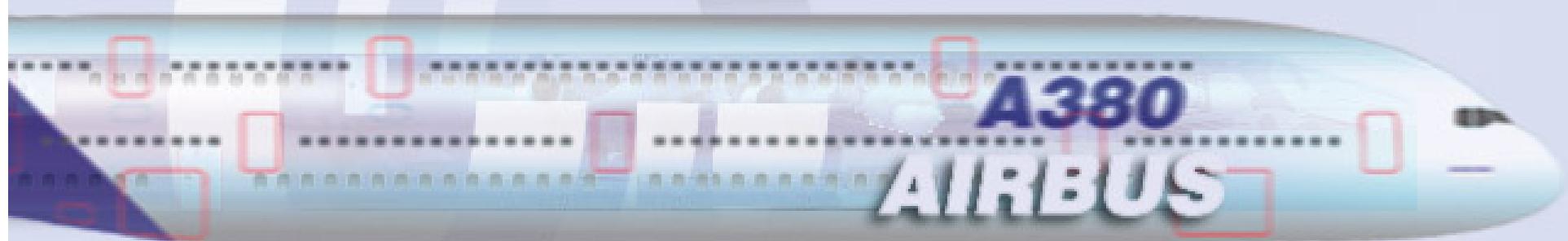


A380: Challenges for the Future



*Capt. Jacques DRAPPIER
Senior Director Training Programmes*

The A380 : Flagship of the 21st Century Launch Variants



A380

Launch
variant

555 seats
8,000 nm
14,800 km

EIS 1Q06



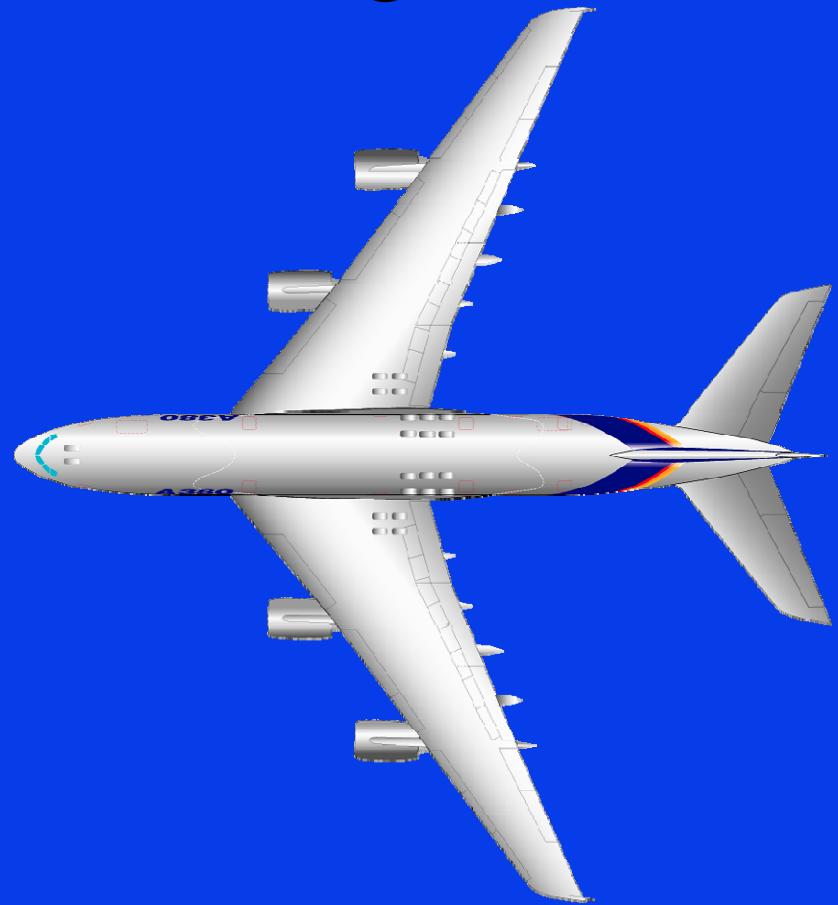
A380-F

Launch
variant

150 t
330,000 lb
5,600 nm
10,400 km

EIS 2Q08

A380 general arrangement



A380-800 / A380-800F	
SPAN	261 ft 10 in / 79.8 m
LENGTH	239 ft 6 in / 73.0 m
HEIGHT	79 ft 1 in / 24.1 m



The 80x80m box compliance for better airport integration

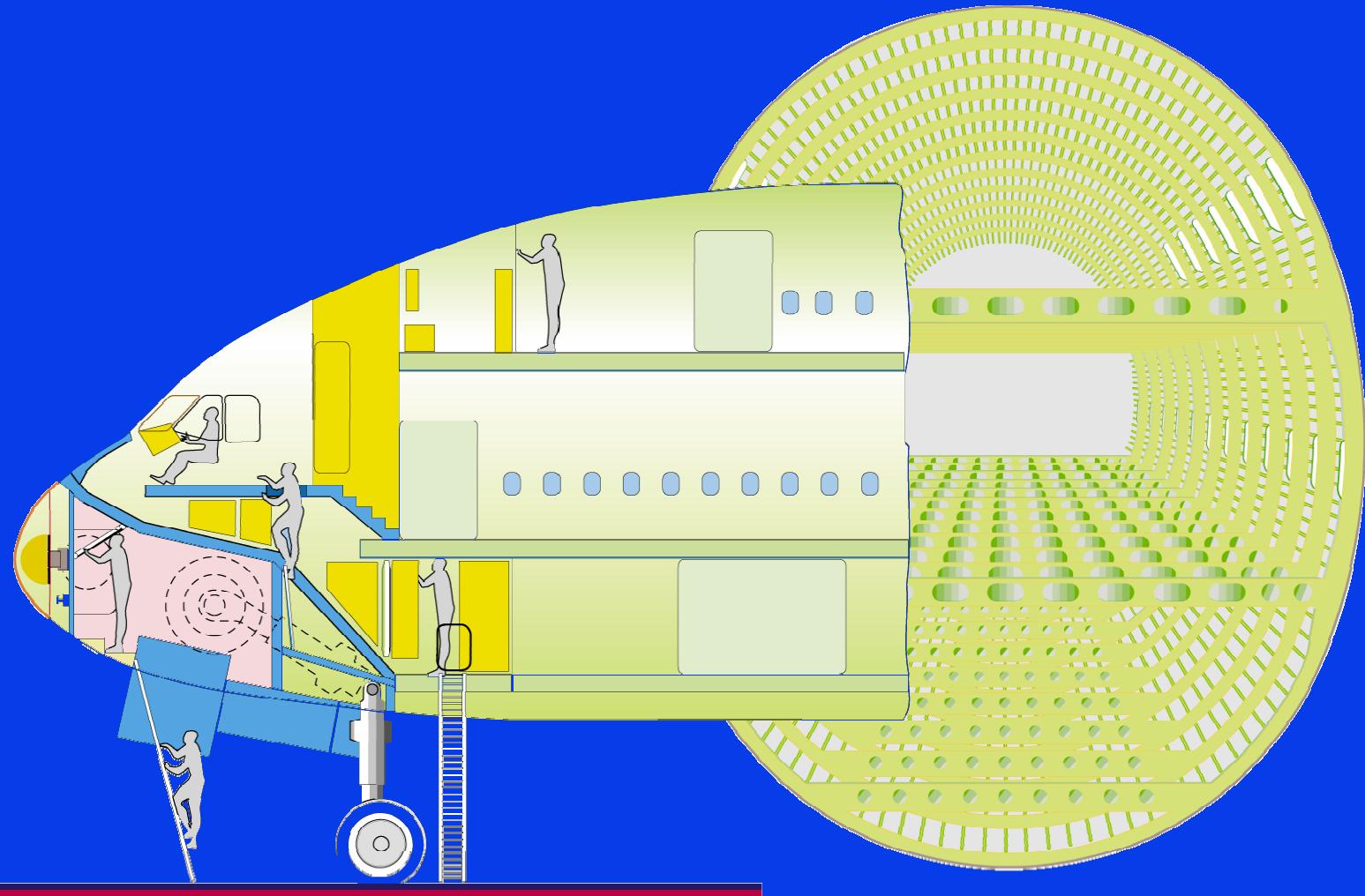
— General Performance

- Taxi constraints : better than actual 747 or 777
- Take Off and landing: better than 747-400
- Altitude capability: FL 330 at Max To Weight
- Vortex generation: better than 747
- CONCLUSION : the A380 will not create piloting challenges different from actual wide body airplanes

New Technology

- **Structure:**
 - Laser welding
 - G L A R E
 - Carbon fiber panels
 - CFRP Wing Ribs
- **Electrical generation:**
 - Variable frequency generators
- **Hydraulics:**
 - Self contained Electro Hydraulic actuators

The cockpit



The cockpit

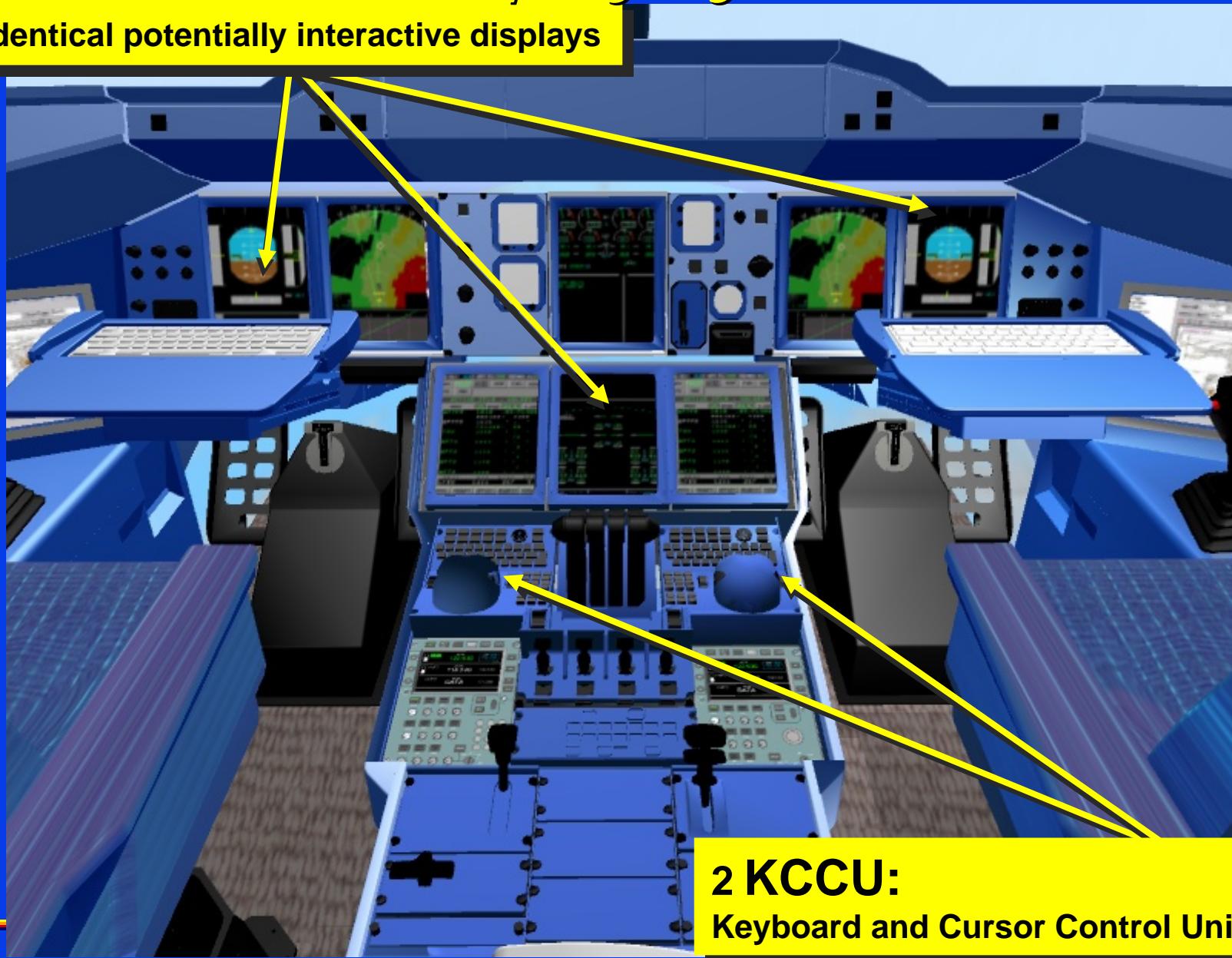
- Common features with the A320 and A340 families:
 - Overall cockpit layout (screens and controls arrangement, dark cockpit, symbology and color coding)
 - Flight envelope protection
 - Side sticks
 - Non back-driven thrust levers
 - FMS functions base line is FMS 2nd generation
- Cockpit improvements are driven by *Flight safety enhancements*, *Lessons learnt from airlines* and *product added values*:
 - camera/video, taxiing aids
 - larger & interactive displays,
 - FMS interface,
 - enhanced ECAM,
 - navigation on airports,
 - take-off acceleration monitoring,
 - on-board Information System
 - thrust indication
 - vertical situation awareness, collision avoidance
 - enhanced crew rest

The “Airbus Cockpit Philosophy”, results of customers feed-back,
experience, and research on new technology



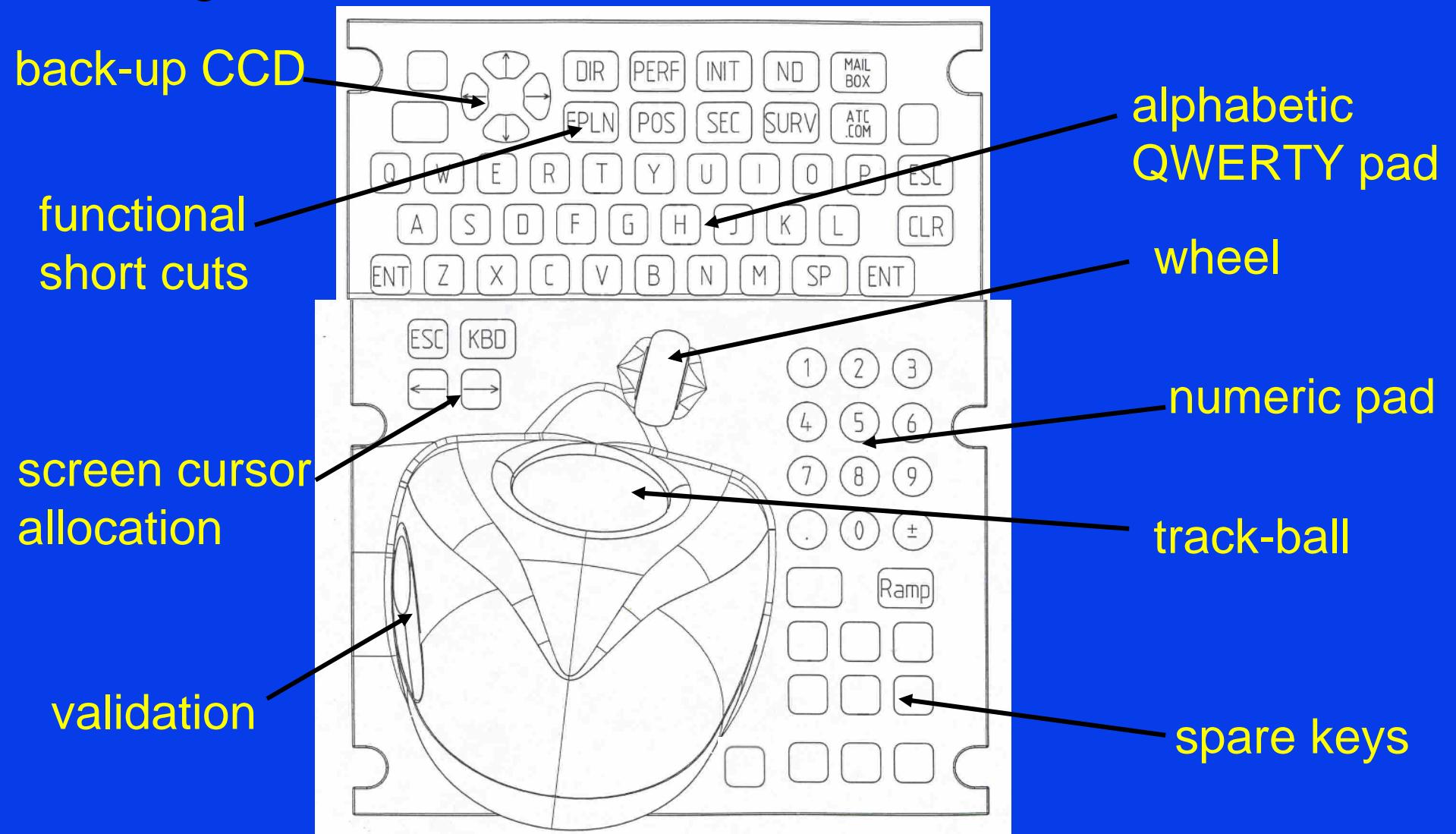
Control and Display System

8 identical potentially interactive displays



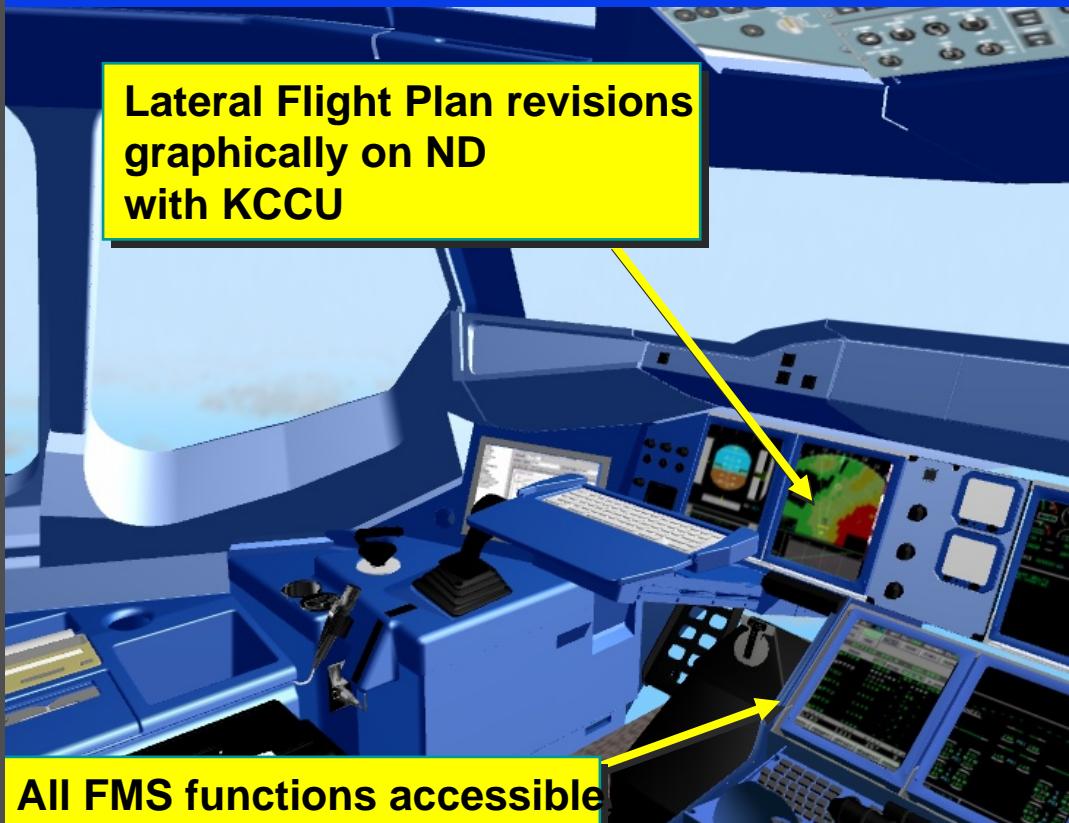
2 KCCU:
Keyboard and Cursor Control Units

— Keyboard and Cursor Control Device

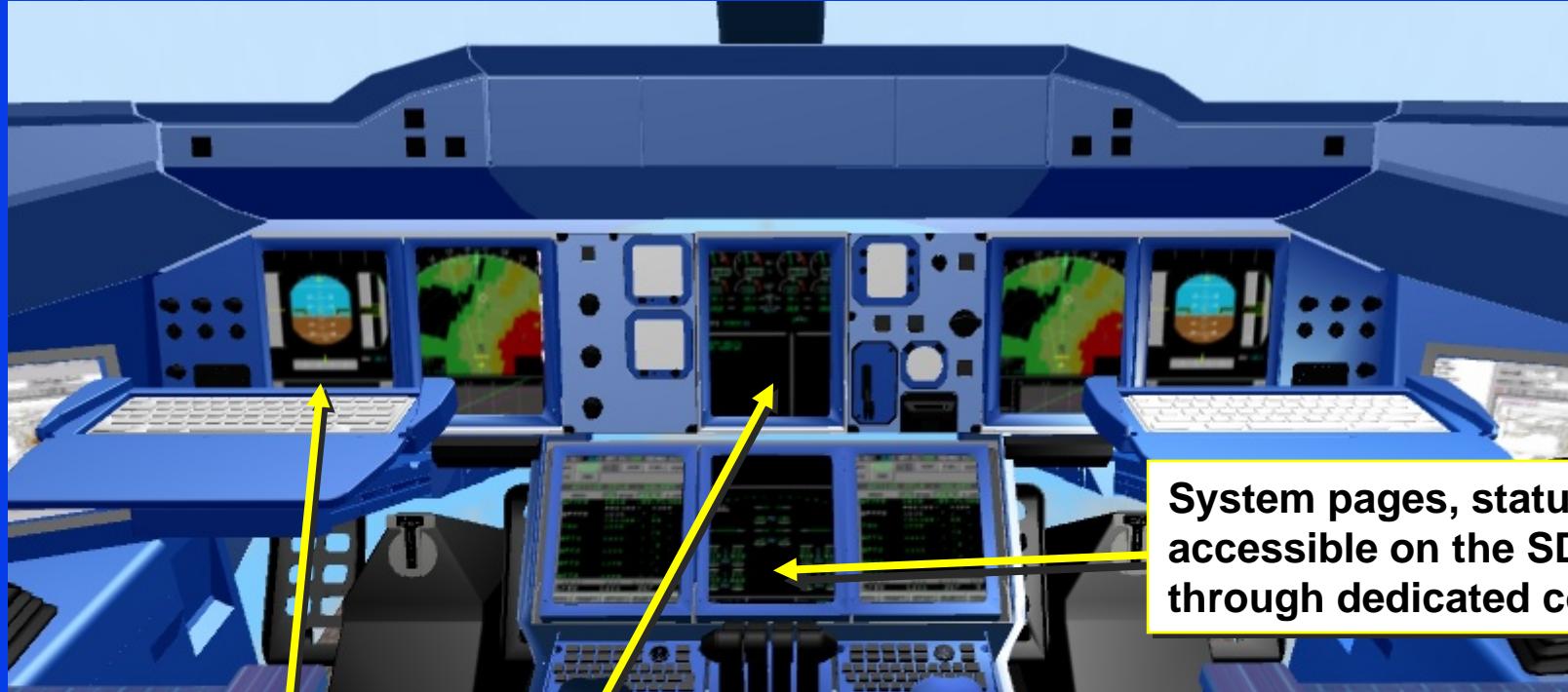


FMS

FMS 1		TIA805				
ACTIVE	POSITION	SEC	DATA	OTHERS	---	
ACTIVE FPLN						
WPT	UTC	SPD(KT)	ALT(FT)	TRK(°)	DIST(NM)	
YQI	18:53	.82 M	FL330	—	BRG230	155
STOOL	19:10	"	"	—	263	17
SPOOK	19:12	"	"	—	"	40
LFV	19:17	528	FL290	—	228	68
OFTUR	19:24	514	"	—	250	12
MONTT	19:26	462	"	—	"	45
HTO	19:31	330	"	—	"	25
VALCY	19:38	320	"	—	"	33
YODA	19:48	310	"	—	"	
<input type="button" value="▼"/>	<input type="button" value="▲"/>	AIRPORT	KJFK	541 NM	20:04	16.9 T
DIR TO			OTHER REV			
MSG CLEAR	TWO LINES OF SYSTEM MESSAGES		MSG HISTO			



— ECAM



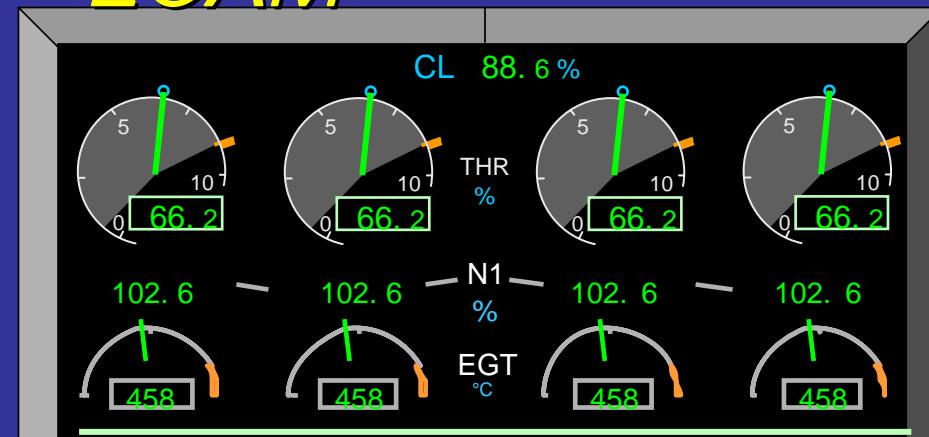
A/C configuration,
some memos and limitations
below PFD

Memos,limitations
abnormal procedures,
normal check-lists on WD
through dedicated controls

System pages, status
accessible on the SD
through dedicated controls

ECP:
Dedicated ECAM controls (keys and
pointer)

ECAM



SEAT BELTS
NO SMOKING



Cockpit Thrust indication

- **ACUTE - Airbus Cockpit Universal Thrust Emulator:**
 - THR will replace N1 (or EPR/TPR) as cockpit thrust control / monitoring parameter (providing enhanced cockpit commonality).
 - Engine manufacturers will select the thrust control / monitoring parameter (N1/EPR/TPR) at engine level
 - converted to THR thrust indication via the FADEC
 - Meaningful thrust indications are displayed as “percentage thrust” using straightforward reference levels:
 - **100% THR = maximum available thrust in actual flight conditions without air bleed**
e.g. Max Take-off thrust in the take-off flight envelope
Max Cont thrust outside take-off flight envelope
 - **0% THR = engine shutdown (windmilling)**
 - Improves readability and improves scale significance
 - Fan speed will remain as primary indication (E/WD) and N2 (and N3 for R-R) will be available as secondary indications

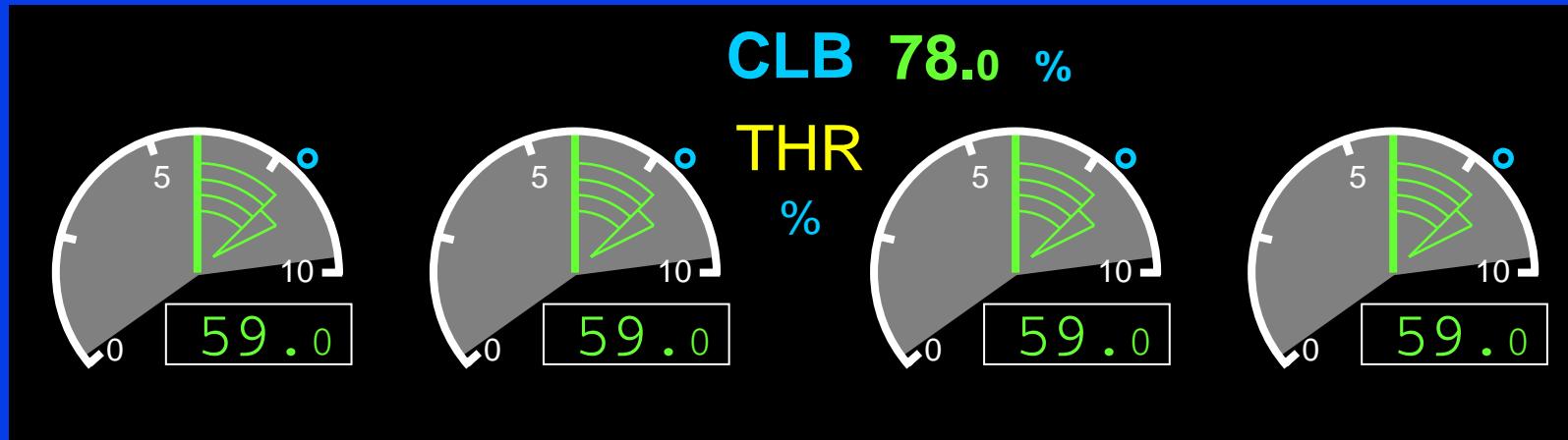
— *THR Cockpit Indication - draft*

FORWARD Engine 1

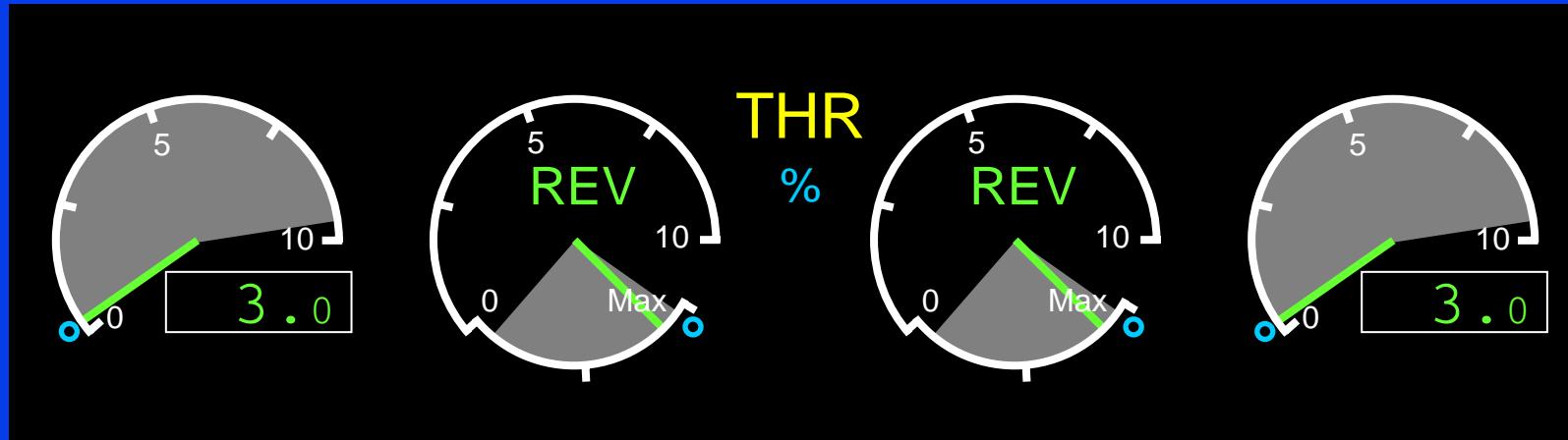
Engine 2

Engine 3

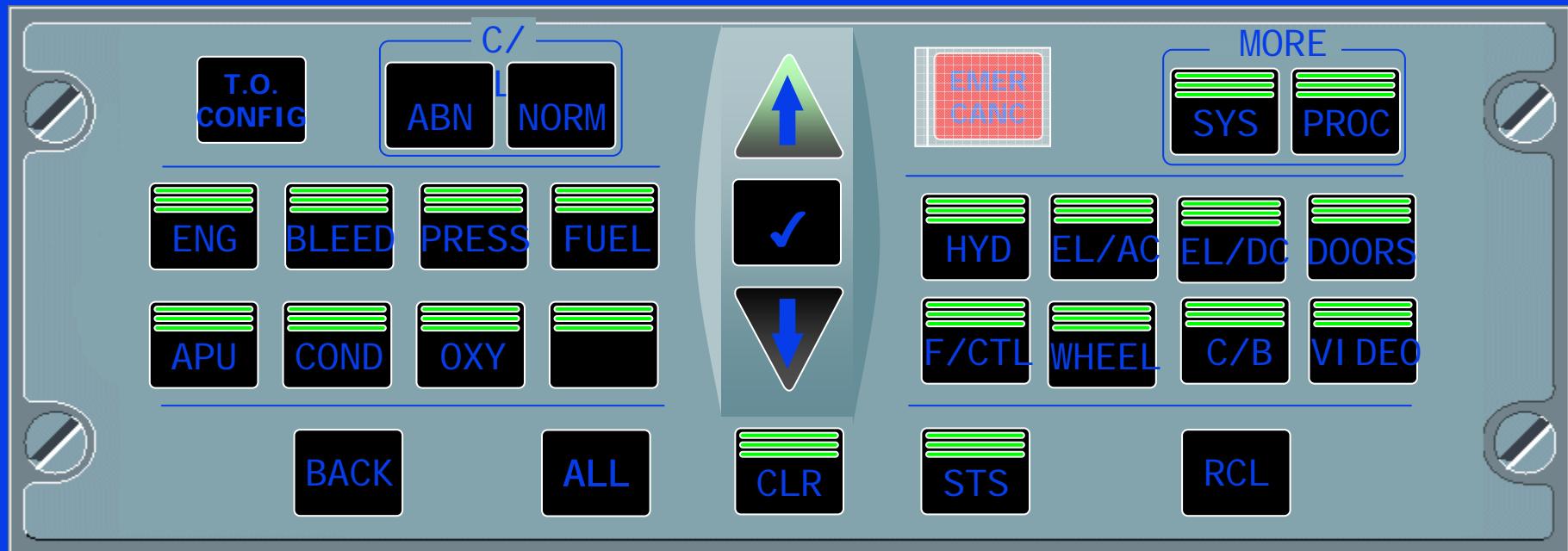
Engine 4



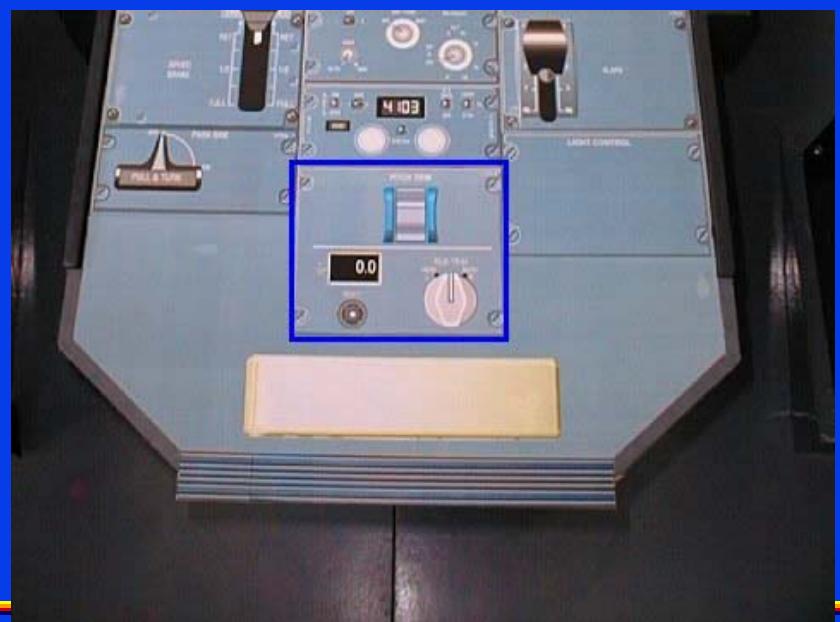
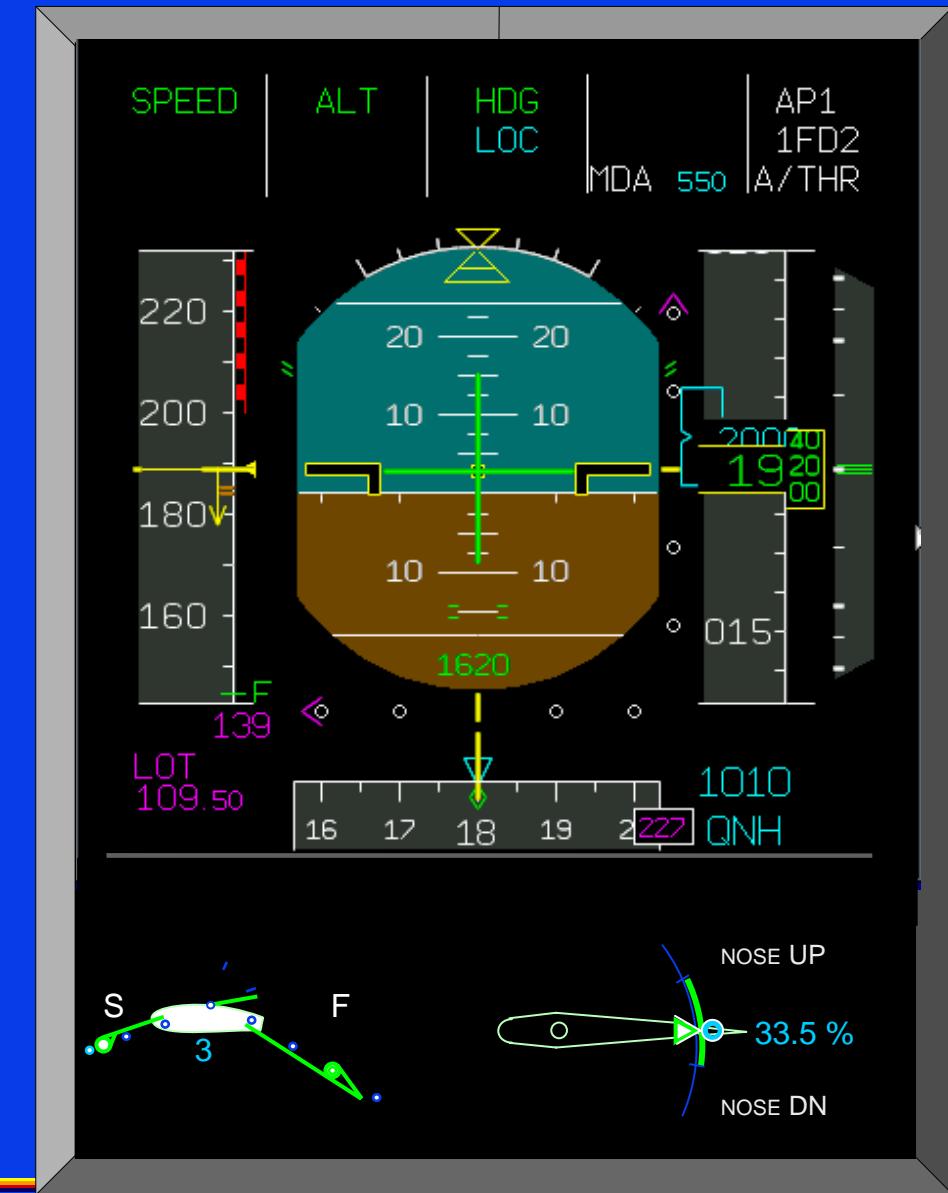
REVERSE



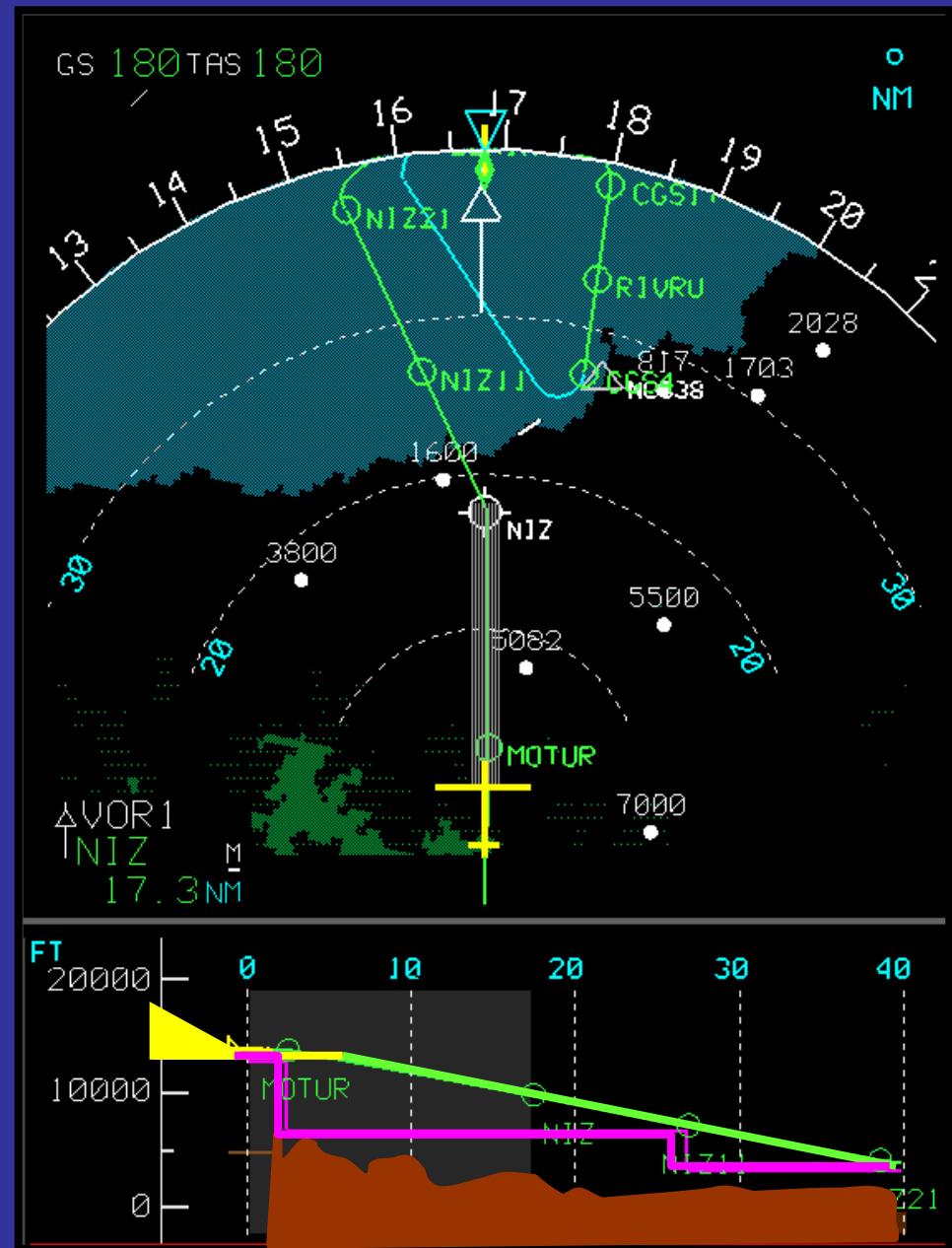
— ECAM Control Panel



Pitch trim control and display



— Vertical display



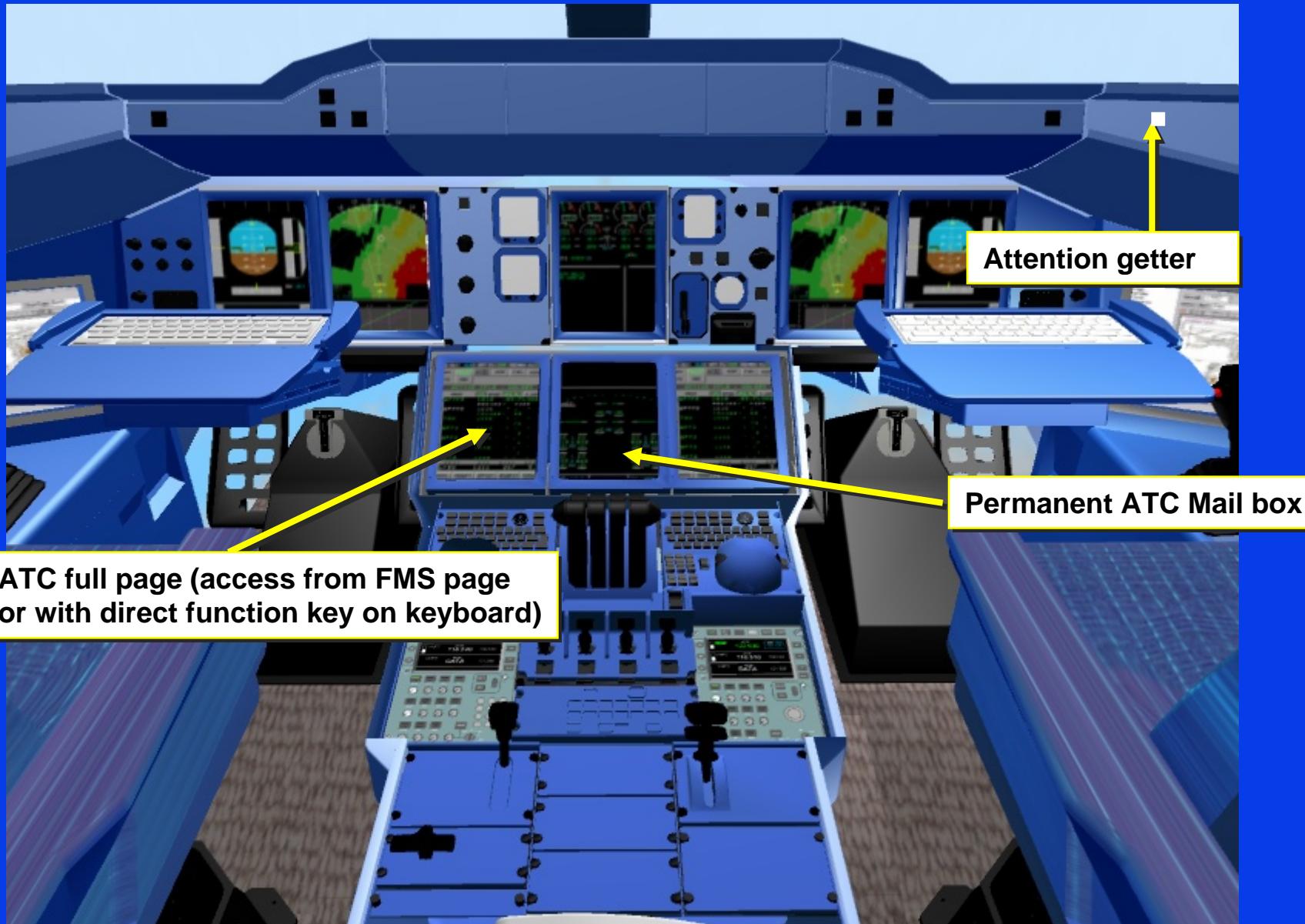
A380 AFS FCU Backup Principle

*Both channel failure
or Voluntary disconnect*



*AFS Backup
On one of the MFDs*

— ATC data link



ATC

ATC permanent mail box below SD

CRUISE

FUEL

		F. USED			
		TOTAL 138 200			
45 400	—	42 200	KGx1000	45 300	—
2030	—	2030	FF	2030	2030
			KG/H		

ENG

15.3	—	15.4	OIL	15.3	—	15.2
			QT			

AIR

LDG ELEV	AUTO	510	FT	△ P	10.5	PSI
22	21	TO	24	CAB V/S	FT/MIN	
	21	TO	23	50	↗	
	22			CAB ALT	3500	FT

TAT	51 °C		GWCG	37.5 %
SAT	36 °C		GW	370 000 KG
ISA	+5		FOB	30 000 KG

1656Z FROM KZAK CTL WILCO **SEND** CANCEL

(REPLY TO 1652Z REQUEST)
OFFSET 15NM RIGHT OF ROUTE
AT ALCOA CLIMB TO FL370

MSG 1/1 RECALL MONITORING

PRINT

ATC Communication full page on MFD

ATC COM ▼ AIB805

INIT. REQUEST REPORT MSG RECORD FIS EMERG.

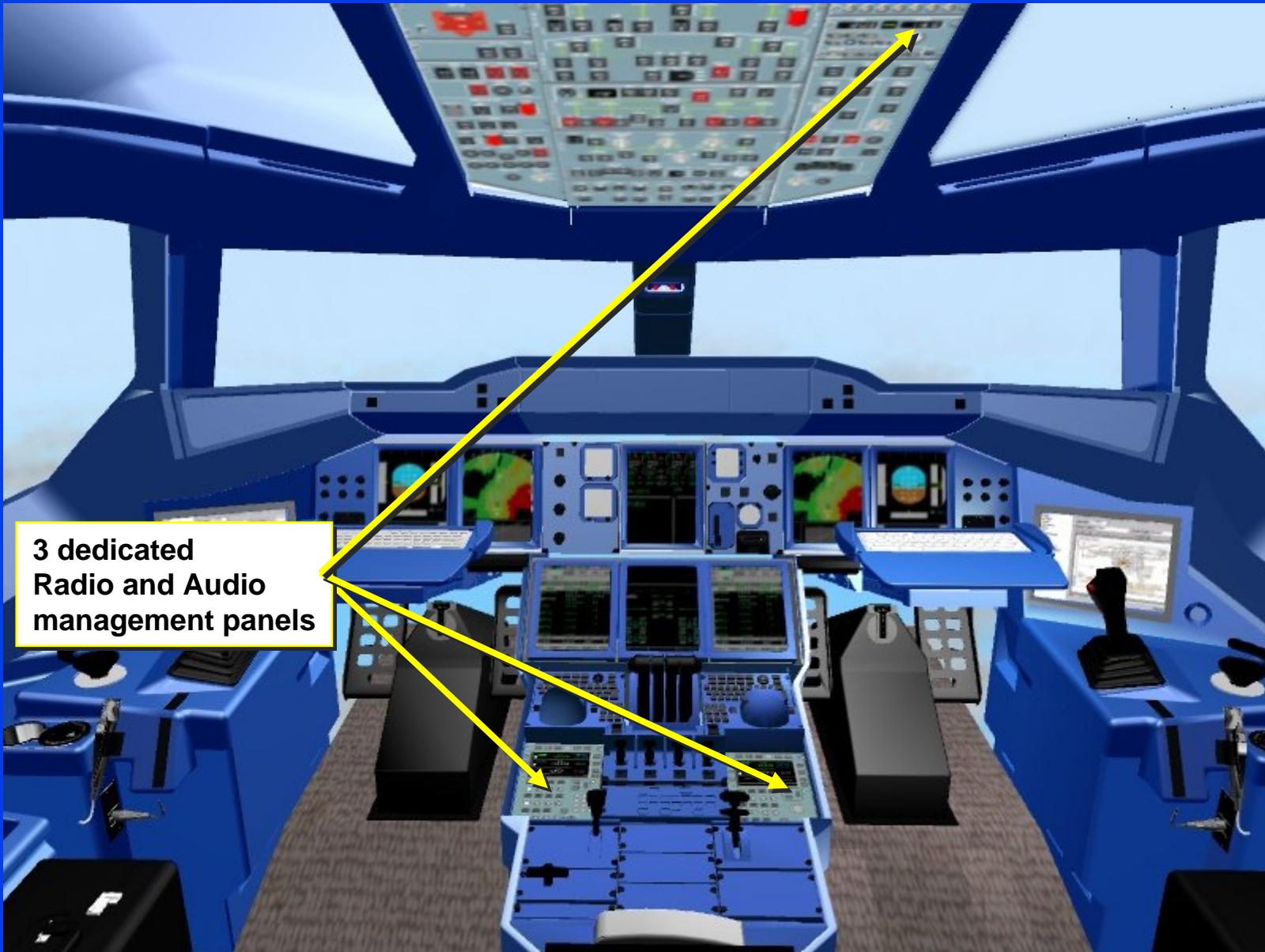
INIT.: NOTIFICATION

ATC CENTER **NTTT** **NOTIFY**

NOTIFIED WITH KZAK 1557Z

INFO CLEAR CONNECTION PAGE

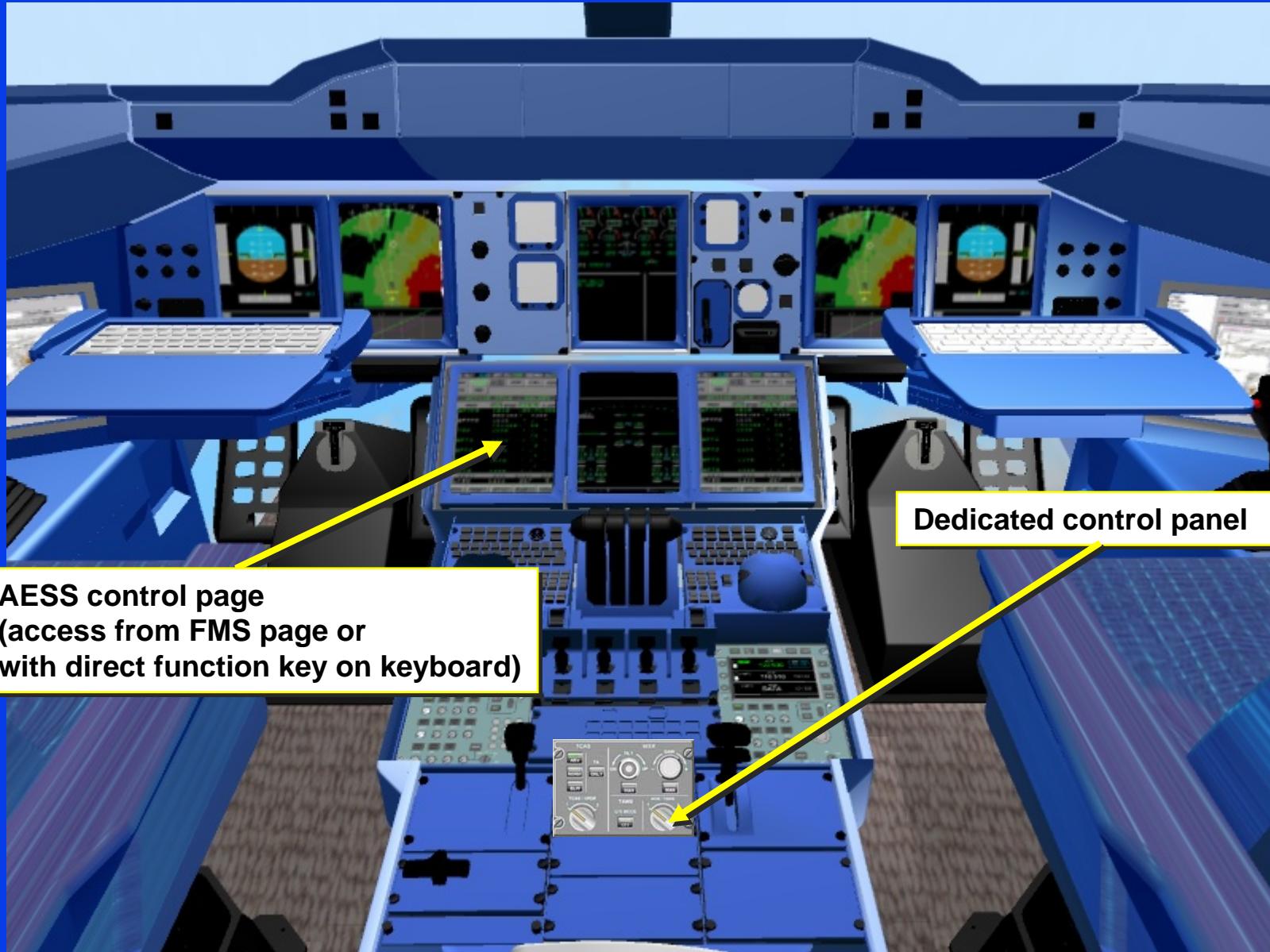
Voice communication



RAMP



Surveillance



— AESSION

AESSION control panel on pedestal



AESSION page on MFD

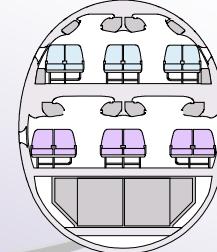


A380 Onboard Information System

Cockpit operation



Cabin operation



Maintenance



*Cabin/Passenger services
IFE*

The Aircraft becomes a node on:

- Air traffic network
- Airline network

OIS objectives

- Offer cost-effective capability for implementing tools which improve A/L operations in three domains: cockpit, cabin & maintenance by:**
 - Reducing paper use
 - Providing operations support to the cockpit crew and cabin crew
 - Enabling 3rd party application integration
 - Linking A/C to A/L ground network
 - Ensuring A/C autonomy with respect to ground operations
- And offer “latest standard” passengers services**

OIS Scope

- Flight Operations support

- Operation Documentation (FCOM, AFM/CDL, MEL...) random and contextual access
- Electronic Logbook
- Weight & Balance management and computations
- Performance computation (T/O, Landing, in flight...)
- Navigation Charts and Maps hosting
- Crew e-mail



- Passengers Services

- E-mail
- Internet
- Intranet
- News
- Live TV, e-commerce

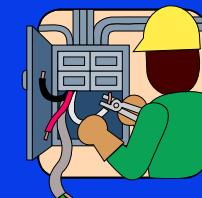
- Cabin Operations support

- Crew e-Mail
- Cabin Logbook
- Operation Documentation (CCOM...) random and contextual access
- Cabin inventory
- PAX data base
- Credit Card banking...



- Maintenance support

- Maintenance documentation (TSM, AMM, IPC,MEL)random and contextual access
- Support and link with OMS functions
 - Logbook, Trouble Shooting, fault reporting, condition monitoring, data loading

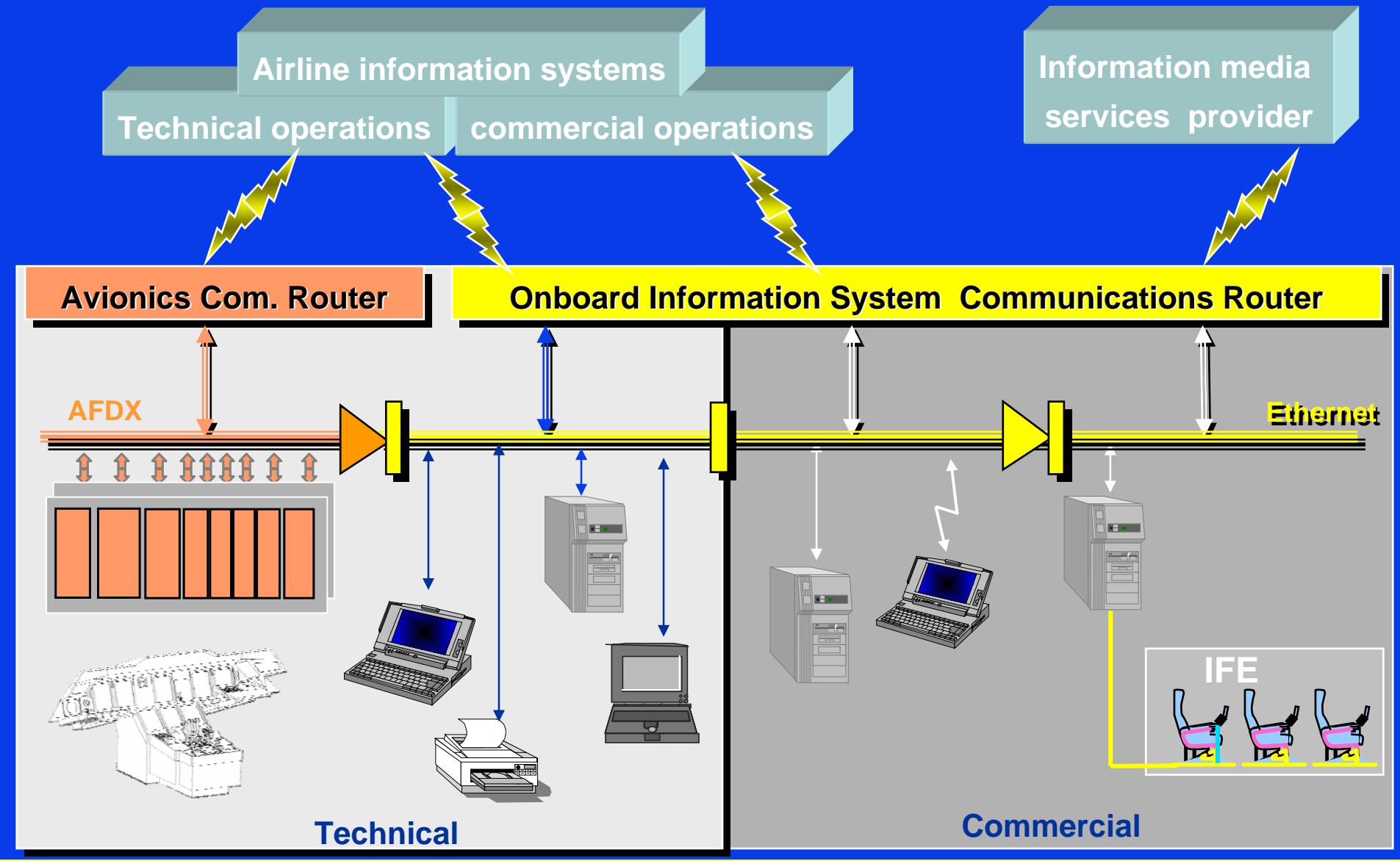


OIS Scope

- **Flight Operations support**

- Operation Documentation (FCOM, AFM/CDL, MEL...) random and contextual access
- Electronic Logbook
- Weight & Balance management and computations
- Performance computation (T/O, Landing, in flight...)
- Navigation Charts and Maps hosting
- Crew e-mail

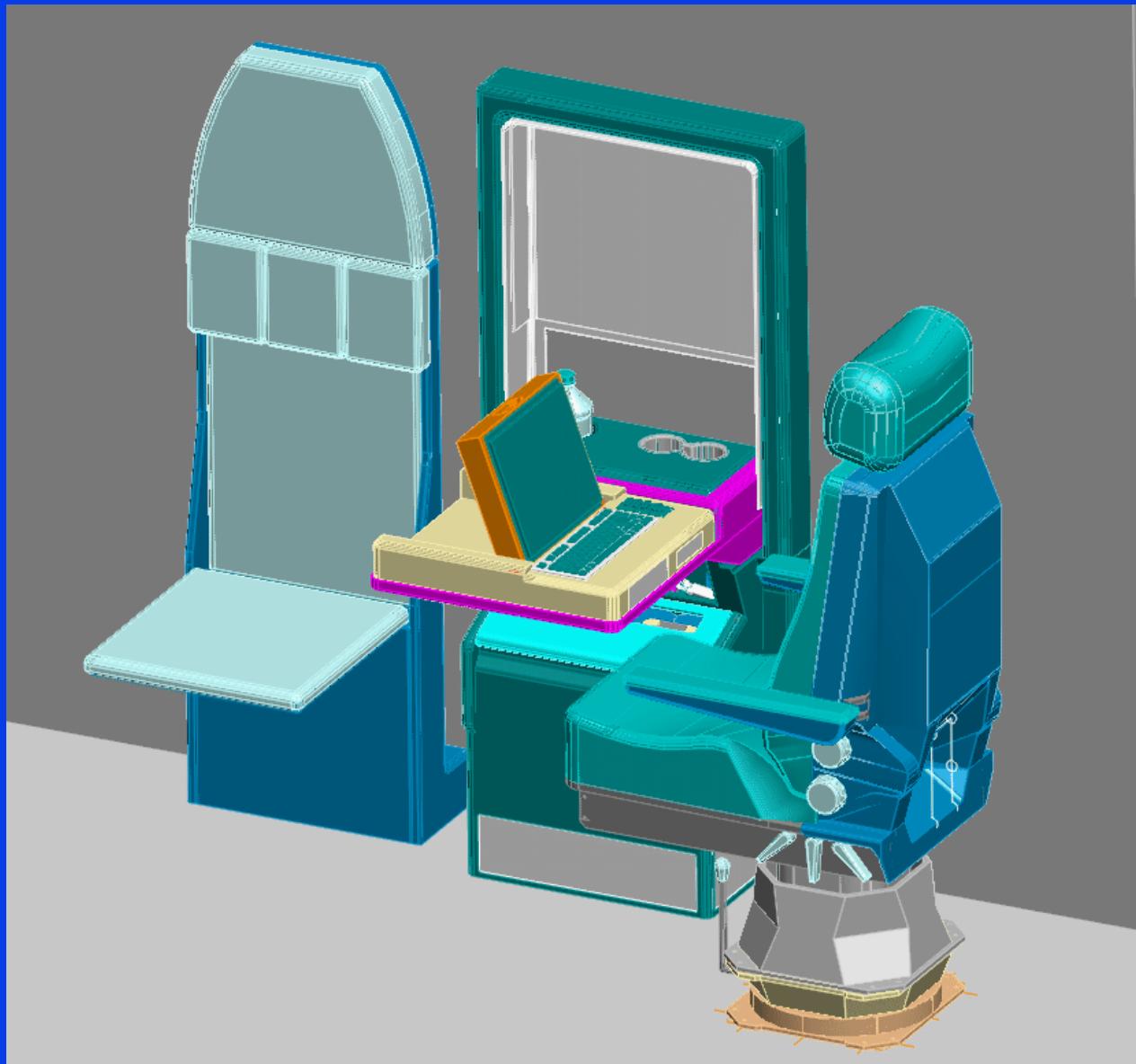
A380 Information system infrastructure



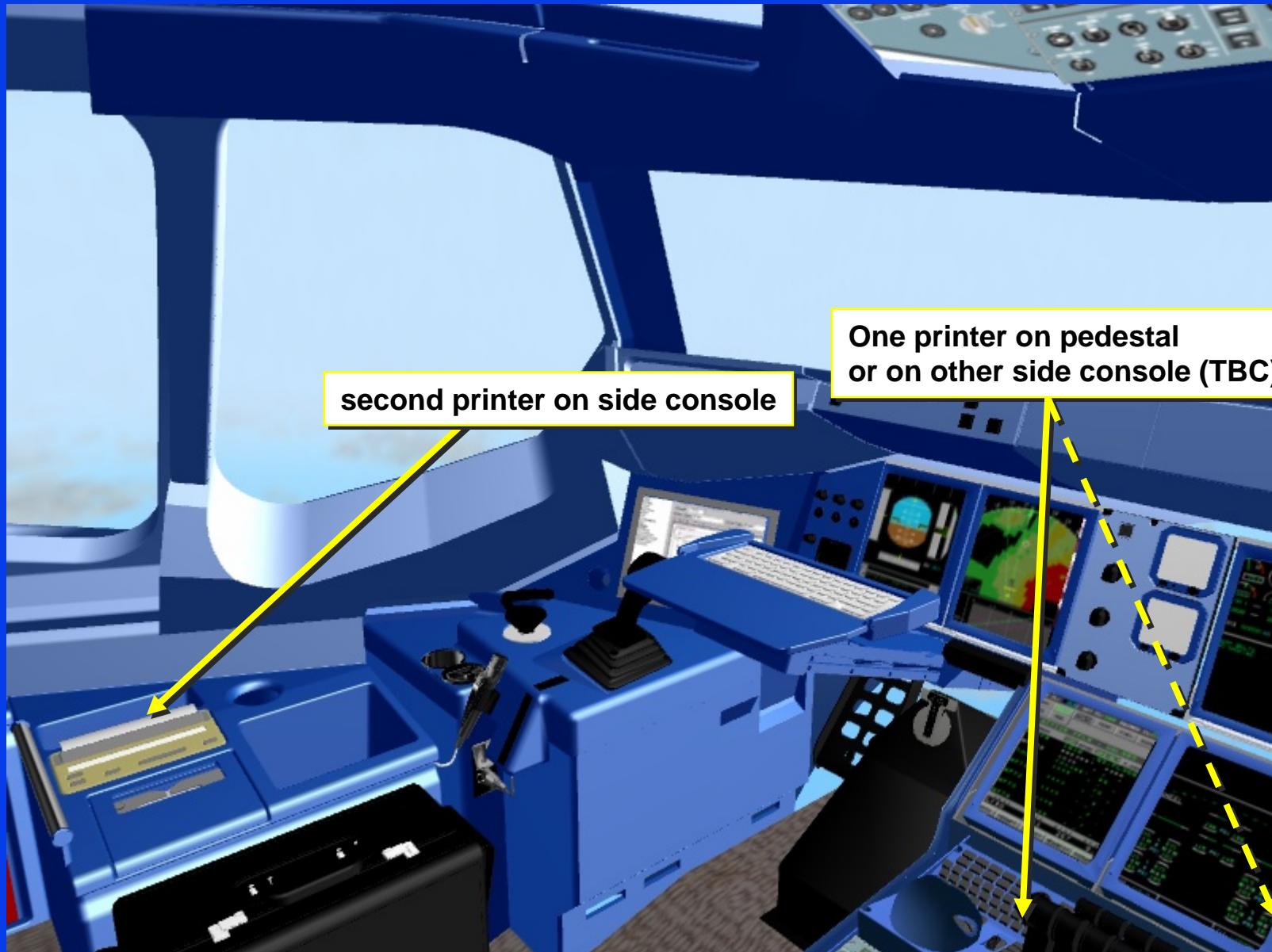
On Board Information System



— *Onboard Maintenance station*



— Printers





Thank You