A350
TECHNICAL TRAINING MANUAL
MAINTENANCE COURSE - T1+T2 - RR Trent XWB
ELECTRO-AVIONICS SYSTEMS Level 1

This document must be used for training purposes only

Under no circumstances should this document be used as a reference

It will not be updated.

AIRBUS Environmental Recommendation
Please consider your environmental responsability before printing this document.

ELECTRO-AVIONICS SYSTEMS LEVEL 1

V1813401 - V01T0M0

ELECTRICAL POWER SYSTEM PRESENTATION (1)

Overview

The function of the electrical power system is to give AC and DC electrical power and supply it to the users.
General familiarization training of this system focuses on:
- The AC generation
- The DC generation
- The AC electrical load distribution
- The primary and secondary power distribution
- The Electrical Structure Network (ESN).

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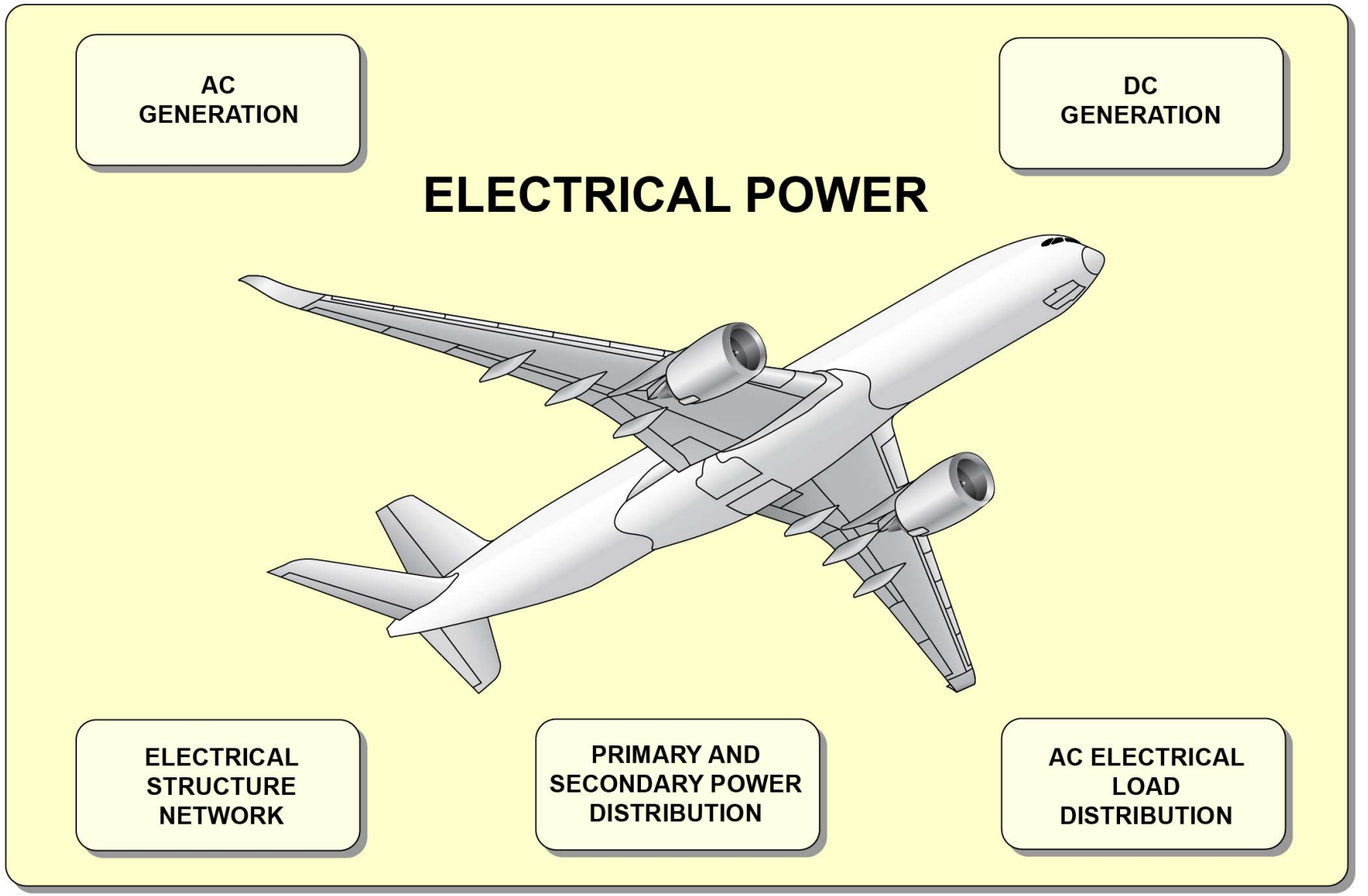

OVERVIEW

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ELECTRICAL POWER SYSTEM PRESENTATION (1)

AC Generation - Presentation

Function/Description

The AC generation system includes:
- The AC main generation
- The AC emergency generation.

The AC main generation includes:
- The Ground Power Units (GPUs) that supply the AC network with 115VAC on the ground only, through the external power receptacles.
- The Variable Frequency Generators (VFGs) that supply the AC network with 230VAC.

The AC emergency generation includes:
- The static inverter that supplies the AC inverter busbar with 115VAC, when emergency battery 1 is available at a minimum.
- The AC generator of the Ram Air Turbine (RAT) module that supplies the AC emergency network with 230VAC (when the RAT is fully extended).

Location

- Four VFGs are installed on the engines (two on each engine).
- Two external power receptacles are installed on the lowest section of the forward fuselage.
- The RAT module is installed on the right side of the aft belly fairing.
- One static inverter is installed on the left side of the avionics compartment.

Interface

The AC network receives 230VAC electrical power supply from the APU starter/generator.

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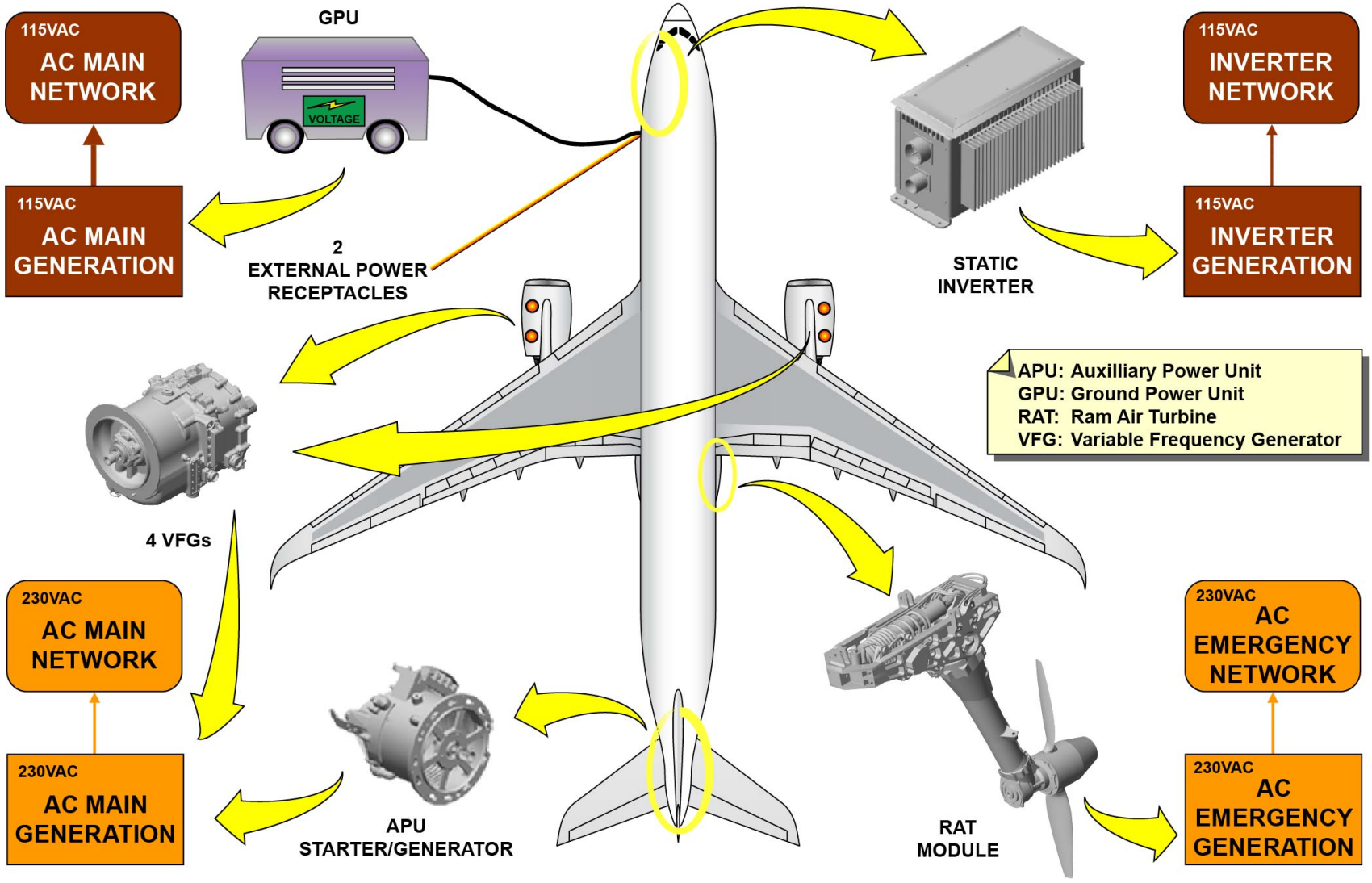


AC GENERATION - PRESENTATION - FUNCTION/DESCRIPTION ... INTERFACE

ELECTRICAL POWER SYSTEM PRESENTATION (1)

DC Generation - Presentation

Function/Description

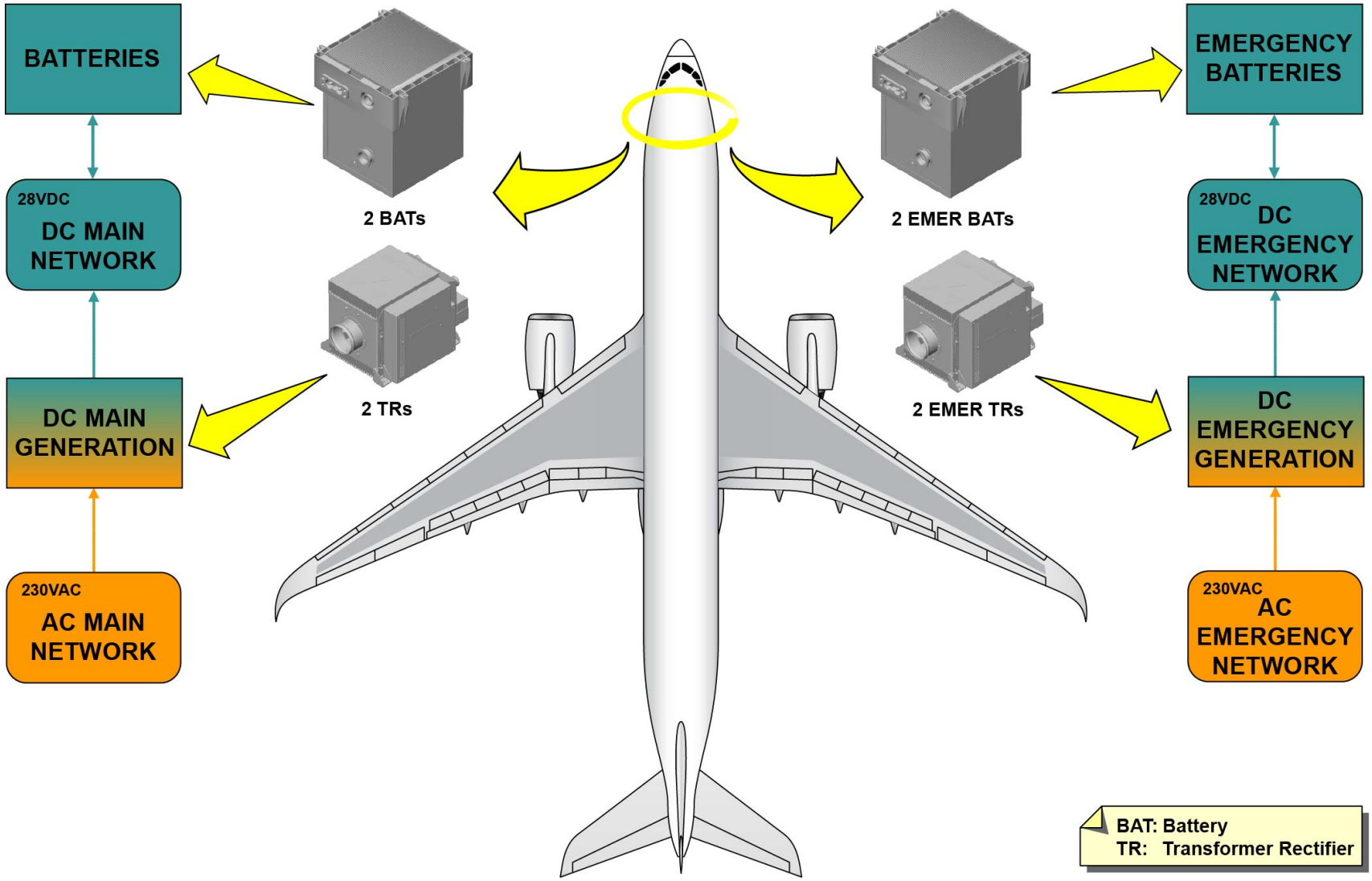
The DC generation system includes:
- The DC main generation
- The DC emergency generation.

The DC main generation includes:
- Two Transformer Rectifiers (TRs) that change the 230VAC from the AC main network into 28VDC to supply the DC main network.
- Two batteries that supply the DC main network on the ground for maintenance.

The DC emergency generation includes:
- Two emergency TRs that change the 230VAC from the AC emergency network into 28VDC to supply the DC emergency network.
- Two emergency batteries that supply the DC emergency network during the extension of the RAT module.

Location

All the TRs and batteries are installed in the avionics compartment.



DC GENERATION - PRESENTATION - FUNCTION/DESCRIPTION & LOCATION

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ELECTRICAL POWER SYSTEM PRESENTATION (1)

AC Electrical-Load Distribution - Presentation

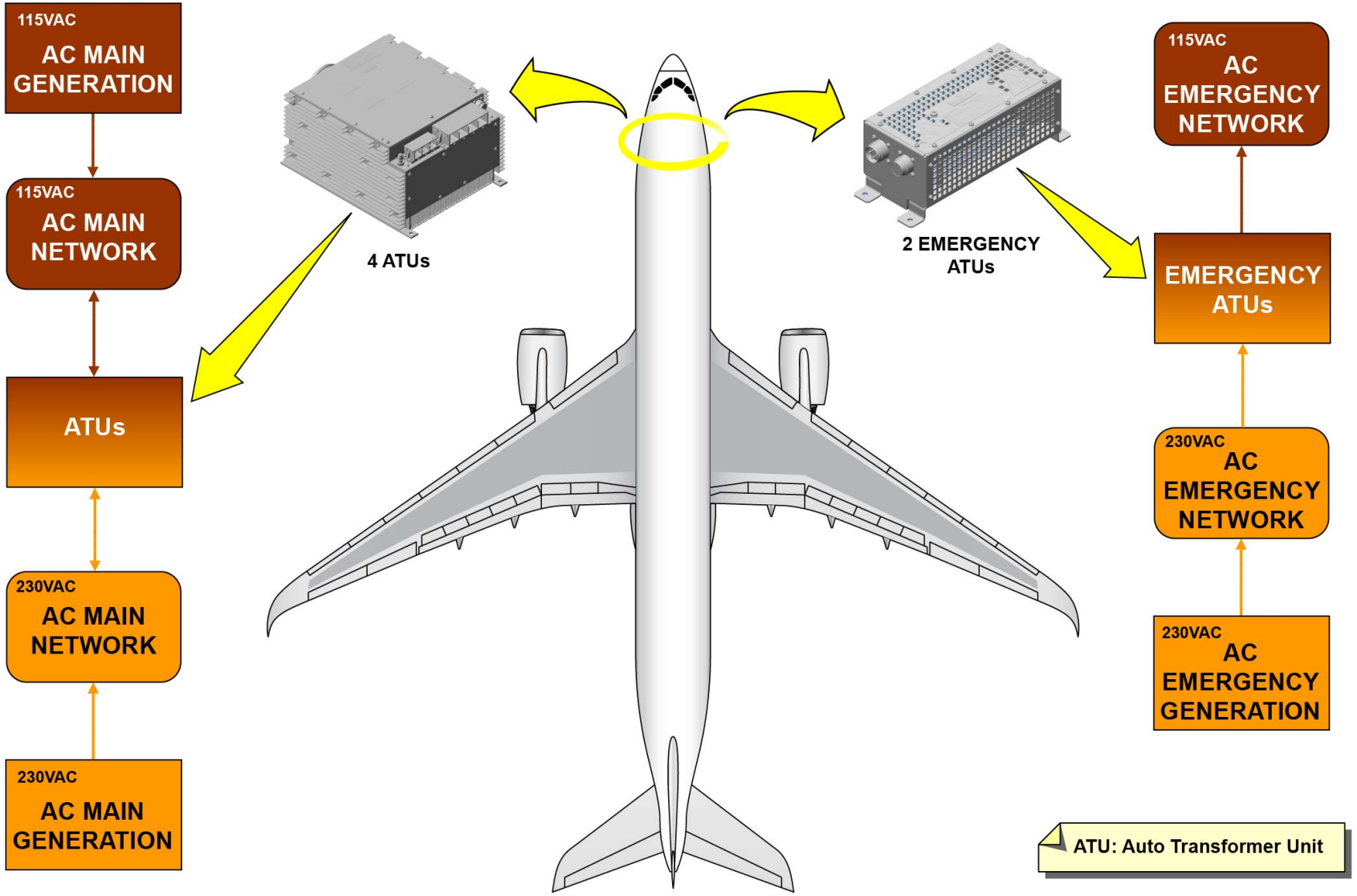
Function/Description

The AC electrical-load distribution includes Auto Transformer Units (ATUs):
The ATUs change:
- 230VAC into 115VAC when the VFGs supply the AC main network
- 115VAC into 230VAC when the GPUs supply the AC main network through the external power receptacles.

The emergency ATUs change:
- 230VAC into 115VAC when the AC generator of the RAT module supplies the AC emergency network.

Location

All the ATUs are installed in the avionics compartment:
- Four ATUs for the AC main network
- Two emergency ATUs for the AC emergency network.



AC ELECTRICAL-LOAD DISTRIBUTION - PRESENTATION - FUNCTION/DESCRIPTION & LOCATION

ELECTRICAL POWER SYSTEM PRESENTATION (1)

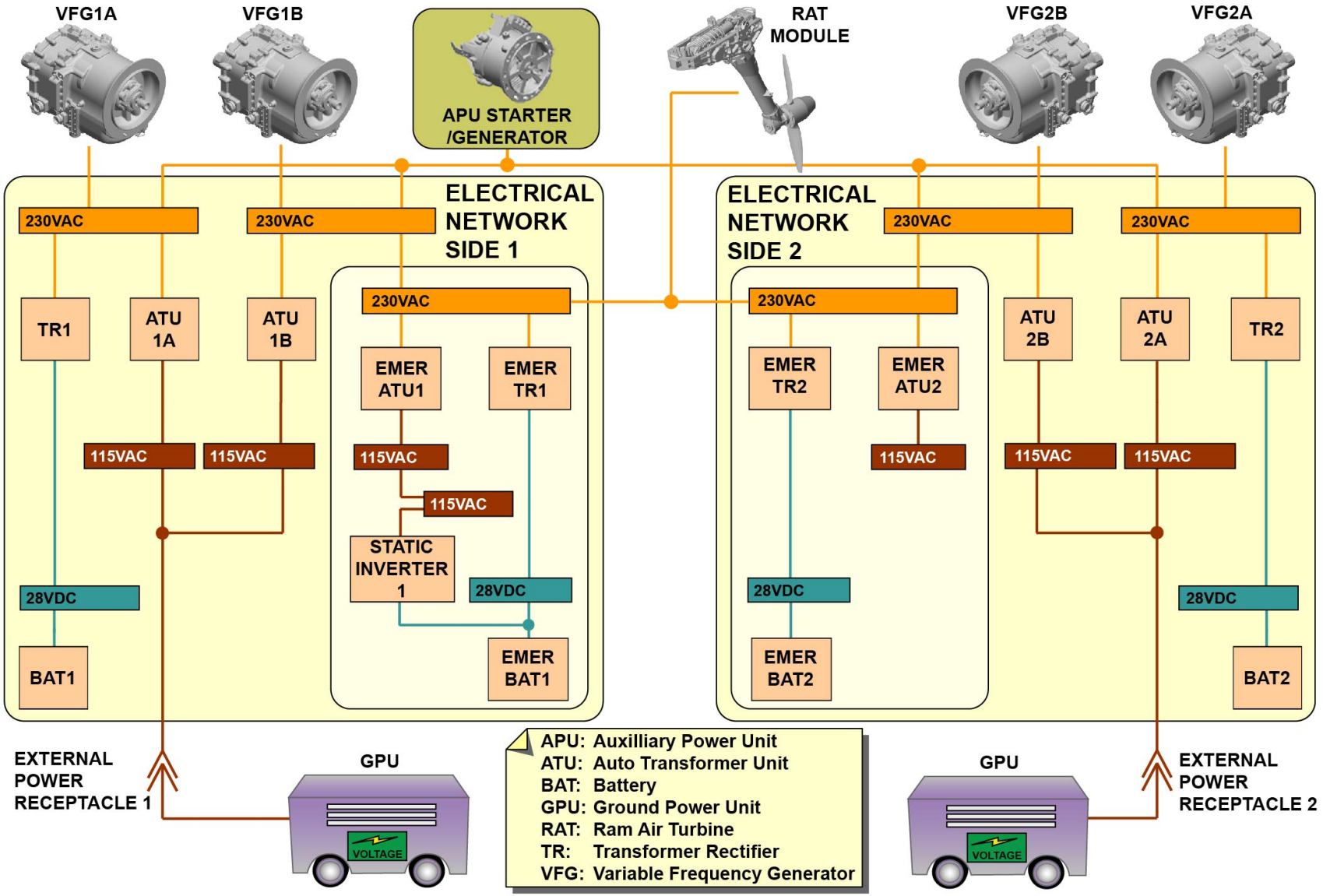
Electrical Power Generation and Distribution - Presentation

Function/Description

Electrical power generation
In normal conditions:
- In flight or on the ground, four VFGs (two on each engine) supply the AC main network. On the ground, two GPUs supply the AC main network through two external power receptacles.
- In flight and on the ground, two TRs or two batteries supply the DC main network.

In emergency conditions:
- One static inverter, that changes DC power into AC power, supplies a part of the AC emergency network when only the emergency batteries are available.
- One generator, in the RAT module, supplies the AC emergency network.
- Two emergency TRs or two emergency batteries supply the DC emergency network.

Electrical power distribution
1_ Four ATUs, that change 230VAC into 115VAC or 115VAC into 230VAC, supply the AC main network.
2_ Two emergency ATUs, that change 230VAC into 115VAC, supply the AC emergency network.



ELECTRICAL POWER GENERATION AND DISTRIBUTION - PRESENTATION - FUNCTION/DESCRIPTION

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ELECTRICAL POWER SYSTEM PRESENTATION (1)

Primary and Secondary Power Distribution - Presentation

Function/Description

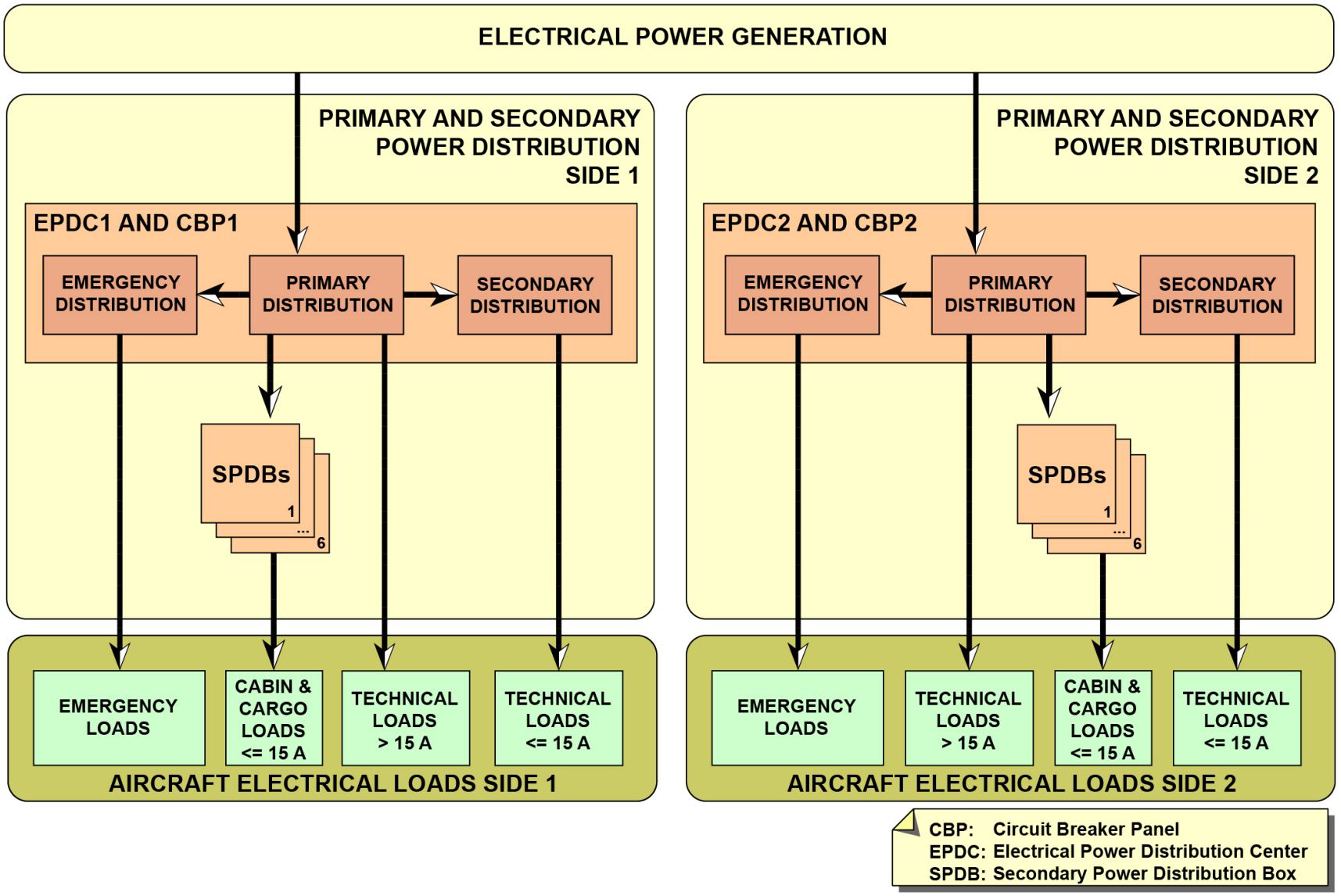
The primary and secondary power-distribution system controls and manages the power sources to supply the electrical network.
The primary and secondary power-distribution system includes:
- The Electrical Power Distribution Center (EPDC) interface
- The Circuit Breaker Panel (CBP) interface
- The cabin and cargo power distribution.

There are two EPDCs (side 1 and side 2) for segregation of the aircraft distribution system. The basic functions of the EPDCs are:
- Connection or disconnection of the AC, DC or emergency power sources
- Reconfiguration of the electrical network
- Protection of the electrical network (short circuit, etc.).

Each EPDC has three sub-systems:
- The primary power distribution
- The secondary power distribution
- The emergency distribution.

The primary power distribution supplies 230VAC, 115VAC and 28VDC to the technical loads and to the non technical loads of more than 15 A.
The secondary power distribution supplies 115VAC and 28VDC to the technical loads of less than or equal to 15 A.
The emergency distribution supplies 230VAC, 115VAC and 28VDC to the emergency loads.
There are two CBPs (side 1 and side 2) for segregation of the aircraft distribution system. The basic functions of the CBPs are:
- The secondary power distribution
- The emergency distribution.

The secondary power distribution supplies 115VAC to the technical loads of less than or equal to 15 A.
The emergency distribution supplies 28VDC to the emergency loads.
The cabin and cargo power distribution is supplied by the Secondary Power Distribution Boxes (SPDBs). The EPDCs supply 115VAC and 28VDC to the SPDBs through the primary power-distribution system. Each SPDB supplies the cabin and cargo loads of less than or equal to 15 A.



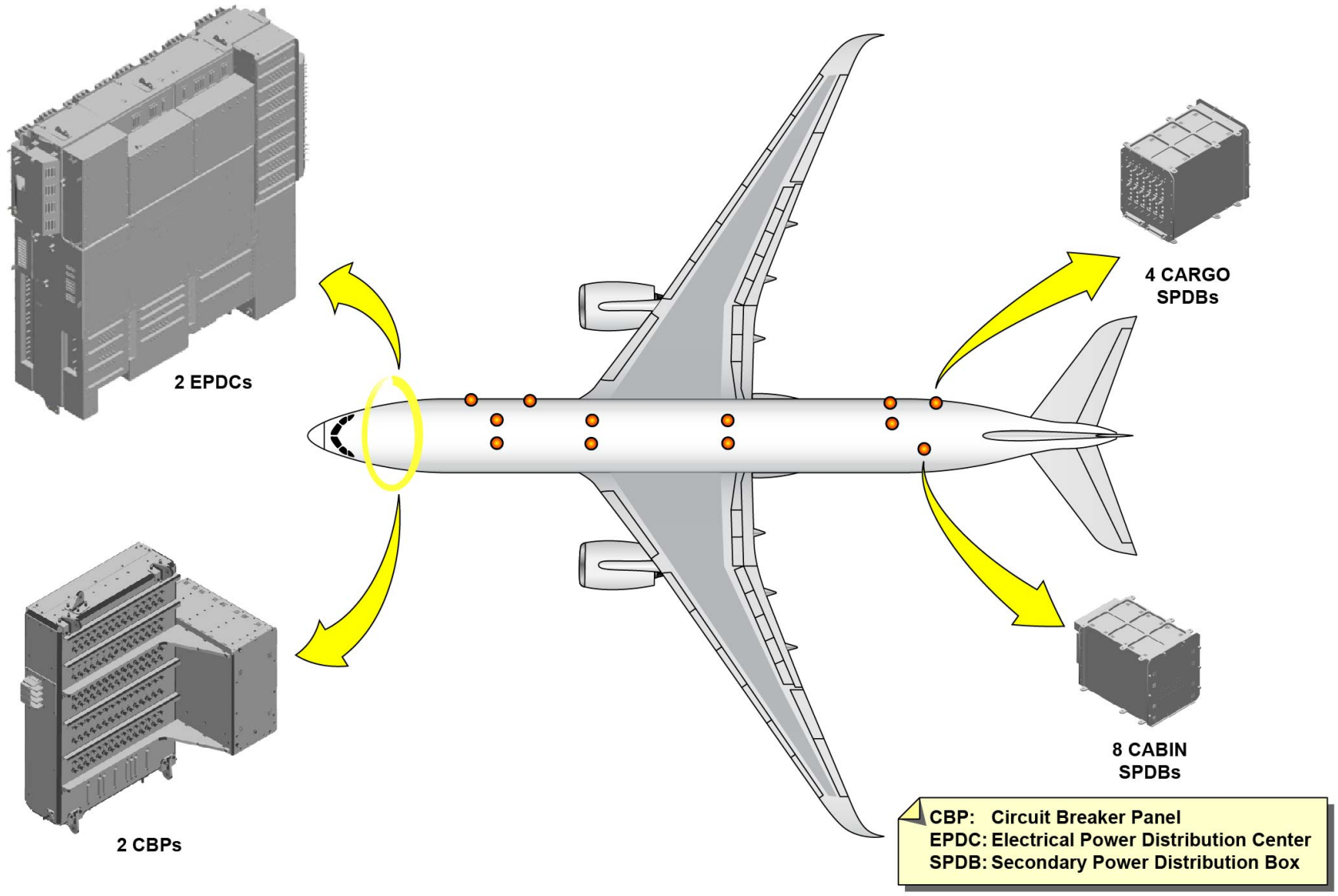
PRIMARY AND SECONDARY POWER DISTRIBUTION - PRESENTATION - FUNCTION/DESCRIPTION

ELECTRICAL POWER SYSTEM PRESENTATION (1)

Primary and Secondary Power Distribution - Presentation (continued)

Location

- Two EPDCs are installed in the avionics compartment.
- Two CBPs are installed in the avionics compartment.
- Eight SPDBs are installed in the cabin and four SPDBs are installed in the cargo compartments (two in the forward compartment and two in the aft compartment).



PRIMARY AND SECONDARY POWER DISTRIBUTION - PRESENTATION - LOCATION

ELECTRICAL POWER SYSTEM PRESENTATION (1)

Primary and Secondary Power Distribution - Presentation (continued)

Interface

The primary and secondary power-distribution system has an interface with the Avionics Full Duplex Switched Ethernet (AFDX) network for communication with the Power Distribution Monitoring and Maintenance Function (PDMMF).
The PDMMF is hosted on the core Onboard Information System (OIS). It includes the monitoring and maintenance functions related to the circuit breakers in the CBPs, the SPDBs and the EPDCs.
The PDMMF has an interface with some Human-Machine Interfaces (HMIs), the Control and Display System (CDS), the Onboard Maintenance Terminal (OMT), the Portable Multipurpose Access Terminal (PMAT).

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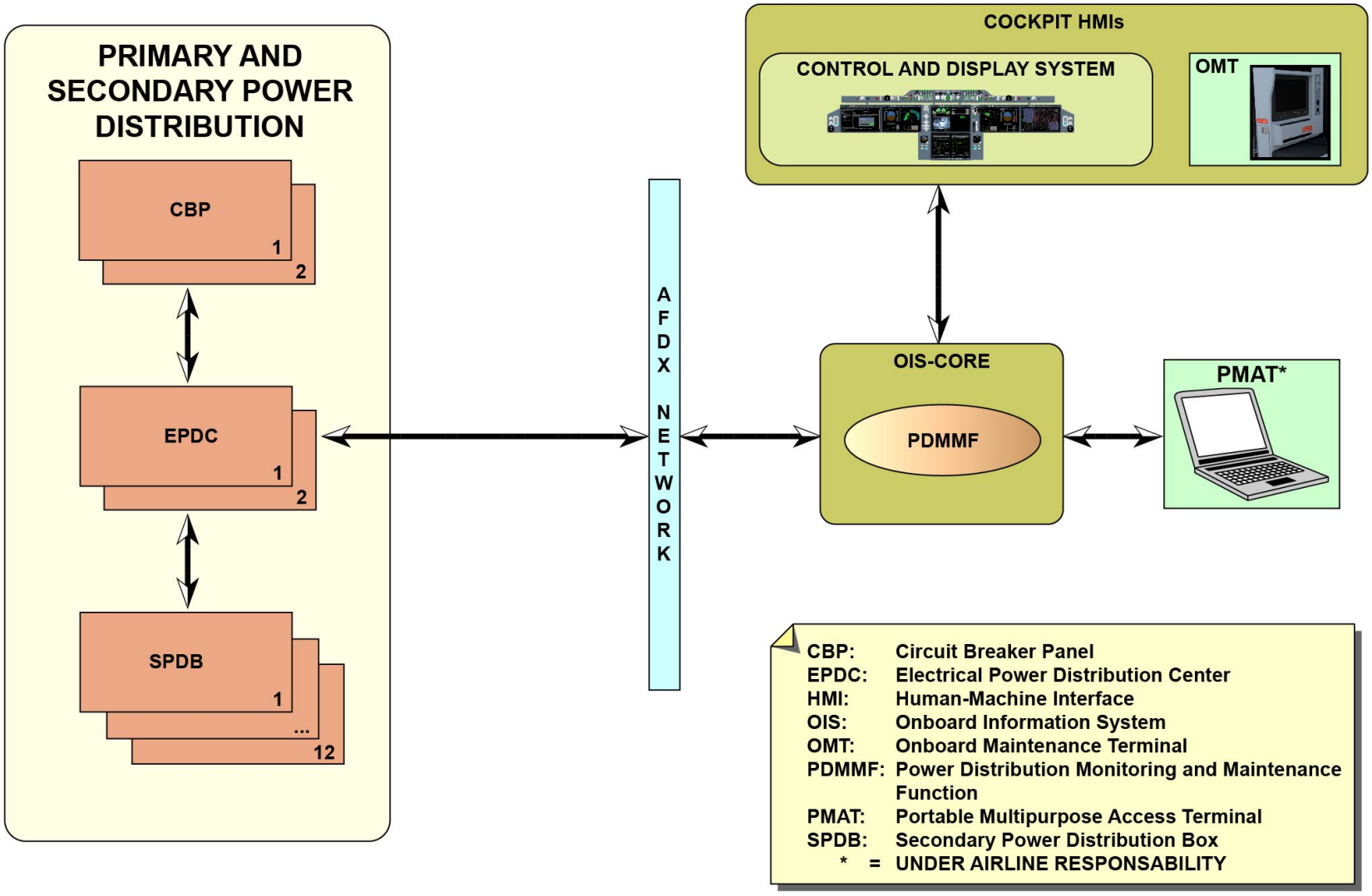

PRIMARY AND SECONDARY POWER DISTRIBUTION - PRESENTATION - INTERFACE

ELECTRICAL POWER SYSTEM PRESENTATION (1)

Electrical Structure Network (ESN) - Presentation

Function/Description

Because the fuselage is made of Carbon Fiber Reinforced Plastic (CFRP) an ESN is located inside the pressurized fuselage and give the following functions:
- Common ground reference
- Grounding/bonding
- Current return path
- Lightning strike protection
- Static electricity discharging.

The ESN is a high-conductivity network distributed in the pressurized fuselage and made of metal parts of the structure such as:
- Primary structure components (metal frames, metal crossbeams, seat tracks, etc.)
- Secondary structure components (cabin center attachments, L-brackets, avionics rack chassis, etc.)
- Standard parts (raceways, ESN cables, electrical junctions, etc.).

Location

The ESN components are installed in the pressurized fuselage.

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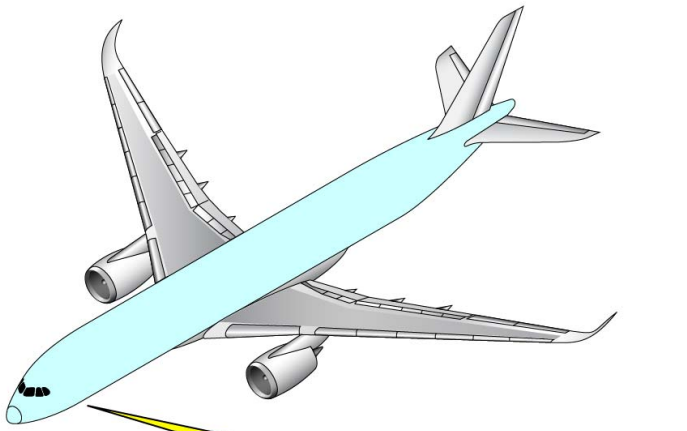

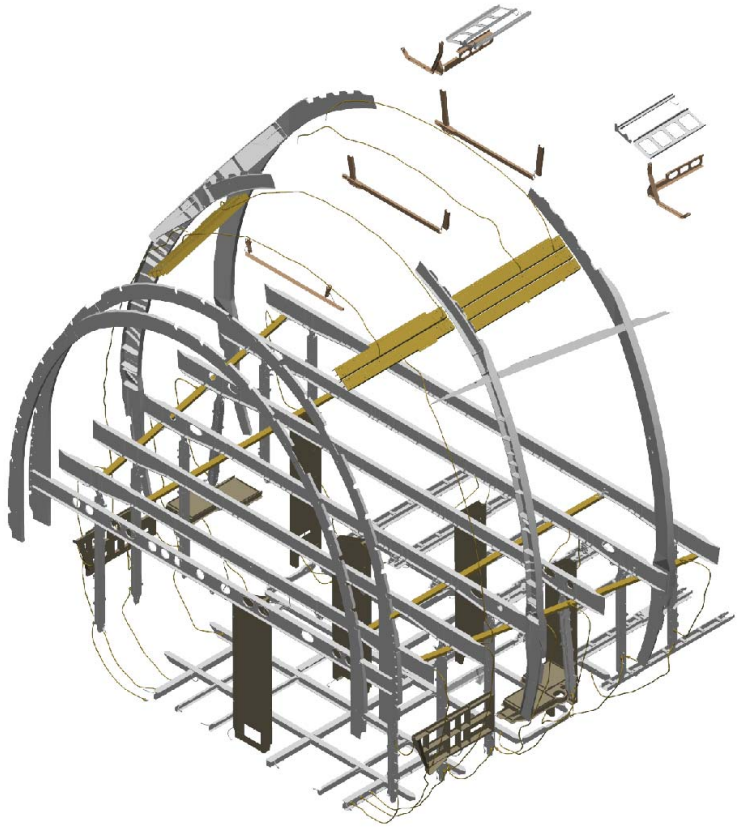

Electrical Structure Network (ESN):

- Common Ground Reference
- Grounding/Bonding
- Current Return Path
- Lightning Strike Protection
- Static Electricity Discharging

PRIMARY STRUCTURE
SECONDARY STRUCTURE
STANDARD PARTS

ELECTRICAL STRUCTURE NETWORK (ESN) - PRESENTATION - FUNCTION/DESCRIPTION & LOCATION

ELECTRICAL POWER SYSTEM PRESENTATION (1)

Control and Indicating - Presentation

The controls and indications of the electrical power system are on the overhead panel on:
- The ELEC section of Integrated Control Panel (ICP) 225VM
- The EMER ELEC PWR section of ICP 215VM.

The status of the electrical power system is shown on the ECAM display, on the System Display (SD).
On the SD, the pages that follow give data about the electrical power system:
- ELEC AC page
- ELEC DC page
- C/B page.

On the ground, the CDS and/or OMT and/or PMAT gives access to the PDMMF page for the followings functions:
- Monitoring all the circuit breakers, Remote Control Circuit Breakers (RCCBs) and Solid State Power Controllers (SSPCs)
- Control of the RCCBs and SSPCs of the main network for maintenance.

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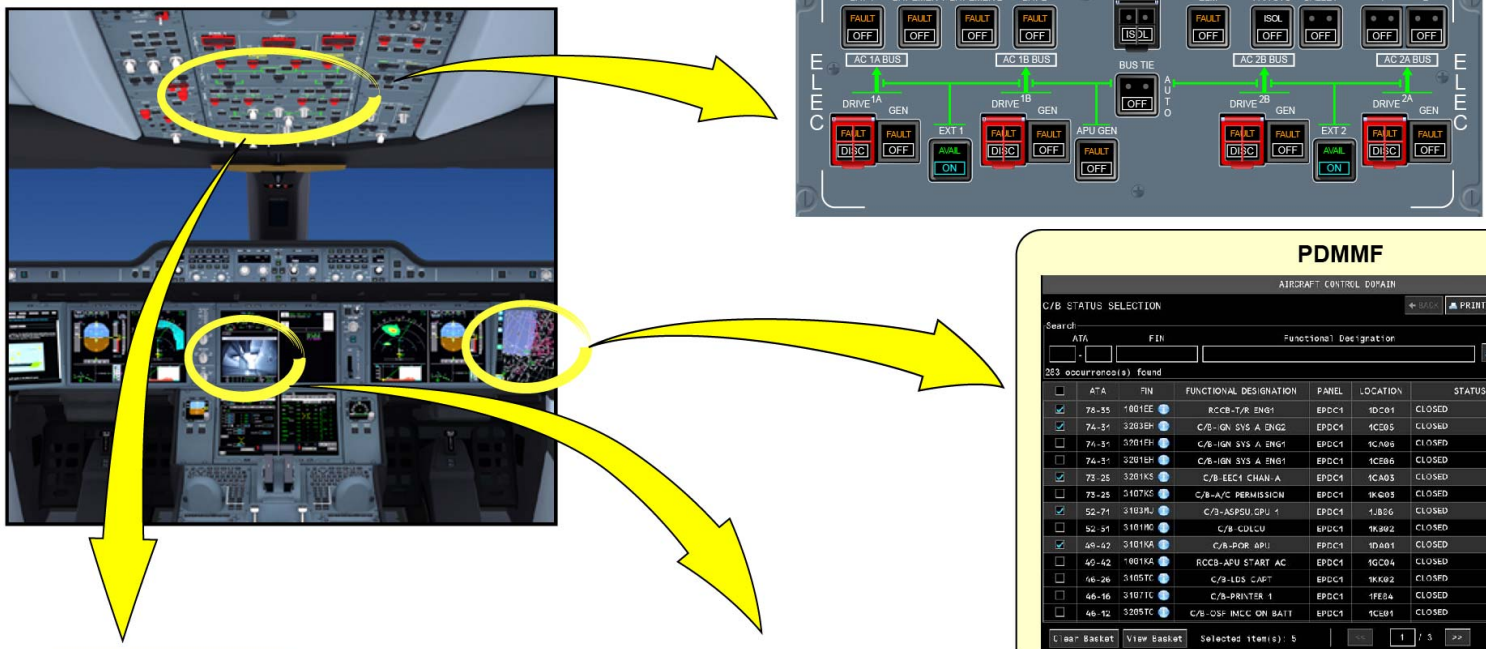

CONTROL AND INDICATING - PRESENTATION

INTEGRATED MODULAR AVIONICS SYSTEM PRESENTATION (1)

Overview

The function of the IMA is to give shared resources for avionics applications and data processing and transmission through a common communication network.
Some Line Replaceable Units (LRUs) are directly connected to the communication network and some LRUs are connected to the network through modules.
The general familiarization training for these systems is about:
- Communication network
- CPIOMs
- CRDCs.

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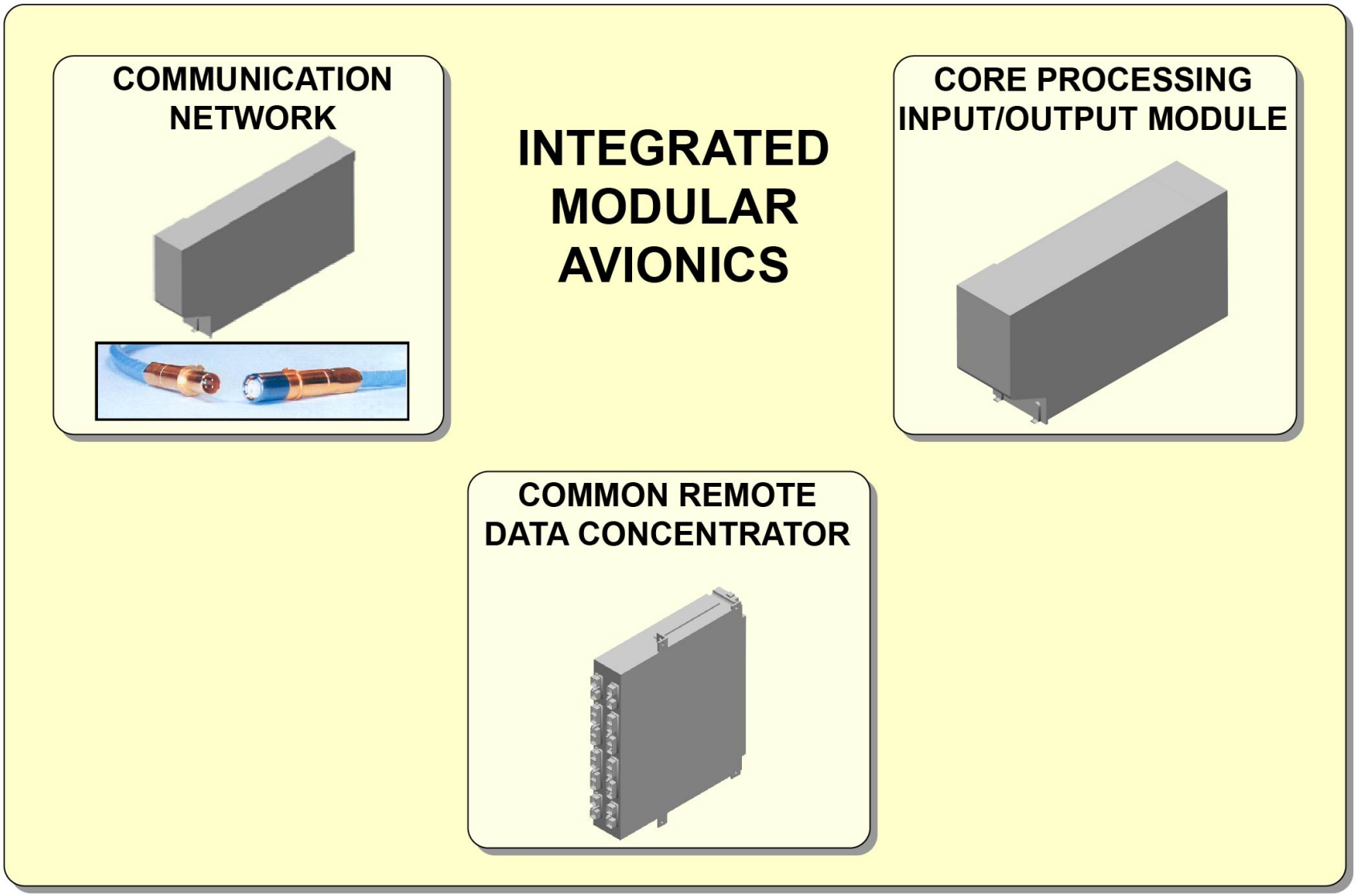

COMMUNICATION NETWORK
INTEGRATED MODULAR AVIONICS
CORE PROCESSING INPUT/OUTPUT MODULE
COMMON REMOTE DATA CONCENTRATOR

OVERVIEW

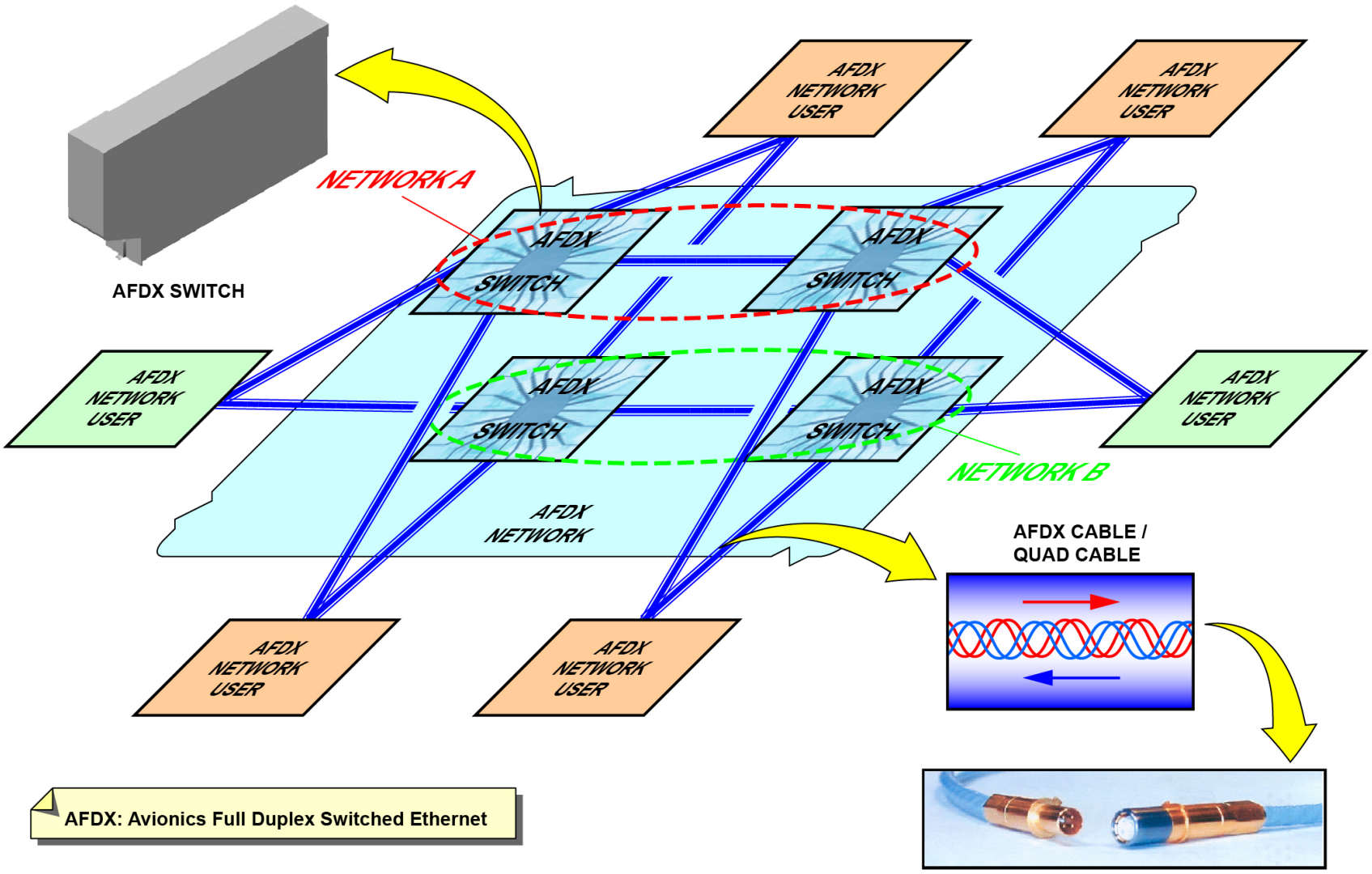
INTEGRATED MODULAR AVIONICS SYSTEM PRESENTATION (1)

Communication Network - Presentation

Function/Description

The communication network, also known as the AFDX network, is used for communication between AFDX network users.
For redundancy, the AFDX network has two networks:
- Network A
- Network B.

The AFDX network uses the AFDX technology.
This technology includes:
- AFDX switches
- AFDX cables (quad cables).



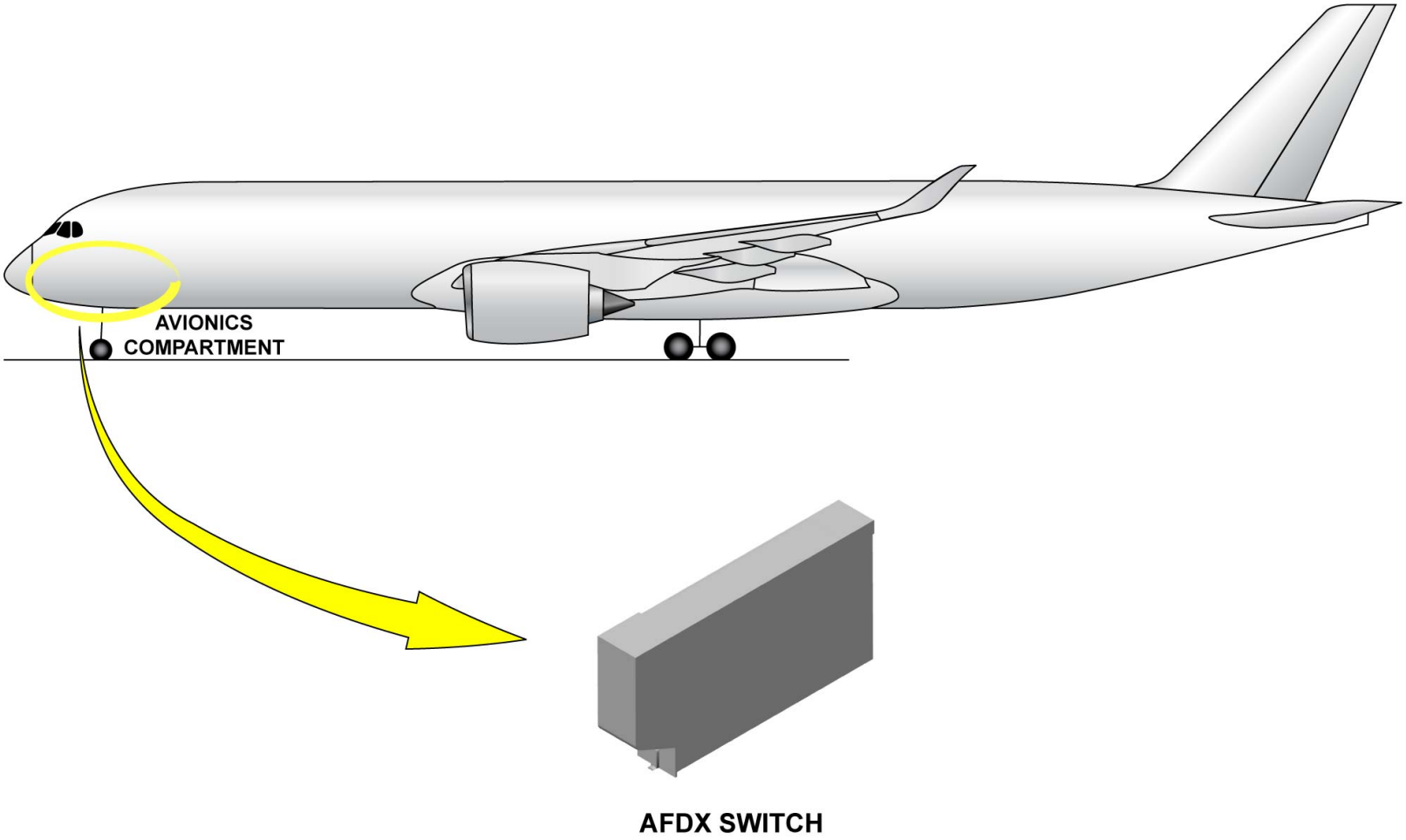
COMMUNICATION NETWORK - PRESENTATION - FUNCTION/DESCRIPTION

INTEGRATED MODULAR AVIONICS SYSTEM PRESENTATION (1)

Communication Network - Presentation (continued)

Location

All the AFDX switches are installed in the avionics compartment.



AFDX: Avionics Full Duplex Switched Ethernet

COMMUNICATION NETWORK - PRESENTATION - LOCATION

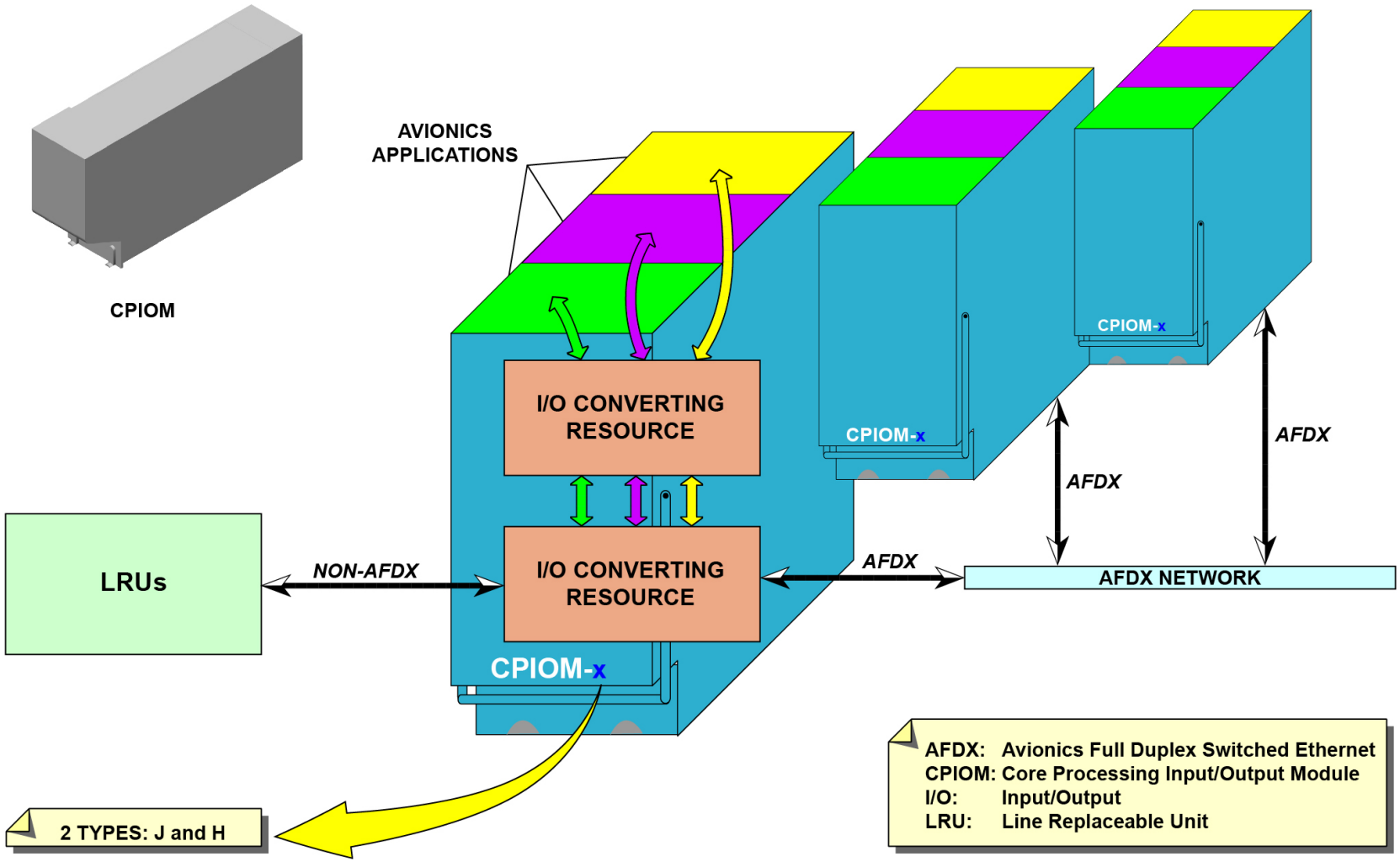
INTEGRATED MODULAR AVIONICS SYSTEM PRESENTATION (1)

CPIOMs - Presentation

Function/Description

The CPIOMs have these functions:
- They host avionics applications and process data to do the avionics functions. Each CPIOM hosts many applications.
- They convert and transmit data between the AFDX network and LRUs that do not have the AFDX technology.

There are two types of CPIOM:
- CPIOM-J
- CPIOM-H.



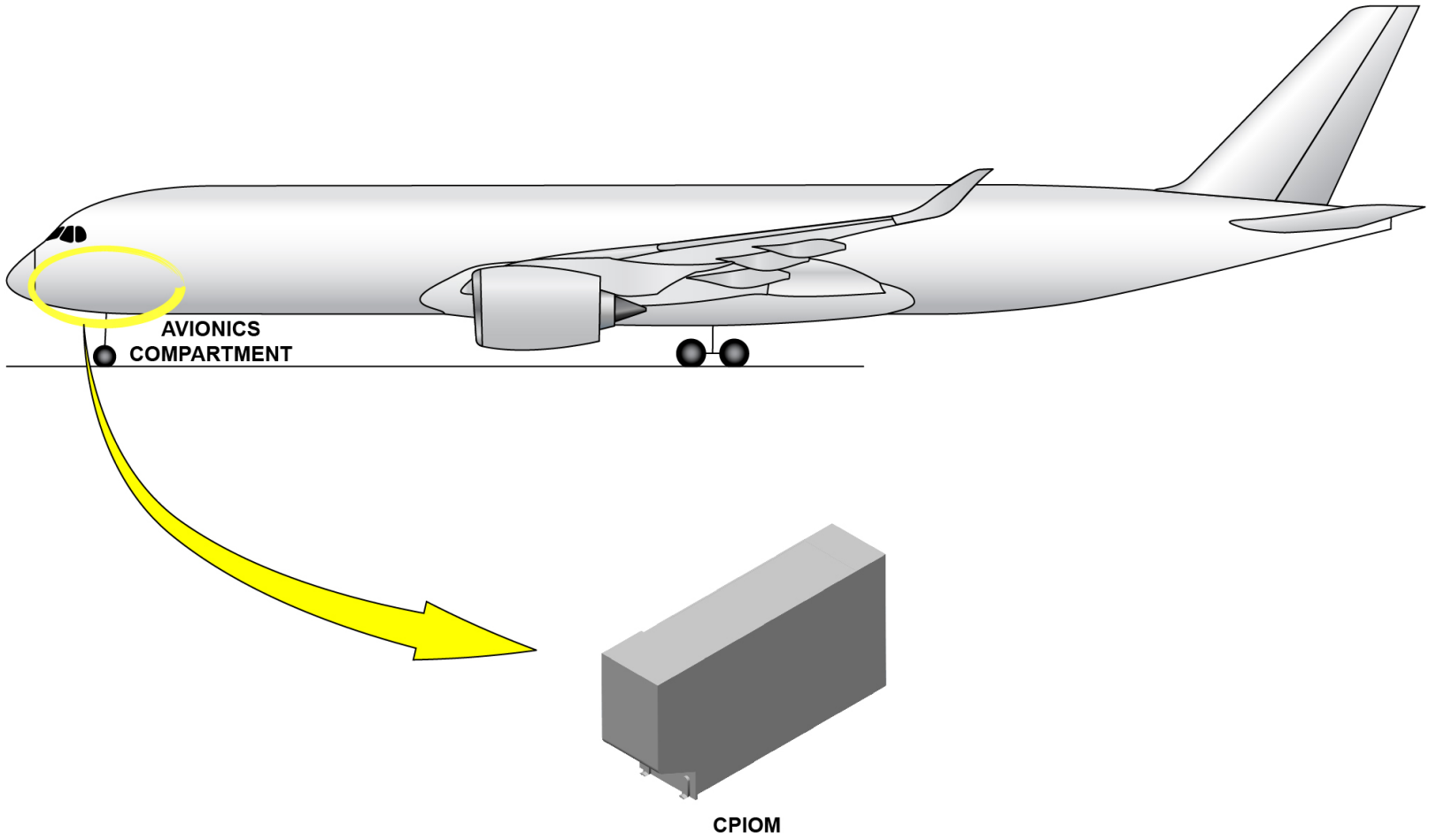
CPIOMS - PRESENTATION - FUNCTION/DESCRIPTION

INTEGRATED MODULAR AVIONICS SYSTEM PRESENTATION (1)

CPIOMs - Presentation (continued)

Location

The CPIOMs are installed in the avionics compartment.



CPIOM: Core Processing Input/Output Module

CPIOMS - PRESENTATION - LOCATION

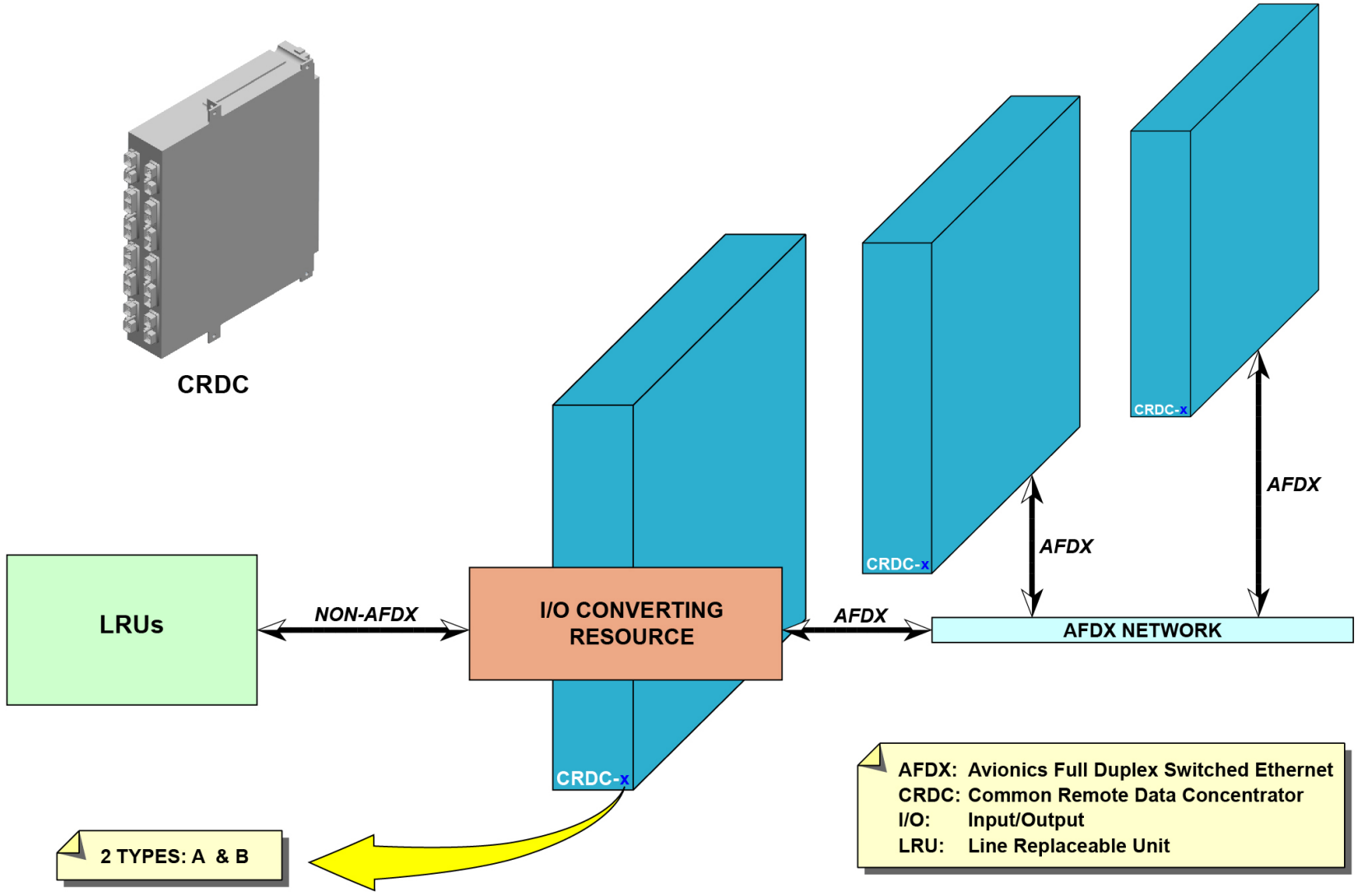
INTEGRATED MODULAR AVIONICS SYSTEM PRESENTATION (1)

CRDCs - Presentation

Function/Description

The CRDCs have these functions:
- They collect, convert and exchange data between the AFDX network and LRUs that do not have the AFDX technology and that are mostly installed out of the avionics compartment.

There are two types of CRDC:
- CRDC-A
- CRDC-B.



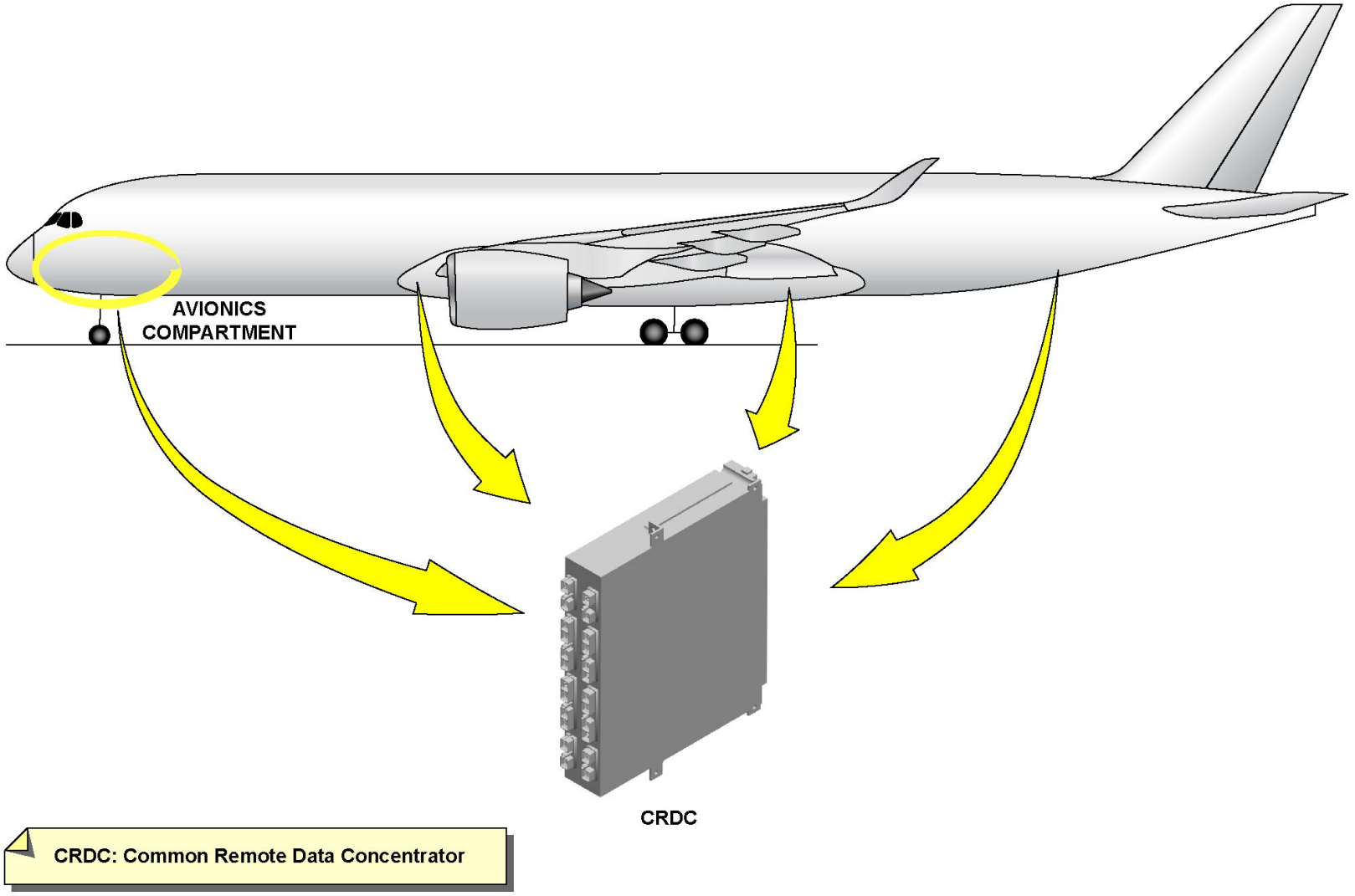
CRDCS - PRESENTATION - FUNCTION/DESCRIPTION

INTEGRATED MODULAR AVIONICS SYSTEM PRESENTATION (1)

CRDCs - Presentation (continued)

Location

The CRDCs are installed in pressurized areas:
- Most of them are installed in the areas below the cabin floor.
- Some of them are installed in the avionics compartment.



CRDCS - PRESENTATION - LOCATION

INTEGRATED MODULAR AVIONICS SYSTEM PRESENTATION (1)

Interface - Presentation

The LRUs with the AFDX capability are directly connected to the AFDX network.
The LRUs without the AFDX capability are connected to the AFDX network through CPIOMs or CRDCs (e.g. computers, sensors etc.).

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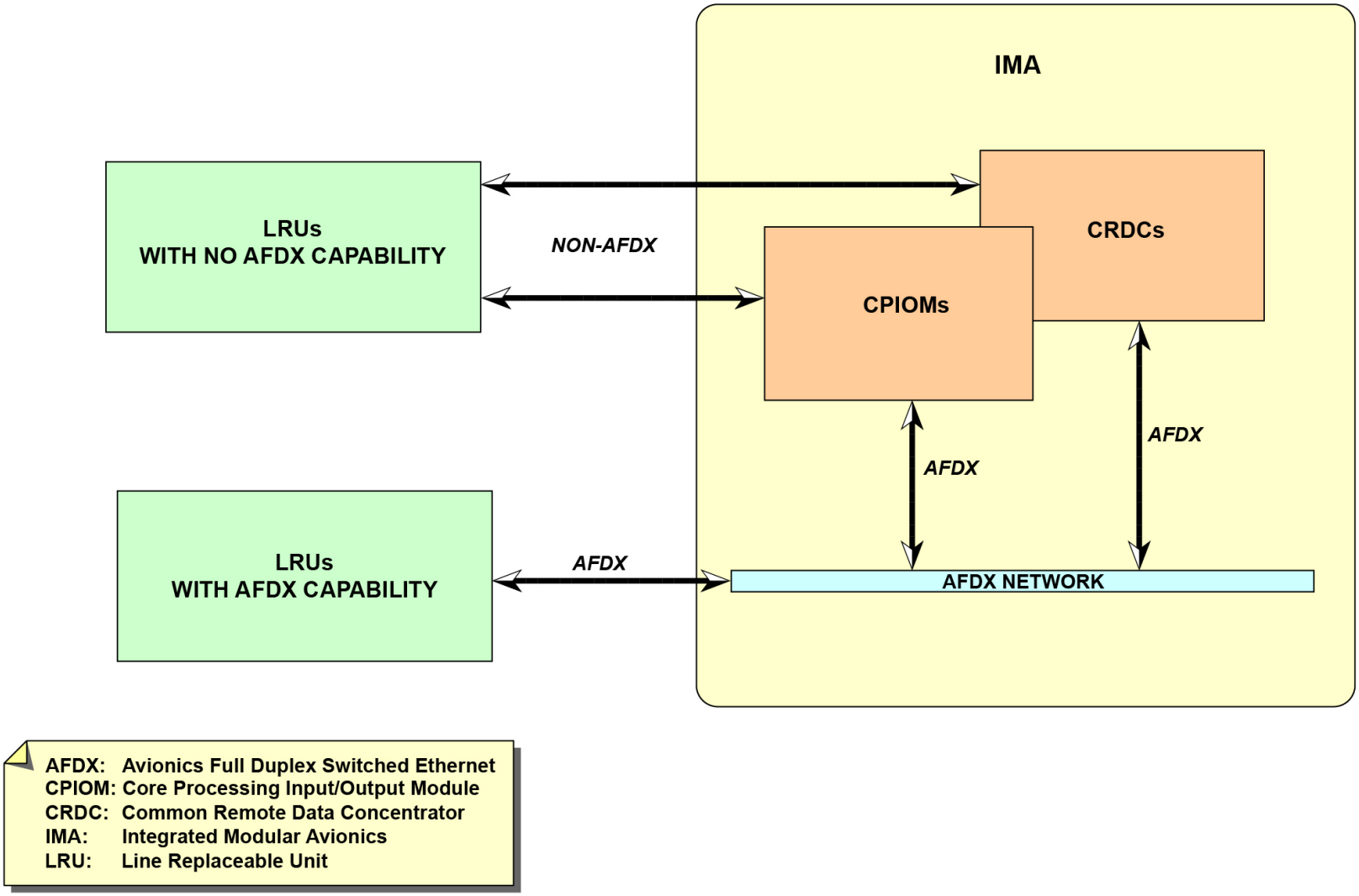

INTERFACE - PRESENTATION

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INTEGRATED MODULAR AVIONICS SYSTEM PRESENTATION (1)

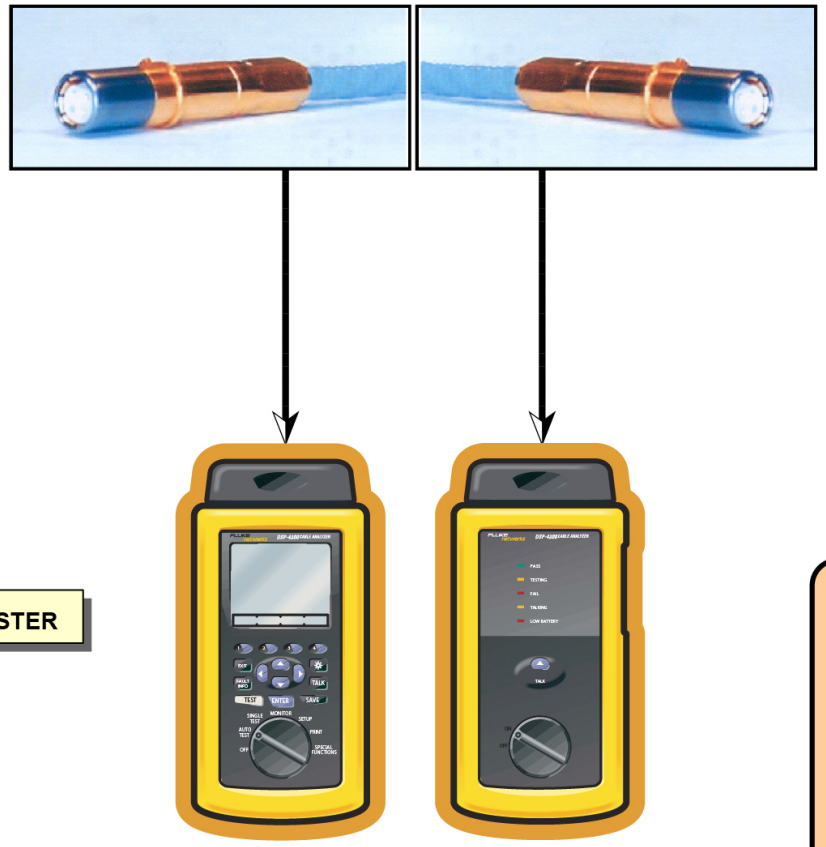
Maintenance

Tools

You must use a specific tester to do a check of the quad cables.

Maintenance Practices

Refer to the AirN@v / Line Electrical Standard Practices to do a check and repair the quad cables.



USE AN APPROVED TESTER

AFDX: Avionics Full Duplex Switched Ethernet

REFER TO
AirN@v LINE ELECTRICAL
STANDARD PRACTICES
FOR AFDX CABLE
CHECK AND REPAIR

MAINTENANCE - TOOLS & MAINTENANCE PRACTICES

INDICATING/RECORDING SYSTEMS PRESENTATION (1)

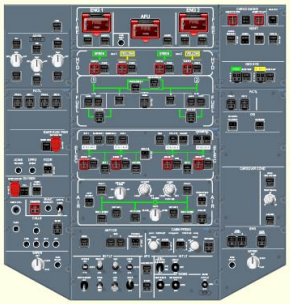
Overview

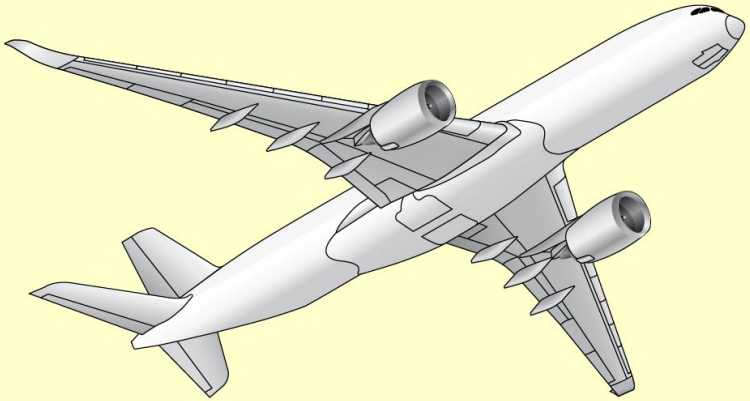
The functions of the indicating/recording systems are:
- To supply indicating and control interfaces with aircraft systems to show flight parameters
- To monitor and control most of the aircraft systems
- To record flight parameters for a full investigation.

The general familiarization training for these systems is about:
- ICPs
- Tailstrike indication
- Recorders
- FWS
- Display systems.

INDICATING/RECORDING SYSTEMS

INTEGRATED CONTROL PANELS

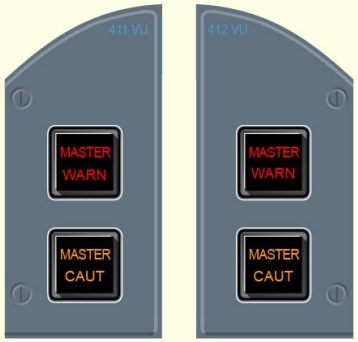




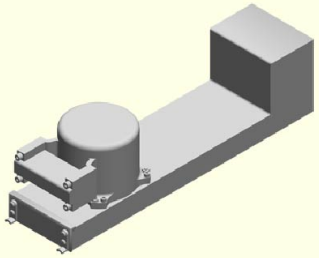
TAILSTRIKE INDICATION SYSTEM

DISPLAY SYSTEMS

FLIGHT WARNING SYSTEM



RECORDERS



OVERVIEW

INDICATING/RECORDING SYSTEMS PRESENTATION (1)

ICPs - Presentation

Function/Description

The functions of the ICPs are:
- To show local warnings and system status and
- To control some aircraft systems.

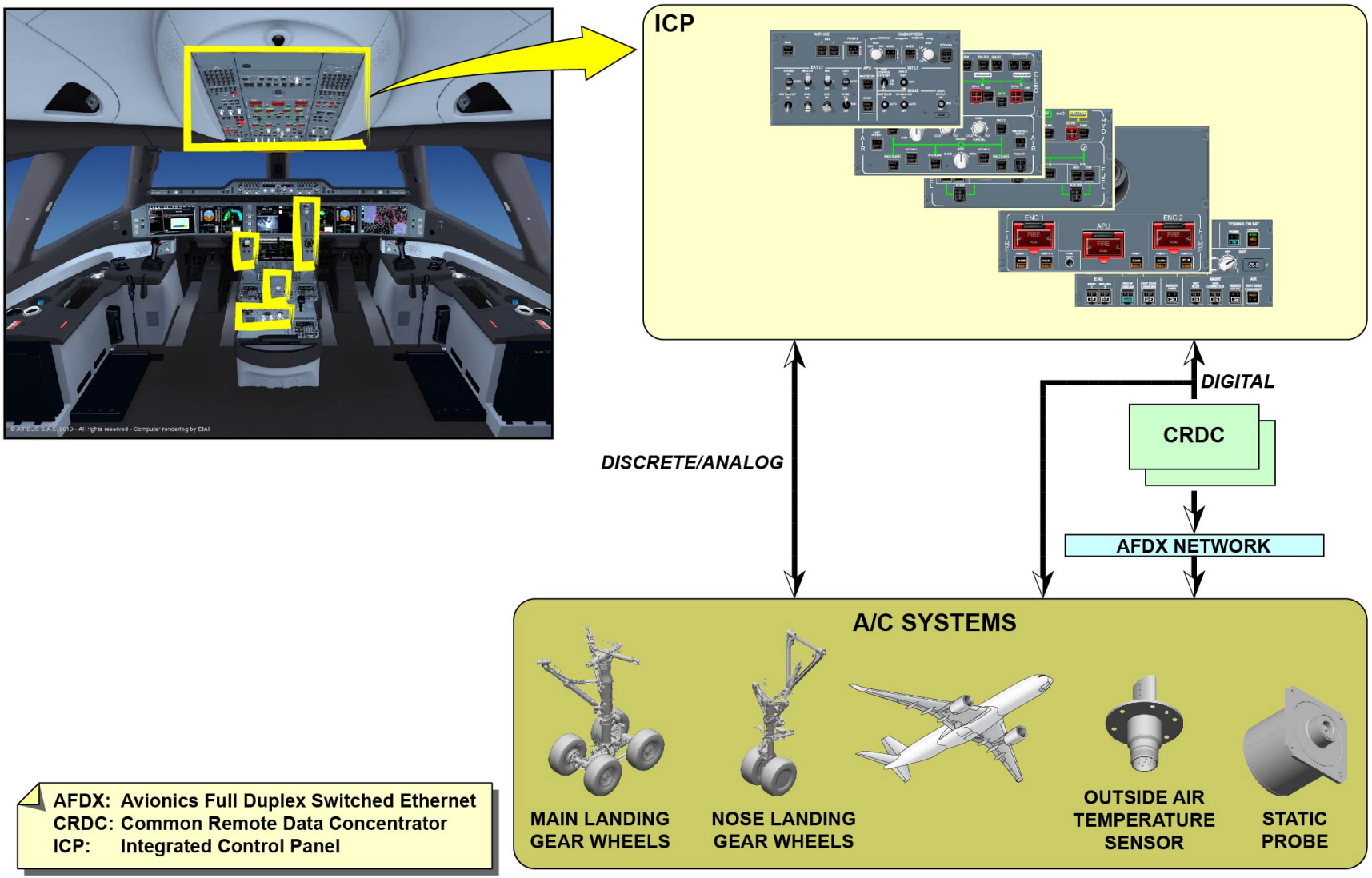
The ICPs use discrete/analog signals and digital communication buses to exchange data with aircraft systems.

Location

All the ICPs are installed in the cockpit. Most of them are on the overhead panel.

Interface

The ICPs have interfaces with the aircraft systems through:
- Discrete/analog buses
- Digital connections, directly or through the Common Remote Data Concentrators (CRDCs) and Avionics Full Duplex Switched Ethernet (AFDX) network.



ICPS - PRESENTATION - FUNCTION/DESCRIPTION ... INTERFACE

INDICATING/RECORDING SYSTEMS PRESENTATION (1)

Tailstrike Indication System - Presentation

Function/Description

The function of the tailstrike indication system is to detect tailstrike indication events and to send data to the FWS for warning generation. When a tailstrike indication event is detected, the LAND ANSA (Landing At Nearest Suitable Airport) warning is shown and a maintenance operation will be necessary on the ground.
The tailstrike indication sensor is the only component of the system. It is an electrical circuit with wires that break easily if there is a contact with the ground. The sensor then transmits the tailstrike detection data to the FWS (hosted in Core Processing Input/Output Modules (CPIOMs)) through the AFDX network.

Location

The tailstrike indication sensor is installed at the bottom of the rear fuselage.

Control and Indicating

When the FWS receives the tailstrike detection data, it generates a tailstrike warning and sends it to the Control and Display System (CDS) through the AFDX network.

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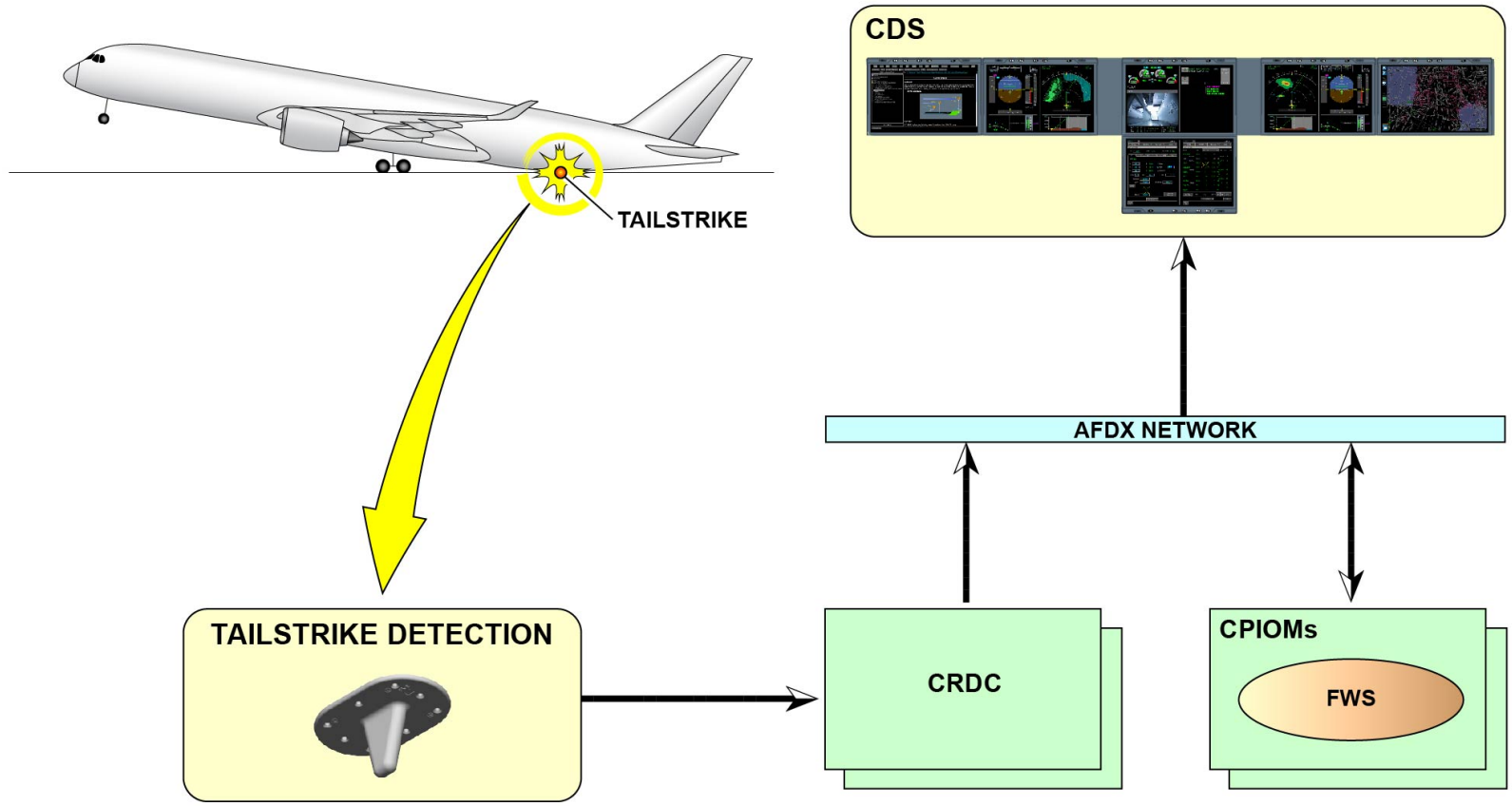


TAILSTRIKE INDICATION SYSTEM - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

INDICATING/RECORDING SYSTEMS PRESENTATION (1)

Recorders - Presentation

Function/Description

The function of the recorders is to record and store mandatory flight parameters related to the last 25 hours of aircraft operation.
The recorders include:
- A Centralized Data Acquisition Unit (CDAU)
- A flight-data interface-function application, and
- A crash-resistant Solid State Flight Data Recorder (SSFDR).

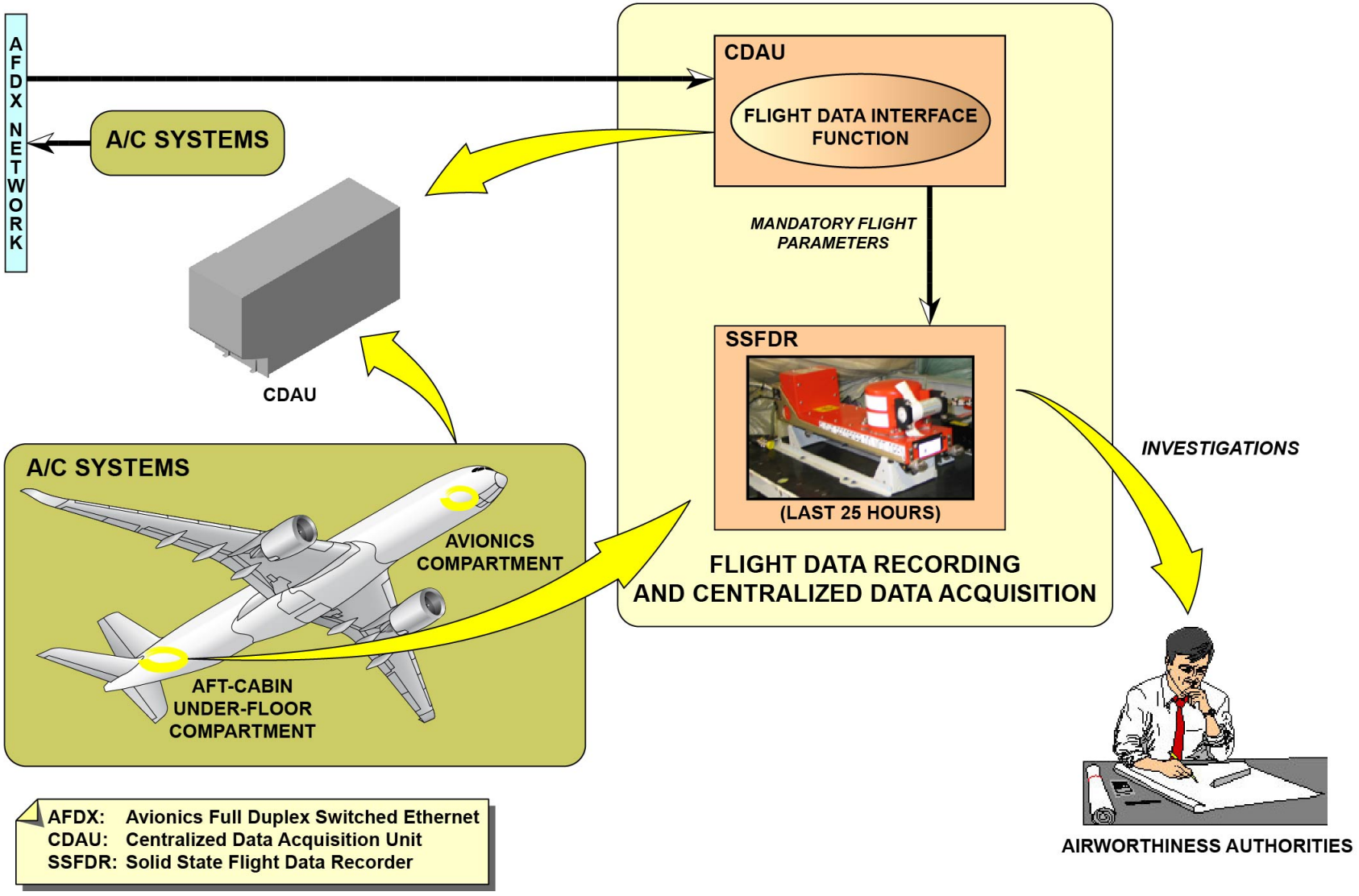
The CDAU hosts the flight-data interface-function application that receives the data from the aircraft systems. The flight-data interface-function application changes the format of the flight parameters into a recordable format and sends them to the SSFDR for recording.

Location

The SSFDR is installed in the aft-cabin underfloor compartment of the aircraft.
The CDAU is installed in the avionics compartment.

Interface

The CDAU has interfaces with the aircraft systems through the AFDX network and through other types of connections which are used as backup connections.
The SSFDR is connected to the CDAU.



RECORDERS - PRESENTATION - FUNCTION/DESCRIPTION ... INTERFACE

INDICATING/RECORDING SYSTEMS PRESENTATION (1)

Recorders - Presentation (continued)

Control and Indicating

The SSFDR controls (two pushbutton switches) are on the overhead panel.
The RCDR/GND CTL pushbutton switch is used to supply electrical power to the SSFDR on the ground for test and maintenance operations.
The DFDR/EVENT pushbutton switch lets the flight crew put a mark on a specified event in the SSFDR.

RECORDERS - PRESENTATION - CONTROL AND INDICATING

INDICATING/RECORDING SYSTEMS PRESENTATION (1)

Flight Warning System (FWS) - Presentation

Function/Description

The FWS is a central system that gives operational aid to the flight crew in normal and abnormal aircraft system operations.
When there is an aircraft system fault or a dangerous aircraft configuration, the function of the FWS is to generate aural and visual warnings through cockpit peripherals.
The FWS has two identical FWS applications hosted in the two CPIOMs. It receives data from most aircraft systems.

Interface

The FWS has interfaces with:
- The ECAM control panel
- The visual attention getters (lights of the MASTER WARN and MASTER CAUT pushbutton switches)
- The CDS
- The aircraft systems through the AFDX network and other types of connections for system monitoring. Most of these connections are backup connections.
- The audio management system for the aural warnings.

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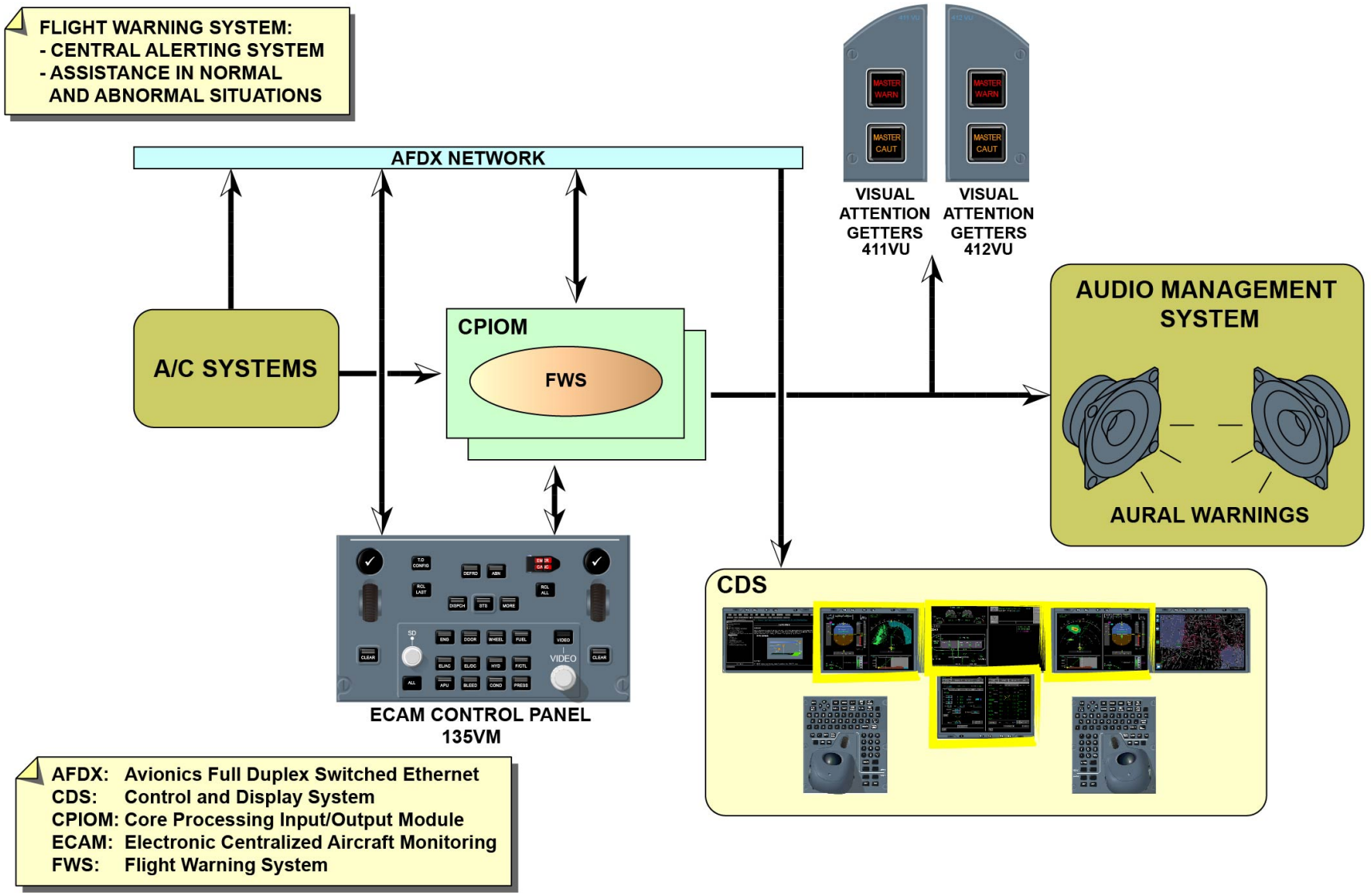


FLIGHT WARNING SYSTEM (FWS) - PRESENTATION - FUNCTION/DESCRIPTION & INTERFACE

INDICATING/RECORDING SYSTEMS PRESENTATION (1)

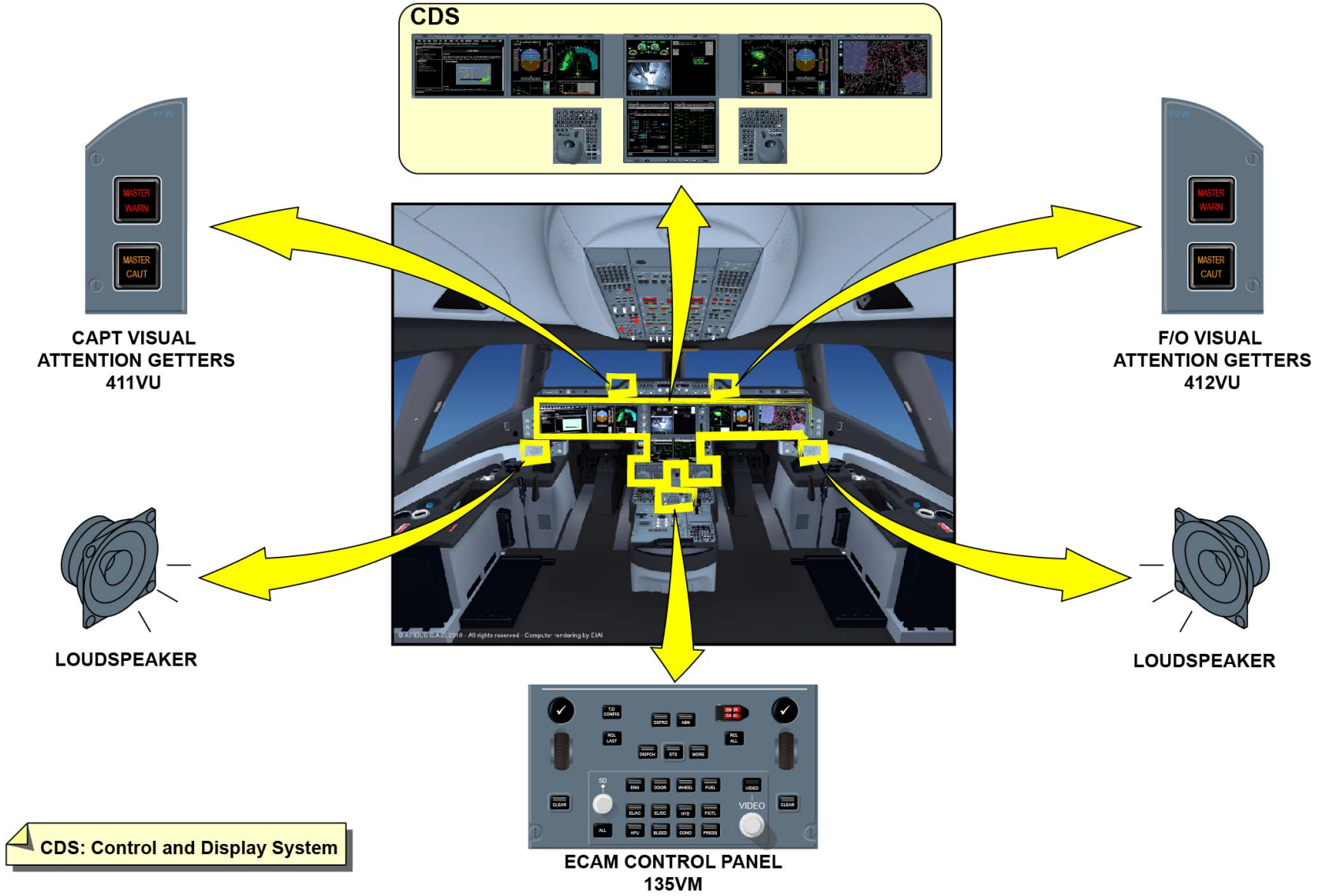
Flight Warning System (FWS) - Presentation (continued)

Control and Indicating

The ECAM control panel is used to:
- Manage ECAM warning procedures
- Manage the display of system pages on the System Display (SD)
- Call and manage the abnormal procedures.

The KCCU is used to:
- Call and manage the normal checklists.

The FWS sends:
- Aural warnings to the cockpit loudspeakers
- Visual warnings through the visual attention getters
- Warning messages for display on the CDS Display Units (DUs).



FLIGHT WARNING SYSTEM (FWS) - PRESENTATION - CONTROL AND INDICATING

INDICATING/RECORDING SYSTEMS PRESENTATION (1)

Display Systems - Presentation

Function/Description

The display systems include:
- The CDS
- The Concentrator and Multiplexer for Video (CMV)
- The Head-Up Display (HUD) (optional).

CDS

The CDS receives aircraft system data through the AFDX network. These data are shown on six interchangeable DUs.

The six DUs have a large Liquid Crystal Display (LCD) divided into two windows, except for the Onboard Information System (OIS). These DUs can show video images.

CMV

The function of the CMV lets the flight crew see the video images on the DUs.

The two CMVs receive video signals from different sources in different formats. Then, it changes the video signals to adapt them to the CDS format.

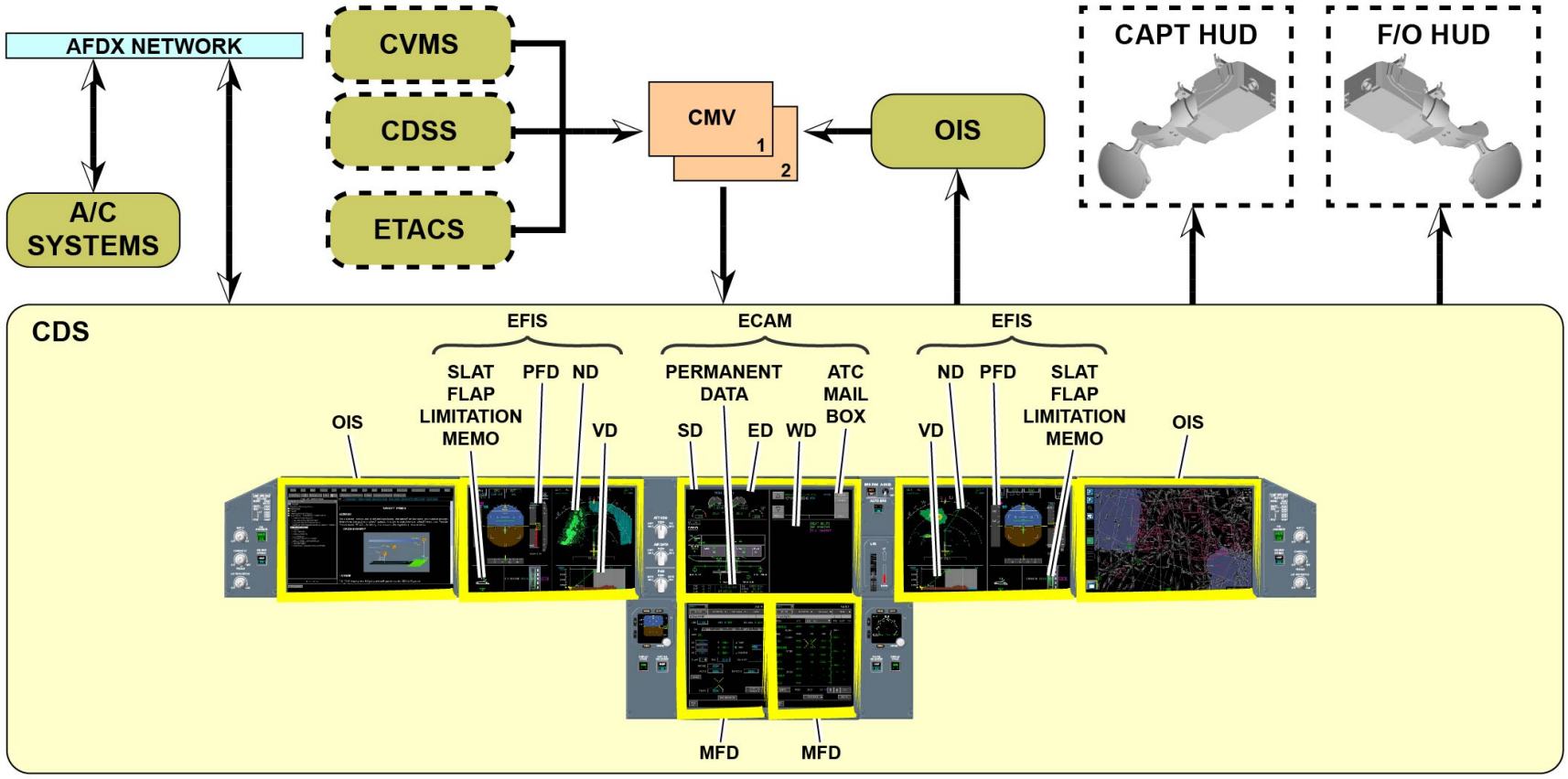
HUD (optional)

The HUD function gives the flight crew navigation, guidance and flight data. It helps to improve the manual flight-path control and situational awareness especially in low visibility conditions.

Interface

The CDS has interfaces with:
- The AFDX network for aircraft data reception
- The CMVs for video signal acquisition
- The Electronic Flight Instrument System (EFIS) control panels for display mode selection.

The CMVs receive video data from:
- The Cabin Video Monitoring System (CVMS) (optional)
- The Cockpit Door Surveillance System (CDSS) (optional)
- The External and Taxiing Aid Camera System (ETACS) (optional)
- The OIS.



AFDX:	Avionics Full Duplex Switched Ethernet	HUD:	Head-Up Display
ATC:	Air Traffic Control	MFD:	MultiFunction Display
CDS:	Control and Display System	ND:	Navigation Display
CDSS:	Cockpit Door Surveillance System	OIS:	Onboard Information System
CMV:	Concentrator and Multiplexer for Video	PFD:	Primary Flight Display
CVMS:	Cabin Video Monitoring System	SD:	System Display
ED:	Engine Display	VD:	Vertical Display
EFIS:	Electronic Flight Instrument System	WD:	Warning Display
ETACS:	External and Taxiing Aid Camera System		

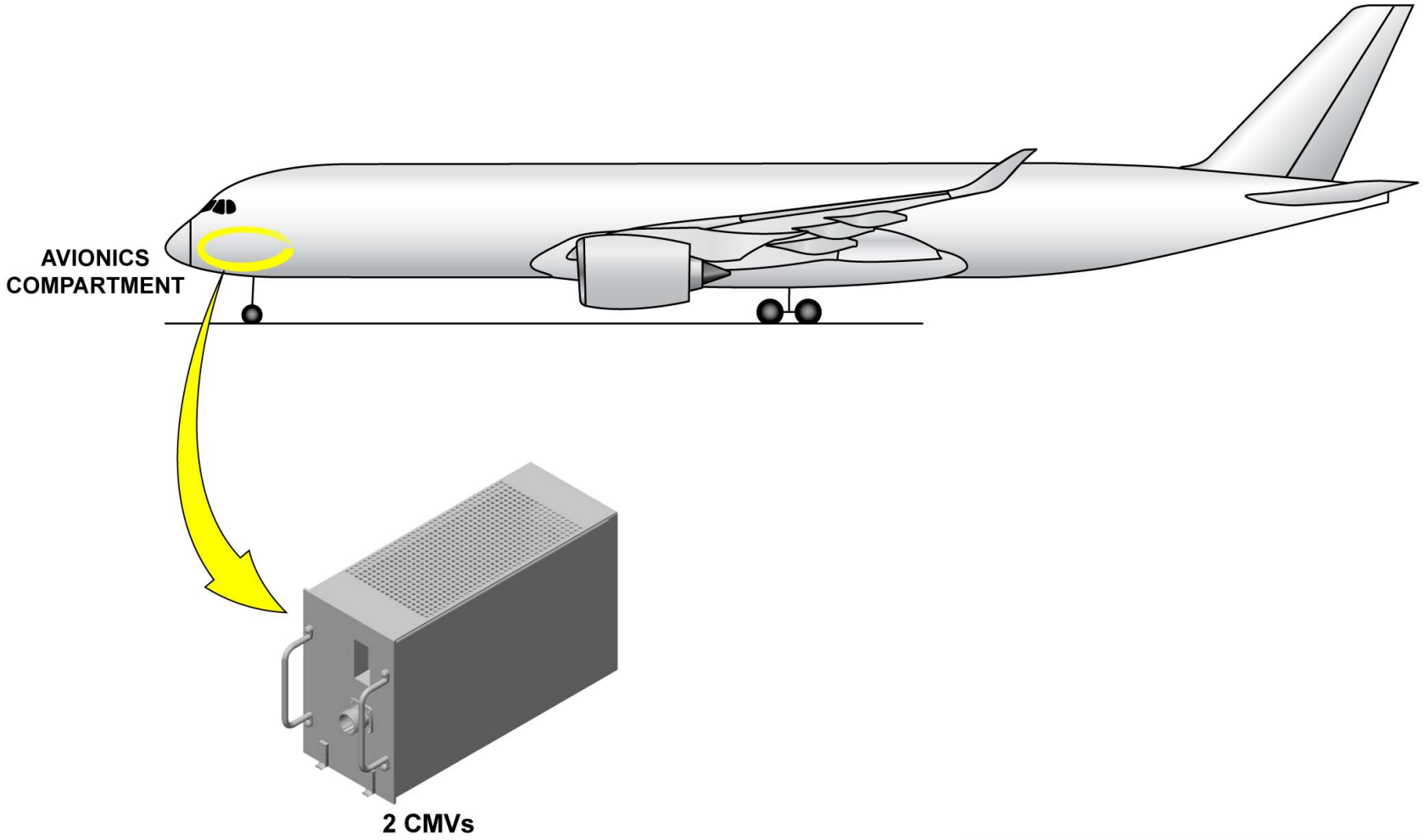
DISPLAY SYSTEMS - PRESENTATION - FUNCTION/DESCRIPTION & INTERFACE

INDICATING/RECORDING SYSTEMS PRESENTATION (1)

Display Systems - Presentation (continued)

Location

There are two CMVs installed in the avionics compartment.



DISPLAY SYSTEMS - PRESENTATION - LOCATION

INDICATING/RECORDING SYSTEMS PRESENTATION (1)

Display Systems - Presentation (continued)

Control and Indicating

CDS

The controls in the cockpit are:

- The CAPT and F/O EFIS control panels to select the display mode
- The CHRONO pushbutton switches, which are on the CAPT and F/O glareshield panels, to give a chronometer indication on the ND
- The DU MASTER BRT knob on panel 115VM to do a CDS reconfiguration
- The display configuration pushbutton-switches to do a CDS reconfiguration:
- CAPT (F/O) OIS ON CENTER pushbutton switch, on panel 301VM (302VM)
- DISPLAY CYCLE pushbutton switch, on panel 301VM (302VM)
- OIS/VIEW OFFSIDE pushbutton switch, on panel 313VU (314VU).
- The two KCCUs, which are on the center pedestal, to control the DUs
- The ECAM control panel:
- To manage and show the warnings, cautions, normal checklists and abnormal procedures on the warning display window.
- To select the aircraft system synoptics and status pages on the system display window.
- The pushbutton switches on each DU to start/stop and adjust the brightness and contrast of the DU.

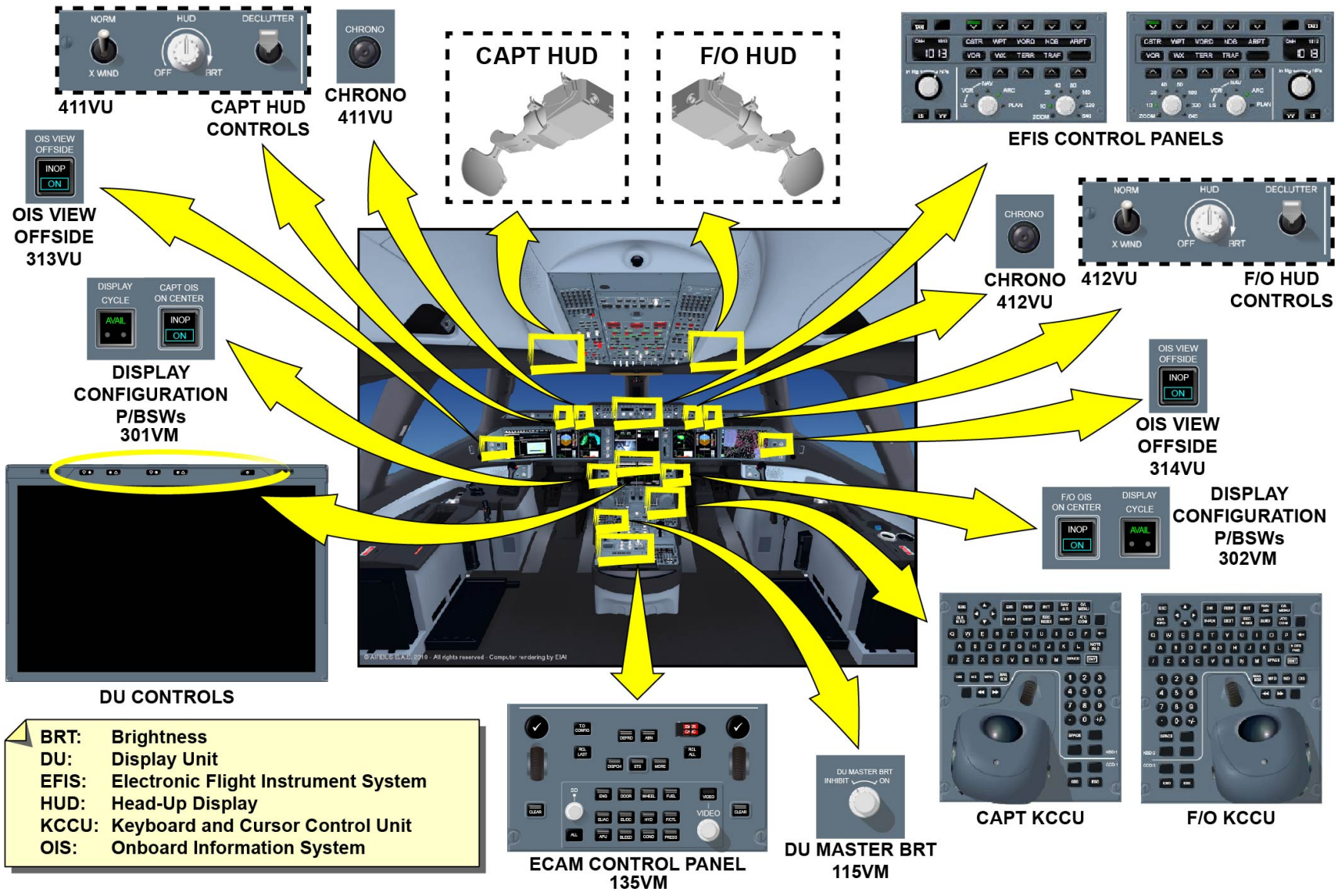
CMV

All the video images that the CMV receives from video source systems (CDSS, CVMS or external video system) are shown on the DUs through a selection from the EFIS control panels and from the ECAM control panel.

HUD (optional)

The HUD data are shown on a transparent image superimposed on the real outside view.

The HUD controls are installed on glareshield panels 411VU and 412VU.

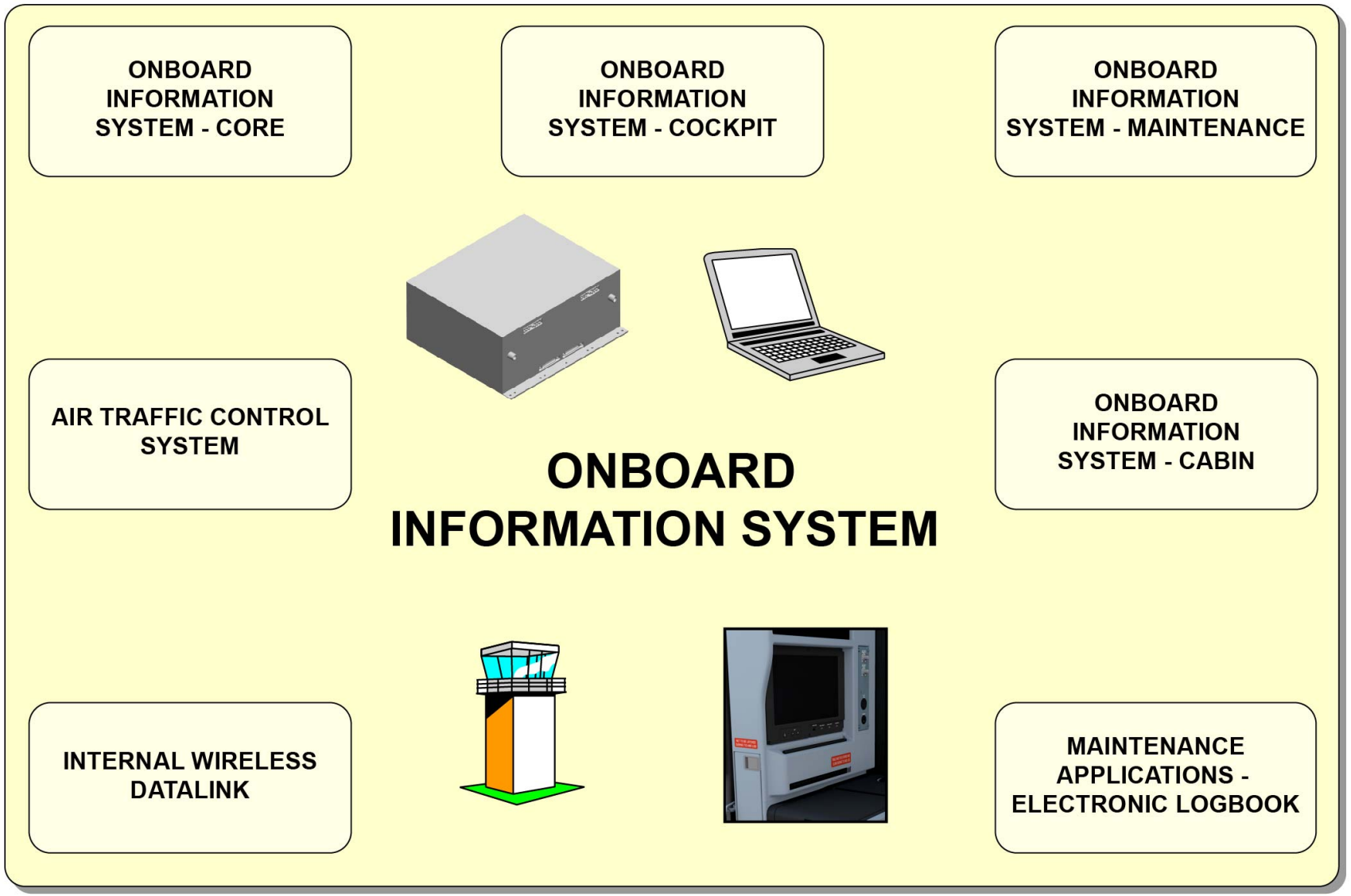


DISPLAY SYSTEMS - PRESENTATION - CONTROL AND INDICATING

INFORMATION SYSTEMS PRESENTATION (1)

Overview

The function of the OIS is to give network infrastructure and to host flight operations, maintenance and cabin applications.
General familiarization training for this system is about:
- OIS - Core
- OIS - Cockpit
- OIS - Maintenance
- OIS - Cabin
- Maintenance Applications - Electronic Logbook
- Internal Wireless Datalink
- Air Traffic Control (ATC) System.


ONBOARD INFORMATION SYSTEM - CORE
ONBOARD INFORMATION SYSTEM - COCKPIT
ONBOARD INFORMATION SYSTEM - MAINTENANCE
AIR TRAFFIC CONTROL SYSTEM
ONBOARD INFORMATION SYSTEM
ONBOARD INFORMATION SYSTEM - CABIN
INTERNAL WIRELESS DATALINK
MAINTENANCE APPLICATIONS - ELECTRONIC LOGBOOK

OVERVIEW

INFORMATION SYSTEMS PRESENTATION (1)

Onboard Information System (OIS) - Core - Presentation

Function/Description

The core OIS is divided into two domains:
- The Aircraft Control Domain (ACD)
- The Airline Information Services Domain (AISD).

Each domain has two parts.
The ACD parts are:
- The flight domain (not included in the OIS) related to the aircraft systems
- The Avionics Server Function Cabinet (ASFC). The function of the ASFC is to host flight operations, ACD maintenance and communication applications.

The two ACD parts are connected to each other through two Secure Communication Interfaces (SCIs), to prevent unauthorized access and data entry into aircraft systems.
The AISD parts are:
- The Open world Server Function Cabinet (OSFC). The function of the OSFC is to host flight operations, cabin, OSFC maintenance and communication applications. Data between the ASFC and the OSFC is transmitted through the Smart Diode Module (SDM) which is used to transmit the applicable data.
- Electronic Flight Bag (EFB) which contains the EFB maintenance applications and EFB laptops.

Interface

The core OIS has interfaces with:
- The airline facilities.
- The cabin Human-Machine Interfaces (HMIs) which contain Flight Attendant Panels (FAPs), airline cabin laptops and cabin printer (optional). These HMIs are used for display of some avionics data and for passenger air/ground communication.

Onboard Information System (OIS) - Cockpit - Presentation

Function/Description

The cockpit OIS gives access to flight operation applications for the flight crew. These flight operation applications are hosted in the two cabinets (ASFC and OSFC).

Control and Indicating

The flight crew gets access to the flight operation applications through:
- The Control and Display System (CDS)
- The EFB laptops.

Onboard Information System (OIS) - Maintenance - Presentation

Function/Description

The maintenance OIS gives access to maintenance applications for the maintenance personnel. These maintenance applications are hosted in the two cabinets (ASFC and OSFC).

Control and Indicating

In the cockpit, the maintenance personnel can get access to the maintenance applications:
- On the Onboard Maintenance Terminal (OMT)
- Through the CDS, if necessary.

In the cabin, the maintenance personnel can get access to the maintenance applications:
- On the FAPs, which are touchscreens
- Through the airline cabin laptops.

Access in the cabin and out of the cockpit is also possible through a Portable Multipurpose Access Terminal (PMAT), which can be connected to the aircraft network through one of the Ethernet connectors installed in different areas in and out of the aircraft.

Onboard Information system (OIS) - Cabin - Presentation

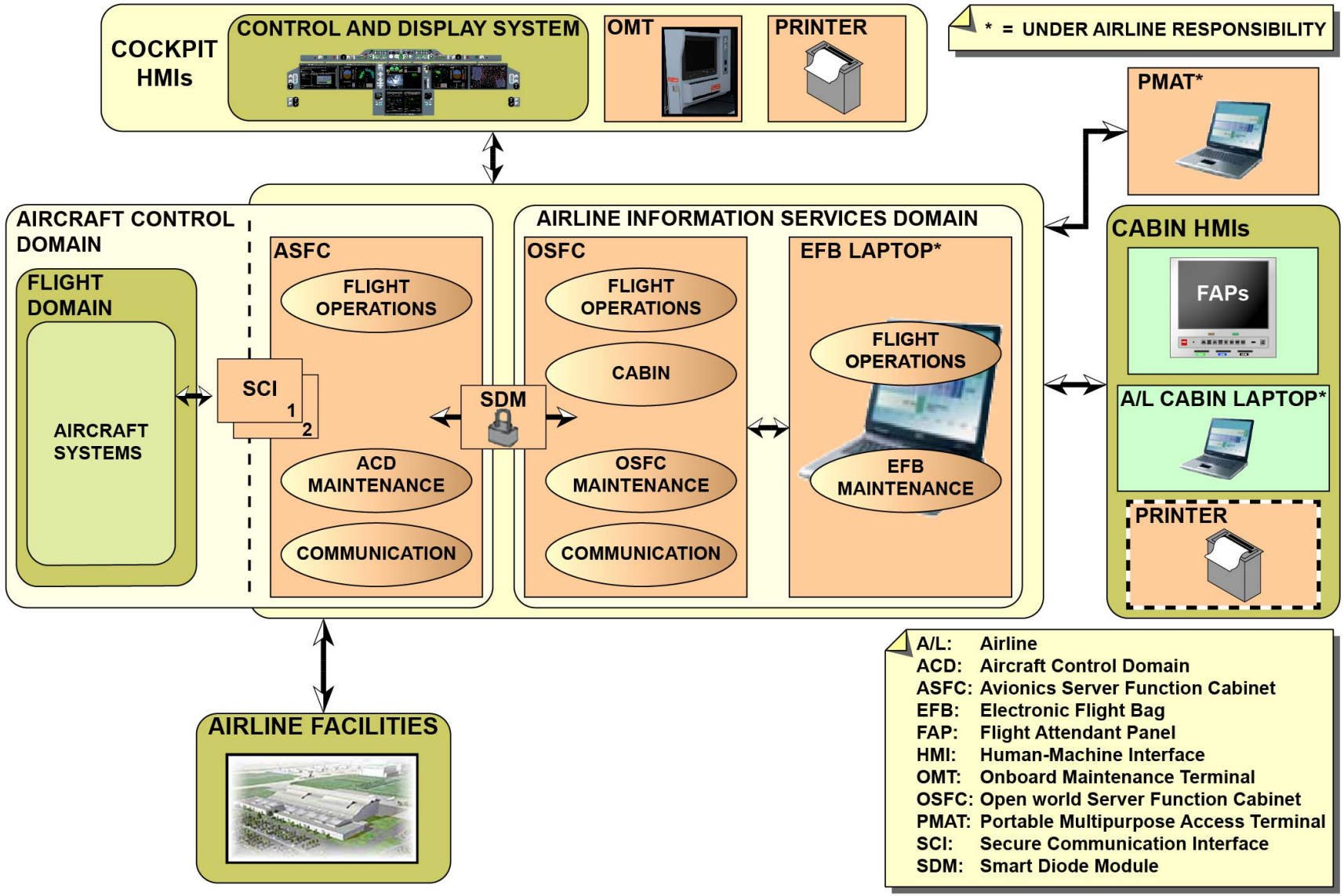
Function/Description

The cabin OIS gives access to cabin applications for the cabin crew.
These cabin applications are hosted in the OSFC.

Control and Indicating

The cabin crew can get access to the cabin applications:
- On the FAPs, which are touchscreens
- Through the internal wireless cabin network through the cabin laptops.

A printer can be installed in the cabin to print cabin and maintenance data (optional).



ONBOARD INFORMATION SYSTEM (OIS) - CORE - PRESENTATION ... ONBOARD INFORMATION SYSTEM (OIS) - CABIN - PRESENTATION

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INFORMATION SYSTEMS PRESENTATION (1)

Maintenance Applications - Electronic Logbook - Presentation

Function/Description

The electronic-logbook maintenance application has the same function as the paper logbook.
It is used for:
- Defect reporting
- Maintenance action reporting
- Aircraft release after maintenance.

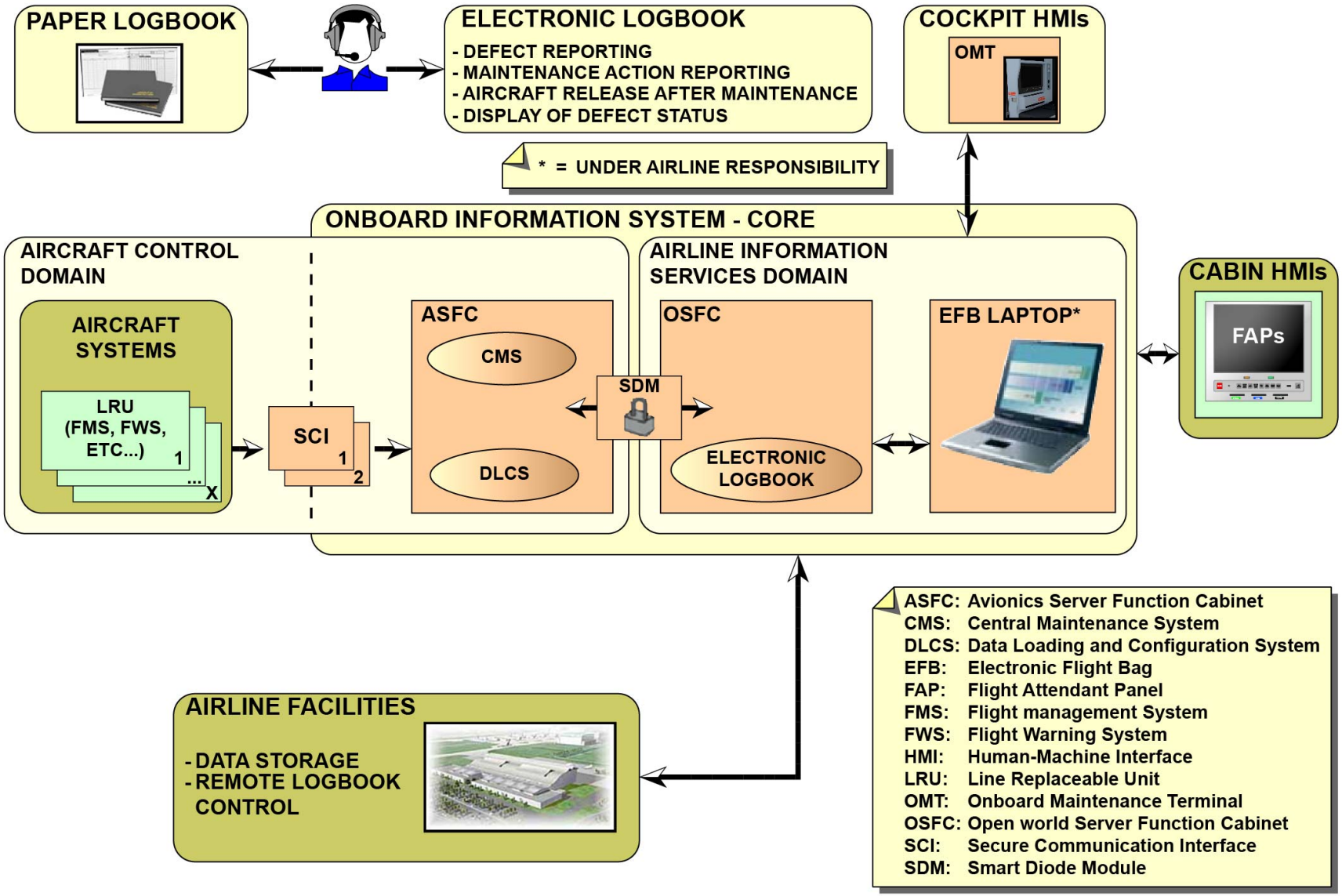
The electronic-logbook maintenance application is hosted in the OSFC and is used to record:
- Pilot, mechanics and cabin crew entries
- Aircraft status and identification data which come from aircraft systems, the ASFC and passenger services Line Replaceable Units (LRUs).

Interface

The electronic-logbook maintenance application has an interface with the aircraft communication systems to send/receive data to/from the airline facilities.

Control and Indicating

The maintenance personnel can get access to the electronic-logbook maintenance application through the HMIs:
- OMT
- FAPs
- EFB laptops.



MAINTENANCE APPLICATIONS - ELECTRONIC LOGBOOK - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

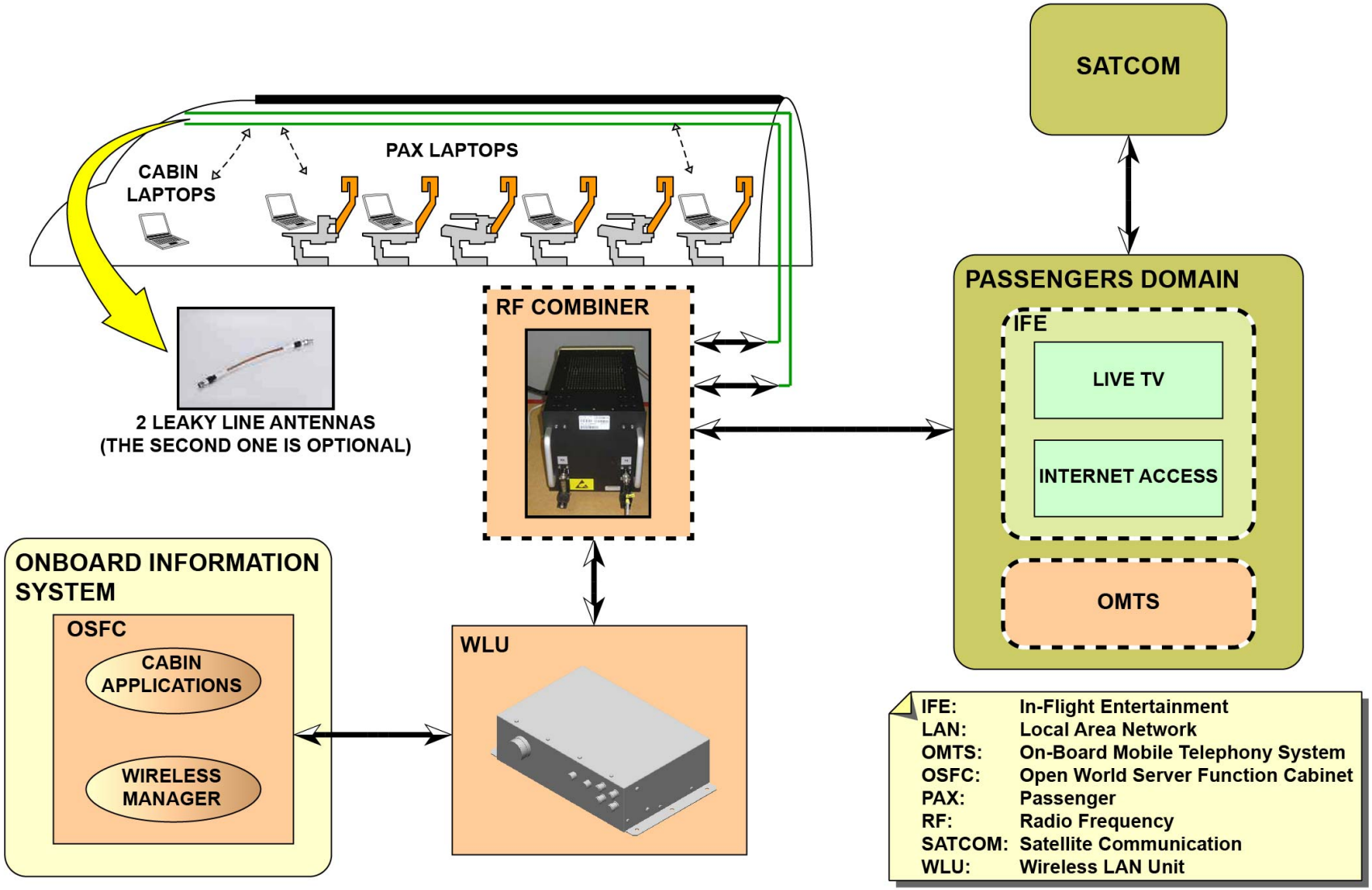
INFORMATION SYSTEMS PRESENTATION (1)

Internal Wireless Datalink - Presentation

Function/Description

The internal wireless datalink system gives the resources necessary for wireless connections in the cabin to get access to:
- Cabin applications in OSFC, for cabin crew
- In-Flight Entertainment (IFE) and On-Board Mobile Telephony System (OMTS), for passengers (optional).

The internal wireless datalink system is part of the AISD in the core OIS and has:
- Two leaky line antennas (the second one is optional)
- One Wireless LAN Unit (WLU)
- A Radio Frequency (RF) combiner (optional)
- A wireless manager application.



INTERNAL WIRELESS DATALINK - PRESENTATION - FUNCTION/DESCRIPTION

INFORMATION SYSTEMS PRESENTATION (1)

Air Traffic Control (ATC) System - Presentation

Function/Description

The ATC system is a datalink application.
The functions of this application are as follows:
- It lets the pilot and the air traffic controller communicate through the Controller-Pilot DataLink Communication (CPDLC) application.
- It lets the pilot request and receive Flight Information Services (FIS) from ground FIS systems.
- It sends automatic reports of the aircraft position to give aircraft surveillance data to the ATC ground station (no pilot action is necessary).

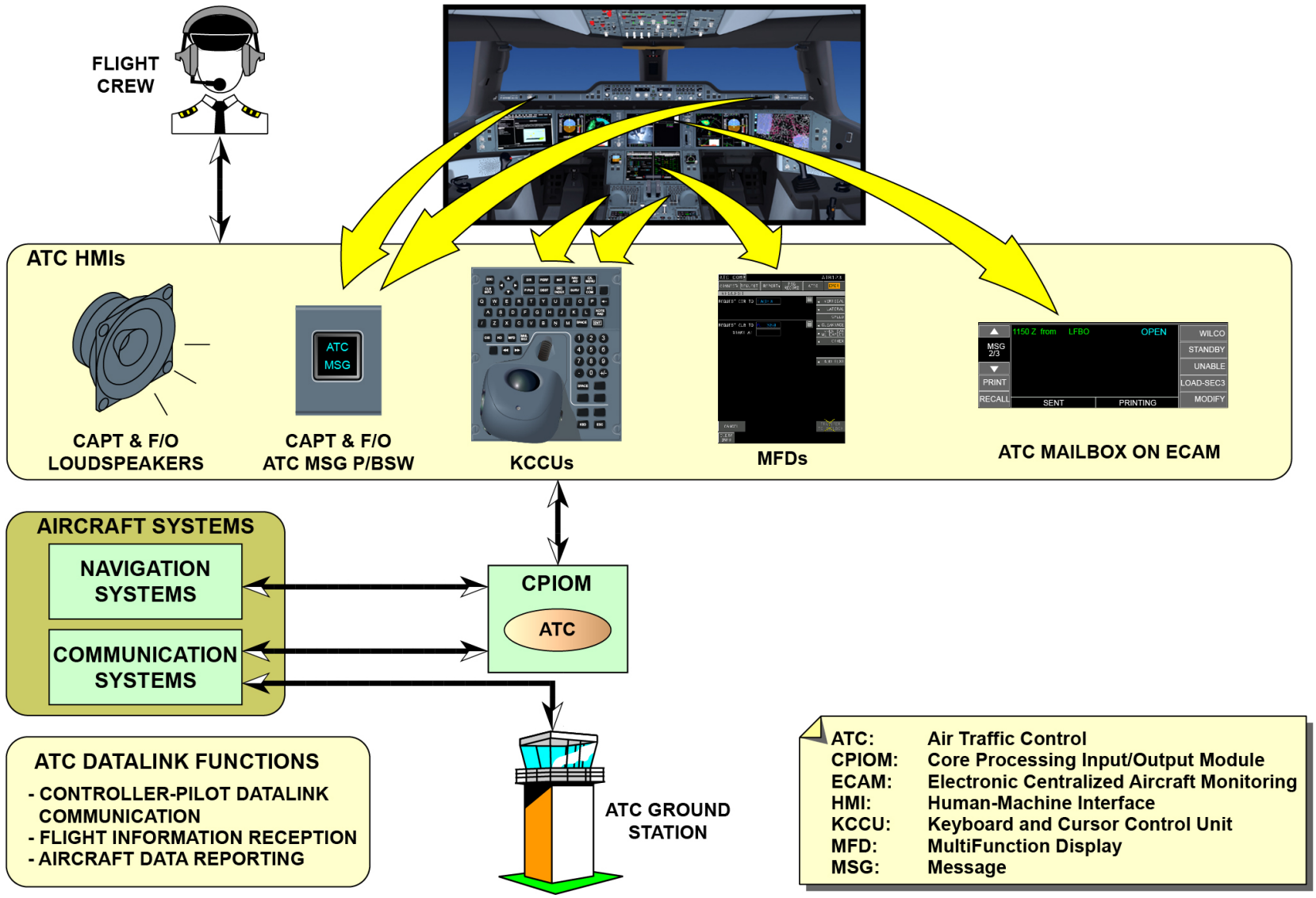
The ATC system has:
- An ATC datalink application hosted in a Core Processing Input/Output Module (CPIOM)
- ATC HMIs.

Interface

The ATC system has interfaces with the aircraft systems that follow:
- Navigation systems: Air Data/Inertial Reference System (ADIRS), Flight Management System (FMS), Aircraft Environment Surveillance System (AESS) etc., for surveillance of the aircraft position and heading by the ATC ground station
- Communication systems for communication with the ATC ground station.

Control and Indicating

The Captain and First Officer ATC MSG pushbutton switches and loudspeakers alert the crew each time a message is received.
The flight crew can get access to the ATC application through the Keyboard and Cursor Control Units (KCCUs):
- On the MultiFunction Display (MFD).
- On the Electronic Centralized Aircraft Monitoring (ECAM) display.



AIR TRAFFIC CONTROL (ATC) SYSTEM - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

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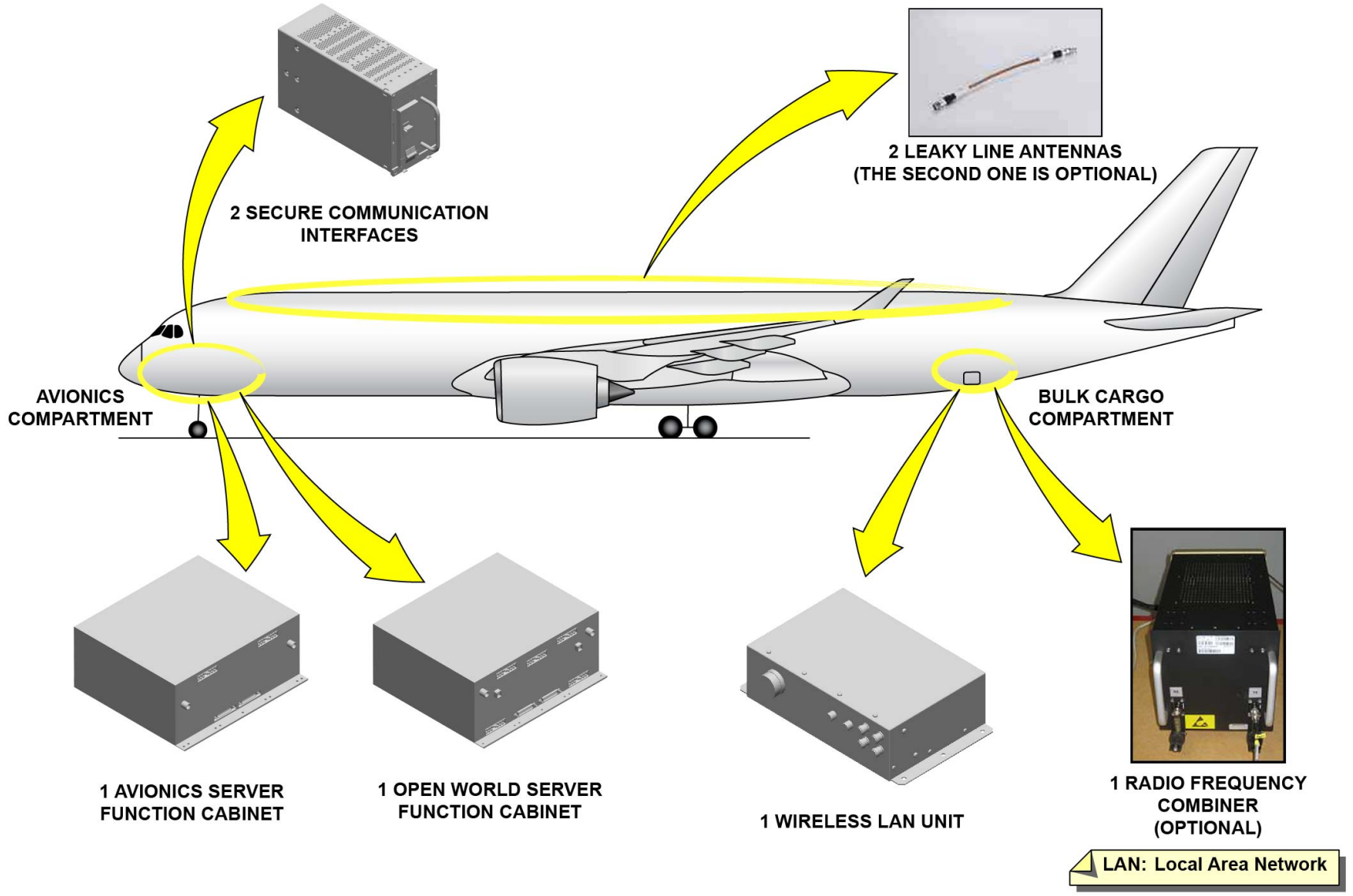
INFORMATION SYSTEMS PRESENTATION (1)

Location - Presentation

The ASFC, the OSFC and the two SCIs are installed in the avionics compartment.
The leaky line antennas are installed in the cabin ceiling.
The WLU and the RF combiner are installed in the bulk cargo compartment.



LOCATION - PRESENTATION

ONBOARD MAINTENANCE SYSTEM PRESENTATION (1)

Overview

The function of the Onboard Maintenance System (OMS) is to give the onboard tools necessary for aircraft maintenance.
General familiarization training for this system is about:
- Central Maintenance System (CMS)
- Data Loading and Configuration System (DLCS)
- Aircraft Condition Monitoring System (ACMS).

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CENTRAL MAINTENANCE SYSTEM

ONBOARD MAINTENANCE SYSTEM

AIRCRAFT CONDITION MONITORING SYSTEM

DATA LOADING AND CONFIGURATION SYSTEM

OVERVIEW

ONBOARD MAINTENANCE SYSTEM PRESENTATION (1)

CMS - Presentation

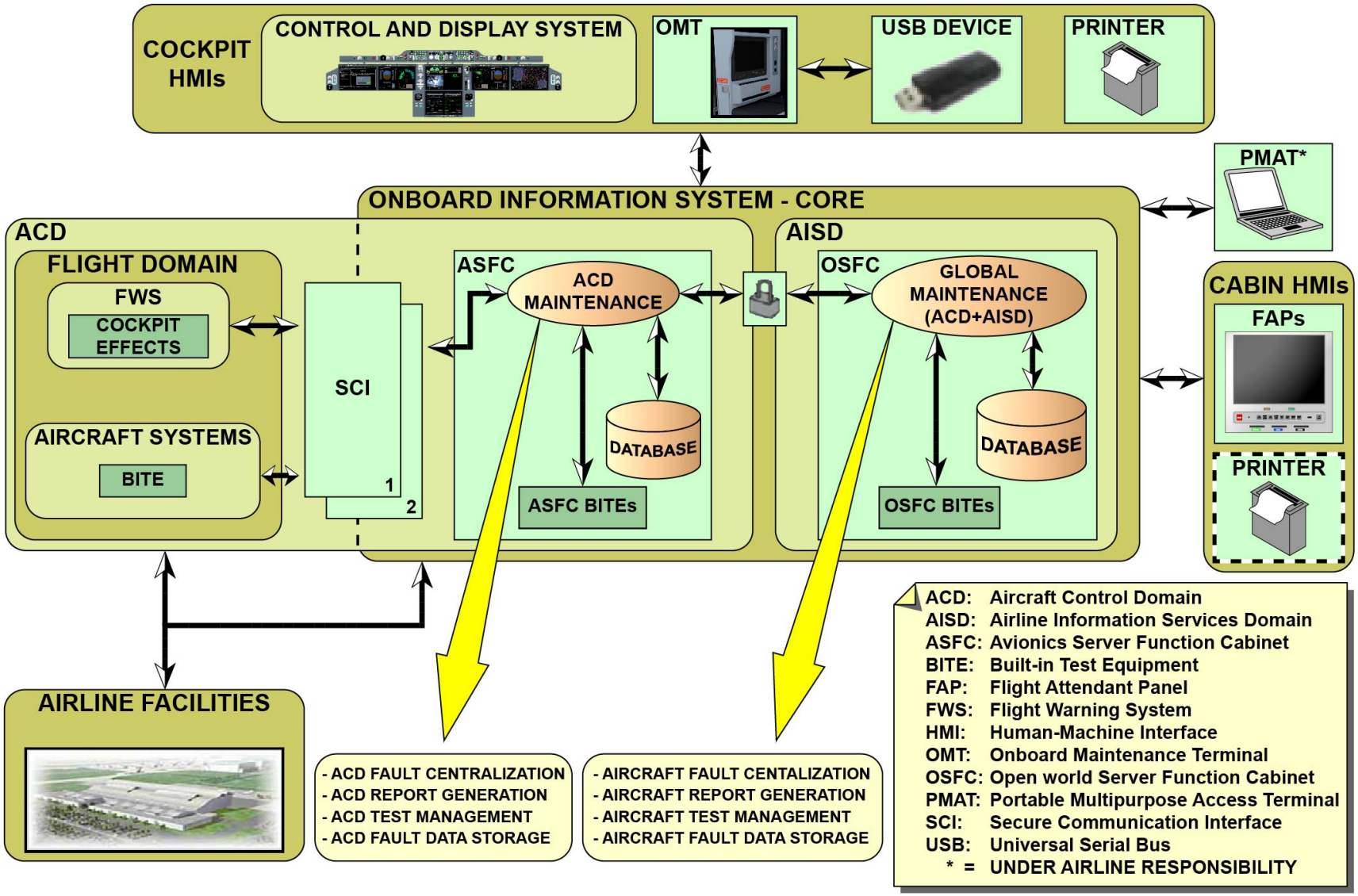
Function/Description

The CMS includes two different functions:
One is hosted in the Avionics Server Function Cabinet (ASFC) part of the Aircraft Control Domain (ACD) for the ACD maintenance.
This function controls for the aircraft:
- Fault centralization
- Report generation
- Test management
- Fault data storage.

One is hosted in the Open world Server Function Cabinet (OSFC) part of the Airline Information System Domain (AISD) for the OSFC maintenance.
This function controls for the aircraft:
- Fault centralization
- Report generation
- Test management
- Fault data storage.

Interface

The CMS has an interface with:
- All the aircraft systems, ASFC and OSFC systems which have a Built-In Test Equipment (BITE)
- Airline facilities to transmit maintenance data
- Databases hosted in the ASFC and OSFC
- The Flight Warning System (FWS), which sends cockpit effects
- Some Human Machine Interfaces (HMIs) (Control and Display System (CDS), Onboard Maintenance Terminal (OMT), Portable Multipurpose Access Terminal (PMAT), Universal Serial Bus (USB), etc...).



CMS - PRESENTATION - FUNCTION/DESCRIPTION & INTERFACE

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ONBOARD MAINTENANCE SYSTEM PRESENTATION (1)

DLCS - Presentation

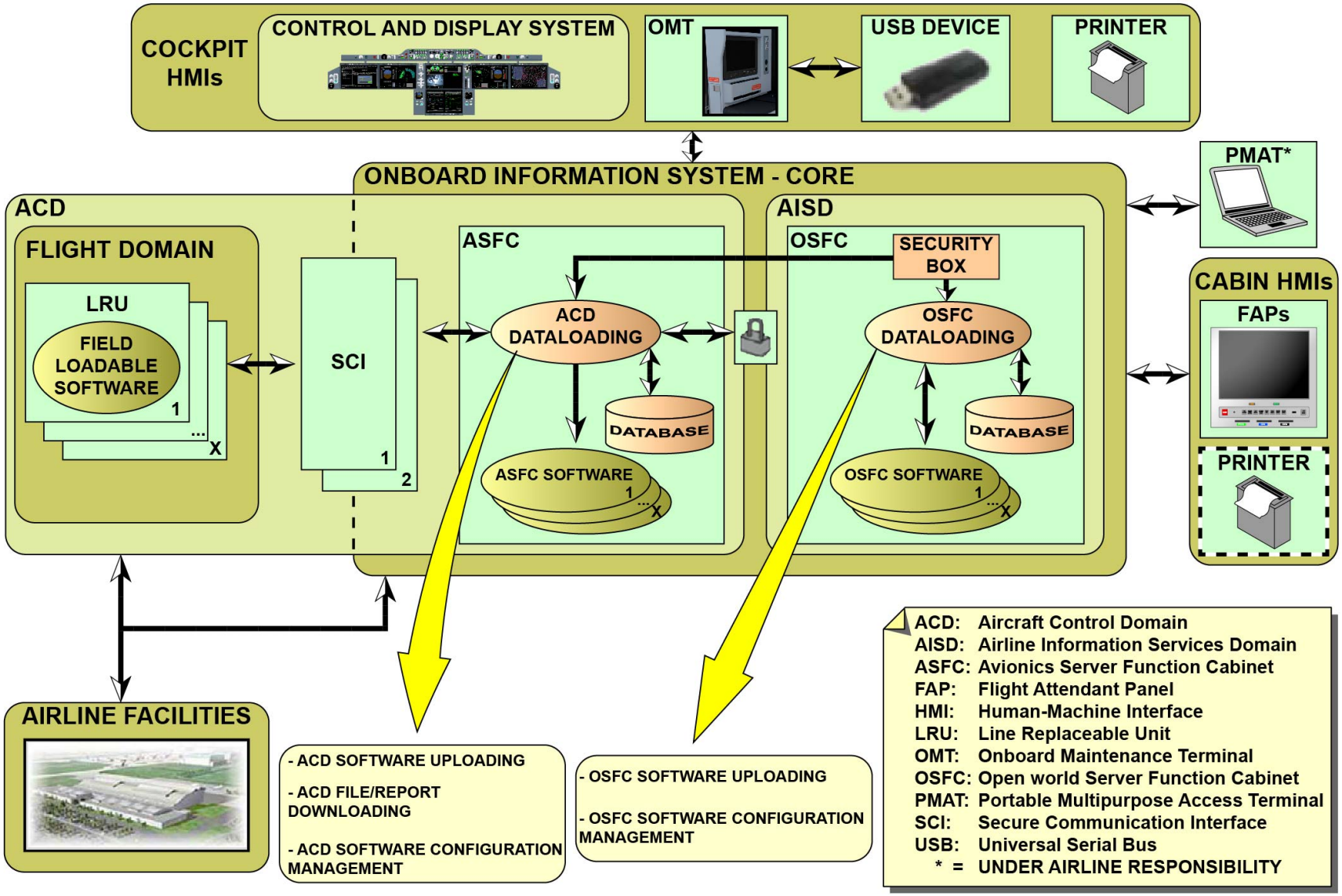
Function/Description

The DLCS includes two different functions:
One is hosted in the ASFC part of the ACD for the ACD dataloading.
This function controls for the ACD:
- Software uploading
- Files/report downloading
- Software configuration management.

One is hosted in the OSFC part of the AISD for the OSFC dataloading.
This function control for the OSFC:
- Software uploading
- Software configuration management.

Interface

The DLCS has an interface with:
- All the aircraft systems, ASFC and OSFC systems that host field loadable software
- The security box in the OSFC which identifies the applicable software to upload
- Airline facilities to transmit maintenance data and upload software
- Databases hosted in the ASFC and OSFC
- Some HMIs (CDS, OMT, PMAT, USB, etc...).



DLCS - PRESENTATION - FUNCTION/DESCRIPTION & INTERFACE

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ONBOARD MAINTENANCE SYSTEM PRESENTATION (1)

ACMS - Presentation

Function/Description

The ACMS includes:
- Centralized Data Acquisition Unit (CDAU)
- ACMS application, hosted in the ASFC.

For the ACMS, the CDAU:
- Monitors the aircraft system parameters in real-time
- Records part of these parameters
- Sends automatic or requested reports to the ACMS application.

The ACMS application:
- Stores the parameters sent by the CDAU
- Manages the ACMS data output
- Manages the ACMS HMIs.

Interface

The ACMS has interfaces with the aircraft facilities to get the parameters.
The operator can send these parameters directly to the airline ground tools through the aircraft communication systems, or can download them into a standard USB device.

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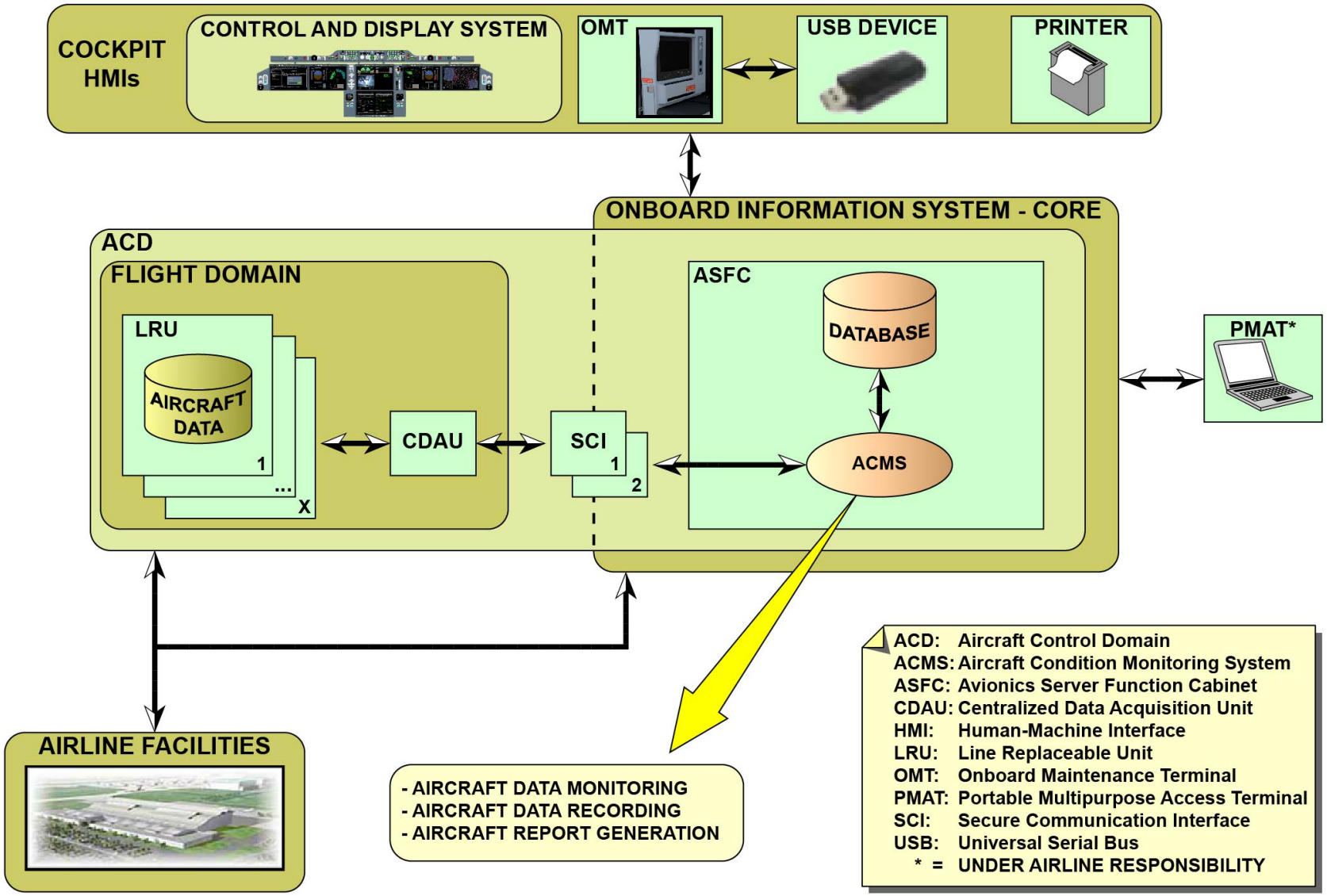

ACMS - PRESENTATION - FUNCTION/DESCRIPTION & INTERFACE

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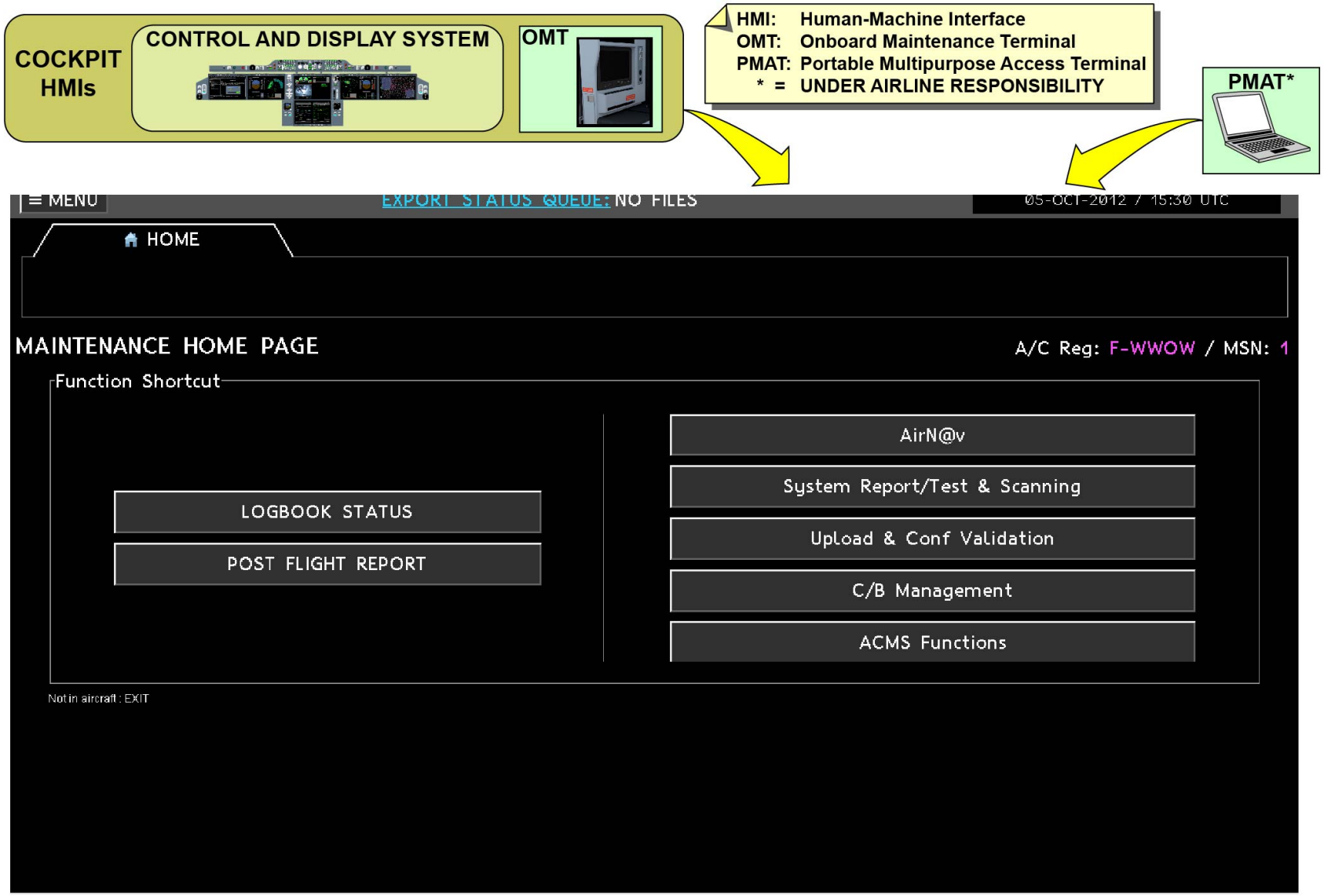
ONBOARD MAINTENANCE SYSTEM PRESENTATION (1)

Control and Indicating - Presentation

The operator can use and control the CMS, DLCS and ACMS through HMIs.
To get access to the Onboard Information System (OIS) displays, the operator can use:
- The OMT
- The CDS
- A PMAT, which he can connect in and out of the aircraft.

The operator can use the cockpit printer to print the maintenance report for CMS and ACMS functions.

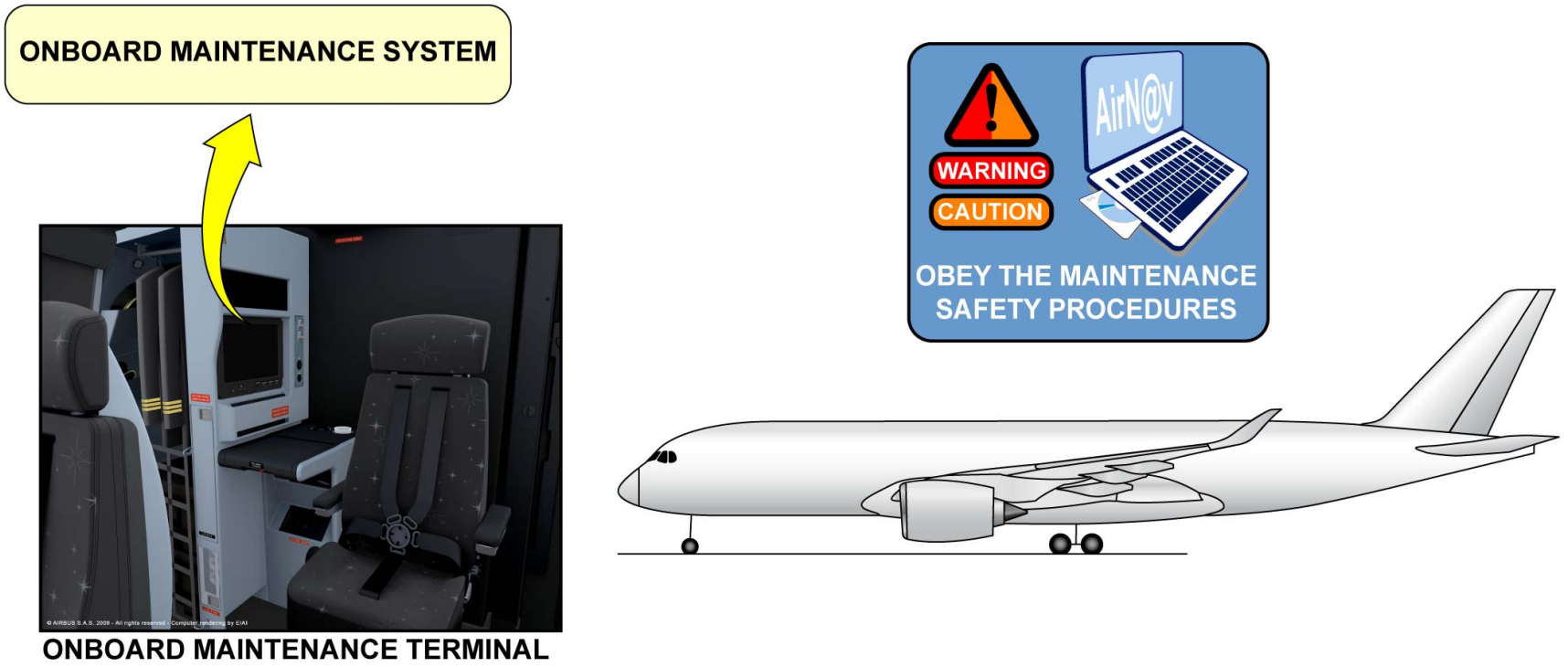


CONTROL AND INDICATING - PRESENTATION

ONBOARD MAINTENANCE SYSTEM PRESENTATION (1)

Safety Precaution - Maintenance

BE CAREFUL WHEN YOU START AN INTERACTIVE TEST FROM THE CMS. IT CAN HAVE AN IMPACT ON OTHER AIRCRAFT SYSTEMS (FLIGHT CONTROLS, RADAR, ETC.) AND CAUSE DAMAGE TO EQUIPMENT OR INJURY TO PERSONS.



SAFETY PRECAUTION - MAINTENANCE

NAVIGATION SYSTEM PRESENTATION (1)

Overview

The function of the navigation system is to give the flight crew the data necessary for a safe and optimized routing of the aircraft.
The General familiarization training for this system is about:
- Air Data/Inertial Reference System (ADIRS)
- Standby Navigation Systems
- Multi-Mode Receiver (MMR)
- Onboard Airport Navigation System (OANS)
- Radio Altimeter (RA)
- Distance Measuring Equipment (DME)
- Automatic Direction Finder (ADF)
- VHF Omnidirectional Range (VOR)/marker
- Aircraft Environment Surveillance System (AESS).

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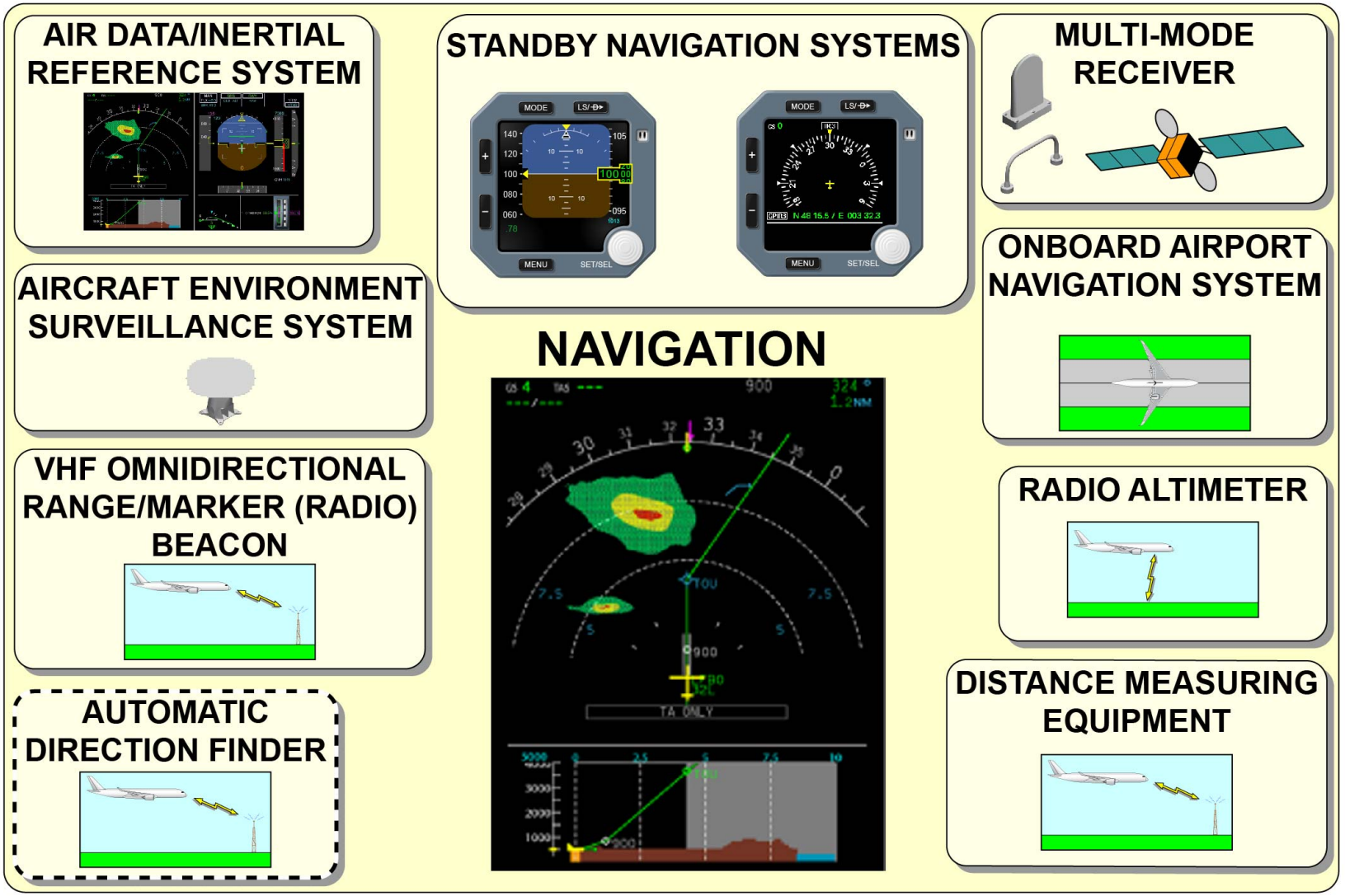
AIR DATA/INERTIAL REFERENCE SYSTEM
STANDBY NAVIGATION SYSTEMS
MODE
LS/-B
MENU
SET/SEL
MULTI-MODE RECEIVER
AIRCRAFT ENVIRONMENT SURVEILLANCE SYSTEM
NAVIGATION
ONBOARD AIRPORT NAVIGATION SYSTEM
VHF OMNIDIRECTIONAL RANGE/MARKER (RADIO) BEACON
RADIO ALTIMETER
AUTOMATIC DIRECTION FINDER
DISTANCE MEASURING EQUIPMENT
TA ONLY

OVERVIEW

NAVIGATION SYSTEM PRESENTATION (1)

Air Data/Inertial Reference System (ADIRS) - Presentation

Function/Description

The ADIRS is an autonomous navigation system, independent of ground navigation aids.
The function of the ADIRS is to give Air Data Reference (ADR), Inertial Reference (IR) data and Universal Time Coordinated (UTC) time reference to many aircraft systems (Control and Display System (CDS), Flight Management System (FMS) etc.).

NOTE: Each Air Data/Inertial Reference Unit (ADIRU) also has the heating function of its related probes.

The ADIRS has three independent channels, one for each ADIRU.
Each ADIRU receives air data from its related probes and sensors.
Each ADIRU has two parts (one ADR part and one IR part):
- The ADR part receives the air data from the different sensors and probes.
- The IR part computes the inertial data given by internal accelerometers and gyrometers.

The ADIRS receives Global Positioning System (GPS) data from the MMRs. In normal operation, the IR part is automatically aligned with the GPS position. It is also possible to align the IR manually through the Keyboard and Cursor Control Unit (KCCU) (the KCCU gives access to the FMS menu on the MultiFunction Display (MFD) to do the IR alignment).

Interface

The ADIRS has interfaces with the CDS to show the air and inertial data on the CDS display units (Primary Flight Display (PFD), Navigation Display (ND) and MFD).

Control and Indicating

The air and inertial data are shown on the CDS display units (PFD, ND and MFD).
The ADIRS controls are done from:
- The ADIRS control panel, installed on the overhead panel, to start and stop the ADIRUs and to tell that there is an ADR/IR fault
- The ADIRS switching panel, installed on the main instrument panel, to manually change the source of the data for the CDS displays
- The CAPT and F/O Electronic Flight Instrument System (EFIS) control panels, installed on the glareshield
- The KCCUs, installed on the center pedestal, to get access to the MFD menu for the IR alignment.

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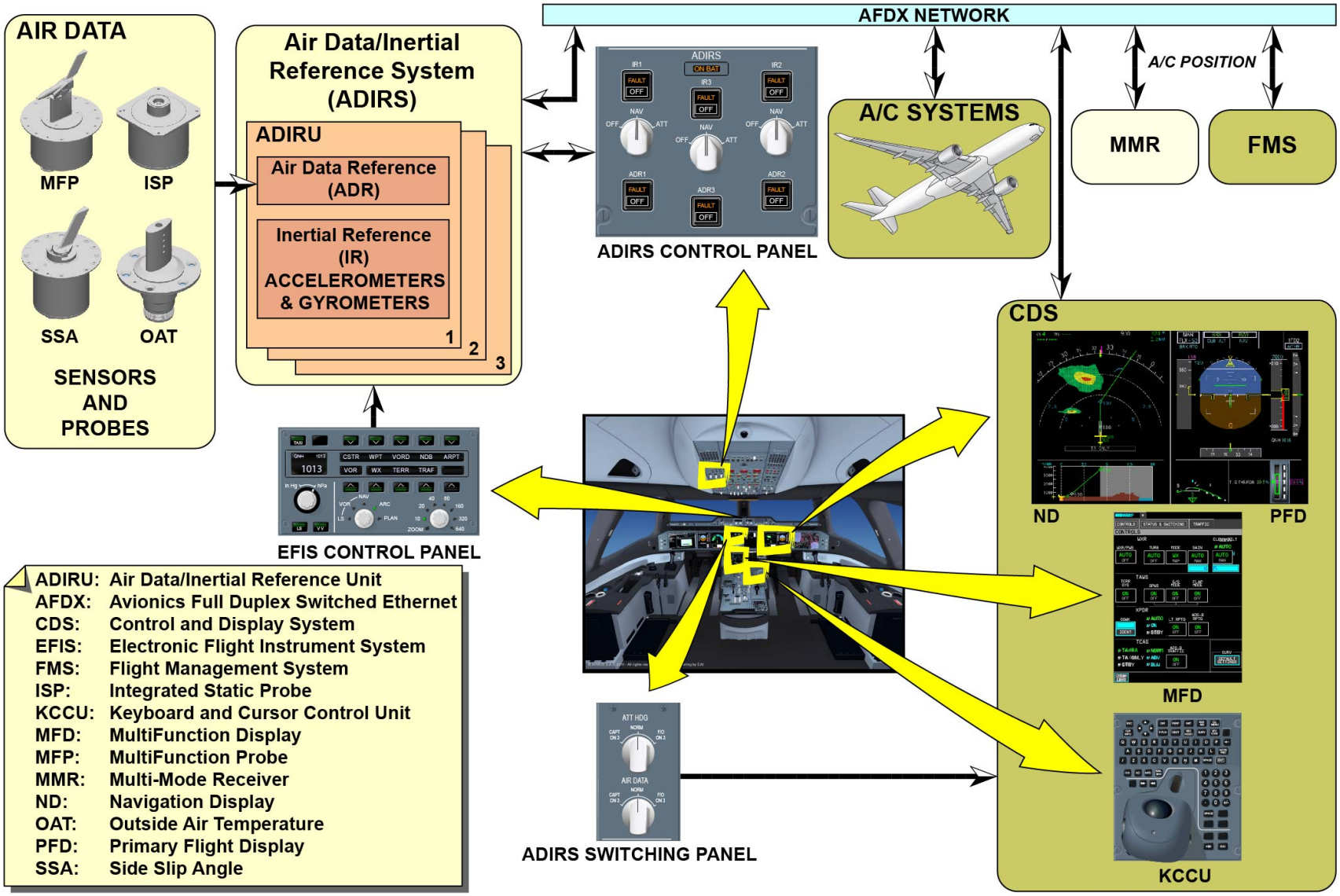


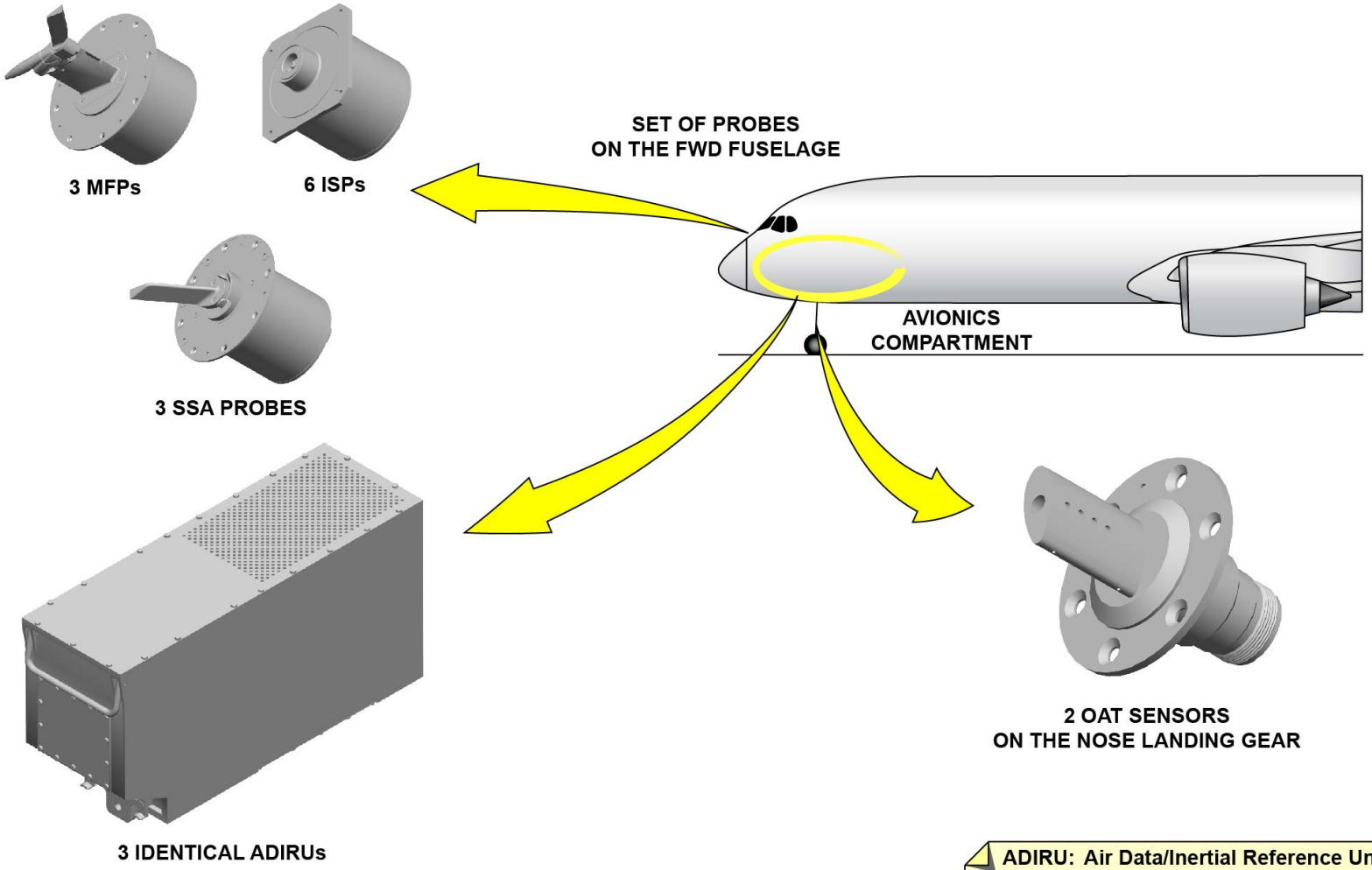
AIR DATA/INERTIAL REFERENCE SYSTEM (ADIRS) - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

NAVIGATION SYSTEM PRESENTATION (1)

Air Data/Inertial Reference System (ADIRS) - Presentation (continued)

Location

The ADIRS has:
- Three ADIRUs installed in the avionics compartment
- Three MultiFunction Probes (MFPs) installed on the left and right sides of the forward fuselage
- Six Integrated Static Probes (ISPs) installed on the left and right sides of the forward fuselage
- Three Side Slip Angle (SSA) probes installed on the forward fuselage
- Two Outside Air Temperature (OAT) sensors installed on the nose landing gear.



AIR DATA/INERTIAL REFERENCE SYSTEM (ADIRS) - PRESENTATION - LOCATION

NAVIGATION SYSTEM PRESENTATION (1)

Standby Navigation Systems - Presentation

Function/Description

The standby navigation systems are autonomous backup systems that can be used by the crew when there is loss of the ADIRS or loss of the CDS. In normal operation, the standby navigation systems are used to make sure that the ADIRS data is correct. In abnormal condition, the standby navigation systems supply backup navigation data.
The standby navigation systems have:
- One standby compass that gives the aircraft magnetic-heading indication
- Two independent Integrated Standby Instrument System (ISIS) indicators (the second indicator is optional).

The function of the ISIS indicators is to compute and show air data parameters, flight plan and navigation data.
The ISIS indicators receive air data through pressure lines from:
- One standby pitot probe
- Two standby static probes.

Location

The standby compass is installed in the cockpit, in the middle top of the windshield.
The two ISIS indicators are installed in the cockpit, on the main instrument panel.
The standby pitot probe is installed on the left side of the forward fuselage.
The two standby static probes are installed on the left and right sides of the forward fuselage, on the nose section.

Control and Indicating

In single configuration (only one ISIS indicator is installed), the ISIS indicator is in standby flight-display mode. The data shown in this mode are flight data and basic navigation data.
In dual configuration (two ISIS indicators are installed):
- One ISIS indicator is in standby flight-display mode.
- The other ISIS indicator is in standby navigation-display mode. The data shown in this mode are aircraft position, heading and main navigation parameters.

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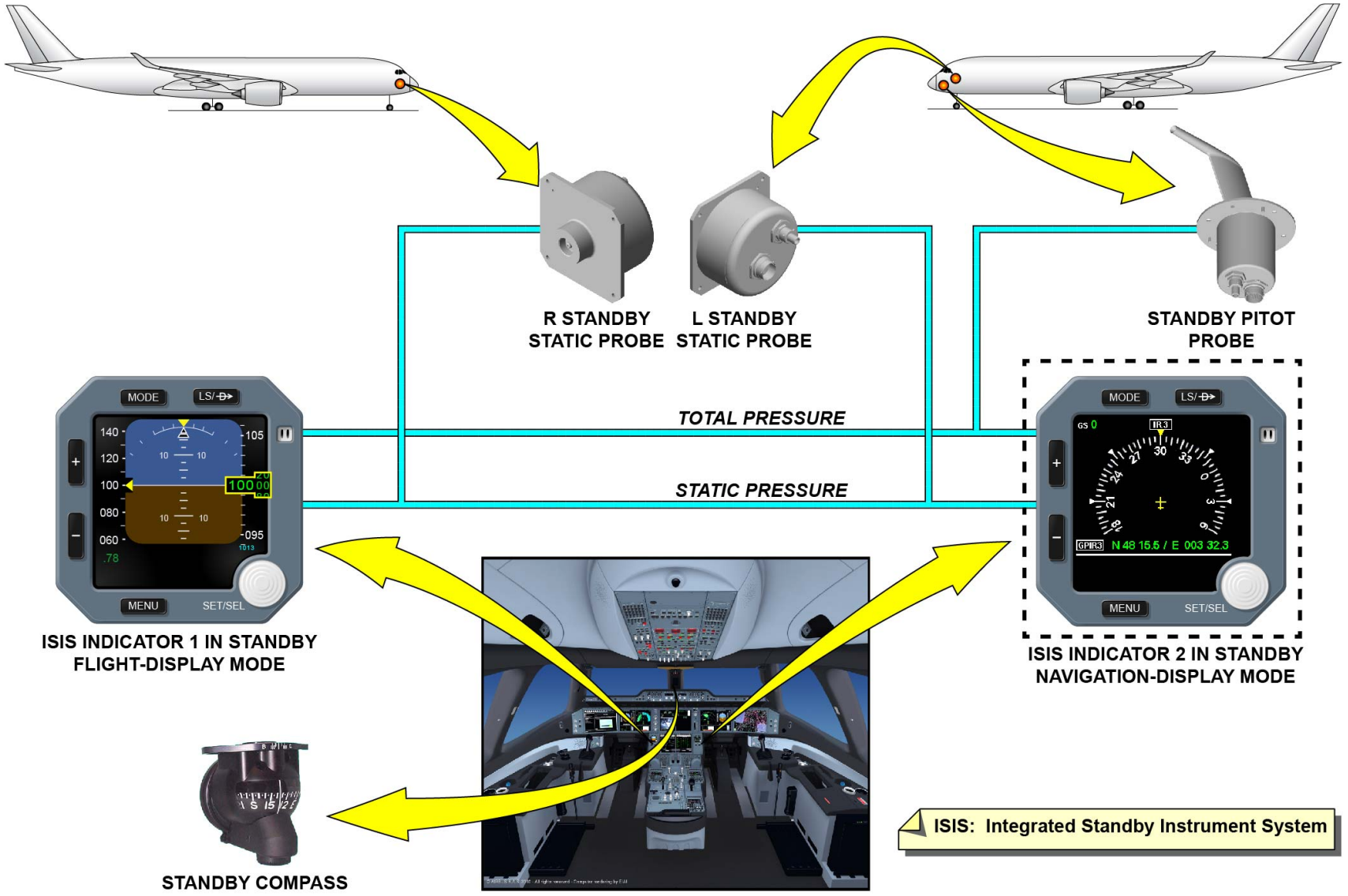

STANDBY NAVIGATION SYSTEMS - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

NAVIGATION SYSTEM PRESENTATION (1)

Multi-Mode Receiver (MMR) - Presentation

Function/Description

The MMR is a radio navigation aid.
The MMR function is to:
- Compute lateral and vertical deviations for precision approach and landing through a landing function (e.g. Instrument Landing System (ILS) function)
- Compute aircraft position, velocity and time from different satellite navigation solutions.

Interface

- The communication systems for the backup tuning (through the Radio and Audio Management Panels (RMPs)) and for audio identification of the ground station (through the loudspeakers and the boomsets)
- The FMS
- The ADIRS for alignment of the IR with the GPS position
- Automatic Flight System (AFS)/PRIMary Computer (PRIM) for guidance deviation orders in Autopilot (AP) mode.

Control and Indicating

The MMR sends navigation data to the CDS for display on the PFD and ND.
The MMR controls are done from:
- The EFIS control panels to select the Landing System (LS) mode
- The MFD to get access to the GPS and ILS pages through the KCCU
- The RMPs to manually set the two MMRs to the backup mode.

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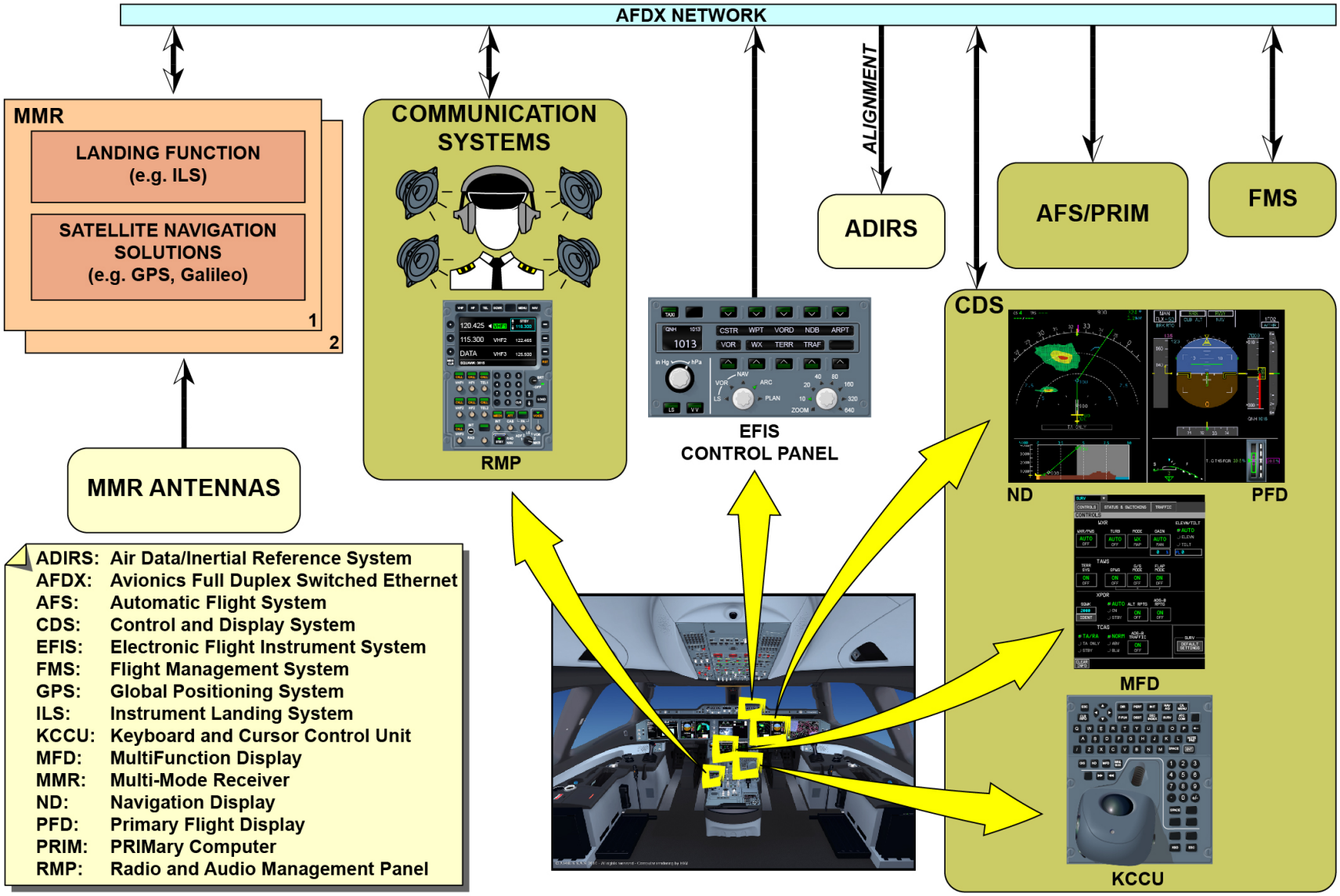


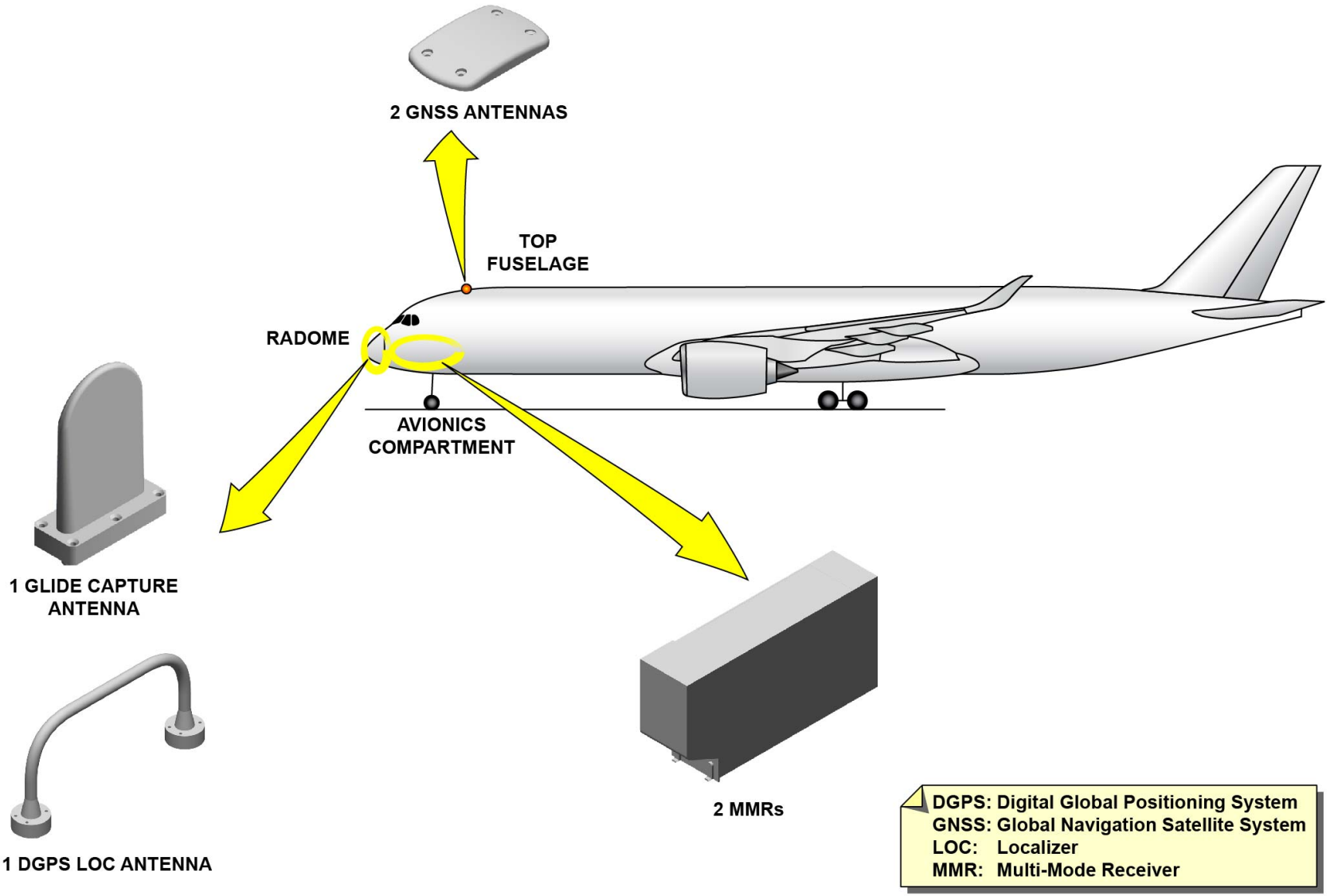
MULTI-MODE RECEIVER (MMR) - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

NAVIGATION SYSTEM PRESENTATION (1)

Multi-Mode Receiver (MMR) - Presentation (continued)

Location

The MMR system has:
- Two MMRs installed in the avionics compartment
- Two Global Navigation Satellite System (GNSS) antennas installed at the top of the fuselage, in the aircraft longitudinal axis
- One Digital Global Positioning System (DGPS) Localizer (LOC) antenna installed in the radome
- One glide capture antenna installed in the radome.



MULTI-MODE RECEIVER (MMR) - PRESENTATION - LOCATION

NAVIGATION SYSTEM PRESENTATION (1)

Onboard Airport Navigation System (OANS) - Presentation

Function/Description

The OANS gives data about the airport to the flight crew when the aircraft is on the ground.
The functions of the OANS are:
- To help the pilot navigate in complex airports
- To prevent dangerous situations such as runway incursion or take-off from an incorrect runway/taxiway (important safety function).

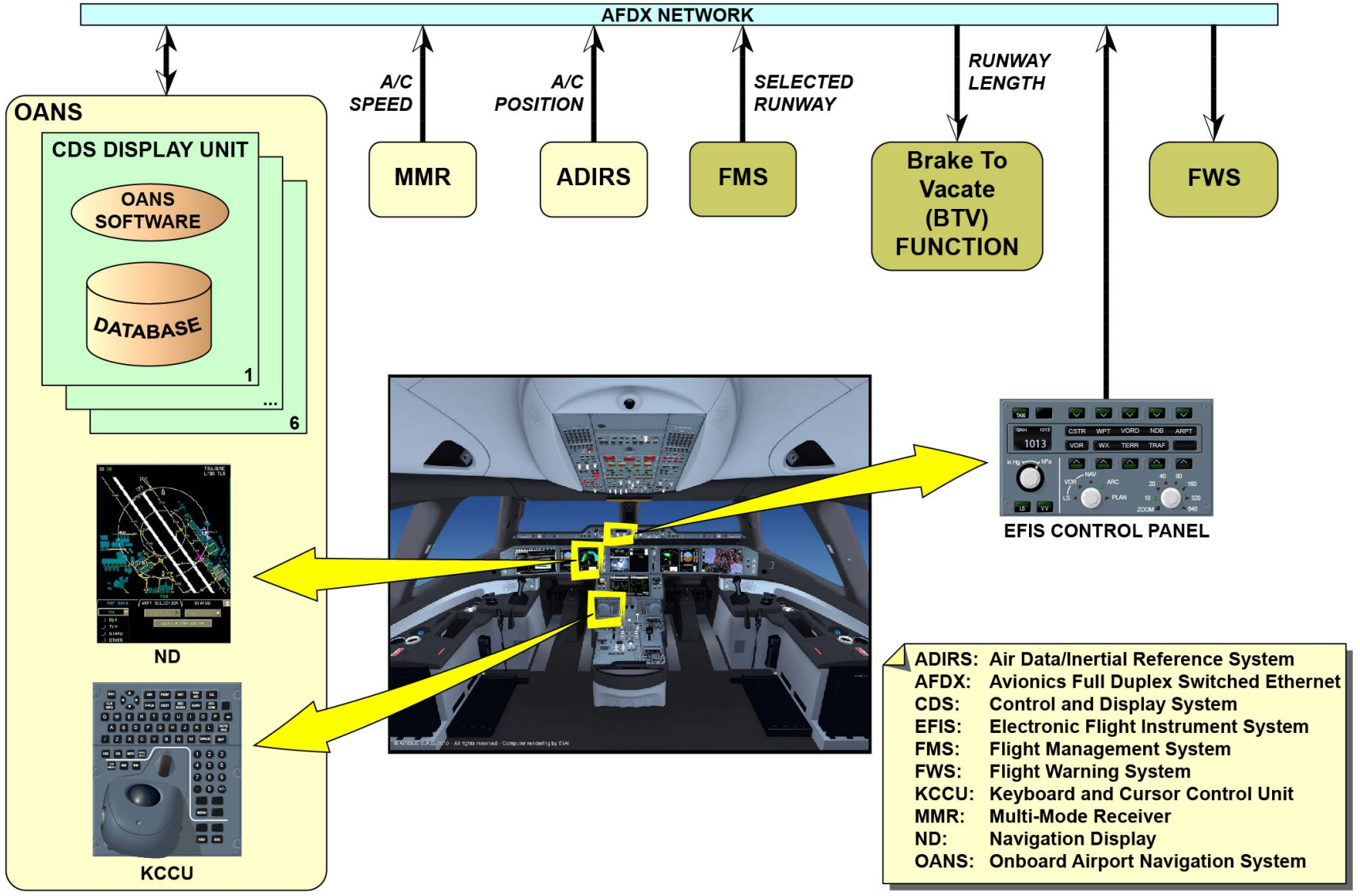
The OANS has OANS software and an airport database uploaded in the six CDS display units.
In normal operation, the OANS data is shown on the ND. The OANS image shows the aircraft position on an airport moving map given by the airport database.
The OANS also sends data to the brake system for the Brake To Vacate (BTV) function.

Interface

The OANS has interfaces with:
- The CDS to show the aircraft and airport data on the airport moving map
- The ADIRS, the MMR and the FMS to have aircraft data (e.g. aircraft position, aircraft speed, selected runway)
- The Flight Warning System (FWS) to generate aural alerts through the communication systems (loudspeakers and boomsets)
- The brake system for the BTV function (e.g. runway length).

Control and Indicating

The ND shows the aircraft position on the airport moving map.
The OANS controls are done from:
- The EFIS control panels to get the OANS image
- The KCCUs to directly control the OANS image and to enter data.



ONBOARD AIRPORT NAVIGATION SYSTEM (OANS) - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

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NAVIGATION SYSTEM PRESENTATION (1)

Radio Altimeter (RA) - Presentation

Function/Description

The RA is an independent system that gives the aircraft radio height.
The RA system has three transceivers and six antennas. Each transceiver is connected to one transmission antenna and to one reception antenna.
The RA transceivers are digital transceivers. They transmit and receive a radio frequency signal through the antennas to measure the vertical distance between the aircraft and the ground.

Interface

The RA has interfaces with :
- The CDS to show the aircraft radio height on the PFD
- The FWS to generate automatic call-out announcements through the communication systems (through the loudspeakers and the boomsets)
- The aircraft systems which use the aircraft radio-height information.

Control and Indicating

The aircraft radio height is shown on the PFD.

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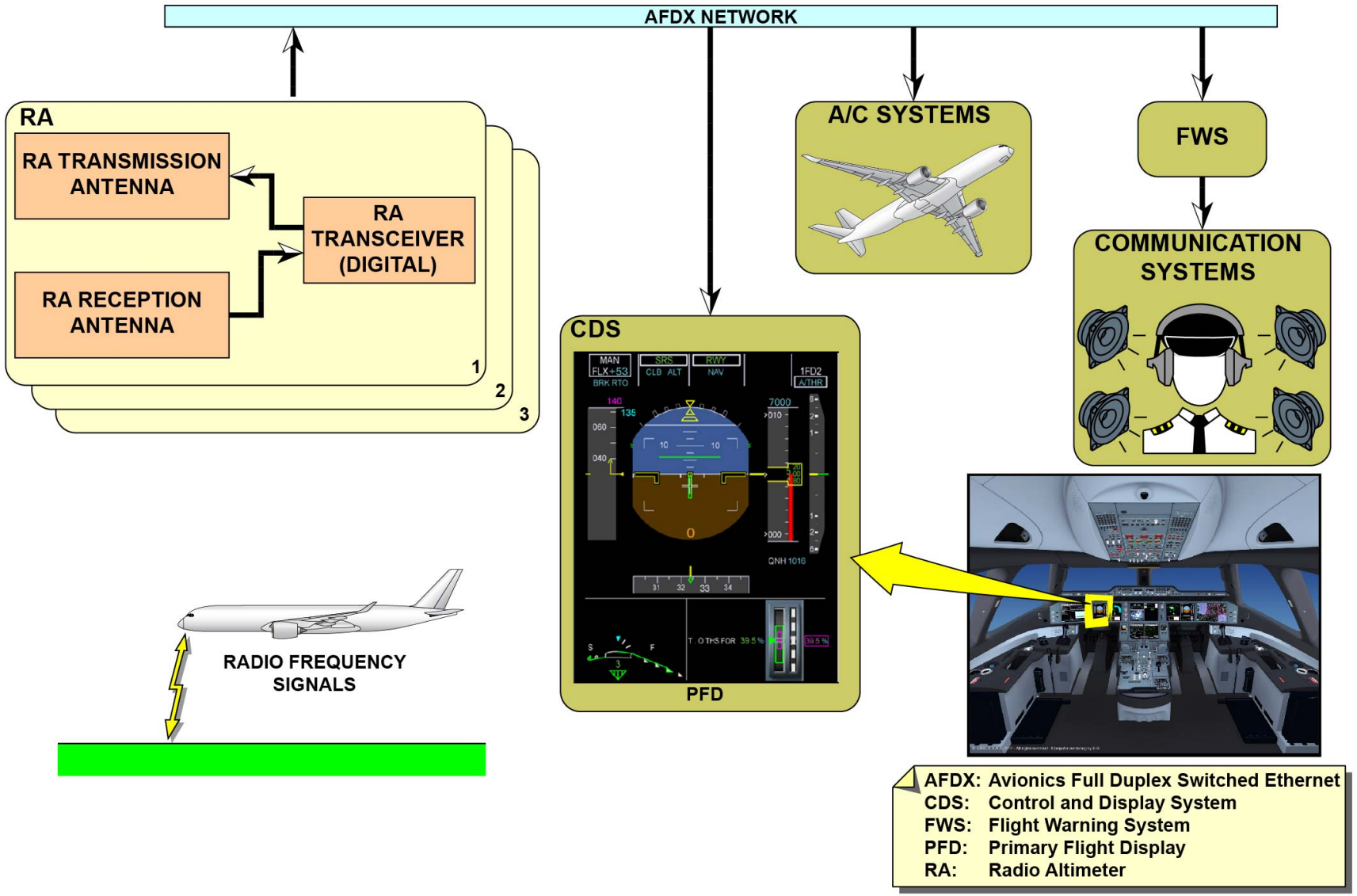


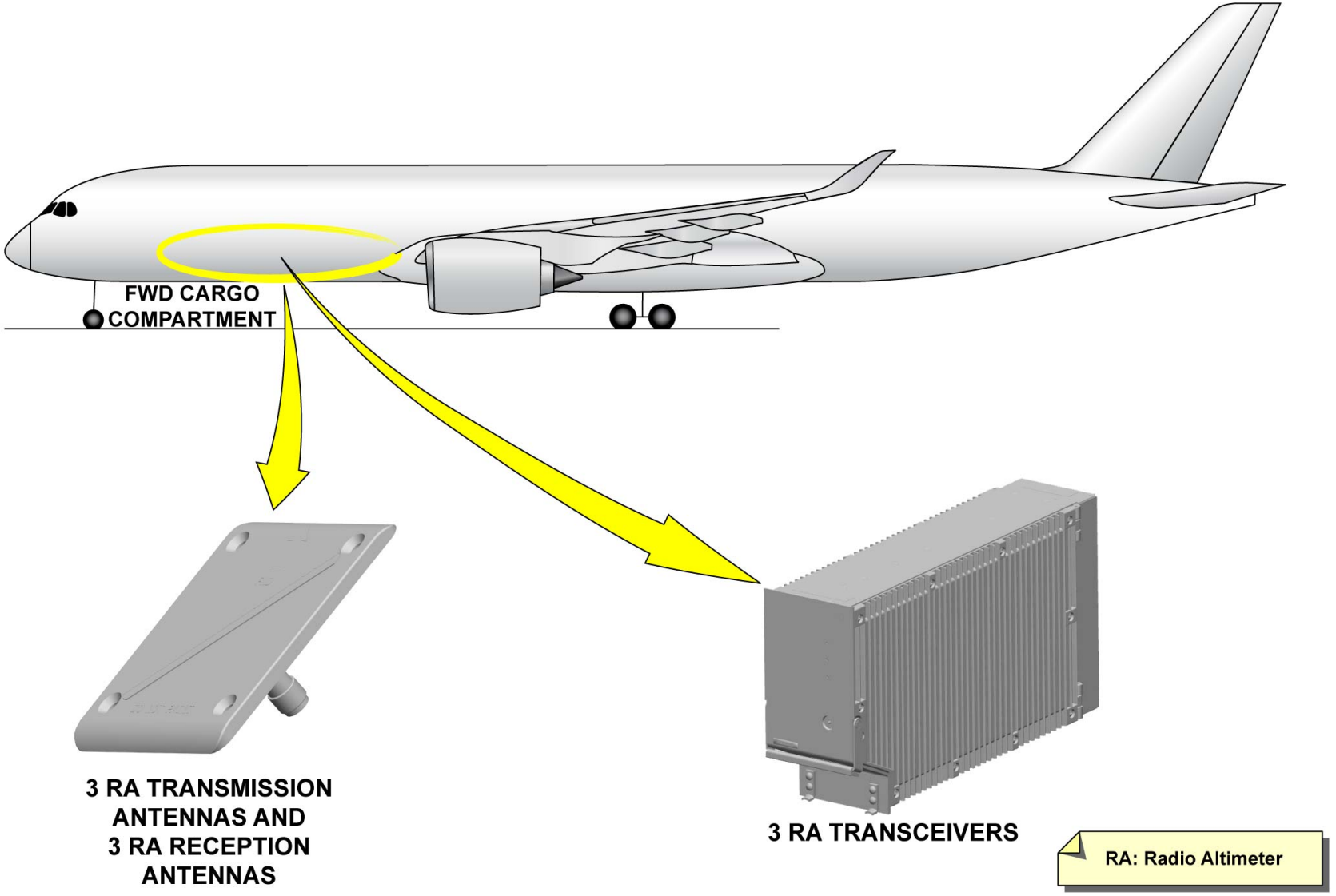
RADIO ALTIMETER (RA) - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

NAVIGATION SYSTEM PRESENTATION (1)

Radio Altimeter (RA) - Presentation (continued)

Location

The three RA transceivers are installed in the forward cargo compartment.
The six RA antennas are installed at the bottom of the forward fuselage.



RADIO ALTIMETER (RA) - PRESENTATION - LOCATION

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NAVIGATION SYSTEM PRESENTATION (1)

Distance Measuring Equipment (DME) - Presentation

Function/Description

The DME system is a radio navigation aid which operates with ground stations.
The function of the DME is to give:
- The slant distance between the aircraft and the selected ground station
- The audio signal for identification of the selected DME ground station.

The DME has two interrogators and two antennas (the second interrogator is optional). Each interrogator is connected to its related antenna.
The DME interrogator measures the transmission time of the signal (between the antenna and the ground station) to calculate the distance between the aircraft and the selected ground station.

Interface

The DME has interfaces with:
- The FMS for automatic tuning
- The CDS to show the DME data
- The communication systems for backup tuning (through the RMPs) and for audio identification of the ground station (through the loudspeakers and the boomsets).

Control and Indicating

The DME sends navigation data to the CDS for display on the ND.
In normal operation, the DME is automatically tuned by the FMS.
The flight crew can manually tune the frequency of the VOR or ILS DME collocated station through:
- The KCCUs to get access to the POSITION/NAVAIDS page on the MFD
- The RMPs for backup tuning.

The EFIS control panels are used to select the display mode on the ND.

Automatic Direction Finder (ADF) - Presentation

Function/Description

The ADF system is a radio navigation aid which operates with ground stations.
The function of the ADF is to give:
- The relative bearing between the aircraft axis and the direction of the selected ADF ground station
- The audio signal for identification of the selected ground station.

The full ADF system has two receivers and two antennas. Each receiver is connected to its related antenna.
The ADF system is optional. It can be installed in single configuration (one receiver and one antenna) or in dual configuration (two receivers and two antennas).

Interface

The ADF has interfaces with:
- The FMS for automatic tuning
- The CDS to show the ADF data
- The communication systems for backup tuning (through the RMPs) and for audio identification of the ground station (through the loudspeakers and the boomsets).

Control and Indicating

The ADF sends navigation data to the CDS for display on the ND.
In normal operation, the ADF is automatically tuned by the FMS.
The flight crew can tune the ADF manually through:
- The KCCUs to get access to the POSITION/NAVAIDS page on the MFD
- The RMPs for backup tuning.

The EFIS control panels are used to select the display mode on the ND.

VOR/Marker - Presentation

Function/Description

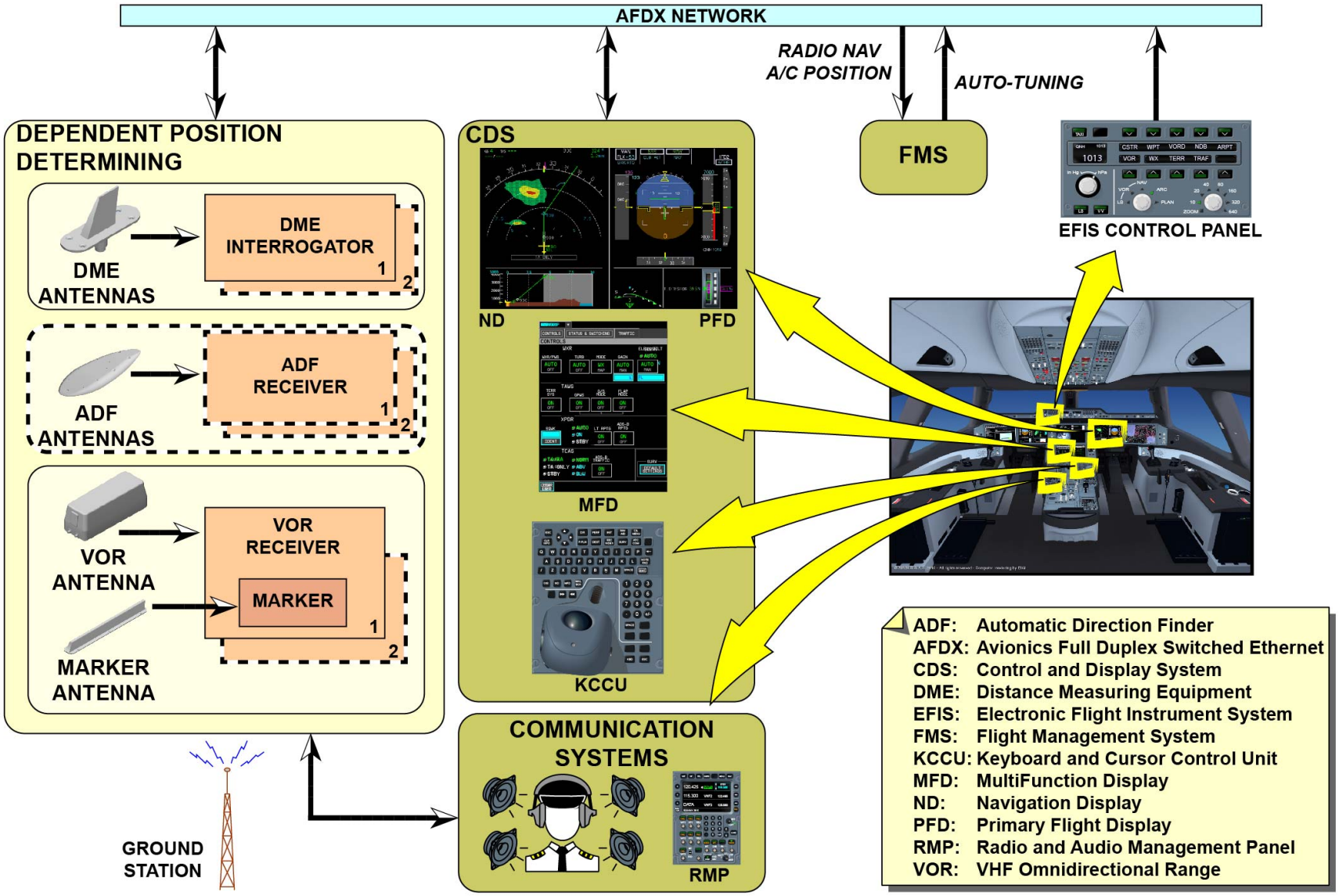
The VOR/marker system is a radio navigation aid which operates with ground stations. It uses the signals that come from an omnidirectional ground station to calculate bearing data.
The VOR/marker system has two receivers (the VOR2 receiver is optional), a VOR antenna (common to the two receivers) and a marker antenna for the VOR1 receiver.
The marker function is only activated in the VOR1/marker receiver which is connected to the marker antenna.
The function of the VOR receiver is to give:
- The aircraft magnetic bearing related to the selected VOR ground station
- The audio and digital identification of the selected ground station.
The function of the marker is to give aural and visual alerts when the aircraft flies above the ground marker beacons during the approach phase.

Interface

The VOR/marker has interfaces with:
- The FMS for automatic tuning
- The CDS to show the VOR data
- The communication systems for backup tuning (through the RMPs) and for audio identification of the ground station (through the loudspeakers and the boomsets).

Control and Indicating

The VOR/marker sends navigation data to the CDS for display on the PFD and ND.
In normal operation, the VOR receiver is automatically tuned by the FMS.
The flight crew can tune the VOR receivers manually through:
- The KCCUs to get access to the POSITION/NAVAIDS page on the MFD
- The RMPs for backup tuning.
The EFIS control panels are used to select the display mode on the ND.



DISTANCE MEASURING EQUIPMENT (DME) - PRESENTATION ... VOR/MARKER - PRESENTATION

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NAVIGATION SYSTEM PRESENTATION (1)

Distance Measuring Equipment (DME) - Presentation

Location

The two DME interrogators are installed in the avionics compartment.
The two DME antennas are installed at the bottom of the center fuselage.

Automatic Direction Finder (ADF) - Presentation

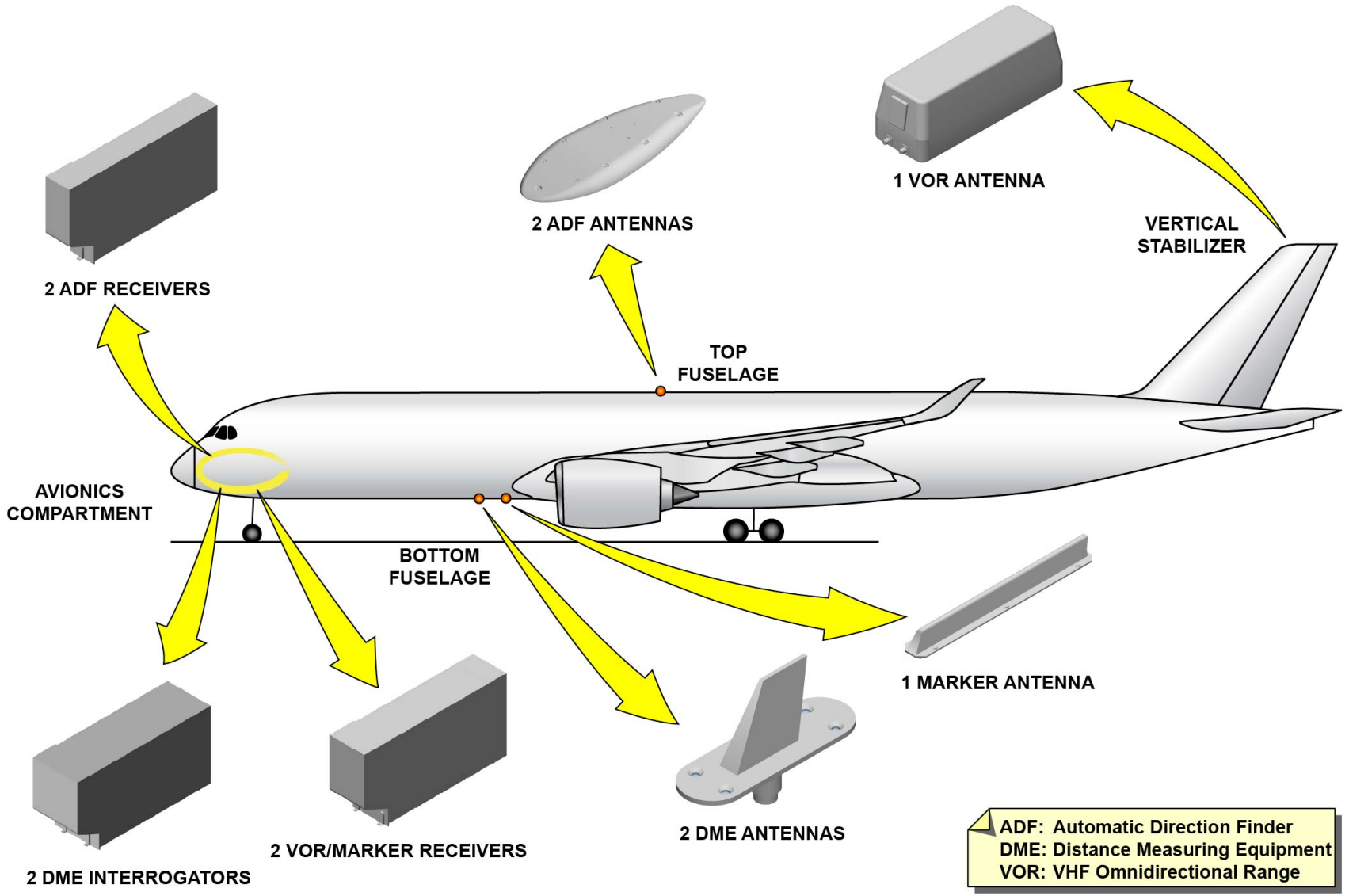
Location

The ADF receivers are installed in the avionics compartment.
The ADF system antennas are installed at the top of the center fuselage.

VOR/Marker - Presentation

Location

MKR antenna located at the bottom of the center fuselage [The two VOR receivers are installed in the avionics compartment.
The VOR antenna is installed at the top of the vertical stabilizer and is used by the two VOR receivers.
The marker antenna is installed at the bottom of the center fuselage.



DISTANCE MEASURING EQUIPMENT (DME) - PRESENTATION ... VOR/MARKER - PRESENTATION

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NAVIGATION SYSTEM PRESENTATION (1)

Aircraft Environment Surveillance System (AESS) - Presentation

Function/Description

The AESS has these subsystems:
- Weather Radar and Predictive WindShear (WXR/PWS)
- Traffic Alert and Collision Avoidance System (TCAS)
- Terrain Awareness and Warning System (TAWS)
- Transponder (XPDR) function for air traffic surveillance by the Air Traffic Control (ATC) ground station.

The function of the AESS is to:
- Give aircraft environment data to the flight crew for display on the CDS. It detects possible external dangerous elements that can have an effect on aircraft flight path or safety (weather conditions, windshear events, turbulence areas, aircraft or terrain proximity)
- Alert the flight crew if there is imminent danger and give an escape maneuver when necessary
- Give automatic reactions through the Autopilot (AP) (only with the TACS).

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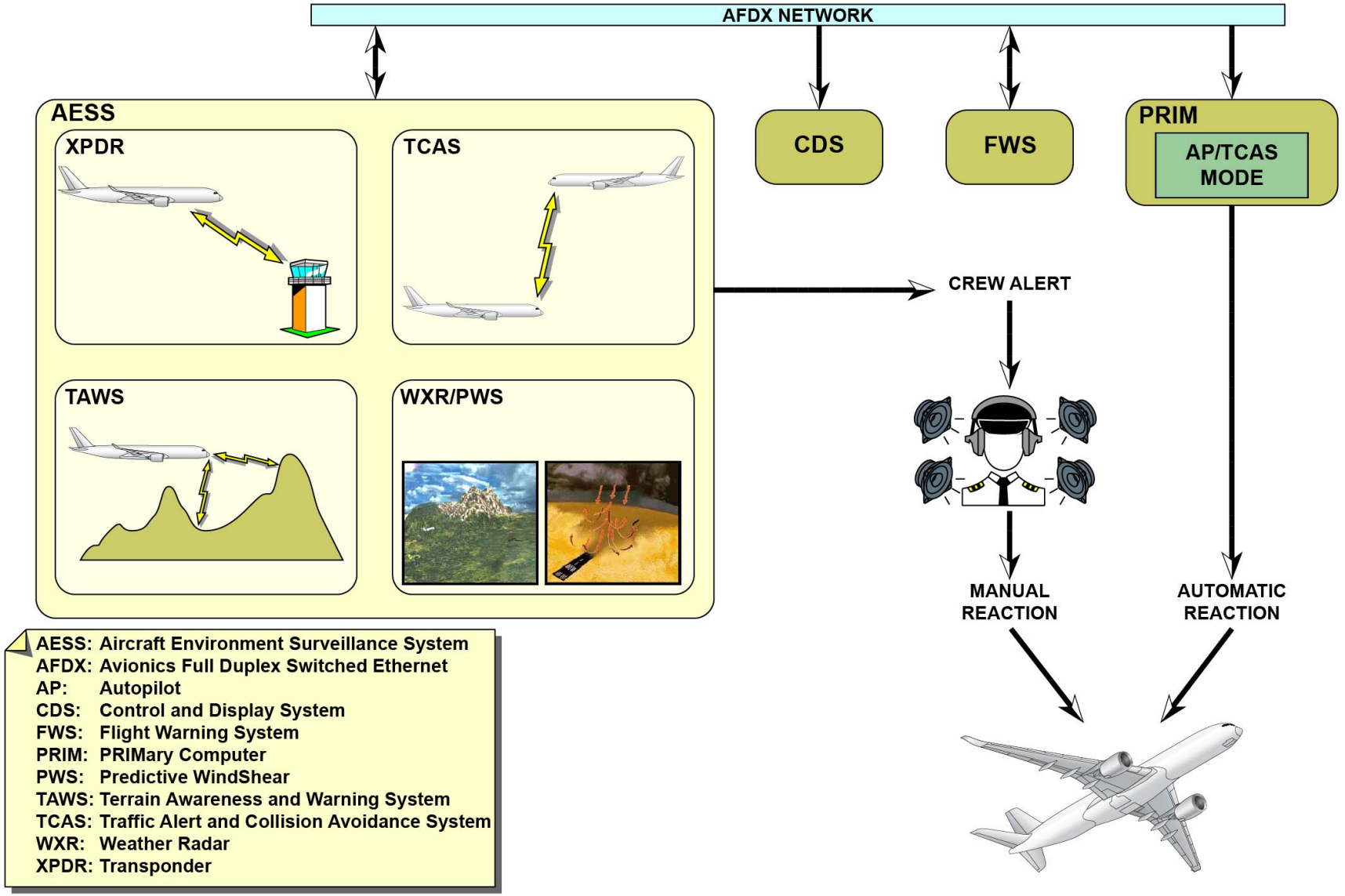

AIRCRAFT ENVIRONMENT SURVEILLANCE SYSTEM (AESS) - PRESENTATION - FUNCTION/DESCRIPTION

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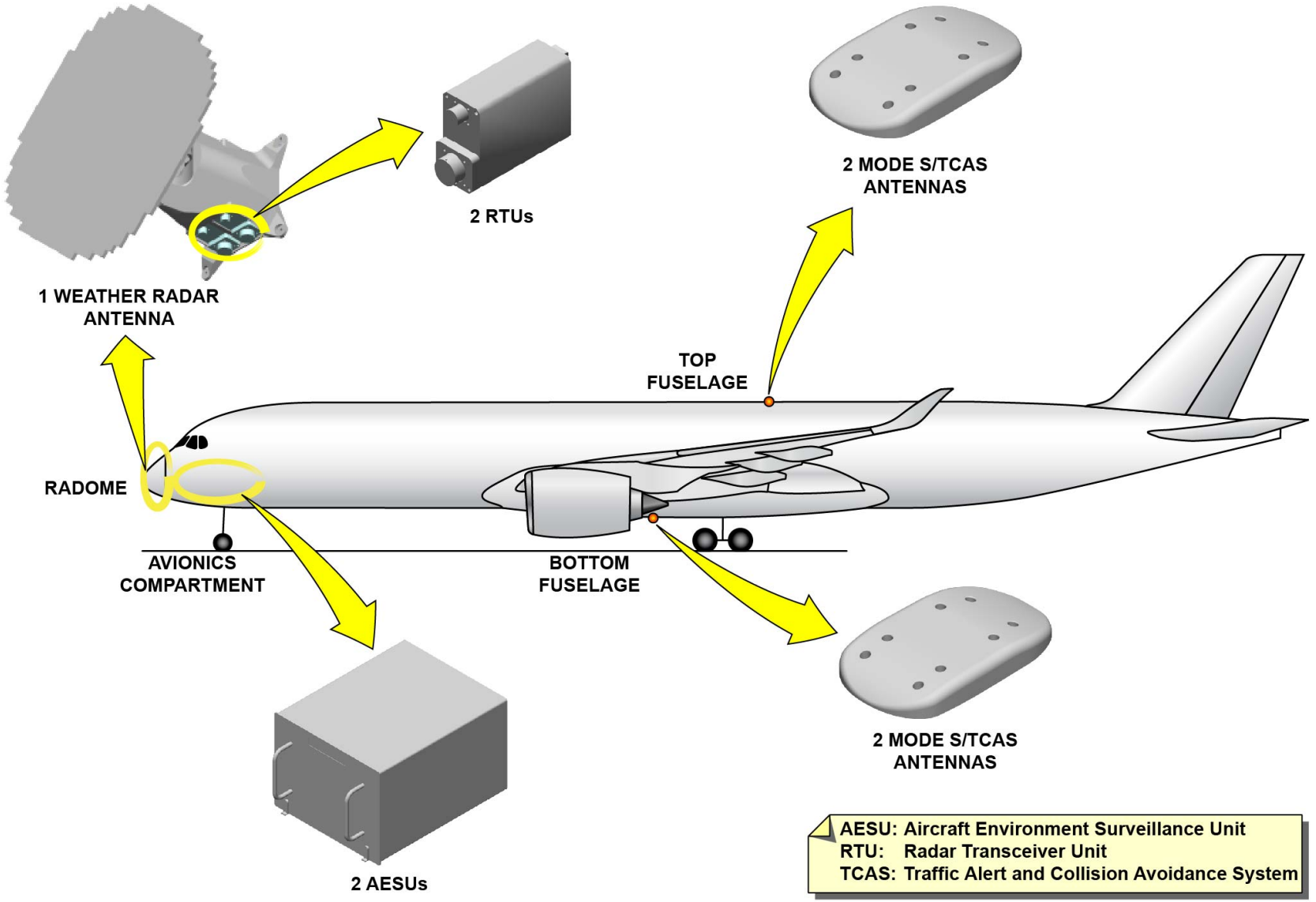
NAVIGATION SYSTEM PRESENTATION (1)

Aircraft Environment Surveillance System (AESS) - Presentation (continued)

Location

The AESS has:
- Two Aircraft Environment Surveillance Units (AESUs) installed in the avionics compartment
- One WXR antenna assembly (plate and drive unit) installed in the radome
- Two Radar Transceiver Units (RTUs) installed in the radome. The two RTUs are directly connected to the WXR antenna drive-unit.
- One AESS control panel installed in the cockpit, on the center pedestal
- Four combined Mode S/TCAS antennas. Two antennas are installed at the top of the fuselage and two antennas are installed at the bottom of the fuselage.



AIRCRAFT ENVIRONMENT SURVEILLANCE SYSTEM (AESS) - PRESENTATION - LOCATION

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NAVIGATION SYSTEM PRESENTATION (1)

AESS - Weather Radar and Predictive WindShear (WXR/PWS) - Presentation

Function/Description

The function of the WXR/PWS is to:
- Detect atmospheric disturbances and turbulence areas to prevent passenger injury or aircraft damage and to make passenger and crew comfort better
- Detect risks of windshear events along the aircraft trajectory
- Give a ground mapping.

The WXR/PWS operates through the AESUs, the RTUs and the WXR antenna.

Interface

The WXR/PWS has interfaces with:
- The CDS to show the WXR and PWS data
- The FWS for alert generation and priority management (then the aural alerts are sent to the communication systems)
- The communication systems for aural alerts through the loudspeakers and the boomsets.

Control and Indicating

The WXR/PWS sends data to the CDS to show the radar image and the related WXR/PWS warnings and data on the ND.
The WXR/PWS controls are done from:
- The AESS control panel (WXR/PWS mode and activation of the function in AESU1 or AESU2)
- The EFIS control panels to select the display mode of the ND to show the radar image
- The KCCUs to get access to the surveillance pages on the MFD (WXR/PWS status and mode).

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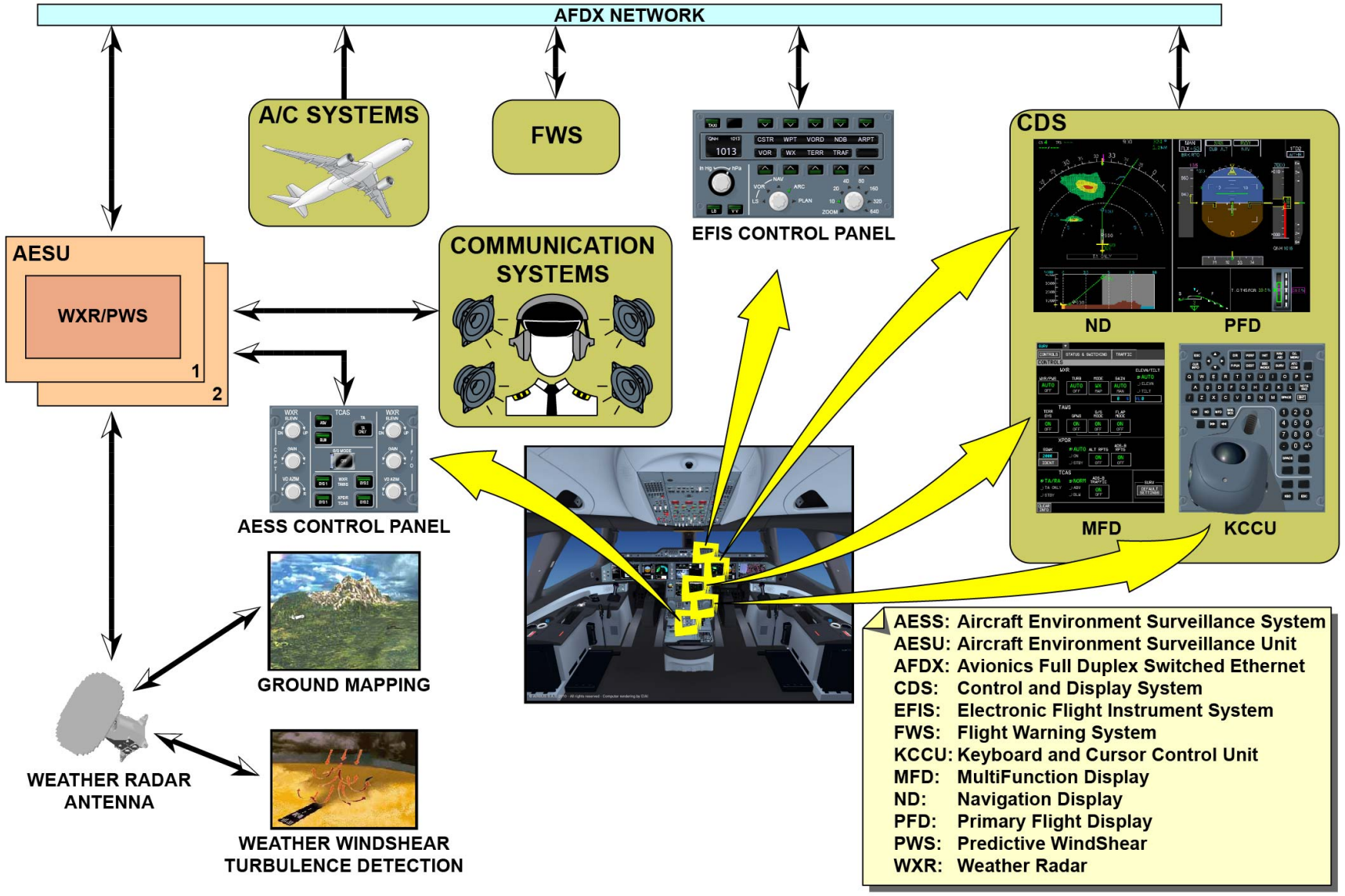

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AESS - WEATHER RADAR AND PREDICTIVE WINDSHEAR (WXR/PWS) - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

NAVIGATION SYSTEM PRESENTATION (1)

AESS - Traffic Alert and Collision Avoidance System (TCAS) - Presentation

Function/Description

The function of the TCAS is to:
- Give an active surveillance of the air traffic to prevent aircraft collision
- Give the flight crew air traffic display and advisories (escape maneuver) to cause a safety vertical separation, if there is a risk of collision.

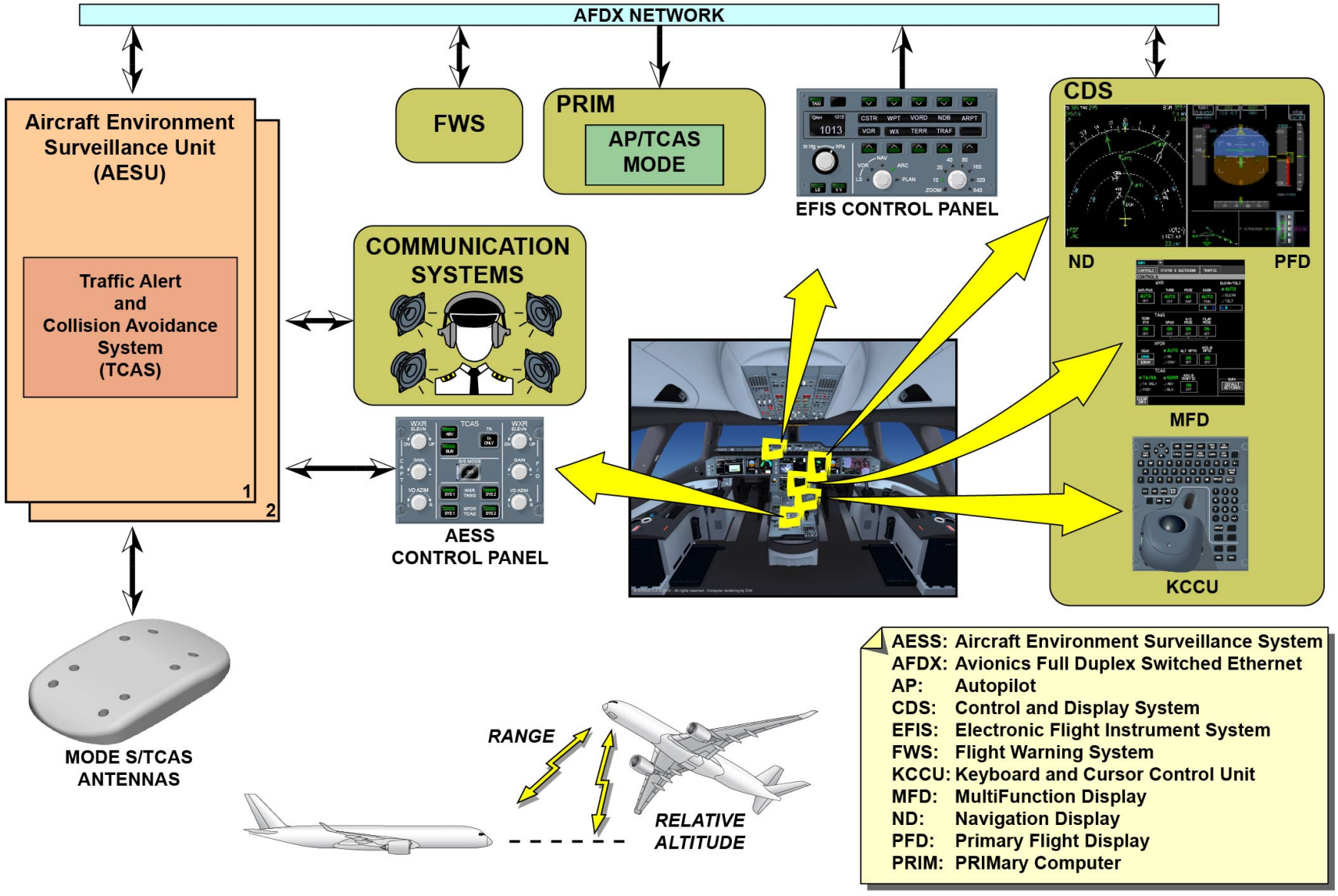
The TCAS transmits Radio Frequency (RF) interrogation signals to the intruder aircraft and uses its reply to make an analysis of its trajectory and the risk of collision.
The TCAS operates through the AESUs and the four Mode S/TCAS antennas.

Interface

The TCAS function has interfaces with:
- The CDS to show the TCAS data
- The PRIM for escape maneuvers (AP/TCAS mode)
- The FWS for alert generation and priority management (then the aural alerts are sent to the communication systems)
- The communication systems for aural alerts through the loudspeakers and the boomsets.

Control and Indicating

The TCAS sends data to the CDS to show the air traffic and the related TCAS warnings and data on the PFD and ND.
The TCAS controls are done from:
- The AESS control panel (TCAS mode and activation of the function in AESU1 or AESU2)
- The EFIS control panels to select the display mode of the ND to show the TCAS data
- The KCCUs to get access to the surveillance pages on the MFD (TCAS status and mode).



AESS - TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS) - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

NAVIGATION SYSTEM PRESENTATION (1)

AESS - Terrain Awareness and Warning System (TAWS) - Presentation

Function/Description

The function of the TAWS is to:
- Prevent aircraft collision with the terrain
- Show an image of the terrain
- Detect dangerous A/C configurations related to the terrain when it compares the current aircraft altitude and position with the terrain database
- Generate aural and visual warnings to alert the flight crew when the aircraft is in dangerous conditions.

The TAWS operates in the two AESUs with internal terrain databases.

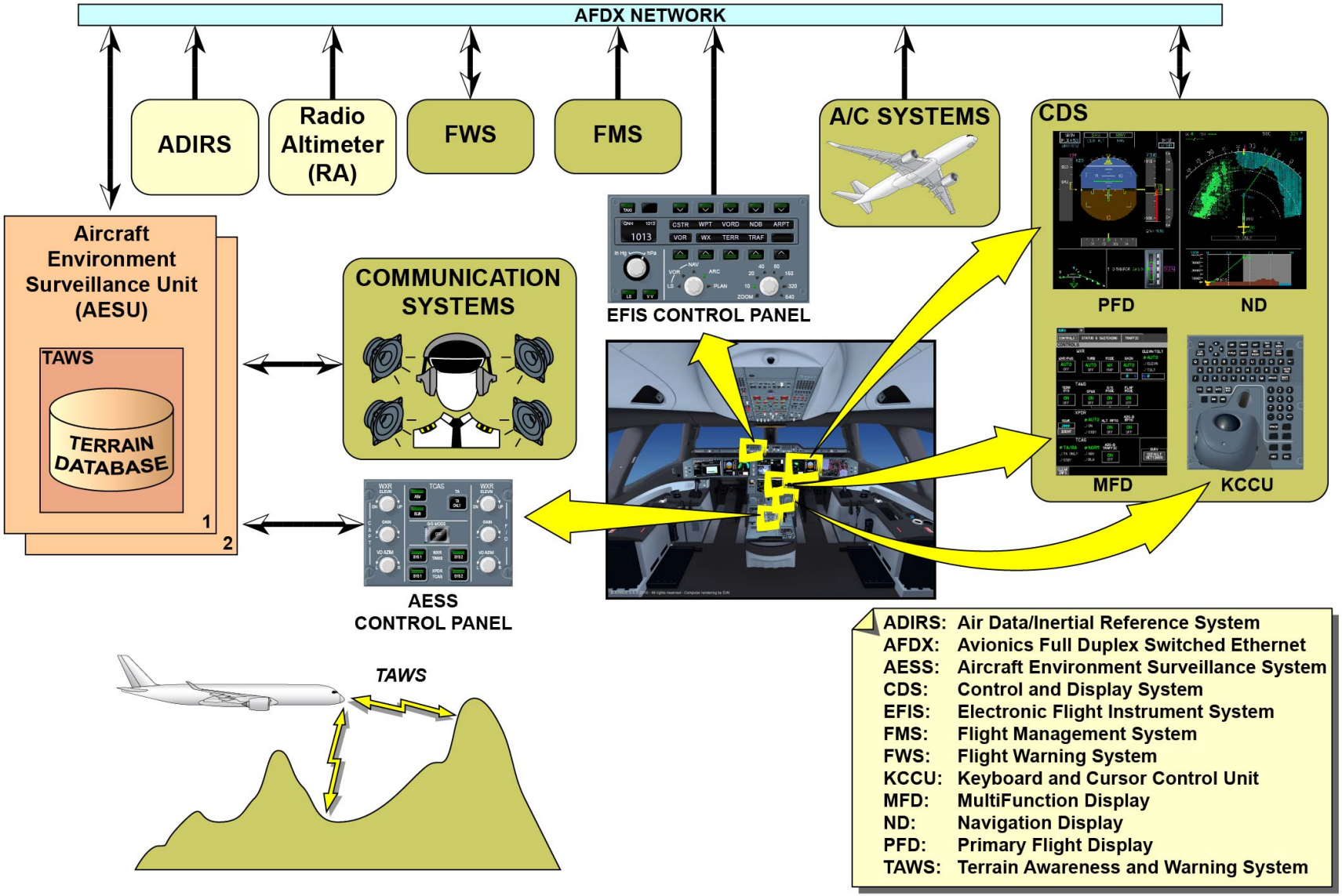
Interface

The TAWS has interfaces with:
- The ADIRS for the aircraft flight path
- The RA for the aircraft radio height
- The FMS for the aircraft position
- The CDS to show the TAWS data
- The FWS for alert generation and priority management (then the aural alerts are sent to the communication systems)
- The communication systems for aural alerts through the loudspeakers and the boomsets
- Some A/C systems (Landing Gear Extension and Retraction System (LGERS), Slat Flap Control Computer (SFCC), MMR, etc.).

Control and Indicating

The TAWS sends data to the CDS to show the terrain image and the related TAWS warnings and data on the ND.

The TAWS controls are done from:
- The AESS control panel (TAWS mode and activation of the function in AESU1 or AESU2)
- The EFIS control panels to select the display mode of the ND to show the terrain image
- The KCCUs to get access to the surveillance pages on the MFD (TAWS status and mode).



AESS - TERRAIN AWARENESS AND WARNING SYSTEM (TAWS) - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

NAVIGATION SYSTEM PRESENTATION (1)

AESS - Transponder (XPDR) - Presentation

Function/Description

The function of the XPDR is to reply to interrogations for identification and altitude reporting through the Mode S/TCAS antennas.
It automatically replies to interrogations from:
- ATC ground station for air traffic surveillance
- TCAS-equipped aircraft to generate traffic alert and prevent collision.

The XPDR operates in the two AESUs and through the four Mode S/TCAS antennas.

Interface

The XPDR has interfaces with:
- The CDS/MFD to show the XPDR data and to change the XPDR code (e.g. SQWAK code)
- The communication systems to change the XPDR code through the RMPs.

Control and Indicating

The XPDR controls are done from:
- The AESS control panel (activation of the function in AESU1 or AESU2)
- The KCCUs, to get access to the surveillance pages on the MFD (XPDR status and mode, XPDR code)
- The RMPs, to change the XPDR code.

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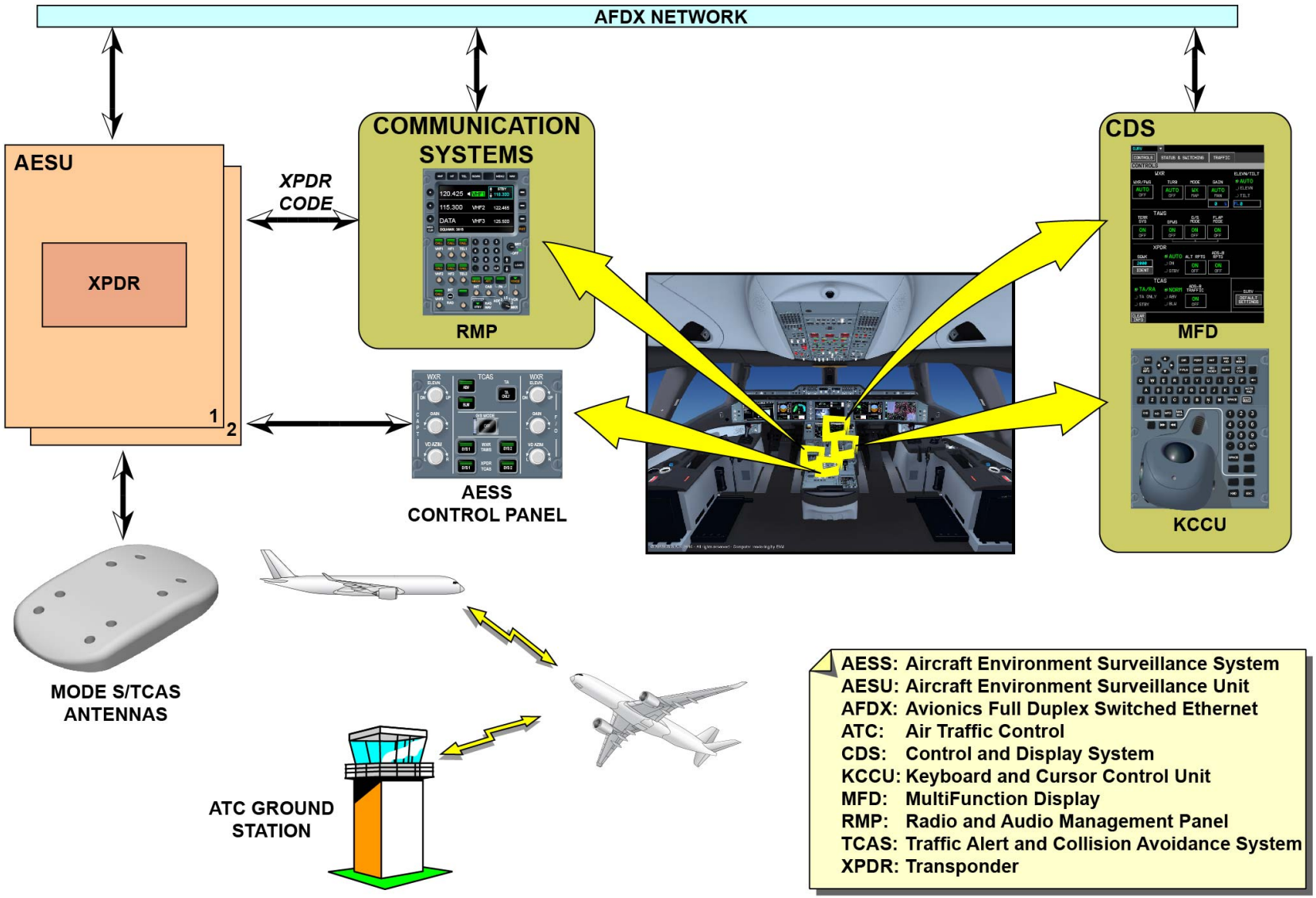


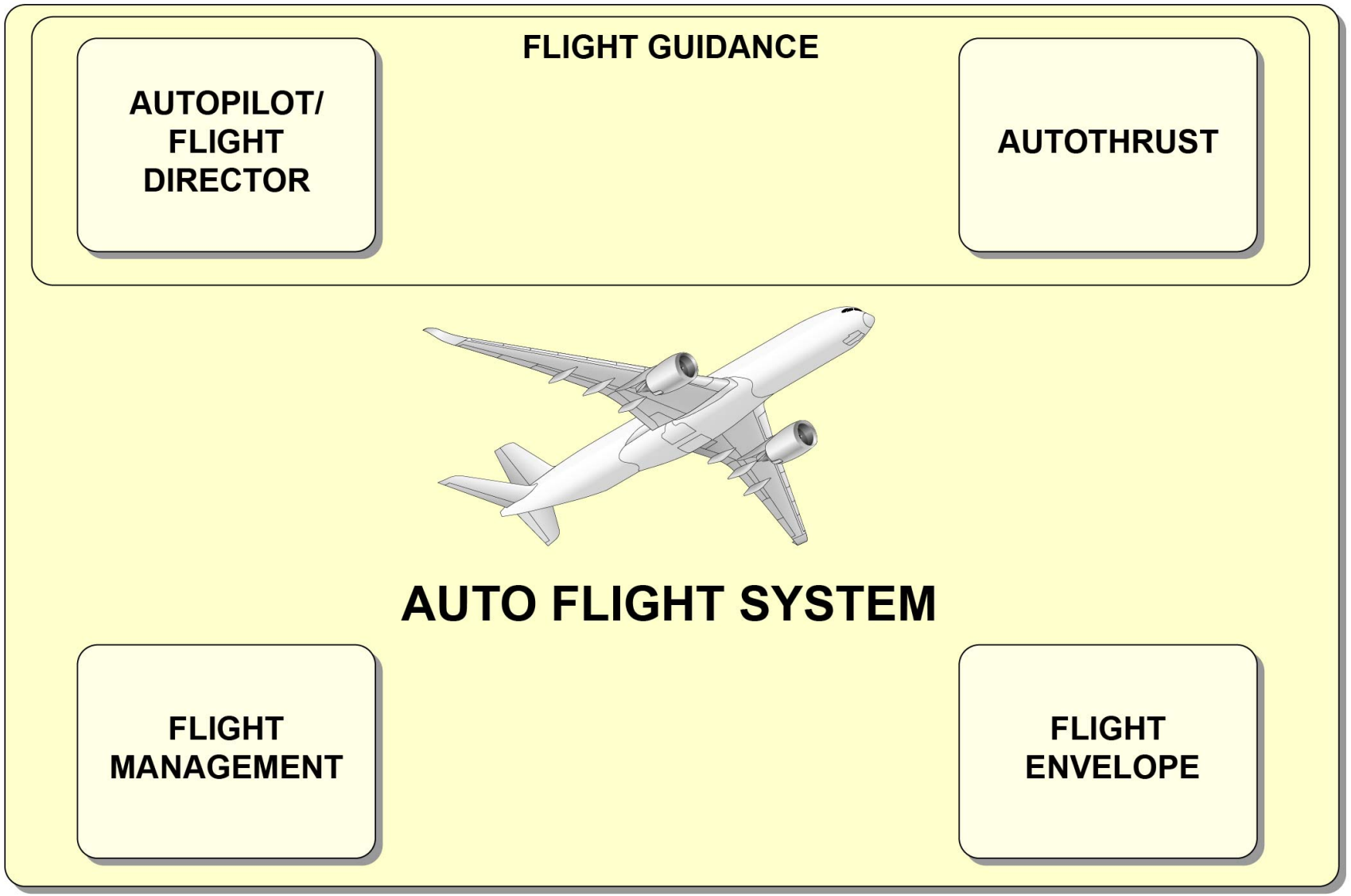
AESS - TRANSPONDER (XPDR) - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

AUTO FLIGHT SYSTEM PRESENTATION (1)

Overview

The functions of the Automatic Flight System (AFS) are:
- To increase the flight safety
- To reduce the crew workload
- To optimize the fuel consumption.

General familiarization training for this system focuses on:
- Flight Guidance functions (FG)
- Autopilot/Flight Director (AP/FD)
- Autothrust (A/THR)
- Flight Envelope (FE)
- Flight Management (FM).


FLIGHT GUIDANCE
AUTOPILOT/
FLIGHT
DIRECTOR
AUTOTHRUST
AUTO FLIGHT SYSTEM
FLIGHT
MANAGEMENT
FLIGHT
ENVELOPE

OVERVIEW

AUTO FLIGHT SYSTEM PRESENTATION (1)

Flight Guidance - Autopilot/Flight Director (AP/FD) - Presentation

Function/Description

The aircraft attitude can be controlled either manually or automatically:
- In manual mode, the pilots use the Side Stick Units (SSUs) to send guidance orders to the flight controls system which will apply corresponding deflection on movable surfaces. In addition, in manual mode, the pilots use the throttle control levers to adjust the thrust.
- In automatic mode, the guidance orders are sent automatically by the AP/FD function part of the AFS to the flight controls system.

The AP/FD includes Autopilot (AP) functions and Flight Director (FD) functions.
The AP functions give orders to:
- The actuators of the flight control surfaces to control the attitude of the aircraft on the three axes (pitch, roll and yaw)
- The Nose Wheel Steering (NWS) system for small adjustments during automatic landing
- The Brake Control System (BCS) for the Brake to Vacate (BTV) function.

The FD functions give guidance information to the flight crew for manual control of the aircraft and for AP monitoring.
The AP/FD receives orders from the Aircraft Environment Surveillance System (AESS) for the Traffic Alert and Collision Avoidance System (TCAS) function. These orders are used for the automatic guidance of the aircraft or are given to the flight crew as FD guidance data for manual control of the aircraft.
The general architecture of the AP/FD includes three PRIMary Computers (PRIMs) and the AFS applications in the Core Processing Input/Output Modules (CPIOMs).
The AP/FD functions are hosted in each PRIM.

Location

For the PRIMs, refer to paragraph location of the description 270000
.

Interface

For the AP/FD functions, the PRIMs have interfaces as follows:
The PRIMs receive inputs from:
- The rudder pedals
- The SSUs
- The FCU and FCU backup
- The navigation systems.

The PRIMs send data or orders to the actuators of the flight control surfaces through the AFDX network, and communicate with:
- The NWS system
- The BCS function
- The engines
- The Control and Display System (CDS)
- The FWS for the generation of warnings and messages
- The AESS for TCAS function.

Flight Guidance - Autothrust (A/THR) - Presentation

Function/Description

The thrust of the aircraft can be controlled either manually or automatically:
- In manual mode, the pilots use the throttle control levers to send guidance (thrust) orders to the Propulsion Control System (PCS).
- In automatic mode, the thrust orders are sent automatically by the A/THR function part of the AFS to the PCS.

The function of the A/THR is to automatically control the engine thrust.

Location

For the PRIMs, refer to paragraph location of the description 270000 .

Interface

The A/THR functions are hosted in each PRIM. For these functions, the PRIMs:
- Communicate with the FCU, the engines and the CDS
- Receive input from the thrust control levers and the instinctive-disconnect pushbutton-switches on the throttle control levers.

The AFS applications, which are hosted in the CPIOMs:
- Give FCU backup, through the AFDX network, used when the FCU is not available but not only
- Send data to the FWS, through the AFDX network, for the generation of warnings and messages.

Flight Envelope (FE) - Presentation

Function/Description

The FE functions monitor the parameters related to the aircraft flight envelope. The primary function of the FE is to detect abnormal flight conditions.
The general architecture of the FE includes three PRIMs.
The FE functions are hosted in each PRIM. For these functions, the PRIMs:
- Communicate, through the AFDX network, with the FE functions hosted in the other PRIMs and the AFS applications in the CPIOMs
- Receive input from the FG function.

Location

For the PRIMs, refer to paragraph location of the description 270000 .

Interface

For the FE functions, the PRIMs have an interface with the CDS through the AFDX network.

Flight Management (FM) - Presentation

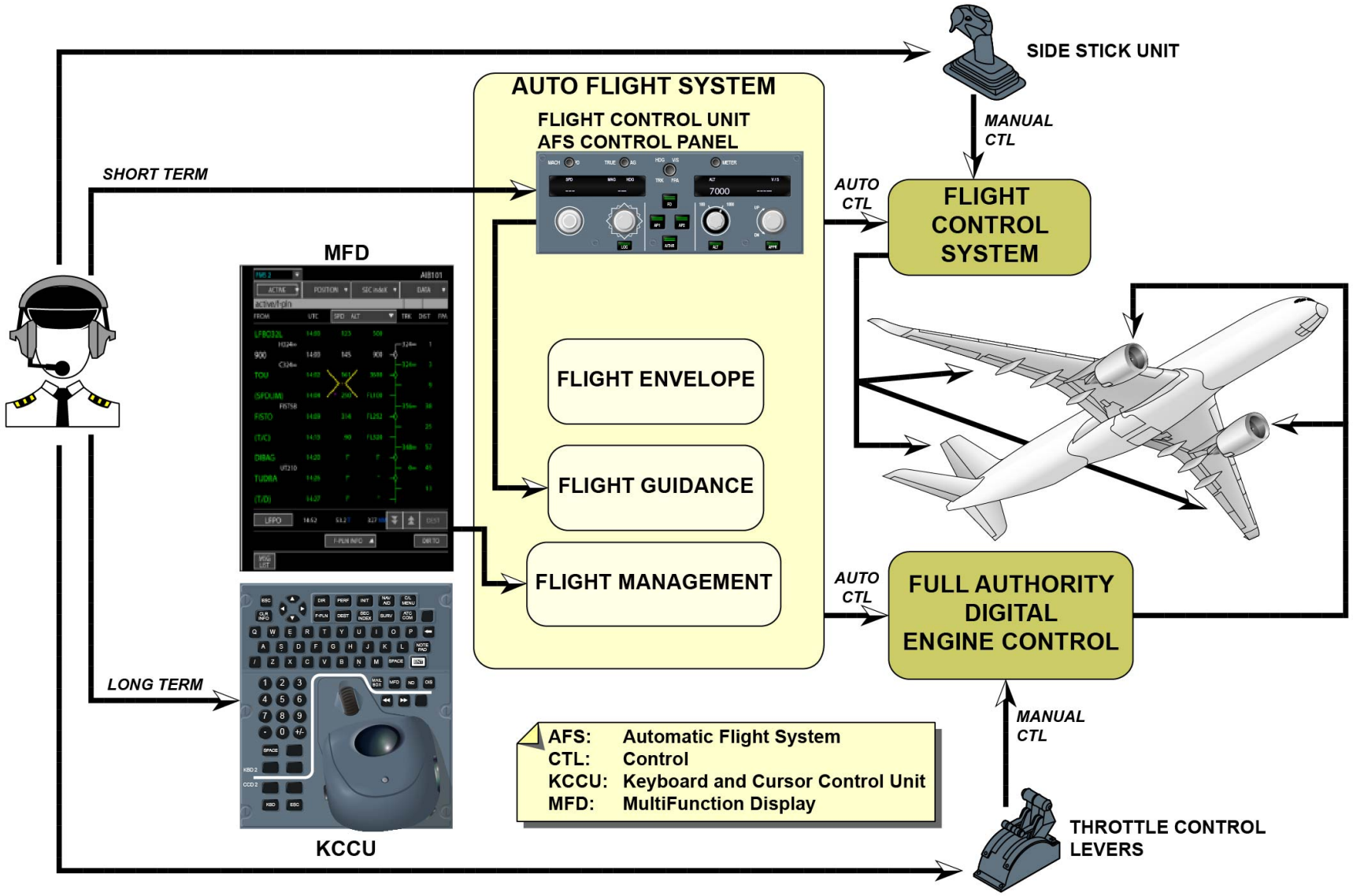
Function/Description

The primary functions of the FM are to:
- Calculate the aircraft position (navigation function)
- Give orders for flight control and thrust control (guidance function).

The general architecture of the FM includes three Flight Management Computers (FMCs).

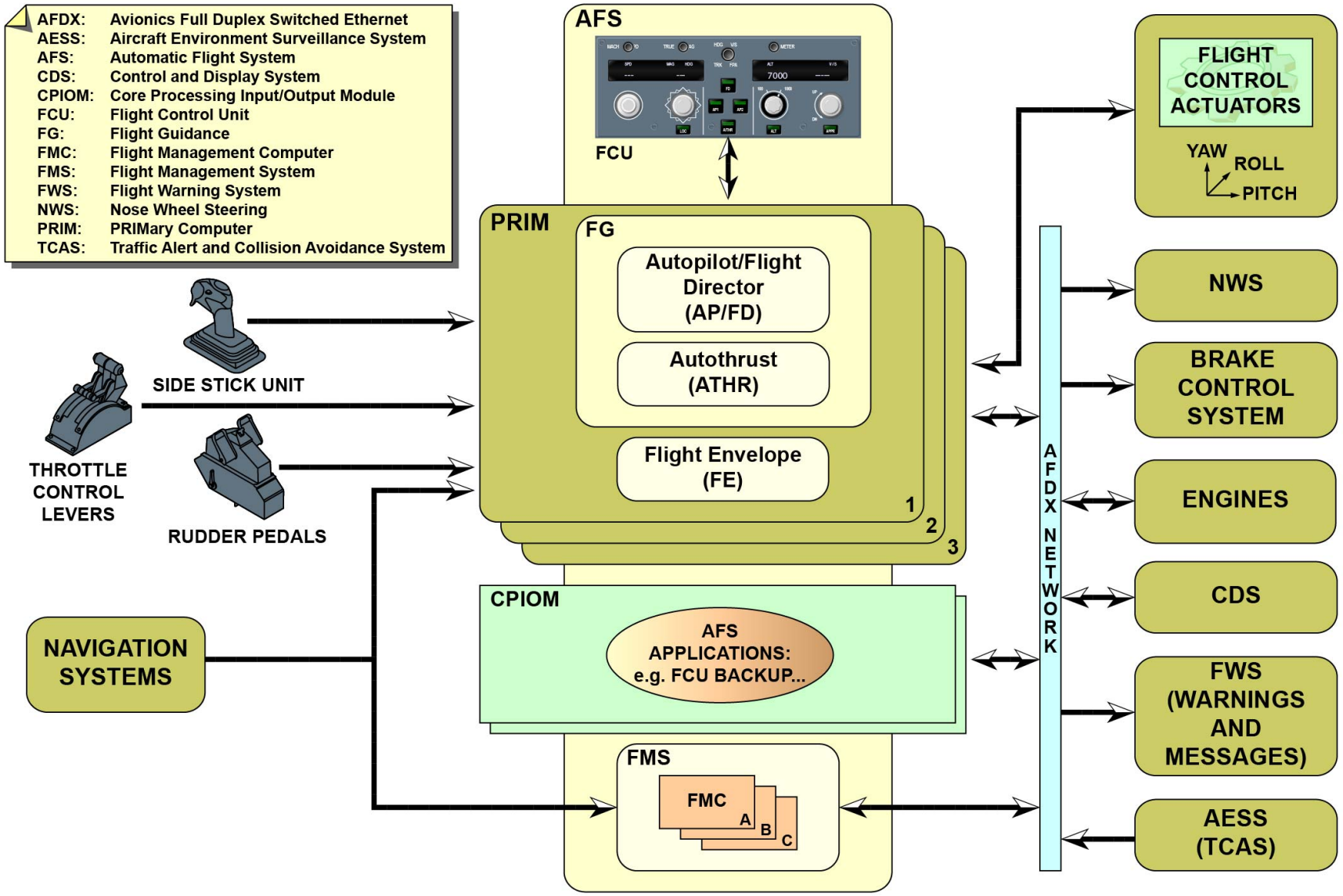
Interface

Each FMC has interfaces with:
- The CDS through the AFDX network
- The navigation systems
- The other FMCs
- The FG and FE functions
- The AFS applications
- The Aircraft Environment Surveillance System (AESS).



FLIGHT GUIDANCE - AUTOPILOT/FLIGHT DIRECTOR (AP/FD) - PRESENTATION ... FLIGHT MANAGEMENT (FM) - PRESENTATION

V1813401 - V01T0M0 - VM22P1LEVEL0101



FLIGHT GUIDANCE - AUTOPILOT/FLIGHT DIRECTOR (AP/FD) - PRESENTATION ... FLIGHT MANAGEMENT (FM) - PRESENTATION

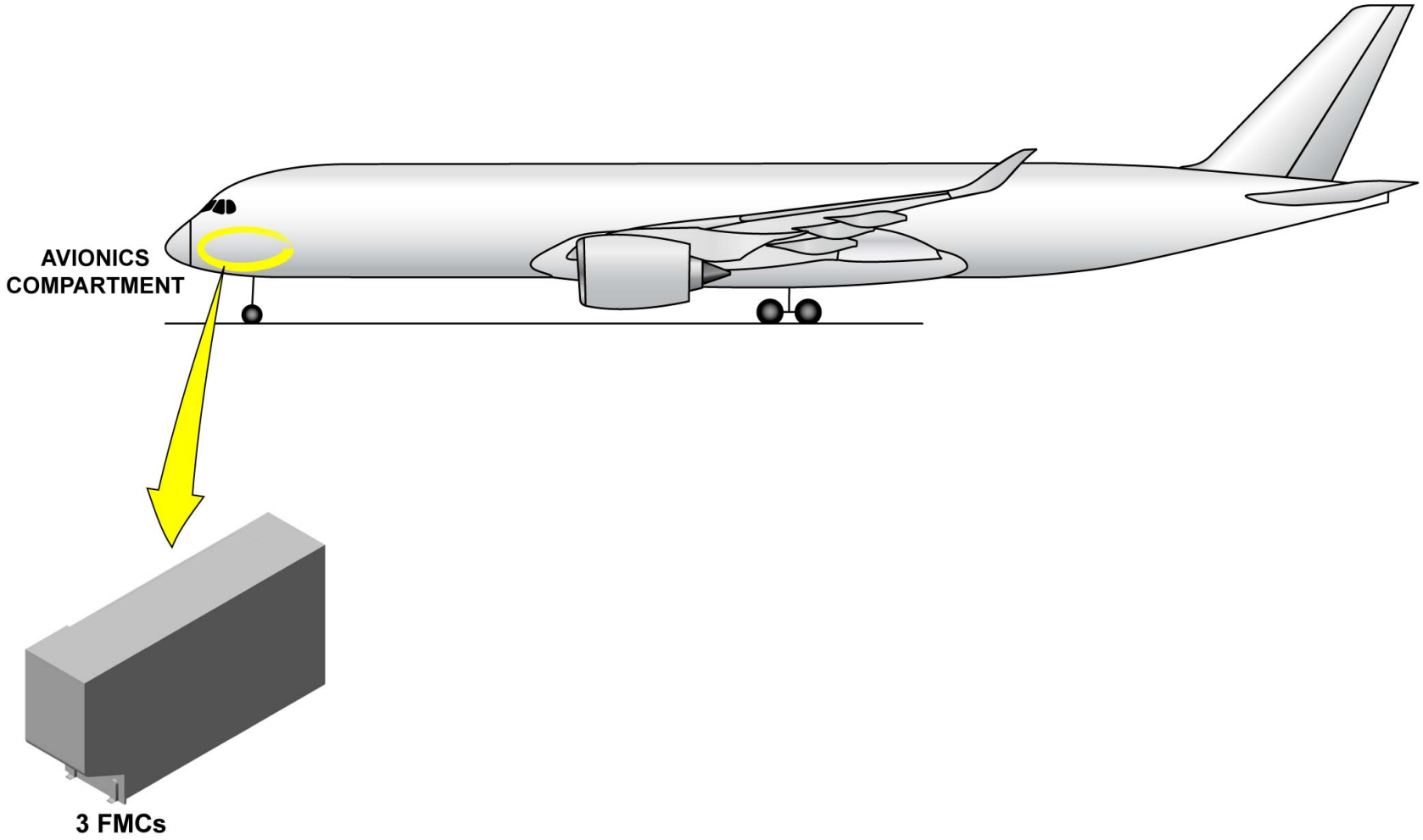
V1813401 - V01T0M0 - VM22P1LEVEL0101

AUTO FLIGHT SYSTEM PRESENTATION (1)

Flight Management (FM) - Presentation (continued)

Location

The three FMCs are installed in the avionics compartment.



FMC: Flight Management Computer

FLIGHT MANAGEMENT (FM) - PRESENTATION - LOCATION

AUTO FLIGHT SYSTEM PRESENTATION (1)

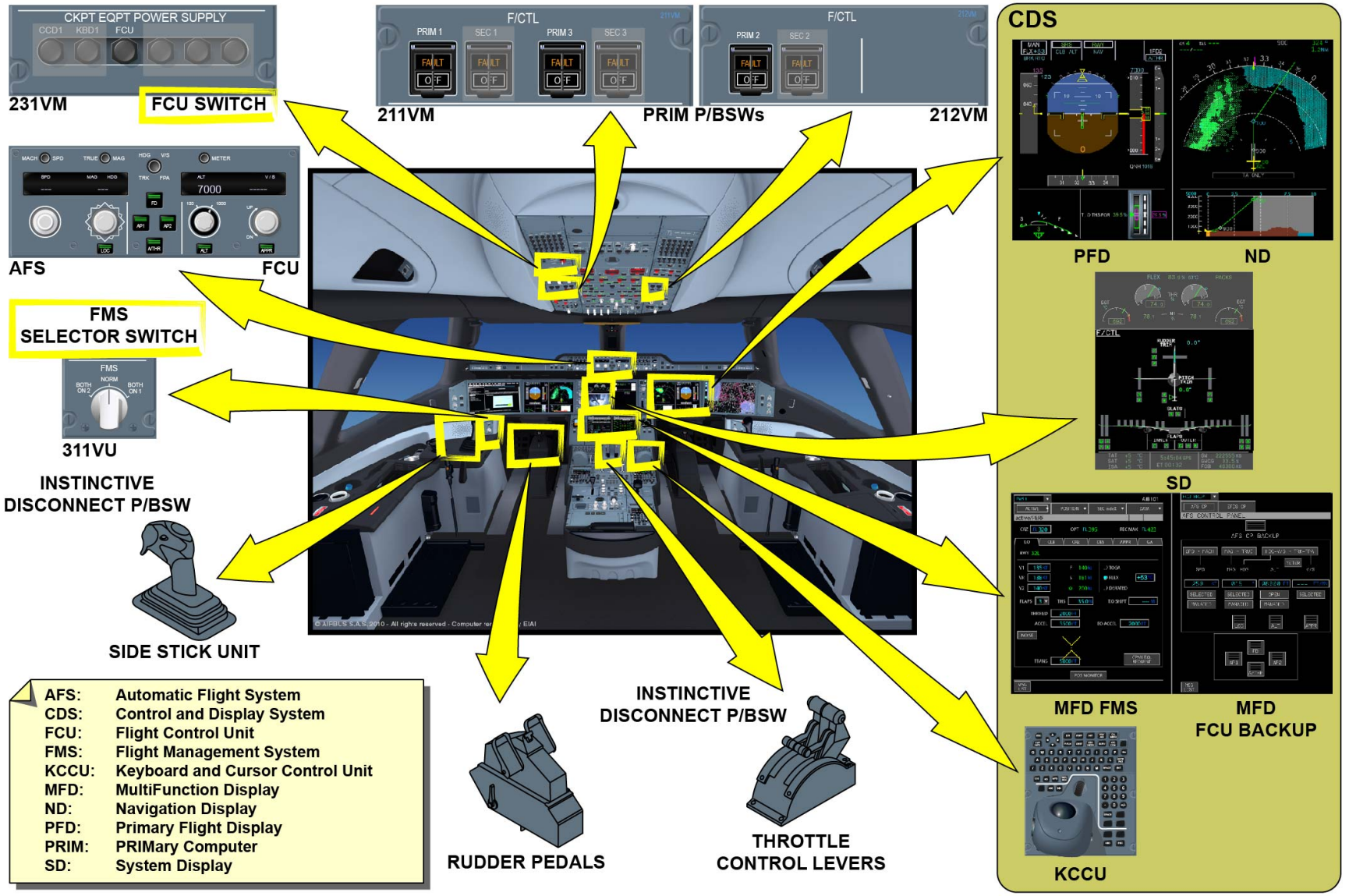
Control and Indicating - Presentation

Control

The controls of the AFS are as follows:
- FCU and FCU backup (the FCU is the primary interface with the flight crew for the selection of the AP/FD and A/THR modes)
- CDS (two MultiFunction Displays (MFDs))
- Keyboard and Cursor Control Units (KCCUs)
- SSUs, each one with an AP instinctive-disconnect pushbutton-switch
- Rudder pedals
- Throttle control levers, each one with an A/THR instinctive-disconnect pushbutton-switch
- Three PRIM pushbutton-switches and one FCU switch on the cockpit overhead panel
- FMS selector switch on the main instrument panel.

Indicating

The indicating of the AFS is as follows:
- The FCU and the FCU backup page on the MFD show the AP/FD and A/THR engagement statuses
- The MFDs and SD are used to show FM data
- The PFDs and NDs show navigation and guidance indications.



CONTROL AND INDICATING - PRESENTATION - CONTROL & INDICATING

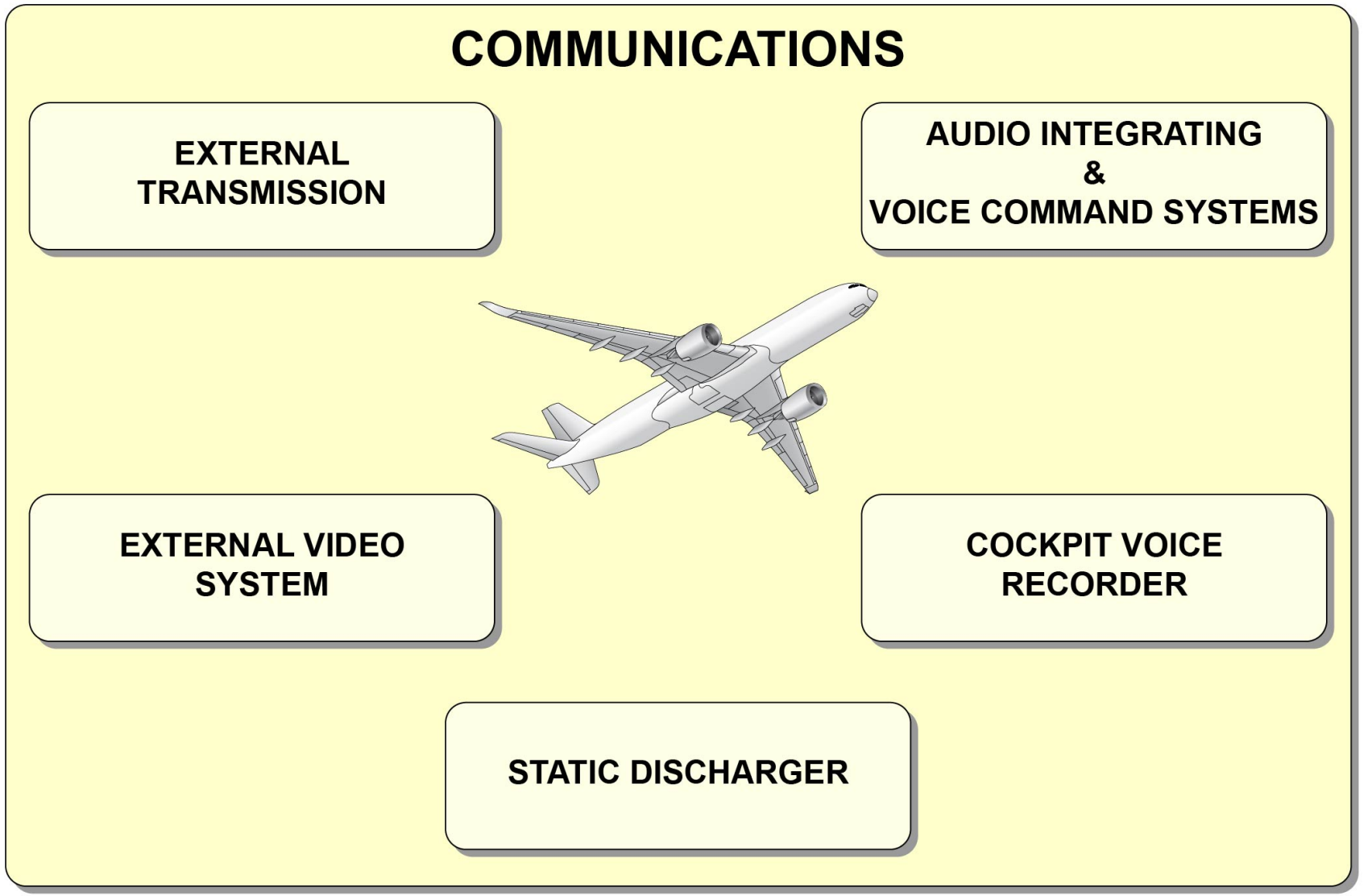
V1813401 - V01T0M0 - VM22P1LEVEL0101

COMMUNICATIONS SYSTEM PRESENTATION (1)

Overview

The functions of the communication system are:
- To give communication means
- To monitor audio and video.

The general familiarization training for these systems includes:
- External transmission systems for voice and data communications
- Audio integrating and voice command systems
- Cockpit Voice Recorder (CVR)
- Static discharger
- External video system.


COMMUNICATIONS
EXTERNAL TRANSMISSION
AUDIO INTEGRATING & VOICE COMMAND SYSTEMS
EXTERNAL VIDEO SYSTEM
COCKPIT VOICE RECORDER
STATIC DISCHARGER

OVERVIEW

COMMUNICATIONS SYSTEM PRESENTATION (1)

External Transmission - Presentation

Function/Description

The function of the external transmission system is to make voice and data communications possible between the aircraft and these ground stations:
- Air Traffic Control (ATC) centers
- Airline Operational Control (AOC) centers.

The external transmission system includes:
- The High Frequency (HF) system
- The Very High Frequency (VHF) system.

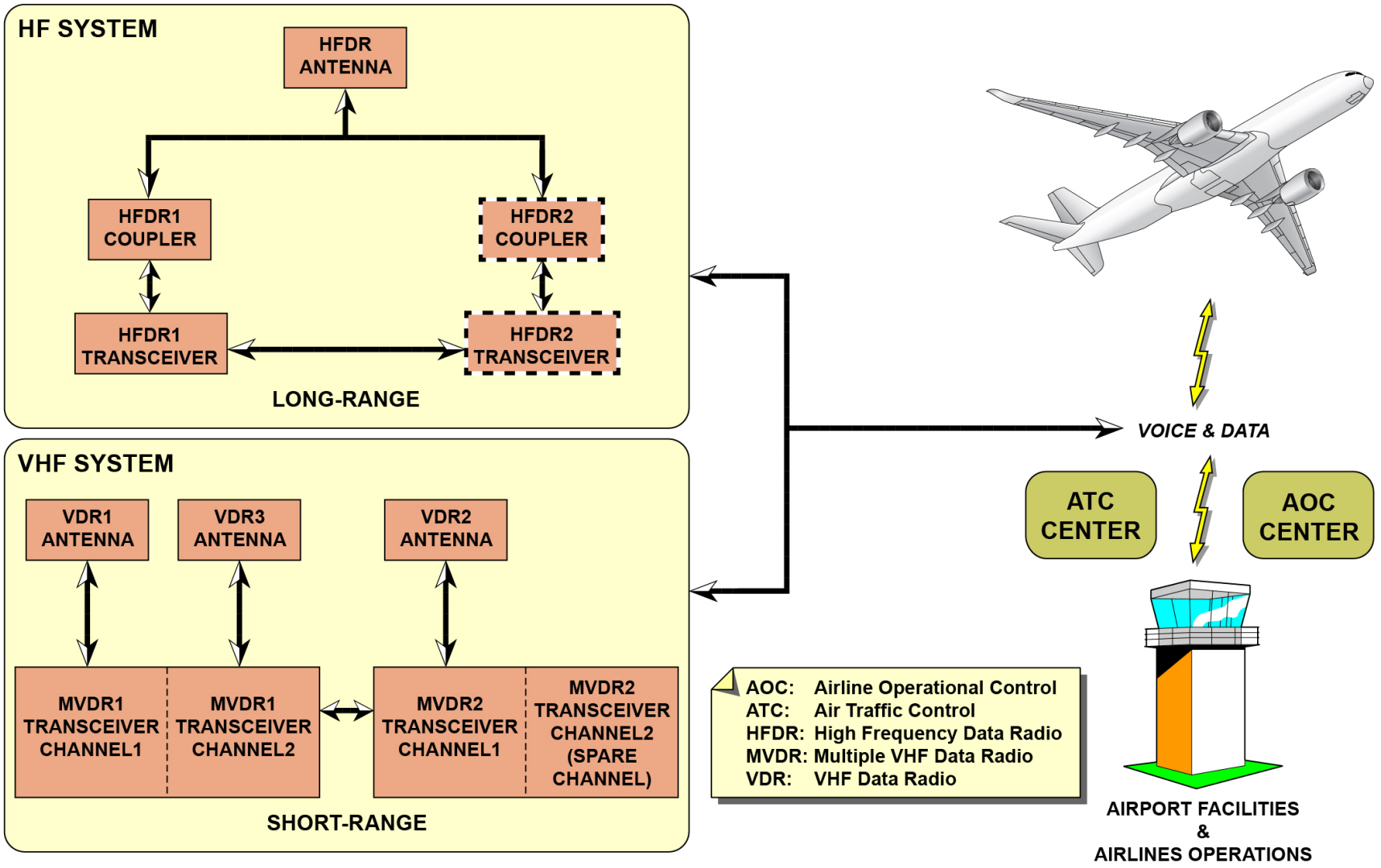
The HF system includes:
- Two identical High Frequency Data Radio (HFDR) transceivers (the second one is optional)
- Two identical HFDR couplers (the second one is optional)
- One common HFDR antenna.

The HF system is used for long-range communications between different aircraft and between the aircraft and ground stations (ATC and/or AOC centers) in voice and/or data simplex modes.

The VHF system includes:
- Two Multiple VHF Data Radio (MVDR) transceivers
- Three VHF Data Radio (VDR) antennas.

MVDR transceiver 1 is connected to two VDR antennas. MVDR transceiver 2 is connected to one VDR antenna.

The VHF system is used for short-range (line of sight) communications between different aircraft and between the aircraft and ground stations (ATC and/or AOC centers) in voice and/or data simplex modes.



EXTERNAL TRANSMISSION - PRESENTATION - FUNCTION/DESCRIPTION

V1813401 - V01T0M0 - VM23P1LEVEL0101

COMMUNICATIONS SYSTEM PRESENTATION (1)

External Transmission - Presentation (continued)

Location

The HF system has:
- Two HFDR transceivers in the avionics compartment (the second one is optional)
- Two HFDR couplers in a pressurized area near the vertical stabilizer (the second one is optional)
- One antenna on the forward section of the vertical stabilizer.

The VHF system has:
- Two MVDR transceivers in the avionics compartment
- One antenna on the forward top section of the aircraft fuselage
- One antenna on the forward bottom section of the aircraft fuselage
- One antenna on the aft top section of the aircraft fuselage.

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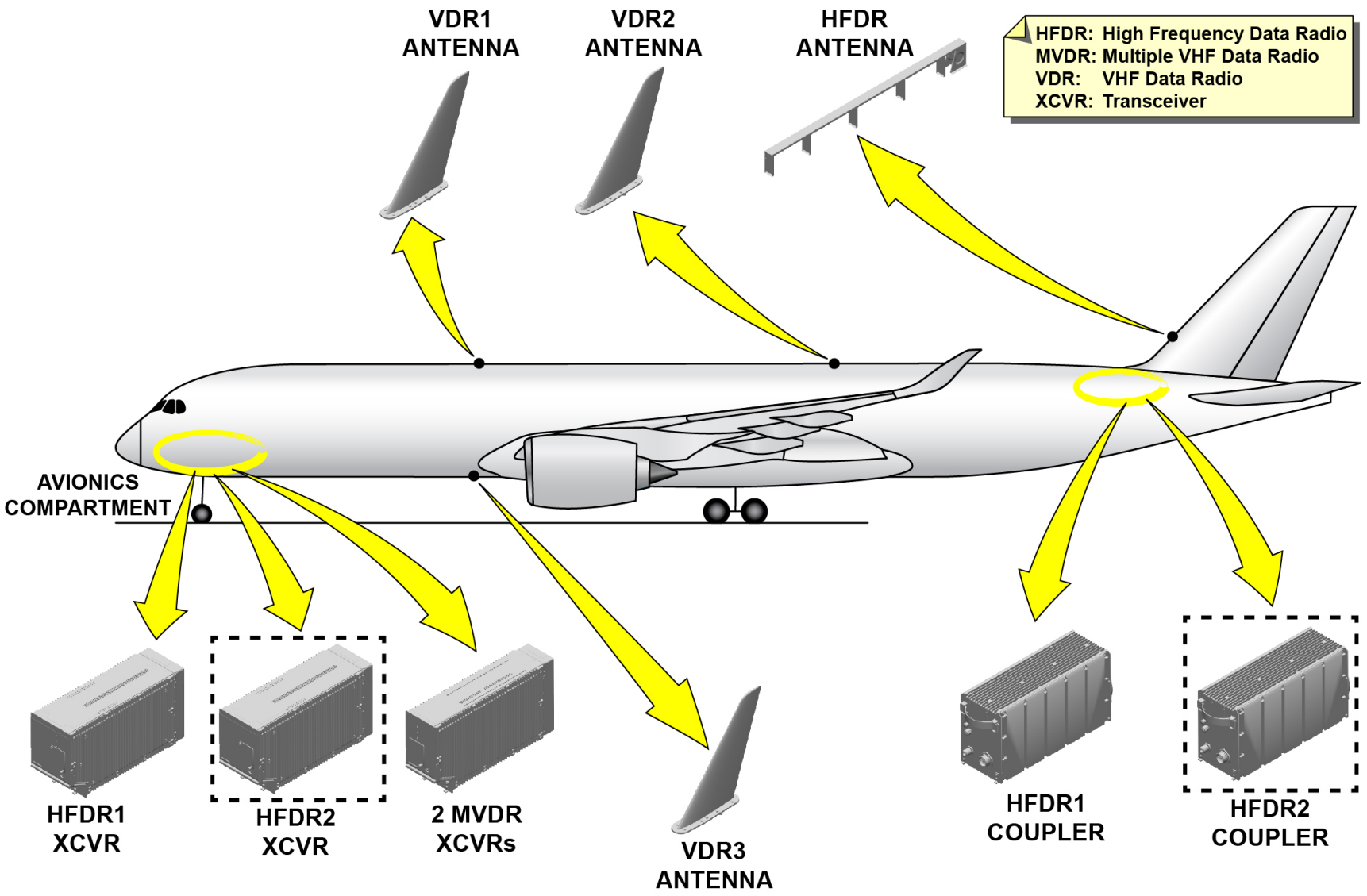


EXTERNAL TRANSMISSION - PRESENTATION - LOCATION

V1813401 - V01T0M0 - VM23P1LEVEL0101

COMMUNICATIONS SYSTEM PRESENTATION (1)

External Transmission - Presentation (continued)

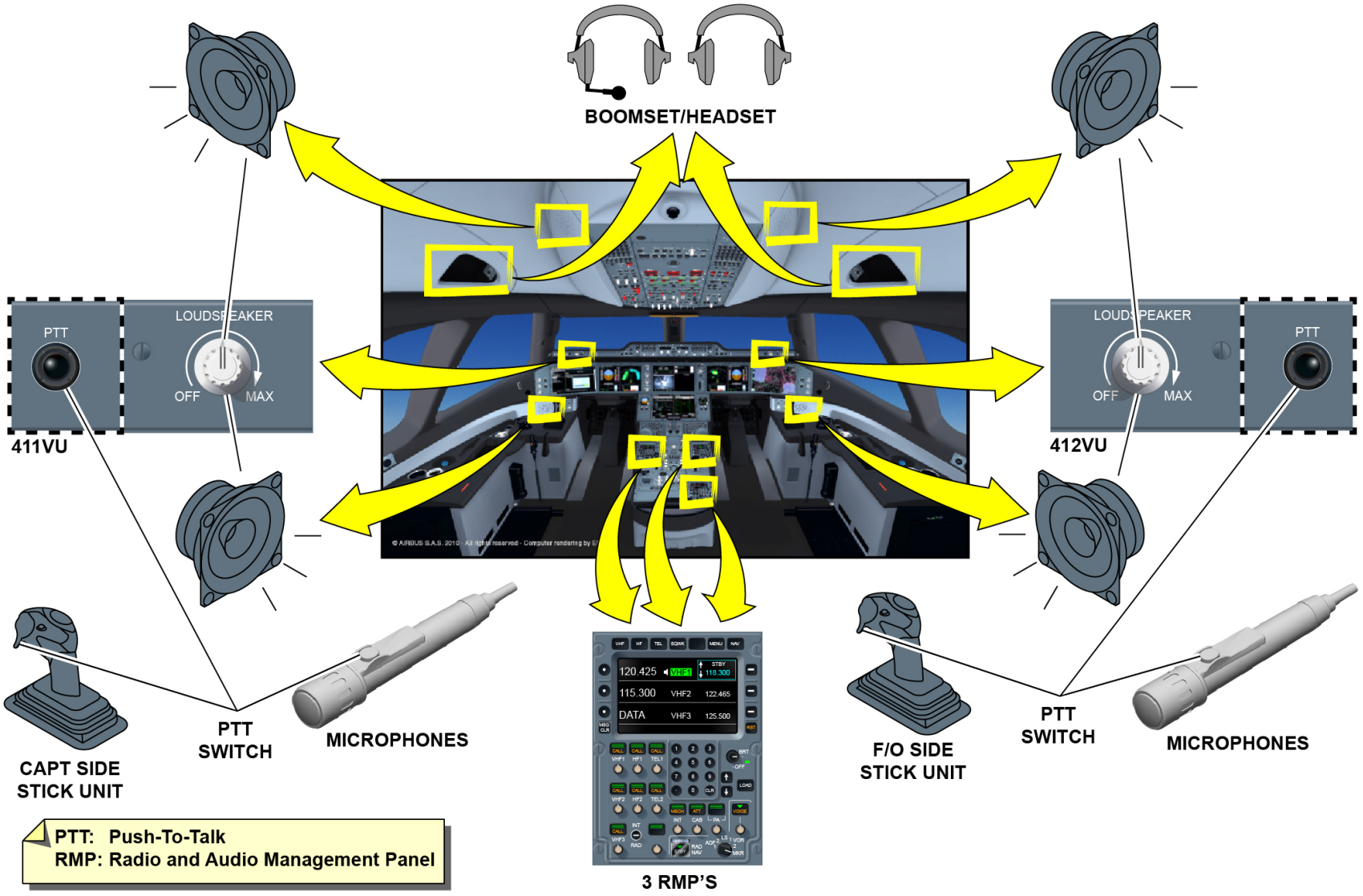
Control and Indicating

For the HF system:
The controls are as follows:
- Three Radio and Audio Management Panels (RMPs) installed in the cockpit, on the center pedestal
- A Push-To-Talk (PTT) switch on the three hand microphones
- A PTT switch on the Captain (CAPT) side-stick unit and one on the First Officer (F/O) side-stick unit
- Two PTT switches on the glareshield (optional): one for the CAPT and one for the F/O.

The indicating is as follows:
- The three RMPs show the status of the frequencies and the communication modes (VOICE/DATA).
- The Control and Display System (CDS) shows the Electronic Centralized Aircraft Monitoring (ECAM) memos and alerts.
- The audio signals are sent to the CAPT and F/O through the boomsets, headsets and four loudspeakers.

For the VHF system:
The controls are as follows:
- Three RMPs: they are used to select and tune a frequency channel, to switch voice and data, and to show the VHF function communication status.
- A PTT switch on the three hand microphones
- A PTT switch on the CAPT side-stick unit and one on the F/O side-stick unit
- Two PTT switches on the glareshield (optional): one for the CAPT and one for the F/O.

The indicating is as follows:
- The three RMPs show the status of the frequencies and the communication modes (VOICE/DATA).
- The CDS shows the ECAM memos and alerts.
- The audio signals are sent to the CAPT and F/O through the boomsets, headsets and four loudspeakers.



EXTERNAL TRANSMISSION - PRESENTATION - CONTROL AND INDICATING

COMMUNICATIONS SYSTEM PRESENTATION (1)

External Transmission - Presentation

Function/Description

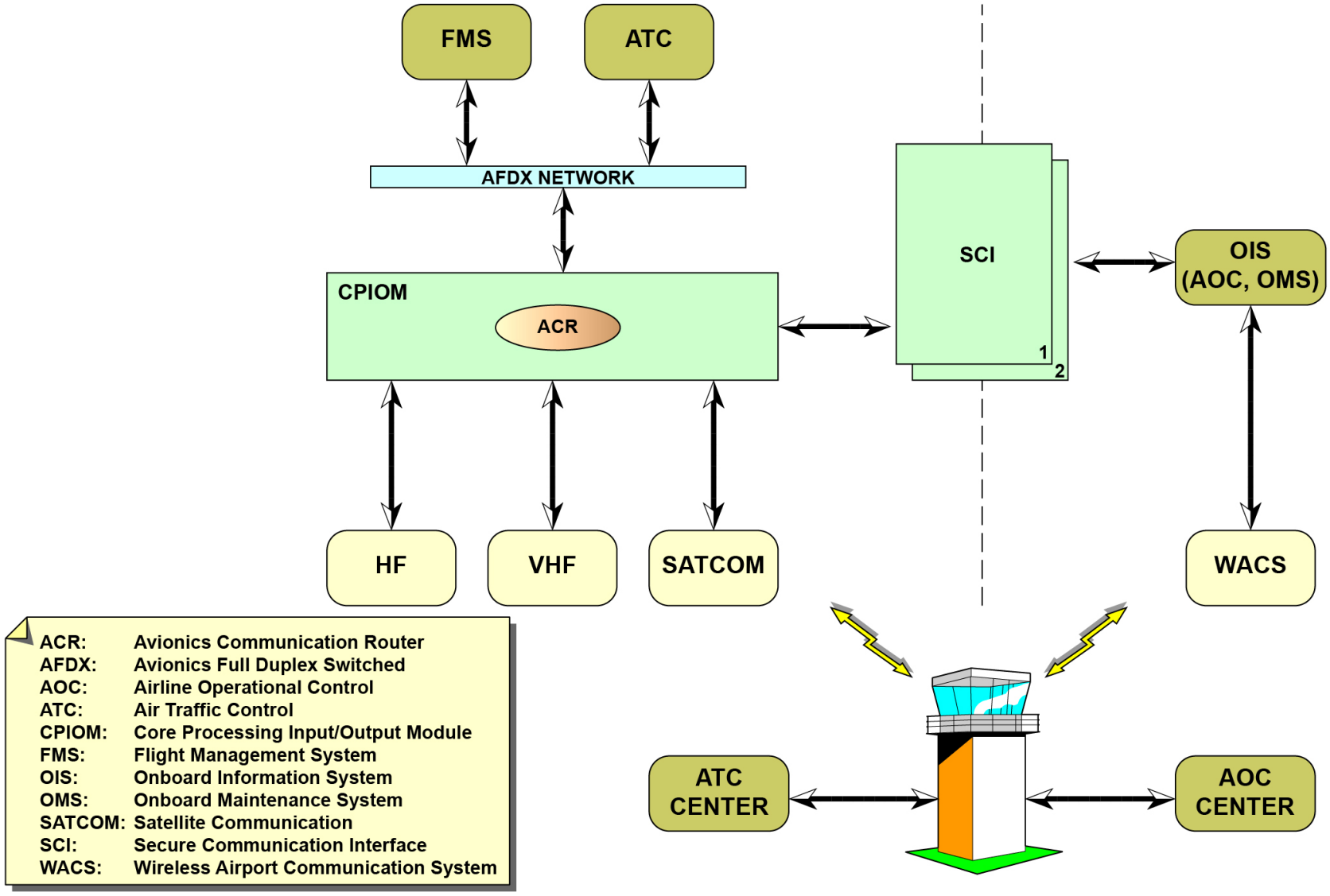
The function of the external transmission system is to give worldwide onboard-communication services necessary to different applications, through these stations:
- ATC
- AOC
- Flight Management System (FMS)
- Airline Administrative Communications (AAC).

The external transmission system includes:
- The Avionics Communication Router (ACR) application
- The Wireless Airport Communication System (WACS)
- The SATellite COMmunication (SATCOM) system.

The function of the ACR application is to give worldwide air-to-ground data communication services to airborne applications through the VHF, HF and SATCOM systems.
The ACR application is hosted in a Core Processing Input/Output Module (CPIOM).
The WACS is used to transmit and receive data for airline use when the aircraft is at the airport gate. It has two transceivers (one of them is optional) and their related antenna.
The SATCOM system is used for voice and data communications (cockpit voice, cockpit data, passenger high speed services) between the aircraft and the ground stations through satellites.
The SATCOM is connected to the ACR application.

Interface

The ACR, which is hosted in a CPIOM, sends data to the CDS through the Avionics Full Duplex Switched Ethernet (AFDX) network.



EXTERNAL TRANSMISSION - PRESENTATION - FUNCTION/DESCRIPTION & INTERFACE

COMMUNICATIONS SYSTEM PRESENTATION (1)

External Transmission - Presentation (continued)

Location

The WACS antenna is installed on the top fuselage.
The WACS transceivers are installed in the aircraft near their antennas.
The SATCOM antenna is installed on the top fuselage.
The Satellite Data Unit (SDU) is installed in the avionics compartment.

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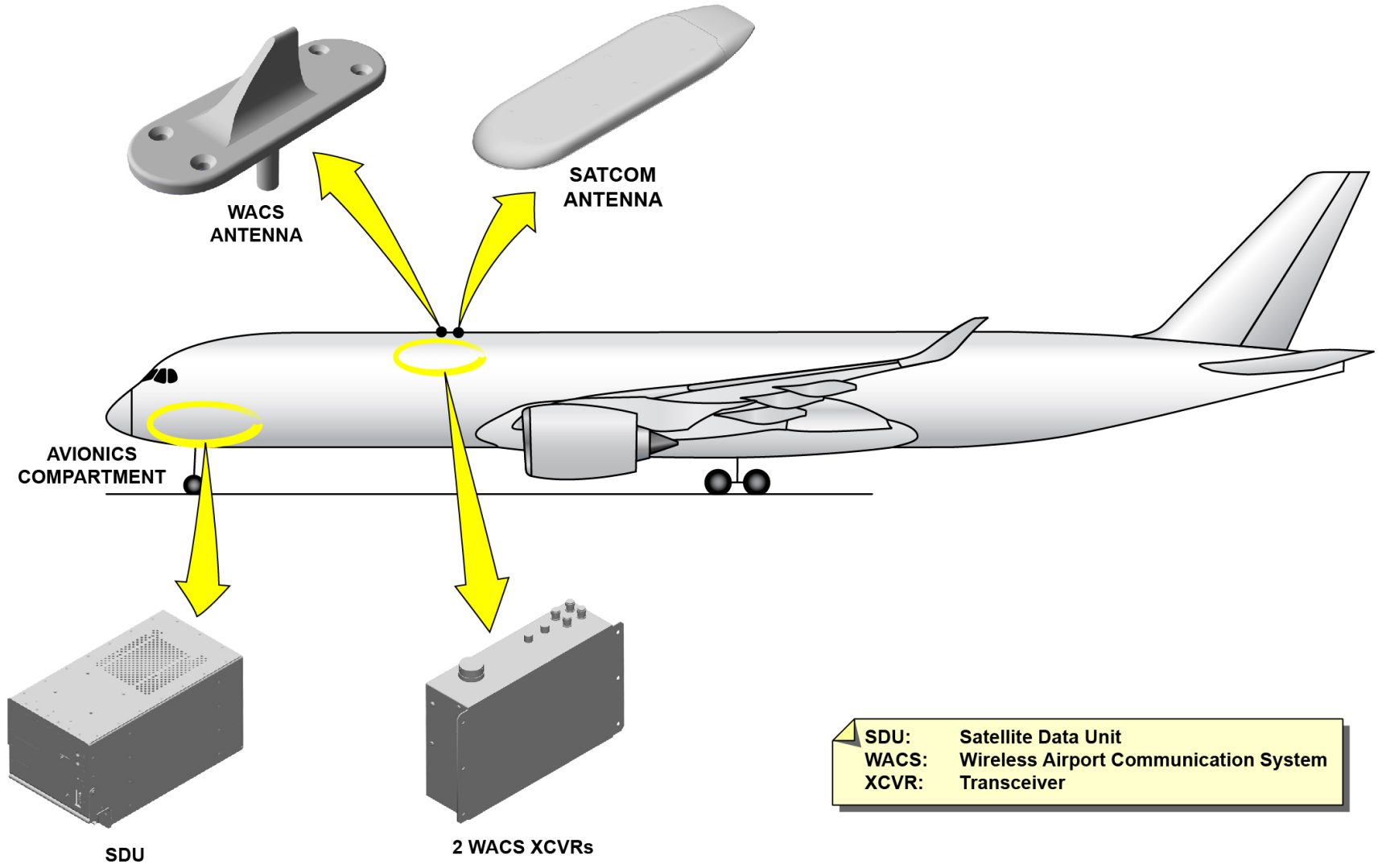


EXTERNAL TRANSMISSION - PRESENTATION - LOCATION

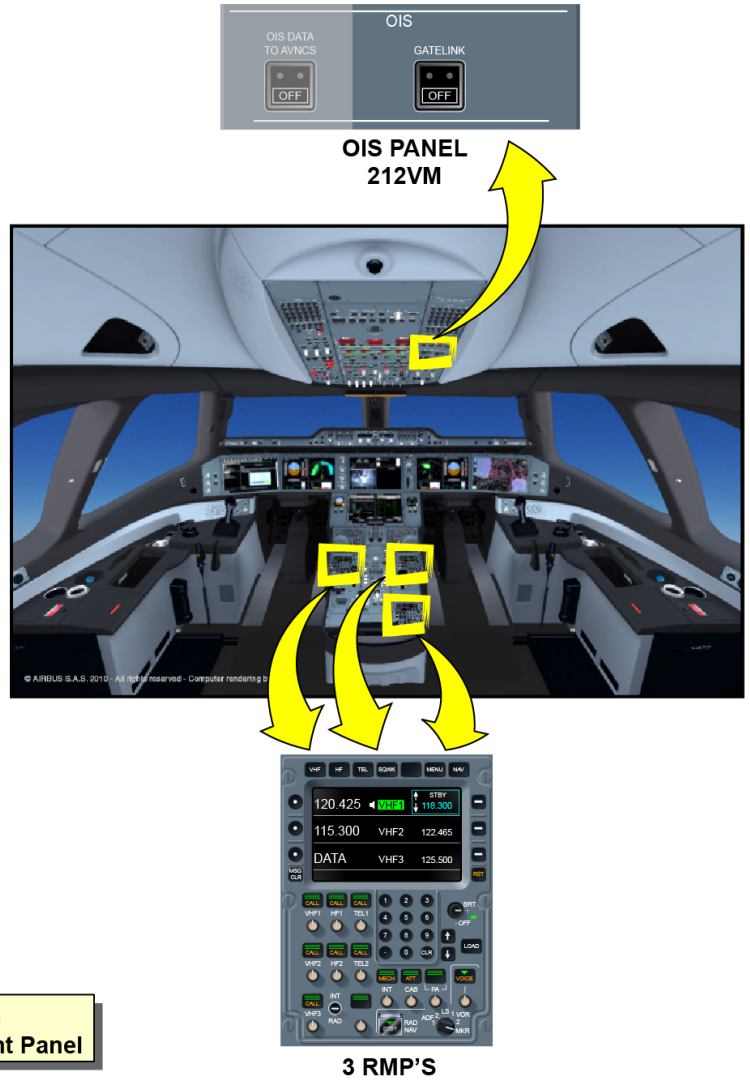
V1813401 - V01T0M0 - VM23P1LEVEL0101

COMMUNICATIONS SYSTEM PRESENTATION (1)

External Transmission - Presentation (continued)

Control and Indicating

The control and indicating of the ACR and SATCOM are made through the RMPs.
The GATELINK pushbutton switch on the OIS control panel is used to stop the transmission of WACS data between the aircraft and the ground.



OIS: Onboard Information System
RMP: Radio and Audio Management Panel

EXTERNAL TRANSMISSION - PRESENTATION - CONTROL AND INDICATING

COMMUNICATIONS SYSTEM PRESENTATION (1)

Audio Integrating and Voice Command Systems - Presentation

Function/Description

The function of the audio integrating and voice command systems is to let the cockpit crew control:
- The voice communications in the aircraft and with other aircraft
- The voice/data communications with the ground stations.

The audio integrating and voice command systems include:
- The Audio Management System (AMS) which has two Audio Management Units (AMUs)
- The radio management system which has three RMPs
- Audio peripheral equipment in the cockpit:
- PTT switches (on the glareshield (optional), boomsets and hand microphones)
- Loudspeakers
- Oxygen mask microphones
- Headsets.
- Audio Control Panel (ACP) 4 (optional).

The function of the AMS is to connect the radio communication systems (HF, VHF and SATCOM) to the RMPs and audio peripherals for data and audio transmission.

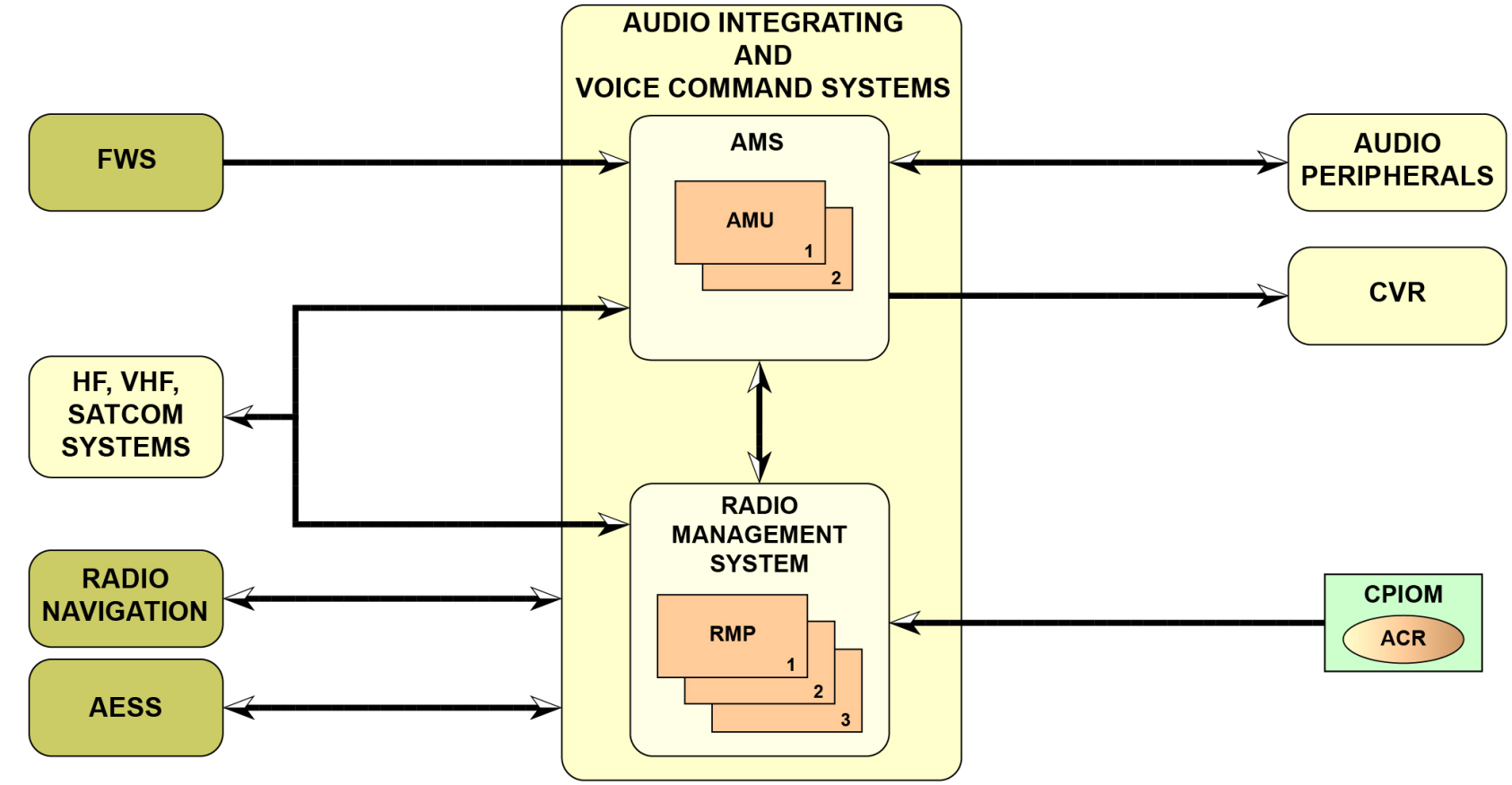
In the AMS, the AMUs are connected to each other and to:
- The RMPs
- The audio peripheral equipment
- The radio communication systems (HF, VHF and SATCOM).

The RMP function is to let the cockpit crew control the tuning, display and/or dialing of:
- The radio communication systems (HF, VHF and SATCOM)
- The data mode control of the radio communication means and of the ACR.

Each RMP is connected to the other RMPs and to:
- The HF system
- The VHF system
- The ACR system
- The SATCOM system.

Interface

The AMUs have interfaces with:
- The CVR
- The radio navigation systems
- The Aircraft Environment Surveillance System (AESS)
- The Flight Warning System (FWS).



ACR:	Avionics Communication Router	CPIOM:	Core Processing Input/Output Module
AESS:	Aircraft Environment Surveillance System	CVR:	Cockpit Voice Recorder
AMS:	Audio Management System	FWS:	Flight Warning System
AMU:	Audio Management Unit	RMP:	Radio and Audio Management Panel

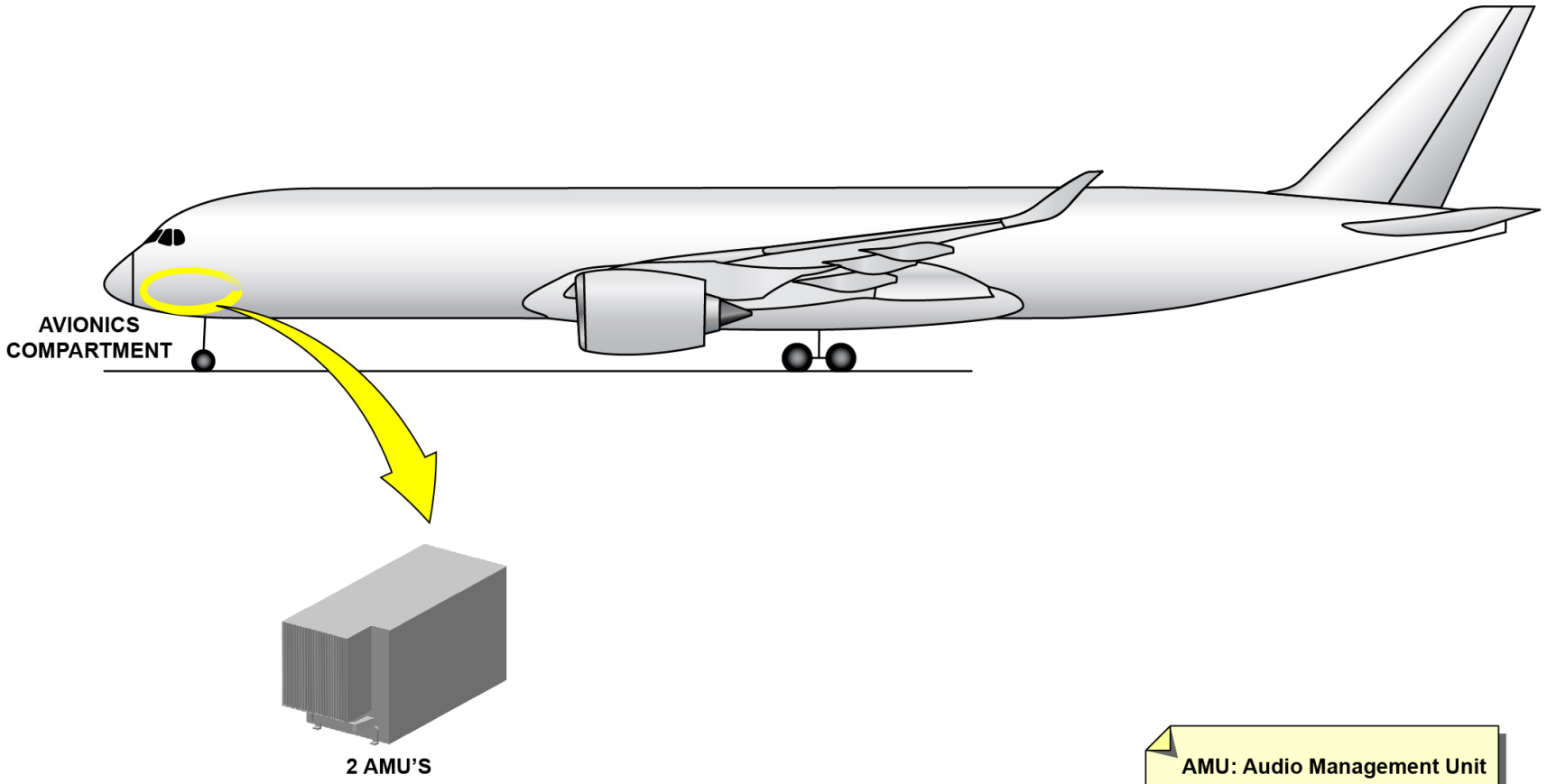
AUDIO INTEGRATING AND VOICE COMMAND SYSTEMS - PRESENTATION - FUNCTION/DESCRIPTION & INTERFACE

COMMUNICATIONS SYSTEM PRESENTATION (1)

Audio Integrating and Voice Command Systems - Presentation (continued)

Location

The two AMUs are installed in the avionics compartment.
The three RMPs are installed in the cockpit, on the center pedestal.



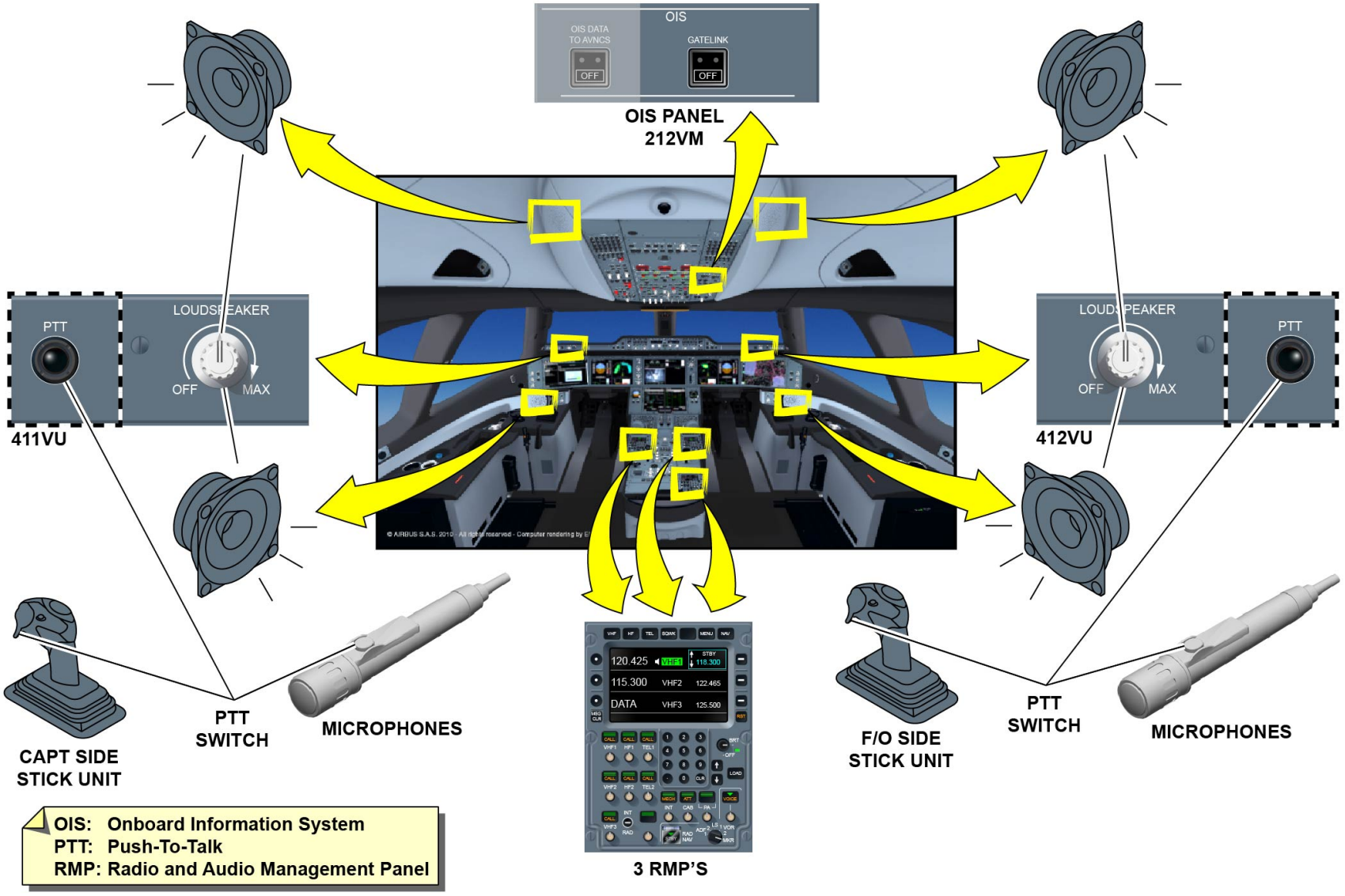
AUDIO INTEGRATING AND VOICE COMMAND SYSTEMS - PRESENTATION - LOCATION

COMMUNICATIONS SYSTEM PRESENTATION (1)

Audio Integrating and Voice Command Systems - Presentation (continued)

Control and Indicating

The RMPs control the AMUs.
The AMUs send data to the RMPs and audio signals to the audio peripherals.
The PTT switches activate the transmission mode.
The loudspeaker potentiometers adjust the loudspeakers volume.



AUDIO INTEGRATING AND VOICE COMMAND SYSTEMS - PRESENTATION - CONTROL AND INDICATING

COMMUNICATIONS SYSTEM PRESENTATION (1)

Cockpit Voice Recorder - Presentation

Function/Description

The CVR system records the conversations and audio communications of the cockpit crew, and datalink communications, in flight and on the ground.
After an aircraft accident or incident, the Airworthiness authorities use the recorded data for investigation.
The CVR system includes:
- A cockpit area microphone which is connected to the CVR Control Unit (CU)
- A CVR CU which is connected to the Solid State Cockpit Voice Recorder (SSCVR)
- A SSCVR.

Location

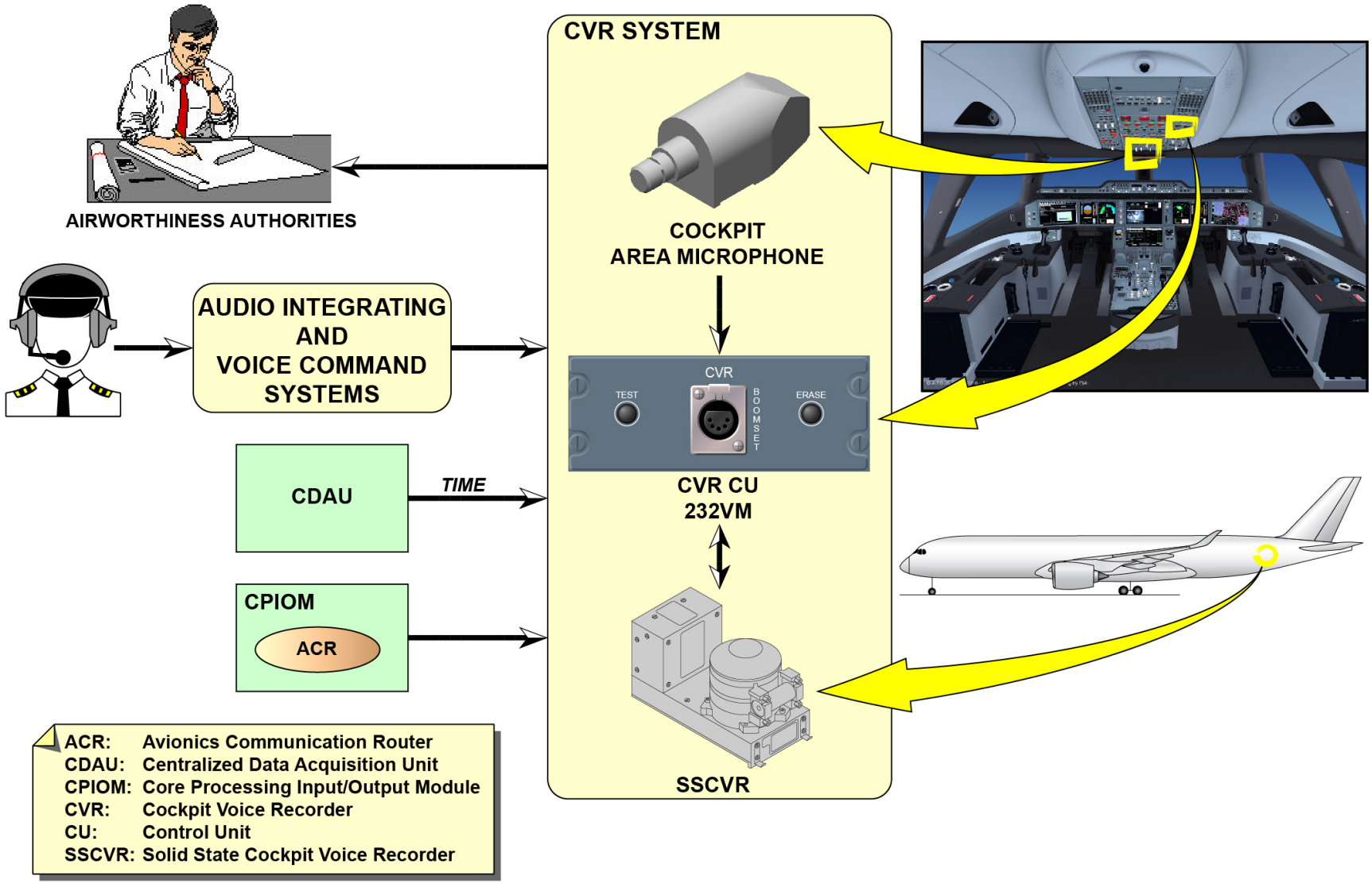
The cockpit area microphone and the CVR CU are installed in the cockpit.
The SSCVR is installed in the aft-cabin underfloor compartment of the aircraft.

Interface

The CVR system has an interface with:
- The ATC application hosted in a CPIOM for datalink message recording
- The Centralized Data Acquisition Unit (CDAU) to give the time of the recorded data
- The audio integrating and voice command systems.

Control and Indicating

The CVR CU is used for the control of the CVR system.



COCKPIT VOICE RECORDER - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

COMMUNICATIONS SYSTEM PRESENTATION (1)

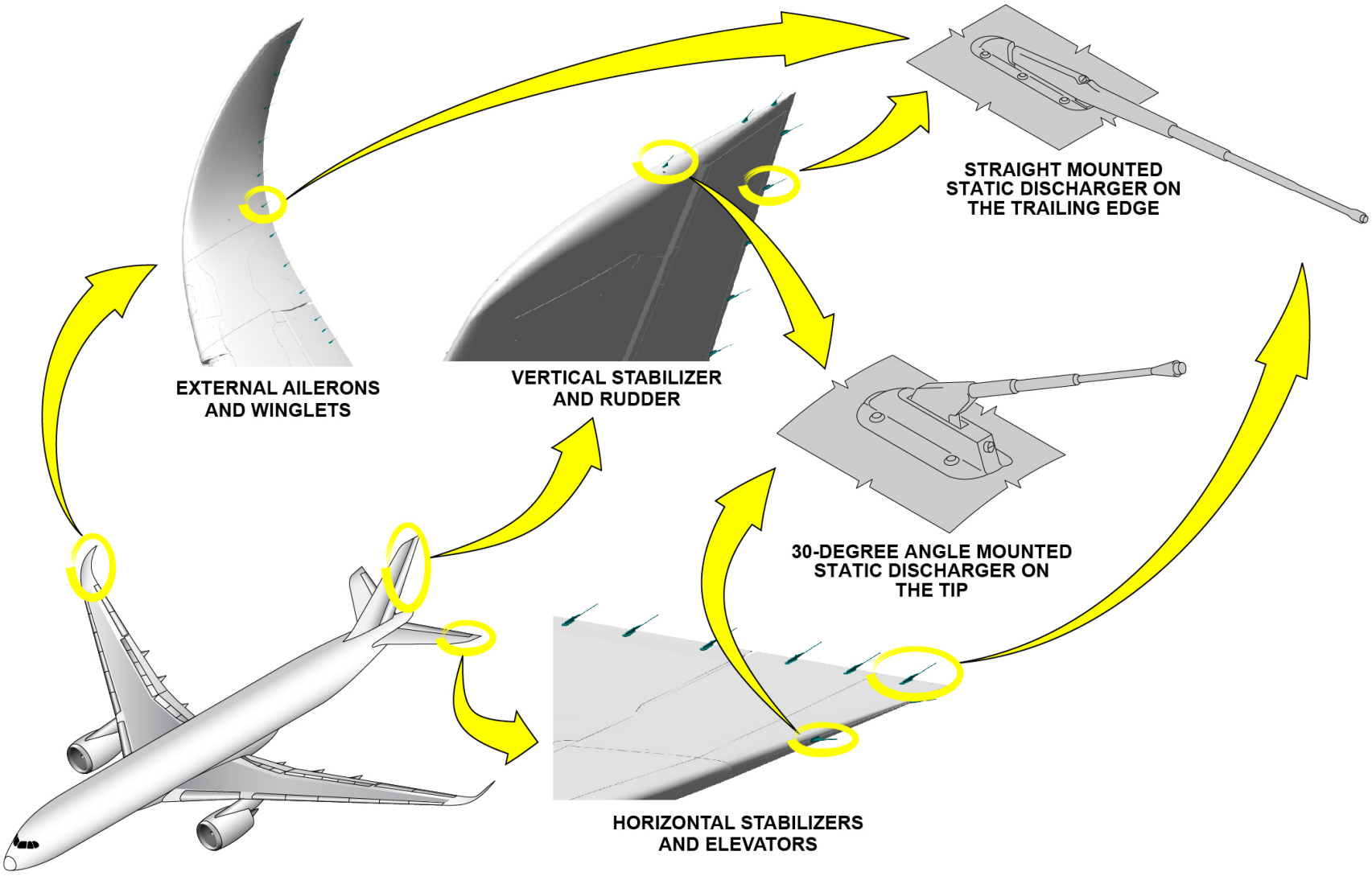
Static Discharger - Presentation

Function/Description

During flight, the aircraft becomes electrostatically charged. Random electricity discharges can cause interference in the communication and navigation systems. The function of the static dischargers is to release the static electricity charge into the atmosphere through a controlled resistance path and thus decrease the interferences in the communication and navigation systems.

Location

Two types of static discharger are installed:
- One with a straight mounting, at the trailing edges
- One with a 30-degree angle, at the tips.



STATIC DISCHARGER - PRESENTATION - FUNCTION/DESCRIPTION & LOCATION

V1813401 - V01T0M0 - VM23P1LEVEL0101

COMMUNICATIONS SYSTEM PRESENTATION (1)

External Video System - Presentation

Function/Description

The external video system is optional for A350-800/900. For A350-1000, only the landscape camera is optional.
The function of the external video system is to give a visual monitoring of the aircraft on the ground during maneuvers (runways, taxiways).
The external video system includes:
- Two Taxiing Aid Cameras (TACs)
- A landscape camera.

Location

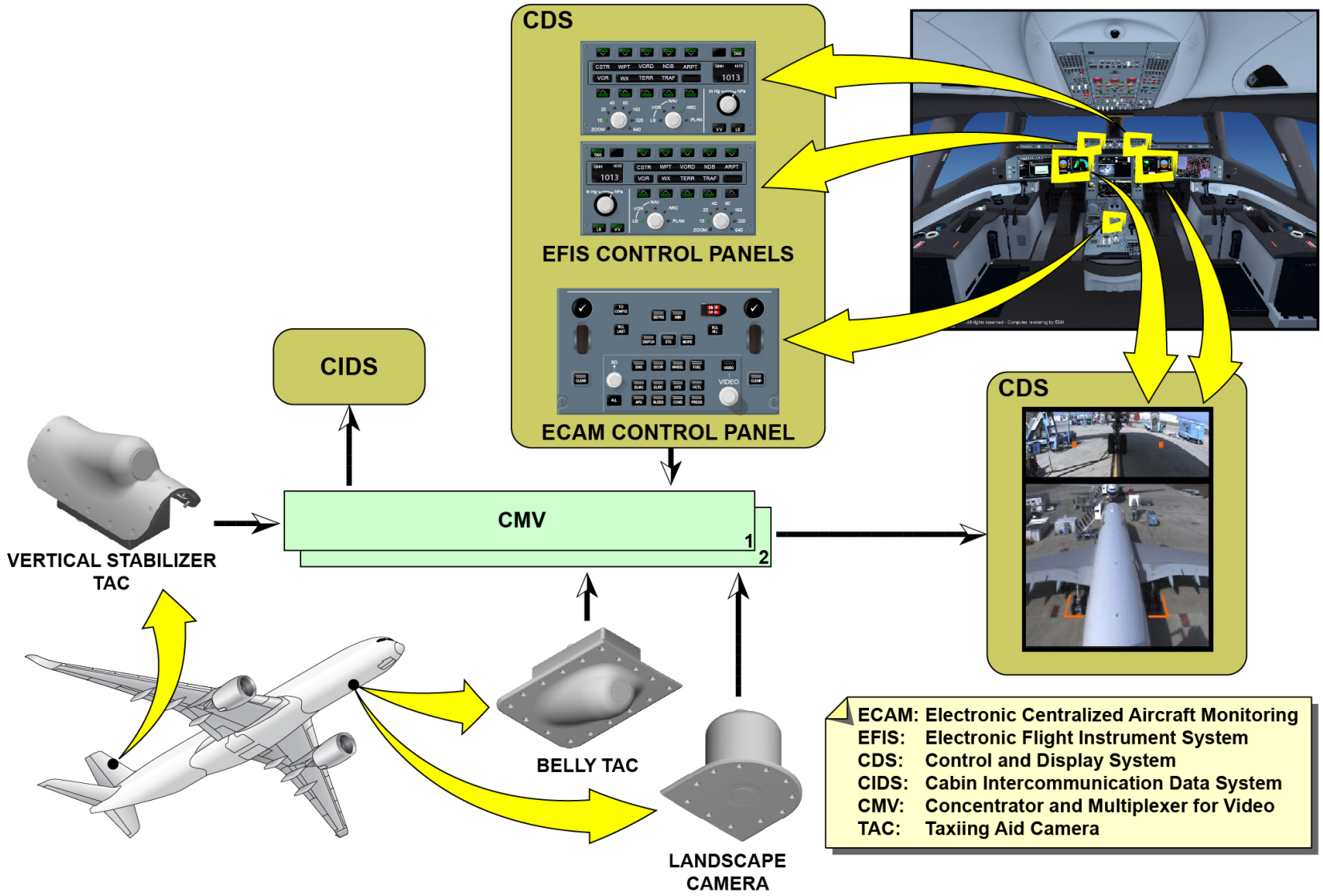
A TAC is installed on the lowest part of the forward fuselage.
A TAC is installed on the top of the vertical stabilizer.
The landscape camera is installed on the lowest part of the forward fuselage.

Interface

The external video system has an interface with the two Concentrators and Multiplexers for Video (CMVs).

Control and Indicating

The Electronic Flight Instrument System (EFIS) and ECAM control panels are used to control the external video system.
The CDS shows the video images from the external video system through the two CMVs:
- On CDS for TACs only
- On passenger seats.



EXTERNAL VIDEO SYSTEM - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

CABIN SYSTEMS PRESENTATION (1)

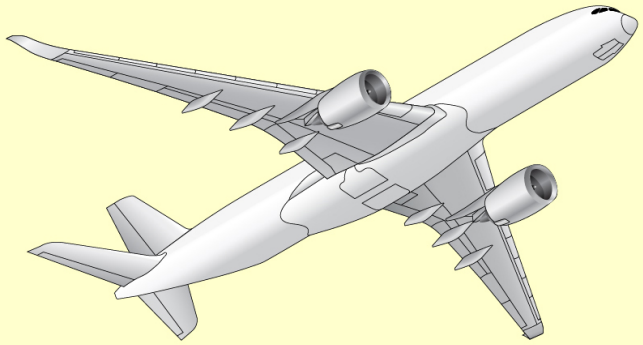
Overview

The cabin system gives the cabin crew an interface to the cabin core system and the cabin monitoring system. It also lets the passengers use the entertainment system.
General familiarization training for this system focuses on:
- Cabin core system
- In-Flight Entertainment (IFE) system
- Cabin monitoring system.

CABIN SYSTEMS

CABIN CORE SYSTEM

IN-FLIGHT ENTERTAINMENT SYSTEM



CABIN MONITORING SYSTEM

OVERVIEW

CABIN SYSTEMS PRESENTATION (1)

Cabin Core System - Presentation

Function/Description

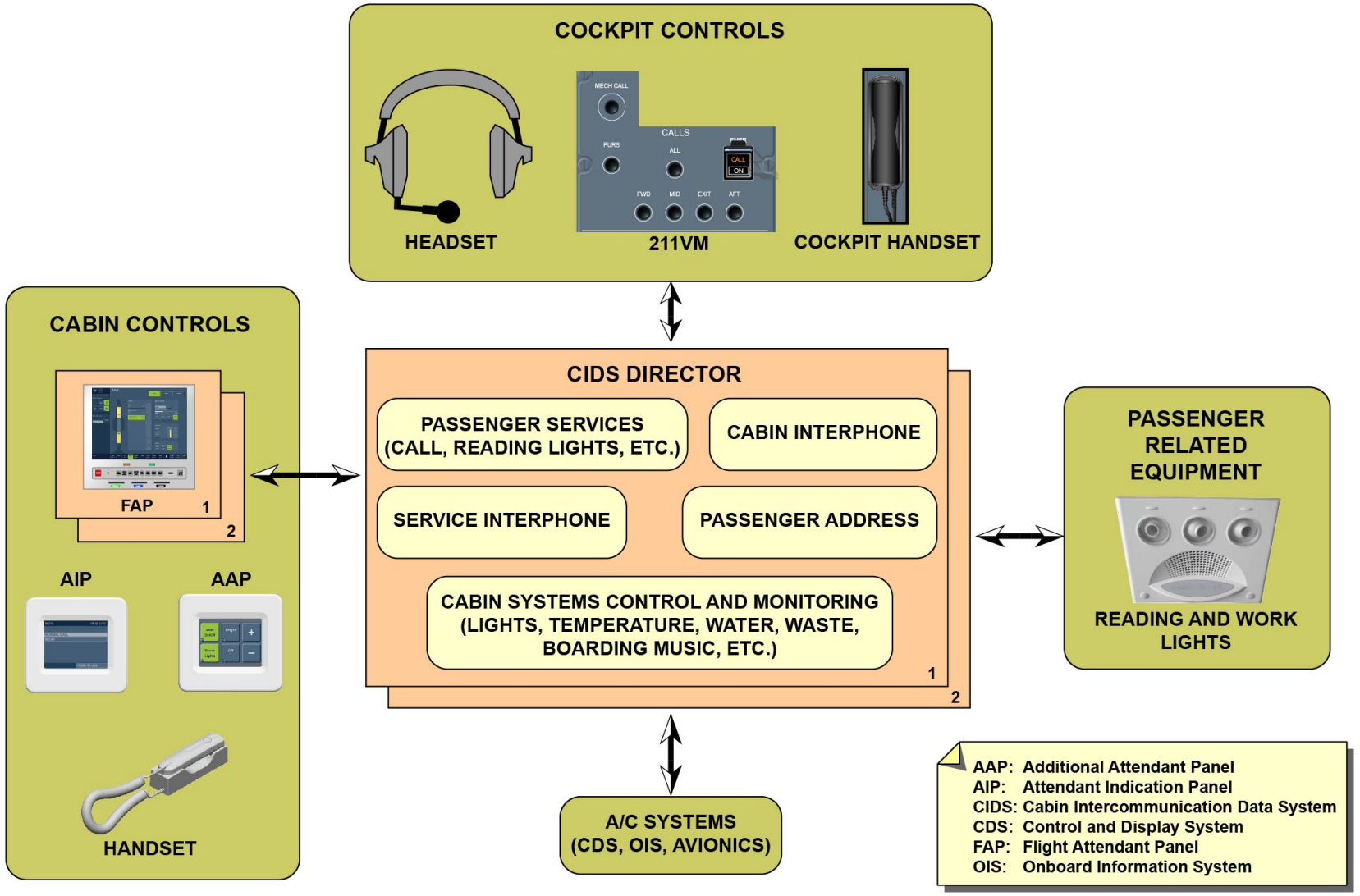
The Cabin Intercommunication Data System (CIDS) is the cabin core system.
It has an easy interface with some cabin support systems for the cabin crew, the passengers, the maintenance personnel and the cockpit crew.
The components of the CIDS are:
- Two CIDS directors
- Flight Attendant Panels (FAPs), Attendant Indication Panels (AIPs), Area Call Panels (ACPs) and Additional Attendant Panels (AAPs) for controls and indicating
- Communication devices such as handsets and loudspeakers.

The CIDS has some communication functions:
- Passenger services (call, reading lights)
- Passenger Address (PA)
- Cabin interphone
- Service interphone
- Cabin system control and monitoring.

The PA lets the crew do announcements to the passengers from the cockpit or from a cabin crew station. These announcements start from the cockpit with a handset or acoustic devices and from the cabin with the cabin-crew station handsets. They are then transmitted to the passengers through passengers headsets (through IFE) and through all cabin loudspeakers. The Prerecorded Announcement and Music (PRAM) function supplies prerecorded voice information and also prerecorded music.
The cabin interphone system lets the crew start calls between all cabin crew stations or between the cockpit and the cabin crew stations. In the cockpit, the crew can use the cockpit handset or the acoustic devices. In the cabin, the crew can use the cabin-crew station handsets.
The service interphone system is available only on the ground. The maintenance personnel speak with the flight/cabin crew through headsets connected to the interphone jacks.
The CIDS has some control and indicating functions related, for example, to cabin lighting, temperature, potable and waste tank level. The CIDS also lets passengers control their seat lights or call the cabin crew.

Interface

The CIDS directors have interfaces to:
- The Control and Display System (CDS)
- The CDS through the Onboard Information System (OIS)
- The aircraft systems and cabin support systems
- The aircraft systems and cabin support systems through the OIS
- The cockpit acoustic equipment.



CABIN CORE SYSTEM - PRESENTATION - FUNCTION/DESCRIPTION & INTERFACE

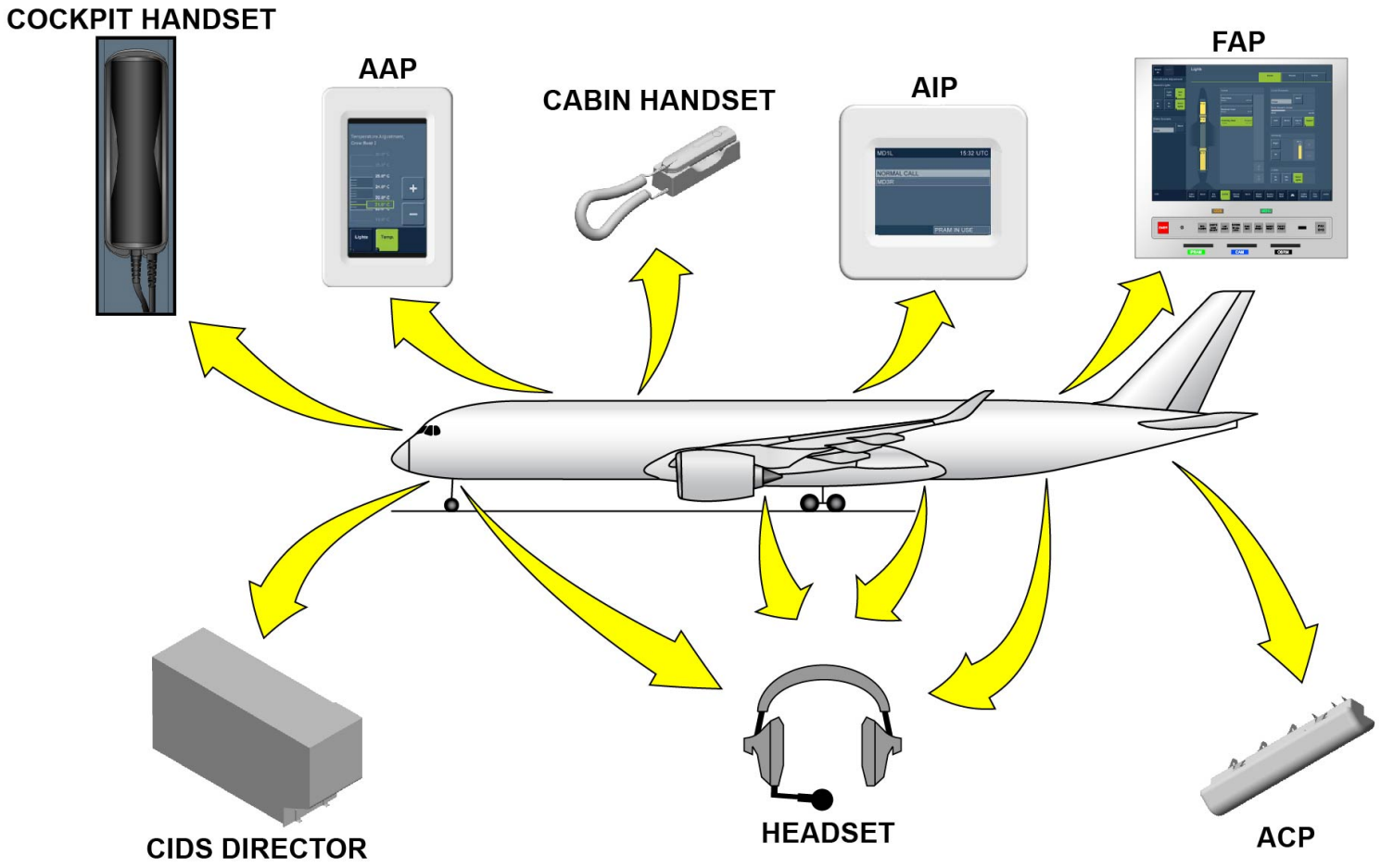
V1813401 - V01T0M0 - VM44P1LEVEL0101

CABIN SYSTEMS PRESENTATION (1)

Cabin Core System - Presentation (continued)

Location

There is one special handset in the cockpit and some handsets in the cabin. The FAPs are in the cabin. The CIDS directors are in the avionics compartment.
The AIPs, ACPs and AAPs are also in the cabin.



CABIN CORE SYSTEM - PRESENTATION - LOCATION

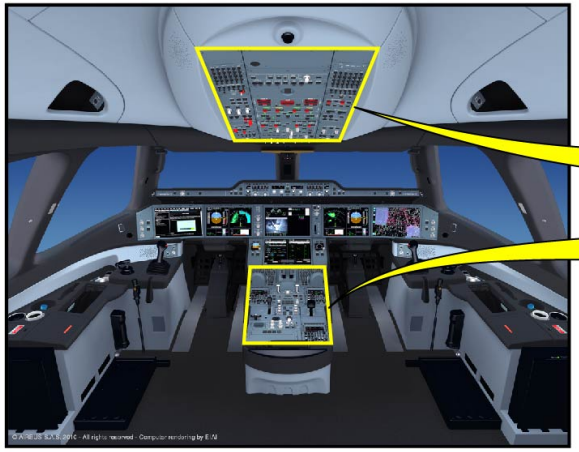
CABIN SYSTEMS PRESENTATION (1)

Cabin Core System - Presentation (continued)

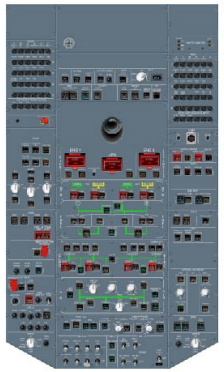
Control and Indicating

The controls for the CIDS are:
- In the cockpit, on the overhead panel and on the center pedestal
- In the cabin, on the FAPs.

The FAPs are also indicators.

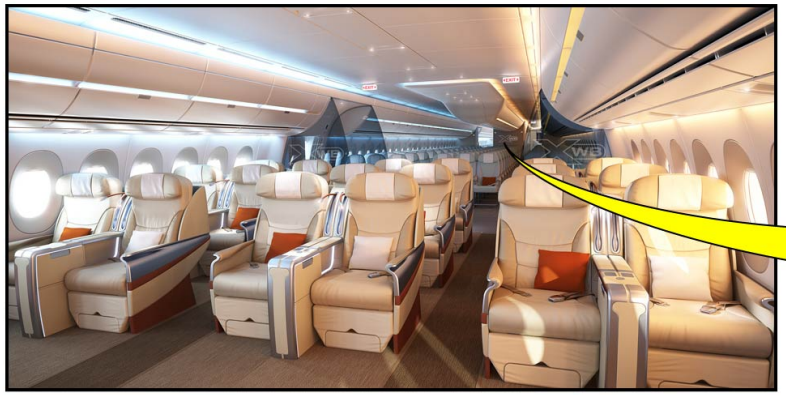


COCKPIT CONTROLS



OVERHEAD PANEL

CENTER PEDESTAL PANEL



CABIN CONTROLS

FAP

AAP

AIP

AAP: Additional Attendant Panel
AIP: Attendant Indication Panel
FAP: Flight Attendant Panel

CABIN CORE SYSTEM - PRESENTATION - CONTROL AND INDICATING

CABIN SYSTEMS PRESENTATION (1)

IFE System - Presentation

Function/Description

The IFE system supplies the passengers with audio, video, data and interactive functions. The interactive functions are games, gambling, on-board shopping and internet service. The IFE system also gives passengers access to telephone and data networks through an optional satellite communication link.
The IFE system contains the IFE Center (IFEC), the cabin distribution network and the passenger in-seat equipment. The IFE control panel is in the Remote Control Center (RCC).
The IFEC has connections with:
- The RCC
- The FAPs
- The cabin distribution network
- The passenger in-seat equipment, the wall-mounted displays and the Wireless Access Points (WAPs) through the cabin distribution network.

Interface

The IFE system has interfaces to other aircraft systems through OIS.

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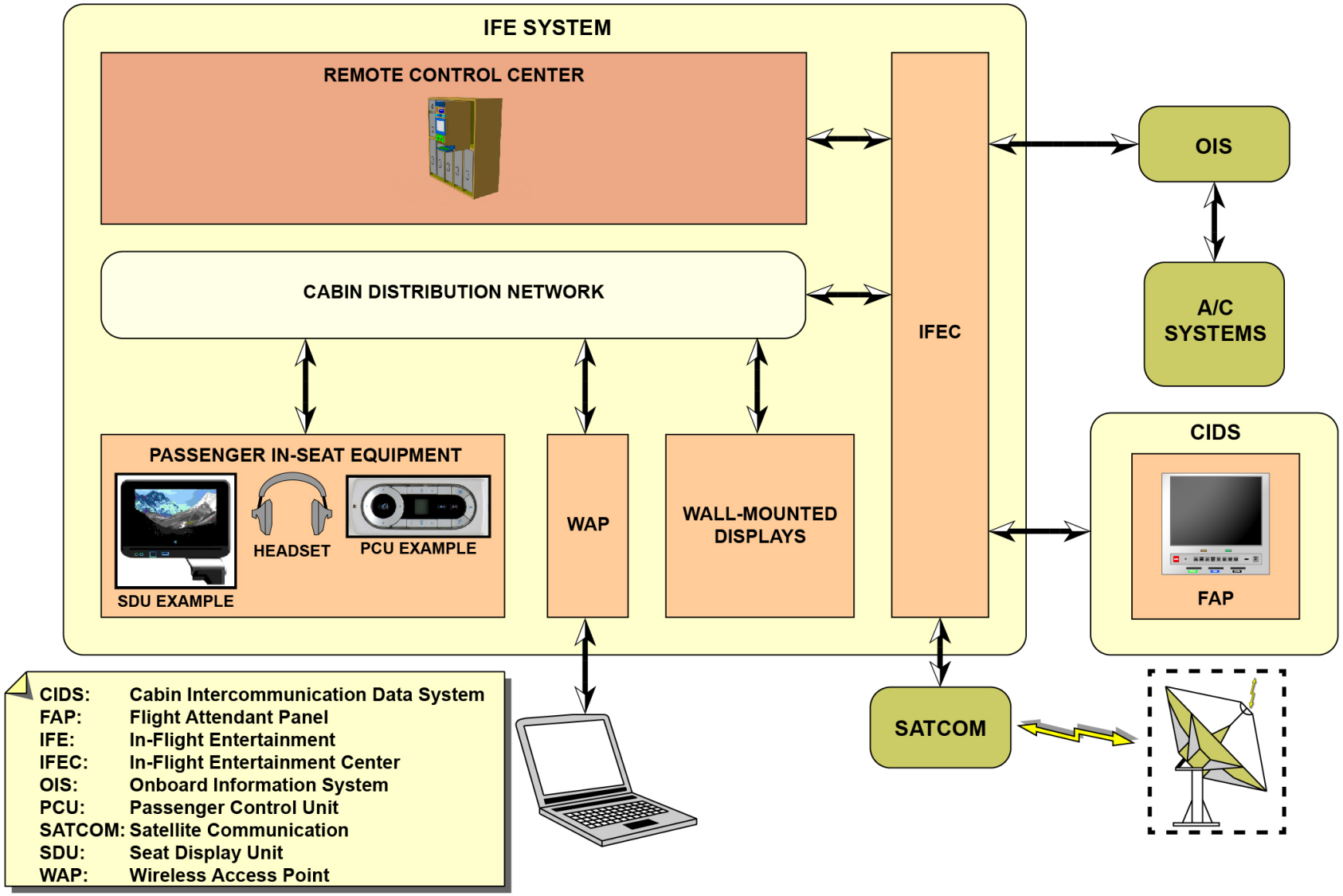


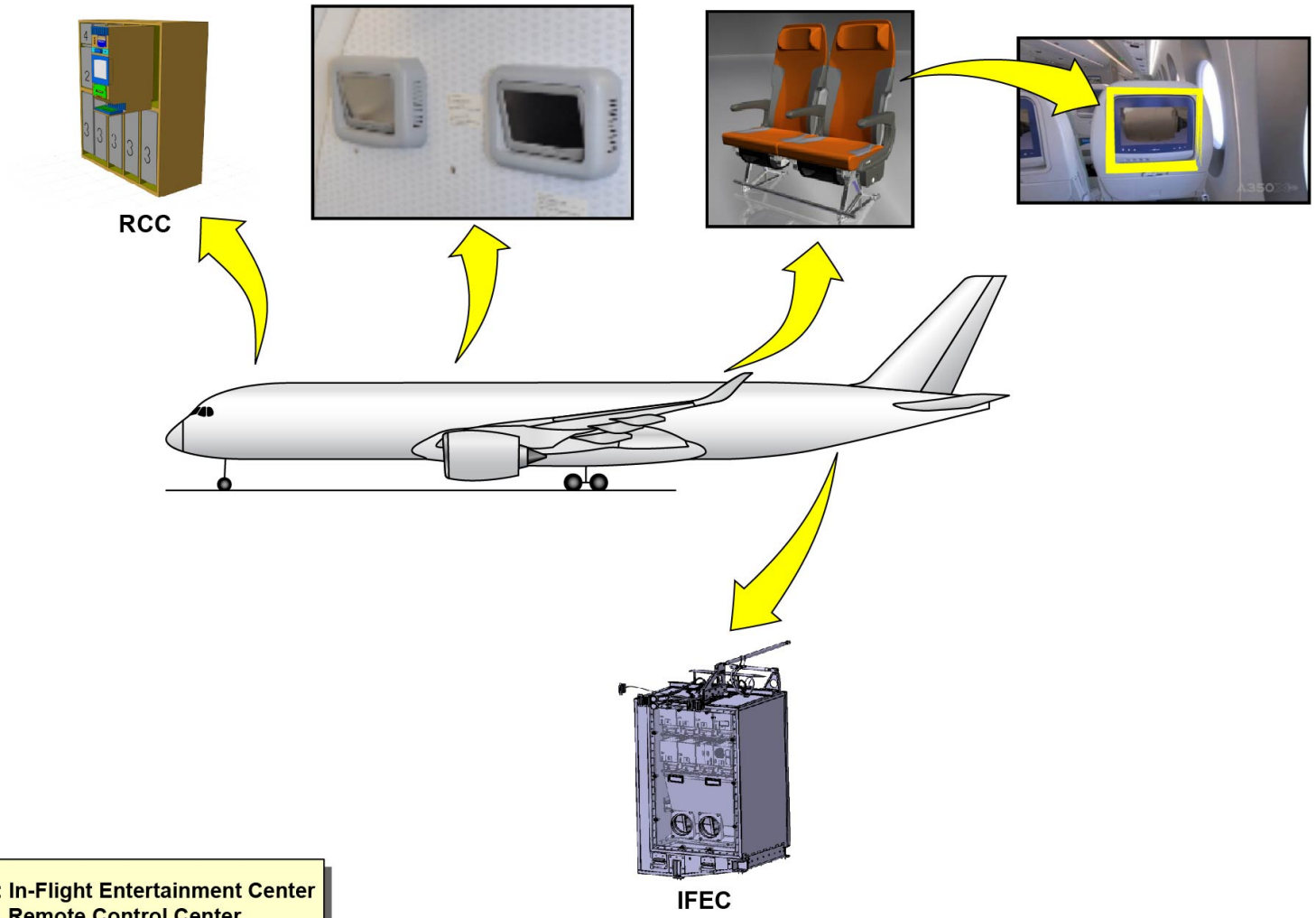
IFE SYSTEM - PRESENTATION - FUNCTION/DESCRIPTION & INTERFACE

CABIN SYSTEMS PRESENTATION (1)

IFE System - Presentation (continued)

Location

The RCC is at the attendant station at door 1 area. The wall-mounted video displays and the passenger in-seat equipment are in the cabin. The IFEC is in the aft of the bulk cargo compartment.



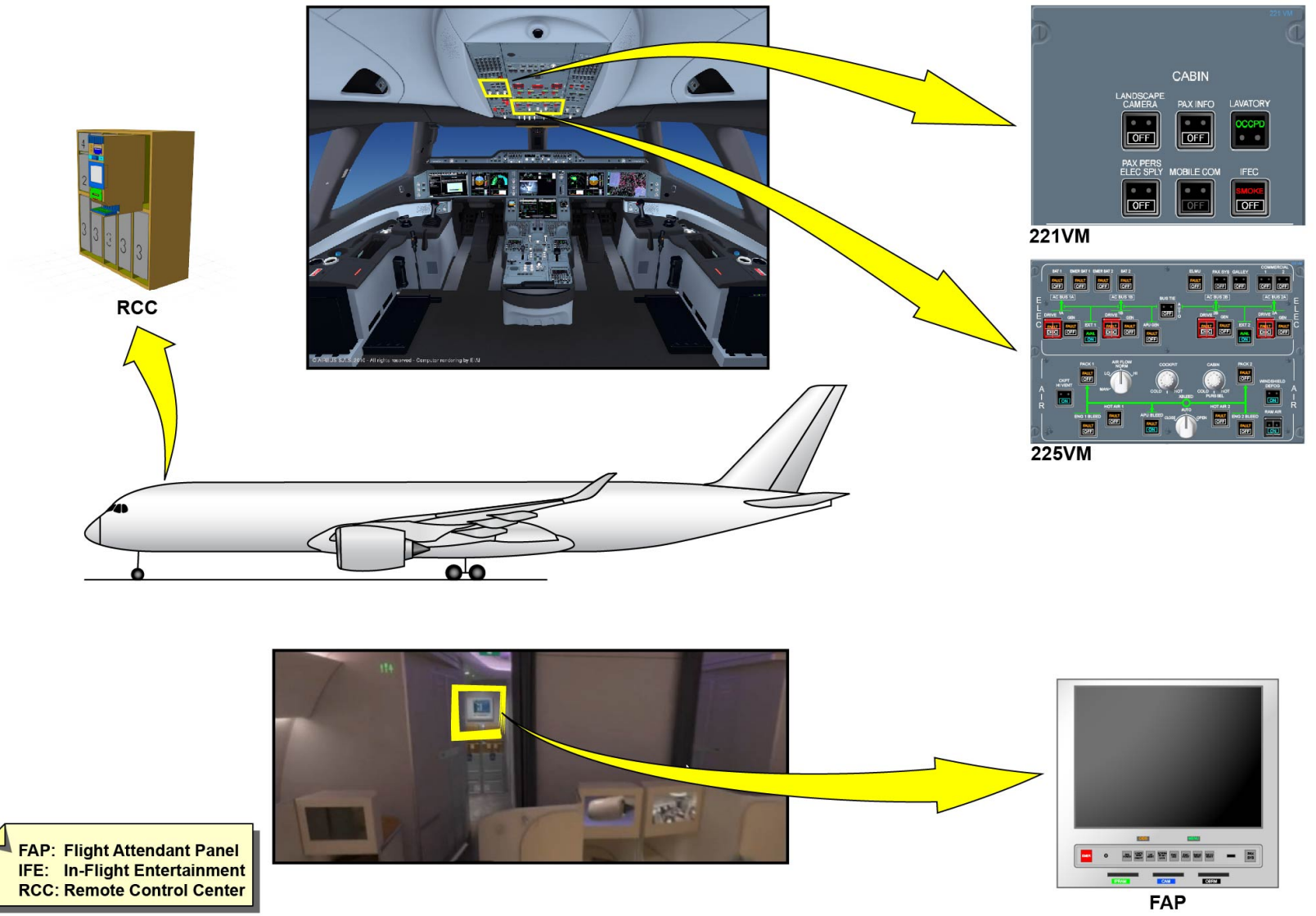
IFE SYSTEM - PRESENTATION - LOCATION

CABIN SYSTEMS PRESENTATION (1)

IFE System - Presentation (continued)

Control and Indicating

The flight crew and the cabin crew have access to the controls of the IFE system in the cockpit, on the FAPs, and through the RCC.



IFE SYSTEM - PRESENTATION - CONTROL AND INDICATING

CABIN SYSTEMS PRESENTATION (1)

Cabin Monitoring System - Presentation

Function/Description

The cabin monitoring system has these optional subsystems:
- Cabin Video Monitoring System (CVMS)
- Cockpit Door Surveillance System (CDSS).

CVMS

The CVMS helps the flight and cabin crew monitor some areas of the cabin. The FAP in the cabin and the CDS in the cockpit show the data. There is a connection between each Area Distribution Unit (ADU) and a maximum of seven camera microphone assemblies. ADUs 2, 3 and 4 are connected to ADU 1.

CDSS

The CDSS helps the flight crew to identify a person that is in front of the cockpit door. A maximum of four infrared cameras show the passenger door 1 area and the cockpit-door entrance area. The CDS shows the images from the cameras. The infrared cameras are connected to ADU 1.

Interface

Concentrator Multiplexer for Videos (CMVs)

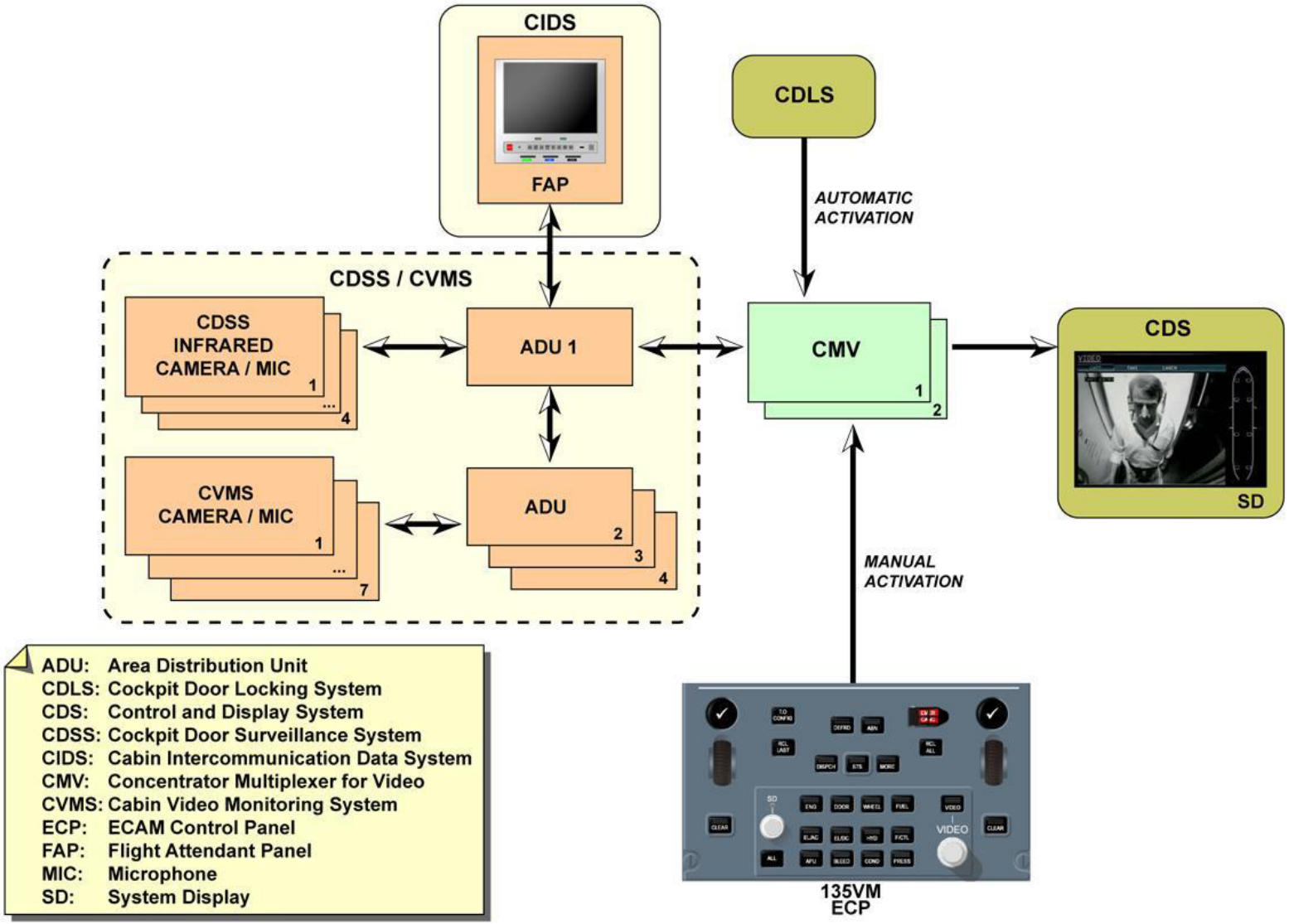
ADU 1 has an interface to the FAP and, through the CMVs, to the System Display (SD) of the CDS.

CDSS

ADU 1 has an interface to the CMV. The CMV has an interface to the CDS and to the Cockpit Door Locking System (CDLS) for automatic display activation.

Electronic Centralized Aircraft Monitoring (ECAM) Control Panel (ECP)

The CMVs have also an interface with the ECP for the control of the video and camera selection.



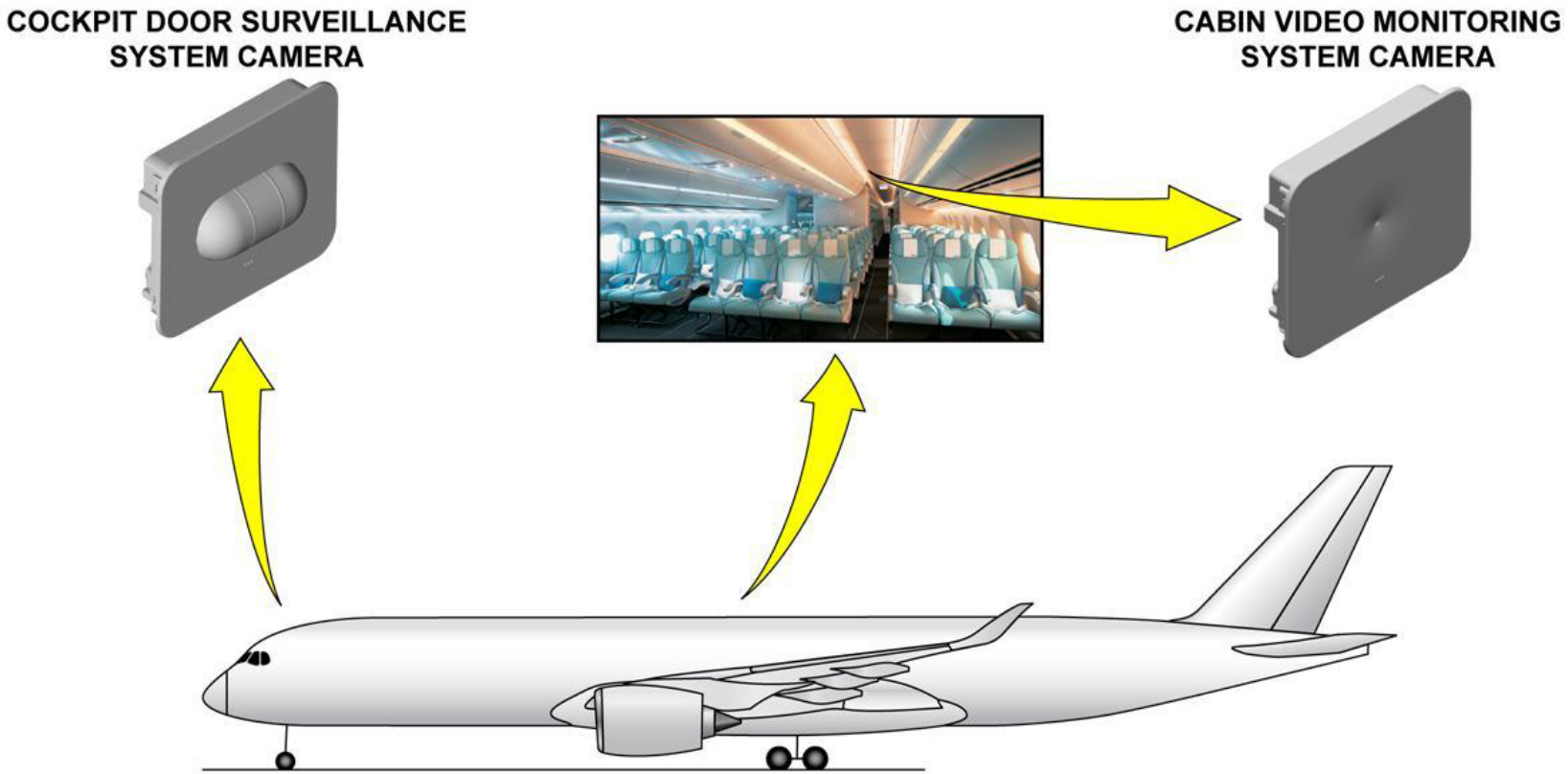
CABIN MONITORING SYSTEM - PRESENTATION - FUNCTION/DESCRIPTION & INTERFACE

CABIN SYSTEMS PRESENTATION (1)

Cabin Monitoring System - Presentation (continued)

Location

CVMS
The CVMS cameras are in the cabin.
CDSS
The infrared CDSS cameras are in the cockpit entrance area.



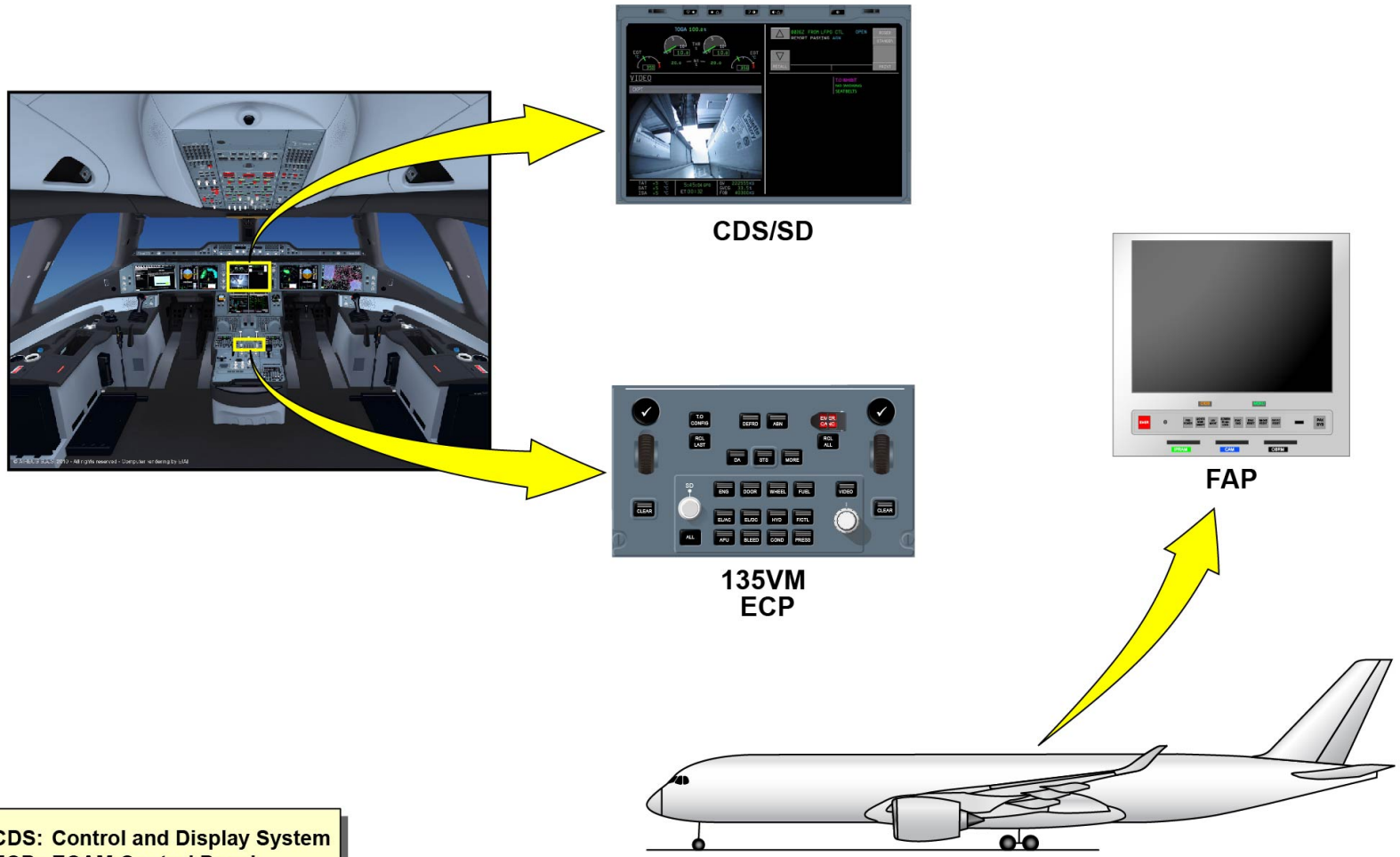
CABIN MONITORING SYSTEM - PRESENTATION - LOCATION

CABIN SYSTEMS PRESENTATION (1)

Cabin Monitoring System - Presentation (continued)

Control and Indicating

CVMS
The CVMS controls are the FAP and the ECP. The FAP in the cabin and the SD of the CDS in the cockpit show the images.
CDSS
The ECP controls the CDSS. The CDS/SD page shows the image.



CDS: Control and Display System
ECP: ECAM Control Panel
FAP: Flight Attendant Panel
SD: System Display

CABIN MONITORING SYSTEM - PRESENTATION - CONTROL AND INDICATING

LIGHTS SYSTEM PRESENTATION (1)

Overview

The lighting system gives internal and external illumination to the aircraft.
General familiarization training for this system focuses on:
- Cockpit lighting
- Cabin lighting
- Cargo and service compartment lighting
- Exterior lighting
- Emergency lighting.

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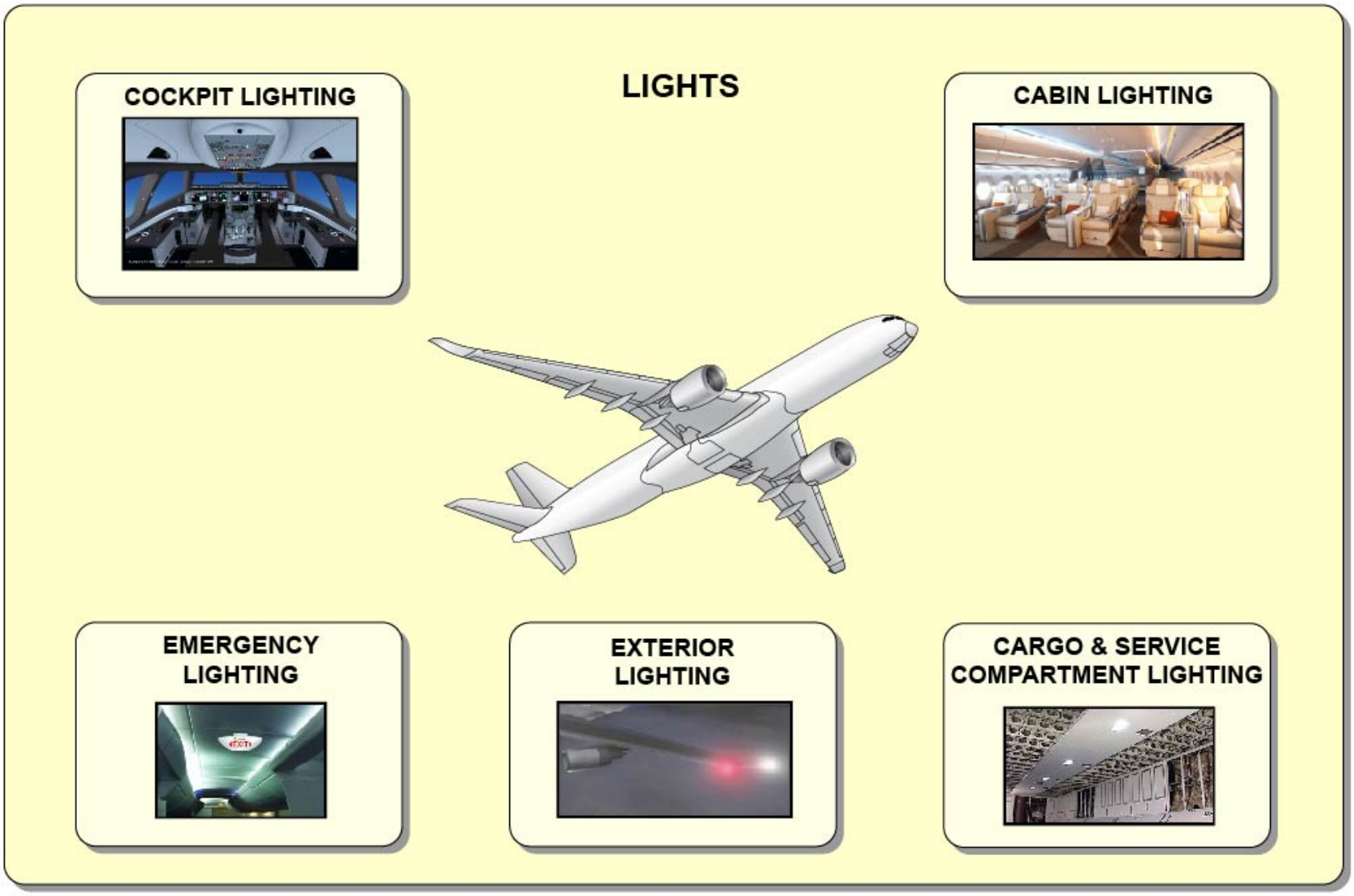

LIGHTS
COCKPIT LIGHTING
CABIN LIGHTING
EMERGENCY LIGHTING
EXTERIOR LIGHTING
CARGO & SERVICE COMPARTMENT LIGHTING

OVERVIEW

LIGHTS SYSTEM PRESENTATION (1)

Cockpit Lighting - Presentation

Function/Description

The cockpit lighting includes:
- General illumination
- Annunciator light test and dimming control
- Instrument and panel integral lighting.

The general illumination system supplies sufficient light in the cockpit to let the flight crew see all panels and equipment clearly.
With the annunciator light test and dimming control it is possible to:
- Control the light intensity
- Do the test of all the annunciator lights installed in the cockpit.

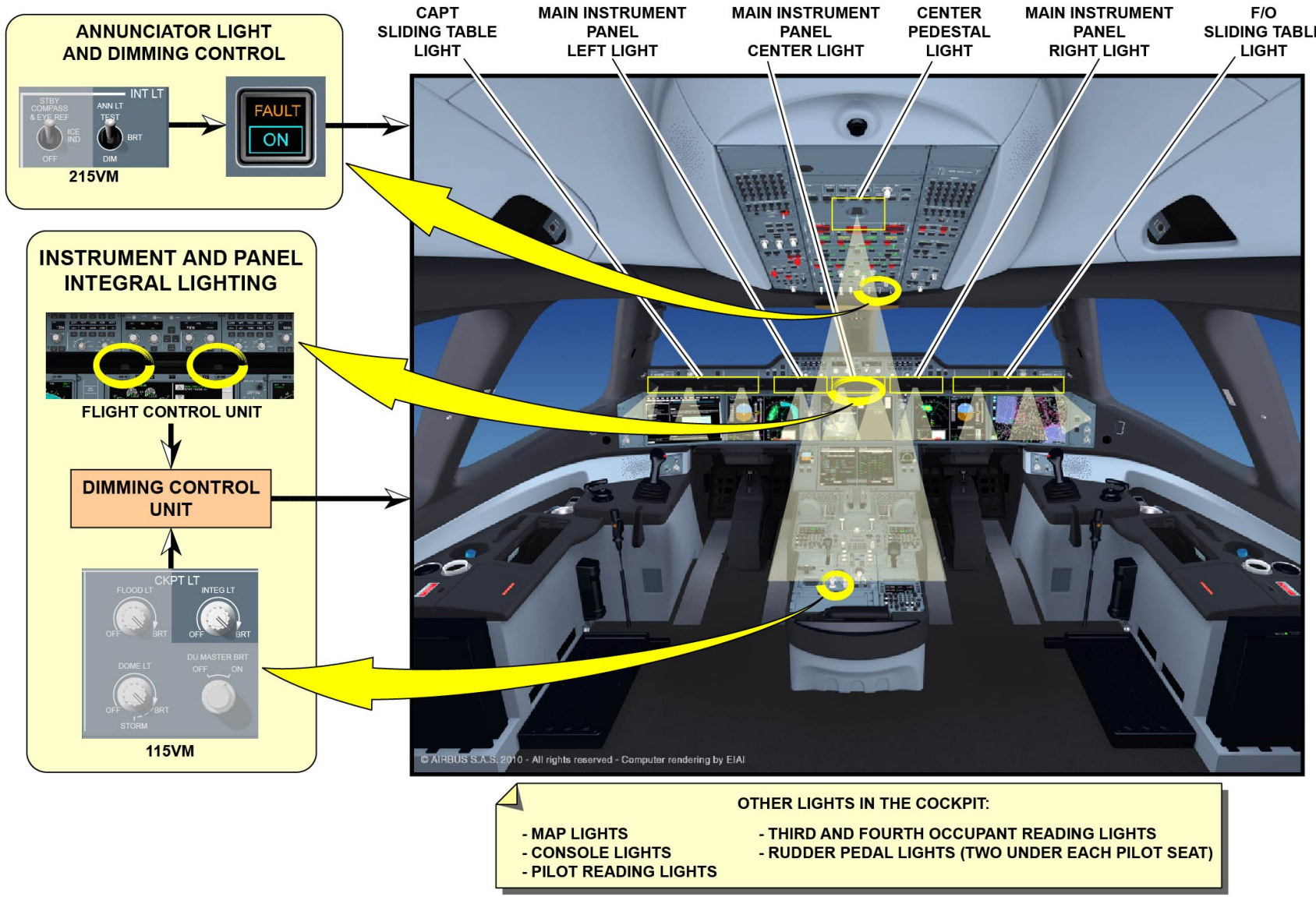
The instrument and panel integral lighting controls the light intensity of the control panels.
The rotary knobs for the instrument and panel integral lighting control the light intensity of the VU panels and the Integrated Control Panels (ICPs) through the dimming control unit.

Control and Indicating

The annunciator light test and dimming control has:
- An annunciator DIM/BRT/TEST switch that is on the overhead panel.

The instrument and panel integral lighting has:
- An integral lighting knob that is on the center pedestal.
- Two glareshield rotary knobs that are on the lower part of the Flight Control Unit (FCU). One knob is for the glareshield integrated lighting and one knob is for the lighting from the rear of the FCU displays.

There are some controls in the cockpit to control these lights:
- CAPT and F/O sliding table lights
- Main instrument panel left, right and center lights
- Map lights
- Pilot reading lights
- Console lights
- Third and fourth occupant lights
- Rudder pedal lights.



COCKPIT LIGHTING - PRESENTATION - FUNCTION/DESCRIPTION & CONTROL AND INDICATING

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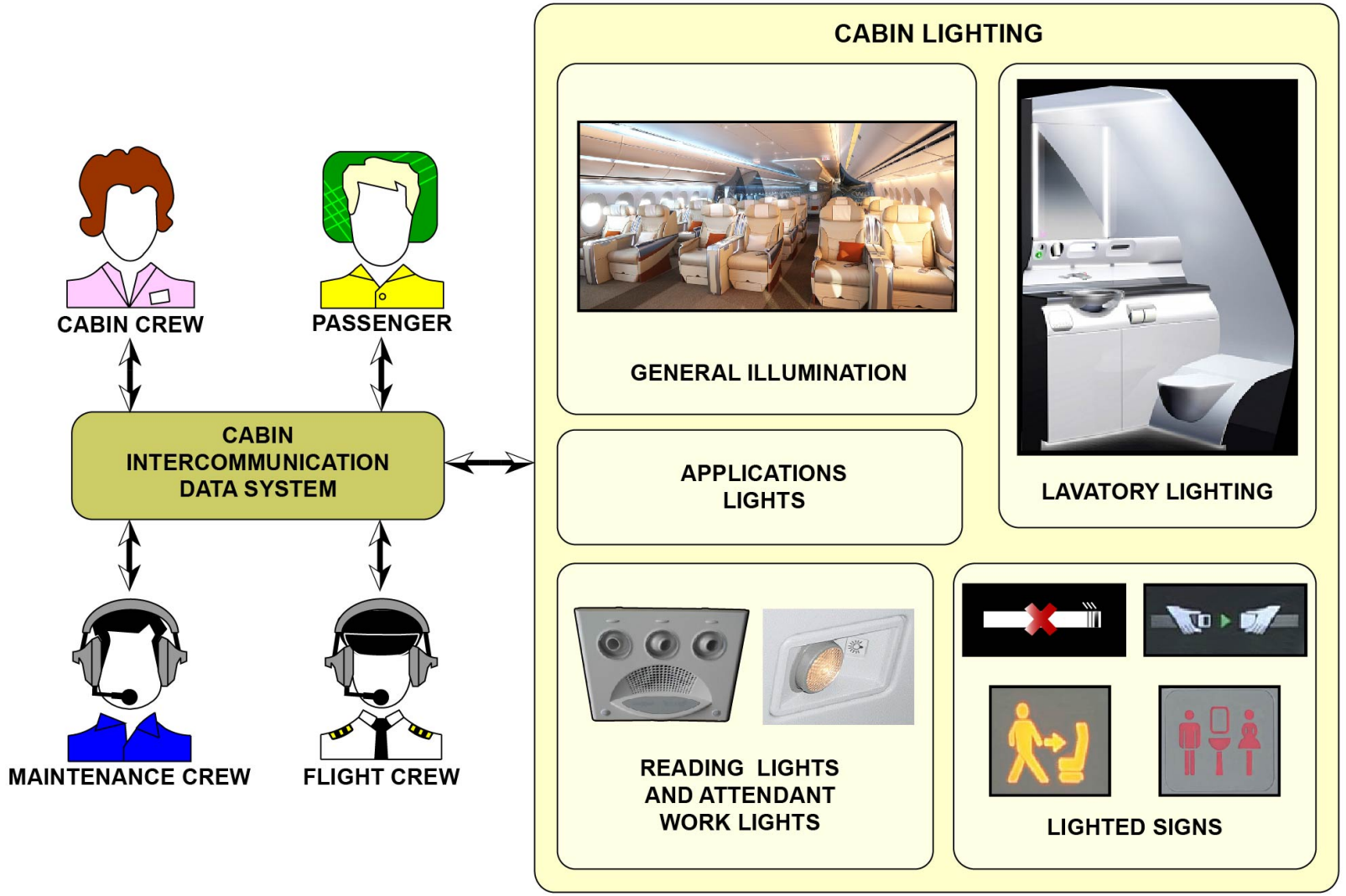
LIGHTS SYSTEM PRESENTATION (1)

Cabin Lighting - Presentation

Function/Description

The cabin lighting includes:
- General illumination
- Lavatory lighting
- Lighted signs
- Reading lights and attendant work lights
- Application lights.

The cabin lighting system illuminates all areas of the cabin.
The Cabin Intercommunication Data System (CIDS) controls and monitors the cabin lighting system.



CABIN LIGHTING - PRESENTATION - FUNCTION/DESCRIPTION

LIGHTS SYSTEM PRESENTATION (1)

Cabin Lighting - Presentation (continued)

Control and Indicating

The Flight Attendant Panel (FAP) controls the cabin general lighting. The pushbuttons for the passenger reading lights are above each passenger seat. The pushbuttons for the attendant work lights are above each attendant seat.
The flight crew can control the No Smoking (NS) / Fasten Seat Belt (FSB) and Return To Seat (RTS) signs from the overhead panel with the SEAT BELTS or NO SMOKING control switch.

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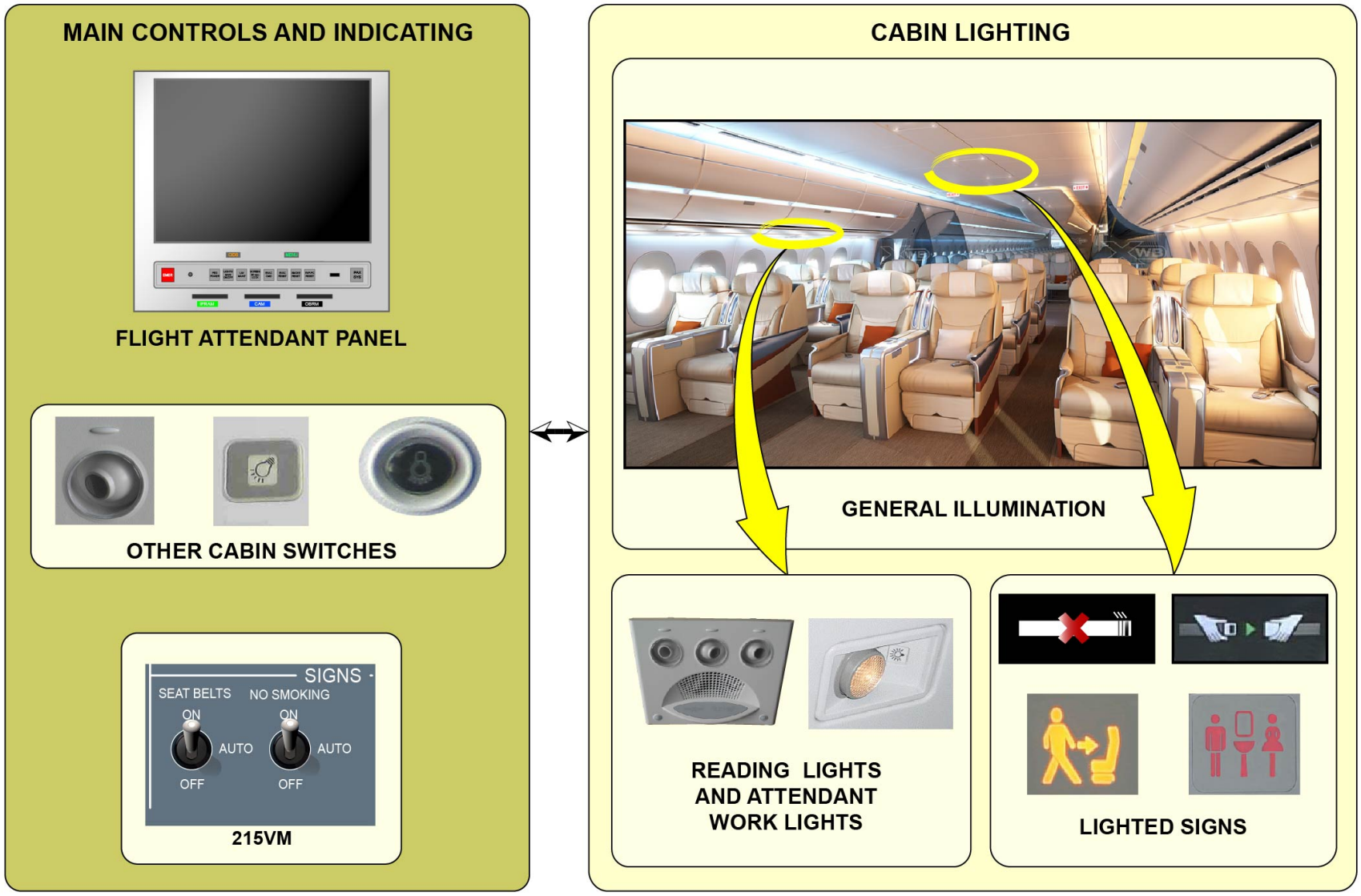

CABIN LIGHTING - PRESENTATION - CONTROL AND INDICATING

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LIGHTS SYSTEM PRESENTATION (1)

Cargo and Service Compartment Lighting - Presentation

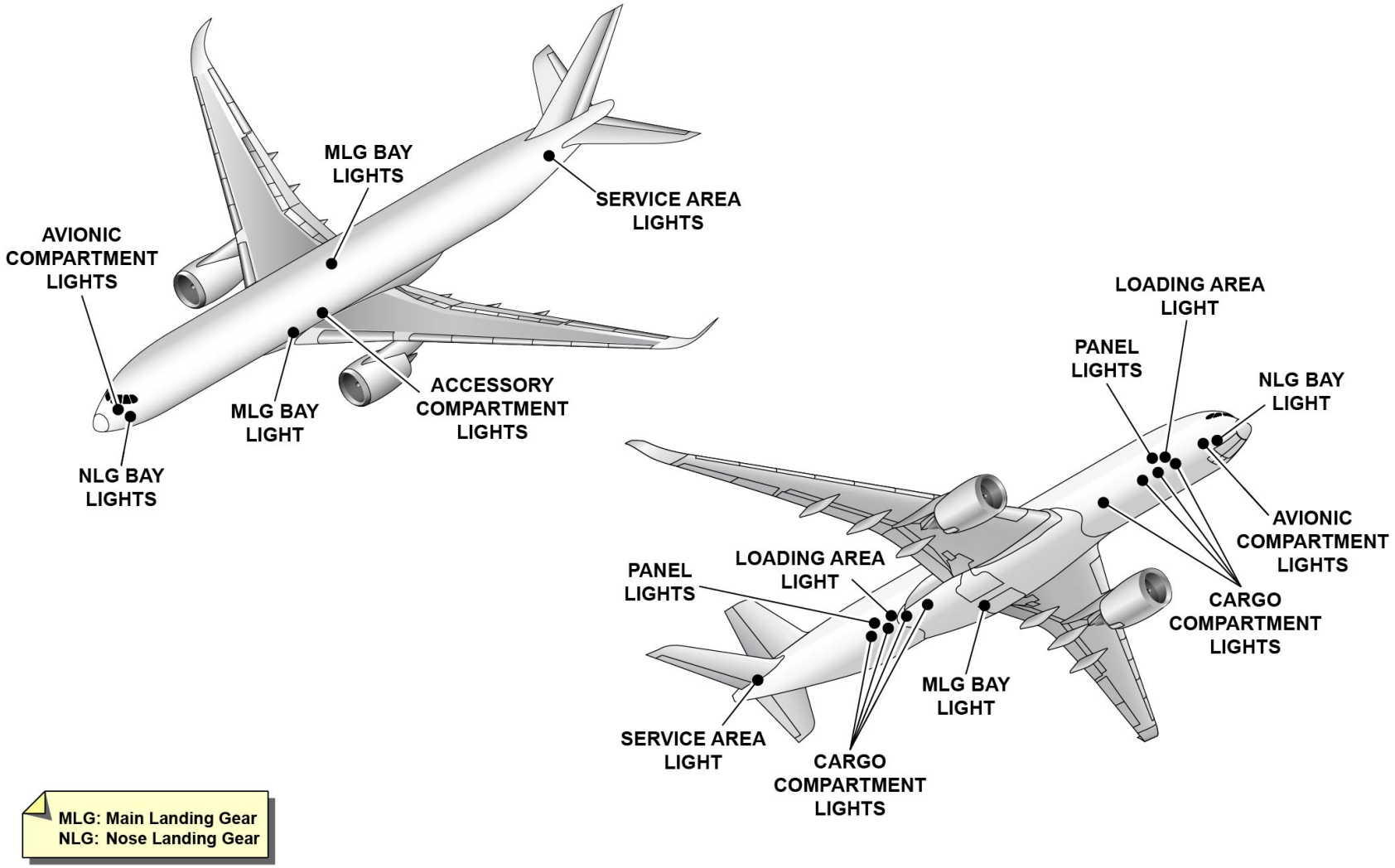
Function/Description

The cargo and service compartment lights include:
- Service area lighting
- Air conditioning duct and accessory compartment lighting
- Lower-deck cargo-compartment lighting (forward, aft and bulk cargo compartments)
- Wheel well lighting
- Maintenance area lighting
- Avionics compartment lighting.

The cargo and service compartment lights illuminate the cargo compartments, the avionics compartment, the service compartments and the maintenance areas.

Control and Indicating

Switches in different areas of the aircraft control independently the lighting for the cargo and service compartment areas.



CARGO AND SERVICE COMPARTMENT LIGHTING - PRESENTATION - FUNCTION/DESCRIPTION & CONTROL AND INDICATING

LIGHTS SYSTEM PRESENTATION (1)

Exterior Lighting - Presentation

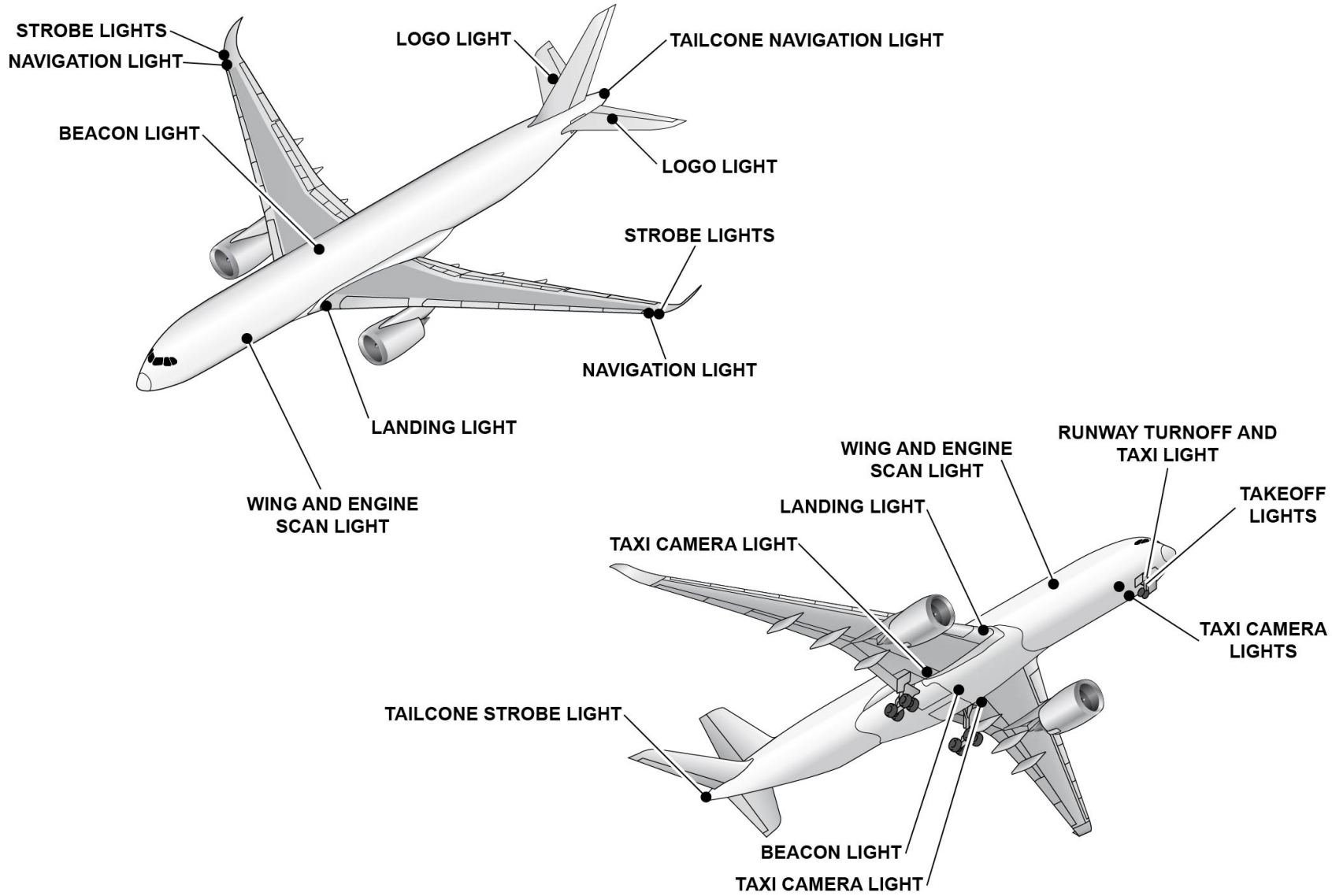
Function/Description

The exterior lighting system includes:
- Navigation lights
- Logo lights
- Landing lights
- Taxi camera lights
- Takeoff lights
- Taxi lights
- Runway turnoff lights
- Anticollision lights (beacon and strobe lights)
- Wing and engine scan lights.

The exterior lighting system illuminates the external surfaces of the aircraft and some areas of the taxiway and the runway below the aircraft.

Location

The exterior lights are along the external surfaces of the aircraft (fuselage, wings, horizontal stabilizer and vertical stabilizer) to illuminate the area adjacent to the aircraft.



EXTERIOR LIGHTING - PRESENTATION - FUNCTION/DESCRIPTION & LOCATION

LIGHTS SYSTEM PRESENTATION (1)

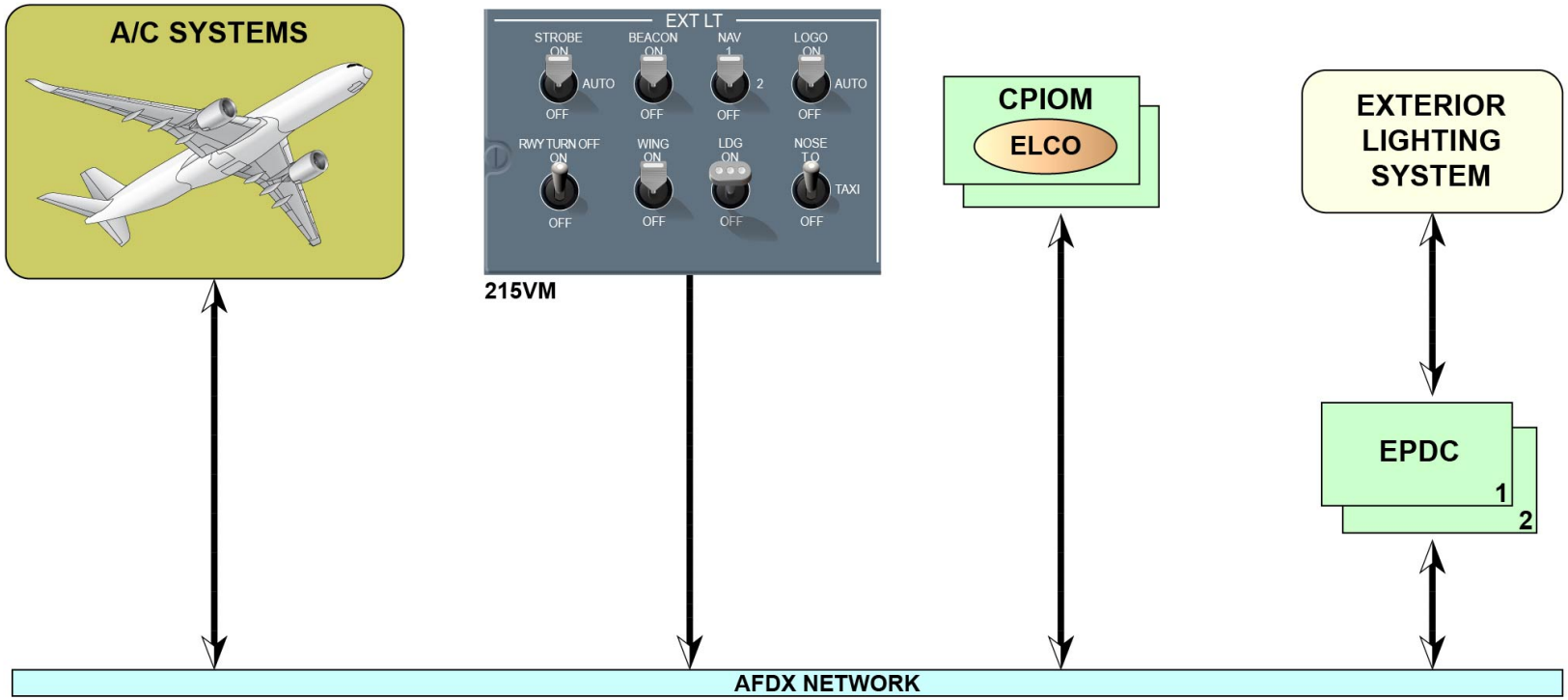
Exterior Lighting - Presentation (continued)

Interface

The exterior lighting system has interfaces through the Avionics Full Duplex Switched Ethernet (AFDX) network with:
- The exterior light panel from the cockpit
- The Electrical Power Distribution Centers (EPDCs)
- software hosted in two Core Processing Input/Output Modules (CPIOMs), which controls and monitors the exterior lighting system
- The aircraft systems.

Control and Indicating

The exterior lighting system is controlled from the cockpit exterior-light panel. This panel is on the overhead panel.



AFDX: Avionics Full Duplex Switched Ethernet
CPIOM: Core Processing Input/Output Module
ELCO: Exterior Lights Controller
EPDC: Electrical Power Distribution Center

EXTERIOR LIGHTING - PRESENTATION - INTERFACE & CONTROL AND INDICATING

LIGHTS SYSTEM PRESENTATION (1)

Emergency Lighting - Presentation

Function/Description

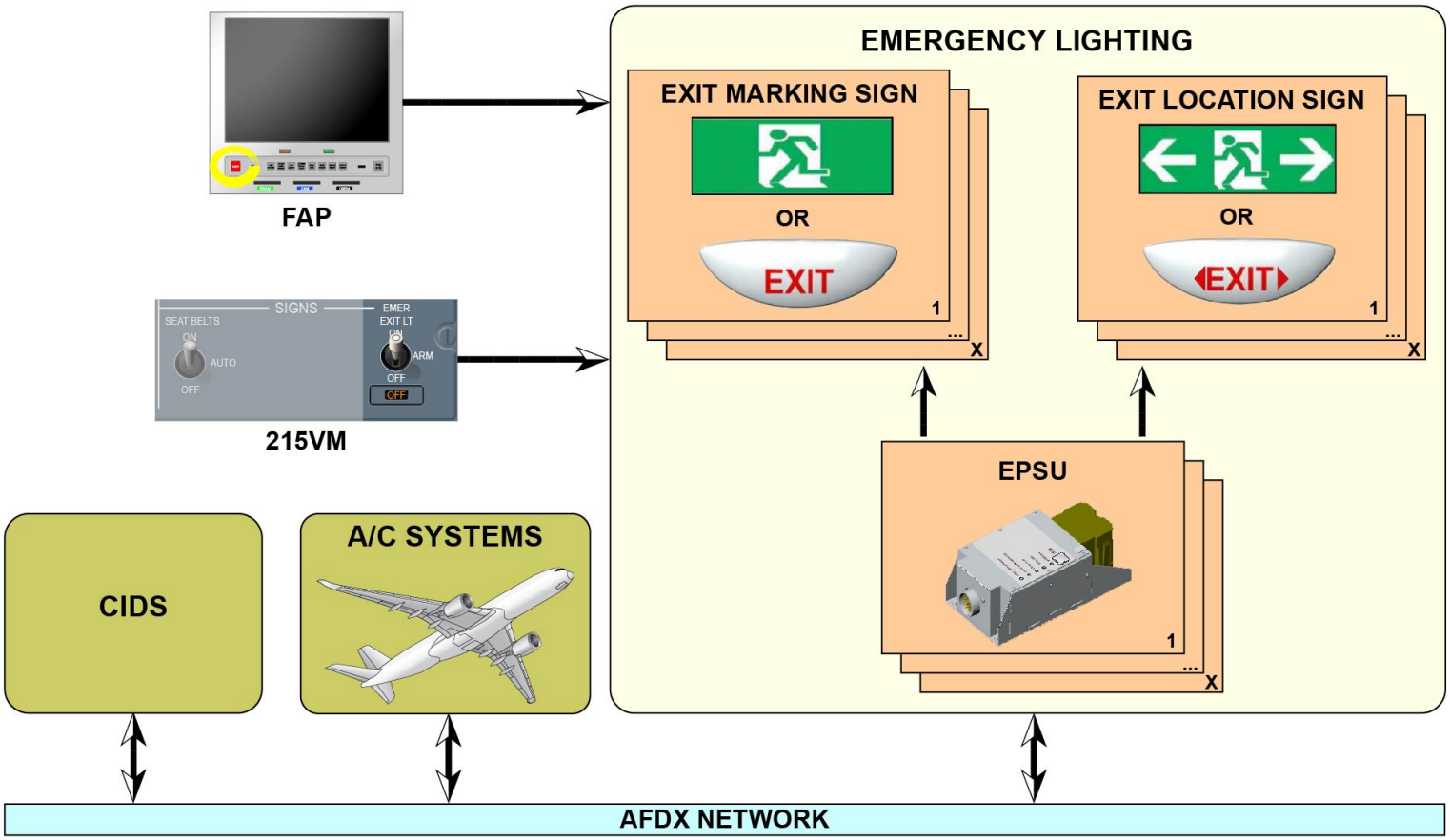
If there is an emergency, the emergency lighting system illuminates the cabin and the cockpit sufficiently. It also helps to identify the emergency exit areas (doors and slides).
The integrated battery of the Emergency Power Supply Units (EPSUs) supplies electrical power when no other electrical source is available.

Interface

The emergency lighting system has interfaces through the AFDX network with:
- The CIDS
- The aircraft systems.

Control and Indicating

The flight crew can control the emergency lighting system from the emergency light panel on the overhead panel.
The cabin crew can control the emergency lighting system on the FAP, with the emergency lighting pushbutton.



AFDX: Avionics Full Duplex Switched Ethernet
CIDS: Cabin Intercommunication Data System
EPSU: Emergency Power Supply Unit
FAP: Flight Attendant Panel

EMERGENCY LIGHTING - PRESENTATION - FUNCTION/DESCRIPTION ... CONTROL AND INDICATING

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