

Performance Seminar

Introduction to A350 and A380 new features

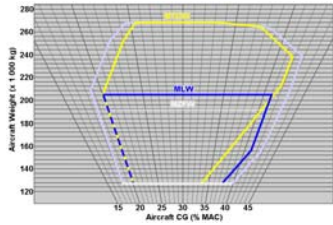
Presented by
Eric VAN RUYSKENSVELDE / Flight Operations Support Director

Contents

- General presentation of aircraft characteristics
- Main new design features
- Changes in daily flight operations
 - A350/A380 On-Board Information System (OIS)
 - A350 Dispatch function

Main aircraft characteristics comparison (A330/A350/A380)

• Aircraft design characteristics

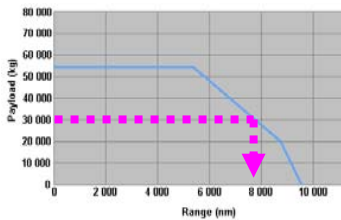


Weights:

- Typical MTOW 233 / 268 / 560 T (*)

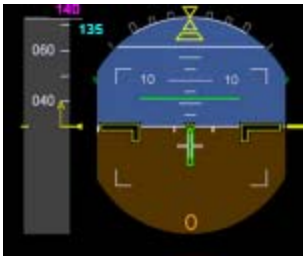


Layout and typical payload: 256 / 315 / 525 PAX (*)



Payload/Range:

- A330 (233T) up to 13,400km
- A350-900 up to 15,000km
- A380-800 up to 15,400km



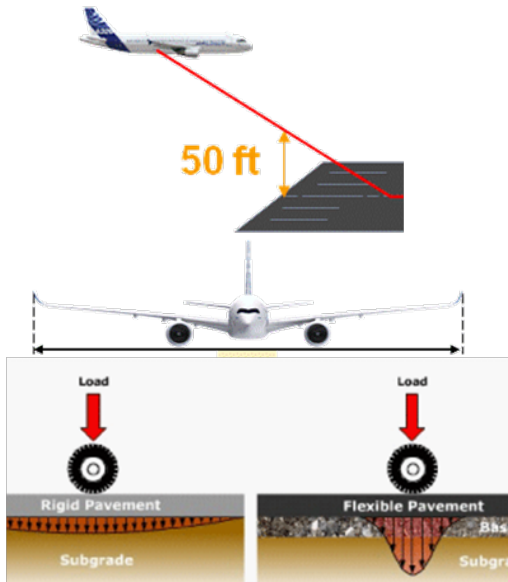
Operating speeds:

- A350/A380 have greater operating speed:
 - Typical cruise Mach 0.85 vs 0.82
 - MMO 0.89 vs 0.86

*A330/A350/A380

Main aircraft characteristics comparison

• Airport requirements:

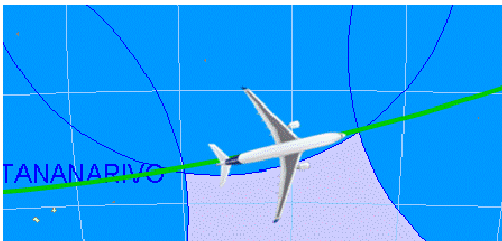


Approach category: Category C ($V_{AT} < 141$ kt)

- A330/A350 ICAO code 4E
- A380 ICAO code 4F but worldwide operations show lower requirements can be applied under certain conditions (as per AACG recommendations)

ACN/PCN: similar range of ACN numbers

• ETOPS:



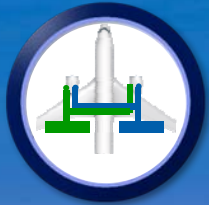
- A330: basically 180min and option up to 240 min
- A350: basic 180min and options up to 240/350 min
- A380: ETOPS rules to apply in the future

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A380/A350: Main new systems

Hydraulics



- Only 2 circuits, 5000 psi

- Ethernet Technology

IMA



Flight Controls



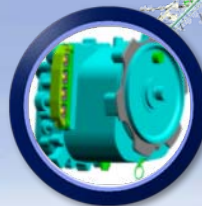
- Electrical Back-up

- Commonality + Innovations (OIS, KCCU, ECAM, VD, AESS, OANS, BTV etc.)

Cockpit



Electrical System

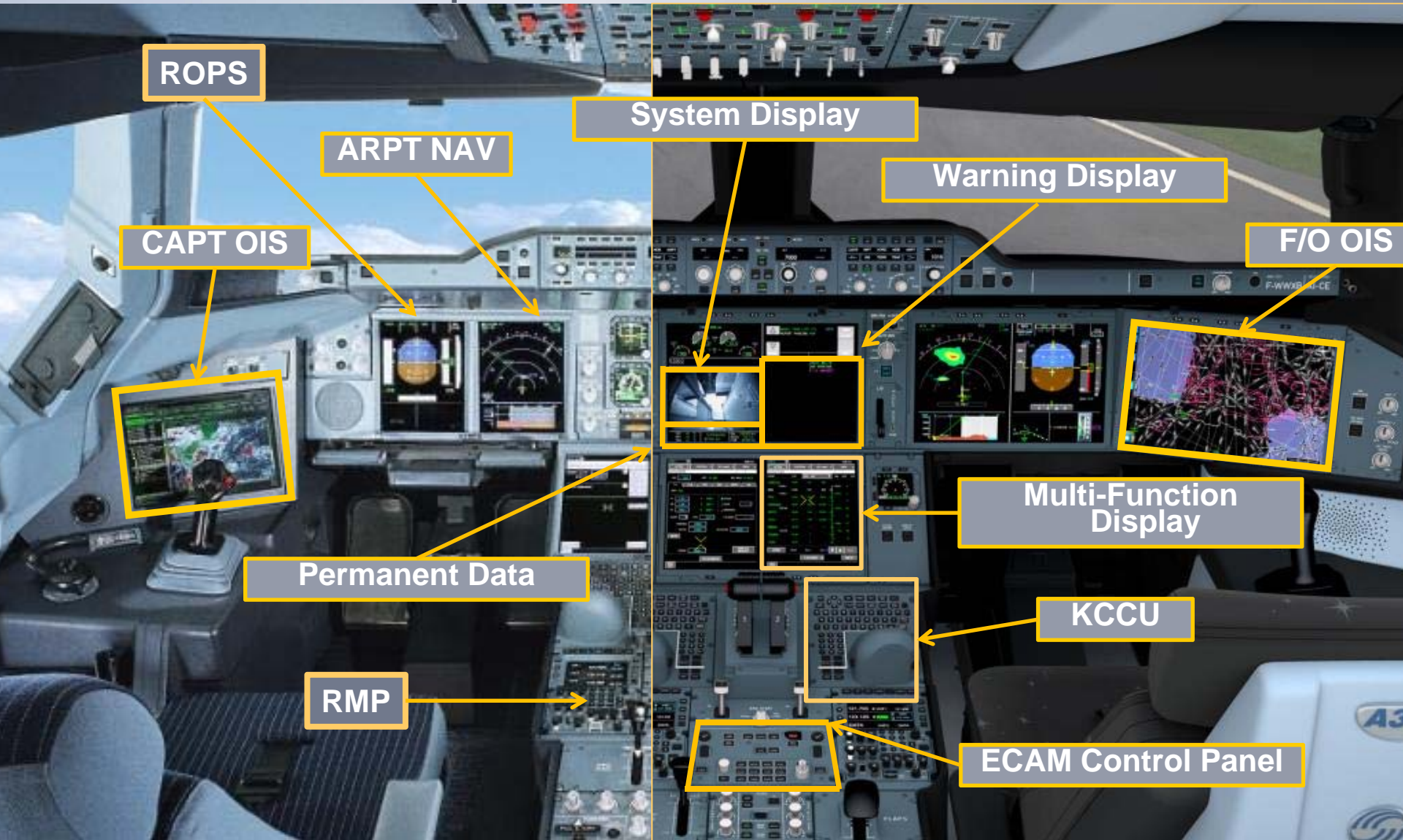


- Variable Frequency Generator

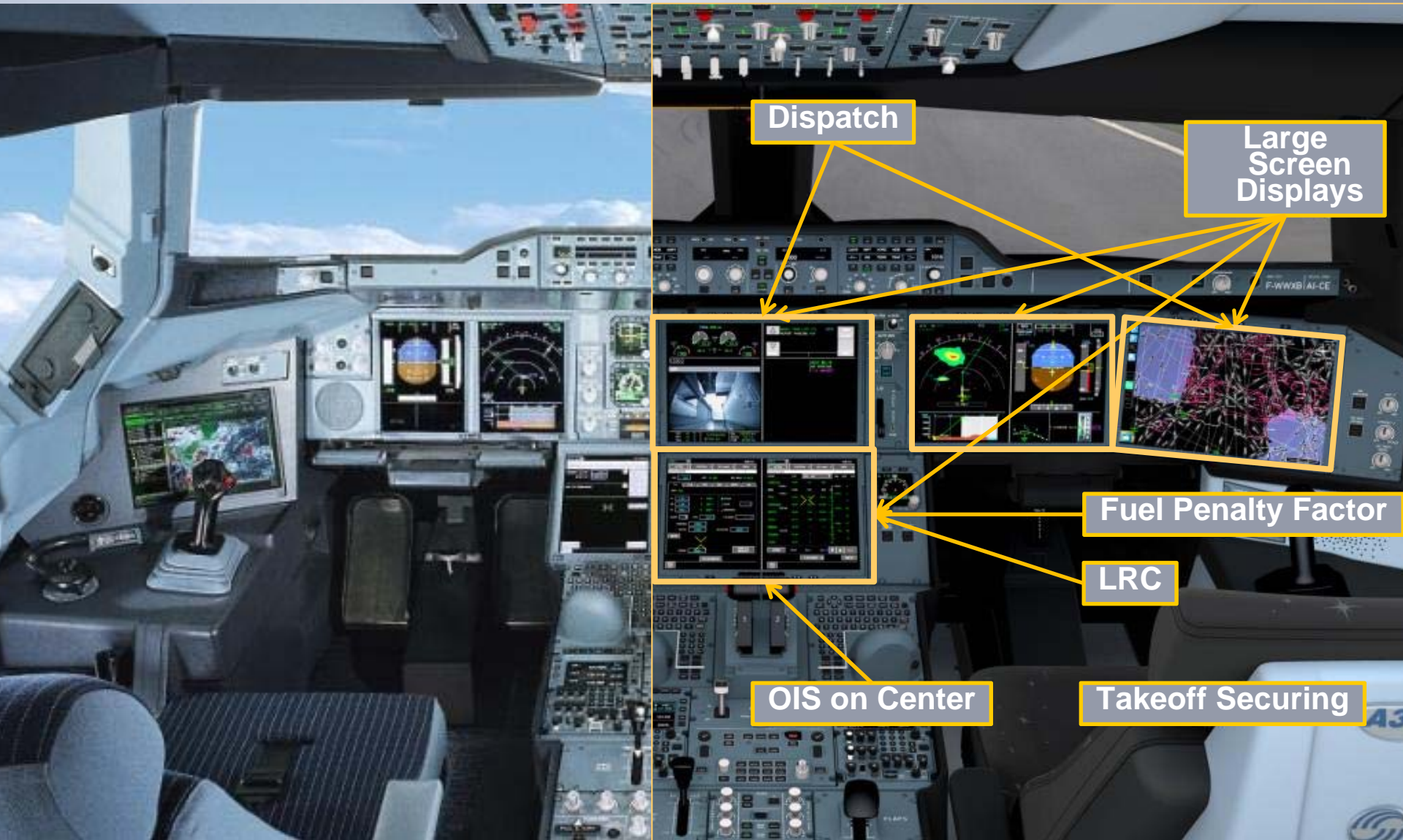
A380/A350 Cockpit – Enhanced Pilot Interfaces



A380/A350 Cockpit – Enhanced Pilot Interfaces



A350 New Features since A380



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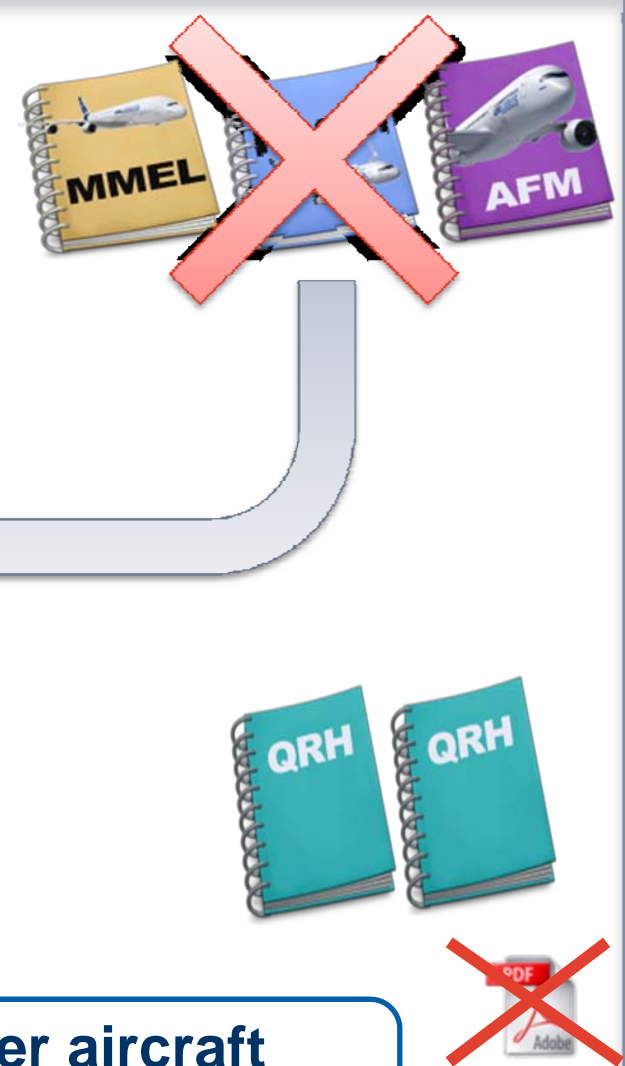
- General presentation of aircraft characteristics
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A350/A380 On-board Information System (OIS) General



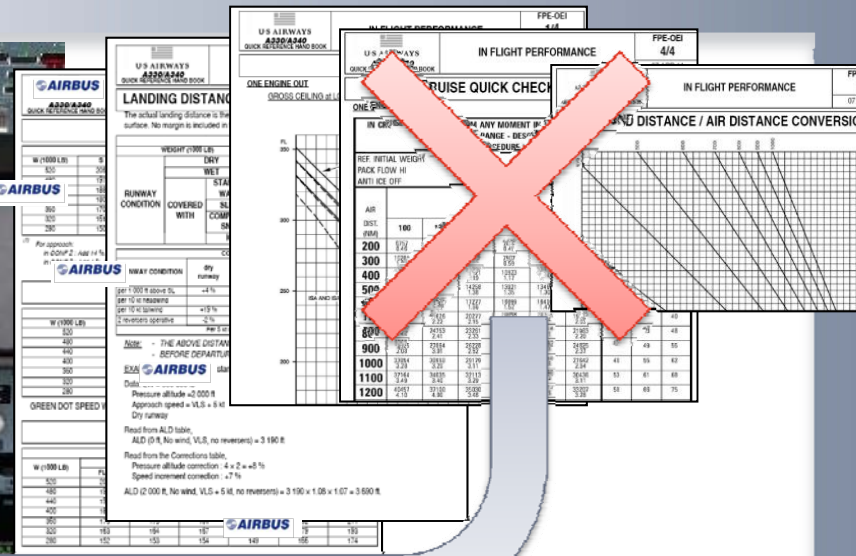
- On-board Information System (OIS) – Manage Mission
 - Enhances access to pilots' operational information and simplifies some of their tasks (**A350: KCCU interactivity with OIS**)
 - Reduces the quantity of paper documents in the cockpit and replaces them with electronic ones:

A350/A380 On-board Information System (OIS) Documentation



● The A350/A380 are basically no-paper aircraft
 ● PDF is not recommended

A350/A380 On-board Information System (OIS) Performance



On-Board applications

TAKEOFF

LANDING

LOADSHEET

IN FLIGHT

OPS LIBRARY

No more paper performance but EFB modules for easier use and better optimization

A350 Dispatch Function

Today's in-service situation – MEL entry

Today

AIR PACK 1(2) REGUL FAULT

AIRCRAFT STATUS	CONDITION OF DISPATCH
Without subtitle and <i>without</i> the associated <i>INFO</i> message PACK 1(2) AVAIL ABOVE FL 290 on the STATUS SD page: both temperature control valves of a pack are failed. The temperature regulation of the associated pack is degraded.	Refer to 21-50-06 Pack Temperature Regulation condition 21-50-06A
Associated with the PACK 1(2) RAM AIR DOOR CLOSED subtitle: a pack ram air inlet or outlet door is failed in closed position. Associated pack operation is allowed after deactivation of the associated ram air door.	Refer to 21-50-11 Pack Ram Air Inlet Door Actuation condition 21-50-11A <i>or</i> Refer to Item 21-50-12 Pack Ram Air Outlet Door Actuation condition 21-50-12A

- Entry into the MEL is not so straightforward

- All Flight Deck Effects are potential MEL entries (ECAM alerts, CDS flags, ...)
- Flight crew have to identify the relevant MEL item
- Maintenance may have to troubleshoot in order to identify the root cause of a logged flight deck effect

Need for an easy entry into the MEL, to optimize aircraft operations (minimize delays, cancellation)

A350 Dispatch Function

Dispatch function concept

- To keep the technical events impacting the ongoing flight in the ECAM WD
 - Decrease number of ECAM alerts on WD
- To gather the system failures having a dispatch impact in a new dedicated page (DISPATCH page)
 - Each individual event are now called > dispatch message
- With the introduction of the Dispatch Messages
 - Easy MEL entry with obvious MEL item identification
 - Supersede the dispatch-oriented ECAM alerts
 - Increase quality of log reports

A350 Dispatch Function

Dispatch function concept – DISPATCH page

- The DISPATCH page...



<u>DISPATCH</u>			
AIR PACK 2 REGUL FAULT			
> AIR PACK 2 RAM AIR INLET DOOR CLOSED			

COND			
> COND ONE CABIN FAN			
TAT +5 °C	5:45:04 GPS	GW 222555 KG	SD
SAT +5 °C	ET 00:32	GWCG	
ISA +5 °C		FOB	
AIR PACK 2 REGUL FAULT PACK 2.....OFF <input type="checkbox"/> CLEAR			WD

A350 Dispatch Function

Dispatch function concept – DISPATCH page

● The DISPATCH page...

- Is displayed when the DISPCH key is pressed on the ECP
- Gathers all active Dispatch Messages
 - displays the ECAM alerts associated with each Dispatch Message in grey color (if any)
- Is the main source for entering the MEL
 - No entry via ECAM alerts

DISPATCH

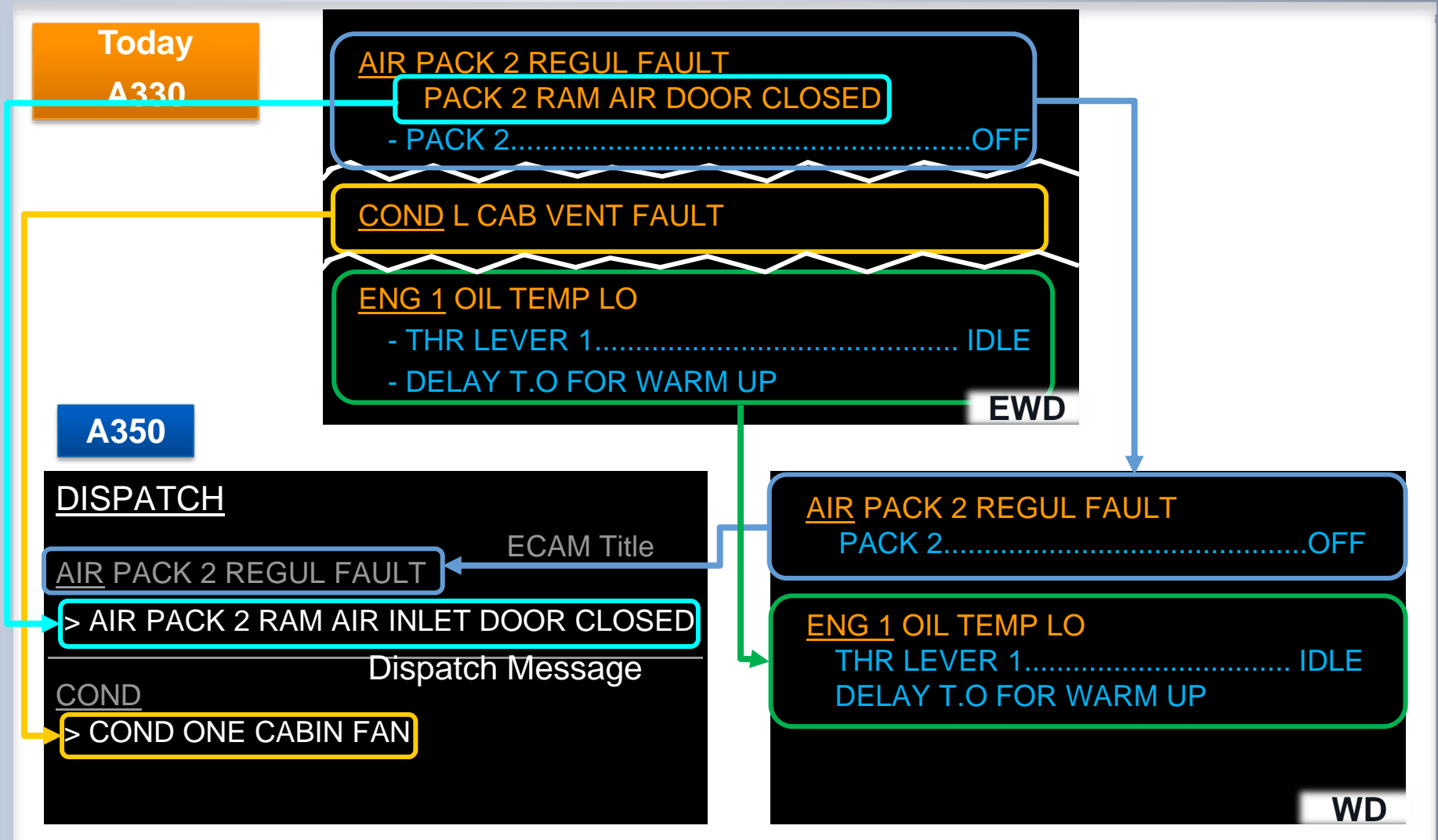
AIR PACK 2 REGUL FAULT
> AIR PACK 2 RAM AIR INLET DOOR CLOSED

COND
> COND ONE CABIN FAN



A350 Dispatch Function

Dispatch function concept – Ongoing flight/Dispatch split



A350 Dispatch Function

Dispatch function concept – Ease MEL entry

Current A/C

AIR PACK 1(2) REGUL FAULT

AIRCRAFT STATUS	CONDITION OF DISPATCH
Without subtitle and without the associated INFO message PACK 1(2) AVAIL ABOVE FL 290 on the STATUS SD page: both temperature control valves of a pack are failed. The temperature regulation of the associated pack is degraded.	Refer to 21-50-06 Pack Temperature Regulation condition 21-50-06A
Associated with the PACK 1(2) RAM AIR DOOR CLOSED subtitle: a pack ram air inlet or outlet door is failed in closed position. Associated pack operation is allowed after deactivation of the associated ram air door.	Refer to 21-50-11 Pack Ram Air Inlet Door Actuation condition 21-50-11A or Refer to Item 21-50-12 Pack Ram Air Outlet Door Actuation condition 21-50-12A

**Today A380
MEL entry with ECAM alert
& correlation with Flight Deck Effects**

A350

AIR PACK 1(2) TEMP REGUL

AIRCRAFT STATUS	CONDITION OF DISPATCH
A temperature control valve of Pack 1(2) is failed. The temperature regulation of Pack 1(2) is degraded.	Refer to 21-50-06 Pack Temperature Regulation
// END	

AIR PACK 1(2) RAM AIR INLET DOOR CLOSED

AIRCRAFT STATUS	CONDITION OF DISPATCH
The Pack 1(2) ram air inlet door is failed in the closed position. Associated pack operation is permitted after deactivation of the associated ram air door.	Refer to 21-50-11 Pack Ram Air Inlet Door Closed
// END	

**A350
MEL entry with Dispatch Message**

A350 Dispatch Function

Dispatch function concept – Summary

- The Dispatch function is able to distinguish:
 - System failures impacting the ongoing flight
 - Other system failures related to dispatch
- The Dispatch function provides “Dispatch Messages” in a new dedicated page displayed on SD
- As much as possible, one Dispatch Message is associated with one MMEL item

One Dispatch Message => One MMEL item

Conclusion: A380/A350 new features

- New systems, new cockpit interfaces and Airbus cockpit commonality
- New Safety Features (ROPS, TOS, etc.)
- « Digital aircraft » for flt ops documentation and performance
- Dispatch function on A350

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