downlock, the BLG extension proceeds.

For more information on the L/G retraction and extension sequences, *Refer to DSC-32-30-10-10 NLG Extension/Retraction .*

[L2]

For an extension or a retraction, the commands are sent to:

- The uplocks
- The selector valves of the landing gear doors actuators
- The selector valves of the landing gear extension/retraction actuators
- The downlocks (*Refer to DSC-32-10-20-20 Landing Gear Downlocks*).

[L3]

LANDING GEAR AND LANDING GEAR DOOR UPLOCKS

The uplocks maintain the landing gear in the retracted position and the landing gear doors in the closed position.

Each uplock has:

- A locking hook
- Two electrical actuators.

One actuator is controlled by the active LGCIS.

The other actuator is controlled by the Free Fall Control Modules (FFCMs) for landing gear gravity extension.

PROXIMITY SENSORS

The proximity sensors provide the LGCIS with landing gear position feedback.

- [L3] Each LGCIS has an assigned set of proximity sensors, and receives the following data:

- Landing gear uplocked, unlocked or downlocked
- Landing gear doors open or closed
- Shock absorber compressed or extended
- Bogies in flight or in ground position.

- [L1] The landing position data is send to:

- The ECAM for the generation of alerts and the display of the WHEEL system page
- The Primary Flight Display (PFD) for the landing gear position indication
- The L/G lever panel, for the red arrow indication
- The L/G indicator panel (only from LGCIS 1).

An independent set of downlock proximity sensors also provides LGCIS 1 with additional landing gear position feedback to turn on the L/G indicator panel lights.

SELECTOR VALVES

There is one selector valve per extension/retraction actuator.

The selector valves control the hydraulic power that is supplied to the extension/retraction actuators.

HYDRAULIC POWER SUPPLY

The GREEN hydraulic system powers:

- The extension/retraction of the NLG and the WLG
- The operation of the NLG and the WLG doors.

- [L1] The YELLOW hydraulic system powers:

- The extension/retraction of the BLG
- The operation of the BLG doors.

Note: The LGERS is pressurized only during the extension and the retraction phases. At all other flight phases, the LGERS is isolated from hydraulic pressure.

OTHER AIRCRAFT SYSTEMS

The LGCIS sends the ground/flight data to the following aircraft systems:

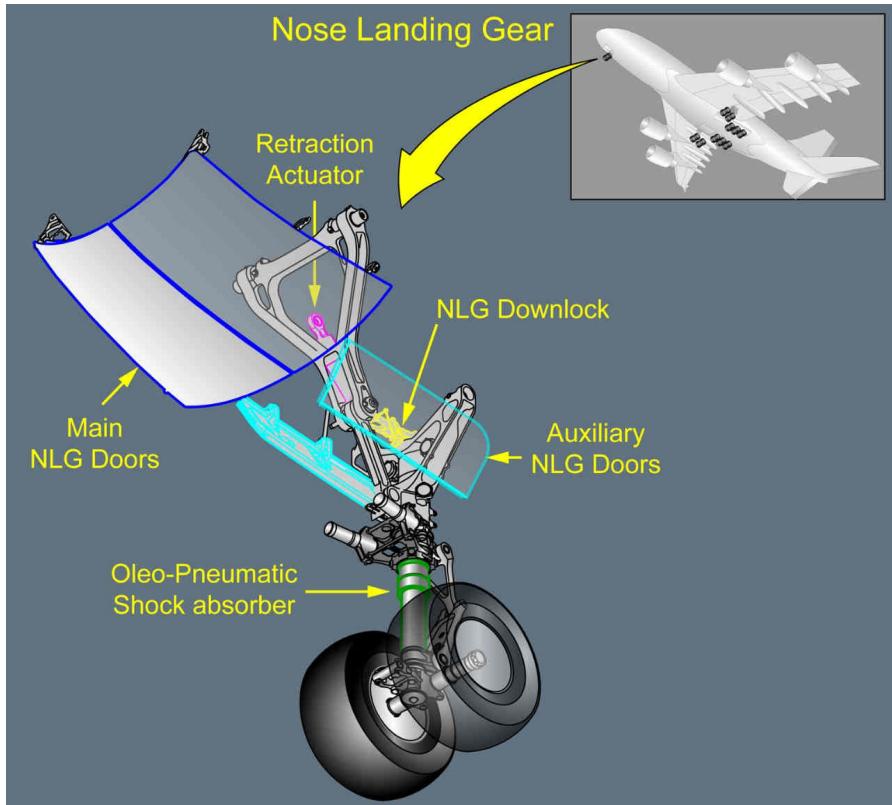
- The Aircraft Condition Monitoring System (ACMS)
- The Surveillance System
- The anti-ice system
- The Auto Flight System (AFS) to enable the engagement of the Autopilot 5 seconds after liftoff

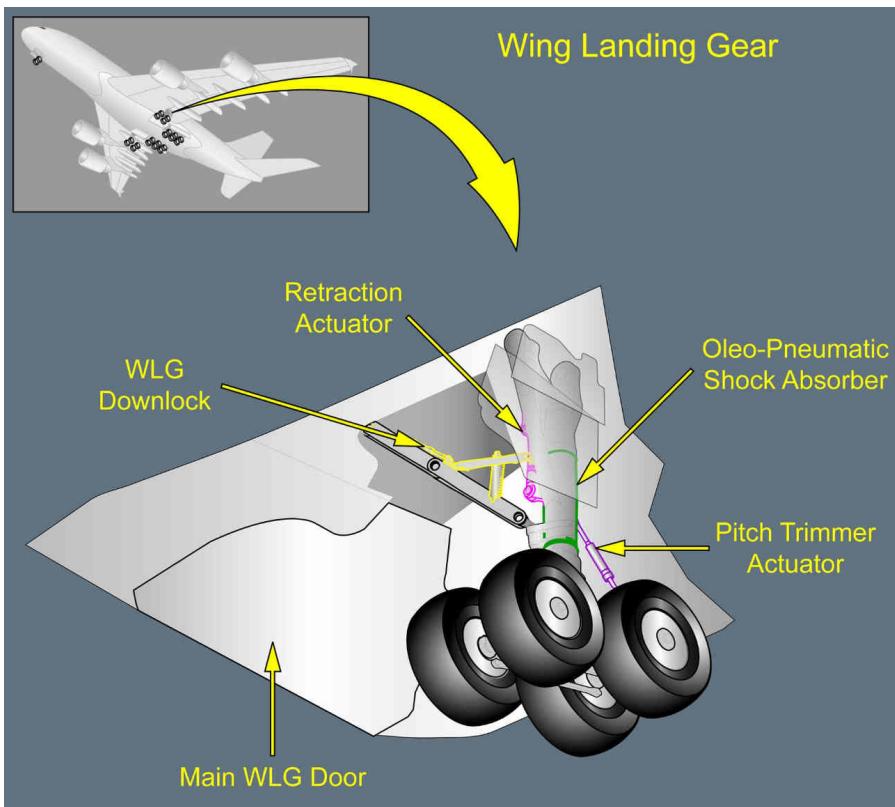
- The Auxiliary Power Unit (APU)
- The braking system
- The steering system
- The Cockpit Voice Recorder (CVR)
- The communication system to inhibit the ground crew interphone connections in flight, and the HF transmission on the ground
- The Digital Flight Data Recorder (DFDR)
- The Doors and Slides Management System (DSMS)
- The electrical system
- The External Taxi Aid Camera System (ETACS)
- The fire protection system
- The Flight Control System (FCS) for the ground spoilers extension logic
- The Flight Management System (FMS) to the DONE flight phase
- The Flight Warning System (FWS)
- The fuel system
- The Full Authority Digital Engine Control (FADEC)
- The hydraulic system
- The lights system
- The Onboard Airport Navigation System (OANS)
- The oxygen system
- The air conditioning system
- The cabin pressurization system to control the pressurization cycle
- The bleed air system
- The ventilation system
- The water and waste system.

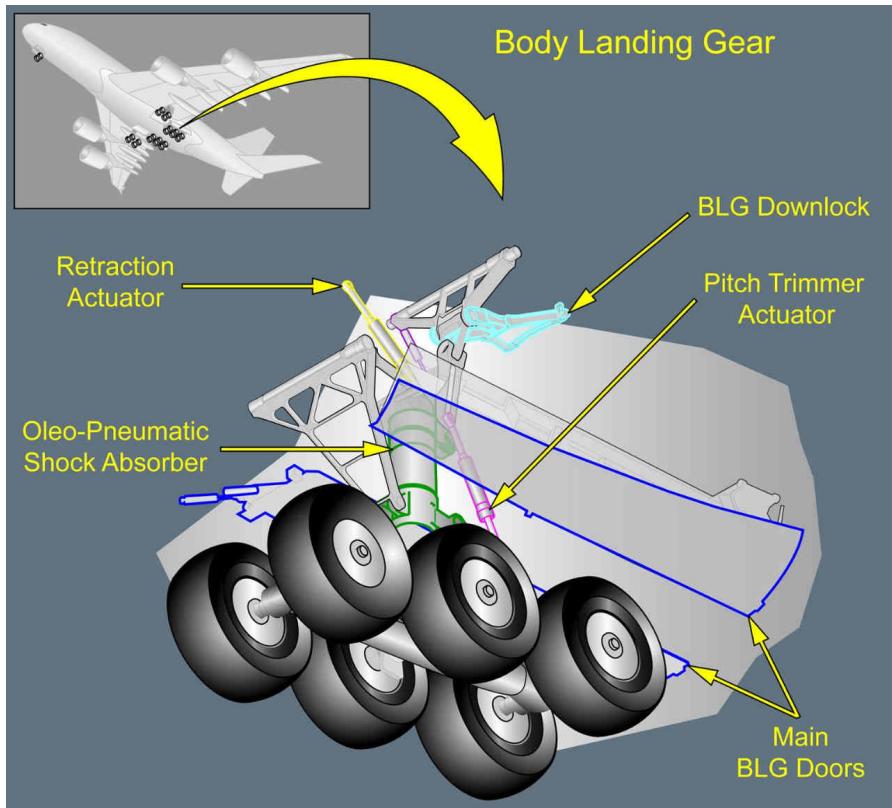
The LGCIS receives airspeed data from the ADIRS to inhibit the extension of the landing gear above 280 kt.

LANDING GEAR EXTENSION AND RETRACTION EQUIPMENT

Applicable to: ALL

NOSE LANDING GEARNose Landing Gear LGERS Equipment

WING LANDING GEARWing Landing Gear LGERS Equipment

BODY LANDING GEARBody Landing Gear LGERS Equipment**L3 PITCH TRIMMER ACTUATORS**

When the aircraft is in flight, the pitch trimmer actuators maintain the WLG and BLG bogies in a pitch down attitude.

The 9 ° pitch down attitude is optimized for the stowage of the landing gear.

The hydraulic pressure in the pitch trimmer actuators is low. Therefore, when the aircraft is on the ground, the bogies are forced to the horizontal position by the weight of the aircraft.

The pitch trimmer actuators are the only gear retraction / extension hydraulic equipment permanently pressurized, including when gears are up.



LANDING GEAR DOWNLOCKS

The downlocks secure the landing gear in the extended position.

- L3 The downlock is mechanical and is achieved via a downlock springs.
- L1 When the aircraft is on the ground, locking pins are installed on each landing gear downlock to mechanically prevent the retraction of the landing gear.

LANDING GEAR GROUND DOOR OPENING

Applicable to: ALL

Only for special operation with aircraft on ground. For more information access to information level 2 and 3.

- L2 For maintenance purposes, the landing gear doors can be opened and closed on the ground via the Ground Door Opening Levers (one per landing gear).
The landing gear doors open by gravity and need hydraulic pressure to be closed.
- L3 The landing gear door opening needs the DC ESS electrical supply for door unlocking.
The landing gear door closing needs the LGCIS powered to command the closing sequence.



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SYSTEM DESCRIPTION - LANDING GEAR
EXTENSION RETRACTION SYSTEM (LGERS)

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Architecture**OVERVIEW**

Applicable to: ALL

The braking system enables:

- Manual braking via flight crew action on:

- The brake pedals

Each brake pedal controls the brakes of its onside WLG and BLG

- [L2] The brake pedals, that are on the Captain (CAPT) and the First Officer (F/O) sides of the cockpit, are mechanically linked to each other.

- [L1] - The PARK BRK handle.

- [L2] **Note:** *Manual braking is only available on ground.*

- [L1] - Automatic braking via:

- The basic autobrake (AUTO BRK)
 - Brake To Vacate (BTV) function
 - Runway Overrun Protection (ROP) function

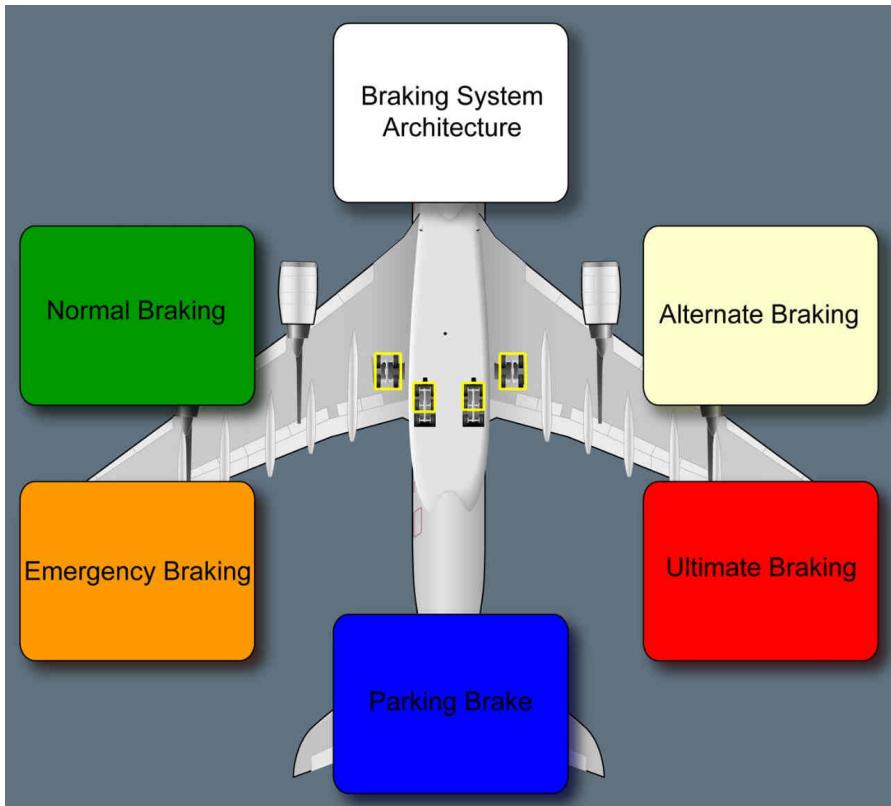
- [L2] - Retraction braking that automatically decelerates the BLG and the WLG wheels, when the landing gear retracts.

[L1] BRAKING MODES

There are 5 braking modes:

- Normal braking
- Alternate braking
- Emergency braking
- Ultimate braking
- Parking brake.

In order to minimize the consequences of a local failure, the left BLG , the right BLG , and both WLG can operate independently in a different braking mode.

Overview**[2] BRAKES**

The aircraft has 16 carbon brakes:

- One brake on each WLG wheel (8 brakes)
- One brake on the 4 most forward wheels of each BLG (8 brakes).

Each brake can be supplied with, either normal or alternate hydraulic power, because of the single cavity brake design. For each single cavity brake, there is a passive shuttle valve between normal and alternate hydraulic supplies.

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Also, each brake has an individual visual wear indicator; When the parking brake is ON, the flight crew can check the wear of the BLG brakes (Refer to PRO-NOR-SOP-50-E Before Walkaround_PARK BRK).

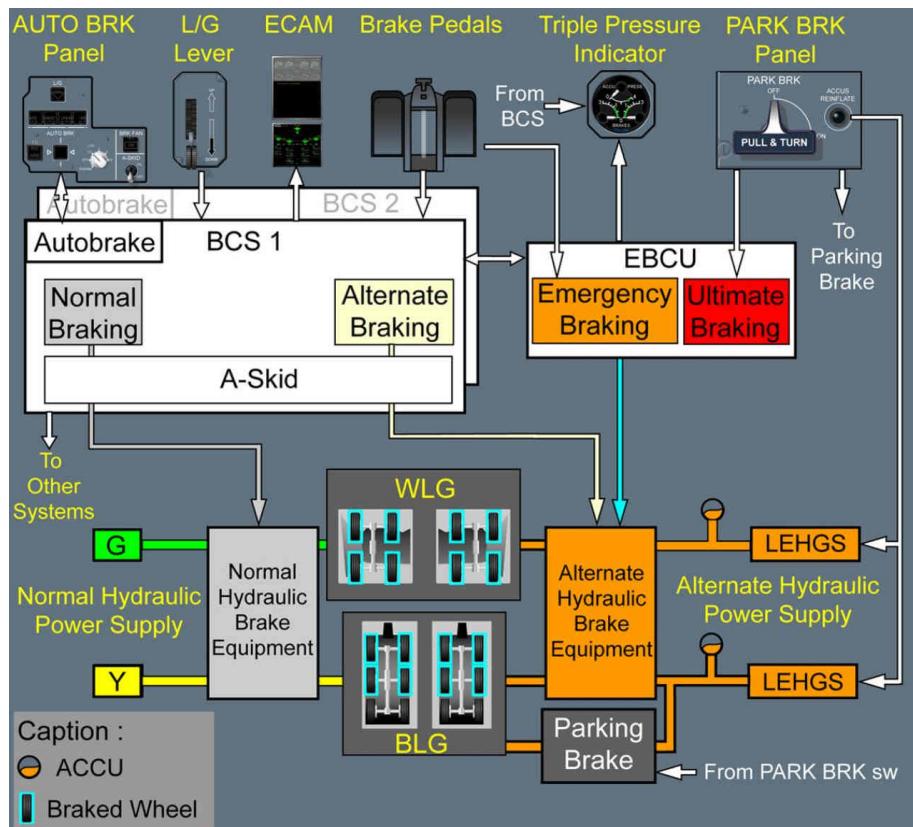
WHEEL FUSE PLUGS

Each WLG and BLG wheel has fuse plugs that prevent the wheel and tire from bursting. In the case of an excessive brake overheat, the fuses melt and the tire deflates.

ARCHITECTURE

Applicable to: ALL

Architecture



BRAKING CONTROL SYSTEM

The Braking Control System (BCS) controls the normal and the alternate braking modes and has two redundant control systems referred to as BCS 1 and BCS 2.

One BCS is active while the other is a backup.

[L2] The backup BCS automatically activates, if the active BCS fails.

[L3] The active BCS changes after each landing gear extension.

Both BCS are hosted by the CPIOMs G.

[L1] Each BCS receives electrical commands from the flight crew via:

- The brake pedals

[L3] The brake pedals have a Normal Brake Pedal Transmitter Unit (NBPTU) that converts the position of the pedals to an electrical signal.

[L1] - The AUTO BRK selector

- The RTO pb

[L2] - The Landing Gear (L/G) lever

- In normal braking mode, the retraction braking activates when the L/G lever is set to the UP position

[L1] Then, the active BCS computes and sends the corresponding electrical commands to the normal and/or to the alternate hydraulic equipment of the braking system, in accordance with flight crew inputs.

The BCS also sends data to:

- The ECAM, to generate alerts and to display the WHEEL system page

- The triple pressure indicator

[L3] - The Emergency Brake Control Unit (EBCU), that activates if the BCS fails.

EMERGENCY BRAKE CONTROL UNIT (EBCU)

The EBCU controls emergency braking and ultimate braking (only on the WLG , *Refer to DSC-32-10-30-30-50 Ultimate Braking Control*), and activates automatically, when:

- The normal and the alternate braking modes fail, or

- The A-SKID sw is set to the OFF position.

Note: There is no A-SKID protection when in emergency or ultimate braking.

The EBCU receives electrical commands from the flight crew, via:

- The brake pedals

[L3] The brake pedals have an Emergency Brake Pedal Transmitter Unit (EBPTU) that converts the position of the pedals to an electrical signal.

[L1] - The PARK BRK handle.

Then, the EBCU computes and sends the corresponding electrical commands to the alternate hydraulic equipment of the braking system, in accordance with flight crew inputs.

The EBCU also sends data to:

- [L3] - The BCS that relays the fault data to the ECAM to generate alerts
- [L1] - The triple pressure indicator, when the braking control system fails.

NORMAL HYDRAULIC POWER SUPPLY

In normal braking mode, hydraulic power is supplied to the braking system by:

- The GREEN hydraulic system for the WLG
- The YELLOW hydraulic system for the BLG.

ALTERNATE HYDRAULIC POWER SUPPLY

- [L2] For the braking system, hydraulic supply redundancy is achieved with dedicated Local Electro-Hydraulic Generation Systems (LEHGS). Each LEHGS has its own hydraulic reservoir and uses electrical power to generate hydraulic pressure. This architecture prevents hydraulic fluid transfer and common point between main aircraft hydraulic systems, which are otherwise a drawback of single cavity brakes.
- [L1] In alternate, emergency, and ultimate braking modes, hydraulic power is supplied by:
 - The Local Electro-Hydraulic Generation Systems (LEHGS)
- [L2] There is:
 - One LEHGS for the WLG brakes
 - One LEHGS for the BLG brakes.

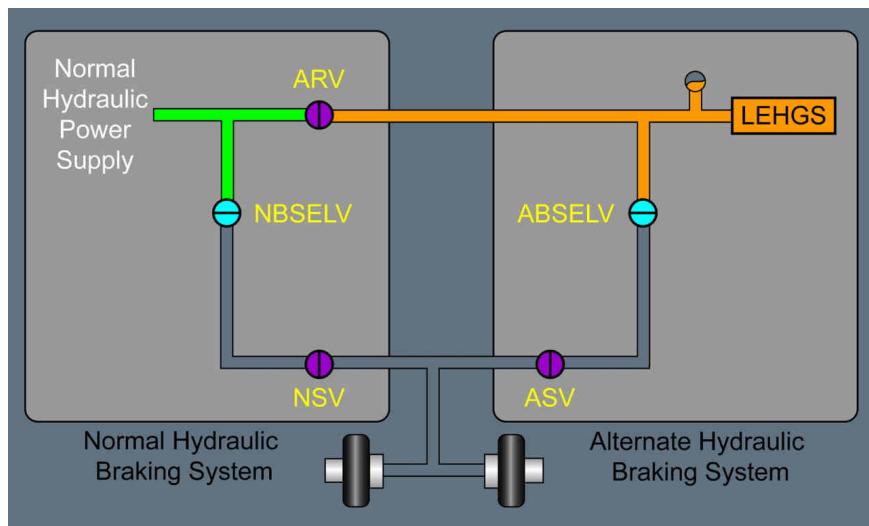
Note: *The LEHGS can automatically supply hydraulic pressure when the engines are running. When the engines are not running, the BLG LEHGS may be activated by pressing the ACCUS REINFLATE pb on the PARK BRK panel (a single push is enough).*

- [L1] - The brake accumulators.
- [L2] The brake accumulators store hydraulic pressure and are maintained pressurized by the LEHGS. They provide:
 - Additional hydraulic pressure to deal with peak flow demands, when the associated LEHGS is operating
 - Hydraulic pressure for at least 6 brake applications, if the associated LEHGS fails
 - Hydraulic pressure for 12 h of efficient parking brake application.

L3 ARV

The braking system has Alternate Refill Valves (ARV) that can connect the normal and the alternate hydraulic power supplies. After engines are started, the ARVs automatically open to charge the brake accumulators and refill the hydraulic reservoirs of the LEHGS.

The ARVs automatically close when the ground speed exceeds 65 kt, and remain closed for the rest of the flight, to segregate normal and alternate hydraulic braking power supplies.

ARV**L3 INTERFACE WITH OTHER SYSTEMS**

The BCS exchanges data with:

- The flight control system and the Auto Flight System (AFS) for flight calculations and the ground control laws
- The Flight Data Recording System (FDRS)
- The Central Maintenance System (CMS)
- The Control and Display System (CDS)
- The electrical system
- The Flight Warning System (FWS)
- The hydraulic system.

Braking Functions**BASIC AUTOBRAKE**

Applicable to: ALL

BASIC AUTOBRAKE

The basic AUTO BRK is a function of the Braking Control System (BCS) that automatically decelerates the aircraft during landing, or in the case of a rejected takeoff (RTO).

- [L2] The basic AUTO BRK :
 - Avoids any delay for brake application in the case of an RTO
 - Reduces flight crew workload during landing, by maintaining a constant deceleration rate
 - Reduces the number of brake applications, and therefore, brake wear.
- [L1] The basic AUTO BRK has four landing modes (LO, 2, 3 and HI) and one RTO mode.
The flight crew selects the basic AUTO BRK mode via the AUTO BRK selector , or the RTO pb .
- [L2] Each landing mode provides a specific deceleration.
The RTO mode provides maximum braking performance limited by A-SKID .
- [L3]

| Basic AUTO BRK Mode | LO | 2 | 3 | HI | RTO |
|---------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---|
| Deceleration | 2.0 m/s ² 4 kt/s | 2.5 m/s ² 5 kt/s | 3.0 m/s ² 6 kt/s | 3.5 m/s ² 7 kt/s | Maximum braking performance limited by A-SKID |

Basic AUTO BRK Modes**[L1] BASIC AUTO BRK ARMING**

The basic AUTO BRK is armed when:

- The flight crew selects a basic AUTO BRK mode
- A-SKID is available (normal and alternate modes)
- [L2] At least two PRIM s are available
- [L3] The PRIM s provide the basic AUTO BRK with the ground spoilers extension command.
- [L2] At least one ADIRU is available (in NAV mode)
- [L3] The ADIRU s provide the basic AUTO BRK with effective aircraft deceleration.
- [L1] The armed basic AUTO BRK mode is displayed in blue on the Flight Mode Annunciation (FMA).

- Note:
- When on ground, the basic AUTO BRK can be armed in any mode, even if the parking brake is on
 - When three IR s are in ATT mode, the basic AUTO BRK is not available.
 - The flight crew cannot arm the RTO mode when the aircraft is in flight.

BASIC AUTO BRK ACTIVATION

The basic AUTO BRK activates when:

- All the arming conditions are satisfied
- The ground spoilers extend. (Refer to DSC-27-10-10-30 Speedbrake and ground spoiler control)

[L2] The basic AUTO BRK activates in landing mode when:

- The ground spoilers extend and the NLG is on ground, or
- 5 seconds after the ground spoilers extend, whichever occurs first.

[L1] The ground spoilers do not extend automatically below 72 kt . As a result, in the case of an RTO initiated below 72 kt , the basic AUTO BRK does not activate.

[L2] Note: In addition to all the above conditions, the RTO mode does not activate below 40 kt . If the flight crew selects the RTO mode by error above 40 kt during the landing roll, the RTO mode will activate.

[L1] The active basic AUTO BRK mode is displayed in green on the FMA .

BASIC AUTO BRK DISARMING/DEACTIVATION

The basic AUTO BRK disarms or deactivates when:

- The flight crew applies sufficient pedal deflection on one or both brake pedals, or
- The aircraft is in flight for more than 10 s (for RTO mode only), or
- The flight crew sets the AUTO BRK Mode selector to DISARM, or
- The flight crew presses the RTO pb in order to turn off the RTO light, or
- The flight crew presses one of the A/THR instinctive disconnect pushbuttons (only with basic AUTO BRK LDG modes, not for RTO mode), or
- Any basic AUTO BRK arming condition is lost, or
- The ground spoilers retract. (Refer to DSC-27-10-10-30 Speedbrake and ground spoiler control).

Note: If the basic AUTO BRK disarms during landing, the AUTO BRK Mode selector automatically returns to the DISARM position and the AUTO BRK mode no longer appears on the FMA .

ANTISKID

Applicable to: ALL

A-SKID

Antiskid (A-SKID) optimizes manual and automatic braking performance by preventing any wheel lock.

L2 A-SKID also:

- Limits tire wear
- Prevents tire bursts
- Provides aquaplaning protection.

L1 For manual braking, the flight crew can achieve maximum braking performance by applying maximum deflection of the brake pedals.

For automatic braking, the flight crew can achieve maximum braking performance in RTO mode and ROP activation.

The flight crew can turn off the A-SKID from the A-SKID sw in the cockpit, without losing NWS .

| | |
|----------------|---|
| CAUTION | The A-SKID disconnection with the A-SKID sw in the cockpit is allowed only in case of "Loss of Braking" procedure <i>Refer to Loss of Braking</i> |
|----------------|---|

A-SKID is not available :

- In ALTN without A-SKID , in EMERGENCY, in ULTIMATE braking modes (All modes with ECAM warning "Brakes A-SKID Fault")
- In Parking Brake mode
- If an excessive number of wheels are released.

L3 A-SKID PRINCIPLE

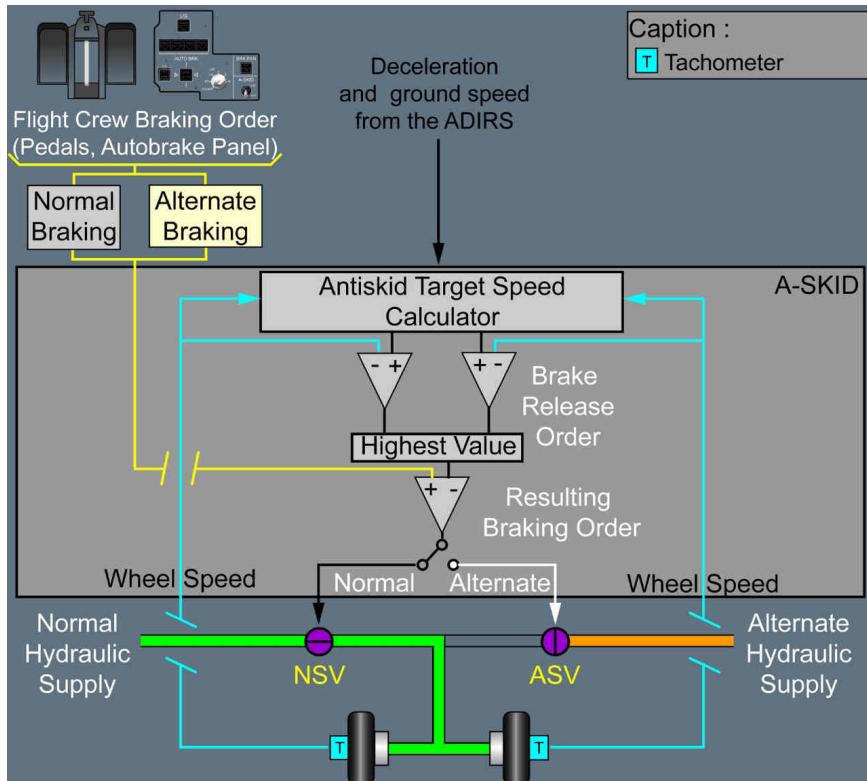
The A-SKID uses data from the ADIRS and the tachometers to calculate an individual target speed for each pair of wheels. Each individual target speed provides maximum braking performance in the current runway conditions, and changes as runway conditions change. When the speeds of a wheel pair decrease below the individual target speed, a brake release order is generated and combined with the braking orders of the flight crew or of the Auto-Brake to maintain this target speed.

The highest brake release order corresponds to the lowest speed of the wheel pair.

The resulting braking order is sent to:

- The Normal Servo Valves (NSV) of the affected pair of wheels, when in normal braking
- The Alternate Servo Valves (ASV) of the affected pair of wheels, when in alternate braking.

Note: A-SKID is available but degraded with all 3 ADIRS in OFF mode.

A-SKID Principle**BRAKE TO VACATE (BTV)**

Applicable to: ALL

The Brake To Vacate (BTV) function manages the auto-brake deceleration at landing.

The BTV:

- Automatically manages the braking : to reach a runway exit pre-selected by the flight crew
- Optimizes the braking by delaying and minimizing the brake application
- Improves passenger comfort.

L2 The PRIMs host the BTV function.

[L1] The BTV function uses and exchanges data with the following systems:

- Onboard Airport Navigation System (OANS)
- The Airport Navigation display on ND
- Auto flight system

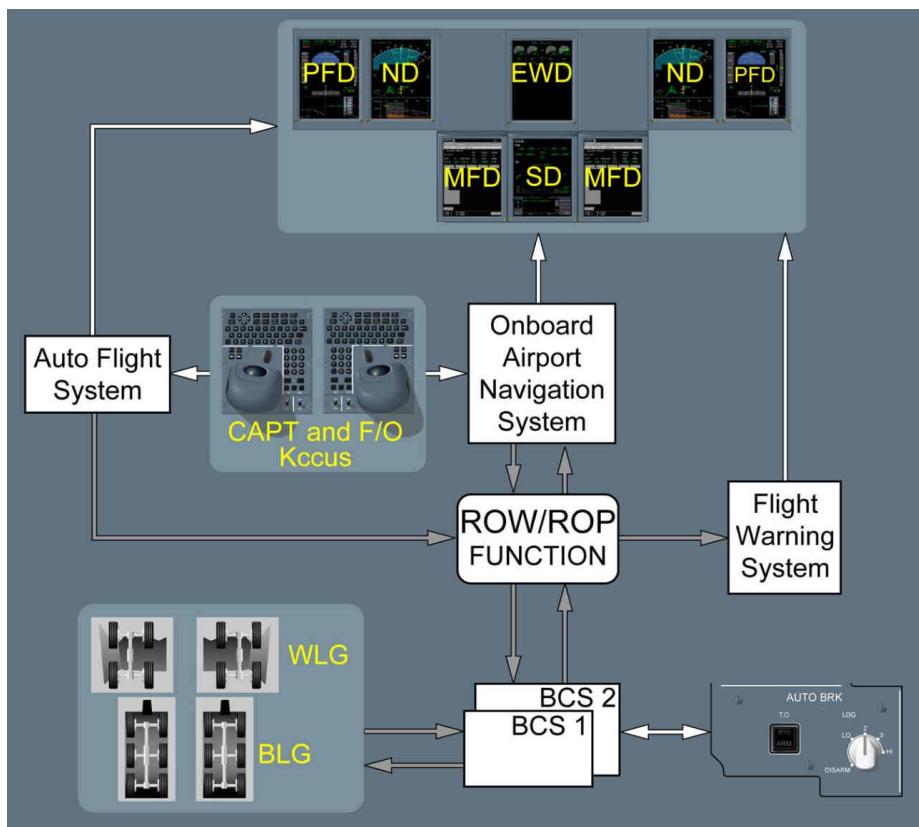
[L2] The BTV function is located in the PRIM and uses PRIM data to compute in real time the different data for braking management.

[L1]- Braking system

- Flight warning system
- Display system

[L2]- Landing runway selected in the FMS.

BTV operational interaction



PRINCIPLE

The flight crew visualizes the data computed by the BTV on the ND, when the ND range selection is set to ZOOM.

The predicted distances of landing computed by the BTV are shown by two lines:

- The DRY line, that indicates the predicted landing distance on a dry runway
- The WET line, that indicates the predicted landing distance on a wet runway.

The DRY and WET lines have two functions:

- The flight crew uses the dry and wet lines to choose the appropriate runway exit during descent preparation
- The flight crew may use the DRY and WET lines to see in real time the BTV predicted landing distances during final approach.

Dry and Wet LineSYSTEM OPERATION AND DISPLAY**BTV INITIALIZATION PHASE**

Before arming BTV and use it for braking at landing, during the descent preparation, the flight crew must select the landing runway and select a runway exit. This is the BTV initialization phase.

The DRY and WET lines displayed during the initialisation phase of BTV correspond to the landing distance in autoland and with autobrake, on dry runway for the dry line, and on wet runway for the wet line.

BTV MONITORING PHASE

In short final, the flight crew can monitor the DRY and WET lines on the ND, with the ND range selector set to ZOOM.

Above 500 ft RA

Above 500 ft RA the dry and wet lines display the required landing distance. The lines do not move.

Between 500 ft and touchdown:

- [L2] - Below 500 ft and nose landing gear touchdown, or
- Below 500 ft and 5 s after the main landing gears touchdown, or
- Below 500 ft and the ground spoiler extension

The DRY and WET lines are computed and displayed in real time

BTV computes in real time the estimated landing distance, adjusts and displays the DRY and WET lines accordingly, taking into account the aircraft behavior (speed, altitude).

Between touchdown and BTV disconnection

At touchdown:

- [L2] - When the nose landing gear touchdown, or
- 5 s after the main landing gear touchdown, or
- At the ground spoiler extension

The DRY and WET lines disappear and a single green line is displayed: The stop bar.

The stop bar shows the predictive stop distance computed by the BTV, based on the real time braking efficiency.

COMPUTATION PRINCIPLE

The computation of the DRY and WET lines takes into account the following elements:

AIRBORNE DISTANCE

The airborne distance is a minimum of 1 312.3 ft (ICAO touchdown zone) between the runway threshold and the touchdown zone.

- [L2] - Above 500 ft, the airborne distance computation is based on FMS data, approach speed and inserted wind
- Below 500 ft and above 50 ft, the airborne distance computation is based on IRS ground speed
- Below 50 ft, the airborne distance computation is based on IRS ground speed and RA data.

Because the BTV considers a minimum airborne distance of 1 312.3 ft between the runway threshold and the touchdown zone, the headwind that could reduce the airborne distance, has no effect on the computation of the airborne distance.

A long flare or a tailwind is fully integrated in the computation of the airborne distance, because these conditions increase the airborne distance.

[L1] TOUCHDOWN GROUND SPEED

- [L2]** Above 500 ft, the computed touchdown ground speed is based on FMS data, approach speed and inserted wind.
Below 500 ft and until touchdown, the computed touchdown ground speed is based on the IRS ground speed corrected by the GPS ground speed.

[L1] BRAKING EFFICIENCY

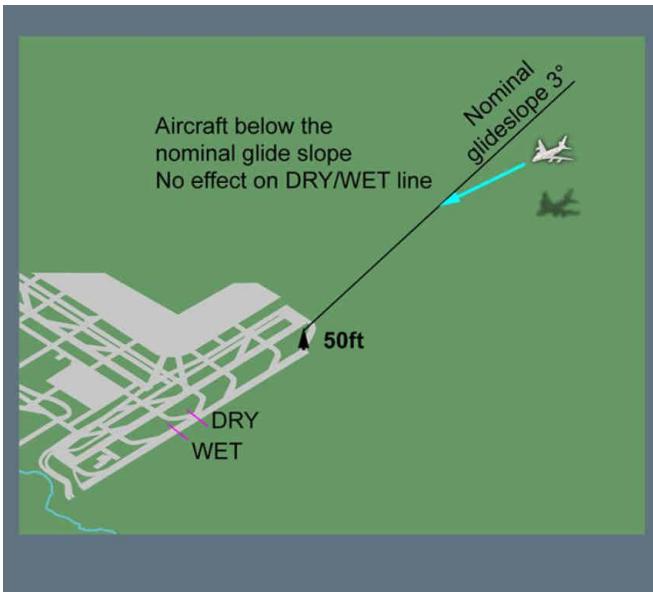
- [L2]** For the computation of the DRY line:
 - The runway is considered dry
 - Autobrake HI is used
 - No thrust reverser is used.

For the computation of the WET line:

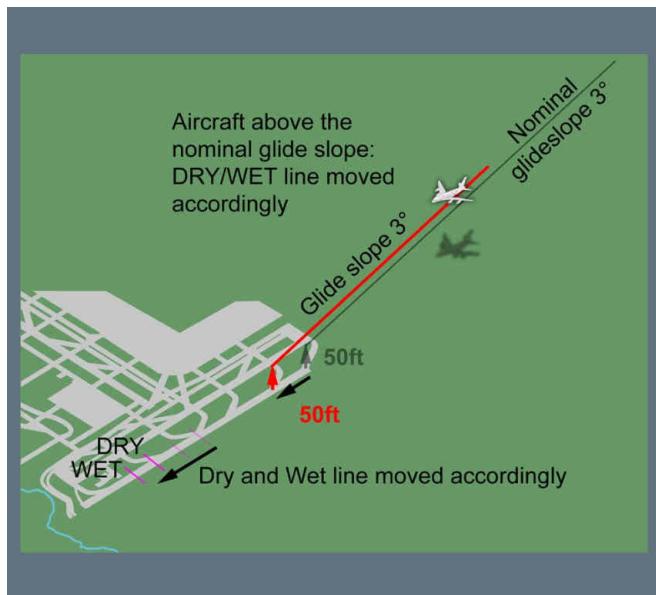
- The runway is considered contaminated with 1/4 in water
- Maximum achievable braking is used
- Maximum reverser is used.

L1 ADAPTATION OF THE DRY AND WET LINES BETWEEN 500FT AND 50FT

- L2** The computation of the DRY and WET lines take into account a standard glide slope of 3 °:
- If the aircraft is below the 3 ° glide slope, the dry and wet line are still positioned as if the aircraft was on the 3 ° glide slope, because the flight crew can reach the standard 3 ° glide slope.



- If the aircraft is above the 3 ° glide slope, the DRY and WET lines are moved accordingly, because BTV assumes that the flight crew maintains the 3 ° glide slope descent from the actual position of the aircraft. In this case, the 50 ft runway over fly point is also moved accordingly, i.e. after the runway threshold.



The objective of the BTV is to manage the automatic braking application to reach the selected runway exit with an aircraft speed of 10 kt.

If the runway exit selected by the flight crew is a high speed turn-off, the objective of BTV is to allow the flight crew to manage the entrance of the high speed turn-off with confidence with BTV active. The BTV speed target remains 10 kt.

L2 BTV OPERATION

In comparison with basic auto-brake mode, BTV does not only command a constant deceleration rate as selected by the flight crew. BTV first commands a regular increase in deceleration rate before it maintains a constant deceleration rate in order to reach the selected exit minus 215 ft at an aircraft speed of 10 kt.

The constant deceleration rate is function of the DRY and WET lines, and the position of the exit selected by the flight crew.

- L3**
- If the flight crew selects an exit between the dry and wet line, the constant deceleration rate is approximately 10 ft/s^2 .
 - If the flight crew selects an exit after the wet line, the constant deceleration rate is approximately 6.50 ft/s^2 .

- [L2] If necessary, BTV can adjust the deceleration rate based on the remaining distance to the selected exit in order to reach the 10 kt target at the exit.

BTV ARMING

The BTV arms when:

- The flight crew selects a runway exit on the airport map display
- The flight crew selects BTV braking mode on the AUTO BRK mode selector
- No ECAM warning affects landing distances
- At least two ADIRU are available (in NAV mode)
The ADIRU s provide BTV with actual aircraft deceleration.

- [L1] When armed, BTV is displayed on the Flight Mode Annunciation (FMA).

BTV ACTIVATION

The BTV activates when:

- All the arming conditions are satisfied
- The ground spoilers extend. (*Refer to DSC-27-10-10-30 Speedbrake and ground spoiler control*)

- [L2] BTV activates when:

- The ground spoilers extend and the NLG is on ground, or
- 5 seconds after the ground spoilers extension, whichever occurs first.

- [L1] When active, BTV is displayed on the FMA .

BTV DISARMING

When armed, BTV disarms if:

- The flight crew modifies the runway or runway exit on the airport map display, or
- The flight crew changes the selected FMS runway above 700 ft , or
- The flight crew changes of landing runway below 700 ft .

[L2]

Note: *Below 700 ft , if the flight crew changes the landing runway or if any arming condition is lost, BTV detects that the actual landing runway is not the BTV selected runway. The auto-brake reverts to BRK HI mode, associated with a triple click, and BRK HI is displayed on the FMA .*

- [L2] - The AUTO BRK selector is set to the DISARM position, or
- Any BTV arming condition is lost,

L1 BTV DEACTIVATION

BTV deactivates when:

- The aircraft ground speed reaches 10 kt , or
- The flight crew disconnects the autobrake via the brake pedals or the A/THR instinctive disconnect pb , or
- L2** - Any BTV arming condition is lost, or
- L1** - The ground spoilers retract. (*Refer to DSC-27-10-10-30 Speedbrake and ground spoiler control*).

ROW - ROP

Applicable to: ALL

ROW AND ROP OBJECTIVES

Runway Overrun Warning (ROW) and Runway Overrun Protection (ROP) are two functions available with BTV.

ROW and ROP functions alert the flight crew in the case of detected potential runway excursion. ROW concerns the airborne phase, from 500 ft AGL until touchdown. ROW alerts the flight crew in the case of potential runway excursion at landing.

ROP concerns the ground phase of the landing. ROP alerts the flight crew in the case of potential runway overrun, asks the flight crew to use maximum reverser thrust and automatically commands maximum braking, when an auto-brake mode is engaged.

- L2** ROW and ROP use the same principle and system resources as BTV.

PRINCIPLE

The ROW and ROP are two complementaries functions.

ROW and ROP use the Onboard Airport Navigation System database (OANS) , and the aircraft position to detect the current landing runway.

- ROW computes in short final and in real time the distance necessary to stop the aircraft on the runway
- ROP computes during landing roll and in real time the distance necessary to stop the aircraft on the runway.

The detection of the landing runway and the computation of the distance to stop the aircraft on the detected runway enable:

- ROW to detect and alert the flight crew of potential runway excursion in flight in short final
- ROP :
 - To detect and alert the flight crew in the case of potential runway excursion on ground
 - If it occurs, to activate maximum braking if necessary (only in auto-brake mode)

ROW AND ROP AVAILABILITY

ROW and ROP functions are available in:

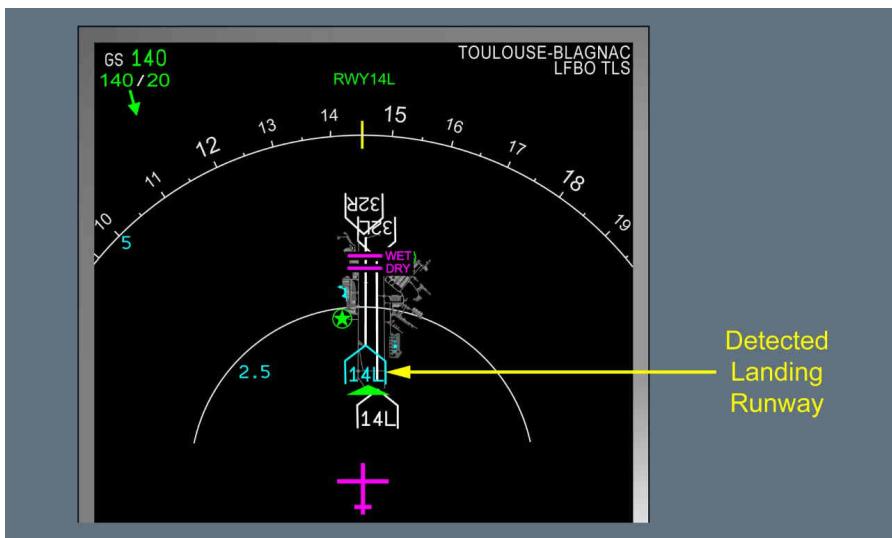
- Basic auto-brake mode, or
- BTV , or
- Pedal braking.

ROW ARMING PHASE

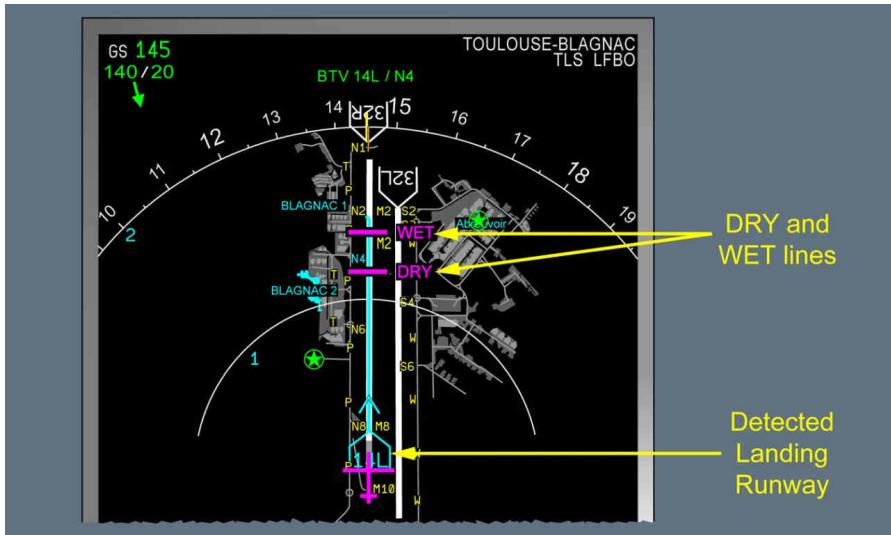
ROW scans the landing runway between 500 ft and 300 ft , taking into account the aircraft position and the runway position. Even if the flight crew changes of landing runway between 500 ft and 300 ft , the new runway becomes the protected runway.

- [L2] In BTV auto-brake mode, the runway detection is performed only at 300 ft . Between 500 ft and 300 ft , the protected runway is the runway selected by the flight crew for the landing in BTV auto-brake mode.
- [L1] As soon as ROW detects the landing runway, this landing runway is highlighted on the Airport Navigation Display on the ND by displaying the QFU in blue.

Detected Landing Runway in Basic Auto-brake Mode and Pedal Braking



In auto-brake mode (Basic or BTV) or pedal braking, in addition to the runway QFU displayed in blue, the DRY and WET lines are computed and displayed on the Airport Navigation Display. For more information *Refer to DSC-32-10-30-20-10 Dry and Wet line concept*

BTV Detected Landing Runway**ROP ARMING PHASE**

ROP is armed when:

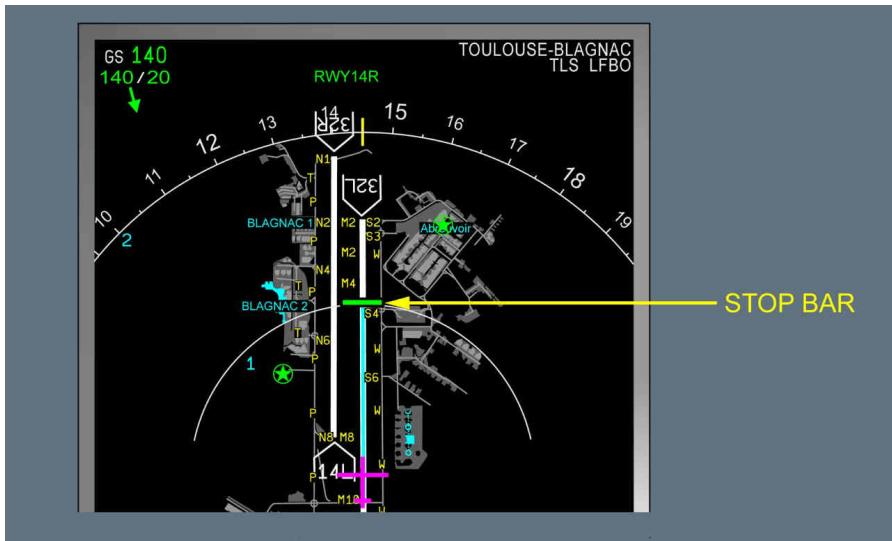
- The aircraft is on ground
- The landing runway is in the OANS database
- The landing runway is detected.

ROP remains armed until 20 kt, or until the aircraft vacates the runway.

In auto-brake mode (basic or BTV), when ROP is armed, a green BAR, showing the computed stop position of the aircraft is displayed on the Airport Navigation Display on the ND.

The blue line displays the predicted braking distance.

In basic auto-brake mode, the predicted braking distance goes from the aircraft position to the green stop bar.

Stop Bar in Classic Auto-Brake Mode

In BTV mode, the blue line showing the predicted braking path, goes from the runway threshold to the selected exit.

Stop Bar in BTV Auto-brake Mode

In pedal braking, the ND does not display the green BAR and the blue line. The ND does not display these informations to avoid the flight crew to use it to delay pedal braking application. On ground, when the flight crew disconnects the auto-brake (basic auto-brake or BTV), ROP remains armed, thanks to the availability of ROP in pedal braking.

LOSS OF ROW/ROP

ROW and ROP can be lost if:

- ROW or ROP receive the information that the aircraft position is erroneous
- ROW or ROP detect a data inconsistency in the Airport Navigation database
- The landing runway is not known by the system.

In this case, BTV and ROP are declared as inoperative and the following ECAM alert may be triggered:

- BRAKES BTV FAULT Refer to PRO-ABN-ECAM-10-32-285 BRAKES BTV FAULT
- SURV ROW/ROP LOST Refer to PRO-ABN-ECAM-10-34-20-GROWR SURV ROW/ROP LOST

DURING ROW OR ROP ACTIVATION

In the case of ROW / ROP loss when, ROW or ROP is active, or ROW or ROP alerts are displayed, or ROP commands maximum braking application, the ROW or ROP alerts remain displayed and the maximum braking application remains applied when ROP is active.

L1 IN FLIGHT

In the case of ROW loss in flight, when the function is armed, the detected runway is no more displayed on Airport Navigation display on ND .
If BTV is armed, the DRY and WET lines are no more displayed on ND .

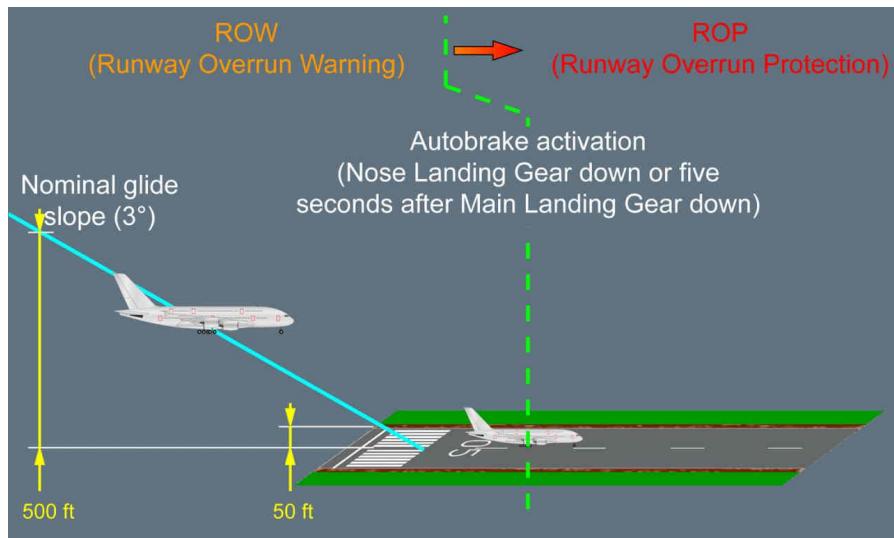
ON GROUND

In the case of ROP loss on ground, when the function is armed, the stop bar is no more displayed on the Airport Navigation display.

ROW ROP OPERATIONAL DOMAIN

ROW and ROP functions are operative:

- On all runway conditions
- In autoland or manual landing
- In any condition of wind
- In conf 3 or conf FULL
- In all weight conditions including for overweight landing.

ROW AND ROP OPERATIONAL DESCRIPTION

ROW ACTIVATION

ROW is armed below 500 ft until the aircraft touches down, independently of the braking means chosen by the flight crew (i.e. autobrake, or pedal braking), when ROW detects the landing runway.

- [L2] In basic autobrake mode or pedal braking, ROW detects the landing runway between 500 ft and 300 ft RA .
If the flight crew selects BTV autobrake mode, the BTV function detects the landing runway at 300 ft . The BTV function performs a late detection of the landing runway in order to favor the landing runway selected by the flight crew as long as possible.
- [L1] ROW detects a possible runway overrun when the aircraft is in flight, considering different parameters such as the aircraft weight, the aircraft speed, the aircraft altitude, the aircraft position, the wind.
If ROW detects a possible runway overrun, ROW activates aural and visual alerts to inform the flight crew of the situation.

On WET runway

ROW computes two lines: i.e. one WET line and one DRY line. These lines correspond to the minimum landing distance for a WET runway and for a DRY runway.

The flight crew uses the appropriate line as reference depending on the actual runway condition, i.e. dry or wet.

ROW informs the flight crew via a visual alert on the PFD IF WET : RWY TOO SHORT , meaning that if the runway is WET, the landing distance computed by ROW is too long.

| | |
|----------------|--|
| CAUTION | If the runway is WET, and "IF WET: RWY TOO SHORT" is displayed on the PFD, the flight crew must perform a go-around. |
|----------------|--|

In the case of a dry runway, the flight crew can continue the landing.

PFD: IF WET RWY TOO SHORT

In addition to the message IF WET : RWY TOO SHORT displayed on the PFD , the WET line on the Airport Navigation appears in amber showing that the landing distance is longer than the available landing distance.

IF WET RWY TOO SHORT on BTV Airport Navigation display on ND



On DRY runway

Even if the runway is dry, because ROW cannot assess actual condition of the runway, the message IF WET: RWY TOO SHORT is displayed.

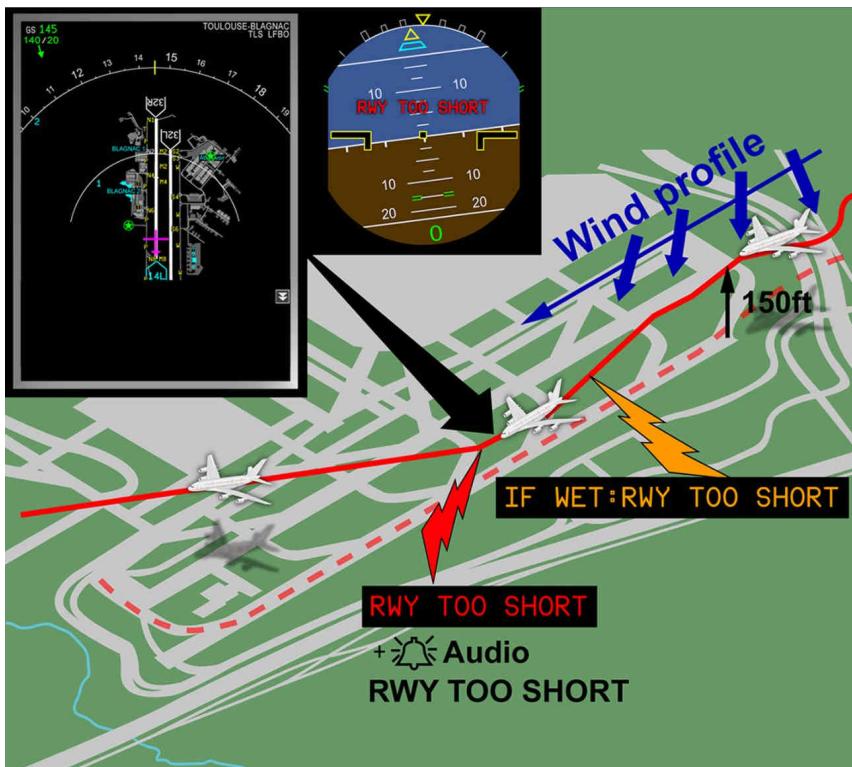
If for any reason, the landing distance computed for a dry runway becomes longer than the remaining runway length, a new message is displayed on the PFD : RWY TOO SHORT .

Associated with this message, an aural alert "RUNWAY TOO SHORT" is triggered. This aural alert is repeated as long as ROW detects that the aircraft is in a situation of possible runway overrun.

The aural alert "runway too short" is triggered below 200 ft .

| | | |
|-----------|----------------|--|
| L2 | WARNING | If RWY TOO SHORT alert is displayed on the PFD, associated with the aural alert "RUNWAY TOO SHORT", the flight must perform a go-around. |
|-----------|----------------|--|

Not used in this context

RWY TOO SHORT: PFD ND classic auto-Brake mode

In addition to the message RWY TOO SHORT displayed on the PFD , the DRY and WET lines on the Airport Navigation appear in red showing that the landing distance is longer than the landing distance available.

Row Activation with BTV selected on ND

ROP ACTIVATION

ROP monitors the aircraft braking distance on ground. If ROP detects a possible overrun situation, ROP becomes active.

ROP considers two scenarios:

- When the flight crew selects an autobrake mode, or
- When the flight crew uses pedal braking.

In autobrake mode

When ROP is active:

- ROP commands the maximum braking performance
The braking system applies maximum braking, limited by the anti-skid.
- The aural alert "SET MAX REVERSE" is triggered
- The message MAX REVERSE is displayed on the PFD. This message pulses for 9 s and then remains steady as long as ROP remains active.

Not used in this context

The aural alert "SET MAX REVERSE" is triggered only if the flight crew did not select the maximum reverse thrust position. The aural alert is repeated continuously until the flight crew

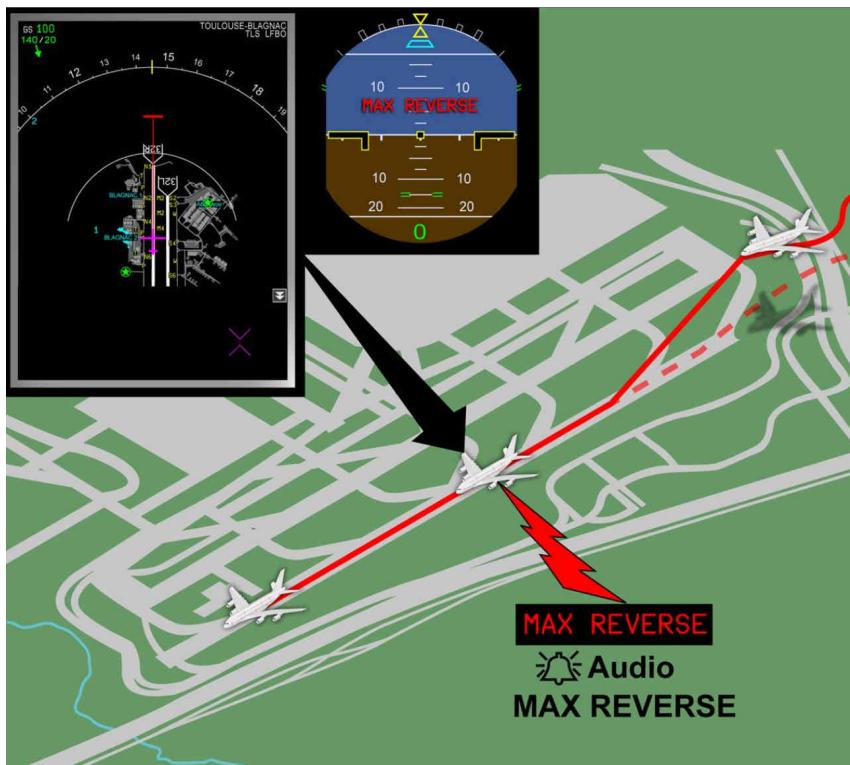
selects the maximum reverse thrust position and as long as ROP is active (i.e. situation of runway overrun detected).

At 80 kt, the aural alert "KEEP MAX REVERSE" is triggered one time if:

- The max reversers are deployed
- ROP function is active.

The aural warning "KEEP MAX REVERSE" is triggered to ask the flight crew to keep max reverser deployed below 80 kt.

Not used in this context

MAX REVERSE: PFD ND

As long as ROP is active:

- The STOP bar displayed on the Airport Navigation is red and pulses
- The STOP bar is displayed after the end of the runway.
- ROP applies maximum braking limited by A-SKID (independently of BTV or basic autobrake mode).

The detection of an overrun situation is reversible. If the maximum braking application and the deceleration rate allow ROP to compute a landing distance shorter than the remaining runway length, ROP deactivates. ROP returns to armed state. The previously selected autobrake mode is active again.

When ROP is active, the flight crew can disconnect the maximum braking only by overriding the braking with a brake pedal application. In this situation, the flight crew reverts to pedal braking. Nevertheless, ROP remains active as long as an runway overrun is detected.

In pedal braking

When ROP is active:

- The aural alert "MAX BRAKING" is triggered
- The messages MAX BRAKING and MAX REVERSE are displayed on the PFD . These messages pulse for 9 s and then remain steady as long as ROP remains active (for more information on the PFD, Refer to DSC-32-20-220 PFD ROW ROP).

Not used in this context

The aural alert "MAX BRAKING" is triggered and repeated continuously until the flight crew applies maximum pedal braking and as long as ROP is active (situation of runway overrun detected).

When the flight crew applies maximum pedal braking, the aural alert "SET MAX REVERSE" replaces the aural alert "MAX BRAKING".

The aural alert "SET MAX REVERSE" is triggered only if the flight crew did not select maximum reverse thrust position. The aural alert is repeated continuously until the flight crew selects the maximum reverse thrust position and as long as ROP is active (if a situation of runway overrun is detected).

Not used in this context

At 80 kt , the aural alert "KEEP MAX REVERSE" is triggered one time if:

- The max reversers are deployed
- ROP function is active.

The aural alert "KEEP MAX REVERSE" is triggered to ask the flight crew to keep max reverser deployed below 80 kt .



A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

32 - LANDING GEAR

SYSTEM DESCRIPTION - BRAKING SYSTEM

Not used in this context



A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

32 - LANDING GEAR

SYSTEM DESCRIPTION - BRAKING SYSTEM

Intentionally left blank



A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

32 - LANDING GEAR

SYSTEM DESCRIPTION - BRAKING SYSTEM

Braking Modes

NORMAL BRAKING

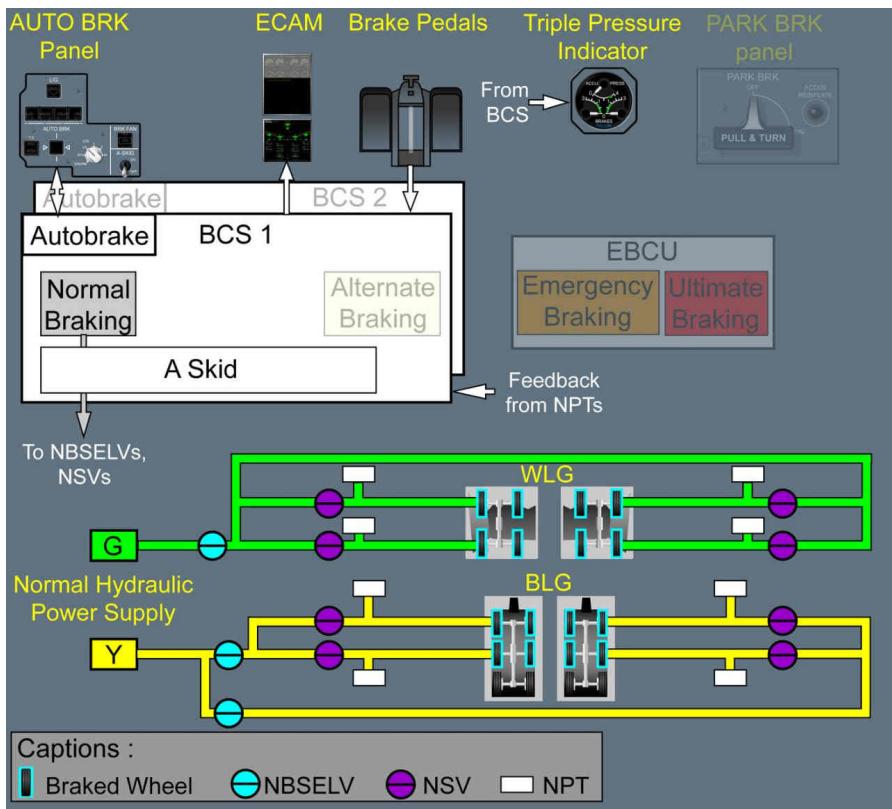
Applicable to: ALL

In normal braking:

- A-SKID is available
- AUTO BRK is available
- Differential braking is available.
- The flight crew can use the brake pedals:
 - Automatic retraction braking is available.
 - The number of brake applications is not limited

NORMAL BRAKING ARCHITECTURE

Normal Braking Architecture



NORMAL BRAKING CONTROL

The BCS controls normal braking.

NORMAL HYDRAULIC BRAKE EQUIPMENT

The normal hydraulic brake equipment receives electrical commands from the active BCS. The normal brake equipment has valves (selector and servo valves) and pressure transmitters to control the GREEN or YELLOW hydraulic pressure, that is applied to the brakes.

L3 NORMAL BRAKE SELECTOR VALVES

There are three Normal Brake Selector Valves (NBSELV s):

- One for the left and the right WLG
- One for the right BLG
- One for the left BLG .

Each NBSELV operates independently from the others, and opens when normal braking is active on the corresponding landing gear.

If normal braking is lost on one or more landing gears, only the affected NBSELV (s) closes in order to isolate the brakes from the GREEN or the YELLOW hydraulic pressure. (*Refer to DSC-32-40-30 Braking System Reconfiguration*).

L3 NORMAL SERVO VALVES

There is one Normal Servo Valve (NSV) for each pair of brakes (8 NSVs).

The NSVs adjust the GREEN or the YELLOW hydraulic pressure to decelerate the aircraft, in accordance with flight crew inputs, via the brake pedals or the AUTO BRK.

L3 NORMAL PRESSURE TRANSMITTERS

There is one Normal Pressure Transmitter (NPT) for each pair of brakes (8 NPTs).

The NPTs measure the normal hydraulic pressure that is applied to the brakes.

This information is sent to the BCS to provide control feedback.

HYDRAULIC POWER SUPPLY

The normal hydraulic power (GREEN and YELLOW) supplies normal braking.

ALTERNATE BRAKING

Applicable to: ALL

In alternate braking:

- A-SKID is available
- AUTO BRK is available
- The flight crew can use the brake pedals:
 - Differential braking is available.
 - The number of brake applications is not limited

Note: Alternate braking performance is equivalent to normal braking performance.

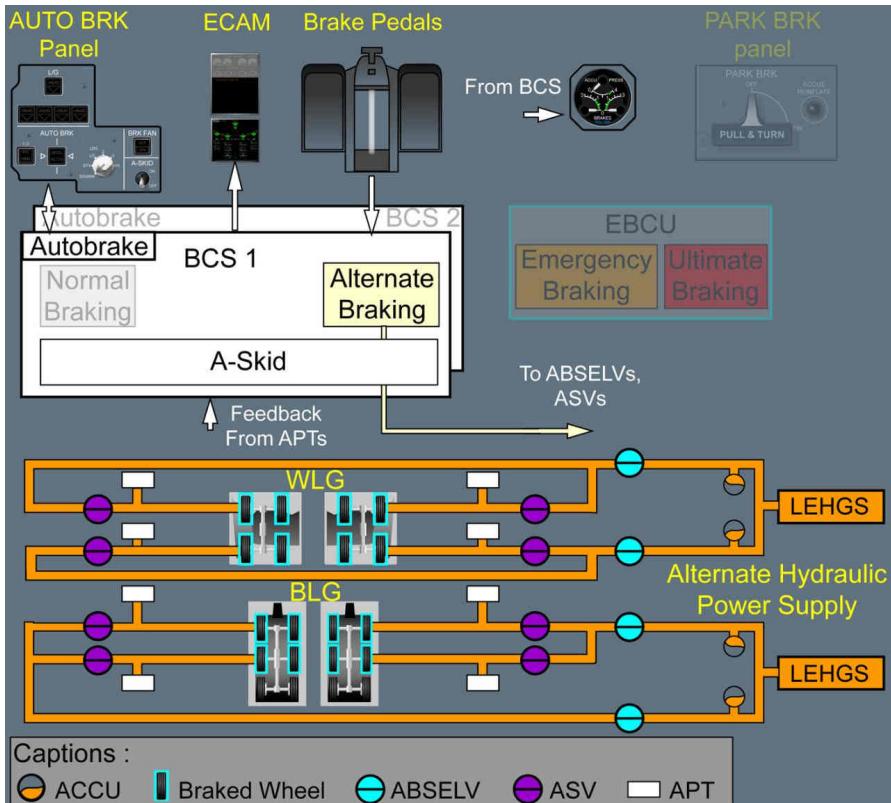
The brake system automatically changes from normal to alternate braking and the BRAKES NORM BRK FAULT alert is displayed, if an excessive number of brakes are released because of the failure of one or more normal hydraulic valves. (Refer to DSC-32-40-30 Braking System Reconfiguration).

ALTERNATE BRAKING WITHOUT A-SKID

- [L3] If the A-SKID is not available (BRAKES A-SKID FAULT alert displayed Refer to PRO-ABN-ECAM-10-32-130 BRAKES A-SKID FAULT ON ALL L/Gs) because of failed tachometers and the BCS operates normally, alternate braking remains available without A-SKID and AUTO BRK , under BCS control.

ALTERNATE BRAKING ARCHITECTURE

Alternate Braking Architecture



ALTERNATE BRAKING CONTROL

The BCS controls alternate braking.

ALTERNATE HYDRAULIC BRAKE EQUIPMENT

In alternate braking, the alternate hydraulic brake equipment receives electrical commands from the active BCS.

The alternate brake equipment has valves (selector and servo valves) and pressure transmitters to control the LEHGS/accumulators hydraulic pressure, that is applied to the brakes.

L3 ALTERNATE BRAKE SELECTOR VALVES

There are four Alternate Brake Selector Valves (ABSELVs):

- One for the forward brakes of the WLG
- One for the aft brakes of the WLG
- One for the left BLG
- One for the right BLG.

Each ABSELV operates independently from the others, and opens when alternate, emergency, or ultimate braking is active on the corresponding landing gear.

If normal braking is lost on one or more landing gears, only the affected ABSELV(s) open.

L3 ALTERNATE SERVO VALVES

There is one Alternate Servo Valve (ASV) for each pair of brakes (8 ASVs).

The ASVs adjust alternate hydraulic pressure to decelerate the aircraft, in accordance with the flight crew inputs.

L3 ALTERNATE PRESSURE TRANSMITTERS

There is one Alternate Pressure Transmitter (APT) for each pair of brakes (8 APTs).

The APTs measure the alternate hydraulic pressure that is applied to the brakes.

This information is sent to the BCS to provide control feedback and indications on the triple pressure indicator in the cockpit.

HYDRAULIC POWER SUPPLY

Alternate hydraulic power (LEHGS and accumulators) supplies alternate braking.

L3 There are four brake accumulators:

- Two for the WLG (one for the forward WLG brakes, one for the aft WLG brakes)
- Two for the BLG (one for the left BLG, one for the right BLG).

These accumulators are isolated between them: one accumulator failure will not prevent to keep half of WLG or BLG braking.

EMERGENCY BRAKING

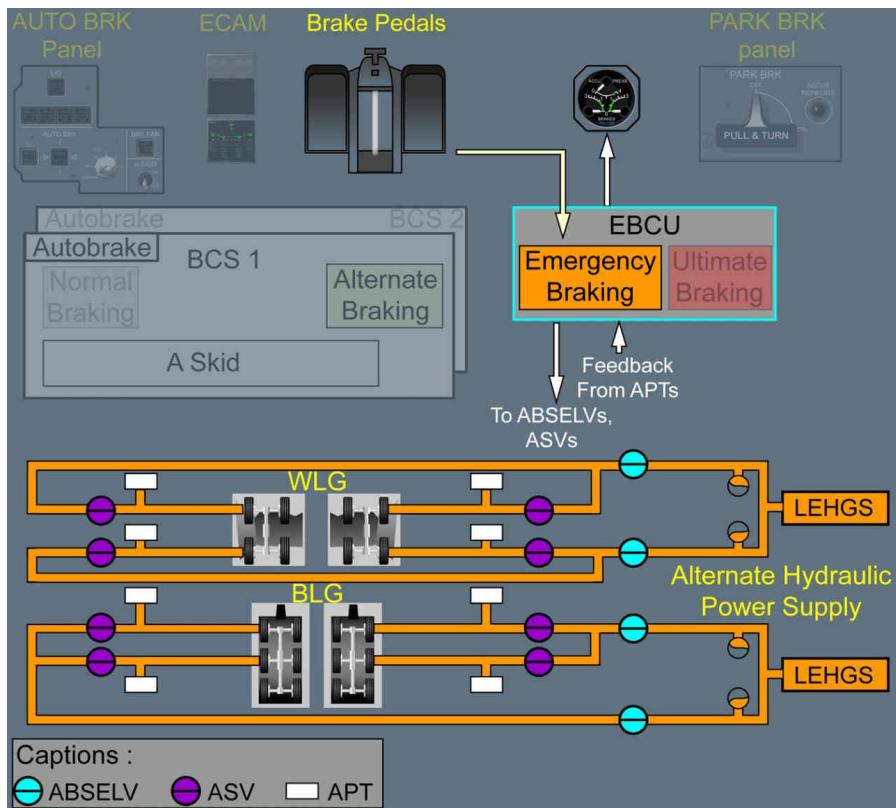
Applicable to: ALL

In emergency braking:

- A-SKID is not available. Hydraulic pressure applied to the brakes is automatically limited, in order to limit risk of tire burst.
- [L2] Hydraulic pressure is automatically limited to 1 000 PSI at landing (landing brake law), 1 700 PSI for taxi-out and Take-Off (take-off brake law).
- [L3] It is possible to revert from landing brake law to take-off brake law by set parking brake to position ON.
- [L1]- AUTO BRK is not available
 - The flight crew can use the brake pedals:
 - Differential braking is available
 - If the LEHGS is available, the number of brake applications is not limited
 - If the LEHGS is not available, the number of brake applications is limited:
Hydraulic power is supplied only by the brake accumulators.

Note: *Braking performance is degraded.*

- [L2] The braking system automatically changes from normal, or alternate braking mode to emergency braking (BRAKES A-SKID FAULT alert is displayed), if:
- BCS 1 and BCS 2 fail, or
 - A-SKID is set to OFF via the A-SKID sw in the cockpit (the BRAKES A-SKID OFF alert is displayed instead of FAULT), or
 - A-SKID fails , or
 - A LEHGS fails when in alternate braking (in fact alternate braking without A-SKID).

EMERGENCY BRAKING ARCHITECTURE**EMERGENCY BRAKING CONTROL**

The EBCU controls emergency braking.

HYDRAULIC BRAKE EQUIPMENT

In emergency braking, the alternate hydraulic brake equipment receives electrical commands from the EBCU.

The alternate brake equipment has valves (selector and servo valves) and pressure transmitters to control the LEHGS/accumulators hydraulic pressure, that is applied to the brakes.

- L3 The hydraulic brake equipment is common with the alternate braking mode. However, there are two independent motors for each valve. One motor is controlled exclusively by the BCS, and the other is controlled exclusively by the EBCU.

L3 ALTERNATE BRAKE SELECTOR VALVES

There are four Alternate Brake Selector Valves (ABSELVs):

- One for the forward brakes of the WLG
- One for the aft brakes of the WLG
- One for the left BLG
- One for the right BLG.

Each ABSELV operates independently from the others, and opens when alternate, emergency, or ultimate braking is active on the corresponding landing gear.

If normal braking is lost on one or more landing gears, only the affected ABSELV(s) open.

L3 ALTERNATE SERVO VALVES

There is one Alternate Servo Valve (ASV) for each pair of brakes (8 ASVs).

The ASVs adjust alternate hydraulic pressure to decelerate the aircraft, in accordance with the flight crew inputs.

L3 ALTERNATE PRESSURE TRANSMITTERS

There is one Alternate Pressure Transmitter (APT) for each pair of brakes (8 APTs).

The APTs measure the alternate hydraulic pressure that is applied to the brakes.

This information is sent to the EBCU to provide control feedback and indications on the triple pressure indicator in the cockpit.

HYDRAULIC POWER SUPPLY

Alternate hydraulic power (LEHGS and/or accumulators) supplies the emergency braking.

If the LEHGS is not available, only the brake accumulators supply hydraulic power.

- L3 There are four brake accumulators:

- Two for the WLG (one for the forward WLG brakes, one for the aft WLG brakes)
- Two for the BLG (one for the left BLG, one for the right BLG).

These accumulators are isolated between them: one accumulator failure will not prevent to keep half of WLG or BLG braking.



A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

32 - LANDING GEAR

SYSTEM DESCRIPTION - BRAKING SYSTEM

ULTIMATE BRAKING

Applicable to: ALL

When PARK BRK handle is set to ON position::

- The parking brake is set on the BLG brakes, at full pressure (about 3 600 PSI) (for more information *Refer to DSC-32-10-30-30-60 Parking Brake*)
- In addition, in some conditions (detected by PRIM), the EBCU opens the appropriate valves to send a 1 700 PSI limited hydraulic pressure to the WLG brakes

Note: When the PARK BRK is selected, ultimate braking will be activated if the ground spoilers are extended and the ground speed is higher than 25 kt (Ultimate braking remains active as long as the PARK BRK handle is in the ON position, or if any engine is running).

When PARK BRK handle is set to ON position:

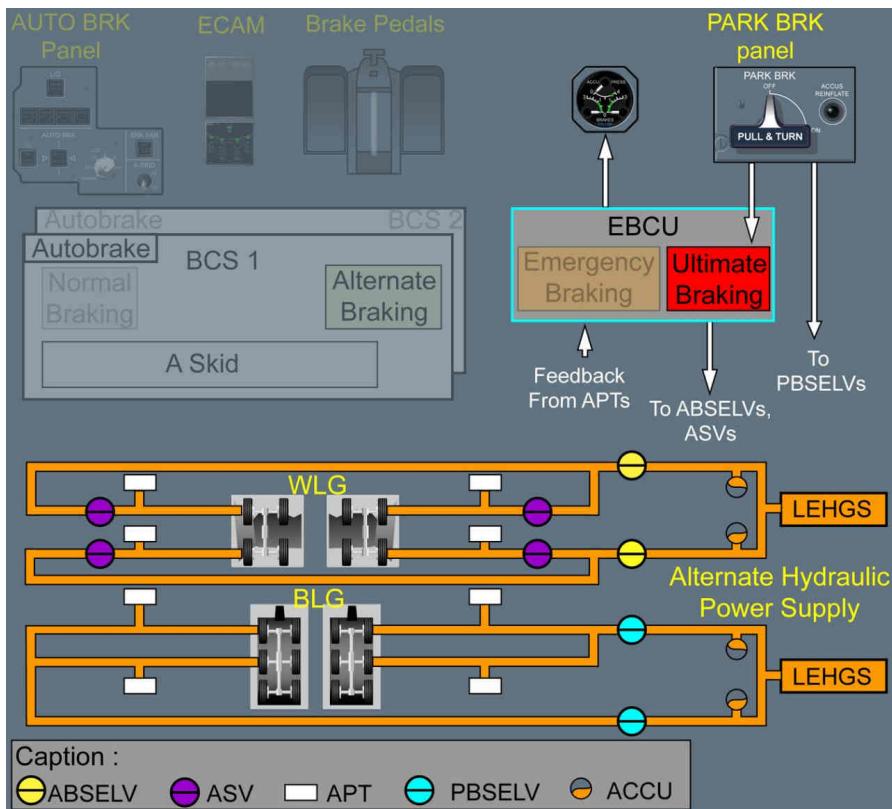
- Normal differential braking is not available
- AUTO BRK is not available
- A-SKID is not available.

L2 The flight crew can monitor this limitation from the triple pressure indicator in the cockpit.

| | | |
|----|----------------|--|
| L1 | CAUTION | Out of normal use of the PARK BRK when aircraft is stopped, flight crew must select PARK BRK handle to ON only if: |
| | | <ul style="list-style-type: none">- The brake pedals are jammed, or- The BRAKES PEDAL BRAKING FAULT alert is displayed. (Refer to PRO-ABN-ECAM-10-32-190 BRAKES PEDAL BRAKING FAULT). <p>BLG tires will burst, WLG may burst.</p> |

ULTIMATE BRAKING ARCHITECTURE

Ultimate Braking Architecture



ULTIMATE BRAKING CONTROL

The EBCU controls ultimate braking on the WLG brakes.

The PARK BRK handle controls ultimate braking on the BLG brakes.

HYDRAULIC BRAKE EQUIPMENT

In ultimate braking, the alternate hydraulic brake equipment receives electrical commands from the EBCU.

The alternate brake equipment has valves (selector and servo valves) and pressure transmitters to control the LEHGS/accumulators hydraulic pressure, that is applied to the WLG brakes.

- [L3] The hydraulic brake equipment is common with the alternate braking mode and emergency braking mode.

L3 ALTERNATE BRAKE SELECTOR VALVES

There are four Alternate Brake Selector Valves (ABSELVs):

- One for the forward brakes of the WLG
- One for the aft brakes of the WLG
- One for the left BLG
- One for the right BLG.

Each ABSELV operates independently from the others, and opens when alternate, emergency, or ultimate braking is active on the corresponding landing gear.

If normal braking is lost on one or more landing gears, only the affected ABSELV(s) open.

L3 ALTERNATE SERVO VALVES

There is one Alternate Servo Valve (ASV) for each pair of WLG brakes (4 ASVs).

The ASVs adjust alternate hydraulic pressure to decelerate the aircraft.

L3 ALTERNATE PRESSURE TRANSMITTERS

There is one Alternate Pressure Transmitter (APT) for each pair of brakes (8 APTs).

The APTs measure the alternate hydraulic pressure that is applied to the brakes.

This information is sent to the EBCU to provide control feedback and indications on the triple pressure indicator in the cockpit.

L3 PARKING BRAKE SELECTOR VALVES

There are two Parking Brake Selector Valves (PBSELVs) :

- One for the right BLG
- One for the left BLG.

When the PARK BRK handle is set to the ON position, the PBSELVs open and hydraulic pressure from the brake accumulators is sent to the BLG brakes.

HYDRAULIC POWER SUPPLY

Alternate hydraulic power (LEHGS and/or accumulators) supplies the ultimate braking.

If the LEHGS is not available, only the brake accumulators supply hydraulic power.

- [L3] There are four brake accumulators:

- Two for the WLG (one for the forward WLG brakes, one for the aft WLG brakes)
- Two for the BLG (one for the left BLG, one for the right BLG).

PARKING BRAKE

Applicable to: ALL

The flight crew can apply the parking brake by setting the PARK BRK handle to ON.

When the parking brake is set to ON, the brakes of the BLG are applied, showing about 3 600 PSI on triple indicator with BLG accumulators normally filled.

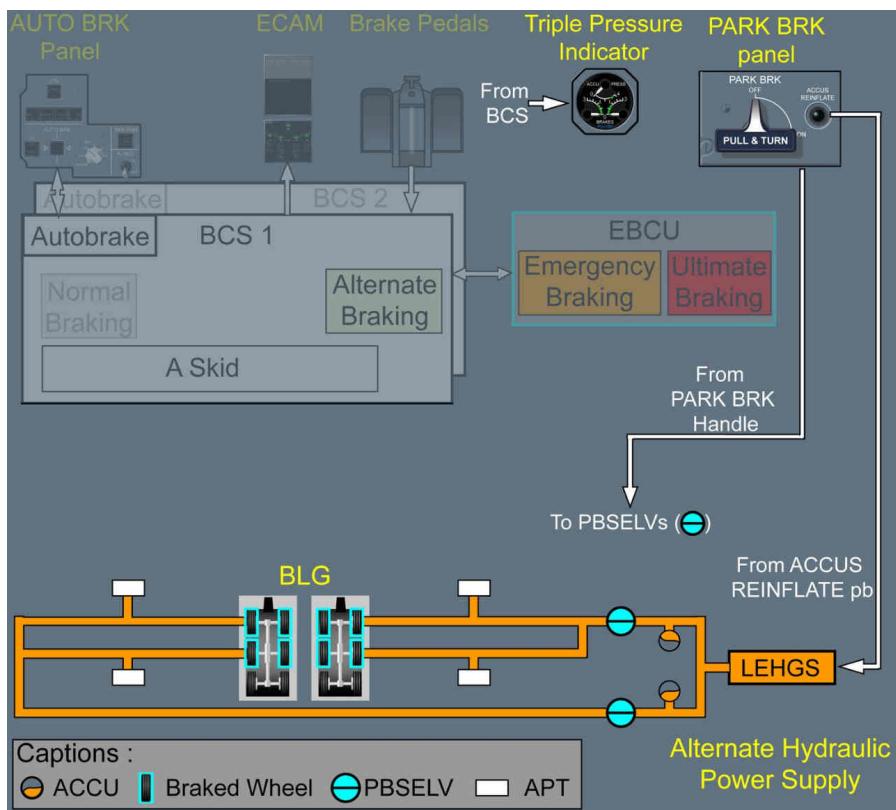
- [L2] **Note:** *If the flight crew applies more than 50% N1 on any engine with parking brake ON, the brakes of the WLG will be applied in addition to the BLG brakes.*

- [L1] A-SKID is not available.

- Note:** *- There is no need to set PARK BRK to OFF to recover pedal braking*
- If PARK BRK is set to ON and pedal is depressed by the flight crew, the highest commanded pressure between PARK BRK, normal brake, and alternate brake will always apply on each gear.

PARKING BRAKE ARCHITECTURE

Parking Brake Architecture



ACCUS REINFLATE

The hydraulic pressure applied to the BLG brakes can be checked from the triple pressure indicator in the cockpit.

If the parking brake hydraulic pressure is low and all the engines are shut down, the ACCUS REINFLATE pb can be used to activate the BLG LEHGS and reinflate the BLG accumulators.

- With initial nominal BLG ACCUS filling, the parking brake is efficient for 12 h.

HYDRAULIC POWER SUPPLY

Alternate BLG hydraulic power (BLG LEGHS or BLG accumulators) supplies the parking brake.

If the LEHGS is not available, only the BLG brake accumulators supply hydraulic power.

There are two BLG brake accumulators:

- One for the LH BLG,
- One for the RH BLG.

The two BLG brake accumulators are isolated, preventing one BLG accumulator failure, or one BLG hydraulic leak on alternate braking system, to disable braking on the opposite BLG

L3 PARKING BRAKE SELECTOR VALVES

There are two Parking Brake Selector Valves (PBSELVs) :

- One for the right BLG
- One for the left BLG.

When the PARK BRK handle is set to the ON position, the PBSELVs open and hydraulic pressure from the brake accumulators is sent to the BLG brakes.

L3 ALTERNATE PRESSURE TRANSMITTERS

There is one Alternate Pressure Transmitter (APT) for each pair of brakes (8 APTs).

The four BLG APTs measure the alternate hydraulic pressure that is applied to the brakes, when the parking brake is set.

This information is sent to the BCS to provide control feedback and indications on the triple pressure indicator in the cockpit.

SUMMARY OF BRAKING MODES

Applicable to: ALL

| Braking Mode | Hydraulic Power Supply | Braking Control | Cockpit Interface | Available Functions | Associated ECAM Alert |
|---------------|-----------------------------------|-----------------|------------------------------------|--|---|
| | | | | | Braking Performance |
| NORMAL | - WLG on GREEN - BLG on YELLOW | BCS | - Brake pedals - AUTO BRK Panel | - A-SKID - AUTO BRK - Differential braking | No associated alert Normal performance except if the <i>Refer to PRO-ABN-ECAM-10-32-200 BRAKES RELEASED</i> alert is displayed → Performance penalties |

Continued on the following page



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AIRCRAFT SYSTEMS

32 - LANDING GEAR

SYSTEM DESCRIPTION - BRAKING SYSTEM

Continued from the previous page

| Braking Mode | Hydraulic Power Supply | Braking Control | Cockpit Interface | Available Functions | Associated ECAM Alert |
|------------------|-----------------------------------|-----------------|------------------------------------|--|---|
| | | | | | Braking Performance |
| ALTERNATE | - LEHGS+ACCU | BCS | - Brake pedals - AUTO BRK Panel | - A-SKID - AUTO BRK - Differential braking | Refer to PRO-ABN-ECAM-10-32-220 BRAKES NORM BRK FAULT |
| | | | | | Normal performance except if the Refer to PRO-ABN-ECAM-10-32-200 BRAKES RELEASED alert is displayed → Performance penalties |
| EMERGENCY | - LEHGS+ACCU or - ACCU Only | EBCU | - Brake pedals | - Differential braking Brake pressure limited to: - 1 700 PSI for take off, and - 1 000 PSI for landing | Refer to PRO-ABN-ECAM-10-32-130 BRAKES A-SKID FAULT ON ALL L/Gs |
| | | | | | Degraded performance <i>Note:</i> Limited number of brake applications if on ACCU only. |
| ULTIMATE | - LEHGS+ACC or - ACCU Only | EBCU | - PARK BRK handle only | - Full PRK BRK pressure applied on BLG 3 600 PSI - Braking pressure on WLG limited to 1 700 PSI | Refer to PRO-ABN-ECAM-10-32-190 BRAKES PEDAL BRAKING FAULT |
| | | | | | Degraded performance <i>Note:</i> Risk of BLG tire burst |
| PARKING | - LEHGS+ACCU | | - PARK BRK handle only | - PRK BRK applied on BLG only | N/A |



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SYSTEM DESCRIPTION - BRAKING SYSTEM

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AIRCRAFT SYSTEMS

32 - LANDING GEAR

SYSTEM DESCRIPTION - STEERING SYSTEM

OVERVIEW

Applicable to: ALL

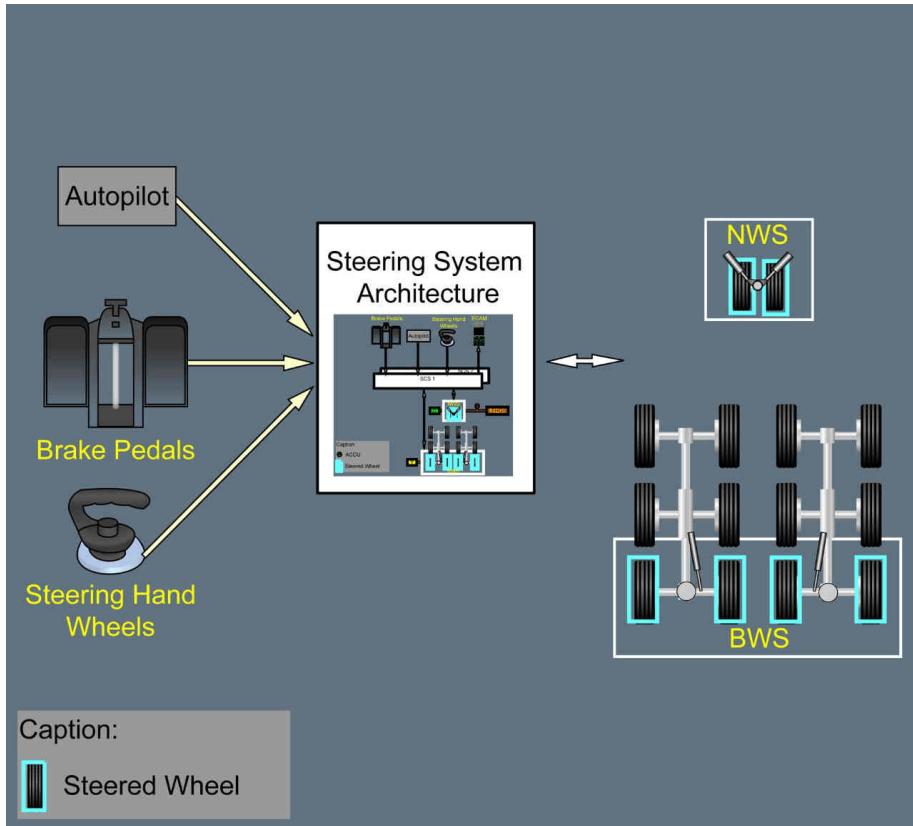
The steering system enables directional control of the aircraft on ground and combines:

- Nose Wheel Steering (NWS)
- Body Wheel Steering (BWS).

The flight crew can steer the aircraft using:

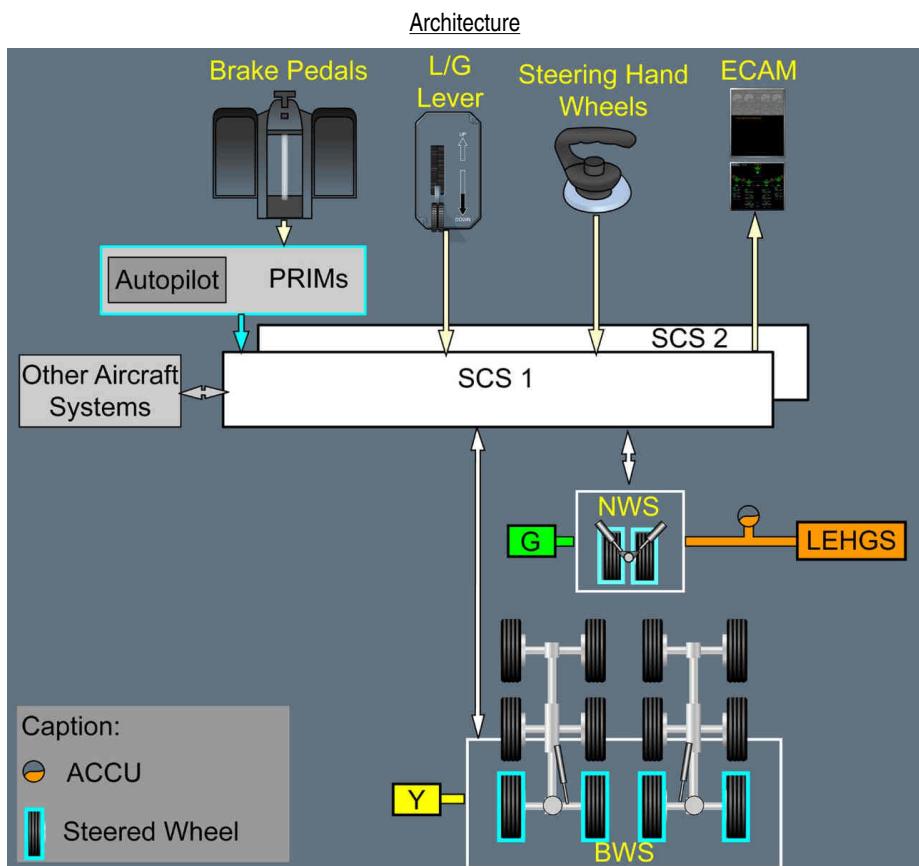
- The rudder pedals, or
- The steering handwheels.

The autopilot can also generate steering commands during an automatic landing.

Overview

ARCHITECTURE

Applicable to: ALL

STEERING CONTROL SYSTEM

The steering control system (SCS) controls the Nosewheel Steering (NWS) and the Body Wheel Steering (BWS).

The SCS has two redundant control systems referred to as SCS 1 and SCS 2.

One SCS is active while the other is a backup.

- The backup SCS automatically activates, if the active SCS fails.

- [L3] The active SCS changes after each landing gear extension.
Both SCS are hosted by the CPIOMs G.
- [L1] Each SCS receives electrical commands from the flight crew via:
- The steering handwheels
- [L3] The steering handwheels and the rudder pedals have sensors that convert the flight crew commands to electrical commands.
- [L1] - The rudder pedals
- [L3] The commands from the rudder pedals are initially sent to the three PRIMs. If the PRIMs fail, the steering handwheels are still available to steer the aircraft (at low speed).
- [L1] - The autopilot during automatic landings
- [L3] - The L/G lever.
Each time the landing gear lever is set to the DOWN position, the active SCS changes.
- [L1] Then, the active SCS computes and sends electrical commands to the hydraulic equipment of the steering system.
At taxi speed, below 50 kt, when the flight crew releases the steering handwheel, the SCS maintains the aircraft in straight line. This steering function is named Heading Control Function (HCF).
[L2] The HCF takes into account the external perturbations (crosswind, nose wheel steering offset, taxiway slope). The HCF can order a maximum of +/- 3 ° of nosewheel steering.
At takeoff and landing above 50 kt, the HCF remains inactive.
- [L1] The SCS also sends data to the ECAM to generate alerts and to display the WHEEL system display.

L3 INTERFACE WITH OTHER SYSTEMS

The SCS sends data to the Digital Flight Data Recorder (DFDR) to BCS, to HSMU (for yellow EMP start) and receives ground speed data from the Air Data and Inertial Reference System (ADIRS).

NOSEWHEEL STEERING**Applicable to: ALL**

There are two NWS modes:

- The normal NWS
- The alternate NWS.

[L2] The NWS is not available when the engines are shut down.

[L1] In both modes, the NWS angle is a function of:

- The position of the steering handwheel that is used by the flight crew, or
- The deflection of the rudder pedals

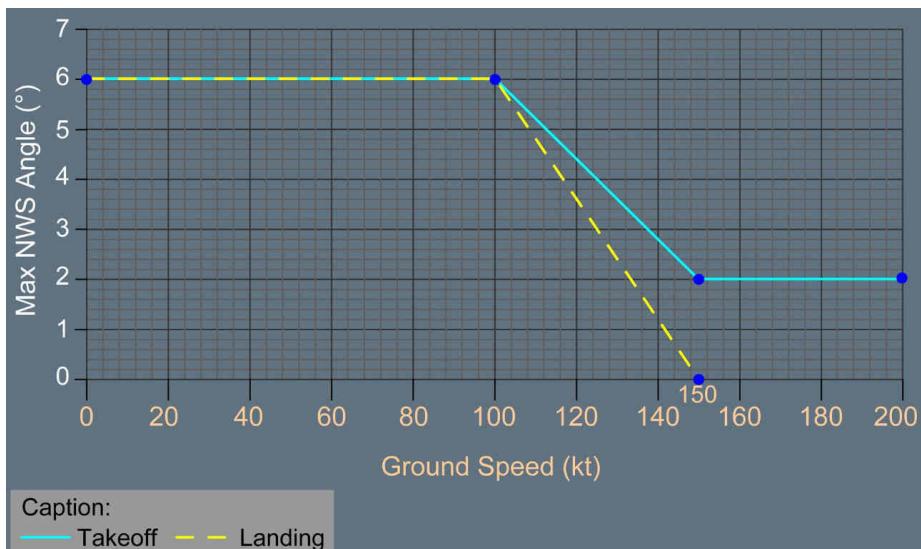
[L2] The rudder pedals of the Captain (CAPT) and the First Officer (F/O) are mechanically linked.
- The ground speed of the aircraft.

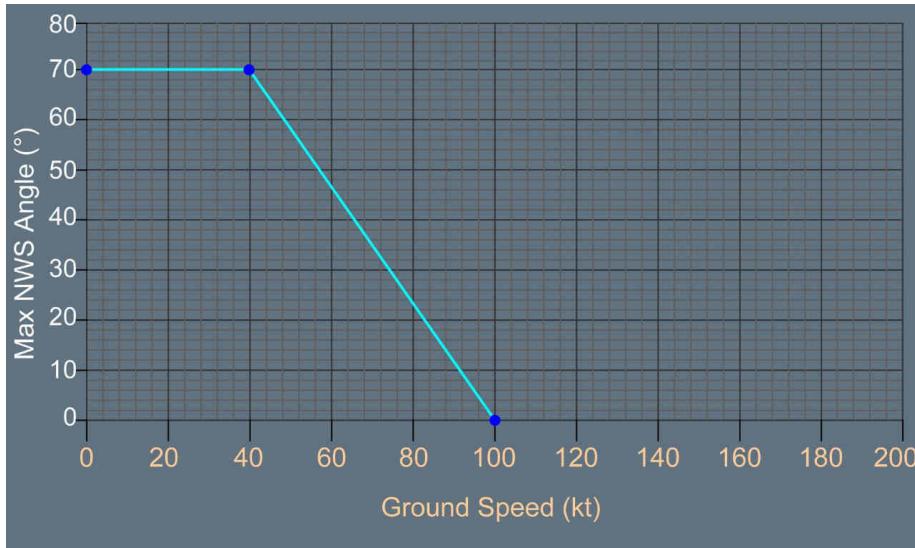
[L1] **Note:** *If both steering handwheels are used simultaneously, the steering commands are algebraically added.*

The maximum NWS angle is:

- 6 degrees left or right, via the rudder pedals
- 70 degrees left or right, via the steering handwheels.

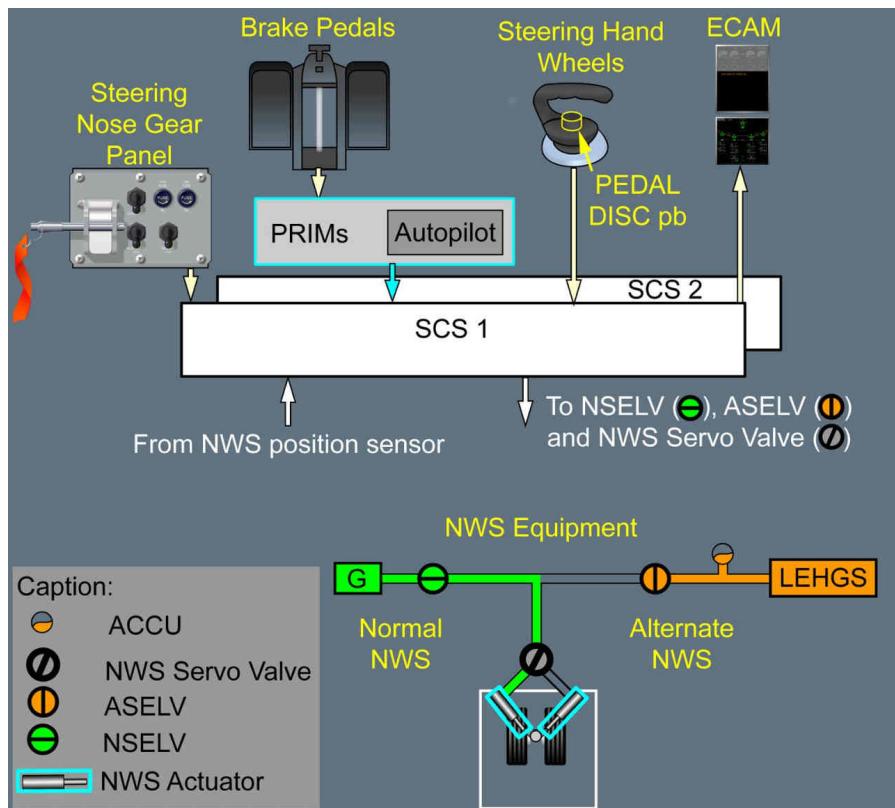
Maximum NWS Angle via the Rudder Pedals



Maximum NWS Angle via the Steering Handwheels

The flight crew can disconnect the NWS from the rudder pedals via the PEDAL DISC pb (e.g. during the flight control checks).

- The NLG has a centering cam that automatically returns the nose wheels to the centered position after liftoff. Should the centering cam fail, the steering system will return the nosewheels to the centered position.

NOSEWHEEL STEERING ARCHITECTURENWS Architecture**NORMAL NOSEWHEEL STEERING (NWS)**

In normal NWS:

- The GREEN system supplies hydraulic power
- The number of steering commands is not limited
- The maximum NWS rate is 15 degrees per second.

L3

ALTERNATE NOSEWHEEL STEERING (NWS)

- [L2] For the steering system, hydraulic supply redundancy is achieved with a dedicated Local Electro-Hydraulic Generation System (LEHGS) to allow NWS at landing and RWY vacate. The LEHGS has its own hydraulic reservoir and uses electrical power to generate hydraulic pressure.
- [L1] If the GREEN hydraulic supply fails, the alternate NWS activates automatically. Alternate NWS availability during taxi-in will be limited by the hydraulic fluid of the nose wheel steering overheat (preventive warning, for more information *Refer to PRO-ABN-ECAM-10-32-360 STEER ALTN STEER SYS HOT*).

In alternate NWS , the hydraulic power is supplied by:

- The steering Local Electro-Hydraulic Generation System (LEHGS)

Note: *The steering LEHGS is active when all engines are running.*

- The NWS accumulator.

- [L2] The NWS accumulator stores hydraulic pressure and is kept pressurized by the LEHGS . It provides:
- Additional hydraulic pressure to deal with peak flow demands when the LEHGS operates
 - Hydraulic pressure for a limited number of steering commands when the LEHGS fails.

- [L1] In alternate NWS , the steering performance is degraded. Therefore, the damping of the steering handwheels automatically increases to prevent the flight crew from commanding excessive steering rates.

- [L3] The maximum alternate NWS rate is 10 degrees per second.

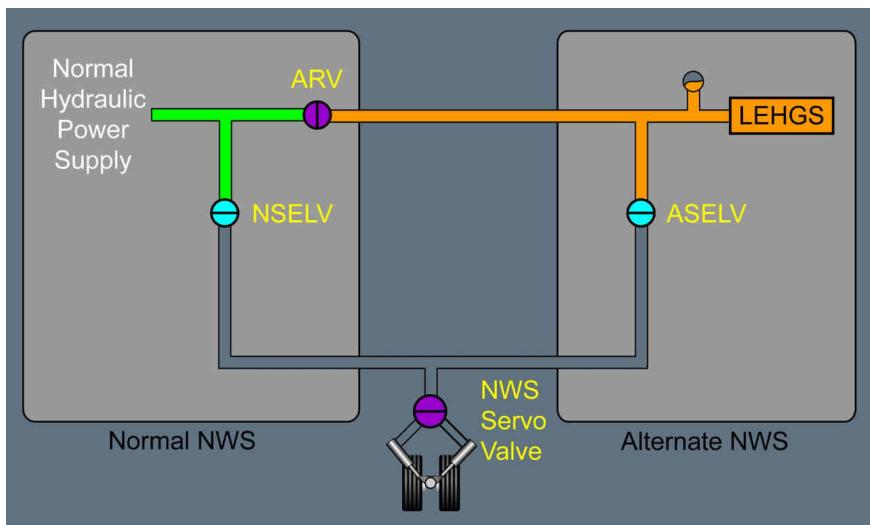
- [L1] The number of steering commands is not limited, unless:

- The STEER ALTN STEER SYS OVHT (*Refer to PRO-ABN-ECAM-10-32-360 STEER ALTN STEER SYS HOT*) alert is displayed, preceded by NWS STEER FAULT (*Refer to PRO-ABN-ECAM-10-32-330 STEER B/W STEER FAULT*), or
- The LEHGS fails (*Refer to PRO-ABN-ECAM-10-32-320 STEER ALTN N/W STEER FAULT*).

[L3] ARV

The steering system has an Alternate Refill Valve (ARV) that can connect the normal and the alternate hydraulic power supplies. After all engines are started, the ARV automatically opens to charge the NWS accumulator and refill the hydraulic reservoir of the LEHGS .

The ARV automatically closes when the ground speed exceeds 30 kt , and remains closed for the rest of the flight, to segregate normal and alternate hydraulic steering power supplies.

ARV**NOSEWHEEL STEERING EQUIPMENT**

The NWS equipment is controlled by the active SCS and uses hydraulic pressure to steer the aircraft in accordance with the flight crew inputs.

The NWS equipment has:

- Two NWS hydraulic actuators on the NLG
- L3 - One NWS servo valve
- One Normal Selector Valve (NSELV)
- One Alternate Selector Valve (ASELV)
- A NWS position sensor provides the SCS with steering angle feedback.

NWS SERVO VALVE

The NWS servo valve controls the hydraulic pressure that is supplied to the steering actuators in accordance with the flight crew steering commands.

NORMAL SELECTOR VALVE

The Normal Selector Valve (NSELV) opens when the normal NWS is active.

If the normal NWS fails, the NSELV closes automatically to isolate the NWS from the GREEN hydraulic pressure.

L3 ALTERNATE SELECTOR VALVE

The Alternate Selector Valve (ASELV) opens when the alternate NWS is active.

TOWING

When the aircraft is towed, the TOW sw on the steering nose gear panel must be placed in the towing position to enable the NLG to be free to castor and prevent damages to the structure if engine fuel lever is set ON.

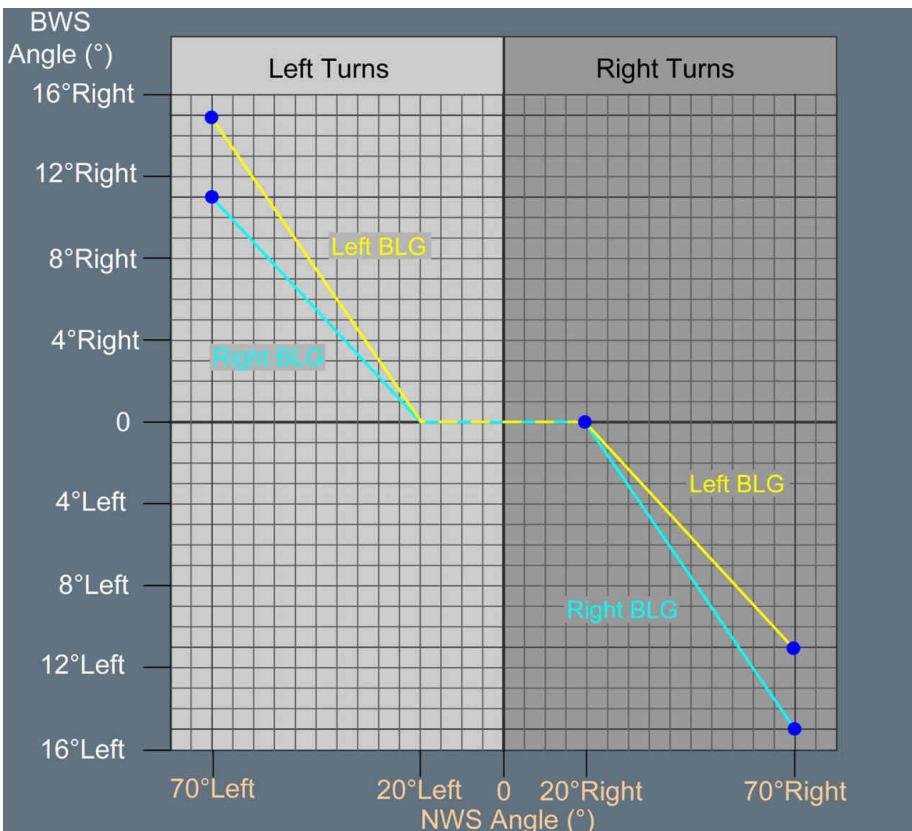
- L2** For more information on the nose gear steering panel, *Refer to DSC-32-20-140-90 Steering Nose Gear Panel*.

BODY WHEEL STEERING

Applicable to: ALL

The BWS reduces the loads on the BLG when the aircraft turns on ground, and activates automatically when the NWS reaches a specific angle.

- L2** The BWS activates automatically when the NWS angle is higher than 20 ° and the ground speed is less than 30 kt (*Refer to DSC-32-30-20 NWS and BWS Operation*).
- L3** The BWS rate is 4.5 ° per second.

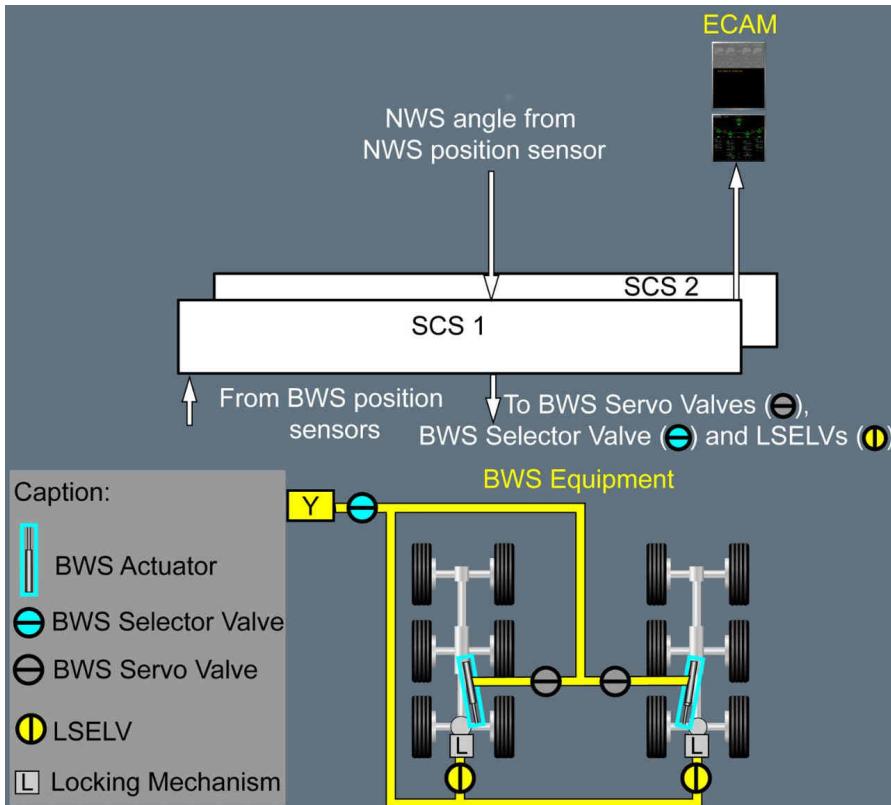
NWS Angle versus BWS Angle

One BWS position sensor per BLG provides the SCS with steering angle feedback.

- When YELLOW pressure is available to BWS and BWS is not active, both BWS are locked in the center position.

The YELLOW hydraulic system supplies the BWS with hydraulic power.

The BWS can activate when YELLOW hydraulic supply is available, either from yellow engine pumps when engine three or four is running, or from yellow electrical pumps when the engines three and four are not running.

BODY WHEEL STEERING ARCHITECTUREBWS Architecture**BWS EQUIPMENT**

The BWS equipment is controlled by the active SCS and uses hydraulic pressure to actuate the aft axles of both BLGs.

The BWS equipment of each BLG has:

- One BWS actuator
- One locking mechanism

L3 The locking mechanism has:

- One locking spring.

The locking spring maintains the locking mechanism in the locked position.

- One unlocking hydraulic actuator

The unlocking actuator extends to cancel the action of the spring and unlock the locking mechanism.

- One BWS servo valve

- One Lock Selector Valve (LSELV)

- One BWS position sensor that provides the SCS with steering angle feedback.

L3 BWS SERVO VALVE

The BWS servo valve controls the hydraulic pressure to extend or retract its associated steering actuator.

L3 BWS SELECTOR VALVE

The BWS selector valve (BSELV) opens when the BWS is active.

When the BWS is not active, the BSELV is closed to prevent unlocking of the locking mechanism.

L3 LOCK SELECTOR VALVE

The Lock Selector Valve (LSELV) controls the hydraulic power that is supplied to the locking mechanism.

It opens to unlock the locking mechanism when the BWS becomes active.

It closes to lock the locking mechanism when the aft axle of the BLG is centered.



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32 - LANDING GEAR

SYSTEM DESCRIPTION - STEERING SYSTEM

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BRAKE TEMPERATURE MONITORING SYSTEM (BTMS)

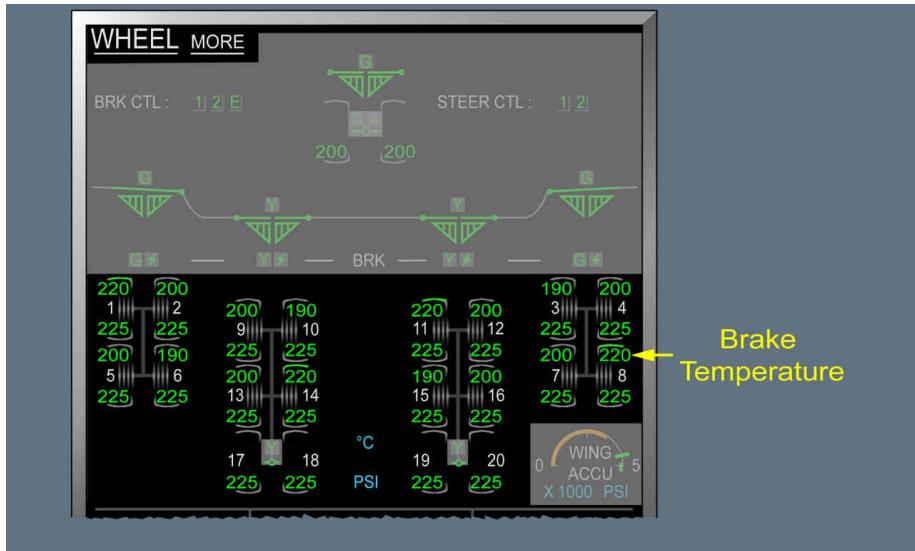
Applicable to: ALL

The Brake Temperature Monitoring System (BTMS) measures the temperature of each brake and sends it to:

- The ECAM to generate the **BRAKES BRAKES HOT** alert (*Refer to Procedure*) and to display the WHEEL page
 - [3] - The Central Maintenance System (CMS) to trigger maintenance messages.

The BTMS displays measured temperatures from 0 °C to 995 °C by 5 °C steps.

BTMS Indications



L1 For information on the BTMS indications on the WHEEL system display, Refer to DSC-32-20-70-50 *WHEEL SD - TPIS and BTMS Indications*.



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AIRCRAFT SYSTEMS

32 - LANDING GEAR

SYSTEM DESCRIPTION - BRAKE
TEMPERATURE MONITORING SYSTEM (BTMS)

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TIRE PRESSURE INDICATING SYSTEM (TPIS)

Applicable to: ALL

The Tire Pressure Indicating System (TPIS) measures the pressure of each tire and sends it to:

- The ECAM to generate the WHEEL TIRE PRESS LO alert (*Refer to Procedure*) and to display the WHEEL page

- The TPIS can measure pressures from 0 to 400 PSI by 5 PSI steps.

TPIS Indications

- For more information on the TPIS indications on the WHEEL system display, *Refer to DSC-32-20-70-50 WHEEL SD - TPIS and BTMS Indications* .



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SYSTEM DESCRIPTION - TIRE PRESSURE MONITORING SYSTEM (TPIS)

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SYSTEM DESCRIPTION - OLEO
PRESSURE MONITORING SYSTEM (OPMS)

OLEO PRESSURE MONITORING SYSTEM (OPMS)

Applicable to: ALL

The Oleo Pressure Monitoring System (OPMS) measures the pressure of each landing gear shock absorber and sends it to:

- The ECAM to generate the appropriate ECAM alerts
- The Central Maintenance System (CMS) to trigger maintenance messages.

The pressure indicators on each landing gear indicate the pressure of the shock absorbers.



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AIRCRAFT SYSTEMS

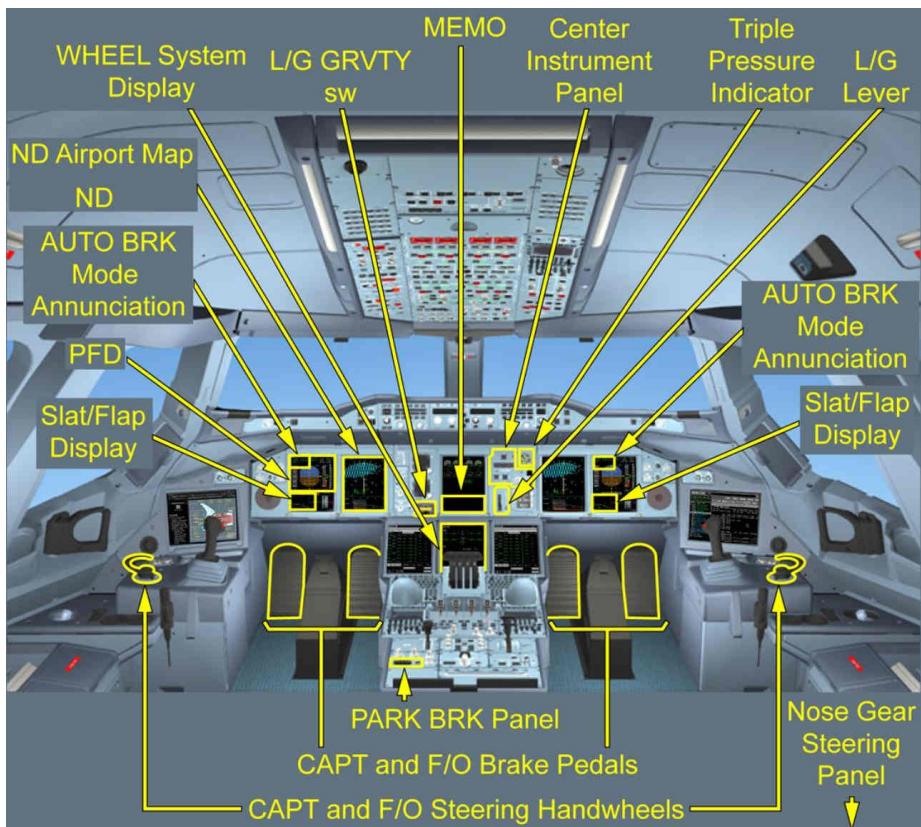
32 - LANDING GEAR

SYSTEM DESCRIPTION - OLEO
PRESSURE MONITORING SYSTEM (OPMS)

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COCKPIT VIEW

Applicable to: ALL

Cockpit View



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AIRCRAFT SYSTEMS

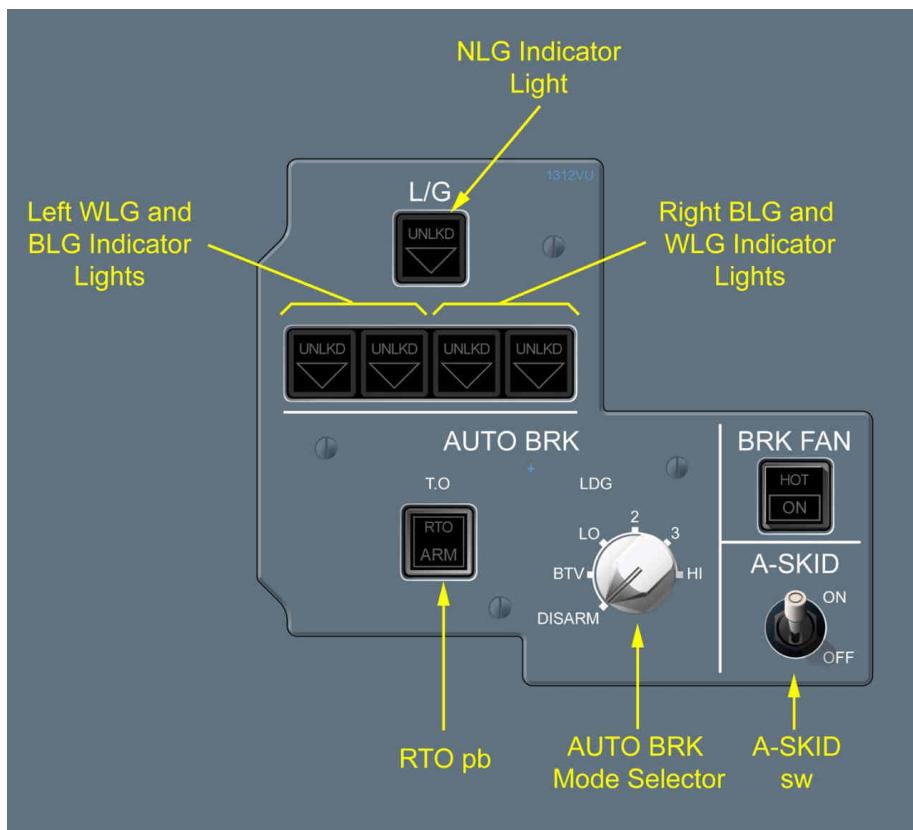
32 - LANDING GEAR

CONTROLS AND INDICATORS - COCKPIT VIEW

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CENTER INSTRUMENT PANEL

Applicable to: ALL



AUTO BRK mode selector

L13



The flight crew arms/disarms a landing AUTO BRK mode, by rotating the AUTO BRK mode selector to the appropriate position.

Each mode corresponds to a deceleration target.

For the basic AUTO BRK mode/deceleration equivalence, *Refer to DSC-32-10-30-20 Autobrake .*

For information on BTV autobrake mode, *Refer to BTV system Description .*

If all the AUTO BRK arming conditions are satisfied, the selector is electrically maintained in the selected position.

If an arming condition is lost or the RTO mode is armed, the selector automatically returns to the DISARM position. For BTV , in the case of a reversion to BRK HI, the selector stays on BTV position even if the FMA displays BRK HI .

Simultaneously, the light of the RTO pb or ACTIV light go off.

For AUTO BRK arming conditions, *Refer to DSC-32-10-30-20 Autobrake .*

For BTV arming conditions, *Refer to BTV System Description .*

Note: A landing AUTO BRK mode can be armed in flight, and on ground.

RTO pb

The AUTO BRK is not armed in the RTO mode.

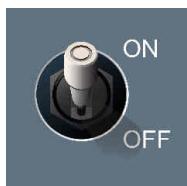


When the RTO pb is pressed, the RTO mode arms and the RTO ARM light goes on provided all the arming conditions are satisfied. In addition, RTO in blue is displayed on PFD FMA left column.

When the RTO pb is pressed again, the RTO mode disarms.

For AUTO BRK arming and disarming conditions, *Refer to DSC-32-10-30-20 Autobrake .*

Note: The RTO mode can be armed only on ground.

A-SKID sw

The A-SKID is available if normal braking or alternate braking with A-SKID are available.

L12



The A-SKID is off. As a consequence, emergency braking is active.
Refer to DSC-32-10-30-30-40 Emergency Braking

- Note:**
- A-SKID sw OFF does not cut off NWS
 - A-SKID sw OFF is to be used only in case of total brake efficiency loss.

L/G Indicator light

The NLG , the WLG and the BLG indicator lights have the same logic.



The associated landing gear is uplocked and the landing gear lever is in the UP position.



The associated landing gear is downlocked and the landing gear lever is in the DOWN position.

- Note:** *LGCIS 1 supplies the gear downlock information, via an independent set of proximity sensors. For more information, Refer to DSC-32-10-20-10 Landing Gear Control and Indication System (LGCIS) .*



The associated landing gear is:

- In transit, or
- Not locked in the selected position, after the normal extension/retraction delay.

In this case, the L/G GEAR NOT LOCKED DOWN (*Refer to Procedure*) or L/G GEAR NOT LOCKED UP (*Refer to Procedure*) alerts are displayed.



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32 - LANDING GEAR

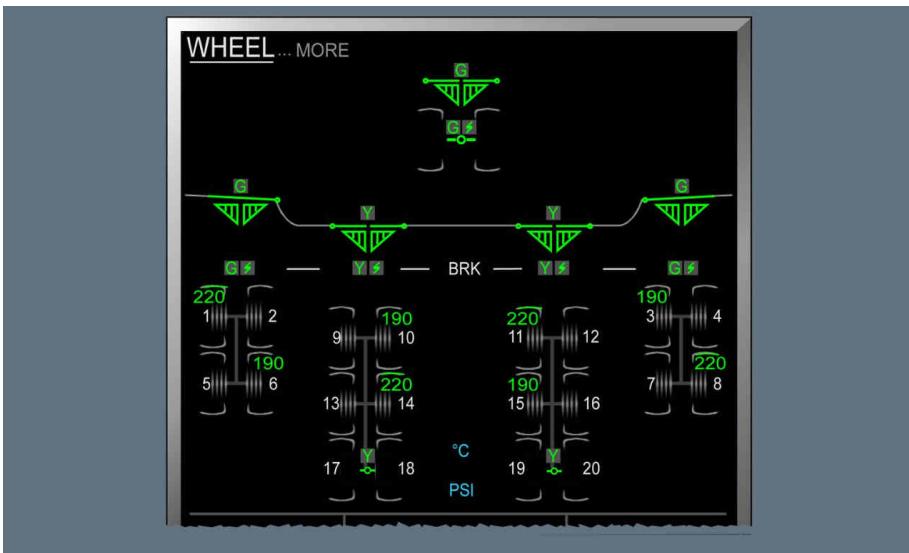
CONTROLS AND INDICATORS - CENTRER INSTRUMENT PANEL

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WHEEL SYSTEM DISPLAY**Applicable to: ALL**

The WHEEL System Display provides the flight crew with information on the landing gear and the associated systems, such as:

- The position of the landing gear and the landing gear doors
- The available hydraulic power sources
- All the brake temperatures
- The malfunctions.

WHEEL System Display

The MORE key on the ECP can be used to display additional landing gear information. When pressed:

-

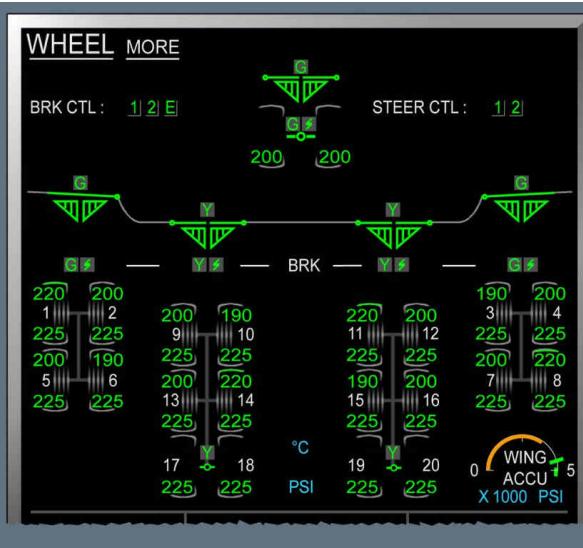
...MORE

MORE

The MORE title changes from **WHEEL** to **WHEEL ...MORE**.

- The following additional information is displayed:

- The BRK CTL and the STEER CTL indications
- The tire pressures
- The WING ACCU pressure indicator.

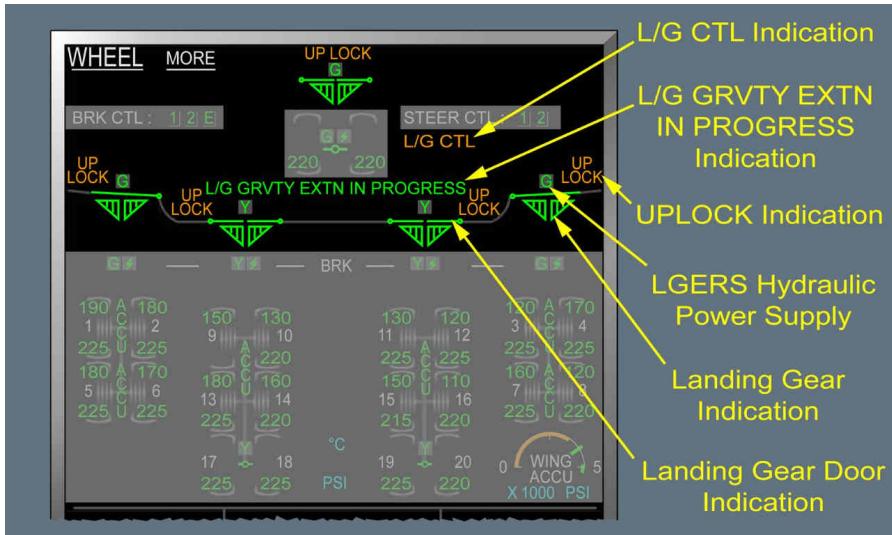
WHEEL MORE System Display

For a description of the WHEEL System Display:

- Refer to DSC-32-20-40-20 WHEEL SD - LGERS Indications
- Refer to DSC-32-20-50-30 WHEEL SD - Braking System Indications
- Refer to DSC-32-20-60-40 WHEEL SD - Steering System Indications
- Refer to DSC-32-20-70-50 WHEEL SD - TPIS and BTMS Indications .

WHEEL SD - LGERS INDICATIONS

Applicable to: ALL

LGERS INDICATIONS**LGERS Indications****L/G CTL INDICATION****L/G CTL**

Displayed when one or more landing gears are not locked in the selected position, after the normal extension/retraction delay.

The L/G GEAR NOT LOCKED DOWN (*Refer to Procedure*) or L/G GEAR NOT LOCKED UP (*Refer to Procedure*) alerts are also displayed.

UP LOCK INDICATION**UP
LOCK**

Displayed when the landing gear is extended and one or more uplocks are in the closed position (the normal position is open).

The L/G UPLOCK FAULT alert is displayed also (*Refer to Procedure*).

LGERS HYDRAULIC POWER SUPPLY**G**

GREEN hydraulic power is available.

Y YELLOW hydraulic power is available.

G GREEN hydraulic pressure is low.

Y YELLOW hydraulic pressure is low

LANDING GEAR INDICATION

No display: The associated landing gear is uplocked.

L12



The associated landing gear is downlocked.

LGCIS 1 controls the display of the left triangle and LGCIS 2 controls the display of the right triangle.

L12



The associated landing gear is in transit.

LGCIS 1 controls the display of the left triangle and LGCIS 2 controls the display of the right triangle.

LANDING GEAR DOORS INDICATIONS



The landing gear doors are closed and uplocked.



The landing gear doors are in transit.



The landing gear doors are open.

L/G GRTVY EXTN IN PROGRESS INDICATION

L/G GRTVY EXTN IN PROGRESS appears when the flight crew commands a landing gear gravity extension. The message no longer appears when all gears are down locked, or after 120 s . For more information on landing gear gravity extension panel Refer to DSC-32-20-90-70 L/G GRTVY Panel .

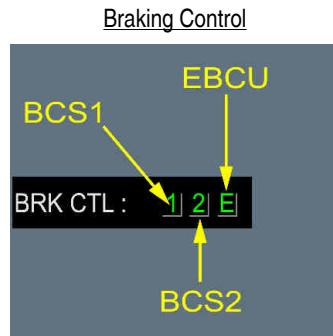
WHEEL SD - BRAKING SYSTEM INDICATIONS

Applicable to: ALL

BRAKING SYSTEM INDICATIONSBraking System Indications

A-SKID INDICATION**A-SKID**

- Displays when the associated landing gear A-SKID is failed.
Different combination of landing gear A-SKID failure leads to different ECAM alerts.
- BRAKES A-SKID FAULT ON ALL L/G Refer to *PRO-ABN-ECAM-10-32-130 BRAKES A-SKID FAULT ON ALL L/Gs*
A-SKID is displayed above each landing gear.
 - BRAKES A-SKID FAULT ON LEFT (RIGHT) BODY L/G Refer to *PRO-ABN-ECAM-10-32-135 BRAKES A-SKID FAULT ON LEFT (RIGHT) BODY L/G*
A-SKID is displays above the right or left body landing gear
 - BRAKES A-SKID FAULT ON WING L/G Refer to *PRO-ABN-ECAM-10-32-132 BRAKES A-SKID FAULT ON WING L/Gs*
A-SKID is displayed above both wing landing gears
 - BRAKES A-SKID FAULT ON WING + L(R) BODY L/Gs Refer to *PRO-ABN-ECAM-10-32-136 BRAKES A-SKID FAULT ON WING + L (R) BODY L/Gs*
A-SKID is displayed above both wing landing gear and the right or left body landing gear
 - BRAKES A-SKID FAULT ON L + R BODY L/G Refer to *PRO-ABN-ECAM-10-32-134 BRAKES A-SKID FAULT ON L + R BODY L/Gs*
A-SKID is displayed above both body landing gears

BRAKING CONTROL

The braking control line displays when:

- One or more braking control systems are failed (BCS and/or EBCU), or
- The MORE key on the ECP is pressed.

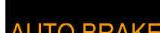


BCS 1(2) operates normally.



The EBCU is failed.

AUTO BRAKE INDICATION



Displayed when the AUTO BRK is failed.

The BRAKES AUTO BRK FAULT alert is displayed also (*Refer to Procedure*).

HYDRAULIC BRAKING POWER SUPPLY



GREEN hydraulic power is available.



YELLOW hydraulic power is available.



GREEN hydraulic pressure is low.



YELLOW hydraulic pressure is low.



The associated LEHGS hydraulic pressure is available.



The associated LEHGS is failed.

ACCU INDICATION

L12



Displayed when:

- Normal braking is failed on the associated landing gear.
- The associated brake accumulator is available.

The loss of normal braking is detected by the braking system:

- During the pre-land test, at landing gear extension, or
- when braking is applied (manual or autobrake).



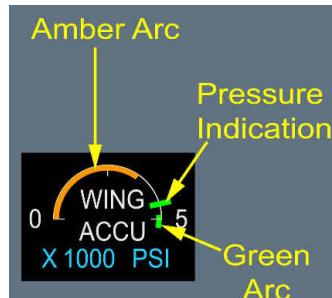
Displayed when the associated brake accumulator is not available (low pressure).

WING ACCU PRESSURE INDICATION

Displayed when:

- The pressure of a wing brake accumulator is low (in the amber arc), or
- The MORE key on the ECP is pressed.

WING ACCU Pressure Indication

**PRESSURE INDICATION**

The pressure indication shows the lowest wing brake accumulator pressure.
When in the amber arc, the pressure indication is amber.
When outside the amber arc, the pressure indication is green.

GREEN ARC

The green arc represents the high pressure zone.
The green arc ranges from 4872 to more than 5000 PSI.

L3 AMBER ARC

The amber arc represents the low pressure zone.
The amber arc ranges from 0 to 3480 PSI.

BRAKES STATUS INDICATION

Residual braking affects the associated pair of brakes.



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AIRCRAFT SYSTEMS

32 - LANDING GEAR

CONTROLS AND INDICATORS - WHEEL
SD - BRAKING SYSTEM INDICATIONS

L12



The associated pair of brakes is released.

A pair of brakes can be released only in normal or alternate braking.

Brakes can be released because of:

- the failure of normal hydraulic valves, or
- An A-SKID failure.



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OPERATING MANUAL

AIRCRAFT SYSTEMS

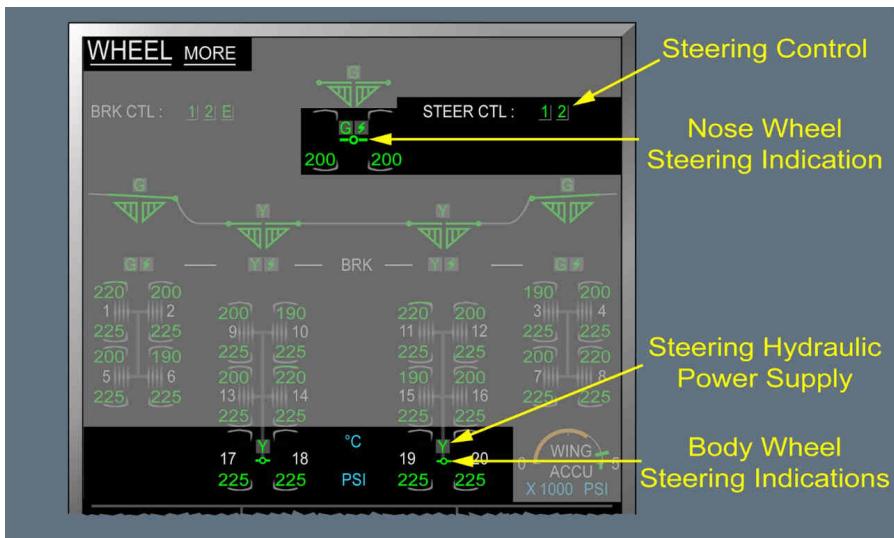
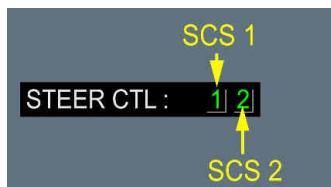
32 - LANDING GEAR

CONTROLS AND INDICATORS - WHEEL
SD - BRAKING SYSTEM INDICATIONS

Intentionally left blank

WHEEL SD - STEERING SYSTEM INDICATIONS

Applicable to: ALL

STEERING SYSTEM INDICATIONSSteering System Indications**STEERING CONTROL**Steering Control

The steering control line displays when:

- At least one steering control system is failed, or
- The MORE key on the ECP is pressed.

1

SCS 1(2) operates normally.

2

SCS 2(1) is failed.

NOSE/BODY WHEEL STEERING INDICATIONS

The nose/body wheel steering operates normally.



- The nose/body wheel steering is failed, or
- The body wheel locking mechanism is failed.

STEERING HYDRAULIC POWER SUPPLY

GREEN hydraulic power is available.



YELLOW hydraulic power is available.



GREEN hydraulic pressure is low.



YELLOW hydraulic pressure is low.



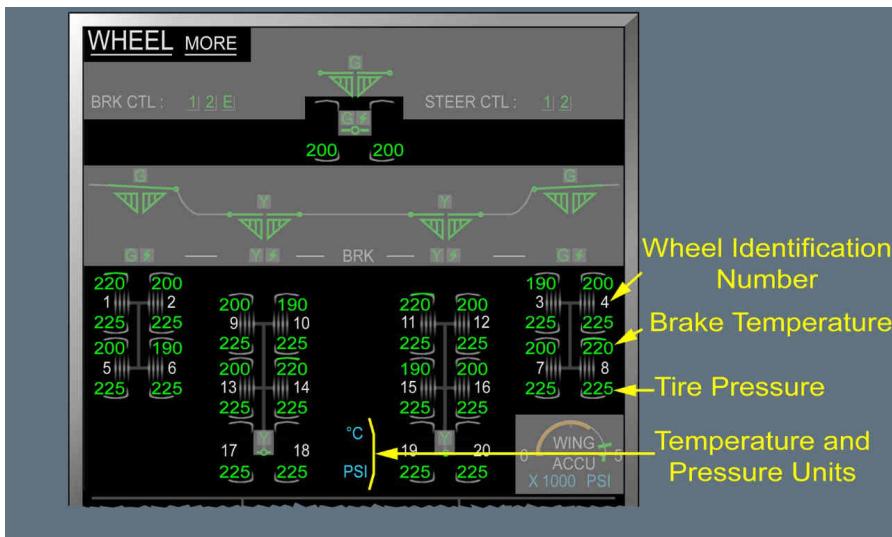
The associated LEHGS hydraulic pressure is available.



The associated LEHGS is failed.

WHEEL SD - TPIS AND BTMS INDICATIONS

Applicable to: ALL

TPIS AND BTMS INDICATIONSTPIS and BTMS Indications**BRAKE TEMPERATURE**

The brake temperature is normal.

L12



The brake temperature is normal. The green arc indicates that it is the hottest wheel brake on the aircraft.

The green arc displays only if the brake temperature exceeds 100 °C.

L123



The brake temperature is excessive for take off.

In case of excessive temperature, there is a risk of fluid auto-ignition in case of leak, a risk of runway overrun in case of aborted take off.

The brake temperature exceeds 300 °C.



The brake temperature exceeds 300 °C. The amber arc indicates that is the hottest wheel brake on the aircraft.

TIRE PRESSURE**225**

Displayed when:

- The tire pressure is normal
- The MORE key on the ECP is pressed.

120

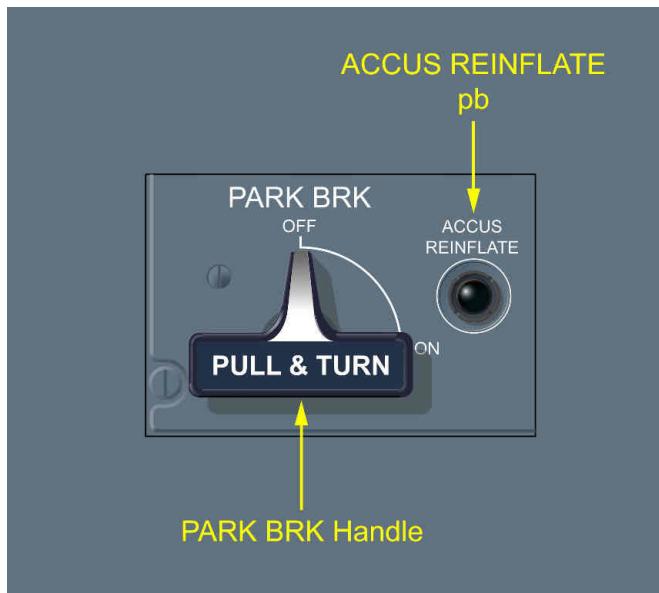
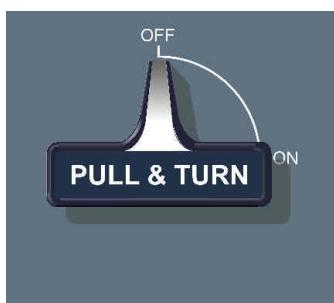
Displayed when:

- The tire pressure is low, or
- The difference between the two tire pressures of the same axle is excessive.

The WHEEL TIRE PRESS LO alert displays simultaneously (*Refer to Procedure*).

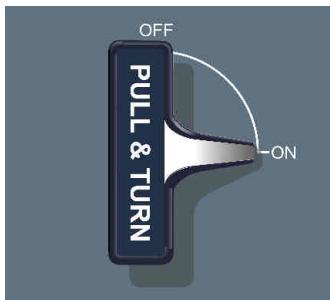
PARK BRK PANEL

Applicable to: ALL

PARK BRK Panel**PARK BRK HANDLE**

The parking brake is not set.

L12



The parking brake is set (ultimate braking may be activated).

For more information *Refer to DSC-32-10-30-30-50*

Ultimate Braking Ultimate Braking.

When PARK BRAKE is ON, there is no need to set it OFF to recover pedal braking.

ACCUS REINFLATE pb

L12

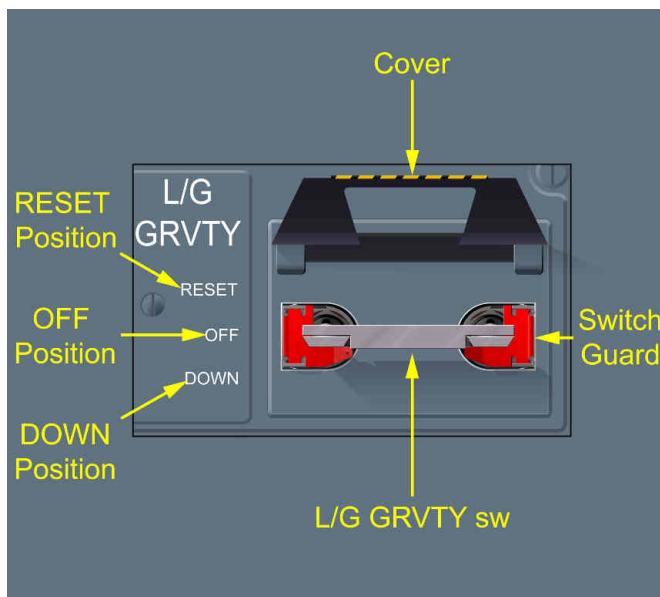


When pressed, the BLG LEHGS and WLG LEHGS activates to pressurize the BLG and WLG brake accumulators. A single push on the ACCUS reinflate pb is enough.

Note: *When any engine is running, associated brake accumulators are automatically pressurized (through ARV in normal taxi-out, or through LEHGS).*

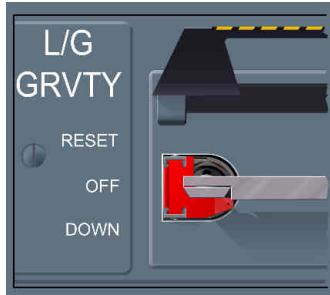
L/G GRVTY PANEL

Applicable to: ALL

L/G GRVTY Panel**L/G GRVTY sw**

The L/G GRVTY panel has two switches that are linked together for simultaneous operation, and protected by a cover.

- [2] However, if the link is removed, the switches can be used separately, for maintenance purposes only.
Each switch controls one FFCM.

OFF POSITION

When the L/G GRVTY sw is in the OFF position (normal position), the landing gear lever can be used for the normal extension/retraction of the L/G.

DOWN POSITION

L12



The extension of the landing gear by gravity is selected. The L/G GRVTY sw remains in the DOWN position until the flight crew selects another position.

Note: Both switch-guards should be removed before the DOWN position is selected.

RESET POSITION

L123



After a gravity landing gear extension, the RESET position is selected to restore the LGERS in the normal configuration.

When the L/G GRVTY sw is in the RESET position:

- The cut-out valves open (*Refer to DSC-32-40-10-10 Cut-Out Valves*)
- The retraction actuators switch from the gravity mode to the normal mode (*Refer to DSC-32-40-10-10 Landing Gear Gravity Extension Control*).

The L/G GRVTY sw should be back in the OFF position before the L/G lever can be used again to extend/retract the L/G .

| | |
|----------------|--|
| CAUTION | The L/G GRVTY sw can be reset either in flight or on ground. However: <ul style="list-style-type: none">- A reset on ground of the L/G GRVTY sw must be performed only by maintenance as BLG doors will collide with forward BLG wheels when closing (a specific prior maintenance action is needed before reset)- A reset in flight must be restricted to training in absence of any gear system failure. |
|----------------|--|



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32 - LANDING GEAR

CONTROLS AND INDICATORS - L/G GRVTY PANEL

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TRIPLE PRESSURE INDICATOR

Applicable to: ALL

Triple Pressure Indicator**BODY ACCU PRESSURE INDICATION**

The BODY ACCU pressure indication shows the lowest BLG brake accumulator pressure.

GREEN ARC

In the green arc, full brake pressure is available.

- [L3] The green arc ranges from 4872 to 5000 PSI.

L1 AMBER ARC

The amber arc represents the low pressure zone.

- [L3] The amber arc ranges from 0 to 3840 PSI.

- [L1] When the indication is in the amber arc, the flight crew should press the ACCUS REINFLATE pb to reinflate the BLG brake accumulators before towing/push-back and before engine start.

LEFT AND RIGHT BRK PRESSURE INDICATIONS

When the parking brake is applied or in alternate braking, the left and right BRK pressure indications show the hydraulic pressure applied on the left and right BLG brakes.

- [L3] The APTs measure the pressure applied to the brakes.
[L1] When the A-SKID is not available, the brake pressure is automatically limited within the green arc in order to limit risk of wheel lock and tyre burst.



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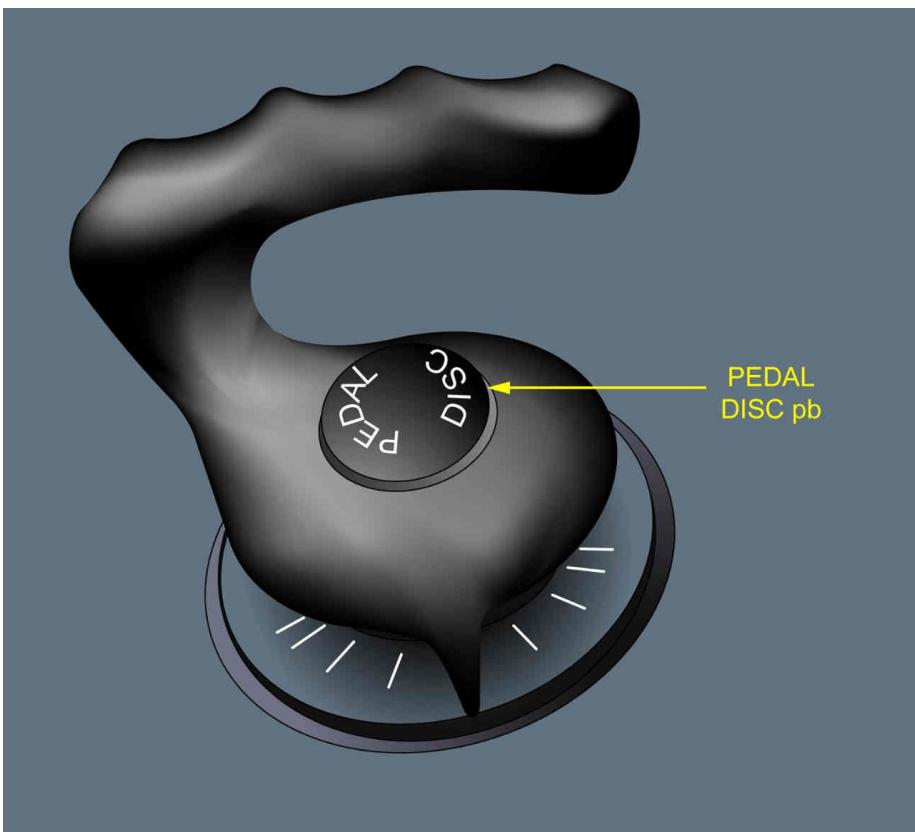
32 - LANDING GEAR

CONTROLS AND INDICATORS - TRIPLE PRESSURE INDICATOR

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CAPT AND F/O STEERING HANDWHEELS

Applicable to: ALL

Steering Handwheel

The flight crew uses the steering handwheels to steer the aircraft during taxi.
Each steering handwheel controls the NWS angle up to 70 degrees left or right.

PEDAL DISC pb

When held pressed, the PEDAL DISC pb disconnects:

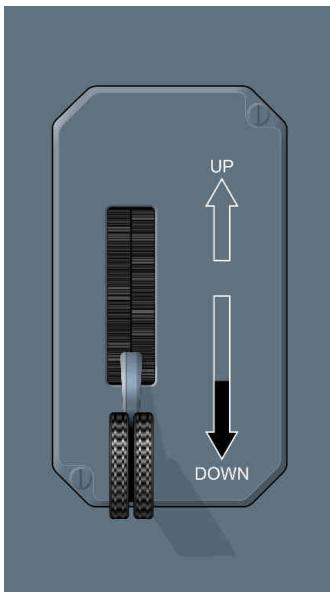
- The NWS from the rudder pedals
- The Heading Control Function.

- [L2] When the flight crew disconnects HCF, any offset that may occur is not compensated.
The flight crew has to compensate the offset with the steering handwheel.

LANDING GEAR LEVER

Applicable to: ALL

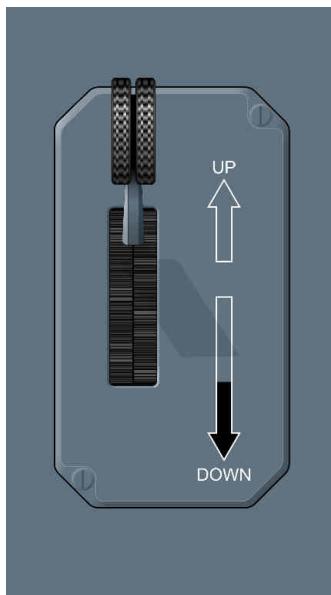
L12

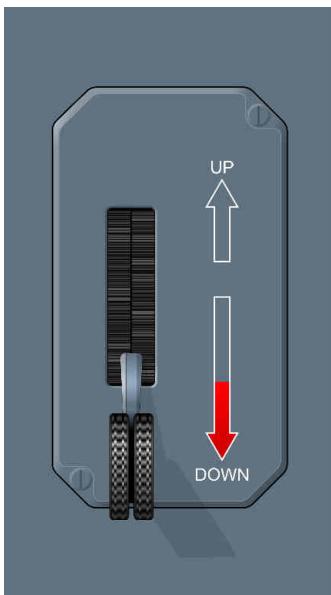


Landing gear extension is selected.

An interlock mechanism (baulk) prevents the retraction of the landing gear, when any gear is seen compressed simultaneously by both LGCIS, by locking the landing gear lever in the DOWN position.

Landing gear retraction is selected.





The red arrow goes on and flash when the aircraft is in a landing configuration below 750 ft radio altimeter and one or more landing gears are not downlocked. The red arrow logic is independent from the position of the landing gear lever. The L/G GEAR NOT DOWN alert displays simultaneously (*Refer to Procedure*).



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AIRCRAFT SYSTEMS

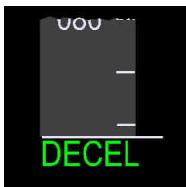
32 - LANDING GEAR

CONTROLS AND INDICATORS - LANDING GEAR LEVER

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DECCEL INDICATION

Applicable to: ALL



The AUTO BRK is active and the aircraft decelerates as selected via the AUTO BRK mode selector.

The DECEL indication:

- Goes on when the effective deceleration is, at least, 80 % of the selected deceleration (AUTO-BRK LDG mode)
- Goes off when the effective deceleration is less than 70 % of the selected deceleration (AUTO-BRK LDG mode).

Note: - *In RTO mode, maximum breaking performance limited by A-SKID is achieved, DECEL indication goes on for 2,7 m/s² and goes off for 2,0 m/s².*
 - *On a slippery runway, the A-SKID may activate before the aircraft reaches the selected deceleration. Therefore, the DECEL light may not go on even if the AUTO BRK is active.*



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32 - LANDING GEAR

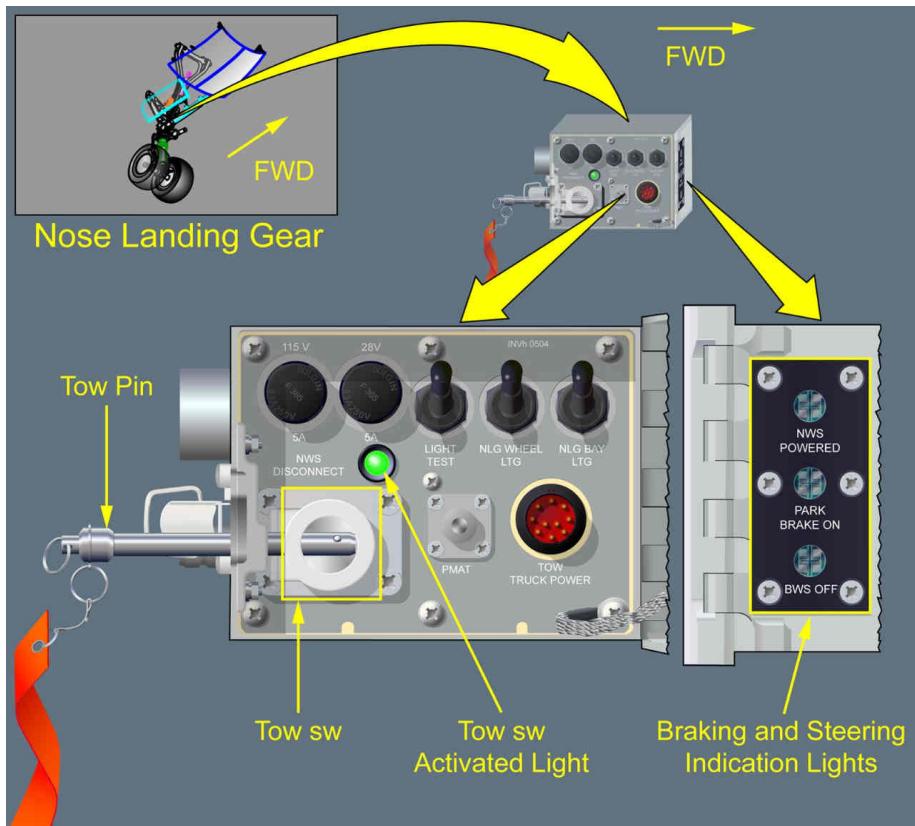
CONTROLS AND INDICATORS - DECEL INDICATION

Intentionally left blank

STEERING NOSE GEAR PANEL

Applicable to: ALL

Steering Nose Gear Panel

**Tow sw**

When the tow pin is installed:

- The tow sw inhibits the NWS, and the TOW SWITCH ACTIVATED light goes on
- The NWS POWERED light goes ON if there is a NWS disconnection failure.

L2 TOW SWITCH ACTIVATED LIGHT

The light inform the ground crew on the activation of TOWING mode for safe towing/push-back..



The tow switch is not activated.



The tow switch is activated.

L2 BRAKING AND STEERING INDICATION LIGHTS

The three lights inform the ground crew on parking brake, Nose Wheel Steering (NWS).and Body Wheel Steering (BWS) status.



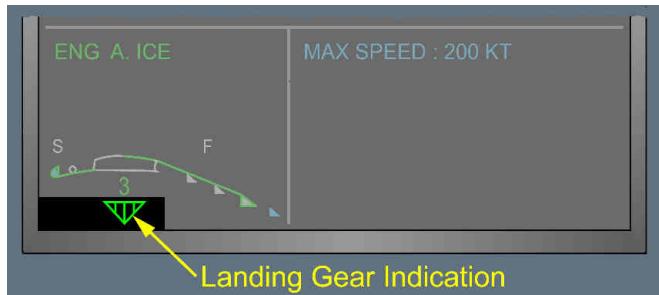
- The parking brake is OFF, or
- The NWS is powered, or
- The BWS is available.



- The parking brake is ON, or
- The NWS is inhibited or not powered, or
- The BWS is not available.

SLAT/FLAP DISPLAY

Applicable to: ALL

Slat/Flap Display

No display: The landing gear is uplocked.



All five landing gear are downlocked.

In case of failure, there is no display.



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AIRCRAFT SYSTEMS

32 - LANDING GEAR

CONTROLS AND INDICATORS - SLAT/FLAP DISPLAY

Intentionally left blank

AUTO BRK MODE ANNUNCIATION ON THE FMA

Applicable to: ALL

AUTO BRK MODE ANNUNCIATION ON THE FMAAUTO BRK Annunciation on the FMA

The AUTO BRK is armed in RTO mode.



The AUTO BRK is armed in AUTO BRK 3 mode.
BTV, BRK LO, BRK 2 or BRK HI may also display.



The AUTO BRK is active in AUTO BRK 3 mode.
BTV, BRK RTO, BRK LO, BRK 2, BRK HI may also display.





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32 - LANDING GEAR

CONTROLS AND INDICATORS - AUTO
BRK MODE ANNUNCIATION ON THE FMA

Intentionally left blank



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AIRCRAFT SYSTEMS

32 - LANDING GEAR

CONTROLS AND INDICATORS - BTV

ND AIRPORT MAP

Applicable to: ALL

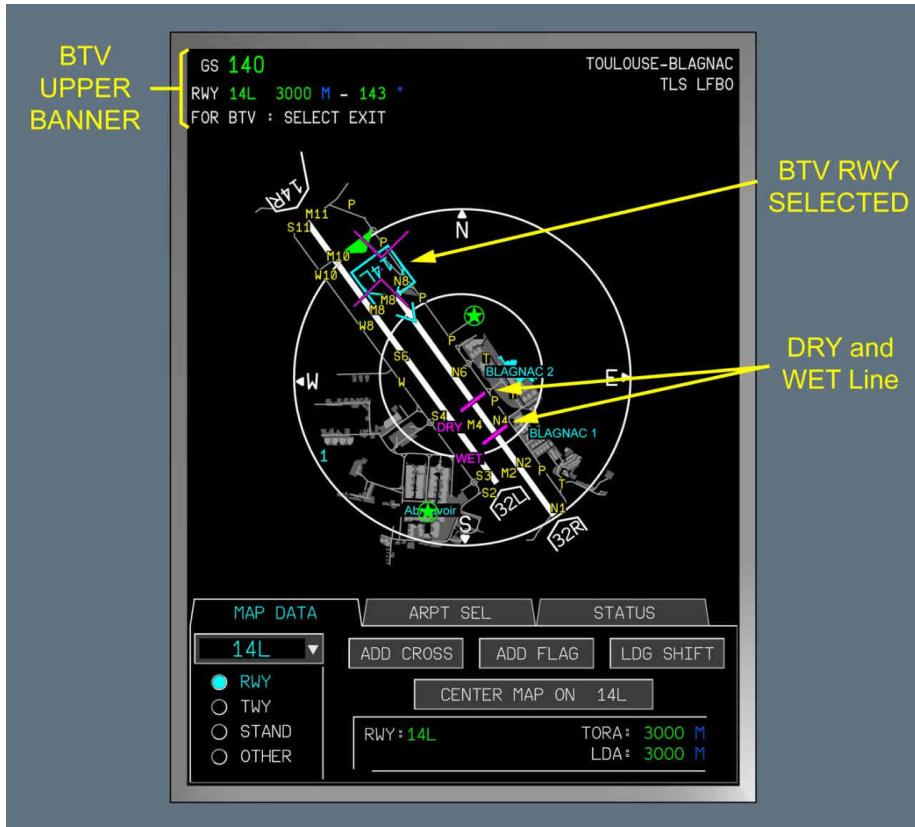
The flight crew configures BTV on the ND via the airport map.

To select the airport map display, the flight crew sets:

- The ND Mode selector to PLAN
- The ND Range selector to ZOOM.

For more information on the airport map display, *Refer to DSC-34-10-70-20-GEFIS EFIS CP*.

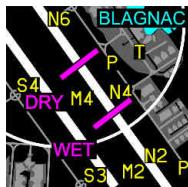
Note: As required (e.g. due to NOTAM), the flight crew can modify the runway length by inserting a threshold shift or end shift (for more information Refer to DSC-34-10-70-20-GND Additional Functions). BTV , ROW and ROP take into account the position of the thresholds to compute the landing distances and protect the aircraft against a runway overrun.

BTV Selected Runway

BTV Exit Selected

DRY AND WET LINES

L12

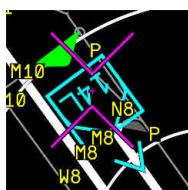


The DRY and WET lines respectively represent the computed landing distance on a dry and a wet runway. The flight crew can select an exit only after the DRY line. On a wet runway, the flight crew should select an exit after the WET line.

The DRY and WET lines are computed taking into account:

- The aircraft weight
- The FMS predicted wind at landing
- The approach speed.

For more information on the DRY and WET lines, *Refer to DSC-32-10-30-20-10 Dry and Wet line concept*.

SELECTED RUNWAY

When the flight crew selects a landing runway for BTV , the QFU of the selected runway is displayed in cyan.

If the flight crew selects a runway that is different from the FMS active runway, the message BTV/FMS RUNWAY DISAGREE is displayed on the upper banner. Nevertheless, the flight crew can confirm the BTV runway selection different from the FMS landing runway.

For more information on the FMS active runway, *Refer to DSC-34-10-70-20-GND Moving Airport Map*.

BTV UPPER BANNER

At the different steps of the BTV preparation, the upper banner displays appropriate information.

BTW RUNWAY SELECTED

RWY 14L 3000 M - 143 The flight crew selected the runway.
FOR BTV : SELECT EXIT For the selected runway, OANS displays the following data:
QFU .

- Landing distance available (LDA)
- Runway heading.

At this step of the BTV preparation, BTV asks the flight crew to select the exit.

RWY 14L 3000 M - 143 The flight crew selected the runway. OANS displays the landing distance available (LDA) and the QFU in blue, because FOR BTV : SELECT EXIT the flight crew shifted the runway via the OANS interface (for more information, Refer to DSC-34-10-70-20-GND Additional Functions).

RWY : INVALID DATA The OANS displays the message when BTV ROW / ROP detects a discrepancy on the runway data.

RWY 14L 2500 M - 143 OANS informs the flight crew that the runway selected by the IF WET : RWY TOO SHORT flight crew is too short in wet condition. If the runway is dry, the FOR BTV : SELECT EXIT flight crew can select an exit or the runway end.

RWY 14L 2000 M - 143 OANS informs the flight crew that the runway is too short. The RWY TOO SHORT flight crew cannot select an exit or the runway end and arm FTV for the selected runway.

DIFFERENT FMS AND SELECTED BTV RUNWAY

RWY 14L 3000 M - 143 The flight crew selected a runway that is different from the BTV/FMS RWY DISAGREE runway in the active FMS flight plan.
FOR BTV : SELECT EXIT The flight crew can continue to prepare BTV . The message will disappear when the flight crew selects the exit.

BTW EXIT SELECTED

L12

RWY 14L 3000 M - 143
EXIT N4 1900 M
ROT 35 ''
TURNAROUND 165' / 190'

The flight crew selected an exit.
BTV displays the data about the selected exit in addition to runway data.
In this example, the flight crew selected the N4 exit. The distance displayed beside the name of the selected exit is the distance between the selected runway threshold and the selected exit.

ROT is the predicted Runway Occupancy time. BTV predicts the runway occupancy time for an automatic landing with BTV braking mode.

TURNAROUND is for the predicted turnaround time. BTV computes two different turnaround times based on the selected exit and the brake energy used to stop the aircraft with BTV. The first value is the predicted turnaround time with maximum reverse, and the second value is the predicted turnaround time with idle reverse.

The predicted turnaround time computation takes into account a fixed taxi phase in addition to the BTV landing. The turnaround time is the cooling time necessary for the brakes to reach 150 °C after landing.

Taking into account the predicted turnaround time based on the brake temperature, the flight crew can adjust the selected exit, as required.

BTV : INVALID DATA
EXIT XXXX

The flight crew selected an exit and the data linked to the selected exit are invalid.

BTW EXIT SELECTION: TOO SHORT

RWY 14L 3000 M - 143
EXIT N6 1412 M
BTW : N6 TOO SHORT

The flight crew selected an exit between the selected runway threshold and the dry line.
BTV displays the data associated with the selected exit. These data are displayed in amber. The flight crew cannot arm BTV because the distance between the runway threshold and the exit is shorter than the minimum landing distance on dry runway.

RWY 14L 2800 M - 143 The flight crew selected an exit after the runway end. OANS displays the data concerning the selected exit. These data are displayed in amber. The flight crew cannot arm BTV because the distance between the runway threshold and the exit is longer than the landing distance available (runway shift situation).

EXIT N1 3000 M

BTV : N1 AFTER RWY END

BTW SELECTED EXIT



The flight crew selected the exit N4. The name of the exit is boxed in cyan when selected. OANS displays the data associated to the exit in the upper banner.

BTW PATH

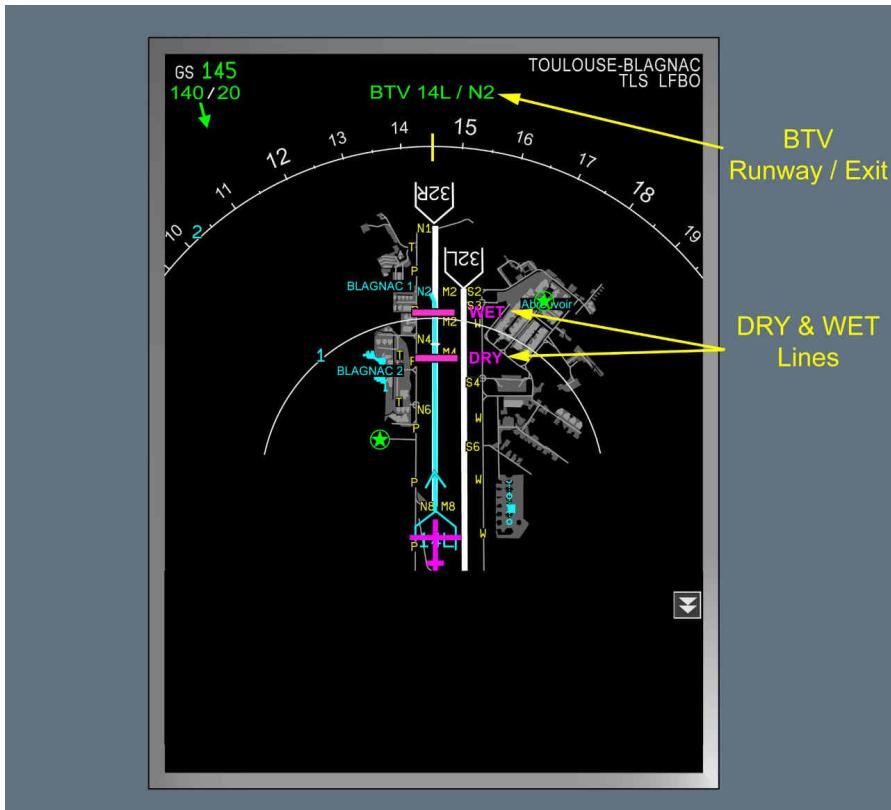


When the flight crew selects a selectable exit for BTV preparation, OANS displays a path between the selected runway threshold and the selected exit. This path shows the predicted aircraft trajectory on the runway for the BTV braking.

ND BTW ROW ROP

Applicable to: ALL

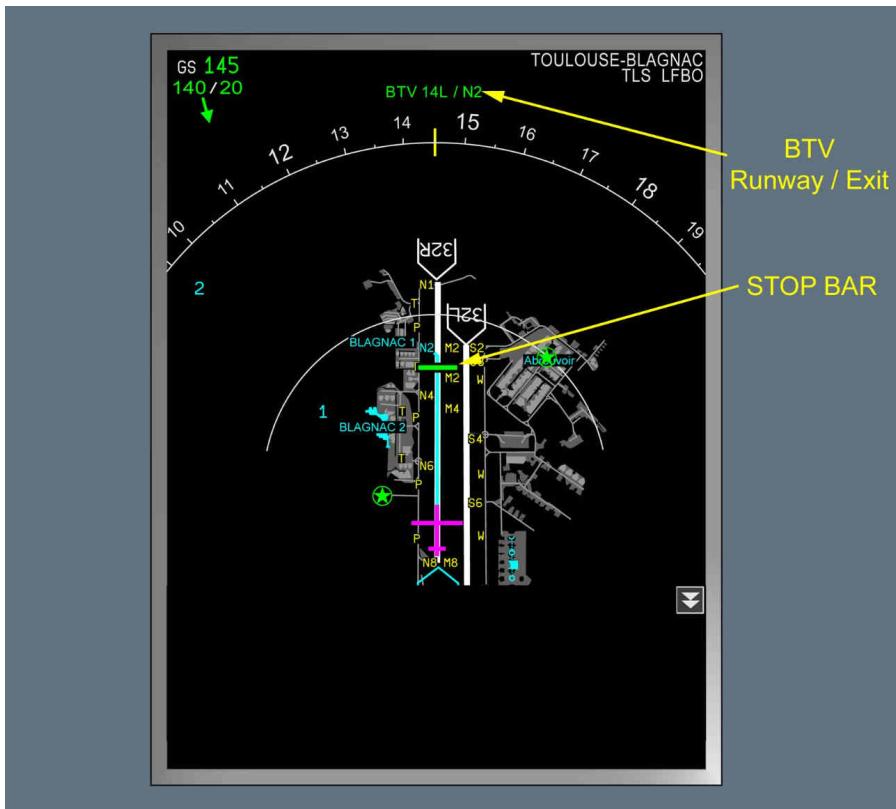
For approach and landing, the flight crew can monitor via the ND, below 500 ft in real time, the behavior of the DRY and WET lines independently of the braking means (auto-brake or pedal braking). The flight crew can adjust and select the appropriate range (range selector set on ZOOM), as required.

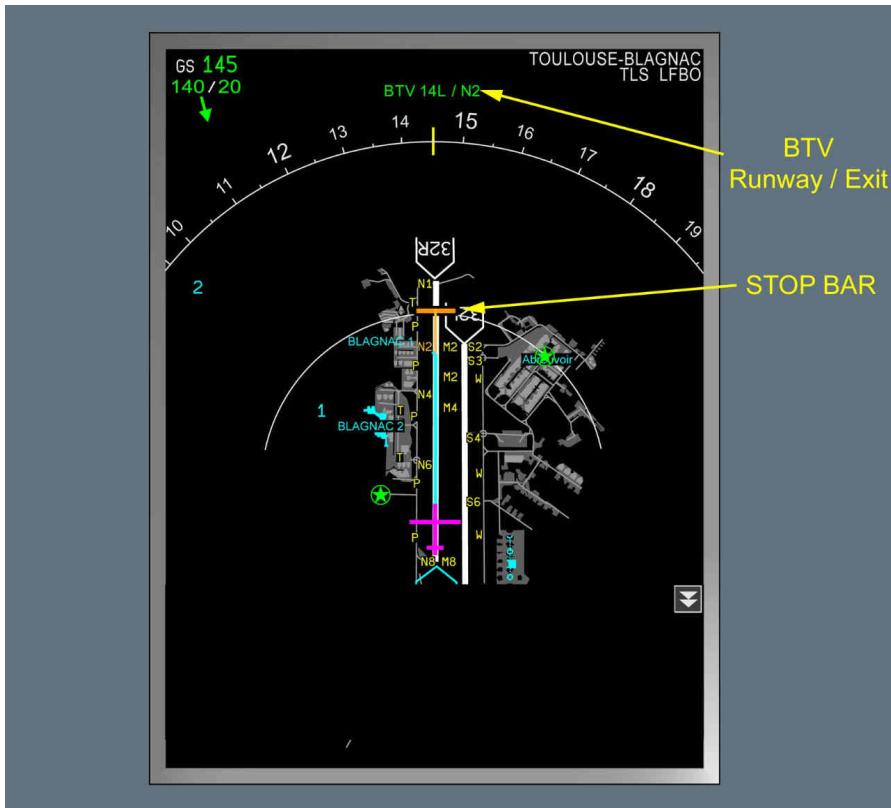
BTV ROW/ROP MONITORING : AIRCRAFT IN FLIGHTND BTV Monitoring : BTV Active in flight

The flight crew selects basic auto-brake mode or pedal braking technic for landing.

BTV MONITORING: AIRCRAFT ON GROUND

ND BTV Monitoring : BTV Active on Ground



EXIT OVERRUNND BTV Monitoring : BTV Active on Ground**BTV / LDG RWY DISAGREE**

When the flight crew lands the aircraft on a runway different from the selected runway for BTV approach and landing, BTV reverts to brake HI and the ND displays the BTV/LDG RWY DISAGREE message in the upper part of the ND. A triple click is associated to the reversion in HI braking mode.

The ND displays the BTV/LDG RWY DISAGREE message below 300 ft when BTV detects the landing runway.

ND BTV Monitoring : BTV / LDG RWY DISAGREE in Flight

UNKNOWN LDG RWYUnknown Landing Runway

ROW use the Onboard Airport Navigation System database and the aircraft position to detect the landing runways.

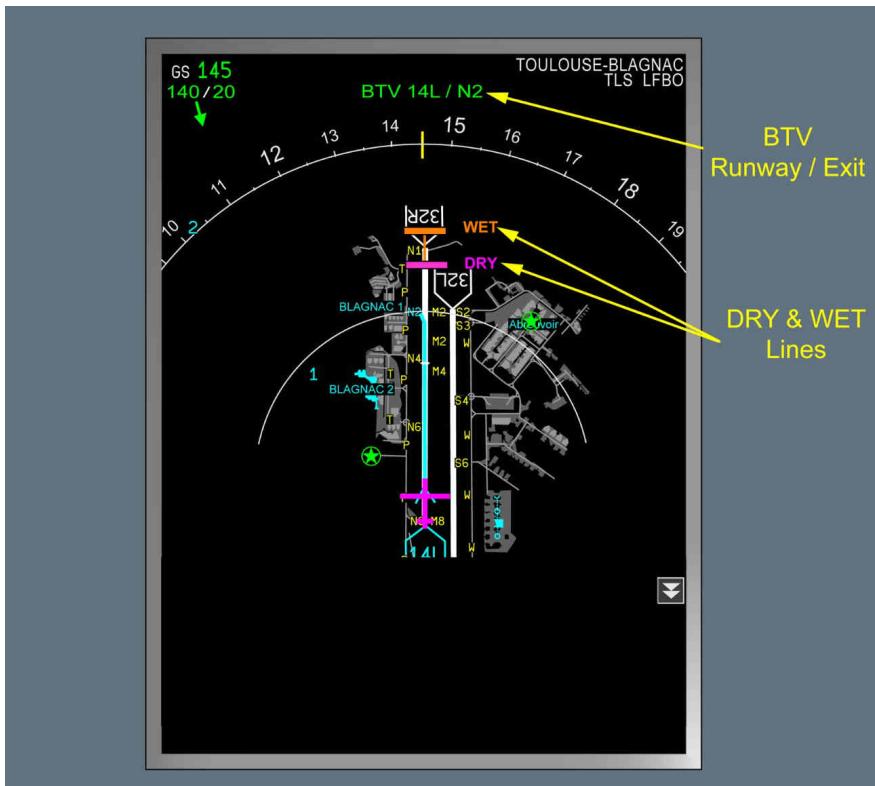
If the detected landing runway is not in the Onboard Airport Navigation System database, or ROW failed to detect the landing runway, the ROW and ROP can not detect the landing runway.

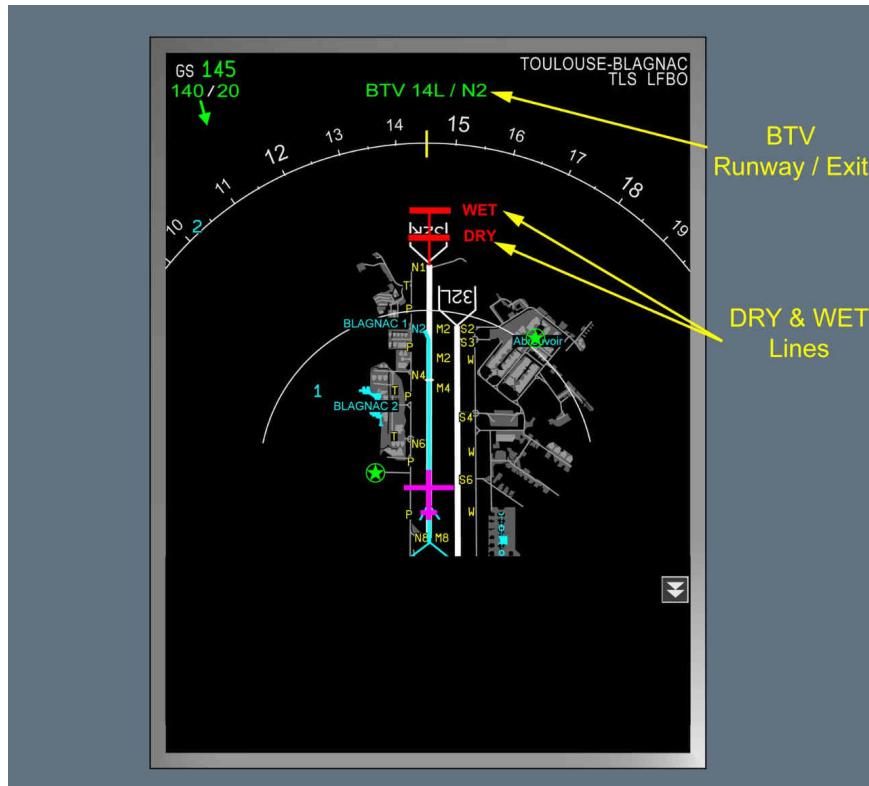
In this case, on the upper part of the Airport Navigation display on the ND .the UNKNOWN LDG RWY message is displayed.

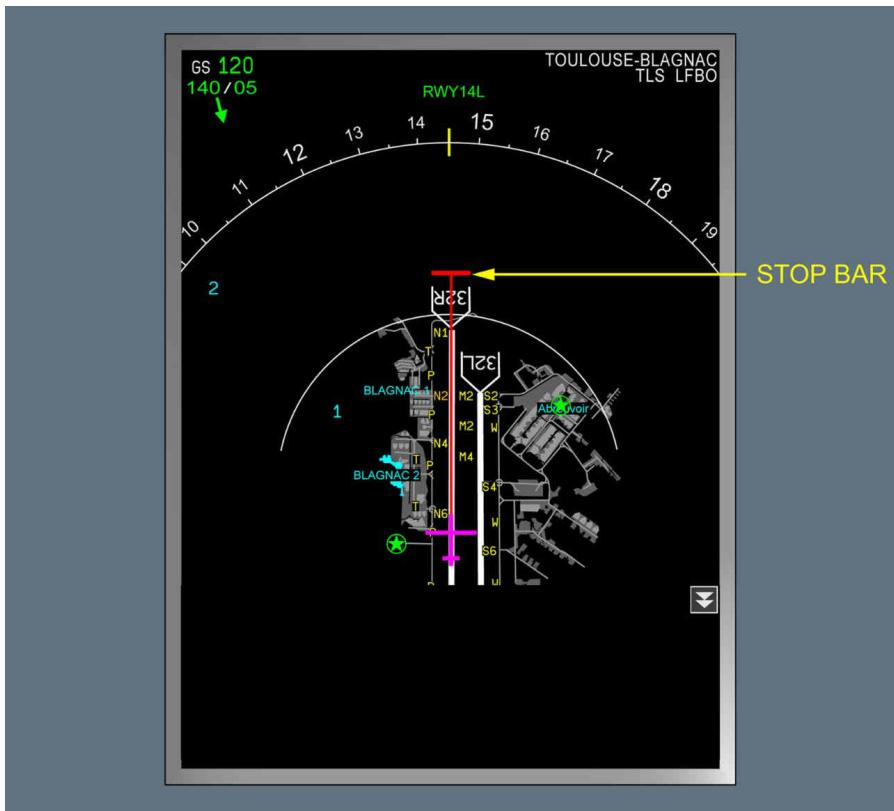
When the ND displays the UNKNOWN LDG RWY message, BTV , ROW and ROP are no more available.

In flight, if no alerts impact the autobrake system, the autobrake reverts to HI armed mode.

On ground, when the BRK HI mode becomes active, the flight crew ears a triple click.

ROW ACTIVATION**IF WET : RWY TOO SHORT**ND BTV Monitoring

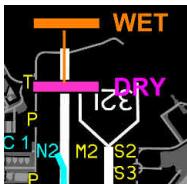
RWY TOO SHORTND BTV Monitoring

ROP ACTIVATIONND Monitoring**DRY AND WET LINES**

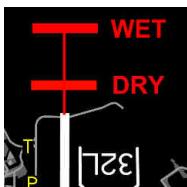
Below 500 ft the DRY and WET lines are alive. In real time, taking into account the aircraft speed, the wind, the trajectory of the aircraft, the DRY and WET lines move accordingly. The DRY and WET lines represent the minimum landing distance achievable by the aircraft.



The ND displays the DRY and WET lines on the runway.



The ND displays the WET line out of the runway. In this situation, the PFD displays IF WET : RWY TOO SHORT .



The ND displays the DRY and WET lines out of the runway. In this situation, the PFD displays RWY TOO SHORT message and the RWY TOO SHORT aural alert triggers.

RUNWAY / EXIT

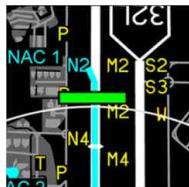
BTV 14L / N2

When the flight crew monitors BTV approach and landing, the ND displays the runway and the exit selected during BTV preparation.

RUNWAY

RWY14L

When the flight crew monitors an approach in basic auto-brake mode or pedal braking, the ND displays the runway that FOW/ROP detect and protect for landing.

STOP BAR

When the aircraft is on ground and an autobrake mode (BTV or basic autobrake mode) is active, the DRY and WET lines disappear and are replaced by one STOP bar.

With BTV active, the STOP bar materializes the point on the runway where BTV will release the brakes at 10 kt . When BTV predicts a stop distance that guarantees that the aircraft will reach the selected exit, the ND displays the STOP bar in green. With a basic autobrake mode active, the STOP bar materializes the point where the aircraft will stop.

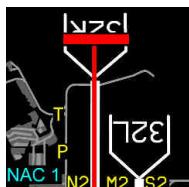
Note: *With a basic autobrake mode active, the blue path stops at the STOP bar. With BTV active, the blue path stops at the selected exit.*

In pedal braking, the STOP bar is not displayed.



When BTV predicts a stop bar after the selected exit, the aircraft will not be able to stop before the selected exit. In this situation, the braking is limited to AUTOBRK HI. The ND displays the STOP bar and the selected exit in amber.

Associated with the display of the STOP bar and the selected exit in amber, a triple click triggers and the CDS displays the message EXIT MISSED on the FMA (For more information on the FMA, Refer to DSC-32-20-220 FMA BTV).



When ROP predicts a STOP bar after the end of the runway, the aircraft is in situation of runway overrun. The ND displays the STOP bar in red.

If an autobrake mode is active, the braking system applies maximum braking, as long as the overrun situation is detected. The PFD displays the MAX REVERSE message when the situation is detected. The message pulses for 9 s then remains steady. (For PFD view, Refer to DSC-32-20-220 PFD ROW ROP)

Associated with the MAX REVERSE message, the aural alert "MAX REVERSE" sounds until the flight crew selects maximum reverse. (For more information, Refer to DSC-32-10-30-20-20 ROW ROP Operations)

At 80 kt , "KEEP MAX REVERSE" sounds if BTV still detects a runway overrun situation.

PFD ROW ROP

Applicable to: ALL

PFD ROW

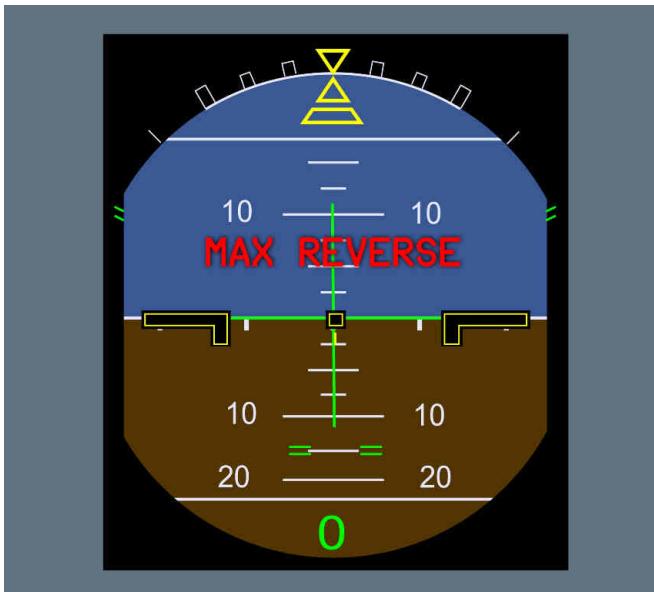
Below 300 ft, ROW detects the landing runway. If ROW detects that the minimum landing distance computed on a wet runway is higher than the remaining runway landing distance, the PFD displays IF WET : RWY TOO SHORT.



If ROW detects that the minimum landing distance computed on a dry runway is higher than the remaining runway landing distance, the PFD displays RWY TOO SHORT.

**PFD ROP**

On ground, when an auto-brake mode (BTV or basic auto-brake mode) is active and ROP detects that the computed braking distance is higher than the remaining runway length, the PFD displays MAX REVERSE. This message pulses for 9 s then remains steady as long as ROP detects that the remaining runway length is too short.



On ground, when the flight crew uses the pedal braking technique and ROP detects that the computed braking distance is higher than the remaining runway length, the PFD displays MAX BRAKING and MAX REVERSE. This message pulses for 9 s then remains steady as long as ROP detects that the remaining runway length is too short

**FMA BTV**

Applicable to: ALL

EXIT MISSED MESSAGE ON THE FMA

The aircraft is on ground with BTV active.



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CONTROLS AND INDICATORS - BTV

When BTV detects that the maximum deceleration rate in BTV autobrake mode does not allow to stop the aircraft before the selected exit, the FMA displays the EXIT MISSED message (in addition to the display on the ND of the STOP bar, and the triggering of the audio triple click).

MEMO

Applicable to: ALL

L12

AUTO BRK OFF

The memo indicated that the auto brake has been disconnected.

Flight Phase Inhibition

L12

FLT L/G DOWN

The aircraft performs a ferry flight with the landing gear down: i.e. the VMO-MMO sw is set to L/G DOWN.

Flight Phase Inhibition

L12

N/W STEER DISC

The tow sw is on. The Nose Wheel Steering is disconnected.

Flight Phase Inhibition


L12

N/W STEER DISC

The tow sw is on and at least two engines are running. The Nose Wheel Steering is disconnected.

Flight Phase Inhibition


L12

L/G GRVTY EXTN The L/G has been extended by gravity.

Flight Phase Inhibition


L12

PARK BRK ON

The parking brake is ON.

Flight Phase Inhibition



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CONTROLS AND INDICATORS - MEMO

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NORMAL OPERATIONS - L/G EXTENSION AND RETRACTIONS

L/G EXTENSION AND RETRACTION

Applicable to: ALL

NLG EXTENSION/RETRACTION

This animated sequence is not available in pdf format

BLG EXTENSION/RETRACTION

This animation is not available in pdf format.

WLG EXTENSION/RETRACTION

This animation is not available in pdf format.

WLG AND BLG EXTENSION/RETRACTION

This animation is not available in pdf format.



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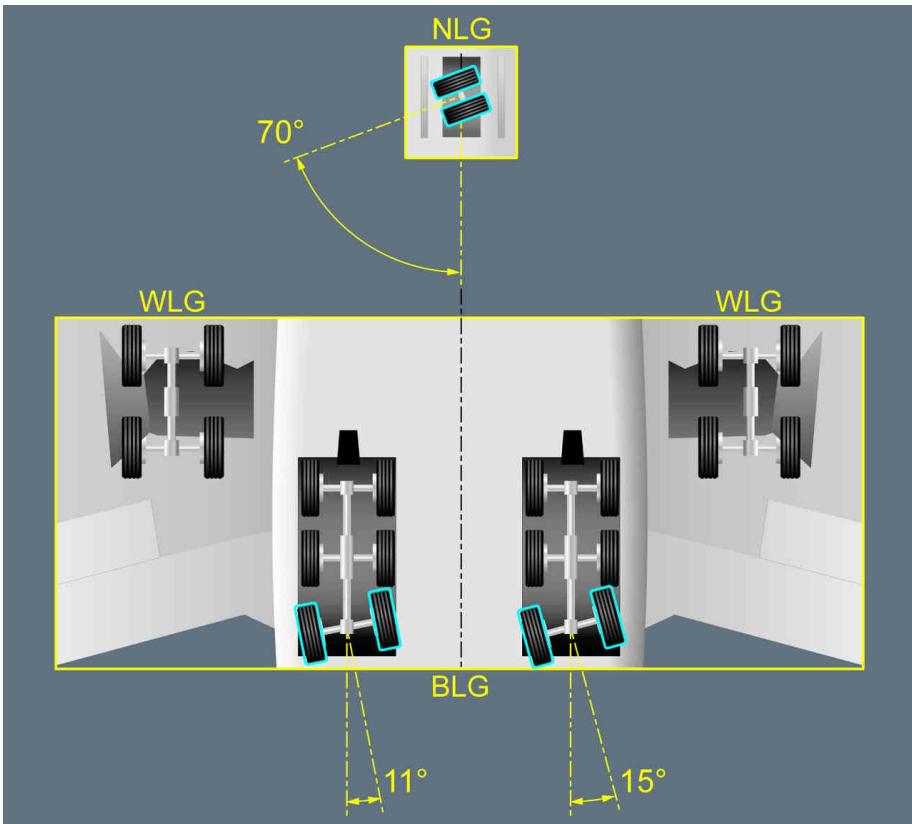
32 - LANDING GEAR

NORMAL OPERATIONS - L/G EXTENSION AND RETRACTIONS

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NWS AND BWS OPERATION

Applicable to: ALL

NWS and BWS Operation



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NORMAL OPERATIONS - NWS AND BWS OPERATION

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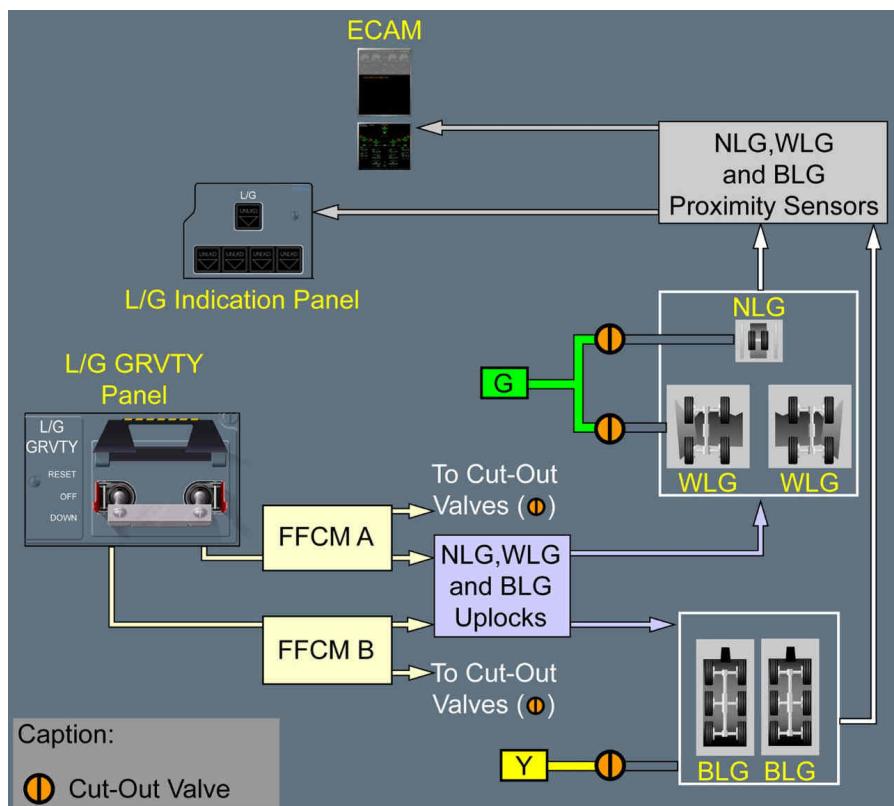
LANDING GEAR GRAVITY EXTENSION

Applicable to: ALL

LANDING GEAR GRAVITY EXTENSION

When the normal extension of the landing gear (L/G) fails, the flight crew can perform a gravity extension via the L/G GRVTY selector.

The gravity extension of the L/G does not use hydraulic power, and the L/G doors remain open. NORM and ALTN NWS remain available after gravity extension.

LANDING GEAR GRAVITY EXTENSION ARCHITECTURELanding Gear Gravity Extension Architecture

LANDING GEAR GRAVITY EXTENSION CONTROL

Two Free Fall Control Modules (FFCM) control the gravity extension of the landing gear.

The FFCMs are independent of the LGCIS.

[L3] The FFCMs are active simultaneously.

[L1] When the flight crew sets the L/G GRTVTY selector to the DOWN position, the FFCMs generate and send the appropriate electrical commands to extend the landing gear by gravity.

[L3] The commands are sequenced by a timer and sent in chronological order to:

1. The cut-out valves to isolate the retraction actuators from the hydraulic power
2. The retraction actuators to activate the gravity mode

Note: The gravity mode enables free flow of the hydraulic fluid between the two chambers and prevents any hydraulic lock of the actuator.

3. The landing gear door uplocks to enable the landing gear doors to fall open

4. The landing gear uplocks (NLG and WLG, then BLG) to enable the landing gear to fall and downlock in the extended position.

5. The total duration of gravity extension from L/G GRTVTY sw on down to last gear downlock is 70 s in absence of failure.

[L1] When the ECAM and the L/G indicator panel operate normally, the landing gear position indications remain available during a gravity extension from the NLG, WLG and BLG proximity sensors.

CUT-OUT VALVES

There are three cut-out valves:

- One for the NLG
- One for the WLG
- One for the BLG

When the L/G GRTVTY selector is set to the DOWN position, the cut out valves close and isolate the landing gear from the hydraulic power (GREEN or YELLOW).

LANDING GEAR AND LANDING GEAR DOOR UPLOCKS

The uplocks maintain the landing gear in the retracted position and the landing gear doors in the closed position.



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ABNORMAL OPERATIONS - LANDING GEAR GRAVITY EXTENSION

Each uplock has:

- A locking hook
- Two electrical actuators.

One actuator is controlled by the active LGCIS.

The other actuator is controlled by the Free Fall Control Modules (FFCMs) for landing gear gravity extension.



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ABNORMAL OPERATIONS - LANDING GEAR GRAVITY EXTENSION

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ABNORMAL OPERATIONS - LANDING GEAR
RETRACTION WITH ONE HYDRAULIC SYSTEM FAILED

LANDING GEAR RETRACTION WITH ONE HYDRAULIC SYSTEM FAILED

Applicable to: ALL

The YELLOW and the GREEN hydraulic systems power the retraction of the landing gear. If either hydraulic system fails during takeoff, some landing gears (depending on which system fails) will not retract when the flight crew sets the L/G lever to the UP position.

L/G RETRACTION WITH THE YELLOW HYDRAULIC SYSTEM FAILED

If the YELLOW hydraulic system fails, and the flight crew sets the L/G lever to the UP position:

- The NLG retracts, NLG doors will close after NLG uplock
 - The BLG and the WLG remain extended, BLG doors will remain closed, but WLG doors will open and stay fully open.
- [L2] Even if the GREEN hydraulic power is available, the WLG will not retract. This is to prevent any collision with the extended BLG.

L/G RETRACTION WITH THE GREEN HYDRAULIC SYSTEM FAILED

If the GREEN hydraulic system fails, and the flight crew sets the L/G lever to the UP position:

- The BLG retracts
- The NLG and the WLG remain extended (NLG and WLG doors will open by gravity and remain open, with position variable function of airloads).



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ABNORMAL OPERATIONS - LANDING GEAR
RETRACTION WITH ONE HYDRAULIC SYSTEM FAILED

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ABNORMAL OPERATIONS - BRAKING SYSTEM RECONFIGURATION

BRAKING SYSTEM RECONFIGURATION

Applicable to: ALL

To avoid a general degradation of braking performance, in the case of a local failure, the braking system is divided into three wheel groups:

- The WLG

L3 The WLG brakes operate in the same braking mode to ensure symmetrical braking on the WLG .

L1- The right BLG

- The left BLG .

Depending on the failure, each wheel group can be degraded separately, and operate in a different braking mode (e.g.: The WLG may be in normal braking, while the left BLG is in alternate braking and the right BLG is in emergency braking).

If a failure occurs on a small number of brakes, the affected brakes are released and the braking system remains in normal mode (*Refer to BRAKES RELEASED procedure*).

If a failure occurs on a large number of brakes, the braking system automatically changes the appropriate wheel group to another braking mode.

The reconfiguration achieves the best braking performance possible, taking into account the actual failures.



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ABNORMAL OPERATIONS - BRAKING SYSTEM RECONFIGURATION

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ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

BRAKES A-SKID FAULT ON ALL L/G (*Refer to procedure*)

BRAKES A-SKID FAULT ON L + R BODY L/G (*Refer to procedure*)

BRAKES A-SKID FAULT ON LEFT (RIGHT) BODY L/G (*Refer to Procedure*)

BRAKES A-SKID FAULT ON WING + L (R) BODY L/Gs (*Refer to Procedure*)

BRAKES A-SKID FAULT ON WING L/G (*Refer to procedure*)

BRAKES A-SKID OFF (*Refer to procedure*)

BRAKES ACCU PRESS LO (*Refer to procedure*)

BRAKES ALTN + EMER BRK FAULT (*Refer to procedure*)

BRAKES ALTN BRK FAULT (*Refer to procedure*)

BRAKES ALTN BRK PRESS MONITORING FAULT (*Refer to procedure*).

BRAKES AUTO BRK FAULT (*Refer to procedure*)

BRAKES BRAKES HOT (*Refer to procedure*)

BRAKES BTV FAULT (*Refer to Procedure*)

BRAKES CTL 1(2) FAULT (*Refer to procedure*)

BRAKES EMER BRK FAULT (*Refer to procedure*)

BRAKES MINOR FAULT (*Refer to procedure*)

BRAKES NORM BRK FAULT (*Refer to procedure*)

BRAKES NORM BRK PRESS MONITORING FAULT (*Refer to procedure*)

BRAKES PARK BRK ON (*Refer to procedure*)

BRAKES PARK BRK PRESS LO (*Refer to procedure*)

BRAKES PEDAL BRAKING FAULT (*Refer to procedure*)

BRAKES RELEASED (*Refer to procedure*)

BRAKES RESIDUAL BRAKING (*Refer to procedure*)

BRAKES SEL VLV JAMMED OPEN (*Refer to procedure*)

BRAKES SYS REDUNDANCY LOST (*Refer to procedure*)

BRAKES SYS SAFETY TEST REQUIRED (*Refer to procedure*).

CONFIG PARK BRAKE ON (*Refer to procedure*)

L/G ABNORM OLEO PRESS (*Refer to procedure*)

L/G BOGIE POSITION FAULT (*Refer to procedure*).

L/G CTL 1(2) FAULT (*Refer to procedure*)

L/G CTL 1+2 FAULT (*Refer to procedure*)

L/G DOORS NOT CLOSED (*Refer to procedure*)

L/G GEAR NOT DOWN (*Refer to procedure*)

L/G GEAR NOT LOCKED UP (*Refer to procedure*)

L/G GRVTY EXTN FAULT (*Refer to procedure*).

L/G LDG WITH 2 ABNORM BODY L/Gs (*Refer to Procedure*)

L/G LDG WITH 2 ABNORM L/Gs ON SAME SIDE (*Refer to Procedure*)

L/G LDG WITH 2 ABNORM WING L/Gs (*Refer to Procedure*)

L/G LDG WITH ABNORM NOSE L/G (*Refer to procedure*)

L/G LDG WITH ABNORM WING OR BODY L/G (*Refer to procedure*)

L/G GEAR NOT LOCKED DOWN (*Refer to procedure*)



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ECAM ALERTS

L/G OLEO PRESS MONITORING SYS FAULT (*Refer to procedure*)

L/G RETRACTION FAULT (*Refer to procedure*)

L/G UPLOCK FAULT (*Refer to procedure*)

L/G SYSTEM DISAGREE (*Refer to procedure*)

L/G WEIGHT ON WHEELS FAULT (*Refer to procedure*)

STEER ALTN N/W STEER FAULT (*Refer to procedure*)

STEER ALTN STEER SYS HOT (*Refer to procedure*)

STEER B/W STEER FAULT (*Refer to procedure*)

STEER B/W STEER NOT LOCKED (*Refer to procedure*)

STEER CAPT(FO) STEER TILLER FAULT (*Refer to procedure*)

STEER N/W + B/W STEER FAULT (*Refer to procedure*)

STEER N/W STEER ANGLE LIMIT EXCEEDED (*Refer to procedure*)

STEER N/W STEER DISC FAULT (*Refer to procedure*)

STEER N/W STEER FAULT (*Refer to procedure*)

STEER NORM N/W STEER FAULT (*Refer to procedure*)

STEER PEDAL STEER CTL FAULT (*Refer to procedure*)

STEER STEER CTL 1(2) FAULT (*Refer to Procedure*)

STEER STEER SEL VLV JAMMED OPEN (*Refer to procedure*)

WHEEL TIRE PRESS LO (*Refer to procedure*)



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ECAM ALERTS

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32 - LANDING GEAR

ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Subsystem | Electrical Supply |
|-----------------|-----------|--|
| LGERS | LGCIS 1 | DC 1 (DC-ESS for L/G position indication on center panel) |
| | LGCIS 2 | DC 2 |
| | FFCM A | DC 1 |
| | FFCM B | DC-ESS |
| Braking system | BCS 1 | DC 1 |
| | BCS 2 | DC 2 |
| | EBCU | DC-ESS DC-BATT |
| | LEHGS | AC 2 and AC 3 |
| Steering system | SCS 1 | DC 1 |
| | SCS 2 | DC 2 |
| | LEHGS | AC 3 |
| BTMS | N/A | DC 1 and DC 2 |
| TPIS | N/A | DC 1 and DC 2 |
| OPMS | N/A | DC 1 and DC 2 |



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DSC-33-30-10 System Description

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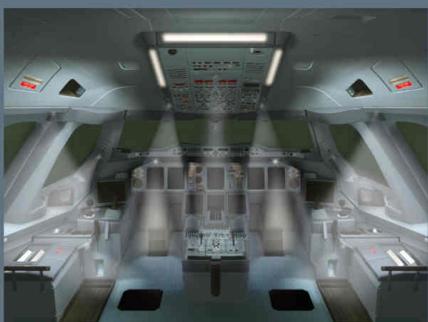
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DSC-33-60 Electrical Supply

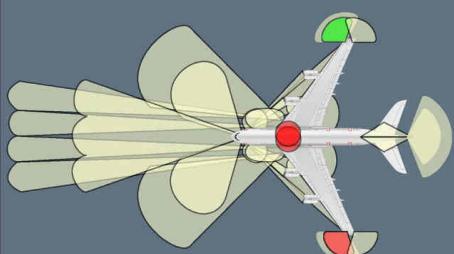
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OVERVIEW

Applicable to: ALL

Lights Overview

Cockpit Lights



Exterior Lights

Signs



Emergency Lights





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LIGHTS OVERVIEW

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COCKPIT LIGHTS - SYSTEM DESCRIPTION

GENERAL

Applicable to: ALL

Cockpit lighting provides the flight crew with the most suitable lighting environment, to carry out their mission.

- All of the cockpit lights use the Light Emitting Diode (LED) technology.
- L1 The flight crew can dim most of the cockpit lights, if necessary.

The cockpit lights have two different colors:

- A white orangey color, that is restful for human eyes
- L2 The following lights come on white orangey:
 - Eye reference light
 - Main instrument panel lights
 - Ambient lights
 - Console, briefcase, and floor lights
 - Center pedestal lights
 - Rear console light
 - Cockpit occupant reading lights.
- L1 - A bluish white color, that facilitates reading.
- L2 The following lights come in bluish white color:
 - Sliding table lights
 - Map lights
 - Flight crew reading lights.



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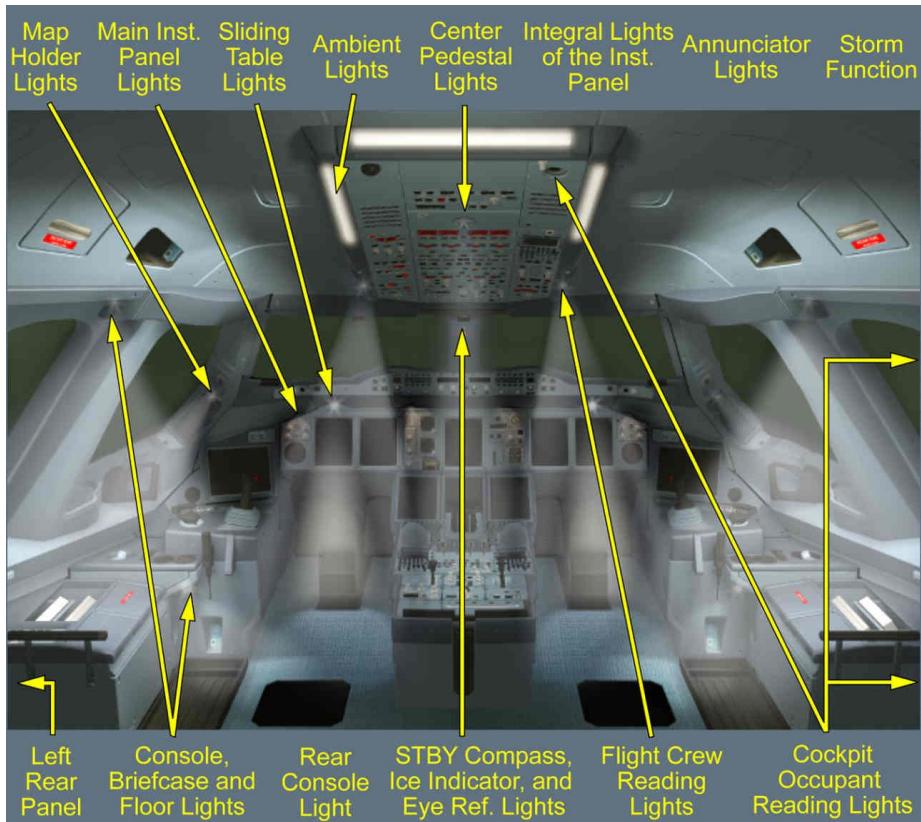
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COCKPIT LIGHTS - SYSTEM DESCRIPTION

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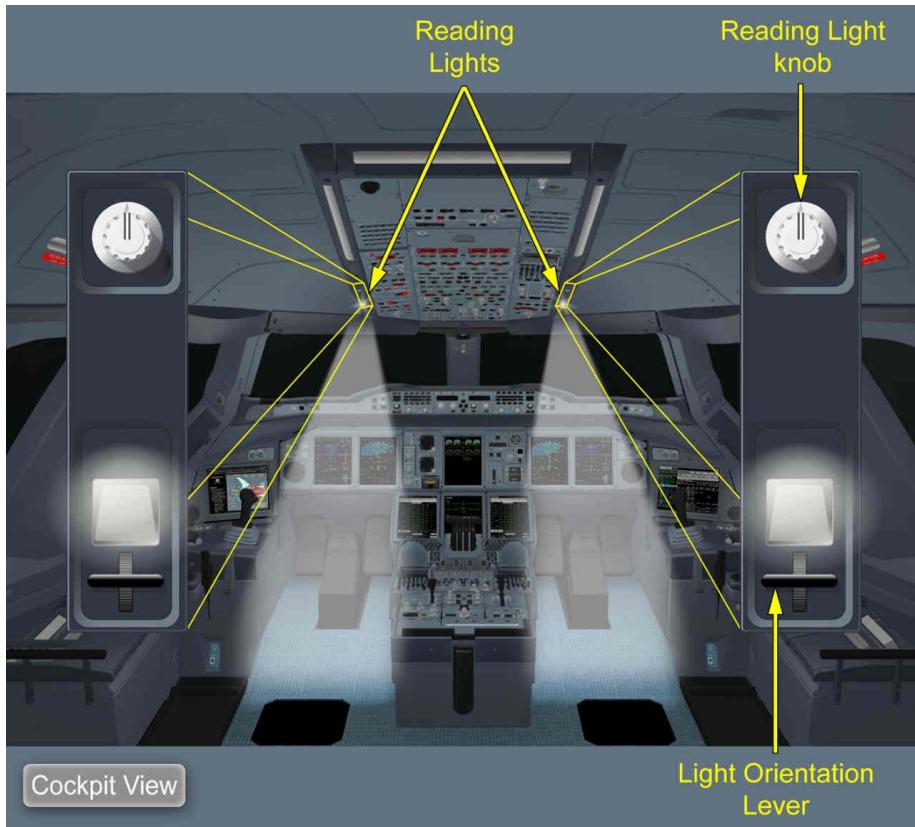
COCKPIT VIEW

Applicable to: ALL

Cockpit View

FLIGHT CREW READING LIGHTS

Applicable to: ALL

Flight Crew Reading Lights & Controls

Each flight crewmember has a reading light. The flight crew can adjust the orientation of the reading light.

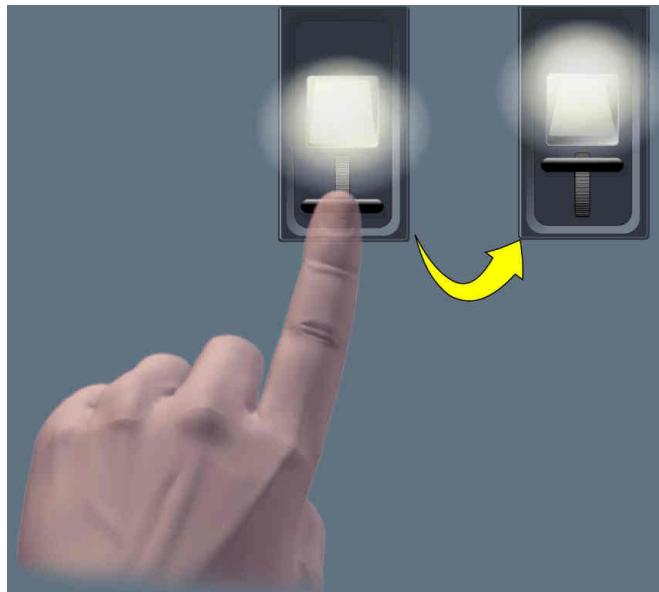
READING LIGHT knob

Turns the reading light on or off, and adjusts its brightness.

Light Orientation lever

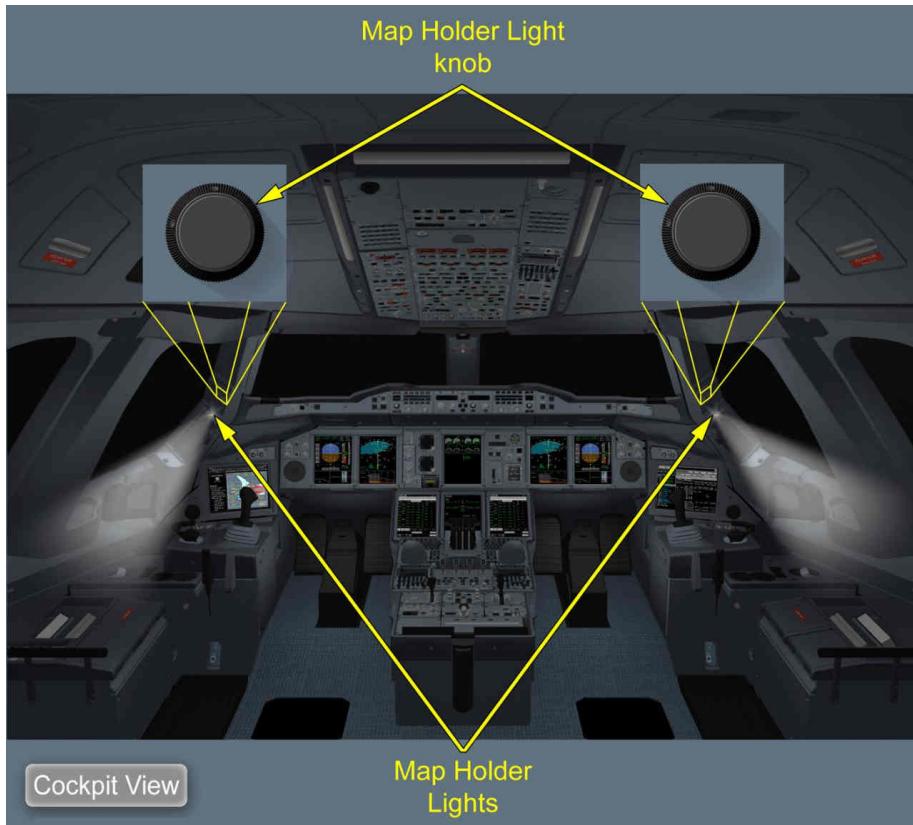
Adjusts the orientation of the associated reading light.

Light Orientation Lever



MAP HOLDER LIGHTS

Applicable to: ALL

Map Holder Lights & Controls

Each flight crewmember has a map holder light.



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COCKPIT LIGHTS - CONTROLS AND INDICATORS

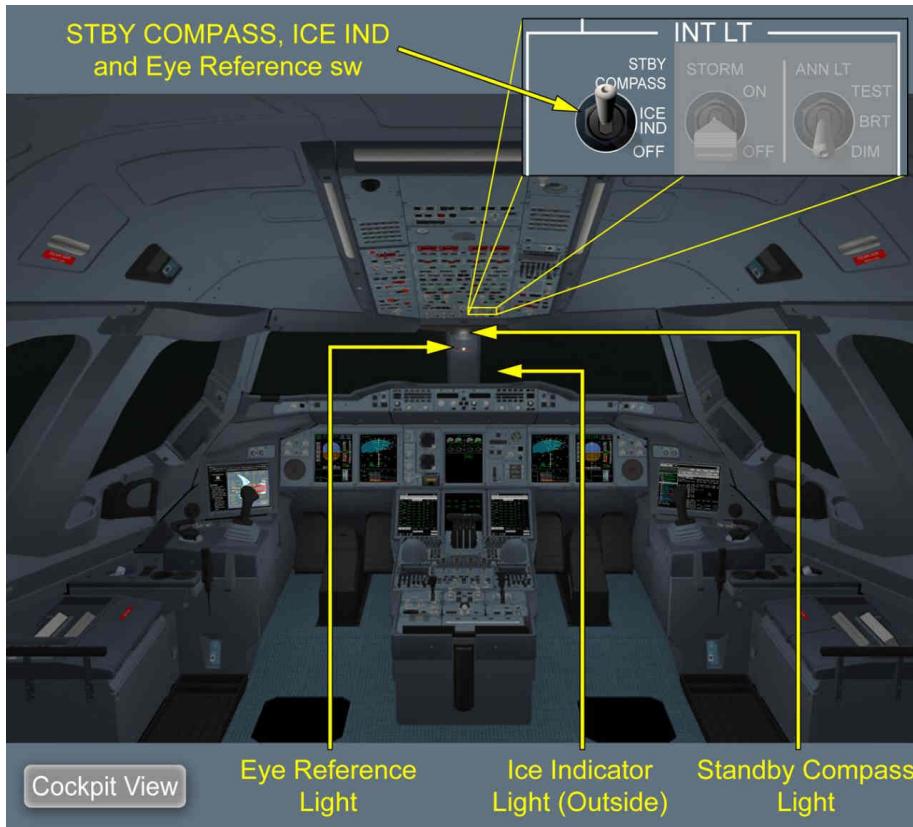
MAP Holder LIGHT knob



Turns the map holder light on or off, and adjusts its brightness.

STANDBY COMPASS, ICE INDICATOR, AND EYE REFERENCE LIGHTS

Applicable to: ALL

STBY Compass, Ice Indicator, and Eye Reference Lights & Controls**STBY Compass, ICE Indicator, and Eye Reference sw**

The standby compass light and the eye reference light are on.



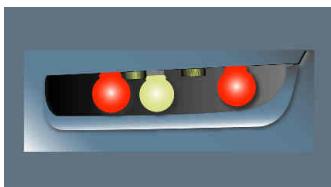
The ice indicator light is on.



EYE REFERENCE LIGHT

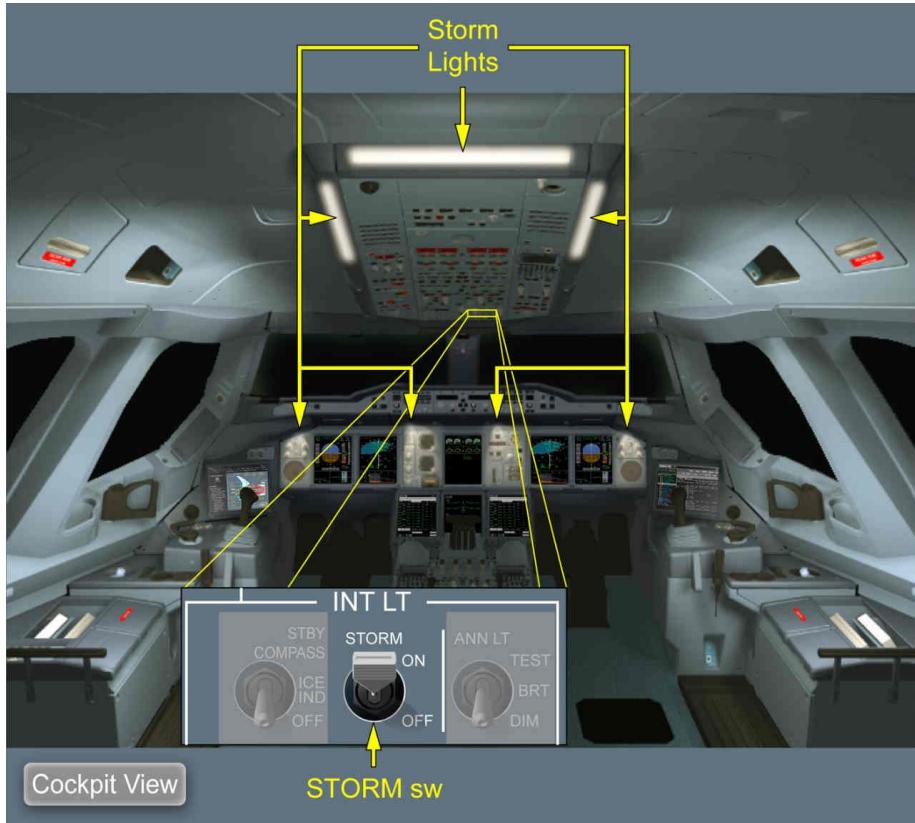
L13

The eye reference light is on.
The eye reference light is in the white ball.



STORM FUNCTION

Applicable to: ALL

Storm Function Lights & Controls

The storm function enables the flight crew to obtain maximum lighting in the cockpit, via the ambient lights and the main instrument panel lights.

STORM sw

Ambient lights on the ceiling, and main instrument panel lights are at their maximum brightness.

Overrides all the other lighting selections, regardless of the position of the AMBIENT LIGHT knob or the MAIN PNL FLOOD LT knob .

ANNUNCIATOR LIGHTS

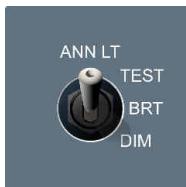
Applicable to: ALL

Annunciator Lights & Controls

The flight crew can adjust the brightness of all annunciator pushbuttons and pushbutton-switches. The flight crew uses the TEST position of the ANN LT sw in order to ensure that the lighting of all annunciators is operative.

ANN LT sw

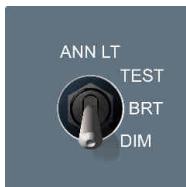
L12



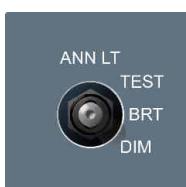
- Turns on the lights of the annunciators pushbuttons and pushbutton-switches
- The numbers 8 appear on each Liquid Crystal Display (LCD s).

The LCD s are:

- The BAT voltage indication on the maintenance panel
- All indications on AFS Control Panel (i.e. SPD or MACH , HDG or TRK , ALT , V/S or FPA)
- The barometric reference on the EFIS Control Panel
- The value of the rudder trim on the pedestal.



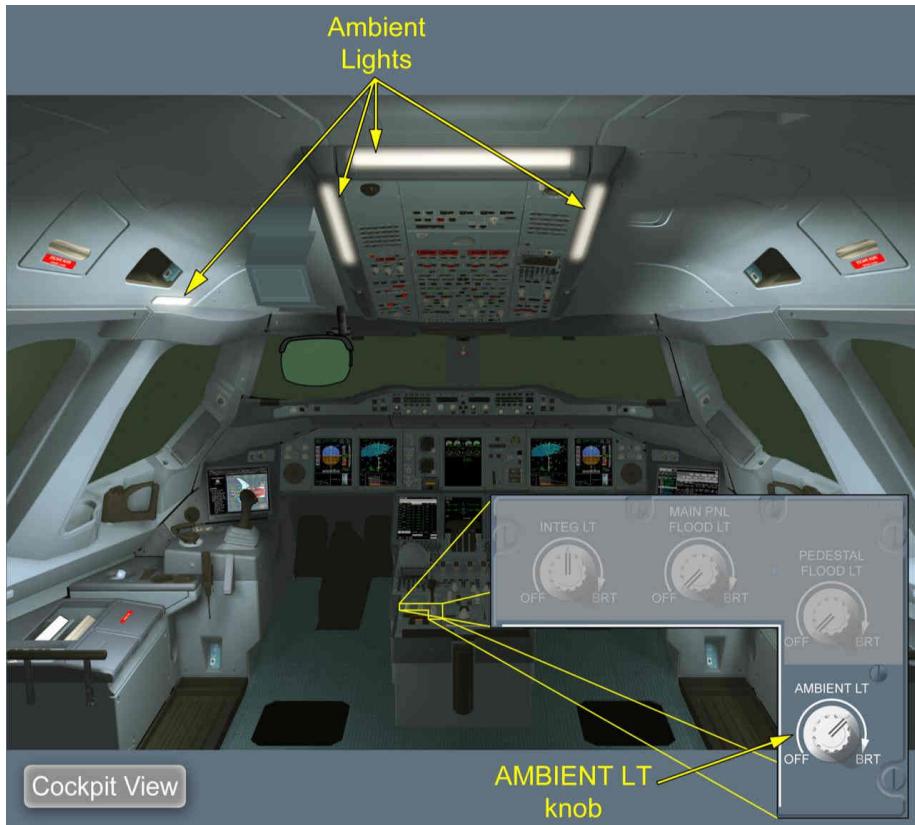
Dims the annunciator lighting.



Annunciator lighting is at its maximum brightness.

AMBIENT LIGHTS

Applicable to: ALL

Ambient Lights & Controls

The overhead panel has ambient lights that provide shadow-free lighting in the cockpit.

[2] There are four light strips, that provide the ambient lighting.

When the aircraft is electrically supplied via ground servicing, only the rear ambient light is available.

L1 AMBIENT Lt knob

Turns the ambient lights on or off, and adjusts their brightness.

INTEGRAL LIGHTS OF THE INSTRUMENT PANEL

Applicable to: ALL

Integral Lights & Controls of the Instrument Panel**Integral Lights
of the Instrument Panel**

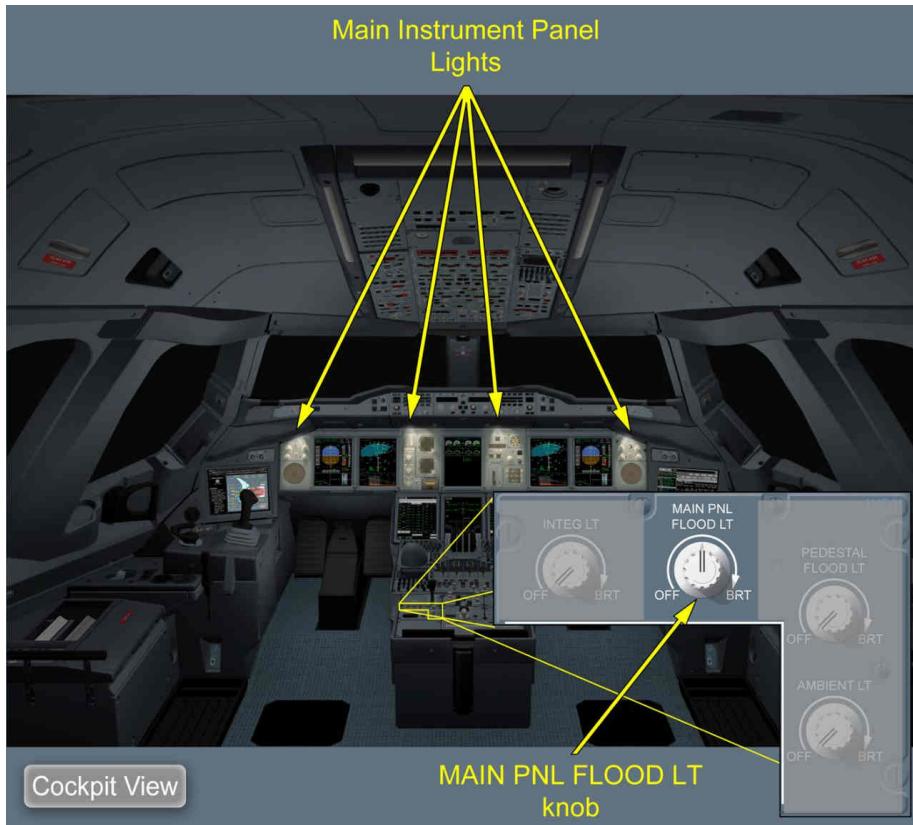
All cockpit panels have integral lighting.

Integ Lt knob

Turns the integral lights of the instrument panels on or off, and adjusts their brightness.

MAIN INSTRUMENT PANEL LIGHTS

Applicable to: ALL

Main Instrument Panel Lights & Controls

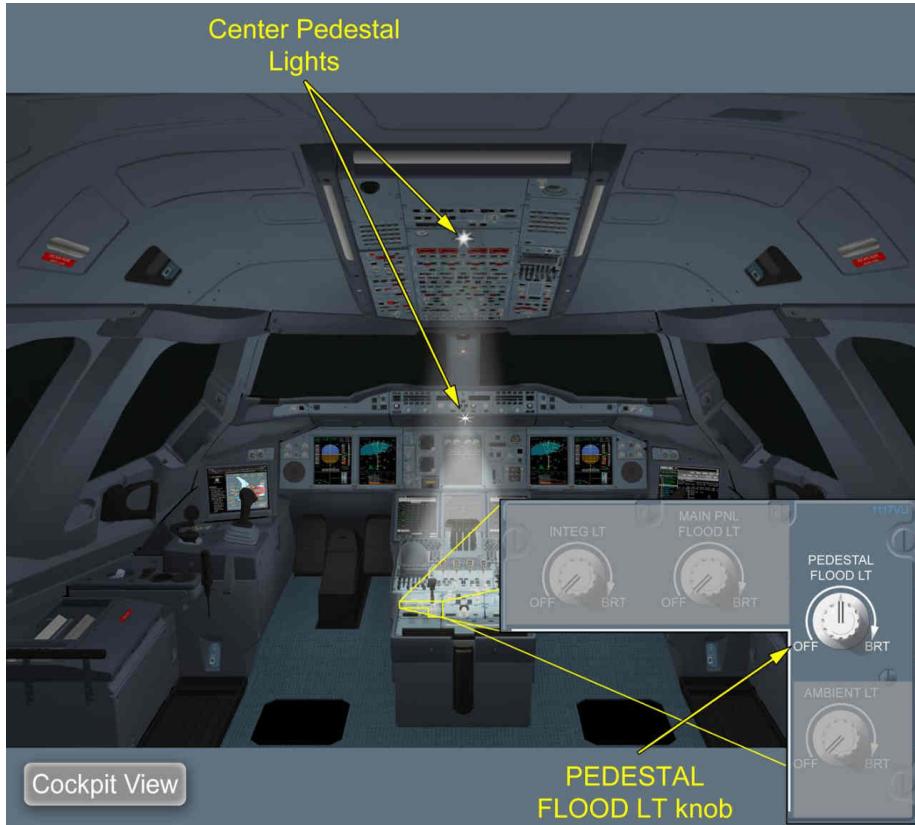
Lights under the glareshield provide lighting for the main instrument panel.

MAIN Pnl FLOOD Lt knob

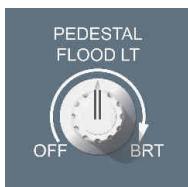
Turns the main instrument panel lights on or off, and adjusts their brightness.

CENTER PEDESTAL LIGHTS

Applicable to: ALL

Center Pedestal Lights & Controls

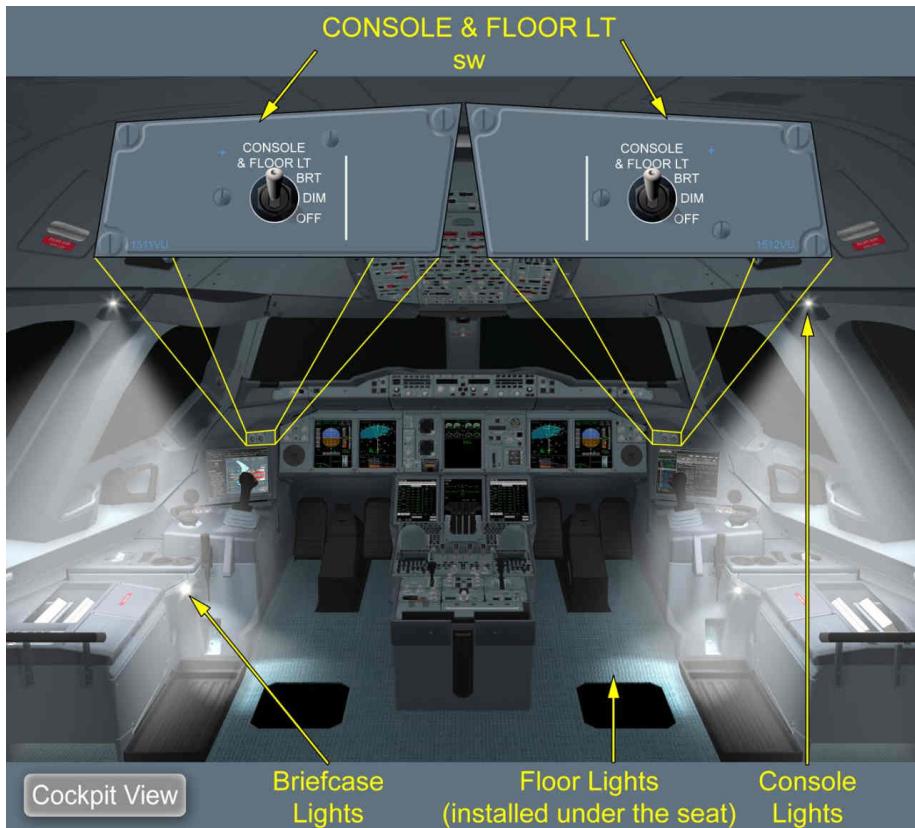
There are lights on the overhead panel and under the glareshield that provide lighting for the center pedestal.

PEDESTAL FLOOD Lt knob

Turns the center pedestal lights on or off, and adjusts their brightness.

CONSOLE, BRIEFCASE, AND FLOOR LIGHTS

Applicable to: ALL

Console, Briefcase, and Floor Lights & Controls

Each flight crew station has:

- Floor area lights, that are under the flight crew seats, and provide lighting for the surrounding floor
- Lateral console lights
- Briefcase lights.

CONSOLE & FLOOR Lt sw

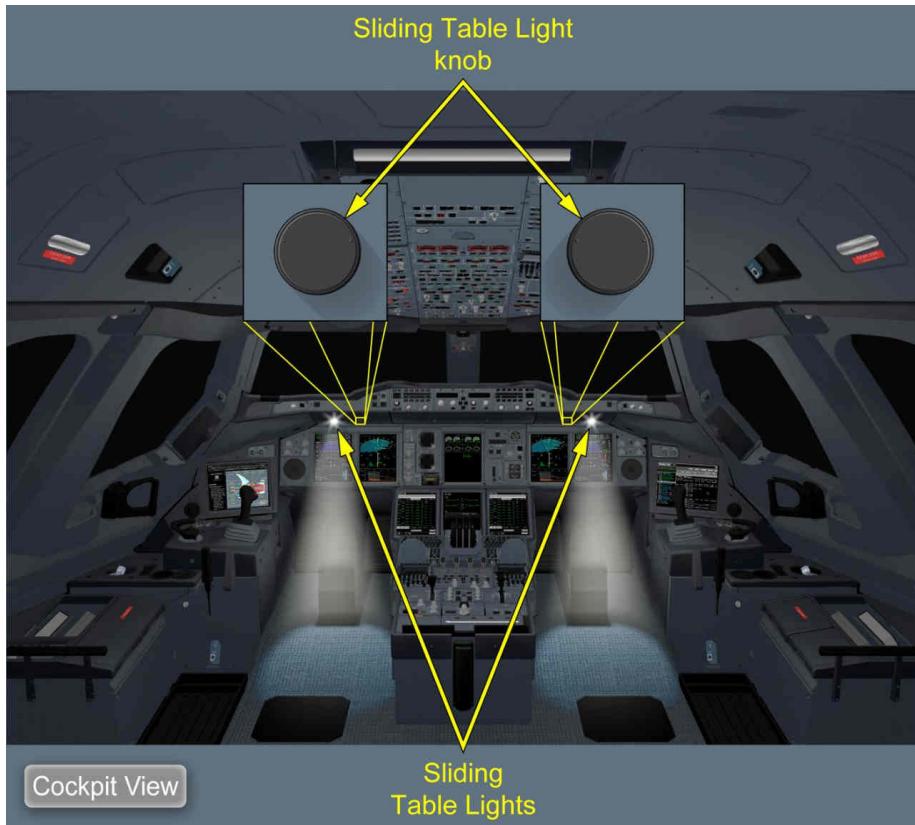
The console, briefcase, and floor lights are at their maximum brightness.



Only the console and briefcase lights are dim. The floor light is turned off.

SLIDING TABLE LIGHTS

Applicable to: ALL

Sliding Table Lights & Controls

There are lights under the glareshield that provide lighting for the flight crew's sliding tables.



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COCKPIT LIGHTS - CONTROLS AND INDICATORS

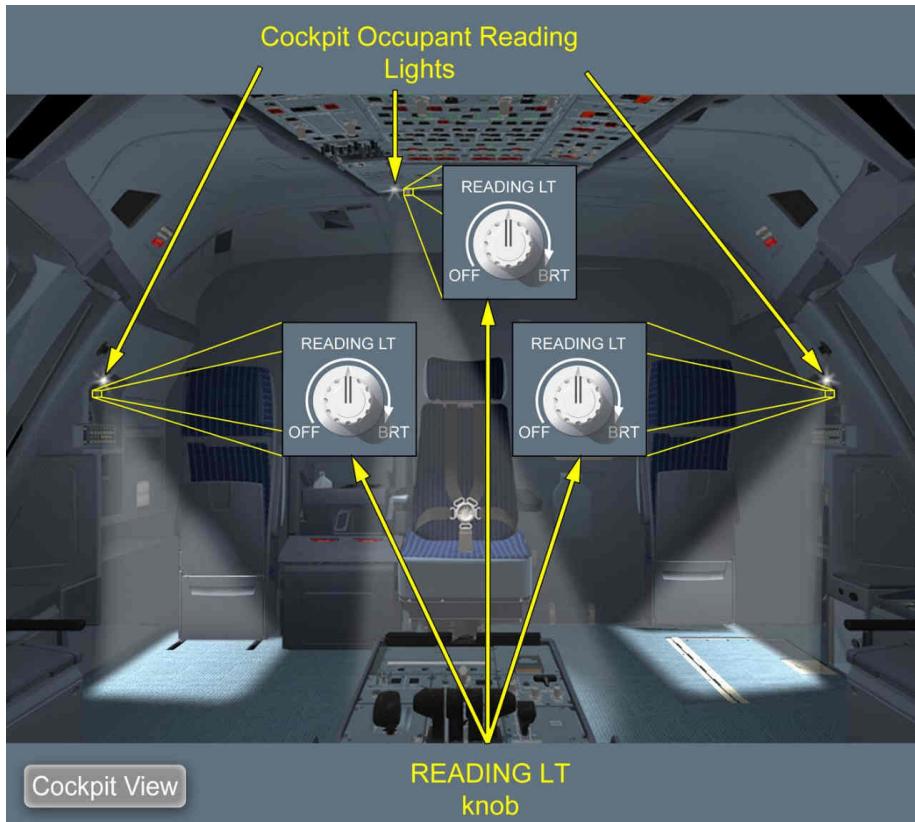
Sliding table Light knob



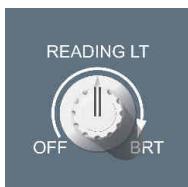
Turns the sliding table light on or off, and adjusts its brightness.

COCKPIT OCCUPANT READING LIGHTS

Applicable to: ALL

Cockpit Occupant Reading Lights & Controls

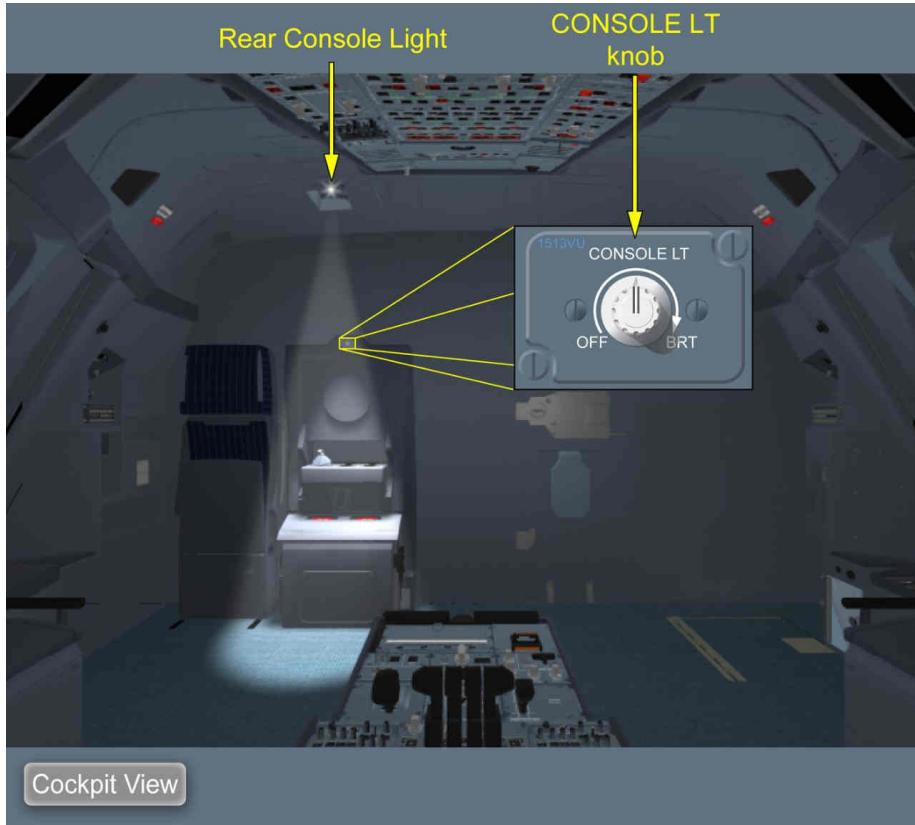
Reading lights are also available for cockpit occupants. In the cockpit, there are three READING LT knob : one for each cockpit occupant.

READING LT knob

Turns the reading light on or off, and adjusts its brightness.

REAR CONSOLE LIGHT

Applicable to: ALL

Rear Console Light & Control

The light on the rear overhead panel provides lighting for the rear console.

CONSOLE LT knob

Turns the rear console light on or off, and adjusts its brightness.

LEFT REAR PANEL

Applicable to: ALL

Left Rear Panel**Cockpit View**

The left rear panel turns on the lighting in the avionics bay, and in the coat stowage.

COAT STWG LT sw

The light in the coat stowage is on.

AVNCS LT sw

The light in the avionics bay is on.



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COCKPIT LIGHTS - CONTROLS AND INDICATORS

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EXTERIOR LIGHTS - SYSTEM DESCRIPTION

GENERAL

Applicable to: ALL

The exterior lights increase visibility around the outside of the aircraft during operations, and improve the flight crew's awareness.

- Exterior lights use either: Lighting Emitting Diodes (LEDs), High Intensity Discharge (HID) or Xenon lamps.



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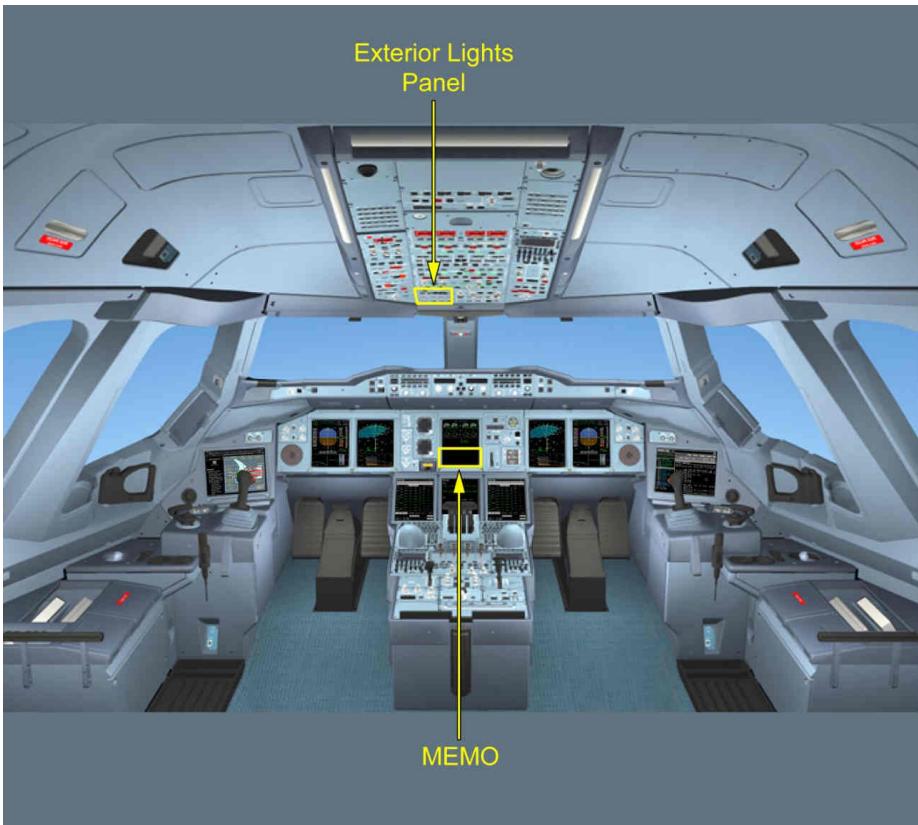
33 - LIGHTS

EXTERIOR LIGHTS - SYSTEM DESCRIPTION

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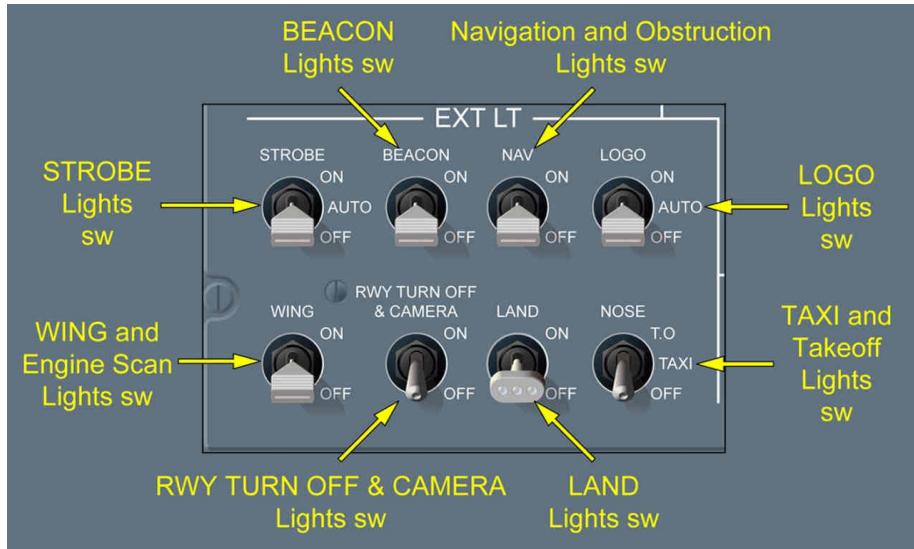
COCKPIT VIEW

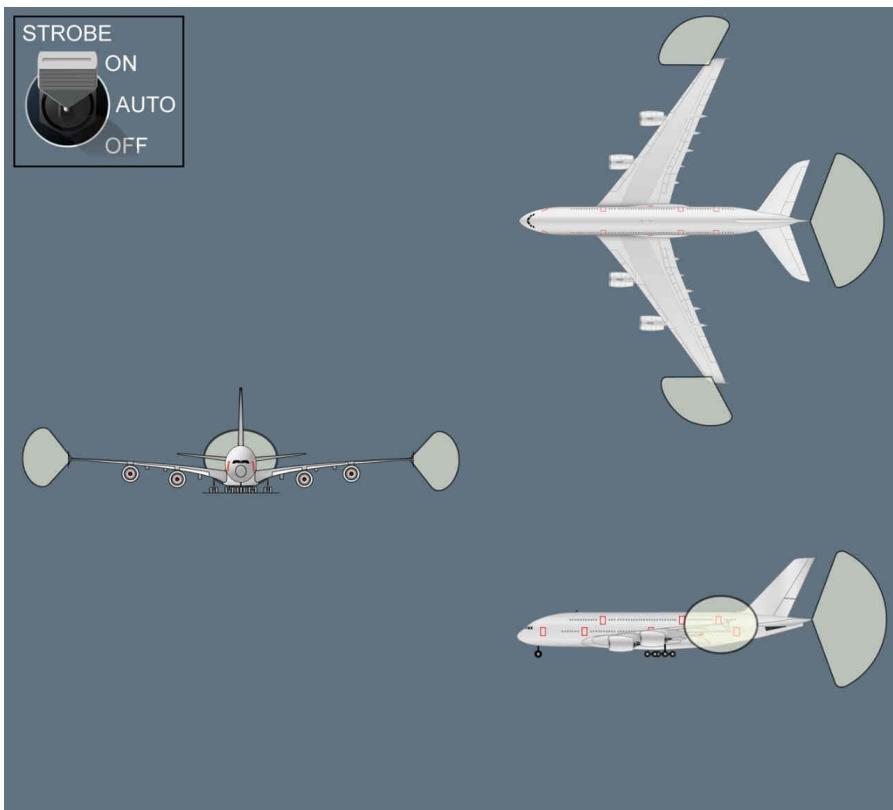
Applicable to: ALL

Cockpit View

EXTERIOR LIGHTS

Applicable to: ALL

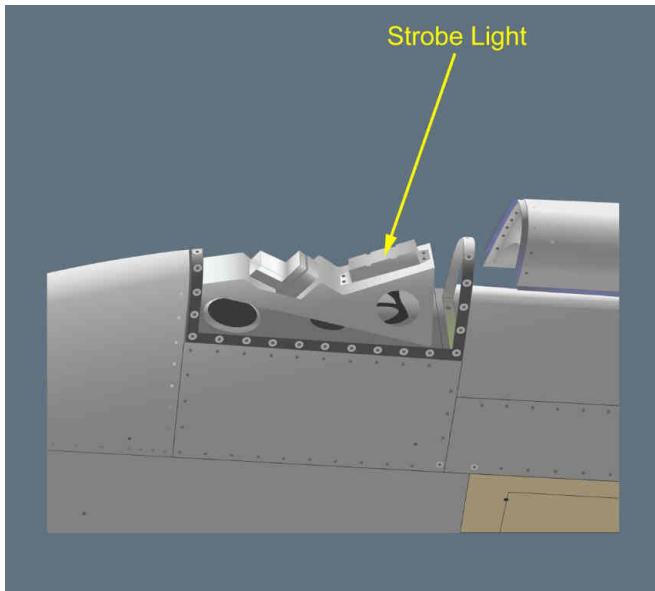
Exterior Lights Overview

STROBE LIGHTSStrobe Lights & Controls

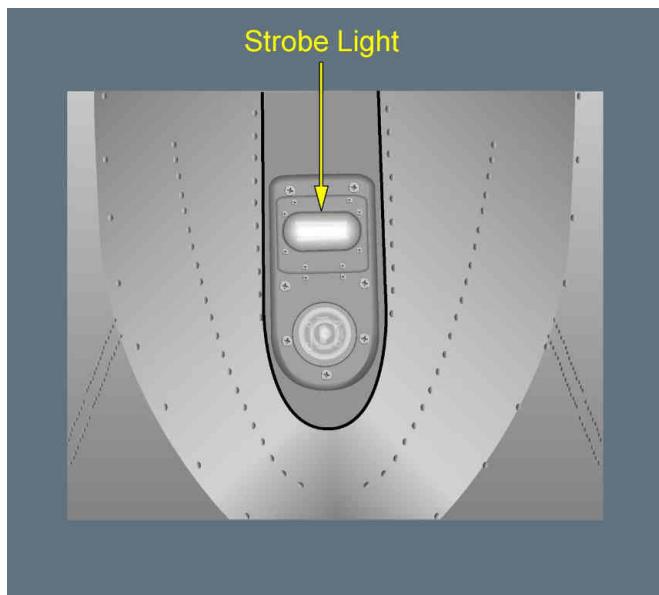
There are three anti-collision strobe lights:

- One on each wing tip

Wing Tip Strobe Light



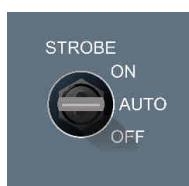
- One on the tailcone.

Tailcone Strobe Light

The strobe lights flash in white alternately with the beacon lights, when both are turned on.

STROBE sw

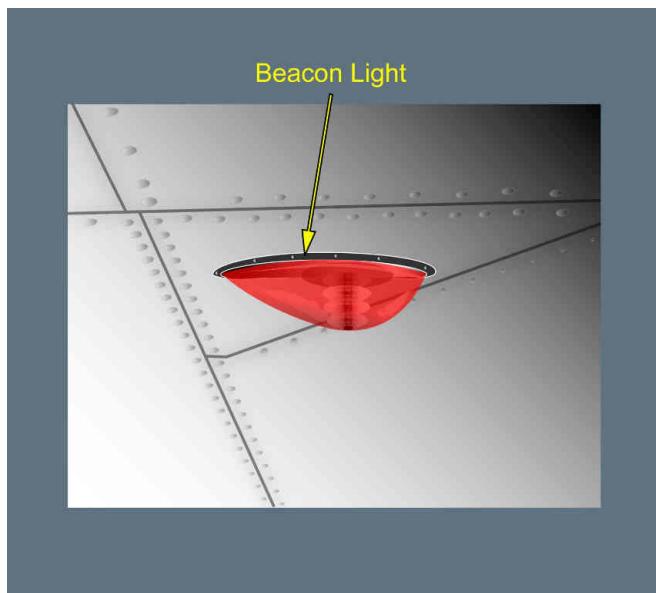
The strobe lights are on.



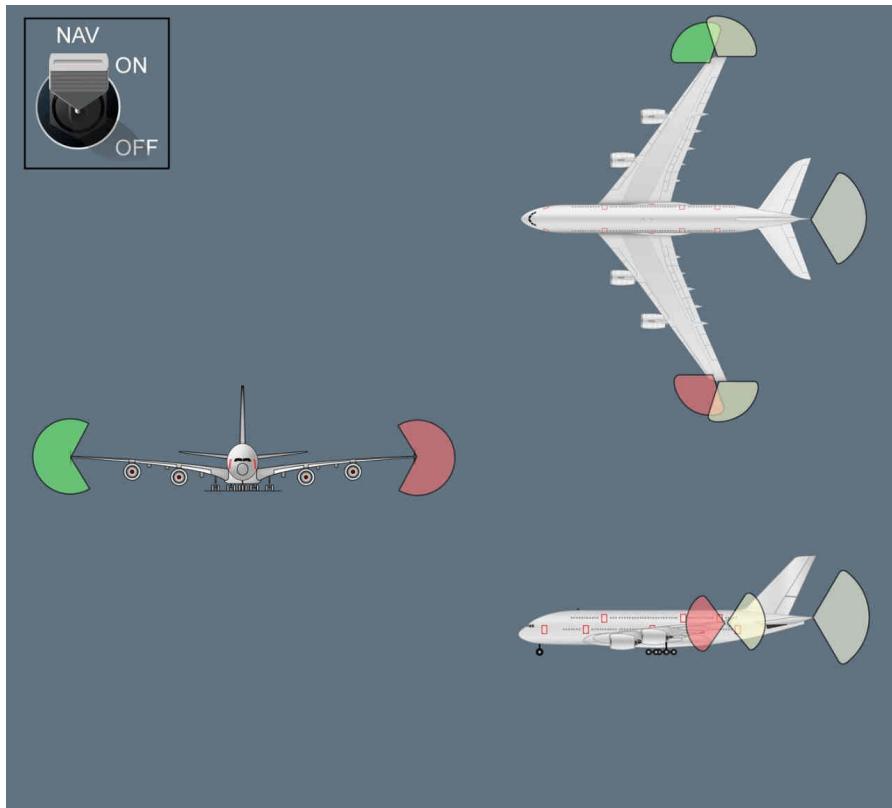
The strobe lights automatically flash in flight.

BEACON LIGHTSBeacon Lights & Controls

There are three antecollision beacon lights: Two on the top of the fuselage, and one under the fuselage.

Beacon Light**BEACON sw**

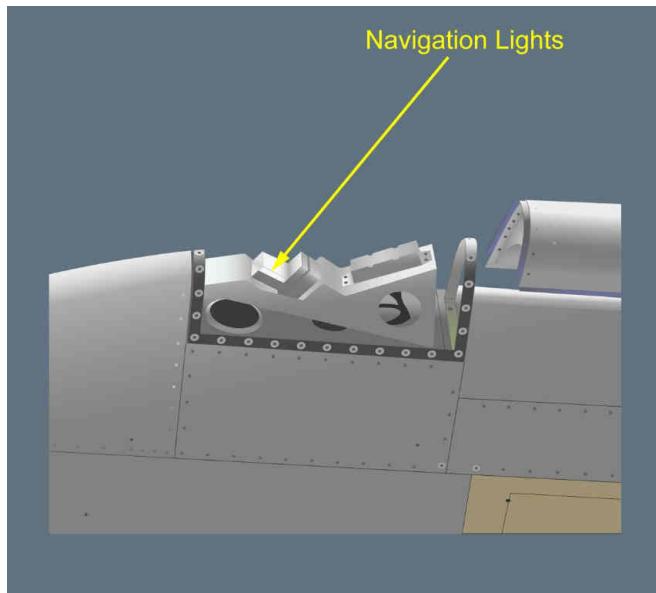
The beacon lights are on, and flash in red. The beacon lights alternate with the strobe lights, if the strobe lights are on.

NAVIGATION AND OBSTRUCTION LIGHTSNavigation and Obstruction Lights & Controls

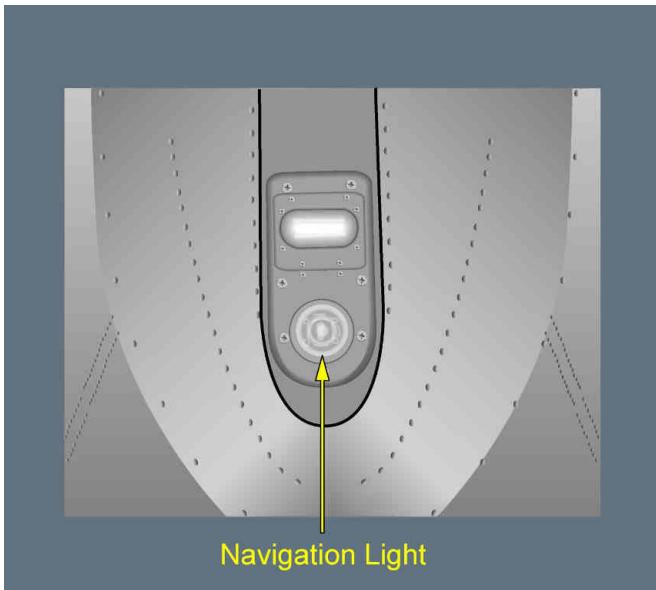
The aircraft has three navigation lights:

- One red navigation light on the left wing tip

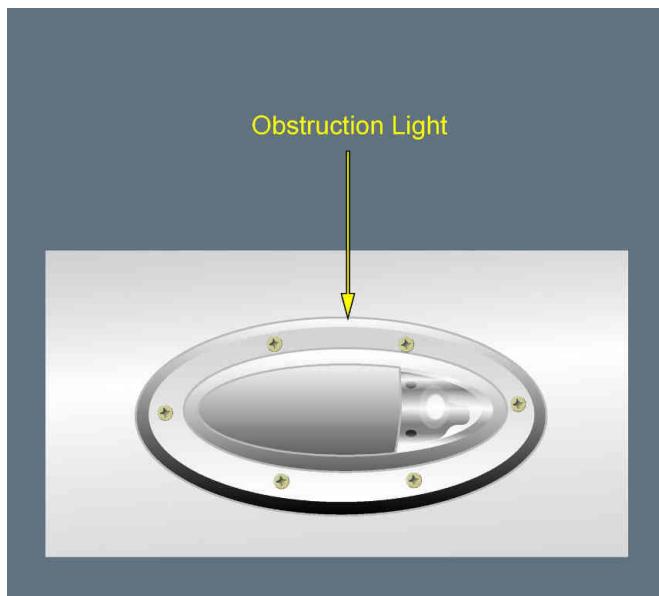
Wing Tip Navigation Light



- One green navigation light on the right wing tip
- One white navigation light on the tail cone.

Tail Cone Navigation Light

The aircraft has two white obstruction lights: One on each wing tip.
The obstruction lights helps distinguishing the aircraft on ground.

Obstruction Lights**NAV sw**

The navigation lights are on.
If the aircraft is on ground, the obstruction lights are also on.

LOGO LIGHTSLogo Lights & Controls

There are two logo lights: One on the upper surface of each horizontal stabilizer. These lights provide lighting on the company logo that is on the tail fin.

LOGO sw

The logo lights are on.



The logo lights come on automatically, when the aircraft is:

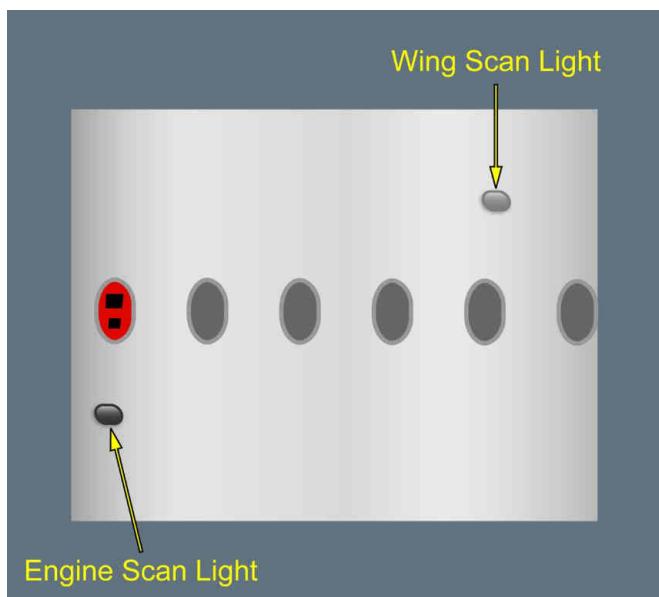
- On ground
- In flight, when the slats are extended.

WING AND ENGINE SCAN LIGHTSScan Lights & Controls

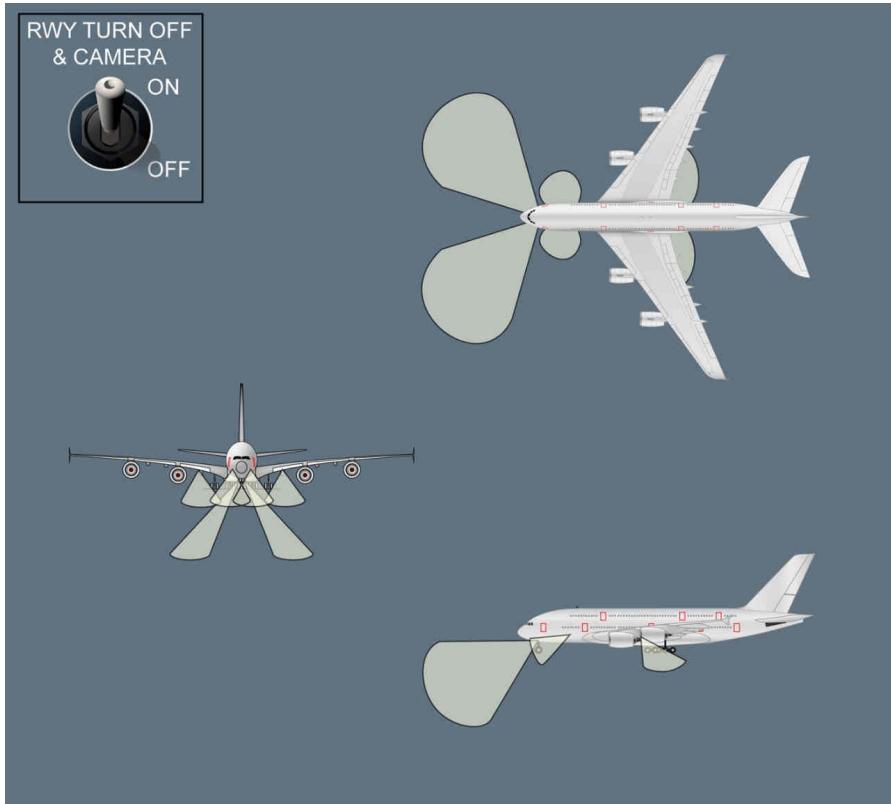
The flight crew is able to visually detect ice accretion, due to scan lights that provide lighting on the wings and engines.

There are two scan lights on each side of the fuselage:

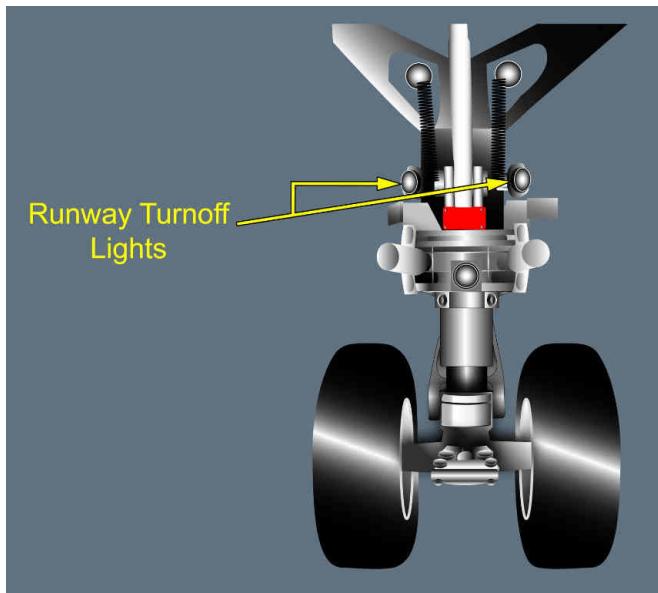
- One that provides lighting on the wing leading edge
- One that provides lighting on the engine air intake.

Wing and Engine Scan Lights**Wing sw**

All scan lights are on.

RUNWAY TURNOFF AND CAMERA LIGHTSRunway Turnoff and Camera Lights & Controls

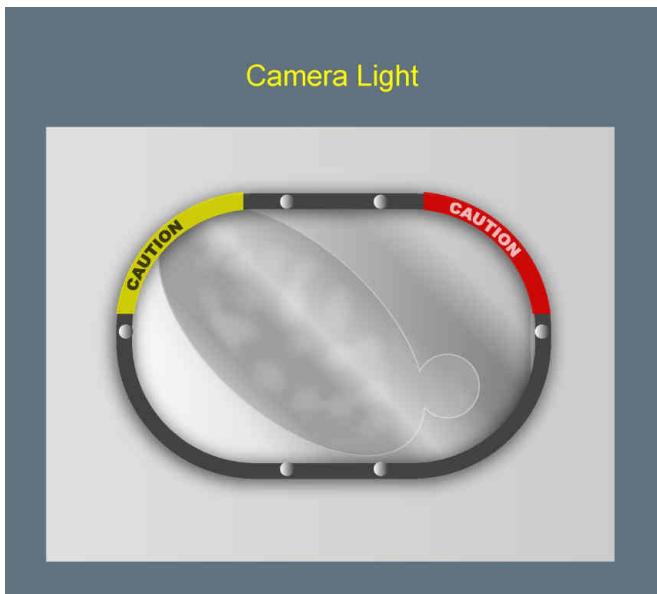
- The aircraft has two runway turnoff lights on the nose landing gear strut, that provide lighting during taxi, and enable the flight crew to detect any obstacle on the runway and on the taxiway

Runway Turnoff Lights

- The aircraft has four camera lights: One camera light on each side of the forward fuselage, and one under each wing.

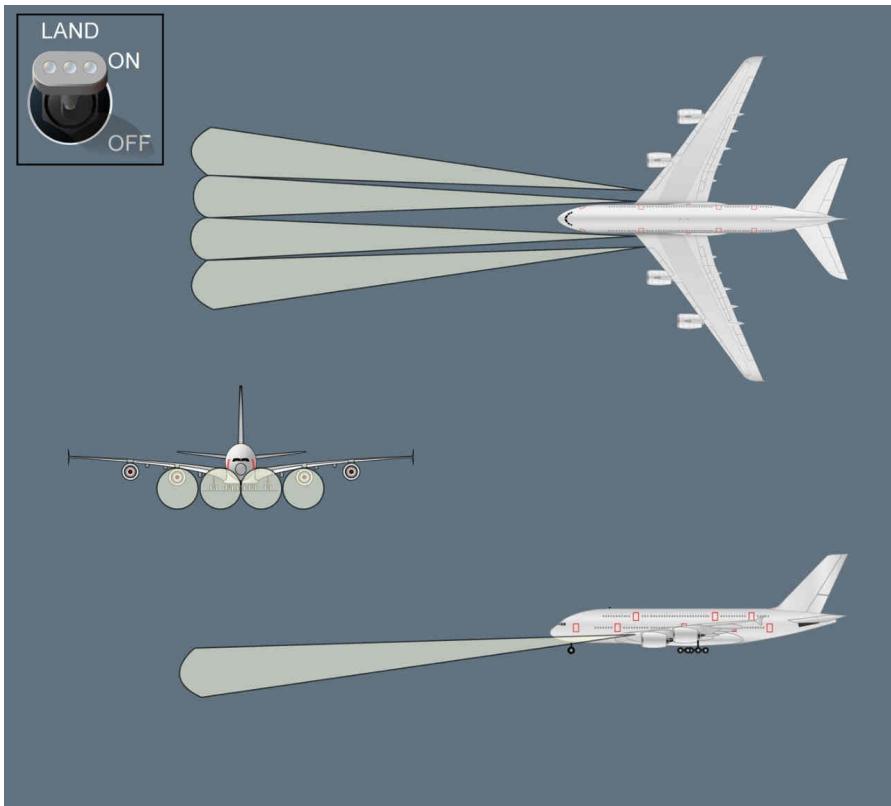
When the flight crew uses the taxi cameras at night, the camera lights provide ground lighting for:

- The nose landing gear
- The main landing gear.

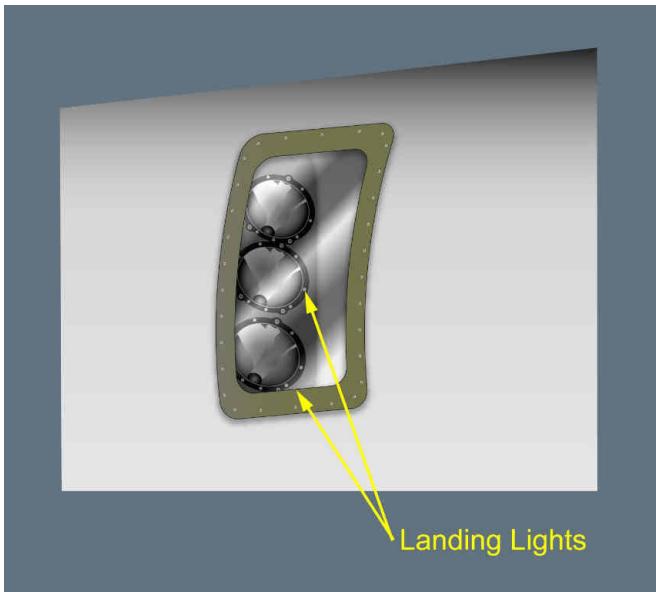
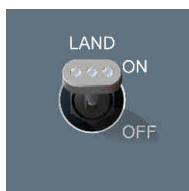
Camera Lights**RWY TURN OFF & CAMERA sw**

On ground:

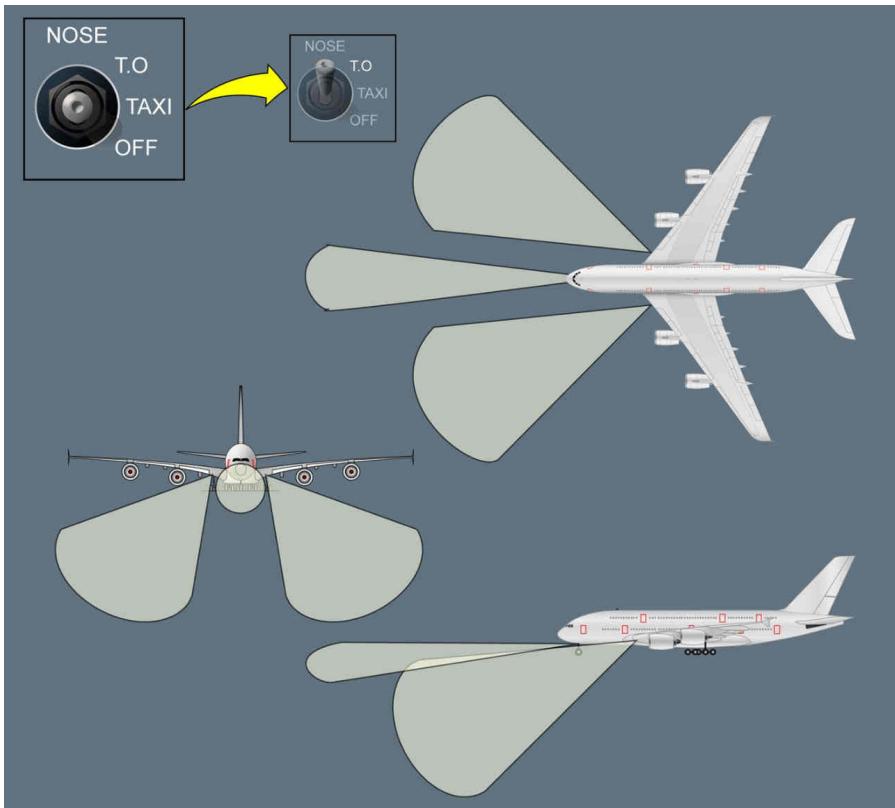
- The runway turnoff lights are on
 - The camera lights are also on, If ETACS is set to ON.
- During takeoff, landing and approach, only the camera lights are on if:
- ETACS is set to ON
 - The nose landing gear is extended.

LANDING LIGHTSLanding Lights & Controls

There are two landing lights near the wing root of each wing leading edge. These lights provide lighting that enables the flight crew to detect any obstacle on the runway.

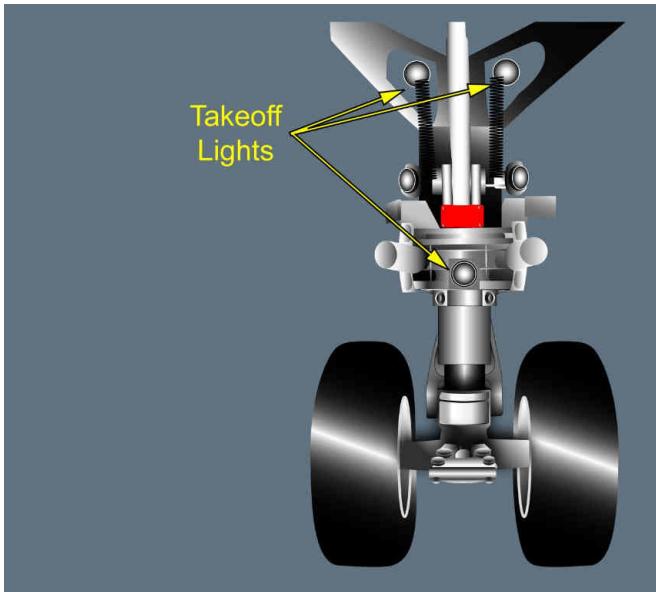
Landing Lights**LAND sw**

The landing lights are on.

TAKEOFF AND TAXI LIGHTSTaxi Lights & Controls

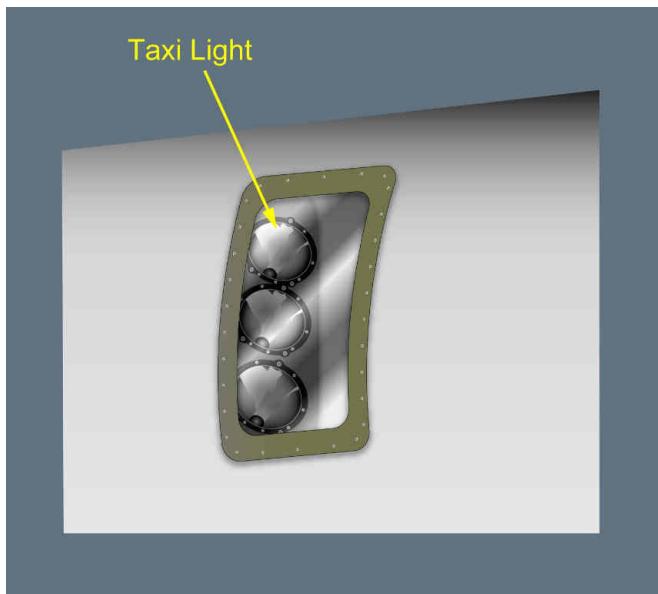
The aircraft has:

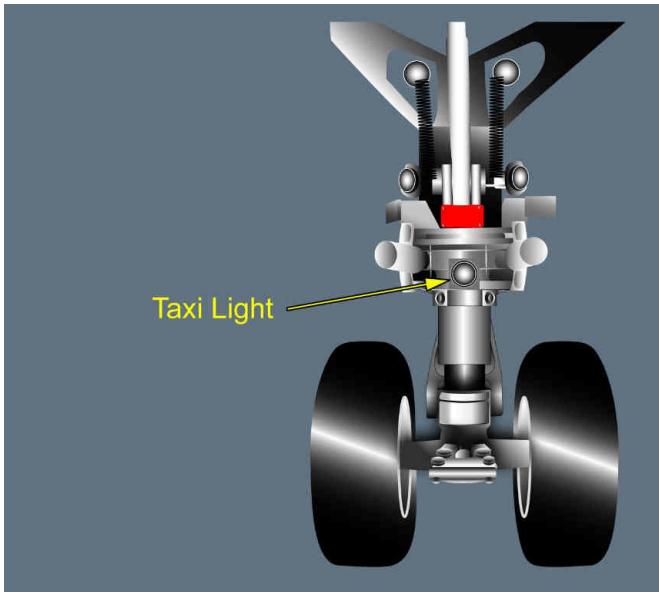
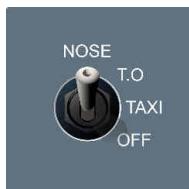
- Three takeoff lights on the nose landing gear strut, that enable the flight crew to detect obstacles on the runway.

Takeoff Lights

- One taxi light, near the wing root of each leading edge, and one taxi light on the nose landing gear strut.

The taxi lights enable the flight crew to detect obstacles on the taxiway.

Taxi Lights on the Wing Root

Taxi Light on the Nose Landing Gear**NOSE sw**

The taxi and the takeoff lights are on.
The light on the nose landing gear goes off automatically, after landing gear retraction.



Only the taxi lights are on.

MEMO

Applicable to: ALL

STROBE LT OFF The aircraft is in cruise, and the STROBE sw is set to OFF.

 Flight phase inhibition:Flight phase inhibition



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EXTERIOR LIGHTS - CONTROLS AND INDICATORS

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EMERGENCY LIGHTS - SYSTEM DESCRIPTION

OVERVIEW

Applicable to: ALL

The emergency lighting has different functions:

- In normal operation or in emergency situation: Shows the way to the exit to leave the aircraft
- In emergency situation: Provides basic illumination if the normal illumination is lost.

The emergency lighting operates independently from the other normal lighting. However some parts of the emergency lighting are integrated in the normal lighting in order to be operative for a normal illumination.

There are emergency lights:

- In the cockpit
Refer to Emergency Lighting in the cockpit
- In the cabin, and on the escape slides.
Refer to Emergency Lighting in the cabin.

The emergency lighting comes on automatically in the cabin, when the electrical power is lost. However, the flight crew can manually turn on the emergency lighting.

EMERGENCY LIGHTING IN THE COCKPIT

Applicable to: ALL

EMERGENCY LIGHTING IN THE COCKPIT

Ambient lights and cockpit way lights provide emergency lighting in the cockpit.

AMBIENT LIGHTS

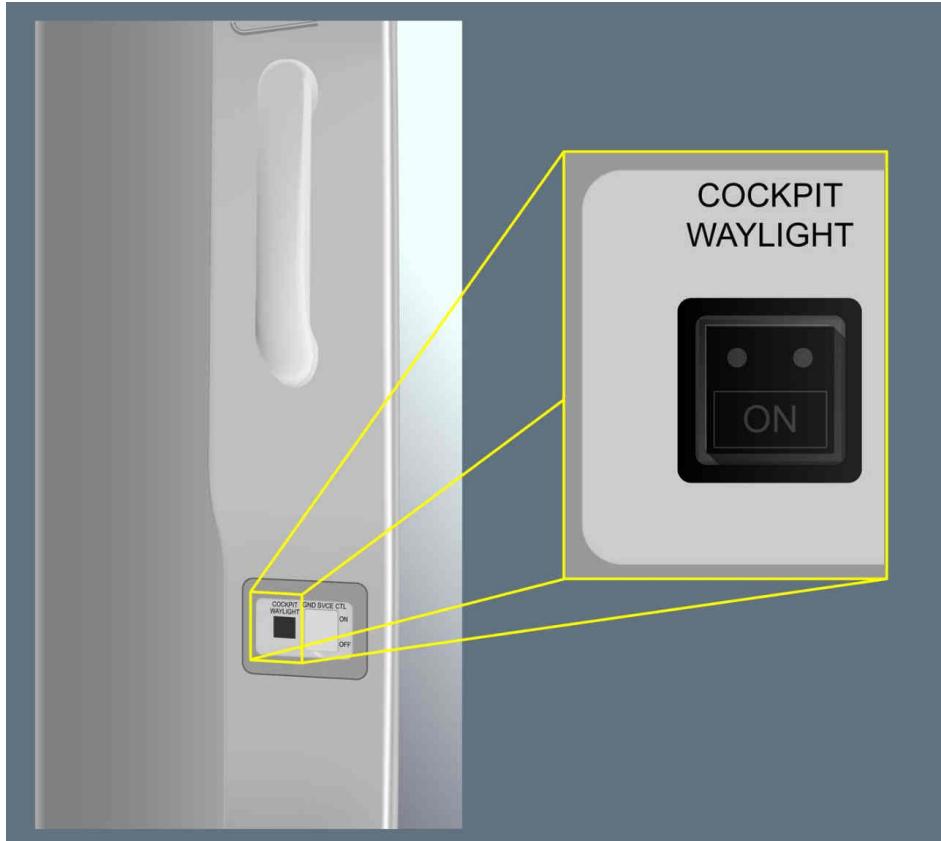
The left and right ambient lights provide emergency lighting in the cockpit, when:

- The aircraft electrical supply comes from the essential power
- The flight crew has set the AMBIENT LT knob to ON.

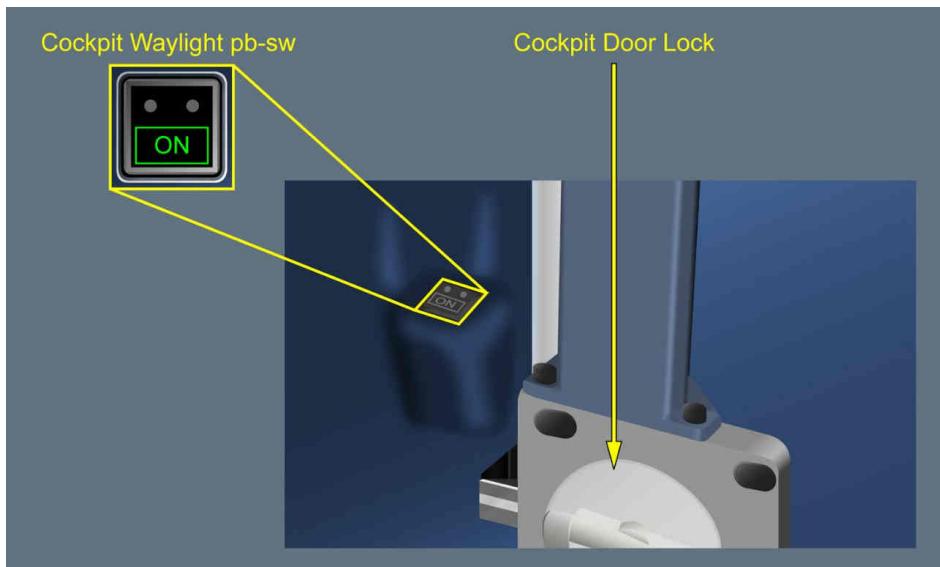
COCKPIT WAY LIGHTS

If the aircraft is not electrically supplied, the flight crew can manually illuminate:

- The way to the cockpit, via the Cockpit Waylight pb-sw, on the main left deck door 1
Cockpit Waylight pb-sw in the cabin



- The way from the cockpit to the deck door, via the Cockpit Waylight pb-sw, near the cockpit door.

Cockpit Waylight pb-sw in the cockpit

A battery supplies the cockpit way light. The cockpit way light goes off automatically after 60 s. The flight crew can turn on the cockpit way light a maximum of ten times, before the first engine start.

EMERGENCY LIGHTING IN THE CABIN

Applicable to: ALL

COMPONENT DESCRIPTION

Emergency lighting is provided in the cabin by:

- The floor path marking
- The exit signs
- The staircase emergency lights
- The overhead emergency lights
- The door lights and slide lights.

All emergency lighting components use Light Emitting Diodes (LEDs).

FLOOR PATH MARKING

The floor path marking will guide passengers to the nearest emergency exit in the event that the overhead emergency lighting and exit signs are no longer visible (e.g. by smoke).

The floor path marking includes:

- Floor path marking lights

The floor path marking lights are:

- On the side of the seats
- On the monuments: Galleys, stowage, partitions, and lavatories.
- Exit identifiers.

The exit identifier provides illumination of the floor near the door and will provide the exit indication in the event that the exit marker is no longer visible.

The exit identifier is visible by an EXIT caption on the bottom of each upright exit door.

EXIT SIGNS

The aircraft has different exit signs:

- Exit locators, that indicate the location of the exit areas
The exit signs are on the cabin ceiling, in order to be visible throughout the aisles.
- Exit markers, that indicate the position of the doors
They are directly above the emergency exits.
- Additional exit signs, in front of the stairwell, that guide passengers out of the staircases.

STAIRCASE EMERGENCY LIGHTS

The staircase emergency lights are installed under each step in order to provide lighting in the stairwells.

OVERHEAD EMERGENCY LIGHTS

There are ceiling lights and spotlights that provide lighting for the aisles, the entry areas, and the cross-aisles of both decks.

DOOR LIGHTS AND SLIDE LIGHTS

The emergency doors M3R and M3L, that are located above wings, have emergency door lights. The emergency door lights provide lighting for the area of the wing where the evacuating passengers make their first step outside the cabin, in the case of an aircraft evacuation.

Each slide has slide lights that provide lighting for the escape slides and the area in front of the slide.



OPERATION

The emergency lighting system can be controlled from:

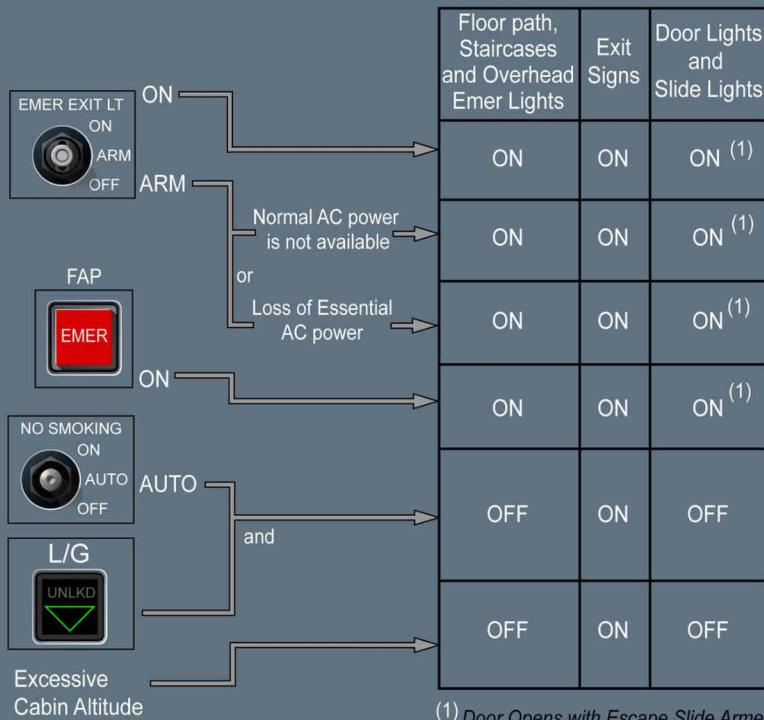
- The cockpit via the EMER EXIT LT sw on the overhead panel, or
- The cabin via the Flight Attendant Panels (FAPs).

All emergency lights automatically come on, when:

- The flight crew sets the EMER EXIT LT sw to ARM, and
- All Normal AC power (i.e. ENG GENs, APU GENs, EXTs) is not available, or
- The Essential AC power (i.e. the normal AC is lost and the RAT does not deliver power) is lost.

L2 Other cases could also automatically turn on a part of emergency lighting (i.e. the door and slide lights, or the exit signs):

- Door and slide lights automatically come on:
 - If the EMER EXIT LT sw is set to ON, or ARM, and
 - As soon as the door is open with the escape slide armed.
- Regardless of the position of the EMER EXIT LT sw, the exit signs automatically come on:
 - If the NO SMOKING sw is set to AUTO, and the landing gears are extended, or
 - In the case of excessive cabin altitude.



ELECTRICAL SUPPLY

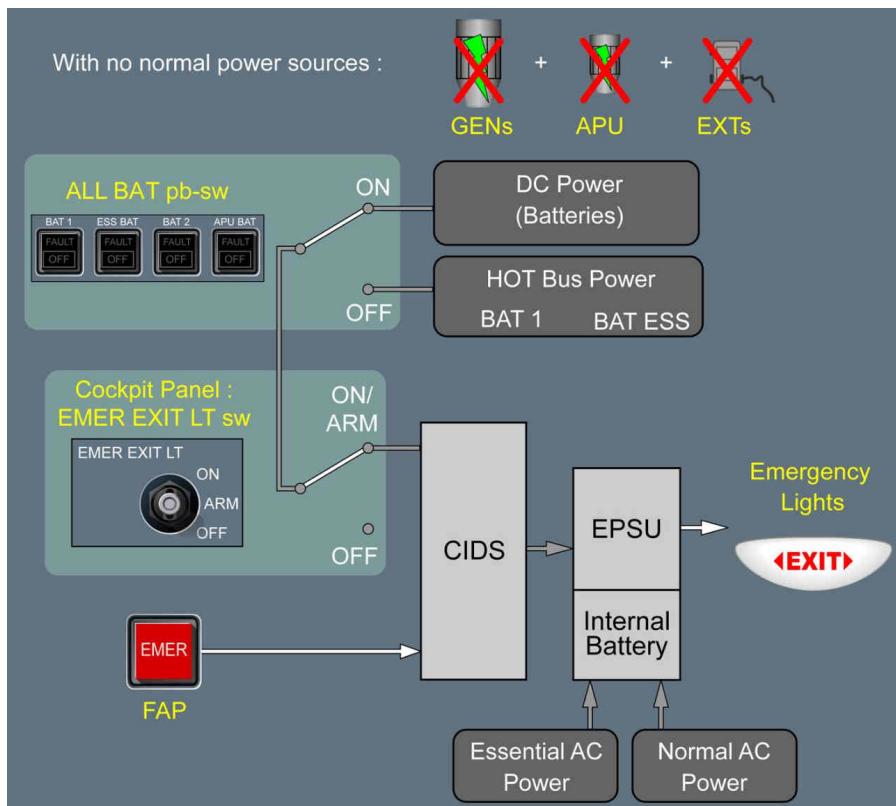
The emergency lighting system of the cabin has an independent power supply: The Emergency Power Supply Units (EPSUs).

- [L2] The EPSUs are the control center of the emergency light system and they are the interface between the emergency lights and the Cabin Intercommunication Data System (CIDS).
- [L1] Several Emergency Power Supply Units (EPSUs) supply all emergency lighting.
- [L2] Each EPSU controls the power supply of the group of emergency lights (e.g. door emergency lights).
- [L3] For redundancy purposes, several emergency lighting components are connected to two EPSUs.
- [L2] When the normal AC power is lost, the essential AC power supplies the emergency lighting system, via the EPSU.

- [L1] When the essential and the normal ACs power are lost, EPSU batteries automatically take over the power supply of the emergency lights.
- [L2] The EPSU batteries enable to supply the emergency lights for at least 10 min.
The EPSU batteries are permanently connected to the electrical network. Therefore the EPSU batteries charge when the Normal AC or the Essential AC is available.
- [L3] When the EMER EXIT LT sw is set to ON or ARM and if the essential and the normal ACs power are lost, the emergency lights come on. In this case:
 - The aircraft batteries (BAT 1, BAT 2, ESS BAT) supply the CIDS

Note: If all BAT pb-sw are set to OFF, the HOT bus (i.e. BAT 1 and ESS BAT) takes over the power supply of the CIDS.

 - The EPSU batteries supply the emergency lighting.



When only the aircraft batteries supply the aircraft, if the NO SMOKING sw is set to AUTO and the landing gears are extended, the exit signs come on. In this case:

- The aircraft batteries (BAT 1, BAT 2, ESS BAT) supply the CIDS
- The EPSU batteries supply the exit signs.

Note: *If all BAT pb-sw are set to OFF, the exit signs do not come on because the CIDS is not supplied.*

COCKPIT VIEW**Applicable to: ALL**

The cabin crew can also manually activate the emergency lights in the cabin, via the EMER ON sw that is on the Flight Attendant Panels (FAP).

Cockpit View

CABIN EMERGENCY LIGHTS

Applicable to: ALL

Emergency Lights OverviewEMER EXIT LT sw

The cabin emergency lights are on.



The cabin emergency lighting system is on standby. In the case of an AC essential or normal power failure, the emergency lights come on automatically in the cabin.

EMERGENCY LIGHTS ANNUNCIATOR

The cabin emergency lighting system is off.



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EMERGENCY LIGHTS - ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

CABIN EMER EXIT LT FAULT (*Refer to procedure*)



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EMERGENCY LIGHTS - ECAM ALERTS

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SIGNS - SYSTEM DESCRIPTION

GENERAL

Applicable to: ALL

The flight crew can turn on the FASTEN SEAT BELT signs and the NO SMOKING signs in the cabin, from the signs panel in the cockpit.

The FASTEN SEAT BELT signs come on automatically in the cabin, when:

- The landing gear is extended, or
- The slats are extended, or
- The cabin altitude is excessive.

The NO SMOKING signs come on automatically in the cabin, when:

- The landing gear is extended, or
- The cabin altitude is excessive.



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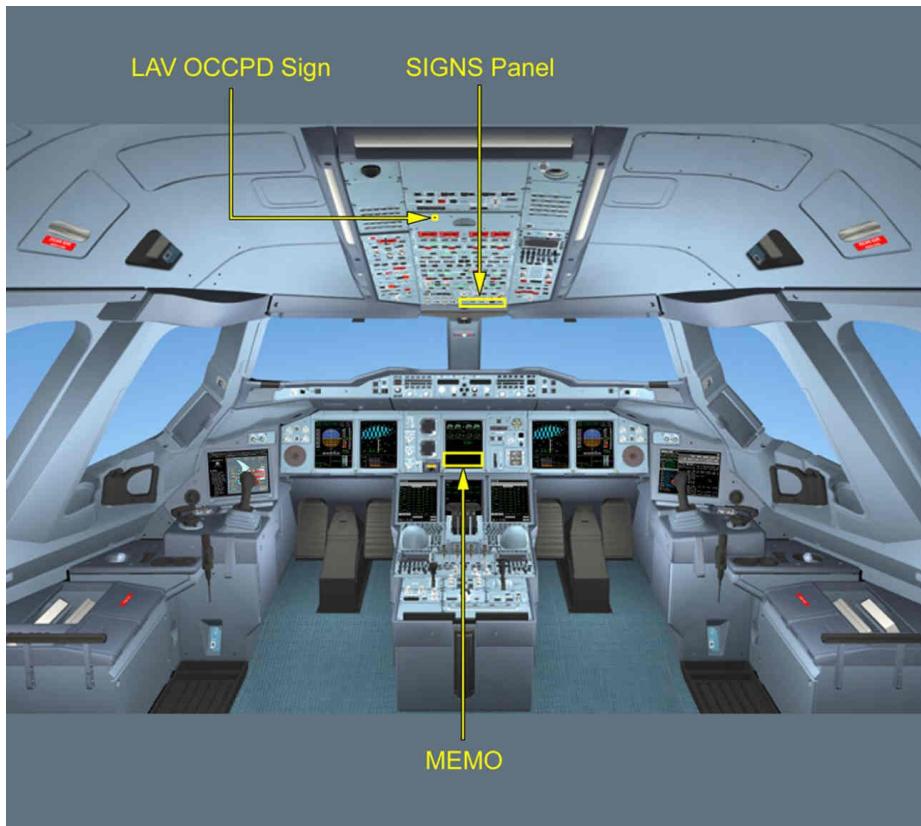
33 - LIGHTS

SIGNS - SYSTEM DESCRIPTION

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COCKPIT VIEW

Applicable to: ALL

Cockpit View

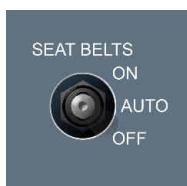
SIGNS

Applicable to: ALL

Signs Controls Overview**SEAT BELTS sw**

The FASTEN SEAT BELT signs and the RETURN TO SEAT signs come on in the cabin.

An associated low tone chime sounds in the cabin.



The FASTEN SEAT BELT signs and the RETURN TO SEAT signs come on automatically in the cabin, when:

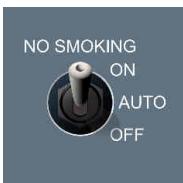
- The slats are extended, or
- The main landing gear is extended.

An associated low tone chime sounds in the cabin.



The FASTEN SEAT BELT signs and the RETURN TO SEAT signs go off in the cabin.

Depending on the CIDS programming, an associated low tone chime sounds in the cabin.

NO SMOKING sw

The NO SMOKING signs and the EXIT signs come on in the cabin.
An associated low tone chime sounds in the cabin.



The NO SMOKING signs and the EXIT signs come on automatically in the cabin, when:

- The slats are extended, or
- The main landing gear is extended.

An associated low tone chime sounds in the cabin.



The NO SMOKING signs and the EXIT signs go off in the cabin.
Depending on the CIDS programming, an associated low tone chime sounds in the cabin.

Note: In the case of excessive cabin altitude (i.e. if the cabin altitude exceeds the maximum of: 9 550 ft and the landing field elevation + 1 000 ft), then the NO SMOKING signs, the FASTEN SEAT BELT signs, and the EXIT signs come on in the cabin, regardless of the position of the SEAT BELT sw and of the NO SMOKING sw.

LAV OCCPD SIGN

Applicable to: ALL



Illuminates when the lavatory located near the forward left exit is occupied.



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SIGNS - CONTROLS AND INDICATORS

MEMO

Applicable to: ALL

L12

SEAT BELTS The flight crew sets the SEAT BELTS sw to ON.
During take-off (flight phase 2) or landing (flight phases 9 or 10), the SIGNS ON MEMO replaces the SEAT BELTS MEMO.

L12

NO SMOKING The flight crew sets the NO SMOKING sw to ON.
During take-off (flight phase 2) or landing (flight phases 9 or 10), the SIGNS ON MEMO replaces the NO SMOKING MEMO.



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ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Subsystem | Electrical Supply |
|----------------|---|---|
| Cockpit Lights | Flight Crew Reading Lights | Left Side: DC 1 Right Side: DC 2 |
| | Map Holder Lights | Left Side: DC 1 Right Side: DC 2 |
| | STBY Compass | DC-ESS |
| | Ice Indicator | DC 1 |
| | Pilot Eye Reference Light | DC 1 |
| | Annunciators | DC 1, DC 2 & DC-ESS |
| | Integral Lights of the Instrument Panel | DC 1 & DC 2 |
| | Ambient Lights | Left Strips: DC-ESS Right Strip: DC-ESS Aft Strip: DC 2 |
| | Center Pedestal Lights | DC 1 |
| | Console, Briefcase, and Floor Lights | Left Side: DC 1 Right Side: DC 2 |
| | Sliding Table Lights | Left Side: DC 1 Right Side: DC 2 |
| | Cockpit Occupant Reading Lights | Third Occupant: DC 1 Fourth Occupant: DC 2 Fifth Occupant: DC 1 |
| | Third Cockpit Occupant Console Light | DC 2 |

Continued on the following page



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ELECTRICAL SUPPLY

Continued from the previous page

| System | Subsystem | Electrical Supply |
|------------------|---------------------------------|--|
| Exterior Lights | Strobe Lights | Wing Tip: AC 2 Tail Cone: AC 4 |
| | Beacon Lights | Upper Fuselage: AC 4 Lower Fuselage: AC 2 |
| | Navigation & Obstruction Lights | AC 3 |
| | Logo Lights | AC 3 & AC 4 |
| | Wing Scan Lights | Left Side: AC 2 Right Side: AC 4 |
| | Engine Scan Lights | Left Side: AC 2 Right Side: AC 4 |
| | Runway Turnoff Lights | AC 2 |
| | Camera Lights | Under Wings: L/G AC 3 Left Fwd fuselage: AC 2 Right Fwd fuselage: AC 4 |
| | Landing Lights | Left Side: AC 2 Right Side: AC 3 |
| | Takeoff Lights | AC 4 |
| | Taxi Lights | Left Wing: AC 2 Right Wing: AC 4 Nose L/G: AC 4 |
| Emergency Lights | | AC-ESS, DC-ESS & EPSU |
| Signs | | AC 1 & AC 2 |

AIRCRAFT SYSTEMS

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STANDBY INSTRUMENTS - OVERVIEW

OVERVIEW

Applicable to: ALL

In addition to the PFD and ND, the standby instruments provide an independent source of information for:

- Air data and inertial reference parameters
- Navigation information.

The standby instruments consist of:

- Two Integrated Standby Instruments Systems (ISIS), located at the center of the instrument panel:
 - One ISIS is used as the Standby Flight Display (SFD)
 - The other ISIS is used as the Standby Navigation Display (SND).
- One standby compass.

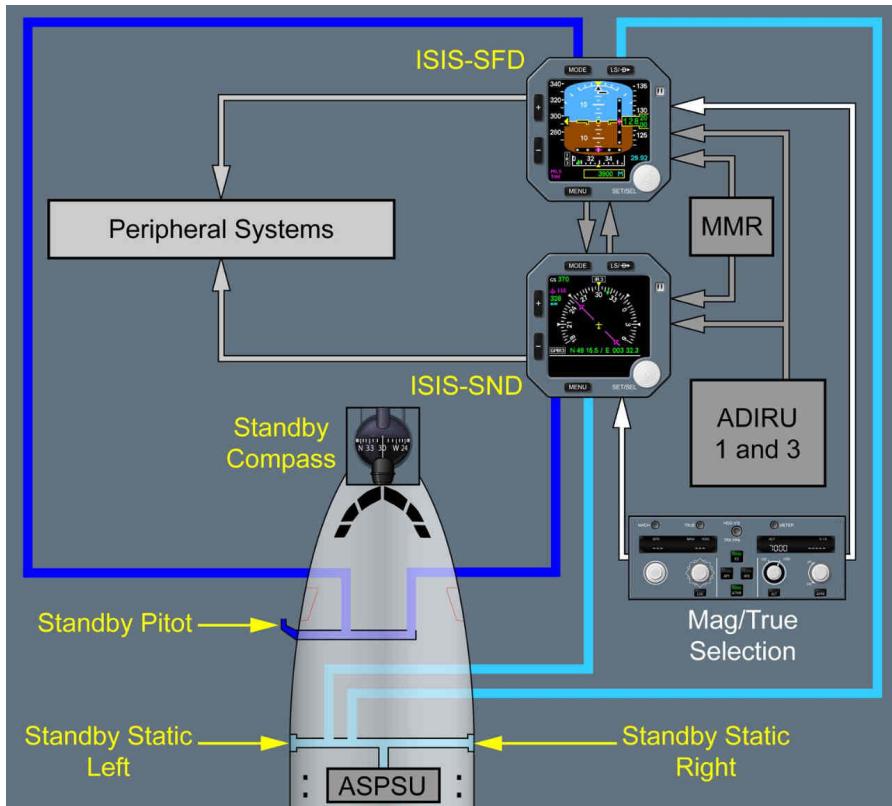
Each ISIS can be either SFD, or SND. It is not possible to display two SFDs, or two SNDs at the same time. One SFD is always displayed.

Both ISIS are connected to fully independent probes:

- One standby pitot probe
- Two standby static probes.

ARCHITECTURE

Applicable to: ALL

ARCHITECTUREArchitecture**MMR**

ISIS receives GPS data from MMR1.

L3

- Ground speed,
- Latitude and Longitude,
- True track.

ADIRU

ADIRU 1 and 3 provide navigation information to ISIS.

- Heading,
- Track,
- Ground speed,
- Latitude,
- Longitude.

PERIPHERAL SYSTEMS

PRIM s

ISIS provides air data parameters to the PRIM s.

- The PRIM s use air data parameters from ISIS for air data monitoring.
For information on air data monitoring by PRIM, *Refer to ADIRS/ADR Monitoring by PRIM .*

ASPSU

Standby static probes provide the Autonomous Standby Power Supply Unit (ASPSU) with differential pressure for door management.

For information on ASPSU , *Refer to Doors/Other Doors/Architecture .*

INDEPENDENT STANDBY INSTRUMENT SYSTEM (ISIS)

There are two ISIS , one Standby Flight Display (SFD) and one Standby Navigation Display (SND).

Each ISIS can be SFD or SND.

- ISIS uses fully segregated standby probes to compute air data parameters.
ISIS SFD uses internal gyrometers to compute aircraft attitude.

ISIS PROBES

ISIS has dedicated probes, which are independent from the probes used by the ADIRS:

- One pitot probe on the left part of the fuselage, and
- Two static probes, one on each side of the fuselage.

mag / true pb

The selection of true or magnetic reference using the MAG / TRUE pb also modifies SNS and SFD display.

For more information on MAG /TRUE pb , *Refer to DSC-22-FG-80-20-B TRUE/MAG pb .*

STANDBY COMPASS

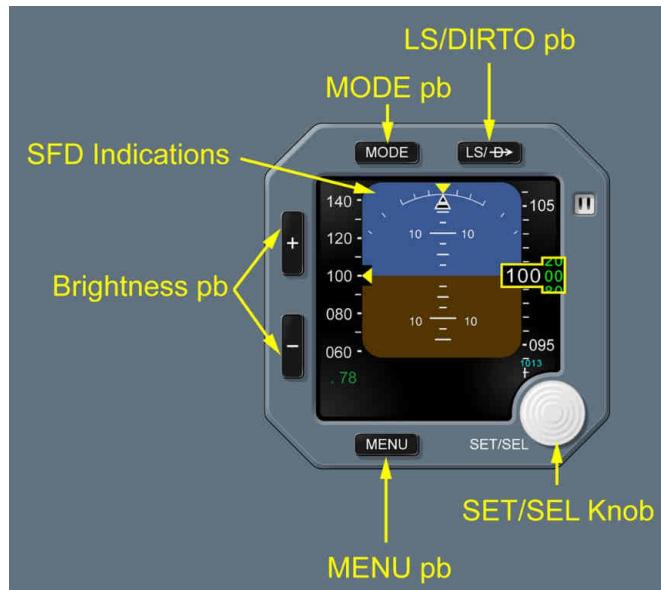
The standby compass is on top of the windshield center post.

The deviation card is above it.

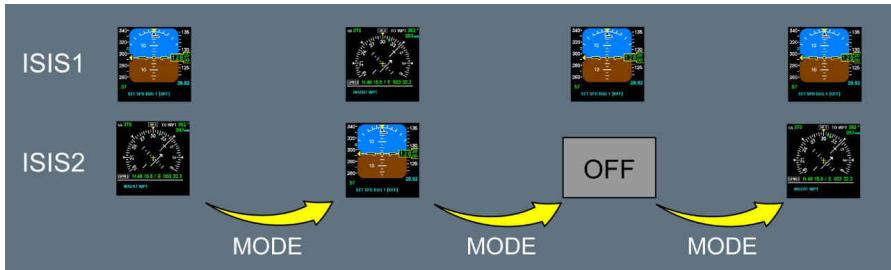
- [2] The deviation card enables to correct the value read on the standby compass in order to obtain the magnetic heading of the aircraft.

SFD Overview**SFD OVERVIEW**

Applicable to: ALL

SFD generalmode pb

enables to switch from SFD to SND display or to switch off the corresponding standby display.

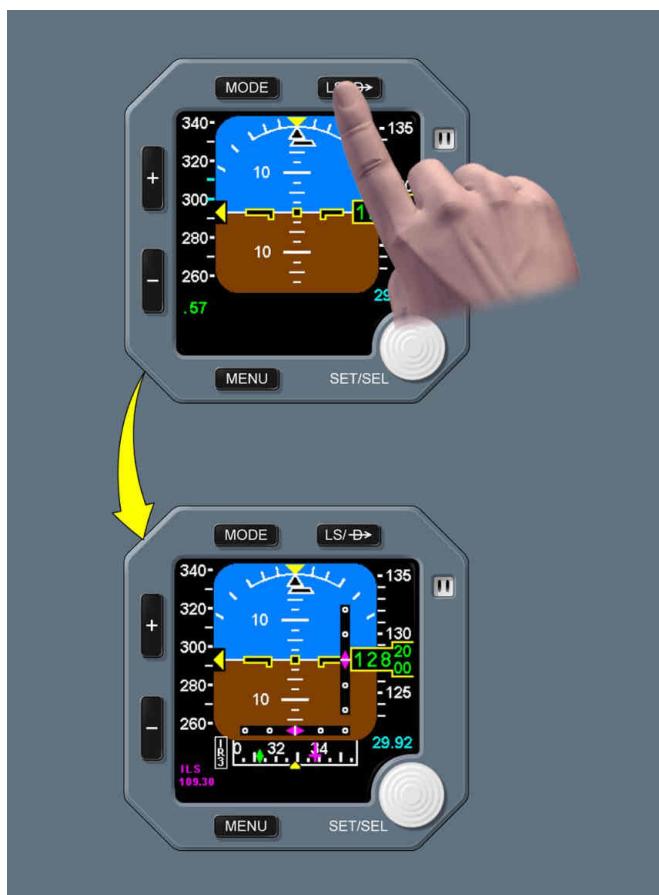
SFD/SND reconfiguration

Automatic reconfiguration may occur in the case of display failure affecting the SFD.

ls/dir to pb
LS/→

When pressed, the SFD displays the following LS indications:

- Localizer scale and index
- Glideslope scale and index
- LS course.

LS/DIR TO pbmenu pb

: When pressed the first item of the SFD menu is displayed.

The content of the SFD menu is:

- SET SPD BUG 1 and SET SPD BUG 2 to adjust and display the speed bugs,
- SET ALT BUG to adjust and display an altimeter bug,
- DISPLAY METERS to display aircraft altitude in meter, in addition to the altitude in ft,
- SET BARO UNIT to switch from hPa to inHg,
- DISPLAY NAV to display the aircraft position, heading and track,
- DISPLAY FIX to modify and display a FIX.

For more information on the use of the SFD menu *Refer to DSC-34-10-20-50 How to use the MENU pb in SFD mode .*

SET/SEL knob



: When pressed the displayed item is selected.
When turned the displayed selection is modified

For more information on the use of the SET/SEL knob in SFD mode *Refer to DSC-34-10-20-50 How to use the SET/SEL knob in SFD mode .*

Brightness pb



: Adjust the brightness of the display.

SFD Indications**SFD INDICATIONS**

Applicable to: ALL

SFD Indications



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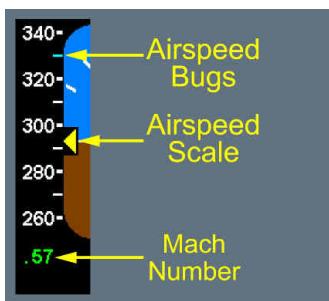
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STANDBY INSTRUMENTS - ISIS/SFD

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Airspeed**AIRSPEED INDICATIONS**

Applicable to: ALL

**AIRSPEED SCALE**

A white scale moves in front of a yellow triangle indicating the airspeed.

- The scale ranges from 30 to 250 kt, with a mark every 5 kt, and from 250 to 520 kt, with a mark every 10 kt.
-  : Replace the speed scale and mach number when the speed data is not available.

Speed Flags**MACH NUMBER**

The Mach number is displayed in green, when above M .5, it goes off when it is lower than M .45.

SPEED BUG

When a speed bug is entered using the BUGS function, the corresponding speed mark is displayed.

Two speed bugs can be displayed at the same time.

A speed bug is entered using the MENU/ SET SPD BUG 1(2) function. For more information on SFD menu, Refer to DSC-34-10-20-20-10-10 MENU pb .

AIRSPEED TOLERANCES**Applicable to: ALL**

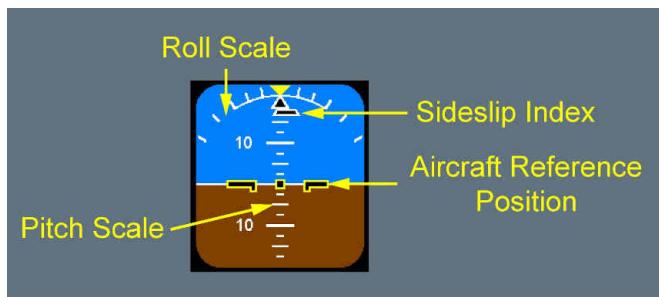
The following values apply to an aircraft in symmetrical flight (no sideslip), in clean configuration, and in a straight and level flight.

The maximum differences between speed or Mach number indications are:

| Flight Level | Speed or Mach Number | Speed Comparison between Standby Flight Display (SFD) and ADR 1(2)(3) |
|--------------|----------------------|---|
| FL 50 | 250 kt | 7 kt |
| FL 100 | 250 kt | 7 kt |
| FL 200 | 320 kt | 6 kt |
| FL 300 | M 0.85 | 6 kt |
| FL 410 | M 0.85 | 6 kt |

Attitude**ATTITUDE**

Applicable to: ALL

ATTITUDE**AIRCRAFT REFERENCE POSITION**

Indicates the fixed reference position of the aircraft.

ROLL

Indicates the bank angle of the aircraft.

- L2 The scale has markers at 0, 10, 20, 30, 45 and 60 ° of bank.



- L1  : Replaces the roll and the pitch scale when the attitude data is not available.

ATT flag in SFD**PITCH SCALE**

The scale indicates the pitch angle of the aircraft.

- [L2] The scale has markers:

- Every 10 ° between 80 ° nose down, and 80 ° nose up
- Every 2.5 ° between 30 ° nose down , and 30 ° nose up.

[L12]



Indicates that the pitch angle of the aircraft is too high, and shows the direction to reduce it.

These arrows appear, when the pitch angle is beyond +/-30 °.

SIDESLIP INDEX

- : On ground, indicates the lateral acceleration of the aircraft
In flight, indicates the sideslip of the aircraft

ATT FLAG

Applicable to: ALL





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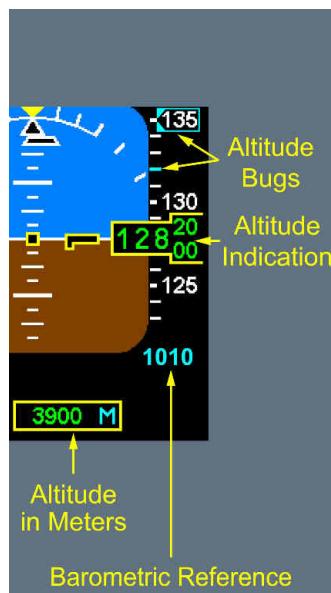
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STANDBY INSTRUMENTS - ISIS/SFD

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Altitude**ALTITUDE**

Applicable to: ALL

**ALTITUDE INDICATION**

The altitude indication is given as a white moving scale and a green digital readout surrounded in yellow.

- The altitude scale ranges from –2000 ft to 50 000 ft every 100 ft, with altitude digital indications every 500 ft.

L1 The altitude is negative.



: Replaces the altitude scale, when the altitude data, is not available.



Altitude Flag



METERS ALTITUDE

The current altitude can also be displayed in meters.

The display is activated using the MENU/DISPLAY METERS function. For more information on the SFD menu, Refer to DSC-34-10-20-20-10-10 MENU pb .

BAROMETRIC REFERENCE

L12

1010 : The barometric reference pressure in hectoPascal (hPa) is selected.
The barometric pressure ranges from 745 hPa to 1 100 hPa .

L12

29.92 : The barometric reference pressure in inches of mercury (inHg) is selected.
The barometric pressure ranges from 22 inHg to 32.48 inHg .

STD : The standard barometric pressure is selected

The display is activated using the MENU/SET BARO UNIT function. For more information on the SFD menu, *Refer to DSC-34-10-20-20-10-10 MENU pb.*

ALTITUDE BUG

: the corresponding altitude mark is indicated by a cyan box.



: The altitude bug is in front of an altitude value.



: The bug is in front of the current altitude.

An altitude bug is entered using the MENU/ SET ALT BUG function. For more information on SFD menu, *Refer to DSC-34-10-20-20-10-10 MENU pb.*



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STANDBY INSTRUMENTS - ISIS/SFD

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Approach**APPROACH**

Applicable to: ALL

Approach**LOCALIZER SCALE AND INDEX**

When the flight crew presses the LS/DIR TO pb, the SFD displays the localizer scale and index.



Both appear, when the LOC receiver is failed, and the flight crew pressed the LS/ DIR TO pb.

LOC and LS Flags**GLIDESLOPE SCALE AND INDEX**

When the flight crew presses the LS/DIR TO pb, the SFD displays the glideslope scale and index.



Both appear, when the G/S receiver is failed, and the flight crew pressed the LS/DIR TO pb.

G/S and LS Flags



LS SOURCE



The flight crew selects an ILS approach.



The flight crew selects a LOC only approach.

Note: The flight crew cannot display FLS deviations and FLS information on SFD.

LS IDENTIFIER OR FREQUENCY



Indicates the identifier of the selected LS station.



Indicates the frequency of the selected LS station.

The frequency appears, if the LS station is not identified.

Note: The flight crew cannot display FLS deviations and FLS information on SFD.

LS COURSE

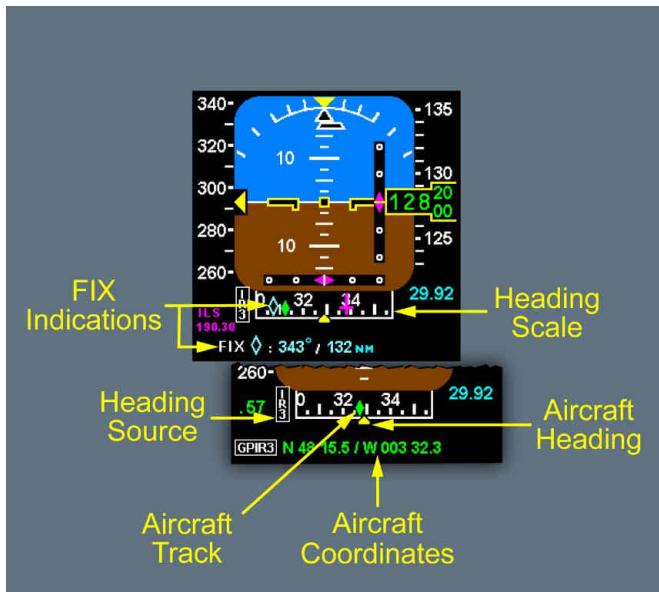


Indicates the course of the localizer.

Appears, when the flight crew tunes an ILS or a LOC, and presses the LS/DIR TO pb.

Navigation**NAVIGATION**

Applicable to: ALL

Navigation Indications**HEADING SCALE**

The heading scale is displayed when:

- The approach guidance has been selected (for more information on approach guidance Refer to *DSC-34-10-20-20-50-10 Approach*), or
- The NAV information has been selected, or
- A FIX is displayed.

AIRCRAFT HEADING AND AIRCRAFT TRACK

The heading scale always displays aircraft heading and aircraft track.

: Aircraft heading and aircraft track are true. Use mag/true pb on the EFIS-FCU to switch from magnetic heading to true heading.



TRU Indication



: Replaces the heading scale, when the heading data, is not available.

HDG Flag



HEADING SOURCE

Represents the current aircraft heading.

Heading data are given by either ADIRU3 or ADIRU1



: Aircraft heading is magnetic and given by ADIRU3



: Aircraft heading is true and given by ADIRU3

FIX INDICATIONS

- FIX bearing on the heading scale,
- Numeric FIX bearing / distance.

Follows the FIX bearing, FIX bearing is true.

FIX ◇ : 343 T / 132 NM

FIX indications are displayed using the MENU / DISPLAY FIX function. For more information on the SFD menu, Refer to DSC-34-10-20-20-10-10 MENU pb .

AIRCRAFT COORDINATES

Selection of DISPLAY NAV item on the SFD menu, displays the heading scale and the aircraft coordinates.



Aircraft coordinates in latitude / longitude.

N 48 15.5 / W 003 32.3

The aircraft position can be either a GPIRS, GPS or IRS position calculated by ADIRS or MMR..

- [GPIR3]** : Aircraft position comes from ADIRU3 (respectively ADIRU1)and is calculated from GPS and IRS3 (respectively IRS1) position.
- [GPS1]** : Aircraft position comes from MMR.
- [GPS]** : Aircraft position comes from ADIRU3 or ADIRU1 and is calculated from GPS position.
- [IR3]** : Aircraft position comes from ADIRU3 (respectively ADIRU1).
- [PPOS]** : The aircraft coordinates are invalid.





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STANDBY INSTRUMENTS - ISIS/SFD

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SND Overview

SND OVERVIEW

Applicable to: ALL

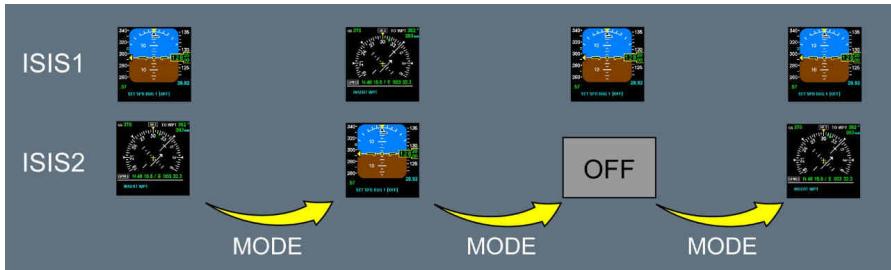
SND general



mode pb



enables to switch from SFD to SND display or to switch off the corresponding standby display.

SFD/SND reconfiguration

Automatic reconfiguration may occur in the case of display failure affecting the SFD.

LS/DIR TO pb

: When pressed the DIR TO function is activated.

Note: If a waypoint list has been defined and the navigation is not active, a DIR TO to any waypoint of the list activates the navigation.

For more information on the DIR TO function on SND , Refer to DSC-34-10-20-50 How to perform a DIR TO .

menu pb

: When pressed the first item of the SND menu is displayed.

The content of the SND menu is:

- INSERT WPT enables to insert waypoint in the waypoint list,
- INSERT FIX enables to insert FIX at the end of the waypoint list,
- EDIT WPT /FIX enables to edit and modify a waypoint or a FIX from the waypoint list,
- CLEAR WPT /FIX enables to delete a waypoint or a FIX from the waypoint list.,

For more information on the use of the SND menu, Refer to DSC-34-10-20-50 How to use the MENU pb in SND mode).

For more information on the use of the waypoint list, Refer to DSC-34-10-20-50 How to insert a WPT in SND mode ..

SET/SEL knob

: When pressed the displayed item is selected.
When turned the displayed selection is modified

For more information on the use of the SET/SEL knob in SND mode *Refer to DSC-34-10-20-50 How to use SET/SEL knob in SND mode .*

WHEN NO MENU IS DISPLAYED

No action is associated to the SET/SEL knob when the MENU is not displayed.

WHEN A MENU ITEM IS DISPLAYED

When turned scrolls the different items of the menu.
When pressed enables the selection of the displayed item.

WHEN A MENU ITEM IS SELECTED

When turned scrolls the different value of the displayed item.
When pressed enables the selection of the displayed value.

Brightness pb

: Adjust the brightness of the display.



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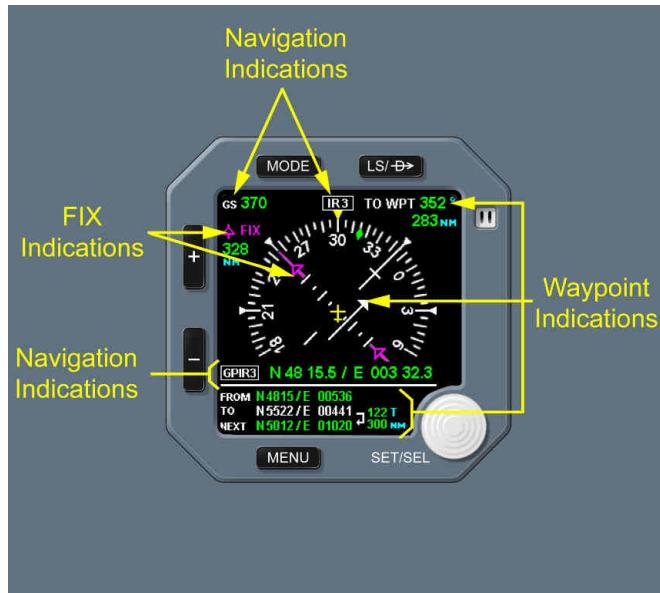
34 - NAVIGATION

STANDBY INSTRUMENTS - ISIS/SND

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SND Indications**SND INDICATIONS**

Applicable to: ALL





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STANDBY INSTRUMENTS - ISIS/SND

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Waypoints**WAYPOINT**

Applicable to: ALL

Waypoint indications**DESIRED TRACK**

Applicable to: ALL

DESIRED TRACK

Indicates the desired track between the FROM waypoint and the TO waypoint.

DEVIATION BAR

Applicable to: ALL

LATERAL DEVIATION

The lateral deviation bar shows the deviation between the aircraft position and the desired track

DEVIATION SCALE

Applicable to: ALL

DEVIATION SCALE

The deviation scale is made small and large lines.
Each large line represents a 5 nm lateral deviation.
Each small line represents a 2.5 nm lateral deviation.

BEARING DISTANCE

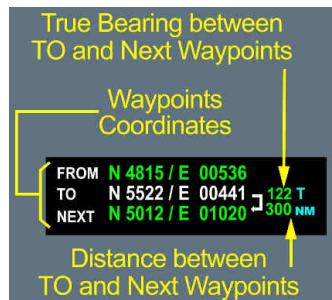
Applicable to: ALL

TO WAYPOINT BEARING / DISTANCE

- 352 °** : The bearing to the TO waypoint is a magnetic bearing.
- 352 T** : The bearing to the TO waypoint is a true bearing.
- 283 NM** : The distance to the TO waypoint is greater than 20 NM.
- 19.7 NM** : The distance to the TO waypoint is lower than 20 NM.

WAYPOINT LIST

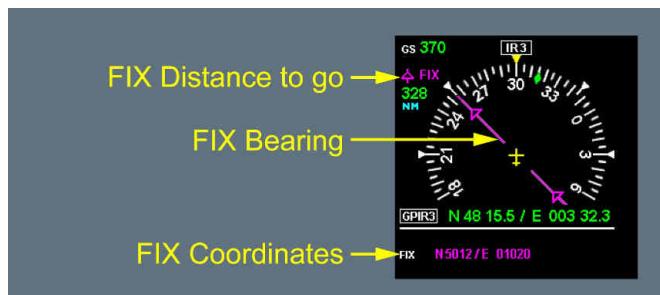
Applicable to: ALL

WAYPOINTS LIST

The waypoints list is created by the flight crew by inserting new waypoints in sequence (for more information on waypoint insertion, *Refer to DSC-34-10-20-50 How to insert a WPT in SND mode*). Each waypoint is defined by its geographical coordinates in latitude / longitude. Waypoints coordinates are truncated to the minutes when displayed in the waypoints list. If a FIX is defined it appears at the end of the waypoints list. The bearing between the TO and the NEXT waypoint is always a true bearing.

Fix**FIX**

Applicable to: ALL

Fix indications**BEARING**

Applicable to: ALL

FIX BEARING

This pointer represents the bearing of the fix.

DISTANCE TO GO

Applicable to: ALL

DISTANCE TO GO

It represents the distance to go to the FIX.

COORDINATES

Applicable to: ALL

FIX COORDINATES

The FIX coordinates in latitude and longitude are always displayed at the bottom of the waypoints list when defined.

Note: Fix coordinates can also be displayed on the SFD.



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AIRCRAFT SYSTEMS

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STANDBY INSTRUMENTS - ISIS/SND

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Position**POSITION**

Applicable to: ALL

Position indications**ROSE DISPLAY**

Applicable to: ALL

ROSE DISPLAY

The rose display shows 240 °.

It is oriented with respect to the aircraft heading.

It is graduated every 5 °, with numeric values every 30 °.

A/C HEADING

Applicable to: ALL

AIRCRAFT HEADING

Represent the current aircraft heading.

Heading data are given either by ADIRU3 or ADIRU1



: Aircraft heading is magnetic and given by ADIRU3.



: Aircraft heading is true and given by ADIRU3.



: Replaces the heading rose, when the heading data, is not available.



A/C TRACK

Applicable to: ALL

AIRCRAFT TRACK

Indicates the aircraft track.

A/C COORDINATES

Applicable to: ALL

AIRCRAFT POSITION

The aircraft position is displayed in latitude / longitude.

The aircraft position can be either a GPIRS, GPS or IRS position calculated by ADIRS or MMR..

- GPIR3** : Aircraft position comes from ADIRU3 (respectively ADIRU1) and is calculated from GPS and IRS3 (respectively IRS1) position.
- GPS1** : Aircraft position comes from MMR.
- GPS** : Aircraft position comes from ADIRU3 or ADIRU1 and is calculated from GPS position.
- IR3** : Aircraft position comes from ADIRU3 (respectively ADIRU1).

The aircraft coordinates are invalid.



GROUND SPEED

Applicable to: ALL

GROUND SPEED

Indicates the aircraft ground speed



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HOW TO USE MENU IN SFD MODE

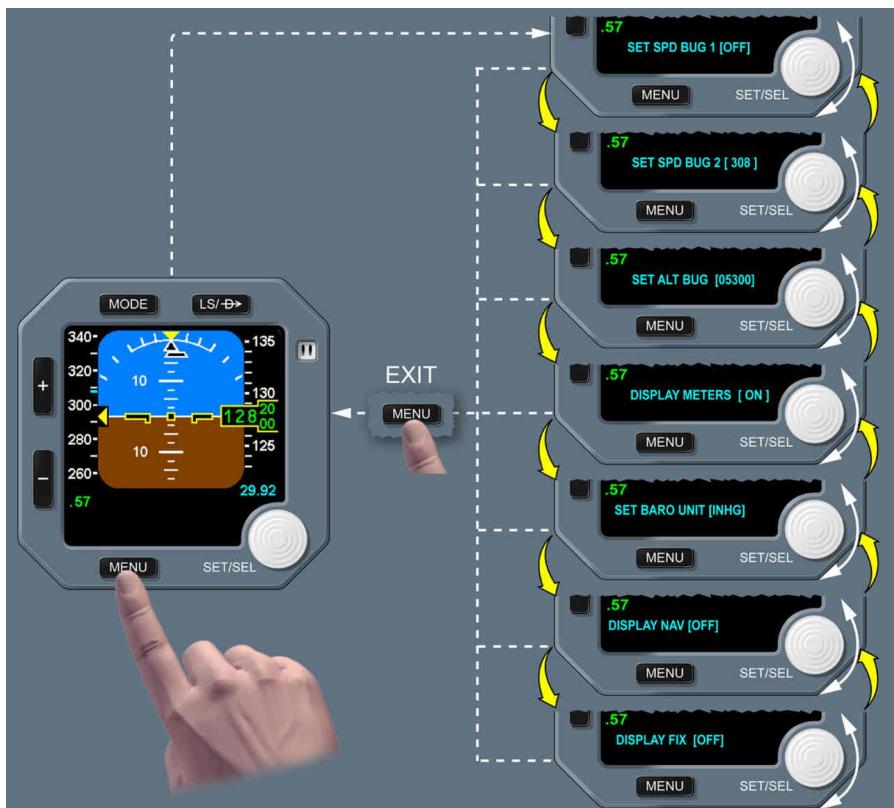
Applicable to: ALL

HOW TO USE MENU IN SFD MODE

When ISIS is in SFD mode, press MENU pb to display the first item of the menu.

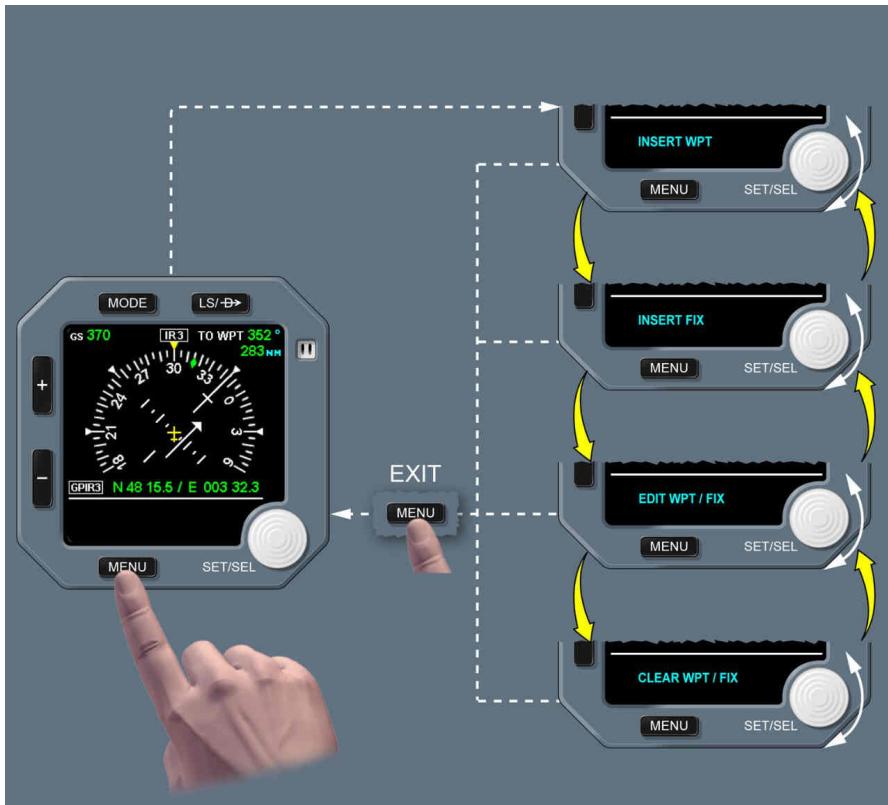
Then, rotate the SET/SEL knob to scroll through the items of the menu.

When the desired item is displayed, press the SET/SEL knob to display the item content.



HOW TO USE MENU IN SND MODE

Applicable to: ALL

HOW TO USE MENU IN SND MODE**HOW TO USE SET/SEL knob IN SFD MODE**

Applicable to: ALL

HOW TO USE SET/SEL knob IN SFD MODE**WHEN NO MENU IS DISPLAYED**

When pressed enables switching from QNH to standard barometric pressure.



When turned enables the selection of the QNH.

**WHEN A MENU ITEM IS DISPLAYED**

When turned scrolls the different items of the menu.



When pressed enables the selection of the displayed item.

**WHEN A MENU ITEM IS SELECTED**

When turned scrolls the different value of the displayed item.



When pressed enables the selection of the displayed item.



HOW TO USE SET/SEL KNOB IN SND MODE

Applicable to: ALL

WHEN NO MENU IS DISPLAYED

No action is associated to the SET/SEL knob when the MENU is not displayed.

WHEN A MENU ITEM IS DISPLAYED

When turned scrolls the different items of the menu.

When pressed enables the selection of the displayed item.

WHEN A MENU ITEM IS SELECTED

When turned scrolls the different value of the displayed item.

When pressed enables the selection of the displayed item.

HOW TO INSERT A WPT IN SND MODE

Applicable to: ALL

HOW TO INSERT A WPT IN SND MODE

Enter new waypoint
Coordinates : N 50 12.5 / E 012 0.3



Press **MENU** to enter the SND menu.

HOW TO PERFORM A DIR TO

Applicable to: ALL

DIR TO WITHOUT WAYPOINT LIST AND NAVIGATION NOT ACTIVATED

DIR TO Waypoint
Coordinates : N 48 15.5 / W 012 36.9



Push **LS/→** to display DIR TO menu

DIR TO WITH WAYPOINT LIST AND NAVIGATION NOT ACTIVATED



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STANDBY INSTRUMENTS - HOW TO

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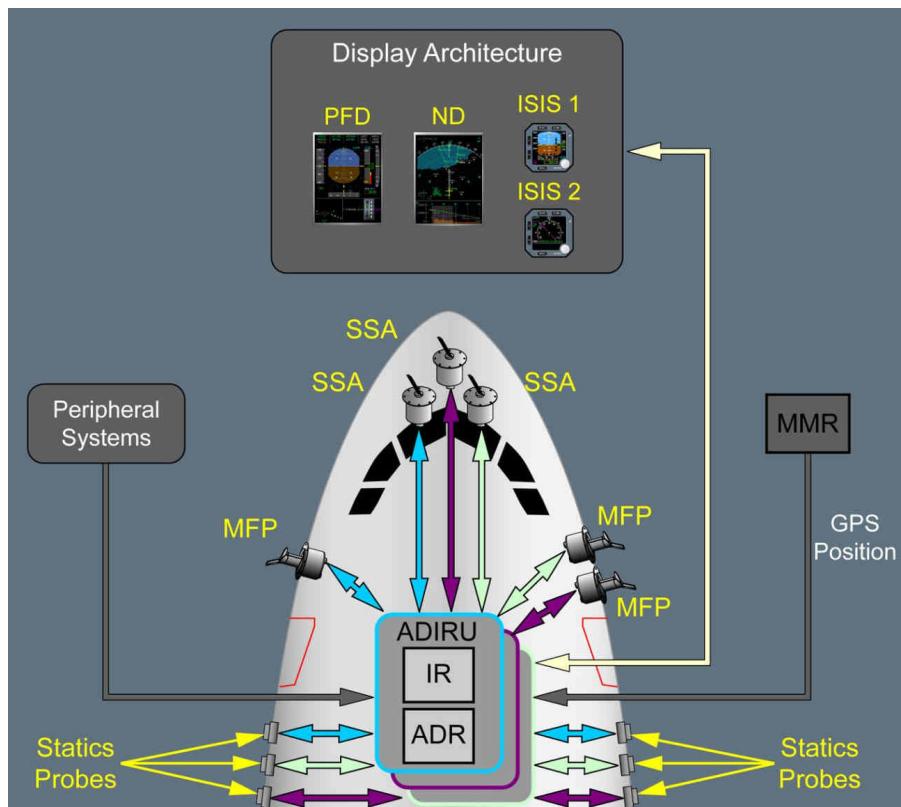
OVERVIEW

Applicable to: ALL

The Air Data and Inertial Reference System (ADIRS) supplies temperature, anemometric, barometric and inertial parameters to the cockpit display (PFD and ND) as well as to other user systems such as FMS, FADEC, or PRIM.

ARCHITECTURE

Applicable to: ALL

ADIRS ARCHITECTURE

ADIRU s

There are three identical ADIRUs (Air Data and Inertial Reference Units).

Each ADIRU is divided in two parts:

- The ADR (Air Data Reference) part
- The IR (Inertial Reference) part.

Each part (either ADR or IR) can work separately in the case of failure of the other part.

ADR PART

The ADR part of the ADIRU provides air data parameters such as:

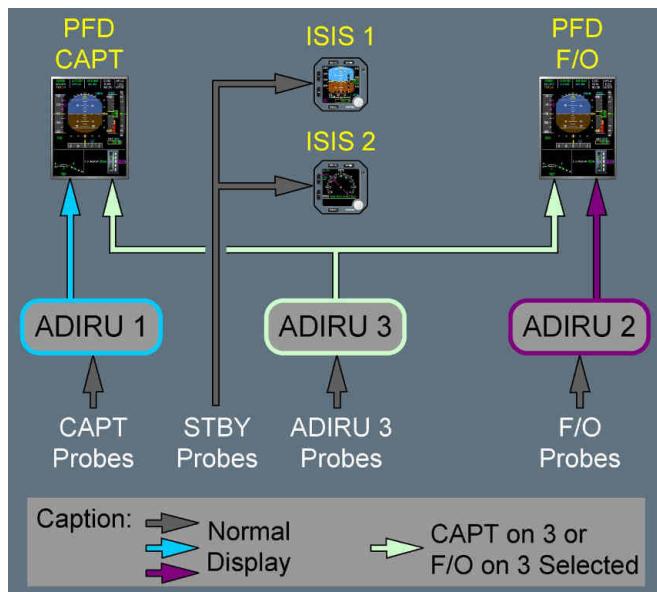
- Total pressure
- Static pressure
- Altitude
- Mach number
- Computed airspeed
- True airspeed
- Total air temperature
- Static temperature
- Barometric vertical speed
- Angle of attack
- Side slip angle.

Each ADR part is connected to:

- One Multi Function Probe (MFP)
- Two Static probe
- One Side Slip Angle (SSA) probe
- One Outside Air Temperature (OAT) probe.

As a consequence, the ADIRS system has three fully segregated sources of air data parameters.

Taking into account the ISIS system, that is independent from ADIRS, the aircraft has four fully segregated sources of air data parameters.

display architecture**IR PART**

The IR part of the ADIRU provides inertial reference (IR) parameters:

- Navigation information
 - [L3] Such as position, ground speed, baro inertial vertical speed, velocities and accelerations all along the a/c and earth axes.
 - [L1] Attitude information
 - [L3] Such as pitch angle, roll angle, pitch and roll rotation rates, pitch and roll rotation accelerations.
 - [L1] Heading information.
 - [L3] Such as magnetic heading, true heading, yaw rotation rates, yaw rotation acceleration.
- [L1] Each IR part is supplied by data coming from its internal gyros and accelerometers sensors. Each IR part also receives GPS data from MMR for initial alignment and computation of the GP/IRS hybrid position.

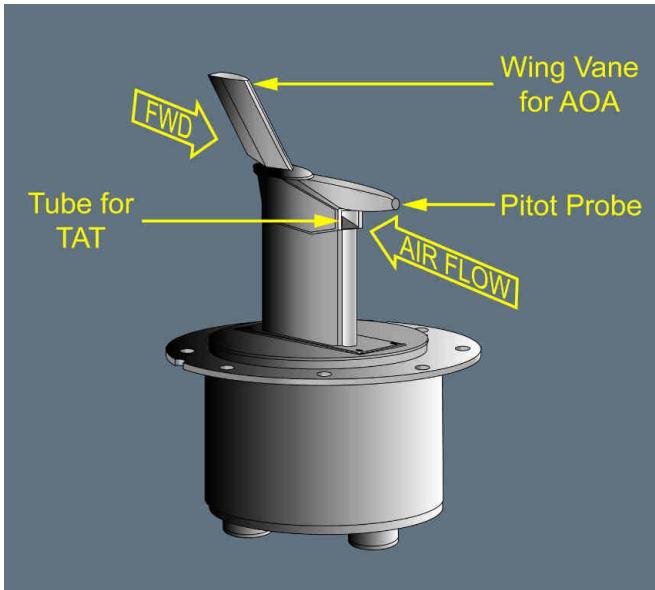
MULTI FUNCTION PROBES (MFP)

The MFP provides the Angle Of Attack, Total Air Temperature and Total Pressure. There are three MFPs.

Each ADIRU is connected to one MFP.

One MFP is located on the left side of the aircraft, and the two others are located on the right side.

MFP probe



STATIC PROBES

The static probes provide the local Static Pressure.

There are six static probes.

Three static probes are located on the right side of the aircraft, and three others are located on the left side.

Each ADIRU is connected to two static probes, one on each side of the fuselage.

SIDE SLIDE ANGLE PROBES

The side slip angle probe provides the side slip angle (SSA).

There are three SSA probes.

The SSA probes are located on the aircraft nose, in front of the windshield.

Each ADIRU is connected to one SSA probe.

MULTI MODE RECEIVER (MMR)

The MMR provides GPS position to the ADIRS to align the IR part.

The IR part uses also the GPS data to compute the GP / IRS hybrid position.

For more information on GPS data used by ADIRS , Refer to DSC-34-10-40-10 GPS data to ADIRS .

ADIRS CONTROLS

ADIRS uses different control gathered on three panels:

- ADR pb, IR pb and IR mode selector on the overhead panel
- ATT HDG and AIR DATA switching on the center instrument panel
- MAG / TRUE pb on the AFS control panel

ADR MONITORING

Applicable to: ALL

GENERAL

Air data parameters, computed by the ADR part of the ADIRS , are of great importance for many aircraft systems. As a consequence they are continuously monitored:

- by the ADR themselves to check the reliability of computed parameters based on:
 - Comparison of left and right static pressure,
 - comparison of ADR and ISIS / GPS / FADEC speed, altitude and pressure,
 - by some peripheral systems to check the reliability of received parameters:
 - PRIM
 - FADEC
 - FWC
- L2** All monitoring rely on voting principles whereby when one source diverges from the average value, it is automatically rejected and the system continues to operate normally with the remaining sources.
- L1** In very extreme and remote situations all ADR s may become unreliable leading to unreliable airspeed or altitude indications.
In such situations the flight crew can switch off all three ADRs to display backup speed and altitude scales.
For information on unreliable airspeed or altitude indications, Refer to DSC-34-10-30-40 Unreliable airspeed or altitude indications .

For information on backup speed and altitude scales, *Refer to DSC-34-10-30-10 Backup Speed Scale*.

[L2] COMPARISON OF LEFT AND RIGHT STATIC PRESSURE

INSIDE EACH ADR

Each ADR compares the static pressure measured on the left side of the aircraft with the static pressure measured on the right side of the aircraft.

If the difference is above a given threshold this may be an indication of an ADR failure, the alert NAV ADR 1(2)(3) FAULT is triggered, *Refer to procedure*.

- [L3] Static pressure threshold is 30 hPa .

[L2] BETWEEN ALL ADR

All ADR s compare the three static pressures measured on the left side of the aircraft with the three static pressures measured on the right side of the aircraft.

If the difference is above a given threshold, this may be an indication of a damage on all static pressure probes on one side of the aircraft. As a consequence altitude computation may be affected, the alert NAV AIR DATA ACCURACY DEGRADED is triggered, *Refer to procedure*

[L2] GPS / ISIS / FADEC AND ADR COMPARISON

The ADR s use air data parameters computed by other systems for internal monitoring.

If one ADR detects a discrepancy the alert NAV ADRx FAULT is triggered (*Refer to procedure*)

If the three ADR s are failed the alert NAV ADR 1+2+3 FAULT is triggered (*Refer to procedure*).

ISIS COMPARISON

Each ADR compares its own computed air speed and altitude with ISIS data.

- [L3] Air speed threshold is 20 kt .

Altitude threshold is 1 000 ft .

[L2] GPS COMPARISON

Each ADR compares its own vertical speed with GPS data.

- [L3] Vertical speed threshold is 1 000 ft/min .

[L2] FADEC COMPARISON

Each ADR compares its own static and total pressure with the four FADEC data.

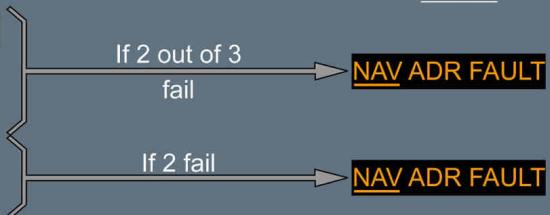
- [L3] Static pressure threshold is 45 hPa .

Total pressure threshold is 50 hPa .

Comparison between:

Alerts

- GPS / ADR Vertical Speed
- ISIS / ADR Altitude
- FADEC / ADR Ps
- ISIS / ADR Cas
- FADEC / ADR Pt

**L2 ADR MONITORING BY PRIM**

The following parameters coming from the ADR s and ISIS are monitored by the PRIM s:

- CAS /Mach / Altitude / Static pressure
- Angle of attack (AOA)
- Side slip angle
- Static and total temperatures (TAS , TAT)

Depending on the erroneous parameter the affected ADR may be rejected by the PRIM s.

CAS / MACH / ALTITUDE / STATIC PRESSURE MONITORING

If one of these parameters is rejected, the ADR (including all other air data parameters) or ISIS is rejected until the end of the flight for flight controls internal use.

Associated with NAV AIR DATA DISAGREE (*Refer to procedure*) and F/CTL ALTN LAW (*Refer to procedure*).

L3

CAS threshold is 16 kt / 50 kt at low / high angle of attack and sideslip.

Mach threshold is M .04 / M .1 at low / high angle of attack and sideslip.

Altitude threshold is 400 ft .

Static pressure threshold is 5 hPa .

L2

AOA MONITORING

An AOA monitoring on ground is available to detect during takeoff roll any failure affecting the AOA measured by MFP probes.

L3

AOA threshold for ground monitoring is 8 ° .

L2

- If one AOA parameter is rejected, the AOA and the side slip angle of the affected ADR are rejected. However the other parameters are still used by the flight controls
 - If two, or more, AOA parameters are rejected, there is a reversion to alternate law
- Associated with NAV AOA DISAGREE (*Refer to procedure*) and F/CTL ALTN LAW (*Refer to procedure*).

L3

AOA threshold is 3.6 ° / 7,2 ° at low / high sideslip.

L2 SIDE SLIP ANGLE MONITORING

- If one side slip angle parameter is rejected, the side slip angle and the AOA of the affected ADR are rejected. However the other parameters are still used by the flight controls
- If two or more side slip angle parameters are rejected, there is a reversion to alternate law.

Associated with F/CTL ALTN LAW (*Refer to procedure*).

TAS AND TAT MONITORING

- If either TAT or TAS is rejected, both TAT and TAS of the affected ADR are rejected
- If two or more TAS / TAT parameters are rejected, the A/THR is lost
- If three TAS / TAT parameters are rejected, reactive windshear, low energy and alpha floor protection are lost.

L3 TAS threshold is 16 kt / 50 kt at low / high angle of attack and sideslip.

TAT threshold is 30 °C .

L2 FADEC AIR DATA SELECTION

FADEC uses air data parameters (total pressure, total temperature and static pressure) for thrust computation.

Air data parameters come from the three ADIRUs and from the engine sensors.

In normal operation, the FADEC uses the air data parameters from the ADIRUs.

Depending on the validity of engine and ADIRUs air data, each FADEC decides which source will be used for thrust computation.

L3 Validation of air data is made as follows:

- Each ADIRU compares its air data with the data from the four FADECs. If ADIRU air data is consistent with two or more FADECs, then the ADIRU considers its own air data valid.
- Each ADIRU then sends its air data and a validity signal on its data to each FADEC.
- Each FADEC compares again its data with the data received from the three ADIRUs. The FADEC needs at least two ADIRUs to make this comparison.
 - If FADEC and ADIRUs data are consistent, ADIRUs data are used
 - If FADEC and ADIRUs data are not consistent, the FADEC will use the validity signal from each ADIRU to determine the best source to use between engine and ADIRUs sources.

L2 PFD AND ND AIR DATA MONITORING

The following air data parameters are compared between captain and first officer display units. In case of discrepancy a message is displayed on the associated display unit:



- On PFD:
 - altitude, associated with CHECK ALT,
 - heading, associated with CHECK HDG,
 - attitude, associated with CHECK ATT.
- On ND
 - heading, associated with CHECK HDG

The comparison is performed for all the parameters by the FWS.

BACKUP SPEED AND ALTITUDE SCALE

Applicable to: ALL

GENERAL

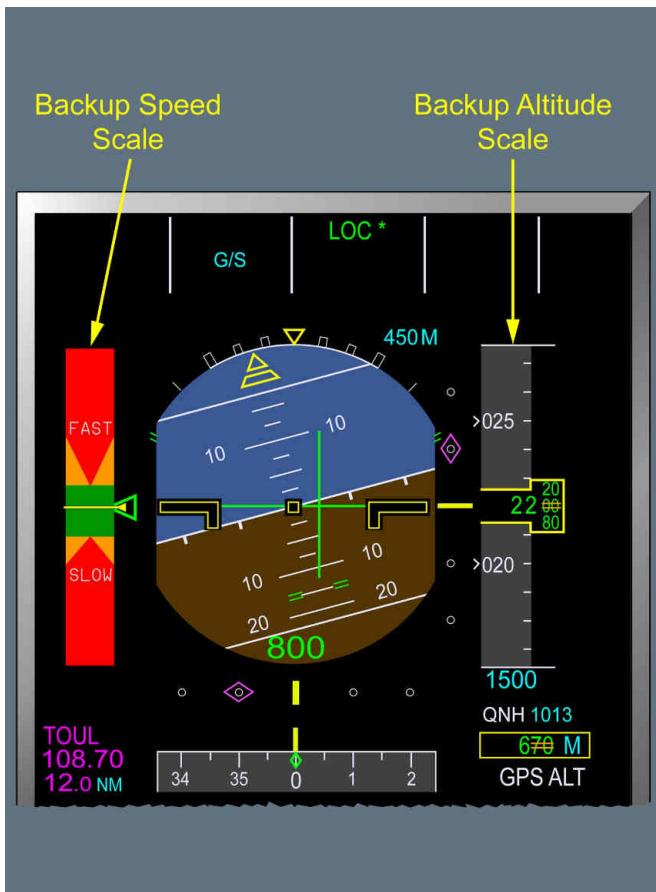
Following unreliable air data detection, the flight crew can display the backup speed and altitude scales by switching off all three ADR s.

The backup speed and altitude scales replace on PFD unreliable speed and altitude by Angle of Attack and GPS altitude.

Unreliable air data situations can be detected either:

- Automatically by the ADR monitoring, associated with NAV ADR 1+2+3 FAULT (*Refer to procedure*) or NAV ALL AIR DATA DISAGREE (*Refer to procedure*), or
- Manually by the flight crew, associated with NAV UNRELIABLE AIRSPEED INDICATIONS (manually displayed by the flight crew).

For more information on unreliable air data situations, *Refer to DSC-34-10-30-40 Unreliable airspeed or altitude indications* .

Backup ScalesBACKUP SPEED SCALE**PRINCIPLE**

The backup speed scale is based on the relation between aircraft Angle Of Attack (AOA) and airspeed.

- [L2] The Multi Function Probes measure the AOA .
- [L3] Since ADR s are off, the AOA data are sent to the display units via the IR parts of the ADIRU s. When all AOA are available, the AOA displayed on Captain and first officer PFDs is the median value from the three measured AOA.

If one AOA is failed, from the two remaining AOA, one is displayed on captain's PFD and the other on first officer's PFD.

[L1] The backup speed scale is designed taking into account a load factor of 1. Since load factor increases with roll, roll manoeuvre must be flown with care.

The BUSS is tuned for the aerodynamic model with the speed brake retracted. The speed brake extension must be avoided as it would affect the relation between Angle of Attack and airspeed, therefore making the BUSS unserviceable.

DISPLAY

The back up speed scale is divided in five colored areas:

- A green area corresponding to the normal speed range.

[L2] This area ensures that speed is maintained between VLS and VFE or VMO .

[L1] - Two red and two amber areas corresponding to speeds above maximum speed (VFE or VMO) or below VLS .

[L2] These areas correspond to speeds above maximum speed (VFE or VMO) or below VLS with increasing levels of intensity from amber to red.

[L1] Flying amber is acceptable for a limited period of time but should be avoided.

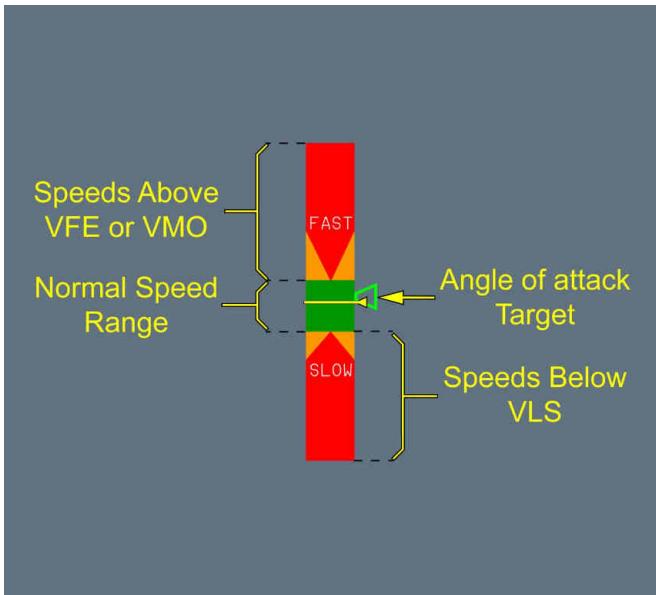
The red areas must be avoided.

A bug indicates the Angle Of Attack target.

[L2] The speed target allow transition from high speeds to low speeds and from one Slats/Flaps configuration to another

[L1] The backup speed scale behaves as a normal speed scale : high speeds (" **FAST** ") towards the top, low speeds (" **SLOW** ") towards the bottom.

For more information on backup speed scale indications *Refer to DSC-31-20-20-130-10 Backup Speed Scale .*

Backup Speed Scale Display**BACKUP ALTITUDE SCALE**

The backup altitude scale is based on GPS altitude information.

Due to GPS altitude imprecision the 2 last digits are dashed.

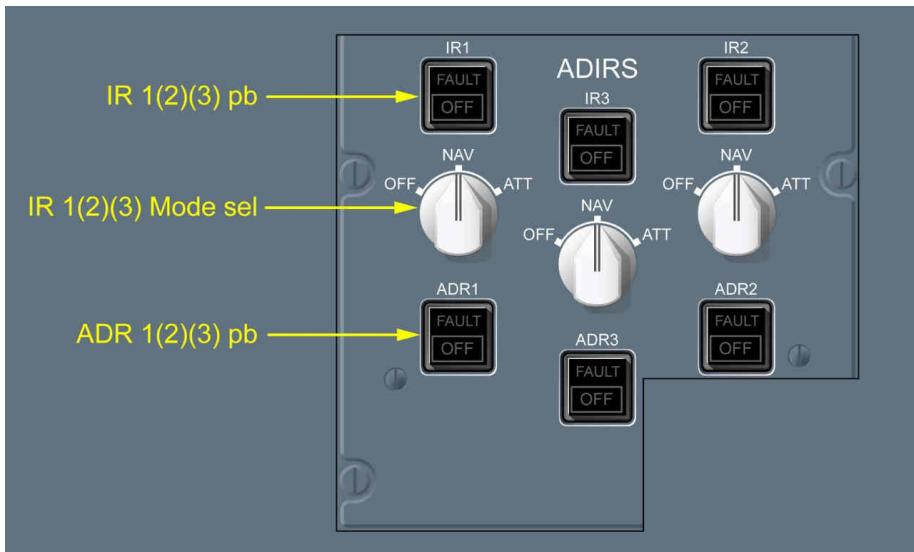
When the backup altitude scale is displayed, the vertical speed indication is not available.

FLYING TECHNIQUES

For information on how to fly the backup speed altitude scales, *Refer to FCTM/FCTM*.

ADIRS CONTROL PANEL

Applicable to: ALL

**IR 1(2)(3) pb**

- : IR 1(2)(3) is off.
IR 1(2)(3) inertial data output is disconnected.



- : IR 1(2)(3) is failed.
Associated with NAV IR 1(2)(3) FAULT (*Refer to procedure*).

ADR 1(2)(3) pb

- : The ADR 1(2)(3) is off.
The ADR 1(2)(3) air data output is disconnected.



- : The ADR 1(2)(3) is failed.
Associated with NAV ADR 1(2)(3) FAULT (*Refer to procedure*).

IR 1(2)(3) selector

- : The ADIRU 1(2)(3) is not energized.
Both IR 1(2)(3) and ADR 1(2)(3) data are not available.



- : Normal mode of operation.
IR 1(2)(3) supplies full inertial data to the aircraft systems.
ADR 1(2)(3) supplies full air data to the aircraft systems.

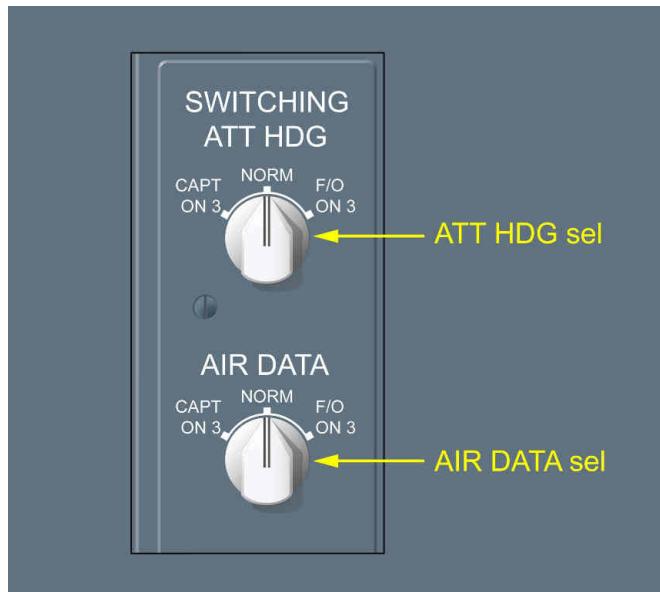
L12



- : IR 1(2)(3) only supplies attitude and heading data (if entered by the flight crew). Navigation data are not available.
For more information on IR in ATT mode, *Refer to DSC-34-10-30-40 ATT only operation*.
ADR 1(2)(3) supplies full air data to the aircraft systems.

ADIRS SWITCHING

Applicable to: ALL

**ATT HDG selector**

: IR1 supplies data to captain PFD and captain ND.
IR2 supplies data to first officer PFD and first officer ND.

: IR3 supplies data to captain PFD and captain ND.



: IR3 supplies data to first officer PFD and first officer ND.

**AIR DATA selector**

: ADR1 supplies data to captain PFD and captain ND.
ADR2 supplies data to first officer PFD and first officer ND.



: ADR3 supplies data to captain PFD and captain ND.



: ADR3 supplies data to first officer PFD and first officer ND.

**MEMO**

Applicable to: ALL

IR IN ALIGN > 7 MIN or IR IN ALIGN X MIN (1<X<6)

- Appears as soon as one IR starts an alignment to recover the NAV mode.
- Indicates the remaining time to finish the alignment of the IRs.
- Flashes in flight phase 1 if a problem occurs on one IR alignment. The alert NAV IR NOT ALIGNED will then appear on the ECAM, as soon as one engine is running (flight phase 2).
- Appears in amber and flashes as soon as one engine is running (flight phase 2).

Flight Phase Inhibition

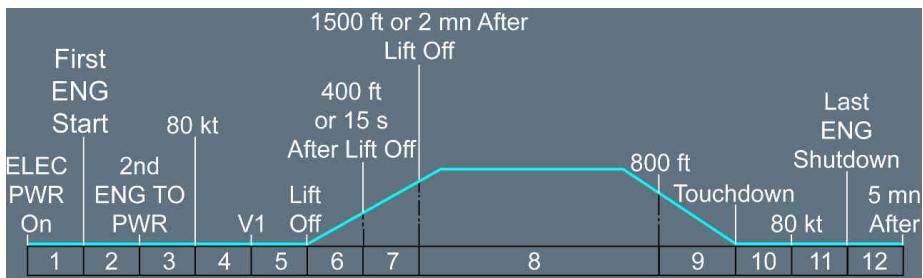
Flight Phase Inhibition

IR 1(2)(3)(1+2)(2+3)(1+3) IN ATT The corresponding IR s started an alignment to recover the ATT mode. For more information, Refer to DSC-34-10-30-40 ATT only operation .

ALL IRs IN ATT ALIGN

All IR s started an alignment to recover the ATT mode.

Flight Phase Inhibition

Flight Phase Inhibition

TRUE NORTH REF

- Indicates that the flight crew selected the TRUE north reference.
- Pulses for 10 s during the preflight phase or before approach to remind the flight crew that the TRUE north reference is selected for takeoff or for approach.

Flight Phase Inhibition

Flight Phase Inhibition

ADIRS SWTG

The flight crew selected the CAPT ON 3 or the F/O ON 3 position on the ATT HDG selector or on the AIR DATA selector.

Flight Phase Inhibition
Flight Phase Inhibition




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ADIRS - CONTROLS AND INDICATORS

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IR ALIGNMENT

Applicable to: ALL

GENERAL

The ADIRS must be aligned. This allows them to operate in NAV mode and continuously provide the aircraft's position.

To complete the alignment, the ADIRS must be initialized to a navigation starting point, from which the ADIRS determine subsequent aircraft positions during flight.

The pilot may check the ADIRS status, and the ADIRS drift, at any moment on the MFD POSITION / IRS page.

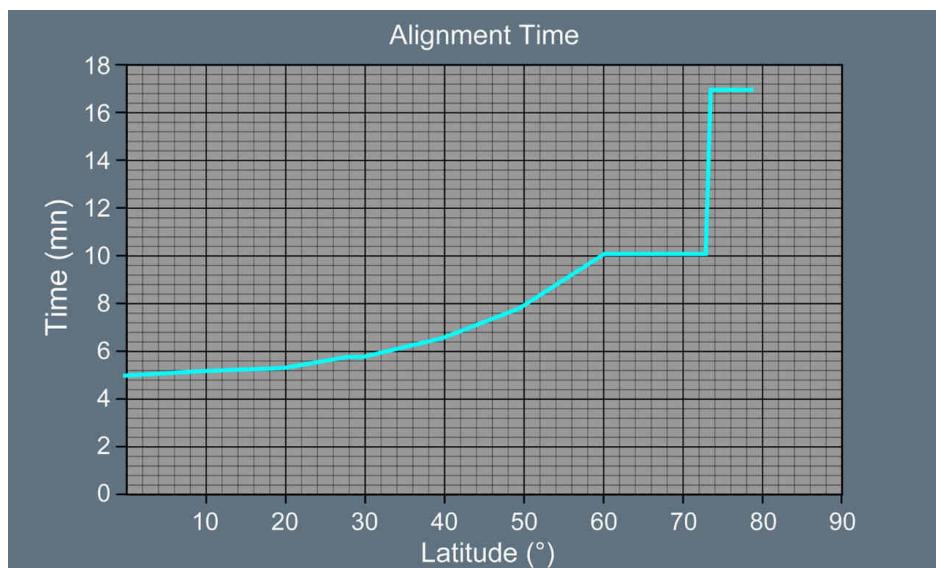
For alignment, the aircraft must be stationary on ground. Any aircraft motion will automatically restart the alignment.

Avoid alignment during an engine start, or while the engines are running.

The pilot may choose to perform:

- A complete alignment, or

L2 It takes between 5 to 17 min depending on the aircraft latitude.

Complete Alignment Time

- L1 - A fast alignment.
L2 It takes about 30 s.

- [L1] In both cases, the ADIRS must be initialized to a navigation starting point.

L3 COMPLETE ALIGNMENT

During a complete alignment, the ADIRS uses gravity to determine the aircraft attitude. It then determines true heading, and estimates the present latitude.

L2 FAST ALIGNMENT

During a fast alignment, the ADIRS resets the ground speed to 0. Therefore, the ADIRS will start the position computation with accurate initial speed.

- [L3] The ADIRS does not estimate the latitude.

HOW TO ALIGN IRS

Applicable to: ALL

HOW TO PERFORM A FAST IR ALIGNMENT

ALL 3 ADIRS mode selectors..... OFF then NAV within 5 s

HOW TO PERFORM A COMPLETE IR ALIGNMENT

ALL 3 ADIRS mode selectors..... OFF for more than 20 s

ALL 3 ADIRS mode selectors..... back to NAV

POSITION INITIALIZATION

The alignment is completed, when the ADIRS is initialized to an appropriate position. If the GPS is available, initialization is automatic, using the GPS position. Flight crew intervention is not necessary.

However, if GPS is not available or if the flight crew wants to override the automatic initialization , a manual initialization is possible, at any moment during the alignment phase. In that case, the flight crew shall:

Enter the required position on the MFD POSITION / IRS page.



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ADIRS - ABNORMAL OPERATIONS

ATT ONLY OPERATION

Applicable to: ALL

The ATT mode provides restoration of attitude and heading data in case of ADIRU power shutdown or IR failure leading to the loss of navigation capabilities.

The sensed procedure NAV IR FAULT (*Refer to procedure*) and the not-sensed procedure IR ALGNMT IN ATT MODE (*Refer to PRO-ABN-ECAM-10-34-10-490 NAV IR ALIGNMENT IN ATT MODE*) provide the applicable procedure to recover the ATT mode.

UNRELIABLE AIRSPEED OR ALTITUDE INDICATIONS

Applicable to: ALL

GENERAL

Most failures of the airspeed or altitude system are detected by ADR s or by systems using air data parameters.

These failures lead to the loss of corresponding cockpit indications and the triggering of associated ECAM alerts.

However, there may be cases where the airspeed or altitude is erroneous without being recognized rapidly by ADR s or aircraft systems. In these cases, the cockpit indications appear normal, but are actually false, and flight crew must rely on their basic flying skills to identify the faulty source(s) and take the required corrective actions.

If only one source provides erroneous data, a straightforward crosscheck of the parameters, provided by the 3 ADR s and ISIS allows the faulty system to be identified. This identification becomes more difficult in extreme situations when two, or even three, sources provide erroneous indications.

MAIN REASONS FOR UNRELIABLE AIRSPEED OR ALTITUDE DATA

Unreliable speed or altitude indication may be due to radome damage.

However, the most probable reason for unreliable airspeed or altitude data is obstructed pitot tubes or static ports. Depending on the level of obstruction, the symptoms visible to the flight crew will be different.

However in all cases, the data provided by the obstructed probe will be false. Since it is highly unlikely that the aircraft probes will be obstructed, at the same time, to the same degree and in the same way, the first indication of unreliable airspeed or altitude data available to the flight crew, will most probably be a discrepancy between the various sources.

The following chart provide a non exhaustive list of the consequences of various cases of partially or totally obstructed pitot tubes and static ports on airspeed and altitude indications.

It should be noted that the cases described below cover extreme situations (e.g. totally obstructed or unobstructed drain holes), and that there could be multiple intermediate configurations with similar but not identical consequences.



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AIRCRAFT SYSTEMS

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ADIRS - ABNORMAL OPERATIONS

| FAILURE CASE | CONSEQUENCES |
|---|--|
| Water accumulated due to heavy rain. Drain holes unobstructed | Transient speed drop until water drains. IAS fluctuations and gradual return to normal. |
| Water accumulated due to heavy rain. Drain holes obstructed. | Permanent speed drop. |
| Ice accretion due to MFP pitot heat failure, or transient MFP pitot blocked due to severe icing. unobstructed drain holes. | Total pressure leaks towards static pressure. IAS drops until obstruction cleared. Erratic ATHR may be observed. |
| Ice accretion due to MFP pitot heat failure, or MFP pitot obstruction due to foreign objects. Obstructed drain holes. | Total pressure blocked. Constant IAS in level flight until obstruction is cleared. In climb, IAS increases. In descent, IAS decreases. Abnormal AP/FD/ATHR behavior: a. AP / FD / pitch up in open climb to hold target IAS . b. AP / FD pitch down in open descent to hold target IAS . |
| Total obstruction of static ports on ground. | Static pressure blocked at airfield level. Normal indications during takeoff roll. After liftoff altitude remains constant. IAS decreases after liftoff. IAS decreases when aircraft climbs. IAS increases, when aircraft descends. |

FAILURE SCENARIOS

NORMAL SITUATION

Flight controls receive airspeed and altitude data from the 3 ADR s as well as ISIS .

Flight controls compare the data coming from all sources with the average value of the 3 ADR s. if one airspeed or altitude data exceeds a given threshold the whole source either ADR or ISIS is rejected.

For more information on ADR monitoring by flight controls, *Refer to DSC-34-10-30-10-20 PRIM Monitoring .*

ONE AIRSPEED OR ALTITUDE SOURCE IS ERRONEOUS

The affected source ADR or ISIS is rejected by flight controls.

The alert NAV AIR DATA DISAGREE is displayed with the following subtitle:

- ADR x REJECTED BY PRIMs or
- STBY INSTRUMENTS REJECTED BY PRIMs .

If the affected source is an ADR used to display speed information on either the captain or first officer PFD , a CHECK SPD FLAG is displayed on the PFD .

Note: Flight crew should be aware that in very extreme circumstances, it may happen that two, or even three ADRs may provide identical and erroneous data. Therefore, the suspect ADR should only be switched off, if it is positively confirmed that the other ADRs are correct.
If any doubt apply the not-sensed NAV UNRELIABLE AIRSPEED PROCEDURE procedure.

TWO ADRs ARE ERRONEOUS

If two ADRs are rejected in sequence, there is a reversion to alternate law.
This also applies, if one ADR is rejected during a flight dispatched under MEL with another ADR failed.

The alert NAV AIR DATA DISAGREE is displayed with the following subtitles:

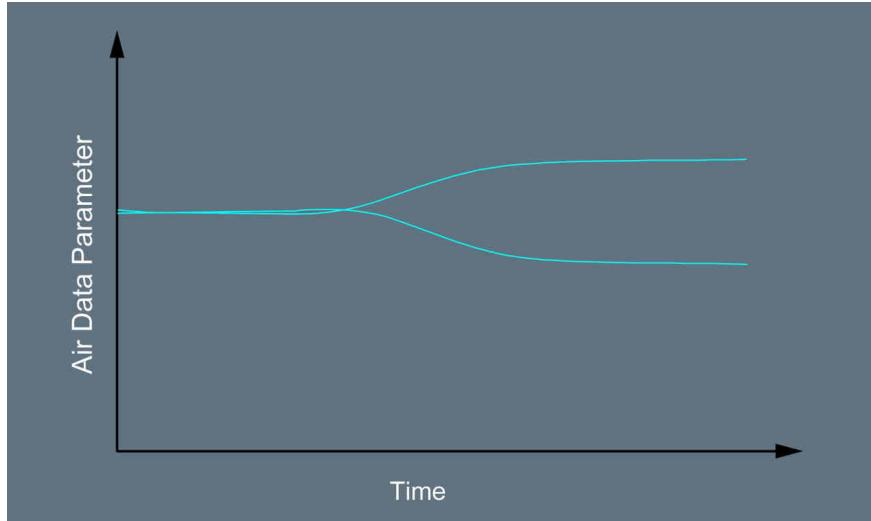
- ADR x REJECTED BY PRIMs and
- ADR y REJECTED BY PRIMs or STBY INSTRUMENTS REJECTED BY PRIMs

Note: Flight crew should be aware that in very extreme circumstances, it may happen that two, or even three ADRs may provide identical and erroneous data. Therefore, the suspect ADR should only be switched off, if it is positively confirmed that the other ADRs are correct.
If any doubt apply the not-sensed NAV UNRELIABLE AIRSPEED PROCEDURE procedure,

TWO SOURCES ALREADY INVALID AND DETECTION OF CONFLICT BETWEEN THE TWO REMAINING SOURCES

If two airspeed and altitude sources (ADR or ISIS) have been rejected by flight controls, the flight controls continue the monitoring of the two remaining sources.

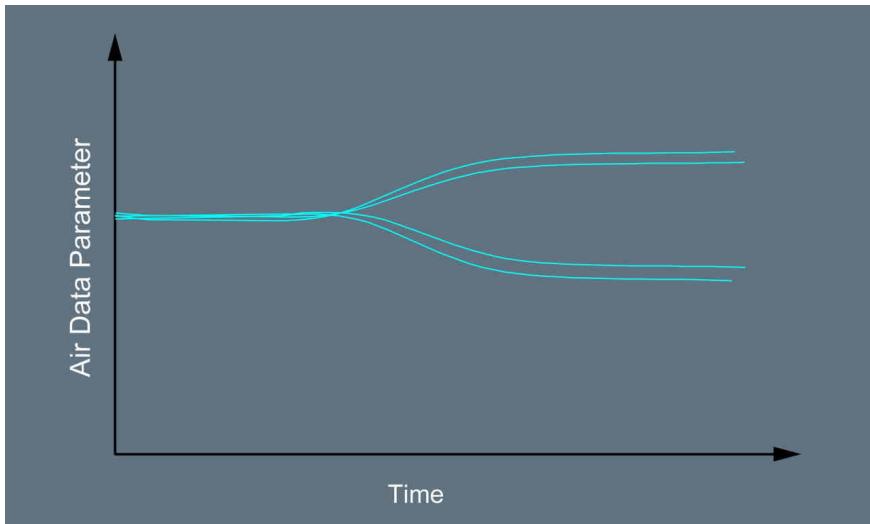
If a discrepancy higher than a given threshold is detected between the two remaining sources, the flight controls are not able to determine which air data is reliable. As a consequence flight controls do not use anymore any air data parameters.



The alert NAV ALL AIR DATA DISAGREE is displayed (*Refer to procedure*).

TWO SOURCES IN CONFLICT WITH TWO OTHER SOURCES

If a discrepancy higher than a given threshold is detected between a group composed of two ADRs and a group composed of one ADR and ISIS, the flight controls are not able to determine which air data is reliable. As a consequence flight controls do not use anymore any air data parameters.



The alert NAV ALL AIR DATA DISAGREE is triggered (*Refer to procedure*).



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ADIRS - ABNORMAL OPERATIONS

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GPS - SYSTEM DESCRIPTION

OVERVIEW

Applicable to: ALL

The Global Positioning System (GPS) is a satellite based radio navigation aid.

Worldwide 28 satellites broadcast accurate navigation data that the aircraft can use for the precise determination of its position.

The aircraft has two independent GPS receivers.

Each GPS receiver is integrated a MMR (Multi Mode Receiver) (GPS1 receiver in MMR1, GPS2 receiver in MMR2).

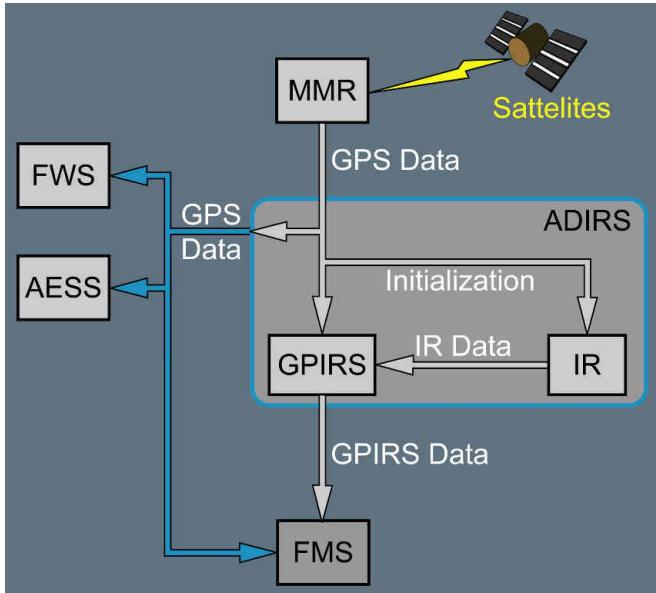
MMR transmit GPS data to ADIRS, FMS, ISIS and clock.

GPS FUNCTION

Applicable to: ALL

GPS DATA TO ADIRS

- The ADIRS uses GPS data from the MMR to compute an hybrid position between IR and GPS data.
Hybrid GPIRS position is provided by the ADIRS to the FMS, for aircraft position computation and display.
- The ADIRS uses GPS data from the MMR for initialization.
- The ADIRS also transmits GPS data from the MMR to the FMS, the FWS and the AEES



GPS DATA TO FMS

Applicable to: ALL

L2 GPS DATA TO FMS

The following GPS data are transmitted to the FMS via the ADIRS .

- GPS position,
- GPS mode,
- number of tracked satellites,
- accuracy,
- GPS true tracks,
- GPS UTC time,
- GPS altitude,
- GPS ground speed.

GPS MODE

The GPS operates in different mode which are indicated on the POSITION /GPS page (Refer to DSC-22-FMS-20-30-22FMS5020K POSITION / GPS page - Mode Impact).



- Initialization mode (INIT): Begins at power up and allows GPS initialization. Ends when the GPS begins satellites acquisition process.
- Acquisition mode (ACQ): The GPS enters in this mode after power up or during long periods of lost satellite signal. It remains in this mode until it is able to track at least four satellites, then transfers to NAV mode. To enter navigation mode more quickly, the GPS uses initial position, time and altitude from ADIRS .
- Navigation mode (NAV): When the GPS can track 4 or more satellites, it enters NAV mode and continuously supplies data to the ADIRS .
- Altitude aiding (ALTAID):
- Fault mode (FAULT): The fault mode is entered when a failure, which may prevent the MMR from transmitting valid GPS data has been detected.

GPS DATA TO ISIS

Applicable to: ALL

GPS DATA TO ISIS

ISIS displays aircraft position either on the SND or SFD .

Aircraft position comes from GPS 1 or GPS 2 via ADIRU 1 or ADIRU 3.

For information on aircraft position on ISIS SFD Refer to DSC-34-10-20-20-60-60 Aircraft coordinates .

For information on aircraft position on ISIS SFD Refer to DSC-34-10-20-30-50 A/C coordinates .

GPS DATA TO CLOCK

Applicable to: ALL

GPS DATA TO CLOCK

The clock receives GPS time and date from MMR1 .

For information on clock Refer to DSC-31-70-10 General .



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GPS - SYSTEM DESCRIPTION

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RADIO ALTIMETER

GENERAL

Applicable to: ALL

There are three Radio Altimeters (RA) which provides the height of the aircraft above the ground.

- [L2] The RA operate below 5 000 ft.
- [L1] The RA height is displayed on both PFD when the aircraft is below 2 500 ft
 - Both PFD display the same height (For more information on PFD display, Refer to DSC-31-20-20-70 Radio Altitude).
- [L3] When all three RA are available the displayed height is the median value.
 - If only two RA are available, the displayed height is the average value.
 - If only one RA is available the displayed height is the remaining value.
- [L1] The RA height is the minimum distance between the main landing-gear wheels and the ground.

AUTOMATIC CALLOUTS

Applicable to: ALL

GENERAL

Below 2 500 ft a synthetic voice generates radio height announcement.

These announcements come through the cockpit loudspeakers even if the speakers are turned off.

- [L3] The Flight warning System (FWS) generates these announcements.

PREDETERMINED CALLOUTS

The altitude callouts use the following predetermined thresholds:

| Height (ft) | Callout |
|-------------|--|
| 2500 | TWO THOUSAND FIVE HUNDRED or TWENTY FIVE HUNDRED |
| 2000 | TWO THOUSAND |
| 1000 | ONE THOUSAND |
| 500 | FIVE HUNDRED or Smart FIVE HUNDRED ⁽¹⁾ |
| 400 | FOUR HUNDRED |
| 300 | THREE HUNDRED |
| 200 | TWO HUNDRED |
| 100 | ONE HUNDRED |
| 90 | NINETY |
| 80 | EIGHTY |
| 70 | SEVENTY |
| 60 | SIXTY |
| 50 | FIFTY |

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Continued from the previous page

| | |
|-------------------------------------|----------------------------------|
| 40 | FORTY |
| 30 | THIRTY |
| 20 | TWENTY |
| 10 | TEN |
| 5 | FIVE |
| DH (or MDA/MDH) +100 ⁽²⁾ | HUNDRED ABOVE or PLUS HUNDRED |
| DH (or MDA/MDH) ⁽²⁾ | MINIMUM |

- (1) The FIVE HUNDRED auto callout is triggered only if the glide deviation exceeds a half dot.
- (2) The reference altitude for callouts is the radio altitude for precision approaches (DH) and baro altitude (MDA/MDH) for non precision approaches

Pin programmings allow the operator to select the callouts needed.

If aircraft remains at a height that is in the detection zone for a height callout, the corresponding message is repeated at regular intervals.

INTERMEDIATE CALLOUT

Below 400 ft, if the time between two consecutive predetermined callouts exceeds a certain threshold, an intermediate callout is triggered at regular time intervals.

- [L3] Between 400 ft and 100 ft, the intermediate callout is triggered 11 safter the previous predetermined callout.
Below 100 ft, the intermediate callout is triggered 4 safter the previous predetermined callout.
- [L1] The intermediate callout calls out the current aircraft height.
- [L2] Between 400 ft and 100 ft, the height is rounded to the lower 10 ft (e.g. TWO HUNDRED AND TWENTY).
Below 100 ft, the height is rounded to the lower feet.

RETARD AURAL ALERT

The "RETARD" aural alert is automatically triggered at:

- 10 ft RA , in autoland with the A/THR active
- 20 ft RA , in all other cases.

For more information about aural alerts, *Refer to DSC-31-40-20 FWS Audio Indicators* .

OVERVIEW

Applicable to: ALL

NAVAIDS**VOR**

The aircraft has two VOR receivers.

The navigation displays (ND s) show VOR 1 and VOR 2 information in accordance with the position of the VOR/ADF pb EFIS control panel. For more information on the VOR/ADF pb , Refer to DSC-31-20-50-GEFIS ND Data Display pb .

ILS

The aircraft has two ILS receivers.

- [L3] Each ILS receiver is integrated in a MMR (Multi Mode Receiver) (ILS 1 receiver in MMR 1, ILS 2 receiver in MMR 2).
- [L1] The flight crew can display the ILS information on each PFD by pressing the LS pb on the onside EFIS control panel (deviation scales and deviation indexes are displayed).
The ND s display ILS information, if the flight crew selects the ROSE LS mode on the EFIS control panel (For more information on the ROSE LS mode, Refer to DSC-31-20-30-60-GROSL ROSE-LS Mode Overview).
- [L2] Captain PFD and first officer ND display ILS 1 information, first officer PFD and captain ND display ILS 2 information.

ADF

The aircraft has one ADF receiver.

The ND s display ADF information, depending on the position of the VOR/ADF pb on the EFIS control panel. For more information on the VOR/ADF pb , Refer to DSC-31-20-50-GEFIS ND Data Display pb .

DME

The aircraft has two DME s.

The frequency set automatically on the DME corresponds to that set on the VOR or ILS .

- [L3] Each FMS can tune up to 4 ground stations on its onside DME :
 - 2 for FMS radio position in DME / DME mode
 - 1 for VOR / DME display
 - 1 for ILS / DME display.
- [L1] The ILS - DME information is displayed on the ND s and PFD s when the flight crew has pressed the LS pushbutton on the EFIS control panel.

MARKER BEACON

One marker beacon system is included in VOR receiver 1.

The PFD displays the outer, middle and inner marker signals. (For more information on marker displays on PFD, Refer to DSC-31-20-20-110-GILSA ILS Approach).

NAVAIDS TUNING

The FMS is the basic means for navaids tuning.

Navaids can be tuned either automatically by the FMS or manually by the flight crew using the FMS . For information on navaids tuning by the FMS, Refer to DSC-22-FMS-10-30-20-22FMS3020A Radio Navigation Tuning - Introduction .

The flight crew can also tune the navaids using the RMP in STBY RAD NAV mode. For information on STBY RAD NAV mode, Refer to DSC-34-10-60-10 Standby RadNav .

STANDBY RADNAV**Applicable to: ALL**

If all three FMC s fail, the flight crew can use the RMP 1 or RMP 2 (Radio Management Panels 1 or 2) on the pedestal for back up tuning.

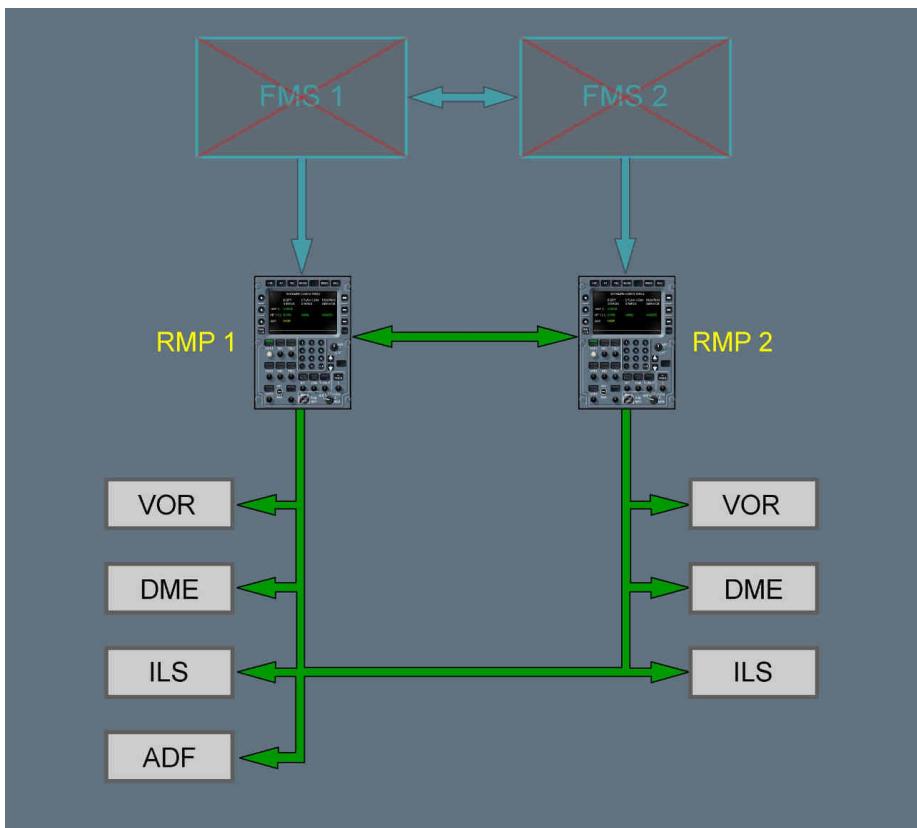
The RMP backup tuning is available when any of RMP1 or RMP2 is switched to RAD NAV STBY mode by pressing the RAD NAV STDBY . For information on the use of the RMP in RAD NAV STDBY mode, Refer to DSC-23-20-05 RAD NAV Controls and Indicators .

The captain RMP controls VOR 1 and ADF 1.

The first officer RMP controls VOR 2.

In RAD NAV STDBY mode each RMP controls both ILS s.

RMP 3 is not used for navaids tuning.

STANDBY RADNAV



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RADIO NAVIGATION - SYSTEM DESCRIPTION

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HOW TO TUNE THE NAVAIDS IN STANDBY RADNAV

Applicable to: ALL

CAUTION The flight crew only activates the STBY RAD NAV mode, if the three FMCs are fault.

Check that both RMPs are on.

01 STBY RAD NAV

Press the STBY RAD NAV guarded key.



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RADIO NAVIGATION - HOW TO

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AIRPORT NAVIGATION - SYSTEM DESCRIPTION

GENERAL

Applicable to: ALL

The Onboard Airport Navigation System (OANS) provides the flight crew with a moving airport map on its onside ND.

The OANS is designed to improve the flight crew awareness of airport surfaces. However, the flight crew's primary reference on ground should always be the outside of the aircraft.

The moving airport map is available if the flight crew sets the ND range selector to ZOOM, in the following ND modes: PLAN, ARC and ROSE-NAV.

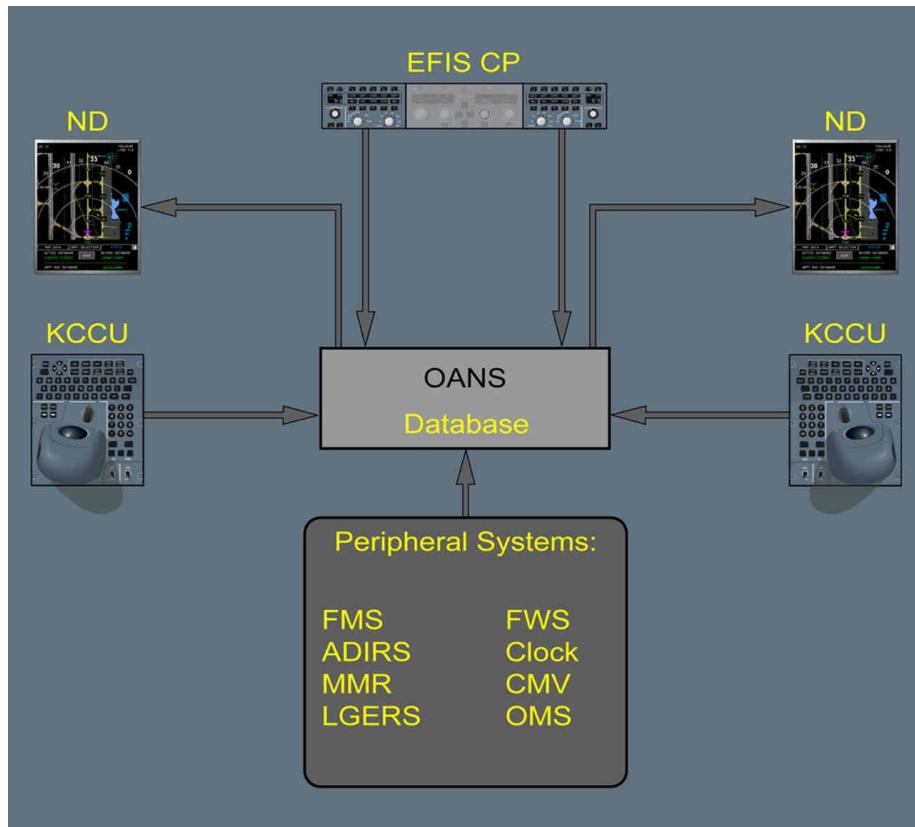
The flight crew can select five different ranges for the OANS display: 5 nm, 2 nm, 1 nm, 0.5 nm and 0.2 nm.

With the OANS, the flight crew can:

- Display the aircraft position, and find any location within an airport, on the moving airport map
- Move the moving airport map via the KCCU
- Display any airport of the OANS database, when in PLAN mode.

ARCHITECTURE

Applicable to: ALL

OANS Architecture

[2] In normal operations, the Captain's OANS uses inputs from the ADIRS 1, MMR 1 and FMS 1. The First Officer's OANS uses inputs from the ADIRS 2, MMR 2 and FMS 2.

EFIS CP

The flight crew uses the EFIS CP to activate the OANS, and to select the range and mode for the display.

ND

When the flight crew selects the ZOOM position via the onside ND range selector , the onside ND displays the moving airport map.

Some tasks, applicable to the airport navigation function, can also be performed via the interactive functions of the ND . For more information about the interactive functions of the ND , *Refer to DSC-34-10-70-20-GND Overview* .

KEYBOARD AND CURSOR CONTROL UNIT (KCCU)

The flight crew uses the KCCU to activate the interactive functions of the ND, and to enter the ident on the OANS function pages.

L2 OANS DATABASE

The OANS database provides the information that appears on the moving airport map.

There are two databases cycles, and each cycle has a validity period. The STATUS panel displays the validity period of both cycles.

- L3** The STATUS panel also displays the part number of the OANS database.
- L2** If the date of the aircraft clock does not correspond to the validity period of the database cycle, the message area of the STATUS panel displays the **DATABASE CYCLE NOT VALID** message.
For more information, *Refer to DSC-34-10-70-20-GND Additional Functions* .

L2 PERIPHERAL SYSTEMS

The OANS interfaces with the following peripheral systems:

FLIGHT MANAGEMENT SYSTEM (FMS)

The FMS provides flight plan data (e.g. selected runways, origin airport, alternate airport and destination airport) and the GPS PRIMARY status.

- L3** The Captain's OANS uses inputs from FMS1, and the First Officer's OANS uses inputs from FMS2.

L2 AIR DATA AND INERTIAL REFERENTIAL SYSTEM (ADIRS)

The OANS computes the aircraft position using:

- The ADR and the IR data, that are provided by the ADIRS
- The MMR data.

- L3** The Captain's OANS uses inputs from ADIRS1, and the First Officer's OANS uses inputs from ADIRS2. When the flight crew changes the ATT HDG selector, ADIRS3 data may be used instead of the data from one of the two other ADIRS.

L2 MULTI MODE RECEIVER (MMR)

The GPS data provided by the MMR, is the primary data source for OANS position computation.

L3 The Captain's OANS uses inputs from MMR1, and the First Officer's OANS uses inputs from MMR2.

L2 LANDING GEAR EXTRACTION RETRACTION SYSTEM (LGERS)

The LGERS provides the landing gear position data, if the aircraft is on ground and in flight.

FLIGHT WARNING SYSTEM (FWS)

The OANS interfaces with the FWS1 (or with the FWS2 in case of FWS1 failure) in order to:

- Display failures
- Trigger the annunciations
- Provide the flight phase data.

L3 CLOCK

The aircraft clock provides the OANS with the current date and the current time, in order to verify the database validity period.

CONCENTRATOR AND MULTIPLEXER FOR VIDEO (CMV)

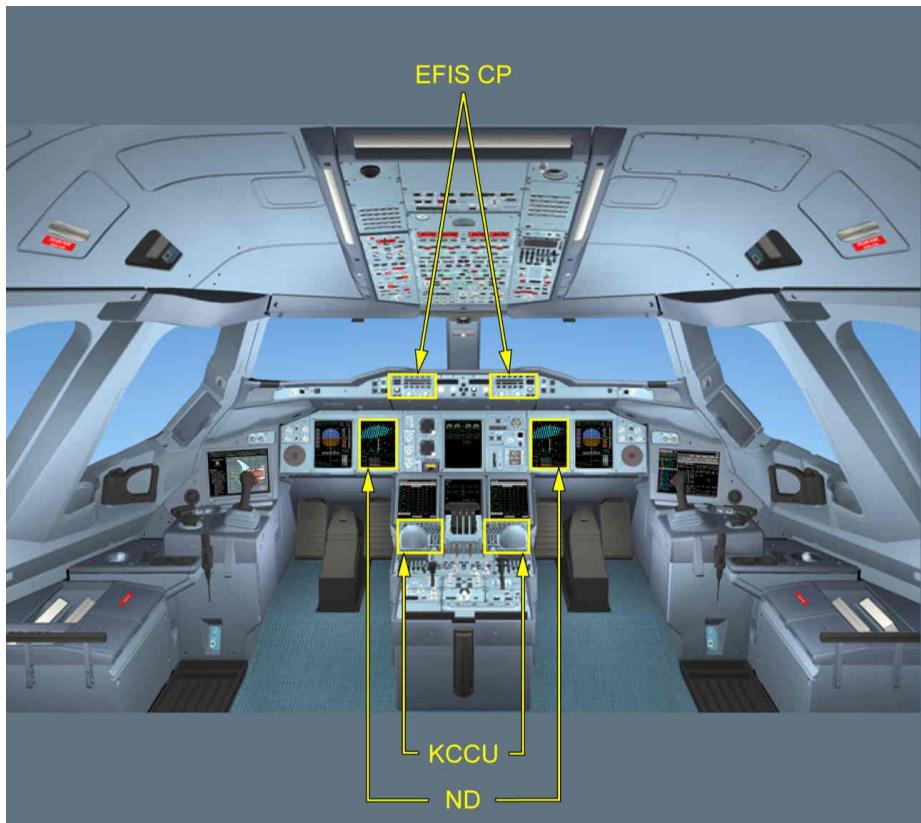
The OANS sends video images to the CMV, and the CMV sends this data to the NDs via the Control and Display System (CDS).

ONBOARD MAINTENANCE SYSTEM (OMS)

The OANS and the OMS share data from the maintenance and the OANS database.

COCKPIT VIEW

Applicable to: ALL

Cockpit View

KCCU

Applicable to: ALL

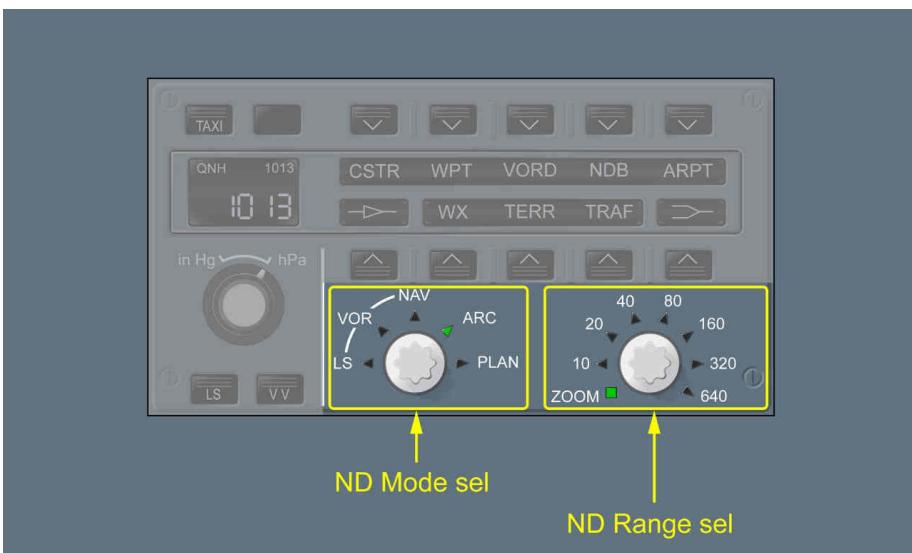
KCCU

The flight crew uses the Keyboard and Cursor Control Unit (KCCU) to:

- Move the cursor on the ND screen
- Move the moving airport map
- Enter the airport ident or the airport items ident, on the ARPT SEL panel, or on the MAP DATA panel.

EFIS CONTROL PANEL

Applicable to: ALL

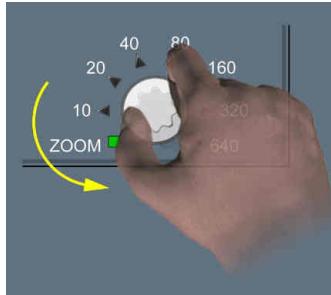
EFIS CP**ND mode selector**

The moving airport map is only available in PLAN, ARC, or ROSE-NAV mode.

In ROSE-VOR and ROSE-LS modes, the OANS is not displayed, even if the flight crew sets the ND range selector to ZOOM.

ND range selector

If the flight crew sets the ND range selector to ZOOM, the ND displays the moving airport map with a 5 nm range.



If the flight crew turns the ND range selector counterclockwise, the ND range decreases respectively by:

- 2 nm
- 1 nm
- 0.5 nm
- 0.2 nm.

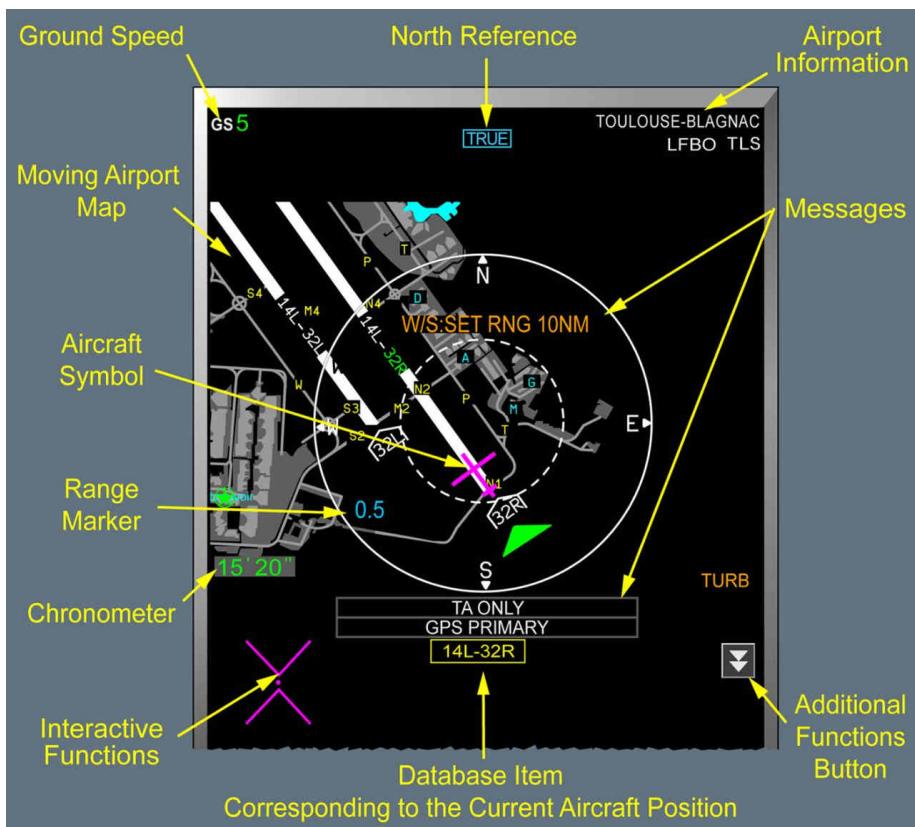
Similarly, each time the flight crew turns the ND range selector clockwise, the ND range increases in the opposite order.

If the flight crew sets the ND range selector to a range other than ZOOM, the ND no longer displays the moving airport map.

[2] In the case of an EFIS CP failure, the ND range selector is automatically set to 5 nm.

ND

Applicable to: ALL

OANS on the NDAIRCRAFT SYMBOL

L12



The aircraft symbol is located on the moving airport map.
The OANS computes the aircraft location, using MMR (GPS) and ADIRS data.

- [L2] The aircraft symbol is displayed with the same scale as the moving airport map, if the flight crew sets the ND range selector to 0.2 nm.

The OANS no longer displays the aircraft symbol, if:

- MMR data is not available, and/or
- IRS data is not available.

MOVING AIRPORT MAP

In normal operation, it is not necessary for the flight crew to manually select an airport. The OANS automatically displays a default airport, based on the current aircraft position and on the FMS flight plan.

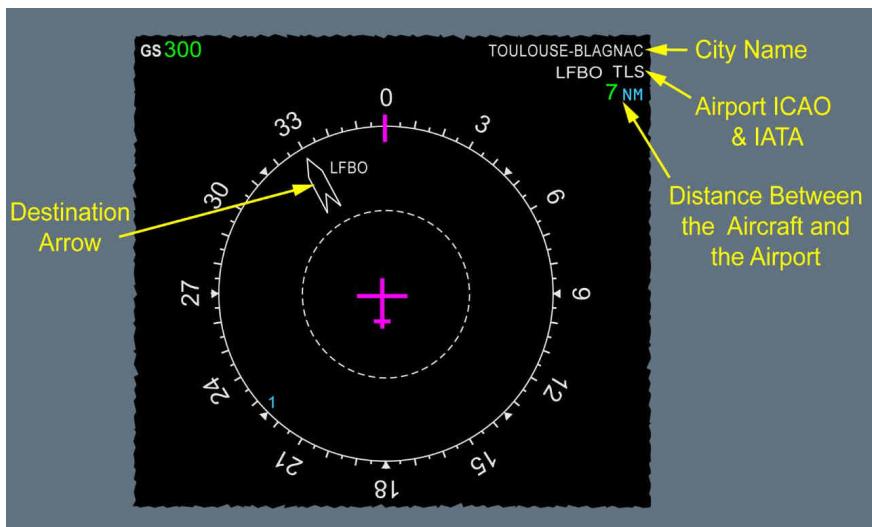
The default airport can be either the origin, destination, or alternate airport of the flight plan, depending on the current aircraft position.

In PLAN mode only, the flight crew can display any other airport of the airport database.

ARC OR ROSE-NAV MODE

In ARC or ROSE-NAV mode, the OANS displays a default moving airport map, in relation to the fixed aircraft symbol. The default airport is oriented to the magnetic or true heading, depending on the position of the TRUE/MAG pb, on the AFS CP.

- [L3] The default airport is:
- The current airport, if the aircraft is on ground, or
 - The origin, destination, or alternate airport, if the aircraft is in flight. The OANS keeps one of these airports, if the aircraft is within a virtual cylinder, that is centered over this airport. This virtual cylinder has a 20 nm radius, and a 5 000 ft height.
- [L1] If the moving airport map is out of the ND range and the selected range is 5 nm, a destination arrow indicates the heading of the destination airport. The arrow also has the ICAO code label of the airport.
- [L2] The destination arrow indicates the airport heading. It does not indicate the runway orientation.

Destination Arrow**L1 PLAN MODE**

In PLAN mode, the OANS displays:

- The default airport, or
- Any airport of the database, that the flight crew manually selects for consultation.

The moving airport map is oriented to the TRUE north, and is centered on:

- The aircraft, if the aircraft is on ground
- The airport, if the aircraft is in flight.

L2 The displayed airport moves immediately, when the flight crew moves the map via the KCCU.

L3 The default airport is:

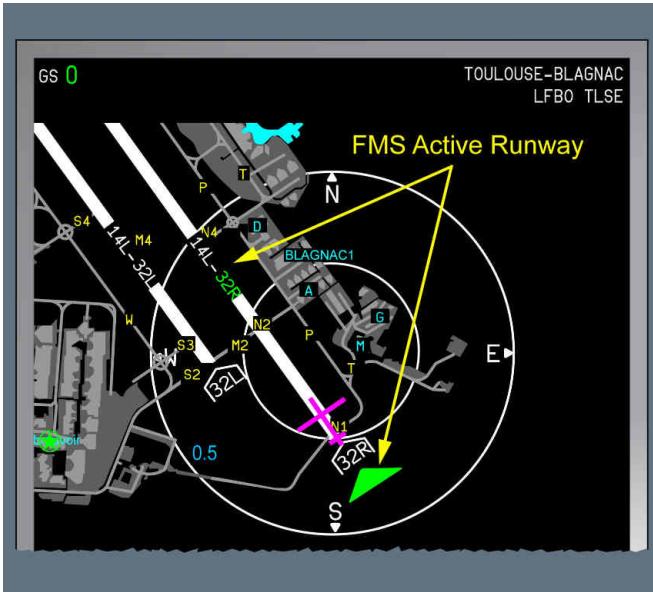
- The origin airport, if the distance from the origin airport to the aircraft is shorter than 50 nm, or
- The destination airport, in all other cases.
If the distance from the origin airport to the destination airport is shorter than 300 nm, the destination airport becomes the default airport.

L1 When the aircraft approaches the selected runway, the OANS displays the QFU of the runway approaching advisory in green.

If the flight crew selects an origin runway, or a destination runway in the FMS flight plan, the OANS displays:

- A green triangle next to the QFU threshold label of the selected runway
- The QFU of the selected runway on the runway label in green.

FMS Runway



GROUND SPEED

The aircraft Ground Speed (GS) is indicated in knots. The ADIRS provides the GS of the GPIRS.

- [2] If the ground speed is not valid, green dashes appear instead of the speed values.

CHRONOMETER

For more information, *Refer to EFIS / ND / CHRONO*.

NORTH REFERENCE

At high latitudes, the ADIRS automatically changes the MAG north reference to the TRUE north reference.

When the aircraft approaches high latitudes, the ND displays the SELECT TRUE NORTH REF message, in order to request that the flight crew selects TRUE north reference.

The flight crew manually changes the north reference by pressing the TRUE/MAG pb on the AFS CP.

INTERACTIVE FUNCTIONS

MOVE FUNCTION

It is possible to move the moving airport map using the KCCU . The flight crew presses the validation pb and simultaneously moves the trackball. The moving airport map follows the trackball motion, if it is inside the display box.

KCCU



As soon as the validation pb is released:

- In PLAN mode: The moving airport map remains in the position defined by the cursor
- In ARC or ROSE-NAV mode: The moving airport map is automatically centered on the aircraft symbol.

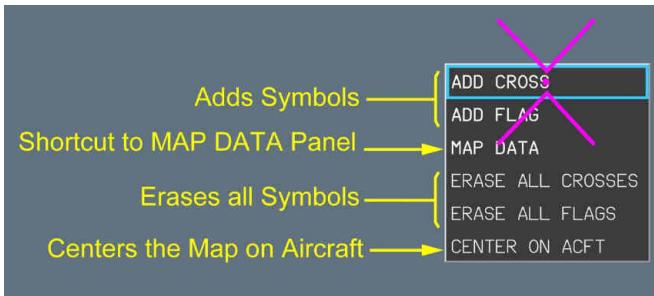
INTERACTIVE MENU

The flight crew can access the airport navigation functions by clicking anywhere on the moving airport map.

[L2] The interactive menu automatically disappears if the flight crew:

- Moves the cursor outside of the menu window, or
- Selects one of the functions, or
- Changes the ND range or mode.

Interactive Menu of the ND



[L1] Adds Symbols

It is possible to add two types of symbols to the moving airport map:



Green flags:

To locate or mark a given point on the airport, for example.



White crosses:

Indicate a problem, such as a closed taxiway.

If the flight crew adds a symbol to the onside moving airport map, the symbol appears where the flight crew has clicked the cursor.

If the flight crew clicks on a symbol in the onside moving airport map, the interactive menu of the ND displays the DELETE function instead of the ADD function.

DELETE FunctionShortcut to the MAP DATA Panel

The flight crew can directly access the MAP DATA panel. For more information, *Refer to MAP DATA Panel*.

Erases all Symbols

The flight crew can delete all symbols that appear on the onside moving airport map. If the flight crew selects the ERASE ALL symbols function, a confirmation action is required.

Erase All Crosses Confirmation Window

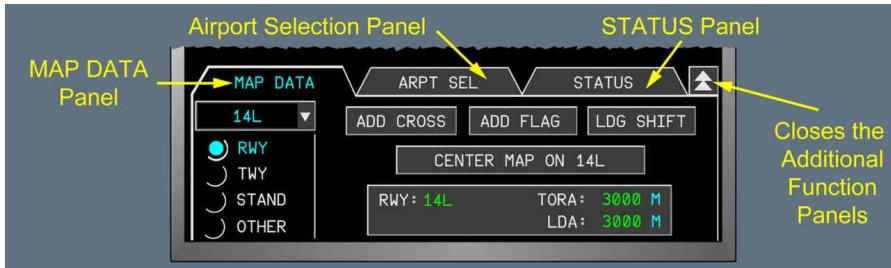
If the flight crew selects the CANCEL button, all the symbols remain on the moving airport map, and the confirmation window no longer appears.

Centers on Aircraft

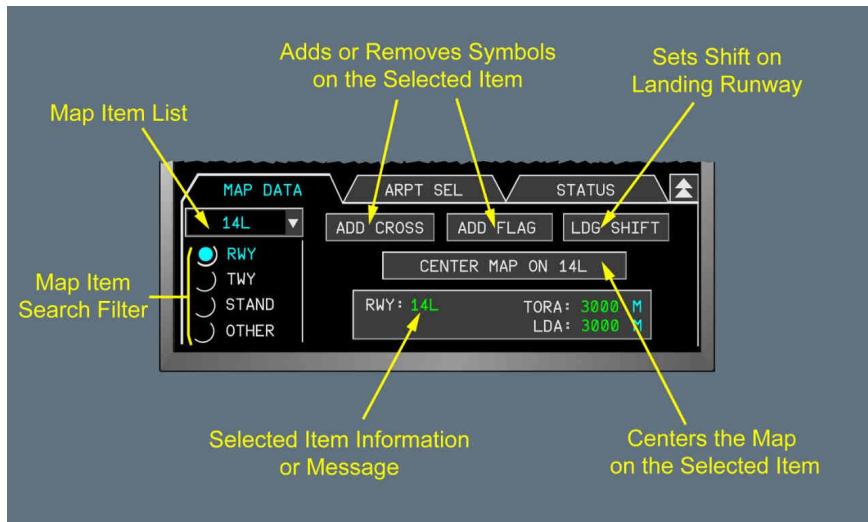
In PLAN mode, the flight crew can center the moving map of the default airport, on the aircraft position.

ADDITIONAL FUNCTIONS BUTTON

If the flight crew clicks on the additional functions button, additional function panels appear on the lower part of the ND.

Additional Function Panels**MAP DATA PANEL**

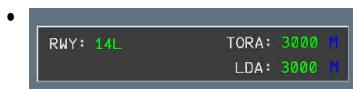
The MAP DATA panel enables the flight crew to see the airport map data.



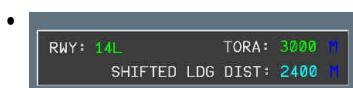
The flight crew can select one map item in the list, or enter the item IDENT via the keyboard. It is possible to display the list of one type of item (runway, taxiway, stand, and other items), by using the search filter.

If the flight crew selects one item:

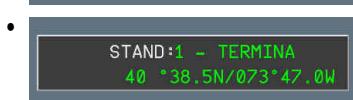
- Additional information is available for:



The runway



The runway shift



The aircraft stands.

If a map item is not found, because it is either not in airport database or not written correctly, the **NOT IN RWY** (or other selected filter) DATABASE message appears instead of the item information.

- The flight crew can add a symbol on the selected item location. If a symbol already exists, the flight crew can select the other symbol, or can delete it.
- In PLAN mode, the flight crew can center the moving airport map on the selected item.

LANDING RUNWAY SHIFT

When the flight crew clicks on the LDG SHIFT button, the following landing runway shift panel appears.

Landing Runway Shift Panel



The flight crew can shift the runway threshold and / or the runway end.

The flight crew can shift the threshold and / or end of only one runway of the database.

When the flight crew validates the runway shift with the return button, the map data panel displays the runway shift See .

AIRPORT SELECTION PANEL

The ARPT SEL panel enables the flight crew to display the information that is in the airport database.

In PLAN mode, the flight crew can also select and display airports that are not origin, alternate, or destination airports.

Airport Selection Panel

The flight crew can:

- Select one airport from the list, or
- Use the keyboard to enter the airport ICAO code, or the IATA code.

The airport search filter enables the flight crew to access the list of airports, by selecting one of the following:

- The ICAO code
- The IATA code
- The city name.

If the flight crew selects one airport:

- Additional information appears in green (City name, ICAO and IATA codes, coordinates ...). The information appears in yellow, if the airport is not currently displayed on the ND .
- If an airport is not found, because it is either not in airport database, or not written correctly, the **NOT IN ICAO** (or other selected filter) **DATABASE** message appears instead of the airport information.
- In ARC or ROSE-NAV mode, the **SET PLAN MODE** message appears to request the flight crew to select the PLAN mode, in order to display the selected airport.
- In PLAN mode, the flight crew can display any selected airport on the ND .

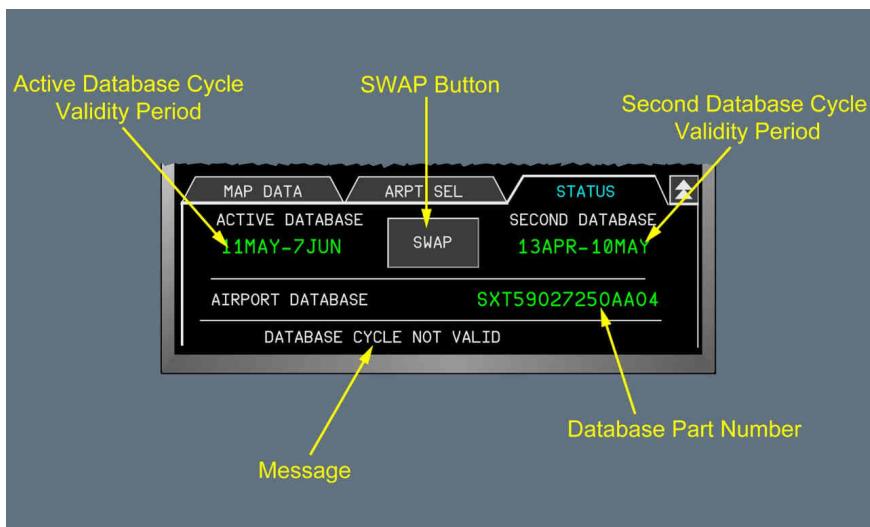
It is always possible to display the origin, destination, or alternate airport of the FMS flight plan, by using the corresponding shortcut buttons that are on the right side of the ARPT SEL panel.

STATUS PANEL

The STATUS panel enables the flight crew to:

- Check the status of the airport database
- Exchange one database cycle with the other.

STATUS panel



- [2] If the airport database is missing or expired, the OANS automatically displays the STATUS panel, when the flight crew accesses the OANS for the first time.

- [L1] The flight crew can exchange one database cycle with the other, using the SWAP button. A confirmation action is required.

SWAP Confirmation Window

- [L2] If a database cycle is changed, all the added symbols will be deleted from the moving airport map.

DATABASE CYCLE NOT VALID

The expiration date of the database cycle is different from the current date.

OANS MESSAGES**ARPT NAV POS LOST**

There is

- An IRS source failure, or
- A failure of both MMRs.

ARPT NOT IN ACTIVE F-PLN

In PLAN mode, the flight crew has displayed an airport that is not the origin, destination, or alternate airport.

NOT AVAIL

The airport navigation display is not available.

PLEASE WAIT

The flight crew's request is in progress.

SURV MESSAGES**TA ONLY**

Refer to Message



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AIRPORT NAVIGATION - CONTROLS AND INDICATORS

TCAS CHANGE MODE

Refer to Message

TCAS: INCREASE RANGE

Refer to Message

TERR: CHANGE MODE

Refer to Message

TERR: INCREASE RANGE

Refer to Message

TURB

The SURV system (WXR / PWS) has detected turbulence.

W/S: CHANGE MODE

Refer to Message

W/S: SET RNG 10 NM

Refer to Message

FMS MESSAGES

CHECK NORTH REF

Refer to Message

GPS PRIMARY

Refer to Message

GPS PRIMARY LOST

Refer to Message

NAV ACCUR DOWNGRADED

Refer to Message

NAV ACCUR UPGRADED

Refer to Message

SELECT TRUE NORTH REF

Refer to Message



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AIRPORT NAVIGATION - CONTROLS AND INDICATORS

SPECIFIC VOR-D NOT AVAIL

Refer to Message

OTHER MESSAGES

CHECK HDG

Refer to Message

DISPLAY SYSTEM VERSIONS DISAGREE

Refer to Message

GENERAL**Applicable to: ALL**

The aircraft has two independent Landing Systems (LS).

- Each LS is integrated in a Multi Mode Receiver (MMR) (LS 1 receiver in MMR 1, LS 2 receiver in MMR 2).

- L1 Each LS provides the following functions:

- ILS function which enables to fly precision approaches and landings based on vertical and lateral deviations received from the Localizer (LOC) and the Glide Slope (G/S) ground stations

- L2 The aircraft has two G/S antennas:

- One is located in the radome
This antenna is referred to as the G/S radome antenna.
- One is located next to the nose landing gear.
This antenna is referred to as the G/S lower antenna.

When the landing gear is up, both MMR s use the G/S radome antenna. Then, when the landing gear is down, and the aircraft is below 700 ft RA , both MMR s use the G/S lower antenna.

- L1 For more information on ILS approaches, *Refer to DSC-22-FG-70-80-20 ILS Approach .*

- GLS function which enables to fly GLS approaches and landings

The computation of the GLS deviations is based on:

- The GPS position that comes from the GPS receiver
- Data received from the GLS ground station.

The LOC antenna receives data from the GLS ground station.

For more information on GLS approaches, *Refer to DSC-22-FG-70-80-25 GLS Approach .*

- FLS function which enables to fly Non-Precision Approaches as well as LOC Back Course or ILS with G/S inoperative approaches.

The computation of the FLS deviations is based on data coming from the FMS database as well as aircraft FMS position information.

For more information on FLS approaches, *Refer to DSC-22-FG-70-80-30 VOR, VOR/DME, or RNAV Approach Flown with FLS Function .*



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LANDING SYSTEMS

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ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

NAV ADR 1(2)(3) FAULT (Refer to procedure)

NAV ADR 1+2(1+3)(2+3) FAULT (Refer to procedure)

NAV ADR 1+2+3 DATA DEGRADED (Refer to procedure)

NAV ADR 1+2+3 FAULT (Refer to procedure)

NAV AIR DATA DISAGREE (Refer to procedure)

NAV ALL AIR DATA DISAGREE (Refer to procedure)

NAV AOA DISAGREE (Refer to procedure)

NAV ARPT NAV FAULT (Refer to procedure)

NAV CAPT & F/O ALT DISAGREE (Refer to procedure)

NAV CAPT & F/O ATT DISAGREE (Refer to procedure)

NAV CAPT & F/O BARO REF DISAGREE (Refer to procedure)

NAV CAPT & F/O HDG DISAGREE (Refer to procedure)

NAV EXTREME LATITUDE (Refer to procedure)

NAV FLS 1(2) FAULT (Refer to procedure)

NAV FLS 1+2 FAULT (Refer to procedure)

NAV FM / GPS POS DISAGREE (Refer to procedure)

NAV FM / IR POS DISAGREE (Refer to procedure)

NAV GLS 1(2) FAULT (Refer to procedure)

NAV GLS 1+2 FAULT (Refer to procedure)

NAV GPS 1(2) FAULT (Refer to procedure)

NAV GPS 1+2 FAULT (*Refer to procedure*)

NAV G/S 1(2) ON LOWER ANT (*Refer to procedure*)

NAV HUD FAULT (*Refer to procedure*)

NAV HUD FPV DISAGREE (*Refer to procedure*)

NAV ILS 1(2) FAULT (*Refer to procedure*)

NAV ILS 1+2 FAULT (*Refer to procedure*)

NAV IR ALIGNMENT IN ATT MODE (*Refer to procedure*)

NAV IR 1(2)(3) FAULT (*Refer to procedure*)

NAV IR 1+2(1+3)(2+3) FAULT (*Refer to procedure*)

NAV IR NOT ALIGNED (*Refer to procedure*)

NAV LOWER G/S ANT FAULT (*Refer to procedure*)

NAV LS 1(2) FAULT (*Refer to procedure*)

NAV LS 1+2 FAULT (*Refer to procedure*)

NAV LS TUNING DISAGREE (*Refer to procedure*)

NAV SIDESLIP PROBE 1(2)(3) FAULT (*Refer to procedure*)

NAV STATIC PROBE FAULT (*Refer to procedure*)

NAV RA SYS A(B)(C) FAULT (*Refer to procedure*)

NAV RA SYS A+B(A+C)(B+C) FAULT (*Refer to procedure*)

NAV RA SYS A+B+C FAULT (*Refer to procedure*)

NAV RESIDUAL AIR SPEED (*Refer to procedure*)

NAV T.O SPEEDS NOT INSERTED (*Refer to procedure*).



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ECAM ALERTS

NAV UNRELIABLE AIR SPEED INDICATION (*Refer to procedure*)



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ECAM ALERTS

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ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

L12

| System | Subsystem | Electrical Supply |
|----------------------|-------------------------------|--|
| ISIS | ISIS 1 | DC 1 DC ESS as backup |
| | ISIS 2 | DC 2 DC ESS as backup |
| Standby Static Probe | Left | AC 2 |
| | Right | AC 2 |
| Standby Pitot Probe | N/A | AC ESS |
| Standby Compass | N/A | DC ESS |
| ADIRU | ADIRU 1 | AC EMER DC ESS as backup |
| | ADIRU 2 | AC 4 DC 2 as backup |
| | ADIRU 3 | AC 1 AC EMER as first backup DC ESS as second backup |
| MFP | MFP 1 | AC EMER |
| | MFP 2 | AC 4 |
| | MFP 3 | AC 2 AC EMER, if AC 2 is failed, and the flight crew has set the AIR DATA selector to CAPT on 3 |
| SSA Probes | SSA 1 | AC ESS |
| | SSA 2 | AC 4 |
| | SSA 3 | AC 2 AC ESS, if AC 2 is failed, and the flight crew has set the AIR DATA selector to CAPT on 3 |
| Static Probes | Left and Right Static Probe 1 | DC ESS |
| | Heating of Static Probes 1 | AC ESS |
| | Left and Right Static Probe 2 | DC 2 |
| | Heating of Static Probes 2 | AC 4 |
| | Left and Right Static Probe 3 | DC 1 DC ESS, if DC 1 is failed, and the flight crew has set the AIR DATA selector to CAPT on 3 |
| | Heating of Static Probes 3 | AC 2 AC ESS, if AC 2 is failed, and the flight crew has set the AIR DATA selector to CAPT on 3 |
| MMR | MMR 1 | AC EMER |
| | MMR 2 | AC 3 |

Continued on the following page



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ELECTRICAL SUPPLY

Continued from the previous page

| System | Subsystem | Electrical Supply |
|----------------|-------------------------|-------------------|
| GPS | GPS 1 | AC EMER |
| | GPS 2 | AC 3 |
| RA | RA SYS A | AC 2 |
| | RA SYS B | AC 4 |
| | RA SYS C | AC ESS |
| VOR | VOR 1 | AC EMER |
| | VOR 2 | AC 4 |
| LS | LS 1 | AC EMER |
| | LS 2 | AC 3 |
| DME | DME 1 | AC EMER |
| | DME 2 | AC 4 |
| Standby RADNAV | Standby RADNAV on RMP 1 | DC ESS |
| | Standby RADNAV on RMP 2 | DC ESS |

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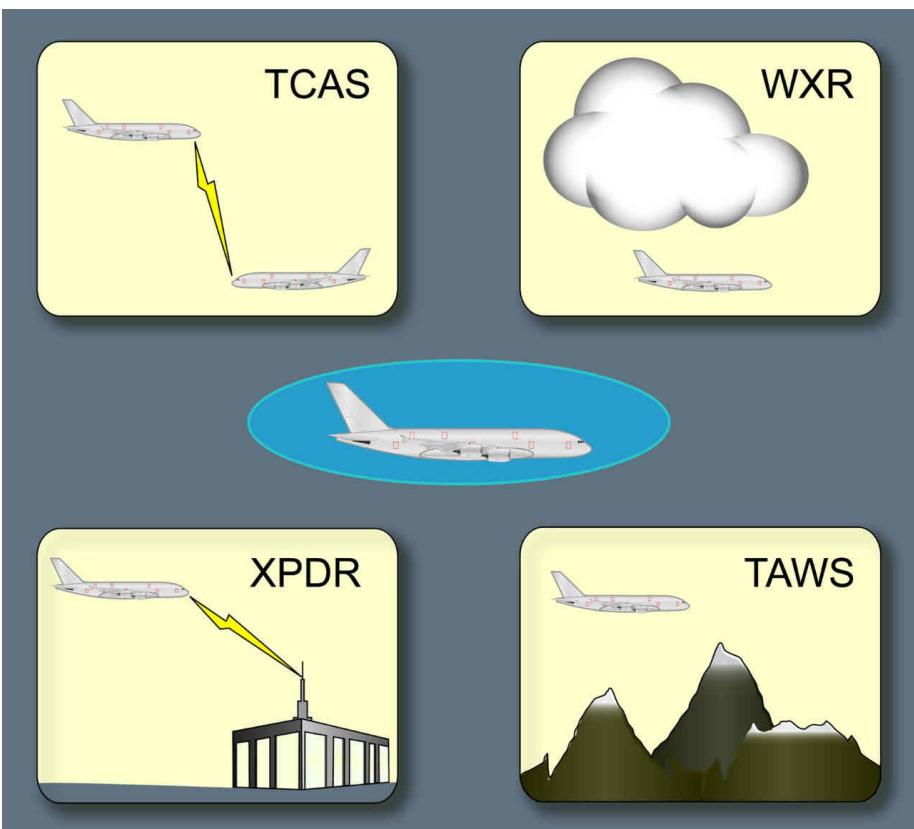
DSC-34-20-100 Electrical Supply

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OVERVIEW**Applicable to: ALL**

The Surveillance (SURV) system includes the following systems that perform aircraft surveillance functions:

- Terrain Awareness and Warning System (TAWS)
- Weather Radar (WXR) system, including the predictive windshear detection
- Traffic Collision Avoidance System (TCAS)
- Transponder (XPDR).

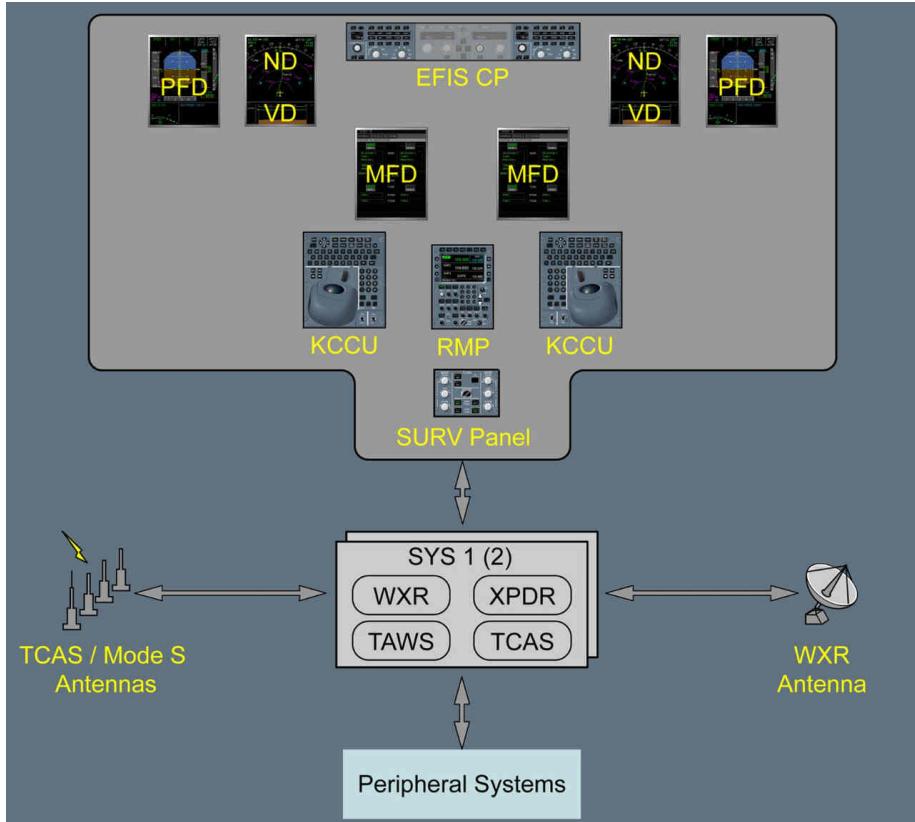
SURV

ARCHITECTURE

Applicable to: ALL

The SURV system has:

- Two identical surveillance systems (SYS 1 and SYS 2)
- A Weather Radar (WXR) antenna
- Four identical antennas with TCAS /Mode S combination
- A SURV panel
- A dedicated MFD page.

SURV System Architecture



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SYSTEM DESCRIPTION

SURV SYS

The SURV includes two identical surveillance systems, referred to as SYS 1 and SYS 2.

SYS 1 and SYS 2 can both perform all of the environmental surveillance functions that are grouped together as follows:

- The WXR with the TAWS
- The TCAS with the XPDR.

- [L3] The Environment Surveillance Unit (AESU) 1(2) provides the SURV SYS 1(2) function.

In normal operation, the AESU that has the WXR/TAWS selected is the master AESU. It manages the alerts and displays for all of the surveillance functions.

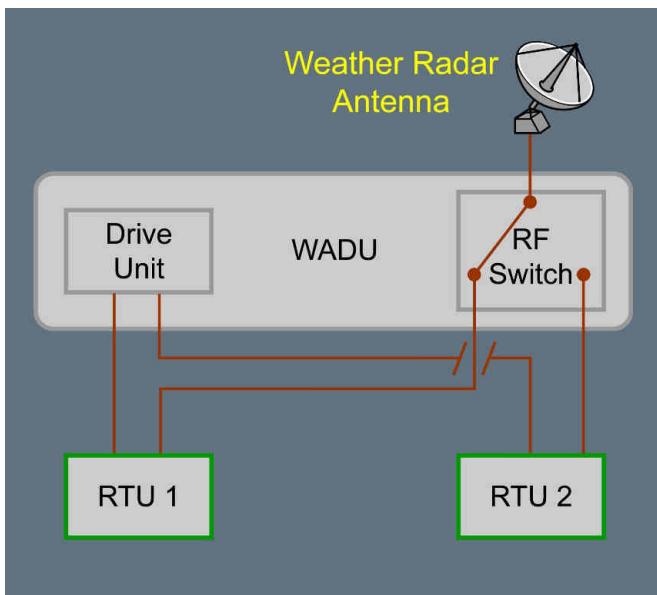
- [L2] When the aircraft is on ground, SYS 1(2) is automatically selected as the master AESU if the flight number in the FMS is an odd (even) number. It enables the detection of hidden failures.

In the case of an electrical emergency configuration, SYS 1 is automatically selected as the master AESU.

WEATHER RADAR (WXR) ANTENNA

The WXR antenna is in the radome.

It receives and transmits signals to the AESU, in order to perform WXR functions.

WXR Antenna Architecture**L3 WEATHER ANTENNA DRIVE UNIT (WADU)**

The WADU is next to the antenna in the radome. It supports and controls the antenna in order to perform the WXR functions.

The WADU has:

- A Radio Frequency (RF) switch, to select the SYS that performs the WXR function
- A drive unit that controls the position of the antenna (tilt and azimuth angles).

RADAR TRANSCEIVER UNITS (RTU)

Two RTUs are connected to the WADU in the radome, and each RTU interfaces with an AESU.

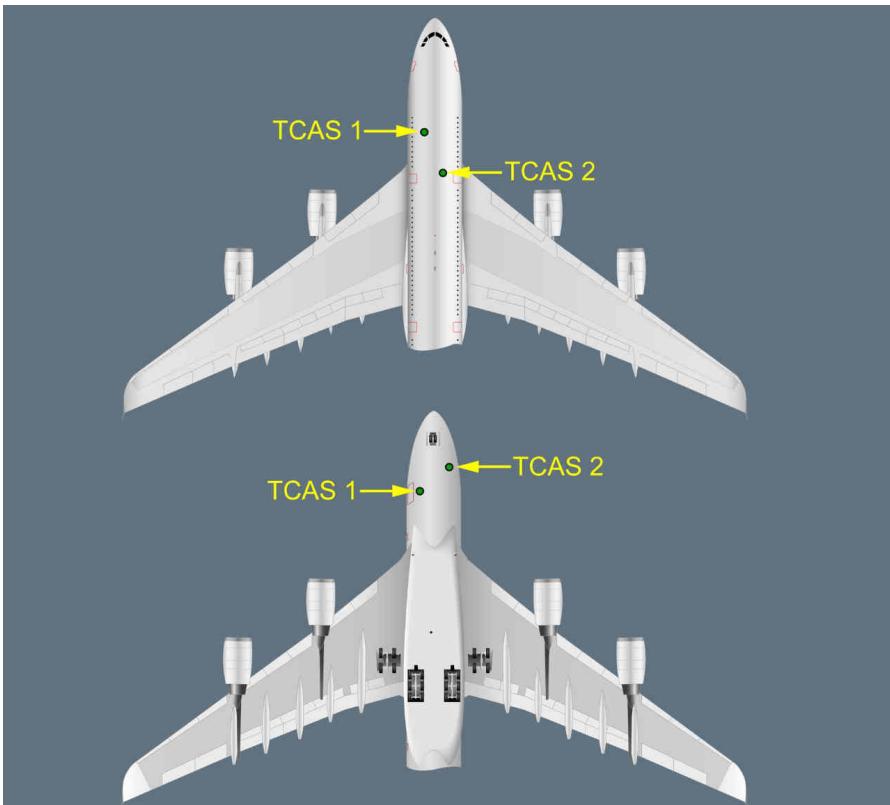
The RTUs:

- Transmit radar pulses
- Receives the return signals from the weather phenomena, and send them to the associated AESU.

TCAS/MODE S ANTENNAS

There are four combined TCAS/Mode S antennas that transmit and receive data to and from the TCAS and Air Traffic Control (ATC).

- There are four antennas at the front of the fuselage: Two at the top, and two at the bottom.

Location of TCAS Antennas**SURV PANEL**

The flight crew can access the main SURV controls, from the SURV panel.

Note: All the SURV controls of the SURV panel are also available on the SURV page of the MFD .

For more information on the applicable sections of the SURV panel:

- Refer to *SURV Overview*
- Refer to *TAWS*
- Refer to *WXR*
- Refer to *TCAS* .

KEYBOARD AND CURSOR CONTROL UNIT (KCCU)

The flight crew uses the KCCU to:

- Access and navigate through the SURV pages on the MFD
- Enter and modify SURV data on the MFD.

MULTIFUNCTION DISPLAY (MFD)

The MFD displays text data provided by the SURV .

The MFD is interactive. Therefore, the flight crew can navigate through the SURV pages, and can consult, enter, or modify data using the Keyboard and Cursor Control Unit (KCCU).

The MFD can display two SURV pages:

- The CONTROLS page, that monitors all surveillance functions

MFD CONTROLS Page

For more information on the applicable sections of the CONTROLS page:

- Refer to TAWS
- Refer to WXR
- Refer to TCAS
- Refer to XPDR .

- The STATUS & SWITCHING page, that indicates the status of each SURV function, and enables the flight crew to select the SYS .

STATUS & SWITCHING Page

For more information on the applicable sections of the STATUS & SWITCHING page:

- Refer to TAWS
- Refer to WXR
- Refer to TCAS
- Refer to XPDR .

NAVIGATION DISPLAY (ND), VERTICAL DISPLAY (VD) AND PRIMARY FLIGHT DISPLAY (PFD)

The ND , the VD , and the PFD provide situational awareness information, related to the TAWS , WXR , and TCAS surveillance functions.

For more information on the applicable sections of the ND :

- *Refer to TAWS*
- *Refer to WXR*
- *Refer to TCAS .*

For more information on the applicable sections of the VD :

- *Refer to TAWS*
- *Refer to WXR .*

For more information on the applicable sections of the PFD :

- *Refer to TAWS*
- *Refer to WXR*
- *Refer to TCAS .*

EFIS CONTROL PANEL (CP)

The flight crew uses the EFIS CP to display weather, terrain, and traffic information on the ND .

For more information on the EFIS CP , *Refer to DSC-34-20-60-30-10 EFIS Control Panel* .

RADIO MANAGEMENT PANEL (RMP)

RMP 1 and RMP 2 are both connected to SYS 1 and SYS 2 of the SURV.

In addition to radio management functions, the RMPs enable the flight crew to control part of the transponder (XPDR). The flight crew can use the RMPs to:

- Change the transponder code (SQWK)
 - Perform an IDENT.
- L2** RMP 3 is not directly connected to the SURV. However, if the XPDR code is set from RMP 3, the RMP synchronization function enables RMP 1 or RMP 2 to transmit the code to the SURV.
- L1** If both RMP 1 and RMP 2 fail, the XPDR control remains available via the SURV/CONTROLS page of the MFD.

L2 PERIPHERAL SYSTEMS

The SURV interfaces with other peripheral systems:

- Mainly via the AFDX network
- Also via other classic connections.

FLIGHT MANAGEMENT SYSTEM (FMS)

The FMS provides navigation and flight plan data.

AIR DATA AND INERTIAL REFERENTIAL UNIT (ADIRU)

The ADIRUs provide ADR, IR, GPS and GPIRS data.

PRIMARY FLIGHT CONTROL COMPUTER (PRIM)

The PRIM provides AFS engagement information.

FLIGHT CONTROL UNIT (FCU)

Both EFIS CPs provides ND settings and the selected altitude.

In the case of an EFIS CP failure, FCU backup provides data to the SURV SYS.

LANDING GEAR EXTRACTION RETRACTION SYSTEM (LGERS)

LGERS provides flight/ground information, and the landing gear position.

FULL AUTHORITY DIGITAL ENGINE CONTROL (FADEC)

The FADEC indicates:

- The running engines
- The takeoff mode selection.

FLIGHT WARNING SYSTEM (FWS)

The SURV interfaces with the FWS for:

- Alert priority management
- Failure display and annunciation.

AIR TRAFFIC COMMUNICATION (ATC)

The SURV provides the ATC with:

- The TCAS system status
- The XPDR system status
- The XPDR altitude reporting.

DIGITAL FLIGHT DATA RECORDER (DFDR)

The SURV provides data required for trouble shooting and accident/incident recording, such as:

- Alerts
- System status.

SLAT FLAP CONTROL COMPUTER (SFCC)

The SFCC provides the flaps position.



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SYSTEM DESCRIPTION

RADIO ALTIMETERS

The radio altimeters provide the radio altitudes.

MULTI MODE RECEIVER (MMR)

The MMR provides the information that the aircraft is below the glide slope.

L3 ONBOARD MAINTENANCE SYSTEM (OMS)

The SURV and the OMS share data for maintenance purposes.



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SYSTEM DESCRIPTION

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34 - SURVEILLANCE

TAWS - SYSTEM DESCRIPTION

OVERVIEW

Applicable to: ALL

The Terrain Awareness and Warning System (TAWS):

- Detects terrain collision threats
- Displays terrain information
- Triggers applicable aural and visual alerts.

The TAWS has:

- A Ground Proximity Warning System (GPWS) function with five basic modes (*Refer to DSC-34-20-20-10-10 GPWS*)
- A Terrain (TERR) and obstacle function with two modes, including the peaks function (*Refer to DSC-34-20-20-10-20 Terrain Function*)
- A TAWS database (*Refer to DSC-34-20-20-10 TAWS Database*).

GPWS

Applicable to: ALL

The purpose of the GPWS function is to warn the flight crew of potentially hazardous situations, such as a collision with terrain.

The GPWS function monitors the flight path of the aircraft and triggers visual and aural alerts, when the aircraft is in one of the following situations:

- Excessive rate of descent (Mode 1)
- Excessive terrain closure rate (Mode 2)
- Altitude loss after takeoff or go-around (Mode 3)
- Terrain clearance not sufficient, if not in landing configuration (Mode 4)
- Excessive descent below the glide slope (Mode 5).

Note: Stall or windshear alerts override GPWS visual and aural alerts.

PRINCIPLE

The GPWS function detects terrain collision threats by comparing the geometric altitude of the aircraft and its trajectory with the information provided by the Radio Altimeters (RA).

L3 The TAWS computes the geometric altitude of the aircraft, by using:

- Pressure altitude
- GPS altitude
- Radio-altitude
- Temperature

- Barometric references
- Data from the TAWS database.

[L2] The following GPWS envelopes can be slightly modified for some airports, in order to minimize unexpected alerts.

EXCESSIVE RATE OF DESCENT (MODE 1)

If a high rate of descent is detected at low altitude, the following alerts are triggered:

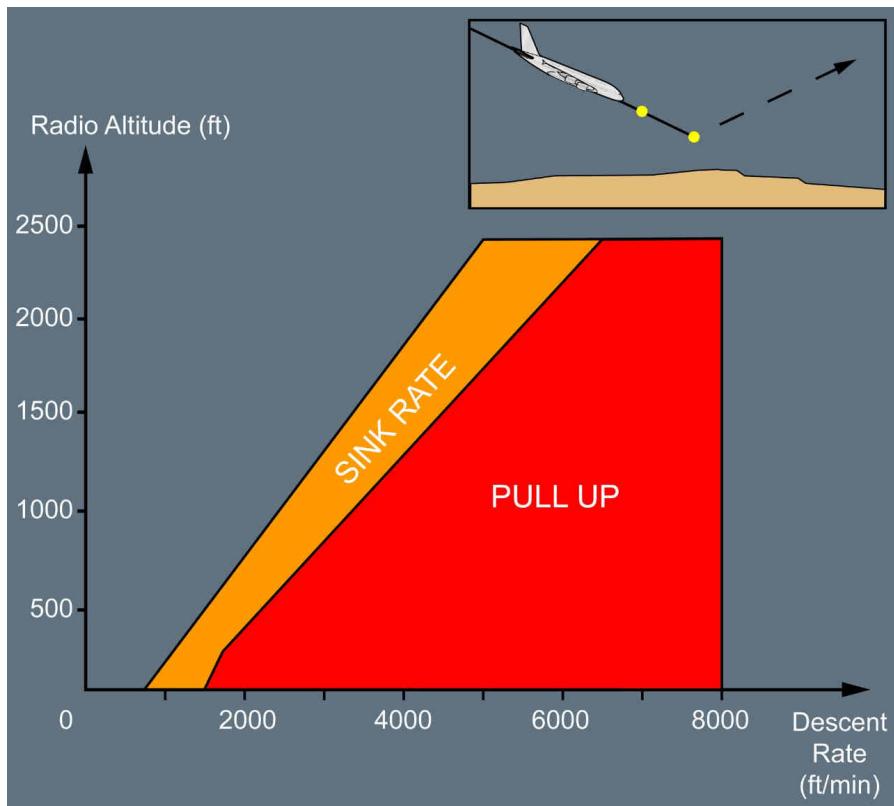
- The "SINK RATE, SINK RATE" aural alert
- The SINK RATE visual alert on the PFD.

[L2] The "SINK RATE, SINK RATE" envelope moves to the right, when the aircraft is above the glide slope beam, in order to avoid any undue alert during a glide slope capture.

[L1] If this rate is, or becomes excessive, the alert will change to:

- The "PULL UP" aural alert that repeats as long as the aircraft descends at an excessive rate
- The PULL UP visual alert on the PFD.

[L2] Mode 1 is inhibited when the aircraft is close to the ground.

Excessive Rate of Descent

- L3 The descent rate data is the barometric vertical speed, or the inertial vertical speed, if the barometric vertical speed is not available.

EXCESSIVE TERRAIN CLOSURE RATE (MODE 2)

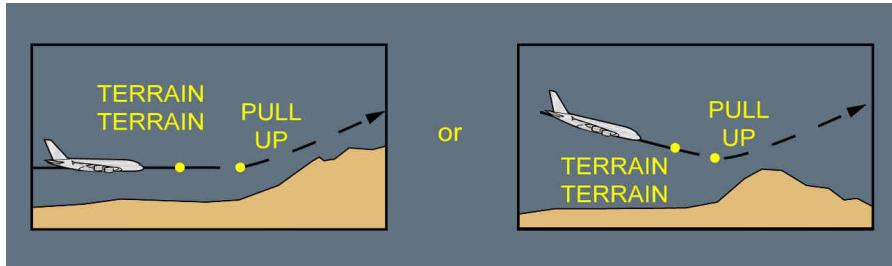
If the aircraft approaches the terrain with an excessive rate, the following alerts are triggered, even if the aircraft is not descending:

- The "TERRAIN, TERRAIN" aural alert
- The TERRAIN visual alert on the PFD.

If the closure rate is not reduced, the alert will change to:

- The "PULL UP" aural alert that repeats as long as the aircraft has an excessive terrain closure rate
- The PULL UP visual alert on the PFD.

Excessive Terrain Closure Rate

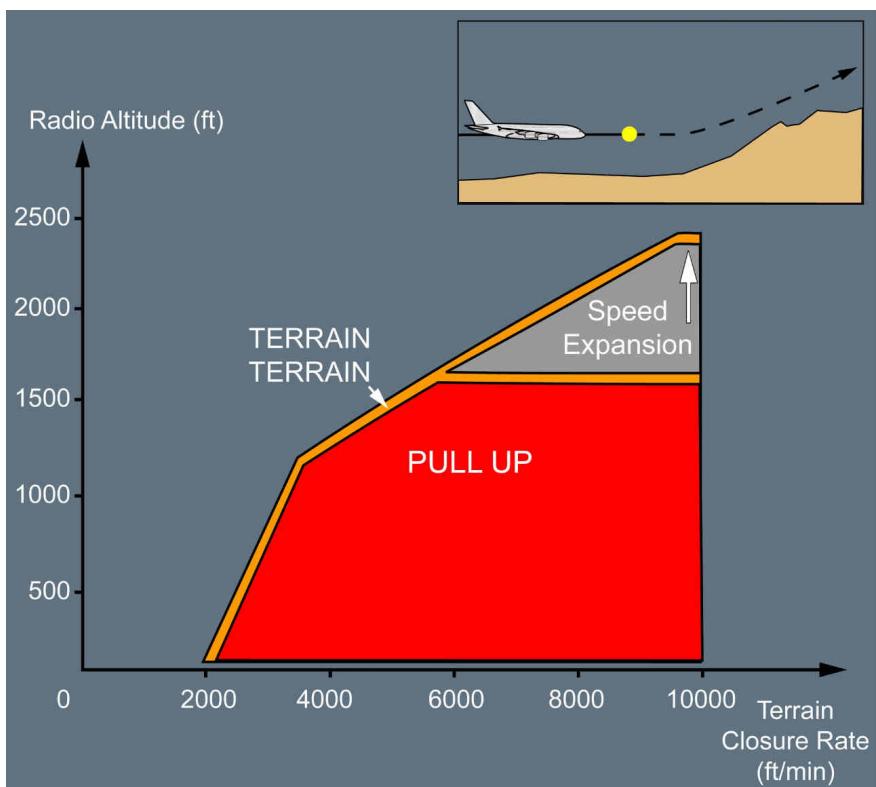


[2] AIRCRAFT NOT IN LANDING CONFIGURATION (MODE 2A)

Mode 2A applies, if the aircraft is at low altitude, and:

- The flaps are not extended for landing, or
- The landing gear is not extended, or
- The aircraft is not flying an ILS(GLS) approach.

The upper cutoff limit of the envelope will increase, as applicable, depending on the airspeed.

Excessive Terrain Closure Rate While Aircraft Not in Landing Configuration

The alerts stop, if the aircraft exits the protection envelope, and if:

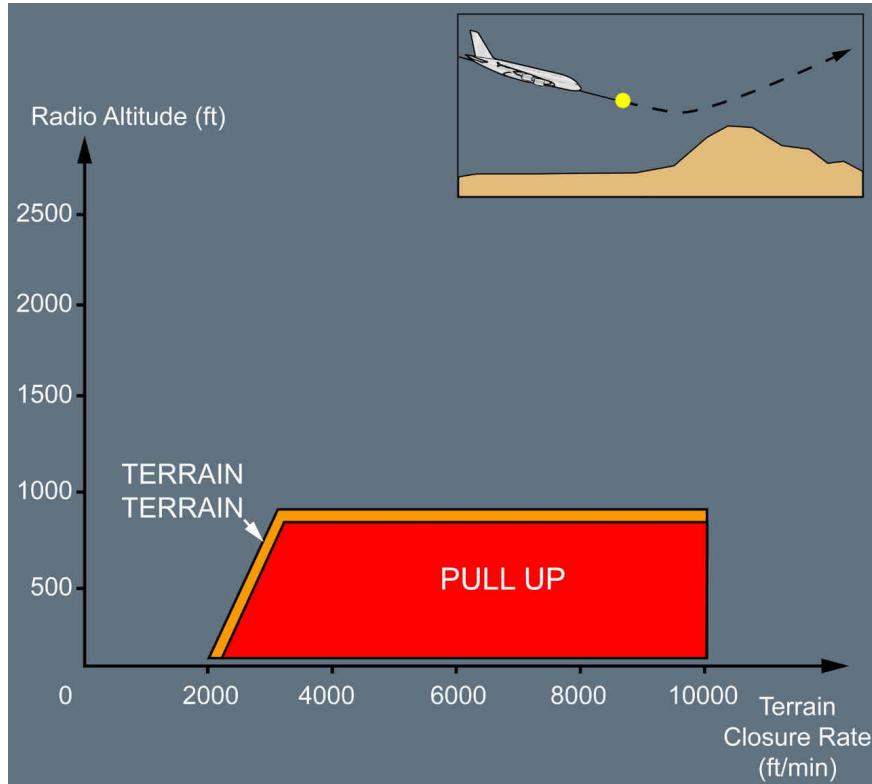
- The aircraft is no longer in the protection envelope for a minimum of 45 s
- The aircraft increases the altitude at which it exited the protection envelope by 300 ft.

AIRCRAFT AT LANDING OR TAKEOFF (MODE 2B)

Mode 2B applies, if the aircraft is at low altitude, and:

- The flaps are extended for landing, or
- The aircraft is within 5 nm and 3 500 ft height of the destination, or

- The flaps are not extended for landing, the aircraft is flying an ILS(GLS) approach, and both glide slope and LOC deviations are below 2 dots,
 - During the first 60 s after takeoff.
- L3 This last condition avoids any spurious warnings due to erroneous radio altimeter tracking after takeoff.

Mode 2B

- L2 If the aircraft enters the mode 2B envelope, with both the landing gear and the flaps in landing configuration, the "TERRAIN, TERRAIN" aural alert is repeated until the aircraft exits the protection envelope (No "PULL UP" aural alert).

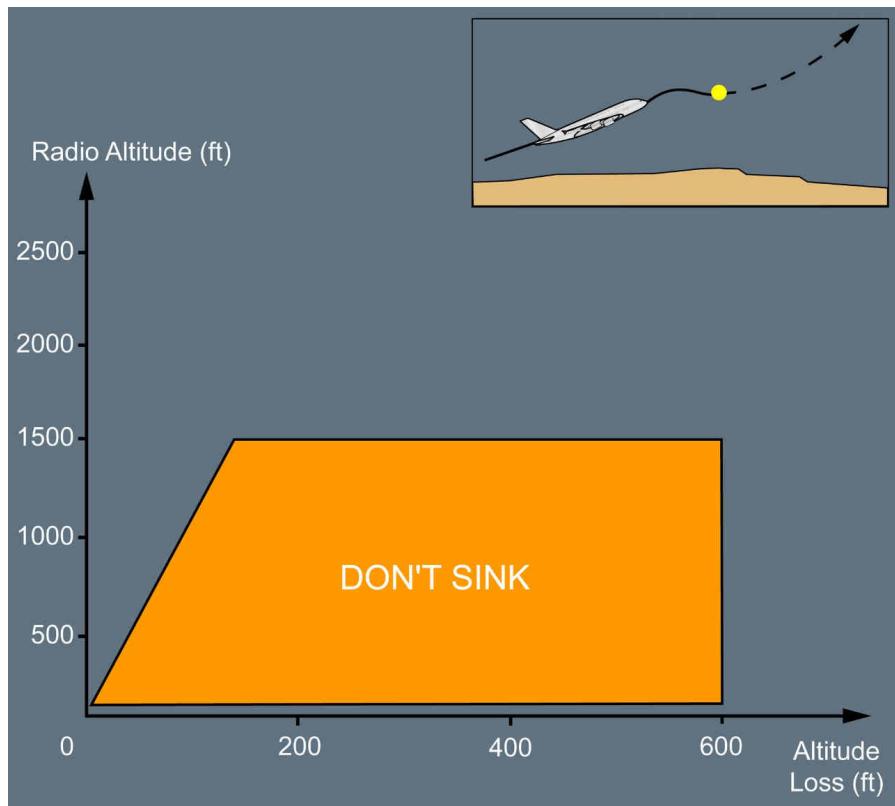
ALTITUDE LOSS AFTER TAKEOFF (MODE 3)

If the GPWS detects an excessive decrease in altitude after takeoff, or during a go-around, when the landing gear or the flaps are not in landing configuration, the following alerts are triggered:

- The "DON'T SINK, DON'T SINK" aural alert
- The DON'T SINK visual alert on the PFD.

Both aural and visual alerts stop, if the aircraft gains sufficient altitude.

- Mode 3 is inhibited when the aircraft is close to the ground.

Mode 3

TERRAIN CLEARANCE NOT SUFFICIENT WHEN NOT IN LANDING CONFIGURATION (MODE 4)

During approach, and depending on the aircraft configuration, mode 4 provides various protections if the terrain clearance is not sufficient.

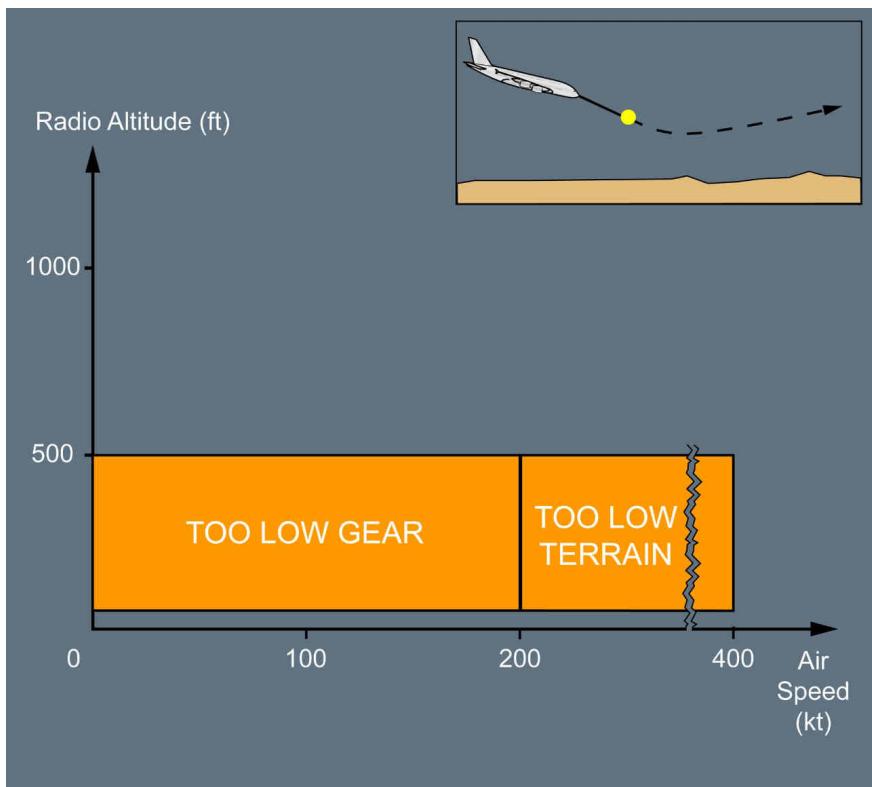
LANDING GEAR UP AND FLAPS NOT IN LANDING CONFIGURATION (MODE 4A)

If the aircraft approaches terrain with the landing gear up and the flaps not extended for landing, the following alerts are triggered:

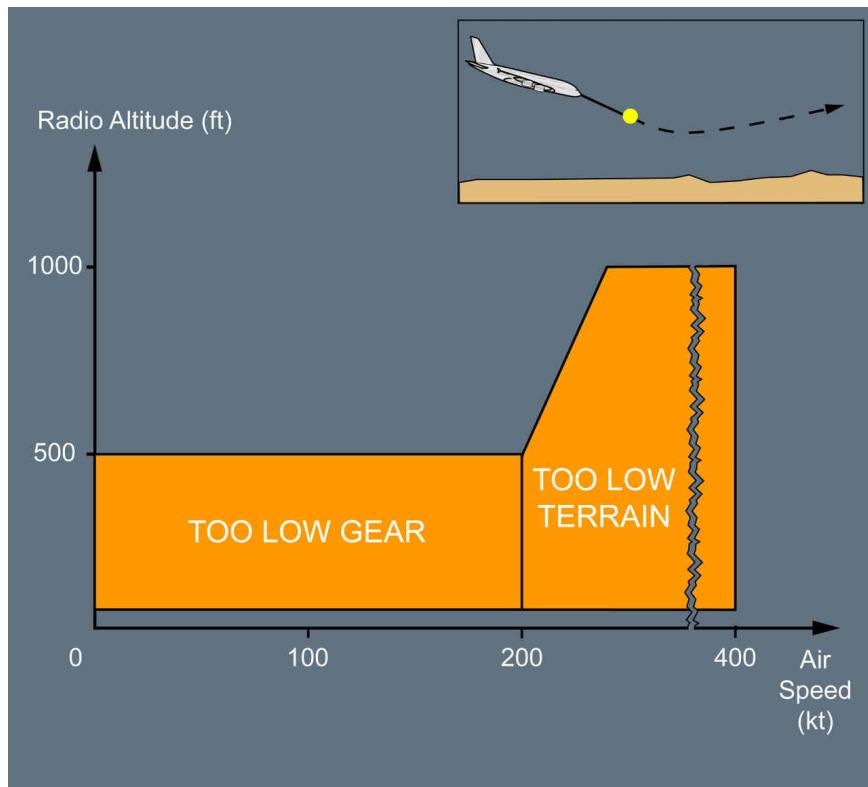
- The "TOO LOW GEAR" aural alert
- The TOO LOW GEAR visual alert on the PFD.

In addition, if the aircraft speed is above 200 kt, the following alerts are triggered:

- The "TOO LOW TERRAIN" aural alert
- The TOO LOW TERRAIN visual alert on the PFD.

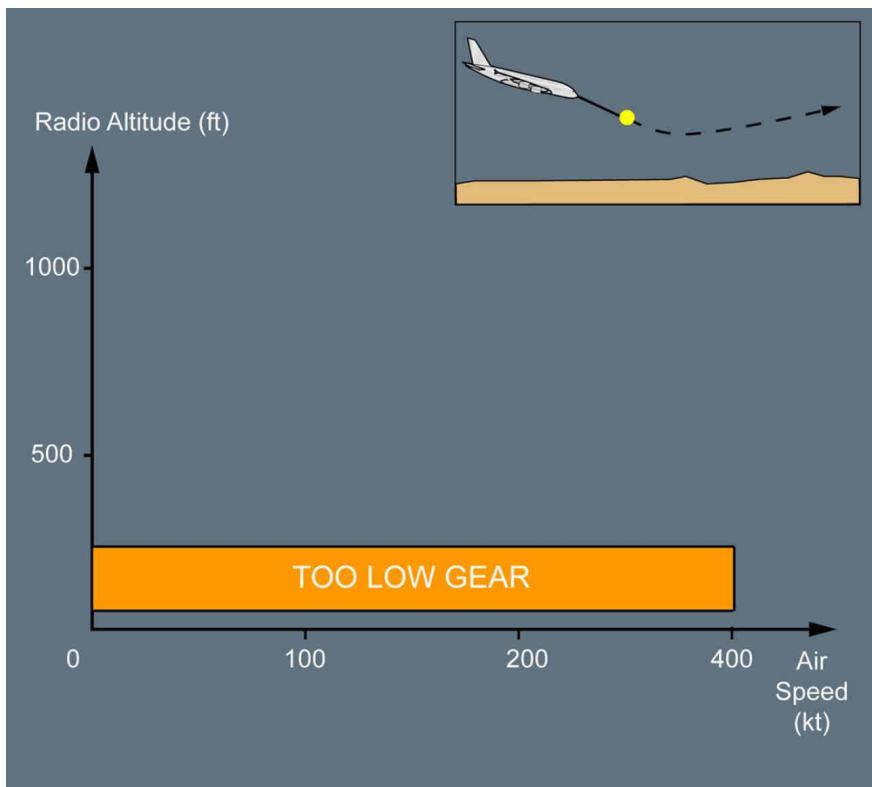
Mode 4A

- [L2] In addition, if system data (e.g. aircraft position or terrain database) does not enable the flight crew to rely on the TAD function, the mode 4A protection envelope becomes:

Mode 4A and TERR function not operative**L1 LANDING GEAR DOWN AND FLAPS NOT IN LANDING CONFIGURATION, OR LANDING GEAR UP AND FLAPS IN LANDING CONFIGURATION (MODE 4B)**

If the aircraft approaches terrain with the landing gear up and the flaps extended for landing, the following alerts are triggered:

- The “TOO LOW GEAR” aural alert
- The TOO LOW GEAR visual alert on the PFD.

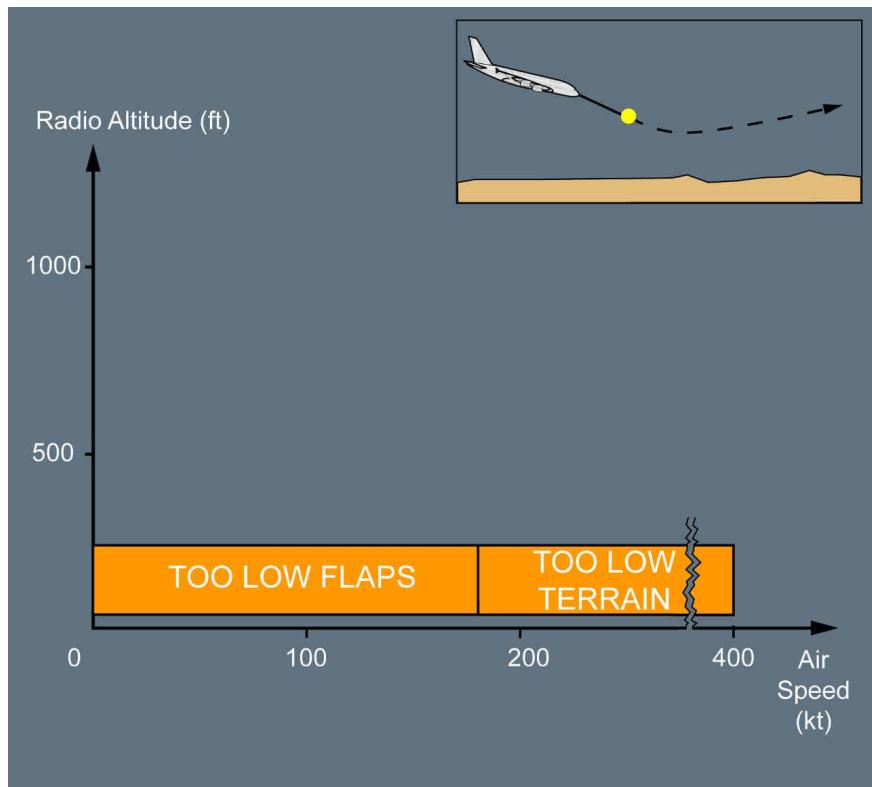
Mode 4B Gear Up and Flaps in Landing Configuration

If the aircraft approaches the terrain with the landing gear down and the flaps not extended for landing, the following alerts are triggered:

- The “TOO LOW FLAPS” aural alert
- The TOO LOW FLAPS visual alert on the PFD.

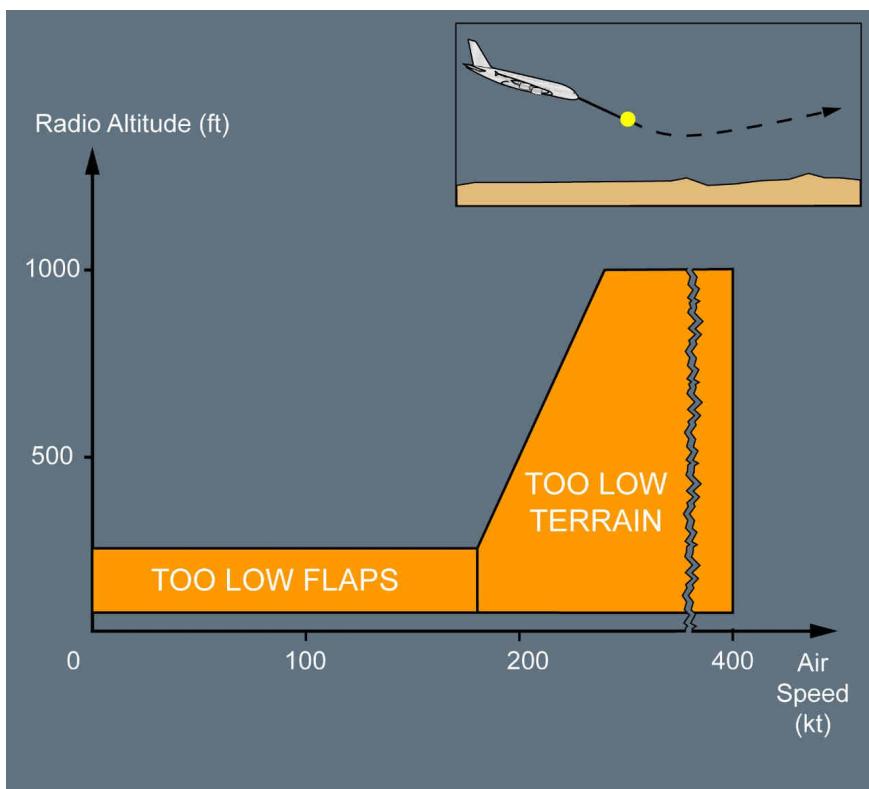
In addition, if the aircraft speed is above 180 kt, the following alerts are triggered:

- The “TOO LOW TERRAIN” aural alert
- The TOO LOW TERRAIN visual alert on the PFD.

Mode 4B Gear Down and Flaps Not in Landing Configuration

- [L2] In addition, if system data (e.g. aircraft position or terrain database) does not enable the flight crew to rely on the TAD function, the mode 4B protection envelope becomes:

Mode 4B Gear Down and Flaps Not in Landing Configuration, and TERR Function Not Operative



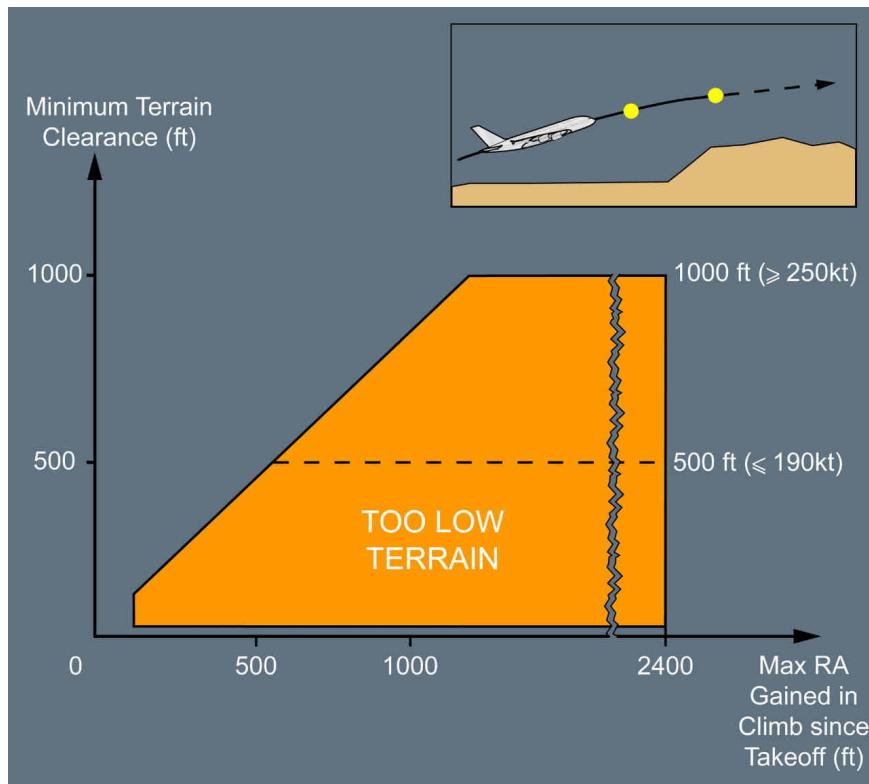
- [L1] The flight crew can inhibit mode 4B by setting the FLAP MODE button to **OFF** on the SURV/CONTROLS page of the MFD (e.g. in the case of a landing with abnormal flaps configuration).

LANDING GEAR UP OR FLAPS NOT IN LANDING CONFIGURATION (MODE 4C)

As an additional protection for mode 3 (decrease in altitude after takeoff), if the aircraft descends towards terrain during takeoff and climb, with the landing gear up, or if the flaps are not in landing configuration, the following alerts are triggered:

- The "TOO LOW TERRAIN" aural alert
- The TOO LOW TERRAIN visual alert on the PFD.

- [L2] These aural alerts are triggered, if the aircraft goes below 75 % of its current radio-altitude, and enters the protection envelope.

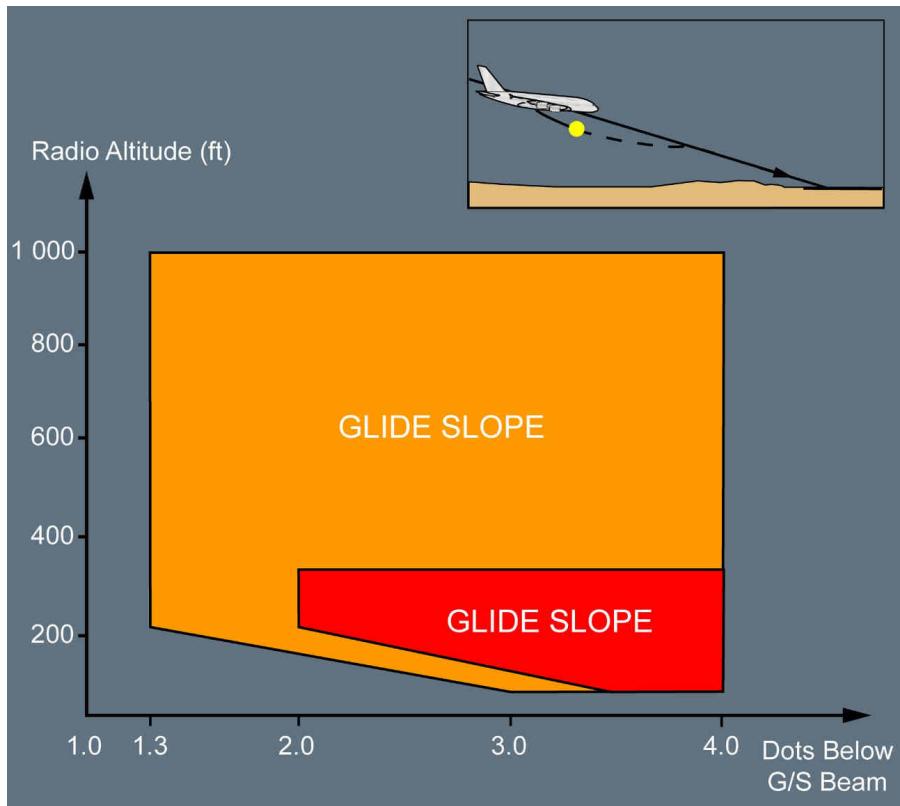
Mode 4C**DESCENT BELOW GLIDE SLOPE (MODE 5)**

If the aircraft descends below the glide slope by more than 1.3 dots during ILS/GLS approaches, the following alerts are triggered:

- The "GLIDE SLOPE" aural alert that repeats as long as the aircraft remains below the glide slope
 - If the glide slope deviation is more than 2 dots below 300 ft, the aural alert becomes louder, and repeats more and more frequently.
 - The GLIDE SLOPE visual alert on the PFD.
- [2] Mode 5 is active during approach, if the landing gear is down, and the aircraft is below 1 000 ft and above 30 ft AGL.

- [L1] The flight crew can deactivate mode 5 by:

- Setting the G/S MODE button to OFF on the SURV CONTROLS page of the MFD, or
- Pressing the G/S MODE pb on the SURV panel.

Descent Below Glide Slope

Note: Usually, the GLIDE SLOPE alert is only triggered, if the landing gear is down. For some airports, the landing gear down condition is not applicable.

TERRAIN FUNCTION**Applicable to: ALL**

In addition to the five basic GPWS modes, TAWS also has a TERR function, based on a worldwide database. The TERR function warns the flight crew of potential hazardous conditions with respect to the surrounding terrain.

The TERR function has the following two modes:

- Terrain Awareness and Display (TAD)
Refer to DSC-34-20-20-10-20 Terrain Awareness and Display
- Terrain Clearance Floor (TCF).
Refer to DSC-34-20-20-10-20 Terrain Clearance Floor

PRINCIPLE

The TERR function provides displays and alerts, based on the comparison between the current aircraft position and the TAWS database.

If the flight crew sets the TERR SYS button of the MFD SURV/CONTROLS page to ON, the TERR function provides:

- A horizontal view of the terrain on the ND, if the flight crew presses the TERR pb on the EFIS CP or if the TAWS triggers an alert
The ND displays terrain in different colors, depending on the terrain altitude in relation to the aircraft altitude.
- A vertical view of the terrain on the VD.

The VD always displays:

- Terrain in brown
 - [L2] The color of the terrain does not change depending on relative terrain proximity, nor during terrain or obstacle alerts.
- Water in blue.

[L2] The VD always displays the terrain, even if the TERR pb is not pressed on the EFIS CP.

TERRAIN AWARENESS AND DISPLAY (TAD)

If the TAD detects a terrain or an obstacle collision threats ahead of the aircraft, the following are triggered:

- A caution, if the aircraft is approximately 60 s away from the conflict terrain.
- A warning, if the aircraft is approximately 30 s away from the conflict terrain.

The TAD function is available in all flight phases, and for all gear and flap configurations.

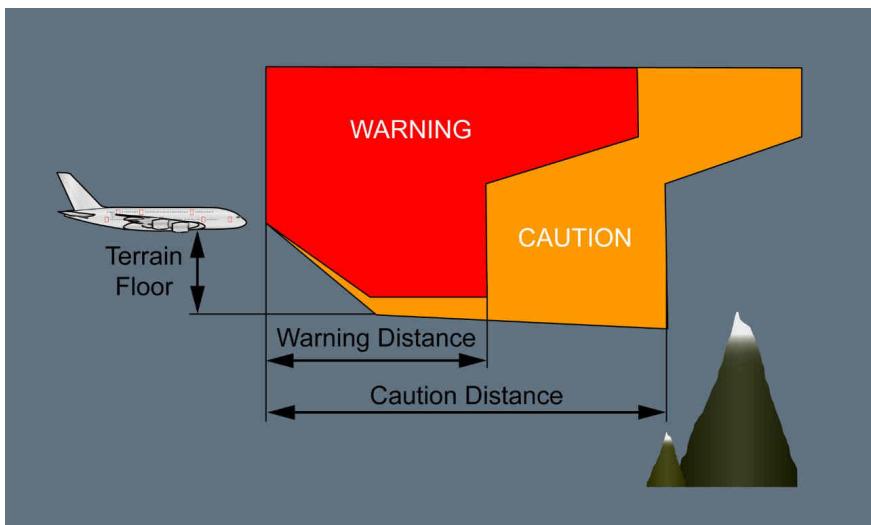
L2 PROTECTION ENVELOPE

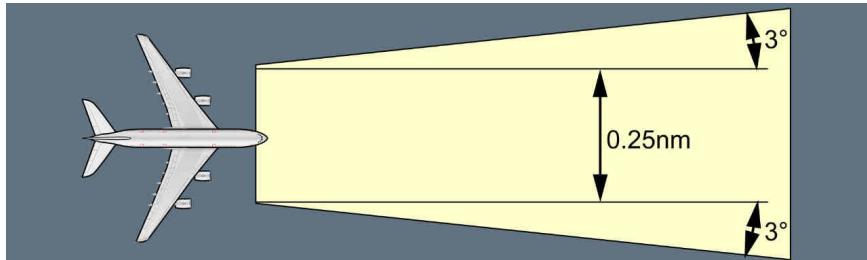
The TAD computes a caution envelope and a warning envelope, based on:

- The aircraft altitude
- The nearest runway altitude
- The range of the nearest collision threats
- The ground speed
- The turn angle.

VERTICAL ENVELOPE

Warning and caution envelopes change, depending on the ground speed and the turn angle.

Vertical Envelope

HORIZONTAL ENVELOPEHorizontal Envelope

Note: When the aircraft turns, the horizontal envelope changes to take into account the flight path of the aircraft.

L1 TERRAIN ALERTS

If the TAD detects a terrain collision threat ahead of the aircraft, the following are triggered:

- The "TERRAIN AHEAD, TERRAIN AHEAD" aural alert that repeats every 7 s, until the terrain is no longer a threat
 - The TERRAIN visual alert on the NDs
- [L2] The TERR pb is also automatically pressed on the EFIS CP.
- [L1] Yellow areas on the NDs, that indicate a terrain conflict with the caution criteria.

If the aircraft continues to approach the terrain, the following are triggered:

- The "TERRAIN AHEAD, PULL UP" aural alert, that repeats continuously, until the terrain is no longer a threat
- The TERRAIN visual alert on the NDs
- Red areas on the NDs, that indicate a terrain conflict with the warning criteria.

OBSTACLE ALERTS

If the TAD detects an obstacle collision threat ahead of the aircraft, the following are triggered:

- The "OBSTACLE AHEAD, OBSTACLE AHEAD" aural alert, that repeats every 7 s until the obstacle is no longer a threat
 - The OBST visual alert on the NDs
 - The [A] symbol on the NDs, that indicates an obstacle conflict with the caution criteria.
- [L2] The point indicates the location of the obstacle.
- The TERR pb is also automatically pressed on the EFIS CP.

- [L1] If the aircraft continues to approach the obstacle, the following are triggered:
 - The "OBSTACLE AHEAD, PULL UP" aural alert, that repeats continuously until the obstacle is no longer a threat
 - The OBST visual alert on the NDs
 - The  symbol on the NDs, that indicates an obstacle conflict with the warning criteria.
- [L2] The point indicates the location of the obstacle.

TERRAIN CLEARANCE FLOOR (TCF)

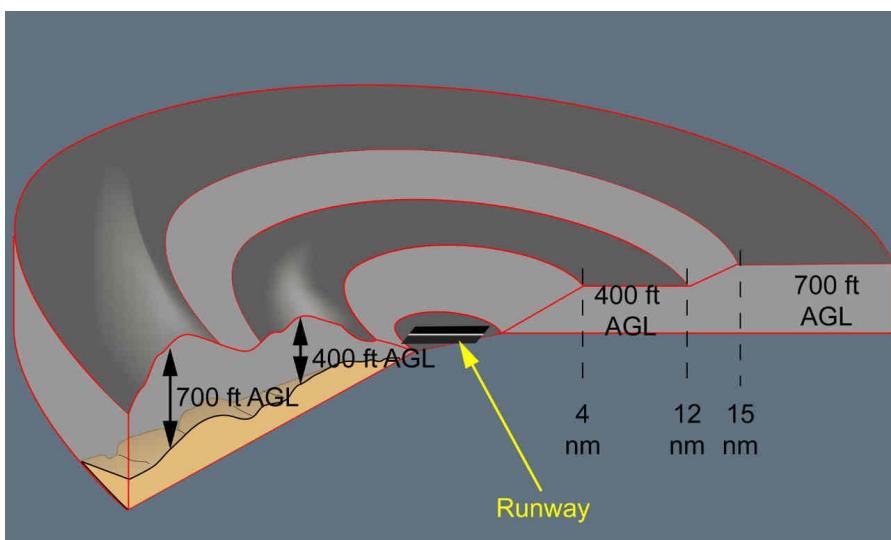
The TCF function computes a terrain clearance envelope around the airport runway. This function enhances the GPWS mode 4, by triggering an alert if the terrain clearance is not sufficient, even when the aircraft is in landing configuration.

The TCF function also protects against an attempt to land where there is no airfield.

The TAWS database includes the applicable TCF envelope for each airport runway that has terrain data, and that is longer than 3 500 ft.

The TCF function is active during all the following flight phases: Takeoff, cruise and approach.

TCF Envelope



If the aircraft descends below the protection envelope, the following are triggered:

- The "TOO LOW TERRAIN" aural alert, if the aircraft enters the envelope
- [L2] If the aircraft continues to descend below the envelope, the alert is triggered one time for every 20 % degradation in radio altitude.
- [L1] - The TOO LOW TERRAIN visual alert on the PFD.

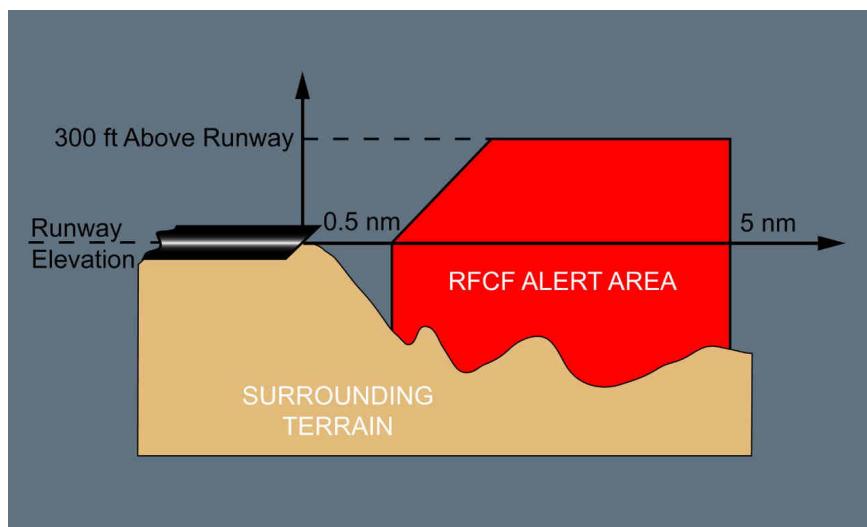
[L2] RUNWAY FIELD CLEARANCE FLOOR (RFCF)

The RFCF function provides an additional protection envelope for runways that are significantly higher than the surrounding terrain.

The envelope is a circular band within 5 nm of the runway, and it is based on the geometric altitude and the runway elevation.

If the aircraft descends below this protection envelope, the "TOO LOW TERRAIN" aural and visual alerts are triggered.

RFCF



TAWS DATABASE

Applicable to: ALL

The TAWS database divides the earth surface into grid cells.

[L3] These cells are defined by longitude and latitude data, in the World Geodetic System WGS 84.

[L1] Each cell contains the highest terrain altitude within the associated terrain area.

The grid resolution varies, depending on the geographic location:

- 0.25 nm x 0.25 nm
- 0.5 nm x 0.5 nm
- 1 nm x 1 nm
- 2 nm x 2 nm
- 5 nm x 5 nm.

The highest resolution (0.25 nm x 0.25 nm) is used for airports areas to accurately reflect the terrain. The lowest resolution (5 nm x 5 nm) is used for non-airport areas, where terrain features are not a collision threat.

The TAWS database has:

- A terrain database
- An obstacle database

The obstacle database includes the location and height of all obstacles that are above 100 ft surrounding terrains.

L2 In addition, man-made obstacle data can be inserted in the TAWS database.

L1- A runway database

The runway database includes the length and name of all hard surface runways worldwide that are 3 500 ft long or more. In addition, this database includes information about the runway orientation, elevation, and surface.

- An envelope modulation database.

The TAWS uses the envelope modulation database to adapt alert/warning protections to specific areas in the world, in order to improve nuisance margins.

Updating the TAWS database is the vendor's responsibility.

L3 The vendor may use one or more of the following data sources:

- Data from government and/or regulatory agencies
- Data from airlines that have surveyed an airport, while establishing layout, approach, or departure procedures, etc
- Data from commercial vendors that also produce data sets for FMS and other navigation systems
- Data from commercial and military surveying agencies, when available
- Airport layout and physical properties from high resolution maps and/or digitized data sources
- Airport layout and physical properties from imagery.

L1 Review the manufacturer document "EGPWS Terrain Database Airport Coverage List", to have official information about the most recent TAWS database, and the list of included airports.

To obtain a copy of this document, please contact:



A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

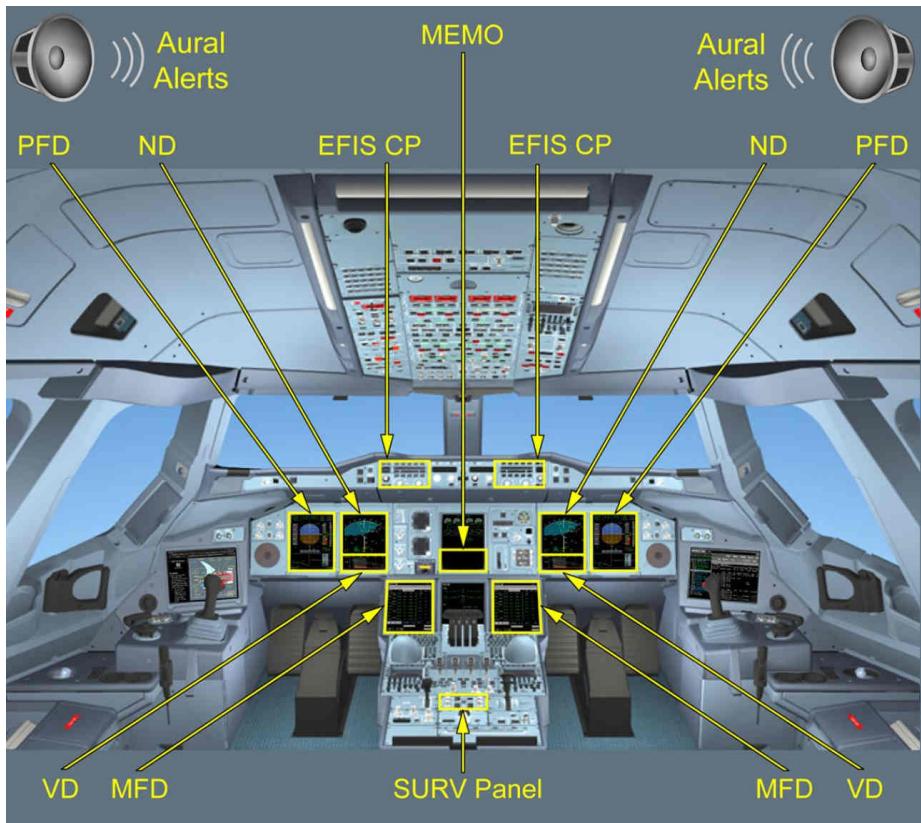
34 - SURVEILLANCE

TAWS - SYSTEM DESCRIPTION

Honeywell - 1500 NE 36th Street
REDMOND, WA, USA 98073
Website: www.egpws.com

COCKPIT VIEW

Applicable to: ALL

Cockpit View

EFIS CONTROL PANEL (CP)

Applicable to: ALL

EFIS CP**TERR pb**

L12



The onside ND displays terrain (TERR) information.

Associated with the TERR message on the ND.

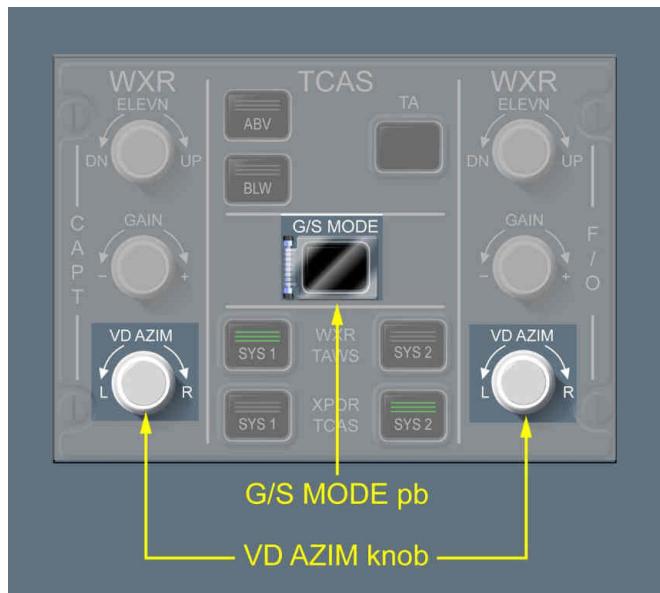
The flight crew cannot press the WXR pb and the TERR pb at the same time.



The onside ND does not display terrain (TERR) information.

SURV PANEL

Applicable to: ALL

SURV Panel**G/S MODE pb**

The G/S mode (mode 5) is active.

This is the default position.

On the SURV/CONTROLS page of the MFD, the G/S MODE button is automatically set to ON.

L12



The flight crew turns off the G/S mode (mode 5).

Associated with the TAWS G/S MODE OFF MEMO.

On the SURV/CONTROLS page of the MFD, the G/S MODE button is automatically set to **OFF**.

VD AZIM knob

L12



- When pushed, selects the AUTO mode.

This is the default position.

- When pulled, selects the manual AZIM mode.

On the VD:

- The eye symbol appears, instead of the aircraft symbol
- The terrain appears along the selected azimuth.

The ND displays a straight white line based on the selected azimuth value.

- When turned, adjusts the AZIM value in degrees.

The AZIM value is limited to $\pm 60^\circ$ around the current heading.

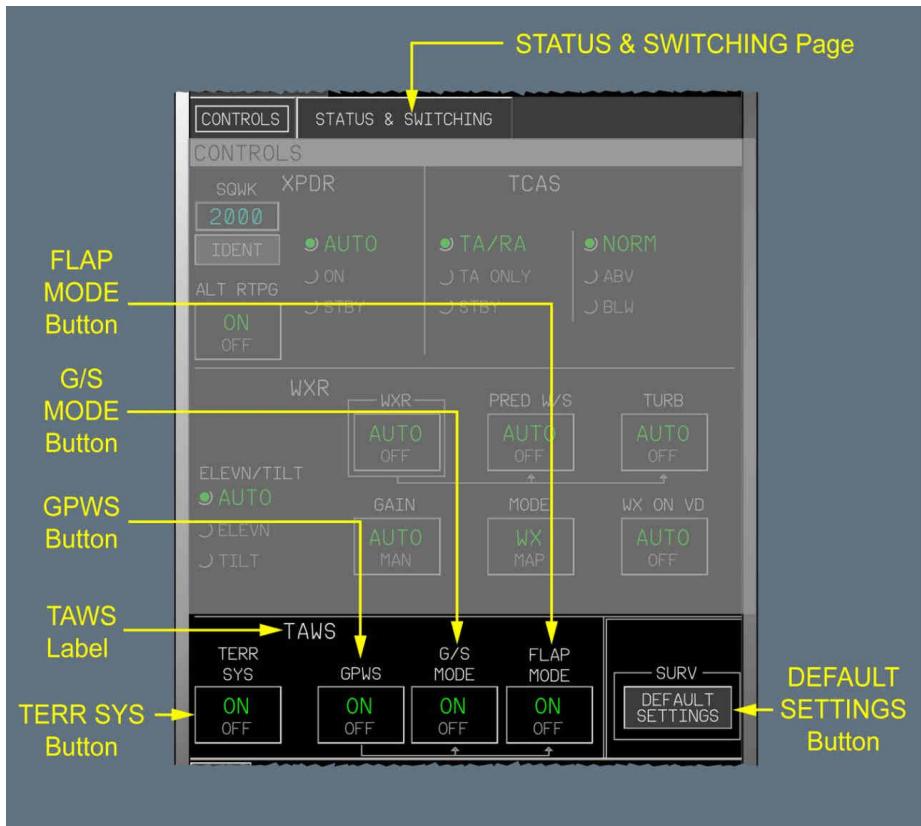
The VD displays the selected AZIM value in the VIEW ALONG AZIMUTH message.

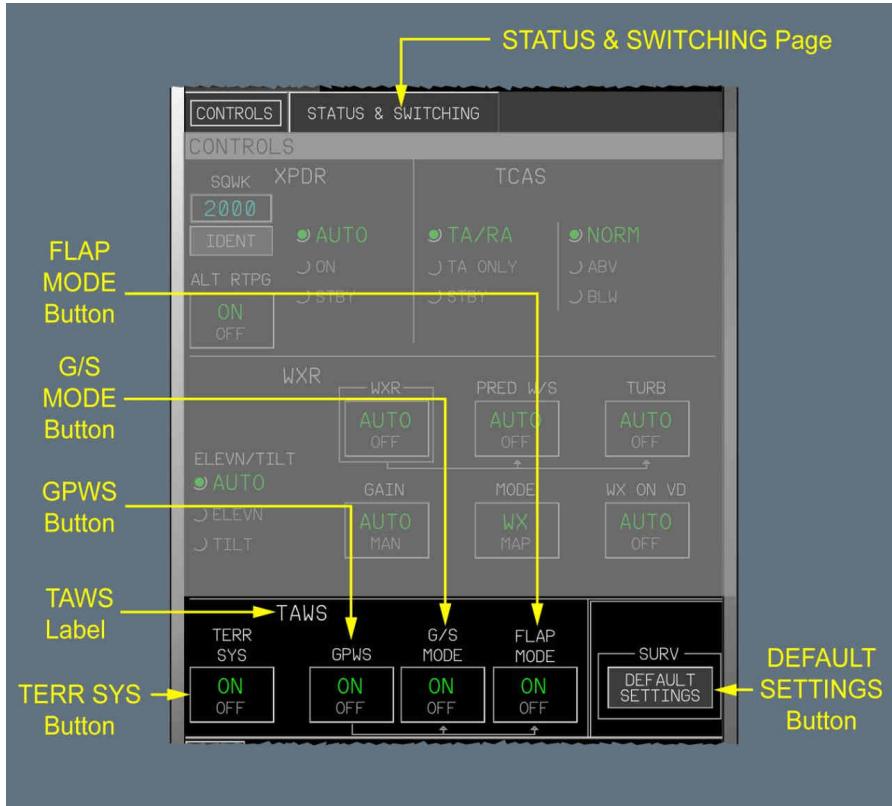
The AZIM line moves on the ND, based on the flight crew's selection.

Note: The flight crew can preset the AZIM value before pulling the VD AZIM knob.

MFD

Applicable to: ALL

SURV Pages


CONTROLS PAGECONTROLS PageTAWS LABEL**TAWS**

TAWS (GPWS and TERR) is on.

TAWS

TAWS is failed.

TERR SYS BUTTON

The TERR function is on.
TAD and TCF modes are operative.
Both VDs display the terrain profile.

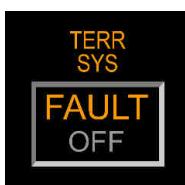
L12



The TERR function is off.
TAD and TCF modes are not available.
None of the VDs display the terrain profile.

Associated with:

- The TERR SYS OFF MEMO
- The **TERR SYS OFF** message on the ND
- The **NO TERR & WX DATA AVAILABLE** message on the VD.
The VD does not display the weather when the TERR function is not available, because it cannot locate the weather vertically (i.e. with respect to the terrain).



The TERR function is failed.

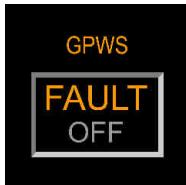
GPWS BUTTON

The GPWS is on.

L12



The flight crew inhibits all GPWS alerts (modes 1 to 5). Associated with the GPWS OFF MEMO.



TAWS and/or GPWS are failed.

G/S MODE BUTTON



The GPWS mode 5 (DESCENT BELOW GLIDE SLOPE) is on. On the SURV panel, nothing appears on the G/S MODE pb.



The flight crew inhibits GPWS mode 5 (DESCENT BELOW GLIDE SLOPE) alerts. Associated with the TAWS G/S MODE OFF MEMO. On the SURV panel, the G/S MODE pb is set to OFF.

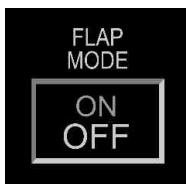


The GPWS mode 5 (DESCENT BELOW GLIDE SLOPE) is failed.

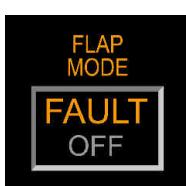
FLAP MODE BUTTON

The GPWS mode 4B (TOO LOW FLAPS) is on.

L12



The flight crew inhibits GPWS mode 4B (TOO LOW FLAPS) alerts.
Associated with the TAWS FLAP MODE OFF MEMO.

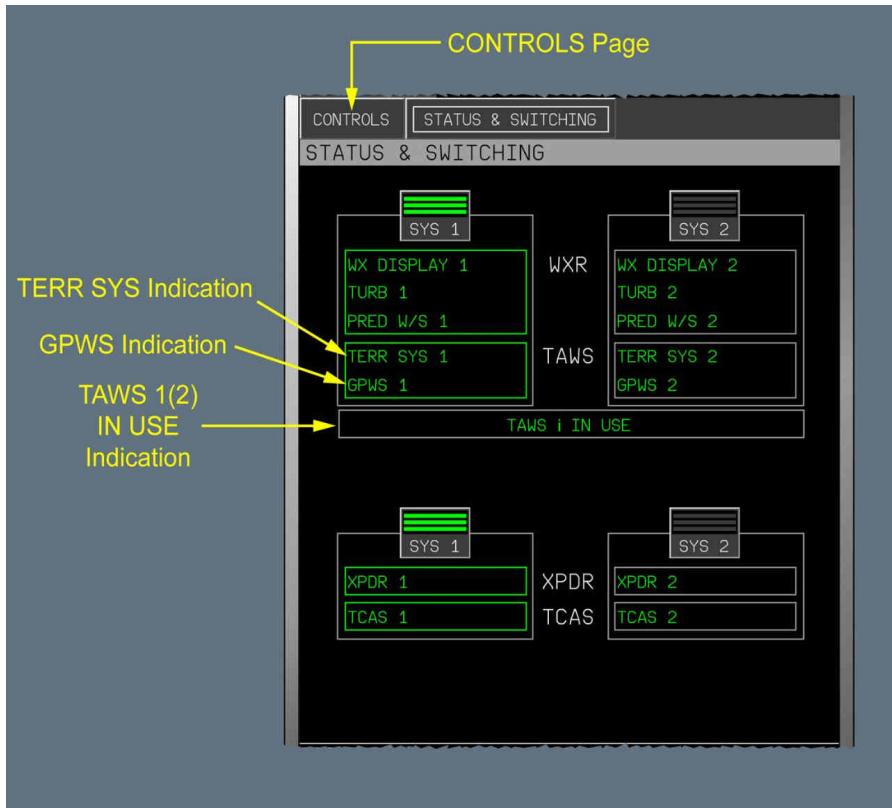


The GPWS mode 4B (TOO LOW FLAPS) is failed.

DEFAULT SETTINGS BUTTON

When clicked, automatically sets all the SURV settings to their default position on both MFDs. A confirmation is necessary in order to set the default positions.

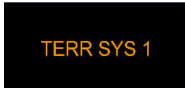
- The TERR SYS button is set to ON
- The GPWS button is set to ON
- The G/S MODE button is set to ON
- The FLAP MODE button is set to ON.

STATUS & SWITCHING PAGESURV/STATUS & SWITCHING Page

- Green indicates that the function is on
The green box indicates that the function is selected.
- White indicates that the function is set to OFF, or is on standby
- Amber indicates that the function is failed.

TERR SYS INDICATION TERR SYS 1

The TERR function is on, on SURV SYS 1(2).

 TERR SYS 1

The TERR function is failed on SURV SYS 1(2).

 TERR SYS OFF

The TERR function is off, on SURV SYS 1(2).

 TERR SYS OFF

The TERR function is failed, and set to OFF.

GPWS INDICATION GPWS 1

The GPWS is on, on SURV SYS 1(2).

 GPWS 1

The GPWS is failed on SURV SYS 1(2).

 GPWS OFF

The GPWS is off, on SURV SYS 1(2).

 GPWS OFF

The GPWS is failed, and set to OFF.

TAWS 1(2) IN USE INDICATION TAWS 1 IN USE

In the case of abnormal operation, indicates that the TAWS and the WXR functions are not provided by the same SYS. The selected SYS provides the WXR function, and the other SYS provides the TAWS function.

ND

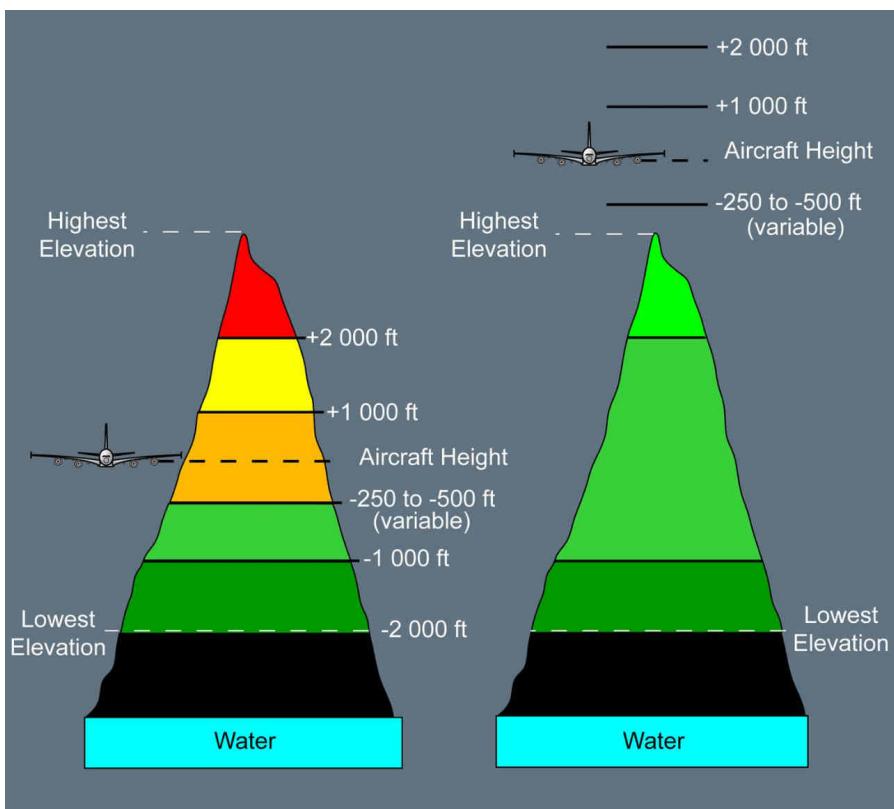
Applicable to: ALL

ND

If the TAWS triggers an alert, the ND automatically displays the terrain representation.

TERRAIN COLORS

When in ROSE or ARC mode, the ND displays the terrain in various colors and densities, depending on the height of the aircraft, in relation with the surrounding terrain.

Terrain Colors

- [2] **Note:**
- Fields for which no terrain data is available in the TAWS database, appear in magenta.
 - If the aircraft approaches the south or north pole, some areas may appear in magenta and/or black. The TAWS is able to display the terrain, if the aircraft flies away from the south or north pole.

OBSTACLE SYMBOL

Indicates an obstacle that conflicts with the caution criteria.



Indicates an obstacle that conflicts with the warning criteria.

TAWS MESSAGES

- TERR The flight crew presses the TERR pb on the EFIS CP, and the TAWS has not triggered any alert.
- TERR SYS OFF** The flight crew sets the TERR SYS button to OFF on the SURV/CONTROLS page of the MFD.
- TERR INOP The TERR function is failed, or on standby.
- TERR TST The TERR function is in test mode.
- TERR RNG There is a difference in range between the SURV and the ND.
L12
- L12 TERRAIN The TAWS triggers a terrain warning.
 Flashes for 9 s, then remains steady.
- L12 TERRAIN The TAWS triggers a terrain caution.
 Flashes for 9 s, then remains steady.
- L12 OBST The TAWS triggers an obstacle warning.
 Flashes for 9 s, then remains steady.
- L12 OBST The TAWS triggers an obstacle caution.
 Flashes for 9 s, then remains steady.
- 62
9 Indicates the lowest and highest terrain elevations (in Flight Level) within the selected range. The elevation values use the same color code as the terrain displayed on the ND.

ND SETTING MESSAGES

- TERR: CHANGE MODE Appears in PLAN mode, when the TAWS triggers a caution.
 For more information, *Refer to 31 / EFIS / ND / ND MESSAGES*
- .
- TERR: CHANGE MODE Appears in PLAN mode, when the TAWS triggers a warning.
 For more information, *Refer to 31 / EFIS / ND / ND MESSAGES*
- .
- TERR: REDUCE RANGE Appears in ARC or ROSE mode, when:
 - The flight crew selects a range on the EFIS CP that is greater than 80 nm
 - The TAWS triggers a caution.
 For more information, *Refer to 31 / EFIS / ND / ND MESSAGES*
- .

TERR: REDUCE RANGE

Appears in ARC or ROSE mode, when:

- The flight crew selects a range on the EFIS CP that is greater than 80 nm
- The TAWS triggers a warning.

For more information, *Refer to 31 / EFIS / ND / ND MESSAGES*

TERR: INCREASE RANGE

Appears in ARC or ROSE mode, when:

- The flight crew sets the range selector to ZOOM
- The TAWS triggers a caution.

For more information, *Refer to 31 / EFIS / ND / ND MESSAGES*

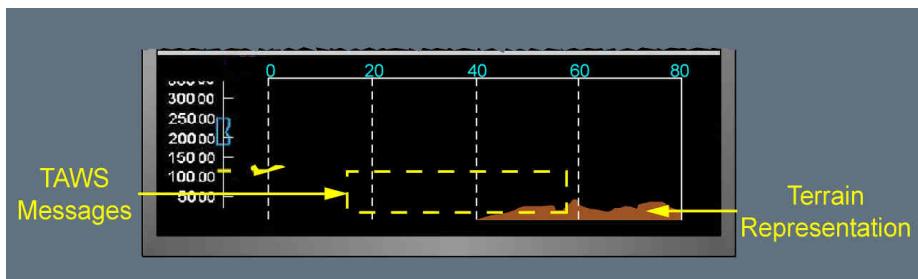
TERR: INCREASE RANGE

Appears in ARC or ROSE mode, when:

- The flight crew sets the range selector to ZOOM
- The TAWS triggers a warning.

For more information, *Refer to 31 / EFIS / ND / ND MESSAGES***VD**

Applicable to: ALL

VD

Note: VD range is always limited to 160 nm .

TERRAIN REPRESENTATION

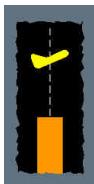
The VD provides the terrain profile along:

- The solid green line displayed on the ND , or
- The solid white line displayed on the ND , if the flight crew has selected the manual AZIM mode of the WXR .

The VD always displays:

- Terrain in brown
 - [L2] The color of the terrain does not change depending on relative terrain proximity, nor during terrain or obstacle alerts.
 - [L1] • Water in blue.

If the TERR function is operative, the VD continuously displays the terrain.



Indicates the real location of the terrain. The zone elevation in amber is based on the measured radio-altimeter information.
Appears when the aircraft radio-altimeter altitude is below 5 000 ft .

For more information on the terrain profile on the VD , *Refer to 31 / EFIS / VD .*

TAWS MESSAGES

[L12]

NO TERR & WX DATA AVAILABLE

Appears when the flight crew:

- Selects PLAN mode on the EFIS CP, or
- Sets to **OFF** the TERR SYS button on the SURV CONTROLS page of the MFD.

The VD does not display the weather when the TERR function is not available, because it cannot locate the weather vertically (i.e. with respect to the terrain).

TERR INOP

Appears when:

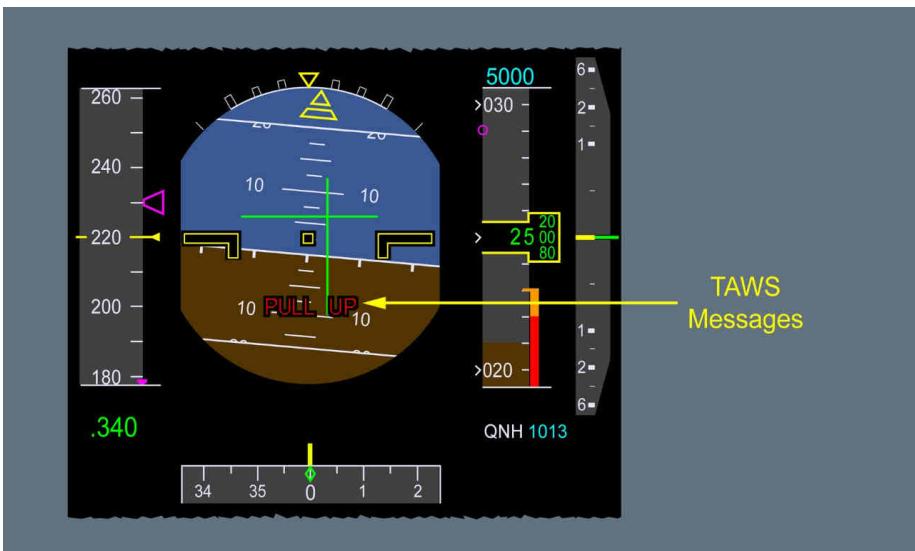
- The TAWS has failed, or
- The flight crew turns off the TAWS, via the SURV page of the MFD, or
- The aircraft is flying in the polar zone.

VIEW ALONG AZIM XXX°

The message is associated with the azimuth value, when the flight crew selects the manual AZIM mode.

PFD

Applicable to: ALL

PFD**TAWS MESSAGES****PULL UP****TAWS triggers:**

- A mode 1 alert (Sink Rate), or
- A mode 2 alert (Excessive Terrain Closure Rate), or
- Terrain awareness warning, or
- Obstacle awareness warning.

SINK RATE**TAWS triggers a mode 1 alert (Sink Rate).****TERRAIN****TAWS triggers a mode 2 alert (Excessive Terrain Closure Rate).****DON'T SINK****TAWS triggers a mode 3 alert (Don't Sink).****TOO LOW****TAWS triggers:****TERRAIN**

- A mode 4 alert (Too Low Terrain), or
- A TCF caution.

TOO LOW GEAR TAWS triggers a mode 4A, or AB alert (Too Low Gear).**TOO LOW FLAPS** TAWS triggers a mode 4B alert (Too Low Flaps).

GLIDE SLOPE TAWS triggers a mode 5 alert (Glide slope).

MEMO

Applicable to: ALL

- | | |
|--------------------|--|
| GPWS OFF | The flight crew sets the GPWS button to OFF on the SURV CONTROLS page of the MFD. |
| TAWS FLAP MODE OFF | The flight crew sets the FLAP MODE button to OFF on the SURV CONTROLS page of the MFD. |
| TAWS G/S MODE OFF | The flight crew sets the G/S MODE button to OFF on the SURV CONTROLS page of the MFD. |
| TERR SYS OFF | The flight crew sets the TERR SYS button to OFF on the SURV CONTROLS page of the MFD. |
| TERR STBY | The TAWS is operative, but the TERR function is not available. |

Flight Phase Inhibition:

Flight Phase Inhibition



AURAL ALERTS

Applicable to: ALL

| Aural Alert | Sound | Meaning |
|--------------------------------|------------------------------|--------------------------|
| DON'T SINK, DON'T SINK | (Audio not available in PDF) | Refer to GPWS/Mode 3 . |
| GLIDE SLOPE, GLIDE SLOPE | (Audio not available in PDF) | Refer to GPWS/Mode 5 . |
| OBSTACLE AHEAD, OBSTACLE AHEAD | (Audio not available in PDF) | Refer to TERR Function . |
| OBSTACLE AHEAD, PULL UP | (Audio not available in PDF) | Refer to TERR Function . |

Continued on the following page



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TAWS - CONTROLS AND INDICATORS

Continued from the previous page

| Aural Alert | Sound | Meaning |
|---------------------------------|------------------------------|---|
| PULL UP | (Audio not available in PDF) | - Refer to GPWS/Mode 1 , or - Refer to GPWS/Mode 2 . |
| SINK RATE, SINK RATE | (Audio not available in PDF) | Refer to GPWS/Mode 1 . |
| TERRAIN | (Audio not available in PDF) | Refer to GPWS/Mode 2 . |
| TERRAIN, TERRAIN | (Audio not available in PDF) | Refer to GPWS/Mode 2 . |
| TERRAIN AHEAD, TERRAIN AHEAD | (Audio not available in PDF) | Refer to TERR Function . |
| TERRAIN AHEAD, PULL UP | (Audio not available in PDF) | Refer to TERR Function . |
| TOO LOW FLAPS | (Audio not available in PDF) | Refer to GPWS/Mode 4 . |
| TOO LOW GEAR | (Audio not available in PDF) | Refer to GPWS/Mode 4 . |
| TOO LOW TERRAIN | (Audio not available in PDF) | - Refer to GPWS / Mode 4 , or - Refer to TERR Function . |

Note: In the case of simultaneous alerts, the first aural alert may be partially triggered.



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TAWS - CONTROLS AND INDICATORS

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OVERVIEW

Applicable to: ALL

The Weather Radar (WXR) system has:

- A weather (WX) display function
- A Predictive Windshear (PWS) function
- A Turbulence (TURB) detection function
- A ground mapping function.

The WXR comes on:

- If at least one engine is running, and if the flight crew presses the WX pb on at least one EFIS CP
- Automatically, in flight.

The WXR is turned off:

- Automatically, after landing
- Manually, if the flight crew deselects the WX pb on both EFIS CPs, when the aircraft is on ground.

WX DISPLAY FUNCTION

Applicable to: ALL

The WX display function enables the flight crew to view precipitation in different colors, depending on the intensity of the precipitation.

The WX display function has several modes, that enable the flight crew to analyze the weather along the vertical and horizontal axes:

- The automatic (AUTO) mode
This is the default mode of the WXR.
- The elevation (ELEVN) mode
- The tilt (TILT) mode
- The azimuth (AZIM) mode
- The gain (GAIN) mode.

The WX display function displays weather data on:

- The ND: For views along the vertical flight path (in AUTO mode), or along the selected altitude (in ELEVN mode), or along the selected tilt angle (in TILT mode)
- The VD: For views along the lateral flight path in (AUTO mode), or along the selected azimuth (in AZIM mode).

PRINCIPLE

The WXR detects precipitation in the surrounding area, by using the WXR antenna.

[L2] The WXR does not detect:

- Cloud, fog, or wind (droplets are too small, or no precipitation at all)
- Clear air turbulence (no precipitation)
- Sandstorms (solid particles are almost transparent to the radar beam)
- Lightning.

The WXR detects:

- Rainfall
- Wet hail and wet turbulence
- Ice crystals, dry hail, and dry snow. However, these three elements give small reflections.

[L1] The WXR continuously scans a volume of space ahead of the aircraft, and stores this data in a three dimensional (3-D) buffer.

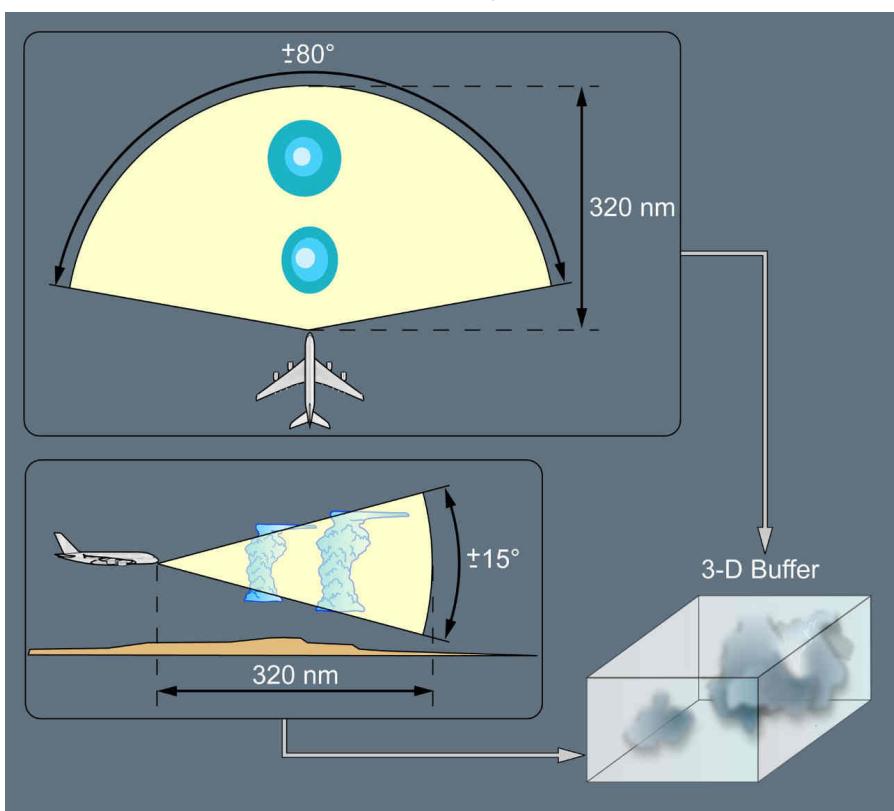
[L2] The WXR antenna scans:

- $\pm 80^\circ$ in azimuth
- $\pm 15^\circ$ in tilt
- Up to 320 nm in front of the aircraft.

The 3-D buffer stores the weather data up to 5 min behind the aircraft.

[L1] The WXR extracts data from the 3-D buffer, in order to display the weather on the ND, and on the VD.

[L3] The WXR takes into account the curvature of the earth, to display an image based on the mean sea level. It also reduces the ground returns from the displayed weather, by using the terrain data provided by the TAWS database.

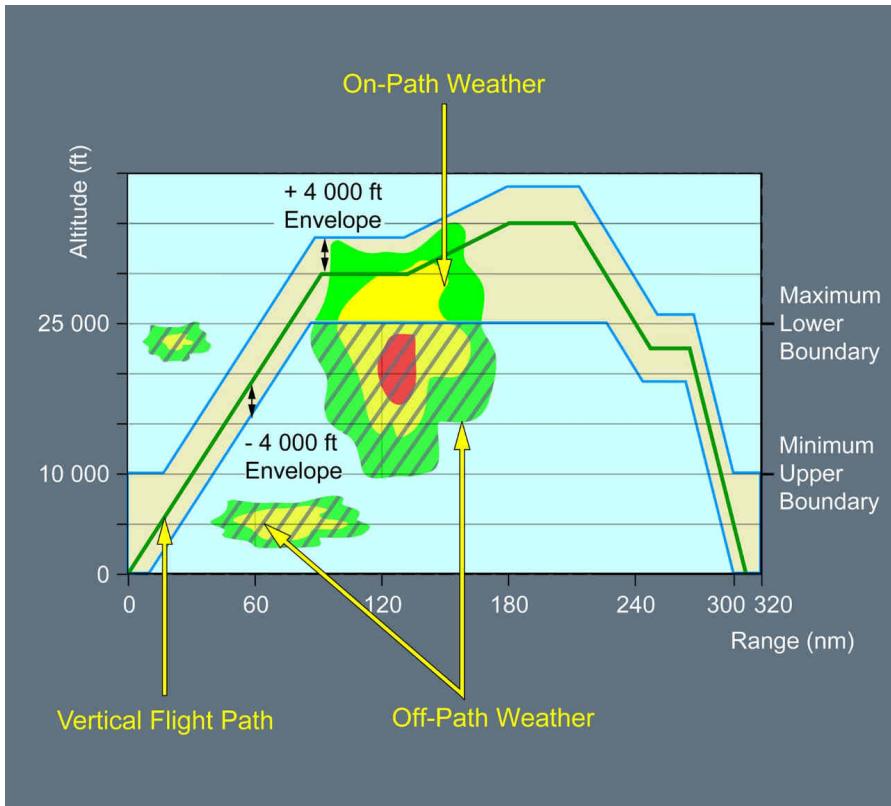
WXR Principle**AUTOMATIC (AUTO) MODE**

The automatic mode (AUTO) is the default mode of the WXR .

The WXR extracts the weather data from the 3-D buffer, along the aircraft flight path.

The WXR takes into account a vertical envelope along the aircraft vertical flight path, in order to display on the ND :

- The on-path weather that the aircraft will encounter (i.e. weather inside the envelope)
The on-path weather appears on the ND in the conventional colors.
- The off-path weather that is not on the aircraft trajectory (i.e. weather outside the envelope).
The off-path weather appears on the ND in black parallel lines, with reduced intensity.

WX Display Envelope

[L3] The aircraft vertical flight path is:

- The FMS flight plan limited by the selected altitude on the AFS CP , if the VD is defined along the FMS trajectory, or
- The flight path extrapolated using the current Flight Path Angle (FPA), and limited by the selected altitude on the AFS CP , if the VD is not defined along the FMS trajectory, or
- The flight path extrapolated up to 60 nm , using the Flight Path Angle (FPA), and limited to the altitude at 60 nm , if the selected altitude is not available.

[L2] The WXR may not be able to discriminate the on-path and the off-path weather at ranges above 160 nm , because of the angle of the antenna beam width. The WXR could consider some off-path weather as on-path weather.

- [L1] For the display on the VD , the WXR extracts the data from the 3-D buffer, along the zero-width vertical cut.
For more information about the vertical cut, *Refer to 31 / EFIS / VD .*

MANUAL ELEV AND TILT MODES

- The manual ELEVN mode enables the flight crew to analyze the weather at a selected altitude.
- [L2] The selected altitude depends on the barometric reference selected by the flight crew.
- [L1] The manual TILT mode enables the flight crew to analyze the weather at a selected tilt angle.
- [L2] Zero tilt value indicates the horizon as seen by the ADIRS .
- [L1] Depending on the flight crew selection, the WXR extracts data from the 3-D buffer:
- At a selected altitude, or
- At a selected tilt angle.

The WXR displays the extracted data on the ND .

The flight crew can select these modes by using:

- The ELEVN knob on the SURV panel
For more information on the ELEVN knob , *Refer to DSC-34-20-30-20-10 ELEVN Knob .*
- The ELEVN /TILT option list on the SURV/CONTROLS page of the MFD .
For more information about the ELEVN /TILT option list, *Refer to DSC-34-20-30-20-20 ELEVN/TILT Option List .*

The flight crew must return to the automatic mode when they have completed the analysis.

MANUAL AZIMUTH (AZIM) MODE

- The manual AZIM mode provides a vertical view of the weather along a selected azimuth.
- The WXR extracts data from the 3-D buffer along the selected azimuth, and displays the extracted weather on the VD .
- The flight crew can select the manual AZIM mode by pulling the VD AZIM knob of the SURV panel.
- For more information about the VD AZIM knob , *Refer to DSC-34-20-30-20-10 VD AZIM Knob .*
- [L2] The WXR automatically returns to the AUTO mode after 30 s , if the flight crew does not select any azimuth value.

MANUAL GAIN MODE

The manual GAIN mode enables the flight crew to adjust sensitivity of the weather display on the ND .

The flight crew can select the manual GAIN mode by using:

- The GAIN knob on the SURV panel
For more information on the GAIN knob , Refer to DSC-34-20-30-20-10 GAIN Knob .
- The GAIN button on the SURV/CONTROLS page of the MFD .
For more information on the GAIN button, Refer to DSC-34-20-30-20-20 GAIN Button .

TURBULENCE DETECTION (TURB) FUNCTION

Applicable to: ALL

The turbulence detection (TURB) function detects wet turbulence in a volume of space ahead of the aircraft.

L3 This function is based on the movement of precipitation.

L2 The TURB detection function scans:

- $\pm 60^\circ$ in azimuth
- Between 0 ft and 60 000 ft MSL
- Up to 40 nm in front of the aircraft.

L1 Note: *The TURB function does not detect clear air turbulence or dry turbulence.*

TURB detection is available, if:

- The WXR is operative
- The flight crew sets the TURB button to AUTO on the SURV/CONTROLS page of the MFD.

The ND displays the areas of turbulence in magenta.

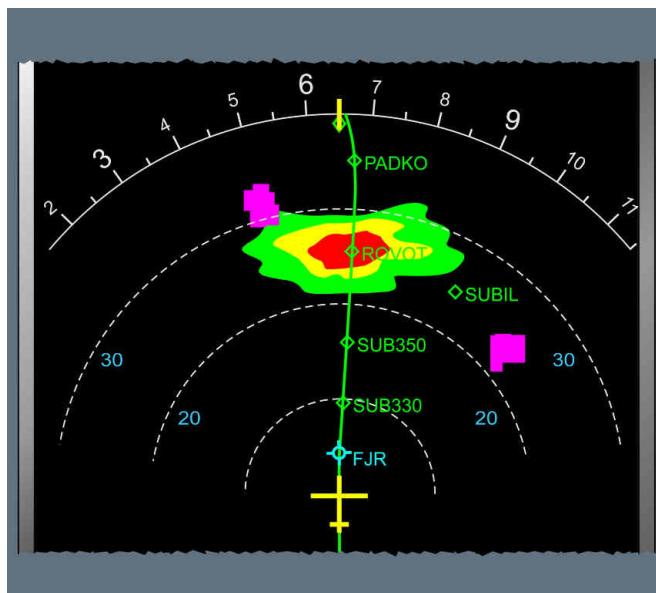
Note: *The VD does not display areas of turbulence.*

The ND displays the **TURB** message, if:

- The flight crew does not press the WX pb on the EFIS CP
- Turbulence is detected close to the aircraft.

L2 The envelope associated with the **TURB** message is:

- 20 nm on both sides of the aircraft heading
- $\pm 5\,000$ ft around the current aircraft altitude.

TURB Area Indication**PREDICTIVE WINDSHEAR (PWS) FUNCTION**

Applicable to: ALL

The Predictive Windshear (PWS) function:

- Detects windshears:
 - At least 10 s before a possible encounter
 - Between 0.5 nm and 5 nm in front of the aircraft
- Triggers alerts.

[3] The PWS function can detect and display up to 8 different windshears simultaneously.

[1] Note: The PRIMs also provide a reactive windshear function (Refer to 22-27 FLIGHT ENVELOPE / PROTECTIONS / REACTIVE WINDSHEAR).

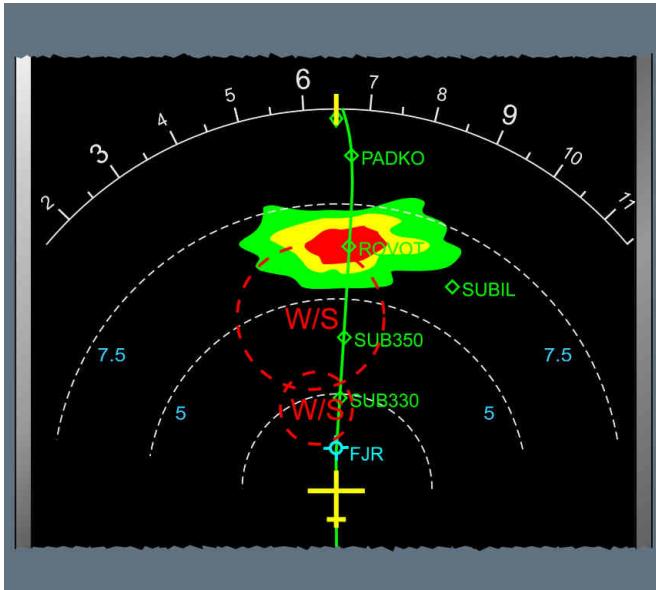
The PWS function is available, if the PRED W/S button is set to AUTO , and:

- If the WXR is operative, or at takeoff, if the WXR is OFF
- In flight, if the aircraft is below 1 500 ft AGL .

The ND displays the areas with predicted windshear as dashed red circles.

Note: The VD does not display areas with the windshear.

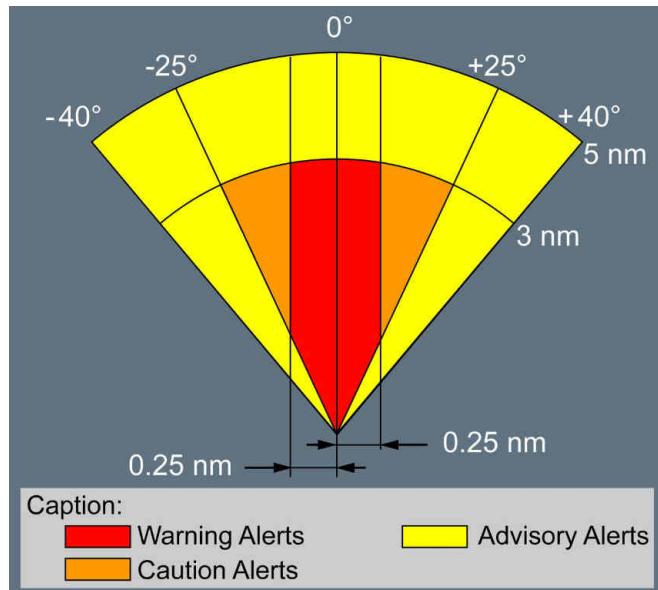
PWS Area Indication on ND



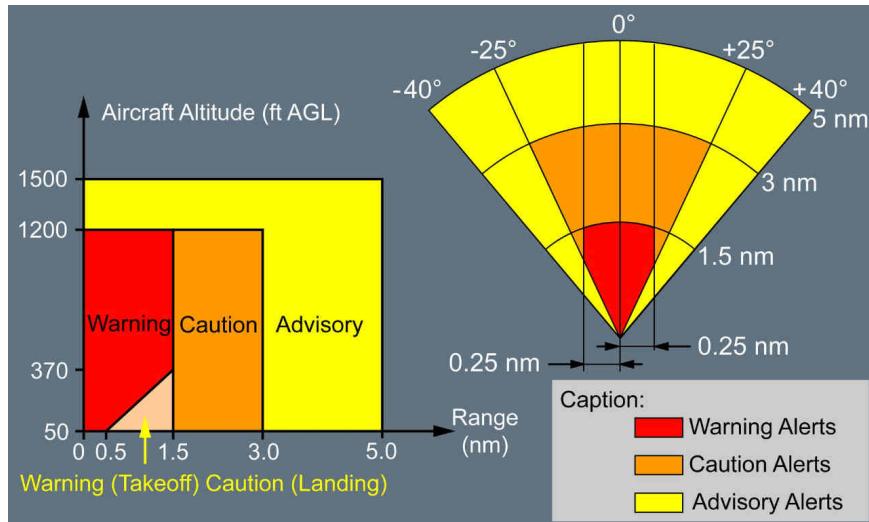
ALERT TRIGGERING CONDITIONS

Depending on the flight phase, and on the aircraft's distance from the windshear, the PWS function will trigger:

- A warning, or
- A caution, or
- An advisory.

DURING TAKEOFF ROLL, UP TO 100 KTPWS During Takeoff Roll

During the takeoff roll, and within a range of 3 nm , warnings and cautions are available.
At takeoff, all alerts are inhibited, if the aircraft speed is above 100 kt and up to 50 ft .

ABOVE 50 FTPWS Above 50ft

At landing:

- All alerts are inhibited, if the aircraft is below 50 ft
- Visual and aural warnings are downgraded to cautions from 370 ft AGL to 50 ft AGL , and range from 0.5 nm to 1.5 nm .

TRIGGERING OF ALERTS**WARNING**

In the case of a warning, the following are triggered:

- During approach, the "GO AROUND, WINDSHEAR AHEAD" aural alert
- During takeoff, the "WINDSHEAR AHEAD, WINDSHEAR AHEAD" aural alert
- The W/S AHEAD visual alert on the PFD s
- PWS area indication on the ND .

L2 The WX pb is also automatically selected on the EFIS CP .

L1 **Note:** - If the ND is in PLAN mode, the ND displays the W/S: CHANGE MODE message
 - If the flight crew selects a range different from 10 nm on the EFIS CP , the ND displays the W/S: SET RNG 10 NM message.

CAUTION

In the case of a caution, the following are triggered:

- The “MONITOR RADAR DISPLAY” aural alert
- The W/S AHEAD visual alert on the PFD s
- The PWS area indication on the ND .

[L2] The WX pb is also automatically selected on the EFIS CP .

[L1] **Note:**

- If the ND is in PLAN mode, the ND displays the W/S: CHANGE MODE message
- If the flight crew selects a range different from 10 nm on the EFIS CP , the ND displays the W/S: SET RNG 10 NM message.

ADVISORY

In the case of an advisory, the following is triggered:

- The PWS area indication on the ND .
- [L2] The WX pb is also automatically selected on the EFIS CP .

GROUND MAPPING FUNCTION

Applicable to: ALL

The ground mapping function enables the flight crew to display a map of terrain features on the ND.

The color code is:

- Black for standing water (no return)
- Green for the terrain
- Amber or red for cities and mountains (strong returns).

[L3] The WXR extracts the data from the 3-D buffer, by using the ground returns and the elevation data from the TAWS database.

[L1] The flight crew can select the ground mapping function via the MODE button on the SURV/CONTROLS page of the MFD, if the WXR is on.



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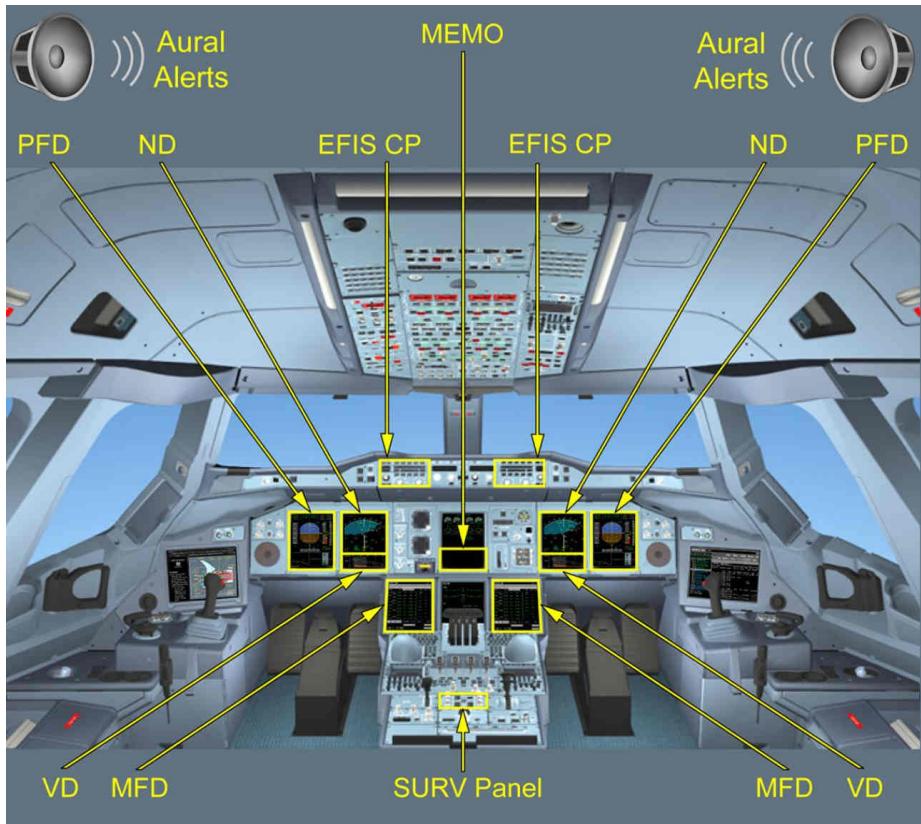
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WXR - SYSTEM DESCRIPTION

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COCKPIT VIEW

Applicable to: ALL

Cockpit View

EFIS CONTROL PANEL

Applicable to: ALL

EFIS CP

WX pb

WX pb

L12



The onside ND and VD display weather information.

On ground, if one engine is operative, turns on the WXR.

The flight crew cannot press the WXR pb and the TERR pb at the same time.

Associated with the WX message on the ND.



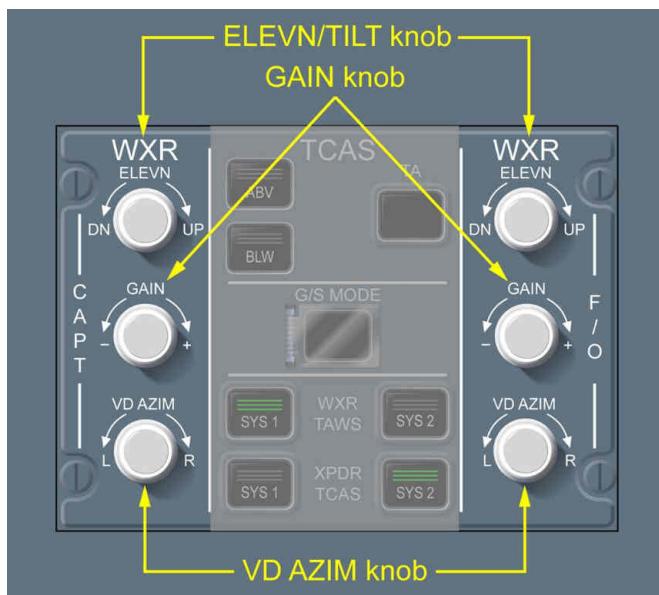
The onside ND and VD do not display weather information.

On ground, if the WX pb of both EFIS CPs are not pressed, turns off the WXR.

SURV PANEL

Applicable to: ALL

SURV Panel



ELEVN knob

L12



- When pushed, selects the AUTO mode.
This is the default position.
Associated with the WX message on the ND.
- When pulled:
 - Selects the manual ELEVN mode
 - Selects the manual TILT mode, if the previous manual mode was ELEVN.
- When turned, adjusts the elevation or tilt value.
The ND displays the elevation or tilt value.
The VD displays a white line indicating the elevation or tilt value.
The default ELEVN value is the current aircraft altitude.

The default TILT value is:
 - On ground: +3.00 °
 - In flight: 0 °.

Note: On the SURV/CONTROLS page of the MFD, the ELEVN/TILT option list is automatically updated.

Gain knob

- When pushed, selects the AUTO GAIN mode
The GAIN function is automatically set to the most appropriate setting.
- When pulled, selects the manual GAIN mode.
- When turned, adjusts the gain value in percentages.
The ND displays the GAIN value.
The default GAIN value is 50 %.

Note: On the SURV/CONTROLS page of the MFD, the GAIN button is automatically updated.

VD AZIM knob

L12



- When pushed, selects the AUTO mode.
This is the default position.
- When pulled, selects the manual AZIM mode.

On the VD:

- The eye symbol appears, instead of the aircraft symbol
- The terrain appears along the selected azimuth.

The ND displays a straight white line based on the selected azimuth value.

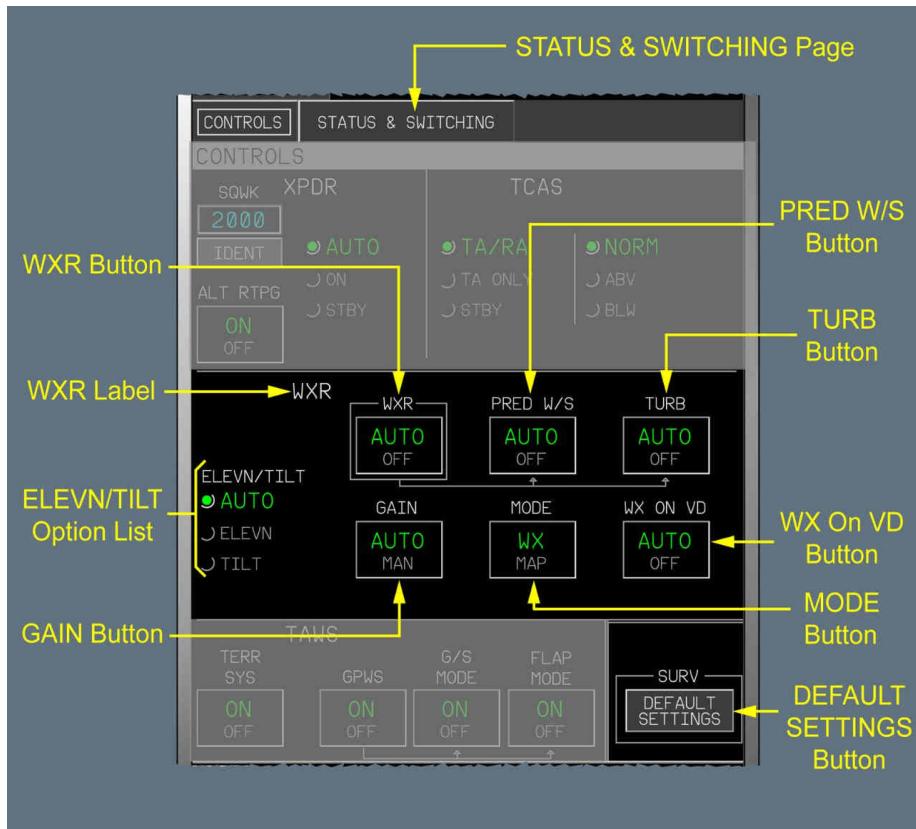
- When turned, adjusts the AZIM value in degrees.
The AZIM value is limited to $\pm 60^\circ$ around the current heading.
The VD displays the selected AZIM value in the VIEW ALONG AZIMUTH message.
- The AZIM line moves on the ND, based on the flight crew's selection.

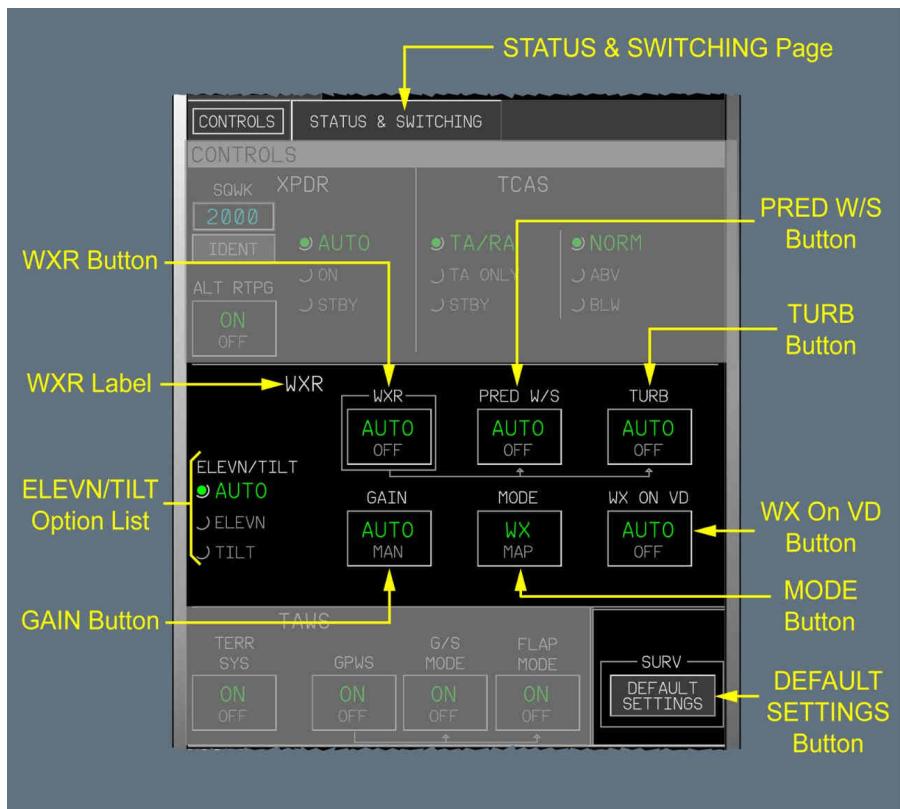
Note: The flight crew can preset the AZIM value before pulling the VD AZIM knob.

MFD

Applicable to: ALL

SURV Pages



CONTROLS PAGE
CONTROLS Page


Note: Flight crew selections (on the SURV/CONTROLS page of the MFD) that are applicable to the weather display, are valid for the outside ND and/or the outside VD.

WXR LABEL
WXR

The WXR is on.

WXR

The WXR is failed.

WXR BUTTON

L12



The WXR automatic mode is on.

This is the default position.

On ground, associated with the WXR ON MEMO.

When clicked, a confirmation is necessary in order to turn off the WXR.

When the flight crew sets the WXR button to AUTO:

- The PRED W/S button is automatically set to AUTO, and the function is on
- The TURB button is automatically set to AUTO, and the function is on
- The ELEVN/TILT option list is automatically set to AUTO
- The GAIN button is automatically set to AUTO
- The MODE button is automatically set to WX
- The WX ON VD button is automatically set to AUTO.

L12



The WXR is off.

When clicked, a confirmation is necessary in order to turn on the WXR.

Associated with:

- The **WXR OFF** MEMO, if the aircraft is in flight phases 2 to 11
- The **WXR OFF** message on the ND.

When the flight crew sets the WXR button to OFF:

- The PRED W/S button is automatically set to **OFF**, and the function is inhibited
- The TURB button is automatically set **OFF**, and the function is inhibited
- The selected option on the ELEVN/TILT option list is deselected, and the option list is inhibited
- The GAIN button no longer appears
- The MODE button no longer appears
- The WX ON VD button is automatically set to **OFF**.

The WXR is failed.



PRED W/S BUTTON

L12

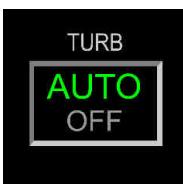
The PWS function operates automatically.
This is the default position.



The PWS function is off.
Associated with the PRED W/S OFF, or the PRED W/S OFF MEMO.

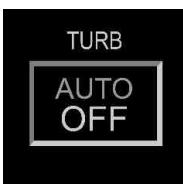


- The WXR is failed, or
- The PWS function is failed.

TURB BUTTON

L12

The TURB function operates automatically.
This is the default position.



The TURB function is off.
Associated with the WXR TURB OFF MEMO.

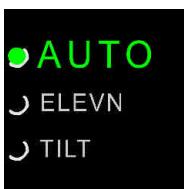
TURB

AUTO
OFF

- The WXR is failed, or
- The TURB function is failed.

ELEVN/TILT OPTION LIST

L12



The flight crew selects the AUTO mode.
This is the default position.
Associated with the WX message on the ND.

L12



The flight crew selects the ELEVN mode, and the barometric reference is STD.
When selected, an entry field appears below the option list. The flight crew should enter the appropriate FL value in the field.
Associated with the ELEVN message and the selected value on the ND.
Associated with the white line indicating the selected altitude on the VD.

L12



The flight crew selects the ELEVN mode, and the barometric reference is QNH.
When selected, an entry field appears below the option list. The flight crew should enter the appropriate FT value in the field.
Associated with the ELEVN message and the selected value on the ND.
Associated with the white line indicating the selected altitude on the VD.

L12



The flight crew selects the TILT mode.
When selected, an entry field appears below the option list. The flight crew should enter the appropriate degrees value in the field.
Associated with the TILT message and the selected value on the ND.
Associated with the white line indicating the selected tilt value on the VD.

ELEVN/TILT

↙ AUTO

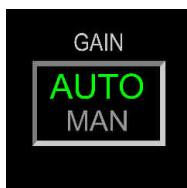
↙ ELEVN

↙ TILT

- The WXR is failed, or
- The WX display function is failed.

GAIN BUTTON

L12

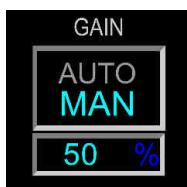


The GAIN mode operates automatically.

This is the default position.

Associated with the WX message on the ND.

L12



The flight crew manually selects the GAIN value.

When selected, an entry field appears below the GAIN button. The flight crew should enter the applicable GAIN percentage value.

Associated with the **GAIN** message and the selected value on the ND.

- The WXR is failed or set to OFF, or
- The WX display function is failed.

MODE BUTTON

L12

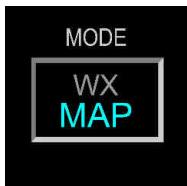


The WX display function is on.

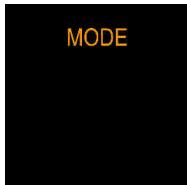
This is the default position.

Associated with the WX message on the ND.

L12



The flight crew selects the ground mapping function.
The ELEVN/TILT option list is no longer available.
Associated with the MAP message on the ND.



- The WXR is failed or set to OFF, or
- The WX display function is failed.

WX ON VD BUTTON



If flight crew presses the WX pb on the EFIS CP, the VD displays weather information.

This is the default position.

L12



If the flight crew presses the WX pb on the EFIS CP, the VD does not display weather information.

Associated with the **WX NOT SEL** message on the VD.



- The WXR function is failed, or
- The WX display function is failed.

DEFAULT SETTINGS BUTTON

L12

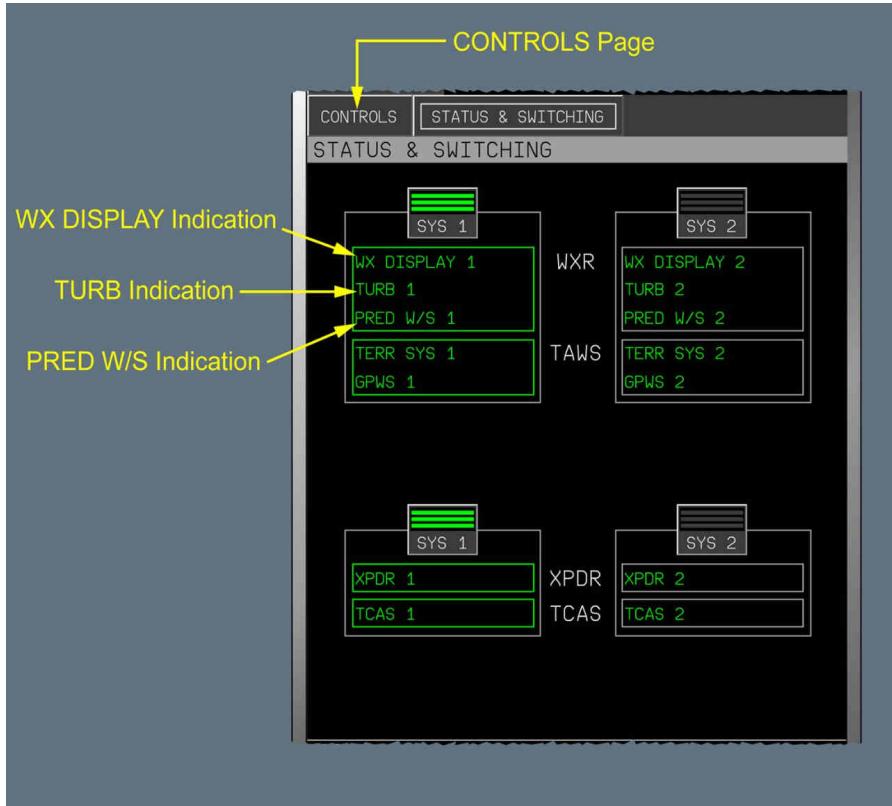


When clicked, automatically sets all the WXR settings to their default position. A confirmation is necessary in order to set the default positions.

- The ELEVN/TILT option list is set to AUTO
- The WXR button is set to AUTO
- The PRED W/S button is set to AUTO
- The TURB button is set to AUTO
- The GAIN button is set to AUTO
- The MODE button is set to WX
- The WX ON VD button is set to AUTO.

The following default settings are valid only for the onside MFD:

- The ELEVN/TILT option list
- The GAIN button
- The MODE button
- The WX ON VD button.

STATUS & SWITCHING PAGESTATUS & SWITCHING Page

- Green indicates that the function is on
- The green box indicates that the function is selected.
- White indicates that the function is set to OFF, or is on standby
- Amber indicates that the function is failed.

WX DISPLAY INDICATION**WX DISPLAY 1**

The WX display function is on, on SURV SYS 1(2).

WX DISPLAY 1

The WX display function is failed on SURV SYS 1(2)

WX DISPLAY OFF

The WX display function is off, on SURV SYS 1(2).

WX DISPLAY OFF

The WX display function is failed, and set to OFF.

TURB INDICATION**TURB 1**

The TURB function is on, on SURV SYS 1(2).

TURB 1

The TURB function is failed on SURV SYS 1(2).

TURB OFF

The TURB function is off, on SURV SYS 1(2).

TURB OFF

The TURB function is failed, and set to OFF.

PRED W/S INDICATION**PRED W/S 1**

The PWS function is on, on SURV SYS 1(2).

PRED W/S 1

The PWS function is failed on SURV SYS 1(2).

PRED W/S OFF

The PWS function is off, on SURV SYS 1(2).

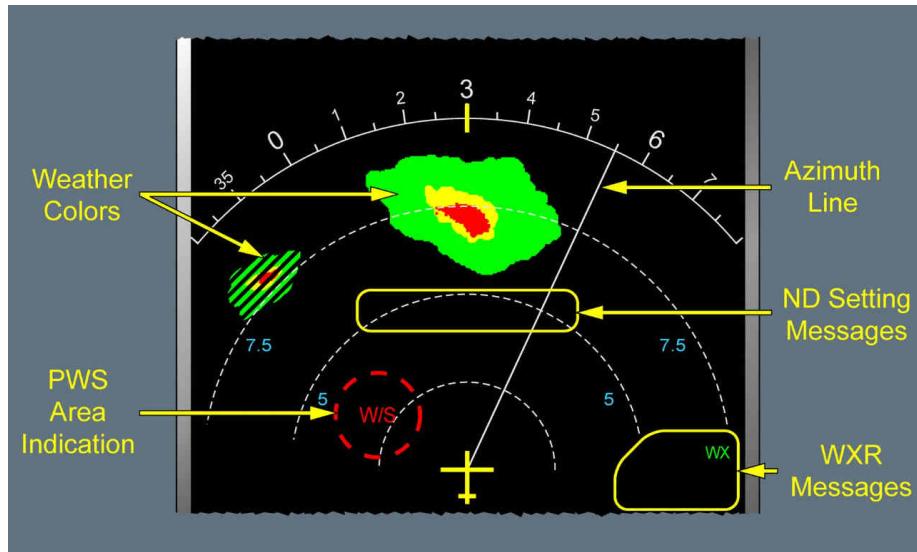
PRED W/S OFF

The PWS function is failed, and set to OFF.

ND

Applicable to: ALL

ND



The ND automatically displays the weather and predictive windshears if the PWS triggers an alert.

WEATHER COLORS

The ND displays the weather precipitation in various colors, depending on the precipitation intensity (black, green, yellow, red, or magenta) if:

- The WXR is on
- In ARC or ROSE mode
- The flight crew presses the WX pb on the EFIS CP.

When in AUTO mode, the ND displays:

- The on-path weather, that the aircraft will encounter, in the conventional colors
- The off-path weather, that is not on the aircraft trajectory, in black parallel lines, with reduced intensity.

AZIMUTH LINE

If the flight crew selects the manual AZIM mode of the WXR, the ND displays a white line to indicate the selected azimuth value.

- [L2] Flashes for 5 s before the WXR automatically reverts to the automatic mode.

WXR MESSAGES**GAIN** 53%

The flight crew selects the manual GAIN mode, by:

- Pulling the GAIN knob on the SURV panel, or
- Setting the GAIN button to MAN on the SURV CONTROLS page of the MFD.

TILT -12.0°

The flight crew selects the manual TILT mode, by:

- Pulling the ELEVN knob two times on the SURV panel, or
- Setting the ELEVN/TILT option list to TILT on the SURV CONTROLS page of the MFD page.

ELEVN 12500FT

The flight crew selects the manual ELEVN mode, by:

- Pulling the ELEVN knob on the SURV panel, or
- Setting the ELEVN/TILT option list to ELEVN on the SURV CONTROLS page of the MFD page.

The unit is:

- "ft", if in QNH baro-setting
- "FL", if in STD baro-setting.

WX

The flight crew selects the WX display function, by setting:

- The MODE button to WX
- The ELEVN/TILT option list to AUTO
- The GAIN button to AUTO, on the SURV CONTROLS page of the MFD.

| | |
|---------------------|--|
| MAP | The flight crew selects the ground mapping function of the WXR, by setting the MODE button to MAP on the SURV CONTROLS page of the MFD. |
| WXR OFF | The flight crew set the WXR button to OFF on the SURV CONTROLS page of the MFD. |
| WXR INOP | A WXR failure is detected. |
| WXR TEST | The WXR is in the test mode. |
| WXR DEGRADD | The WXR is in a degraded mode. The on-path and off-path weather may not be consistent with the current aircraft trajectory. |
| L12 WXR GND CLUT | The WXR no longer removes the ground returns from the weather display because: <ul style="list-style-type: none">- The WXR does not receive terrain data from the TAWS function, or- There is an aircraft position uncertainty. I.e. the uncertainty of the horizontal aircraft position is above 2.5 nm. |
| L12 WXR RNG | There is a difference in range between the SURV and the ND. |
| PRED W/S | The PWS function is failed. Appears when the aircraft is on ground, or when the slats lever position is not set to zero. |
| TURB | The TURB function detects turbulence. The weather is not displayed on the ND. |

ND SETTING MESSAGES

| | |
|--------------------|--|
| W/S: CHANGE MODE | Appears in PLAN mode, when the PWS (of the SURV system) triggers a warning. For more information, <i>Refer to 31 / EFIS / ND / ND MESSAGES</i> . |
| W/S: SET RNG 10 NM | Appears in ARC or ROSE mode, when: <ul style="list-style-type: none">- The flight crew selects a range that is different from 10 nm- The PWS triggers a warning. For more information, <i>Refer to 31 / EFIS / ND / ND MESSAGES</i> . |
| W/S: CHANGE MODE | Appears in PLAN mode, when the PWS (of the SURV system) triggers a caution. For more information, <i>Refer to 31 / EFIS / ND / ND MESSAGES</i> . |

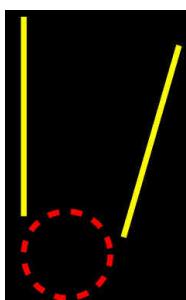
W/S: SET RNG 10 NM

Appears in ARC or ROSE mode, when:

- The flight crew selects a range that is different from 10 nm
- The PWS triggers a caution.

For more information, *Refer to 31 / EFIS / ND / ND MESSAGES .***PWS AREA INDICATION**

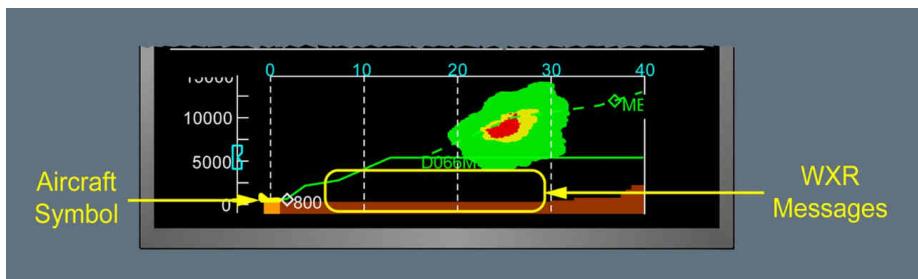
The ND range is set to 10 nm in ARC mode, or to 20 nm in ROSE mode, and a windshear is detected.



The ND range is more than 10 nm in ARC mode, or more than 20 nm in ROSE mode, and a windshear is detected.

VD

Applicable to: ALL

VD

The VD displays the weather along:

- The solid green line displayed on the ND , or
- The solid white line displayed on the ND , if the flight crew has selected the manual AZIM mode of the WXR .

Note: VD range is always limited to 160 nm .

AIRCRAFT/EYE SYMBOL



The WXR is in AUTO mode.



The flight crew selects the manual AZIM mode of the SURV system.

WXR MESSAGES

WXR INOP

Appears, when the flight crew presses the WX pb on the EFIS CP, and:

- The WXR (on the SURV system) is failed, or
- The aircraft is flying in the polar zone.

WX NOT SEL

Appears, when the flight crew:

- Presses the WX pb on the EFIS CP
- Sets the WX ON VD button to OFF on the SURV CONTROLS page of the MFD.

L12

NO TERR & WX DATA AVAILABLE

Appears when the flight crew:

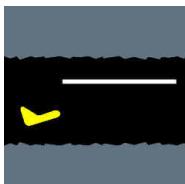
- Selects PLAN mode on the EFIS CP, or
- Sets to **OFF** the TERR SYS button on the SURV CONTROLS page of the MFD.

The VD does not display the weather when the TERR function is not available, because it cannot locate the weather vertically (i.e. with respect to the terrain).

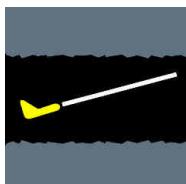
VIEW ALONG AZIM XXX°

The message is associated with the azimuth value, when the flight crew selects the manual AZIM mode.

ELEVN AND TILT INDICATIONS



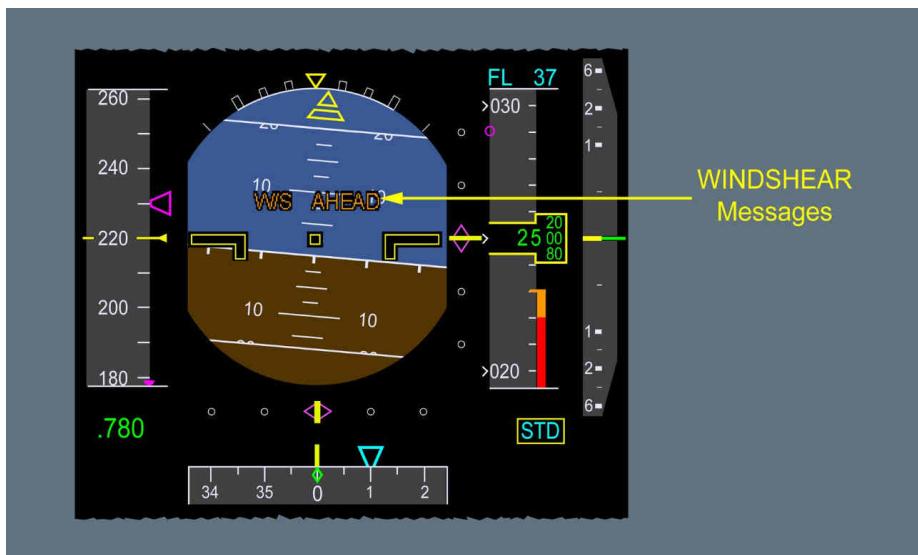
Indicates the selected altitude, in manual elevation mode.



Indicates the selected tilt angle, in manual tilt mode.

PFD

Applicable to: ALL

PFD**WINDSHEAR MESSAGES**

L12

W/S AHEAD

PWS detects a windshear in front of the aircraft, and triggers a caution.
Flashes for 9 s, then remains steady.

L12

W/S AHEAD

PWS detects a windshear in front of the aircraft, and triggers a warning.
Flashes for 9 s, then remains steady.

MEMO

Applicable to: ALL

PRED W/S OFF

The flight crew sets the PRED W/S button to OFF on the SURV CONTROLS page of the MFD.

Flight Phase Inhibition:

Flight Phase Inhibition

PRED W/S OFF

The flight crew sets the PRED W/S button to OFF on the SURV CONTROLS page of the MFD.

Flight Phase Inhibition:

Flight Phase Inhibition

WXR TURB OFF

The flight crew sets the TURB button to OFF on the SURV CONTROLS page of the MFD.

Flight Phase Inhibition:

Flight Phase Inhibition

[1] WXR ON

The aircraft is on ground, and the flight crew manually selects the WXR function.

[2] Flight Phase Inhibition:

Flight Phase Inhibition

[1] WXR OFF

The flight crew sets the WXR button to OFF on the SURV CONTROLS page of the MFD.

[2] Flight Phase Inhibition:

Flight Phase Inhibition**AURAL ALERTS**

Applicable to: ALL

| Aural Alert | Sound | Meaning |
|-------------------------------------|------------------------------|--|
| MONITOR RADAR DISPLAY | (Audio not available in PDF) | The PWS triggers a windshear caution, and the aircraft is not in a dangerous zone. For more information, Refer to DSC-34-20-30-10 Predictive Windshear (PWS) Function . |
| WINDSHEAR AHEAD, WINDSHEAR AHEAD | (Audio not available in PDF) | The PWS triggers a windshear warning during takeoff. For more information, Refer to DSC-34-20-30-10 Predictive Windshear (PWS) Function . |
| GO AROUND, WINDSHEAR AHEAD | (Audio not available in PDF) | The PWS triggers a windshear warning during approach. For more information, Refer to DSC-34-20-30-10 Predictive Windshear (PWS) Function . |

Note: In the case of simultaneous alerts, the first aural alert may be partially triggered.

OVERVIEW**Applicable to: ALL**

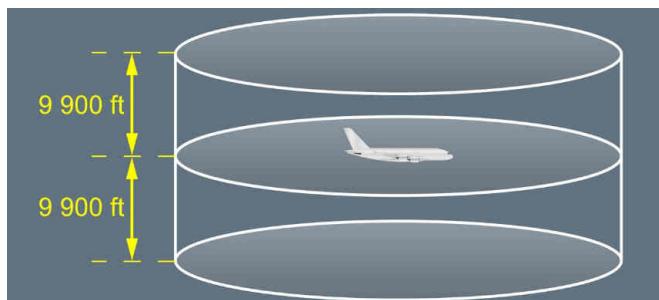
The Traffic Collision Avoidance System (TCAS):

- Detects and displays surrounding aircraft that have a transponder
- Calculates possible collision threats
- Triggers vertical speed orders, in order to avoid collisions.

PRINCIPLE**Applicable to: ALL**

The TCAS detects intruders that are flying within a maximum range of 20 nm to 60 nm (depending on the aircraft configuration and external weather conditions), and within a maximum altitude of 9 900 ft above, and 9 900 ft below, the aircraft.

TCAS Range



L2 Note: In some circumstances, TCAS intruders may be detected up to 100 nm.

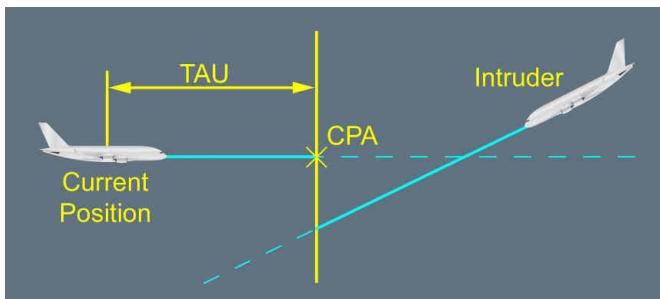
L1 The TCAS obtains data transmitted by the transponders of nearby aircraft, and uses this data to evaluate possible collision threats.

L2 The TCAS determines:

- The bearing of intruders, in relation to the bearing of the aircraft
- The distance between the aircraft and intruders, and the rate of separation or closure
- The relative altitude of intruders, if intruders have a Mode-C or Mode-S transponder.

The TCAS then calculates the intruder trajectory, the Closest Point of Approach (CPA), and the estimated time (TAU), before reaching the CPA.

L3 The TAU is the ratio between the distance that separates both aircraft, and the sum of their speed.

TAU Definition

If the TCAS detects that the trajectory of an intruder may be a collision threat, it triggers:

- Aural and visual alerts
- Vertical speed orders, to ensure there is sufficient distance between the trajectory of the aircraft and the trajectory of the intruders. In addition, the TCAS takes all intruders into account, and adjusts the vertical speed orders, in order to avoid a collision.

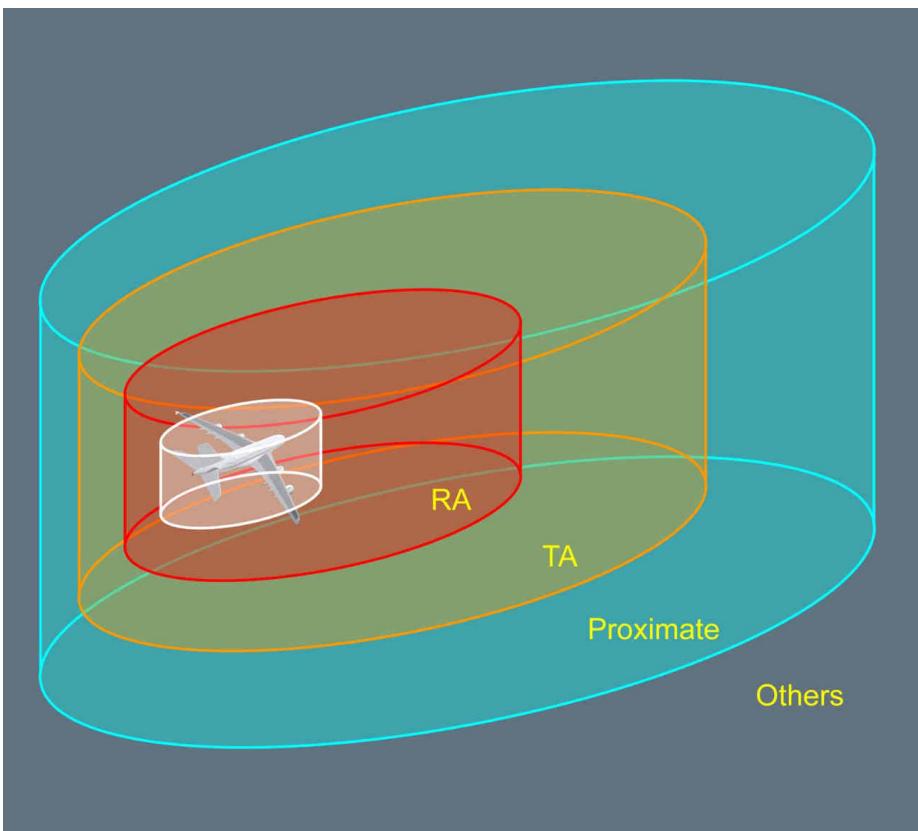
If the aircraft is below 1 650 ft AGL in descent, or above 1 750 ft AGL in climb, the TCAS does not consider aircraft that are descending below 380 ft or below 400 ft while climbing. These aircraft are considered to be on ground.

INTRUDER DETECTION CATEGORIES

Applicable to: ALL

The TCAS divides the space surrounding the aircraft into the following four zones, in order to evaluate and categorize possible collision threats:

- Resolution Advisory (RA)
- Traffic Advisory (TA)
- Proximate intruders
- Other intruders.

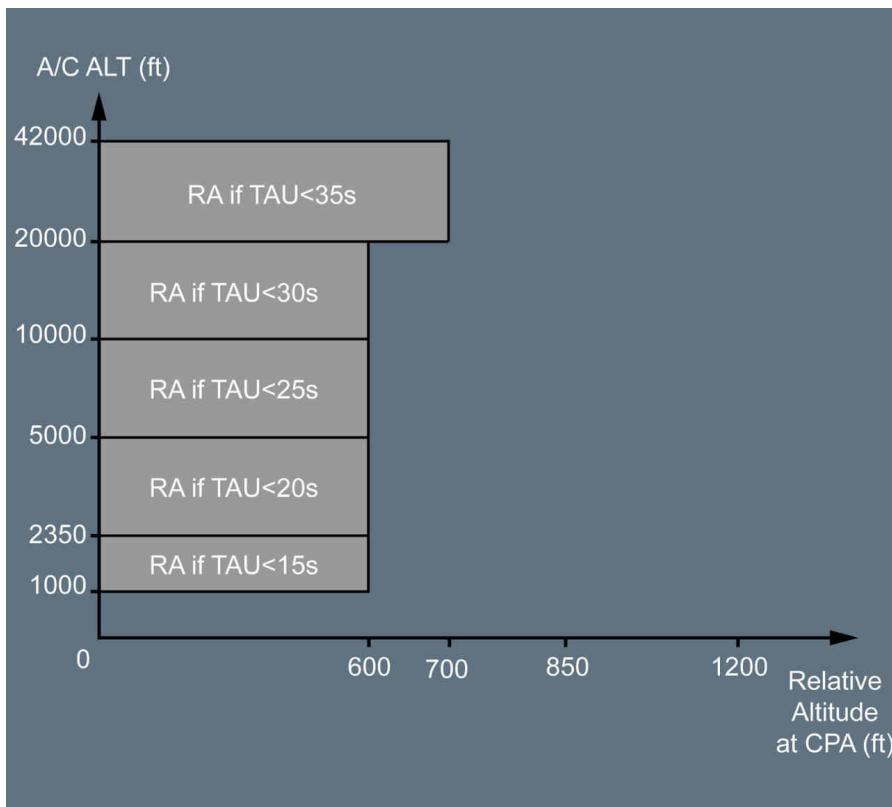
TCAS Envelopes**RESOLUTION ADVISORY (RA)**

The TCAS triggers a Resolution Advisory (RA) to indicate that there is a high threat of collision.

There are two types of RAs:

- Preventive RA: The flight crew must monitor vertical speed
- Corrective RA: The flight crew must adjust vertical speed.

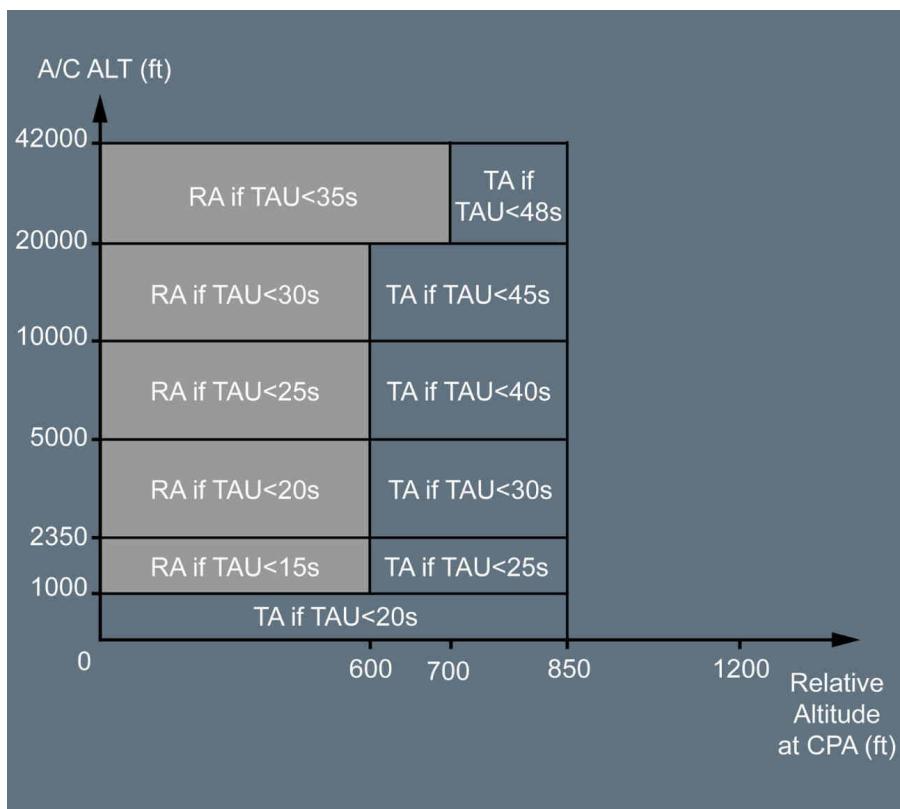
The PFD displays vertical speed orders that indicate the vertical direction that the aircraft should take, in order to avoid a collision.

RA Intruder

- [L2] The TCAS does not trigger RAs:
 - Below 950 ft AGL in descent
 - Below 1 100 ft AGL in climb.
- [L1] The TCAS associates aural alerts with the RAs.

TRAFFIC ADVISORY (TA)

The TCAS triggers a Traffic Advisory (TA) to indicate a possible collision threat. This advisory helps the flight crew to visually locate the intruder. It also prepares the flight crew for a possible RA. However, a TA may not always occur before an RA.

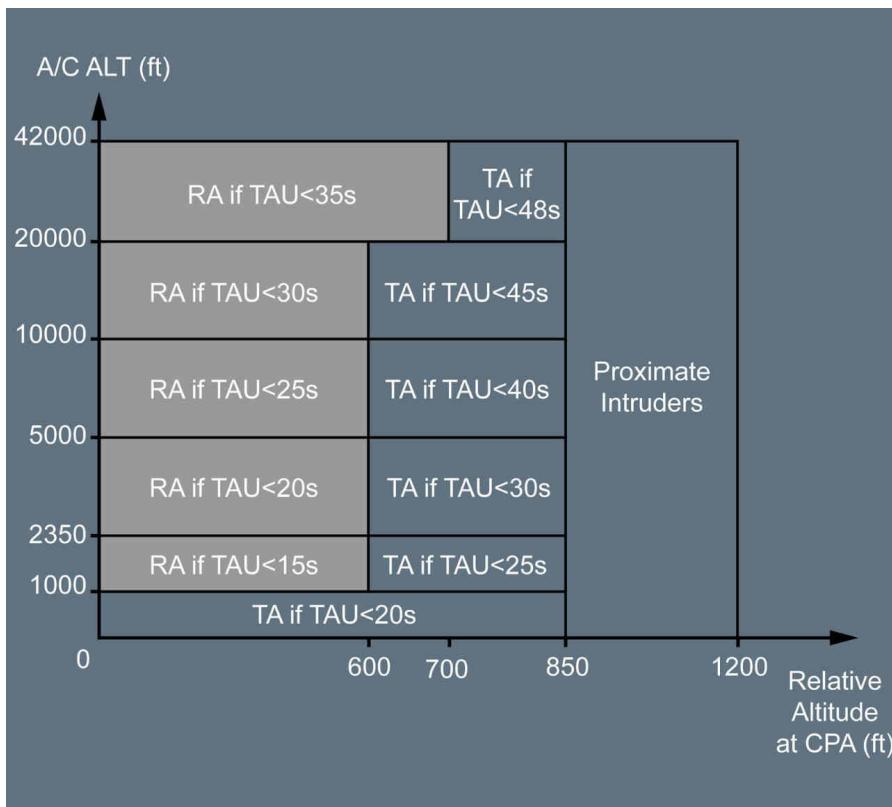
RA/TA Intruder

The TCAS associates aural alerts with the TAs.

PROXIMATE INTRUDER

The TCAS monitors intruders that are in proximity of the aircraft, but that are not a collision threat. These are called proximate intruders.

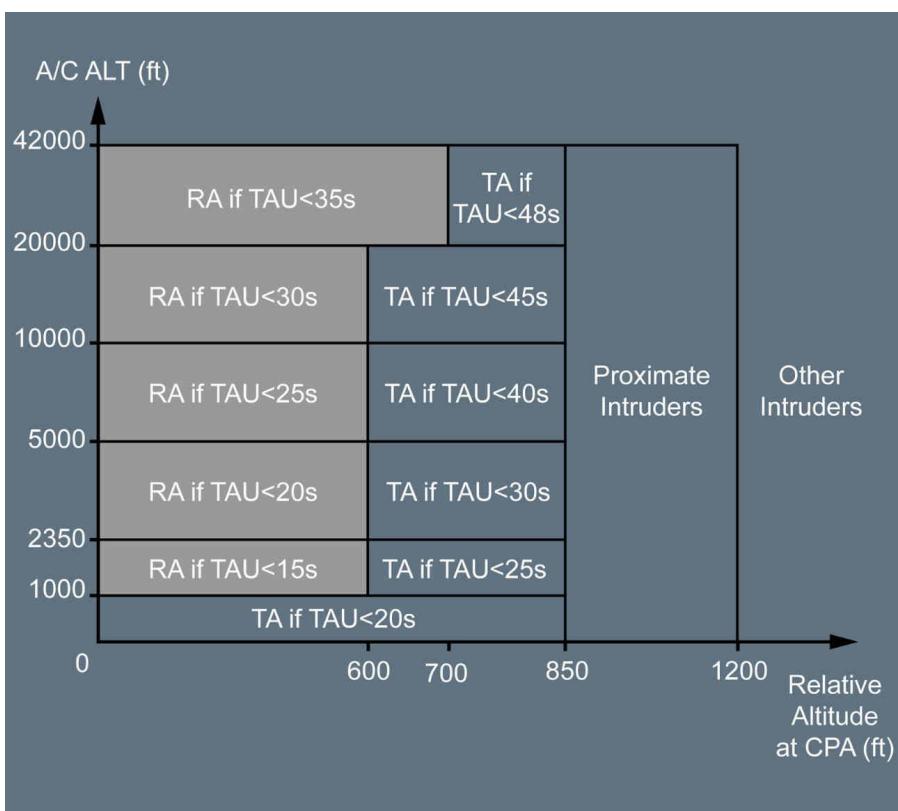
- [L2] The difference in altitude between the aircraft and the proximate intruder is less than 1 200 ft, and they are within 6 nm of each other.

RA/TA / Proximate IntruderOTHER INTRUDERS

The TCAS monitors intruders that are in the detection envelope of the TCAS, but are not in the proximate intruder, TA, or RA category.

These are called other intruders.

- [2] The difference in altitude between the aircraft and the other intruder is between 1 200 ft and 9 900 ft above or below.

Other Intruders**TCAS MODES****Applicable to: ALL**

The TCAS has three different modes of operation:

- The Traffic Advisory/Resolution Advisory (TA/RA) mode
- The Traffic Advisory Only (TA ONLY) mode
- The standby (STBY) mode.

TRAFFIC ADVISORY/RESOLUTION ADVISORY (TA/RA) MODE

The Traffic Advisory/Resolution Advisory (TA/RA) mode is the default TCAS mode.

The TA/RA mode enables:

- The ND to display all intruders
- The PFD to display the vertical speed scale
- The triggering of aural alerts.

TRAFFIC ADVISORY ONLY (TA ONLY) MODE

If the TCAS is in TA ONLY mode:

- All RAs are inhibited, and become TAs
- The PFD does not display vertical speed areas
- The ND displays the **TA ONLY** message
- The TAU is 20 s, regardless of the aircraft altitude.

L3

TA ONLY mode can be selected manually, or automatically.

MANUAL SELECTION

The flight crew can manually select the TA ONLY mode by:

- Pressing the TA pb on the SURV panel, or
- Selecting the TA ONLY option on the SURV CONTROLS page of the MFD.

For more information on the manual selection of the TA ONLY mode, *Refer to FCTM/SUPPLEMENTARY INFORMATION/TCAS.*

AUTOMATIC SELECTION

The TA ONLY mode is automatically selected, if:

- One of the following alerts is triggered, and/or
 - Windshear
 - Stall
 - TAWS.

The TCAS returns to TA/RA mode, when the alert is finished.

- The aircraft is below 1 000 ft±100 ft, and/or
- The aircraft is in emergency electrical configuration.
In this case, the flight crew can also select the standby mode.

STANDBY (STBY) MODE

In the standby mode, the TCAS does not perform any TCAS function, and does not trigger any alert.

The PFD and the ND do not display any TCAS information.

The STBY mode is associated with:

- The **TCAS STBY** message on the ND
- The TCAS STBY MEMO.

TCAS DISPLAY SELECTION

Applicable to: ALL

The ND displays intruders that enter the zone surrounding the aircraft, when:

- In ROSE or ARC mode
- • The flight crew presses the TRAF pb on the EFIS CP, or
- • The flight crew did not press the TRAF pb on the EFIS CP, and the TCAS triggers an alert.

Note: If the ND is in PLAN mode, the ND does not display intruders.

When the aircraft is below 1 700 ft AGL, all advisories indicating intruders below 380 ft AGL are inhibited.

L2 The TCAS manages up to 60 intruders, but the ND displays the 8 most threatening intruders only.

L1 There are three types of TCAS displays:

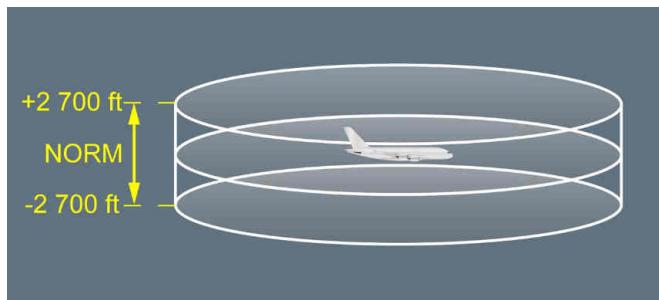
- Normal (NORM)
- Above (ABV)
- Below (BLW).

NORMAL

NORM is the default selection.

In NORM, the TCAS displays intruders that are between 2 700 ft below, and 2 700 ft, above the aircraft.

Normal Mode



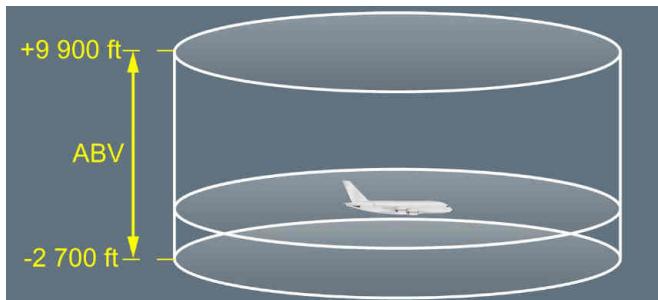
The flight crew can select the NORM TCAS display by:

- Deselecting the ABV pb and the BLW pb on the SURV panel, or
- Selecting the NORM option on the SURV/CONTROLS page of the MFD.

ABOVE (ABV)

In ABV mode, the TCAS displays intruders that are between 2 700 ft below, and 9 900 ft above, the aircraft.

Above Mode



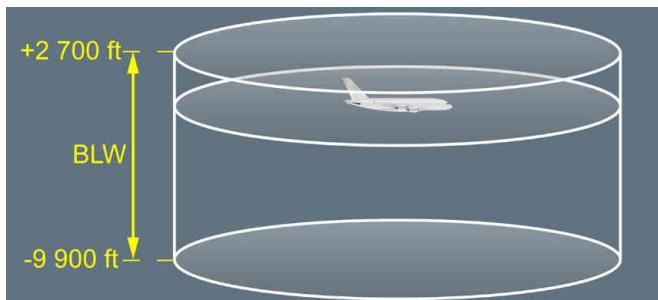
The flight crew can select the ABV TCAS display by:

- Pressing the ABV pb on the SURV panel, or
- Selecting the ABV option on the SURV/CONTROLS page of the MFD.

BELow (BLW)

In BLW mode, the TCAS displays intruders that are between 9 900 ft below, and 2 700 ft above, the aircraft.

Below Mode





A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

34 - SURVEILLANCE

TCAS - SYSTEM DESCRIPTION

The flight crew can select the BLW TCAS display by:

- Pressing the BLW pb on the SURV panel, or
- Selecting the BLW option on the SURV/CONTROLS page of the MFD.



A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

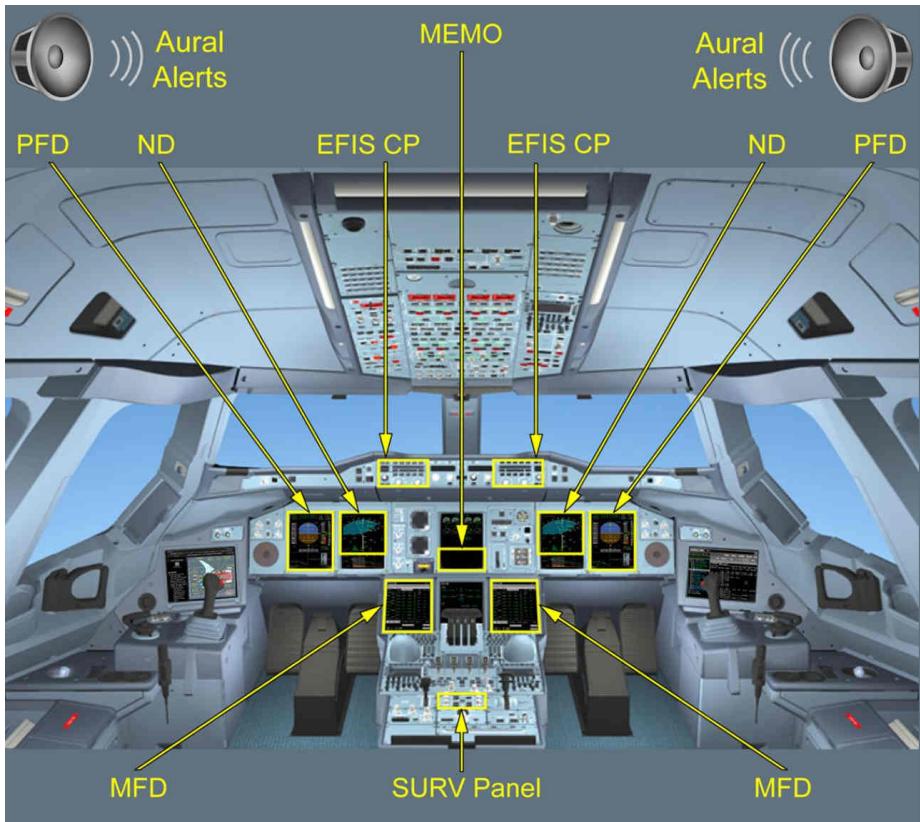
34 - SURVEILLANCE

TCAS - SYSTEM DESCRIPTION

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COCKPIT VIEW

Applicable to: ALL

Cockpit View

EFIS CONTROL PANEL

Applicable to: ALL

EFIS CP

TRAF pb

TRAF pb

The onside ND displays traffic information.

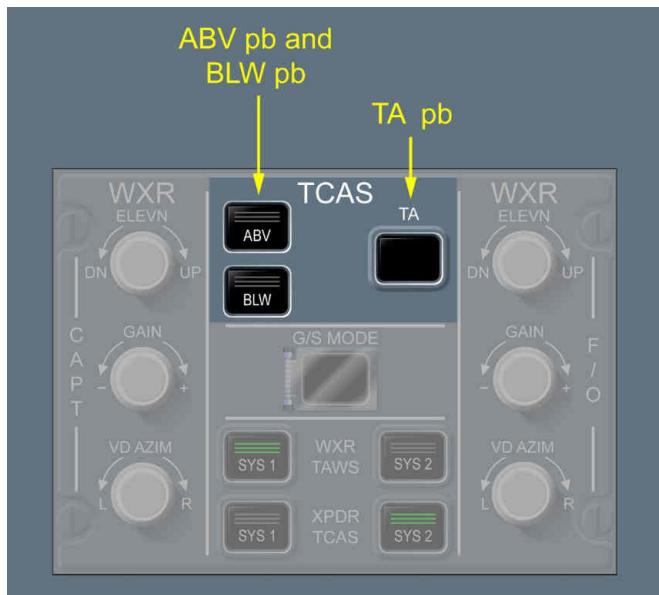
**TRAF pb**

The onside ND does not display traffic information.



SURV PANEL

Applicable to: ALL

SURV PanelTA pb

The TCAS is in TA/RA mode.

L12



The TCAS is in TA ONLY mode.
Associated with the **TA ONLY** message on the ND.

ABV pb AND BLW pb

The TCAS display is in NORM mode.



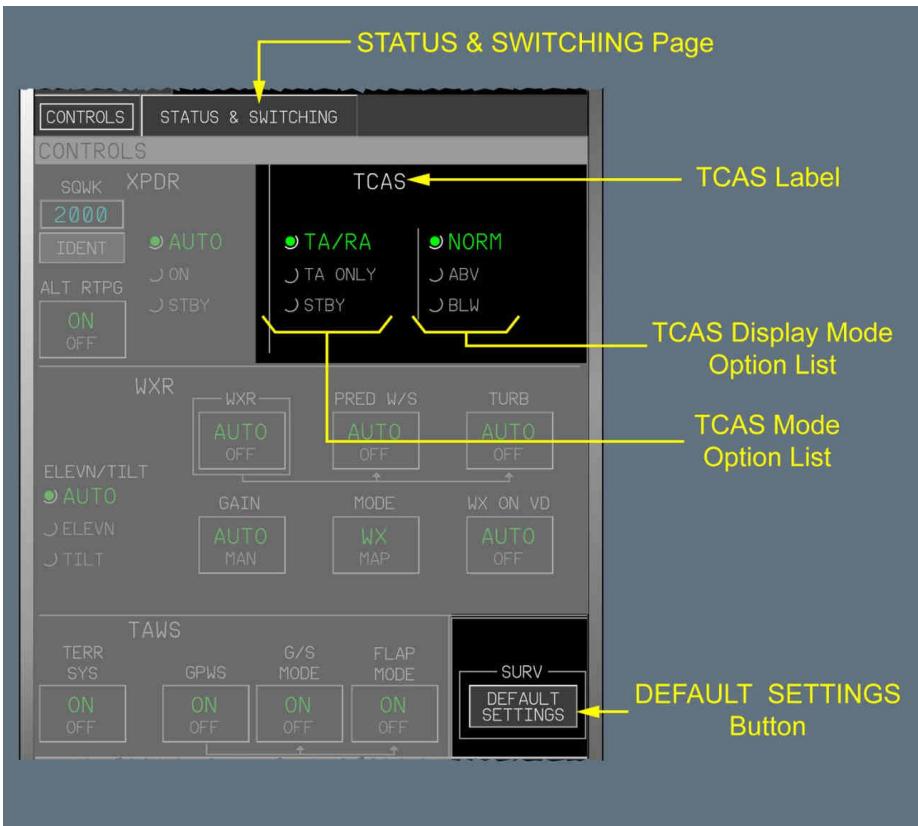
The TCAS display is in ABV mode.

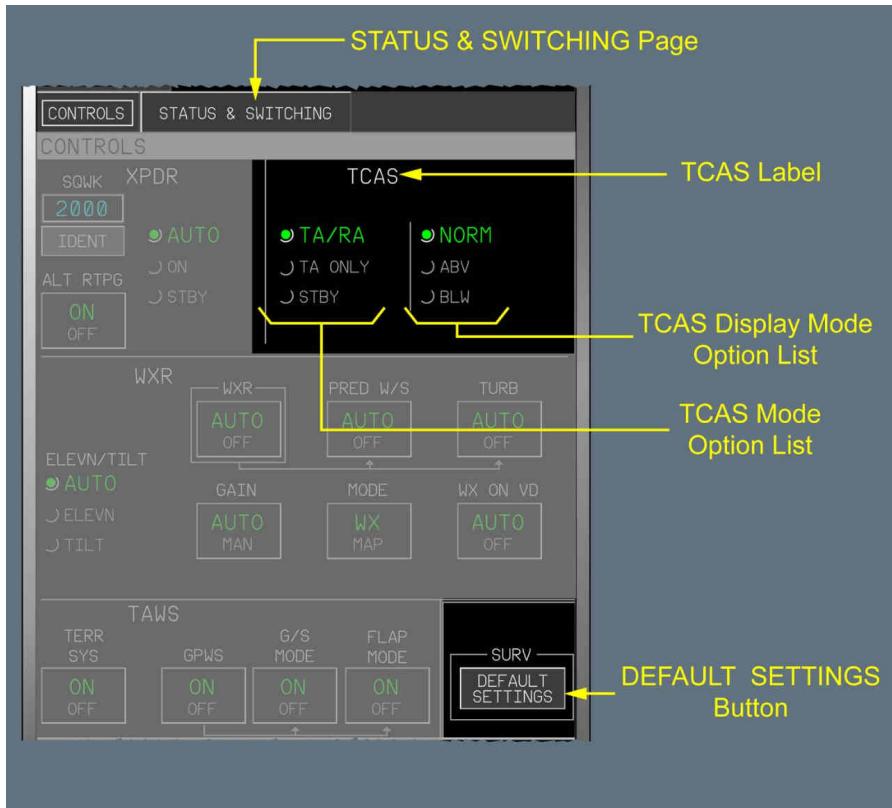


The TCAS display is in BLW mode.

MFD

Applicable to: ALL

SURV Pages

CONTROLS PAGECONTROLS Page**TCAS LABEL****TCAS**

TCAS is on.

TCAS

The TCAS or XPDR is failed.

TCAS MODE OPTION LIST

The flight crew selects the TA/RA mode.



The flight crew selects the TA ONLY mode.

Associated with the **TA ONLY** message on the ND.



The flight crew selects the STBY mode. The TCAS does not provide any alerts or displays.

Associated with:

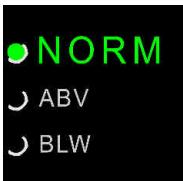
- The **TCAS STBY** message on the ND
- The TCAS STBY MEMO.



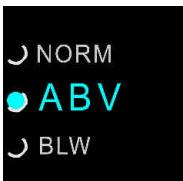
The XPDR is on standby.



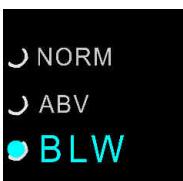
The TCAS or XPDR is failed.

TCAS DISPLAY MODE OPTION LIST

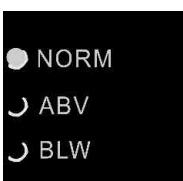
The flight crew selects the NORM mode.



The flight crew selects the ABV mode.



The flight crew selects the BLW mode.

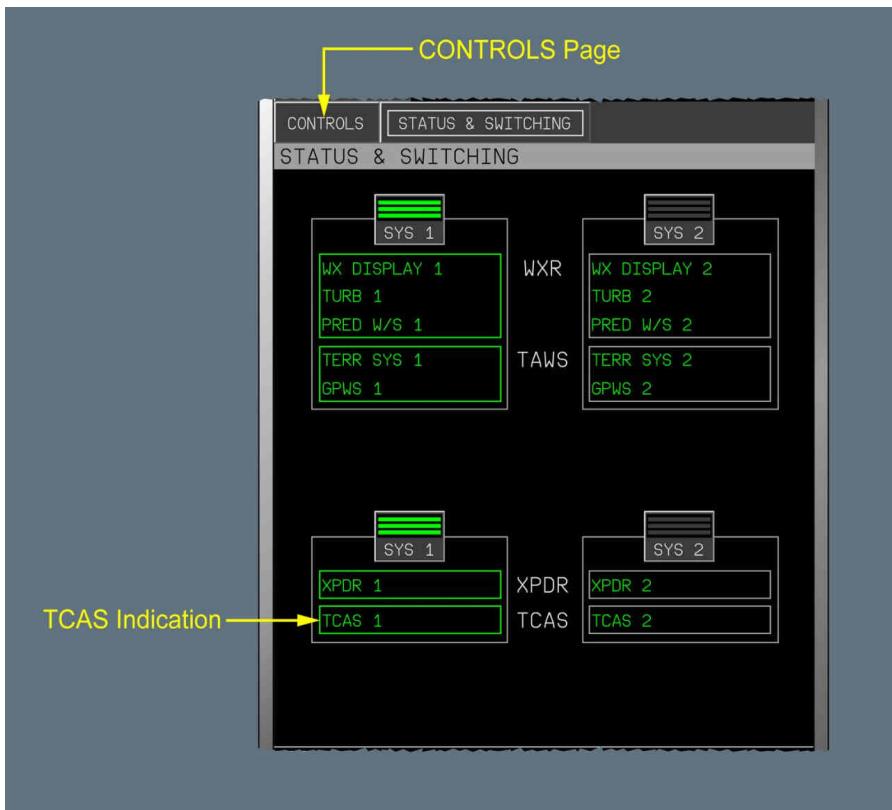


- The XPDR is on standby, or
- The TCAS or XPDR is failed.

DEFAULT SETTINGS BUTTON

When clicked, automatically sets all the TCAS settings to their default position on both MFDs. A confirmation is necessary in order to set the default positions.

- The TCAS mode option list is set to TA/RA
- The TCAS display mode option list is set to NORM.

STATUS & SWITCHING PAGESTATUS & SWITCHING Page

- Green indicates that the function is on
- The green box indicates that the function is selected.
- White indicates that the function is set to OFF, or is on standby
- Amber indicates that the function is failed.



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TCAS - CONTROLS AND INDICATORS

TCAS INDICATION

TCAS 1

The TCAS is on, on SURV SYS 1(2).

TCAS 1

The TCAS is failed on SURV SYS 1(2).

TCAS STBY

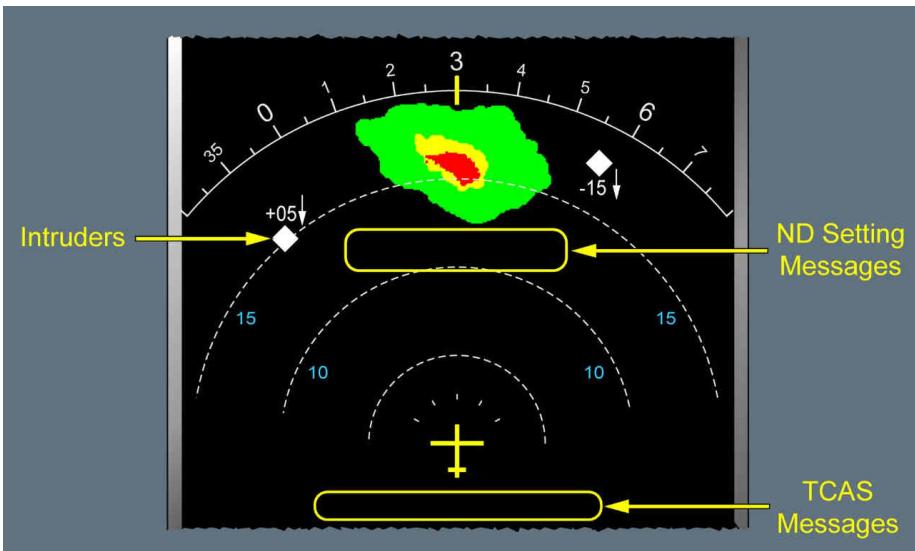
The TCAS is not operating on SURV SYS 1(2).

TCAS STBY

The TCAS is failed, and set to OFF.

ND

Applicable to: ALL

ND

The ND automatically displays the intruders, if the TCAS triggers an alert.

- The TRAF pb is automatically selected on the EFIS CP .

INTRUDERS

The following symbols indicate the range and location of intruders:

- An intruder is in the RA range.
- An intruder is in the TA range.
- An intruder is in the proximate range.
- Other intruder.

These symbols appear with:

- Two digits, that indicate the relative altitude of the intruder (in hundreds of feet)
They appear below the symbol, if the intruder is below the aircraft, and above the symbol if the intruder is above the aircraft.
- A plus (+) or minus (-) symbol that appears to the left of the digits, and that indicates if the intruder is above (+) or below (-) the aircraft
- An arrow, to the right of the digits, that indicates the vertical movement of the intruder.

TCAS MESSAGES

| | |
|------------------|---|
| 22.1 NM +12 ↑ | Provides information (range, relative altitude, and vertical speed arrow) about the two most dangerous RA intruders without bearing. |
| 22.1 NM +12 ↓ | Provides information (range, relative altitude, and vertical speed arrow) about the two most dangerous TA intruders without bearing. |
| TA ONLY | The flight crew selects the TA ONLY mode, by: <ul style="list-style-type: none">- Pressing the TA pb on the SURV panel, or- Setting the TCAS mode option list to TA ONLY on the SURV CONTROLS page of the MFD. |
| TCAS | The TCAS is failed, and the TRAF pb is pressed on the EFIS CP. |
| TCAS STBY | The TRAF pb is pressed on the EFIS CP, and: <ul style="list-style-type: none">- The TCAS is on standby, or- The XPDR is on standby, or- The XPDR is failed. |
| TCAS TEST | The TCAS is in test, and the TRAF pb is pressed on the EFIS CP |

ND SETTING MESSAGES

| | |
|----------------------|--|
| TCAS: INCREASE RANGE | Appears in ROSE-VOR or ROSE-LS mode, when: <ul style="list-style-type: none">- The flight crew sets the range selector to ZOOM- The aircraft is not on ground- The TCAS identifies at least one TA intruder. For more information, <i>Refer to 31 / EFIS / ND / ND MESSAGES</i>. |
|----------------------|--|



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TCAS: INCREASE RANGE

Appears in ROSE-VOR or ROSE-LS mode, when:

- The flight crew sets the range selector to ZOOM
 - The aircraft is not on ground
 - The TCAS identifies at least one RA intruder.
- For more information, *Refer to 31 / EFIS / ND / ND MESSAGES*.

TCAS: REDUCE RANGE

Appears, when:

- The flight crew selects a range on the EFIS CP that is more than 40 nm
 - The TCAS identifies at least one TA intruder.
- For more information, *Refer to 31 / EFIS / ND / ND MESSAGES*.

TCAS: REDUCE RANGE

Appears, when:

- The flight crew selects a range on the EFIS CP that is more than 40 nm
 - The TCAS identifies at least one RA intruder.
- For more information, *Refer to 31 / EFIS / ND / ND MESSAGES*.

TCAS: CHANGE MODE

Appears in PLAN mode, when the TCAS identifies at least one TA intruder.

For more information, *Refer to 31 / EFIS / ND / ND MESSAGES*

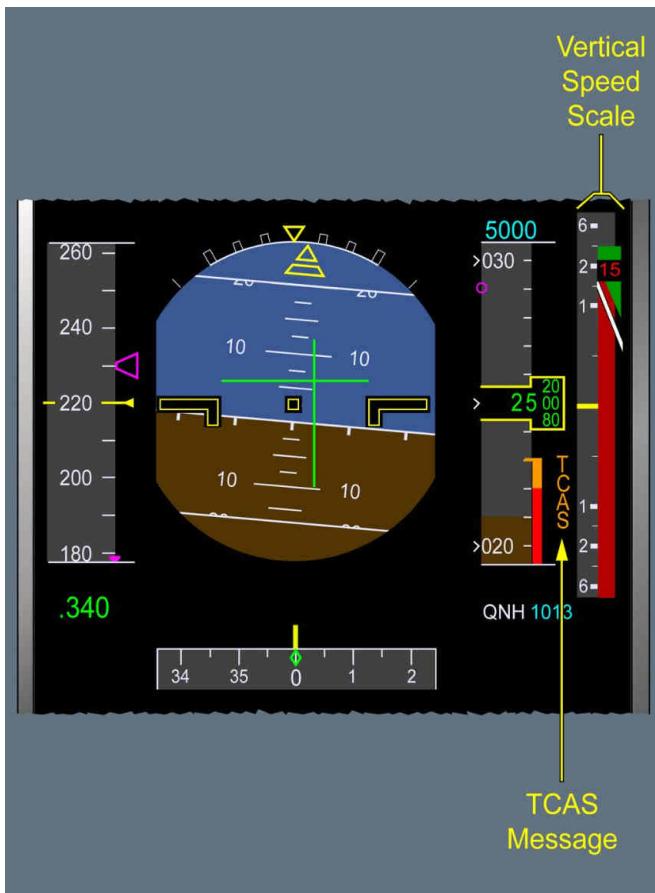
TCAS: CHANGE MODE

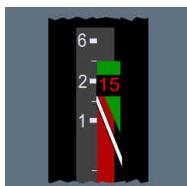
Appears in PLAN mode, when the TCAS identifies at least one RA intruder.

For more information, *Refer to 31 / EFIS / ND / ND MESSAGES*

Applicable to: ALL

PFD



VERTICAL SPEED SCALE

When the TCAS triggers an RA, green and red areas appear instead of the grey background:

- A red area indicates the vertical speed range that is not authorized
- A green area indicates the vertical speed range within which the aircraft should fly, in order to avoid a threat of collision with one or more intruders.

Note: The aircraft can also fly in the grey vertical speed range area without a threat of collision.

TCAS MESSAGE

The TCAS is failed.

MEMO

Applicable to: ALL

TCAS STBY

The flight crew:

- Selects STBY in the TCAS mode option list on the SURV CONTROLS page of the MFD, or
- Selects STBY in the XPDR mode option list on the SURV CONTROLS page of the MFD, or
- Sets the ALT RPTG button to **OFF** on the SURV CONTROLS page of the MFD.

Flight Phase Inhibition:

Flight Phase Inhibition

AURAL ALERTS
Applicable to: ALL

| Aural Alert | Sound | Meaning | Inhibition Condition |
|--|------------------------------|--|--|
| TRAFFIC, TRAFFIC | (Audio not available in PDF) | The TCAS triggers a TA. | TA is inhibited, if the aircraft is: <ul style="list-style-type: none"> - Below 400 ft AGL in descent - Below 600 ft AGL in climb. |
| CLIMB, CLIMB | (Audio not available in PDF) | The TCAS triggers a corrective RA. The aircraft must climb with the vertical speed that is indicated by the green area on the vertical speed scale of the PFD. | RAs are inhibited, if the aircraft is: <ul style="list-style-type: none"> - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| CLIMB, CROSSING CLIMB, CLIMB, CROSSING CLIMB | (Audio not available in PDF) | The TCAS triggers a corrective RA, and the aircraft will cross the intruder's altitude. The aircraft must climb with the vertical speed that is indicated by the green area on the vertical speed scale of the PFD. | RAs are inhibited, if the aircraft is: <ul style="list-style-type: none"> - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| INCREASE CLIMB, INCREASE CLIMB | (Audio not available in PDF) | The TCAS triggers a corrective RA, and has already triggered a CLIMB alert. The vertical speed is not sufficient to achieve safe vertical separation. | RAs are inhibited, if the aircraft is: <ul style="list-style-type: none"> - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| CLIMB, CLIMB NOW, CLIMB, CLIMB NOW | (Audio not available in PDF) | The TCAS triggers a corrective RA, and has already triggered a DESCEND alert. The intruder's trajectory has changed. | RAs are inhibited, if the aircraft is: <ul style="list-style-type: none"> - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| DESCEND, DESCEND | (Audio not available in PDF) | The TCAS triggers a corrective RA. The aircraft must descend with the vertical speed that is indicated by the green area on vertical speed scale of the PFD. | RAs are inhibited if the aircraft is: <ul style="list-style-type: none"> - Below 1 000 ft AGL in descent - Below 1 200 ft AGL in climb. |

Continued on the following page



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TCAS - CONTROLS AND INDICATORS

Continued from the previous page

| Aural Alert | Sound | Meaning | Inhibition Condition |
|---|------------------------------|---|--|
| DESCEND, CROSSING DESCEND, DESCEND, CROSSING DESCEND | (Audio not available in PDF) | The TCAS triggers a corrective RA, and the aircraft will cross the intruder's altitude. The aircraft must descend with the vertical speed that is indicated by the green area on vertical speed scale of the PFD. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| INCREASE DESCENT, INCREASE DESCENT | (Audio not available in PDF) | The TCAS triggers a corrective RA, and has already triggered a DESCEND alert. The vertical speed is not sufficient to achieve safe vertical separation. | RAs are inhibited if the aircraft is: - Below 1 450 ft AGL in descent - Below 1 650 ft AGL in climb. |
| DESCEND, DESCEND NOW, DESCEND, DESCEND NOW | (Audio not available in PDF) | The TCAS triggers a corrective RA, and has already triggered a CLIMB alert. The intruder's trajectory has changed. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| ADJUST VERTICAL SPEED, ADJUST | (Audio not available in PDF) | The TCAS triggers a corrective RA. The flight crew must adjust the vertical speed in the green area on the vertical speed scale of the PFD, as appropriate. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| MONITOR VERTICAL SPEED | (Audio not available in PDF) | The TCAS triggers a preventive RA. The flight crew must ensure that vertical speed remains outside the red area on the vertical speed scale of the PFD. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| MAINTAIN VERTICAL SPEED, MAINTAIN | (Audio not available in PDF) | The TCAS triggers a corrective RA. The flight crew must maintain the vertical speed that is indicated in the green area on the vertical speed scale of the PFD. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| MAINTAIN VERTICAL SPEED, CROSSING MAINTAIN | (Audio not available in PDF) | The TCAS triggers a corrective RA, and the aircraft will cross the intruder's altitude. The flight crew must maintain the vertical speed that is indicated in the green area on the vertical speed scale of the PFD. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| CLEAR OF CONFLICT | (Audio not available in PDF) | The range increases, and separation is sufficient. | |

Note: In the case of simultaneous alerts, the first aural alert may be partially triggered.



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TCAS - CONTROLS AND INDICATORS

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XPDR - SYSTEM DESCRIPTION

OVERVIEW

Applicable to: ALL

The transponder (XPDR) responds to Air Traffic Control (ATC) requests, and helps the ground controller to identify and locate each aircraft, and monitor air traffic.

The XPDR supports the TCAS surveillance function, and uses the TCAS/MODE S antennas.

The MFDs display the XPDR status.

Both SURV SYS 1 and SYS 2 interface with the RMPs, in order to:

- Control the transponder code
- Activate the identification function
- Synchronize data displayed on the MFDs.

PRINCIPLE

Applicable to: ALL

The XPDR automatically responds to requests:

- From the ATC, to ensure effective air traffic surveillance
- From another aircraft that has a TCAS, to ensure that traffic alerts are triggered.

The XPDR provides the ATC with:

- Mode A: Transmission of aircraft identification
- Mode C: Transmission of aircraft barometric altitude
- Mode S: Selective calling.

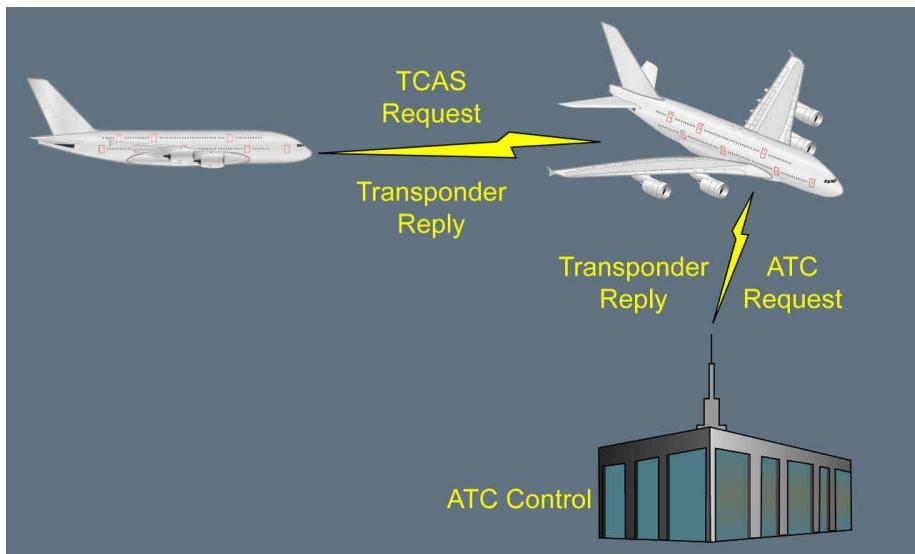
The XPDR receives information from:

- Aircraft that have a TCAS
- Mode S ground stations.

ADIRU 1 and 2 provide the necessary parameters to each XPDR function on both SURV SYS.

The XPDR transmits the following parameters to the ATC center, upon ground request:

- The indicated airspeed, Mach number, and baro vertical speed, that are supplied by the ADRs
- The magnetic heading, ground speed, track angle, track angle rate, and inertial vertical speed, that are all supplied by the IRs
- The selected altitude and barometric reference settings supplied by the FCUs.

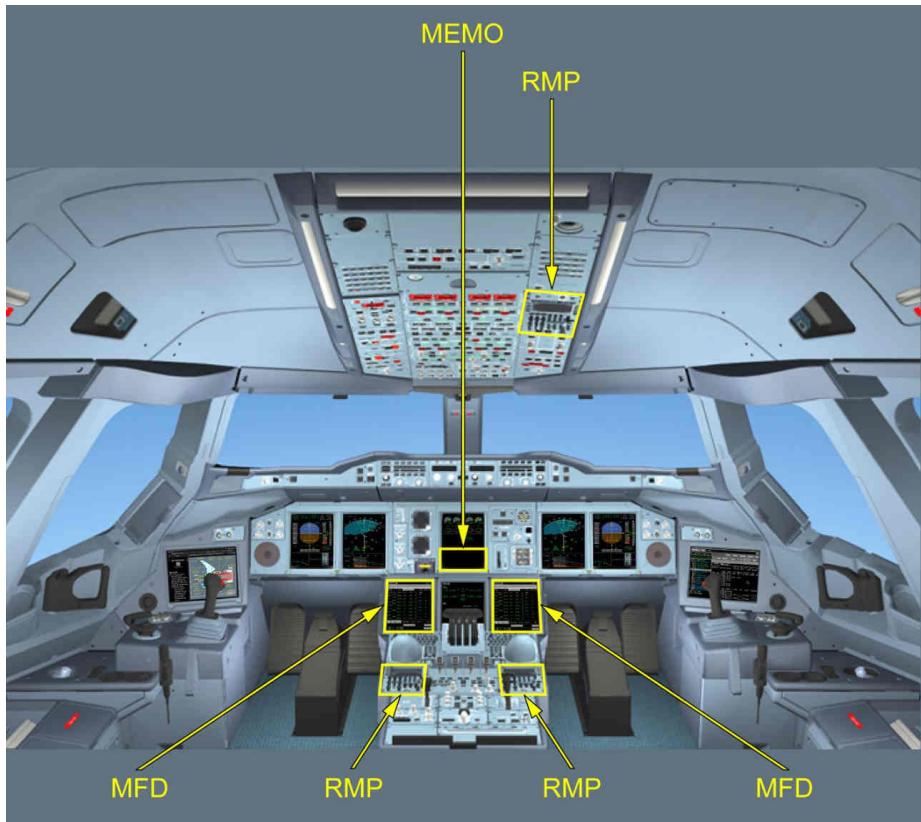
XPDR PrincipleXPDR MODES**Applicable to: ALL**

The XPDR has three different modes of operation:

- AUTO
 - In flight, all XPDR functions are operative
 - On ground, modes A and C are inhibited. Mode S is operative (selective calling).
- ON
 - Mode S continuously transmits information to other aircraft and replies to requests from aircraft and ground stations. On ground, the XPDR can also reply to MODE A or C requests.
- STBY.
 - The XPDR does not transmit either reply to ground stations and other aircraft. The TCAS is also in the standby mode.

COCKPIT VIEW

Applicable to: ALL

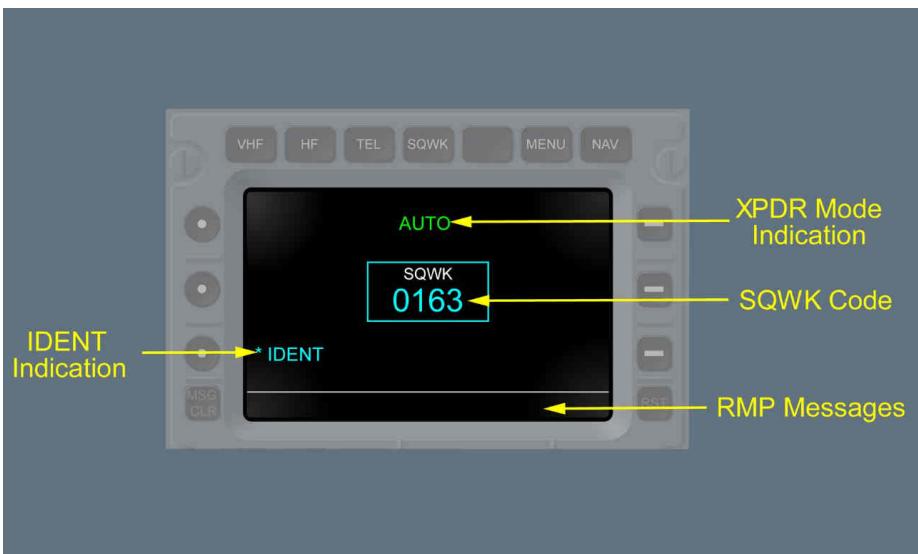
Cockpit View

RMP

Applicable to: ALL

RMP**SQWK PAGE ACCESS KEY**

When pressed, RMP 1(2)(3) displays the SQWK page. The flight crew can enter the XPDR code on the SQWK page.

SQWK Page**XPDR MODE INDICATION****AUTO**

The flight crew selects the AUTO mode.

ON

The flight crew selects the ON mode.

STBY

The flight crew selects the STBY mode.

SQWK CODE**SQWK
0163**

The flight crew enters a SQWK code.

**SQWK
028_**

The flight crew enters an erroneous digit in the SQWK code.
Associated with the SQUAWK CODE NOT VALID message in the RMP messages area.

If the flight crew attempts to manually validate the erroneous SQWK code:

- The previous valid code appears, instead of the erroneous SQWK code
- The RMP messages area displays the SQUAWK CODE REVERTED TO PREV ENTRY message.

IDENT INDICATION*** IDENT**

The associated ADK key enables the flight crew to send the aircraft identification signal.

This is the default position.

IDENT

The star symbol disappears for 5 s, after the flight crew presses the ADK 3 key, in order to send the aircraft identification signal.

RMP MESSAGES**SQUAWK CODE NOT VALID**

The flight crew enters an erroneous SQWK code.

SQUAWK CODE REVERTED TO PREV ENTRY

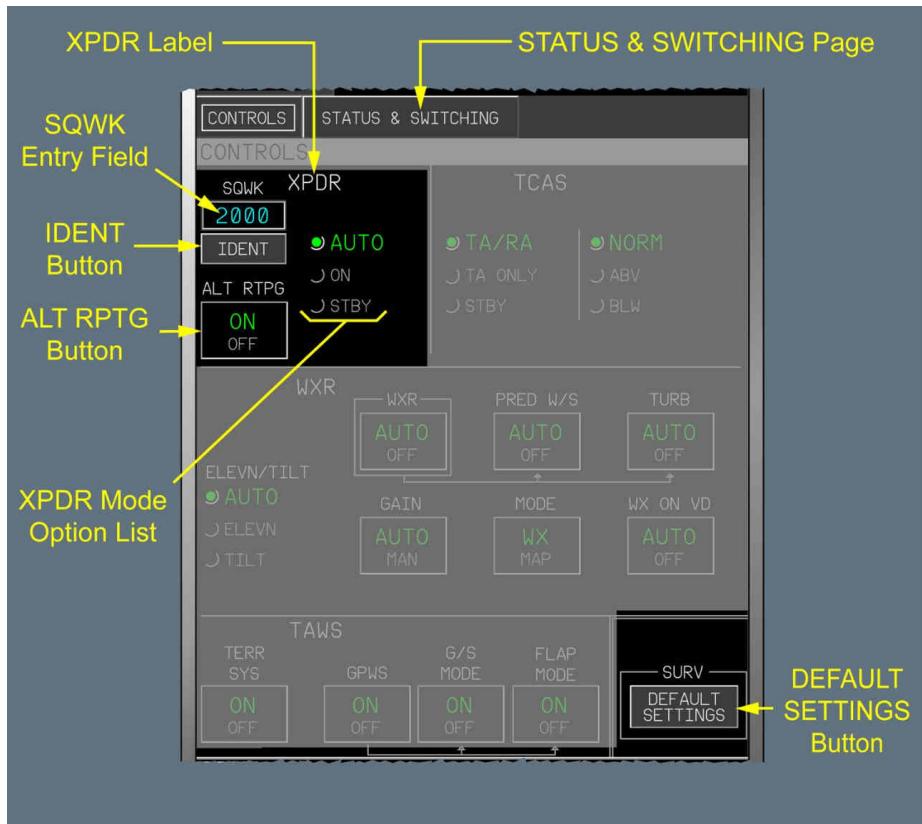
The flight crew attempts to manually validate an erroneous or incomplete SQWK code.

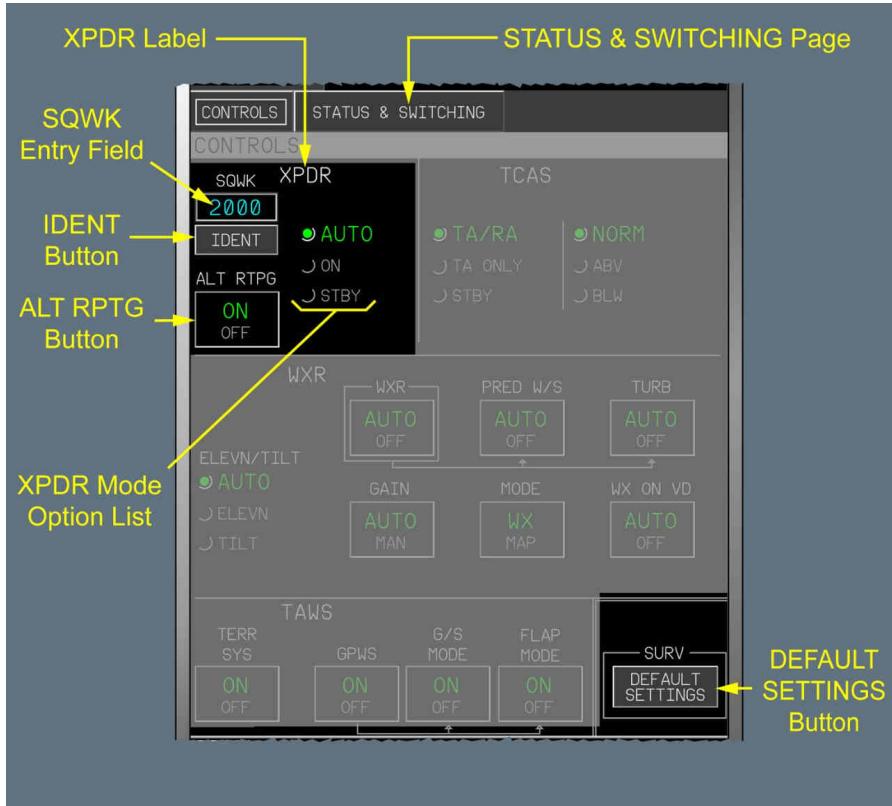
TRANSMITTING IDENT

The aircraft identification signal has been transmitted.

MFD

Applicable to: ALL

SURV Pages


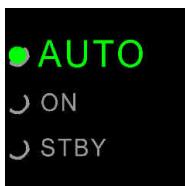
CONTROLS PAGECONTROLS PageXPDR LABEL

XPDR The XPDR is on.

XPDR The XPDR is failed.

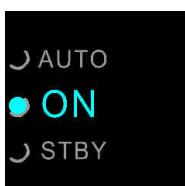
XPDR MODE OPTION LIST

L12



The flight crew selects the AUTO mode.
Associated with the AUTO message on the RMP SQWK page.

L12

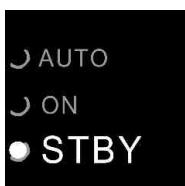


The flight crew selects the ON mode.

Associated with:

- The ON message on the RMP SQWK page
- The ON message on the RMP HF page, RMP VHF page, and RMP TEL page.

L12



The flight crew selects the STBY mode. The XPDR neither transmits information, nor replies to other aircraft or ground stations.

When selected:

- The TCAS display mode option list is no longer available
- The TCAS mode option list is no longer available
- The ALT RPTG button is set to OFF and is no longer available.

Associated with:

- The STBY message on the RMP SQWK page
- The STBY message on the RMP HF page, RMP VHF page, and RMP TEL page
- The TCAS STBY message on the ND
- The XPDR STBY and the TCAS STBY MEMOs.

ALT RPTG BUTTON

The flight crew activates the altitude data transmission.

When selected:

- The TA/RA option is selected on the TCAS mode option list
- The NORM option is selected on the TCAS display mode option list.

L12



The flight crew deactivates the altitude data transmission.

When selected:

- The TCAS mode option list is not available
- The TCAS display mode option list is not available.

Associated with:

- The **TCAS STBY** message on the ND
- The ALT RPTG OFF and the TCAS STBY MEMOS.

The XPDR is in STBY mode.



The XPDR is failed.

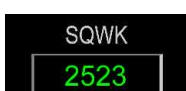


SQWK ENTRY FIELD



The XPDR is on.

The flight crew can enter the XPDR code in the entry field.



The XPDR is on.

The flight crew modifies the XPDR code in the entry field. It automatically updates the SQWK value on the RMP.



The XPDR is failed.

IDENT BUTTON

When clicked, the aircraft identification signal is sent.

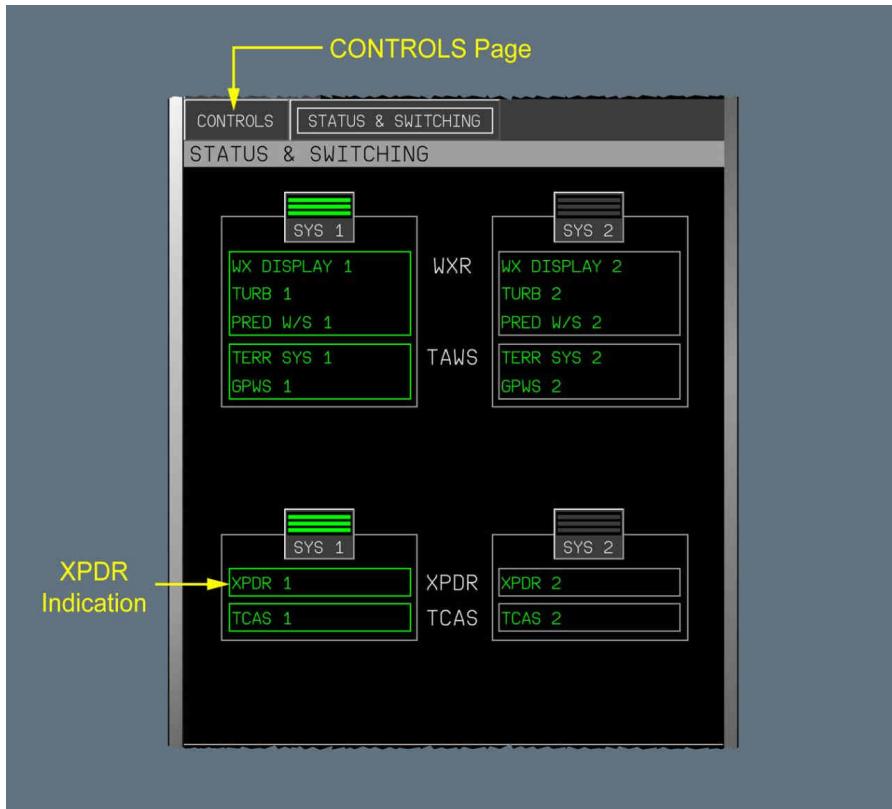


The XPDR is failed.

DEFAULT SETTINGS BUTTON

When clicked, automatically sets all the XPDR settings to their default position on both MFDs. A confirmation is necessary in order to set the default positions.

- The XPDR mode option list is set to AUTO
- The ALT RPTG button is set to ON.

STATUS & SWITCHING PAGESTATUS & SWITCHING Page

- Green indicates that the function is on
The green box indicates that the function is selected.
- White indicates that the function is set to OFF, or is on standby
- Amber indicates that the function is failed.

XPDR INDICATION

The XPDR is on, on SURV SYS 1(2).



The XPDR is failed on SURV SYS 1(2).



The XPDR is not operating on SURV SYS 1(2).



The XPDR is failed, and set to OFF.

MEMO

Applicable to: ALL

ALT RPTG OFF

The flight crew has set the ALT RPTG button to OFF on the SURV CONTROLS page of the MFD.

XPDR STBY

The flight crew has selected STBY in the XPDR mode option list on the SURV CONTROLS page of the MFD.

Flight Phase Inhibition:

Flight Phase Inhibition



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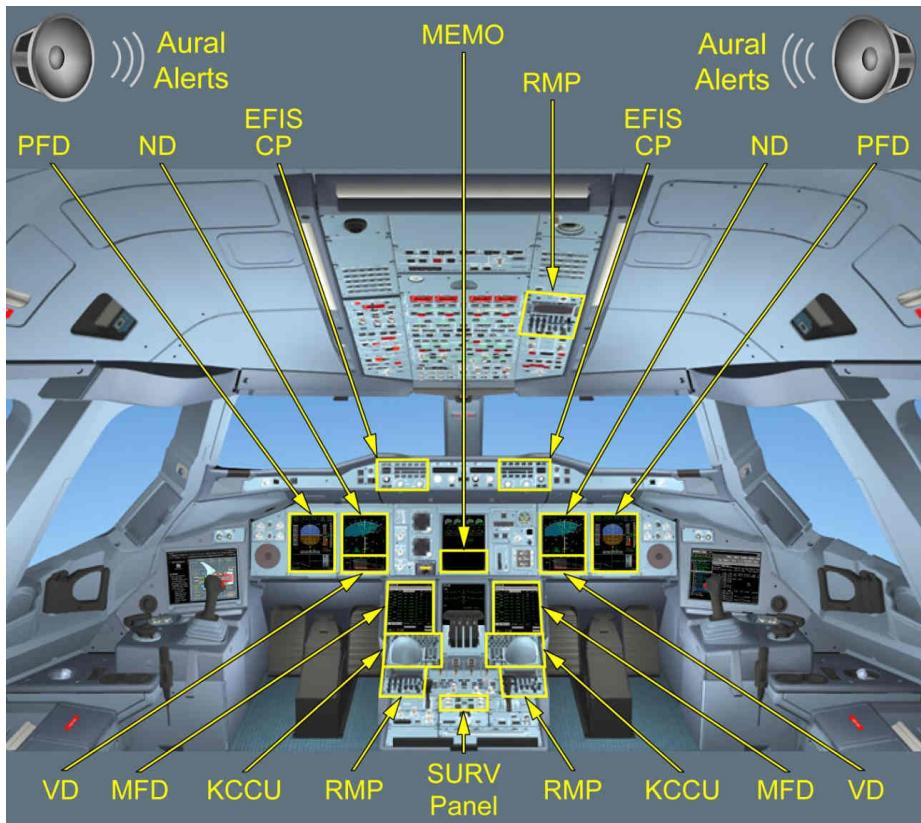
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XPDR - CONTROLS AND INDICATORS

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COCKPIT VIEW

Applicable to: ALL

Cockpit View



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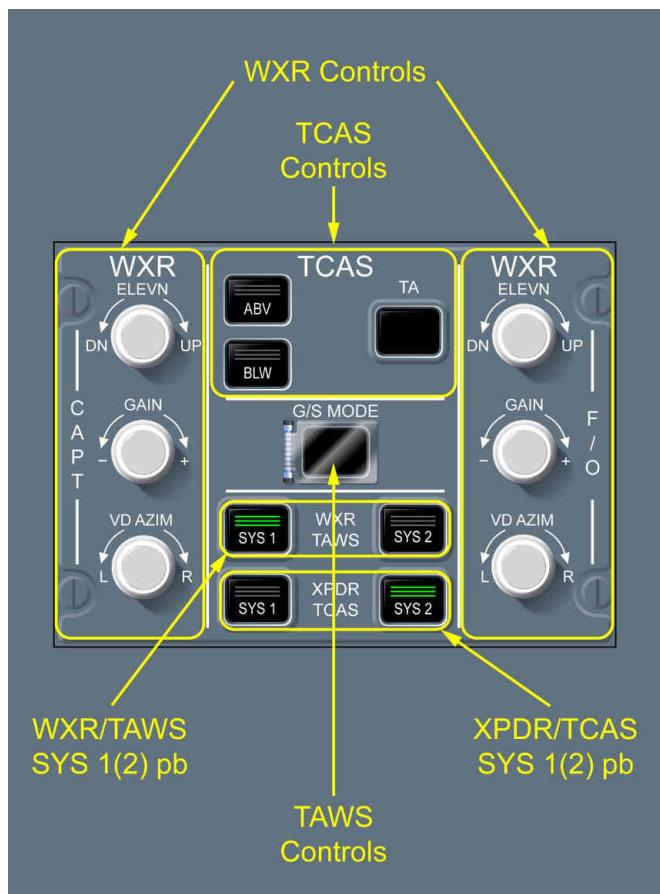
34 - SURVEILLANCE

CONTROLS AND INDICATORS - COCKPIT VIEW

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SURV PANEL

Applicable to: ALL

SURV Panel**WXR/TAWS SYS 1(2) pb**

SYS 1 provides the WXR/TAWS functions.

WXR
TAWS

SYS 2 provides the WXR/TAWS functions.

Note: On the SURV/STATUS & SWITCHING page of the MFD, the WXR/TAWS SYS 1(2) buttons are automatically updated.

XPDR/TCAS SYS 1(2) pb

XPDR
TCAS

SYS 1 provides the XPDR/TCAS functions.

XPDR
TCAS

SYS 2 provides the XPDR/TCAS functions.

Note: On the SURV/STATUS & SWITCHING page of the MFD, the XPDR/TCAS SYS 1(2) buttons are automatically updated.

TAWS CONTROLS

The TAWS controls enable the flight crew to monitor the TAWS surveillance function (Refer to TAWS Controls on SURV Panel).

WXR CONTROLS

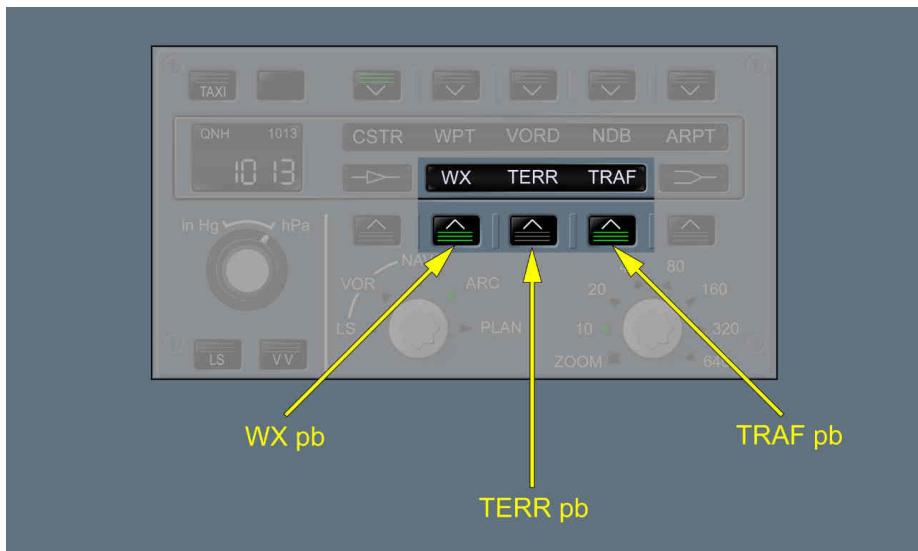
The WXR controls enable the flight crew to monitor the WXR surveillance function (Refer to WXR Controls on SURV Panel).

TCAS CONTROLS

The TCAS controls enable the flight crew to monitor the TCAS surveillance function (Refer to TCAS Controls on SURV Panel).

EFIS CONTROL PANEL

Applicable to: ALL

EFIS CPWX pb

L12



The onside ND and VD display weather information.

On ground, if one engine is operative, turns on the WXR.

The flight crew cannot press the WXR pb and the TERR pb at the same time.

Associated with the WX message on the ND.



The onside ND and VD do not display weather information.

On ground, if the WX pb of both EFIS CPs are not pressed, turns off the WXR.

TERR pb

L12



The onside ND displays terrain (TERR) information.

Associated with the TERR message on the ND.

The flight crew cannot press the WXR pb and the TERR pb at the same time.



The onside ND does not display terrain (TERR) information.

TRAF pb

The onside ND displays traffic information.



The onside ND does not display traffic information.

KCCU

Applicable to: ALL

KCCU**SURV KEY**

When pressed:

- Displays the SURV /CONTROLS page on the MFD (Refer to *SURV page*)
- The cursor returns to the MFD , if it was previously on another display.

CLR INFO KEY

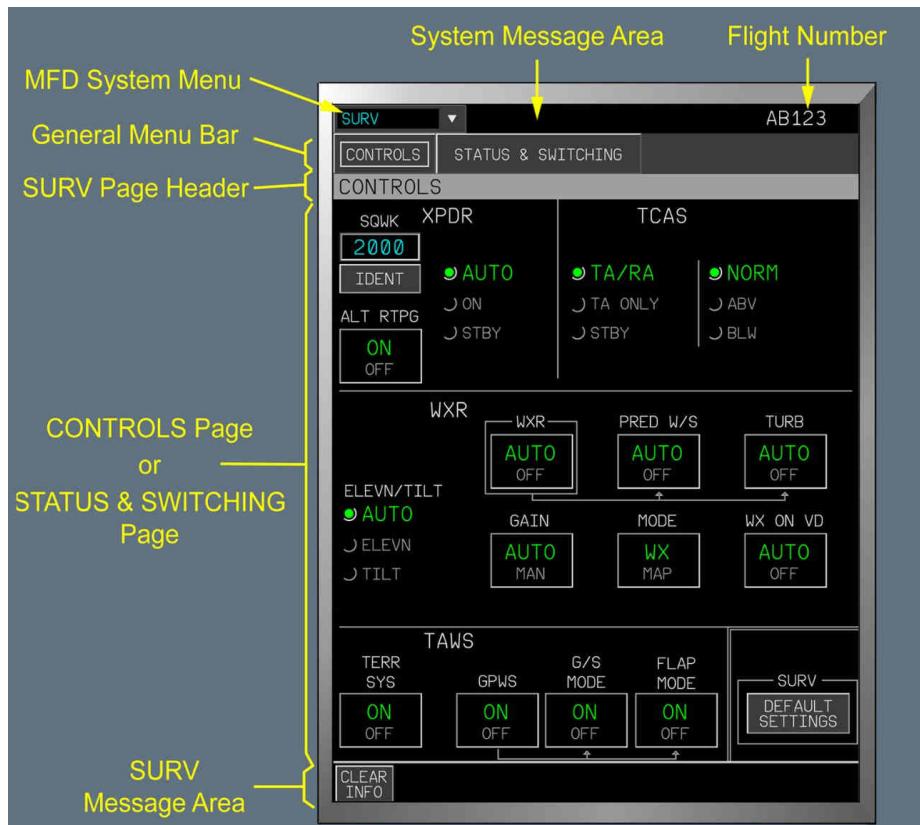
When pressed, clears the message displayed in the FMS, ATC COM, or surveillance message area.

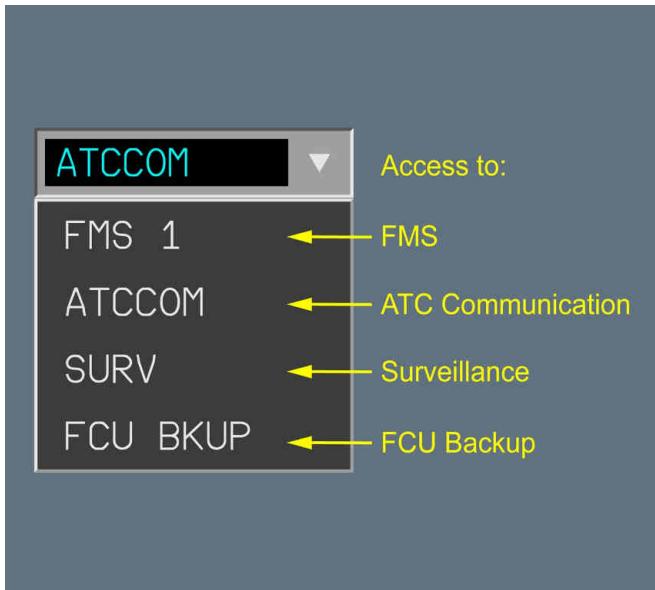
NAVIGATION KEYS

When pressed, moves the cursor to the display unit that is to the right, or to the left, of the one that is currently selected (if applicable).

MFD - SURV PAGES

Applicable to: ALL

SURV Pages

MFD SYSTEM MENUMFD System Menu

Indicates the system that is currently displaying data on the MFD .
The system menu lists all the systems that can display data on the MFD :

FMS

Provides access to the FMS pages.

Refer to 22 / FMS / CONTROLS AND INDICATORS / MFD .

ATC COM

Provides access to the ATC communication pages.

Refer to 46 / ATC / CONTROLS AND INDICATORS / MFD .

SURV

Provides access to the surveillance pages.

Refer to SURV Pages Overview .

FCU BKUP

Provides access to the FCU backup pages.

Refer to 22 / FLIGHT GUIDANCE / CONTROLS AND INDICATORS / FCU BACKUP .

SYSTEM MESSAGE AREA

The system message area displays three different messages to direct the flight crew's attention to an ATC COM or FMS event, when the MFD is currently not displaying an ATC COM or FMS page:

- NEW ATIS RECEIVED:
Indicates that a new ATIS report is received, and that the MFD is displaying an application other than the ATC COM. This message no longer appears when the flight crew accesses an ATC COM page.
- ATIS SYS MSG:
Indicates that a ATIS FSM message is received, and that the MFD is displaying an application other than the ATC COM. This message no longer appears when the flight crew accesses an ATC COM page.
- CHECK FMS MESSAGE:
Indicates that an amber FMS message is pending, and that the MFD is displaying an application other than the FMS. This message no longer appears when the flight crew accesses an FMS page.

FLIGHT NUMBER

Indicates the flight number that the flight crew has entered on the ACTIVE/INIT page of the FMS (*Refer to 22 / FMS / CONTROLS AND INDICATORS / MFD / ACTIVE / INIT Page*).

- [2] The Control and Display System (CDS) manages the display of the flight number.

GENERAL MENU BAR

The general menu bar provides the flight crew with access to the following two SURV pages:

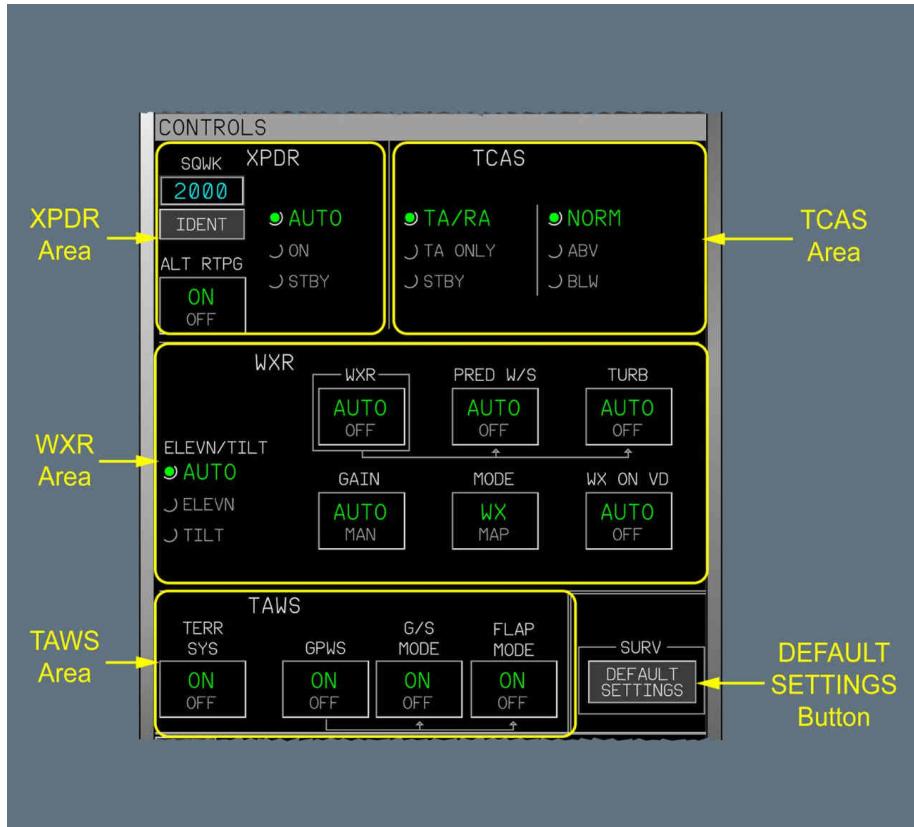
- CONTROLS page
- STATUS & SWITCHING page.

SURV PAGE HEADER

The SURV page header indicates the title of the displayed SURV page.

CONTROLS PAGE

Applicable to: ALL

SURV / CONTROLS Page**XPDR AREA**

The XPDR area enables the flight crew to monitor the XPDR function.

For more information, *Refer to the XPDR section on the MFD CONTROLS page*.

TCAS AREA

The TCAS area enables the flight crew to monitor the TCAS surveillance function.

For more information, *Refer to the TCAS section on the MFD CONTROLS page* .

WXR AREA

The WXR area enables the flight crew to monitor the WXR surveillance function.
For more information, *Refer to the WXR section on the MFD CONTROLS page* .

TAWS AREA

The TAWS area enables the flight crew to monitor the TAWS surveillance function.
For more information, *Refer to the TAWS section on the MFD CONTROLS page* .

DEFAULT SETTINGS BUTTON

L12



When clicked, automatically sets all the SURV settings to their default position. A confirmation is necessary in order to set the default positions.

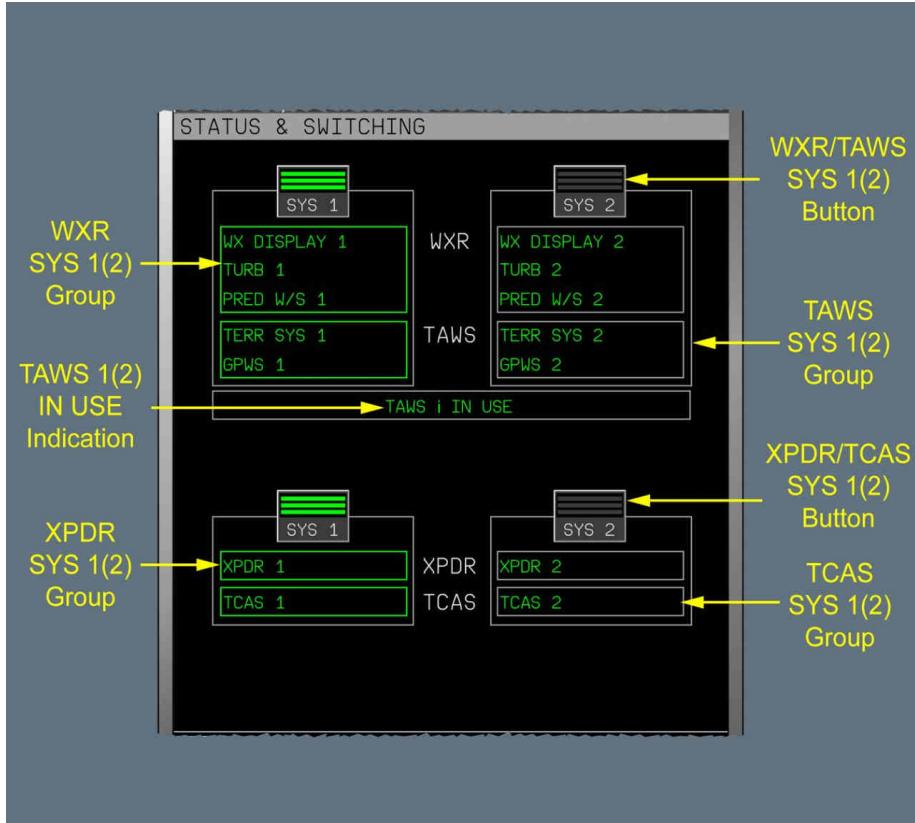
- The XPDR mode option list is set to AUTO
- The ALT RPTG button is set to ON
- The TCAS display mode option list is set to NORM
- The TCAS mode option list is set to TA/RA
- The ELEVN/TILT option list is set to AUTO
- The WXR button is set to AUTO
- The PRED W/S button is set to AUTO
- The TURB button is set to AUTO
- The GAIN button is set to AUTO
- The MODE button is set to WX
- The WX ON VD button is set to AUTO
- The TERR SYS button is set to ON
- The GPWS button is set to ON
- The G/S MODE button is set to ON
- The FLAP MODE button is set to ON.

The following default settings are valid only for the onside MFD:

- The ELEVN/TILT option list
- The GAIN button
- The MODE button
- The WX ON VD button.

STATUS & SWITCHING PAGE

Applicable to: ALL

STATUS & SWITCHING Page

- Green indicates that the function is on
The green box indicates that the function is selected.
- White indicates that the function is set to OFF, or is on standby
- Amber indicates that the function is failed.

WXR/TAWS SYS 1(2) BUTTONS

SYS 1 provides the WXR/TAWS functions.



SYS 2 provides the WXR/TAWS functions.

Note: On the SURV panel, the WXR/TAWS SYS 1(2) pb is automatically updated.

WXR SYS 1(2) GROUP

Indicates the status of the WXR functions on SYS 1(2).

For more information, Refer to WXR / CONTROLS AND INDICATORS / MFD .

TAWS SYS 1(2) GROUP

Indicates the status of the TAWS functions on SYS 1(2).

For more information, Refer to TWAS / CONTROLS AND INDICATORS / MFD .

TAWS 1(2) IN USE INDICATION

In the case of abnormal operation, indicates that the TAWS and the WXR functions are not provided by the same SYS. The selected SYS provides the WXR function, and the other SYS provides the TAWS function.

XPDR/TCAS SYS 1(2) BUTTONS

SYS 1 provides the XPDR/TCAS functions.



SYS 2 provides the XPDR/TCAS functions.

Note: On the SURV panel, the XPDR/TCAS SYS 1(2) pb is automatically updated.

XPDR SYS 1(2) GROUP**XPDR 1**

Indicates the status of the XPDR on SYS 1(2).

For more information, *Refer to XPDR / CONTROLS AND INDICATORS / MFD .***TCAS SYS 1(2) GROUP****TCAS 1**

Indicates the status of the TCAS on SYS 1(2).

For more information, *Refer to TCAS / CONTROLS AND INDICATORS / MFD .***SURV MESSAGE AREA****Applicable to: ALL**

The SURV message area displays messages on two lines of 33 characters.

The flight crew can clear the displayed message by clicking on the CLEAR INFO button, or by pressing the CLR INFO key on the KCCU.

ENTRY OUT OF RANGE MESSAGE

If the flight crew enters a value that is not in the correct range, the message area displays:

- The ENTRY OUT OF RANGE message on the first line
- The applicable range on the second line (as indicated in the table below).

| Data Type | Out Of Range Messages |
|-----------|--|
| ELEVN | <ul style="list-style-type: none">■ If the QNH reference is selected on the EFIS CP baro setting: RANGE: 0 ft to 60 000 ft■ If the STD reference is selected on the EFIS CP baro setting: RANGE: FL 0 to FL 600 |
| GAIN | RANGE: 0 % to 100 % |
| TILT | RANGE: -15.0 ° to +15.0 ° |

FORMAT ERROR MESSAGE

If the flight crew enters an ELEVN, GAIN, or TILT value that is not valid, the message area displays:

- The FORMAT ERROR message on the first line
- The applicable format on the second line (as indicated in the table below).

| Data Type | Data Format Help Messages |
|-----------|---|
| ELEVN | <ul style="list-style-type: none">■ If the QNH reference is selected on the EFIS CP baro setting: FORMAT: "XXXXX" FT■ If the STD reference is selected on the EFIS CP baro setting: FORMAT: FL "XXX" |
| GAIN | FORMAT: "XXX" % |
| TILT | FORMAT: "+/-XX.X" ° |

SQWK CODE NOT VALID MESSAGE

If the flight crew enters a SQWK value that is not valid, the message area displays the SQWK CODE NOT VALID message on the first line.

MFD DATA ENTRY FORMAT

Applicable to: ALL

This chapter provides a list of all the data that the flight crew may enter on the MFD .

For each data, the table displays:

- The appropriate format
- The appropriate units
- The appropriate range
- The page(s) on which the flight crew must enter the data.

The following characters are used to indicate the format:

- A: Letters
- B: Magnetic/True reference
- N: Numbers
- X: Letters and Numbers.

Note: *The flight crew can:*

- *Enter the units that are indicated in blue*
- *Omit leading zeros in fields that have numerical data.*

If the flight crew enters an erroneous format, the message area displays the FORMAT ERROR message, followed by the correct format (*Refer to Messages List*).

If the flight crew enters an erroneous value, the message area displays the ENTRY OUT OF RANGE message, followed by the correct range (*Refer to Messages List*).

ELEVN

L12

| | |
|------------|---|
| Format | FL NNN or NNN <u>Note:</u> The flight crew can omit leading zeros. NNNN FT or NNNNN |
| Units | FL NNN: Hundreds of Feet (MSL) NNNN FT : Foot |
| Range | FL NNN Min : 0 Max : 600 NNNNN FT Min : 0 Max : 60 000 |
| Resolution | FL NNN: 10 NNNN FT : 1 000 |
| Page | Refer to SURV/CONTROLS page . |

GAIN

| | |
|------------|-------------------------------|
| Format | NNN |
| Units | NNN: Percent |
| Range | NNN Min : 0 Max : 100 |
| Resolution | NNN: 5 |
| Page | Refer to SURV/CONTROLS page . |

SQWK

| | |
|--------|-------------------------------|
| Format | NNNN |
| Range | Each N: Min : 0 Max : 7 |
| Page | Refer to SURV/CONTROLS page . |

TILT

L12

| | |
|--------|---|
| Format | ±NN.N or ±NN.N ° <u>Note:</u> - “-” may be entered as M - If there is “+” or “-” no sign, “+” is displayed by default |
| Units | NN.N: Degrees |

Continued on the following page



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| | | |
|-------------------|-------------------------------------|--------------------|
| Range | NN.N: <i>Min</i> : -15.0 | <i>Max</i> : +15.0 |
| Resolution | NN.N: 0.25 | |
| Page | <i>Refer to SURV/CONTROLS page.</i> | |



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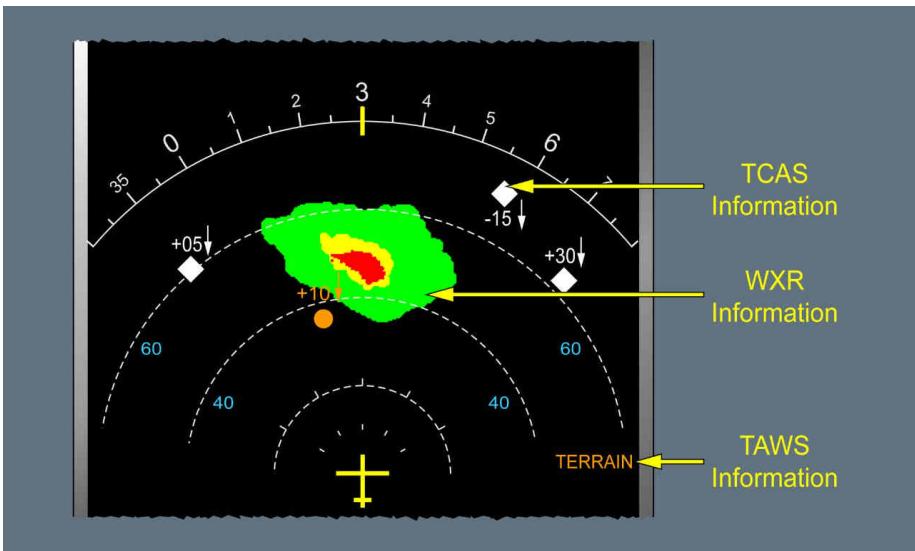
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CONTROLS AND INDICATORS - MFD

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ND

Applicable to: ALL

ND



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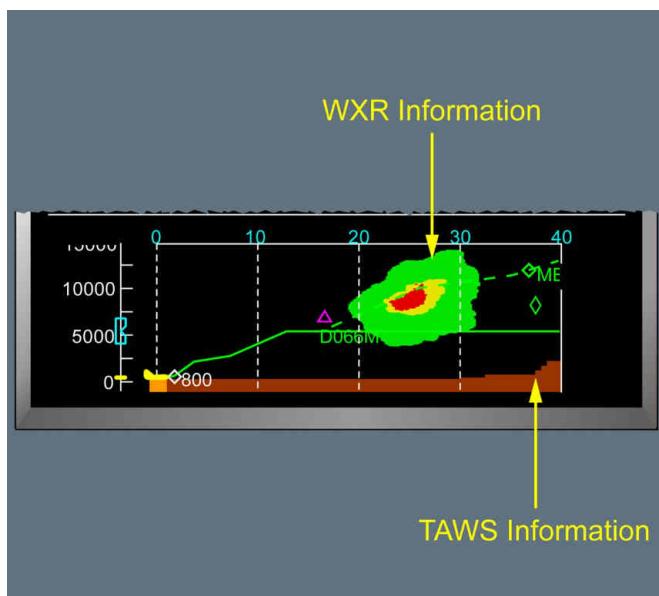
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CONTROLS AND INDICATORS - ND

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VD

Applicable to: ALL

VD**TAWS INFORMATION**

Refer to the VD Section of the TAWS Description .

WXR INFORMATION

Refer to the VD Section of the WXR Description .



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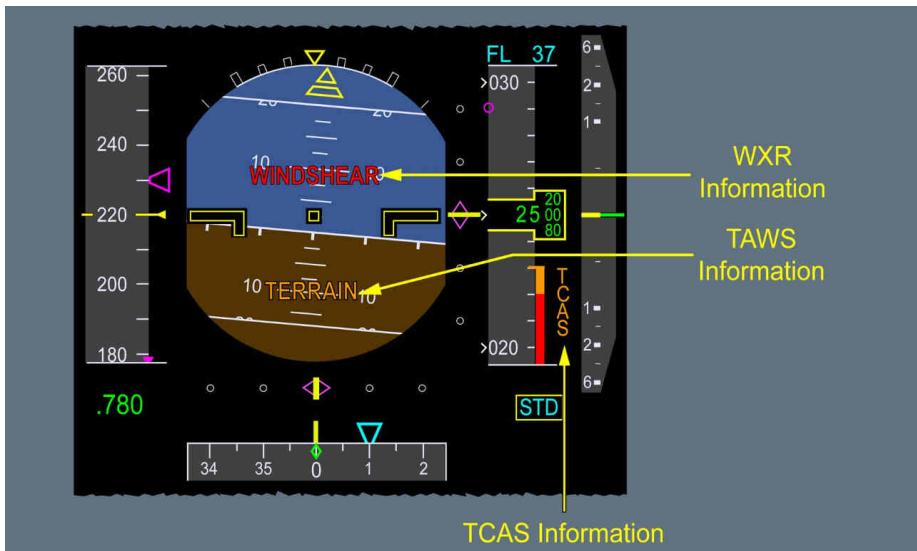
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CONTROLS AND INDICATORS - VD

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PFD

Applicable to: ALL

PFD**TAWS INFORMATION**

Refer to the PFD Section of the TAWS Description .

WXR INFORMATION

Refer to the PFD Section of the WXR Description .

TCAS INFORMATION

Refer to the PFD Section of the TCAS Description .



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CONTROLS AND INDICATORS - RMP

RMP

Applicable to: ALL

The RMP enables the flight crew to change the XPDR code or to perform an IDENT .
For more information, *Refer to the RMP Section of the XPDR Description* .



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CONTROLS AND INDICATORS - AURAL ALERTS

AURAL ALERTS

Applicable to: ALL

TAWS AURAL ALERTS

| Aural Alert | Sound | Meaning |
|--------------------------------|------------------------------|---|
| DON'T SINK, DON'T SINK | (Audio not available in PDF) | Refer to GPWS/Mode 3 . |
| GLIDE SLOPE, GLIDE SLOPE | (Audio not available in PDF) | Refer to GPWS/Mode 5 . |
| OBSTACLE AHEAD, OBSTACLE AHEAD | (Audio not available in PDF) | Refer to TERR Function . |
| OBSTACLE AHEAD, PULL UP | (Audio not available in PDF) | Refer to TERR Function . |
| PULL UP | (Audio not available in PDF) | - Refer to GPWS/Mode 1 , or - Refer to GPWS/Mode 2 . |
| SINK RATE, SINK RATE | (Audio not available in PDF) | Refer to GPWS/Mode 1 . |
| TERRAIN | (Audio not available in PDF) | Refer to GPWS/Mode 2 . |
| TERRAIN, TERRAIN | (Audio not available in PDF) | Refer to GPWS/Mode 2 . |
| TERRAIN AHEAD, TERRAIN AHEAD | (Audio not available in PDF) | Refer to TERR Function . |
| TERRAIN AHEAD, PULL UP | (Audio not available in PDF) | Refer to TERR Function . |
| TOO LOW FLAPS | (Audio not available in PDF) | Refer to GPWS/Mode 4 . |
| TOO LOW GEAR | (Audio not available in PDF) | Refer to GPWS/Mode 4 . |
| TOO LOW TERRAIN | (Audio not available in PDF) | - Refer to GPWS / Mode 4 , or - Refer to TERR Function . |

Note: In the case of simultaneous alerts, the first aural alert may be partially triggered.

WXR AURAL ALERTS

| Aural Alert | Sound | Meaning |
|----------------------------------|------------------------------|--|
| MONITOR RADAR DISPLAY | (Audio not available in PDF) | The PWS triggers a windshear caution, and the aircraft is not in a dangerous zone. For more information, Refer to DSC-34-20-30-10 Predictive Windshear (PWS) Function . |
| WINDSHEAR AHEAD, WINDSHEAR AHEAD | (Audio not available in PDF) | The PWS triggers a windshear warning during takeoff. For more information, Refer to DSC-34-20-30-10 Predictive Windshear (PWS) Function . |
| GO AROUND, WINDSHEAR AHEAD | (Audio not available in PDF) | The PWS triggers a windshear warning during approach. For more information, Refer to DSC-34-20-30-10 Predictive Windshear (PWS) Function . |

Note: In the case of simultaneous alerts, the first aural alert may be partially triggered.

TCAS AURAL ALERTS

| Aural Alert | Sound | Meaning | Inhibition Condition |
|---|---------------------------------|--|--|
| TRAFFIC, TRAFFIC | (Audio not available in PDF) | The TCAS triggers a TA. | TA is inhibited, if the aircraft is: - Below 400 ft AGL in descent - Below 600 ft AGL in climb. |
| CLIMB, CLIMB | (Audio not available in PDF) | The TCAS triggers a corrective RA. The aircraft must climb with the vertical speed that is indicated by the green area on the vertical speed scale of the PFD. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| CLIMB, CROSSING CLIMB, CLIMB, CROSSING CLIMB | (Audio not available in PDF) | The TCAS triggers a corrective RA, and the aircraft will cross the intruder's altitude. The aircraft must climb with the vertical speed that is indicated by the green area on the vertical speed scale of the PFD. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| INCREASE CLIMB, INCREASE CLIMB | (Audio not available in PDF) | The TCAS triggers a corrective RA, and has already triggered a CLIMB alert. The vertical speed is not sufficient to achieve safe vertical separation. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| CLIMB, CLIMB NOW, CLIMB, CLIMB NOW | (Audio not available in PDF) | The TCAS triggers a corrective RA, and has already triggered a DESCEND alert. The intruder's trajectory has changed. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| DESCEND, DESCEND | (Audio not available in PDF) | The TCAS triggers a corrective RA. The aircraft must descend with the vertical speed that is indicated by the green area on vertical speed scale of the PFD. | RAs are inhibited if the aircraft is: - Below 1 000 ft AGL in descent - Below 1 200 ft AGL in climb. |
| DESCEND, CROSSING DESCEND, DESCEND, CROSSING DESCEND | (Audio not available in PDF) | The TCAS triggers a corrective RA, and the aircraft will cross the intruder's altitude. The aircraft must descend with the vertical speed that is indicated by the green area on vertical speed scale of the PFD. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| INCREASE DESCENT, INCREASE DESCENT | (Audio not available in PDF) | The TCAS triggers a corrective RA, and has already triggered a DESCEND alert. The vertical speed is not sufficient to achieve safe vertical separation. | RAs are inhibited if the aircraft is: - Below 1 450 ft AGL in descent - Below 1 650 ft AGL in climb. |

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CONTROLS AND INDICATORS - AURAL ALERTS

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| Aural Alert | Sound | Meaning | Inhibition Condition |
|--|---------------------------------|--|---|
| DESCEND, DESCEND NOW, DESCEND, DESCEND NOW | (Audio not available in PDF) | The TCAS triggers a corrective RA, and has already triggered a CLIMB alert. The intruder's trajectory has changed. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| ADJUST VERTICAL SPEED, ADJUST | (Audio not available in PDF) | The TCAS triggers a corrective RA. The flight crew must adjust the vertical speed in the green area on the vertical speed scale of the PFD, as appropriate. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| MONITOR VERTICAL SPEED | (Audio not available in PDF) | The TCAS triggers a preventive RA. The flight crew must ensure that vertical speed remains outside the red area on the vertical speed scale of the PFD. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| MAINTAIN VERTICAL SPEED, MAINTAIN | (Audio not available in PDF) | The TCAS triggers a corrective RA. The flight crew must maintain the vertical speed that is indicated in the green area on the vertical speed scale of the PFD. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| MAINTAIN VERTICAL SPEED, CROSSING MAINTAIN | (Audio not available in PDF) | The TCAS triggers a corrective RA, and the aircraft will cross the intruder's altitude. The flight crew must maintain the vertical speed that is indicated in the green area on the vertical speed scale of the PFD. | RAs are inhibited, if the aircraft is: - Below 900 ft AGL in descent - Below 1 100 ft AGL in climb. |
| CLEAR OF CONFLICT | (Audio not available in PDF) | The range increases, and separation is sufficient. | |

Note: TAs are inhibited below 400 ft AGL in descent, and below 600 ft AGL in climb.

RAs are inhibited below 950 ft AGL in descent, and below 1 100 ft AGL in climb.

In the case of simultaneous alerts, the first aural alert may be partially triggered.



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MEMO

Applicable to: ALL

TAWS MEMO

GPWS OFF

The flight crew sets the GPWS button to OFF on the SURV CONTROLS page of the MFD.

TAWS FLAP MODE OFF

The flight crew sets the FLAP MODE button to OFF on the SURV CONTROLS page of the MFD.

TAWS G/S MODE OFF

The flight crew sets the G/S MODE button to OFF on the SURV CONTROLS page of the MFD.

TERR SYS OFF

The flight crew sets the TERR SYS button to OFF on the SURV CONTROLS page of the MFD.

TERR STBY

The TAWS is operative, but the TERR function is not available.

- L2** Flight Phase Inhibition:

Flight Phase Inhibition**WXR MEMO**

PRED W/S OFF

The flight crew sets the PRED W/S button to OFF on the SURV CONTROLS page of the MFD.

- L2** Flight Phase Inhibition:

Flight Phase Inhibition

- [L1] PRED W/S OFF The flight crew sets the PRED W/S button to OFF on the SURV CONTROLS page of the MFD.
- [L2] Flight Phase Inhibition:

Flight Phase Inhibition

- [L1] WXR TURB OFF The flight crew sets the TURB button to OFF on the SURV CONTROLS page of the MFD.
- [L2] Flight Phase Inhibition:

Flight Phase Inhibition

- [L1] WXR ON The aircraft is on ground, and the flight crew manually selects the WXR function.

- [L2] Flight Phase Inhibition:

Flight Phase Inhibition



- [L1] WXR OFF The flight crew sets the WXR button to OFF on the SURV CONTROLS page of the MFD.

- [L2] Flight Phase Inhibition:

Flight Phase Inhibition



TCAS MEMO

TCAS STBY

The flight crew:

- Selects STBY in the TCAS mode option list on the SURV CONTROLS page of the MFD, or
- Selects STBY in the XPDR mode option list on the SURV CONTROLS page of the MFD, or
- Sets the ALT RPTG button to OFF on the SURV CONTROLS page of the MFD.

- [L2] Flight Phase Inhibition:

Flight Phase Inhibition**XPDR MEMO**

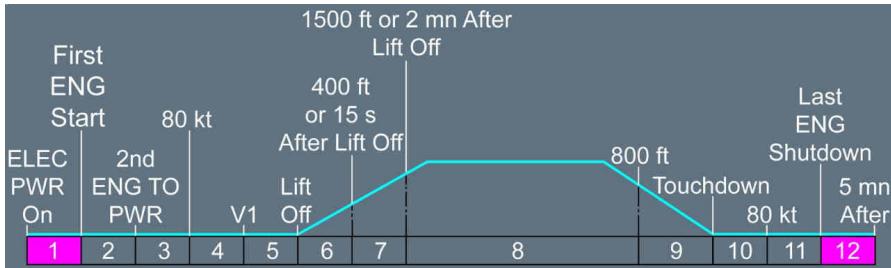
ALT RPTG OFF

The flight crew has set the ALT RPTG button to OFF on the SURV CONTROLS page of the MFD.

XPDR STBY

The flight crew has selected STBY in the XPDR mode option list on the SURV CONTROLS page of the MFD.

- Flight Phase Inhibition:

Flight Phase Inhibition

AUTOMATIC OPERATION**Applicable to: ALL**

If the flight crew sets the default settings of the SURV system via the DEFAULT SETTINGS button of the SURV/CONTROLS page of the MFD, the SURV system operates as follows:

ON GROUND, AT THE AIRCRAFT POWER-UP

- When the aircraft is on ground, SYS 1(2) is automatically selected as the master AESU if the flight number in the FMS is an odd (even) number. It enables the detection of hidden failures.
- The TCAS turns on, and the TRAF pb on the EFIS CP is automatically pressed.
The TAWS turns on. The flight crew should press the TERR pb on the EFIS CP to display terrain information.
The XPDR turns on.
The WXR is not operative. The flight crew should press the WX pb on the EFIS CP during the "Before Takeoff" procedure, to turn on the WXR.

TAKEOFF

If the flight crew does not press the WX pb on the EFIS CP:

- The PWS automatically turns on, when thrust is applied
- The WXR automatically turns on, after liftoff.

LANDING

If the aircraft is below 1 000 ft, the TCAS mode is TA ONLY.

ON GROUND, AFTER LANDING

60 s after touchdown, the WX pb on the EFIS CP is automatically deselected and the WXR automatically turns off.

The TCAS remains in TA ONLY mode.

The XPDR is in AUTO mode.

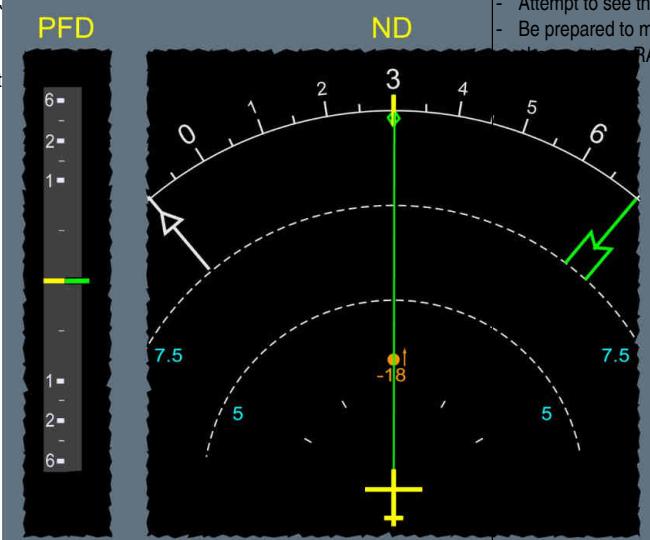
The TAWS is operative.

TCAS SCENARIOS

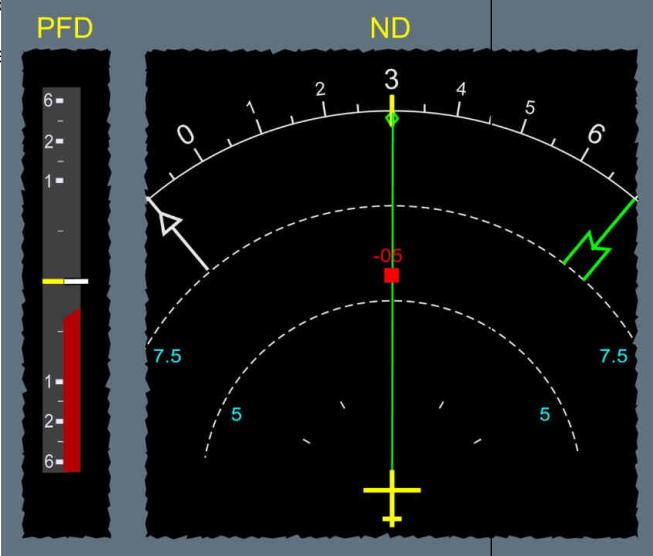
Applicable to: ALL

TRAFFIC ADVISORY

| Scenario | Aural Alert and Display | Flight Crew Response |
|---|---|--|
| <u>TRAFFIC, TRAFFIC</u> One intruder is: - Approximately 100 ft above the aircraft - Climbing - 1 800 ft below the aircraft | (Audio not available in PDF) <u>Traffic, Traffic</u> | <ul style="list-style-type: none">- Do not maneuver based on the traffic advisory- Attempt to see the intruder- Be prepared to maneuver, if the TA becomes a RA. |



PREVENTIVE RESOLUTION ADVISORY

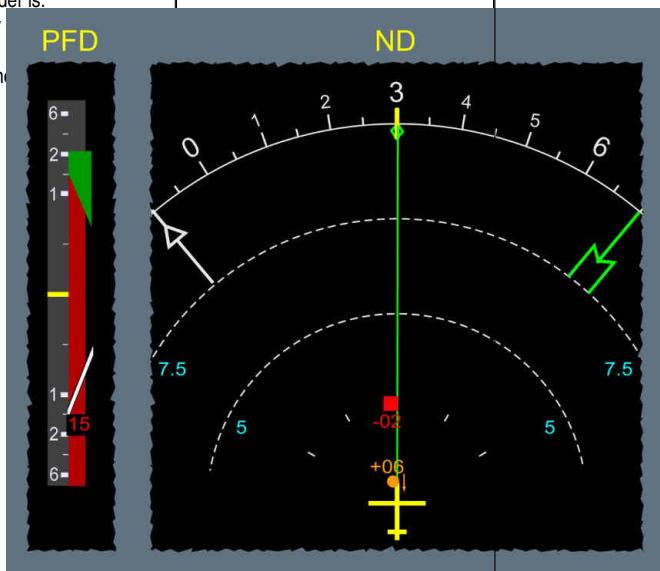
| Scenario | Aural Alert and Display | Flight Crew Response |
|--|---|----------------------|
| MONITOR VERTICAL SPEED | (Audio not available in PDF) <u>MONITOR VERTICAL SPEED</u> | Do not descend. |
| One intruder is: - Approximately 600 ft above the aircraft - 500 ft below the aircraft |  | |

CORRECTIVE RESOLUTION ADVISORY

| Scenario | Aural Alert and Display | Flight Crew Response |
|--|---|---|
| CLIMB, CLIMB One intruder is: - Approximately aircraft - 100 ft below the | (Audio not available in PDF) <u>CLIMB, CLIMB</u> | Promptly (within 5 s) and smoothly, establish a climb rate of 1 500 ft/min. |
| CLIMB, CLIMB NOW One intruder is 600 ft above the aircraft. | (Audio not available in PDF) | Within 2.5 s, initiate a change from a descent to a climb maneuver. |

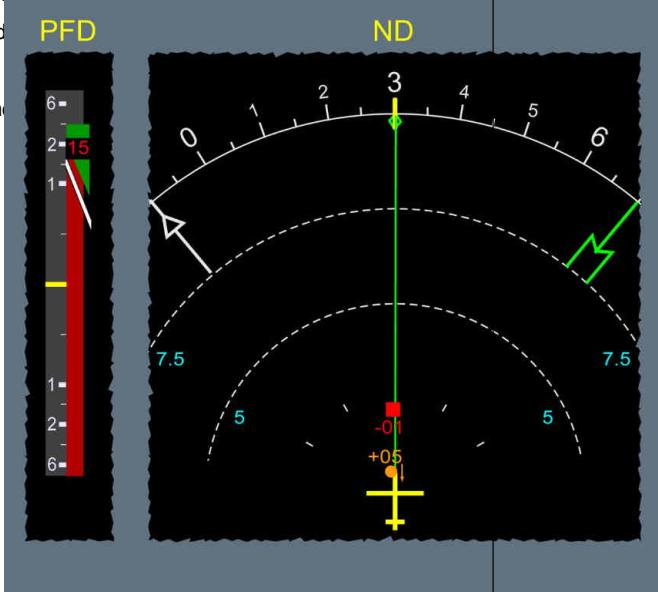
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| Scenario | Aural Alert and Display | Flight Crew Response |
|---|-------------------------|---|
| The second intruder is: - Approximately 100 ft above the aircraft - 200 ft below the aircraft | <u>CLIMB, CLIMB NOW</u> |  |

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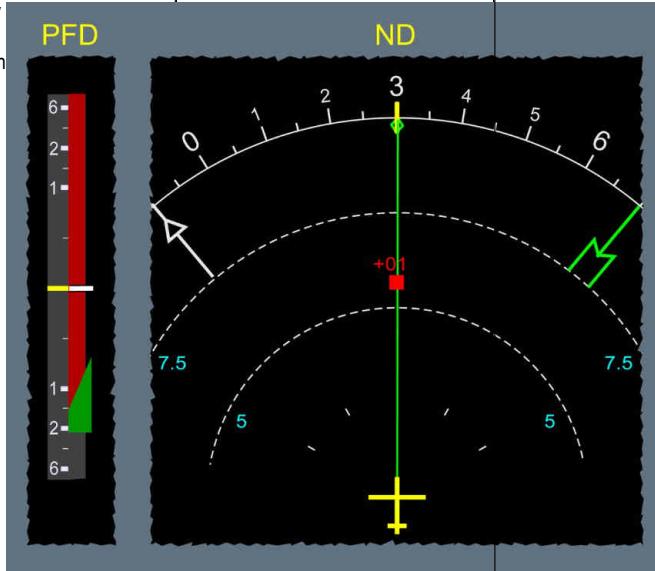
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| Scenario | Aural Alert and Display | Flight Crew Response |
|--|---|---|
| INCREASE CLIMB, INCREASE CLIMB One intruder is 500 ft above the aircraft. | (Audio not available in PDF) INCREASE CLIMB, INCREASE CLIMB | Immediately (within 2.5 s) and smoothly, increase the climb rate to 2 000 ft/min. |
| The second intruder - Approximately aircraft - 100 ft below the aircraft |  <p>PFD</p> <p>ND</p> <p>Detailed description: The image shows the Primary Flight Display (PFD) and Navigation Display (ND). The PFD on the left has a vertical scale with markings from 1 to 6. A red bar is positioned at the 2 mark, with the number '15' displayed in red above it. The ND on the right shows a circular scale with markings from 0 to 6. A green vector arrow points upwards from the center, indicating a climb rate of 15 ft/min. The vector's position corresponds to the '15' marking on the PFD scale.</p> | |

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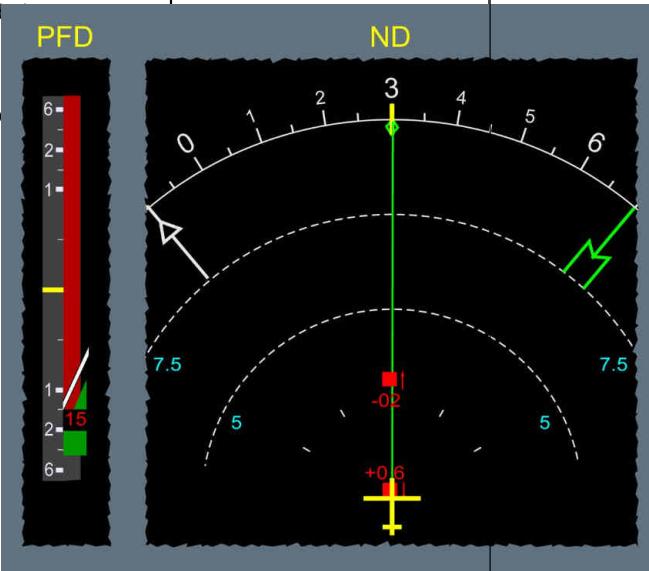
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| Scenario | Aural Alert and Display | Flight Crew Response |
|--|---|---|
| DESCEND, DESCEND One intruder is: - Approximately aircraft - 100 ft above th | (Audio not available in PDF) DESCEND, DESCEND | Promptly (within 5 s) and smoothly, establish a descent rate of 1 500 ft/min. |

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| Scenario | Aural Alert and Display | Flight Crew Response |
|--|---|---|
| <p>INCREASE DESCEND, INCREASE DESCEND One intruder is 600 ft above the aircraft.</p> <p>The second intruder</p> <ul style="list-style-type: none"> - Approximately 200 ft below the aircraft - Climbing - 200 ft below the first intruder | <p>(Audio not available in PDF)</p> <p><u>INCREASE DESCEND,</u> <u>INCREASE DESCEND</u></p> | Immediately (within 2.5 s) and smoothly, increase the descent rate to 2 000 ft/min. |

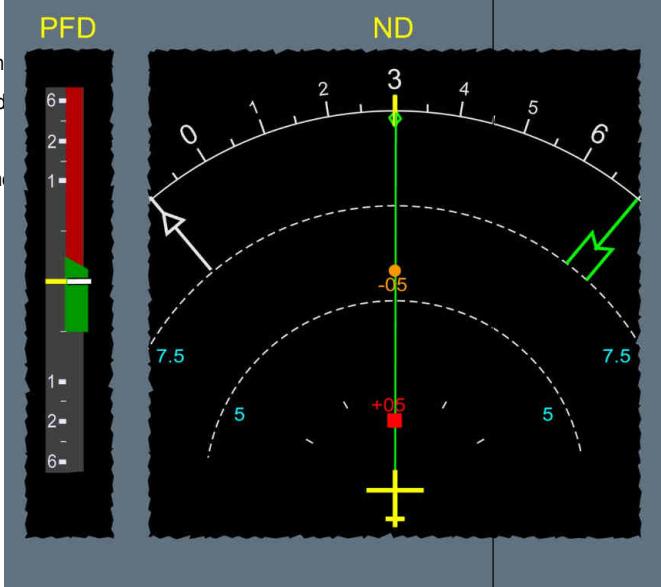

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| Scenario | Aural Alert and Display | Flight Crew Response |
|---|---|--|
| MAINTAIN VERTICAL SPEED, MAINTAIN One intruder is 400 ft above the aircraft. The second intruder is 300 ft below the aircraft. | <i>(Audio not available in PDF)</i> <u>MAINTAIN VERTICAL SPEED, MAINTAIN</u> | <ul style="list-style-type: none"> - Remain in level flight - Do not climb or descend. |
| | <p>The figure shows the Primary Flight Display (PFD) and Navigation Display (ND). The PFD on the left has a vertical scale from -6 to +6. The ND on the right shows a vertical scale from -6 to +6 with dashed concentric circles at 5, 7.5, and 10 units. A green vertical line is at 0. A red square at +04 and a red square at -03 are marked. A yellow crosshair is at the bottom center.</p> | |
| ADJUST VERTICAL SPEED, ADJUST | <i>(Audio not available in PDF)</i> | <ul style="list-style-type: none"> - Remain in level flight |

Continued on the following page

Continued from the previous page

| Scenario | Aural Alert and Display | Flight Crew Response |
|---|---|----------------------------|
| One intruder is: - Approximately aircraft - 500 ft above the | ADJUST VERTICAL SPEED, ADJUST | - Do not climb or descend. |
| The second intruder - Approximately aircraft - 500 ft below the |  | |



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ABNORMAL OPERATIONS

RECONFIGURATIONS

Applicable to: ALL

If one or more functions of the SURV system are failed, the flight crew can manually reconfigure the remaining functions, in order to ensure that the system continues to function correctly.

It is recommended that the flight crew:

- Apply the ECAM procedure corresponding to the failure
- Select the SURV system in which the WXR function is operative.

The illustration below provides some examples of reconfigurations.

Click on a function to set it as failed.

Up to two functions may be set as failed.

No Failure

The flight crew sets the Default Settings on the SURV page of the MFD.



(Click on any function to simulate a failure)



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34 - SURVEILLANCE

ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

SURV GPWS 1(2) FAULT (Refer to procedure)

SURV GPWS 1+2 FAULT (Refer to procedure)

SURV PRED W/S 1(2) FAULT (Refer to procedure)

SURV PRED W/S 1+2 FAULT (Refer to procedure)

SURV SYS 1(2) FAULT (Refer to procedure)

SURV SYS 1+2 FAULT (Refer to procedure)

SURV SYS DEGRADED (Refer to procedure)

SURV TAWS 1(2) FAULT (Refer to procedure)

SURV TAWS 1+2 FAULT (Refer to procedure)

SURV TCAS 1(2) FAULT (Refer to procedure)

SURV TCAS 1+2 FAULT (Refer to procedure)

SURV TERR SYS 1(2) FAULT (Refer to procedure)

SURV TERR SYS 1+2 FAULT (Refer to procedure)

SURV TURB 1(2) FAULT (Refer to procedure)

SURV TURB 1+2 FAULT (Refer to procedure)

SURV WXR 1(2) FAULT (Refer to procedure)

SURV WXR 1+2 FAULT (Refer to procedure)

SURV XPDR 1(2) FAULT (Refer to procedure)

SURV XPDR 1+2 FAULT (Refer to procedure)



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ECAM ALERTS

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34 - SURVEILLANCE

ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Subsystem | Electrical Supply |
|--------|------------------------|-------------------|
| SURV | SURV SYS 1 (XPDR/TCAS) | 115 V AC ESS |
| | SURV SYS 1 (WXR/TAWS) | 115 V AC ESS |
| | SURV SYS 2 (XPDR/TCAS) | 115 V AC 4 |
| | SURV SYS 2 (WXR/TAWS) | 115 V AC 4 |



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ELECTRICAL SUPPLY

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DSC-35-PLP PRELIMINARY PAGES

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DSC-35-30-10 System Description

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DSC-35-30-20 Controls and Indicators

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|---|---|
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| How to Don the PBE..... | A |
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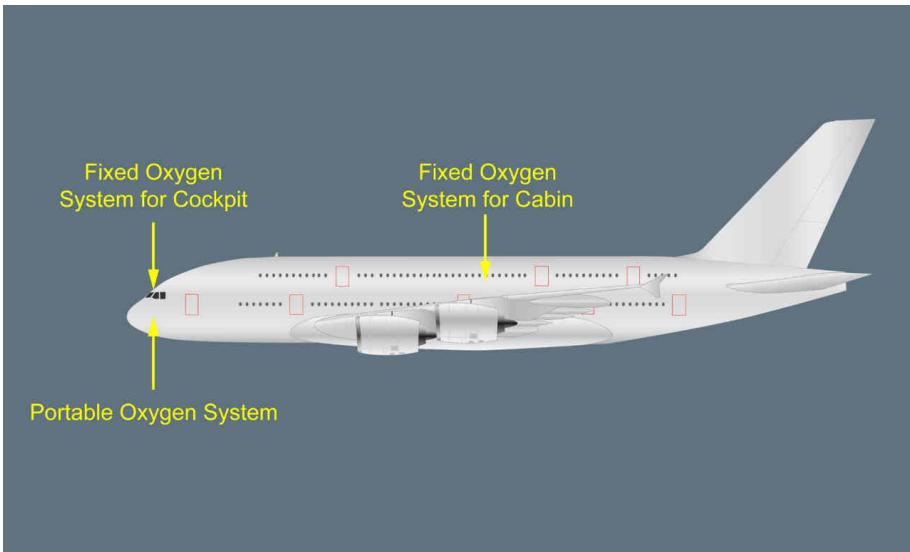
| | |
|------------------------|---|
| Electrical Supply..... | A |
|------------------------|---|

OVERVIEW**Applicable to: ALL**

The oxygen system is designed to supply oxygen to the flight crew, cabin crew, and passengers, if necessary (e.g. depressurization).

The oxygen system has a:

- Fixed oxygen system in the cockpit
- Fixed oxygen system in the cabin
- Portable oxygen system for the cockpit and cabin.

General



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OVERVIEW

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FIXED OXYGEN SYSTEM FOR COCKPIT - SYSTEM DESCRIPTION

FIXED OXYGEN SYSTEM FOR COCKPIT

Applicable to: ALL

The fixed oxygen system in the cockpit has:

- 5 full-face quick-donning masks

Each mask is stowed in its own stowage box.

The stowage box is next to each flight crew station.

- One high-pressure oxygen bottle

L3 This high-pressure bottle is in the upper avionics bay. It has a capacity of 118 ft³.

- A pressure-reducer transmitter

This pressure-reducer transmitter is connected directly to the high-pressure oxygen bottle, and ensures that oxygen is supplied at low pressure.

It has a relief valve that can discharge oxygen overboard, in the case of overpressure.

Overpressure will be indicated by the overboard discharge indicator.

L1 - A supply valve

This valve is normally open. The flight crew can manually close the valve to stop oxygen supply, by using the CREW SUPPLY pb-sw that is on the OXYGEN overhead panel.

L3 - An Oxygen System Control Unit (OSCU)

The OSCU monitors and controls the cockpit oxygen system.

Note: *The OSCU monitors and controls both cockpit and cabin oxygen system.*

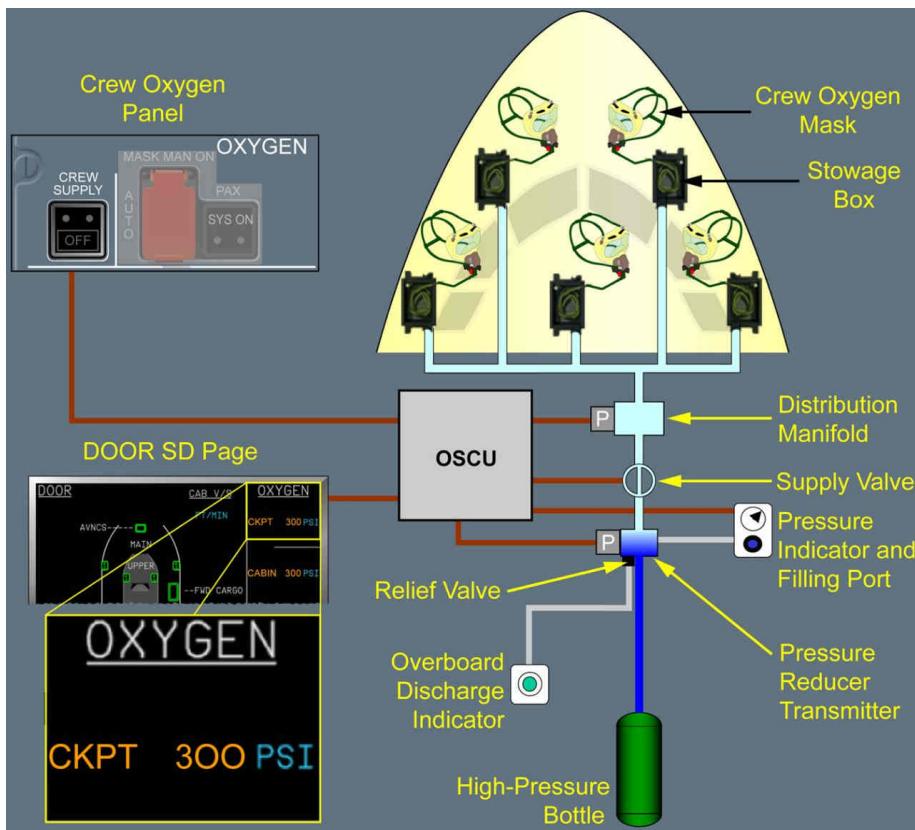
- A filling port with a pressure indicator

The oxygen bottle can be refilled from the outside via a filling port.

This filling port is in the forward cargo compartment.

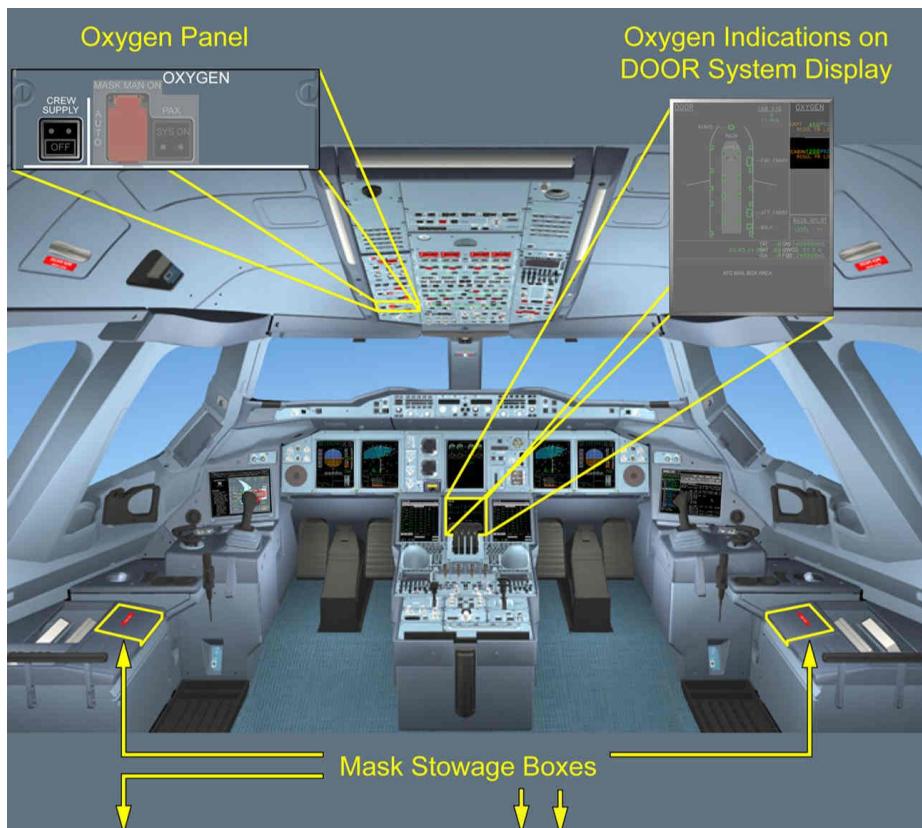
L1 - An overboard discharge indicator.

This indicator is normally green. The indicator turns yellow, if there is any overpressure in the oxygen system.

Fixed Oxygen System for the Cockpit

COCKPIT VIEW

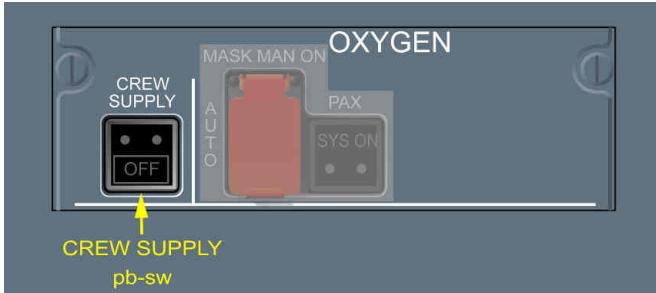
Applicable to: ALL

Cockpit View

OXYGEN PANEL

Applicable to: ALL

Oxygen Panel

**crew supply pb-sw**

The CREW SUPPLY pb-sw controls oxygen supply to the masks in the cockpit.

The supply valve is open, and supplies oxygen to the masks.

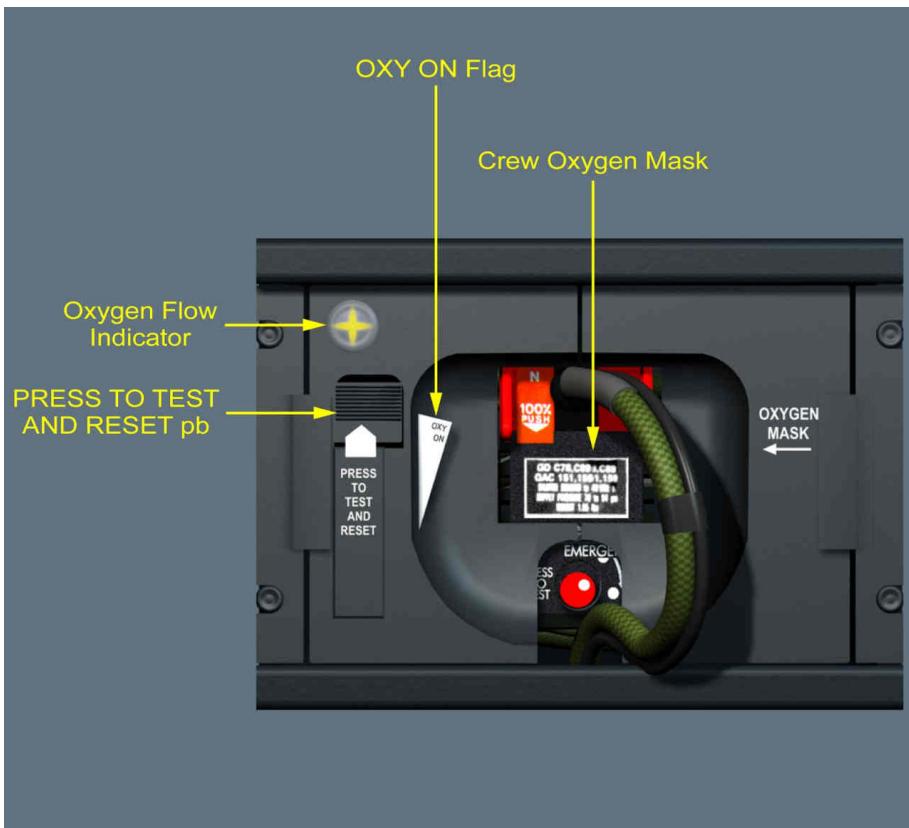


The supply valve is closed.



MASK STOWAGE BOX

Applicable to: ALL

Mask Stowage Box

OXYGEN FLOW INDICATOR

Oxygen is not flowing.



Oxygen is flowing.

**Press to TEST and RESET pb**

When pressed, the PRESS TO TEST AND RESET pb either tests, or resets, the oxygen system:

- If the mask has not been taken out of the stowage box (OXY ON flag not visible), this pushbutton tests the oxygen system.
When the system is operating correctly, the oxygen flow indicator will be yellow for a few seconds.
- If the mask has been taken out of the stowage box and restowed (OXY ON flag visible), this pushbutton resets the oxygen system. Therefore:
 - The oxygen supply to the mask is cut off
 - The mask microphone is deactivated
 - The OXY ON flag disappears.

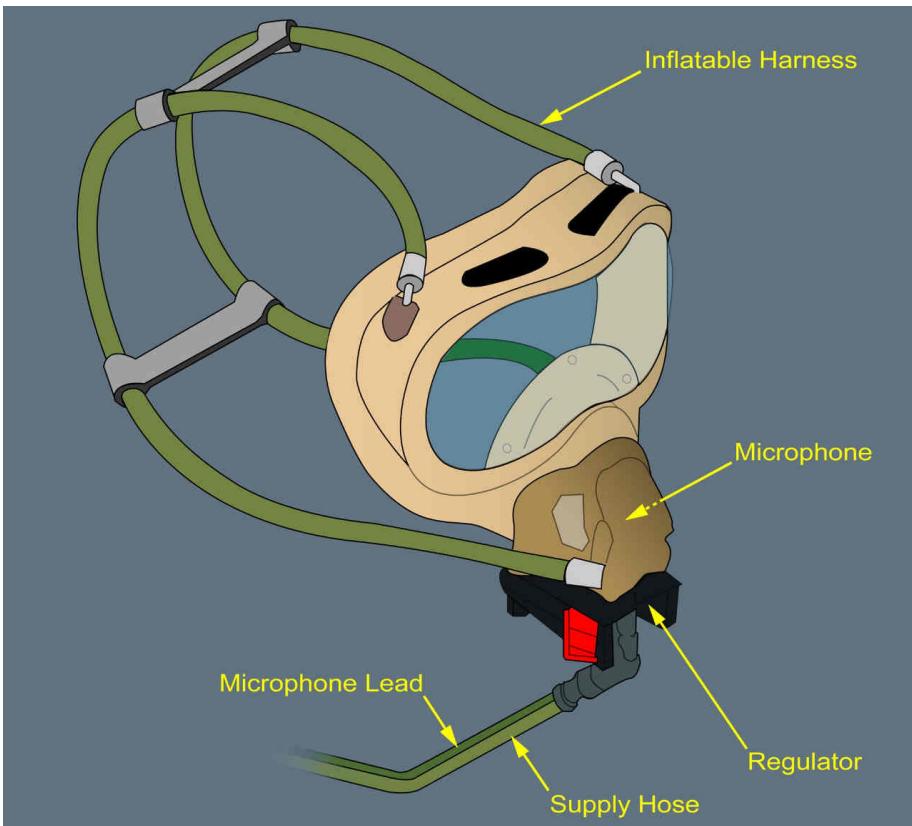
OXY ON FLAG

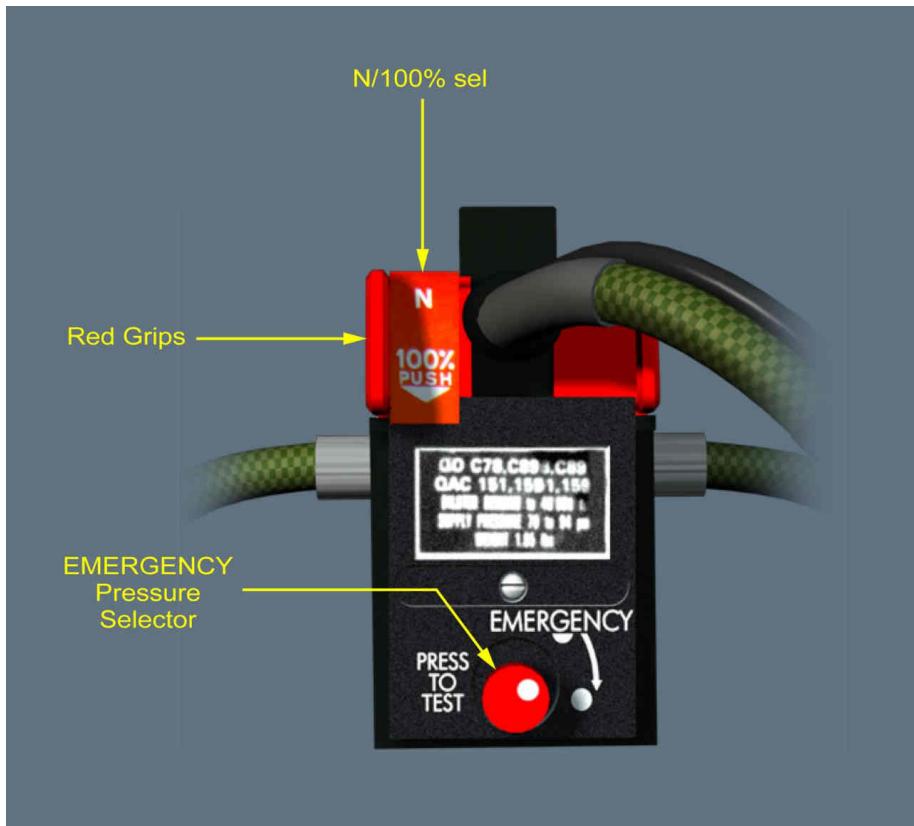
Appears, after the mask is pulled out of its stowage box, and the left door of the stowage box is closed again. Oxygen flows to the mask.



FLIGHT CREW OXYGEN MASK

Applicable to: ALL

Flight Crew Oxygen Mask

Regulator

RED GRIPS

When the red grips are pressed together, the harness inflates.
When the red grips are released, the harness deflates.

EMERGENCY selector

The EMERGENCY selector provides overpressure, if necessary (e.g. to prevent smoke, smell, or ashes from entering the mask, or to remove condensation).



When pressed, and until released, supplies oxygen overpressure
When turned, permanently supplies oxygen overpressure.

Note: If the cabin altitude is above 30 000 ft, oxygen overpressure is automatically supplied.

N/100% selector

The N/100% selector has two positions:



The mask provides 100% pure oxygen at all cabin altitudes.

L13



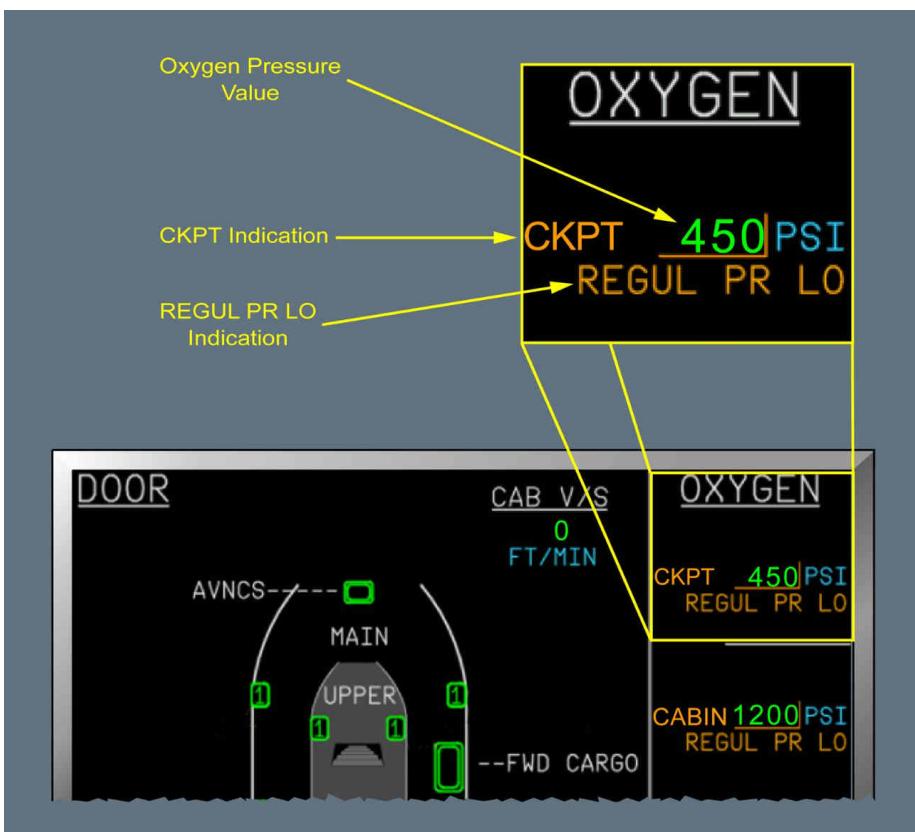
The mask provides a mixture of ambient air from the cockpit, and oxygen. The proportion of air and oxygen in the mixture depends on the cabin altitude.

Note: If the cabin altitude is above 30 000 ft, the mask automatically provides 100% oxygen.

OXYGEN INDICATIONS ON DOOR SD PAGE

Applicable to: ALL

The DOOR System Display provides the flight crew with information on the oxygen system.

Cockpit Oxygen System Indications**CKPT INDICATION**

Normal operation of the oxygen system.

L12



- The oxygen system is off (the CREW SUPPLY pb-sw is OFF)
The REGUL PR LO indication also appears.
Or
- The oxygen system has low pressure.
The CKPT indication appears with:
 - The REGUL PR LO indication, on ground, if there is a low pressure in the distribution manifold
 - The oxygen pressure value in amber, because low pressure is detected in the oxygen bottle.
Associated with the following ECAM alert: OXY CKPT BOTTLE PRESS LO (*Refer to procedure*).

OXYGEN PRESSURE VALUE



The pressure is equal to, or above the minimum necessary to dispatch the aircraft with five flight crewmembers.



On ground only, appears with the amber half-frame, if the pressure is below the minimum necessary to dispatch the aircraft with five flight crewmembers. However, the pressure may be sufficient to dispatch the aircraft with less than five flight crewmembers: *Refer to Cockpit Oxygen Limitations*.

L12



Low pressure is detected in the oxygen bottles.

This occurs, when the pressure is below 350 PSI.

Associated with the following ECAM alert: OXY CKPT BOTTLE PRESS LO (*Refer to procedure*).

- L3 **Note:** *The oxygen pressure is temperature compensated. A temperature sensor, located next to the oxygen bottle, measures the temperature in the area.*

REGUL PR LO INDICATION

L13



Appears on ground, when:

- The oxygen CREW SUPPLY pb-sw is OFF, or
- The oxygen pressure in the oxygen distribution manifold is low.
Oxygen pressure is low, if it goes below 47 PSI.

HOW TO TEST THE MASK

Applicable to: ALL

● On the Oxygen Panel:

CREW SUPPLY pb-sw CHECK ON

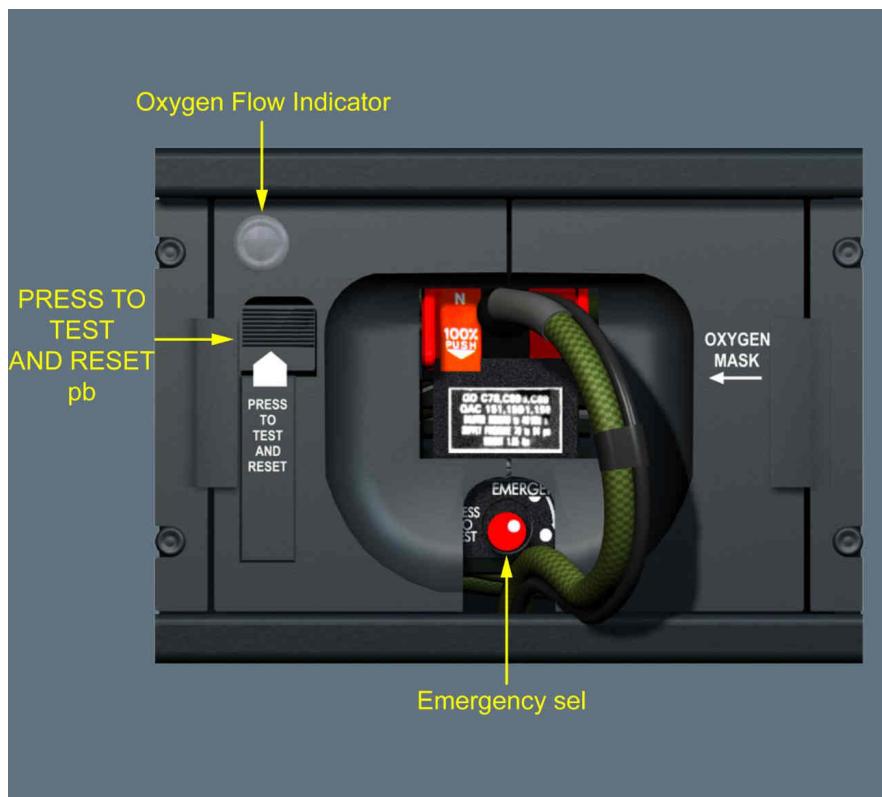
● On the glareshield:

LOUDSPEAKERS..... CHECK ON

● On the RMP:

INT reception knob..... PRESS OUT - ADJUST

INT/RAD switch..... INT

● On the mask stowage box:Oxygen Mask Stowage Box



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FIXED OXYGEN SYSTEM FOR COCKPIT - HOW TO

PRESS TO TEST AND RESET pbPRESS AND HOLD

Check that the oxygen flow indicator turns yellow for a short time, and then goes black.

Hold the PRESS TO TEST AND RESET pb down, and press the EMERGENCY selector.

Check that the oxygen flow indicator turns yellow, and remains yellow, as long as the EMERGENCY selector is pressed.

Listen for oxygen flow through the loudspeakers. Inform any engineer whose headset may be connected to the nose intercom, that a loud noise may be heard.

Check that the PRESS TO TEST AND RESET pb returns to the up position.

Check that the N/100% selector is in the 100% position.

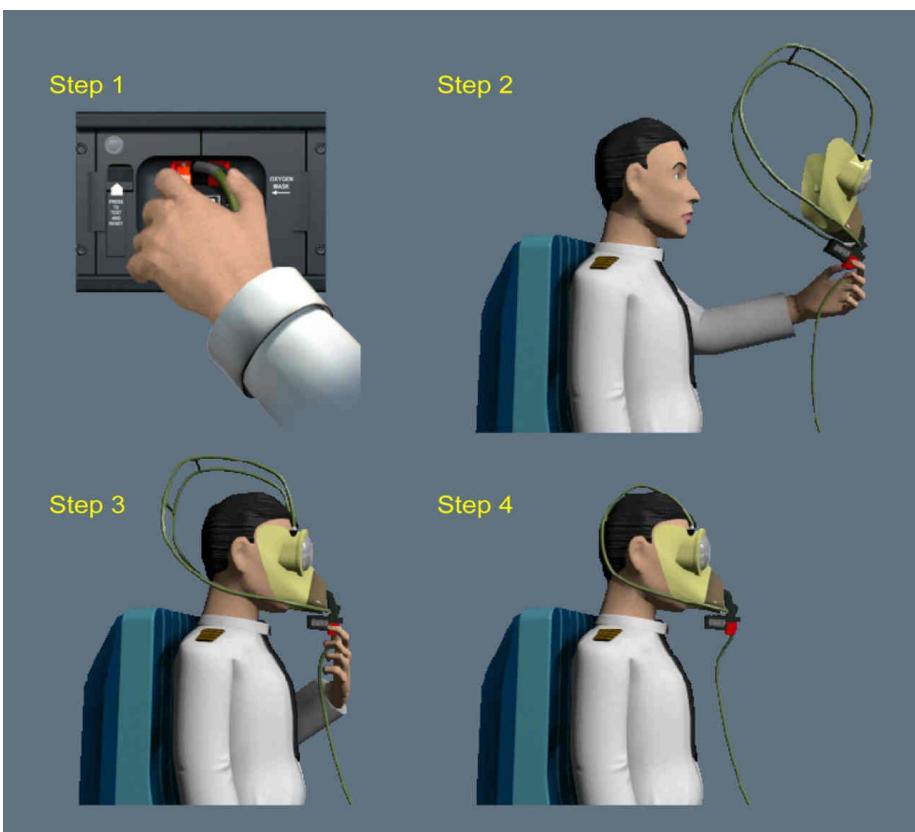
Press the EMERGENCY selector again.

Check that the oxygen flow indicator remains black. This ensures that the mask is not supplied with oxygen.

HOW TO DON THE MASK

Applicable to: ALL

To don the flight crew oxygen mask:

How to Don the Mask

CAUTION When the HUD is deployed, See also How to don the mask with the HUD.

STEP 1 AND 2

Remove the mask from its stowage box, by squeezing the red grips toward each other, and pulling the mask out of its box.

The stowage box opens, and the:

- Mask is immediately supplied with oxygen
- Mask harness immediately inflates
- Mask microphone is active.



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FIXED OXYGEN SYSTEM FOR COCKPIT - HOW TO

STEP 3 AND 4

Don the mask, and release the red grips. This will deflate the mask harness, and keep the mask in position.

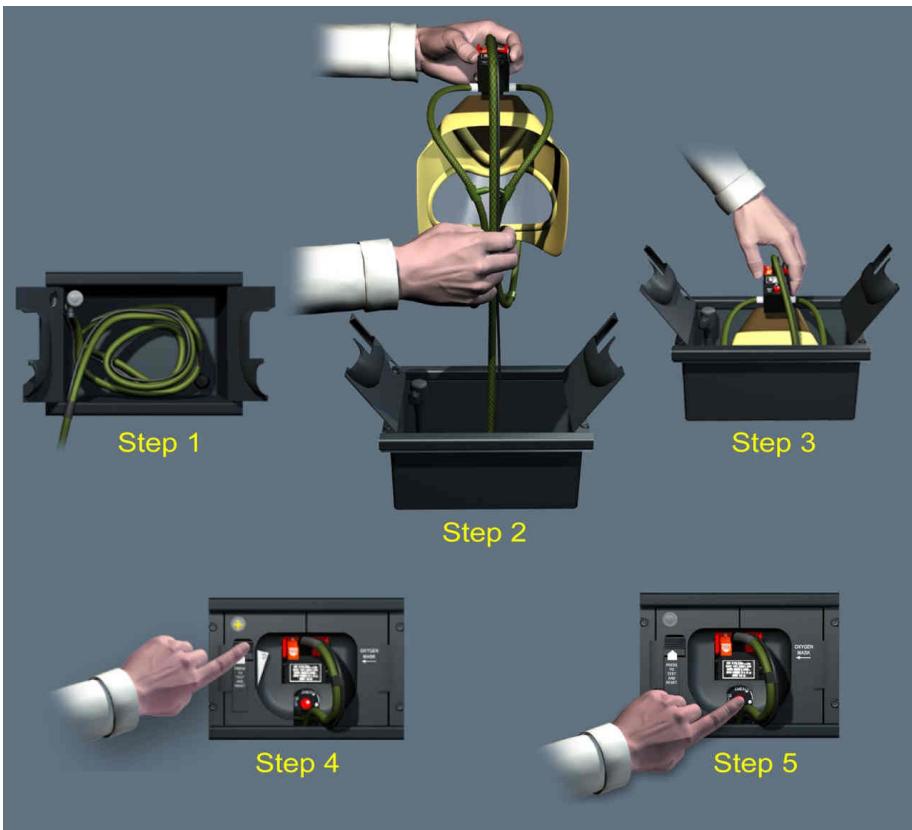
Note: The visor of each mask may have a protective film to help prevent scratches. This film is optional, and can be removed at any time.

HOW TO DON THE MASK WITH THE HUD

This animation is not available in pdf format.

HOW TO STOW THE MASK

Applicable to: ALL

Mask Stowage**STEP 1**

Coil the hose that is connected to the mask, and put it in the bottom of the stowage box.

STEP 2

Hold the mask by the regulator, and pull the inflatable harness downward with care.

Note: Ensure that the harness is not inside the mask.

STEP 3

Put the mask in the stowage box.

Make sure that the:

- Mask touches the bottom of the stowage box
- N/100% selector is face up, and at the 100% position.

STEP 4

Close the doors of the mask stowage box.

Firmly press the PRESS TO TEST AND RESET pb.

When released, check that the OXY ON flag disappears.

STEP 5

Press the EMERGENCY selector, and check that the oxygen flow indicator remains black.



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FIXED OXYGEN SYSTEM FOR COCKPIT - ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

OXY CKPT BOTTLE PRESS LO (*Refer to procedure*)



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FIXED OXYGEN SYSTEM FOR COCKPIT - ECAM ALERTS

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FIXED OXYGEN SYSTEM FOR THE CABIN**Applicable to: ALL**

The fixed oxygen system of the cabin provides oxygen to the cabin (passengers and cabin crew), and to the crew rest compartments:

- Automatically, in the case of cabin depressurization, when the cabin altitude is above 13 800 ft.
- Manually, if the flight crew presses the MASK MAN ON pb .

The fixed oxygen system of the cabin has:

- High-pressure oxygen bottles
 - L3 Each high-pressure bottle is located behind the right-hand sidewall lining of the forward cargo compartment. It has a capacity of 213 ft³ .
 - A pressure-reducer transmitter on each bottle
This transmitter is connected to the high-pressure oxygen bottle, and supplies oxygen to the regulators for distribution to the entire system.
- L1- Two regulators with supply valves, that provide oxygen to all cabin occupants
- L3 These valves provide cabin occupants with a continuous flow of oxygen, and regulate this oxygen flow in accordance with the cabin altitude.
- L1- Two supply lines, one for the main deck, and one for the upper deck
- L2 Each supply line has two shutoff valves that can isolate the supply line in the engine-burst area. In case one of the supply lines ruptures in the engine-burst area, both associated shutoff valves will automatically isolate the affected section of the supply line. Oxygen is still supplied to the masks in the affected section, via interconnected lines from the other deck.
- L1- Masks

The masks are stowed in containers, that automatically open to release the masks, when:

- The cabin altitude is above 13 800 ft
- The flight crew opens the MASK MAN ON pb guard, and presses the pushbutton.

- L3 These containers are above the passenger seats, in each lavatory, in each galley, at each cabin crew station, in both stairs, and in each crew rest compartment.
When the masks are released, prerecorded instructions are automatically broadcast.
- An Oxygen System Control Unit (OSCU)
The OSCU monitors and controls the cabin oxygen system.

Note: *The OSCU monitors and controls both cockpit and cabin oxygen system.*

The OSCU receives the real number of passengers from the FMS , in order to indicate on the ECAM that there is low pressure in the bottles (*Refer to DSC-35-30-20-GOIND Oxygen Pressure Value*).

- A filling port with a pressure indicator

Oxygen bottles can be refilled from the outside via a filling port.

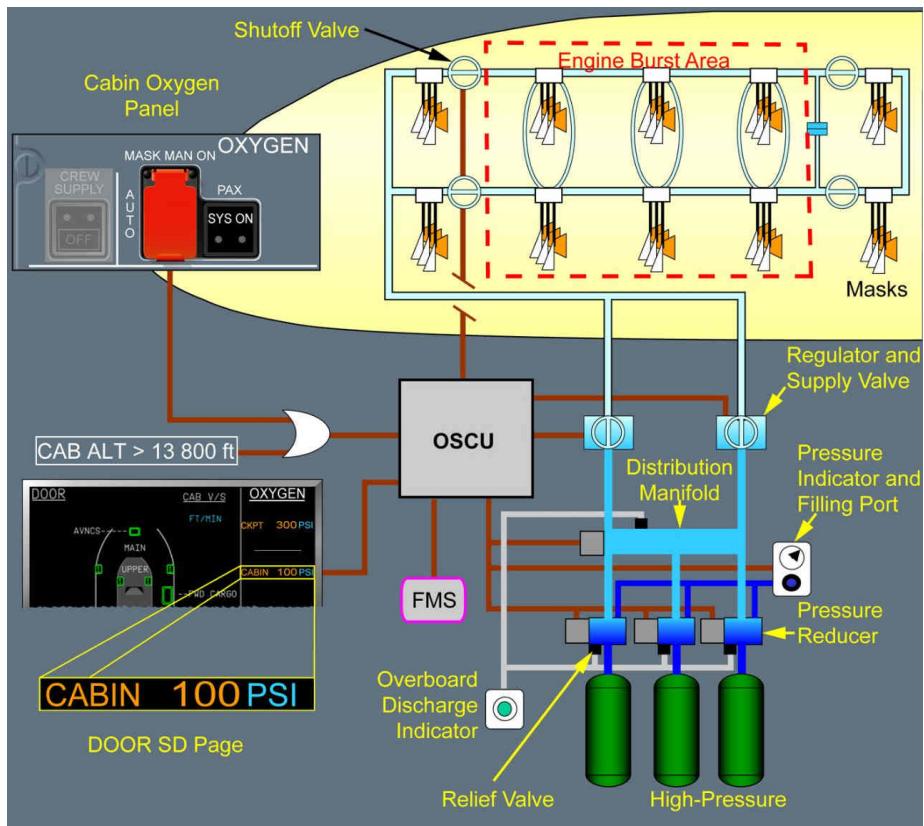
This filling port is near the forward cargo door.

- [L1] - An overboard discharge indicator

This indicator is normally green. It turns yellow, if there is any overpressure in the oxygen bottles, or in the oxygen distribution system.

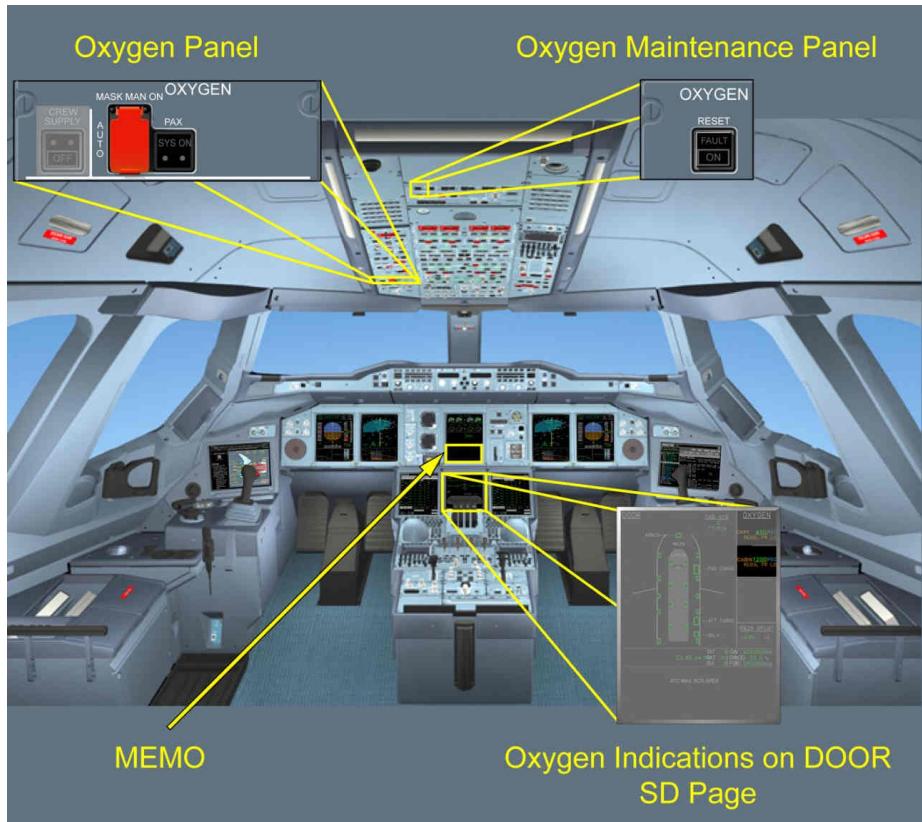
- [L3] When an overpressure occurs, either a pressure reducer transmitter relief valve, or the manifold relief valve opens to discharge oxygen overboard.

Fixed Oxygen System for the Cabin



COCKPIT VIEW

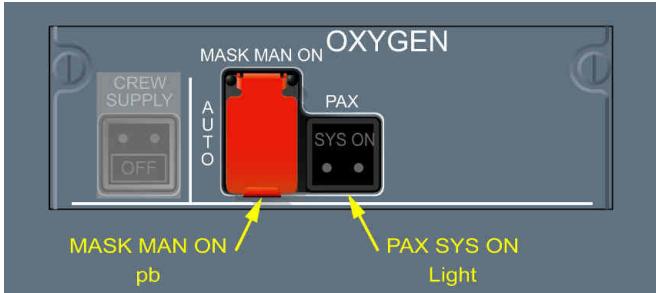
Applicable to: ALL

Cockpit View

OXYGEN PANEL

Applicable to: ALL

Oxygen Panel

**MASK MAN ON pb**

The MASK MAN ON pb is a guarded pushbutton.



Normal position.

If the cabin altitude is above 13 800 ft, the masks drop automatically.



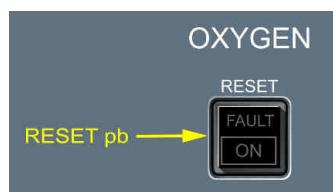
The guard is open, and the pushbutton is pressed: The masks will drop.

PAX SYS ON light

- : Oxygen flows toward the passenger masks.
The light remains on, until the RESET pb on the OXYGEN maintenance panel is pressed.

OXYGEN MAINTENANCE PANEL

Applicable to: ALL

Maintenance Panel**RESET pb**

Maintenance personnel uses this pushbutton to reset the control circuit, after the oxygen system has been used.

L13

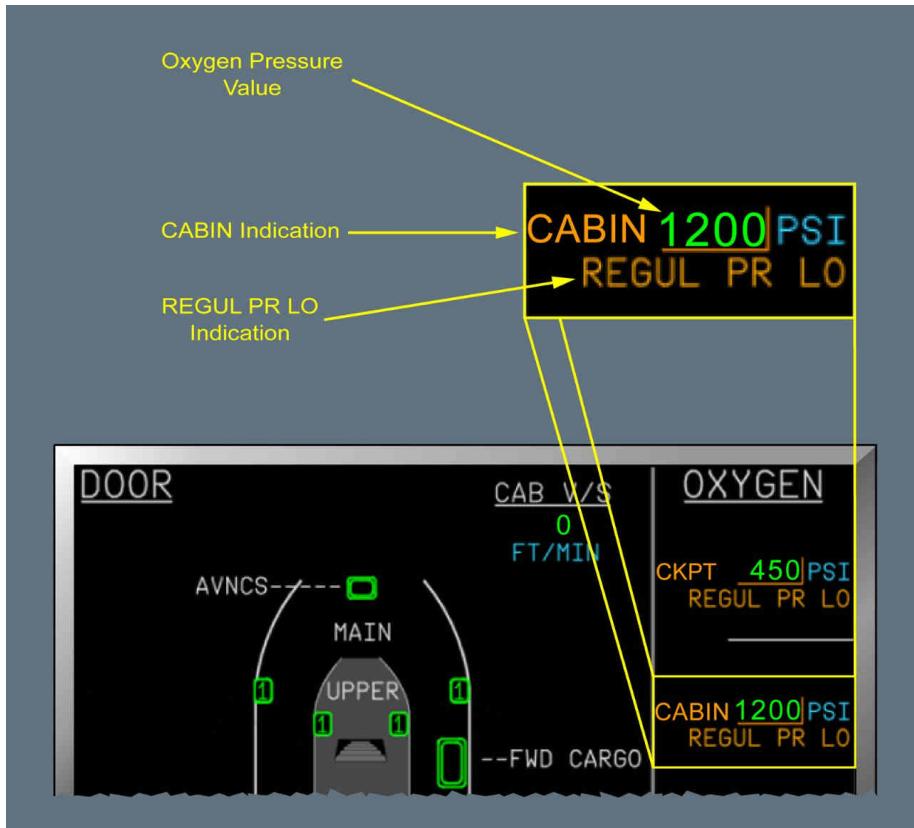


- : When pressed, resets the oxygen system: The PAX SYS ON light (on the OXYGEN panel) goes off.
When the reset is completed, **ON** goes off.
The reset lasts approximately three seconds.
- : The reset has failed.

OXYGEN INDICATIONS ON DOOR SD PAGE

Applicable to: ALL

The DOOR System Display provides the flight crew with information on the oxygen system.

Cabin Oxygen System Indications**CABIN INDICATION**

Normal operation of the oxygen system.

L12



- The oxygen system has low pressure.
The CABIN indication appears with:

- The REGUL PR LO indication, on ground, if there is low pressure in the distribution manifold.
- The oxygen pressure value in amber, if low pressure is detected in the oxygen bottles.

Associated with the following ECAM alert: OXY CABIN BOTTLE PRESS LO (*Refer to procedure*).

Or

- At least one engine-burst area shutoff valve is closed, or at least one regulator supply valve is closed, however it should be open.

Associated with the following ECAM alert: OXY CABIN VLV CLOSED (*Refer to procedure*).

OXYGEN PRESSURE VALUE



The pressure is equal to, or above 1 600 PSI .



On ground only, appears with the amber half-frame, if: The pressure is below 1 600 PSI . However, the pressure may be sufficient to dispatch the aircraft with the real number of cabin occupants: *Refer to Cabin Oxygen Limitations* .

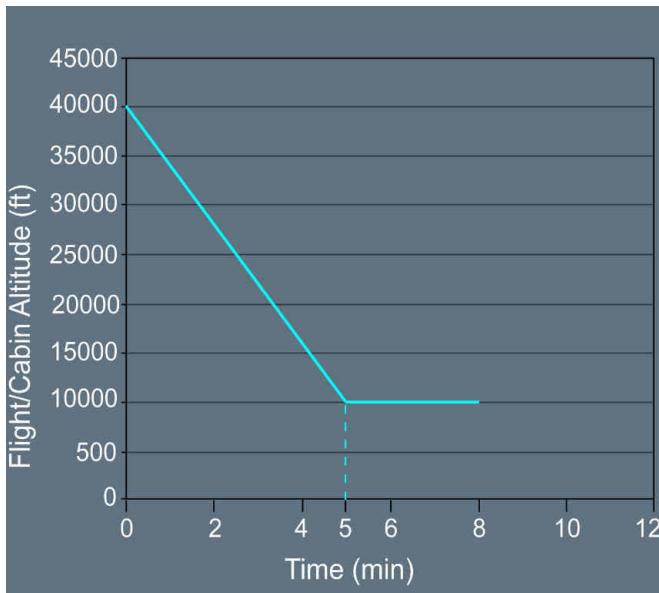
L123

150

Low pressure is detected in the oxygen bottles.

The pressure is below the minimum pressure necessary to fly an emergency descent in the following conditions:

- From 40 000 ft to 10 000 ft for 5 min
- This emergency descent profile is:



- With the real number of cabin occupants.

The real number of cabin occupants is computed by using the passenger number, provided by the FMS.

This minimum pressure depends on the number of oxygen bottles that are installed:
3.

However, before one engine starts, low pressure is detected in the oxygen bottles, if the pressure is below 800 PSI.

Associated with the following ECAM alert: OXY CABIN BOTTLE PRESS LO (Refer to procedure).

L3 **Note:** *The oxygen pressure is temperature compensated. A temperature sensor, located next to the oxygen bottles, measures the temperature in the area.*

REGUL PR LO INDICATION

L13



Appears on ground, if oxygen pressure in the oxygen distribution manifold is low.

Oxygen pressure is low, if it goes below 98 PSI.

MEMO

Applicable to: ALL

OXY PAX SYS ON

The masks are released in flight, either automatically or manually, with the EXCESS CAB ALT alert activated.

L12

OXY PAX SYS ON

The masks are released in flight, either automatically or manually, without the EXCESS CAB ALT alert activated. The amber memo indicates that the Oxygen System Control Unit (OSCU) and the Cabin Pressure Control System (CPCS) are not consistent related to the cabin pressure altitude .



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FIXED OXYGEN SYSTEM FOR CABIN - CONTROLS AND INDICATORS

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FIXED OXYGEN SYSTEM FOR CABIN - ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

OXY CABIN BOTTLE PRESS LO (*Refer to procedure*)

OXY CABIN VLV CLOSED (*Refer to procedure*)



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AIRCRAFT SYSTEMS

35 - OXYGEN

FIXED OXYGEN SYSTEM FOR CABIN - ECAM ALERTS

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PROTECTIVE BREATHING EQUIPMENT (PBE)**Applicable to: ALL**

There is one Protective Breathing Equipment (PBE) in the cockpit.

The flight crew can use the PBE in the case of smoke, fire, or toxic gas emissions. The PBE :

- Protects the user's eyes and respiratory system for 15 min

- Enables the user to leave the station

- Enables the user to communicate.

L3 The PBE has a speech transmitter, and a very good acoustic transmission.

L1 The PBE also protects the user against cabin depressurization, when the cabin altitude is below 25 000 ft . However, the flight crew must not don the PBE when the cabin depressurization begins. In this case, the flight crew must don the oxygen mask (*Refer to DSC-35-20-30 How to Don the Mask*).

The PBE is stowed in a stowage box. For location, *Refer to DSC-25-10-20 Left Rear Area* .

The flight crew can remove the PBE from its stowage box, and don it in less than 10 s .

L3 The flight crew can don the PBE , even if having long hair, a beard, or glasses.

The PBE is based on a system of chemical air regeneration, located in the breathing bag. An oronasal mask enables the user to inhale regenerated air, and to exhale air into the regeneration system.

L1 The stowage box has a transparent cover, that enables to check the condition of the vacuum bag.

The PBE is usable as long as:

- The vacuum bag is vacuum sealed, and
- The stowage box is not damaged.



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OPERATING MANUAL

AIRCRAFT SYSTEMS

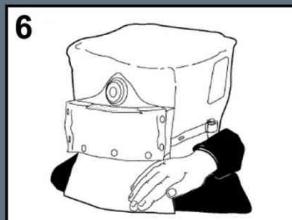
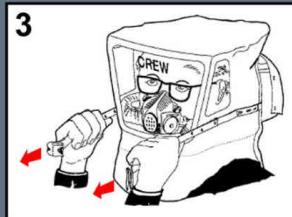
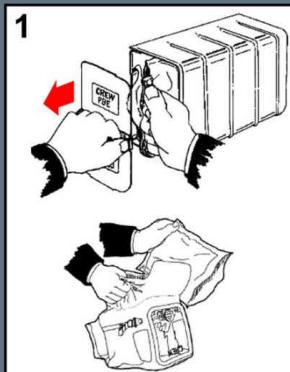
35 - OXYGEN

PORTABLE OXYGEN SYSTEM - SYSTEM DESCRIPTION

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HOW TO DON THE PBE

Applicable to: ALL

How to Don the PBE

1. Firmly pull the red handle to remove the cover.

Take out the vacuum bag, and remove the PBE from the vacuum bag.

2. Slide both hands, with palm facing each other, inside the neck seal. The PBE visor must be face down.

Bow the head downward. Adjust the PBE on the head, with the nose and the mouth close to the oronasal mask.

3. Pull the adjustment straps forward to actuate the air regeneration system. Within one to five seconds, the PBE starts to inflate. The flight crew may hear a rushing noise of oxygen entering the hood. The PBE is now operating for 15 min.
4. Pull the adjustment straps back to secure the oronasal mask high on the nose for a tight seal.

WARNING

Put the hair above the neck seal inside the hood.

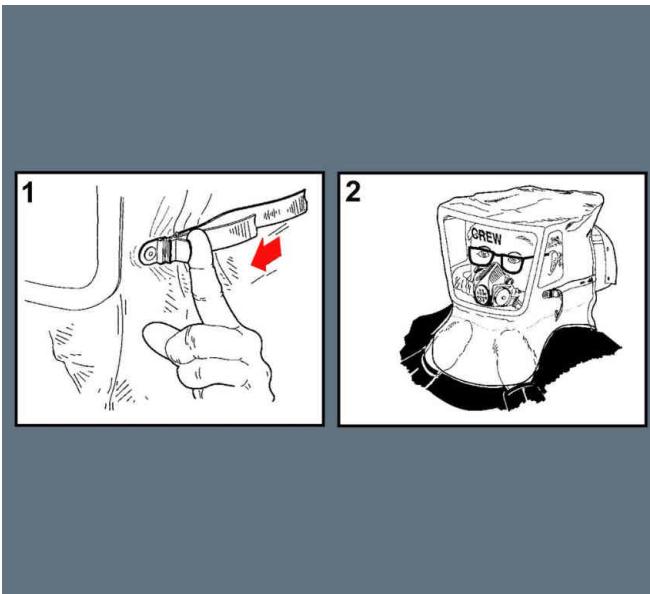
Do not damage the neck seal when putting on the PBE. Be especially careful with eyeglasses, sharp-edged necklaces and earrings.

5. If wearing eyeglasses: Move the earpieces of the eyeglasses through the PBE to adjust the eyeglasses over the oronasal mask. Do not adjust the eyeglasses through the neck seal.
6. Adjust the neck seal position for a good seal. Check that there is no clothing or hair trapped in the neck seal. To protect the neck and the shoulders, adjust the material hanging below the neck seal.

Note: *If the flight crew uses the PBE until the end of complete inhalation: The hood tightly collapses around the head, and a rapid increase of heat and moisture occurs.*

HOW TO PUT OFF THE PBE

Applicable to: ALL

How to Put off the PBE



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PORTABLE OXYGEN SYSTEM - HOW TO

1. Go to a safe area, away from fire, flame, and toxic fumes.
Reach the adjustment straps with both hands. Push forward the metal tabs of the adjustment straps.
2. Place both hands under the neck seal, and under the chin. Pull up the PBE: Guide the oronasal cone and the neck seal over the face and the eyeglasses.
Place the PBE in a safe area to cool, away from fire and water.



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PORTABLE OXYGEN SYSTEM - HOW TO

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ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Subsystem | Electrical Supply |
|------------------------|--------------------|-------------------|
| OSCU | N/A | DC ESS |
| Release of cabin masks | MASK MAN ON pb | DC ESS |
| | Automatic realease | DC ESS |



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ELECTRICAL SUPPLY

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AIRCRAFT SYSTEMS

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36 - BLEED AIR

SYSTEM DESCRIPTION - OVERVIEW

OVERVIEW

Applicable to: ALL

The bleed air system supplies high-pressure air to the following systems:

- Air conditioning and cabin pressurization
- Wing anti-ice and engine anti-ice
- Engine start
- Hydraulic reservoir pressurization
- Pack bay ventilation system.

High-pressure air is supplied by:

- The engines
- The APU
- Ground-air sources, through three HP ground connectors.

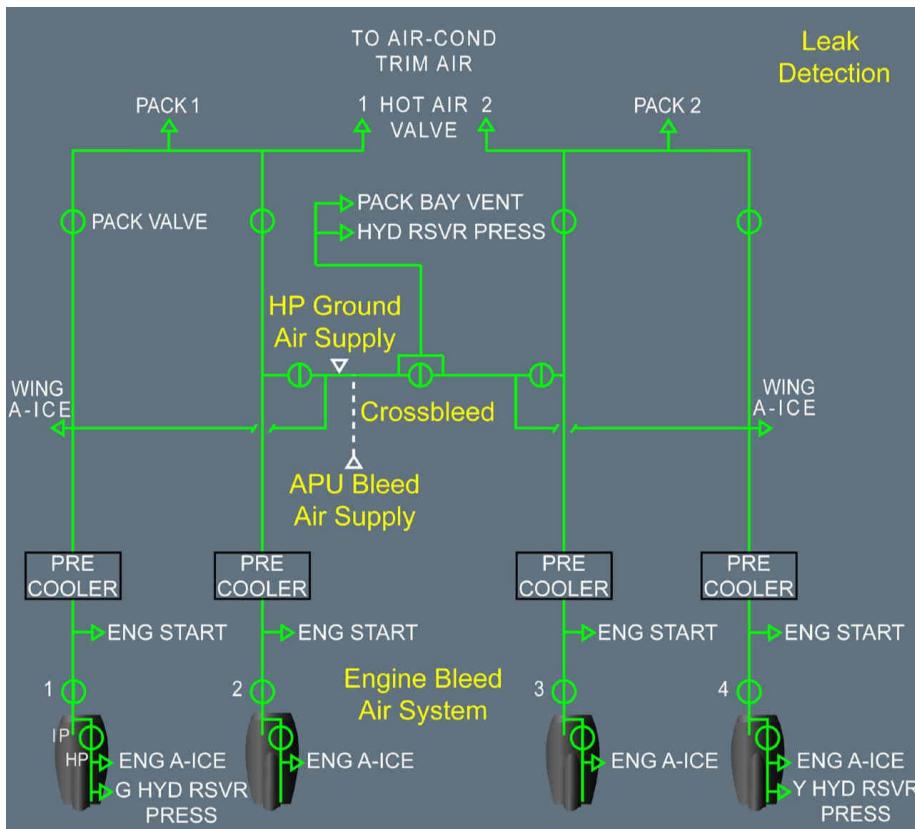
There are three crossbleed valves on the crossbleed duct. These crossbleed valves ensure that bleed air is supplied to the systems, depending on which bleed air sources are available.

A leak detection system detects any overheat near the bleed ducts.

In normal condition, the bleed system operates automatically.

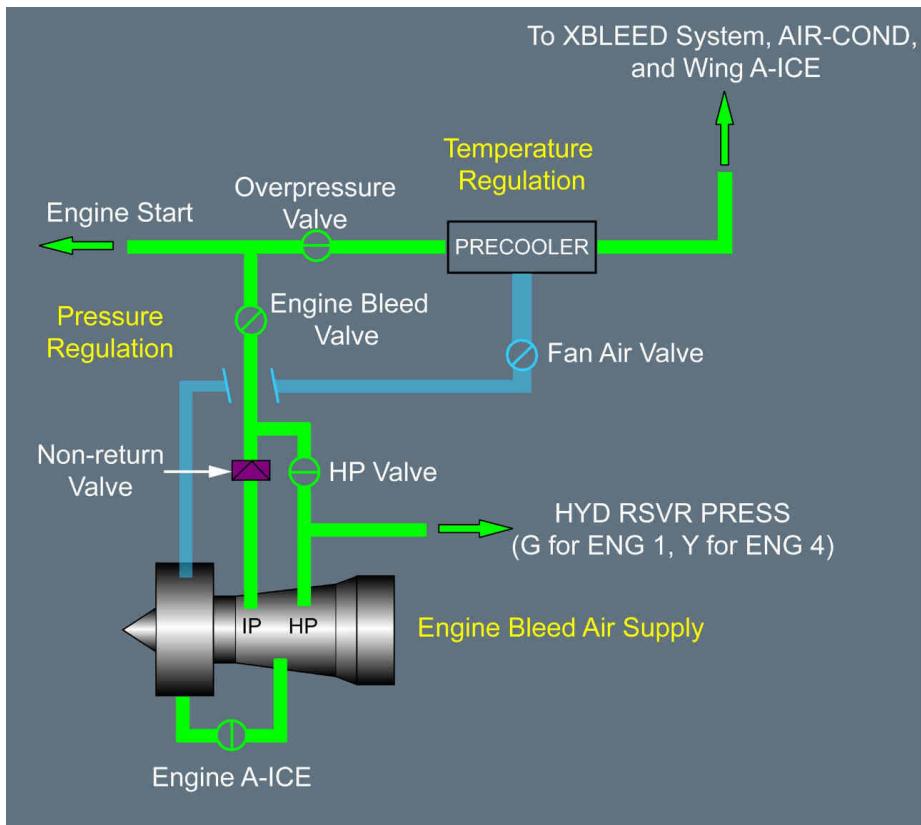
If necessary, the pilot can manually operate the bleed system.

The bleed controller functions of the CPIOM A monitor and control the bleed system.

Bleed Air System


ENGINE BLEED AIR SYSTEM

Applicable to: ALL

Engine Bleed Air System**ENGINE BLEED AIR SUPPLY**

Engine bleed air usually comes from the Intermediate Pressure (IP) stage of the High Pressure (HP) engine compressor.

- L3 Bleed air is usually bled from the fourth stage of the HP engine compressor.

- [L2] The pressure at this stage of the compressor is sufficiently high to supply pressurized air to the system users at most engine thrust settings, except at low thrust settings. Using air from the IP stage minimizes fuel consumption.
- [L1] At low engine thrust settings, the air pressure is not sufficiently high, and air is bled from the high (HP) stage of the HP engine compressor, through the HP valve.
- [L3] HP air is bled from the 9th stage of the HP engine compressor.
- [L1] The HP valve automatically controls and regulates the pressure of the air supply.
- [L3] The HP valve limits the downstream bleed pressure to 48.5 lb/in²(PSI).
- [L1] The HP valve closes automatically in any one of the following cases:
 - When the bleed pressure at the IP stage of the compressor is sufficiently high
 - [L3] When pressure is higher than 33.5 lb/in²(PSI).
 - [L1] - When the bleed pressure at the HP stage of the compressor is too low (e.g. at engine start)
 - [L3] When pressure is lower than 15 lb/in²(PSI).
 - [L1] - When the engine bleed valve is selected **OFF**
 - In case of bleed overtemperature.
- [L3] The temperature downstream of the bleed valve exceeds:
 - 260 °C, with a bleed pressure lower or equal to 45 lb/in²(PSI), during more than 55 s
 - 245 °C, with a bleed pressure greater than 45 lb/in²(PSI), during more than 55 s.

When the HP valve is open, a pressure non-return valve prevents air from the HP stage of the compressor from circulating to the IP stage. This non-return valve is mounted downstream of the IP stage of the compressor.

PRESSURE REGULATION

For each engine, the engine bleed valve regulates the delivered bleed pressure. This valve can also close, and isolate its applicable engine bleed system.

- [L3] It is located downstream of the IP and HP bleed junction.
 - [L2] This valve maintains the bleed supply pressure at about 40 PSI, to obtain a 30 PSI pack inlet pressure.
- The pressure depends on the bleed airflow. The engine bleed valve regulates the airflow, to balance the pressure of the air bled from the two engines that are on the same side.
- [L3] In case pressure regulation fails, an OverPressure Valve (OPV) protects the bleed system. This valve automatically closes, if the bleed pressure downstream of the engine bleed valve exceeds 85 PSI. It automatically opens again, when pressure goes below 55 PSI.

ENGINE BLEED VALVE OPERATION

Each engine bleed valve automatically operates, when its associated engine is running. If necessary, each engine bleed valve can be manually-closed, by setting the assigned ENG BLEED pb-sw to **OFF**.

Additionally, the four engine bleed valves automatically close, when the APU BLEED pb-sw is set to ON.

L2 Automatic Opening

The engine bleed valve automatically opens when the associated engine bleed is available.

The engine bleed valve then regulates the engine bleed air pressure.

L3 The valve opens, when the upstream pressure is greater than 15 PSI.

L2 Automatic Closure

The engine bleed valve automatically closes:

- When the associated engine bleed pressure is too low.

L3 The upstream pressure is less than 15 PSI.

L2 - During the start sequence of the associated engine.

L3 It opens again, when the engine start valve closes, and the upstream pressure is greater than 15 PSI.

L2 - In case the associated ENG FIRE pb is pressed.

- In case of associated bleed malfunctions:

- Bleed air overpressure

L3 The pressure downstream of the bleed valve exceeds:

■ 60 PSI, with a bleed temperature lower or equal to 245 °C, during more than 15 s.

■ 45 PSI, with a bleed temperature greater than 245 °C, during more than 15 s.

L2 • Bleed air overtemperature

L3 The temperature downstream of the bleed valve exceeds:

■ 260 °C, with a bleed pressure lower or equal to 45 PSI, during more than 55 s.

■ 245 °C, with a bleed pressure greater than 45 PSI, during more than 55 s.

L2 • A leak detection in the surrounding area

L3 A leak is detected in the associated pylon or wing area.

TEMPERATURE REGULATION

A precooler regulates the temperature of each engine bleed.

L3 The precooler is an air-to-air heat exchanger, mounted downstream of the engine bleed valve. It uses cooling air, that is bled from the engine fan. A fan air valve regulates the airflow. The fan air valve closes, when there is no bleed pressure.

L2 To obtain the selected temperature in the cabin zones, the precooler regulates bleed air temperature to approximately 200 °C.

However, depending on the demand, the bleed air temperature can be regulated down to 150 °C, provided that wing anti-ice is off.



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36 - BLEED AIR

SYSTEM DESCRIPTION - ENGINE BLEED AIR SYSTEM

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36 - BLEED AIR

SYSTEM DESCRIPTION - APU BLEED AIR SUPPLY

APU BLEED AIR

Applicable to: ALL

The APU also provides bleed air to the bleed system, via the APU bleed valve, and the APU isolation valve.

The APU isolation valve operates simultaneously with the APU bleed valve.

L3 These valves are not pressure-regulating valves, since the APU runs at a constant speed.

L1 The APU can supply bleed air to replace engine bleed air:

- On ground, without any restriction
- In flight, up to 22 500 ft , when the aircraft speed is below MACH 0.56 (*Refer to LIM-49-20 Operational Envelope*).

L3 A non-return valve, located near the crossbleed duct, protects the APU when air is bled from another source.

APU BLEED VALVE OPERATION

When the APU BLEED pb-sw is set to ON , provided that the APU is running, and that the aircraft is at or below 22 500 ft , with a speed below MACH 0.56:

- The APU bleed valve opens
- All crossbleed valves open
- All engine bleed valves close.

In the case of an APU bleed leak, or if the APU FIRE pb is pressed, the APU bleed valve will close automatically.



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SYSTEM DESCRIPTION - APU BLEED AIR SUPPLY

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36 - BLEED AIR

SYSTEM DESCRIPTION - HP GROUND AIR SUPPLY

HP GROUND AIR

Applicable to: ALL

There are three HP ground connectors. An HP ground source can be connected to each HP ground connector, to supply bleed air to the aircraft.

- These HP ground connectors are on the belly fairing.
- Each connector has a non-return valve, that protects the connector, when air is bled from another source.
- When anyone of the HP ground sources is connected, all systems can receive bleed air.

Note: An HP ground source can be used for air conditioning, provided the air supply is free of oil contamination.



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AIRCRAFT SYSTEMS

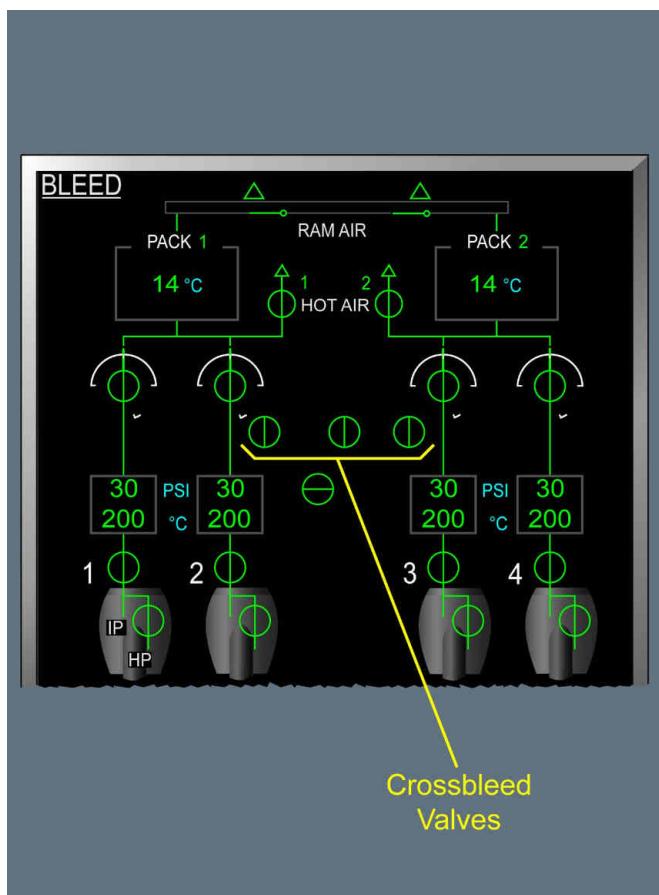
36 - BLEED AIR

SYSTEM DESCRIPTION - HP GROUND AIR SUPPLY

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CROSSBLEED

Applicable to: ALL

Crossbleed Valves

A crossbleed duct interconnects the LH and the RH bleed supply systems. This duct has three crossbleed valves, that can isolate or interconnect the various air supply systems:

- The center crossbleed valve interconnects the LH and the RH bleed systems.
- The LH (respectively RH) crossbleed valve interconnects the bleed systems of engines 1 and 2 (respectively 3 and 4).

All these valves are normally closed. They open automatically, and at the same time:

- On ground, at engine start
- When the APU bleed valve is selected open
- In case any engine bleed system fails.

All crossbleed valves can be manually-opened at the same time, when the XBLEED selector is set to OPEN.

In the case of an engine leak: The affected engine bleed duct is isolated, by maintaining the appropriate crossbleed valves closed, provided that the XBLEED selector position is at AUTO (*Refer to DSC-36-10-60-10 Leak Detection*).

LEAK DETECTION

Applicable to: ALL

LEAK DETECTION

On ground and in flight, dual detection loops provide leak detection for the bleed ducts of the:

- Engines
- [L2] These ducts are located in the engine pylons.
- [L1] - Outer and inner wings
- APU
- Pack bays
- Air conditioning hot-air system.

[L2] The presence of hot air near the ducts indicates a leak in the bleed ducts.

[L1] Bleed leak detection is monitored by two bleed leak detection systems (1 and 2).

[L3] For each dual loop:

- One is connected to the bleed leak detection system 1.
- The other is connected to the bleed leak detection system 2.

Each bleed leak detection system monitors the bleed overheats detected by its connected loops, and transmit it to the ECAM.

[L2] The ECAM will trigger an overheat alert, in case:

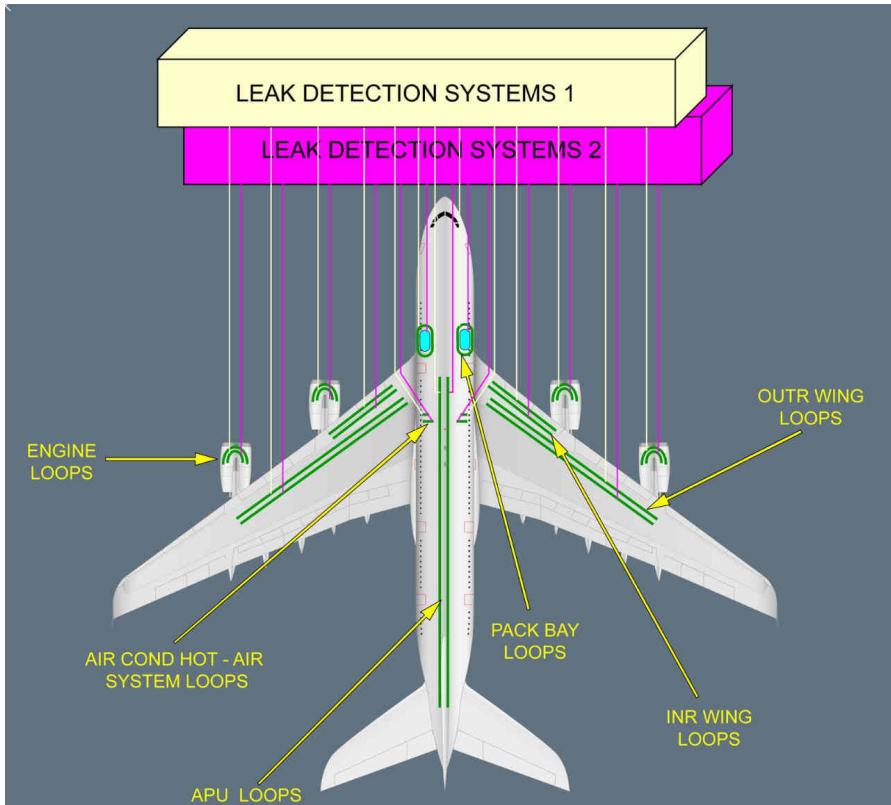
- Both loops detect an ambient overheat, or
- One loop detects an ambient overheat, and the other one is inoperative.

[L3] An overheat is detected, when the ambient temperature near the bleed ducts is above:

- 180 deg C for the engine pylon ducts
- 124 deg C for all other ducts.

[L1] If a leak is detected, the affected bleed duct is automatically isolated:

- When an engine or a wing bleed duct is affected, the applicable bleed source is closed, and the crossbleed valves are closed, as appropriate.
- When the APU bleed duct is affected, APU bleed source is closed.
- When pack bays or air-conditioning hot air systems are affected, the applicable pack valves or hot-air valves close.

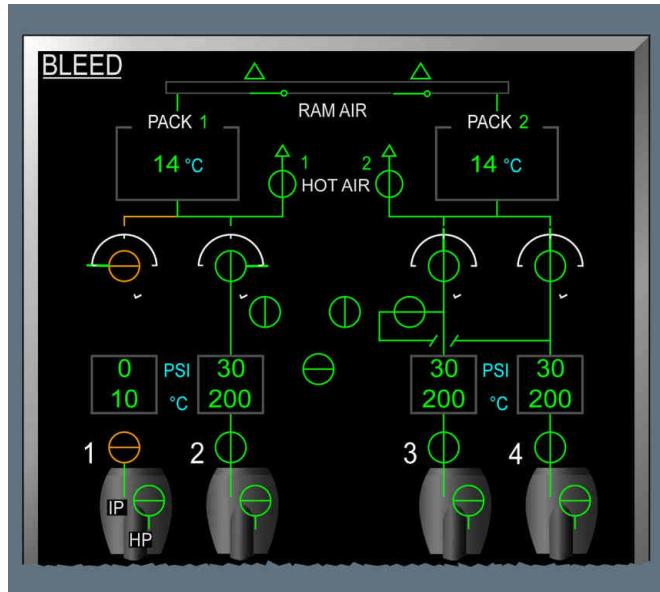
Leak Detection**⑫ OUTER WING AND ENGINE BLEED LEAKS**

If a leak is detected on an outer engine bleed duct, or on an outer wing, the following valves automatically close, provided that the XBLEED selector position is at AUTO:

- The associated engine bleed valve
- The crossbleed valve on the side of the affected engine
- The center crossbleed valve
- The associated pack valve

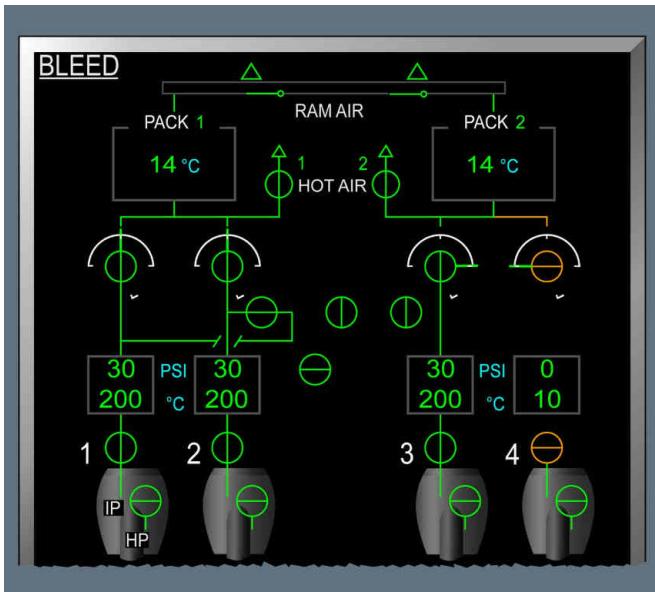
Therefore, if a leak is detected on the engine 1 bleed duct, or on the left outer wing:

- Bleed from the engine 2, 3 and 4, is available
- APU bleed is not available.

Left Outer Wing and Engine 1 Bleed Leak

If a leak is detected on the engine 4 bleed duct, or on the right outer wing:

- Bleed from the engine 1, 2, and 3, is available
- APU bleed remains available for the pack 1.

Right Outer Wing and Engine 4 Bleed Leak

For more information on the associated ECAM procedures: Refer to PRO-ABN-ECAM-10-36-80 AIR L(R) OUTR WING LEAK/ENG 1(4) BLEED LEAK .

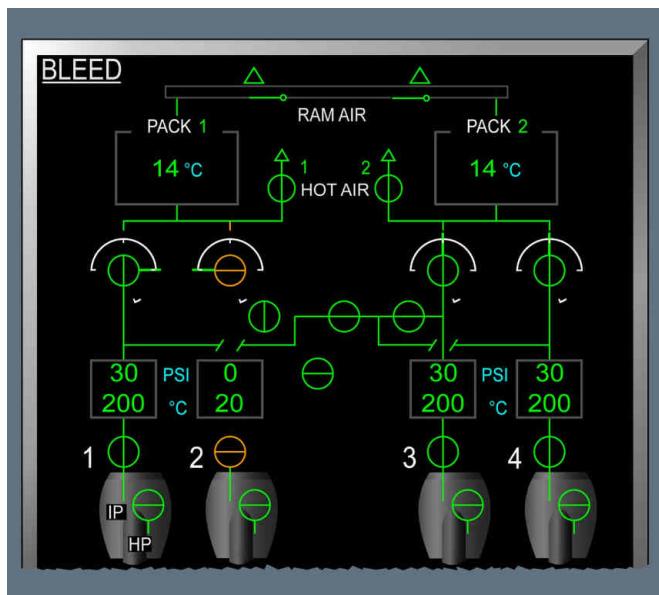
INNER WING AND ENGINE BLEED LEAKS

If a leak is detected on an inner engine, the following valves automatically close:

- The associated engine bleed valve
- The crossbleed valve on the side of the affected engine
- The associated pack valve.

Therefore, if a leak is detected on the engine 2 bleed duct, or on the left inner wing:

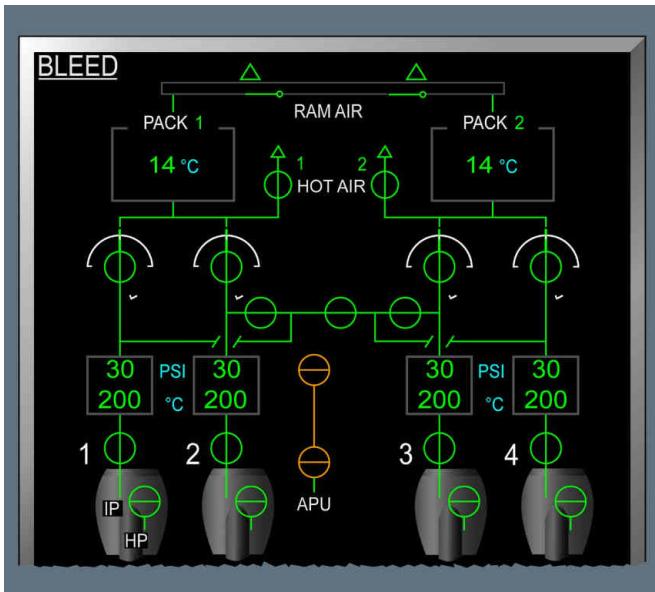
- Bleed from the engine 1, 3 and 4, is available
- APU bleed is available.

Engine 2 Bleed Leak

For more information on the associated ECAM procedures: *Refer to PRO-ABN-ECAM-10-36-90 AIR L(R) INR WING LEAK/ENG 2(3) BLEED LEAK.*

APU BLEED LEAK

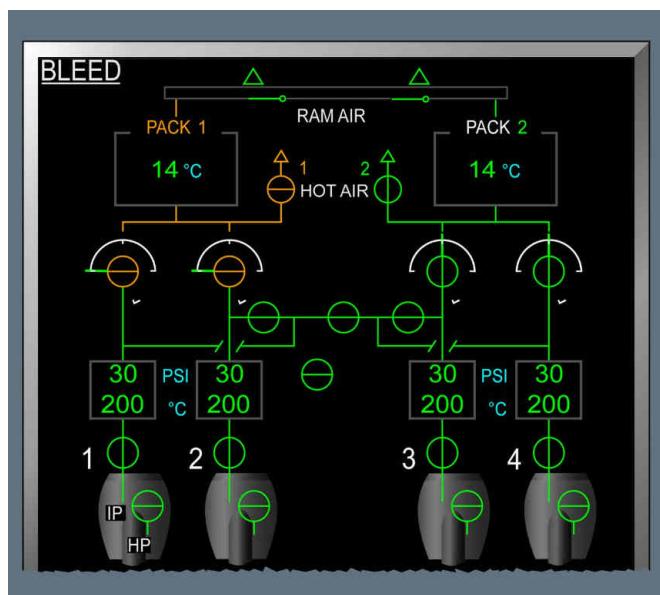
If a bleed leak is detected in the APU bleed ducts, the APU bleed valve, and the APU isolation valve automatically close. APU bleed is no longer available.

APU Bleed Leak

Refer to PRO-ABN-ECAM-10-36-100 AIR APU BLEED LEAK.

[2] PACK LEAKS

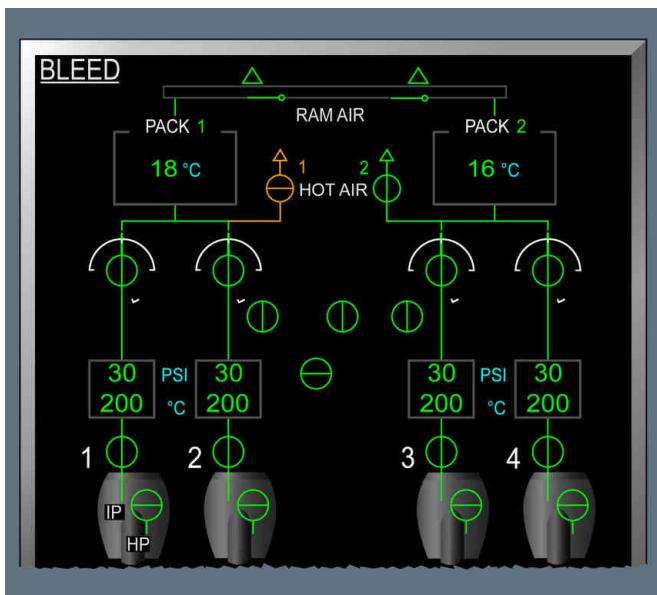
If a leak is detected in a pack bay area, the two pack valves of the affected pack and the corresponding hot-air valve automatically close.

Bleed Leak on PACK 1

Refer to PRO-ABN-ECAM-10-36-110 AIR PACK 1(2) LEAK.

L2 HOT-AIR LEAKS

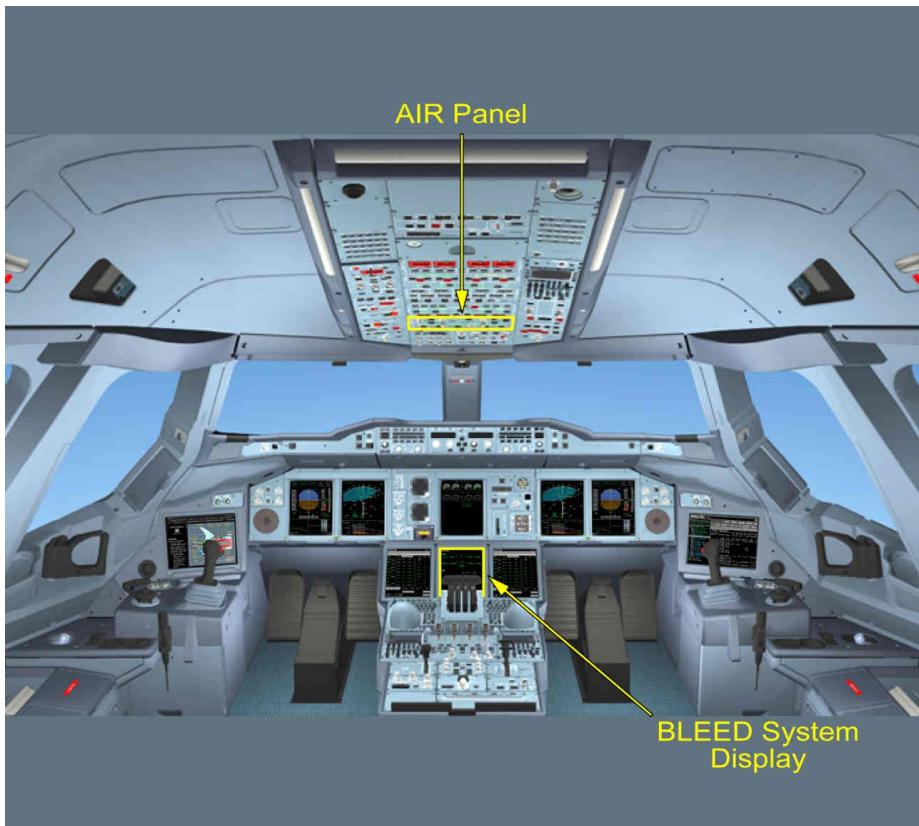
If a leak is detected on one of the hot-air ducts of the air conditioning hot-air system, the corresponding hot-air valve automatically closes.

Hot Air 1 Bleed Leak

Refer to PRO-ABN-ECAM-10-36-120 AIR HOT AIR 1(2) LEAK

COCKPIT VIEW

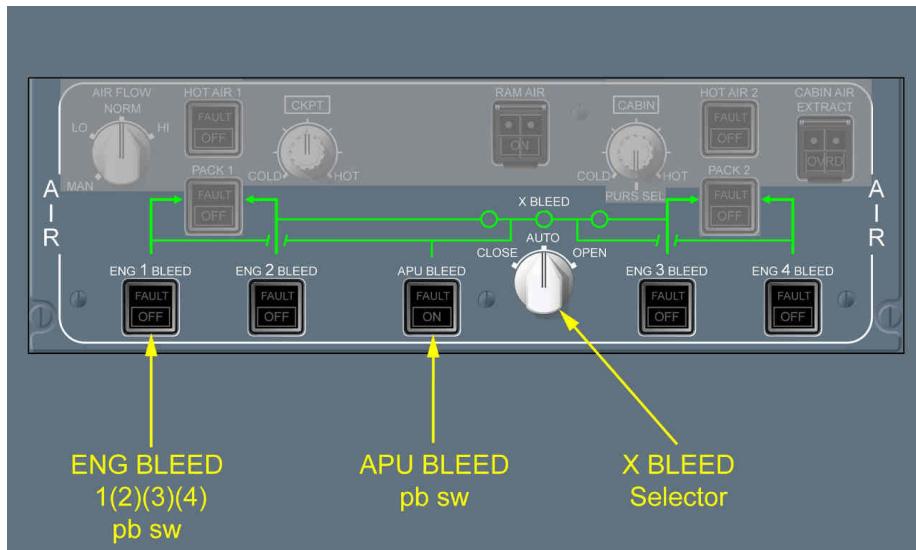
Applicable to: ALL

Cockpit View

AIR PANEL

Applicable to: ALL

AIR Panel

**ENG 1(2)(3)(4) BLEED pb-sw**

The engine bleed valve is automatically-controlled.



The engine bleed valve is closed.



- L12
- The engine bleed position disagrees with the requested position, or
 - An overpressure is detected, or
 - An engine bleed overheat is detected.

Associated with the following ECAM alerts:

AIR ENG 1(2)(3)(4) BLEED FAULT (Refer to procedure)

- A leak is detected in the applicable engine or inner (outer) wing.

- [L2] Associated with the following ECAM alerts:

AIR L (R) INR WING LEAK (*Refer to procedure*)
AIR L (R) OUTR WING LEAK (*Refer to procedure*)
AIR ENG 1(4) BLEED LEAK (*Refer to procedure*)
AIR ENG 2(3) BLEED LEAK (*Refer to procedure*)

- [L1] The FAULT light goes off, when the flight crew selects **OFF**, and the applicable failure disappears.

APU BLEED pb-sw



The APU bleed valve is closed.



The APU bleed valve is open, provided that:

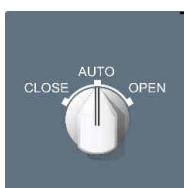
- The APU is running
- The aircraft altitude is below 22 500 ft
- No APU leak is detected.



The ECAM detects an APU bleed leak

- [L2] Associated with the following ECAM alerts:
- AIR APU BLEED LEAK (*Refer to procedure*)

X BLEED selector



The crossbleed valves are automatically-controlled.



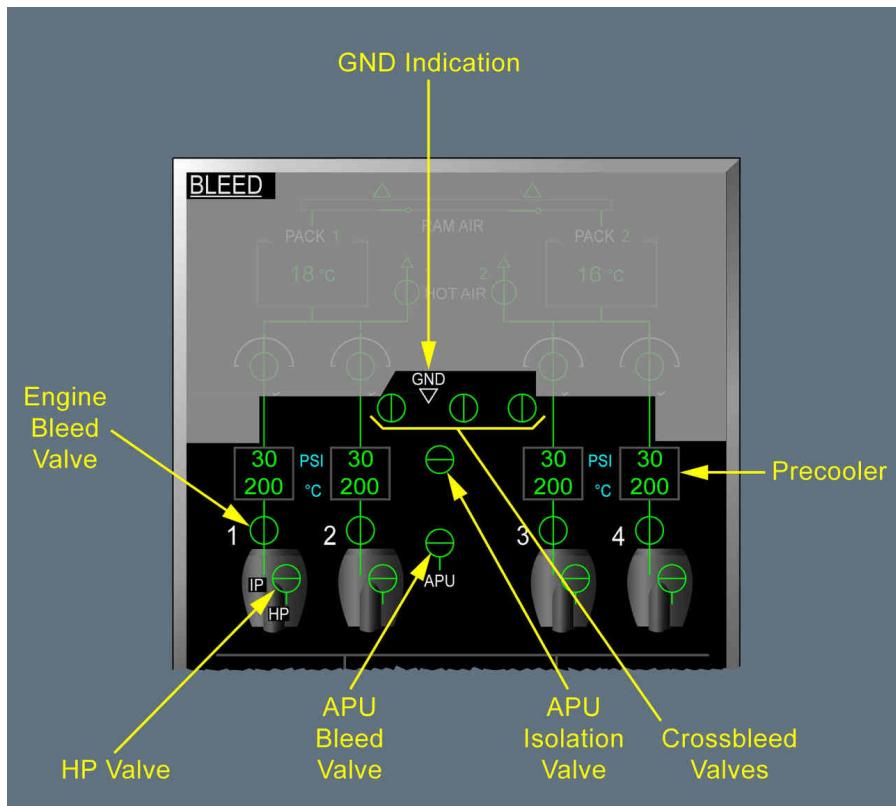
The three crossbleed valves are closed.

The three crossbleed valves are opened.



BLEED SYSTEM DISPLAY

Applicable to: ALL

BLEED SYSTEM DISPLAYBLEED System Display**HP VALVE**

The HP valve is closed.



The HP valve is open.



The HP valve is abnormally open.



- The HP valve is abnormally closed, or
- The HP valve is closed, and the assigned engine is not running.

ENGINE BLEED VALVES



The engine bleed valve is open.



The engine bleed valve is closed.



The engine bleed valve is abnormally open.



- The engine bleed valve is abnormally closed, or
- The HP valve is closed, and the assigned engine is not running.

APU BLEED VALVE

Appears only if APU pb-sw is ON.



The APU bleed valve is closed.



The APU bleed valve is open.



The APU bleed valve is abnormally open, and the APU BLEED pb-sw is ON.

The APU bleed valve is abnormally closed, and the APU BLEED pb-sw is ON.



The APU bleed valve is in transit.

APU ISOLATION VALVE



The APU isolation valve is open.



The APU isolation valve is closed.



The APU isolation valve is abnormally open.

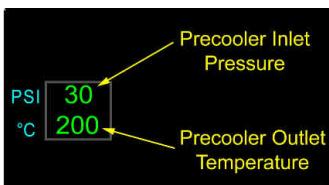


The APU isolation valve is abnormally closed.



The APU isolation valve is in transit (opening or closing).

PRECOOLER



The precooler inlet pressure is normal.

PSI 80

The precooler inlet pressure is abnormal.

°C 200

The precooler outlet temperature is normal.

°C 280

The precooler outlet temperature is abnormal.

CROSSBLEED VALVES

The crossbleed valve is open.



The crossbleed valve is closed.



The crossbleed valve is abnormally open.



The crossbleed valve is abnormally closed.

GND INDICATION

L13



Indicates that it is possible to connect the HP ground air supply.
It appears on ground only (main landing gear compressed), and aircraft speed is less than 50 kt.



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36 - BLEED AIR

ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

AIR ABNORM BLEED CONFIG (*Refer to procedure*)

AIR APU BLEED FAULT (*Refer to procedure*)

AIR APU BLEED LEAK (*Refer to procedure*)

AIR BLEED LEAK (*Refer to procedure*)

AIR BLEED TEMP LO (*Refer to procedure*)

AIR ENG 1(2)(3)(4) BLEED FAULT (*Refer to procedure*)

AIR ENG 1(2)(3)(4) BLEED NOT CLOSED (*Refer to procedure*)

AIR ENG 1(2)(3)(4) BLEED OFF (*Refer to procedure*)

AIR ENG 1(2)(3)(4) HP VLV NOT OPEN (*Refer to procedure*)

AIR ENG BLEED TEMP LO (*Refer to procedure*)

AIR FWD CARGO DUCT LEAK (*Refer to procedure*)

AIR HOT AIR 1(2) LEAK (*Refer to procedure*)

AIR L (R) OUTR WING LEAK / ENG 1(4) BLEED LEAK (*Refer to procedure*)

AIR L (R) INR WING LEAK / ENG 2(3) BLEED LEAK (*Refer to procedure*)

AIR LEAK DET FAULT (*Refer to procedure*)

AIR PACK 1(2) LEAK (*Refer to procedure*)

AIR X BLEED FAULT (*Refer to procedure*)



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36 - BLEED AIR

ECAM ALERTS

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36 - BLEED AIR

ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Subsystem | Electrical Supply |
|---------------------|-------------------------|-------------------|
| Engine Bleed Valves | Bleed valve 1 and 2 | DC 1 or DC ESS |
| | Bleed valve 3 and 4 | DC 2 or DC ESS |
| HP valves | HP Valve 1 and 2 | DC 1 or DC ESS |
| | HP Valve 1 and 4 | DC 1 or DC ESS |
| X BLEED | Left crossbleed valve | DC 2 or DC ESS |
| | Center crossbleed valve | |
| | Right crossbleed valve | |
| Leak Detection | OHDU 1 | DC 2 or DC ESS |
| | OHDU 2 | |
| APU Bleed | APU Isolation Valve | DC 2 or DC ESS |
| | APU Bleed valve | DC 1 or DC ESS |



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ELECTRICAL SUPPLY

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38 - WATER/WASTE

SYSTEM DESCRIPTION

OVERVIEW

Applicable to: ALL

The water/waste system has the following three main subsystems:

- The potable water system, to supply potable water to the lavatories and galleys.
- The wastewater system, to drain overboard the wastewater from the lavatories, washbasins, and galleys.
- The vacuum toilet system, to drain the waste from the toilets.

On the aircraft:

- The potable water is stored in potable water tanks.
- The toilet waste is stored in the waste storage tanks.

In flight, the cabin crew uses the FAP to control and monitor the waste/water system.

③ On ground, the ground handling personnel supply the aircraft with potable water and perform waste servicing from:

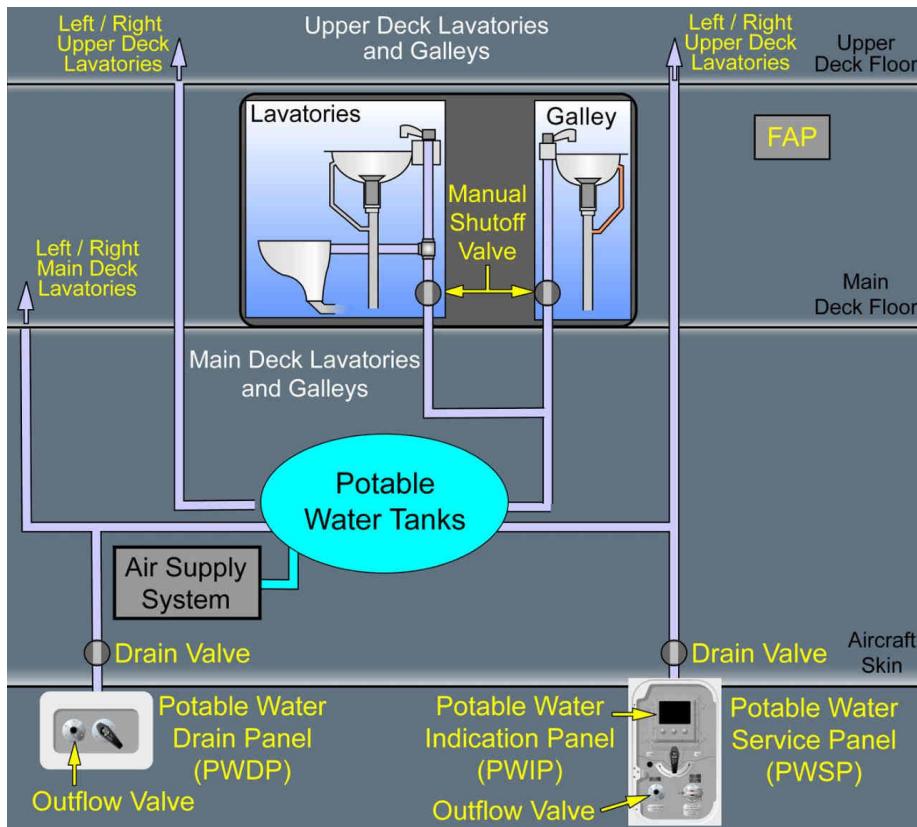
- The Potable Water Service Panel (PWSP)
- The Potable Water Drain Panel (PWDP)
- The waste service panel.

POTABLE WATER SYSTEM

Applicable to: ALL

The potable water system supplies potable water from the potable water tanks to:

- The lavatories and the galleys
- The toilets for flushing.

Potable Water System

[3] There is an air supply system that supplies pressurized air to the potable water system. This pressurized air forces the potable water to flow from the potable water tanks to the lavatories and galleys.

The potable water tanks are above the landing gear bay, on the left and right sides of the forward area of the aft cargo.

On ground, the ground handling personnel refills the potable water tanks.

The quantity of water to be added to the potable water tanks can either be preselected by:

- The cabin crew from the FAP, or
- The ground handling personnel from the Potable Water Indication Panel (PWIP).



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SYSTEM DESCRIPTION

When the quantity of water is preselected, the ground handling personnel must fill the potable water tanks from the PWSP only.

On ground, the potable water tanks and pipes are drained via two drain valves and two outflow valves, when required:

- A drain valve is used to drain the forward water pipes through an outflow valve on the PWDP.
- Another drain valve is used to drain the water tanks and the aft water pipes through an outflow valve on the PWSP.

If required, the cabin crew can isolate the galley, the water faucet, and the toilet, from the potable water supply, by using a manual shutoff valve.

There is a shutoff valve in each galley and behind the access door, that is under the washbasins in each lavatory.

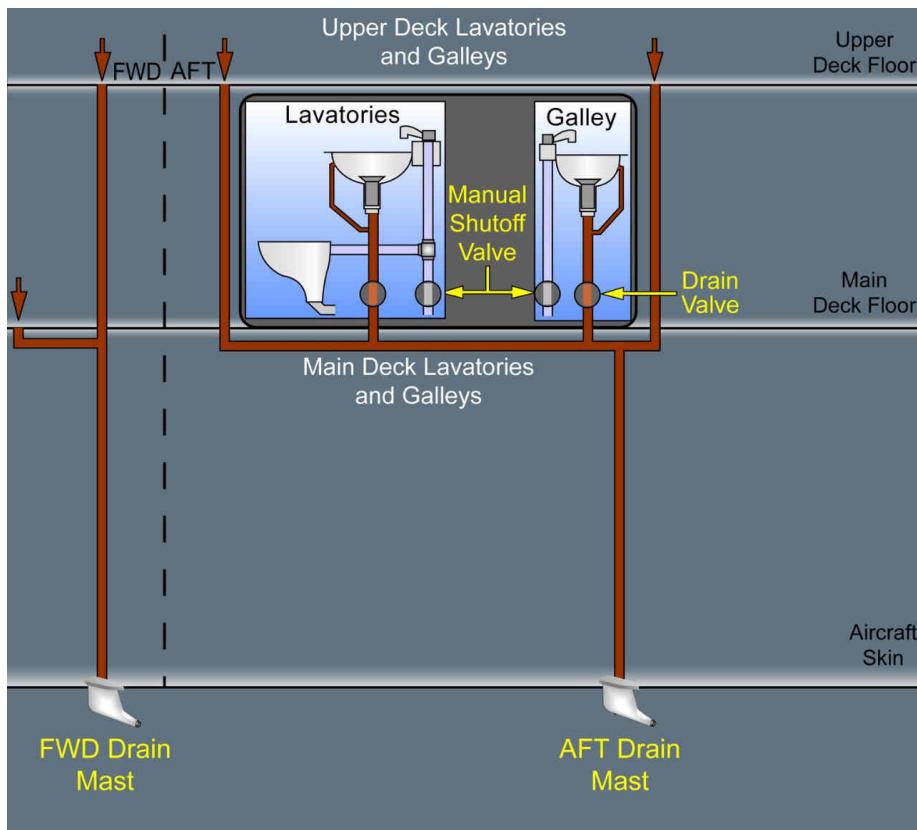
WASTEWATER SYSTEM

Applicable to: ALL

The wastewater system drains the wastewater from the sinks in the galleys and from the washbasins in the lavatories overboard through two heated drain masts.

Wastewater is drained overboard due to:

- Differential pressure, when the aircraft is in flight<
- Gravity, when the aircraft is on ground.

Wastewater System

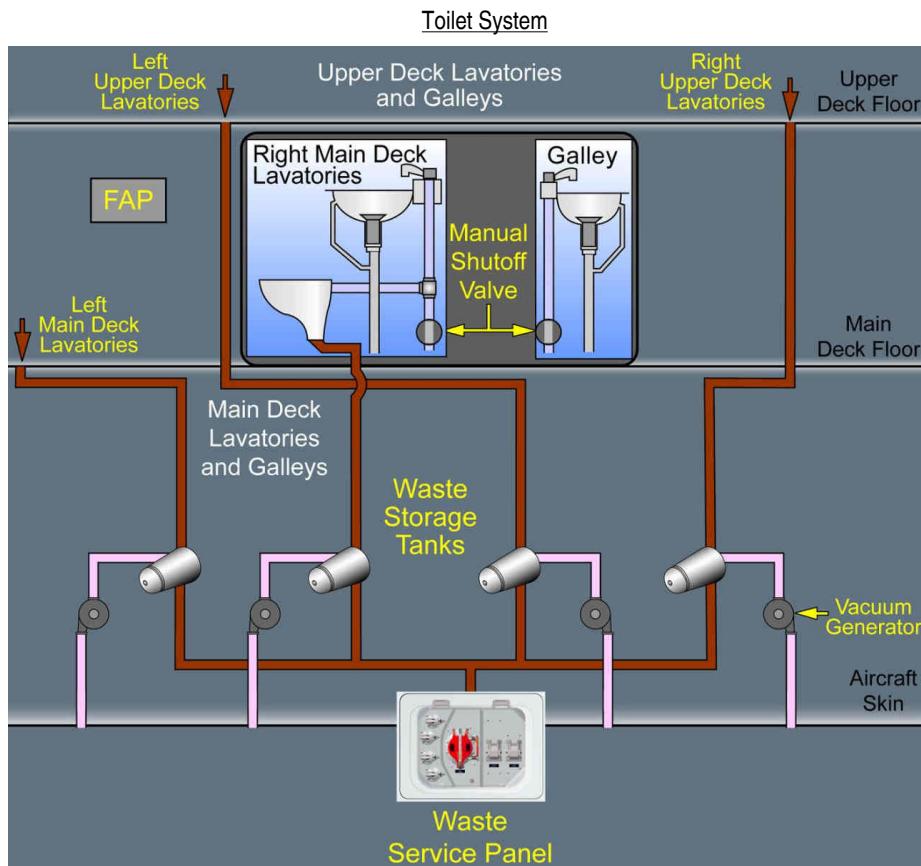
In the wastewater system, each lavatory and galley drain pipes have a drain valve that prevents cabin air from leaking through the drain mast.

TOILET SYSTEM

Applicable to: ALL

The aircraft has a vacuum toilet system for the toilets of the main and upper deck and the waste storage tanks.

- The waste storage tanks are behind the bulk cargo compartment.
- The vacuum toilet system uses potable water to flush the toilets.



- In flight, differential pressure, between the cabin air and the ambient air, forces waste from the toilet into the waste storage tanks.
- On ground, and below 16 000 ft, each waste storage tank has a vacuum generator that provides the necessary pressure difference.

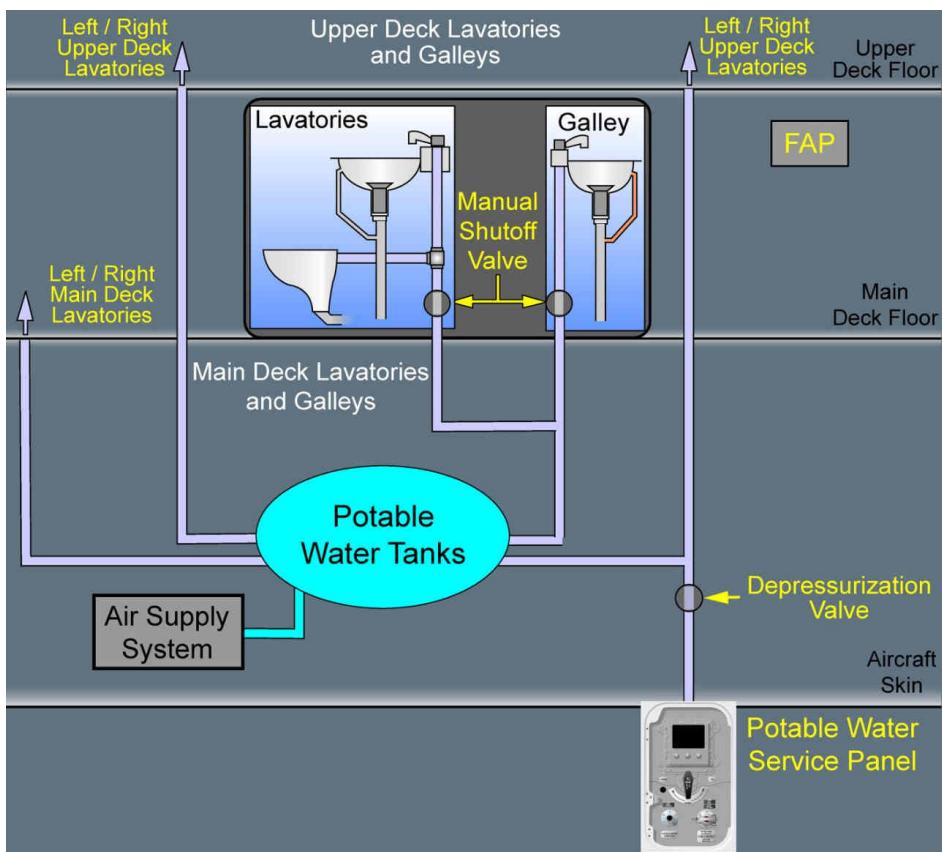
Each lavatory has a manual shutoff valve. The cabin crew can use the manual shutoff valve to isolate an inoperative toilet from the potable water supply.

- L3** On ground, ground handling personnel performs waste servicing of the waste storage tanks from the waste service panel.

AIR SUPPLY SYSTEM**Applicable to: ALL**

The air supply system:

- Supplies pressurized air to the potable water system, in order to provide potable water from potable water tanks to the cabin.
- [L3] The normal operating pressure of the potable water system is between 35 PSI (2.41 bar) and 41 PSI (2.83 bar).
- [L2]- Depressurizes the potable water system in order, to shut it down.
If there is a leak in the air supply system in flight, the cabin crew can depressurize and shut down the potable water system via the FAP. This will open a depressurization valve and release the pressure overboard through a vent. The water in the pipes then flows back to the water tanks and the potable water system shuts down.

Air Supply System



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SYSTEM DESCRIPTION

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ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Subsystem | Electrical Supply |
|------------|------------------------|-------------------|
| Toilet | Vacuum Generator | AC 1 |
| Air Supply | Air-Compressor | AC 4 |
| | Depressurization Valve | DC 2 |



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OVERVIEW**Applicable to: ALL**

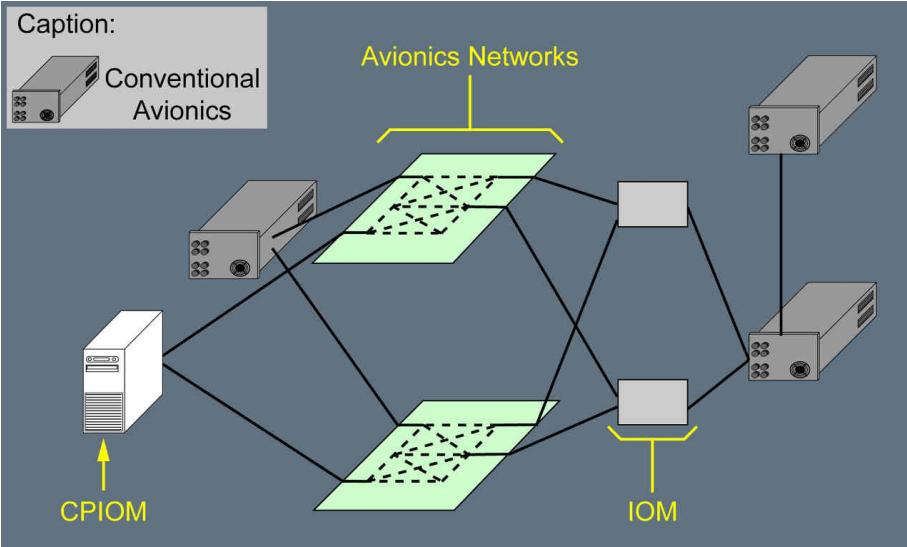
Instead of conventional cabling, some aircraft systems communicate with each other via two avionics networks.

The aircraft systems are monitored and controlled by:

- Conventional avionics, with computers that are assigned to specific systems, or
- Core Processing Input/Output Modules (CPIOMs), with computers that are assigned to several systems.

The Input/Output Modules (IOMs) are an interface between some conventional avionics, and the avionics networks.

The CPIOMs, and the IOMs are directly connected to the avionics networks.

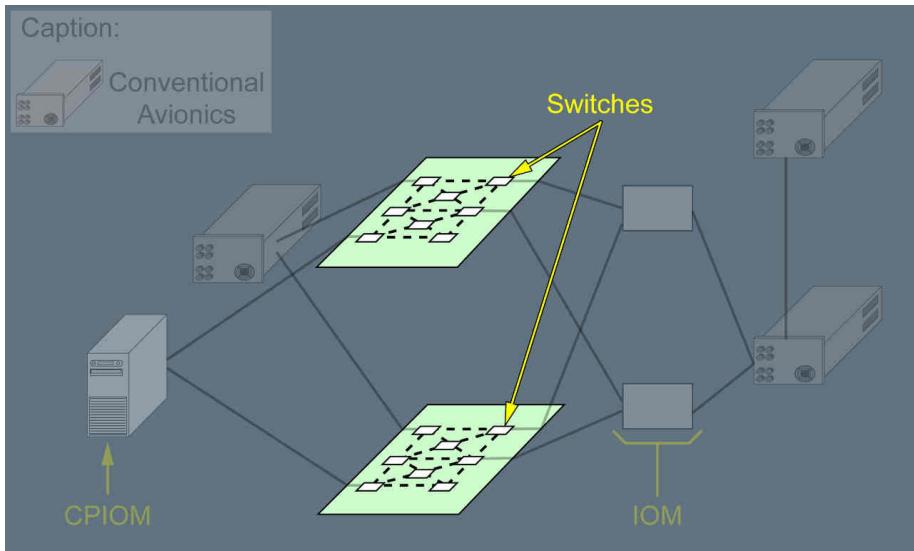
Avionics Network**AVIONICS NETWORKS****Applicable to: ALL**

There are two independent, identical, and redundant avionics networks. The aircraft systems are connected to both of these networks.

The information that comes from the aircraft systems is transmitted to the avionics networks via several transit points, referred to as switches.

Note: Some aircraft systems can communicate with each other via conventional cabling, independently of the avionics networks, to ensure that some communication remains possible, in case of a failure of both avionics networks.

Avionics Networks



Switches automatically manage the communication between the aircraft systems, through the avionics network:

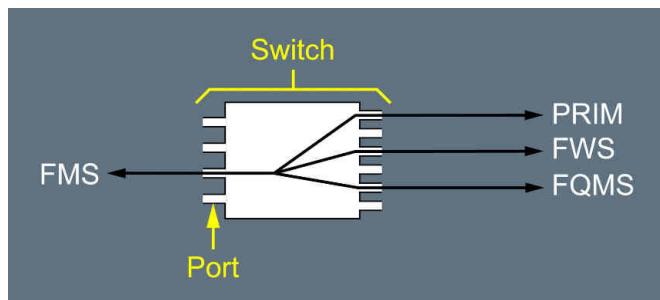
- They connect the aircraft systems to the network
- They route the information that is exchanged between the applicable aircraft systems.

I2 There is a total of 16 switches: 8 switches for each avionics network.

I1 Each switch on one avionics network is paired with a specific switch on the other avionics network. However, the switches of one avionics network are not connected to the switches of the other avionics network.

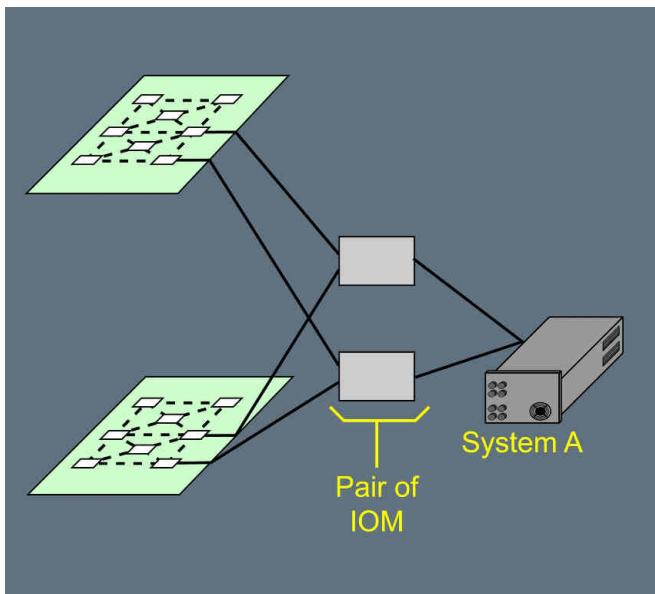
On each avionics network, there are cables that connect the switches to one another. The cables also connect these switches to the applicable aircraft systems.

I3 The switches transmit information to the applicable aircraft systems via several ports.

Information Transmission Example**IOMS****Applicable to: ALL**

The IOMs are grouped in pairs. Each avionics system that uses IOMs is connected to a pair of IOMs, to ensure redundancy. The IOMs in each pair interface with both avionics networks.

- There are four pairs of IOMs.
- The IOMs transform data signals from a specific format (e.g. ARINC 429, discrete signals) into data signals that are compatible with the avionics networks, and vice versa.

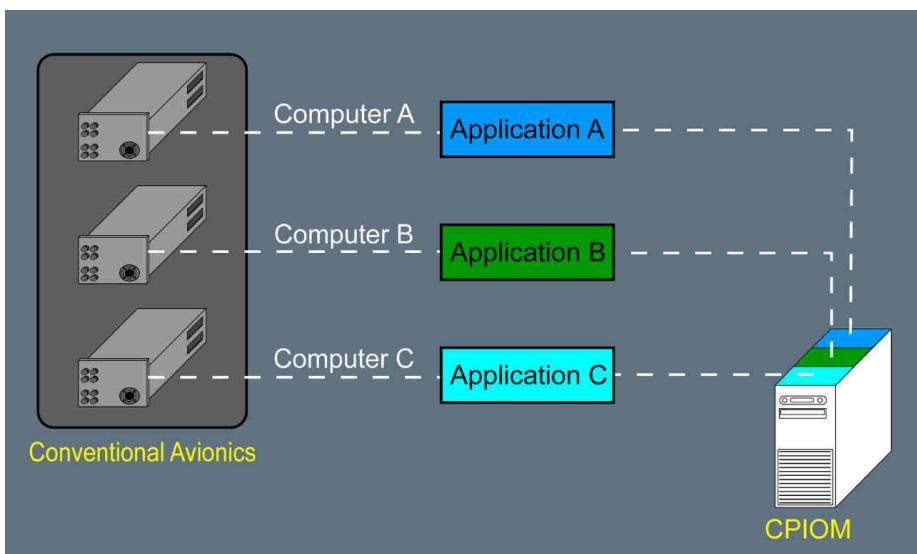
IOMs**CPIOMS****Applicable to: ALL**

The CPIOMs host several applications, in order to monitor and control some aircraft systems.

The CPIOMs transmit signals compatible with:

- The avionics networks, and
- The conventional avionics.

One CPIOM replaces several conventional avionics computers.

CPIOMs

L3 There are 7 CPIOM groups.

CPIOM A has four units that monitor and control the following aircraft systems:

- Bleed air
- Pneumatics air distribution
- Overheat detection

CPIOM B has four units that monitor and control the following aircraft systems:

- Cabin pressure
- Cabin and avionics ventilation control
- Air generation and temperature control.

CPIOM C has two units that monitor and control the following aircraft systems:

- Flight warning
- Flight control unit backup
- Weight and balance backup computation
- Flight control data concentrator.

CPIOM D has two units that monitor and control the following aircraft systems:

- Air traffic communication
- Avionics communication router (Datalink).

CPIOM E has two units that monitor and control the following aircraft systems:

- Electrical load management
- Circuit breaker monitoring
- Electrical system BITE.

CPIOM F has four units that monitor and control the following aircraft systems:

- Fuel management
- Fuel measurement.

CPIOM G has four units that monitor and control the following aircraft systems:

- Braking
- Steering
- Landing gear extension/extraction
- Tire pressure/oleo temperature/brake temperature monitoring system.

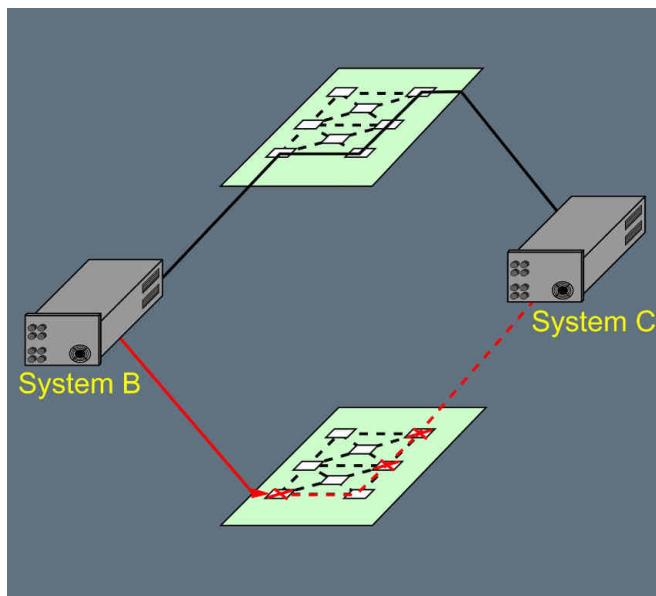
SWITCH FAILURE AFFECTING ONE NETWORK**Applicable to:** ALL

If a single or multiple switch failure affects only one avionics network, the other network will maintain communication between the aircraft systems. There is no operational impact.

- A single switch failure will trigger a message for maintenance. It is not associated with any ECAM alert.

A multiple switch failure affecting one network is associated with one of the following ECAM alerts, as applicable:

- AVIONICS NETWORK DOUBLE SWITCH FAULT (*Refer to procedure*)
- AVIONICS NETWORK MULTIPLE SWITCH FAULT (REDUNDANCY DEGRADED) (*Refer to procedure*).

Multiple Switch Failure Affecting One Network**SWITCH FAILURE AFFECTING BOTH NETWORKS****Applicable to:** ALL

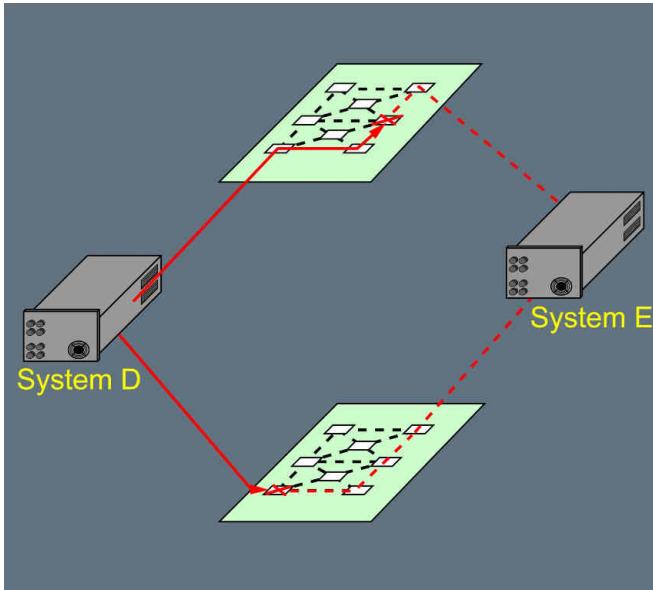
If a multiple switch failure affects both avionics networks, network communication between the systems, that communicate via these switches, will be lost.

Some connected systems may be affected, depending on what information can no longer be transmitted.

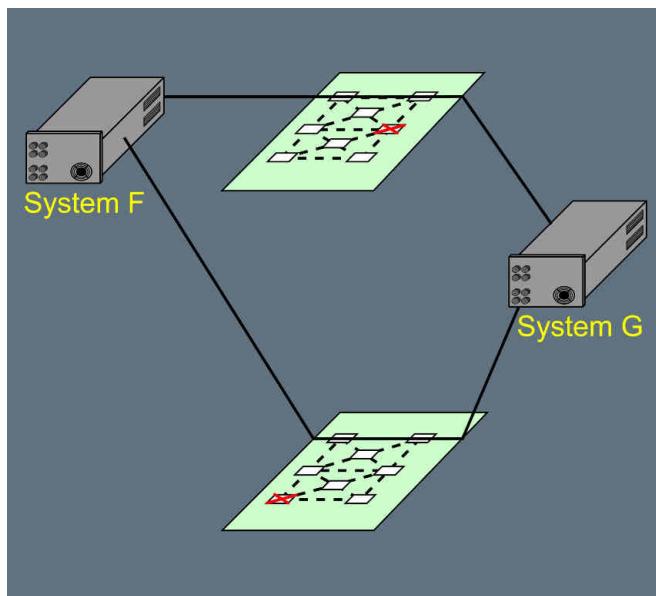
A multiple switch failure affecting both networks is associated with the following ECAM alerts:

- AVIONICS NETWORK MULTIPLE SWITCH FAULT (NETWORK DEGRADED) (*Refer to procedure*)
- AVIONICS NETWORK ALL SWITCHES FAULT (*Refer to procedure*).

Double Switch Failure Affecting Both Networks: Communication Between D and E Affected



Double Switch Failure Affecting Both Networks: Communication Between F, and G Not Affected



IOM FAILURE DEGRADING REDUNDANCY

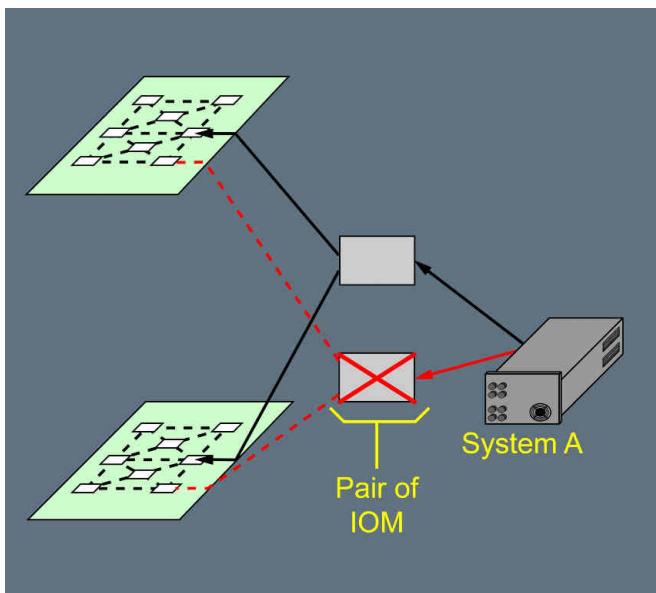
Applicable to: ALL

If only one IOM of one (or more) IOM pair(s) fails, the other IOM of the affected pair(s) will maintain communication between connected aircraft systems and avionics networks. There is no operational impact.

A single IOM failure will trigger a message for maintenance. It is not associated with any ECAM alert.

This is associated with one of the following ECAM alerts, as applicable:

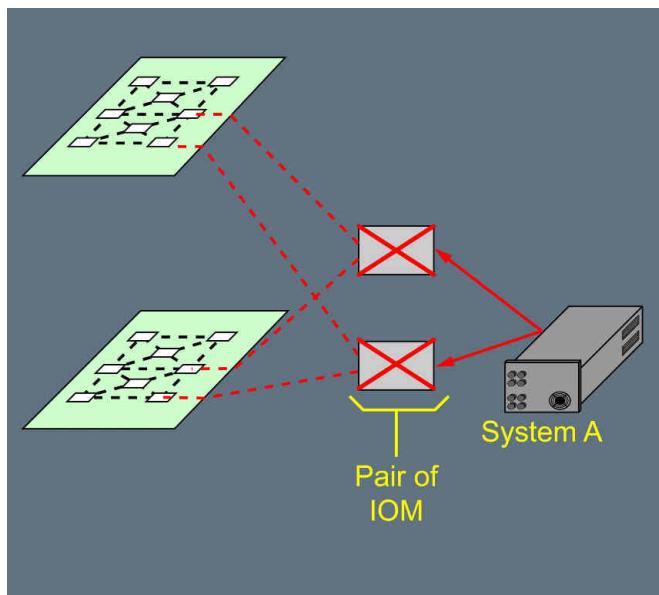
- AVIONICS NETWORK DOUBLE IOM FAULT (*Refer to procedure*)
- AVIONICS NETWORK MULTIPLE IOM FAULT (REDUNDANCY DEGRADED) (*Refer to procedure*).

Single IOM Failure**FAILURE OF A PAIR OF IOMS****Applicable to: ALL**

If one pair of IOMs fails, communication between its connected aircraft systems and both avionics networks will be lost.

This is associated with the following ECAM alert:

- AVIONICS NETWORK MULTIPLE IOM FAULT (NETWORK DEGRADED) (*Refer to procedure*).

Failure of a Pair of IOMs**CPIOM FAILURE****Applicable to: ALL**

In case of a CPIOM failure, the ECAM will not trigger a specific CPIOM alert. Aircraft systems, monitored and controlled by this failed CPIOM, may be affected. If this is the case, the ECAM will trigger the applicable system alerts.



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ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

AVIONICS NETWORK ALL SWITCHES FAULT (*Refer to procedure*)

AVIONICS NETWORK DOUBLE IOM FAULT (*Refer to procedure*)

AVIONICS NETWORK DOUBLE SWITCH FAULT (*Refer to procedure*)

AVIONICS NETWORK MULTIPLE CABLE FAULT (*Refer to procedure.*)

AVIONICS NETWORK MULTIPLE IOM FAULT
(NETWORK DEGRADED) (*Refer to procedure*)

AVIONICS NETWORK MULTIPLE IOM FAULT
(REDUNDANCY DEGRADED) (*Refer to procedure*)

AVIONICS NETWORK MULTIPLE SWITCH FAULT
(NETWORK DEGRADED) (*Refer to procedure*)

AVIONICS NETWORK MULTIPLE SWITCH FAULT
(REDUNDANCY DEGRADED) (*Refer to procedure*)



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| HEADING..... | AI |
| ICING..... | AJ |
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| LEVEL..... | AL |
| MACH..... | AM |
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| | |
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| TO..... | BN |
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System Overview

GENERAL

Applicable to: ALL

The Air Traffic Control (ATC) datalink system provides Communication, Navigation and Surveillance for Air Traffic Management (CNS/ATM) services.

The ATC datalink system is made up of several applications that the flight crew uses to communicate with the ATC center. These applications enable the air traffic controller to follow aircraft navigation, and improve air traffic.

COMMUNICATION AND NAVIGATION FOR AIR TRAFFIC MANAGEMENT

At the beginning of the flight, the flight crew initiates a connection with the air traffic controller in the ATC center by sending notification, via the ATS Facilities Notification (AFN) application.

Once the notification is sent, a connection initiated by the air traffic controller can be established between the aircraft and the ATC center. The flight crew and the controller may then exchange predefined and/or freetext messages displayed either on the ATC COM page of the MFD, or the mailbox section on the lower section of the System Display (SD).

Communication is performed by one of the following applications, depending on the type of request:

- Controller/Pilot Data Link Communication (CPDLC) application, or
- ARINC623 (A623) application, for some specific types of requests.

A Message Record application records uplink (from ground-to-air) and downlink (from air-to-ground) messages exchanged between the flight crew and the ground controller. It also provides the flight crew with the possibility to retrieve and display any recorded message.

SURVEILLANCE AND NAVIGATION FOR AIR TRAFFIC MANAGEMENT

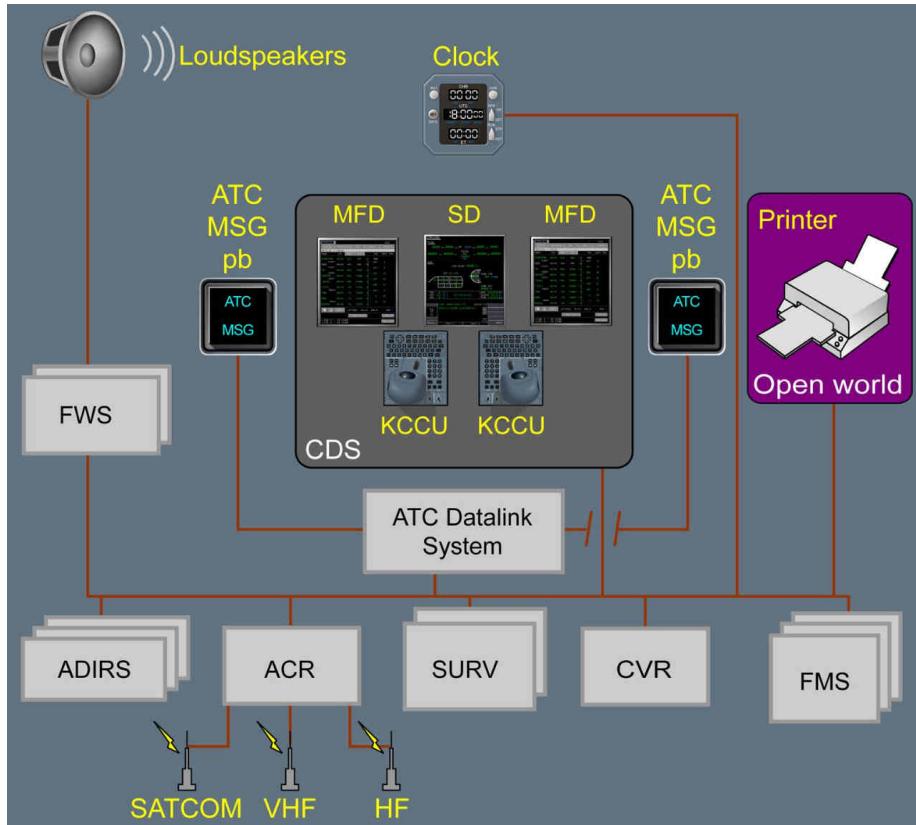
An automatic aircraft surveillance system sends aircraft position and aircraft navigation data to different ATC centers.

This system uses the Automatic Dependent Surveillance (ADS) application.

ARCHITECTURE

Applicable to: ALL

ATC Datalink System Architecture



- The ATC system is installed on CPIOM-D.

MULTI FUNCTION DISPLAY (MFD)

The MFD displays the ATC COM pages, where the flight crew creates requests, manages connection, checks history files and ATIS reports and modifies answers.

SYSTEM DISPLAY (SD)

The lower section of the SD permanently displays the mailbox, where messages exchanged between the flight crew and the air traffic controller are displayed.

- [L3] Note: ATIS and ADS messages appear on the MFD only.

KEYBOARD AND CURSOR CONTROL UNIT (KCCU)

The ATC datalink system interfaces with the two KCCUs.

The KCCU enable the flight crew to interact with the ATC datalink system, e.g. to type or select messages or requests.

The KCCU also have function keys:

- ATC COM key, to display the corresponding ATC page on the MFD, and to position the cursor on the MFD
- MAILBOX key, to position the cursor on the mailbox section of the SD
- CLEAR INFO key, to clear information messages from the message area at the bottom of the ATC COM pages.

PRINTER

The flight crew can print any message exchanged with the ATC center and that is accessible from the MFD or SD.

- [L12] Note: Each time the flight crew prints a message, they have to check that the printed message is the same as the one on the display unit.
The reference information is the information displayed on the screen.

FMS

The ATC datalink system interfaces with the three FMC s.

The ATC link with the FMS enables the flight crew to:

- Directly load a route clearance from the ATC to the secondary flight plan (SEC 3)
(Refer to DSC-22-FMS-10-40-70 Secondary Flight Plan Initialization)
- Generate a route clearance request message from the FMS secondary flight plan pages on the MFD

The flight crew then transfers the request message to the mailbox on the SD .

- Monitor a flight parameter in the FMS
The FMS displays a reminder to the flight crew when the parameter is achieved.
(Refer to DSC-46-10-10-30-50 Modify Report for more information)
- Provide FMS parameters for ADS position reporting.

L3 FWS

The ATC link with the FWS enables the flight crew to:

- Turn on the lights of the two visual attention getters ATC MSG pb, when a message is received in the mailbox, or a monitored condition is achieved
The light flashes at a frequency of 2 Hz.
Either the Captain or the First Officer can press a pushbutton to stop both visual attention-getters.
- Trigger the aural signal (Ring), when a message is received in the mailbox, or a monitored condition is achieved
There are two levels of alerts depending on the urgency of the message.
The air traffic controller assigns the urgency status of the message.
Urgent messages are repeated every 5 s, other messages are repeated every 15 s.

The aural signal stops when the flight crew:

- Presses one of the two ATC MSG pb, or
 - Treats the message in the mailbox, such as writing an answer message or printing the message.
- Inhibit the ATC MSG pb lighting and the aural signal during taxiing, takeoff, and landing.

Flight Phase Inhibition

If the aircraft receives a message during the inhibition period, the ATC center is automatically warned of the uplink message rejection.

L3 AVIONICS COMMUNICATION ROUTER (ACR)

The ACR is the system providing the communication means between the aircraft and the ground facilities. Communication may use satellite communication (SATCOM), or radio frequency (VHF or HF).

Refer to ACR Description in the Communication Chapter .

L3 CLOCK

The ATC datalink system interfaces with the clock, that provides the UTC time reference for all messages.

L3 AIR DATA AND INERTIAL REFERENCE SYSTEM (ADIRS)

The ATC link with the ADIRS provides a backup system to the clock and the FMS.

L3 SURVEILLANCE (SURV) SYSTEM

The ATC datalink system interfaces with the SURV system, that provides the TCAS status that is sent to the ATC center thanks to the ADS application.

L3 COCKPIT VOICE RECORDER (CVR)

In addition to the voice recording function, the CVR interfaces with the ATC datalink system to record exchanged data between the flight crew and the air traffic controller.



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ATS Facilities Notification (AFN)**ATS FACILITIES NOTIFICATION (AFN)**

Applicable to: ALL

The AFN application provides the Notification function.

The Notification function enables the aircraft to send notification to a given ATC center. The notification can be sent automatically by the application following a ground request, or manually by the flight crew. The ATC center is identified by its ICAO 4-letter code.

[3] Note: *The ATC centers initiate automatic notification when the aircraft crosses from one ATC area to another.*

By this notification, the aircraft sends all necessary details to the ATC center, to enable the ATC center to identify the aircraft, and to establish a CPDLC connection between the aircraft and the ATC center.

As soon as notification is sent to, and accepted by an ATC center, this center is considered as notified, and it is added to the list of notified centers. The list contains all notified centers, whether automatically or manually notified.

PILOT'S INTERFACE

The CONNECT/NOTIFICATION page of the MFD :

- Enables the flight crew to enter the ATC center to notify
- Displays a list of notified ATC centers, and the UTC time at which the notification was successful
- Provides a quick access to the CONNECTION STATUS page.

Refer to DSC-46-10-20-30-10 NOTIFICATION Page .

CONNECT/NOTIFICATION Page

Controller/Pilot Data Link Communication (CPDLC)**CONTROLLER/PILOT DATA LINK COMMUNICATION (CPDLC)****Applicable to: ALL**

As soon as an ATC center is notified, the CPDLC application enables the flight crew and the air traffic controller to communicate.

The CPDLC application performs the following functions:

- Connection Status (*Refer to DSC-46-10-10-30-10 Connection Status*)
- Max Uplink Delay (*Refer to DSC-46-10-10-30-20 Maximum Uplink Delay*)
- Request (*Refer to DSC-46-10-10-30-30 Request*)
- Position Report (*Refer to DSC-46-10-10-30-40 Position Report*)
- Modify Report (*Refer to DSC-46-10-10-30-50 Modify Report*)
- Other Reports (*Refer to DSC-46-10-10-30-60 Other reports*)
- Emergency (*Refer to DSC-46-10-10-30-70 Emergency*).

The flight crew and the air traffic controller use a set of predefined messages that are received and displayed on the ATC mailbox part of the SD (*Refer to DSC-46-10-10-70-10 Mailbox*).

 There are up to 200 messages for uplink communication and 100 for downlink communication.

 Both the flight crew and the ground controller are able to send freetext messages.

Note: When crossing from one air traffic control area to another, the CPDLC enables the air traffic controllers to proceed to an automatic transfer of ATC centers, in order to avoid initiation of a notification by the flight crew.

CONNECTION STATUS**Applicable to: ALL**

A notified ATC center can initiate a CPDLC connection with the aircraft. This center is then considered as active. There can be only one active ATC center at a given time.

While the aircraft is flying, it can change from one ATC area to another. In anticipation of this change, the next ATC center may initiate a passive connection with the aircraft. Then the next ATC center appears in the NEXT ATC field on the CONNECT/CONNECTION STATUS page.

When the change of control becomes effective, the current active ATC center ends its connection with the aircraft, and the defined next ATC center automatically becomes the active one.

PILOT'S INTERFACE

The upper part of the CONNECT/CONNECTION STATUS page displays the ICAO code of the active, and the next ATC center, if any. The page also provides the possibility to disconnect both the active and the next ATC center.

Refer to DSC-46-10-20-30-20 CONNECTION STATUS Page .

CONNECT/CONNECTION STATUS Page**MAXIMUM UPLINK DELAY**

Applicable to: ALL

The MAX UPLINK DELAY function enables the system to reject (without display to the flight crew) any CPDLC uplink messages when the delay between ground emission and onboard reception exceeds the time specified on the CONNECT/MAX UPLINK DELAY page.



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The MAX UPLINK DELAY is specified by the air traffic controller. The ground system can automatically uplink the delay value in a specific freetext message.

The flight crew is responsible for entering the uplink value in the system, through the CONNECT/MAX UPLINK DELAY page.

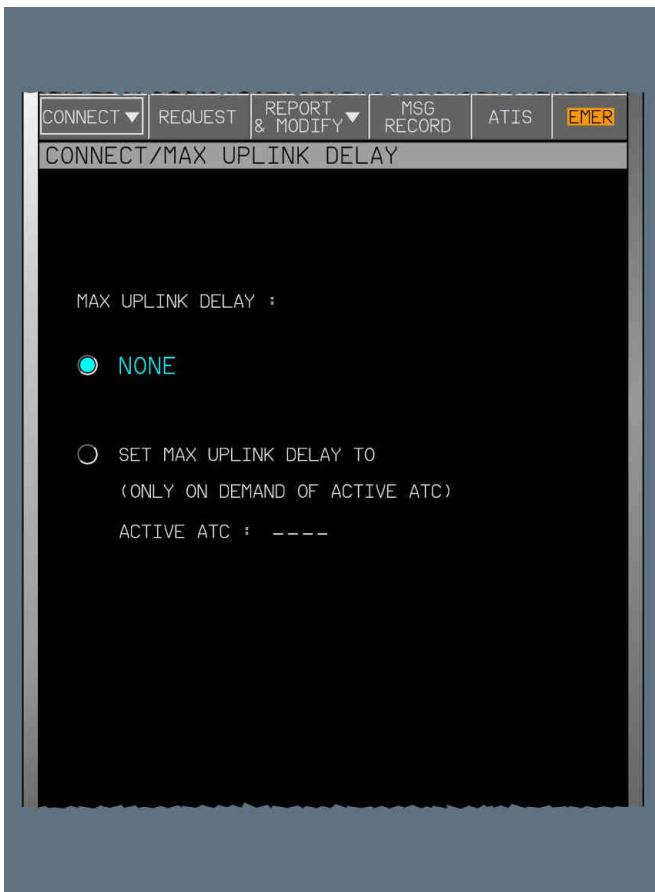
| | |
|----------------|---|
| CAUTION | Do not enter a value in the MAX UPLINK DELAY entry field until requested by the air traffic controller. |
|----------------|---|

Note: The MAX UPLINK DELAY value is reset to NONE when the connection with the current active ATC center ends.

PILOT'S INTERFACE

The CONNECT/MAX UPLINK DELAY page enables the flight crew to set, at the air traffic controller's request, the maximum uplink value.

Refer to DSC-46-10-20-30 MAX UPLINK DELAY Page .

CONNECT/MAX UPLINK DELAY Page**REQUEST****Applicable to: ALL**

The flight crew prepares all requests via the REQUEST page on the MFD.

This MFD page enables the flight crew to create a request message, by using items that produce predefined, short and specific frames.

Each frame contains a short message asking for a change or contains freetext.

A message may be a combination of more than one frame.

The message may contain up to 5 different frames. Some combinations are however not valid. For example, requesting to climb and to descend in the same message is not valid.

Some requests may contain only one frame:

- Departure clearance
- Oceanic clearance.

Note: 1. If one of the above frames is selected, and if other frames have previously been selected, the former ones are lost.
2. Lateral/Rerouting is not a request message but only a reminder for the flight crew to use the FMS in the case of a lateral rerouting.

Requests are part of the CPDLC application, except for departure and oceanic clearances which are part of the A623 application.

PILOT'S INTERFACE

The REQUEST page enables the flight crew to:

- Use predefined frames to create a message
- Delete a selected frame from a message
- Insert a reason in the message, using a predefined frame or freetext, as required
- Transfer the created message to the mailbox, before sending it to the ATC center
- Cancel and delete a created message.

Refer to DSC-46-10-20-30-40 REQUEST Page

REQUEST Page**POSITION REPORT****Applicable to: ALL**

The POSITION REPORT function provides useful information to the ATC center on the aircraft past, present and future position, and trend (such as climbing, descending, heading, track, speed).

The position reports can be generated:

- Automatically, each time a waypoint is sequenced
This function is activated if the AUTO POSITION REPORT in the REPORT/ AUTO & MANUAL POSITION page of the MFD is set to ON.
- Automatically, each time the active ATC center requests for one (through a dedicated uplink message)
- Manually by the flight crew, using the MFD POSITION REPORT page.

The automatic generation of the position reports is not available, if:

- There is no active ATC center
- There is no communication between the FMS and the ATC Datalink System.

When a position report is automatically generated, it appears in the mailbox on the SD. The flight crew can either view and modify the report (on the MFD), or send the report to the ATC center.

PILOT'S INTERFACE

The REPORT/AUTO & MANUAL POSITION page enables the flight crew to:

- Set the AUTO POSITION REPORT to ON or OFF
- Create a position report.

When the flight crew displays the REPORT/AUTO & MANUAL POSITION page on the MFD , all fields, except three, are automatically filled with data from the FMS . The three exceptions are ICING, TURBULENCE, and ENDURANCE. These three fields, and the freetext zone are automatically emptied when the page appears.

The flight crew can modify the fields that are automatically filled by the FMS .

Refer to DSC-46-10-20-30-50 AUTO & MANUAL POSITION Page .

REPORT/AUTO & MANUAL POSITION Page

| | | | | | |
|---|---------------|---------------------------------------|---|---|------|
| CONNECT ▼ | REQUEST | REPORT & MODIFY ▼ | MSG RECORD | ATIS | EMER |
| REPORT/AUTO & MANUAL POSITION | | | | | |
| AUTO POSITION REPORT | | | <input type="checkbox"/> ON <input type="checkbox"/> OFF | | |
| OVHD | MIPAK | UTC 0946Z | ALT 32000 FT | | |
| PPOS | TAVUN | 1005Z | 32000 FT | | |
| TO | PUT | 1022Z | | | |
| NEXT | DALAN | | | | |
| SPEED | CAS 310 KT | GROUND 320 KT | VERTICAL 0 FT/MIN | | |
| HEADING | 135 °T | TRACK | 132 °T | | |
| ICING | TRACE ▼ | SAT | - 40 F | | |
| TURBULENCE | LIGHT ▼ | | | | |
| ETA DEST | 1133 Z | ENDURANCE | 4 H30 MIN | | |
| <input type="checkbox"/> DEVIATING | | <input type="checkbox"/> CLIMBING TO | | <input type="checkbox"/> DESCENDING TO | |
| <input type="checkbox"/> ERASE ALL FIELDS | | <input type="checkbox"/> REFRESH DATA | | <input type="checkbox"/> ADD FREETEXT | |
| | | | | <input type="checkbox"/> XFR TO MAILBOX | |

MODIFY REPORT**Applicable to: ALL**

The MODIFY REPORT function enables the flight crew to modify automatic replies, proposed by the CPLDC, to specific requests sent by the air traffic controller to the flight crew.

The CPLDC may propose automatic replies to reply to:

- One or several Confirm request, or
- One or several Report request, or
- One or several Open negotiation request, or
- A combination of the above requests.

The flight crew can send replies directly to the ATC center, or modify them on the MFD.

When the flight crew decides to modify a reply, the REPORT/MODIFY page on the MFD displays only the frames that the flight crew can modify.

 The flight crew can modify a number of 5 frames at a given time.

 *Note: The number of frames displayed for modification may be equal to or less than the number of frames in the reply (on the mailbox), because only modifiable frames appear on the MFD.*

When the flight crew opens the REPORT/MODIFY page for the first time after clicking on the MODIFY button in the mailbox, all modifiable fields are automatically updated with data from the FMS, as applicable.

The flight crew can modify any field that is displayed. All fields are mandatory fields, except if preceded by a selection tick box. In the later case, the field becomes mandatory only when the tick box is active.

The flight crew can add a freetext message (if there is none, and if the maximum number of frames in the reply is not reached), or modify a freetext message (if there is already one).

PILOT'S INTERFACE

The REPORT/MODIFY page displays all the relevant data that the flight crew can modify.

The flight crew can modify or delete any field, but cannot delete mandatory fields.

The flight crew can add or modify a freetext message.

The flight crew must click on the XFR TO MAILBOX button at the end of the modification.

REPORT/MODIFY Page**OTHER REPORTS****Applicable to: ALL**

The air traffic controller may ask the flight crew to report back at a later time in flight, such as when reaching a given altitude, crossing a given point, or back on route.

The ATC Datalink System will then ask the FMS to monitor a specific parameter, such as a waypoint, or an altitude, and will automatically generate a downlink message, as required, when the monitored parameter fulfils the condition.

The downlink message is generated in the mailbox. The flight crew then sends the message to the ATC center.

If for any reasons, the downlink message is not automatically generated, the flight crew may create the downlink message on the REPORT/OTHER REPORTS page of the MFD.

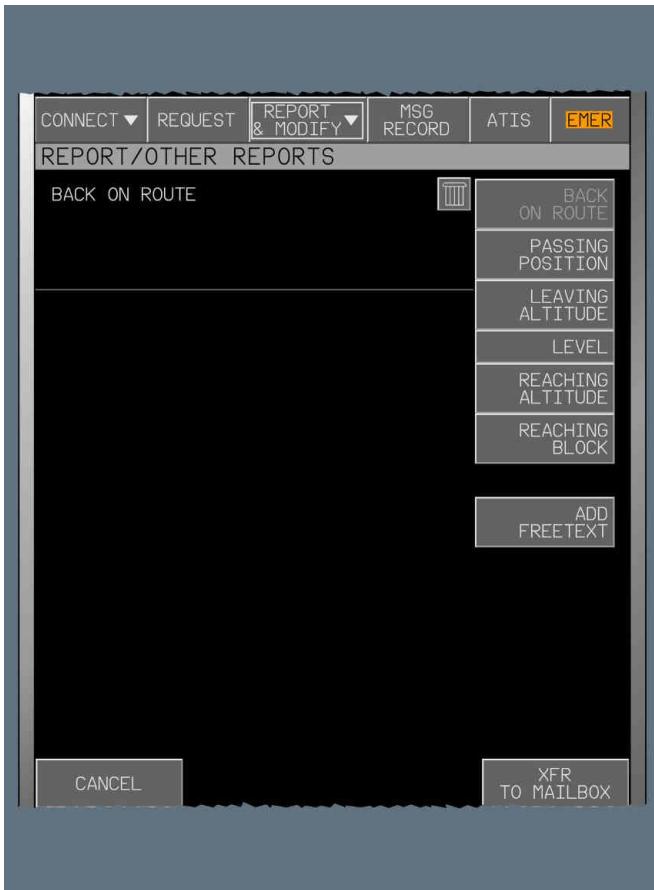
Note: The BACK ON ROUTE situation cannot be monitored by the FMS.

PILOT'S INTERFACE

The REPORT/OTHER REPORTS page enables the flight crew to:

- Use predefined frames to create a message
- Delete a selected frame from a message
- Insert a reason in the message (using freetext)
- Transfer the created message to the mailbox, before sending it to the ATC center
- Cancel and delete a created message.

Refer to DSC-46-10-20-30-70 OTHER REPORTS Page .

REPORT/OTHER REPORTS Page**EMERGENCY****Applicable to: ALL**

The EMERGENCY page enables the flight crew to generate emergency messages.

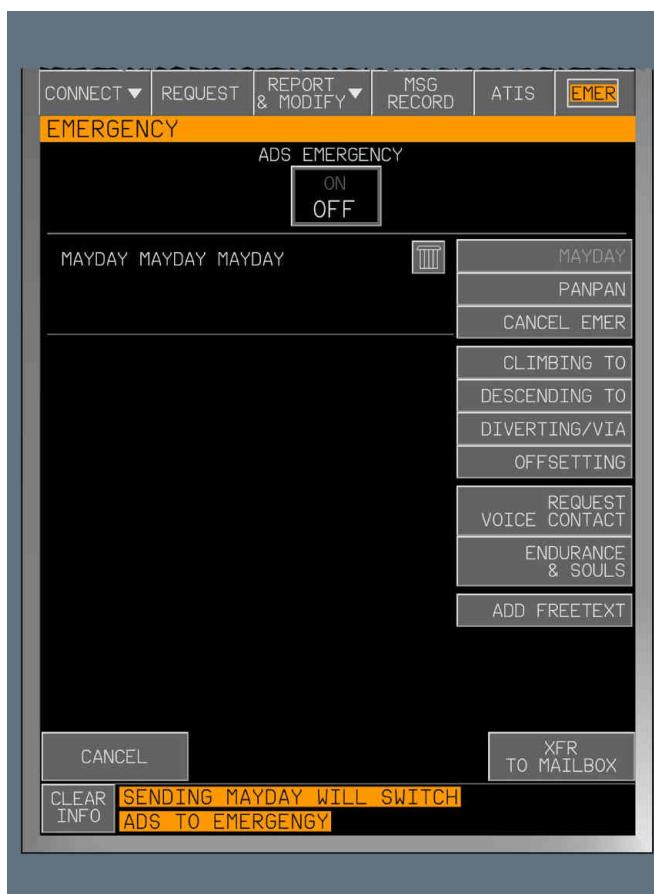
PILOT'S INTERFACE

The EMERGENCY page enables the flight crew to:

- Prepare ATC datalink emergency requests
- Activate the "ADS Emergency" mode.

Note: When the flight crew sends a MAYDAY message, the ADS EMERGENCY function automatically comes ON.

Refer to DSC-46-10-20-30-100 EMERGENCY Page .

EMERGENCY Page



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Message Record**MESSAGE RECORD****Applicable to: ALL**

The Message Record function enables to store messages exchanged between the aircraft and the ATC center, and enables the flight crew to retrieve and display these recorded messages at any time.

When the flight crew closes a message in the mailbox, the message is stored and disappears from the mailbox. The flight crew can access the stored message via the MSG RECORD/LIST page on the MFD.

ATIS messages and ADS reports are not stored in this application.

L3 Note: When the maximum number of stored messages is reached, any new message will be stored and the oldest message will be deleted. The maximum number of stored messages is 99 CPDLC messages and 20 A623 messages.

PILOT'S INTERFACE

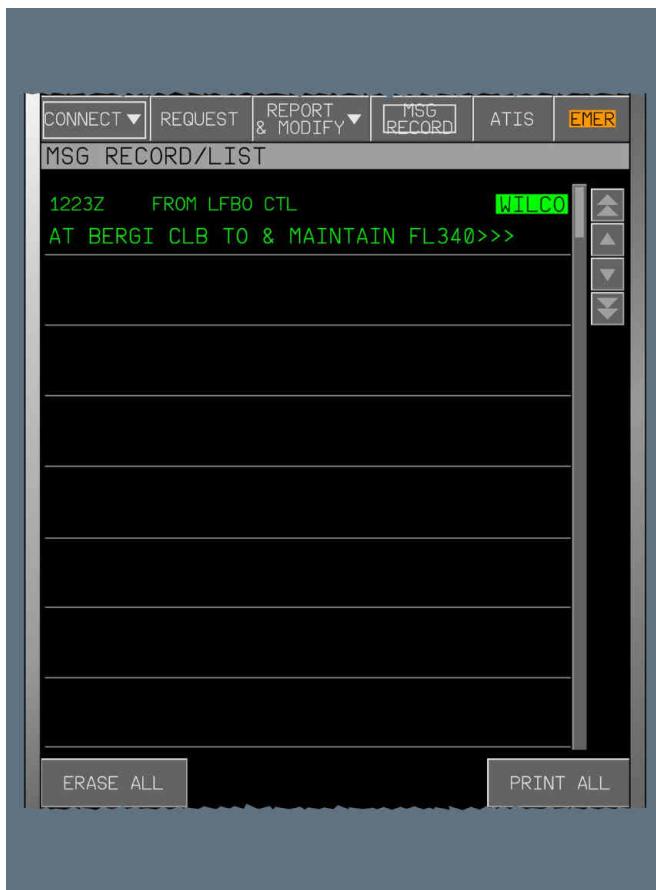
The MSG RECORD/LIST page enables the flight crew to:

- Access the ATC messages previously processed, including the associated responses
- The message displayed on the MSG RECORD/LIST page may not be complete. To display the full message, the flight crew must click on the message, and the message will appear on a MSG RECORD/ZOOM page.

Note: If a downlink message sending has failed, the message appears in amber on the MSG RECORD/LIST page.

- Print one or all recorded messages
- Erase all recorded messages.

Refer to DSC-46-10-20-30-80 MSG RECORD/LIST Page .

MSG RECORD/LIST Page



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A623

A623

Applicable to: ALL

The A623 application performs the following functions:

- Digital ATIS (*Refer to DSC-46-10-10-50-10 Digital ATIS*)
- Departure and Oceanic clearance Requests (*Refer to DSC-46-10-10-50-20 Oceanic/Departure Request*).

Note: *Contrary to the CPDLC application, A623 exchanges do not require previous notification.*

DIGITAL ATIS

Applicable to: ALL

The digital Automatic Terminal Information Services (ATIS) enables the flight crew to request and obtain information on active terminal conditions, such as runway, approach procedure, or meteorological parameters (wind, visibility, weather, clouds, runway surface conditions, etc). The flight crew can request information for departure, destination, and alternate airports via the ATIS/LIST page on the MFD.

The flight crew can receive the ATIS reports:

- Either manually, by clicking on the SEND REQUEST button on the ATIS/LIST page
- [L2] The airport sends the most recent version of the ATIS report within 5 min. If the report is not sent within 5 min, the system indicates that the flight crew must submit the request again.
- [L1] The flight crew then clicks on the UPDATE button to manually update the ATIS information.
- Or automatically, by selecting the AUTO UPDATE option on the ATIS/LIST page.
- [L2] The airport sends the ATIS report to the aircraft each time a new version is available.

[L1] **Note:** *AUTO UPDATE function is not available for departure airport.*

The ATIS response messages can be read on:

- The ATIS/LIST page
- The ATIS/RECEIVED page
- The printer: The response is directly sent to the printer if the AUTO PRINT function is selected.

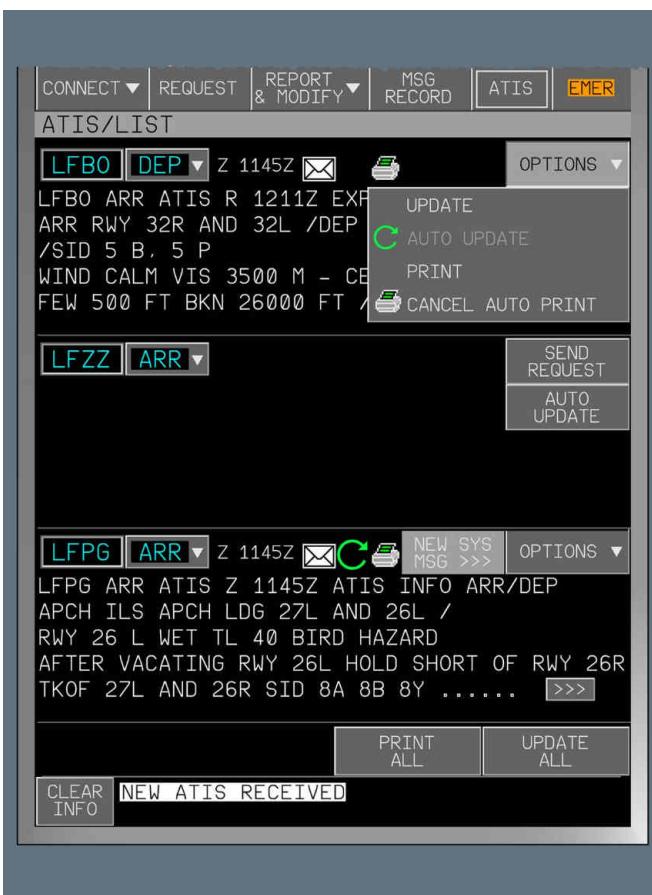
PILOT'S INTERFACE

The ATIS /LIST page enables the flight crew to:

- Request, and receive ATIS messages for departure, arrival, and/or alternate airports, as required
- Print each ATIS message individually, or print all displayed messages
- Manually request an update of all currently displayed messages
- Open the ATIS message on a zoom page to display the complete message, if the message is too long and truncated. This is done using the  button.

The ATIS /LIST page has three ATIS request areas.

Refer to DSC-46-10-20-30-90 ATIS/LIST Page .

ATIS /LIST Page

The ATIS /RECEIVED page enables the flight crew to display the two most recently received messages.

ATIS / RECEIVED Page

CONNECT ▾ REQUEST REPORT & MODIFY ▾ MSG RECORD ATIS EMER

ATIS/RECEIVED LAST PREVIOUS

LFPG ARR ATIS Z 1145Z
ATIS INFO ARR/DEP
APCH ILS
APCH LDG 27L AND 26L /
RWY 26 L
WET TL 40
BIRD HAZARD
AFTER VACATING RWY 26L HOLD SHORT OF RWY 26R
TKOF 27L AND 26R SID 8A 8B 8Y
USE NOISE ABATEMENT PROCEDURE

RETURN TO LIST PRINT

OCEANIC/DEPARTURE REQUEST**Applicable to: ALL**

The OCEANIC/DEPARTURE REQUEST function enables the flight crew to request and obtain an oceanic or a departure clearance.



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The oceanic or departure request can be initiated by:

- The flight crew, by sending a request to the air traffic controller, or
The flight crew must wait for the oceanic or departure clearance that will be sent by the air traffic controller.
- The air traffic controller, by sending an oceanic or a departure clearance to the flight crew without request.

PILOT'S INTERFACE

The DEPARTURE and OCEANIC options of the REQUEST page enable the flight crew to send a departure or an oceanic clearance request.

DEPARTURE REQUEST Page

The screenshot shows the 'DEPARTURE REQUEST' page of the ATC Applications System. At the top, there are tabs: CONNECT ▾, REQUEST, REPORT & MODIFY ▾, MSG RECORD, ATIS, and EMER (highlighted in yellow). Below the tabs, the word 'REQUEST' is displayed.

Flight information fields include:

- DEPARTURE REQUEST
- REQUEST WILL BE SENT TO :
- DEPARTURE ARPT: LFPG
- DESTINATION: KJFK
- ACFT TYPE: A380
- ATIS CODE: C
- GATE: [empty]

To the right of these fields is a vertical list of request types, each preceded by a left-pointing arrow:

- VERTICAL
- LATERAL
- SPEED
- CLEARANCE
- WHEN CAN WE EXPECT
- OTHER

Below this list is a button labeled 'ADD TEXT' with a left-pointing arrow.

At the bottom of the page are several buttons:

- CANCEL
- XFR TO MAILBOX
- CLEAR INFO
- LAST MSG ELEMENT

OCEANIC REQUEST Page

CONNECT ▾ REQUEST REPORT & MODIFY ▾ MSG RECORD ATIS EMER

REQUEST

OCEANIC REQUEST

REQUEST WILL BE SENT TO :

OCEANIC CENTER KZAK

ENTRY POINT 4636.5N/15613.6E

ETA 1328 Z

MACH .75

LEVEL FL 035

(NO NOTIFICATION REQUIRED)

CANCEL XFR TO MAILBOX

CLEAR INFO LAST MSG ELEMENT

VERTICAL
LATERAL
SPEED
CLEARANCE
WHEN CAN WE EXPECT
OTHER
ADD TEXT

Cancel XFR TO MAILBOX

CLEAR INFO LAST MSG ELEMENT

VERTICAL
LATERAL
SPEED
CLEARANCE
WHEN CAN WE EXPECT
OTHER
ADD TEXT



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Intentionally left blank

Automatic Dependent Surveillance (ADS)**AUTOMATIC DEPENDENT SURVEILLANCE (ADS)**

Applicable to: ALL

The Automatic Dependent Surveillance (ADS) function provides information reports, without any flight crew action, to one or more ATC centers or AOC centers.

The reports includes data such as the aircraft position, speed, equipment onboard (e.g. TCAS, RNAV capability, RVSM capability).

There are three different types of reports:

- Periodical
- After ATC center request
- After an event, through the monitoring of an aircraft event, such as waypoint sequencing.

The air traffic controller initiates the ADS connection, provided that the ADS status of the aircraft is either "ARMED" or "CONNECTED".

When at least one ATC center is connected by the ADS:

- The CONNECTION STATUS page of the MFD indicates the "CONNECTED" status of the ADS, and provides a list of all ADS connected centers
- The mailbox indicates the number of ADS connected centers in the mailbox default screen.

A maximum of five ATC or AOC centers may be connected to an aircraft at one time. The flight crew can disconnect one or all ATC or AOC centers. A disconnected center is no longer displayed in the list.

Note: *The ADS function does not require any notification nor that an ATC center be active before any ADS reporting.*

ADS STATUS

The ADS function may be:

- ARMED

This is the default status. The ADS function is ready for use, but there is no connected ATC center.

- CONNECTED

There is at least one ATC center connected for reporting.

Connected centers are listed on the CONNECTION STATUS page of the MFD.

- OFF

The ADS function is switched off. Any connected ATC center is disconnected and ATC centers can no longer connect to the aircraft.

ADS EMERGENCY STATUS

The ADS Emergency function may be:

- OFF:
This is the default status.
- ON:
This is an emergency status. Any connected ATC center is warned.
L3 In this status, the frequency of reporting is higher.

L1 *Note: The ADS Emergency is automatically set to ON when the flight crew sends a MAYDAY message via the EMERGENCY page of the MFD.*

PILOT'S INTERFACE

The CONNECT/CONNECTION STATUS page enables the flight crew to:

- Set the ADS status to ARMED or OFF
- Set the ADS EMERGENCY to ON or OFF
- List connected ATC center(s) that receive reports, if any
- Disconnect individually, or globally, the connected ATC center(s).

Refer to DSC-46-10-20-30-20 CONNECTION STATUS Page

ADS ARMED

ADS CONNECTED

Mailbox**GENERAL****Applicable to: ALL**

The ATC mailbox is the dialog interface between the aircraft and the ATC center. Uplink and downlink messages are received or sent via the mailbox.

There are 9 categories of uplink messages:

- Standard clearances
- Loadable clearances
- Deferred clearances
- Information messages
- Report request messages
- Confirm messages
- Negotiation messages
- Open negotiation messages
- No answer messages.

Note: These categories include the associated answer processing.

There are 5 categories of downlink messages:

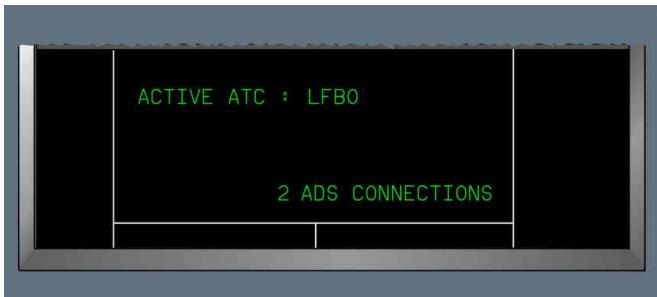
- Request messages
- Route clearance request
- Position report messages
- Text messages
- Emergency messages.

In normal configuration, the mailbox is displayed permanently on the lower part of the System Display (SD) Display Unit (DU).

PILOT'S INTERFACE

When no message is displayed on the mailbox, a default screen appears and indicates:

- The name of the connected ATC center, when a datalink connection is active
- The number of ADS active connections, when at least one ADS centre is connected
- The ADS status, when the ADS is set to OFF.



As soon as there is one message in the mailbox, the mailbox display is automatically modified in order to enable the flight crew to manage the message.



MAILBOX CAPACITY

Applicable to: ALL

The mailbox has a maximum capacity of:

- 5 uplink messages that have not been answered

If another message is received, it cannot be inserted in the mailbox, and an automatic downlink message will warn the ATC center that the message has been discarded because mailbox maximum capacity has been reached.

- 5 created messages still to be downlinked

When this limit is reached, the flight crew is no longer able to transfer a newly created message to the mailbox.

- 10 messages not included in the above two categories, for example, sent messages or uplink messages that do not require an answer.

If an 11th message is filled in the mailbox, the oldest one is closed and is stored in the MSG RECORD page of the MFD.



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MAILBOX COLORS

Applicable to: ALL

Uplink messages are displayed on a black background and:

- When received, the message appears in white and the main parameters in blue
- When answered, the message becomes green
- When monitored, the parameters appear in magenta and indicate that they are being monitored by the FMS.
 - When the maximum number of messages is attained, the parameters become green
 - When monitoring fails, the parameter becomes amber.

Downlink messages appear in black:

- On a blue background before sending
- On a green background after sending.



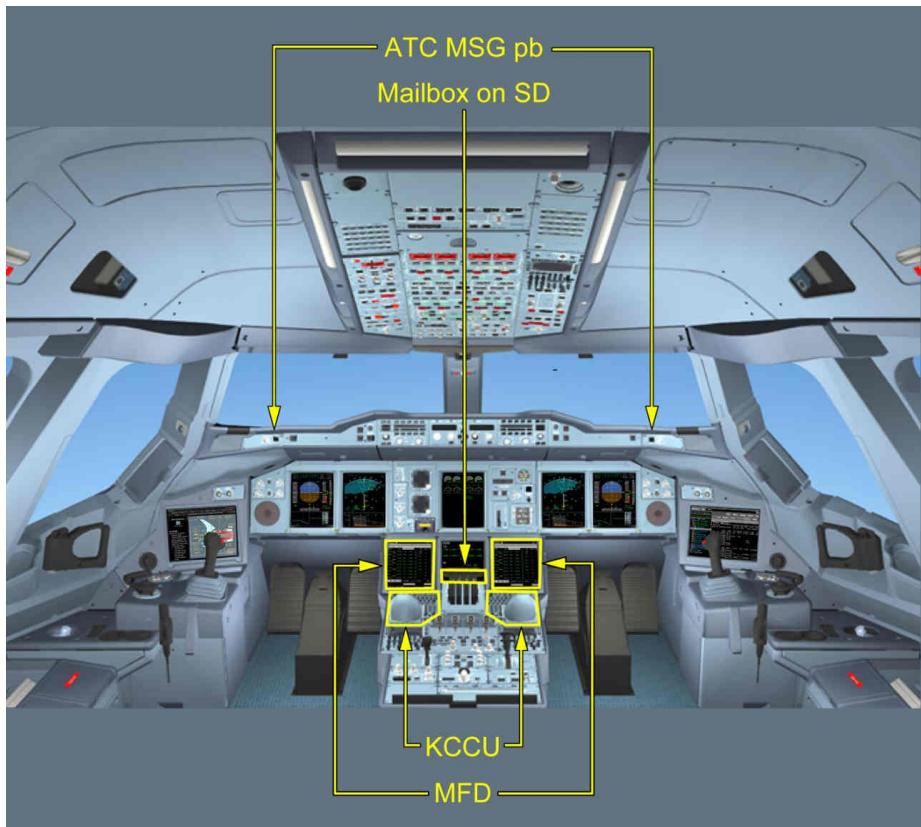
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Cockpit View**GENERAL**

Applicable to: ALL

Cockpit View



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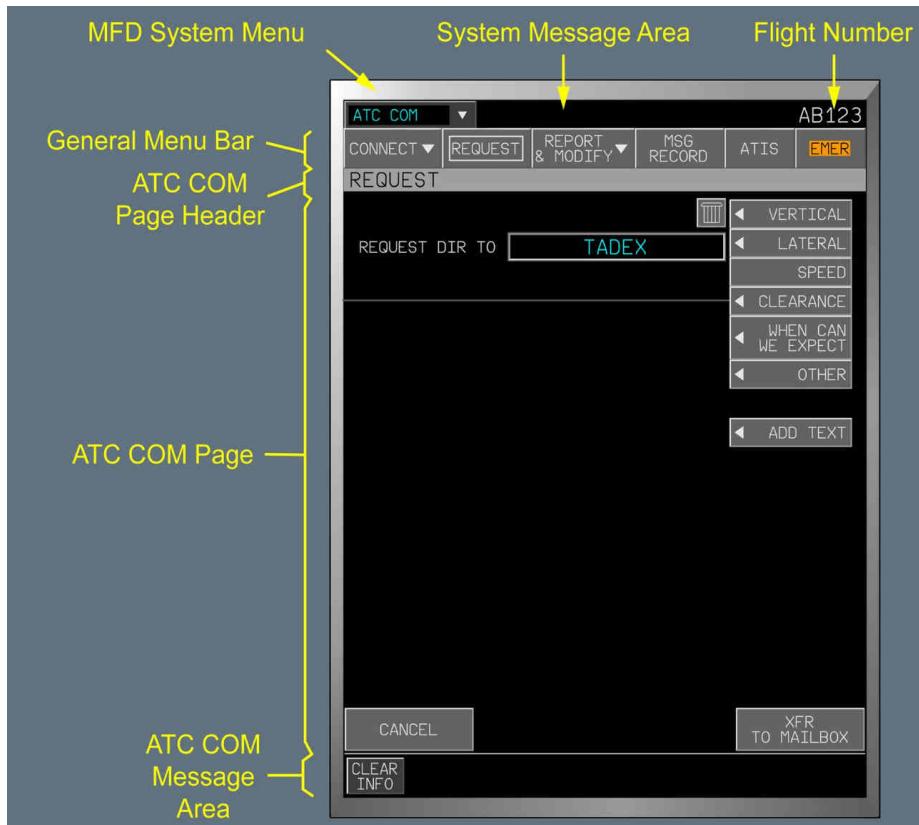
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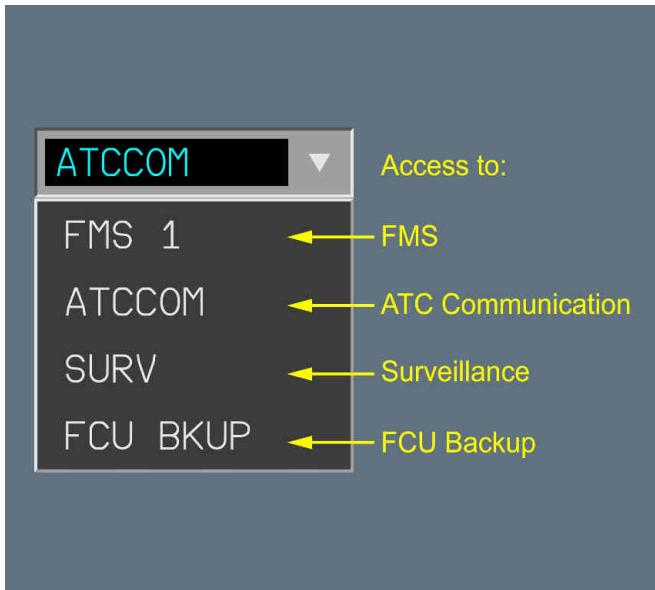
ATC - AIR TRAFFIC CONTROL DATALINK APPLICATIONS
SYSTEM - CONTROLS AND INDICATORS

Intentionally left blank

Multi Function Display (MFD) - General**MFD OVERVIEW**

Applicable to: ALL

ATC COM Page

MFD SYSTEM MENUMFD System Menu

Indicates the system identifier that is currently displaying data on the MFD .
The menu list displays all systems that can display data on the MFD :

FMS

Provides access to the FMS pages.

Refer to FMS Pages Overview .

ATC COM

Provides access to the ATC communication pages.

Refer to ATC COM Pages Overview .

SURV

Provides access to the surveillance pages.

Refer to SURV Pages Overview .

FCU BKUP

Provides access to the FCU backup pages.

Refer to *FCU BKUP page Overview* .

SYSTEM MESSAGE AREA

The System Message Area displays three different messages to direct the flight crew's attention to an ATC COM or FMS event, when the MFD does not display an ATC COM or FMS page:

- NEW ATIS RECEIVED:
Indicates that a new ATIS report is received, and that the MFD displays a page other than an ATC COM page. This message disappears when the flight crew accesses an ATC COM page.
- ATIS SYS MSG:
Indicates that an ATIS FMS message is received, and the MFD displays a page other than an ATC COM page. This message disappears when the flight crew accesses an ATC COM page.
- CHECK FMS MESSAGE:
Indicates that an amber FMS message is pending, and THAT the MFD displays a page other than an FMS page. This message disappears when the flight crew accesses a FMS page.

FLIGHT NUMBER

Indicates the flight number that the flight crew has entered on the ACTIVE / INIT page of the FMS (Refer to *ACTIVE / INIT Page*).

-  The Control and Display System (CDS) manages the display of the flight number.

GENERAL MENU BAR

The general menu bar provides the flight crew with access to the main ATC COM pages.
The main ATC COM pages are divided into 6 groups, indicated by the 6 menus of the general menu bar: CONNECT, REQUEST, REPORT & MODIFY, MSG RECORD, ATIS and EMER.

- Note:
- *The flight crew can access all ATC COM pages via one of these 6 menus.*
 - *A box around the menu name indicates that the displayed page belongs to this menu.*

ATC COM PAGE HEADER

The ATC COM page header indicates the title of the ATC COM page currently displayed.
The page title includes the different levels of the page hierarchy, separated by a slash, for example REPORT/AUTO & MANUAL POSITION.



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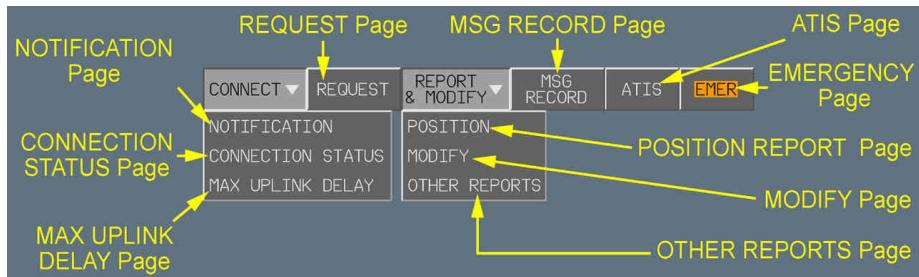
46 - INFORMATION SYSTEMS

ATC - AIR TRAFFIC CONTROL DATALINK APPLICATIONS
SYSTEM - CONTROLS AND INDICATORS

Intentionally left blank

MFD - ATC COM Pages**GENERAL**

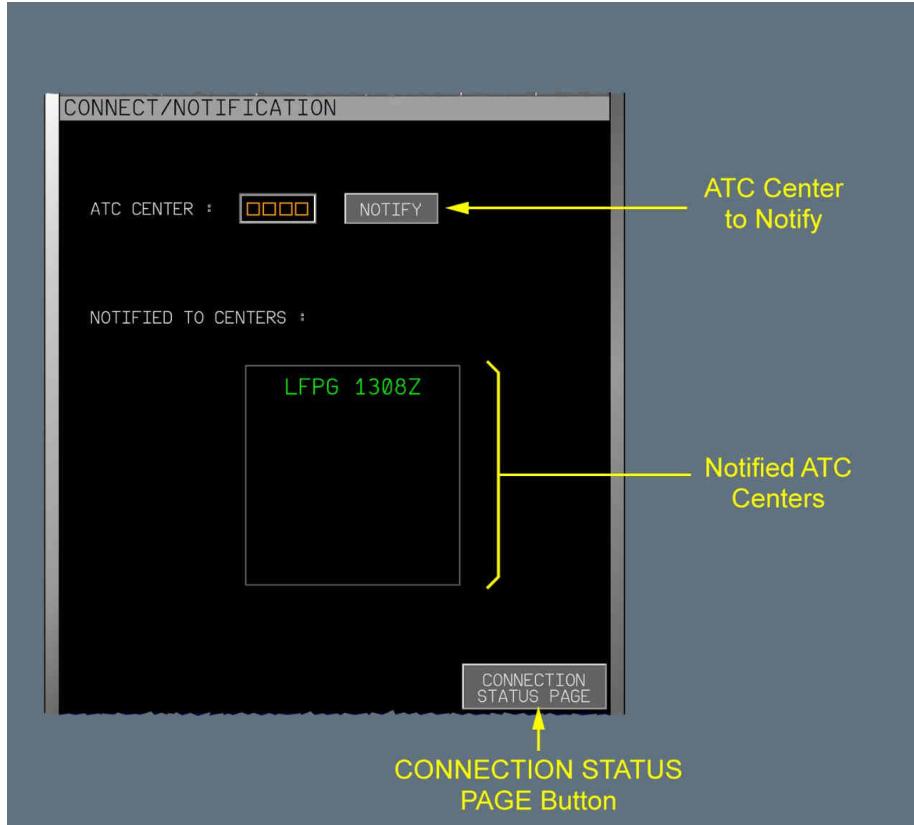
Applicable to: ALL

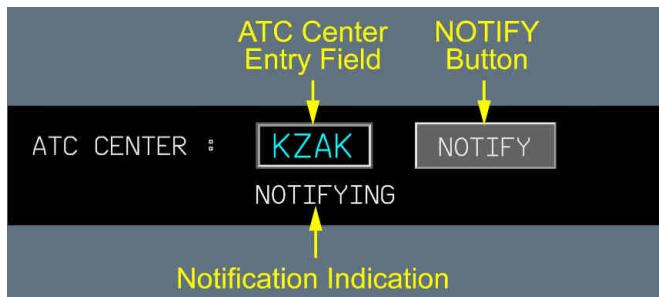
MFD ATC COM Pages - General

Note: If the flight crew decides to display an ATC COM page while the ATC is failed, via the KCCU keys (ATC COM key or Navigation keys), the **ATC COM NOT AVAIL** message appears for 5 s .

NOTIFICATION PAGE

Applicable to: ALL

CONNECT/NOTIFICATION Page

ATC CENTER TO BE NOTIFIEDATC Center To Be Notified**ATC CENTER ENTRY FIELD**

Indicates the ATC center to be notified, in ICAO 4-letter code.



The field is blank. Because boxes are amber, it is mandatory to complete it for notification.

Appears:

- At power-up, if there has not been any active ATC centers, nor any manually notified centers
- After a successful notification.

NOTIFY BUTTON

When clicked, a notification is sent to the ATC center entered in the field.

NOTIFICATION INDICATION

A notification message has just been sent to the entered ATC center, and an answer is expected. The notification process is in progress.



The notification process has failed.

NOTIFIED ATC CENTERS

L12

NOTIFIED TO CENTERS :

LFPG 1308Z

displays the list of manually
and automatically notified
ATC centers, in ICAO
two-letter code, followed
by the UTC time of the
notification.

Up to 6 ATC centers may
be displayed in the list.

NOTIFIED TO CENTERS : NONE

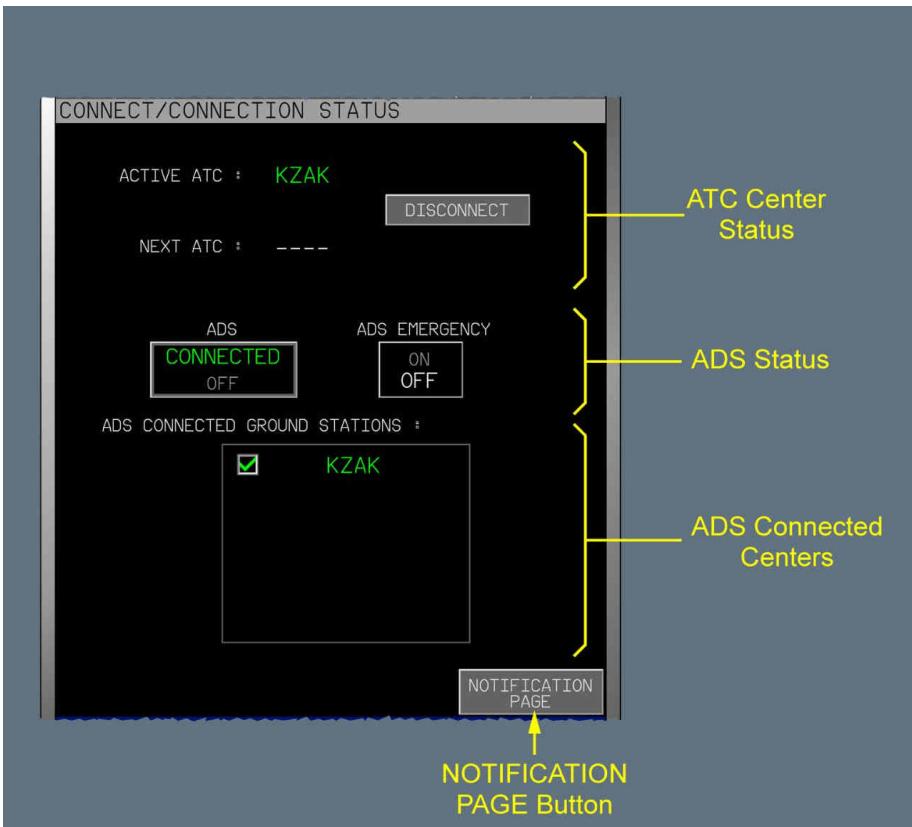
indicates that no ATC
center has been notified.

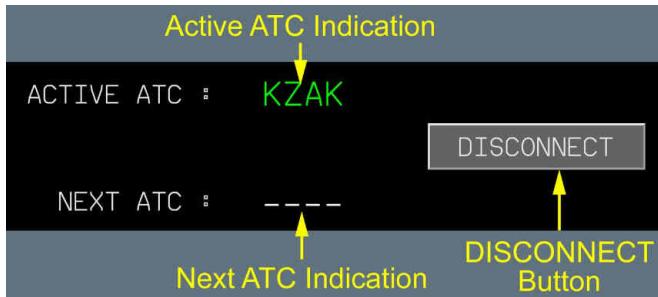
CONNECTION STATUS PAGE BUTTONCONNECTION
STATUS PAGE

When clicked, displays the CONNECTION STATUS page
on the MFD.

CONNECTION STATUS PAGE

Applicable to: ALL

CONNECT/CONNECTION STATUS Page

ACTIVE ATC CENTERActive ATC Center**ACTIVE ATC INDICATION****KZAK**

Indicates the ICAO code of the active ATC center.

Indicates that no active ATC center is selected.

NEXT ATC INDICATION**NEXT**

Indicates the ICAO code of the next ATC center.

The active ATC center sends this information in anticipation of a change of control.

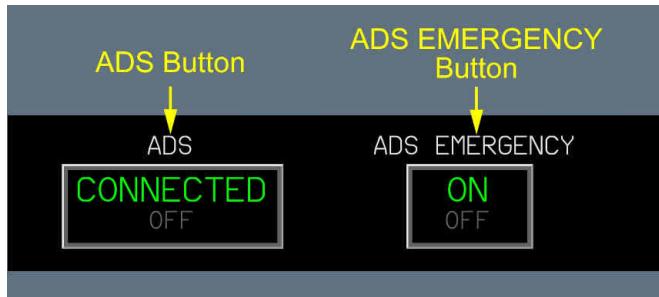
Indicates that no next ATC center is selected.

DISCONNECT BUTTON**DISCONNECT**

When clicked, the active and the next ATC centers are disconnected.

A confirmation window appears before the disconnection becomes effective.

If the disconnection is confirmed, both ACTIVE ATC and NEXT ATC fields display white dashes.

ADS STATUSADS Status**ADS BUTTON**

Indicates that the ADS is armed and awaits a connection from an ATC center.

When clicked and after validating a confirmation window, the ADS goes OFF.



Indicates that the ADS is connected to at least one ATC center.

When clicked and after validating a confirmation window, the ADS goes OFF.



Indicates that the ADS is OFF. No ATC center can connect.

When clicked, the ADS is armed.

ADS EMERGENCY BUTTON

Indicates that the ADS Emergency is OFF.

This is the default state.

When clicked and after validating a confirmation window, the ADS Emergency comes ON.



Indicates that the ADS Emergency is ON.

ADS CONNECTED CENTERS

ADS CONNECTED GROUND STATIONS : NONE

Indicates that no ATC center is connected for ADS reporting.

ADS CONNECTED GROUND STATIONS :

- KZAK1
- KZAK2
- KZAK3
- KZAK4

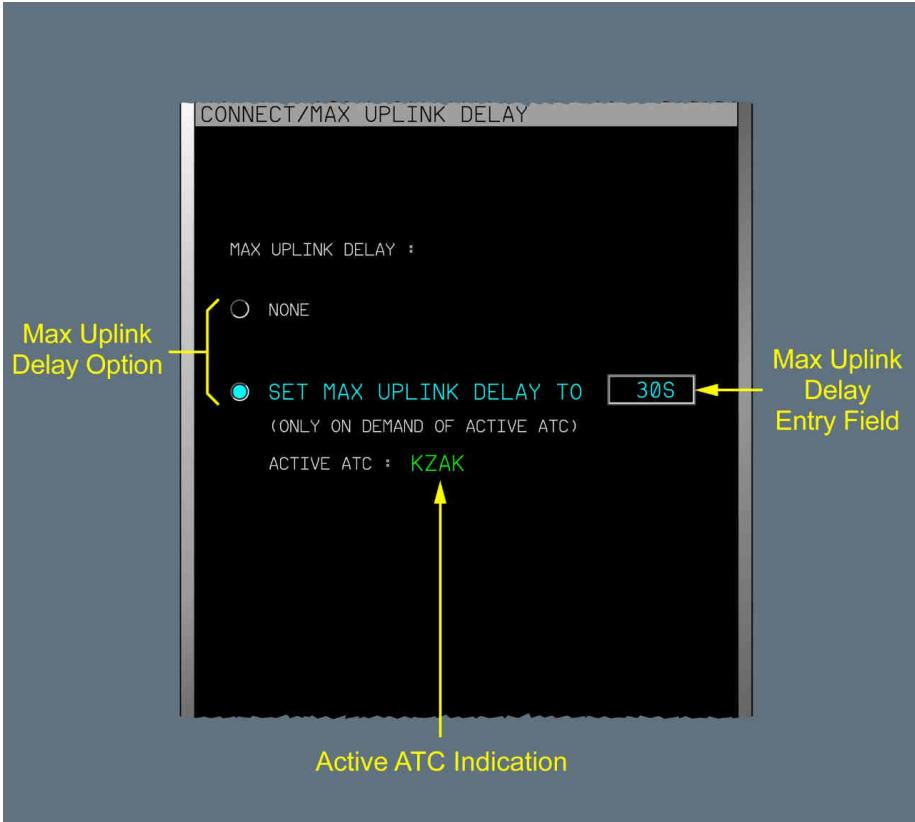
Displays the list of ATC center(s) connected for ADS reporting, using 4-letter ICAO code, or 3-character code (if the ICAO code is not available). If the centers are listed in chronological order, the most recently connected being at the top of the list. Each ATC center can be individually disconnected.

NOTIFICATION PAGE BUTTON
NOTIFICATION
PAGE

When clicked, displays the NOTIFICATION page on the MFD.

MAX UPLINK DELAY PAGE

Applicable to: ALL

CONNECT/MAX UPLINK DELAY Page

MAX UPLINK DELAY OPTION **NONE**

Indicates that no maximum uplink delay is entered.
This is the default position.

 SET MAX UPLINK **NONE**

Indicates that the SET MAX UPLINK DELAY option is selected.

When selected, the MAX UPLINK DELAY entry field automatically appears.

 SET MAX UPLI**MAX UPLINK DELAY ENTRY FIELD**

Indicates that the SET MAX UPLINK DELAY option has been selected and the flight crew has not entered any value in the MAX UPLINK DELAY entry field.



Indicates the value of the maximum uplink delay entered by the flight crew.

KZAK

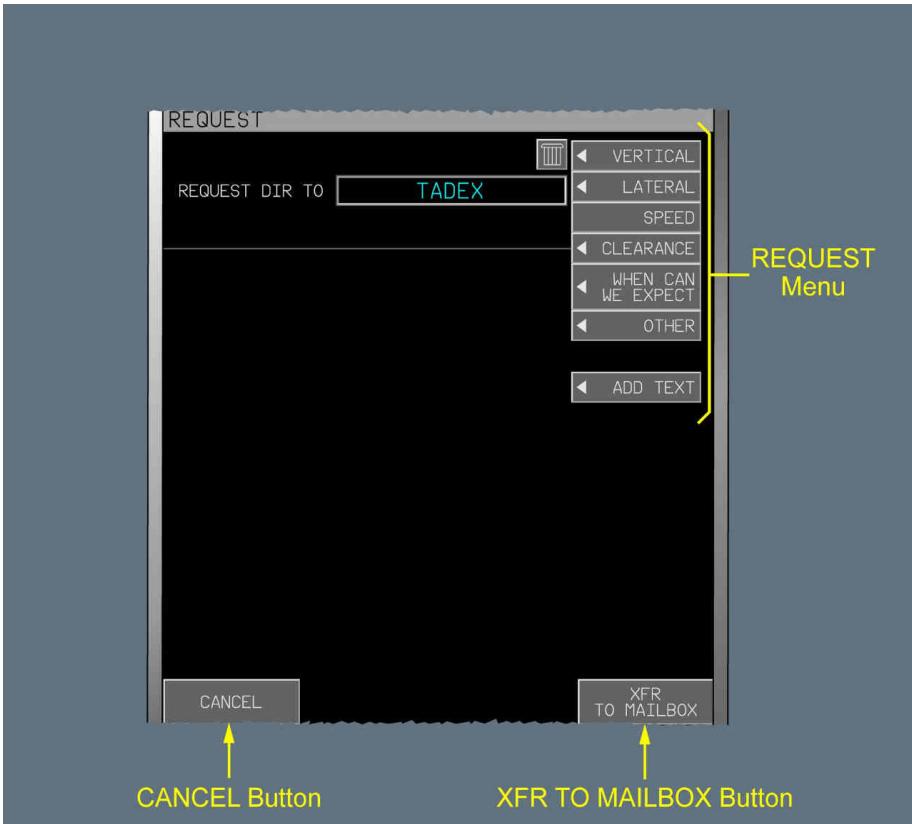
Indicates the ICAO code of the active ATC center.

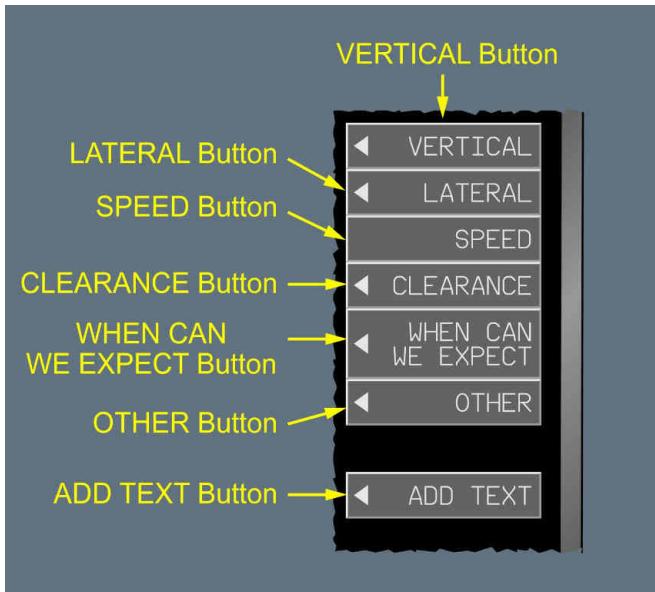


Indicates that there is no active ATC center.

REQUEST PAGE

Applicable to: ALL

REQUEST Page

REQUEST MENURequest Menu

The flight crew uses the REQUEST menu to create the frames that compose a request message. The menu provides direct access to predefined texts, leaving blank fields where the flight crew must enter complementary information.

The flight crew may select up to five frames in a request message.

Some frame combinations are not permitted.

The REQUEST menu options are:

VERTICAL

- CLIMB TO

- L3 The flight crew requests a higher flight altitude at a specified position or time. The position or time information is optional.

CLIMB TO cannot be selected as the same time as DESCEND TO.

Selecting a CLIMB TO after a DESCEND TO selection erases the previous selection.

- DESCEND TO

- L3 The flight crew requests a lower flight altitude at a specified position or time. The position or time information is optional.

DESCEND TO cannot be selected as the same time as CLIMB TO.

Selecting a DESCEND TO after a CLIMB TO selection erases the previous selection.

- ALTITUDE

- L3 The flight crew requests a specific flight altitude.

- BLOCK ALT

- L3 The flight crew requests a range of altitudes, in which they want to fly. Both altitudes are mandatory.

- CRUISE CLIMB

- L3 The flight crew requests for a cruise climb to a specified altitude.

LATERAL

- DIRECT TO

- L3 The flight crew requests a direct routing to a specified waypoint.

- OFFSET

- L3 The flight crew requests an offset from the initial route. The offset is defined by a distance and a direction. The offset starts at a specified point on the route. The definition of the starting point is optional.

- WX DEVIATION

- L3 The flight crew requests an offset from the initial route due to weather conditions. The offset is defined by a distance and a direction.

- HEADING

- L3 The flight crew requests a heading change.

- TRACK

- L3 The flight crew requests a track change.

- [L1] - SID/STAR
[L3] The flight crew requests a Standard Instrument Departure (SID) procedure or a Standard Terminal Arrival Route (STAR) procedure, according to the current flight phase.
With the aircraft on ground, the request is made for a SID procedure.
With the aircraft in-flight, the request is made for a STAR procedure.
- [L1] - REROUTING
[L3] This frame cannot be selected with other frames. When selected, the REROUTING frame appears and all other frames disappear. In addition, if the REROUTING frame has already been selected, and if the flight crew selects another frame, the REROUTING frame disappears.
- [L1] **SPEED**
[L3] The flight crew requests a new speed or a range of speed.
To request a range of speed, the flight crew completes the optional TO SPEED field.
- [L1] **CLEARANCE**
- DEPARTURE
[L3] A message with a departure clearance is sent to the departure airport that the flight crew has entered in the FMS.

[L2] The following fields may be automatically completed, when the information becomes available:
 - Departure airport
 - Destination airport
 - Aircraft type
 - ATIS code.
- OCEANIC
[L3] A message with an oceanic clearance is sent to the oceanic ATC center that the flight crew has entered.
- OTHER
[L3] The flight crew enters a request for clearance in textual format.

L1 WHEN CAN WE EXPECT

- HIGHER ALTITUDE

L3 The flight crew prepares a negotiation message for a higher altitude.

HIGHER ALTITUDE cannot be selected as the same time as LOWER ALTITUDE.

Selecting a HIGHER ALTITUDE after a LOWER ALTITUDE selection erases the previous selection.

- LOWER ALTITUDE

L3 The flight crew prepares a negotiation message for a lower altitude.

LOWER ALTITUDE cannot be selected as the same time as HIGHER ALTITUDE.

Selecting a LOWER ALTITUDE after a HIGHER ALTITUDE selection erases the previous selection.

- CLIMB TO

L3 The flight crew prepares a negotiation message to climb to a specified altitude.

CLIMB TO cannot be selected as the same time as DESCEND TO.

Selecting a CLIMB TO after a DESCEND TO selection erases the previous selection.

- DESCEND TO

L3 The flight crew prepares a negotiation message to descend to a specified altitude.

DESCEND TO cannot be selected as the same time as CLIMB TO.

Selecting a DESCEND TO after a CLIMB TO selection erases the previous selection.

- CRUISE CLIMB

L3 The flight crew prepares a negotiation message to cruise climb to a specified altitude.

- SPEED

L3 The flight crew prepares a negotiation message for a new speed or range of speed.

To request a range of speed, the flight crew completes the optional TO SPEED field.

- BACK ON ROUTE

L3 The flight crew prepares a negotiation message to come back on the initial route.

L1 OTHER

The OTHER frame enables the flight crew to prepare requests other than those provided above:

- FREETEXT
- VOICE CONTACT
- OWN SEPARATION & VMC
- VMC DES.

ADD TEXT

The flight crew can add reasons to a request, by using either short predefined messages, or free text messages:

- DUE TO WEATHER
- DUE TO A/C PERFORMANCE

- DUE TO TURBULENCE
- DUE TO TECHNICAL
- DUE TO MEDICAL
- AT PILOTS DISCRETION
- FREETEXT.

Note: The flight crew can only insert an "ADD TEXT" frame if another frame already exists. A message cannot be made up of only an "ADD TEXT" frame.

CANCEL BUTTON

A rectangular button with a thin black border. Inside, the word "CANCEL" is centered in a white, sans-serif font.

CANCEL

When clicked, deletes any request displayed on the MFD.

XFR TO MAILBOX BUTTON

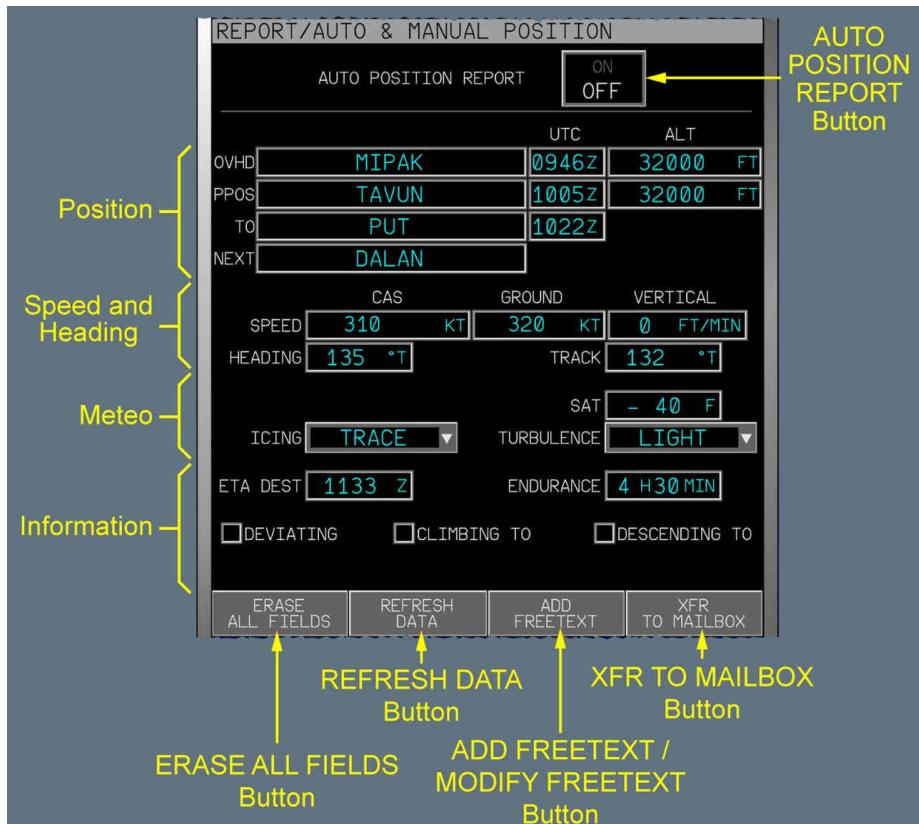
A rectangular button with a thin black border. Inside, the text "XFR" is on top and "TO MAILBOX" is below it, both in a white, sans-serif font.

XFR
TO MAILBOX

When clicked, transfers any valid request to the mailbox. This is only possible if all mandatory fields, indicated by amber boxes (if empty), are correctly completed.

AUTO & MANUAL POSITION PAGE

Applicable to: ALL

REPORT/AUTO & MANUAL POSITION Page**AUTO POSITION REPORT BUTTON**

The AUTO POSITION REPORT is OFF.



The AUTO POSITION REPORT is ON.

POSITION

- OVHD (Overhead)

Indicates the last FMS-sequenced waypoint. The time and altitude of flying over OVHD are provided.

[L3] These fields may remain empty, if no data from the FMS is available, and no data is entered by the flight crew.

- [L1] - PPOS (Present position)

Indicates the current aircraft position. The time and altitude at this position are also provided. These fields are mandatory.

- TO (To waypoint)

Indicates the next waypoint to be sequenced in the FMS. The expected time of flying over this waypoint is also provided.

[L3] These fields may remain empty, if no data from the FMS is available, and no data is entered by the flight crew.

- [L1] - NEXT

Indicates the waypoint to be sequenced in the FMS after the TO waypoint.

[L3] This field may remain empty, if no data from the FMS is available, and no data is entered by the flight crew.

SPEED AND HEADING

- SPEED/CAS

Indicates the air speed of the aircraft.

[L3] This field may remain empty, if no data from the FMS is available, and no data is entered by the flight crew.

- [L1] - SPEED/GROUND

Indicates the aircraft speed at fixed ground reference.

[L3] This field may remain empty, if no data from the FMS is available, and no data is entered by the flight crew.

- [L1] - SPEED/VERTICAL

Indicates the vertical speed of the aircraft.

[L3] This field may remain empty, if no data from the FMS is available, and no data is entered by the flight crew.

[L1] - HEADING

Indicates the aircraft current heading.

[L3] This field may remain empty, if no data from the FMS is available, and no data is entered by the flight crew.

[L1] - TRACK

Indicates the aircraft current track.

[L3] This field may remain empty, if no data from the FMS is available, and no data is entered by the flight crew.

METEO**- WIND**

Indicates the wind direction and speed.

[L3] Both fields may remain empty, if no data from the FMS is available, and no data is entered by the flight crew. If any-one field is entered, the other one is mandatory.

[L1] - SAT

Indicates the Static Air Temperature (SAT).

[L3] This field may remain empty, if no data from the FMS is available, and no data is entered by the flight crew.

[L1] - ICING

This is a flight crew entry.

The flight crew selects one item from a list of possible items:

- “ “: empty, no information available
- Trace
- Light
- Moderate
- Severe.

- TURBULENCE

This is a flight crew entry.

The flight crew selects one item from a list of possible items:

- “ “: empty, no information available
- Light
- Moderate
- Severe.

INFORMATION- **ETA DEST**

Indicates the Estimated Time of Arrival.

[L3] This field may remain empty, if no data from the FMS is available, and no data is entered by the flight crew.

[L1] - **ENDURANCE**

Indicates the remaining time of flight taking into account long range cruise speed, and the remaining Fuel On Board (FOB). It is expressed in hours and minutes.

This is a flight crew entry.

- **DEVIATING**

Indicates the offset of the aircraft with respect to the defined flight plan. The flight crew selects the DEVIATING information by ticking the box in front of the DEVIATING label. When the box is ticked, the associated DEVIATING field is mandatory.

- **CLIMBING/DESCENDING TO**

These two selections are exclusive. The flight crew selects the field by ticking the box in front of the CLIMBING TO, or DESCENDING TO label. When one box is ticked, the associated altitude field is mandatory.

The target altitude is entered on the FCU, and sent via the FMS.

ERASE ALL FIELDS BUTTON

ERASE
ALL FIELDS

When clicked, clears all fields of the displayed position report. The flight crew can only click on this button if there is at least one field that is completed with data.

REFRESH DATA BUTTON

REFRESH
DATA

When clicked, updates the data displayed on the REPORT/AUTO & MANUAL POSITION page.
All fields are completed with data from the FMS except ICING, TURBULENCE and ENDURANCE fields that are emptied, and the freetext messages that do not change.

ADD FREETEXT BUTTON / MODIFY FREETEXT BUTTON

ADD
FREETEXT

When clicked, the MFD page changes to FREETEXT.

On this page:

- The AUTO POSITION REPORT indication is not displayed
- All position report data appear in non-modifiable format
- Only the freetext frame can be modified
- There is a RETURN TO REPORT button that enables to go back to the basic page.



MODIFY
FREETEXT

Displayed instead of the ADD FREETEXT button, when the flight crew has edited the freetext frame.

XFR TO MAILBOX BUTTON

L12



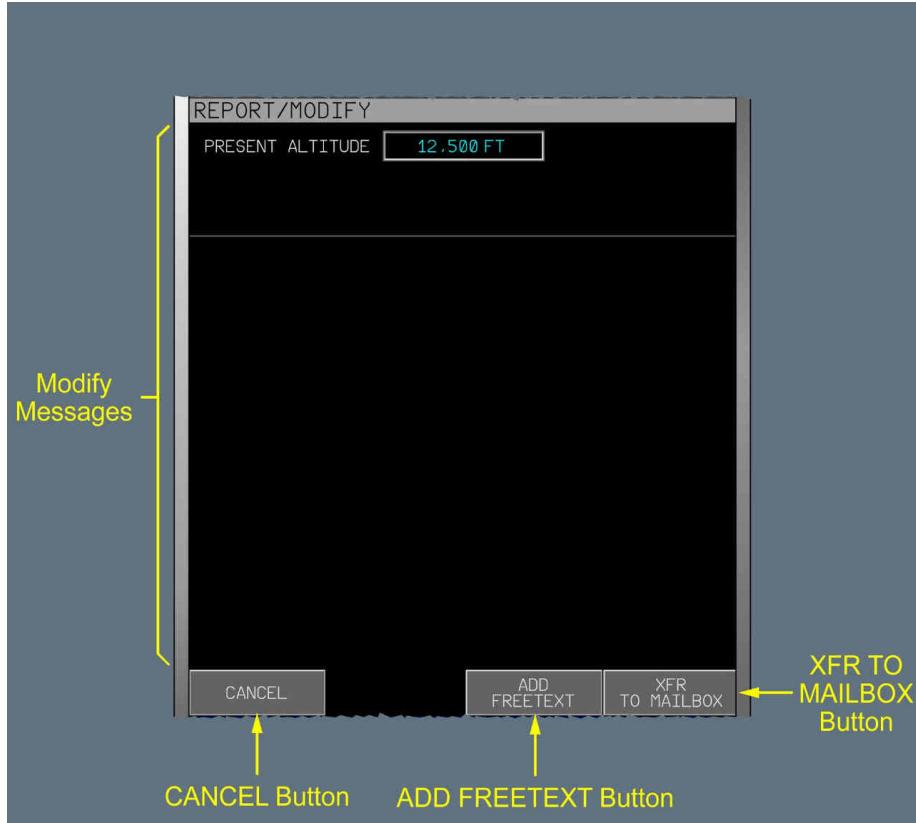
XFR
TO MAILBOX

When clicked, the position report is transferred to the mailbox.

This is only possible if all mandatory fields, indicated by amber boxes (if empty), are correctly completed.

MODIFY PAGE

Applicable to: ALL

REPORT/MODIFY Page**MESSAGE MODIFICATION AREA**

Enables the flight crew to modify a downlink message that is displayed in the mailbox, before to sending it to the ground.



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CANCEL BUTTON



When clicked, closes the MODIFY page, and the default ATC COM page appears.

ADD FREETEXT BUTTON



When clicked, displays a freetext frame at the bottom of the page, if available.

A RETURN TO REPORT button enables the flight crew to go back to the basic MODIFY page.

XFR TO MAILBOX BUTTON

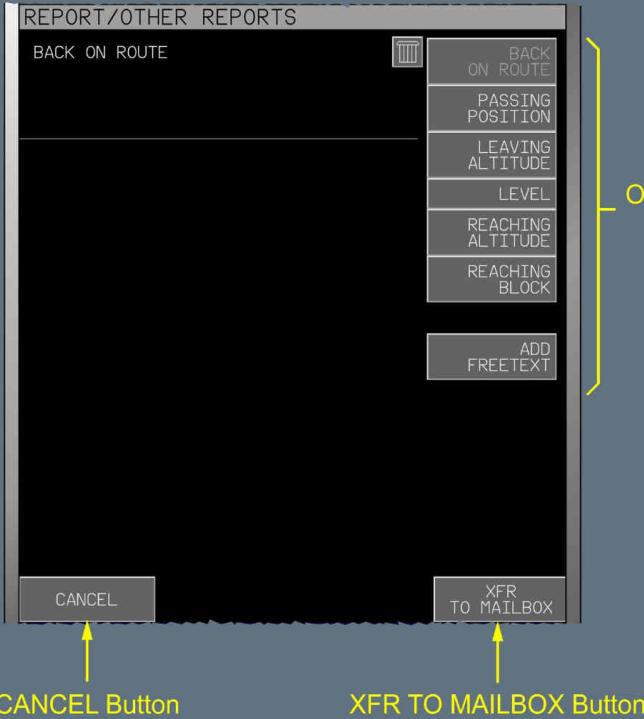
L12

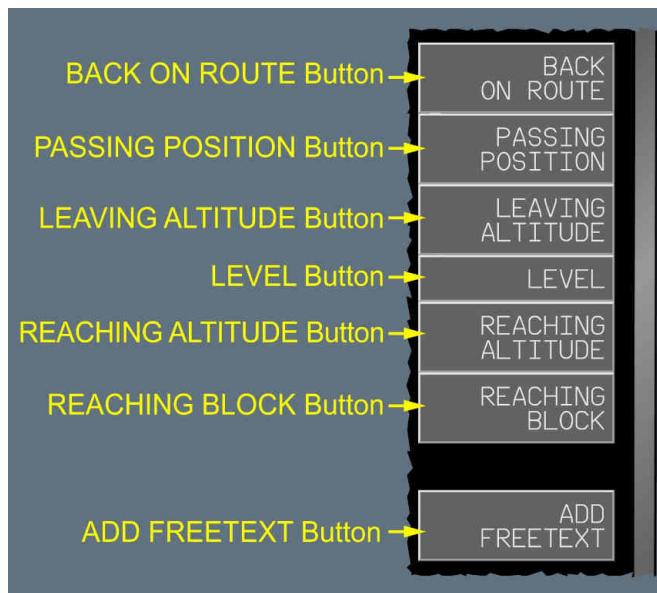


When clicked, transfers the modified data to the mailbox. This is only possible if all mandatory fields, indicated by amber boxes (when empty), are correctly completed.

OTHER REPORTS PAGE

Applicable to: ALL

REPORT/OTHER REPORTS Page

OTHER REPORTS MENUOTHER REPORTS Menu**BACK ON ROUTE**

Indicates that the aircraft has returned to its initial route.

PASSING POSITION

Indicates the current position of the aircraft.

LEAVING ALTITUDE

Indicates that the aircraft is leaving its current altitude.

LEVEL

Indicates the current altitude of the aircraft.

REACHING ALTITUDE

Indicates the altitude that the aircraft has reached.

REACHING BLOCK

Indicates the altitude zone that the aircraft has reached.

ADD FREETEXT

Enables the flight crew to add information in a freetext area displayed at the bottom of the page.

CANCEL BUTTONA dark grey rectangular button with a white border and the word "CANCEL" centered in white capital letters.

CANCEL

When clicked, deletes any report displayed on the MFD.

XFR TO MAILBOX BUTTON

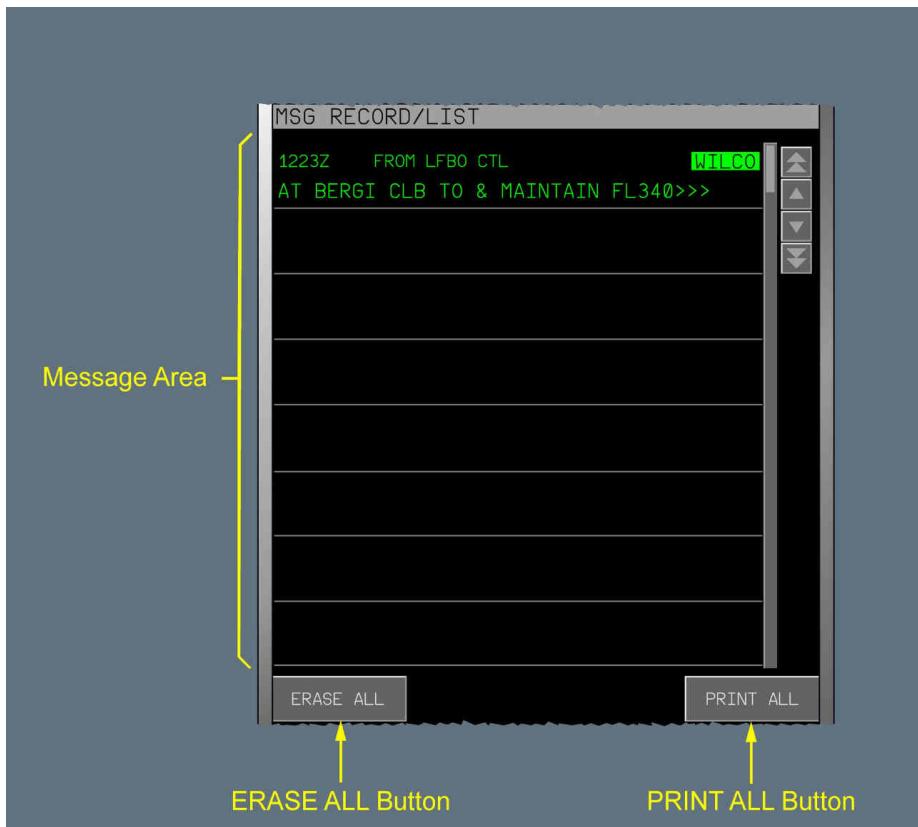
L12 A dark grey rectangular button with a white border and the text "XFR TO MAILBOX" centered in white capital letters.

XFR
TO MAILBOX

When clicked, transfers any valid report to the mailbox. This is only possible if all mandatory fields, indicated by amber boxes (when empty), are correctly completed.

MSG RECORD/LIST PAGE

Applicable to: ALL

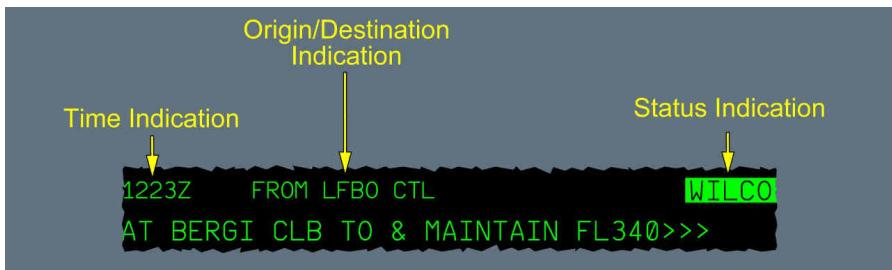
MSG RECORD/LIST Page**MESSAGES AREA**

Messages exchanged between ATC centers and the aircraft are stored in this area, starting with the most recent.

When the flight crew clicks on any message, the MSG RECORD / ZOOM page appears and the entire message is displayed.

To display the list again, the flight crew must click on the RETURN TO LIST button.

If no message is stored, a **NO STORED MSG** message appears in the middle of the page.



TIME

Indicates the UTC time:

- At which the ATC center sends the message, for an uplink message
- At which the flight crew sends the message to the ATC center, for a downlink message.

ORIGIN / DESTINATION

Indicates the active ATC center that sent / received the message.

STATUS

The following indicates the various possible responses of the flight crew to a message from an active ATC center:

AFFIRM

The flight crew responds "Yes".

NEGATIVE

The flight crew responds "No".

OPEN

Indicates a lost of acknowledgement from a downlink or a response message.

ROGER

The flight crew has received and understood the uplink message.


STANDBY

The flight crew postpones the decision to accept, or not accept the air traffic controller clearance.


UNABLE

The flight crew is not able to perform the clearance.


WILCO

The flight crew will comply to perform the clearance.

Note: *The status field is empty for:*

- A downlink message sent to the active ATC center
- An uplink message for which no response is expected.

ERASE ALL BUTTON


ERASE ALL

When clicked, and after confirmation, erases all recorded messages from the list.

Note: *If the flight crew clicks on this button while one of the recorded message appears on the other MFD, no message is erased and the MSG RECORD USED OFFSIDE message appears in the ATC COM Message Area.*

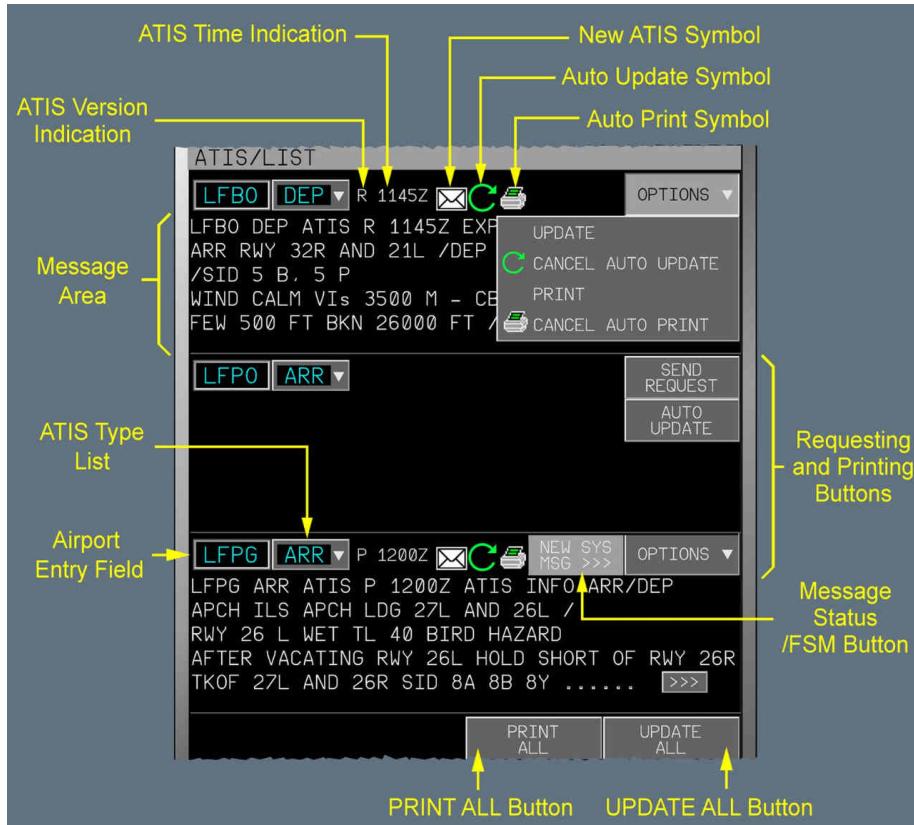
PRINT ALL BUTTON


PRINT ALL

When clicked, prints all saved messages.

ATIS/LIST PAGE

Applicable to: ALL

ATIS/LIST Page**AIRPORT ENTRY FIELD**

Enables the flight crew to enter the ICAO code of the airport to which the request is sent.

ATIS TYPE LIST

Enables the flight crew to indicate if the airport selected for the associated request area is the departure airport (DEP), destination airport (ARR), or an alternate airport (ARR).

ATIS VERSION INDICATION

- Z Indicates the version of the ATIS message conveyed by the received ATIS uplink report (e.g. "A").
- The version of the ATIS message is not available.

ATIS TIME INDICATION

- 1245Z Indicates the time of the ATIS message conveyed by the received ATIS uplink report.
- The time of the ATIS report is not available.

NEW ATIS SYMBOL

Indicates that a new ATIS message has been received.

The symbol disappears when:

- The flight crew displays the ATIS/LIST page on the MFD, if the new ATIS message is entirely displayed on the ATIS/LIST page, or
- The flight crew displays the ATIS/LIST page on the MFD, and displays the new ATIS message on the ATIS/RECEIVED page, because the new ATIS message cannot be entirely displayed on the ATIS/LIST page.

AUTO UPDATE SYMBOL

Indicates that the flight crew has selected the auto update function from the OPTIONS menu.

The ATIS message is automatically updated when a new ATIS version is available.

AUTO PRINT SYMBOL

Indicates that the flight crew has selected the auto print function from the OPTIONS menu.

The ATIS message is automatically printed when a new ATIS version is available.

MESSAGE STATUS / FSM BUTTON**PREDEFINED MESSAGES**

As soon as a predefined message is received, the associated indication appears on the Message Status / FSM (Flight System Message) button.

| Indication Displayed | Meaning |
|----------------------|--|
| SENDING | Appears when the flight crew clicks on: <ul style="list-style-type: none">- The REQUEST button, or- The AUTO UPDATE button, or- The UPDATE item of the OPTIONS menu, or- The AUTO UPDATE option of the OPTIONS menu. |
| SENT | Appears when the message is received on ground. |
| USE VOICE | Appears when: <ul style="list-style-type: none">- The ATC center detects a problem in the ATIS request, or- ATIS is not available at the ATC center. |
| SEND AGAIN | Appears when: <ul style="list-style-type: none">- The request becomes 'downlink lost', or- There is timeout of the operational T_{ATIS} timer, or- There is timeout of the operational T_{ACK} timer, or- There is timeout of the T_{FSM} timer, or- The ATC center receives an ATIS request that is not valid. The flight crew is requested to resubmit a request. |
| NO AUTO UPDATE | Appears when the ATC center does not support automatic update contract. However, it will send a single ATIS message. |
| END OF UPDATE | Appears when: <ul style="list-style-type: none">- The ATC center has received a message indicating the end of the automatic update contract, and closes the automatic update process, or- The ATC center has deleted the aircraft from its list of "aircraft under ATIS automatic update contract". |

NON PREDEFINED MESSAGES

As soon as a message that is not predefined is received, the NEW SYS MSG >>> indication appears on the Message Status / FSM button.

When the flight crew clicks on the button, the ATIS / SYS MSG page appears on the MFD. The flight crew should click on the RETURN TO LIST button to display the ATIS/LIST page again.

As soon as the flight crew viewed this message, the indication of the Message Status / FSM button becomes SYS MSG >>>.

REQUESTING AND PRINTING BUTTONS

When either the AIRPORT entry field, or the ATIS TYPE list are updated, the SEND REQUEST and AUTO UPDATE buttons appears.

The OPTIONS button appears when the ATIS request has been accepted by the ATC center.

SEND REQUEST BUTTON

When clicked, sends the ATIS request.

AUTO UPDATE BUTTON

When clicked, sends the ATIS auto update request.

OPTIONS BUTTON

When clicked, displays a list including the following options:

UPDATE

When clicked, sends an ATIS update request.

AUTO UPDATE/CANCEL AUTO UPDATE

When clicked, selects or deselects the auto update function.

PRINT

When clicked, prints the last received ATIS message.

AUTO PRINT/CANCEL AUTO PRINT

When clicked, selects or deselects the auto print function.

MESSAGE AREA

The ATIS messages appear in this area.

- [L3] The message area has a capacity of 5 lines and a maximum capacity of 215 characters as follows:
- 44 characters on each of the four first lines
 - 39 characters on the fifth line.
- [L1] When the ATIS message cannot be entirely displayed in the message area, dots appear instead of the last 9 characters.
The flight crew can display the ATIS message entirely on the ATIS/RECEIVED page by clicking on the >>> button.
- To go back to the ATIS/LIST page, the flight crew must click on the RETURN TO LIST button.

PRINT ALL BUTTON
PRINT
ALL

When clicked, prints all the ATIS messages that are currently displayed.

UPDATE ALL BUTTON
UPDATE
ALL

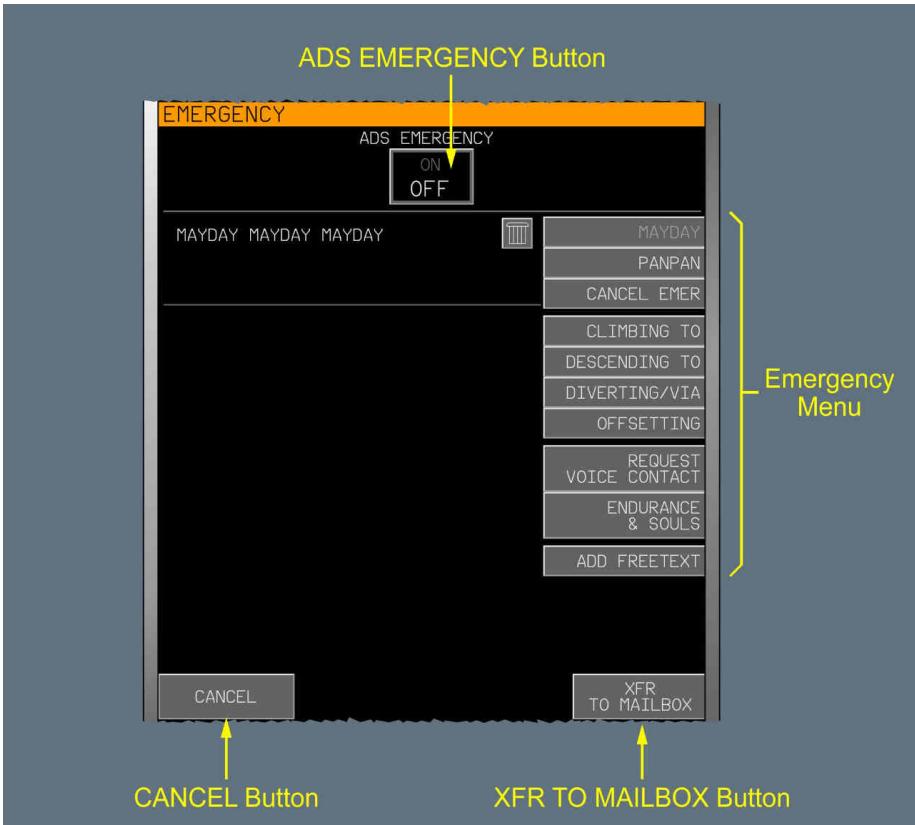
When clicked, initiates a new ATIS request to the ATC center for all ATIS areas, except those for which:

- An auto update contract is already active, or
- An update request is in 'waiting' state.

Note: If communication is not available, when the UPDATE ALL button is clicked, there are no changes on the ATIS/LIST page and the COM DATALINK NOT AVAIL, CHECK RMP COM STATUS PAGE message appears in the ATC COM message area.

EMERGENCY PAGE

Applicable to: ALL

EMERGENCY Page**ADS EMERGENCY BUTTON**

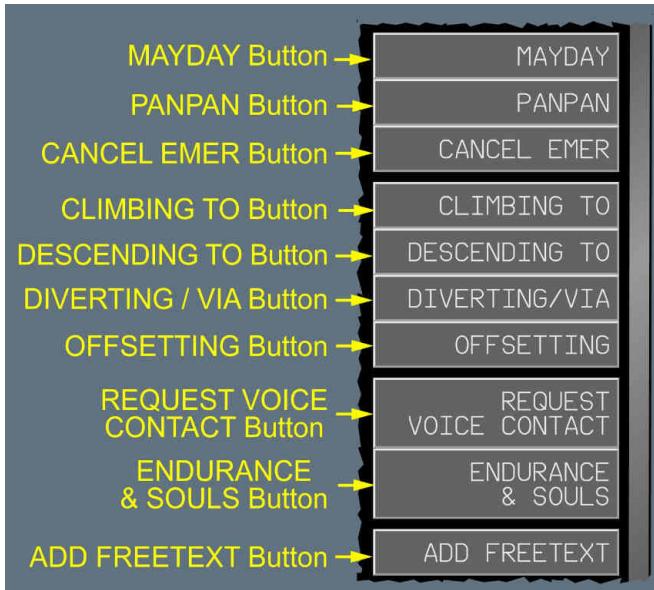
The ADS Emergency is OFF.
This is the default position.



The ADS Emergency is ON.

EMERGENCY MENU

EMERGENCY Menu



MAYDAY BUTTON

When clicked, a downlink message, that indicates a critical failure on board, is generated. The ADS Emergency mode automatically comes on when the MAYDAY message is sent. The "SENDING MAYDAY WILL SWITCH ADS TO EMERGENCY" message appears in the ATC COM message area.

PANPAN BUTTON

When clicked, a downlink message, that indicates a major failure on board, is generated.

CANCEL EMER BUTTON

When clicked, a downlink message, that cancels the previous emergency message that the flight crew has sent, is generated.

At the same time, the ADS emergency mode is deselected.

CLIMBING TO BUTTON

When clicked, displays the FCU-selected altitude for climb.

If the DESCENDING TO option is already displayed on the MFD, it disappears if the flight crew clicks on the CLIMBING TO button.

DESCENDING TO BUTTON

When clicked, displays the FCU-selected altitude for descent.

If the CLIMBING TO option is already displayed on the MFD, it disappears if the flight crew clicks on the DESCENDING TO button.

DIVERTING/VIA BUTTON

When clicked, enables the flight crew to enter the route or airport to which the aircraft is diverting.

OFFSETTING

When clicked, displays the offset value from the flight plan.

REQUEST VOICE CONTACT BUTTON

When clicked, enables the flight crew to request the voice communication with the ATC center. The entry field enables the flight crew to indicate the frequency at which it requests to contact the ATC center.

The default frequency value is 121.5 MHz.

ENDURANCE & SOULS BUTTON

When clicked, displays the ENDURANCE and SOULS ON BOARD entry fields.

The ENDURANCE entry field enables the flight crew to enter the maximum remaining flight time, limited by fuel autonomy.

The SOULS ON BOARD entry field enables the flight crew to enter the number of people on board.

ADD FREETEXT

When clicked, displays a free text area, that enables the flight crew to add freetext.

XFR TO MAILBOX BUTTON

L12

 XFR
TO MAILBOX

When clicked, transfers any valid emergency message to the ATC mailbox.

This is only possible if all mandatory fields, indicated by amber boxes (when empty), are correctly completed.

CANCEL BUTTON CANCEL

When clicked, deletes all emergency message displayed on the MFD.



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MFD - ATC COM Messages

ATC COM MESSAGES AREA

Applicable to: ALL

The ATC COM message area displays messages on two lines of 33 characters.
The flight crew can clear the displayed message by clicking on the CLEAR INFO button, or by pressing the CLR INFO key on the KCCU.

ATIS USED OFFSIDE

Applicable to: ALL

Appears when one flight crewmember's MFD displays the ATIS/RECEIVED page, and the other flight crewmember modifies the AIRPORT entry field or the ATIS TYPE list on the ATIS/LIST page on his MFD.

COM DATALINK NOT AVAIL CHECK RMP COM STATUS PAGE

Applicable to: ALL

Appears to check, on the COM STATUS page on the RMP, the availability of the communication means that have datalink capability.

DESELECT AUTO UPDATE

Applicable to: ALL

Appears when an auto update request contract is active and no previous ATIS cancel auto update request has been sent to the ground (i.e. the request is 'in progress' state).

ENTER OR CHECK FLT NUMBER IN FMS INIT PAGE

Applicable to: ALL

Appears when the flight crew clicks on any XFR TO MAILBOX button or clicks on the NOTIFY button of the NOTIFICATION page and the flight number is not available or not valid.

ENTRY OUT OF RANGE

Applicable to: ALL

Appears on the first line If a value entered by the flight crew is not in the correct range.
The data range, as appropriate and according to the data field type, as indicated in the table below, appears on the second line.



| Type of data | Out Of Range Messages |
|-------------------|---------------------------|
| Altitude | |
| Beacon code | RNG: 0000 TO 7777 |
| Distance | RNG: 1 TO 999.9 NM |
| Flight level | RNG: FL30 TO FL450 |
| Frequency | |
| Ground speed | RNG: 70 TO 700 KT |
| Heading or track | RNG: 0 TO 360 ° |
| Hour | RNG: 0 TO 23 H |
| Latency | RNG: 1 TO 999 S |
| Mach | RNG: M.61 TO M.92 |
| Minute | RNG: 0 TO 59 MN |
| Offset | RNG: 1 TO 128 NM |
| Position | |
| Position or time | |
| Remaining fuel | RNG: 0H00MIN TO 23H59MIN |
| Remaining souls | RNG: 1 TO 1024 |
| Speed | RNG: 70 TO 350 KT |
| Temperature | RNG: -80 TO 47 C |
| Time | RNG: 0000Z TO 2359Z |
| Vertical speed | RNG: -6000 TO 6000 FT/MIN |
| Weather Deviation | RNG: 1 TO 128 NM |
| Wind heading | RNG: 1 TO 360 ° |
| Wind speed | RNG: 0 TO 255 KT |

FMS ACFT POSITION NOT AVAIL NOTIFICATION NOT AVAIL

Applicable to: ALL

Appears when the flight crew clicks on the NOTIFY button of the NOTIFICATION page, and the aircraft position is not available.

FORMAT ERROR

Applicable to: ALL

Appears on the first line if a value entered by the flight crew is not valid.

The correct format, as indicated in the table below, appears on the second line.

| Type of data | Data Format Help Messages |
|---------------|----------------------------------|
| Aircraft type | FORMAT: XXXX |
| Airport | FORMAT: AAAA |
| Altitude | FORMAT: FOR ALT XXXXX FOR FL XXX |
| ATIS code | FORMAT: A |

Continued on the following page



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| Type of data | Data Format Help Messages |
|-------------------|----------------------------------|
| Beacon code | FORMAT: XXXX |
| Distance | FORMAT: XXXXNM/KM |
| Fix name | FORMAT: XXXXX |
| Flight level | FORMAT: FLXXX |
| Frequency | FORMAT: XXXXXX |
| Gate | FORMAT: XXXXX |
| Ground speed | FORMAT: XXXKT |
| Heading or track | FORMAT: XXX° |
| ICAO code | FORMAT: AAAA |
| Latency | FORMAT: SSS |
| Mach | FORMAT: .XX |
| Offset | FORMAT: XXXL/R |
| Position | FORMAT: WPT OR LAT/LONG |
| Position or time | FORMAT: POS XXXXX OR UTC HHMMZ |
| Procedure | FORMAT: XXXXXX |
| Remaining fuel | FORMAT: HHMM |
| Remaining souls | FORMAT: XXX |
| Speed | FORMAT: FOR CAS XXX FOR MACH .XX |
| Temperature | FORMAT: +/-XXC/F |
| Time | FORMAT: HHMMZ |
| Vertical speed | FORMAT: +/-XXXXFT/MIN OR M/MIN |
| Weather Deviation | FORMAT: XXXL/R/LR |
| Wind heading | FORMAT: XXX° |
| Wind speed | FORMAT: XXXKT/KM |

IDENTICAL ATIS REQUEST

Applicable to: ALL

Appears when:

- The flight crew enters the same ATIS type option in two ATIS request areas, and the Airport entry fields in both areas are the same, or
- The flight crew enters the same airport code in two ATIS request areas, and the ATIS type option in both areas are the same.

Note: *In both cases, the most recent modified element does not change.*



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LAST MSG ELEMENT

Applicable to: ALL

Appears when:

- There are five frames on the REQUEST page, or
- There is a DEPARTURE or OCEANIC frame on the REQUEST page, or
- There are five frames on the OTHER REPORTS page, or
- There are five frames on the EMERGENCY page.

MAILBOX FULL SEND, CANCEL OR CLOSE SOME MSG

Applicable to: ALL

Appears when the flight crew clicks on any XFR TO MAILBOX button, and the mailbox messages file is full.

MSG RECORD PARTLY LOST

Applicable to: ALL

Appears when there is a storage problem, and the MSG RECORD page is displayed.

MSG RECORD USED OFFSIDE

Applicable to: ALL

Appears when one flight crewmember's MFD displays the MSG RECORD/LIST page, and the other flight crewmember clicks on the ERASE ALL button of the MSG RECORD/LIST page on his MFD.

NEW ATIS RECEIVED

Applicable to: ALL

Appears when a new ATIS message is received and the ATIS/RECEIVED page is displayed.

NO FMS DATA

Applicable to: ALL

Appears when the flight crew clicks on the REFRESH DATA button or the AUTO POSITION REPORT button of the POSITION page, and FMS data are not available.



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PLEASE CHECK NOTIFICATION THEN WAIT FOR ATC CONNECTION

Applicable to: ALL

Appears when the flight crew sets the AUTO POSITION REPORT to ON, and there is no active datalink connection.

PLEASE WAIT : IN PROGRESS

Applicable to: ALL

Appears when the flight crew modifies the AIRPORT entry field or the ATIS TYPE list of the ATIS/LIST page, and:

- An ATIS request is in "waiting" mode, or
- An auto update request contract is active and a previous ATIS cancel auto update request has been sent to the ground.

PRINTER NOT AVAIL

Applicable to: ALL

Appears when the flight crew clicks on the auto print button of the ATIS page, and the printer is not available.

SENDING MAYDAY WILL SWITCH ADS TO EMERGENCY

Applicable to: ALL

Appears as soon as the flight crew clicks on the MAYDAY button on the EMERGENCY page.



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Intentionally left blank

MFD - Data Entry Format**DATA ENTRY FORMAT****Applicable to: ALL**

This chapter lists all data that the flight crew may enter on the MFD .

For all data, the table displays:

- The accepted format
- The accepted units
- The accepted range
- The page(s) where the flight crew enters the data.

The following characters are used to indicate the format:

- A: Letters
- B: Magnetic/ True reference
- N: Numbers
- X: Letters and Numbers.

Note: - *The units that the flight crew can enter are indicated in blue*
 - *In fields that have numerical data, leading zeros can be omitted.*

If the format entered is not valid, the "FORMAT ERROR" message appears in the ATC COM message area, followed by the associated correct format (*Refer to DSC-46-10-20-40 FORMAT ERROR*).

If the value entered is not valid, the "ENTRY OUT OF RANGE" message appears in the ATC COM message area, followed by the associated correct range (*Refer to DSC-46-10-20-40 ENTRY OUT OF RANGE*).

AIRPORT ENTRY FIELD**Applicable to: ALL**

| | |
|--------|------------------------------------|
| Format | XXXX |
| Range | Four alphanumeric characters |
| Page | ATIS/LIST (<i>Refer to Page</i>) |



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ALT

Applicable to: ALL

L12

| | |
|-------------------|--|
| Format | <p>FL NNN or NNN</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> <p>NNNNN FT or NNNNN</p> <p><u>Note:</u> - <i>Between 0 and 1000 feet, "FT" must be written</i> - <i>Leading zeros may be omitted.</i></p> <p>NNNNN M</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> |
| Units | <p>FL NNN: Hundreds of Feet (MSL)</p> <p>NNNNN FT : Foot</p> <p>NNNNN M : Meter</p> |
| Range | <p>FL NNN <i>Min : 30</i> <i>Max : 450</i></p> <p>NNNNN FT <i>Min : 0</i> <i>Max : 25 000</i></p> <p>NNNNN M <i>Min : 0</i> <i>Max : 13 700</i></p> |
| Resolution | <p>FL NNN: 10</p> <p>NNNNN FT : 100</p> <p>NNNNN M : 100</p> |
| Page | POSITION REPORT (Refer to Page) |



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ALTITUDE

Applicable to: ALL

L12

| | |
|-------------------|--|
| Format | FL NNN or NNN <i>Note:</i> <i>Leading zeros may be omitted</i> NNNNN FT or NNNNN <i>Note:</i> - Between 0 and 1000 feet, "FT" must be written. - Leading zeros may be omitted NNNNN M <i>Note:</i> <i>Leading zeros may be omitted</i> |
| Units | FL NNN: Hundreds of Feet (MSL) NNNNN FT : Foot NNNNN M : Meter |
| Range | FL NNN <i>Min</i> : 30 <i>Max</i> : 450 NNNNN FT <i>Min</i> : 0 <i>Max</i> : 25 000 NNNNN M <i>Min</i> : 0 <i>Max</i> : 13 700 |
| Resolution | FL NNN: 10 NNNNN FT : 100 NNNNN M : 100 |
| Page | REQUEST (<i>Refer to Page</i>) MODIFY (<i>Refer to Page</i>) |



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ASSIGNED ALTITUDE

Applicable to: ALL

L12

| | |
|-------------------|--|
| Format | <p>FL NNN or NNN</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> <p>NNNNN FT or NNNNN</p> <p><u>Note:</u> - <i>Between 0 and 1000 feet, "FT" must be written.</i> - <i>Leading zeros may be omitted</i></p> <p>NNNNN M</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> |
| Units | <p>FL NNN: Hundreds of Feet (MSL)</p> <p>NNNNN FT : Foot</p> <p>NNNNN M : Meter</p> |
| Range | <p>FL NNN <i>Min : 30</i> <i>Max : 450</i></p> <p>NNNNN FT <i>Min : 0</i> <i>Max : 25 000</i></p> <p>NNNNN M <i>Min : 0</i> <i>Max : 13 700</i></p> |
| Resolution | <p>FL NNN: 10 NNNNN FT : 100 NNNNN M : 100</p> |
| Page | MODIFY (Refer to Page) |

ASSIGNED SPD

Applicable to: ALL

L12

Continued on the following page



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AIRCRAFT SYSTEMS

46 - INFORMATION SYSTEMS

ATC - AIR TRAFFIC CONTROL DATALINK APPLICATIONS SYSTEM - CONTROLS AND INDICATORS

Continued from the previous page

| | |
|-------------------|--------------------------|
| Resolution | NNN: 1 M.NNN: 0.01 |
| Page | MODIFY (Refer to Page) |

AT

Applicable to: ALL

L12



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ATC CENTER

Applicable to: ALL

| | |
|--------|--------------------------------|
| Format | XXXX |
| Range | Maximum 4 letters |
| Page | NOTIFICATION (Refer to Page) |

ATIS

Applicable to: ALL

| | |
|--------|--------------------------|
| Format | A |
| Range | One letter |
| Page | MODIFY (Refer to Page) |

ATIS CODE

Applicable to: ALL

| | |
|--------|---------------------------|
| Format | A |
| Range | One letter |
| Page | REQUEST (Refer to Page) |

BLOCK

Applicable to: ALL

L12

| | |
|--------|---|
| Format | FL NNN or NNN <u>Note:</u> <i>Leading zeros may be omitted</i> NNNNN FT or NNNNN <u>Note:</u> <ul style="list-style-type: none">- Between 0 and 1000 feet, "FT" must be written.- Leading zeros may be omitted NNNNN M <u>Note:</u> <i>Leading zeros may be omitted</i> |
| Units | FL NNN: Hundreds of Feet (MSL) NNNNN FT : Foot NNNNN M : Meter |

Continued on the following page



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| | | |
|-------------------|---|--|
| Range | FL NNN <i>Min : 30</i> NNNN FT <i>Min : 0</i> NNNNN M <i>Min : 0</i> | <i>Max : 450</i> <i>Max : 25 000</i> <i>Max : 13 700</i> |
| Resolution | FL NNN: 10 NNNN FT : 100 NNNNN M : 100 | |
| Page | REQUEST (Refer to Page) | |

CAS SPEED

Applicable to: ALL

L12

| | |
|-------------------|---|
| Format | NNN or NNN KT <i>Note: Leading zeros may be omitted</i> M .NN or .NN <i>Note: The decimal point must be written, trailing zeros may be omitted</i> |
| Units | NNN: Knot M .NN: Mach |
| Range | NNN: <i>Min : 70</i> <i>Max : 350</i> M .NN: <i>Min : .61</i> <i>Max : .92</i> |
| Resolution | NNN: 1 M .NN: 0.01 |
| Page | POSITION REPORT (Refer to Page) |



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CLB TO

Applicable to: All

12

| | |
|-------------------|--|
| Format | <p>FL NNN or NNN</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> <p>NNNNN FT or NNNNN</p> <p><u>Note:</u> - <i>Between 0 and 1000 feet, "FT" must be written.</i> - <i>Leading zeros may be omitted</i></p> <p>NNNNN M</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> |
| Units | <p>FL NNN: Hundreds of Feet (MSL)</p> <p>NNNNN FT : Foot</p> <p>NNNNN M : Meter</p> |
| Range | <p>FL NNN <i>Min : 30</i> <i>Max : 450</i></p> <p>NNNNN FT <i>Min : 0</i> <i>Max : 25 000</i></p> <p>NNNNN M <i>Min : 0</i> <i>Max : 13 700</i></p> |
| Resolution | <p>FL NNN: 10 NNNNN FT : 100 NNNNN M : 100</p> |
| Page | REQUEST (Refer to Page) |



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CLBING TO

Applicable to: ALL

L12

| | |
|-------------------|--|
| Format | FL NNN or NNN <i>Note:</i> <i>Leading zeros may be omitted</i> NNNNN FT or NNNNN <i>Note:</i> - Between 0 and 1000 feet, "FT" must be written. - Leading zeros may be omitted NNNNN M <i>Note:</i> <i>Leading zeros may be omitted</i> |
| Units | FL NNN: Hundreds of Feet (MSL) NNNNN FT : Foot NNNNN M : Meter |
| Range | FL NNN <i>Min</i> : 30 <i>Max</i> : 450 NNNNN FT <i>Min</i> : 0 <i>Max</i> : 25 000 NNNNN M <i>Min</i> : 0 <i>Max</i> : 13 700 |
| Resolution | FL NNN: 10 NNNNN FT : 100 NNNNN M : 100 |
| Page | POSITION REPORT (Refer to Page) |



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CLIMBING TO

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CRUISE CLB TO

Applicable to: ALL

L12

| | |
|-------------------|--|
| Format | <p>FL NNN or NNN</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> <p>NNNNN FT or NNNNN</p> <p><u>Note:</u> - <i>Between 0 and 1000 feet, "FT" must be written.</i> - <i>Leading zeros may be omitted</i></p> <p>NNNNN M</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> |
| Units | <p>FL NNN: Hundreds of Feet (MSL)</p> <p>NNNNN FT : Foot</p> <p>NNNNN M : Meter</p> |
| Range | <p>FL NNN <i>Min : 30</i> <i>Max : 450</i></p> <p>NNNNN FT <i>Min : 0</i> <i>Max : 25 000</i></p> <p>NNNNN M <i>Min : 0</i> <i>Max : 13 700</i></p> |
| Resolution | <p>FL NNN: 10 NNNNN FT : 100 NNNNN M : 100</p> |
| Page | REQUEST (Refer to Page) |

DEPARTURE ARPT

Applicable to: ALL

| | |
|---------------|------------------------------|
| Format | XXXX |
| Range | Four alphanumeric characters |
| Page | REQUEST (Refer to Page) |



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DESKTOP

Applicable to: ALL

12

| | |
|-------------------|--|
| Format | <p>FL NNN or NNN</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> <p>NNNNN FT or NNNNN</p> <p><u>Note:</u> - <i>Between 0 and 1000 feet, "FT" must be written.</i> - <i>Leading zeros may be omitted</i></p> <p>NNNNN M</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> |
| Units | <p>FL NNN: Hundreds of Feet (MSL)</p> <p>NNNNN FT : Foot</p> <p>NNNNN M : Meter</p> |
| Range | <p>FL NNN <i>Min : 30</i> <i>Max : 450</i></p> <p>NNNNN FT <i>Min : 0</i> <i>Max : 25 000</i></p> <p>NNNNN M <i>Min : 0</i> <i>Max : 13 700</i></p> |
| Resolution | <p>FL NNN: 10 NNNNN FT : 100 NNNNN M : 100</p> |
| Page | <p>POSITION REPORT (<i>Refer to Page</i>)</p> <p>REQUEST (<i>Refer to Page</i>)</p> |



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DESCENDING TO

Applicable to: ALL

| 12

DESTINATION

Applicable to: All

| | |
|---------------|------------------------------|
| Format | XXXX |
| Range | Four alphanumeric characters |
| Page | REQUEST (Refer to Page) |



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DEVIATING

Applicable to: ALL

L12

| | |
|-------------------|---|
| Format | NNND, DNNN, NNN NM D or DNNN NM NNN KM D or DNNN KM D: Offsetting Direction <u>Note:</u> <i>Leading zeros may be omitted</i> |
| Units | NNN: Nautical Mile NNN KM : Kilometer |
| Range | D: L (Left), R (Right) or nothing NNN: <i>Min</i> : 1 <i>Max</i> : 128 NNN KM : <i>Min</i> : 1 <i>Max</i> : 256 |
| Resolution | NNN: 1 NNN KM : 1 |
| Page | POSITION REPORT (<i>Refer to Page</i>) MODIFY (<i>Refer to Page</i>) |

DIR TO

Applicable to: ALL

L12

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| | |
|-------------------|---------------------------|
| Resolution | DD, EEE: 1 MM.M: 0.1 |
| Page | REQUEST (Refer to Page) |

DISTANCE

Applicable to: ALL

L12

DIVERTING TO / VIA

Applicable to: ALL

L12

| | |
|---------------|---|
| Format | XXXXX <i>Note:</i> If one editbox is filled in, the other one must also be filled in |
| Range | Min : 1 alphanumeric character Max : 5 alphanumeric characters |
| Page | EMERGENCY (Refer to Page) |

ENDURANCE

Applicable to: ALL

| | |
|---------------|--|
| Format | HHMM HH H MM M HH H MM MN HH H MM MIN |
| Units | HH: Hour MM: Minute |

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| | |
|-------------------|--|
| Range | HH <i>Min : 0</i> <i>Max : 23</i> MM <i>Min : 0</i> <i>Max : 59</i> |
| Resolution | HH: 1 MM: 1 |
| Page | POSITION REPORT (<i>Refer to Page</i>) EMERGENCY (<i>Refer to Page</i>) |

ENSUING WPT

Applicable to: ALL

L12

| | |
|-------------------|--|
| Format | XXXXX DDMM.MB/EEEMM.MC or BDDMM.M/CEEEMM.M <i>Note:</i> Leading zeros may be omitted |
| Units | DD: Latitude Degree EEE: Longitude Degree MM.M: Minute |
| Range | XXXX: <i>Min : 1</i> alphanumeric character <i>Max : 5</i> alphanumeric characters DD: <i>Min : 0</i> <i>Max : 90</i> B: N or S EEE: <i>Min : 0</i> <i>Max : 180</i> C: E or W MM.M: <i>Min : 0</i> <i>Max : 59.9</i> |
| Resolution | DD, EEE: 1 MM.M: 0.1 |
| Page | MODIFY (<i>Refer to Page</i>) |



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ENTRY POINT

Applicable to: ALL

L12

| | |
|-------------------|--|
| Format | XXXXX DDMM.MB/EEEMM.MC or BDDMM.M/CEEEMM.M <i>Note:</i> <i>Leading zeros may be omitted</i> |
| Units | DD: Latitude Degree EEE: Longitude Degree MM.M: Minute |
| Range | XXXX: <i>Min</i> : 1 alphanumeric character <i>Max</i> : 5 alphanumeric characters DD: <i>Min</i> : 0 <i>Max</i> : 90 B: N or S EEE: <i>Min</i> : 0 <i>Max</i> : 180 C: E or W MM.M: <i>Min</i> : 0 <i>Max</i> : 59.9 |
| Resolution | DD, EEE: 1 MM.M: 0.1 |
| Page | REQUEST (Refer to Page) |

ETA

Applicable to: ALL

| | |
|-------------------|--|
| Format | HHMM HHMM Z HH H MM M HH H MM MN HH H MM MIN |
| Units | HH: Hour MM: Minute |
| Range | HH <i>Min</i> : 0 <i>Max</i> : 23 MM <i>Min</i> : 0 <i>Max</i> : 59 |
| Resolution | HH: 1 MM: 1 |
| Page | REQUEST (Refer to Page) |



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ETA DEST

Applicable to: ALL

| | |
|------------|--|
| Format | HHMM HHMM Z HH H MM M HH H MM MN HH H MM MIN |
| Units | HH: Hour MM: Minute |
| Range | HH Min : 0 Max : 23 MM Min : 0 Max : 59 |
| Resolution | HH: 1 MM: 1 |
| Page | POSITION REPORT (Refer to Page) |

FREETEXT

Applicable to: ALL

| | |
|--------|--|
| Format | Any character that belongs to [A..Z], [0..9], [], [/], [+], [-], [,] |
| Range | Maximum of 96 characters |
| Page | REQUEST (Refer to Page) POSITION REPORT (Refer to Page) MODIFY (Refer to Page) OTHER REPORTS (Refer to Page) EMERGENCY (Refer to Page) |

GATE

Applicable to: ALL

| | |
|--------|---------------------------|
| Format | AAAAA |
| Range | Maximum 5 letters |
| Page | REQUEST (Refer to Page) |



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GROUND SPEED

Applicable to: ALL

L12

| | |
|---|--|
| Format | NNN or NNN KT |
| <i>Note:</i> Leading zeros may be omitted | |
| Units | NNN: Knot |
| Range | NNN: <i>Min</i> : 70 <i>Max</i> : 700 |
| Resolution | NNN: 10 |
| Page | POSITION REPORT (Refer to Page) |

GROUND TRACK

Applicable to: ALL

L12

| | |
|---|--|
| Format | NNN NNN T |
| <i>Note:</i> Leading zeros may be omitted | |
| Units | NNN: Magnetic Degree NNN T : True Degree |
| Range | NNN <i>Min</i> : 1 <i>Max</i> : 360 <i>Note:</i> 360 is displayed as 0 NNN T <i>Min</i> : 1 <i>Max</i> : 360 <i>Note:</i> 360T is displayed as 0T |
| Resolution | NNN, NNN T : 1 |
| Page | REQUEST (Refer to Page) |



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HDG

Applicable to: ALL

12

| | |
|-------------------|--|
| Format | NNN NNN T <u>Note:</u> <i>Leading zeros may be omitted</i> |
| Units | NNN: Magnetic Degree NNN T : True Degree |
| Range | NNN <i>Min : 1</i> <i>Max : 360</i> <u>Note:</u> <i>360 is displayed as 0</i> NNN T <i>Min : 1</i> <i>Max : 360</i> <u>Note:</u> <i>360T is displayed as 0T</i> |
| Resolution | NNN, NNN T : 1 |
| Page | REQUEST (Refer to Page) |

HEADING

Applicable to: All

L12



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ICING

Applicable to: All

| | |
|---------------|--|
| Format | X |
| Range | < >, means that no information about icing conditions is available. TRACE LIGHT MODERATE SEVERE |
| Page | POSITION REPORT (Refer to Page) |

LEAVING

Applicable to: ALL

L12



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LEVEL

Applicable to: All

12

MACH

Applicable to: All

12

| | |
|-------------------|---|
| Format | M .NN or .NN <u>Note:</u> The decimal point must be written, trailing zeros may be omitted |
| Units | M.NN: Mach |
| Range | M.NN: Min : .61 Max : .92 |
| Resolution | M.NN: 0.01 |
| Page | REQUEST (Refer to Page) |



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MAX UPLINK DELAY

Applicable to: ALL

NEXT

Applicable to: ALL

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NEXT WPT

Applicable to: ALL

L12

| | |
|------------|---|
| Format | XXXXX DDMM.MB/EEEMM.MC or BDDMM.M/CEEEMM.M <i>Note:</i> Leading zeros may be omitted |
| Units | DD: Latitude Degree EEE: Longitude Degree MM.M: Minute |
| Range | XXXXX: Min : 1 alphanumeric character Max : 5 alphanumeric characters DD: Min : 0 Max : 90 B: N or S EEE: Min : 0 Max : 180 C: E or W MM.M: Min : 0 Max : 59.9 |
| Resolution | DD, EEE: 1 MM.M: 0.1 |
| Page | MODIFY (Refer to Page) |

NEXT WPT ETA

Applicable to: ALL

| | |
|------------|--|
| Format | HHMM HHMM Z HH H MM M HH H MM MN HH H MM MIN |
| Units | HH: Hour MM: Minute |
| Range | HH Min : 0 Max : 23 MM Min : 0 Max : 59 |
| Resolution | HH: 1 MM: 1 |
| Page | MODIFY (Refer to Page) |



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OCEANIC CENTER

Applicable to: ALL

| | |
|---------------|---------------------------|
| Format | XXXX |
| Range | Maximum 4 letters |
| Page | REQUEST (Refer to Page) |

OFFSET

Applicable to: ALL

L12

| | |
|-------------------|---|
| Format | NNND, DNNN, NNN NM D or DNNN NM NNN KM D or DNNN KM D: Offsetting Direction <u>Note:</u> <i>Leading zeros may be omitted</i> |
| Units | NNN: Nautical Mile NNN KM : Kilometer |
| Range | D: L (Left), R (Right) or nothing NNN: <i>Min</i> : 1 <i>Max</i> : 128 NNN KM : <i>Min</i> : 1 <i>Max</i> : 256 |
| Resolution | NNN: 1 NNN KM : 1 |
| Page | REQUEST (<i>Refer to Page</i>) MODIFY (<i>Refer to Page</i>) |

OFFSETTING

Applicable to: All

L12

| | |
|---------------|---|
| Format | NNND, DNNN, NNN NM D or DNNN NM NNN KM D or DNNN KM D: Offsetting Direction <i>Note:</i> <i>Leading zeros may be omitted</i> |
| Units | NNN: Nautical Mile NNN KM : Kilometer |

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| | |
|-------------------|--|
| Range | D: L (Left), R (Right) or nothing NNN: <i>Min : 1</i> <i>Max : 128</i> NNN KM : <i>Min : 1</i> <i>Max : 256</i> |
| Resolution | NNN: 1 NNN KM : 1 |
| Page | EMERGENCY (Refer to Page) |

OVHD

Applicable to: ALL

L12

| | |
|-------------------|--|
| Format | XXXXX DDMM.MB/EEEMM.MC or BDDMM.M/CEEEMM.M <i>Note:</i> Leading zeros may be omitted |
| Units | DD: Latitude Degree EEE: Longitude Degree MM.M: Minute |
| Range | XXXX: Min : 1 alphanumeric character Max : 5 alphanumeric characters DD: <i>Min : 0</i> <i>Max : 90</i> B: N or S EEE: <i>Min : 0</i> <i>Max : 180</i> C: E or W MM.M: <i>Min : 0</i> <i>Max : 59.9</i> |
| Resolution | DD, EEE: 1 MM.M: 0.1 |
| Page | POSITION (Refer to Page) |



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PASSING

Applicable to: ALL

L12

| | |
|-------------------|---|
| Format | XXXXX DDMM.MB/EEEMM.MC or BDDMM.M/CEEEMM.M <i>Note:</i> <i>Leading zeros may be omitted</i> |
| Units | DD: Latitude Degree EEE: Longitude Degree MM.M: Minute |
| Range | XXXXX: <i>Min</i> : 1 alphanumeric character <i>Max</i> : 5 alphanumeric characters DD: <i>Min</i> : 0 <i>Max</i> : 90 B: N or S EEE: <i>Min</i> : 0 <i>Max</i> : 180 C: E or W MM.M: <i>Min</i> : 0 <i>Max</i> : 59.9 |
| Resolution | DD, EEE: 1 MM.M: 0.1 |
| Page | MODIFY (Refer to Page) OTHER REPORTS (Refer to Page) |

POSITION

Applicable to: ALL

L12

| | |
|---------------|---|
| Format | XXXXX DDMM.MB/EEEMM.MC or BDDMM.M/CEEEMM.M <i>Note:</i> <i>Leading zeros may be omitted</i> |
| Units | DD: Latitude Degree EEE: Longitude Degree MM.M: Minute |

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| | |
|-------------------|---|
| Range | XXXXX: <i>Min : 1 alphanumeric character</i> <i>Max : 5 alphanumeric characters</i> DD: <i>Min : 0</i> <i>Max : 90</i> B: N or S EEE: <i>Min : 0</i> <i>Max : 180</i> C: E or W MM.M: <i>Min : 0</i> <i>Max : 59.9</i> |
| Resolution | DD, EEE: 1 MM.M: 0.1 |
| Page | MODIFY (<i>Refer to Page</i>) |

PPOS

Applicable to: ALL

L12

| | |
|-------------------|---|
| Format | XXXXX DDMM.MM/EEEMM.MC or BDDMM.M/CEEEMM.M <i>Note:</i> <i>Leading zeros may be omitted</i> |
| Units | DD: Latitude Degree EEE: Longitude Degree MM.M: Minute |
| Range | XXXXX: <i>Min : 1 alphanumeric character</i> <i>Max : 5 alphanumeric characters</i> DD: <i>Min : 0</i> <i>Max : 90</i> B: N or S EEE: <i>Min : 0</i> <i>Max : 180</i> C: E or W MM.M: <i>Min : 0</i> <i>Max : 59.9</i> |
| Resolution | DD, EEE: 1 MM.M: 0.1 |
| Page | POSITION REPORT (<i>Refer to Page</i>) |



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PRESENT ALTITUDE

Applicable to: ALL

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| | |
|-------------------|--|
| Format | <p>FL NNN or NNN</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> <p>NNNNN FT or NNNNN</p> <p><u>Note:</u> <ul style="list-style-type: none">- <i>Between 0 and 1000 feet, "FT" must be written.</i>- <i>Leading zeros may be omitted</i></p> <p>NNNNN M</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> |
| Units | <p>FL NNN: Hundreds of Feet (MSL)</p> <p>NNNNN FT : Foot</p> <p>NNNNN M : Meter</p> |
| Range | <p>FL NNN <i>Min : 30</i> <i>Max : 450</i></p> <p>NNNNN FT <i>Min : 0</i> <i>Max : 25 000</i></p> <p>NNNNN M <i>Min : 0</i> <i>Max : 13 700</i></p> |
| Resolution | <p>FL NNN: 10</p> <p>NNNNN FT : 100</p> <p>NNNNN M : 100</p> |
| Page | MODIFY (Refer to Page) |

PRESENT GROUND TRK

Applicable to: ALL

L12

| | |
|---------------|--|
| Format | NNN NNN T <u>Note:</u> <i>Leading zeros may be omitted</i> |
| Units | NNN: Magnetic Degree NNN T : True Degree |

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PRESENT HDG

Applicable to: All

12



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PRESENT POSITION

Applicable to: ALL

12

| | |
|-------------------|---|
| Format | XXXXX DDMM.MM/EEEMM.MC or BDDMM.M/CEEEMM.M <u>Note:</u> <i>Leading zeros may be omitted</i> |
| Units | DD: Latitude Degree EEE: Longitude Degree MM.M: Minute |
| Range | XXXXX: <i>Min</i> : 1 alphanumeric character <i>Max</i> : 5 alphanumeric characters DD: <i>Min</i> : 0 <i>Max</i> : 90 B: N or S EEE: <i>Min</i> : 0 <i>Max</i> : 180 C: E or W MM.M: <i>Min</i> : 0 <i>Max</i> : 59.9 |
| Resolution | DD, EEE: 1 MM.M: 0.1 |
| Page | MODIFY (Refer to Page) |

PRESENT SPD

Applicable to: ALL

L12



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REACHING

Applicable to: ALL

L12



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REACHING BLOCK

Applicable to: ALL

L12

| | |
|-------------------|---|
| Format | FL NNN or NNN <i>Note:</i> <i>Leading zeros may be omitted</i> NNNNN FT or NNNNN <i>Note:</i> <ul style="list-style-type: none">- Between 0 and 1000 feet, "FT" must be written.- Leading zeros may be omitted NNNNN M <i>Note:</i> <i>Leading zeros may be omitted</i> |
| Units | FL NNN: Hundreds of Feet (MSL) NNNNN FT : Foot NNNNN M : Meter |
| Range | FL NNN <i>Min :</i> 30 <i>Max :</i> 450 NNNNN FT <i>Min :</i> 0 <i>Max :</i> 25 000 NNNNN M <i>Min :</i> 0 <i>Max :</i> 13 700 |
| Resolution | FL NNN: 10 NNNNN FT : 100 NNNNN M : 100 |
| Page | MODIFY (Refer to Page) OTHER REPORTS (Refer to Page) |

REMAINING FUEL

Applicable to: ALL

| | |
|---------------|--|
| Format | HHMM HH H MM M HH H MM MN HH H MM MIN |
| Units | HH: Hour MM: Minute |
| Range | HH <i>Min :</i> 0 <i>Max :</i> 23 MM <i>Min :</i> 0 <i>Max :</i> 59 |

Continued on the following page



Continued from the previous page

| | |
|------------|--------------------------------------|
| Resolution | HH: 1 MM: 1 |
| Page | MODIFY page (<i>Refer to Page</i>) |

REPORTED WPT

Applicable to: ALL

L12

| | |
|------------|---|
| Format | <ol style="list-style-type: none"> 1. XXXXX DDMM.MB/EEEMM.MC or BDDMM.M/CEEEMM.M <i>Note:</i> <i>Leading zeros may be omitted</i> 2. HHMM HHMM Z HH H MM M HH H MM MN HH H MM MIN |
| Units | <ol style="list-style-type: none"> 1. DD: Latitude Degree EEE: Longitude Degree MM.M: Minute 2. HH: Hour MM: Minute |
| Range | <ol style="list-style-type: none"> 1. XXXXX: $\text{Min} : 1$ alphanumeric character $\text{Max} : 5$ alphanumeric characters DD: $\text{Min} : 0$ $\text{Max} : 90$ B: N or S EEE: $\text{Min} : 0$ $\text{Max} : 180$ C: E or W MM.M: $\text{Min} : 0$ $\text{Max} : 59.9$ 2. HH $\text{Min} : 0$ $\text{Max} : 23$ MM $\text{Min} : 0$ $\text{Max} : 59$ |
| Resolution | <ol style="list-style-type: none"> 1. DD, EEE: 1 MM.M: 0.1 2. HH: 1 MM: 1 |
| Page | MODIFY (<i>Refer to Page</i>) |



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SAT

Applicable to: All

| 12

SID/STAR

Applicable to: ALL

| | |
|---------------|--|
| Format | XXXXXX |
| Range | <i>Min : 1 alphanumeric character Max : 6 alphanumeric characters</i> |
| Page | REQUEST (Refer to Page) |

SOULS ON BOARD

Applicable to: ALL

L12

| | |
|---------------|---|
| Format | NNNN <i>Note:</i> Leading zeros may be omitted |
| Range | Min : 1 Max : 1 024 |
| Page | MODIFY (Refer to Page) EMERGENCY (Refer to Page) |



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SPD

Applicable to: ALL

12

SPEED

Applicable to: All

L12



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SQUAWKING

Applicable to: All

| | |
|---------------|---|
| Format | NNNN |
| Range | Each N: Min : 0 Max : 7 |
| Page | MODIFY (Refer to Page) |

TO

Applicable to: ALL

L12

| | |
|--------|---|
| Format | <p>1. FL NNN or NNN</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> <p>NNNNN FT or NNNNN</p> <p><u>Note:</u> <i>- Between 0 and 1000 feet, "FT" must be written.</i> <i>- Leading zeros may be omitted</i></p> <p>NNNNN M</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> <p>2. XXXXX</p> <p>DDMM.MB/EEEMM.MC or BDDMM.M/CEEEMM.M</p> <p><u>Note:</u> <i>Leading zeros may be omitted</i></p> |
| Units | <p>1. FL NNN: Hundreds of Feet (MSL)</p> <p>NNNNN FT : Foot</p> <p>NNNNN M : Meter</p> <p>2. DD: Latitude Degree</p> <p>EEE: Longitude Degree</p> <p>MM.M: Minute</p> |

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TRACK

Applicable to: ALL

L12

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| | |
|-------------------|-----------------------------------|
| Resolution | NNN, NNN T : 1 |
| Page | POSITION REPORT (Refer to Page) |

TURBULENCE

Applicable to: ALL

| | |
|---------------|---|
| Format | X |
| Range | < >, that means no information is available about turbulence conditions LIGHT MODERATE SEVERE |
| Page | POSITION REPORT (Refer to Page) |

UTC

Applicable to: ALL

| | |
|-------------------|--|
| Format | HHMM HHMM Z HH H MM M HH H MM MN HH H MM MIN |
| Units | HH: Hour MM: Minute |
| Range | HH <i>Min</i> : 0 <i>Max</i> : 23 MM <i>Min</i> : 0 <i>Max</i> : 59 |
| Resolution | HH: 1 MM: 1 |
| Page | POSITION REPORT (Refer to Page) |

VERTICAL SPEED

Applicable to: ALL

L12

| | |
|---------------|---|
| Format | \pm NNNN, \pm NNNN FT, \pm NNNN FT/MIN, or \pm NNNN FTM \pm NNNN M, \pm NNNN M/MIN, or \pm NNNN MM <u>Note:</u> - “-” may be entered as M - If no sign is input, “+” is taken by default |
| Units | NNNN: Feet per Minute NNNN M : Meter per Minute |

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| | | |
|------------|---|----------------------------|
| Range | NNNN: Min : 0 NNNN M : Min : 0 | Max : 6 000 Max : 2 000 |
| Resolution | NNNN: 100 NNNN M : 10 | |
| Page | POSITION REPORT (Refer to Page) | |

VOICE CONTACT

Applicable to: ALL

L12

| | |
|------------|--|
| Format | NNNN (HF) <i>Note:</i> Leading zeros may be omitted NNNNNNNNNNNN <i>Note:</i> SATCHANNEL corresponds to a 12 digits telephone number NNN.NNN (VHF) |
| Units | NNNNN (HF): KiloHertz NNN.NNN (VHF): MegaHertz |
| Range | NNNNN (HF) Min : 2 850 Max : 28 000 NNNNNNNNNNNN: 12 numbers NNN.NNN (VHF) Min : 117 Max : 138 |
| Resolution | NNNNN (HF): 1 NNN.NNN (VHF): 0.001 |
| Page | REQUEST (Refer to Page) EMERGENCY (Refer to Page) |



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WIND

Applicable to: ALL

L12

| | |
|-------------------|--|
| Format | DDD/NNN KT DDD ° /NNN KT DDD/NNN DDD ° /NNN DDD/NNN KM DDD ° /NNN KM DDD/NNN KM/H DDD ° /NNN KM/H <i>Note:</i> <i>Leading zeros may be omitted</i> |
| Units | DDD and DDD ° : Degree NNN KT and NNN: Knot NNN KM and NNN KM/H : Kilometer per Hour |
| Range | DDD <i>Min</i> : 1 <i>Max</i> : 360 NNN KT and NNN <i>Min</i> : 0 <i>Max</i> : 255 NNN KM and NNN KM/H <i>Min</i> : 0 <i>Max</i> : 511 |
| Resolution | DDD: 1 NNN: 1 |
| Page | POSITION REPORT (Refer to Page) |

WX DEV

Applicable to: ALL

L12

| | |
|---------------|---|
| Format | NNND, DNNN, NNN NM D or DNNN NM NNN KM D or DNNN KM D: Offsetting Direction <i>Note:</i> <i>Leading zeros may be omitted</i> |
| Units | NNN: Nautical Mile NNN KM : Kilometer |
| Range | D: L (Left), R (Right), LR or nothing NNN: <i>Min</i> : 1 <i>Max</i> : 128 NNN KM : <i>Min</i> : 1 <i>Max</i> : 256 |

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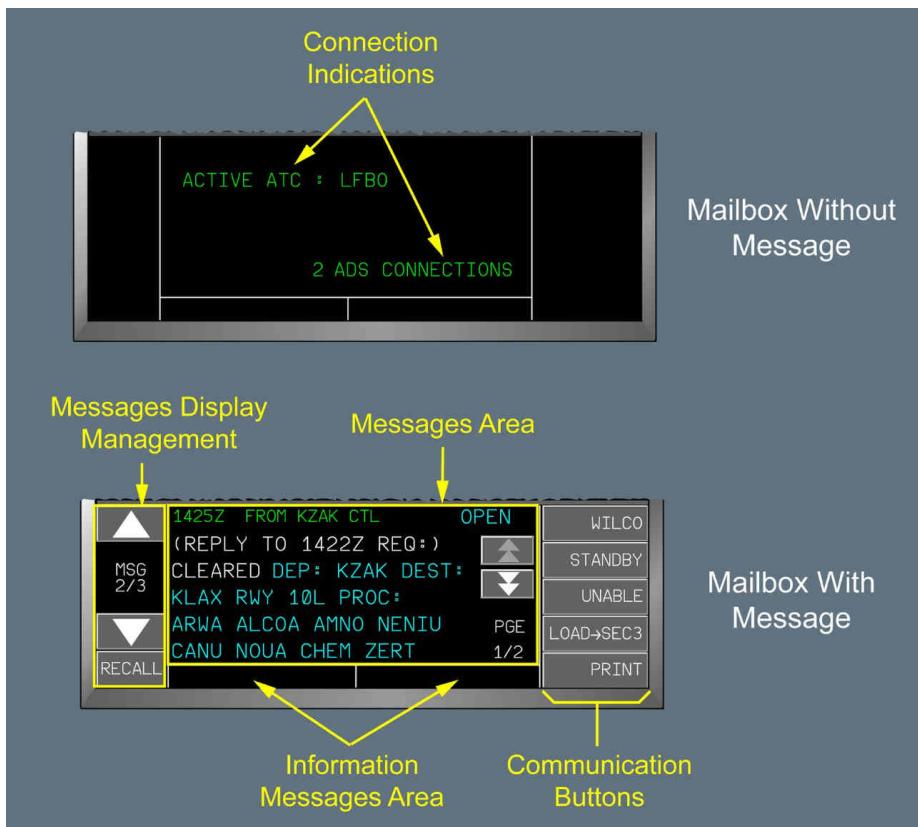
| | |
|------------|----------------------------------|
| Resolution | NNN: 1 NNN KM : 1 |
| Page | REQUEST (<i>Refer to Page</i>) |

ATC Mailbox on SD

MAILBOX

Applicable to: ALL

Mailbox



Note: If the ATC application is failed and the flight crew decides to display the mailbox by selecting one of the KCCU keys (MAIL BOX key or Navigation keys), the **MAILBOX NOT AVAIL** message appears for 5 seconds.

CONNECTION INDICATIONS

Applicable to: ALL

CONNECTION STATUS INDICATION

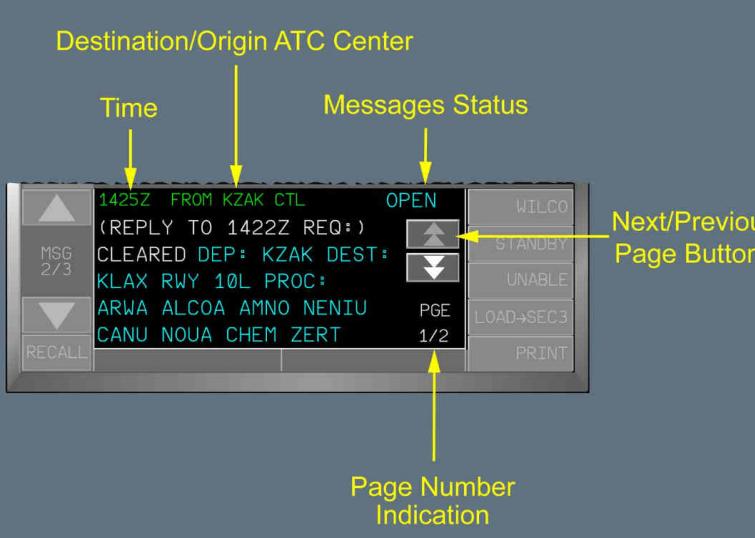
ACTIVE ATC : LFBO Indicates the ATC center to which the aircraft is connected.

ADS CONNECTED CENTERS INDICATION**ADS OFF** The ADS is OFF.

2 ADS CONNECTIONS When the ADS is CONNECTED, indicates the number of ADS connected centers.

*Note: If the ADS is ARMED or not running, no data appears.***MESSAGE AREA**

Applicable to: ALL

Message Area

TIME

Indicates the UTC time:

- At which the ATC center sends the message, for an uplink message
- At which the flight crew sends the message to the ATC center, for a downlink message.

Note: - *If the time that the ATC center sent the message is not available :*

- *No time appears in the time area*
- *The "(RECEIVED AT XXXXZ)" indication appears at the end of the message, where XXXX is the time at which the uplink message is received.*

- *If the clock is failed, the time area is:*

- *Empty if no time stamp was previously available, or*
- *Completed with 4 dashes followed by 'Z' ('---Z') in other cases.*

DESTINATION/ORIGIN ATC CENTER

Indicates the active ATC center that sent or received the message.

MESSAGE STATUS

Indicates the response of the flight crew to a message received from the active ATC center.

L3 Refer to DSC-46-10-20-30-80 Messages Area for more details on different possible messages.

L1 **Note:** *The status is empty for:*

- *A downlink message sent to the active ATC center*
- *An uplink message for which no response is expected.*

NEXT/PREVIOUS PAGE BUTTONS

When clicked, display the next/previous page of the message, if the message length is more than one page.

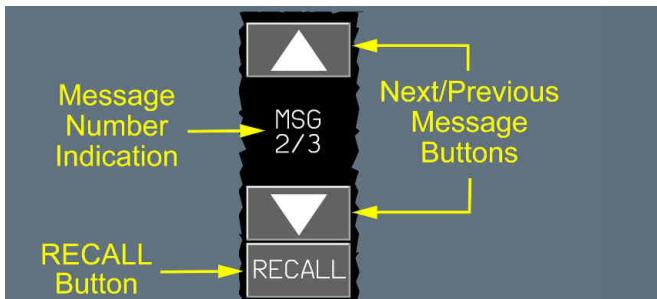
PAGE NUMBER INDICATION

Indicates the page number of the currently displayed page of the message.

If the message contains only one page, no information appears.

MESSAGES DISPLAY MANAGEMENT

Applicable to: ALL

Messages Display Management**MESSAGE NUMBER INDICATION**

Indicates the rank of the displayed message in the mailbox queue.
If there is only one message in the mailbox, no information appears.

NEXT / PREVIOUS MESSAGE BUTTONS

When clicked, display the previous/next message in the mailbox queue.
If there is only one message in the mailbox, no button appears.

RECALL BUTTON

When clicked, recalls the message that the flight crew most recently removed from the mailbox using the CLOSE button.

COMMUNICATION BUTTONS

Applicable to: ALL

COMMUNICATION BUTTONS

Depending on the nature of the message, the system automatically displays the appropriate communication buttons. The possible communication buttons are:

WILCO BUTTON

When clicked, prepares a response message to comply with an ATC clearance.

ROGER BUTTON

When clicked, prepares a response message to confirm reception and understanding of an ATC information or report request. The flight crew must only use ROGER in response to an uplink free text message. Under no circumstances will ROGER be used instead of AFFIRM.

AFFIRM BUTTON

When clicked, prepares a response message to accept an ATC negotiation message. AFFIRM is an appropriate response to an uplinked negotiation request message (e.g. CAN YOU ACCEPT [altitude] AT [time]).

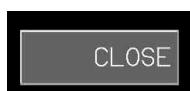
ACK BUTTON

When clicked, prepares a response message to accept a departure/oceanic clearance.

SEND BUTTON

When clicked, sends a message or a response, that was prepared by using the other command buttons (WILCO, ROGER, STANDBY, ...) to the ATC center.

The SEND button, for a downlink message other than a response selected by a button, is displayed but cannot be selected as long as the flight crew has not displayed all the pages of the corresponding message.

CLOSE BUTTON

When clicked, closes and removes from the mailbox a message that the flight crew has sent to the ATC, or removes from the mailbox a message from the ATC center that has been answered, and send it to the MSG RECORD page of the MFD. This is not applicable when the answer is on standby.

STANDBY BUTTON STANDBY

When clicked, prepares a response message to inform the ATC center that the flight crew needs to delay the answer.

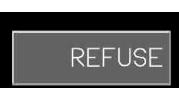
CANCEL BUTTON CANCEL

When clicked, enables the flight crew to:

- Remove a prepared downlink message from the mailbox, or
- Cancel a selected reply to an uplink message.

CANNOT BUTTON CANNOT

When clicked, prepares a response message to send a negative answer to an OPEN negotiation message from the ATC center.

REFUSE BUTTON REFUSE

When clicked, prepares a response message to send a negative answer to a departure/oceanic clearance.

UNABLE BUTTON UNABLE

When clicked, prepares a response message to reject an ATC clearance.

NEGATIVE BUTTON NEGATIVE

When clicked, prepares a response message to answer "no" to an ATC negotiation message.

DUE TO BUTTON DUE TO

When clicked, enables the flight crew to add a justification (due to aircraft performance, weather, ...) for a NEGATIVE or UNABLE response.

MODIFY BUTTON

When clicked, displays the MODIFY page on the MFD, to enable the flight crew to modify a message proposed by the FMS. Also used to update the parameters that the FMS provides to the mailbox.

REFRESH BUTTON

When clicked, updates downlink FMS data on the mailbox.

LOAD→SEC3 BUTTON

When clicked, loads a clearance received from the ATC center in the FMS.

Note: *If there is a flight plan in SEC 3, this flight plan will be deleted when the ATC flight plan is uploaded. To avoid loss of a flight plan, the flight crew must copy the SEC 3 flight plan in SEC 1, or SEC 2 before uploading the ATC flight plan.*

FREETEXT BUTTON

When clicked, enables the flight crew to add freetext for a NEGATIVE or UNABLE response.

PRINT BUTTON

When clicked, prints the message that is currently displayed in the mailbox.

INFORMATION MESSAGES AREA**Applicable to: ALL**

| Information Displayed | Conditions for display request | Reasons for display removal |
|-----------------------|---|-----------------------------|
| ANSWER MSG | A file of uplink messages to be answered is full | File no more full |
| CHECK CLRCE | Response lost for a positive reminder of a deferred clearance | |
| COM FAULT | ATC COM means failed | ATC COM means available |

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| Information Displayed | Conditions for display request | Reasons for display removal |
|-----------------------|--|---|
| COM NOT AVAIL | ATC COM means temporarily not available | ATC COM means available |
| COM NOT INIT | Router not initialized | Router initialized |
| FILE FULL | A file of 'not ready to be closed' downlink messages generated by the flight crew is full | File no more full |
| FMS MONITORING | Monitoring in progress | Monitoring result obtained or time out |
| LINK LOST | "Abnormal" loss of data link connection | |
| LOAD FAILED | Loading failed due to the content of the data proposed | Other loading requested |
| LOAD NOT AVAIL | Loading not possible, including when the loading was in progress | Other loading requested |
| LOAD OK | Successful loading | Other loading requested |
| LOAD PARTIAL | Partial loading | Other loading requested |
| LOADING | Loading requested and in progress | Load result obtained or time out |
| MFD FOR MODIF | Following click on MODIFY button | Sending requested; modified text displayed in the mailbox |
| MONIT CNCLD | Monitoring canceled | Other monitoring requested |
| MONIT FAILED | Monitoring requested and failed | Other monitoring requested or monitoring no longer required |
| MONIT LOST | Loss of monitoring | Other monitoring requested or monitoring no longer required |
| MONIT NOT AVAIL | Monitoring impossible because of system unavailability | Other monitoring requested or monitoring no longer required |
| NO ATC REPLY | No reply to a request (operational timer expired) and no link loss (displayed for pending DL only) | |
| NO FMS DATA | FMS data not available | Other data request requested |
| NON STD FORMAT | Reception of a partially valid OCL/DCL uplink message with valid ATC-ICAO Designator field | |
| NON STD SENDER | Reception of a partially valid OCL/DCL uplink message with invalid ATC-ICAO Designator field | |
| OVERFLW CLOSED | A file of other messages is full and a new message of this category stored in the file | |
| PARTIAL FMS DATA | FMS data not available for all requests | Other data request requested |
| PRINT FAILED | Printing requested from mailbox and printing fails | New information belonging to the same category asks for display |
| PRINT NOT AVAIL | Printing requested from mailbox while printer not available | New information belonging to the same category asks for display |
| PRINTING | Printing requested from the mailbox and printing in progress | 10 seconds after printing requested |
| RECALL MODE | Recall of the last message removed from the mailbox | Leaving recall mode |

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| Information Displayed | Conditions for display request | Reasons for display removal |
|-----------------------|--|---|
| REMINDER | Display of FMS reminder message | |
| SEND FAILED | <ul style="list-style-type: none">- Transmission of reply to uplink message not possible ('Failed DSP' received or timer expired) and no link lost (displayed for UL only), or- Transmission of a downlink not possible ('Failed DSP' received or timer expired) and no link lost (displayed for UL only) | |
| SENDING | The flight crew pressed the SEND button | Sending result obtained (positive or negative) or timeout |
| SENT | Reception of ACK from DSP (Service Provider) or associated uplink message for a downlink | |
| WAIT FMS DATA | Data requested from FMS | Data request result obtained or time out |



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Intentionally left blank

ATC MSG pb**ATC MSG PB**

Applicable to: ALL

Impacted DU: 00011365 ATC MSG pb

No message from the ATC has been received.



L13



Flashing: A message from the ATC has been received.
The pushbutton flashes at a frequency of 2 Hz.

Associated with a RING aural alert that sounds if the flight crew does not press the pushbutton or read the message within:

- 15 s after the reception of a normal message
- 5 s after the reception of an urgent message.

When the flight crew presses either of the pushbutton, the ATC MSG lights of the two ATC MSG pb go off and the aural alert is inhibited.

Note: ATC MSG pb may not flash and the associated RING aural alert may not sound when a reminder appears in the ATC mailbox.

ATC MSG PB

Applicable to: ALL

Impacted by TDU: 00023312 ATC MSG pb

No message from the ATC has been received.



L13



Flashing: A message from the ATC has been received.
The pushbutton flashes at a frequency of 2 Hz,

Associated with a RING aural alert that sounds if the flight crew does not press the pushbutton or read the message within:

- 15 s after the reception of a normal message
- 5 s after the reception of an urgent message.

When the flight crew presses either of the pushbutton, the ATC MSG lights of the two ATC MSG pb go off and the aural alert is inhibited.

KCCU

KCCU

Applicable to: ALL

KCCU

ATC COM KEY

When pressed:

- Displays the ATC COM REQUEST page on the MFD (*Refer to ATC COM REQUEST page*)
- Moves the cursor back to the MFD if it was previously on another display.

Mailbox KEY

When pressed, the cursor moves to the mailbox section of the SD (*Refer to Mailbox*), if it was previously on another display.

CLR INFO KEY

When pressed, clears the message that is currently displayed in the ATC COM Message Area (*Refer to Message Area*)

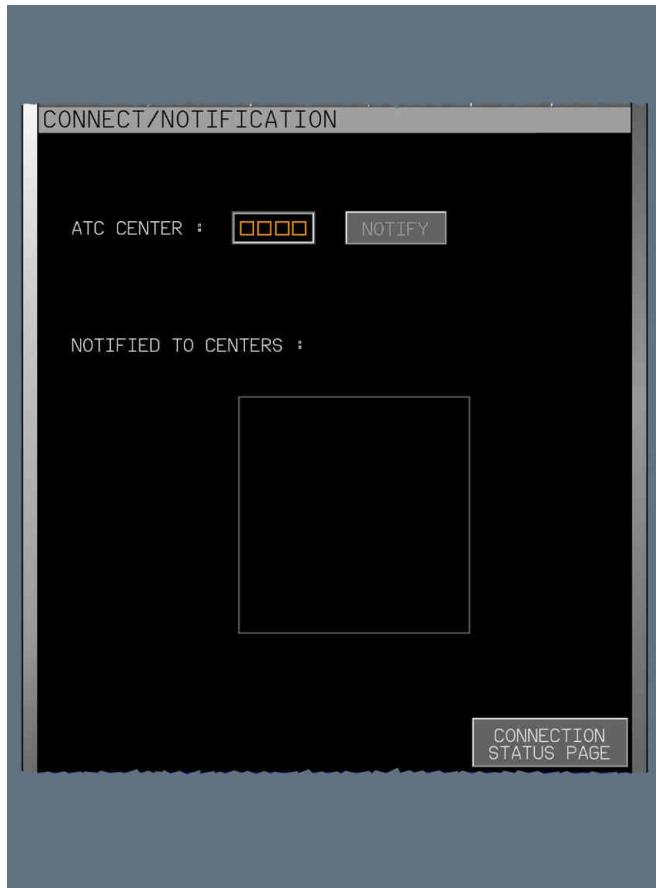
Note: The flight crew also uses this key to clear the FMS and SURV messages.

NAVIGATION KEYS

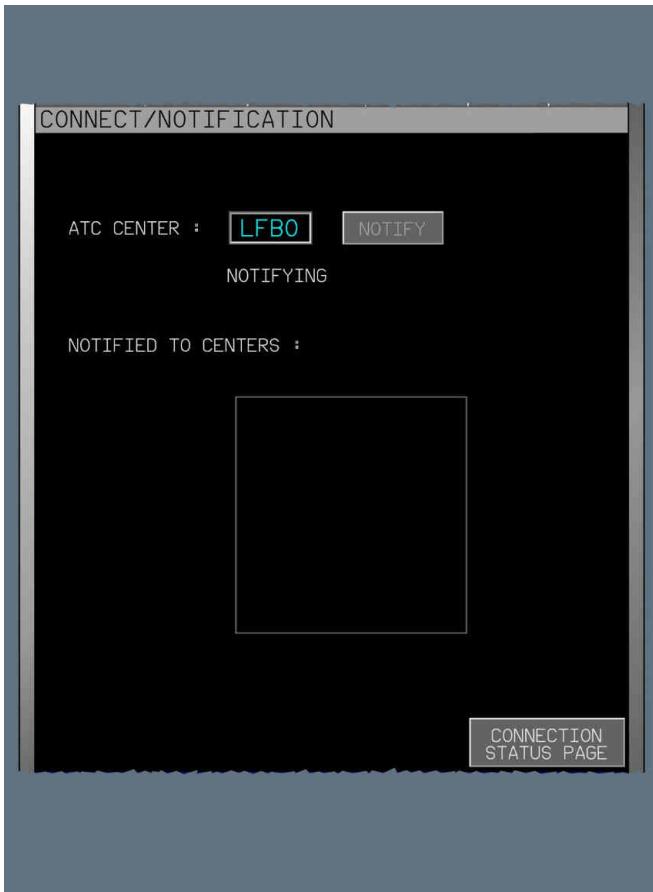
When pressed, move the cursor to the display unit that is to the right, or to the left, of the display unit that is currently selected (if applicable).

HOW TO MAKE A MANUAL NOTIFICATION TO AN ATC CENTER**Applicable to:** ALL

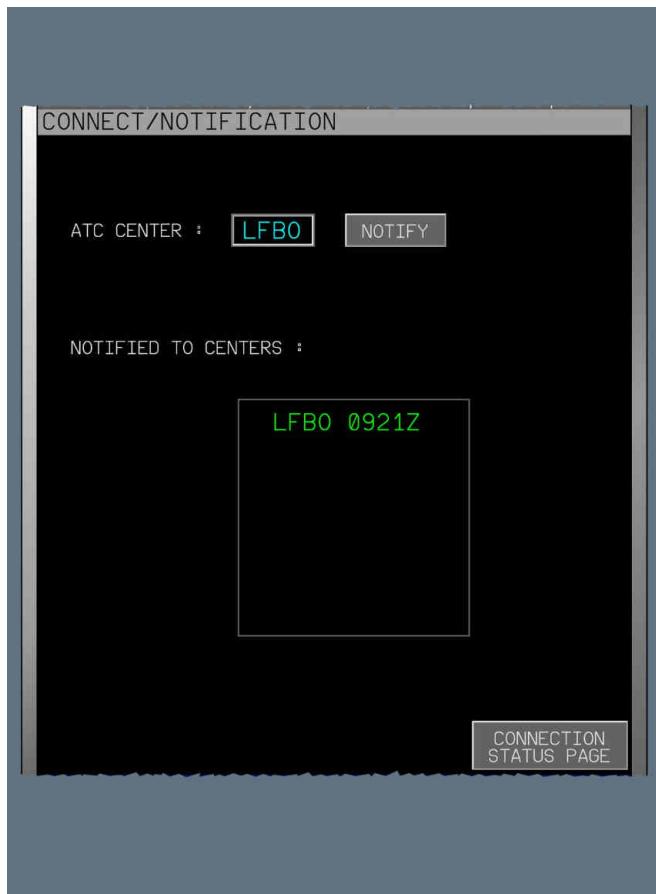
Select ATC COM on the MFD system menu or press the ATCCOM key on the KCCU.
Click on the CONNECT button on the general menu bar of the MFD and select NOTIFICATION to open the CONNECT/NOTIFICATION page.



Enter the ICAO code of the ATC center in the ATC center entry field, and click on the NOTIFY button. "NOTIFYING" appears below the ATC center field.



As soon as a notification is sent to, and accepted by the ATC center, the name of the ATC center is added to the list of notified ATC centers.



The ATC center can initiate a CPDLC connection.

The transfer from one ATC center to another is usually done automatically.

HOW TO SEND A REQUEST MESSAGE

Applicable to: ALL

Select ATC COM on the MFD system menu or press the ATCCOM key on the KCCU .



Use the buttons of the REQUEST menu to select the frames that are in the message. Up to five frames may be selected for one message. Some frame combinations are not possible. For more details about the frames, *Refer to DSC-46-10-20-30-40 Request Page - Request Menu*.



To delete one frame from the message, click on the recycle bin symbol of the frame. Some frames contain mandatory fields (amber boxes when empty). Complete all the mandatory fields. Click on the XFR TO MAILBOX button to transfer the request message to the mailbox. The XFR TO MAILBOX button becomes available only when all mandatory fields have been completed. Clicking on the CANCEL button cancels all frames from the request message.



In the mailbox, click on the SEND button to send the request message to the ATC center.
"SENDING" appears in the Information Messages Area in the mailbox, and the request message appears in black with green background.

Note: When a downlink message is in the mailbox but includes more than one page, the flight crew must display all the pages of the message in the mailbox before being allowed to send it to the ATC center (using the page up and page down keys). The SEND button is not active until all the pages have been displayed.



When the message is received on ground, "SENT" appears in the Information Messages Area in the mailbox.



A timer is automatically triggered when a downlink message is sent. This timer has a total countdown time of 3 min and 30 s.

If the timer ends before the message is received on ground, or before the response of the ATC center is received onboard (only if the downlink message requires an answer), the text "SEND FAILED" appears in the Information Messages Area of the corresponding downlink.

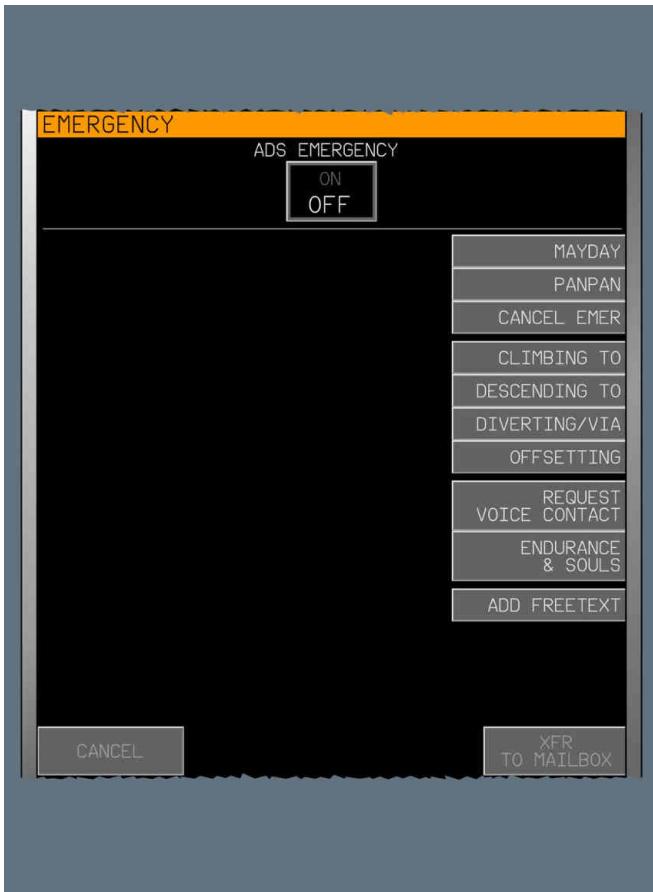
Click on the CLOSE button to remove the message from the mailbox.

HOW TO SEND AN EMERGENCY MESSAGE

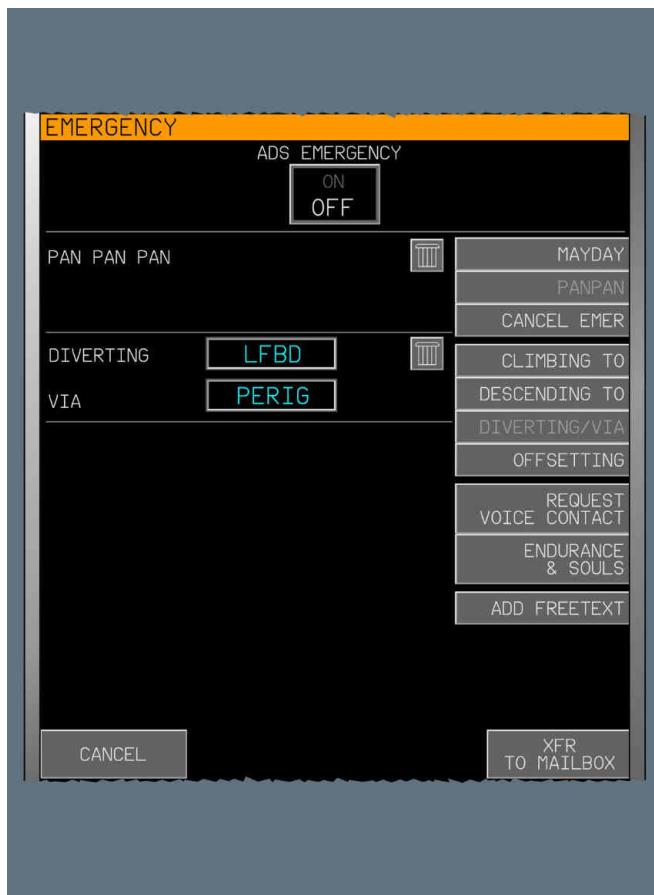
Applicable to: ALL

Select ATC COM on the MFD system menu or press the ATCCOM key on the KCCU .

Click on the EMER button on the general menu bar of the MFD to open the EMERGENCY page.



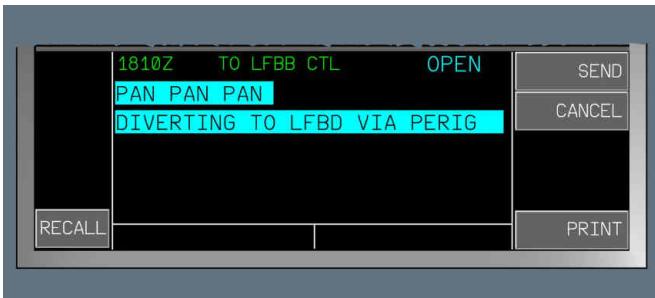
Use the buttons of the EMERGENCY menu to select the frames that are in the message. Some frame combinations are not possible. For more details about the frames, *Refer to DSC-46-10-20-30-100 Emergency Menu.*



Some frames include mandatory fields (amber boxes when empty). Complete all the mandatory fields.

Click on the XFR TO MAILBOX button to transfer the message to the mailbox. The XFR TO MAILBOX button becomes available only when all mandatory fields have been completed.

Clicking on the CANCEL button cancels all frames from the request message.



In the mailbox, click on the SEND button to send the message to the ATC center.



Click on the CLOSE button to remove the message from the mailbox.

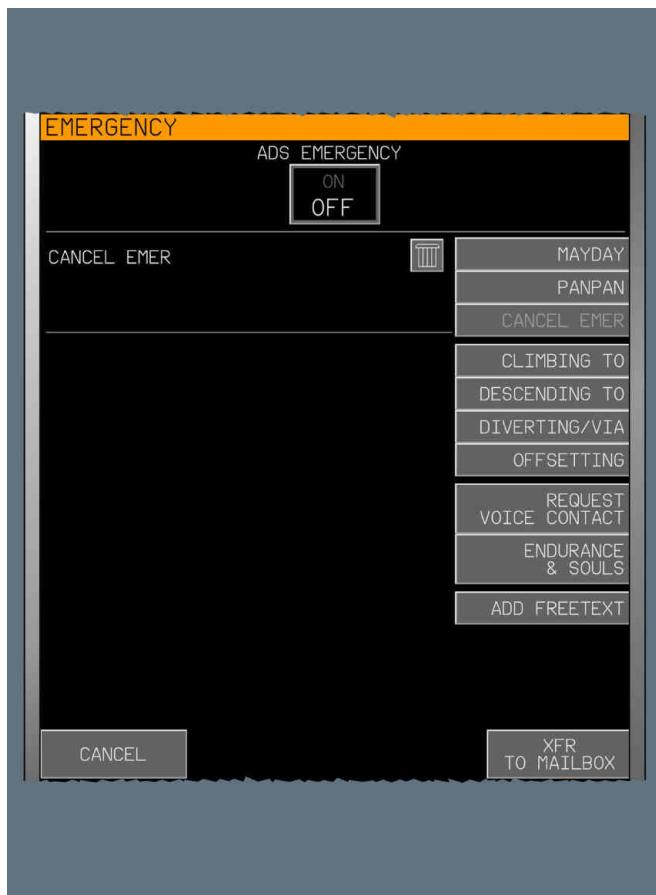
HOW TO CANCEL EMERGENCY

Applicable to: ALL

Select ATC COM on the MFD system menu or press the ATCCOM key on the KCCU.

Click on the EMER button on the general menu bar of the MFD to open the EMERGENCY page.

Click on the CANCEL EMER button on the EMERGENCY menu.



Click on the XFR TO MAILBOX button to transfer the message to the mailbox.

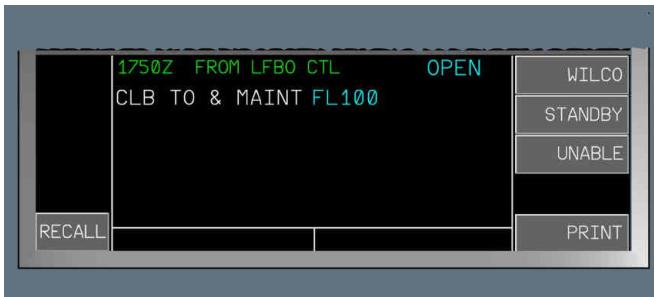


In the mailbox, click on the SEND button to send the message to the ATC center.
Then click on the CLOSE button to remove the message from the mailbox.

HOW TO READ AN UPLINK MESSAGE

Applicable to: ALL

When an uplink message is received, the ATC MSG light of the two ATC MSG pb comes up and an aural alert (ring) sounds in the cockpit.



Note: During takeoff and landing, the ATC MSG light and aural alert are inhibited.

Press the ATC MSG pb to switch off the light and cancel the audio signal.

The new message appears immediately in the mailbox if it is an emergency message, or if the message file is empty.

In any other cases, the message is automatically filed in the mailbox. The flight crew can display any



next or previous message by clicking on the and buttons.
Messages are filed in the mailbox in a chronological order.

The flight crew can access any filed message in the mailbox and can process (i.e. answer or send) the filed message in any order.

When the message appears in the mailbox on more than one page, the flight crew can access any



next or previous page of the message by clicking on the and buttons.

MESSAGE REPLY

When an uplink message coming from the ATC center appears in the mailbox, all possible replies appear on the right side of the mailbox.



Click on the selected reply then click on the SEND button to send the reply to the ATC center.
Click on the CLOSE button to remove the message from the mailbox.

HOW TO MANAGE A CONFIRM MESSAGE

Applicable to: ALL

The air traffic controller may request that the flight crew confirms navigation parameters (altitude, speed...).

The received message is filed in the mailbox and is associated to a visual alert and an aural alert that is not urgent.

The FMS sends the navigation parameters. The ATC Datalink Applications System automatically proposes a response in the mailbox and "WAIT FM DATA" temporarily appears in the Information Messages Area of the mailbox, indicating that the system is waiting for FMS data.



When the FMS has sent data, "WAIT FM DATA" disappears and the response appears in the mailbox in black with a blue background.



Note: If the aircraft is not at a stabilized altitude, a message is added to the "PRESENT ALTITUDE" to indicate the vertical aircraft progression (climbing or descending), else "PRESENT ALTITUDE" message appears alone in the mailbox.

The flight crew can modify the confirm message before sending it to the ATC center. Click on the MODIFY button in the mailbox to open the REPORT/MODIFY page on the MFD.



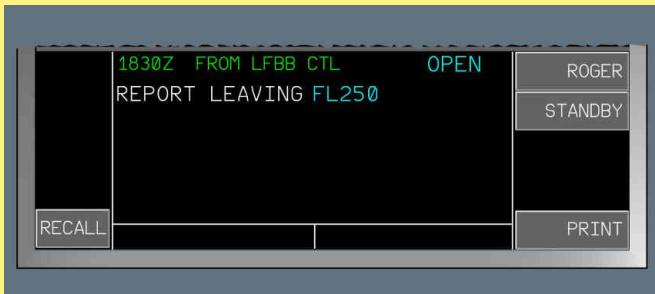
Make the necessary changes and add freetext if needed then click on the XFR TO MAILBOX button to transfer the modified confirm message to the mailbox.

In the mailbox, click on the SEND button to send the confirm message to the ATC center. Then, click on the CLOSE button to remove the message from the mailbox.

HOW TO MANAGE A REPORT MESSAGE**Applicable to: ALL**

Impacted DU: 00018548 How to Manage a Report Message

The air traffic controller may require that the flight crew reports back at a later time in flight, for example when reaching a altitude, crossing a point, or when back on route. The received message is filed in the mailbox and is associated to a visual alert and an aural alert that is not urgent.



Click on the ROGER button in the mailbox. The message status becomes ROGER, and appears in black with a blue background.

The data in the message, displayed first in blue, then appears in magenta, indicating that the condition is being monitored by the FMS. "MONITORING" appears in the Information Message Area of the mailbox.



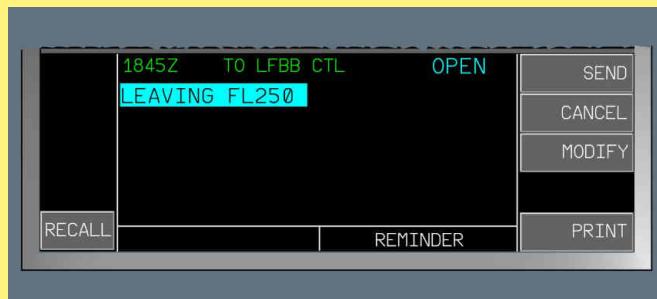
In the mailbox, click on the SEND button to send the ROGER reply to the ATC center, and click on the CLOSE button to remove the message from the mailbox.



When the condition of the report is met, the FMS sends a reminder to the ATC Datalink Applications System.

Then, the response to the report message is automatically put in the mailbox queue and a visual and aural alerts are triggered. When this message is displayed, "REMINDER" appears in the Information Message Area of the mailbox.

Note: ATC MSG pb may not flash and the associated RING aural alert may not sound when the reminder appears in the ATC mailbox.



The flight crew can modify the report message before sending it to the ATC center. Click on the MODIFY button in the mailbox to open the REPORT/MODIFY page on the MFD.

Add the changes and click on the XFR TO MAILBOX button to transfer the report message to the mailbox again.

In the mailbox, click on the SEND button to send the report message to the ATC center.



Click on the CLOSE button to remove the message from the mailbox.

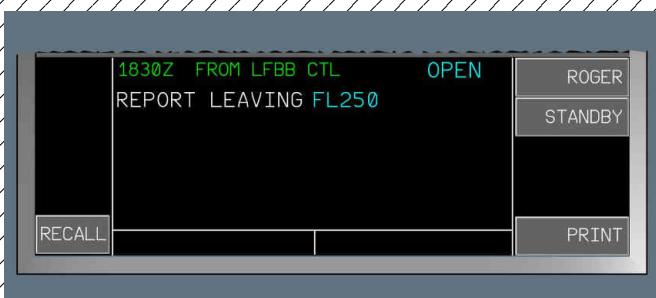
HOW TO MANAGE A REPORT MESSAGE

Applicable to: ALL

Impacted by TDU: 00023313 How to Manage a Report Message

The air traffic controller may require that the flight crew reports back at a later time in flight, for example when reaching a altitude, crossing a point, or when back on route.

The received message is filed in the mailbox and is associated to a visual alert and an aural alert that is not urgent.



Click on the ROGER button in the mailbox. The message status becomes ROGER, and appears in black with a blue background.

The data in the message, displayed first in blue, then appears in magenta, indicating that the condition is being monitored by the FMS. "MONITORING" appears in the Information Message Area of the mailbox.



In the mailbox, click on the SEND button to send the ROGER reply to the ATC center, and click on the CLOSE button to remove the message from the mailbox.



When the condition of the report is met, the FMS sends a reminder to the ATC Datalink Applications System.

Then, the response to the report message is automatically put in the mailbox queue and a visual and aural alerts are triggered. When this message is displayed, "REMINDER" appears in the Information Message Area of the mailbox.



The flight crew can modify the report message before sending it to the ATC center. Click on the MODIFY button in the mailbox to open the REPORT/MODIFY page on the MFD.

Add the changes and click on the XFR TO MAILBOX button to transfer the report message to the mailbox again.

In the mailbox, click on the SEND button to send the report message to the ATC center.



Click on the CLOSE button to remove the message from the mailbox.

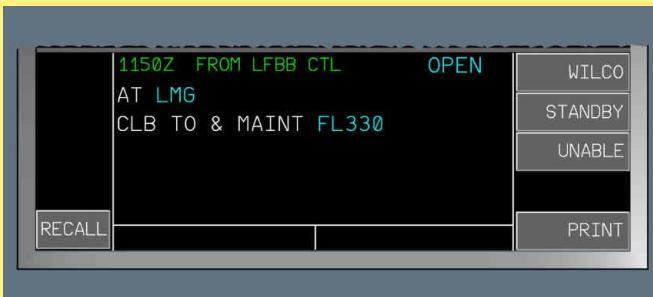
HOW TO MANAGE A DEFERRED CLEARANCE MESSAGE

Applicable to: ALL

Impacted DU: 00018549 How to Manage a Deferred Clearance Message

The air traffic controller may send a clearance that is not yet applicable to the flight crew, such as to climb to an altitude when reaching a waypoint.

The received message is filed in the mailbox and is associated to a visual alert and an aural alert that is not urgent.



In the mailbox, click on the WILCO button to accept the clearance. The message status becomes WILCO and appears in black with a blue background.



In the message, the data associated to the clearance becomes magenta, indicating that the FMS is currently monitoring the deferred clearance. This is confirmed by "MONITORING" displayed in the Information Message Area of the mailbox.

Click on the SEND button to send the WILCO reply to the ATC center, and click on the CLOSE button to remove the message from the mailbox.



30 s before the clearance is applicable, the FMS indicates to the ATC Datalink System that the condition to apply the clearance is met.

The clearance message is filed in the mailbox queue and visual and aural alerts are triggered. When the message is displayed, "REMINDER" appears in the Information Message Area of the mailbox.

Note: ATC MSG pb may not flash and the associated RING aural alert may not sound when the reminder appears in the ATC mailbox.



Click on the CLOSE button to remove the message from the mailbox.

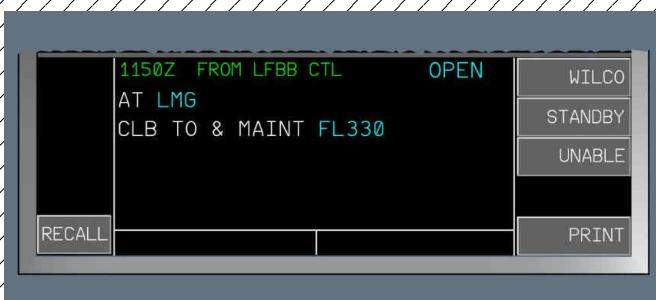
HOW TO MANAGE A DEFERRED CLEARANCE MESSAGE

Applicable to: ALL

Impacted by TDU: 00023314 How to Manage a Deferred Clearance Message

The air traffic controller may send a clearance that is not yet applicable to the flight crew, such as to climb to an altitude when reaching a waypoint.

The received message is filed in the mailbox and is associated to a visual alert and an aural alert that is not urgent.



In the mailbox, click on the WILCO button to accept the clearance. The message status becomes WILCO and appears in black with a blue background.



In the message, the data associated to the clearance becomes magenta, indicating that the FMS is currently monitoring the deferred clearance. This is confirmed by "MONITORING" displayed in the Information Message Area of the mailbox.

Click on the SEND button to send the WILCO reply to the ATC center, and click on the CLOSE button to remove the message from the mailbox.



30 s before the clearance is applicable, the FMS indicates to the ATC Datalink System that the condition to apply the clearance is met.

The clearance message is filed in the mailbox queue and visual and aural alerts are triggered. When the message is displayed, "REMINDER" appears in the Information Message Area of the mailbox.



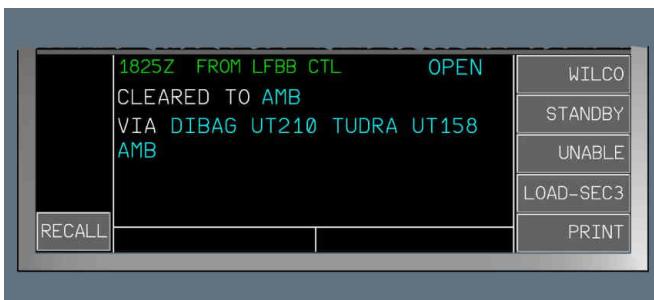
Click on the CLOSE button to remove the message from the mailbox.

HOW TO MANAGE A LOADABLE MESSAGE

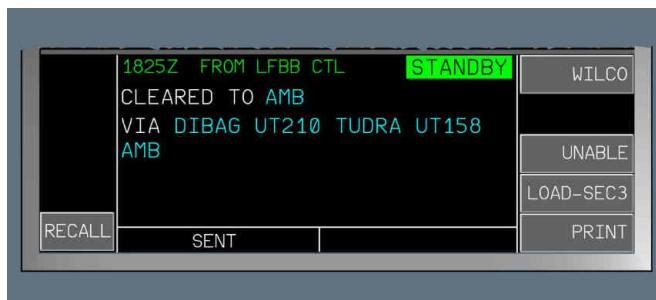
Applicable to: ALL

The flight crew can load constraint messages and ATC F-PLN clearances, received from the ATC center, in the third secondary flight plan (SEC3 F-PLN) of the FMS.

The received message is filed in the mailbox and is associated to a visual alert and an aural alert that is not urgent.

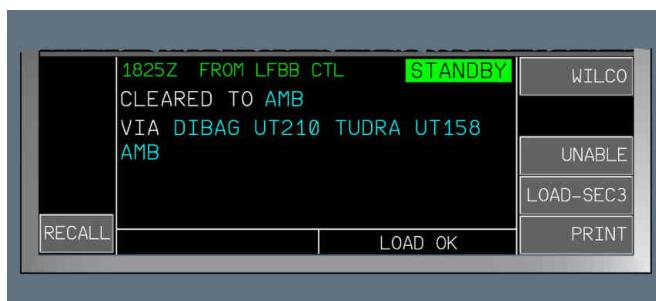


It is recommended to send a STANDBY reply to the ATC center to indicate that the final answer will not be immediate. Click on the STANDBY button in the mailbox, then click on the SEND button.



To load the contents of the message in the SEC3 F-PLN of the FMS, click on the LOAD-SEC3 button in the mailbox.

When the load is completed, "LOAD OK" appears in the Information Messages Area of the mailbox.



Access the MFD-FMS secondary F-PLN pages to evaluate the received clearance.

After deciding whether or not to fly this clearance, send the final answer to the ATC center. In the mailbox, click on the WILCO button (to accept) or the UNABLE button (to decline). Then click on the SEND button.





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If this route clearance cannot be completely loaded (for instance waypoint not in the FMS database, runway/ILS mismatch,...), access the MFD-FMS secondary F-PLN pages to assess the reasons for the rejected parameters, and take appropriate action.

Finally, click on the CLOSE button to remove the message from the mailbox.

HOW TO USE POSITION REPORT

Applicable to: ALL

AUTOMATIC POSITION REPORT ACTIVATION/DEACTIVATION

Select ATC COM on the MFD system menu or press the ATCCOM key on the KCCU.

Click on the REPORT button and select POSITION on the general menu bar of the MFD to open the REPORT/AUTO & MANUAL POSITION page.

REPORT/AUTO & MANUAL POSITION

AUTO POSITION REPORT ON OFF

| | | UTC | ALT |
|------|-------|-------|----------|
| OVHD | PERIG | 1210Z | 26000 FT |
| PPOS | DIBAG | 1215Z | 26000 FT |
| TO | TUDRA | 1221Z | |
| NEXT | BEVOL | | |

| | CAS | GROUND | VERTICAL |
|---------|--------|--------|--------------|
| SPEED | 345 KT | 336 KT | 0 FT/MIN |
| HEADING | 345 °T | | TRACK 350 °T |

| | |
|------------|------------|
| ICING | SAT - 32 F |
| TURBULENCE | |

ETA DEST 1307 Z ENDURANCE 4 H 30 MIN

DEVIATING CLIMBING TO DESCENDING TO

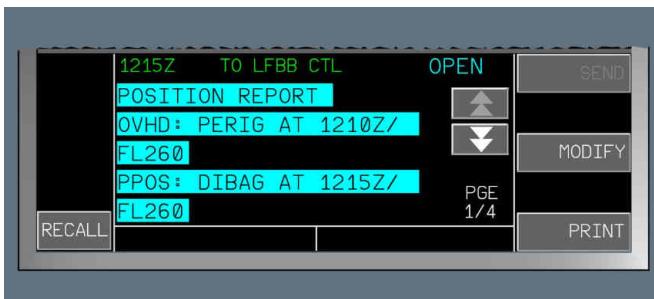
ERASE ALL FIELDS REFRESH DATA ADD FREETEXT XFR TO MAILBOX

To activate the AUTO POSITION REPORT function, set the AUTO POSITION REPORT to ON.
To deactivate the AUTO POSITION REPORT function, set the AUTO POSITION REPORT to OFF.

AUTOMATIC POSITION REPORT

The AUTO POSITION REPORT function is available when the AUTO POSITION REPORT has been set to ON.

Each time a waypoint is sequenced, the automatic report is generated and appears in the mailbox.



The flight crew can modify this report. Click on the MODIFY button in the Mailbox. The REPORT / MESSAGE MODIFY page appears on the MFD.

Add the changes and click on the XFR TO MAILBOX button on the MFD to transfer the message to the mailbox.

In the mailbox, display all the pages of the message and click on the SEND button to send the position report message to the ATC center.

Click on the CLOSE button to remove the message from the mailbox.

MANUAL POSITION REPORT

Select ATC COM on the MFD System Menu or press the ATCCOM key on the KCCU.

Click on the REPORT button and select POSITION on the general menu bar of the MFD to open the REPORT/AUTO & MANUAL POSITION page.

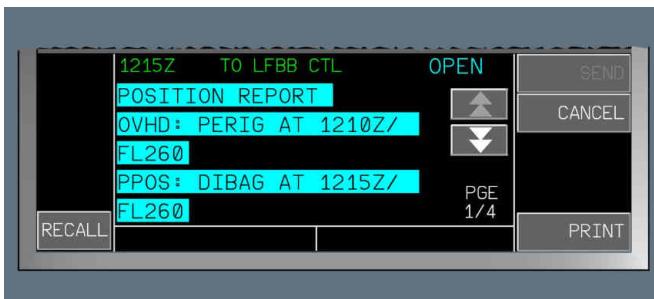
REPORT/AUTO & MANUAL POSITION

| | | |
|---|------------|---|
| AUTO POSITION REPORT | | <input type="checkbox"/> ON <input type="checkbox"/> OFF |
| OVHD | PERIG | UTC 1210Z ALT 26000 FT |
| PPOS | DIBAG | 1215Z 26000 FT |
| TO | TUDRA | 1221Z |
| NEXT | BEVOL | |
| SPEED | CAS 345 KT | GROUND 336 KT VERTICAL 0 FT/MIN |
| HEADING | 345 °T | TRACK 350 °T |
| ICING | | SAT - 32 F |
| ETA DEST | 1307 Z | TURBULENCE |
| ENDURANCE 4 H 30 MIN | | |
| <input type="checkbox"/> DEVIATING | | <input type="checkbox"/> CLIMBING TO |
| | | <input type="checkbox"/> DESCENDING TO |
| <input type="checkbox"/> ERASE ALL FIELDS | | <input type="checkbox"/> REFRESH DATA |
| | | <input type="checkbox"/> ADD FREETEXT |
| | | <input type="checkbox"/> XFR TO MAILBOX |

All fields, except ICING, TURBULENCE and ENDURANCE are automatically completed with data from the FMS, but can be modified.

Complete the empty fields and/or modify the fields completed by the FMS.

Click on the XFR TO MAILBOX button on the MFD to transfer the message to the mailbox.



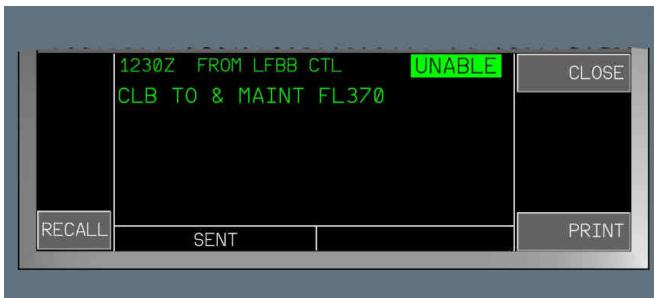
In the mailbox, the flight crew must display all the pages of the message to activate the SEND button.

Then click on the SEND button to send the position report message to the ATC center. Or click on the CANCEL button to cancel the message.

Click on the CLOSE button to remove the message from the mailbox.

HOW TO STORE MESSAGES

Applicable to: ALL



To remove a message from the mailbox when it has been processed, click on the CLOSE button in the mailbox. The message disappears from the mailbox.

It is recommended to remove all processed messages from the mailbox to enable uplink messages to be directly displayed in the mailbox.

Click on the RECALL button to display again the message most recently removed from the mailbox. All messages removed from the mailbox are recorded and can be reviewed later.

Select ATC COM on the MFD System Menu or press the ATCCOM key on the KCCU.

Click on the MSG RECORD button on the general menu bar of the MFD to open the MSG RECORD/LIST page.



All messages are stored in chronological order with the most recently received at the top.
Click on the ERASE ALL button to erase all the saved messages.

Click on the PRINT ALL button to print all the saved messages.

To display a full message, click on the message. The full message appears on a MSG RECORD/ZOOM page.

In a MSG RECORD/ZOOM page, click on the PRINT button to print the message.

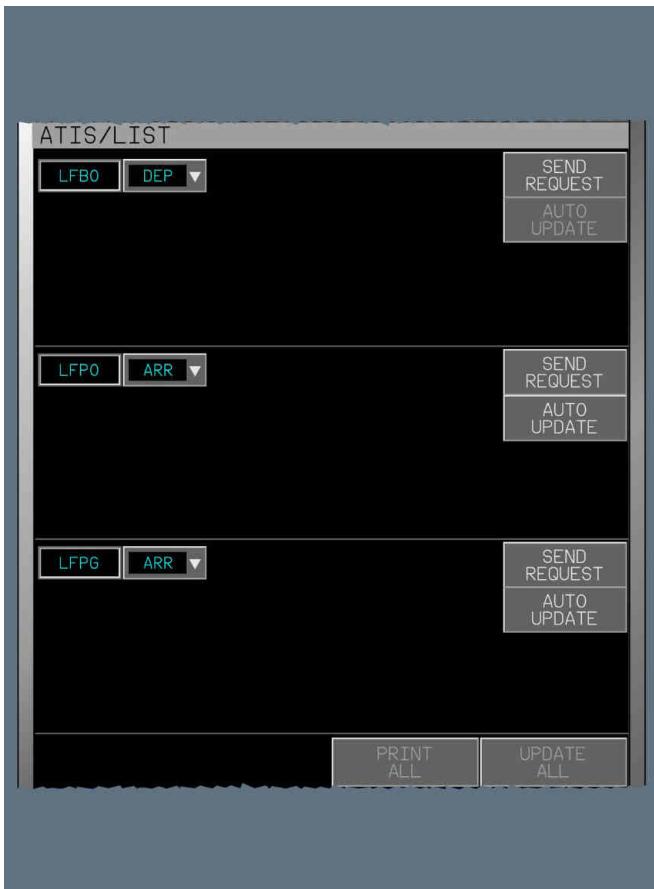
In a MSG RECORD/ZOOM page, click on the RETURN TO LIST button to go back to the list.

HOW TO USE DIGITAL ATIS

Applicable to: ALL

ATIS REQUEST

Select ATC COM on the MFD system menu or press the ATCCOM key on the KCCU.
Click on the ATIS button on the general menu bar of the MFD to open the ATIS/LIST page.



When initially accessing the ATIS/LIST page, the application automatically fills in the three airport names and type of the three ATIS areas with departure, arrival and alternate airport names (whenever they entered in the FMS).

The departure type indicator (DEP) is automatically associated to the departure airport request. The arrival type indicator (ARR) is automatically associated to the destination and the alternate airport requests.

To make a request for another airport, enter the ICAO code of the airport in one of the three areas. Click on the SEND REQUEST button to send the ATIS request.

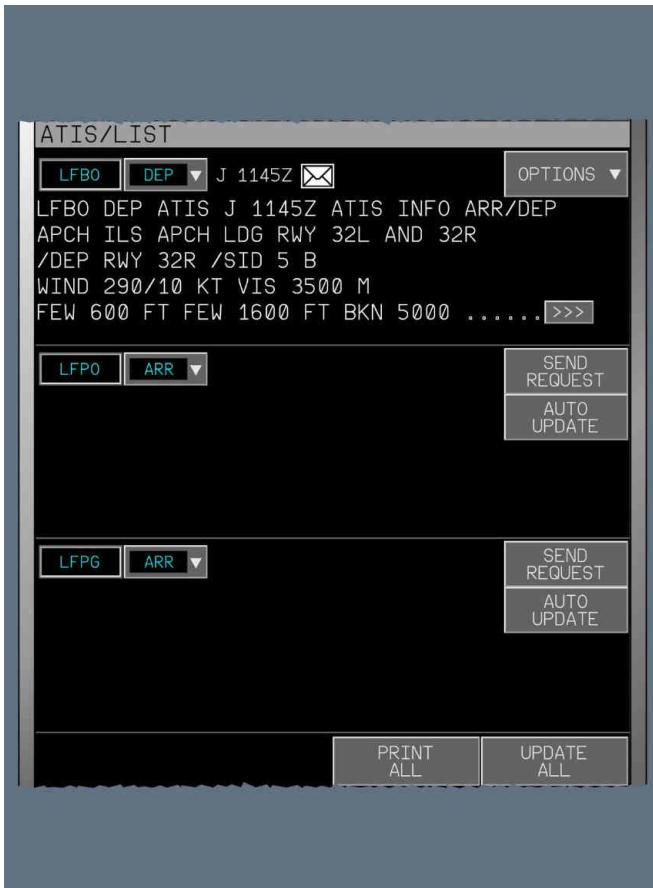
This will send to the ground system a request for an ATIS report. "SENDING" appears on the Message Status / FSM button.

When the ATIS report request is received on ground, "SENT" appears on the Message Status / FSM button.



ATIS RECEPTION

When an ATIS message is received, the symbol appears in the area from which the request was sent.



When the ATIS message cannot be entirely displayed in the message area, dots appear instead of the last 9 characters. Click on the button to display the ATIS message entirely on the

ATIS/RECEIVED page. Then click on the RETURN TO LIST button to go back to the ATIS/LIST page.

To print a displayed ATIS message in one area, click on the OPTIONS button and select PRINT.

To print the displayed ATIS messages in the three areas, click on the PRINT ALL button.

ATIS UPDATE

On the ATIS LIST page on the MFD, to request an update of the displayed ATIS, click on the OPTIONS button and select UPDATE. The ATIS update request is sent to the ATC center.

To request an update of the ATIS in the three areas, click on the UPDATE ALL button.

AUTO PRINT FUNCTION

The AUTO PRINT function enables to automatically print the ATIS text when it is received.

To activate the AUTO PRINT function in one area of the ATIS LIST page, click on the OPTIONS



button and select AUTO PRINT. The printer symbol appears on the area.

To deactivate the AUTO PRINT function in one area, click on the OPTIONS button and select CANCEL AUTO PRINT. The symbol disappears from the area.

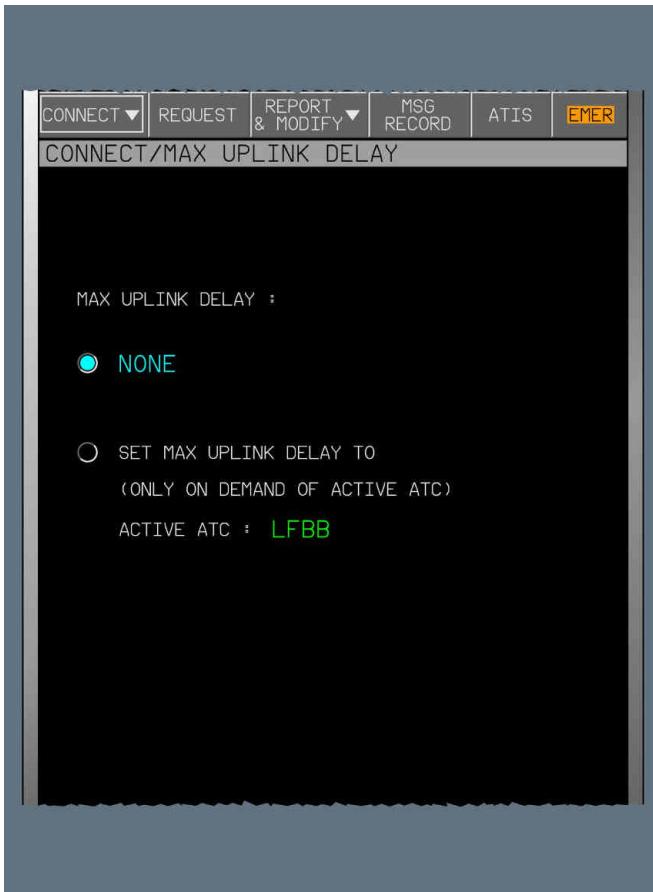
HOW TO SET MAX UPLINK DELAY

Applicable to: ALL

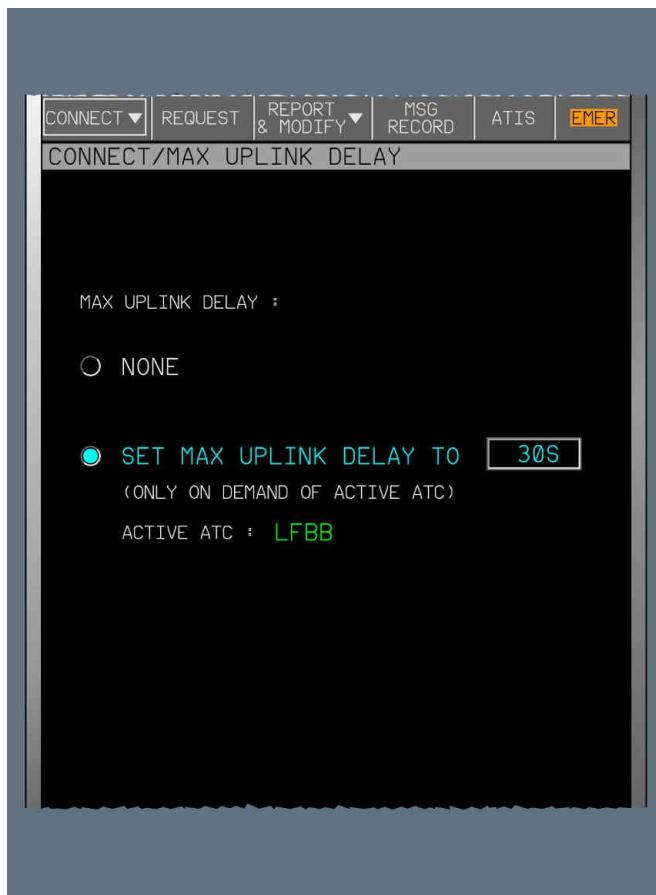
This action must be performed on the air traffic controller's request only.

Select ATC COM on the MFD system menu or press the ATCCOM key on the KCCU.

Click on the CONNECT button on the general menu bar of the MFD and select MAX UPLINK DELAY.



Tick the SET MAX UPLINK DELAY option and enter the delay in seconds.



Note: This delay applies for the active ATC center only. The value is reset to "NONE" when the connection with the current active ATC center ends.



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ATC - AIR TRAFFIC CONTROL DATALINK
APPLICATIONS SYSTEM - ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

COM ADS DATALINK FAULT (*Refer to procedure*)

COM ATC DATALINK FAULT (*Refer to procedure*)



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APPLICATIONS SYSTEM - ECAM ALERTS

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OIS - ONBOARD INFORMATION SYSTEM - SYSTEM DESCRIPTION

Overview

OVERVIEW

Applicable to: ALL

The Onboard Information System (OIS) provides tools for the flight crew to operate the aircraft. The OIS includes aircraft technical information, operating manuals, performance computation and mission management information.

The OIS provides information that is similar to the contents of a flight crew's briefcase. The OIS is often related to the Electronic Flight Bag (EFB).

The OIS has the following applications:

- OPS LIBRARY
- T.O PERF
- LDG PERF
- IN-FLT PERF
- LOADSHEET (Weight And Balance)
- FLT FOLDER (Electronic Flight Folder)
- NAV CHARTS (Navigation Charts)
- AOC (Company Communication)
- ELOGBOOK (Electronic Logbook).



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OIS - ONBOARD INFORMATION SYSTEM - SYSTEM DESCRIPTION

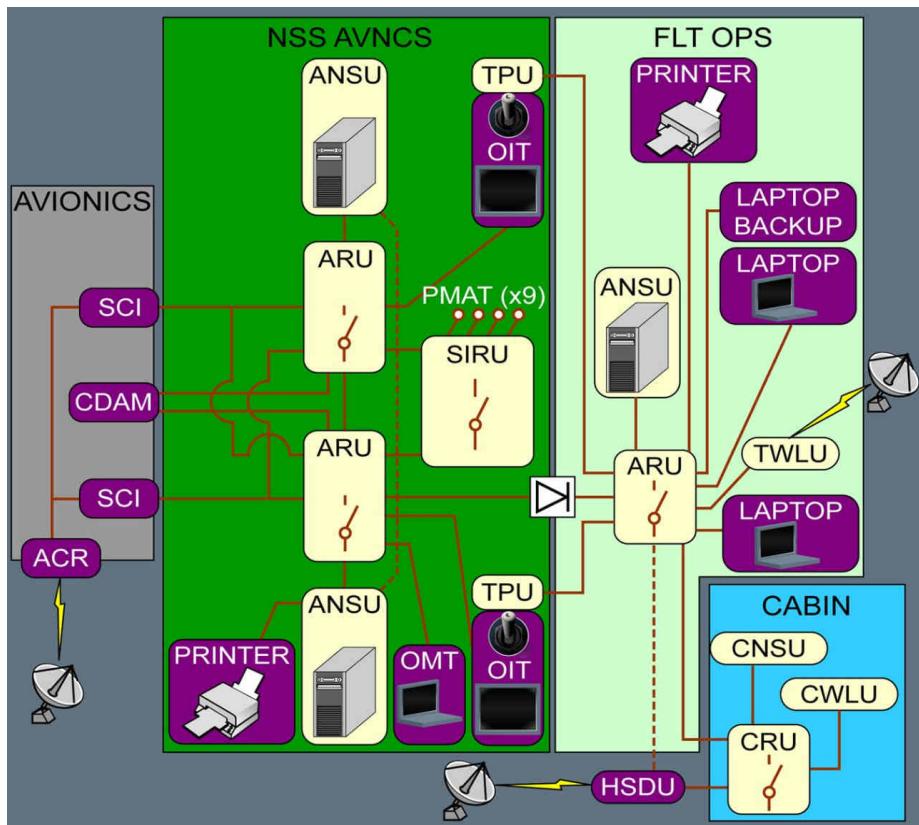
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Architecture

ARCHITECTURE

Applicable to: ALL

- The OIS is installed on the Network Server System (NSS).



The OIS is installed on the Network Server System (NSS).

- The NSS has two sides: The NSS AVNCS side and the FLT OPS side.

The flight crew can select the side to be displayed on the Onboard Information Terminal (OIT) screen via the OIT SIDE sw.

[L2] Two-way communication between the NSS AVNCS side and the aircraft avionics system is possible via the Secure Communication Interface (SCI).

One-way communication from the NSS AVNCS side to the FLT OPS side is possible via a diode.

As a result, information can only flow from the NSS AVNCS side to the FLT OPS side, or from the Avionics to the FLT OPS side, via the NSS AVNCS side.

[L1] On the NSS AVNCS side, two servers host the OIS applications.

On the FLT OPS side, the laptops in the cockpit host the OIS applications.

NSS AVNCS

[L2] The NSS AVNCS side has:

- One printer located on the center pedestal in the cockpit
- Two Aircraft Network Server Unit (ANSU) that host flight crew and maintenance applications
- Two Aircraft Router Units (ARUs) that enable connection between the various components of the NSS AVNCS side
- One Onboard Maintenance Terminal (OMT) that enables the maintenance personnel to access the servers

[L3] - A dedicated Secure Interface Router Unit (SIRU) with 9 to 12 plugs distributed throughout the aircraft to enable a Portable Maintenance Access Terminal (PMAT) to be connected to the servers.

[L1] The NSS AVNCS side hosts the following flight crew applications:

- The AOC application that the flight crew uses to communicate with the airline flight operations department
- The electronic logbook.

The NSS AVNCS side also hosts maintenance applications.

FLT OPS

The FLT OPS side has:

- One printer located on the Captain's lateral console
- Two laptops that are connected to the network
- One backup laptop that is connected to the network
- One Aircraft Network Server Unit (ANSU), that hosts network applications (printing and data communication capabilities)
- One Aircraft Router Unit (ARU), that enables connection between the various components of the FLT OPS side
- One Terminal area Wireless LAN Unit (TWLU), that enables communication on ground.



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The FLT OPS side hosts the following flight crew applications:

- The OPS LIBRARY
- The performance applications (T.O PERF, LDG PERF, IN-FLT PERF, LOADSHEET)
- The mission applications (NAV CHARTS, FLT FOLDER).

Note: *It takes 2 minutes to start the ARU at aircraft power-up. The flight crew should not start the three connected laptops until the ARU is operating. Therefore, the flight crew must wait at least 2 minutes after aircraft power-up before starting the three connected laptops.*



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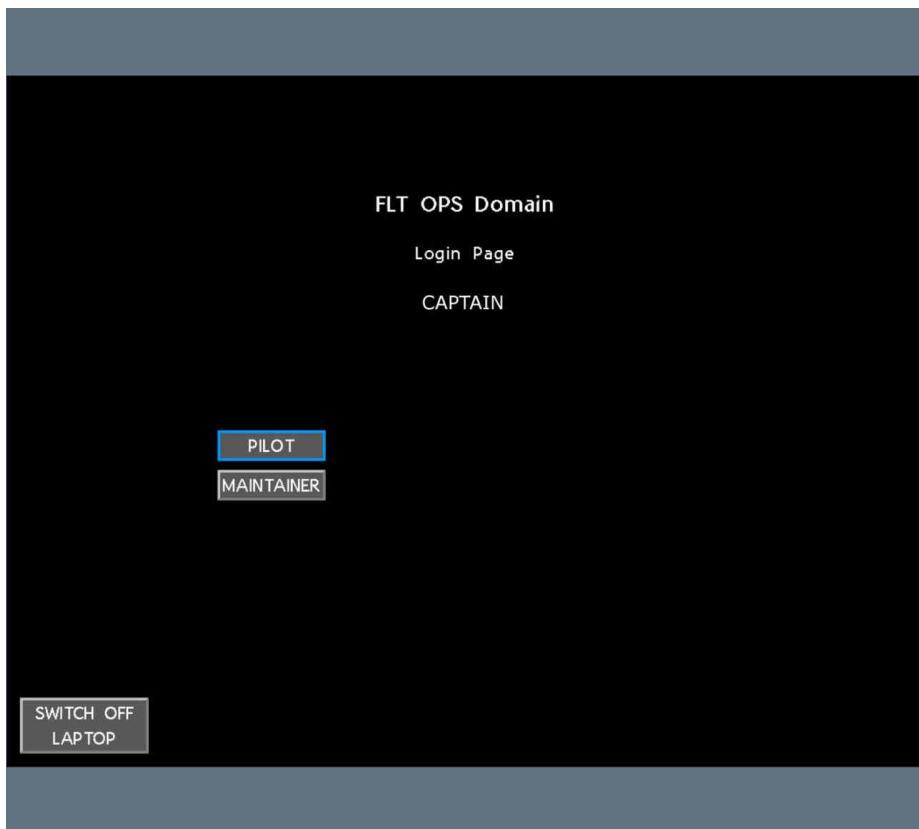
OIS - ONBOARD INFORMATION SYSTEM - SYSTEM DESCRIPTION

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Applications on FLT OPS Side**LOGIN PAGE****Applicable to: ALL**

The Login page is the first page that appears after the flight crew turns on the laptop.
The flight crew must click on the PILOT button to log on.

[Login Page \(Captain's Laptop\)](#)





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Login Page (First Officer's Laptop)

FLT OPS Domain

Login Page

F/O

PILOT

MAINTAINER

SWITCH OFF
LAPTOP



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Login Page (Backup Laptop)

FLT OPS Domain

[Login Page](#)

[BACKUP](#)

[PILOT](#)

[MAINTAINER](#)

[SWITCH OFF
LAPTOP](#)

The flight crew should click on the SWITCH OFF LAPTOP button to switch off the laptop.

FLT OPS STS PAGE

Applicable to: ALL

After logon, the FLT OPS STS page automatically starts and appears.

FLT OPS STS Page

The screenshot shows the 'FLT OPS STS' page of the AIRBUS OIS system. At the top, there's a menu bar with 'MENU', 'FLT OPS STS' (which is highlighted in blue), 'FUNCTIONS', '0 MSG', a dropdown arrow, and 'CLEAR'. Below the menu, the page is titled 'INIT'. It displays the following information:

- ACFT REGISTRATION: F-WWOW
- MSN: 0001
- OIS VERSION: 14-JUL-08 V2.0
- ACTIVE CHARTS: 07-AUG-08 27-AUG-08
- FLT NBR: AIB123
- ROUTE: FROM LFBO TO LFBD

At the bottom, there are navigation buttons: a left arrow, 'FLT OPS STS' (highlighted in blue), 'CHARTS', and a right arrow.



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The FLT OPS STS page enables the flight crew to:

- Check the following general information:
 - The aircraft registration
 - The Manufacturer Serial Number (MSN)
 - The OIS version.
- Check the navigation charts database validity

Note: *The navigation charts database validity does not appear until the flight crew starts the NAV CHARTS application.*

- Check or enter the following flight-related information:

- The flight number (FLT NBR)
- The departure and destination airports (FROM and TO).

The OIS synchronizes the FLT OPS STS pages of both OITs: When the flight crew makes a change on one side, the OIS automatically updates the FLT OPS STS page on the other side.

Note: *1. When the flight crew has made a manual entry on the FLT OPS STS page, if they change the parameters in the FMS, the FLT OPS STS page does not automatically retrieve the new parameters.*

The flight crew must click on the SYNCHRO AVIONICS button on the FLT OPS STS page to retrieve the new FMS parameters.

2. When the connection of a laptop to the network is lost, "SYNCHRONIZATION NOT AVAIL" appears on the FLT OPS STS page. When the connection is recovered, the synchronization of the FLT OPS STS page is partially lost between the CAPT and the F/O laptop.

In this case, when one flight crewmember makes a manual entry on the FLT OPS STS page of his laptop, the change does not appear on the FLT OPS STS page of the other laptop.

The flight crew has to restart both laptops to recover the full synchronization on the FLT OPS STS page of both laptops.

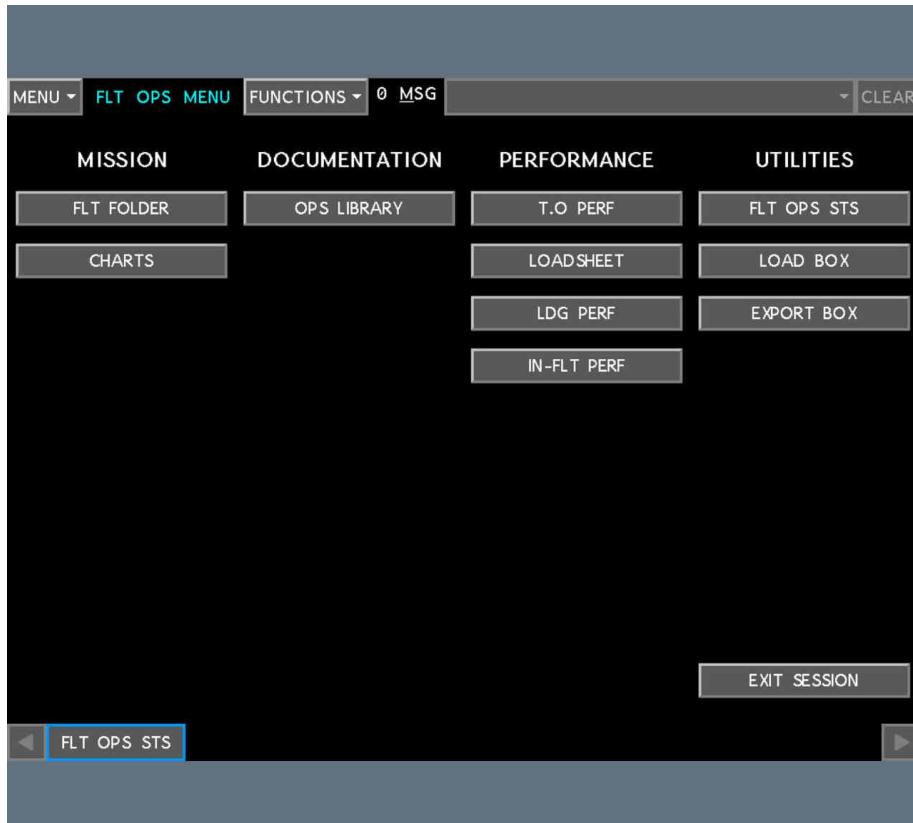
FLT OPS MENU PAGE

Applicable to: ALL

The FLT OPS MENU page enables the flight crew to start the FLT OPS applications.

The flight crew accesses the FLT OPS MENU page by:

- Clicking on the MENU button and selecting FLT OPS MENU, or
- Pressing the  key on the keyboard, or on the ACD.

FLT OPS MENU Page



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LOAD BOX / EXPORT BOX

Applicable to: ALL

LOAD BOX

The flight crew uses the LOAD BOX to load data on the laptop (e.g. manual updates, performance data updates, Electronic Flight Folder (EFF)).

The data transfer between the aircraft and the ground can be performed either by a physical device, (e.g. USB device) or by wireless communication (gatelink, SATCOM).

When the flight crew performs data loading from the LOAD BOX on one laptop, data is loaded on all laptops that are connected to the network.

- Note:
- *To transfer data to the laptop using a USB device, the flight crew inserts the USB device and presses the REFRESH LOAD BOX button on the LOAD BOX*
 - *The flight crew must not use two USB devices at the same time on the same laptop.*

LOAD BOX

| MENU | | LOAD BOX | | FUNCTIONS | | 0 | MSG | | | CLEAR | |
|-------------------------------------|--------------|-----------|-------|-------------|------|--------|-----|--------|--------|--------|--|
| <input type="checkbox"/> | DATA IDEN... | GENERATED | △ | DESTINATION | CAPT | STATUS | F/O | STATUS | BACKUP | STATUS | |
| <input checked="" type="checkbox"/> | AIB110_RKSI | 08-DEC | 14:27 | LOADSHEET | NOT | LOADED | NOT | LOADED | NOT | LOADED | |
| <input checked="" type="checkbox"/> | KLAX | | | | | | | | | | |

REFRESH LOAD BOX LOAD ABORT

◀ LOAD BOX ▶

OPS LIBRARY**Applicable to:** ALL

The OPS LIBRARY application is available on the FLT OPS side and enables the flight crew to access:

- The Flight Crew Operating Manual (FCOM)
- The Flight Crew Training Manual (FCTM)
- The Cabin Crew Operating Manual (CCOM)
- The Minimum Equipment List (MEL)
- The Configuration Deviation List (CDL)

- The Weight and Balance Manual (WBM)
- The Aircraft Flight Manual (AFM).

In accordance with the Airlines policy or as requested by National Authorities, the airline can remove or modify any of these manuals, or add a manual.

- Note:**
1. *The Operator may decide to put PDF files in the OPS LIBRARY application. The flight crew must not attempt to print individual pages of the PDF file onboard the aircraft, in order to avoid that the entire file is printed.*
 2. *When viewing a PDF file, the flight crew should click on the FULL SCREEN button to view the entire screen width, as necessary.*

[OPS LIBRARY Home Page](#)

The screenshot shows a software application window titled "OPS LIBRARY". At the top, there is a menu bar with "Check" and "About" options. Below the menu is a toolbar with buttons for "LIBRARY", "ECAM ALERTS", "LOGBOOK STATUS", "SEARCH", and "BOOKMARKS". The main area is titled "Manuals" and contains a list of six items, each with a blue rectangular highlight around its name. The items are: "FLIGHT CREW OPERATING MANUAL", "FLIGHT CREW TRAINING MANUAL", "CABIN CREW OPERATING MANUAL", "MASTER MINIMUM EQUIPMENT LIST", "WEIGHT AND BALANCE MANUAL", and "AIRPLANE FLIGHT MANUAL". To the right of each item, there are four columns of data: the date "23-May-2008", the status "Success", the action "check on", and the date "29-Jul-2008".

| Manual | Date | Status | Action | Date |
|-------------------------------|-------------|---------|----------|-------------|
| FLIGHT CREW OPERATING MANUAL | 23-May-2008 | Success | check on | 29-Jul-2008 |
| FLIGHT CREW TRAINING MANUAL | 23-May-2008 | Success | check on | 29-Jul-2008 |
| CABIN CREW OPERATING MANUAL | 23-May-2008 | Success | check on | 29-Jul-2008 |
| MASTER MINIMUM EQUIPMENT LIST | 23-May-2008 | Success | check on | 29-Jul-2008 |
| WEIGHT AND BALANCE MANUAL | 23-May-2008 | Success | check on | 29-Jul-2008 |
| AIRPLANE FLIGHT MANUAL | 23-May-2008 | Success | check on | 29-Jul-2008 |

PERFORMANCE**Applicable to: ALL**

The Performance applications are available on the FLT OPS side and group the following modules:

- T.O PERF

This application computes takeoff performance data based on aircraft and environmental entries made by the flight crew.

Refer to PER-TOF-TOI T.O PERF Interface .

- LDG PERF

This application computes landing performance data for dispatch or in-flight conditions, based on aircraft and environmental entries made by the flight crew.

Refer to PER-LND-LDI LDG PERF Interface .

- LOADSHEET

This application computes aircraft loading data.

Refer to PER-LOD-GEN Loadsheets Application .

- IN-FLT PERF

This application computes in-flight performance data based on aircraft and environmental entries made by the flight crew.

Refer to PER-OPD-GEN IN-FLT PERF Application - ATMO Module .

NAV CHARTS**Applicable to: ALL**

The NAV CHARTS application enables the flight crew to consult en route and terminal charts on the OIT.

The operator can choose the NAV CHARTS provider between JEPPESEN and LIDO.

L1 EN ROUTE CHARTS

The en route charts are the high and low altitudes navigation charts.

En route charts can be either static or dynamic:

- Static charts : Digital copy of the paper charts
- Dynamic charts : Offer an adjustable level of details, and lookup features for more information about all objects in the chart.

The dynamic en route charts can automatically adjust with the aircraft position during the flight.

TERMINAL CHARTS

Terminal charts provide the flight crew with airport charts, and have:

- Airport general information
- Airport, taxi and parking facilities
- Departure, arrival and approach procedures.

The flight crew can make a selection of airports from the application database, to enable a quick access to the charts of these airports.

If the FLT OPS STS page is completed, departure and destination airports automatically appear in the selection.

FLT FOLDER

Applicable to: ALL

ELECTRONIC FLIGHT FOLDER (EFF)

The purpose of an Electronic Flight Folder (EFF) is to provide the flight crew with an electronic means to:

- Consult and store documents with mission-related information
- Monitor and log the flight progress
- Send the documents to a ground archiving system.

An EFF is prepared on ground by airline operations and can be loaded on board using an aircraft-ground communication means. The air-ground communication means includes USB devices, gatealink and Satellite Communication (SATCOM).

After the flight, the flight crew sends the EFF to the airline operations for archiving.

An EFF is organized in a tree structure of folders and documents. The structure is customized by each airline administrator, according to the Airline policy.

One specific type of document is the flight plan. The flight plan is based on the computerized flight plan. It enables the flight crew to record the flight progress (time and fuel progress).

FLT FOLDER APPLICATION

The FLT FOLDER application is available on the FLT OPS side, and is the interface for the flight crew to consult EFFs.

The FLT FOLDER application can store information from other applications from the FLT OPS side (performance computations). Therefore, the FLT FOLDER application provides a means to centralize all the mission-related information into one application. This enables quick and easy consultation.

The FLT FOLDER application enables the synchronization of the EFF between the Captain's laptop and the First Officer's laptop.



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Applications on NSS AVNCS Side

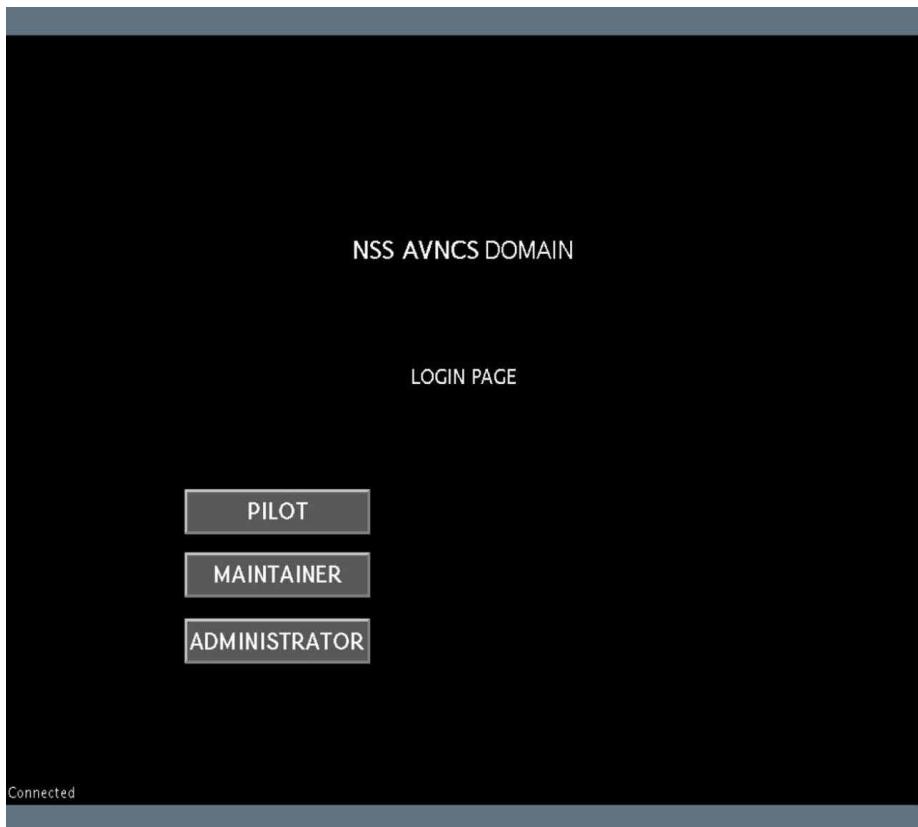
NSS AVNCS LOGIN PAGE

Applicable to: ALL

The LOGIN page is the first page that appears when the NSS is started, and when the OIT SIDE sw is set to NSS AVNCS.

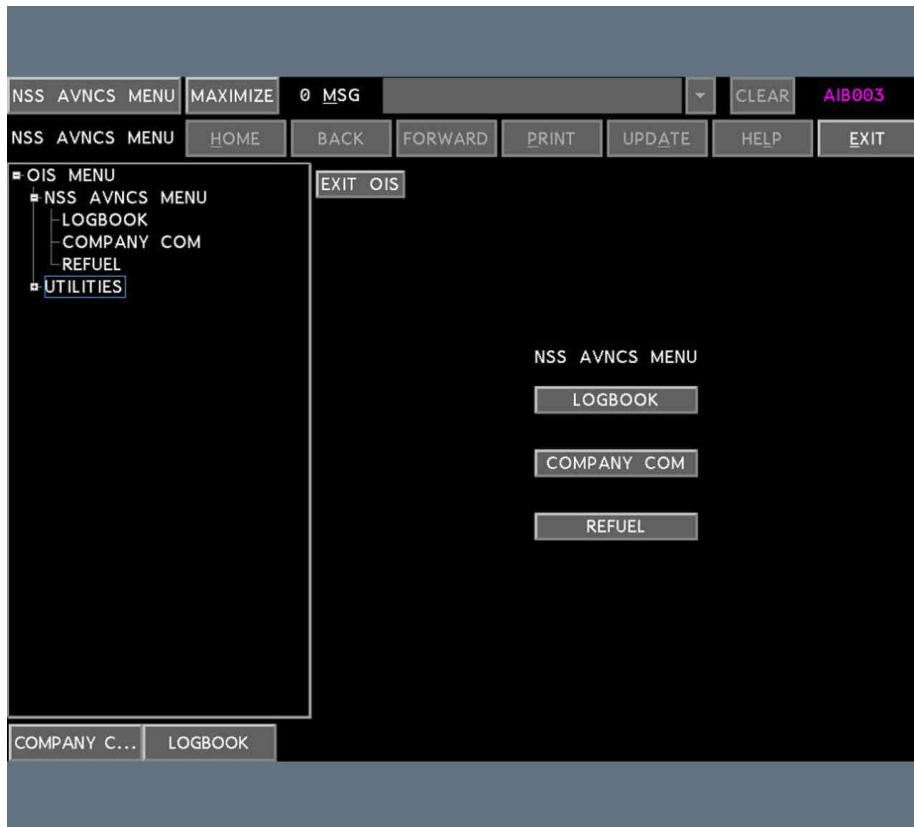
The flight crew must click on the Pilot button to log on.

NSS AVNCS Login Page



NSS AVNCS MENU PAGE**Applicable to: ALL**

After log-on on the NSS AVNCS side, the NSS AVNCS Menu page automatically appears. The NSS AVNCS Menu page enables the flight crew to start NSS AVNCS applications.

NSS AVNCS MENU Page

Note: After log-on, the COMPANY COM and TECHNICAL LOGBOOK applications automatically start.



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ELOGBOOK

Applicable to: ALL

The eLogbook application is on the NSS AVNCS side.

The purpose of the eLogbook application is to efficiently manage flight crew and maintenance personnel action, and to optimize the follow-up of the aircraft technical status.

The aircraft logbook information is available in digital format. This format provides standardized reporting means and a direct link to the aircraft information system.

The eLogbook has three domains associated with the three main user profiles:

- Technical logbook, dedicated to the flight crew
- Onboard Maintenance System (OMS) logbook functions, dedicated to maintenance personnel
- Cabin logbook, also called Digital Cabin Logbook (DCL), dedicated to the cabin crew.

The eLogbook data is stored on aircraft in a database hosted by the NSS. This database is duplicated and hosted in a ground station.

TECHNICAL LOGBOOK**Applicable to: ALL**

The flight crew can access the technical logbook:

- During flight preparation

The flight crew must synchronize the eLogbook data with the ground station, to ensure that they have the latest status of the aircraft.

Then, the flight crew:

- Checks the status of the aircraft, the maintenance actions and servicing actions reports (if any)
- Enters the mandatory preflight parameters (if any)
- Accepts the aircraft.

When the flight crew has accepted the aircraft, acceptance data is automatically sent to the ground station.

- In flight

The flight crew can record any defect. If communication between the aircraft and the ground station is available, the flight crew can send defects to the ground station.

L2 As such, the maintenance personnel can anticipate the maintenance action and prepare the spare part in advance.

L1- In postflight

After landing, the flight crew:

- Checks that all necessary entries have been made in the technical logbook
- Enters the mandatory postflight parameters (if any)
- Close the flight.

When the flight is closed, flight data is automatically sent to the ground.

L2 The updating of the technical logbook in the cockpit is performed thanks to the synchronization process.

L1 The technical logbook has four main pages:

- STATUS page
- LOGBOOK ENTRY page
- HISTORY page
- FLIGHT DATA page.

STATUS PAGESTATUS Page - Aircraft Accepted

The STATUS page provides the flight crew with the following information:

LOGBOOK CONTROL

The logbook control can have two status:

- Control is onboard

The logbook is controlled from the aircraft: Reading and recording information are authorized for all users working on aircraft database (with technical logbook and OMS logbook functions). The ground personnel cannot make any changes in the eLogbook database of the aircraft. All the displayed information on the OITs is up to date with no need to launch any synchronization process.

- Control is on ground

The ground personnel has control of the logbook, or the control status is not available due to communication failure: Reading is allowed. Recording information on board is not recommended, because in case of synchronization from ground to board, all data entered onboard will be erased and lost. The displayed information may not be up to date until the synchronization process is initiated.

AIRCRAFT AND FLIGHT INFORMATION DATA

The aircraft and flight information data is:

- The aircraft registration (ACFT REGISTRATION)
- The flight number (FLT NBR)
- The departure and destination airports (FROM and TO)
- The date of flight (DATE).

If the flight crew has already entered the flight information data (except the date of flight) in the FMS, data is automatically transferred from the avionics system and appears when the flight crew starts the technical logbook application.

However, the flight crew can manually enter the flight information data.

TECHNICAL/CABIN ITEMS

The flight crew can access technical and cabin items.

Technical items

- Open items

Open items are defects that the flight crew recorded during the flight. These items are not yet deferred or fixed. The flight crew cannot delete an open item that is recorded.

If communication during flight is possible, the flight crew can send open items to the ground, so that the maintenance personnel anticipates the maintenance action and prepares the spare part in advance.

The maintenance personnel must consider open items

- Deferred items

Deferred items are items associated to an action or analyse that enables the maintenance personnel to defer them. These items can be MEL items, CDL items or other items.

- Temporary items

Temporary items are logbook defects that the flight crew recorded and stored in the temporary items list.

The flight crew can delete or modify temporary items.

Before the aircraft closure, the flight crew should transfer items they want to record, from the temporary items list to the open items list. Temporary items that are not transferred are deleted when the flight crew closes the flight.

Cabin items

The cabin crew records cabin defects in the DCL. Then, the cabin crew sends to the flight crew some of these defects which have an impact on next dispatch, so that the flight crew can validate them:

L2

L1

- If the flight crew has validated the defect, the defect becomes a technical open item.

The cabin crew can consult this item in the DCL.

- If the flight crew has rejected the defect, the defect becomes a cabin item, and appears in the cabin open items list.

ACCEPTANCE

The flight crew can access the maintenance release status and validity, and latest actions that are reported, validated and released through logbook.

This information enables the flight crew to initiate preflight inspections in order to accept the aircraft:

- See maintenance release content
- Check the whole deferred defects list
- See other reports such as Serviced report or Regular checks (Daily, Weekly, Transit...)
- Make walk-around in order to detect potential other defects.

LOGBOOK ENTRY PAGE**LOGBOOK ENTRY Page**

| | | | |
|---------------------------|---------------|------------------------------|-------------|
| STATUS | LOGBOOK ENTRY | HISTORY | FLIGHT DATA |
| VALIDATE ITEM FROM: | | SEARCH & VALIDATE ITEM BY: | |
| ECAM ALERTS | | SYSTEM & FUNCTION | |
| CABIN ITEMS | | COCKPIT INTERFACE | |
| | | KEYWORD | |
| VALIDATE NON-LISTED ITEM: | | | |
| FREE TEXT | | | |
| STATUS | | | |

The LOGBOOK ENTRY page enables the flight crew to record a defect in the logbook, when a failure is detected.

The technical logbook provides several assistants to record a defect:

- ECAM ALERTS assistant

The ECAM ALERTS assistant enables the flight crew to record a defect from the list of ECAM alerts that appeared on the EWD during the flight.

- CABIN ITEMS assistant

The CABIN ITEMS assistant enables the flight crew to display the list of all defects submitted by the cabin crew for flight crew validation or refusal.

- Standard defects

The flight crew can record a defect by selecting an item from the standard defects database of the eLogbook. The flight crew can use the SYSTEM & FUNCTION, COCKPIT INTERFACE and KEYWORD assistants to select the item.

- FREE TEXT assistant

The flight crew can record a free text defect to describe an aircraft failure.

Note: Free text is an ultimate mean to report a defect, because a free text defect will never be linked to correlation nor documentation and so, dispatch activities around this defect will be longer, even difficult, for maintenance personnel.

HISTORY PAGE

The HISTORY page enables the flight crew to access all items that have been closed by the maintenance personnel.

HISTORY Page

| STATUS | LOGBOOK ENTRY | HISTORY | FLIGHT DATA |
|--------|--|-------------|-------------|
| REPORT | | OPEN DATE ▼ | CLOSE DATE |
| | COCKPIT WINDOW CLEANING REQUEST | 11-OCT-07 | 11-OCT-07 |
| | INOP SYS L+R WINDSHLDS HEATG | 11-OCT-07 | 11-OCT-07 |
| | MAINTENANCE TIME LIMITED ITEM ECAM WARNING | 11-OCT-07 | 11-OCT-07 |

▲ ▼

STATUS

FLIGHT DATA PAGE

The FLIGHT DATA page enables the flight crew to create a flight data report of the current flight.

Preflight Parameters

The screenshot displays the OIS interface for preflight parameters. At the top, there are tabs for STATUS, LOGBOOK ENTRY, HISTORY, and FLIGHT DATA. Below these, flight information is shown: Flight Number (AIB003 CURRENT), Aircraft Registration (F-GGEA), and Flight Path (FROM TLS TO CDG). The date is listed as 19-FEB-09. There are two tabs at the bottom left: PRE-FLIGHT and POST-FLIGHT. In the center, fuel data is displayed: Remaining fuel (20 T) and Uplift (20000 L). Density is listed as 0.785, and the supplier is FUEL TLS. At the bottom right, there is a STATUS button.

AIRCRAFT AND FLIGHT INFORMATION DATA

The aircraft and flight information data is the same as displayed on the STATUS page. Refer to STATUS PAGE .

Note: The flight crew can modify the aircraft and flight information data while the aircraft is not accepted. When the flight crew has accepted the aircraft, the flight crew can modify the TO data only.

PREFLIGHT DATA

Preflight data is data that the flight crew enters before the departure of the flight.

Some preflight data is mandatory (indicated by amber boxes when empty). The flight crew must enter mandatory data before the acceptance of the aircraft.

[L2] Note: *The Operator can fully customize preflight data.*

L1 POSTFLIGHT DATA

Post-Flight Parameters

The screenshot shows the 'Post-Flight Parameters' screen of the OIS. At the top, there are four tabs: STATUS, LOGBOOK ENTRY, HISTORY, and FLIGHT DATA. The FLIGHT DATA tab is selected, showing flight information for flight AIB003 (CURRENT). The flight details include ACFT REGISTRATION (F-GGEA), DATE (19-FEB-09), and route segments FROM TLS to TO CDG. Below the flight details, there are two tabs: PRE-FLIGHT (selected) and POST-FLIGHT. Under PRE-FLIGHT, there is a section for NIL DEFECT. Under POST-FLIGHT, there is a TIME section with flight times and total time. The bottom right corner of the screen has a STATUS button.

| | | | | | |
|----------------|------------------|-------|----------|-------|-----|
| FLT NBR | AIB003 (CURRENT) | | | | |
| FROM | TLS | TO | CDG | | |
| TIME | | | | | |
| TOTAL TIME B/F | 15:10 | HOURS | LANDING | 17:00 | (Z) |
| FLIGHT TIME | 01:50 | HH:MM | TAKE OFF | 15:40 | (Z) |
| TOTAL TIME | 17:00 | HOURS | | | |

Postflight data is data that the flight crew enters after the arrival of the flight, and before the aircraft closure.

[L2] Note: *The Operator can fully customize postflight data.*

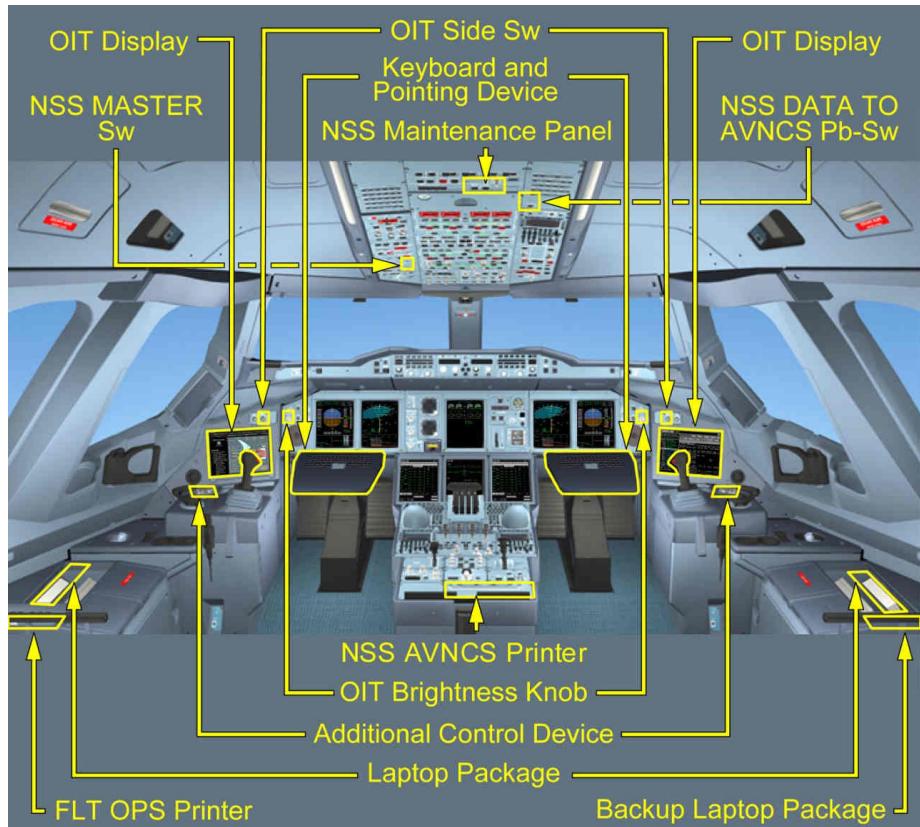
AIRLINE OPERATIONAL CONTROL (AOC)**Applicable to: ALL**

The Airline Operational Control (AOC) is available on the NSS AVNCS side, and is also referred as company communication.

- The AOC uses the Aircraft Communication Addressing and Reporting System (ACARS) messaging system to transmit AOC messages.
- The AOC provides communication functions between the aircraft and the airline ground facilities.

Cockpit View**COCKPIT VIEW**

Applicable to: ALL

Cockpit View



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OIT Display

OIT DISPLAY

Applicable to: ALL

The flight crew uses the OIT display to access and display the FLT OPS or the NSS AVNCS applications.

L2 The OIT s enable the flight crew to display:

- The OPS LIBRARY
Refer to DSC-46-20-20-90 OPS LIBRARY Consultation Page .
- The Performance applications
Refer to DSC-46-20-20-100 Performance Application Page .
- The FLT FOLDER application
Refer to DSC-46-20-20-110 FLT FOLDER Page .
- The NAV CHARTS application
- The Technical Logbook application
Refer to DSC-46-20-20-120 Technical Logbook Page .
- The AOC application.



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Intentionally left blank

OIT SIDE Sw**OIT SIDE SW****Applicable to: ALL**

The OIT SIDE sw enable each flight crewmember to display the NSS AVNCS side or the FLT OPS side on their OIT display.



The OIT displays the NSS AVNCS side.



The OIT displays the FLT OPS side.

Note: *The hourglass may appear on the OIT display, when the flight crew switches from the FLT OPS side to the NSS AVNCS side, and vice-versa.*

In this case, the flight crew must click anywhere on the screen to recover the cursor.



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OIT Brightness Knob**OIT BRIGHTNESS KNOB**

Applicable to: ALL



Enables each flight crewmember to turn their OIT on or off, and to adjust the brightness of their OIT screen.

When a flight crewmember sets his OIT BRIGHTNESS knob to OFF, the associated OIT, keyboard and pointing device, and Additional Control Device (ACD) are switched off.



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Intentionally left blank

Keyboard and Pointing Device**KEYBOARD AND POINTING DEVICE**

Applicable to: ALL

Each flight crewmember can use their keyboard and pointing device that is on the sliding table.

Keyboard and Pointing Device**OIS MENU KEY**

On the FLT OPS side, when pressed, the OIT displays the FLT OPS Menu page.

OIS XFR KEY

On the FLT OPS side, when pressed, the OIT displays the current display of the other OIT. Refer to DSC-46-20-30 X-OIS Function .



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Additional Control Device (ACD)**ADDITIONAL CONTROL DEVICE (ACD)****Applicable to: ALL**

Each flight crewmember can use their Additional Control Device (ACD), if their keyboard and pointing device is retracted or not available.

Additional Control Device**OIS XFR KEY**

On the FLT OPS side, when pressed, the OIT displays the current display of the other OIT . Refer to DSC-46-20-30 X-OIS Function .

OIS MENU KEY

On the FLT OPS side, when pressed, the OIT displays the FLT OPS Menu page.



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Laptop Package**LAPTOP PACKAGE**

Applicable to: ALL

**USB PLUGS**

Enables the flight crew to plug an USB device, to load or to export data. For more information on the use of the USB plugs, *Refer to DSC-46-20-10-30 LOAD BOX / EXPORT BOX*.

ON/OFF SW

- To turn on the laptop, slide the ON/OFF sw to the right for no more than 2 s.
- To turn off the laptop, slide the ON/OFF sw to the right again for no more than 2 s.

ON LED INDICATION

The laptop is off.



The laptop is on.

ON LED MIRROR

Reflects the indication of the ON LED, and enables the flight crew to see more clearly the ON LED indication, when the laptop is stowed in the package.

PWR STS LED INDICATION

The laptop is either on or off, and is electrically powered by its battery.

L123



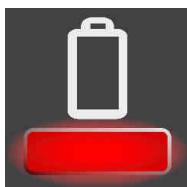
- Steady: The laptop is electrically powered by the aircraft, and the laptop battery is fully charged.
- Flashing: The laptop is on. It is electrically powered by the aircraft and the battery is intentionally not fully charged.
Due to an internal protection of the laptop, the battery is intentionally discharged to 80%, when the temperature of the laptop is high.

L12



- Steady: The laptop is electrically powered by the aircraft, and the laptop battery is normally on charge.
- Flashing: The laptop is electrically powered by the aircraft, and the charge of the laptop battery is interrupted.

L12



- Steady: The laptop is on, and is electrically powered by its battery. The charge of the laptop battery is low, and the laptop will soon go off.
- Flashing: The laptop is electrically powered by the aircraft, and the laptop battery is faulty or is not charging correctly.

LAPTOP SCREEN BRIGHTNESS PB

When pressed, adjusts the brightness of the laptop screen.



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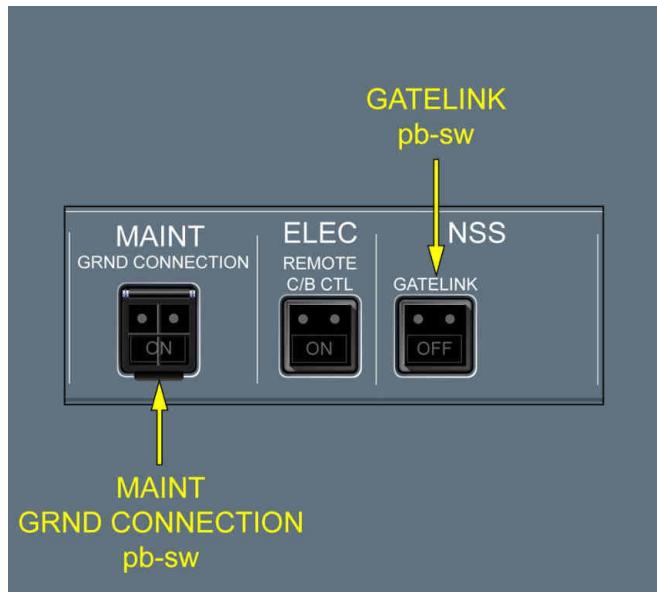
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NSS Maintenance Panel**NSS MAINTENANCE PANEL**

Applicable to: ALL

NSS Maintenance PanelMAINT GRND CONNECTION pb-sw

The maintenance personnel cannot connect a PMAT to the NSS AVNCS side via the plugs distributed throughout the aircraft.



The maintenance personnel pressed the MAINT GRND CONNECTION pb-sw .
For maintenance purposes on ground, the maintenance personnel can connect a PMAT to the NSS AVNCS side via the plugs distributed throughout the aircraft.

NSS GATELINK pb-sw

The Terminal Area Wireless LAN Unit (TWLU) is on.
Communication between NSS and ground via gatelink is possible.



The Terminal Area Wireless LAN Unit (TWLU) is off.
Communication between NSS and ground via gatelink is not possible.

NSS DATA TO AVNCS Pb-Sw**NSS DATA TO AVNCS PB-SW**

Applicable to: ALL

L12



Communication between the NSS AVNCS side and the aircraft avionics is enabled in both ways.

When pressed, disables communication between the NSS AVNCS side and the aircraft avionics.

The SCIs allow communication only from the aircraft avionics to the NSS AVNCS side.

L12



Communication between the NSS AVNCS side and the aircraft avionics is disabled. The AOC can no longer send messages to the ground but can still receive some. The logbook communication with the ground is lost.

When pressed, enables communication between the NSS AVNCS side and the aircraft avionics in both ways.



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NSS MASTER Sw**NSS MASTER SW**

Applicable to: ALL

NSS MASTER sw

Normal operation. No smoke is detected.



Smoke is detected in the NSS.

The SMOKE light remains on, as long as smoke is detected.



All electrical power to the NSS is cut off.



All electrical power to the NSS is cut off, and smoke is detected.





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OPS LIBRARY Consultation Page**OPS LIBRARY CONSULTATION PAGE**

Applicable to: ALL

OPS LIBRARY Consultation Page

The screenshot shows the **FLT OPS Menu** with the **OPS LIBRARY** tab selected. The **FCOM REVISIONS** section is displayed, containing the following content:

FCOM REVISIONS

FCOM revisions are issued to add, update, or revise information. The Operator determines the revision periodicity.

When necessary, a revision may be issued in between the defined periodicity (e.g. need for urgent update).

A vertical white bar appears to the left of all revised parts of the manual. The flight crew can display the reason for the change by clicking on the white bar.

The FCOM also has a list of revisions. The list provides:

- A link to the applicable parts of the manual
- The technical reason for each revision.

TEMPORARY INFORMATION

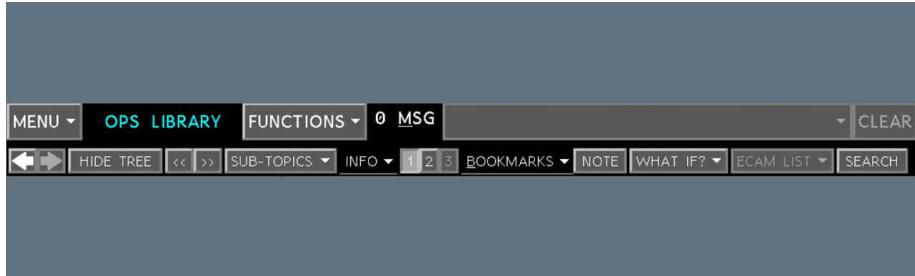
Some FCOM sections may need a temporary update (e.g. to explain a system behavior that will be modified by a future standard). In such cases, the applicable FCOM section is changed to a Temporary Documentary Unit (TDU).

However, the initial content of the FCOM remains available, and

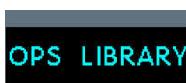
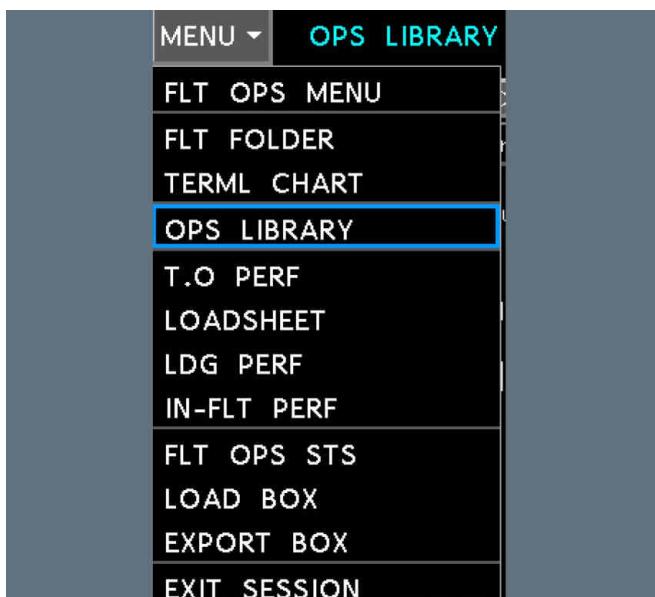
The interface includes a **Navigation Tree** on the left and an **Information Content** panel on the right. The bottom navigation bar shows **FLT OPS STS**, **FLT FOLDER**, and **OPS LIBRARY**.

FLT OPS MENU

Applicable to: ALL

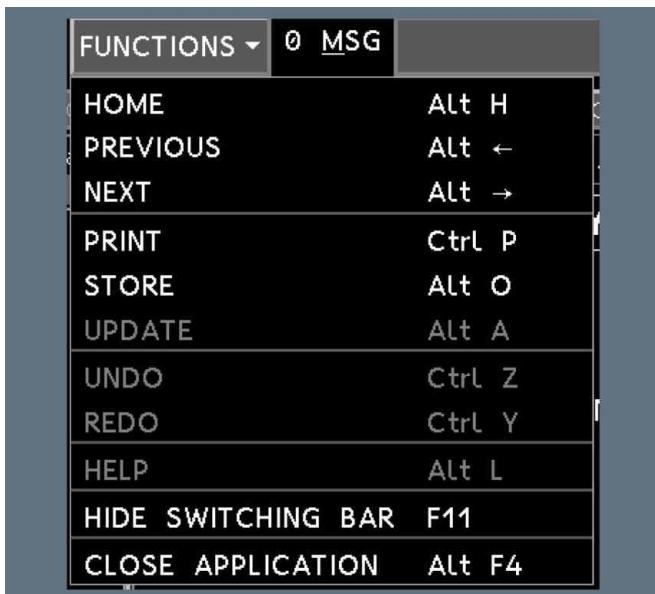
FLT OPS Menu**LINE 1**

When clicked, displays a drop-down list, that enables to flight crew to access all the applications on the FLT OPS side, and to exit the session.

MENU Drop-Down List

Indicates the active application.

- FUNCTIONS**
- When clicked, displays a drop-down list, that enables the flight crew:
- To display the HOME page of the application, by selecting HOME
 - To display the information that was previously displayed, if any, by selecting PREVIOUS
 - To display the information that was displayed before the flight crew clicked on the PREVIOUS button, by selecting NEXT
 - To print the currently-displayed information, by selecting PRINT
The Printer for the FLT OPS side is located on the Captain's lateral console.
 - To display the manual that is being consulted in full screen, and to hide the navigation tree, by selecting HIDE SWITCHING BAR
 - In full screen, to change the display from full screen to normal screen, by selecting SHOW SWITCHING BAR
 - To close the application, by selecting CLOSE APPLICATION.

FUNCTIONS Drop-Down List

Displays messages to the flight crew.

0 MSG

When clicked, erases messages that are on the message toolbar.

CLEAR**LINE 2**

Appears when the flight crew accesses a manual from the OPS LIBRARY.



When clicked, displays the information that was previously displayed, if any.



When clicked, displays the information that was displayed before the flight crew clicked on the PREVIOUS button.



When clicked, hides the navigation tree.



When clicked, displays the navigation tree in the window, on the left side of the screen.



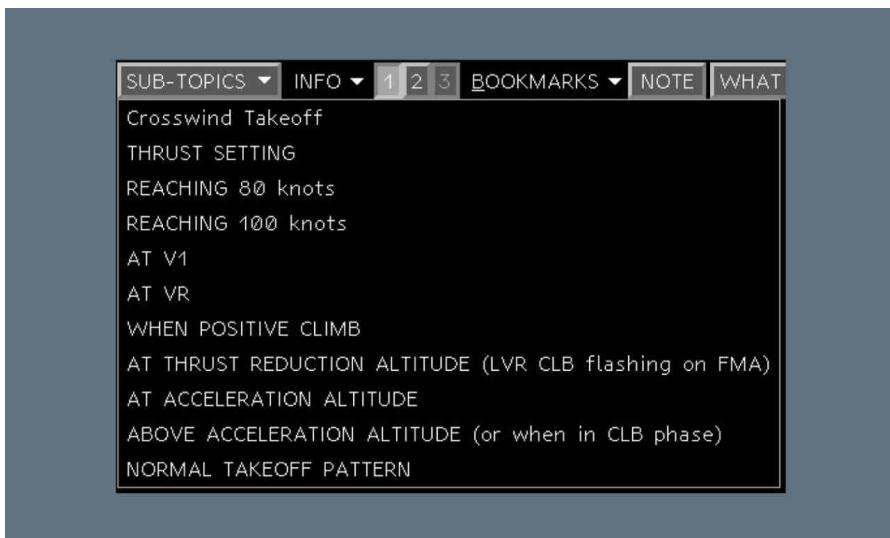
When clicked, displays the preceding information from the cursor position in the navigation tree.



When clicked, displays the following information from the cursor position in the navigation tree.



When clicked, displays a drop-down list, that enables the flight crew to display the different chapters or subchapters of the displayed information, if any.



The screenshot shows the OIS interface with the Sub-topics dropdown menu open. The menu contains the following items:

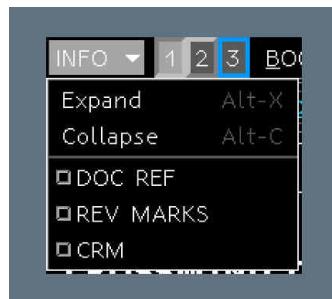
- SUB-TOPICS ▾
- INFO ▾
- 1 2 3
- BOOKMARKS ▾
- NOTE
- WHAT

The menu lists several takeoff-related sub-topics:

- Crosswind Takeoff
- THRUST SETTING
- REACHING 80 knots
- REACHING 100 knots
- AT V1
- AT VR
- WHEN POSITIVE CLIMB
- AT THRUST REDUCTION ALTITUDE (LVR CLB flashing on FMA)
- AT ACCELERATION ALTITUDE
- ABOVE ACCELERATION ALTITUDE (or when in CLB phase)
- NORMAL TAKEOFF PATTERN

INFO ▾

- When clicked, displays a drop-down list that enables the flight crew:
- To expand the applicable conditions or frames (e.g. annunciations), when applicable, by selecting Expand
 - To hide the applicable conditions or frames (e.g. annunciations), when applicable, by selecting Collapse
 - To display the information reference and the date of release, by selecting DOC REF
- When a Temporary Documentary Unit (TDU) appears, displays also the reason for issue of the TDU .
- To display the revision marks, when applicable, by selecting REV MARKS
 - To display the task sharing for the SOP s, by selecting CRM.

INFO Drop-down List

1 2 3

When clicked, displays the selected layers of information. The active buttons indicate the available information layers for the displayed information. For more information, *Refer to How to use Information Layers*

BOOKMARKS ▾

- When clicked, displays a drop-down list, that enables the flight crew:
- To add the displayed information in a list of bookmarks, by selecting ADD TO LIST
 - To organize bookmarks by selecting ORGANIZE
 - To access the bookmarked information.

For more information, *Refer to How to Use Bookmarks* .

BOOKMARKS Drop-down List

When clicked, displays an area that enables the flight crew to add a note (free text) to the displayed information.



When clicked and when applicable, provides a list of procedures or information that may be related to the information currently displayed. For more information, *Refer to How to Use the What If Function*.



When clicked and when a MMEL item is displayed, displays a drop-down list that provides the ECAM alerts associated with the MMEL item that is displayed.

This drop-down list enables the flight crew to access the ECAM alerts documentary units, in the MMEL Entries chapter of the MMEL.

For more information, *Refer to DSC-46-20-50-10 How to Use the Return to ECAM function*.



When clicked, displays the SEARCH Panel. For more information about the search, *Refer to How to Use the Word Search*.

NAVIGATION TREE

Applicable to: ALL

NAVIGATION TREE

The flight crew uses the navigation tree to rapidly navigate through the manuals from the OPS LIBRARY.

The flight crew can use two modes to display the navigation tree:

- The Path mode, or
- The Tree mode.

The flight crew can select one of these modes from below the navigation tree.

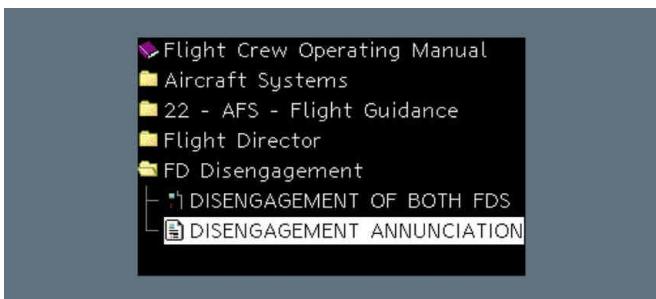
When the cursor in the navigation tree is on a folder, the contents of the folder appears on the right side of the screen.

PATH MODE



The Path mode provides a filtered structure, displaying only the parent folders of the selection.

The Path mode



TREE MODE



The Tree mode displays the navigation tree as in a "classic" explorer.

The folders and subfolders are opened by clicking on the icon and closed by clicking on the icon.

The Tree Mode**INFORMATION CONTENT****Applicable to: ALL****INFORMATION CONTENT**

Information is organized in documentary units.

- A documentary unit can include text, illustrations, external objects (audio files, video, pictures) and animated graphics.

Note: *The flight crew cannot watch videos or listen audio files included in a documentary unit, with the onboard OPS LIBRARY.*

INFO ▾

When clicking on the  button and selecting DOC REF, the flight crew can access the reference of the documentary unit, the date of release, and the aircraft effectiveness. When consulting a Temporary Documentary Unit (TDU), the reason for issue also appears.



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Performance Application Page

PERFORMANCE APPLICATION PAGE

Applicable to: ALL

Performance Application Page

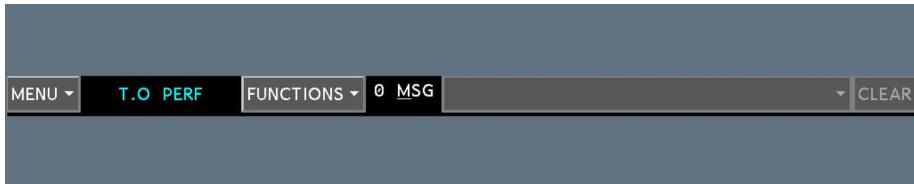
FLT OPS Menu

↓

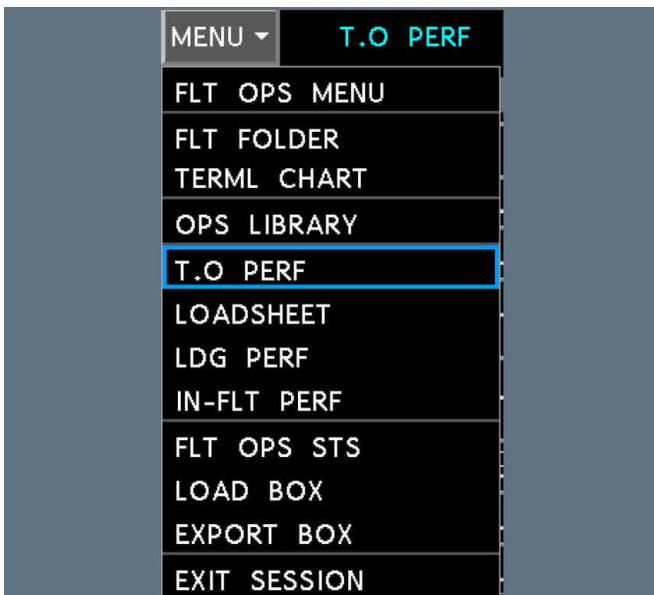
| | | | | |
|--|-----------------|-----------|-------|-------|
| MENU | T.O PERF | FUNCTIONS | 0 MSG | CLEAR |
| CONDITIONS <F3> WIND °/kt [---] [-] OAT °C [---] ISA --- QNH hPa [---] RWY COND [---] A-ICE [---] TOW T 569.0 CONF OPT CONF (STD) [---] AIR COND On (STD) [---] THRUST FLEX (STD) [---] | | | | |
| SINGLE RWY COMPUTATION <F2> MULTIPLE RWY COMPUTATION <Ctrl F2> TOULOUSE(BLAG) LFOB / TLS [---] NO RWY [---] ELEVN ft SLOPE % LENGTH m CWY m SWY m ENTRY ANGLE ° T.O SHIFT m ERROR *** Missing parameter WIND *** Missing parameter OAT *** Missing parameter QNH *** Missing parameter RWY COND *** Missing parameter A-ICE *** Missing parameter RWY | | | | |
| NORMAL | | | | |
| ACFT STS <F5> SYNCHRO LOGBOOK COMPUTE <F8> XCHECK WITH FMS <F7> CLEAR <F6> | | | | |
| ◀ FLT OPS STS T.O PERF ▶ | | | | |

FLT OPS MENU

Applicable to: ALL

FLT OPS Menu

When clicked, displays a drop-down list, that enables to flight crew to access all the applications on the FLT OPS side, and to exit the session.

MENU Drop-down List

Indicates the active application.

When clicked, displays a drop-down list, that enables the flight crew:

FUNCTIONS

- To display the HOME page of the application, if any, by selecting HOME
- To print the currently-displayed information, by selecting PRINT
The Printer for the FLT OPS side is located on the Captain's lateral console.
- To copy the displayed performance application page to the EFF, by selecting STORE
- To display the performance application in full screen, by selecting HIDE SWITCHING BAR
- In full screen, to change the display from full screen to normal screen, by selecting SHOW SWITCHING BAR
- To close the application, by selecting CLOSE APPLICATION.

FUNCTIONS Drop-down List

| FUNCTIONS ▾ | | 0 MSG |
|--------------------|-----|--------|
| HOME | | Alt H |
| PREVIOUS | | Alt ← |
| NEXT | | Alt → |
| PRINT | | Ctrl P |
| STORE | | Alt O |
| UPDATE | | Alt A |
| UNDO | | Ctrl Z |
| REDO | | Ctrl Y |
| HELP | | Alt L |
| HIDE SWITCHING BAR | F11 | |
| CLOSE APPLICATION | | Alt F4 |



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Displays messages to the flight crew.

0 MSG

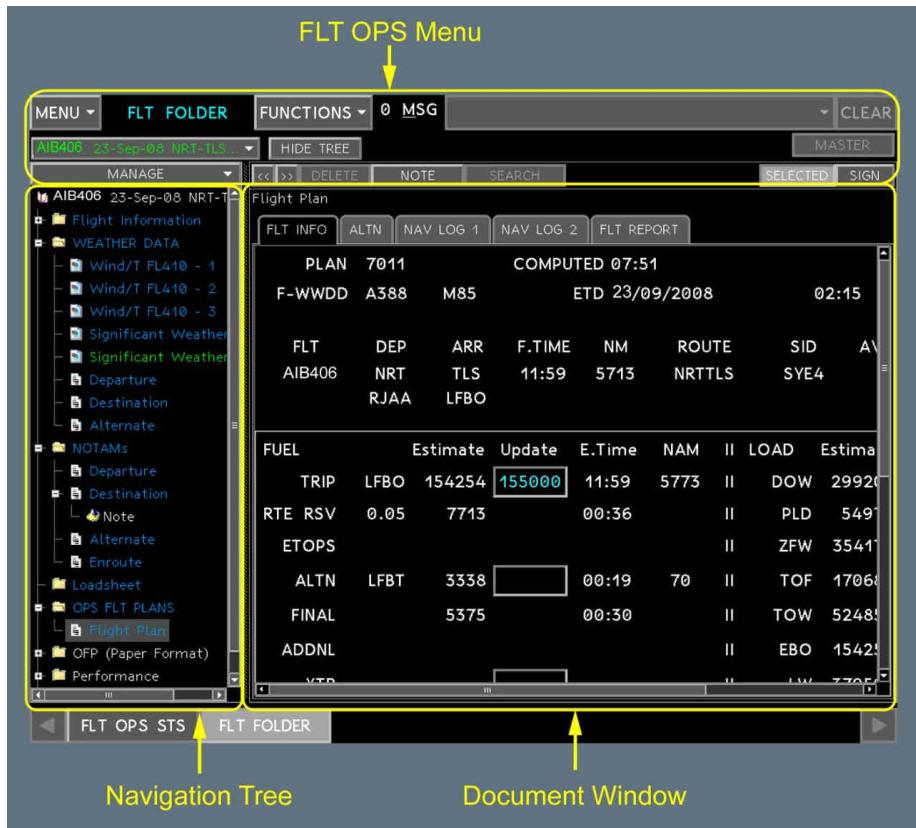


[CLEAR]

When clicked, erases messages that are on the message toolbar.

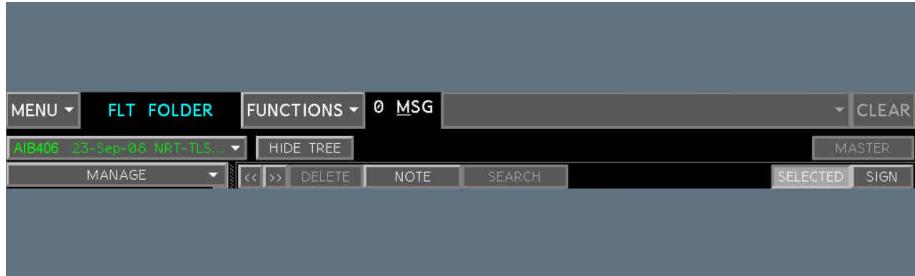
FLT FOLDER Page**FLT FOLDER PAGE**

Applicable to: ALL

FLT FOLDER Page

FLT OPS MENU

Applicable to: ALL

FLT OPS MenuLINE 1

When clicked, displays a drop-down list, that enables to flight crew to access all the applications on the FLT OPS side, and to exit the session.

MENU Drop-Down List**FLT FOLDER**

Indicates the active application.

FUNCTIONS

When clicked, displays a drop-down list, that enables the flight crew:

To print the currently displayed document, by selecting PRINT

The Printer for the FLT OPS side is located on the Captain's lateral console.

- To display the manual that is being consulted in full screen, and to hide the navigation tree, by selecting HIDE SWITCHING BAR
- In full screen, to change the display from full screen to normal screen, by selecting SHOW SWITCHING BAR
- To close the application, by selecting CLOSE APPLICATION.

FUNCTIONS Drop-Down List

| FUNCTIONS | | 0 <u>MSG</u> |
|--------------------|--------|--------------|
| HOME | | Alt H |
| PREVIOUS | | Alt ← |
| NEXT | | Alt → |
| PRINT | | Ctrl P |
| STORE | | Alt O |
| UPDATE | | Alt A |
| UNDO | | Ctrl Z |
| REDO | | Ctrl Y |
| HELP | | Alt L |
| HIDE SWITCHING BAR | F11 | |
| CLOSE APPLICATION | Alt F4 | |

Displays messages to the flight crew.

0 MSG

When clicked, erases messages that are on the message toolbar.

CLEAR

LINE 2

When clicked, displays the list of EFFs that have been imported in the FLT FOLDEP application.

When the flight crew selects an EFF in the EFF list, the application asks if the selected EFF must be set as current.

The EFFs are listed according to their identifier:

- Flight Number
- Date of flight
- Departure airport
- Destination airport.

When clicked, hides the navigation tree. The document is then displayed on the full horizontal screen.

HIDE TREE

When clicked, displays the navigation tree in the window, on the left side of the screen.

SHOW TREE**GET MASTER**

When clicked, the flight crewmember gets the master access for the Flight Follow Up (FFU).

In this case, the other flight crewmember cannot perform the FFU. The flight plan is read only on his laptop.

Indicates that the flight crewmember has the master access for the FFU.

MASTER

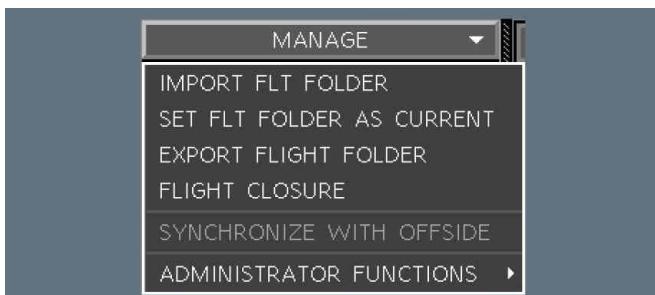
LINE 3

When clicked, displays a drop down list that enables the flight crew:

- To import in the FLT FOLDER application, the EFF that the flight crew loaded in the load box, by selecting IMPORT FLT FOLDER

Note: When the flight crew opens the FLT FOLDER application, the EFFs that the flight crew previously loaded in the load box are automatically imported.

- To promote the displayed EFF to the current state, by selecting SET FLT FOLDER AS CURRENT
- To export the displayed EFF , by selecting EXPORT FLIGHT FOLDER
- To close the displayed EFF , by selecting FLIGHT CLOSURE
- To synchronize the EFF with the other side, by selecting SYNCHRONIZE WITH OFFSIDE
- To manage the EFF s that are closed, but not exported to the ground, by selecting ADMINISTRATOR FUNCTIONS.



When clicked, displays the preceding document from the cursor position in the navigation tree.



When clicked, displays the following document from the cursor position in the navigation tree.



When clicked, moves the displayed document to the recycle bin.



When clicked, displays a note box that enables the flight crew to add a note (free text) to the displayed document.



When clicked, displays the note associated with the document that is displayed.

SHOW NOTE

When clicked and when a note is displayed, hides the note associated with the document that is displayed.

HIDE NOTE

When clicked, displays an area that enables the flight crew to search for a character string inside a document (Refer to DSC-46-20-50-30 How to Use Word Search).

SEARCH

Note: Word search cannot be performed inside a PDF file.

When clicked and when the search area is displayed, hides the search area.

HIDE SEARCH

When clicked and when relevant, activates the document that is displayed.

SELECT

The SELECT function is only available for the flight plan documents.

Activating a flight plan indicates that this flight plan is the applicable one.

When clicked, removes the active status to the document that is activated.

SELECTED

When click, flags the document as signed.

SIGN

When clicked, removes the signed flag to a document that is signed.

SIGNED

When click, flags the document as checked.

CHECK

When clicked, removes the checked flag to a document that is checked.

CHECKED

REFRESH

When clicked, refreshes the display of the flight plan with the information of the offside laptop.

NAVIGATION TREE

Applicable to: ALL

The flight crew uses the navigation tree to navigate within an EFF.

When starting the application, the navigation tree displays the current EFF. If no current EFF was selected, it will display the first EFF of the EFF list.

CONTENT

The operator can customize the structure of the EFFs.

However, all EFFs contain the following:

- A root folder, which provides the identifier of the EFF, composed of:
 - The flight number
 - The date of flight
 - The departure airport
 - The Destination airport.
- Subfolders, that contain subfolders and/or documents
- Different types of documents:
 - Text documents
L3 TXT, RTF, PDF, HTML, XML.
 - Graphical documents.
L1 JPEG, PNG, SVG, GIF.

COLOR CODING FOR DOCUMENTS

SIGN CONSTRAINT

Authorities and/or the operator's policy may require the flight crew to sign specific documents in an EFF.

When the flight crewmember signs the document, the document name in the navigation tree turns from blue to green.

CHECK CONSTRAINT

The operator's policy may require the flight crew to check specific documents in an EFF.

When the flight crew checks the document, the document name in the navigation tree turns from blue to green.

NO CONSTRAINT

Documents that do not require a signature or a check appear in white in the navigation tree.

SUMMARY

| Color | Indicates |
|-------|--|
| BLUE | Documents that must be signed or checked. |
| GREEN | Documents that have been flagged as signed or checked. |
| WHITE | Documents that do not require a signature or a check. |

COLOR CODING FOR SUBFOLDERS

The same color code as for document is applied to subfolder names in the navigation tree.

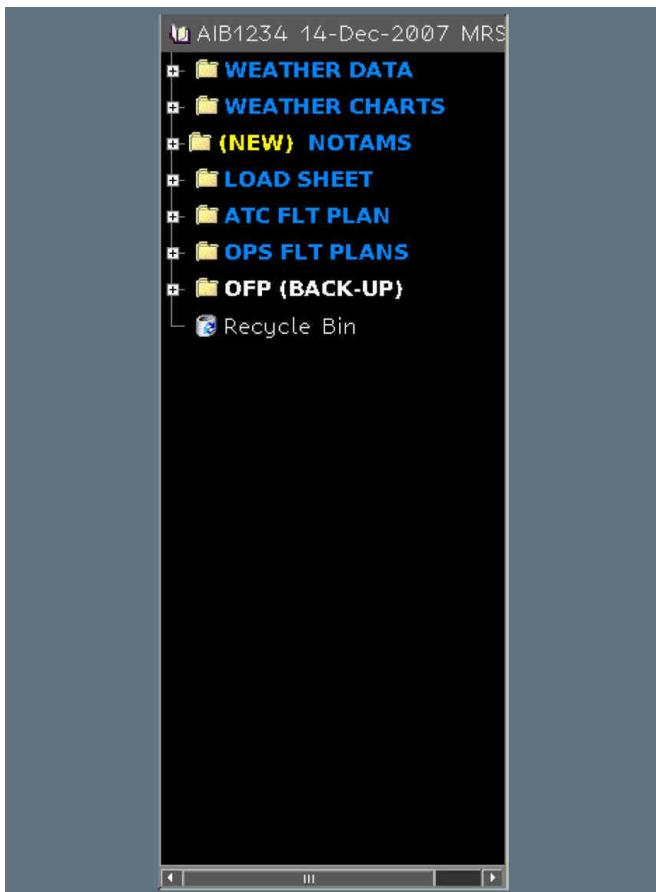
| Color | Indicates |
|-------|---|
| BLUE | Subfolders containing one or more documents that must be signed or checked. |
| GREEN | Subfolders in which all the required actions ('Sign' or 'Check') have been performed. |
| WHITE | Subfolders with no document that must be signed or checked. |

(NEW) INDICATOR

The (NEW) indicator before a document name indicates that:

- The document is new
- The flight crew has not read the document.

When the flight crew has read the document, the (NEW) indicator is no longer displayed. If a subfolder contains documents preceded by the (NEW) indicator, the (NEW) indicator also appears before the subfolder name in the navigation tree. The indicator disappears as soon as the flight crew has read all these documents.

Navigation Tree - (NEW) Indicator**DOCUMENT WINDOW****Applicable to: ALL**

When the flight crew selects a subfolder in the navigation tree, the document window displays the list of subfolders and documents inside the selected subfolder.

When the flight crew selects a document in the navigation tree, the document window displays the selected document.



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DOCUMENTS TO SIGN

If the flight crew must sign the document that is displayed, the  button appears on the top right hand corner of the document.



When clicked, flags the document as signed.



Indicates that the document is flagged as signed.

When clicked, flags the document as unsigned.

DOCUMENT TO CHECK

If the flight crew must check the documents that is displayed, the  button appears on the top right hand corner of the document.



When clicked, flags the document as checked.



Indicates that the document is flagged as checked.

When clicked, flags the document as unchecked.

GRAPHICS

When the displayed document is a graphic, the following buttons appear on the right hand corner of the document window.



When clicked, increases the zoom level on the displayed graphic.



When clicked, decreases the zoom level on the displayed graphic.



When clicked, scrolls the displayed graphic to the left.



When clicked, scrolls the displayed graphic to the right.



When clicked, scrolls the displayed graphic to the bottom.



When clicked, scrolls the displayed graphic to the top.



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Technical Logbook Pages

TECHNICAL LOGBOOK PAGE

Applicable to: ALL

Technical Logbook Page

NSS AVNCS Menu

↓

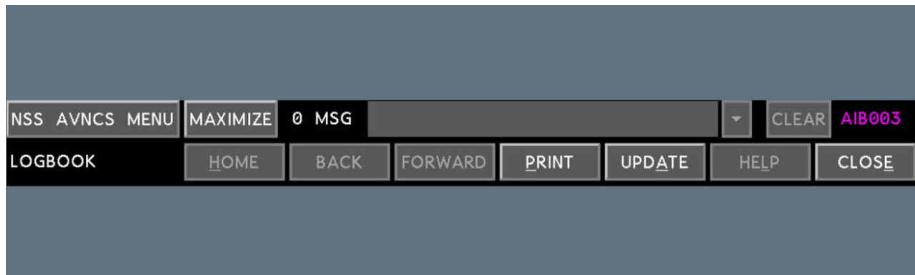
| | | | | | | | | |
|---------------------|---------------|---------------------|-----------------------|---------------------|--------|------|-------|--|
| NSS AVNCS MENU | MAXIMIZE | 0 MSG | ▼ | CLEAR | AIB003 | | | |
| LOGBOOK | HOME | BACK | FORWARD | PRINT | UPDATE | HELP | CLOSE | |
| STATUS | LOGBOOK ENTRY | HISTORY | FLIGHT DATA | | | | | |
| LOGBOOK ON BOARD | | GIVE BACK TO GROUND | | | | | | |
| ACFT REGISTRATION | | | F-GGEA | | | | | |
| FLT NBR | | | AIB003 | | | | | |
| FROM | | | TLS | TO | | | CDG | |
| DATE | | | 19-FEB-09 | ddmmyy | | | | |
| TECHNICAL CONDITION | | | | MAINTENANCE RELEASE | | | | |
| OPEN ITEMS | | 0 | DATE: 18-FEB-09 18:04 | | | | | |
| DEFERRED ITEMS | | 3 | MORE | | | | | |
| TEMPORARY ITEMS | | 0 | | | | | | |
| CABIN LOGBOOK | | | | PIC ACCEPT | | | | |
| OPEN ITEMS | | 0 | | | | | | |
| COMPANY C... | | | LOGBOOK | | | | | |

↑

Technical Logbook Pages

NSS AVNCS MENU

Applicable to: ALL

NSS AVNCS MenuLINE 1

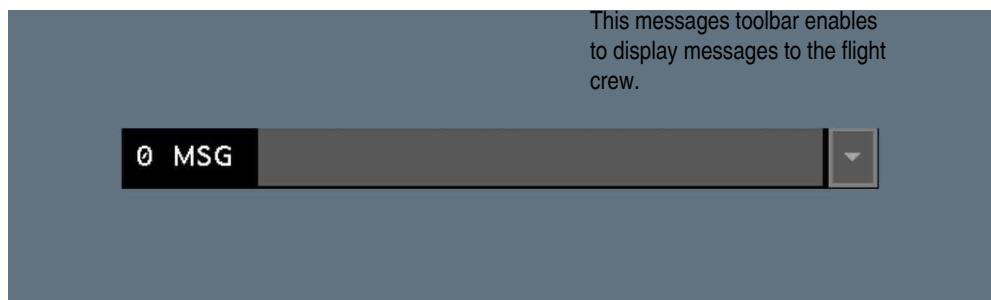
When clicked, displays the NSS AVNCS Menu page.



When clicked, displays the technical logbook application in full screen.



When clicked and when the application is in full screen, changes the display from full screen to normal screen.



This messages toolbar enables to display messages to the flight crew.



When clicked, erases messages that are on the messages toolbar.

Indicates the current flight number.

AIB003**LINE 2**

Indicates the active application.

LOGBOOK**PRINT**

When clicked, prints the page of the technical logbook that is currently-displayed.

The printer for the NSS AVNCS side is located on the center pedestalal console.

Note: *The flight crew can only print the following pages :*

- *The STATUS page*
- *The aircraft acceptance report*
- *The PRE-FLIGHT and POST FLIGHT data panels.*

When clicked, updates the avionics system parameters.

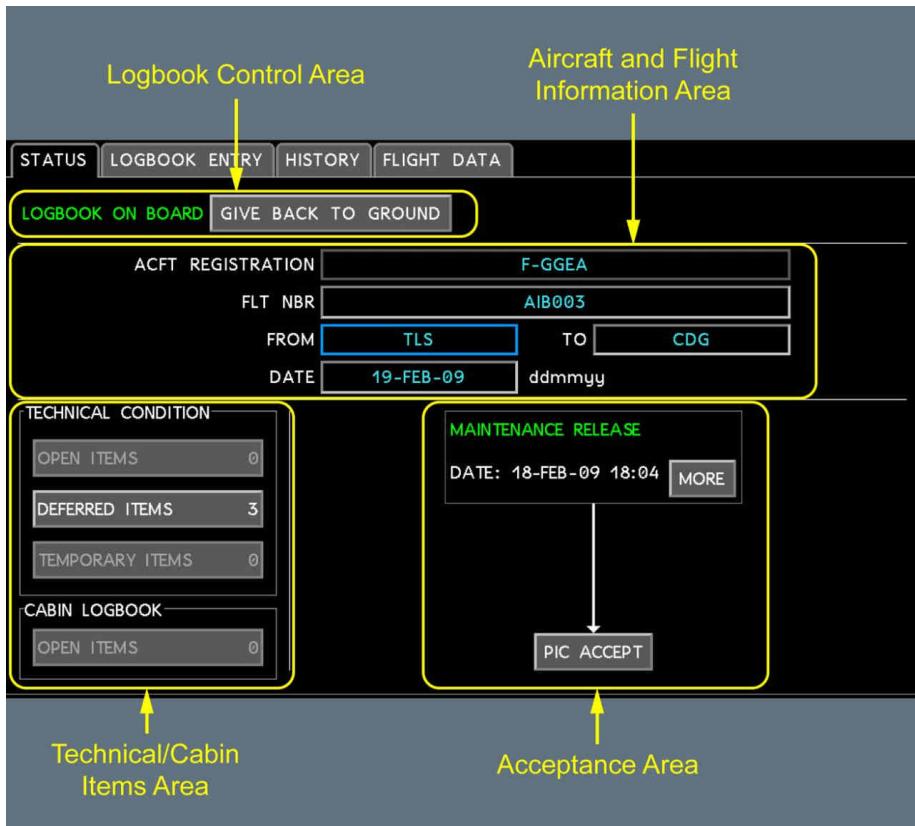
UPDATE**CLOSE**

When clicked, closes the active application and displays the NSS AVNCS Menu page.

Note: *The other buttons of line 2 are not active when the flight crew uses the technical logbook application.*

STATUS PAGE

Applicable to: ALL

STATUS Page

LOGBOOK CONTROL AREA**LOGBOOK ON BOARD****LOGBOOK ON BOARD**

Indicates that the users onboard the aircraft (flight crew, maintenance personnel) have the control of the logbook.

GIVE BACK TO GROUND

When clicked, begins synchronization with the ground station. The flight crew has no longer the control of the logbook.

LOGBOOK ON GROUND**LOGBOOK ON GROUND**

Indicates that the maintenance personnel on ground has the control of the logbook.

The date and time of the last synchronization with the ground station appears on the right side of the logbook status.

UPDATE

When clicked, begins synchronization with the ground station, and the control status of the logbook becomes onboard if the maintenance personnel on ground has released the logbook.

AIRCRAFT AND FLIGHT INFORMATION AREA

The data of the aircraft and flight information area (except the date of flight) appears in blue if the flight crew manually entered the data, or in magenta when the data comes from the avionics system.

The Aircraft and Flight Information area provides:

- ACFT REGISTRATION
The aircraft registration.
- FLT NBR
The flight number.
- FROM
The departure airport.
- TO
The destination airport.
- DATE
The date of flight.

TECHNICAL/CABIN ITEMS AREA

The technical/cabin items area provides a rapid overview of the aircraft condition regarding the existing defect items.

Each button indicates the number of items in the list.

TECHNICAL CONDITION**OPEN ITEMS****2**

When clicked, displays the list of open items (2 items).

DEFERRED ITEMS**3**

When clicked, displays the list of deferred items (3 items).

TEMPORARY ITEMS**1**

When clicked, displays the list of temporary items (1 item).

CABIN LOGBOOK**OPEN ITEMS****2**

When clicked, displays the list of cabin open items (2 items).

ACCEPTANCE AREA**MAINTENANCE RELEASE**

Indicates that the maintenance release is valid.
The valid maintenance release has the dates of creation and expiration.

MAINTENANCE RELEASE RECEIVED FROM GROUND

Indicates that the maintenance release is valid and received from ground.
The valid maintenance release has the dates of creation and expiration.

NO VALID MAINTENANCE RELEASE

Indicates that there is no valid maintenance release.

MORE

When clicked, displays the details of release with access to the maintenance release report (See MAINTENANCE RELEASE REPORT).

PIC ACCEPT

When clicked, displays the flight acceptance report that enables the Pilot In Command (PIC) to accept the aircraft, thanks to electronic signature. When the aircraft is accepted (i.e. all logbook data sent to the ground, onboard and ground database synchronized and successful acknowledgement received from ground), the "AIRCRAFT ACCEPTED" status appears.

CLOSE FLIGHT

When clicked, displays the flight closure report, that enables the flight crew to close the flight, thanks to electronic signature.

MAINTENANCE RELEASE REPORT

The flight crew accesses the Maintenance Release Report by clicking on the MORE button on the STATUS page.

The maintenance release report has three panels.

REPORTS PANEL

The table on the REPORTS panel provides the defect items closed by the maintenance personnel since the last maintenance release. The table does not include the deferred items.

REPORTS Panel

STATUS / MAINTENANCE RELEASE REPORT

MAINTENANCE RELEASE

DATE: 11-OCT-07 04:37
EXPIRY: ---

REPORTS **PARAMETERS** **SERVICED**

| TITLE | TYPE | OPEN DATE ▾ | STATUS |
|---|--------|-------------|--------|
| COCKPIT WINDOW CLEANING REQUEST | DEFECT | 11-OCT-07 | CLOSED |
| INOP SYS L+R WINDSHLD HEATG | DEFECT | 11-OCT-07 | CLOSED |
| MAINTENANCE TIME LIMITED ITEM ECAM W... | DEFECT | 11-OCT-07 | CLOSED |

[Up] [Down]

STATUS

The REPORTS panel provides for each item:

- **TITLE**
The title of the item. When the flight crew clicks on the title, the defect record appears.
- **OPEN DATE**
The date when the flight crew recorded the defect.

PARAMETERS PANEL

The PARAMETERS table provides actions, that the maintenance personnel performed during the last check of the aircraft. In the COMMENTS column, the maintenance personnel can enter additional information.

Note: The operator can customize each panel containing specific check list or job cards.

PARAMETERS Panel

STATUS / MAINTENANCE RELEASE REPORT

MAINTENANCE RELEASE

DATE: 11-OCT-07 04:37

EXPIRY: ---

REPORTS PARAMETERS SERVICED

| NAME | VALUE | COMMENTS |
|--------------|---|----------|
| DAILY CHECK | <input checked="" type="checkbox"/> PERFORMED | |
| WEEKLY CHECK | <input checked="" type="checkbox"/> PERFORMED | |

SERVICED PANEL

The SERVICED panel provides a list of parameters associated with servicing procedures, that the maintenance personnel performed.

For each parameter, a table provides the name of the parameter, the values, the units and comments that the maintenance personnel has entered.

Note: *The operator can customize the SERVICED panel content.*

SERVICED Panel

STATUS / MAINTENANCE RELEASE REPORT

MAINTENANCE RELEASE

DATE: 11-OCT-07 04:37

EXPIRY: ---

SERVICED

REPORTS PARAMETERS SERVICED

ENGINE OIL

| NAME | VALUE | COMMENTS |
|------|-------------|----------|
| ENG1 | 1 US QUARTZ | |
| ENG2 | 1 US QUARTZ | |
| ENG3 | 2 US QUARTZ | |
| ENG4 | 1 US QUARTZ | |
| APU | 2 US QUARTZ | |

STATUS

ACTIONS BUTTONS

When clicked, displays the previous page of the table.



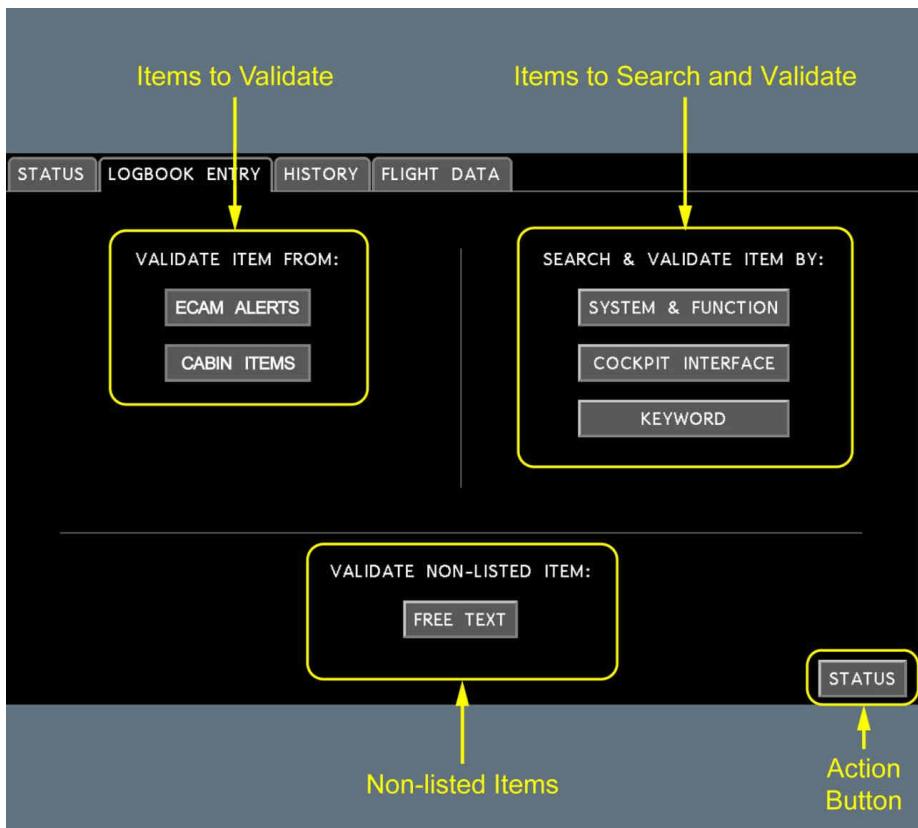
When clicked, displays the next page of the table.



When clicked, returns to the STATUS page.

LOGBOOK ENTRY PAGE

Applicable to: ALL

LOGBOOK ENTRY Page**ITEMS TO VALIDATE****ECAM ALERTS**

When clicked, displays the list of alerts that appeared on the EWD during the flight.

CABIN ITEMS

When clicked, displays the defects items that the cabin crew recorded in the DCL , and submitted to the flight crew for acceptance or refusal.

ITEMS TO SEARCH AND VALIDATE**SYSTEM & FUNCTION**

When clicked, displays a search area that enables the flight crew to record a defect, which belongs to the standard defect database, by selecting:

- The impacted system (e.g. ENGINE)
- Then, the impacted function of the system (e.g. ENG IGNITION)
- Then, the impacted allocation of the function (e.g. INOP SYS).

COCKPIT INTERFACE

When clicked, displays a view of the cockpit that enables the flight crew to record a defect, which belongs to the standard defect database, using the cockpit view.

KEYWORD

When clicked, displays a search area that enables the flight crew to record a defect, which belongs to the standard defect database, making a word search.

For more information, *Refer to DSC-46-20-50-40 How to Record a Defect in the Logbook .*

NON-LISTED ITEMS**FREE TEXT**

When clicked, displays an area that enables the flight crew to record a free text defect report.

ACTION BUTTON**STATUS**

When clicked, returns to the STATUS page.

HISTORY PAGE

Applicable to: ALL

HISTORY TABLEHISTORY Table

| STATUS | LOGBOOK ENTRY | HISTORY | FLIGHT DATA |
|--------|---------------|--|------------------------|
| | | REPORT | OPEN DATE ▾ CLOSE DATE |
| | | COCKPIT WINDOW CLEANING REQUEST | 11-OCT-07 11-OCT-07 |
| | | INOP SYS L+R WINDSHLDS HEATG | 11-OCT-07 11-OCT-07 |
| | | MAINTENANCE TIME LIMITED ITEM ECAM WARNING | 11-OCT-07 11-OCT-07 |

STATUS

The HISTORY table provides the list of all defect items, that the maintenance personnel has already closed.

Items are listed by "OPEN DATE" criteria: The last open item appears at the top of the table.

The HISTORY table provides for each item:

- REPORT

The title of the item. When the flight crew clicks on the title, the associated detailed report appears. See Detailed Report.

- OPEN DATE

The date when the flight crew recorded the defect.

- CLOSE DATE

The date when the maintenance closed the item.

DETAILED REPORTDetailed Report

| STATUS / HISTORY / DETAILED REPORT | |
|------------------------------------|---------------------------------|
| TITLE | COCKPIT WINDOW CLEANING REQUEST |
| OPEN DATE | 11-OCT-07 |
| CLOSE DATE | 11-OCT-07 |
| COMMENT | NONE |
| ADDITIONAL INFO | NONE |
| LAST MAINT ACTION | CLEANING PERFORMED |

[Navigation icons: back, forward, search]

RETURN **STATUS**

The detailed report provides:

- **TITLE**
The title of the item.
- **OPEN DATE**
The date when the flight crew recorded the defect.
- **REF REPORT**
The internal reference of the item. This reference is created by the eLogbook application.
- **CLOSED DATE**
The date when the maintenance personnel closed the item.
- **COMMENT**
The comments that the flight crew entered when they recorded the defect.
- **ADDITIONAL INFO**
The additional information that the flight crew entered when they recorded the defect.
- **LAST MAINT ACTION**
The last action that the maintenance personnel performed, and that enabled to close the item.

ACTIONS BUTTONS

When clicked, displays the previous page of the table.



When clicked, displays the next page of the table.



When clicked and when a detailed report is displayed, displays the detailed report of the previous item in the table.



When clicked and when a detailed report is displayed, displays the detailed report of the next item in the table.



When clicked and when a detailed report is displayed, returns to the HISTORY table.



When clicked, returns to the STATUS page.

FLIGHT DATA PAGE

Applicable to: ALL

FLIGHT DATA Page

Aircraft and Flight Information Area

STATUS LOGBOOK ENTRY HISTORY FLIGHT DATA

FLT NBR AIB001 (CURRENT) ACFT REGISTRATION F-GGEA
FROM TLS TO CDG DATE 10-OCT-07

PRE-FLIGHT POST-FLIGHT

FUEL
RECEIPT NUMBER ----- TOTAL UPLIFT ----- LTRS
FUEL SUPPLIER -----

ICING
NIL ■ NO DE-ICING TIME STARTED ----- HH:MM

PRE-FLIGHT POST-FLIGHT
Data Panel Data Panel

STATUS

The diagram illustrates the Flight Data Page interface. At the top, there's a header bar with tabs: STATUS, LOGBOOK ENTRY, HISTORY, FLIGHT DATA. Below this is a search bar with fields for FLT NBR (AIB001 CURRENT), ACFT REGISTRATION (F-GGEA), FROM (TLS), TO (CDG), and DATE (10-OCT-07). The main area is divided into two sections: PRE-FLIGHT and POST-FLIGHT. The PRE-FLIGHT section contains fields for RECEIPT NUMBER and FUEL SUPPLIER, both with dashed input boxes. The POST-FLIGHT section contains fields for TOTAL UPLIFT (LTRS) and TIME STARTED (HH:MM). Below these sections are fields for ICING (NIL, NO DE-ICING) and a STATUS button. Labels 'PRE-FLIGHT Data Panel' and 'POST-FLIGHT Data Panel' are placed at the bottom left and right respectively, with arrows pointing to the corresponding sections.

AIRCRAFT AND FLIGHT INFORMATION AREA

The data of the aircraft and flight information area (except the date of flight) appears in blue if the flight crew manually entered the data, or in magenta when the data comes from the avionics system.

The Aircraft and Flight Information area provides:

- FLT NBR
The flight number.
- FROM
The departure airport.
- TO
The destination airport.
- ACFT REGISTRATION
The aircraft registration.
- DATE
The date of flight.

PRE-FLIGHT DATA PANEL

Note: The Operator can fully customize the PRE-FLIGHT data panel. So this part uses an illustration of possible content with parameters used for example. Final parameters will be defined by the operator.

PRE-FLIGHT Data Panel

The PRE-FLIGHT Data Panel interface is shown in a dark-themed window. At the top, there are two tabs: "PRE-FLIGHT" (which is selected) and "POST-FLIGHT". Below the tabs, the "FUEL" section contains fields for "RECEIPT NUMBER" and "TOTAL UPLIFT" (in LTRS), along with a "FUEL SUPPLIER" field. In the "ICING" section, there is a status indicator "NIL ■ NO DE-ICING" and a "TIME STARTED" field showing "HH:MM".

POST-FLIGHT DATA PANEL

Note: The Operator can fully customize the POST-FLIGHT data panel. So this part uses an illustration of possible content with parameters used for example. Final parameters will be defined by the operator.

POST-FLIGHT Data Panel**ACTIONS BUTTONS**

When clicked, returns to the STATUS page.

OPEN ITEMS PAGE**Applicable to: ALL**

The flight crew accesses the OPEN ITEMS page by clicking on the technical OPEN ITEMS button on the STATUS page.



A380
FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

46 - INFORMATION SYSTEMS

OIS - ONBOARD INFORMATION SYSTEM - CONTROLS AND INDICATORS

OPEN ITEMS TABLE

OPEN ITEMS Table

| STATUS / OPEN ITEMS | | | |
|-------------------------------------|---|-----------|----------|
| | REPORT | OPEN DATE | STATUS |
| <input checked="" type="checkbox"/> | Bar, MBA, Seat belt, inoperative | 18-FEB-09 | NOT SENT |
| <input checked="" type="checkbox"/> | A-ICE L WINDSHIELD HEATG FAULT ECAM WARNING | 18-FEB-09 | NOT SENT |
| <input checked="" type="checkbox"/> | FAULT OF INTEGRAL LIGHTING OF SEVERAL PANELS VU | 18-FEB-09 | NOT SENT |
| <input checked="" type="checkbox"/> | ENG 2 REVERSER FAULT ECAM WARNING | 18-FEB-09 | NOT SENT |
| <input checked="" type="checkbox"/> | HYD G+Y SYS PRESS LO ECAM WARNING | 18-FEB-09 | NOT SENT |

SEND

STATUS

The OPEN ITEMS table provides for each open items:

- REPORT

The title of the item.

When the flight crew clicks on the title, the associated detailed report appears.

See Detailed Report.

- OPEN DATE

The date when the flight crew recorded the defect.

- STATUS

The sending status:

SENDING...

The flight crew is sending the item to the ground station (ground acknowledgement is waited).

NOT SENT

The flight crew did not send the item to the ground station, or the flight crew sent the item to the ground station but the ground station has not received it (no acknowledgement from ground was received).

SENT

The flight crew sent the item to the ground station.

DETAILED REPORTDetailed Report

STATUS / OPEN ITEMS / DETAILED REPORT

| | | | |
|-----------------|-----------------------------------|------------|--------------------|
| TITLE | ENG 2 REVERSER FAULT ECAM WARNING | | |
| ATA | 78-30-00 | | |
| OPEN DATE | 18-FEB-09 | REF REPORT | FGGEA090218202225L |
| COMMENT | NONE | | |
| ADDITIONAL INFO | | | |

◀ ▶ SEND

RETURN STATUS

The detailed report provides:

- TITLE
The title of the open item.
- ATA
The associated MEL or CDL item, if any.
- OPEN DATE
The date when the flight crew recorded the defect.
- REF REPORT
The reference of the open item. This reference is created by the eLogbook application.

- COMMENT

The comments that the flight crew entered when they recorded the defect.

- ADDITIONAL INFO

The additional information that the flight crew entered when they recorded the defect report.

The flight crew can change this field after they have recorded the defect report.

ACTIONS BUTTONS

When clicked, displays the previous page of the table.



When clicked, displays the next page of the table.



When clicked, displays the detailed report associated with the previous open item in the table.



When clicked, displays the detailed report associated with the next open item in the table.



When clicked and when the OPEN ITEMS table is displayed, sends to the ground application the open items, that the flight crew has ticked on the first column of the table.

When clicked and when a detailed report is displayed, sends the associated open item to the ground application.



When clicked and when a detailed report is displayed, returns to the OPEN ITEMS table.



When clicked, returns to the STATUS page.

DEFERRED ITEMS PAGE**Applicable to: ALL**

The flight crew accesses the DEFERRED ITEMS page by clicking on the DEFERRED ITEMS button on the STATUS page.

The DEFERRED ITEMS page has three panels:

- MEL ITEMS panel
- CDL ITEMS panel
- OTHER panel.

MEL ITEMS PANEL

The MEL ITEMS panel appears when the flight crew clicks on the DEFERRED ITEMS button on the STATUS page.

MEL ITEMS TABLE

MEL ITEMS Table

The screenshot shows a software interface for managing deferred items. At the top, there are three tabs: 'MEL ITEMS (2)', 'CDL ITEMS (1)', and 'OTHER (0)'. The 'MEL ITEMS' tab is selected. Below the tabs is a table with four columns: 'REPORT', 'CLASSIFICATION', 'OPEN DATE', and 'EXPIRY DATE'. Two rows of data are visible: 'F/CTL PRIM 1 FAULT ECAM WARNING' (MEL(o)(m), 18-FEB-09, 28-FEB-09) and 'DOOR MAIN 1L SLIDE LENGTHENING F...' (MEL, 18-FEB-09, 28-FEB-09). At the bottom right of the table area are two small navigation icons (up and down arrows). A blue rectangular button labeled 'STATUS' is located at the bottom right of the table's dark background area.

| REPORT | CLASSIFICATION | OPEN DATE | EXPIRY DATE |
|-------------------------------------|----------------|-----------|-------------|
| F/CTL PRIM 1 FAULT ECAM WARNING | MEL(o)(m) | 18-FEB-09 | 28-FEB-09 |
| DOOR MAIN 1L SLIDE LENGTHENING F... | MEL | 18-FEB-09 | 28-FEB-09 |

The MEL items are listed by "EXPIRY DATE" criteria: The item that has the first expiry date appears at the top of the table.

The MEL ITEMS table provides for each MEL items :

- REPORT

The title of the item. When the flight crew clicks on the title, the associated detailed report appears. See Detailed Report.

- CLASSIFICATION

MEL The MEL item is not associated with an operational procedure nor a maintenance procedure.

MEL(o) The MEL item is associated with an operational procedure.

MEL(m) The MEL item is associated with a maintenance procedure.

MEL(o)(m) The MEL item is associated with an operational procedure and a maintenance procedure.

- OPEN DATE

The date when the MEL item was opened.

- EXPIRY DATE

The date when the MEL item expires, in accordance with the MEL item classification (A, B, C or D).

DETAILED REPORT

Detailed Report

| STATUS / DEFERRED ITEMS / DETAILED REPORT | | | |
|---|---|---------------|--------------------|
| TITLE | F/CTL PRIM 1 FAULT ECAM WARNING | | |
| CLASSIFICATION: | MEL(o)(m) | MEL REFERENCE | 27-93-01 |
| OPEN DATE | 18-FEB-09 | REF REPORT | FGGEA090218173550L |
| EXPIRY DATE | 28-FEB-09 | | |
| COMMENT | NONE | | |
| ADDITIONAL INFO | NONE | | |
| LAST MAINT ACTION | DEFERRED UNDER MEL PRIM1 (OPS PROCEDURE REQUIRED) | | |
| ◀ ▶ | | | |
| | | RETURN | STATUS |

The detailed report provides:

- TITLE
The title of the MEL item.
- CLASSIFICATION
 - MEL
The MEL item is not associated with an operational procedure nor a maintenance procedure.
 - MEL(o)
The MEL item is associated with an operational procedure.
 - MEL(m)
The MEL item is associated with a maintenance procedure.
 - MEL(o)(m)
The MEL item is associated with an operational procedure and a maintenance procedure.

- MEL REFERENCE

The MEL item reference.

- OPEN DATE

The date when the MEL item was opened.

- REF REPORT

The internal reference of the MEL item. This reference is created by the eLogbook application.

- EXPIRY DATE

The date when the MEL item expires.

- COMMENT

The comments, that the flight crew has entered, when they recorded the defect.

- ADDITIONAL INFO

The additional information, that the flight crew has entered, when they recorded the defect.

- LAST MAINT ACTION

The last maintenance actions, that the maintenance personnel performed, and that are relevant to this MEL item.

CDL ITEMS PANEL

The flight crew accesses this panel by clicking on CDL ITEMS on the DEFERRED ITEMS page.

CDL ITEMS TABLECDL ITEMS Table

| STATUS / DEFERRED ITEMS | | | |
|-------------------------|--|-----------------------------|---------------------------------------|
| MEL ITEMS (2) | CDL ITEMS (1) | OTHER (0) | |
| | REPORT 57-01 WING TIP FENCE | CLASSIFICATION CDL(o)(m) | OPEN DATE 18-FEB-09 EXPIRY DATE |
| | | | |

STATUS

The CDL ITEMS table provides for each CDL items :

- REPORT

The title of the item. When the flight crew clicks on the title, the associated detailed report appears. See Detailed Report.

- CLASSIFICATION

CDL

The CDL item is not associated with an operational procedure nor a maintenance procedure.

CDL(o)

The CDL item is associated with an operational procedure.

CDL(m)

The CDL item is associated with a maintenance procedure.

CDL(o)(m)

The CDL item is associated with an operational procedure and a maintenance procedure.

- OPEN DATE

The date when the CDL item was opened.

- EXPIRY DATE

The date when the CDL item expires, if any.

DETAILED REPORTDetailed Report

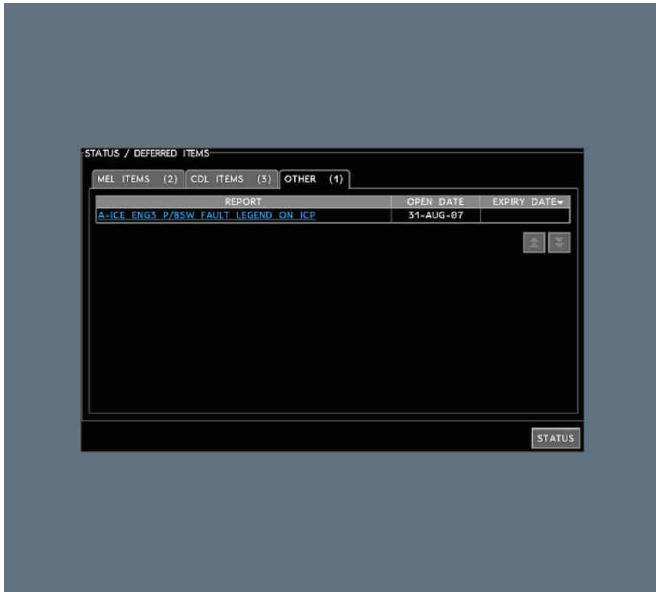
| STATUS / DEFERRED ITEMS / DETAILED REPORT | |
|---|--|
| TITLE | 57-01 WING TIP FENCE |
| CLASSIFICATION: CDL(o)(m) | CDL REFERENCE 57-01 |
| OPEN DATE | 18-FEB-09 |
| EXPIRY DATE | |
| COMMENT | NONE |
| ADDITIONAL INFO | NONE |
| LAST MAINT ACTION | DEFERRED UNDER CDL WING TIP FENCE LEFT UPPER (OPS PROCEDURE R EQUIRED) |
| ◀ ▶ | |
| RETURN STATUS | |

The detailed report provides:

- **TITLE**
The title of the CDL item.
- **CLASSIFICATION**
 - CDL** The CDL item is not associated with an operational procedure nor a maintenance procedure.
 - CDL(o)** The CDL item is associated with an operational procedure.
 - CDL(m)** The CDL item is associated with a maintenance procedure.
 - CDL(o)(m)** The CDL item is associated with an operational procedure and a maintenance procedure.
- **CDL REFERENCE**
The CDL item reference.
- **OPEN DATE**
The date when the CDL item was opened.
- **REF REPORT**
The internal reference of the CDL item. This reference is created by the eLogbook application.
- **EXPIRY DATE**
The date when the CDL item expires, if any.
- **COMMENT**
The comments, that the flight crew has entered, when they recorded the defect.
- **ADDITIONAL INFO**
The additional information, that the flight crew has entered, when they recorded the defect.
- **LAST MAINT ACTION**
The last maintenance actions, that the maintenance personnel performed, and that are relevant to this CDL item.

OTHER PANEL

The flight crew accesses this panel by clicking on OTHER on the DEFERRED ITEMS page.

OTHER TABLE**OTHER Table**

The OTHER table provides for each item:

- REPORT
The title of the item.
- OPEN DATE
The date when the maintenance personnel deferred the item.
- EXPIRY DATE
The date when the item expires, if any.

TEMPORARY ITEMS PAGE**Applicable to: ALL**

The flight crew accesses the TEMPORARY ITEMS page by clicking on the TEMPORARY ITEMS button on the STATUS page.



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OPERATING MANUAL

AIRCRAFT SYSTEMS

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TEMPORARY ITEMS Page

STATUS / TEMPORARY ITEMS

ITEM SELECTION MAIN FEED TK 4 PMP P/BSW FAULT LEGEND ILLUMINATES ON OVERHEAD ...
CKPT SEAT CAPT LUMBAR REST ADJUSTMENT INOPERATIVE

DELETE ITEM

PILOT COMMENT NONE

STORE IN OPEN ITEMS

STATUS

ITEM SELECTION List

Provides the list of defect reports that the flight crew stored as temporary items.

PILOT COMMENT Field

Provides the comment, that the flight crew entered when recording the defect, associated with the selected item from the ITEM SELECTION list.

When clicked, deletes the item selected in the ITEM SELECTION list.

DELETE ITEM

STORE IN OPEN ITEMS

When clicked, stores the item selected in the ITEM SELECTION list in the open item list.
The flight crew can access this item on the OPEN ITEMS page.

STATUS

When clicked, returns to the STATUS page.

CABIN OPEN ITEMS PAGE

Applicable to: ALL

The flight crew accesses the CABIN OPEN ITEMS page by clicking on the cabin OPEN ITEMS button on the STATUS page.

CABIN OPEN ITEMS TABLE

CABIN OPEN ITEMS Table

| STATUS / CABIN OPEN ITEMS | | | |
|---------------------------|-------------|----------|---------------|
| REPORT | OPEN DATE ▼ | STATUS | |
| Bar, MBA, Curtain, dirty | 11-OCT-07 | NOT SENT | |
| | | | |
| | | | STATUS |

The CABIN OPEN ITEMS table provides for each item:

- REPORT

The title of the item.

When the flight crew clicks on the title, the associated detailed report appears.

See DETAILED REPORT.

- OPEN DATE

The date when the cabin crew recorded the defect in the DCL.

- STATUS column

The sending status:

SENDING...

The cabin crew is sending the item to the ground station (ground acknowledgement is waited).

NOT SENT

The cabin crew did not send the item to the ground station, or the cabin crew sent the item to the ground station, but the ground station did not receive it (no acknowledgement from ground was received).

SENT

The cabin crew sent the item to the ground station, and the ground station received it

DETAILED REPORT

Detailed Report

| STATUS / CABIN OPEN ITEMS / DETAILED REPORT | | | |
|---|--------------------------|------------|--------------------|
| TITLE | BAR, MBA, CURTAIN, DIRTY | | |
| OPEN DATE | 11-OCT-07 | REF REPORT | FWWOWC071011022956 |
| COMMENT | BAR, MBA, CURTAIN, DIRTY | | |

[Navigation icons: back, forward, search]

[Buttons: RETURN, STATUS]

The detailed report provides:

- **TITLE**
The title of the cabin open items.
- **OPEN DATE**
The date when the cabin crew recorded the defect in the DCL.
- **REF REPORT**
The reference of the cabin item. This reference is created by the eLogbook application.
- **COMMENT**
The comments, that the cabin crew entered, when recording the defect.

ACTIONS BUTTONS



When clicked, displays the previous page of the table.



When clicked, displays the next page of the table.



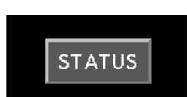
When clicked and when a detailed report is displayed, displays the detailed report associated to the previous cabin item in the table.



When clicked and when a detailed report is displayed, displays the detailed report associated with the next cabin item in the table.



When clicked and when a detailed report is displayed, returns to the CABIN OPEN ITEMS table.



When clicked, returns to the STATUS page.



X-OIS FUNCTION

Applicable to: ALL

The X-OIS function enables one flight crewmember to display on his OIT the current display of the other OIT. The X-OIS function is available on the FLT OPS side only.

The X-OIS function can be activated by pressing the OIS XFR key either on the ACDs or on the keyboards.

The X-OIS function can be deactivated by pressing again the OIS XFR key.

When a flight crewmember presses the OIS XFR key, his OIT displays the display of the other OIT and the message "X-OIS Activated" appears on his OIT.

Note: When a flight crewmember deactivates the X-OIS function, two pointers may appear on his OIT. To remove one of the two pointers, the flight crewmember should move the pointing device via the touchpad on the keyboard.



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AIRCRAFT SYSTEMS
46 - INFORMATION SYSTEMS

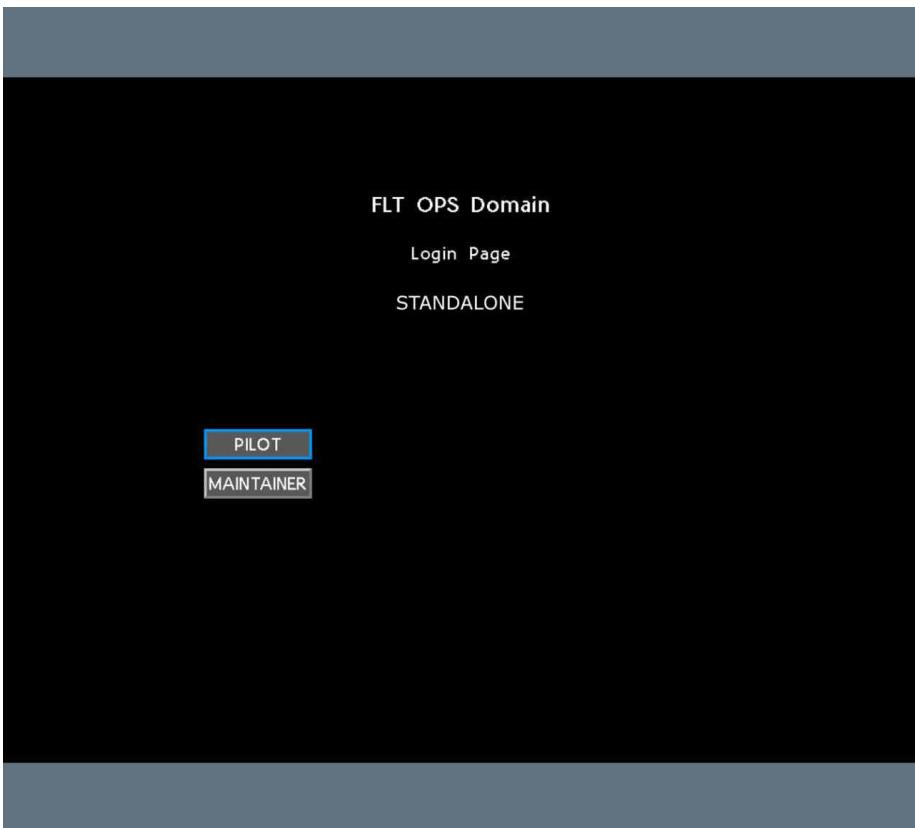
OIS - ONBOARD INFORMATION SYSTEM - NORMAL OPERATIONS

Intentionally left blank

LAPTOP START**Applicable to: ALL**

"STANDALONE" appears on the Login page of the laptop when:

- The Captain's, First Officer's, or backup laptop is started before the ARU
In this case, when the ARU is started, the flight crew must restart the affected laptop, in order for the laptop to be connected to the aircraft network.
- The Captain's, First Officer's or backup laptop is not connected to the network.
In this case, the laptop operates as a stand-alone.

Login Page (Standalone)

LAPTOP OPERATED AS A STAND-ALONE**Applicable to: ALL**

When a laptop is operated as a stand-alone, (i.e. not connected to the network),

"SYNCHRONIZATION NOT AVAIL" appears on the FLT OPSSTS page.

In this case, the synchronization is not possible between the FLT FOLDER application

In this case:

- The synchronization of the EFF between the Captain's laptop and the First Officer's laptop is not possible
- The communication between the NAV CHARTS application of the Captain's laptop and the First Officer's laptop is not possible
- The OPS LIBRARY cannot retrieve the ECAM alerts that occur during the flight, and the MEL and CDL items from the eLogbook.



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OIS - ONBOARD INFORMATION SYSTEM - ABNORMAL OPERATIONS

Laptop in Stand-Alone

The screenshot shows the INIT screen of the Airbus OIS. At the top, there is a menu bar with options: MENU, FLT OPS STS, FUNCTIONS, 0 MSG, and a CLEAR button. A message "SYNCHRONIZATION NOT AVAIL" is displayed. Below the menu, the aircraft registration is listed as F-WWOW. The aircraft serial number (MSN) is 0001. The OIS version is 14-JUL-08 V2.0. There is a section labeled ACTIVE, which includes the chart period from 07-AUG-08 to 27-AUG-08. Below this, flight number information is shown, with the flight number AIB123. The flight origin is LFBO and the destination is LFBD. At the bottom, there is a navigation bar with buttons for FLT OPS STS (which is highlighted), CHARTS, and other functions.



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OIS - ONBOARD INFORMATION SYSTEM - ABNORMAL OPERATIONS

Intentionally left blank



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OPERATING MANUAL

AIRCRAFT SYSTEMS

46 - INFORMATION SYSTEMS

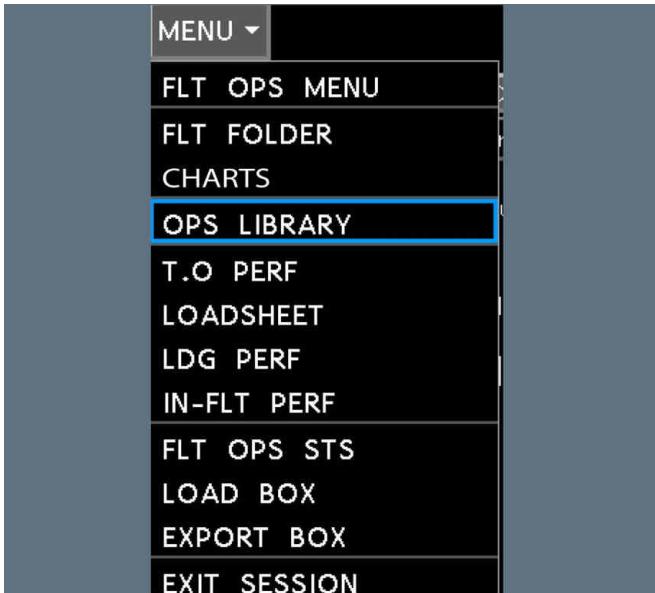
OIS - ONBOARD INFORMATION SYSTEM - HOW TO

How to Use the OPS LIBRARY

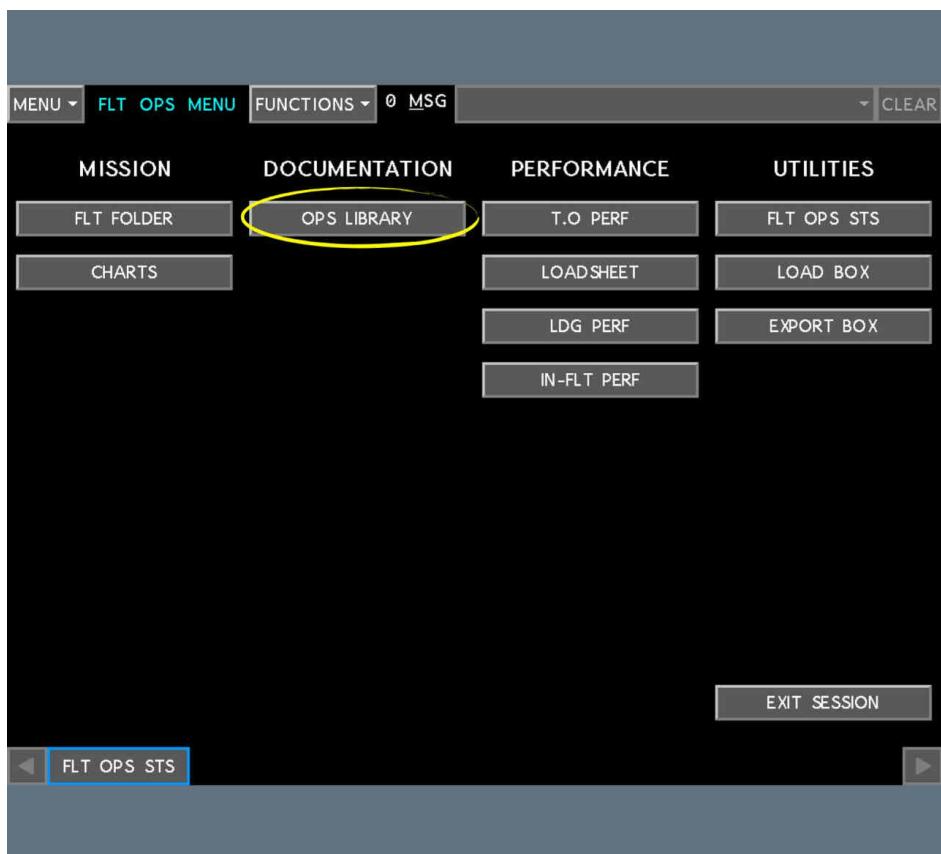
HOW TO START THE OPS LIBRARY**Applicable to: ALL**

1. Select the application to start by:

- Clicking on the MENU button and selecting OPS LIBRARY, or

MENU Drop-down List

- On the FLT OPS MENU page, clicking on the OPS LIBRARY button.

FLT OPS MENU Page

2. The OPS LIBRARY starts and will enable the flight crew to consult the manuals that are associated to the MSN from the FLT OPS STS page.
The LIBRARY panel is active by default, and the accessible manuals are listed on the page.

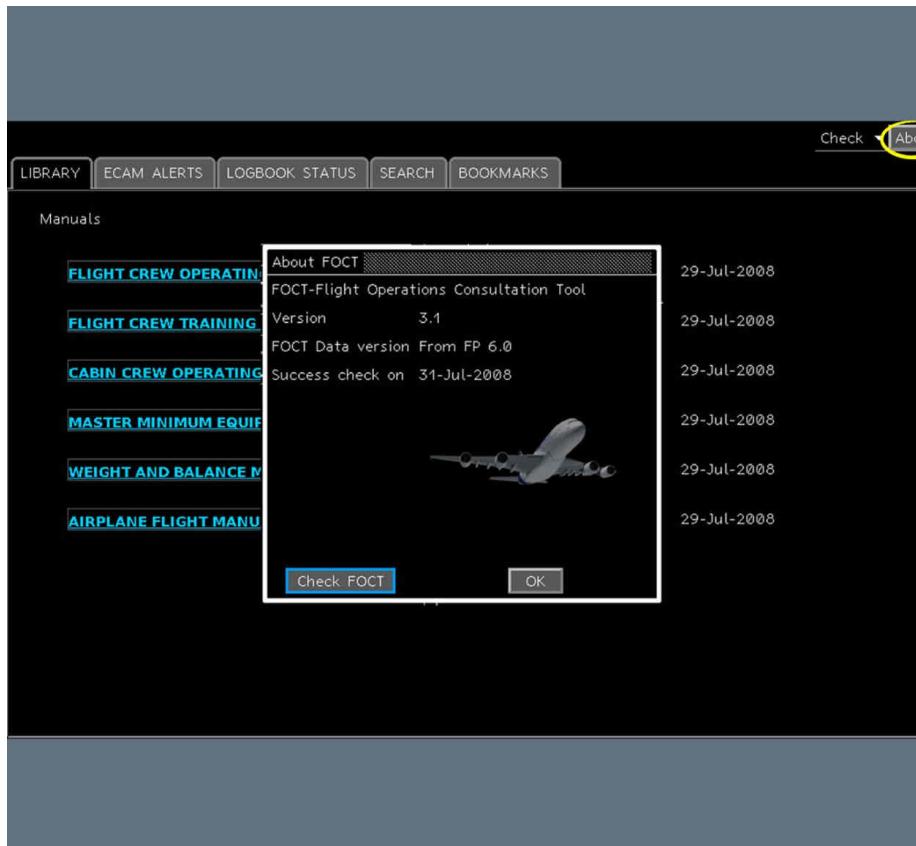
LIBRARY Panel

The screenshot shows a software interface titled "LIBRARY Panel". At the top, there is a navigation bar with tabs: "LIBRARY" (which is highlighted with a yellow oval), "ECAM ALERTS", "LOGBOOK STATUS", "SEARCH", and "BOOKMARKS". To the right of the tabs are two small buttons: "Check" and "About". Below the navigation bar, the word "Manuals" is displayed. A list of six manuals is shown in a table format:

| Manual Name | Date | Status | Last Check Date |
|---|-------------|---------|----------------------|
| FLIGHT CREW OPERATING MANUAL | 23-May-2008 | Success | check on 29-Jul-2008 |
| FLIGHT CREW TRAINING MANUAL | 23-May-2008 | Success | check on 29-Jul-2008 |
| CABIN CREW OPERATING MANUAL | 23-May-2008 | Success | check on 29-Jul-2008 |
| MASTER MINIMUM EQUIPMENT LIST | 23-May-2008 | Success | check on 29-Jul-2008 |
| WEIGHT AND BALANCE MANUAL | 23-May-2008 | Success | check on 29-Jul-2008 |
| AIRPLANE FLIGHT MANUAL | 23-May-2008 | Success | check on 29-Jul-2008 |

3. Click on the name of the manual to open.

Note: 1. On the Library panel, the About button provides access to the information on the FOCT, such as the version of the software.

About FOCT

2. After having selected a manual, the first documentary unit that the flight crew has selected to display may not to appear.
in this case, select another documentary unit on the navigation tree, then select again the initial documentary unit to display it.

HOW TO CHECK A MANUAL**Applicable to: ALL**

The check manual function enables to check the completeness of the manuals onboard the aircraft.
Click on the FUNCTIONS button and select HOME to access the Library panel.
Then click on the Check button and select the manual to check in the drop-down list.

Check Drop-Down List

The screenshot shows the Airbus OIS Library panel. At the top, there are tabs: LIBRARY, ECAM ALERTS, LOGBOOK STATUS, SEARCH, and BOOKMARKS. Below the tabs, the word "Manuals" is displayed. A list of manuals is shown with their last checked date and status. A context menu is open over the first item in the list, with the "Check" option highlighted by a yellow circle. The menu also includes "Check All" and other options like "Flight Crew Operating Manual" through "Airplane Flight Manual".

| Manual | Last Checked | Status | Valid Until |
|-------------------------------|--------------|------------------|-------------|
| FLIGHT CREW OPERATING MANUAL | 23-May-2008 | Success check | |
| FLIGHT CREW TRAINING MANUAL | 23-May-2008 | Success check on | 29-Jul-2008 |
| CABIN CREW OPERATING MANUAL | 23-May-2008 | Success check on | 29-Jul-2008 |
| MASTER MINIMUM EQUIPMENT LIST | 23-May-2008 | Success check on | 29-Jul-2008 |
| WEIGHT AND BALANCE MANUAL | 23-May-2008 | Success check on | 29-Jul-2008 |
| AIRPLANE FLIGHT MANUAL | 23-May-2008 | Success check on | 29-Jul-2008 |

As soon as the check is started, "Checking..." appears on the line of the manual, on the Library Panel.



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AIRCRAFT SYSTEMS

46 - INFORMATION SYSTEMS

OIS - ONBOARD INFORMATION SYSTEM - HOW TO

Check in Progress

The screenshot shows a software interface for managing flight manuals. At the top, there's a navigation bar with tabs: LIBRARY, ECAM ALERTS, LOGBOOK STATUS, SEARCH, and BOOKMARKS. On the far right of the bar are 'Check' and 'About' buttons. Below the bar, the word 'Manuals' is centered. A table lists six manuals with their last checked date, check status, and next scheduled check date. The 'MASTER MINIMUM EQUIPMENT LIST' row has a yellow circle drawn around the 'check' column, which contains the text 'Checking...'. The other five rows show successful checks.

| Manual | Last Checked | Status | Next Check |
|-------------------------------|--------------|-------------|----------------------|
| FLIGHT CREW OPERATING MANUAL | 23-May-2008 | Success | check on 29-Jul-2008 |
| FLIGHT CREW TRAINING MANUAL | 23-May-2008 | Success | check on 29-Jul-2008 |
| CABIN CREW OPERATING MANUAL | 23-May-2008 | Success | check on 29-Jul-2008 |
| MASTER MINIMUM EQUIPMENT LIST | 23-May-2008 | Checking... | |
| WEIGHT AND BALANCE MANUAL | 23-May-2008 | Success | check on 29-Jul-2008 |
| AIRPLANE FLIGHT MANUAL | 23-May-2008 | Success | check on 29-Jul-2008 |

When the check of a manual is complete, the results appears on the line of the manual, on the Library Panel.

Check Result

The screenshot shows a software interface titled "Check Result". At the top, there are tabs for "LIBRARY", "ECAM ALERTS", "LOGBOOK STATUS", "SEARCH", and "BOOKMARKS". To the right of these tabs are "Check" and "About" buttons. Below the tabs, the word "Manuals" is displayed. A table lists six manuals with their details:

| Manual | Date | Status | Last Check Date |
|-------------------------------|-------------|------------------|-----------------|
| FLIGHT CREW OPERATING MANUAL | 23-May-2008 | Success check on | 29-Jul-2008 |
| FLIGHT CREW TRAINING MANUAL | 23-May-2008 | Success check on | 29-Jul-2008 |
| CABIN CREW OPERATING MANUAL | 23-May-2008 | Success check on | 29-Jul-2008 |
| MASTER MINIMUM EQUIPMENT LIST | 23-May-2008 | Success check on | 17-Sep-2008 |
| WEIGHT AND BALANCE MANUAL | 23-May-2008 | Success check on | 29-Jul-2008 |
| AIRPLANE FLIGHT MANUAL | 23-May-2008 | Success check on | 29-Jul-2008 |

The status of the check can be:

- "Success check on" & Date: The check was performed the date displayed and was successful
- "Failed check on" & Date: The check was performed the date displayed and was not successful
- "Aborted check on" & Date: No check was performed. The date displayed is the current date.

HOW TO ACCESS THE FCOM

Applicable to: ALL

The FCOM has 4 main chapters:

- Aircraft Systems
- Procedures
- Limitations
- Performance.

In addition, the FCOM has the following chapters, as necessary:

- Summary of Highlights
- Organization of the Manual
- Operating Engineering Bulletins (OEB s)
- Temporary Documentary Units (TDU s).

AIRCRAFT SYSTEMS

The Aircraft Systems chapter is divided in ATA chapters for each aircraft system. This chapter includes the specific description of each system, and the associated cockpit interfaces.

Aircraft Systems

The screenshot shows a software interface for the Flight Crew Operating Manual (FCOM) for the A380. The left pane displays a hierarchical tree view of the manual's contents, with 'AIRCRAFT SYSTEMS' expanded to show various ATA chapters. The right pane shows a list of document units corresponding to these chapters. The top status bar indicates the manual is valid from APR 2007 and lists the path: Flight Crew Operating Manual / Aircraft Systems.

| Document Unit |
|--|
| List of Document Unit |
| Abbreviations |
| 20 - Aircraft General |
| 21 - Air Conditioning |
| 21 - Ventilation |
| 21 - Pressurization |
| 22-27 - Flight Envelope |
| 22 - AFS Introduction |
| 22 - AFS - Flight Guidance |
| 22 - AFS - Flight Management |
| 23 - Communication |
| 24 - Electrical |
| 25 - Equipment |
| 26 - Fire and Smoke Protection |
| 27 - Flight Controls |
| 28 - Fuel |
| 29 - Hydraulic System |
| 30 - Ice and Rain Protection |
| 31 - Indicating/Recording |

PROCEDURES

The Procedures chapter has 6 subchapters:

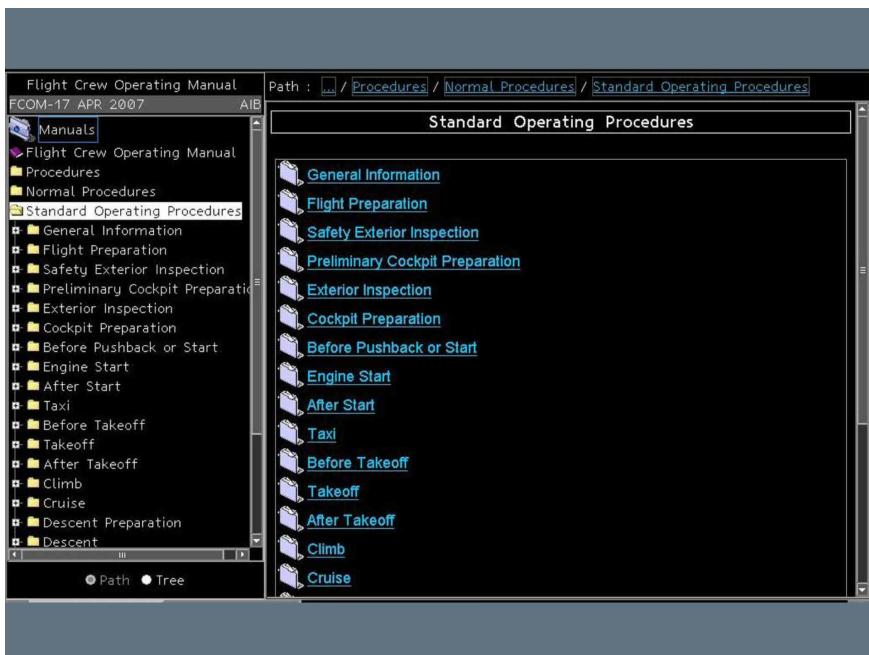
- Normal Procedures
- Abnormal and Emergency Procedures
- Not Sensed Procedures
- Non ECAM Procedures
- Supplementary Procedures
- Special Operations.

Procedures

The screenshot shows a software interface for the Airbus Flight Crew Operating Manual. On the left, there's a sidebar with the title "Flight Crew Operating Manual" and the date "FCOM-17 APR 2007". Below this are links for "Manuals", "Flight Crew Operating Manual", "Procedures", and several sub-links under "Procedures": "List of Document Unit", "Normal Procedures", "Abnormal and Emergency Procedures", "Not-Sensed Procedures (ABN PROC)", "Non ECAM Procedures", "Supplementary Procedures", and "Special Operations". The main panel has a header "Path : Flight Crew Operating Manual / Procedures" and a title "Procedures". Below the title is a list of the same procedure categories as in the sidebar.

NORMAL PROCEDURES

The Normal Procedures subchapter describes the Standard Operating Procedures (SOP s) for each flight phase, the normal checklists as provided on the ECAM , the tasksharing and the systems related procedures.

Normal Procedures SOPs**ABNORMAL AND EMERGENCY PROCEDURES**

The Abnormal and Emergency Procedures subchapter describes the procedures that appear on the ECAM , in the case of a system failure.

In this subchapter, additional information is provided along with the ECAM procedures, as necessary.

Abnormal and Emergency Procedures

The screenshot shows a software interface for the Airbus Flight Crew Operating Manual (FCOM). The left pane displays a hierarchical tree view of the manual's contents, including sections like 'Manuals', 'Procedures', and 'Abnormal and Emergency Procedures'. The right pane shows a list of specific abnormal and emergency procedures, each preceded by a small icon. The path to the current section is indicated at the top of the right pane.

Flight Crew Operating Manual
FCOM-17 APR 2007 AIB

Path : [Procedures](#) / [Abnormal and Emergency Procedures](#)

Abnormal and Emergency Procedures

Operating Techniques

- 21 - Air Conditioning
- 21 - Ventilation
- 21 - Pressurization
- 22 - Flight Guidance
- 22 - Flight Management System
- 23 - Communication
- 24 - Electrical
- 26 - Fire and Smoke Protection
- 27 - Flight Controls
- 27 - Slats/Flaps
- 28 - Fuel
- 29 - Hydraulic
- 30 - Ice and Rain protection
- 31 - Indicating/Recording
- 32 - Landing Gear
- 34 - Navigation
- 35 - Oxygen

Path Tree

NOT-SENSED PROCEDURES

The Not-Sensed Procedures subchapter describes the abnormal and emergency procedures that are manually requested by the flight crew by pressing the ABN PROC pb on the ECAM Control Panel (ECP). For more information, *Refer to DSC-31-40-50 How to Activate a Not-Sensed ABN PROC .*

Not-Sensed Procedures

The screenshot shows a software interface for the Airbus Flight Crew Operating Manual (FCOM). The left pane displays a hierarchical tree view of the manual's contents, including sections like 'Manuals', 'Procedures', and 'Not-Sensed Procedures (ABN PROC)'. The right pane shows a list of specific not-sensed procedures, each preceded by a small icon. The path to the current section is indicated at the top of the right pane.

Flight Crew Operating Manual
FCOM-14 AUG 2007 AIB

Path : [Procedures](#) / [Not-Sensed Procedures \(ABN PROC\)](#)

Not-Sensed Procedures (ABN PROC)

Introduction

Emergency Procedures

ENG

F/CTL

L/G

NAV

FUEL

MISCELLANEOUS

NON ECAM PROCEDURES

The Non ECAM Procedures subchapter describes the procedures that are not displayed on the ECAM .

SUPPLEMENTARY PROCEDURES

The Supplementary Procedures subchapter provides all the procedures that are not included in the Normal, Abnormal/Emergency, Not Sensed and Non ECAM Procedures subchapters.

The Supplementary Procedures subchapter includes procedures such as how to operate the aircraft in adverse weather conditions or with particular aircraft configurations.

Supplementary Procedures

The screenshot shows a navigation tree on the left and a content area on the right. The navigation tree includes 'Flight Crew Operating Manual FCOM-17 APR 2007 AIB' at the top, followed by 'Manuals', 'Flight Crew Operating Manual', 'Procedures', 'Supplementary Procedures' (which is selected and highlighted in yellow), and then 'Ice And Rain Protection', 'Engines', 'Two engines taxi', and 'Adverse Weather'. The content area on the right is titled 'Supplementary Procedures' and lists the same four items under a blue header: 'Ice And Rain Protection', 'Engines', 'Two engines taxi', and 'Adverse Weather'.

SPECIAL OPERATIONS

The Special Operations subchapter provides procedures that are not considered as standard operations, or that may require special authorization from National Authorities.

LIMITATIONS

The Limitations chapter is divided into ATA chapters.

It includes the aircraft operating limitations that are required by the regulation. These limitations are also included in the Aircraft Flight Manual (AFM).

Limitations

The screenshot shows a software interface for the Flight Crew Operating Manual (FCOM) version 17 APR 2007. The left pane displays a tree view of the manual's contents under 'Flight Crew Operating Manual' and 'AIB'. The right pane is titled 'Limitations' and lists various document units and their sub-sections. The path 'Flight Crew Operating Manual / Limitations' is indicated at the top of the right pane.

| Document Unit | Sub-Section |
|---------------------------|--------------------------------|
| List of Document Unit | General Limitations |
| | Weight and Center of Gravity |
| | Environmental Envelope and Air |
| | Speed Limitations |
| | 21 - Air Conditioning |
| | 21 - Pressurization |
| | 22 - Auto Flight System |
| | 23 - Communication |
| | 24 - Electrical |
| | 28 - Fuel |
| | 30 - Ice and Rain protection |
| | 32 - Landing Gear |
| | 35 - Oxygen |
| | 36 - Bleed Air |
| 49 - Auxiliary Power Unit | |
| Engines | |

PERFORMANCE

The Performance chapter includes the aircraft performance for each flight phase.

Performances

The screenshot shows the FCOM interface. On the left, there's a navigation tree under 'Flight Crew Operating Manual FCOM-17 APR 2007'. It includes sections like 'Manuals', 'Flight Crew Operating Manual', and 'Performance'. Under 'Performance', there's a 'List of Document Unit' which branches into 'Operating Data', 'Loading', 'Thrust Ratings', 'Takeoff', 'Climb', 'Cruise', 'Flight Planning', 'Holding', 'Descent', and 'Landing'. On the right, a 'Path' bar indicates the current location: 'Flight Crew Operating Manual / Performance'. Below it, a 'Performance' section is displayed with a list of links corresponding to the document units: 'List of Document Unit', 'Operating Data', 'Loading', 'Thrust Ratings', 'Takeoff', 'Climb', 'Cruise', 'Flight Planning', 'Holding', 'Descent', and 'Landing'. Each link is preceded by a small icon.

SUMMARY OF HIGHLIGHTS

This chapter provides all the highlights, with links to the revised documentary units.

ORGANIZATION OF THE MANUAL

This chapter provides information about the contents, the organization and the revisions of the FCOM .

Refer to GEN FCOM Purpose .

OEB

The OEB chapter provides a list and description of all applicable Operational Engineering Bulletins (OEB s).

Refer to OEB-000 Introduction .

TDU

The TDU chapter provides a list of all applicable Temporary Documentary Units (TDU s).

Refer to GEN-GREVI Temporary Information .

HOW TO USE INFORMATION LAYERS**Applicable to: ALL**

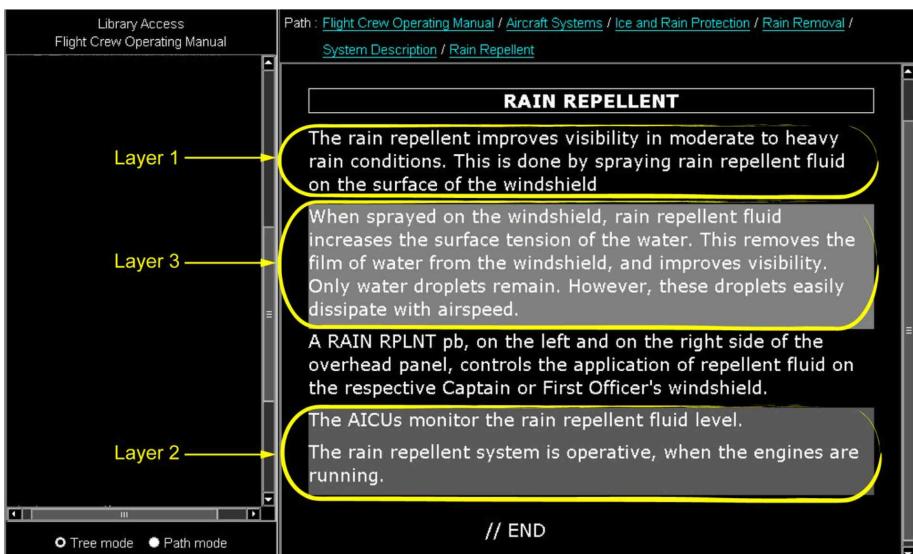
There are three layers of information:

- Layer 1: "Need to know"
Layer 1 presents information that is necessary in the cockpit.
- Layer 2: "Nice to know"
Layer 2 presents information that is used as a reference, in order to fully understand the logic of the aircraft and pilot interfaces.
- Layer 3: "Detailed information".
Layer 3 provides more detailed explanations, that are not necessarily needed in flight.

The text in each layer appears on a different colored background.

When the flight crew selects a layer of information, it remains selected during the consultation of several documentary units.

When the flight crew selects a layer of information that is not available, the highest available layer of information appears. However, the button that the flight crew uses to select the layer remains selected, but is disabled.

Information Layers

Similar to the text, an illustration can also change, according to the selected layer of information.

HOW TO DISPLAY ILLUSTRATIONS**Applicable to: ALL**

Documentary units may include illustrations.

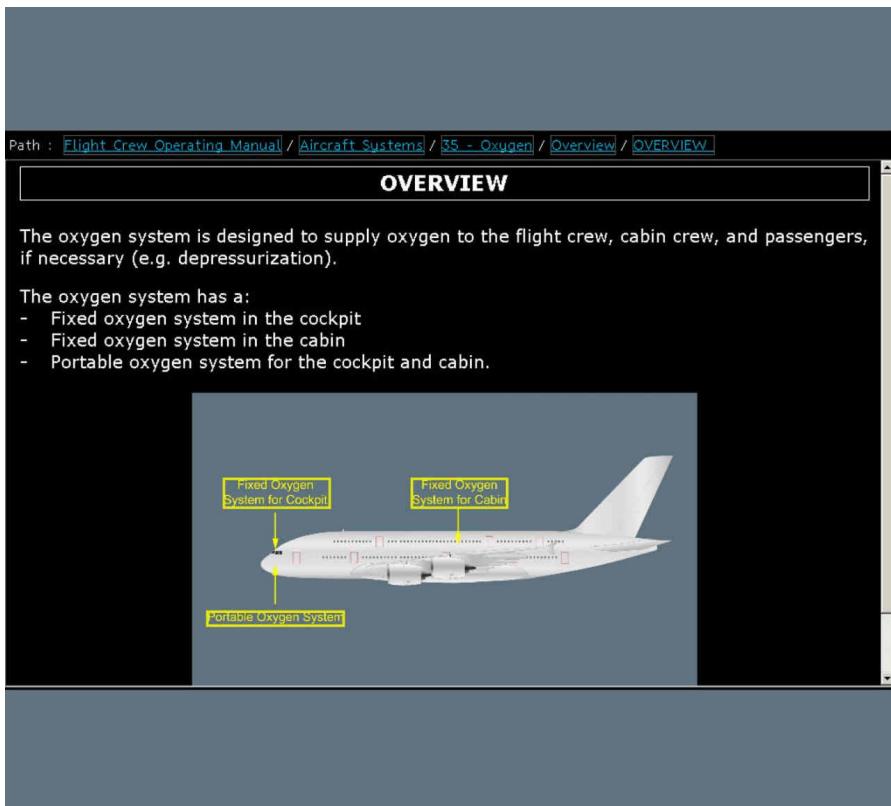
There are two types of illustrations:

- Inline illustrations
- Thumbnail illustrations.

Note: *Symbols are small illustrations or graphics that are embedded in the flow of the text.*

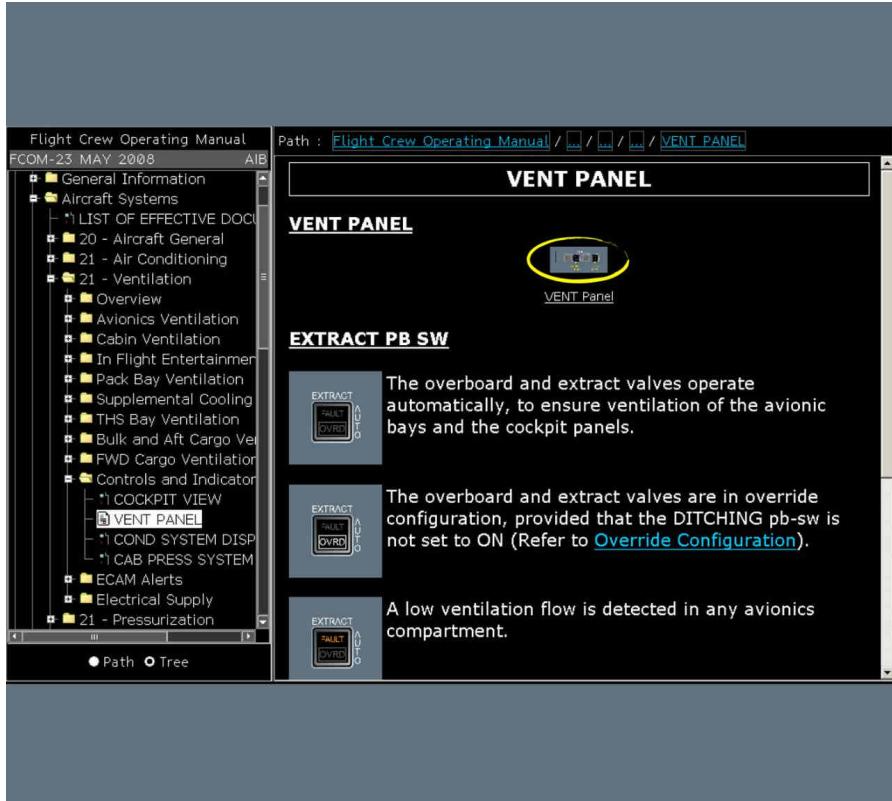
INLINE ILLUSTRATIONS

Inline illustrations appear next to the text. They appear in full size.

In-line Illustrations

THUMBNAIL ILLUSTRATIONS

Thumbnail illustrations appear as a symbol, on which the flight crew must click in order to display the illustration.

Thumbnail Illustration

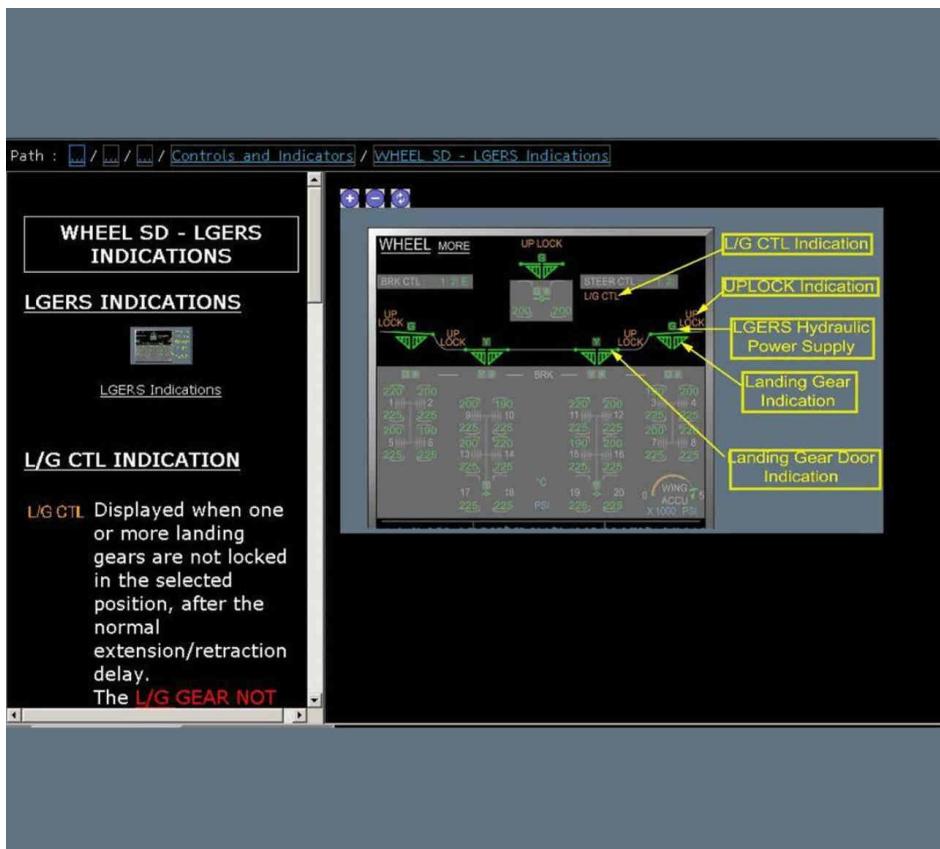
Click on the symbol to display the illustration.

The window is then divided in two frames and the navigation tree no longer appears.

The window can be divided:

- Vertically: The illustration appears in the right frame, and the text in the left frame.

Thumbnail Illustration - Vertical Split



- Horizontally: The illustration appears in the lower frame, and the text in the upper frame.

Thumbnail Illustration - Horizontal Split**HOTSPOTS**

An illustration can include hotspots.

Hotspots are interactive zones. When clicked, they automatically display applicable information:

- Either, directly associated with the illustration. In this case, the illustration and text appear simultaneously
- Or, provide access to further information. In this case, the hotspot is a link.

Illustration with Hotspots

The screenshot shows a computer screen displaying the Airbus A380 Flight Crew Operating Manual (FCOM) version 16 SEP 2008. The left sidebar contains a navigation tree with categories like Manuals, Flight Crew Operating Manual, Aircraft Systems, and System Description. The main content area shows a diagram of an aircraft from a rear perspective, highlighting the landing gear. Four callout boxes provide detailed views of specific systems: 'LGERS' (Landing Gear Extension and Retraction System), 'Steering System', 'Braking System' (which is circled with a yellow oval), and 'BTMS' (Brake Temperature Monitoring System). The path to this page is listed as: Flight Crew Operating Manual / 32 / 32 / Overview / OVERVIEW.

Flight Crew Operating Manual
FCOM-16 SEP 2008 AIB

Path : [Flight Crew Operating Manual](#) / [32](#) / [32](#) / [Overview](#) / [OVERVIEW](#)

The following systems are associated with the landing gear:

- The Landing Gear Extension and Retraction System (LGERS)
- The braking system
- The steering system
- The Tire Pressure Indicating System (TPIS)
- The Brake Temperature Monitoring System (BTMS)
- The Oleo Pressure Monitoring System (OPMS)

LGERS

Steering System

Braking System

BTMS

LANDING GEAR

● Path ● Tree

Click on the hotspot to display the associated documentary unit.

Linked Documentary Unit with Hotspot

The screenshot shows a dark-themed interface for the FCOM. On the left, there's a sidebar with navigation links: Manuals, Flight Crew Operating Manual, Aircraft Systems, 32 - Landing Gear, System Description, Braking System, Architecture, OVERVIEW (which is highlighted), and ARCHITECTURE. Below the sidebar are two buttons: a radio button for Path and a checked radio button for Tree. The main content area has a header bar with 'From : Flight Crew Operating Manual / ... / ... / Overview / OVERVIEW' and 'Path : Flight Crew Operating Manual / ... / ... / ... / ... / Architecture / OVERVIEW'. A large rectangular box labeled 'OVERVIEW' is centered in the content area. Below it, the text 'The braking system enables:' is followed by a bulleted list. Further down, the section 'BRAKING MODES' is introduced with its own list of five modes. At the bottom of the content area, a note reads 'In order to minimize the consequences of a local failure, the left ...'.

HOW TO USE LINKS**Applicable to: ALL**

Some documentary units from the FCOM include links with other documentary units in the FCOM or in other manuals (e.g. FCTM, MMEL).

Documentary Unit with a Link

The screenshot shows a flight crew operating manual for the A380. The left sidebar lists various sections like Manuals, Flight Crew Operating Manual, Procedures, Normal Procedures, Standard Operating Procedures, Non-Precision Approach, and NPA Flown without FLS Function. The main content area shows the title 'NPA Flown without FLS Function' and a 'GENERAL' section. Below it, text explains the flight crew's preference for using the FLS function to fly a Non-Precision Approach (NPA). It also states that if the FLS function is not available, the crew will fly the NPA without it, referring to the 'Introduction' section. A callout highlights the word 'Introduction'.

Flight Crew Operating Manual
FCOM-14 AUG 2007 AIB

Path : [\[\]](#) / [\[\]](#) / [\[\]](#) / [\[\]](#) / [\[\]](#) / [NPA Flown without FLS Function](#) / [General](#)

GENERAL

The flight crew will preferably use the FLS function to fly a Non-Precision Approach (NPA). However, the flight crew will fly the Non-Precision Approach (NPA) without the FLS function, if one of the following occurs:

- The FLS function is not available
For more information on the FLS function availability, Refer to [Introduction](#).
- The FLS capability is not as required.
For more information on the required FLS capability, Refer to [General](#).

The following table indicates the AP/FD modes, that the flight crew can use to fly the final approach:

To access the associated documentary unit, click on the link.

Linked Documentary Unit

Flight Crew Operating Manual
FCOM-14 AUG 2007 AIB

From : [\[\]](#) / [\[\]](#) / [\[\]](#) / [\[\]](#) / [NPA Flown without FLS Function](#) / [General](#)
Path : [\[\]](#) / [\[\]](#) / [\[\]](#) / [\[\]](#) / [Introduction and Guidance Material](#) / [Introduction](#)
[NON-PRECISION APPROACH \(NPA\).](#)

FLS FUNCTION AVAILABILITY, AND FLS CAPABILITY

The FLS function is available:

- For VOR, VOR/DME, RNAV (including GPS), ILS with glideslope out, LOC, and LOC B/C approaches, and
- When the approach is stored in the navigation database.

However, the FLS function is not available for a selected NPA, if the difference between the final approach course and the runway course is more than 50°.

When the flight crew selects an NPA on the FMS ARRIVAL page, the NO FLS FOR THIS APPR message may appear on the FMS message area, meaning that the FLS function is not available for the selected approach. The flight crew will then fly the approach without the FLS function.

When the FLS function is available, and the flight crew presses the LS pb, the FLS capability appears on the FMA. The FLS capability is one of the following: F-APP, F-APP + RAW, or RAW ONLY. For required conditions for FLS capability, Refer to [Limitations / Auto Flight System](#).

To return to the documentary unit in the FCOM, click on the PREVIOUS button.

Note: If the link is not active, an Error message appears, as illustrated below. Click on OK to continue.

Link Error Message

HOW TO USE TEMPORARY DOCUMENTARY UNITS**Applicable to: ALL**

A Temporary Documentary Unit (TDU) temporarily replaces the original documentary unit in the navigation tree. When navigating through the manual, the TDU appears instead of the original documentary unit.

A TDU appears with a dashed yellow line on the right side of the window.

Note: *The list of TDU s for the FCOM is in the TDU chapter.*

Temporary Documentary Unit

Flight Crew Operating Manual
FCOM-02 APR 2007 AIB

Path : [Flight Crew Operating Manual](#) / [TDU](#) / [Start and Update of Predictions](#)

Temporary Information - 02 APR 07 **Impacted DU**

START AND UPDATE OF PREDICTIONS

In preflight, the FMS starts computing the flight plan predictions when the following data is available:

- The lateral flight plan
- The cruise flight level (CRZ FL)
- The cost index (CI)

Note: If the flight crew did not enter a cost index, the default value is the cost index of the previous flight, stored in the DONE phase (or 0 if there is no stored cost index).

- The aircraft gross weight (GW)

The FMS updates the predictions at regular intervals, and when:

- The lateral, or vertical flight plan is changed
- The cost index is changed
- The cruise temperature, SAT, or tropopause altitude are

INFO ▾

To display the reason for issue of the TDU , click on the **INFO ▾** button and select DOC REF.



To display the original documentary unit, click on the symbol. The original documentary unit is the one that is temporarily not valid, and which has been replaced by the TDU .

Impacted Documentary Unit

Flight Crew Operating Manual
FCOM-02 APR 2007 AIB

Manuals
Flight Crew Operating Manual
TDU
START AND UPDATE OF PREDICTION

From : [Flight Crew Operating Manual](#) / [TDU](#) / [Start and Update of Predictions](#)
Path : [/](#) [/](#) [/](#) [/](#) [/](#) [Flight Plan Predictions](#) /

NOT CURRENTLY APPLICABLE

Modified by Temporary Information  [Go to Temporary](#) [Info](#)

START AND UPDATE OF PREDICTIONS

In preflight, the FMS starts computing the flight plan predictions when the following data is available:

- The lateral flight plan
- The cruise flight level (CRZ FL)
- The cost index (CI)
- The aircraft gross weight (GW)

The FMS updates the predictions at regular intervals, and when one of the following events occur:

- Change of the lateral, or vertical flight plan (e.g. insertion of a waypoint, a time constraint, constant mach segment, etc...),
- Change of the cost index,



To return to the TDU , click on the symbol.

When an OEB has a link to a TDU , the associated TDU appears with a secondary dashed line. This secondary dashed line is white, if the TDU is associated with a white OEB , or red, if the TDU is associated with a red OEB . For more information about OEB s, *Refer to OEB-000 Introduction* .

HOW TO USE WORD SEARCH

Applicable to: ALL

The WORD SEARCH function enables the flight crew to find specific words in all the manuals.

SEARCH PANEL

To access the SEARCH panel, click on the SEARCH button.

OPS LIBRARY

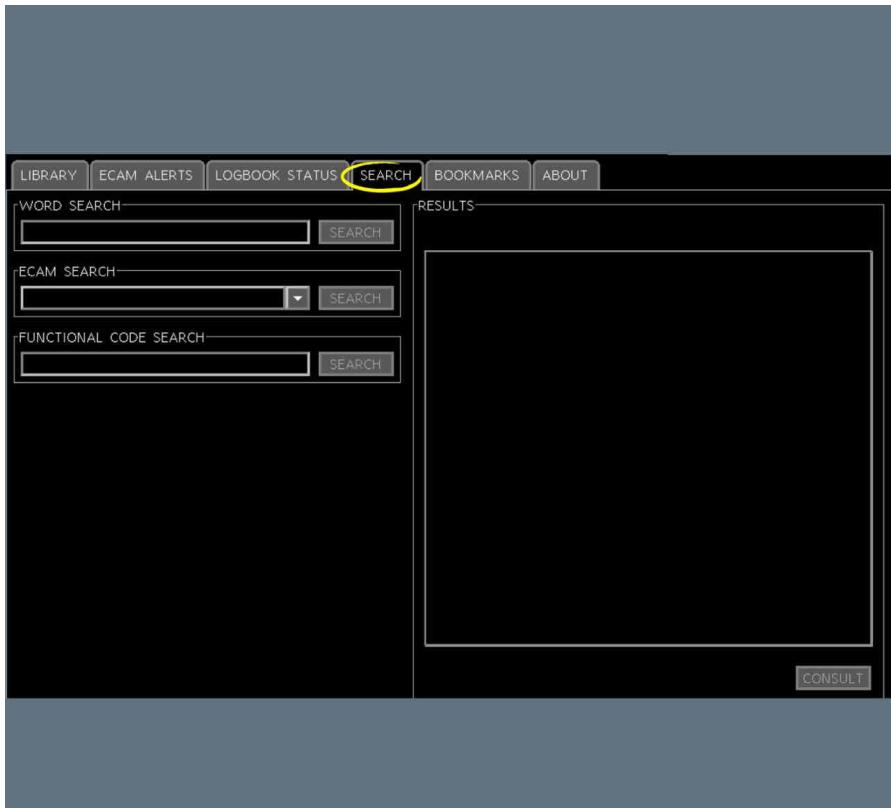
The screenshot shows the Airbus OPS Library interface for the A380 Flight Crew Operating Manual (FCOM). The top navigation bar includes buttons for HOME, HIDE TREE, SUB-TOPICS, BOOKMARKS, NOTE, WHAT IF, ECAM LIST, and a SEARCH button, which is highlighted with a yellow oval.

The left sidebar displays the tree structure of the FCOM manual:

- Flight Crew Operating Manual
- FCOM-23 MAY 2008 AIB
- Flight Crew Operating Manual
- Flight Crew Training Manual
- Cabin Crew Operating Manual
- Master Minimum Equipment List
- Configuration Deviation List
- Weight And Balance Manual
- Airplane Flight Manual

The right panel shows the contents of the selected "Flight Crew Operating Manual" node:

- LIST OF MODIFICATIONS
- SUMMARY OF HIGHLIGHTS
- General Information
- Aircraft Systems
- Procedures
- Limitations
- Performance
- Operations Engineering Bulletins
- TDU

SEARCH Panel

Enter the words in the WORD SEARCH entry field.

If more than one word is entered, the search will look for documentary units that have at least one of the entered words.

Operators (and, or) can be used (e.g. APU and OIS).

To look for an exact word sequence, use quotes (e.g. "FUEL LEAK DET FAULT").

Click on the SEARCH button to start the search.

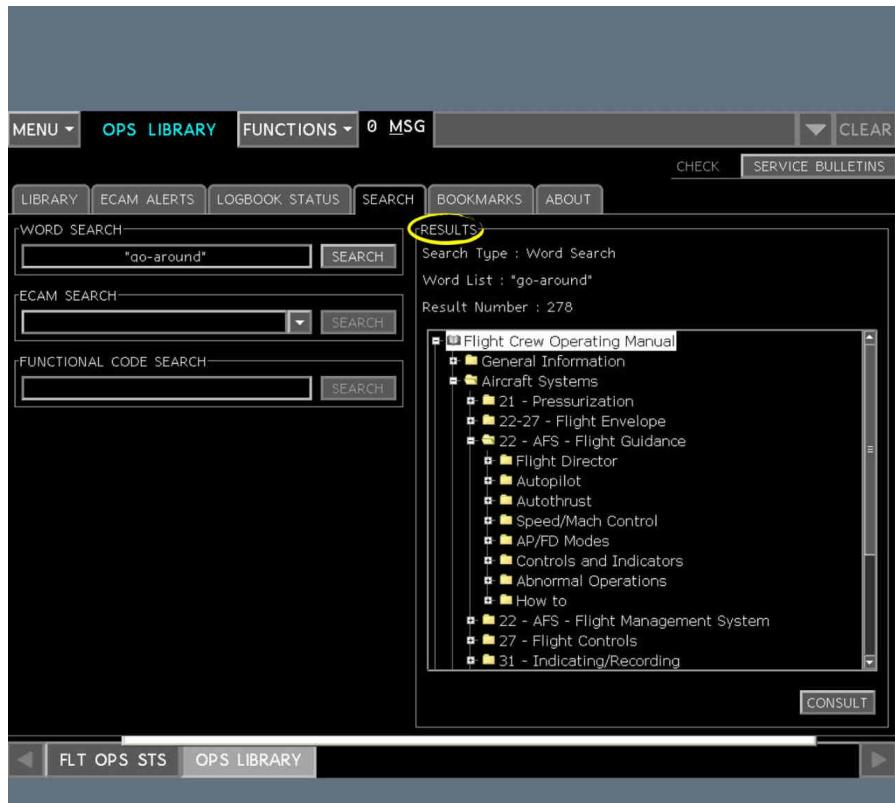
If more than 50 answers are found, a message appears. Click on OK to perform an advanced search, or to view all the answers.

RESULTS WINDOW

For each manual, the RESULTS window displays the list of documentary units that are retrieved by the search.

The upper area of the RESULTS window displays the search parameters and the number of results.

The list of documentary units appears in a navigation tree in the lower part of the RESULTS window.

RESULTS Window

To access the results in a manual, select the manual, then click on the CONSULT button, or click twice on the title of the manual.

To access the documentary unit, click on the name of the documentary unit and click on the CONSULT button or double click on the name of the documentary unit.

CONSULTATION MODE

In consultation mode, folders and documentary units that have a search result appear in green in the navigation tree.

In the text, the words that have been searched for also appear highlighted.

Consultation Mode

The flight crew arms the A/THR at takeoff, by setting the thrust levers to TOGA or FLX-MCT, in accordance with TOGA, or FLEX selection on the T.O panel of the FMS PERF page . The A/THR controls the thrust at TOGA, or FLEX.

When the aircraft reaches the thrust reduction altitude, the flight crew activates the A/THR by setting the thrust levers at the CL detent (or FLX-MCT detent, if at least one engine is out).

For scenario example, Refer to [From Takeoff to Thrust Reduction Altitude](#).

The flight crew also arms the A/THR by engaging a **go-around**: The flight crew sets the thrust levers at the TOGA detent. The A/THR controls the thrust at TOGA thrust.

When the aircraft reaches the GA thrust reduction altitude, the flight crew activates the A/THR by setting the thrust levers at the CL detent (or FLX-MCT detent, it at least one engine is out).

ARMING CONDITIONS

The A/THR arms, if one of the following occurs:

- **SRS TO** engages

To quit the consultation mode of the search, click on the cross of the WORD SEARCH area.

Consultation Mode - Word Search Area

The screenshot shows the Airbus Flight Crew Operating Manual (FCOM) OPS LIBRARY interface in Consultation Mode. The search term 'A/THR ARMING' has been entered, resulting in 278 hits. The main pane displays the article 'A/THR ARMING' with the following text:

The flight crew arms the A/THR at takeoff, by setting the thrust levers to TOGA or FLX-MCT, in accordance with TOGA, or FLEX selection on the T.O panel of the FMS PERF page . The A/THR controls the thrust at TOGA, or FLEX.

When the aircraft reaches the thrust reduction altitude, the flight crew activates the A/THR by setting the thrust levers at the CL detent (or FLX-MCT detent, if at least one engine is out).

For scenario example, Refer to [From Takeoff to Thrust Reduction Altitude](#).

The flight crew also arms the A/THR by engaging a go-around: The flight crew sets the thrust levers at the TOGA detent. The A/THR controls the thrust at TOGA thrust.

When the aircraft reaches the GA thrust reduction altitude, the flight crew activates the A/THR by setting the thrust levers at the CL detent (or FLX-MCT detent, it at least one engine is out).

ARMING CONDITIONS

The A/THR arms, if one of the following occurs:

- [SRS TO engages](#)

At the bottom of the search results pane, there is a 'WORD SEARCH (278 Hits)' button, which is highlighted with a yellow circle.

HOW TO USE ECAM SEARCH**Applicable to: ALL**

The ECAM SEARCH function enables the flight crew to access documentary units that are associated with an ECAM alert. These documentary units are:

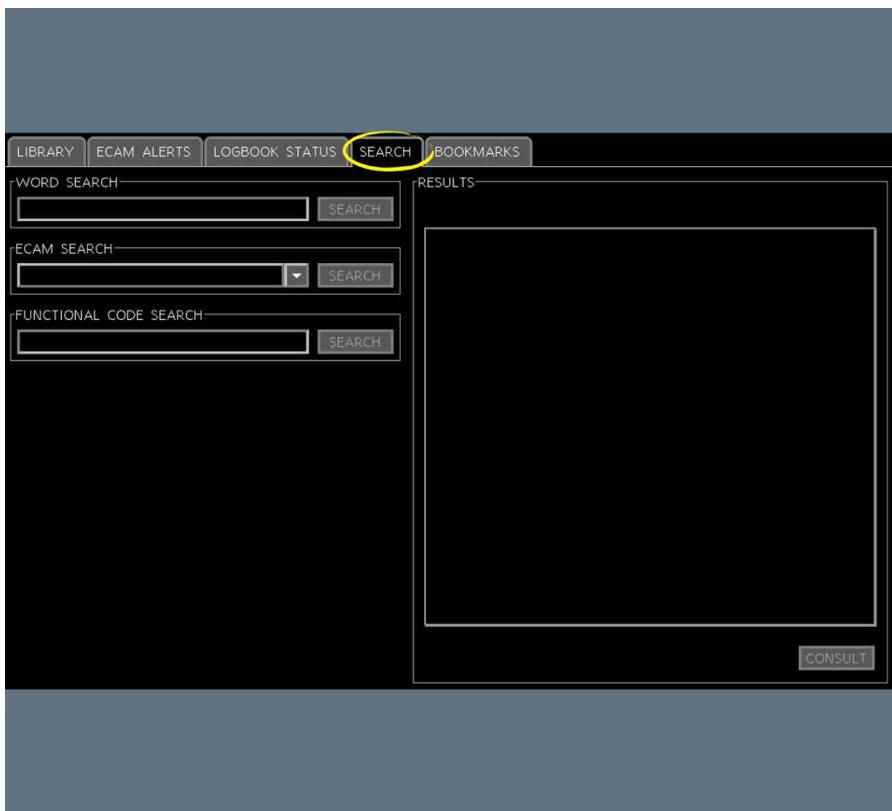
- The associated abnormal or emergency procedure in the FCOM
- The associated documentary unit in the MMEL Entries chapter of the MMEL.

SEARCH PANEL

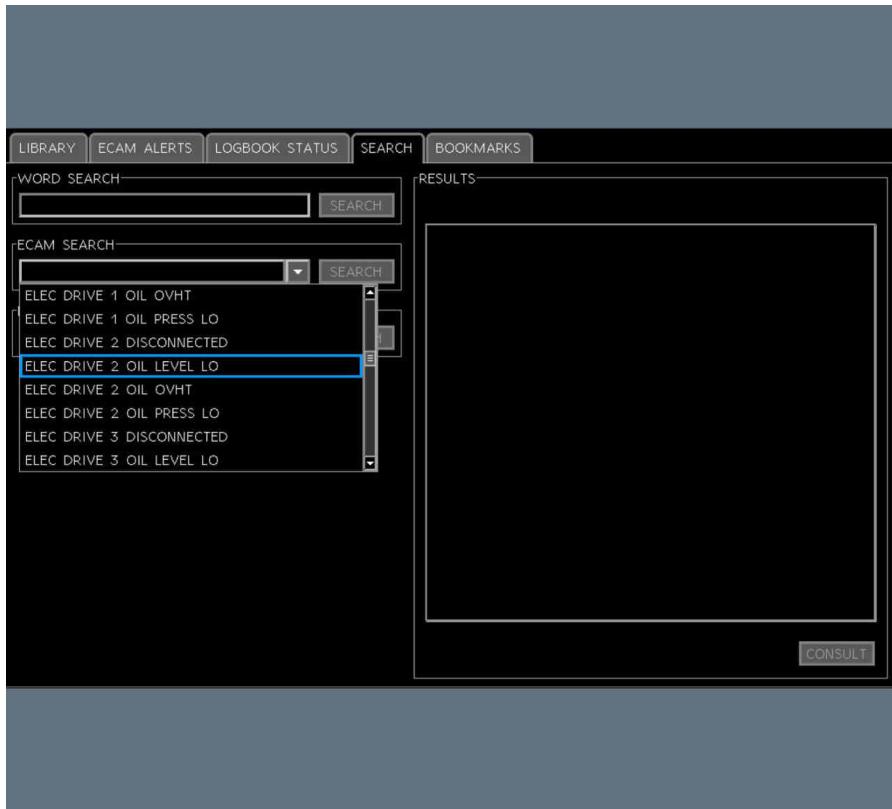
To access the Search panel, click on the SEARCH button.

OPS LIBRARY

The screenshot shows the 'Flight Crew Operating Manual' displayed in the OPS LIBRARY application. The interface includes a toolbar at the top with buttons for HIDE TREE, SUB-TOPICS, INFO, BOOKMARKS, NOTE, WHAT IF?, ECAM LIST, and SEARCH (which is highlighted with a yellow circle). The left pane shows a tree view of the manual's contents, including sections like General Information, Aircraft Systems, Procedures, Limitations, Performance, Operations Engineering Bulletins, and TDU. The right pane displays the selected section, 'Flight Crew Operating Manual', with its sub-sections: LIST OF MODIFICATIONS, SUMMARY OF HIGHLIGHTS, General Information, Aircraft Systems, Procedures, Limitations, Performance, Operations Engineering Bulletins, and TDU.

SEARCH Panel

Select the ECAM alert in the ECAM SEARCH list.

ECAM Search List

Click on the SEARCH button to start the search.

RESULTS PANEL

The RESULTS window displays the documentary units that are retrieved by the search.

The upper area of the RESULTS window displays the search parameters.

The documentary units appear in a navigation tree in the lower part of the RESULTS window.

RESULT Window

The screenshot shows the 'RESULT Window' interface. At the top, there are tabs: LIBRARY, ECAM ALERTS, LOGBOOK STATUS, SEARCH, and BOOKMARKS. The SEARCH tab is active. Below the tabs are three search input fields: WORD SEARCH (empty), ECAM SEARCH (containing 'ELEC DRIVE 2 OIL LEVEL LO'), and FUNCTIONAL CODE SEARCH (empty). To the right of these fields is a 'SEARCH' button. To the right of the search area is a 'RESULTS' section with a yellow circle around it. The 'RESULTS' section displays the following information:
Search Type : Ecam Search
Word List : ELEC DRIVE 2 OIL LEVEL LO
Result Number : 1
The results are listed in a tree view:

- Flight Crew Operating Manual - NewFP611
 - Procedures
 - ECAM Abnormal and Emergency Procedures
 - All ECAM Procedures
 - 24-Electrical
 - ELEC DRIVE 1(2)(3)(4) OIL LEVEL LO

CONSULT

To access the documentary unit, click on the name of the documentary unit and click on the CONSULT button or double click on the name of the documentary unit.

CONSULTATION MODE

In consultation mode, folders and the documentary units that have a search result appear in green in the navigation tree.

Consultation Mode

The screenshot shows the Airbus Onboard Information System (OIS) in Consultation Mode. The main title is "ELEC DRIVE 1(2)(3)(4) OIL LEVEL LO". Below it, under "ANNUNCIATIONS", is a note about MEL dispatch conditions. Under "STATUS", it shows "INOP SYS" and "ALL PHASES" for "GEN 1(2)(3)(4)". The left sidebar lists various electrical faults, and the bottom has search and ECAM buttons.

Note: The first documentary that the flight crew has selected to display from the RESULT panel may not appear.

In this case, in the navigation tree, select another documentary unit, then select again the documentary unit that has a search result.

To quit the consultation mode of the search, click on the cross of the ECAM SEARCH area.

Consultation Mode - ECAM Search Area**HOW TO USE THE AUTOMATIC CONTEXT****Applicable to: ALL**

When an ECAM alert occurs during the flight, the ECAM alert automatically appears on the ECAM ALERTS panel of the OPS LIBRARY.

This enables the flight crew to rapidly access the abnormal or emergency procedure associated with the ECAM alert.

To access the information associated with an ECAM alert that appears in flight:

1. Display the OPS LIBRARY
2. Select the ECAM ALERTS panel.

All the ECAM alerts that occurred during the flight appear in the chronological order.

ECAM ALERTS Panel

| ECAM alert message | SEARCH | Timestamp | Icon |
|-----------------------|------------------------|--------------|------|
| F/CTL PRIM 1 FAULT | SEARCH | 27-Sep 10:05 | |
| ELEC DRIVE 3 OIL OVHT | SEARCH | 27-Sep 09:55 | |
| ENG 2 N1 OVER LIMIT | SEARCH | 27-Sep 08:13 | |
| NAV RA SYS A+B FAULT | SEARCH | 27-Sep 07:56 | |

Note: The ECAM alerts appear with the same color as they appear on the ECAM.

3. Select an ECAM alert by clicking on the associated SEARCH button.

The consultation mode appears. The documentary units associated with the selected ECAM alert and the folders containing these documentary units appear highlighted in green in the navigation tree.

Abnormal & Emergency Procedure

The screenshot shows the Airbus ECAM system interface. On the left, there is a tree view of faults under 'Flight Crew Operating Manual' and 'FCOM-23 OCT 2009'. A specific fault, 'F/CTL PRIM 1(2)(3) FAULT', is highlighted in green. The main right panel displays the fault message 'F/CTL PRIM 1(2)(3) FAULT' in a large yellow box, followed by the heading 'ANNUNCIATIONS' with a yellow exclamation mark icon. Below this, a text box contains instructions for associated MEL dispatch conditions, listing three items: 'Refer to MMEL/F/CTL PRIM 1 FAULT', 'Refer to MMEL/F/CTL PRIM 2 FAULT', and 'Refer to MMEL/F/CTL PRIM 3 FAULT'. Further down, another text box provides instructions for taxiing: 'During taxi-in, one minute after the FLAPS lever is set to 0: FOR TAXI : FLAPS SELECT CONF 1+F'. It includes a detailed explanation: 'On ground, when the flaps are retracted and if at least one engine is running, the spoilers extend 5° up. This prevents friction between the spoilers and the flaps, which could damage the spoilers.' It also notes that 'When some spoilers are failed, the flaps should remain extended as long as the aircraft is taxiing in order to prevent this friction.'

4. To quit the consultation mode of the search, click on the cross of the ECAM SEARCH area.

HOW TO USE THE RETURN TO ECAM FUNCTION

Applicable to: ALL

The Return to ECAM function enables the flight crew to access the documentary units of the MMEL entries chapter of the MMEL(ECAM alerts), that are associated with the MMEL item that is displayed.

1. Display a MMEL item.
2. Click on the ECAM LIST button.

MMEL Item


The screenshot shows the OIS interface with the following details:

- Top Bar:** Includes buttons for HIDE TREE, SUB-TOPICS, INFO (with page numbers 1, 2, 3), BOOKMARKS, NOTE, WHAT IF?, ECAM LIST (highlighted with a yellow circle), and SEARCH.
- Left Sidebar:** Displays the Master Minimum Equipment List (MMEL) tree structure under AIB. Nodes include Manuals, MMEL Items, Air Conditioning, 50-Pack System, and 21-50-01 Pack, which is expanded to show sub-items like 21-50-02 Pack 1 Valve, 21-50-03 Pack 2 Valve, etc.
- Central Content:**
 - Section Header:** 21-50-01 Pack
 - Table:** Repair Interval

| Repair Interval | Nbr Installed | Nbr Required |
|-----------------|---------------|--------------|
| C | 2 | 1 |
 - Text:** Placard
 - Text:** One may be inoperative provided:
 - 1) Associated PACK pb-sw is set to OFF, and
 - 2) Both associated pack valves are checked closed on ECAM BLEED page, and
 - 3) A check is made before each flight that, for the remaining pack, none of the cautions listed in the operational procedure are displayed on ECAM EWD.
- Bottom:** Path and Tree selection buttons.

A drop-down list appears. This drop-down list displays the ECAM alerts, that are associated with the MMEL item that is displayed.

MMEL Item with ECAM LIST

The screenshot shows the Airbus MMEL software interface. The left pane displays a tree view of equipment lists, with the '21-50-01 Pack' node selected. The right pane shows detailed information for the selected pack, including its repair interval (C), number of installed units (2), and a list of associated faults. Below this, operational procedures for the pack are listed.

Master Minimum Equipment List
MMEL-16 SEP 2008 AIB

Path : [Master Minimum Equipment List](#) / [21-50-01 Pack](#)

21-50-01 Pack

| Repair Interval | Nbr Installed |
|-----------------|---------------|
| C | 2 |

Placard

One may be inoperative provided:

- 1) Associated PACK pb-sw is se
- 2) Both associated pack valves are checked closed on ECAM BLEED page, and
- 3) A check is made before each flight that, for the remaining pack, none of the cautions listed in the operational procedure are displayed on ECAM EWD.

AIR PACK 1 CTL 1 FAULT
AIR PACK 1 CTL 2 FAULT
AIR PACK 1 VLV 1 FAULT
AIR PACK 1 VLV 2 FAULT
AIR PACK 1(2) CTL DEGRADED
AIR PACK 1(2) FAULT
AIR PACK 1(2) OVHT
AIR PACK 1(2) REGUL FAULT
AIR PACK 1+2 FAULT
AIR PACK 2 CTL 1 FAULT
AIR PACK 2 CTL 2 FAULT
AIR PACK 2 VLV 1 FAULT
AIR PACK 2 VLV 2 FAULT

3. Select an ECAM alert in this list.

The documentary unit from the MMEL Entries chapter of the MMEL, that is associated with the selected ECAM ALERT, appears.

MMEL Entry

The screenshot shows the OIS interface with the following details:

- Toolbar:** Includes buttons for HIDE TREE, SUB-TOPICS, INFO (with tabs 1, 2, 3), BOOKMARKS, NOTE, WHAT IF?, ECAM LIST, and SEARCH.
- Left Panel (Tree View):** Shows the "Master Minimum Equipment List" structure. The "AIR" section is expanded, listing various faults such as AIR APU BLEED FAULT, AIR APUL BLEED LEAK, AIR BLEED LEAK, etc.
- Top Status Bar:** Displays "From : Master Minimum Equipment List / ... / ... / 21-S0-01 Pack" and "Path : Master Minimum Equipment List / ... / ... / AIR / AIR PACK 1 VLV 1 FAULT".
- Central Content Area:** A table titled "AIR PACK 1 VLV 1 FAULT" with two columns:
 - AIRCRAFT STATUS:** Describes the fault as "The pack 1 valve 1 is indicated amber closed on ECAM BLEED page: the pack 1 valve 1 is failed in closed position." It refers to "Pack 1 Valve exception a)".
 - CONDITION OF DISPATCH:** Refers to "Pack 1 Valve exception a)".
- Bottom Content Area:** Describes the fault as "The pack 1 valve 1 is indicated amber open on ECAM BLEED page: the pack 1 valve 1 is failed in open position and must be deactivated in closed position." It refers to "Pack 1 Valve exception b)".
- Bottom Content Area:** Associated with the caution "AIR PACK 1 VLV 2 FAULT" and both pack 1 valves indicated amber open on ECAM BLEED page: both pack 1 valves are failed open. They must be deactivated in closed position. It refers to "Pack exception b)".

4.

To return to the MMEL item, click on the button.

HOW TO USE THE LOGBOOK STATUS**Applicable to: ALL**

The LOGBOOK STATUS panel enables the flight crew to access the MEL or CDL items, that are associated with the current deferred items of the eLogbook.

The LOGBOOK STATUS panel is active by default.



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FLIGHT CREW
OPERATING MANUAL

AIRCRAFT SYSTEMS

46 - INFORMATION SYSTEMS

OIS - ONBOARD INFORMATION SYSTEM - HOW TO

LOGBOOK STATUS Panel

LIBRARY **ECAM ALERTS** **LOGBOOK STATUS** **SEARCH** **BOOKMARKS**

OPEN ITEMS: NONE

DEFERRED MEL ITEMS:

| REPORT | PROPOSED ITEM |
|-------------------------------------|---|
| BRAKES RELEASED ECAM WARNING | 32-42-01 A LEFT SIDE BRAKES IN RELEASED CONFIGURATION (WING+BODY) (o) |
| ENG 2 REVERSER LOCKED ECAM WARNING | 78-30-04 A THRUST REVERSER LOCK (o) (m) |
| F/CTL PART SPLRS FAULT ECAM WARNING | 27-64-01 A SPOILER HYDRAULIC ACTUATOR (1, 2, 3, 4, 7, AND 8) (o) |
| COM F/O PTT STUCK ECAM WARNING | 88-88-88 PTT STUCK |

DEFERRED CDL ITEMS:

| REPORT | PROPOSED ITEM |
|---|---|
| 21-01 OUTFLOW VALVE PANEL MISSING | 77-77 OUTFLOW VALVE |
| 57-04 WLG HINGED DOOR RUBBER SEAL MISSING | 66-66 WLG HINGED RUBBER |

SYNCHRO LOGBOOK

To access the MEL or CDL item associated with a deferred item from the eLogbook:

1. Click on the link located on the row of the item, in the PROPOSED ITEM column.

LOGBOOK STATUS Panel - MEL Link

LIBRARY ECAM ALERTS LOGBOOK STATUS SEARCH BOOKMARKS

OPEN ITEMS: NONE

DEFERRED MEL ITEMS:

| REPORT | PROPOSED ITEM |
|-------------------------------------|---|
| BRAKES RELEASED ECAM WARNING | 52-42-01 A LEFT SIDE BRAKES IN RELEASED CONFIGURATION (WING+BODY) (o) |
| ENG 2 REVERSER LOCKED ECAM WARNING | 78-30-04 A THRUST REVERSER LOCK (o) (m) |
| F/CTL PART SPLRS FAULT ECAM WARNING | 27-64-01 A SPOILER HYDRAULIC ACTUATOR (1, 2, 3, 4, 7, AND 8) (o) |
| COM F/O PTT STUCK ECAM WARNING | 88-88-88 PTT STUCK |

DEFERRED CDL ITEMS:

| REPORT | PROPOSED ITEM |
|---|-------------------------|
| 21-01 OUTFLOW VALVE PANEL MISSING | 77-77 OUTFLOW VALVE |
| 57-04 WLG HINGED DOOR RUBBER SEAL MISSING | 66-66 WLG HINGED RUBBER |

SYNCHRO LOGBOOK

2. The associated MEL or CDL item appears.
The box of this MEL or CDL item is automatically ticked.

Deferred Item - Associated MEL Item

Master Minimum Equipment List
MMEL-16 SEP 2008 AIB

Manuals

Master Minimum Equipment List
MMEL Items

32-Landing Gear

42-Braking

32-42-01 Left Side Brakes in Released Configuration

- 32-42-02 Right Side Brakes in Released Configuration
- 32-42-03 Left Side Brakes (Body+Wing)
- 32-42-04 Right Side Brakes (Body+Wing)
- 32-42-05 Auto Brake
- 32-42-06 Brakes Control 2
- 32-42-07 Normal Braking Pressure
- 32-42-08 Alternate Braking Pressure
- 32-42-09 Tachometer

Path : / / / /

32-42-01 Left Side Brakes in Released Configuration (Body+Wing)

| Repair Interval | Nbr Installed | Nbr Required |
|-----------------|---------------|--------------|
| C | 8 | 6 |

Two body brakes may be inoperative in released configuration provided:

- 1) The remaining brakes on the left side are operative, and
- 2) All tachometers on the left side are operative, and
- 3) Flight Manual performance penalties are applied.

32-42-01A

| Repair Interval | Nbr Installed | Nbr Required |
|-----------------|---------------|--------------|
| | | |

32-42-01B

| Repair Interval | Nbr Installed | Nbr Required |
|-----------------|---------------|--------------|
| | | |

Note:

1. The eLogbook application does not send missing parts of the CDL items.
2. There is no indication to the flight crew when the push/receive function of MEL/CDL items from the eLogbook application to the FLT OPS side is lost. In this case, the LOGBOOK STATUS panel may display an out of date logbook status.
As indicated in the Standard Operating Procedures (SOP), the flight crew must check the dispatch conditions of the aircraft by using the LOGBOOK STATUS panel. If the LOGBOOK STATUS panel disagrees with the aircraft status in the eLogbook application, the flight crew must manually select or unselect the associated MEL/CDL items in the OPS LIBRARY.



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OPERATING MANUAL

AIRCRAFT SYSTEMS

46 - INFORMATION SYSTEMS

OIS - ONBOARD INFORMATION SYSTEM - HOW TO

HOW TO USE BOOKMARKS

Applicable to: ALL

To add the displayed documentary unit to the list of bookmarks, click on the BOOKMARKS button and select ADD TO LIST.

There are two ways to access documentary units associated with a bookmark:

- Click on the BOOKMARKS button and select in the drop-down list the documentary unit, as illustrated below:

Bookmarks Access

The screenshot shows the OIS interface with the 'Bookmarks' tab selected. The left pane displays a tree view of documentation, including 'Flight Crew Operating Manual' and 'Aircraft Systems'. The right pane shows a list of bookmarks with details about A/THR arm conditions.

| Bookmark | Action | Condition |
|------------------------------|--------|-----------|
| ADD TO LIST | Alt-L | ARMING |
| ORGANIZE | Alt-G | |
| HYDRAULIC DISTRIBUTION | | |
| AIR PACK 1(2) REGUL FAULT | | |
| INITIAL APPROACH | | |
| HOW TO DISPLAY ILLUSTRATIONS | | |

The flight crew arms the A/THR by setting the thrust levers to TOGA or DERATED selection on the T.O panel of the FMS PERF page . The A/THR controls the thrust at TOGA, FLEX or DERATED.

When the aircraft reaches the thrust reduction altitude, the flight crew activates the A/THR by setting the thrust levers at the CL detent (or FLX-MCT detent, if at least one engine is out).

For scenario example, Refer to [From Takeoff to Thrust Reduction Altitude](#).

The flight crew also arms the A/THR by engaging a go-around: The flight crew sets the thrust levers at the TOGA detent. The A/THR controls the thrust at TOGA thrust.

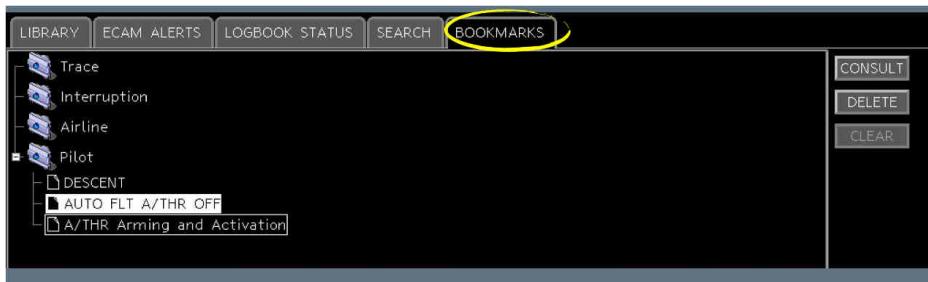
When the aircraft reaches the GA thrust reduction altitude, the flight crew activates the A/THR by setting the thrust levers at the CL detent (or FLX-MCT detent, if at least one engine is out).

ARMING CONDITIONS

The A/THR arms, if one of the following occurs:

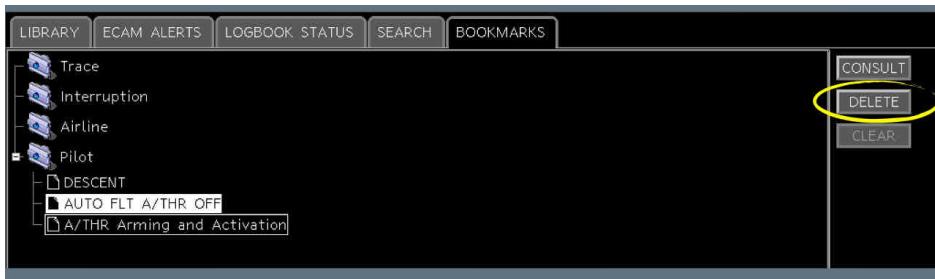
- **SRS TO engages**

- Click on the FUNCTIONS button and select HOME, then select the BOOKMARKS panel. Created bookmarks are saved in the Pilot folder.
To display a documentary unit, click on the name of the documentary unit in the Pilot folder, then click on the CONSULT button.

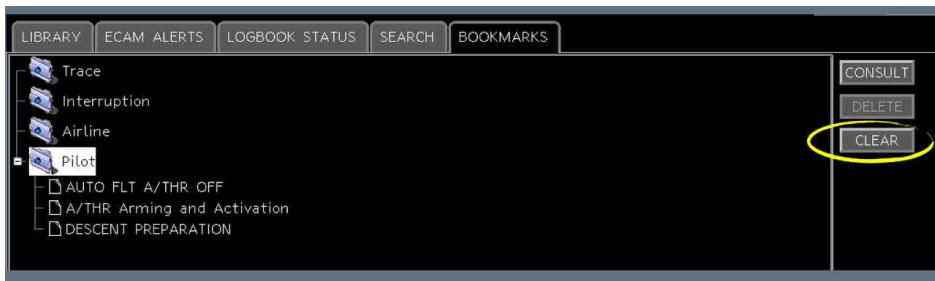
Bookmarks - Pilot Folder

The flight crew can delete the bookmarks:

- To delete one or more bookmarks, select the bookmarks and click on the DELETE button



- To delete all the bookmarks, click on the Pilot folder and on the CLEAR button.

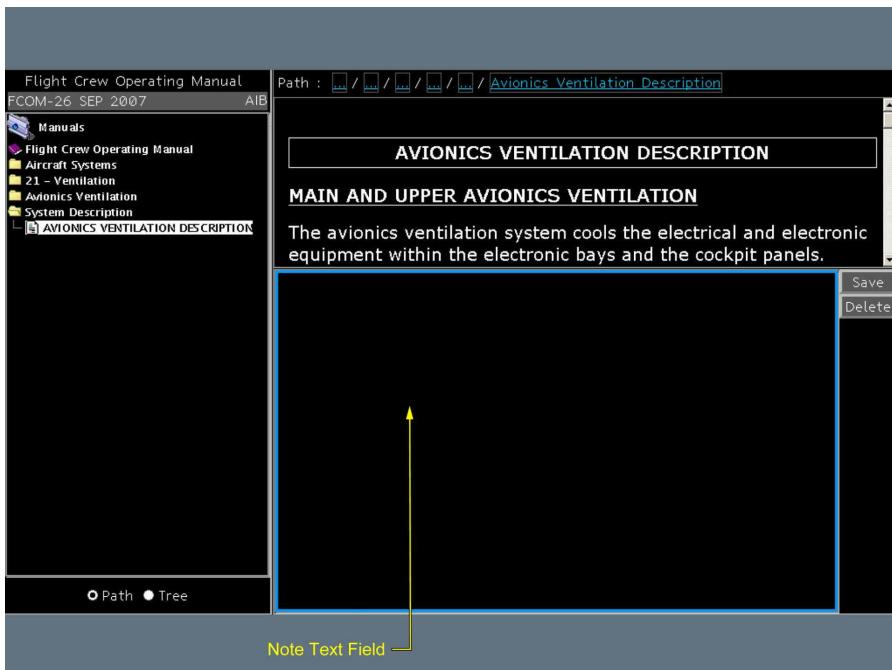
HOW TO USE NOTES

Applicable to: ALL

The flight crew can add notes (free text) to each documentary unit.

CREATE A NOTE

When a documentary unit is displayed, click on the NOTE button to display the Note Text field. Type the text of the note in the field, and click on the Save button to save it.

Note Text Field**DISPLAY A NOTE**

When a note is associated with a documentary unit, a new element, attached to the documentary unit, appears in the navigation tree. This element includes the note and has the same name as the documentary unit.

Documentary Unit with a Note

The screenshot shows a flight manual interface. On the left, a navigation tree lists sections like 'Manuals', 'Flight Crew Operating Manual', 'Aircraft Systems', '21 - Ventilation', 'Avionics Ventilation', and 'System Description'. A note titled 'AVIONICS VENTILATION DESCRIPTION' is highlighted with a yellow oval. The main content area is titled 'AVIONICS VENTILATION DESCRIPTION' and contains a section titled 'MAIN AND UPPER AVIONICS VENTILATION'. It describes the avionics ventilation system's function and the two ventilation circuits. Below this is a diagram of an aircraft cross-section with air flow paths labeled 'Main and Upper Avionics Ventilation'. At the bottom, there are buttons for 'Path' and 'Tree'.

To display the note, click on this section in the navigation tree, or click on the NOTE button.
To change the text of the note, type the new text in the text field, and click on the Save button.
To delete the note, click on the Delete button. The element in the navigation tree then disappears.
To hide the note, click again on the NOTE button, or click on the navigation tree to display another documentary unit.

HOW TO USE THE "WHAT IF" FUNCTION**Applicable to: ALL**

The "What If" function provides the flight crew with a quick access to possible scenarios and information that are related to the displayed documentary unit.

The associated information may be:

- Procedures to be applied
- Failed system description or abnormal operations
- Status of the controls and indicators on the selected scenarios.

The "What If" function and the WHAT IF button are active when the documentary unit includes such information.

Documentary Unit with the "What If" Function Active

The screenshot shows a software interface for the Airbus Flight Crew Operating Manual. The top menu bar includes buttons for HIDE TREE, SUB-TOPICS, INFO, BOOKMARKS, NOTE, and WHAT IF? (which is circled in yellow). The main content area displays a tree view of the manual structure on the left and detailed operational steps on the right. A specific section titled 'TAKEOFF' is highlighted, followed by 'CROSSWIND TAKEOFF' with a note about crosswind takeoff technique. Below this, a 'THRUST SETTING' section indicates that rolling takeoff is permitted. A table lists various controls and their settings: TAKEOFF (ANNOUNCE), THR (30 %), THRUST LEVERS (FLX or TOGA), DIRECTIONAL CONTROL (USE RUDDER), CHRONO (START), PFD/ND (SCAN), and TAKEOFF THRUST (CHECK). At the bottom, a bold 'REACHING 80 KNOTS' section is shown. Navigation buttons at the bottom include Path (radio button selected) and Tree (radio button).

Click on the WHAT IF button to display the drop-down list and select the required documentary unit.

"What If" Drop-Down List

The screenshot shows the Airbus Onboard Information System (OIS) interface. The left sidebar displays a tree structure of manuals, with 'Flight Crew Operating Manual FCOM-16 SEP 2008 AIB' selected. The main panel shows a 'WHAT IF?' dropdown menu with several options:

- AP/FD mode reversion : from SRSTO to OPCLB
- Engine failure after V1
- Flight with landing gear down
- Fluid contaminated runway
- Operations in volcanic ash
- Operations on runways less than 58m wide** (highlighted with a blue border)
- Rejected takeoff
- Takeoff from an airport at or above 9200 ft of pressure altitude
- Windshear detected

Below the dropdown, there is a section titled 'THRUST SE' with the note 'Rolling takeoff is permitted.' followed by a table of thrust settings:

| TAKEOFF | ANNOUNCE |
|--------------------------|-------------|
| THR | 30 % |
| THRUST LEVERS | FLX or TOGA |
| DIRECTIONAL CONTROL | USE RUDDER |
| CHRONO | START |
| PFD/ND | SCAN |
| TAKEOFF THRUST | CHECK |
| REACHING 80 KNOTS | |

At the bottom left of the main panel, there are two radio buttons: 'Path' (selected) and 'Tree'.



To return to the previous documentary unit, click on the button, or click on the FUNCTIONS button and select PREVIOUS.

Note: Some hyperlinks in the drop-down lists are not active. When the flight crew selects a hyperlink in the drop-down list that is not active, an Error message appears, as illustrated below. Click on OK to continue.

"What If" Error Message



HOW TO CLOSE THE OPS LIBRARY

Applicable to: ALL

To close the OPS LIBRARY, click on the FUNCTIONS button and select CLOSE APPLICATION.

HOW TO EXIT THE OIS SESSION

Applicable to: ALL

There are two ways to exit the current session and return to the Login page:

- Return to the FLT OPS MENU page and click on the EXIT SESSION button, or
- Click on the MENU button and select EXIT SESSION.

Note: The flight crew cannot exit the OIS session when the FLT FOLDER application is open.



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Intentionally left blank



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How to Use Performance Applications

HOW TO START PERFORMANCE APPLICATIONS

Applicable to: ALL

Note: The flight crew cannot start performance applications if all mandatory fields of the FLT OPS STS page are not completed.

TAKEOFF PERFORMANCE APPLICATION

To start the Takeoff performance application:

- Click on the MENU button and select T.O PERF, or
- On the FLT OPS MENU page, click on the T.O PERF button.

Refer to *PER-TOF-TOI T.O PERF Interface*.

LANDING PERFORMANCE APPLICATION

To start the Landing performance application:

- Click on the MENU button and select LDG PERF, or
- On the FLT OPS MENU page, click on the LDG PERF button.

Refer to *PER-LND-LDI LDG PERF Interface*.

LOADSHEET APPLICATION

To start the Loadsheets performance application:

- Click on the MENU button and select LOADSHEET, or
- On the FLT OPS MENU page, click on the LOADSHEET button.

Refer to *PER-LOD-GEN Loadsheet Application*.

IN-FLIGHT PERFORMANCE APPLICATION

To start the In-flight performance application:

- Click on the MENU button and select IN-FLT PERF, or
- On the FLT OPS MENU page, click on the IN-FLT PERF button.

Refer to *PER-OPD-GEN IN-FLT PERF Application - ATMO Module*.

HOW TO CLOSE PERFORMANCE APPLICATIONS

Applicable to: ALL

To close a performance application, click on the FUNCTIONS button and select CLOSE APPLICATION.



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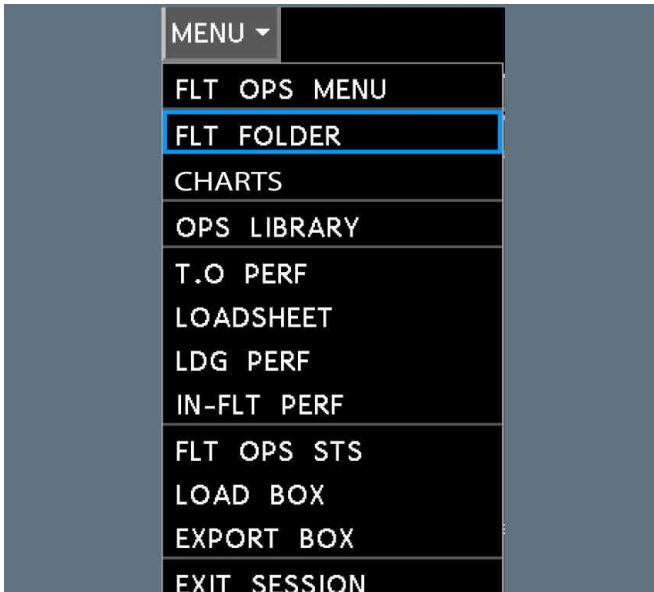
OIS - ONBOARD INFORMATION SYSTEM - HOW TO

How to Use the FLT FOLDER

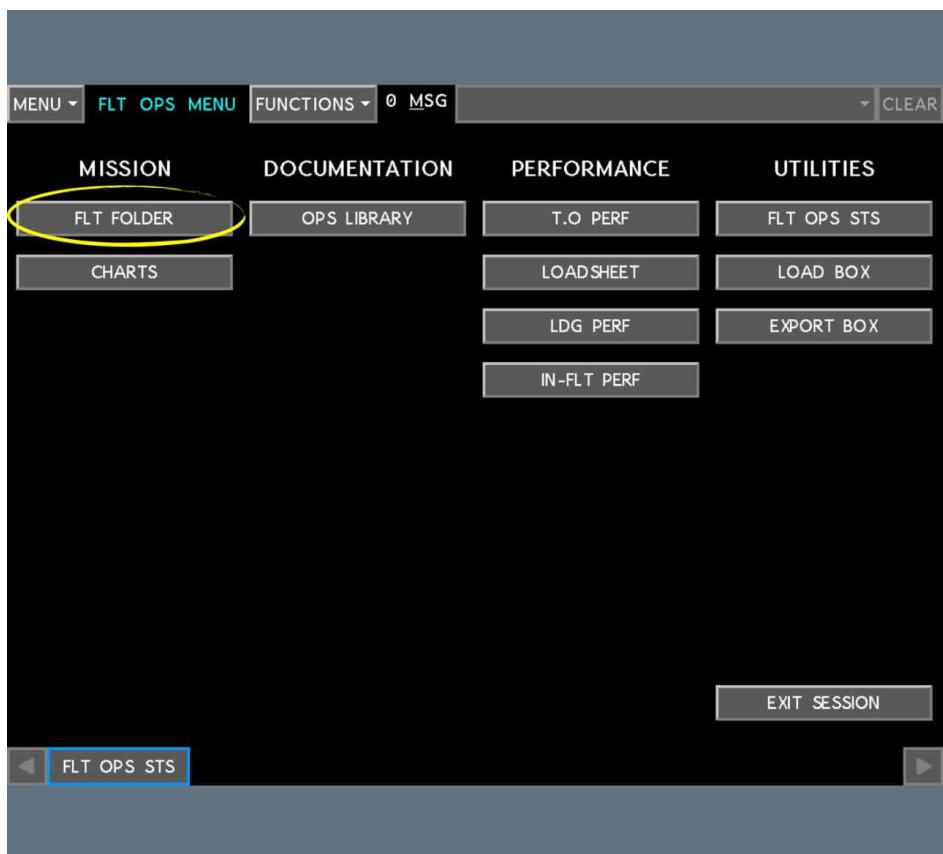
HOW TO START THE FLT FOLDER**Applicable to: ALL**

To start the FLT FOLDER application:

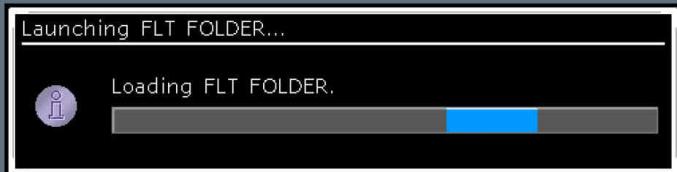
- Click on the MENU button and select FLT FOLDER, or

MENU Drop-down List

- On the FLT OPS MENU page, click on the FLT FOLDER button.

FLT OPS MENU Page

[2] Note: The **FLT FOLDER** application takes about 50 s to start. During start, the following popup appears.



HOW TO ACCESS AN EFF

Applicable to: ALL

GENERAL

An EFF, or an EFF update, is prepared on ground by airline operations.

The transfer of the EFF to the aircraft is done via a USB key or via communication means (gatelink or SATCOM).

There are three steps to access an EFF or an EFF update in the **FLT FOLDER** application:

1. The flight crew loads the EFF or the EFF update by using the **LOAD BOX**.

Note: As the **LOAD BOX** loads the **EFF** or **EFF updates** on all connected laptops, the flight crew needs to load the **EFF** or the **EFF update** on one laptop only.

2. The EFF or the EFF update is imported into each flight crewmember's **FLT FOLDER** application.

3. Each flight crewmember selects the EFF to open in the EFF list.

LOAD AN EFF VIA A USB DEVICE

To load an EFF via a USB device:

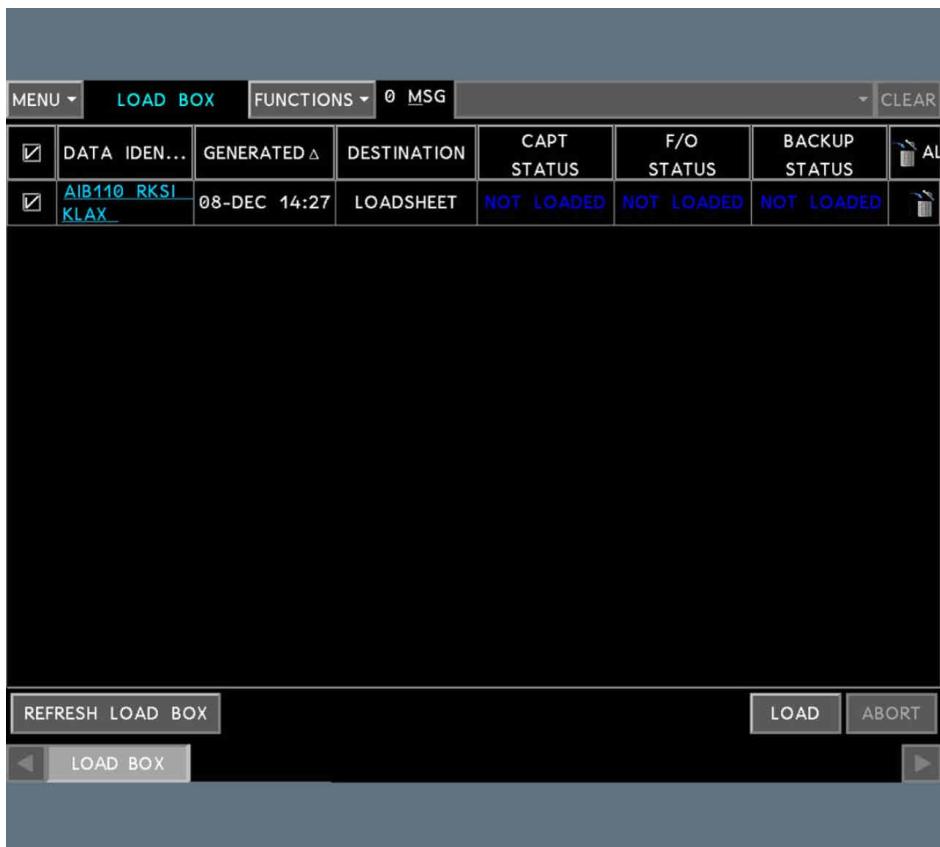
1. Plug the USB device into one of the available USB ports of the laptop.
2. Click on the **MENU** button, and select **LOAD BOX** to open the **LOAD BOX**.

The **LOAD BOX** automatically detects new data to load, and adds this data to the list of data to load.

Note: If the flight crewmember plugs the USB device after having opened the LOAD BOX, the flight crewmember should click on the REFRESH LOAD BOX button to display the content of the USB device.

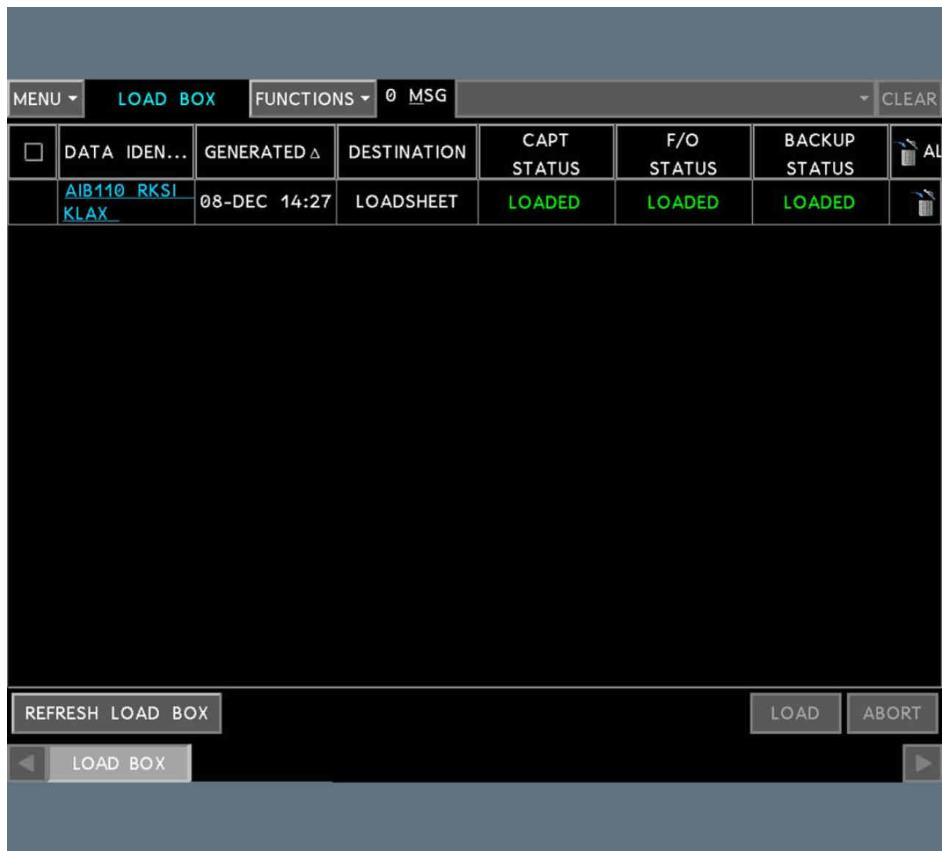
3. Select the EFF to load.

EFF to load



4. Click on the LOAD button to start the loading process.

When the loading process is completed, "LOADED" appears in the STATUS column for each laptop that is connected to the network.

EFF loaded

Note: If the loading process fails on one laptop, "FAULT" appears in the associated STATUS column. This indicates that the loading process has not been successful on this laptop. In this case, select again the EFF and restart the data loading process by clicking on the LOAD button.

5. Unplug the USB device.

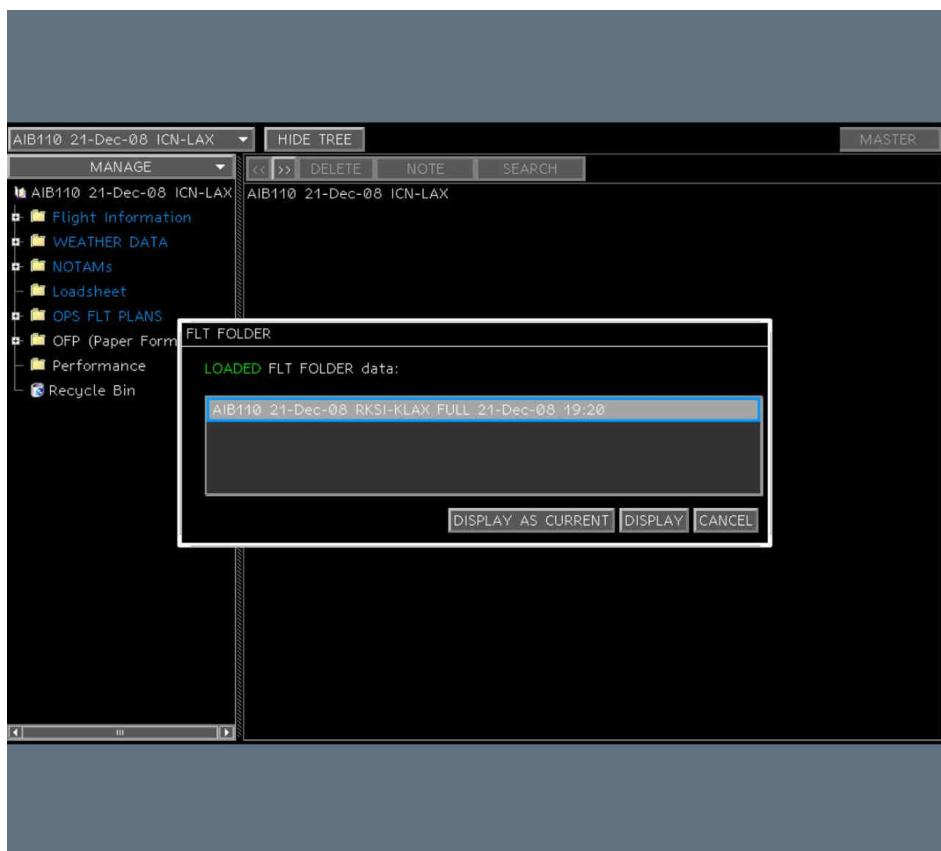
IMPORT AND OPEN THE EFF

1. Start the FLT FOLDER application.

When a flight crewmember starts the FLT FOLDER application, or sets the FLT FOLDER application in foreground, the application automatically imports the EFF that the flight crew loaded from the LOAD BOX.

A pop-up appears, and displays all the EFFs that have been loaded.

Import EFF



2. Select on the pop-up the EFF to use.
3. Click on the DISPLAY AS CURRENT button to display the selected EFF, and promote it as the current one, or click on the DISPLAY button to only display the EFF.

Note: *The current EFF is the EFF corresponding to the flight.*

When a flight crewmember promoted the selected EFF as current, the FLT FOLDER applications synchronizes between the Captain's laptop and the First Officer's laptop. The other flight crewmember does not need to promote the EFF as current.

HOW TO SIGN A DOCUMENT

Applicable to: ALL

SIGN A DOCUMENT

To sign a document that is displayed, click on the SIGN button on the top right hand corner of the document window.

The FLT FOLDER application flags the document as signed. The SIGNED button appears on the top right hand corner of the document window, instead of the SIGN button.

For more information, *Refer to DSC-46-20-20-110 Document Window*.

REMOVE THE SIGNED FLAG TO A SIGNED DOCUMENT

To remove the signed flag to a document that the flight crew already signed, click on the SIGNED button on the top right hand corner of the document window.

The FLT FOLDER applications unflags the document. The SIGN button appears on the top right hand corner of the document window, instead of the SIGNED button.

HOW TO CHECK A DOCUMENT

Applicable to: ALL

TO CHECK A DOCUMENT

To check the documents that is displayed, click on the CHECK button on the top right hand corner of the document window.

The FLT FOLDER application flags the document as checked. The CHECKED button appears on the top right hand corner of the document window, instead of the CHECK button.

For more information, *Refer to DSC-46-20-20-110 Document Window*.

REMOVE THE CHECKED FLAG TO A CHECKED DOCUMENT

To remove the checked flag to a document that the flight crew already checked, click on the CHECKED button on the top right hand corner of the document window.

The FLT FOLDER applications unflags the document. The CHECK button appears on the top right hand corner of the document window, instead of the CHECKED button.

HOW TO USE NOTES

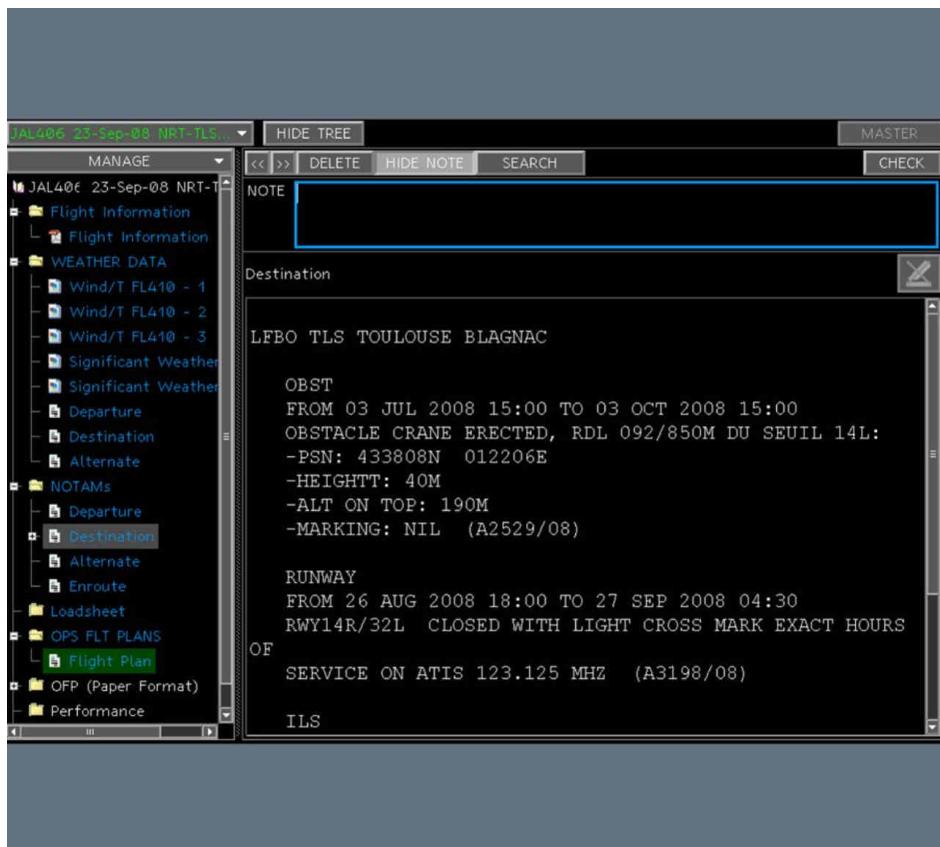
Applicable to: ALL

CREATE A NOTE

To add a note to a document:

1. Select the document to add a note to, then click on the NOTE button.

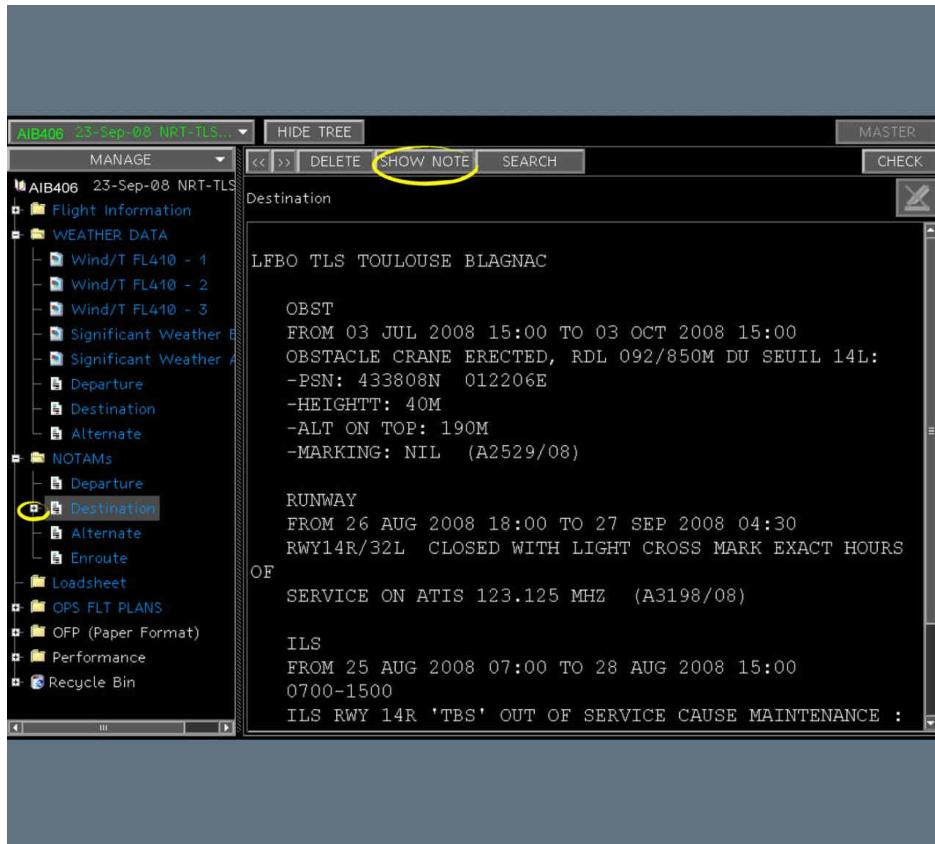
- [L2] A note box appears on top of the document window. The document content display is resized.

Document with Note Box

- [L1] 2. Type the content of the note.
 3. Press the ENTER key on the keyboard to save the note.
- [L2] The note box disappears.

L1

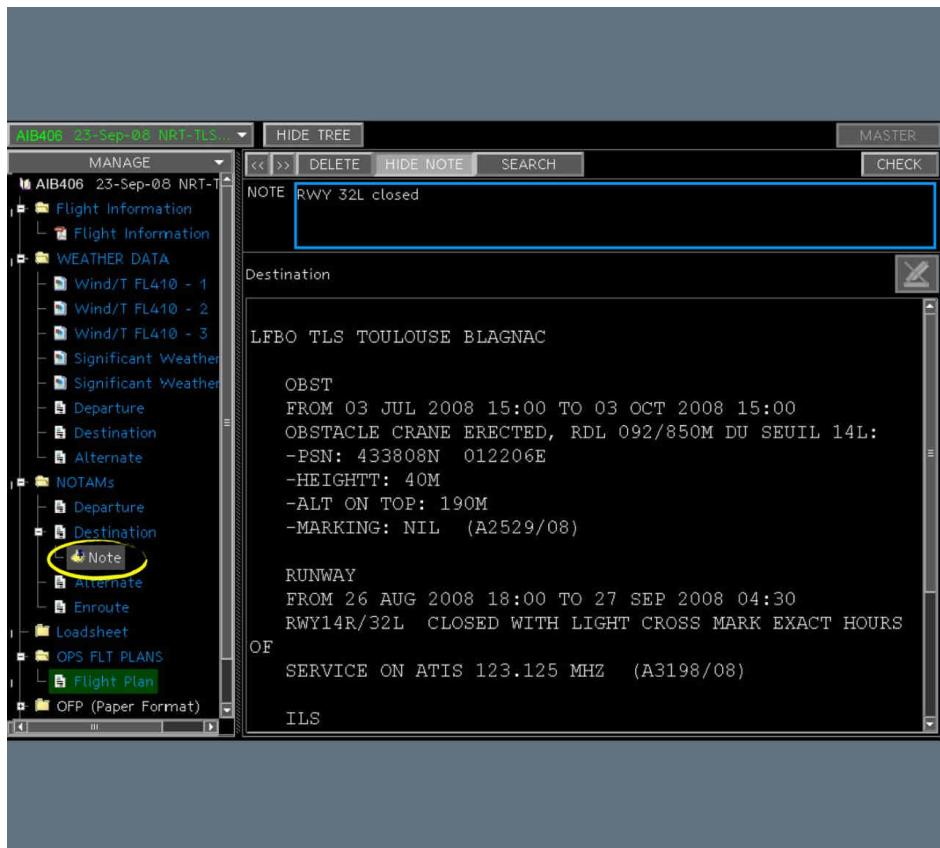
In the navigation tree, the icon appears in front of the document name, and the SHOW NOTE button appears in the FLT OPS MENU, instead of the NOTE button. This indicates that a note is attached to the document.

Document with a Note

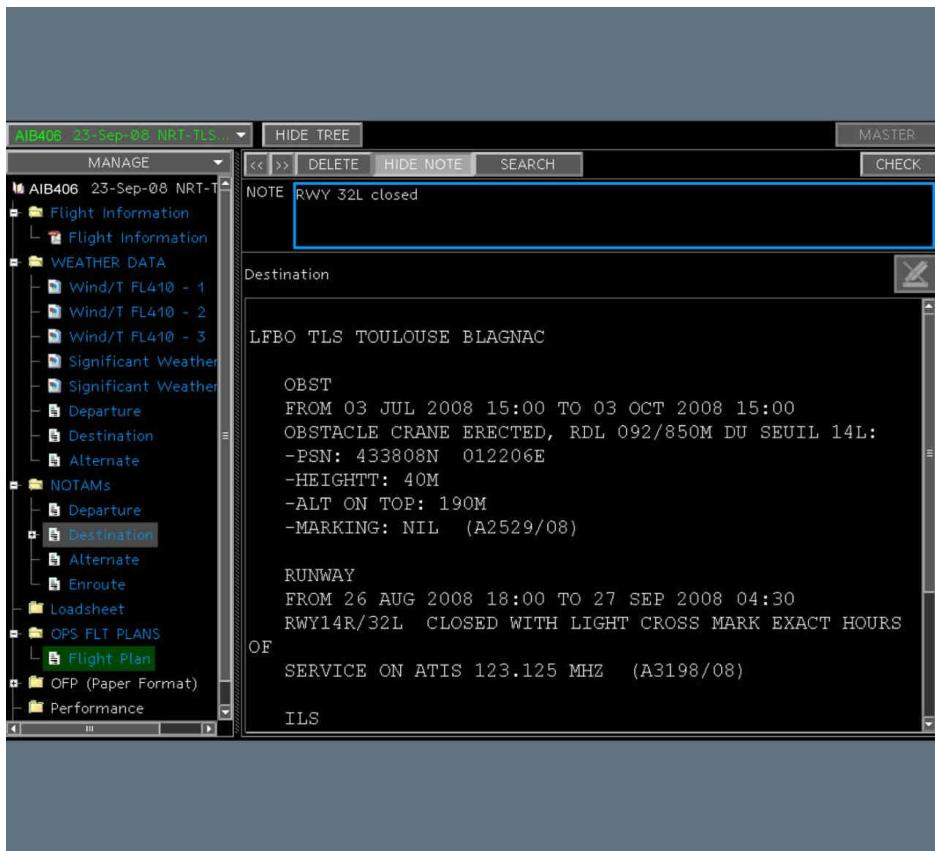
DISPLAY A NOTE

There are two ways to display a note that is attached to a document:

- Click on the note in the navigation tree
- L2 The note box appears.

Note in the Navigation Tree

- L1 - Select in the navigation tree the document the note is attached to, then click on the NOTE button.
- L2 The note box appears.

Document with the Note Displayed

- [L1] To close the note box at any time, click on the HIDE NOTE button.

CHANGE OR DELETE A NOTE

To change the content of a note:

1. Display the note.
2. Change the content of the note.
3. Press the ENTER key on the keyboard.

- [L2] The note box disappears.

- [L1] To delete a note:
1. Display the note.
 2. Remove the text in the note box, then press the ENTER key on the keyboard.



The  icon disappears in the navigation tree.

- [L2] The note box disappears, and the NOTE button appears in the FLT OPS Menu.

HOW TO USE WORD SEARCH

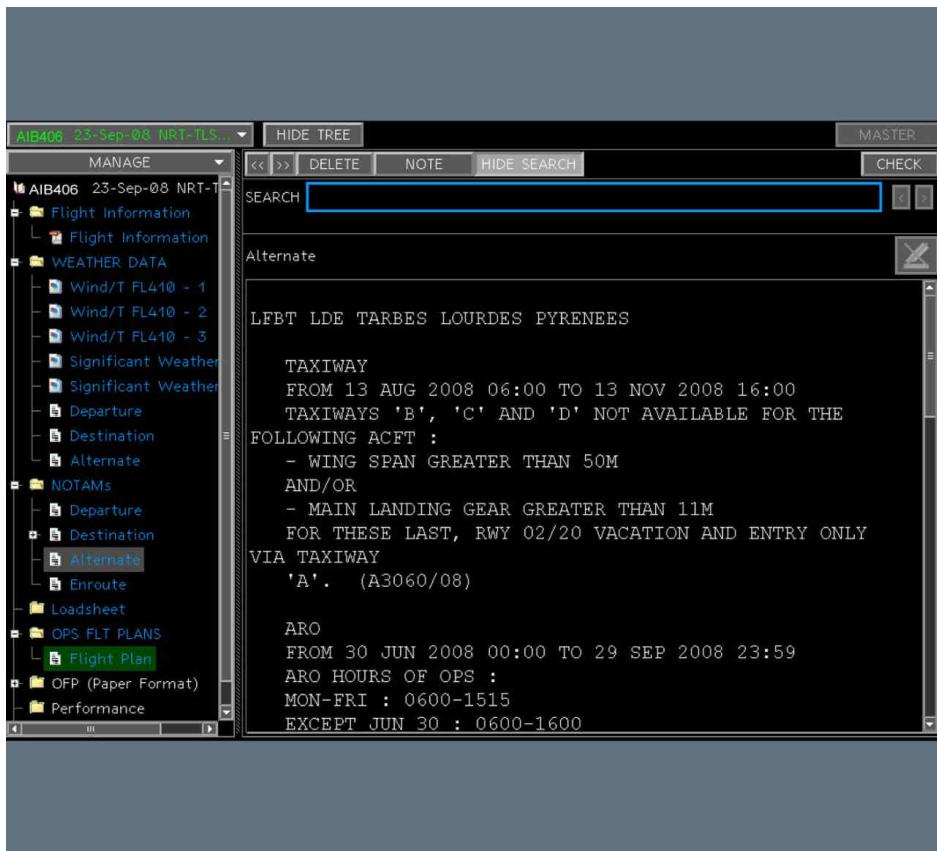
Applicable to: ALL

It is possible to search for one or more words in text documents.

To search for text in a document:

1. Select the document to search in.
2. Click on the SEARCH button in the FLT OPS menu.

- [L2] A search box appears at the top of the document window. The display of the document content is resized.

Document - Search Box

- [L1] 3. Enter the words to search for in the WORD entry field.
- [L2] The search engine searches for document containing each word of the search string.
- [L1] 4. Press the ENTER key on the keyboard to initiate the search.
- [L2] The cursor jumps to the first word that matches one of the words searched for.
The number of occurrences appears in the search box.

Document - Search Result

The screenshot shows a software interface for managing flight operations. On the left is a tree view of flight information, including sections like Flight Information, WEATHER DATA, NOTAMs, OPS FLT PLANS, and Performance. The OPS FLT PLANS section is expanded, showing Flight Plan, OFP (Paper Format), and Performance. In the center, there's a search bar with the word "taxiway" entered, and below it, a message stating "3 occurrences found". The main pane displays two sets of text results. The first set is for an alternate route from LFBT to LDE via TARBES LOURDES PYRENEES, mentioning a restriction on TAXIWAYS 'B', 'C' and 'D'. The second set is for ARO (Actual Release On Time) hours, from 30 JUN 2008 to 29 SEP 2008, with specific times for Monday through Friday and an exception for June 30.

LFBT LDE TARBES LOURDES PYRENEES

TAXIWAY
FROM 13 AUG 2008 06:00 TO 13 NOV 2008 16:00
TAXIWAYS 'B', 'C' AND 'D' NOT AVAILABLE FOR THE
FOLLOWING ACFT :
- WING SPAN GREATER THAN 50M
AND/OR
- MAIN LANDING GEAR GREATER THAN 11M
FOR THESE LAST, RWY 02/20 VACATION AND ENTRY ONLY
VIA TAXIWAY
'A'. (A3060/08)

ARO
FROM 30 JUN 2008 00:00 TO 29 SEP 2008 23:59
ARO HOURS OF OPS :
MON-FRI : 0600-1515
EXCEPT JUN 30 : 0600-1600

[1] 5.



Click on the and buttons in the search box to find a previous or following match.

To close the search box, click on the HIDE SEARCH button in the FLT OPS menu.



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AIRCRAFT SYSTEMS

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HOW TO USE A FLIGHT PLAN

Applicable to: ALL

GENERAL

A flight plan document can be composed of multiple panels:

- One panel with data for FMS initialization (FMS INIT panel)
- One panel with flight information (FLT INFO panel)
- One panel with alternate airports information (ALTN panel)
- One or more panels with a navigation log, that enables the flight crew to perform the flight follow up (NAV LOG panels)
- One panel for flight reporting (FLT REPORT panel).

The operator can customize the flight plan.

The operator can define additional information in relation to the entry fields. Those information appear when the cursor moves over the associated entry field.



The Operator can define a range associated with some of the parameters. If the parameter exceeds the defined range, it appears in amber.

Operational Flight Plan

| FMS INIT | FUEL & LOAD | ALTN | NAV LOG 1 | NAV LOG 2 | FLT REPORT | | | | |
|--------------------------------|-------------|-------|-----------|-----------|------------|-------|-----|---|-----|
| WPT | DIRTO | ET | ETA | AT | EFOB | ΔFOB | EFU | FUEL | CHK |
| AWY | MORA | CT | ATA | RETA | AFOB | ΔFUEL | AFU | | |
| <input type="checkbox"/> EDDF | ▼ | 00:00 | | | 22.0 | 0.0 | | | |
| | | 00:00 | 13:37 | | | | | | |
| <input type="checkbox"/> ANEKI | ▼ | 00:16 | 13:54 | 00:16 | 19.0 | 0.9 | 2.0 | <input checked="" type="checkbox"/> CHECKED | |
| | ANEK6G | 55 | 00:16 | 13:54 | 19.9 | 0.0 | 2.9 | | |
| <input type="checkbox"/> BADLI | ▼ | 00:02 | 13:57 | 00:02 | 19.0 | -1.9 | 3.0 | <input type="checkbox"/> FUEL | CHK |
| | Y163 | 55 | 00:19 | 13:57 | 13:57 | 19.4 | 0.0 | 3.4 | |
| <input type="checkbox"/> PABLA | ▼ | 00:04 | 14:01 | | 18.0 | | 4.0 | | |
| | Y163 | 59 | 00:23 | | 14:01 | | | | |
| <input type="checkbox"/> HERBI | ▼ | 00:04 | 14:05 | | 17.0 | | 5.0 | | |
| | Y163 | 59 | 00:27 | | 14:05 | | | | |
| <input type="checkbox"/> MOPAN | ▼ | 00:04 | 14:09 | | 16.0 | | 5.0 | | |
| | Y164 | 119 | 00:31 | | 14:09 | | | | |
| <input type="checkbox"/> TOC | ▼ | 00:04 | 14:13 | | 16.0 | | 6.0 | | |

ACTIVATE A FLIGHT PLAN

An EFF can have various flight plans. However, just like the FMS, only one flight plan can be active.

To active a flight plan, click on the SELECT button.

Flight Plan to Activate

In the navigation tree, the background of the document title changes to green, and the SELECTED button appears, instead of the SELECT button.

Flight Plan Activated**FMS INIT PANEL**

The FMS INIT panel displays information that is necessary for the flight crew to initialize the FMS.

FMS INIT Panel

The screenshot shows the FMS INIT panel with the following data:

General

OIS VERSION V3.0 17-NOV-08
A/C REG. FWWOW

Initialization Data :

| | | | |
|-----------|--------|----------|-------|
| FLT NBR | AIB380 | | |
| FROM | LFBO | TO | LFSB |
| CPNY RTE | TLSMLH | ALTN | LFBO |
| ETD | 08:50 | NM | 479 |
| CRZ FL | 350 | CRZ TEMP | M051 |
| CI | 112 | AVG DISA | -3 |
| TRIP WIND | M028 | TROPO | 30600 |

Flight Plan

LFBO MEN5A MEN UN871 KONOL Z59 LUMEL LUME8K LFSB

FLT INFO PANEL

The FLT INFO panel displays the time, fuel and weights predictions for the flight. This panel has editable fields, that enable the flight crew to enter the actual information (fuel, times, weights).

FLT INFO Panel

The screenshot displays the AIRBUS Onboard Information System (OIS) interface, specifically the Flight Information (FLT INFO) panel. At the top, there are buttons for FMS INIT, FLT INFO (which is selected), ALTN, NAV LOG 1, NAV LOG 2, and FLT REPORT. Below this, the flight plan details are shown:

| | | | | |
|--------|------|---------------------|----------------|-------|
| PLAN | 9387 | COMPUTED 2009-01-31 | | |
| 80842T | A388 | M85 | ETD 22/10/2008 | 15:00 |

Flight details:

| | | | | | | | | |
|--------|------|------|--------|-----|--------|--------|----------|----------|
| FLT | DEP | ARR | F.TIME | NM | ROUTE | SID | Avg Wind | Avg Temp |
| AIB380 | CDG | NCE | 01:13 | 485 | CDGNCE | LATR1B | M004 | M049 |
| | LFPG | LFMN | | | | | | |

Fuel consumption table:

| FUEL | Estimate | Update | E.Time | NAM | II | LOAD | Estimate | Update | Max Struct |
|--------------|----------|--------|--------|-----|----|-----------|----------|--------|------------|
| TRIP LFMN | 14.1 | 14.4 | 01:13 | 490 | II | DOW | 300.0 | | |
| RTE RSV 0.05 | 0.7 | 0.8 | 00:04 | | II | PLD | 52.0 | | |
| ETOPS | | | | | II | ZFW | 352.0 | | 366.0 |
| ALTN LFML | 5.4 | 6.0 | 00:22 | 101 | II | TOF | 25.3 | 34.0 | |
| FINAL | 5.2 | 5.4 | 00:30 | | II | TOW | 377.3 | 386.0 | 569.0 |
| ADDNL | | 1.0 | | | II | EBO | 14.1 | 14.4 | |
| XTR | | 6.4 | | | II | LW | 363.3 | 363.0 | 391.0 |
| TOF | 25.3 | 34.0 | | | II | | | | |
| TAXI | 0.8 | 1.0 | | | II | TRPT COFF | | 1.029 | |

ALTN PANEL

The ALTN panel provides the flight crew with the information to perform the flight from the destination airport to the alternate airports, in the case of diversion.

ALTN Panel

| ALTN | NAM | NM | FL | TIME | FUEL | Update |
|------|-----|-----|-----|-------|------|--------|
| LFML | 101 | 100 | 180 | 00:22 | 5.4 | 6.0 |

NAV LOG PANEL

The NAV LOG panel (Flight Follow-Up) provides a means to log the flight progress (i.e. fuel and time checks).

It is an interactive tabular representation of the flight plan with value labels and entry fields. If the flight crew wants to change the flight plan, the NAV LOG panel provides several functions that enable the flight crew to record the required information on the flight plan.

NAV LOG Panel


The screenshot shows the NAV LOG Panel interface. At the top, there is a menu bar with options like MENU, FLT FOLDER, FUNCTIONS, and a message counter (0 MSG). Below the menu is a toolbar with buttons for NOTE, DELETE, SEARCH, SELECTED, SIGN, and FLOWN WPT. The main area displays an Operational Flight Plan with several waypoints listed in a table. The table columns include WPT, DIRTO, ET, ETA, AT, EFOB, ΔFOB, EFU, FUEL, and CHK. The FUEL column contains values such as 0.0, 0.9, 2.0, etc. The last row, which includes waypoints Y163 and TOC, is highlighted with a yellow border. A cursor is shown clicking the FLOWN WPT button in the toolbar.

| WPT | DIRTO | ET | ETA | AT | EFOB | ΔFOB | EFU | FUEL | CHK |
|--------|-------|-------|-------|-------|------|-------|-----|---|-----|
| AWY | MORA | CT | ATA | RETA | AFOB | ΔFUEL | AFU | | |
| EDDF | ▼ | 00:00 | | | 22.0 | | | 0.0 | |
| | | 00:00 | 13:37 | | | | | | |
| ANEKI | ▼ | 00:16 | 13:54 | 00:16 | 19.0 | 0.9 | 2.0 | <input checked="" type="checkbox"/> CHECKED | |
| ANEK6G | 55 | 00:16 | 13:54 | | 19.9 | 0.0 | 2.9 | | |
| BADLI | ▼ | 00:02 | 13:57 | 00:02 | 19.0 | 0.4 | 3.0 | <input type="checkbox"/> FUEL | CHK |
| Y163 | 55 | 00:19 | 13:57 | 13:57 | 19.4 | 0.0 | 3.4 | | |
| PABLA | ▼ | 00:04 | 14:01 | | 18.0 | | 4.0 | | |
| Y163 | 59 | 00:23 | | 14:01 | | | | | |
| HERBI | ▼ | 00:04 | 14:05 | | 17.0 | | 5.0 | | |
| Y163 | 59 | 00:27 | | 14:05 | | | | | |
| MOPAN | ▼ | 00:04 | 14:09 | | 16.0 | | 5.0 | | |
| Y164 | 119 | 00:31 | | 14:09 | | | | | |
| TOC | ▼ | 00:04 | 14:13 | | 16.0 | | 6.0 | | |

When the flight crew navigates through the flight plan, they can display the flown waypoint by clicking on the FLOWN WPT button.

GET THE MASTER STATUS

To be able to fill in or modify the flight plan on the NAV LOG panel, the flight crewmember who performs the flight follow up must have the master status.

To get the master status, click on the GET MASTER button.

In this case, the flight plan in the EFF of the other flight crewmember is in read-only.

Note: Only one flight crewmember can have the master status for an EFF.

INSERT A NEW WAYPOINT FROM A WAYPOINT IN THE FLIGHT PLAN

The air traffic controller can permit the flight crew to perform a direct to a next waypoint, from an initial waypoint.

To record the new clearance in the flight plan on the NAV LOG panel:

1. Click on the arrow on the right of the initial waypoint.

Insert Next Waypoint from Initial Waypoint

| | WPT AWY | DIRTO MORA | ET CT | ETA ATA | AT RETA | EFOB AFOB | ΔFOB ΔFUEL | EFU AFU | FUEL CHK |
|-------|------------|---------------|--|----------------------------------|----------------------------------|----------------------------|--------------------------|-----------------------------------|---|
| EDDF | ▼ | | 00:00 00:00 | | 22.0 13:37 | | | 0.0 | |
| ANEKI | ▼ | [] | 00:16 00:16 | 13:54 13:54 | 00:16 13:54 | 19.0 19.9 | 0.9 0.0 | 2.0 2.9 | <input checked="" type="checkbox"/> CHECKED |
| BADLI | ▼ | [] | 00:02 00:19 RESTORE CLEARANCE OR NOTE | 13:57 13:57 14:01 14:01 | 00:02 13:57 13:57 14:01 | 19.0 19.4 0.4 0.0 | 3.0 3.4 0.0 3.4 | <input type="checkbox"/> FUEL CHK | |
| HERBI | ▼ | [] | 00:04 00:27 | 14:05 14:05 | | 17.0 | | 5.0 | |
| MOPAN | ▼ | [] | 00:04 00:31 | 14:09 14:09 | | 16.0 | | 5.0 | |
| TOC | ▼ | [] | 00:04 | 14:13 | | 16.0 | | 6.0 | |

2. On the drop-down list, select NEXT WPT.

The following pop-up appears.

Next Waypoint - Drop down List

On the pop-up, the drop-down list enables the flight crew to select a waypoint from the flight plan.

3. Choose the next waypoint on the drop-down list, or enter the name of the next waypoint, if it does not belong to the flight plan.

Next Waypoint Selected

4. Click on the OK button.

- If the next waypoint belongs to the flight plan, all the waypoints between the initial waypoint and the next waypoint are greyed. The next waypoint appears in the DIRTO field of the initial waypoint.

Next Waypoint from the Flight Plan


| FMS INIT | | FUEL & LOAD | | ALTN | | NAV LOG 1 | | NAV LOG 2 | | FLT REPORT | |
|--------------------------------|--------|-------------|-------|-------|------|-----------|-----|---|-----|------------|--|
| WPT | DIRTO | ET | ETA | AT | EFOB | ΔFOB | EFU | FUEL | CHK | | |
| AWY | MORA | CT | ATA | RETA | AFOB | ΔFUEL | AFU | | | | |
| <input type="checkbox"/> EDDF | ▼ | 00:00 | | | 22.0 | | | 0.0 | | | |
| | | 00:00 | 13:37 | | | | | | | | |
| <input type="checkbox"/> ANEKI | ▼ | 00:16 | 13:54 | 00:16 | 19.0 | 0.9 | 2.0 | <input checked="" type="checkbox"/> CHECKED | | | |
| | ANEK6G | 55 | 00:16 | 13:54 | 19.9 | 0.0 | 2.9 | | | | |
| <input type="checkbox"/> BADLI | ▼ | 00:02 | 13:57 | 00:02 | 19.0 | 0.4 | 3.0 | <input type="checkbox"/> FUEL | CHK | | |
| Y163 | 55 | 00:19 | 13:57 | 13:57 | 19.4 | 0.0 | 3.4 | | | | |
| <input type="checkbox"/> PABLA | ▼ | 00:04 | 14:01 | | 18.0 | | | 4.0 | | | |
| Y163 | 59 | 00:23 | | 14:01 | | | | | | | |
| <input type="checkbox"/> HERBI | ▼ | 00:04 | 14:05 | | 17.0 | | | 5.0 | | | |
| Y163 | 59 | 00:27 | | 14:05 | | | | | | | |
| <input type="checkbox"/> MOPAN | ▼ | 00:04 | 14:09 | | 16.0 | | | 5.0 | | | |
| Y164 | 119 | 00:31 | | 14:09 | | | | | | | |
| <input type="checkbox"/> TOC | ▼ | 00:04 | 14:13 | | 16.0 | | | 6.0 | | | |

- If the next waypoint does not belong to the flight plan, the next waypoint appears on the flight plan just after the initial waypoint.

Next Waypoint Outside the Flight Plan

The screenshot shows the 'Operational Flight Plan' screen. At the top, there are menu options: MENU, FLT FOLDER, FUNCTIONS, and a message area showing 0 MSG. Below the menu is a toolbar with buttons for NOTE, DELETE, SEARCH, SELECTED, SIGN, FLOWN, and WPT. The main area is titled 'Operational Flight Plan' and contains a table of waypoints. The columns are labeled: WPT, DIRTO, ET, ETA, AT, EFOB, ΔFOB, EFU, FUEL, and CHK. The rows represent waypoints: EDDF, ANEKI, ANEK6G, BADLI, WPT3, PABLA, HERBI, and MOPAN. The fourth row, BADLI, is highlighted with a yellow border. The data for BADLI is as follows:

| WPT | DIRTO | ET | ETA | AT | EFOB | ΔFOB | EFU | FUEL | CHK |
|--------------------------------|--------|-------|-------|-------|-------|-------|-----|---|-----|
| AWY | MORA | CT | ATA | RETA | AFOB | ΔFUEL | AFU | | |
| <input type="checkbox"/> EDDF | ▼ | 00:00 | | | 22.0 | | 0.0 | | |
| | | 00:00 | 13:37 | | | | | | |
| <input type="checkbox"/> ANEKI | ▼ | 00:16 | 13:54 | 00:16 | 19.0 | 0.9 | 2.0 | <input checked="" type="checkbox"/> CHECKED | |
| | ANEK6G | 55 | 00:16 | 13:54 | | 19.9 | 0.0 | 2.9 | |
| <input type="checkbox"/> BADLI | ▼ | 00:02 | 13:57 | 00:02 | 19.0 | 0.4 | 3.0 | <input type="checkbox"/> FUEL CHK | |
| | Y163 | 55 | 00:19 | 13:57 | 13:57 | 19.4 | 0.0 | 3.4 | |
| <input type="checkbox"/> WPT3 | ▼ | | | | | | | | |
| <input type="checkbox"/> PABLA | ▼ | 00:04 | 14:01 | | 18.0 | | 4.0 | | |
| | Y163 | 59 | 00:23 | | 14:01 | | | | |
| <input type="checkbox"/> HERBI | ▼ | 00:04 | 14:05 | | 17.0 | | 5.0 | | |
| | Y163 | 59 | 00:27 | | 14:05 | | | | |
| <input type="checkbox"/> MOPAN | ▼ | 00:04 | 14:09 | | 16.0 | | 5.0 | | |

REMOVE AN INSERTED WAYPOINT FROM THE FLIGHT PLAN

To remove a waypoint, that the flight crew inserted in the flight plan:

1. Click on the arrow on the right of the waypoint to remove.

Waypoint to Remove

The screenshot shows the OIS interface with the following details:

- Top Bar:** MENU, FLT FOLDER, FUNCTIONS, 0 MSG, CLEAR.
- Buttons:** <<, >>, NOTE, DELETE, SEARCH, SELECTED, SIGN, FLOWN, WPT.
- Section Header:** Operational Flight Plan.
- Table Headers:** FMS INIT, FUEL & LOAD, ALTN, NAV LOG 1, NAV LOG 2, FLT REPORT.
- Table Columns:** WPT, DIRTO, ET, ETA, AT, EFOB, ΔFOB, EFU, FUEL, CHK.
- Table Data:** Rows for EDDF, ANEKI, ANEK6G, BADLI, Y163, WPT3, HERBI, Y163, MOPAN.
- Context Menu (over WPT3):**
 - WPT3
 - NEXT WPT
 - HIDE
 - RESTORE
 - DELETE
 - CLEARANCE OR NOTE

2. In the drop-down list, select DELETE.

The following pop-up appears.

Delete - Pop-up

3. Click on the OK button.

The waypoint is removed from the flight plan.

Waypoint Removed from the Flight Plan

| FMS INIT | FUEL & LOAD | ALTN | NAV LOG 1 | NAV LOG 2 | FLT REPORT | | | | |
|--------------------------------|-------------|-------|-----------|-----------|------------|-------|-----|---|-----|
| WPT | DIRTO | ET | ETA | AT | EFOB | ΔFOB | EFU | FUEL | CHK |
| AWY | MORA | CT | ATA | RETA | AFOB | ΔFUEL | AFU | | |
| <input type="checkbox"/> EDDF | ▼ | 00:00 | | | 22.0 | | 0.0 | | |
| | | 00:00 | 13:37 | | | | | | |
| <input type="checkbox"/> ANEKI | ▼ | 00:16 | 13:54 | 00:16 | 19.0 | 0.9 | 2.0 | <input checked="" type="checkbox"/> CHECKED | |
| | ANEK6G | 55 | 00:16 | 13:54 | 19.9 | 0.0 | 2.9 | | |
| <input type="checkbox"/> BADLI | ▼ | 00:02 | 13:57 | 00:02 | 19.0 | 0.4 | 3.0 | <input type="checkbox"/> FUEL | CHK |
| | Y163 | 55 | 00:19 | 13:57 | 13:57 | 19.4 | 0.0 | 3.4 | |
| <input type="checkbox"/> PABLA | ▼ | 00:04 | 14:01 | | 18.0 | | 4.0 | | |
| | Y163 | 59 | 00:23 | | 14:01 | | | | |
| <input type="checkbox"/> HERBI | ▼ | 00:04 | 14:05 | | 17.0 | | 5.0 | | |
| | Y163 | 59 | 00:27 | | 14:05 | | | | |
| <input type="checkbox"/> MOPAN | ▼ | 00:04 | 14:09 | | 16.0 | | 5.0 | | |
| | Y164 | 119 | 00:31 | | 14:09 | | | | |
| <input type="checkbox"/> TOC | ▼ | 00:04 | 14:15 | | 16.0 | | 6.0 | | |

PERFORM AUTOMATIC FLIGHT FOLLOW-UP (FFU)

The automatic FFU enables the flight crew to collect from the avionics the data that must be recorded on the flight plan for the flight follow-up.

The automatic FFU is performed when the aircraft is in FMS cruise flight phase.

The position of the aircraft is collected by the FLT FOLDER application every minute. When a waypoint from the flight plan is close to the position of the aircraft, the position is collected every 20 s.

To automatic FFU is performed as following:

1. When the distance between the collected position of the aircraft and a waypoint of the flight plan is less than 7 nm, the waypoint is considered as overflow.

On the navigation log, the line of the flown waypoint, the data that comes from avionics, and the data that is associated with the waypoint, appear in a yellow square.

Waypoint to Check



| WPT | | DIRTO | ET | ETA | AT | EFOB | ΔFOB | EFU | FUEL | CHK |
|-------|------|--------|-------|-------|-------|-------|------|-----|---|-----|
| AWY | MORA | CT | ATA | RETA | AFOB | ΔFUEL | AFU | | | |
| EDDF | ▼ | | 00:00 | | | 22.0 | | 0.0 | | |
| | | | 00:00 | 13:37 | | | | | | |
| ANEKI | ▼ | ■■■■■ | 00:16 | 13:54 | 00:16 | 19.0 | 0.9 | 2.0 | <input checked="" type="checkbox"/> CHECKED | |
| | | ANEK6G | 55 | 00:16 | 13:54 | 19.9 | 0.0 | 2.9 | | |
| BADLI | ▼ | ■■■■■ | 00:02 | 13:57 | 00:02 | 19.0 | 0.4 | 3.0 | <input type="checkbox"/> FUEL CHK | |
| | | Y163 | 55 | 00:19 | 13:57 | 13:57 | 19.4 | 0.0 | 3.4 | |
| PABLA | ▼ | ■■■■■ | 00:04 | 14:01 | | 18.0 | | 4.0 | | |
| | | Y163 | 59 | 00:23 | | 14:01 | | | | |
| HERBI | ▼ | ■■■■■ | 00:04 | 14:05 | | 17.0 | | 5.0 | | |
| | | Y163 | 59 | 00:27 | | 14:05 | | | | |
| MOPAN | ▼ | ■■■■■ | 00:04 | 14:09 | | 16.0 | | 5.0 | | |
| | | Y164 | 119 | 00:31 | | 14:09 | | | | |
| TOC | ▼ | ■■■■■ | 00:04 | 14:13 | | 16.0 | | 6.0 | | |

2. To permanently save the data, the flight crew must validate the data.

To validate the data, tick the FUEL CHK box.

3. When the flight crew checked the data, the data coming from the avionics is saved.

Waypoint - Checked

Operational Flight Plan

| FMS INIT | FUEL & LOAD | ALTN | NAV LOG 1 | NAV LOG 2 | FLT REPORT | FUEL | CHK |
|----------------------------------|-------------|-------|-----------|-----------|------------|-------|-----|
| WPT | DIRTO | ET | ETA | AT | EFOB | ΔFOB | EFU |
| AWY | MORA | CT | ATA | RETA | AFOB | ΔFUEL | AFU |
| <input type="checkbox"/> EDDF ▾ | | 00:00 | | | 22.0 | | 0.0 |
| | | 00:00 | 13:37 | | | | |
| <input type="checkbox"/> ANEKI ▾ | | 00:16 | 13:54 | 00:16 | 19.0 | 0.9 | 2.0 |
| | ANEK6G | 55 | 00:16 | 13:54 | 19.9 | 0.0 | 2.9 |
| <input type="checkbox"/> BADLI ▾ | | 00:02 | 13:57 | 00:02 | 19.0 | 0.4 | 3.0 |
| | Y163 | 55 | 00:19 | 13:57 | 13:57 | 19.4 | 0.0 |
| <input type="checkbox"/> PABLA ▾ | | 00:04 | 14:01 | | 18.0 | | 4.0 |
| | Y163 | 59 | 00:23 | | 14:01 | | |
| <input type="checkbox"/> HERBI ▾ | | 00:04 | 14:05 | | 17.0 | | 5.0 |
| | Y163 | 59 | 00:27 | | 14:05 | | |
| <input type="checkbox"/> MOPAN ▾ | | 00:04 | 14:09 | | 16.0 | | 5.0 |
| | Y164 | 119 | 00:31 | | 14:09 | | |
| <input type="checkbox"/> TOC ▾ | | 00:04 | 14:15 | | 16.0 | | 6.0 |

HOW TO PRINT A DOCUMENT

Applicable to: ALL

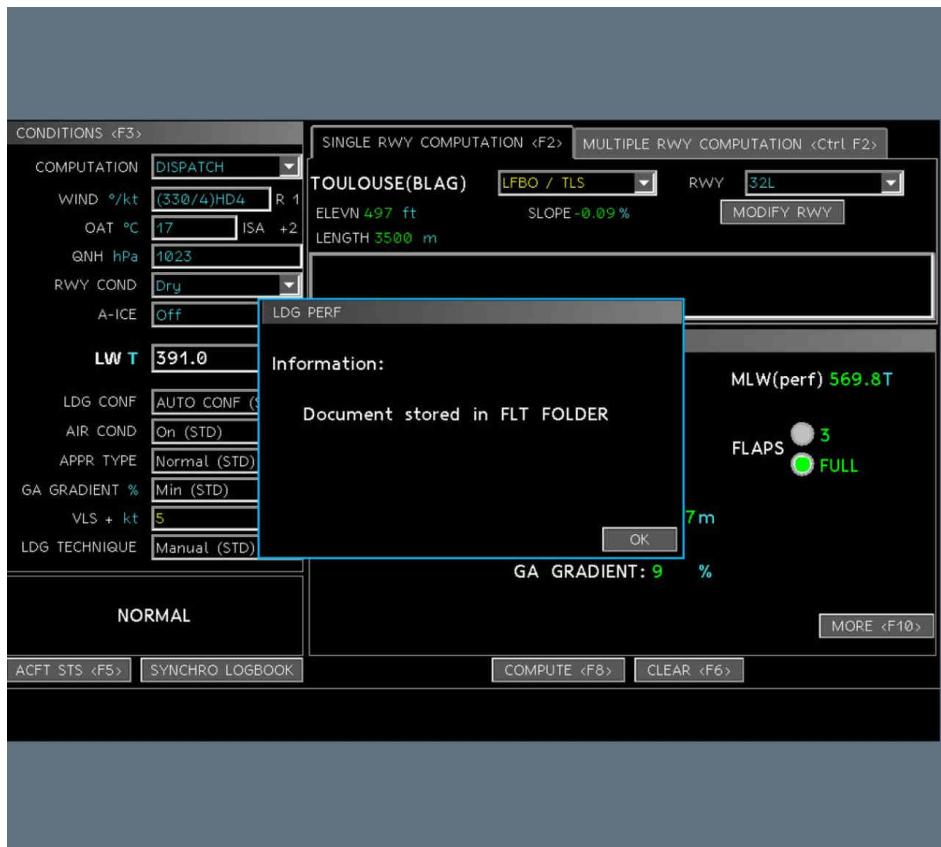
To print a document, select the document to print and click on the PRINT button on the FLT OPS menu.

HOW TO STORE IN AN EFF**Applicable to: ALL**

The flight crew can store, in the current EFF, a snapshot of performance computations. The flight crew performs this computation with one of the performance applications.

To store the result page of a computation in the current EFF:

1. Perform the computation in the performance application.
2. Click on the FUNCTIONS button and select STORE.
3. When the document is stored, the following message appears.

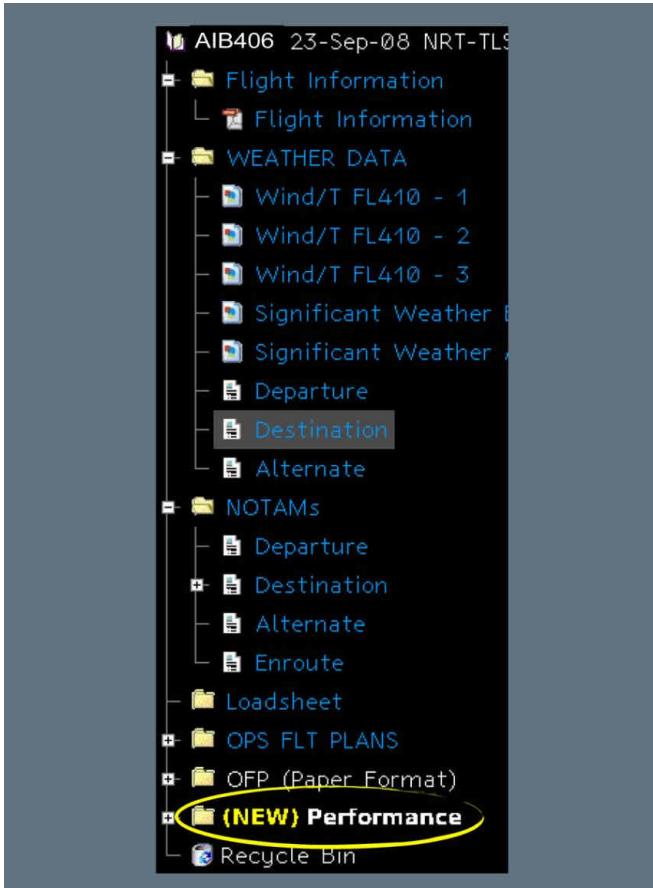
Document Stored Message

Click on the OK button.

4. Display the FLT FOLDER application.

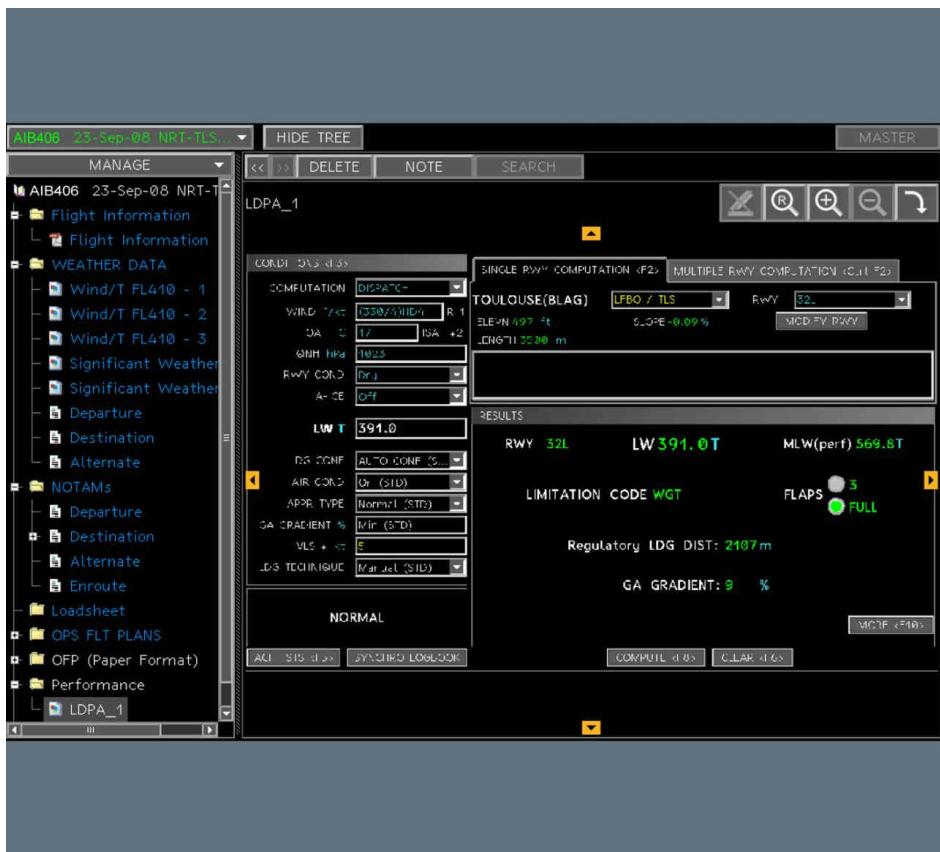
A new document appears in the navigation tree of the current EFF, with the (NEW) symbol.

Navigation Tree



5. Open the folder, and click on the document to display the snapshot.

The name of the document contains the name of the application that the flight crew used to perform the calculation (TOPA, LDPA, IFPA or WBA).

Document Stored in the EFF

HOW TO EXPORT AN EFF**Applicable to: ALL****GENERAL**

The flight crew can export an EFF:

- Before push-back, in order to send a part of the EFF (e.g. loadsheet) to the airline operations center for regulatory or reporting purposes
- After landing, to close the EFF, and send to the airline operations center all the documents that have to be archived.

There are two main steps to export an EFF:

1. The flight crew exports the EFF from the FLT FOLDER application to the EXPORT BOX.
2. In the EXPORT BOX, the flight crew sends the EFF to the ground via a USB key, or via wireless (gatelink or SATCOM).

SEND THE EFF TO THE GROUND VIA A USB DEVICE

1. Plug the USB device into one of the available USB ports in the laptop package.
2. Click on the MANAGE button and select EXPORT FLIGHT FOLDER.

The following page appears.



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Flight Folder Export

The screenshot shows a software interface for exporting flight folder content. At the top, there's a header bar with the flight identifier "AIB110 22-Dec-08 ICN-LAX ...". To the right of the identifier are buttons for "SHOW TREE" and "STANDALONE". Below the header, the text "FLT FOLDER IDENTIFIER: AIB110 22-Dec-08 ICN-LAX" is displayed. A large central area is labeled "No document", indicating that no files have been selected for export. On the left side, under the heading "EXPORT CONTENT:", there are two options: "Before Push Back (CFP)" and "After flight (Full export)". At the bottom right, there are "EXPORT" and "RETURN" buttons.

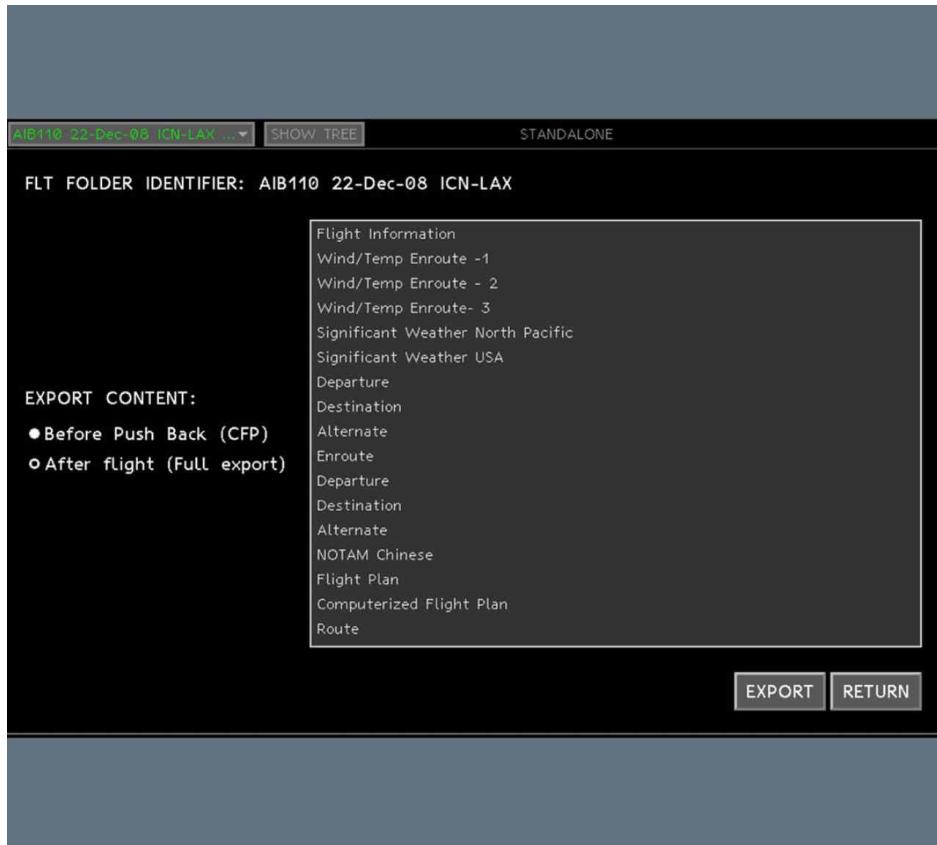
3. Select the type of export to perform:

- Select "Before Push Back" to send a part of the content of the EFF, that has been defined to be exported before the departure of the flight, to the EXPORT BOX

In this case, the EFF status does not change: It remains current. The flight crew can still change the content of the EFF.

- Select "Full Export" to send the whole content of the EFF to the EXPORT BOX, and to change the status of the EFF to closed.

In this case, the flight is closed. The flight crew cannot make any subsequent change to the content of the EFF.

Export Content

4. Click on the EXPORT button.

The EXPORT BOX appears, and displays the EFF that the flight crew exported from the FLT FOLDER.

EXPORT Box with EFF

- L3 The used space on the USB key is indicated at the bottom of the screen.
L1 5. Select USB as destination.

Export - Destination Selected

| GND | USB | DATA IDENTIFIER | DATE | SOURCE | STATUS | ALL |
|-----|-------------------------------------|--|-----------------|------------|----------|-----|
| ■ | <input checked="" type="checkbox"/> | FLT FOLDER AIB110 ICN-LAX 19-DEC-08 | 19-DEC 07:57 | FLT FOLDER | NOT SENT | |

SEND

WIRELESS STATUS: GATELINK NOT AVAIL

USB KEY: 9% FULL

◀ FLT OPS STS ▶ FLT FOLDER EXPORT BOX ▶

6. Click on the SEND button to start the export process.
The EXPORT BOX sends the EFF to the USB key.
When the export process is completed, "SENT" appears in the STATUS column.

Export Completed

The screenshot shows the 'EXPORT BOX' screen of the OIS. At the top, there are menu options: 'MENU', 'EXPORT BOX' (highlighted in blue), 'FUNCTIONS', '0 MSG', and 'CLEAR'. Below this is a table with the following data:

| GND | USB | DATA IDENTIFIER | DATE | SOURCE | STATUS | ALL |
|-----|-----|--|-----------------|------------|-------------------------|-----|
| ■ | ■ | FLT FOLDER AIB110 ICN-LAX 19-DEC-08 | 19-DEC 07:57 | FLT FOLDER | SENT (USB) 19-DEC 08:55 | |

Below the table is a large black area. In the center of this area, there is a 'SEND' button. At the bottom of the screen, there is a navigation bar with buttons for 'FLT OPS STS', 'FLT FOLDER', and 'EXPORT BOX'.

SEND THE EFF TO THE GROUND VIA WIRELESS

1. Click on the MANAGE button and select EXPORT FLIGHT FOLDER.
The following page appears.

Flight Folder Export

AIB110 22-Dec-08 ICN-LAX ... ▾ SHOW TREE STANDALONE

FLT FOLDER IDENTIFIER: AIB110 22-Dec-08 ICN-LAX

No document

EXPORT CONTENT:

- Before Push Back (CFP)
- After flight (Full export)

EXPORT RETURN

2. Select the type of export to perform:

- Select "Before Push Back" to send a part of the content of the EFF, that has been defined to be exported before the departure of the flight, to the EXPORT BOX
In this case, the EFF status does not change: It remains current. The flight crew can still change the content of the EFF.
- Select "Full Export" to send the whole content of the EFF to the EXPORT BOX, and to change the status of the EFF to closed.
In this case, the flight is closed. The flight crew cannot make any subsequent change to the content of the EFF.



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Export Content

AIB110 22-Dec-08 ICN-LAX ... ▾ SHOW TREE STANDALONE

FLT FOLDER IDENTIFIER: AIB110 22-Dec-08 ICN-LAX

EXPORT CONTENT:

- Before Push Back (CFP)
- After flight (Full export)

Flight Information
Wind/Temp Enroute -1
Wind/Temp Enroute - 2
Wind/Temp Enroute- 3
Significant Weather North Pacific
Significant Weather USA
Departure
Destination
Alternate
Enroute
Departure
Destination
Alternate
NOTAM Chinese
Flight Plan
Computerized Flight Plan
Route

EXPORT RETURN

3. Click on the EXPORT button.

The EXPORT BOX appears, and displays the EFF that the flight crew exported from the FLT FOLDER.

EXPORT Box with EFF

The screenshot shows the 'EXPORT Box' screen. At the top, there is a menu bar with 'MENU', 'EXPORT BOX' (highlighted in blue), 'FUNCTIONS', '0 MSG', and a 'CLEAR' button. Below the menu is a table with one row. The columns are labeled 'GND', 'USB', 'DATA IDENTIFIER', 'DATE', 'SOURCE', and 'STATUS'. The first two rows under 'GND' are empty. The third row contains data: '■ ■' under GND, 'FLT FOLDER AIB110 ICN-LAX' under USB, '19-DEC 07:57' under DATE, 'FLT FOLDER' under SOURCE, and 'NOT SENT' under STATUS. There are also 'ALL' and trash bin icons in the last column. Below the table is a large black area. In the center of this area is a 'SEND' button. At the bottom of the screen, there is status information: 'WIRELESS STATUS: GATELINK AVAIL' and 'USB KEY: NO KEY'. At the very bottom, there is a navigation bar with icons for back, forward, and search, followed by buttons for 'FLT OPS STS', 'FLT FOLDER', and 'EXPORT BOX'.

[L2] The gatelink status is indicated at the bottom of the screen.

The SATCOM status is not indicated.

[L1] 4. Select GND as destination.

Export - Destination Selected

The screenshot shows the 'EXPORT BOX' screen of the OIS. At the top, there are buttons for 'MENU', 'EXPORT BOX' (which is highlighted in blue), 'FUNCTIONS', and 'CLEAR'. Below this is a table with columns: GND, USB, DATA IDENTIFIER, DATE, SOURCE, and STATUS. A single row is selected, indicated by a blue border around the first column. The selected row contains: GND (checkbox checked), USB (checkbox unchecked), DATA IDENTIFIER (FLT FOLDER AIB110 ICN-LAX 19-DEC-08), DATE (19-DEC 07:57), SOURCE (FLT FOLDER), and STATUS (NOT SENT). To the right of the table are two icons: 'ALL' (trash can) and 'NOT SENT' (trash can). Below the table is a large black area. On the right side of this area is a 'SEND' button. At the bottom, there is status information: 'WIRELESS STATUS: GATELINK AVAIL' and 'USB KEY: NO KEY'. The bottom navigation bar includes buttons for 'FLT OPS STS', 'FLT FOLDER', 'EXPORT BOX' (highlighted in blue), and arrows.

| GND | USB | DATA IDENTIFIER | DATE | SOURCE | STATUS |
|-------------------------------------|--------------------------|--|-----------------|------------|----------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | FLT FOLDER AIB110 ICN-LAX 19-DEC-08 | 19-DEC 07:57 | FLT FOLDER | NOT SENT |

5. Click on the SEND button to start the export process.

The EXPORT BOX sends the EFF to the USB key.

When the export process is completed, "SENT" appears in the STATUS column.

Export Completed

The screenshot shows the OIS interface with the following details:

- Top Bar:** MENU ▾, EXPORT BOX (highlighted in blue), FUNCTIONS ▾, 0 MSG, CLEAR.
- Table:** A grid showing data export information.

| GND | USB | DATA IDENTIFIER | DATE | SOURCE | STATUS | ALL |
|-----|-----|--|-----------------|------------|-------------------------|-----|
| ■ | ■ | FLT FOLDER AIB110 ICN-LAX 19-DEC-08 | 19-DEC 07:57 | FLT FOLDER | SENT (GND) 19-DEC 08:55 | |
- Buttons:** SEND (disabled).
- Status:** WIRELESS STATUS: GATELINK AVAIL, USB KEY: NO KEY.
- Bottom Bar:** FLT OPS STS, FLT FOLDER, EXPORT BOX.

If no communication mean (gatelink and SATCOM) is available when the flight crew sends the EFF, the following pop-up appears.

Export - Communication not available

The screenshot shows the Airbus Onboard Information System (OIS) interface. At the top, there is a menu bar with "MENU", "EXPORT BOX" (highlighted in blue), "FUNCTIONS", "0 MSG", and "CLEAR". Below the menu is a table with columns: GND, USB, DATA IDENTIFIER, DATE, SOURCE, and STATUS. One row is visible: a checked checkbox, a folder icon, "FLT FOLDER AIB110 ICN-LAX", "19-DEC-08 07:57", "FLT FOLDER", and "NOT SENT". To the right of the table are two icons: "ALL" and a trash bin. A modal dialog box titled "EXPORT BOX" is displayed in the center. It contains a warning message: "COM with ground not available. Move data to outbox? (Data will be sent when COM is available)". There are "OK" and "Cancel" buttons at the bottom of the dialog. At the bottom of the screen, there is a status message: "WIRELESS STATUS: GATELINK NOT AVAIL" and "USB KEY: NO KEY". The bottom navigation bar includes "FLT OPS STS", "FLT FOLDER", and "EXPORT BOX".

Click on the OK button, and the EFF will be sent to the ground as soon as a communication mean is available.

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- Note: When the flight crew starts the export process, if the SATCOM is the only communication means available, the export process may be blocked, because the data file size is bigger than the size permitted by the SATCOM. In this case, "SENDING" remains displayed in the STATUS column. However, the export will be automatically performed by gatelink as soon as the gatelink is available.
If the gatelink is not available, the flight crew must record a defect in the logbook or contact maintenance.
The flight crew should consider that the export process fails when "SENDING" remains displayed for more than 40 min .

HOW TO CLOSE THE FLT FOLDER

Applicable to: ALL

To close the FLT FOLDER, click on the FUNCTIONS button and select CLOSE APPLICATION.



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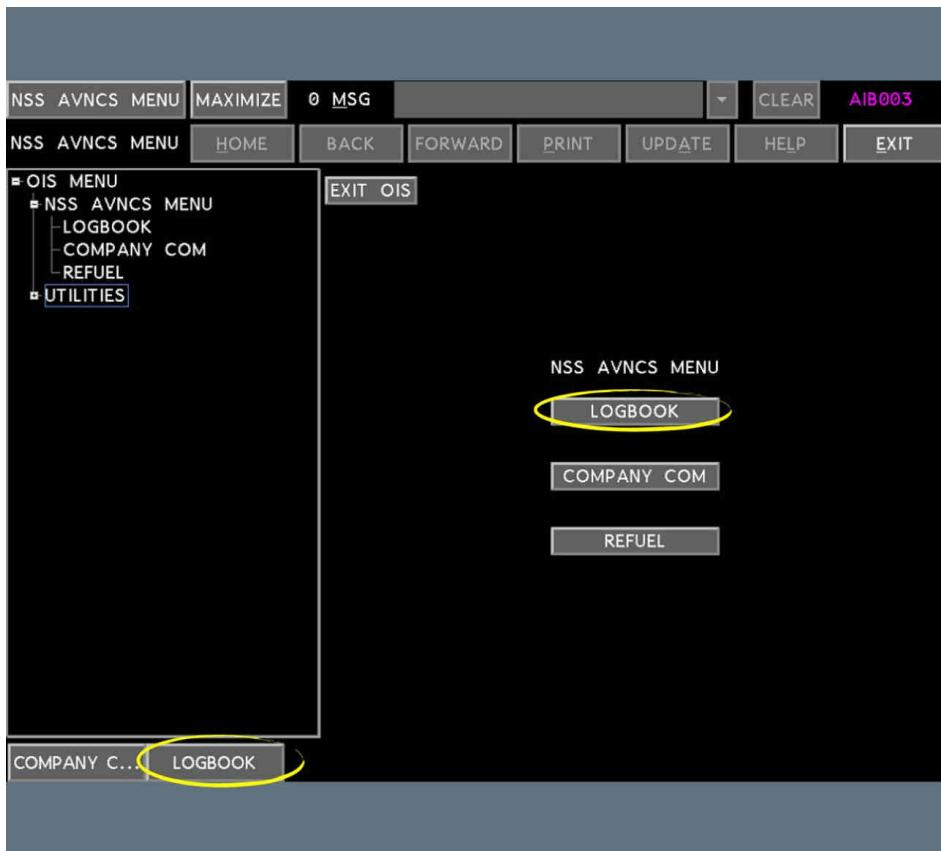
OIS - ONBOARD INFORMATION SYSTEM - HOW TO

How to Use the Technical Logbook

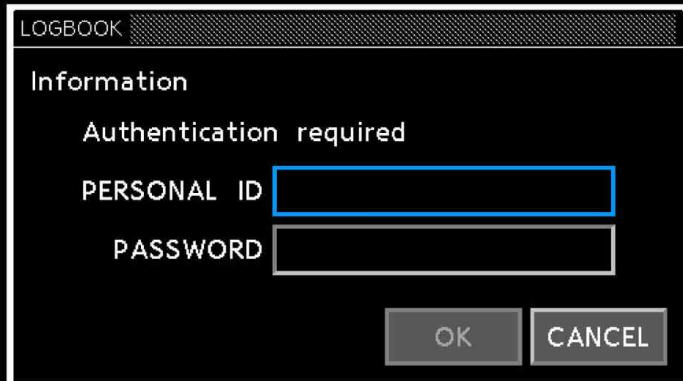
HOW TO START THE TECHNICAL LOGBOOK

Applicable to: ALL

1. Set the OIT SIDE sw to NSS AVNCS.
2. Log on as Pilot.
The NSS AVNCS Menu page appears.
The technical logbook application has already started.
3. To display the technical logbook, click on one of the LOGBOOK buttons.

NSS AVNCS MENU Page

4. When the user identification window appears, enter the personal ID and password, and click on the OK button.



HOW TO ACCEPT THE AIRCRAFT

Applicable to: ALL

The procedure to accept the aircraft has three steps:

- Step 1: Ensure the validity of data
- Step 2: Check the aircraft airworthiness status
- Step 3: Open a flight.

STEP 1: ENSURE THE VALIDITY OF DATA

After the flight crew logons in the technical logbook, check that the displayed information is applicable to the current aircraft, and is the latest available information (up to date information).

AIRCRAFT REGISTRATION

Check that the aircraft registration displayed in the Flight Information area of the STATUS page corresponds to the registration of the aircraft.

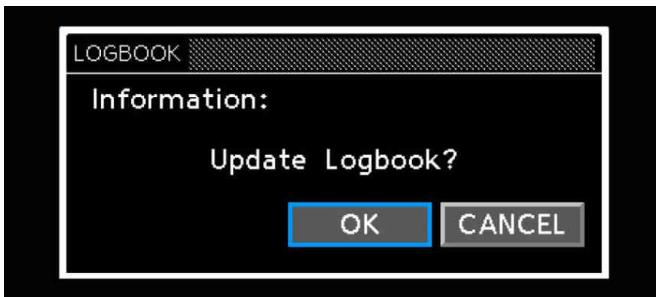
CONTROL OF THE ELOGBOOK AND DATA UPDATE

Check who has the control of the logbook, and if data on the aircraft is up to date:

- If the logbook is not onboard (the " LOGBOOK ON GROUND " message appears in the LOGBOOK CONTROL area), start a synchronization process to obtain the control of the logbook. The synchronization process updates data onboard.

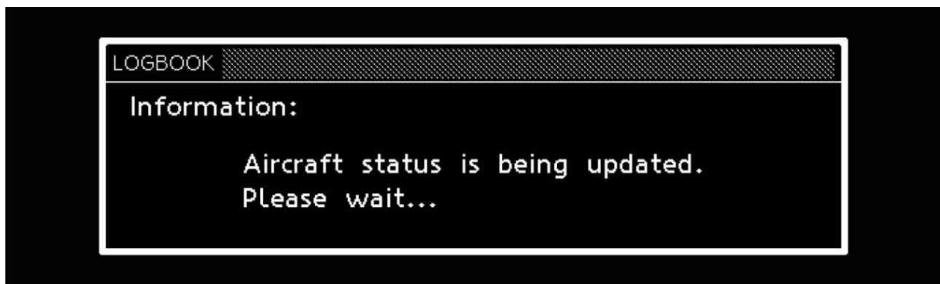
1. Click on the UPDATE button on the STATUS page.

The following message appears:

Message - Update Logbook

2. Click on the OK button to begin the update.

The following message then appears, to indicate that the aircraft status is being updated.

Message - Updating Status

Note: To enter new data (flight data, defect), the logbook must be onboard.

3. When the update is completed, the control of the logbook changes. The " LOGBOOK IS ON BOARD " message appears in the LOGBOOK CONTROL area.
- If the logbook is already onboard (the " LOGBOOK IS ON BOARD " message appears in the LOGBOOK CONTROL area), all the displayed information is applicable , and it's not necessary to begin a synchronization process.

Note: If no valid maintenance release is available, it is not possible to take control of the logbook. The only way to do so is to request that the maintenance personnel retrieves the control onboard via the maintenance logbook, and to wait valid maintenance release pronounced from ground.

STEP 2: CHECK THE AIRCRAFT AIRWORTHINESS STATUS

Before operating the aircraft, it is mandatory to check the aircraft airworthiness status.

CHECK DEFECT ITEMS

1. Check that ECAM alerts that appeared during the previous flight have been recorded in the logbook by the previous flight crew, and have been deferred or closed by the maintenance personnel.

Crosscheck the ECAM alerts from the previous flight with the deferred items list and the table of the report panel:

- Press the RCL pb on the ECP for at least 3 s to display the ECAM alerts from the previous flight
- On the STATUS page, click on the DEFERRED ITEMS button to display the deferred items list
- On the STATUS page, click on the MORE button to display the REPORTS panel.
The table of the REPORTS panel provides items that the maintenance personnel has closed since the last maintenance release.

[L2]

2. Check the STATUS page:

- Click on the OPEN ITEMS button to display the open items list.
- Check that there is no open items.
- Click on the STATUS button to return to the STATUS page.
- Click on the DEFERRED ITEMS button.
- Check the current MEL , CDL and other items via the tables on the MEL , CDL and Other panels.

To display the detailed report for an item, click on the title of the item in the table.

[L1]

Note: The MEL and CDL deferred items are automatically retrieved by the OPS LIBRARY application on the FLT OPS side, and appear on the LOGBOOK STATUS panel in the OPS LIBRARY.

To display the contents of a MEL or CDL item, start the OPS LIBRARY on the FLT OPS side. Refer to DSC-46-20-50-10 How to use The Logbook Status .

[L1]

- Click on the STATUS button to return to the STATUS page.

CHECK MAINTENANCE RELEASE STATUS

1. Check the maintenance release status on the STATUS page.
2. Click on the MORE button to display the MAINTENANCE RELEASE report.
3. Check the maintenance actions and parameters on the REPORT, PARAMETERS and SERVICED panels.
4. Click on the STATUS button to return to the STATUS page.

CHECK LAST FLIGHT DATA REPORT

1. Click on the FLIGHT DATA panel to access the FLIGHT DATA page.
2. Check the last flight data report on the PRE-FLIGHT and POST-FLIGHT panels.
3. Click on the STATUS button to return to the STATUS page.

STEP 3: OPEN A FLIGHT**CREATE A FLIGHT DATA REPORT**

1. Click on the STATUS panel to display the STATUS page.
2. Check and/or enter the flight number, departure and destination airport, and the date of flight in the AIRCRAFT AND FLIGHT INFORMATION area.

Aircraft and Flight Information Data

| | | | |
|-------------------|-----------|--------|-----|
| ACFT REGISTRATION | F-GGEA | | |
| FLT NBR | AIB003 | | |
| FROM | TLS | TO | CDG |
| DATE | 19-FEB-09 | ddmmyy | |

Note: The flight crew cannot open a new flight until the previous flight is closed.

RECORD PREFLIGHT PARAMETERS

1. Click on the FLIGHT DATA panel to display the FLIGHT DATA page.
The PRE-FLIGHT panel appears.
2. Enter preflight parameters.

Preflight Parameters

STATUS LOGBOOK ENTRY HISTORY FLIGHT DATA

FLT NBR **AIB003 (CURRENT)** ACFT REGISTRATION **F-GGEA**

FROM **TLS** TO **CDG** DATE **19-FEB-09**

PRE-FLIGHT POST-FLIGHT

FUEL

| | | | | |
|-----------|-------------|---|----------|-----------------|
| REMAINING | 20 | T | DENSITY | 0.785 |
| UPLIFT | 2000 | L | SUPPLIER | FUEL TLS |

STATUS

Note: The flight crew must enter the mandatory preflight parameters before accepting the aircraft.

The flight crew can enter the parameters that are not mandatory later during the flight, but must enter those parameters before closure of the flight.

- [L2] **Note:** To correct a erroneous entry, doubleclick on the entry and enter the correct information.

L1 ACCEPT THE AIRCRAFT

1. Click on the STATUS button to display the STATUS page.
2. Click on the PIC ACCEPT button to accept the aircraft.

L2 After the flight crew clicked on the PIC ACCEPT button, the eLogbook application checks the following parameters:

- The open items

If the flight crew did not display the OPEN ITEMS page, a message appears.

- The deferred items

If the flight crew did not display the DEFERRED ITEMS page, a message appears.

- The existence of a valid maintenance release

If there is no valid maintenance release, a message appears.

- The preflight parameters

If the flight crew did not enter preflight parameters, a message appears.

L1 The aircraft acceptance report appears. The aircraft acceptance report provides all the information the flight crew must sign off when they accept the aircraft.



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Flight Acceptance Report

| | | | | | |
|--|-----------------------|------------------------|--------------------------------|-----------------------|---------------|
| LOGBOOK | | | | | |
| AIRCRAFT ACCEPTANCE REPORT | | | | | |
| Flight Number: AIB003 | FROM: TLS | DATE: 18/02/09 | UTC: 20:07 | | |
| Tail Number: FGGEA | TO: | DATE: | UTC: | | |
| CERTIFICATE OF RELEASE TO SERVICE: VALID | | | | DATE: 18/02/09 | |
| ACCEPTED ITEM: | | | | | |
| Type: | MEL / CDL ref: | Deferred limit: | Rectification interval: | Severity: | |
| DEFECT | 25-60-03 | 28/02/09 | C | MEDIUM | |
| TITLE: DOOR MAIN IL SLIDE LENGTHENING FAULT ECAM WARNING | | | | | |
| ATA: 521000 | | | | | |
| REPORT: | | | | | |
| ACCEPTED ITEM: | | | | | |
| Type: | MEL / CDL ref: | Deferred limit: | Rectification interval: | Severity: | |
| DEFECT | 27-93-01 | 28/02/09 | C | MEDIUM | |
| TITLE: F/CTL PRIM 1 FAULT ECAM WARNING | | | | | |
| ATA: 279300 | | | | | |
| REPORT: | | | | | |
| ACCEPTED ITEM: | | | | | |
| | | | | SIGN | CANCEL |

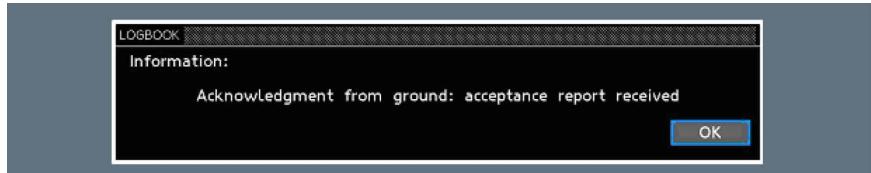
3. Check on the aircraft acceptance report that all the information is valid and in accordance with the airworthiness of the aircraft.
4. Click on the SIGN button to validate the report.
If some data is not correct, click on the CANCEL button, then make the appropriate changes.
After validation of the report, the electronic signature window appears.
5. Enter the personal data, then click on the OK button.

GROUND NOTIFICATION OF AN OPEN FLIGHT

When the flight crew successfully opened the flight, the technical logbook performs an automatic synchronization process with the ground application.

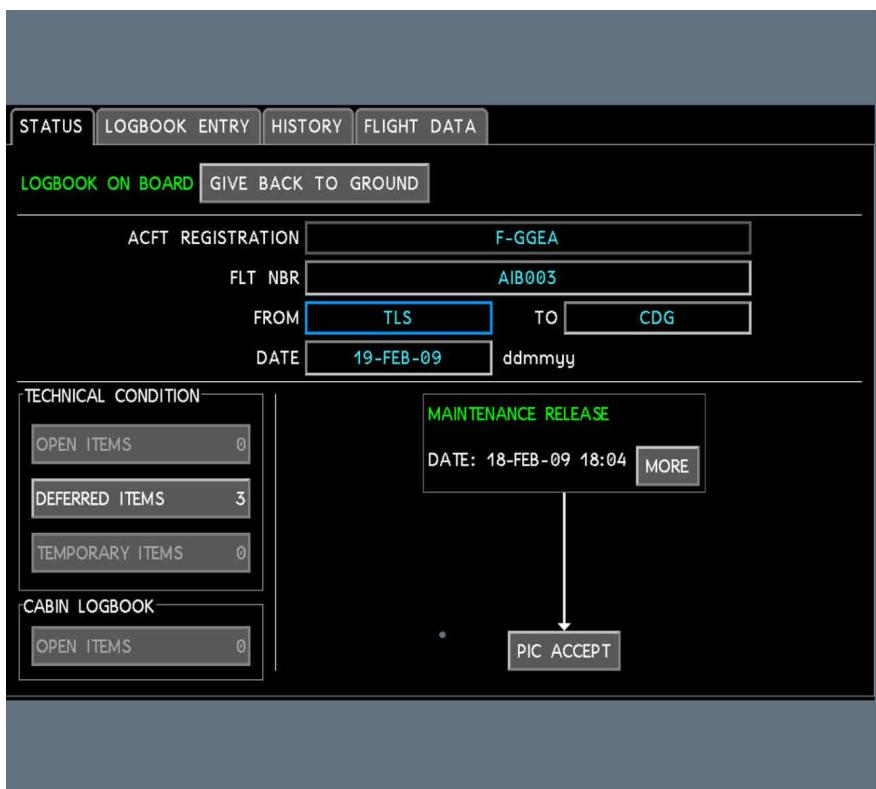
When the synchronization process is completed, a message indicates if the synchronization is successful or not.

The following message indicates that the aircraft received the acknowledgment from ground, about the reception by the ground application of the information concerning the flight acceptance.

Acknowledgment Message from Ground

Click on the OK button to close the message.

The "AIRCRAFT ACCEPTED" status appears in the ACCEPTANCE area on the STATUS page.

STATUS Page - Aircraft Accepted

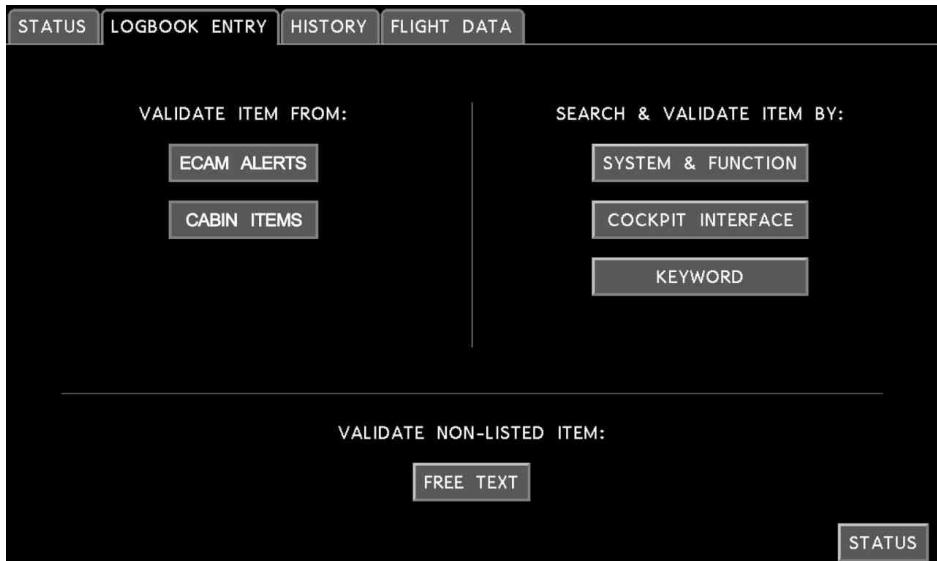
- Note:
1. The flight crew must wait the Acknowledgment message from ground before the push-back.
If this message is not received onboard, the flight crew must print the logbook, and give a copy to the maintenance before the push-back.
 2. The flight crew cannot abort the synchronization process. They must wait that the process is completed.
 3. The flight crew must not use the technical logbook application during the synchronization process.

HOW TO RECORD A DEFECT IN THE LOGBOOK

Applicable to: ALL

REPORT A DEFECT

1. Click on the LOGBOOK ENTRY panel to display the LOGBOOK ENTRY page.

LOGBOOK ENTRY Page

2. Choose the appropriate assistant to record the defect.

ECAM ALERT ASSISTANT

1. Click on the ECAM ALERTS button to display the ECAM ALERTS assistant.

Alerts that appeared on the ECAM during the flight are listed in the ITEM SELECTION list. The most recently triggered alert appears at the top of the list.

Note: An ECAM alert, that is triggered on ECAM several times during the flight, appears several times in the list.

2. Select the defect in the ITEM SELECTION list.
3. If necessary, enter free text in the PILOT COMMENT field.



Note: When the title of the alert on ECAM contains two lines, the flight crew must enter the second line of the title in the PILOT COMMENT field, in order for the maintenance personnel to easily find the associated MEL item, when deferring the defect.

4. Select the mode of storage of the defect:

- OPEN ITEMS: The defect is directly stored in the open items list. The flight crew cannot delete the defect, and cannot modify the PILOT COMMENT field.
- TEMPORARY ITEMS: The defect is stored in the temporary items list. The flight crew can delete the defect, or modify the PILOT COMMENT field.

5. Click on the STORE button to record the defect.

Note: If the defect is not in the ITEM SELECTION list, create a FREE TEXT defect.

CABIN ITEMS ASSISTANT

During the flight, the cabin crew can ask the flight crew to validate or not cabin defects. The cabin crew sends a message to the flight crew. The message appears in the message toolbar.

1. Click on the CABIN ITEMS button to display the CABINS ITEMS assistant.
The ITEM SELECTION list lists the defects that the cabin crew recorded.

CABIN ITEM Assistant

LOGBOOK ENTRY / CABIN ITEMS

ITEM SELECTION Bar, MBA, Seat belt, inoperative

CABIN COMMENT

PILOT COMMENT

STORE IN OPEN ITEMS
 CABIN OPEN ITEMS

STORE

RETURN **STATUS**

2. Select the defect in the list.

When the defect is selected, the comment, that the cabin crew entered for the current defect, appears in the CABIN COMMENT area.

3. If necessary, enter free text in the PILOT COMMENT field.



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4. Select the mode of storage of the defect:
 - OPEN ITEMS: The defect is stored in the open items list. So this item becomes a mandatory item for next dispatch. The defect will appear in the technical logbook and in the DCL
 - CABIN OPEN ITEMS: The defect is stored in the cabin open items list. The defect will only appear in the DCL.
5. Click on the STORE button to record the defect report.

SYSTEM AND FUNCTION ASSISTANT

1. Click on the SYSTEM & FUNCTION button to display the SYSTEM AND FUNCTION assistant.

SYSTEM AND FUNCTION Assistant

LOGBOOK ENTRY / SYSTEM & FUNCTION

| | | | |
|----------------|----------------------|--|---------------------------------------|
| SYSTEM | LIGHTS | FUNCTION | SELECT FUNCTION |
| ALLOCATION | SELECT ALLOCATION | | |
| ITEM SELECTION | <input type="text"/> | | |
| PILOT COMMENT | <input type="text"/> | | |
| STORE IN | | <input type="radio"/> OPEN ITEMS <input checked="" type="radio"/> TEMPORARY ITEMS | |
| | | <input type="button" value="STORE"/> | <input type="button" value="RETURN"/> |
| | | <input type="button" value="STATUS"/> | |

2. Complete the SYSTEM, FUNCTION, and ALLOCATION fields via the associated drop-down list.
- [L2] As soon as the flight crew completes the fields, the ITEM SELECTION list decreases in size.
- [L1] 3. Select the defect in the ITEM SELECTION list.
4. If necessary, enter free text in the PILOT COMMENT field.
5. Select the mode of storage of the defect: OPEN ITEMS or TEMPORARY ITEMS.

SYSTEM AND FUNCTION Assistant Completed

LOGBOOK ENTRY / SYSTEM & FUNCTION

| | | | |
|------------|----------------|----------|---------------|
| SYSTEM | LIGHTS | FUNCTION | COCKPIT LIGHT |
| ALLOCATION | OVERHEAD PANEL | | |

ITEM SELECTION

- FAULT OF INTEGRAL LIGHTING OF PANEL VU
- FAULT OF INTEGRAL LIGHTING OF ICP VM
- FAULT OF INTEGRAL LIGHTING OF SEVERAL PANELS VU**

PILOT COMMENT

STORE IN OPEN ITEMS
 TEMPORARY ITEMS

STORE

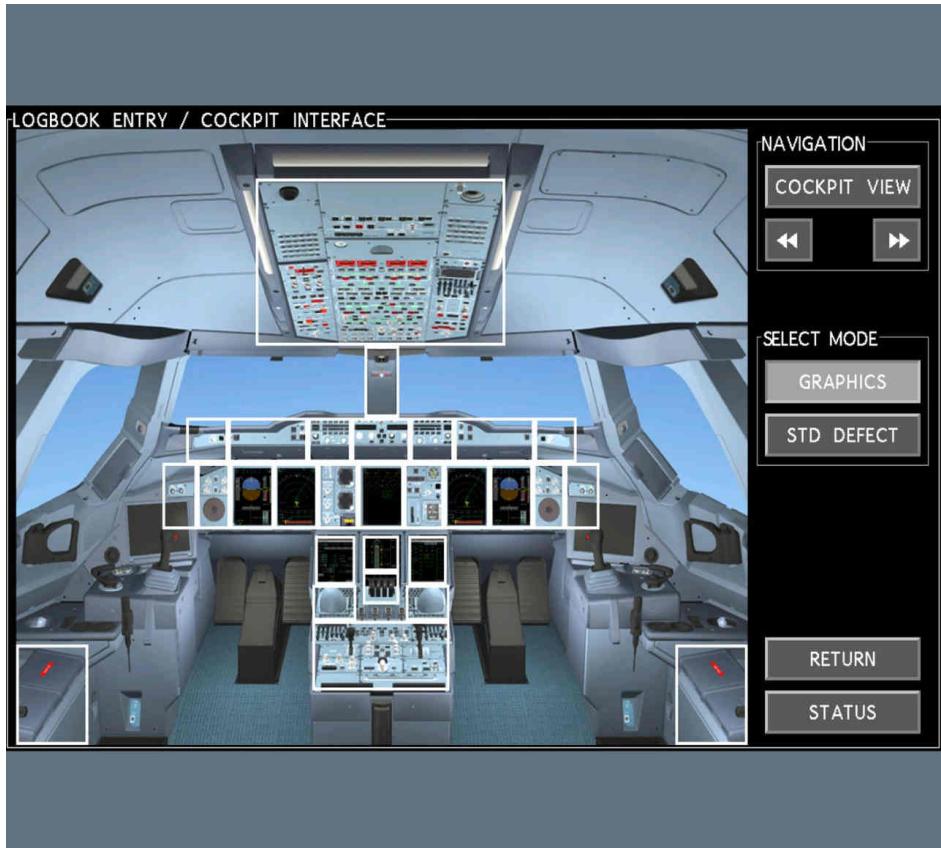
RETURN **STATUS**

6. Click on the STORE button to record the defect.

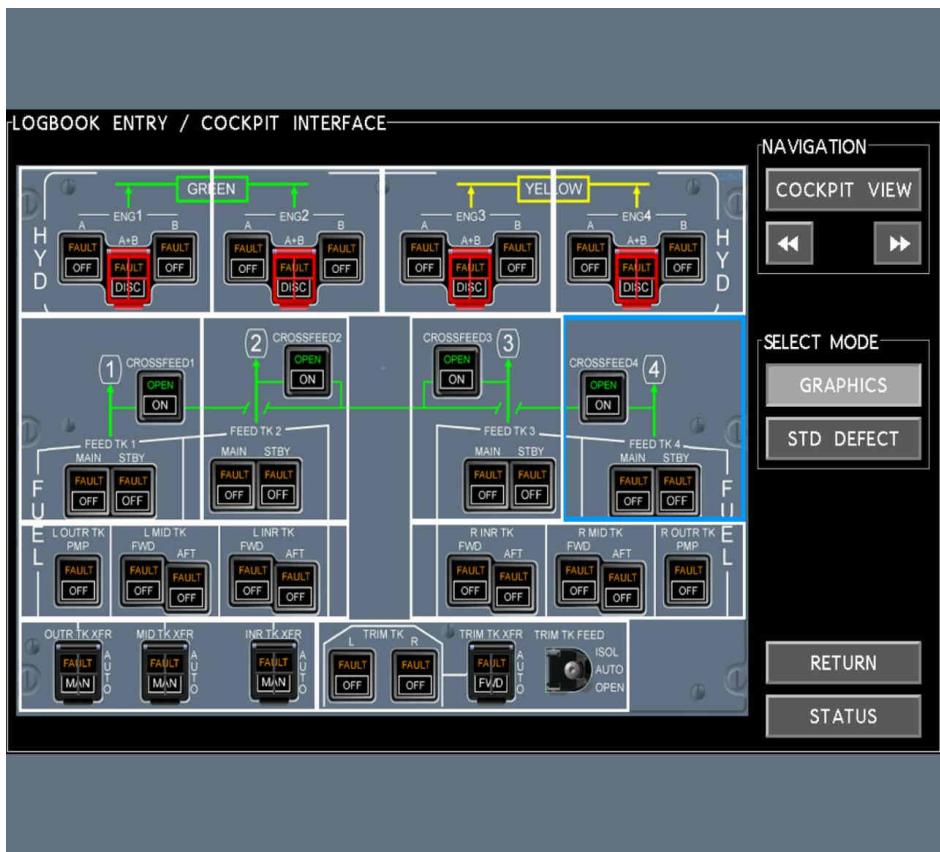
Note: If the defect is not in the ITEM SELECTION list, create a FREE TEXT defect.

COCKPIT INTERFACE ASSISTANT

1. Click on the COCKPIT INTERFACE button to display the COCKPIT INTERFACE assistant.

COCKPIT INTERFACE Assistant

2. Find the location of the defect on the displayed window and click on it.
Successive zooming helps to refine the selection until the STD DEFECT button becomes active.

COCKPIT INTERFACE ASSISTANT - Location

3. Click on the STD DEFECT button.

Standard defects that correspond to the selected location appear in the standard defect list.

COCKPIT INTERFACE ASSISTANT - Standard Defect List

-LOGBOOK ENTRY / COCKPIT INTERFACE-

| | | |
|----------------|--|--|
| ITEM SELECTION | CROSSFEED VLV 4 P/BSW OPEN CAPTION ILLUMINATES . MAIN FEED TK 4 PMP P/BSW FAULT LEGEND ILLUMINAT. MAIN/STANDBY FEED PUMP AMBER OFF ON OVERHEAD .. MAIN/STANDBY FEED PUMP AMBER ON ON OVERHEAD P. STBY FEED TK 4 PMP P/BSW FAULT LEGEND ILLUMINAT.. | NAVIGATION COCKPIT VIEW ◀ ▶ |
| PILOT COMMENT | <input type="text"/> | SELECT MODE GRAPHICS STD DEFECT |
| STORE IN | <input checked="" type="radio"/> OPEN ITEMS <input type="radio"/> TEMPORARY ITEMS | <input type="button" value="STORE"/> |
| | | <input type="button" value="RETURN"/> <input type="button" value="STATUS"/> |

4. Select the defect in the standard defect list.
5. Select the mode of storage of the defect: OPEN ITEMS or TEMPORARY ITEMS.
6. Click on the STORE button to record the defect report.

Note: If the defect is not in the ITEM SELECTION list, create a FREE TEXT defect.

KEYWORD ASSISTANT

1. Click on the KEYWORD button to display the KEYWORD assistant.



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KEYWORD Assistant

LOGBOOK ENTRY / KEYWORDS

KEYWORD(S)

RESULTS:

ITEM SELECTION

PILOT COMMENT

STORE IN OPEN ITEMS
 TEMPORARY ITEMS

2. Enter one or more words that occur in the defect text.
3. Click on the SEARCH button to begin the search.
Standard defects that correspond to the search appear in the ITEM SELECTION list.
4. Select the defect in the ITEM SELECTION list.
5. Select the mode of storage of the defect: OPEN ITEMS or TEMPORARY ITEMS.

KEYWORD Assistant Completed

LOGBOOK ENTRY / KEYWORDS

KEYWORD(S)

RESULTS: 3 standard defects were found that match your search.

ITEM SELECTION

| |
|--|
| A-ICE L WINDSHIELD HEATG FAULT ECAM WARNING |
| A-ICE L+R WINDSHIELDS HEATG FAULT ECAM WARNING |
| A-ICE R WINDSHIELD HEATG FAULT ECAM WARNING |

PILOT COMMENT

STORE IN OPEN ITEMS
 TEMPORARY ITEMS

6. Click on the STORE button to store the defect report.

Note: If the defect is not in the ITEM SELECTION list, create a FREE TEXT defect report.

FREE TEXT DEFECT

1. Click on the FREE TEXT button to display the FREE TEXT assistant.



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FREE TEXT Assistant

LOGBOOK ENTRY / FREE TEXT

TITLE

PILOT COMMENT

STORE IN OPEN ITEMS
 TEMPORARY ITEMS

2. Type the text of the defect in the FREE TEXT area.
3. Select the mode of storage of the defect: OPEN ITEMS or TEMPORARY ITEMS.

FREE TEXT Assistant Completed

LOGBOOK ENTRY / FREE TEXT

TITLE [COCKPIT WINDOW CLEANING REQUEST]

PILOT COMMENT []

STORE IN OPEN ITEMS
 TEMPORARY ITEMS

STORE

[RETURN] [STATUS]

4. Click on the STORE button to record the defect report.

VALIDATE A TEMPORARY ITEM

1. Click on the STATUS button to display the STATUS page.
2. Click on the TEMPORARY ITEMS button.

TEMPORARY ITEMS

STATUS / TEMPORARY ITEMS

ITEM SELECTION MAIN FEED TK 4 PMP P/BSW FAULT LEGEND ILLUMINATES ON OVERHEAD ...
CKPT SEAT CAPT LUMBAR REST ADJUSTMENT INOPERATIVE

DELETE ITEM

PILOT COMMENT NONE

STORE IN OPEN ITEMS

STATUS

3. Select the defect to be validated from the ITEM SELECTION list.
4. If necessary, update the PILOT COMMENT field.
5. Click on the STORE IN OPEN ITEMS button to store the defect in the open items list.

Note: Remaining temporary items are automatically deleted when the flight crew closes the flight.



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HOW TO CHANGE A DEFECT

Applicable to: ALL

DEFECT FROM THE OPEN ITEMS LIST

For defects that the flight crew stored in the open items list, the flight crew can only complete the ADDITIONAL INFO field. It is not possible to change the PILOT COMMENT field.

1. Click on the STATUS panel or on the STATUS button to display the STATUS page.
2. On the STATUS page, click on the OPEN ITEMS button.
3. Select the appropriate defect in the list.
4. Complete the ADDITIONAL INFO field.
The change is automatically saved.
5. Click on the RETURN button to return to the STATUS page.

DEFECT FROM THE TEMPORARY ITEMS LIST

For defects that the flight crew stored in the temporary items list, the flight crew can only change the PILOT COMMENT field of the report.

1. Click on the STATUS panel or on the STATUS button to display the STATUS page.
2. On the STATUS page, click on the TEMPORARY ITEMS button.
3. Select the appropriate defect in the list.
4. Change the PILOT COMMENT field.
The change is automatically saved.
5. Click on the RETURN button to return to the STATUS page.

HOW TO CANCEL A DEFECT

Applicable to: ALL

CANCEL A LOGBOOK DEFECT

Defects that the flight crew stored in the open items list cannot be deleted.

If a defect that the flight crew stored in the open items list is not accurate, proceed as follows:

1. Click on the STATUS panel, or on the STATUS button, to display the STATUS page.
2. On the STATUS page, click on the OPEN ITEMS button.
3. Select the appropriate defect in the list.
4. Enter "Logbook entry inaccurate, new entry made for correction" in the ADDITIONAL INFO field of the selected defect.
5. Create and record a new FREE TEXT defect. In the PILOT COMMENT field, enter the following remark: "New entry made to correct Ref Report", with the report reference of the defect that is cancelled.



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DELETE A LOGBOOK DEFECT

Defects that the flight crew stored in the temporary items list can be deleted.

To delete a defect from the temporary items list:

1. Click on the STATUS panel or on the STATUS button to display the STATUS page.
2. On the STATUS page, click on the TEMPORARY ITEMS button.
3. Select the appropriate entry report in the list.
4. Click on the DELETE ITEM button.
5. Click on the YES button on the confirmation window.

HOW TO SEND AN OPEN ITEM TO THE GROUND

Applicable to: ALL

1. Click on the STATUS panel to display the STATUS page.
2. Click on the OPEN ITEMS button to display the open items list.

OPEN ITEMS Table

| STATUS / OPEN ITEMS | | | |
|-------------------------------------|---|-------------|----------|
| | REPORT | OPEN DATE ▾ | STATUS |
| <input checked="" type="checkbox"/> | Bar, MBA, Seat belt, inoperative | 18-FEB-09 | NOT SENT |
| <input checked="" type="checkbox"/> | A-ICE L WINDSHIELD HEATG FAULT ECAM WARNING | 18-FEB-09 | NOT SENT |
| <input checked="" type="checkbox"/> | FAULT OF INTEGRAL LIGHTING OF SEVERAL PANELS VU | 18-FEB-09 | NOT SENT |
| <input checked="" type="checkbox"/> | ENG 2 REVERSER FAULT ECAM WARNING | 18-FEB-09 | NOT SENT |
| <input checked="" type="checkbox"/> | HYD G+Y SYS PRESS LO ECAM WARNING | 18-FEB-09 | NOT SENT |

[Up] [Down] SEND

[STATUS]

3. Tick, in the list, the items to be sent to the ground.

4. Click on the SEND button to send the items.

For each ticked item, "SENDING..." appears in the STATUS column.

When a item is sent, and acknowledgement is received from ground, "SENT" appears in the STATUS column of the item.



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HOW TO CLOSE THE FLIGHT

Applicable to: ALL

The flight crew closes the flight as soon as possible, when the aircraft is at the gate, in order to transfer the information recorded during the flight to the ground application.

There are three steps in the procedure to close the flight.

- Step 1: Record postflight parameters
- Step 2: Close the flight
- Step 3: Notify ground of flight closure.

STEP 1: RECORD POSTFLIGHT PARAMETERS

1. Click on the STATUS button to display the STATUS page.
2. Check and correct, if necessary, the destination airport (TO field).
3. Click on the FLIGHT DATA panel to display the FLIGHT DATA page.
4. Click on the POST-FLIGHT panel to display the POST-FLIGHT area.
5. Fill in the postflight parameters.

Post-Flight Parameters

| | | | | |
|---|------------------|---------|-------------|--------------------|
| STATUS | LOGBOOK ENTRY | HISTORY | FLIGHT DATA | |
| FLT NBR | AIB003 (CURRENT) | | | ACFT REGISTRATION |
| FROM | TLS | TO | CDG | F-GGEA |
| | | | | DATE 19-FEB-09 |
| <input checked="" type="radio"/> PRE-FLIGHT <input type="radio"/> POST-FLIGHT | | | | |
| NIL DEFECT | | | | |
| NIL DEFECT ■ | | | | |
| TIME | | | | |
| TOTAL TIME B/F | | 15:10 | HOURS | LANDING 17:00 (Z) |
| FLIGHT TIME | | 01:50 | HH:MM | TAKE OFF 15:40 (Z) |
| TOTAL TIME | | 17:00 | HOURS | |
| <input type="button" value="STATUS"/> | | | | |

L2 *Note:* To correct an erroneous entry, doubleclick on the entry and enter the correct information.

L1 STEP 2: CLOSE THE FLIGHT

1. Click on the STATUS button to display the STATUS page.
2. Check that ECAM alerts that appeared during the flight have been recorded in the technical logbook.

Crosscheck the ECAM alerts with the open items list:

- Press the RCL pb on the ECP for at least 3 s to display the ECAM alerts
- Click on the OPEN ITEMS button to display the open items list.

3. Check that non monitored defects have been recorded in the technical logbook (flight crew observations, structural damages), in the open items list.

4. On the STATUS page, click on the CLOSE FLIGHT button.

L2 5. The eLogbook application checks the following parameters:

- Cabin entries not validated

If some cabin entries are not validated, the list of cabin items that the flight crew must validate appears.

- Non-recorded ECAM alerts

If some ECAM alerts are not recorded as defect, the list of ECAM alerts appears.

- Temporary items

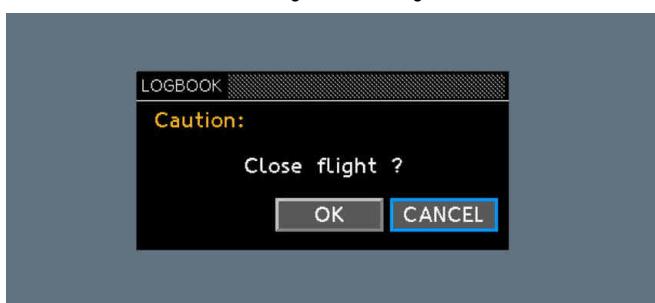
If there are some temporary items, a confirmation message appears. All temporary items are deleted with flight closure.

- Mandatory fields completed.

If some mandatory fields are not completed, a confirmation message appears.

L1 After the closure check, a confirmation message appears. Click on the OK button.

Message - Close Flight



6. A report summary of the flight closure appears. This report includes all the information the flight crew will sign off by closing the flight.

Check that all the information is valid and in accordance with the airworthiness of the aircraft.

7. Click on the SIGN button to validate the report.

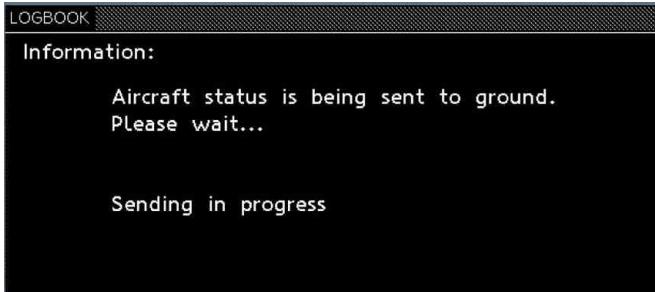
If some data is not correct, click on the CANCEL button, then make the appropriate changes.

After validation of the report, the electronic signature window appears.

8. Enter the personal data, then click on the OK button.

STEP 3: NOTIFY GROUND OF FLIGHT CLOSURE

After closure, the technical logbook automatically sends a message to the ground station. The following message appears to indicate that the aircraft status is being sent to the ground.

Message - Aircraft Status to the Ground

Note: *The flight crew must not record a defect in the technical logbook when the aircraft status is being sent to the ground.*



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How to Use the LOAD BOX

HOW TO LOAD DATA WITH THE LOAD BOX

Applicable to: ALL

Impacted DU: 00022220 Load Data via a USB Device

Use of the LOAD BOX only to upload performance database and EFF. Avoid using the LOAD BOX in order to load heavy items, e.g. operational manuals.

- In order to load heavy items, the maintenance personnel should use the Data Loading Configuration Manager (DLCM).

L1 LOAD DATA VIA A USB DEVICE

To load data via a USB device:

1. Plug the USB device into one of the available USB ports of the laptop.
2. Click on the MENU button, and select LOAD BOX to open the LOAD BOX.

The LOAD BOX automatically detects new items to load, and adds these items to the list of items to load.

Note: *If the flight crewmember plugs the USB device after having opened the LOAD BOX, the flight crewmember should click on the REFRESH LOAD BOX button to display the content of the USB device.*

3. Select the items of data to load.

LOAD BOX - Items to Load

| MENU ▾ | | LOAD BOX | FUNCTIONS ▾ | | 0 MSG | | | CLEAR |
|-------------------------------------|--------------|-------------|-------------|-------------|------------|---------------|---|-------|
| <input checked="" type="checkbox"/> | DATA IDEN... | GENERATED △ | DESTINATION | CAPT STATUS | F/O STATUS | BACKUP STATUS |  | |
| <input checked="" type="checkbox"/> | HSPDATA | UNKNOWN | UNKNOWN | NOT LOADED | NOT LOADED | NOT LOADED |  | |
| <input checked="" type="checkbox"/> | LSPDATA | UNKNOWN | UNKNOWN | NOT LOADED | NOT LOADED | NOT LOADED |  | |
| <input checked="" type="checkbox"/> | PDBDATA | UNKNOWN | UNKNOWN | NOT LOADED | NOT LOADED | NOT LOADED |  | |

REFRESH LOAD BOX LOAD ABORT

◀ FLT OPS STS LOAD BOX ▶

4. Click on the LOAD button to start the loading process.

When the loading process is completed, "LOADED" appears in the STATUS column for each laptop that is connected to the network.

LOAD BOX - Data Loaded

| MENU | LOAD BOX | FUNCTIONS | 0 MSG | CLEAR | | | |
|--------------------------|-------------------------|-------------|-------------|-------------|------------|---------------|--|
| <input type="checkbox"/> | DATA IDEN... | GENERATED ▲ | DESTINATION | CAPT STATUS | F/O STATUS | BACKUP STATUS |  AL |
| | HSPDATA | UNKNOWN | UNKNOWN | LOADED | LOADED | LOADED |  AL |
| | LSPDATA | UNKNOWN | UNKNOWN | LOADED | LOADED | LOADED |  AL |
| | PDBDATA | UNKNOWN | UNKNOWN | LOADED | LOADED | LOADED |  AL |

REFRESH LOAD BOX LOAD ABORT

◀ FLT OPS STS LOAD BOX ▶

Note: If the loading process of an item fails on one laptop, "FAULT" appears in the associated STATUS column. This indicates that the loading process has not been successful on this laptop. In this case, select again this item and restart the data loading process by clicking on the LOAD button.

5. Unplug the USB device.

Impacted by TDU: 00023385 Load Data via a USB Device

LOAD DATA VIA A USB DEVICE

To load data via a USB device:

1. Plug the USB device into one of the available USB ports of the laptop.
2. Click on the MENU button, and select LOAD BOX to open the LOAD BOX.

The LOAD BOX automatically detects new items to load, and adds these items to the list of items to load.

Note: If the flight crewmember plugs the USB device after having opened the LOAD BOX, the flight crewmember should click on the REFRESH LOAD BOX button to display the content of the USB device.

3. Select the items of data to load.

LOAD BOX - Items to Load

| | | DATA IDEN... | GENERATED △ | DESTINATION | CAPT STATUS | F/O STATUS | BACKUP STATUS | AL |
|-------------------------------------|-------------------------|--------------|-------------|-------------|-------------|------------|---------------|---|
| <input checked="" type="checkbox"/> | HSPDATA | UNKNOWN | UNKNOWN | NOT LOADED | NOT LOADED | NOT LOADED | NOT LOADED |  |
| <input checked="" type="checkbox"/> | LSPDATA | UNKNOWN | UNKNOWN | NOT LOADED | NOT LOADED | NOT LOADED | NOT LOADED |  |
| <input checked="" type="checkbox"/> | PDBDATA | UNKNOWN | UNKNOWN | NOT LOADED | NOT LOADED | NOT LOADED | NOT LOADED |  |

REFRESH LOAD BOX LOAD ABORT

◀ FLT OPS STS LOAD BOX ▶

4. Click on the LOAD button to start the loading process.

When the loading process is completed, "LOADED" appears in the STATUS column for each laptop that is connected to the network.

LOAD BOX - Data Loaded

The screenshot shows the 'LOAD BOX' screen of the OIS. At the top, there's a menu bar with 'LOAD BOX' highlighted. Below it is a table with columns: DATA IDEN..., GENERATED △, DESTINATION, CAPT STATUS, F/O STATUS, BACKUP STATUS, and a column for actions (represented by icons). The table contains three rows of data:

| DATA IDEN... | GENERATED △ | DESTINATION | CAPT STATUS | F/O STATUS | BACKUP STATUS | Actions |
|--------------|-------------|-------------|-------------|------------|---------------|---------|
| HSPDATA | UNKNOWN | UNKNOWN | LOADED | LOADED | LOADED | [Icon] |
| LSPDATA | UNKNOWN | UNKNOWN | LOADED | LOADED | LOADED | [Icon] |
| PDBDATA | UNKNOWN | UNKNOWN | LOADED | LOADED | LOADED | [Icon] |

At the bottom, there are buttons for 'REFRESH LOAD BOX', 'LOAD', and 'ABORT'. Below that is a navigation bar with 'FLT OPS STS', 'LOAD BOX', and arrows.

Note: If the loading process of an item fails on one laptop, "FAULT" appears in the associated STATUS column. This indicates that the loading process has not been successful on this laptop. In this case, select again this item and restart the data loading process by clicking on the LOAD button.

5. Unplug the USB device.

LOAD DATA VIA WIRELESS

The data to load is sent from ground to the aircraft via wireless (gatelink or SATCOM).

A message is displayed in the message area of the FLT OPS menu. It indicates that data is available for loading in the LOAD BOX.

1. Click on the MENU button, and select LOAD BOX to open the LOAD BOX.
The LOAD BOX automatically detects items to load which have been sent via wireless, and adds them to the list of items to load.
 2. Select the items of data to load.
 3. Click on the LOAD button to start the loading process.
When the loading process is completed for an item, "LOADED" appears in the STATUS column for each laptop that is connected to the network.
- Note: If the loading process of an item fails on one laptop, "FAULT" appears in the associated STATUS column. This indicates that the loading process has not been successful on this laptop. In this case, select again this item and restart the data loading process by clicking on the LOAD button.*
4. When the loading process is completed, remove the items that have been loaded from the list of items to load, by clicking on the associated recycle bin symbol.



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AIRCRAFT SYSTEMS

46 - INFORMATION SYSTEMS

OIS - ONBOARD INFORMATION SYSTEM - HOW TO

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OIS - ONBOARD INFORMATION SYSTEM - ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

COM NSS DATA TO AVNCS XFR FAULT (*Refer to procedure*)

COM NSS/AVNCS DATA XFR FAULT (*Refer to procedure*)

MISC OIS FAULT (*Refer to procedure*)



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OIS - ONBOARD INFORMATION SYSTEM - ECAM ALERTS

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OIS - ONBOARD INFORMATION SYSTEM - ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Subsystem | Electrical Supply |
|----------------|----------------------|---------------------------|
| NSS AVNCS Side | ANSU 1 | AC 2 and BAT 2 |
| | ANSU 2 | AC 1 or AC EMER and BAT 1 |
| | ARU 1 | AC 2 and DC 2 |
| | ARU 2 | AC 1 or AC EMER and DC 1 |
| | SIRU | AC 1 and DC 1 |
| | Printer | AC 1 |
| FLT OPS Side | Captain Laptop | DC 1 |
| | First Officer Laptop | DC 2 or BAT 2 |
| | Back-up Laptop | DC 2 |
| | ANSU | AC ESS and BAT 1 |
| | ARU | AC ESS and DC 1 or DC ESS |
| | Printer | AC ESS |
| OIT | Captain OIT | AC 2 and DC 2 |
| | First officer OIT | AC ESS and DC 1 or DC ESS |



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OIS - ONBOARD INFORMATION SYSTEM - ELECTRICAL SUPPLY

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AOC - AIRLINE OPERATIONAL CONTROL - SYSTEM DESCRIPTION

Overview

OVERVIEW

Applicable to: ALL

The flight crew and the company ground stations use the Airline Operational Control (AOC) application to exchange messages related to aircraft operations and/or management. The AOC is also called Company Communication (CPNY COM) program.

The AOC application uses the ACARS messaging system, to transmit AOC messages.

The AOC application enables Operators to:

- Manage flight operations: Data initialization, flight log, flight summary, free text, Estimated Time of Arrival (ETA), ramp service requests, in range, or diversion
- Check the weather status: TAF, METAR, or SIGMET
- Manage delays related to: Departure, takeoff, flight, and gates
- Manage flight parameters.

The AOC function is hosted by the OIS / NSS avionics domain.

Due to the fact that Operators can customize the AOC application, this chapter only provides a general description of the application.

AOC APPLICATION

Applicable to: ALL

The onboard AOC application has:

- Associated software
- An AOC database, that can be:
 - A generic database, with the basic AOC functions, or
 - A standard database, with some customized functions, or
 - A customized database.

The Operator manages the customized AOC application, via Ground Support Equipment (GSE).

The GSE enables Operators to create, consult, change and test the customized AOC application.

AOC FUNCTIONS

Applicable to: ALL

The AOC application performs the following:

- Message management function
- Out-Off-On-In (OOOI) function.

MESSAGE MANAGEMENT FUNCTION

The AOC application either warns, or advises, the flight crew that an AOC message is received, depending on the message priority.

[L2] Operators use the GSE to customize the ECAM MEMOs and aural alerts, that are associated with the AOC message.

[L1] The AOC enables the flight crew to automatically:

- Print specific types of messages
- Send specific types of messages
- Delete all messages from the mailbox at the end of each flight
- Store all messages in the appropriate directory (sent, inbox, or outbox)
- Perform additional functions, as applicable, depending on AOC customization.

The AOC enables the flight crew to manually:

- Print messages
- Edit messages
- Zoom messages
- Store messages, as applicable, depending on AOC customization
- Send pre-defined messages to the company ground station with an associated free text.

*Note: In the case of loss of ACARS transmission, the status of AOC downlink messages may be wrong, and uplink messages may not appear in the mailbox.
In this case, the flight crew must record a defect in the logbook.*

OUT-OFF-ON-IN (OOOI) FUNCTION

The AOC application computes and sends automatic reports (also called OOOI reports) to provide the Operators with applicable details about aircraft and flight status, progress, and/or delays.

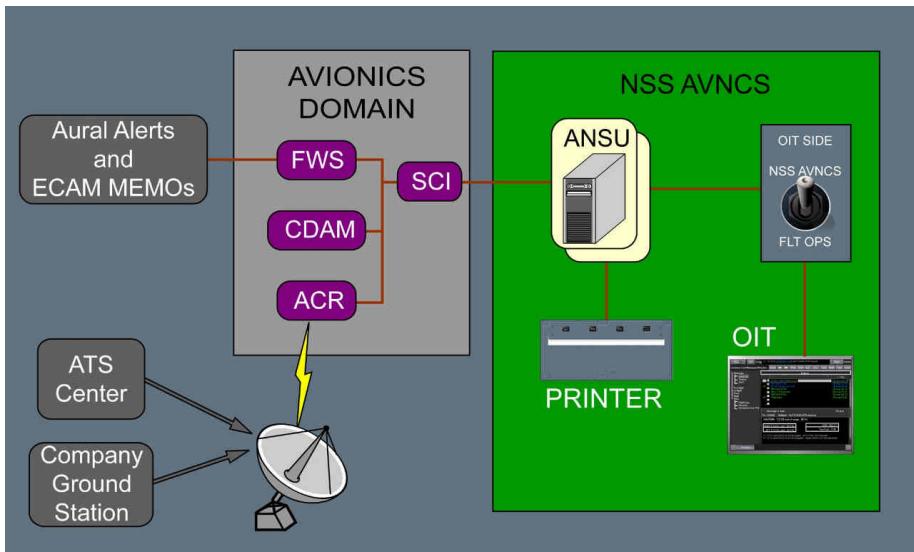
The AOC automatically sends the message at a pre-defined time during the flight (e.g. when the doors are closed, when the parking brake is off, when the landing gear is up (down), etc).

Operators use the GSE to customize the triggering conditions of these messages.

The flight crew can visualize these messages via the OIT.

Architecture**ARCHITECTURE**

Applicable to: ALL

Architecture**NSS AVIONICS**

The AOC function is hosted by the avionics domain of both Avionics Network Server Units (ANSU 1 and ANSU 2). In the case of an ANSU 1 failure, ANSU 2 provides the AOC application.

The flight crew can use the AOC functions, via the OIT interfaces, if the OIT SIDE sw is set to the NSS AVNCS position.

- [L3] On ground only, the flight crew can access the AOC functions via the Onboard Maintenance Terminal (OMT).

Refer to Limitations / 45-On Board Maintenance System / OMT

- [L1] The AOC can automatically print various received messages, via the printer that is on the center pedestal. The flight crew can use this printer to manually print any message.

Refer to Limitations / 46-Information Systems / Printers

For more information about the NSS Avionics domain, *Refer to Informations Systems / OIS / Architecture*.

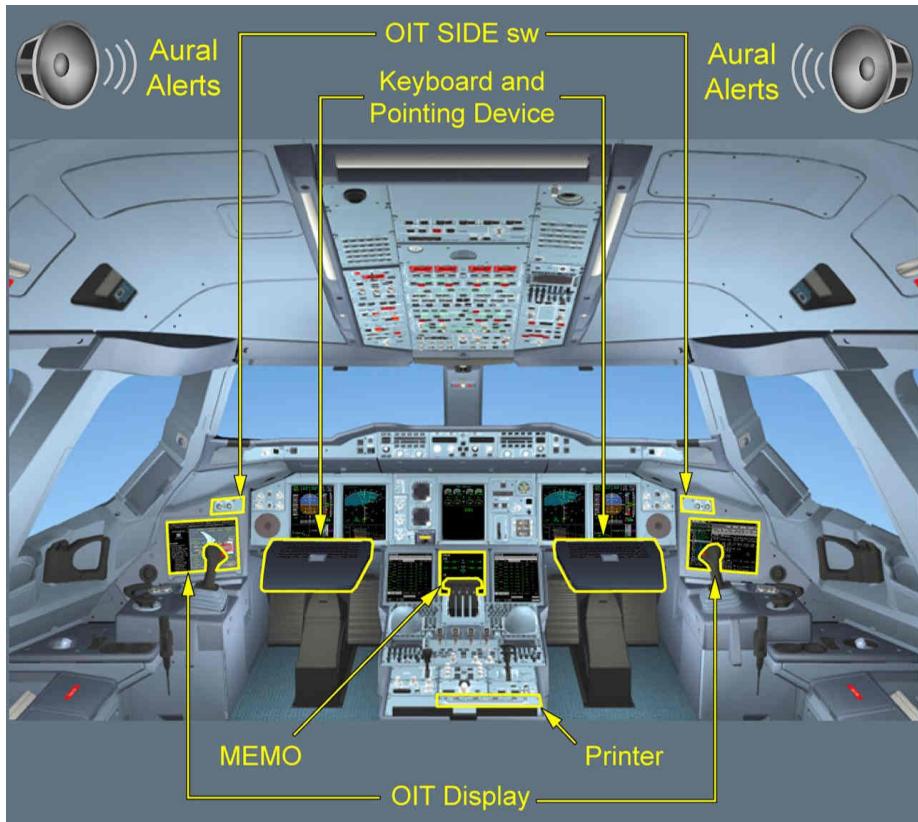
L2 AVIONICS DOMAIN

In association with the avionics domain, the AOC application:

- Exchanges information with the FWS via the Secure Communication Interface (SCI), in order to trigger ECAM MEMOs and aural alerts
- Can automatically insert data from the avionics parameters in the messages
The Centralized Data Acquisition Module (CDAM) records these avionics parameters.
- Receives defined parameters (i.e. company identifier, flight number, etc) from the Avionics Communication Router (ACR).
The ACR also transmits AOC messages to the company ground station.

COCKPIT VIEW

Applicable to: ALL

Cockpit View**PRINTER**

Applicable to: ALL

The AOC automatically prints various received messages, via the printer that is on the center pedestal. The flight crew can also use this printer to manually print any message.

OIT DISPLAY**Applicable to:** ALL

The flight crew uses the OIT display to:

- Access the AOC application
- Display, edit, print, send, delete, and/or store AOC messages.

OIT SIDE SW**Applicable to:** ALL

The flight crew has access to the AOC function on the onside OIT.

KEYBOARD AND POINTING DEVICE**Applicable to:** ALL

The flight crew can use the keyboard and the pointing device that are on the sliding table, in order manage the AOC application.



The flight crew can also consult the AOC application via the additional control panel, if the keyboard is retracted, or not available.

MEMO

Applicable to: ALL

L12

COMPANY MSG

The flight crew received a company message.
No longer appears, when the flight crew read all the received messages.

An aural alert may also be associated with this message. For more information on the aural alert, *Refer to DSC-46-40-20 Aural Alerts*.

Flight phase inhibition:

Flight Phase Inhibition

L12

COMPANY MSG:PRNTR

The flight crew received a company message that will be automatically printed.

No longer appears, when:

- The flight crew read all the received messages that are associated with the automatic printout, or
- All the messages, associated with the automatic printout, are printed.

An aural alert may also be associated with this message. For more information on the aural alert, *Refer to DSC-46-40-20 Aural Alerts*.

Flight phase inhibition:

Flight Phase Inhibition

[L12]

COMPANY ALERT

The flight crew received an urgent company message.

Flashes for 180 s, then remains steady.
No longer appears, when the flight crew read all of the urgent messages.
An aural alert is also associated with this message.
For more information on the aural alert, *Refer to DSC-46-40-20 Aural Alerts*.

[L2] Flight phase inhibition:

Flight Phase Inhibition

L12

COMPANY ALERT: PRNTR

The flight crew received an urgent message that is automatically printed.

Flashes for 180 s, then remains steady.

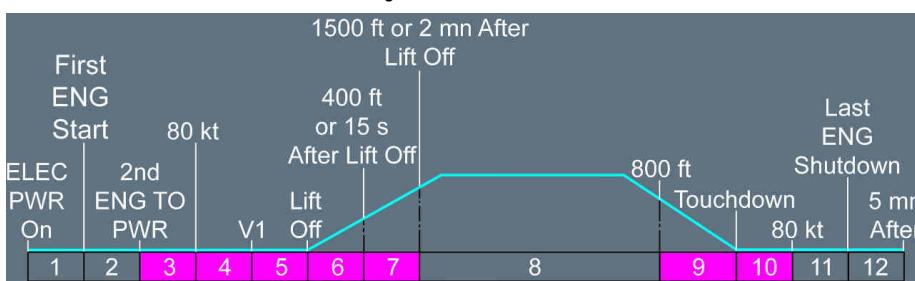
No longer appears, when:

- The flight crew read all the urgent messages that are associated with the automatic printout, or
- All the urgent messages, associated with the automatic printout, are printed.

An aural alert is also associated with this message.

For more information on the aural alert, *Refer to DSC-46-40-20 Aural Alerts*.

L2 Flight phase inhibition:

Flight Phase Inhibition

L12

CALL COMPANY

The flight crew received a company message that requires them to contact the company on the specified frequency.

No longer appears, when the flight crew read all the received messages that require them to contact the company on the specified frequency.

An aural alert is also associated with this message. For more information on the aural alert, *Refer to DSC-46-40-20 Aural Alerts*.

L2 Flight phase inhibition:

Flight Phase Inhibition

AURAL ALERTS
Applicable to: ALL

| Aural Alert | Sound | Meaning | Inhibition Condition |
|-----------------|------------------------------|--|---|
| COMPANY MESSAGE | (Audio not available in PDF) | The flight crew has received a company message. It is associated with: - The COMPANY MSG MEMO, or - The COMPANY MSG: PRNTR MEMO. | The AOC inhibits the aural alert, when the aircraft goes below 10 000 ft in flight phase 8. |
| COMPANY ALERT | (Audio not available in PDF) | The flight crew has received an urgent company message. It is associated with: - The COMPANY ALERT MEMO, or - The COMPANY ALERT: PRNTR MEMO. | The AOC inhibits the aural alert, when the aircraft goes below 10 000 ft in flight phase 8. |
| CALL COMPANY | (Audio not available in PDF) | The flight crew has received a company message that requires them to contact the company on the specified frequency. It is associated with the CALL COMPANY MEMO. | The AOC inhibits the aural alert, when the aircraft goes below 10 000 ft in flight phase 8. |

AIRCRAFT SYSTEMS

49 - AUXILIARY POWER UNIT (APU)

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49 - AUXILIARY POWER UNIT (APU)

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49 - AUXILIARY POWER UNIT (APU)

SYSTEM DESCRIPTION

OVERVIEW

Applicable to: ALL

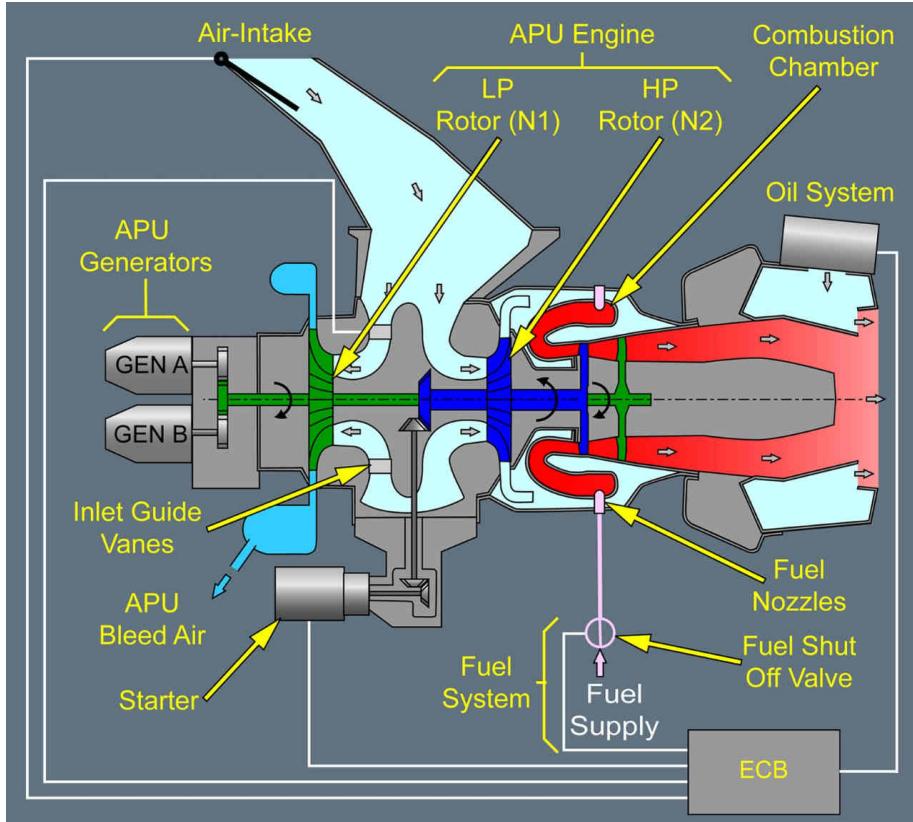
The Auxiliary Power Unit (APU) can provide:

- On ground:
 - Bleed air for engine start, and for air conditioning
 - Electrical power, via two generators.
- During takeoff:
 - Bleed air for air conditioning
When needed (e.g. when optimum aircraft performance is required), the APU provides bleed air for air conditioning.
- In flight:
 - Bleed air for engine start, or as a backup for air conditioning, up to an altitude of 22 500 ft, when the aircraft speed is below MACH 0.56, and regardless of the aircraft speed, in case of all engine flame out.
 - A backup for electrical power via one generator, up to an altitude of 22 500 ft, when the aircraft speed is below MACH 0.56, and regardless of the aircraft speed, in the case of an all engine flame out.

SYSTEM ARCHITECTURE

Applicable to: ALL

System Architecture



APU ENGINE

The APU has two rotors:

- The Low Pressure (LP) rotor

The LP provides power for bleed air and electrical generation.

The N1 indication on the ECAM indicates the rotation speed of the power rotor.

- [L3] • The LP is made of a turbine that drives the load compressor. The air compressed by the load compressor is delivered to the aircraft's bleed air system.
- The LP is connected to a shaft that drives the two APU electrical generators.
- [L1] - The High Pressure (HP) rotor.
- [L3] The HP rotor provides power to the power rotor.
- [L1] The N2 indication on the ECAM indicates the rotation speed of the HP rotor.

APU GENERATORS

When the aircraft is on ground, the APU simultaneously drives two APU generators: APU GEN A, and APU GEN B.

When the aircraft is in flight, the APU drives one APU generator: APU GEN A. If the APU GEN A fails, the APU drives the APU GEN B.

- [L3] To determine whether the aircraft is on ground or in flight, the APU uses the ground/flight information from ADR 1 and ADR 3. If ADR 1 and ADR 3 send different ground/flight information, the APU considers that the aircraft is in flight. In addition, if ADR 1(3) fails in flight, ADR 1(3) sends the in-flight information to the APU, even after landing. In this case, after landing, the APU considers that the aircraft is still in flight, and the APU only drives the APU GEN A.
- [L1] Each APU generator provides a constant frequency of 400 Hz.
- [L2] Each generator can provide a power of 120 KVA.
- [L1] Any APU generator can replace any engine generator (within the APU operational envelope). On ground, both APU generators can supply the entire aircraft network.

ELECTRONIC CONTROL BOX (ECB)

The ECB monitors and controls the operation of the APU , and displays the applicable information on the ECAM .

The ECB :

- Sequences and monitors the APU start

Refer to DSC-49-30-10 APU Start

- Monitors the operating parameters of the APU

Such parameters include N1, N2, and Exhaust Gas Temperature (EGT).

- [L3] Other parameters include speed management, speed limitation, temperature limitation, independent overspeed protection, and inlet guide vane control.

- [L2] - Monitors bleed air
- [L3] The ECB controls the APU bleed valve and the air intake flap position.
- [L2] - Sequences the manual or automatic shutdown
 - Refer to DSC-49-30-10 APU Shutdown*
 - Refer to DSC-49-40-10 APU Automatic Shutdown*
- Controls the emergency shutdown.
 - Refer to DSC-49-40-10 APU Emergency Shutdown*

AIR-INTAKE

External air flows into the APU via an air-intake flap. The flap automatically closes, when the APU is not in operation.

- [L2] The ECB automatically and electrically controls the opening and closure of the flap.

INLET GUIDE VANES (IGV)

The IGVs control the bleed airflow, based on aircraft demand.

They regulate the flow of air that enters and exits the load compressor.

The ECB controls the IGVs.

Impacted by TDU: 00021434 APU Starter

APU STARTER

The APU starter starts the APU, when the air-intake flap is fully open, and the START pb is set to ON.

The APU starter is electrically supplied via the APU DC busbar, that is powered by:

- The APU battery, or
- The APU TR.

The ECB controls the APU starter.

Impacted DU: 00001759 APU Starter

APU STARTER

The APU starter starts the APU, when the air-intake flap is open, and the START pb is set to ON.

Note: The flight crew must check that the FLAP OPEN indication is displayed on the APU SD page before switching the APU START pb to ON.

The APU starter is electrically supplied via the APU DC busbar, that is powered by:

- The APU battery, or
- The APU TR.

The ECB controls the APU starter.

APU BLEED AIR

The APU can provide bleed air to the bleed system, via the APU bleed valve (*Refer to DSC-36-10-30 APU Bleed Air*)

- [L3] Airflow to the bleed system is controlled by the position of the IGV s, based on aircraft demand.
- [L2] The ECB controls the bleed air system of the APU .

OIL SYSTEM

The APU has two independent oil systems to lubricate and cool down:

- The APU components
- The two APU generators.

The ECB monitors the oil system (i.e. oil quantity, oil pressure and oil filter).

OIL QUANTITY

On ground, if the oil quantity is low, the APU SD page displays the pulsing OIL LVL LO indication.

Even if the OIL LVL LO indication appears on the APU SD page, the flight crew can operate the APU normally.

- [L3] The OIL LVL LO indication appears before the oil quantity reaches the minimum level to operate the APU . When the OIL LVL LO indication appears, the APU will continue to operate normally for at least 14 h .

- [L23] **Note:** *The OIL LVL LO indication is inhibited in flight. Therefore if the flight crew has used the APU in flight and the OIL LVL LO appears after landing, the remaining time for APU operation could be less than 14 h*

- [L2] If the quantity of oil continues to decrease down to the critical oil level, the APU automatically shuts down and the ECAM triggers the APU FAULT alert.

OIL FILTER

One oil filter protects both oil systems from contamination.

When the oil filter is clogged, the ECAM triggers APU OIL FILTER CLOGGED (*Refer to procedure*).

FUEL SYSTEM

The fuel system supplies the APU with the appropriate quantity of fuel. (*Refer to DSC-28-10 APU FEED*)

In addition to the APU feedline shutoff valve, the APU has a fuel shutoff valve.

The fuel shutoff valve automatically closes when the APU is not in operation, or in the event of an emergency.



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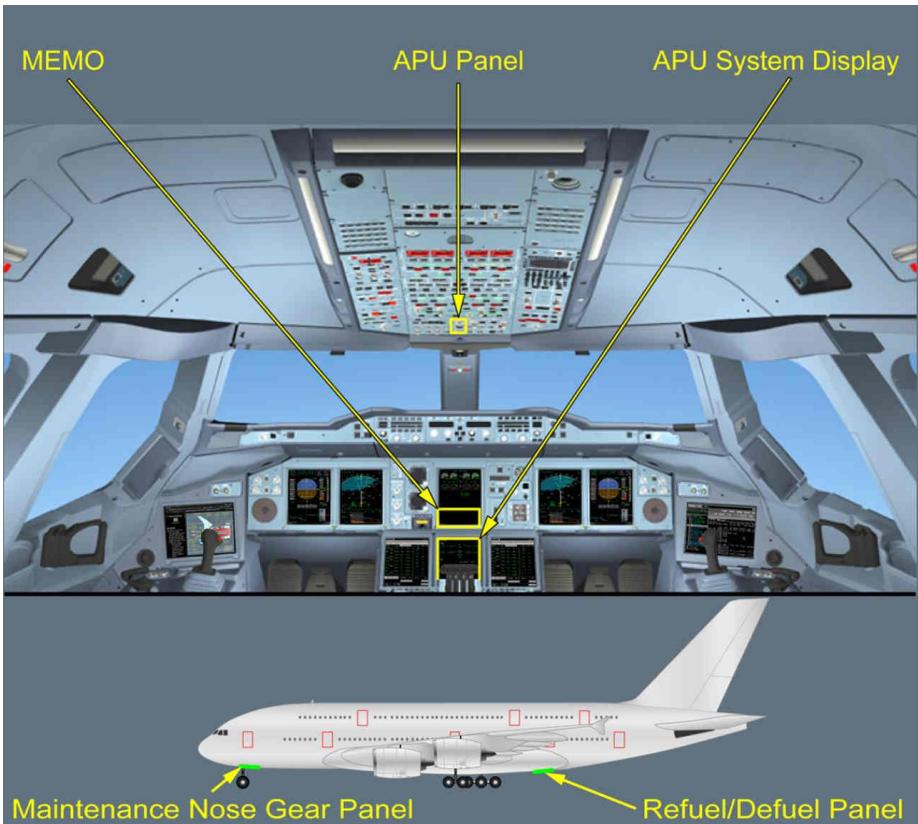
AIRCRAFT SYSTEMS
49 - AUXILIARY POWER UNIT (APU)

SYSTEM DESCRIPTION

The ECB controls fuel flow.

COCKPIT VIEW

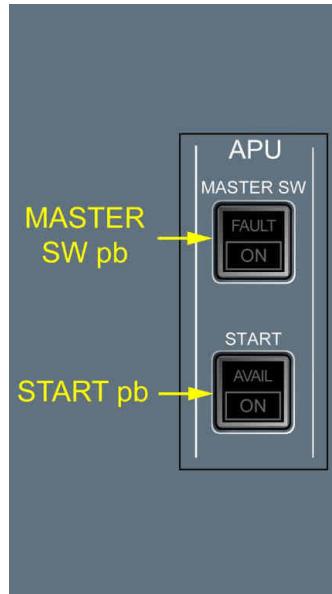
Applicable to: ALL

Cockpit View

APU PANEL

Applicable to: ALL

APU Panel

**MASTER SW pb-sw**

The APU is off.

When pressed, the APU system is powered and the air-intake flap opens.



The APU is in operation.

When pressed, the APU shutdown sequence begins.

L12



- The APU is failed, or
- An automatic shutdown has occurred, or
- An emergency shutdown has occurred.
Associated with the following ECAM alert:
- **APU FAULT** (*Refer to procedure*)

START pb

The APU is off.



The APU is starting.

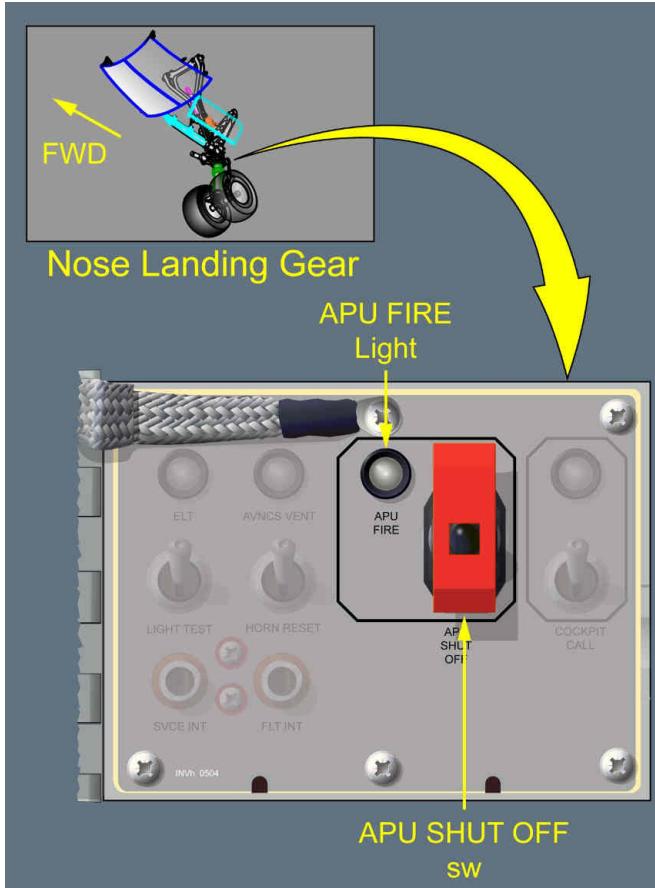
When the APU reaches 95 % speed, the ON light goes off and the AVAIL light comes on.



The APU is started, and can provide electrical power, and/or bleed air.

MAINTENANCE NOSE GEAR PANEL

Applicable to: ALL

Maintenance Nose Gear Panel**APU FIRE LIGHT**

Normal position. No fire is detected.



Fire is detected in the APU compartment. In addition of the light, an external horn comes on.

The APU automatically shuts down, the APU fuel valves close, and the APU fire extinguisher discharges the agent.

The light and the horn remain on, until the fire is extinguished.

APU SHUT OFF SW



Normal position.



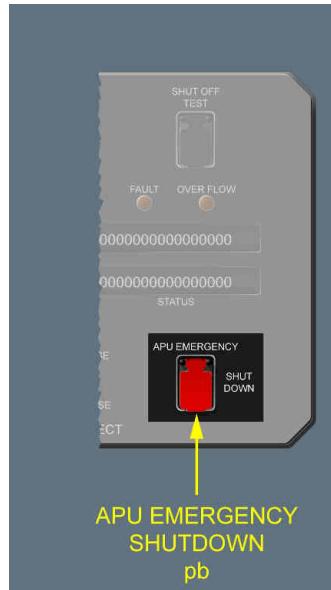
The ground crew has opened the guard.

When pushed down and released:

- Initiates an APU shutdown from outside the aircraft (normal operation), or
- Initiates an emergency shutdown of the APU , due to an APU failure (*Refer to the Emergency Shutdown Description*).

REFUEL/DEFUEL PANEL

Applicable to: ALL

Refuel/Defuel Panel**APU Emergency Shutdown pb**

Normal position.



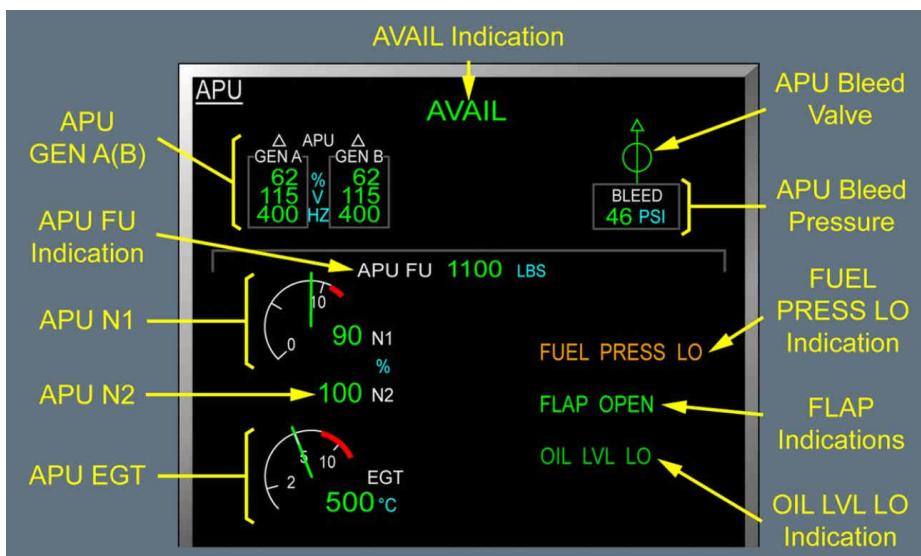


When pressed, the APU shuts down, without a cooling period.

APU SYSTEM DISPLAY

Applicable to: ALL

APU SD Page



AVAIL INDICATION

L12

AVAIL

APU is running, and can provide bleed air and electrical power.
This indication appears, when N1 is greater than 95 %.

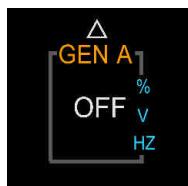
APU GEN A(B)

The APU generator indications on the SD differ, when the APU generator is:

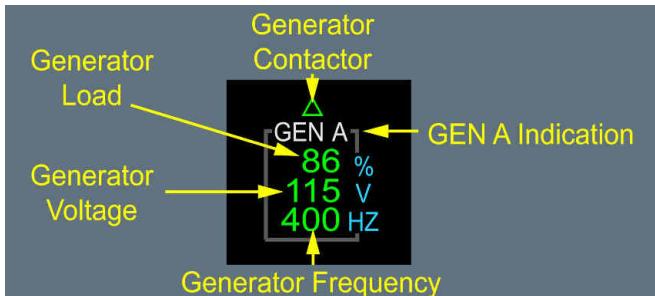
- On standby, or
- Off, or
- In operation.

APU GENERATOR ON STANDBY

The APU generator is on standby: The APU is off.

GEN A SET TO OFF

The APU generator is off: The APU is on, and the APU GEN A pb-sw is set to **OFF**.

APU GENERATOR IN OPERATION**GEN A In Operation****GENERATOR CONTACTOR**

The APU generator is connected to the electrical network.



The APU generator is not connected to the electrical network.



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49 - AUXILIARY POWER UNIT (APU)

CONTROLS AND INDICATORS

GEN A INDICATION

GEN A Normal operation.

GENERATOR LOAD

L12

90 %

The APU generator load is normal.
The load is normal, when it is less than 108 %.

L12

110 %

There is an overload on the APU generator.
The load is greater than 108 % for more than 10 s.

GENERATOR VOLTAGE

L12

115 v

The APU generator voltage is normal.
The voltage is normal between 110 V and 120 V.

125 v

The APU generator voltage is abnormal.

GENERATOR FREQUENCY

L12

400 Hz

The APU generator frequency is normal.
The frequency is between 390 Hz and 410 Hz.

380 Hz

The APU generator frequency is abnormal.

APU FU INDICATION

L12

APU FU 1100 LBS

The quantity of fuel, used by the APU , since the last reset.

On ground, the APU FU value automatically resets during:

- The first engine-start, if the APU is running
- The touchdown
- The last engine-shutdown, if the APU is running.

In-flight, the APU FU value resets during the APU start.

For more information on the APU fuel consumption, please Refer to 00011415 **Not found**.

APU FU =1100 LBS

The quantity of fuel used by the APU is no longer calculated by the ECB . The last computed quantity remains displayed with the two amber dashes.

APU N1

The APU N1 rotation speed is normal.

L12



APU N1 rotation speed is equal to, or greater than, the APU N1 red limit.

The APU N1 red limit is the lower border of the red arc.

It is greater than 105 % .

An automatic shutdown sequence begins.

Associated with the following ECAM alert:

- APU FAULT (Refer to procedure)

APU N2

The APU N2 rotation speed is normal.

L12

110 N2

APU N2 rotation speed is equal to, or greater than, the APU N2 red limit.
It is greater than 102 %.

An automatic shutdown sequence begins.

Associated with the following ECAM alert:

- APU FAULT (*Refer to procedure*).

APU EGT INDICATION



The APU EGT is normal.

L123



The APU EGT is at, or greater than, the APU EGT red limit.

The APU EGT red limit is the lower border of the red arc.

An automatic shutdown sequence begins.

The ECB computes the APU EGT red limit. This limit can vary from 600 °C up to 1 280 °C (during APU start), depending on several external parameters (e.g. ambient temperature, pressure).

Associated with the following ECAM alert:

- APU FAULT (*Refer to procedure*)

OIL LVL LO INDICATION

L13



Pulses, and indicates a low quantity of APU oil.

The APU can continue to operate normally for at least 14 h.

Note: *The OIL LVL LO indication is inhibited in flight. Therefore if the flight crew has used the APU in flight and the OIL LVL LO appears after landing, the remaining time for APU operation could be less than 14 h*

When this indication appears, the APU SD page automatically appears.

FLAP INDICATIONS**FLAP MOVING**

The air-intake flap moves to the open, or to the closed position.

FLAP OPEN

The air-intake flap is fully open.

FUEL PRESS LO INDICATION**FUEL PRESS LO**

APU fuel pressure is low.

**BLEED
46 PSI**

The current pressure of APU bleed air.

APU BLEED VALVE

Appears only if the MASTER SW pb-sw is ON.



The APU bleed valve is closed.



The APU bleed valve is open.



The APU bleed valve is abnormally closed, and the APU BLEED pb-sw is ON.



The APU bleed valve is abnormally open, and the APU BLEED pb-sw is off.

MEMO**Applicable to: ALL****L12****APU AVAIL**

The APU is running.

The APU N1 is greater than 95 %.



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APU BLEED

The APU supplies bleed air to the air conditioning packs.



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NORMAL OPERATIONS

NORMAL OPERATIONS

Applicable to: ALL

- The ECB monitors APU start and shutdown.

APU START

When the MASTER SW pb-sw is set to ON:

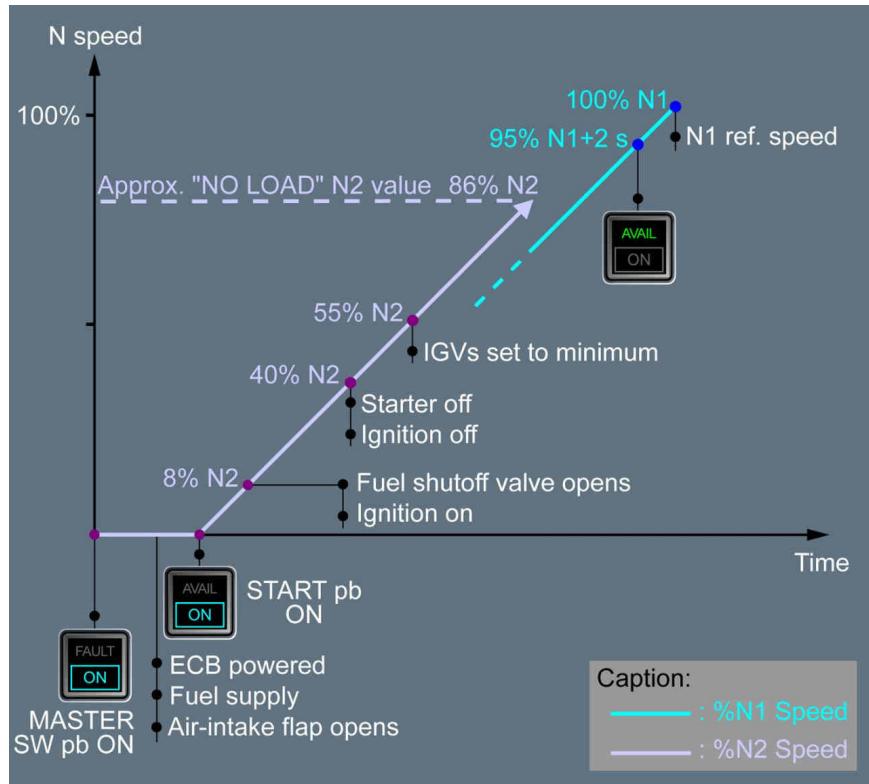
- The ON light of the MASTER SW pb-sw comes on
- The APU page appears on the SD, if the aircraft has ground power, or main generator power.

When the START pb is set to on:

- The APU start sequence begins
- When the APU is running:
 - The ON light goes off and the AVAIL light comes on, on the START pb
 - The APU AVAIL memo appears on the EWD.

Note: The MASTER SW pb-sw remains ON.

L3 DETAILED APU START SEQUENCE

Detailed APU Start Sequence

APU START SEQUENCE: ABORT OR INHIBIT CONDITIONS

| Abort/Inhibit Condition | Description | Start Abort/Inhibit | On Ground | In Flight | Confirmation Time |
|----------------------------|--|---------------------|-----------|-----------|-------------------|
| Air-intake flap | Air-intake flap fails to open | Inhibit | Yes | Yes | 40 s |
| No N2 rotation | N2 is still less than 8 % , 15 s after APU start | Abort | Yes | Yes | 15 s |
| Oil pressure not available | The oil pressure indication is not available prior to engine rotation. | Inhibit | Yes | Yes | 2 s |

Continued on the following page



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NORMAL OPERATIONS

Continued from the previous page

| Abort/Inhibit Condition | Description | Start Abort/Inhibit | On Ground | In Flight | Confirmation Time |
|--------------------------|--|---------------------|-----------|-----------|-------------------|
| No ignition | No ignition within 16 s of fuel on. Ignition is based on a temperature rise of 20 °C. | Abort | Yes | Yes | 16 s |
| Hung start | N2 is less than 40 %, 15 s after APU start. | Abort | Yes | No | 0 s |
| Abnormal N1 rotation | N1 is less than 25 %, or above 125 %, and N2 is greater than 55 %. | Abort | Yes | Yes | 0 s |
| N1 Rise time | N1 is less than 95 %, and N2 has been greater than 30 %, for more than 60 s. | Abort | Yes | Yes | 0 s |
| EGT not available | EGT indication is not available. | Inhibit/Abort | Yes | Yes | 3 s |
| EGT abnormal temperature | EGT is greater 700 °C. | Abort | Yes | Yes | 3 s |

APU SHUTDOWN

When the MASTER SW pb-sw is set to off:

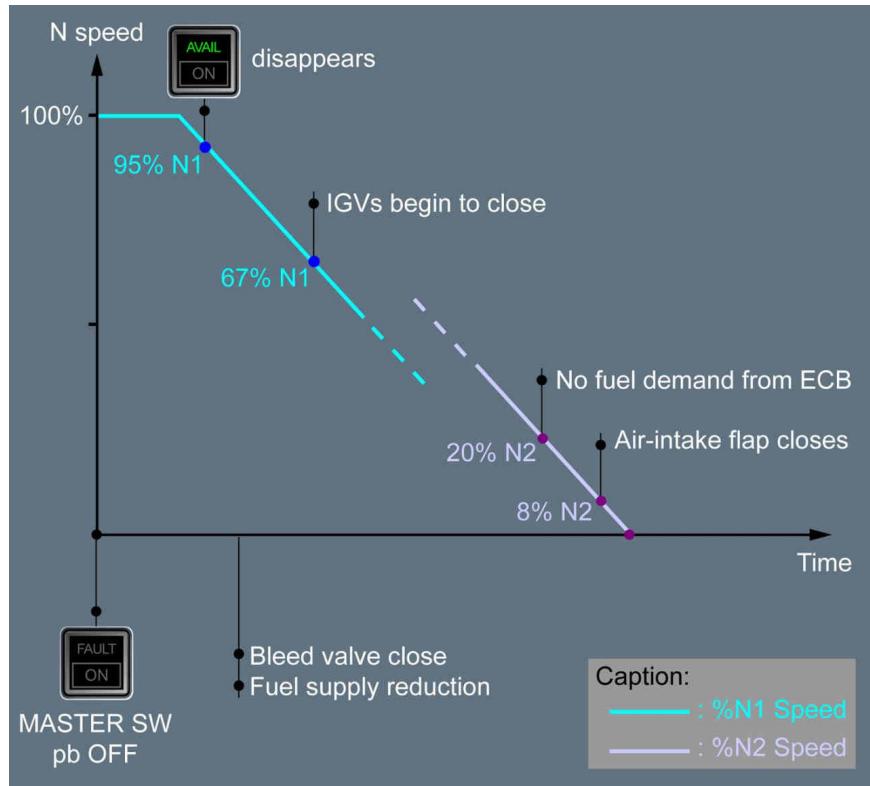
- The ON light of the MASTER SW pb-sw goes off
- The AVAIL light of the START pb goes off
- The APU bleed valve closes (if open)
- A cooling period begins

[L3] A 60-second cooling period enables the APU to run with a minimum load, in order to reduce the temperature of the APU's engine.

- [L1]
- Fuel supply to the APU stops
 - The air-intake flap closes
 - The APU stops.

L3 DETAILED APU SHUTDOWN SEQUENCE

Detailed APU Shutdown Sequence





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ABNORMAL OPERATIONS

ABNORMAL OPERATIONS

Applicable to: ALL

APU AUTOMATIC SHUTDOWN

In the case of an APU failure or misbehavior, the APU automatically shuts down, without a cooling period.

- [L2] Associated with the following ECAM alert:
- APU FAULT (*Refer to procedure*).

L13

| Shutdown Conditions | On Ground | In Flight |
|---|-----------|----------------|
| Aircraft emergency stop | Yes | Not applicable |
| N1 overspeed: N1 is greater than 105 % | Yes | Yes |
| N2 overspeed: N2 is greater than 102 % | Yes | Yes |
| APU oil low pressure | Yes | No |
| APU Generator oil low pressure | Yes | No |
| APU oil high temperature | Yes | No |
| Generator oil high temperature | Yes | No |
| EGT Limit Exceeded: EGT is higher than 700 °C | Yes | Yes |
| ECB failure | Yes | Yes |
| APU fuel system failure | Yes | Yes |
| No normal DC power | Yes | Yes |
| N1 underspeed: N1 is less than 88 % | Yes | Yes |
| Loss of N1 or N2 overspeed protection | Yes | Yes |
| Bleed air reverse flow | Yes | Yes |

APU EMERGENCY SHUTDOWN

An immediate APU shutdown, without a cooling period, can occur when:

- One of the following is pressed:
 - APU FIRE pb on the overhead panel
 - APU Emergency Shutdown pb on the Refuel/Defuel panel
 - APU Shut Off sw on the Maintenance Nose Gear panel.
- An APU fuel feedline damage is detected.

- [L2] Associated with the following ECAM alert:
- APU FAULT (*Refer to Procedure*)



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ABNORMAL OPERATIONS

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ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

APU FAULT (*Refer to procedure*)

APU MACH LIMIT EXCEEDED (*Refer to procedure*)

APU OIL FILTER CLOGGED (*Refer to procedure*)



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ECAM ALERTS

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ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Subsystem | Electrical Supply |
|--------|-------------|---|
| APU | ECB | APU DC ⁽¹⁾ / DC ESS ⁽²⁾ |
| | APU starter | APU DC |

(1) ECB is supplied by APU HOT BUS on ground, if the APU DC busbar is not supplied.

(2) Only during APU start, due to a loss of voltage on the APU BAT HOT BUS.



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ELECTRICAL SUPPLY

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DSC-52-PLP PRELIMINARY PAGES

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DSC-52-20-10 System Description

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|--|---|
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| Inside the Aircraft - How to Operate Passenger Doors..... | A |
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DSC-52-30-40 Cargo

DSC-52-30-40-10 System Description

| | |
|--|---|
| Overview..... | A |
| Forward (FWD) and Aft cargo doors..... | B |
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DSC-52-30-40-20 Controls and Indicators

| | |
|------------------------------|---|
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DSC-52-30-50 Avionics Bay Access Doors and Hatches

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| | |
|-------------------------|---|
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DSC-52-60 ECAM Alerts

| | |
|------------------|---|
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DSC-52-70 Electrical Supply

| | |
|------------------------|---|
| Electrical Supply..... | A |
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52 - DOORS

SYSTEM DESCRIPTION

OVERVIEW

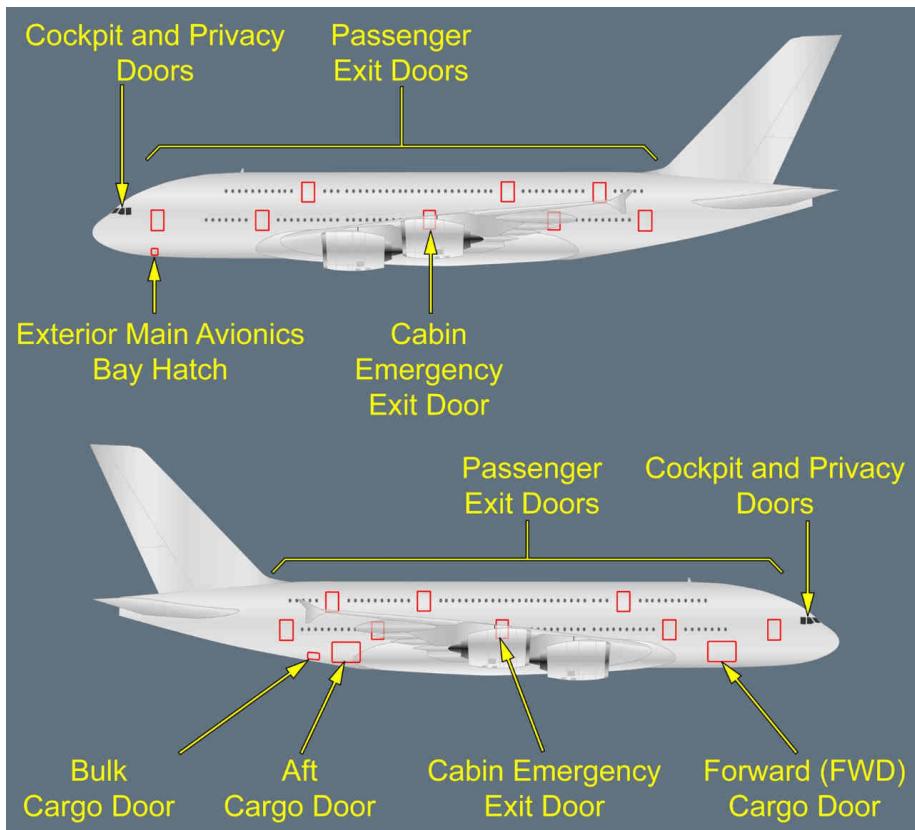
Applicable to: ALL

The aircraft has:

- In the cabin:
 - 14 passenger doors
 - 2 emergency exits.

The cabin doors are electrically controlled. The crewmember can manually control the cabin doors, if necessary.

- In the cockpit:
 - 1 cockpit door
 - 1 privacy door.
- In the cargo compartments:
 - 3 cargo compartment doors.
- In the avionics bay compartments:
 - 2 avionics bay hatches (one hatch is accessible from the outside of the aircraft)
 - 4 avionics bay access doors.

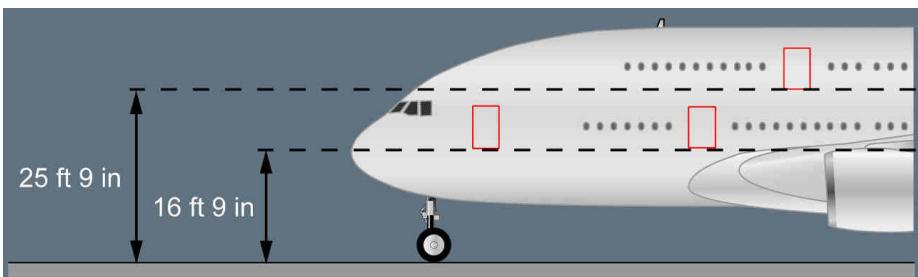
Overview

The passenger doors and emergency exits on the main deck are as follows:

- Type A
- Dimensions: Width = 4 ft 2 in , and height = 6 ft 4 in
- Door sill height = 16 ft 9 in .

The passenger doors on the upper deck are as follows:

- Type A
- Dimensions: Width = 4 ft 2 in , and height = 6 ft 4 in
- Door sill height = 25 ft 9 in .

Door Sill Height



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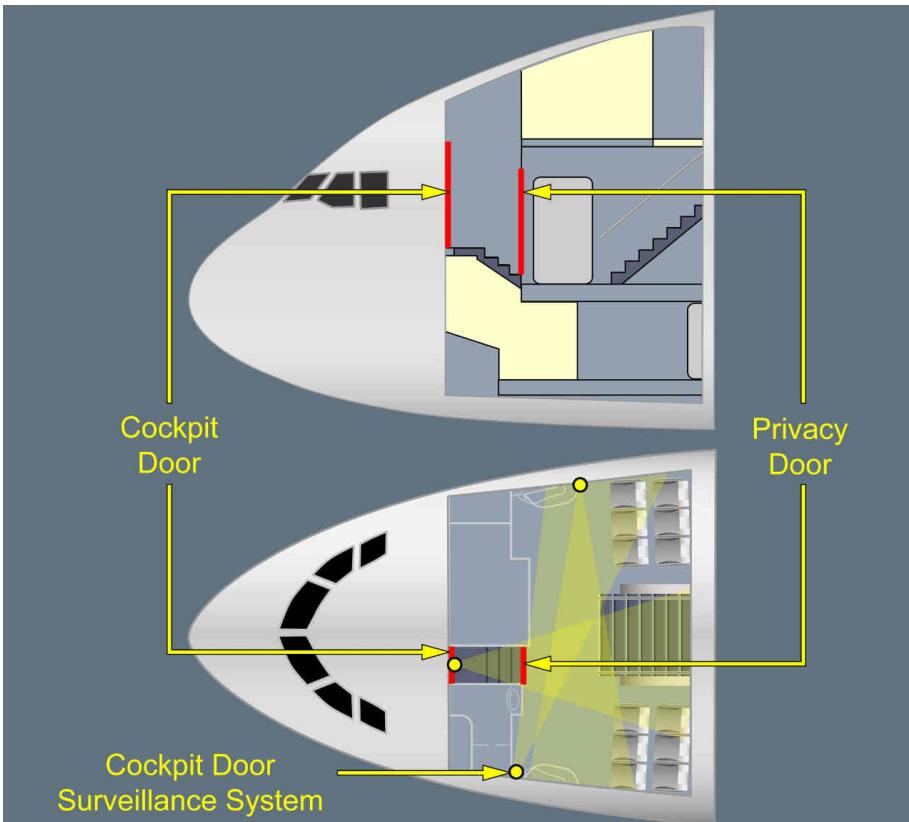
52 - DOORS

SYSTEM DESCRIPTION

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OVERVIEW

Applicable to: ALL

Overview**COCKPIT DOOR**

Applicable to: ALL

The cockpit door separates the cockpit from the cabin.

The cockpit door automatically locks, as soon as it closes, when the Cockpit Door Locking System (CDLS) is powered.

- A Cockpit Door Lock Control Unit (CDLCU) electrically locks and unlocks the cockpit door.

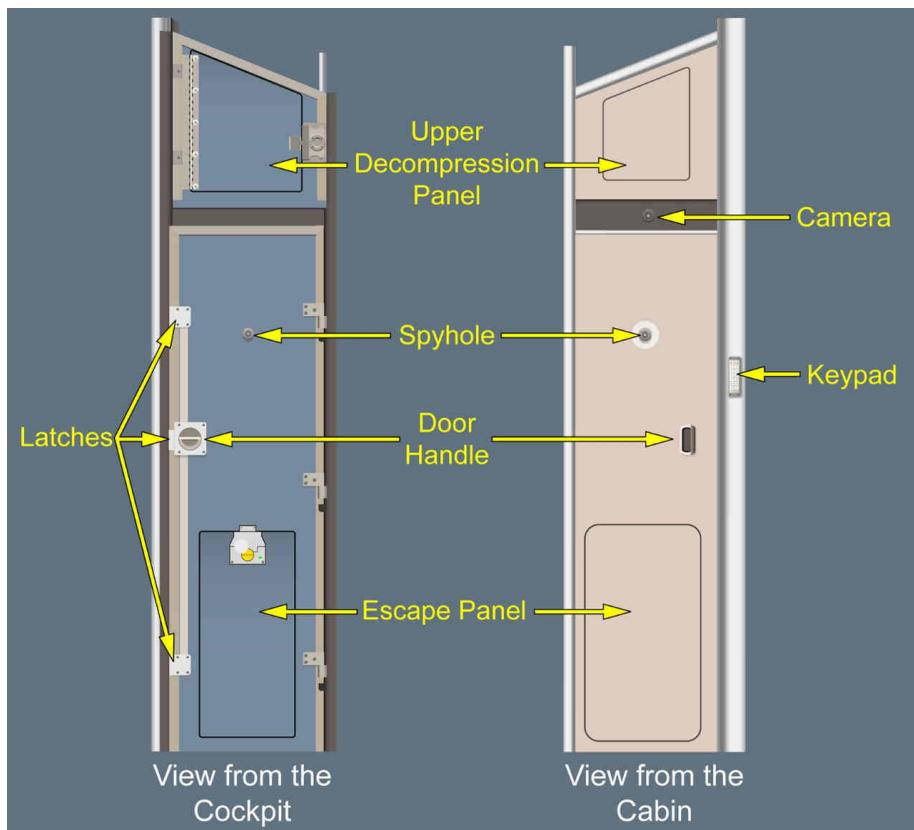
L1 If the CDLS fails, the door unlocks but remains closed.

On the overhead panel, the CKPT DOOR CONT panel indicates any failed electrical latches. For more information on the CKPT DOOR CONT panel, *Refer to DSC-52-20-20-GCKPP CKPT DOOR CONT Panel*.

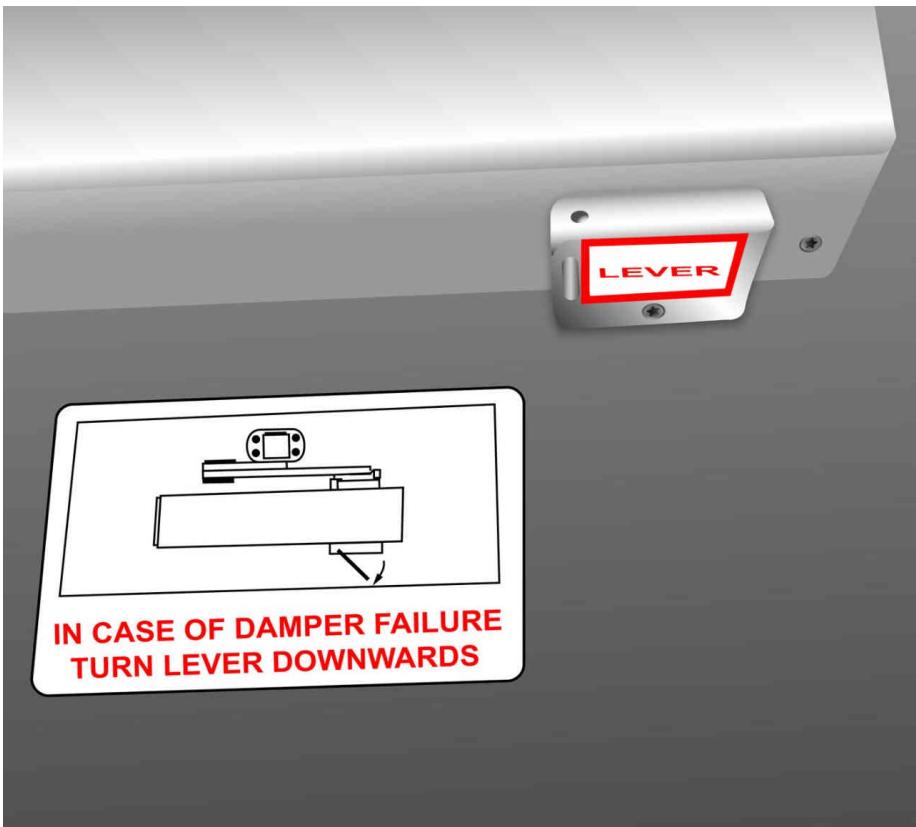
The flight crew uses the CKPT DOOR sw to either open the cockpit door, or to refuse access to the cockpit. For more information on the CKPT DOOR sw , *Refer to DSC-52-20-20-GCKPD CKPT DOOR sw*.

At any time, the flight crew can use the door handle to manually open the cockpit door.

Cockpit Door Description



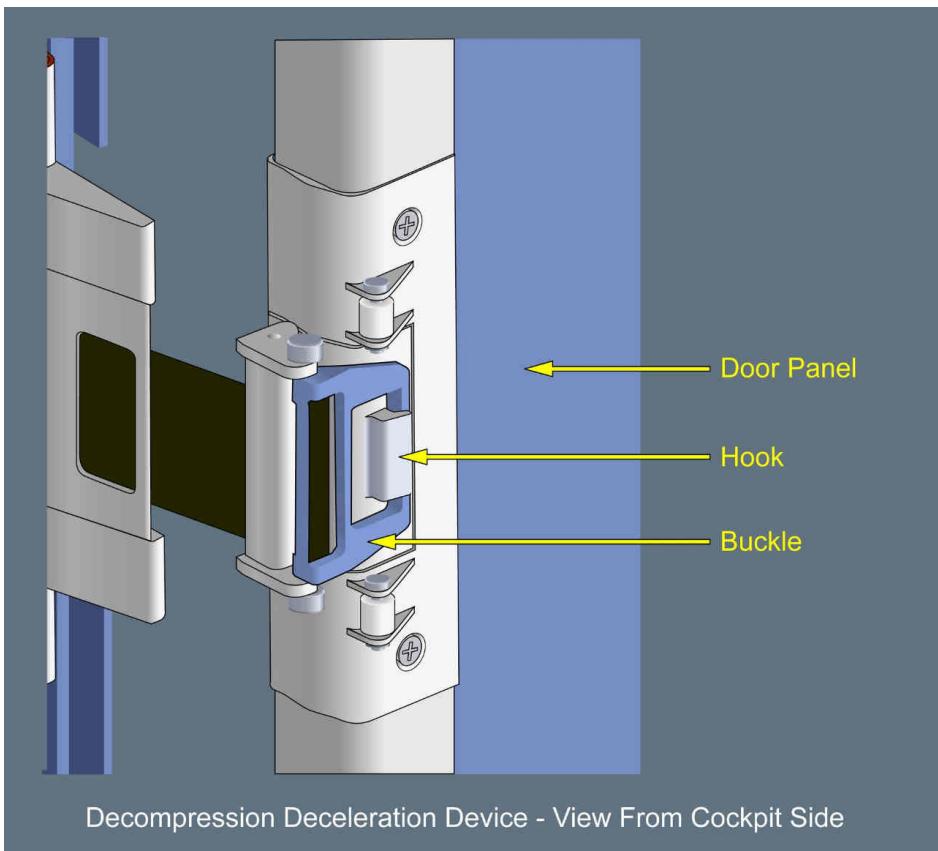
- L2 The cockpit door has a noise damper, that slows down the door during the closing and the opening. In the case of a damper blockage, the flight crew can disengage it by pulling the lever, in order to close the door.

Noise Damper

PROTECTION AGAINST DECOMPRESSION

In the case of rapid decompression in the cockpit:

- The upper decompression panel opens
- L3 The upper decompression panel automatically opens, if the differential pressure between the cabin and the cockpit is equal to, or more than, 0.145 PSI .
- L1 The decompression is detected by the pressure sensors that are located on the CKPT DOOR CONT panel. For more information, *Refer to CKPT DOOR CONT panel* .
- The cockpit door unlocks automatically.
- The Decompression Deceleration Device (DDD) slows down the opening of the cockpit door. After decompression, the flight crew must pull the buckle away from the hook in order to open the cockpit door.

Decompression Deceleration Device

Decompression Deceleration Device - View From Cockpit Side

- L3 The cockpit door automatically unlocks, if the pressure in the cockpit changes by more than 10 PSI /s.

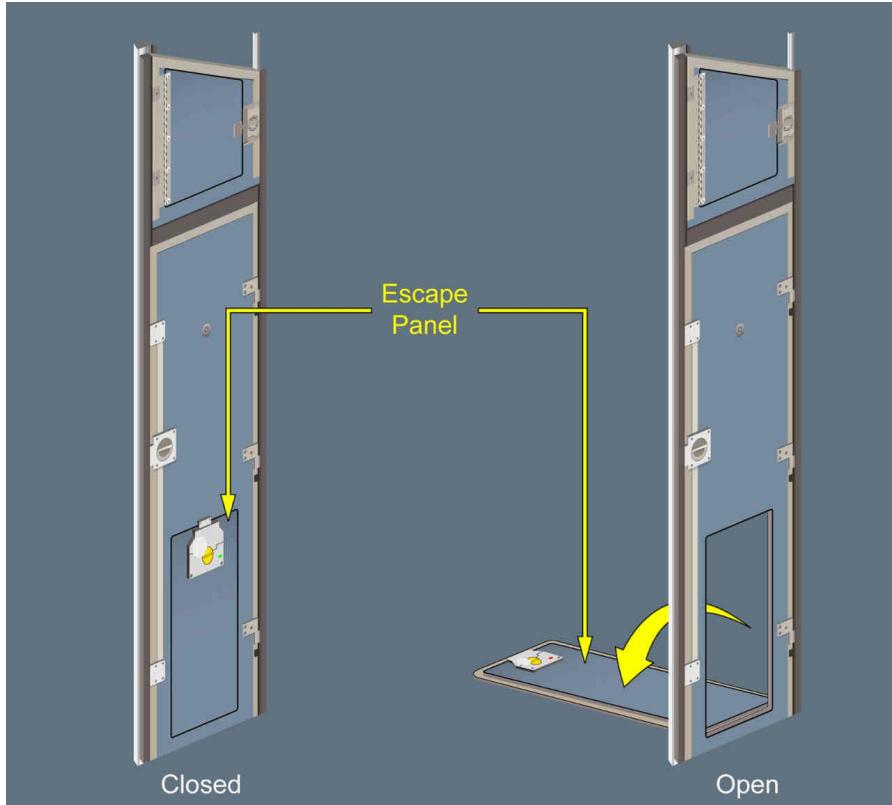
L1 **CAUTION** Do not touch the DDD , in order to avoid damage to this device.

In the case of a cabin decompression, the escape panel opens.

- L3 The escape panel automatically opens, if the pressure in the cockpit is more than approximately 0.5 PSI (in the range of 0.435 PSI - 0.580 PSI).

ESCAPE PANEL

If required, it is also possible to evacuate the cockpit through the escape panel that is on the cockpit door.



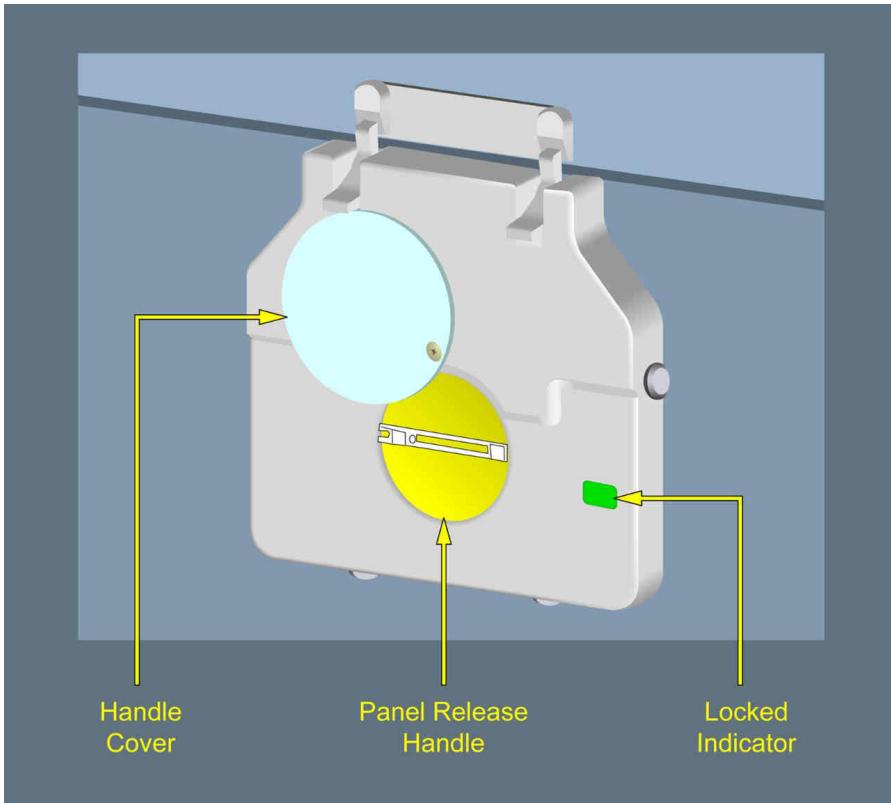
The flight crew can open the escape panel if:

- The cockpit door is jammed in the closed position
- There is an emergency.

The flight crew can open the escape panel by:

- Rotating the handle cover in order to access the panel release handle
- Pushing the panel release handle, and turning it in any direction in order to unlock the escape panel.

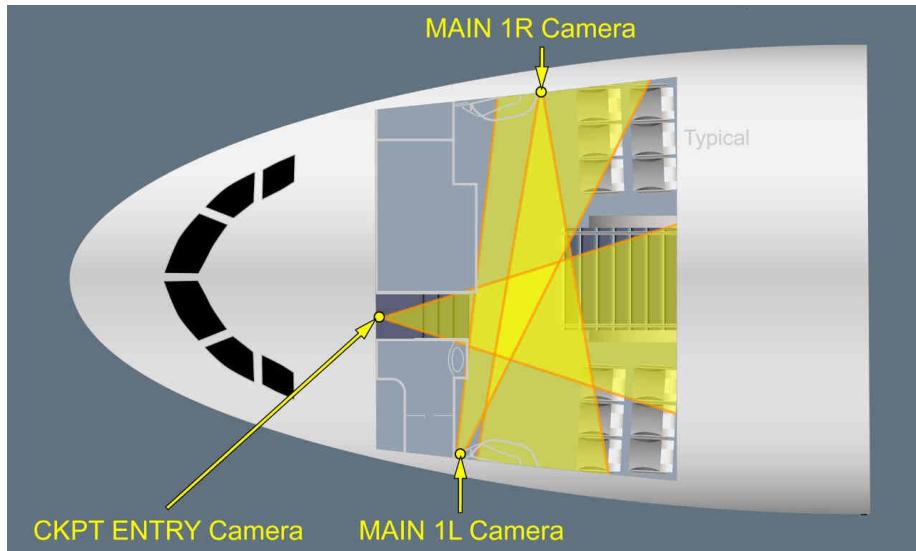
 If the escape panel is unlocked, the locked indicator is red.



COCKPIT DOOR SURVEILLANCE SYSTEM

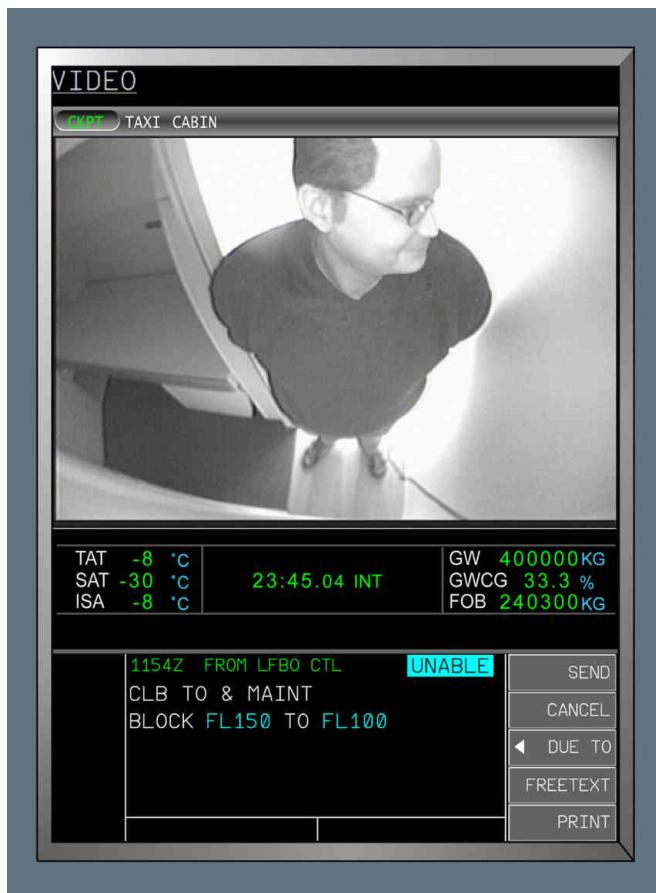
Applicable to: ALL

The Cockpit Door Surveillance System (CDSS) has three cameras that enable the flight crew to identify who is requesting entry to the cockpit, before authorizing (or not) their access.

Camera Location

The VIDEO System Display (SD) page automatically displays the CKPT ENTRY camera image, if:

- The emergency cockpit access is requested, or
- In flight, the routine cockpit access is requested, and the ECAM displays the CRUISE page.

SD Page

The flight crew can change the view of CKPT ENTRY camera to two separate images: Views of MAIN 1L camera and MAIN 1R camera.



The flight crew can also display images from these cameras without a request for cockpit access. For a detailed description, *Refer to DSC-31-80-20-10 ECAM Control Panel*.

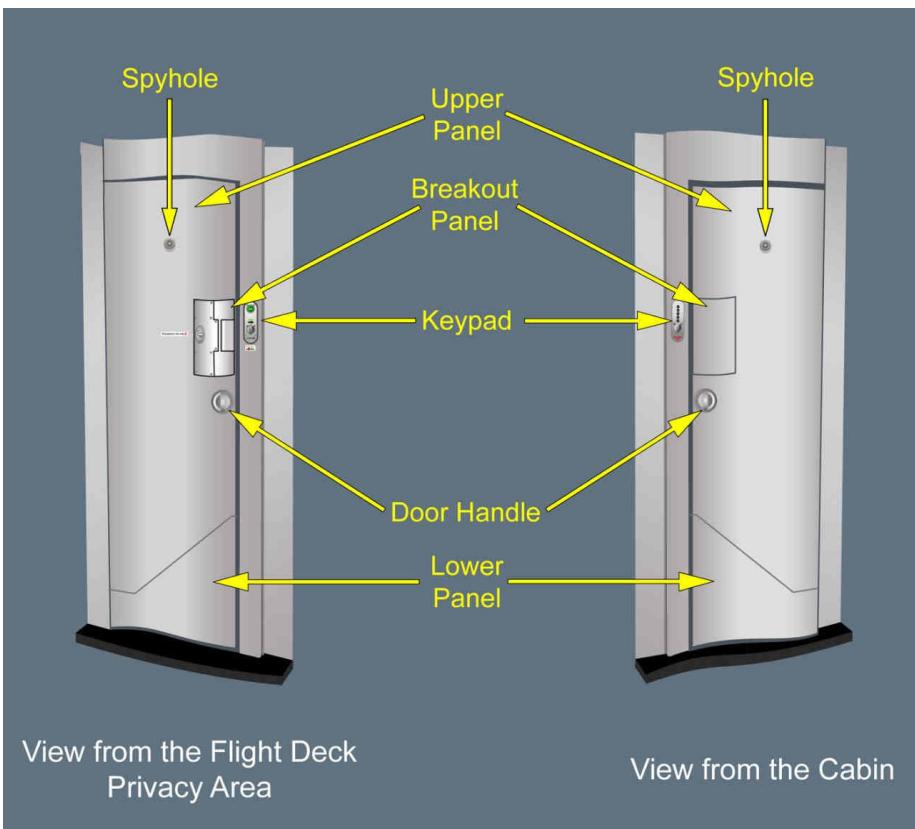
PRIVACY DOOR

Applicable to: ALL

The privacy door separates the flight deck privacy area from the cabin.

The privacy door automatically locks, as soon as it closes, when the Privacy Door Locking System (PDLS) is powered.

- A Privacy Door Lock Control Unit (PDLCU) electrically locks and unlocks the privacy door.
 The crewmember unlocks the door to access to the flight deck privacy area, via a keypad.

Privacy Door

View from the Flight Deck
Privacy Area

View from the Cabin

PROTECTION AGAINST DECOMPRESSION

The privacy door opens toward:

- The cabin, in the case of cabin decompression
- The cockpit, in the case of cockpit decompression.

The lower panel is blocked by the stairs. The upper panel opens fully toward the corridor of the flight deck privacy area.



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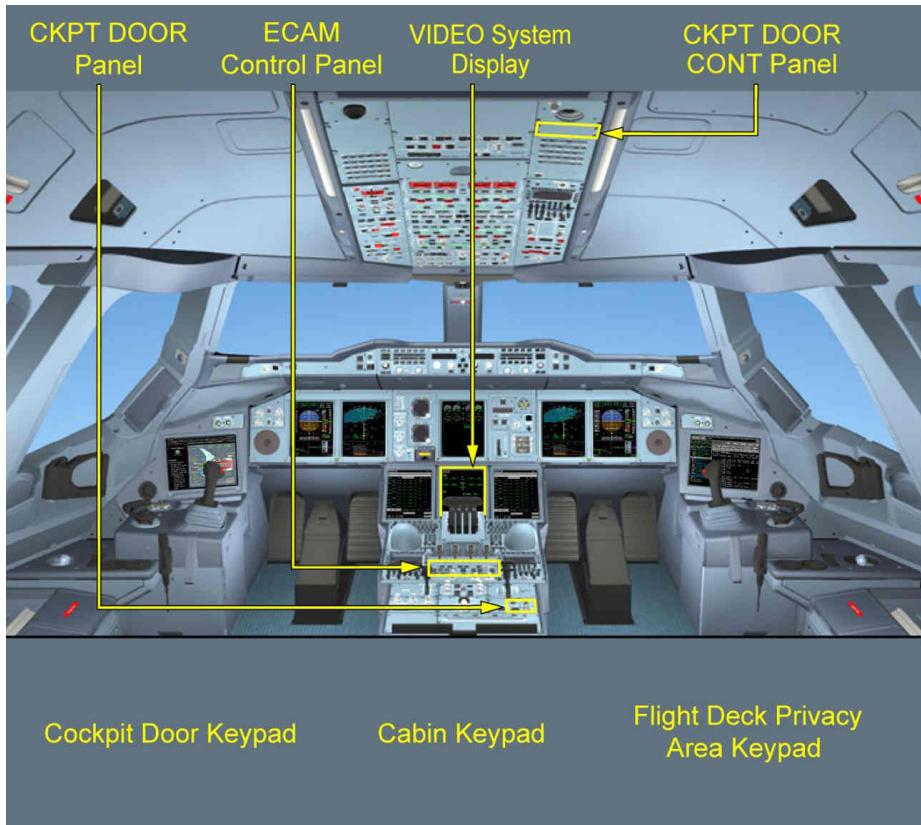
52 - DOORS

COCKPIT - SYSTEM DESCRIPTION

- [L2] Decompression devices are automatically released, if the differential pressure between the cabin and the flight deck privacy area/cockpit is at, or above 0.145 PSI.

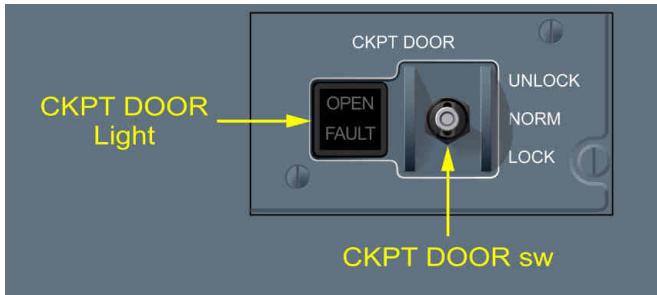
COCKPIT VIEW

Applicable to: ALL

Cockpit View

CKPT DOOR PANEL

Applicable to: ALL

CKPT DOOR PanelCKPT DOOR sw

Unlocks the door, as long as the flight crew maintains the UNLOCK position.

Note: When the flight crew releases the switch, it goes back to the NORM position.



The door is locked. If a crewmember enters a routine access code on the keypad, the door remains locked.

Note: If a crewmember enters the emergency access code on the keypad, the door automatically unlocks for 5 s, after a defined period of time.
The Operator defines this period of time.



Locks the door, and inhibits the keypad and the buzzer for a defined period of time.

The Operator defines this period of time (between 5 min and 20 min).

Note: When the flight crew releases the switch, it goes back to the NORM position.

CKPT DOOR LIGHT

Steady: The door is open.

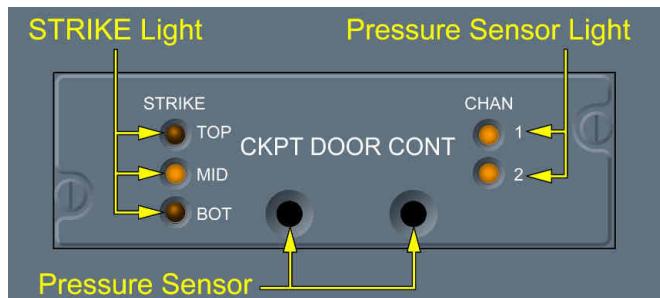
Flashing: A crewmember enters an emergency access code on the keypad.



The CDLS is failed.

CKPT DOOR CONT PANEL

Applicable to: ALL

CKPT DOOR CONT Panel**STRIKE LIGHT**

The corresponding (upper, mid or lower) locking strike is operative.



The corresponding (upper, mid or lower) locking strike is not maintained in the locked position.

To attempt to recover the CDLS , Refer to PRO-SUP-24-52 Cockpit Door Locking System (CDLS) Reset .

After a CDLS reset:

- If the light goes off, the system has resumed normal operation
- If the light remains on, the CDLS is failed.

PRESSURE SENSOR

Two redundant differential pressure sensors enable the detection of a rapid variation in pressure. The pressure sensors enable the simultaneous opening of all latches, when a defined pressure drop is detected.

PRESSURE SENSOR LIGHT

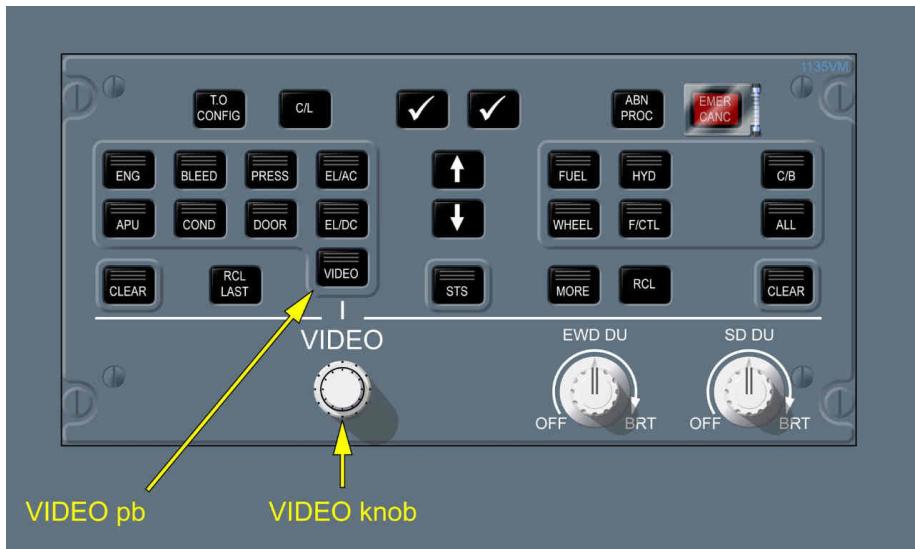
The corresponding (CHAN 1 or CHAN 2) pressure sensor is operative.



The corresponding (CHAN 1 or CHAN 2) pressure sensor is inoperative.

ECAM CONTROL PANEL

Applicable to: ALL

ECAM Control Panel**Video pb**

The SD does not display the VIDEO page.



The SD displays the VIDEO page.

VIDEO knob



The outer part of the VIDEO knob enables the flight crew to select a different video system to be displayed on the SD.

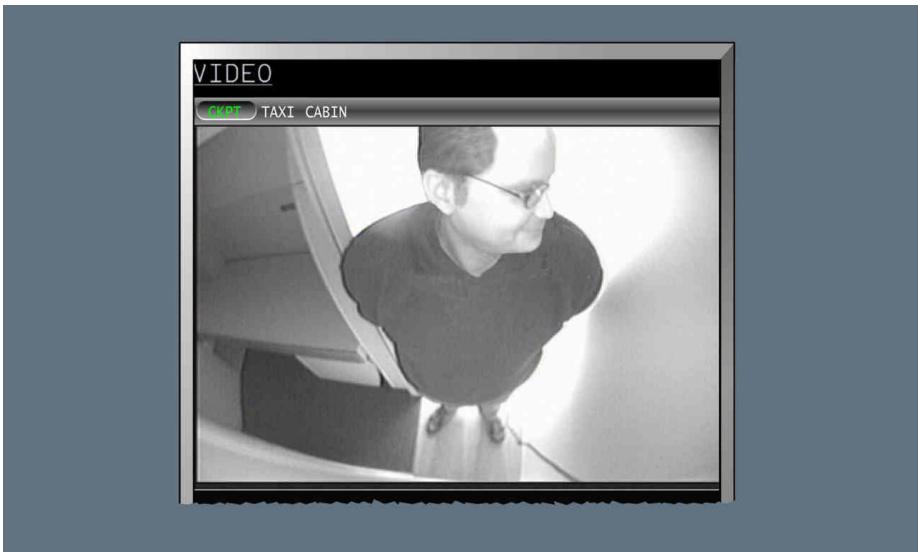
The inner part of the VIDEO knob enables the flight crew to select a video camera, as applicable.

VIDEO SYSTEM DISPLAY

Applicable to: ALL

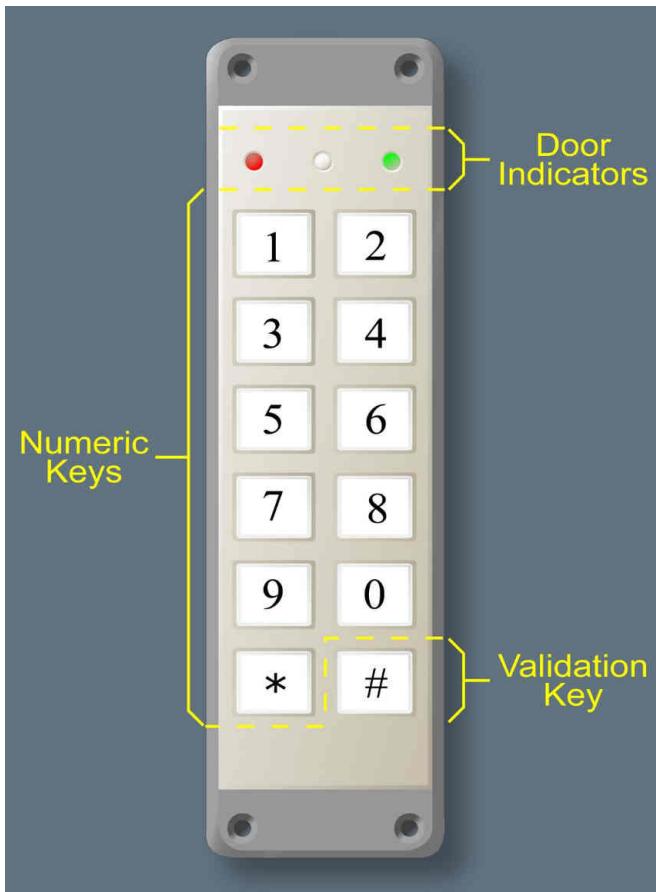
The VIDEO system display provides the flight crew with live video images of the cockpit door entrance area.

VIDEO System Display



COCKPIT DOOR KEYPAD

Applicable to: ALL

Keypad**DOOR INDICATORS**

The CKPT DOOR sw is set to UNLOCK.
The door is not locked, and can be opened.

L12



The CKPT DOOR sw is set to LOCK.

The door is locked, and cannot be opened for several minutes.

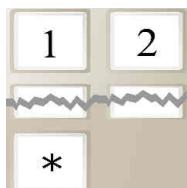
The keypad is inhibited.

The Operator defines the locking period of time (between 5 min and 20 min).



Any key is pressed.

NUMERIC KEYS



Enables the entry of a code.

VALIDATION KEY

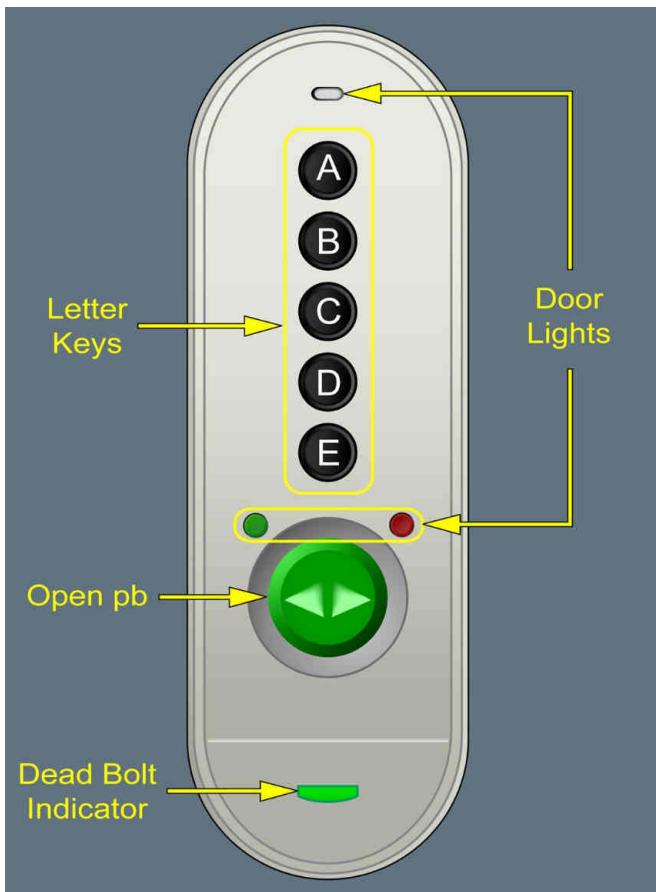


Validates a code.

CABIN KEYPAD

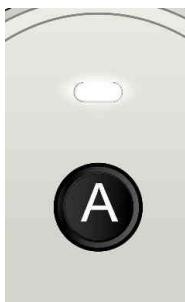
Applicable to: ALL

Cabin Keypad

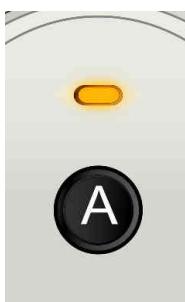


LETTER KEYS

Enables the entry of a code.

DOOR LIGHTS

Any key is pressed.



The Privacy Door Locking System (PDLS) is failed.



Comes on briefly: The code is successfully entered.

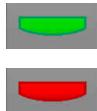
Comes on for 5 s: During this time, the door is unlocked and can be opened.



- Comes on briefly: The door is closed and locked.
- Comes on for 2 s: The code is not correctly entered.

OPEN PB

When pressed, the door is unlocked for 5 s.

DEAD BOLT INDICATOR

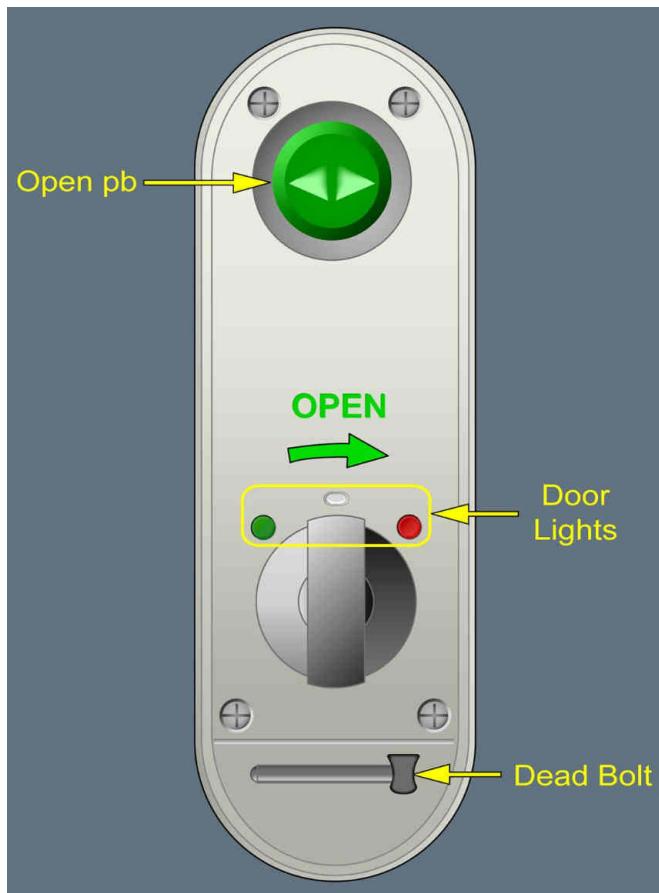
The dead bolt is not engaged and the door can be opened via the keypad.

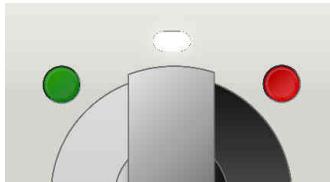
The dead bolt is engaged and the door is locked.

FLIGHT DECK PRIVACY AREA KEYPAD

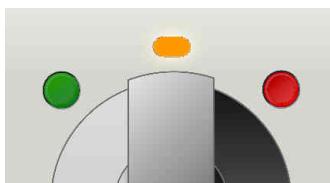
Applicable to: ALL

Keypad

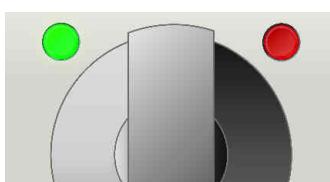


DOORS LIGHTS

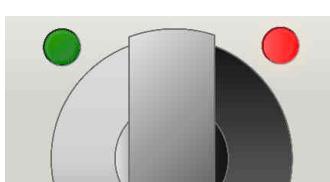
Any key is pressed.



The Privacy Door Locking System (PDLS) is failed.
The privacy door is unlocked.



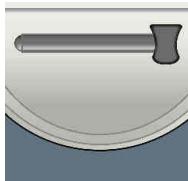
Comes on for 5 s: During this time, the door is unlocked and can be opened.



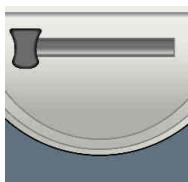
Steady: The door is locked.

OPEN PB

When pressed, the door is unlocked for 5 s.

DEAD BOLT

The dead bolt is not engaged, and the door can be opened via the keypad.



The dead bolt is engaged, and the door is locked.



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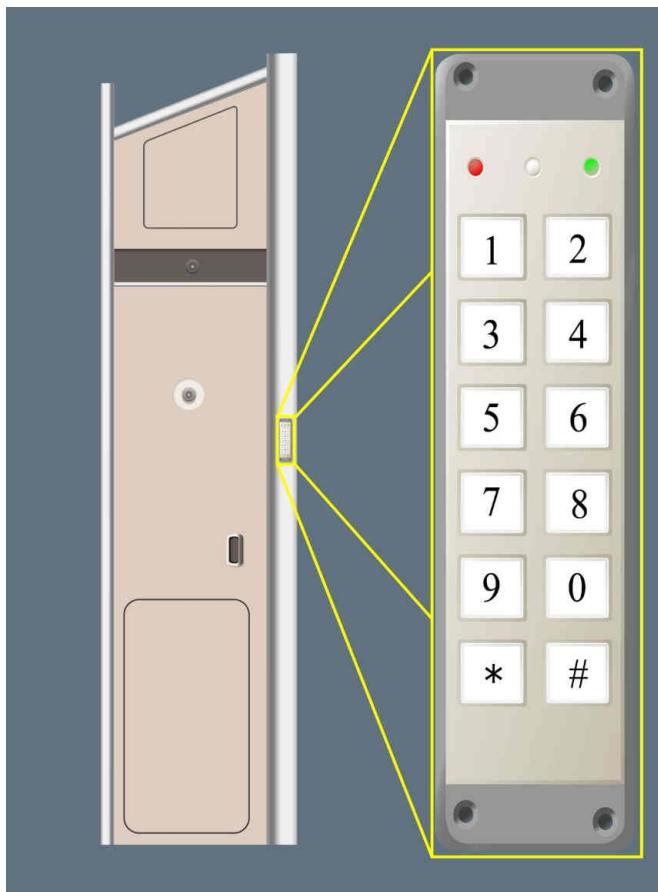
52 - DOORS

COCKPIT - CONTROLS AND INDICATORS

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HOW TO OPERATE THE COCKPIT DOOR**Applicable to: ALL**

The cabin crew uses the keypad to request access to the cockpit.

Keypad**ROUTINE ACCESS (I.E. NORMAL ACCESS) REQUEST**

To request access to the cockpit, type a code, and validate it by using the "#" key, on the keypad

- [L2] *The Operator defines this code (between 0 and 7 digits).*
- [L1] *A buzzer sounds in the cockpit for 2 s with a "DOOR PLEASE" audio message .*

(Audio not available in PDF)

After identification of the person that requests access, unlock the door by using the CKPT DOOR SW .

If the flight crew refuses access by setting the CKPT DOOR sw to LOCK, the keypad and the buzzer are inhibited for a defined period of time.

[L2] *The Operator defines this period of time (between 5 min and 20 min).*

[L1] *If the flight crew does not respond, the door remains locked.*

EMERGENCY ACCESS REQUEST

To request emergency access to the cockpit, type an emergency code, and validate it using the “#” key, on the keypad.

[L2] *The Operator defines this emergency code.*

[L1] *A buzzer sounds in the cockpit until the flight crew unlocks, or locks the door by using the CKPT DOOR sw .*

(Audio not available in PDF)

The DOOR CKPT DOOR EMER OPENING IN PROGRESS alert is also triggered. For more information, Refer to PRO-ABN-ECAM-10-52-160 DOOR CKPT DOOR EMER OPENING IN PROGRESS .

After identification of the person that requests access, unlock the door by using the CKPT DOOR SW .

If the flight crew refuses access by setting the CKPT DOOR sw to LOCK, the keypad and the buzzer are inhibited for a defined period of time.

[L2] *The Operator defines this period of time (between 5 min and 20 min).*

[L1] *If the flight crew does not respond, the door automatically unlocks for 5 s after a defined period of time.*

[L2] *The Operator can define this period of time (between 15 s and 120 s).*

EVACUATION THROUGH THE ESCAPE PANEL

Rotate the handle cover in order to access the panel release handle.

Push the panel release handle, and turn it in any direction in order to unlock the escape panel.

Kick the escape panel toward the cabin.

Evacuate the cockpit on hands and knees.

HOW TO OPERATE THE PRIVACY DOOR

Applicable to: ALL

ACCESS FROM THE CABIN SIDE

The crewmember uses the keypad to access the flight deck privacy area.

Keypad

To request access to the flight deck privacy area, type a code on the keypad.

L2 *The Operator defines this code (up to 7 digits).*

L1 The green LED on the left comes on briefly. If the code is not correct, the red LED on the right comes on for 2 s.

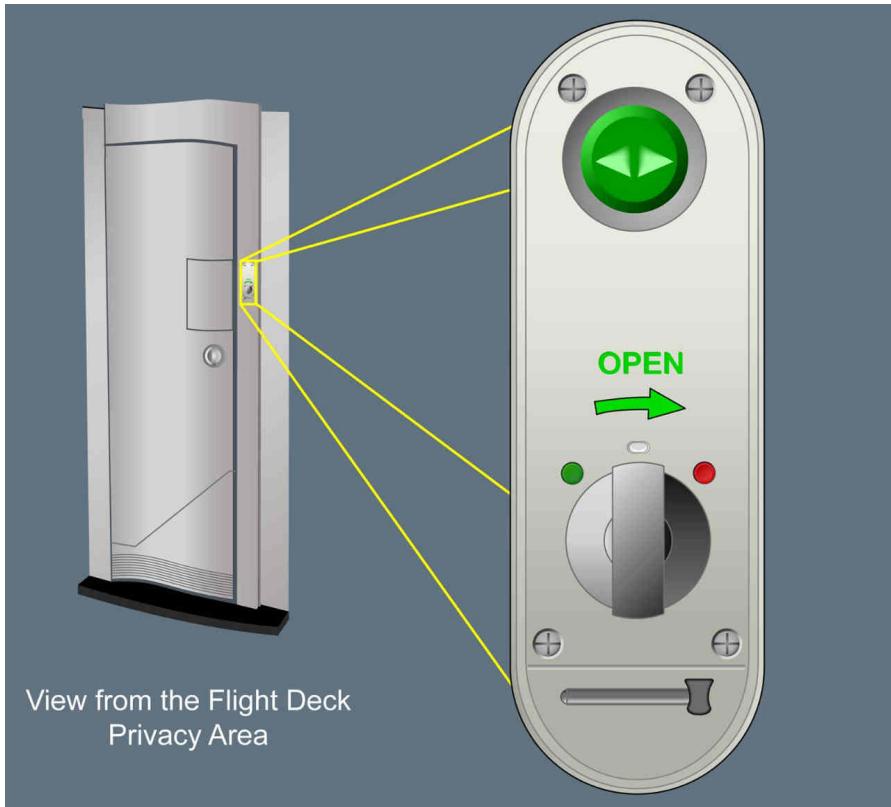
Press the open pb, then pull the door toward the cabin.

The door is unlocked for 5 s.

The red LED on the right comes on briefly to indicate that the door is locked.

ACCESS FROM THE FLIGHT DECK PRIVACY AREA

The crewmember uses the keypad to access the cabin.

Keypad

View from the Flight Deck
Privacy Area

It is not necessary to enter an access code in order to unlock, and open the door from the flight deck privacy area side.

To access the cabin, press the open pb or turn the door unlock lever clockwise, then push the door toward the cabin.

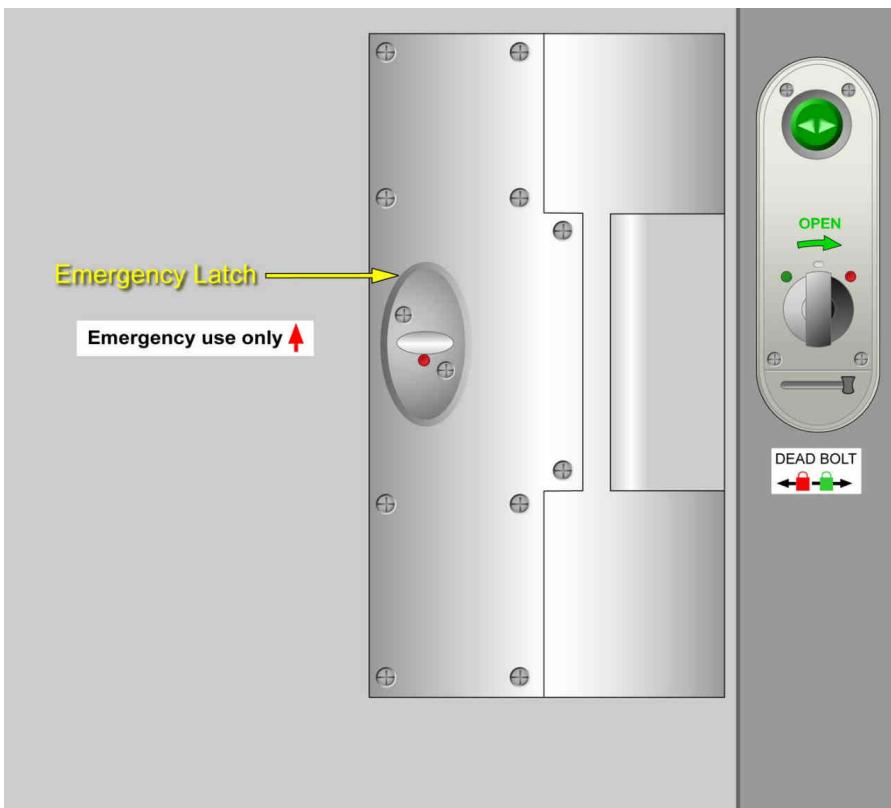
Note: *The flight crew can use the dead bolt to lock/unlock the privacy door, in the case of a Privacy Door Locking System (PDLS) failure.*

EMERGENCY ACCESS FROM THE FLIGHT DECK PRIVACY AREA

Use the latch on the breakout panel, in order to rapidly open the privacy door.

- ② *The privacy door opens, even if it is electrically closed, or locked by the dead bolt.*

L1

Emergency Latch**EMERGENCY ACCESS FROM THE CABIN**

Remove the override cover on the lower part of the keypad.



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52 - DOORS

COCKPIT - HOW TO

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52 - DOORS

OTHER DOORS - SYSTEM DESCRIPTION

OVERVIEW

Applicable to: ALL

The Door and Slides and Management System (DSMS) monitors and/or controls:

- The passenger doors and the emergency exits

Refer to DSC-52-30-30-10 Passenger Doors and Emergency Exits

- The cargo doors

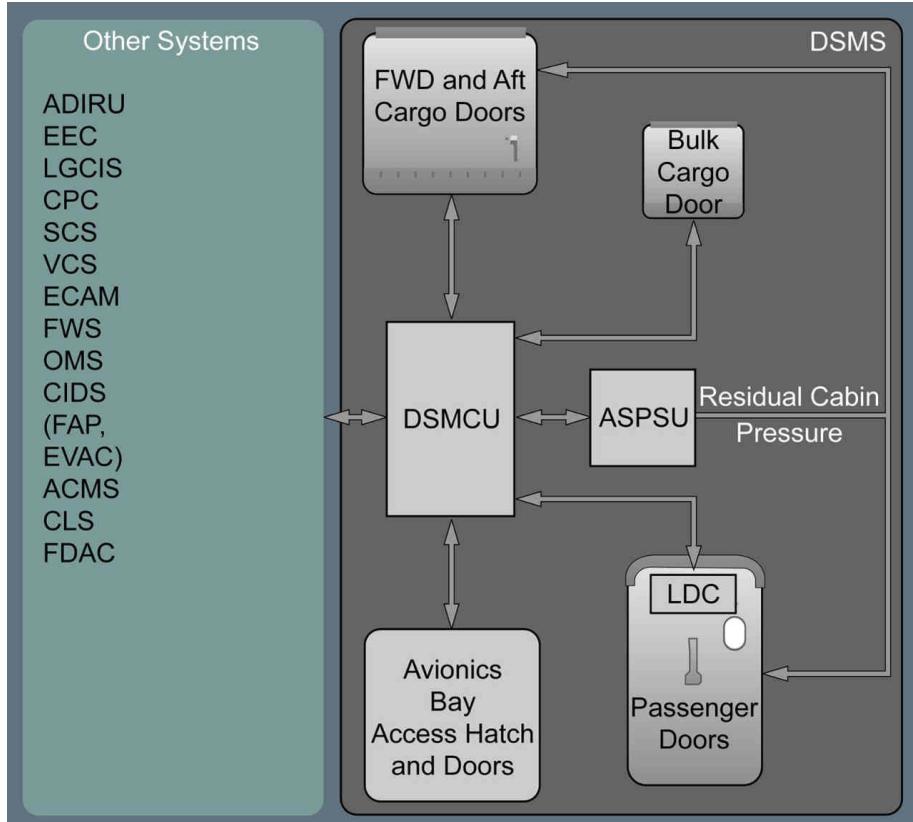
Refer to DSC-52-30-40-10 Overview

- The avionic bay doors.

Refer to DSC-52-30-50-10 Overview

ARCHITECTURE

Applicable to: ALL

Architecture**② DOORS AND SLIDES MANAGEMENT CONTROL UNIT**

The Doors and Slides Management Control Unit (DSMCU) interfaces with the aircraft, and communicates mainly via AFDX with other aircraft systems.

The Door and Slides and Management System (DSMS) is a three-channel system and its main functions are to:

- Monitor and display the status of the:

- Passenger exit doors
- Avionics bay hatches and doors

Note: The SD page displays the exterior main avionics bay hatch only.

- Cargo doors
- Escape slides.

- Control:

- Passenger exit doors
- Forward and aft cargo doors
- The deployment of the escape slides.

- Manage:

- The measurement function of the door sill height
- The residual cabin pressure indication
- The inhibition of cabin and cargo pressurization, if one or more doors are not locked.

L2 AUTONOMOUS STANDBY POWER SUPPLY UNIT

The Autonomous Standby Power Supply Unit (ASPSU) detects and indicates the residual cabin pressure.

In the case of an electrical power loss, the ASPSU provides electrical power for the residual cabin pressure indication for 2.5 h.

L2 LOCAL DOOR CONTROLLER

A Local Door Controller (LDC) is installed on each passenger door.

The LDC is connected to a set of sensors and switches that enable the monitoring of the door positions and slide status, respectively. The LDC monitors all the actions at the passenger doors, and sends all information to the DSMCU for processing.

If the normal electrical power is lost, there is an energy stowage in the LDC that can provide power for at least 5.30 h.

L3 OTHER SYSTEMS

The DSMS interfaces with other systems via the AFDX network, or other classic connections.



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52 - DOORS

OTHER DOORS - SYSTEM DESCRIPTION

CABIN PRESSURE CONTROL SYSTEM (CPCS)

The DSMS provides the signal for cabin pressurization.

FLIGHT WARNING SYSTEM (FWS)

The DSMS interfaces with the FWS in order to exchange:

- The current door status
- Failure display and annunciations
- Flight phase data.

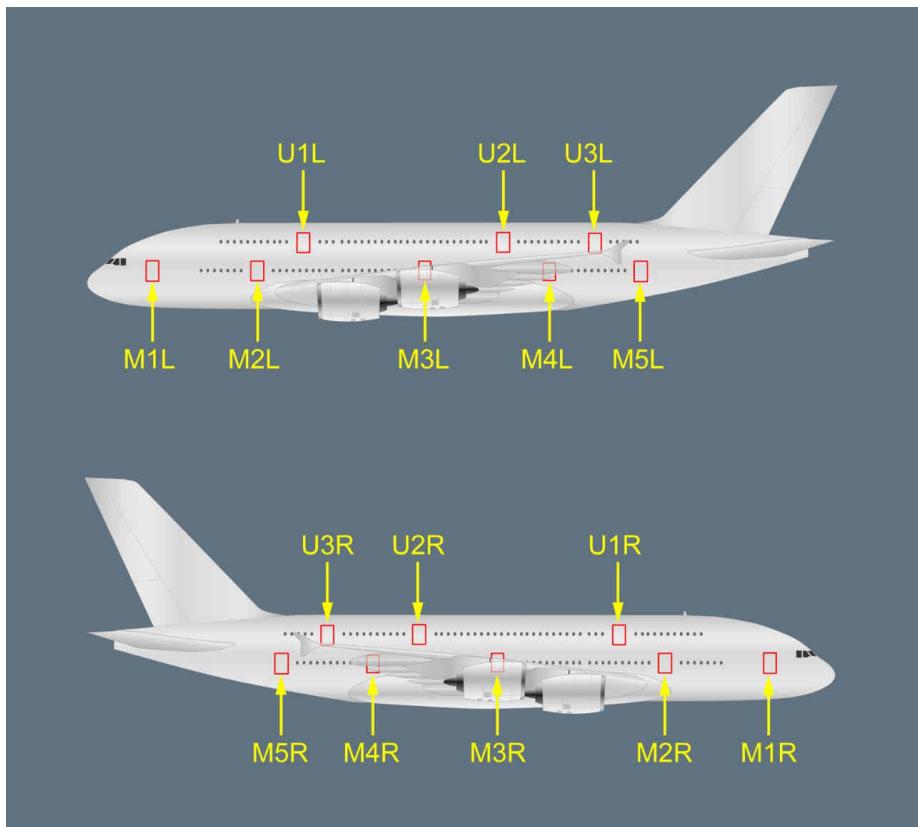
VENTILATION CONTROL SYSTEM (VCS)

The DSMS provides the cargo door status.

System Description**PASSENGER DOORS AND EMERGENCY EXITS****Applicable to: ALL**

The aircraft has 16 passenger doors:

- Five doors on each side of the aircraft, for the main deck
- Three doors on each side of the aircraft, for the upper deck.

Door Arrangement

The doors open forward. The opening/locking of the door is performed mechanically by moving the door handle. In normal operation, the door revolves electrically by pressing the OPEN pb, or the CLOSE pb. In emergency operation, the door revolves automatically.

In the case of an electrical power loss, the door can be manually operated.

There is a flight lock actuator in each door that locks the door handle during the climb and descent phases, in order to prevent inadvertent operation during flight.

The flight lock actuator releases the door handle in one of the following cases:

- During cruise, or
- [L3] During cruise, the differential pressure between the exterior and the interior of the aircraft prevents the doors from opening.
- [L1]- If the aircraft is on ground, or
- In the case of a cabin differential pressure detection, or
 - If there is a failure of the LDC, or of the flight lock actuator.
- [L2] The flight lock actuator locks the door handle, when the aircraft reaches a speed of 65 kt. The door handle remains locked until the aircraft reaches FL 240.



ESCAPE SLIDES/RAFTS

Applicable to: ALL

All passenger/emergency doors have an escape slide.

[L2] There are three different types of escape slides:

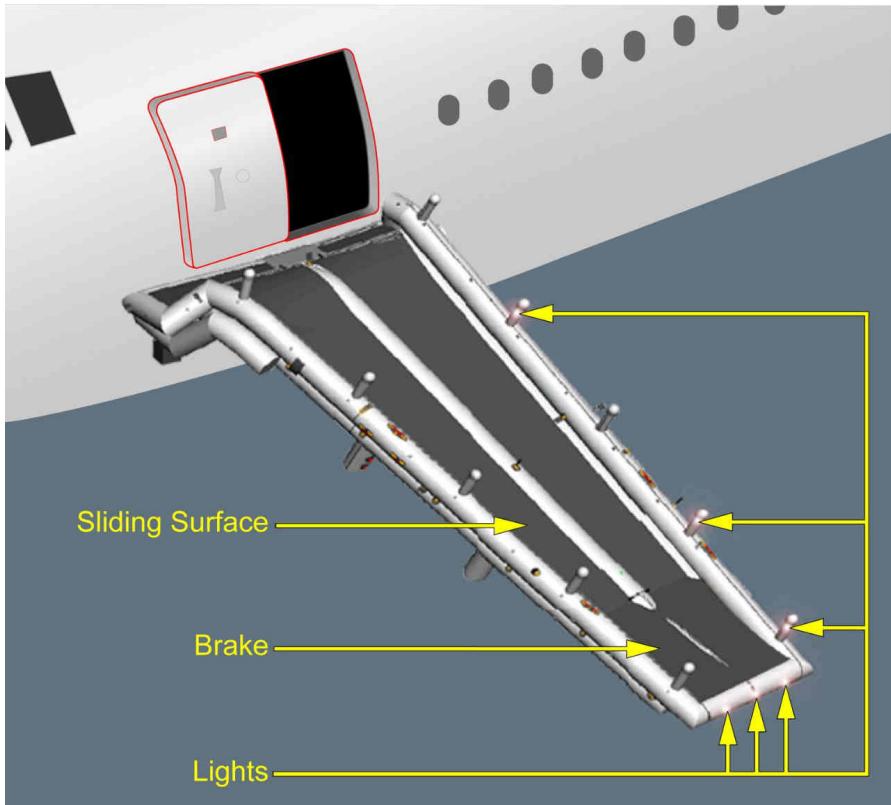
- The main deck doors M1, M2, M4, and M5, have a door-mounted escape slide
- The main deck door M3 has a belly-fairing integrated escape slide
- All upper deck doors have a fuselage integrated escape slide, below the doors.

[L1] At each door, there is a slide arming lever to arm, or disarm, the emergency escape slide.

Escape Slide Locations**ESCAPE SLIDES**

Each escape slide has:

- Two lanes
- Lights on the upper side and on the bottom part
- Deceleration stripes (only for the upper escape slides).

Escape Slide Description

For more information on the escape slides, Refer to CCOM/09-20-10 *Description of Slides and Sliderafts*.

If the door is opened from the outside, the escape slide automatically disarms.

If the escape slide arming lever is set to ARMED, and the door opens from the inside:

- An advisory SLIDE ARMED light comes on in the door window
 - The escape slide automatically inflates.
- Each escape slide inflates in approximately 6 s.

If the DITCHING pb-sw is set to ON:

- The automatic inflation of escape slide at the M3 doors is inhibited
- The automatic deployment of the M1 doors extension slide is inhibited.

In the case of an emergency opening, the LDC turns off the slide armed light at each door.

- [L1] If the automatic deployment of the escape slide fails, the Manual Inflation pb enables the manual inflation of the escape slide.

SLIDERAFTS

It is possible to use each escape slide as a sliderraft, except for:

- The escape slide at the M3 doors
- The escape slide at the M1 door, when it is inflated in extended mode.

For more information on sliderrafts, *Refer to CCOM/09-20-10 Description of Slides and Sliderrafts.*

In the case of ditching, the cabin crew can detach each escape slide from the aircraft by:

- Pulling the disconnect handle
- Cutting the mooring line of the escape slide in order to separate the raft from the aircraft.

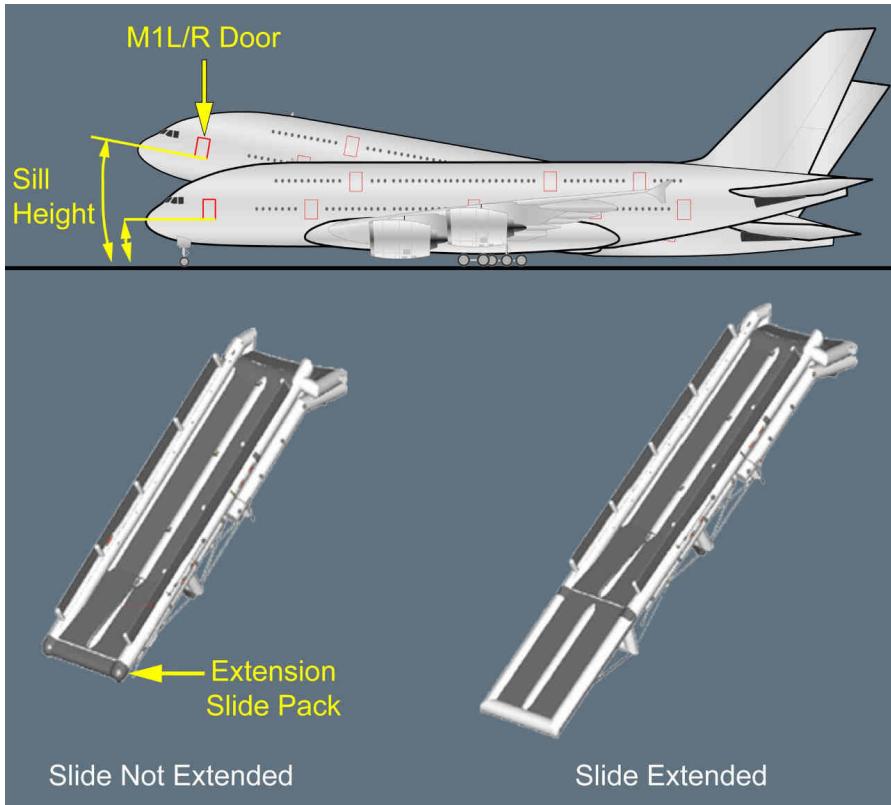
ESCAPE SLIDE EXTENSION

Only the M1 doors have an extension slide.

If the aircraft pitch attitude angle exceeds a specific threshold (e.g. abnormal landing gear configuration), the escape slides deploys with the extension.

- [L3] The aircraft pitch attitude angle is detected by a pitch attitude sensor that is on each M1 door. If the pitch attitude is more than 2.5 °, the slide extension is deployed.

Note: *If the pitch attitude sensor is not available and communication between LH and RH door M1 is not possible, the slide does not have an extension.*

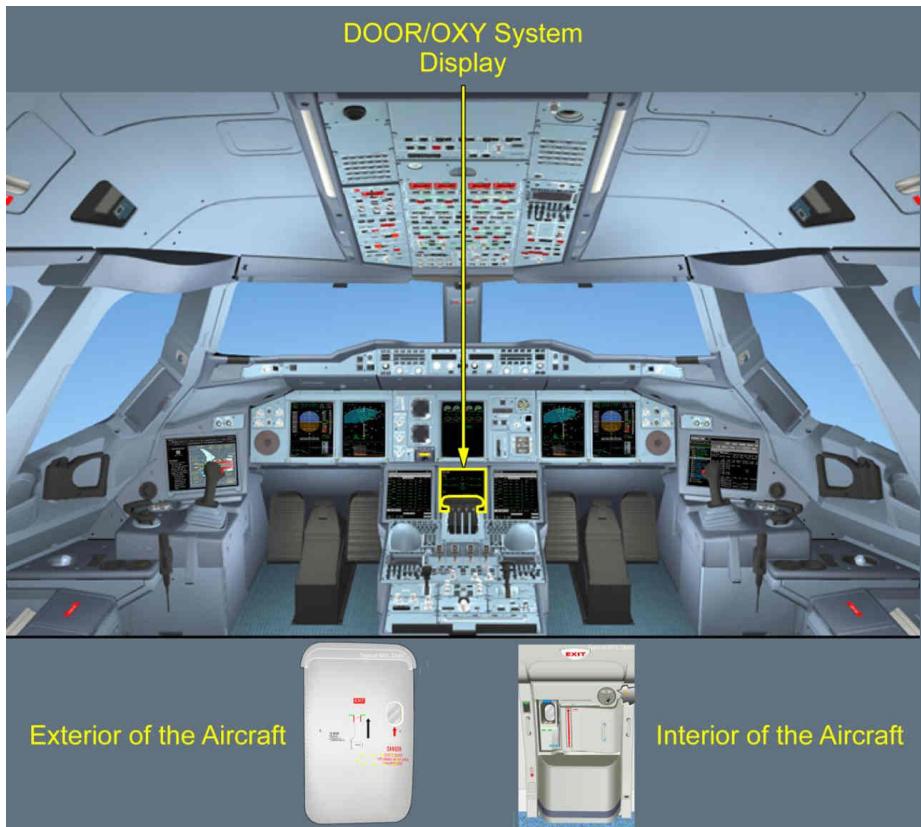
Slide Extension

Controls and Indicators

COCKPIT VIEW

Applicable to: ALL

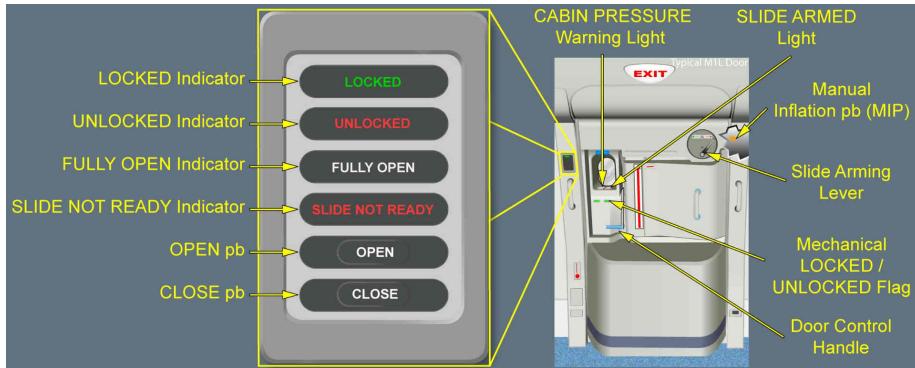
Cockpit View



INTERIOR OF THE AIRCRAFT

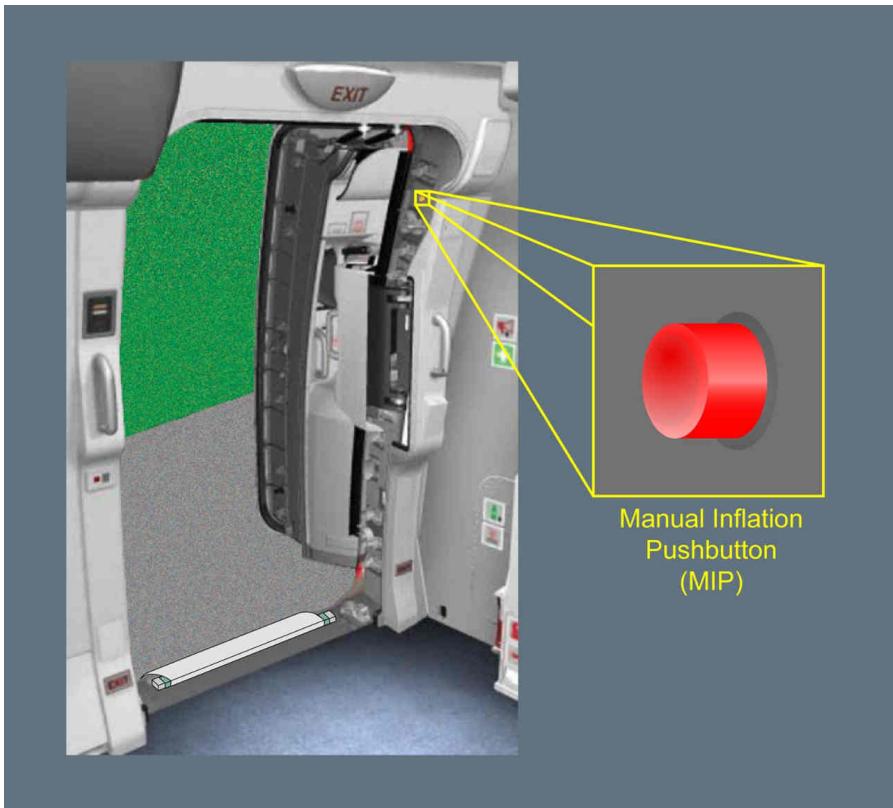
Applicable to: ALL

General



Manual Inflation pb

MIP Location



The door is open, and the escape slide is armed.





When pressed, the escape slide manually inflates.

Note: *The MIP is a backup function, and should only be used if the automatic deployment fails.*

LOCKED INDICATOR



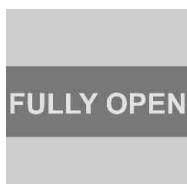
The door is locked.

UNLOCKED INDICATOR



The door is unlocked.

FULLY OPEN INDICATOR



The door is fully open.

SLIDE NOT READY INDICATOR

Steady: The bottle, for slide inflation, has low pressure.
Flashing: Only for M1 door, when the slide is not entirely extended.

OPEN pb

The door is ready to be opened.
When maintained pressed, the door opens electrically. The **OPEN** indicator goes off when the door is fully open.

CLOSE pb

The door is not closed.
When maintained pressed, the door closes electrically. The **CLOSE** indicator goes off when the door is fully closed.

MECHANICAL LOCKED/UNLOCKED FLAG

The door is locked.
The door control handle is in the lowest position.



The door is unlocked.
The door control handle is not in the lowest position.

Cabin Pressure Warning light

L12



Flashes, in the case of a cabin differential pressure detection, if:

- The aircraft is on ground
- The associated slide is disarmed.

Cabin differential pressure is detected, if the difference between the cabin pressure and the outside pressure is above 0.036 PSI.

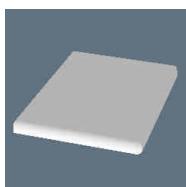
Associated with an aural alert, if the door control handle is lifted up.

These aural and visual alerts are inhibited during evacuation:

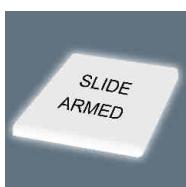
- Via the EVAC COMMAND pb on the overhead panel or the CIDS EVAC sw on the FAP in the cabin
- If the door is opened while the slide is armed.

WARNING

Do not open the door, if the red warning light is flashing on the door window (cabin pressurized).

SLIDE ARMED light

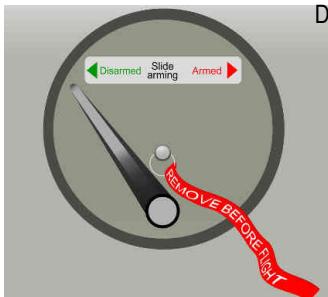
The slide arming lever is set to the Disarmed position.



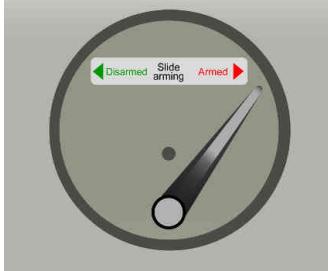
The slide arming lever is not set to the Disarmed position, and someone opens the door.

Slide Arming lever

Disarms the slide.

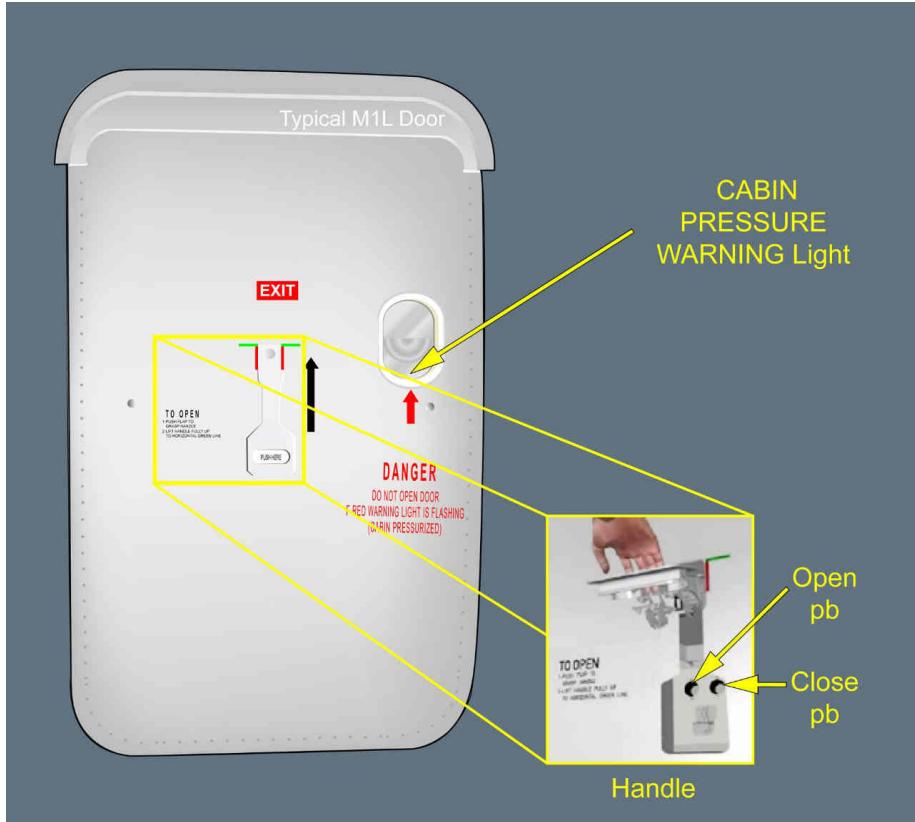


Arms the slide.



EXTERIOR OF THE AIRCRAFT

Applicable to: ALL

GeneralOutside Open pb

The light comes on when the door is ready to be opened.



When maintained pressed, the door opens electrically.



The light comes on when the door is ready to be closed.



When maintained pressed, the door closes electrically.

Cabin Pressure Warning light

L12



Flashes, in the case of a cabin differential pressure detection, if:

- The aircraft is on ground
- The associated slide is disarmed.

Cabin differential pressure is detected, if the difference between the cabin pressure and the outside pressure is above 0.036 PSI.

Associated with an aural alert, if the door control handle is lifted up.

These aural and visual alerts are inhibited during evacuation:

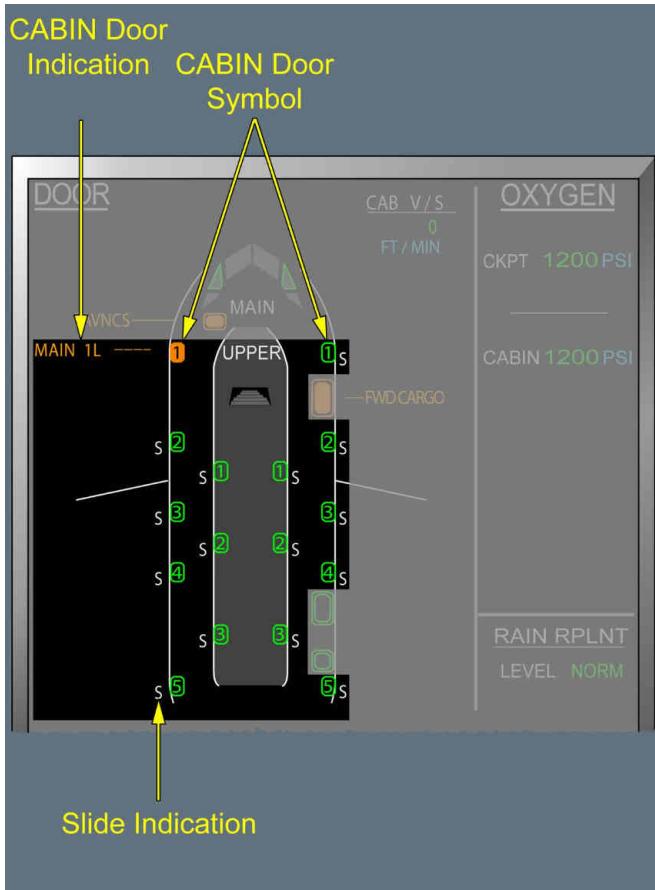
- Via the EVAC COMMAND pb on the overhead panel or the CIDS EVAC sw on the FAP in the cabin
- If the door is opened while the slide is armed.

WARNING

Do not open the door, if the red warning light is flashing on the door window (cabin pressurized).

DOOR/OXY SYSTEM DISPLAY

Applicable to: ALL

DOOR/OXY SD Page - Cabin Door**CABIN DOOR SYMBOL**

The door is closed and locked.



The door is not locked.

---- MAIN 1R

The door is not locked, and at least one engine is running.

---- MAIN 1R

The information is not valid.

SLIDE INDICATOR



The slide is armed.



The slide is disarmed.



The slide is failed.



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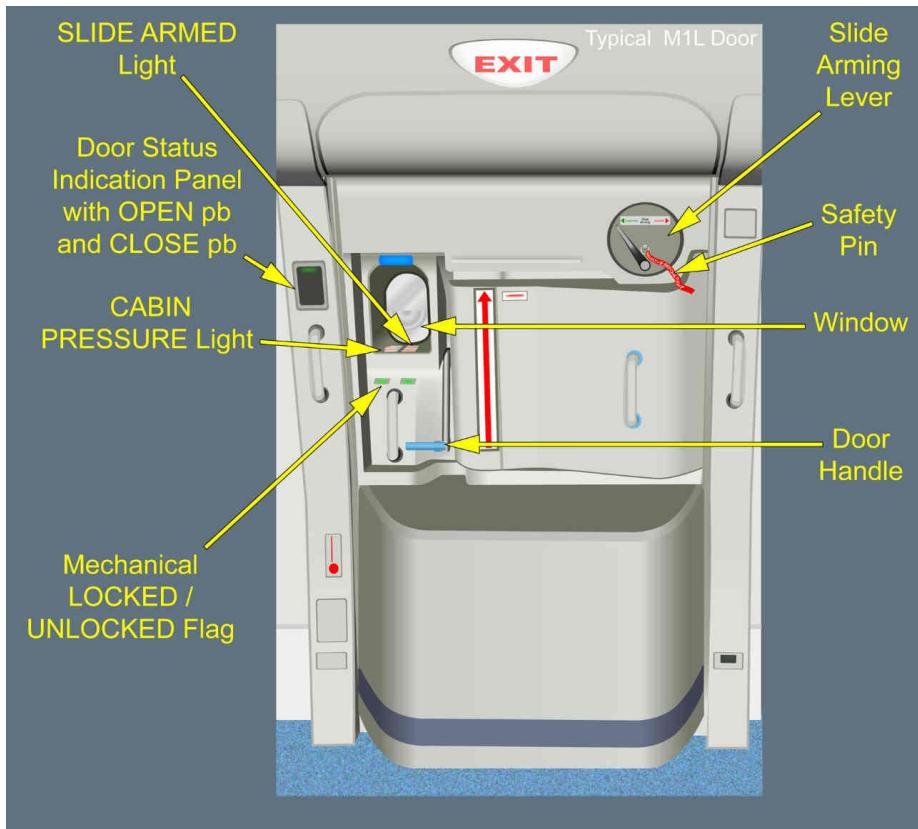
52 - DOORS

OTHER DOORS - CABIN

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How to**INSIDE THE AIRCRAFT - HOW TO OPERATE PASSENGER DOORS**

Applicable to: ALL

Main Deck Passenger Door - Inside

For the detailed operational procedures for door opening or closing, *Refer to CCOM/09-10-30-A Normal Opening from the Inside.*

| | |
|----------------|---|
| WARNING | Do not open the door, if the red warning light is flashing (cabin pressurized). |
|----------------|---|



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AIRCRAFT SYSTEMS

52 - DOORS

OTHER DOORS - CABIN

HOW TO OPEN THE DOOR

In normal operation (i.e. no emergency evacuation), disarm the escape slide.

Lift the door handle fully up to unlock the door.

Press and hold the OPEN pb, or manually move the door to the forward direction, until the fully open position is reached.

HOW TO CLOSE THE DOOR

Press and hold the CLOSE pb, or manually move the door to the aft direction, and stop the movement when facing the door frame.

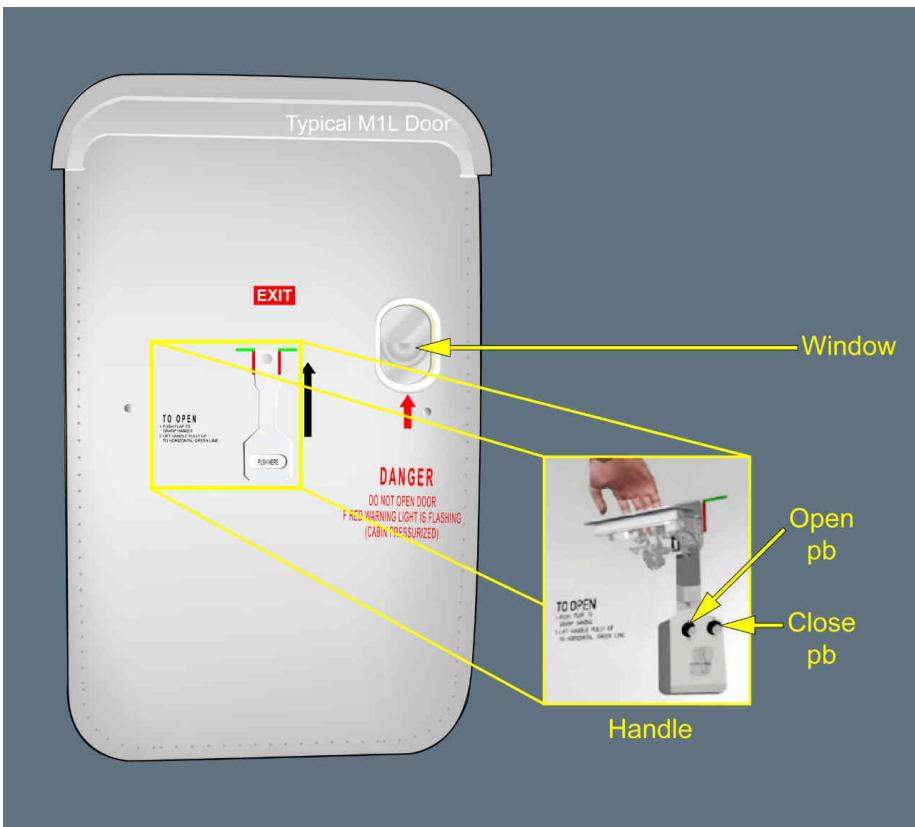
When the door is facing the door frame, grasp one of the door handles and pull the door inwards the door frame.

Lower the door handle to lock the door.

OUTSIDE THE AIRCRAFT - HOW TO OPERATE PASSENGER DOORS

Applicable to: ALL

Main Deck Passenger Door - Outside



For the detailed operational procedures for door opening or closing Refer to CCOM/09-10-30-B
Normal Opening from the Outside.

| | |
|----------------|--|
| WARNING | Do not open the door, if the red warning light is flashing on the door window (cabin pressurized). |
|----------------|--|

HOW TO OPEN THE DOOR

Push the flap to grasp the handle.



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52 - DOORS

OTHER DOORS - CABIN

Lift the door handle fully up to unlock the door.

Press and hold the open pb, or manually pull the door, then move the door forward, until the door is fully open.

HOW TO CLOSE THE DOOR

Press and hold the close pb, or manually move the door in the aft direction, and stop the door movement when facing the door frame.

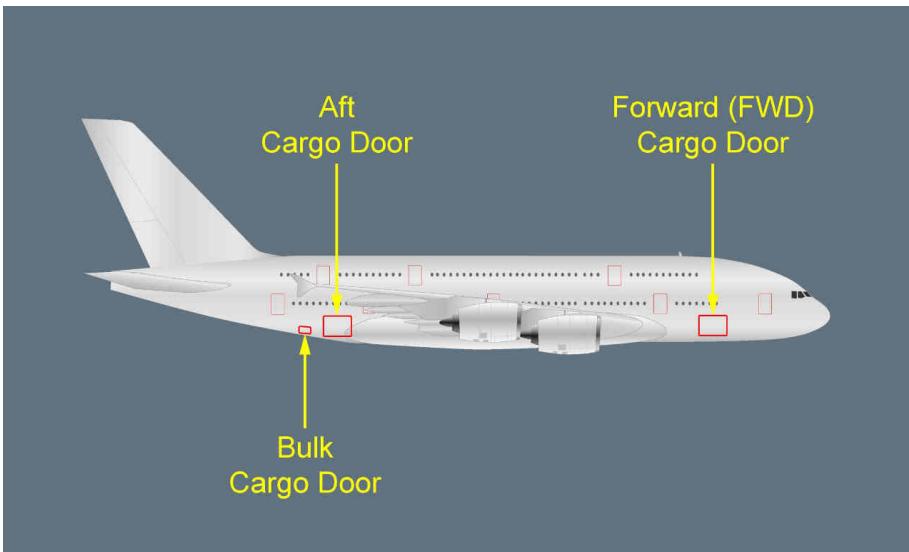
Push the door toward the door frame.

Lower the handle to lock the door.

System Description**OVERVIEW****Applicable to: ALL**

There are three cargo doors on the right side of the aircraft:

- One forward (FWD) cargo door
- One aft cargo door
- One bulk cargo door.

Cargo Doors**FORWARD (FWD) AND AFT CARGO DOORS****Applicable to: ALL**

The forward (FWD) and aft cargo doors provide access to the FWD and aft cargo compartments, respectively.

Both the FWD and aft cargo doors open outward and upward. They are mechanically locked, and hydraulically operated by the green hydraulic system.

The ground crew can manually lock and unlock the cargo doors by using the door handle, located on the door, from outside the aircraft.

The ground crew can use the NORMAL OPERATION sw to open and close the cargo doors via the hydraulic actuator. The NORMAL OPERATION sw is on the cargo door operation panel, that is on the right side of each door (outside the aircraft).

In the case of an electrical or hydraulic pump failure, the ground crew can hydraulically open or close the cargo doors by following the appropriate maintenance actions, and by using:

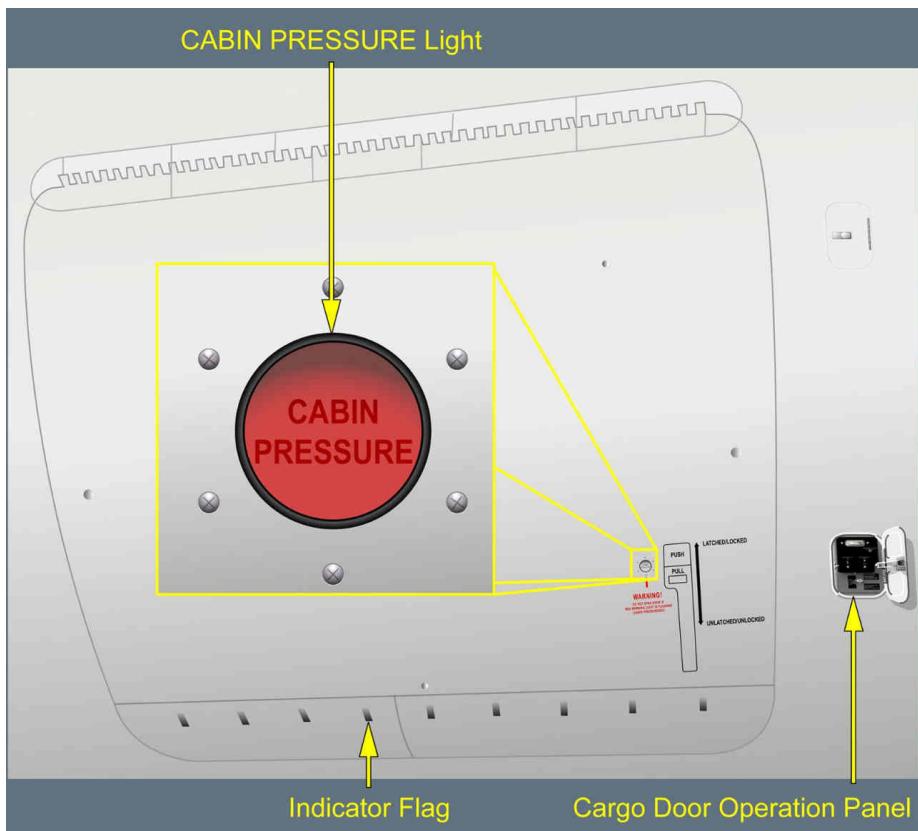
- A lever for manual override, that is also on the cargo door operation panel
- A hand pump, that is on the hydraulic maintenance panel.

When the door is fully open, and locked in the open position, a "FULLY OPEN AND ARRESTED" indicator on the cargo door operation panel, comes on.

The cargo door opening and closing is inhibited:

- During takeoff, flight, landing, or taxi
- When engine 3 and 4 are running
- During cargo loading operation
- When the cargo door is closed and locked.

[3] When the door is inhibited, the hydraulic actuator is isolated from the hydraulic system by an isolation valve. In this case, there is no power to open the door.

Cargo Door - CABIN PRESSURE Light

- There are indicator flags, on the lower part of the door (outside the aircraft), to indicate if the door is locked or unlocked.

BULK CARGO DOOR

Applicable to: ALL

The ground crew can access the bulk cargo compartment from the bulk cargo door.

The bulk cargo door opens inward and upward.

The ground crew can manually open or close the bulk cargo door by using one of the door handles that are in the interior and on the exterior of the aircraft.



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OPERATING MANUAL

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OTHER DOORS - CARGO

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Controls and Indicators

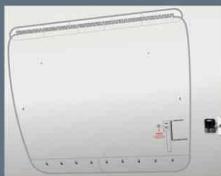
COCKPIT VIEW

Applicable to: ALL

Cockpit View

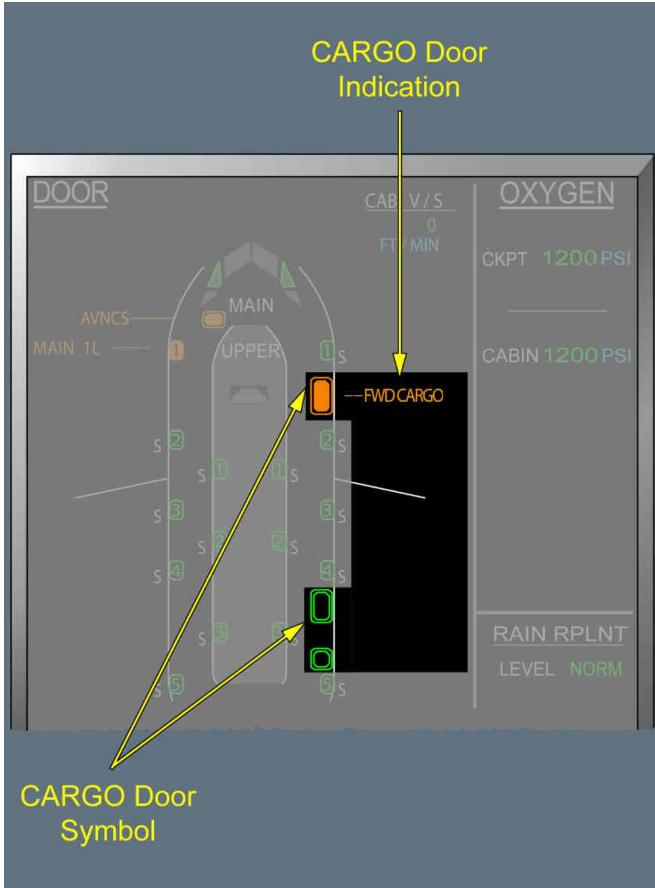


Cargo Door



DOOR/OXY SYSTEM DISPLAY

Applicable to: ALL

DOOR/OXY SD Page - Cargo Door**CARGO DOOR SYMBOL**

The door is closed and locked.





The door is not locked.

CARGO DOOR INDICATION

The door is not locked, and at least one engine is running



The information is not valid.

FWD AND AFT CARGO DOORS

Applicable to: ALL

CABIN PRESSURE WARNING light

L12



Flashes, in the case of a cabin differential pressure detection.
Cabin differential pressure is detected if the difference between the cabin pressure and the outside pressure is above 0.036 PSI.

WARNING

Do not open the door, if the red warning light is flashing on the door window (cabin pressurized).

INDICATOR FLAG

The door is closed and locked.



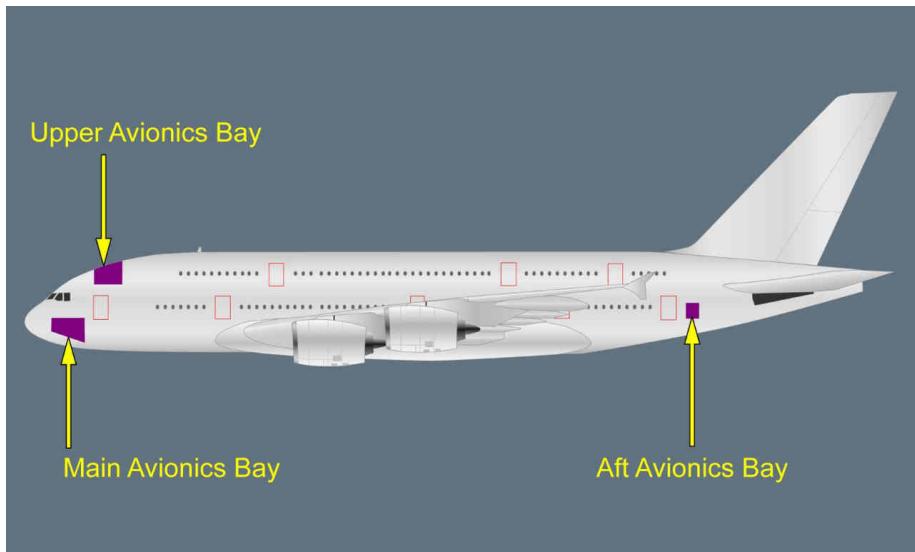
The door is unlocked.

L3 CARGO DOOR OPERATION PANEL

System Description**OVERVIEW****Applicable to: ALL**

The aircraft has the following three avionics bays:

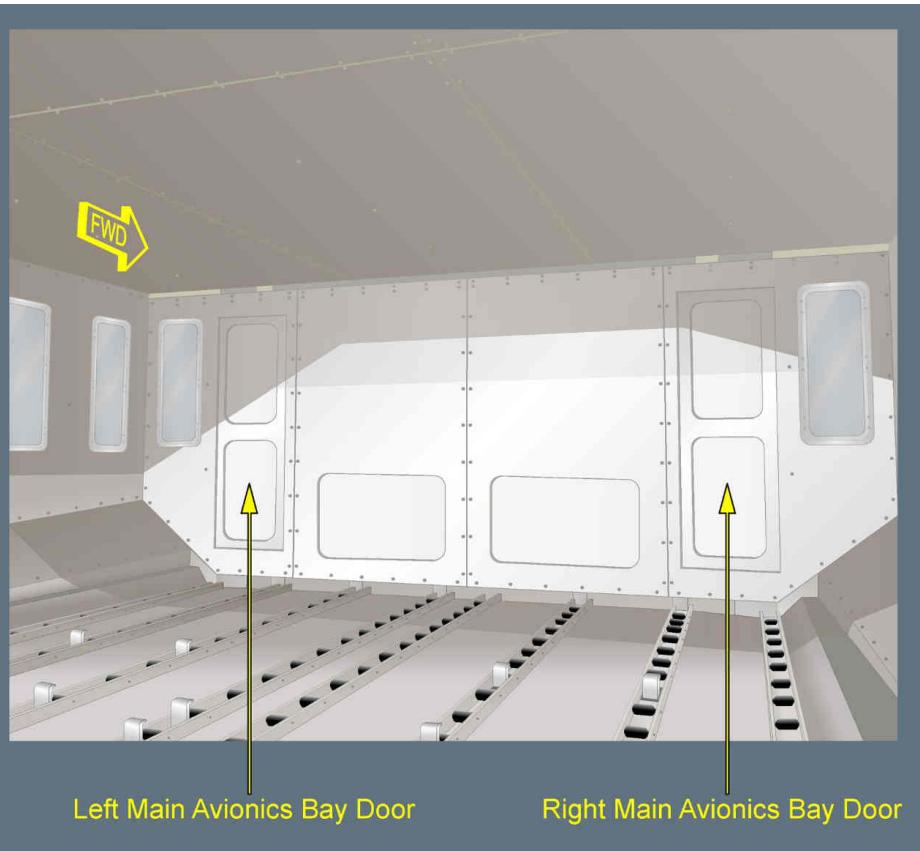
- Main avionics bay
- Upper avionics bay
- Aft avionics bay.

Overview

MAIN AVIONICS BAY**Applicable to: ALL**

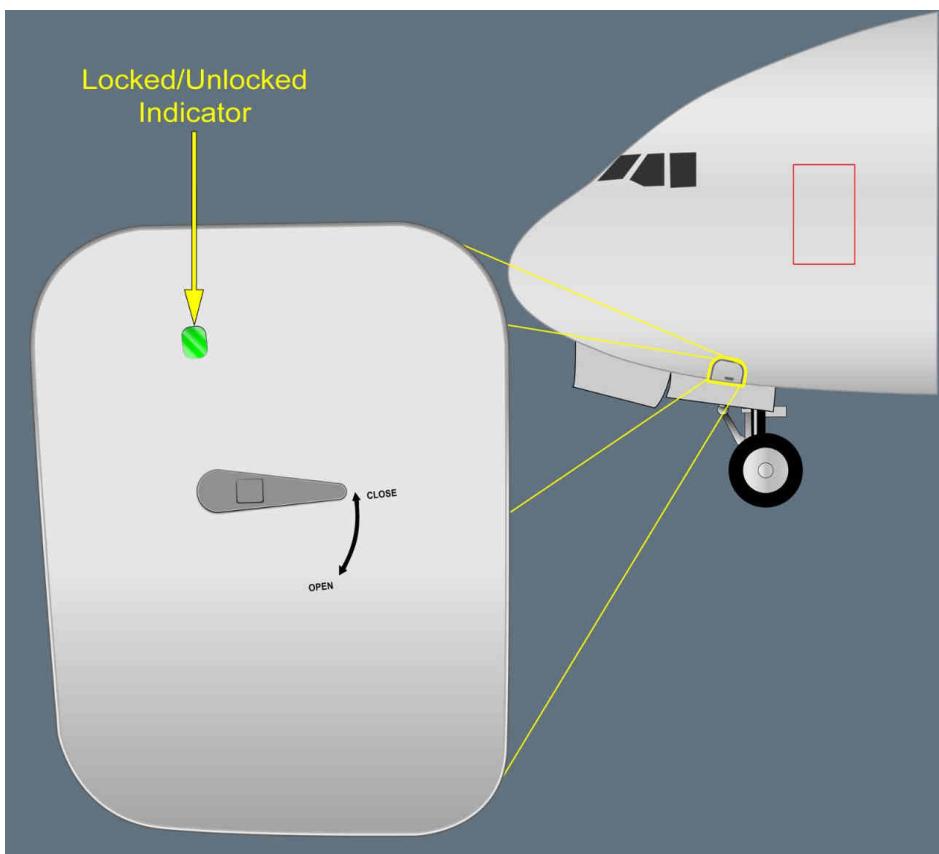
It is possible to access the main avionics bay from:

- The forward cargo compartment through two doors

Main Avionics Bay Doors

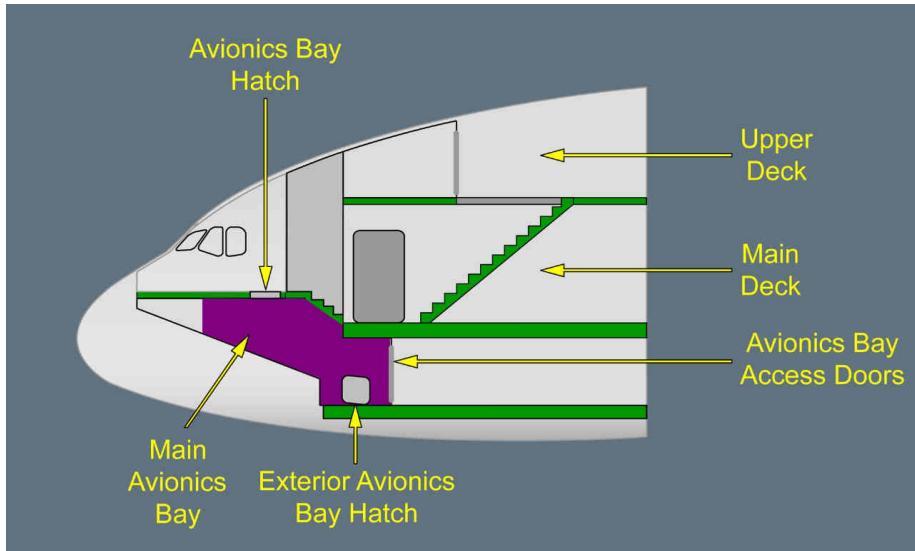
- Outside the aircraft, via an inward-opening hatch that provides external access to the avionics compartment.

This hatch can be manually operated from either the interior or the exterior of the aircraft.

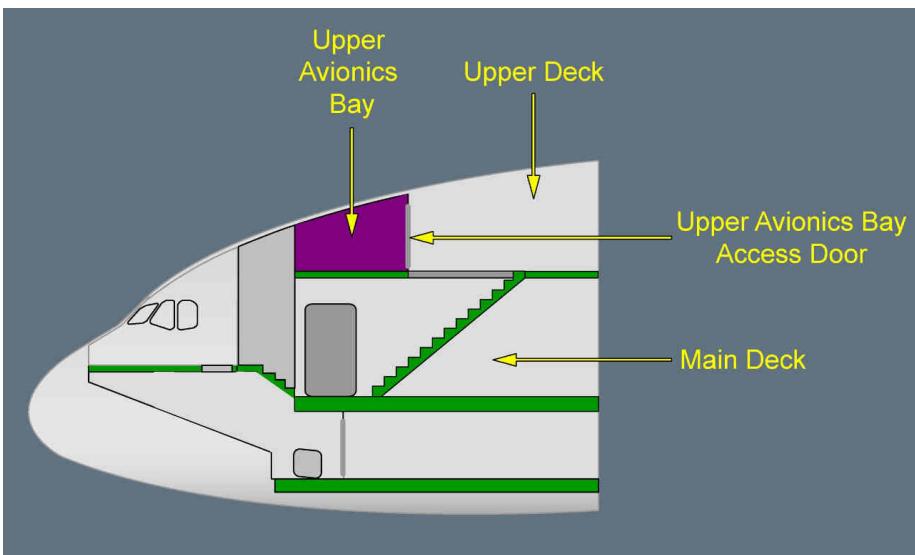
Exterior Main Avionics Bay Hatch

An extensible ladder enables access to/from the ground.

- The cockpit, through a hatch.
- A ladder is available in the avionics compartment for access from the cockpit.

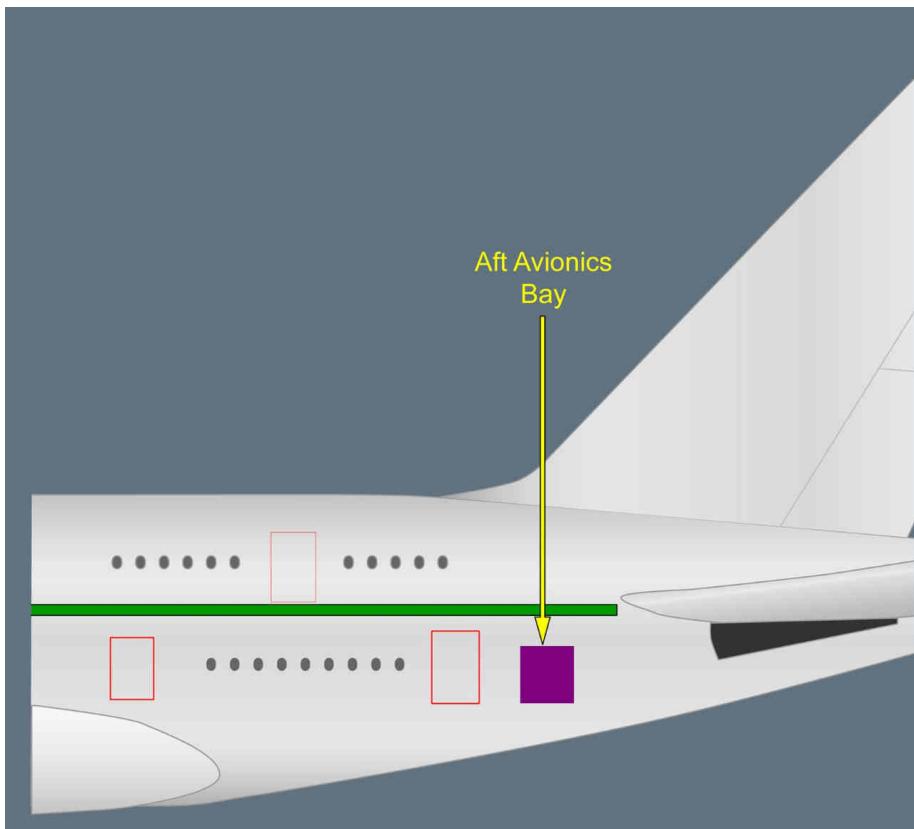
Main Avionics Bay**UPPER AVIONICS BAY****Applicable to: ALL**

The flight crew can access the upper avionics bay, via the upper avionics bay access door.

Upper Avionics Bay**AFT AVIONICS BAY**

Applicable to: ALL

The aft avionics bay is accessible from the aft main deck lavatory.

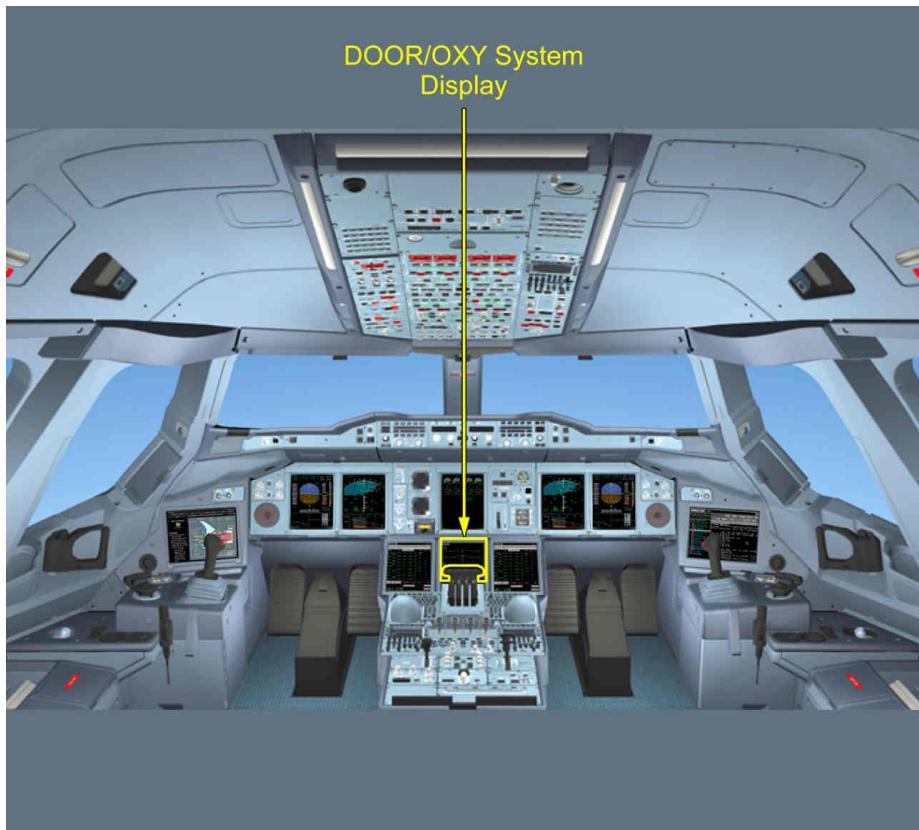
Aft Avionics Bay

Controls and Indicators

COCKPIT VIEW

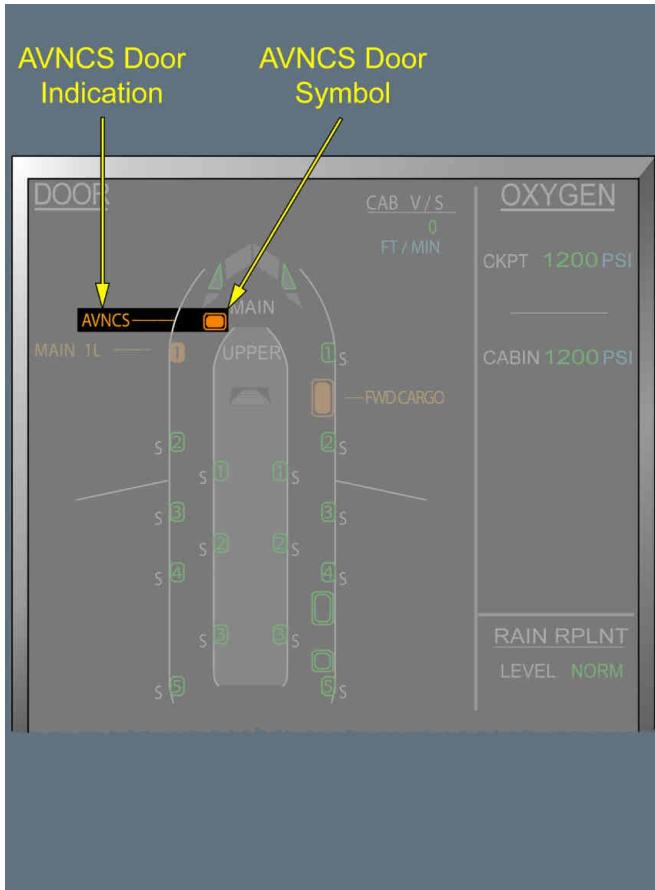
Applicable to: ALL

Cockpit View



DOOR/OXY SYSTEM DISPLAY

Applicable to: ALL

DOOR/OXY SD Page - Avionics Door**AVNCS DOOR SYMBOL**

The door is closed and locked



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OTHER DOORS - AVIONICS BAY ACCESS DOORS AND HATCHES



The door is not closed.

AVNCS ——

The door is unlocked.

AVNCS ——

The information is not valid.



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OTHER DOORS - AVIONICS BAY ACCESS DOORS AND HATCHES

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ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

DOOR AFT(UPPER) AVNCS NOT CLOSED (*Refer to procedure*)

DOOR AVNCS NOT CLOSED (*Refer to procedure*)

DOOR CKPT DOOR EMER OPENING IN PROGRESS (*Refer to procedure*)

DOOR FWD(AFT)(BULK) CARGO NOT CLOSED (*Refer to procedure*)

DOOR L(R) MAIN AVNCS NOT CLOSED (*Refer to procedure*)

DOOR MAIN 1(2)(3)(4)(5)L(R) / UPPER 1(2)(3)L(R) ACTUATOR FAULT (*Refer to procedure*)

DOOR MAIN 1(2)(3)(4)(5)L(R) / UPPER 1(2)(3)L(R) FLIGHT LOCK FAULT (*Refer to procedure*)

DOOR MAIN 1(2)(3)(4)(5)L(R) / UPPER1(2)(3)L(R) LATCH MONITORING FAULT (*Refer to procedure*)

DOOR MAIN 1(2)(3)(4)(5)L(R) / UPPER 1(2)(3)L(R) NOT CLOSED (*Refer to procedure*)

DOOR MAIN 1(2)(3)(4)(5)L(R) / UPPER 1(2)(3)L(R) POS DET FAULT (*Refer to procedure*)

DOOR MAIN 1(2)(3)(4)(5)L(R) / UPPER 1(2)(3)L(R) SLIDE FAULT (*Refer to procedure*)

DOOR MAIN 1L(R) SLIDE LENGTHENING FAULT (*Refer to procedure*)

DOOR POS DET FAULT (*Refer to procedure*)

DOOR RESIDUAL DIFF PRESS DET FAULT (*Refer to procedure*)



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ECAM ALERTS

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ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Electrical Supply |
|---|-------------------|
| Cockpit | |
| Keypad | |
| Cockpit Door Surveillance System (CDSS) | AC 3 |
| Cockpit Door Locking Control Unit (CDLCU) | DC 1 |
| Privacy Door Locking System (PDLS) | DC 2 |
| Cabin | |
| Doors and Slide Management Control Unit (DSMCU) | AC 3, AC 4 |
| Autonomous Standby Power Supply Unit (ASPSU) | AC 3 |
| Local Door Controller (LDC) LH | AC 1, AC 2 |
| Local Door Controller (LDC) RH | AC 3, AC 4 |



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ELECTRICAL SUPPLY

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DSC-56-30 How to

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COCKPIT SLIDING WINDOWS

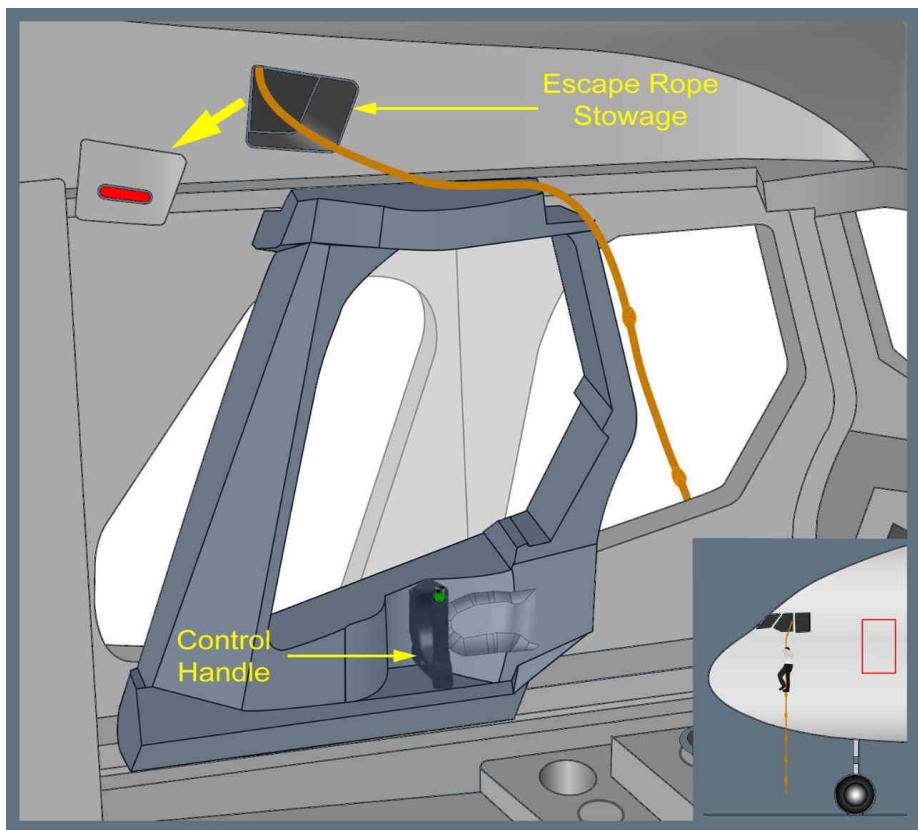
Applicable to: ALL

The flight crew can use the sliding windows as emergency exits. There is one sliding window on the left, and one on the right of the cockpit windows.

Note: *To ensure that the sliding window can be opened when required, do not stow any objects in the sliding window area.*

A small compartment above each fixed lateral window holds an escape rope. The flight crew can evacuate the cockpit by opening the sliding window, and using the escape rope. For more information, Refer to DSC-56-30 How to Escape through the Cockpit Window .

Sliding Window



The sliding windows can only be opened from inside the cockpit.

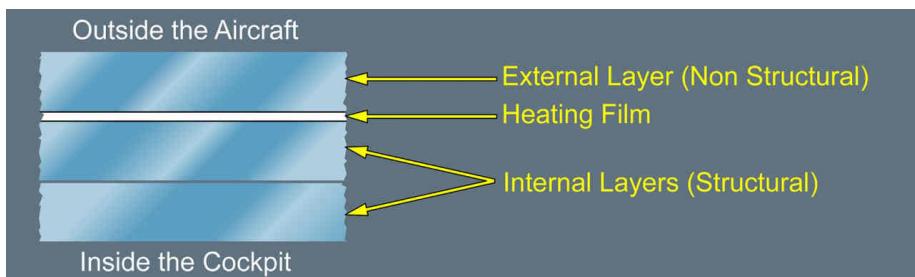
COCKPIT WINDSHIELDS AND WINDOWS

Applicable to: ALL

Each windshield or window has three layers. The external layer is not a structural layer. The two internal layers are structural layers. There is a heating film between the external layer and the internal layers.

Here is a horizontal section of a windshield or window:

Horizontal Section of a Windshield or Window

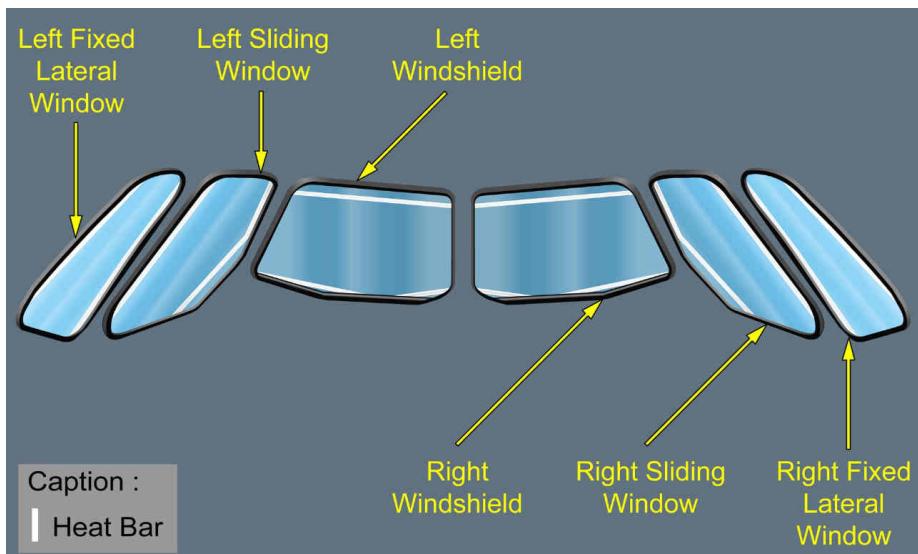


The heating film defogs and/or de-ices the windshield/window.

[L2] For more information, *Refer to Ice Protection / Window Heat*.

[L1] Each heating film is powered by two heat bars.

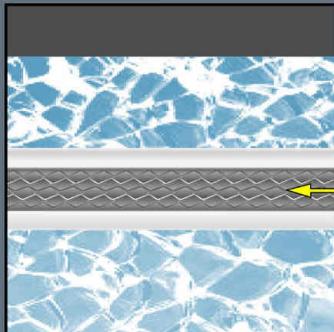
The heat bars are located as follows:

Heat Bars Location

The heat bars also enable the flight crew to detect if a structural layer is damaged, in case of windshield or window cracked.

If a windshield, or a window, is cracked:

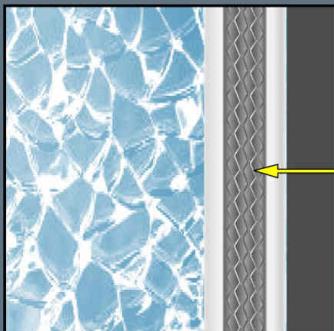
- The cracks are on the exterior side of the heat bars, or
- The cracks are on the cockpit side of the heat bars.



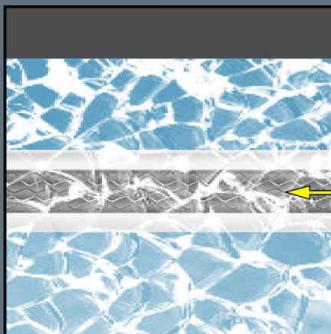
Heat Bar

If the cracks are on the exterior side of the heats bars, the external layer is broken: The structure is not affected.

Or

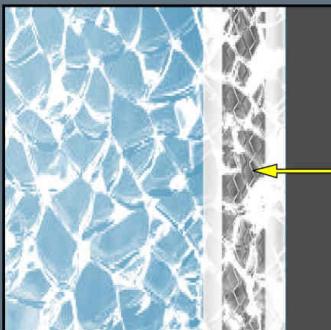


Heat Bar



Heat Bar

Or



Heat Bar

If the cracks are on the cockpit side of the heat bars, at least one structural layer is damaged.

If a windshield or a window is cracked, the flight crew must apply the MISC CKPT WINDOW CRACKED Procedure: *Refer to Procedure*.

The flight crew can display this procedure by pressing the ECP ABN PROC pb , then by selecting the MISCELLANEOUS menu.



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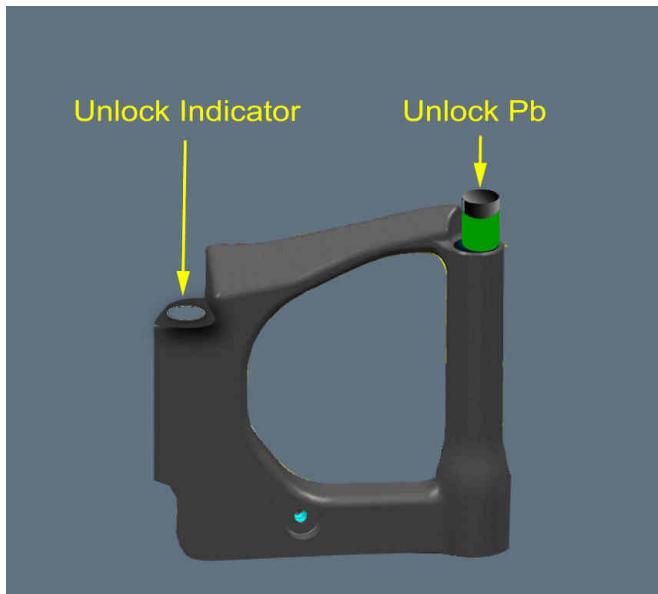
56 - COCKPIT WINDOWS

SYSTEM DESCRIPTION

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SLIDING WINDOW

Applicable to: ALL

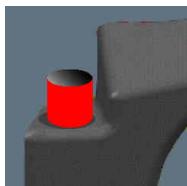
Control HandleUnlock pb

The sliding window is open, or locked in the closed position.



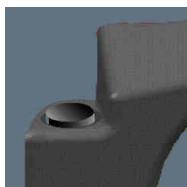
The sliding window is unlocked.
The flight crew can move the window.

UNLOCK INDICATOR



The sliding window is not locked.

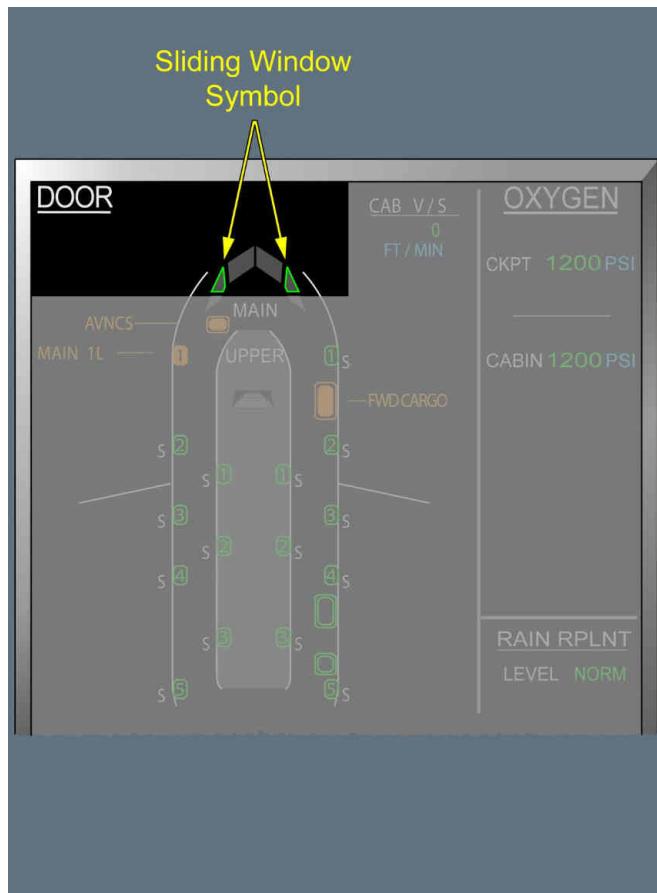
Note: When the window is not in front of its frame, the red part of the unlock indicator is visible, but not entirely.



The sliding window is open, or locked in the closed position.

DOOR/OXY SYSTEM DISPLAY

Applicable to: ALL

DOOR/OXY SD Page - Sliding Window**SLIDING WINDOW SYMBOL**

The sliding window is locked in the closed position.



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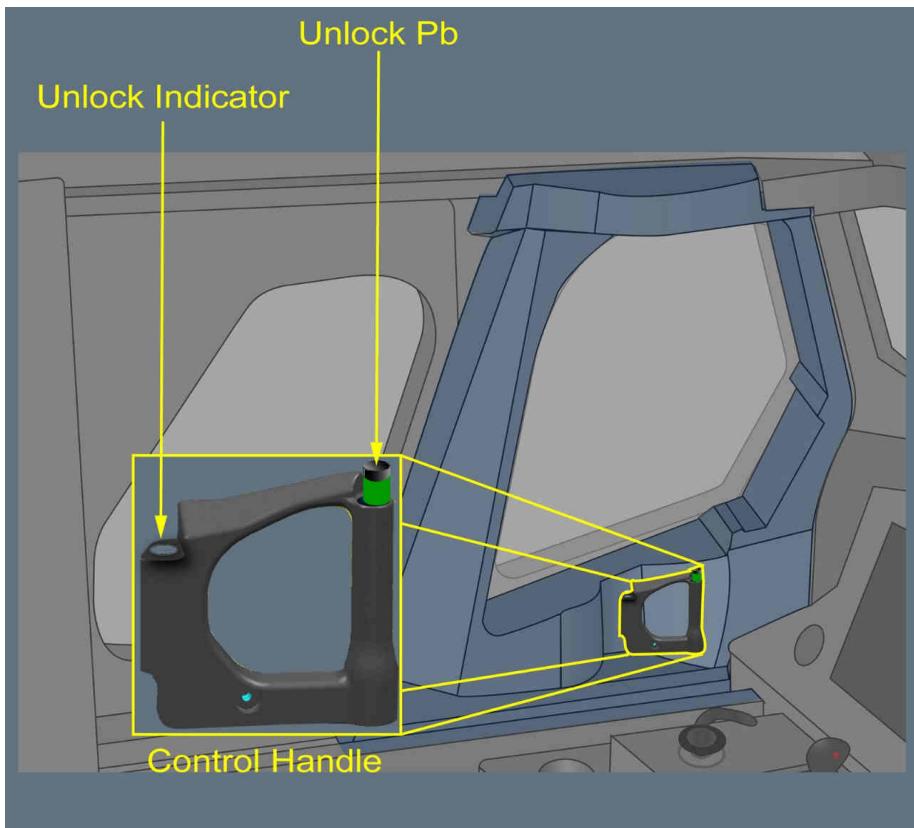
CONTROLS AND INDICATORS



The sliding window is not locked.

HOW TO OPERATE THE COCKPIT SLIDING WINDOW**Applicable to: ALL**

Each sliding window has a control handle to open or close the window.

Sliding Window and Control Handle**HOW TO OPEN THE SLIDING WINDOW**

1. Press and hold the unlock pb, until the red part of the unlock indicator is entirely visible.
2. Keep pressing the unlock pb, and pull out the control handle.
This will free the sliding window from its frame.
3. Keep pressing the unlock pb, and slide the window open.
4. Stop pressing the unlock pb.

This will lock the window in its open position.

Note: If the flight crew stops pressing the unlock pb, when the window is not completely open, the window will remain locked in its position.

HOW TO CLOSE THE SLIDING WINDOW

1. Press and hold the unlock pb, until the red part of the unlock indicator is entirely visible.
2. Keep pressing the unlock pb, and slide the window closed.
3. When the window is in front of its fixed frame, push the control handle.

The window moves into its frame, and becomes locked in the closed position. The red part of the unlock indicator is no longer visible.

HOW TO ESCAPE THROUGH THE COCKPIT WINDOW

Applicable to: ALL

Open the sliding window.

For more details, Refer to DSC-56-30 How to Operate the Cockpit Sliding Window .

Open the escape rope stowage.

The escape rope stowage is located above the fixed lateral window.

Entirely unroll the escape rope, and throw it through the window.

Firmly grasp the escape rope, seat on the window, facing inside the cockpit, and slide down the rope.

The following video shows how to escape through the cockpit window:

This animation is not available in pdf format.



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ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

DOOR CKPT SLIDING WINDOW NOT CLOSED (*Refer to procedure*)

MISC CKPT WINDOW CRACKED (*Refer to procedure*)

MISC CKPT WINDOW ELEC ARCING (*Refer to procedure*)



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OVERVIEW

OVERVIEW

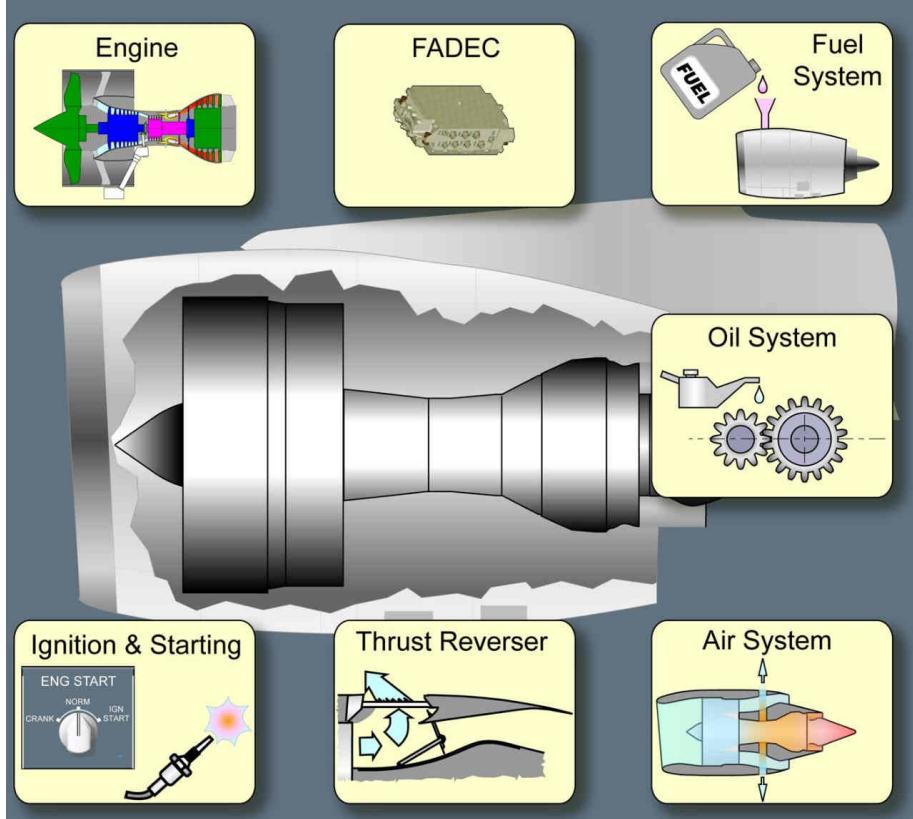
Applicable to: ALL

Four Engine Alliance GP7270 power the aircraft.

Each engine provides up to 70 000 lb takeoff thrust at ISA sea level conditions.

Each engine has:

- A high bypass ratio turbofan engine
- A Full Authority Digital Engine Control (FADEC)
- A fuel system
- An oil system
- An air system
- A thrust reverser system
- An ignition and start system.





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70 - ENGINES

ENGINE DESCRIPTION

ENGINE DESCRIPTION

Applicable to: ALL

The engine has:

- Two compressor-turbine assemblies:
 - Low Pressure (LP)
 - High Pressure (HP)

[L3] Each turbine drives its assigned compressor via a shaft.

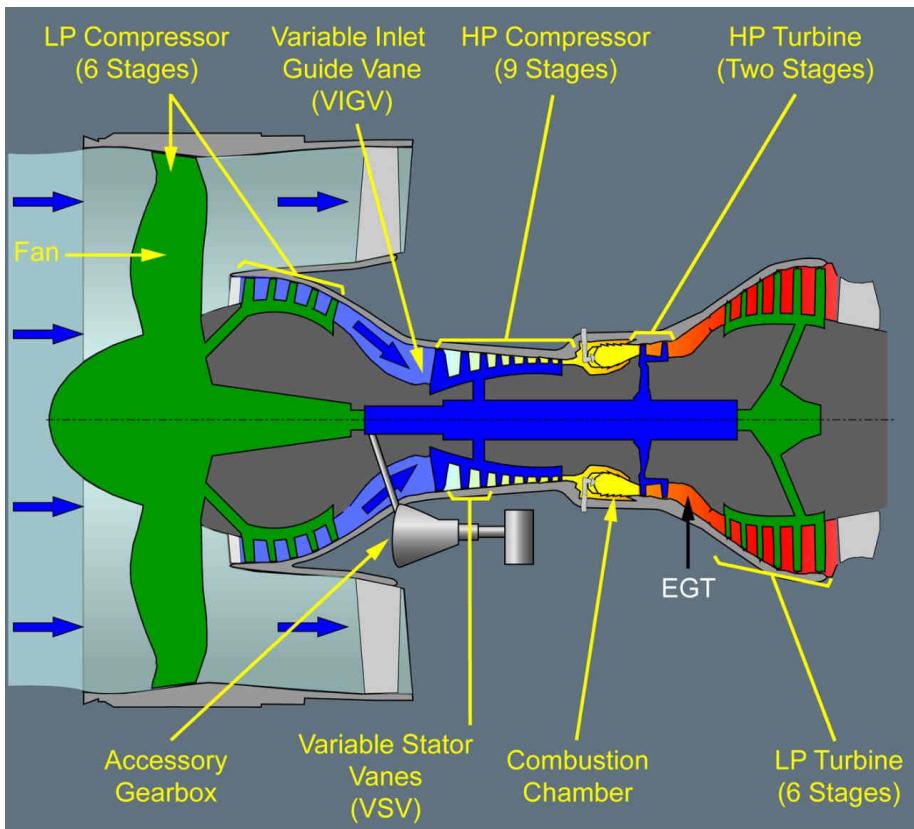
The engine is a counter-rotation type engine, i.e. the LP and the HP compressors turn in opposite directions.

[L1]- An accessory gearbox

- A combustion chamber.

The engine operation is as follows:

- At the fan level, the air is separated in two flows: Most of the air flows out of the core engine and provides most of the engine power. The remaining air enters the engine core
- The air that enters the engine core is compressed by the LP and the HP compressors
- Fuel is added and ignited in the combustion chamber
- The resulting gas drives the HP and the LP turbines
- The HP (LP) turbine drives the HP (LP) compressor.

EngineLOW-PRESSURE (LP) COMPRESSOR-TURBINE ASSEMBLY

The low pressure assembly consists of a LP compressor, including the fan, connected to the LP turbine by the LP shaft.

L3 The LP compressor has six stages including the fan, and the LP turbine has six stages.

L1 At the fan level, the air is separated into two flows:

- Most of the air flows outside the engine core to provide most of the engine thrust
- The remaining air flows through the HP compressor to the combustion chamber.

The rotation speed of the LP rotor provides the N1 engine parameter.

- [L3] The N1 engine parameter is the current rotation speed of the LP rotor given in percentage of the reference rotation speed.
- [L1] The FADEC uses this parameter for engine control and monitoring. The N1 parameter appears on the EWD.
 - The engine applicable thrust is calculated based on the N1 parameter.
- [L3] Four speed probes located on the front bearing housing of the engine measure the N1 parameter.

HIGH-PRESSURE (HP) COMPRESSOR-TURBINE ASSEMBLY

- The high-speed assembly consists of the HP compressor, connected to the HP turbine by the HP shaft.
- [L3] The HP rotor is contra-rotating compared with the LP rotor. This increases the efficiency of the LP compressor air flow when entering the HP compressor.
 - The HP compressor has 9 stages and the HP turbine has 2 stages.
 - [L1] The rotation speed of the HP rotor provides the N2 engine parameter.
 - [L3] The N2 engine parameter is the current rotation speed of the HP rotor given in percentage of the reference rotation speed.
 - [L1] The FADEC uses this parameter for engine control and monitoring. The N2 parameter appears on the SD .
 - [L3] A speed probe located between the accessory gearbox and the HP rotor measures the N2 parameter.

VARIABLE STATOR VANES AND VARIABLE INLET GUIDE VANES

The Variable Stator Vanes (VSV) and Variable Inlet Guide Vanes (VIGV) regulate the amount of air that flows inside the compressor.
For more information on VSV s and VIGV s, *Refer to DSC-70-20-20-10 Stall Recovery*.

COMBUSTION CHAMBER

- The combustion chamber burns a mixture of HP air and fuel. The FADEC controls the fuel-air mixture in accordance with the engine thrust lever position and the aircraft operating conditions.
- [L3] The combustion chamber is located between the HP compressor and the HP turbine.
 - The combustion chamber is an annular assembly fitted with 28 fuel nozzles and 2 igniters.

ACCESSORY GEARBOX

- The accessory gearbox drives accessories for engine and aircraft systems operation, using the engine mechanical power (e.g. engine-driven generator for electrical power or the engine-driven pumps for hydraulic power).
- [L2] The accessory gearbox of each engine drives:
 - One engine-driven generator that supplies the AC power
 - Two hydraulic engine-driven pumps that supply the hydraulic pressure to the users

- A pneumatic starter. For information on engine starting, *Refer to Starting*
- A FADEC alternator. For more information, *Refer to DSC-70-20-10 Architecture*
- Engine oil pumps. For more information, *Refer to Oil system*
- Engine fuel pumps. For more information, *Refer to Fuel system*.

L3 The accessory gearbox transmits mechanical power to these accessories via the HP rotor.

OVERVIEW

Applicable to: ALL

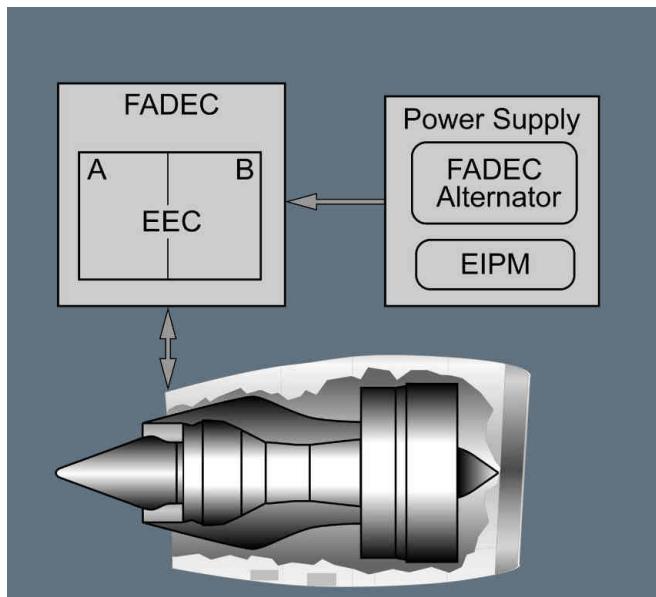
Each engine has a Full Authority Digital Engine Control (FADEC).

The FADEC performs a complete engine management:

- Engine protection
- Engine power management
- Engine ignition and starting control
- Engine parameters monitoring and display.

ARCHITECTURE

Applicable to: ALL

FADEC Architecture**FADEC**

Each FADEC has one Engine Electronic Controller (EEC) that provides engine control and cockpit indications.

- L3 Each EEC has two fully redundant channels A and B. Only one EEC channel controls the engine. When one EEC channel fails, the other EEC channel controls the engine.

The EEC channel that controls the engine changes at each engine start.

L1 FADEC ELECTRICAL SUPPLY

The FADEC is electrically supplied from:

- The FADEC alternator when the engine rotation speed is sufficient
- [L2] The FADEC alternator supplies the FADEC when the engine rotation is above 12.5 % N2.
- [L3] The FADEC alternator is driven by the accessory gearbox.
- [L1] - The aircraft electrical network when the engine rotation speed is too low, or if the FADEC alternator is failed.
- [L2] The aircraft electrical network supplies the FADEC when N2 is below 10.5 %.
- [L1] The Engine Interface and Power management (EIPM) controls the electrical power from aircraft electrical network to the FADEC.
- [L3] There is one EIPM for two engines.

The aircraft electrical network supplies the FADEC for 15 min at aircraft power-up.

The aircraft electrical network supplies the FADEC for 10 min when the FADEC GND PWR pb is pressed.

FADEC Electrical Supply

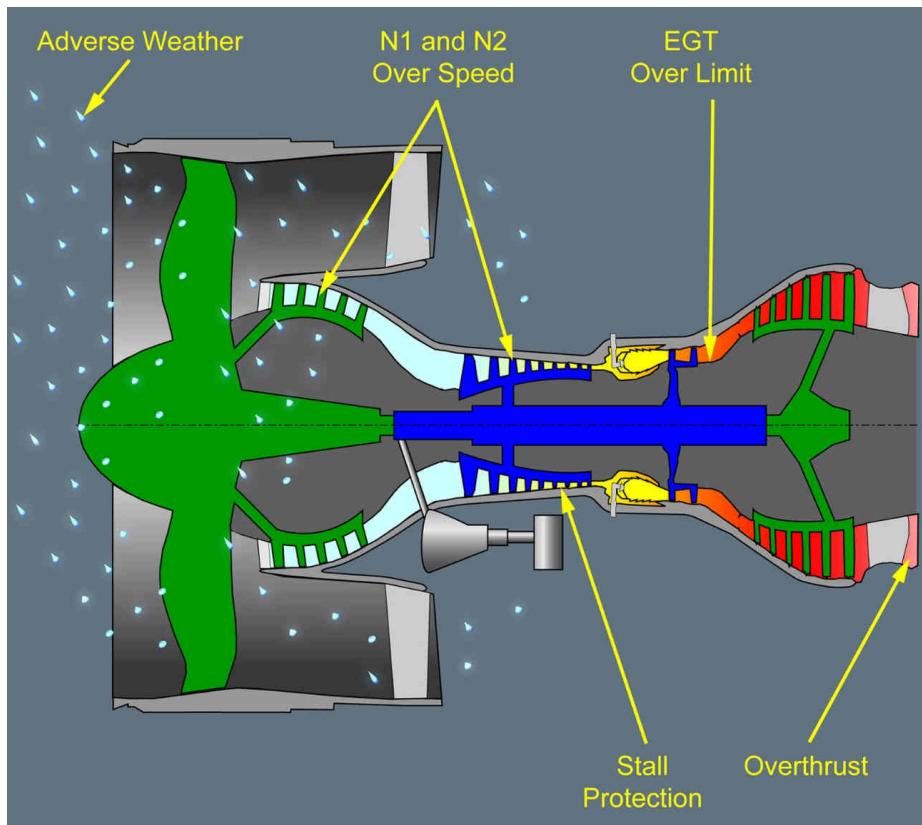


ENGINE PROTECTIONS

Applicable to: ALL

The FADEC provides protections against the following engine malfunctions:

- N1 , N2 over speed, and EGT overlimit
- Overthrust
- Engine flame out in adverse weather conditions
- Engine stall.

General

N1/N2 OVER SPEED AND EGT OVERLIMIT

The FADEC monitors:

- LP and HP compressors speeds, i.e. N1, N2
- EGT.

In the case of over speed of the LP or HP compressor and without flight crew action to reduce or shut down the engine, the FADEC automatically shuts down the engine.

On ground, during an automatic engine start sequence, if the FADEC detects an EGT over limit, the FADEC automatically shuts down the engine. The engine is then motored to clear fuel vapors. After sufficient time, the FADEC automatically attempts a second engine start sequence.

OVERTHRUST PROTECTION

The FADEC protects the engine when the current engine thrust is above the commanded engine thrust. The FADEC ensures that the engine thrust remains within the safe limits in the case of overthrust.

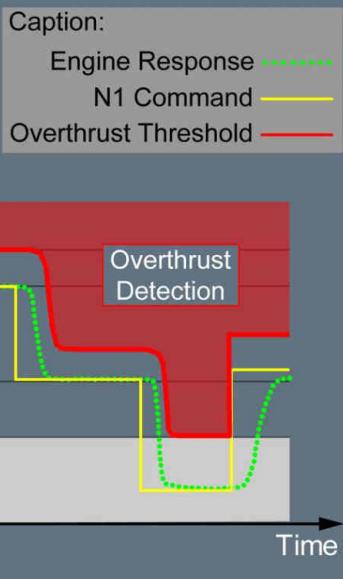
Depending on the aircraft altitude and speed, if the FADEC detects an overthrust, the FADEC shuts down the affected engine, or reduces the thrust within the normal thrust envelope.

[2] If FADEC detects an overthrust on an engine:

- The FADEC shuts down the affected engine, when the aircraft is on ground and the throttle levers are in IDLE detent or in the reverser position (e.g. if the overthrust is detected at touchdown or during a rejected takeoff)
- The FADEC reduces the thrust of the affected engine, when the aircraft is in flight below 15 000 ft.

There is no overthrust protection above 15 000 ft, or when the aircraft speed is above M 0.4.

[1] *Note: If the autopilot is engaged, the AUTOLAND warning triggers upon a N1 asymmetry detection in AP flare mode.*



ADVERSE WEATHER

Heavy rain or hail does not affect the engine operation. However, if the FADEC detects a risk of engine flameout due to excessive rain or hail at low engine power (i.e. idle), the FADEC automatically switches on both igniters.

For more information on the engine flameout detection, *Refer to DSC-70-80-20 Continuous Ignition*.

STALL PROTECTION

To ensure engine stability within the whole engine power and aircraft speed envelope, a smooth airflow in the compressors is necessary.

The FADEC regulates the volume of airflow through the LP and HP compressors to prevent the engine to stall at low engine speed.

- [L3] The airflow in the compressors is regulated by using:
 - Internal bleed valves that adjust the amount of airflow through the LP and HP compressors
 - Variable Inlet Guide Vanes (VIGV s) and Variable Stator Vanes (VSV s) that adjust the angle at which the airflow goes into the LP compressor. The VIGV s and VSV s positions change with the engine speed.



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For more information on engine stability, Refer to DSC-70-60-60-10 Engine Stability.

THRUST CONTROL

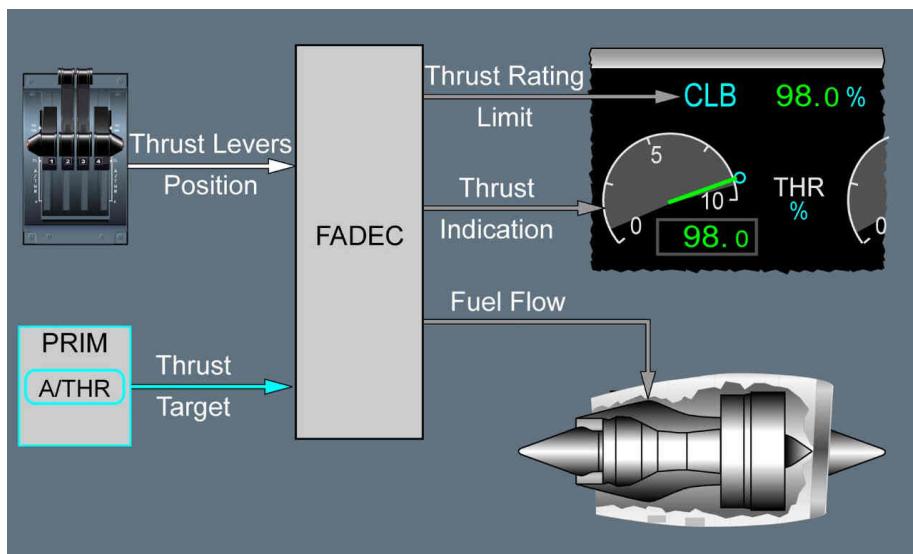
Applicable to: ALL

The FADEC controls the engine thrust.

The FADEC operates in:

- Automatic mode: The FADEC computes the engine thrust in accordance with the A/THR target
- Manual Mode: The FADEC computes each engine thrust in accordance with the associated thrust lever position.

The FADEC adjusts the fuel to command the engine thrust, and computes the thrust rating limit in accordance with the thrust levers position.

Thrust Control**THRUST RATING LIMIT**

The FADEC computes the applicable thrust rating mode and the corresponding thrust limit value based on:

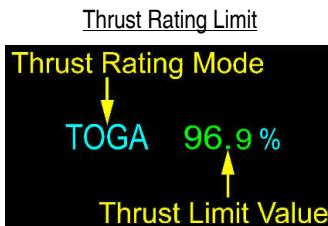
- The position of the thrust levers
- The data entered in the T.O and CLB panel of the FMS ACTIVE/PERF page.

The thrust limit value corresponds to the maximum available thrust for the thrust levers position and FMS selection.

Note: If the thrust lever is set between two detents, the FADEC selects the rating limit mode corresponding to the highest detent.

The engine thrust is always limited by the thrust lever position, with or without A/THR , except when **A. FLOOR** protection is active.

The EWD displays the thrust rating mode and the corresponding thrust limit value.



The following thrust rating modes are available:

- **TOGA** : Takeoff or go-around mode

The TOGA mode provides the maximum available thrust at takeoff or go-around.

- **DOx** : Derated takeoff mode

The DOx mode reduces the maximum thrust at takeoff.

6 derated takeoff levels are defined: **DO4 , DO8 , D12 , D16 , D20 , D24** .

L2

Each level reduces the maximum thrust from 4 % up to 24 % .

L1

For more information on the derated takeoff mode, *Refer to PER-TOF-THR-DRT Definition of Derated Takeoff*.

The flight crew can select the derated takeoff level via the T.O panel of the FMS ACTIVE/PERF page. For more information, *Refer to FMS PERF page - Takeoff thrust* .

- **FLEX** : Flexible takeoff thrust

The FLEX mode reduces the thrust at takeoff.

For more information on the flexible takeoff thrust, *Refer to PER-TOF-THR-FLX Definition of FLEX Takeoff* .

The flight crew can select a flexible takeoff thrust via the T.O panel of the FMS ACTIVE/PERF page. For more information, *Refer to FMS PERF page - Takeoff thrust* .

- **CLB** : Climb mode

The CLB mode provides the maximum thrust during climb.

- DCLBx : Derated climb mode

The DCLBx reduces the maximum climb thrust.

3 derated climb levels are defined: **DCL1** , **DCL2** , **DCL3** .

For more information on the derated climb mode, *Refer to Derated Climb* .

The flight crew can select a derated climb level via the CLB panel of the FMS ACTIVE/PERF page. For more information, *Refer to FMS PERF page - Derated climb thrust* .

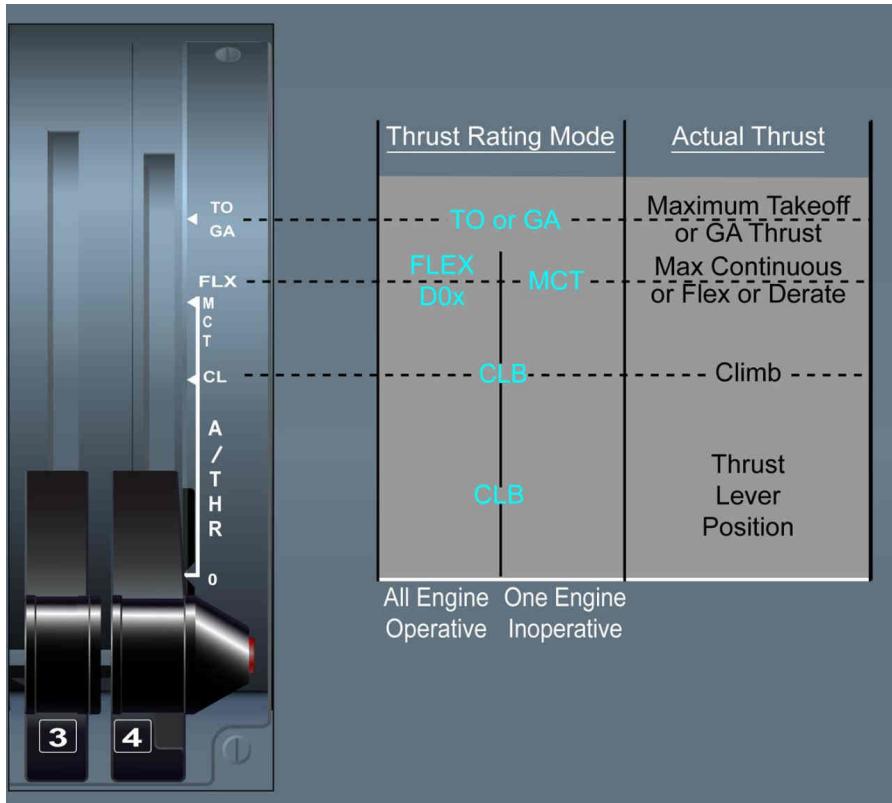
- MCT : Maximum continuous thrust mode

The MCT mode provides the maximum engine thrust with one engine inoperative.

MANUAL THRUST CONTROL

In manual mode, each engine is controlled by the position of the associated thrust lever. The flight crew controls the thrust by moving the thrust lever from IDLE to TOGA detents.

Each position of the thrust lever within the IDLE to TOGA detents range corresponds to a percentage of thrust.

Manual Thrust Control**MANUAL THRUST ON GROUND**

Depending on the selected takeoff thrust on the T.O panel of the FMS ACTIVE/PERF page, i.e. TOGA , or FLEX , or DERATED, the associated thrust rating mode, T.O , or D0x , or FLEX is displayed, whatever the position of the thrust levers.

If the A/THR is armed at takeoff, A/THR activates when the flight crew sets the thrust levers to the CLB detent. CLB becomes the thrust rating limit mode.

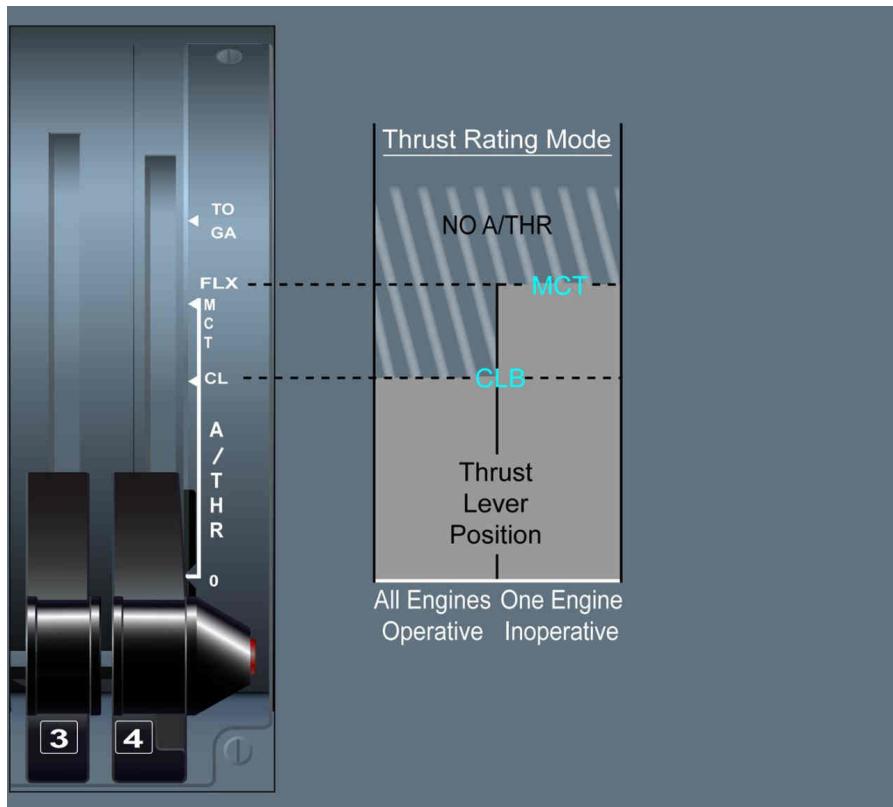
For more information on A/THR , Refer to *Typical A/THR scenario*.

THRUST CONTROL IN AUTOMATIC MODE

When the A/THR is active, the PRIMs compute the thrust target. The thrust of the engine is limited to the thrust corresponding to the associated thrust lever position, except if the **A. FLOOR** protection is activated.

- [L3] The A/THR thrust targets are N1 targets.
- [L2] The thrust lever position determines the maximum thrust that the A/THR can command.
- [L1] For more information on the A/THR, *Refer to A/THR overview*.

Thrust Automatic mode



THRUST RATING LIMIT ALL ENGINES OPERATIVE

When all engines are operative, the A/THR activates when the thrust levers are between IDLE and CLB detents.

THRUST RATING LIMIT ONE ENGINE OPERATIVE

When one engine is inoperative, A/THR activates when the thrust levers are between IDLE and MCT detents.

ENGINE POWER SETTING**Applicable to: ALL**

The FADEC has two modes to manage the engine thrust:

- Normal (NORM)
- Degraded (DEGRADED).

The selection of the operating mode depends on the availability of several air data sources: The static pressure (P0), the total pressure (PT), and TAT.

The NORMAL mode is used when all air data sources are available to the FADEC.

NORMAL MODE

In NORMAL mode, the primary engine parameter displayed on the EWD is the thrust (THR).

The THR parameter represents the percentage of thrust delivered by the engine.

100 % THR corresponds to the engine thrust achieved when the thrust lever is in the TOGA detent and the engine bleed is off.

L3 The FADEC calculates the THR command as a function of:

- The throttle lever position
- The aircraft speed/Mach
- The aircraft altitude
- The outside air temperature.

The THR command is used to adjust the engine fuel flow, and therefore to produce the required thrust.

The FADEC calculates the current THR as a function of N1 , P0 (static pressure), EGT , TAT, and PT (total pressure).

The current THR and THR command are compared for closed loop engine control.

The FADEC calculates TAT , PT, Speed/Mach, altitude and Δ ISA by using air data parameters.

For information on air data selection, *Refer to DSC-70-20-40-20 Air Data Selection*.

DEGRADED MODE

In DEGRADED mode, the N1 parameter is the primary engine parameter. On the EWD , the N1 parameter replaces the THR parameter.

L2 The FADEC reverts to N1 control, and uses the current N1 to control the thrust.

- [L3] The FADEC computes the N1 command as a function of the thrust levers position, and compares the N1 command with the actual N1 for closed loop engine control.
- [L1] For more information on primary engine parameter display in DEGRADED mode, *Refer to DSC-70-90-50 N1 Indications (Degraded)*.
The FADEC reverts to DEGRADED mode when some air data parameters are not available.
- [L3] The automatic reversion to DEGRADED mode occurs when one of the following parameters necessary to compute the THR command is totally lost:
- Static pressure (P0), or
- Total pressure (PT), or
- TAT .
- [L1] In the case of reversion to DEGRADED mode, a thrust equivalent to the current thrust in NORMAL mode is provided until the flight crew changes the position of the thrust lever.
If three or four engines operate in DEGRADED mode, the A/THR is lost.
In DEGRADED mode, the thrust rating modes are lost.

FADEC AIR DATA SELECTION

The FADEC uses air data parameters for power management.

The three ADIRUs and the engine sensors provide air data parameters to the FADEC.

In normal operation, the FADEC uses the air data parameters from the ADIRUs.

Depending on the validity of the engine and ADIRUs air data, each FADEC selects the source that is used for power management.

- [L3] Validation of air data is done as follows:
- Each ADIRU compares its air data with the data from the four FADECs. If the ADIRU air data is consistent with two or more FADECs, then the ADIRU considers its own air data as valid and sends a validity signal to each FADEC
 - Each FADEC compares its data with the data received from the three ADIRUs. The FADEC needs at least two ADIRUs to do this comparison
 - If the FADEC and the ADIRUs air data are consistent, the ADIRUs data are used
 - If the FADEC and the ADIRUs air data are not consistent, the FADEC uses the validity signal from each ADIRU to determine the best source to use between engine and ADIRUs sources.

IDLE SETTINGS

Applicable to: ALL

When a thrust lever is set to idle, the FADEC adjusts the minimum thrust required to maintain correct engine operation at low speed depending on the flight phase.

There are three idle settings:

- Approach idle

It enables a rapid engine acceleration from idle to go-around thrust.

- [L2] This setting is selected during approach when the FLAPS lever is set to 2, 3, or FULL, or when the landing gear is extended.

- [L1]- Reverse idle

It enables a rapid engine acceleration from idle to maximum reverse thrust.

- [L2] This setting is selected on ground, when reverse thrust is selected.

- [L1]- Normal idle.

- [L2] This setting is selected in the other flight phases, i.e. in flight with FLAPS lever set to 0, or 1 and landing gear retracted, or on ground with reversers not selected.

The normal idle setting varies according to:

- Bleed demand
- Oil temperature
- Mach number
- Altitude
- SAT.

FUEL FLOW CONTROL

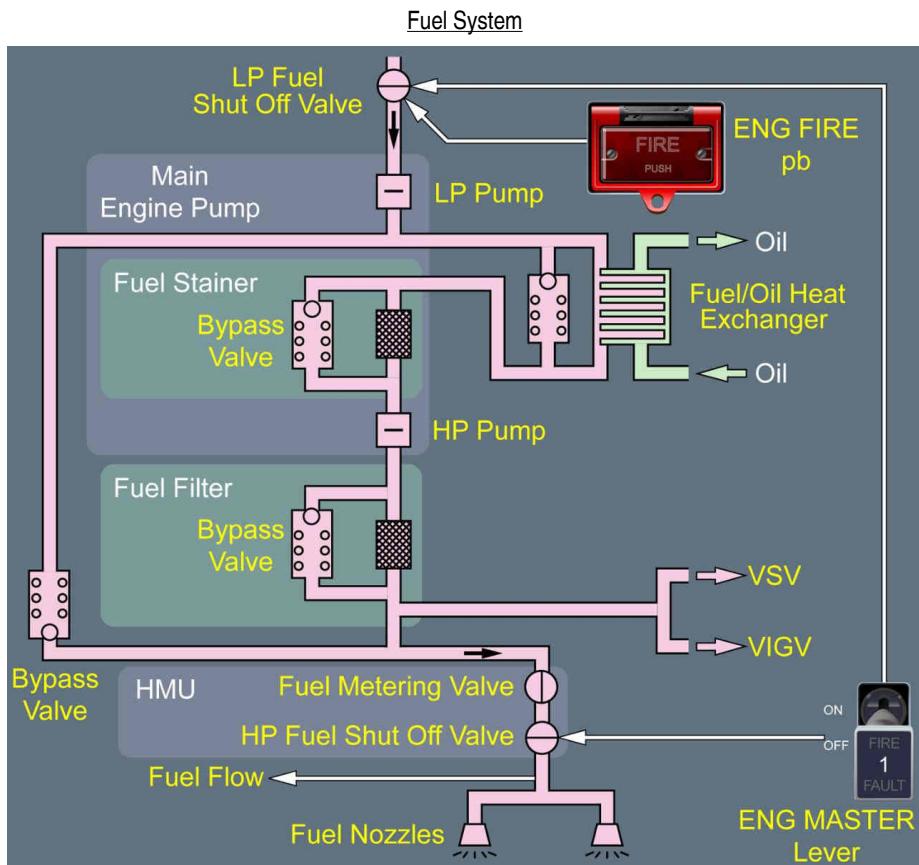
Applicable to: ALL

The FADEC controls the fuel flow, via the HMU , as necessary. For more information on the engine fuel system, *Refer to DSC-70-40-40-10 Overview* .

FUEL SYSTEM

Applicable to: ALL

The fuel system supplies fuel to the combustion chamber at the required flow rate, pressure and temperature.

**ENGINE FUEL PUMP**

The main engine pump delivers fuel coming from the feed tank to the fuel nozzles at the required pressure and temperature.

- L3 The accessory gearbox drives the main engine pump.

The main engine pump is made of the LP and HP pumps.

LP PUMP

Fuel supplied from the feed tank flows through the LP pump.

The LP pump then supplies the fuel to the Fuel Oil Heat Exchanger (FOHE).

HP PUMP

The HP pump pressurizes and supplies fuel to the fuel nozzles via the HMU.

L3 FUEL OIL HEAT EXCHANGER (FOHE)

The FOHE uses cold LP fuel to decrease the temperature of the engine oil.

Heat is continuously transmitted from the oil to the fuel when the engine is in operation. This increases the fuel temperature at the outlet of the FOHE.

FUEL FILTER AND FUEL STRAINER

The fuel strainer and the fuel filter protect the fuel system from contamination.

L3 The fuel strainer and the fuel filter are upstream and downstream the main engine pump.

L1 The fuel strainer and the fuel filter include a bypass valve. The bypass valve ensures that fuel continuously flows to the fuel nozzles, if the fuel filter or the fuel strainer is clogged.

The opening of the bypass valves may lead to HMU contamination by fuel particles.

FUEL SHUTOFF VALVES

The LP and HP fuel shutoff valves open or close fuel supply to the combustion chamber, when the flight crew sets the ENG MASTER lever to OFF.

LP shutoff valve closes, if the flight crew presses the ENG FIRE pb-sw.

HYDROMECHANICAL METERING UNIT (HMU)

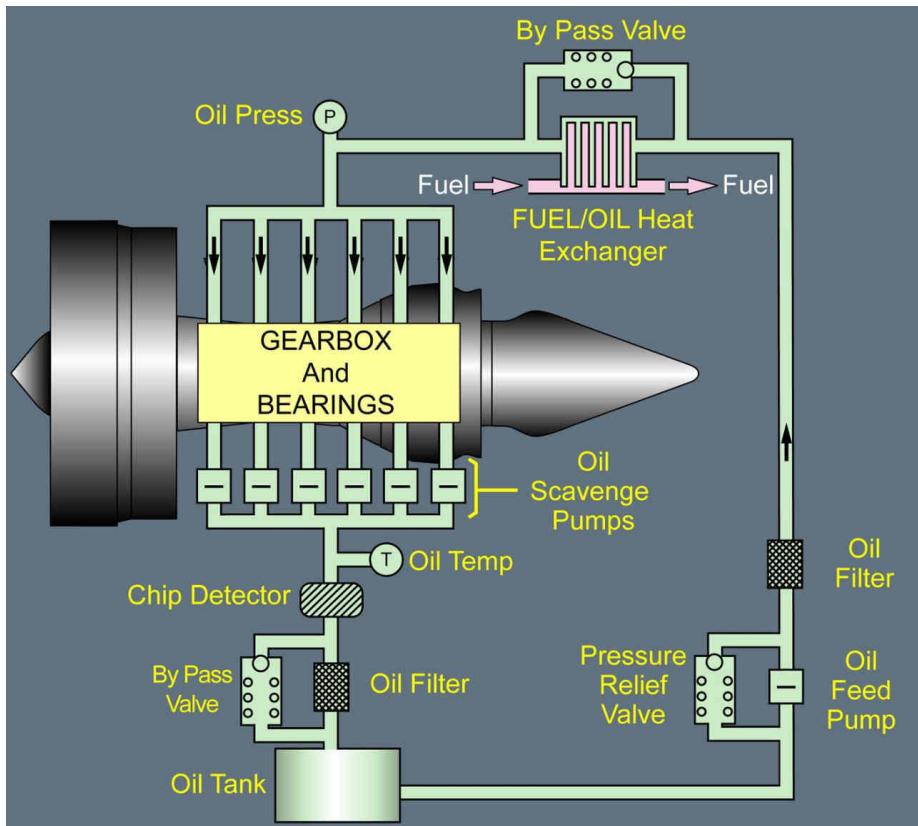
The FADEC controls fuel supply via the Hydromechanical Metering Unit (HMU) in order to obtain the required engine thrust.

L3 The HMU :

- Controls the fuel flow to the engine combustion chamber via the Fuel Metering Valve
- Protects the engine from overspeed by closing the HP shutoff valve
- Operates the HP shutoff valve to start or stop the engine
- Operates the Variable Inlet Guide Vanes (VIGV) and the Variable Stator Vanes (VSV) to regulate the LP and HP compressor flow (Refer to DSC-70-20-20-10 Stall Recovery).
High pressure fuel is used to actuate the VIGV and the VSV .

OIL SYSTEM

Applicable to: ALL

Oil System

The oil system lubricates and cools the engine components such as bearings, gears, and accessory drives.

OIL PUMPS

The oil feed pump supplies oil from the engine oil tank to the engine components to lubricate.

The oil scavenge pumps collect the oil from the return lines to the engine oil tank.

- L3 The accessory gearbox drives the oil feed and scavenge pumps.

OIL FILTERS

Two oil filters protect the oil system from contamination.

- [L3] The oil is filtered in the feed line and in the return line.
- [L1] The oil filter bypass valve opens, if the oil filter in the return line is totally clogged. It ensures that oil continuously flows to the engine components.
- [L3] Only the oil filter in the return line has a bypass valve.

CHIP DETECTOR

The chip detector in the oil system gives an indication of the internal condition of the engine.

FUEL OIL HEAT EXCHANGER (FOHE)

The FOHE uses cold LP fuel to decrease the temperature of the engine oil.

Heat is continuously transmitted from the oil to the fuel when the engine is in operation. This increases the fuel temperature at the outlet of the FOHE.

PRESSURE RELIEF VALVE

The oil pressure may be abnormally high at the oil feed pump outlet, if the oil temperature is very low during engine start. In such a case, the pressure relief valve opens to decrease the oil pressure. When the temperature of the oil increases, the pressure decreases, and the pressure relief valve closes.

The pressure relief valve also opens to decrease oil pressure, if the oil filter in the feed line becomes clogged.



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AIR SYSTEM

AIR SYSTEM

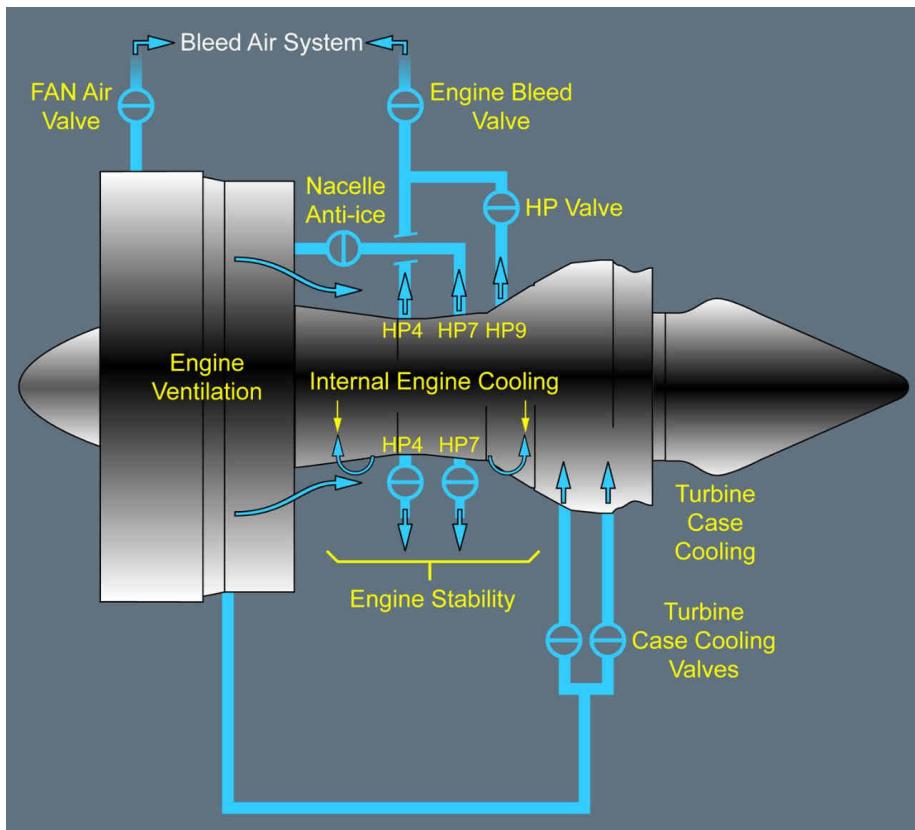
Applicable to: ALL

The engine bleed air system ensures:

- The engine stability, by controlling the volume of air flow through the engine compressors
- Engine cooling, by supplying cool air to internally cool the engine and to improve the turbine efficiency.

The engines also provide bleed air to:

- The bleed air system
 - For information about engine bleed air system, *Refer to Engine bleed*.
- The wing and nacelle anti-ice.
 - For more information, *Refer to Ice Protection*.

Engine Air System**L3 ENGINE STABILITY**

The control of the airflow through the LP and HP compressor ensures the engine stability.

The FADEC controls the volume of airflow via:

- Bleed valves at the HP compressor stages 4 and 7
 - At low engine speed, the FADEC opens the bleed valves to deviate some airflow from the compressors to the fan airstream.
 - At higher engine speed, the FADEC closes the bleed valves to supply the full airflow to the compressors.
- Variable Inlet Guide Vanes (VIGV s) and Variable Stator Vanes (VSV s) in the IP compressor.
 - For more information on VIGV s and VSV s, *Refer to DSC-70-20-20-10 Stall Recovery*.

L3 INTERNAL ENGINE COOLING

The engine is internally cooled with air supplied by the LP and HP compressors.

This air is also used to seal bearing chambers and to prevent internal oil leakage.

L3 TURBINE CASE COOLING

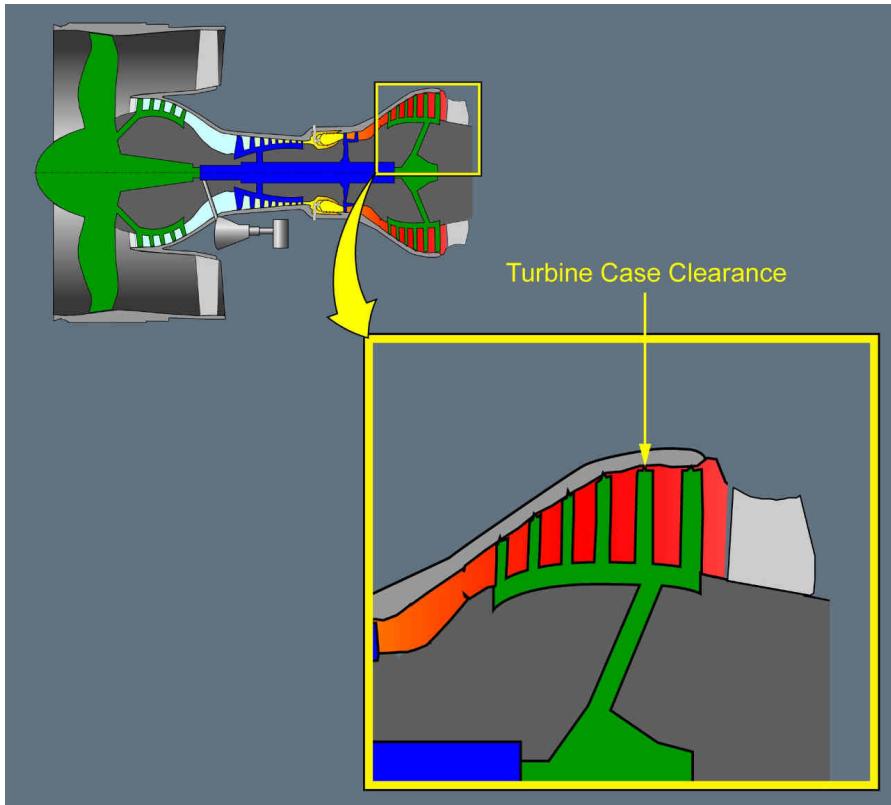
To reduce the turbine blade tip clearances, and to improve turbine efficiency, the turbine case is cooled.

The FADEC controls the turbine case cooling by the operation of the Turbine Case Cooling (TCC) valves.

In cruise, the FADEC opens the TCC valves to supply cooling air to HP and LP cases.

In other flight phases, the FADEC closes the TCC valves to stop the flow of cooling air to the HP case, and to reduce the flow to the LP case.

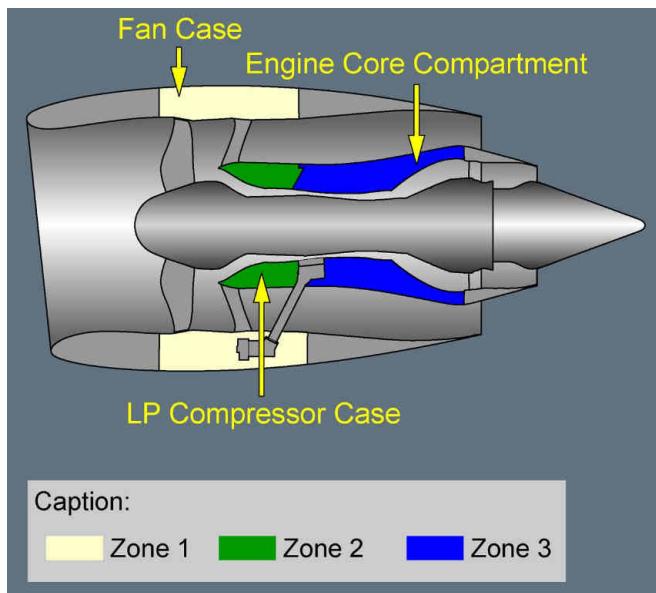
The TCC valves automatically close in the event of control system failure. As a consequence, the HP and LP turbine cases are no longer cooled, and the turbine blade tip clearances increase.

Clearance**L3 ENGINE VENTILATION**

The engine has 3 fire resistant zones that are isolated form each other:

- Zone 1: Fan case compartment
- Zone 2: LP compressor case compartment
- Zone 3: Engine core compartment.

The 3 engine fire zones are ventilated by fan airflow to decrease temperature and to prevent accumulation of fumes.

Engine Fire Zones



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AIR SYSTEM

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OVERVIEW**Applicable to: ALL**

There are two thrust reversers: One on each inboard engine.

The thrust reversers enable to reduce:

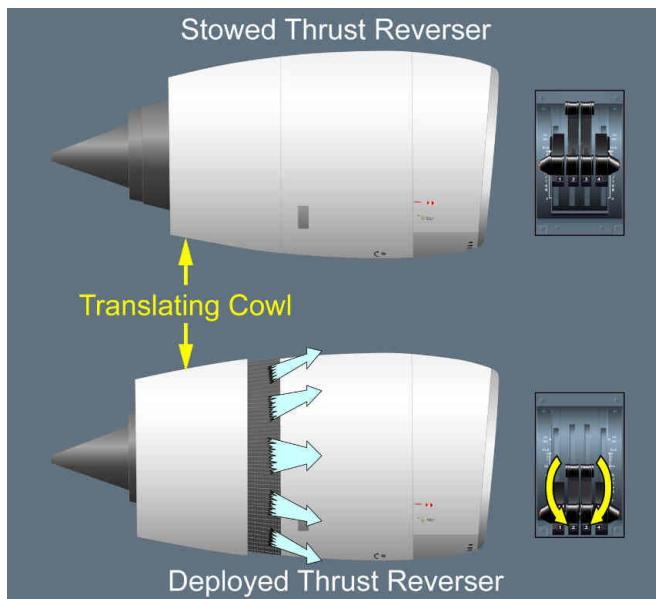
- The landing distance by the creation of a reverse thrust
- The energy absorbed by the brakes.

SYSTEM DESCRIPTION**Applicable to: ALL**

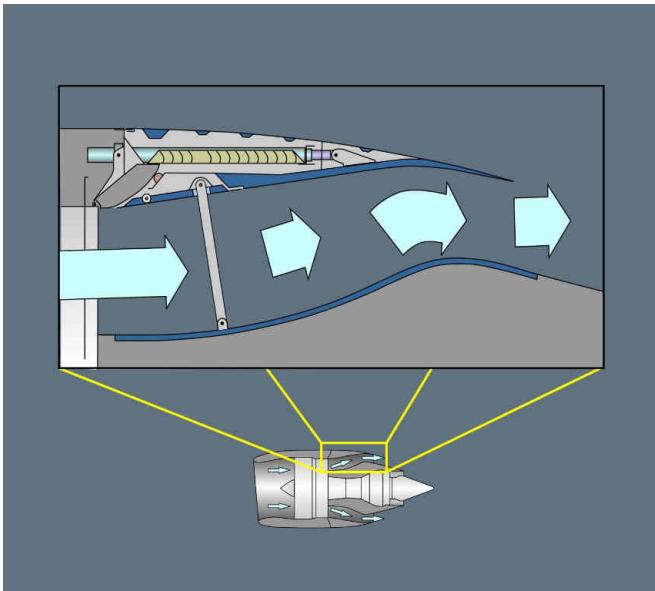
Each thrust reverser has two translating cowls: One on each side of the engine.

The two translating cowls are mechanically linked.

On ground, the translating cowls open to obtain a reverse thrust when the thrust lever is set to the idle detent and the thrust reverser lever is set to reverse thrust positions, i.e. IDLE REV to MAX REV.

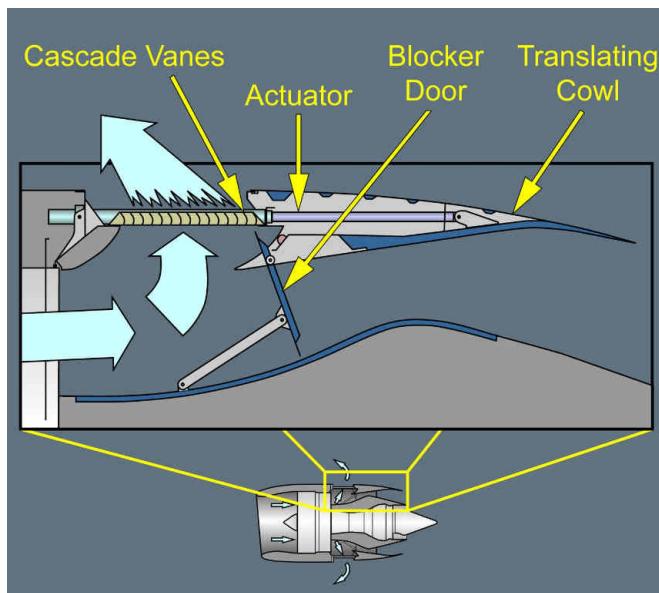
Translating Cowls**STOWED THRUST REVERSER**

When the reverser is stowed, the translating cowls are closed and the airflow outside the core engine is not deviated.

Stowed Thrust ReversersDEPLOYED THRUST REVERSER

When the thrust reverser lever is set from IDLE REV to MAX REV, the reverse thrust is obtained by the deviation of the airflow outside the core engine, as follows:

1. The translating cowls move backward
2. The blocker doors rotate
3. The air flow is diverted forward through the cascade vanes.

Deployed Thrust Reverser**L3 THRUST REVERSER CONTROL**

The thrust reverser mechanism has an Electrical Thrust Reverser Actuation System (ETRAS) that operates and locks the translating cowls.

During thrust reverser operation, the Electrical Thrust Reverser Actuation Controller (ETRAC) controls the translating cowls in deployed or stowed direction.

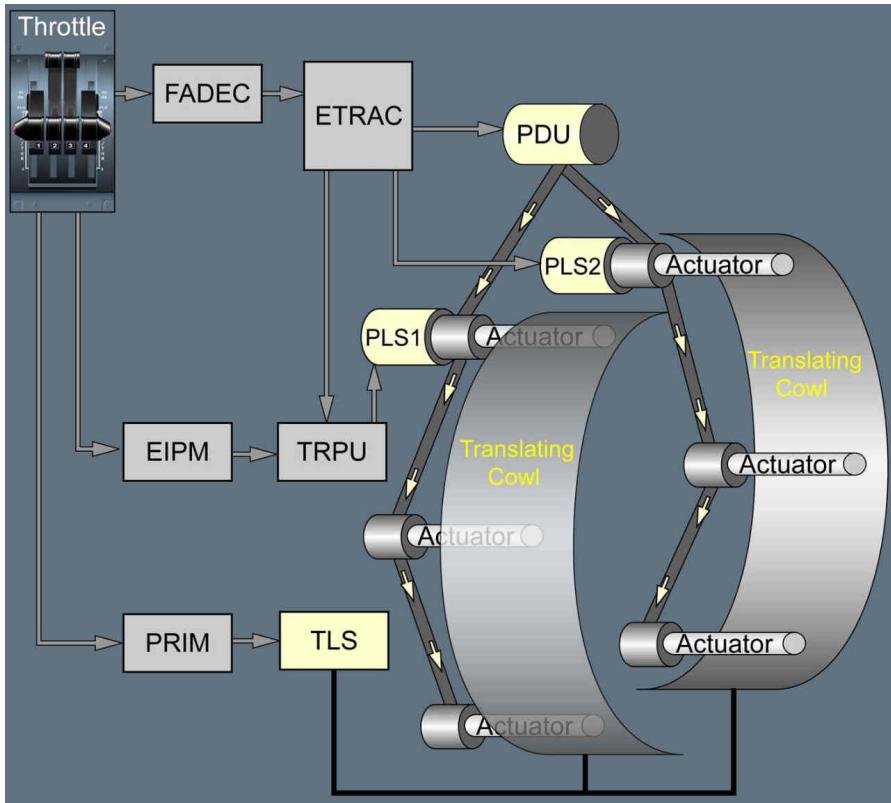
6 actuators, 3 on each translating cowl, actuate the thrust reverser. The Power Drive Unit (PDU) provides the mechanical power to the thrust reverser actuators.

2 Primary Locking Systems (PLS), one on each upper actuator, lock the translating cowls and avoid the thrust reverser operation when the thrust reverser is not selected. The PLS are part of the first and second lines of defense of the thrust reverser system.

The ETRAS controls one PLS and the Thrust Reverser Power Unit (TPRU) controls the second PLS .

The Tertiary Lock System (TLS) also avoids the thrust reverser operation when the thrust reverser is not selected. The TLS is part of the third line of defense of the thrust reverser system. The FADEC , EIPM , and the PRIM control the 3 lines of defense.

For more information about the 3 lines of defense, *Refer to DSC-70-70-70-20 Three Lines of Defense .*

Thrust Reverser SystemDEPLOYMENT- STOWAGE SEQUENCE

Applicable to: ALL

THRUST REVERSER DEPLOYMENT

The deployment of the reverser starts when the three lines of defense are cleared, i.e. the aircraft is on ground and the flight crew selects the reverse thrust.

For more information on the conditions to clear the three lines of defense, *Refer to DSC-70-70-70-20 Three Lines of Defense*.

During the thrust reverser deployment, the engine reverse thrust is limited to reverse idle.

- L3 This limits the loads applied on the thrust reverser system and provides protection against an engine stall.

- [L1] When the thrust reversers is deployed, the engine reverse thrust increases toward the commanded reverse thrust.
- [L3] Transition from reverse idle to commanded reverse thrust occurs when thrust reverser is deployed by more than 80 %. This occurs approximately 2 to 3 s after the flight crew selects the reverse thrust.

L1 THRUST REVERSER STOWAGE

The stowage of the thrust reverser starts when the thrust reverser lever is set forward REV IDLE .

THRUST REVERSER PROTECTIONS

Applicable to: ALL

LINES OF DEFENSE

The thrust reverser system has three lines of defense to prevent a reverser deployment in flight. The three lines of defense are fully segregated and must be cleared to allow the thrust reverser deployment.

- [L2] The three lines of defense are controlled as follows:
 - The FADEC and the EIPM monitor and control the first and second lines of defense
 - The Master PRIM monitors and controls the third line of defense.
- [L3] When the thrust lever of the engine 2(3) is set to the reverse position the following logics apply.

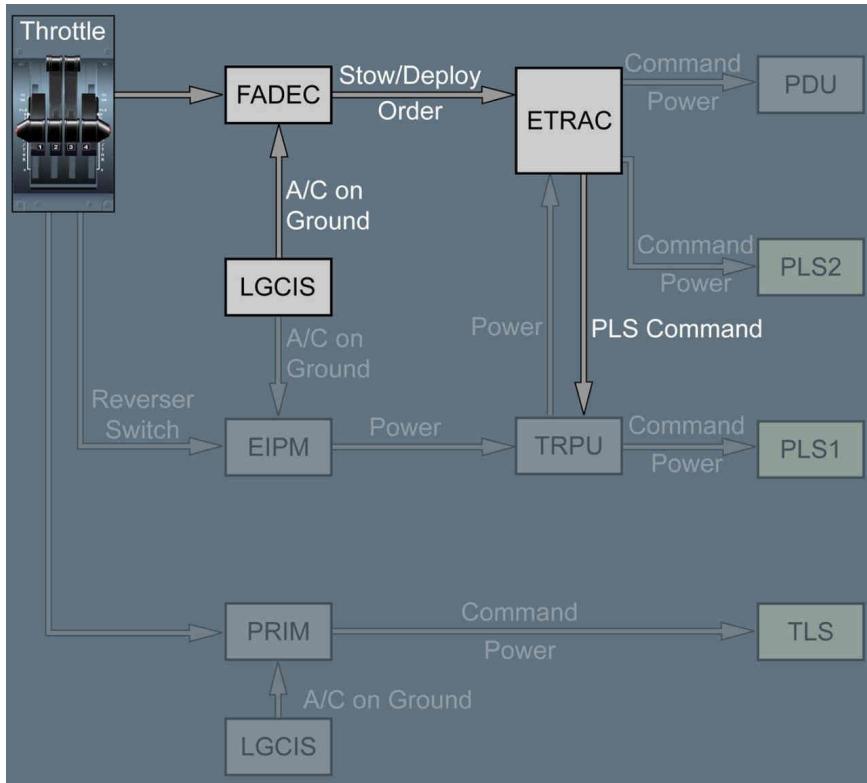
FIRST LINE OF DEFENSE

The first line of defense is cleared when:

- The throttle is in the reverse position
- The aircraft is on ground.

When the condition to clear the first line of defence is true:

- The FADEC requests the ETRAC to command the reverse deployment
- The ETRAC commands the TRPU to release the first Primary Lock System (PLS1)
- The ETRAC commands the release of the second Primary Lock System (PLS2).

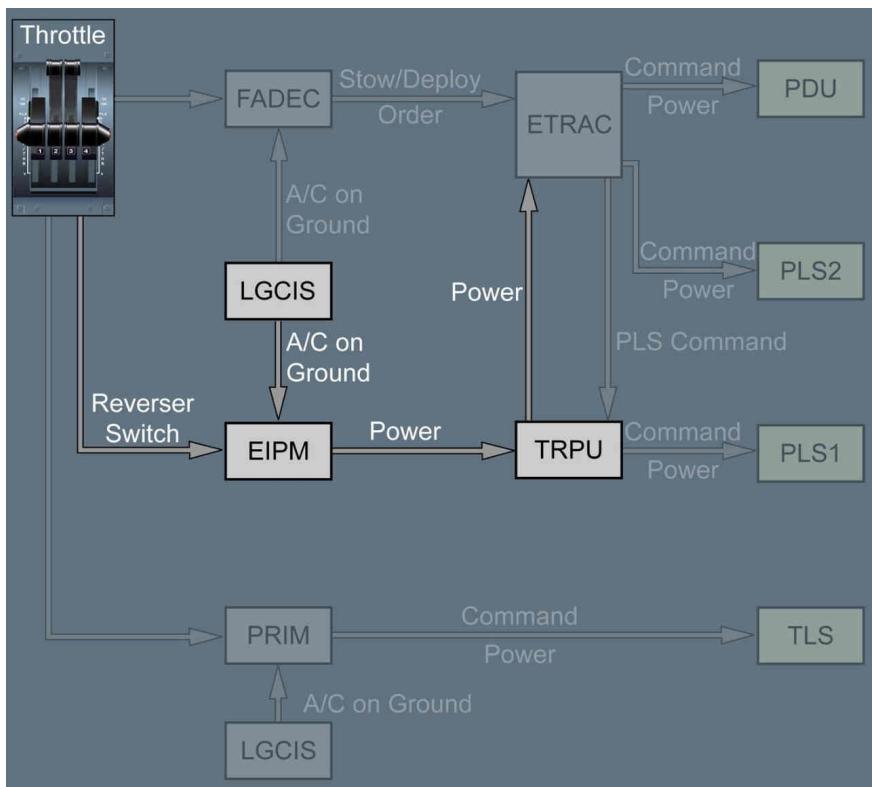
First Line of Defense

SECOND LINE OF DEFENSE

The second line of defense is cleared when:

- The thrust reverser switch activates
The reverser switch activates when the thrust lever is set to the reverse position.
- The aircraft is on ground.

When the condition to clear the second line of defence is true:

- The EIPM supplies the Thrust Reverser Power Unit (TRPU)
- The TPRU supplies the ETRAC to release the second Primary Lock System (PLS2)
- The TRPU commands the release of the first Primary Lock System (PLS1), when requested by the ETRAC.

Second Line of Defense**THIRD LINE OF DEFENSE**

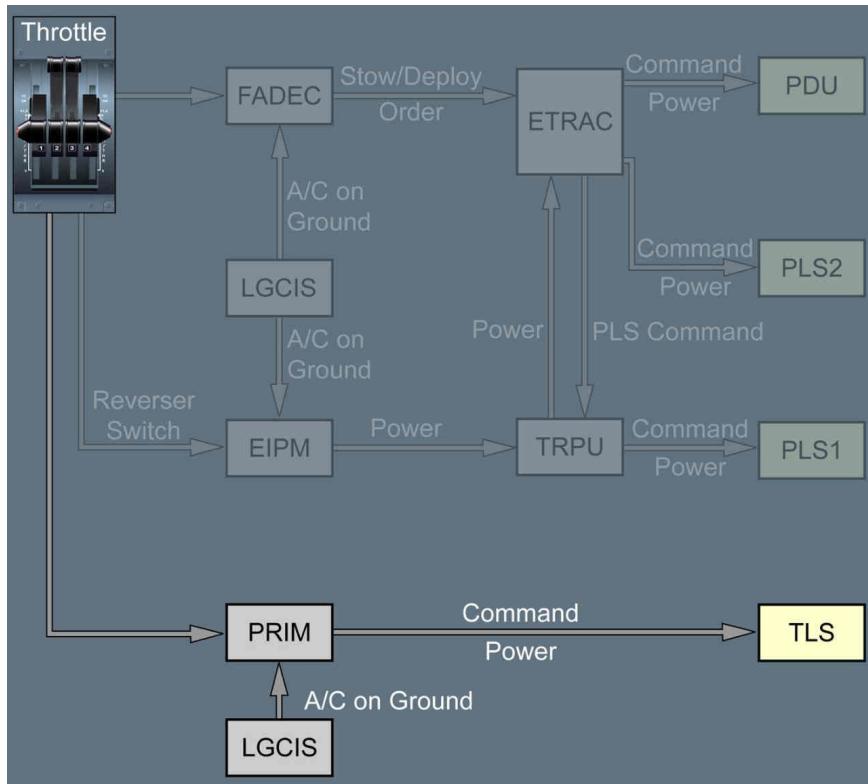
The third line of defense is cleared when:

- The Throttle is set to the reverse position

Note: The PRIM uses a throttle position independent of the throttle position that the FADEC uses.

- The aircraft is on ground.

The PRIM commands the power supply of the Tertiary Lock System (TLS) in order to release the tertiary lock when the condition to clear the third line of defence is true.

Third Line of Defense


IDLE PROTECTION

If the FADEC detects an inadvertent deployment of a thrust reverser, the FADEC automatically limits the associated engine thrust to idle.

- L3 The FADEC detects an inadvertent reverse deployment when:

- The reverse thrust is not selected
- At least one thrust reverser translating cowl is deployed by more than 5 %.

AUTO-IDLE PROTECTION

The auto-idle protection ensures that the outboard engines are at idle during the thrust reversers operation.



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THRUST REVERSER SYSTEM

The auto-idle protection activates if at least one outboard engine thrust lever is above idle detent during thrust reverser operation.

This protection covers the inadvertent selection of an outboard engine thrust lever above idle during the thrust reverser operation.

THRUST REVERSER LEVER LOCKING MECHANISM

The thrust reverser lever is mechanically locked when the associated throttle lever is not in the IDLE detent.



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THRUST REVERSER SYSTEM

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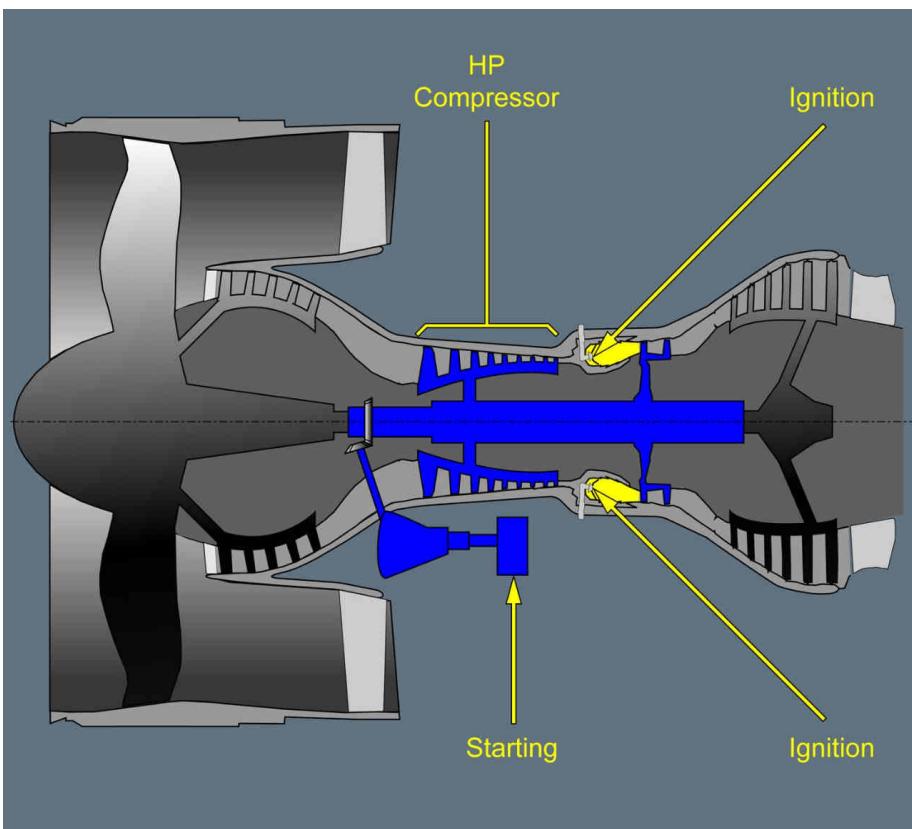
GENERAL**Applicable to: ALL**

The ignition and starting system is used on ground or in-flight to start the engine, and to crank the engine.

- The system uses bleed air to drive the pneumatic starter at high speed.

The pneumatic starter drives the engine High Pressure (HP) rotor via the accessory gearbox. Then, the fuel is introduced into the combustion chamber for ignition.

The FADEC controls the ignition and starting system.

Ignition



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IGNITION AND STARTING - GENERAL

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IGNITION SYSTEM**Applicable to: ALL**

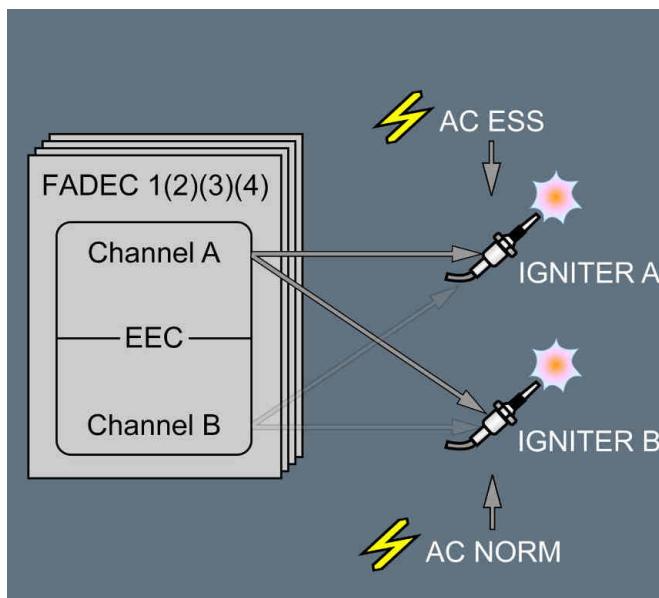
The ignition system is used for:

- Engine start on ground (automatic or manual)
- Engine relight in flight.

The FADEC controls the ignition system.

The ignition system has two independent igniters A and B for each engine.

- [L3] Each EEC channel can control both igniters.

**IGNITION FOR STARTING****Applicable to: ALL****ON GROUND****AUTOMATIC START**

Only one igniter operates for an automatic start.

- [L2] With ENG MASTER lever set to ON, 20 s after N2 reaches 20 %, the igniter is automatically selected.
- [L1] In the case of an automatic restart attempt, both igniters are selected at the second attempt.

- [L2] Note: *Ignition automatically stops at the end of the start sequence, when N2 reaches approximately 58 %. The start valve closes at approximately 63 % N2.*

L1 MANUAL START

For a manual start, both igniters are used, when the ENG MASTER lever is set to ON.

- [L2] Note: *The ignition automatically stops at the end of the start sequence when N2 reaches approximately 56 %. The start valve closes at approximately 58 % N2.*

L1 IN FLIGHT

Both igniters are selected, when ENG MASTER lever is set to ON.

CONTINUOUS IGNITION

Applicable to: ALL

MANUAL SELECTION

In flight, the flight crew manually selects the continuous ignition by setting the ENG START selector to IGN START, if the engine is running.

On ground, after the engine start sequence, the FADEC automatically stops the igniters. To activate the continuous ignition, the flight crew must set the ENG START selector to NORM, then back to IGN START. On ground, the continuous ignition operates, if the engine is not at low power.

- [L2] The engine is at low power when N1 is below 53 % for more than 30 s.
The FADEC uses both igniters, when the continuous ignition operates.
If the pressure in the combustion chamber is too high to enable the igniters to operate, the FADEC inhibits the igniters. In such a case, the IGNITION memo appears on the EWD to recall the flight crew selection but the igniters do not operate.

L1 AUTOMATIC SELECTION

FLAMEOUT PREVENTION

When the FADEC detects that the engine has a risk of flameout, the FADEC automatically selects both igniters to quickly recover the engine. When the engine relights, the FADEC maintains both igniters for 60 s.

- [L3] The engine flameout detection is based on the N2 and on the pressure in the combustion chamber.

L1 QUICK RELIGHT

The FADEC automatically selects both igniters when the ENG MASTER lever is cycled and the engine is running: i.e. the ENG MASTER lever is set to ON, the flight crew sets to OFF then to ON the ENG MASTER lever within 30 s.

- [L2] The quick relight is available if N2 is greater than 45 %.



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IGNITION AND STARTING - IGNITION

- [L1] The FADEC maintains both igniters for 60 s after the ENG MASTER lever is set back to ON, or for 60 s after the engine relights.



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IGNITION AND STARTING - IGNITION

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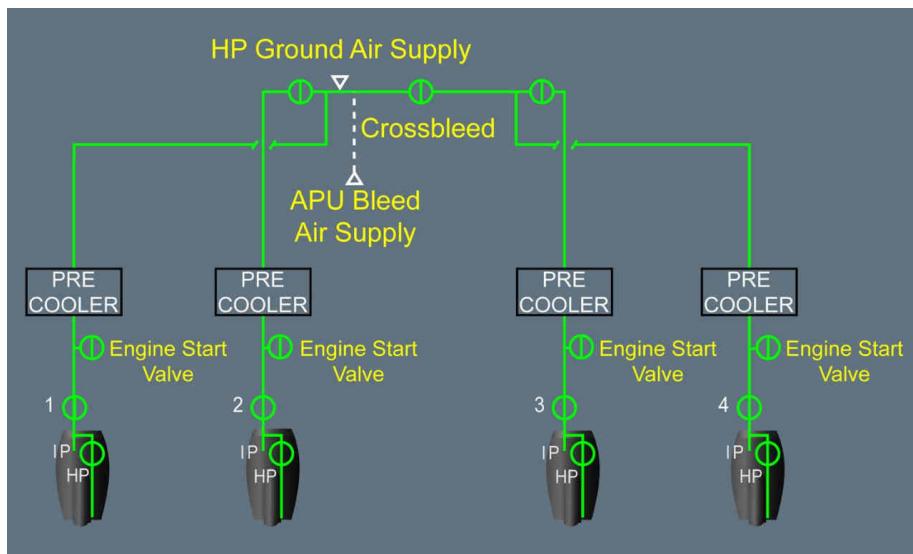
Start System**START SYSTEM****Applicable to: ALL**

The start system uses pressurized air to start the engine on ground and to relight the engine in flight.

The start system has:

- A pneumatic starter
- The pneumatic starter is on the accessory gearbox.
The pneumatic starter drives the engine HP compressor-turbine assembly.
- An engine start valve.
- The engine start valve is controlled automatically, or manually by the ground mechanic.
- The pneumatic starter can start the engine with air coming from:
 - The APU, or
 - Other engine running, or
 - A HP ground source.

The engine can be started either automatically or manually.

Bleed Sources for Engine Start



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IGNITION AND STARTING - STARTING

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Automatic Starting**AUTOMATIC START SEQUENCE****Applicable to: ALL**

In automatic engine start mode, the FADEC controls and sequences:

- The engine start valve
- The igniter(s)
- The FMV .

For more information on the automatic start sequence, *Refer to DSC-70-30-10 Automatic Start Sequence* .

START ABORT DURING AUTOMATIC START**Applicable to: ALL**

The FADEC monitors engine parameters for unusual circumstances including:

- Hot start, or hung start
- No light up
- EGT overlimit
- Engine stall
- N1 rotor jamming
- Engine start valve abnormal position
- Engine starter engagement time exceedance
- Engine starter disconnection.

AUTOMATIC ABORT OF AUTOMATIC START ON GROUND

On ground, if the FADEC detects one of the above listed failure, the FADEC interrupts the start sequence and initiates two further attempts of automatic start sequence after cranking, except in the case of N1 rotor jamming or engine starter failure.

If the third start attempt fails, the start sequence is aborted.

In the case of a starter failure or a N1 rotor jamming, the FADEC automatically aborts the engine start without further attempt of automatic start sequence.

When the FADEC aborts an automatic start sequence, the FADEC:

- Closes the engine start valve
- Closes the FMV
- Stops the ignition.

-  On ground, automatic start is not aborted, when N2 is above 58.4 %.

L1 AUTOMATIC ABORT OF AUTOMATIC START IN FLIGHT

In flight, automatic start is not aborted. However, the FADEC monitors the engine parameters and generates the associated ECAM alerts, when necessary. It is the responsibility of the flight crew to initiate corrective action, as necessary.

MANUAL ABORT OF AUTOMATIC START

The flight crew can interrupt an automatic start sequence by setting the ENG MASTER lever to OFF.

L2 This action:

- Closes the fuel HP valve and the engine start valve
- Stops the ignition
- Resets the FADEC.

Note: If the ENG MASTER lever is not set to OFF, setting the ENG START selector to NORM, or CRANK or setting MAN START pb-sw to ON has no effect.

QUICK AND AUTO RELIGHT

Applicable to: ALL

AUTO RELIGHT FUNCTION

If the FADEC detects an engine flame out, on ground or in flight, continuous ignition with both igniters is automatically selected.

L2 The ignition is maintained for 60 s after engine relight.

L1 QUICK RELIGHT FUNCTION

In the event of an inadvertent cycling of the ENG MASTER lever with the engine running, from ON position to OFF, then back to ON within 30 s, the FADEC automatically selects the continuous ignition with both igniters.

The quick relight function immediately opens the FMV.

L2 The quick relight function is available provided that N2 is greater than 45 %.

L1 The ignition is maintained for 60 s.

STARTER ASSISTED OR WINDMILLING START

Applicable to: ALL

In flight, depending on engine parameters and flight conditions, the FADEC chooses between a starter assisted or a windmilling engine start.

L2 The FADEC selects a starter assisted engine start (i.e. engine start valve automatically open), when N2 is below 11 %.

An airspeed at or above 260 kt ensures a windmilling start capability.



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- For a starter assisted engine start, the other running engines or the APU provides bleed air to the pneumatic starter.
For the windmilling engine start, relative wind is used to rotate the engine.
- During a windmilling engine start, the FADEC disconnects both hydraulic pumps in order to increase the relight envelope.



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Manual Starting**MANUAL START****Applicable to: ALL**

A manual start can be performed on ground, in the case of a not successful automatic start.

In manual start, the FADEC has limited control. Therefore, the flight crew has to:

- Set the ENG MASTER lever to ON, when required
- Monitor the engine acceleration.

In manual engine start, the FADEC does not provide automatic fault correction. However, the FADEC monitors the engine parameters and generates the associated ECAM alerts, when necessary.

In manual starting, the FADEC controls:

- The opening of the engine start valve , when the ENG START selector is set to IGN START and the ENG MAN START pb-sw is set to ON

L2 *Note: The starter engages if N2 is under the starter engagement speed, i.e. 25 % N2 on ground or in flight.*

L1 - The FMV and the igniters, when the ENG MASTER lever is set to ON

- The Engine start valve closure and ignition cut off, when N2 reaches idle.

The FADEC does not automatically abort an abnormal manual start except in the case of an EGT overlimit.

The manual start sequence can be interrupted:

- Before the ENG MASTER lever is set to ON, by setting the ENG MAN START pb-sw to OFF
- After the ENG MASTER lever is set to ON, by setting it back to OFF.

L2 This action:

- Closes the fuel LP and HP valves, and the engine start valve
- Stops the ignition
- Resets the FADEC .

Note: When the ENG MASTER lever is set to ON, setting the ENG MAN START pb-sw to OFF has no effect.

L1 For more information on the manual start sequence, Refer to PRO-SUP-70-10 Manual Engine Start .



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IGNITION AND STARTING - STARTING

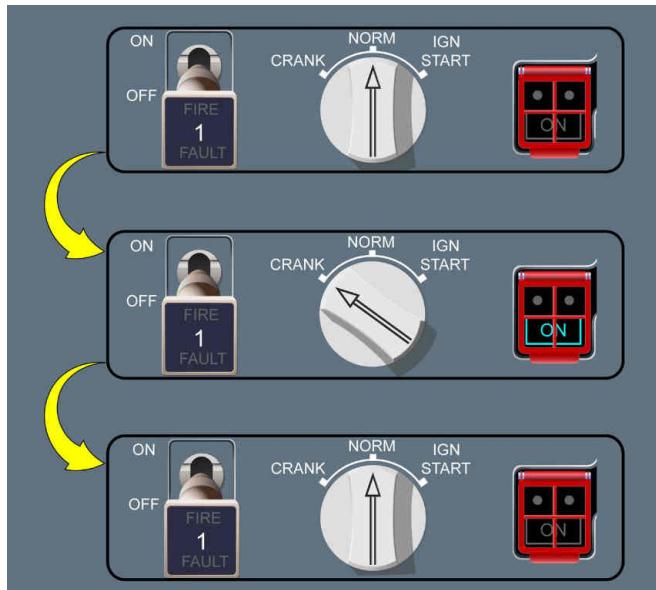
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CRANKING

Applicable to: ALL

A dry cranking cycle ventilates the engine to remove fuel vapors after a not successful start attempt on the ground.

To perform a dry crank:

Cranking

The dry crank is stopped by setting either the ENG MAN START pb-sw to OFF or setting the ENG START selector to NORM.

- ③ A wet cranking can be also performed by setting the ENG START selector to CRANK and the MAN START pb-sw to ON, then by setting the ENG MASTER lever to ON. In this case, fuel is provided without ignition. The wet crank is stopped by setting the ENG START selector to NORM.



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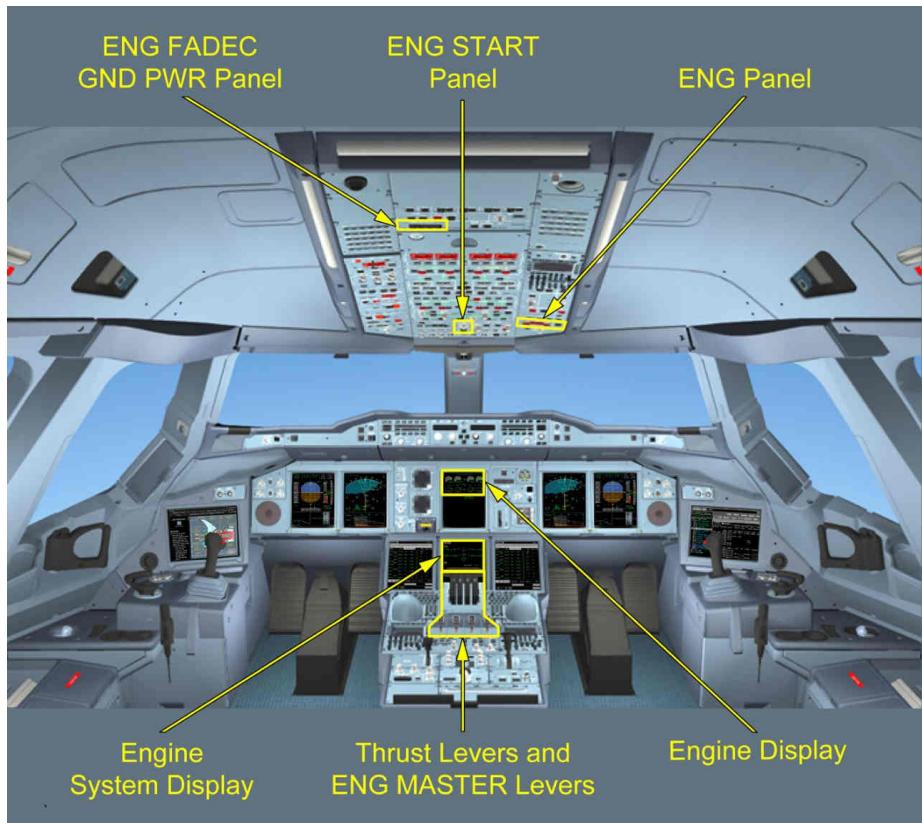
70 - ENGINES

IGNITION AND STARTING - CRANKING

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COCKPIT VIEW

Applicable to: ALL

Cockpit View

ENG FADEC GND PWR PANEL

Applicable to: ALL



The aircraft electrical network or the FADEC alternator automatically supplies the FADEC .



L12



On ground, the aircraft electrical network supplies the FADEC for 10 min , provided that:

- The ENG FIRE pb-sw is not pressed
- The FADEC is not self-powered.
The FADEC is self-powered when N2 is above 12.5 % .

For more information on FADEC electrical supply, *Refer to DSC-70-20-10 Architecture* .

ENG START PANEL

Applicable to: ALL



Default position: No ignition.

However, continuous ignition A + B is automatically selected when:

- The FADEC detects that the engine has a risk of flameout, or
 - The ENG MASTER lever is cycled and the engine is running.
- For more information, *Refer to DSC-70-80-20 Continuous Ignition*.



Used for engine start, or

To select the manual continuous ignition when the engine is running.

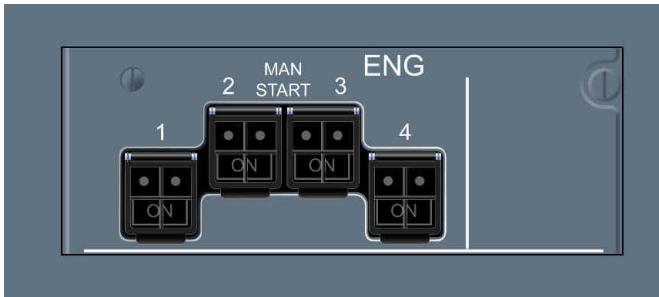
For more information, *Refer to DSC-70-80-20 Continuous Ignition*.

Used for a dry or a wet engine cranking.

For more information, *Refer to DSC-70-80-40 Cranking*.

ENG PANEL

Applicable to: ALL

ENG Panel**ENG MAN START PB-SW**

L12



During a manual engine start, the start valve opens, provided ENG START selector is set to IGN/START or CRANK.

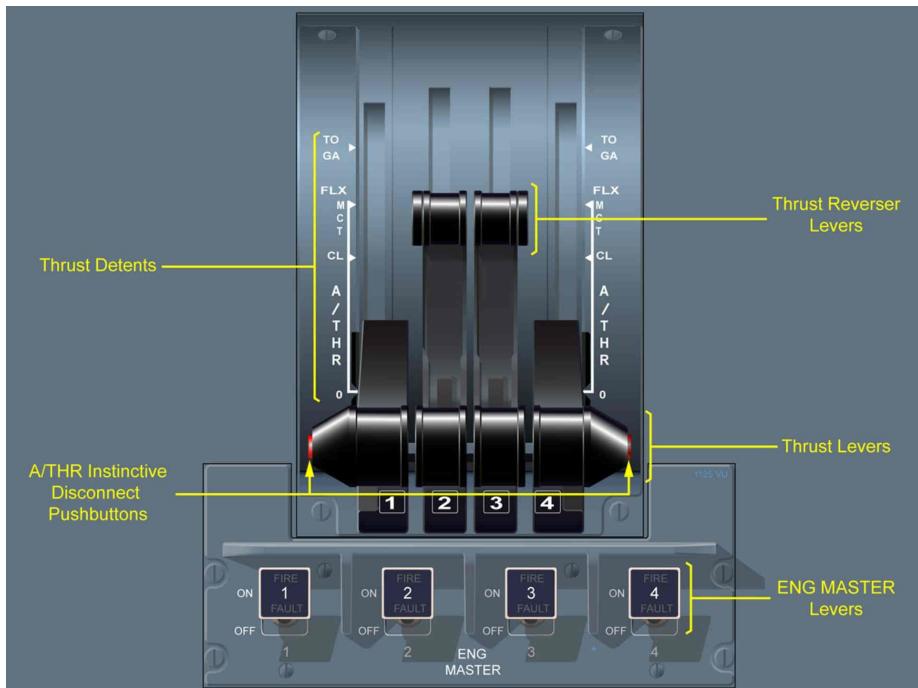
Note: *The start valve automatically closes when N2 reaches 58.4 %.*



The start valve closes, provided the ENG MASTER lever is set to OFF. This stops the engine start sequence.

ENG MASTER PANEL AND THRUST LEVERS

Applicable to: ALL

Thrust Levers and ENG MASTER Levers**THRUST LEVERS**

The thrust levers are used to manually adjust the engine thrust.

Each thrust lever can be moved individually.

- [L2] The thrust lever position appears on the EWD via a blue circle on the thrust gauge.

THRUST DETENTS

The flight crew can set each thrust lever in one of the following detents:

- Idle (0) detent
- Climb (CLB) detent

- Flexible takeoff thrust (FLX) and Maximum Continuous Thrust (MCT) detent
- Takeoff and Go-Around (TOGA) detent.

Each detent has one or several thrust rating limits. For more information, *Refer to DSC-70-20-40-10 Thrust Rating Limit*.

THRUST REVERSER 2(3) LEVER

The thrust reversers levers are used to control the deployment and the stowing of the reversers, and to adjust the reverse thrust.

Each thrust reverser lever can be moved individually from IDLE REV detent to MAX REV detent, when the associated thrust lever is in the IDLE detent.

- [2] The flight crew can monitor the position of the thrust reverser lever on the EWD , via the blue circle on the reverse thrust gauge.

For more information on the reverse thrust gauge, *Refer to DSC-70-90-42 Reverse Thrust Lever Position*

A/THR INSTINCTIVE DISCONNECT PB

Pressing one A/THR Instinctive Disconnect pb disconnects the A/THR and the autobrake.

For information on A/THR disconnection, *Refer to DSC-22-FG-50-40-A A/THR Disconnection* .

ENGINE 1(2)(3)(4) MASTER LEVER



- The FADEC initiates an automatic engine start sequence, provided the ENG START selector is set to IGN START position, or For more information, *Refer to DSC-70-30-10 Automatic Start Sequence* .
- Turns on the igniters and the fuel, if the ENG MAN START pb-sw is set to ON.
For more information, *Refer to DSC-70-80-30-30 Manual Starting* .

Shutdowns the engine or aborts the start sequence.
The FADEC resets.



ENGINE MASTER 1(2)(3)(4) LIGHT

L12

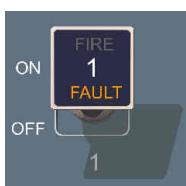


A fire is detected on the corresponding engine.

Associated with the following ECAM alerts:

- [ENG 1\(2\)\(3\)\(4\) FIRE \(IN FLIGHT\)](#) (*Refer to procedure*)
- [ENG 1\(2\)\(3\)\(4\) FIRE \(ON GROUND\)](#) (*Refer to procedure*).

L12



- An automatic start sequence aborts, or

- The HP fuel valve position is abnormal

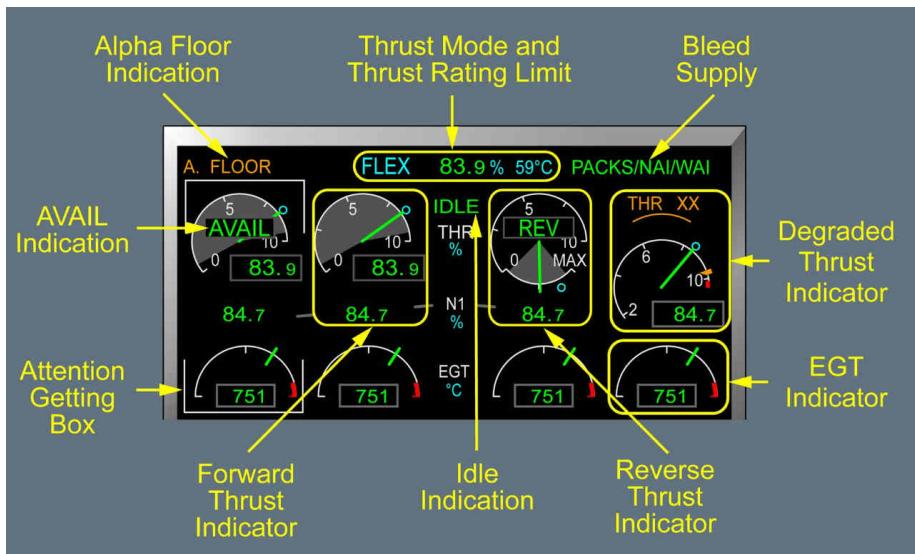
Associated with the ECAM alert [ENG 1\(2\)\(3\)\(4\) HP FUEL VLV FAULT](#) (*Refer to procedure*)

- The overthrust protection is active and the FADEC automatically shut downs the engine.

Associated with the ECAM alert [ENG 1\(2\)\(3\)\(4\) CTL SYS FAULT](#) (*Refer to procedure*).

ENGINE DISPLAY**Applicable to: ALL**

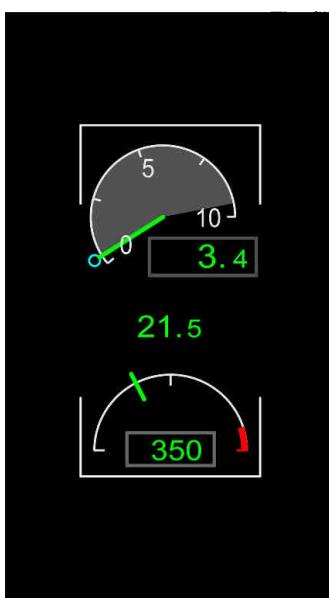
The primary engine parameters are permanently displayed on the Engine Display (ED) area of the Engine Warning Display (EWD).

ENGINE DISPLAYATTENTION GETTING BOX

The attention getting box appears either in amber or in white.

The attention getting box appears on the EWD and on the ENG SD page.

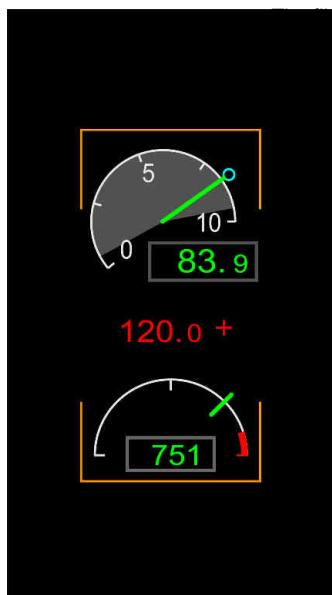
L12



Crew must monitor the parameters of the corresponding

attention getting box appears in the case of engine start or crank sequence until AVAIL message appears.

L12



Flight crew must pay high attention to the parameters of the selected engine.

An indication appears as soon as an amber or red indication is on EWD and/or on the ENG SD page.

ALPHA FLOOR MESSAGE

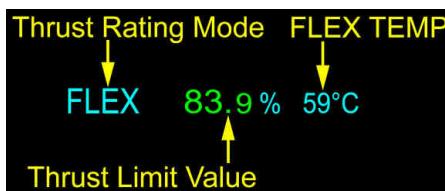
A. FLOOR

The α -floor protection is active.

For more information, Refer to DSC-22-27-20-20A Alpha Floor Protection .

THRUST RATING MODE AND THRUST LIMIT VALUE INDICATION

Thrust Rating Mode and Thrust Limit Value



Indicates the thrust limit value and the associated thrust rating mode selected based on:

- The position of the thrust levers
- The data entered in the T.O and CLB panels of the FMS ACTIVE/PERF page

- Engines status, i.e. running or not running
- Aircraft on ground or in flight.

THRUST RATING MODE**TOGA**

Takeoff or go-around thrust rating mode is selected.

MCT

Maximum continuous thrust rating mode is selected.

CLB

Climb thrust rating mode is selected.

DCLB1

Derated climb thrust rating mode is selected. 3 derated climb levels are defined: DCLB1, DCLB2, DCLB3.

FLEX

Flexible takeoff thrust rating mode is selected.

D04

Derated takeoff thrust rating mode is selected. 6 derated takeoff levels are defined: D04, D08, D12, D16, D20, D24.

THRUST LIMIT VALUE**83.9 %**

Indicates the thrust limit value associated with the thrust rating mode.

FLEX TEMPERATURE**59°C**

Indicates the flexible temperature entered on the T.O panel of the FMS ACTIVE/PERF page, when the FLEX thrust rating mode is selected.

BLEED SUPPLY**PACKS**

The engine bleeds supply the air conditioning packs.

NAI

The engine nacelle anti-ice is on.

WAI

The wing anti-ice is on.

All three indications can appear independently.

IDLE INDICATION

L12

IDLE

In flight, at least three engines are at idle.
Pulses for 10 s then remains steady.

AVAIL INDICATION

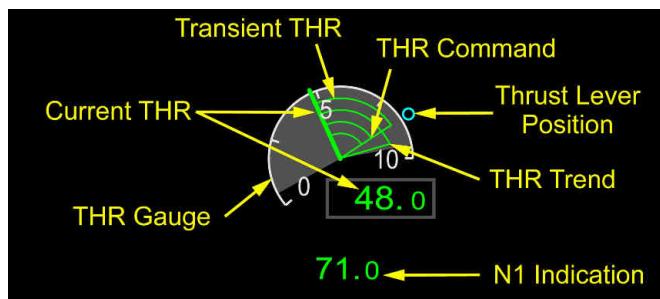
After engine start, the engine is at or above idle.

In the case of an engine relight in flight, the message pulses to indicate a successful relight.

- L2 No longer appears:
- After 1 min in flight or 10 s on ground, or
 - If the thrust lever is set above idle.

FORWARD THRUST INDICATIONS

Applicable to: ALL

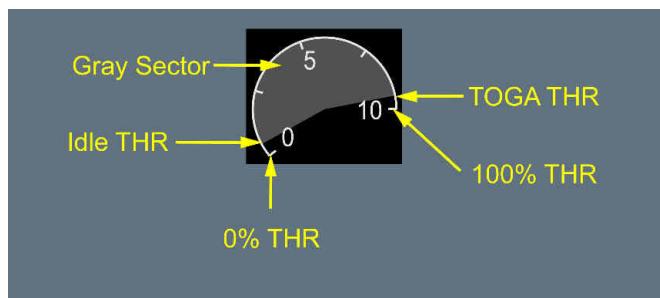
Forward Thrust Indications**CURRENT THR**

The needle and the digital value indicate the current thrust supplied by the engine, as a percentage of the maximum engine thrust achieved with the engine bleed off.

THRUST GAUGE

The thrust gauge indicates the engine thrust, in percentage:

- 0 corresponds to 0 % of THR
- 10 corresponds to 100 % of THR.

Forward Thrust Indications**GRAY SECTOR**

The gray sector indicates the usable thrust range.

[L2] The gray sector appears if:

- The engine is at, or above idle
- The engine is controlled in NORMAL mode
- The engine is not failed.

L1 TOGA THR

The upper position of the gray sector indicates the TOGA thrust.

The TOGA thrust corresponds to the engine thrust when the thrust lever is set to the TOGA detent. The TOGA thrust takes the bleed demand into account.

IDLE THR

The lower position of the gray sector indicates the idle thrust.

The idle thrust corresponds to the engine thrust when the thrust lever is set to the idle detent.

100% THR

100 % corresponds to the maximum thrust, when thrust lever is set to the TOGA detent and all engine bleeds are off.

0% THR

0 % THR is the engine thrust achieved when the engine is not running, or is in windmilling.

THR COMMAND

Indicates the thrust target, when the A/THR is active.

THR TREND

The green triangle indicates the direction of thrust trend, when the A/THR is active.

TRANSIENT THR INDICATIONS

The four green arc indicate the difference between the THR command and the current THR, when the A/THR is active.

THRUST LEVER POSITION

The blue circle indicates the position of the thrust lever:

- In manual mode: Indicates the THR reached after the engine stabilization
- In automatic mode: Indicates the value of the THR rating limit that corresponds to the selected thrust lever detent and the conditions of the flight.

[L2] The thrust lever indication moves within the gray sector.

N1 INDICATIONS**93.8**

N1 value is in normal range.

L12

113.8 +

N1 value is above the red limit.

The N1 red limit value is 111 % .

The red cross no longer appears after an engine restart on ground.

Associated with the ECAM alert [ENG 1\(2\)\(3\)\(4\) N1 OVER LIMIT](#) (*Refer to procedure*).

L12

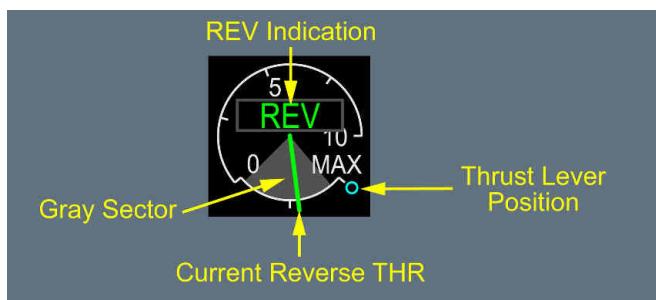
93.±

N1 value accuracy is degraded.

Associated with the ECAM alert [ENG 1\(2\)\(3\)\(4\) CTL SYS FAULT](#) (*Refer to procedure*) .**REVERSE THRUST INDICATIONS**

Applicable to: ALL

The reverse thrust indications appear on inner engines.

Reverse Thrust Indications**CURRENT REVERSE THR INDICATION**

The needle indicates the current reverse thrust supplied by the engine, as a percentage of the maximum reverse thrust.

GRAY SECTOR**REVERSE GRAY SECTOR**

The gray sector indicates the usable reverse thrust range.

[L2] The gray sector appears if:

- The reverser is selected
- The reverser is unlocked
- The engine is at, or above, reverse idle for more than one second
- The engine is not failed
- The aircraft is on ground.

[L1] REVERSE IDLE THRUST

The upper position of the gray sector indicates the reverse idle thrust.

The reverse idle thrust corresponds to the engine thrust when the thrust reverser lever is set to the IDLE REV detent.

MAXIMUM REVERSE THRUST

The lower position of the gray sector indicates the maximum reverse thrust.

The maximum reverse thrust corresponds to the engine thrust when the thrust reverser lever is set to the MAX REV detent.

THRUST REVERSER LEVER POSITION

The blue circle indicates the position of the thrust reverser lever.

REV 2(3) INDICATIONS

[L12]

REV 2

On ground, the thrust reverser lever is in the REV detent and the reverse mode is not available.

In the case of a thrust reverser unlocked in flight, the indication pulses.

Pulses for 9 s, then remains steady.

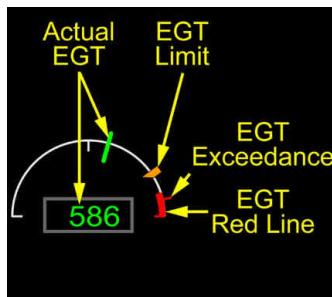
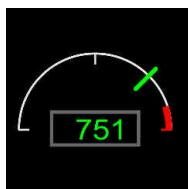
Associated with the ECAM alert ENG 2(3) REV UNLOCKED (*Refer to procedure*).

REV 2

On ground, the reverse mode is selected.

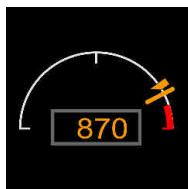
EGT INDICATIONS

Applicable to: ALL

EGT INDICATIONS**EGT Indications****CURRENT EGT**

The EGT is normal.

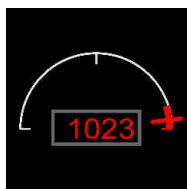
L12



The EGT is above the EGT limit.

Associated with the ECAM alert ENG 1(2)(3)(4) EGT OVERLIMIT (Refer to procedure).

L123



The EGT is above the red line.

The EGT indication appears in red:

- During takeoff, if the EGT is:
 - At or above 1 022 °C , or
 - At or above 1 002 °C , for more than 20 s .
- During all other phases, if the EGT is at or above 1 002 °C .

Associated with the ECAM alert ENG 1(2)(3)(4) EGT OVERLIMIT (*Refer to procedure*) .

EGT LIMIT

The amber line indicates the maximum EGT.

L2 The maximum EGT is:

- 745 °C, during the ground start sequence
- 865 °C, during engine relight in flight
- 970 °C, during all other phases.

The amber indication does not appear:

- During takeoff, or
- When thrust reversers are selected, or
- If alpha floor protection is activated.

EGT RED LINE

A red arc appears above the EGT red line.

L2 The EGT red line is at 1 002 °C.

EGT EXCEEDANCE

If the EGT red line is exceeded, a red mark appears at the highest achieved value.

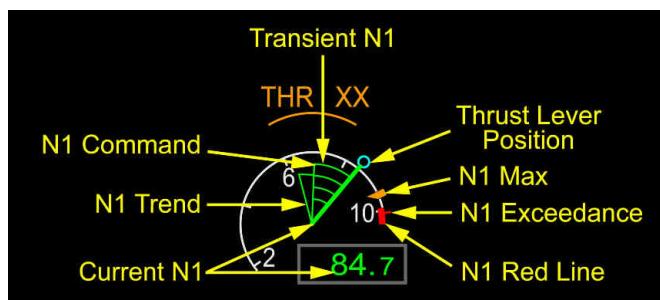
The red mark no longer appears after a subsequent engine start on ground.

ENGINE DISPLAY IN DEGRADED MODE

Applicable to: ALL

N1 INDICATIONS (DEGRADED)

Replaces the THR gauge, when the engine operates in DEGRADED mode. For more information, *Refer to DSC-70-20-40-20 DEGRADED Mode* .

N1 Indication (Degraded Mode)CURRENT N1

N1 value is in normal range.

L12

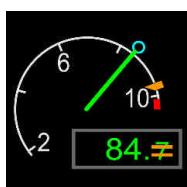


N1 value is above the red line.

The N1 red line value is 111 % .

Associated with the ECAM alert ENG 1(2)(3)(4) N1 OVER LIMIT (Refer to procedure).

L12



N1 value accuracy is degraded.

Associated with the ECAM alert ENG 1(2)(3)(4) CTL SYS FAULT (Refer to procedure).

N1 COMMAND

Indicates the thrust target, when the A/THR is active.

N1 TREND

The green triangle indicates the direction of N1 trend, when A/THR is active.

THRUST LEVER POSITION

The blue circle indicates the position of the thrust lever. In manual mode, the blue circle corresponds to the N1 value reached after the engine stabilization.

The blue circle does not appear when thrust reversers are selected.

N1 MAX

The N1 Max indication corresponds to the maximum N1 when the thrust levers are in TOGA detent or in MAX REV detent.

N1 RED LINE

A red arc appears above the N1 red line.

[2] The red line is at 111 %.

N1 EXCEEDANCE

If the N1 red line is exceeded, a red mark appears at the highest achieved value.

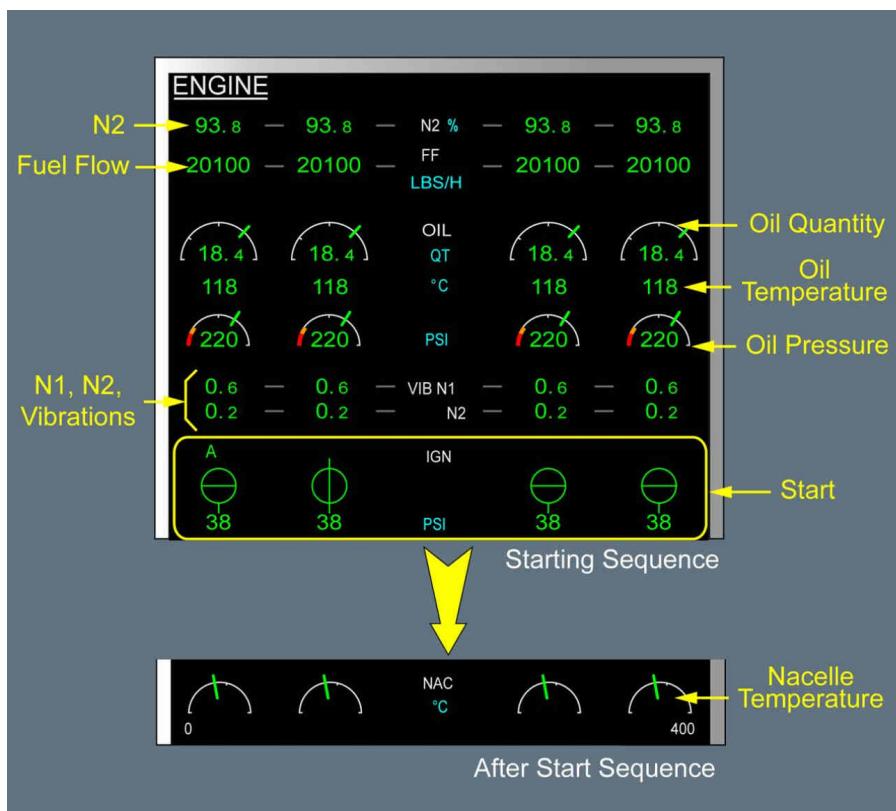
The red mark no longer appears after a subsequent engine start on ground.

ENG SYSTEM DISPLAY

Applicable to: ALL

ENGINE SYSTEM DISPLAY

The ENG SD page provides the engine secondary parameters.

Engine System DisplayN2

93.8

N2 value is in normal range.

L12

119.8 +

N2 value is above the red limit.

N2 red limit value is 118.7 % .

The red cross no longer appears after a subsequent engine start on ground.

Associated with the ECAM alert ENG 1(2)(3)(4) N2 OVER LIMIT (Refer to procedure).

40.0

Engine start or crank is in progress.

L12

93.±

N2 value accuracy is degraded.

Associated with the ECAM alert ENG 1(2)(3)(4) CTL SYS FAULT (*Refer to procedure*).FUEL FLOW**9120**

Fuel flow is normal.

9420

The accuracy of the fuel flow measurement is degraded.

L12

9120**CLOGGED**

Fuel filter is clogged.

Associated with the ECAM alert ENG 1(2)(3)(4) FUEL FILTER CLOGGED (*Refer to procedure*).OIL QUANTITY

The engine oil quantity is in normal range.

L12



The engine oil quantity drops below the oil advisory limit that corresponds to the first white dash.

The needle and the oil quantity value pulse green.

The oil advisory limit is 1.2 quarts.

The advisory is inhibited:

At takeoff or go-around, or

- When the thrust reversers are selected, or
- When the alpha floor protection is active.

OIL TEMPERATURE

L12

118

The engine oil temperature is in normal range.

If the engine oil temperature is above 163 °C , the oil temperature indication pulses green.

Note: When the engine is not running, and depending on the outside air temperature (OAT), this indication can be negative.

L12

200

The engine oil temperature is abnormal.

If the engine oil temperature is above 177 °C , the oil temperature indication is amber.

Associated with the ECAM alert ENG 1(2)(3)(4) OIL TEMP HI (Refer to procedure).

OIL PRESSURE

L13



The engine oil pressure is in normal range.

Note: The scale is not linear:

- On the first half of the scale, the engine oil pressure range varies from 0 PSI to 100 PSI
- On the second half of the scale, the engine oil pressure range varies from 100 PSI to 440 PSI .

L12



The engine oil pressure is abnormal.

If the engine oil pressure is equal to or below 25 PSI , the indication is red.

Associated with the ECAM alert ENG 1(2)(3)(4) OIL PRESS LO (Refer to procedure).

L12



The engine oil filter is clogged.

Associated with the ECAM alert ENG 1(2)(3)(4) OIL FILTER CLOGGED (Refer to procedure).

N1(N2) VIBRATIONS**0.6**

The level of N1(N2) rotor vibration is in normal range.

If the rotor vibration level is above 5 units, the rotor vibration indication pulses green.

ATTENTION GETTING BOX

The attention getting box appears either in amber or in white.

L12

The flight crew must monitor the parameters for the corresponding engine.

The attention getting box appears in the case of a start or crank sequence until AVAIL message appears.



L12

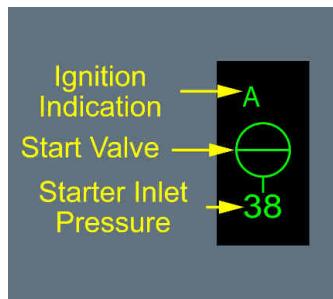
The flight crew must pay high attention to the parameters of the affected engine.

This indication appears as soon as an amber or red indication appears on the EWD and/or on the ENG SD page.



START PARAMETERS

During the engine start sequence, the start indications replace the nacelle temperature indications.

Start Parameters**IGNITION**

The igniter A(B) is energized.



Both igniters A and B are energized.

START VALVE

The start valve is open.



The start valve is closed.

L12



The start valve is abnormally open.

Associated with the ECAM alert ENG 1(2)(3)(4) START VLV FAULT - START VLV NOT CLOSED (*Refer to procedure*).

L12



The start valve is abnormally closed.

Associated with the ECAM alert ENG 1(2)(3)(4) START VLV FAULT - VLV STUCK CLOSED (*Refer to procedure*).

STARTER INLET PRESSURE

The starter inlet pressure is normal.

L12

O

During engine start, the starter inlet pressure is abnormal, either:

- Too high, or
- Too low, for engine start.

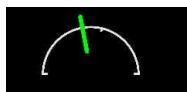
If the engine bleed pressure is above 60 PSI during 15 s , the engine bleed pressure is amber.

If the starter inlet pressure is below 15 PSI , the starter inlet pressure is amber.

Associated with the ECAM alert ENG 1(2)(3)(4) START FAULT (Refer to procedure).

NACELLE TEMPERATURE

The nacelle temperature indication does not appear during the engines start.



The nacelle temperature is in normal range.

L12



The nacelle temperature is above the nacelle temperature advisory limit that corresponds to the white dash. The needle pulses.

The nacelle temperature advisory limit is 300 °C.

MEMO

Applicable to: ALL

IGNITION

Automatic continuous ignition is in progress, or manual continuous ignition is selected.



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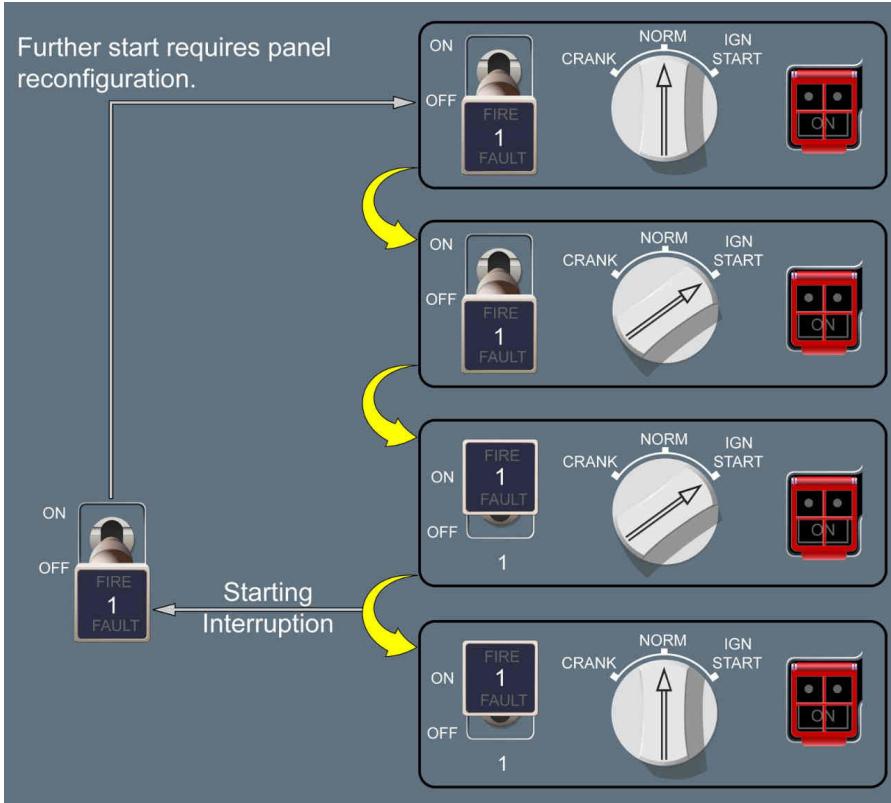
70 - ENGINES

CONTROLS AND INDICATORS

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ENGINE START

Applicable to: ALL

AUTOMATIC STARTING SEQUENCE**INITIAL CONFIGURATION OF CONTROLS**

- ENG MASTER lever is set to OFF
- ENG START selector is set to NORM
- ENG MAN START pb-sw is set to OFF.

ENG START SELECTOR

Set the ENG START selector to IGN/START:

- ENG SD page appears
- All pack valves close.

Note: After 30 s, if the ENG MASTER lever is not set to ON, the pack valves open again.

ENG MASTER LEVER**ON GROUND**

Set the ENG MASTER lever to ON:

- LP fuel valve opens
- Engine start valve opens
- At 20 % N2:
 - Ignition starts (igniters A or B)
 - FMV and HP fuel valve open, and FF increases.
- When N2 is approximately at 56 %: Igniter stops
- When N2 above 58.4 %:
 - Engine start valve closes (fully closed after approximately 10 s)
 - Pack valves open again if no other engine is started within 30 s.
- FADEC stabilizes the engine at idle speed.

IN FLIGHT

Set the ENG MASTER lever to ON:

- LP fuel valve opens
- Engine start valve opens if N2 is below 11 %, or if the aircraft airspeed (CAS) is below 260 kt

Note: The engine start valve remains closed in the case of a windmilling start sequence, i.e. when aircraft speed is above 260 kt.

- Ignition starts (igniters A + B)
- When N2 is above 20 %: FMV and HP fuel valve open
- When N2 is above 58.4 %:
 - Engine start valve closes (fully closed in approximately 10 s)
 - Pack valves open again if no other engine is started within 30 s
 - Igniter is set to off when AVAIL appears.
- FADEC stabilizes the engine at idle speed.



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70 - ENGINES

NORMAL OPERATIONS

ENG START SELECTOR

At the end of the start sequence, set the ENG START selector to NORM:

- The WHEEL SD page replaces the ENG SD page.

Note: If the ENG START selector is not set to NORM, the WHEEL SD page replaces the ENG SD page after the fourth engine starts.

STARTING INTERRUPTION

If the ENG MASTER lever is set back to OFF:

- LP and HP fuel valves close
- Ignition stops
- START valve closes.

ENGINE SHUTDOWN

Applicable to: ALL

The procedure to shutdown an engine is the following:

- The thrust lever is set to IDLE in order to stabilize the engine at idle thrust
- The ENGINE MASTER lever is set to OFF, when the engine parameters are stabilized.
The FADEC closes the LP and HP fuel valves.
The engine decelerates and stops.

The ENG FIRE pb-sw provides a backup engine shutdown capability on ground and in flight.



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NORMAL OPERATIONS

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ECAM ALERTS

ECAM ALERTS

Applicable to: ALL

ENG 1(2)(3)(4) CTL SYS FAULT (*Refer to procedure*)

ENG 1(2)(3)(4) CTL VLV FAULT (*Refer to procedure*).

ENG 1(2)(3)(4) EGT OVER LIMIT (*Refer to procedure*)

ENG 1(2)(3)(4) FADEC FAULT (*Refer to procedure*)

ENG 1(2)(3)(4) FADEC IDENT FAULT (*Refer to procedure*)

ENG 1(2)(3)(4) FADEC SYS FAULT (*Refer to procedure*)

ENG 1(2)(3)(4) FADEC TEMP HI (*Refer to procedure*).

ENG 1(2)(3)(4) FAIL (*Refer to procedure*)

ENG 1(2)(3)(4) FUEL FILTER CLOGGED (*Refer to procedure*)

ENG 1(2)(3)(4) FUEL FILTER MONITORING FAULT (*Refer to procedure*)

ENG 1(2)(3)(4) FUEL LEAK (*Refer to procedure*)

ENG 1(2)(3)(4) FUEL STRAINER CLOGGED (*Refer to procedure*)

ENG 1(2)(3)(4) FUEL SYS CONTAMINATION (*Refer to procedure*)

ENG 1(2)(3)(4) HP FUEL VLV FAULT (*Refer to procedure*)

ENG 1(2)(3)(4) IGN A(B) FAULT (*Refer to procedure*)

ENG 1(2)(3)(4) IGN A+B FAULT (*Refer to procedure*)

ENG 1(2)(3)(4) MINOR FAULT (*Refer to procedure*)

ENG 1(2)(3)(4) N1/N2 OVER LIMIT (*Refer to procedure*).

ENG 1(2)(3)(4) OIL CHIP DETECTED (*Refer to procedure*)

ENG 1(2)(3)(4) OIL FILTER CLOGGED (*Refer to procedure*)

ENG 1(2)(3)(4) OIL PRESS LO (Red alert) (*Refer to procedure*)

ENG 1(2)(3)(4) OIL SYS CONTAMINATION (*Refer to procedure*).

ENG 1(2)(3)(4) OIL TEMP HI (*Refer to procedure*)

ENG 1(2)(3)(4) OIL TEMP LO (*Refer to procedure*)

ENG 1(2)(3)(4) OVTHR PROT LOST (*Refer to procedure*)

ENG 1(2)(3)(4) SENSOR FAULT (*Refer to procedure*)

ENG 1(2)(3)(4) SHUT DOWN (*Refer to procedure*)

ENG 1(2)(3)(4) STALL (*Refer to procedure*)

ENG 1(2)(3)(4) START FAULT (*Refer to procedure*).

ENG 1(2)(3)(4) START VLV FAULT (NOT CLOSED) (*Refer to procedure*)

ENG 1(2)(3)(4) START VLV FAULT (NOT OPEN) (*Refer to procedure*)

ENG 1(2)(3)(4) THR LEVER FAULT (*Refer to procedure*)

ENG 1(2)(3)(4) THRUST LOSS (*Refer to procedure*)

ENG 2(3) REVERSER CTL FAULT (*Refer to procedure*)

ENG 2(3) REVERSER ENERGIZED (*Refer to procedure*)

ENG 2(3) REVERSER FAULT (*Refer to procedure*)

ENG 2(3) REVERSER INHIBITED (*Refer to procedure*)

ENG 2(3) REV LOCKED (*Refer to procedure*)

ENG 2(3) REVERSER MINOR FAULT (*Refer to procedure*)

ENG 2(3) REVERSER UNLOCKED (*Refer to procedure*)

ENG ALL ENG FLAME OUT (*Refer to procedure*)



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ECAM ALERTS

ENG HI VIBRATIONS (*Refer to procedure*)

ENG RELIGHT IN FLIGHT (*Refer to procedure*)

ENG REVERSER SELECTED (*Refer to procedure*)

ENG T.O THRUST DISAGREE (*Refer to procedure*)

ENG TAIL PIPE FIRE (*Refer to Procedure*)

ENG THR LEVERS NOT SET (*Refer to procedure*)

ENG THRUST LOCKED (*Refer to procedure*)

ENG TWO ENG OUT ON SAME SIDE (*Refer to procedure*)

ENG TWO ENG OUT ON OPPOSITE SIDE (*Refer to procedure*)

ENG TYPE DISAGREE (*Refer to procedure*)



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ELECTRICAL SUPPLY

ELECTRICAL SUPPLY

Applicable to: ALL

| System | Subsystem | | Electrical Supply |
|-------------------------------|-----------|------------------------------------|-------------------|
| FADEC | CHANNEL A | ALL ENGINES | AC ESS |
| | CHANNEL B | ENG 1 and ENG 3 ENG 2 and ENG 4 | AC 3 AC 2 |
| IGNITION | A | ALL ENGINES | AC ESS |
| | B | ENG 1 and ENG 3 ENG 2 and ENG 4 | AC 3 AC 2 |
| EMU | | ENG 1 and ENG 3 ENG 2 and ENG 4 | AC 4 AC 2 |
| | HP VALVES | ALL ENGINES | AC ESS |
| ETRAC | | ENG 2 | DC 1 |
| | | ENG 3 | DC 2 |
| REVERSER THIRD LOCK SYSTEM | | ENG 2 | AC 2 |
| | | ENG 3 | AC 4 |

(1) ECB is supplied by APU HOT BUS on ground, if the APU DC busbar is not supplied.

(2) Only during APU start, due to a loss of voltage on the APU BAT HOT BUS.



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ELECTRICAL SUPPLY

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PROCEDURES

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PRO-NOR Normal Procedures

PRO-ABN Abnormal and Emergency Procedures

PRO-SUP Supplementary Procedures

PRO-SPO Special Operations



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LIST OF EFFECTIVE TEMPORARY DOCUMENTARY UNITS

| M ⁽¹⁾ | Localization | DU Title | DU identification | DU date |
|--|----------------|---------------------------------|-------------------|-----------|
| | PRO-NOR-SOP-40 | APU and ENG Fire Test/APU Start | LG01405 | |
| | PRO-NOR-SOP-40 | APU Start | 00021429.0001001 | 29 MAR 11 |
| Criteria: T71799, DD | | | | |
| Applicable to: ALL | | | | |
| Impacted DU: 00000674 APU Start_APU START | | | | |
| Reason for issue: | | | | |
| This TDU is issued to ask the flight crews to monitor the APU flap position before APU start. The flight crew must set to ON the APU START pb-sw when the APU flap is fully open (i.e. FLAP OPEN indication appears on the APU SD page). | | | | |
| This will be corrected by a future APU ECB standard, that will monitor the flap position before starting the APU. | | | | |

| | | | |
|---|----------------------|------------------|-----------|
| PRO-NOR-SOP-60 | Glareshield | LG00465 | |
| PRO-NOR-SOP-60 | Glareshield_BARO REF | 00021152.0001001 | 14 JAN 10 |
| Criteria: DD | | | |
| Applicable to: ALL | | | |
| Impacted DU: 00005474 Glareshield_BARO REF | | | |
| Reason for issue: | | | |
| This TDU is issued to inform the flight crew that if the selected barometric unit is mercury inches, there may be a discrepancy of 0.01 inHg between the value selected on the EFIS CPs and the values displayed on the PFDs. This discrepancy is due to the rounding performed by the FCU. This discrepancy does not impact the altitude computations. | | | |
| The S5.0 FCU software standard will correct this issue. | | | |

| | | | |
|--|------------------------|------------------|-----------|
| PRO-NOR-SOP-80 | Automatic Engine Start | 00023393.0001001 | 29 MAR 11 |
| Criteria: EA | | | |
| Applicable to: ALL | | | |
| Impacted DU: 00000807 Automatic Engine Start | | | |
| Reason for issue: | | | |
| A380 fitted with GP 7200 engines experienced several cases of thrust reverser fault ECAM alert at engines 2 and 3 start. | | | |
| Preliminary investigations point out that the communication between FADEC and ETRAC may be lost during the FADEC and ETRAC electrical power-up. As a result, the thrust reverser function is lost, and the ENG 2(3) REVERSER FAULT ECAM alert appears and remains latched on the EWD . | | | |
| The FADEC and ETRAC electrical power-up occurs when the flight crew sets the ENG START selector to IGN/START. | | | |
| This TDU intends to modify the procedure for the engines start in order to avoid any potential flight delay linked to this issue and, if possible, to recover the thrust reverser function without maintenance action. | | | |



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|--|-----------------|-------------------------|-------------------|-----------|
| | PRO-NOR-SOP-160 | Descent Preparation | LG00475 | |
| | PRO-NOR-SOP-160 | Descent preparation_FMS | 00023858.0010001 | 03 NOV 11 |
| Criteria: T62545, T73428, T77504 | | | | |
| Applicable to: ALL | | | | |
| <i>Impacted DU: 00000980 Descent preparation_FMS</i> | | | | |
| Reason for issue: | | | | |
| Due to a misbehavior of the FMS L2 standard, the BARO/RADIO MINIMUM inserted on the APPR panel of the FMS ACTIVE/PERF and SEC/PERF pages is automatically rounded off to the nearest ten feet (e.g. 222 ft becomes 220 ft , 225 ft becomes 230 ft , and 240 ft stays 240 ft , etc.). | | | | |
| The APPR Panel of the FMS PERF pages and the PFD then display the rounded off BARO/RADIO MINIMUM value. The FWS also uses the rounded off BARO/RADIO MINIMUM value to trigger automatic callouts. | | | | |
| To cover this misbehavior, the following recommendation is provided to Operators: | | | | |
| If the BARO/RADIO MINIMUM value is not a multiple of ten, the flight crew should insert on the APPR panel of the FMS PERF pages a BARO/RADIO MINIMUM value rounded up to the nearest ten feet. For example, if the MINIMUM is equal to 91 ft , the flight crew should insert ' 100 ft ' on the APPR panel. | | | | |

| | | | |
|---|----------------------|------------------|-----------|
| PRO-NOR-SOP-170 | Descent | LG00476 | |
| PRO-NOR-SOP-170 | Descent_AT 10 000 FT | 00021151.0002001 | 01 JUN 11 |
| Criteria: T73428, DD | | | |
| Applicable to: ALL | | | |
| <i>Impacted DU: 00000990 Descent_AT 10 000 FT</i> | | | |
| Reason for issue: | | | |
| This TDU is issued to inform the flight crew that if the selected barometric unit is mercury inches, there may be a discrepancy of 0.01 inHg between the value selected on the EFIS CPs and the values displayed on the PFDs. This discrepancy is due to the rounding performed by the FCU. This discrepancy does not impact the altitude computations. | | | |
| The S5.0 FCU software standard will correct this issue. | | | |

| | | | |
|--|---|------------------|-----------|
| PRO-NOR-SOP-220 | Go-Around | LG00480 | |
| PRO-NOR-SOP-220 | Go-Around_AT GO-AROUND ACCELERATION ALTITUDE | 00022944.0001001 | 01 JUN 11 |
| Criteria: T73183 | | | |
| Applicable to: ALL | | | |
| <i>Impacted DU: 00001054 Go-Around_AT GO-AROUND ACCELERATION ALTITUDE</i> | | | |
| Reason for issue: | | | |
| This TDU is linked to the action performed by the flight crew during the OANS preparation for landing if an airport destination is not in the OANS database. | | | |
| If the airport destination is not in the OANS database, the flight crew must pull the OANS reset button on the overhead panel. If the flight crew diverts to an alternate airport, the flight crew must push the OANS reset button to activate OANS . During descent preparation, the flight crew will be able to check that the alternate airport is or not in the OANS database. | | | |



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|--|-----------------|-------------------|-------------------|-----------|
| | PRO-NOR-SOP-230 | After Landing | LG00481 | |
| | PRO-NOR-SOP-230 | After landing_APU | 00022520.0001001 | 29 MAR 11 |
| Criteria: DD | | | | |
| Applicable to: ALL | | | | |
| <i>Impacted DU: 00001062 After landing_APU</i> | | | | |
| Reason for issue: | | | | |
| <i>This TDU is issued to ask the flight crew to monitor the APU flap position before APU start. The flight crew must set to ON the APU START pb-sw when the APU flap is fully open (i.e. FLAP OPEN indication appears on the APU SD page).</i> | | | | |
| <i>This will be corrected by a future APU ECB standard, that will monitor the flap position before starting the APU.</i> | | | | |

| | | | | |
|---|-----------------|-------------------------------|------------------|-----------|
| | PRO-NOR-SOP-250 | Securing the aircraft | LG00483 | |
| | PRO-NOR-SOP-250 | Securing the aircraft_GENERAL | 00021519.0001001 | 03 SEP 10 |
| Criteria: DD | | | | |
| Applicable to: ALL | | | | |
| <i>Impacted DU: 00005212 Securing the aircraft_GENERAL</i> | | | | |
| Reason for issue: | | | | |
| <i>At aircraft power off, the FMS retains data for the next flight, only when the batteries are switched off at least 10 seconds after switching off the external power. For all other power off sequences, the FMS data is lost.</i> | | | | |

| | | | | |
|---|------------------------|-----------------------------|------------------|-----------|
| | PRO-ABN-ECAM-10-22-FMS | NAV T.O SPEEDS NOT INSERTED | LG02196 | |
| | PRO-ABN-ECAM-10-22-FMS | T.O SPEEDS NOT INSERTED | 00023898.0001001 | 08 AUG 11 |
| Criteria: T78651 | | | | |
| Applicable to: ALL | | | | |
| <i>Impacted DU: 00023835 NAV T.O SPEEDS NOT INSERTED</i> | | | | |
| Reason for issue: | | | | |
| <i>After the flight crew performed the T.O CONFIG test, the ECAM will immediately trigger the T.O SPEEDS NOT INSERTED alert, if V1/VR fields become empty (e.g. because of a change of the takeoff runway). The next FWS standard (L52) will cancel this TDU.</i> | | | | |



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|---|--------------------|---------------------------------|-------------------|-----------|
| | PRO-ABN-ECAM-10-24 | ELEC APU GEN A(B) FAULT | LG00564 | |
| | PRO-ABN-ECAM-10-24 | ELEC APU GEN A(B) FAULT - Alert | 00024028.0001001 | 01 APR 11 |
| Criteria: T81521 | | | | |
| Applicable to: ALL | | | | |
| Impacted DU: 00008618 ELEC APU GEN A(B) FAULT - Alert | | | | |
| Reason for issue: | | | | |
| In the case of intermittent short-circuit, the GEN reset may result in the GEN recovery. An intermittent short-circuit may trigger several ELEC APU GEN A(B) FAULT alerts with the recovery of the GEN at each reset. | | | | |
| A GEN reset on intermittent short-circuits may result in an overvoltage or an overcurrent in the electrical network leading to potential damage on the equipment supplied by this power source. | | | | |
| Because at the time the ELEC APU GEN A(B) FAULT alert triggers the flight crew cannot identify whether the short-circuit is permanent or intermittent, they should not attempt a GEN reset. | | | | |
| Therefore, ETC n°39 modifies the ELEC APU GEN A(B) FAULT alert to remove the GEN A(B) reset. | | | | |
| The future GGPCU standard software 18 will cancel this ETC. | | | | |

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| PRO-ABN-ECAM-10-24 | ELEC GEN 1(2)(3)(4) FAULT | LG00570 | |
| PRO-ABN-ECAM-10-24 | ELEC GEN 1(2)(3)(4) FAULT - Alert | 00024016.0001001 | 01 APR 11 |
| Criteria: T81521 | | | |
| Applicable to: ALL | | | |
| Impacted DU: 00007743 ELEC GEN 1(2)(3)(4) FAULT - Alert | | | |
| Reason for issue: | | | |
| In the case of intermittent short-circuit, the GEN reset may result in the GEN recovery. An intermittent short-circuit may trigger several ELEC GEN 1(2)(3)(4) FAULT alerts with the recovery of the GEN at each reset. | | | |
| A GEN reset on intermittent short-circuits may result in an overvoltage or an overcurrent in the electrical network leading to potential damage on the equipment supplied by this power source. | | | |
| Because at the time the ELEC GEN 1(2)(3)(4) FAULT alert triggers the flight crew cannot identify whether the short-circuit is permanent or intermittent, they should not attempt a GEN reset. | | | |
| Therefore, ETC n°39 modifies the ELEC GEN 1(2)(3)(4) FAULT alert to remove the GEN 1(2)(3)(4) reset. | | | |
| The future GGPCU standard software 18 will cancel this ETC . | | | |



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| | PRO-ABN-ECAM-10-27-20 | F/CTL SLAT SYS 1+2 FAULT | LG00695 | |
| | PRO-ABN-ECAM-10-27-20 | F/CTL SLAT SYS 1+2 FAULT - Alert | 00020643.0004001 | 10 MAR 11 |
| Criteria: T76485, T77352, T78651 | | | | |
| Applicable to: ALL <i>Impacted DU: 00007964 F/CTL SLAT SYS 1+2 FAULT - Alert</i> | | | | |
| <u>Reason for issue:</u> <i>In electrical emergency configuration, the SLAT SYS 1 monitors and controls the slats.</i> <i>During the reconfiguration of the electrical network in electrical emergency configuration, the SLAT SYS 1 is lost. As a consequence, the slats are lost and the ECAM caution SLAT SYS 1+2 FAULT is triggered.</i> <i>This anomaly is due to the SFCC 1 computer that unduly detects that the motor control of the electrical motor is failed when the electrical network reconfigures in electrical emergency configuration. This causes the loss of the SLAT SYS 1.</i> <i>In electrical emergency configuration, to recover the slats, the flight crew must reset the SLAT SYS 1 if the ECAM caution SLAT SYS 1+2 FAULT is triggered.</i> <i>ECAM procedure is updated via the ATQC database.</i> <i>The SFCC S4.0 will correct this issue, and will cancel the TDU .</i> | | | | |

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|--|--------------------|------------------------|------------------|-----------|
| | PRO-ABN-ECAM-10-28 | FUEL TRIM TK XFR FAULT | LG00734 | |
| | PRO-ABN-ECAM-10-28 | FUEL TRIM TK XFR FAULT | 00023457.0001001 | 01 SEP 10 |
| Criteria: T81246 | | | | |
| Applicable to: ALL <i>Impacted DU: 00003012 FUEL TRIM TK XFR FAULT</i> | | | | |
| <u>Reason for issue:</u> <i>Addition of a triggering condition for the FUEL TRIM TK XFR FAULT alert:</i> <i>The FQMS uses the landing gear lever feedback for the automatic isolation of the trim tank during takeoff and landing. If the FQMS inputs from the landing gear lever disagree by providing different UP and DOWN information, there is no automatic transfer from the trim tank, the trim line isolation is displayed as normally closed, and the ECAM displays the FUEL TRIM TK XFR FAULT alert. In this case, there are no automatic fuel transfers from the trim tank throughout the flight, but the flight crew is able to perform a manual trim tank transfer.</i> <i>This specific failure case also adds a new part to the procedure of the FUEL TRIM TK XFR FAULT alert.</i> | | | | |



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| | PRO-ABN-ECAM-10-28 | FUEL TRIM TK XFR FAULT - Alert | 00023458.0001001 | 01 SEP 10 |
| Criteria: T81246 | | | | |
| Applicable to: ALL | | | | |
| <i>Impacted DU: 00008322 FUEL TRIM TK XFR FAULT - Alert</i> | | | | |
| Reason for issue: | | | | |
| Since April 2010, one A380 has experienced several occurrences of FUEL TRIM TK XFR FAULT alerts in flight with no flight crew procedure on the ECAM. The FUEL SD page indicated the trim line isolation normally closed. The root cause of this FUEL TRIM TK XFR FAULT alert without procedure is the landing gear lever and associated wiring. The FQMS uses the landing gear lever feedback for the automatic isolation of the trim tank during takeoff and landing: If the FQMS inputs from the landing gear lever disagree by providing different UP and DOWN information, there is no automatic transfer from the trim tank, the trim line isolation is displayed as normally closed, and the ECAM displays the FUEL TRIM TK XFR FAULT alert with no further procedure for the flight crew. In this case, there are no automatic fuel transfers from the trim tank throughout the flight, but the flight crew is able to perform a manual trim tank transfer. | | | | |
| The ATQC_L50_V10 database adds a manual trim tank transfer procedure to the FUEL TRIM TK XFR FAULT alert. The ECAM will always display this procedure in order to ensure that the flight crew always has an applicable procedure when the FUEL TRIM TK XFR FAULT alert triggers in flight. | | | | |

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| PRO-ABN-ECAM-10-32 | BRAKES ALTN + EMER BRK FAULT | LG00854 | |
| PRO-ABN-ECAM-10-32 | BRAKES ALTN + EMER BRK FAULT - Alert | 00022291.0001001 | 12 JUN 09 |
| Criteria: T78497 | | | |
| Applicable to: ALL | | | |
| <i>Impacted DU: 00007175 BRAKES ALTN + EMER BRK FAULT - Alert</i> | | | |
| Reason for issue: | | | |
| Because of a corruption of the memory of one Braking Control System (BCS), the affected BCS may take control at landing gear extension. Alternate and emergency braking are declared failed. By resetting the A-SKID, the failed BCS gives again control to the other BCS. Normal braking is restored. | | | |
| The modification of the BRAKES ALTN + EMER BRK FAULT alert, to consider the above operational recommendations, is done via ATQC. | | | |
| The future BSCS standard will correct this issue. | | | |



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| | PRO-ABN-ECAM-10-32 | BRAKES EMER BRK FAULT | LG00853 | |
| | PRO-ABN-ECAM-10-32 | BRAKES EMER BRK FAULT - Alert | 00022292.0001001 | 07 MAY 10 |
| Criteria: T78497 | | | | |
| Applicable to: ALL | | | | |
| <i>Impacted DU: 00007177 BRAKES EMER BRK FAULT - Alert</i> | | | | |
| Reason for issue: | | | | |
| Because of a corruption of the memory of one Braking Control System (BCS), the affected BCS may take control at landing gear extension. Normal braking and alternate braking are also declared failed (<u>BRAKES A-SKID FAULT ON ALL L/G triggers</u>). In addition, emergency braking is spuriously declared failed. By resetting the A-SKID, the failed BCS gives again control to the other BCS. Normal braking is restored. | | | | |
| However, if the other BCS is also failed, the alert will persist. The flight crew should check on the WHEEL SD page that emergency braking is available. | | | | |
| The modification of the <u>BRAKES EMER BRK FAULT</u> alert, to consider the above operational recommendations, is done via ATQC . | | | | |
| The future BSCS standard will correct this issue. | | | | |

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| | PRO-ABN-ECAM-10-34-10 | NAV CAPT AND F/O ATT DISAGREE | LG00893 | |
| | PRO-ABN-ECAM-10-34-10 | NAV CAPT AND F/O ATT DISAGREE - Alert | 00023230.0001001 | 03 MAY 10 |
| Criteria: T81119 | | | | |
| Applicable to: ALL | | | | |
| <i>Impacted DU: 00008408 NAV CAPT AND F/O ATT DISAGREE - Alert</i> | | | | |
| Reason for issue: | | | | |
| With ADIRS L4-1 standard (P/N HNS502198BD01), using the ATT HDG selector may induce jumps in the Vertical Speed (V/S) provided by the IR 3, with consequences on flight control laws and/or on approach capability. | | | | |
| <u>NAV CAPT & F/O ATT DISAGREE</u> is amended to prevent the V/S jumps on IR 3 when the flight crew uses the ATT HDG selector. | | | | |
| If the <u>NAV CAPT & F/O ATT DISAGREE</u> alert triggers in flight, as per ECAM procedure, the flight crew should first crosscheck the attitude: | | | | |
| <ul style="list-style-type: none"> - If the attitude data on the CAPT PFD are affected, the flight crew should set the AIR DATA selector to CAPT ON 3 before setting the ATT HDG selector to CAPT ON 3. - If the attitude data on the F/O PFD are affected, the flight crew should set the AIR DATA selector to F/O ON 3 before setting the ATT HDG selector to F/O ON 3. | | | | |



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| | PRO-ABN-ECAM-10-34-10 | NAV CAPT AND F/O HDG DISAGREE | LG00892 | |
| | PRO-ABN-ECAM-10-34-10 | NAV CAPT AND F/O HDG DISAGREE - Alert | 00023229.0001001 | 03 MAY 10 |
| Criteria: T81119 | | | | |
| Applicable to: ALL | | | | |
| Impacted DU: 00008407 NAV CAPT AND F/O HDG DISAGREE - Alert | | | | |
| <u>Reason for issue:</u> | | | | |
| With ADIRS L4-1 standard (P/N HNS502198BD01), using the ATT HDG selector may induce jumps in the Vertical Speed (V/S) provided by the IR 3, with consequences on flight control laws and/or on approach capability. | | | | |
| NAV CAPT & F/O HDG DISAGREE is amended to prevent the V/S jumps on IR 3 when the flight crew uses the ATT HDG selector. | | | | |
| If the NAV CAPT & F/O HDG DISAGREE alert triggers in flight, as per ECAM procedure, the flight crew should first crosscheck the heading: | | | | |
| <ul style="list-style-type: none"> - If the heading on the CAPT PFD is affected, the flight crew should set the AIR DATA selector to CAPT ON 3 before setting the ATT HDG selector to CAPT ON 3. - If the heading on the F/O PFD is affected, the flight crew should set the AIR DATA selector to F/O ON 3 before setting the ATT HDG selector to F/O ON 3. | | | | |

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| | PRO-ABN-ECAM-10-34-10 | NAV IR 1(2)(3) FAULT | LG00881 | |
| | PRO-ABN-ECAM-10-34-10 | NAV IR 1(2)(3) FAULT - Alert | 00023231.0001001 | 03 MAY 10 |
| Criteria: T81119 | | | | |
| Applicable to: ALL | | | | |
| Impacted DU: 00008385 NAV IR 1(2)(3) FAULT - Alert | | | | |
| <u>Reason for issue:</u> | | | | |
| With ADIRS L4-1 standard (P/N HNS502198BD01), using the ATT HDG selector may induce jumps in the Vertical Speed (V/S) provided by the IR 3, with consequences on flight control laws and/or on approach capability. | | | | |
| NAV IR 1 (2) FAULT is amended to prevent the V/S jumps on IR 3 when the flight crew uses the ATT SEL selector. | | | | |
| If the NAV IR 1(2) FAULT alert triggers in flight, the flight crew should set the AIR DATA selector to CAPT ON 3(F/O ON 3) before setting the ATT HDG selector to CAPT ON 3(F/O ON 3). | | | | |



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| | PRO-ABN-ECAM-10-36 | AIR ENG 1(2)(3)(4) BLEED FAULT | LG00945 | |
| | PRO-ABN-ECAM-10-36 | AIR ENG 1(2)(3)(4) BLEED FAULT - Alert | 00023117.0003001 | 10 MAR 11 |
| Criteria: T78651, T78737 | | | | |
| Applicable to: ALL | | | | |
| Impacted DU: 00007719 AIR ENG 1(2)(3)(4) BLEED FAULT - Alert | | | | |
| <i>Reason for issue:</i> | | | | |
| In the case of takeoff with packs OFF, and no other bleed demand, the AIR ENG 1(2)(3)(4) BLEED FAULT alert may trigger. In this situation, after takeoff, (above 1500ft), a reset of the affected engine bleed allows to clear the corresponding alert and recover the affected engine bleed system. | | | | |
| The ETC 32 adds the engine bleed reset action line to the ECAM procedure. | | | | |

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| | PRO-ABN-ECAM-10-42 | AVIONICS NETWORK MULTIPLE SWITCH FAULT (NETWORK DEGRADED) | LG00960 | |
| | PRO-ABN-ECAM-10-42 | AVIONICS NETWORK MULTIPLE SWITCH FAULT (NETWORK DEGRADED) - Alert | 00023228.0001001 | 03 MAY 10 |
| Criteria: T81119 | | | | |
| Applicable to: ALL | | | | |
| Impacted DU: 00007538 AVIONICS NETWORK MULTIPLE SWITCH FAULT (NETWORK DEGRADED) - Alert | | | | |
| <i>Reason for issue:</i> | | | | |
| With ADIRS L4-1 standard (P/N HNS502198BD01), using the ATT HDG selector may induce jumps in the Vertical Speed (V/S) provided by the IR 3, with consequences on flight control laws and/or on approach capability. | | | | |
| AVIONICS NETWORK MULTIPLE SWITCH FAULT (NETWORK DEGRADED) is amended to prevent the V/S jumps on IR 3 when the flight crew uses the ATT HDG selector. | | | | |
| If the AVIONICS NETWORK MULTIPLE SWITCH FAULT (NETWORK DEGRADED) alert occurs in flight, the flight crew should switch the AIR DATA selector before the ATT HDG selector. | | | | |

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| | PRO-ABN-ECAM-10-49 | APU FAULT | LG00970 | |
| | PRO-ABN-ECAM-10-49 | APU FAULT - Alert | 00020786.0002001 | 03 SEP 10 |
| Criteria: T77417 | | | | |
| Applicable to: ALL | | | | |
| Impacted DU: 00007683 APU FAULT - Alert | | | | |
| <i>Reason for issue:</i> | | | | |
| During the APU start sequence, when the aircraft is at, or approximately at, the maximum altitude for an APU start and, in particular, when the external air temperature is low (e.g. below -30 °C), the Electronic Control Box (ECB - P/N 3900942-03) may command an excessive flow of fuel. In such cases, an EGT over-limit may occur and may result in an automatic shutdown of the APU. | | | | |
| If the APU FAULT AUTO SHUTDOWN ECAM caution is triggered during an in-flight APU start attempt when the aircraft is at, or approximately at, the maximum altitude for an APU start (i.e. at FL 200), the flight crew should attempt additional APU starts at a lower altitude. An APU start should be successful below FL 150. | | | | |
| A future APU Fuel Control Unit standard will correct this issue. | | | | |



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| | PRO-ABN-ECAM-10-70 | ENG ALL ENG FLAME OUT | LG00993 | |
| | PRO-ABN-ECAM-10-70 | ENG ALL ENG FLAME OUT - Alert | 00020793.0010001 | 16 AUG 11 |
| <p>Criteria: EA, T77417, T78651</p> <p>Applicable to: ALL</p> <p>Impacted DU: 00008075 ENG ALL ENG FLAME OUT - Alert</p> <p>Reason for issue:</p> <p>During the APU start sequence, when the aircraft is at, or approximately at, the maximum altitude for an APU start and, in particular, when the external air temperature is low (e.g. below -30 °C), the Electronic Control Box (ECB - P/N 3900942-03) may command an excessive flow of fuel. In such cases, an EGT over-limit may occur and may result in an automatic shutdown of the APU.</p> <p>In the case of all-engine flame out, the flight crew starts the APU to assist an engine start and to supply the normal electrical network. If the APU start sequence fails, the flight crew should attempt additional APU starts at a lower altitude. An APU start should be successful below FL 150.</p> <p>A future APU Fuel Control Unit standard will correct this issue.</p> | | | | |
| <p>Criteria: T71998, T78651, T78678</p> <p>Applicable to: ALL</p> <p>Impacted DU: NONE</p> <p>Reason for issue:</p> <p>The Unreliable Air Speed Indication procedure requests to display the Backup Scales (i.e. BUSS and GPS altitude) until the end of the flight, if the faulty air data cannot be identified.</p> <p>At high altitude, an overall operational review has shown that the cases of unreliable speed situation were a temporary phenomenon, due to temporary contamination of the total pressure probes, with water or ice, typically above FL 250. In-service experience on Airbus fleet has shown that such a temporary phenomenon disappears after a few minutes, allowing recovery of a normal situation.</p> <p>Therefore the Unreliable Air Speed Indication procedure is enhanced.</p> <p>If all air data are unreliable:</p> <ul style="list-style-type: none"> - Above FL 250, the flight crew flies the aircraft using pitch & thrust parameters When contamination of the total pressure probe disappears, the normal flying techniques can be resumed and the normal flight controls law is recovered. - Below FL 250, the use of the BUSS remains recommended until the end of the flight. <p>With the introduction of the Airbus Temporary Quick Change (ATQC) database L50 V5, the ECAM procedure contains a reminder of the memory items (i.e. the immediate actions that the flight crew should apply if the safe conduct of the flight is affected). Then the ECAM refers to the paper Quick reference handbook (QRH), which provides the complete procedure.</p> <p>With the next FWS standard, the entire procedure will be available on the ECAM.</p> | | | | |



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| | PRO-SUP-24-22-FG | Flight Control Unit (FCU) Reset Criteria: DD Applicable to: ALL <i>Impacted DU: 00019430 Flight Control Unit (FCU) Reset</i> | 00019639.0001001 | 14 JAN 10 |
| | PRO-SUP-24-22-FMS | Flight Management Computer FMC A(B)(C) Reset Criteria: DD Applicable to: ALL <i>Impacted DU: 00019415 Flight Management Computer FMC A(B)(C) Reset</i> | 00023890.0001001 | 10 MAR 11 |
| | PRO-SUP-24-32 | Brake and Steering Control System (BSCS) 1(2) Reset Criteria: T71998, T77518, DD Applicable to: ALL <i>Impacted DU: NONE</i> | 00021269.0005001 | 07 JAN 11 |

(1) Evolution code : N=New, R=Revised, E=Effectivity



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| PRO-NOR-SOP-180 INTERMEDIATE/FINAL APPROACH_AT MINIMUM | C | 1 | 04 Nov 2011 : Modification of content of the element 00001014.0001001 |
| PRO-NOR-SOP-180 INTERMEDIATE/FINAL APPROACH_AT MINIMUM | C | 2 | 04 Nov 2011 : Modification of content of the element 00001014.0001001 |
| PRO-NOR-SOP-AIL-00000029 CAT II and CAT III Approach_ "DH or AH" setting on MCDU PERF APPR page | N | 1 | 04 Nov 2011 : Modification of content of the element 20300048.9001001 |
| PRO-NOR-SOP-AIL-00000029 CAT II and CAT III Approach_ "DH or AH" setting on MCDU PERF APPR page | N | 2 | 04 Nov 2011 : Modification of content of the element 20300048.9001001 |
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| PRO-NOR-SOP-240 Parking Procedure / Callouts | A | 1 | 04 Nov 2011 : Modification of content of the element 20300443.9001001 |
| PRO-NOR-SOP-240 Parking Procedure / Callouts | A | 2 | 04 Nov 2011 : Modification of content of the element 20300443.9001001 |
| PRO-NOR-SCO Summary for Each Flight Phase | I | 1 | 04 Nov 2011 : Modification of content of the element 00023038.0001001 |
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STANDARD OPERATING PROCEDURES - GENERAL INFORMATION

GENERAL INFORMATION

Applicable to: ALL

FOREWORD

The Standard Operating Procedures (SOPs) contained in this part are recommended by Airbus, and are consistent with the other chapters of this manual.

The authorities do not certify SOPs. Airbus presents them herein as the best way to proceed, from a technical and operational standpoint. Airbus continuously updates the SOPs and the revisions take into account Operators feedback from in-line experience as well as Airbus flight tests and training experience.

In addition, Operators may amend the SOPs as needed, at their own responsibility. Operators should consider with care consistency with other parts of the FCOM when they perform amendments.

CONTENT AND USE OF SOPS

This FCOM chapter contains additional information on normal procedures.

Standard Operating Procedures consist of inspections, preparations, and normal procedures. All items of a given procedure are listed in a sequence that follows a standardized scan of the cockpit panels, unless that sequence goes against the action priority logic, to ensure that the flight crew performs all actions in the most efficient way.

Standard Operating Procedures are divided into flight phases. The flight crew should perform the SOPs actions by memory.

There are flow patterns at the end of some flight phases to indicate where the actions are performed. The flight crewmembers must apply the flow patterns to ensure that they perform the necessary actions for a specific flight phase, before completing the applicable checklist.

The SOPs assume that all systems are operating normally, and that all automatic functions are used normally.

The FCOM also contains normal procedures that are non-routine procedures in the Supplementary Procedures chapter and in the Special Operations chapter.

NORMAL CHECKLIST

For some flight phases, after the flight crew completes appropriate procedures, they use the related ECAM normal checklist to ascertain that they performed the essential actions.

- For additional training-oriented information, *Refer to FCTM/OP-40-40-2-40-2-2 Introduction.*



COMMUNICATION

For training-oriented information on cross-cockpit communication, *Refer to FCTM/AO-15 Cockpit/Cabin Communication*

COCKPIT TIDINESS

The flight crew must keep the cockpit in order, because misplaced objects can cause several hazards:

- Coffee cups put on the glareshield, or on the pedestal can fall due to turbulence, or if knocked over by the flight crew. The liquid spilled on the pedestal and on the cockpit control panels can cause equipment damage, and have an immediate impact on the flight.
- Books, if any, put on the glareshield can fall, and inappropriately operate some pushbuttons/switches, or damage equipment
- Books, if any, put on the pedestal can inappropriately operate some pushbuttons/switches, particularly when the flight crew moves the books to operate controls on the pedestal, E.g. rudder trim setting, or radio selection on the RMP.

RECOMMENDATIONS

Therefore, Airbus highly recommends that all objects are put and stored in their assigned place in the cockpit. The flight crew should:

- Put cups in the provided cupholders
- Store books, if any, in the appropriate library space. The flight crew must put them back to this library space, when they finished to use these books.
- Put the briefcases, CDs/DVDs, bottles and coats in their assigned stowage space.

A trash bag should also be available behind the flight crew seats. The flight crew should use it for waste disposal.

The flight crew should also put the meal trays behind their seats, when finished. The flight attendants should then collect the meal trays, as rapidly as possible.



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OPERATIONAL POLICY_CREW DUTIES REFERENCE CHART

Applicable to: ALL

CREW DUTIES REFERENCE CHART

The Crew Duties Reference Chart below indicates normal divisions in pilot work load. This chart serves as a guide to help crew members coordinate their duties with regard to a typical flight.

(●) : As required

| CREW DUTIES | REFERENCE | CAPT | FO | PF | PM |
|---|-----------|------|-----|----|----|
| REPORT | | | | | |
| Report & Sign-in | FOM 6 | ● | ● | | |
| FLIGHT PLANNING | | | | | |
| Review flight plan, weather, route information and NOTAMs | FOM 6 | ● | ● | | |
| Self briefing | FOM 6 | ● | ● | | |
| Take FLT document folder to A/C | FOM 6 | | ● | | |
| Joint Briefing | FOM 6 | ● | ● | | |
| COCKPIT PREPARATION | | | | | |
| Exterior inspection | FOM 6 | ● | (●) | | |
| Check A/C documents | FOM 6 | ● | ● | | |
| Cockpit preparation/Interior inspection | FOM 6 | ● | ● | | |
| Check FLT and MAINT log Book | FOM 6 | ● | ● | | |
| Set up EFB equipment | FOM 6 | ● | ● | | |
| Set up FMS equipment | FOM 2/6 | (●) | ● | | |
| Verify FMS equipment | FOM 2/6 | ● | (●) | | |
| Check final document (GD, NOTOC, W/B and etc.) on board | FOM 2/6 | ● | ● | | |
| Takeoff briefing | FOM 6 | | | ● | |
| ATC clearance | FOM 2/6 | | ● | | |

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| CREW DUTIES | REFERENCE | CAPT | FO | PF | PM |
|--|-----------|------|-----|----|----|
| TAXI AND BEFORE TAKEOFF | | | | | |
| Taxi clearance | FOM 2/6 | | ● | | |
| Takeoff briefing if changed | FOM 6 | | | ● | |
| Ensure required fuel for takeoff | FOM 6 | ● | ● | | |
| Takeoff reminder | FOM 6 | | | ● | |
| CLIMB and CRUISE | | | | | |
| Report to Company Radio | FOM 9 | | | | ● |
| FMS modification | FOM 2/6 | | | | ● |
| AFS CP modification: - Autopilot engaged - Autopilot not engaged | FOM 2/6 | | | ● | ● |
| PA announcement | FOM 6/14 | ● | (●) | | |
| Monitor enroute fuel temperature | FOM 6 | | | ● | ● |
| Enroute HF SELCAL check | FOM 6 | | | | ● |
| Update Wx (En-route, Destination & Alternate Airport) | FOM 6 | | | ● | ● |
| WAYPOINT PASSAGE | | | | | |
| Confirm name of next waypoint, desired track distance & time to next waypoint. | FOM 6 | | | ● | ● |
| Transmit position report to ATC, controlling HF facility, or Company Radio | FOM 6/9 | | | | ● |
| Record flying data on FLT plan | FOM 6 | | | ● | ● |
| BEFORE DESCENT | | | | | |
| Arrival ATIS | FOM 6 | | | ● | ● |

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| CREW DUTIES | REFERENCE | CAPT | FO | PF | PM |
|---|-----------|------|----|-----|----|
| Set up EFB equipment | FOM 6 | | | ● | ● |
| FMS set up for approach | FOM 2/6 | | | (●) | ● |
| Landing briefing | FOM 6 | | | ● | |
| APPROACH AND LANDING | | | | | |
| Report to Company Radio | FOM 9 | | | | ● |
| Ground control communication | FOM 6 | | ● | | |
| POSTFLIGHT | | | | | |
| Perform ACARS post flight | FOM 6 | | ● | | |
| FLT and MAINT Log book entries | FOM 6 | | ● | | |
| Log book sign | FOM 6 | ● | | | |
| Report to Company Radio | FOM 6/9 | (●) | ● | | |
| Return completed master flight plan and log sheet | FOM 6 | | ● | | |

Pilot Flying and Pilot Monitoring Areas of Responsibility including taxing

Refer to FCTM/Mormal Operation

Note: With the airplane stationary on the ground, CAPT cuts off the ENG master Switch(es).



OPERATIONAL POLICY_NORMAL CHECK LIST INITIATION

Applicable to: ALL

NORMAL CHECK LIST INITIATION

The Captain calls for check lists on the ground. In flight , the PF calls for the check list.

- Before Start Checklist

Down to the line

After completion of the cockpit preparation, Load Sheet onboard and completion of the MFD-FMS revise.

Below the line

Checklist items will be checked after :

- Confirm the ground staff and cabin ready or push back.
- ATC clearance and push back clearance has been received.
- After complete cockpit preparation for pushback and start.

- After Start Checklist

When the flight controls check has been completed

- Before Takeoff Checklist

Down to the line

After completing takeoff briefing confirmation and checking takeoff memo

Below the line

When the cabin report has been received, and after the line –up clearance or takeoff clearance has been received.

- After Takeoff Checklist

Down to the line

After completing flap retraction

Below the line

After 10,000ft or transition altitude whichever comes later

- Approach Checklist

Perform while descending 10,000ft. if the transition level is below 10,000ft, perform the approach checklist except altimeter setting. After completion of altimeter setting, the PM calls out "APPROACH CHECKLIST COMPLETE"

- Landing Checklist

Performing when the landing configuration has been completed and landing memo is displayed on ECAM

- After Landing Checklist

Perform when clear of the runway.



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- Parking Checklist
After arriving at the ramp/gate, and the Shutdown Procedure complete.
- Securing The Aircraft Checklist
After the last flight of the day, and the Secure Checklist complete.

OPERATIONAL POLICY_LOWER THAN STANDARD MINIMA

Applicable to: ALL

LOWER THAN STANDARD MINIMA

Refer to FOM chapter 4 - Weather

- Takeoff Minima

Company Standard Takeoff Minima is RVR 750m (2,400 ft) / VIS 800m (1/2 SM).

When the reported weather is below the Company Standard Takeoff Minima, the requirements of the Lower Than Standard Takeoff Minima will apply.

Operating procedures for takeoffs with visibility less than RVR 750m (2,400 ft) / VIS 800m (1/2 SM) are:

- Captain will take off.
- The flight crew must check the runway number (designated) prior to taxiing onto the runway.
- The flight crew must check the airplane heading against the desired runway heading after taxiing on the runway.
- Standing takeoff should be performed.
- When the weather conditions at the departure airport are above the airport takeoff minima but at or below the landing minima (including engine out landing minima), or the aircraft cannot return to the departure airport because of other reasons, such as performance, there must be a designated takeoff alternate which can be reached at cruising speed with one engine inoperative within two hours from the departure airport after takeoff.

- Landing Minima

For instrument approaches, the A380 is classified as Category C. When executing circling approaches, the A380 is classified as a Category C (ICAO) or Category D (FAA).

A circle-to-land approach shall not be conducted when the ceiling is less than 1,000 feet (300m) or the visibility is less than 3 statute miles (4,800m). If a higher MDH and/or weather restrictions are published it will control.

If the published MDH is less than 1000 feet, MDA shall be 1000 feet + Airport Elevation.

If no appropriate category or maximum speed circle-to-land minima are published, the approach is not authorized.



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OPERATIONAL POLICY_RADIO COMMUNICATIONS

Applicable to: ALL

RADIO COMMUNICATIONS

- VHF 1 will normally be selected for active ATC communications.
- VHF 2 will normally be selected to 121.5 MHz for emergency.
- VHF 3 will normally be selected to ACARS (also used for ATIS and company radio).

Note: The speaker volume should be turned on for ATC monitor during flight.

Note: Verify that RADIO/AUDIO Control Panel is properly set for Headset off/on, Passenger Announcement, ACC/ FIR boundary etc, to prevent the loss of communication. General callout ("AUDIO Panel Set", "Volume Set", etc) should be used as appropriate for Headset off/on, Passenger Announcement.

OPERATIONAL POLICY_AUTOPILOT, WEATHER RADAR AND TCAS SELECTIONS

Applicable to: ALL

AUTOPILOT, WEATHER RADAR AND TCAS SELECTIONS

It is the basic principal that the PF has to select his/her own side.

During flying in RVSM airspace , the transponder switch must be selected to the same side as the selected Autopilot.

OPERATIONAL POLICY_WEATHER RADAR AND TERRAIN DISPLAY POLICY

Applicable to: ALL

WEATHER RADAR AND TERRAIN DISPLAY POLICY

Whenever the possibility exists for adverse weather and terrain/obstacles near the intended flight path, one pilot should monitor the weather radar display and the other pilot should monitor the terrain display. The use of the terrain display during night or IMC operations, on departure and approach when in proximity to terrain/obstacles, and at all times in non-radar environment is recommended.

Note: Normally, PM should select TERR mode on his/her ND, if needed to monitor both WXR and TERR.

Note: It may be useful to show the terrain display at other times to enhance terrain/situational awareness



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OPERATIONAL POLICY_FMS PAGE SELECT

Applicable to: ALL

FMS PAGE SELECT

The specific page listed below is recommended for each flight phase. But another Selection can be used if necessary

| Flight Phase | PF | PM |
|--------------|--------------|-------|
| Takeoff | PERF TAKEOFF | F-PLN |
| Climb | PERF CLM | F-PLN |
| Cruise | PERF CRZ | F-PLN |
| Descent | PERF DES | F-PLN |
| Approach | PERF APPR | F-PLN |

OPERATIONAL POLICY_SCAN POLICY

Applicable to: ALL

SCAN POLICY

Definition

- Inside & outside : As the aircraft descends, outside references are used more than the instruments.
However , Pilots must also monitor their instruments.
- Inside : Pilots will continuously monitor the instruments.

| Conditions | PF | PM |
|---------------------------------|------------------|------------------|
| Coupled approach (Below 1000ft) | | |
| IMC (or night) | Inside & Outside | Inside |
| After visual reference contact | Inside & Outside | Inside |
| Manual approach (Below 1000ft) | | |
| IMC (or night) | Inside | Inside & Outside |
| After visual reference contact | Inside & Outside | Inside & Outside |
| Visual Approach | | |
| After visual reference contact | Inside & Outside | Inside & Outside |

Additional Standard Scan Policy Reference

Refer to FOM Chapter 6 – Normal Operations



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OPERATIONAL POLICY_STANDARD CALLOUT

Applicable to: ALL

STANDARD CALLOUT

Refer to FCOM/ Procedures/Normal Procedures / Standard Callout

Additional Standard Procedures and Callouts Reference

- Refer to FCOM/ Procedures/Normal Procedures / Standard Callout

OPERATIONAL POLICY_ILS AIRBORNE REQUIRED EQUIPMENTS FOR CAT II/III

Applicable to: ALL

ILS AIRBORNE REQUIRED EQUIPMENTS FOR CAT II/III

Refer to FCOM /Limitations/22 Auto pilot System/ Automatic approach, Landing , Roll-Out/Require equipment for CAT II/III



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STANDARD OPERATING PROCEDURES - FLIGHT PREPARATION

FLIGHT PREPARATION

Applicable to: ALL

TECHNICAL CONDITION OF THE AIRCRAFT

The flight crew verifies the technical state of the aircraft (i.e. deferred defect list), in accordance with airworthiness, acceptability of malfunctions (i.e. MEL), and influence on the flight plan. Refer to FOM chapter 6 –Normal Operations.

- L2** For additional training-oriented information, *Refer to FCTM/Flight Preparation/MEL.*

WEATHER BRIEFING

The flight crew gets a weather briefing.

- L2** The briefing should include:
- Actual and expected weather conditions for takeoff including runway conditions, and for climb phases
 - Significant weather en route, including winds and temperatures
 - Terminal forecasts for destination and alternate airports
 - Actual weather for destination and alternate airports, for short range flights and recent past weather, if available
 - Survey of the meteorological conditions at airports along the planned route.
- L1** Weather can affect the choice of routing (E.g. influence which route is the quickest) and the choice of flight level.

The flight crew must also consider the possibility of contaminated runways at the departure and destination airfields. The flight crew must also verify ISA deviations and en route icing conditions. They must consider the possibility of holding due to weather at the destination.

NOTAMS

The flight crew must examine NOTAMs for flight planning impacts, unserviceable NAVAIDS, availability of runways and approach aids, etc, all of which may affect the conduct of the flight.

FLIGHT PLAN AND OPERATIONAL REQUIREMENTS

The flight crew checks the company flight plan for routing, altitudes and flight time.

The Captain checks the ATC flight plan and ensures that the ATC flight plan:

- Is filled in and filed, in accordance with the prescribed procedures
- Agrees with the fuel flight plan routing.

The flight crew checks the loadsheet and the maximum allowable takeoff and landing weights.



OPTIMUM FLIGHT LEVEL

The flight crew should choose a flight level that is as much as possible near the optimum FL . To obtain the optimum flight level, the flight crew should use the IN-FLT PERF CRZ module. For more information on the use of the IN-FLT PERF CRZ module, *Refer to Performance/In-Flight/Cruise/CRZ Module Interface* .

[L2] As a general rule:

- An altitude that is 4 000 ft below the optimum FL results in a significant penalty: Approximately 5 % of fuel
- An altitude that is 8 000 ft below the optimum FL results in a significant penalty: Approximately 10 % of fuel, i.e. above the usual contingency allowance that is 5 %
- If the flight crew intends to fly above the optimum FL (up to ceiling), the consumption increase can reach 4 % .

COMPUTERIZED FLIGHT PLAN CHECK

In most cases the flight crew uses a computer-derived flight plan to obtain the correct fuel requirements. Although these computerized requirements are normally accurate, the flight crew may check them in accordance with Operators policy.

To crosscheck the flight plan, the flight crew should use the IN-FLT PERF PLAN Module. For more information on minimum recommended fuel requirements and on the use of the IN-FLT PERF PLAN Module, *Refer to Performance/In-Flight/Flight Planning/Minimum Recommended Fuel Requirements* .

The flight crew should verify that the fuel calculations and the required fuel on board are correct, and that the figure complies with the applicable regulations.

FUEL TRANSPORTATION

The flight crew should check the policy covering the “tankering” of fuel on sectors where there is favorable fuel price differential or operational requirement.

Remember that carrying unnecessary extra fuel increases the fuel consumption for that sector and therefore reduces the economy of the operation (E.g. lower flex temperature, more tire and brake wear, more time in climb phases, lower optimum flight level, etc).



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STANDARD OPERATING PROCEDURES
- SAFETY EXTERIOR INSPECTION

SAFETY EXTERIOR INSPECTION

Applicable to: ALL

GENERAL

Safety exterior inspections ensure that the aircraft and the external environment of the aircraft are safe for operation. When the flight crew arrives at the aircraft, they must check for, or be informed of any obstructions near the aircraft, engineering activity, or refueling activity, etc.

WHEEL CHOCKS

WHEEL CHOCKS.....CHECK IN POSITION | CAPT

LANDING GEAR DOORS

LANDING GEAR DOORS.....CHECK POSITION | CAPT

WARNING If any landing gear door is open, do not pressurize the hydraulic systems until clearance is obtained from ground personnel.

APU AREA

APU AREA.....CHECK | CAPT

- Check that the APU exhaust is free of obstruction.*



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- PRELIMINARY COCKPIT PREPARATION

GENERAL

Applicable to: ALL

The flight crew performs the preliminary cockpit preparation to ensure that all required safety checks are completed before applying electrical power.

The safety checks prevent the inadvertent operation of aircraft systems, danger to the aircraft, and danger to the personnel.

The preliminary cockpit preparation includes:

- Aircraft power-up, if the aircraft is not already electrically powered
- OIS initialization
- ECAM/Logbook check
- APU start
- OIS preparation.

AIRCRAFT POWER-UP

Applicable to: ALL

GENERAL

The FO applies the following procedure only if the aircraft is not already electrically supplied.

During the aircraft power-up procedure, the flight crew completes the necessary checks before they put on the electrical power.

- L2 For additional training-oriented information, *Refer to FCTM/NO-40 Aircraft Power-Up.*

WARNING Do not pressurize the hydraulic systems until clearance is obtained from ground personnel.

ENGINES

| | | |
|-----------------------------|------|----|
| ENG MASTERS 1, 2, 3, 4..... | OFF | FO |
| ENG START selector | NORM | FO |

WIPERS

| | | |
|---------------------------|-----|----|
| BOTH WIPER selector | OFF | FO |
|---------------------------|-----|----|

BATTERIES

| | | |
|---|----|----|
| ALL BAT pb-sw (BAT 1, ESS, 2, APU BAT)..... | ON | FO |
|---|----|----|

EXT POWER

- If the AVAIL light is on:

EXT pb-sw (2, 3, 1, 4).....ON | FO

[L2] The AVAIL light goes off.

[L1] The EXT power units should be connected, in the following order:

- EXT 2
- EXT 3
- EXT 1
- EXT 4.

[L2] This order ensures the shortest start time of the display units.

[L1] At least two EXT power units are necessary to supply the entire electrical network.

[L2] If the flight crew anticipates high electrical demands (e.g. APU start or doors actuation):

- A third or a fourth EXT power unit is necessary to supply the entire electrical network, or
- The flight crew must temporarily reduce the electrical load when only two EXT power units are available, by setting the:
 - CAB FANS pb-sw to OFF, and
 - COOLG pb-sw to OFF.

Note: These temporary actions ensure that enough electrical power is available during a high electrical demand (e.g. to start the APU or to operate the doors).

When the flight crew sets to OFF the CAB FANS pb-sw and the COOLG pb-sw, no degradation of the galley cooling system and of the air conditioning is expected for a few minutes, i.e. the time necessary to start the APU or to operate the doors.

As soon as it is possible, the flight crew should set to ON the CAB FANS pb-sw and the COOLG pb-sw.

When the APU is available, no reduction of load is necessary.

COCKPIT LIGHTS

COCKPIT LIGHTS.....AS RQRD | BOTH

[L2] On the overhead panel, set the STBY COMPASS sw as required, and set to BRT or DIM the ANN LT sw as required.

On the pedestal, set the PEDESTAL FLOOD LT knob, the AMBIENT LT knob and INTEG LT knob, as required.

Adjust the brightness of the Display Units: PFD, ND, MFD, EWD and SD.



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OIS INITIALIZATION

Applicable to: ALL

Laptops Start

CAPT & FO LAPTOPS..... ON | BOTH

- [L2] If the maintenance personnel did not set to ON the CAPT and FO laptops, on each lateral console, set the CAPT and FO laptops to ON.

To turn on the laptops, slide the laptops ON/OFF sw to the right for not more than 2 s.

Set the laptop to ON sufficiently early to give enough time for laptop power on. Time for power on is approximately 5 min.

[L1] BACKUP LAPTOP ON | FO

- [L2] The backup laptop rack is located in the FO lateral console.

If the maintenance personnel did not set to ON the backup laptop, set the backup laptop to ON.

To turn on the laptop, slide the laptop ON/OFF sw to the right for not more than 2 s.

The backup laptop must be running to perform automatic data loading.

Keyboard and Cursor Control Unit (KCCU)

CCD sw and KBD sw 1 and 2..... ON | BOTH

OIS Applications Start

OIT knob ON | BOTH

- [L2] Turn the OIT knob in order to start the OIT and adjust the brightness.

[L1] OIT SIDE sw NSS AVNCS | BOTH
LOGIN AS PILOT..... PERFORM | BOTH

- [L2] The connection to NSS AVNCS takes a few minutes. During that time, the flight crew should launch the FLT OPS applications.

[L1] OIT SIDE sw FLT OPS | BOTH
LOGIN AS PILOT..... PERFORM | BOTH
NAV CHARTS..... START | BOTH
OPS LIBRARY..... START | BOTH

COMPANY COM(ACARS)INITIALIZATION

OIT SIDE sw NSS AVNCS | FO
INIT DATA..... SEND | FO

- [L2] Send a request to the airline ground station via the INIT DATA button of COMPANY COM application. When the request is delivered on ground (i.e. an acknowledgement from ground is received onboard), the request message appears in the Sent items.



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Note: Send Initialization after check input data and display data.

Note: Check Uplink message : CAT Recency, Full Thrust Recency And SOW Index Range.

Note: SOW Index Range is included for a month only if it is changed.

FLT OPS STATUS

OIT SIDE sw FLT OPS | FO

● In accordance with Operators policy or if required by operational regulation:

FLT OPS STS page..... CHECK OIS VERSION | BOTH

[L2] If required, the flight crew performs this check unless a specific procedure is established as per Operators policy to ensure that the correct version is on board.

On the FLT OPS STS page, check the OIS version number and compare it with the valid version number given as reference by the Operator (e.g. on the company flight plan).

[L1] NAV CHARTS..... CHECK VALIDITY DATE | BOTH

[L2] Check the validity date of the NAV CHARTS on the FLT OPS STS page.

ECAM/LOGBOOK CHECK

Applicable to: ALL

ECAM RCL

RCL pb PRESS | CAPT

[L2] Press the RCL pb for at least 3 s to recall all alerts that were cleared or cancelled.

[L1] CLEARED or CANCELLED ALERTS CHECK | CAPT

LOGBOOK CHECK

OIT SIDE sw NSS AVNCS | CAPT

MEL/CDL ITEMS..... CHECK and NOTE CDL | CAPT

[L2]

- Check the deferred items list
- Crosscheck with ECAM recall
- Note the missing parts of the CDL deferred items
- Check the maintenance release status
- Enter the pre-flight parameters, in accordance with Operators policy.

MEL/CDL ITEMS CHECK

OIT SIDE sw FLT OPS | CAPT



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MEL/CDL ITEMS (as appropriate).....CHECK DISPATCH CONDITIONS | BOTH

- [L2] Access the MEL and CDL items via the LOGBOOK STATUS panel of the OPS LIBRARY.
MEL items are automatically activated in performance applications.
CDL items are automatically activated in performance applications, but without missing parts.

AIRCRAFT ACCEPTANCE

OIT SIDE sw NSS AVNCS | CAPT

AIRCRAFT ACCEPTANCE.....PERFORM | CAPT

- [L2] Before the electronic flight acceptance, check that VHF3 DATA mode is active.
Accept the aircraft, sign electronically the flight acceptance report.

Note: The aircraft acceptance can be performed later, but must be completed at the end of the Cockpit Preparation.

APU AND ENG FIRE TEST/APU START

Applicable to: ALL

RMP

- [L2] For additional training-oriented information, Refer to FCTM/NO-40 APU and ENG Fire Test/APU Start.
- [L1] RMP 1 and 2.....ON | FO
- [L2] FO switches on both RMPs.
- [L1] STBY RAD NAV key.....OFF | FO
- COMMUNICATION FREQUENCIES.....TUNE | FO

[L2] Use:

- VHF will normally be selected for the active ATC communications
- VHF will normally be selected for the emergency (121.5 MHZ)

Note: When A/C is parked at the gate, VHF2 can be used for ATIS or company frequencies to ensure that VHF3 is devoted to ACARS.

- VHF3 will normally be selected for ACARS (also used for ATIS, and company radio in flight)

Note: When VHF 3 is selected for voice mode, up/down links of all ACARS won't work, so it must be switched to data mode immediately after having finished using the voice.

Note: The Speaker volume should be turned on for monitor during flight.

The flight crew usually uses VHF3 for ACARS.



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[L1] INT RECEPTION knob RELEASE/ADJUST | BOTH

- [L2] Press and release the INT RECEPTION knob to the out position.
Turn the INT RECEPTION knob to adjust the volume and to enable contact with the ground crew.

APU AND ENG FIRE TEST

Note: The flight crew should apply the APU Start on Batteries supplementary procedure to start the APU on batteries. For more information, Refer to PRO-SUP-49 APU Start on Batteries . The flight crew should perform the APU and ENG fire tests when the APU is available.

| | | |
|--|----------------------|----|
| APU FIRE pb-sw | CHECK IN and GUARDED | FO |
| APU AGENT light | OFF | FO |
| ENG 1(2)(3)(4) FIRE pb-sw | CHECK IN and GUARDED | FO |
| ENG 1(2)(3)(4) AGENT 1 and 2 light | OFF | FO |
| FIRE TEST pb | PRESS | FO |

- [L2] The flight crew should maintain the TEST pb pressed during the time of the test.

TEST RESULT

Check that all ENG FIRE and APU FIRE detection and extinguishing systems are operative:

- The continuous repetitive chime sounds
- The MASTER WARN light flashes
- The ECAM displays the ENG 1(2)(3)(4) FIRE , APU FIRE and MLG BAY FIRE alerts
- All ENG FIRE pb-sw and the APU FIRE pb-sw come on in red
- All SQUIB lights of the ENG and APU AGENT pb come on
- All DISCH lights of the ENG and APU AGENT pb come on
- All FIRE lights on the ENG MASTER panel come on.

Impacted by TDU: 00021429 APU Start

APU START

| | | |
|---------------------------|----|----|
| APU MASTER SW pb-sw | ON | FO |
| APU START pb | ON | FO |

- [L2] For more information, Refer to APU Start Sequence .

- [L1] Note: - If only batteries supply the aircraft, Refer to PRO-SUP-49 APU Start on Batteries .
- If the APU start failed, Refer to APU Start Limitation.

Impacted DU: 00000674 APU Start_APU START

APU START

| | | |
|---------------------------|----|----|
| APU MASTER SW pb-sw | ON | FO |
|---------------------------|----|----|



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- When the APU flap is fully open (i.e. FLAP OPEN indication appears on the APU SD page):

- APU START pb ON | FO
- L2 On the APU SD page, check that FLAP OPEN appears before setting to ON the APU START pb.
For additional informations, Refer to APU Start Sequence .
- L1 Note: - If only batteries supply the aircraft, Refer to PRO-SUP-49 APU Start on Batteries .
- If the APU start failed, Refer to APU Start Limitation.

ELEC

- EXT PWR (if ON).....AS RQRD | FO
- L2 The flight crew should keep ON the external power units to reduce the APU load, particularly in hot weather conditions.

OIS PREPARATION

Applicable to: ALL

FMS/OIS FLT OPS STS

- L2 The flight crew initializes the OIS with the planned city pair (FROM/TO) and flight number (FLT NBR). The OIS can be initialized automatically from the FMS or manually.
Initialization of the FMS enables automatic initialization of the OIS Flight Ops applications (Performance and Navigation charts), the AOC and the Logbook.
At aircraft power-up, the DATA/STATUS page is the default FMS page that appears. Display the FMS ACTIVE/INIT page by pressing the INIT key on the KCCU, or by selecting INIT in the ACTIVE menu on the General Menu Bar on the MFD.

- L1 ● If Company Flight Plan is received via ACARS:

ACFT STATUS on the FMS DATA/STATUS page..... CHECK | FO

- L2 Check:

- The engine and aircraft types
- The active database validity period
- The pilot stored elements.

Check if any waypoint, NAVAID, route, and runway appear. Review and delete them, if appropriate.

L1 RECEIVED CPNY F-PLN..... INSERT | FO

L2 The Company Flight Plan is automatically loaded in the FMS.

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If the flight crew wants to insert the received flight plan in SEC 1(2)(3), they should clear the secondary flight plan by using the Delete button, before inserting the received flight plan.

The Company Flight Plan can be received via ACARS even if the flight crew did not previously select CPNY F-PLN REQUEST.

| | | | |
|----|---|---------------|------|
| L1 | FLT NBR and FROM/TO on FMS ACTIVE/INIT page..... | CHECK | FO |
| | OIT SIDE sw | FLT OPS | BOTH |
| | FLT OPS STS page..... | SELECT | BOTH |
| | FLT OPS STS page..... | CHECK UPDATED | BOTH |
| L2 | Check that FLT NBR and CITY PAIR in the OIS are in accordance with the FMS. | | |
| L1 | ● If Company Flight Plan is not received via ACARS: | | |
| | OIT SIDE sw | FLT OPS | BOTH |
| | FLT OPS STS page..... | SELECT | BOTH |
| | FLT NBR and FROM/TO..... | INSERT | FO |
| L2 | Enter the FLT NBR and CITY PAIR on the FLT OPS STS page. | | |
| L1 | FLT OPS STS page..... | CHECK UPDATED | FO |

PRELIMINARY PERFORMANCE DETERMINATION

| | | | |
|----|--|------------------------------|------|
| L2 | For additional training-oriented information, Refer to FCTM/NO-40 OIS Preparation. | | |
| L1 | Compute the preliminary performance data in accordance with the technical condition of the aircraft and/or any other criteria that may impact the performance data (e.g. NOTAM, runway condition, aircraft configuration). | | |
| | T.O PERF..... | START | BOTH |
| L2 | Start the T.O PERF application. | | |
| L1 | AIRFIELD DATA..... | OBTAIN | BOTH |
| L2 | Obtain airfield data that are used for preliminary takeoff performance computation. | | |
| L1 | ● If dispatch under MEL or CDL and in accordance with the logbook: | | |
| | MEL ITEMS (as appropriate)..... | CHECK ACTIVATED | BOTH |
| L2 | As appropriate, check that the MEL items are activated in the applicable performance application. | | |
| L1 | CDL ITEMS (as appropriate)..... | CHECK ACTIVATED and COMPLETE | BOTH |
| L2 | As appropriate, check that the CDL items are activated in the applicable performance application. | | |
| | Complete missing parts of the CDL items in accordance with the logbook. | | |



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- L1 OIS PRELIMINARY TAKEOFF PERF..... COMPUTE and CROSSCHECK | BOTH
- L2 In the T.O PERF application, enter the selections in accordance with the estimated departure conditions:
- In the RUNWAY SELECTION panel, enter the runway characteristics
The flight crew should consider any NOTAM that affects the airport data.
Note: In anticipation of a possible runway change, select multiple runways, as applicable in the MULTIPLE RWY panel.
- In the OUTSIDE CONDITIONS panel, enter the outside conditions
- In the MEL/CDL panel, check selected items, if any
- In the AIRCRAFT CONFIGURATION panel, enter the aircraft configuration (e.g. aerodynamic configuration, air flow, thrust option)
Check the takeoff weight.
- Launch the computation and check the results.
- L1 ● In accordance with Operators policy or if required by operational regulation:
PRELIMINARY TAKEOFF PERFORMANCE..... STORE IN CURRENT EFF | FO

OPERATIONS ENGINEERING BULLETINS (OEB)

- OEB in FCOM CHECK | BOTH
Review all OEBs in the OEB section of the FCOM, particularly red OEBs, that are applicable to the aircraft.
- L2 Any flight crewmember who operates at the flight deck at any time during the on-going flight should be aware of the applicable OEB(s), e.g. via this OEB review.



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STANDARD OPERATING PROCEDURES - EXTERIOR WALKAROUND

GENERAL

Applicable to: ALL

Exterior walkaround ensures that the general condition of the aircraft is satisfactory and that the visible aircraft components and equipment are safe for the flight:

- There is no impact damage to the structure
- There is no evident fuel, oil, or hydraulic leak
- All ground access doors are closed.

Maintenance personnel usually inspects the aircraft before the flight. In the absence of maintenance personnel, a flight crewmember performs this walkaround before the flight.

Items marked (*) must be performed again by a flight crewmember before the flight.

The parking brake must be set to ON during the exterior walkaround, in order to enable the flight crew to check brake wear indications.

| | |
|----------------|--|
| WARNING | If any landing gear door is open, do not apply hydraulic power until clearance is obtained from maintenance personnel. |
|----------------|--|

If any items are missing, or are not in an appropriate condition, use the Configuration Deviation List (CDL) for dispatch assessment.

BEFORE WALKAROUND

Applicable to: ALL

ECAM PAGES

- [L2] For additional training-oriented information, Refer to FCTM/NO-50 Before Walkaround .
- [L1] ● **On the DOOR SD page:**
CKPT OXYGEN PRESSURE.....CHECK | CAPT
Check that the cockpit oxygen pressure is green, and that there is no amber half-frame.
If the oxygen pressure appears with an amber half-frame, check that the pressure remains above the minimum necessary to fly the scheduled flight, with the real number of cockpit occupants: Refer to OXYGEN SYSTEM LIMITATIONS .
- [L1] CABIN OXYGEN PRESSURE.....CHECK | CAPT
Check that the cabin oxygen pressure is green, and that there is no amber half-frame.
If the oxygen pressure appears with an amber half-frame, check that the pressure remains above the minimum necessary to fly the scheduled flight, with the real number of cabin occupants: Refer to OXYGEN SYSTEM LIMITATIONS .

[L1]

● On the HYD SD page:

RESERVOIR FLUID LEVEL.....CHECK WITHIN NORMAL RANGE | CAPT

L13

Note: If the normal filling range appears in white with an amber cross indicating that it is not computed, set to NAV any ADIRS MODE selector.

After the engine start, if required, the hydraulic reservoir of the LEHGS is automatically refilled. The normal filling range of the hydraulic system takes into account the amount of fluid that will be transferred to the LEHGS. However, to compute the fluid level in the LEHGS, temperature information from the ADRs is required.

● On the ENG SD page:

ENG OIL QUANTITY.....CHECK NORMAL | CAPT

Note: If the ENG oil quantity indication does not appear on the ENG SD page, press all ENG FADEC GND PWR pb-sw on the overhead maintenance panel.

L2

Check that the oil quantity is at, or above 6 quarts plus the estimated consumption for the intended flight (average estimated consumption is 0.4 quarts per hour), but not lower than 10 quarts.

SPEED BRAKE LEVER

SPEED BRAKE leverCHECK RETRACTED and DISARMED | CAPT

| | |
|----------------|--|
| WARNING | If the flight control surfaces position does not agree with the SPEED BRAKE lever position, do not apply hydraulic power until clearance is obtained from maintenance personnel. |
|----------------|--|

PARK BRK

PARK BRK handleON | CAPT

L2 The flight crew should set to ON the PARK BRK handle during the exterior inspection, in order to check the brake wear indicators.

BODY ACCU AND BRK PRESSURE INDICATIONS

BODY ACCU and BRK pressure indications.....CHECK | CAPT

L2 Check for normal indications.

The BODY ACCU pressure indication must be in the green arc.

L1 If required, press the ACCUS REINFLATE pb to pressurize the BLG and WLG brake accumulators.



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SLATS/FLAPS POSITION

FLAPS.....CHECK POSITION | CAPT

- [L2] Check that the slats/flaps position on the lower part of the PFD agrees with the FLAPS lever position.

| | | |
|----|----------------|---|
| L1 | WARNING | If the flight control surfaces position does not agree with the FLAP lever position, do not apply hydraulic power until clearance is obtained from maintenance personnel. |
|----|----------------|---|

EMERGENCY EQUIPMENT

Check that:

- Life vests are stowed
- Crash axe is stowed
- Protective Breathing Equipment (PBE) is stowed and ready for use
- Portable fire extinguisher is lockwired and the pressure gauge indicator is in the green area
- Oxygen masks are stowed
- Flashlights are stowed
- Escape ropes are stowed.

LANDING GEAR PINS AND COVERS

GEAR PINS and COVERS.....CHECK ONBOARD and STOWED | CAPT

SECURITY INSPECTION

This procedure will be performed for security when entering the cockpit before Exterior Inspection and Cockpit preparation.

Check for any suspicious item in the following area :

| SECURITY INSPECTION CHECK ITEM |
|---------------------------------------|
| FLOOR |
| CEILING |
| AFTER FLIGHT DECK WALL |
| DOCUMENT STOWAGE |
| SEATBACK POCKET & LIFE VEST |
| HEADSET STOWAGE BIN |
| ESCAPE ROPE STOWAGE |
| WASTE BIN |
| OXYGEN MASK STOWAGE |
| COAT ROOM/SUITCASE STOWAGE |

Continued on the following page



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STANDARD OPERATING PROCEDURES - EXTERIOR WALKAROUND

Continued from the previous page

SECURITY INSPECTION CHECK ITEM

SPARE BULB BOX

DISKET BOX

SMOKE HOOD

PRINTER PAPER ROLL STOWAGE

3rd/4th OCCUPANT SEAT

L/G LOCKING PIN BOX

UPPER/UNDER SIDE AREA OF THE SEAT

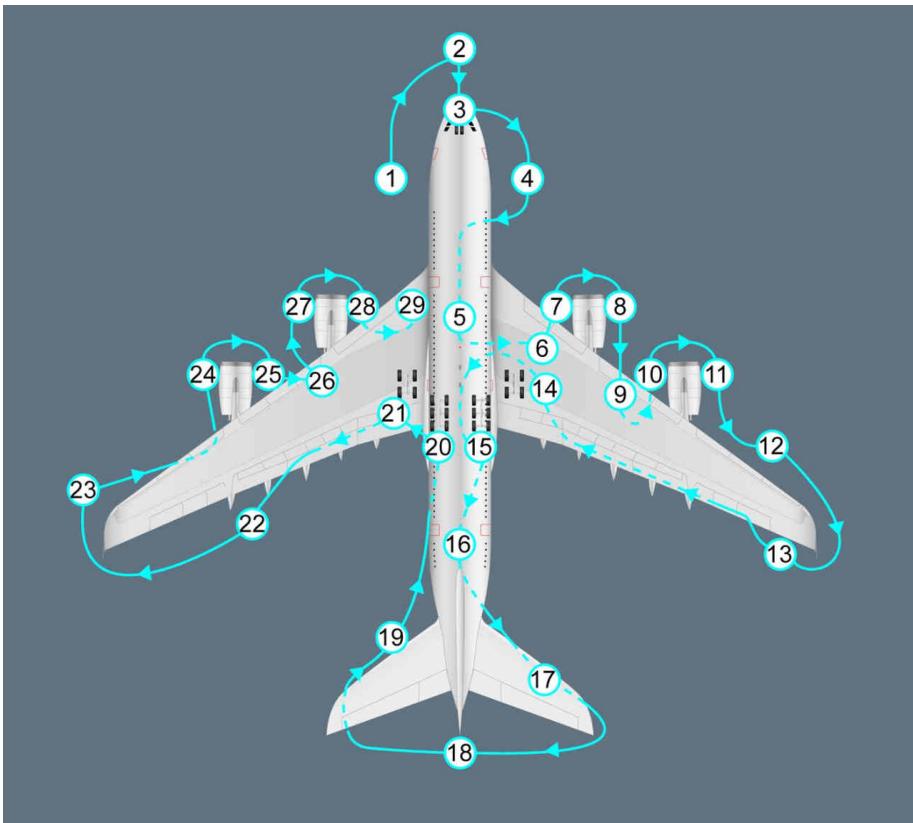
AREA AROUND RUDDER/BRAKE PEDALS

SLIDING TABLE

CHECKLIST STOWAGE

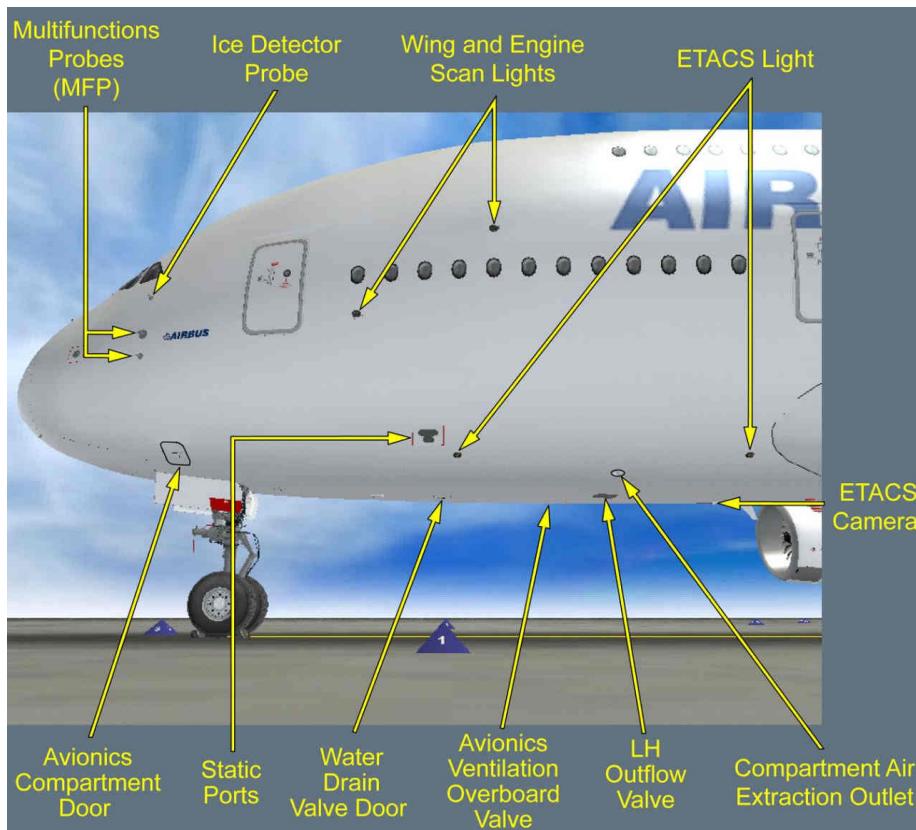
EXTERIOR WALKAROUND

Applicable to: ALL

Exterior Walkaround

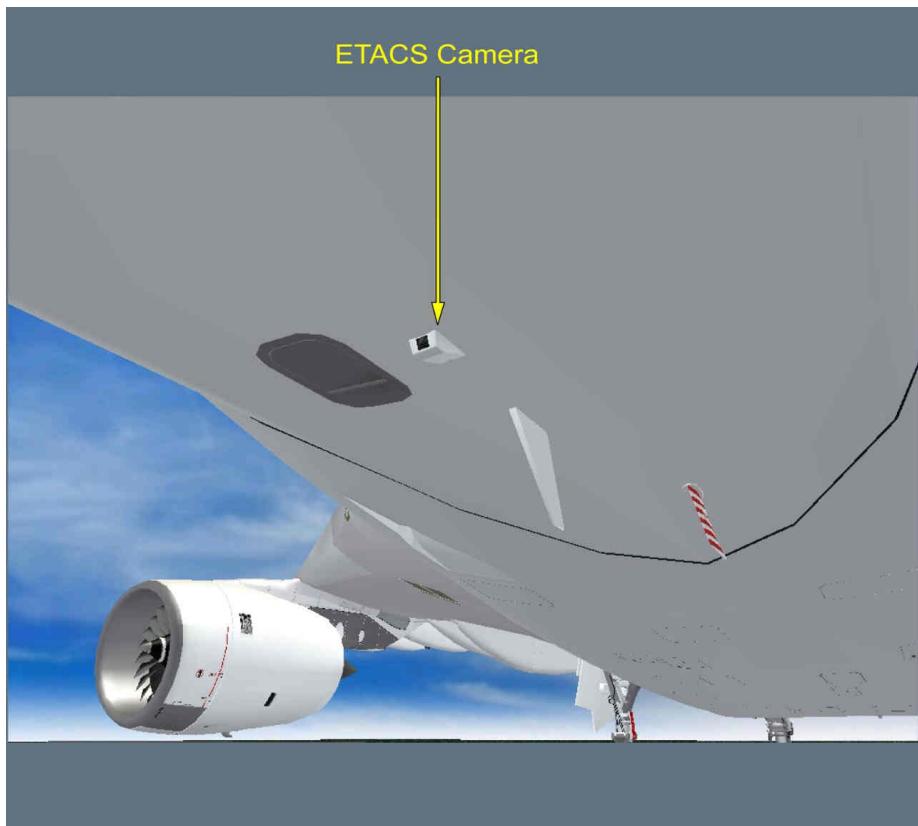
LH FWD FUSELAGE

Applicable to: ALL

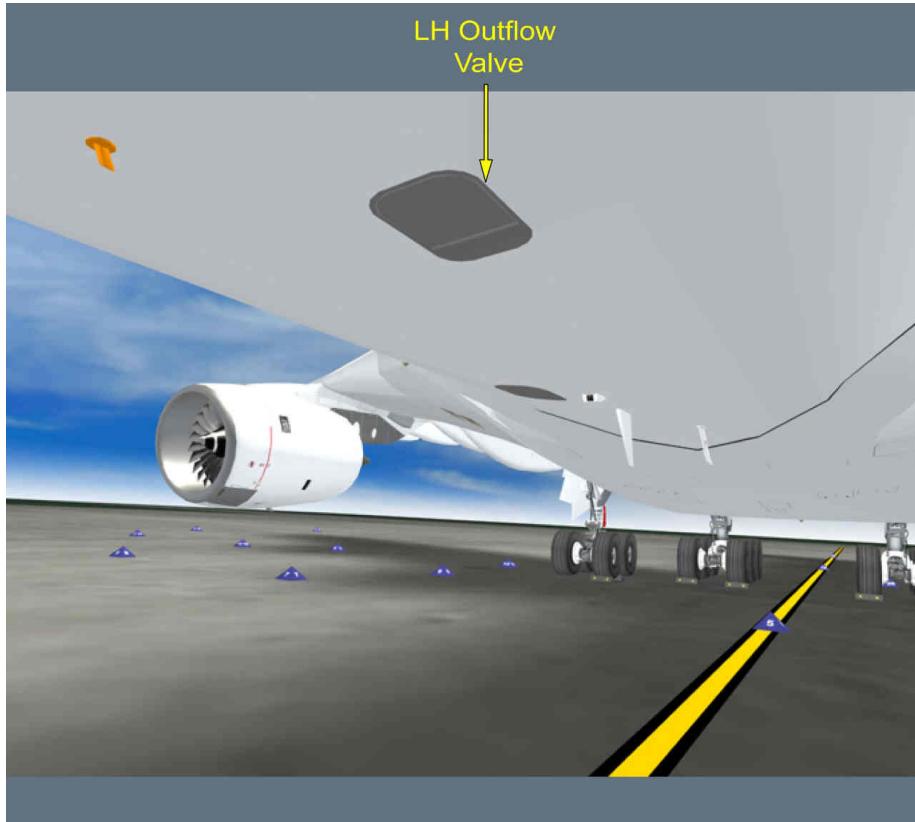


ETACS CAMERA.....CHECK CONDITION

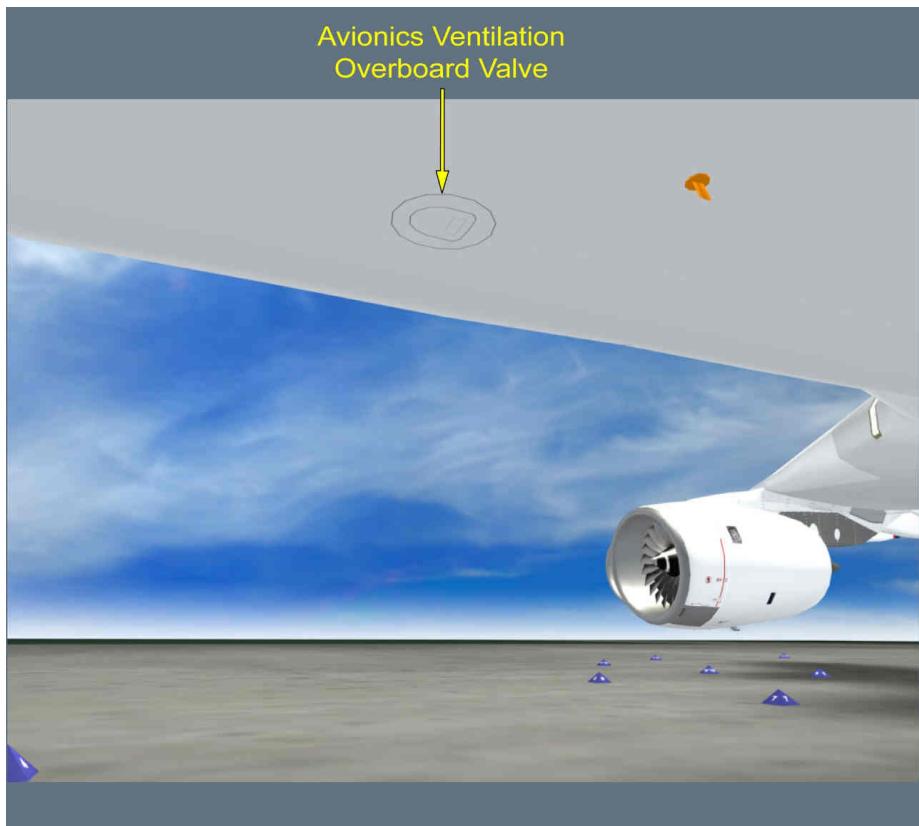
- [2] Check the condition of the ETACS camera, and make sure it is clean and not damaged.



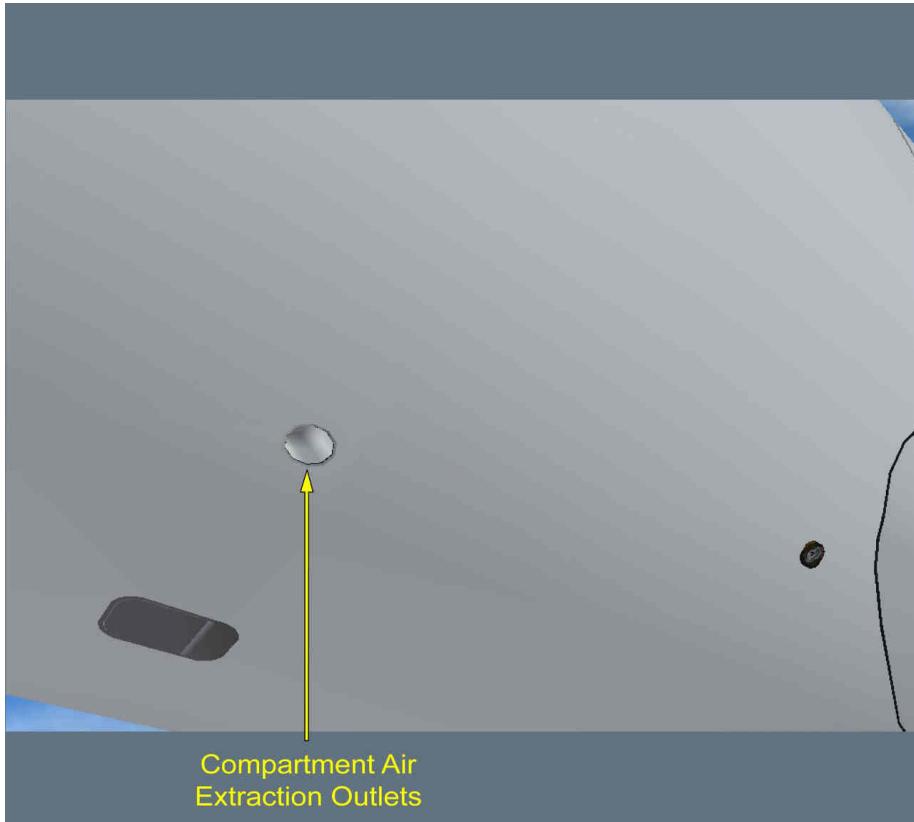
- LH OUTFLOW VALVE.....CHECK CONDITION
 Check the condition of the LH forward outflow valve, and make sure it is clear of obstruction.



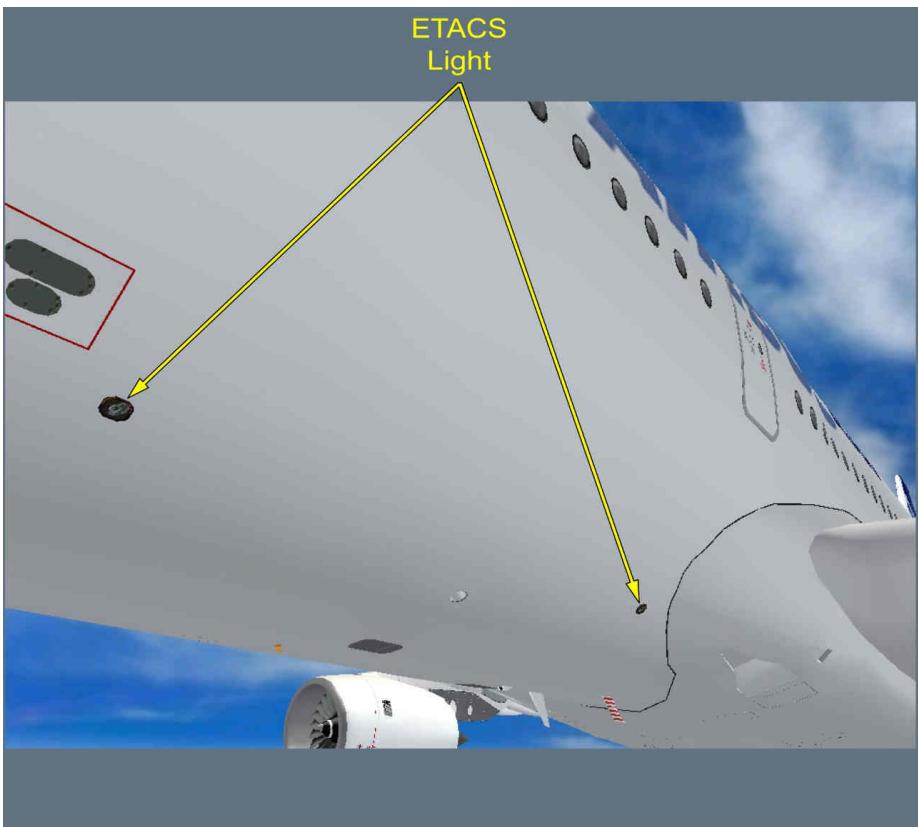
- L1 AVIONICS VENTILATION OVERBOARD VALVE.....CHECK CONDITION
 L2 Check the condition of the avionics ventilation overboard valve.



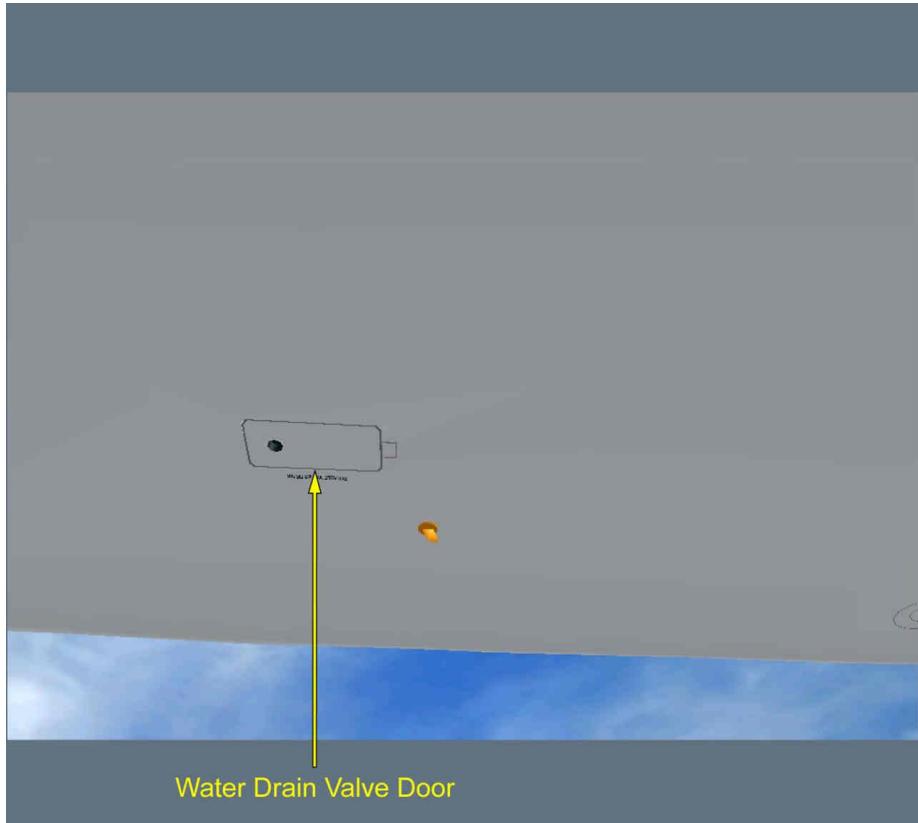
- COMPARTMENT AIR EXTRACTION OUTLETS CHECK CONDITION
 Check that the extraction outlets are clear of obstruction.



- L1 ETACS LIGHT..... CHECK CONDITION
 L2 Check the condition of the LH ETACS light, and make sure it is clean and not damaged.

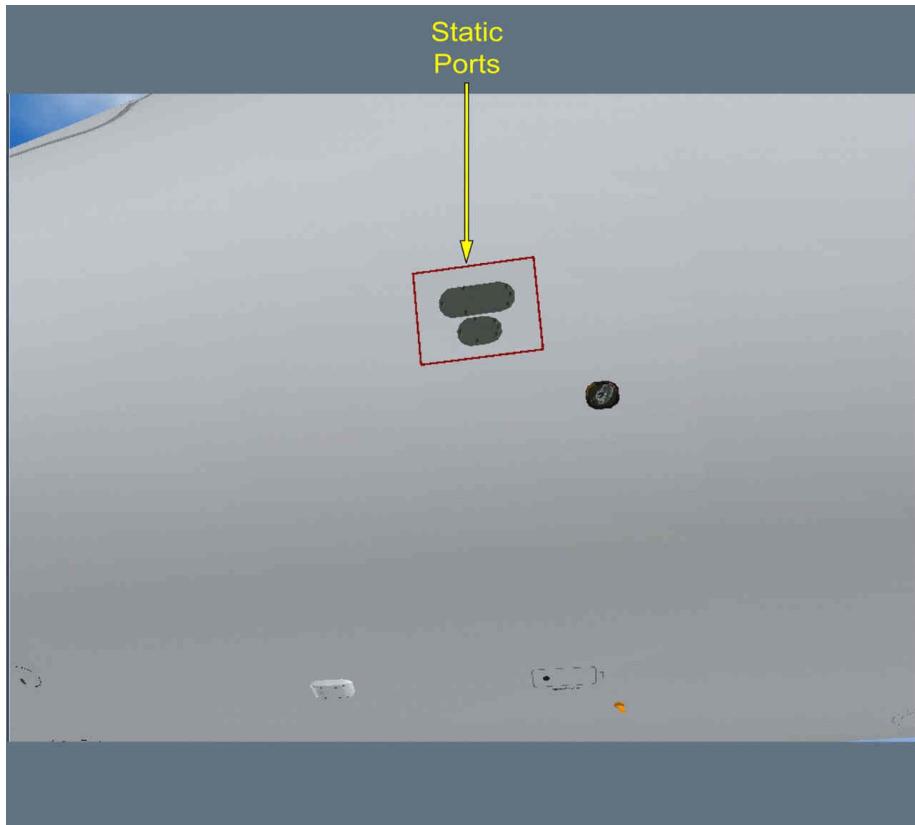


L1 WATER DRAIN VALVE DOOR.....CLOSED



STATIC PORTS.....CLEAR

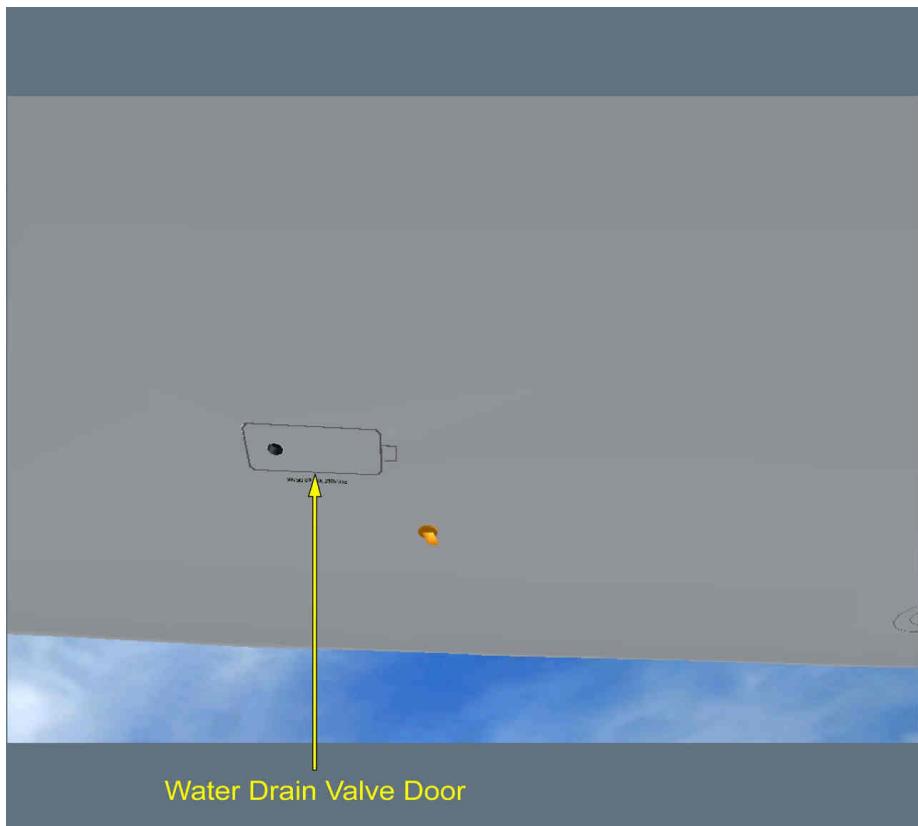
L2 Check that the CAPT, F/O, standby, and backup static ports are clean, and that the protective covers are removed.



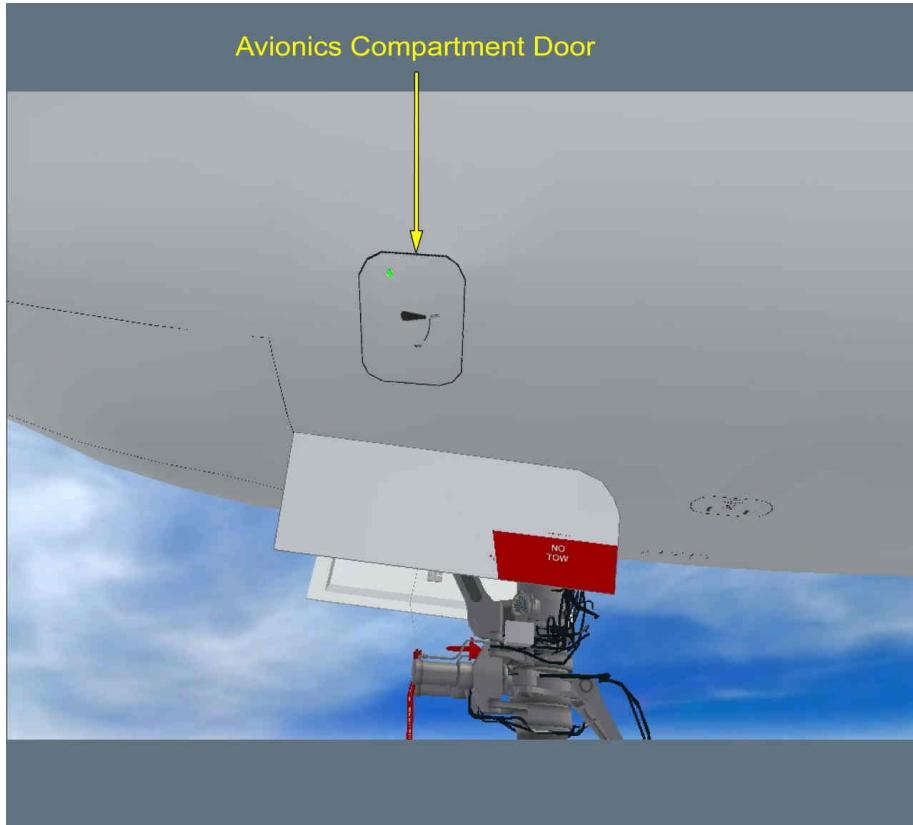
- WING AND ENGINE SCAN LIGHTS..... CHECK CONDITION
- Check the condition of the wing and engine scan lights, and make sure that they are clean and not damaged.

Wing And Engine
Scan Lights

- ANTENNAS**CHECK CONDITION
- While walking around the fuselage, check the condition of the various antennas and make sure that they are not damaged.



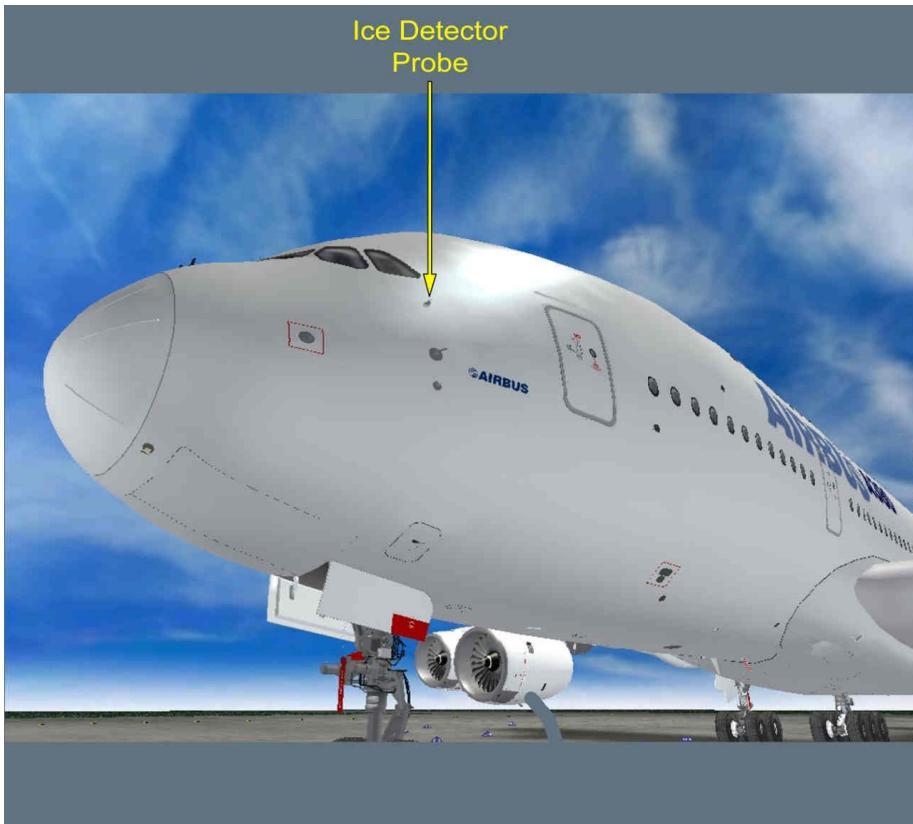
- AVIONICS COMPARTMENT DOOR.....CLOSED
- Check that the avionics compartment door is closed. Check that the visual locking indicator is green.



- L1 * MULTI-FUNCTIONS PROBE (MFP).....CHECK CONDITION
 L2 Check that the CAPT MFP (PITOT / AOA / TAT) is not damaged.

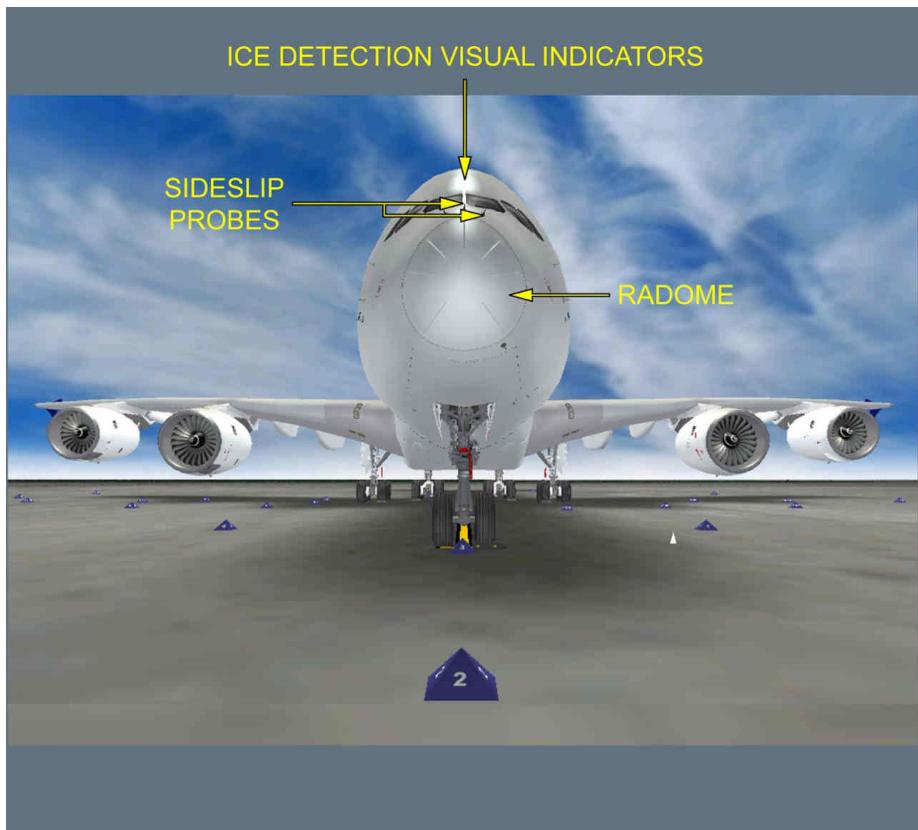
**Multi-Functions Probes
(MFP)**

- ICE DETECTOR PROBE.....CHECK CONDITION
 Check that the ice detector probe is not damaged.



NOSE SECTION

Applicable to: ALL

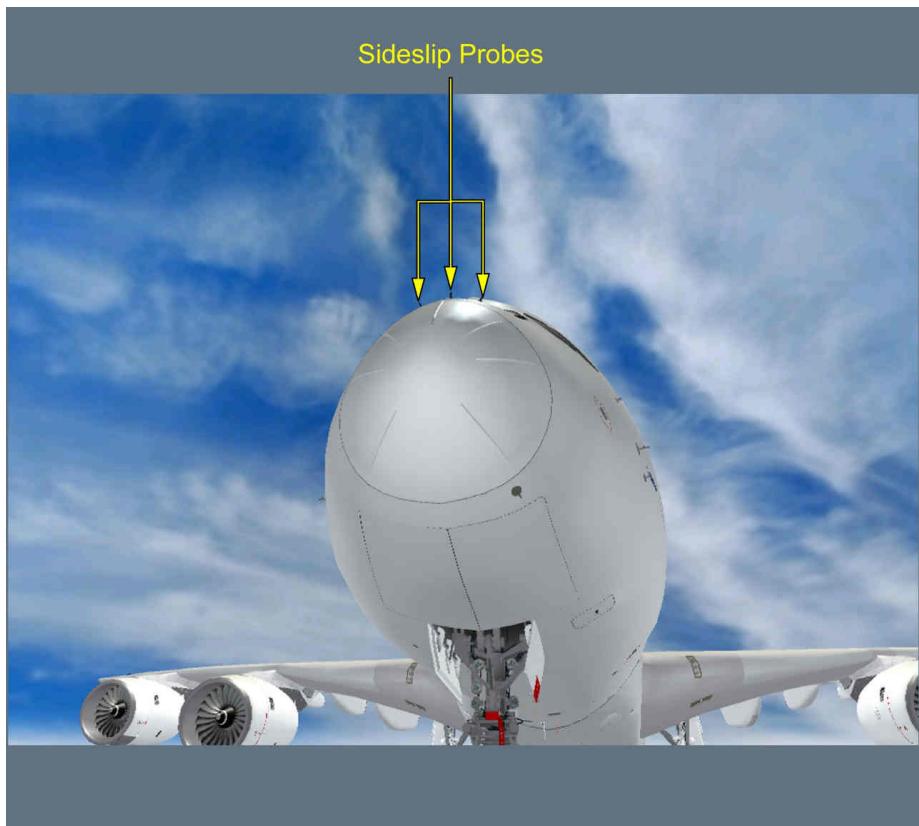


* RADOME.....CHECK CONDITION

- Check the radome for cracks, deformation, or lighting strike.



- L1 SIDESLIP PROBES.....CHECK CONDITION
 L2 Check that the sideslip probes (3) are not damaged.

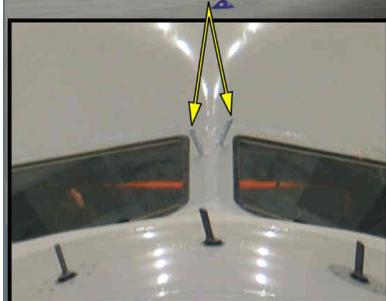


- ICE DETECTION VISUAL INDICATORS (2).....CHECK CONDITION
 Check that the ice detection visual indicators are not damaged.

Ice Detection Visual Indicators



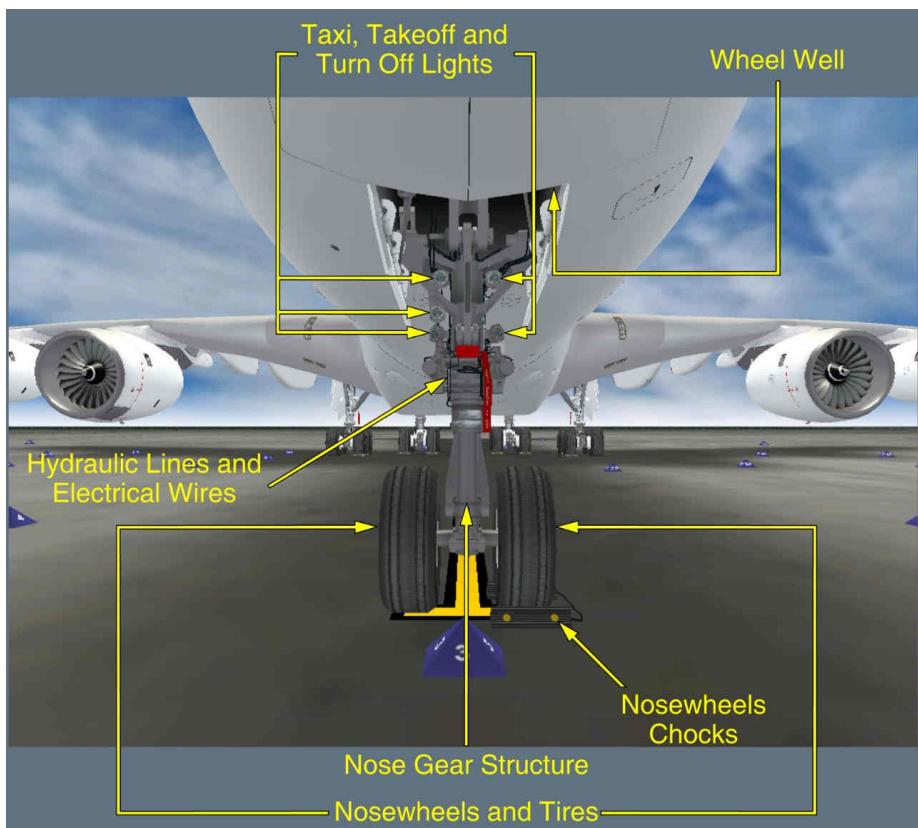
Ice Detection Visual Indicators



2

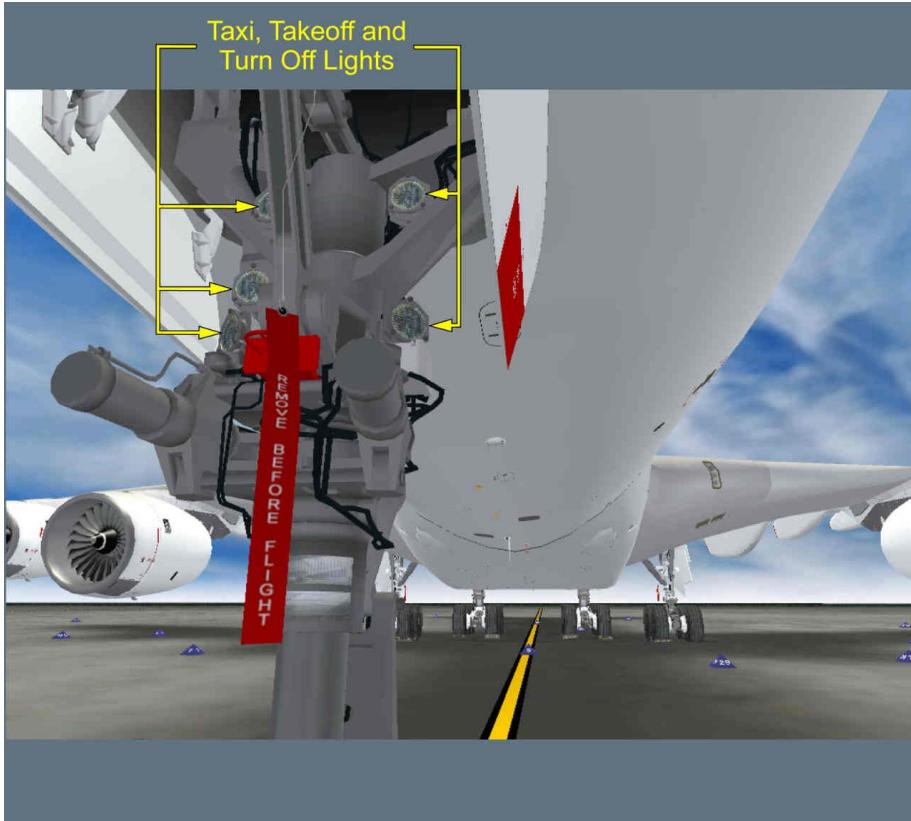
NOSE L/G

Applicable to: ALL

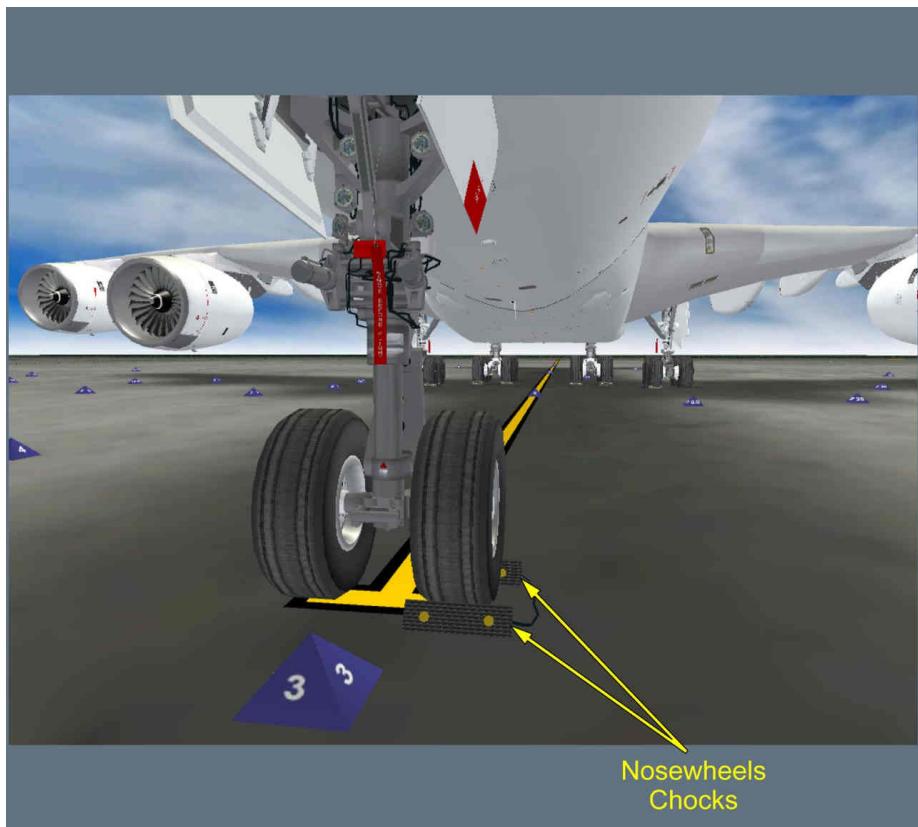


TAXI, TAKEOFF AND TURN OFF LIGHTS..... CHECK CONDITION

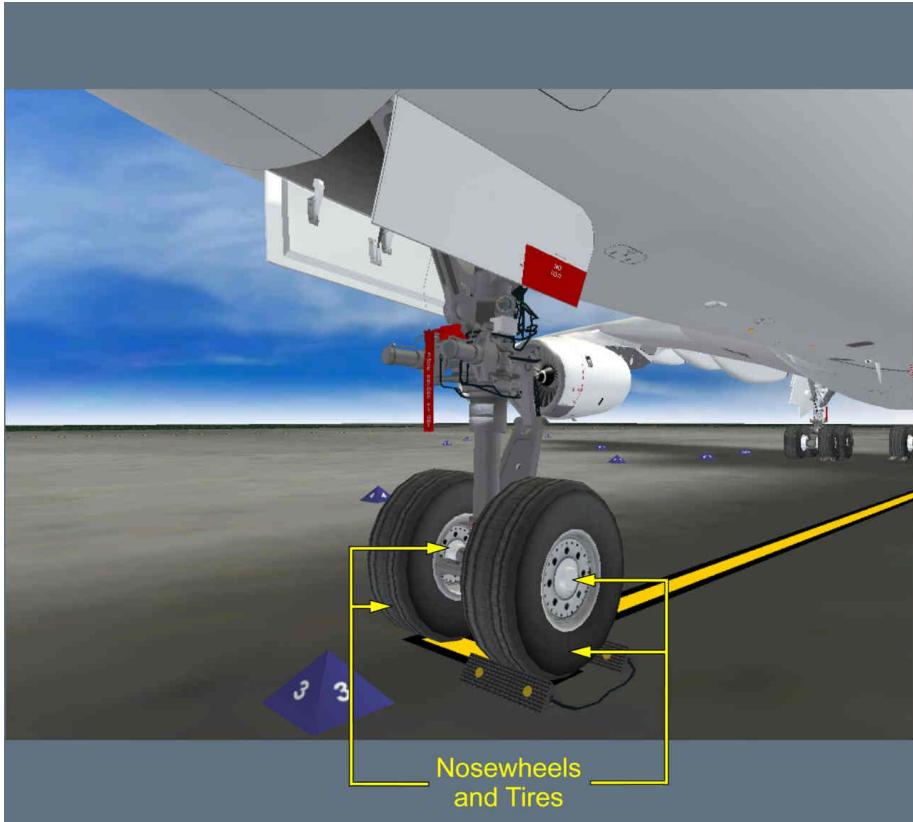
- Check the conditions of the taxi, takeoff and turn off lights, and make sure there are clean and not damaged.



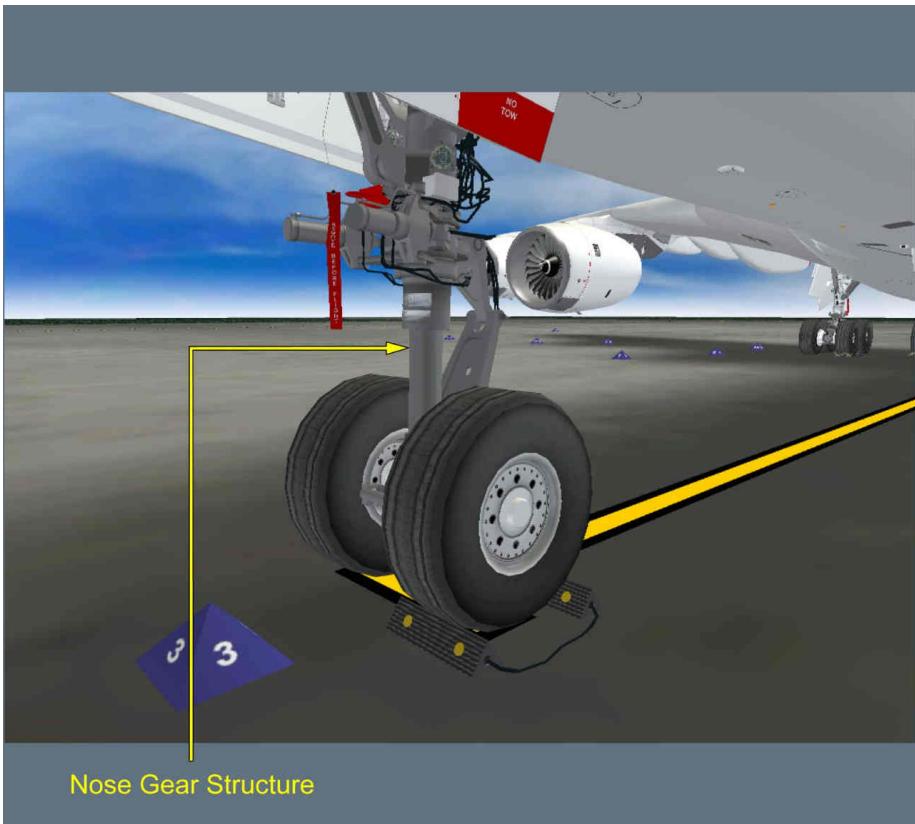
* NOSE WHEEL CHOCKS.....IN PLACE



* NOSEWHEELS AND TIRES.....CHECK CONDITION
 Check the nosewheels and tires for wear, cuts, and cracks.

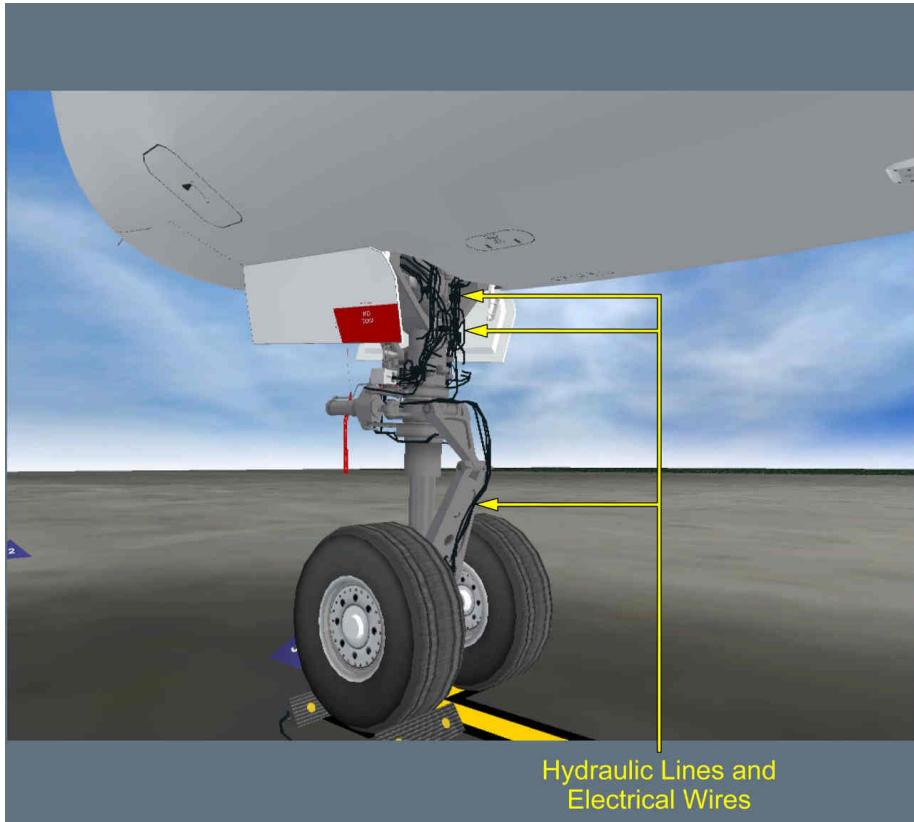


- L1 NOSE GEAR STRUCTURE..... CHECK CONDITION**
 Check the nose gear structure and check that the shock absorber is inflated. A chrome part should be visible.



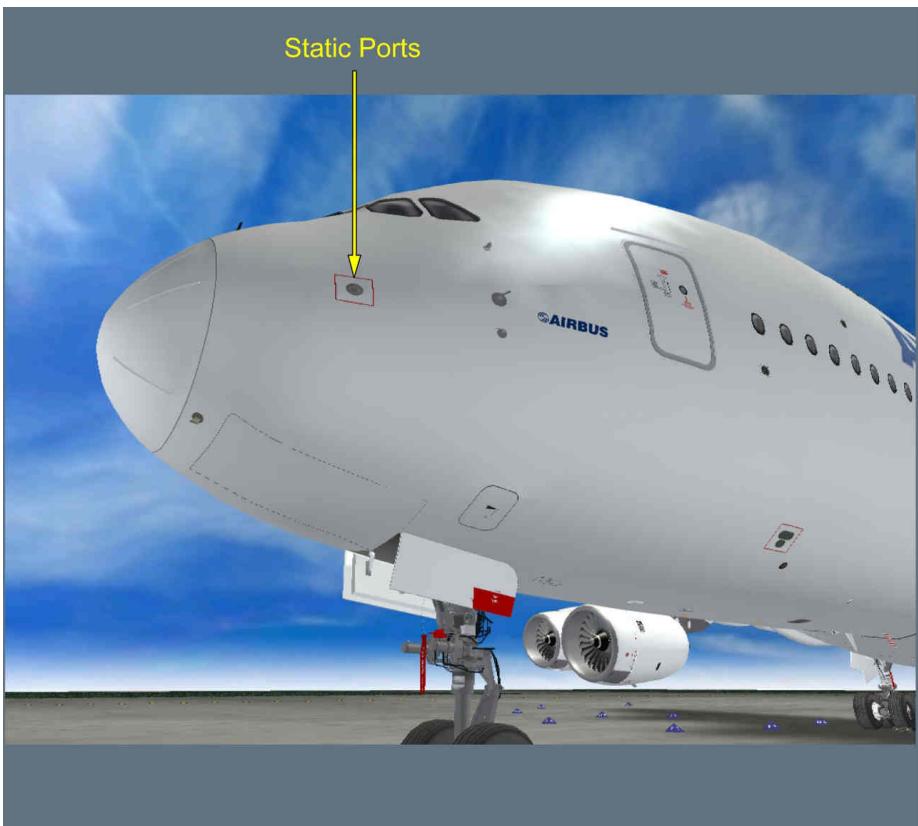
Nose Gear Structure

- HYDRAULIC LINES AND ELECTRICAL WIRES..... CHECK CONDITION
 Check the hydraulic lines for leaks. Check that the electrical wires are not damaged.

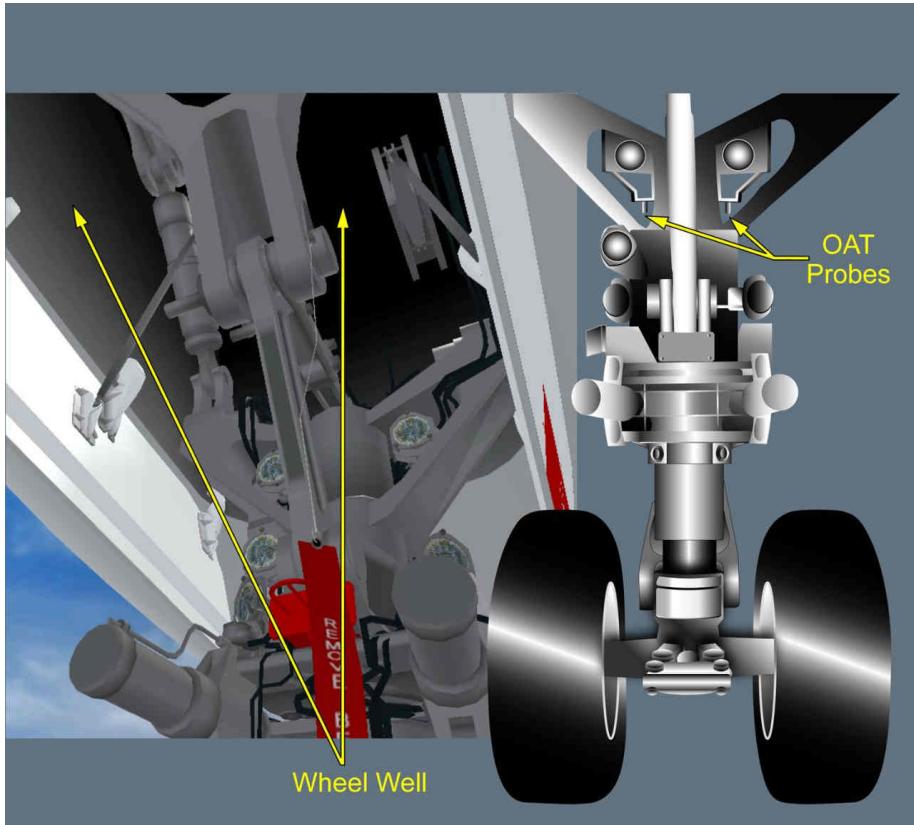


L1 STATIC PORTSCLEAR

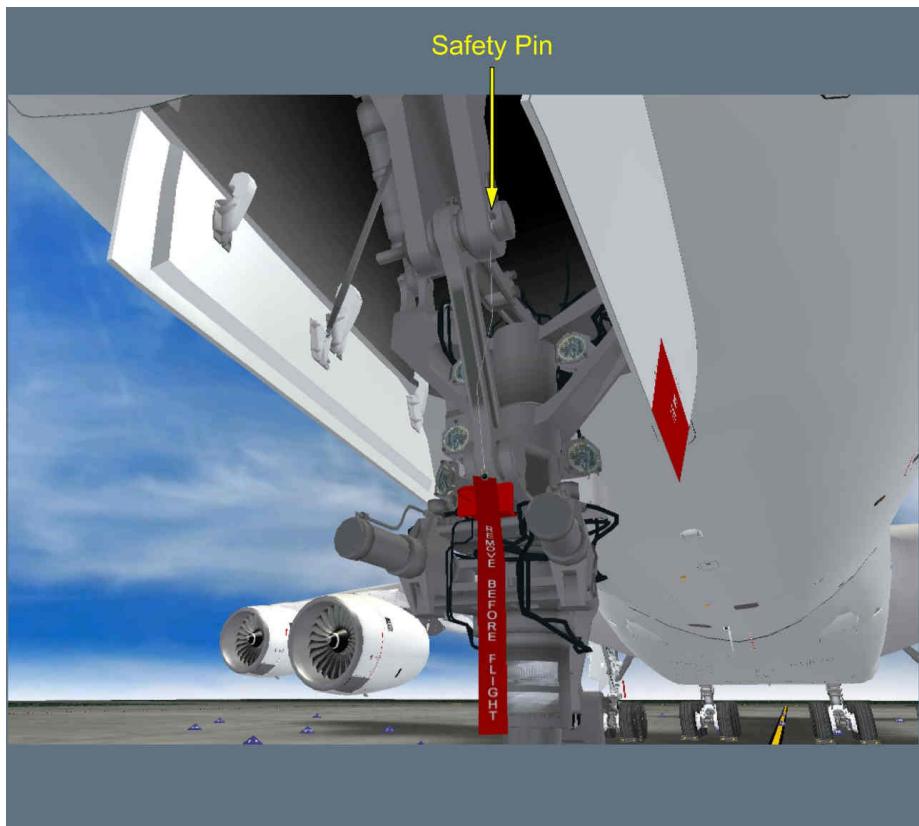
L2 Check that the static ports are clean and that the protective covers are removed.



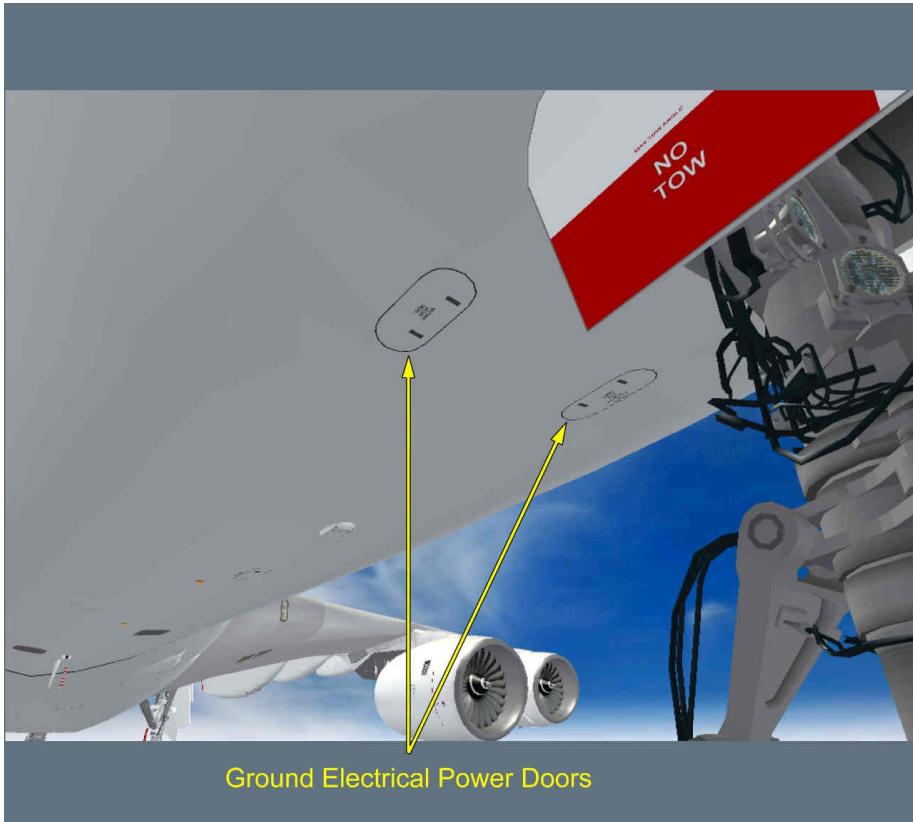
- WHEEL WELL.....CHECK
 Check the wheel well for leaks.



- OAT PROBES**.....CHECK CONDITION
 Check the OAT probes are not damaged.
- SAFETY PIN**.....REMOVED
 Check that the nose wheel safety pin has been removed.

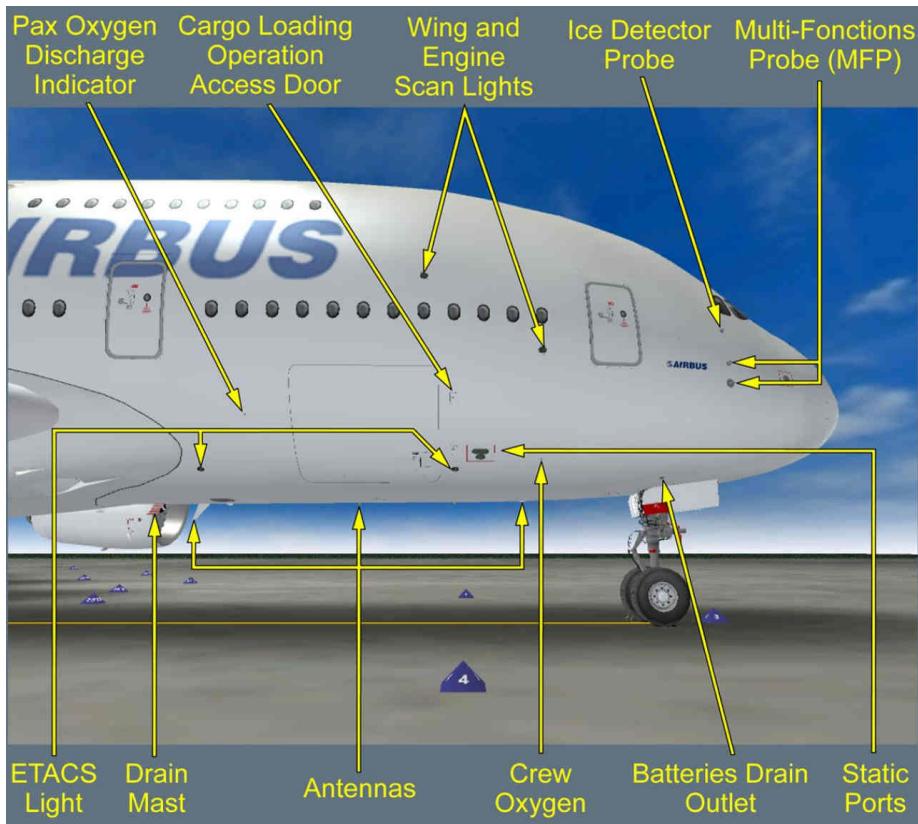


- GROUND ELECTRICAL POWER DOORS (if not required).....CLOSED
- If ground electrical power is required, check that the security strap is tied to prevent the plug from falling. If ground electrical power is not required, check that the door is closed.



RH FWD FUSELAGE

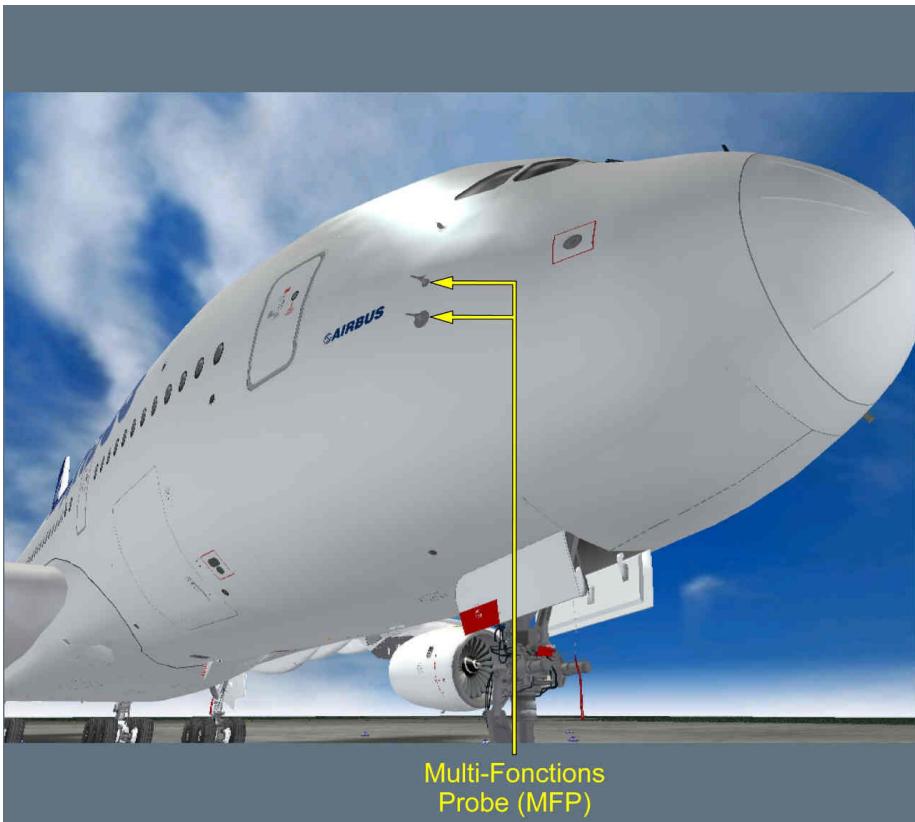
Applicable to: ALL

**CREW OXYGEN DISCHARGE INDICATOR..... GREEN**

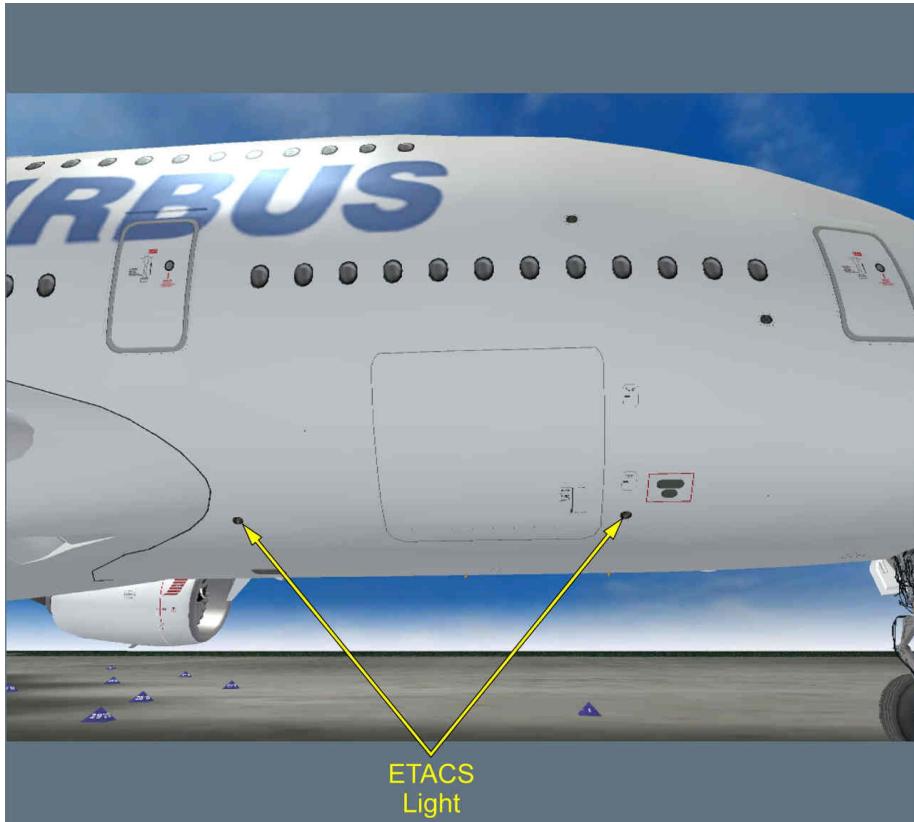
- [2] Check that the green oxygen discharge indicator is in place: In the case of an overpressure in the oxygen system, the disk would be missing.



- [L1] MULTI-FUNCTIONS PROBES (MFP).....CHECK CONDITION
[L2] Check that the F/O and standby MFP (PITOT / AOA / TAT) are not damaged.



- RH ETACS LIGHT CHECK CONDITION
 Check the condition of the RH ETACS light, and make sure it is clean and not damaged.

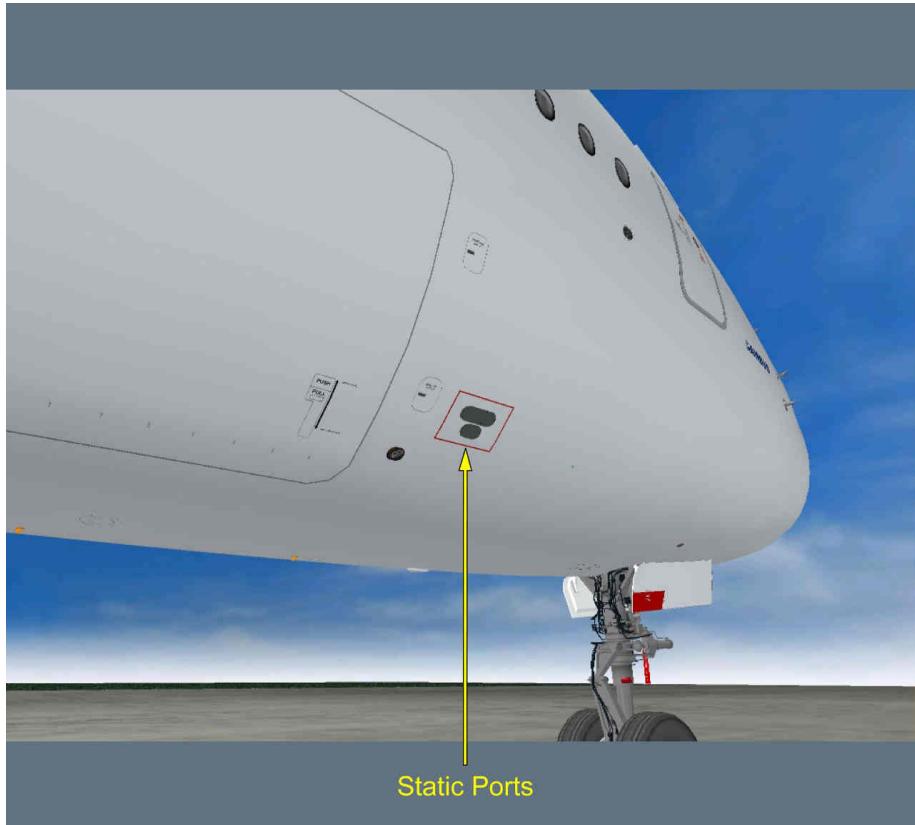


L1 ICE DETECTOR PROBECHECK CONDITION

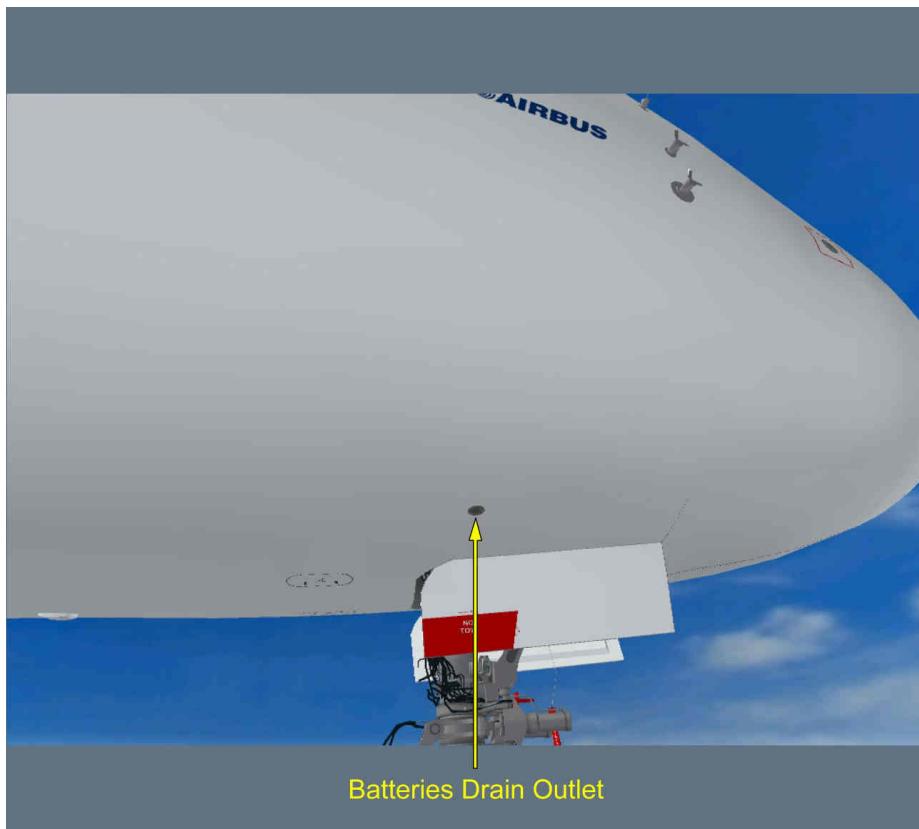
L2 Check that the ice detector probe is not damaged.



- STATIC PORTS.....CLEAR
- Check that the CAPT, F/O standby static ports are clean and that the protective covers have been removed.



- L1 BATTERIES DRAIN OUTLET.....CHECK CONDITION
 L2 Check that there is no leak from the batteries drain outlet.



- CARGO LOADING OPERATION ACCESS DOOR.....CLOSED
- Check that the cargo loading operation access door is closed.

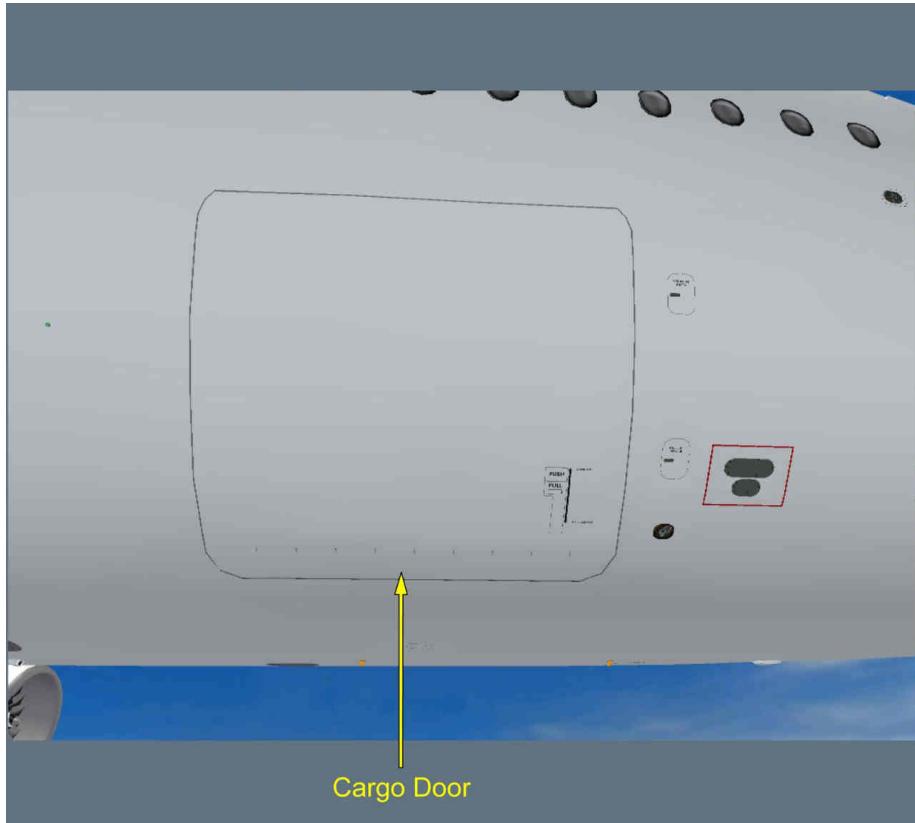
Cargo Loading Operation Access Door



- L1 CARGO DOOR OPERATION ACCESS DOOR.....CLOSED
 L2 Check that the cargo door operation access door is closed.

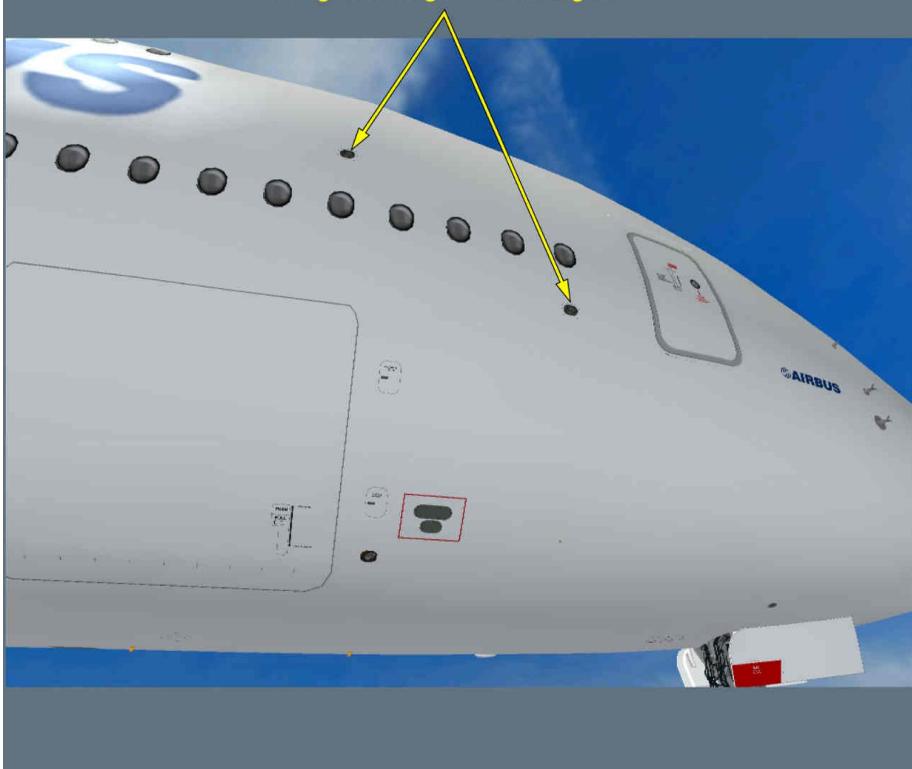


- CARGO DOOR.....CLOSED
- Check that the cargo door is closed: The cargo door is correctly closed when there are no red indicator flags visible.

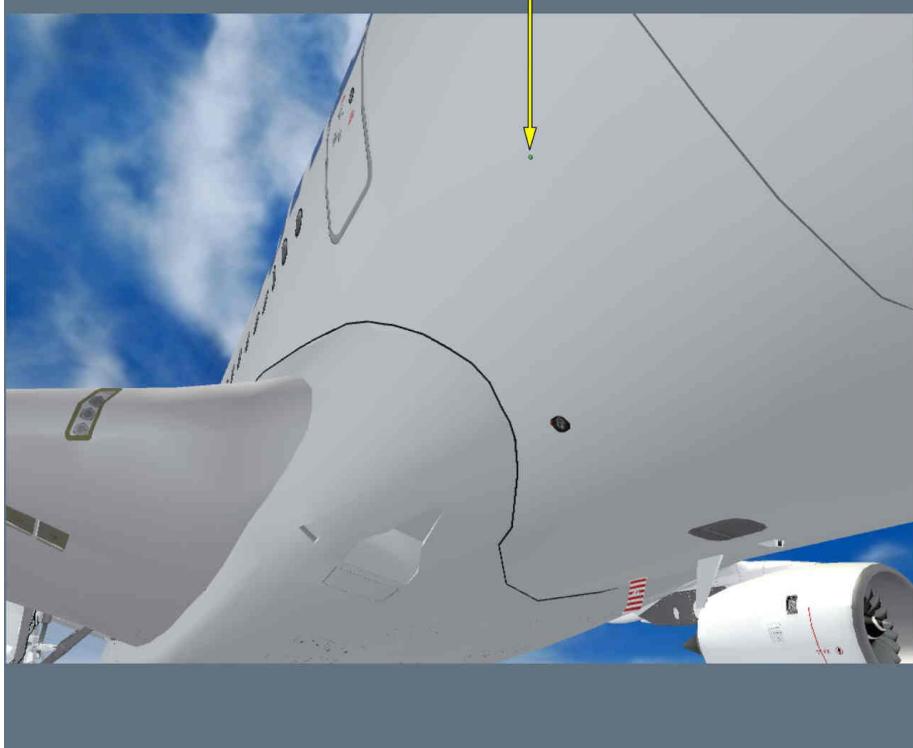


- 1 WING AND ENGINE SCAN LIGHTS..... CHECK CONDITION
- 2 Check the conditions of the wing and engine scan lights, and make sure they are clean and not damaged.

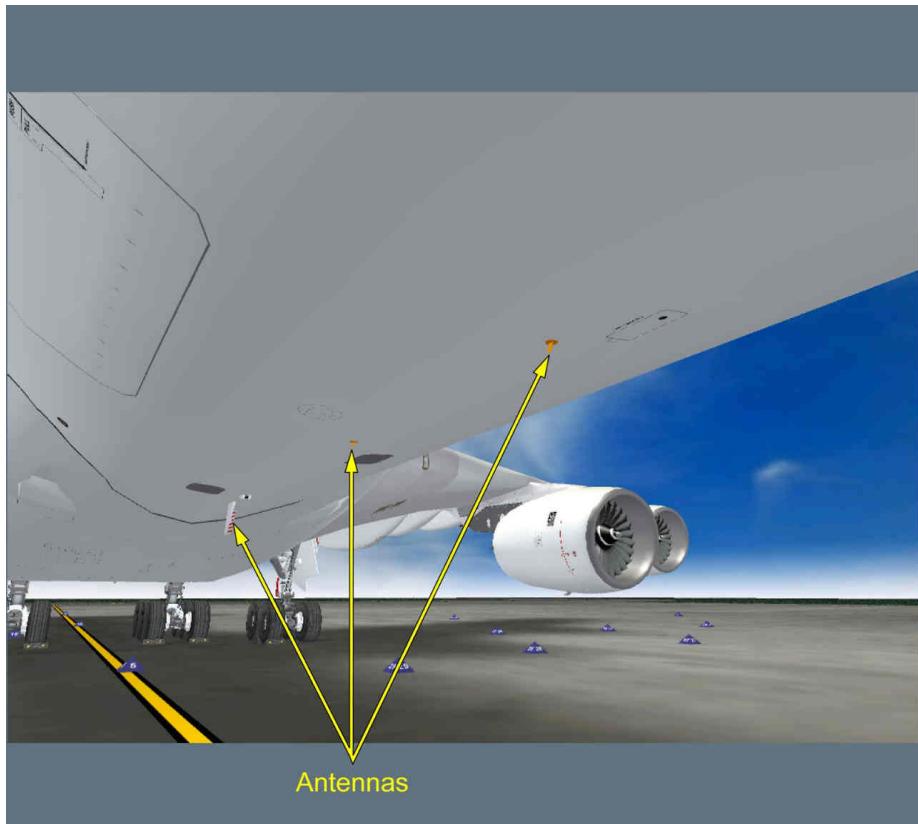
Wing and Engine Scan Lights



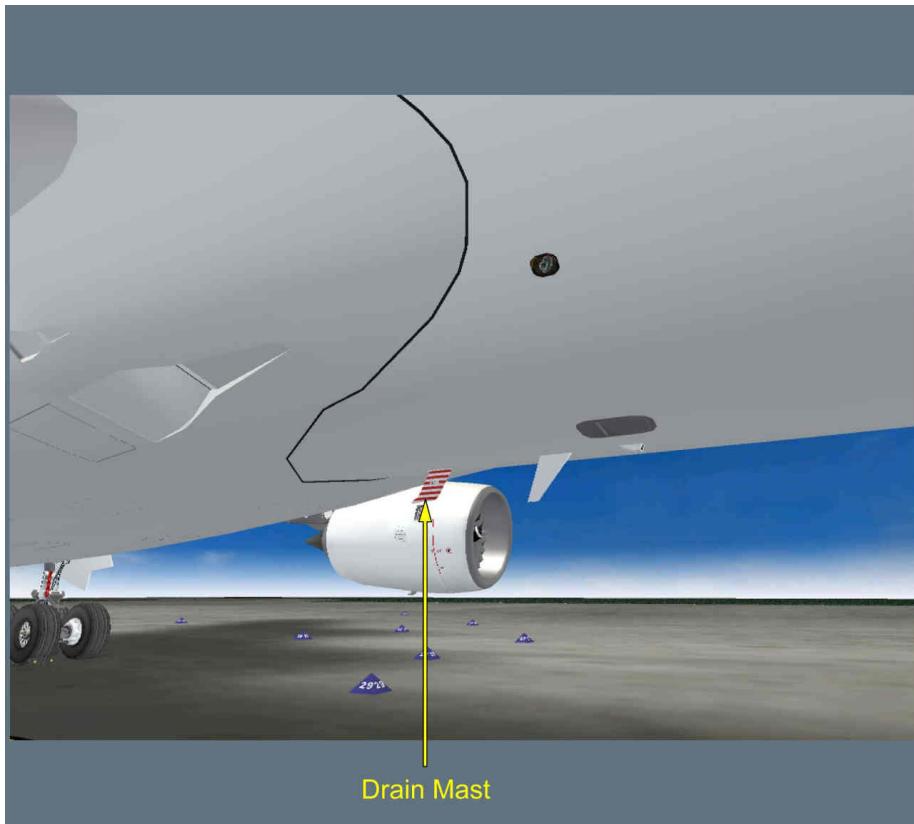
- PAX OXYGEN DISCHARGE INDICATOR..... GREEN
- Check that the green oxygen discharge indicator is in place. In case of an overpressure in the oxygen system, the disk would be missing.

Pax Oxygen Discharge Indicator

- ANTENNAS.....CHECK CONDITION**
- While walking around the fuselage, check the condition of the various antennas and make sure that they are not damaged.

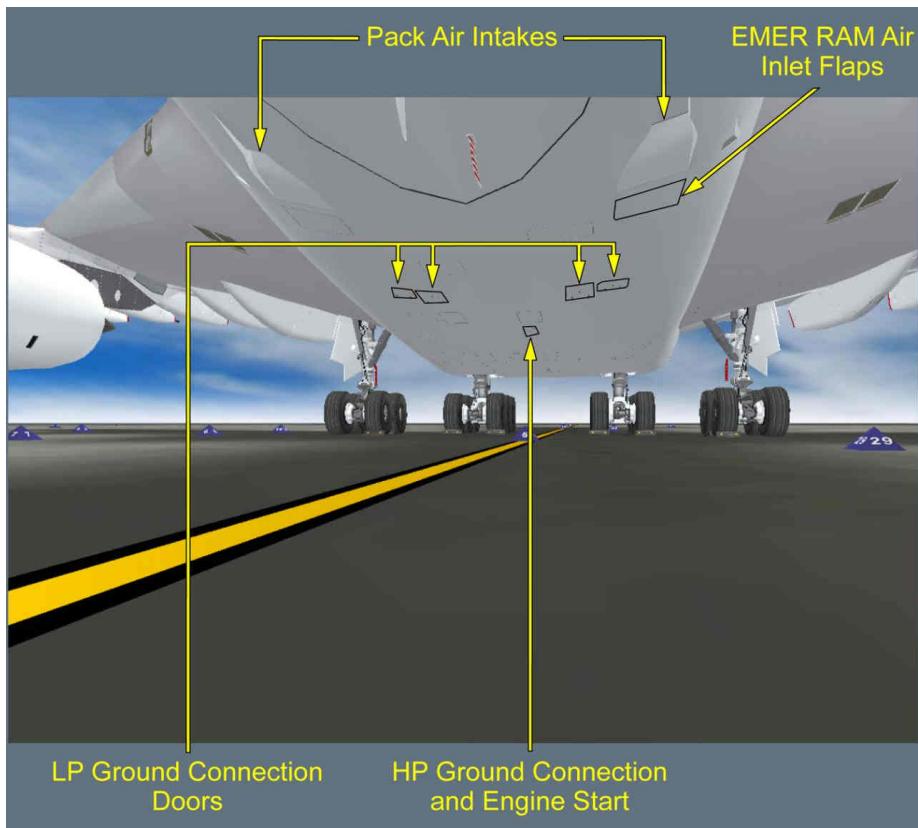


- DRAIN MAST.....CHECK CONDITION
 While walking around along the fuselage, check the condition of the drain mast.



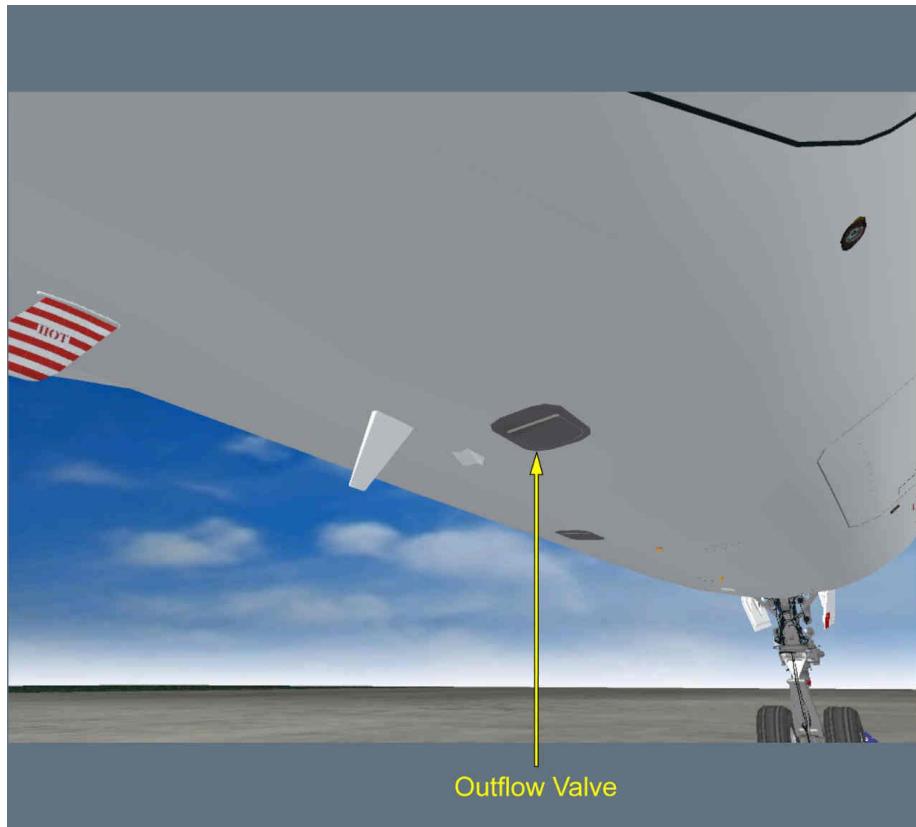
LOWER CENTER FUSELAGE

Applicable to: ALL

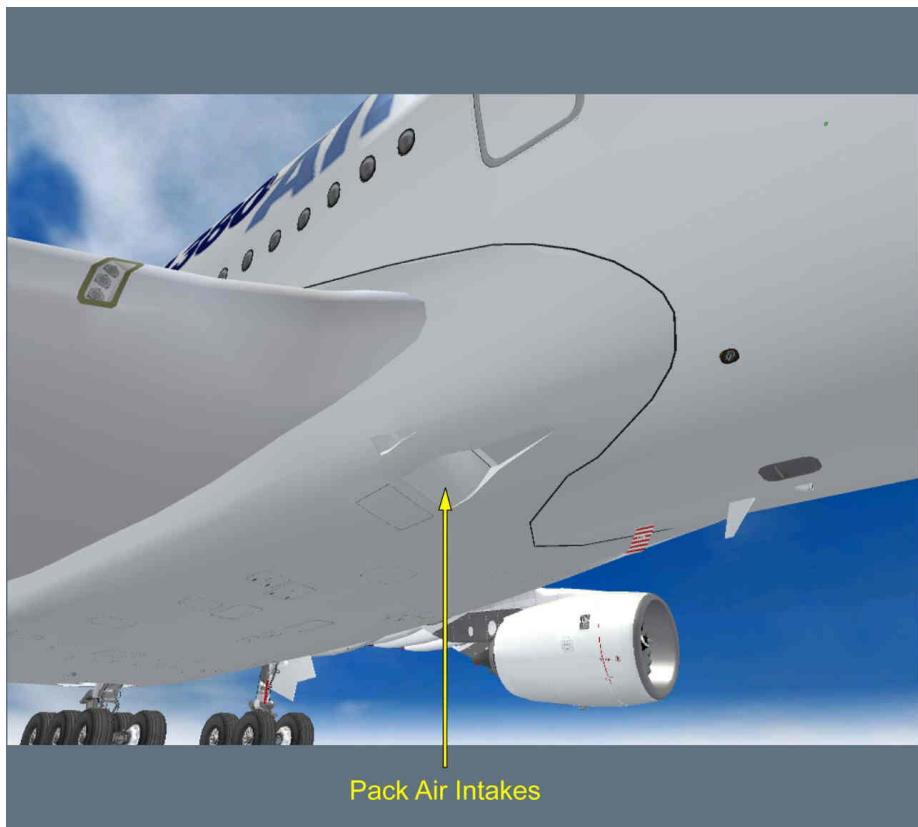


RH OUTFLOW VALVE.....CHECK CONDITION

- Check the RH outflow valve, and make sure it is clear of obstruction.



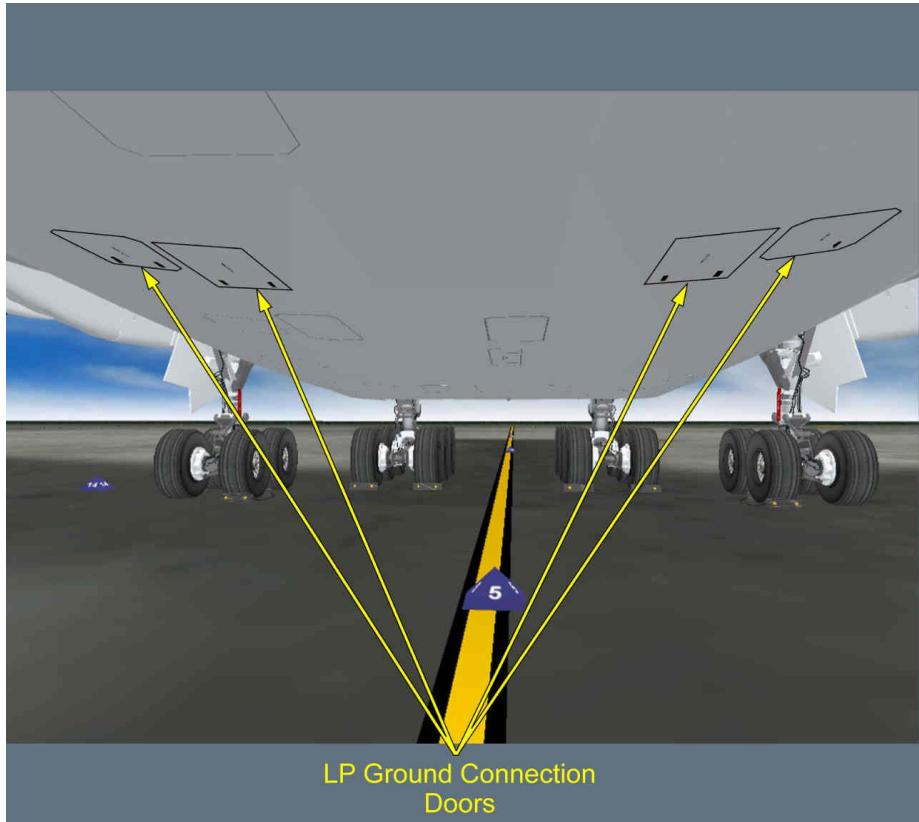
- L1 PACK AIR INTAKES.....CLEAR
 L2 Check that the pack air intakes are clear of obstruction.



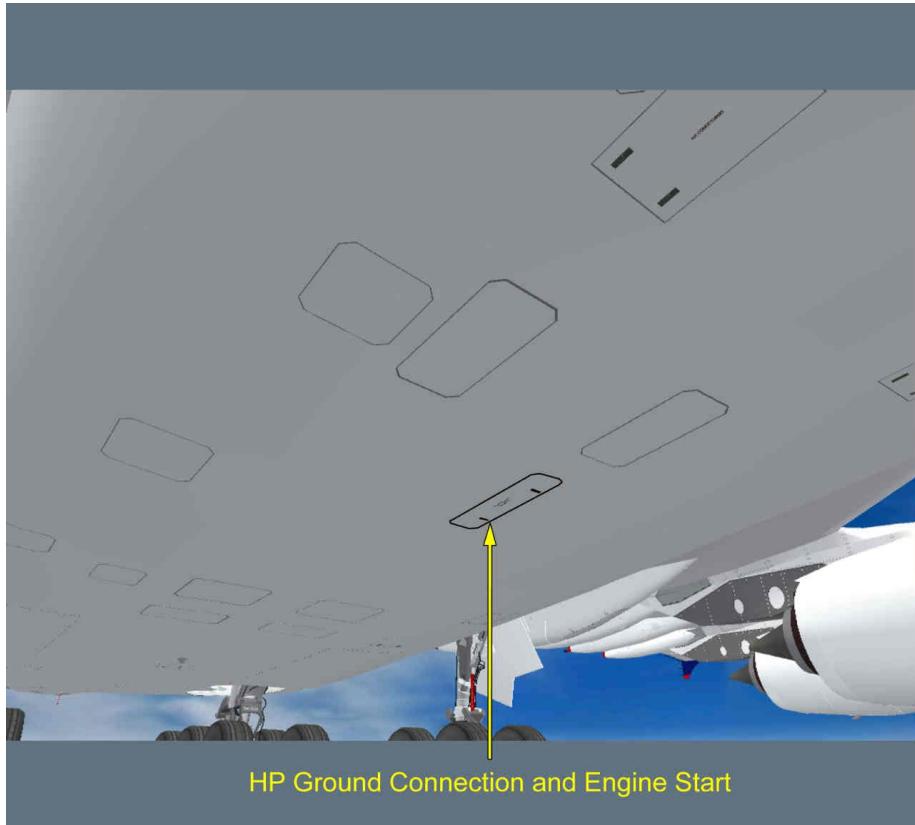
- EMER RAM AIR INLET FLAPS.....CHECK CONDITION
 Check the emergency RAM air inlet flaps (2) condition and check that they are closed.



- L1 LP GROUND CONNECTION DOORS (4).....CLOSED
 L2 Check that the LP ground connection doors are closed if not in use.



- HP GROUND CONNECTION AND ENGINE START.....CLOSED
- Check that the HP ground connection and engine start door is closed.

**HP Ground Connection and Engine Start**

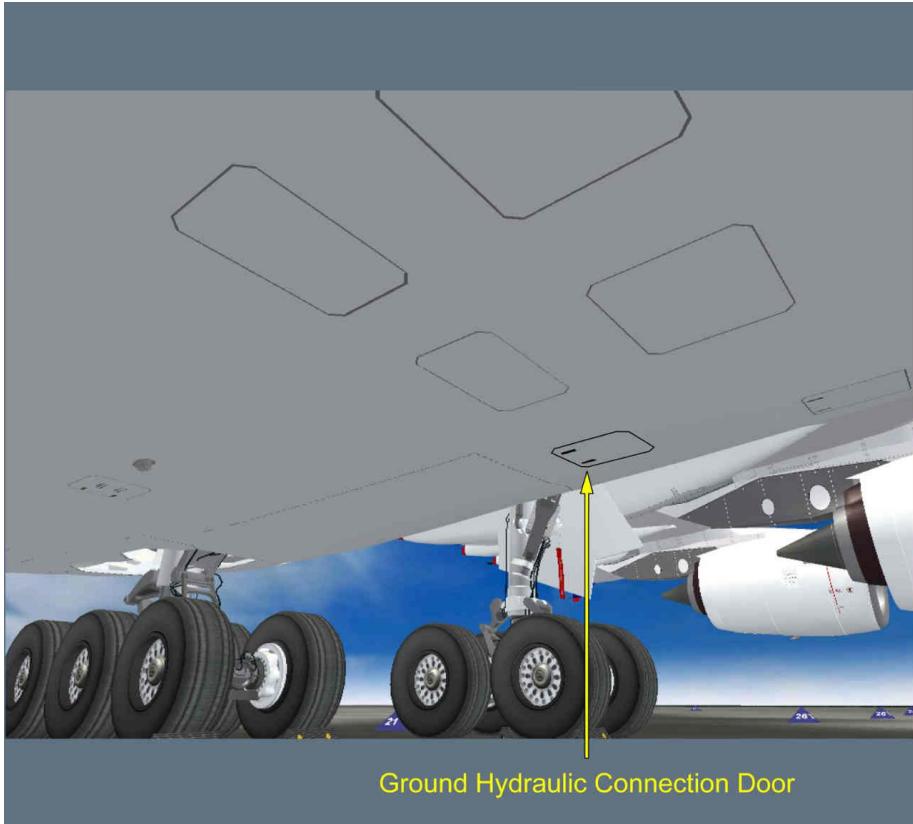
L AND R WING L/G GROUND OPENING HANDLE ACCESS DOOR.....CLOSED

Check that the access door of the left and right wing L/G ground opening handle is closed.



L and R Wing L/G Ground
Opening Access Door

- GROUND HYDRAULIC CONNECTION DOOR.....CLOSED
- Check that the ground hydraulic connection door is closed.



- L1 ANTICOLLISION LIGHT CHECK CONDITION
 L2 Check the anticollision light for condition, and make sure it is clean and not damaged.



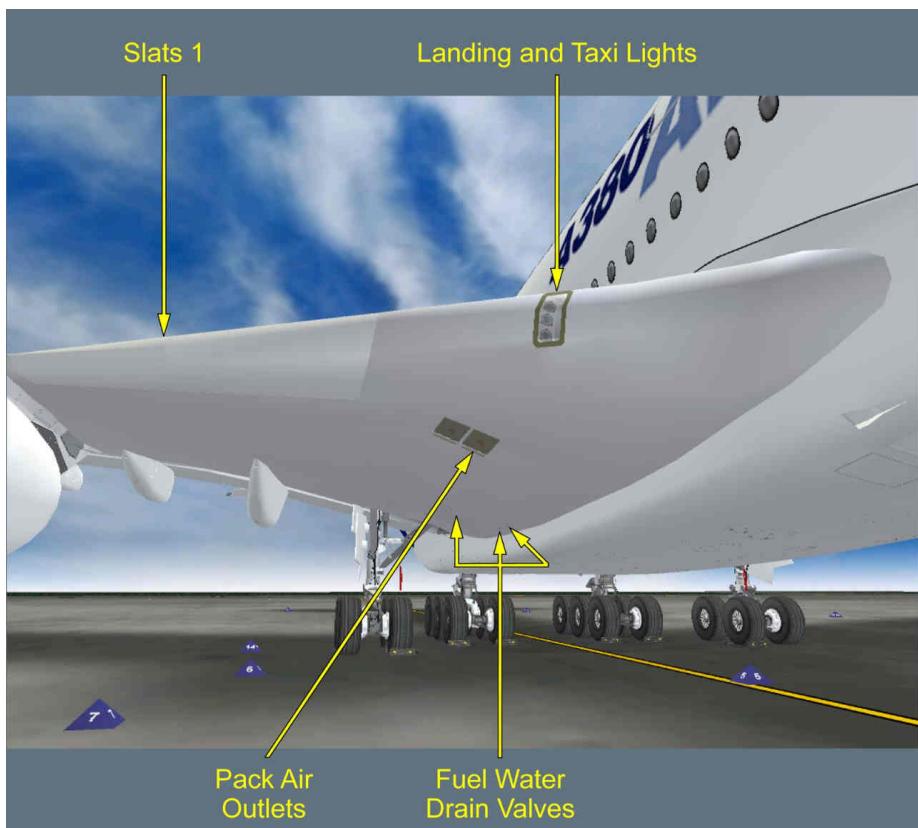
- L AND R BODY L/G GROUND OPENING HANDLE ACCESS DOOR.....CLOSED
- Check that the access door of the left and right body L/G ground opening handle is closed.



L and R Body L/G Ground
Opening Handle Access Door

RH CENTER WING

Applicable to: ALL

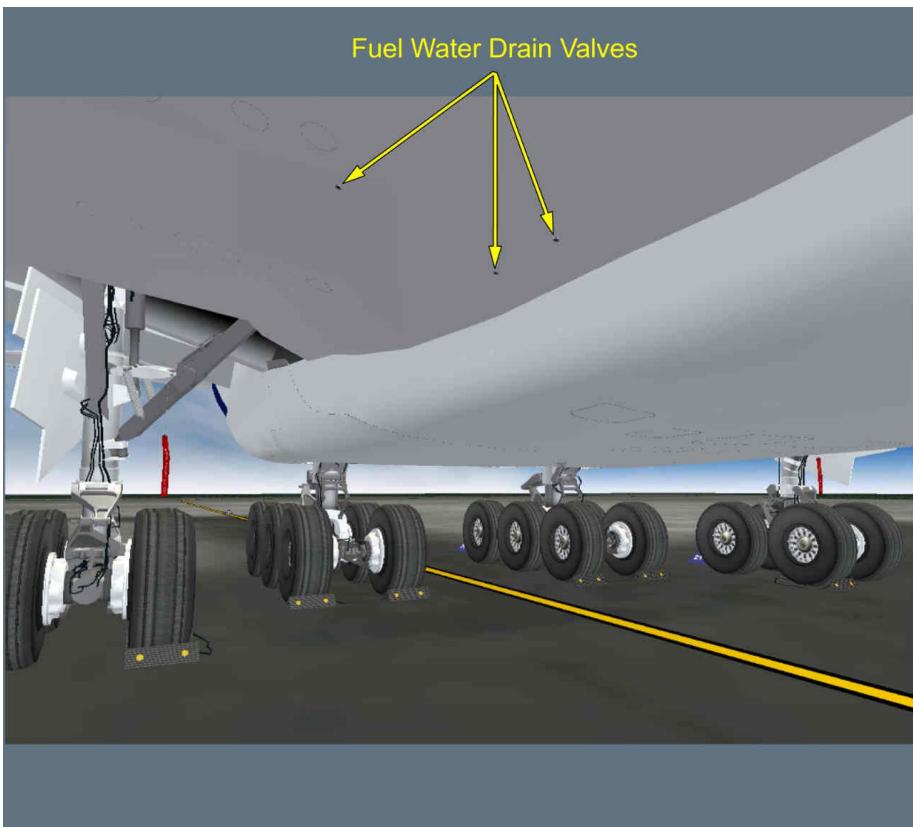


PACK AIR OUTLETS (2).....CHECK CONDITION

- Check that the pack air outlets (2) are clear of obstruction.



FUEL WATER DRAIN VALVES..... NO LEAK

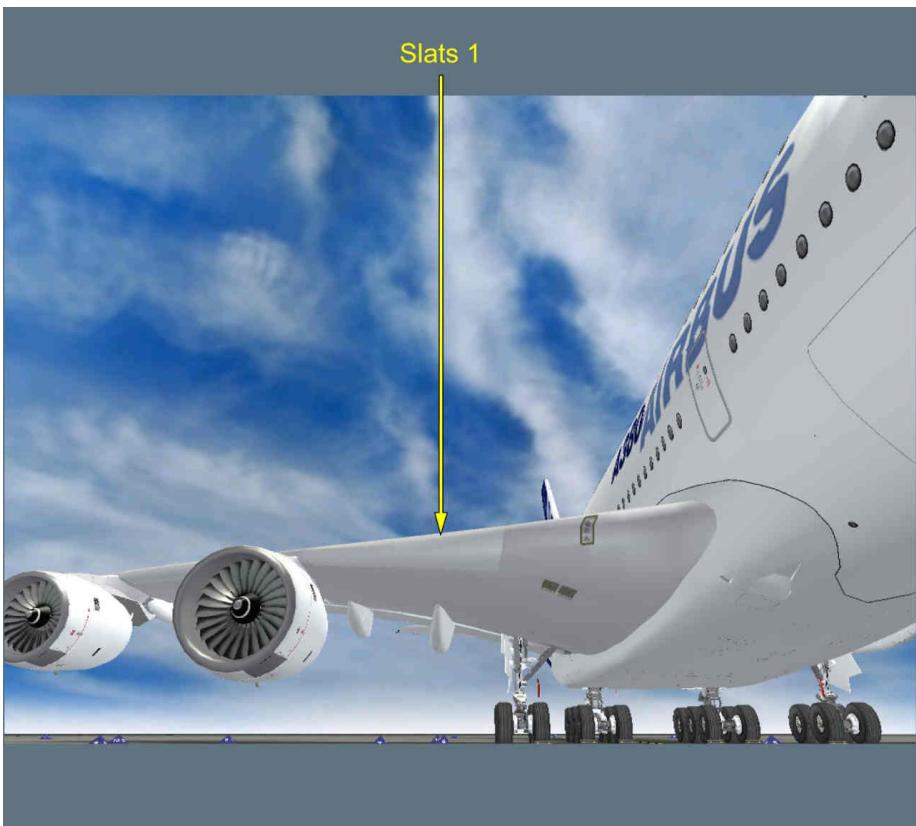


LANDING AND TAXI LIGHTS..... CHECK CONDITION

Check the condition of the landing and taxi lights, and make sure that the protective cover is not damaged.

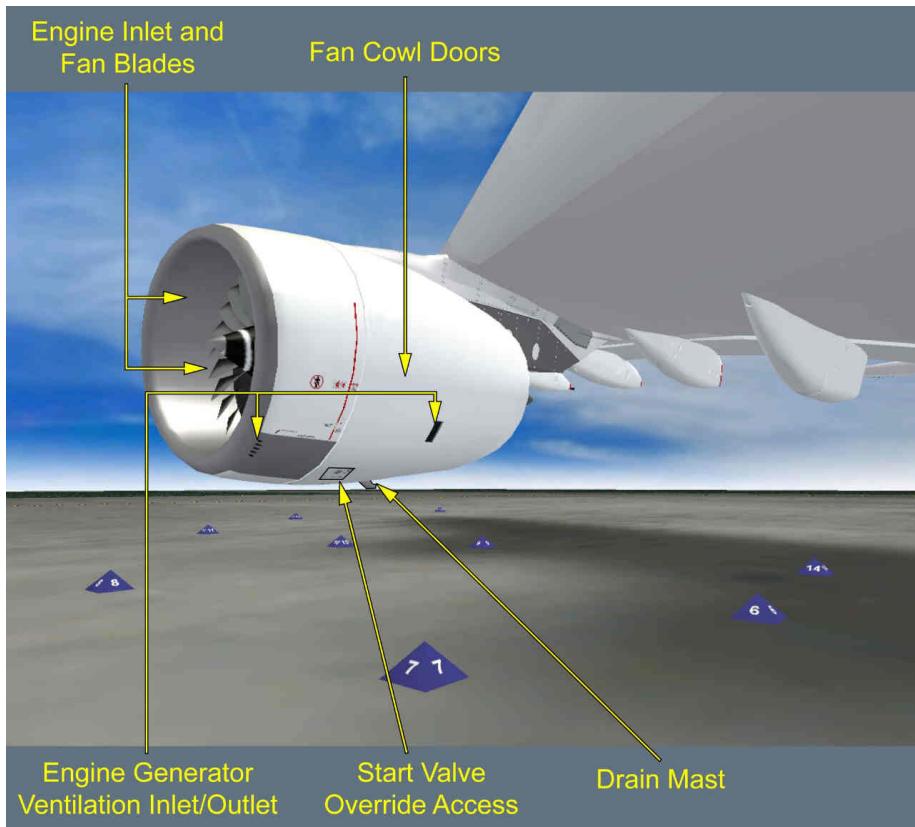


- * SLAT 1.....CHECK CONDITION AND POSITION
 Check that the slat 1 is not damaged, and check that its position is in accordance with the slat/flap lever position.

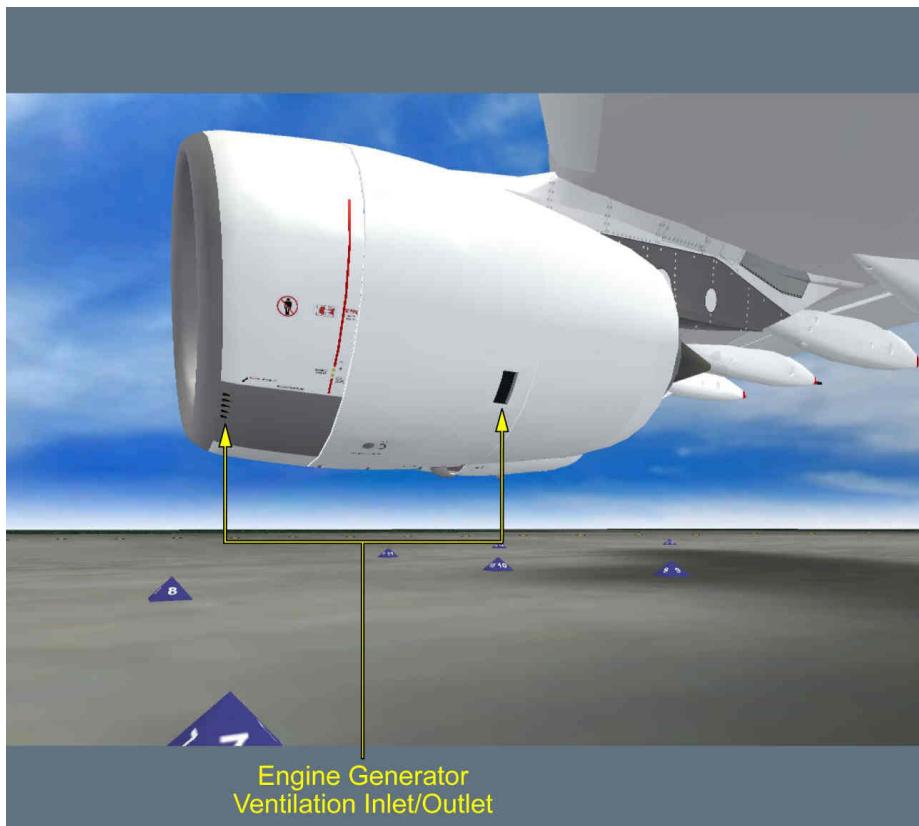


ENG 3 LH SIDE

Applicable to: ALL

**ENGINE GENERATOR VENTILATION INLET/OUTLET.....CHECK CONDITION**

- Check that the engine generator ventilation inlet/outlet is clear of obstruction.



L1 START VALVE OVERRIDE ACCESS.....CLOSED



* DRAIN MAST.....CHECK CONDITION/NO LEAK

L2 Under the engine, check the condition of the drain mast, and make sure that there are no leaks.

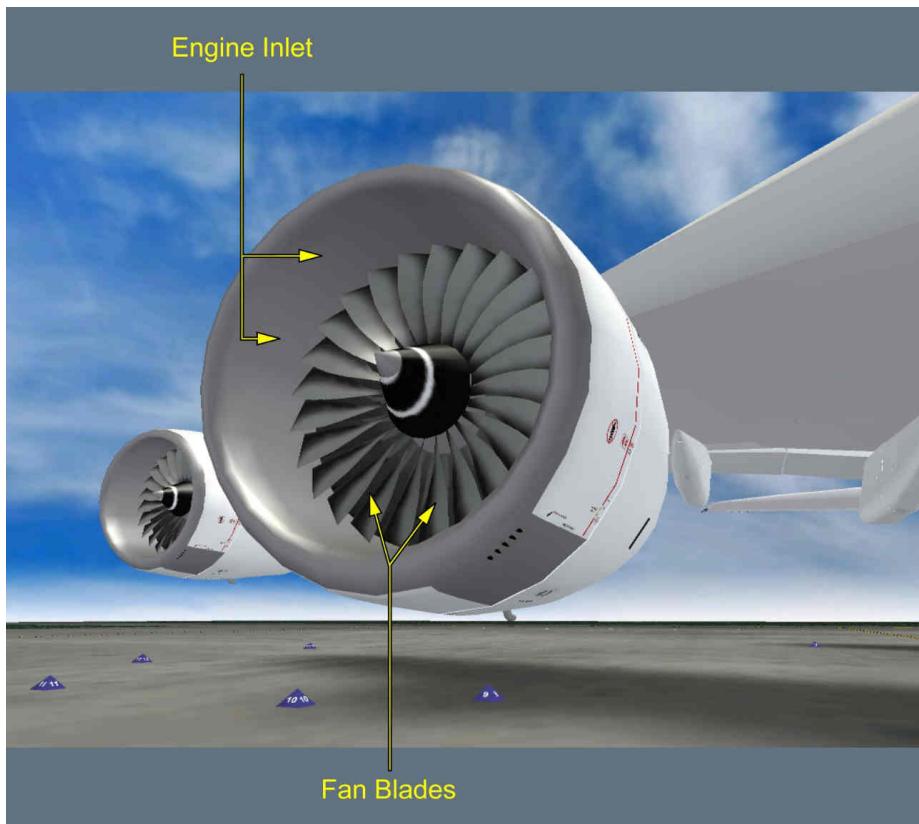


* FAN COWL DOORS.....CLOSED AND LATCHED



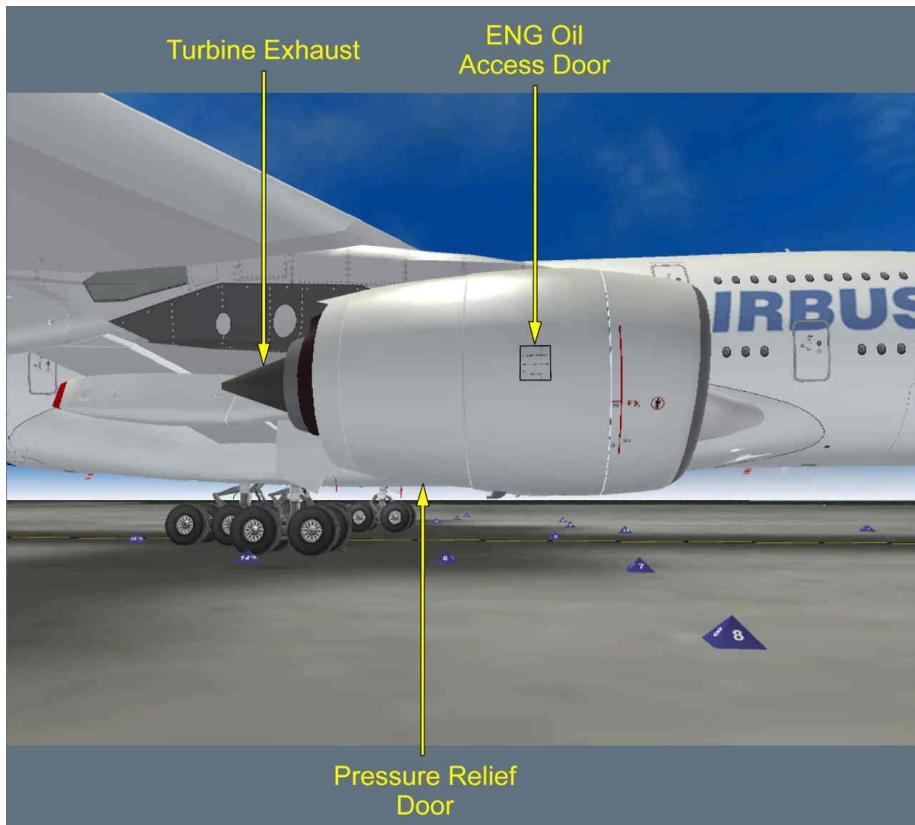
* ENGINE INLET AND FAN BLADES.....CHECK CONDITION

Check the engine inlet and the fan blades for any significant dents, bending, or damage.

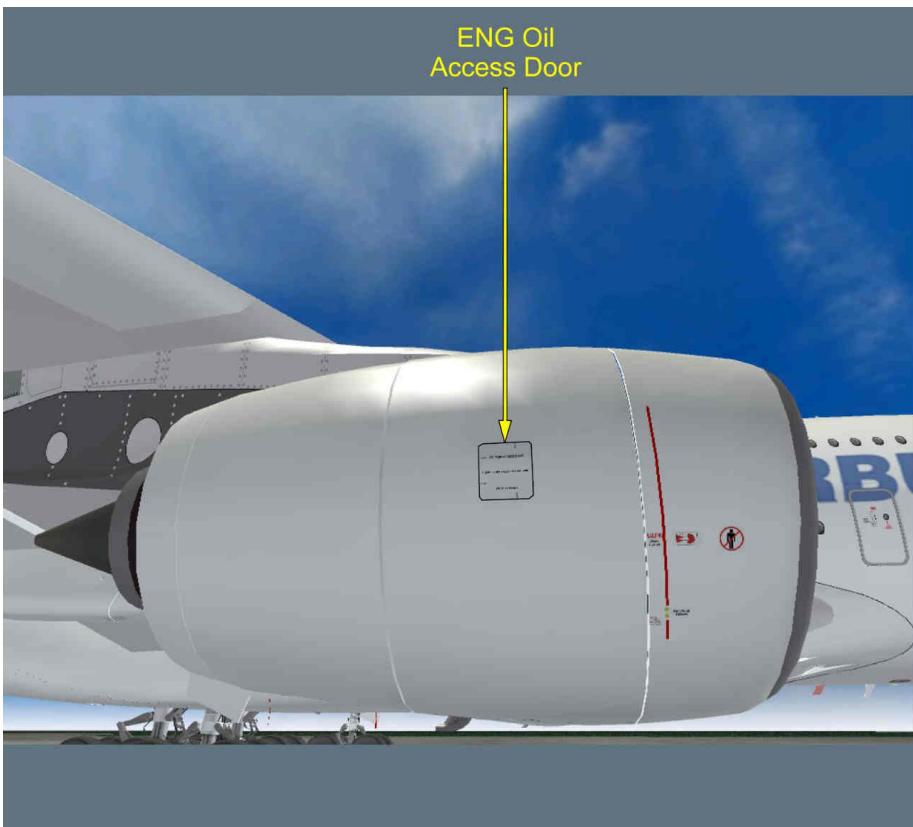


ENG 3 RH SIDE

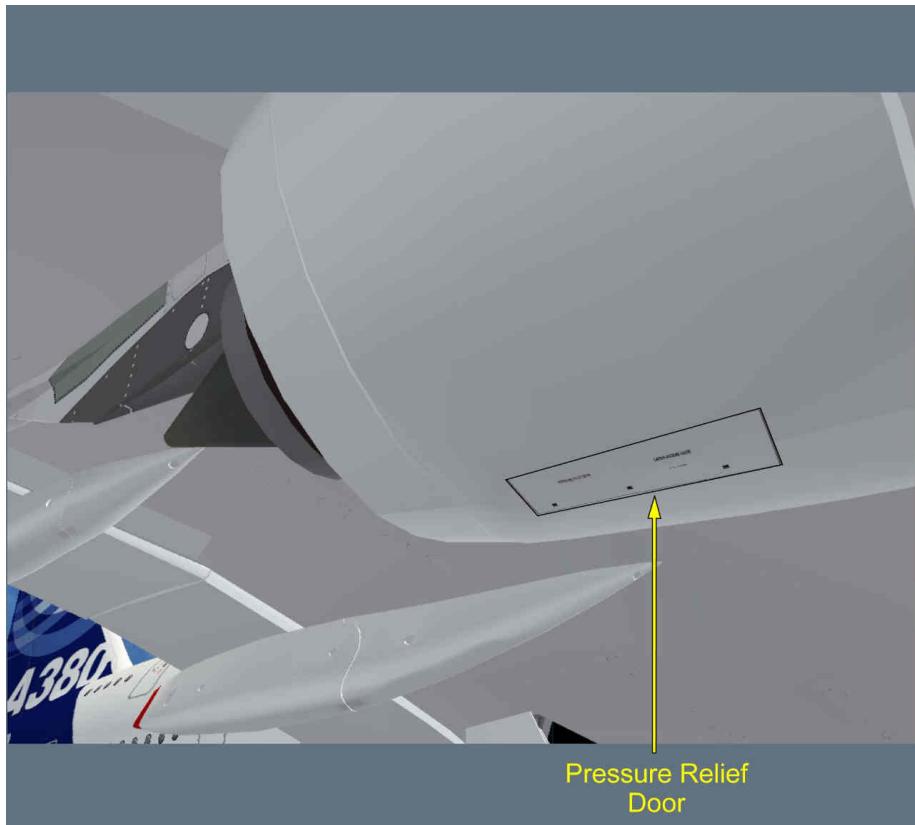
Applicable to: ALL



ENG OIL FILL ACCESS DOOR.....CLOSED

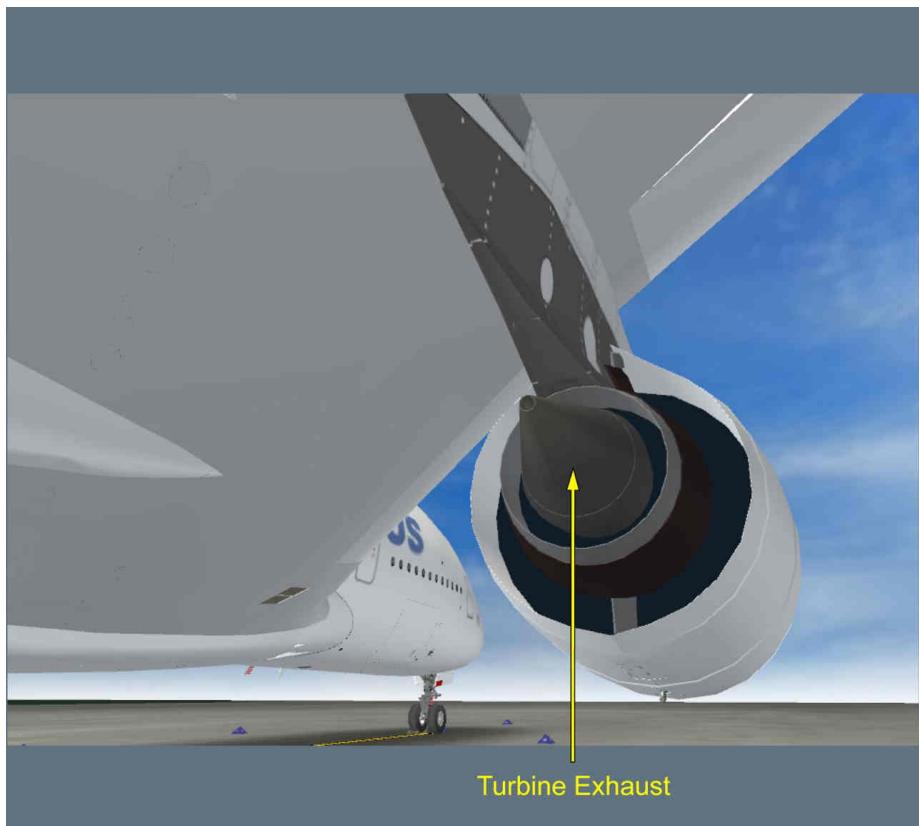


PRESSURE RELIEF DOOR.....CLOSED

Pressure Relief
Door

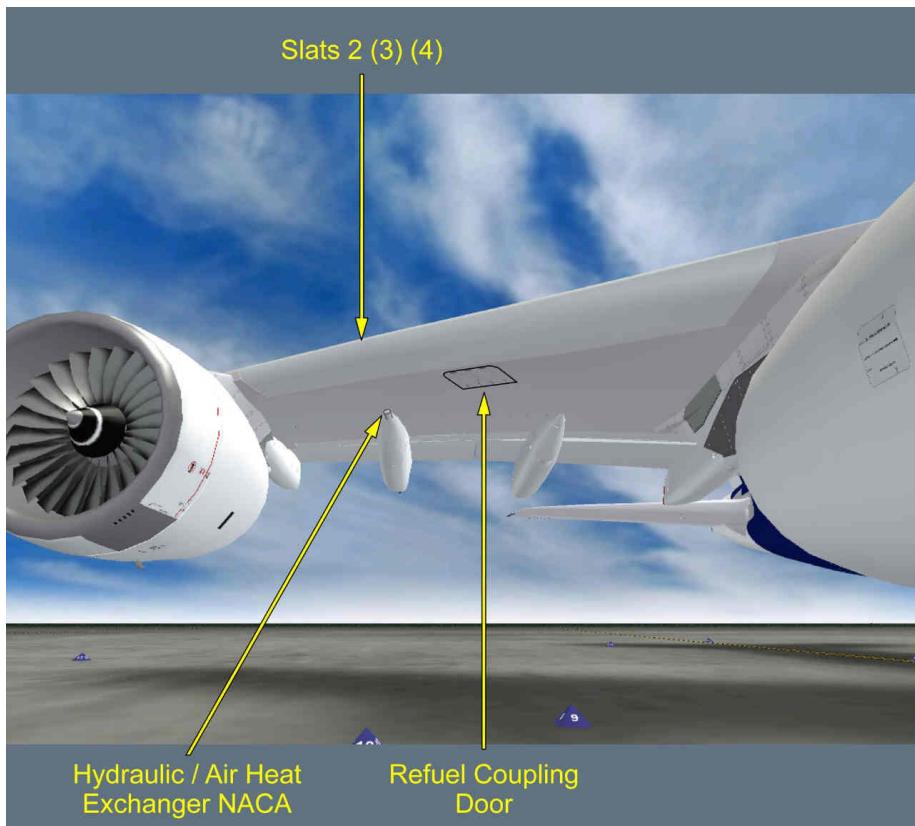
TURBINE EXHAUST.....CLEAR

Check that the turbine exhaust is clear of obstruction, and that the turbine blades are not damaged.

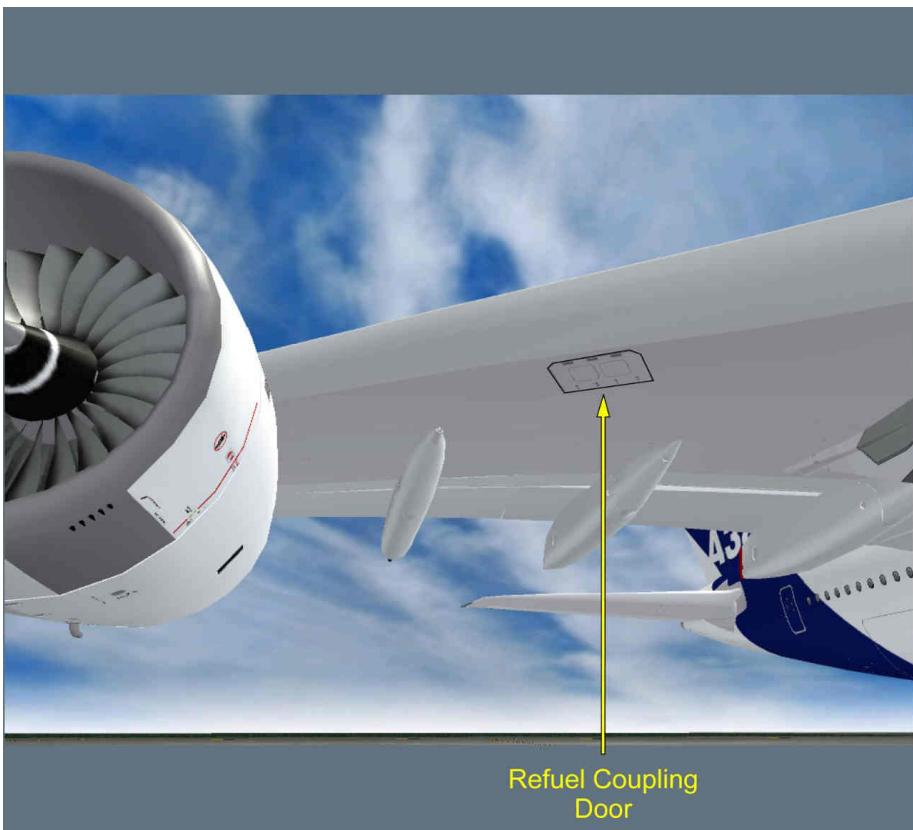


RH WING LEADING EDGE

Applicable to: ALL

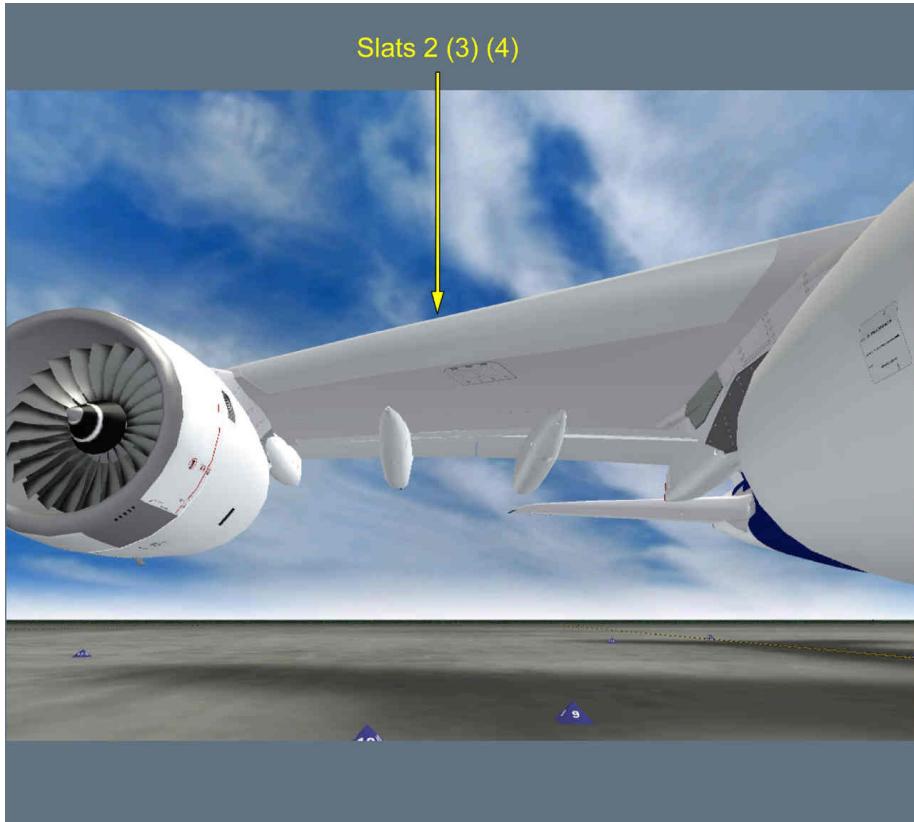


REFUEL COUPLING DOOR.....CLOSED

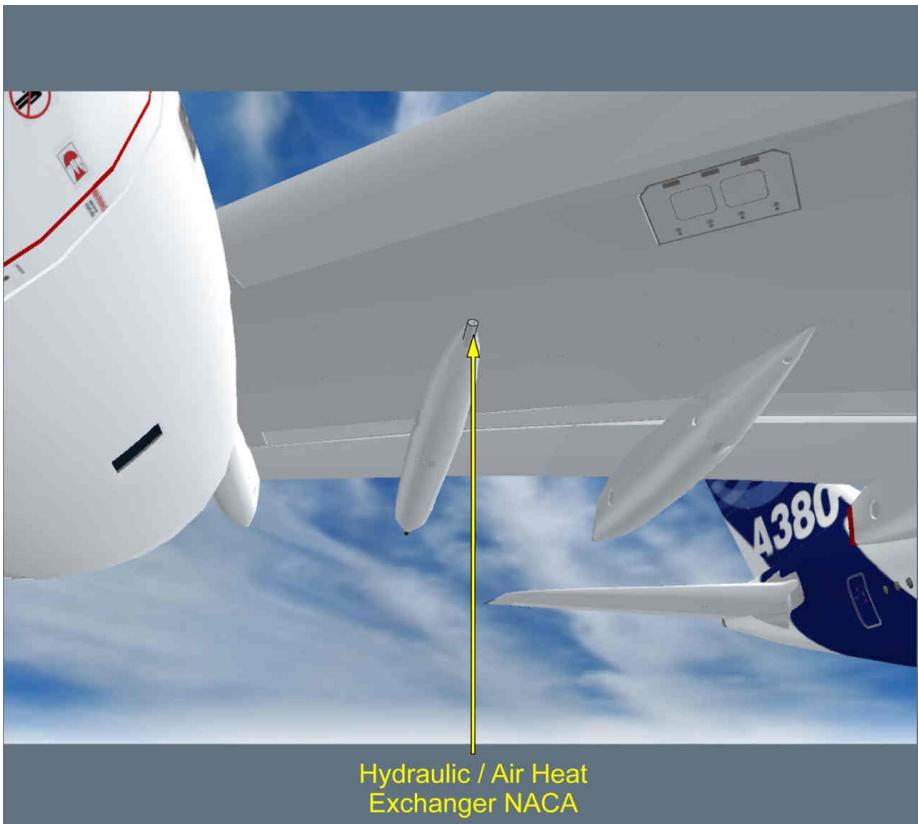
Refuel Coupling
Door

* SLATS 2, 3, 4.....CHECK CONDITION

 Check that the slats are not damaged.

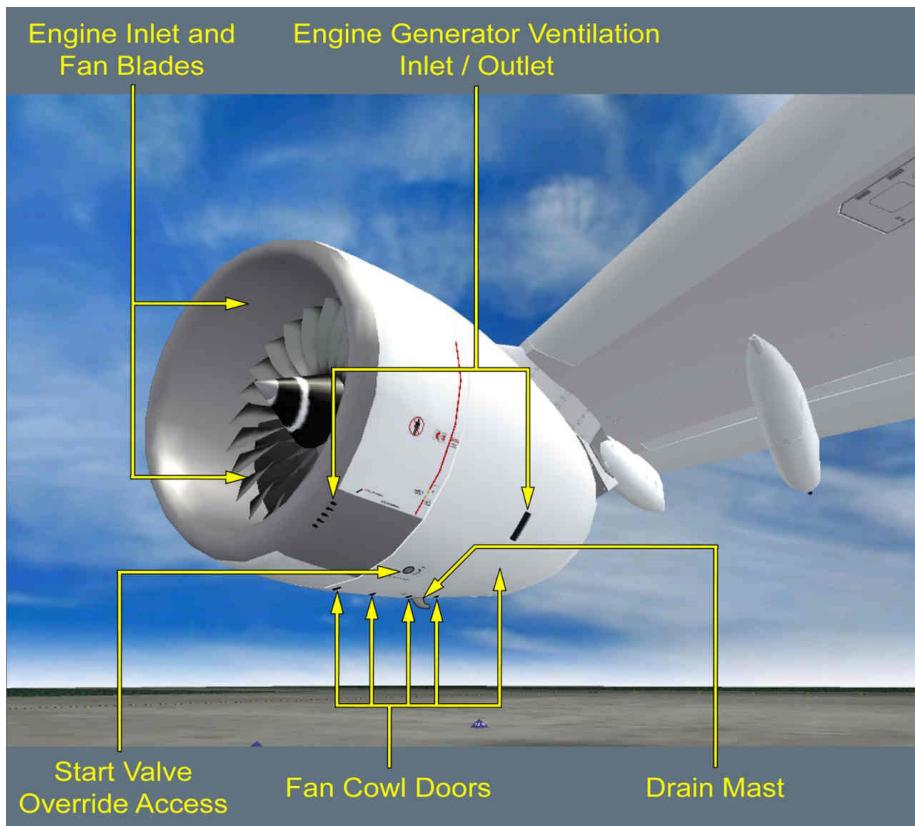


- [L] HYDRAULIC/AIR HEAT EXCHANGER NACA.....CHECK CONDITION
- [L] Check that the hydraulic/air heat exchanger NACA on the flap track fairing 4 is clear of obstruction, and that the backup air inlet door is open.



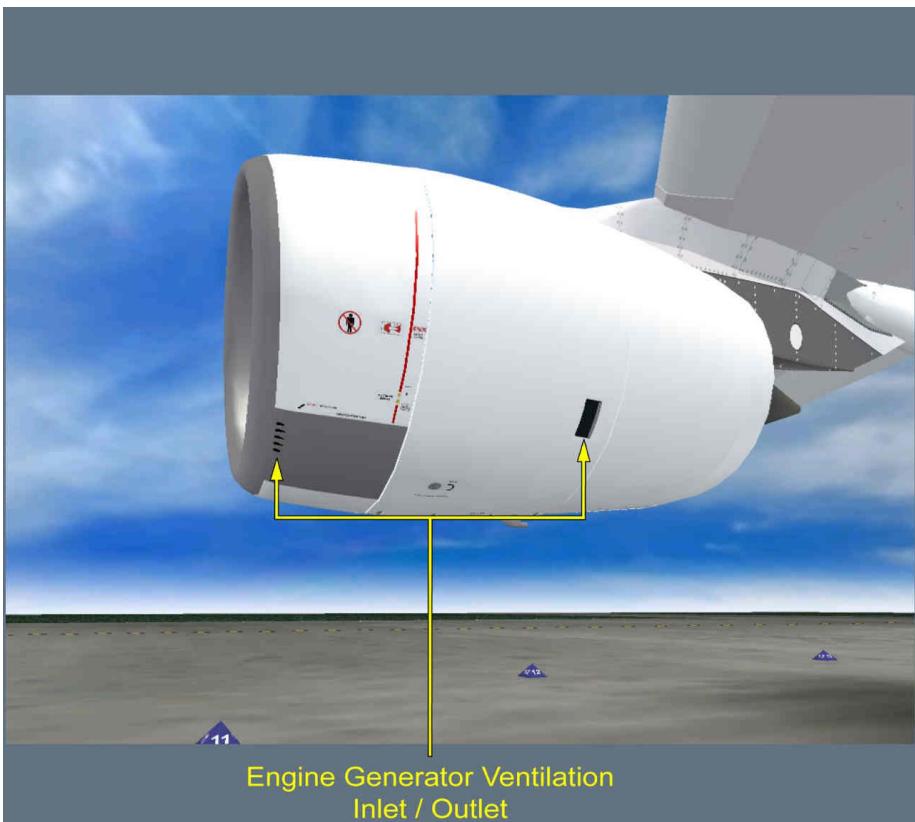
ENG 4 LH SIDE

Applicable to: ALL



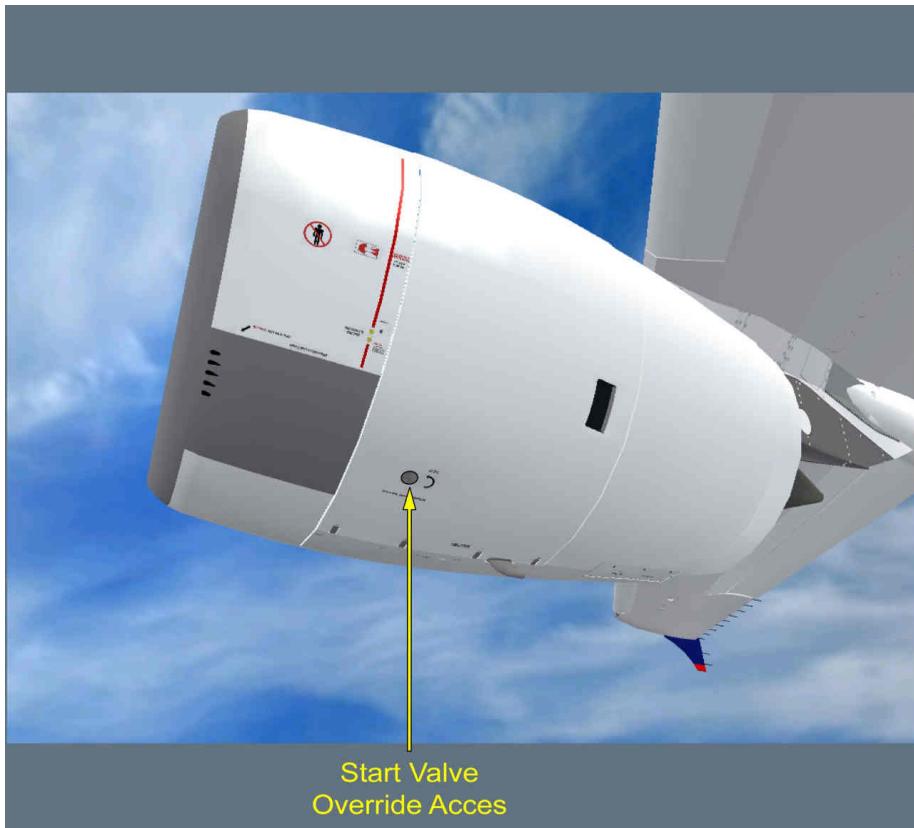
ENGINE GENERATOR VENTILATION INLET/OUTLET.....CHECK CONDITION

- Check that the engine generator ventilation inlet/outlet is clear of obstruction.



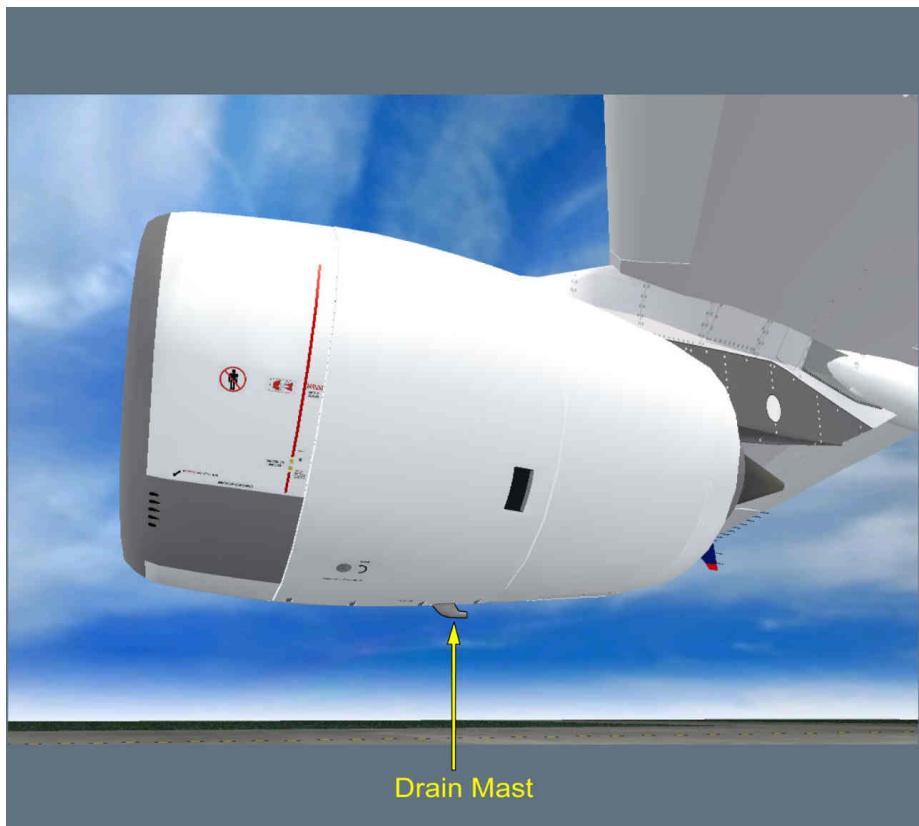
Engine Generator Ventilation
Inlet / Outlet

START VALVE OVERRIDE ACCESS.....CLOSED

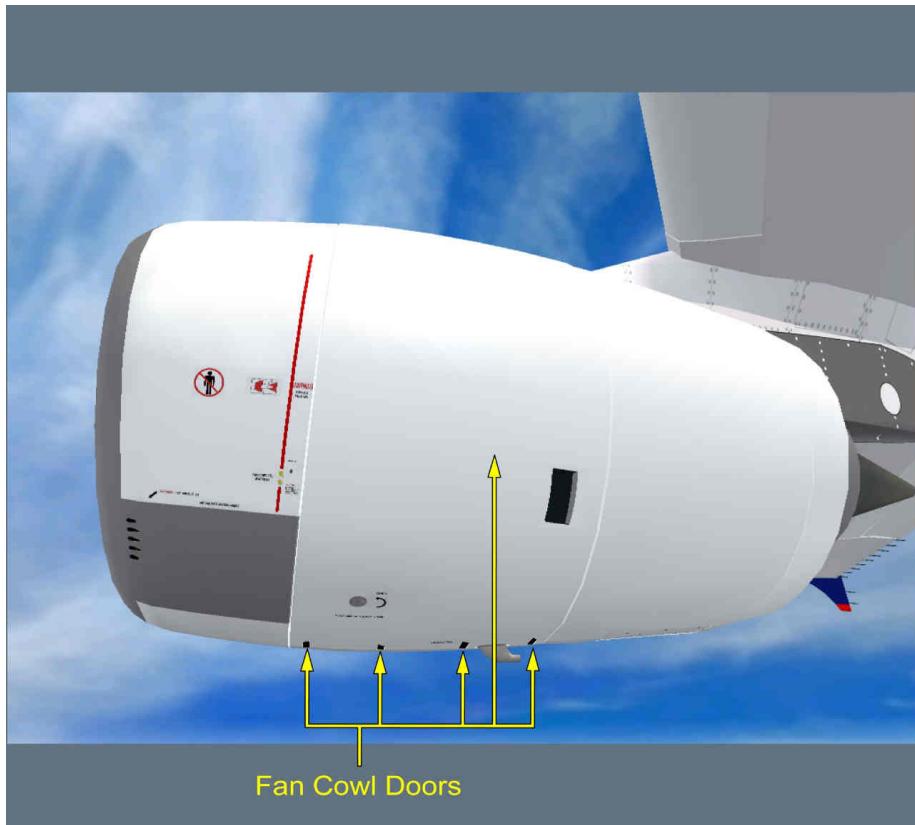


Start Valve
Override Acces

* DRAIN MAST.....CHECK CONDITION/NO LEAK
 Under the engine, check the condition of the drain mast, and make sure that there are no leaks.

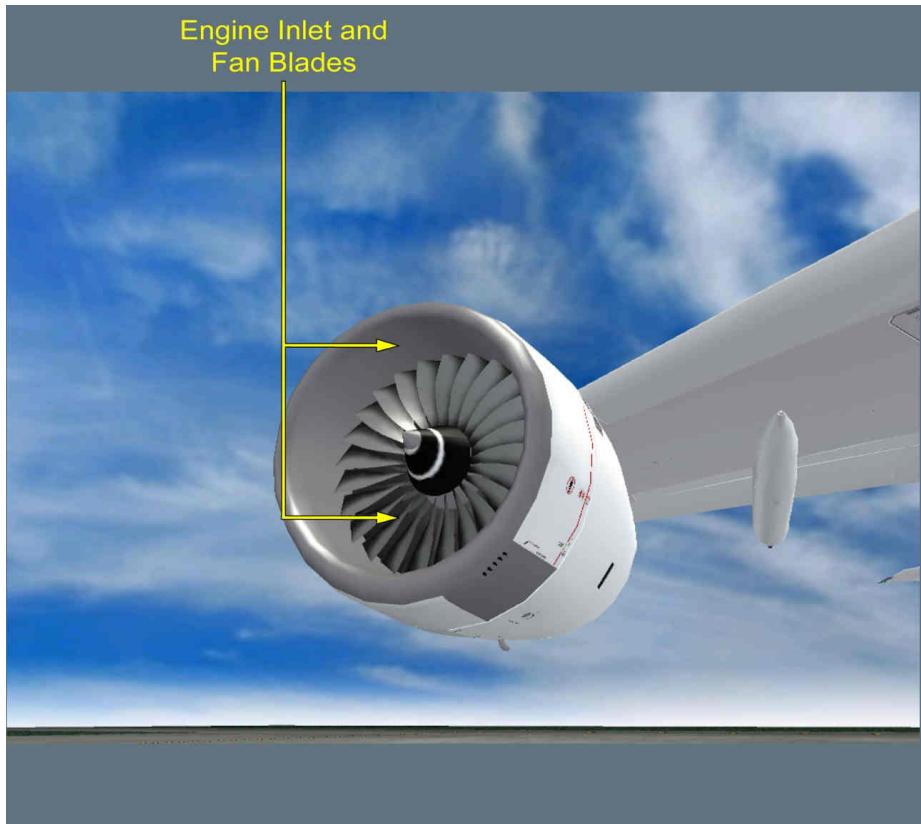


* FAN COWL DOORS.....CLOSED AND LATCHED



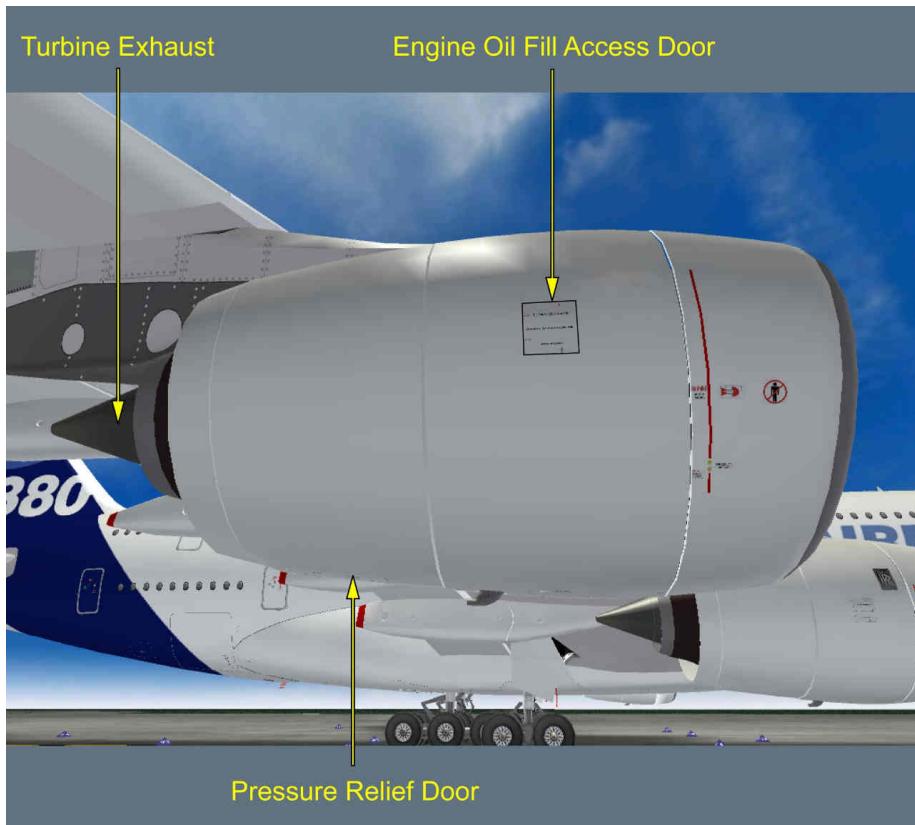
* ENGINE INLET AND FAN BLADES.....CHECK CONDITION

Check the engine inlet and the fan blades for any significant dents, bending, or damage.



ENG 4 RH SIDE

Applicable to: ALL

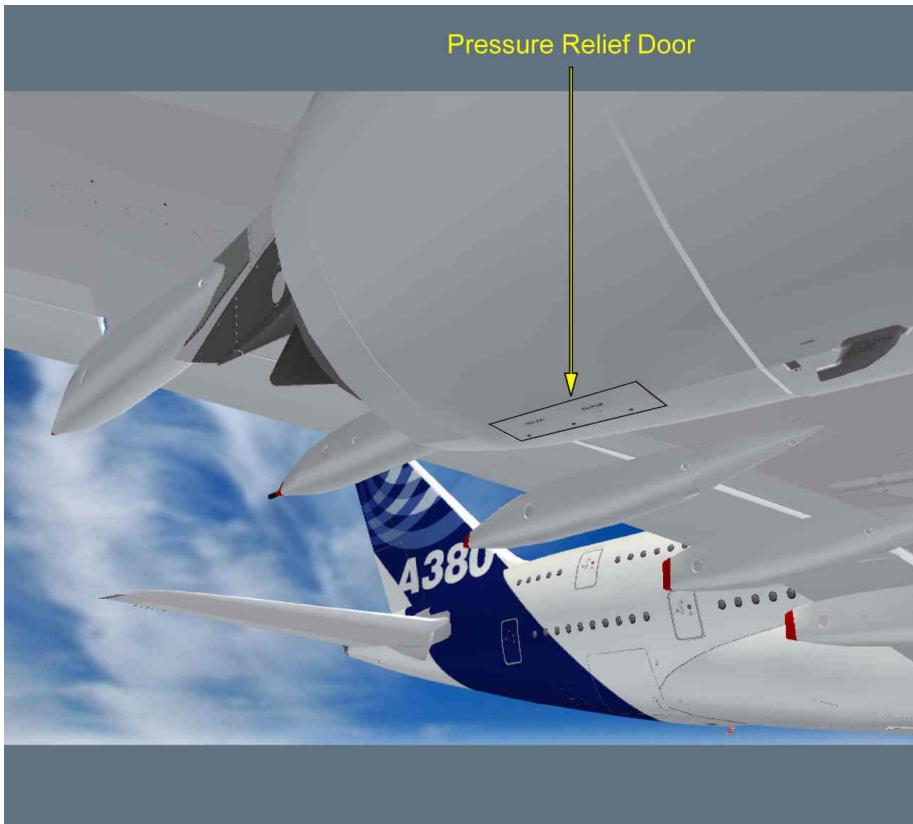


ENG OIL FILL ACCESS DOOR.....CLOSED



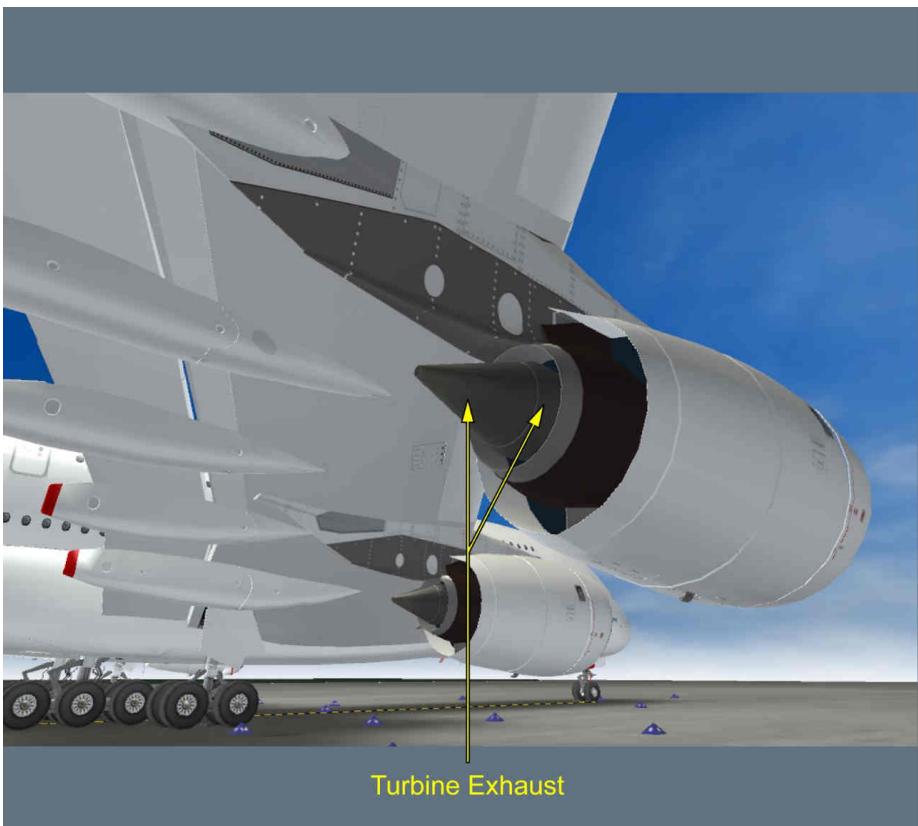
PRESSURE RELIEF DOOR.....CLOSED

Pressure Relief Door



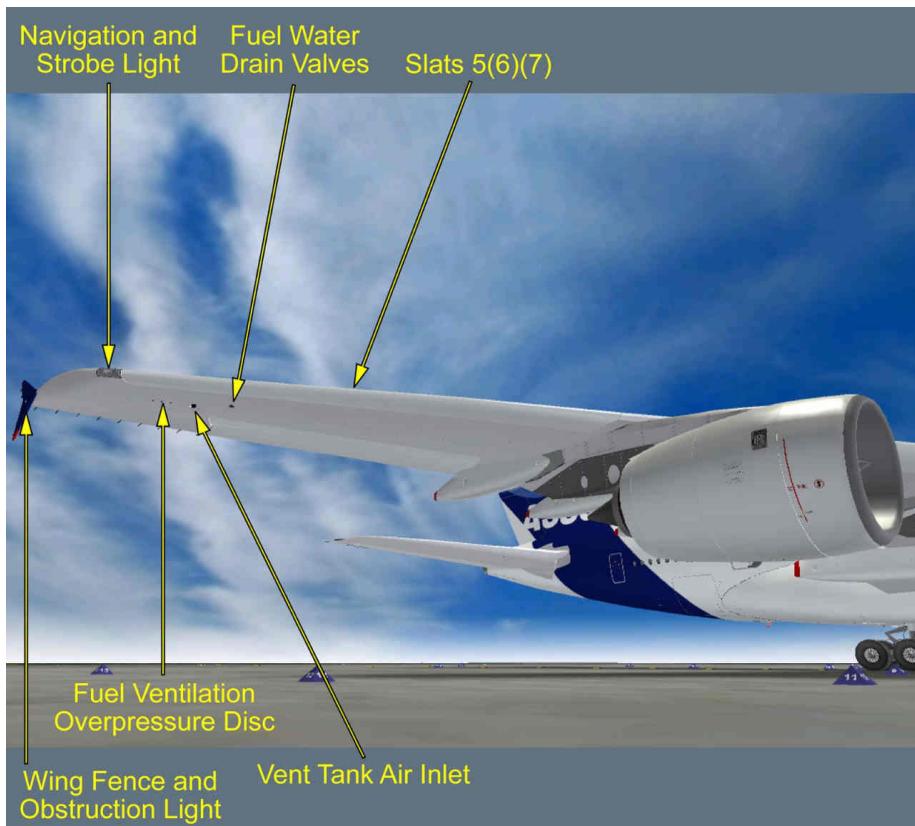
TURBINE EXHAUST.....CLEAR

Check that the turbine exhaust is clear of obstruction, and that the turbine blades are not damaged.



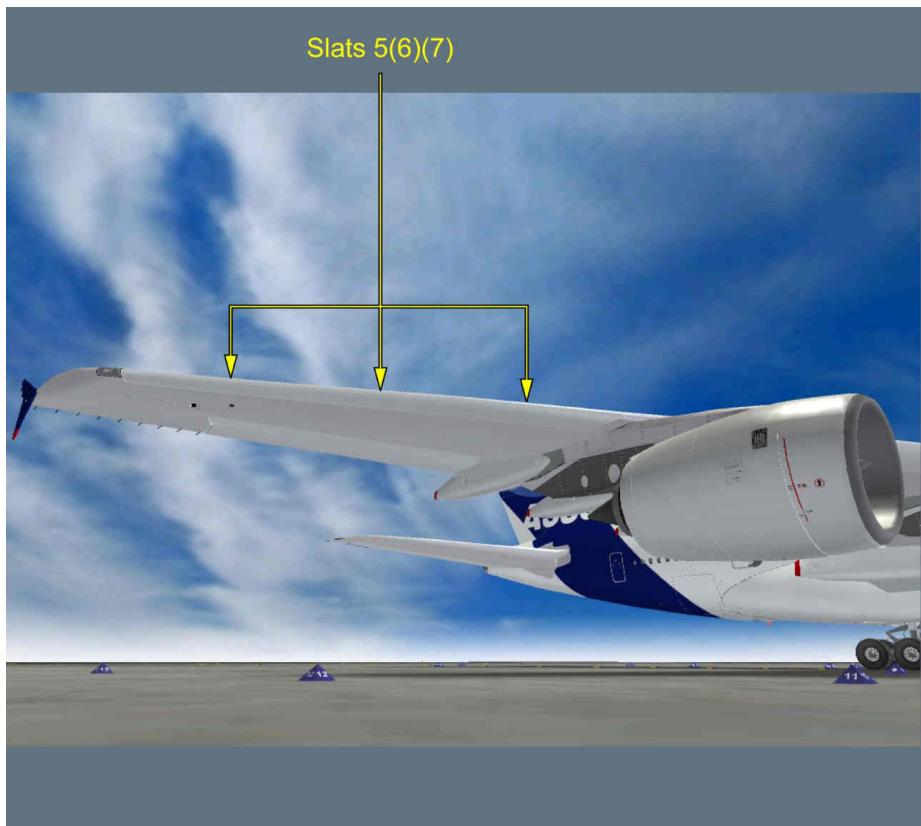
RH WING TIP

Applicable to: ALL



* SLATS 5, 6, 7.....CHECK CONDITION

Check the slats are not damaged.



L1* FUEL VENTILATION OVERPRESSURE DISC.....INTACT



FUEL WATER DRAIN VALVES..... NO LEAK

Fuel Water Drain Valves



WING FENCE AND OBSTRUCTION LIGHT..... CHECK CONDITION

- Check the condition of the wing fence and obstruction light, and make sure that the protective cover is not damaged.

Wing Fence and Obstruction Light



- L1 VENT TANK AIR INLETCLEAR
 L2 Check that the vent tank air inlet is clear of obstruction. .

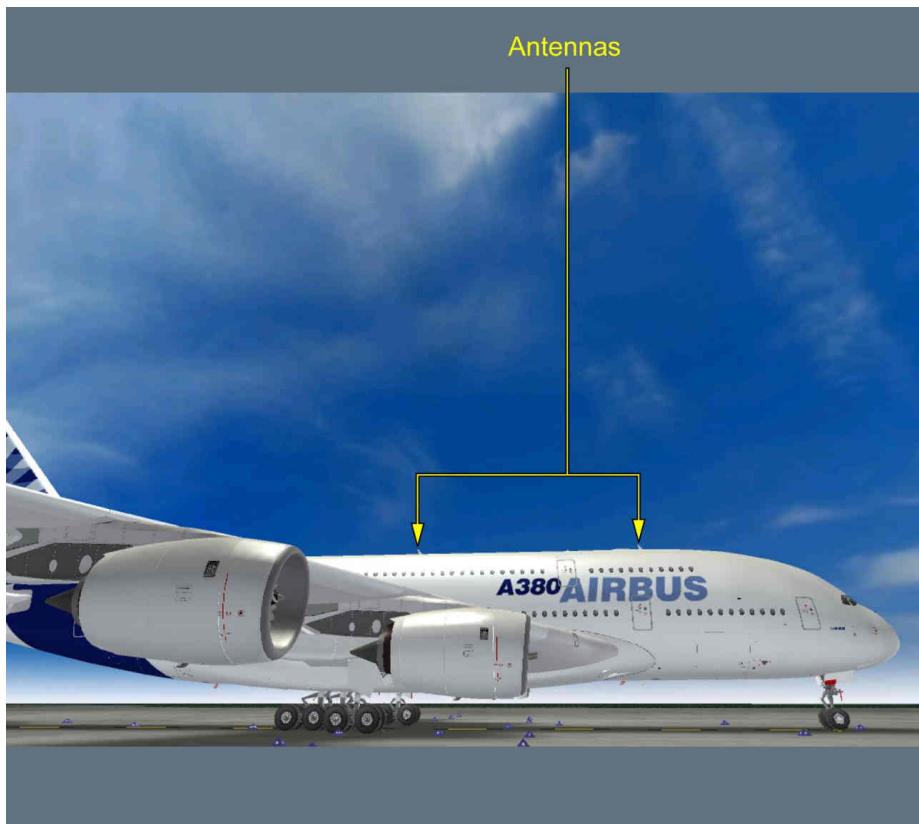


- NAVIGATION AND STROBE LIGHT.....CHECK CONDITION
- Check the condition of the navigation and strobe lights, and make sure that the protective cover is not damaged.

Navigation and Strobe Light

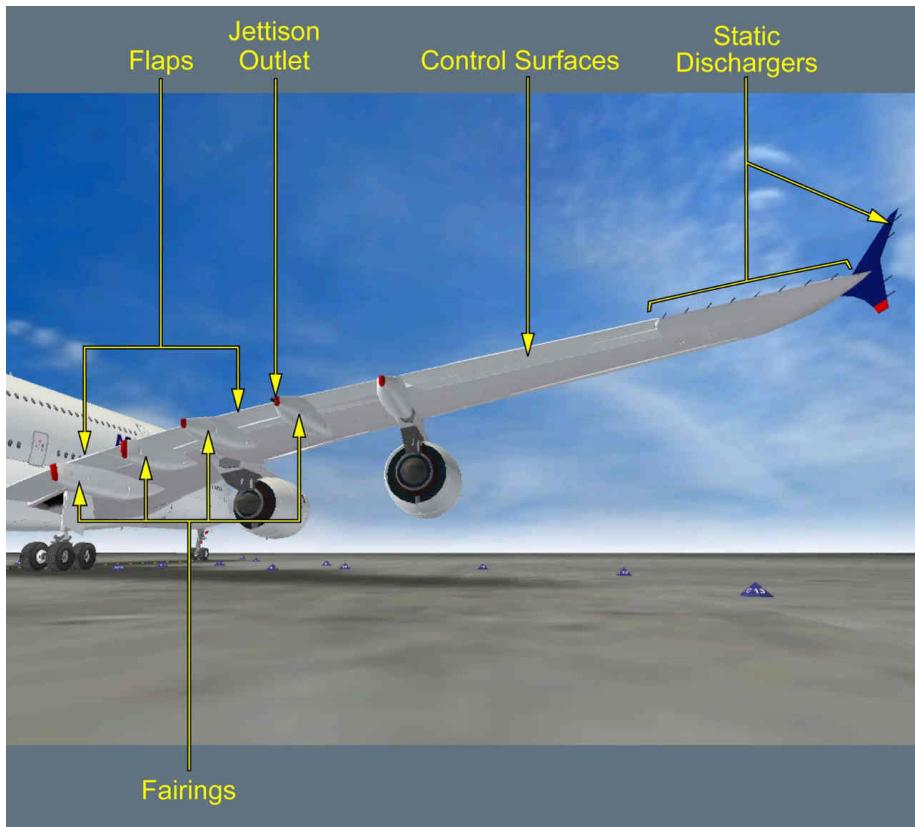


- [1] ANTENNAS ON TOP OF FUSELAGE..... CHECK CONDITION
[2] From this position, check that there is no damage to the VHF antennas on top of the fuselage: VHF 1 on forward fuselage and VHF 3 on the rear fuselage.



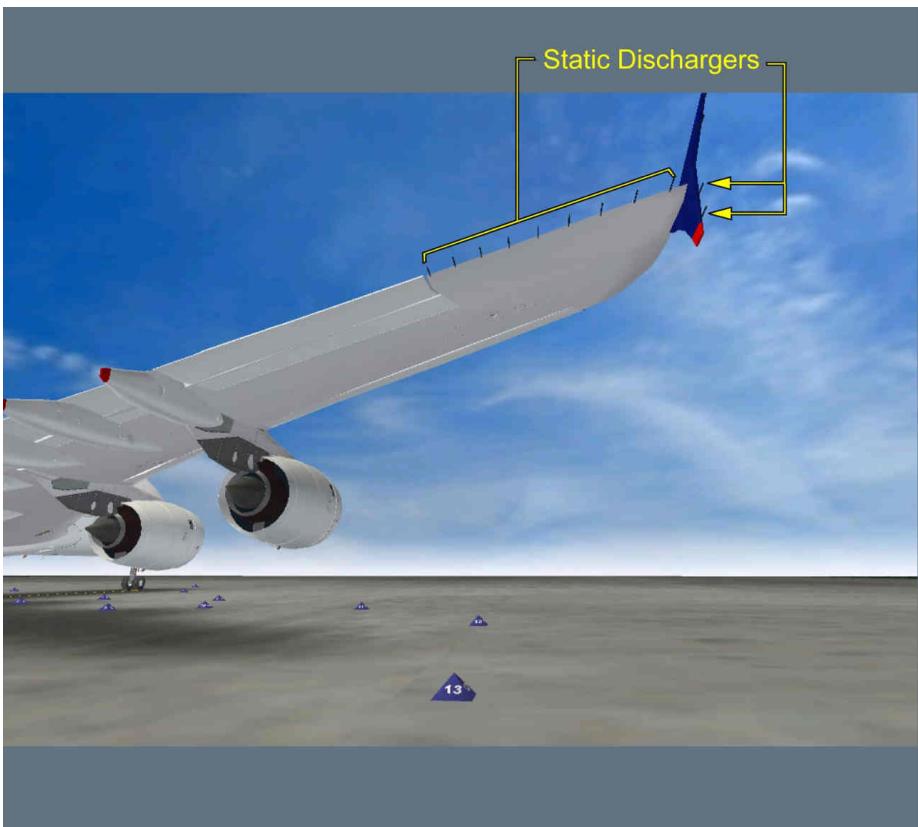
RH WING TRAILING EDGE

Applicable to: ALL



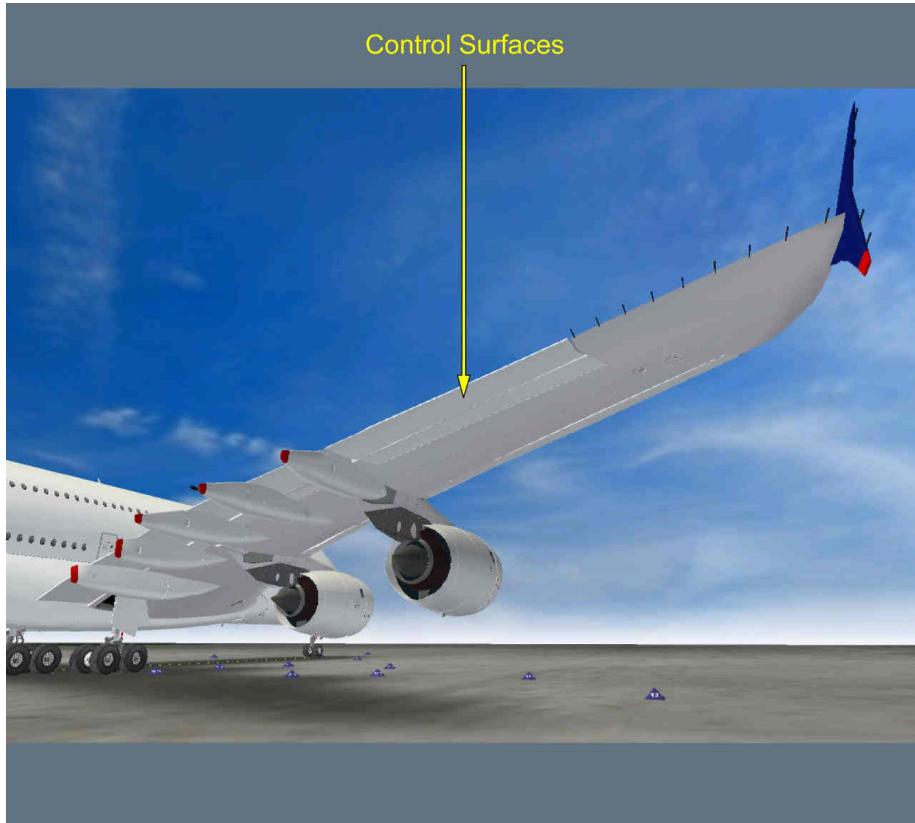
STATIC DISCHARGERS.....CHECK CONDITION

- [2] Check that the static dischargers are not missing or damaged.

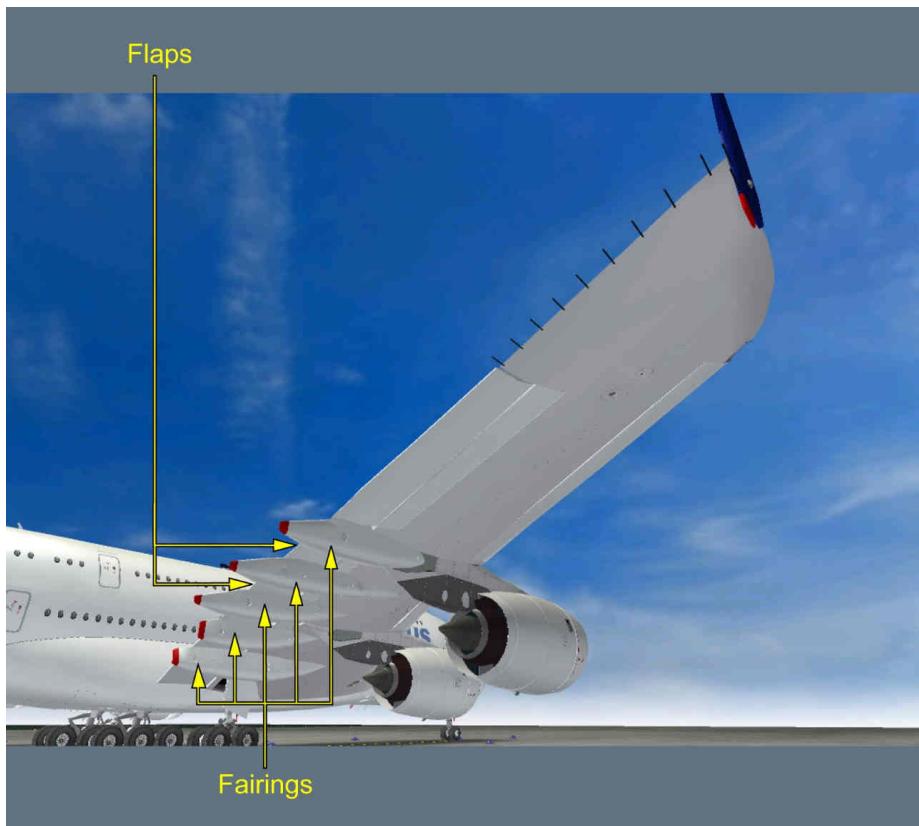


* CONTROL SURFACES.....CHECK CONDITION

Check that the control surfaces are not damaged.



- * FLAPS AND FAIRINGS.....CHECK CONDITION AND POSITION
 Check that the flaps and flap track fairings are not damaged , and check that the flap position is in accordance with the slat/flap lever position.

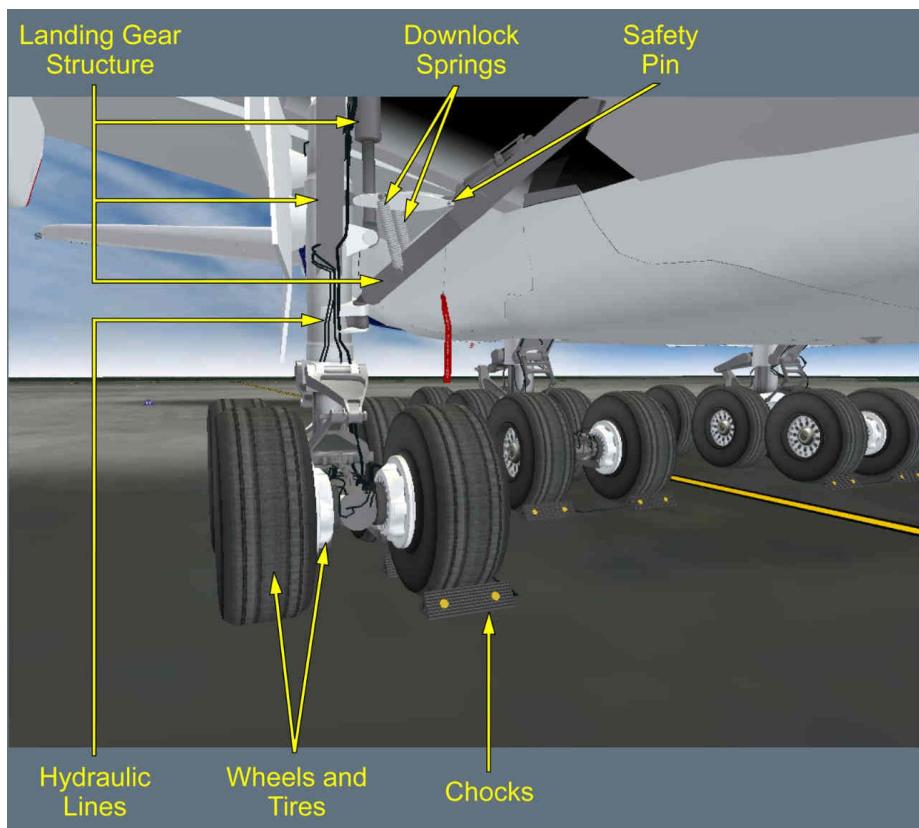


JETTISON OUTLET..... NO LEAK



RH WING LANDING GEAR

Applicable to: ALL

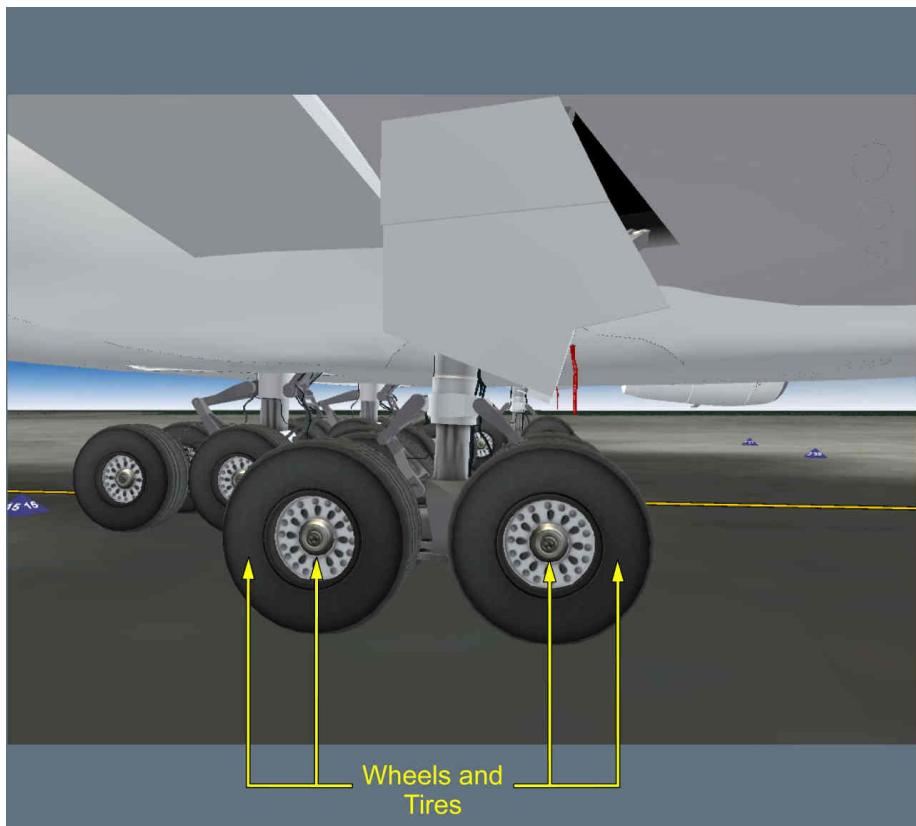


* CHOCKS.....REMOVED



* WHEELS AND TIRES.....CHECK CONDITION

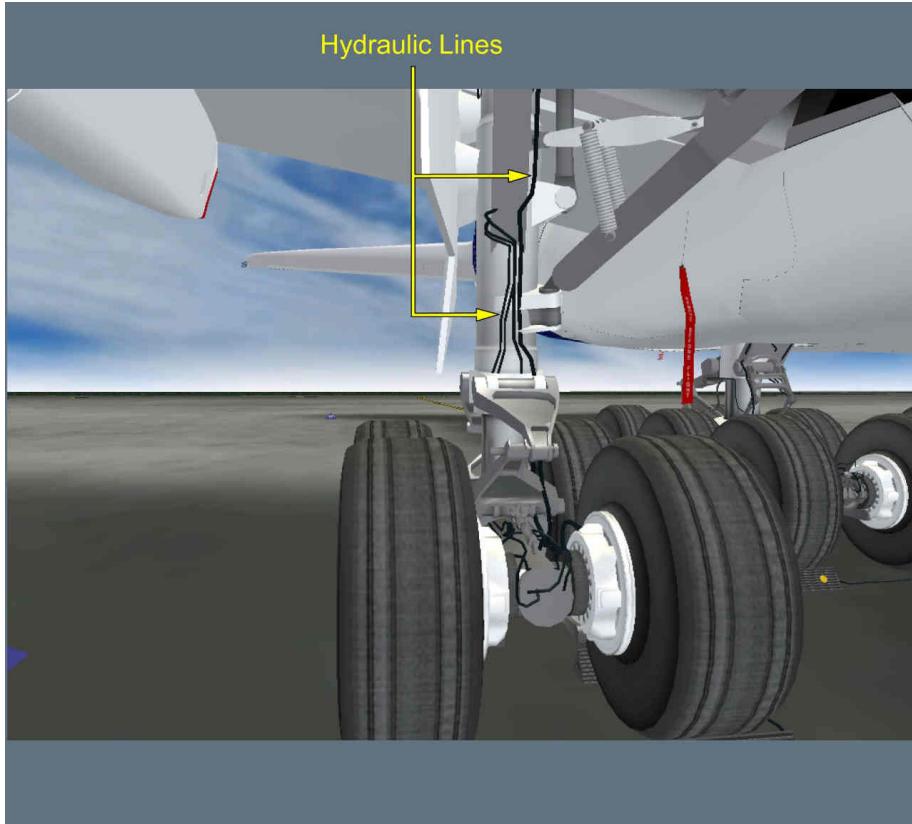
Check the wheels and tires for wear, cuts, and cracks.



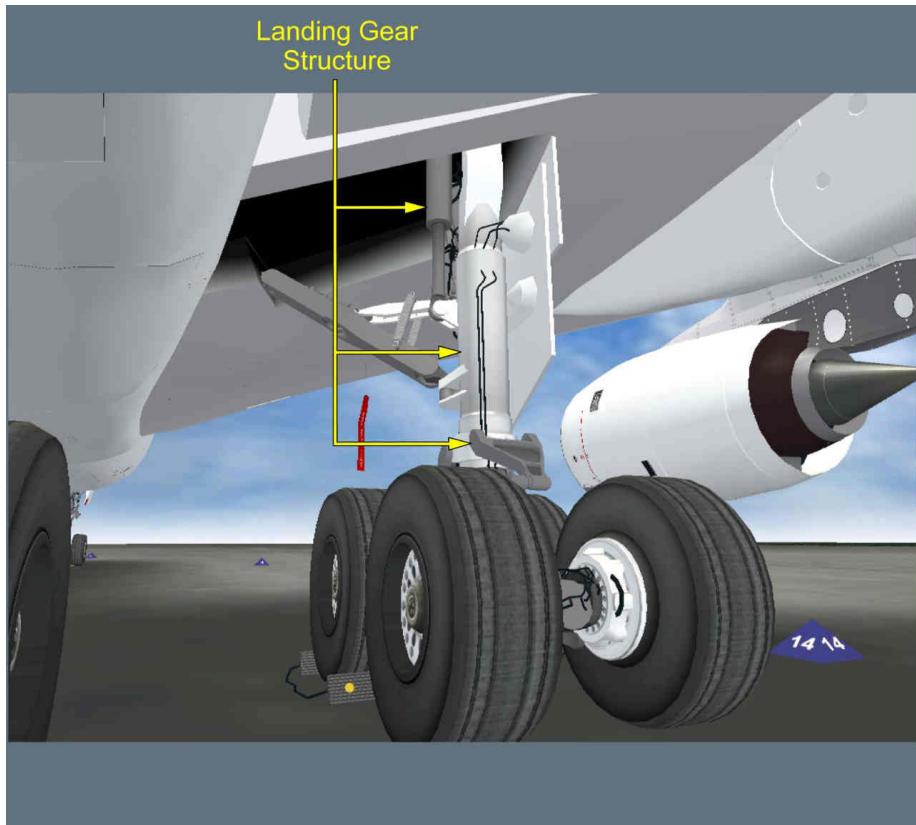
Wheels and
Tires

HYDRAULIC LINES.....CHECK CONDITION

Check the condition of the hydraulic lines, and make sure there are no leaks.

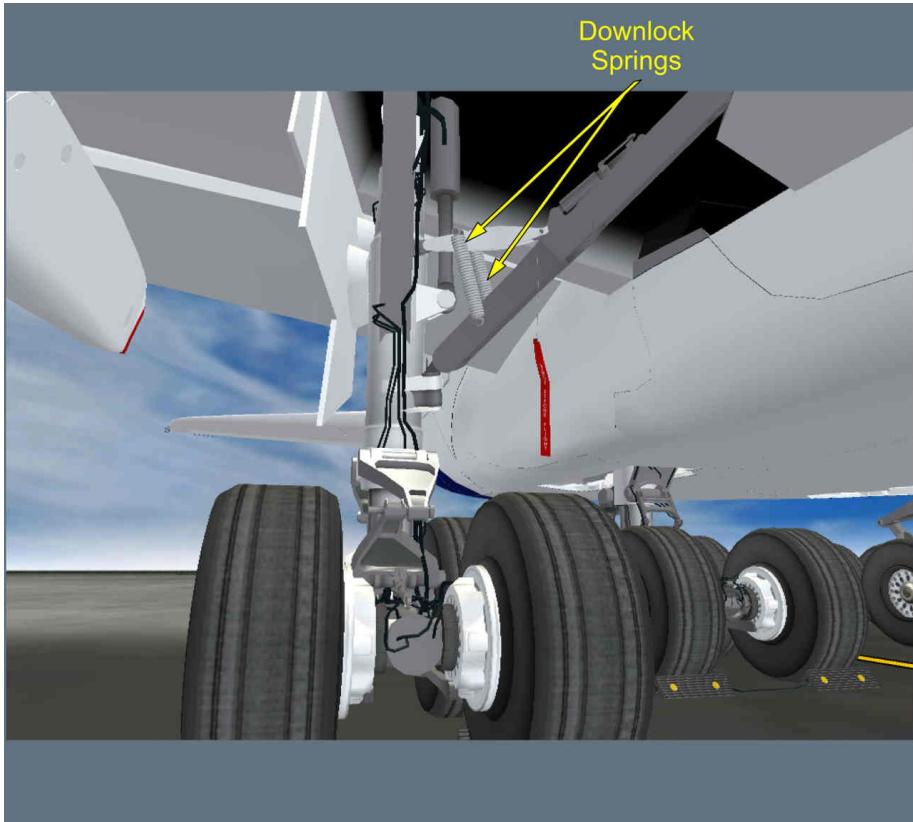
**L1 LANDING GEAR STRUCTURE.....CHECK CONDITION**

Check that the landing gear structure is not damaged.



DOWNLOCK SPRINGS.....CHECK CONDITION

- From the front of the landing gear, check the condition of the downlock springs.

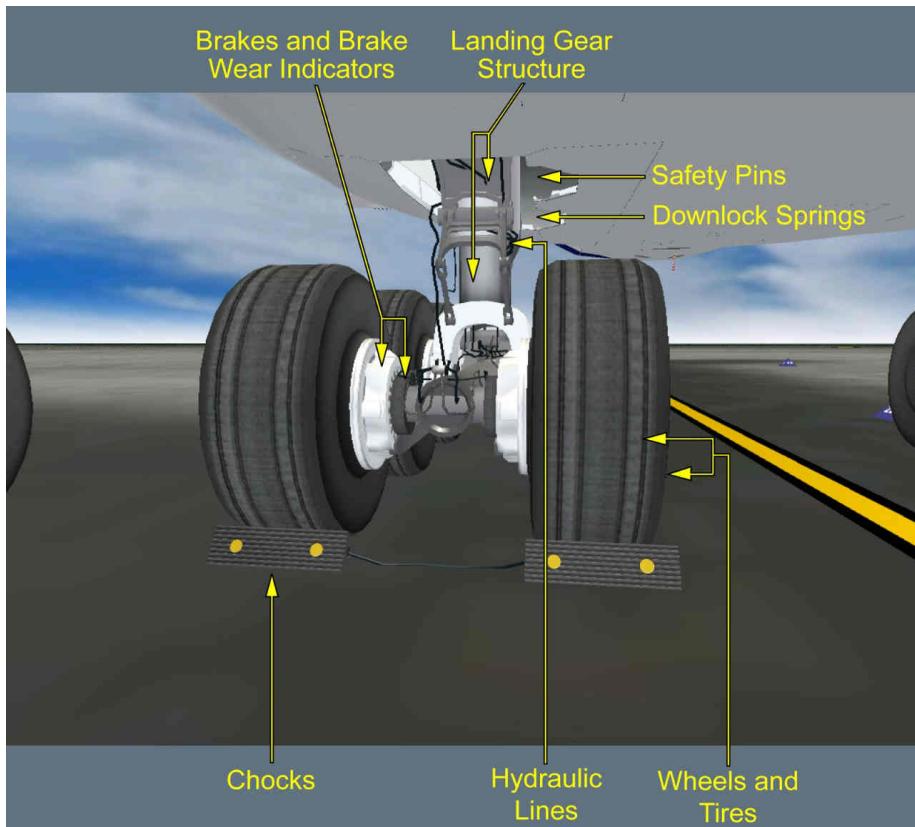


L1 SAFETY PIN..... REMOVED

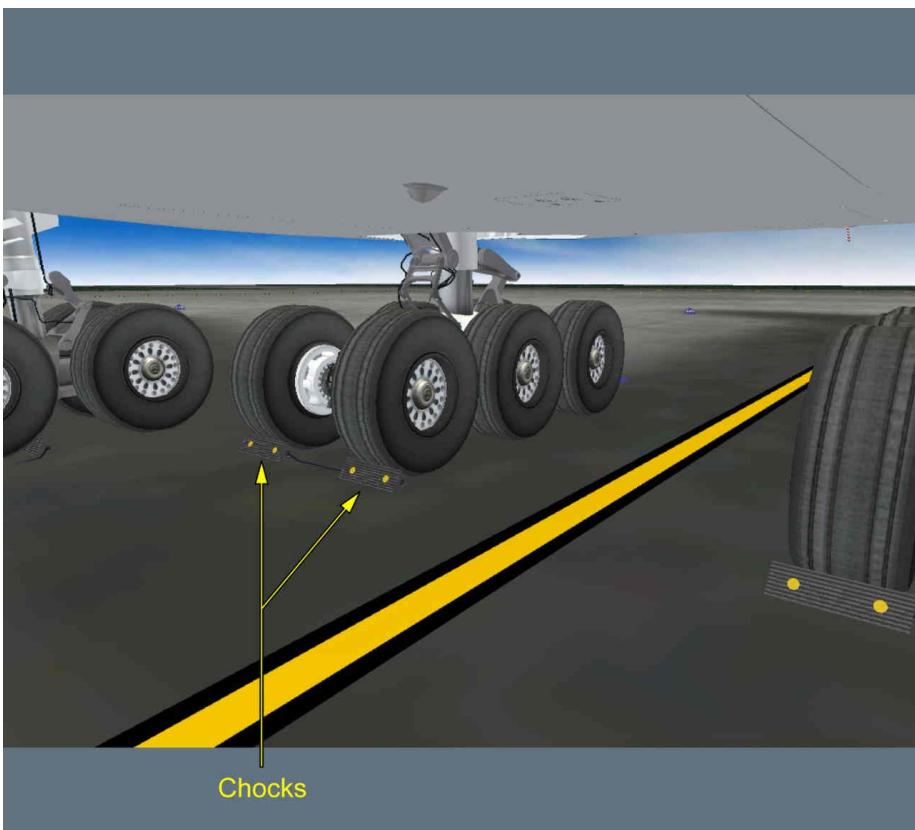


RH BODY LANDING GEAR AND FUSELAGE

Applicable to: ALL

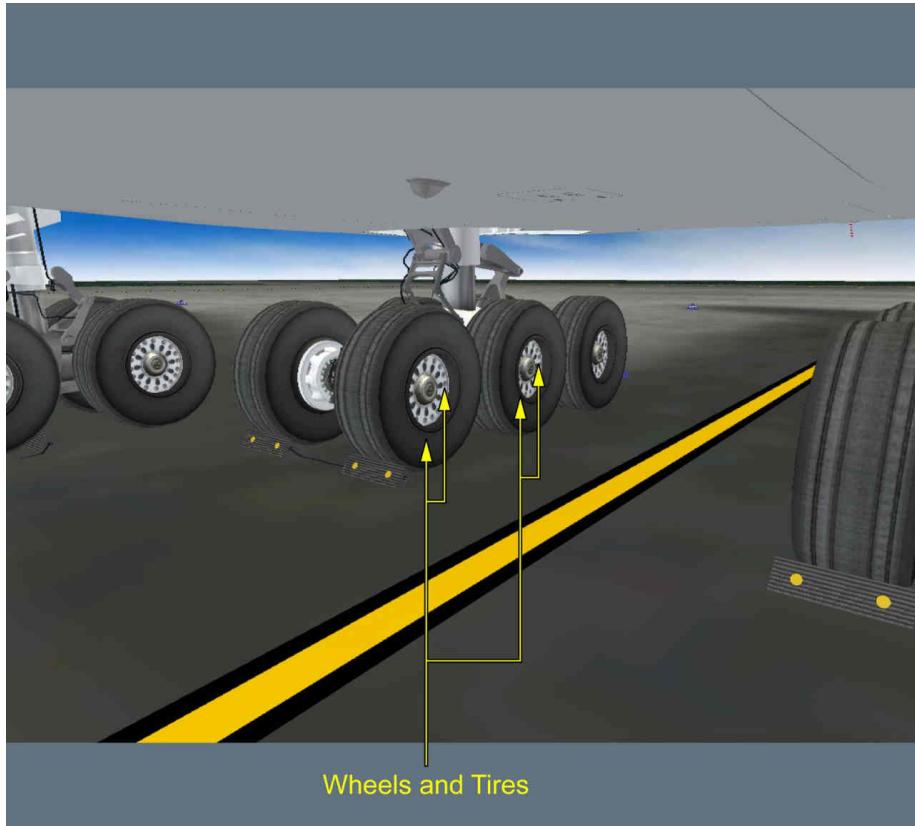


* CHOCKS..... REMOVED

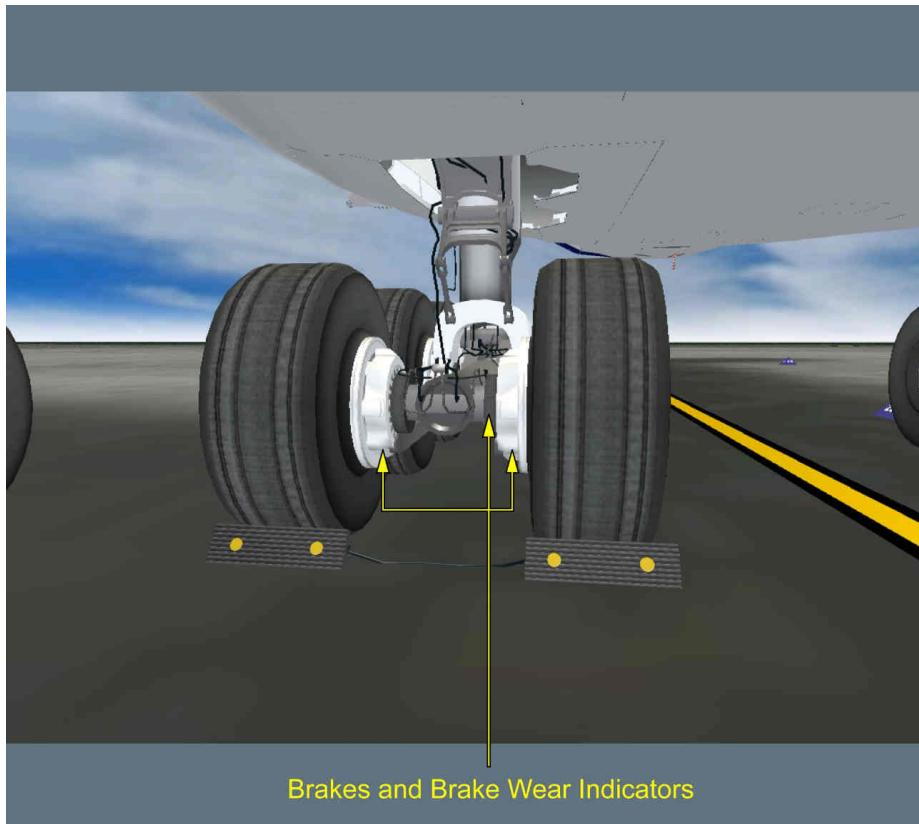


* WHEELS AND TIRES..... CHECK CONDITION

- Check the wheels and tires for wear, cuts, and cracks.



- L1 BRAKES AND BRAKE WEAR INDICATORS.....CHECK CONDITION
 L2 Check the brakes for wear and the position of the brake wear pin: If the pin is almost flush with the guide, the brake must be replaced.



Brakes and Brake Wear Indicators

HYDRAULIC LINES.....CHECK CONDITION

Check the condition of the hydraulic lines, and make sure there are no leaks.

Hydraulic Lines

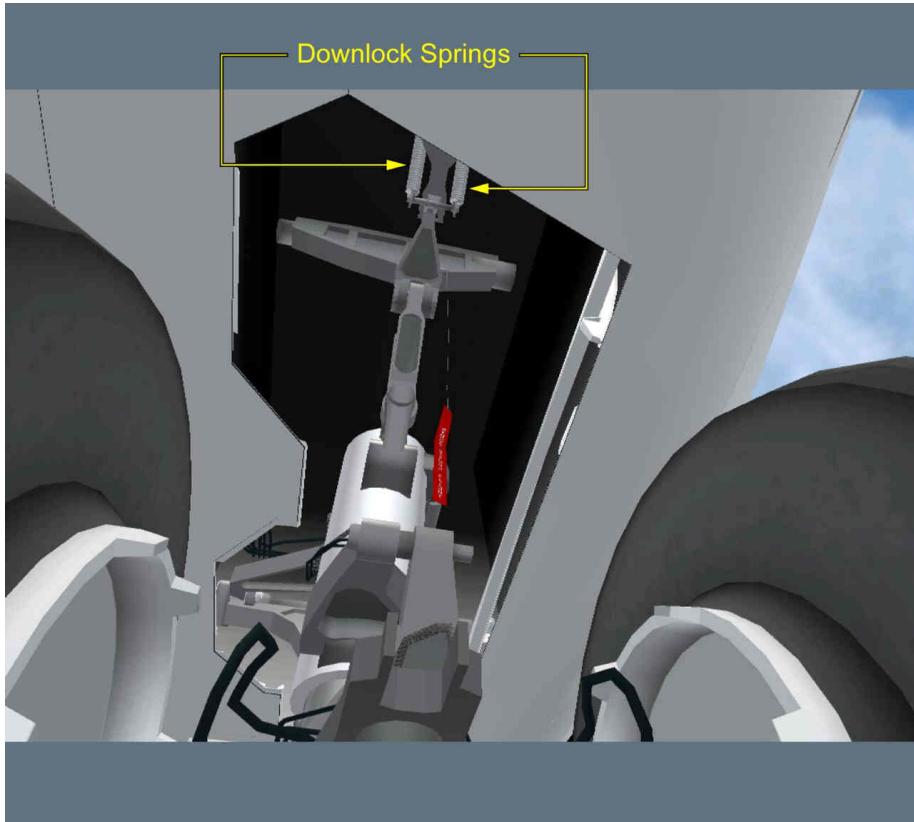
L1 LANDING GEAR STRUCTURE.....CHECK CONDITION

L2 Check that the landing gear structure is not damaged.

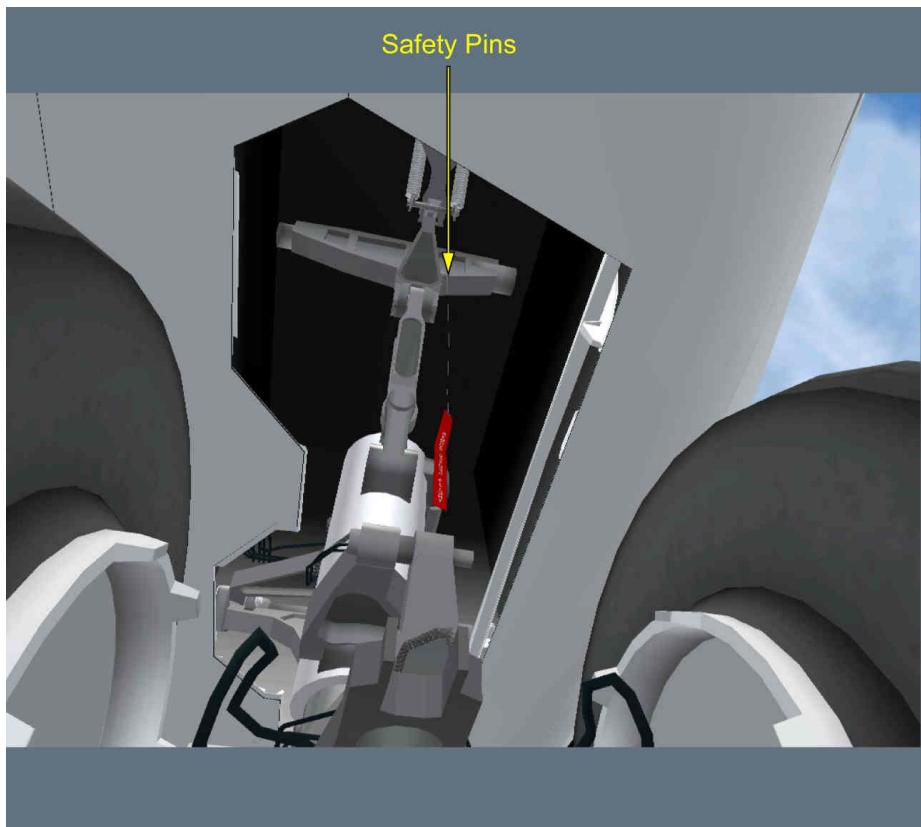
Landing Gear Structure

L1 DOWNLOCK SPRINGS.....CHECK CONDITION

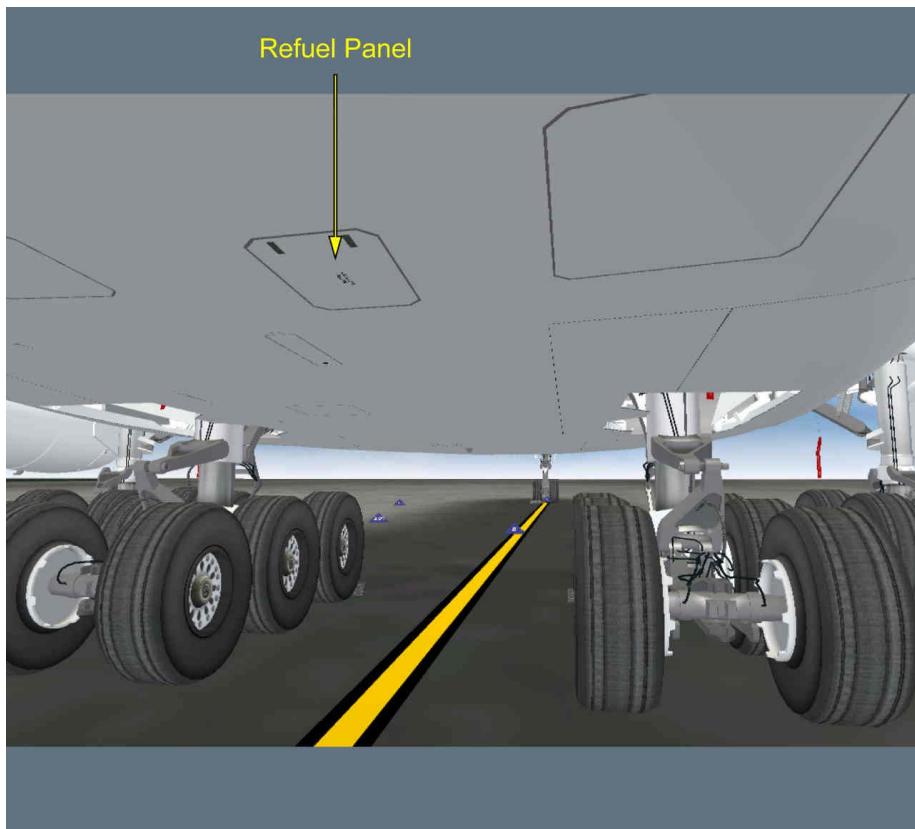
From the front of the landing gear, check the condition of the downlock springs.



L1 SAFETY PINS..... REMOVED

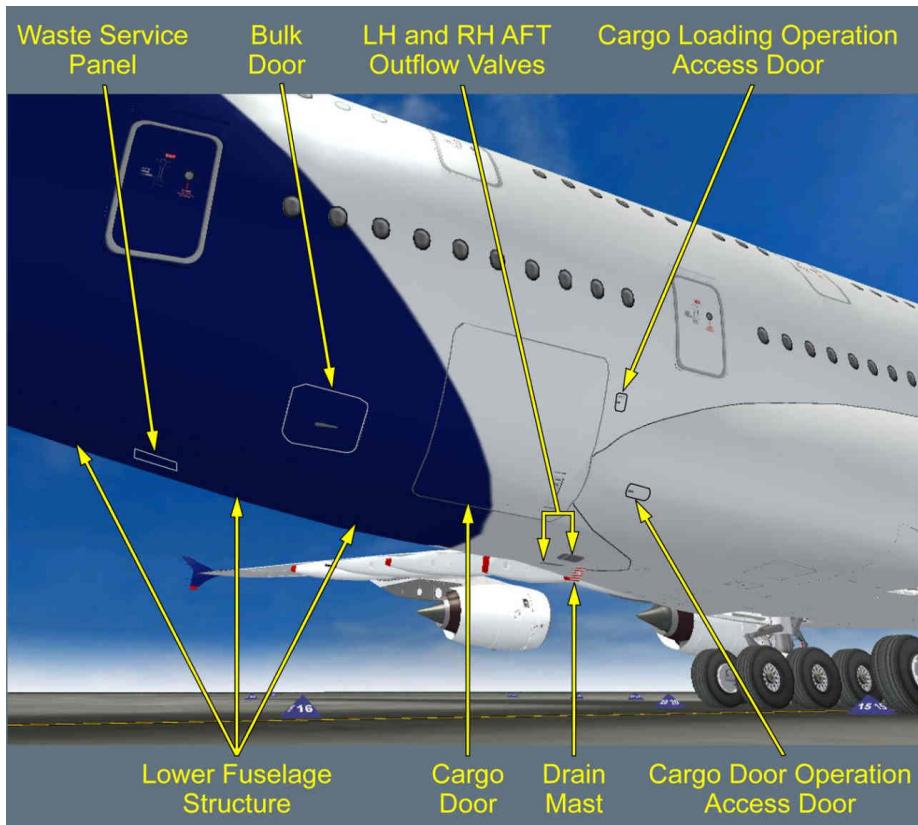


REFUEL PANEL CLOSED



AFT FUSELAGE

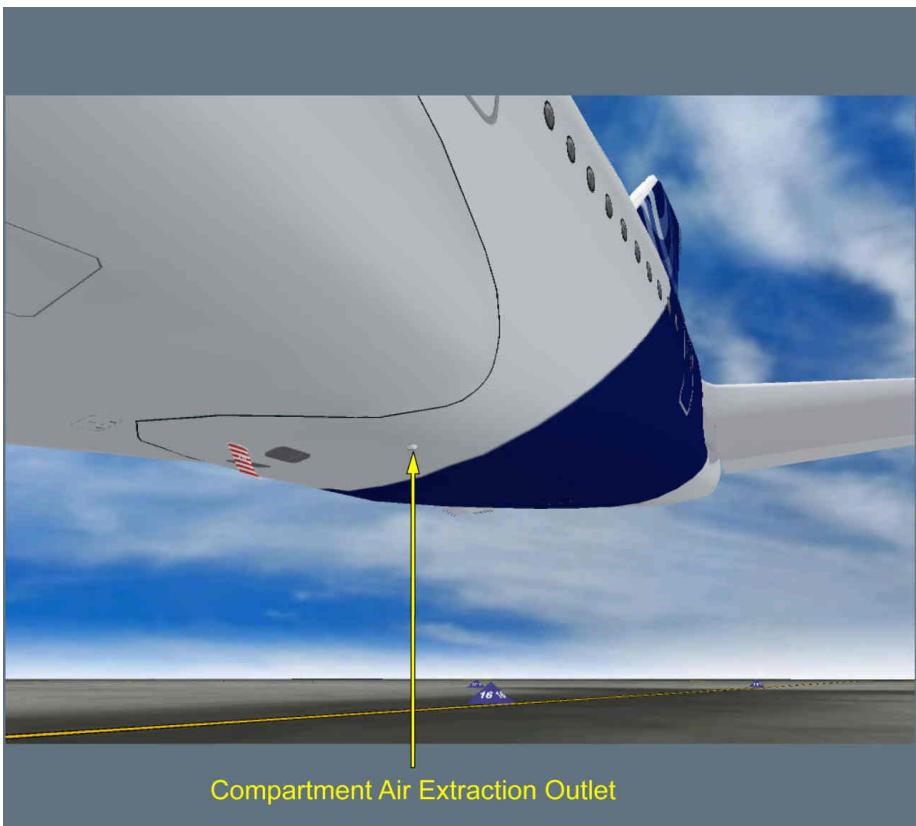
Applicable to: ALL

**LH AND RH AFT OUTFLOW VALVES..... CHECK CONDITION**

- Check the condition of the LH and RH aft outflow valves, and make sure they are clear of obstruction.

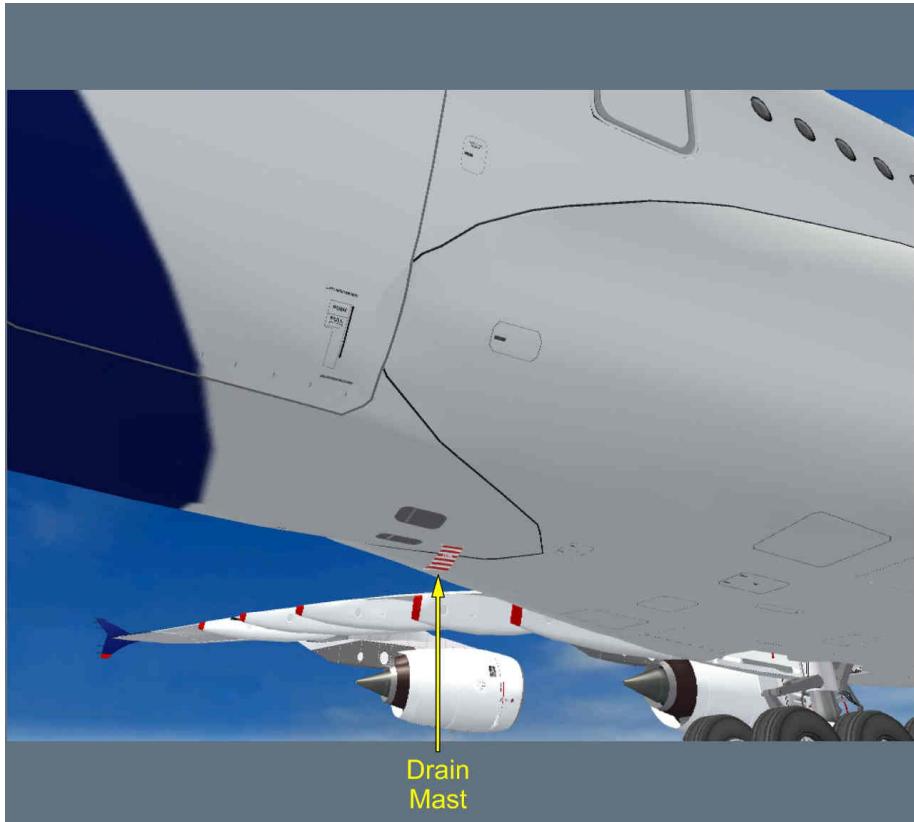
**L1 COMPARTMENT AIR EXTRACTION OUTLET CHECK CONDITION**

Check the condition of the extraction outlet, and make sure it is clear of obstruction.

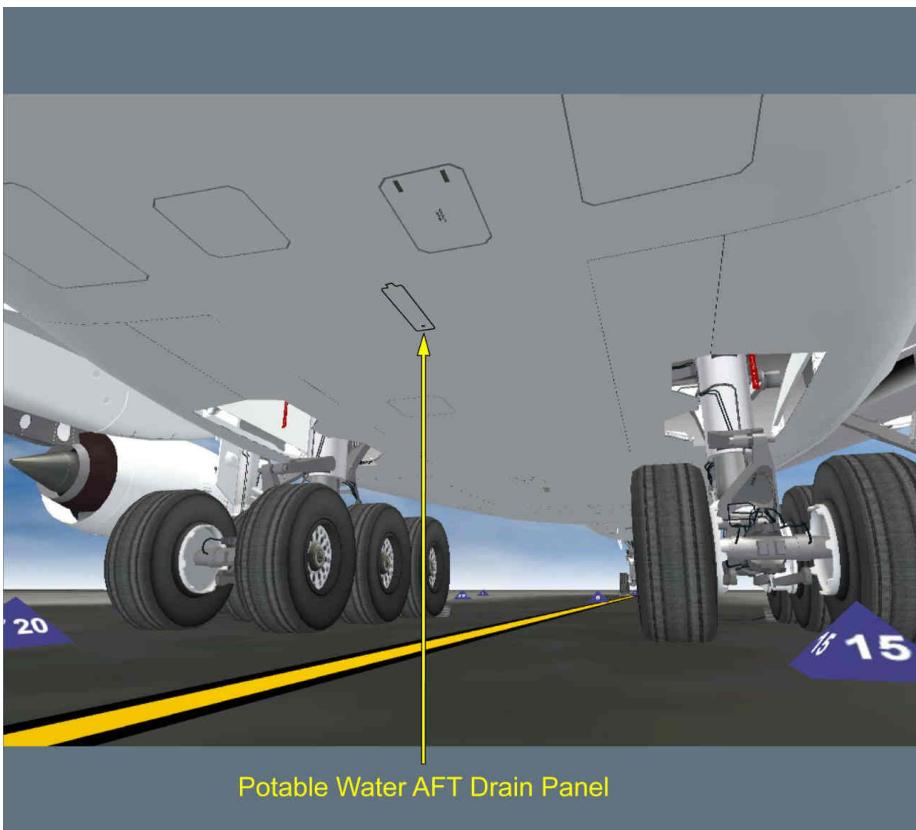


DRAIN MAST.....CHECK CONDITION

- While walking around the fuselage, check the condition of the drain mast.

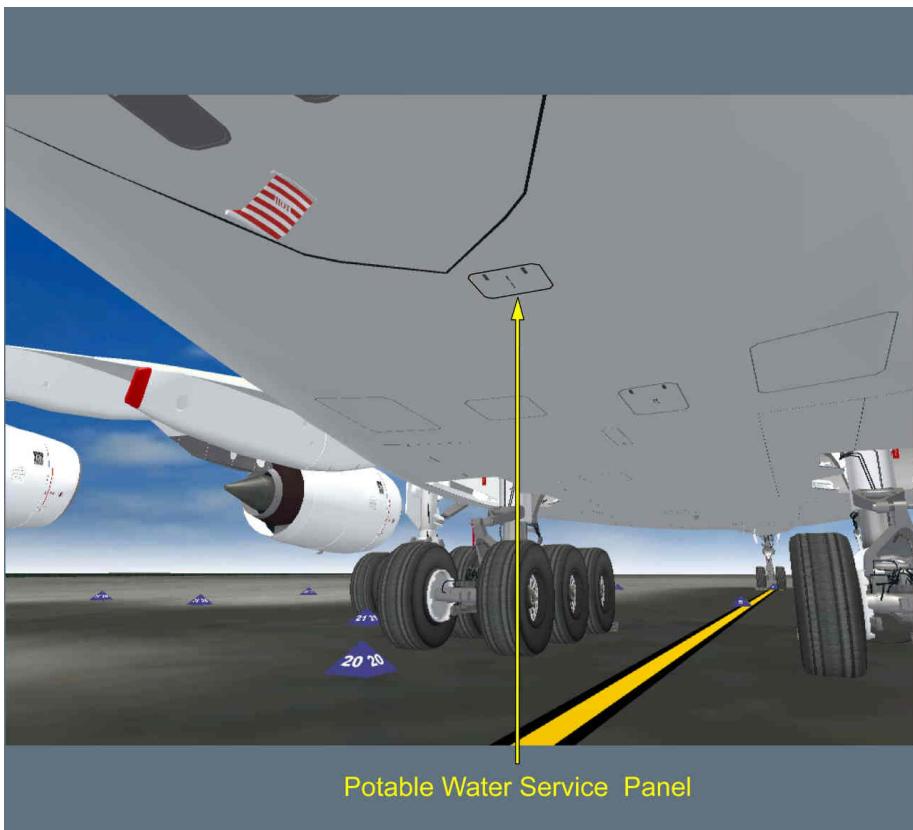


L1 POTABLE WATER AFT DRAIN PANEL.....CLOSED

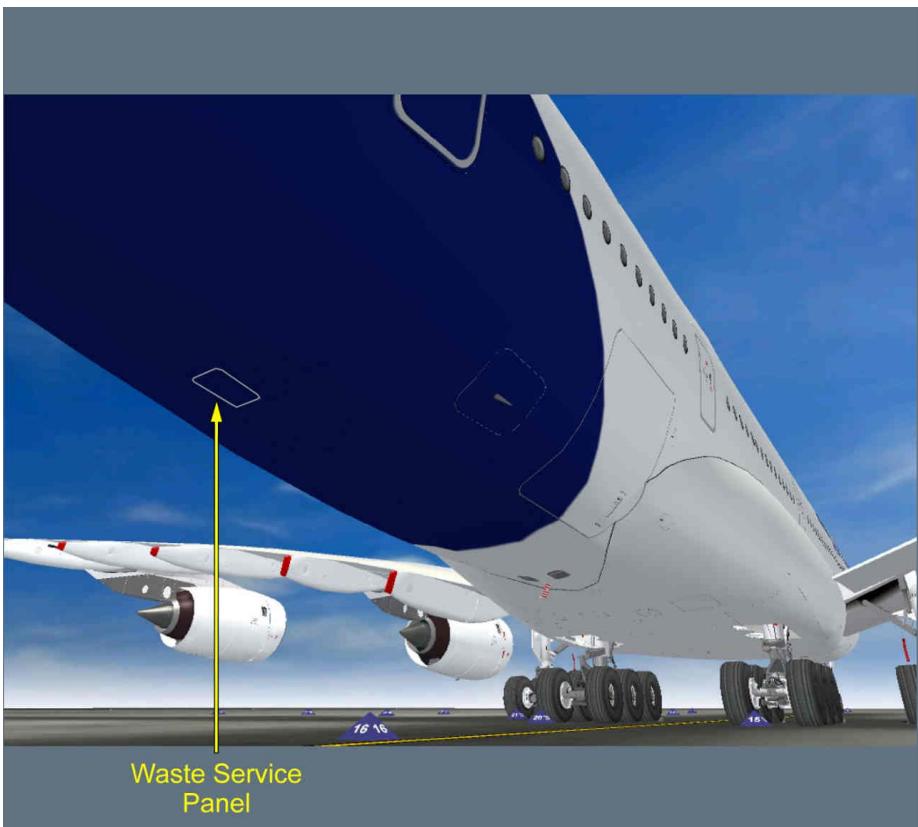


Potable Water AFT Drain Panel

* POTABLE WATER SERVICE PANEL.....CLOSED



* WASTE SERVICE PANEL.....CLOSED

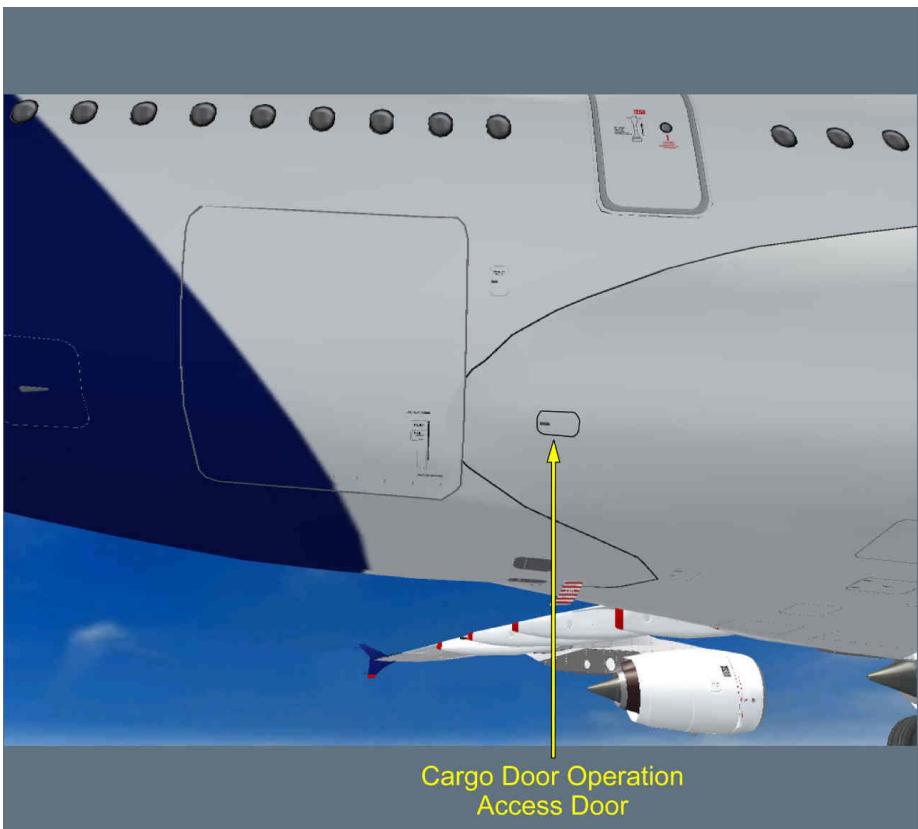


Waste Service
Panel

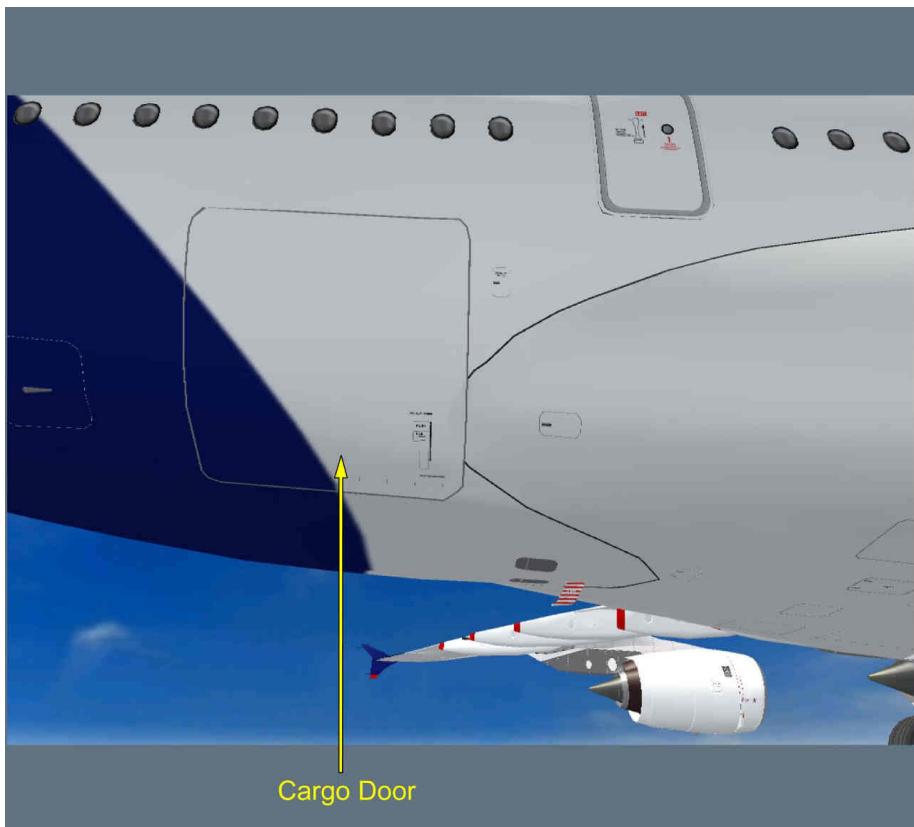
CARGO LOADING OPERATION ACCESS DOOR.....CLOSED



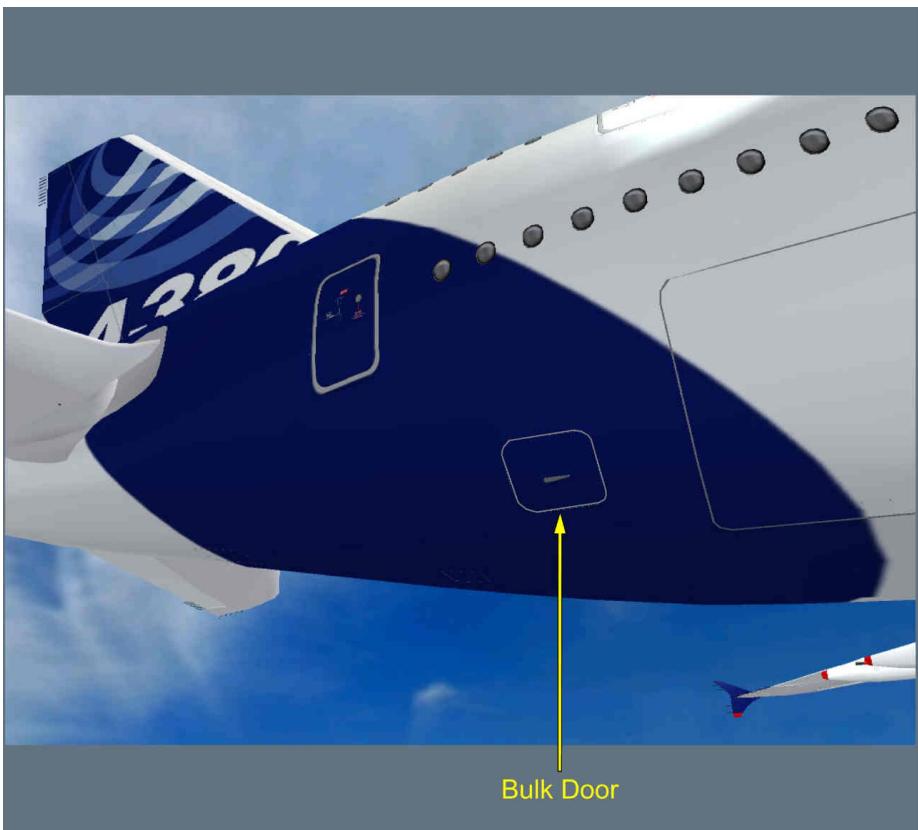
CARGO DOOR OPERATION ACCESS DOOR.....CLOSED



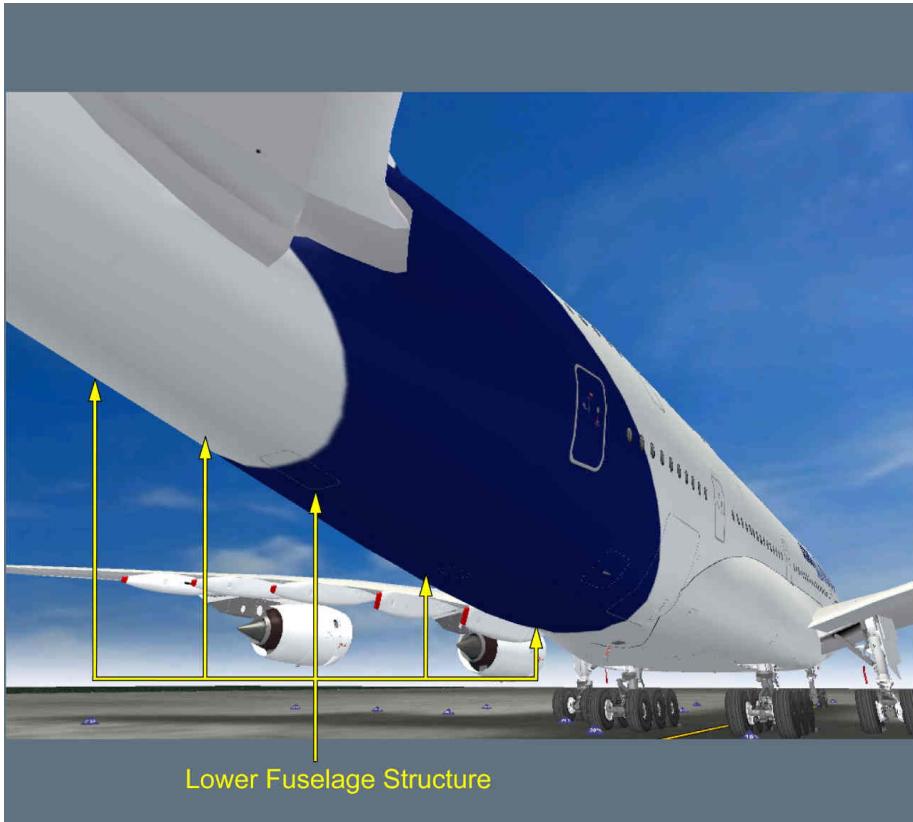
CARGO DOOR..... CLOSED



BULK DOOR.....CLOSED

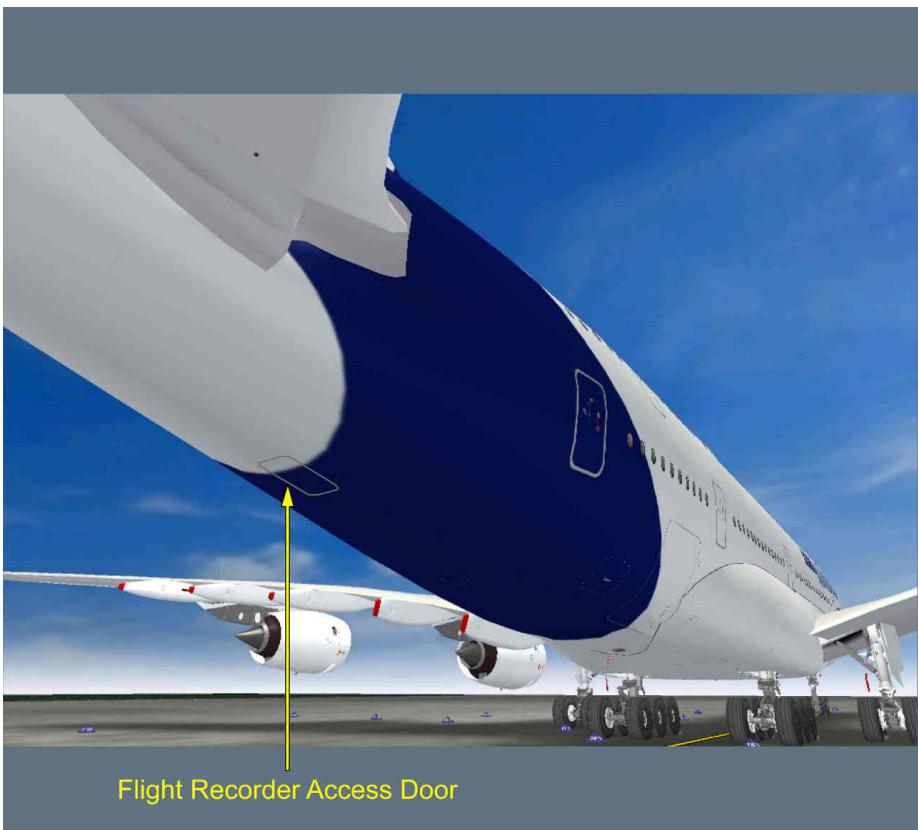


- * LOWER FUSELAGE STRUCTURE (TAILSTRIKE).....CHECK CONDITION
 Check the lower fuselage for damage, that would indicate a tailstrike.



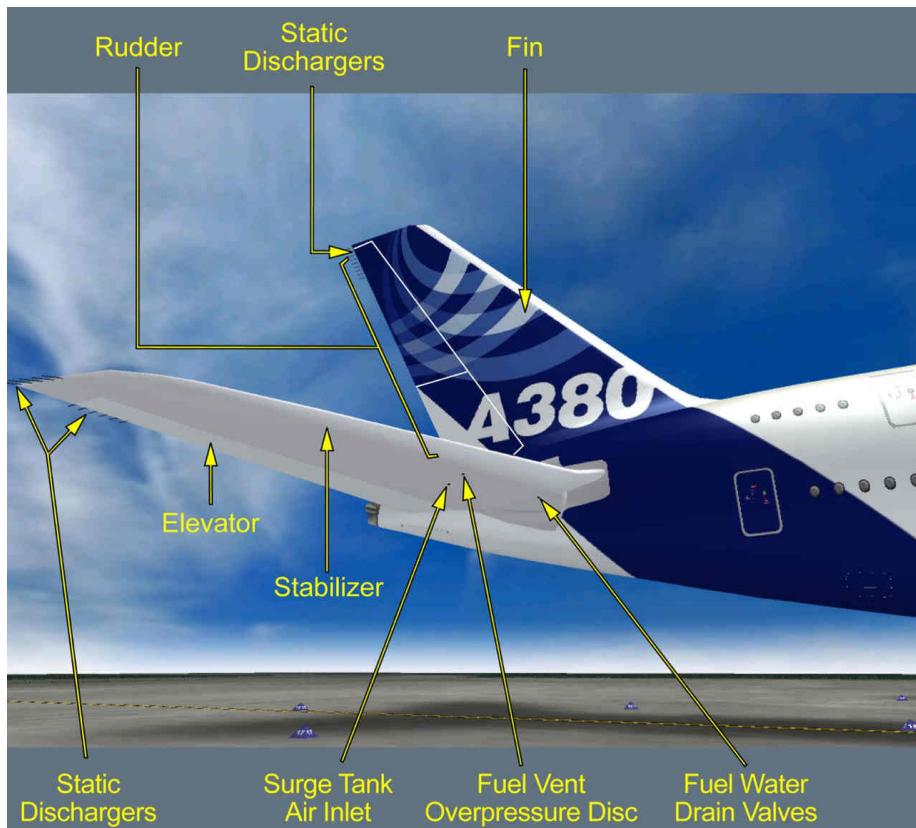
Lower Fuselage Structure

L1 FLIGHT RECORDERS ACCESS DOOR.....CLOSED



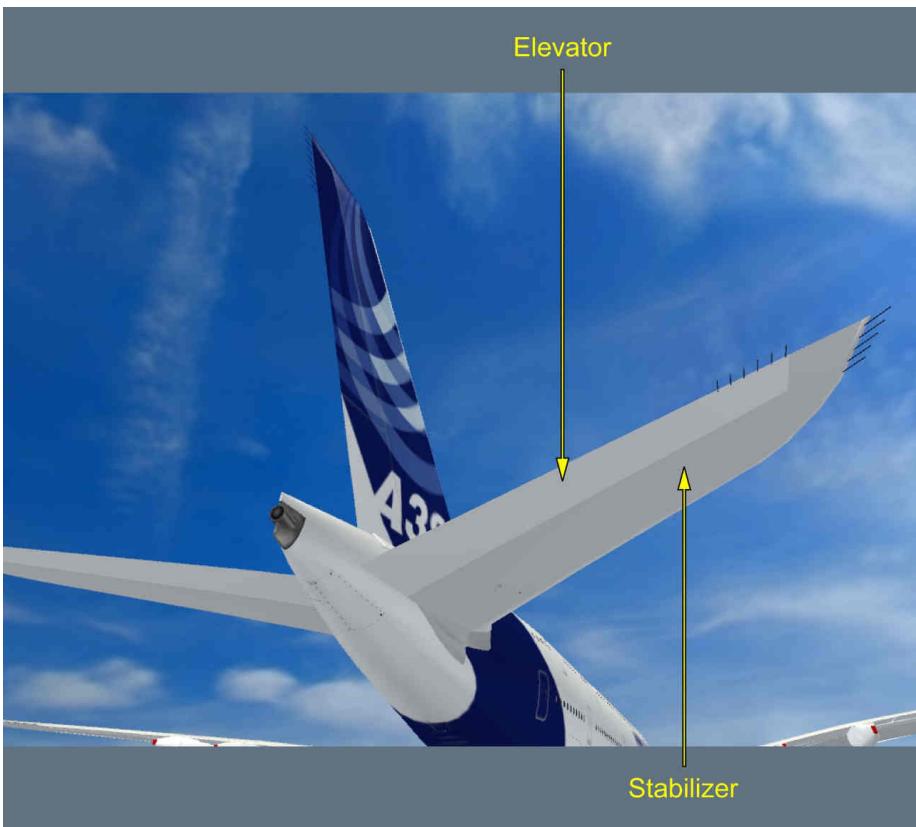
RH TAIL

Applicable to: ALL



* STABILIZER AND ELEVATOR.....CHECK CONDITION

[2] Check the right stabilizer, and elevator to make sure that they are not damaged..



- SURGE TANK AIR INLETCLEAR
 On the right horizontal stabilizer, check that the surge tank air inlet is clear.

Surge Tank Air Inlet



- L1** FUEL WATER DRAIN VALVES..... NO LEAK
 L2 Below the stabilizer, check for leaks from the fuel water drain valves.

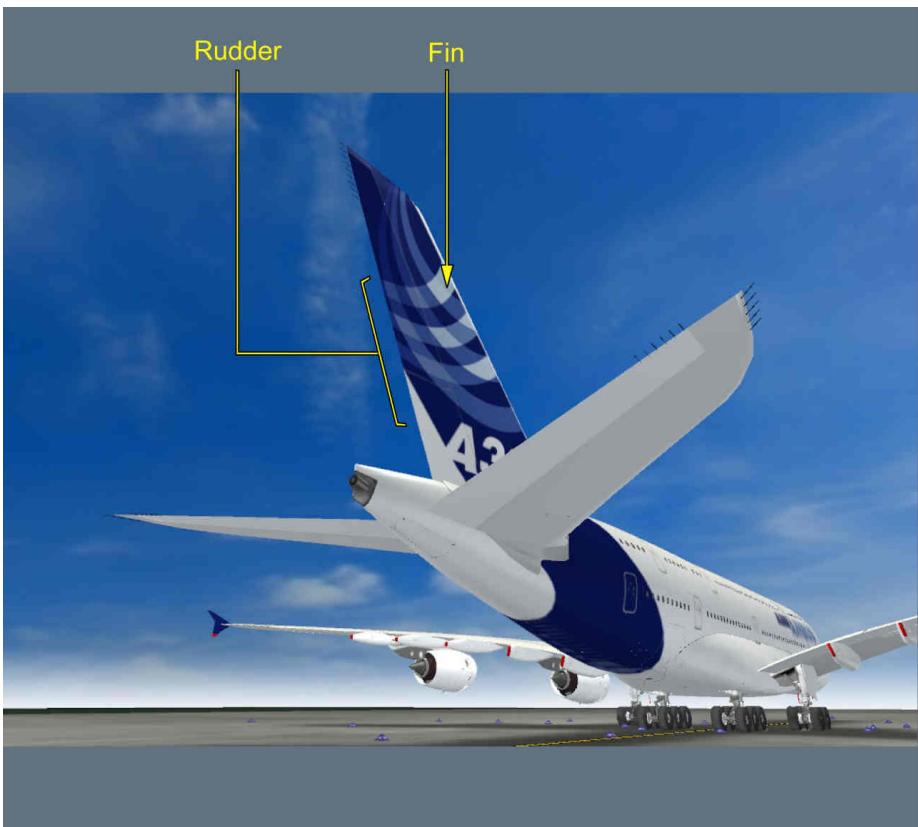


[1] * FUEL VENTILATION OVERPRESSURE DISC.....INTACT

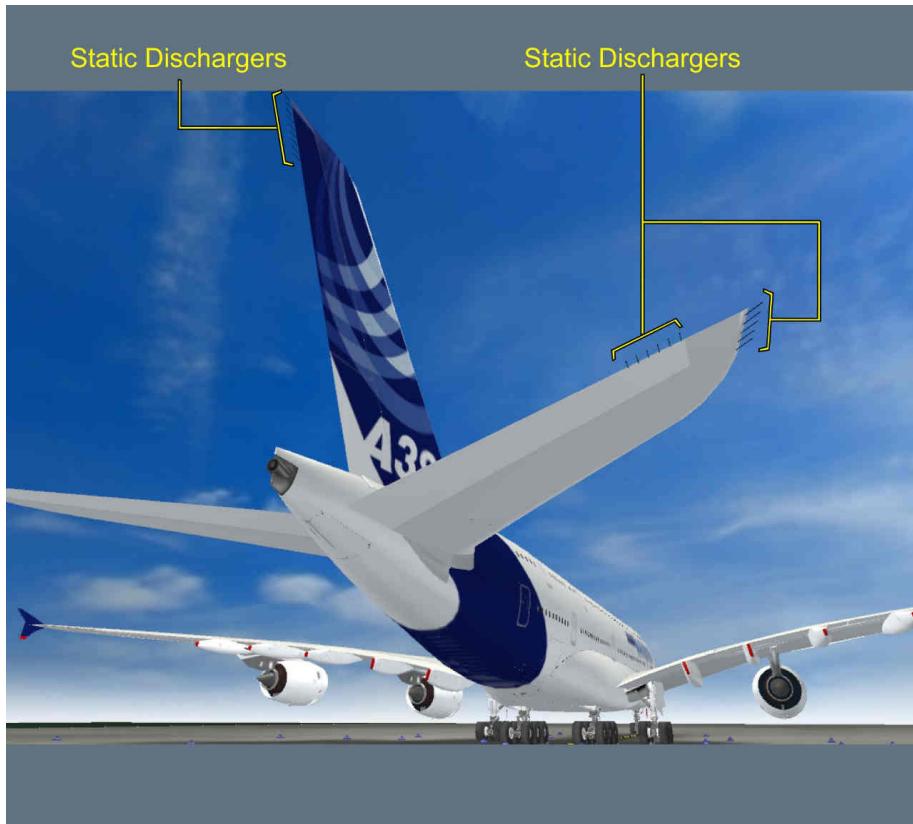


FIN AND RUDDER.....CHECK CONDITION

[2] Check the rudder, and right fin to make sure that they are not damaged.

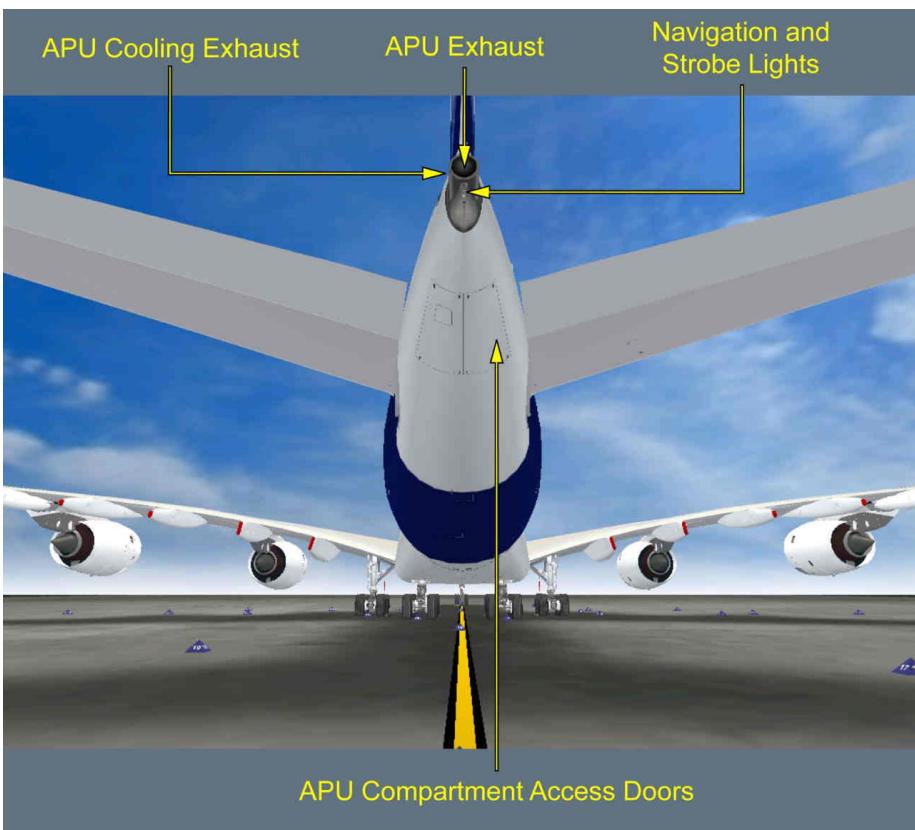


- STATIC DISCHARGERS (elevator and rudder).....CHECK CONDITION
 Check that the static dischargers are not missing or damaged.



APU

Applicable to: ALL

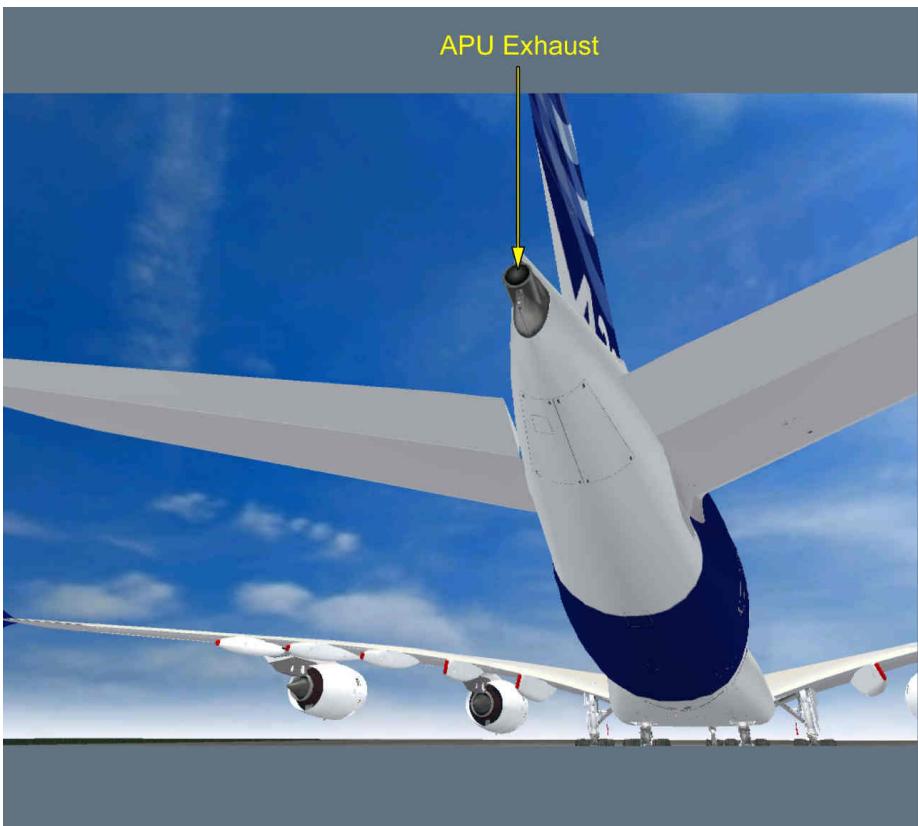


APU COMPARTMENT ACCESS DOORS.....CLOSED



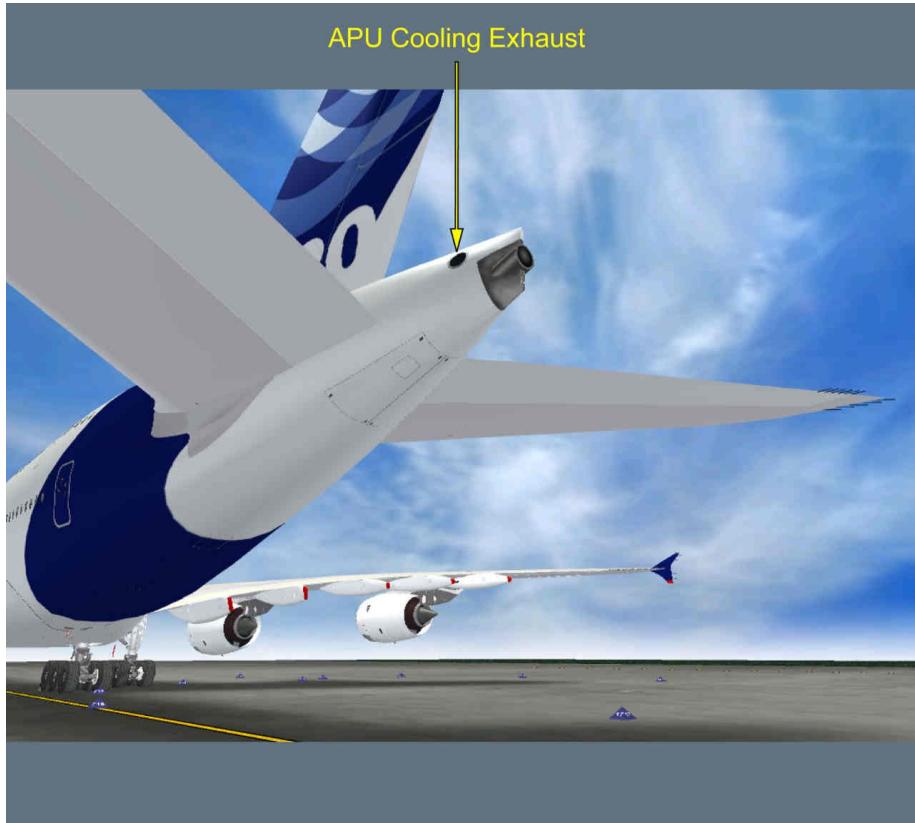
APU EXHAUST.....CLEAR

Check that the APU exhaust is clear of obstruction.



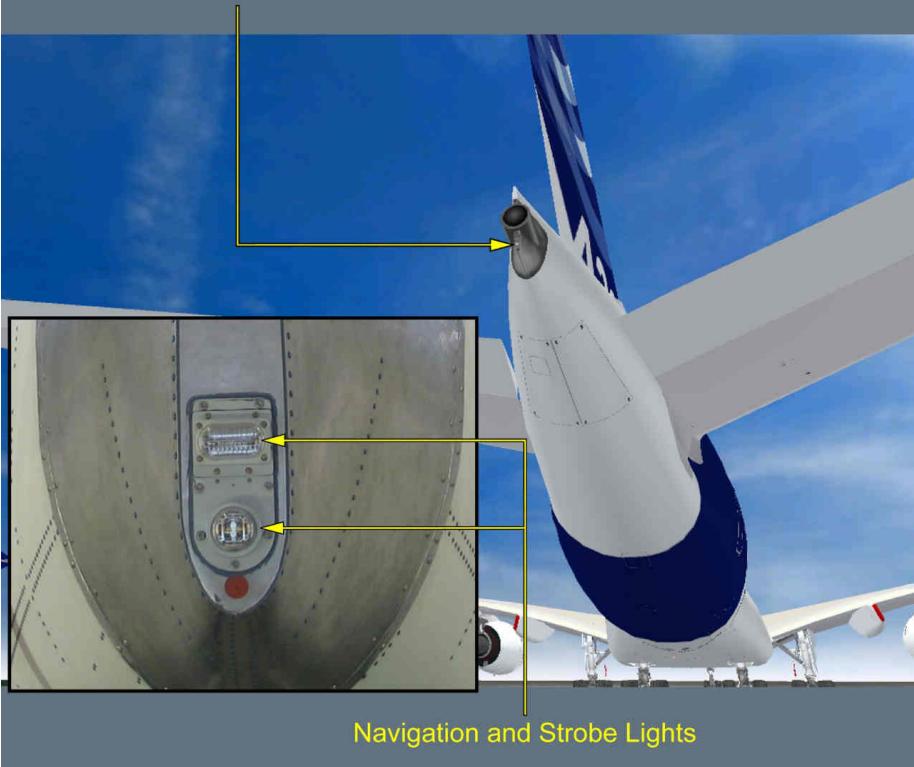
APU COOLING EXHAUSTCLEAR

Check that the APU cooling exhaust is clear of obstruction.



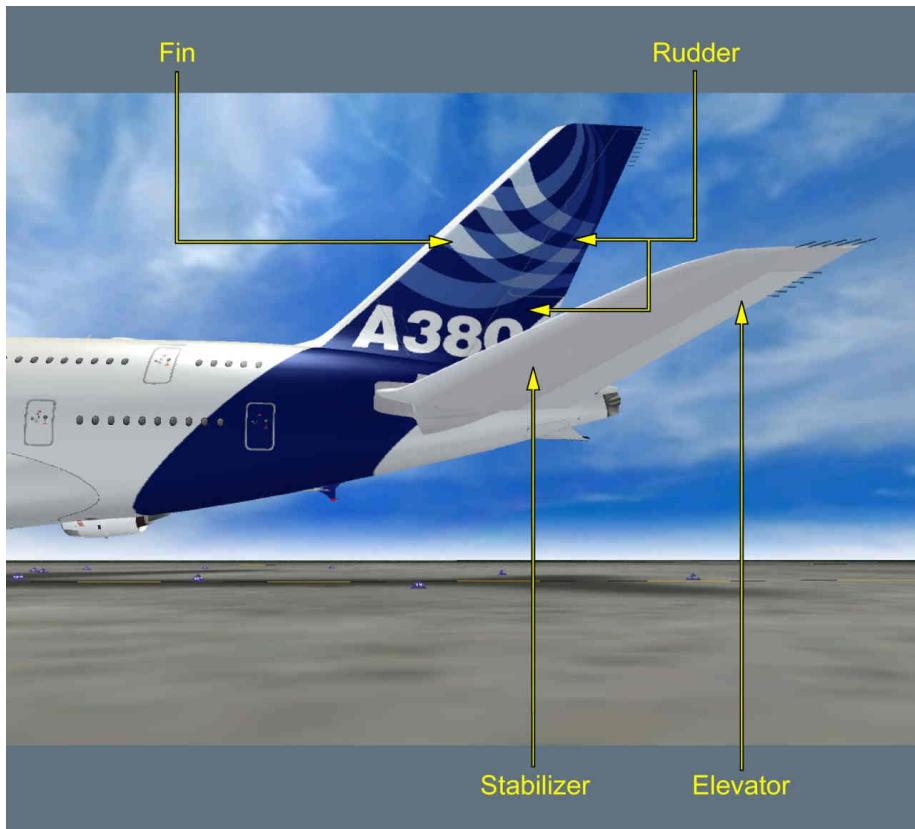
NAVIGATION AND STROBE LIGHTS..... CHECK CONDITION

- Check that the navigation and strobe lights are not damaged.

Navigation and Strobe Lights**Navigation and Strobe Lights**

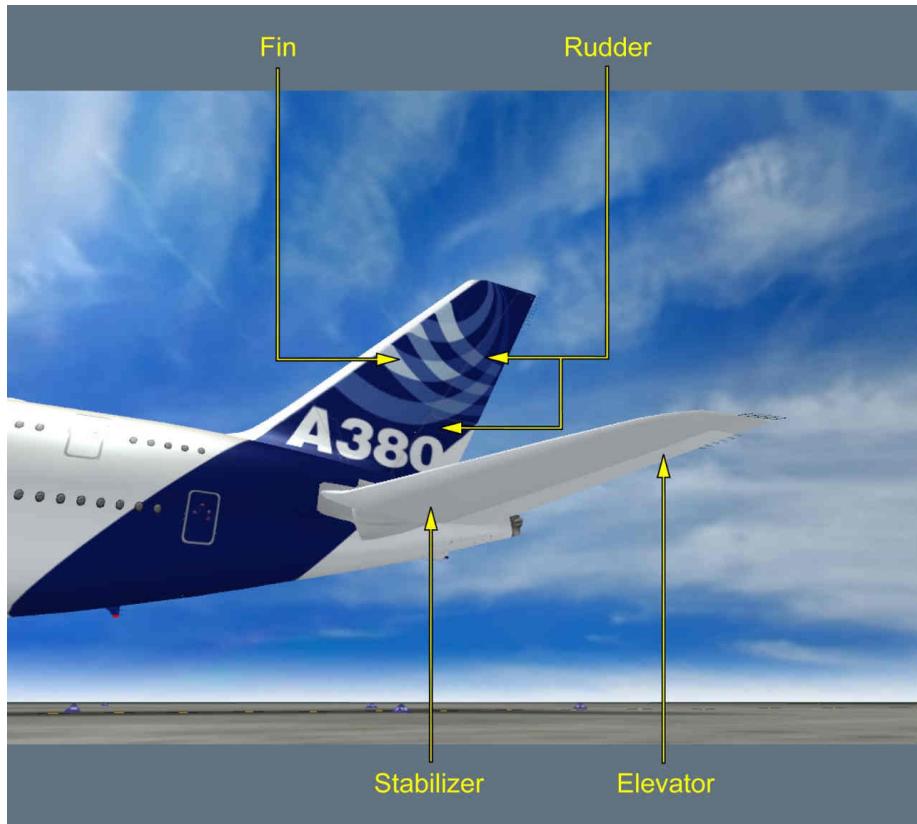
LH TAIL

Applicable to: ALL



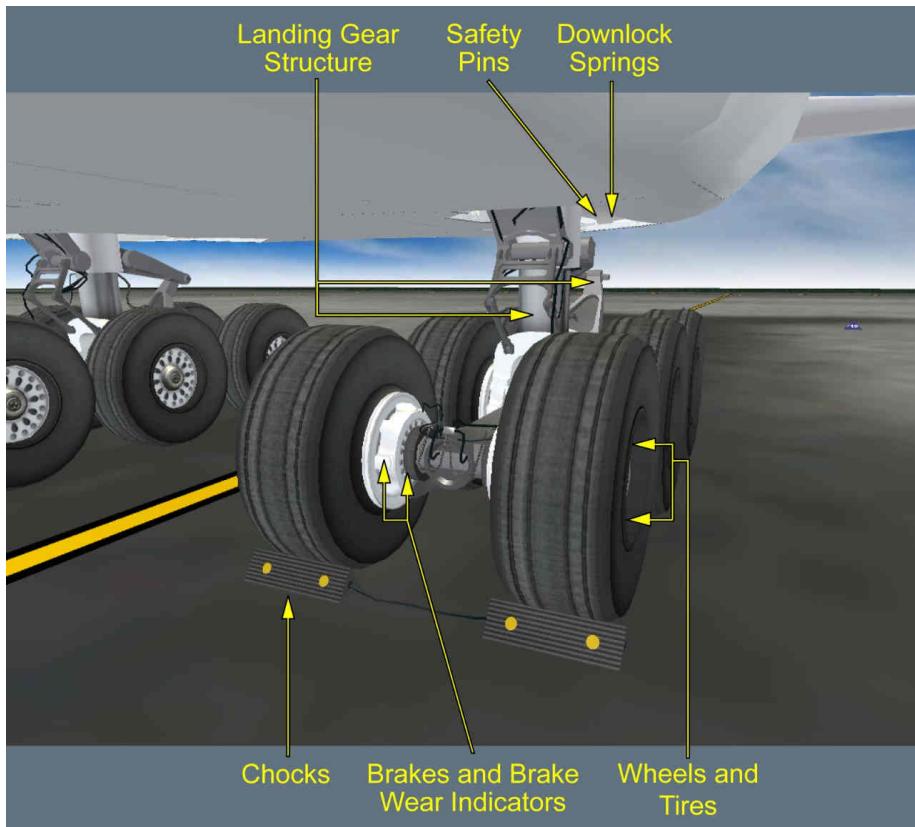
* STABILIZER, ELEVATOR, FIN, AND RUDDER..... CHECK CONDITION

[2] While walking around the left side of the fuselage, check that the left sides of the stabilizer, fin, and rudder are not damaged.

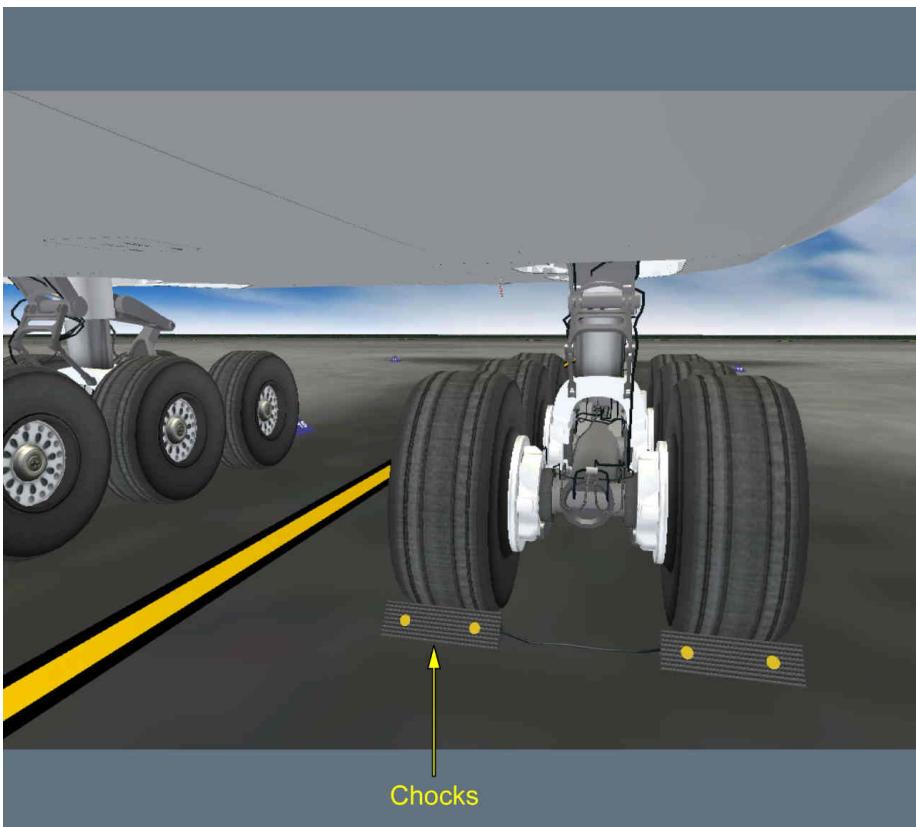


LH BODY LANDING GEAR AND FUSELAGE

Applicable to: ALL



* CHOCKS..... REMOVED

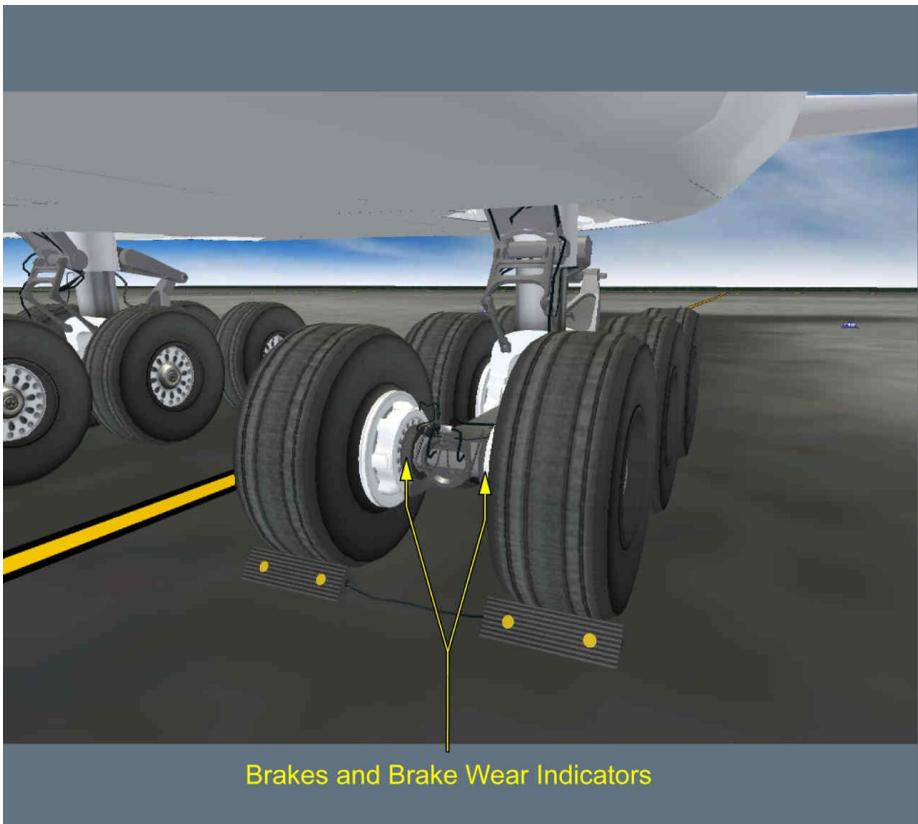


* WHEELS AND TIRES..... CHECK CONDITION

Check the wheels and tires for wear, cuts, and cracks.

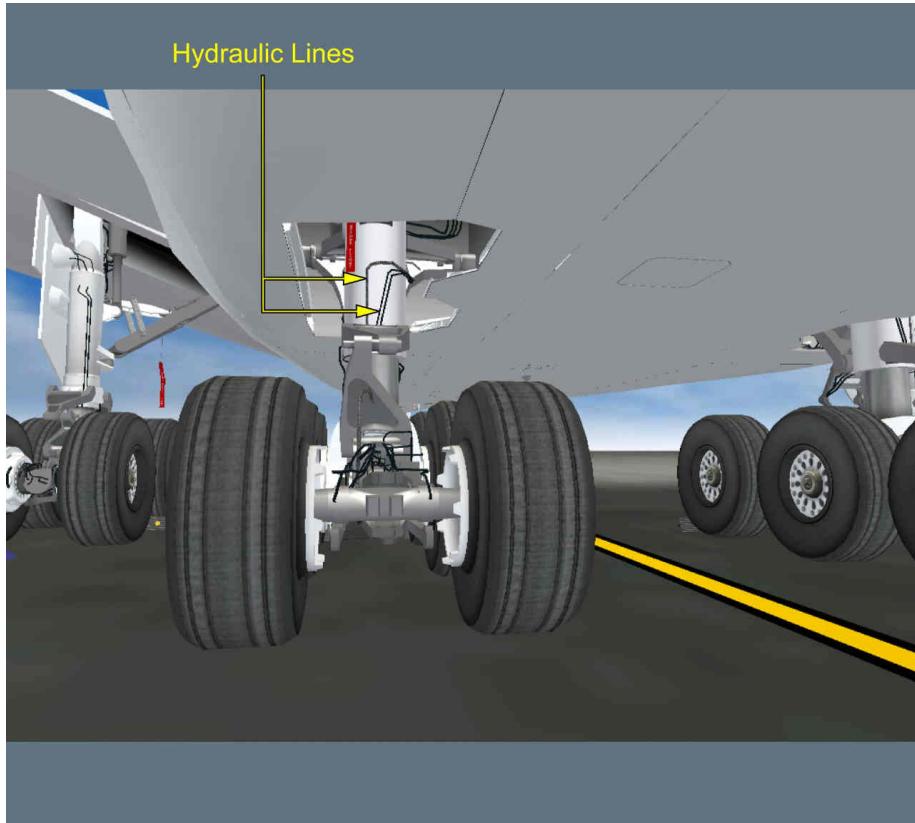


- 1 BRAKES AND BRAKE WEAR INDICATORS.....CHECK CONDITION**
- Check the brakes for wear and the position of the brake wear pin: If the pin is almost flush with the guide, the brake must be replaced.*

**Brakes and Brake Wear Indicators**

HYDRAULIC LINES.....CHECK CONDITION

Check the condition of the hydraulic lines, and make sure that there are no leaks.

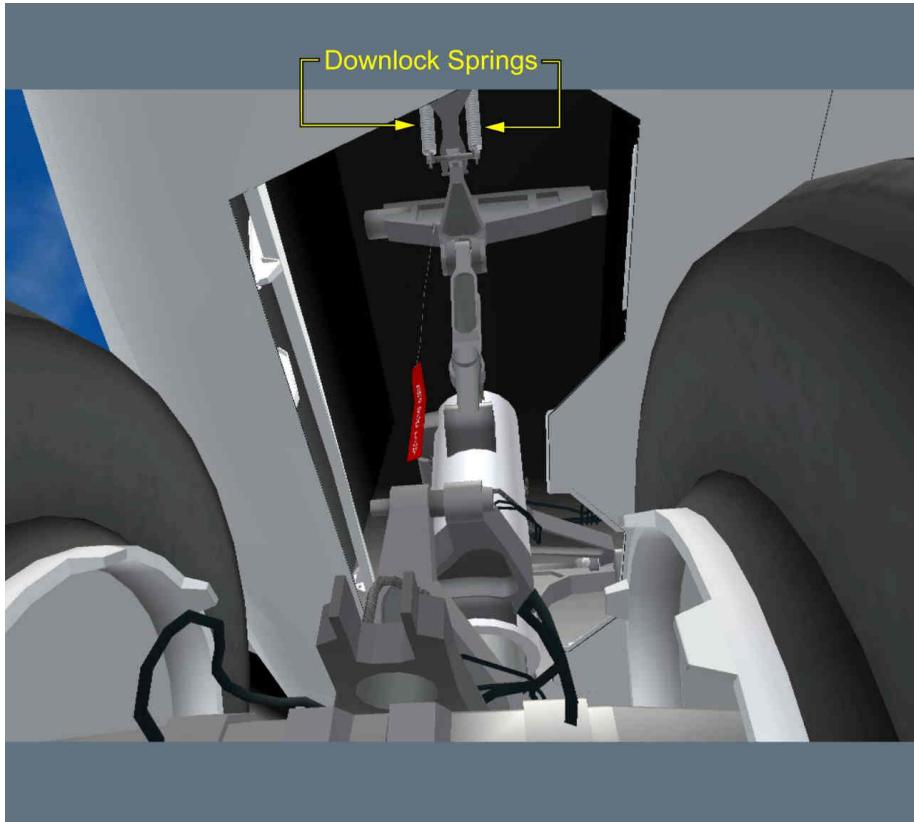


- L1 LANDING GEAR STRUCTURE.....CHECK CONDITION
 L2 Check that the landing gear structure is not damaged.

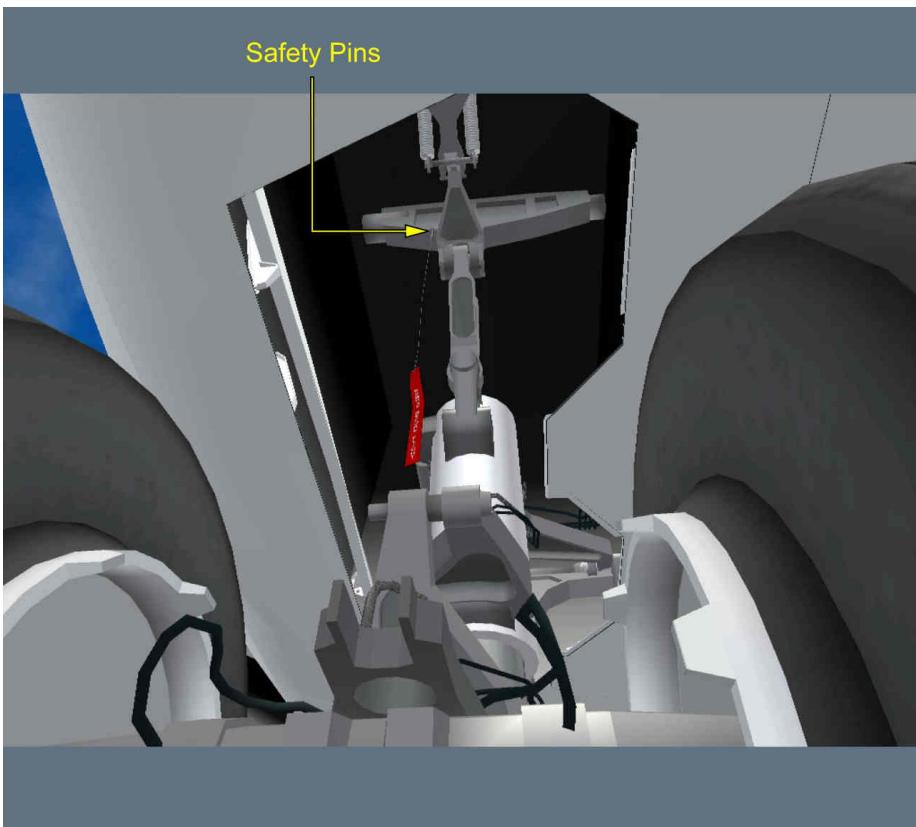


DOWNLOCK SPRINGS.....CHECK CONDITION

From the front of the landing gear, check the condition of the downlock springs.

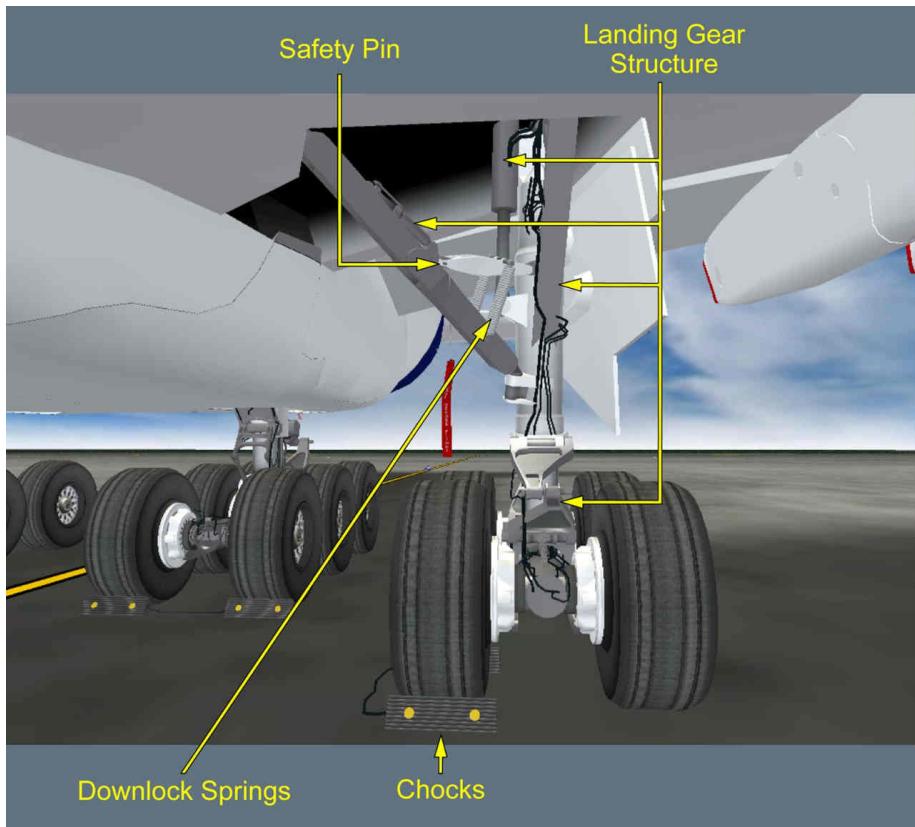


L1 SAFETY PINS..... REMOVED

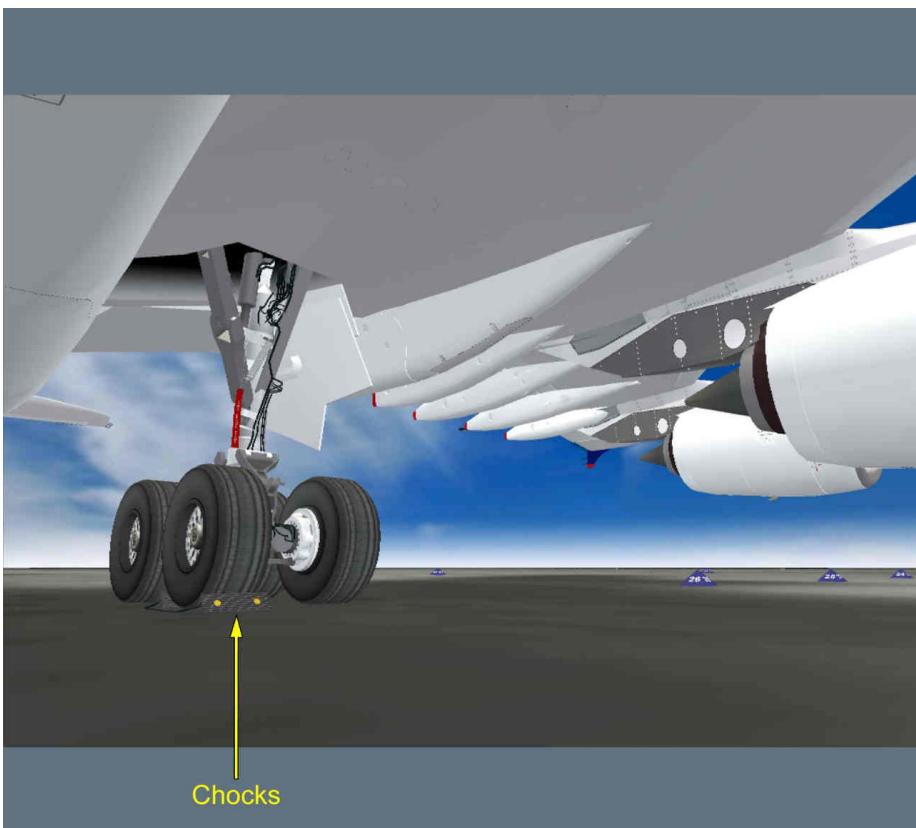


LH WING LANDING GEAR

Applicable to: ALL

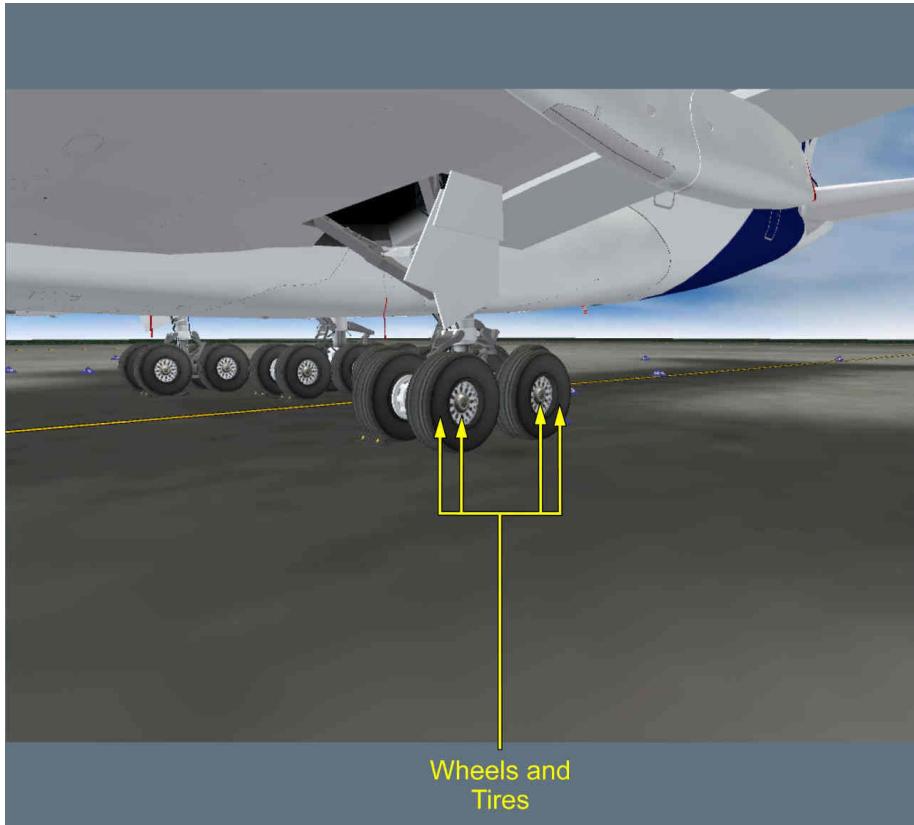


* CHOCKS..... REMOVED

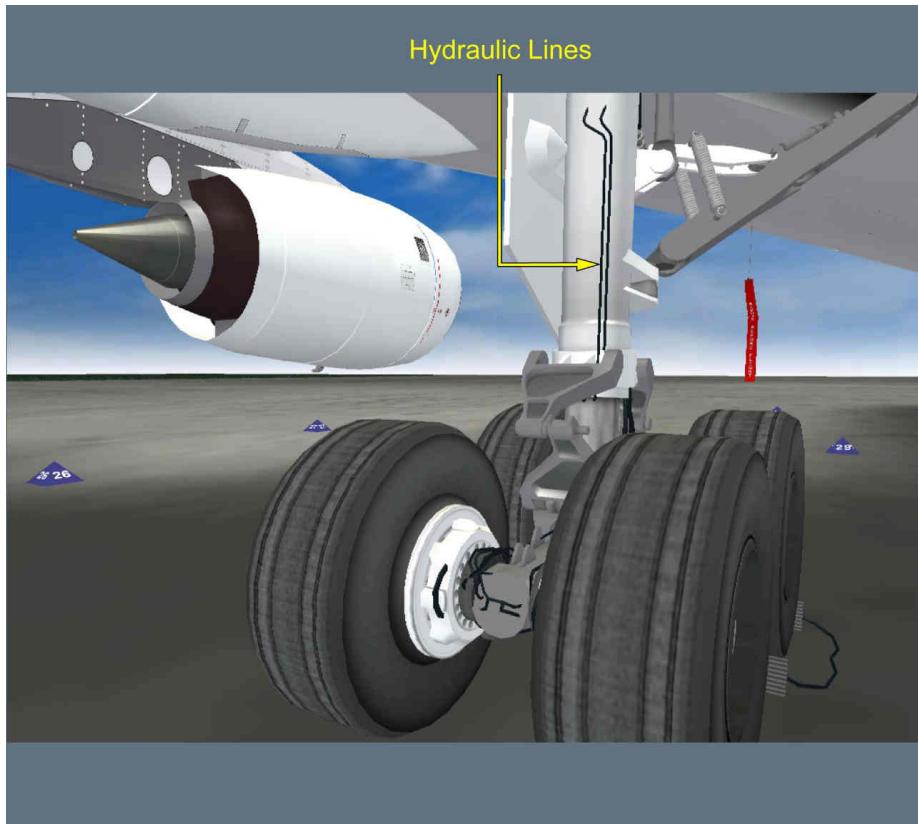


* WHEELS AND TIRES..... CHECK CONDITION

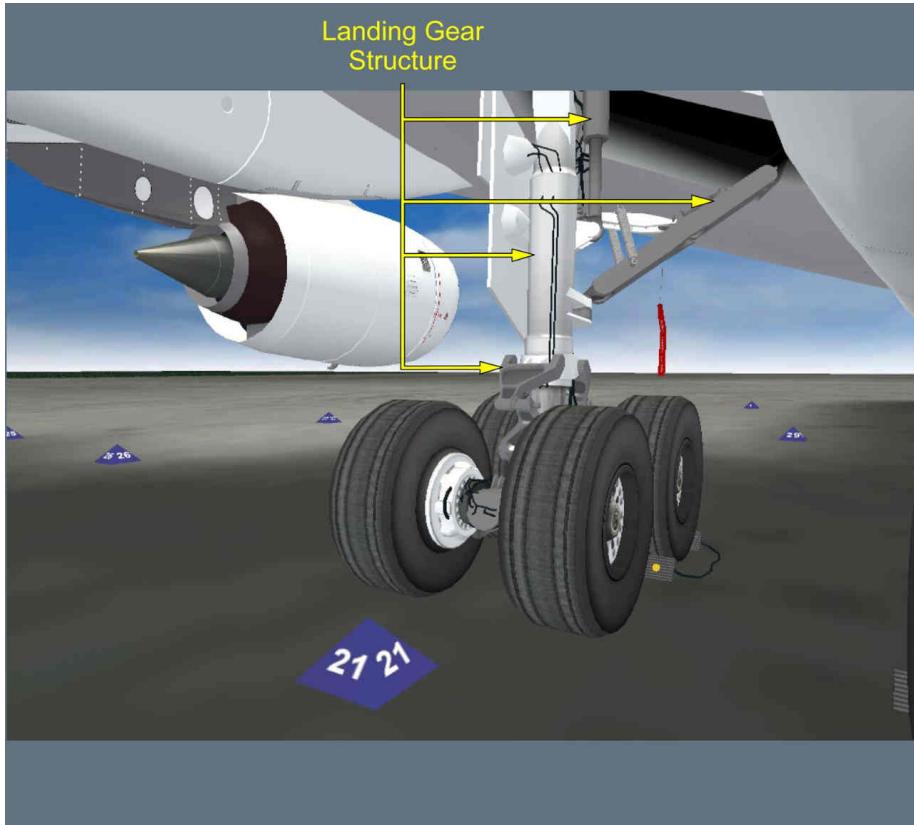
Check the wheels and tires for wear, cuts, and cracks.



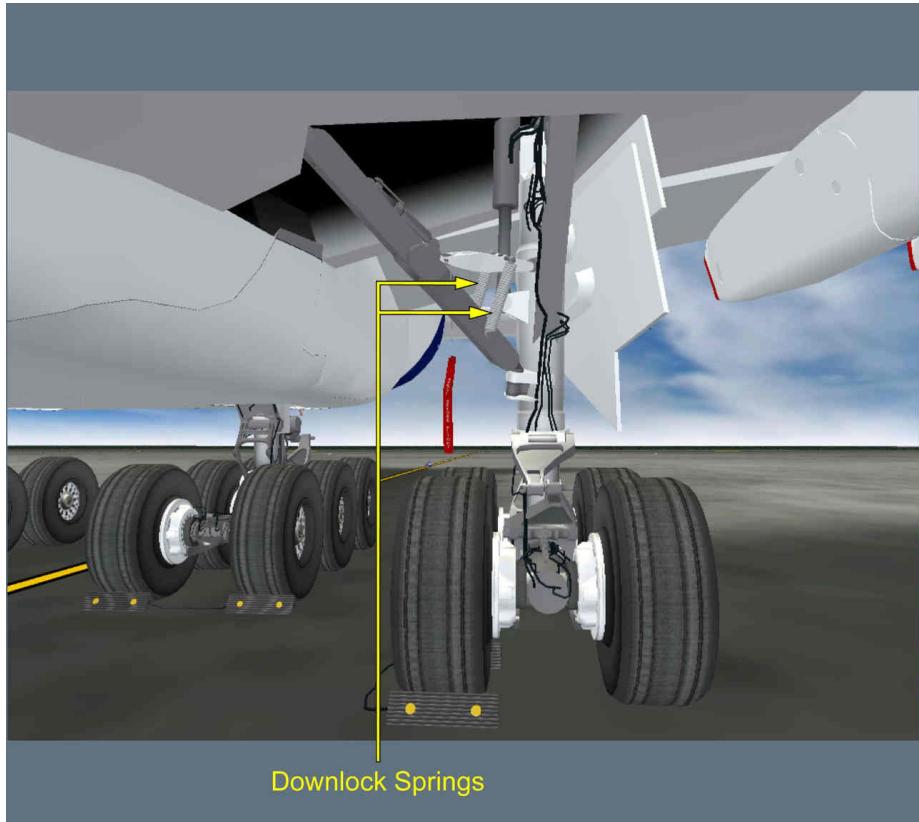
- L1** HYDRAULIC LINES.....CHECK CONDITION
 Check the condition of the hydraulic lines, and make sure there are no leaks.



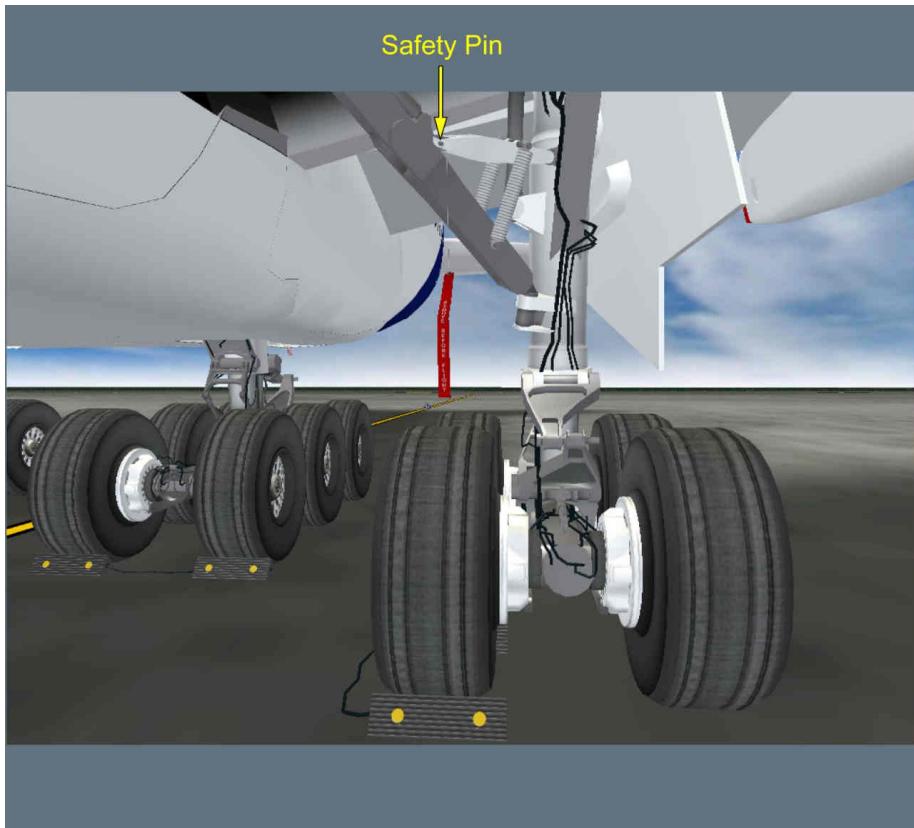
- LANDING GEAR STRUCTURE.....CHECK CONDITION
 Check that the landing gear structure is not damaged.



- L1 DOWNLOCK SPRINGS.....CHECK CONDITION
From the front of the landing gear, check the condition of the downlock springs.

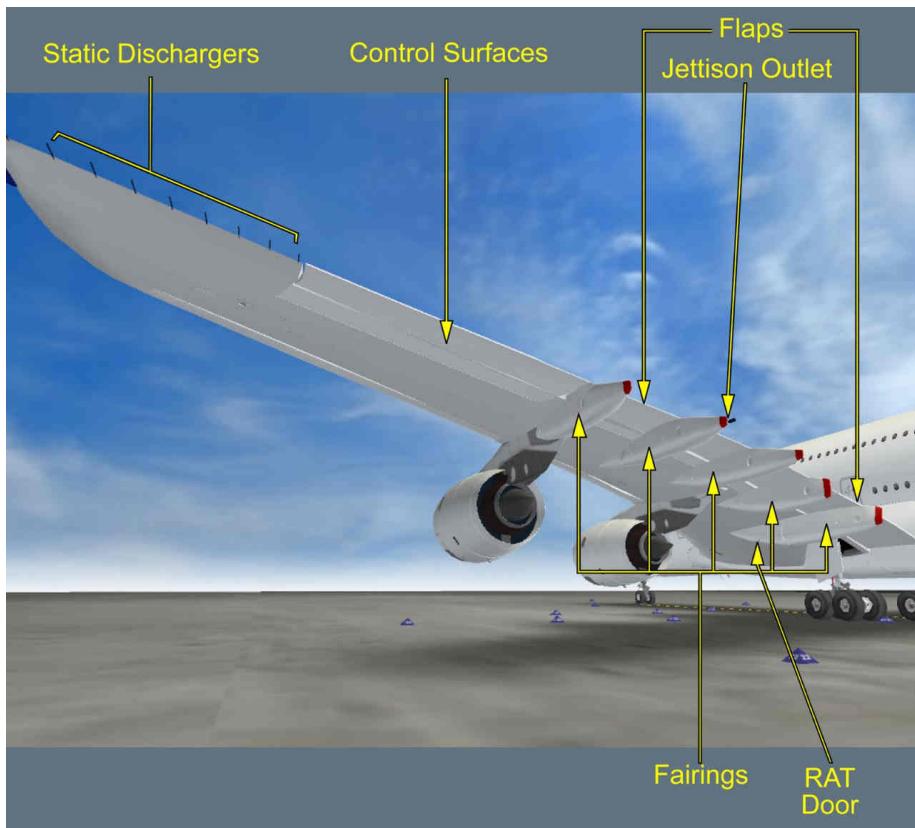


SAFETY PIN..... REMOVED



LH WING TRAILING EDGE

Applicable to: ALL

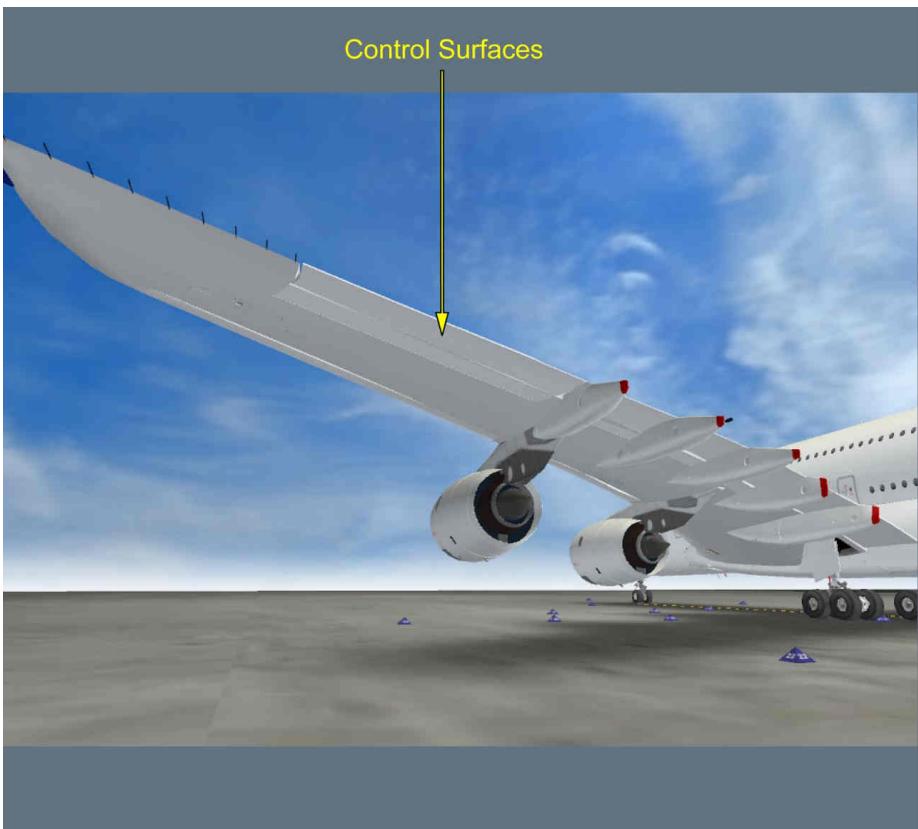


EMERGENCY RAT DOORS.....CLOSED

- Check that the emergency RAT doors on the flap track fairing N° 2 are closed.

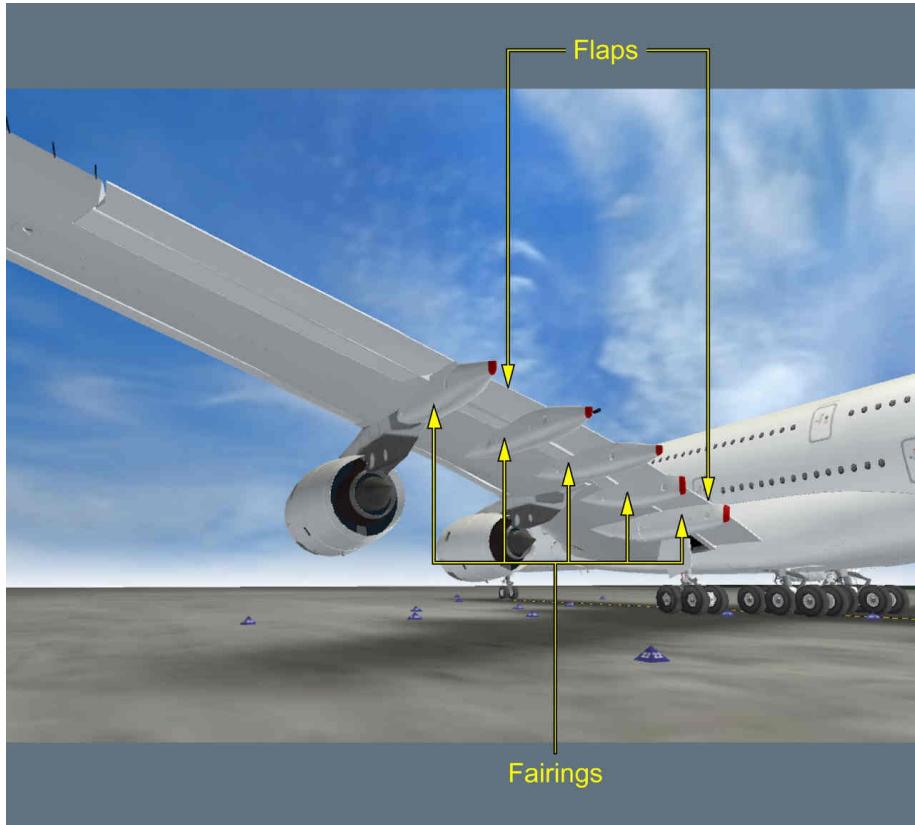


- L1 * CONTROL SURFACES.....CHECK CONDITION
 L2 Check that the control surfaces are not damaged.



* FLAPS AND FAIRINGS.....CHECK CONDITION

Check that the flaps and flap track fairings are not damaged.



L1 STATIC DISCHARGERS.....CHECK

Check that the static dischargers are not missing or damaged.

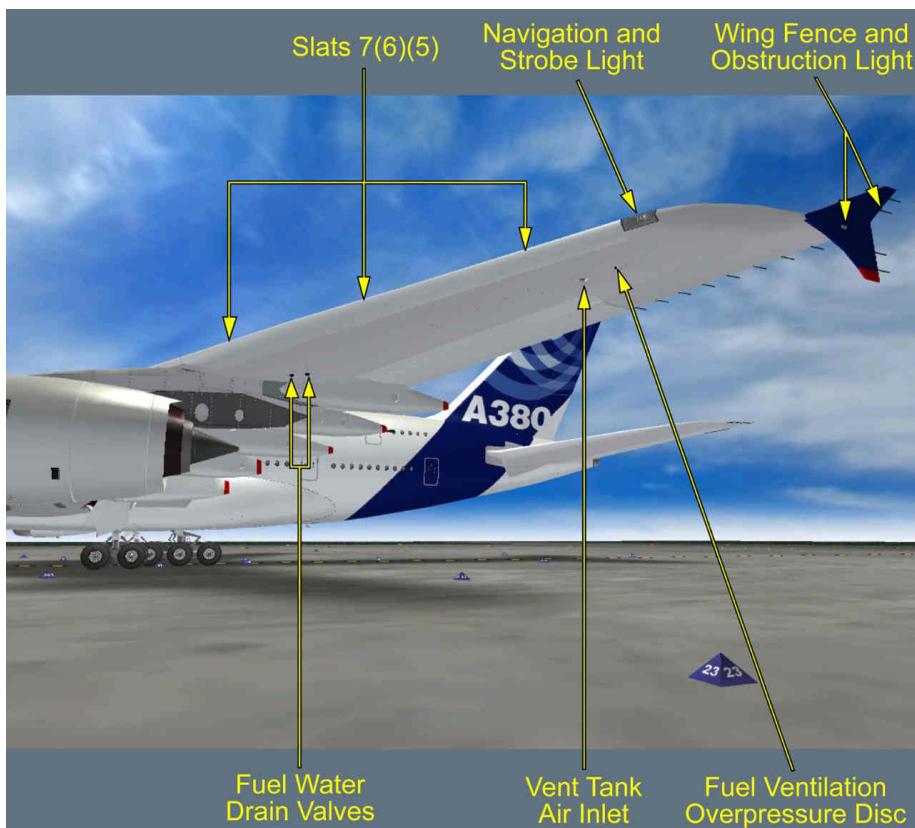


L1 JETTISON OUTLET..... NO LEAK



LH WING TIP

Applicable to: ALL

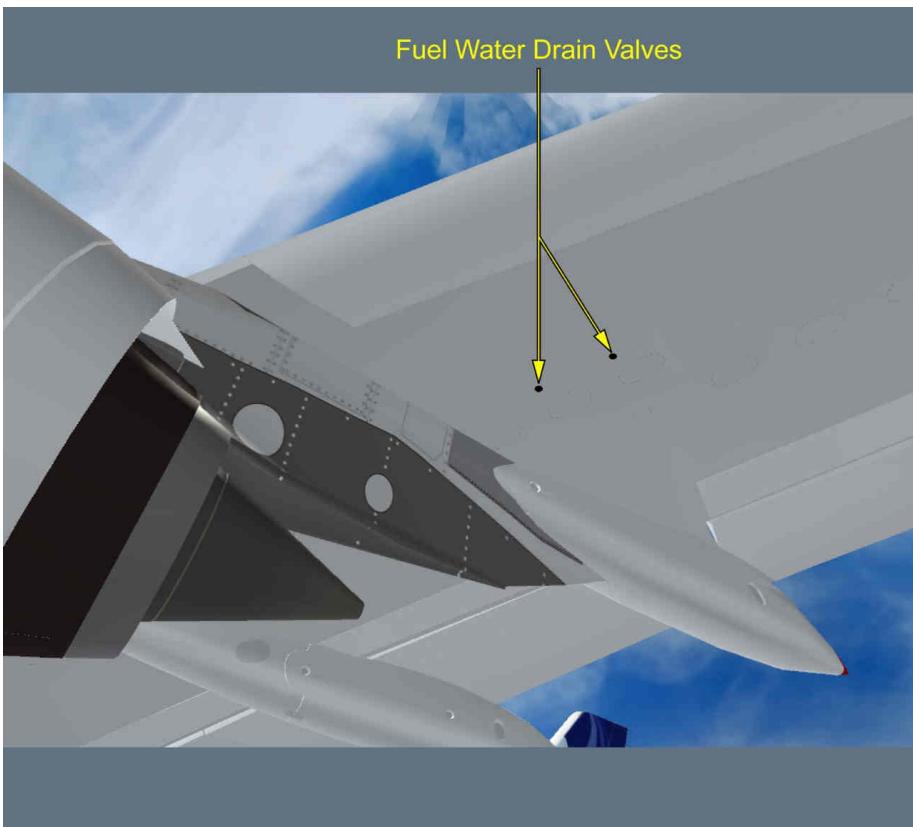
**NAVIGATION AND STROBE LIGHT.....CHECK CONDITION**

- Check the condition of the navigation and strobe lights, and make sure that the protective cover is not damaged.

Navigation and Strobe Light



FUEL WATER DRAIN VALVES..... NO LEAK



VENT TANK AIR INLET..... CLEAR

Check that the vent tank air inlet is clear of obstruction.



* FUEL VENTILATION OVERPRESSURE DISC.....INTACT



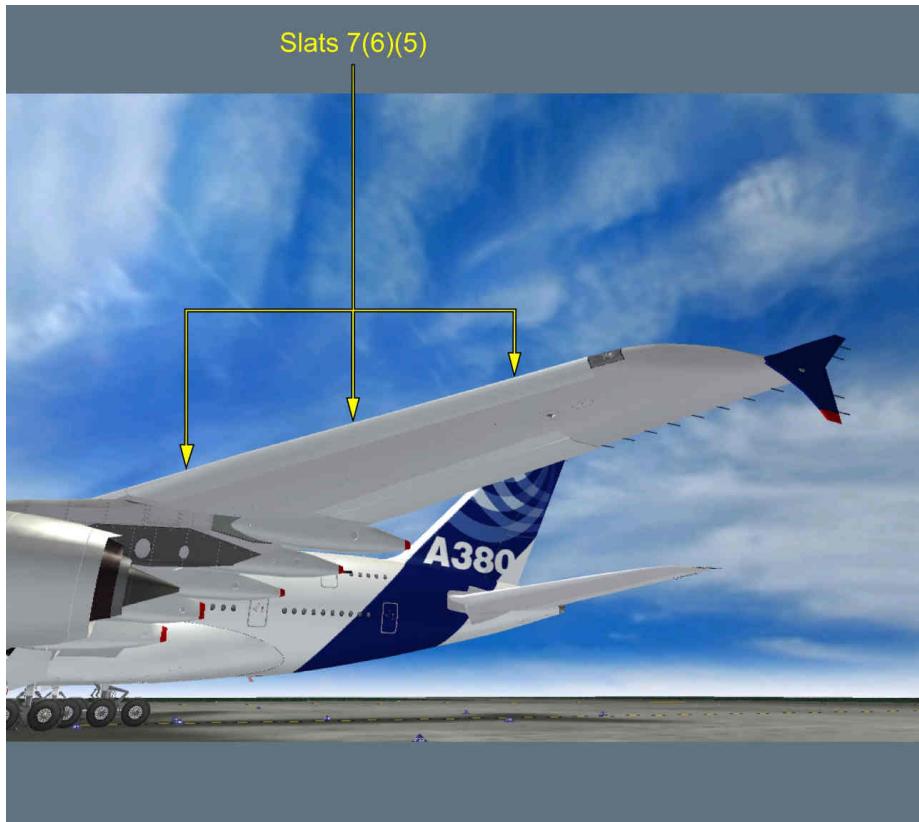
WING FENCE AND OBSTRUCTION LIGHT.....CONDITION

Check the condition of the wing fence and obstruction light, and make sure that the protective cover is not damaged.

Wing Fence and Obstruction Light

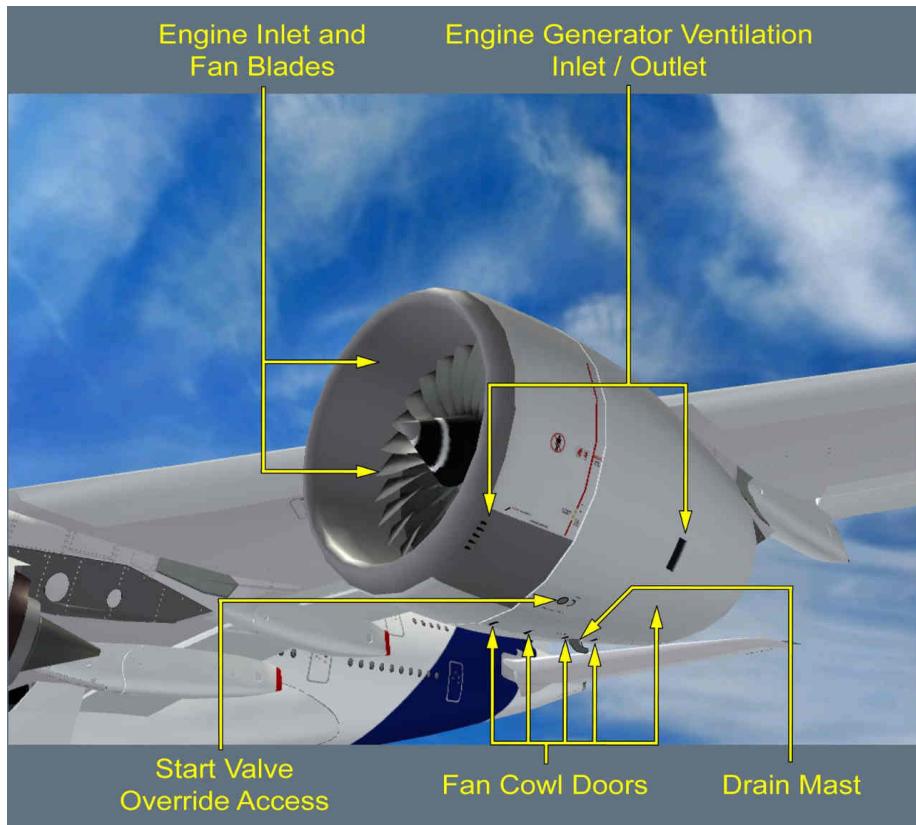


- L1* SLATS 7, 6, 5.....CHECK CONDITION
 L2 Check the slats are not damaged.



ENG 1 LH SIDE

Applicable to: ALL

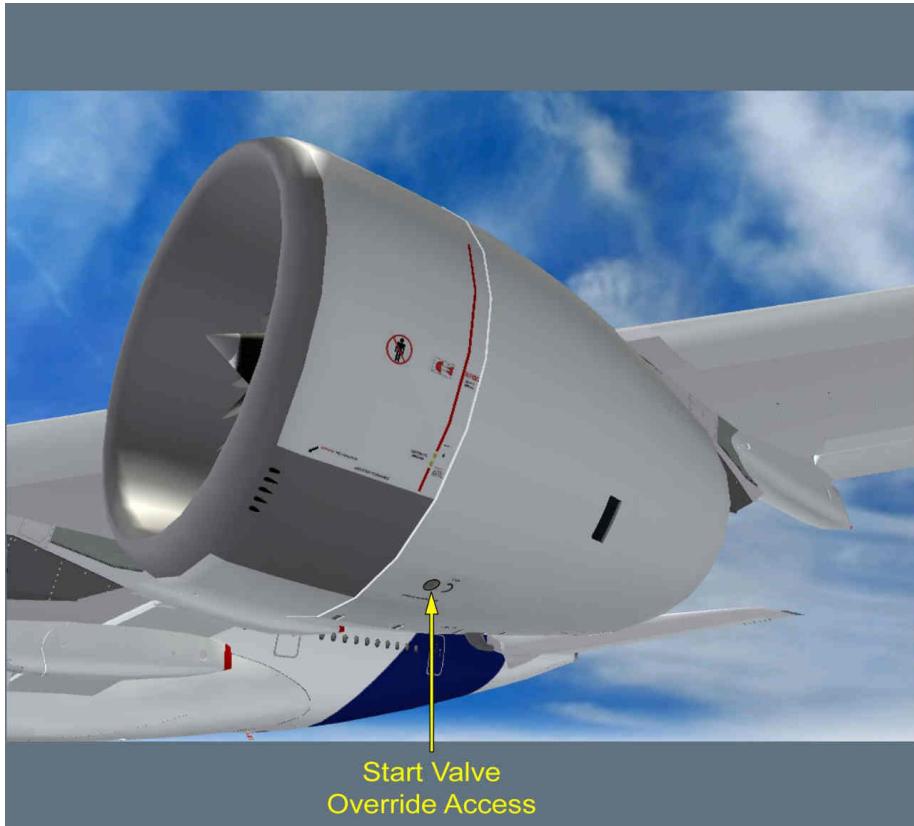


ENGINE GENERATOR VENTILATION INLET/OUTLET.....CHECK CONDITION

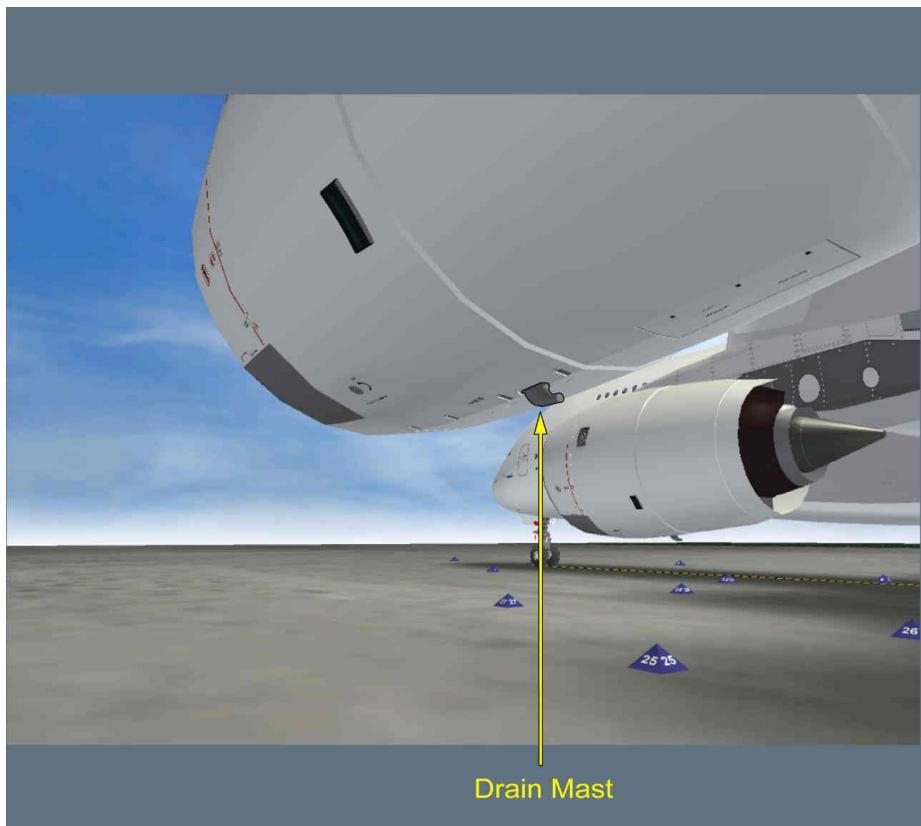
- [2] Check that the engine generator ventilation inlet/outlet is clear of obstruction.

**Engine Generator Ventilation
Inlet / Outlet**

START VALVE OVERRIDE ACCESS.....CLOSED

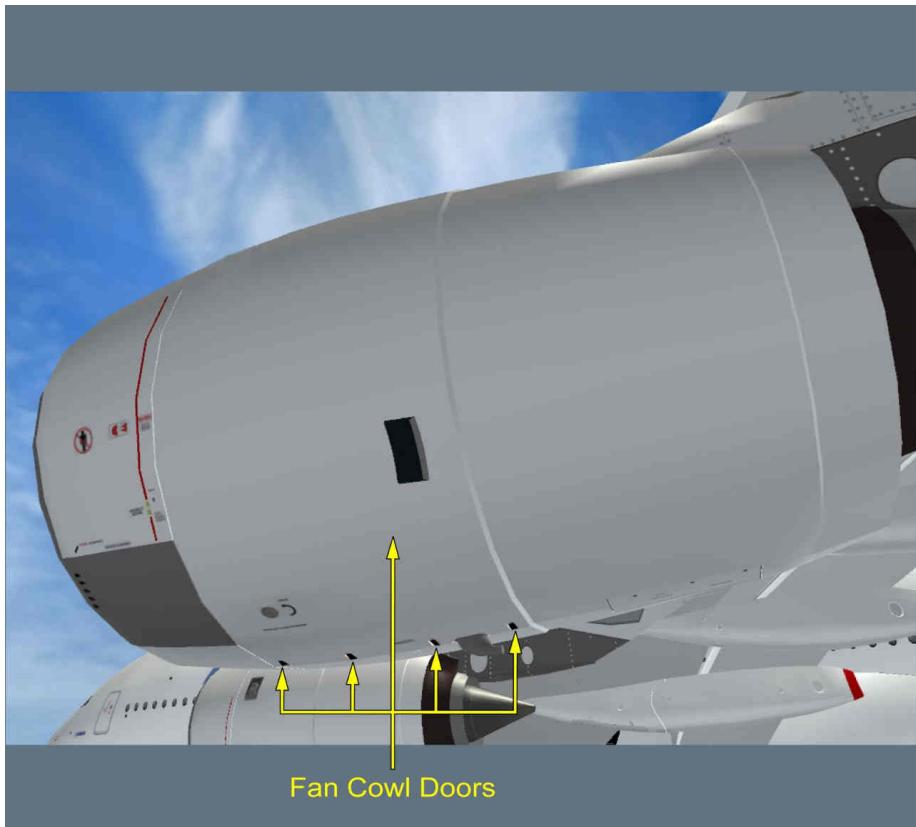


* DRAIN MAST.....CHECK CONDITION/NO LEAK
 Under the engine, check the condition of the drain mast, and make sure that there are no leaks.

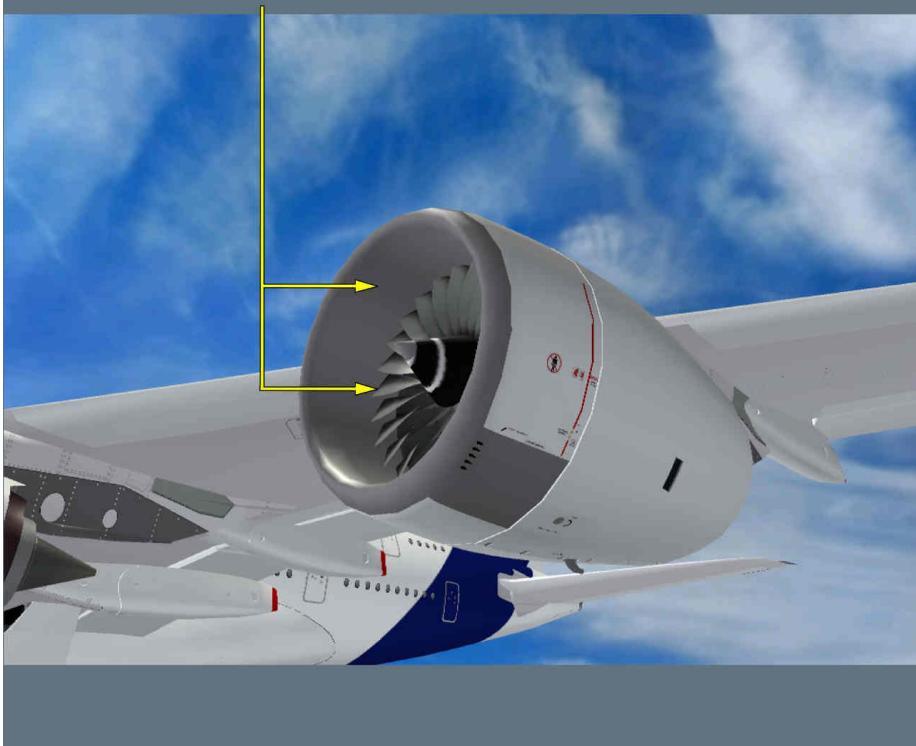


Drain Mast

* FAN COWL DOORS.....CLOSED AND LATCHED

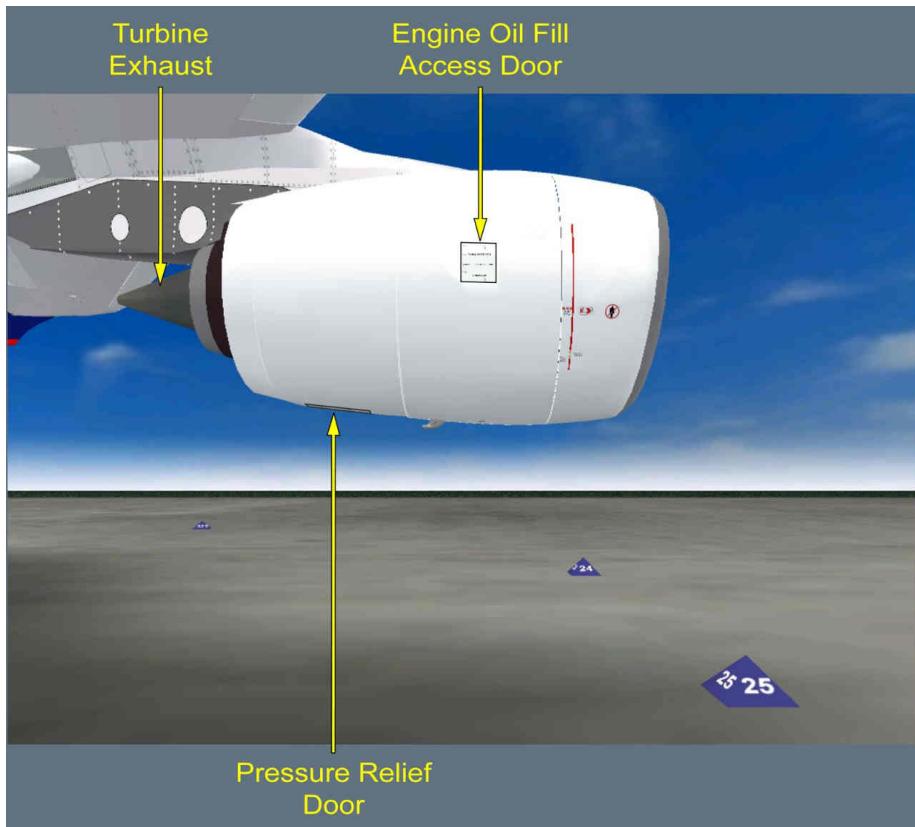


* ENGINE INLET AND FAN BLADES.....CHECK CONDITION
 Check the engine inlet and the fan blades for any significant dents, bending, or damage.

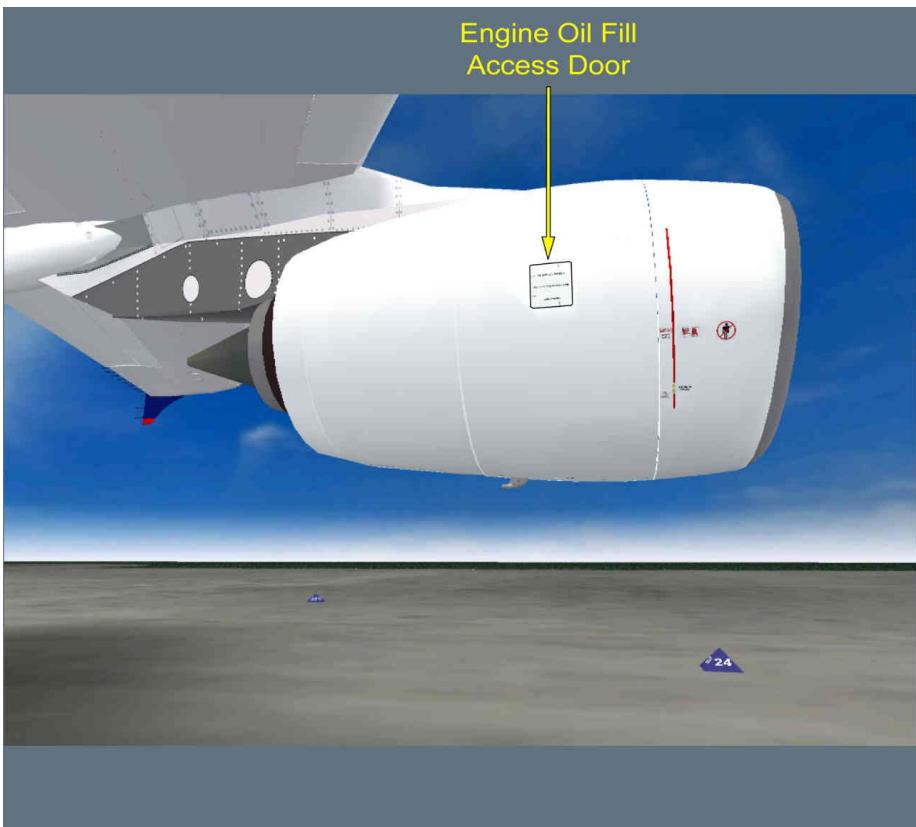
Engine Inlet and
Fan Blades

ENG 1 RH SIDE

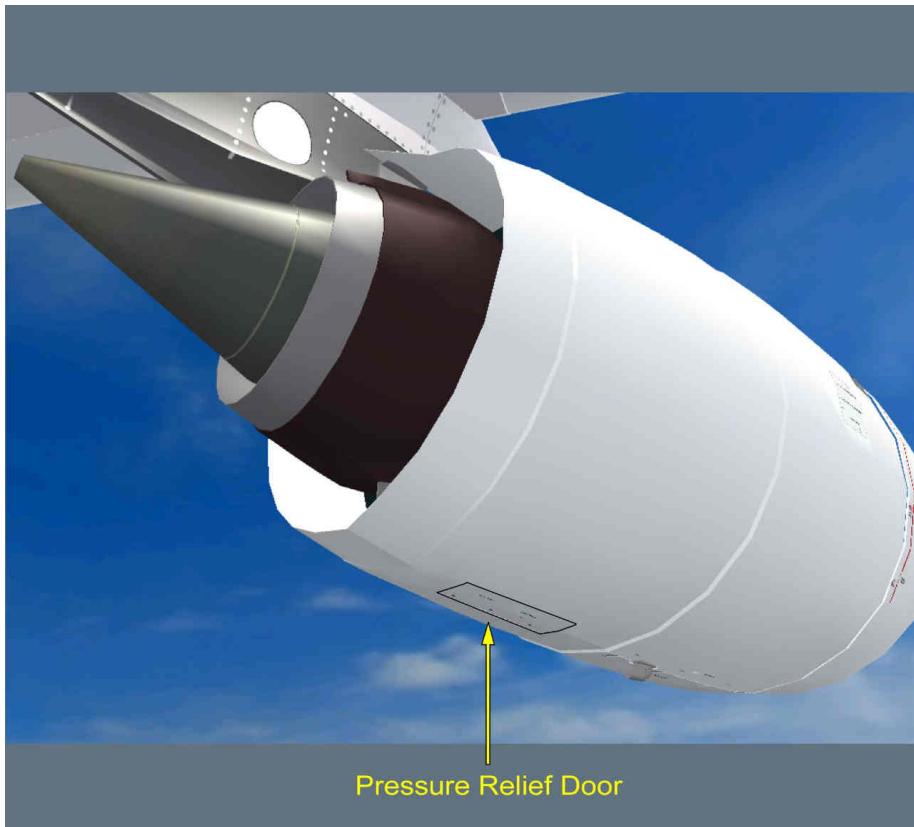
Applicable to: ALL



ENG OIL FILL ACCESS DOOR.....CLOSED

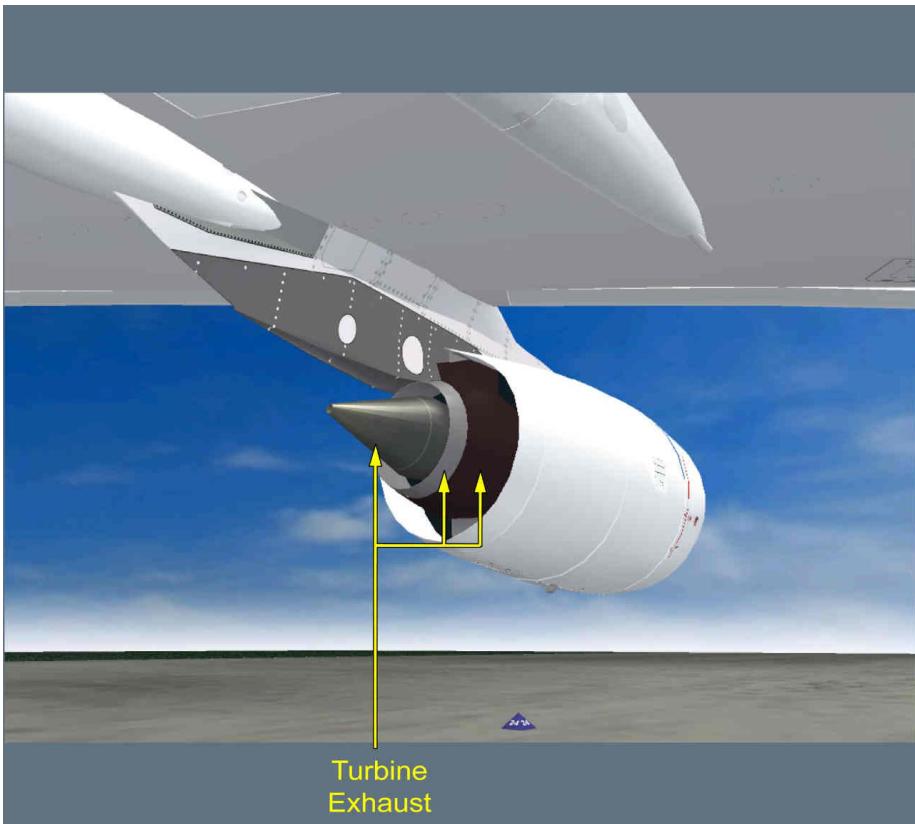


PRESSURE RELIEF DOOR.....CLOSED



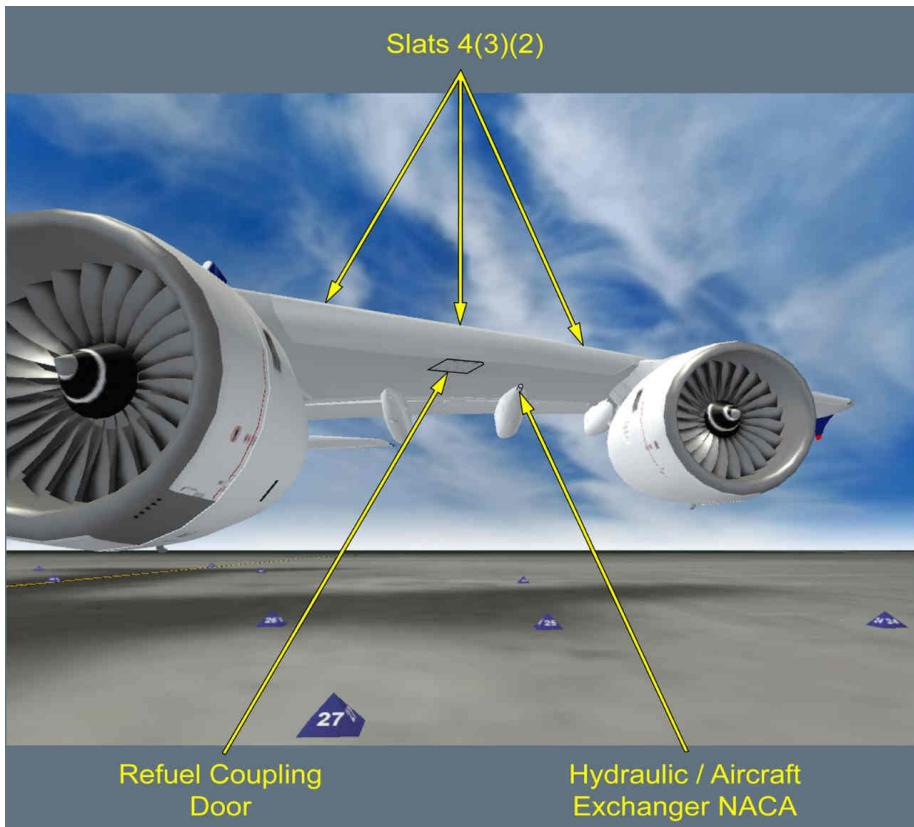
TURBINE EXHAUST.....CLEAR

Check that the turbine exhaust is clear of obstruction, and that the turbine blades are not damaged.



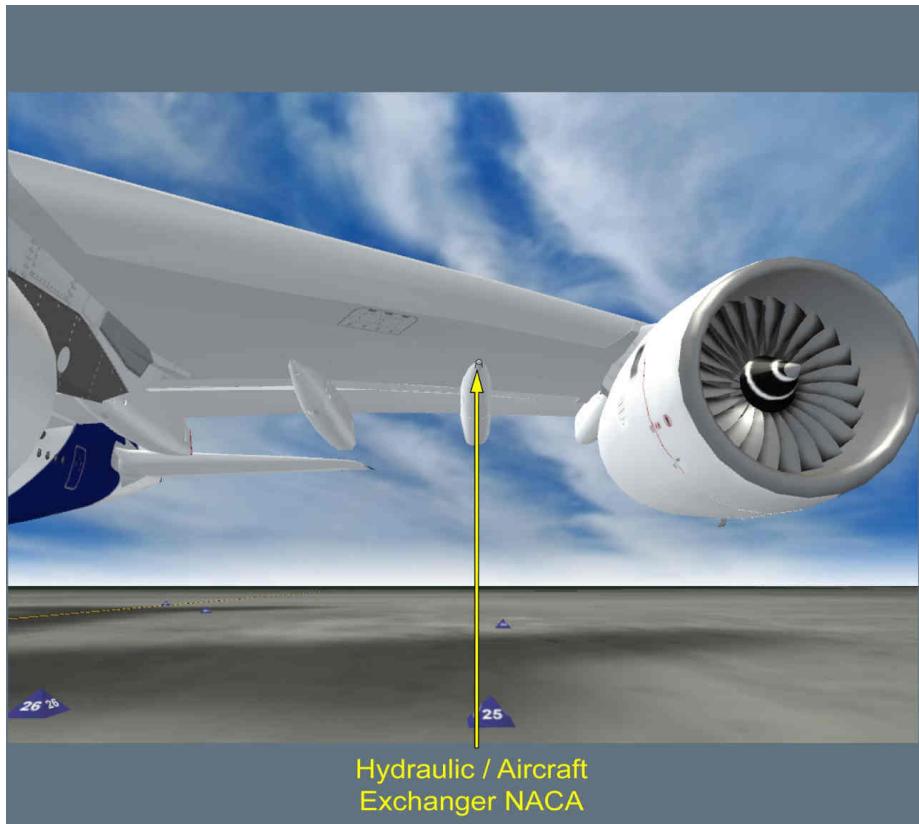
LH WING LEADING EDGE

Applicable to: ALL



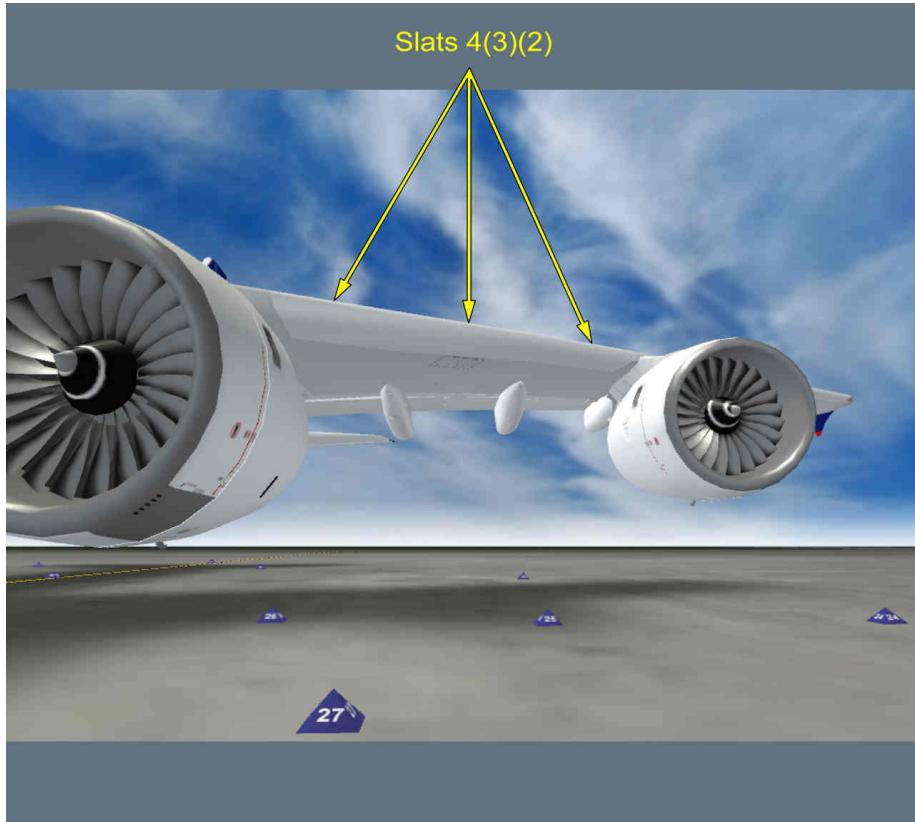
HYDRAULIC / AIR HEAT EXCHANGER NACA.....CHECK CONDITION

- [2] Check that the hydraulic/air heat exchanger NACA on the flap track fairing 4 is clear of obstruction, and that the backup air inlet door is open.

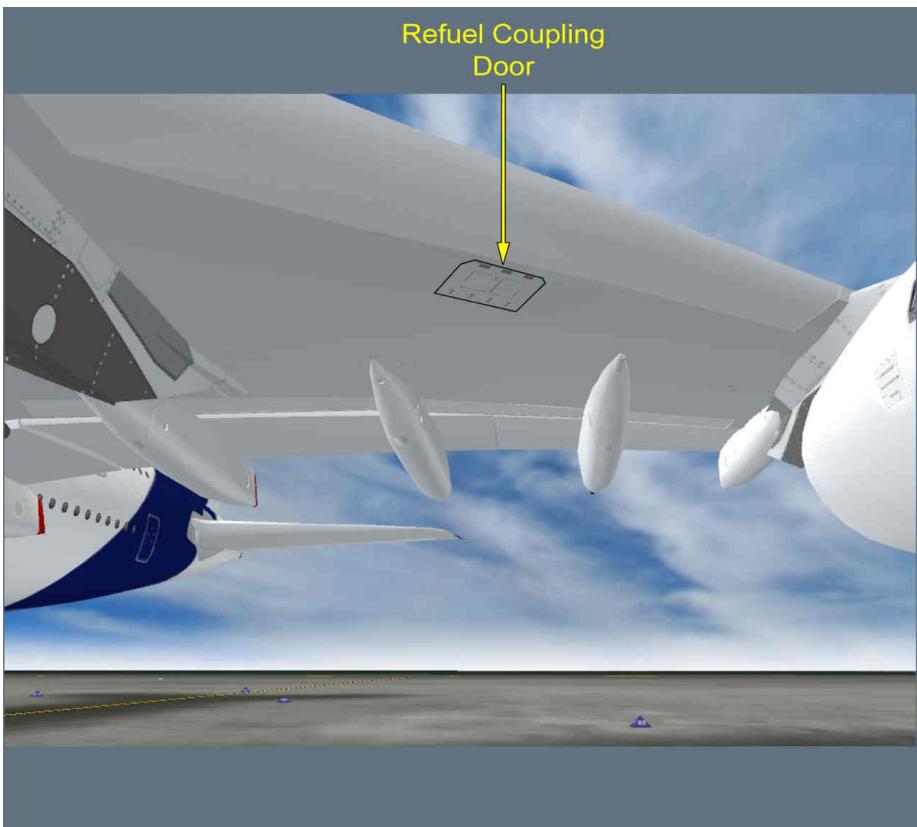


Hydraulic / Aircraft
Exchanger NACA

- * SLATS 4, 3, 2..... CHECK CONDITION
 Check that the slats are not damaged.

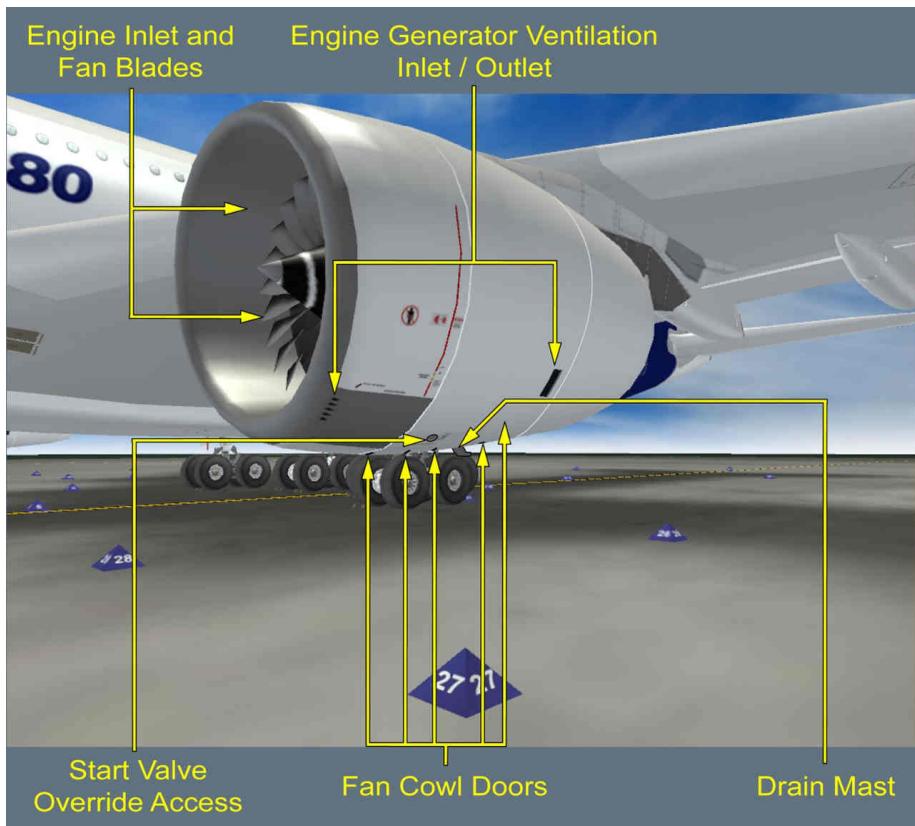


L1 REFUEL COUPLING DOOR.....CLOSED



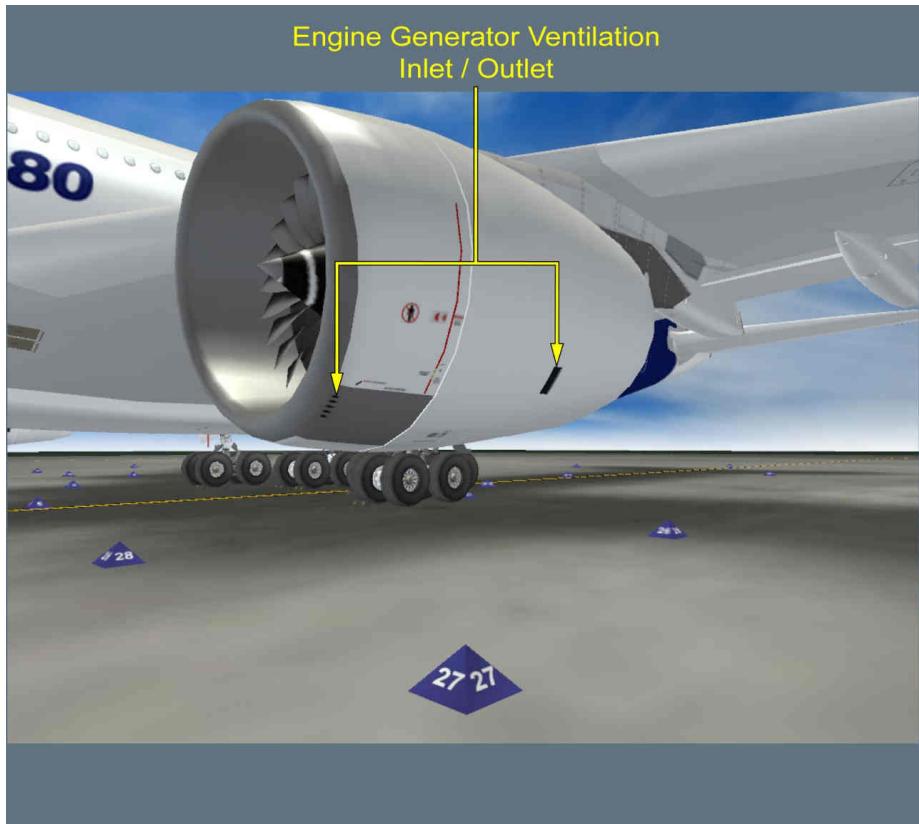
ENG 2 LH SIDE

Applicable to: ALL

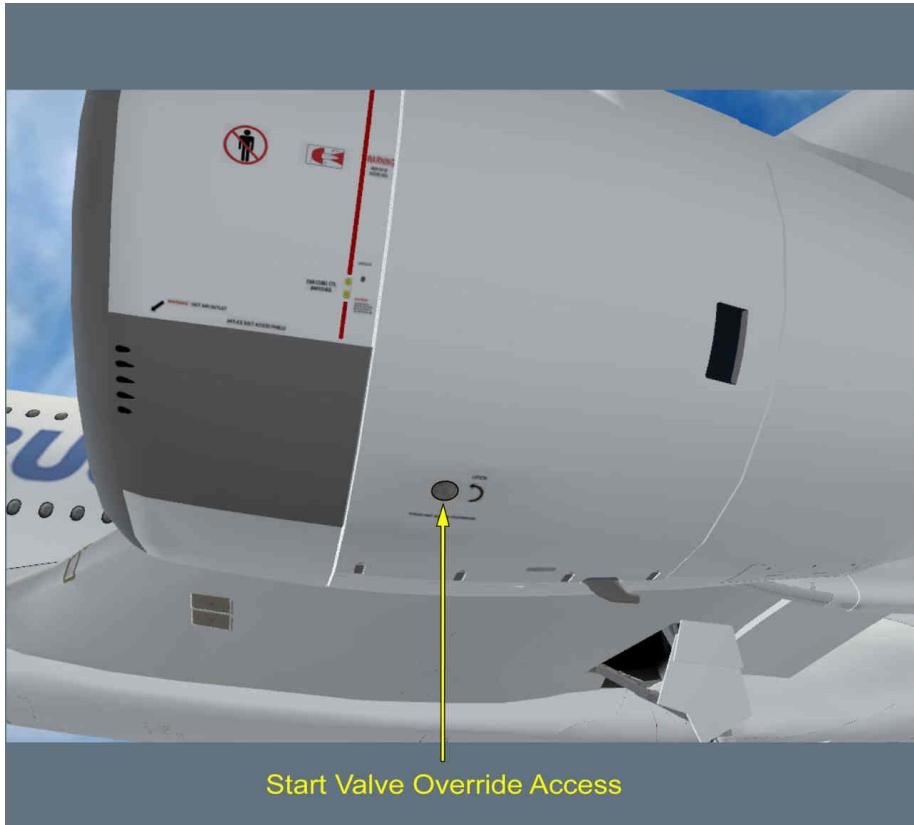


ENGINE GENERATOR VENTILATION INLET/OUTLET.....CHECK CONDITION

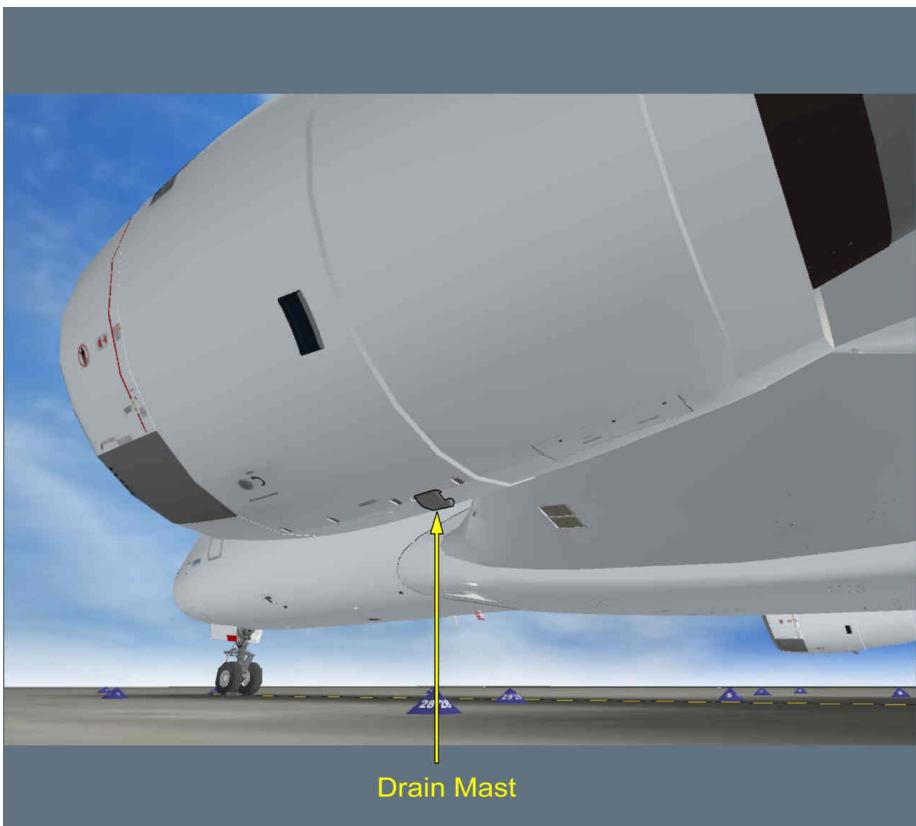
- Check that the engine generator ventilation inlet/outlet is clear of obstruction.



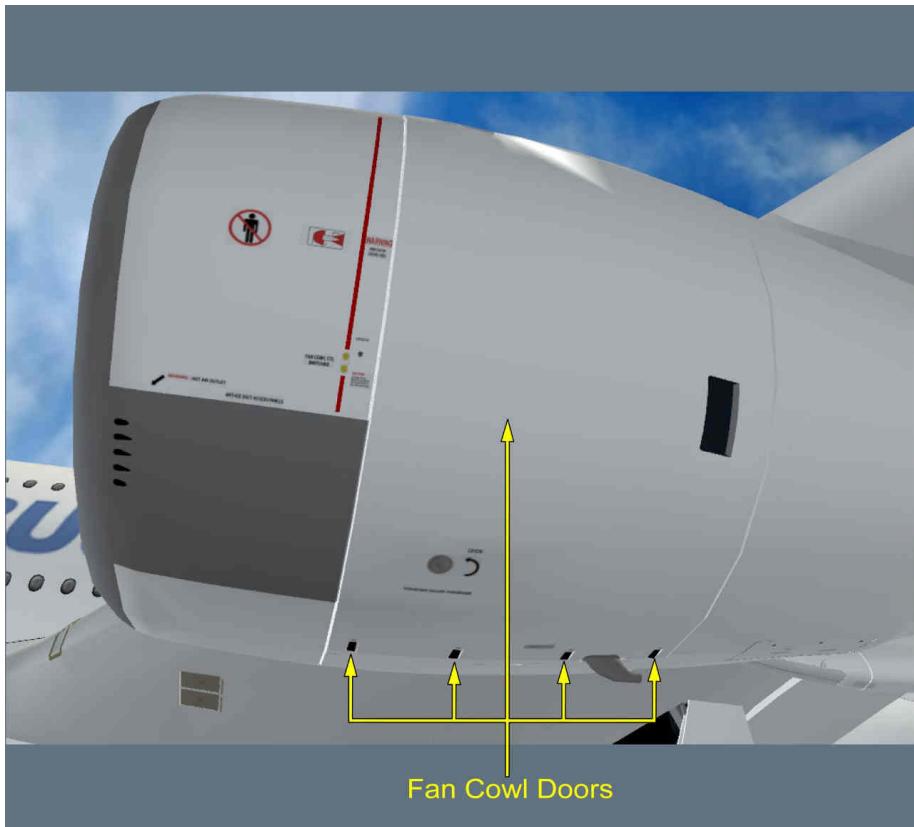
START VALVE OVERRIDE ACCESS.....CLOSED



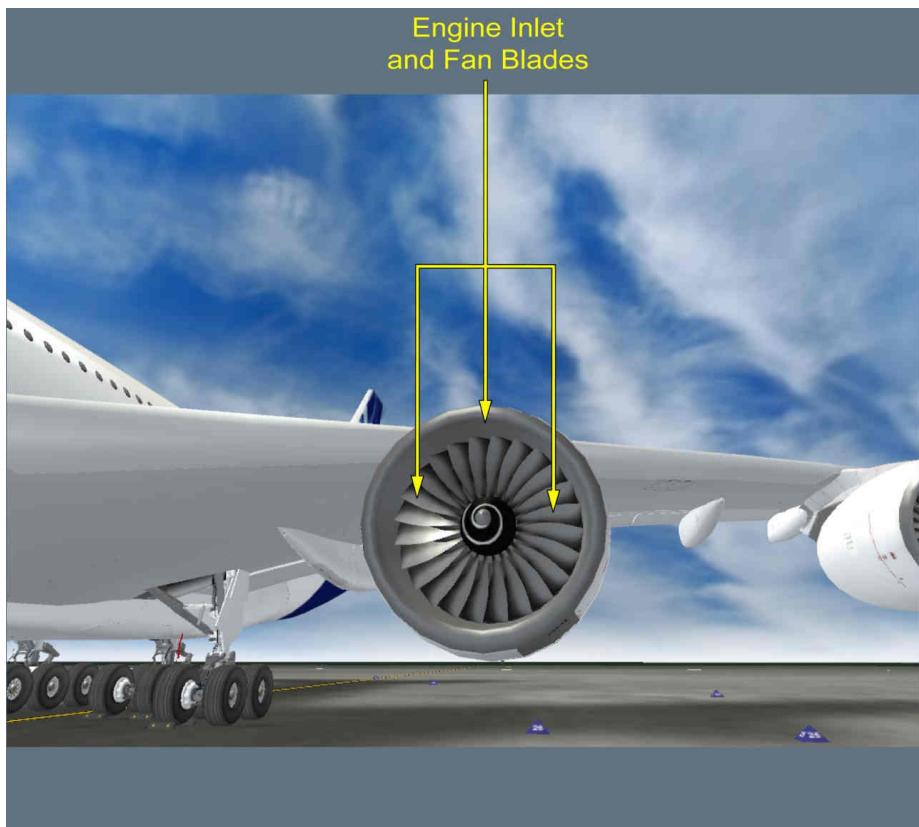
* DRAIN MAST.....CHECK CONDITION/NO LEAK
 Under the engine, check the condition of the drain mast, and make sure that there are no leaks.



* FAN COWL DOORS.....CLOSED AND LATCHED

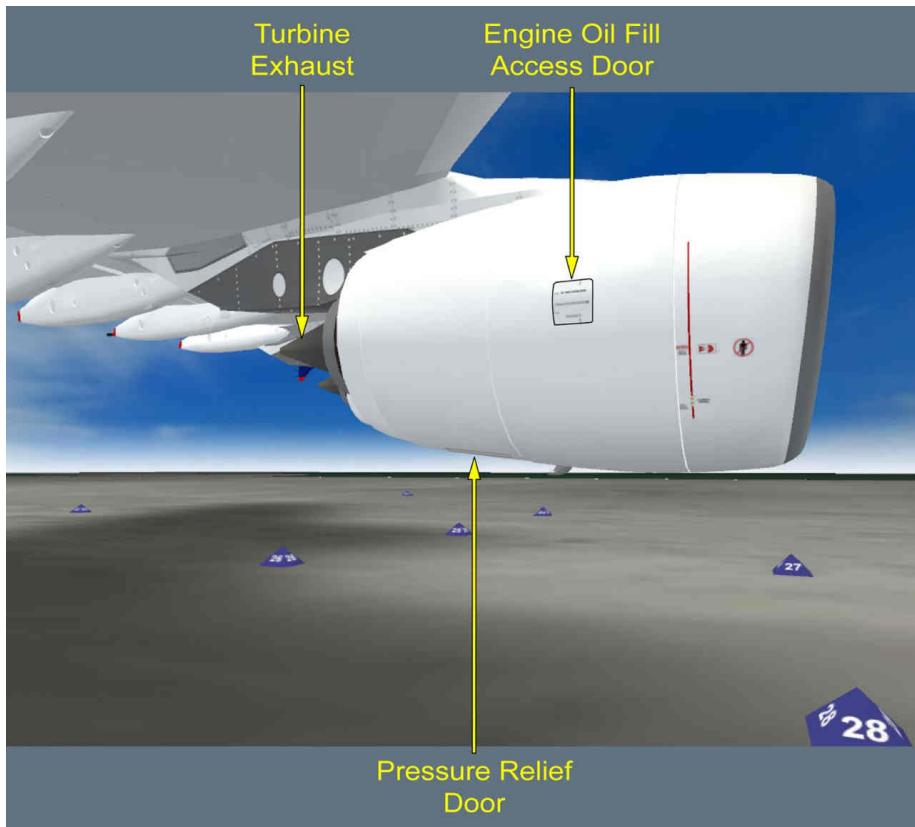


* ENGINE INLET AND FAN BLADES.....CHECK CONDITION
 Check the engine inlet and the fan blades for any significant dents, bending, or damage.

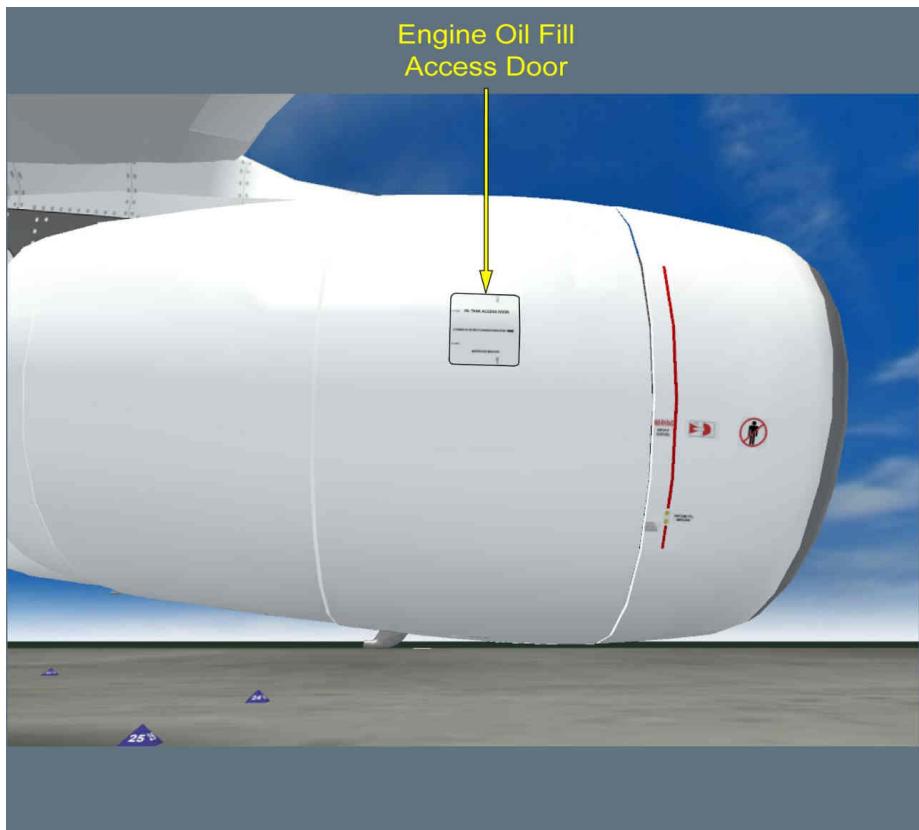


ENG 2 RH SIDE

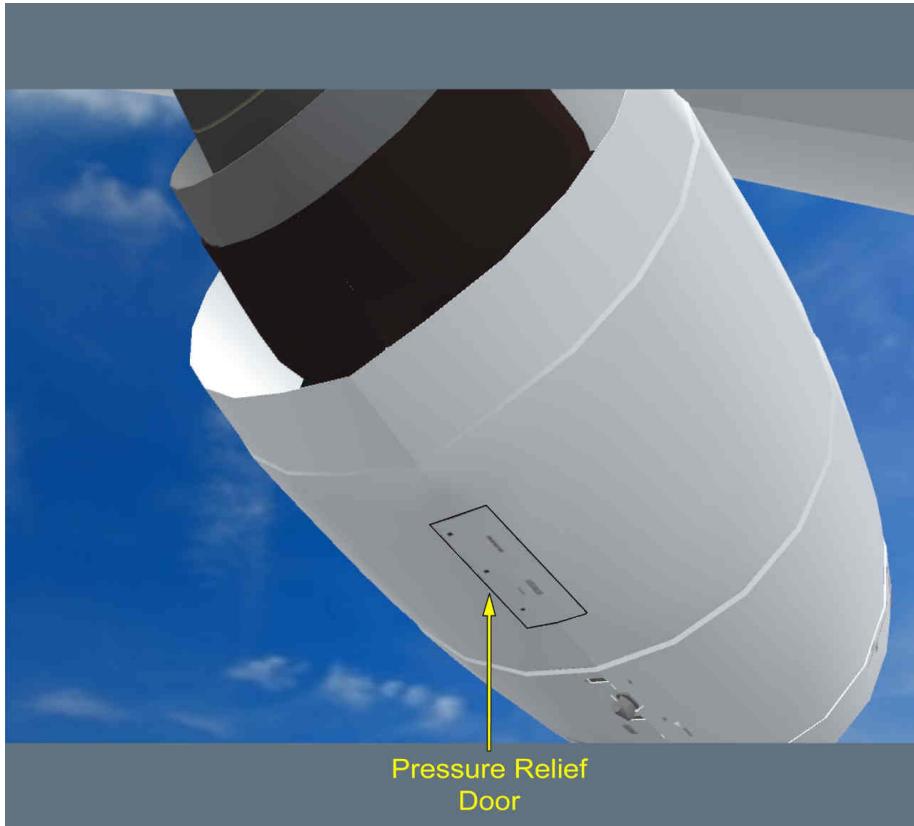
Applicable to: ALL



ENG OIL FILL ACCESS DOOR.....CLOSED



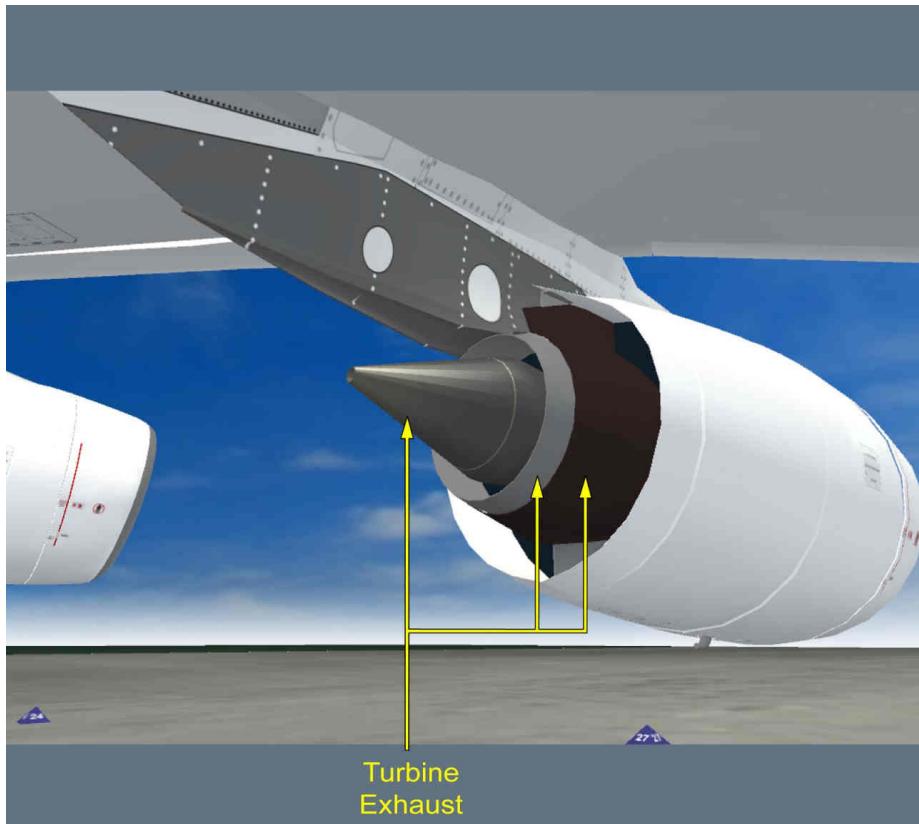
PRESSURE RELIEF DOOR.....CLOSED



Pressure Relief
Door

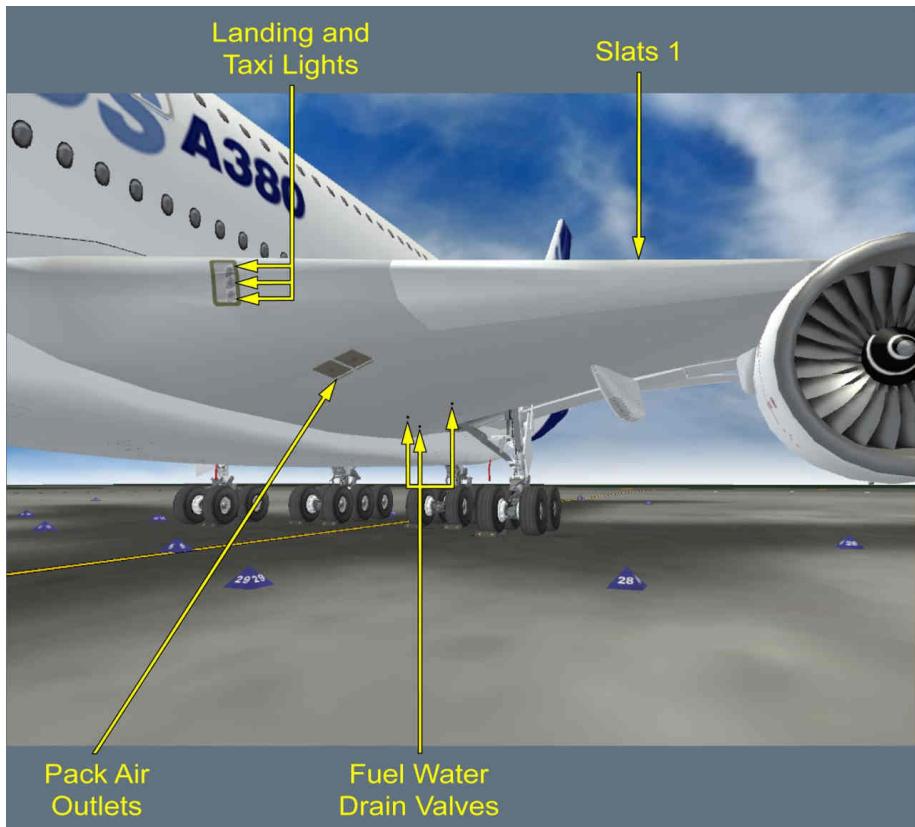
TURBINE EXHAUST.....CLEAR

Check that the turbine exhaust is clear of obstruction, and that the turbine blades are not damaged.

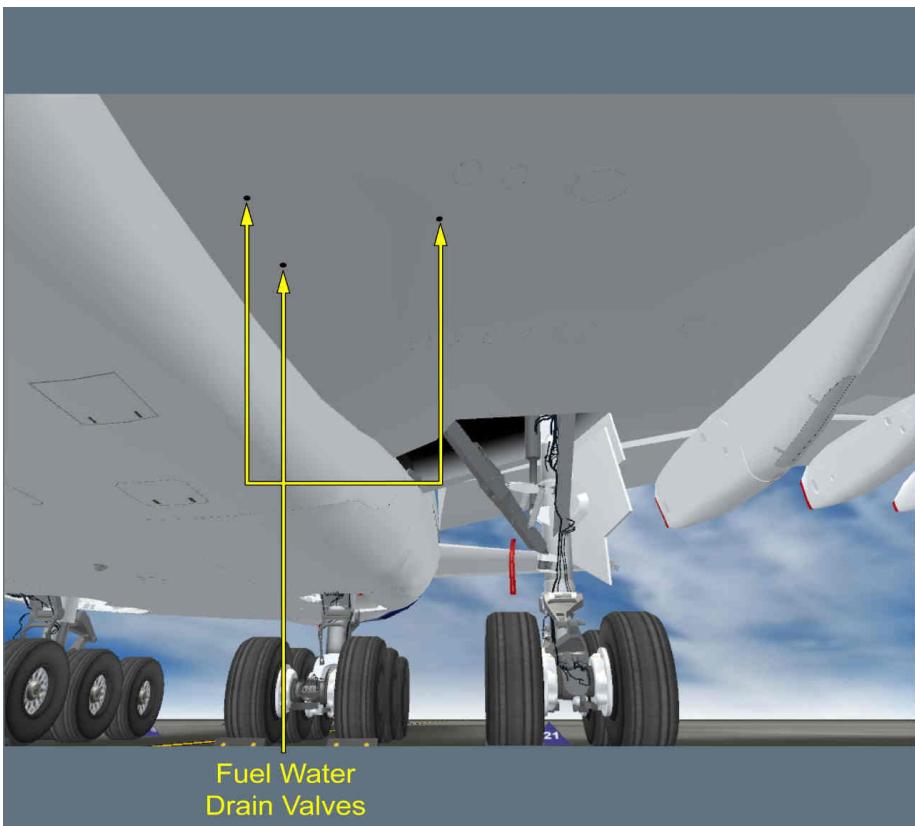


LH CENTER WING

Applicable to: ALL



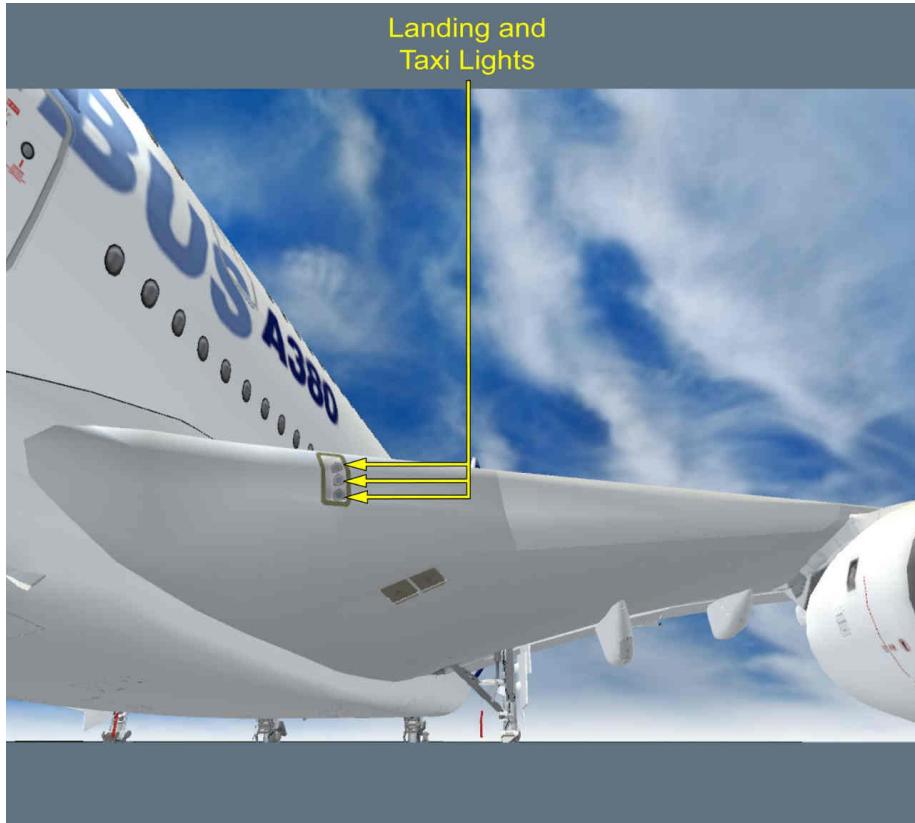
FUEL WATER DRAIN VALVES (inner tank and feed tank 2)..... NO LEAK



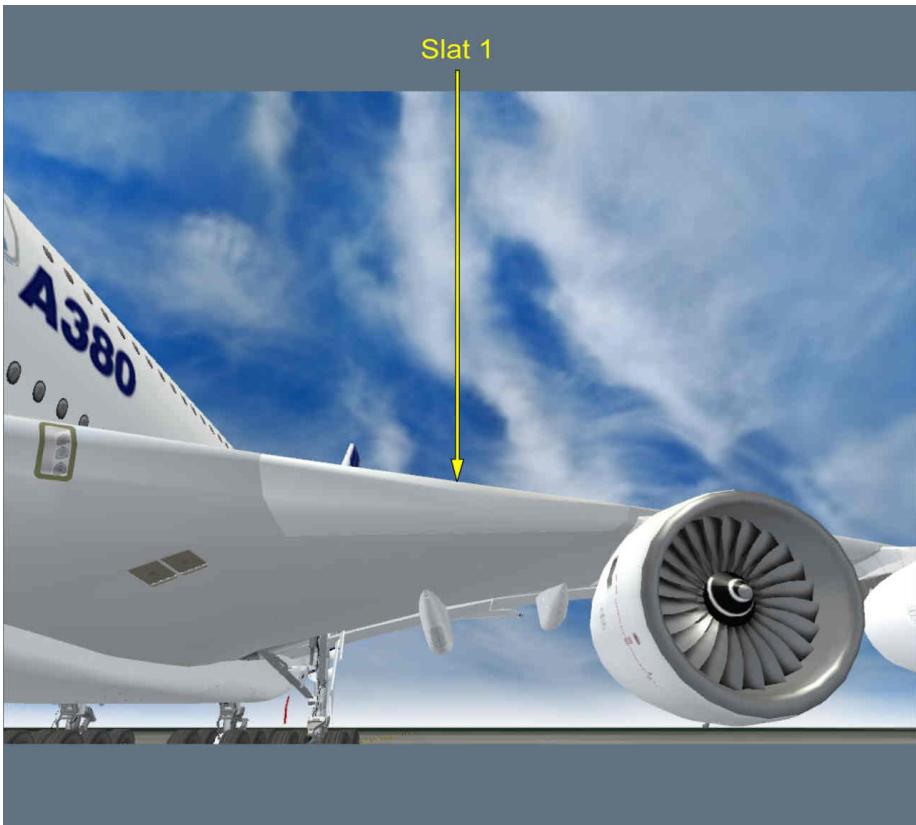
Fuel Water
Drain Valves

LANDING AND TAXI LIGHTS..... CHECK CONDITION

- Check the condition of the landing and taxi lights, and make sure that the protective cover is not damaged.



- L1*** SLAT 1.....CHECK CONDITION
 Check that the slat 1 is not damaged.



- PACK AIR OUTLETS (2).....** CHECK CONDITION
 Check that the pack air outlets (2) are clear of obstruction.



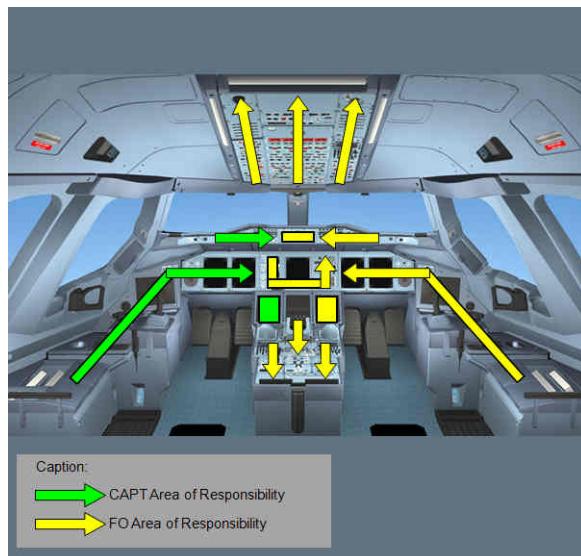
GENERAL**Applicable to:** ALL

The CAPT and FO should perform the cockpit preparation, in accordance with the defined panel scan sequence and tasksharing.

The FO prepares the overhead panel, the center instrument panel and the pedestal while the CAPT performs the external walkaround. When both pilots are seated and the CAPT checked the FMS , both flight crewmembers continue the cockpit preparation.

WARNING

Do not pressurize the hydraulic systems until clearance is obtained from ground personnel.

PANEL SCAN SEQUENCE**Applicable to:** ALLpanel scan sequence



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OVERHEAD PANEL

Applicable to: ALL

WHITE LIGHTS ON THE OVERHEAD PANEL

- During the scan sequence of the overhead panel:

ALL WHITE LIGHTS OFF | FO

[L2] It is a general rule to turn off all white lights for all the systems during the scan sequence.

- [L1] Note: - Depending on Operators policy, the GND CONNECTION pb-sw on the MAINT panel and the REMOTE C/B CTL pb-sw on the maintenance ELEC panel may be kept ON during the cockpit preparation, if the maintenance personnel uses the Portable Multipurpose Access Terminal (PMAT) for maintenance purposes
- During the scan of the overhead panel, check also that the only amber lights are the GEN FAULT lights.

RCDR

RCDR GND CTL pb-sw ON | FO

EVAC

CAPT/CAPT & PURS sw CAPT | FO

[L2] Set the CAPT/CAPT & PURS sw on the EVAC panel as per Company policy.

PROBE & WINDOW HEAT

PROBE & WINDOW HEAT pb-sw AUTO | FO

[L2] The PROBE & WINDOW HEAT pb-sw should not be set to ON except in cold weather operations.
For more information, Refer to PRO-SUP-91-10-10 Overview .

ADIRS

ALL IR MODE selector NAV | FO

[L2] Many aircraft systems use the ADIRS outputs. Therefore, align the IRs as soon as possible in order to provide data to the related systems.



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Perform a complete alignment, if:

- *This is the first flight of the day*
- *There was a change in flight crew*
- *The GPS is not available, and if the flight crew expects long segments in airspaces with poor radio NAVAIDS coverage.*

For other flights, perform a fast alignment.

- [L1] **Note:** *During the refuel operations or the Auto Ground Transfer (AGT), at least one IR should remain operative. If the flight crew needs to align the IRs during the refuel operations or the AGT, they should switch off two IRs, then set them to NAV and wait for 40 s before switching off the third IR.*
- [L2] *For additional training-oriented information, Refer to FCTM/NO-60 ADIRS Initialization*

ELT

ELT.....ARMED | FO

RESET

RESET BUTTONS (Left side).....CHECK | FO

- [L2] *Check that all reset buttons are pushed.*

EXTERIOR LIGHTS

| | | |
|-----------------|------|----|
| STROBE sw | AUTO | FO |
| BEACON sw | OFF | FO |
| NAV sw | ON | FO |

- [L2] *Set to ON the NAV sw, as required, to turn on the navigation and obstruction lights.*

[L1] REMAINING EXTERIOR LIGHTS.....AS RQRD | FO

SIGNS

SEAT BELTS swON | FO

- [L2] *Set to ON the SEAT BELTS sw when refueling is complete. For more information, Refer to CCOM/Refueling with passengers onboard procedure.*

[L1] NO SMOKING swAUTO | FO
EMER EXIT LT swARM | FO



ENG START

ENG START selector NORM | FO

AIR

APU BLEED pb-sw ON | PF

- [L2] *Do not use the APU BLEED, if the maintenance personnel confirms that an HP ground air unit is connected to the aircraft.*

The flight crew should also check on the BLEED SD page, if there is pressure in the bleed air system, to determine if an HP ground air unit is connected.

- [L1] XBLEED selector AUTO | PF
AIR FLOW selector NORM | FO

- [L2] *As long as the number of passenger is not entered in the FMS, airflow is automatically adjusted for the maximum number of passengers.*

As soon as the number of passengers is entered, during FMS initialization, airflow is automatically adjusted to the actual number of passengers.

- [L1] CKPT selector AS RQRD | FO
[L2] *The temperature ranges between 18 °C and 30 °C. The recommended temperature selection is approximately 21.5 °C (about 10 o'clock).*
[L1] CABIN selector PURS SEL | FO
[L2] *Cabin temperature is controlled from the Flight Attendant Panel (FAP) only.*

ELEC

ELEC DC SD PAGE..... DISPLAY | FO
ALL BAT pb-sw (BAT 1, ESS, 2 and APU)..... OFF then ON | FO

● 10 s after setting all BAT pb-sw to ON

On the ELEC DC SD page, check that the current charge of each battery is below 60 A, and is decreasing.

FUEL

TRIM TK FEED sw AUTO | FO



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MAINTENANCE

ALL LIGHTS OFF | FO

- [L2] - Depending on Operators policy, the GND CONNECTION pb-sw on the MAINT panel and the REMOTE C/B CTL pb-sw on the maintenance ELEC panel may be kept ON during the cockpit preparation, if the maintenance personnel uses the Portable Multipurpose Access Terminal (PMAT) for maintenance purposes
- [L2] - Check that all lights are off. If not, select the corresponding pushbutton to turn off the light.

CARGO AIR COND

CARGO AIR COND selectors..... AS RQRD | FO

RMP 3

RMP 3..... ON | FO
STBY RAD NAV key..... OFF | FO

CVR

CVR TEST pb PRESS | FO

- [L2] Press and release the pushbutton. If the test fails, the RECORDER CVR FAULT ECAM alert triggers 5 s after the flight crew presses the CVR TEST pb.

RESET

RESET BUTTONS (Right side)..... CHECK | FO

- [L2] Check that all reset buttons are pushed.

CENTER INSTRUMENT PANEL

Applicable to: ALL

SWITCHING

SWITCHING selectors..... NORM | FO

- [L2] Check that the ATT HDG selector, the AIR DATA selector, and the FMS selector are set to NORM.



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ISIS

ISIS.....CHECK | FO

- [L2] - Adjust the brightness, as appropriate
- Check:

- The airspeed
- The barometric setting
- The altitude indication
- The attitude indications
- The heading.

L/G GRTY

L/G GRTY sw OFF | FO

CLOCK

CLOCK.....CHECK and SET AS NECESSARY | FO

- [L2] Check the time and adjust, if necessary.
Elapsed time and chronometer should be set to zero.

A-SKID

A-SKID sw ON | FO

PEDESTAL

Applicable to: ALL

PARK BRK

PARK BRK.....ON | FO

- If brakes are hot and chocks are in place:

PARK BRKOFF | FO

- [L2] Release the PARK BRK handle to improve brakes cooling.
[L1] On the triple pressure indicator, check that the left and right brake pressure drops to zero.



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BODY ACCU PRESSURE

BODY ACCU Pressure.....CHECK/REINFLATE | FO

- [L2] *Check for normal indications.*

The BODY ACCU pressure indication must be in the green band.

- [L1] *If required, press the ACCU REINFLATE pb to reinflate the BLG brake accumulators.*

ENG

THRUST LEVERSIDLE | FO

THRUST REVERSER LEVERSSTOWED | FO

ENG MASTERS 1, 2, 3 and 4.....OFF | FO

CKPT DOOR

CKPT DOOR swNORM | FO

MFD ATC COM

Applicable to: ALL

● On the MFD ATC COM/MSG RECORD page:

MSG RECORD.....ERASE ALL | FO

- [L2] *Click on the ERASE ALL button in order to erase the record of all CPDLC messages of the previous flight before starting a new flight. This avoids confusing CPDLC messages from the previous flight with the ones of the current flight.*

[L1] ● On the MFD ATC COM/CONNECT/CONNECTION STATUS page:

● If ADS services are expected:

ADS.....CHECK ARMED | FO

ATC CLEARANCE

Applicable to: ALL

ATC CLEARANCE.....THE MOST PROBABLE/OBTAIN | FO

The flight crew should obtain ATC clearance, or use the probable clearance.

NAV CHARTS CLIPBOARD.....PREPARE | FO

- [L2] *At ATC clearance, or at any convenient time, the FO prepares the NAV CHARTS clipboard.*



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MFD SURV

Applicable to: ALL

On the MFD SURV/CONTROLS page:

SURV DEFAULT SETTINGS..... SELECT | BOTH

[L2] - XPRD is set to AUTO. The SQWK code remains as previously selected

- TCAS is set to TA/RA and NORM
- WXR is set to AUTO:
 - ELEVN/TILT is set to AUTO
 - MODE is set to WX
 - TURB is set to AUTO
 - GAIN is set to AUTO
 - WX ON VD is set to ON
 - PRED W/S is set to AUTO.
- All TAWS modes are set to ON.

MFD FMS INITIALIZATION

Applicable to: ALL

FLIGHT PLAN INITIALIZATION

FLIGHT PLAN INITIALIZATION..... COMPLETE, AS RQRD | FO

[L2] Complete the FMS ACTIVE/INIT page, as required.

[L1] Note: For ATC needs, the crew should enter exactly the entire Flight number, as shown on the ICAO flight plan, without inserting any space, on the MFD INIT page

Note: Enter the Cost Index will be decided in consideration with the economical efficiency by the company.

[L2] For additional training-oriented information, Refer to FCTM/NO-60 FMS Initialization.

Note: For ATC needs, the crew should enter exactly the entire Flight number, as shown on the ICAO flight plan, without inserting any space, on the MFD INIT page

Note: Enter the Cost Index will be decided in consideration with the economical efficiency by the company.



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WINDS

WINDS..... ENTER AS APPROPRIATE | FO

- [L2] Choose between the trip wind or the forecasted wind for climb, cruise, or descent, as appropriate. Use the average wind or forecasted wind from the computerized F-PLN.

IRS ALIGNMENT

■ If the GPS is available:

IRS 1, 2, and 3..... CHECK NAV or ALIGN | FO

- [L2] On the FMS POSITION/IRS page, check that the IRS are either aligned or in alignment.

■ If the GPS is not available, or is failed:

IRS 1, 2 and 3..... ALIGN | FO

- [L2] For more information on the IRS alignment, Refer to DSC-34-10-30-30 How to align IRS .

DEPARTURE SELECTION

DEPARTURE..... SELECT/CHECK | FO

- [L2] Select the runway, SID and TRANS, as appropriate, in the FMS DEPARTURE page. If the company route already has the departure procedure, check this departure.

NAVAIDS

NAVAIDS..... CHECK | PF

- [L2] On the FMS POSITION/NAVAIDS page, check the VOR, ILS, and ADF, tuned by the FMS. Change them, if required, and check that the ND and PFD (for the ILS) display the correct ident.

[L1] NAVAID DESELECTION..... AS RQRD | PF

- [L2] Check the list of deselected navaids on the FMS POSITION/NAVAIDS page. If the NOTAMs warn that some navaids are not reliable, deselect them.

FUEL AND LOAD

ZFW/ZFWCG..... INSERT | FO

- [L2] If the ZFWCG and ZFW are not available, the flight crew can enter the expected values to enable:
- FMS performance predictions
- Optimum fuel distribution, if refueling is not completed.



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[L1] BLOCK FUEL..... INSERT | FO

CAUTION Some of the characteristic speeds that are displayed on the PFD (green dot, F, S, VLS) are based on the ZFW and ZFWCG that the flight crew enters in the FMS . In addition, when the first engine starts, the pitch trim is automatically set to the takeoff target, based on the entered ZFWCG and block fuel. It is therefore the Captain's responsibility to carefully check all of this data.

[L2] The fuel is automatically distributed, in accordance with the entered ZFWCG and takeoff CG target. Refer to DSC-28-50-20 AUTOMATIC GROUND TRANSFER

If refuel is not yet completed, the flight crew can enter the expected Fuel On Board (FOB). When the flight crew enters the ZFWCG , ZFW and BLOCK FUEL, the FMS provides all the predictions, as well as the EXTRA fuel, if any.

[L1] RTE RSV/FINAL..... CHECK/INSERT AS APPROPRIATE | FO
MIN FUEL AT DEST..... CHECK/INSERT AS APPROPRIATE | FO

[L2] Check that the minimum fuel at destination is in accordance with the required minimum fuel.

TAKEOFF PERFORMANCE

PRELIMINARY TAKEOFF PERF DATA..... INSERT | FO

[L2] Insert the preliminary takeoff performance data on the T.O panel of the FMS ACTIVE/PERF page.

| | | |
|-----------------------------|----------------|----|
| V1, VR and V2..... | INSERT | FO |
| TOGA/FLEX/DERATED..... | SELECT/INSERT | FO |
| FLAPS..... | SELECT | FO |
| T.O SHIFT..... | INSERT AS RQRD | FO |
| PACKS..... | INSERT | FO |
| ANTI-ICE..... | INSERT | FO |
| THR RED/ACCEL ALTITUDE..... | SET OR CHECK | FO |
| NOISE PROCEDURE..... | AS APPROPRIATE | FO |
| TRANS ALTITUDE..... | AS APPROPRIATE | FO |
| EO ACCEL ALTITUDE..... | SET OR CHECK | FO |

TAKEOFF DATA REQUEST

As per company policy, or as deemed necessary, the flight crew can send a CPNY T.O REQUEST to obtain the takeoff data from the ground station.



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CLIMB PERFORMANCE

DERATED CLB INSERT AS APPROPRIATE | FO

- [L2] Check *NONE or insert the selected derated climb on the CLB panel of the FMS ACTIVE/PERF page, as appropriate.*

SPEED PRESELECTION

On the CLB and CRZ panels of the FMS ACTIVE/PERF page:

PRESEL SPEEDS.....AS RQRD | FO

ACTIVE F-PLN CHECK

COMPUTERIZED FLIGHT PLAN..... ACCESS | FO

- [L2] Use the computerized flight plan in the EFF as reference for routing and fuel predictions.

- [L1] ACTIVE F-PLN.....CHECK and COMPLETE AS APPROPRIATE | FO

Modify the active flight plan, as appropriate, depending on the data provided by the ATIS, ATC, or MET.

- [L2] - Lateral revision at departure airport
- Lateral revision at waypoint for route modification, as appropriate
- Vertical revision for climb speed limit/constraints in accordance with ATC clearance. Enter step altitudes as appropriate
- Lateral revision for arrival.

- [L1] Check the EOSID on the ND PLAN mode, if applicable.

Check the F-PLN and the ND PLAN mode vs. the computerized flight plan or the navigation charts.

Check the distance to destination along the F-PLN. Compare it with the total distance computed by the computerized flight plan.

SEC F-PLN

SECONDARY FLIGHT PLANS..... AS APPROPRIATE | FO

- [L2] Create the SEC 1, SEC 2, and SEC 3 F-PLN, as appropriate, using the FMS SEC INDEX page. The flight crew can use SEC 1 and SEC 2 to copy the active F-PLN, and to anticipate a runway change, an immediate return, or a diversion immediately after takeoff.

For an anticipated takeoff runway change, they must compute the takeoff performance accordingly.

The flight crew can load an ATC flight plan in the SEC 3 only.



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- [L1] **Note:** Before the flight crew creates a SEC 1(2)(3) flight plan, they should erase the associated SEC 1(2)(3) data from the previous flight via the *DELETE* button on the SEC 1(2)(3) panel of the SEC INDEX page.

ROUTE SUMMARY CHECK

- ROUTE SUMMARY.....CHECK versus ATC F-PLN | FO
[L2] Check the route summary via the FMS DATA/ROUTE page.

FMS DATA CROSSCHECK

FMS INITIALIZATION.....CROSSCHECK | CAPT

After the FO initialized the FMS, the CAPT crosschecks:

- The airfield data
- The IRS alignment
- The fuel and load data
- The takeoff performance data with the OIS takeoff performance data
- The F-PLN.

NAV CHARTS CLIPBOARD

NAV CHARTS CLIPBOARD.....IMPORT | CAPT

- [L2] The CAPT imports the NAV CHARTS clipboard that the FO prepared.

GLARESHIELD

Applicable to: ALL

GENERAL

Perform the glareshield preparation when both flight crewmembers are seated and after the F/O checked the FMS.

LIGHTING

INTEGRAL LIGHTS.....AS RQRD | BOTH

LOUDSPEAKER

LOUDSPEAKER knobSET | BOTH

- [L2] Set the LOUDSPEAKER knob to approximately 1 o'clock position.



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Impacted by TDU: 00021152 Glareshield BARO REF

BAROMETRIC REFERENCE

BAROMETRIC REFERENCE.....SET | BOTH

[L2] Set the QNH on the EFIS CP and on the ISIS.

Check the barometric reference and altitude indications on the PFD and on ISIS.

The maximum difference is:

- ± 20 ft between both PFDs
- ± 30 ft between ISIS and PFD
- ± 25 ft between each PFD and airport elevation.

Impacted DU: 00005474 Glareshield_BARO REF

BAROMETRIC REFERENCE

BAROMETRIC REFERENCE.....SET | BOTH

[L2] Set the QNH on the EFIS CP and on the ISIS.

Check the barometric reference and altitude indications on the PFD and on ISIS.

The maximum difference is:

- ± 20 ft between both PFDs
- ± 30 ft between ISIS and PFD
- ± 25 ft between each PFD and airport elevation.

Note: If the barometric unit is mercury inches, the flight crew may notice a discrepancy of 0.01 inHg between the QNH values on the PFDs and the QNH values selected on the EFIS CP. This discrepancy does not impact the altitude computations.

EFIS CONTROL PANEL (EFIS CP)

ND MODE AND RANGE.....AS RQRD | BOTH

[L2] MODE : Display the ARC mode on the ND, if the takeoff direction is in approximately the same direction as the departure clearance.

Display the NAV mode, if the change in direction will be more than 70 °, after takeoff. This enables the ND to display the area behind the aircraft.

RANGE : Set the minimum range to display the first waypoint after departure, or as required for weather purposes.

[L1] WX pb on EFIS CP.....OFF | BOTH

Before pressing the WX pb on any EFIS CP, the flight crew should be sure that:

- No maintenance personnel is facing the aircraft within a distance less than 20 ft within an arc of 135 ° on either side of the aircraft centerline

- The aircraft is not directed towards any large metallic obstacle, such as a hangar, within 20 ft in an arc of 90 ° on either side of the aircraft centerline.

- [L2] The weather radar starts to emit as soon as the first engine is started if WX is selected on the EFIS CP to display weather information.
- [L1] OTHER EFIS OPTIONS..... AS RQRD | BOTH
- [L2] Select other EFIS options (e.g. constraints, waypoints, navaids, etc.) as required.

AFS CONTROL PANEL (AFS CP)

- The FO sets the AFS CP:

| | | |
|---|-------------------------------------|----|
| FD..... | ON | FO |
| NORTH REF..... | MAG | FO |
| [L2] Check that TRUE does not appear neither on the HDG/TRK window of the AFS CP, nor on the PFD. | | |
| [L1] SPD/MACH window..... | DASHED | FO |
| HDG/TRK window..... | DASHED | FO |
| HDG-V/S / TRK-FPA pb | HDG-V/S | FO |
| ALT window..... | INITIAL EXPECTED CLEARANCE ALTITUDE | FO |
| V/S / FPA window..... | DASHED | FO |

- The CAPT crosschecks the AFS CP:

| | | |
|-------------|------------|------|
| AFS CP..... | CROSSCHECK | CAPT |
|-------------|------------|------|

LATERAL CONSOLES

Applicable to: ALL

OXYGEN MASK TEST

Test the oxygen masks of each occupied station.

During the test, check that the oxygen correctly reaches the oxygen mask by verifying that the oxygen mask blinker becomes yellow, and the flow of oxygen flow can be heard via the loudspeakers.

- On the RMP :

| | | |
|------------------|-----|------|
| INT/RAD sw | INT | BOTH |
|------------------|-----|------|

- On the mask stowage box:

| | | |
|-----------------------|---------|------|
| OXYGEN MASK TEST..... | PERFORM | BOTH |
|-----------------------|---------|------|

- [L2] For a detailed test of the mask, Refer to DSC-35-20-30 How to Test the Mask .



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L1

● On the DOOR SD page:

REGUL PR LO indication | BOTH
..... CHECK NOT DISPLAYED

L2

The flight crew must perform this check after checking the masks of each occupied station, to ensure that the oxygen supply valve is open.

Due to residual pressure between the oxygen supply valve and the oxygen mask, it may not be possible to detect that a supply valve is failed closed, during the oxygen mask test.

SLIDING WINDOWS

SLIDING WINDOWS..... CLOSED/LOCKED | BOTH
L2 Check that the green part of the unlock pb is visible on the control handle of the sliding window.

POLAR OPERATION

Applicable to: ALL

Refer to the Polar Operation Check list in the Reference Checklist.

NOISE ABATEMENT DEPARTURE PROCEDURE

Applicable to: ALL

Refer to FOM Chapter 6 – Normal Operations

JUMP SEAT BRIEFING

Applicable to: ALL

The PIC will ensure that each cockpit jump seat occupant is familiar with the Flight Crew Briefing Card Items

The Flight Crew Briefing Card in the QRH Binder

TAKEOFF BRIEFING

Applicable to: ALL

L2 For additional training-oriented information, Refer to FCTM/NO-60 Takeoff Briefing.

L1 TAKEOFF BRIEFING..... PERFORM | PF

L2 *The purpose of the takeoff briefing is for the PF to inform the PM of the planned course of action for both normal and abnormal situations during takeoff, and to identify other operational risks.*

L1 Use the Flight Crew Briefings Card of the Reference Check list folder.QRHBinder.

For detail information, refer to FOMChapter 6 – Normal Operations.

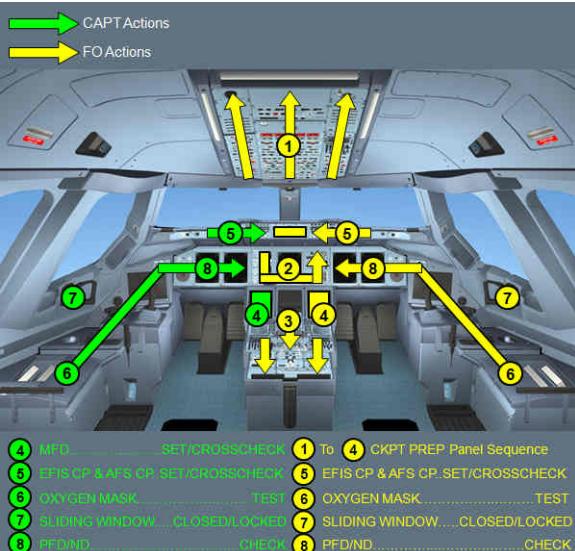
If the departure includes an EOSID, use the EOSID procedure described in the AIRPORT/RWY panel of the takeoff application, to perform the briefing.

FLOW PATTERN

Applicable to: ALL

FLOW PATTERN

flow pattern





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- BEFORE PUSHBACK OR START

BEFORE START CLEARANCE

Applicable to: ALL

LOADSHEET

- FINAL LOADSHEET..... CHECK | BOTH
- [L2] Carefully check the final loadsheet, particularly for significant errors. Make sure that the loadsheet data is correct (e.g. correct flight number, aircraft, dry operating weight/CG, configuration, fuel on board).
- [L1] FUEL ON BOARD..... CHECK | BOTH
- [L2] On the permanent data of the SD , check that the Fuel On Board (FOB) corresponds to the F-PLN and to the Loadsheet.
- [L1] ZFW/ZFWCG in FMS..... CHECK/REVISE | FO
- [L2] The PF compares the ZFW / ZFCG of the loadsheet with the ZFW / ZFWCG entered in the FMS ACTIVE/FUEL & LOAD page, and revises them if necessary.
- [L1] ZFW/ZFWCG in FMS..... CROSSCHECK | CAPT
- [L2] The CAPT crosschecks the ZFW / ZFWCG entered in the FMS ACTIVE/FUEL & LOAD page.
- [L1] LOADSHEET TOCG AND ECAM GWCG..... CROSSCHECK | BOTH
- [L2] Check the loadsheet TOCG vs. the ECAM GWCG :
- If the difference is less than 1 % , no further action is required
The ECAM GWCG is reliable.
- If there is more than 1 % difference, check that the ZFW and the ZFCG are correctly entered in the FMS .
1. If not, revise the ZFW / ZFWCG in the FMS and compare the ECAM GWCG and the loadsheet TOCG
2. If the difference is confirmed, compute again the loadsheet using the trim tank fuel quantity displayed on the FUEL SD page
For more information on how to compute the loadsheet using trim tank fuel quantity, Refer to PER-LOD-FDC Trim Tank Adjustment.
3. If the difference between the loadsheet TOCG and the ECAM GWCG is still greater than 1 % , suspect an abnormal fuel distribution. Confirm the fuel distribution with load control and compute again the loadsheet accordingly.
- [L1] ECAM GWCG..... CHECK WITHIN OPERATIONAL LIMITS | BOTH
- [L2] Check that the Gross Weight CG displayed on the permanent data of the SD is within the operational limits using the OIS Loadsheet application or referring to the loadsheet.



- [L1] ● If the ECAM GWCG is within the operational limits:
- THS FOR _ in FMS ACTIVE/PERF page..... INSERT T.O CG (in %) | FO
- [L2] Use the TOCG indicated on the loadsheet as the reference for insertion of the T.O CG in the FMS .
- [L1] THS FOR _ in FMS ACTIVE/PERF page..... CROSSCHECK | CAPT
FINAL LOADSHEET..... SIGN and EXPORT | CAPT
- [L2] If the loadsheet is modified, or if required by the authorities or by the airline policy, the Captain sends the loadsheet to the ground via the EXPORT function in the LOADSHEET application.
- [L1] ● If the ECAM GWCG is not within the operational limits:
- AUTO GND XFR pb-sw ON | FO
- [L2] Ground transfer is activated to automatically obtain the ground CG target in accordance with the final ZFW / ZFWCG values entered in the FMS .
- If time permits, continue the Automatic Ground Transfer (AGT) until the FUEL AUTO GND XFR COMPLETED alert triggers
 - If departure is imminent, monitor the ECAM GWCG during the AGT . The flight crew can manually stop the AGT when the ECAM CG is within the operational limits.
- Note:
- The flight crew can obtain the amount of fuel that should be transferred from/to the trim tank to be inside the operational envelope, via the Loadsheets application
 - The flight crew should not launch the automatic ground transfer if the aircraft is moving (e.g. during towing.) The AGT is inhibited as soon as at least two engines are running.
- [L1] AUTO GND XFR..... MONITOR | FO
THS FOR _ in FMS ACTIVE/PERF page..... INSERT T.O CG (in %) | FO
- [L2] Use the TOCG indicated on the loadsheet as the reference for insertion of the T.O CG in the FMS .
- [L1] THS FOR _ in FMS ACTIVE/PERF page..... CROSSCHECK | CAPT
FINAL LOADSHEET..... SIGN and EXPORT | CAPT
- [L2] If the loadsheet is modified, or if required by the authorities or by the airline policy, the Captain sends the loadsheet to the ground via the EXPORT function on the LOADSHEET application.

TAKEOFF DATA

- [L2] For additional training-oriented information, Refer to FCTM/NO-70 Takeoff Data.



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- BEFORE PUSHBACK OR START

- [L1] OIS FINAL TAKEOFF PERF..... CONFIRM or RECOMPUTE | BOTH
- [L2] - *If takeoff conditions did not change, verify and confirm that the preliminary takeoff data are still valid*
- *If takeoff conditions changed, calculate the final takeoff performance, using the T.O. PERF application on the OIS.*
- [L1] FMS TAKEOFF DATA..... CHECK/REVISE, AS REQUIRED | FO
- [L2] *The FO checks or revises the takeoff data in the T.O. panel of the FMS ACTIVE/PERF page.*
- [L1] REVISED FMS TAKEOFF DATA..... CROSSCHECK | CAPT
- [L2] *The CAPT crosschecks the takeoff speeds and the flexible temperature.*
The CAPT crosschecks the FMS entries made by the FO, using the XCHECK WITH AVNCS function in the T.O. PERF application.
- [L1] *The flight crew should pay particular attention in determining the takeoff configuration.*
- **In accordance with Airlines policy or if required by operational regulation:**
- FINAL TAKEOFF PERFORMANCE..... STORE IN CURRENT EFF | FO

SEATING POSITION

- SEATS, SEAT BELTS, HARNESSSES, RUDDER PEDALS, ARMRESTS..... ADJUST | BOTH
- [L2] *The seat is correctly adjusted when the pilot's eyes are in line with the red ball and the white light.*
For additional training-oriented information, Refer to FCTM/NO-70 Seating Position.

HUD

- HUD..... DEPLOY | CAPT
- HUD knob ADJUST | CAPT
- [L2] *Turn on the HUD and adjust the brightness according to conditions.*
- [L1] DISPLAY MODE..... AS RQRD | CAPT
- [L2] *Select the declutter mode as required.*
The flight crew should select the crosswind mode only in flight, when the FPV is not within the display area of the HUD.

For additional training-oriented information, *Refer to FCTM/SI-90 General.*

| | |
|----------------|--|
| CAUTION | In order to avoid head contact with the HUD, the flight crew should: <ul style="list-style-type: none"> - Tight the seat belts and the fifth strap for takeoff and landing - Maintain the seat belts and the fifth strap fasten, in all other flight phases. |
|----------------|--|



MFD

- MFD IN TAKEOFF CONFIGURATION | BOTH
- [L2] - ACTIVE/F-PLN page on the PM side
- T.O panel of the ACTIVE/PERF page on the PF side.

EXTERNAL POWER

- [L2] For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .
- [L1] EXT PWR CHECK AVAIL | BOTH
- [L2] Check that the EXT PWR pb-sw are set to AVAIL before the request of the external power disconnection.
- [L1] EXT PWR DISCONNECTION REQUEST | CAPT

LP GROUND CARTS

- LP GROUND CARTS.....CHECK DISCONNECTED | BOTH
- [L2] If LP ground carts are used for air conditioning, request disconnection before engine start.
If LP ground carts are connected during the engine start, air pressure in the mixer unit may be detected out of range, and the associated alert COND MIXER PRESS REGUL FAULT may trigger.

BEFORE START CHECKLIST DOWN TO THE LINE

- BEFORE START C/L down to the line.....COMPLETE | BOTH
Refer to PRO-NOR-C-L Before Start .
- [L2] For additional information on the associated standard callout, Refer to PRO-NOR-SCO Summary for Each Flight Phase .
For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .

AT START CLEARANCE

Applicable to: ALL

PUSHBACK/START UP CLEARANCE

- PUSHBACK/START UP CLEARANCE.....OBTAIN | FO
- [L2] Obtain ATC pushback/start up clearance and ground crew clearance.



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VIDEO

TAXI VIDEO..... AS RQRD | BOTH

- [L2] As required, set the TAXI video on the PFD or on the SD to see the aircraft vicinity.

WINDOWS AND DOORS

WINDOWS AND DOORS..... CHECK CLOSED | BOTH

- [L2] - On the DOOR SD page, check that all doors and windows are closed
- When required by local authorities, check that the cockpit door is closed and locked (i.e. OPEN does not appear on the CKPT DOOR light).

[L1] SLIDES.....CHECK ARMED | CAPT

LIGHTS

BEACON sw ON | CAPT

- [L2] When cleared for start or pushback, set to ON the BEACON sw.

THRUST LEVERS

THR LEVERS..... IDLE | CAPT

CAUTION The engines start regardless of the thrust lever position. If the thrust levers are not set to IDLE, then thrust rapidly increases to the corresponding thrust lever position, causing a hazardous situation.

PARKING BRAKE AND NOSEWHEEL STEERING

■ If pushback is not required:

PARK BRK..... ON | CAPT

- [L2] On the triple pressure indicator, the left and right BRK pressure indications should be above 3 500 PSI .

■ If pushback is required:

- [L2] For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

[L1] PARK BRK..... OFF | CAPT

CAUTION Do not use the brakes during pushback, unless required due to an emergency.



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N/W STEER DISC MEMO | CAPT
..... CHECK DISPLAYED

[L2] In the case of a pushback (towbarless or conventional), the ground crew should set the tow pin to the towing position on the steering nose gear panel. The N/W STEER DISC memo on the ECAM indicates this position.

[L1] **CAUTION** If the ECAM does not display the N/W STEER DISC memo, but the ground crew confirms that the tow pin is in the towing position, the flight crew should not perform the pushback in order to avoid possible damage to the nose landing gear upon green hydraulic pressurization.
To dispatch the aircraft in such a case, Refer to MEL/MI-32-50 NWS Disconnection Function .

When the pushback is completed, set to ON the PARK BRK handle, and ask the ground crew for towbar disconnection.

BEFORE START CHECKLIST BELOW THE LINE

BEFORE START C/L below the line..... | COMPLETE | BOTH

Refer to PRO-NOR-C-L Before Start .

[L2] For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .
For additional information on the associated standard callout, Refer to PRO-NOR-SCO Summary for Each Flight Phase .



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STANDARD OPERATING PROCEDURES - ENGINE START

AUTOMATIC ENGINE START

Applicable to: ALL

Impacted DU: 00000807 Automatic Engine Start

- L2 For additional training-oriented information, *Refer to FCTM/NO-80 General.*
For more information on the associated standard callouts, *Refer to PRO-NOR-SCO Summary for Each Flight Phase.*

L1 ENG START selector IGN START | CAPT

L2 *The ENG SD page appears.*

L1 WAIT FOR 10 s

L2 *The flight crew should wait approximately for 10 s before the ENG MASTER lever of the engines 2 and 3 are set to ON.*

A 10 s delay permits to detect the loss of a thrust reverser function.

- L1 ● If no ENG 2(3) REVERSER FAULT ECAM alert appears:

START ENGINES 1 and 2..... ANNOUNCE | CAPT

Note: *For any operational reason, any engine can be started first.*

ENG MASTER 1, then 2..... ON | CAPT

L2 *Set the ENG MASTER levers to ON when all amber crosses and messages no longer appear on the engine parameters of the EWD and of the ENG SD page.*

Note: *Parameter callouts are not mandatory.*

| <i>On the EWD</i> | <i>On the SD</i> |
|---|---|
| | <i>The corresponding start valve is open. The bleed pressure is green. The engine LP valve is open.</i> |
| | <i>N2 increases. Oil pressure increases.</i> |
| | <i>20 s after N2 reaches 20 % : - FF increases - The indication of the active igniter (A or B) appears.</i> |
| <i>30 s (maximum) after FF increases: - EGT increases - N1 increases.</i> | |
| | <i>At 56 % N2 : - The corresponding start valve is closed - Ignition indication no longer appears.</i> |

L1

Note: The level of N2 vibration may exceed 5 units and the indication may pulse for a short period of time during the engine start sequence.

Depending on the time between the engine shutdown and the next engine start, the HP rotor can bow due to the thermal stabilization of the engine. As a result, during the engine start sequence, the N2 vibration indication may exceed 5 units.

In order to minimize the rotor bow effect during the engine automatic start sequence, the FADEC cranks the engine for 20 s after the N2 reaches 20 % .

● When the engine reaches idle (i.e. AVAIL appears on the EWD):

| | | |
|---------------------------|-------------------|------|
| ENG IDLE PARAMETERS |CHECK NORMAL | CAPT |
|---------------------------|-------------------|------|

L2

At ISA , sea level, with bleed off, check that:

- THR is approximately 3 %
- EGT is approximately 455 °C
- N1 is approximately 20 %
- N2 is approximately 66 %
- FF is approximately 1 400 lbs/h .

L1

| | | |
|----------------------------|----------|------|
| START ENGINES 3 and 4..... | ANNOUNCE | CAPT |
| ENG MASTER 3 then 4..... | ON | CAPT |

Apply the same procedure as indicated for engines 1 and 2.

● If ENG 2(3) REVERSER FAULT ECAM alert appears:

| | | |
|--------------------------|------|------|
| ENG START selector | NORM | CAPT |
|--------------------------|------|------|

● When XX appears on ENG parameters:

| | | |
|--------------------------|-----------|------|
| ENG START selector | IGN START | CAPT |
|--------------------------|-----------|------|

L2

The action to set the ENG START selector to NORM then to IGN START enables to reset the electrical power of the FADEC and ETRAC , and to clear thrust reverser failure.

L1

■ If ENG 2(3) REVERSER FAULT ECAM alert no longer appears after 10 s :

| | | |
|----------------------|-------|------|
| ENGINES 1 and 2..... | START | CAPT |
|----------------------|-------|------|

Apply the same procedure as previously indicated under the condition "If no ENG 2(3) REVERSER FAULT ECAM alert appears" .

| | | |
|----------------------|-------|------|
| ENGINES 3 and 4..... | START | CAPT |
|----------------------|-------|------|

Apply the same procedure as previously indicated under the condition "If no ENG 2(3) REVERSER FAULT ECAM alert appears" .

■ If ENG 2(3) REVERSER FAULT ECAM alert appears again after 10 s :

Consider thrust reverser failure.

AUTOMATIC ENGINE START
Applicable to: ALL

Impacted by TDU: 00023393 Automatic Engine Start

- For additional training-oriented information, Refer to FCTM/NO-80 General.
 For more information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase.

ENG START selector IGN START | PF

The ENG SD page appears.

START ENGINES 1 and 2..... ANNOUNCE | PF

Note: For any operational reason, any engine can be started first.

ENG MASTER 1 then 2..... ON | PF

- Set the ENG MASTER levers to ON when all amber crosses and messages no longer appear on the engine parameters of the EWD and of the ENG SD page.

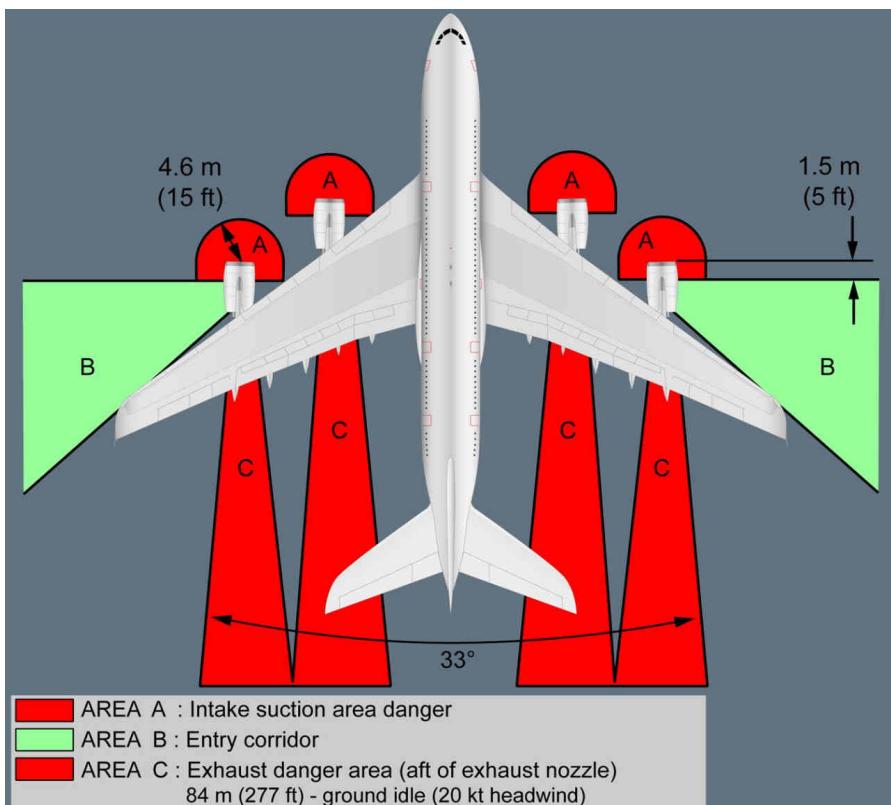
Note: Parameter callouts are not mandatory.

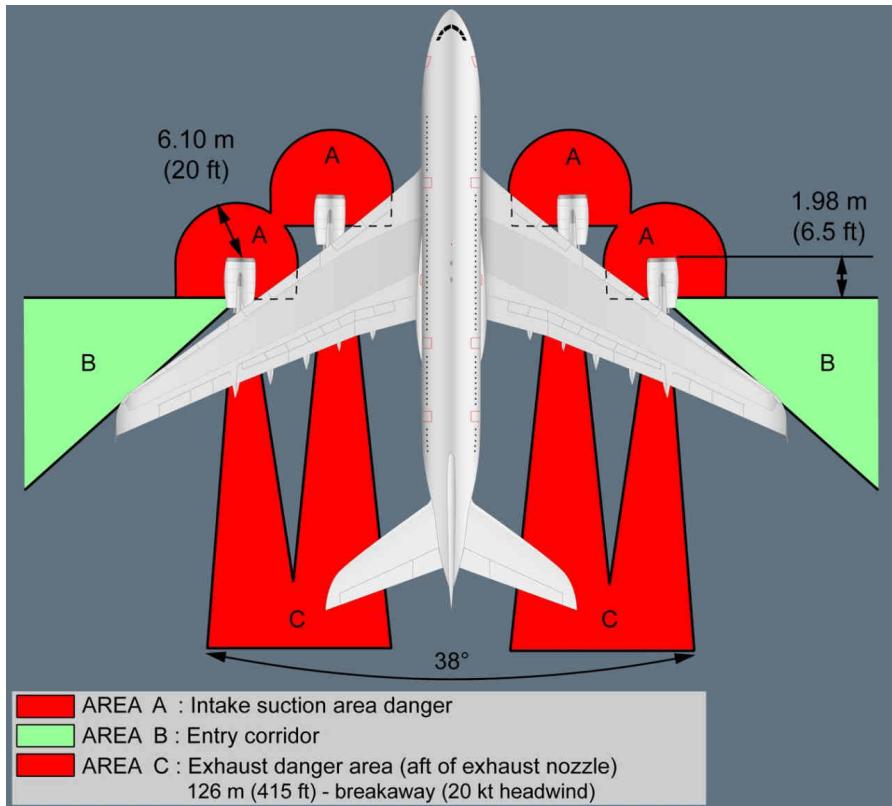
| On the EWD | On the SD |
|--|--|
| | The corresponding start valve is open. The bleed pressure is green. The engine LP valve is open. |
| | N2 increases. Oil pressure increases. |
| | 20 s after N2 reaches 20 % : - FF increases - The indication of the active igniter (A or B) appears. |
| 30 s (maximum) after FF increases: - EGT increases - N1 increases. | |
| | At 56% N2 : - The corresponding start valve is closed - Ignition indication no longer appears. |

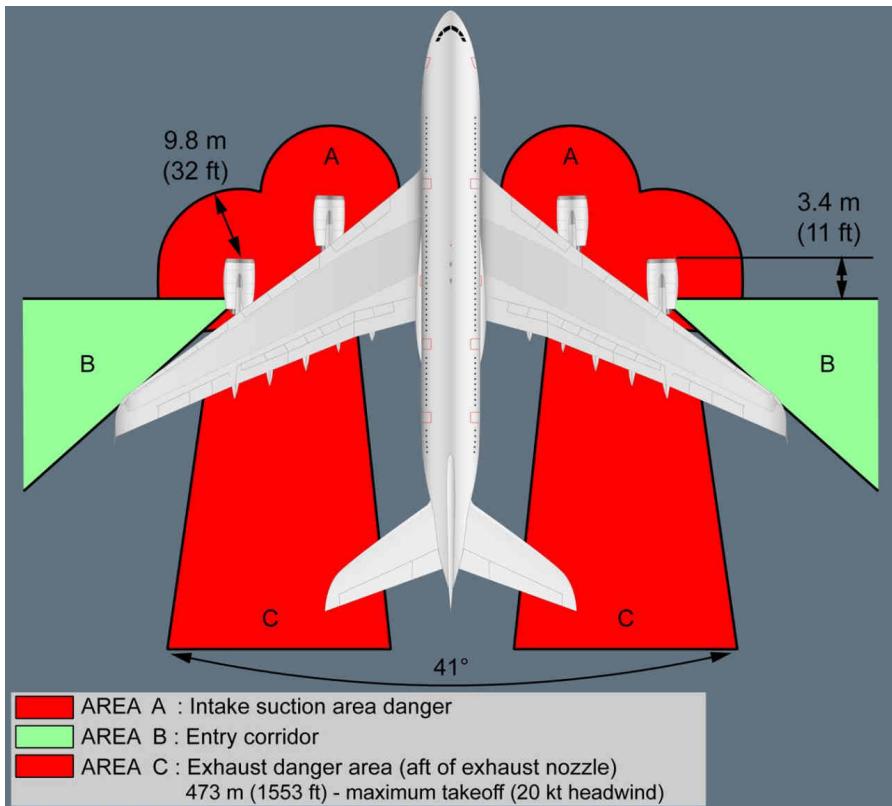
- When the engine reaches idle (i.e. AVAIL appears on the EWD)
ENG IDLE PARAMETERS CHECK NORMAL | PF
- At ISA, sea level, with bleed off, check that:
- THR is approximately 3%
- EGT is approximately 455 °C
- N1 is approximately 20 %
- N2 is approximately 66 %
- FF is approximately 1 400 lb/h.
- START ENGINES 3 and 4 ANNOUNCE | PF
ENG MASTER 3 then 4 ON | PF
- Apply the same procedure as indicated for engines 1 and 2.

GROUND RUN UP - DANGER AREAS

Applicable to: ALL

MINIMUM IDLE THRUSTMinimum Idle Thrust

BREAKAWAY POWERBreakaway Power

TAKEOFF THRUSTTakeoff Thrust



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AFTER START

Applicable to: ALL

ENG START SELECTOR

- [L2] For additional training-oriented information, Refer to FCTM/NO-90 ENG START Selector.
- [L1] ENG START selector NORM | CAPT
 - Setting to NORM the ENG START selector indicates the end of the start sequence
 - [L3] If the ENG START selector remains in the IGN START position, this prevents a continuous ignition on ground. The flight crew should set the ENG START selector to NORM then to IGN START to activate continuous ignition on ground.
- [L2] The flight crew should then perform the AFTER START actions.
 - The WHEEL SD page appears instead of the ENG SD page

Note: If the flight crew does not set the ENG START selector to NORM, the WHEEL SD page automatically appears instead of the ENG SD page 30 s after the last engine start.

To prevent thermal shock, the engine should run at idle or taxi thrust for a minimum of 3 min (5 min recommended) prior to takeoff .

APU BLEED

APU BLEED pb-sw OFF | CAPT

- [L2] - The APU bleed valve closes
 - All engine bleed valves open
 - All crossbleed valves close.

ENG ANTI-ICE

All ENG ANTI-ICE pb-sw AS RQRD | CAPT

- Set to ON the ENG ANTI-ICE pb-sw , if:
 - Icing conditions exist or are anticipated (Refer to PRO-SUP-30 Definition of Icing Conditions), or
 - Standing water, slush, ice, or snow is on the taxiways or runway when the OAT is less than 10 °C .
- When taxiing in icing conditions, if temperature is less than + 3 °C :
 - With freezing fog conditions: the flight crew must apply the ice shedding procedure, Refer to PRO-SUP-70-20 Ground Ice Shedding Procedure In Case Of Freezing Fog
 - Without freezing fog conditions: In order to shed any possible ice on the fan, the flight crew must increase the thrust to 60 % N1 momentarily on two symmetric engines at a time (i.e. 1 and 4, 2 and 3) with parking brake on (or brake with pedals). The engines run-up must be performed at least every 30 min of total taxi time (including taxi-in and taxi-out time) and when lined-up before applying the takeoff thrust.

CAUTION

Pay particular attention to the aircraft movement during this procedure. If during thrust increase, the aircraft starts to move, immediately retard the thrust levers to IDLE.

If the aircraft moves, apply the thrust on only one engine at a time.

APU

- If the APU is not required:

APU MASTER SW pb-sw OFF | CAPT

GROUND SPOILERS

GND SPLRS..... ARM | FO

RUDDER TRIM

RUDDER TRIM..... ZERO | FO

- [2] If the rudder trim position is not zero, press the RESET pb on the RUDDER TRIM panel.



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FLAPS

FLAPS.....SET | FO

- [L2] - Set the FLAPS for takeoff
- Check the slats and flaps position on the slats/flaps display of the PFD
- If taxiing in icing conditions with rain, slush, or snow, maintain the slats/flaps retracted, until the aircraft reaches the holding point of the takeoff runway, in order to prevent contamination of the slats/flaps mechanism.

PITCH TRIM

PITCH TRIM.....CHECK | FO

- [L2] Check that the pitch trim is set to the takeoff target on the pitch trim display of the PFD.

ECAM STATUS

ECAM STATUS.....CHECK | BOTH

- [L2] - The F/O checks and the CAPT crosschecks that there is no status reminder (STS) on the EWD
- If STS appears on the EWD, press the STS pb on the ECP to display the STATUS page.

GROUND CREW

CLEAR TO DISCONNECT.....ANNOUNCE | CAPT

- [L2] The ground crew will:
- Remove the chocks
- Remove the tow pin
- Disconnect the interphone
- Make the hand signal on the left or right side.

For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

N/W STEER DISC MEMO

N/W STEER DISC MEMO.....CHECK NOT DISPLAYED | CAPT

FLIGHT CONTROLS

FLIGHT CONTROLS.....CHECK | BOTH

The flight crew should perform the flight control check when the slats/flaps are set to the takeoff configuration.



1. The CAPT remains silent, and applies full longitudinal and lateral sidestick deflection.

On the F/CTL SD page, the FO checks full travel of all elevators and all ailerons, and the correct deflection and retraction of all spoilers.

The FO announces "full up", "full down", "neutral", "full left", "full right", "neutral", when each applicable full travel/neutral position is reached.

The CAPT remains silent, and checks that the FO calls are in accordance with the sidestick order.

Note: To reach full travel, maintain full sidestick for a sufficient period of time.

2. The CAPT remains silent, presses the PEDAL DISC pb to disconnect the NWS and applies full left rudder, full right rudder, and neutral. The FO follows on the rudder pedals and announces "full left", "full right", "neutral" as each full travel/neutral position is reached.

Note: To reach full travel, apply full rudder for a sufficient period of time.

3. The FO applies full longitudinal and lateral sidestick deflection, remains silent, and checks full travel and the correct sense of all elevators and all ailerons, and the correct deflection and retraction of all spoilers, on the F/CTL SD page.

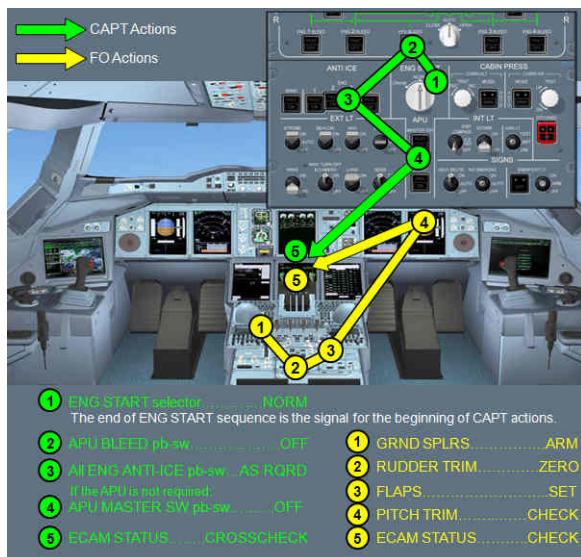
- [2] Note: - The F/CTL SD page automatically appears during 20 s after any flight crew action on the sidestick or on the rudder pedals
- After the F/CTL checks, the rudder trim returns to a position between $\pm 3^\circ$. As a result, the rudder trim check at neutral in the AFTER START C/L may appear as not completed (i.e. in blue).

AFTER START CHECKLIST

AFTER START C/L.....COMPLETE | BOTH

Refer to PRO-NOR-C-L After Start .

- [2] For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .
For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

L2 FLOW PATTERN
after engine start

L1 After Start Procedure and Call out

| EVENT | CAPTAIN | FO |
|--|--|---|
| After ECAM Status Check | Announce to Ground Crew "Clear to Disconnect" | |
| After Check "NW STRG DISC" MEMO not displayed | "Flight Control Check" | |
| The Capt . silently checks that the F/O calls are in accordance with the sidestick order | | |
| | Elevator : Ailerons: The Capt. Presses PEDAL DISC pb on the nosewheel tiller and silently applies full left rudder , full right rudder, and neutral. Rudder : "AFTER START CHECK LIST" | F/O will call this checks as it is carried out: "FULL UP, FULL DOWN, NEUTRAL" "FULL LEFT, FULL RIGHT, NEUTRAL" " FULL LEFT, FULL RIGHT NEUTRAL" "AFTER START CHECK LIST COMPLETE" |



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STANDARD OPERATING PROCEDURES - TAXI

TAXI

Applicable to: ALL

The Captain will turn ON then OFF the Landing Light /Taxi Light/Turnoff Light in response to the Ramp Coordinator's signal.

CLEARANCE

TAXI CLEARANCE..... OBTAIN | FO

EXTERNAL AND TAXI AID CAMERA SYSTEM (ETACS)

TAXI pb on EFIS CP AS RQRD | BOTH

- [L2] *For additional training-oriented information, Refer to FCTM/NO-100 External Taxi Aid Camera System.*

AIRPORT NAVIGATION

Direct visual observation out of the cockpit windows remains the primary means of taxiing. If there is a conflict between outside and the OANS display, the reference must be the outside view.

ND RANGE selector ZOOM, AS APPROPRIATE | BOTH

- [L2] - *If necessary, set the ND RANGE selector to ZOOM to activate the Onboard Airport Navigation System (OANS). Then, select ARC, ROSE, or PLAN mode, as appropriate.*
[L2] - *If the DATABASE CYCLE NOT VALID message appears on the STATUS panel, check the active database cycle validity period, and swap the active and second database.*

For additional training-oriented information, Refer to FCTM/NO-100 Airport Navigation .

EXTERIOR LIGHTS

NOSE sw TAXI | CAPT

- [L2] *During the day and during the night, set the NOSE sw to TAXI.*

[L1] RWY TURN OFF & CAMERA sw AS RQRD | CAPT

PARK BRK

- [L2] *For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .*

[L1] PARK BRK..... OFF | CAPT

- [L2] *Check that the left and right brake pressure is zero on the triple pressure indicator.*

Small residual pressure can be indicated for a short period of time.

THRUST LEVERS

THRUST LEVERS.....AS RQRD | CAPT

- [L2] - Little, if any, power above idle thrust can be necessary to move the aircraft (e.g. approximately up to 10 % THR at heavy weight, with a uphill taxi slope). Excessive thrust application on engines can result in exhaust-blast damage (e.g. on airport signs). The flight crew should use symmetrical thrust. When the aircraft begins to move, less thrust is necessary.
- If the inner engines are located over unconsolidated or unprepared ground during taxi, avoid high thrust settings on the inner engines (i.e. engine ingestion (FOD) risk increases). If additional thrust is necessary, the flight crew should preferably use the outer engines.
- The use of engine anti-ice increases the ground idle thrust
- If the aircraft was parked for a long time (i.e. more than 6 h) in high tire temperature conditions and with a high aircraft weight, then the flight crew can feel a "square wheel effect" when the aircraft begins to move.

BRAKES

- [L2] For additional training-oriented information, Refer to FCTM/NO-100-100-2 Brakes .
For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

[L1] BRAKES.....CHECK | CAPT

CAUTION If the aircraft was parked in wet conditions for a long time, the first brake application at low speed is less effective.

- [L2] - When the aircraft begins to move, the PF smoothly presses the brake pedals to check the braking efficiency of the normal braking system
The FO checks that the left and right BRK pressure on the triple pressure indicator remains at zero.
- The maximum taxi speed should be 30 kt in a straight line on long taxiways, and 8 to 10 kt on a sharp turn. It is difficult to assess the ground speed. Therefore, monitor the ground speed on the ND or on the ETACS video. Avoid continuous brake application. When the aircraft exceeds 30 kt with idle thrust, smoothly brake, and decelerate to 10 kt . Release the brakes, to enable the aircraft to accelerate again.



NOSEWHEEL STEERING

- [L2] For additional training-oriented information, Refer to FCTM/NO-100-100-1 Tiller and Rudder Pedals Use.
- [L1] NOSEWHEEL STEERING..... AS RQRD | CAPT
 - Use smooth and progressive handwheel inputs
 - The nosewheel steering angle is limited to 70 °.

ATC CLEARANCE

ATC CLEARANCE..... CONFIRM | FO

TAKEOFF DATA

If the takeoff data changed, or in the case of a runway change, prepare updated takeoff data and recompute takeoff performance, as appropriate.

TAKEOFF DATA COMPUTATION

■ If multiple runway selection was used in anticipation of the runway change:

- T.O PERF..... ACCESS | FO
- SELECTED RWY AND INPUT DATA..... CHECK | FO
- [L2] Check that the new runway was previously selected and check that the conditions used for takeoff performance computation are still valid.
- [L1] TAKEOFF DATA..... CHECK | FO
- [L2] Check the takeoff data for the selected runway.

■ If multiple runway selection was not used, or if the takeoff conditions changed:

- T.O PERF..... ACCESS | FO
- NEW RUNWAY/NEW CONDITIONS..... SELECT/ENTER | FO
- TAKEOFF PERF..... COMPUTE | FO
- [L2] Launch the computation for the new selected runway or the new takeoff conditions.
- [L1] TAKEOFF PERFORMANCE RESULTS..... CROSSCHECK | CAPT

IN THE FMS ACTIVE/PERF PAGE

● In the case of ATC clearance or takeoff runway change:

- TAKEOFF PERF DATA..... UPDATE | FO
- [L2] Update the FMS in accordance with the new results of the takeoff performance computation: i.e. update the T.O panel of the FMS ACTIVE/PERF page, and the FMS ACTIVE F-PLN page.

If the flight crew anticipated the runway change in a secondary flight plan, activate this SEC F-PLN.

| | | | |
|----|---|----------------|------|
| L1 | V1, VR AND V2..... | UPDATE | FO |
| | FLX T.O TEMPERATURE..... | UPDATE | FO |
| | FLAPS..... | UPDATE | FO |
| | FMS UPDATES..... | CROSSCHECK | CAPT |
| L2 | <i>The CAPT crosschecks the new FMS inputs.</i> | | |
| L1 | FLAPS lever..... | AS APPROPRIATE | CAPT |
| L2 | <i>Set the FLAPS for takeoff.</i> | | |

AFS/FLIGHT INSTRUMENTS

● In the case of ATC clearance or takeoff runway change:

| | | |
|---|--------------------------|------|
| F-PLN (SID, TRANS)..... | REVISE or CHECK | FO |
| <i>Carefully confirm that the ATC clearance agrees with the FMS , if NAV mode is to be used.</i> | | |
| INITIAL CLIMB SPEED AND SPEED LIMIT..... | REVISE or CHECK | FO |
| <i>Revise the SPD panel of the FMS ACTIVE/VERT REV page associated with the departure, or the CLB waypoint.</i> | | |
| CLEARED ALTITUDE ON AFS CP..... | SET | FO |
| <i>On the PFD , crosscheck and confirm the first cleared altitude.</i> | | |
| HDG ON AFS CP..... | PRESET, AS RQRD | FO |
| <ul style="list-style-type: none"> - If the ATC requires a heading after takeoff, or in the case of a radar vector departure, preset the heading on the AFS CP . NAV disarms. For more information, Refer to DSC-22-FG-100-GHOW How to Define a HDG/TRK Preset for Takeoff . - RWY TRK mode maintains the aircraft on the runway track until HDG engages. | | |
| FD..... | CHECK SELECTED ON | FO |
| PFD/ND..... | CHECK | BOTH |
| <i>Check that the PFD and the ND indications (e.g. airspeeds, initial target altitude, heading, slats/flaps configuration, FMA modes) are in accordance with the departure.</i> | | |
| MFD..... | IN TAKEOFF CONFIGURATION | BOTH |
| <ul style="list-style-type: none"> - The PF displays the T.O panel of the FMS ACTIVE/PERF page - The PM displays the FMS ACTIVE/F-PLN page. | | |

TAKEOFF BRIEFING

- L2 For additional training-oriented information, Refer to FCTM/NO-100 Takeoff Briefing.



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STANDARD OPERATING PROCEDURES - TAXI

- [L1] TAKEOFF BRIEFING.....CONFIRM | PF
- [L2] *The takeoff briefing should usually be only a brief confirmation of the entire takeoff briefing that is done at the gate. The flight crew should address any clearance changes at this time.*

AUTO BRK

- RTO pbARM | FO
- [L2] - The RTO ARM light comes on
- BRK RTO appears on the FMA
- The flight crew can arm the AUTO BRK in the RTO mode, even if the PARK BRK is set to ON
- The RTO mode improves the safety in the case of an aborted takeoff.
If the takeoff is aborted, the AUTO BRK system applies maximum braking as soon as the thrust levers are set to idle, and if the speed is above 72 kt (i.e. corresponding to the order of ground spoiler extension). Below 72 kt, the AUTO BRK does not activate, because the ground spoilers do not automatically extend.

ATC

ATC CODE.....CONFIRM/SET | FO

FINAL CHECK

- TO CONFIG pbTEST | FO
- [L2] Press the TO CONFIG pb on the ECP, and check that the EWD displays the T.O CONFIG NORMAL memo.
- [L1] T.O MEMO.....NO BLUE LINE | FO
- [L2] Check that the EWD does not display any blue line in the T.O memo section.
- [L1] CABIN.....READY | BOTH
- [L2] Check CABIN READY on the EWD, or obtain the report from the chief purser: "Cabin ready for takeoff".

BEFORE TAKEOFF CHECKLIST DOWN TO THE LINE

BEFORE TAKEOFF C/L down to the lineCOMPLETE | BOTH

Refer to PRO-NOR-C-L Before Takeoff .



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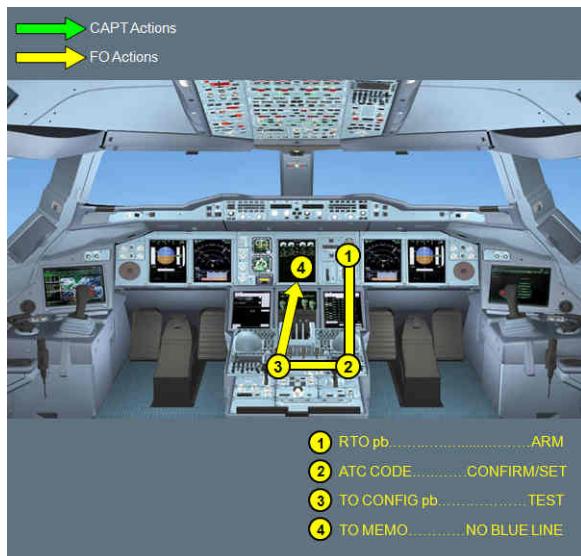
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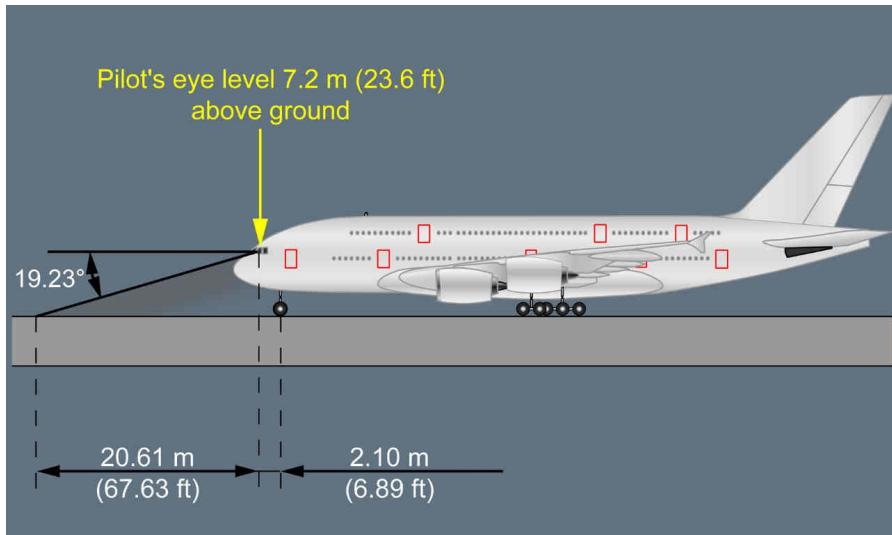
STANDARD OPERATING PROCEDURES - TAXI

TAXI PROCEDURE AND CALL OUT

| EVENT | CAPTAIN | FO |
|-----------------------------|--|-----------------|
| Obtain TAXI Clearance | Nose Light ----- TAXI Turn on nosewheel light to TAXI day and night. RWY TURNOFF & LANDING lights may be switched on, As required. | |
| Verify clearing of own side | Release parking brake and check brake pressure Zero (triple indicator). Slight residual pressure may be indicated for a short period of time “BRAKE CHECK” | “PRESSURE ZERO” |

- | BOTH
- [2] For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .
For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

L2 FLOW PATTERNtaxi flow pattern

L2 VISUAL GROUND GEOMETRYVISUAL GROUND GEOMETRY**TURN ON TURNING PAD**

Applicable to: ALL

OVERVIEW

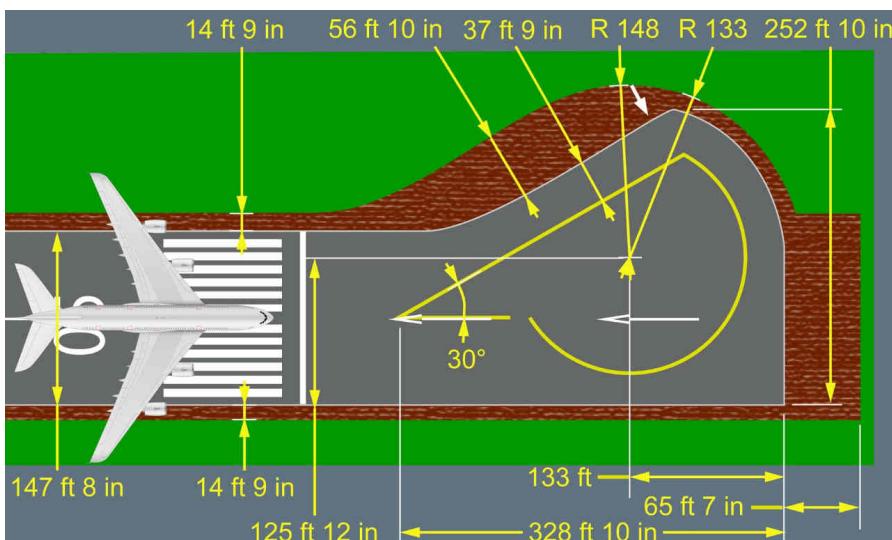
On runways with a width of less than 200 ft, it is not possible to perform a U-turn (for U-turns on a 200 ft wide runway, Refer to PRO-NOR-SOP-100-A 180 Deg Turn On 60 M (200 FT) Wide Runway_GENERAL). If a runway does not have a taxiway to access the runway threshold or to exit at the end of the runway, or if the taxiway is not usable, the runway may have a turn pad. The type of turn pad used as a reference in this procedure is a Technical Instruction on Civil Airports (ITAC) turn pad that was defined for B747 aircraft.

Note: In the case of a BWS fault:

- The flight crew must slightly increase the THR settings
- It is not recommended to turn on a turn pad, if the runway is wet.

CAUTION This procedure is not permitted on a contaminated runway.

ITAC turn pad



- [L3] Dimensions in degrees and feet.

[L1] PROCEDURE

Taxi on the runway centerline.

Use the ETACS belly camera to monitor the maneuver.

- [L2] However, it is possible to perform the maneuver without a belly camera.

- [L1] When the aircraft approaches the turn pad, reduce and maintain the speed to 5 kt .

Use the GPS ground speed displayed on the ETACS camera display, if possible.

- [L2] At a very low speed, GPS ground speed is more accurate than the IRS ground speed displayed on the ND .

- [L1] ● When the aircraft is in straight line, aligned with the yellow turn pad line (30 ° divergence heading from the runway axis):

THR ON OUTER ENGINE OPPOSITE THE TURNSIDE.....10% SET | PF

Note: An asymmetric thrust increase causes left (right) yaw momentum. This requires the flight crew to slightly adjust the tiller in the opposite direction, in order to maintain the aircraft alignment.

- [L2] In the lower range of thrust, engines have a high level of inertia.

A 10 % THR preset enables rapid engine thrust adjustment and good speed control before the turn.

When the aircraft is at the maximum takeoff weight, a 15 % THR can be preset.

Note: *On wet runways, less thrust may be required.*

[L1] SPEED..... MAINTAIN 5 KT | PF

[L2] *If the aircraft speed is more than 5 kt, control the speed by smoothly applying the brakes in a symmetrical manner.*

[L1] The flight crew begins the turn using the arrows painted at the outside of the ITAC turn pad. The flight crew must start the turn when the virtual line indicated by the direction of the arrow crosses the shoulder of the Pilot Flying (PF).

● When the PF reaches the arrow:

[L2] Note: *If there is no arrow to start the turn on the turn pad, the flight crew can use the belly camera to start the turn. Start the turn when the turn side dot on the belly camera display reaches the turn line of the turn pad.*

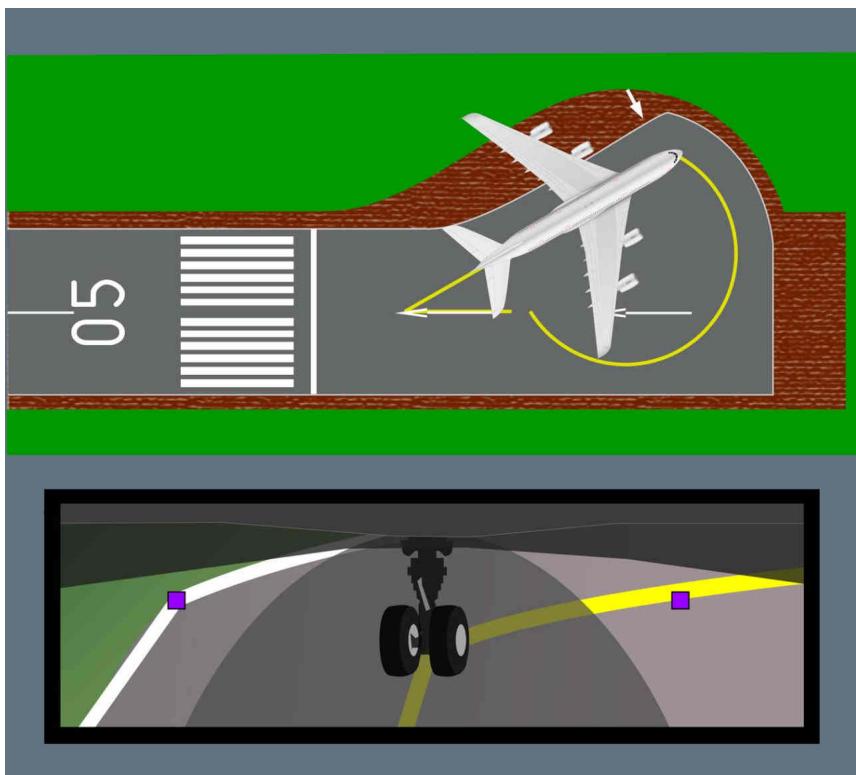
[L1] FULL TILLER..... APPLY AND MAINTAIN | PF

[L2] *The flight crew can use differential braking to shorten the turn, if necessary.*

L1 THR ON OUTER ENG
.....ADJUST TO MAINTAIN 5 KT

PF

Belly Camera View and (Arrow) Position at the Beginning of the Turn



SPEED.....MAINTAIN 5 KT | PF

L2 If 5 kt is exceeded with full tiller applied, there is a risk that the nose wheel tires skid on the runway.

If the aircraft decelerates below 5 kt, or stops during the maneuver, gently increase THR on the outer engine of the external turn side.

In the lower range of thrust, the engines have a high level of inertia.

If the aircraft is at maximum takeoff weight, the flight crew can adjust the THR by approximately 15 %, according to external conditions (e.g. wind, runway condition).

Note: On wet runways, less thrust may be required.

L1

● When the turn is completed :

| | | |
|---------------------------|------------------|----|
| BRAKE PEDAL RELEASED..... | CONFIRM | PF |
| THR ON OUTER ENGINE..... | IDLE SET | PF |
| TILLER..... | SMOOTHLY RELEASE | PF |

180 DEG TURN ON 60 M (200 FT) WIDE RUNWAY

Applicable to: ALL

GENERAL

The approximate turn width (without margin) is 55 m (180 ft) taking into account the maximum nosewheel steering angle (i.e. 70 °).

This 55 m (180 ft) turn width is based on the below procedure for U-turn on 60 m (200 ft) wide runway, using either the ETACS belly camera or external visual references as a guideline.

| | |
|----------------|---|
| CAUTION | This procedure is not permitted in the case of BWS Fault. |
|----------------|---|

| | |
|----------------|---|
| CAUTION | This procedure is not permitted on contaminated runway. |
|----------------|---|

180° TURN USING THE ETACS BELLY CAMERA

Taxi on the runway centerline.

During the maneuver:

- Maintain a ground speed of 5 kt
- Prefer the use of the ETACS camera display to monitor the GPS ground speed that is more accurate than the IRS ground speed displayed on the ND
- L1 - Monitor the approaching runway edge.

Turn toward the edge of the runway with a 20 ° intercept angle, and maintain a 20 ° angle.

- L2 *On the PFD, check the 20 ° divergence from the runway axis.*

- L1 **● When the aircraft approaches the runway edge, and approximately 3 s before starting the turn:**

| | | |
|--|---------|------|
| THR ON OUTER ENGINE OPPOSITE THE TURNSIDE..... | 20% SET | CAPT |
|--|---------|------|

Note: An asymmetric thrust increase causes left (right) yaw momentum. This requires the flight crew to slightly adjust the tiller in the opposite direction, in order to maintain the 20 ° aircraft divergence from the runway axis.

- L2 *In the lower range of thrust, the engines have a high level of inertia. A 20 % THR preset enables rapid engine thrust adjustment and good speed control before the turn.*



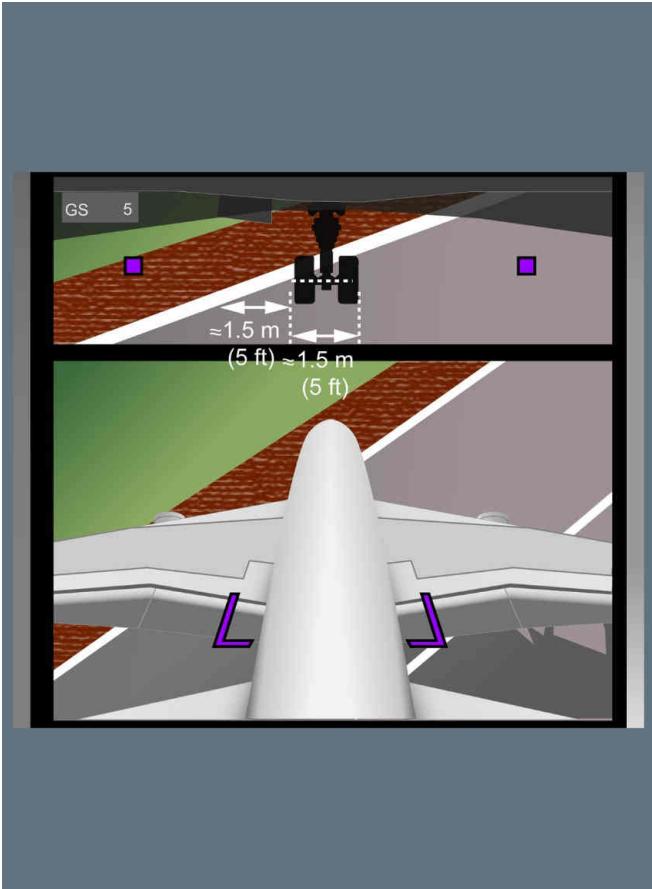
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Note: On wet runways, less thrust may be required.

- [L1] SPEED.....MAINTAIN 5 KT | CAPT
- [L2] If the aircraft speed goes above 5 kt, control the speed by smoothly applying the brakes in a symmetrical manner.
- [L1] ● When the outer end of the nose landing gear is approximately 1.5 m (5 ft) away from the edge of the runway:
 - FULL TILLER.....APPLY AND MAINTAIN | CAPT
 - [L2] 1.5 m (5 ft) is the approximate width of the nose landing gear width. Use this measurement as the ETACS reference to begin to turn without delay.



- L1 ● When the aircraft is stabilized in turn, and the tiller and the NWS are at their maximum steering angle:
MAXIMUM INSIDE TURN PEDAL BRAKING..... APPLY SMOOTHLY | CAPT
L2 The flight crew must use the brake pivot turn technique.
- L3 Note: In the case of the use of the brake pivot turn technique, if the nose wheel steering angle is more than 20 °, the BCS releases the body landing gear brakes and the rear wheel of the wing landing gear brakes.

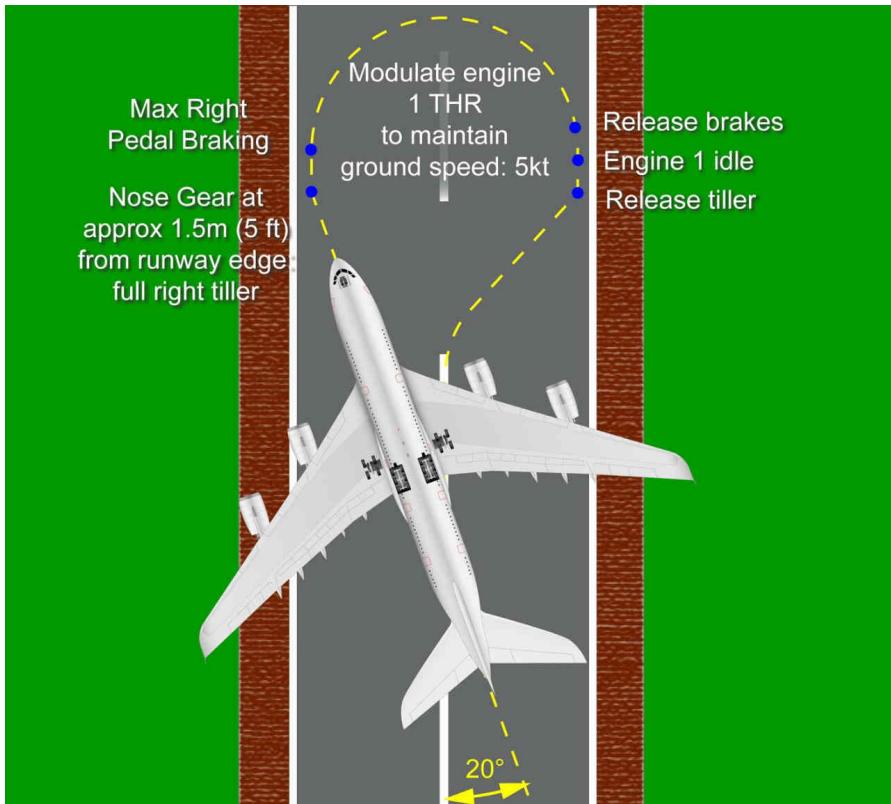


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- [L1] THR ON OUTER ENGINE.....ADJUST TO MAINTAIN 5 KT | CAPT
- [L2] *If 5 kt is exceeded with full tiller applied, there is a risk that the nose wheel tires skid on the runway.*
If the aircraft decelerates below 5 kt or stops during the maneuver, gently increase the THR on the outer engine.
Adjust the thrust setting according to the aircraft behavior.
If the aircraft is at maximum takeoff weight, the flight crew can adjust by around 25 % the needed THR , according to external conditions (e.g. wind, runway condition).
- Note: For wet runways, less thrust may be required.
- When the turn is completed, and to return to the runway centerline:
- | | | |
|--------------------------|------------------|------|
| BRAKE PEDAL..... | RELEASE | CAPT |
| THR ON OUTER ENGINE..... | IDLE SET | CAPT |
| TILLER..... | SMOOTHLY RELEASE | CAPT |

180° Right Turn180° TURN USING EXTERNAL VISUAL REFERENCES

Note: This procedure does not require the use of the ETACS.

However, if ETACS is available, it is recommended that during the turn maneuver the FO uses the ETACS:

- To monitor the nose landing gear margin in comparison to the runway edge
- The GPS ground speed, that is more accurate than the IRS ground speed displayed on the ND.

Taxi on the runway centerline.



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During the maneuver:

- Maintain a ground speed of 5 kt
- Monitor the approaching runway edge.

Turn toward the edge of the runway with a 20 ° intercept angle, and maintain a 20 ° angle.

[L2] *On the PFD, check the 20 ° divergence from the runway axis.*

[L1] **● When the aircraft approaches the runway edge, and approximately 3 s before starting the turn:**

THR ON OUTER ENGINE OPPOSITE THE TURNSIDE..... 20% SET | CAPT

Note: An asymmetric thrust increase causes left (right) yaw momentum. This requires the flight crew to slightly adjust the tiller in the opposite direction, in order to maintain the 20 ° aircraft divergence from the runway axis.

[L2] *In the lower range of thrust, the engines have a high level of inertia.*

A 20 % THR preset enables rapid engine thrust adjustment and good speed control before the turn.

Note: On wet runways, less thrust may be required.

[L1] SPEED..... MAINTAIN 5 KT | CAPT

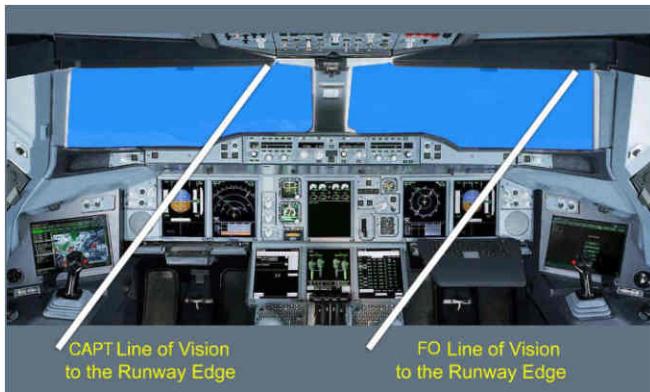
[L2] *If the aircraft speed is more than 5 kt, control the speed by smoothly applying the brakes in a symmetrical manner.*

[L1] **● Use the following visual references to determine the position at which to begin the turn, in comparison to the runway edge:**

For a 180° Turn to the Right:

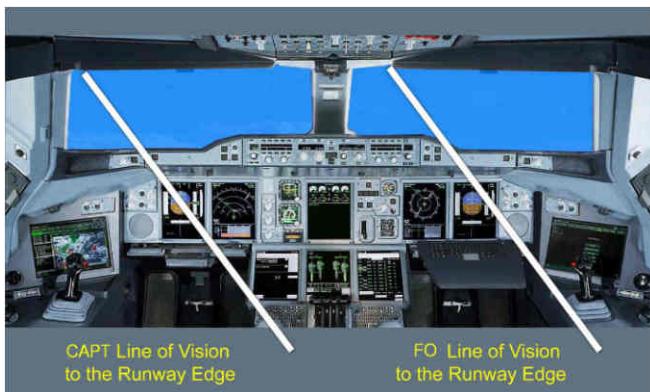
CAPT: The CAPT's view of the runway edge corresponds to a diagonal line that is in the pilot's field of view, and that passes through the CAPT glareshield at the bottom of the hump, then through the CAPT PFD all the way to the right lower corner of the OIT.

FO: The FO's view of the runway edge corresponds to a diagonal line that is in the pilot's field of view, and that passes through the FO PFD to the upper right corner of the glareshield.

180 turn right**For a 180° Turn to the Left:**

CAPT: The CAPT's view of the runway edge corresponds to a diagonal line that is in the pilot's field of view, and that passes through the CAPT PFD to the upper left corner of the glare shield.

FO: The FO's view of the runway edge corresponds to a diagonal line that is in the pilot's field of view, and that passes through the FO glare shield at the bottom of the hump, then through the FO PFD all the way to the left lower corner of the OIT.

180 turn left**● When the runway edge reaches the reference line:**

FULL TILLER.....APPLY AND MAINTAIN | CAPT



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- When the aircraft is stabilized in turn, and the tiller and the NWS are at their maximum steering angle:

MAXIMUM INSIDE TURN PEDAL BRAKING..... APPLY SMOOTHLY | CAPT

[L2] *The flight crew must use the brake pivot turn technique.*

[L3] Note: *In the case of the use of the brake pivot turn technique, if the nose wheel steering angle is more than 20 °, the BCS releases the body landing gear brakes and the rear wheel of the wing landing gear brakes.*

[L1] THR ON OUTER ENGINE.....ADJUST TO MAINTAIN 5 KT | CAPT

[L2] *If 5 kt is exceeded with full tiller applied, there is a risk that the nose wheel tires skid on the runway.*

If the aircraft decelerates below 5 kt or stops during the maneuver, gently increase the THR on the outer engine.

Adjust the thrust setting according to the aircraft behavior.

If the aircraft is at maximum takeoff weight, the flight crew can adjust by around 25 % the needed THR, according to external conditions (e.g. wind, runway condition).

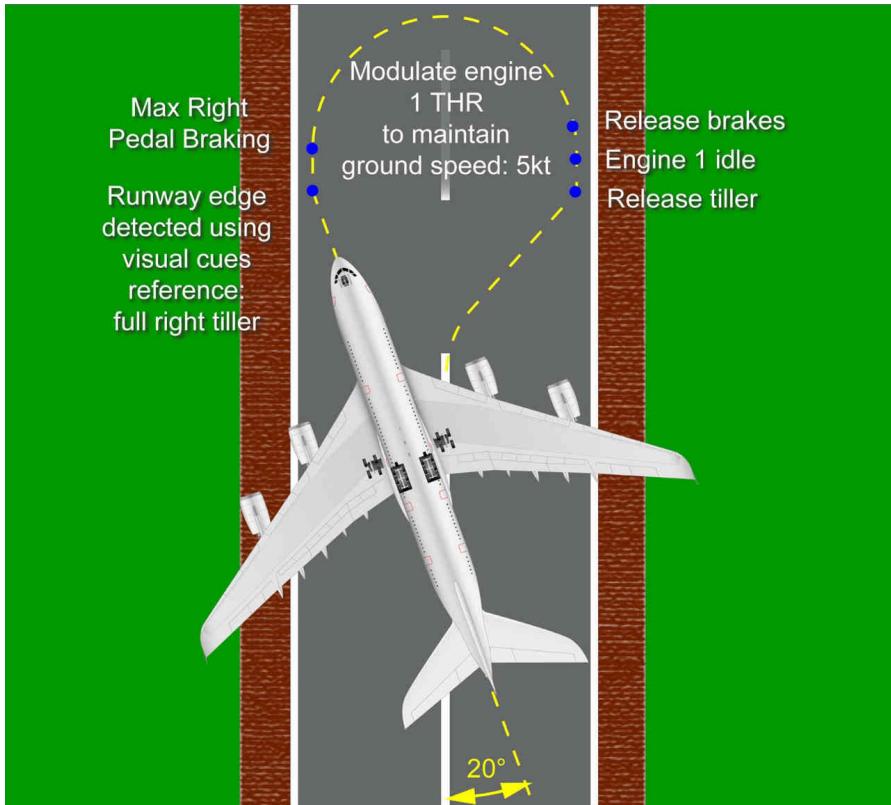
Note: *For wet runways, less thrust may be required.*

- When the turn is completed, and to return to the runway centerline:

BRAKE PEDAL.....RELEASE | CAPT

THR ON OUTER ENGINE.....IDLE SET | CAPT

TILLER.....SMOOTHLY RELEASE | CAPT

180° Right Turn



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STANDARD OPERATING PROCEDURES - BEFORE TAKEOFF

BEFORE TAKEOFF

Applicable to: ALL

TAKEOFF OR LINE UP CLEARANCE

TAKEOFF OR LINE UP CLEARANCE..... OBTAIN | FO

CABIN CREW

CABIN CREW..... ADVISE | FO

- [L2] *About 3 minitues prior to the estimated takeoff time, captain call "TAKEOFF SIGNAL"*

PACKS

- [L2] For additional training-oriented information, Refer to FCTM/NO-110-110-1 Packs.

[L1] PACKS 1 and 2..... AS RQRD | FO

- [L2] - Consider setting the packs to OFF, or setting the APU BLEED pb-sw to ON:

[L2] • This improves aircraft performance when using TOGA thrust

[L2] • In the case of a FLEX takeoff, this reduces the EGT and therefore, reduces the maintenance costs.

- [L2] - It is not authorized to use the APU bleed, if wing anti-ice is used.

EXTERIOR LIGHTS

EXTERIOR LIGHTS..... SET | FO

- [L2] In order to minimize bird strike hazard during takeoff:

- Set the RWY TURN OFF & CAMERA sw to ON

- Set the LAND sw to ON

- Set the NOSE sw to T.O.

ETACS

- If the ETACS was used during the taxi:

TAXI pb on EFIS CP OFF | BOTH

EFIS CP

ND RANGE selector AS RQRD | BOTH

- [L2] On the ND, when Airport Navigation is no longer used, set the minimum range to display the first waypoint after departure, or as required for weather purposes.



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STANDARD OPERATING PROCEDURES - BEFORE TAKEOFF

- [L1] EFIS OPTIONS (WX pb or TERR pb) AS RQRD | BOTH
- [L2] Consider the following settings:
- WX pb set to ON, on the PF side
- TERR pb set to ON, on the PNF side.
- [L1] TRAF pb ON | BOTH

BEFORE ENTERING THE RUNWAY

- APPROACH PATH CHECK CLEAR OF TRAFFIC | BOTH
- STROBE sw ON | FO
- [L2] Set the STROBE sw to ON to cross or enter a runway.
- [L1] TAKEOFF RUNWAY CONFIRM | BOTH
- [L2] Confirm that the line up is performed on the intended runway. Useful aids are:
- The runway markings
- The runway lights
Be careful that in low visibility, edge lights could be mixed up with the center line lights.
- The ILS signal
If the runway is ILS equipped, the flight crew can press the LS pb: The LOC deviation should be centered after line up.
- The runway symbol on the ND.

SLIDING TABLE

- SLIDING TABLE STOWED | BOTH

TCAS

- TA pb TA ONLY or TA/RA | FO
- [L2] TA/RA is the default mode of the TCAS.
The flight crew may use the TA ONLY mode in specific airports, and for specific procedures (identified by Operators) that may provide resolution advisories that are neither wanted nor appropriate (e.g. closely-spaced parallel or converging runways).

BEFORE TAKEOFF CHECKLIST BELOW THE LINE

- BEFORE TAKEOFF C/L below the line COMPLETE | BOTH
Refer to PRO-NOR-C-L Before Takeoff.
- [L2] Read the checklist below the line, when the flight crew obtains the line up clearance.
For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .



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STANDARD OPERATING PROCEDURES - BEFORE TAKEOFF

For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

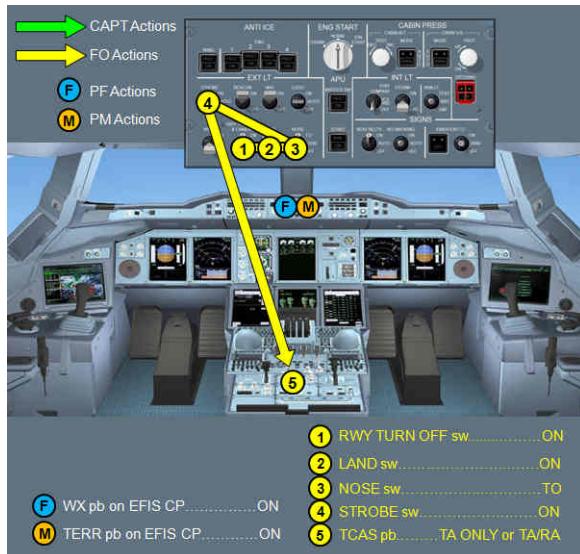
Before Takeoff Procedure and Call out

[L1]

| EVENT | CAPTAIN | FO |
|---|---|---|
| During taxi | "BEFORE TAKEOFF C/L" | "DOWN TO THE LINE" |
| At about 3 minutes prior to the estimated takeoff time, | "TAKEOFF SIGNAL" Check the "CABIN READY" message on the ECAM MEMO , or at least obtain the cabin report from the purser: : CABIN SECURED FOR TAKEOFF | Notify the cabin crew to prepare for takeoff (make 4 chimes) then position the seat belts signal ON |

Note: *Do not takeoff until cabin readiness confirmation is received from the purser*

| | | |
|---|--|---|
| Takeoff /Line up clearance | WX RDR ON ----- EFIS CP (PF) TERR ON ----- EFIS CP AS RQRD (PM) | Obtain Exterior Lights ----- Set Set the RWY TURN OFF, LAND and NOSE switches to ON/TO, in order to minimize bird strike hazard during takeoff and set the STROBE lights to ON, before entering the runway. |
| | | Lining up on the runway |
| Lining up on the runway | "BELOW THE LINE" | "BEFORE TAKEOFF C/L COMPLETE" |
| Each pilot checks his/her side approach path, and call "FINAL CLEAR" "RUNWAY CLEAR" | Prior to taxiing onto the runway the flight crews will check the runway number on a holding position sign and cross check against the ND (if applicable) | |

BEFORE TAKEOFF FLOW PATTERNbefore takeoff



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STANDARD OPERATING PROCEDURES - TAKEOFF

TAKEOFF

Applicable to: ALL

CROSSWIND TAKEOFF

For training-oriented information on crosswind takeoff technique, *Refer to FCTM/NO-120 Takeoff Roll.*

THRUST SETTING

- [L2] For additional training-oriented information on thrust setting, *Refer to FCTM/NO-120 Thrust Setting*.

For additional training-oriented information on takeoff roll, *Refer to FCTM/NO-120 Takeoff Roll.*

For additional information on the associated callouts, *Refer to PRO-NOR-SCO Summary for Each Flight Phase.*

- [L1] Rolling takeoff is permitted.

| | | | |
|--------------|----------|----|----|
| TAKEOFF..... | ANNOUNCE | | PF |
| THR..... | 25 % | PF | |

- [L2] *Apply 25 % THR on all four engines with brakes set to on. However, the flight crew can release the brakes to perform a rolling takeoff.*

- [L1] ■ **If the crosswind is at, or below 23 kt , and there is no tailwind:**

| | | | |
|--------------------|-------------|----|----|
| BRAKES..... | RELEASE | | PF |
| THRUST LEVERS..... | FLX or TOGA | PF | |

- [L2] *Note: The ECAM displays the ENG SD page, instead of the WHEEL SD page.*

- [L1] ■ **If the crosswind is above 23 kt , and/or in the case of tailwind:**

| | | | |
|--------------------|---------|----|----|
| BRAKES..... | RELEASE | | PF |
| THRUST LEVERS..... | 50 % | PF | |

- **At 20 kt ground speed:**

| | | | |
|--------------------|-------------|--|----|
| THRUST LEVERS..... | FLX or TOGA | | PF |
|--------------------|-------------|--|----|

Note: When FO is PF , After calling FMA “ MAN FLEX”, the Captain’s hand must be on the thrust levers until V1 .and FO’s hand must be removed from the thrust levers.

| | | | |
|--------------------------|------------|----|----|
| CHRONO..... | START | | PM |
| DIRECTIONAL CONTROL..... | USE RUDDER | PF | |

PFD/ND..... SCAN | PM

- [L2] - Check the FMA on the PFD :



Note: If an ILS is tuned associated with the departure runway, RWY mode appears. In all other cases, no lateral mode appears until the aircraft lifts off.

If the flight crew presets HDG or TRK on the AFS CP :



- [L2] - If GPS PRIMARY LOST , check on the ND the FMS position: i.e. that the aircraft is on the runway centerline.

[L3] The FMS updates the aircraft position at takeoff, only if GPS PRIMARY LOST .

[L1] TAKEOFF THRUST..... CHECK | PM

[L2] Before the aircraft reaches 80 kt , check the thrust setting, i.e. check that the actual THR of each engine reached the thrust rating limit and the thrust target indicated by the blue dot.

BEFORE REACHING 80 KT

[L2] For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

[L1] THRUST SET..... ANNOUNCE | PM



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STANDARD OPERATING PROCEDURES - TAKEOFF

PFD and ENG indications..... SCAN | PM

- [L2] Scan the airspeed and the THR throughout the takeoff.

AT 100 KT

- [L2] For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .
- [L1] ONE HUNDRED KNOTS..... ANNOUNCE | PM
ONE HUNDRED KNOTS..... CROSSCHECK | PF
- [L2] - Below 100 kt , the PF can decide to abort the takeoff, depending on the circumstances
- Above 100 kt , rejecting the takeoff is a more serious matter.

AT V1

- [L2] For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .
- [L1] V1..... MONITOR or ANNOUNCE | PM

AT VR

- [L2] For additional training-oriented information, Refer to FCTM/NO-120 Rotation Technique .
For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .
- [L1] ROTATION..... ORDER | PM
ROTATION..... PERFORM | PF
- [L2] If the PF uses the HUD :
- At VR , initiate the rotation, and bring the inverted T toward the horizon line
- After liftoff, fly the velocity vector and follow the SRS using the flight path director.

If the PF does not use the HUD :

- At VR , initiate the rotation toward a pitch attitude of 12.5 ° (10 ° , if one engine is failed)
- After liftoff, follow the SRS pitch command bar.

Note: If a tail strike occurs, the ECAM triggers the TAIL STRIKE alert. For more information, Refer to procedure .

- At 30 ft, if NAV is armed (i.e. the flight crew did not preset any HDG or TRK), NAV automatically engages



- If NAV is not armed, RWY TRK engages at 50 ft and remains displayed until the flight crew selects another lateral mode



WHEN POSITIVE CLIMB

- [L2] For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .
- [L1] POSITIVE CLIMB..... ANNOUNCE | PM
- [L2] Announce positive climb, when the vertical speed indication is positive and the radio altitude has increased.
- [L1] L/G UP..... ORDER | PF
L/G..... UP | PM
AP..... AS RQRD | PF
- [L2] The flight crew can engage AP 1 or AP 2 above 100 ft AGL .
For additional training-oriented information on flight guidance, Refer to FCTM/NO-120-120-1 Vertical Profile .



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For additional information on the FMA display during this phase of flight, Refer to DSC-22-FG-70-120-20 Introduction .

AT THE THRUST REDUCTION ALTITUDE (I.E. LVR CLB FLASHES ON THE FMA)

- [L2] For additional training-oriented information, *Refer to FCTM/NO-120 Thrust Reduction Altitude .*
- [L1] THRUST LEVERS.....CL | PF
- [L2] Autothrust automatically activates: **A/THR** appears on the FMA .
 - Note:* When the aircraft reaches 1 500 ft , or at the thrust reduction altitude, whichever occurs the first, the CRUISE SD page appears instead of the ENG SD page.
 - For more information on the FMA display during this phase of flight, *Refer to DSC-22-FG-70-120-20 Introduction .*
- [L1] PACKS 1 and 2 (if applicable).....ON | PM

L2 AT THE ACCELERATION ALTITUDE

For additional training-oriented information, *Refer to FCTM/NO-120 Acceleration Altitude .*
For additional training-oriented information, *Refer to FCTM/NO-120 Low Altitude Level Off .*
For more information on the FMA display during this phase of flight, *Refer to DSC-22-FG-70-120-20 Introduction .*

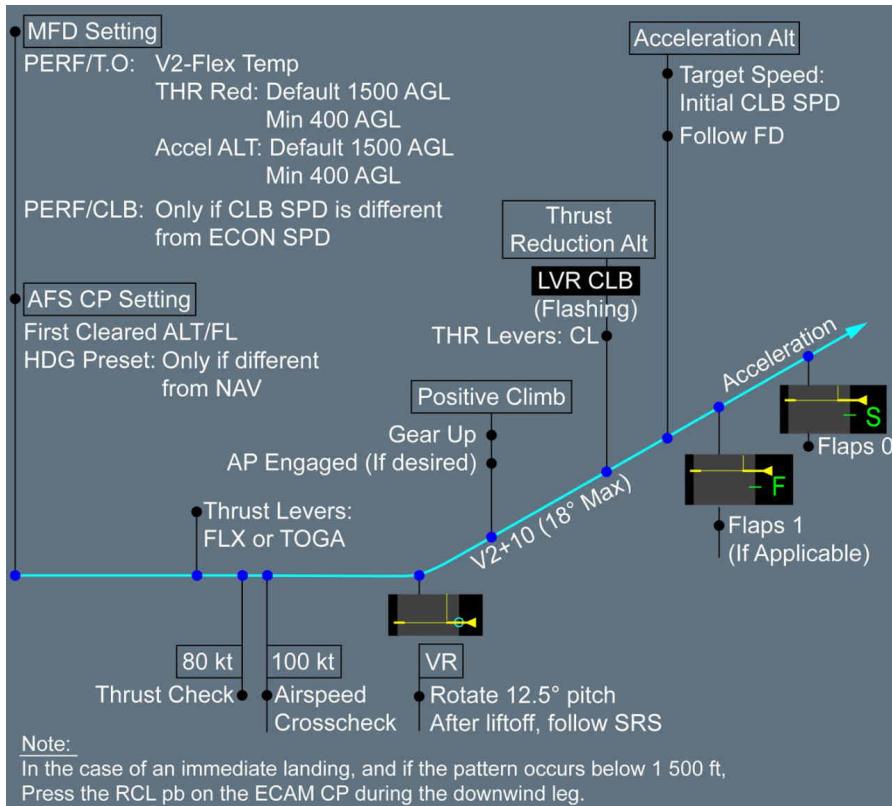
ABOVE THE ACCELERATION ALTITUDE (OR WHEN IN CLB PHASE)

- [L2] The following procedure ensures that the aircraft correctly accelerates toward the climb speed.
- [L1] **● At F speed:**
 - [L2] *Note:* For takeoffs in CONF 1+F, F speed does not appear.
 - [L1] FLAPS 1.....ORDER | PF
 - [L1] FLAPS 1.....SET | PM
- [L1] **● At S speed:**
 - FLAPS ZERO.....ORDER | PF
 - FLAPS ZERO.....SET | PM
 - EXTERIOR LIGHTS.....SET | PM
- [L2] - Set to OFF the NOSE sw and the RWY TURN OFF & CAMERA sw
- [L1] GND SPLRS.....DISARM | PM

NORMAL TAKEOFF PATTERN

- [2] For additional training-oriented information on immediate turn after takeoff, *Refer to FCTM/NO-120 Immediate Turn After Takeoff*

For additional training-oriented information on takeoff at heavy weight, *Refer to FCTM/NO-120-120-2 General*

Normal Takeoff Pattern



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STANDARD OPERATING PROCEDURES - AFTER TAKEOFF

AFTER TAKEOFF

Applicable to: ALL

APU

- If the APU was used to supply the air conditioning during takeoff:

| | | |
|---------------------------|-----|----|
| APU BLEED pb-sw | OFF | PM |
| APU MASTER SW pb-sw | OFF | PM |

TCAS

- If the takeoff was performed with TA ONLY:

| | | |
|-------------|-------|----|
| TA pb | TA/RA | PM |
|-------------|-------|----|

L2 Deselect TA ONLY on the TA pb of the SURV panel.

ANTI-ICE PROTECTION

| | | |
|----------------------|---------|----|
| ANTI-ICE pb-sw | AS RQRD | PM |
|----------------------|---------|----|

L2 The flight crew should set to ON the ENG ANTI-ICE pb-sw , when icing conditions are expected with a TAT at, or below 10 °C (Refer to PRO-SUP-30 Definition of Icing Conditions).

SLIDING TABLE

| | | |
|--------------------|-----------------------|------|
| SLIDING TABLE..... | RELEASE, AS NECESSARY | BOTH |
|--------------------|-----------------------|------|

AFTER TAKEOFF/CLIMB CHECKLIST DOWN TO THE LINE

| | | |
|---|----------|------|
| AFTER TAKEOFF/CLIMB C/L down to the line..... | COMPLETE | BOTH |
|---|----------|------|

Refer to PRO-NOR-C-L After Takeoff/Climb

L2 For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .
For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

Takeoff Procedure and Call out

L1

| TAKEOFF | | |
|--|----|----|
| EVENT | PF | PM |
| Align airplane with the runway | | |
| Check the Runway Heading and Runway Designator | | |

Continued on the following page



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TAKEOFF

| EVENT | PF | PM |
|---|---|--|
| | Confirm takeoff reminder (HAA) | Verify takeoff reminder |
| | Announce type of takeoff | |
| After obtain takeoff clearance | Repeat ATC Clearance “CLEARED FOR TAKEOFF” | Read back ATC takeoff clearance “CLEARED FOR TAKEOFF” Run the ELAPSED TIME “TIME SET” |
| At brake release or while rolling .Setting thrust levers to initial stabilization value about 25% THR | “TAKE OFF” | “TIME CHECK” - Start the CHRONO |
| When thrust levers set to FLEX/TOGA, check the FMA on the PFD. | “MAN FLEX XX (TOGA),SRS,RWY(or blank) ATHR Blue” | “CHECKED” |
| <i>Note: If the F/O conduct T/O, after Thrust set FLX or TOGA”, the captain’s hand must be on the thrust levers until V1. And F/O’s hands must be removed from the thrust levers.</i> | | |
| Before passing 80kt | “CHECKED” | “THRUST SET” |
| If Auto thrust has failed: (Refer to MANUAL THRUST CONTROL) | “SET THRUST” | Thrust levers set to the Thrust limit “THRUST SET” |
| At 100kt | “CHECKED” | “ONE HUNDRED KNOTS” |
| At V1 | | “V ONE” |
| At VR | | “ROTATE” |
| When the VSI is positive and the radio altimeter has increased | “GEAR UP” | “POSITIVE CLIMB” “GEAR UP” |
| LVR CLB flashing on FMA | “LEVER CLIMB, THRUST CLIMB, AUTO THRUST” | “CHECKED” “TIME RESET” Reset the CHRONO |
| At Acceleration Altitude | “CLIMB” or “OPEN CLIMB” | “CHECKED” - Check target speed change from V2+10 to the first CLB speed(either preselected or managed) “MANAGED (or SELECTED) SPEED XXX” |
| At F Speed | “FLAPS 1” | “SPEED CHECKED, FLAP 1” |
| At S Speed | “FLAPS ZERO” | |

Continued on the following page



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STANDARD OPERATING PROCEDURES - AFTER TAKEOFF

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TAKEOFF

| EVENT | PF | PM |
|-------|----------------------------------|--|
| | | "SPEED CHECKED, FLAPS ZERO" Exterior Lights -Set NOSE sw and RWY TURN OFF sw to OFF -LAND lights may be left ON -GND SPLRS lever ---- DISARM |
| | "AFTER TAKEOFF/CLIMB CHECK LIST" | "DOWN TO THE LINE" |



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STANDARD OPERATING PROCEDURES - CLIMB

CLIMB

Applicable to: ALL

INITIAL CLIMB

The usual vertical mode is CLB or OP CLB, with managed speed active.

- [L2] For additional training-oriented information on the FMS pages during the initial climb phase, Refer to *FCTM/NO-140 Initial Climb*.

For additional training-oriented information on lateral navigation, Refer to *FCTM/NO-140 Lateral Mode*.

For additional training-oriented information on climb thrust, Refer to *FCTM/NO-140 Climb Thrust*.

For additional training-oriented information on AP/FD modes in climb, Refer to *FCTM/NO-140 AP/FD Climb Modes*.

For additional training-oriented information on small altitude changes during the climb, Refer to *FCTM/NO-140 Small Altitude Changes*.

- [L1] CRZ FL..... SET AS RQRD | PF

- [L2] - *If the ATC clears the aircraft to the scheduled CRZ FL or above, it is not necessary to modify the CRZ FL that was inserted on the ACTIVE/INIT page during the cockpit preparation. The flight guidance automatically takes into account any altitude that the flight crew selects on the AFS CP above the CRZ FL.*
- *If the ATC limits the CRZ FL to a lower level than the one entered on the ACTIVE/INIT page (or than the one that appears on the PERF page) insert this lower CRZ FL on the PERF page. If the flight crew does not enter this lower CRZ FL on the PERF page, there is no transition to the CRZ phase. Therefore, the managed speed/Mach targets are not modified and A/THR SOFT mode is not available. In that case, the FMA displays ALT instead of ALT CRZ in the second column.*

- [L1] CLIMB SPEED MODIFICATIONS.....AS RQRD | PF

- [L2] *If ATC requests, or operational considerations lead to change the speed:*

1. *Select the new speed with the SPD/MACH knob on the AFS CP and pull*
2. *The new speed target is now activated*
3. *Press the SPD/MACH knob to return to the managed speed profile. The speed target becomes managed.*



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STANDARD OPERATING PROCEDURES - CLIMB

- Note:**
- The best speed (and rate of climb) for long-term situations is between Green Dot (GD) and the ECON speed. At high altitude, an acceleration from GD to ECON speed can take a long time
 - At high altitude and depending on the Mach (selected or computed by the FMS), the airspeed can be below GD.
- For additional training-oriented information on speed considerations during climb, Refer to FCTM/NO-140 Speed Considerations.

AFTER TAKEOFF/CLIMB CHECKLIST BELOW THE LINE

AFTER TAKEOFF/CLIMB C/L below the line.....COMPLETE | BOTH

Refer to PRO-NOR-C-L After Takeoff/Climb

- [L2] For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .
For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

ANTI-ICE PROTECTION

ANTI-ICE pb-swAS RQRD | PM

- [L2] The flight crew should set to ON the ENG ANTI-ICE pb-sw , when the aircraft encounters icing conditions, unless the SAT is below - 40 °C (Refer to PRO-SUP-30 Definition of Icing Conditions).

AT 10 000 FT

| | | |
|---------------------|---------|------|
| LAND sw | OFF | PM |
| SEAT BELTS sw | AS RQRD | CAPT |
| EFIS OPTIONS..... | AS RQRD | BOTH |
| ECAM MEMO..... | REVIEW | PM |

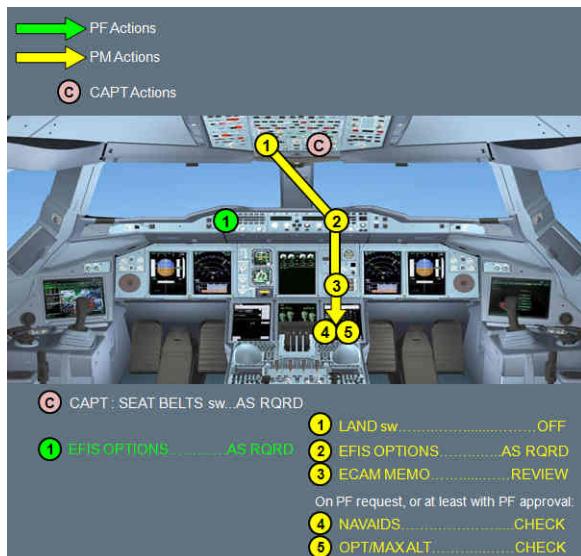
- On PF request, or at least with PF approval:

NAVAIDS.....CLEAR | PM

- [L2] Clear the manually tuned NAVAIDS in the TUNED FOR DISPLAY panel of the POSITION/NAVAIDS page.

[L1] OPT/MAX ALT.....CHECK | PM

- [L2] Check the optimum and maximum altitude capability.

L2 AT 10000 FT FLOW PATTERNclimb**AT THE TRANSITION ALTITUDE**

BAROMETRIC REFERENCE.....SET STD/CROSSCHECK | BOTH

- L2**
- At the transition altitude, the barometric setting flashes on the PFD . The flight crew should set STD on the EFIS CP and on the ISIS SFD
 - Crosscheck the barometric settings and the altitude indications
For additional training-oriented information on the VD in relation to the barometric reference setting, Refer to FCTM/NO-140 Vertical Display .
 - For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .



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STANDARD OPERATING PROCEDURES - CLIMB

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STANDARD OPERATING PROCEDURES - CRUISE

CRUISE

Applicable to: ALL

ALT CRZ

ALT CRZ on FMA CHECK | PF

- L2 Check that the aircraft flies at the cruise flight level that was entered on the CRZ panel of the FMS ACTIVE/PERF page.

This enables the aircraft to:

- Fly at the ECON cruise Mach/speed
- The cruise Mach/speed is targeted and cruise fuel consumption is optimized.
- Benefit from the A/THR SOFT mode
- Have accurate predictions.

Note: If the selected AFS CP altitude is below the FMS CRZ FL , then change the CRZ to the current altitude.

For additional training-oriented information on FMS , Refer to FCTM/NO-150 FMS Use .

For additional training-oriented information on Cost Index (CI), Refer to FCTM/NO-150 Cost Index .

For additional training-oriented information on speed considerations, Refer to FCTM/NO-150 Speed Considerations .

For additional training-oriented information on altitude considerations, Refer to FCTM/NO-150 Altitude Considerations .

ECAM

- L2 In cruise, the tasksharing is left to the flight crew's appreciation.

L1 ECAM MEMO..... REVIEW | PF-PM
SD PAGES..... REVIEW | PF-PM

- L2 Periodically review the SD pages, and particularly monitor the ENG oil pressure.

L123 Note: During the cruise, the oil quantity variation is not linear. The flight crew can notice a rapid decrease, particularly at the beginning of the flight.

This rapid decrease is due to an oil temperature decrease that leads to a longer oil transit time in the sumps (i.e. more oil is retained in the sumps).

Periodically review the following SD pages:

- BLEED: For bleed parameters
- ELEC: For electrical parameters and GEN load

- HYD: For fluid quantity. After landing gear retraction, the indicated fluid quantities are higher than on ground
- COND: For duct temperature, compared to zone temperature. Avoid large differences between both temperatures for passenger comfort
- F/CTL: Note any abnormal control surface position
- FUEL: For fuel quantity and distribution.

FLIGHT PROGRESS

FLIGHT PROGRESS..... CHECK | PF-PM

[L2] **Note:** VLS on the PFD ensures a 0.3 g margin with respect to the buffet. No additional margin is necessary in cruise.

- [L1] Monitor the flight progress, the navigation, the fuel quantity and the fuel distribution, as usual.
- [L2] For additional training-oriented information on fuel monitoring, Refer to FCTM/NO-150 Fuel Monitoring .

For additional training-oriented information on fuel temperature, Refer to FCTM/NO-150 Fuel Temperature .

WHEN OVERFLYING A MANUALLY ENTERED WAYPOINT:

- Check the track and distance to the next waypoint
- Check the wind and update it when the current wind is significantly different.

WHEN OVERFLYING A WAYPOINT, OR EVERY 30 MIN:

- Check the fuel: Check the FOB on the permanent data, and the fuel predictions in the FMS ACTIVE/FUEL & LOAD page, and , or compare with the CRZ Module of the IN-FLT PERF application

[L2] For more information on the CRZ Module of the IN-FLT PERF application, Refer to PER-IFT-CRZ-GEN IN-FLT PERF Application - CRZ Module .

- [L1] - Check that the sum of the FOB and the FU is consistent with the FOB at departure. If the sum is much less than the FOB at departure, or if the sum decreases, then suspect a fuel leak, Refer to PRO-ABN-ECAM-10-28-120 FUEL LEAK DETECTED .

| | |
|----------------|---|
| CAUTION | The flight crew must also check the fuel, if they intend to apply a lateral fuel balancing procedure, i.e. before they apply the following procedures: <ul style="list-style-type: none">- Refer to PRO-ABN-ECAM-10-28-390 FUEL WINGS NOT BALANCED , or- Refer to PRO-ABN-ECAM-10-28-GMAN FUEL MAN BALANCING PROCEDURE If the flight crew suspects a fuel leak, apply the <u>FUEL LEAK DETECTED</u> procedure, Refer to procedure . |
|----------------|---|



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STANDARD OPERATING PROCEDURES - CRUISE

STEP FLIGHT LEVEL

- [L2] For additional training-oriented information, Refer to FCTM/NO-150 Step Climb.
- [L1] STEP FLIGHT LEVEL.....AS APPROPRIATE | PF-PM

NAVIGATION ACCURACY

● **IF GPS PRIMARY LOST:**

NAVIGATION ACCURACY.....MONITOR | PF-PM

- [L2] *The flight crew must monitor the navigation accuracy, particularly if any of the following occurs:*
- IRS only navigation
 - FMS POSITION/MONITOR page displays **ACCURACY LOW**
 - The NAV ACCURACY DOWNGRADED message appears on the FMS message area, and on the ND.

For more information, Refer to FCTM/Navigation Accuracy Crosscheck and Crew Strategy

OXYGEN MASKS

● **If the oxygen mask was used:**

OXYGEN MASK.....CHECK | PF-PM

- [L2] *Check that the oxygen mask is stowed correctly. Refer to DSC-35-20-30 How to Stow the Mask .*

LEAVING THE COCKPIT

If a flight crew needs to leave the cockpit , a briefing should be conducted to other crew For detail refer to FOM Chapter 6 – Normal Operation

ENROUTE CREW CHANGE BRIEFING

Prior to changing duty stations, the flight crew going off duty will brief the other flight crew . For detail refer to FOM Chapter 6 – Normal Operation

RVSM, RNP-5/10, MNPS ENROUTE PROCEDURES

Refer to FOM Chapter 1- - Navigation



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STANDARD OPERATING PROCEDURES - CRUISE

ENROUTE HF SELCAL CHECK

Check SELCAL before entering class II airspace . If unable SELCAL check , it will be necessary to maintain a listening watch until back within VHF communication coverage

CPDLC(CONTROLLER PILOT DATA LINK COMMUNICATIONS) OPERATIONS PROCEDURE

Refer to FOM Chapter 9 – Communication, and FCRM Chapter 1 – Operations information.

POLAR OPERATION

Refer to the Polar Operation check list in the QRH



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STANDARD OPERATING PROCEDURES - DESCENT PREPARATION

DESCENT PREPARATION

Applicable to: ALL

LANDING INFORMATION

The Descent Preparation and Approach Briefings can take approximately 10 min. Therefore, the flight crew should begin the briefings approximately 80 nm before the top of descent.

WEATHER AND LANDING INFORMATION..... OBTAIN | PM

- L2 *The flight crew can receive the landing information update via either AOC, ATIS, ATC, etc. Check the weather reports at ALTERNATE and DESTINATION airports. Airfield data, if any, should include the runway to be used for arrival.*
- L1 LDG ELEVN..... CHECK | PF
- L2 *Check that LDG ELEVN appears on the CRUISE page, and check the associated value.*

BAROMETRIC REFERENCE

BAROMETRIC REFERENCE..... PRESET | BOTH

- L2 *Preset the QNH on the EFIS CP.*

ECAM

STATUS PAGE/STATUS MORE PAGE..... CHECK | PM

- L2 - *Check the STATUS page before completing the approach briefing. Review the active DEFERRED PROCs (i.e. ALL PHASES, APPR and LDG) and LIMITATIONS, and take particular note of any degradation in landing capability, or any other aspect affecting the approach and landing*
- *The STATUS page also automatically appears, if not empty, when the flight crew sets the barometric reference, or when the slats are extended*
- *Check the ALERTS IMPACTING LDG PERF on the STATUS MORE page, in order to verify if any alert triggered during the flight has an impact on the landing performance.*

LANDING PERFORMANCE

Perform an in-flight landing performance assessment if:

- Landing conditions have changed, e.g. due to runway or weather conditions or in-flight failure affecting the performance, or
- No preliminary landing performance was established before departure, e.g. in the case of a diversion, if the LDG PERF application was initialized with the destination airport only.



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STANDARD OPERATING PROCEDURES - DESCENT PREPARATION

- SYNCHRO ECAM button.....CLICK | PM
- [L2] Click on the SYNCHRO ECAM button in order to update the last ECAM alerts that occurred during the flight.
- [L1] LANDING PERFORMANCE.....CHECK | PM
- [L2] Check that the initial landing conditions are applicable to the estimated arrival conditions.
- [L1] ● If landing conditions changed:
LANDING PERFORMANCE.....COMPUTE | PM
- [L2] In the LDG PERF application, modify the selections in accordance with the estimated arrival conditions:
- In the AIRPORT/RUNWAY part, select the applicable runway
- In the CONDITIONS part, enter the estimated landing conditions
- In the AIRCRAFT STATUS part, check the selected items, if any
- Launch the computation and check the results versus Airline policy or applicable regulations.
- [L1] LANDING PERFORMANCE.....CROSSCHECK | PF

Impacted DU: 00000980 Descent preparation_FMS

FMS

- [L2] For additional training-oriented information, Refer to FCTM/NO-160 Approach Preparation .
- [L1] The PM prepares the arrival in the FMS .
- [L2] For more information on the associated standard callouts, Refer to PRO-NOR-SCO PF/PNF Duties Transfer .
The following tasksharing remains the one decided at the beginning of the flight.
- [L1] FMS ACTIVE/F-PLN/ARRIVAL page INSERT/CHECK | PM
- [L2] - Insert APPR, STAR, TRANS, and APPR VIA, if applicable
- If the NO FLS FOR THIS APPR message appears on the FMS message area, the flight crew will fly the NPA without the FLS function.
- [L1] DES panel of the FMS ACTIVE/PERF page INSERT/CHECK | PM
- Before the descent, check the MANAGED MACH/ SPD
- If a speed different from the ECON Mach/speed is required, insert that Mach/speed in the ECON entry fields.
- [L2] The FMS uses this new managed MACH/ SPD target (instead of ECON) to compute the descent profile.



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STANDARD OPERATING PROCEDURES - DESCENT PREPARATION

The managed speed profile of the descent has a default speed limit of 250 kt below 10 000 ft . The flight crew can delete or modify this speed limit, if necessary, on the SPD panel of the VERT REV page.

- [L1] APPR panel of the FMS ACTIVE/PERF page
.....INSERT/CHECK | PM
- [L2] Insert and check the approach data on the APPR panel of the FMS ACTIVE/PERF page.
- [L1] - Enter the destination QNH , temperature, and wind
- [L2] The entered wind should be the average wind value provided by the ATC or ATIS . Do not enter the gust values (e.g. if the wind is 150/20-25, insert the lower speed 150/20. In the managed speed mode, the ground speed mini function takes into account the gusts).
- [L1] - Insert the MINIMUM (i.e. BARO or RADIO), as applicable. If the BARO/RADIO MINIMUM value is not a multiple of ten, round up the MINIMUM (BARO or RADIO) to the nearest ten feet. For example, if the MINIMUM is equal to 91 ft , insert ' 100 ft ' on the APPR panel.
- [L2] Note: - Any change of the RWY or the type of arrival (e.g. VOR , ILS) automatically deletes the previous MINIMUM
- To avoid undershooting the published MDA (MDH) during a go-around due to the aircraft inertia during the pull-up, some Authorities may require Operators to add a specific number of feet to the published MDA (MDH).
For information, the following table provides the height loss after the initiation of a go-around with the AP engaged:

| | | | | | | |
|---|-------|-------|-------|-------|-------|--------|
| Height at which the Automatic Go-Around is initiated | 10 ft | 20 ft | 40 ft | 60 ft | 80 ft | 100 ft |
| Height Loss | 10 ft | 15 ft | 24 ft | 34 ft | 34 ft | 34 ft |

These height losses are average values based on flight tests results. The flight tests were performed at medium weight, medium CG , with all engines operative, and in ISA conditions.



- [L1] - Check or modify the landing configuration.
 - Always select the landing configuration on the APPR panel of the PERF page:
 - [L2] • The flight crew can choose FLAPS 3 rather than FLAPS FULL for landing, depending on the available runway length or go-around performance, or if they expect windshear or severe turbulence during the approach
 - [L2] • In the case of a system failure, the ECAM can require a specific landing configuration. Select the correct landing configuration on the APPR panel.
 - Select CONF 3 on the APPR panel for landing in CONF 3
 - Select FULL for all other slats/flaps configurations.

As a general rule, the flight crew can use the managed speed if the landing configuration and the configuration selected on the APPR panel are the same (if they are not the same, the managed speed will not drop down to the approachspeed).

- [L1] - In the case of an in-flight failure that affects the landing performance and increases the VAPP, use the LDG PERF application for VAPP computation. Insert the computed VAPP in the APPR panel of the FMS ACTIVE/PERF page.
 - [L2] The flight crew can modify VAPP. The ground speed mini function takes into account this new value.
- | | | | |
|------|---|------------|----|
| [L1] | GA panel of the FMS ACTIVE/PERF page | CHECK | PM |
| [L2] | Check the THR RED and ACCEL altitudes, and modify them if necessary. | | |
| [L1] | FMS POSITION/NAVAIDS page | CHECK | PM |
| [L2] | - Set the NAVAIDS as required, and check the VOR / ADF idents on the ND s and the ILS (GLS) ident on the PFD s <ul style="list-style-type: none">- For an ILS (GLS) approach, check the frequency(channel) and the course of the selected ILS (GLS)- If a VOR / DME exists close to the airfield, select it and enter the associated ident in the BRG / DIST TO entry fields of the POSITION/MONITOR page, for NAV ACCURACY monitoring during descent. | | |
| [L1] | SEC pages..... | AS RQRD | PM |
| [L2] | The flight crew should prepare a SEC F-PLN before the top of descent, either to an alternative runway for destination, or to the landing runway in the case of circling. In all cases, the routing to the alternate should be available. If there is a last-minute runway change, then the flight crew only needs to activate the appropriate SEC F-PLN , without forgetting to set the new MINIMUM and NAVAIDS. | | |
| [L1] | FMS..... | CROSSCHECK | PF |



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STANDARD OPERATING PROCEDURES - DESCENT PREPARATION

Impacted by TDU: 00023858 Descent preparation, FMS

FMS

[L2] For additional training-oriented information, Refer to FCTM/NO-160 Approach Preparation.

[L1] The PM prepares the arrival in the FMS.

[L2] For more information on the associated standard callouts, Refer to PRO-NOR-S00 PF/PNF Duties Transfer.

The following tasksharing remains the one decided at the beginning of the flight:

[L1] FMS ACTIVE/F-PLN/ARRIVAL page INSERT/CHECK | PM

[L2] - Insert APPR, STAR, TRANS, and APPR VIA, if applicable
- If the [NO FLS FOR THIS APPR] message appears on the FMS message area, the flight crew will fly the NPA without the FLS function.

[L1] DES panel of the FMS ACTIVE/PERF page INSERT/CHECK | PM

- Before the descent, check the MANAGED MACH/ SPD
- If a speed different from the ECON Mach/speed is required, insert that Mach/speed in the ECON entry fields.

[L2] The FMS uses this new managed MACH/ SPD target (instead of ECON) to compute the descent profile.

The managed speed profile of the descent has a default speed limit of 250 kt below 10 000 ft. The flight crew can delete or modify this speed limit, if necessary, on the SPD panel of the VERT REV page.

[L1] APPR panel of the FMS ACTIVE/PERF page INSERT/CHECK | PM

[L2] Insert and check the approach data on the APPR panel of the FMS ACTIVE/PERF page.

- [L1] - Enter the destination QNH, temperature, and wind
The entered wind should be the average wind value provided by the ATC or ATIS. Do not enter the gust values (e.g. if the wind is 150/20-25, insert the lower speed 150/20. In the managed speed mode, the ground speed mini function takes into account the gusts).
[L1] - Insert the MINIMUM (i.e. BARO or RADIO), as applicable

- [L2] Note: - Any change of the RWY or the type of arrival (e.g. VOR, ILS) automatically deletes the previous MINIMUM
- To avoid undershooting the published MDA (MDH) during a go-around due to the aircraft inertia during the pull-up, some Authorities may require Operators to add a specific number of feet to the published MDA (MDH).

For information, the following table provides the height loss after the initiation of a go-around with the AP engaged:

| Height at which the Automatic Go-Around is initiated | 10 ft | 20 ft | 40 ft | 60 ft | 80 ft | 100 ft |
|--|-------|-------|-------|-------|-------|--------|
| Height Loss | 10 ft | 15 ft | 24 ft | 34 ft | 34 ft | 34 ft |

These height losses are average values based on flight tests results. The flight tests were performed at medium weight, medium CG, with all engines operative, and in ISA conditions.

- [L1] - Check or modify the landing configuration.
- Always select the landing configuration on the APPR panel of the PERF page:
- The flight crew can choose FLAPS 3 rather than FLAPS FULL for landing, depending on the available runway length or go-around performance, or if they expect windshear or severe turbulence during the approach
- [L2] • In the case of a system failure, the ECAM can require a specific landing configuration. Select the correct landing configuration on the APPR panel.
- Select CONF 3 on the APPR panel for landing in CONF 3
 - Select FULL for all other slats/flaps configurations.
- As a general rule, the flight crew can use the managed speed if the landing configuration and the configuration selected on the APPR panel are the same (if they are not the same, the managed speed will not drop down to the approach speed).
- [L1] - In the case of an in-flight failure that affects the landing performance and increases the VAPP, use the LDG PERF application for VAPP computation. Insert the computed VAPP in the APPR panel of the FMS ACTIVE/PERF page.
- [L2] The flight crew can modify VAPP. The ground speed mini function takes into account this new value.
- [L1] GA panel of the FMS ACTIVE/PERF page | CHECK | PM
- [L2] Check the THR RED and ACCEL altitudes, and modify them if necessary.
- [L1] FMS POSITION/NAVAIDS page | CHECK | PM
- [L2] - Set the NAVAIDS as required, and check the VOR / ADF idents on the NDs and the ILS (GLS) ident on the PFDs
- For an ILS (GLS) approach, check the frequency(channel) and the course of the selected ILS (GLS)
- If a VOR / DME exists close to the airfield, select it and enter the associated ident in the BRG / DIST TO entry fields of the POSITION/MONITOR page, for NAV ACCURACY monitoring during descent.
- [L1] SEC pages | AS RQRD | PM
- [L2] The flight crew should prepare a SEC F-PLN before the top of descent, either to an alternative runway for destination, or to the landing runway in the case of circling. In all cases, the routing to the alternate should be available. If there is a last-minute runway change, then the flight crew only needs to activate the appropriate SEC F-PLN, without forgetting to set the new MINIMUM and NAVAIDS.
- [L1] FMS | CROSSCHECK | PF

OANS

RUNWAY SHIFT.....AS RQRD | PM

The flight crew must shift the runway threshold and/or the runway end, as required (e.g. due to NOTAM).

- [L2] - *BTV locates the dry and wet lines according to the runway threshold and to ensure that the flight crew will select an achievable runway exit*
The dry and wet lines computation takes into account the current weight of the aircraft (i.e. not the predicted landing weight).
- *ROW/ROP needs the real position of the runway end to ensure the aircraft protection against runway excursion.*

BTW

The use of the BTV autobrake mode is recommended in the case of dry or wet runway conditions.

| | |
|----------------|--|
| CAUTION | Do not use BTV in the case of: |
| | - Contaminated runway |
| | - Any reverse inoperative, or in the case of any aircraft failure affecting landing performance. |

ND MODE selector PLAN | PM

ND RANGE selector ZOOM | PM

RUNWAY.....SELECT | PM

RUNWAY EXIT.....SELECT | PM

- [L2] *Select the exit in accordance with the runway conditions, i.e. wet or dry.*

It is recommended to select an exit beyond the WET line, even on a dry runway, in order to:

- *Anticipate the last minute change of the runway condition from dry to damp or wet*
- *Provide a smooth deceleration for passenger comfort.*

The flight crew chooses the exit by taking into account:

- *The destination airport gate (if known)*
- *The airport ground circulation*
- *The runway exit configuration (i.e. high speed turn off on dry runway)*
- *The predictive turn around times displayed on the ND.*

AUTOBRAKE

AUTO BRK/BTV.....SELECT, AS RQRD | PM

- [L2] *Set the AUTO BRK Mode selector to the appropriate autobrake mode, depending on the condition and the length of the runway.*



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- [L1] To use BTV, set the AUTO BRK Mode selector to BTV before removing the Airport Navigation display from the ND (i.e. before the selection of a ND range different from ZOOM). If the flight crew sets another ND range before arming the BTV autobrake mode, the BTV preparation is lost.
On contaminated runways, use autobrake mode 3. Do not use BTV.
- [L2] If BTV is not available, the HI mode produces a smooth but high level of deceleration on dry runways, that can be useful in short runway situations.
- [L1] ● If the flight crew selected BTV:
OANS RUNWAY LENGTH Vs CHARTS RUNWAY LENGTH..... BOTH
..... CROSSCHECK |
[L2] The flight crew crosschecks the runway length displayed on the Airport Navigation display with the LDA published in the charts, when BTV is armed.
The difference between the runway length displayed on the Airport Navigation display and the LDA published in the charts must not exceed 115 ft.

LANDING BRIEFING

- [L2] For additional training-oriented information, FCTM Landing Briefing.
LANDING BRIEFING..... PERFORM | PF
The main objective of the landing briefing is for the PF to inform the PM of the planned course of action for the approach.
It is recommended to use the FMS pages as a guide for the descent and approach briefing.

DESCENT CLEARANCE

- DESCENT CLEARANCE..... OBTAIN | PM
Cleared Altitude on AFS CP..... SET | PF
- [L2] When the flight crew obtains the ATC clearance, they should set the cleared altitude(FL) on the AFS CP taking into account the safe altitudes.
If the lowest safe altitude is above the cleared altitude, check with the ATC to determine if this constraint applies.
If the ATC confirms that this constrain applies, set the safe altitude on the AFS CP until it is safe to reach the cleared altitude.



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ANTI-ICE PROTECTION

ANTI ICE pb-sw AS RQRD | PM

- [2] *During the descent, the flight crew should set to ON the ENG ANTI-ICE pb-sw when they expect or encounter icing conditions. For more information on icing conditions, Refer to PRO-SUP-30 Definition of Icing Conditions .*

When the engines are at idle, the use of the anti-ice reduces the descent path angle. If needed, the flight crew can compensate this behavior by increasing the descent speed, or by extending the speed brakes, as necessary.



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DESCENT

Applicable to: ALL

DESCENT INITIATION

DESCENT..... INITIATE | PF

- L2 *The standard method to initiate a descent is to engage the DES mode at the Top of Descent (T/D) computed by the FMS .*

The FMS computes the T/D based on the following assumptions:

- The aircraft will begin the descent in DES mode with managed speed
- The FMS will guide the aircraft along the descent profile computed with all the vertical F-PLN data (i.e. ALT CSTR , MANAGED MACH / SPD , SPD CSTR , SPD LIMIT) to reach VAPP at 1 000 ft AGL .

The T/D appears on the ACTIVE/F-PLN page and on the ND  .

Note: *The ND does not display the Top of Descent  when HDG (or TRACK) mode is engaged.*

For additional training-oriented information on T/D and profile computation, *Refer to FCTM/NO-170 Computation Principle .*

● **When the aircraft reaches the T/D :**

ALT knob PUSH | PF
DES mode engages.

■ **If the ATC requires an early descent:**

Use the DES mode.

The DES mode guides the aircraft down to a lower vertical speed, in order to converge with the required descent path. (The flight crew may use a V/S of 1 000 ft/min).

■ **If the ATC delays the descent:**

Beyond the T/D , the **T/D REACHED** message appears on the PFD and MFD . This suggests that the flight crew should reduce the speed toward green dot speed with ATC permission.

When cleared for descent, engage DES mode with the managed speed active.

DESCENT MONITORING

- L2 For additional training-oriented information on the FMS pages during the descent, *Refer to FCTM/NO-170 Descent Monitoring.*



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For additional training-oriented information on descent profile monitoring and adjustment, *Refer to FCTM/NO-170 Guidance and Monitoring.*

L1 DESCENT..... MONITOR | PF

- L2 - When flying in NAV mode, use the DES mode

The aircraft descends along the descent flight path. The aircraft guidance takes into account all the constraints of the flight plan.

For additional training-oriented information on descent constraint, Refer to FCTM/NO-170 Descent Constraints.

- Monitor the VERT DEV

The VERT DEV appears on the PFD and on the DES panel of the ACTIVE/PERF page. The VERT DEV indicates if the aircraft is on, above, or below the descent profile. The aircraft is considered to be on the vertical profile when the VERT DEV is less than 50 ft. In that case, the FMS predicts that it will respect the constraints until the aircraft levels off at the next AFS CP altitude.

- Monitor the speed change that occurs when the aircraft reaches the speed change symbol  in managed speed
- Monitor the FMA when the aircraft reaches the level-off symbol (i.e.  or )

Note: The NDs display a level-off symbol  along the flight path. The position of this symbol is based on the current active modes: i.e. AP/FD and A/THR.

- Monitor the predicted descent point after the next level-off.

- When flying in HDG or TRACK mode and therefore, out of the lateral F-PLN, the DES mode is not available. Only V/S / FPA or OP DES mode is available for descent.

The target altitude is the AFS CP selected altitude, and the altitude constraints are not taken into account.

Note: When the lateral mode changes from NAV to HDG or TRACK, V/S / FPA engages on the current vertical speed or current flight path angle.

For additional training-oriented information on mode reversion to V/S, Refer to FCTM/NO-170 Mode Reversion.

FMS predictions assume a return to the lateral F-PLN and to the descent flight path.

- Monitor the VERT DEV

The PFD displays the VERT DEV. The flight crew can use the VERT DEV to monitor the descent provided that the crosstrack error is less than 5 nm. To monitor the descent, the flight crew should use the level-off symbol  in addition to the energy circle on the ND.

- Monitor the speed change that occurs, when the aircraft reaches the speed change symbol  in managed speed.

- Monitor the FMA when the aircraft reaches level-off symbol .



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- Check the predictions before engaging again the DES mode, in order to resume the descent profile.

Periodically during the stabilized descent, the flight crew can check that the remaining distance to destination is approximately the difference between the current FL and the airfield FL divided by the FPA in degrees. If the flight crew did not select TRK-FPA, they can display the Velocity Vector (V) in order to obtain the FPA.

FPA ($^{\circ}$) = Δ FL / DIST (NM)

L1 DESCENT ADJUSTMENT

RATE of DESCENT.....ADJUST, AS RQRD | PF

- L1 To increase the rate of descent, increase the descent speed by using the selected speed, if comfort and the ATC permit. It is more cost-effective (Time/Fuel) than using the speed brakes:
- Maintain a high speed as long as possible, provided that the ATC permits to fly above the speed limits
 - If the aircraft is high and at high speed, it is more efficient to keep the high speed until ALT* then to decelerate at level-off, instead of combining descent and deceleration.

If the aircraft goes below the desired profile, use the selected speed and the V/S mode to adjust the rate of descent.

L1 SPEED BRAKES.....AS RQRD | PF

- L2 In the OP DES mode, the flight crew can use the speed brakes to increase the rate of descent. The flight crew can also use the speed brakes to maintain the required rate of descent, when engine anti-ice is used.

In the DES mode, if the aircraft is on, or below the flight path and the ATC requires a higher rate of descent, do not use the speed brakes because the rate of descent is imposed by the planned flight path. Therefore, the A/THR may increase thrust to compensate for the increase in drag. In this case, use the OP DES mode with speed brakes.

AT 20 000FT

Cabin CrewAdvice | CAPT

Note: The Captain Use Seat Belt Selector 3 chimes then Auto or On and make PA "Cabin Crew, Prepare for Landing"

TAWS AND WXR

TERR pb on EFIS CP.....AS RQRD | BOTH
WX pb on EFIS CP.....AS RQRD | BOTH



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- [L2] If use of the weather radar is required, consider displaying the weather data on the PF side, and the terrain data on the PM side.

Impacted DU: 00000990 Descent_AT 10 000 FT

AT 10 000 FT

- | | | | |
|---|---------|--|------|
| LAND sw | ON | | PM |
| [L2] <i>The flight crew may set to ON the landing lights, depending on the airline policy, or following regulatory recommendations.</i> | | | |
| [L1] SEAT BELTS sw | ON | | CAPT |
| CSTR pb on EFIS CP | ON | | BOTH |
| LS pb | AS RQRD | | BOTH |
| [L2] <i>Press the LS pb , if one of the following approaches is planned:</i> | | | |
| - ILS / GLS | | | |
| - ILS G/S out, LOC only, or LOC B/C | | | |
| - NPA with the FLS function. | | | |

The PFD displays the landing system data, in accordance with the approach selected on the FMS ARRIVAL page: Deviation scales, deviation signals, course pointer, information. If an NPA is selected on the FMS ARRIVAL page, the FMA displays the FLS capability.

- [L1] ● **For NPA flown with the FLS function:**

- | | | | |
|--|-------|--|----|
| FLS CAPABILITY..... | CHECK | | PM |
| [L2] <i>The FLS capability does not appear, if one of the following conditions occurred:</i> | | | |
| - The NO FLS FOR THIS APPR has appeared on the FMS message area | | | |
| - The required conditions to display the FLS capability are not met. | | | |
| <i>For more information, Refer to LIM-22-20 Required Conditions for F-APP, F-APP + RAW, or RAW ONLY Capability .</i> | | | |
| FLS DATA..... | CHECK | | PM |
| [L2] <i>Check the following data against the published approach chart:</i> | | | |
| - For RNAV (including GPS), VOR, or VOR/DME approach: | | | |
| • The anchor point location | | | |
| • The F-LOC beam course | | | |
| • The F-LOC compatibility with the lateral flight plan. | | | |
| - For ILS G/S out, LOC only, or LOC B/C approach: | | | |
| • The LOC or LOC B/C beam course | | | |

- The flight path angle of the F-G/S beam

Note: The published approach chart may provide the slope of the final leg in %: 3 ° of flight path angle is equal to 5.2% of slope.

- The F-G/S beam compatibility with the vertical flight plan.

L1 NAVAIDS..... AS RQRD/CHECK | PF

L2 Ensure that the appropriate navaids are tuned and identified.

● If GPS PRIMARY LOST :

NAVIGATION ACCURACY..... CHECK | PF

L2 Crosscheck the navigation accuracy by using the POSITION/MONITOR page (i.e. BRG / DIST TO computed data) and the ND (i.e. VOR / DME raw data).

The navigation accuracy check determines the autopilot mode that the flight crew should use for the approach, and the type of ND displays.

● When the aircraft approaches the transition level, and when cleared for an altitude:

BAROMETRIC REFERENCE..... SET/CROSSCHECK | BOTH

L2

- When the aircraft approaches the transition level, and when the ATC cleared for an altitude, set the preset QNH on the EFIS CP and on the ISIS PFD
- Crosscheck the barometric reference settings and the altitude indications.

Note:

- The flight crew must take into account any QNH change on the EFIS CP s, ISIS PFD , and on the APPR panel of the FMS ACTIVE/PERF page
- When the aircraft operates in low OAT conditions, the flight crew should consider altitude corrections for low temperature.
- If the barometric unit is mercury inches, the flight crew may notice a discrepancy of 0.01 inHg between the QNH values on the PFD s and the QNH values selected on the EFIS CP . This discrepancy does not impact the altitude computations.

For more information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

Impacted by TDU: 00021151 Descent_AT 10 000 FT

AT 10 000 FT

L2 LAND sw ON | PNF

L2 The flight crew may set to ON the landing lights, depending on the airline policy, or following regulatory recommendations.

L1 SEAT BELTS sw 3 CHIMES THEN ON | CAPT
 CSTR pb on EFIS CP ON | BOTH



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L1 LS pb AS RQRD | BOTH

L2 Press the LS pb, if one of the following approaches is planned:

- ILS / GLS
- ILS G/S out, LOC only, or LOC B/C
- NPA with the FLS function.

The PFD displays the landing system data, in accordance with the approach selected on the FMS ARRIVAL page: Deviation scales, deviation signals, course pointer, information. If an NPA is selected on the FMS ARRIVAL page, the FMA displays the FLS capability.

L1 ● For NPA flown with the FLS function:

FLS CAPABILITY CHECK | PNF

L2 The FLS capability does not appear, if one of the following conditions occurred:

- The **NO FLS FOR THIS APPR** has appeared on the FMS message area
- The required conditions to display the FLS capability are not met.

For more information, Refer to LIM-22-20 Required Conditions for F-APP, F-APP + RAW, or RAW ONLY Capability .

L1 FLS DATA CHECK | PNF

L2 Check the following data against the published approach chart:

- For RNAV (including GPS), VOR, or VOR/DME approach:
 - The anchor point location
 - The F-LOC beam course
 - The F-LOC compatibility with the lateral flight plan.
- For ILS G/S out, LOC only, or LOC B/C approach:
 - The LOC or LOC B/C beam course
 - The flight path angle of the F-G/S beam

Note: The published approach chart may provide the slope of the final leg in %; 3 ° of flight path angle is equal to 5.2% of slope.

- The F-G/S beam compatibility with the vertical flight plan.

L1 NAVAIDS AS RQRD/CHECK | PF

L2 Ensure that the appropriate navaids are tuned and identified.

L1 ● If GPS PRIMARY LOST :

NAVIGATION ACCURACY CHECK | PF

L2 Crosscheck the navigation accuracy by using the POSITION/MONITOR page (i.e. BRG / DIST TO computed data) and the ND (i.e. VOR / DME raw data).

The navigation accuracy check determines the autopilot mode that the flight crew should use for the approach, and the type of ND displays.

When the aircraft approaches the transition level, and when cleared for an altitude:

BAROMETRIC REFERENCE.....SET/CROSSCHECK | BOTH

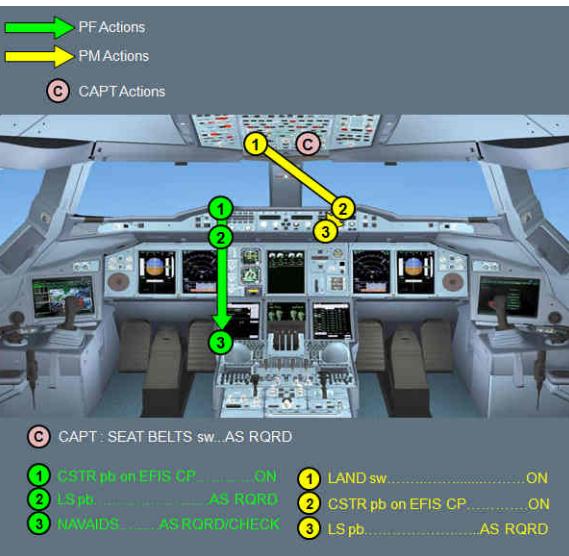
- [L1] - When the aircraft approaches the transition level, and when the ATC cleared for an altitude, set the preset QNH on the EFIS CP and on the ISIS PFD
 - Crosscheck the barometric reference settings and the altitude indications.

Note: - The flight crew must take into account any QNH change on the EFIS CP s, ISIS PFD, and on the APPR panel of the FMS ACTIVE/PERF page
 - When the aircraft operates in low OAT conditions, the flight crew should consider altitude corrections for low temperature.

For more information on the associated callouts, Refer to PRO-NOR-SOP Summary for Each Flight Phase .

FLOW PATTERN

descent at 10000 ft





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HOLDING

HOLDING PATTERN..... AS RQRD | PM

- [L2] *The flight crew can insert an holding pattern in the FMS if required during the descent. For more information on the HOLD revision, * Refer to DSC-22-FMS-10-40-50-22FMS4030G HOLD - Purpose .*

APPROACH CHECKLIST

APPROACH C/L..... COMPLETE | BOTH

Refer to PRO-NOR-C-L Approach

- [L2] *For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction . For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .*

Descent / Approach Procedure and Call out

L1

| DESCENT | | |
|---|--|--|
| EVENT | CAPT | PM |
| Approximately 20,000ft (Consider airport field elevation) or TOD ,whichever lower. | <ul style="list-style-type: none"> - SEAT BELTS ----- AS RQRD (3 chimes then Auto or On) - Make PA "CABIN CREW PREPARE FOR LANDING" (Refer to FOM Chapter 2- Operational policy) | |
| When approaching or passing Transition level | When cleared to descent to an altitude below Transition Level in relatively low Transition level area compared to other regions (Europe etc.) from ATC flight crew should reset immediately Altimeter setting to QNH. However if ATC instruction is received to level off at or above Transition Level , flight crew shall reset applicable Altimeter back to QNE. | |
| | PF | "TRANSITION , ALTIMETER RESET ----- in Hg/hPa" |
| | "----- inHg/hPa RESET" | |
| APPROACH | | |
| When operating in low OAT ,altitude corrections should be considered Refer to FOM Chapter 4 – Weather > Altimeter | <i>Continued on the following page</i> | |



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DESCENT

| EVENT | CAPT | PM |
|---------------------------|---|--|
| At 10,000 ft | <p>“ CHECKED”</p> <ul style="list-style-type: none"> - CSTR pb on EFIS CP --- ON - LS pb ----- AS RQRD - NAVAIDS ----- AS RQRD/CHECK | <p>“ ONE ZERO THOUSAND”</p> <ul style="list-style-type: none"> - LAND sw ----- ON - CSTR pb on EFIS CP --- ON - LS pb ----- AS RQRD |
| | CAPT | |
| | “SEAT BELTS ----- ON” (3 Chimes then on)” | |
| | PF | |
| Approach phase activation | “Approach Check List” | Accomplish APPROACH check list (Performed while descending through 10,000ft in case of transition level below 10,000ft, performed approach check list except altimeter(s) Setting) |
| | <p>“ACTIVATE APPROACH PHASE”</p> <p>“CONFIRM”</p> | <p>“CONFIRM ?”</p> <ul style="list-style-type: none"> - Check target speed change on PFD “MANAGED SPEED XXX” |



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GENERAL

Applicable to: ALL

GENERAL

The following approach procedures are based on the assumption that the flight crew uses the recommended speed guidance: Managed.

Note: *It is possible to perform an ILS approach, when a non ILS approach was previously scheduled. This can be done by either using a SEC F-PLN, or by modifying the primary F-PLN.*

NOS

Considerations

- Review all messages.
- Confirm ILS identification. The requirement to tune and identify navaids can be satisfied by aurally identifying the navaid or by confirming that the tuned navaid frequency is replaced by the correct alphabetical identifier on the PFD.
- Set DA or DH(RA).
- For all approaches, regardless of who is flying the aircraft, the Captain will make the final decision to continue and land or go-around, and make the appropriate callout
- The PM should continue standard callouts during final approach and the PF should acknowledge callouts.

INITIAL APPROACH

Applicable to: ALL

INITIAL APPROACH

- | | | |
|-----------------------------|---|--------------------------|
| <input type="checkbox"/> L2 | For additional training-oriented information, <i>Refer to FCTM/NO-180 Initial Approach.</i> | |
| <input type="checkbox"/> L1 | APPROACH PHASE..... | CHECK/ACTIVATE |
| | | PM with PF'S order |
- L2 - *If the aircraft overflies the DECEL pseudo waypoint in NAV mode, the APPR phase activates automatically*
 - L2 - *If the aircraft is in HDG or TRACK mode approximately 15 nm from touchdown, activate and confirm the APPR phase on the FMS ACTIVE/PERF page.*

L1 POSITIONING.....MONITOR | PF

- L2 - In NAV mode, use the VERT DEV on the PFD and on the DES panel of the ACTIVE/PERF page
 - In HDG or TRACK mode, use the energy circle on the ND that shows the required distance to land.

L1 MANAGED SPEED.....CHECK | PF

- L2 Check that the managed speed is active and monitor the target speed.

Note:

The aircraft decelerates automatically at the DECEL pseudo waypoint  when managed speed is active and NAV, LOC* or LOC mode is engaged.

During the approach, the autothrust maintains the maneuvering speed of the current configuration (O, S, F, VAPP).

If ATC requires a particular speed, use selected speed. Adjust the aircraft configuration accordingly. When the ATC speed constraint (e.g. "maintain 170 kt to the outer marker") no longer applies, return to managed speed.

If ATC orders successive step descents down to the final approach flight path, use V/S or FPA mode and monitor the VERT DEV.

L1 SPEED BRAKES.....AS RQRD | PF

NAVIGATION ACCURACY

● If GPS PRIMARY LOST:

NAVIGATION ACCURACY.....MONITOR | PM

- L2 On the POSITION/MONITOR page, check that the required navigation accuracy is appropriate to the phase of flight.

Monitor the navigation accuracy and be prepared to change the approach strategy. If the NAV ACCUR DOWNGRADED message appears on the FMS message area and on the ND, use raw data to check the navigation accuracy.

The navigation accuracy determines the autopilot modes that the flight crew should use for the approach, the type of ND displays, and the use of TAWS.

| NAVIGATION ACCURACY | ND | | AP/FD mode | TERR function |
|--|--------------------------------------|----|------------|---------------|
| | PF | PM | | |
| GPS PRIMARY | | | | |
| ACCURACY HIGH | | | | |
| ACCURACY LOW and ACCURACY check ≤ 1 nm | ARC or ROSE-NAV with navaid raw data | | NAV | ON |

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| NAVIGATION ACCURACY | ND | | AP/FD mode | TERR function |
|--|---------|---|--------------|-------------------|
| | PF | PM | | |
| GPS PRIMARY LOST and ACCURACY LOW and ACCURACY check >1 nm | ROSE-LS | ARC or ROSE-NAV or ROSE-LS with navaid raw data | HDG or TRACK | Automatically OFF |
| GPS PRIMARY LOST and aircraft flying within an unreliable radio navaid area | | | | |

INTERMEDIATE/FINAL APPROACH

Applicable to: ALL

INTERMEDIATE/FINAL APPROACH

- [L2] For additional training-oriented information, *Refer to FCTM/NO-180 Intermediate Approach*

L1 GENERAL

The preferred technique for flying an ILS(GLS) approach is to fly a decelerated approach using the AP / FD s, the LOC and G/S modes, the autothrust in SPEED mode, and the managed speed target.

The objective is to stabilize the aircraft on the final descent path at VAPP in the landing configuration, at 1 000 ft above airfield elevation in instrument conditions, or at 500 ft above airfield elevation in visual conditions, after continuous deceleration on the glide slope.

To be stabilized, all of the following conditions must be achieved prior to, or upon reaching this stabilization height:

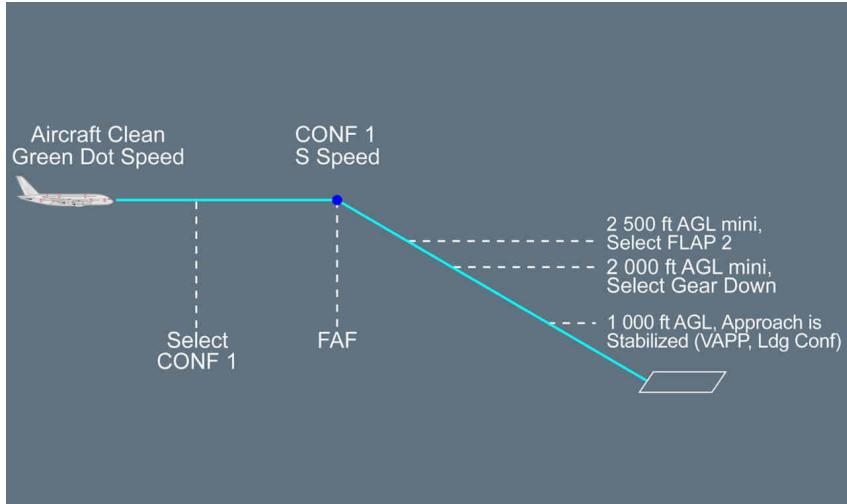
- The aircraft is on the correct lateral and vertical flight plan,
- The aircraft is in the desired landing configuration,
- The thrust is stabilized, usually above idle, to maintain the target approach speed along the desired final approach path,
- There is no excessive flight parameter deviation.

If the aircraft is not stabilized on the approach path in landing configuration, at 1 000 ft above airfield elevation in instrument conditions, or at 500 ft above airfield elevation in visual conditions, or as restricted by Operator policy/regulations, a go-around must be initiated unless the crew estimates that only small corrections are necessary to rectify minor deviations from stabilized conditions due, amongst others, to external perturbations.

L2

Decelerated Approach

The decelerated approach technique descends the aircraft to 1 000 ft , at VAPP . In most cases, the interception of the final descent path is achieved with CONF 1 at S speed.

Decelerated Approach

L3

The advantages are:

- Decrease in fuel consumption
- Decrease in the noise level
- Time saving
- Flexibility and ability to vary speed, to be in accordance with ATC requests.



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STANDARD OPERATING PROCEDURES - PRECISION APPROACH

Note: For ILS approach, the ICAO defines the envelope in which the quality of the G/S signal ensures a normal capture. This envelope is within 10 nm, $\pm 8^\circ$ from the centerline of the ILS glide path, and up to 1.75 teta (teta, being the nominal glide path angle).

If the approach is armed when the aircraft is far outside from the standard glideslope (G/S) capture envelope, a spurious G/S * engagement may occur, due to an incorrect G/S deviation signal. This spurious G/S capture will order a pitch up, if the aircraft is below the glide beam, and a pitch down, if the aircraft is above the glide beam.

Each time that the flight crew notices pitch movement, or a spurious G/S *, or a trajectory deviation, they must immediately disconnect the AP, if engaged, in order to re-establish a normal attitude and disengage APPR mode. It is then recommended to arm/rearm the APP (ILS) mode within the normal capture zone.

L1 COLD WEATHER CONDITIONS

For altitude correction in low temperature conditions, Refer to PER-OPD-AMILA ATMO Module Interface (Low altitude temperature corrections) .

APPR MODE ACTIVATION

- L2** For additional information on the FMA display during this phase of flight, Refer to DSC-22-FG-70-120-90 ILS Approach and Autoland .
For more information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .
- L1** ● When the ATC clears the aircraft for the approach:
APPR pb on AFS CP PRESS | PF
- L2** - The flight crew should press the APPR pb only after the ATC clears the aircraft for the approach
- When pressed, the LOC and G/S modes arm provided that the flight crew:
- Selected an ILS(GLS) approach on the FMS ARRIVAL page, or
 - Manually-tuned an ILS(GLS) in the POSITION/NAVAIDS page and did not select an approach or only selected a runway on the FMS ARRIVAL page, or
 - Set the RAD NAV key to STBY and selected the LS on RMP 1 or 2.
- LOC and/or G/S modes engage not sooner than 3 s after being armed.

Note: If the flight crew selects a non-precision approach in the active flight plan, and if they manually tune an ILS(GLS) on the POSITION/NAVAIDS page, the MFD and PFD display **CHECK APPR SEL**. This message is a reminder to the flight crew that, although an ILS(GLS) is tuned in the POSITION/NAVAIDS page, the available approach guidance modes are F-LOC and F-G/S modes (for NPA flown with the FLS function) when the APPR pb is pressed on the AFS CP.

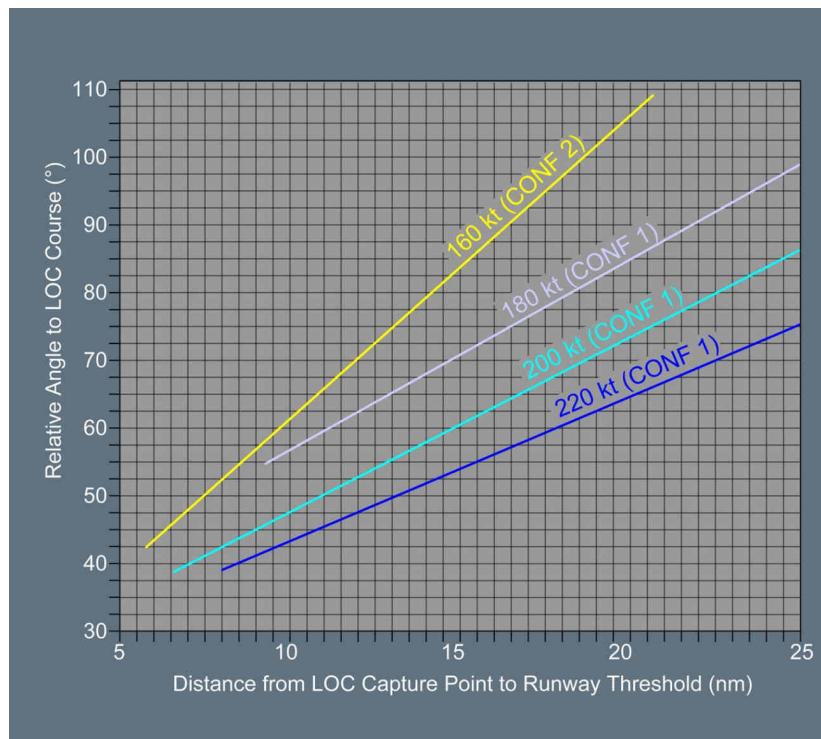
● If GPS PRIMARY LOST :

The pre-capture zone of the LOC beam is not available. Therefore, the LOC capture performance may be degraded, and overshoot of the LOC beam may occur.

L3

For more information on the capture zone and pre-capture zone of the LOC beam, *Refer to LOC* Engagement Conditions*.

The following graph illustrates the angle of interception vs. the distance, that ensures a capture with a single overshoot. This overshoot is less than 1.3 dots.

LOC Capture Domain

The LOC capture point is the point at which the aircraft track projection intercepts the LOC centerline.

- [L1] AP 1+2.....ON | PF
- [L2] When the APPR mode is selected, the flight crew should engage both AP s.
- [L1] FMA.....CHECK | PM
- Check that the FMA displays the approach capability ([CAT2], [CAT3] SINGLE, [CAT3] DUAL, or [AUTO LAND]) for the intended ILS(GLS) approach.

APPROACHING GREEN DOT SPEED

- [L2] For additional training-oriented information on final approach, Refer to FCTM/NO-180 Final Approach .

For additional information on the FMA display during this phase of flight, *Refer to DSC-22-FG-70-120-90 ILS Approach and Autoland*.

For additional information on the associated standard callouts:

- *Refer to PRO-NOR-SCO Flaps or Gear Configuration*
- *Refer to PRO-NOR-SCO Flight Parameters* .

L1 FLAPS 1.....ORDER | PF
 FLAPS 1.....SET | PM

L2 - *The flight crew should not set FLAPS 1 later than 3 nm from the Final Approach Fix (FAF)*

L1 - *Check the aircraft deceleration toward S speed*

L2 - *The aircraft must reach, or be established on, the glideslope with FLAPS 1 and S speed at or above 2 500 ft AGL*

- *If the aircraft speed is significantly above S on the glideslope, or if the aircraft does not decelerate on the glideslope, extend the landing gear in order to decelerate the aircraft.*
The flight crew can also use the speed brakes. However, the flight crew should be aware of the VLS increase, and the limited effect of the speed brakes at low speeds.

L1 TA pbTA ONLY or TA/RA | PF

L2 *The flight crew may use the TA ONLY mode in specific airports, and for specific procedures (identified by Operators) that may provide resolution advisories that are neither wanted or appropriate (e.g. closely-spaced parallel or converging runways).*

L1 LOC CAPTURE.....MONITOR | PF

L2 *The flight crew must always monitor the capture of a LOC beam. During the capture phase, when the LOC deviation is within the LOC scale, the LOC deviation on the PFD and the ND should move toward the center of the scale.*

If GPS PRIMARY is lost, the LOC capture performance may be degraded, and overshoot of the LOC beam may occur.

L3 Note: *For ILS approach, the ICAO requires the LOC beam to ensure a normal capture within 10 nm, and $\pm 35^\circ$ from the centerline of the course. Some current ILS systems just meet the requirement and are subject to an erroneous capture outside these limits.*

L1 G/S CAPTURE.....MONITOR | PF

L2 Note: *The glideslope may be captured independently of the LOC beam capture, depending on the PRIM pin program.*

L1 ● **If above the glideslope:**

V/S MODE

.....AS RQRD | PF

Do not exceed 2 000 ft/min .



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AFS CP ALTITUDE SET ABOVE A/C ALTITUDE | PF

[L2] Select an altitude above the aircraft altitude, in order to prevent inadvertent ALT* engagement.

[L1] ● When G/S Capture (G/S*):
GO-AROUND ALTITUDE.....SET | PF-PM

[L2] Note: - This procedure prevents from an undesired level off at the G/S intercept altitude
- If the aircraft intercepts the ILS(GLS) above the validity range of the radio altimeter
(i.e. when the radio altitude indication is not yet available on the PFD), CAT 1 appears on the FMA . Check that the FMA displays the correct capability for the intended approach when the aircraft is below 5 000 ft .

BELOW VFE NEXT, AT 2500 FT AGL MINIMUM

[L2] For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Flaps or Gear Configuration .

[L1] FLAPS 2..... ORDER | PF
FLAPS 2.....SET | PM

- Check the aircraft deceleration toward F speed
[L2] - If the aircraft intercepts the ILS(GLS) glideslope below 2 500 ft AGL , select FLAPS 2 at one dot below the glideslope
- If the aircraft speed is significantly above F on the glideslope, or if the aircraft does not decelerate on the glideslope, extend the landing gear in order to decelerate the aircraft. The use of the speed brakes is not recommended.

AFTER FLAPS 2 SELECTION, AT 2000 FT AGL MINIMUM

[L2] For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Flaps or Gear Configuration .

[L1] L/G DOWN..... ORDER | PF
L/G..... DOWN | PM
AUTO BRK..... CONFIRM | PM

[L2] If the runway conditions deteriorated since the approach briefing, consider the impact on the landing performance assessment and if there is a need for another braking mode.
When BTV is selected, if the aircraft lands on a runway different from the runway selected for BTV settings, the autobrake reverts automatically to autobrake mode Hi in short final.

[L1] GND SPLRS..... ARM | PM
EXTERIOR LIGHTS.....SET | PM

AFTER LANDING GEAR DOWN SELECTION

- [L2] For more information on the FMA display during this phase of flight, Refer to *DSC-22-FG-70-120-90 ILS Approach and Autoland*.
- [L1] ● **Below VFE NEXT:**
- [L2] For more information on the associated standard callouts, Refer to *PRO-NOR-SCO Flaps or Gear Configuration* .
- [L1] FLAPS 3..... ORDER | PF
FLAPS 3..... SET | PM
- WHEEL SD PAGE..... CHECK | PM
- [L2] - *The WHEEL SD page appears below 800 ft , or at landing gear extension*
- *Check the five landing gear green indications. At least one green triangle on each landing gear strut is sufficient to indicate that this landing gear strut is down and locked.*
- [L1] ● **Below VFE NEXT:**
- [L2] For more information on the associated standard callouts, Refer to *PRO-NOR-SCO Flaps or Gear Configuration* .
- [L1] FLAPS FULL..... ORDER | PF
FLAPS FULL..... SET | PM
- Check that the aircraft decelerates to VAPP .*
- A/THR..... CHECK IN SPEED MODE or OFF | PF
- [L2] *For GLS CAT I with autoland, if the A/THR is available, activate the A/THR .*
- [L1] SLIDING TABLE..... STOWED | BOTH
LDG MEMO..... NO BLUE LINE | PM
CABIN..... READY | BOTH
- [L2] *Check CABIN READY on the EWD , or obtain the report from the chief purser: "Cabin ready for landing".*
- [L1] LANDING C/L..... COMPLETE | BOTH
Refer to PRO-NOR-C-L Landing
- [L2] *For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .
For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .*
- [L1] FLIGHT PARAMETERS..... CHECK | PF
The PF announces any modification to the FMA .



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The PM announces any flight parameter deviation. For more information on the associated callouts, Refer to PRO-NOR-SCO Flight Parameters .

● **At 500 ft AGL (or RA) and below and if the flight crew selected BTV autobrake mode:**

The PM may take advantage to adjust the ND RANGE selector to display the dry and wet lines on the Airport Navigation display, when the landing is positively considered.

● **At 350 ft AGL (or RA):**

| | | |
|----------------------|----------|----|
| LAND ON FMA | ANNOUNCE | PF |
| ILS(GLS) COURSE..... | CHECK | |

[L2] Check the ILS(GLS) course on the PFD .

AT MINIMUM+100 FT

[L2] For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

[L1] ONE HUNDRED ABOVE.....MONITOR or ANNOUNCE | PM

1

AT MINIMUM

[L2] For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

[L1] MINIMUM.....MONITOR or ANNOUNCE | CAPT
LANDING or GO-AROUND.....ANNOUNCE

[L2] Maintain the aircraft on a stabilized flight path up to the flare.

At 50 ft , one dot below the glide slope means that the aircraft is 7 ft below the glide slope.
Do not duck under the glide slope.

ALL ILS APPROACHES (CAT I) Procedure and Call out



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STANDARD OPERATING PROCEDURES - PRECISION APPROACH

L1

ILS CAT - I Approach

| EVENT | PF | PM |
|--|---|---|
| If GPWS does not call indications, such as "RADIO ALTIMETER", "ONE THOUSAND", "FIVE HUNDRED", "MINIMUM", "ONE HUNDRED", "FIFTY", etc, the PM shall call as appropriate | | |
| <ul style="list-style-type: none"> - "CHECKED"(1*) : I have checked NAVAID identifier on PFD or ND - "ROGER (2*) : I didn't check NAVAID identifier on PFD or ND , but I have received all of your last transmission. | | |
| Note: <ul style="list-style-type: none"> - "LANDING(3*) : The captain shall announce his/her decision to allow to the A/C to continue to a landing at MDA/DA , if the visual references are distinctly visible and identifiable. - "GO-AROUND/FLAPS"(4*) : Refer to the Go around Phase | | |
| After identification of ILS by display or morse code | Verify ILS Identified "CHECKED(1*) or ROGER(2*)" | "0000 IDENTIFIED" |
| When flaps required at green dot speed or below VFE | " FLAPS 1" | Confirm VFE speed and select FLAPS 1 "SPEED CHECKED" "FLAPS 1" |
| At 2,500ft AGL Minimum | " FLAPS 2" | Confirm VFE speed and select FLAPS 2 "SPEED CHECKED" "FLAPS 2" |
| When on localizer intercept heading: <ul style="list-style-type: none"> - Verify that the ILS is tuned and identified - Verify that the LOC and G/S pointers are shown - Verify that the approach clearance is received | | |
| When ILS approach clearance received from ATC, Select APP mode and call | " APPROACH ARM " | |
| x:: Manual Flight | "ARM APPROACH" | "APPROACH ARM" "CHECKED" |
| | "GS, LOC BLUE , CAT1" | |
| Engage both APs or remaining AP | "AP 1 &2 ON" or AP 2 &1 ON" | "CHECKED" |
| When localizer, glide slope armed | "GS,LOC BLUE,CAT3 (), AP 1&2" | "CHECKED" |
| When the first positive movement of Localizer index | "CHECKED" | "LOCALIZER ALIVE" |
| When localizer is captured | "LOC STAR" "LOC" | "CHECKED" "CHECKED" |
| When the first positive movement of Glide slope index | "CHECKED" | "GLIDE SLOPE ALIVE" |

Continued on the following page



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Continued from the previous page

ILS CAT - I Approach

| EVENT | PF | PM |
|---|---|---|
| When glide slope is captured | "GS STAR" "GO AROUND ALTITUDE 0000 SET" "GS" | "CHECKED" "0000 BLUE" "CHECKED" |
| x: Manual Flight | "SET GO AROUND ALTITUDE 0,000" "0,000 BLUE" | " 0,000 SET" |
| After flaps 2 selection, at 2,000ft AGL minimum | "GEAR DOWN" | L/G DOWN -- SELECT "GEAR DOWN" - Ground Spoiler ---- ARM - EXTERIOR LIGHTS -- SETSet NOSE SW to T.O, RWY TURN OFF & CAMERA SW to ON - AUTO BRK ----- CONFIRM |
| After Landing Gear down , When below VFE NEXT | "FLAPS 3" | Confirm VFE speed and select FLAPS 3 "SPEED CHECKED" "FLAPS 3" |
| When below VFE NEXT | "FLAPS FULL" | Confirm VFE speed and select FLAPS 3 "SPEED CHECKED" "FLAPS FULL" |
| | "LANDING CHECK LIST" | Accomplish LANDING CHECK LIST "LANDING CHECK LIST COMPLETE" |
| At OM or FAF | Check as publish altitude with actual passing altitude "CHECK/TIMING" | "OUTER MAKER,(Published altitude)" or AT Final Fix, Other than OM "() DME (Published altitude)" or "VOR name (Published altitude)" or "NDB name (Published altitude)" |
| x: Manual Flight | "IN SIGHT" | ABOVE DA(H), When in visual "STROBE LIGHT INSIGHT" "APPROACH LIGHT INSIGHT" "RUNWAY INSIGHT" |
| At 1,000 ft above HAT , | "STABILIZED" or "VMC -CORRECTING" in VMC or "GO-AROUND/FLAPS"("4) | "ONE THOUSAND , CLEARED TO LAND" or (Call out any unstable conditions) "ONE THOUSAND ,CONTINUE" (Call out any unstable conditions) |

Continued on the following page



Continued from the previous page

ILS CAT - I Approach

| EVENT | PF | PM |
|---|--|--|
| At 500ft HAT , | "STABILIZED" or "GO-AROUND/FLAPS"(*4) | Monitor AUTO CALLOUT "FIVE HUNDRED"** (Call out any unstable conditions) |
| At 350ft AGL(or RA) | Check ILS course on the PFD when displayed on FMA "LAND" | "CHECKED" |
| At 100ft above entered MDA/DA(H) | "CHECKED" | Monitor AUTO CALLOUT "HUNDRED ABOVE" |
| Before reaching DH When in visual call | "INSIGHT" | "STROBE LIGHT INSIGHT" "APPROACH LIGHT INSIGHT" "RUNWAY INSIGHT" |
| At DA(H) | CAPT "LANDING or GO-AROUND" | Monitor Auto callout "MINIMUM" |
| If PF calls "GO-AROUND/FLAPS" , PM retracts FLAPS one step and call " Flaps 1 step" | | |
| After 2nd Auto Pilot On(if used) | "CAT 3 DUAL" or "CAT3 SINGLE" | "CHECKED" |
| Above DA(H), When in visual | "STROBE LIGHT IN SIGHT" "APPROACH LIGHT IN SIGHT" "RUNWAY INSIGHT" | "ROGER" |
| At 100ft above entered MDA/DA(H) | "CHECKED" | Monitor Auto callout "HUNDRED ABOVE" |
| At Entered MDA/DA(H) | CAPT "LANDING or GO-AROUND" | Monitor Auto Callout 'MINIMUM' |
| At 40ft RA, When displayed on FMA | PF Check FLARE on FMA | "FLARE" |
| At 30ft RA | Monitor thrust reduction & flare by flight instruments | thrust "IDLE" is displayed on the FMA |
| At 10ft RA | - Retard both thrust to IDLE - Monitor lateral guidance by external reference | Monitor engine parameters |
| At touch down | | Check ROLLOUT on FMA "ROLL OUT" |

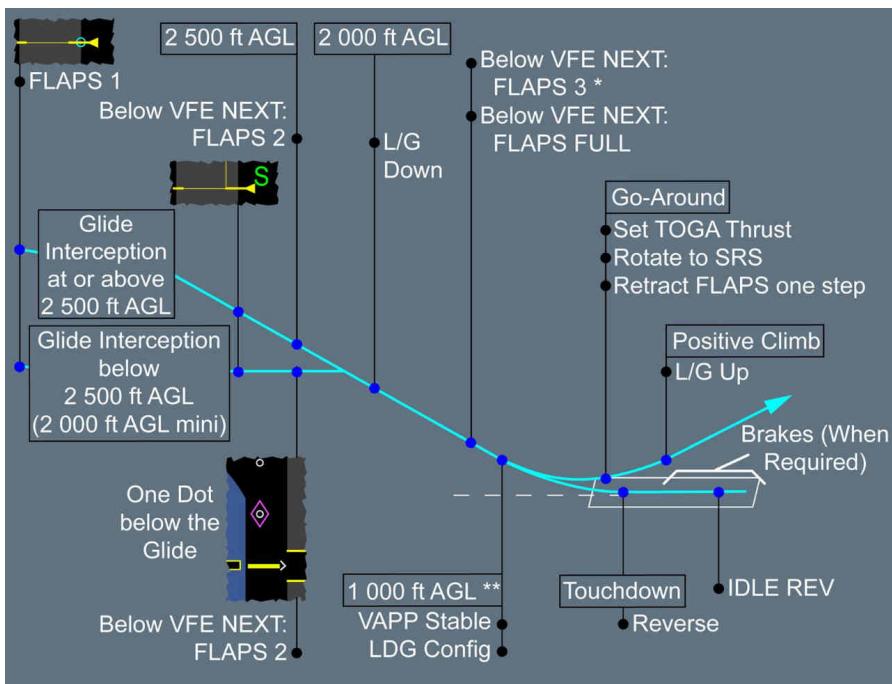
Note: If the Auto callouts are not called by FWC, PM should call these items.

ILS(GLS) APPROACH PATTERN

Applicable to: ALL

ILS(GLS) APPROACH PATTERN

The following approach pattern is based on the assumption that managed speed is used:

ILS Approach

* The change in flaps setting is almost continuous and takes into account the extension time of the surfaces. However, the flight crew must consider VFE NEXT that appears on the PFD in some cases (e.g. heavy aircraft).

** 1 000 ft AGL minimum IMC, 500 ft AGL minimum VMC, or in accordance with the airline policy and regulations.

If in selected speed, select:

- S speed after FLAPS 1 selection
- F speed after FLAPS 2 selection
- VAPP after landing FLAPS selection.



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Note: If earlier stabilization at VAPP is required, start the deceleration at a higher altitude.



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STANDARD OPERATING PROCEDURES - CAT II AND CAT III APPROACH

GENERAL

Applicable to: ALL

GENERAL

The A380 is certified for CATIIIb precision approach and landing. It incorporates a Fail Operational Dual –Autopilot system with rollout control.

DECISION HEIGHT

Decision height is the wheel height above the runway elevation by which a go-around must be initiated unless adequate visual reference has been established and the aircraft position and approach path have been assessed as satisfactory to continue the approach and landing in safety.

ALERT HEIGHT

An Alert Height is a height above the runway, based on the characteristics of the airplane and its fail-operational automatic landing system, above which a Category III approach would be discontinued and a missed approach initiated if a failure occurred in one of the redundant parts of the automatic landing system, or in the relevant ground equipment.

FAIL PASSIVE

An automatic landing system is fail-passive if, in the event of a failure, there is no significant out-of-trim condition or deviation of flight path or attitude. A DA(H) is used as approach minimums.

An automatic landing system is fail-operational if, in the event of a failure below alert height, the approach, the flare and landing can be completed by the remaining part of the automatic system. In the event of failure, the automatic landing system will operate as a fail-passive system

CAT II/III OPERATING REQUIREMENT

Applicable to: ALL

Refer to Ground/Runway Equipment Required for Precision Instrument Approaches in this Chapter. Review NOTAMS to make sure that the destination airport still meets visual or non-visual CAT II or CAT III requirements:

- Runway and approach lighting,
- Radio navaid availability,
- RVR equipment availability, etc.



To commence a CATII/III approach, the reported weather must be at or above the approach minima. Once an aircraft has passed a Final Approach Fix (or commenced the final approach segment if there is no Final Approach Fix), it may continue the approach to the DA(H)/AH even if the weather deteriorates below the approach minima.

Note: *Policy regarding an approach ban may differ from country to country. Flight crew must confirm and apply the procedures specific to that country.*

Unless LVP are reported active by ATIS, clearance to carry out a CAT II or CAT III approach must be requested from ATC, who will check the status of the ILS and lighting and protect the sensitive areas from incursion by aircraft or vehicles. Such an approach may not be undertaken until the clearance has been received.

Correct adjustment of pilot's seat prior to approach in low visibility conditions is very important in order to take full advantage of existing Visibility. The seat should be adjusted to confirm the external visual Reference over the airplane nose.

At night in low visibility conditions, landing lights can be detrimental to the acquisition of visual references. Reflected light from water droplets or snow may actually reduce visibility. Landing lights would therefore not normally be used in CAT II or CAT III weather conditions.

CAT II AND CAT III APPROACH_OPERATING LIMITATIONS

Applicable to: ALL

OPERATING LIMITATIONS

Subject to the operating procedures herein, the A380 is authorized to be operated to the following minima:

- Approach and Landing Minima

Check weather conditions at destination and at alternate. Refer to the FOM Chapter 4, Weather and the Airway manual (Green page) for specific weather minima for the runway.

- Wind Limitations

The maximum surface wind components for CAT II/III autoland are :

| Winds | Headwind | Crosswind | Tailwind |
|-----------|----------|-----------|----------|
| Component | 38 kts | 15 kts | 10 kts |

- Braking Action

A CAT II/III approach is not permitted in windshear or turbulent conditions or when braking action is reported to be poor than "MEDIUM (or FAIR)" for any part of the runway.



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STANDARD OPERATING PROCEDURES - CAT II AND CAT III APPROACH

- Landing Distance

The landing distance required for a CAT II/III landing is 1.15 times the dry runway landing distance required determined from the Landing Performance Chart

- Pilot Seating

An approach and landing in conditions below for CATI minima shall be accomplished by the PIC occupying the left hand seat.

- Mode of Operation (On the FMA)

Conduct an autoland using autopilot coupled approach.

| | | |
|---------|---------------------------------|--------------------------|
| CAT II | CAT 3 DUAL, CAT 3 SINGLE, CAT 2 | |
| CAT III | Fail Passive | CAT 3 DUAL, CAT 3 SINGLE |
| | Fail Operational | CAT 3 DUAL |

- Flight Crew Duties

- The captain will conduct all CAT II/III approaches as a PF.
- An approach and landing in conditions below CAT I minima will be accomplished by the captain occupying the left seat.
- The captain may only operate as a PM in the right seat in actual CAT II / III conditions if he has been trained for CAT II/III PM duties and has a certificate.

CAT II AND CAT III APPROACH_CERTIFICATION OF PILOTS

Applicable to: ALL

CERTIFICATION OF PILOTS

Refer to the FOM Chapter 6, Normal Operations.

CAT II AND CAT III APPROACH_AIRCRAFT STATUS

Applicable to: ALL

AIRCRAFT STATUS

Refer to FOM Chapter 6 – Normal Operations

CAT II AND CAT III APPROACH_REQUIRED EQUIPMENT FOR CAT I, II, III

Applicable to: ALL

REQUIRED EQUIPMENT FOR CAT I, II, III

Refer to FCOM /Limitation/Auto Flight System/Automatic Approach, Landing and Roll-Out/Required Equipments for CAT II, or CATIII Operation



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STANDARD OPERATING PROCEDURES - CAT II AND CAT III APPROACH

CAT II AND CAT III APPROACH_PRACTICE CAT III APPROACH

Applicable to: ALL

PRACTICE CAT III APPROACH

- A Practice CAT II/ III Approach can only be accomplished if both the PIC and F/O have completed CAT II/III training.
- An auto-coupled approach and landing utilizing CAT II/ III procedures in weather conditions at or above CAT I approach minima shall be deemed a practice CAT II/III approach. Use the DH/AH on a Practice CAT II/III Approach as appropriate for the approach.
- Since the ILS critical area is not protected from ground vehicles or other aircraft during auto coupled approach or landing when the weather is above ceiling 800 feet and visibility 2 miles, the flight crew shall notify ATC at the commencement of "Auto Land".
e.g. "We are conducting Autoland"

CAT II AND CAT III APPROACH_AUTOMATIC SYSTEMS USAGE

Applicable to: ALL

AUTOMATIC SYSTEMS USAGE

- Autopilot
An approach in conditions below Category I weather minima shall be autocoupled using all available autopilots and shall be completed by auto-land. The autopilots shall be engaged such that localizer capture would occur no later than the Final Approach Fix (FAF) and the airplane shall be fully configured for landing by 1,500ft HAT. The autopilot should only be disengaged after landing on reaching a safe taxi speed or stopping aircraft.
- Autothrust
Autothrust is mandatory for all CAT III operations . For all other low visibility landings, the autothrust shall be used, if available.
- Autobrake
Autobrakes are mandatory for CAT III operations . For all other low visibility landings, the autobrakes, if available, shall be used. Setting low or medium should be selected to expedite stopping when landing in low visibility.

CAT II AND CAT III APPROACH_CAT II OPERATIONS

Applicable to: ALL

CAT II OPERATIONS

Category II approaches may be conducted using two autopilots, with two engines (1 on the right side , and 1 on the left side)or three engines.



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STANDARD OPERATING PROCEDURES - CAT II AND CAT III APPROACH

Note: *If an aircraft has an engine failure prior to 1,000ft HAT, the aircraft may continue approach, when completed engine failure procedure prior to descent below 1,000ft HAT, and unless otherwise conflict with CAT II approach condition*

CAT II AND CAT III APPROACH_NON-NORMAL OPERATIONS FOR CAT II

Applicable to: ALL

NON-NORMAL OPERATIONS FOR CAT II

The airplane is approved for dual autopilot operations to CAT II minimums with an engine inoperative prior to 1,000ft HAT, and the airplane trimmed for the condition. Autoland requires use of CONF 3 or Full.

CAT II AND CAT III APPROACH_CAT III OPERATIONS

Applicable to: ALL

CAT IIIA/IIIB OPERATIONS:

- In **CAT III operations with DH**, the condition required at DH is that there should be visual references, which confirm that the aircraft is over the touchdown zone. Go around is mandatory if the visual references do not confirm this.
- For **CAT III operations with AH**, the decision to continue does not depend on visual references, even though a minimum RVR is specified. The decision depends only on the operational status of the aircraft and ground equipment. If a failure occurs prior to reaching the AH, a go-around will be made. A go-around must nevertheless be performed if “AUTOLAND” warning light flashes or “FLARE” is not annunciated on the PFD below AH

Note: *Operations based on an AH may continue to land regardless of reported weather conditions if equipped with a fail operational rollout system which did not indicate a malfunction prior to passing alert height, and the flight crew considers continuation a safe course of action.*



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STANDARD OPERATING PROCEDURES - CAT II AND CAT III APPROACH

CAT II AND CAT III APPROACH_AUTO COUPLED NON-NORMAL OPERATIONS FOR CAT III

Applicable to: ALL

AUTO COUPLED NON-NORMAL OPERATIONS FOR CAT III

- **Downgrading conditions**

- If the following conditions are met Above 1000ft HAT, a flight crew can perform an approach(CAT I/II/IIa) with a higher minima when downgrading conditions exist (including downgrading to fail passive system).
 - Briefing for approach procedure with a new minima,
 - Reported RVR is at or above the approach minima,
 - Decision to downgrade is completed above 1000ft HAT,

Note: *If an automatic landing system has downgraded to Fail passive (CAT 2 / CAT 3 SINGLE) while approaching with AH, use DH as a minimum.*

Note: *If DH is not published for CAT III approach and the aircraft is fail passive automatic landing system, set Radio Altimeter Minimum at 50 ft RA as a CAT IIIa decision height.*

CAT II AND CAT III APPROACH_CAT II/III LANDING BRIEFING

Applicable to: ALL

CAT II/III LANDING BRIEFING

In addition to the normal briefing , the PIC should include items for CATII/III operation.
Refer to the FOM Chapter 6 – Normal Operations.

CAT II AND CAT III APPROACH_"DH OR AH" SETTING ON MCDU PERFD APPR PAGE

Applicable to: ALL

1

"DH OR AH" SETTING ON MCDU PERFD APPR PAGE

| Approach | | Decision Height Setting |
|----------|---------|---|
| CAT II | | DH/RA value |
| CAT III | with DH | DH/RA value |
| | with AH | If DH is published, set RA as depicted, or if not, set RA 50ft. "NO" |



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STANDARD OPERATING PROCEDURES - CAT II AND CAT III APPROACH

MISSED APPROACH (CAT II)

Applicable to: ALL

MISSED APPROACH (CAT II)

A missed approach must be executed when any of the following conditions exist:

- At or below 1,000ft HAT and above 200ft RA
 - ALPHA FLOOR activation,
 - Loss of AP (cavally charge),
 - Downgrading of capability (triple click). changes from "CAT 3 DUAL", "CAT 3 SINGLE", "CAT 2" to "CAT 1",
 - Amber caution (single chime),
 - Engine failure
 - "LAND" mode does not appear on the FMA at 350ft RA
 - Any of the airborne equipment required for the particular CAT II operation being conducted becomes inoperative
 - Before arriving at DH, any of the required elements of the CAT II ground system becomes inoperative
 - Crew incapacitation is evident (recommended to continue if below 100 ft AGL).
- At or below 200ft RA and before touchdown
 - The rate of descent exceeds 1000fpm.
 - "LAND" mode disappear on the FMA.
 - FLARE is not annunciated on the PFD. FLARE is not annunciated on the PFD.
 - Crew incapacitation is evident (recommended to continue if below 100 ft).
 - "AUTOLAND" warning light flashes.
 - There are insufficient visual cues at DH to continue to a safe landing
 - Loss of visual cues occurs after DH.
 - The pilot determines that a landing cannot be safety accomplished within the touch down zone.
 - Engine failure unless engine failure procedures are completed by 1000ft HAT (Recommended to continue if below 100ft AGL).
 - Directed by ATC.
- After a go-around, if another approach is planned:
 - Re-assess the capability of the airplane (i.e. refer to the Required Equipment List).
 - Re-assess the weather and runway conditions.
 - Consider another approach at a different category if necessary.



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STANDARD OPERATING PROCEDURES - CAT II AND CAT III APPROACH

MISSED APPROACH (CAT III)

Applicable to: ALL

MISSED APPROACH (CAT III)

A missed approach must be executed when any of the following conditions exist:

- **At or below 1000ft HAT and prior to AH or DH**

- ALPHA FLOOR activation,
 - Loss of AP (cavalry charge),
 - Amber caution (single chime),
 - Engine is inoperative (Recommended to continue if below 100ft AGL).
- CAT IIIa: Unless engine failure procedures are completed by 1000 ft HAT (recommended to continue if below 100 ft AGL).
- CAT IIIb: Engine is inoperative (recommended to continue if below 100 ft AGL).
- "LAND" mode does not appear on the FMA at 350ft RA.
 - CAT IIIa Fail Passive Approach : Downgrading of capability from "CAT 3 DUAL", "CAT 3 SINGLE" to "CAT 2", "CAT 1".
 - CAT IIIb Fail Operational Approach : Downgrading of capability from "CAT 3 DUAL" to "CAT 3 SINGLE", "CAT 2", "CAT 1".
 - Any of the required elements of the ground system becomes inoperative. However, CAT III approaches and landings may be continued even though the sequence flashers become inoperative,
 - Any of the airborne equipment required for the particular CAT III operation being conducted becomes inoperative.
 - Crew incapacitation is evident (recommended to continue if below 100 ft AGL).

- **Prior to Touchdown**

- "AUTOLAND" warning light flashes.
- The rate of descent exceeds 1000fpm
- FLARE is not annunciated on the PFD.
- "LAND" mode disappears on the FMA.
- There are insufficient visual cues at DH to continue to a safe landing (CAT IIIa with DH)
- Loss of visual cues occurs after DH (CAT IIIa with DH).
- The pilot determines that a landing cannot be safely accomplished within the touchdown zone.
- Directed by ATC.

- **After a go-around, if another approach is planned :**

- Re-assess the capability of the airplane (i.e. refer to the Required Equipment List).



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- Re-assess the weather and runway conditions.
- Consider another approach at a different category if necessary.

CAT II AND CAT III APPROACH_ENGINE INOPERATIVE

Applicable to: ALL

ENGINE INOPERATIVE

- ILS CAT II/III Fail Passive : One or Two Engine (On the opposite side) Inoperative for CAT II, One Engine for CAT III.
An autoland may be accomplished as long as the quality of the approach is satisfactory. Additional engine-out logic is incorporated during runway alignment to ensure the downwind wing is not low at touchdown. If the crosswind is from the side opposite the failed engine, a failed-engine high (upwind wing low) attitude is maintained during the approach. An additional sideslip is induced proportional to the engine-out crab and the crosswind sideslip.
- Approach
Directional control (yaw) is not affected by rudder trim with 1 or 2 autopilots in the LOC or ROLLOUT modes, but it may be desirable to trim the rudder to zero to facilitate manual directional control when the autopilots are disengaged on the runway.
To maintain wings level on final, in addition to sideslip used for wind correction to the autopilot may maintain a slight sideslip.
The amount of Go-Around (CAT III) rudder input is calculated from angle of attack and elevator displacement, which is "washed out" to zero during the flare. If the autopilots are disengaged, be prepared to maintain rudder pedal pressure.

CAT II AND CAT III APPROACH_CAT II APPROACH

Applicable to: ALL

CAT II APPROACH

The use of AP with FD with or without A/THR is approved in APPR modes (GS*, LOC*, GS, LOC, LAND). At least One AP engagement is approved.

Refer to ILS Auto Coupled Approach & Landing Procedure and Callouts.

| EVENT | CAPT | FO |
|---|---|---------|
| Above 1,000 ft HAT; Refer to Failure and Associated Actions above 1,000 ft for CAT II ((Refer to FCTM/NORMAL OPERATIONS/Precision Approach/Failure and associated actions) | | |
| If Auto land status has changed from CAT3/2 to CAT 1 | The approach may be continued reverting to higher DH, "CHANGE MINIMUMS" | "CAT 1" |

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| EVENT | CAPT | FO |
|---|---|--|
| | Check as appropriate the correct minimum "CHECKED" Briefing is amended to include CAT I or higher minimum approach procedure & DH/MDA | Change DH/MDA on the appropriate field of the PERF APPR page "DH/MDA () SET" |
| At or below 1,000 ft HAT | | |
| If Auto land status has changed from CAT3 SINGLE/DUAL or CAT 2 to CAT 1 | "GO-AROUND/FLAPS"(*4) | "CAT 1" |
| At 1,000ft HAT | "STABILIZED" "GO-AROUND/FLAPS"(*4) | "ONE THOUSAND, CLEARED TO LAND" or "ONE THOUSAND, CONTINUE" |
| At 500 ft HAT | "STABILIZED" "GO-AROUND/FLAPS"(*4) | Monitor AUTO CALLOUT " FIVE HUNDRED" |
| At 350 ft RA | "LAND " when displayed on FMA | LAND must be displayed on FMA and runway course must be checked "CHECKED" |
| If LAND does not appear or runway course is incorrect, | "GO-AROUND/FLAPS"(*4) | "NO LAND" |
| At 200 ft RA and below, Any AUTO LAND light flashing on glareshield requires an immediate go-around. First officer should call out "NO AUTOLAND". | | |
| <i>Note:</i> Whenever the LAND mode is lost, the AUTO LAND light comes on. | | |
| At 100 ft above DH | "CHECKED" | Monitor AUTO CALLOUT "MINIMUM**" |
| DH | If external visual references are sufficient, "LANDING"(*3) or if not, "GO-AROUND/FLAPS"(*4) | Monitor AUTO CALLOUT "MINIMUM**" |
| At flare height (40 ft RA: the precise value is a function of v/s), | If FLARE does not comes up on FMA, a go-around must be performed. "GO-AROUND/FLAPS"(*4) | call "FLARE" or "NO FLARE" |
| At 10 ft RA, | Monitor A/THR commands IDLE thrust during the flare and the FMA and EWD show 'IDLE'. If RETARD mode is not available, the Captain has to reduce thrust manually. | Monitor AUTO CALLOUT "RETARD" |

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| EVENT | CAPT | FO |
|------------------------|---|--|
| At touchdown, | If nosewheel steering or antiskid failed, or automatic roll out control is not satisfactory, disengage AP at touchdown immediately | The FMA displays 'ROLL OUT' in green, and the PFD displays the yaw bar and no FD bars. Call "ROLL OUT" |
| When disengage the APs | "AUTO PILOTS OFF" <ul style="list-style-type: none">- Use rudder pedal for directional control- Do not use nose wheel steering control handle before taxi speed is reached- Do not use nose wheel steering control handle before taxi speed is reached | If off center line during roll out, Call "STEER RIGHT/LEFT" (as appropriate) |

CAT II AND CAT III APPROACH_CAT IIIA APPROACH

Applicable to: ALL

CAT IIIA APPROACH

The use of AP with FD, with A/THR for CAT III is approved using APPR modes (GS*, LOC*, GS, LOC, LAND, FLARE, ROLL OUT) in CONF FULL and CONF 3.

At least One AP engagement is approved.

Refer to CAT II Approach Procedure and Callouts

In the case of a CAT III approach without DH, the flight crew should enter NONE, NO, NO DH, or NODH in the RADIO entry field of the APPR panel of the ACTIVE/PERF page. This avoids the undue triggering of the HUNDRED ABOVE and MINIMUM auto callouts.

For more information on the associated callouts, Refer to Summary for Each Flight Phase.

Below 200ft, the flight crew should perform a go-around if the AUTOLAND light comes on and they have no visual contact.

| EVENT | CAPT | FO |
|--|-------------------|---|
| Above 1,000 ft HAT | | |
| If ILS capability change conditions required for CAT III is no longer fulfilled, activated TRIPLE CLICK aural warning Refer to FCOM/Limitations/22 Auto Flight System/Automatic Approach, Landing, and Approach/APPROACH CAPABILITY Perform associated ECAM actions, if necessary. | | |
| If Auto land status has changed from CAT 3 DUAL or CAT 3 SINGLE to CAT 2 The approach may be continues reverting to higher DH, | "CHANGE MINIMUMs" | "CAT 2" |
| | | Change DH on the appropriate field of the PERF APPR page |

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| EVENT | CAPT | FO |
|---|--|---|
| | Check as appropriate and correct minimum "CHECKED" Briefing is amended to include CATII procedure and DH | "DH () SET" |
| At or below 1,000 ft HAT | | |
| If Auto land status has changed from CAT3 DUAL, to CAT 3 SINGLE or CAT 2 | "GO-AROUND/FLAPS"(*4) | "CAT 2" |
| At 1,000 HAT | "STABILIZED" "GO-AROUND/FLAPS"(*4) | "ONE THOUSAND", CLEARED TO LAND or, "ONE THOUSAND ,CONTINUE" |
| At 500 HAT | "STABILIZED" "GO-AROUND/FLAPS"(*4) | Monitor AUTO CALLOUT "FIVHUNDRED" |
| At 350 ft RA, | "LAND" "GO-AROUND/FLAPS"(*4) | LAND must be displayed on FMA and runway course must be checked "CHECKED" |
| If CAT IIIa with Fail Operational At Alert Height (100ft RA) "ONE HUNDRED" Auto Call Out by FWC | "CAT 3 DUAL" If any deviation "GO – AROUND /FLAPS" "(*)4) | "ALERT HEIGHT" |
| If CAT IIIa with Fail Passive , At 100ft above DH, | "CHECKED" | Monitor AUTO CALLOUT "HUNDRED ABOVE" |
| The pilot must have contact at least one of the runway visual reference before descent below DH | | |
| At DH | "LANDING"(*)3 or "GO-AROUND/FLAPS"(*4) | Monitor AUTO CALLOUT "MINIMUM" |

CAT II AND CAT III APPROACH_CAT IIIB APPROACH

Applicable to: ALL

CAT IIIB APPROACH

The use of AP with FD, with A/THR for CAT III is approved using APPR modes (GS*, LOC*, GS, LOC, LAND, FLARE, ROLL OUT) in CONF FULL and CONF 3.

Dual AP engagement is approved.

Refer to CATII Approach Procedure and Callouts

In the case of a CAT III approach without DH, the flight crew should enter NONE, NO, NO DH, or NODH in the RADIO entry field of the APPR panel of the ACTIVE/PERF page.



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This avoids the undue triggering of the HUNDRED ABOVE and MINIMUM auto callouts.
 For more information on the associated callouts, Refer to Summary for Each Flight Phase.
 Below 200ft, the flight crew should perform a go-around if the AUTOLAND light comes on and they have no visual contact.

| EVENT | CAPT | FO |
|---|--|---|
| Above 1,000 ft HAT | | |
| If ILS capability change conditions required for CAT III is no longer fulfilled, activated TRIPLE CLICK aural warning Refer to FCOM/Limitations/22 Auto Flight System/Automatic Approach,Landing, and Approach/APPROACH CAPABILITY Perform associated ECAM actions, if necessary. | | |
| If Auto land status has changed from CAT 3 DUAL or CAT 3 SINGLE to CAT 2 The approach may be continues reverting to higher DH, | "CHANGE MINIMUMs" | "CAT 3 SINGLE" or "CAT 2" |
| | Check as appropriate and correct minimum "CHECKED" Briefing is amended to include CATII /CATIIIa procedures and DH | Change DH on the appropriate field of the PERF APPR page "DH (____) SET" |
| At or below 1,000 ft HAT : If DH is not published | | |
| If Auto land status has changed from CAT3 DUAL, to CAT 3 SINGLE or CAT 2 | "GO-AROUND/FLAPS"(*4) | "CAT 3 SINGLE" or "CAT 2" |
| At 1,000 HAT, | "STABILIZED" "GO-AROUND/FLAPS"(*4) | "ONE THOUSAND, CLEARED TO LAND" or, "ONE THOUSAND, CONTINUE" |
| At 500 ft HAT, | "STABILIZED" "GO-AROUND/FLAPS"(*4) | Monitor AUTO CALLOUT "FIVE HUNDRED" |
| At 350 ft RA, | "LAND" when displayed on FMA | LAND must be displayed on FMA and runway course must be checked "CHECK" |
| At Alert Height (100ft RA) "ONE HUNDRED" Auto Call Out by FWC | "CAT 3 DUAL" If any deviation "GO – AROUND /FLAPS" "(*4) | "ALERT HEIGHT" |
| At flare height (40 ft RA: the precise value is a function of V/S), | If FLARE does not comes up on FMA, a go-around must be performed. "GO – AROUND /FLAPS" "(*4) | "FLARE" or "NO FLARE" |

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| EVENT | CAPT | FO |
|--|---|---|
| At 10 ft RA, | Monitor A/THR commands IDLE thrust during the flare and the FMA and EWD show 'IDLE'. If RETARD mode is not available, the Captain has to reduce thrust manually. | Monitor Auto callout "RETARD" |
| At touchdown, | | The FMA displays 'ROLL OUT' in green, and the PFD displays the yaw bar and no FD bars. Call "ROLL OUT" |
| When disengage the APs | "AUTO PILOTS OFF" - Use rudder pedal for directional control - Do not use nose wheel steering control handle before taxi speed is reached | If off center line during roll out, Call "STEER RIGHT/LEFT" (as appropriate) |
| - Check Airport Signs and Markings (*SMGCS) - The F/O should assist the Captain in runway and taxiway identification. | | |



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STANDARD OPERATING PROCEDURES - NON-PRECISION APPROACH

Introduction and Guidance Material

INTRODUCTION

Applicable to: ALL

The flight crew will preferably use the FLS function to fly a Non-Precision Approach (NPA).

FLS FUNCTION AVAILABILITY, AND FLS CAPABILITY

The FLS function is available:

- For VOR, VOR/DME, NDB, NDB/DME, RNAV (including GPS), ILS with glideslope out, LOC, and LOC B/C approaches, and
 - When the approach is stored in the navigation database.
- [L2] However, the FLS function is not available for a selected NPA , if the difference between the final approach course and the runway course is more than 50°.
- [L1] When the flight crew selects an NPA on the FMS ARRIVAL page, the **NO FLS FOR THIS APPR** message may appear on the FMS message area, meaning that the FLS function is not available for the selected approach. The flight crew will then fly the approach without the FLS function. When the FLS function is available, and the flight crew presses the LS pb , the FLS capability appears on the FMA . The FLS capability is one of the following: **F-APP** , **F-APP + RAW** , or **RAW ONLY** . For required conditions for FLS capability, *Refer to Limitations / Auto Flight System* . In accordance with the type of NPA , the FLS capability must be **F-APP** , or **F-APP + RAW** .

AP / FD MODES IN FINAL APPROACH

The following table indicates the AP / FD modes, that the flight crew can use to fly the final approach:

| Approach | Approach Selection in the FMS ARRIVAL Page | AP / FD Modes | | For more information: |
|----------------|--|-------------------|--|--|
| | | With FLS Function | Without FLS Function | |
| VOR VOR/DME | VOR | F-LOC and F-G/S | <ul style="list-style-type: none">- NAV and FPA , or- TRACK and FPA | <i>Refer to PRO-NOR-SOP-190-10 Guidance for VOR, or VOR/DME approach</i> |
| NDB, NDB/DME | NDB | F-LOC and F-G/S | <ul style="list-style-type: none">- NAV and FPA , or- TRACK and FPA | <i>Refer to PRO-NOR-SOP-190-10 Guidance for VOR, or VOR/DME approach</i> |

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| Approach | Approach Selection in the FMS ARRIVAL Page | AP / FD Modes | | For more information: |
|-------------------------------------|--|-------------------|----------------------|---|
| | | With FLS Function | Without FLS Function | |
| RNAV (including GPS) | RNV or GPS | F-LOC and F-G/S | NAV and FPA | Refer to <i>PRO-NOR-SOP-190-10</i> Guidance for RNAV Approach |
| ILS with glideslope out LOC only | ILS ⁽¹⁾ LOC | LOC and F-G/S | LOC and FPA | Refer to <i>PRO-NOR-SOP-190-10</i> Guidance for ILS G/S out, LOC only, LOC B/C approach |
| LOC B/C | BAC | LOC B/C and F-G/S | LOC B/C and FPA | |

- (1) The flight crew selects an ILS approach on the FMS ARRIVAL page, then clicks on the DESELECT GLIDE button on the FMS POSITION / NAVAIDS page.

To use the FLS function, the flight crew must press the APPR pb . This action will arm, or engage:

- F-LOC, LOC or LOC B/C mode, and
- F-G/S mode.

COMMON PROCEDURES FOR USE OF NAV MODE, OR FLS FUNCTION

Extract the approach from the navigation database, and insert it in the primary flight plan.

The approach stored in the navigation database has been either:

- Produced by an approved supplier compliant with ED76/DO200A requirements, or
- Validated, and approved by the operator.

Do not modify the final approach, and the associated altitude constraints.

Before starting the approach, check the lateral and vertical flight plan against the published approach chart.

Before the FAF, or equivalent waypoint on the FMS flight plan, check that the approach trajectory is laterally intercepted. A correct interception ensures that the aircraft is correctly established on the final approach course before starting the descent.

FLYING REFERENCE

The recommended flying reference is TRK-FPA. This reference should be selected during the initial approach.



GUIDANCE FOR VOR, VOR/DME, NDB, OR NDB/DME APPROACH

Applicable to: ALL

To perform the final approach, the flight crew can use:

- The FLS function: F-LOC and F-G/S modes
 - The flight crew presses the APPR pb.
- Managed lateral guidance, and selected vertical guidance: NAV and FPA modes (or NAV and V/S modes)
- Selected lateral and vertical guidance: TRACK and FPA modes (or HDG and V/S modes).

WITH THE FLS FUNCTION

The flight crew can use the FLS function to perform a VOR, VOR/DME, NDB, or NDB/DME approach procedure, when:

1. Either, **F-APP** is displayed on FMA.

In addition, the flight crew should:

- Tune the reference VOR, VOR/DME, NDB, or NDB/DME, and
- Select the VOR needles on the ND.

2. Or, **F-APP + RAW** is displayed on FMA.

In addition, the flight crew must tune and monitor the reference VOR, VOR/DME, NDB, or NDB/DME, and check that these navaids indicate correct navigation.

● If the FLS capability downgrades from **F-APP to **F-APP + RAW**:**

The flight crew can continue to perform the NPA, if they monitor the reference navaids, and these navaids indicate correct navigation.

● If the FLS capability downgrades to **RAW ONLY:**

Do not use the FLS function.

Press the APPR pb off, and the LS pb off.

If the reference navaids are monitored, and indicate correct navigation: The flight crew can continue the approach in selected vertical and lateral modes, or without the AP and FDs.

Otherwise, the flight crew must stop the approach, unless the flight crew obtains the necessary visual conditions.

WITHOUT THE FLS FUNCTION

In order to use the NAV mode during the final approach, the flight crew must tune and monitor the reference navaids. The flight crew must use the reference navaids and the altimeter as the primary means of navigation, to laterally and vertically monitor the approach.

● During the approach:**● If GPS PRIMARY is lost, or if high accuracy is lost:**

The flight crew can continue the approach in NAV mode, if the navigation accuracy is confirmed against radio navaid raw data. Otherwise, the flight crew must stop the approach, unless the flight crew obtains the necessary visual conditions.

● If the NAV FM / GPS POS DISAGREE alert triggers during the approach:

The flight crew must stop the approach, unless the flight crew obtains the necessary visual conditions.

However, if the navigation accuracy is confirmed against radio navaid raw data: The flight crew can continue the approach by using selected lateral and vertical modes, or without the AP and FDs.

GUIDANCE FOR RNAV APPROACH**Applicable to: ALL**

RNAV approach includes GPS approach.

For RNAV approach requiring GPS PRIMARY, the flight crew must check the GPS PRIMARY availability prior the flight.

Note: *If 24 or more GPS satellites are operative, GPS PRIMARY is available worldwide. If the number of satellite is 23 or less: Check the GPS PRIMARY availability at the destination, by using an approved ground based prediction software.*

To fly the final approach, the flight crew can use:

- The FLS function: F-LOC and F-G/S modes
 - The flight crew will press the APPR pb.
- Managed lateral guidance, and selected vertical guidance: NAV and FPA modes (or NAV and V/S modes).

WITH THE FLS FUNCTION

To fly an RNAV approach with the FLS function, the FLS capability must be **F-APP**.

● Before starting the approach:

Check that the FLS capability is **F-APP**.

● During the approach:**● If the FLS capability downgrades to **F-APP + RAW**, or **RAW ONLY**:**

Do not use the FLS function.

Press the APPR pb off, and the LS pb off.

Discontinue the approach, unless visual reference are obtained.



WITHOUT THE FLS FUNCTION

● For RNAV approach requiring GPS PRIMARY:

● Before starting the approach:

Check that GPS PRIMARY is available.

● During the approach:

● If the GPS PRIMARY LOST message appears on the ND:

If GPS PRIMARY appears on only one FMS: Continue the approach by using the AP/FD associated to the FMS that has GPS PRIMARY.

Otherwise, discontinue the approach, unless visual conditions are obtained.

● For RNAV approach not requiring GPS PRIMARY:

● Before starting the approach:

Check that the navigation accuracy is HIGH with the appropriate RNP value.

● If the accuracy is LOW:

If only one FMS is in LOW accuracy, the flight crew can continue the approach by using the AP/FD associated to the other FMS.

Otherwise, discontinue the approach, unless visual conditions are obtained.

● If the NAV FM / GPS POS DISAGREE alert triggers during the approach:

Discontinue the approach, unless visual conditions are obtained.

● During final approach:

Laterally monitor the final approach by using the cross track error on the ND.

Fly the vertical flight path in FPA mode, and crosscheck the altitude and distance to the runway with the appropriate chart.

GUIDANCE FOR ILS G/S OUT, LOC ONLY, LOC B/C APPROACH

Applicable to: ALL

The NAV mode can be used down to LOC or LOC B/C interception.

For intermediate and final approach, the flight crew can use:

- LOC or LOC B/C mode with the FLS function for the vertical guidance: F-G/S mode
The flight crew will press the APPR pb.
- LOC or LOC B/C, and selected vertical guidance: FPA (or V/S) mode.
The flight crew will press the LOC pb.

WITH THE FLS FUNCTION

The flight crew can use the FLS function, when one between both cases occurs:

1. The FLS capability is **F-APP**.

In addition, the reference navaids must be tuned.

2. The FLS capability is **F-APP + RAW**

In addition, the reference navaids must be tuned, monitored, and indicate correct navigation.

The flight crew must monitor the altitude and DME distance with regards to the approach chart.

● If the FLS capability downgrades to **F-APP + RAW:**

Continue the approach, if the reference navaid is monitored, and indicate correct navigation with regards to the published altitudes.

● If the FLS capability downgrades to **RAW ONLY:**

Do not use the FLS function.

Press the LOC pb to disarm/disengage the AP/FD F-G/S mode.

Disregard the F-G/S deviation.

The LOC or LOC B/C deviation remains trustful.

Continue the approach in selected vertical guidance (FPA or V/S mode), or without AP and FDs. Otherwise, discontinue the approach, unless visual conditions are obtained.

WITHOUT THE FLS FUNCTION

When using LOC or LOC B/C mode with FPA (or V/S) mode: Fly the vertical flight path by using the altimeter, and the DME distance to the runway threshold, as indicated on the approach chart.

APPROACH SPEED TECHNIQUE

Applicable to: ALL

In all cases, the flight crew should use managed speed.

WITH THE FLS FUNCTION

The preferred speed technique is to make a decelerated approach. The aircraft should intercept the final descent path at S speed in CONF 1.

The objective is to stabilize the aircraft on the final descent path at 1 000 ft AGL.

WITHOUT THE FLS FUNCTION

The preferred speed technique is to make a stabilized approach. The aircraft should intercept the final descent path in landing configuration, and at VAPP. For this purpose, the flight crew should insert VAPP as a speed constraint at the FAF.



NPA Flown with FLS Function

GENERAL

Applicable to: ALL

The FLS function allows the flight crew to fly the Non-Precision Approach (NPA) in an ILS look alike way.

REQUIRED FLS CAPABILITY

In accordance with the type of NPA , the FLS capability must be [F-APP] , or [F-APP + RAW] :

| Approach | Required FLS Capability | For more information: |
|---|--------------------------|--|
| VOR, VOR/DME, NDB, NDB/DME | [F-APP] or [F-APP + RAW] | Refer to PRO-NOR-SOP-190-10 Guidance for VOR, or VOR/DME approach |
| RNAV (including GPS) | [F-APP] | Refer to PRO-NOR-SOP-190-10 Guidance for RNAV Approach |
| ILS G/S out, LOC, LOC B/C (¹) | [F-APP] or [F-APP + RAW] | Refer to PRO-NOR-SOP-190-10 Guidance for ILS G/S out, LOC only, LOC B/C approach |

- (1) *The ILS G/S out approach is an ILS approach for which the G/S ground station is out of service.
To fly an ILS G/S out: Select an ILS approach on the FMS ARRIVAL page, then deselect the G/S by clicking on the DESELECT GLIDE button on the FMS POSITION / NAV AIDS page.*

If the FLS capability is not as required, the FLS function must not be used.

USE OF LS pb

To fly the NPA with the FLS function, the flight crew presses the LS pb:

- The landing system deviations appear on the PFD, in accordance with the NPA selected on the FMS ARRIVAL page:
 - F-LOC, LOC or LOC B/C deviation
 - F-G/S deviation.
 - The FLS capability appears on the FMA.
- [2] However, if the direct distance to the destination airport is more than 300 nm, only the deviation scales appear on the PFD.

OAT, AND BARO SETTING

Check that the OAT is inserted on the FMS PERF page – APPR panel. If the temperature is below the ISA temperature, the FMS ensures the correction of the FLS beam.

[L2] For more information, *Refer to Indicating/Recording / Cold Weather*.

[L1] Check that QNH baro setting is selected.

WARNING

Obstacle clearance is not guaranteed:

- If erroneous baro setting is selected
- If FLS guidance is used outside the published approach.

FLYING TECHNIQUE

The flight crew can fly the approach in several ways:

- By referring to the FLS deviations, without the FDs, and without the AP
- By referring to the FLS deviations, and by using the FDs, with or without the AP.

Below MDA (or DA):

- If the F-LOC(LOC)(LOC B/C) beam is aligned with the runway, the LS pb may be kept on
In this case, the visual reference must always prevail.
- If the F-LOC(LOC)(LOC B/C) beam is not aligned with the runway, the LS pb should be set to off.

INITIAL APPROACH

Applicable to: ALL

[L2] For additional training-oriented information, *Refer to FCTM/NO-180 Initial Approach*.

[L1] APPROACH PHASE..... CHECK/ACTIVATE | PM with PF's order

[L2] - If the aircraft overflies the DECEL pseudo waypoint in NAV mode, the APPR phase activates automatically
- If the aircraft is in HDG or TRACK mode approximately 15 nm from touchdown, activate and confirm the APPR phase on the FMS ACTIVE/PERF page.

[L1] POSITIONING..... MONITOR | PF

[L2] - In NAV mode, use the VERT DEV on the PFD and on the DES panel of the ACTIVE/PERF page
- In HDG or TRACK mode, use the energy circle on the ND that shows the required distance to land.

[L1] MANAGED SPEED..... CHECK | PF

[L2] Check that the managed speed is active and monitor the target speed.

Note:

The aircraft decelerates automatically at the DECEL pseudo waypoint  when managed speed is active and NAV, LOC* or LOC mode is engaged.



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During the approach, the autothrust maintains the maneuvering speed of the current configuration (O, S, F, VAPP).

If ATC requires a particular speed, use selected speed. Adjust the aircraft configuration accordingly. When the ATC speed constraint (e.g. "maintain 170 kt to the outer marker") no longer applies, return to managed speed.

If ATC orders successive step descents down to the final approach flight path, use V/S or FPA mode and monitor the VERT DEV.

| | | | |
|-----------------------------|--|---------|------|
| <input type="checkbox"/> L1 | SPEED BRAKES..... | AS RQRD | PF |
| | RNP on the FMS | AS RQRD | PM |
| <input type="checkbox"/> L2 | On the FMS POSITION/MONITOR page, check that the Required Navigation Accuracy is appropriate to the phase of flight. | | |
| <input type="checkbox"/> L1 | FLS CAPABILITY..... | CHECK | PF |
| <input type="checkbox"/> L2 | Check that the FLS capability is appropriate to the selected NPA, and be prepared to change the approach strategy. For more information on the required FLS capability, Refer to PRO-NOR-SOP-190-20-GGEN Required FLS Capability . | | |
| <input type="checkbox"/> L1 | On each ND : Select ARC, or ROSE-NAV. VOR(ADF) NEEDLES (VOR pb (ADF pb)) | AS RQRD | BOTH |

INTERMEDIATE / FINAL APPROACH

Applicable to: ALL

L2 For additional training-oriented information, Refer to FCTM/NO-180 Intermediate Approach

GENERAL

The preferred technique for flying an NPA approach with the FLS function is to fly a decelerated approach by using:

- The AP and FD s
- The following modes:
 - F-LOC , LOC , or LOC B/C
 - F-G/S
- The A/THR in SPEED mode
- The managed speed target.

The objective is to stabilize the aircraft on the final descent path at VAPP in the landing configuration, at 1 000 ft above airfield elevation in instrument conditions, or at 500 ft above airfield elevation in visual conditions, after continuous deceleration on the F-G/S beam.

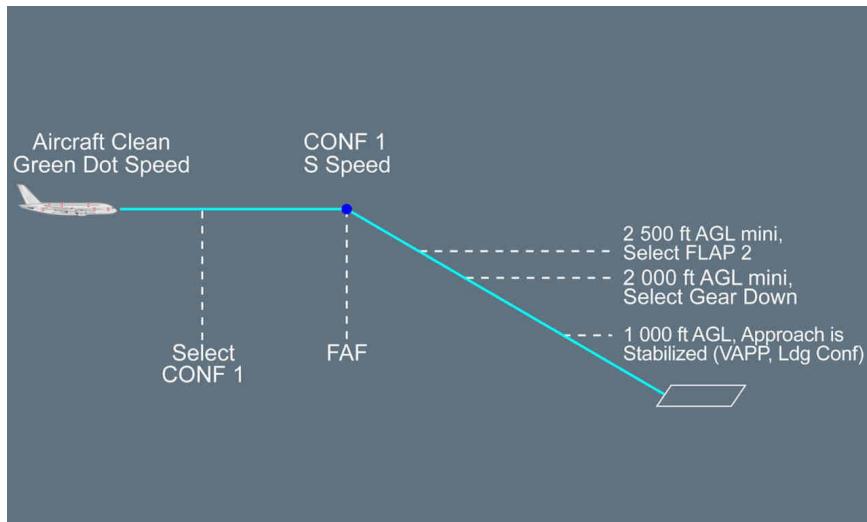
To be stabilized, all of the following conditions must be achieved prior to, or upon reaching this stabilization height:

- The aircraft is on the correct lateral and vertical flight plan,
- The aircraft is in the desired landing configuration,
- The thrust is stabilized, usually above idle, to maintain the target approach speed along the desired final approach path,
- There is no excessive flight parameter deviation.

If the aircraft is not stabilized on the approach path in landing configuration, at 1 000 ft above airfield elevation in instrument conditions, or at 500 ft above airfield elevation in visual conditions, or as restricted by Operator policy/regulations, a go-around must be initiated unless the flight crew estimates that only small corrections are necessary to rectify minor deviations from stabilized conditions due, amongst others, to external perturbations.

L2 DECELERATED APPROACH

The decelerated approach technique descends the aircraft to 1 000 ft , at VAPP . In most cases, the interception of the final descent path is achieved with CONF 1 at S speed.

Decelerated Approach

L3 The advantages are:

- Decrease in fuel consumption
- Decrease in the noise level

- Time saving
- Flexibility and ability to vary speed, to be in accordance with ATC requests.

L1 COLD WEATHER CONDITIONS

For altitude correction in low temperature conditions, *Refer to PER-OPD-AMILA ATMO Module Interface (Low altitude temperature corrections)*.

APPR MODE ACTIVATION

- L2** For more information on the FMA display during this phase of flight:
- *Refer to DSC-22-FG-70-120-90 VOR Approach Flown with FLS Function , or*
 - *Refer to DSC-22-FG-70-120-90 LOC only Approach Flown with FLS Function .*

For more information on the associated standard callouts, *Refer to PRO-NOR-SCO Summary for Each Flight Phase*.

- L1** **Note:** *The flight crew can intercept the FLS beam in HDG , or TRACK , in a similar way to an ILS beam.*

● When the ATC clears the aircraft for the approach:

APPR pb on AFS CP PRESS | PF

- L2** *The flight crew should press the APPR pb only after the ATC clears the aircraft for the approach.*

When pressed, the F-LOC / LOC / LOC B/C and F-G/S modes arm if:

- *The flight crew selected an NPA approach on the FMS ARRIVAL page, and*
- *The NO FLS FOR THIS APPR message did not appear on the MFD .*

- L1** FLYING REFERENCE..... TRK-FPA | PF-PM
AP ENGAGEMENT..... CONSIDER | PF
FLS CAPABILITY..... CHECK | PF

- L2** *Check that the FMA displays F-APP , or F-APP + RAW , in accordance with the type of approach.*

APPROACHING GREEN DOT SPEED

- L2** For additional training-oriented information on final approach, *Refer to FCTM/NO-180 Final Approach .*

For more information on the FMA display during this phase of flight:

- *Refer to DSC-22-FG-70-120-90 VOR Approach Flown with FLS Function , or*
- *Refer to DSC-22-FG-70-120-90 LOC only Approach Flown with FLS Function .*



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For additional information on the associated standard callouts:

- Refer to PRO-NOR-SCO Flaps or Gear Configuration
- Refer to PRO-NOR-SCO Flight Parameters .

| | | | |
|----|--|------------------------------|-------|
| L1 | FLAPS 1..... | ORDER | PF |
| | FLAPS 1..... | SET | PM |
| L2 | - The flight crew should not set FLAPS 1 later than 3 nm from the Final Approach Fix (FAF) | | |
| L1 | - Check the aircraft deceleration toward S speed | | |
| L2 | - The aircraft must reach, or be established on, the F-G/S beam with FLAPS 1 and S speed at or above 2 500 ft AGL | | |
| | - If the aircraft speed is significantly above S on the F-G/S beam, or if the aircraft does not decelerate on the F-G/S beam, extend the landing gear in order to decelerate the aircraft. | | |
| | The flight crew can also use the speed brakes. However, the flight crew should be aware of the VLS increase, and the limited effect of the speed brakes at low speeds. | | |
| L1 | TA pb | TA ONLY or TA/RA | PM |
| L2 | The flight crew may use the TA ONLY mode in specific airports, and for specific procedures (identified by Operators) that may provide resolution advisories that are neither wanted or appropriate (e.g. closely-spaced parallel or converging runways). | | |
| L1 | F-LOC, LOC or LOC B/C CAPTURE..... | MONITOR | PF |
| L2 | The flight crew must always monitor the capture of the F-LOC / LOC / LOC B/C beam. During the capture phase, the associated deviation on the PFD and ND should move toward the center of the scale. | | |
| L1 | F-G/S CAPTURE..... | MONITOR | PF |
| | ● If above the F-G/S beam: | | |
| | FPA MODE | AS RQRD | PF |
| | Do not exceed 2 000 ft/min . | | |
| | AFS CP ALTITUDE | SET ABOVE A/C ALTITUDE | PF |
| L2 | Select an altitude above the aircraft altitude, in order to prevent from inadvertent ALT* engagement. | | |
| L1 | ● At F-G/S* engagement: | | |
| | GO-AROUND ALTITUDE..... | SET | PF-PM |
| L2 | This procedure prevents from an undesired level off at F-G/S intercept altitude. | | |



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BELOW VFE NEXT, AT 2500 FT AGL MINIMUM

- [L2] For additional information on the associated standard callouts, Refer to *PRO-NOR-SCO Flaps or Gear Configuration* .
- | | | |
|-------------------|-------|----|
| [L1] FLAPS 2..... | ORDER | PF |
| FLAPS 2..... | SET | PM |
- Check the aircraft deceleration toward F speed
- [L2] - If the aircraft intercepts the F-G/S beam below 2 500 ft AGL , select FLAPS 2 at one dot below the F-G/S beam
- If the aircraft speed is significantly above F on the F-G/S beam, or if the aircraft does not decelerate on the F-G/S beam, extend the landing gear in order to decelerate the aircraft. The use of the speed brakes is not recommended.

AFTER FLAPS 2 SELECTION, AT 2000 FT AGL MINIMUM

- [L2] For additional information on the associated standard callouts, Refer to *PRO-NOR-SCO Flaps or Gear Configuration* .
- | | | |
|--------------------|---------|----|
| [L1] L/G DOWN..... | ORDER | PF |
| L/G..... | DOWN | PM |
| AUTO BRK..... | CONFIRM | PM |
- [L2] If the runway conditions deteriorated since the approach briefing, consider the impact on the landing performance assessment and if there is a need for another braking mode.
When BTV is selected, if the aircraft lands on a runway different from the runway selected for BTV settings, the autobrake reverts automatically to autobrake mode Hi in short final.
- | | | |
|----------------------|-----|----|
| [L1] GND SPLRS..... | ARM | PM |
| EXTERIOR LIGHTS..... | SET | PM |

AFTER LANDING GEAR DOWN SELECTION

- [L2] For more information on the FMA display during this phase of flight:
- Refer to *DSC-22-FG-70-120-90 VOR Approach Flown with FLS Function* , or
- Refer to *DSC-22-FG-70-120-90 LOC only Approach Flown with FLS Function* .
- [L1] ● **Below VFE NEXT:**
- [L2] For more information on the associated standard callouts, Refer to *PRO-NOR-SCO Flaps or Gear Configuration* .
- | | | |
|-------------------|-------|----|
| [L1] FLAPS 3..... | ORDER | PF |
| FLAPS 3..... | SET | PM |



WHEEL SD PAGE.....CHECK | PM

- [L2] - The WHEEL SD page appears below 800 ft , or at landing gear extension
- Check the five landing gear green indications. At least one green triangle on each landing gear strut is sufficient to indicate that this landing gear strut is down and locked.

● Below VFE NEXT:

- [L2] For more information on the associated standard callouts, Refer to PRO-NOR-SCO Flaps or Gear Configuration .

[L1] FLAPS FULL.....ORDER | PF

FLAPS FULL.....SET | PM

Check that the aircraft decelerates to VAPP .

A/THR.....CHECK IN SPEED MODE or OFF | PF

SLIDING TABLE.....STOWED | BOTH

LDG MEMO.....NO BLUE LINE | PM

CABIN.....READY | BOTH

- [L2] Check CABIN READY on the EWD , or obtain the report from the chief purser: "Cabin ready for landing".

[L1] LANDING C/L.....COMPLETE | BOTH

Refer to PRO-NOR-C-L Landing

- [L2] For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .

For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

● At FAF :

F-G/S MODECHECK ENGAGED | PF

Check that the aircraft sequences the waypoint associated with the FAF , at the altitude specified on the published approach chart.

[L1] FLIGHT PARAMETERS.....CHECK | PM

- [L2] The PF announces any modification to the FMA .

The PM announces any flight parameter deviation. For more information on the associated callouts, Refer to PRO-NOR-SCO Flight Parameters .

● At 500 ft AGL (or RA) and below and if the flight crew selected BTV autobrake mode:

The PM may take advantage to adjust the ND RANGE selector to display the dry and wet lines on the Airport Navigation display, when the landing is positively considered.



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AT MINIMUM+100 FT

- [L2] For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .
- [L1] ONE HUNDRED ABOVE.....MONITOR or ANNOUNCE | PM

1

AT MINIMUM

- [L2] For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .
- [L1] MINIMUM.....MONITOR or ANNOUNCE | PM
- If the flight crew obtains appropriate visual references:
- LANDING or GO-AROUND.....ANNOUNCE | CAPT
- AP.....OFF | PF
- [L2] At MDA / MDH - 50 ft (DA / DH - 50 ft), if the AP is still engaged, the DISCONNECT AP FOR LDG message pulses on the FMA .
- [L1] FD OFF.....ORDER | PF
- FD.....OFF | PM
- RUNWAY TRACK.....CHECK/ORDER | PF
- [L2] If needed, the PF orders the PM to set the runway track on the AFS CP .
- [L1] RUNWAY TRACK.....SET, AS RQRD | PM
- LS pbORDER, AS RQRD | PF
- [L2] If required, the PF orders the PM to set the LS pb .
If the F-LOC(LOC)(LOC B/C) beam is aligned with the runway, the flight crew may keep the LS pb set to on. In this case, the visual reference must always prevail.
If the F-LOC(LOC)(LOC B/C) beam is not aligned with the runway, the flight crew should set to off the LS pb .
- [L3] The F-LOC(LOC)(LOC B/C) beam can be considered as aligned with the runway, if the difference between the final approach course and the runway course is less than 4 ° .
- [L1] LS pbSET, AS RQRD | PM
- [L2] Maintain the aircraft at a stabilized flight path to flare.
At 50 ft , one dot below the F-G/S beam is 7 ft below the F-G/S beam.
Do not duck under the F-G/S beam.
- If the flight crew did not obtain appropriate visual references:
- GO-AROUND.....ANNOUNCE | CAPT



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NPA Flown with FLS Function Procedure and Callouts

| NPA Flown with FLS Function | | |
|--|---|---|
| EVENT | PF | PF |
| Insert MDA +50ft on FMS MFD PERF Page or, insert DA Auto pilot should remain engaged until suitable visual reference is established | | |
| After identification of RAW data signals by display or morse code | "CHECKED or ROGER" | "0000 IDENTIFIED" – LOC "00 IDENTIFIED" – NDB "000 IDENTIFIED" -VOR |
| When cleared for approach | "APPROACH ARM" | |
| x: Manual Flight | "APPROACH APP" | "APPROACH ARM" |
| Flying Reference change to TRK-FPA | "TRK-FPA SET" | |
| x: Manual Flight | "SET TRK-FPA" | "TRK-FPA SET" |
| When F-LOC is armed | "F-LOC BLUE" | "CHECKED" |
| When F-GS is armed | "F-GS BLUE" | "CHECKED" |
| When the first positive movement of F-LOC index | "CHECKED" | "F-LOC ALIVE" |
| When the first positive movement of F-GS index | "CHECKED" | "F-GS ALIVE" |
| When F-LOC is captured | "F-LOC STAR" "F-LOC" | "CHECKED" |
| When the first positive movement of F-GS index | | "CHECKED" |
| When F-GS is captured | "F-GS STAR" "GO AROUND ALTITUDE 0,000ft SET" "F-GS" | "CHECKED" "0,000ft BLUE "CHECKED" |
| x: Manual Flight | "SET GO AROUND ALTITUDE 0,000ft" "0,000 BLUE" | "GO AROUND, 0,000 SET" |
| After flaps 2 selection, at 2,00ft AGL minimum | "GEAR DOWN" | L/G DOWN – SELECT "GEAR DOWN" - Ground Spoiler ---- ARM - EXTERIOR LIGHTS – SET Set NOSE SW to T.O, RWY TURN OFF & CAMERA SW to ON - AUTO BRK ----- CONFIRM |

Continued on the following page



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| NPA Flown with FLS Function | | |
|---|--|--|
| EVENT | PF | PF |
| After Landing Gear down , When below VFE NEXT | “ FLAPS 3” | Confirm VFE speed and select FLAPS 3 “SPEED CHECKED” “FLAPS 3” |
| When below VFE NEXT | “FLAPS FULL” | Confirm VFE speed and select FLAPS 3 “SPEED CHECKED” “FLAPS FULL” |
| At least before FAF or 1,500ft HAT Accomplish LANDING CHECK LIST | “LANDING CHECK LIST” | “LANDING CHECK LIST COMPLETE” |
| At FAF or 1,500ft HAT | “CHECKED or ROGER” | “() DME (Published altitude)” or “VOR name (Published altitude)” or “NDB name (Published altitude)” |
| At 1,000 ft HAT, | “STABILIZED” or “VMC –CORRECTING” “GO-AROUND/FLAPS”(*4) | “ONE THOUSAND ,CLEARED TO LAND” or “ONE THOUSAND ,CONTINUE” Call out any unstable conditions |
| At 500ft HAT, | “STABILIZED” or “GO-AROUND/FLAPS” | Monitor AUTO CALLOUT “FIVE HUNDRED” Call out any unstable conditions |
| At 100ft above entered MDA/DA | “CHECKED” | Monitor AUTO CALLOUT “ONE HUNDRED ABOVE” |
| If ground reference are visible : | AP-- Off “SET RUNWAY TRACK” | - FD—Off (With PF's order) “RUNWAY TRACK 000 SET” - LS pb--- As Required (With PF's Order) |
| Continue , as for a visual approach | CAPT | Monitor AUTO CALLOUT “MINIMUM” |
| At Entered MDA/DA | “LANDING or GO-AROUND” | |
| If ground reference are not visible : Initiate a go around | <p>At MDA(H)/DA(H) -50ft , If the AP is still engaged the “DISCONNECTED AP FOR LDG” message will pulse on</p> <p>Note: the FMA</p> | |



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NPA Flown without FLS Function

GENERAL

Applicable to: ALL

The flight crew will preferably use the FLS function to fly a Non-Precision Approach (NPA).

However, the flight crew will fly the Non-Precision Approach (NPA) without the FLS function, if one of the following occurs:

- The FLS function is not available

For more information on the FLS function availability, *Refer to PRO-NOR-SOP-190-10-GINT FLS Function Availability, and FLS Capability*.

- The FLS capability is not as required.

For more information on the required FLS capability, *Refer to PRO-NOR-SOP-190-20-GGEN Required FLS Capability*.

The following table indicates the AP / FD modes, that the flight crew can use to fly the final approach:

| Approach | Approach Selection in the FMS ARRIVAL Page | AP / FD Modes | For more information: |
|------------------------------------|--|--|---|
| VOR VOR/DME | VOR | <ul style="list-style-type: none">- NAV and FPA , or- TRACK and FPA | <i>Refer to PRO-NOR-SOP-190-10 Guidance for VOR, or VOR/DME approach</i> |
| NDB NDB/DME | NDB | <ul style="list-style-type: none">- NAV and FPA , or- TRACK and FPA | <i>Refer to PRO-NOR-SOP-190-10 Guidance for VOR, or VOR/DME approach</i> |
| RNAV (including GPS) | RNV or GPS | NAV and FPA | <i>Refer to PRO-NOR-SOP-190-10 Guidance for RNAV Approach</i> |
| ILS G/S out LOC only LOC B/C | ILS LOC BAC | LOC and FPA LOC B/C and FPA | <i>Refer to PRO-NOR-SOP-190-10 Guidance for ILS G/S out, LOC only, LOC B/C approach</i> |

For ILS G/S out, LOC only, or LOC B/C approach, the flight crew will press the LOC pb to arm the LOC or LOC B/C mode.

INITIAL APPROACH

Applicable to: ALL

INITIAL APPROACH

- [L2] For additional training-oriented information, *Refer to FCTM/NO-180 Initial Approach.*
- [L1] APPROACH PHASE.....CHECK/ACTIVATE | PF-PM
- [L2] - If the aircraft overflies the DECEL pseudo waypoint in NAV mode, the APPR phase activates automatically
- If the aircraft is in HDG or TRACK mode approximately 15 nm from touchdown, activate and confirm the APPR phase on the FMS ACTIVE/PERF page.
- [L1] POSITIONING.....MONITOR | PF
- [L2] - In NAV mode, use the VERT DEV on the PFD and on the DES panel of the ACTIVE/PERF page
- In HDG or TRACK mode, use the energy circle on the ND that shows the required distance to land.
- [L1] MANAGED SPEED.....CHECK | PF
- [L2] Check that the managed speed is active and monitor the target speed.

Note:

The aircraft decelerates automatically at the DECEL pseudo waypoint  when managed speed is active and NAV, LOC* or LOC mode is engaged.

During the approach, the autothrust maintains the maneuvering speed of the current configuration (O, S, F, VAPP).

If ATC requires a particular speed, use selected speed. Adjust the aircraft configuration accordingly. When the ATC speed constraint (e.g. "maintain 170 kt to the outer marker") no longer applies, return to managed speed.

If ATC orders successive step descents down to the final approach flight path, use V/S or FPA mode and monitor the VERT DEV.

- [L1] SPEED BRAKES.....AS RQRD | PF

NAVIGATION ACCURACY**● If GPS PRIMARY LOST:**

NAVIGATION ACCURACY.....MONITOR | PM

- [L2] On the POSITION/MONITOR page, check that the required navigation accuracy is appropriate to the phase of flight.
- Perform a navigation accuracy check.



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If the approach is stored in the navigation database, determine the strategy to be used in final approach, in accordance with the following table:

| NAVIGATION ACCURACY | ND | | AP/FD mode | TERR function |
|---|-----------------|---|---------------|-------------------|
| | PF | PM | | |
| GPS PRIMARY | | | | |
| ACCURACY HIGH | | ARC or ROSE-NAV | | |
| ACCURACY LOW and ACCURACY check ≤ 1 nm | | (1) with navaid raw data | NAV | ON |
| GPS PRIMARY LOST and ACCURACY LOW and ACCURACY check > 1 nm | | | | |
| GPS PRIMARY LOST and aircraft flying within an unreliable radio navaid area | ROSE-VOR (2) | ARC or ROSE-NAV or ROSE-VOR with navaid raw data (3) | TRACK and FPA | Automatically OFF |

(1) For VOR, VOR/DME, NDB, or NDB/DME approach, one flight crewmember may select ROSE-VOR.

(2) For ILS G/S out, LOC only, or LOC B/C approach, select ROSE-LS.

(3) For ILS G/S out, LOC only, or LOC B/C approach, the flight crew will select ROSE-LS instead of ROSE-VOR.

- Note:
1. During approach in overlay to a conventional radio navaid procedure, monitor raw data. If raw data indicates unsatisfactory managed guidance, use selected guidance.
 2. The flight crew can continue to fly a managed approach, after the display of the NAV ACCUR DOWNGRADED message, if raw data indicates that the guidance is satisfactory.

L1 FLYING REFERENCE..... TRK-FPA | PF-PM

INTERMEDIATE / FINAL APPROACH

Applicable to: ALL

GENERAL

The preferred technique for flying an NPA approach without the FLS function is to fly a stabilized approach using:

- The AP and FD s
- The A/THR in SPEED mode
- The managed speed target.

The aircraft should intercept the final descent path in landing configuration, and at VAPP. For this purpose, the flight crew should insert VAPP, as a speed constraint, at the FAF .

The aircraft should be stabilized on the final descent path at VAPP in the landing configuration.

To be stabilized, all of the following conditions must be achieved prior to, or upon reaching this stabilization height:

- The aircraft is on the correct lateral and vertical flight plan,
- The aircraft is in the desired landing configuration,
- The thrust is stabilized, usually above idle, to maintain the target approach speed along the desired final approach path,
- There is no excessive flight parameter deviation.

If the aircraft is not stabilized on the approach path in landing configuration, at 1 000 ft above airfield elevation in instrument conditions, or at 500 ft above airfield elevation in visual conditions, or as restricted by Operator policy/regulations, a go-around must be initiated unless the flight crew estimates that only small corrections are necessary to rectify minor deviations from stabilized conditions due, amongst others, to external perturbations.

COLD WEATHER CONDITIONS

For altitude correction in low temperature conditions, *Refer to PER-OPD-AMILA ATMO Module Interface (Low altitude temperature corrections)*.

INTERMEDIATE APPROACH

■ For RNAV Approach:

GPS PRIMARY ON POSITION/MONITOR PAGE.....CHECK AVAILABLE | PM

● If GPS PRIMARY LOST:

RNP FOR APPROACH.....CHECK/ENTER | PM

HIGH ACCURACY.....CHECK | PM

L2 *Note: RNAV approach without GPS is subject to a specific operational approval.*

L1 ■ For ILS G/S out, LOC only, or LOC approach:

LOC pbPRESS | PF-PM

L2 *The flight crew should press the LOC pb after the ATC clears the aircraft for the approach.*

L1 AP ENGAGEMENT.....CONSIDER | PF

APPROACHING GREEN DOT SPEED

L2 For additional training-oriented information on final approach, *Refer to FCTM/NO-180 Final Approach .*



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For additional information on the associated standard callouts:

- Refer to *PRO-NOR-SCO Flaps or Gear Configuration*
- Refer to *PRO-NOR-SCO Flight Parameters*.

| | | | |
|---|--|------------------|----|
| L1 | FLAPS 1..... | ORDER | PF |
| | FLAPS 1..... | SET | PM |
| <i>Check the aircraft deceleration toward S speed.</i> | | | |
| | TA pb | TA ONLY or TA/RA | PM |
| <i>The flight crew may use the TA ONLY mode in specific airports, and for specific procedures (identified by Operators) that may provide resolution advisories that are neither wanted or appropriate (e.g. closely-spaced parallel or converging runways).</i> | | | |
| L1 | ● For ILS G/S out, LOC only, or LOC B/C approach: | | |
| | LOC or LOC B/C CAPTURE..... | MONITOR | PF |
| L2 | <i>The flight crew must always monitor the capture of the LOC / LOC B/C beam. During the capture phase, the associated deviation on the PFD and ND should move toward the center of the scale.</i> | | |

BELOW VFE NEXT

| | | | |
|--|---|-------|----|
| L2 | For additional information on the associated standard callouts, <i>Refer to PRO-NOR-SCO Flaps or Gear Configuration</i> . | | |
| L1 | FLAPS 2..... | ORDER | PF |
| | FLAPS 2..... | SET | PM |
| <i>Check the aircraft deceleration toward F speed.</i> | | | |

AFTER FLAPS 2 SELECTION

| | | | |
|--|--|---------|----|
| L2 | For additional information on the associated standard callouts, <i>Refer to PRO-NOR-SCO Flaps or Gear Configuration</i> . | | |
| L1 | L/G DOWN..... | ORDER | PF |
| | L/G..... | DOWN | PM |
| | AUTO BRK..... | CONFIRM | PM |
| <i>If the runway conditions deteriorated since the approach briefing, consider the impact on the landing performance assessment and if there is a need for another braking mode.</i> | | | |
| | <i>When BTV is selected, if the aircraft lands on a runway different from the runway selected for BTV settings, the autobrake reverts automatically to autobrake mode Hi in short final.</i> | | |
| L1 | GND SPLRS..... | ARM | PM |



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EXTERIOR LIGHTS.....SET | PM

[L2] Set:

- The NOSE sw to T.O
- The RWY TURN OFF & CAMERA sw to ON

AFTER LANDING GEAR DOWN SELECTION

● **Below VFE NEXT:**

[L2] For more information on the associated standard callouts, Refer to PRO-NOR-SCO Flaps or Gear Configuration .

[L1] FLAPS 3..... ORDER | PF
FLAPS 3..... SET | PM

WHEEL SD PAGE..... CHECK | PM

[L2] - The WHEEL SD page appears below 800 ft , or at landing gear extension
- Check the five landing gear green indications. At least one green triangle on each landing gear strut is sufficient to indicate that this landing gear strut is down and locked.

● **Below VFE NEXT:**

[L2] For more information on the associated standard callouts, Refer to PRO-NOR-SCO Flaps or Gear Configuration .

[L1] FLAPS FULL..... ORDER | PF
FLAPS FULL..... SET | PM

Check that the aircraft decelerates to VAPP .

POSITION/FLIGHT PATH.....MONITOR/ADJUST | BOTH

[L2] For approach in overlay to a conventional radio navaid procedure:

- Use radio navaid raw data to monitor the lateral navigation
- Use altitude indication versus radio navaid position, adjust the FPA , as necessary, to follow the published descent profile, taking into account the minimum altitudes
- Do not use the VDEV on the PFD
- If the lateral navigation is not satisfactory, use the TRACK mode.

For RNAV approach:

- Monitor the crosstrack error on the ND
- Use altitude indication versus distance to the runway, adjust the FPA , as necessary to follow the published descent profile, taking into account the minimum altitudes
- If the lateral guidance is not satisfactory, perform a go-around.

[L1] A/THR.....CHECK IN SPEED MODE or OFF | PF



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| | | |
|--------------------|--------------|------|
| SLIDING TABLE..... | STOWED | BOTH |
| LDG MEMO..... | NO BLUE LINE | PM |
| CABIN..... | READY | BOTH |

- [L2] Check CABIN READY on the EWD , or obtain the report from the chief purser: "Cabin ready for landing".
- [L1] LANDING C/L.....COMPLETE | BOTH
 - Refer to PRO-NOR-C-L Landing
- [L2] For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .
For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

● At FAF :

| | | |
|----------|-----|-------|
| FPA..... | SET | PF-PM |
|----------|-----|-------|

● After the FAF :

| | | |
|-------------------------|-----|-------|
| GO-AROUND ALTITUDE..... | SET | PF-PM |
|-------------------------|-----|-------|

- [L2] Set the go-around altitude on the AFS CP when the aircraft is below the go-around altitude.

| | | |
|------------------------|-------|----|
| FLIGHT PARAMETERS..... | CHECK | PM |
|------------------------|-------|----|

- [L2] The PF announces any modification to the FMA .

The PM announces any flight parameter deviation. For more information on the associated callouts, Refer to PRO-NOR-SCO Flight Parameters .

● At 500 ft AGL (or RA) and below and if the flight crew selected BTV autobrake mode:

The PM may take advantage to adjust the ND RANGE selector to display the dry and wet lines on the Airport Navigation display, when the landing is positively considered.

AT MINIMUM+100 FT

- [L2] For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .
- [L1] ONE HUNDRED ABOVE.....MONITOR or ANNOUNCE | PM

1

AT MINIMUM

- [L2] For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .
- [L1] MINIMUM.....MONITOR or ANNOUNCE | PM

■ If the flight crew obtains appropriate visual references:

LANDING..... ANNOUNCE | CAPT

L2 In selected guidance, if ground references are not visible when the aircraft reaches MDA / MDH, the pilot should make an immediate go-around. However, if the distance to the runway is not properly assessed, a step descent approach may be considered, and a level-off at MDA / MDH may be performed while searching for visual references. If the flight crew has no visual reference at the MAP , at the latest, the flight crew must initiate a go-around.

L1 AP..... OFF | PF

L2 At MDA / MDH - 50 ft , if the AP is still engaged, the DISCONNECT AP FOR LDG message pulses on the FMA .

L1 FD OFF..... ORDER | PF

FDs..... OFF | PM

RUNWAY TRACK..... CHECK/ORDER | PF

If needed, the PF orders the PM to set the runway track on the AFS CP .

L1 RUNWAY TRACK..... SET, AS RQRD | PM

L2 Maintain the aircraft at a stabilized flight path to flare.

■ If the flight crew did not obtain appropriate visual references:

GO-AROUND..... ANNOUNCE | CAPT

NPA Flown without FLS Function Procedure and Callouts

| Initial Approach Procedure and Callout | | |
|---|-----------------------------|------------------------|
| Localizer Approach | | |
| EVENT | PF | PM |
| After LOC signal is identified by display or morse code | "CHECKED" (*1) or ROGER(*2) | "0000 IDENTIFIED" |
| When cleared for approach | "LOCALIZER ARM" | |
| x: Manual Flight | "ARM LOCALIZER" | "LOCALIZER ARM" |
| Flying Reference change to TRK-FPA | "TRK-FPA SET" | |
| x: Manual Flight | "SET TRK-FPA" | "TRK-FPA SET" |
| When localizer is armed | "LOC BLUE" | "CHECKED" |
| When the first positive movement of localizer index | "CHECKED" | "LOCALIZER ALIVE" |
| When localizer is captured | "LOC STAR" "LOC" | "CHECKED" "CHECKED" |
| LS pb must on from 10,000ft for identify LOC display on the PFD | | |

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| Initial Approach Procedure and Callout | | |
|---|---|---|
| Localizer Approach | | |
| EVENT | PF | PM |
| VOR/NDB/GPS Approach | | |
| EVENT | PF | PM |
| After VOR/NDB signal is identified by display or morse code | "CHECKED (*1) or ROGER(*2) | "000 IDENTIFIED" "00 IDENTIFIED" |
| Approach clearance is received | Follow lateral /vertical guidance NAV(TRK)/FPA | |
| Flying Reference change to TRK-FPA | "TRK / FPA () SET" | "CHECKED" |
| x: Manual Flight | "SET TRK-FPA()" | |
| Intermediate Approach Procedure and Callouts | | |
| In descent, Set intermediate altitude constraints on FCU | "NEXT ALTITUDE () SET" | "() BLUE" |
| After passing each step down fix, call out the next DME fix and altitude limits | "CHECKED" | "() DME () FEET" |
| At least before FAF or 1,500ft HAT | "LANDING CHECK LIST" | "LANDING CHECK LIST COMPLETE" |
| Final Approach Procedure and Callouts | | |
| At FAF | "FPA () SET" | "CHECKED" |
| x: Manual Flight | "SET FPA () " | "FPA () SET" "CHECKED" |
| After the FAF | "GO AROUND ALTITUDE 0,000 SET" | "0,000 BLUE" |
| x: Manual Flight | "SET GO AROUND ALTITUDE 0,000" "0,000 BLUE" | AFS CP ALT –Set GA ALT "0,000 SET" "0,000 SET" |
| At 1,000 ft HAT | " STABILIZED" or "VMC -CORRECTING" " GO-AROUND/FLAPS"(*4) | "ONE THOUSAND ,CLEARED TO LAND" or "ONE THOUSAND ,CONTINUE" Call out any unstable conditions |
| At 500ft HAT , | " STABILIZED" or " GO-AROUND/FLAPS" | Monitor AUTO CALLOUT "FIVE HUNDRED" Call out any unstable conditions |
| At 100ft above entered MDA/DA | "CHECKED" | Monitor AUTO CALLOUT "ONE HUNDRED ABOVE" |

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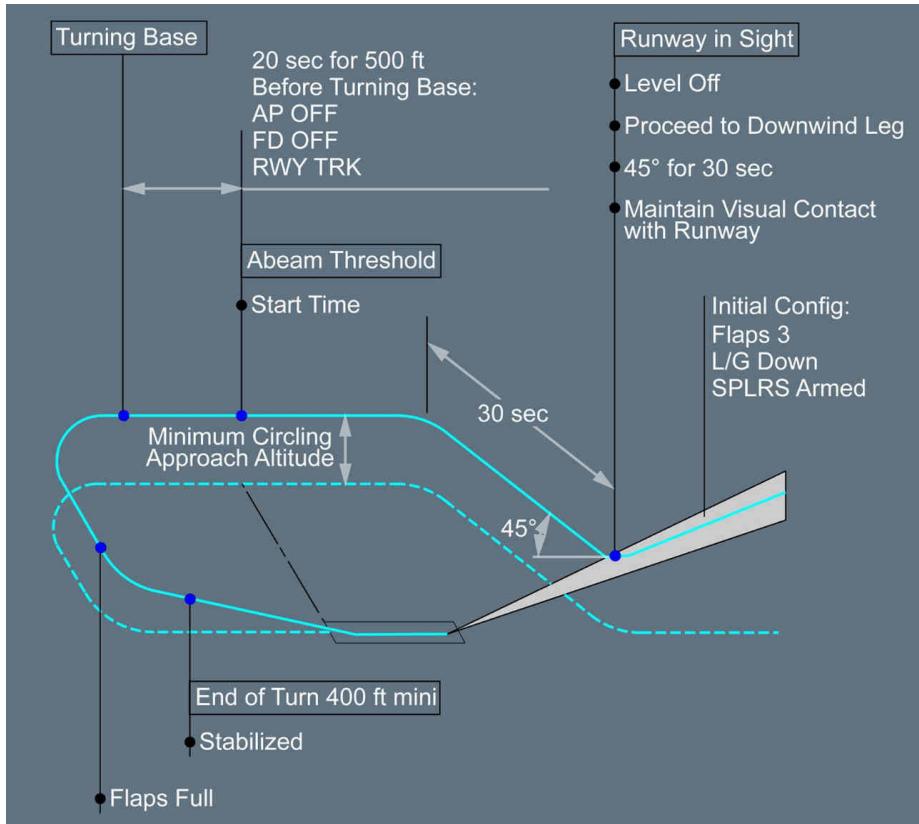
STANDARD OPERATING PROCEDURES - NON-PRECISION APPROACH

Continued from the previous page

| Initial Approach Procedure and Callout | | |
|---|--------------------------------------|--|
| Localizer Approach | | |
| EVENT | PF | PM |
| If ground reference are visible : Continue , as for a visual approach | - AP-- Off “SET RUNWAY TRACK” | - FD—Off (With PF's order) “RUNWAY TRACK 000 SET” - LS pb--- As Required (With PF's Order) |
| At Entered MDA/DA | CAPT “LANDING or GO-AROUND” | Monitor AUTO CALLOUT ‘MINIMUM’ |
| • If ground reference are not visible : Initiate a go around Note : At MDA(H)/DA(H) -50ft , If the AP is still engaged the “DISCONNECTED AP FOR LDG” message will pulse on the FMA | | |

Circling Approach**LOW VISIBILITY CIRCLING APPROACH**

Applicable to: ALL

Low Visibility Circling Approach



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STANDARD OPERATING PROCEDURES - VISUAL APPROACH

VISUAL APPROACH

Applicable to: ALL

INTRODUCTION

- [L2] For training-oriented information, *Refer to FCTM/NO-200 Initial Approach .*
- [L1] Perform the approach on a nominal 3 ° glideslope using visual references. The approach should be stabilized by 500 ft above airfield elevation on the correct approach path, in the landing configuration at VAPP.
 - Method for Visual approach:
 - The autopilot is not used
 - FD s are OFF
 - Use of FPV is recommended
 - Use of A/THR is recommended with managed speed.
 - [L2] This enables the ground speed mini function. For more information on ground speed mini function principle, *Refer to DSC-22-FG-60-20-A Introduction .*
 - [L1] Bear in mind the possible risk of optical illusions due to hindered nightvision.

INITIAL/INTERMEDIATE APPROACH

The flight plan selected on the FMS should include the selection of the landing runway. The downwind leg may also be part of the flight plan. This may produce a useful indication of the aircraft position in the circuit, on the ND. However, the flight crew must use the appropriate visual references.

AT THE BEGINNING OF THE DOWNWIND LEG

| | | |
|---|-----------|----|
| APPROACH PHASE..... | ACTIVATE | PM |
| [L2] <i>On the APPR panel of the ACTIVE/PERF page, use the ACTIVATE APPR button to activate the approach phase.</i> | | |
| FD OFF..... | ORDER | PF |
| FD..... | OFF | PM |
| FLYING REFERENCE..... | TRK-FPA | PM |
| A/THR ACTIVE..... | CHECK | PM |

ON THE DOWNWIND LEG

Abeam threshold, extend the downwind leg to 45 s (\pm wind correction). Turn into the base leg with a maximum of 30 ° of bank. Descend with the appropriate FPA.

● Below VFE NEXT:

| | | |
|--------------|-------|----|
| FLAPS 2..... | ORDER | PF |
| FLAPS 2..... | SET | PM |

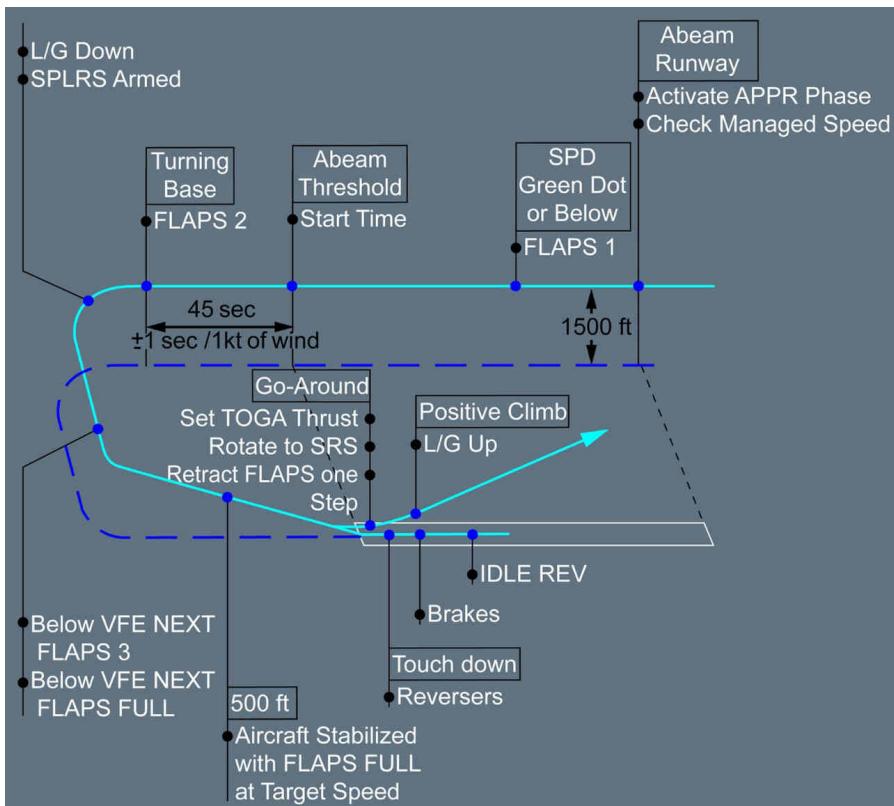
Check the aircraft deceleration toward F speed.

FINAL APPROACH

- The speed trend arrow and FPV help the flight crew to make timely and correct thrust settings (if in manual thrust) and approach path corrections. Avoid descent through the correct approach path with idle thrust. (Late recognition of this situation without a prompt thrust increase may lead to considerable speed decay and altitude loss).
- Have the aircraft stabilized by 500 ft AGL, on the correct approach path at VAPP (or ground speed mini) with the appropriate thrust applied.
If the aircraft is not stabilized on the approach path in landing configuration at 500 ft above airfield elevation, or as restricted by Operator policy/regulations, a go-around must be initiated unless the crew estimates that only small corrections are necessary to rectify minor deviations from stabilized conditions due, amongst others, to external perturbations.
- Avoid any tendency to duck under in the late stages of the approach.
- Avoid destabilizing the approach in the last 100 ft to have the best chance of making a good touchdown at the desired position.

VISUAL APPROACH PATTERN

The following approach pattern is based on the assumption that managed speed is used:

Visual Approach Pattern

If in selected speed, select:

- S speed after FLAPS 1 selection
- F speed after FLAPS 2 selection
- VAPP after FLAPS FULL selection.

RECOMMENDED VISUAL APPROACH(KAL)

Applicable to: ALL

RECOMMENDED VISUAL APPROACH(KAL)Background

As opening new runway in the Incheon International Airport, SRAA will plan to establish the Charted Visual Approach, and the company also has a plan to activate Visual Approach with the fuel save policy. Therefore, it is required to make a standard (recommended) procedure for Visual Approach.

* SRAA : Seoul Regional Aviation Administration

Objective

It is provided with stable Flight Pattern, Procedure, Callouts and the Automation Use Guidance for the safe visual approach and landing.

General

- This is the Recommended Visual Approach Procedure provided for the stabilized approach.
- Refer to K-Page and Airway Manual for the (Charted) Visual Approach Pattern, Procedure, etc. for each airport.
- For the box pattern approach, maintain downwind width of 2.5 mile (altitude 1,500 feet HAT) and adjust the pattern to make a final roll out at 3 NM from the threshold (altitude 1,000 ft HAT).
- If decided not to apply the Recommended Pattern and Procedure due to weather, traffic or a non-normal condition of an airplane, etc., fly in accordance with the Visual Pattern and procedure of POM.
- Use the automation system (FMGS, Autopilot, Flight Director, Autothrottle, etc.) as needed.
- GS/LOC can be used on final if ILS is operative normally and the required visual references for landing are identified.

Automation Use Policy

- Reference points for the approach can be inserted into FMGS and then used.
- Use of FINAL APP mode is not recommended.
- Disengage AP and turn off FD before starting descent on the base leg.
- LOC/GS can be used after final rollout.

| | |
|----------------|---|
| CAUTION | Do not descend with following GS indication only although ILS is operative normally. If referring to LOC only to intercept final, it could be overshot. |
|----------------|---|

Procedure and Callouts

- The PM provides the required information (altitude, airspeed, descent rate, etc.) at a right time with Standard Callouts and General Callouts.
- 'BEFORE LANDING Checklist' could be completed before base turning.
- When descending, make the continuous descent with approximate 3° FPA (700-800fpm).
- Accomplish the Standard Callout at 1,000 feet HAT and 500 feet HAT as same as the instrument approach.
- The PM uses the Recommended General Callouts properly to make a stable approach.

Recommended General Callouts



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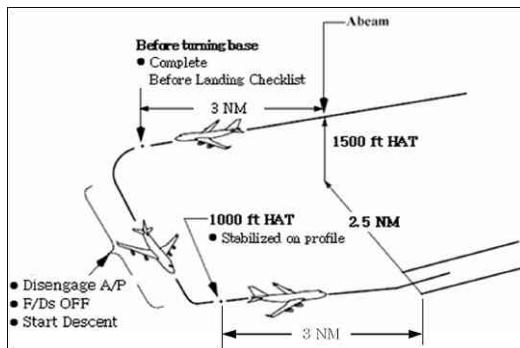
PROCEDURES
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STANDARD OPERATING PROCEDURES - VISUAL APPROACH

| Position | PF | PM |
|------------|--|--|
| DOWN WIND | "CHECK" or "TIME CHECK" (if needed) | "ABEAM END OF RUNWAY" |
| | "RH (LH) TURN, SET TRK 000" | "BASE TURNING POINT" "TIME OUT, START TURN" (if needed) |
| BASE LEG | "CORRECTING" | Verify track miles. Call present altitude and vertical deviation("1,000, LOW") |
| FINAL TURN | "ROGER" | When approaching the final course. "APPROACHING FINAL COURSE" |
| ON FINAL | "STABILIZED" or "CORRECTING" | At 1000 feet HAT, called by GPWS "ONE THOUSAND" call, "CLEAR TO LAND (or CONTINUE)" |
| | "ROGER" | When intercepting the vertical profile. "APPROACHING GLIDE PATH" |
| | "STABILIZED" "CORRECTING" or "GO-AROUND /FLAPS" | At 500 feet HAT, called by GPWS "FIVE HUNDRED" |
| | "CORRECTING" | If required, call present V/S and vertical deviation with trend as appropriate. "V/S 1,000, (GOING) BELOW" "V/S 500, (GOING) ABOVE" |
| | "CORRECTING" | If required, call lateral deviation as appropriate. "LEFT (or RIGHT) OF COURSE" |

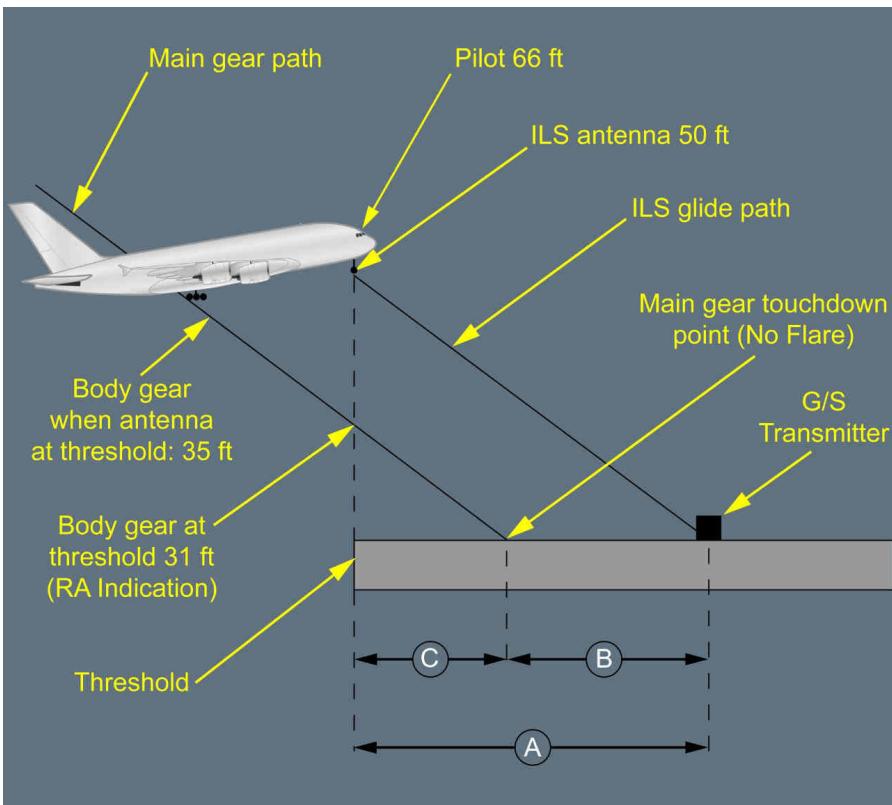
RECOMMENDED VISUAL APPROACH PATTERN

Note: The recommended visual approach pattern with one engine inoperative, note that the aircraft cannot maintain flight level with CONF-3 and landing gear down.

Recommended visual approach pattern

VISUAL SEGMENTS AND GEOMETRY

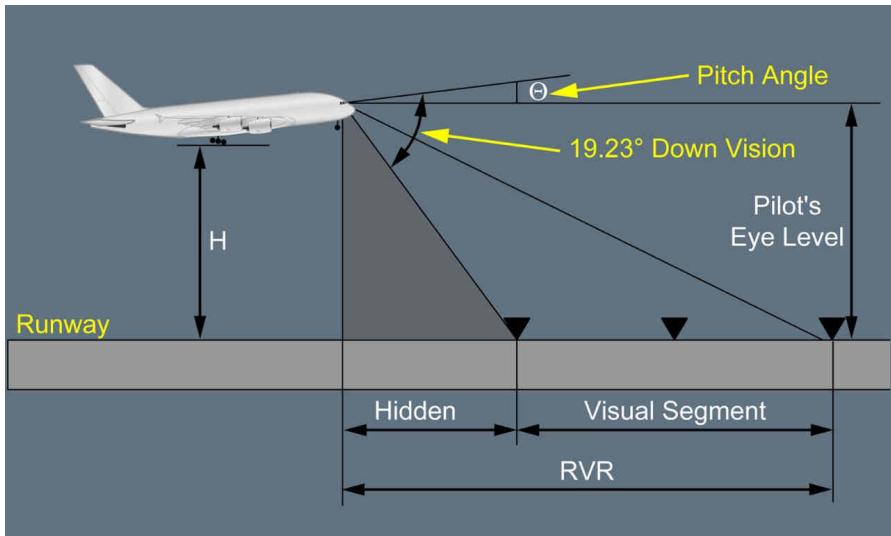
Applicable to: ALL

ILS FINAL APPROACH AND LANDING GEOMETRYILS FINAL APPROACH AND LANDING GEOMETRY

| GLIDE PATH (°) | G/S TRANS [A] | [B] | TOUCHDOWN POINT [C] |
|----------------|------------------|----------------|---------------------|
| 2.5 ° | 349 m (1 145 ft) | 130 m (427 ft) | 219 m (718 ft) |
| 3 ° | 291 m (955 ft) | 118 m (389 ft) | 173 m (567 ft) |

Conditions:

- ILS antenna at 50 ft at runway threshold
- No flare
- Pitch angle: 2 °

L2 MINIMUM VISUAL GROUND SEGMENTSMINIMUM VISUAL GROUND SEGMENTS

| | CAT III | | CAT II |
|-------------------|---------------|----------------|----------------|
| H | 15 ft | 50 ft | 100 ft |
| Pitch | 3 ° | 2 ° | 2 ° |
| Pilot's Eye Level | 15 m (49 ft) | 25 m (82 ft) | 40 m (131 ft) |
| Visual Segment | 30 m (98 ft) | 60 m (197 ft) | 90 m (295 ft) |
| Hidden | 52 m (171 ft) | 81 m (266 ft) | 129 m (423 ft) |
| Minimum RVR | 82 m (269 ft) | 141 m (463 ft) | 219 m (718 ft) |

Example:

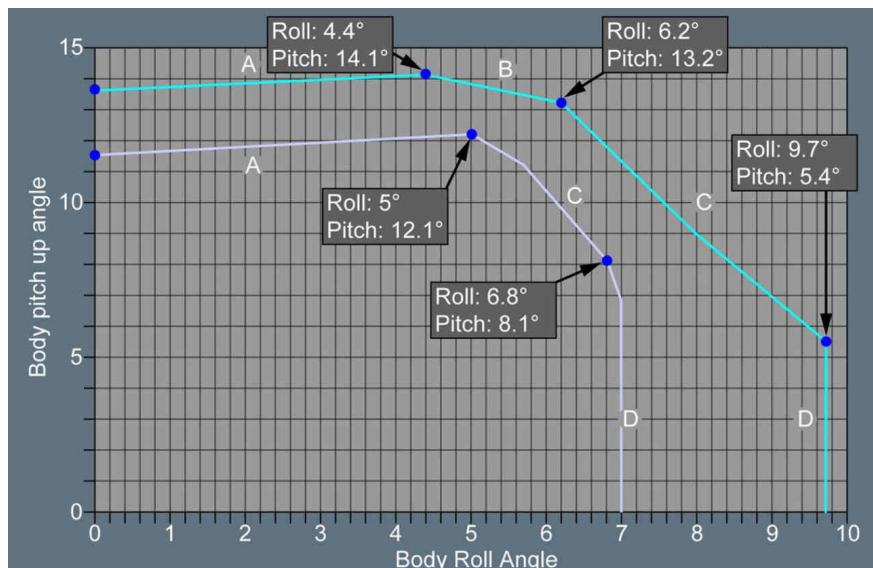
For a CAT III fail-operational landing with DH, and a minimum visual segment of 30 m, the Runway Visual Range (RVR) required at 20 ft RA is RVR = Obscured area (57 m (187 ft)) + visual segment (30 m (98 ft)) = 87 m (285 ft).

GROUND CLEARANCE

Avoid a high flare.

A tail strike occurs, if the pitch attitude exceeds 11.5° with the landing gear compressed, or 13.5° with the landing gear extended.

A wing tip or engine scrape occurs, if the roll angle exceeds 7° .

L2 GROUND CLEARANCE DIAGRAMGround Clearance Diagram

Caption :

Touchdown Main Landing Gear
(Body + Wing L/G) :

— Landing Gear Extended

— Landing Gear Compressed

Contact Points :

A Landing Gear and Rear Fuselage

B Landing Gear and Stabilizer

C Landing Gear and Wing Tip

D Landing Gear and Outer Engine

LANDING

Applicable to: ALL

FOR MANUAL LANDING

AP..... OFF | PF

- [L2] *The flight crew should disengage the AP whatever the type of approach is.
A/THR SPEED mode remains engaged.*

L1 AT AROUND 40 FT RA

From a stabilized approach, the flare height is approximately 40 ft .

FLARE..... INITIATE | PF

- [L2] *For additional training-oriented information, Refer to FCTM/NO-220 Flare .*

L1 ATTITUDE..... MONITOR | PF

- [L2] *Rely on the "PITCH - PITCH" auto callout for pitch monitoring.*

If the bank angle reaches 5 ° , the PM should call out "BANK - BANK".

L1 THRUST LEVERS..... IDLE | PF

- [L2] *Move the thrust levers to idle, and begin a gentle progressive flare to enable the aircraft to touch down without a prolonged float.*

If the autothrust is engaged, it automatically disconnects when all the thrust levers are set to idle detent.

At 20 ft , an automatic "RETARD" callout will trigger, as a reminder.

Note: *Ground spoilers extension is inhibited if two or more thrust levers remain above the IDLE detent.*

FOR AUTOMATIC LANDING

BETWEEN 50 FT AND 40 FT RA

FMA..... CHECK FLARE | PM

50/40 FT AGL FLARE

FLARE..... MONITOR | PF

- [L2] *For additional training-oriented information, Refer to FCTM/NO-220 Flare*

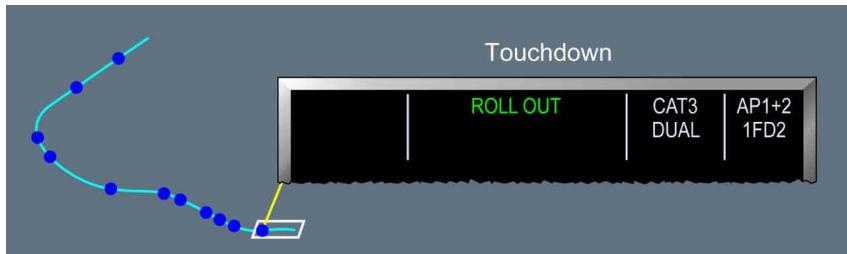
L1 AT APPROXIMATELY 30 FT RA

FMA..... CHECK THR IDLE | PM

L2 *The autothrust begins to decrease thrust to idle.*30 FT AGL IDLE**L1 AT 10 FT RA****L2** An automatic "RETARD" callout triggers.20 FT AGL (or 10 FT) AUTO "RETARD" CALLOUT**L1** THRUST LEVERS..... IDLE | PF**L2** *The autothrust disconnects.***L1** LATERAL GUIDANCE..... MONITOR | PF**L2** *Monitor the lateral guidance by using external references.*

L1 AT TOUCHDOWN

FMA.....CHECK ROLL OUT | PM

TOUCHDOWN**● If AUTO ROLL OUT:**

AP.....KEEP ENGAGED, UNTIL END OF ROLL OUT | PF

DEROTATION**L2** For additional training-oriented information, *Refer to FCTM/NO-220 Derotation.***● As soon as the main landing gear touches down:**

DEROTATION.....INITIATE | PF

CROSSWIND LANDINGFor training-oriented information on crosswind landing technique, *Refer to FCTM/FCTM.***LANDING ROLL****L2** For additional training-oriented information, *Refer to FCTM/NO-220 Roll Out.*For additional training-oriented information, *Refer to FCTM/NO-220-220-1 General.*For additional information on the associated callouts, *Refer to PRO-NOR-SCO Summary for Each Flight Phase.***L1** REVERSER LEVERS.....PULL | PF- *Select MAX REV immediately after the main landing gear touches down***L2** - *If the airport regulations limit the use of the thrust reversers and if landing performance permits, select and maintain IDLE REV until the aircraft reaches the taxi speed*- *In the case of a failure of one reverser, it is possible to use the opposite reverser*- *If required for performance reasons, braking may begin before the nosewheel touchdown.**However, if passenger comfort is the priority, the flight crew should delay braking on dry runways only, until the nosewheel touches down*



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- During rollout, avoid sidestick inputs (either lateral or longitudinal). If the flight crew encounters directional control problems, they should reduce the thrust to reverse idle until directional control is satisfactory

- [L1] - After the flight crew selects reverse thrust, they should perform a full stop landing.

GND SPLRS EXTENDED..... ANNOUNCE | PM

- [L2] Check the slats/flaps display on the lower part of the PFD , to ensure that the ground spoilers are extended.

If no ground spoilers are extended:

- Check that all thrust levers are set to IDLE detent
- Set both thrust reverser levers to MAX REV, and fully press the brake pedals.

Note: If ground spoilers are not armed, ground spoilers will extend at reverse thrust selection.

[L1] REVERSERS..... CHECK/ANNOUNCE | PM

[L2] Check that the EWD displays the expected reverser deployment (i.e. REV).

[L1] DIRECTIONAL CONTROL..... MONITOR/ENSURE | PF

- [L2] - Monitor directional control, if the rollout is automatic
- Ensure directional control, if the rollout is manual. Use the rudder pedals for directional control.

[L1] Do not use the nosewheel steering control handle before reaching taxi speed.

● If autobrake is selected:

AUTO BRK..... CHECK/ANNOUNCE | PM

[L2] Check and announce BTV , BRK LO , BRK 2 , BRK 3 or BRK HI on the FMA .

Note: If no ground spoilers are extended, the autobrake is not activated.

[L1] ● If no autobrake:

BRAKES..... AS RQRD | PF

DECELERATION..... CHECK/ANNOUNCE | PM

[L2] The flight crew feels the deceleration. They confirm the deceleration by using the speed trend on the PFD

[L1] ● If AUTO ROLLOUT, before 20 kt :

AP..... DISCONNECT | PF

AT 80 KT

[L2] For additional information on the associated callouts, Refer to 00023038 **Not found** .

EIGHTY KNOTS..... ANNOUNCE | PF



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STANDARD OPERATING PROCEDURES - LANDING

REVERSER LEVERS..... IDLE | PF-CAPT

CAUTION *Avoid using high levels of reverse thrust at low speed, unless required due to an emergency or if "KEEP MAX REVERSE" sounds. The distortion of the airflow caused by gases that re-enter the compressor can cause engine stalls that may result in excessive EGT.*

FOR CAT II & CAT III OPERATIONS WITH BTV

- If the aircraft ground speed is more than 10 kt when the aircraft enters the last 1 000 ft of the runway (i.e. the centerline runway lights are continuously red):

[L2] The runway center line is color coded. Continuous red lights mark the last 1 000 ft of a runway designed for CATII and CATIII operations.

In low visibility condition, the flight crew must select an exit 1 000 ft before the runway end.

In normal BTV operation, BTV deactivates when the aircraft reaches 10 kt ground speed. If the aircraft ground speed is more than 10 kt when the aircraft enters the last 1 000 ft of the runway, the flight crew must override BTV and apply manual braking as required.

[L1] BTV AUTOBRAKE MODE..... OVERRIDE | PF
MANUAL BRAKING..... APPLY AS RQRD | PF

AT TAXI SPEED

REVERSER LEVERS..... STOW | PF

[L2] When the aircraft reaches the taxi speed, and before it leaves the runway, stow the reversers.

[L1] **CAUTION** *Except in an emergency, do not use reverse thrust to control the aircraft speed while on taxiways.*

[L2] On taxiways, the use of reversers, even restricted to idle thrust, may have the following effects:

- The engines may ingest fine sand and debris that may be detrimental to the engines and airframe systems
- On snow-covered areas, snow will recirculate into the air inlet, and may cause an engine flameout or rollback.

[L1] AUTO BRK..... DISARM | PF

[L2]

- The autobrake may be disarmed at pilot's discretion.
- The flight crew should use one of the A/THR Instinctive Disconnect pb to disarm the autobrake
- If BTV is active and the flight crew did not disarm manually the autobrake, the autobrake disarms automatically at 10 kt.



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LANDING ROLL PROCEDURE /CALLOUTS

[L1]

| EVENT | PF | PM |
|--|--|--|
| After Touch Down | | Check ground spoilers deployed on ECAM "GROUND SPOILERS" |
| If spoilers are not deployed automatically | Spoilers shall be deployed manually by Captain | "NO SPOILERS" |
| | Select MAX REV immediately after the main landing gear touches down | Check that the EWD displays the expected reverse deployment "REVERSE GREEN" If reverse deployment is not as expected, call "NO REVERSE ENGINE2(3) or NO REVERSE" as appropriate |
| If auto brake is selected | | Check and call the auto brake function on the FMA "BTV" "BRK LO" "BRK 2" "BRK 3" "BRK HI" |
| If auto brake is not selected | BRAKES ----- as RQRD | "BRK HI" |
| | | Deceleration check "DECCEL" or "NO DECCEL" |
| At 80kts | Reverse lever to IDLE | "EIGHT KNOTS" |
| At Taxi speed | Reverse STOW | |
| Before Taxi Speed | 'AUTO PILOT OFF' - AUTO BRAKE disengage | |
| CAT II/III only | Use rudder pedals for directional control Do not use wheel steering control handle before taxi speed is reached | If off center line during roll out Call "STEER RIGHT / LEFT" (as appropriate) |

Note: When using standard high speed turn off after landing , the aircraft speed must be reduced to at or below 50kts Before vacating a dry runway or at a safe taxi speed on a wet runway . For perpendicular turnoffs of approximately 90 degrees , the aircraft must be reduced to a safe taxi speed.



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STANDARD OPERATING PROCEDURES - GO-AROUND

GO-AROUND

Applicable to: ALL

GO-AROUND INITIATION

- [L2] For additional training-oriented information on considerations about initiation of go-around, Refer to *FCTM/NO-210 Considerations About Go-Around*
For additional training-oriented information on rejected landing, Refer to *FCTM/NO-210 Rejected Landing*
For additional information on the associated callouts, Refer to *PRO-NOR-SCO Summary for Each Flight Phase*.
[L1] Simultaneously apply the following three actions:

THRUST LEVERS.....TOGA | PF

If TOGA thrust is not required, set the thrust levers to the TOGA detent then, retard the thrust levers as required. This enables to engage the GO-AROUND phase with the associated AP / FD modes.

- [L2] **Note:** *If the thrust levers are not briefly set to the TOGA detent, the FMS does not engage the GO-AROUND phase, and when the aircraft flies over, or close to the airport (less than 7 nm) the FMS will sequence the destination waypoint in the F-PLN.*

The GO-AROUND phase engages. The previously-flown approach is automatically strung back into the flight plan at the end of the missed approach procedure.

For additional training-oriented information on go-around phase, Refer to FCTM/NO-210 Go-Around Phase

- [L1] ROTATION.....PERFORM | PF
- [L2] *Initiate the rotation toward a pitch attitude of 12.5 ° (10 ° , if one engine is failed) to obtain a positive rate of climb, then follow the SRS pitch command bar.*
- [L1] GO-AROUND.....ANNOUNCE | PF
- FLAPS.....RETRACT ONE STEP | PM
- FMA.....CHECK/ANNOUNCE | PF
- [L2] *If the flight crew decides not to fly the flight plan after the go-around, they can use the HDG/TRK preset function. For more information, Refer to DSC-22-FG-100-GHOW How to Define a HDG/TRK Preset for Go-Around .*



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STANDARD OPERATING PROCEDURES - GO-AROUND

| | | | | |
|----|--|----------|--|----|
| L1 | POSITIVE CLIMB..... | ANNOUNCE | | PM |
| L2 | - If the pitch attitude goes above 20 °, or below 10 ° up: The PM announces: "PITCH" - If there is no climb rate: The PM announces: "SINK RATE" | | | |
| L1 | L/G UP..... | ORDER | | PF |
| | L/G..... | UP | | PM |
| | NAV or HDG..... | AS RQRD | | PF |

AT GO-AROUND THRUST REDUCTION ALTITUDE (LVR CLB FLASHING ON FMA)

| | | | |
|--------------------|----|--|----|
| THRUST LEVERS..... | CL | | PF |
|--------------------|----|--|----|

Impacted DU: 00001054 Go-Around_AT GO-AROUND ACCELERATION ALTITUDE

AT GO-AROUND ACCELERATION ALTITUDE

Monitor that the speed target increases to initial CLB speed.

| | | | | |
|----|--|------------------------------|--|------|
| L2 | The FMS predictions are recovered, therefore: | | | |
| | - If HDG or TRACK mode is selected, OP CLB engages | | | |
| | - If NAV mode is engaged, CLB engages. | | | |
| | ● If the speed target does not increase to initial CLB speed: | | | |
| | AFS CP ALTITUDE | CHECK | | PF |
| | ALT pb | PRESS | | PF |
| L1 | FLAPS..... | ORDER RETRACTION ON SCHEDULE | | PF |
| | FLAPS..... | RETRACT ON SCHEDULE | | PM |
| | GND SPLRS..... | DISARM | | PM |
| | EXTERIOR LIGHTS..... | SET | | PM |
| | AFTER TAKEOFF/CLIMB C/L down to the line..... | COMPLETE | | BOTH |
| | Refer to PRO-NOR-C-L After Takeoff/Climb | | | |
| L2 | For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction . | | | |
| | For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase . | | | |



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- L1 ● If necessary, at the transition altitude:
- BAROMETRIC REFERENCE.....SET STD/CROSSCHECK | BOTH
- L2 - At the transition altitude, the barometric setting flashes on the PFD . The flight crew should set STD on the EFIS CP and on the ISIS SFD
- Crosscheck the barometric settings and the altitude indications
- For additional training-oriented information on the VD in relation to the barometric reference setting, Refer to FCTM/NO-140 Vertical Display .
- For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .
- L1 AFTER TAKEOFF/CLIMB C/L below the line.....COMPLETE | BOTH
- Refer to PRO-NOR-C-L After Takeoff/Climb
- L2 For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .
- For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .
- L1 Fly the published missed approach procedure, or prepare for a second approach, or divert as required.
- L2 For additional training-oriented information on leaving the go-around phase, Refer to FCTM/NO-210-210-1 General .
- L1 ● To fly the published missed approach:
- Engage the NAV or the HDG mode.
- L2 NAV , HDG , or TRACK modes can be engaged only above 100 ft .
- L1 ● When the flight crew established the aircraft path and obtained the clearance:
- The PF transfers his/her duties to the PM .
- L2 The PF can request the PM to update the FMS , depending on the situation.
- The following tasksharing remains the one decided since the beginning of the flight.
- L1 ● To prepare for a second approach:
- APPROACH PHASE.....ACTIVATE | PM with PF's order
- L2 Activate the APPR phase on the FMS ACTIVE/PERF page.
- If the APPR phase is not activated :
- Managed approach speed is not available
- BARO/RADIO indications do not appear on the PFD .

L1

● To divert to the alternate:

FMS..... UPDATE | PM

L2

- If the flight crew prepared an alternate flight plan, they should use ENABLE ALTN in the revision menu of the TO waypoint on the ACTIVE/F-PLN page
- If the flight crew prepared a SEC/F-PLN to the diversion airfield, they should swap the SEC F-PLN to the ACTIVE F-PLN.
- If the flight crew did not prepare any alternate, they should:
 - Initiate a selected climb
 - Perform a lateral revision to insert the new destination.

L1

● When cleared to a waypoint:

DIRECT TO..... PERFORM | PM with PF's order

L2

*The FMS automatically reverts to the CLB phase.**The FMS automatically sets the CRZ FL at the default alternate CRZ FL (FL 220, or FL 310), and maintains the previous cost index.**The flight crew may adjust these targets if necessary.*

L1

FMS..... CROSSCHECK | PF

● If the ARPT NAV reset button on the overhead panel is pulled because the initial destination airport is not in the OANS database:

Push the ARPT NAV reset button on the overhead panel.

L2

*This action enables the flight crew to check if the alternate airport is in the OANS database.***GO – AROUND PROCEDURE AND CALLOUTS**

L1

| EVENT | PF | PM |
|---|---|---|
| At Go-Around initiation | Apply the three following actions simultaneously - THRUST LEVER --- TO GA - ROTATION ----- PERFORM Call "GO-AROUND FLAPS" - Check and Call FMA "MAN TOGA SRS (GA TRK ATTHR BLUE)" | Flaps retract one step "FLAPS ONE STEP" "CHECK" |
| When the vertical speed indication is positive and the RA has increased | | "POSITIVE CLIMB" |

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| EVENT | PF | PM |
|--|---|--|
| | "GEAR UP" Consider retarding to CL detent if TOGA thrust is not required | "GEAR UP" |
| Select NAV or HDG mode | "NAV MANAGE or HDG PULL" | "CHECKED" |
| ⌘: Manual Flight | "MANAGE NAV or PULL HDG" "CHECKED" | "NAV MANAGE" or "HDG PULL" |
| At GA thrust reduction altitude LVR CLB flashing on FMA | Reduce thrust levers to CL position "LEVER CLIMB,THRUST CLIMB,AUTO THRUST" | |
| At GA acceleration altitude | Monitor that the speed target increases to initial CLB speed Retract flaps on schedule | |
| | | Exterior Lights - Set NOSE sw and RWY TURN OFF sw to OFF - LAND lights may be left ON GNS SPLRS lever ---- DISARM |
| | "AFTER TAKEOFF/CLIMB CHECK LIST " | "DOWN TO THE LINE" |

Impacted by TDU: 00022944 Go-Around_AT GO-AROUND ACCELERATION ALTITUDE

AT GO-AROUND ACCELERATION ALTITUDE

Monitor that the speed target increases to initial CLB speed.

| | | | |
|--|---|------------------------------|------|
| <input checked="" type="checkbox"/> L2 | ● If the speed target does not increase to initial CLB speed: | | |
| | AFS CP ALTITUDE | CHECK | PF |
| | ALT pb | PRESS | PF |
| <input checked="" type="checkbox"/> L1 | FLAPS | ORDER RETRACTION ON SCHEDULE | PF |
| | FLAPS | RETRACT | PM |
| | GND SPLRS | DISARM | PM |
| | EXTERIOR LIGHTS | SET | PM |
| | AFTER TAKEOFF/CLIMB C/L down to the line | COMPLETE | BOTH |
| | Refer to PRO-NOR-C-L After Takeoff/Climb | | |
| <input checked="" type="checkbox"/> L2 | For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction. | | |
| | For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase. | | |

| | | | |
|----|--|---------------------------|---------------------------|
| L1 | ● If necessary, at the transition altitude: | BAROMETRIC REFERENCE..... | SET STD/CROSSCHECK BOTH |
| L2 | - At the transition altitude, the barometric setting flashes on the PFD. The flight crew should set STD on the EFIS CP and on the ISIS SFD | | |
| L2 | - Crosscheck the barometric settings and the altitude indications For additional training-oriented information on the VD in relation to the barometric reference setting, Refer to FCTM/NO-140 Vertical Display . | | |
| L2 | - For additional information on the associated callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase | | |
| L1 | AFTER TAKEOFF/CLIMB C/L below the line..... | COMPLETE | BOTH |
| | Refer to PRO-NOR-C-L After Takeoff/Climb | | |
| L2 | For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction . | | |
| L2 | For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase | | |
| L1 | Fly the published missed approach procedure, or prepare for a second approach, or divert as required. | | |
| L2 | For additional training-oriented information on leaving the go-around phase, Refer to FCTM/NO-210-210-1 General . | | |
| L1 | ● To fly the published missed approach: | | |
| L2 | Engage the NAV or the HDG mode. | | |
| L2 | NAV , HDG , or TRACK modes can be engaged only above 100 ft. | | |
| L1 | ● When the flight crew established the aircraft path and obtained the clearance: | | |
| L2 | The PF transfers his/her duties to the PM . | | |
| L2 | The PF can request the PM to update the FMS , depending on the situation. | | |
| L2 | The following tasksharing remains the one decided since the beginning of the flight. | | |
| L1 | ● To prepare for a second approach: | | |
| | APPROACH PHASE..... | ACTIVATE | PM with PF's order |
| L2 | Activate the APPR phase on the FMS ACTIVE/PERF page. | | |
| | If the APPR phase is not activated : | | |
| L2 | - Managed approach speed is not available | | |
| L2 | - BARO/RADIO indications do not appear on the PFD . | | |

| | | | | |
|--|-------------------------------|---|------------|--------------------|
| <input checked="" type="checkbox"/> L1 | ● To divert to the alternate: | FMS | UPDATE | PM |
| <input checked="" type="checkbox"/> L2 | | - If the flight crew prepared an alternate flight plan, they should use ENABLE ALTN in the revision menu of the TO waypoint on the ACTIVE/F-PLN page - If the flight crew prepared a SEC/F-PLN to the diversion airfield, they should swap the SEC F-PLN to the ACTIVE F-PLN. - If the flight crew did not prepare any alternate, they should: • Initiate a selected climb • Perform a lateral revision to insert the new destination. | | |
| <input checked="" type="checkbox"/> L1 | ● When cleared to a waypoint: | DIRECT TO | PERFORM | PM with PF's order |
| <input checked="" type="checkbox"/> L2 | | The FMS automatically reverts to the CLB phase. The FMS automatically sets the CRZ FL at the default alternate CRZ FL (FL 220, or FL 310), and maintains the previous cost index. The flight crew may adjust these targets if necessary. | | |
| <input checked="" type="checkbox"/> L1 | FMS..... | | CROSSCHECK | PF |

GO-AROUND PROCEDURE AND CALLOUTS

| EVENT | PF | PM |
|---|---|---|
| At Go-Around initiation | Apply the three following actions simultaneously - THRUST LEVER -- TO GA - ROTATION ----- PERFORM Call "GO-AROUND FLAPS" - Check and Call FMA "MAN TOGA SRS (GA TRK ATHR BLUE)" | Flaps retract one step "FLAPS ONE STEP" "CHECK" |
| When the vertical speed indication is positive and the RA has increased | "GEAR UP" Consider retarding to CL detent if TOGA thrust is not required | "POSITIVE CLIMB" "GEAR UP" |
| Select NAV or HDG mode | "MANAGE NAV" or "PULL HDG XXX" | "CHECKED" or "HDG XXX BLUE" |
| x: Manual Flight | "MANAGE NAV" or "PULL HDG XXX" | "CHECKED" or "HDG XXX BLUE" |

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STANDARD OPERATING PROCEDURES - GO-AROUND

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| EVENT | PF | PM |
|--|--|---|
| | "NAV" or "HDG XXX BLUE" | |
| At GA thrust reduction altitude LVR CLB flashing on FMA | Reduce thrust levers to CL position "LEVER CLIMB THRUST CLIMB AUTO THRUST" | |
| At GA acceleration altitude | Monitor that the speed target increases to initial CLB speed Retract flaps on schedule | |
| | | Exterior Lights - Set NOSE sw and RWY TURN OFF sw to OFF - LAND lights may be left ON GNS SPLRS lever ---- DISARM |
| | "AFTER TAKEOFF/CLIMB CHECK LIST" | "DOWN TO THE LINE" |



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STANDARD OPERATING PROCEDURES - AFTER LANDING

AFTER LANDING

Applicable to: ALL

GROUND SPOILERS

GND SPLRS..... DISARM | CAPT

FLAPS

FLAPS..... RETRACT | FO

Retract flaps, unless ice accretion is suspected.

- L2 - Set the FLAPS lever to 0
- If the approach was performed in icing conditions, or if the runway was contaminated with slush or snow, do not retract the flaps until after engine shutdown, and after the ground crew confirmed that the flaps and slats are clear of obstruction due to ice.

Impacted DU: 00001062 After landing_APU

APU

APU MASTER SW pb-sw ON | FO

APU START may be delayed until just prior to engine shutdown

- If the APU flap is fully open (i.e. FLAP OPEN appears on the APU SD page):
APU START pb ON | FO
On the APU SD page, check that FLAP OPEN appears before setting to ON the APU START pb.
For additional information, Refer to APU Start Sequence .

Note: If the APU start failed, Refer to APU Start Limitation.

Impacted by TDU: 00022520 After landing_APU

APU

APU MASTER SW pb-sw ON | FO

APU START may be delayed until just prior to engine shutdown

APU START pb ON | FO

- L2 *Note: If the APU start failed, Refer to APU Start Limitation.*

ENG START

ENG START selector CHECK NORM | FO

ANTI-ICE

ANTI ICE.....AS RQRD | FO

[L2] If engine anti-ice is used, carefully control taxi speed, particularly on wet or slippery surfaces because ground idle is increased.

[L1] When taxiing in freezing fog conditions, if temperature is less than + 3 °C (37 °F), ice may accumulate on the engines fans.

In order to shed the ice, the flight crew must apply the ice shedding procedure at least every 30 min of total taxi time before takeoff. The total taxi time is the cumulative time of the taxi-in time of the previous flight and taxi-out time of the next flight.

Therefore, because it is necessary to determine the remaining taxi-out time that is allowed for the next flight, the flight crew must record in the logbook the taxi-in time in freezing fog conditions. For more information, Refer to PRO-SUP-70-20 Ground Ice Shedding Procedure In Case Of Freezing Fog .

EXTERIOR LIGHTS

LAND swOFF | FO

[L2] Turn off the LAND lights, if they are not necessary.

[L1] STROBE swAUTO | FO

[L2] When leaving the runway, set the STROBE sw to AUTO.

[L1] OTHER EXTERIOR LIGHTS.....AS RQRD | FO

[L2] Set the NAV sw to ON, as required, to turn on the navigation and obstruction lights.

[L1] NOSE swTAXI | FO

[L2] Set NOSE sw to TAXI, when the aircraft leaves the runway.

[L1] RWY TURN OFF & CAMERA swAS RQRD | FO

[L2] Turn on the RWY TURN OFF& CAMERA sw at night for ETACS purpose.

AIRPORT NAVIGATION

Direct visual observation out of the cockpit windows remains the primary means of taxiing. If there is a conflict between outside and the OANS display, the reference must be the outside view.

ND RANGE selectorZOOM, AS APPROPRIATE | BOTH

[L2] If necessary, set the ND RANGE selector to ZOOM to activate the Onboard Airport Navigation System (OANS). Then, select ARC, ROSE, or PLAN mode, as appropriate.



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EFIS CONTROL PANEL (EFIS CP)

- | | | |
|--|-----------|------|
| TAXI pb | AS RQRD | BOTH |
| <input type="checkbox"/> When the TAXI pb is set to ON, the ETACS appears on the PFD. | | |
| <input type="checkbox"/> L1 WX pb | CHECK OFF | BOTH |
| <input type="checkbox"/> L2 The weather radar automatically switches off 60 s after landing. | | |

BODY WHEEL STEERING

After the last turn to the gate or the parking, ensure that the aircraft is rolling straight for at least 20 ft, in order to realign the Body Wheel Steering (BWS).

- L2 If the BWS is not aligned for parking, the L/G B/W STEER LOCK FAULT alert triggers.

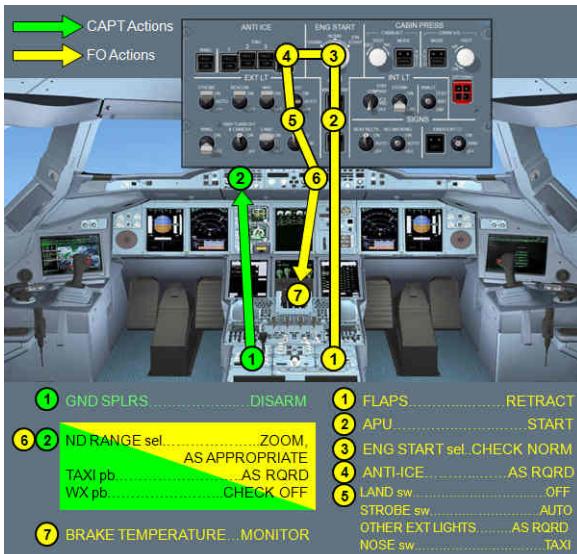
BRAKE TEMPERATURE

- | | | |
|---|---------|----|
| <input type="checkbox"/> L2 For additional training-oriented information, Refer to FCTM/NO-230 Brake Temperature. | | |
| <input type="checkbox"/> L1 BRAKE TEMPERATURE..... | MONITOR | FO |
| <input type="checkbox"/> L2 - Check the brake temperature for discrepancies and high temperature on the WHEEL SD page | | |
| <input type="checkbox"/> - Maintenance action is due in the following cases: | | |
| <ul style="list-style-type: none">• The temperature difference between two brakes on a same gear is above 150 °C, and the temperature of either brake is above or equal to 600 °C, or• The temperature difference between two brakes on a same gear is above 150 °C, and the temperature of either brake is below or equal to 60 °C, or• The difference between the average temperature of the left and right brakes is above or equal to 200 °C, or• A fuse plug has melt, or• The brake temperature exceeds 800 °C. | | |

AFTER LANDING CHECKLIST

AFTER LANDING C/L.....COMPLETE | BOTH
Refer to PRO-NOR-C-L After Landing

- L2 Ensure that the after-landing checks are completed after the aircraft cleared the runway.
For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .
For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

L2 FLOW PATTERNAfter Landing**AFTER LANDING PROCEDURE AND CALLOUTS**

L1

| EVENT | PF | PM |
|---|---|---|
| After Landing Check List should be commenced after vacating the active runway or entering taxiway | | |
| | <ul style="list-style-type: none"> Ground spoilers --- Disarm. (Signal for F/O to commence after landing items) | <ul style="list-style-type: none"> Flaps ----- Retract APU ----- Start (APU START may be delayed until just prior To engine shutdown) ENG START selector ----- Check Normal ANTI ICE ----- AS RQRD LAND sw ----- AS RQRD STROBE sw ----- Auto NOSE sw ----- Taxi |
| | <ul style="list-style-type: none"> ND RANGE Selector ----- ZOOM , Appropriate TAXI pb ----- AS RQRD (For ETACS Operation) WX pb ----- Check OFF Brake Temperature ----- Monitor | |

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STANDARD OPERATING PROCEDURES - AFTER LANDING

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| EVENT | PF | PM |
|-------|----------------------------|-------------------------------------|
| | "AFTER LANDING CHECK LIST" | "AFTER LANDING CHECK LIST COMPLETE" |



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STANDARD OPERATING PROCEDURES - PARKING

PARKING

Applicable to: ALL

ANTI-ICE

ANTI-ICE.....OFF | FO

APU BLEED

APU BLEED pbON | FO

- [L2] Set the APU BLEED pb to ON immediately before engine shutdown to prevent engine exhaust fumes from entering the air conditioning.

PARK BRK

PARK BRK.....ON | CAPT

- [L2] - If the temperature of one brake is above 500 °C, avoid applying the parking brake, unless operationally necessary
- On the triple pressure indicator, check the left and right brakes pressures.

ENG MASTERS 1, 2, 3 AND 4

ENG MASTERS 1, 2, 3 and 4.....OFF | CAPT

- [L2] - After high thrust operations, such as the use of maximum reverse thrust at landing, operate the engine at idle for 3 min before shutting down the engine
[L3] This 3 min period thermally stabilizes the hot section of the engine.
[L2] This 3 min period can include operational time at idle, such as taxiing.
Depending on the circumstances (e.g. urgent need to open a cargo door or to connect the stairs), the flight crew may decide to shut down the engines regardless of the time at idle.
- Check that engine parameters decrease
- The DOOR/OXY SD page appears
- If the APU is not available, connect external power before shutting down the engines
- After the last engine shutdown, an automatic test of the fuel crossfeed valves, the LP valves, and the heat exchanger valves, begins. If a failure is detected, the associated ECAM alert triggers, and should be entered in the logbook. This test lasts approximately 2 min.

ELAPSED TIME

ELAPSED TIME (if applicable).....STOP | FO



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SEAT BELTS

SEAT BELTS sw OFF | CAPT

SLIDES

SLIDES DISARMED.....CHECK | CAPT

- [L2] *Check that the slides are disarmed on the DOOR/OXY SD page. If any slide is not disarmed, warn the cabin crew*

EXTERIOR LIGHTS

BEACON sw OFF | CAPT

- [L2] *Turn off the BEACON lights when all engines spooled down.*

L1 OTHER EXTERIOR LIGHTS..... AS RQRD | CAPT

GROUND CONTACT

GROUND CONTACT..... ESTABLISH | CAPT

- [L2] *- The flight crew should establish communication with the ground crew
- Check that chocks are in place.*

FUEL PUMPS

FUEL PUMPS..... OFF | PM

HUD

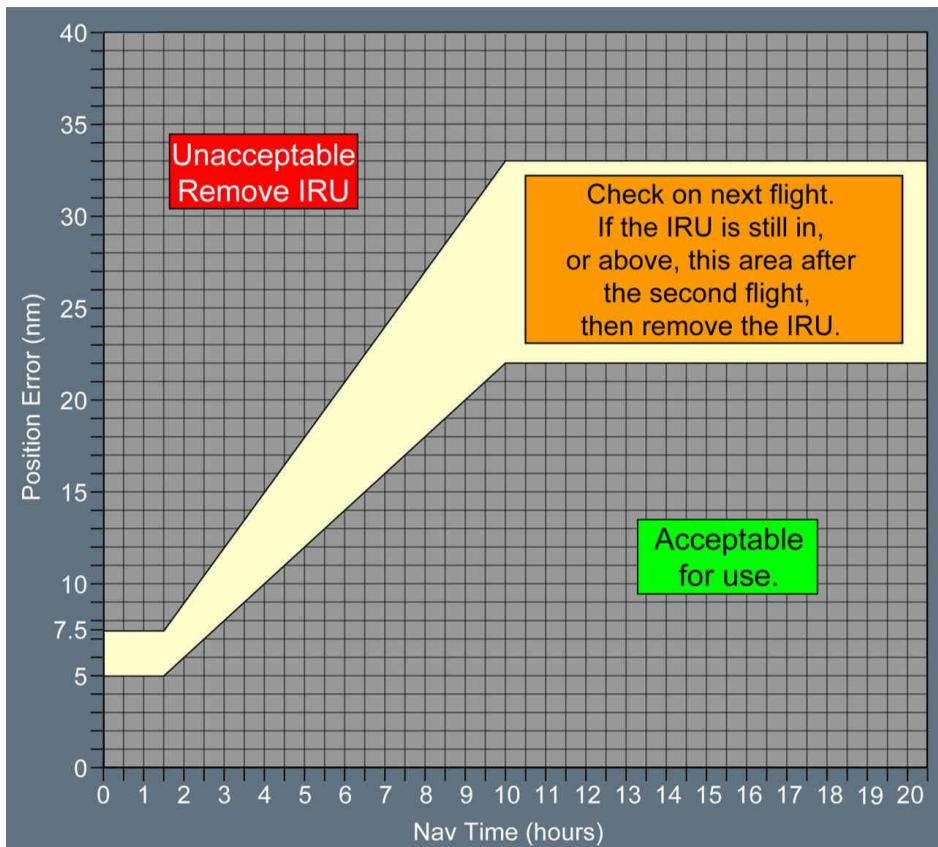
HUD..... STOW | CAPT

IRS PERFORMANCE

IRS PERFORMANCE..... CHECK | PM

- *Drift check:*

- On the FMS POSITION/MONITOR page, check that the drift does not exceed the following:

IRS Performance- *Residual ground speed check:*

On the FMS POSITION/IRS page, select IRS1, IRS2, IRS3 and check the GND SPD:

- If the GND SPD is above 15 kt: Report. The excessive deviation must be confirmed after two consecutive flights



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- If the GND SPD is above 21 kt: Report. The IRU must be removed.

FUEL QUANTITY

FUEL QUANTITY.....CHECK | PNF

- [L2] Check that the sum of the fuel on board and the fuel used is consistent with the fuel on board at departure. If the flight crew detects a discrepancy that is not usual, maintenance action is due.

PARKING CHECKLIST

PARKING C/L.....COMPLETE | BOTH

Refer to PRO-NOR-C-L Parking

- [L2] For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .
For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

PARK BRK

PARK BRK.....AS RQRD | CAPT

If the ECAM displays the BRAKES BRAKE HOT alert, the flight crew should release the parking brake when the wheel chocks are in position.

Note: When winds including gusts exceed 30 knots or, if slope of parking ramp is excessive, leave parking brake set.

- [L2] Releasing the parking brake prevents the critical structures from being exposed to high temperatures for an extended period of time. However, the flight crew may keep the parking brake applied if operationally required (e.g. slippery tarmac).

ONBOARD INFORMATION SYSTEM (OIS) CLOSURE

OIT SIDE swFLT OPS | BOTH
ALL APPLICATIONS.....CLOSE | BOTH

- [L2] Close all the applications on the laptops.

[L1] EXIT SESSION.....PERFORM | BOTH

- [L2] The exit session initializes again the FLT OPS STS page on the laptops for the next flight.

LOGBOOK

OIT SIDE swNSS AVNCS | BOTH

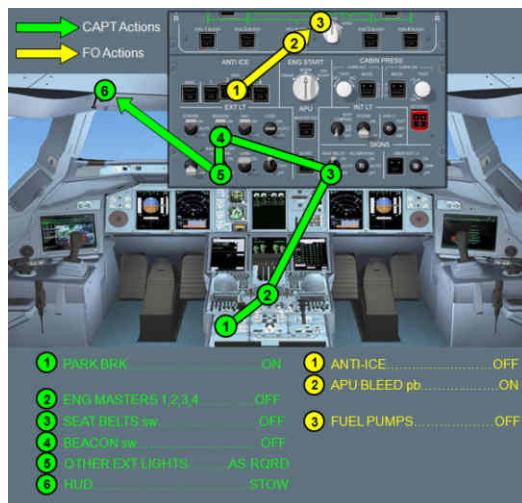
- [L2] Set the OIT SIDE sw to NSS AVNCS in order to access the Logbook.

- L1 FLIGHT CLOSURE.....PERFORM | CAPT
L2 Before the electronic flight closure, check that VHF 3 DATA mode is active.

On the Technical Logbook:

- Enter the postflight parameters
- Ensure that the cabin crew finished recording all cabin defects
- Check that all defects have been recorded
- Record the taxi-in time in freezing fog conditions. For more information, Refer to PRO-SUP-70-20 Ground Ice Shedding Procedure In Case Of Freezing Fog
- Close the flight, sign electronically the flight closure report.

Parking



1

2

PARKING PROCEDURE / CALLOUTS

| EVENT | CAPT | F/O |
|-----------------------|--|---|
| When approaching GATE | "CHECK" "CHECK" "LEFT CLEAR" | "APPROACHING GATE ____" "MARSHALLER INSIGHT" (in the event a marshaller's guidance is provided) "RIGHT CLEAR" |
| | | "BRAKE PRESSURE NORMAL" (after checking accumulator pressure) <i>Continued on the following page</i> |



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STANDARD OPERATING PROCEDURES - PARKING

Continued from the previous page

| EVENT | CAPT | F/O |
|---|-------------------------------|---|
| | "CHECK" | |
| Verify displayed aircraft type (if available) | "CHECK" "CHECK" "CHECK" | "A380-800" "SPEED ____" (Make a speed callout whenever necessary) |
| When Approaching to STOP | "CHECK" | "AMBER" (In case of a color indicator, when green turns to amber), or "APPROACHING TO STOP POSITION" |
| At stop position | "STOP" "PARKING BRAKE SET" | "STOP" "CHECK" |



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STANDARD OPERATING PROCEDURES - SECURING THE AIRCRAFT

SECURING THE AIRCRAFT

Applicable to: ALL

Impacted by TDU: 00021519 Securing the aircraft_GENERAL

GENERAL

The flight crew should apply the following procedure as per company policy.

Airbus recommends performing the following procedure when the aircraft is left unattended: i.e. no qualified flight crew or ground crew are in the cockpit to supervise and monitor the aircraft systems.

If the aircraft is secured for cold soak: *Refer to PRO-SUP-91-10-40 Securing the Aircraft for Cold Soak.*

Impacted DU: 00005212 Securing the aircraft_GENERAL

GENERAL

The flight crew should apply the following procedure as per company policy.

Airbus recommends performing the following procedure when the aircraft is left unattended: i.e. no qualified flight crew or ground crew are in the cockpit to supervise and monitor the aircraft systems.

If the aircraft is secured for cold soak: *Refer to PRO-SUP-91-10-40 Securing the Aircraft for Cold Soak .*

FMS DATA RETENTION AT AIRCRAFT POWER OFF

When the APU is off and all the batteries are switched off at least 10 s after switching off the external power, the FMS records the following data for the next flight:

- PERF and IDLE factors
- Stored waypoints, routes, navaids and runways
- Entered climb and descent winds
- Entered data on the INIT page, PERF page, SEC INDEX page, etc.

However, if the batteries are switched off less than 10 s after switching off the external power, or if the batteries are switched off before switching off the external power, the FMS does not record these data.

PARK BRK

PARK BRK..... ON | CM1

- Keep the parking brake on in order to reduce the rate of the hydraulic leak in the LEHGS accumulators.*



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STANDARD OPERATING PROCEDURES - SECURING THE AIRCRAFT

OXYGEN CREW SUPPLY

OXYGEN CREW SUPPLY pb-sw OFF | CM2

ADIRS (1+2+3)

ADIRS (1+2+3)..... OFF | CM1

- [2] *The flight crew should not turn off the ADIRS during transits at latitudes above 70 °N, in order to avoid excessive alignment time.*

After turning off the ADIRS, wait at least 10 s before turning off the electrical supply, in order to ensure that the ADIRS will memorize the latest data.

EXTERIOR LIGHTS

EXTERIOR LIGHTS..... OFF | CM2

GROUND SERVICING

GND SERVICING pb-sw AS RQRD | CM2

- [2] *If the ground crew or the servicing personnel requires electrical power, consider setting to ON the GND SERVICING pb-sw (in the forward cabin, near the M1 door), before powering off the aircraft.*

APU BLEED

APU BLEED pb-sw OFF | CM2

EXT POWER

EXT pb-sw AS RQRD | CM2

At least two EXT power units are necessary to supply the entire electrical network.



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STANDARD OPERATING PROCEDURES - SECURING THE AIRCRAFT

- [L2] If the electrical charge of at least one APU generator is above 50 %:
- At least three EXT power units are necessary to supply the aircraft with the APU OFF
- If only two EXT power units are available, it is recommended to keep the APU ON or to reduce the load demand for a while (e.g. by setting to OFF the CAB FANS pb-sw and COOLG pb-sw).

Note: These temporary actions ensure that enough electrical power is available during a high electrical demand (e.g. to operate the cargo doors).

When the flight crew sets to OFF the CAB FANS pb-sw and the COOLG pb-sw, no degradation of the galley cooling system and of the air conditioning is expected for a few minutes, i.e. the time necessary to operate the doors.

As soon as it is possible, the flight crew should set to ON the CAB FANS pb-sw and the COOLG pb-sw.

APU

APU MASTER SW pb-sw OFF | CM2

- [L2] Turn off the APU after all passengers disembarked.

EMER LIGHTS AND SIGNS

EMER EXIT LT sw OFF | CM2

- [L2] The flight crew must set to OFF the EMER EXIT LT sw to avoid battery discharge, when:
- Only batteries supply the aircraft, or
- No electrical power supplies the aircraft (i.e. external power, APU and all batteries are set to OFF).
[L3] When EMER EXIT LT sw is set to ARM or ON and the aircraft is not supplied, the Emergency lighting in cabin operates. In this case the HOT BUS via the BAT 1, the ESS BAT and the internal EPSU batteries supply the emergency lighting.
For more information about emergency lighting, Refer to DSC-33-40-10-GCABI Electrical Supply .

[L1] NO SMOKING sw OFF | CM2

- [L2] The flight crew must set to OFF the NO SMOKING sw to avoid battery discharge, when only the batteries supply the aircraft.

ONBOARD INFORMATION SYSTEM (OIS)

ALL LAPTOPS..... OFF | BOTH

- [L2] Switch off all laptops only if the aircraft is left unattended.

To turn off the laptops, click on the SWITCH OFF LAPTOP button on the LOGIN page of the FLT OPS Domain.

Note: The Network Server System (NSS) automatically shuts down at aircraft power down.

- [L1] OIT knob OFF | BOTH
[L2] The flight crew should switch off both OITs.

SECURING THE AIRCRAFT CHECKLIST

SECURING THE AIRCRAFT C/L..... COMPLETE | BOTH

Refer to PRO-NOR-C-L Securing the Aircraft

- [L2] For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction .
For additional information on the associated standard callouts, Refer to PRO-NOR-SCO Summary for Each Flight Phase .

BAT 1, ESS, 2 AND APU BAT

ALL BAT pb-sw (BAT 1, ESS, 2, APU BAT)..... OFF | CM2

- [L2] Wait until the APU flap is fully closed (i.e. around 2 min after the APU is set to OFF) before turning off the APU battery. This ensures that the APU shutdown sequence is entirely completed.

COCKPIT WAY LIGHT

COCKPIT WAYLIGHT pb-sw ON, IF NECESSARY | CM2

- [L2] If the aircraft is not electrically supplied, the flight crew can use the cockpit way light in order to leave the aircraft. The cockpit way light goes off automatically after 60 s . For more information, Refer to DSC-33-40-10 Emergency Lighting in the Cockpit .



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PROCEDURES
NORMAL PROCEDURES
NORMAL CHECKLISTS

INTRODUCTION

Applicable to: ALL

The following normal checklists illustrate:

- Detected items already completed
- Non-detected items, before they are manually selected with the tick pb on the ECAM Control Panel (ECP).

[2] For additional training-oriented information, Refer to FCTM/OP-40-40-2-40-2-2 Introduction.
For additional information on the checklist content, Refer to DSC-31-40-10 Checklists (C/L).

BEFORE START

Applicable to: ALL

| | |
|---------------------------|--------------------------------------|
| SECURITY INSPECTION | COMPLETE (BOTH) |
| CKPT PREP..... | COMPLETE (BOTH) |
| OXYGEN..... | ____ SET (BOTH) |
| GEAR PINS & COVERS..... | REMOVE |
| FUEL QTY..... | ____ LBS ± ____ LBS |
| T.O DATA..... | SET |
| ALTIMETER..... | ____ INHG/HPA SET & X-CHECKED (BOTH) |
| PARK BRK..... | SET |
| SIGNS ON/AUTO | |
| ADIRS NAV | |
| WINDOWS/DOORS..... | CLOSE (BOTH) |
| BEACON ON | |
| C/L COMPLETE | |

AFTER START

Applicable to: ALL

| | |
|---|--------------|
| A-ICE..... | AS RQRD |
| ● If ECAM status not normal: ECAM STS..... | CHECK |
| ● If ECAM status normal: ECAM STS: NORMAL | |
| F/CTL..... | CHECK (BOTH) |

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PROCEDURES
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NORMAL CHECKLISTS

AFTER START (Cont'd)

RUDDER TRIM NEUTRAL

[2] The rudder trim at neutral appears completed (i.e. in green) when the rudder trim position is below $\pm 0.2^\circ$.

[L1] PITCH TRIM.....CHECK
GROUND EQUIPMENTCLEAR(BOTH)
C/L COMPLETE

BEFORE TAKEOFF

Applicable to: ALL

FLIGHT INSTRUMENTS.....CHECK (BOTH)
TAKEOFF BRIEFING.....CONFIRM
V1 / VR / V2 / FLEX TEMP.....CHECK (BOTH)

T.O

SIGNS ON
SPLRs : ARM
FLAPS T.O
AUTO BRAKE RTO
T.O CONFIG NORMAL

CABIN CREW.....ADVISE
PACK 1+2.....AS RQRD
EXTERIOR LIGHTSSET
C/L COMPLETE

AFTER TAKEOFF/CLIMB

Applicable to: ALL

LDG GEAR UP
FLAPS 0
PACK 1+2 ON
APU MASTER SW OFF

LAND SW.....OFF
ALTIMETER.....STANDARD SET & X-CHECKED (BOTH)
C/L COMPLETE



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APPROACH

Applicable to: ALL

CABIN CREW ADVISE
LANDING DATA SET (BOTH)
AUTO BRAKE / BTW AS RQRD
LANDING BRIEFING CONFIRM

● If ECAM status not normal:

ECAM STS.....CHECK

● If ECAM status normal:

eCAM STS: NORMAL

ALTIMETER..... ____ INHG/HPA SET & X-CHECKED (BOTH)
LAND SW ON
MINIMA..... ____ SET (BOTH)
SEAT BELTS ON
C/L COMPLETE

LANDING

Applicable to: ALL

A/THR MODE..... AS RQRD

LDG

SIGNS ON
LDG GEAR DOWN
FLAPS LDG

The FLAPS LDG appears completed (i.e. in green), when the flaps lever position is in accordance with the landing configuration, entered on the APPR panel of the FMS ACTIVE PERF page.

SPLRs : ARM

C/L COMPLETE

AFTER LANDING

Applicable to: ALL

EXTERIOR LIGHTS SET
SPLRs : DISARM
FLAPS 0
APU : START

Continued on the following page



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NORMAL CHECKLISTS

AFTER LANDING (Cont'd)

C/L COMPLETE

PARKING

Applicable to: ALL

PARK BRK ON
EXT LT..... AS RQRD
APU BLEED ON
ALL ENG_s OFF
FUEL PMPs OFF
SEAT BELTS OFF
C/L COMPLETE

SECURING THE AIRCRAFT

Applicable to: ALL

ADIRS..... OFF
OXYGEN OFF
APU BLEED OFF
EMER EXIT LT OFF
SIGNS OFF
APU..... OFF
ALL 3 LAPTOPS..... OFF
ALL 4 BAT_s OFF
C/L COMPLETE



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STANDARD CALLOUTS

COMMUNICATIONS AND STANDARD TERMS

Applicable to: ALL

Standard phraseology is essential to ensure an effective flight crew communication. The phraseology should be concise and exact. The following section lists the callouts that the flight crew should use as standard callouts. They supplement the callouts identified in the SOP. These standard Airbus callouts are also designed to promote situational awareness, and to ensure the flight crew understanding of systems and their use in line operation.

CHECKLIST CALLOUTS

Applicable to: ALL

- "CHECK" is a command for the other flight crewmember to check an item
- "CHECKED" is a response to indicate that an item is checked
- "CROSSCHECKED" is a callout verifying information from both flight crew's stations.
- "ROGER" is a response that an item has been understood.

If a checklist should to be interrupted, announce "STANDBY CHECKLIST".

Announce "CONTINUE CHECKLIST" for the continuation of the checklist.

After a checklist is completed, announce " __CHECKLIST COMPLETE".

ACTIONS COMMANDED BY PF

Applicable to: ALL

The following commands do not necessarily initiate a guidance mode change, e.g. selected to managed, or managed to selected. The intent is to ensure clear, consistent, and standard communication between crewmembers. All actions performed on the AFS CP and FMS must be checked on the PFD and ND: E.g. "FL 350 blue", "FL 200 magenta". The flight crew should ensure that the correct AFS CP control is used, then verify the indications on the PFD/ND.

"SET"

The "SET" command means using an AFS CP knob to set a value, but not to change a mode.
"SET" is performed by only rotating the appropriate knob.

Examples:

- "SET GO AROUND ALTITUDE __"
- "SET QNH __"
- "SET FL __"
- "SET HDG __".

"MANAGE/PULL"

The "MANAGE" command means pushing an AFS CP knob to engage, or arm, a managed mode or target.

The "PULL" command means pulling an AFS CP knob to engage a selected mode or target.

Examples:

- "PULL HDG 090": The flight crew pulls and turns the HDG/TRK knob
- "MANAGE NAV": The flight crew pushes the HDG/TRK knob
- "FL 190 PULL": The flight crew turns and pulls the ALT knob
- "FL 190 MANAGE": The flight crew turns and pushes the ALT knob
- "PULL SPEED 250 kt": The flight crew pulls and turns the SPD/MACH knob
- "MANAGE SPEED": The flight crew pushes the SPD/MACH knob.

Note: If the value was previously set, there is no requirement to repeat the figure. Simply announce e.g. "PULL HDG", "PULL SPEED", "FL PULL".

The V/S / FPA knob has no managed function. The standard callouts for the use of this knob are the followings:

- "V/S Plus(Minus) 700 PULL", or
- "FPA Minus 3 ° PULL": The flight crew turns and pulls the V/S / FPA knob.

"PRESS ALT"

The ALT pb enables to immediately start a level off. The standard callout for the use of the ALT pb is "PRESS ALT".

"ARM"

The "ARM __" command means arming a system by pushing the specified AFS CP control.

Examples:

- "ARM APPROACH"
- "ARM LOC."

"ON/OFF"

The simple "ON" or "OFF" command is used for the autopilot, the flight director, the A/THR and the velocity vector.

FMA

Applicable to: ALL

The PF should announce any FMA change, unless specified differently (e.g. CAT II & III task sharing).



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Therefore, the PF should announce:

- All armed modes with their associated color (e.g. blue, magenta): E.g. "G/S blue", "LOC blue"
- All active modes without their associated color (e.g. green, white): E.g. "NAV", "ALT".

The PM should check and respond "CHECKED" to all FMA changes announced by the PF.

ALTITUDE

Applicable to: ALL

The PM announces "ONE THOUSAND TO LEVEL" when passing 1 000 ft before the cleared altitude or FL, and the PF announces "CHECKED".

FLAPS OR GEAR CONFIGURATION

Applicable to: ALL

FLAPS CALLOUTS

| FLAPS Configuration | Callout |
|---------------------|--------------|
| 1 | "FLAPS ONE" |
| 1+F | "FLAPS ONE" |
| 0 | "FLAPS ZERO" |

The flight crewmember replies the following callout when he/she selects the new FLAPS position, e.g.:

| | Callout | Remark |
|----|-----------------|---|
| PF | "FLAPS ONE" | |
| PM | "SPEED CHECKED" | The PM checks that the speed is: - Above S or F speed and accelerating, during takeoff - Below VFE next and decelerating during approach. |
| | "FLAPS ONE" | The PM selects the FLAP lever position. The PM checks the blue FLAPS lever position on the PFD to confirm the correct selection, then replies. |

GEAR CALLOUTS

| | Callout | Remark |
|----|-----------------|---|
| PF | "GEAR UP(DOWN)" | |
| PM | "GEAR UP(DOWN)" | The PM selects the landing gear lever position. The PM checks the red lights landing gear indicator lights on the centre instrument panel to confirm the landing gear operation, then replies. |



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FLIGHT PARAMETERS

Applicable to: ALL

The PM announces:

- "SPEED" if the speed decreases below the speed target -5 kt, or increases above the speed target +10 kt
- "PITCH" if the pitch attitude increases above 7 ° nose up, or below -3 ° nose down
- "BANK" if the bank angle increases above 5 °
- "SINK RATE" if the descent rate increases above 1 000 ft/min
- "LOC" if the LOC, F-LOC or LOC B/C deviation increases above 1/4 dot
- "GLIDE" if G/S or F-G/S deviation increases above 1 dot
- "COURSE" if the course increases above 1/2 dot VOR or 5 ° ADF
- "XX FT HIGH(LOW)" at altitude checks point.

Note: *The PM announces the attitude deviations until landing.*

If the PM announces a flight parameter deviation, the appropriate PF response should be:

- Acknowledge the PM callout, for appropriate flight crew coordination
- Take immediate corrective action to bring the parameter back into the defined stabilized conditions
- Assess whether stabilized conditions will be recovered early enough prior to landing. If not, initiate a go-around.

PF/PM DUTIES TRANSFER

Applicable to: ALL

Both flight crewmembers must use the following callouts in order to transfer the controls:

To give control: The PF announces "YOU HAVE CONTROL". The other flight crewmember accepts this transfer by announcing "I HAVE CONTROL", before assuming the PF duties.

To take control: The PM announces "I HAVE CONTROL". The other flight crewmember accepts this transfer by announcing "YOU HAVE CONTROL", before assuming the PM duties.

SUMMARY FOR EACH FLIGHT PHASE

Applicable to: ALL

| To Remove the External Power Units | | |
|------------------------------------|--------------------------|-----------------------|
| Event | CAPTAIN or FIRST OFFICER | Ground Personnel |
| Initial ground contact | GROUND (from) COCKPIT | COCKPIT (from) GROUND |
| External __ disconnection | REMOVE EXTERNAL __ | EXTERNAL__ REMOVED |



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Before Pushback or Start

| Event | CAPTAIN | FIRST OFFICER |
|--|------------------|---------------------------|
| Before pushback/start up clearance is received | BEFORE START C/L | DOWN TO THE LINE |
| After pushback/start up clearance is received | BELOW THE LINE | BEFORE START C/L COMPLETE |

Pushback/Engine Start

| Event | CAPTAIN | Ground Personnel |
|--|--|--|
| When ready for pushback, and pushback clearance received from ATC | GROUND (from) COCKPIT, CLEARED FOR PUSHBACK (or PUSHBACK APPROVED) | COCKPIT (from) GROUND, RELEASE PARKING BRAKE |
| Start of pushback | PARKING BRAKE RELEASED | |
| When ready to start engines | READY TO START ENGINES ? STARTING ENG(S)___ | CLEARED TO START ENGINES |
| When pushback complete | PARKING BRAKE SET | PUSHBACK COMPLETED. SET PARKING BRAKE |
| When ready to disconnect (i.e. after engine are started and parameters are stabilized) | CLEAR TO DISCONNECT | STAND BY HAND SIGNAL ON THE LEFT (or RIGHT) |

After Engine Start

| Event | CAPTAIN | FIRST OFFICER |
|---|----------------------|--------------------------------|
| Flight control check in the following sequence: | FLIGHT CONTROL CHECK | |
| 1. Elevators | | FULL UP, FULL DOWN, NEUTRAL |
| 2. Ailerons/Spoilers | | FULL LEFT, FULL RIGHT, NEUTRAL |
| 3. Rudder ⁽¹⁾ | RUDDER | FULL LEFT, FULL RIGHT, NEUTRAL |
| All engines are started and stabilized, and external power units are disconnected | AFTER START C/L | AFTER START C/L COMPLETE |

(1) The FIRST OFFICER should follow the pedal movements with his/her feet.



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Taxi

| Event | CAPTAIN | FIRST OFFICER |
|--|--|-----------------------------|
| When taxi clearance obtained | CLEAR LEFT SIDE | CLEAR RIGHT SIDE |
| Brake transfer check | BRAKE CHECK | PRESSURE ZERO |
| During taxi | BEFORE TAKEOFF C/L | DOWN TO THE LINE |
| When takeoff or line-up clearance obtained | FINAL CLEAR, RUNWAY CLEAR (Verify clearing of own side) | |
| Lining up on the runway | BELOW THE LINE | BEFORE TAKEOFF C/L COMPLETE |

TAKEOFF AND CLIMB

| Event | PF | PM |
|---|--|--------------------------------------|
| After obtaining takeoff clearance | "CLEARED FOR TAKEOFF" | "CLEARED FOR TAKEOFF" |
| | "TAKE OFF" | "TIME SET" |
| When thrust lever set to FLEX or TOGA, check FMA on PFD | MAN FLEX XX (or TOGA), SRS, RWY (or Blank), A/THR Blue | "TIME CHECK" |
| Before reaching 80 kt | CHECKED | THRUST SET |
| At 100 kt | CHECKED | ONE HUNDRED KNOTS |
| At V1 | | V1 ⁽¹⁾ |
| At VR | | ROTATE |
| Landing gear retraction | GEAR UP | POSITIVE CLIMB GEAR UP |
| If AP is engaged by PM | AP 1(2) ON | |
| Checklist | AFTER TAKEOFF/CLIMB C/L | DOWN TO THE LINE |
| At 10,000 feet | CHECK | ONE ZERO THOUSAND |
| When approaching or passing transition altitude | | TRANSITION, ALTIMETER RESET STANDARD |
| At 10,000ft or transition altitude whichever comes up later | BELOW THE LINE | AFTER TAKEOFF/CLIMB C/L COMPLETE |

(1) The PM monitors the auto callout, or announces if it is inoperative.



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For more information on callouts associated with a malfunction before V1 at takeoff, Refer to FCTM/AO-90 Abnormal and Emergency Callouts.

| DESCENT | | |
|--|---|--|
| Event | PF | PM |
| At 20,000feet (or TOD if CRZ LEVEL is below 20,000feet) | SEAT BELTS ----- AS RQRD (3 chimes then Auto or On) | |
| | CABIN CREW PREPARE FOR LANDING (PA by captain) | |
| When approaching or passing transition level | inHg or hPa RESET | TRANSITION, ALTIMETER RESET inHg or hPa |
| At 10,000 feet | CHECKED | ONE ZERO THOUSAND |
| | APPROACH C/L | APPROACH C/L COMPLETE |

| Approach and Landing | | |
|--|---|---|
| Event | PF | PM |
| Activation of approach phase | ACTIVATE APPROACH PHASE | APPROACH PHASE ACTIVATED |
| RA alive | CHECKED | monitors pin-programmed auto callout "TWO THOUSAND FIVE HUNDRED" or announces if inoperative ^{(1) (2)} |
| At G/S* or below GA altitude for NPA, without AP | SET GA ALTITUDE_FT | GA ALTITUDE_SET |
| Landing checklist | LANDING C/L | LANDING C/L COMPLETE |
| FAF | CHECKED | PASSING__(Fix Name),__FT |
| 1 000 ft HAT | "STABILIZED" or "VMC-CORRECTING" in VMC or "GO-AROUND FLAPS" GA | "ONE THOUSAND, CLEARED TO LAND" or "ONE THOUSAND, CONTINUE" (Call out any unstable conditions) ⁽²⁾ |
| 100 ft above MDA/DH | CHECKED | ONE HUNDRED ABOVE ⁽²⁾ |
| Visual references at MDA/DH | CONTINUE | MINIMUM ⁽²⁾ |
| No visual reference at MDA/DH | GO-AROUND - FLAPS | MINIMUM ⁽²⁾ |
| | | ONE HUNDRED ⁽²⁾ FIFTY ⁽²⁾ |
| After touchdown | | |

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Continued from the previous page

| Approach and Landing | | |
|--------------------------|---------|------------------------------|
| Event | PF | PM |
| Ground spoilers extended | | SPOILERS ⁽³⁾ |
| REV on EWD | | REVERSE GREEN ⁽⁴⁾ |
| Deceleration | | DECEL ⁽⁵⁾ |
| At 80 kt | CHECKED | EIGHTY KNOTS |

- (1) Crew awareness: The flight crew should now keep RA in scan to landing.
- (2) The PM monitors the pin-programmed auto callouts, or announces if they are inoperative.
- (3) If the spoilers are not extended, announce "NO SPOILER".
- (4) If the reverse deployment is not as expected, announce "NO REVERSE ENGINE_" or "NO REVERSE", as appropriate.
- (5) In the case of failure or no positive deceleration: "NO DECEL"

"DECEL" callout means that the deceleration is felt by the flight crew, and confirmed by the speed trend on the PFD. It can also be confirmed by the DECEL indication on the PFD, if the autobrake is active.

However, the DECEL indication appears when the current deceleration reaches 80 % of the selected deceleration rate. Therefore it is not an indication of the correct autobrake functioning, but it indicates that the deceleration rate is reached. E.g. the DECEL indication may not appear on a contaminated runway, with the autobrake active, due to the effect of the anti-skid.

The DECEL indication may also appear on a dry runway, with the autobrake set to LO: In this case, the deceleration may be reached due to the only use of reversers, and without the autobrake activation.

| Go-Around | | |
|------------------------|-------------------------|-------------------------------------|
| Event | PF | PM |
| GO-AROUND EXECUTION | GO-AROUND – FLAPS | |
| Flaps retraction | | FLAPS__ |
| Gear retraction | GEAR UP | POSITIVE CLIMB GEAR UP |
| Checklist | AFTER TAKEOFF/CLIMB C/L | DOWN TO THE LINE |
| At transition altitude | BELOW THE LINE | AFTER TAKEOFF/CLIMB C/L COMPLETE |

| After Landing | | |
|---------------|-------------------|----------------------------|
| Event | CAPTAIN | FIRST OFFICER |
| Checklist | AFTER LANDING C/L | AFTER LANDING C/L COMPLETE |

| Parking | | |
|-----------|-------------|----------------------|
| Event | CAPTAIN | FIRST OFFICER |
| Checklist | PARKING C/L | PARKING C/L COMPLETE |



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FLIGHT CREW
OPERATING MANUAL

PROCEDURES
NORMAL PROCEDURES
STANDARD CALLOUTS

Securing the Aircraft

| Event | CAPTAIN | FIRST OFFICER |
|-----------|---------------------------|---------------------------------------|
| Checklist | SECURING THE AIRCRAFT C/L | SECURING THE AIRCRAFT C/L COMPLETE |



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STANDARD CALLOUTS

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TASKSHARING

SAFETY EXTERIOR INSPECTION

Applicable to: ALL

| CAPT | FO |
|-------------------------|-------------------|
| WHEEL CHOCKS..... | CHECK IN POSITION |
| LANDING GEAR DOORS..... | CHECK POSITION |
| APU AREA..... | CHECK |

PRELIMINARY COCKPIT PREPARATION

Applicable to: ALL

POWER-UP (IF AIRCRAFT NOT ELECTRICALLY SUPPLIED):

| CAPT | FO |
|---------------------|---|
| | ENG MASTERS 1, 2, 3, 4..... OFF |
| | ENG START selector NORM |
| | BOTH WIPER selector OFF |
| | ALL BAT pb-sw (BAT 1, ESS, 2 and APU BAT)..... ON |
| | EXT pb-sw (2, 3, 1, 4)..... ON |
| COCKPIT LIGHTS..... | AS RQRD |
| | COCKPIT LIGHTS..... AS RQRD |

OIS INITIALIZATION:

| CAPT | FO |
|------------------------------|------------------------------------|
| LAPTOP.....ON | LAPTOP.....ON |
| | BACKUP LAPTOP.....ON |
| KCCU CCD sw and KBD sw | ON |
| OIT knob | ON |
| OIT SIDE swNSS AVNCS | OIT SIDE swNSS AVNCS |
| LOGIN AS PILOT.....PERFORM | LOGIN AS PILOT.....PERFORM |
| OIT SIDE sw | FLT OPS |
| LOGIN AS PILOT.....PERFORM | OIT SIDE sw |
| FLT FOLDER.....START | FLT OPS |
| NAV CHARTS.....START | OIT SIDE sw |
| OPS LIBRARY.....START | FLT FOLDER.....START |
| | FLT OPS |
| COMPANY COM : | FLIGHT FOLDER APPLICATION : |
| OIT SIDE swNSS AVNCS | LOAD BOX.....START |
| INIT DATA.....SEND | EFF.....LOAD |
| OIT SIDE sw | FLT OPS |
| | EFF.....DISPLAY AS CURRENT |

•In accordance with Operators policy or if required by operational regulation:

| | | | |
|-----------------------|---------------------|-----------------------|---------------------|
| FLT OPS STS page..... | CHECK OIS VERSION | FLT OPS STS page..... | CHECK OIS VERSION |
| NAV CHARTS..... | CHECK VALIDITY DATE | NAV CHARTS..... | CHECK VALIDITY DATE |



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TASKSHARING

ECAM/LOGBOOK CHECK:

| CAPT | FO |
|-----------------------------------|---------------------------|
| RCL pb | PRESS |
| CLEARED or CANCELLED ALERTS | CHECK |
| OIT SIDE sw | NSS AVNCS |
| MEL/CDL ITEMS..... | CHECK AND NOTE CDL |
| OIT SIDE sw | FLT OPS |
| MEL/CDL ITEMS..... | CHECK DISPATCH CONDITIONS |
| OIT SIDE sw | NSS AVNCS |
| AIRCRAFT ACCEPTANCE..... | PERFORM |

APU AND ENG FIRE TEST/APU START:

| CAPT | FO |
|----------------------------|---------|
| RMP 1 and 2..... | ON/SET |
| APU and ENG FIRE TEST..... | PERFORM |
| APU MASTER SW pb-sw | ON |
| APU START pb | ON |
| EXT PWR (if ON)..... | AS RQRD |

OIS PREPARATION:

| CAPT | FO |
|--|------------------------------|
| FMS/OIS FLT OPS STS : | |
| •If F-PLN is received via ACARS: | |
| OIT SIDE sw | FLT OPS |
| FLT OPS STS page..... | SELECT |
| FLT OPS STS page..... | CHECK UPDATED |
| •If F-PLN is not received via ACARS: | |
| OIT SIDE sw | FLT OPS |
| FLT OPS STS page..... | SELECT |
| FLT OPS STS page..... | CHECK UPDATED |
| EFF : | |
| EFF | CHECK, AS RQRD |
| PRELIMINARY PERFORMANCE DETERMINATION : | |
| T.O PERF..... | START |
| AIRFIELD DATA..... | OBTAİN |
| MEL ITEMS..... | CHECK ACTIVATED |
| CDL ITEMS..... | CHECK ACTIVATED and COMPLETE |
| ACFT STATUS..... | CHECK |
| RECEIVED CPNY F-PLN.. | INSERT |
| FLT NBR and FROM/TO.. | CHECK |
| OIT SIDE sw | FLT OPS |
| FLT OPS STS page..... | SELECT |
| FLT OPS STS page..... | CHECK UPDATED |
| OIT SIDE sw | FLT OPS |
| FLT OPS STS page..... | SELECT |
| FLT OPS STS page..... | INSERT |
| FLT NBR and FROM/TOFLT OPS STS page..... | CHECK |

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OIS PREPARATION:

| CAPT | FO |
|--|--|
| OIS PRELIMINARY T.O PERF.....COMPUTE and CROSSCHECK | OIS PRELIMINARY T.O PERF.....COMPUTE and CROSSCHECK |
| | •In accordance with Operators policy or if required by operational regulation: PRELIMINARY TAKEOFF PERFORMANCE.....STORE IN CURRENT EFF |
| OEB : | |
| OEB in FCOM.....CHECK | OEB in FCOM.....CHECK |

EXTERIOR WALKAROUND

Applicable to: ALL

| CAPT | FO |
|---|-----------|
| ECAM OXY PRESS/HYD QTY/ENG OIL QTY.....CHECK | |
| SPEED BRAKE leverCHECK RETRACTED/DISARMED | |
| PARK BRK handle ON | |
| BODY ACCU and BRK pressure indications..... CHECK | |
| FLAPS..... CHECK POSITION | |
| EMER EQPT.....CHECK | |
| GEAR PINS and COVERS.....ONBOARD and STOWED | |
| EXTERIOR WALKAROUND..... PERFORM | |

COCKPIT PREPARATION

Applicable to: ALL

OVERHEAD PANEL:

| CAPT | FO |
|-------------|--------------------------------------|
| | ALL WHITE LIGHTS..... OFF |
| | RCDR GND CTL pb-SW ON |
| | CAPT/CAPT & PURS sw AS RQRD |
| | PROBE & WINDOW HEAT pb-SW AUTO |
| | ALL IR MODE selector NAV |
| | ELT..... ARMED |
| | RESET BUTTONS (left side).....CHECK |
| | STROBE sw AUTO |
| | BEACON sw OFF |
| | REMAINING EXT LIGHTS..... AS RQRD |
| | SEAT BELTS sw ON |

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OVERHEAD PANEL:

| CAPT | FO |
|--------------------------------------|----------|
| NO SMOKING sw | ON |
| EMER EXIT LT sw | ARM |
| ENG START selector | NORM |
| APU BLEED pb-sw | ON |
| XBLEED selector | AUTO |
| AIR FLOW selector | NORM |
| CKPT selector | AS RQRD |
| CABIN selector | PURS SEL |
| BAT..... | CHECK |
| TRIM TK FEED sw | AUTO |
| ALL LIGHTS on MAINTENANCE panel..... | OFF |
| CARGO AIR COND selectors..... | AS RQRD |
| RMP 3..... | ON |
| STBY RAD NAV key..... | OFF |
| CVR TEST pb | PRESS |
| RESET BUTTONS (right side)..... | CHECK |

CENTER INSTRUMENT PANEL:

| CAPT | FO |
|--------------------------|-----------|
| SWITCHING selectors..... | NORM |
| ISIS..... | CHECK |
| L/G GRVTY sw | OFF |
| CLOCK..... | CHECK/SET |
| A-SKID sw | ON |

PEDESTAL:

| CAPT | FO |
|--|-----------------|
| PARK BRK..... | ON |
| •If brakes are hot and chocks are in place: PARK BRK..... | OFF |
| BODY ACCU Pressure..... | CHECK/REINFLATE |
| THRUST LEVERS | IDLE |
| THRUST REVERSER LEVERS | STOWED |
| ENG MASTERS 1, 2, 3 and 4..... | OFF |
| CKPT DOOR sw | NORM |

MFD ATC COM :

MSG RECORD..... ERASE ALL

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| | | |
|---------------------------------|---|--|
| | •If ADS services are expected: ADS.....CHECK ARMED | |
| | ATC CLEARANCE.....THE MOST PROBABLE/OBTAIN | |
| | NAV CHARTS CLIPBOARD.....PREPARE | |
| MFD SURV : | SURV DEFAULT SETTINGS.....SELECT | |
| FMS INITIALIZATION : | FMS.....INITIALIZE | |
| | ACTIVE F-PLN.....CHECK/COMPLETE | |
| | SEC F-PLN(s).....AS APPROPRIATE | |
| MFD SURV : | SURV DEFAULT SETTINGS.....SELECT | |
| FMS INITIALIZATION : | FMS INITIALIZATION.....CROSSCHECK | |
| NAV CHARTS CLIPBOARD.....IMPORT | | |

GLARESHIELD:

| CAPT | FO |
|--|------------------------------|
| • When both flight crewmembers are seated: | |
| INTEGRAL LIGHTS.....AS RQRD | INTEGRAL LIGHTS.....AS RQRD |
| LOUDSPEAKER knobSET | LOUDSPEAKER knobSET |
| BAROMETRIC REFERENCE.....SET | BAROMETRIC REFERENCE.....SET |
| EFIS CP.....AS RQRD | EFIS CP.....AS RQRD |
| WX pb on EFIS CP.....OFF | WX pb on EFIS CP.....OFF |
| AFS CP.....CROSSCHECK | AFS CP.....CHECK/SET |

LATERAL CONSOLE AND CAPT / FO INSTRUMENT PANELS:

| CAPT | FO |
|--|---|
| INT/RAD SW | INT |
| OXYGEN MASK TEST.....PERFORM | OXYGEN MASK TEST.....PERFORM |
| REGUL PR LO indication.....CHECK NOT DISPLAYED | REGUL PR LO indication.....CHECK NO DISPLAYED |
| SLIDING WINDOW.....CLOSED/LOCKED | SLIDING WINDOW.....CLOSED/LOCKED |
| PFD.....CHECK | PFD.....CHECK |
| ND.....CHECK | ND.....CHECK |

TAKEOFF BRIEFING:

| PF | PM |
|------------------------------|----|
| TAKEOFF BRIEFING.....PERFORM | |



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TASKSHARING

BEFORE PUSHBACK OR START

Applicable to: ALL

BEFORE START CLEARANCE:

| CAPT | FO |
|--|--|
| FINAL LOADSHEET..... | CHECK |
| ZFW/ZFWCG in FMS..... | CROSSCHECK |
| FOB..... | CHECK |
| LOADSHEET TOCG/ECAM GWCG..... | CROSSCHECK |
| ECAM GWCG..... | CHECK WITHIN LIMITS |
| •If ECAM GWCG is within the operational limits: THS FOR _ in FMS..... | CROSSCHECK |
| FINAL LOADSHEET..... | SIGN and EXPORT |
| •If ECAM GWCG is not within the operational limits: AUTO GND XFR..... | MONITOR |
| THS FOR _ in FMS..... | CROSSCHECK |
| FINAL LOADSHEET..... | SIGN and EXPORT |
| OIS FINAL T.O PERF..... | CONFIRM or RECOMPUTE |
| REVISED FMS T.O DATA..... | CROSSCHECK |
| SEATING POSITION..... | ADJUST |
| HUD..... | DEPLOY/ADJUST |
| FMS ACTIVE/PERF page (PF) / FMS ACTIVE/F-PLN page (PM)..... | SET |
| | EXT PWR..... |
| | EXT PWR DISCONNECTION..... |
| | LP GROUND CARTS..... |
| BEFORE START C/L down to the line..... | COMPLETE |
| | BEFORE START C/L down to the line..... |
| | COMPLETE |

*In accordance with Airline policy or if required by operational regulation:

FINAL T.O PERF..... STORE IN CURRENT EFF

AT START CLEARANCE:

| CAPT | FO |
|--|----------------------------------|
| | PUSHBACK/START UP CLEARANCE..... |
| BEACON sw | ON |
| TAXI VIDEO | AS RQRD |
| WINDOWS AND DOORS..... | CHECK CLOSED |
| SLIDES ARMING..... | ORDER |
| SLIDES..... | CHECK ARMED |
| THR LEVERS..... | IDLE |
| •If pushback is not required: PARK BRK..... | ON |

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AT START CLEARANCE:

| CAPT | FO |
|---|--|
| •If pushback is required: PARK BRK.....OFF | |
| N/W STEER DISC MEMO.....CHECK DISPLAYED | |
| BEFORE START C/L below the line.....COMPLETE | BEFORE START C/L below the line.....COMPLETE |

ENGINE START

Applicable to: ALL

| CAPT | FO |
|----------------------------|--------------|
| ENG START selector | IGN START |
| START ENGINES 1 and 2..... | ANNOUNCE |
| ENG MASTER 1 then 2..... | ON |
| ENG IDLE PARAMETERS..... | CHECK NORMAL |
| START ENGINES 3 and 4..... | ANNOUNCE |
| ENG MASTER 3 then 4..... | ON |
| ENG IDLE PARAMETERS..... | CHECK NORMAL |

AFTER START

Applicable to: ALL

| CAPT | FO |
|---|------------------------------|
| ENG START selector | NORM |
| APU BLEED pb-sw | OFF |
| AI ENG ANTI-ICE pb-sw | AS RQRD |
| •If the APU is not required: APU MASTER SW pb-sw | OFF |
| | FLAPS.....SET |
| | PITCH TRIM.....CHECK |
| ECAM STATUS..... | CROSSCHECK |
| CLEAR TO DISCONNECT..... | ANNOUNCE |
| N/W STEER DISC MEMO..... | CHECK NOT DISPLAYED |
| FLIGHT CONTROLS..... | CHECK |
| AFTER START C/L..... | COMPLETE |
| | AFTER START C/L.....COMPLETE |



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TASKSHARING

TAXI

Applicable to: ALL

| CAPT | FO |
|---|--|
| | TAXI CLEARANCE..... OBTAIN |
| TAXI pb on EFIS CP AS RQRD | TAXI pb on EFIS CP AS RQRD |
| ND RANGE selector ZOOM, AS APPROPRIATE | ND RANGE selector ZOOM, AS APPROPRIATE |
| NOSE sw TAXI | |
| RWY TURN OFF & CAMERA sw AS RQRD | |
| PARK BRK..... OFF | |
| THRUST LEVERS..... AS RQRD | |
| BRAKES..... PRESS | LH & RH BRK PRESSURE..... CHECK ZERO |
| NOSEWHEEL STEERING..... AS RQRD | |
| | ATC CLEARANCE..... CONFIRM |
| If takeoff data or conditions changed: | |
| TAKEOFF PERF RESULTS..... CROSSCHECK | TAKEOFF PERF..... REVISE/COMPUTE |
| FMS UPDATES..... CROSSCHECK | FMS TAKEOFF PERF DATA..... UPDATE |
| | FLAPS lever..... AS APPROPRIATE |
| | F-PLN (SID, TRANS)..... REVISE or CHECK |
| | INITIAL CLIMB SPEED AND SPEED LIMIT... REVISE or CHECK |
| | AFS CP..... SET |
| | FD..... CHECK SELECTED ON |
| PFD/ND..... CHECK | PFD/ND..... CHECK |
| FMS ACTIVE/PERF page (PF) / FMS ACTIVE/F-PLN page (PM)..... | SET |
| TAKEOFF BRIEFING..... | CONFIRM |
| CABIN..... READY | CABIN..... READY |
| | RTO pb ARM |
| | ATC CODE..... CONFIRM/SET |
| | TO CONFIG pb TEST |
| | T.O MEMO..... NO BLUE LINE |
| BEFORE TAKEOFF C/L down to the line...COMPLETE | BEFORE TAKEOFF C/L down to the line..... COMPLETE |

BEFORE TAKEOFF

Applicable to: ALL

| CAPT | FO |
|---------------------------------|--|
| | TAKEOFF OR LINE UP CLEARANCE..... OBTAIN |
| | CABIN CREW..... ADVISE |
| | PACKS 1 and 2..... AS RQRD |
| | EXTERIOR LIGHTS..... SET |
| TAXI pb on EFIS CP..... OFF | TAXI pb on EFIS CP..... OFF |
| ND RANGE selector AS RQRD | ND RANGE selector AS RQRD |

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| CAPT | FO |
|--|--|
| EFIS CP OPTIONS..... | AS RQRD |
| TRAFFIC pb on EFIS CP..... | ON |
| APPROACH PATH..... | CHECK CLEAR OF TRAFFIC |
| | STROBE sw |
| TAKEOFF RUNWAY..... | CONFIRM |
| SLIDING TABLE..... | STOWED |
| BEFORE TAKEOFF C/L below the line..... | COMPLETE |
| | TA pb |
| | BEFORE TAKEOFF C/L below the line..... |
| | COMPLETE |

TAKEOFF

Applicable to: ALL

| PF | PM |
|--|---------------------------------------|
| CONFIRM TAKEOFF REMINDER (HAA) | VERIFY TAKEOFF REMINDER |
| ANNOUNCE TYPE OF TAKEOFF | |
| •After obtaining takeoff clearance: | |
| CLEARED FOR TAKEOFF | CLEARED FOR TAKEOFF |
| | "TIME SET" |
| TAKEOFF..... | ANNOUNCE |
| THR..... | 25 % "TIME CHECK" START THE CHRONO |
| •If the crosswind is at, or below 23 kt, and there is no tailwind: | |
| BRAKES..... | RELEASE |
| THRUST LEVERS..... | FLX or TOGA |
| •If the crosswind is above 23 kt, and/or in the case of tailwind: | |
| BRAKES..... | RELEASE |
| THRUST LEVERS..... | 50 % |
| •At 20 kt ground speed: | |
| THRUST LEVERS..... | FLX or TOGA |
| DIRECTIONAL CONTROL..... | USE RUDDER |
| | PFD/ND..... |
| | SCAN |
| | TAKEOFF THRUST |
| | CHECK |
| •Before reaching 80 kt: | |
| | THRUST SET |
| | ANNOUNCE |
| | PFD and ENG indications..... |
| | SCAN |
| •At 100 kt: | |
| ONE HUNDRED KNOTS..... | CROSSCHECK |
| ONE HUNDRED KNOTS..... | ANNOUNCE |
| •At V1: | |
| | V1..... |
| | MONITOR or ANNOUNCE |

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| PF | PM |
|---|--|
| •At VR: | |
| ROTATION..... | PERFORM ROTATION..... ORDER |
| •When positive climb: | |
| L/G UP..... AP..... | ORDER L/G..... UP AS RQRD |
| •At the thrust reduction altitude: | |
| THRUST LEVERS | CL PACKS 1 and 2 (if applicable)..... ON CHRONO..... RESET |
| FLAPS 1..... | ORDER FLAPS 1..... SET |
| •At S speed: | |
| FLAPS ZERO..... | ORDER FLAPS ZERO..... SET EXTERIOR LIGHTS..... SET GND SPLRS..... DISARM |

AFTER TAKEOFF

Applicable to: ALL

| PF | PM |
|--|--|
| •If the APU was used to supply the air conditioning during takeoff: | |
| | APU BLEED pb-sw OFF APU MASTER SW pb-sw OFF |
| •If the takeoff was performed with TA ONLY: | |
| | TA pb TA/RA |
| | ANTI-ICE pb-sw AS RQRD |
| SLIDING TABLE..... RELEASE, AS NECESSARY | SLIDING TABLE..... RELEASE, AS NECESSARY |
| AFTER TAKEOFF/CLIMB C/L down to the line | COMPLETE AFTER TAKEOFF/CLIMB C/L down to the line.... COMPLETE |

CLIMB

Applicable to: ALL

| PF | PM |
|-----------------------|--|
| •At 10 000 ft: | |
| SEAT BELTS sw | LAND sw OFF |
| EFIS OPTIONS..... | AS RQRD EFIS OPTIONS..... AS RQRD ECAM MEMO..... REVIEW |
| | •On PF request, or at least with PF approval: |
| | NAVAIDS..... CLEAR OPT/MAX ALT..... CHECK |

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•**At transition altitude:**

| | |
|---|--|
| ALTIMETER..... | RESET STD |
| CRZ FL..... | SET AS RQRD |
| CLIMB SPEED MODIFICATIONS..... | AS RQRD |
| AFTER TAKEOFF/CLIMB C/L below the line.... COMPLETE | AFTER TAKEOFF/CLIMB C/L below the line....COMPLETE |
| | ANTI-ICE pb-sw AS RQRD |

CRUISE

Applicable to: ALL

| PF | PM |
|---|----------------|
| ALT CRZ on FMA..... | CHECK |
| In cruise, the tasksharing is left to the flight crew's appreciation. | |
| ECAM MEMO..... | REVIEW |
| SD PAGES..... | REVIEW |
| FLIGHT PROGRESS..... | CHECK |
| FUEL..... | MONITOR |
| STEP FLIGHT LEVEL..... | AS APPROPRIATE |
| • If GPS PRIMARY LOST: | |
| NAVIGATION ACCURACY..... | MONITOR |
| • If the oxygen mask was used: | |
| OXYGEN MASK | CHECK |

DESCENT PREPARATION

Applicable to: ALL

| PF | PM |
|---------------------------|---|
| | WEATHER AND LANDING INFORMATION.....OBTAIN |
| LDG ELEVN..... | CHECK |
| BAROMETRIC REFERENCE..... | PRESET |
| | BAROMETRIC REFERENCE..... PRESET |
| | STATUS page/STATUS MORE page.....CHECK |
| | SYNCHRO ECAM button.....CLICK |
| LANDING PERFORMANCE..... | CROSSCHECK |
| | • In accordance with Airlines policy or if required by operational regulation: |
| | LANDING PERFORMANCE.....STORE IN CURRENT EFF |
| FMS..... | CROSSCHECK |
| | FMS..... PREPARE |
| | RUNWAY SHIFT..... AS RQRD |
| | ND MODE selector |
| | ND RANGE selector |
| | RUNWAY..... SELECT |

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| PF | PM |
|---|---|
| | RUNWAY EXIT.....SELECT |
| | AUTO BRK/BTV.....SELECT, AS RQRD |
| *If the flight crew selected BTV: | |
| OANS RUNWAY LENGTH Vs CHARTS RUNWAY LENGTH.....CROSSCHECK | OANS RUNWAY LENGTH Vs CHARTS RUNWAY LENGTH.....CROSSCHECK |
| LANDING BRIEFING.....PERFORM | |
| | DESCENT CLEARANCE.....OBTAIN |
| CLEARED ALTITUDE ON AFS CP.....SET | |
| | ANTI ICE pb-swAS RQRD |

DESCENT

Applicable to: ALL

| PF | PM |
|--------------------------------------|--------------------------------------|
| DESCENT.....INITIATE | |
| DESCENT.....MONITOR | |
| RATE of DESCENT.....ADJUST, AS RQRD | |
| SPEED BRAKES.....AS RQRD | |
| WX pb/TERR pb on EFIS CP.....AS RQRD | WX pb/TERR pb on EFIS CP.....AS RQRD |
| AT 20000 FT : | |
| CAPT | |
| SEAT BELTS.....AS RQRD | |
| (3 chimes then Auto or On) | |
| PA | |
| "CABIN CREW PREPARE FOR LANDING" | |

***When the aircraft approaches the transition level, and when cleared for an altitude:**

AT 10000 FT :

| | | |
|---------------------------|--------------------------|---------|
| | LAND sw | ON |
| SEAT BELTS sw | | ON(CAP) |
| CSTR pb on EFIS CP.....ON | CSTR pb on EFIS CP | ON |
| LS pb | AS RQRD | AS RQRD |

***For NPA flown with the FLS function:**

| | | |
|-------------------------------|---------------------------------|-------|
| | FLS CAPABILITY..... | CHECK |
| | FLS DATA..... | CHECK |
| NAVAIDS.....AS RQRD/CHECK | | |
| *If GPS PRIMARY LOST: | | |
| NAVIGATION ACCURACY.....CHECK | | |
| ALTIMETER..... | RESET ____InHg/hPa | |
| HOLDING PATTERN.....AS RQRD | | |
| APPROACH C/L.....COMPLETE | APPROACH CHECKLIST.....COMPLETE | |



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PRECISION APPROACH

Applicable to: ALL

INITIAL APPROACH:

| PF | PM |
|---------------------------|---|
| SEAT BELTS sw | ON(CAP) |
| APPROACH PHASE..... | CHECK/ACTIVATE ⁽¹⁾ |
| POSITIONING..... MONITOR | |
| MANAGED SPEED..... CHECK | |
| SPEED BRAKES..... AS RQRD | |
| | •If GPS PRIMARY LOST: NAVIGATION ACCURACY..... MONITOR |

- ⁽¹⁾
- If AP is engaged, the PF checks or activates the approach on the AFS CP
 - If AP is not engaged, the PNF checks or activates the approach on the AFS CP.

The PF can request the PNF to perform this action depending on the situation.

INTERMEDIATE/FINAL APPROACH:

| PF | PM |
|---|------------------------|
| •When the ATC clears the aircraft for the approach: APPR pb on AFS CP..... | PRESS |
| AP 1+2..... | ON |
| | FMA..... |
| | CHECK |
| •Approaching Green Dot speed: FLAPS 1..... | ORDER |
| LOC CAPTURE..... | MONITOR |
| G/S CAPTURE..... | MONITOR |
| •If above the glide slope: V/S MODE..... | AS RQRD |
| AFS CP ALTITUDE..... | SET ABOVE A/C ALTITUDE |
| •When G/S capture (G/S*): GO-AROUND ALTITUDE..... | SET ⁽¹⁾ |
| •Below VFE next, at 2 500 ft AGL minimum: FLAPS 2..... | ORDER |
| •After FLAPS 2 selection, at 2 000 ft AGL minimum: L/G DOWN..... | ORDER |
| | L/G..... |
| | AUTO BRK |
| | CONFIRM |
| | GND SPLRS..... |
| | ARM |
| | EXTERIOR LIGHTS..... |
| | SET |
| •Below VFE next: FLAPS 3..... | ORDER |
| | FLAPS 3..... |
| | SET |
| | WHEEL SD PAGE..... |
| | CHECK |

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INTERMEDIATE/FINAL APPROACH:

| PF | PM |
|--|--|
| •Below VFE next: | |
| FLAPS FULL..... | ORDER FLAPS FULL..... |
| | A/THR..... CHECK IN SPEED MODE or OFF |
| SLIDING TABLE..... | STOWED SLIDING TABLE..... STOWED |
| | LDG MEMO..... NO BLUE LINE |
| CABIN..... | READY CABIN..... READY |
| LANDING C/L..... | COMPLETE LANDING C/L..... COMPLETE |
| | FLIGHT PARAMETERS..... CHECK |
| •At 350 ft AGL (or RA): | |
| LAND ON FMA..... | ANNOUNCE |
| ILS(GLS) COURSE..... | CHECK |
| •During a CAT III Approach without DH: | |
| CONTINUE..... | ANNOUNCE |
| •At 200 ft RA, if the flight crew did not detect any failure: | |
| | •At 100 ft RA: |
| | ONE HUNDRED..... MONITOR or ANNOUNCE |
| •At MINIMUM+100 ft: | |
| | ONE HUNDRED ABOVE..... MONITOR or ANNOUNCE |
| •At MINIMUM: | |
| LANDING or GO-AROUND..... | MINIMUM..... MONITOR or ANNOUNCE ANNOUNCE(CAPT) |

- (1) - If AP is engaged, the PF sets the go-around altitude on the AFS CP
 - If AP is not engaged, the PNF sets the go-around altitude on the AFS CP.

The PF can request the PNF to perform this action depending on the situation.

NON-PRECISION APPROACH WITH FLS FUNCTION

Applicable to: ALL

INITIAL APPROACH:

| PF | PM |
|---------------------|------------------------------|
| SEAT BELTS sw | ON(CAP) |
| APPROACH PHASE..... | CHECK/ACTIVATE (1) |
| POSITIONING..... | MONITOR |
| MANAGED SPEED..... | CHECK |
| SPEED BRAKES..... | AS RQRD |
| | RNP on the FMS AS RQRD |

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INITIAL APPROACH:

| PF | PM |
|---|---|
| FLS CAPABILITY..... | CHECK |
| VOR(ADF) NEEDLES (VOR pb(ADF pb)).AS RQRD | VOR(ADF) NEEDLES (VOR pb(ADF pb))...AS RQRD |

- (1) - If AP is engaged, the PF checks or activates the approach on the AFS CP
 - If AP is not engaged, the PNF checks or activates the approach on the AFS CP.

The PF can request the PNF to perform this action depending on the situation.

INTERMEDIATE/FINAL APPROACH:

| PF | PM |
|--|------------------------|
| •When the ATC clears the aircraft for the approach: | |
| APPR pb on AFS CP..... | PRESS |
| FLYING REFERENCE..... | TRK-FPA ⁽¹⁾ |
| AP ENGAGEMENT..... | CONSIDER |
| FLS CAPABILITY..... | CHECK |
| •Approaching Green Dot speed: | |
| FLAPS 1..... | ORDER |
| F-LOC, LOC or LOC B/C CAPTURE..... | MONITOR |
| F-G/S CAPTURE..... | MONITOR |
| •If above the F-G/S beam: | |
| FPA MODE..... | AS RQRD |
| AFS CP ALTITUDE..... | SET ABOVE A/C ALTITUDE |
| •At F-G/S* engagement: | |
| GO-AROUND ALTITUDE..... | SET ⁽²⁾ |
| •Below VFE next, at 2 500 ft AGL minimum: | |
| FLAPS 2..... | ORDER |
| •After FLAPS 2 selection, at 2 000 ft AGL minimum: | |
| L/G DOWN..... | ORDER |
| •Below VFE next: | |
| FLAPS 3..... | ORDER |
| •Below VFE next: | |
| FLAPS FULL..... | ORDER |
| SLIDING TABLE..... | STOWED |
| CABIN..... | READY |
| LANDING C/L..... | COMPLETE |
| <i>Continued on the following page</i> | |



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INTERMEDIATE/FINAL APPROACH:

| PF | PM |
|--|---|
| | FLIGHT PARAMETERS..... CHECK |
| •At FAF F-G/S MODE..... | CHECK ENGAGED |
| •At MINIMUM+100 ft: | ONE HUNDRED ABOVE..... MONITOR or ANNOUNCE |
| •At MINIMUM: | MINIMUM..... MONITOR or ANNOUNCE |
| •If the flight crew obtains appropriate visual references: LANDING..... AP..... OFF | ANNOUNCE(CAPT) |
| FD OFF..... RUNWAY TRACK..... LS pb | ORDER FD..... OFF CHECK/ORDER RUNWAY TRACK..... SET, AS RQRD ORDER, AS RQRD LS pb AS RQRD |
| •If the flight crew did not obtain appropriate visual references: GO-AROUND..... | ANNOUNCE(CAPT) |

- (1) - If AP is engaged, the PF sets the flying reference on the AFS CP
 - If AP is not engaged, the PNF sets the flying reference on the AFS CP.

The PF can request the PNF to perform this action depending on the situation.

- (2) - If AP is engaged, the PF sets the go-around altitude on the AFS CP
 - If AP is not engaged, the PNF sets the go-around altitude on the AFS CP.

The PF can request the PNF to perform this action depending on the situation.

NON-PRECISION APPROACH WITHOUT FLS FUNCTION

Applicable to: ALL

INITIAL APPROACH:

| PF | PM |
|---------------------|-------------------------------|
| SEAT BELTS sw | ON(CAP) |
| APPROACH PHASE..... | CHECK/ACTIVATE ⁽¹⁾ |
| POSITIONING..... | MONITOR |
| MANAGED SPEED..... | CHECK |
| SPEED BRAKES..... | AS RQRD |

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INITIAL APPROACH:

| PF | PM |
|-----------------------|--|
| | •If GPS PRIMARY LOST NAV ACCURACY.....MONITOR |
| FLYING REFERENCE..... | TRK-FPA ⁽²⁾ |

- (1) - If AP is engaged, the PF checks or activates the approach on the AFS CP
 - If AP is not engaged, the PNF checks or activates the approach on the AFS CP.

The PF can request the PNF to perform this action depending on the situation.

- (2) - If AP is engaged, the PF sets the flying reference on the AFS CP
 - If AP is not engaged, the PNF sets the flying reference on the AFS CP.

The PF can request the PNF to perform this action depending on the situation.

INTERMEDIATE/FINAL APPROACH:

| PF | PNF |
|--|--|
| •For RNAV Approach: | GPS PRIMARY.....CHECK AVAILABLE •If GPS PRIMARY LOSS RNP FOR APPROACH.....CHECK/ENTER HIGH ACCURACY.....CHECK |
| •For ILS G/S out, LOC only, or LOC Approach: LOC pb | PRESS ⁽¹⁾ |
| FMA.....ANNOUNCE AP ENGAGEMENT.....CONSIDER | |
| •Approaching Green Dot speed: FLAPS 1.....ORDER | FLAPS 1.....SELECT TA pbTA ONLY or TA/RA |
| •For ILS G/S out, LOC only, or LOC B/C Approach: LOC or LOC B/C CAPTURE.....MONITOR | |
| •Below VFE next: FLAPS 2.....ORDER | FLAPS 2.....SELECT |
| •After FLAPS 2 selection: L/G.....ORDER | L/G.....SET DOWN AUTO BRKCONFIRM GND SPLRS.....ARM EXTERIOR LIGHTS.....SET |
| •Below VFE next: FLAPS 3.....ORDER | FLAPS 3.....SET WHEEL SD PAGE.....CHECK |
| •Below VFE next: FLAPS FULL.....ORDER | FLAPS FULL.....SET |
| CABIN.....READY | CABIN.....READY |

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INTERMEDIATE/FINAL APPROACH:

| PF | PNF |
|---|--|
| LANDING C/L..... | COMPLETE |
| | LANDING C/L..... COMPLETE |
| | FLIGHT PARAMETERS..... CHECK |
| •At the FAF: FPA..... | SET ⁽²⁾ |
| •After the FAF: GO-AROUND ALTITUDE..... | SET ⁽³⁾ |
| POSITION/FLIGHT PATH..... | ADJUST |
| | POSITION/FLIGHT PATH..... MONITOR |
| | A/THR..... CHECK IN SPEED MODE or OFF |
| SLIDING TABLE..... | STOWED |
| | SLIDING TABLE..... STOWED |
| | LDG ECAM MEMO..... NO BLUE |
| •At MINIMUM+100 ft: ONE HUNDRED ABOVE..... | MONITOR or ANNOUNCE |
| •At MINIMUM: MINIMUM..... | MONITOR or ANNOUNCE |
| •If the flight crew obtains appropriate visual references: LANDING..... | ANNOUNCE (CAPT) |
| AP..... | OFF |
| FDs OFF..... | ORDER FDs..... |
| RUNWAY TRACK..... | CHECK/ORDER RUNWAY TRACK..... SET, AS RQRD |
| •If the flight crew did not obtain appropriate visual references: GO-AROUND..... | ANNOUNCE (CAPT) |

- ⁽¹⁾ - If AP is engaged, the PF presses the LOC pb on the AFS CP
- If AP is not engaged, the PNF presses the LOC pb on the AFS CP.

The PF can request the PNF to perform this action depending on the situation.

- ⁽²⁾ - If AP is engaged, the PF sets the FPA on the AFS CP
- If AP is not engaged, the PNF sets the FPA on the AFS CP.

The PF can request the PNF to perform this action depending on the situation.

- ⁽³⁾ - If AP is engaged, the PF sets the go-around altitude on the AFS CP
- If AP is not engaged, the PNF sets the go-around altitude on the AFS CP.

The PF can request the PNF to perform this action depending on the situation.

- ⁽⁴⁾ - If AP is engaged, the PF adjusts the flight path on the AFS CP
- If AP is not engaged, the PNF adjusts the flight path on the AFS CP.

The PF can request the PNF to perform this action depending on the situation.



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MANUAL LANDING

Applicable to: ALL

| PF | PM |
|---|---|
| AP..... | OFF |
| •At about 40 ft RA: FLARE..... | INITIATE ATTITUDE..... |
| THRUST LEVERS..... | IDLE |
| •At touchdown: REVERSER LEVERS..... | PULL |
| DIRECTIONAL CONTROL..... | MONITOR/ENSURE |
| •If no autobrake: BRAKES..... | AS RQRD |
| | •If autobrake is selected: AUTO BRK..... |
| | DECELERATION..... |
| •At 80 kt: REVERSER LEVERS..... | EIGHTY KNOTS..... |
| | ANNOUNCE |
| IDLE | |
| •At taxi speed: REVERSER LEVERS..... | STOW |
| AUTO BRK..... | DISARM |

AUTOMATIC LANDING

Applicable to: ALL

| PF | PM |
|---|-------------------------------------|
| •Between 50 ft and 40 ft RA: FLARE..... | FMA..... |
| | CHECK FLARE |
| MONITOR | |
| •At approximately 30 ft RA: THRUST LEVERS..... | FMA..... |
| LATERAL GUIDANCE..... | CHECK THR IDLE |
| IDLE | |
| •At 10 ft RA: "Retard" LATERAL GUIDANCE..... | |
| MONITOR | |
| REVERSER LEVERS..... | FMA..... |
| DIRECTIONAL CONTROL..... | CHECK ROLL OUT |
| MONITOR/ENSURE | |
| | •If AUTO ROLLOUT: AP..... |
| | KEEP ENGAGED, UNTIL END OF ROLL OUT |
| | GND SPLRS EXTENDED..... |
| | CHECK/ANNOUNCE |
| | REVERSERS..... |
| | CHECK/ANNOUNCE |

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| PF | PM |
|--|--|
| •If no autobrake: BRAKES..... AS RQRD | •If autobrake is selected: AUTO BRK..... CHECK/ANNOUNCE DECELERATION..... CHECK/ANNOUNCE |
| •If AUTO ROLLOUT: AP..... DISCONNECT | |
| •At 80 kt: REVERSER LEVERS..... IDLE | EIGHTY KNOTS..... ANNOUNCE |
| •At taxi speed: REVERSER LEVERS..... STOW AUTO BRK..... DISARM | |

GO-AROUND

Applicable to: ALL

| PF | PM |
|---|---|
| •Simultaneously apply the following three actions: THRUST LEVERS..... TOGA ROTATION..... PERFORM GO-AROUND..... ANNOUNCE | |
| FMA CHECK/ANNOUNCE | FLAPS..... RETRACT ONE STEP |
| L/G UP..... ORDER | POSITIVE CLIMB..... ANNOUNCE |
| NAV or HDG..... AS RQRD | L/G..... UP |
| •At go-around thrust reduction altitude: THRUST LEVERS..... CL | |
| •At go-around acceleration altitude: SPEED TARGET..... MONITOR FLAPS..... ORDER RETRACTION ON SCHEDULE | FLAPS..... RETRACT GND SPLRS..... DISARM EXTERIOR LIGHTS..... SET |
| AFTER TAKEOFF/CLIMB C/L down to the line..... COMPLETE | AFTER TAKEOFF/CLIMB C/L down to the line..... COMPLETE |
| Fly the published missed approach procedure, or prepare for a second approach, or divert as required. | |
| •If necessary, at the transition altitude: BAROMETRIC REFERENCE.. SET STD/CROSSCHECK | BAROMETRIC REFERENCE..... SET STD/CROSSCHECK |
| AFTER TAKEOFF/CLIMB C/L below the line COMPLETE | AFTER TAKEOFF/CLIMB C/L below the line..... COMPLETE |



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AFTER LANDING

Applicable to: ALL

| CAPT | FO |
|---|---|
| GND SPLRS.....DISARM | FLAPS.....RETRACT |
| | APU MASTER SW pb-swON |
| | APU START pbON |
| | ENG START selectorCHECK NORM |
| | ANTI ICEAS RQRD |
| | LAND swOFF |
| | STROBE swAUTO |
| | NOSE swTAXI |
| | OTHER EXTERIOR LIGHTS.....AS RQRD |
| ND RANGE selectorZOOM, AS APPROPRIATE | ND RANGE selectorZOOM, AS APPROPRIATE |
| TAXI pbAS RQRD | TAXI pbAS RQRD |
| WX pbCHECK OFF | WX pbCHECK OFF |
| | BRAKE TEMPERATURE.....MONITOR |
| AFTER LANDING C/L.....COMPLETE | AFTER LANDING C/L.....COMPLETE |

PARKING

Applicable to: ALL

| CAPT | FO |
|-----------------------------------|--------------------------------|
| | ANTI-CE.....OFF |
| PARK BRK.....ON | APU BLEED pbON |
| ENG MASTERS 1, 2, 3 and 4.....OFF | ELAPSED TIME.....STOP |
| SLIDES DISARMED.....CHECK | |
| SEAT BELTS swOFF | |
| BEACON swOFF | |
| OTHER EXTERIOR LIGHTS.....AS RQRD | FUEL PUMPS.....OFF |
| HUD.....STOW | |
| GROUND CONTACT.....ESTABLISH | IRS PERFORMANCE.....CHECK |
| PARK BRK.....AS RQRD | FUEL QUANTITY.....CHECK |
| PARKING C/L.....COMPLETE | PARKING C/L.....COMPLETE |
| OIT SIDE swFLT OPS | OIT SIDE swFLT OPS |
| ALL OIS APPLICATIONS.....CLOSE | ALL OIS APPLICATIONS.....CLOSE |
| EXIT SESSION.....PERFORM | EXIT SESSION.....PERFORM |
| OIT SIDE swNSS AVNCS | OIT SIDE swNSS AVNCS |
| | FLIGHT CLOSURE.....PERFORM |



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SECURING THE AIRCRAFT

Applicable to: ALL

| CAPT | FO |
|--|--|
| PARK BRK.....ON | OXYGEN CREW SUPPLY pb-swOFF |
| ADIRS (1+2+3).....OFF | EXTERIOR LIGHTS.....OFF |
| | GND SERVICING pb-swAS RQRD |
| | APU BLEED pb-swOFF |
| | EXT pb-swAS RQRD |
| | APU MASTER SW pb-swOFF |
| | EMER EXIT LT swOFF |
| | NO SMOKING swOFF |
| OIT knobOFF | OIT knobOFF |
| CM1 LAPTOP.....OFF | CM2 + BACKUP LAPTOPS.....OFF |
| SECURING THE AIRCRAFT C/L.....COMPLETE | SECURING THE AIRCRAFT C/L.....COMPLETE |
| | ALL BAT pb-sw (BAT 1, ESS, 2, APU BAT).....OFF |
| | COCKPIT WAYLIGHT pb-swON, IF NECESSARY |



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SYSTEMS RELATED PROCEDURES - INFORMATION SYSTEMS

HOW TO USE THE ATC DATALINK SYSTEM

Applicable to: ALL

- Refer to DSC-46-10-40 How to Make a Manual Notification to an ATC Center
- Refer to DSC-46-10-40 How to Send a Request Message
- Refer to DSC-46-10-40 How to Send an Emergency Message
- Refer to DSC-46-10-40 How to Cancel Emergency
- Refer to DSC-46-10-40 How to Read an Uplink Message
- Refer to DSC-46-10-40 How to Manage a Confirm Message
- Refer to DSC-46-10-40 How to Manage a Report Message
- Refer to DSC-46-10-40 How to Manage a Deferred Clearance Message
- Refer to DSC-46-10-40 How to Manage a Loadable Message
- Refer to DSC-46-10-40 How to Use Position Report
- Refer to DSC-46-10-40 How to Store Messages
- Refer to DSC-46-10-40 How to Use Digital ATIS
- Refer to DSC-46-10-40 How to Set MAX UPLINK DELAY

HOW TO USE THE OPS LIBRARY

Applicable to: ALL

- Refer to DSC-46-20-50-10 How to Start the OPS LIBRARY
- Refer to DSC-46-20-50-10 How to Check a Manual
- Refer to DSC-46-20-50-10 How to Access the FCOM
- Refer to DSC-46-20-50-10 How to Use Information Layers
- Refer to DSC-46-20-50-10 How to Display Illustrations
- Refer to DSC-46-20-50-10 How to Use Links
- Refer to DSC-46-20-50-10 How to Use Temporary Documentary Units
- Refer to DSC-46-20-50-10 How to Use Word Search
- Refer to DSC-46-20-50-10 How to Use Bookmarks
- Refer to DSC-46-20-50-10 How to Use Notes
- Refer to DSC-46-20-50-10 How to Use the "What If" Function
- Refer to DSC-46-20-50-10 How to Close the OPS LIBRARY
- Refer to DSC-46-20-50-10 How to Exit the OIS Session

HOW TO USE PERFORMANCE APPLICATIONS

Applicable to: ALL

- Refer to DSC-46-20-50-20 How to Start Performance Applications
- Refer to DSC-46-20-50-20 How to Close Performance Applications



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SYSTEMS RELATED PROCEDURES - INFORMATION SYSTEMS

HOW TO USE THE FLT FOLDER

Applicable to: ALL

Refer to DSC-46-20-50-30 How to Start the *FLT FOLDER*

Refer to DSC-46-20-50-30-10 How to Access an *EFF*

Refer to DSC-46-20-50-30-20 How to Sign a Document

Refer to DSC-46-20-50-30-30 How to Check a Document

Refer to DSC-46-20-50-30 How to Use Notes

Refer to DSC-46-20-50-30 How to Use Word Search

Refer to DSC-46-20-50-30-80 How to Use a Flight Plan

Refer to DSC-46-20-50-30 How to Print a Document

Refer to DSC-46-20-50-30 How to Store in an *EFF*

Refer to DSC-46-20-50-30-40 How to Export an *EFF*

Refer to DSC-46-20-50-30 How to Close the *FLT FOLDER*

HOW TO USE THE TECHNICAL LOGBOOK

Applicable to: ALL

Refer to DSC-46-20-50-40 How to Start the *Technical Logbook*

Refer to DSC-46-20-50-40 How to Accept the Aircraft

Refer to DSC-46-20-50-40 How to Record a Defect in the Logbook

Refer to DSC-46-20-50-40 How to Change a Defect

Refer to DSC-46-20-50-40 How to Cancel a Defect

Refer to DSC-46-20-50-40 How to Send an Open Item to the Ground

Refer to DSC-46-20-50-40 How to Close the Flight



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SYSTEMS RELATED PROCEDURES - DOORS

HOW TO OPERATE THE DOORS

Applicable to: ALL

Refer to DSC-52-20-30 How to Operate the Cockpit Door

Refer to DSC-52-20-30 How to Operate the Privacy Door

Refer to DSC-52-30-30-30 Inside the Aircraft - How to Operate Passenger Doors

Refer to DSC-52-30-30-30 Outside the Aircraft - How to Operate Passenger Doors



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| <u>CAB PRESS DIFF PRESS HI</u> | C |
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| <u>■ CAB PRESS EXCESS CAB ALT ■</u> | E |
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PRO-ABN-ECAM-10-22-FG 22-Flight Guidance

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PRO-ABN-ECAM-10-22-FMS 22-Flight Management System

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PRO-ABN-ECAM-10-24 Electrical

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PRO-ABN-ECAM-10-27-10 27-Flight Controls

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PRO-ABN-ECAM-10-29 Hydraulic System

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| <u>HYD G (Y) SYS PRESS LO</u> | M |
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| <u>HYD G+Y SYS PRESS LO</u> | O |
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PRO-ABN-ECAM-10-30 Ice and Rain protection

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SURV WINDSHEAR, WINDSHEAR, WINDSHEAR



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INTRODUCTION

OPERATIONAL RECOMMENDATIONS

Applicable to: ALL

OVERVIEW

Abnormal and Emergency procedures involve actions that the flight crew must perform in order to ensure adequate safety, and help to make the remainder of the flight easier.

Abnormal and Emergency procedures are actions that the flight crew performs:

- After failures, that the ECAM detects (sensed procedures), or
- After failures or situation, that the flight crew detects or encounters (not-sensed ABN PROC , e.g. CKPT WINDOW CRACKED, OVERWEIGHT LANDING), or
- After an aural alert (e.g. OBSTACLE AHEAD, PULL UP).

When the flight crew performs procedures that appear on the ECAM , the flight crew uses the "READ" and "DO" principle (oral reading).

INITIATION OF PROCEDURES

The Pilot Flying (PF) initiates the abnormal and emergency procedures. For training-oriented information on the role of the PF in the initiation of the procedure, *Refer to FCTM/ECAM/Tasksharing Rules .*

However the PF must not take any action (except canceling aural alerts, by pressing the MASTER WARN light) until:

- The appropriate flight path is established
- The aircraft is at least 400 ft above the runway, if a failure occurs during takeoff, approach, or go-around.

A height of 400 ft is recommended, because it is a good compromise between the necessary time to stabilize the aircraft, and excessive delay in procedure initiation.

In some emergency cases, provided that the appropriate flight path is established, the Pilot Flying may initiate actions before reaching 400 ft above the runway.

LAND ASAP/LAND ANSA

In some emergency cases, LAND ASAP (As Soon As Possible) is part of the procedure. In this case, the flight crew should land as soon as possible at the nearest suitable airport at which a safe approach and landing can be performed.

In some abnormal cases, LAND ANSA (At Nearest Suitable Airport) is part of the procedure. In this case, the flight crew should consider landing at the nearest suitable airport.



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USE OF AUTOPILOT (AP)

It is possible to use the AP in most failure cases, unless specified in:

- Some failure cases provided in the Aircraft Systems / 22-FG / Abnormal Operation chapter (*Refer to Failures and Associated Actions for CAT II or CAT III Approach*), or
- ECAM procedures.

However, the AP is not certified in all configurations. Therefore, if the flight crew decides to use the AP in the case of failures, extra vigilance is required. If the aircraft deviates from the desired, or safe flight path, the flight crew must disconnect the AP .

LANDING DISTANCE

The ECAM indicates when it is necessary to increase the landing distance, due to the abnormal or emergency situation. The ECAM provides the flight crew with the applicable information to compute landing performance. For more information, *Refer to DSC-31-40-10 Landing Performance Indications* .

MEMORY ITEMS

Memory Items are items that the flight crew must memorize, in order to be able to rapidly apply them, without referring to the ECAM and/or to the FCOM .

The flight crew can easily identify the required memory items because they are surrounded by a white box (*Refer to PRO-ABN-00-100 Introduction*).

The following is a list of the abnormal and emergency procedures requiring the flight crew to memorize items.

- WXR alerts:
 - *Refer to PRO-ABN-NECA-34-20-620 GO AROUND, WINDSHEAR AHEAD*
 - *Refer to PRO-ABN-NECA-34-20-610 WINDSHEAR AHEAD, WINDSHEAR AHEAD*
 - *Refer to PRO-ABN-NECA-34-20-630 WINDSHEAR, WINDSHEAR, WINDSHEAR*
- TCAS alerts:
 - *Refer to PRO-ABN-NECA-34-20-520 SURV Traffic Advisory Alert*
 - *Refer to PRO-ABN-NECA-34-20-570 SURV Resolution Advisory Alerts*



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- TAWS alerts:
 - Refer to PRO-ABN-NECA-34-20-510 SURV GLIDE SLOPE, GLIDE SLOPE Alert
 - Refer to PRO-ABN-NECA-34-20-650 SURV PULL UP Alerts
 - Refer to PRO-ABN-NECA-34-20-680 SURV SINK RATE, SINK RATE - DON'T SINK, DON'T SINK Alerts
 - Refer to PRO-ABN-NECA-34-20-660 SURV TERRAIN, TERRAIN - TOO LOW TERRAIN Alerts
 - Refer to PRO-ABN-NECA-34-20-670 SURV TERRAIN AHEAD, TERRAIN AHEAD - OBSTACLE AHEAD, OBSTACLE AHEAD Alerts
 - Refer to PRO-ABN-NECA-34-20-690 SURV TOO LOW GEAR - TOO LOW FLAPS Alerts
- The immediate actions of the EMER DESCENT procedure, *Refer to PRO-ABN-ECAM-10-80-40 EMER DESCENT*
- The immediate actions of the UNRELIABLE AIRSPEED INDICATION procedure, *Refer to PRO-ABN-ECAM-20-10-10 UNRELIABLE AIRSPEED INDICATION*
- LOSS OF BRAKING procedure, *Refer to PRO-ABN-NECA-32-130 LOSS OF BRAKING*
- STALL RECOVERY procedure, *Refer to PRO-ABN-NECA-10 Stall Recovery*.

FCOM PROCEDURE LAYOUT

Applicable to: ALL

The Abnormal and Emergency Procedures section includes:

- Sensed procedures: Procedures that automatically appear on the ECAM in the case of a failure
- Not-sensed ABN PROC : Procedures that are manually called by the flight crew on the ECAM
- Procedures not displayed on ECAM that are performed by the flight crew as basic airmanship (e.g. STALL, OVERSPEED)
- Aural alerts that guide the flight crew (e.g. Pull up).

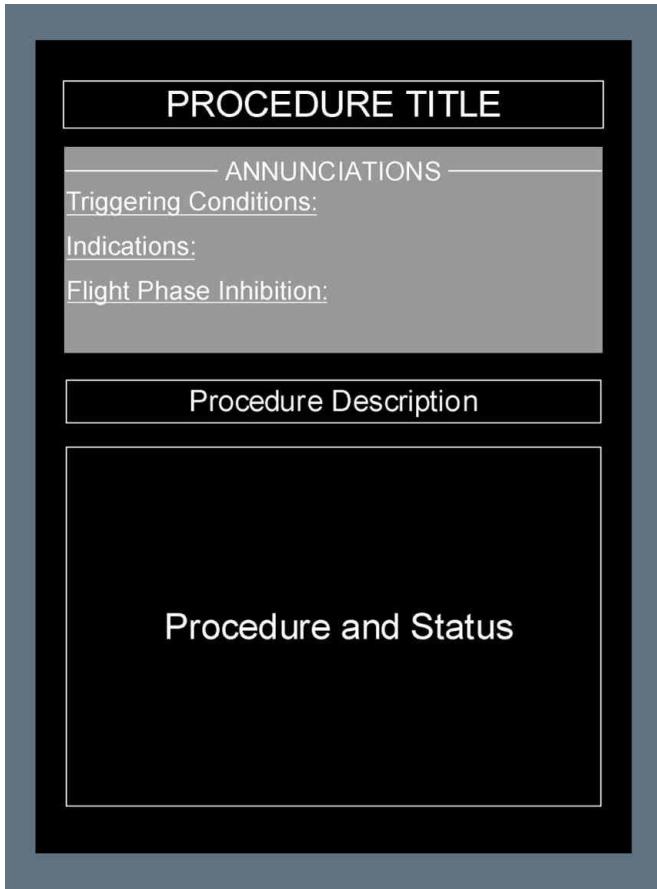
The ECAM procedures provided in the FCOM are identical to the procedures that appear on the ECAM . However, the FCOM also provides additional operational information (comments).

The FCOM displays in uppercase letters the information that appears on the ECAM and uses the same color as the ECAM . All the additional comments appears in the FCOM in lowercase letters.

In accordance with the rules regarding the use of the ECAM , and if time permits, the flight crew can refer to the FCOM , after they have:

- Completed the ECAM actions,
- Reviewed the STATUS pages.

FCOM Presentation of ABN or EMER procedures

**PROCEDURE TITLE**

The title of an abnormal or emergency procedure, that appears on the ECAM, is:



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- Red for a warning
- Amber for a caution
- On a black background.

ABN or EMER Procedure Title Displayed on the ECAM



CAB PRESS EXCESS DIFF PRESS

The title of an abnormal or emergency procedure, that does not appear on the ECAM, is:

- Red for a warning
- Amber for a caution
- On a grey background.

ABN or EMER Procedure Title not Displayed on the ECAM



TCAS ALERTS

SEVERAL ALERTS UNDER THE SAME TITLE

When applicable, several alerts may be grouped under the same procedure title. However, depending on the failure, the actions that the flight crew should perform may differ.

Several Alerts Grouped Under the Same Title**ENG 1(2)(3)(4) FIRE (IN FLIGHT)**

LAND ASAP

| | |
|----------------------------------|------|
| THR LEVER 1(2)(3)(4)..... | IDLE |
| ENG 1(2)(3)(4) MASTER LEVER..... | OFF |
| ENG 1(2)(3)(4) FIRE P/B | PUSH |

NAV IR 1(2)(3) FAULT**● If IR 1 is affected :**

ATT HDG SWTG CAPT ON 3

● If IR 2 is affected :

ATT HDG SWTG F/O ON 3

● If IR 3 is affected :

ATT HDG SWTG NORM

ANNUNCIATIONS

The annunciations section provides:

- The triggering conditions, that describe the cause of the alert activation
- The following indications associated with the alert:
 - Audio effect such as Single Chime (SC), or Continuous Repetitive Chime (CRC)
 - The local lights
 - MASTER lights (MASTER WARN or MASTER CAUT)
 - The applicable SD page.

Indications

- The Flight Phase Inhibition diagram, that indicates the flight phases during which the alert is inhibited. For more information about the flight phases, *Refer to DSC-31-40-10 ECAM Flight Phases* .

Flight Phase Inhibition

In the above example, the alert is inhibited in the aircraft flight phase 1, 4, 5, 6, 9, 12.

PROCEDURE DESCRIPTION

The Procedure Description section provides:

- A summary of the procedure, when necessary. Particularly when the procedure is quite complex.
- A link to the MEL for relevant dispatch conditions, if applicable.

PROCEDURE AND STATUS

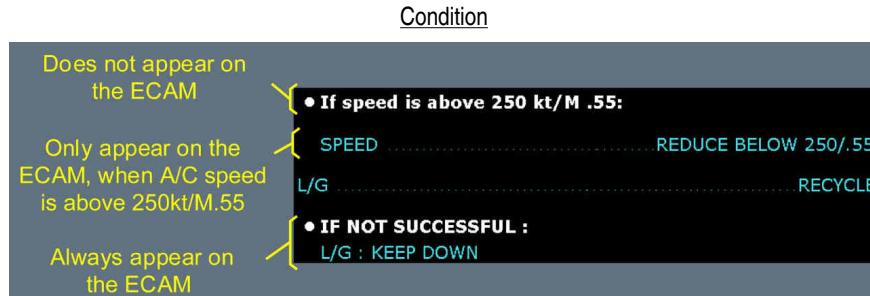
The Procedure and Status section provides the procedure and additional comments.

CONDITIONS

A white bullet appears in front of lines that are conditions. These lines are also referred to as condition lines.

The conditions that appear on the ECAM are in uppercase bold letters in the FCOM.

There are conditions, that are automatically managed by the ECAM, and do not appear on the ECAM, or that are part of non-ECAM procedures. Such conditions appear in the FCOM in lowercase letters.



INDENTATION

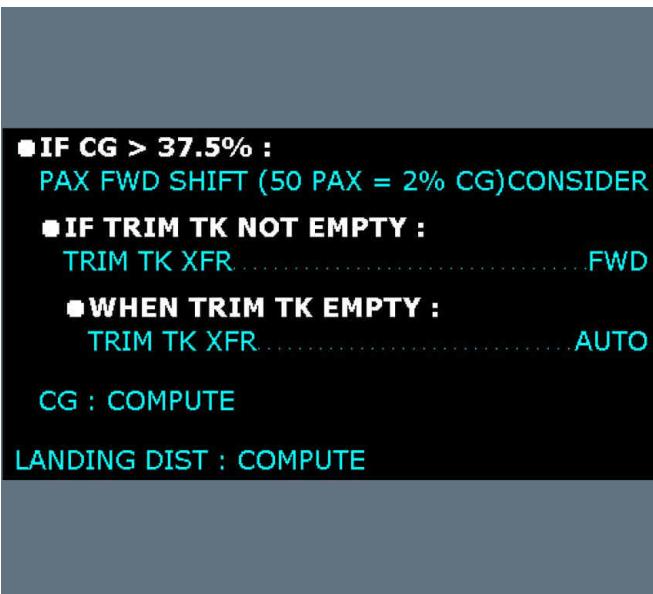
When a procedure line depends on several conditions, these conditions are indented on the ECAM and in the FCOM.



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Sample of an Indented Procedure Line



ASSOCIATED PROCEDURES

Some alerts, also referred to as primary alerts, automatically trigger other associated alerts. Associated alerts appear in the FCOM below the primary procedure.



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Associated Alerts Sample

HYD G(Y) RSVR AIR PRESS LO

• **IF G(Y) SYS PRESS FLUCTUATES:**

G(Y) ENG 1(3) PMP A and B OFF
G(Y) ENG 2(4) PMP A and B OFF

• **If on ground, and all engines are off:**

G(Y) ELEC PMP A and B OFF

ASSOCIATED PROCEDURES

HYD G(Y) SYS PRESS LO

Refer to [HYD G+Y SYS PRESS LO](#)

MEMORY ITEMS

Memory items are items that the flight crew must memorize, in order to be able to rapidly apply them, without referring to the ECAM, and/or to the FCOM.

Memory items are surrounded by a white box in the FCOM procedure, in order to enable the flight crew to easily identify them.



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Memory Items

• If the AUTO BRK is armed, but does not activate :

BRAKE PEDALS PRESS

• If no braking :

REV MAX

BRAKE PEDALS RELEASE

A-SKID OFF

BRAKE PEDALS PRESS



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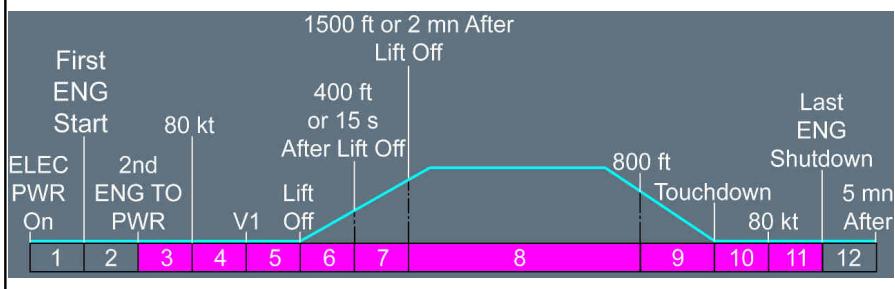
Intentionally left blank

21-Air Conditioning**AIR PACK 1(2) CTL 1(2) FAULT**

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- One channel of the pack controller is failed.

Indications:BLEED SD PageFlight Phase Inhibition:

- For associated MEL dispatch conditions:

- Refer to *MEL/ME-ECAM-36-21 AIR PACK 1 CTL 1 FAULT*
- Refer to *MEL/ME-ECAM-36-21 AIR PACK 1 CTL 2 FAULT*
- Refer to *MEL/ME-ECAM-36-21 AIR PACK 2 CTL 1 FAULT*
- Refer to *MEL/ME-ECAM-36-21 AIR PACK 2 CTL 2 FAULT*.

Crew awareness.

Continued on the following page

AIR PACK 1(2) CTL 1(2) FAULT (Cont'd)**MORE INFO****REDUND LOSS**

PACK 1(2) CTL 1(2)

AIR PACK 1(2) CTL DEGRADED

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- [L2] The pack 1(2) control is degraded.
- [L3] The two applications of the pack 1(2) control hosted in the CPIOM B are failed.

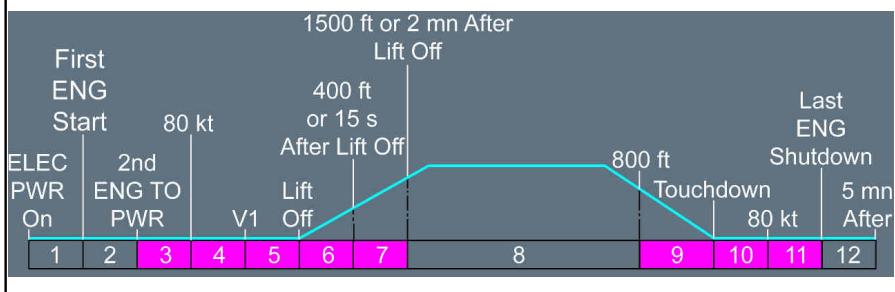
Indications:

- [L2]

SD page



BLEED SD Page

Flight Phase Inhibition:

Continued on the following page

AIR PACK 1(2) CTL DEGRADED (Cont'd)

- [L2] For associated MEL dispatch conditions, Refer to MEL/ME-ECAM-36-21 AIR PACK 1(2) CTL DEGRADED .

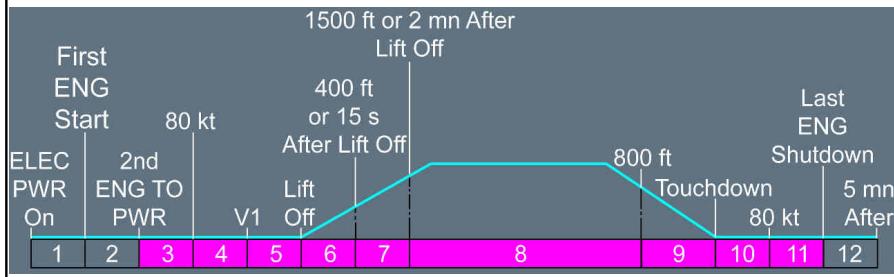
Crew awareness.

STATUS**INOP SYS****ALL PHASES**

PACK 1(2) CTL DEGRADED

AIR PACK 1(2) CTL REDUNDANCY LOST**Applicable to: ALL****ANNUNCIATIONS**Triggering Conditions:

- [L2] One redundant application of the pack 1(2) control is failed.
[L3] This application is hosted in the CPIOM B.

Indications:Flight Phase Inhibition:*Continued on the following page*



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AIR PACK 1(2) CTL REDUNDANCY LOST (Cont'd)

For associated MEL dispatch conditions:

- Refer to *MEL/ME-ECAM-36-21 AIR PACK 1 CTL REDUNDANCY LOST*
- Refer to *MEL/ME-ECAM-36-21 AIR PACK 2 CTL REDUNDANCY LOST*.

Crew awareness.

MORE INFO

REDUND LOSS

PACK 1(2) CTL REDUND

AIR PACK 1(2) FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [L2] The pack is failed.
- [L3] The pack fails, when:
 - The associated pack valves are abnormally closed, or
 - Both channels of the associated pack controller are failed.

Indications:

[L2]



PACK 1(2) pb

BLEED SD Page

Flight Phase Inhibition:

- [L2] For associated MEL dispatch conditions: Refer to MEL/ME-ECAM-36-21 AIR PACK 1(2) FAULT .

PACK 1(2)..... OFF

- [L2] The airflow of the remaining pack is automatically set to HIGH.

Continued on the following page

AIR PACK 1(2) FAULT (Cont'd)**STATUS****INOP SYS****ALL PHASES**

PACK 1(2)

AIR PACK 1(2) OFF

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- The PACK 1(2) pb is abnormally set to **OFF**.

Indications:**BLEED SD Page****Flight Phase Inhibition:**

- This alert is also inhibited the first 60 s of the phase 8.

Continued on the following page

AIR PACK 1(2) OFF (Cont'd)

Crew awareness.

STATUS**INOP SYS****ALL PHASES**

PACK 1(2)

|

AIR PACK 1(2) OVHT

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- [L2] The pack outlet temperature is above 95 °C.

Indications:**Flight Phase Inhibition:***Continued on the following page*



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AIR PACK 1(2) OVHT (Cont'd)

For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-36-21 AIR PACK 1(2) OVHT*.

PACK 1(2)..... OFF

- On ground, before any engine start, the pack valves of the affected pack, automatically close. The airflow of the remaining pack is automatically set to HIGH.*

DEFERRED PROC

ALL PHASES

● **WHEN PACK OVHT OUT :**

PACK 1(2)..... ON

STATUS

INOP SYS

ALL PHASES

PACK 1(2)

AIR PACK 1(2) REGUL FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

[L2] Pack performance is degraded.

- [L3]
- The pack is in bypass mode, or
 - The water extraction system inside both ACMs is failed, or
 - The ram air inlet or outlet doors are failed, or
 - The turbine isolation valve is failed, or
 - The Turbine Bypass Valve (TBV) is failed.

Indications:

[L2]

BLEED SD PageFlight Phase Inhibition:

[L2] For associated MEL dispatch conditions: Refer to *MEL/ME-ECAM-36-21 AIR PACK 1(2) REGUL FAULT*.

Continued on the following page



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AIR PACK 1(2) REGUL FAULT (Cont'd)

- Depending on the failure, one of the following messages will appear:

PACK 1(2) IN BYPASS MODE

PACK 1(2) WATER EXTRACT FAULT

PACK 1(2) RAM AIR DOOR CLOSED

[L2] No aural warning, or master caution is associated to this message.

[L1] TURBINE ISOL VLV FAULT

[L2] - This message is inhibited in flight, and

- No aural warning, or master caution is associated with this message.

[L1] TURBINE BYPASS VLV OPEN

[L2] - This message is inhibited in flight, and

- No aural warning, or master caution is associated with this message.

- [L1] ● Only if the PACK 1(2) IN BYPASS MODE or PACK WATER EXTRACT FAULT message is displayed:

PACK 1(2) AVAIL ABOVE FL 290

- WHEN BELOW FL 290 (AUTO RCL) :

PACK 1(2)..... OFF

[L2] This message is recalled, when the aircraft goes below FL 290.

STATUS

INOP SYS

ALL PHASES

PACK 1(2)

INFO

- If the PACK 1(2) IN BYPASS MODE or PACK WATER EXTRACT FAULT message is displayed:

PACK 1(2) AVAIL ABOVE FL 290

PACK 1(2) REGUL DEGRADED

AIR PACK 1(2) VLV 1(2) FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- L2
- One pack valve is failed open, or
 - One pack valve is failed closed, and:
 - At least one pack valve on the other pack is failed closed, or
 - The other pack is failed.

Indications:

Local light



PACK 1(2) pb

SD page



BLEED SD Page

Flight Phase Inhibition:*Continued on the following page*



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AIR PACK 1(2) VLV 1(2) FAULT (Cont'd)

- [3] Note:** The FAULT light of the PACK 1(2) pb illuminates, when:
- The pack valve is failed open, and
 - The PACK 1(2) pb is set to OFF.

- [2]** For associated MEL dispatch conditions:

- Refer to MEL/ME-ECAM-36-21 AIR PACK 1 VLV 1 FAULT
- Refer to MEL/ME-ECAM-36-21 AIR PACK 1 VLV 2 FAULT
- Refer to MEL/ME-ECAM-36-21 AIR PACK 2 VLV 1 FAULT
- Refer to MEL/ME-ECAM-36-21 AIR PACK 2 VLV 2 FAULT.

Crew awareness.

AIR PACK 1+2 FAULT

Applicable to: ALL

ANNUNCIATIONS

Triggering Conditions:

Both packs do not operate.

The packs do not operate, if:

- They are failed, or
- The associated PACK pb is set to OFF, or
- They overheat.

Indications:

Audio



Master Light



Local light



SD page

PACK pb

BLEED SD Page

Flight Phase Inhibition:

This alert is also inhibited during the first 180 s of the flight phase 8.

For associated MEL dispatch conditions, Refer to MEL/ME-ECAM-36-21 AIR PACK 1+2 FAULT .

Continued on the following page

AIR PACK 1+2 FAULT (Cont'd)

- If at least one door is not closed or is not locked, and at least one engine is running:

PACK 1+2 INHIBITED BY DOORS

MAX FL : 100/MEA

- Otherwise:

PACK 1..... OFF
PACK 2..... OFF

- If there is a pack overheat:

- IF PACK OVHT OUT :

PACK 1..... ON
PACK 2..... ON

The overheat disappears, when the fault light of the PACK pb goes off.

- [L1] ● In flight, if the alert was triggered above FL 100:

DESCENT TO FL 100/MEA..... INITIATE
MAX FL : 100/MEA

- WHEN DIFF PRESS < 1 PSI & FL < 100/MEA :

RAM AIR..... ON

- If PACK 1+2 pbs requested OFF by CAB PRESS EXCESS DIFF PRESS, or
CAB PRESS SYS FAULT:

CABIN AIR EXTRACT..... OVRD

- In flight, if the alert was triggered below FL 100

MAX FL : 100/MEA

RAM AIR..... ON

- If PACK 1+2 pbs requested OFF by CAB PRESS EXCESS DIFF PRESS, or CAB
PRESS SYS FAULT:

CABIN AIR EXTRACT..... OVRD

This opens the cabin air extract valve, to ventilate the cabin.

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AIR PACK 1+2 FAULT (Cont'd)

LIMITATIONS

LIMITATIONS ON ECAM

ALL PHASES

LAND ANSA
MAX FL : 100/MEA

LIMITATIONS ON PFD

ALL PHASES

LAND ANSA
MAX FL : 100/MEA

DEFERRED PROC

ALL PHASES

- If there is a pack overheat:

- WHEN PACK OVHT OUT :

PACK 1.....ON
PACK 2.....ON

- In flight, if the alert was triggered above FL 100:

- WHEN DIFF PRESS < 1 PSI & FL < 100/MEA :

RAM AIR.....ON

- If PACK 1+2 pbs requested OFF by CAB PRESS EXCESS DIFF PRESS, or

CABIN AIR EXTRACT.....OVRD

STATUS

INOP SYS

ALL PHASES

PACK 1+2

AIR PACK 1+2 REGUL REDUNDANCY LOST

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [L2] The performance of both packs is degraded due to several valve and sensor failures.
[L3] On each pack, at least one of the following systems is failed:

- The ACM
- The Altitude Valve (AV)
- The ACM Isolating Valve (AIV)
- The Temperature Control Valve (TCV)
- Turbine Bypass Valve (TBV).
- The ram air inlet valve of the heat exchanger
- One of the ram air outlet valves of the heat exchanger
- The temperature sensors inside the pack.

Indications:BLEED SD PageFlight Phase Inhibition:

- [L2] For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-36-21 AIR PACK 1+2 REGUL REDUNDANCY LOST*.

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AIR PACK 1+2 REGUL REDUNDANCY LOST (Cont'd)

Crew awareness.

STATUS

INFO

PACK 1+2 REGUL DEGRADED

AIR PACK REGUL DEGRADED

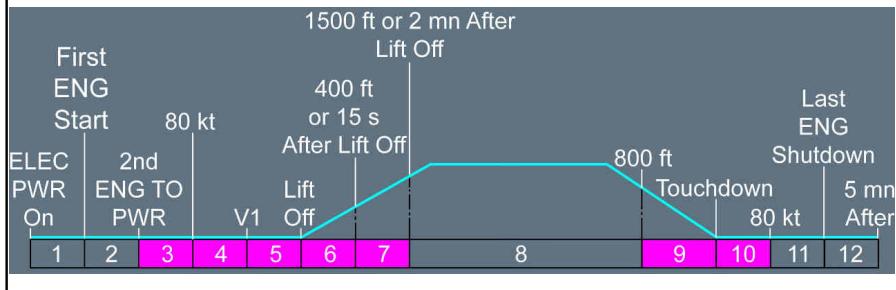
Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- One pack is failed and the remaining pack air flow is no longer sufficient to ensure the satisfactory regulation of the temperature in the forward cargo compartment.

Indications:

BLEED SD Page

Flight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-36-21 AIR PACK REGUL DEGRADED*.

PACK FLOW INSUFFICIENT FOR FWD CRG
FWD CARGO TEMP REGUL..... OFF

Continued on the following page

AIR PACK REGUL DEGRADED (Cont'd)**STATUS****INOP SYS****ALL PHASES**

PACK REGUL DEGRADED
FWD CRG TEMP REGUL
FWD CRG 1 TEMP REGUL
FWD CRG 2 TEMP REGUL

COND FWD CARGO TEMP REGUL FAULT

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- [L2] The temperature regulation in the forward cargo is lost, or degraded.
Indications:

SD page

COND SD Page**Flight Phase Inhibition:***Continued on the following page*



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COND FWD CARGO TEMP REGUL FAULT (Cont'd)

For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND FWD CARGO TEMP REGUL FAULT*.

- In the case of trim air valve failure:
CARGO TRIM AIR VLV FAULT
- If the temperature regulation of the cargo compartment is degraded:
CARGO TEMP MONITOR

STATUS

INOP SYS

ALL PHASES

FWD CARGO TEMP REGUL (If the temperature regulation in the forward cargo compartment is lost)

INFO

- If the temperature regulation in the forward cargo compartment is degraded:
FWD CRG TEMP REGUL DEGRADED

COND ALL PRIMARY CABIN FANS FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [L2] The four primary fans are failed. The pack airflow is automatically set to HIGH.

Indications:

Audio



Master Light



SD page

COND SD PageFlight Phase Inhibition:

- [L2] For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND ALL PRIMARY CABIN FANS FAULT*.

Crew awareness.

Continued on the following page



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PROCEDURES - ALL ECAM PROCEDURES

COND ALL PRIMARY CABIN FANS FAULT (Cont'd)

L12

STATUS

INOP SYS

ALL PHASES

ALL PRIMARY CAB FANS

INFO

CABIN TEMP REGUL DEGRADED

The temperature in some cabin zones may be abnormally low.

COND BULK CARGO DUCT OVHT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

[L2] There is an overheat in the bulk cargo duct.

[L3] There is a bulk cargo duct overheat when the air temperature inside the duct exceeds 70 °C.
Indications:

[L2]



SC



MASTER
CAUT



FAULT
OFF



COND SD Page

HEATER pb-sw

Flight Phase Inhibition:

[L2] For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND BULK CARGO DUCT OVHT*.

BULK HEATER.....OFF

Continued on the following page



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COND BULK CARGO DUCT OVHT (Cont'd)

DEFERRED PROC

ALL PHASES

- WHEN BULK CARGO DUCT OVHT OUT :

BULK HEATER.....ON

STATUS

INOP SYS

ALL PHASES

BULK CRG HEATER

COND BULK CARGO HEATER FAULT

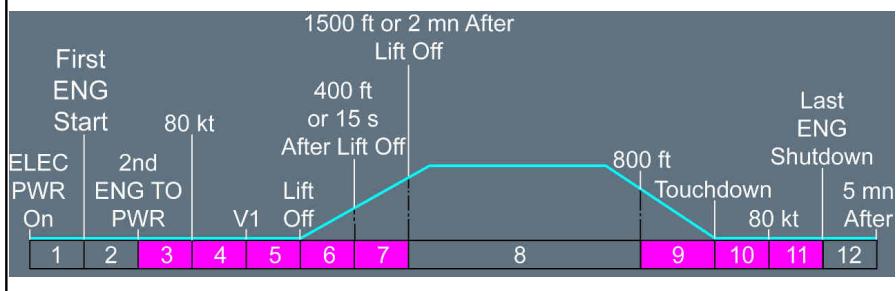
Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- The heater of the bulk cargo compartment is failed.

Indications:

SD page

COND SD PageFlight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND BULK CARGO HEATER FAULT*.

Crew awareness.

- Temperature regulation of the bulk cargo compartment is lost.

Continued on the following page

COND BULK CARGO HEATER FAULT (Cont'd)**STATUS****INOP SYS****ALL PHASES**

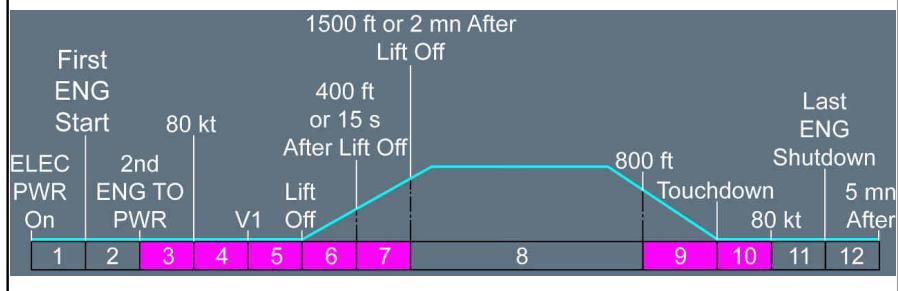
BULK CRG HEATER

COND BULK CARGO ISOL FAULT

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- [L2] One of the bulk cargo isolation valves is failed open: The bulk cargo compartment is not isolated.
- [L3] This alert is inhibited, if the alert COND BULK CARGO VENT FAULT is triggered.

Indications:BULK ISOL VALVES pbCOND SD Page**Flight Phase Inhibition:***Continued on the following page*



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COND BULK CARGO ISOL FAULT (Cont'd)

- [2] For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND BULK CARGO ISOL FAULT.*

BULK ISOL VALVES.....OFF

STATUS

INOP SYS

ALL PHASES

BULK CRG ISOL

COND BULK CARGO VENT FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

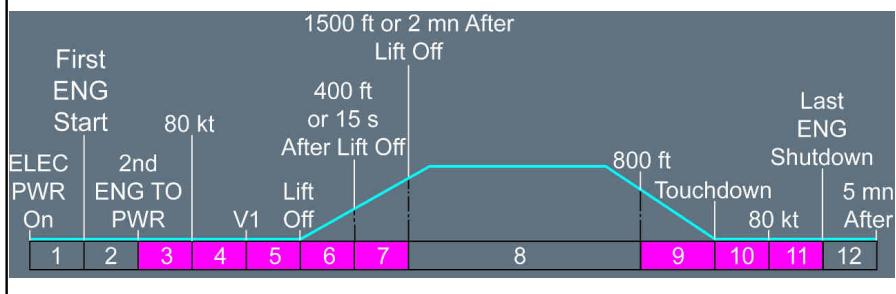
- At least one of the bulk cargo isolation valves is abnormally closed: The bulk cargo compartment is no longer ventilated.

Indications:

BULK ISOL VALVES pb



COND SD Page

Flight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND BULK CARGO VENT FAULT*.

Crew awareness.

Continued on the following page

COND BULK CARGO VENT FAULT (Cont'd)**STATUS****INOP SYS****ALL PHASES**BULK CRG VENT
BULK CRG HEATER**COND DUCT OVHT**

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- [L2] There is an overheating in a cockpit duct, or a cabin duct.
- [L3] There is a duct overheating, when the air temperature inside the applicable duct exceeds 70 °C.
Indications:

[L2]



HOT AIR 1(2) pb

COND SD Page

Flight Phase Inhibition:*Continued on the following page*



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COND DUCT OVHT (Cont'd)

[L2] For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND DUCT OVHT*.

● In the case of a cockpit duct overheat:

CKPT DUCT OVHT

HOT AIR 2..... OFF

● IF HOT AIR JAMMED OPEN :

PACK 2..... OFF

● In the case of a cabin duct overheat:

CABIN DUCT OVHT

HOT AIR 1(2)..... OFF

[L2] The hot-air valve that must be closed depends on the affected cabin duct.

[L1] ● IF HOT AIR JAMMED OPEN :

PACK 1(2)..... OFF

[L2] The pack that must be set to off depends on the hot-air valve that is jammed open.

[L1] CARGO TEMP..... MONITOR

● In the case of a forward cargo duct overheat:

FWD CARGO DUCT OVHT

HOT AIR 1..... OFF

● IF HOT AIR JAMMED OPEN :

PACK 1..... OFF

Continued on the following page



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COND DUCT OVHT (Cont'd)

L12

DEFERRED PROC

ALL PHASES

● WHEN DUCT OVHT OUT :

HOT AIR 1(2).....ON

The hot-air valve that must be closed depends on the affected cabin duct.

● If the hot-air valve is jammed open:

PACK 1(2).....ON

L12

STATUS

INOP SYS

ALL PHASES

CKPT TEMP REGUL (in the case of a cockpit
duct overheat)

CAB PART TEMP REGUL (in the case of a
cabin duct overheat)

FWD CRG TEMP REGUL (in the case of a
forward cargo duct overheat)

INFO

CABIN TEMP REGUL DEGRADED

Temperature regulation in some cabin zones is degraded.

- If the forward cargo temperature regulation is affected:
FWD CRG TEMP REGUL DEGRADED

COND FWD CARGO ISOL FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [L2] One of the forward cargo isolation valves is failed open: The forward cargo compartment is not isolated.
- [L3] This alert is inhibited, if the alert COND FWD CARGO VENT FAULT is triggered.

Indications:

[L2]

FWD ISOL VALVES pbCOND SD PageFlight Phase Inhibition:

- [L2] For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND FWD CARGO ISOL FAULT*.

FWD ISOL VALVES.....OFF*Continued on the following page*

COND FWD CARGO ISOL FAULT (Cont'd)**STATUS****INOP SYS****ALL PHASES**

FWD CRG ISOL

COND FWD CARGO VENT FAULT

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- [L2] At least one of the forward cargo isolation valves is abnormally closed: The forward cargo compartment is no longer ventilated.

Indications:FWD ISOL VALVES pbCOND SD Page**Flight Phase Inhibition:***Continued on the following page*



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COND FWD CARGO VENT FAULT (Cont'd)

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND FWD CARGO VENT FAULT*.

Crew awareness.

STATUS

INOP SYS

ALL PHASES

FWD CRG VENT
FWD CRG TEMP REGUL

INFO

FWD CRG VENT DEGRADED
FWD CRG TEMP REGUL DEGRADED

COND HOT AIR 1(2) FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [L2] – The hot-air valve is failed closed, or
– The HOT AIR pb is abnormally set to **OFF**.

Indications:COND SD PageFlight Phase Inhibition:

- [L2] When the ECAM does not require the flight crew to perform any action: No single chime, and no master caution is triggered.

For associated MEL dispatch conditions: *Refer to MEL/ME-ECAM-21-3 COND HOT AIR 1(2) FAULT.*

Continued on the following page



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COND HOT AIR 1(2) FAULT (Cont'd)

[L3] The temperature regulation in some cockpit or cabin zones will be affected, if at least one TASOV remains closed: For more information on this failure case, *Refer to DSC-21-10-10-30 Cabin, Cockpit Zones, and Crew Rest Compartments*).

- [L1] ● If the temperature regulation of the cargo zones is affected:
CARGO TEMP..... MONITOR
- If the hot-air valve 1(2) is not failed closed:
HOT AIR 1(2)..... ON

STATUS

INOP SYS

ALL PHASES

CKPT TEMP REGUL (if the temperature regulation in the cockpit is affected)
CAB PART TEMP REGUL (if the temperature regulation in some cabin zones is affected)
FWD CRG TEMP REGUL (if the temperature regulation in forward cargo zone is affected)

INFO

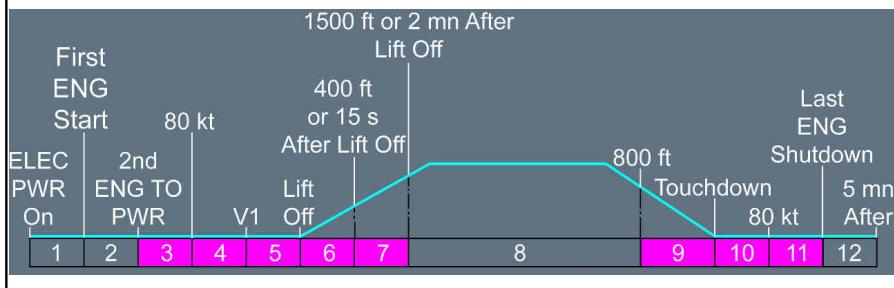
- If the temperature regulation in some cockpit or cabin zones is affected:
CABIN TEMP REGUL DEGRADED
- If the temperature regulation in the forward cargo zone is affected:
FWD CRG TEMP REGUL DEGRADED

COND MIXER PRESS REGUL FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- The air pressure in the mixer unit is abnormally high, or abnormally low.

Indications:Flight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND MIXER PRESS REGUL FAULT*.

- When pressure in the mixer unit is too high:

MIXER PRESS HI

- When pressure in the mixer unit is too low, and the aircraft is on ground, before engine start:

MIXER PRESS LO

- Displayed only in the flight phase 1.*

- RISK OF REDUCED CABIN AIR FLOW

Continued on the following page

COND MIXER PRESS REGUL FAULT (Cont'd)STATUSINFO

RISK OF REDUCED CABIN AIR FLOW

COND ONE PRIMARY CABIN FAN FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- One primary fan is failed.

Indications:

SD page



COND SD Page

Flight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to MEL/ME-ECAM-21-3 COND ONE PRIMARY CABIN FAN FAULT .

Continued on the following page



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COND ONE PRIMARY CABIN FAN FAULT (Cont'd)

Crew awareness.

MORE INFO

REDUND LOSS

1 PRIMARY CAB FAN

COND PURSER TEMP SEL FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [L2] The CABIN selector on the AIR panel is set to PURS SEL, and the temperature cannot be selected on the Flight Attendant Panel (FAP).
 [L3] The temperature selected on the FAP cannot be transmitted to the CIDS.

Indications:

[L2]

COND SD PageFlight Phase Inhibition:

- [L2] For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND PURSER TEMP SEL FAULT*.

CABIN TEMP.....ADJUST

- [L2] *The selected temperature is the same in all the cabin zones.*

COND RAM AIR 1(2) FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

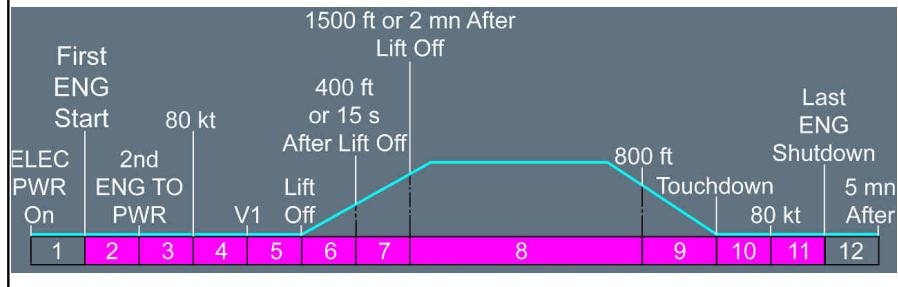
- The RAM air inlets are no longer controlled by the RAM AIR pb .

Indications:

SD page



COND SD Page

Flight Phase Inhibition:

- For associated MEL dispatch conditions: Refer to *MEL/ME-ECAM-21-3 COND RAM AIR 1(2) FAULT*.

Crew awareness.

- In flight, the failed RAM air inlet is indicated on the COND system display.

Continued on the following page

COND RAM AIR 1(2) FAULT (Cont'd)**MORE INFO****REDUND LOSS**

RAM AIR 1(2)

COND TEMP CTL 1(2) FAULT

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

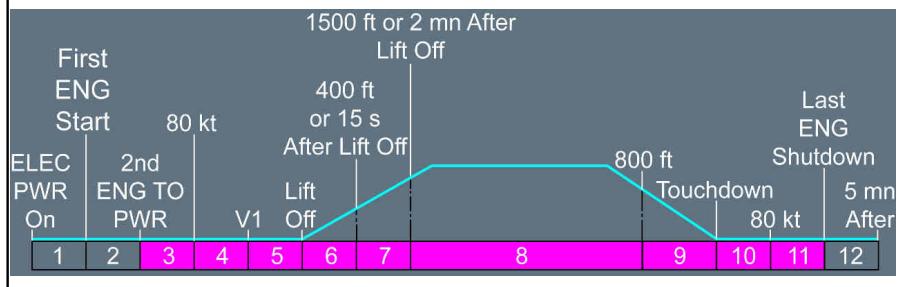
- One channel of the temperature controller is failed.

Indications:

SD page



COND SD Page

Flight Phase Inhibition:

- For associated MEL dispatch conditions: Refer to *MEL/ME-ECAM-21-3 COND TEMP CTL 1(2) FAULT*.

Continued on the following page



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COND TEMP CTL 1(2) FAULT (Cont'd)

Crew awareness.

MORE INFO

REDUND LOSS

TEMP CTL 1(2)

COND TEMP CTL DEGRADED

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

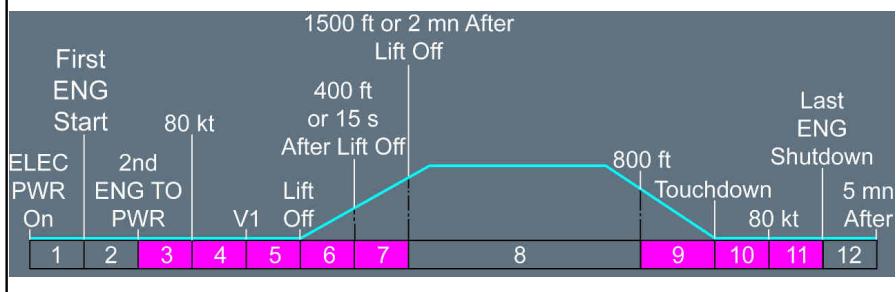
- The temperature control in two or three cabin zones is lost. The temperature control in the affected zones is automatically set by default to the average temperature in the other cabin zones.

Indications:

SD page



COND SD Page

Flight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND TEMP CTL DEGRADED*.

Crew awareness.

Continued on the following page

COND TEMP CTL DEGRADED (Cont'd)**STATUS****INOP SYS****ALL PHASES**

TEMP CTL DEGRADED

COND TEMP CTL FAULT

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- [L2] – Both channels of the temperature controller are failed, or
– Both pack controllers are failed, or
– The trim air system is failed.

Indications:

SD page



COND SD Page

Flight Phase Inhibition:*Continued on the following page*



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COND TEMP CTL FAULT (Cont'd)

L2 For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND TEMP CTL FAULT*.

- If cargo temperature regulation is affected:

CARGO TEMP MONITOR

L12

STATUS _____

INOP SYS

ALL PHASES

ALL ZONES TEMP REGUL

The temperature in some cockpit or cabin zones may be abnormally low.

INFO

- When both pack controllers are failed:

ENG IDLE HI

PACKS 1+2 AT FIXED TEMP

When the thrust levers are at idle, the engines are automatically set to idle high.

The packs deliver a fixed 20 °C temperature.

FWD CRG TEMP REGUL DEGRADED

COND TEMP CTL REDUNDANCY LOST

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

L2 One redundant application of the temperature control is failed.

L3 This application is hosted in the CPIOM B.

Indications:Flight Phase Inhibition:

L2 For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND TEMP CTL REDUNDANCY LOST*.

Crew awareness.

— **MORE INFO** —**REDUND LOSS**

TEMP CTL REDUND

COND THREE PRIMARY CABIN FANS FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- Three primary fans are failed. The pack airflow is automatically set to HIGH.

Indications:

Audio



Master Light



SD page

COND SD PageFlight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND THREE PRIMARY CABIN FANS FAULT*.

Crew awareness.

Continued on the following page



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COND THREE PRIMARY CABIN FANS FAULT (Cont'd)

L12

STATUS

INOP SYS

ALL PHASES

3 PRIMARY CAB FANS

INFO

CABIN TEMP REGUL DEGRADED

The temperature in some cabin zones may be abnormally low.

COND TWO PRIMARY CABIN FANS FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- Two primary fans are failed. The airflow is automatically set to HIGH.

Indications:

Audio



Master Light



SD page

COND SD PageFlight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND TWO PRIMARY CABIN FANS FAULT*.

Crew awareness.

Continued on the following page



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COND TWO PRIMARY CABIN FANS FAULT (Cont'd)

L12

STATUS

INOP SYS

ALL PHASES

2 PRIMARY CAB FANS

INFO

CABIN TEMP REGUL DEGRADED

The temperature in some cabin zones may be abnormally low.



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21-Ventilation**AIR PACK BAY 1(2) VENT FAULT**

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

L2 The pack bay ventilation of one pack is failed on ground.

L3 The blowing fan, that is assigned to the ventilation of one pack bay, is failed.

Indications:

L2



SC



Master Light

Flight Phase Inhibition:

For associated MEL dispatch conditions: Refer to *MEL/ME-ECAM-36-21 AIR PACK BAY 1(2) VENT FAULT*.

● On ground:

PACK 1(2).....OFF

PACK 1(2) AVAIL IN FLT

Continued on the following page



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AIR PACK BAY 1(2) VENT FAULT (Cont'd)

STATUS

INOP SYS

ALL PHASES

PACK 1(2) (On ground)
PACK BAY 1(2) VENT (On ground)

INFO

- On ground:
PACK 1(2) AVAIL IN FLT

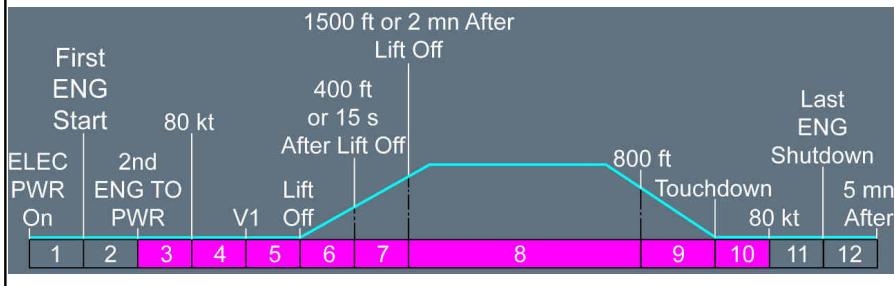
AIR PACK BAY 1+2 VENT FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

The pack bay ventilation of both packs is failed on ground.

Both blowing fans, that are assigned to the ventilation of the pack bays, are failed.

Indications:Flight Phase Inhibition:

For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-36-21 AIR PACK BAY 1+2 VENT FAULT*.

● On ground:

PACK 1..... OFF
PACK 2..... OFF
PACK 1+2 AVAIL IN FLT

This alert is recalled after touchdown, when the aircraft speed is below 80 kt, to remind the flight crew to set both PACK pb to **OFF**.

Continued on the following page



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AIR PACK BAY 1+2 VENT FAULT (Cont'd)

STATUS

INOP SYS

ALL PHASES

PACK 1+2 (On ground)
PACK BAY 1+2 VENT (On ground)

INFO

- On ground:
PACK 1+2 AVAIL IN FLT

COND AFT VENT CTL 1(2) FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

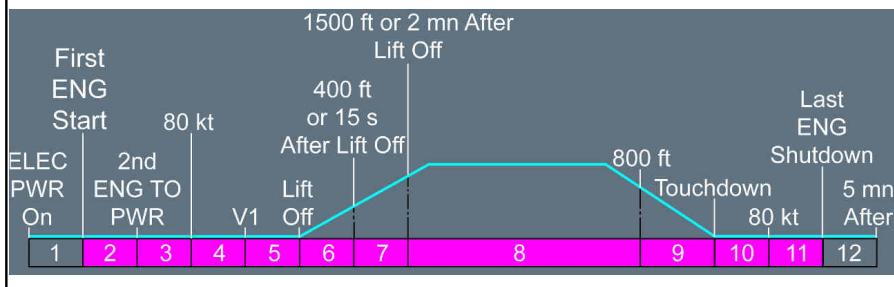
- [L2] The channel 1(2) of the aft ventilation controller is failed.

Indications:

SD page



COND SD Page

Flight Phase Inhibition:

- [L2] For associated MEL dispatch conditions: Refer to *MEL/ME-ECAM-21-3 COND AFT VENT CTL 1(2) FAULT*.

Crew awareness.

Continued on the following page

COND AFT VENT CTL 1(2) FAULT (Cont'd)**MORE INFO****REDUND LOSS**

AFT VENT CTL 1(2)

COND AFT VENT CTL DEGRADED

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- [L2] Two applications of the aft ventilation controller are lost.
[L3] These applications are hosted on the CPIOM B.

Indications:

[L2]

SD page



COND SD Page

Flight Phase Inhibition:

Continued on the following page



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COND AFT VENT CTL DEGRADED (Cont'd)

- [2] For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND AFT VENT CTL DEGRADED*.

Crew awareness.

STATUS

INOP SYS

ALL PHASES

AFT VENT CTL DEGRADD

COND AFT VENT CTL FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- Both channels of the aft ventilation controller are failed.

Indications:

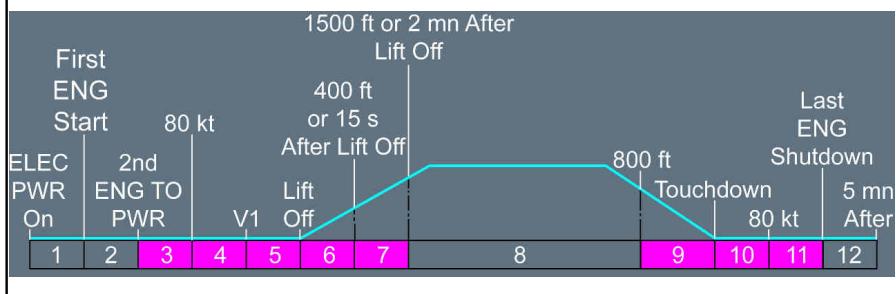
Audio



Master Light



SD page

COND SD PageFlight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND AFT VENT CTL FAULT*.

Crew awareness.

Continued on the following page

COND AFT VENT CTL FAULT (Cont'd)**STATUS****INOP SYS****ALL PHASES**CAB AIR EXTRACT VLV
AFT VENT CTL**INFO**

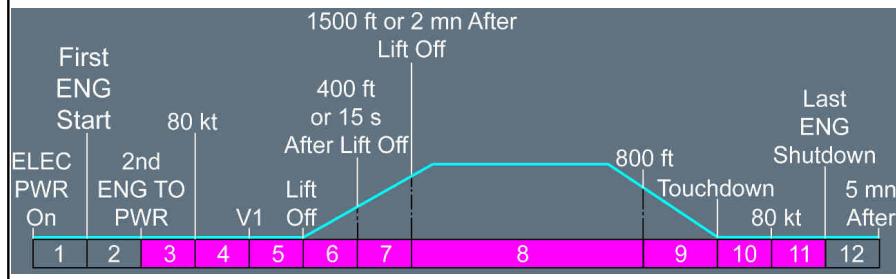
CABIN TEMP REGUL DEGRADED

COND AFT VENT CTL REDUNDANCY LOST

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- [L2] A redundant application of the aft ventilation controller is failed. There is no operational impact.
- [L3] This application is hosted on the CPIOM B.

Indications:**Flight Phase Inhibition:***Continued on the following page*



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COND AFT VENT CTL REDUNDANCY LOST (Cont'd)

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND AFT VENT CTL REDUNDANCY LOST*.

Crew awareness.

MORE INFO

REDUND LOSS

AFT VENT CTL REDUND

COND FWD(AFT) CREW REST ISOL FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [2] The isolation of the lower deck cabin crew rest compartment is lost.

Indications:

SD page



COND SD Page

Flight Phase Inhibition:

- [2] For associated MEL dispatch conditions: Refer to *MEL/ME-ECAM-21-3 COND FWD(AFT) CREW REST ISOL FAULT (If Installed)*

Crew awareness.

Continued on the following page

COND FWD(AFT) CREW REST ISOL FAULT (Cont'd)**STATUS****INOP SYS****ALL PHASES**

FWD(AFT) CREW REST ISOL

COND FWD(AFT) CREW REST VENT FAULT

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- [L2] The ventilation of the cabin crew rest compartment is lost.

Indications:

SD page

COND SD Page**Flight Phase Inhibition:***Continued on the following page*



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COND FWD(AFT) CREW REST VENT FAULT (Cont'd)

- [2] For associated MEL dispatch conditions: *Refer to MEL/ME-ECAM-21-3 COND FWD(AFT) CREW REST VENT FAULT (If Installed)*

Crew awareness.

STATUS

INOP SYS

ALL PHASES

FWD(AFT) CREW REST VENT

COND FWD VENT CTL 1(2) FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- The channel 1(2) of the forward ventilation controller is failed.

Indications:

SD page



COND SD Page

Flight Phase Inhibition:

- For associated MEL dispatch conditions: Refer to *MEL/ME-ECAM-21-3 COND FWD VENT CTL 1(2) FAULT*.

Crew awareness.

Continued on the following page

COND FWD VENT CTL 1(2) FAULT (Cont'd)**MORE INFO****REDUND LOSS**

FWD VENT CTL 1(2)

COND FWD VENT CTL DEGRADED

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- Two applications of the forward ventilation controller are failed.
- These applications are hosted on the CPIOM B.

Indications:

- SD page



COND SD Page

Flight Phase Inhibition:

Continued on the following page



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COND FWD VENT CTL DEGRADED (Cont'd)

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND FWD VENT CTL DEGRADED*.

Crew awareness.

STATUS

INOP SYS

ALL PHASES

FWD VENT CTL DEGRADD

COND FWD VENT CTL FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [L2] Both channels of the forward ventilation controller are failed.

Indications:

Audio



Master Light



SD page



COND SD Page

Flight Phase Inhibition:

- [L2] For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND FWD VENT CTL FAULT*.

- If IFEC pb-sw is ON:

IFEC.....OFF

Continued on the following page

COND FWD VENT CTL FAULT (Cont'd)**STATUS****INOP SYS****ALL PHASES**IFE BAY VENT
RAM AIR
FWD VENT CTL**INFO**

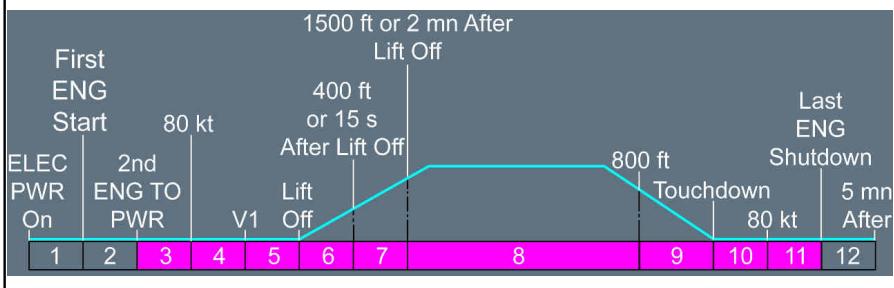
CABIN TEMP REGUL DEGRADED

COND FWD VENT CTL REDUNDANCY LOST

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- [L2] A redundant application of the forward ventilation controller is failed. There is no operational impact.
- [L3] This application is hosted on the CPIOM B.

Indications:**Flight Phase Inhibition:***Continued on the following page*



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COND FWD VENT CTL REDUNDANCY LOST (Cont'd)

- [2] For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND FWD VENT CTL REDUNDANCY LOST*.

Crew awareness.

MORE INFO

REDUND LOSS

FWD VENT CTL REDUND

COND PART SECONDARY CABIN FANS FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- One secondary fan is failed, or
 – Two not adjacent secondary fans are failed.

Indications:

SD page



COND SD Page

Flight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND PART SECONDARY CABIN FANS FAULT*.

Crew awareness.

Continued on the following page

COND PART SECONDARY CABIN FANS FAULT (Cont'd)**MORE INFO****REDUND LOSS**

PART SECONDARY CAB FANS

COND SECONDARY CABIN FANS FAULT**Applicable to: ALL****ANNUNCIATIONS****Triggering Conditions:**

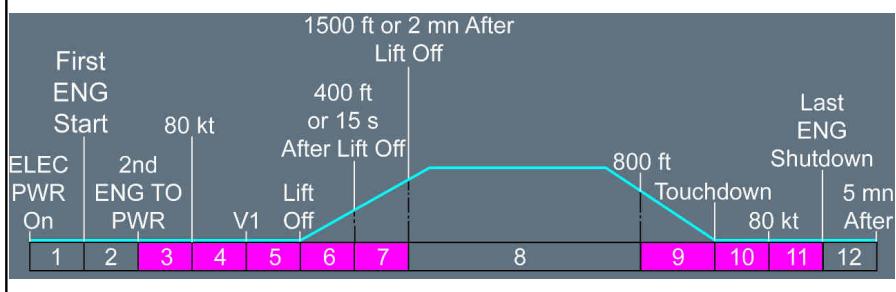
- [L2] – Two adjacent secondary fans are failed, or
– More than two secondary fans are failed.

Indications:

SD page



COND SD Page

Flight Phase Inhibition:*Continued on the following page*



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COND SECONDARY CABIN FANS FAULT (Cont'd)

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-3 COND SECONDARY CABIN FANS FAULT*.

Crew awareness.

STATUS

INOP SYS

ALL PHASES

SECONDARY CAB FANS

INFO

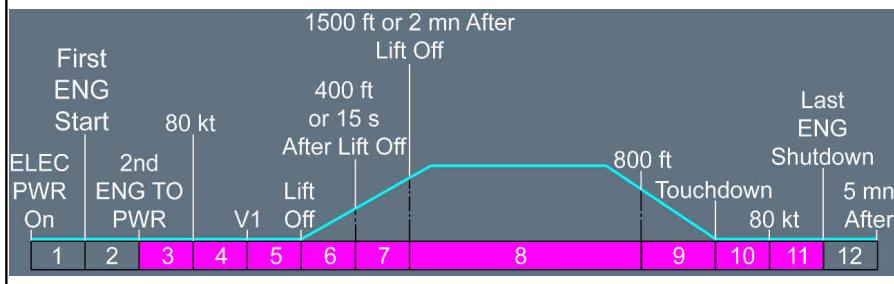
CABIN TEMP REGUL DEGRADED

VENT AVNCS BLOWING DEGRADED

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [L2] On both avionics ventilation circuits (left and right), the blowing fans are failed or the filters are clogged.

Indications:Flight Phase Inhibition:

- [L2] Both backup valves automatically open and ventilate the avionics bay with air from the mixer unit. For associated MEL dispatch conditions, *Refer to MEL/ME-ECAM-21-4 VENT AVNCS BLOWING DEGRADED*.

Crew awareness.

VENT AVNCS BLOWING FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- Both L and R ventilation circuits are not ventilated.

Indications:

Audio



Master Light



SD page



COND SD Page

Flight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to MEL/ME-ECAM-21-4 VENT AVNCS BLOWING FAULT.

AIR FLOW..... HI
CAB FANS..... ON

● IF ALERT PERSISTS AFTER 5 MIN :

MAX FLT TIME : 5 HR

Continued on the following page



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VENT AVNCS BLOWING FAULT (Cont'd)

LIMITATIONS

LIMITATIONS ON ECAM

ALL PHASES

- If the alert persists after 5 min:
MAX FLT TIME : 5 HR

STATUS

INOP SYS

ALL PHASES

VENT AVNCS BLOWING

VENT AVNCS EXTRACT FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- L2** Air in the main and upper avionics bays, is not extracted overboard:
 – The extraction fan is failed, or
 – The extract valve is abnormally closed.

Indications:EXTRACT pb-swFlight Phase Inhibition:

- L2** For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-4 VENT AVNCS EXTRACT FAULT*.

Continued on the following page



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VENT AVNCS EXTRACT FAULT (Cont'd)

VENT AVNCS EXTRACT..... OVRD

- [2] Air that ventilates the main and upper avionics bays is extracted by differential pressure via the overboard valve.

STATUS

INOP SYS

ALL PHASES

VENT AVNCS EXTRACT

VENT AVNCS L (R) BLOWING FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- The L (R) ventilation circuit is not ventilated.

Indications:

Audio



Master Light



SD page

COND SD PageFlight Phase Inhibition:

- For associated MEL dispatch conditions: Refer to *MEL/ME-ECAM-21-4 VENT AVNCS L(R) BLOWING FAULT*

AIR FLOW..... HI
CAB FANS..... ON

Continued on the following page



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VENT AVNCS L (R) BLOWING FAULT (Cont'd)

STATUS

INOP SYS

ALL PHASES

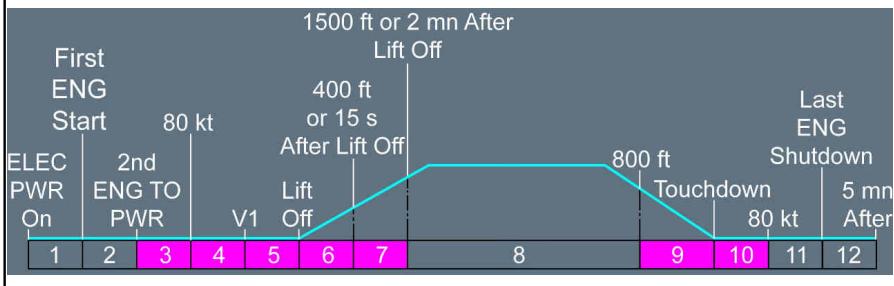
VENT AVNCS L (R) BLOWING

VENT AVNCS OVBD VLV FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- The avionics overboard valve is abnormally:
 – Open
 – Closed, or
 – Partially open.

Indications:Flight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-4 VENT AVNCS OVBD VLV FAULT*.

Continued on the following page



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VENT AVNCS OVBD VLV FAULT (Cont'd)

VENT AVNCS EXTRACT..... OVRD

- [L2] *Air that ventilates the main and upper avionics bays is extracted by differential pressure via the overboard valve.*

[L1] ● **IF OVBD VLV STILL FULL OPEN :**

MAX FL : 100/MEA

CABIN ALT MODE.....MAN

- [L2] *The flight crew manually controls the cabin altitude.*

[L1] CAB V/S TRGT.....+2500 FT/MIN

- [L3] *All outflow valves open, to prevent cabin depressurization via the overboard valve, as this may damage the avionics bays.*

LIMITATIONS

LIMITATIONS ON ECAM

ALL PHASES

- In flight, if the avionics overboard valve is fully open:
MAX FL : 100/MEA

LIMITATIONS ON PFD

ALL PHASES

- In flight, if the avionics overboard valve is fully open:
MAX FL : 100/MEA

STATUS

INOP SYS

ALL PHASES

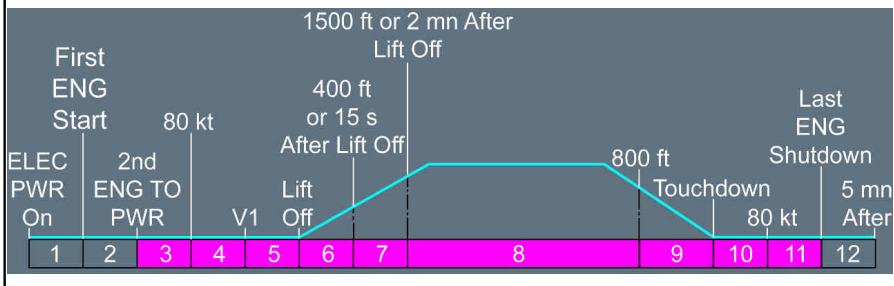
VENT AVNCS OVBD VLV

VENT AVNCS VENT CTL FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- The avionics ventilation controller is failed.

Indications:Flight Phase Inhibition:

- When the avionics ventilation controller is lost:

- The avionics compartment remains ventilated.
- The avionics ventilation blowing fans, and the extraction fan are set to the maximum speed.
- The ECAM alerts associated to the avionics ventilation system are no longer monitored.
- The indications on the COND SD page associated to the avionics ventilation system are lost.

For associated MEL dispatch conditions, *Refer to MEL/ME-ECAM-21-4 VENT AVNCS VENT CTL FAULT.*

Crew awareness.

Continued on the following page

VENT AVNCS VENT CTL FAULT (Cont'd)**STATUS****INOP SYS****ALL PHASES**

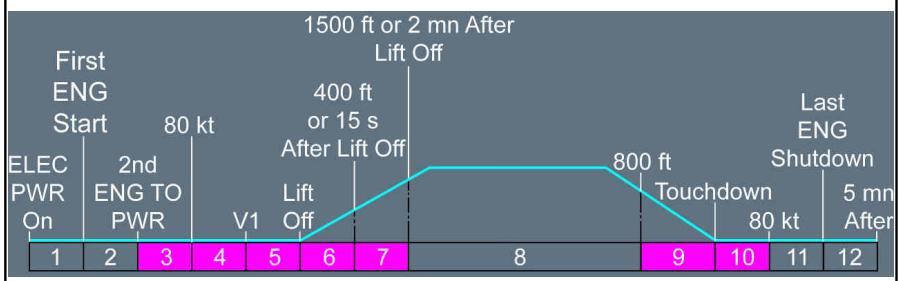
AVNCS VENT CTL

VENT COOLG SYS 1(2) OVHT

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- There is an overheating on the system 1(2) of the supplemental cooling system.
- Indications:

**Flight Phase Inhibition:***Continued on the following page*



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VENT COOLG SYS 1(2) OVHT (Cont'd)

- [L2] For associated MEL dispatch conditions:

- Refer to *MEL/ME-ECAM-21-4 VENT COOLG SYS 1 OVHT*
- Refer to *MEL/ME-ECAM-21-4 VENT COOLG SYS 2 OVHT*.

- If the supplemental cooling system 1(2) overheat is isolated:

COOLG SYS 1(2) OVHT ISOLATED

- [L2] *The supplemental cooling system part that is not isolated, continues to operate normally.*

- [L1] ● If the system 1(2) of the supplemental cooling system 1(2) automatically shuts down:

COOLG SYS 1(2) AUTO SHUTDOWN

- If the automatic shutdown of the supplemental cooling system 1(2) failed:

VENT COOLG..... OFF

- [L2] *Both supplemental cooling systems no longer operate.*

STATUS

INOP SYS

ALL PHASES

VENT COOLG SYS

VENT COOLG SYS 1(2)

VENT COOLG SYS PROT FAULT
COOLG SYS 1(2) OVHT PROT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- The overheat detection system of the supplemental cooling system 1(2), is lost.
- Indications:

Flight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to MEL/ME-ECAM-21-4 VENT COOLG SYS PROT FAULT.

Crew awareness.

VENT IFE BAY ISOL FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- L2 The IFE bay ventilation system can no longer be isolated from the air-conditioning system.
 L3 The IFE bay backup valve is failed open.

Indications:Flight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-4 VENT IFE BAY ISOL FAULT*.

Crew awareness.

STATUS**INOP SYS****ALL PHASES**

IFE BAY ISOL

VENT IFE BAY VENT FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

[L2] The IFE bay is not ventilated.
[L3]

- The blowing fan of the IFE bay is failed, or
- On ground, the IFE backup valve is failed.

Indications:

[L2]

Flight Phase Inhibition:

[L2] For associated MEL dispatch conditions, Refer to MEL/ME-ECAM-21-4 VENT IFE BAY VENT FAULT.

IFEC.....OFF

- When the IFEC pb-sw is set to OFF:
IFE BAY VENT AVAIL IN FLT

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VENT IFE BAY VENT FAULT (Cont'd)

STATUS

INOP SYS

ALL PHASES

IFE BAY VENT

INFO

- When the IFEC pb-sw is set to OFF:
IFE BAY VENT AVAIL IN FLT

VENT LAV & GALLEYS EXTRACT FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:**L2**

The lavatory and galley's air extraction system does not operate.

L3

- On ground only, when the two extraction fans of the lavatory and galleys air extraction system are failed.
- On ground and in flight, when the air extraction system of the lavatory and galleys, is clogged.

Indications:Flight Phase Inhibition:**L2** The aft avionics bays is not ventilated on ground.For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-4 VENT LAV & GALLEYS EXTRACT FAULT*.

- **On ground, if the in-flight function of the lavatory and galleys extraction is not lost:**
LAV & GALLEYS EXTRACT AVAIL IN FLT

Continued on the following page

VENT LAV & GALLEYS EXTRACT FAULT (Cont'd)**STATUS****INOP SYS****ALL PHASES**

LAV & GALLEYS EXTRACT

INFO

- On ground, when lavatory and galleys ventilation is available in flight:
LAV & GALLEYS EXTRACT AVAIL IN FLT
AFT AVNCS SMOKE DET DEGRADED
MAIN + UPPER CWS SMOKE DET DEGRADED

VENT THS BAY VENT FAULT

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

The ventilation system of the THS bay is failed.

Indications:**Flight Phase Inhibition:***Continued on the following page*



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VENT THS BAY VENT FAULT (Cont'd)

- [2] For associated MEL dispatch conditions, *Refer to MEL/ME-ECAM-21-4 VENT THS BAY VENT FAULT.*

Crew awareness.

STATUS

INOP SYS

ALL PHASES

THS BAY VENT



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21-Pressurization**CAB PRESS AUTO CTL FAULT**

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [L2]
- The automatic control of at least one outflow valve controller is failed, inhibited during taxi and cruise phases
 - The CPIOM B is failed, or
 - The pressure sensors are failed, or the ambient pressure data is no longer available.

For more information on the automatic control system, *Refer to DSC-21-30-10-10 Outflow Valve Controllers*.

Indications:CAB PRESS SD PageFlight Phase Inhibition:*Continued on the following page*

CAB PRESS AUTO CTL FAULT (Cont'd)

 For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-2 CAB PRESS AUTO CTL FAULT*.

Depending on the failure or the combination of failures, the consequences on the cabin pressurization system may be different:

- The cabin pressurization system continues to operate automatically, there is no operational impact:
If the automatic control of at least one outflow valve controller continues to operate.

Note: - *If the automatic control system of only one outflow valve controller is failed:*

- *This caution is also inhibited during the taxi and cruise phase*
 - *No aural warning is triggered*
 - *No master caution is triggered.*
- *If the automatic control system of only two outflow valve controllers are failed:*
- *This caution is also inhibited during the cruise phase.*

- The cabin pressurization system is in backup mode, there is no operational impact before the top of descent:
 - If the automatic control of all the outflow valve controllers is failed, or
 - If the CPIOM-B is failed, or
 - If all the pressure sensors are failed, or
 - If all the ambient pressure sensors are failed.

In backup mode, the landing field elevation is set by default to 7 000 ft :

- If the manual pressurization system is available (e.g. if all the pressure sensors or If the ambient pressure sensors are failed), at top of descent, the flight crew uses the manual system of the cabin pressurization to set the cabin altitude target to the landing field elevation.
- If the manual pressurization system is not available (e.g. If the automatic control of all the outflow valve controllers is failed, or if the CPIOM-B is failed), at top of descent, the landing field elevation is fixed at 7 000 ft (or 7 500 ft if, in addition, the ambient pressure is no longer available).

Thus, below 7 000 ft (7 500 ft), the outflow valves are opened, and the cabin altitude is the same as the aircraft altitude: Therefore, high descent rate must be avoided.

Note: When the CPIOM B is failed, the cabin altitude target no longer appears on the SD page: Therefore, the flight crew must not use the cabin pressurization manual system.

Continued on the following page



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CAB PRESS AUTO CTL FAULT (Cont'd)

- If the automatic control of one outflow valve controller is lost:
AUTO CTL SYS 1(2)(3)(4) FAULT
- If the automatic control of all the outflow valve controllers is failed
 - or
 - if the CPIOM-B is failed
 - or
 - If all the pressure sensors are failed
 - or
 - If the ambient pressure sensors are failed

■ If the manual pressurization system is not available:

AUTO CTL SYS 1+2+3+4 FAULT

CAB PRESS IN BACKUP MODE

L2 There is no operational impact before top of descent.

L1 CAB PRESS MAN MODES : DO NOT USE

L2 The pressurization system no longer receives the landing field elevation information, and the cabin altitude targets no longer appear on the SD. Therefore, the flight crew must not use the cabin pressurization manual system.

L1 IN DES : CAB ALT REGULATED TO 7000 FT

L2 In backup mode, the cabin altitude is regulated to 7 000 ft in descent.

L1 BELOW 7000 FT : CAB ALT = ACFT ALT

L2 Below 7 000 ft, the outflow valves open: The cabin altitude is the same as the aircraft altitude.

L1 BELOW 7000 FT : AVOID HI DES V/S

L2 Below 7 000 ft, avoid high descent rate to limit uncomfortable variations of cabin pressure.

● If the ambient pressure information is also no longer available

CABIN ALT REGULATED TO 7500FT

CAB PRESS MAN MODES : DO NOT USE

BELLOW 7500 FT : CAB ALT = ACFT ALT

BELLOW 7500 FT : AVOID HI DES V/S

■ If the manual pressurization system is available:

CABIN ALT MODE.....MAN

The flight crew manually controls the cabin altitude.

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CAB PRESS AUTO CTL FAULT (Cont'd)

| L1 | ACFT FL | CABIN ALT TRGT |
|----|---------|----------------|
| | 430 | 8000 |
| | 400 | 7000 |
| | 350 | 5500 |
| | 300 | 3700 |
| | 250 | 2900 |
| | 200 | 2150 |
| | 150 | 1500 |
| | 100 | 900 |

CABIN ALT TRGT..... AS RQRD

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CAB PRESS AUTO CTL FAULT (Cont'd)

LIMITATIONS

LIMITATIONS ON ECAM

ALL PHASES

- If the manual pressurization system is not available:
MAN PRESS : DO NOT USE

LIMITATIONS ON PFD

APPR & LDG

- If manual pressurization system is not available:
AVOID HI DESCENT V/S

DEFERRED PROC

ALL PHASES

- If the manual pressurization system is available:

AT TOP OF DESCENT :

CAB ALT TRGT..... LDG ELEVN

STATUS

INOP SYS

ALL PHASES

CAB PRESS AUTO CTL (1)(2)(3)(4)

INFO

- If the manual pressurization system is available:

| ACFT FL | CABIN ALT TRGT |
|---------|----------------|
| 430 | 8000 |
| 400 | 7000 |

Continued on the following page



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CAB PRESS AUTO CTL FAULT (Cont'd)

| | |
|-----|------|
| 350 | 5500 |
| 300 | 3700 |
| 250 | 2900 |
| 200 | 2150 |
| 150 | 1500 |
| 100 | 900 |

- If the manual pressurization system is not available:

CAB PRESS IN BACKUP MODE

IN DES : CAB ALT REGULATED TO 7000 FT

BELOW 7000 FT : CAB ALT = ACFT ALT

- If the manual pressurization system is not available and if the ambient pressure is no longer available:

CAB ALT REGULATED TO 7500 FT

BELOW 7500 FT : CAB ALT = ACFT ALT

CAB PRESS CTL REDUNDANCY LOST

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

One of the following failure occurred:

- Two applications of the CPIOM B are lost. The third, and fourth CPIOM B applications, ensure that there is no impact on cabin pressurization.
- Only three pressure sensors are available. The remaining pressure sensors ensure that there is no impact on cabin pressurization.

Indications:Flight Phase Inhibition:

For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-2 CAB PRESS CTL REDUNDANCY LOST*.

Crew awareness.

CAB PRESS DIFF PRESS HI

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

[L2] In automatic mode, the cabin differential pressure is above 8.92 PSI, and is below 9.2 PSI.

Indications:

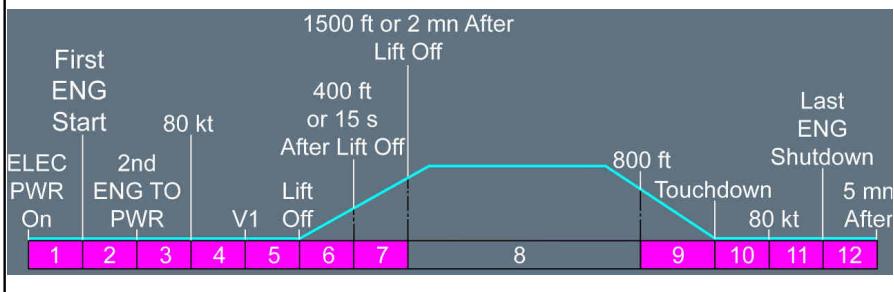
Audio



Master Light



SD page

CAB PRESS SD PageFlight Phase Inhibition:*Continued on the following page*



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CAB PRESS DIFF PRESS HI (Cont'd)

■ If the manual pressurization system is available:

CABIN ALT MODE.....MAN

| ACFT FL | CABIN ALT TRGT |
|---------|----------------|
| 430 | 8000 |
| 400 | 7000 |
| 350 | 5500 |
| 300 | 3700 |
| 250 | 2900 |
| 200 | 2150 |
| 150 | 1500 |
| 100 | 900 |

CABIN ALT TRGT.....AS RQRD

■ If the manual pressurization system is not available:

EXPECT HI CAB RATE

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CAB PRESS DIFF PRESS HI (Cont'd)

LIMITATIONS

LIMITATIONS ON ECAM

APPR & LDG

- If the manual pressurization system is not available:
AVOID HI DESCENT V/S

DEFERRED PROC

ALL PHASES

- If the manual pressurization system is available:

AT TOP OF DESCENT :

CABIN ALT TRGT..... LDG ELEVN

STATUS

INFO

- If the manual pressurization system is available:

| ACFT FL | CABIN ALT TRGT |
|---------|----------------|
| 430 | 8000 |
| 400 | 7000 |
| 350 | 5500 |
| 300 | 3700 |
| 250 | 2900 |
| 200 | 2150 |
| 150 | 1500 |
| 100 | 900 |

CAB PRESS DIFF PRESS LO

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [L2] During descent, and if the aircraft altitude is at least 1 500 ft above the landing field elevation, the cabin differential pressure is almost at 0 PSI.

- [L3] The cabin differential pressure will reach 0 PSI in approximately 1.5 min.

Indications:

- [L2]



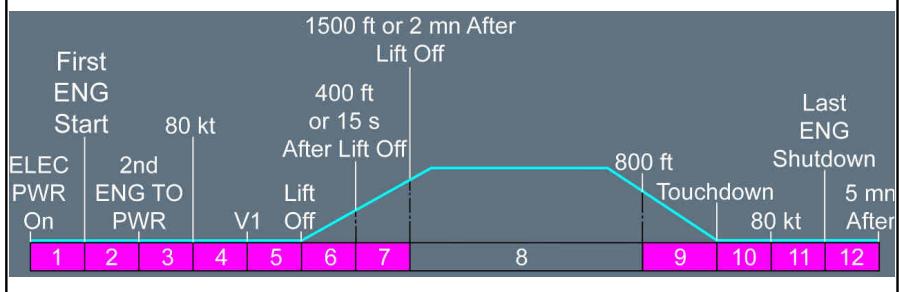
Audio



Master Light



SD page

CAB PRESS SD PageFlight Phase Inhibition:**EXPECT HI CAB RATE**

- [L2] To protect the aircraft from negative differential pressure, a sudden change in the cabin vertical speed may occur.

- [L1] ACFT DESCENT RATE.....REDUCE

CAB PRESS EXCESS CAB ALT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

-  **L2**
- In climb (or descent), the cabin altitude of the aircraft is above the higher of the following altitudes:
 - 9 550 ft
 - 1 000 ft above the takeoff (or landing) field elevation.
 - In cruise, the cabin altitude of the aircraft is above 9 550 ft.

Indications:

Audio



Master Light



SD page

CAB PRESS SD PageFlight Phase Inhibition:

-  For additional training-oriented information, Refer to FCTM/Emergency Descent.

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CAB PRESS EXCESS CAB ALT (Cont'd)

- If the aircraft is above FL 100:
CREW OXY MASKS..... USE
 - If the aircraft is above FL 100, and below FL 160:
DESCENT..... INITIATE
 - If the aircraft is above FL 160:
EMER DESCENT :
SIGNS..... ON
- If A/THR is neither armed nor active:
ALL THR LEVERS..... IDLE
- L2 If A/THR is armed or active, check A/THR is at IDLE on the E/WD.
- L1 SPEED BRAKE LEVER..... FULL
SPEED..... MAX / APPROPRIATE
- L2 If structural damage is suspected, use the flight controls with care and reduce speed as appropriate.
If the aircraft speed is below VLO and the aircraft altitude is below 21 000 ft, the landing gear can be extended.
- L1 ATC..... NOTIFY
- L2 Notify the ATC of the nature of the emergency, and state intentions.
If the ATC cannot be contacted:
 - Set the squawk code to 7700, on the SQWK page of the RMP, or
 - Set the ADS emergency status to ON, on the COM page of the ATC, or
 - Transmit a distress message on one of the following frequencies:
 - (VHF) 121.5 MHz
 - (HF) 2182 kHz
 - (HF) 8364 kHz.

L1 MAX FL : 100/MEA

L2 The minimum altitude must take into account:

- The Minimum Safe Altitude (MSA)
- Oxygen requirements
- The turbulence, that can be uncomfortable for passengers

Continued on the following page



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CAB PRESS EXCESS CAB ALT (Cont'd)

- The low Outside Air Temperature (OAT), that can be uncomfortable for the passengers, when the aircraft cabin is ventilated with RAM air.

L1 ● IF CAB ALT ABOVE 14000 FT :

PAX OXY MASK MAN ON.....PRESS

L2 If the cabin altitude of the aircraft is above 13 800 ft, the passenger oxygen masks will automatically drop.

If the automatic drop did not operate, pressing the PAX OXY MASK MAN ON pb confirms will release the passenger masks. In addition, contact the cabin crew to confirm that passenger oxygen masks are released.

Notify the cabin crew when the aircraft reaches a safe flight level, and the use of oxygen masks is no more necessary.

L1 ● If the aircraft is above FL 160:

● WHEN DESCENT ESTABLISHED :

CREW OXY MASKS DILUTION.....N

L2 To save oxygen, set the N/100% selector to N.

With the N/100% selector set to 100 %, oxygen quantity may be insufficient to cover the entire emergency descent profile.

Ensure that crew communication is established with oxygen masks. Avoid the continuous use of the interphone to minimize interference with the breathing noise in the oxygen mask.

LIMITATIONS

LIMITATIONS ON ECAM

ALL PHASES

- In flight:
MAX FL : 100/MEA

LIMITATIONS ON PFD

ALL PHASES

- In flight:
MAX FL : 100/MEA

CAB PRESS EXCESS DIFF PRESS

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [L2] The cabin differential pressure is above 9.65 PSI.

Indications:

Audio

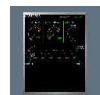
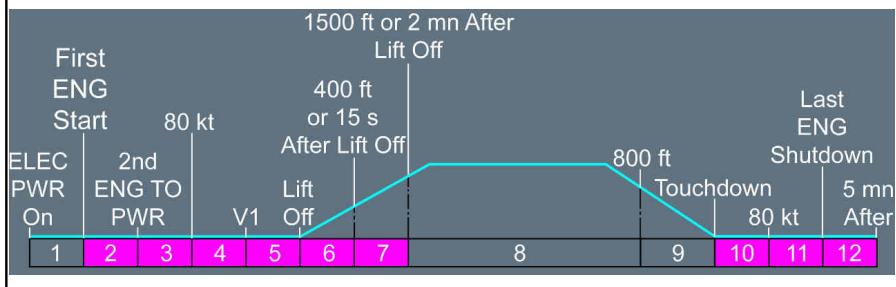


CRC

Master Light



SD page

CAB PRESS SD PageFlight Phase Inhibition:

- [L2] For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-2 CAB PRESS EXCESS DIFF PRESS*.

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CAB PRESS EXCESS DIFF PRESS (Cont'd)

● In flight:

PACK 1..... OFF
PACK 2..... OFF

● In flight, if the alert was triggered above FL 100:

DESCENT TO FL 100/MEA..... INITIATE

MAX FL : 100/MEA

● WHEN DIFF PRESS < 1 PSI & FL < 100/MEA :

RAM AIR..... ON
CABIN AIR EXTRACT..... OVRD

L12

LIMITATIONS

LIMITATIONS ON ECAM

ALL PHASES

MAX FL : 100/MEA

LAND ANSA

The outflow valves may be abnormally closed. Therefore, the flight crew must land at the next suitable airport, due to the lack of cabin air renewal.

LIMITATIONS ON PFD

ALL PHASES

MAX FL : 100/MEA

LAND ANSA

CAB PRESS EXCESS NEGATIVE DIFF PRESS

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- L2 The cabin differential pressure is lower than -0.72 PSI.
This warning disappears, when the cabin differential pressure goes above -0.32 PSI.
- Indications:

CAB PRESS SD PageFlight Phase Inhibition:

ACFT IMMEDIATE LEVEL OFF.....INITIATE

- If at least one pack is operating:
AIR FLOW.....HI

- If no pack is operating:
RAM AIR.....ON

- L2 External air ventilates the cockpit and cabin zones. Cabin and cockpit temperature will increase.

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CAB PRESS EXCESS NEGATIVE DIFF PRESS (Cont'd)

DEFERRED PROC

ALL PHASES

● WHEN NORMAL DIFF PRESS RECOVERED :

- If at least one pack is operating:
AIR FLOW.....NORM
- If no pack is operating:
RAM AIR.....OFF

MEMOPAGE

MEMO ON ECAM

- If the RAM AIR pb is set to **ON**:
RAM AIR |

CAB PRESS EXCESS RESIDUAL DIFF PRESS

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

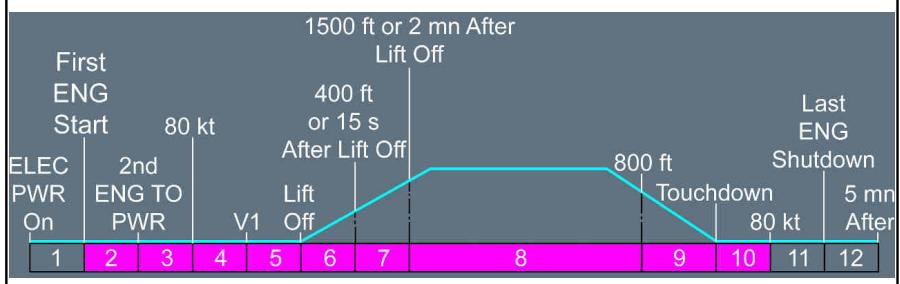
- L2 The cabin residual pressure is above 0.072 PSI:
- On ground, with no engine running, or
 - 90 s after touchdown.

Indications:

CRC



CAB PRESS SD Page

Flight Phase Inhibition:

Continued on the following page



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CAB PRESS EXCESS RESIDUAL DIFF PRESS (Cont'd)

PACK 1..... OFF
PACK 2..... OFF
CABIN CREW..... ALERT

● BEFORE OPENING ANY CABIN DOOR :

RESIDUAL DIFF PRESS..... CHECK

- [L2] *The cabin differential pressure is indicated on the CRUISE SD page and on the CAB PRESS SD page.*
Before opening any cabin door, the residual differential pressure indication must be 0 PSI on SD pages.
- [L3] *The maximum differential pressure allowed before opening any cabin door is 0.036 PSI, corresponding to 0 PSI indicated on the SD pages.*

CAB PRESS INHIBITED BY DOORS

Applicable to: ALL

ANNUNCIATIONS

Triggering Conditions:

- [L2] At least one door is not closed, and locked, at takeoff power application.

Indications:

Audio



Master Light

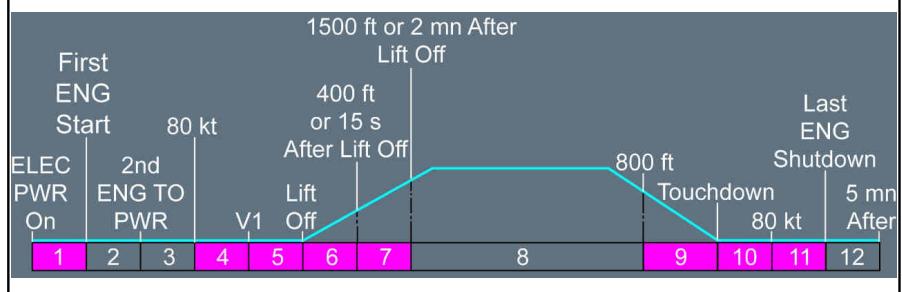


SD page



CAB PRESS SD Page

Flight Phase Inhibition:



- [L2] The four outflow valve controllers will prevent cabin pressurization, by maintaining the four outflow valves open.
- [L3] In addition, the pack controller will maintain the four pack valves closed.
- [L2] For associated MEL dispatch conditions, *Refer to MEL/ME-ECAM-21-2 CAB PRESS INHIBITED BY DOORS*.

MAX FL : 100/MEA

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CAB PRESS INHIBITED BY DOORS (Cont'd)

LIMITATIONS

LIMITATIONS ON ECAM

ALL PHASES

MAX FL : 100/MEA

LIMITATIONS ON PFD

ALL PHASES

MAX FL : 100/MEA

CAB PRESS LDG ELEVN FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [L2] The outflow valve controllers do not receive the landing field elevation from the FMS.
[L3] The CPIOM B is failed.

Indications:

[L2]

CAB PRESS SD PageFlight Phase Inhibition:

- [L2] For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-2 CAB PRESS LDG ELEVN FAULT*.

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CAB PRESS LDG ELEVN FAULT (Cont'd)

■ **If the manual pressurization system is not available**

IN DES : CAB ALT REGULATED TO 7000 FT

[L2] *In backup mode, the cabin altitude is regulated to 7 000 ft in descent.*

[L1] **BELOW 7000 FT : CAB ALT = ACFT ALT**

[L2] *Below 7 000 ft, the outflow valves open: The cabin altitude is the same as the aircraft altitude.*

[L1] **BELOW 7000 FT : AVOID HI DES V/S**

[L2] *Below 7 000 ft, avoid high descent rate to limit uncomfortable variations of cabin pressure.*

■ **If the manual pressurization system is available**

See deferred procedure.

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CAB PRESS LDG ELEVN FAULT (Cont'd)

LIMITATIONS

LIMITATIONS ON PFD

APPR & LDG

- If manual pressurization system is not available:
AVOID HI DESCENT V/S

[L12]

DEFERRED PROC

ALL PHASES

- If manual pressurization system is available:

AT TOP OF DESCENT :

CABIN ALT MODE.....MAN

The flight crew manually controls the cabin altitude.

CABIN ALT TRGT.....LDG ELEVN

Check the LDG ELEVN indication on the CAB PRESS system display, or on the CRUISE system display, and adjust the landing field elevation, if necessary.

STATUS

INFO

- If manual pressurization is not available:
IN DES : CAB ALT REGULATED TO 7000 ft
BELOW 7000 FT : CAB ALT = ACFT ALT

CAB PRESS MAN CTL FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- The manual cabin pressurization mode is failed.

Indications:

Audio



Master Light



SD page

Flight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-2 CAB PRESS MAN CTL FAULT*.

CAB PRESS MAN MODES : DO NOT USE*Continued on the following page*



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CAB PRESS MAN CTL FAULT (Cont'd)

LIMITATIONS

LIMITATIONS ON ECAM

ALL PHASES

MAN PRESS : DO NOT USE

STATUS

INOP SYS

ALL PHASES

CAB PRESS MAN CTL

CAB PRESS OUTFLW VLV CTL 1(2)(3)(4) FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

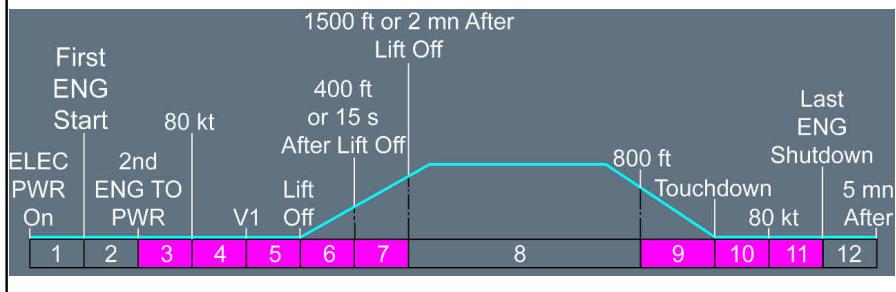
- One outflow valve is not controlled by its assigned outflow valve controller: The outflow valve automatically closes.

Indications:

SD page



CAB PRESS SD Page

Flight Phase Inhibition:

- For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-2 CAB PRESS OUTFLW VLV CTL 1(2)(3)(4) FAULT*.

Crew awareness.

Continued on the following page

CAB PRESS OUTFLW VLV CTL 1(2)(3)(4) FAULT (Cont'd)**STATUS****INOP SYS****ALL PHASES**

OUTFLW VLV CTL 1(2)(3)(4) FAULT

CAB PRESS OUTFLW VLV CTL FAULT

OUTFLW VLV 1+2+3(1+2+4)(1+3+4)(2+3+4)(1+2)(1+3)(1+4)(2+3)(2+4)(3+4)

Applicable to: ALL

ANNUNCIATIONS**Triggering Conditions:**

- Two, or three outflow valves are not controlled by their assigned outflow valve controller: The applicable outflow valves close automatically.

Indications:CAB PRESS SD Page**Flight Phase Inhibition:***Continued on the following page*



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CAB PRESS OUTFLW VLV CTL FAULT (Cont'd)

OUTFLW VLV 1+2+3(1+2+4)(1+3+4)(2+3+4)(1+2)(1+3)(1+4)(2+3)(2+4)(3+4)

For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-2 CAB PRESS OUTFLW VLV CTL FAULT.*

- If outflow valves 1+3+4 are affected

and

If manual pressurization system is available

CABIN ALT MODE.....MAN

The flight crew manually controls the cabin altitude.

| L1 | ACFT FL | CABIN ALT TRGT |
|----|---------|----------------|
| | 430 | 8000 |
| | 400 | 7000 |
| | 350 | 5500 |
| | 300 | 3700 |
| | 250 | 2900 |
| | 200 | 2150 |
| | 150 | 1500 |
| | 100 | 900 |

CABIN ALT TRGT.....AS RQRD

- If outflow valves 1+3+4 are affected

and

If manual pressurization system is available

and

If ambient pressure information is not available

CABIN ALT REGULATED TO 7500FT

CAB PRESS MAN MODES : DO NOT USE

BELLOW 7500 FT : CAB ALT = ACFT ALT

BELLOW 7500 FT : AVOID HI DES V/S

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CAB PRESS OUTFLW VLV CTL FAULT (Cont'd)
OUTFLW VLV 1+2+3(1+2+4)(1+3+4)(2+3+4)(1+2)(1+3)(1+4)(2+3)(2+4)(3+4)

LIMITATIONS

LIMITATIONS ON ECAM

ALL PHASES

- If outflow valves 1+3+4 are affected and
If the manual pressurization system is not available
and
If ambient pressure information is not available
MAN PRESS : DO NOT USE

1

- If outflow valves 1+3+4 are affected and
If the manual pressurization system is not available
and
If ambient pressure information is not available
AVOID HI DES V/S

DEFERRED PROC

ALL PHASES

- If outflow valves 1+3+4 are affected and
If the manual pressurization system is available

AT TOP OF DESCENT :

CAB ALT TRGT..... LDG ELEVN

STATUS

INOP SYS

ALL PHASES

OUTFLW VLV CTL (1+2) (1+3) (1+4) (2+3)
(2+4) (3+4) (1+2+3) (2+3+4) (1+3+4) (1+2+4)

INFO

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CAB PRESS OUTFLW VLV CTL FAULT (Cont'd)

OUTFLW VLV 1+2+3(1+2+4)(1+3+4)(2+3+4)(1+2)(1+3)(1+4)(2+3)(2+4)(3+4)

- If outflow valves 1+3+4 are affected
and
If the manual pressurization system is available

| ACFT FL | CABIN ALT TRGT |
|---------|----------------|
| 430 | 8000 |
| 400 | 7000 |
| 350 | 5500 |
| 300 | 3700 |
| 250 | 2900 |
| 200 | 2150 |
| 150 | 1500 |
| 100 | 900 |

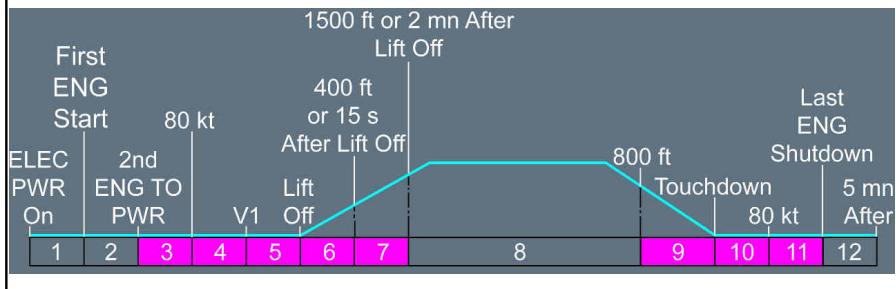
- If outflow valves 1+3+4 are affected
and
If the manual pressurization system is not available
and
If ambient pressure information is not available
CABIN ALT REGULATED TO 7500FT
BELOW 7500 FT : CAB ALT = ACFT ALT

CAB PRESS SENSORS FAULT

Applicable to: ALL

ANNUNCIATIONSTriggering Conditions:

- [L2] Only one or two pressure sensors remain available.

Indications:Flight Phase Inhibition:

- [L2] For associated MEL dispatch conditions, Refer to *MEL/ME-ECAM-21-2 CAB PRESS SENSORS FAULT*.

Crew awareness.