

Aerosoft Airbus A318/A319/A320/A321

Volume 9

Connected Flight Deck Flows

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RECORD OF REVISIONS

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Welcome to your Multi Crew introduction course!

At the beginning let us discuss some of the details of multi crew operations you may not be used to from your previous operation in single pilot cockpits. Even if you already have previous experience in a multi crew cockpit you should read this section to get comfortable with the way the Airbus should be operated to ensure you and your crew member will fly it safely!

First of all you will notice the most obvious: There is someone else sitting next to you, including all the advantages, but also all the weaknesses of humans. This is especially true concerning we are untrained simmers, who, unlike professional pilots, do not have a type rating.

As you might already know from your previous flight experience there are a few golden rules of operating an Airbus, which are especially important when flying it with two crew members.

You can find those in a very nice document by Airbus and the FAA here:

<http://lessonslearned.faa.gov/IndianAir605/AirbusSafetyLib -FLT OPS-SOP-SEQ03%20-%20Ops%20Golden%20Rules.pdf>

Take your time to read and fully understand them. Always be aware of the Golden Rules when flying the Airbus!

Now let's continue with some specific aspects of operating with another crew member. You may have flown, or when no second pilot is available will still fly, with addons providing a simulation of a first officer. It will not take long for you to notice that these are, as long as they understand your commands, more or less "perfect" in doing their flows, etc.

This is not the case any longer!

Flying with a real person means he is going to make mistakes, not doing what you want him to do and misunderstanding each other. This is normal and we have to deal with it. Over the last decades procedures have been developed to counteract the human factors while flying. They can't prevent all kind of mistakes, but they will help managing them!

Crew Resource Management (CRM)

What I'm outlining here is basically just a very small part of what real pilots learn in a CRM course. The real course lasts several days and includes in depth discussions of how to react in certain situations, etc. Some people tend to put a CRM course on par with an actor training.

We're just doing a brief summary on this here, however once you have read and understood it, it will greatly enhance your experience flying the Airbus in a multi crew environment.

All of the following sort of belongs to CRM, but for a better readability I'll split it in several parts combined with the most important information you need to fly the Airbus with a real person as your captain or first officer:

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Know what your Crew member is doing

Probably the most important lesson to be learned is to check each other.

Just like a real crew that keeps watching each other you should also have a look at your crew member! As we are all doing this in our free time, sitting at home and probably having our Wife/Husband/girlfriend/boyfriend/mistress/children around us we will do mistakes. This is normal and there is nothing wrong with it.

Talk about it with your other crew member and let him know about mistakes you made. If he knows about your mistakes he can watch you.

Flying is a constant learning experience and as such it is good to know which mistakes others make as you may also make them without knowing about it!

My flight instructor always told me: *"You should stop flying when you say you don't learn something new any longer!"*

So, keep watching your crew member and correct him when necessary. Doing mistakes is human and there is nothing wrong with it as long as you acknowledge and correct them.

Sterile Cockpit

During high workload communication should be kept to a minimum necessary to operate the Airbus safely. Such situations are taxi, takeoff, climb out, approach and landing.

This not only includes communication, but also entering data into the systems (particularly the FMGS), etc.

As a rule of thumb the Sterile Cockpit concept should be applied below FL100/10.000ft, but also at any other times of high workload.

Callouts

Just like in ATC communication there are certain standard phrases that are used for communication between the crew in an Airbus (and in any other aircraft).

In the following document you can find some more information on this topic:

[http://www.airbus.com/fileadmin/media_gallery/files/safety_library_items/AirbusSafetyLib - FLT OPS SOP SEQ04.pdf](http://www.airbus.com/fileadmin/media_gallery/files/safety_library_items/AirbusSafetyLib_-_FLT_OPS_SOP_SEQ04.pdf)

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I will list the most important callouts and some standard calls for procedures you should be familiar with which are not listed in the doc above:

- I have control/You have control
- Set Heading/Speed/Altitude xxx
 - If a change in FCU altitude is made always check it on the PFD and reply Altitude/FL xxxx to make sure the correct value is set and „seen“ by the System! When flying in managed modes keep in mind the FMGS may overwrite your set altitude due to a CSTR.
- [Insert System name] ON/OFF
- Gear UP/DOWN
- Altimeter reset:
 - PF: „altimeters“
 - PM: „standard, passing FLxxx“
 - PF: „standard, passing FLxxx“
- Approaching FCU altitude
 - PM: „1000“
 - The PM has to call 1000 if the aircraft is 1000ft before the assigned altitude. Some airlines also have a 2000 or a 500 call, but 1000 is the most common one.

FMA Callouts

I'm making this as a separate section as it is very important you are aware of these!

As you already know from the Golden Rules both pilots should **always** be aware of the FMA, regardless of who the PF is and who is the PM. Therefore it is important that each change in the FMA is announced.

Announcements are to be made by the PF, however the PM shall announce the new mode if the PF does not make a timely announcement. Give him a short time to notice the change though. Nothing can be more annoying than someone always doing your announcements if you miss them by half a second!

A missing announcement may indicate an incapacitation of the other crew member!

Task sharing/SOP

A proper sharing of tasks is needed in order to operate the aircraft in a professional and safe manner.

Following a Standard Operating Procedures (SOP) is the only way to operate the aircraft time and fuel efficient and to create the base for proper CRM.

In the real world each operator creates their own SOP which tells exactly which tasks are to be performed by which pilot. We have included a detailed SOP in this manual, which you should use to fly the Airbus.

If every pilot of our Airbus operates it according to the SOP we included you will have no problems, even when flying with someone whom you have never seen or talked to before, so you could basically fly with each and every pilot who has our Airbus!

Do not worry if you see something done differently in some video. Keep in mind each airline may do things different than another.

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Briefing

The briefing is one of the parts most of us will not be very familiar with.

Even worse, many of us may have already adapted a wrong way of conducting a briefing as there are several addons out there which include briefings, but to be honest, so far I haven't seen a single addon doing a briefing correctly and as it would be done in real life.

Only a good briefing can lead to a good flight with both crewmembers knowing what will be done.

Knowing what the other pilot plans to do is the key element of flying with each other and to remain ahead of the aircraft. In fact there is a lot more behind a briefing than most of us would think seeing a video of a real crew conducting a briefing.

A detailed guide how to conduct a proper briefing is published by Airbus here:

http://www.airbus.com/fileadmin/media_gallery/files/safety_library_items/AirbusSafetyLib - FLT OPS-SOP-SEQ06.pdf

You should follow this guide at all times when briefing your other crew member.

Make sure to plan with enough time to prepare and conduct the briefing.

Equally important is the usage of the same charts by both crew members, in order for both to get the same information. Of course it's ideal if the charts even comply with the database. If they are not up to date make sure to check the procedure entered in the FMGS with your charts to make sure no sudden surprise happens during the approach!

Below you will find the flows for our SOP divided into Captain/First Officer and Pilot Flying/Pilot Monitoring sections.

We recommend always to fly according to these flows, even when flying the Airbus in a single pilot operations in order to get used to them.

I'm looking forward to see you in the air and wish you always three greens!

Emanuel Hagen

COCKPIT PREPARATION FLOWS	
PF	PM / PNF
PFD/ND.....BRT	ECAMS BRT
FLOOD LT.....AS RQRD	
INTEG LT.....AS RQRD	
OVERHEAD PANEL	PEDESTAL
BATTERY 1+2.....ON	PARKING BRAKE.....SET
EXT POWER.....ON	FLAPS.....VERIFY 0
RCDR GND CTL.....ON	SPEEDBRAKE.....RET/DISARM
ADIRS.....NAV	ENG MASTER 1+2.....OFF
ELEC HYD PUMP.....ON	ENG MODE SEL.....NORM
FUEL PUMPS.....ON	THRUST LEVERS.....IDLE
ENG GEN.....ON/FAULT	TRANSPONDER.....STBY
PACK 1+2.....ON	RADIO PANEL.....ON
ENG BLEED 1+2.....ON	FREQSET
HOT AIR.....ON	
ENG ANTI ICE.....OFF	ECAM / MAIN PANEL
PROBE HEAT.....AUTO	ECAM RECALL.....SELECT
EMER EXIT LT.....ARM	L/G LEVER.....DOWN
CABIN SIGNS.....ON	DOORS.....OPEN/AS RQRD
NAV LT.....ON	ANTI SKID.....ON
GPWS.....ON	
MCDU.....SET	ATIS/ATC CLRN.....OBTAIN
	SQUAWKSET
----- TAKEOFF BRIEFING-----	
TAKEOFF BRIEFING.....PERFORM	
GLARESHIELD	GLARESHIELD
BARO REF.....SET	BARO REF.....SET
FD.....ON	
LS.....AS RQRD	
ND MODE/RANGE.....SET	
VOR/ADF.....SELECT	
FCU.....SET	FCU.....VERIFY AND COMPLETE
	PEDESTAL
	MCDUCHECK IRS ALIGN

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BEFORE PUSHBACK / START FLOWS	
PF	PM / PNF
TO DATA..... CHECK/REVISE MCDU..... PERF TO	BOARDING VERIFY COMPLETE FUELING..... VERIFY COMPLETE DOORS..... CLOSE PARKING BRAKE..... ON CHOCKS..... REMOVE TRAFFIC CONES REMOVE EXT POWER DISCONNECT
----- BEFORE START C/L TO THE LINE-----	
WINDOWS/DOORS CHECK THRUST LEVERS IDLE PARKING BRAKE AS RQRD	PUSHBACK/START CLEAR OBTAIN WINDOWS/DOORS CHECK BEACON..... ON
----- BEFORE START C/L BELOW THE LINE-----	

BEFORE START/PUSHBACK CHECKLIST
COCKPIT PREP COMPLETED
WHEEL CHOCKS..... REMOVED PM
CABIN SIGNS ON/AUTO
ADIRS NAV
FUEL QUANTITY ____KG
TO DATA SET
BARO REF..... ____SET B

WINDOWS/DOORS..... CLOSED B
BEACON ON
THRUST LEVERS IDLE
PARKING BRAKE AS RQRD

AFTER START FLOWS	
PF	PM / PNF
ENG MODE SEL NORM	
APU BLEED..... OFF	
ENG ANTI ICE.....AS RQRD	
WING ANTI ICEAS RQRD	
APU MASTERAS RQRD	
	GND SPLRS..... ARM
PITCH TRIM..... SET	RUD TRIM ZERO
	FLAPS..... SET
	ECAM STATUS..... CHECK
FLT CTL CHECK	FLT CTL CHECK
----- AFTER START C/L-----	

AFTER START CHECKLIST	
ANTI ICE	AS RQRD
ECAM STATUS	CKD
PITCH/RUD TRIM	____/ZERO
HAND SIGNAL	RECEIVED

TAXI FLOWS	
CAPT	FO
NOSE LT TAXI RWY TURN OFF ON	TAXI CLEARANCE OBTAIN
TAXI CLEARANCE OBTAINED: PARKING BRAKE OFF THRUST LEVERS AS RQRD BRAKES CHECK	ELAPSED TIME AS RQRD BRAKE PRESS CHECK ZERO AUTO BRAKE MAX
FLT INSTR/FMA CHECK	FLT INSTR/FMA CHECK RADAR AS RQRD
TO BRIEFING CONFIRM	TO CONFIG PRESS TO MEMO CHECK NO BLUE
----- BEFORE TAKEOFF C/L TO THE LINE -----	

BEFORE TAKEOFF FLOWS	
CAPT	FO
APPR PATH CLEAR OF TFC CHECK	BRAKE TEMP CHECK BRAKE FANS OFF TO/LU CLEARANCE OBTAIN CABIN CREW ADVISE ENG MODE SEL AS RQRD TCAS TA OR TA/RA EXT LT SET PACK 1+2 AS RQRD SLIDING TABLE STOW
THRUST BUMP AS RQRD SLIDING TABLE STOW	
----- BEFORE TAKEOFF C/L BELOW THE LINE -----	
WHEN LINED UP: CONTROLS HAND TO PF	

BEFORE TAKEOFF CHECKLIST	
FLT CTL CKD	B
FLT INSTR CKD	B
TAKEOFF BRIEFING CONFIRMED	
FLAPS CONF FLAPS ____	B
V1, VR, V2, FLX TEMP . ____/____	B
ATC SET	
ECAM MEMO TAKEOFF NO BLUE	

CABIN CREW ADVISED	
TCAS TA OR TA/RA	
ENG MODE SEL AS RQRD	
PACK 1+2 AS RQRD	

TAKEOFF FLOWS	
PF	PM / PNF
ANNOUNCE "TAKEOFF"	
BRAKES RELEASE	
THRUST LEVERS FLEX/TOGA	
CHRONO START	
BELOW 80 KT:	PFD/ND SCAN
	N1 (EPR) CHECK
	ANNOUNCE "POWER SET"
	PFD/ENG PARAMS SCAN
AT 100 KT:	
ANNOUNCE "CHECKED"	ANNOUNCE "100 KT"
AT V1:	ANNOUNCE "V1"
AT VR:	ANNOUNCE "ROTATE"
WHEN V/S POSITIVE:	ANNOUNCE "POSITIVE CLIMB"
ORDER "GEAR UP"	L/G UP
	GRND SPLRS DISARM
	NOSE LT OFF
	RWY TURN OFF LT OFF
AP AS RQRD	ANNOUNCE "GEAR UP"
AT THRUST REDUCTION ALT:	
THRUST LEVERS CL	ONE PACK ON
AT F SPEED:	
ORDER "FLAPS 1"	FLAPS 1 SELECT
	ANNOUNCE "SPD CKD FLAPS 1"
AT S SPEED:	
ORDER "FLAPS 0"	FLAPS 0 SELECT
	ANNOUNCE "SPD CKD FLAPS 0"
	2ND PACK ON

AFTER TAKEOFF AND CLIMB FLOWS	
PF	PM / PNF
	APU MASTER..... AS RQRD ENG MODE SEL..... AS RQRD TCAS TA/RA ANTI ICE..... AS RQRD
----- AFTER TAKEOFF C/L TO THE LINE -----	
FCU/FMGS SET IF AP ON	MCDU PERF CLB
AT TRANSITION ALT: BARO REF STD	BARO REF..... STD
----- AFTER TAKEOFF C/L BELOW THE LINE -----	
AT 10000 FT: EFIS OPTION ARPT RADIO NAV..... CHECK	ENG ANTI ICE AS RQRD LAND LT..... OFF SEAT BELTS AS RQRD ECAM MEMO REVIEW OPT/MAX ALT..... CHECK SEC F-PLN AS RQRD

AFTER TAKEOFF CHECKLIST
L/G UP
FLAPS RETRACTED
PACKS ON

BARO REF..... STANDARD SET B

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CRUISE FLOWS	
PF	PM / PNF
MONITOR FLIGHTPATH	EVERY 30 MINS : FUEL CHECK ECAM (ALL PAGES) CHECK

DESCENT PREP AND DESCENT FLOWS	
PF	PM / PNF
LDG ELEV CHECK	ATIS OBTAIN LANDING DATA PREPARE GPWS LDG FLAP 3 AS RQRD
-----APPROACH BRIEFING-----	
APPR BRIEFING PERFORM	DESCENT CLEARANCE OBTAIN ANTI ICE AS RQRD
DESCENT INITIATE MCDU PROG/PERF DES DESCENT MONITOR SPEEDBRAKES AS RQRD	
WHEN CLEARED TO ALTITUDE : BARO REF SET	BARO REF SET ECAM STATUS CHECK
AT 10000 FT : EFIS OPTION CSTR LS PUSHBUTTON AS RQRD RADIO NAV SELECT/IDENT NAV ACCURACY CHECK	LAND LT ON SEAT BELTS AS RQRD

APPROACH FLOWS	
PF	PM / PNF
15 NM FROM TOUCHDOWN: APPR PHASEACTIVATE OR SET GREEN DOT SPEED ----- APPROACH C/L -----	ENG MODE SEL..... AS RQRD SEAT BELTS ON/AUTO NAV ACCURACYMONITOR

APPROACH CHECKLIST
APPROACH BRIEFING CONFIRMED
ECAM STATUS CKD
SEAT BELTS ON
BARO REF SET B
MDA/DH..... SET B
ENG MODE SEL AS RQRD

FINAL FLOWS	
PF	PM / PNF
AT GREEN DOT SPEED: ORDER "FLAPS 1"	FLAPS 1 SELECT ANNOUNCE "SPD CKD FLAPS 1"
CHECK OR SET S SPEED	
	TCAS TA OR TA/RA
WHEN ESTABLISHED ON APPROACH:	
AT 2000 FT AGL ORDER "FLAPS 2"	GO AROUND ALT SET FLAPS 2 SELECT ANNOUNCE "SPD CKD FLAPS 1"
CHECK OR SET F SPEED	
WHEN FLAPS 2 ORDER "GEAR DOWN"	L/G DOWN GRND SPLRS ARM AUTO BRAKE AS RQRD CONFIRM/ANNOUNCE "GEAR DOWN"
WHEN L/G DOWN, BELOW V_{FE} ORDER "FLAPS 3"	FLAPS 3 SELECT ANNOUNCE "SPD CKD FLAPS 3"
WHEN FLAPS 3, BELOW V_{FE} ORDER "FLAPS FULL"	FLAPS FULL SELECT ANNOUNCE "SPD CKD FLAPS FULL"
CHECK OR SET V_{APP}	
	A/THR CHECK SPD OR OFF WING ANTI ICE AS RQRD EXT LT SET
SLIDING TABLE STOWED	SLIDING TABLE STOWED CABIN REPORT OBTAIN CABIN CREW ADVISE
-----LANDING C/L-----	

LANDING CHECKLIST
CABIN CREW ADVISED
A/THR SPEED/OFF
ECAM MEMO LANDING NO BLUE B

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SHORT FINAL FLOWS	
PF	PM / PNF
AT DH/MDA + 100 FT :	FLT PARAMS CHECK Announce any deviation in excess of: V/S: 1000 ft/min IAS: speed target + 10 KT; VAPP – 5 KT ANNOUNCE “HUNDRED ABOVE”
AT DH/MDA : ANNOUNCE “LANDING” OR “GA/FLAPS”	ANNOUNCE “MINIMUM”

LANDING FLOWS	
PF	PM / PNF
AT 20 FEET : FLARE..... PERFORM THRUST LEVERS IDLE AT TOUCHDOWN: REV MAX BRAKES AS RQRD	ATTITUDE..... MONITOR ANNOUNCE “GRND SPLRS” ANNOUNCE “REVERSE GREEN” IF DECELERATING : ANNOUNCE “DECEL”
AT 70 KT : REV CHECK IDLE AT TAXI SPEED: REV STOW BEFORE 20 KT : AUTO BRAKE DISENGAGE	ANNOUNCE “70 KT”

GO AROUND FLOWS	
PF	PM / PNF
THRUST LEVERS TOGA ANNOUNCE “GO AROUND” ROTATION..... PERFORM ORDER “GEAR UP” AT GA THRUST RED. ALTITUDE : THRUST LEVERS CL AT GA ACCEL ALTITUDE : SPEED..... MONITOR	FLAPS..... RETRACT ONE STEP ANNOUNCE.....NEW FLAPS SETTING ANNOUNCE..... “POSITIVE CLIMB L/G..... UP ANNOUNCE..... “GEAR UP” NAV/HDG..... SELECT FLAPS..... RETRACT ON SCHEDULE

AFTER LANDING FLOWS	
CAPT	FO
AT NIGHT TIME: LAND LTRETRACT GRND SPLRSDISARM <i>SIGNAL FOR PM/PNF TO COMENCE CLEAN-UP</i>	AT DAY TIME: LAND LTRETRACT CLEAN-UP : FLAPSRETRACT ENG MODE SEL NORM TRANSPONDER STBY ANTI ICE AS RQRD APUSTART RADAR OFF/STBY BRAKE TEMPCHECK
----- AFTER LANDING C/L -----	

AFTER LANDING CHECKLIST (FO SILENTLY)
GRND SPLRS DISARMED FLAPS RETRACTED ENG MODE SEL NORM APU AS RQRD

PARKING FLOWS	
PF	PM / PNF
PARKING BRAKE SET	ANTI ICE OFF
ENG MASTER 1+2 OFF	APU BLEED ON
FUEL PUMPS OFF	
GRND CONTACT ESTABLISHED	ELAPSED TIME STOP
BEACON LT OFF	WHEEL CHOCKS SET
EXT LT AS RQRD	EXT POWER CONNECT
SEATBELTS OFF	ECAM STATUS CHECK
PARKING BRAKE AS RQRD	BRAKE FAN OFF
	DUs DIM
-----PARKING C/L-----	

PARKING CHECKLIST
APU BLEED ON
ENG MASTER 1+2 OFF
ANTI ICE OFF
SEAT BELTS OFF
EXT LT AS RQRD
FUEL PUMPS OFF
PARKING BRAKE AS RQRD

SECURING THE AIRCRAFT FLOWS	
PF	PM / PNF
PARKING BRAKE CHECK ON	
ADIRS (1+2+3) OFF	
	EXT LT OFF
	APU BLEED OFF
	APU MASTER OFF
	EMER EXIT LT OFF
	NO SMOKING OFF
	EXT POWER AS RQRD
	BATTERY 1+2 OFF
----- SECURING THE AIRCRAFT C/L -----	

SECURING THE AIRCRAFT CHECKLIST
ADIRS OFF
NO SMOKING OFF
APU OFF
BATTERY 1+2 OFF

CHECKLISTS

BEFORE START/PUSHBACK CHECKLIST

COCKPIT PREP..... COMPLETED
WHEEL CHOCKS..... REMOVED **PM**
CABIN SIGNS ON/AUTO
ADIRS..... NAV
FUEL QUANTITY ____KG
TO DATA..... SET
BARO REF ____SET **B**

WINDOWS/DOORS..... CLOSED **B**
BEACON ON
THRUST LEVERS IDLE
PARKING BRAKE AS RQRD

AFTER START CHECKLIST

ANTI ICE AS RQRD
ECAM STATUS CKD
PITCH/RUD TRIM..... ____/ZERO
HAND SIGNAL RECEIVED

BEFORE TAKEOFF CHECKLIST

FLT CTL CKD **B**
FLT INSTR..... CKD **B**
TAKEOFF BRIEFING CONFIRMED
FLAPS CONF FLAPS ____ **B**
V1, VR, V2, FLX TEMP __, __, __/__ **B**
ATC SET
ECAM MEMO..... TAKEOFF NO BLUE

CABIN CREW..... ADVISED
TCAS TA OR TA/RA
ENG MODE SEL AS RQRD
PACK 1+2..... AS RQRD

AFTER TAKEOFF CHECKLIST

L/G UP
FLAPS RETRACTED
PACKS ON

BARO REF STANDARD SET **B**

APPROACH CHECKLIST

APPROACH BRIEFING CONFIRMED
ECAM STATUS..... CKD
SEAT BELTS ON
BARO REF ____SET **B**
MDA/DH ____SET **B**
ENG MODE SEL AS RQRD

LANDING CHECKLIST

CABIN CREW ADVISED
A/THR SPEED/OFF
ECAM MEMO LANDING NO BLUE **B**

AFTER LANDING CHECKLIST (FO SILENTLY)

GRND SPLRS DISARMED
FLAPS..... RETRACTED
ENG MODE SEL NORM
APU AS RQRD

PARKING CHECKLIST

APU BLEED ON
ENG MASTER 1+2..... OFF
ANTI ICE..... OFF
SEAT BELTS OFF
EXT LT AS RQRD
FUEL PUMPS OFF
PARKING BRAKE AS RQRD

SECURING THE AIRCRAFT CHECKLIST

ADIRS OFF
NO SMOKING OFF
APU OFF
BATTERY 1+2 OFF