

# ***Managing the Electronic Flight Bag***

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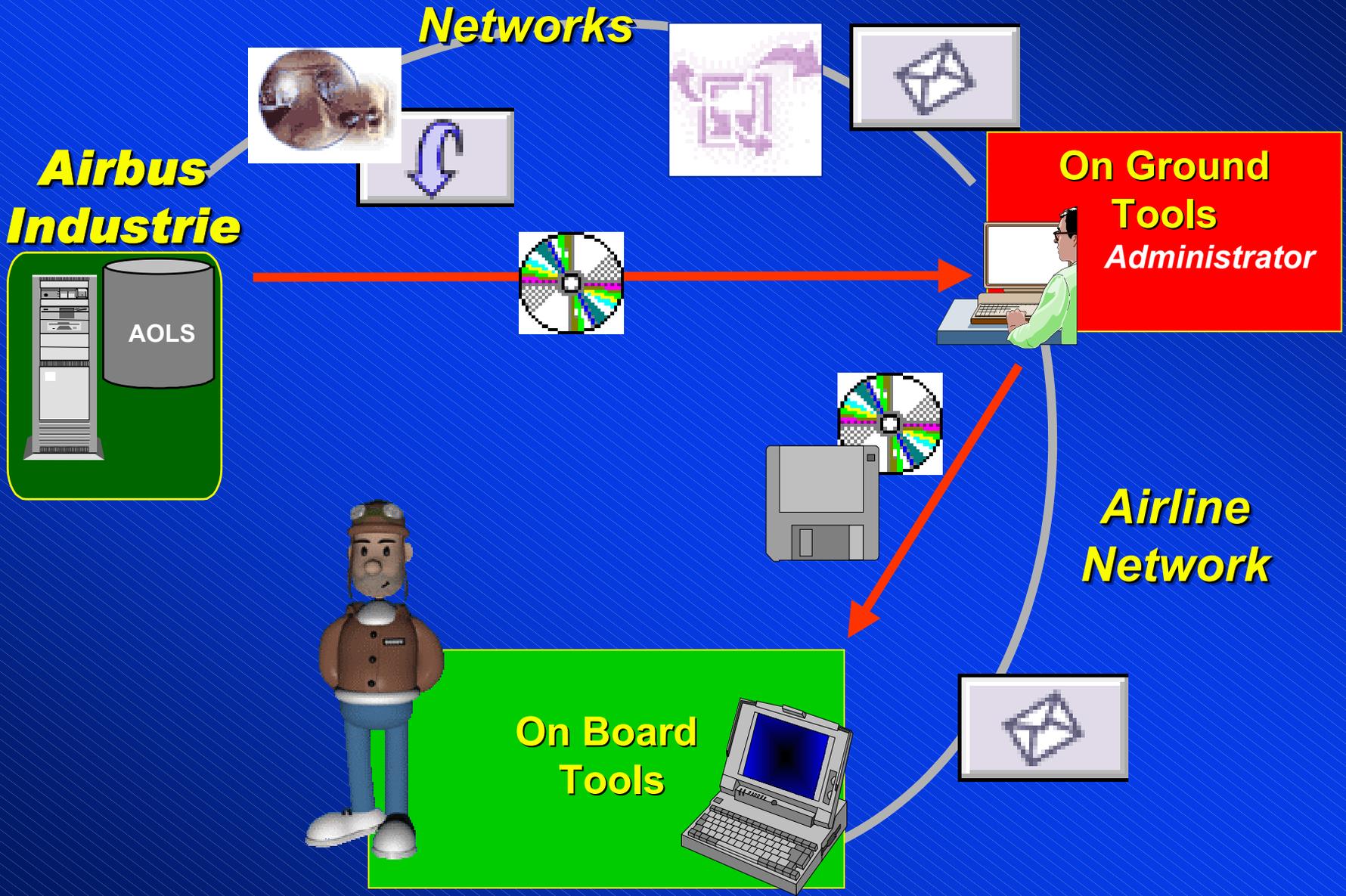
Airbus Industrie Flight Operations Support Division

# Contents

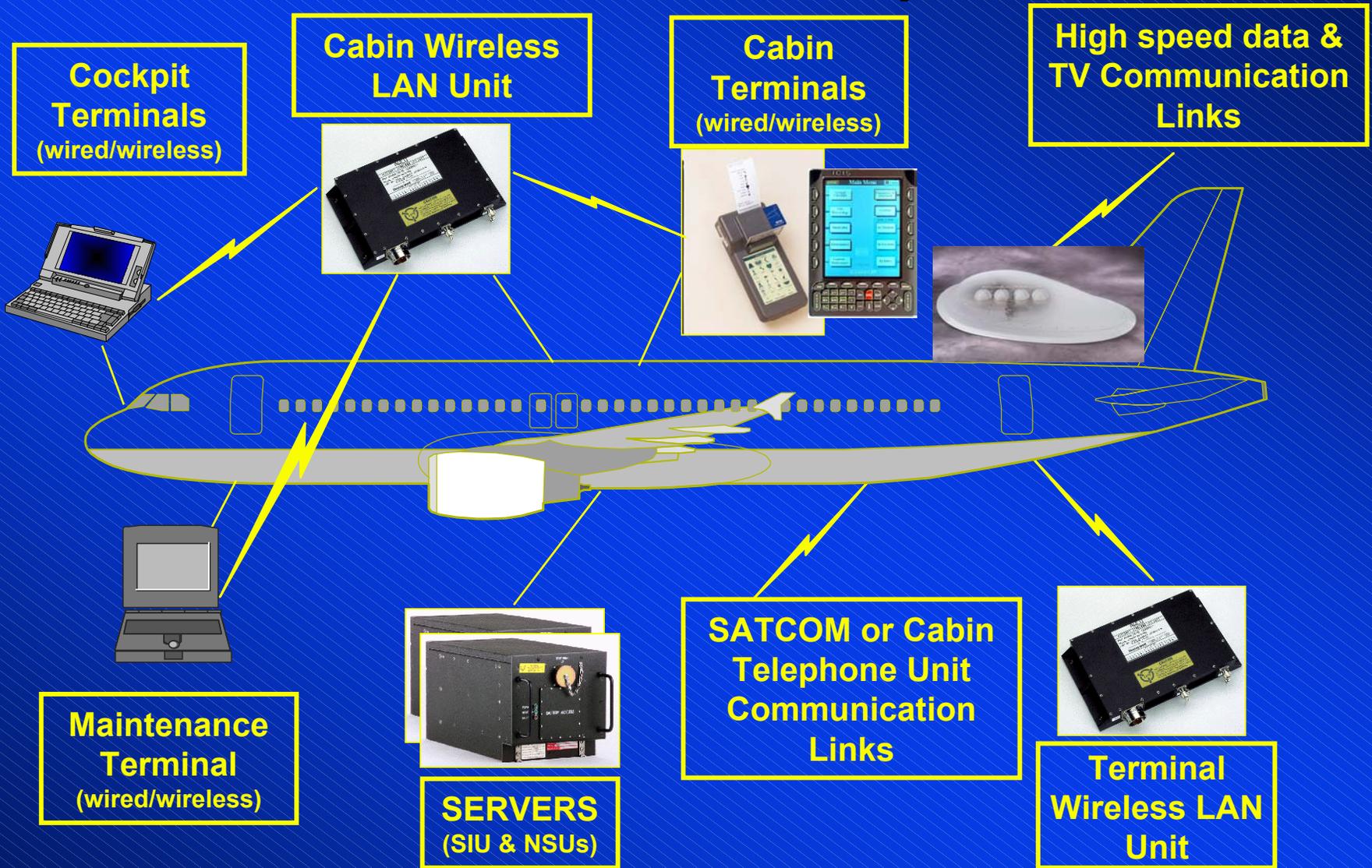
- This presentation intends to illustrate the EFB management through some general issues and the experience gained with the Airbus Less Paper in the Cockpit project. The following processes related to the EFB management are covered.
  - ↳ Entities involved in the global process
  - ↳ Communication
  - ↳ Procedures to be implemented by the Airline
  - ↳ EFB Dispatch and Use



# Communication - Present Status

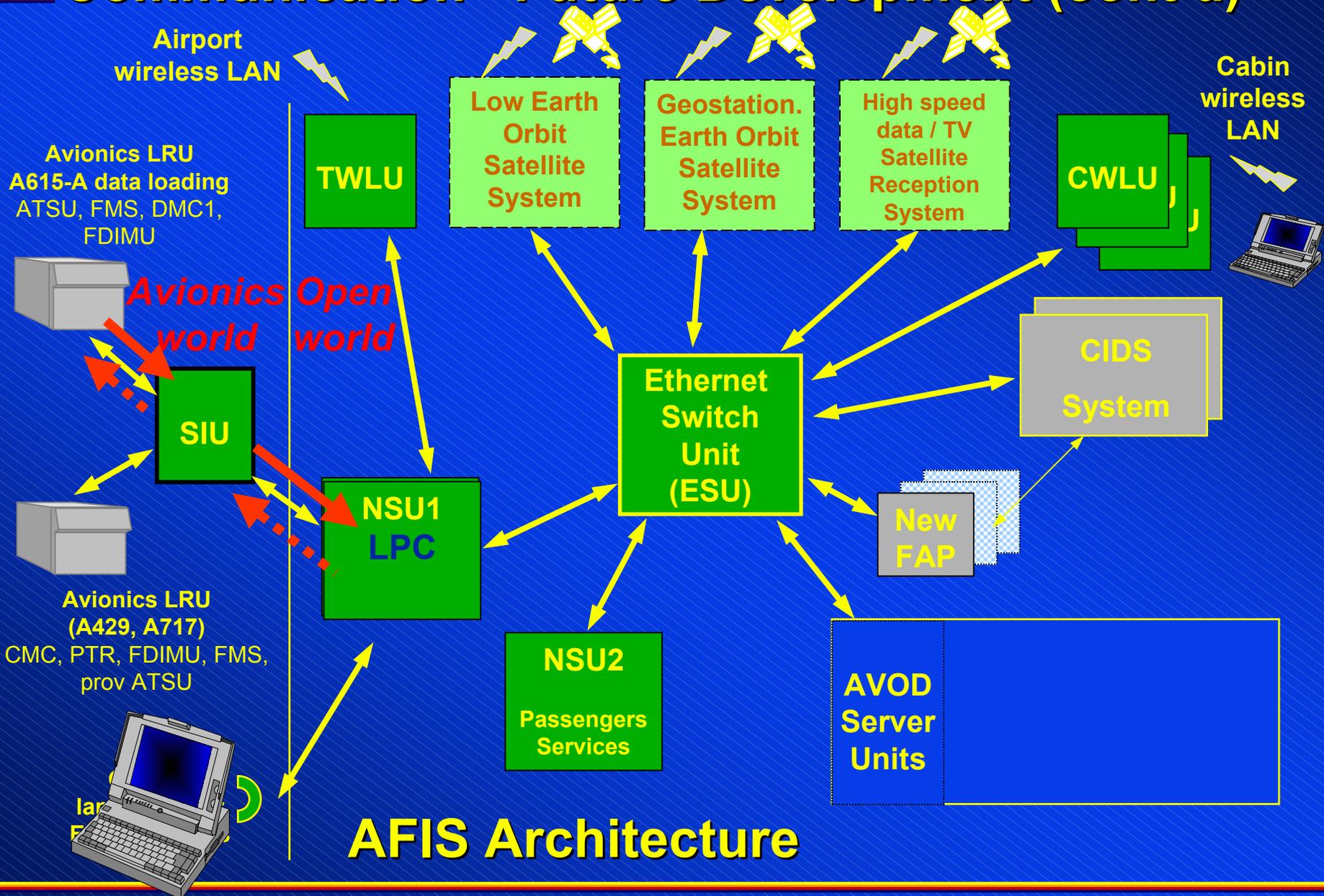


# Communication - Future Development



## AFIS Components (Airbus in-Flight Information Services)

# Communication - Future Development (cont'd)



# Communication - Security concerns

- When the data interchange between the various entities involved in the EFB processes is performed through a network, the following security requirements have to be fulfilled.
  - ↳ Authentication
    - ◆ ability to verify the identity of the end-user
  - ↳ Data Integrity
    - ◆ protection of information from undetected modification
  - ↳ Non Repudiation
    - ◆ prevention of an entity from denying previous actions
  - ↳ Confidentiality
    - ◆ protection of information from unauthorized disclosure
  - ↳ Logging/Tracking
    - ◆ traceability of events and information status

# Procedures to be implemented by the Airline

- The Standard Operating Procedures related to the use of the laptop on board have to be amended to cope with the Airline organization
- The SOP shall include the tests of integrity which guarantee
  - ↳ that the laptop has been properly updated
  - ↳ that the laptop has not been corrupted
  - ↳ that the environment is coherent (Software version versus the version of data)
- Training related to the use of a laptop has to be set-up.

# Procedures to be implemented by the Airline

- The Airline procedures related to the quality control will have to be amended or developed to cope with the information management via the Network
- Necessary mechanisms shall be implemented to ensure a proper traceability (logging & Tracking)
  - ↳ version of software loaded on identified laptops
  - ↳ data loaded on identified laptops
  - ↳ logging of all actions of update
  - ↳ an archive has to be maintained
- Necessary procedure shall be implemented to maintain the synchronization between the manufacturer information (software, data) and the information customized and dispatched by the airline
  - ↳ Versioning management

# EFB Dispatch and Use

## *Airbus Less Paper in the Cockpit Implementation*

- 3 ways to work with Airbus LPC

- ↳ one laptop per aircraft

- ◆ first officer computes performance and consults manuals
- ◆ cross-check with captain
- ◆ backup by ground operations

- ↳ two laptops per aircraft

- ◆ first officer computes performance
- ◆ cross-check with captain who can also compute separately
- ◆ backup is second laptop
- ◆ pilots can separately consult the manuals

# EFB Dispatch and Use

## *Implementation (cont'd)*

- 3 ways to work with LPC (cont'd)
  - ↳ one laptop per pilot
    - ◆ first officer computes performance
    - ◆ cross-check with captain who can also compute separately
    - ◆ backup is second laptop
    - ◆ pilots can separately consult the manuals
- In all cases, paper QRH remains on-board

## EFB Dispatch and Use Cockpit Configuration

- Use the sliding table to work on the PC
- Easy access to MCDU to enter computed data in the FMS



# EFB Dispatch and Use

## Cockpit Configuration (cont'd)

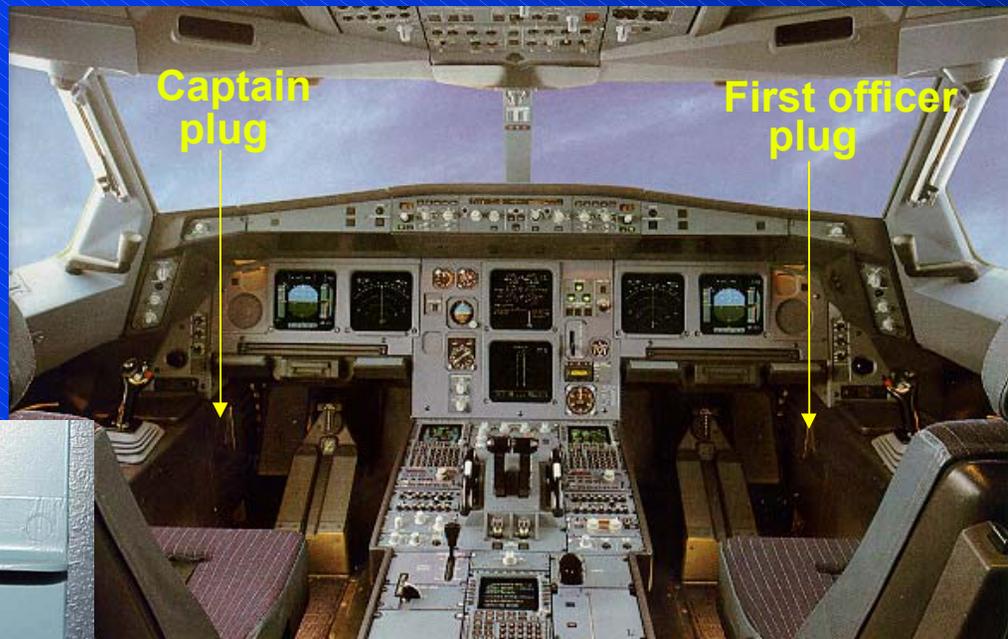
- Power Plug behind the first officer (A320F aircraft) or behind the captain (A330/A340)
- Standard Plug on FBW aircraft



# EFB Dispatch and Use

## Cockpit Configuration (cont'd)

- One additional plug per pilot



# EFB Dispatch and Use

## Cockpit Configuration (cont'd)

- Storage bin next to each pilot. Easy access to the laptop at any time



## EFB Dispatch and Use *Cockpit Configuration (cont'd)*

- Pilots Cross-check during cockpit preparation



# EFB Dispatch and Use

## *Security over the Network*

- In the frame work of AOLS (Airbus On-Line Services) the following functions have been implemented to answer the security concerns.

### Requirements

- ↳ Authentication
- ↳ Data Integrity
- ↳ Non Repudiation
- ↳ Confidentiality
- ↳ Logging/Tracking

### AOLS Functions

- ↳ Certificate
- ↳ Certificate
- ↳ Logging/Tracking
- ↳ Access Rights
- ↳ Logging/Tracking

# EFB Dispatch and Use

## *Data integrity control*

- In addition to the implemented security mechanisms, additional controls are implemented to validate that the LPC environment has not been corrupted.
  - ↳ Integrity check on Software modules based on :
    - ◆ Time Stamp
    - ◆ CRC (Cyclic Redundancy Check)
  - ↳ Integrity check on Operational data based on:
    - ◆ Time Stamp
    - ◆ CRC
    - ◆ List of Effective Files

# EFB Dispatch and Use

## *EFB Dispatch*

- the Administrator prepares the up to date customized set of data
- One or Two Laptops per Aircraft
  - ↳ the maintenance organization is in charge to install the laptops on board prior the flight.
- One Laptop per Pilot
  - ↳ prior the flight the pilots must update their laptops
    - ◆ through a CD-ROM (Complete update)
    - ◆ through the Network (Differential update)

# Conclusion

- The implementation of the EFB concept implies a non negligible activity with regards to the organizational aspects
  - ↳ Quality controls
  - ↳ Standard Operating procedures
- The Training aspect shall not be under-estimated.