Indicating/Recording System Presentation

31 - Indicating/Recording System Presentation

ELECTRONIC INSTRUMENT SYSTEM

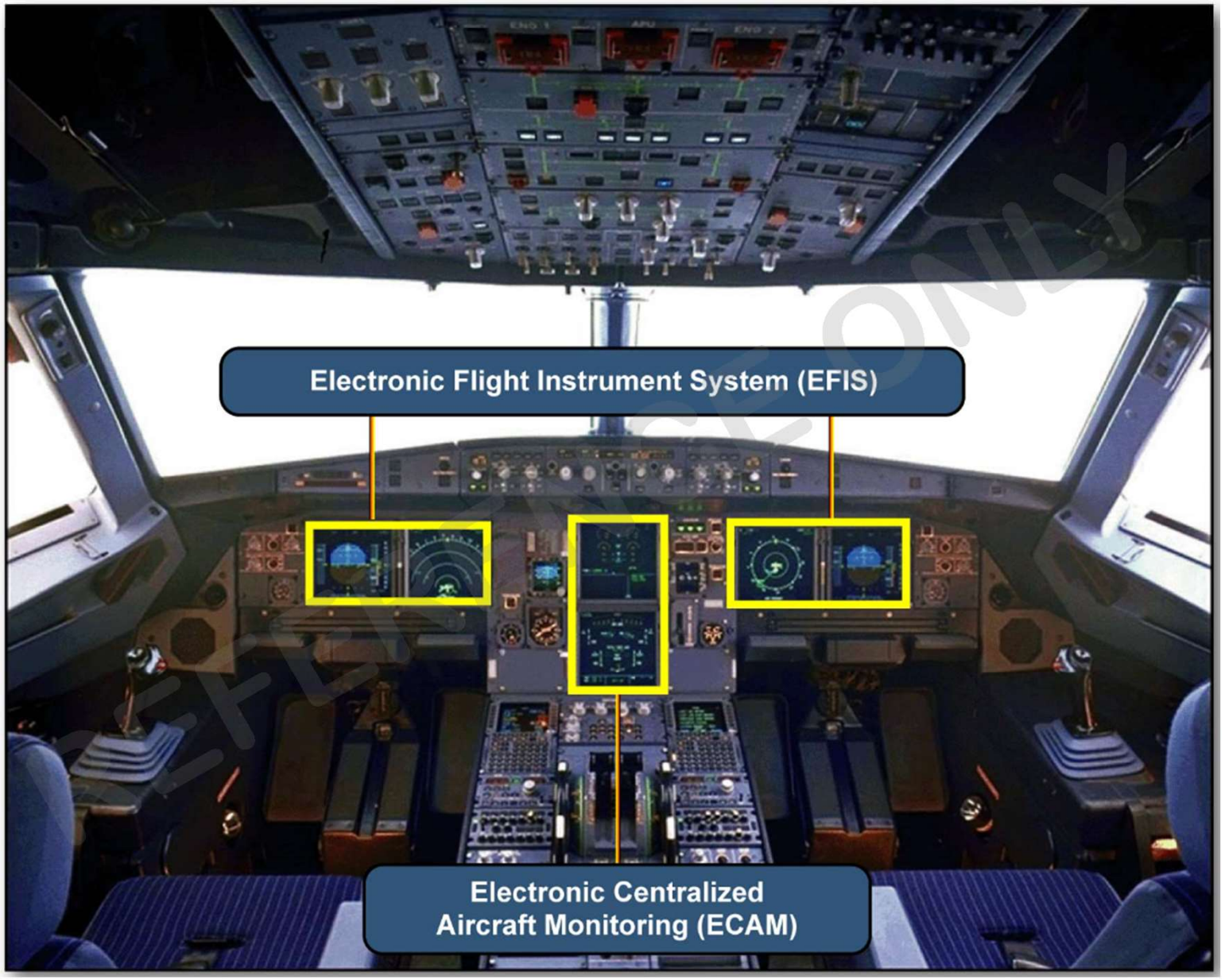
EIS divided into 2 subsystems:
- EFIS
- ECAM

EFIS displays give to the flight crew all basic flight parameters
ECAM SYS gives to the flight crew A/C SYS displays, faults, checklists and operational status.

The Single Aisle aircraft cockpit instrumentation information is displayed on six display units. These display units are part of the Electronic Instrument System (EIS).

The EIS is separated into two subsystems:
- Electronic Flight Instrument System (EFIS),
- Electronic Centralized Aircraft Monitoring (ECAM).

The four EFIS displays (2 for each flight crew member) give to the flight crew all the basic flight parameters. The ECAM system gives to the flight crew aircraft system displays, faults, checklists and the aircraft operational status.


Electronic Flight Instrument System (EFIS)
Electronic Centralized
Aircraft Monitoring (ECAM)

ECAM

Data received by the SDACs and sent to the DMC for display on the ECAM
The System Data Acquisition Concentrators (SDACs) receive data from the A/C systems and sends it to the Display Management Computers (DMCs) for display on the ECAM display units.
Note: DMC 1 supplies both ECAM displays and DMC 2 is also a backup for ECAM displays.

DMCs acquire data and generate the images:
DMC 1 supplies the both ECAM displays
DMC 2 and 3 available as a backup

The DMCs acquire data and transmit it to the Display Units (DUs), which generate the images. Under normal circumstances:
- DMC 1 supplies both ECAM display,
- DMC 2 and 3 are available as a backup.

FWCs receive data from:
- A/C systems
- SDACs

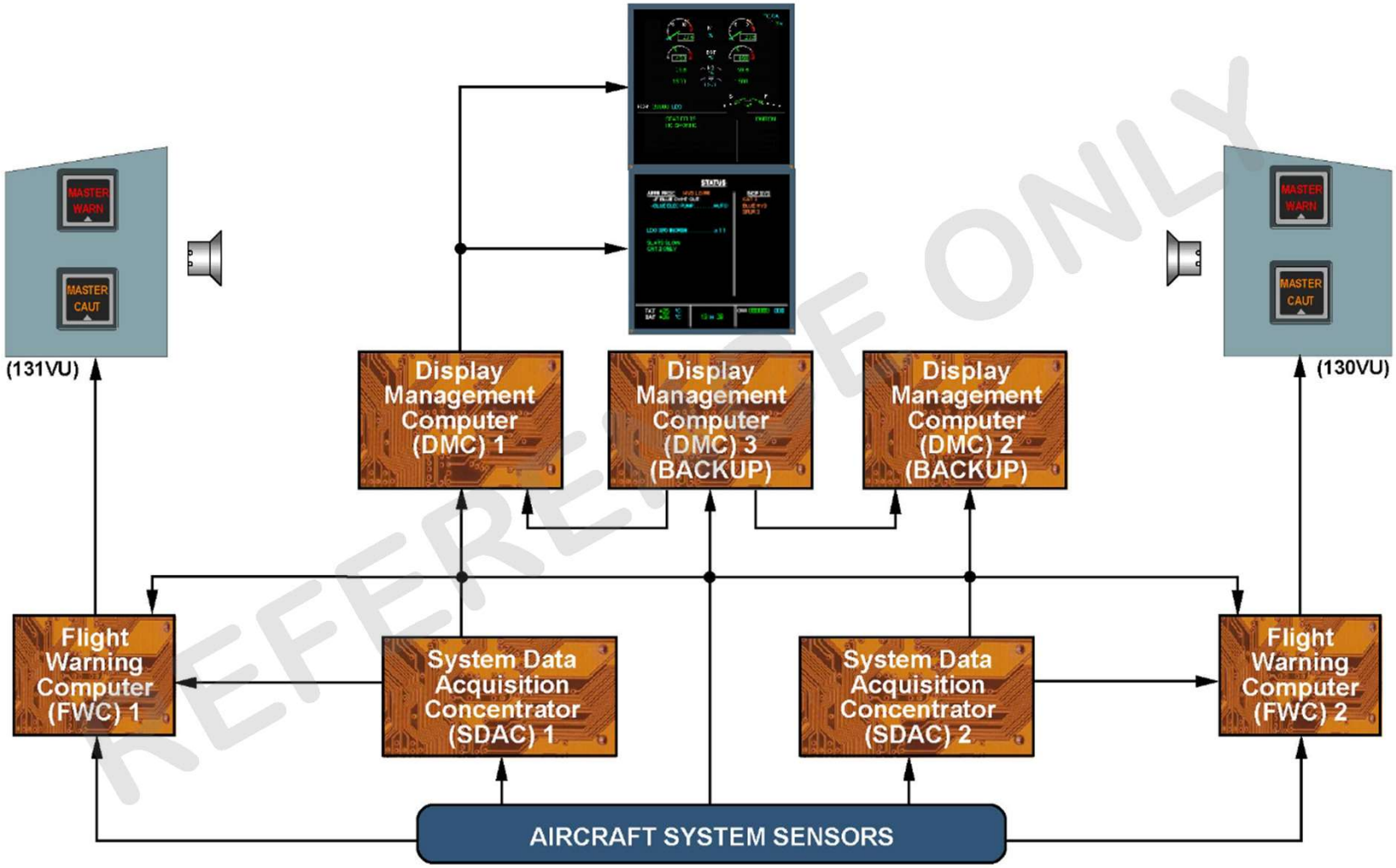
The Flight Warning Computers (FWCs), heart of the ECAM system, receive data from:
- the A/C systems to generate red warnings,
- the SDACs to generate amber cautions.

FWCs supply:
- The DMCs
- The attention getters
- The loudspeakers

The DMCs acquire data and transmit it to the Display Units (DUs), which generate the images. Under normal circumstances:
- DMC 1 supplies both ECAM display,
- DMC 2 and 3 are available as a backup.

The Flight Warning Computers (FWCs), heart of the ECAM system, receive data from:
- the A/C systems to generate red warnings,
- the SDACs to generate amber cautions.

The FWCs then supply:
- the DMCs for the display of alert messages,
- the attention getters,
- the loudspeakers with aural alerts and synthetic voice messages.



EWD divided into:
- Upper area to display engine parameters, FOB and slat/flap position
- Lower area for warning, caution and memo messages

The Engine/Warning Display (EWD) is divided into two main parts:
- the upper area is used to display the main engine parameters, the Fuel On Board (FOB) and the slat/flap position,
- the lower area is used for warning, caution and memo messages.

SD divided into:
- Upper part to display various system pages
- Lower part to display permanent data

The System Display (SD) is divided into two areas:
- the upper part is used to display the various system pages, diagrams of the A/C systems, the lower part is used to display permanent data.

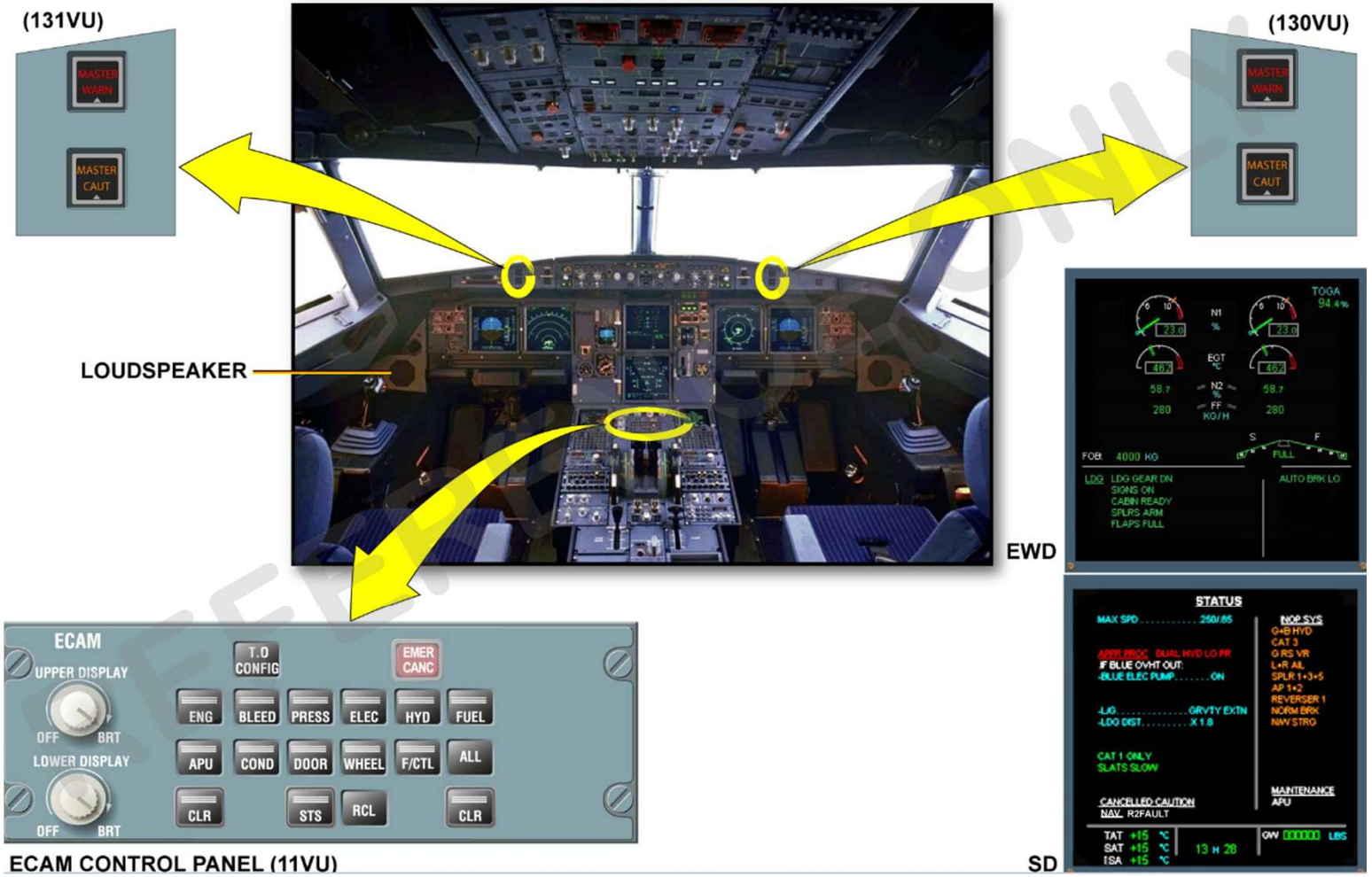
ECAM control panel used to:
- Adjust the brightness of the ECAM screens and to turn them off
- Display the system pages or the status page
- Clear or recall a warning or caution message

Below the ECAM displays, on the center pedestal, there is the ECAM control panel. The two control knobs on the LH side are used to adjust the brightness of the two ECAM screens and to turn them off. The P/Bs on the RH side are mainly used to:
- display any of the system pages or the STATUS page,
- clear or recall a warning or caution message.

Operational status of the A/C shown on the status page

An A/C STATUS page may be also displayed on the SD to give an operational status of the A/C. When things are not normal the STATUS page displays:
- operational data on the LH side,
- INOPerative SYStem on the RH side.

In front of each pilot, there are two attention getters, a red MASTER WARNing and an amber MASTER CAUTion. As a further means of getting the attention, there is a loudspeaker on each side of the cockpit for aural alerts and synthetic voice messages.



ECAM CONTROL PANEL (11VU)

EFIS

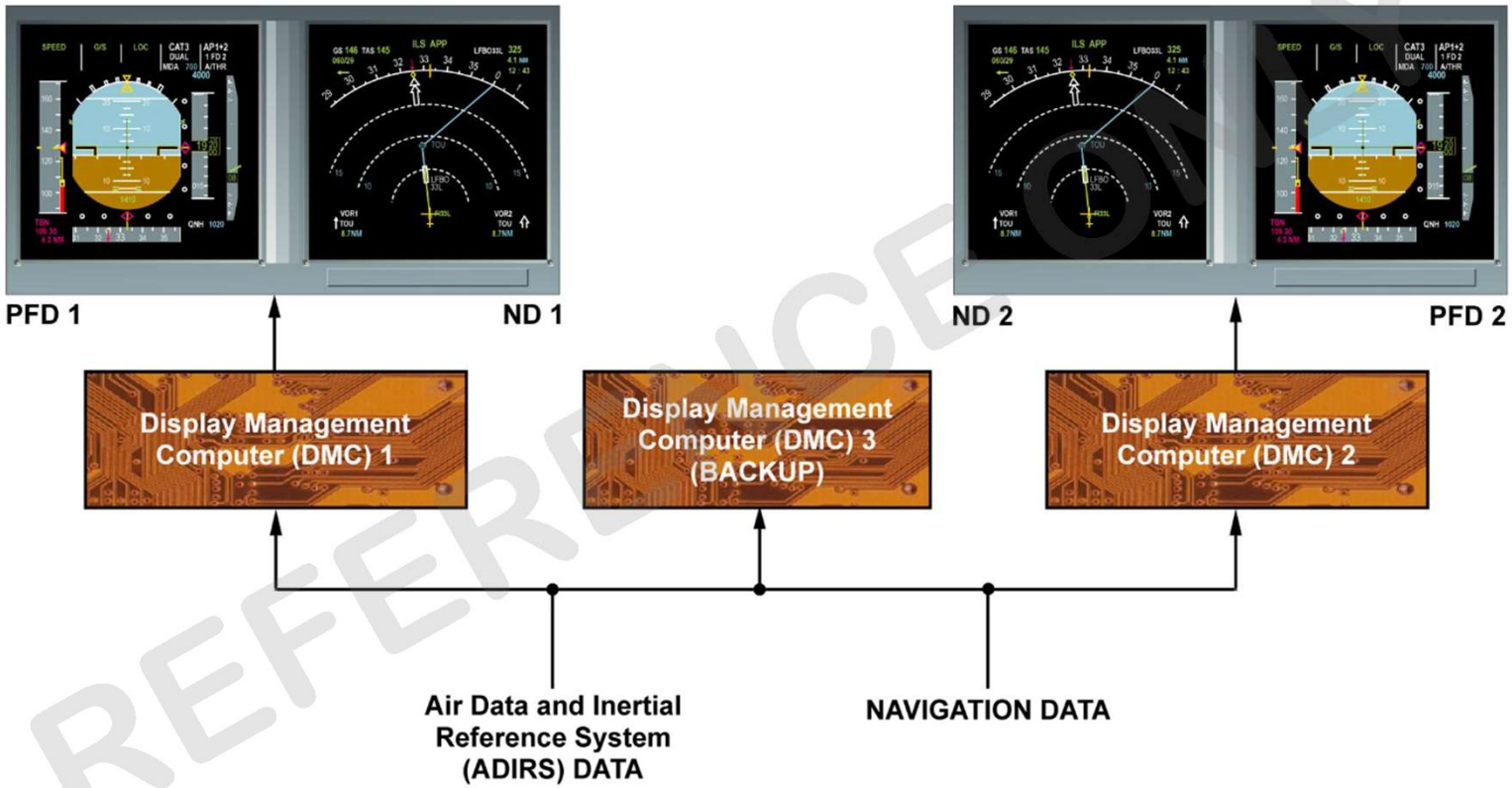
Data from the ADIRS and navigation data from FMGC are sent to the DMCs for EFIS display

For the EFIS displays, data from the Air Data and Inertial Reference System (ADIRS) plus navigation data from the Flight Management and Guidance System (FMGS) is fed directly to the DMCs.

The DMCs then process the data and generate the images to display.

Under normal circumstances:

- DMC 1 supplies the CAPT EFIS displays,
- DMC 2 supplies the F/O EFIS displays,
- DMC 3 is available as a backup.



EFIS CONTROL AND INDICATING

Flight parameters displayed on the PFDs

Navigation data displayed on the NDs

Flight parameters are displayed on the Primary Flight Display (PFD) while navigation data is displayed on the Navigation Display (ND).

Brightness of the PFDs and NDs controlled by knobs

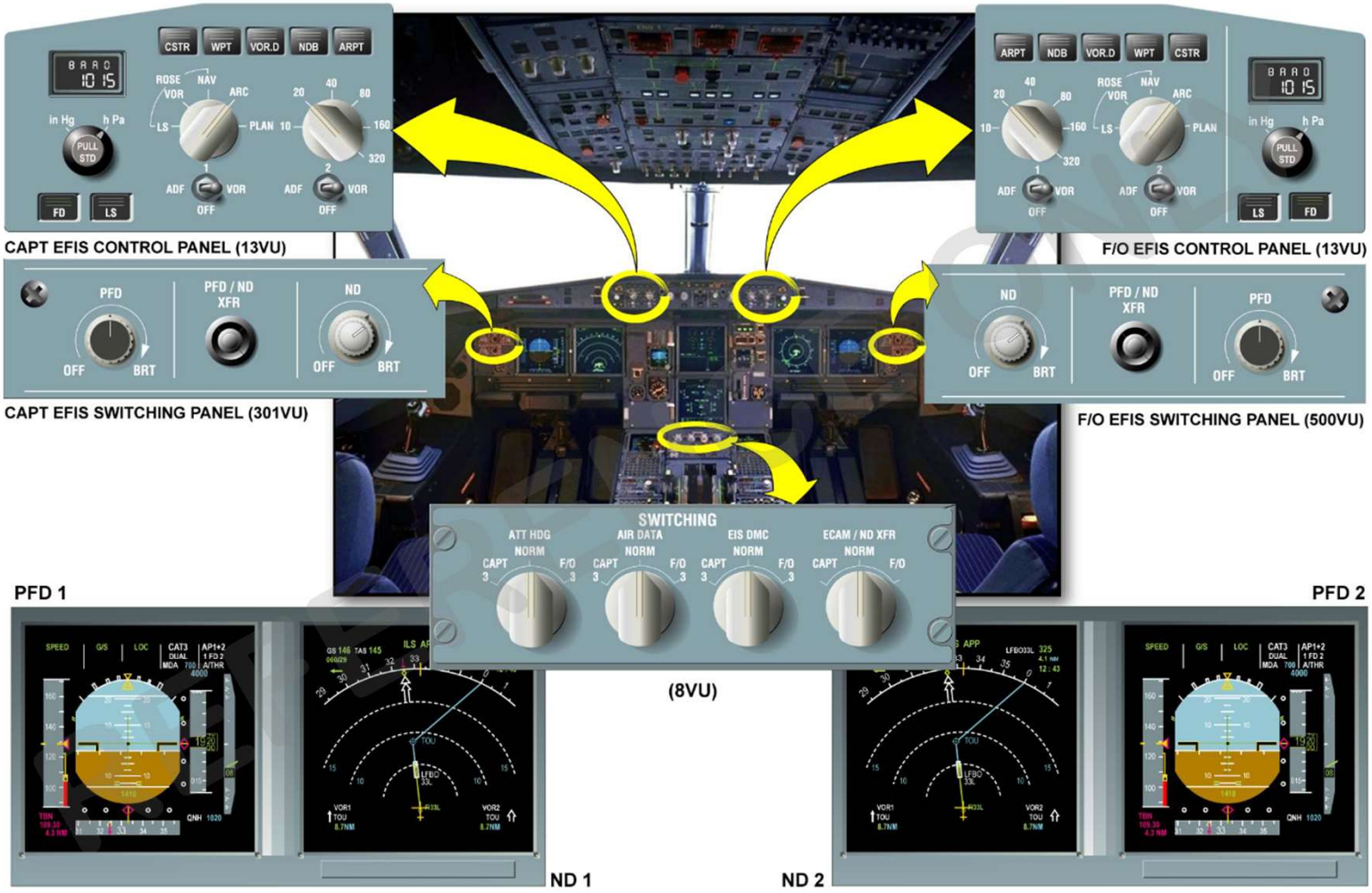
Outboard of the PFDs, there are control knobs to adjust the brightness of the associated PFD and ND, and to turn the displays off.

EFIS control panels used to select what is displayed on the EFIS screens

Two EFIS control panels are used to select what is displayed on the EFIS screens. The EFIS control panels are divided into two sections, one section associated with the PFD and the other one with the ND.

On switching panel, 2 selectors restore EFIS and ECAM displays in abnormal operation

Just below the ECAM screens, on the center pedestal, there is a switching panel with, on the right, 2 rotary selectors to restore data to the EFIS and ECAM displays in abnormal operation.


CAPT EFIS CONTROL PANEL (13VU)
F/O EFIS CONTROL PANEL (13VU)
CAPT EFIS SWITCHING PANEL (301VU)
F/O EFIS SWITCHING PANEL (500VU)
SWITCHING
ATT HDG
AIR DATA
EIS DMC
ECAM / ND XFR
(8VU)
PFD 1
PFD 2
ND 1
ND 2

CLOCK

- UTC, ET, chronometer and date given by a single clock
- Can be synchronized with satellite GPS time
  A single electrical clock gives the Universal Time Coordinated (UTC) and date as time references for the crew and all peripheral systems. The other functions available for crew are Elapsed Time (ET) and chronometer (CHR). The clock can be synchronized with satellite GPS time.
- Time also displayed on the SD

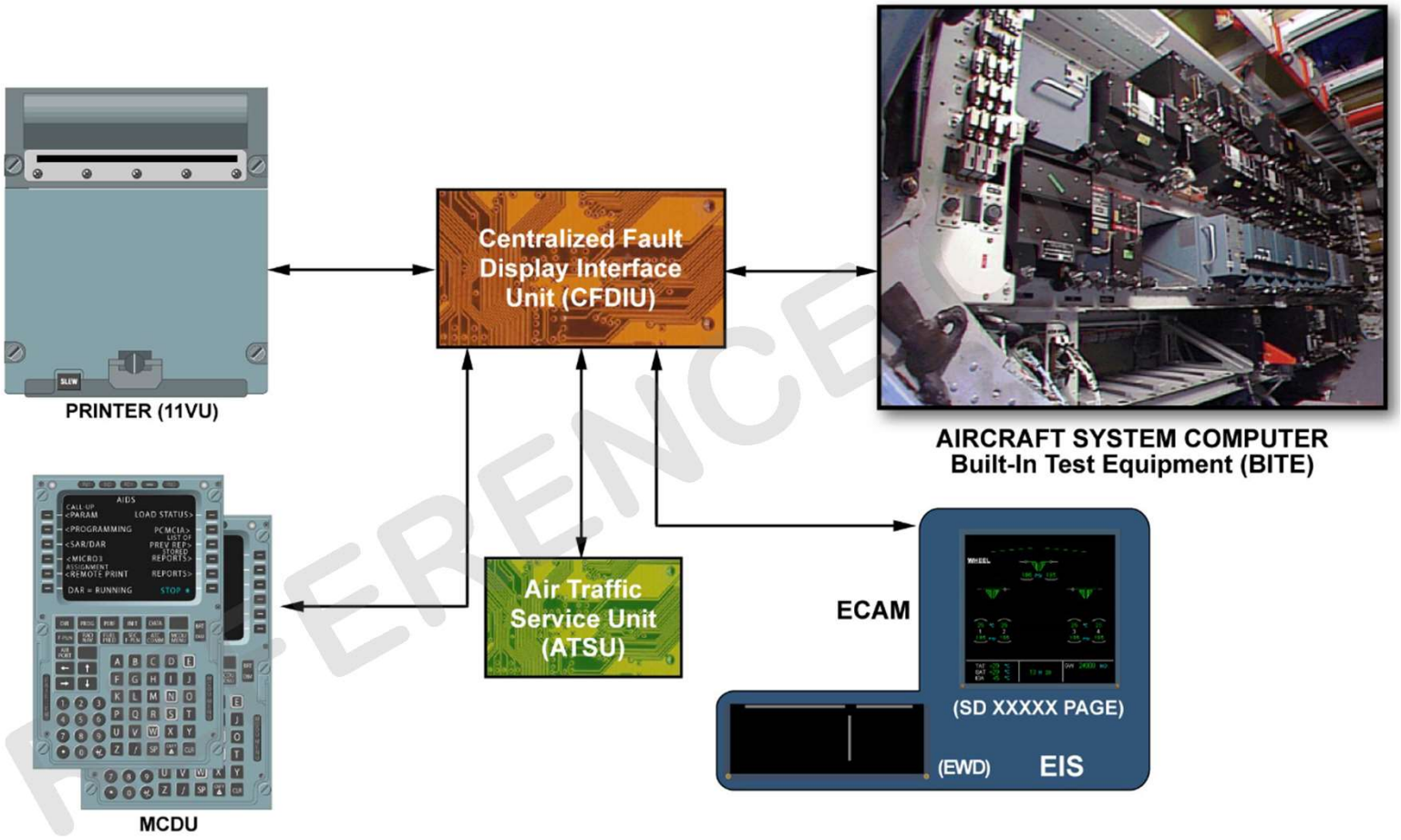
SD

CLOCK (400VU)

CENTRALIZED FAULT DISPLAY SYSTEM

- CFDIU centralizes and memorizes all system failures information
- Reading or printing done with the MCDUs/Printer
- Most system computers have BITE
- The ECAM monitors A/C systems and transmits warnings to CFDIU

The Centralized Fault Display Interface Unit (CFDIU) centralizes and memorizes all information concerning A/C system failures. Reading or printing of the failure information is done in the cockpit with any Multipurpose Control and Display Unit (MCDU) or the printer. Most A/C system computers have a Build-In Test Equipment (BITE). The BITE permanently monitors the system operation. When a failure is detected, it is stored in the BITE memory and is transmitted to the CFDIU. The ECAM, which generate warning and status messages, delivers these data to the CFDIU as well.

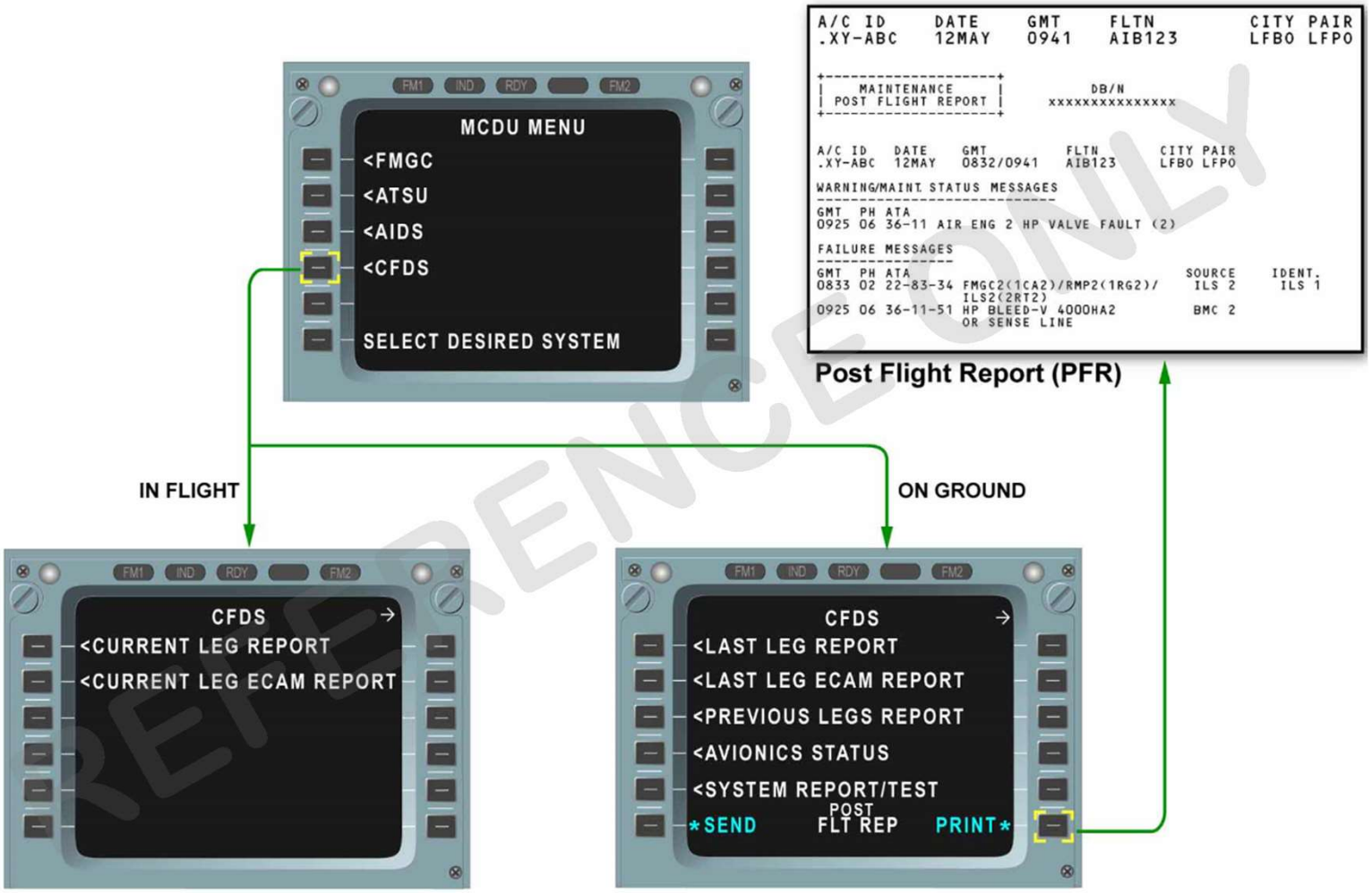

Centralized Fault Display Interface Unit (CFDIU)
PRINTER (11VU)
AIRCRAFT SYSTEM COMPUTER
Built-In Test Equipment (BITE)
Air Traffic Service Unit (ATSU)
MCDU
ECAM
(SD XXXXX PAGE)
(EWD)
EIS

- 2 MCDU menus depending on the A/C if it is in flight or on ground

  The failure information is available in various reports. The reading of the failure information is made from two different MCDU menus depending on if the A/C is in flight or on ground. The SYSTEM REPORT/TEST function is available on ground only. It enables a dialogue between the CFDIU and a system computer. The SYSTEM REPORT/TEST menu page presents the list of all the systems connected to the CFDIU, in ATA chapter order.

- PFR only printed on ground
  The maintenance Post Flight Report (PFR) can only be printed on ground. It summarizes and displays the list of the ECAM warning messages and the fault messages that occurred during the last flight, with the associated time, flight phase and ATA reference. It helps the maintenance crew to make a correlation for easier troubleshooting.

- ECAM warning and fault messages shown on the PFR



AIRMAN (OPTION)

AIRMAN operation principle:
- The aircraft transmits its status information in real-time
- Aircraft data reception and analyse
- Data correlation with Airbus's and Airline's data and documentation
- Determination of the maintenance actions

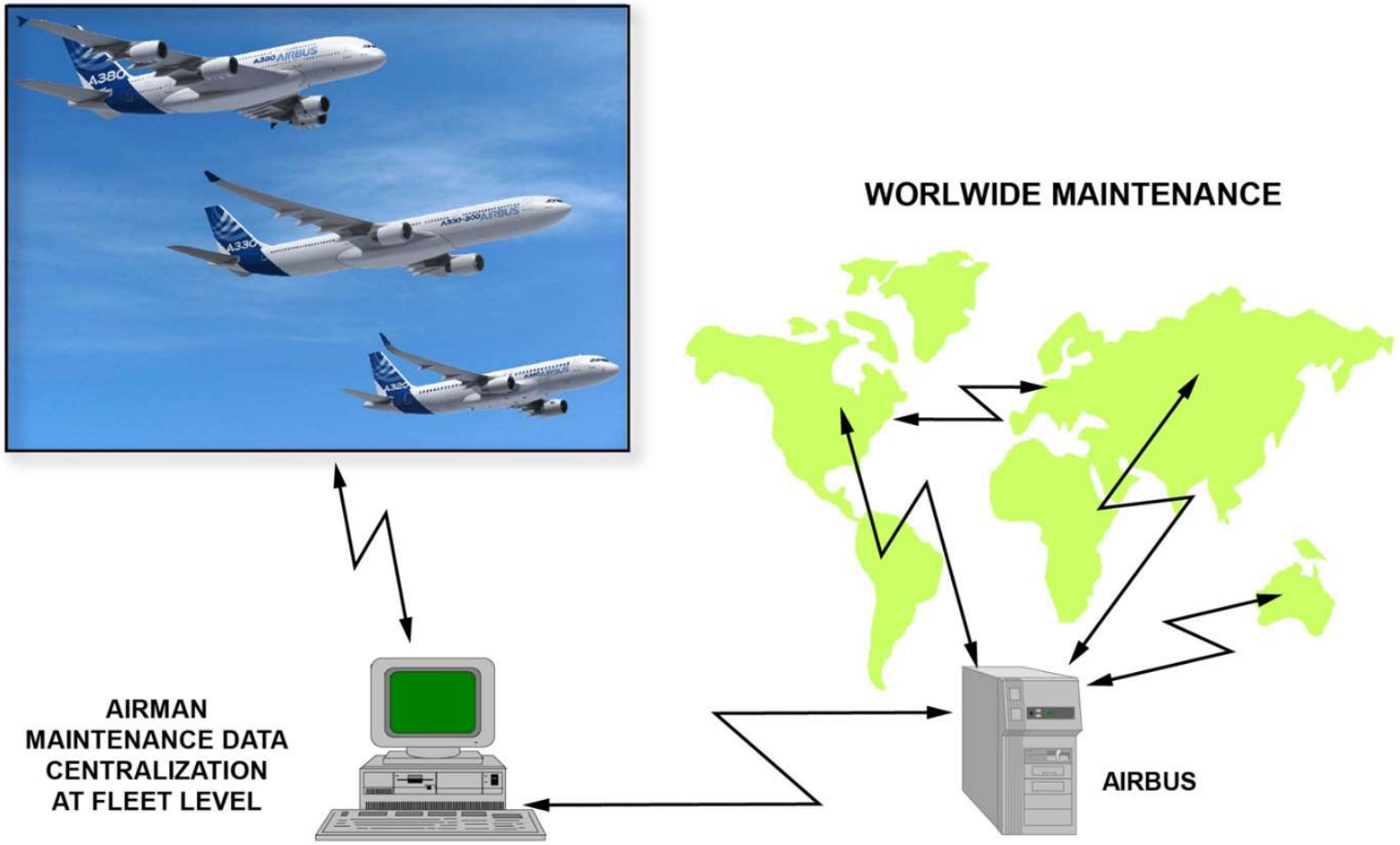
AIRMAN is a ground-based software dedicated to the identification and the management of unscheduled maintenance.

AIRMAN receives and analyses the aircraft status information generated by the Centralized Fault Display System (CFDS) and also e-logbook data.
The information is automatically transmitted to the ground by the aircraft communication system.

These information sources are synthesized, combined with Airbus and the Airline own technical documentation and shown through a user-friendly interface. Aircraft status information is sent to AIRMAN while the aircraft is both in flight and on ground. Message analysis also takes place in real-time.

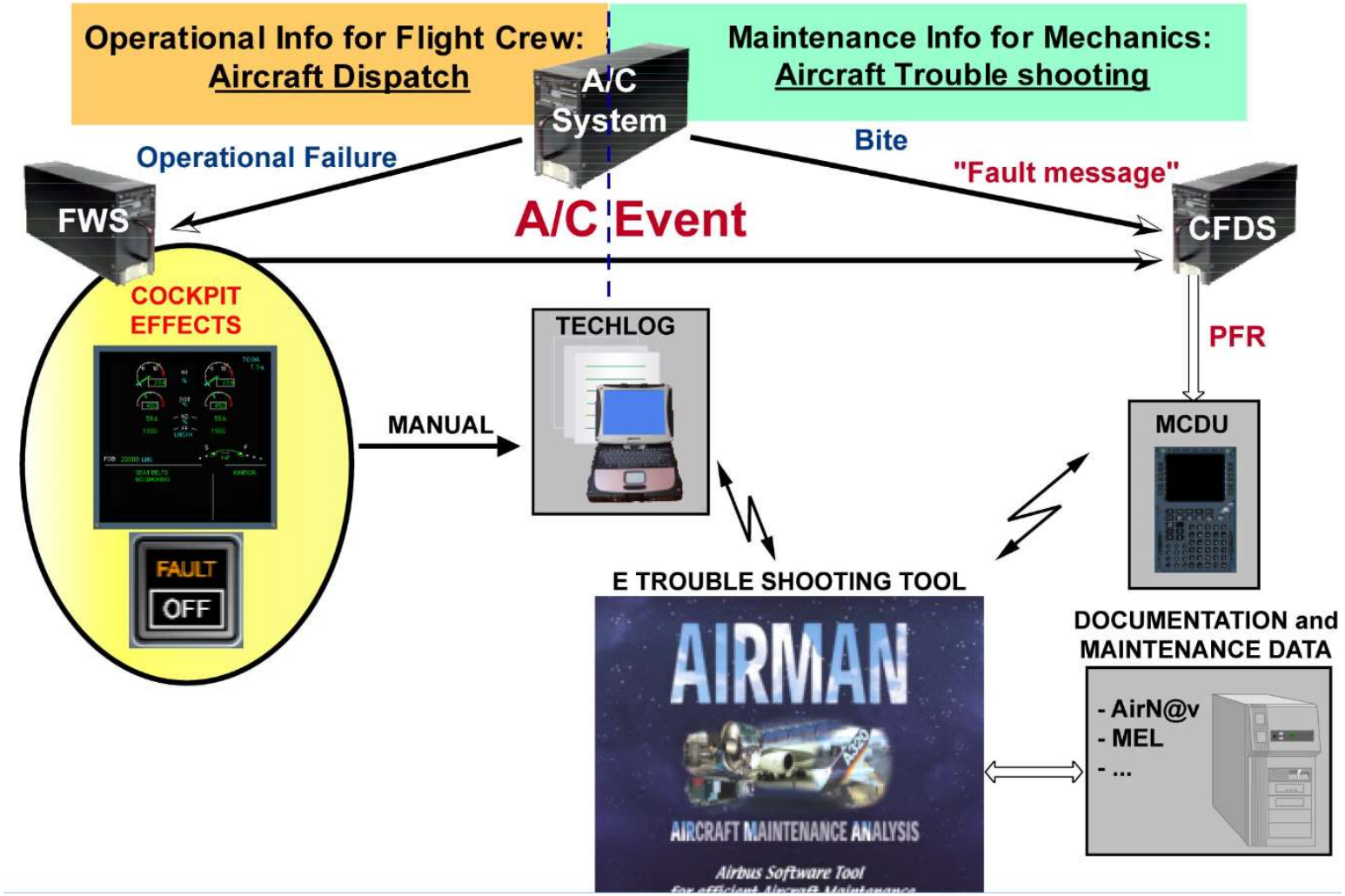
These capabilities maximize the time available for appropriate maintenance actions to be determined and preparations to be made.

AIRMAN is capable of analyzing an aircraft fault history and consequently identifying and prioritizing preventive maintenance actions.


WORLWIDE MAINTENANCE
AIRMAN
MAINTENANCE DATA
CENTRALIZATION
AT FLEET LEVEL
AIRBUS

Maintenance Philosophy:
- fault detection by BITEs
- fault centralization by the CFDS
- alert generation from FWS
- generation of PFR
- reporting on the logbook
- data transmission to AIRMAN

The aircraft maintenance philosophy is based on the following steps:
- fault detection made by the computers BITEs,
- cockpit effects as flags on Display Units, and warning generated by the Flight Warning System (FWS),
- centralization by the CFDS of BITE faults, cockpit effects and related maintenance procedures generation of Post Flight Report (PFR),
- fault event data reporting through the eLogbook,
- fault event data and reports transmission to AIRMAN for maintenance support on ground.


Operational Info for Flight Crew:
Aircraft Dispatch
Maintenance Info for Mechanics:
Aircraft Trouble shooting
A/C System
Operational Failure
Bite
"Fault message"
FWS
A/C Event
CFDS
COCKPIT EFFECTS
FAULT
OFF
MANUAL
TECHLOG
PFR
MCDU
E TROUBLE SHOOTING TOOL
AIRMAN
AIRCRAFT MAINTENANCE ANALYSIS
Airbus Software Tool
DOCUMENTATION and MAINTENANCE DATA
- AirN@v
- MEL
- ...

ELOGBOOK
eLogbook = main communication means between flight crew and maintenance

Use of eLogbook by the flight crew:
- Logbook status consultation
- Creation of a new flight
- Defect reporting

Use of eLogbook by the maintenance:
- Logbook status consultation
- Defect reporting
- Maintenance or servicing action reporting
- CRS

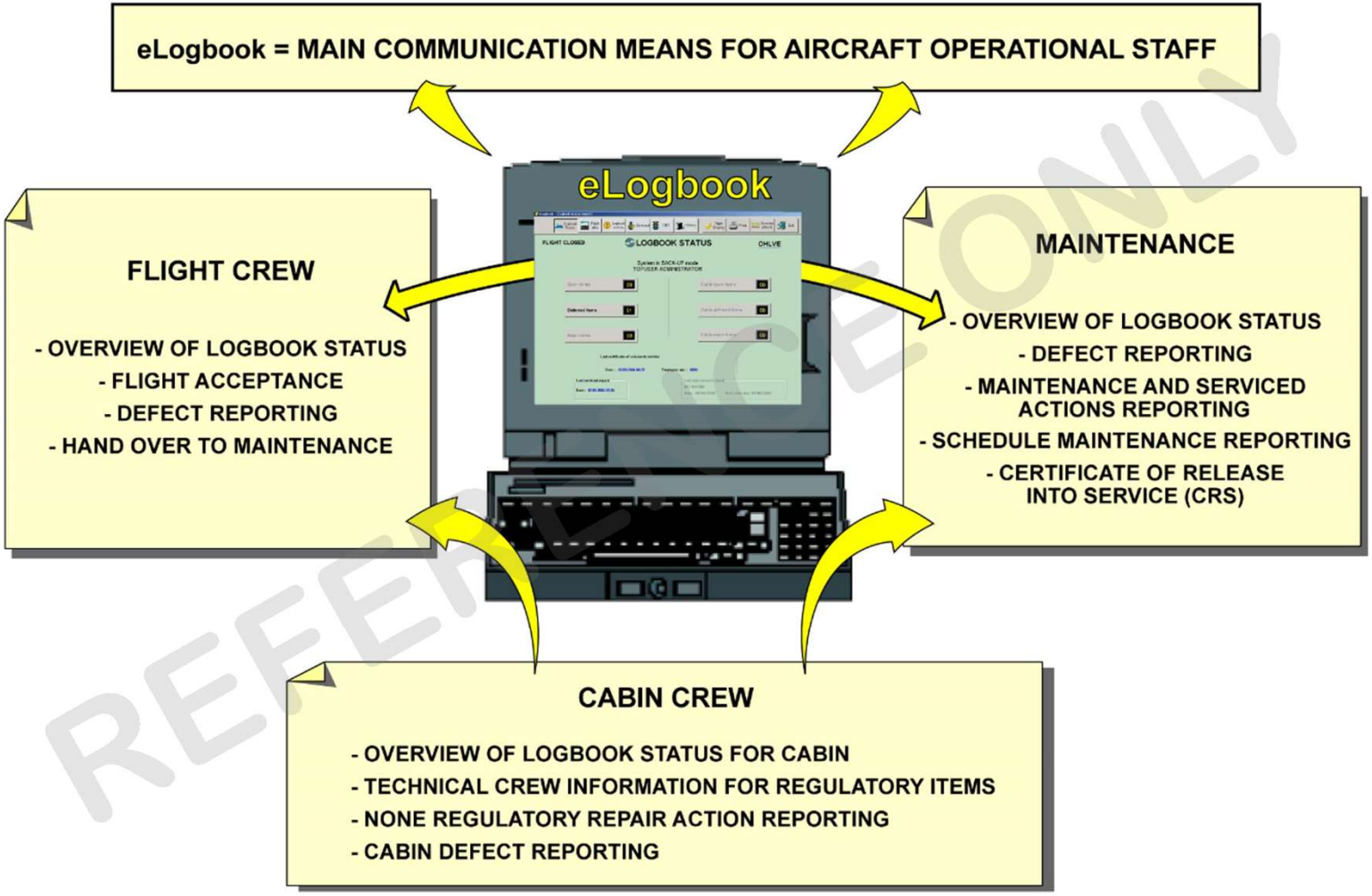
Use of eLogbook by the cabin crew:
- Logbook status consultation
- Cabin defect reporting

The eLogbook is the main communication means for aircraft operational staff. It enables the flight crew and the technical staff to be aware of the aircraft status, to enter aircraft defect and to report maintenance and servicing actions.

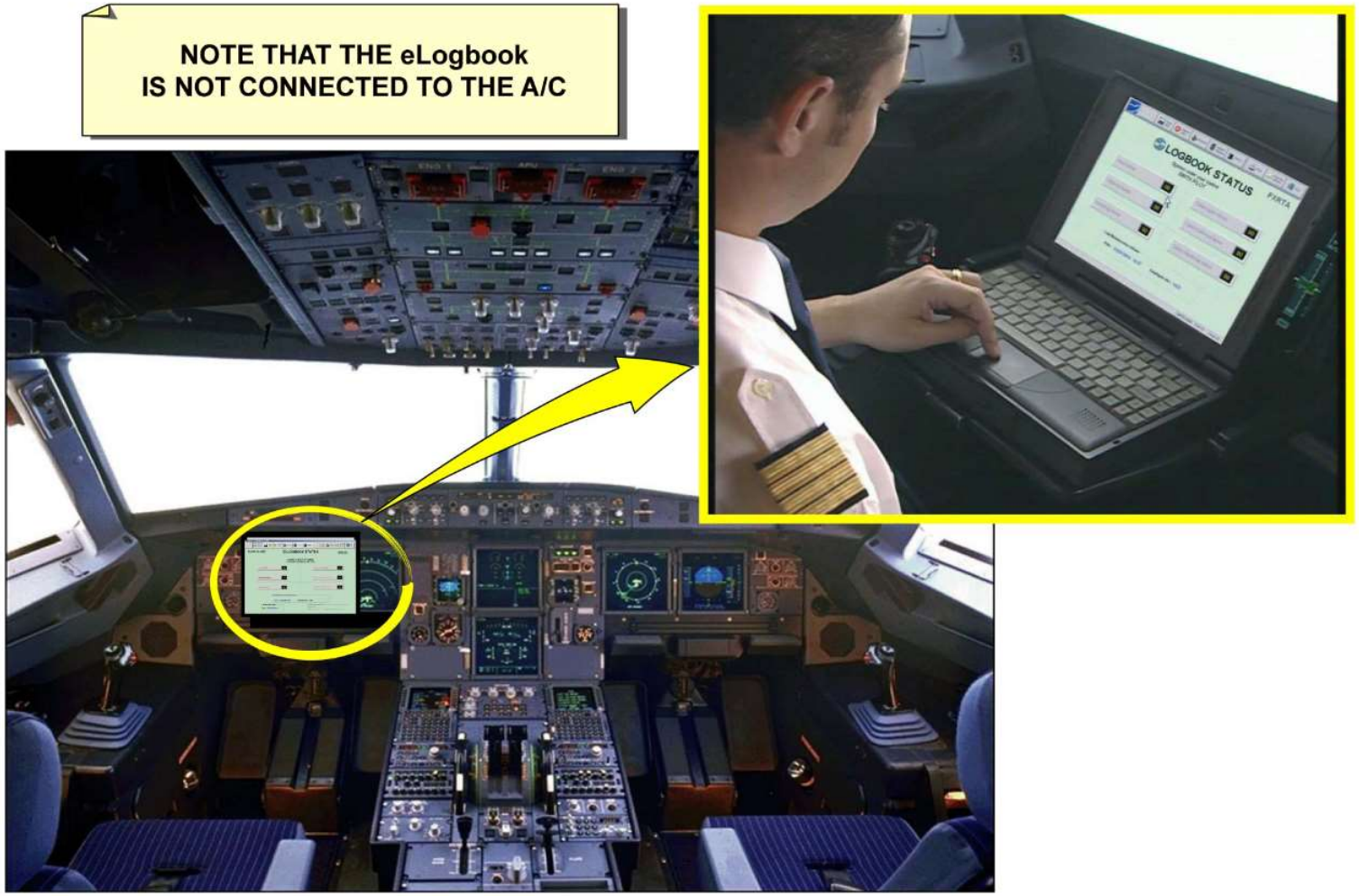
The eLogbook lets the flight crew:
- consult the Logbook status
- accept / create a new flight
- report aircraft defects
- hand over to maintenance

The maintenance staff uses the eLogbook to:
- consult the aircraft status
- report aircraft defects
- report corrective or scheduled maintenance actions
- report servicing actions
- build the Certificate of Release into Service (CRS) of the aircraft

Finally the cabin crew can also use the eLogbook to:
- consult the aircraft status
- inform the flight crew about regulatory cabin defects
- report none regulatory cabin defects



- ELogbook is stand-alone
- Stowed in cockpit



DIGITAL FLIGHT DATA RECORDING

- FDIU function integrated in the FDIMU
  The Flight Data Interface and Management Unit (FDIMU) has two primary functions. The first of which is the Flight Data Interface Unit (FDIU) function.

- FDIU acquires and formats various critical flight parameters and system data before supplying the SSFDR
  To fulfill the mandatory requirements of crash recording, the FDIU acquires and formats various critical flight parameters and system data before supplying the Solid State Flight Data Recorder (SSFDR).

- Acceleration of the A/C measured by the linear accelerometer

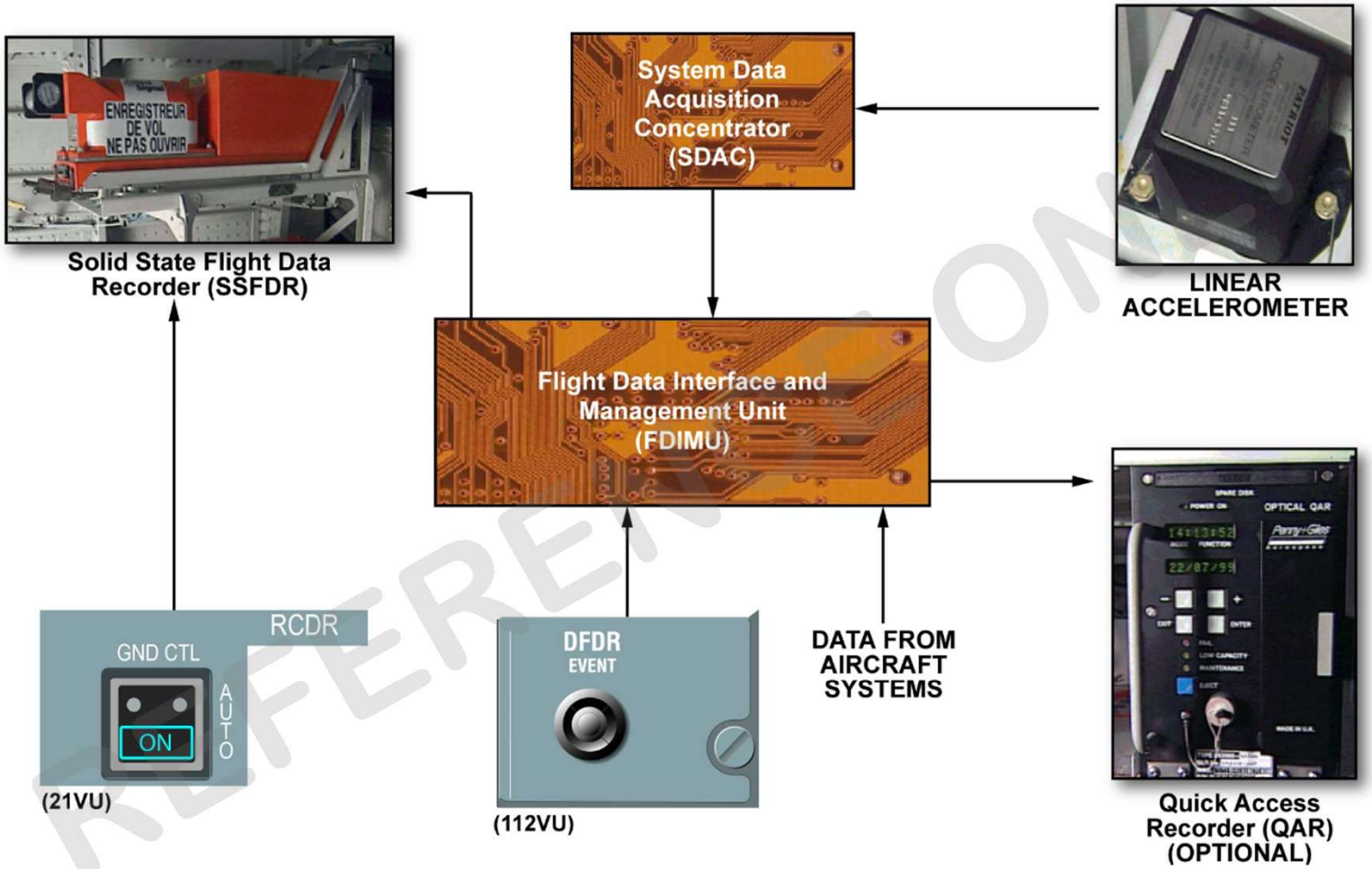
- Signal digitalized by the SDAC and sent to the FDIU
  The linear accelerometer measures the acceleration of the A/C in all three axes. The System Data Acquisition Concentrator (SDAC) digitizes the analog signal of the linear accelerometer and sends it to the FDIU.

- QAR records the same parameters as the SSFDR

- SSFDR operation is automatic when at least one engine is running
  For maintenance and performance purposes, the optional Quick Access Recorder (QAR) records the same parameters as the SSFDR. The operation of the SSFDR is automatic when at least one engine is running.

- SSFDR can be supplied when the A/C is on ground by means of a GND CTL P/B located on the RCDR panel

- An event mark can be set on the SSFDR memory with a DFDR EVENT P/B
  On the overhead panel, there is a GrouND ConTroL P/B located on the ReCorDeR panel. This P/B lets the SSFDR be supplied when the A/C is on ground for preflight checks before engine start or for test and maintenance purposes. On the center pedestal, there is a Digital Flight Data Recorder (DFDR) EVENT P/B, which can be used to set an event mark on the SSFDR memory.



AIRCRAFT INTEGRATED DATA SYSTEM

Main function of the AIDS are:

- To monitor engine and APU condition
- To monitor A/C performance
- To supply trouble shooting assistance

Second function of the FDIMU is the DMU function

The main functions of the Aircraft Integrated Data System (AIDS) are to monitor engine condition, APU condition and A/C performance, and to provide trouble shooting assistance. The second main function of the FDIMU is the DMU function which houses the Aircraft Integrated Data System (AIDS).

DMU is the heart of the AIDS

DMU functions:

- Collect, process and record various A/C parameters
- Generate reports

The Data Management Unit (DMU) is the heart of the AIDS. It fulfils the following functions:

- collection, processing and recording of various A/C parameters, including the mandatory parameters given by the FDIU. The recording is made in an internal memory of the DMU and on an optional external recorder called Digital AIDS Recorder (DAR),
- generate various reports according to defined conditions. These reports are stored in a non-volatile memory of the DMU.

Data loaders used to upload or download data with DMU (floppy disk)

A data loader is used to upload programmed data into the DMU and to download recorded DMU data on a floppy disk for on ground analysis.

Printer can be controlled:

- Automatically by the DMU
- Manually from the MCDU or using the AIDS PRINT P/B

The printer is used to print reports generated by the DMU.

The printer can be automatically controlled by the DMU, manually controlled from the MCDU or using the AIDS PRINT P/B on the center pedestal.

PCMCIA card slot to upload DMU software and download DMU data

- Optional SPC to enable WEFA function

The FDMIU has a PCMCIA card slot to upload DMU software and download DMU data.

An optional Smart PCMCIA Card (SPC) hosting a SIM card can be inserted into the PCMCIA interface as an alternative to a normal PCMCIA card. The SPC enables Wireless Extension For ACMS (WEFA) function to transfer maintenance data to the ground.

2 MCDUs are connected to the DMU

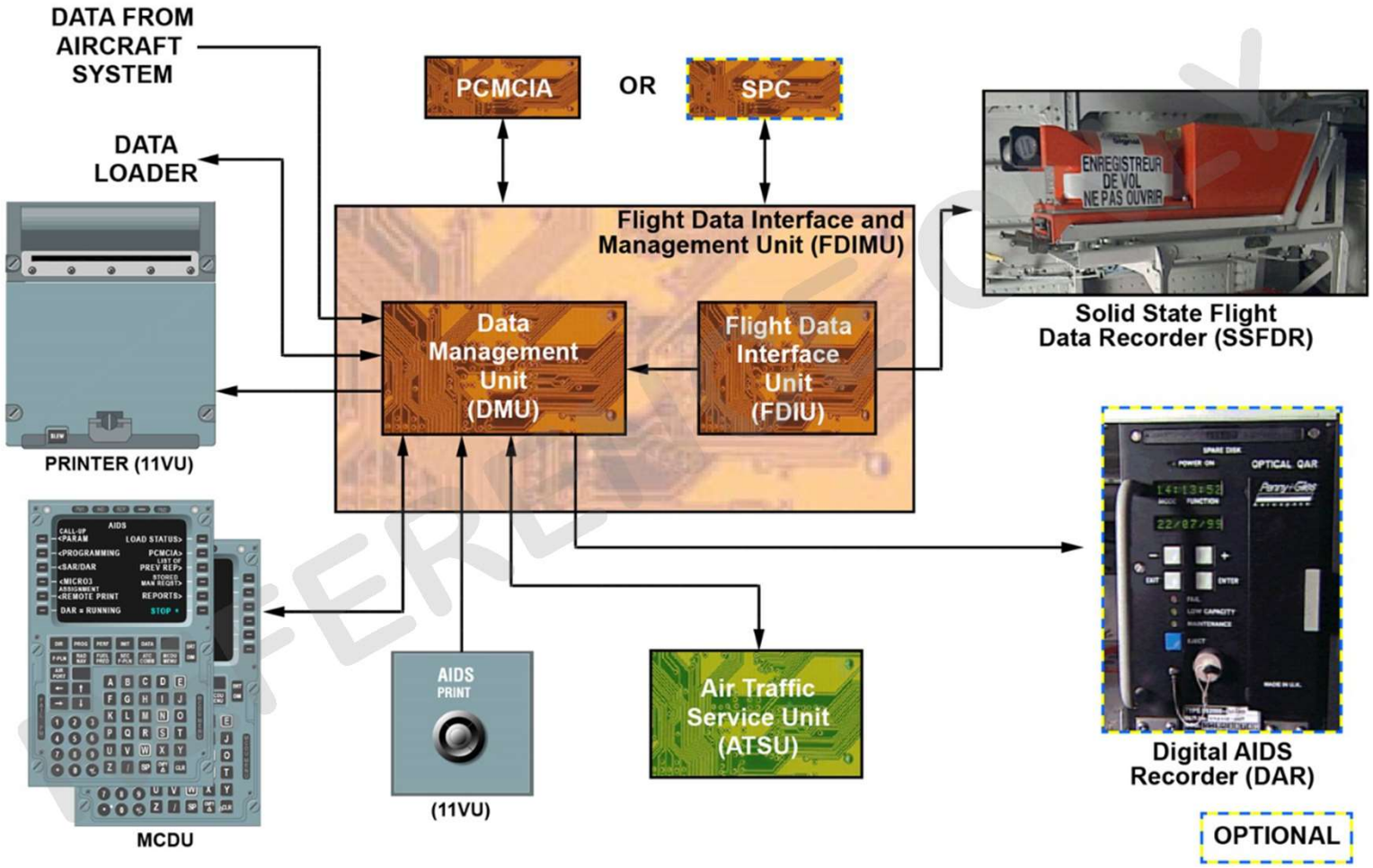
In the A/C, two MCDUs are connected to the DMU.

To initiate communication with the AIDS via either MCDU, the user has to press the AIDS line select key from the MCDU MENU page. The AIDS MCDU menu page is then displayed.

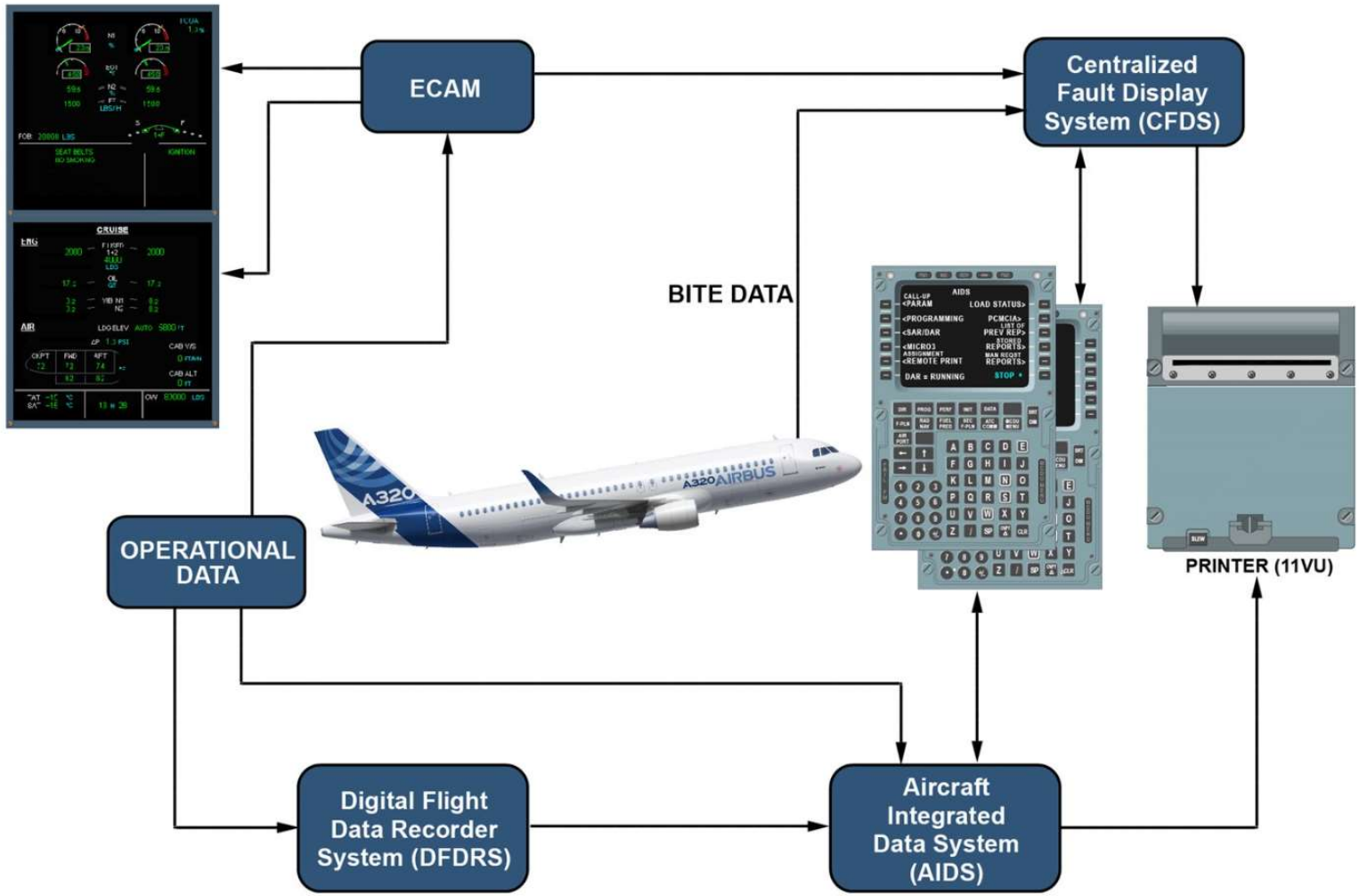
Some of the AIDS functions, including real time parameter read out, may be controlled from this menu.

AIDS line select key from the MCDU MENU page

SPC: Smart PCMCIA Card



ON BOARD MAINTENANCE FACILITIES
In this graphic all the indicating/recording systems can be seen together.

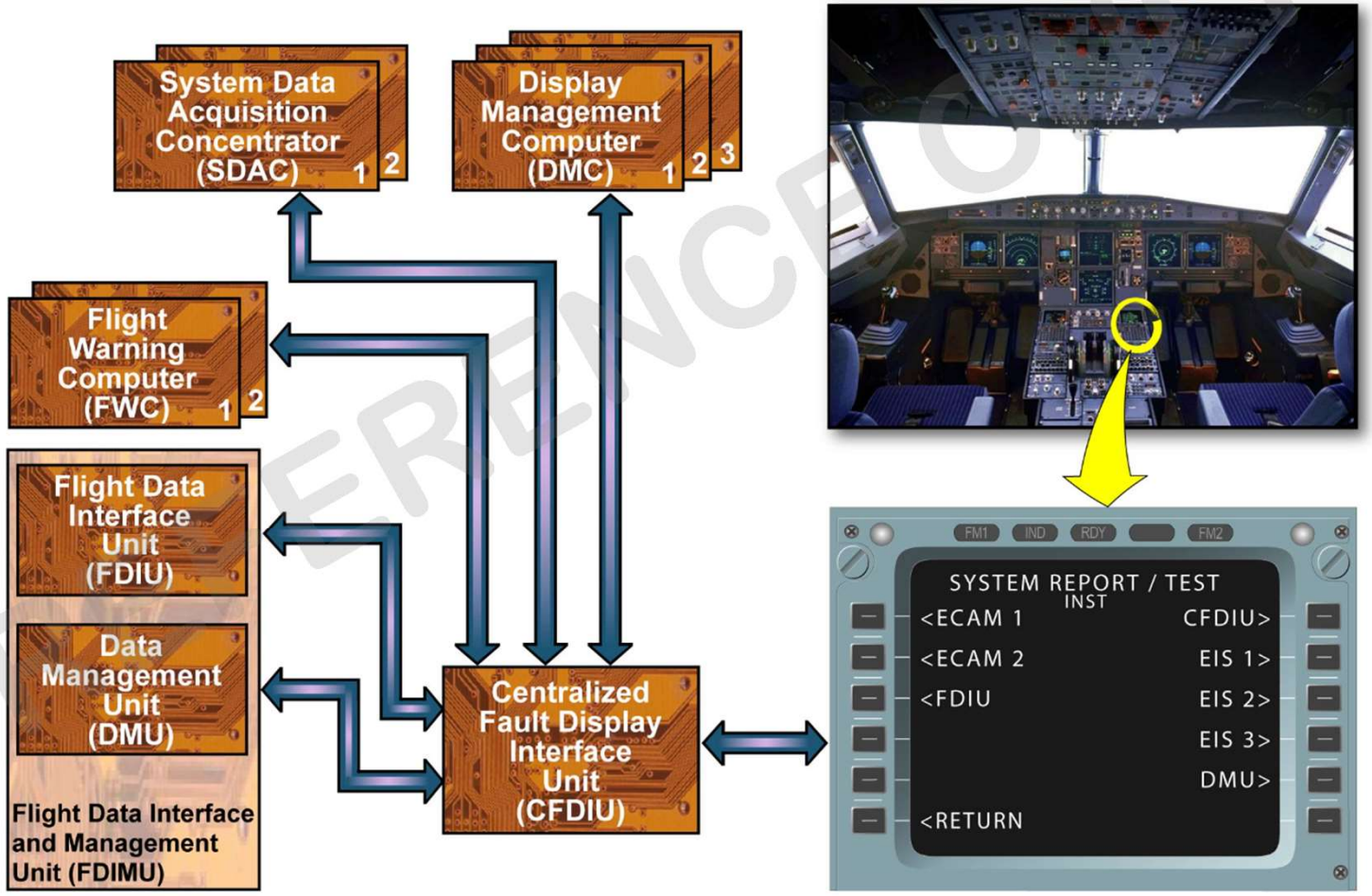


MAINTENANCE/TEST FACILITIES

CFDS fault messages and specific BITE test accessible using the MCDU
Using the MCDU, you can have access to the CFDS fault messages of all the indicating/recording systems.
Specific BITE tests are available as well.

ECAM 1 and 2 give access to FWCs, SDACs and ECAM control panel
ECAM 1 and 2 gives access to FWC 1/2, SDAC 1/2 and ECAM control panel.

EIS 1 gives access to DMC1, PFD 1, ND 1 and Upper ECAM
EIS 2 gives access to DMC2, PFD 2, ND 2 and Lower ECAM
EIS 3 gives access to DMC 3



SAFETY PRECAUTIONS
Respect AMM procedures


EIS Architecture
REFERENCE ONLY
A/C ID
XY-ABCD
DATE
21NOV
GMT
1002
MAINTENANCE
POST FLIGHT REPORT
ECAM WARNING MESSAGES
GMT PH ATA
0855 05 30-31
0855 05 30-11
0920 05 27-00
0925 06 28-00
CTR TK PUMP 2 LO PR (5)
AULT MESSAGES
PH ATA
03 38-31-68 DIFF PRESS XCDR
03 34-42-33
SOURCE
FLIGHT RECORDER
DO NOT OPEN

EFIS-ECAM
Comp loc REAR Avionic Bay
DMC/SDAC/FWCs

Identical DUs (LCD)
DUs control panels:
- ECP
- EFIS control panels
- Lighting/loudspeaker control panels

EFIS-ECAM
The Electronic Instrument System (EIS) is shown on 6 identical Liquid Crystal Display (LCD) units and controlled through the EIS control panels. The Electronic Centralized Aircraft Monitoring (ECAM) displays are identical and controlled through the ECAM Control Panel (ECP). The Electronic Flight Instrument System (EFIS) displays are controlled by the EFIS control panels and the lighting/loudspeaker control panels.

DMC
-Receives A/C sensors/systems
-Computes and displays images
-DMC1 drives:
- CAPT EFIS
- ECAM

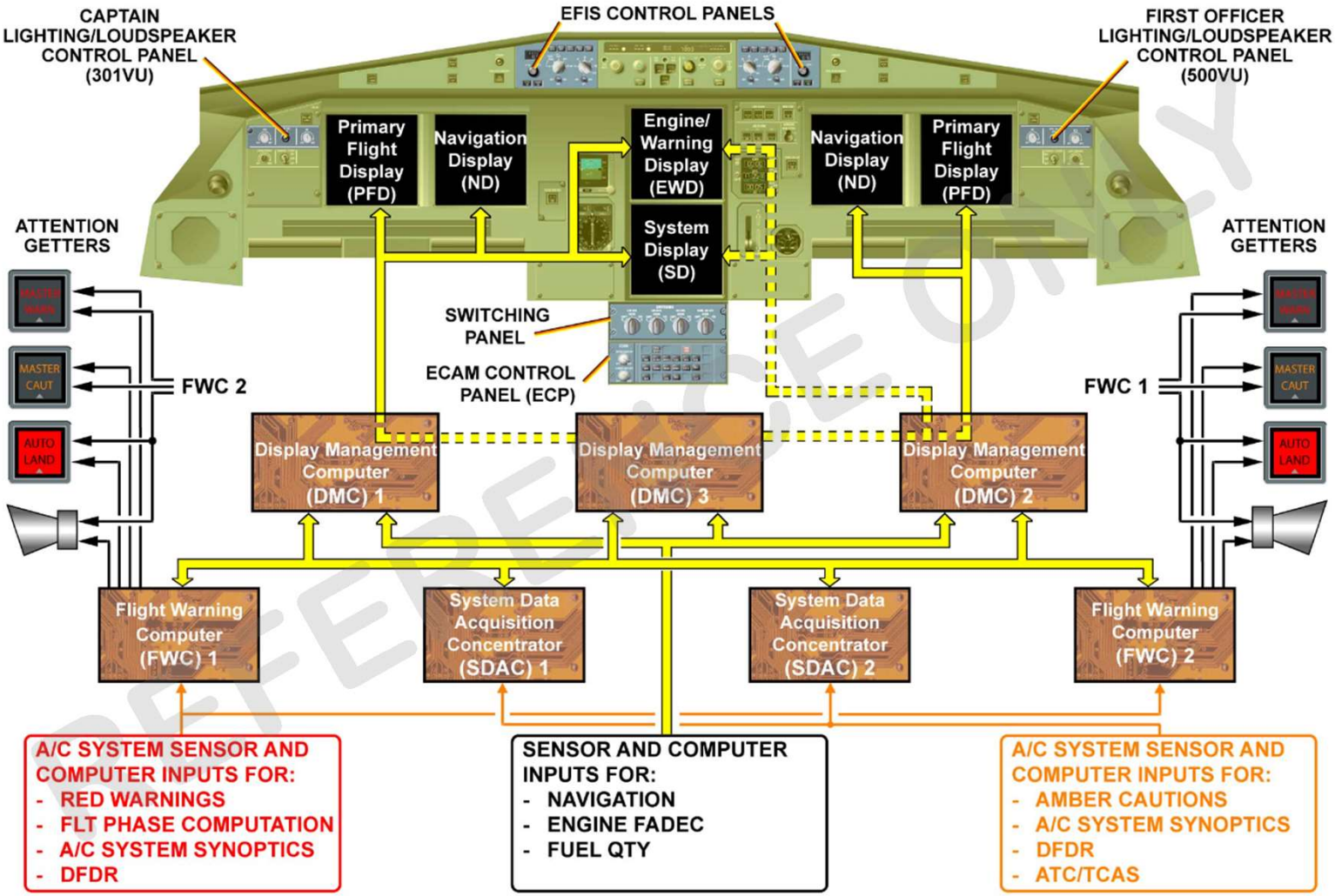
-DMC 2 drives: F/O EFIS
-DMC 1 failure: DMC 2 supplies ECAM
-Automatic transfer for ECAM only
-DMC 3 can drive any of 6 DUs
-DMC 3: Hot spare
-Data loading of the DMC 1: Portable Data Loader (PDL)

The Display Management Computers (DMCs) are data concentrators and receive data from aircraft sensors and systems. They send them to the Display Units (DUs). The DUs compute and display the images on each unit. In normal operation DMC1 drives the CAPT Primary Flight Display (PFD), the CAPT Navigation Display (ND), Engine/Warning Display (EWD) and System Display (SD). In normal operation DMC 2 drives the F/O PFD and ND DUs. If DMC 1 fails, it is automatically replaced by DMC 2 for ECAM only. DMC 2 cannot drive the CAPT PFD and ND; a manual switching to DMC 3 is required. DMC 3 can drive any of the six DUs. DMC 3 is a hot spare awaiting the failure of DMC 1 or 2 and can be switched to drive the DUs linked to the failed DMC.
Data loading of the DMC 1 is possible with Portable Data Loader (PDL).

FWC
The Flight Warning Computers (FWCs) monitor the aircraft systems. Each FWC generates all warning and caution messages, supplies the attention getters, computes the flight phase and provides aural warnings.
- A/C systems monitoring
- Warning and caution messages
- Attention getters
- Flight phases computation
- Aural warnings

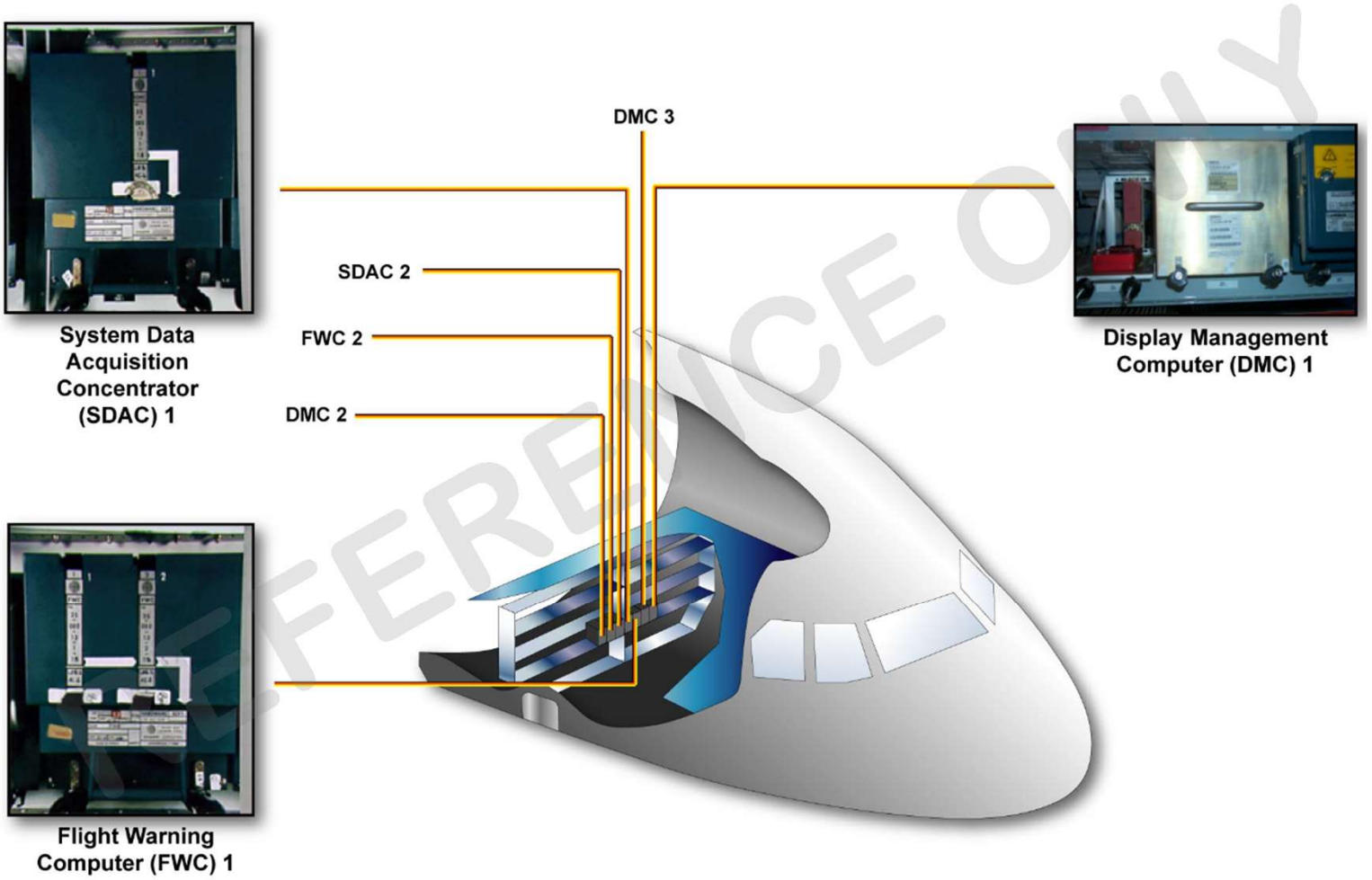
SDAC
The System Data Acquisition Concentrators (SDACs) receive various signals from the aircraft systems and send them to the FWCs and to the DMCs.
- Receive A/C systems signals
- Send data to FWCs and DMCs

INPUTS
The inputs received by the FWC are used to elaborate red warnings. Various items of information for systems like engines, fuel, navigation and which do not agree with a warning, are directly sent to the DMCs. The inputs received by the SDACs are used by the DMCs to display system pages and by the FWCs to generate most of amber warnings.
- FWCs: Red warnings
- SDACs: Amber warnings
- DMCs: Data not corresponding to a warning
- SDACs → Amber warnings → FWC for warnings



COMPONENT LOCATION

The EIS computers are located in the aft avionics rack.



ECAM
Description and Operation

GENERAL PRESENTATION

Three main functions

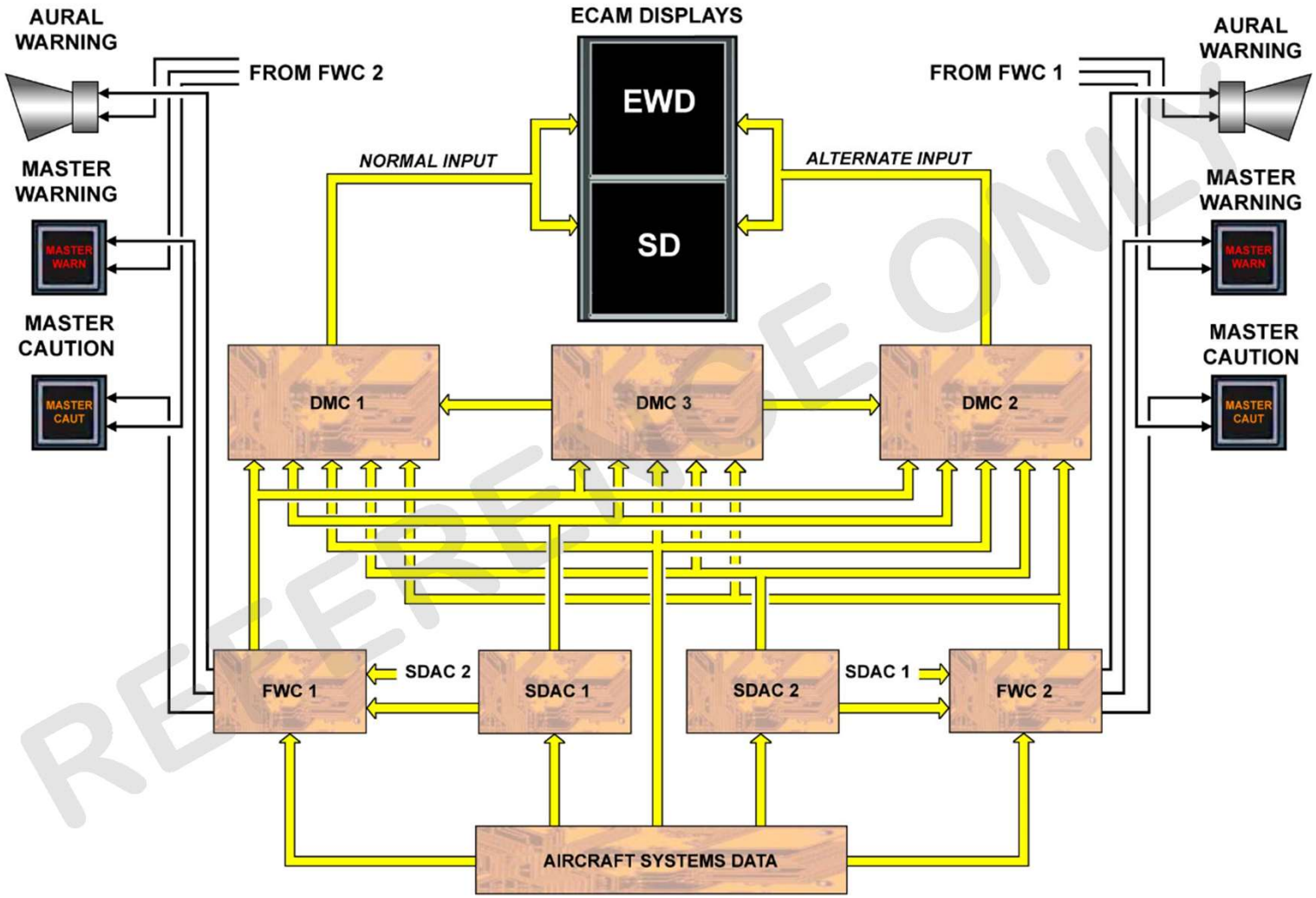
Acquisition shared between SDACs, FWCs, DMCs

Warnings and Memos by FWCs

The Electronic Centralized Aircraft Monitoring (ECAM) performs three main functions:

- Data acquisition and concentration,
- Data warning computation,
- Warning announcement and data display.

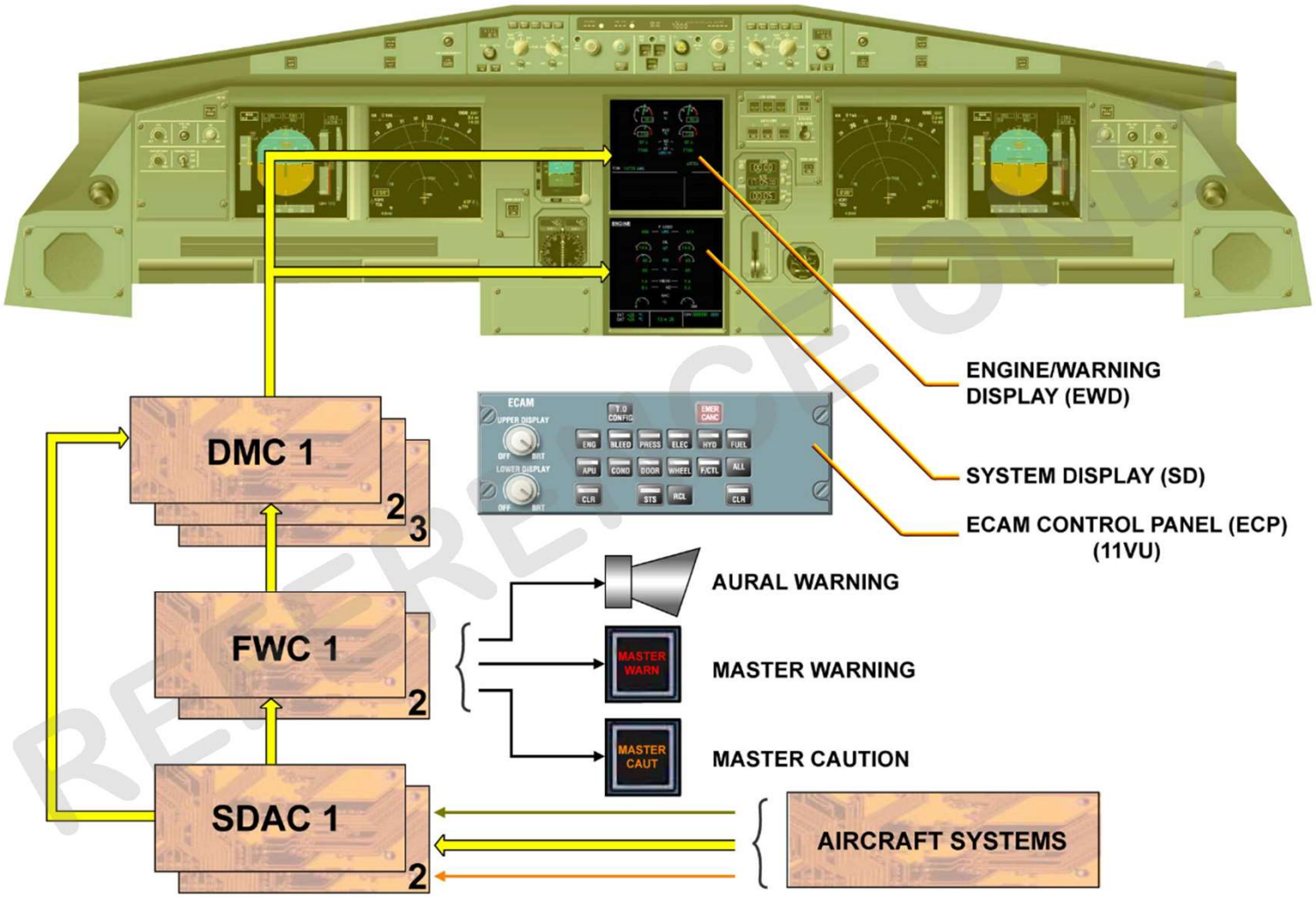
Data acquisition is shared between the System Data Acquisition Concentrators (SDACs),the Flight Warning Computers (FWCs) and the Display Management Computers (DMCs). Data warning computation and memo are achieved by the FWCs, warning announcements and data display are made through loudspeakers and Display Units (DUs).



ECAM SYSTEM
ECAM system components are:
- SDACs,
- FWCs,
- DMCs,
- ECAM Control Panel (ECP).

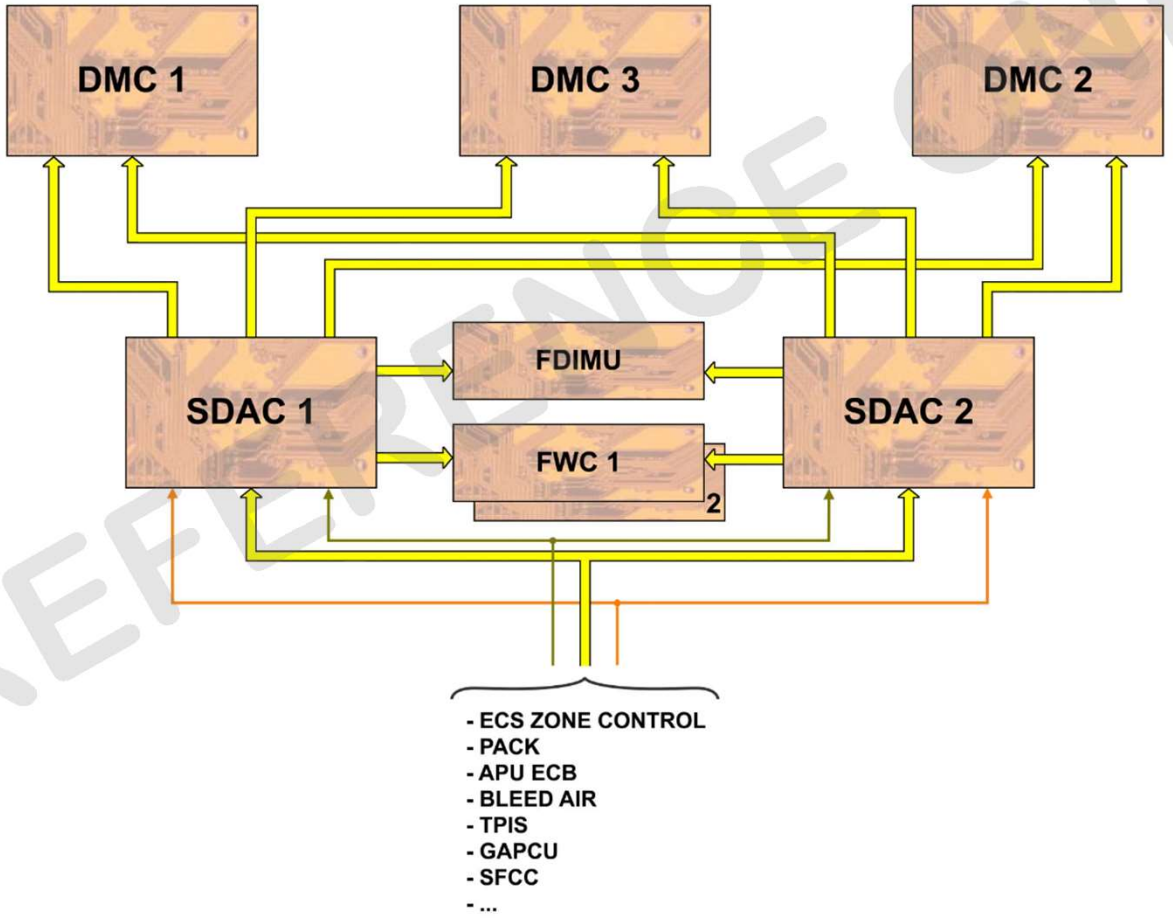
ECAM SYSTEM - SDAC
The two SDACs are identical and interchangeable. [The SDACs acquire A/C systems malfunction/failure data corresponding to caution situations and send them to the FWCs for generation of the corresponding alert and procedure messages. [The two SDACs also acquire and send to the 3 DMCs A/C system signals necessary for the display of system information. The ECP is the user interface to the ECAM system.

SDAC
- SDACs are identical and interchangeable
- Acquire amber cautions data for FWCs
- Acquire systems data for DMCs
- The ECP is the user interface



SDAC DATA PROCESSING
5 Parameters to both SDACs
SDAC outputs are ARINC 429
SDAC outputs are DMCs and other users

Therefore, each parameter acquired is given to the two SDACs. All the signals (discrete, analog, digital) entering the SDACs are converted into digital format and delivered on their output buses under ARINC 429. The SDACs copy certain parameters to distribute them to other equipment in digital form (ARINC 429).



FWC

FWC generates all messages and warnings
The two FWCs are interchangeable. Each FWC generates alphanumeric codes corresponding to all texts and messages to be displayed on [the ECAM DUs. [The aural warnings and synthetic voices are delivered by the FWCs to the cockpit loudspeakers. The FWCs compute all warnings and cautions.

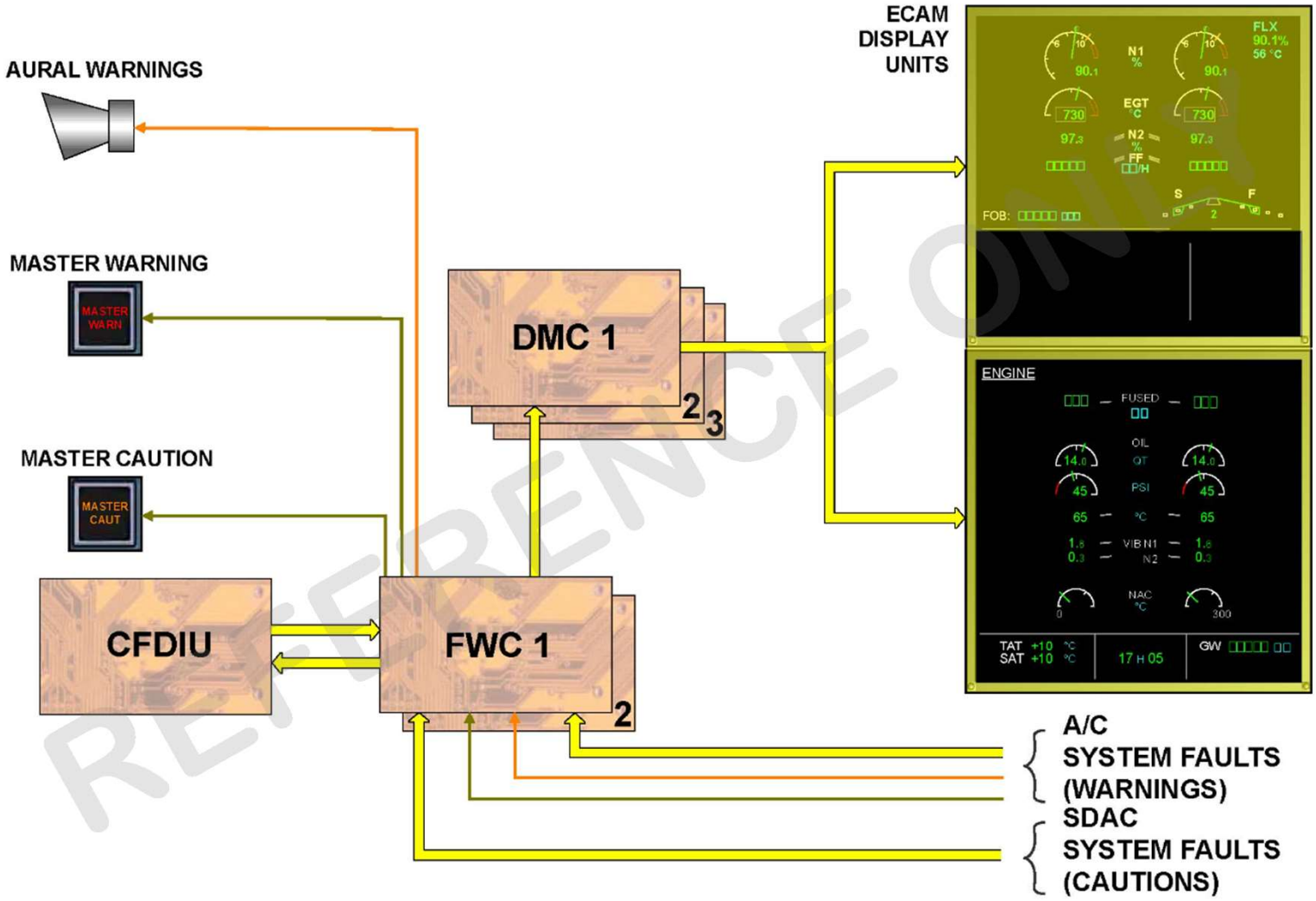
FWCs functions
- Data acquisition
- Flight data computation
- Data warning computation

FWCs outputs and inputs
The FWCs perform three main functions:
- Data acquisition,
- Flight phase computation,
- Data warning computation corresponding to warning situations.

The FWCs outputs/inputs are:
- Discrete for visual attention getters,
- Analog for audio signals,
- ARINC 429 called FWC DATA BUS,
- RS 422 called FWC MESSAGE BUS.

FWCs functions
- Show problems
- Identify the failed systems
- Provide appropriate corrective action

Each FWC sends a copy of its own acquisition through an ARINC 429 bus to the opposite FWC.
The FWCs provide aural and visual information in order to:
- Show, in real time, all the system failures and dangerous configurations with their level of seriousness,
- Identify the systems or circuits affected by a failure,
- Provide the appropriate corrective action.

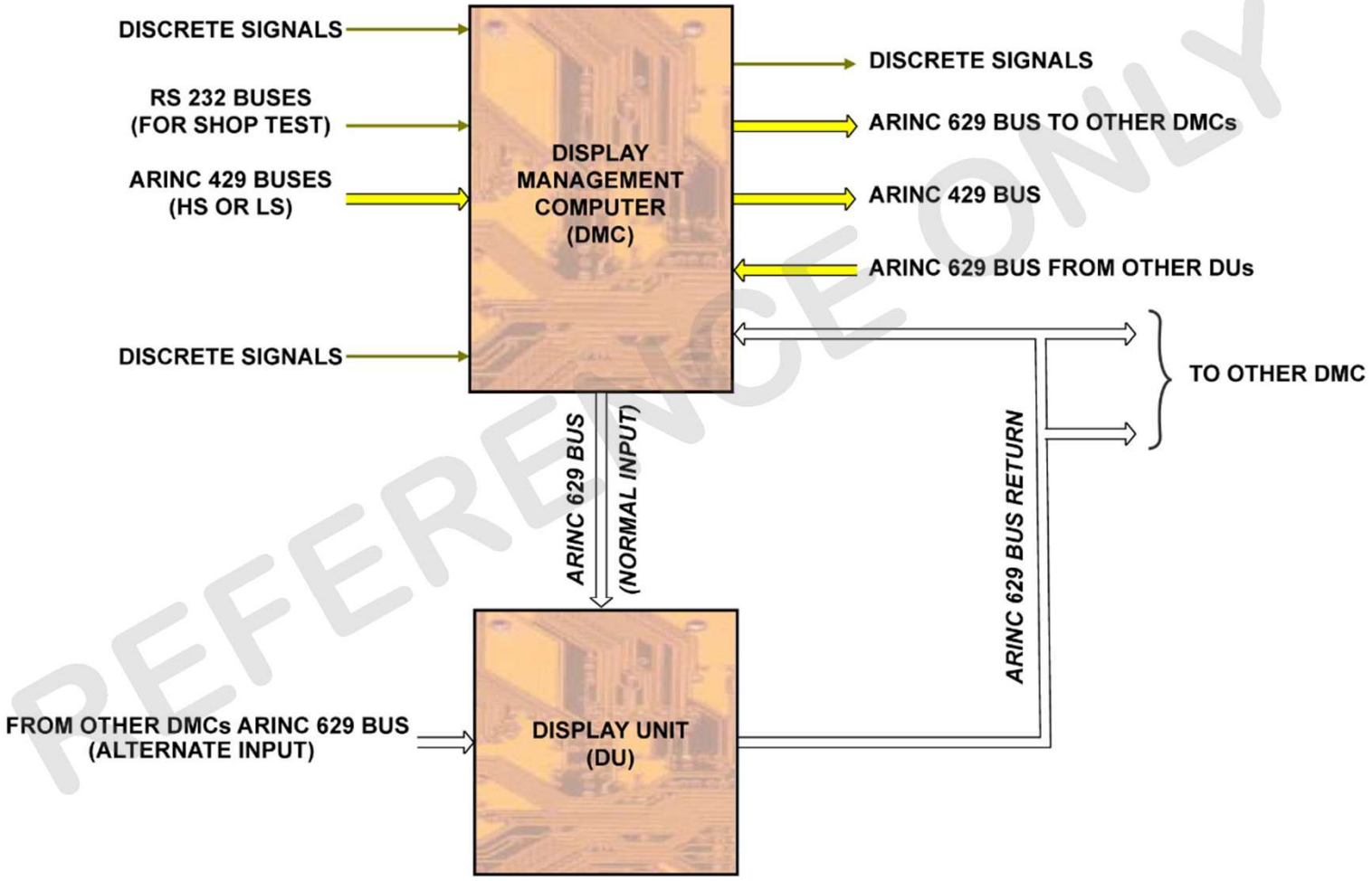


DMC
DMC main functions: interface between SDACs, FWCs and DUs
DMC input/output signals for ECAM: discrete, ARINC 429 bus, ARINC 629 bus, RS 232 bus

The three DMCs are identical and interchangeable. The DMCs receive data from the A/C systems, either directly or through the SDACs and FWCs. The 3 DMCs can be considered as data concentrators and receive data from A/C sensors and systems in order to merge and send them to the DUs through ARINC 629 output buses. Moreover, the DMCs insure:
- The interface between EIS and the other A/C computers and systems,
- The information exchange between the displays,
- The tele-loading of the operational software.

The DMCs acquire and send several types of signals for ECAM:
- Discrete,
- ARINC 629 bus,
- ARINC 429 bus,
- RS 232 buses for workshop test,
- ARINC 453 bus (just passing through).

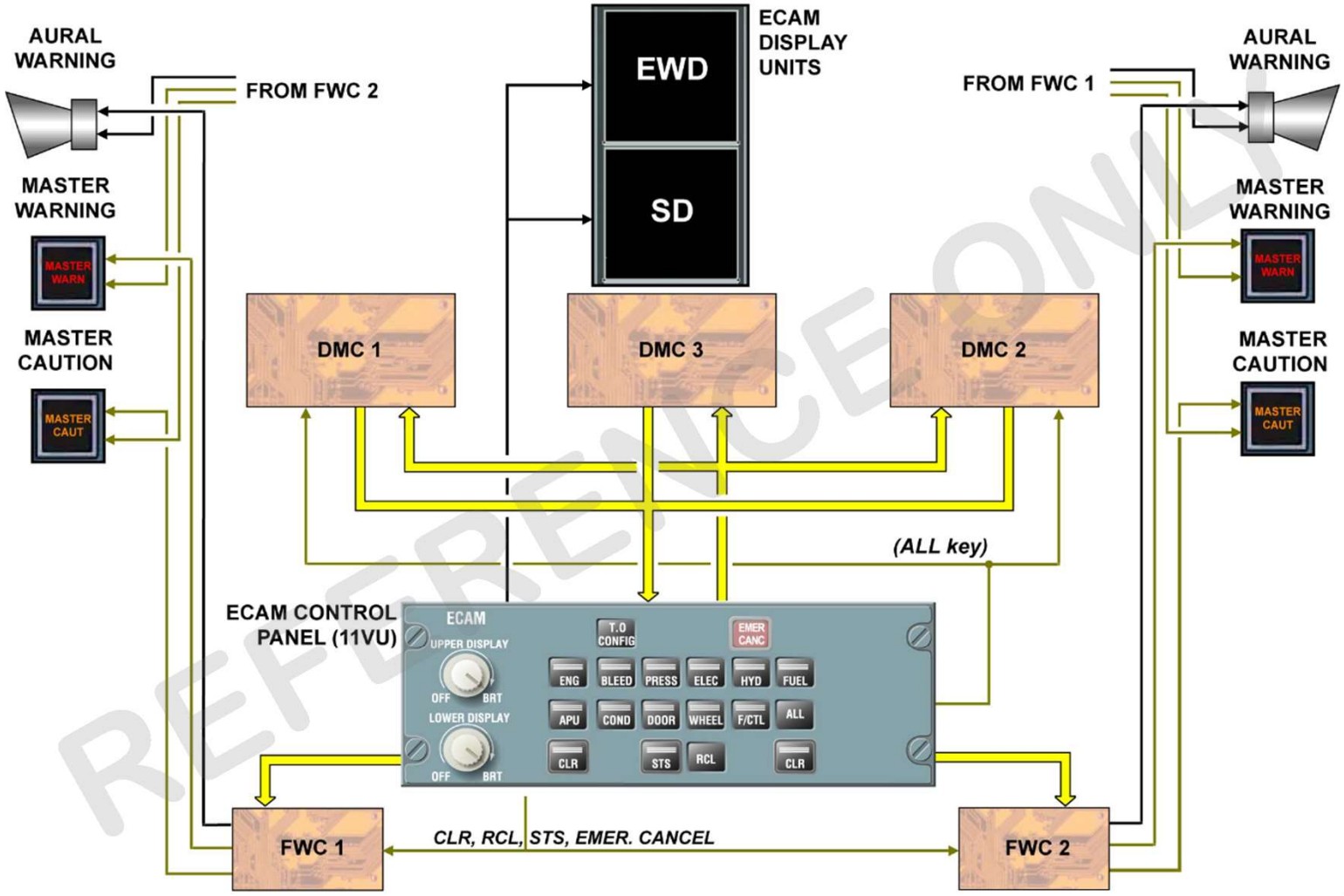
DMC/ECAM DU INTERFACE



ECP INTERFACE
Interfaces
ECP

The ECAM interface includes:
- ECAM control panel,
- The warning and caution lights,
- The loudspeaker,
- The DUs.

The ECP is a control and display unit. [It transmits selections to the FWCs and DMCs, [it receives DMC data to illuminate the keys lights. [The ECP outputs discretes for CLEAR (CLR), RECALL (RCL), STATUS (STS) and emergency cancel (EMER CANC) keys are linked to the FWCs. The output discrete for ALL key is directly linked to the DMCs. [It is also linked to the DUs for ON/OFF brightness control.



EFIS
Description and Operation

GENERAL

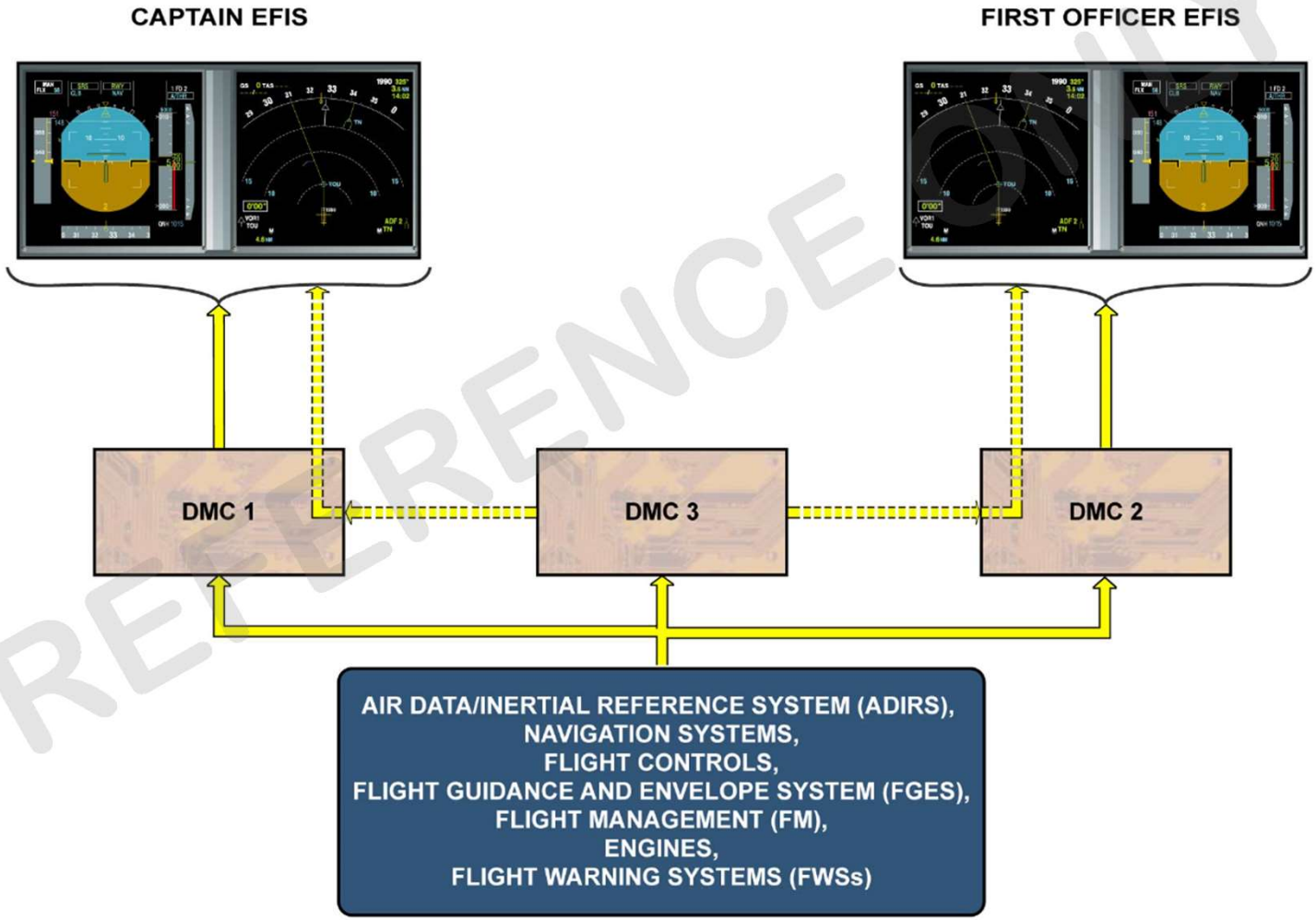
EFIS main components

Inputs to DMCs

The Electronic Flight Instrument System (EFIS) consists of two main components:

- Display Management Computers (DMCs),
- Display Units (DUs).

The DMCs receive Air Data/Inertial Reference System (ADIRS), navigation systems, Flight Management (FM), Flight Guidance and Envelope System (FGES), flight controls, engines and Flight Warning Systems (FWSs) required by the DUs in order to generate Primary Flight Display (PFD) and Navigation Display (ND) symbologies.



DMC

DMC

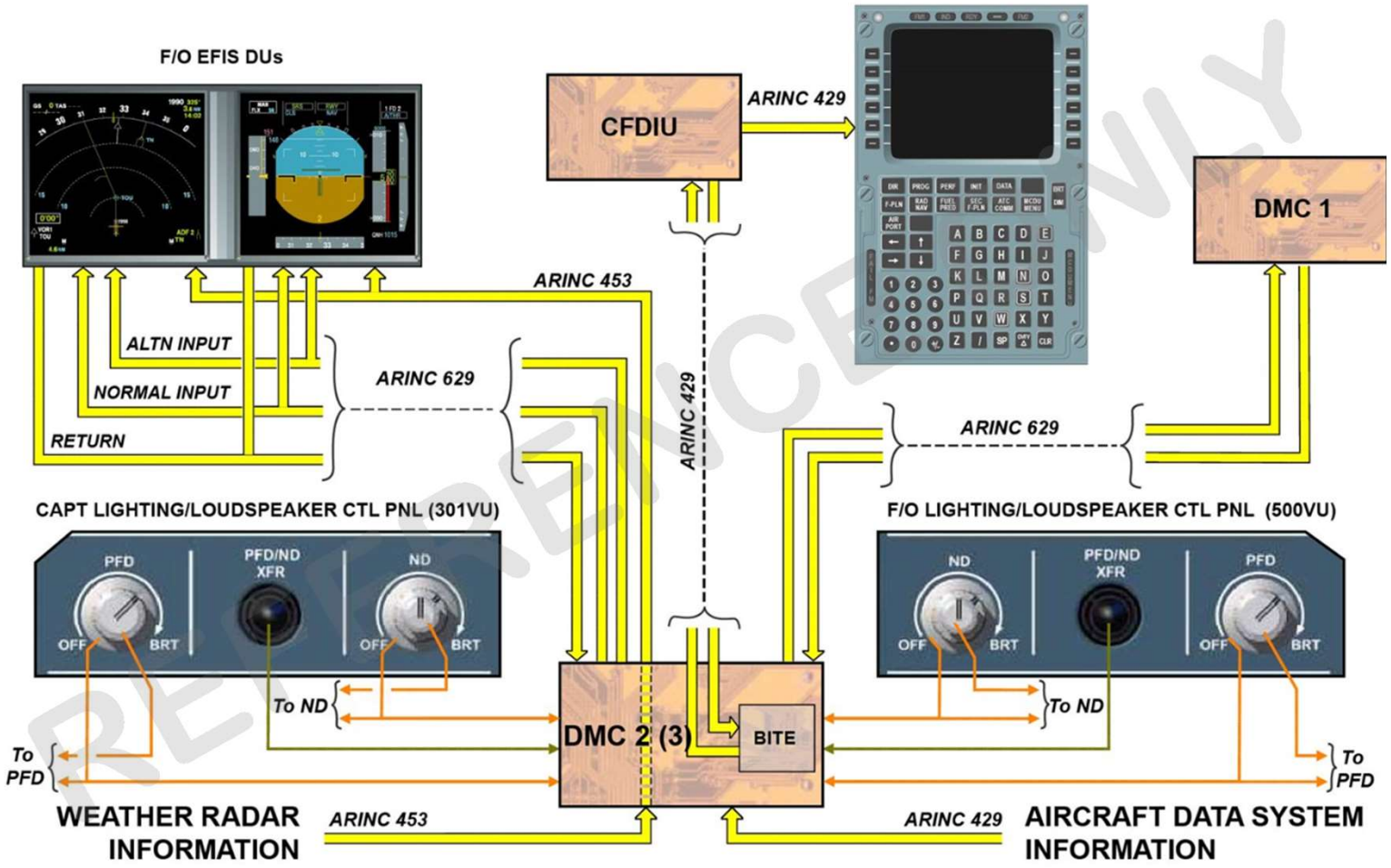
Input/output
The three DMCs are identical and interchangeable, they receive A/C system data on ARINC 429 buses, weather radar information on ARINC 453 high-speed bus, [analog signal for the brightness control, [discrete signal for the PFD/ND transfer and PFD/ND ON/OFF.

DMC role

Loading:
DMC cross loading
CDLC

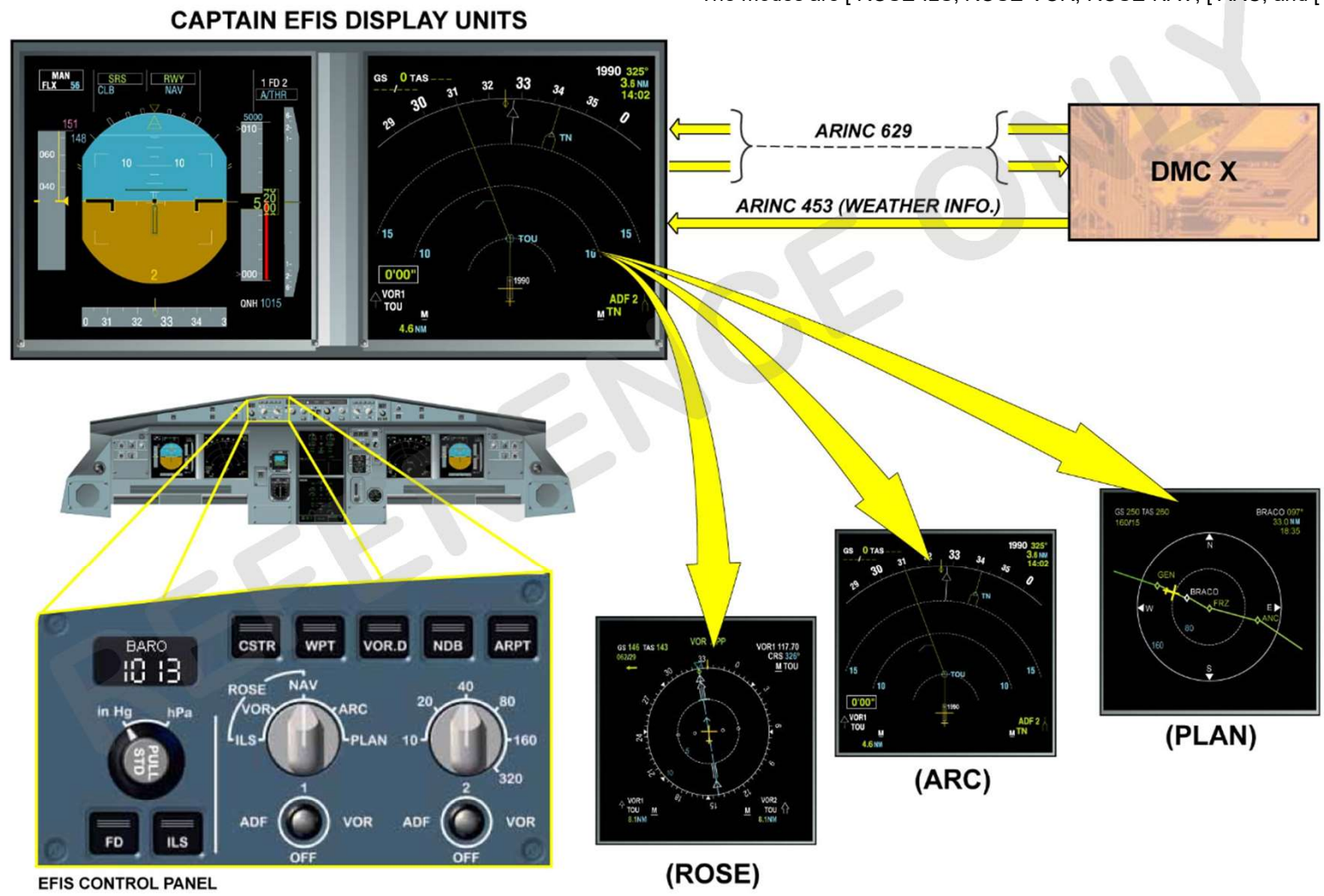
BITE TEST
CFDS/MCDU

DMCs send data on an ARINC 629 link to the DUs. [When a new DMC 1, 2 or 3 is installed, the relevant software must be downloaded into it, this is done by cross loading from DMC 1, 2 or 3 via the MCDU. If a new software must be loaded, it is first done on DMC 1 from the Centralized Data Loading Connector (CDLC), then a cross loading has to be performed. [When a new DU is installed, a cross loading from the corresponding DMC has to be performed via the MCDU. The DMC BITE test is performed and the results are stored for later transfer to the Centralized Fault Display System (CFDS). It is possible to read this information via the MCDU.
Note: The software includes DMC (EFIS, ECAM) and DU (EFIS, ECAM) data.



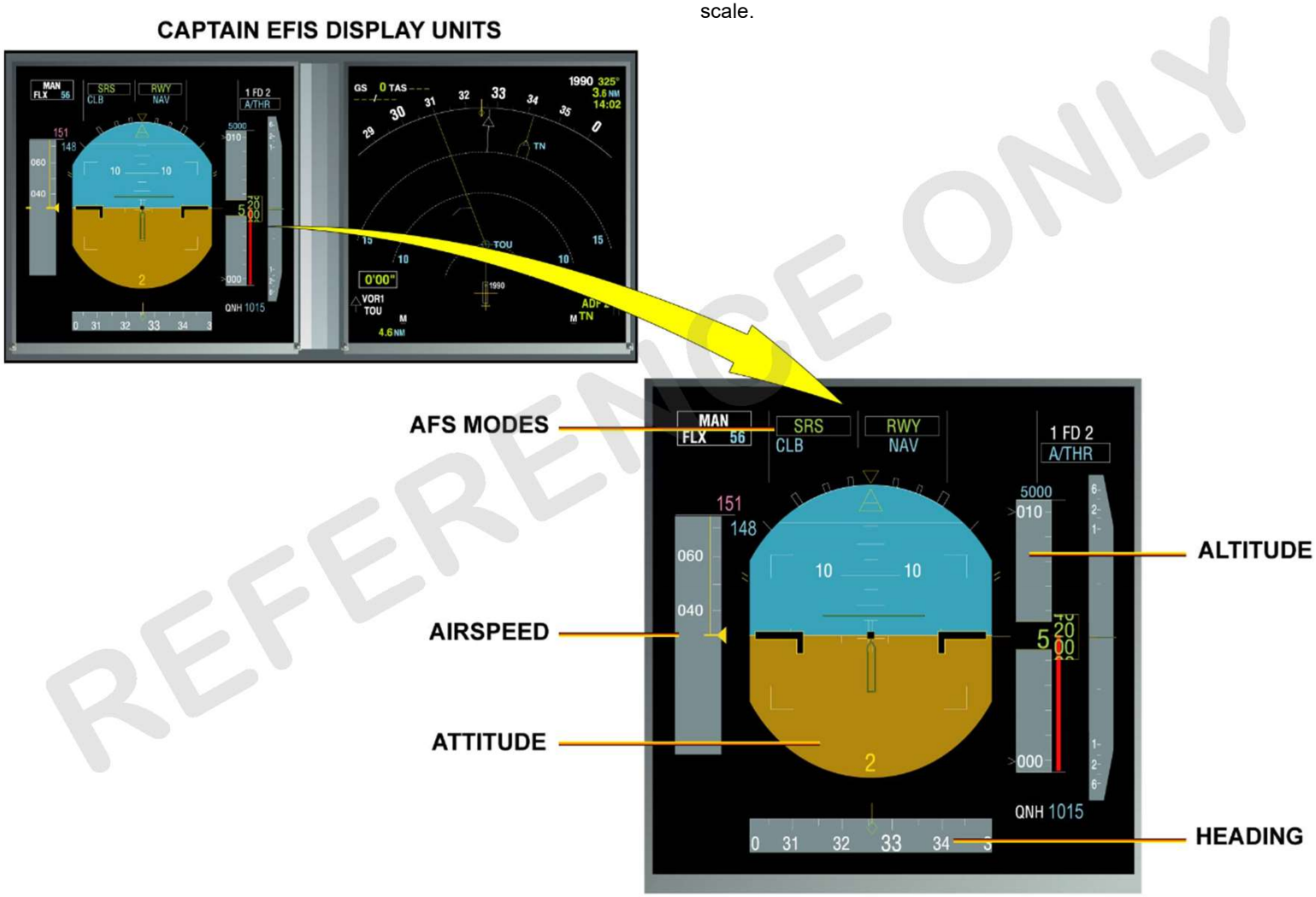
DISPLAY UNIT (ND)
LCD navigation displays
ARINC 629 and ARINC 453 inputs
EFIS control panel/modes

The DUs are identical and interchangeable. They are Liquid Crystal Displays. Each DU receives digital signals from [its related DMC through an ARINC 629 link, and also through an ARINC 453 high-speed bus for the weather radar link. The NDs provide this information according to the modes selected on the EFIS control panel (part of the Flight Control Unit). The modes are [ROSE-ILS, ROSE-VOR, ROSE-NAV, [ARC, and [PLAN.



DISPLAY UNIT (PFD)
Primary Flight Display
Option Metric Altitude pushbutton

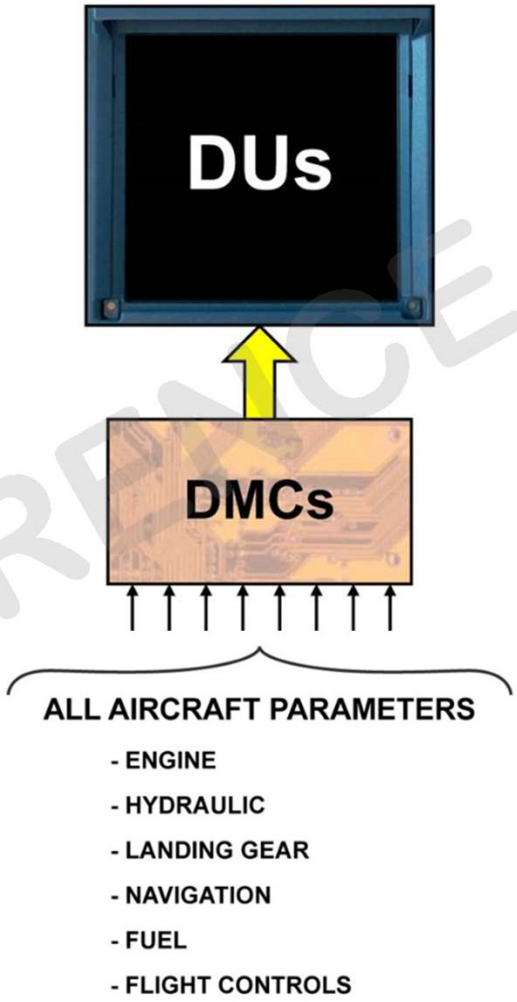
The PFDs provide flight information for A/C control, including A/C attitude, [airspeed, [altitude, [heading and [Automatic Flight System modes.
A METRIC ALT pushbutton can be installed on the FCU. If you push this pushbutton, the selected altitude is displayed in meters above the altitude scale.



DMC Bus Reconfiguration

GENERAL
Active aircraft system source for display

As a general rule, the Display Management Computer (DMC) uses the active aircraft system source for display, provided it is valid or selected.

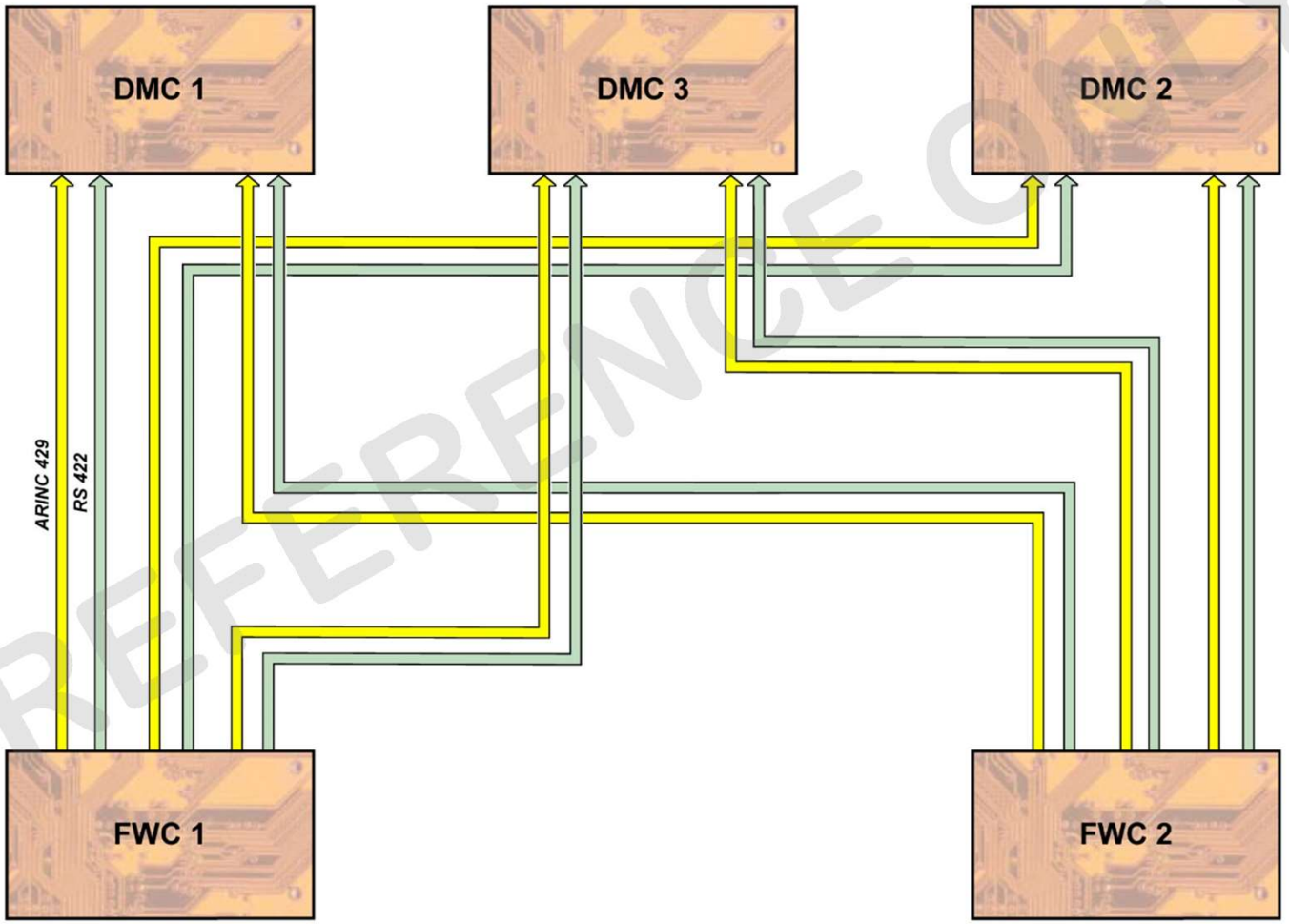


FWC

The DMCs preferably work with the FWC1
FWC or data not valid
Data on ARINC 429 bus
Text messages on RS 422 bus

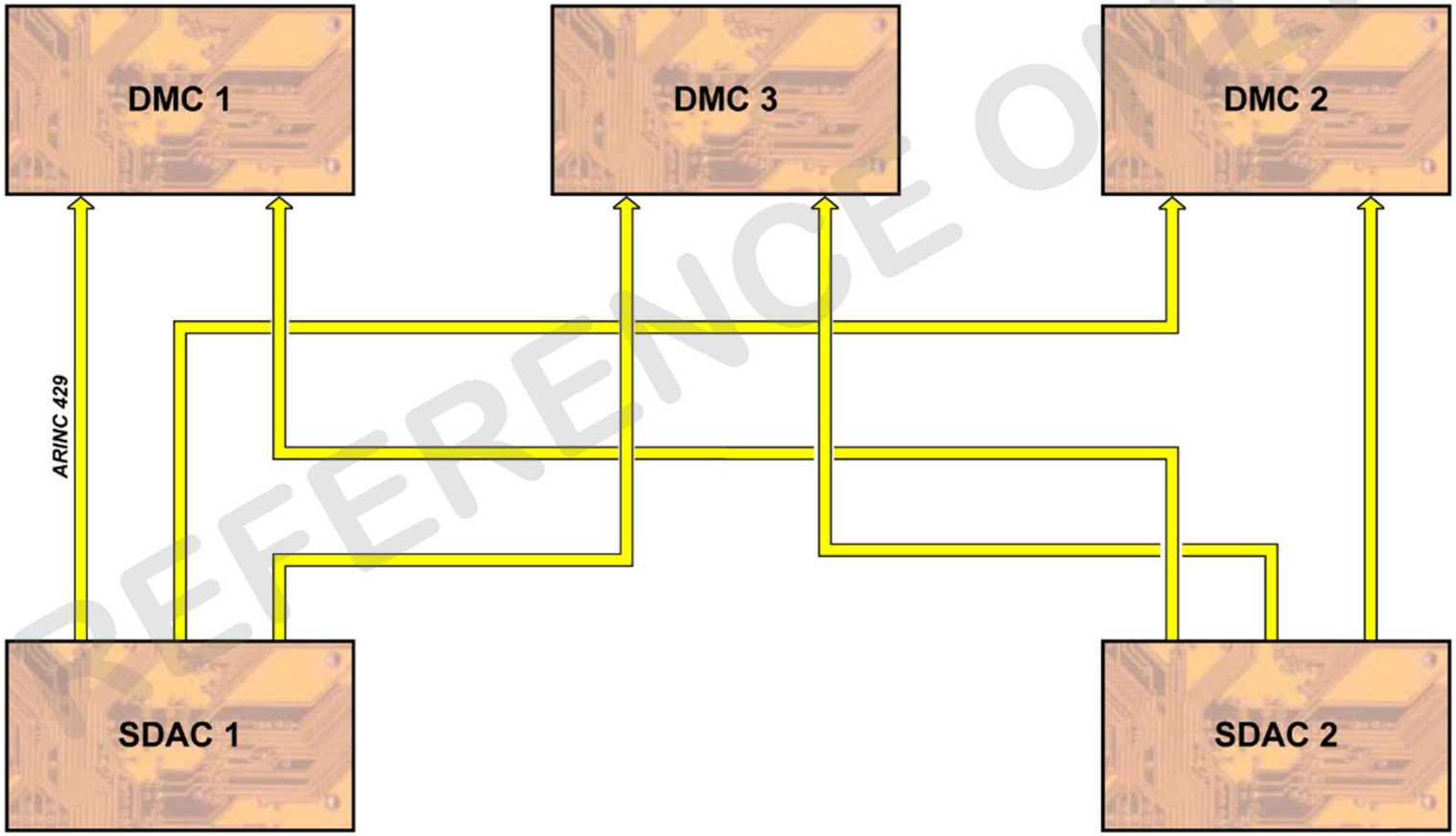
Each DMC receives both Flight Warning Computer (FWC) 1 and 2 data buses. The DMCs preferably work with the FWC1 data. If the data is not valid or if FWC 1 is not valid, the DMCs will automatically switch to the FWC Data bus.

NOTE: the RS 422 buses are used by the FWCs to send text messages (warnings, MEMO and status) to the DMCs.



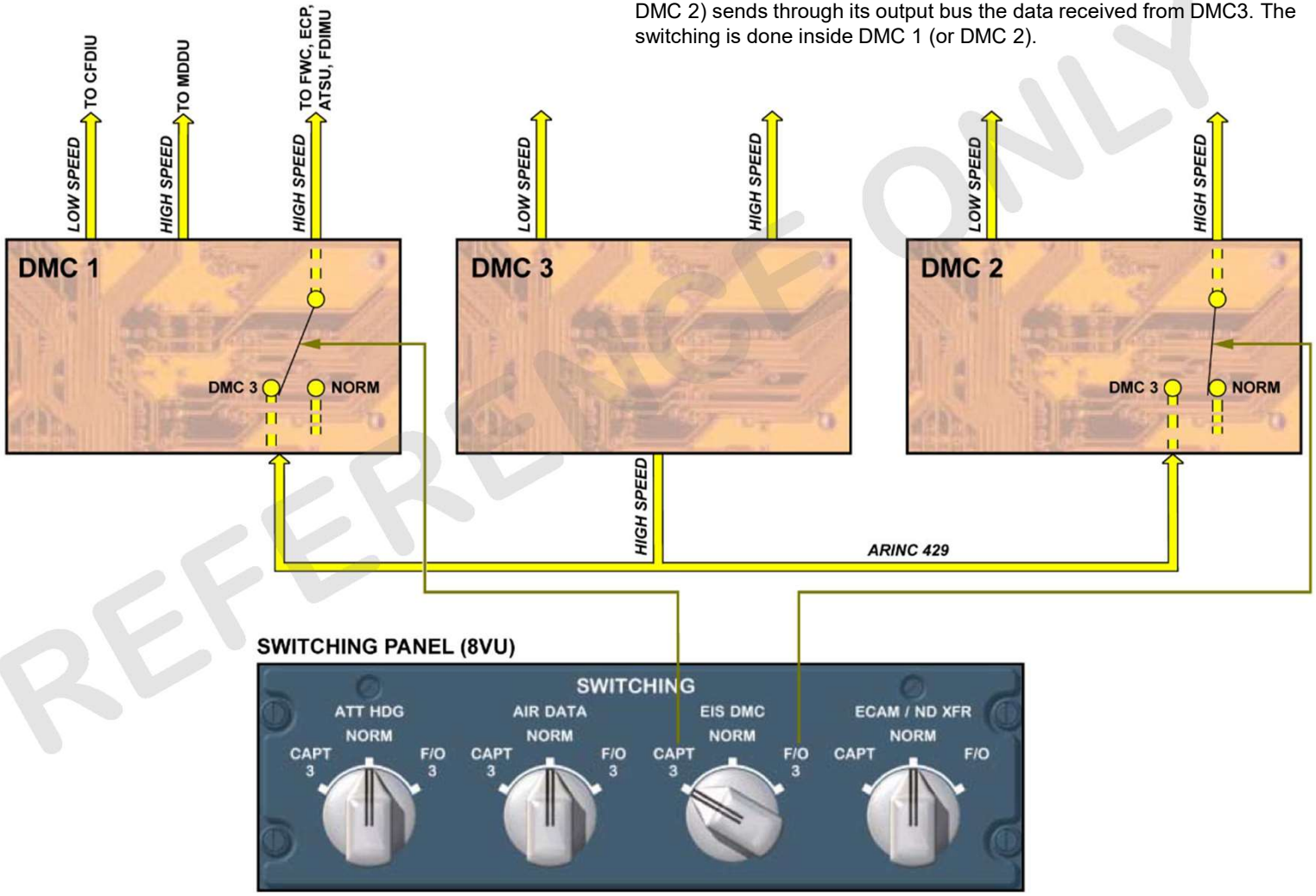
SDAC
Both SDACs to all DMCs
DMCs normally use SDAC 1 data
Automatic switching to SDAC 2

Each DMC receives and processes the data from each of the two System Data Acquisition Concentrators (SDACs). The DMCs use SDAC 1 data providing it is valid. All data transfer is by ARINC 429. If the data is not valid or if SDAC 1 is not valid, the DMCs will use the data from SDAC 2.The switching is automatic.



DMC OUTPUT BUSES
High speed bus
Low speed bus
DMC3 output through DMC 1 or DMC 2

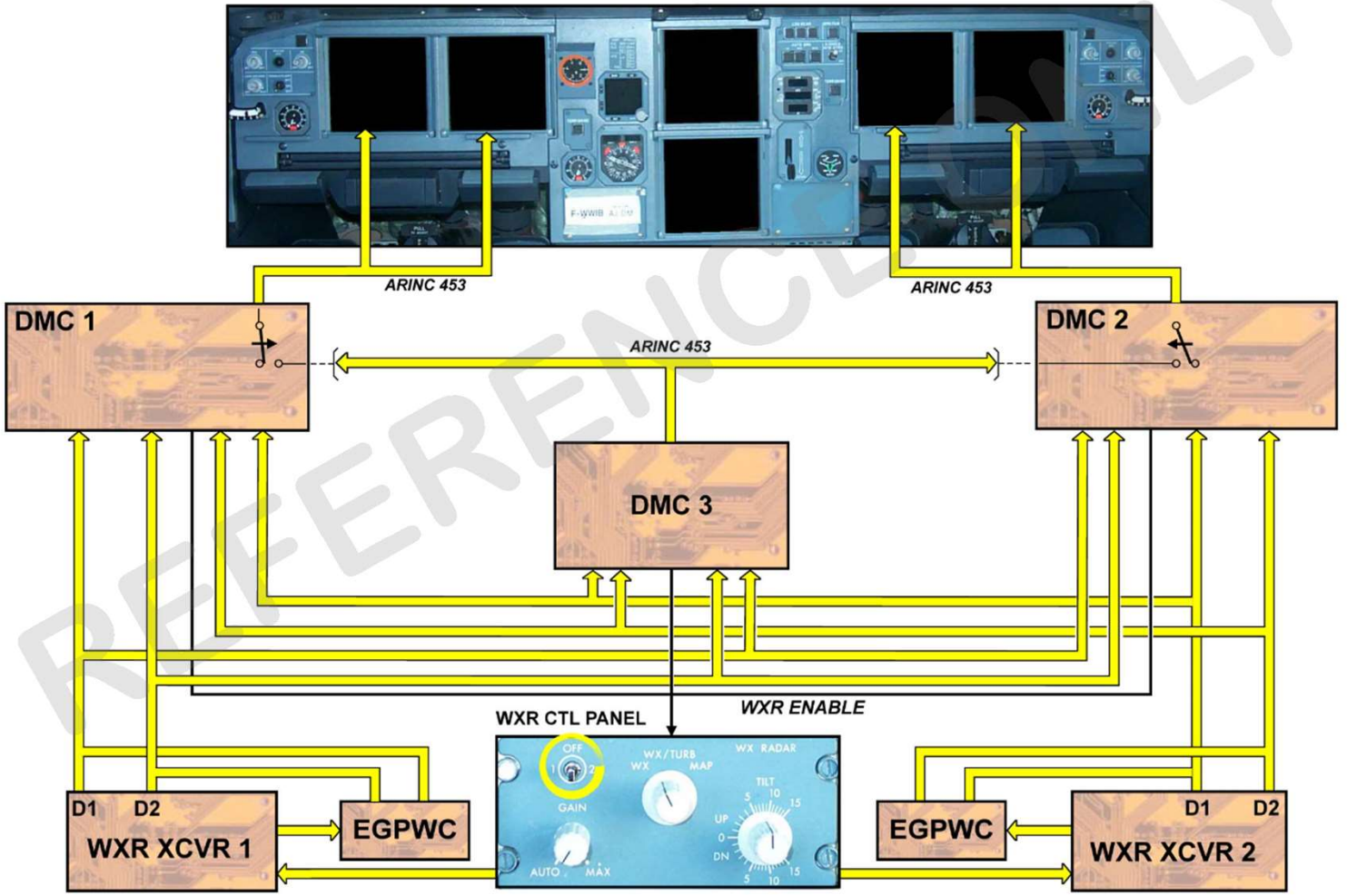
Each DMC transmits data on two ARINC 429 buses:
-One high speed switched bus: FWC, ECAM Control Panel (ECP), Air Traffic Service Unit (ATSU), Flight Data Interface Management Unit (FDIMU),
-One low speed unswitched bus: Centralized Fault Display Unit (CFDIU).
When the EIS DMC Selector Switch is set to CAPT 3 (or F/O 3), DMC 1 (or DMC 2) sends through its output bus the data received from DMC3. The switching is done inside DMC 1 (or DMC 2).



WEATHER RADAR

Arinc 453 data buses
From WXR to DMCs and from DMC to DUs
WXR enable discrete

Each DMC receives the weather radar (WXR) transceivers (XCVRs) or the Enhanced Ground Proximity Warning Computer (EGPWC) data via four ARINC 453 data buses {D1 and D2}. The DMCs retransmit the ARINC 453 bus to the EFIS DUs. As only one WXR XCVR is in operation at a time, the DMCs process information from the one in operation. The WXR enable discrete disables the operation if the plan mode is selected on the EFIS controller.



EIS Abnormal Operation

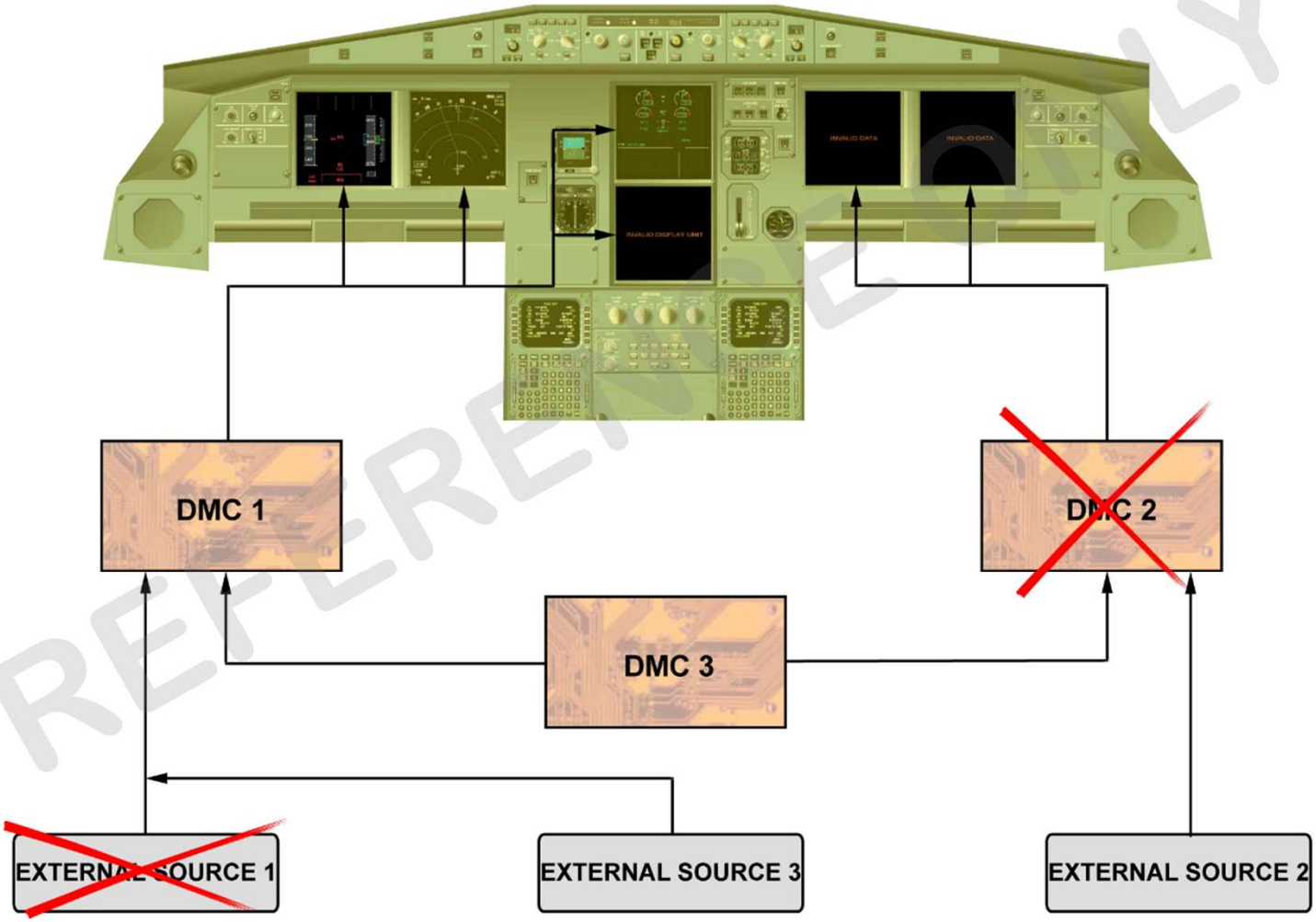
EIS ABNORMAL OPERATION

Three main types of reconfiguration

- DU failures
- DMC failures
- External information source failure

In order to ensure reliability of the displayed data, the Electronic Instrument System (EIS) has three main types of reconfiguration:

- In the case of single or multiple Display Unit (DU) failures,
- In the case of single or multiple Display Management Computer (DMC) failures,
- In the case of external (sensor/computer) source failure



SINGLE OR MULTIPLE FAILURE

EIS components failure

PFD DU
ND DU
ECAM upper DU
ECAM lower DU
Multiple DU
ECAM control panel
SDAC
FWC
DMC

Many failures could occur on the EIS like:
- Primary Flight Display (PFD),
- Navigation Display (ND),
- Electronic Centralized Aircraft Monitoring (ECAM) Upper or lower DU,
- Multiple DU,
- ECAM Control Panel (ECP),
- System Data Acquisition Concentrator (SDAC),
- Flight Warning Computer (FWC),
- DMC.

PFD DU FAILURE
PFD automatically transferred to the ND

In the case of PFD failure (detected) or if the PFD unit is switched off by means of its potentiometer, the PFD is automatically displayed on the ND unit.

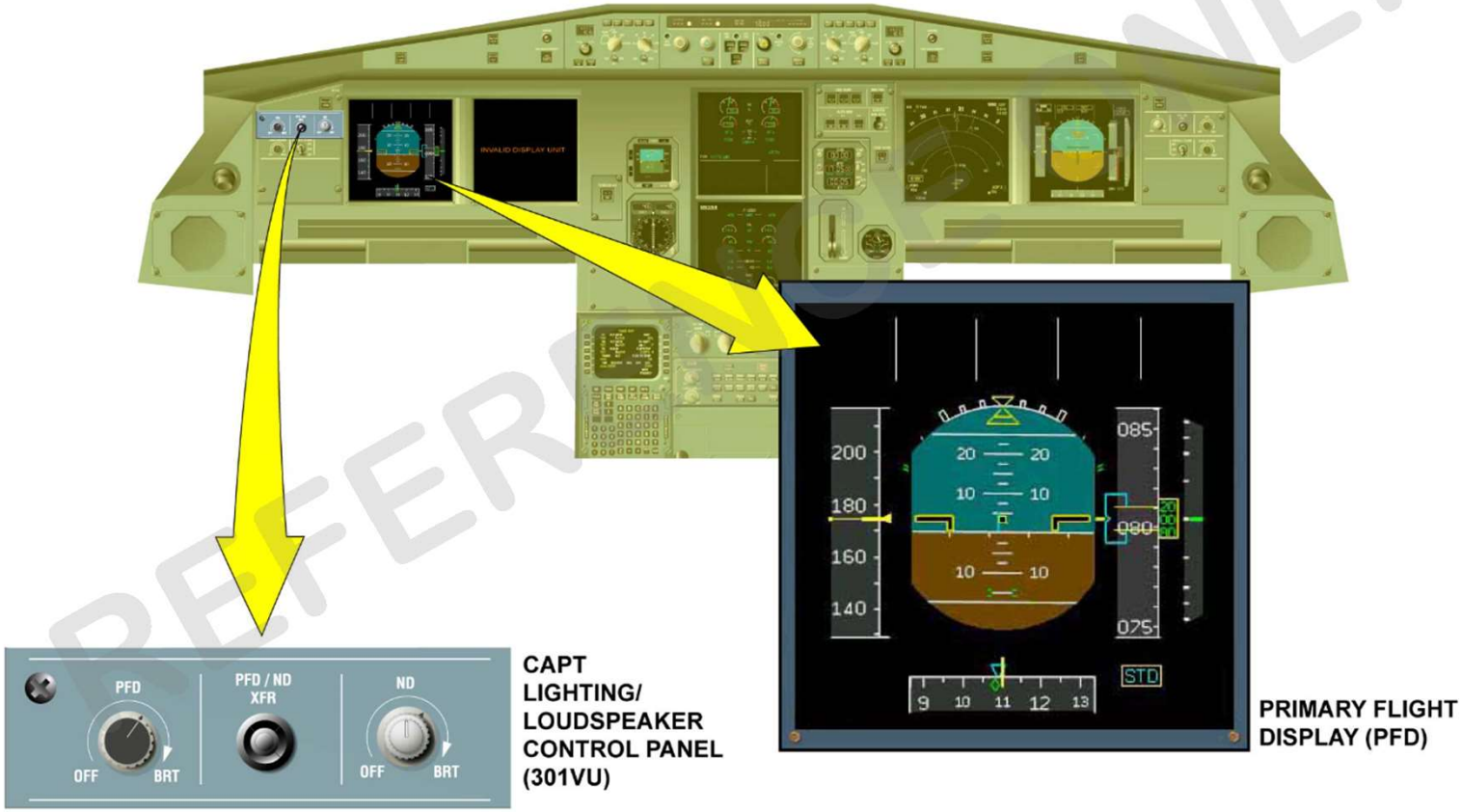
PRIMARY FLIGHT DISPLAY (PFD)

PFD DU FAILURE (PFD/ND XFR)
PFD/ND transfer P/BSW

The PFD/ND transfer (XFR) P/BSW provides the crew with the possibility to recover the ND image on the ND unit, if necessary. Display change is performed by software switching of the PFD/ND outputs inside the DMC.

ND DU FAILURE
ND failure

In the case of ND unit failure the crew has the possibility to present the ND image by pressing the PFD/ND XFR P/BSW.



ND DU FAILURE (PFD/ND XFR)
PFD/ND transfer pushbutton

The ND screen stays instead of the PFD screen until the PFD/ND XFR P/BSW is pressed again.

UPPER ECAM DU FAILURE
EWD is automatically transferred to the SD unit

In the case of an upper display (EWD) failure or if the upper display control potentiometer is turned to off, the upper display is automatically transferred on the lower display, this mode is called ECAM single display mode.

ENGINE/WARNING DISPLAY (EWD)

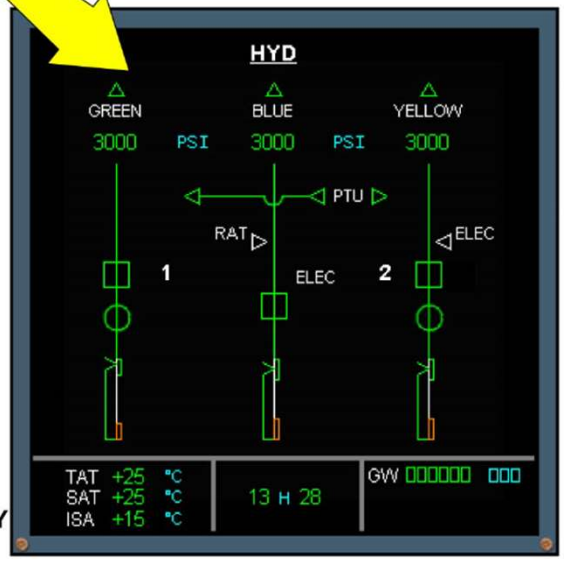
Parameters are given for a CFM engine or a PW engine. For an IAE engine, the parameters will be shown as follows: Engine Pressure Ratio (EPR), EGT, N1, N2.

UPPER ECAM DU FAILURE (SYSTEM PAGE RECOVERING)
Temporary page recovery
Permanent page recovery

In this case a system page can be recovered by pushing and holding a system key on the ECP or by rotating the ECAM/ND XFR selector on the switching panel in order to display the system page on the ND side.

ECAM CONTROL PANEL (11VU)

SYSTEM DISPLAY (SD) (HYD PAGE)

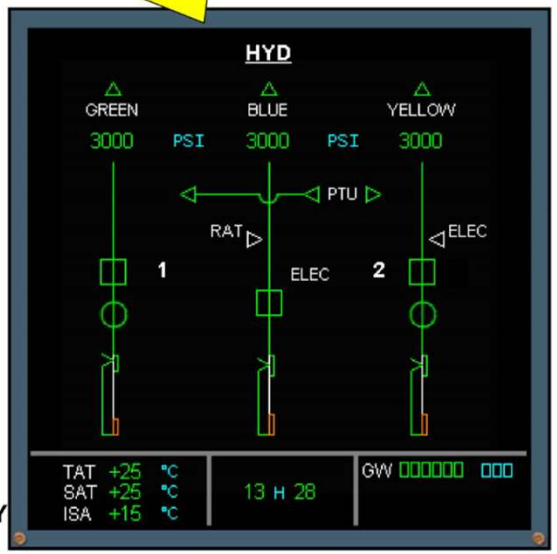


LOWER ECAM DU FAILURE
Automatic reconfiguration impossible

In case of lower DU failure or if the lower display is turned to off, no automatic reconfiguration is possible, the ECAM works in single display mode. Each crew member also has the possibility to present the SD image on the ND side only, and never on the PFD side, by rotating the ECAM/ND transfer selector switch on the switching panel.

SWITCHING PANEL (8VU)

SYSTEM DISPLAY (SD) (HYD PAGE)



BOTH ECAM DU FAILURE (ECAM ND XFR)

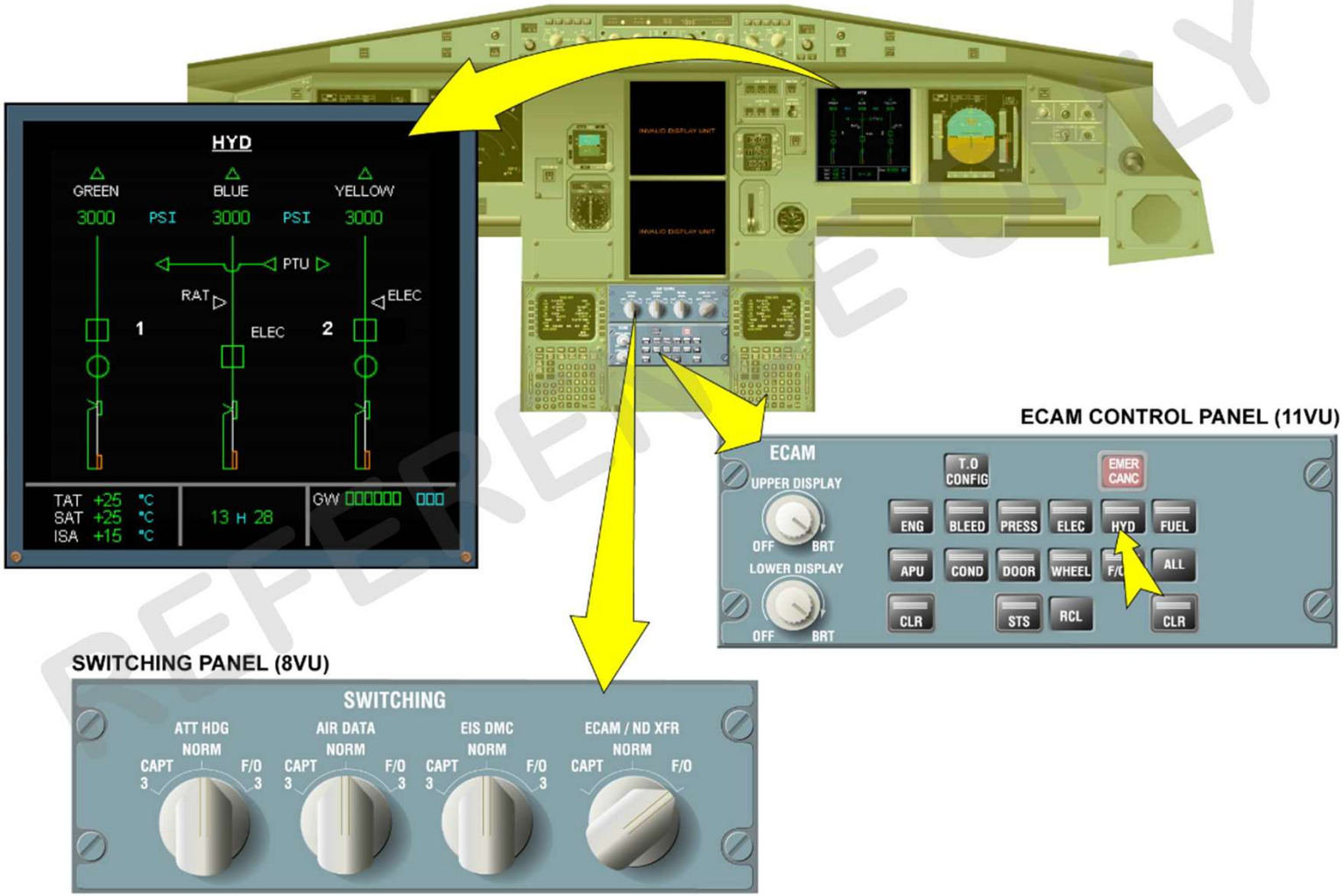
n case of EWD unit and SD unit failure, no automatic reconfiguration is possible

In case of EWD unit and SD unit failure, each crew member has the possibility to permanently present the EWD on the ND unit by rotating the ECAM/ND transfer selector switch on the switching panel.

SWITCHING PANEL (8VU)

BOTH ECAM DU FAILURE (SYSTEM PAGE RECOVERING)
Recover a system page by holding a system key on the ECAM control panel

It is still possible to recover a system page by pushing and holding a system key on the ECP.



MULTIPLE DU FAILURE (SAME SIDE)
PFD unit and ND unit fails, no reconfiguration is possible

In the case of PFD unit and ND unit failure (on the same side) no reconfiguration is possible.

ECAM CONTROL PANEL FAILURE
Emergency cancel, clear, recall, all, and status available

If the ECP fails, the main functions, emergency cancel (EMER CANC), clear (CLR), recall (RCL), all (ALL) and status (STS) remain available.

ECAM CONTROL PANEL (11VU)

SDAC FAILURE

One SDAC failure, no operational consequence

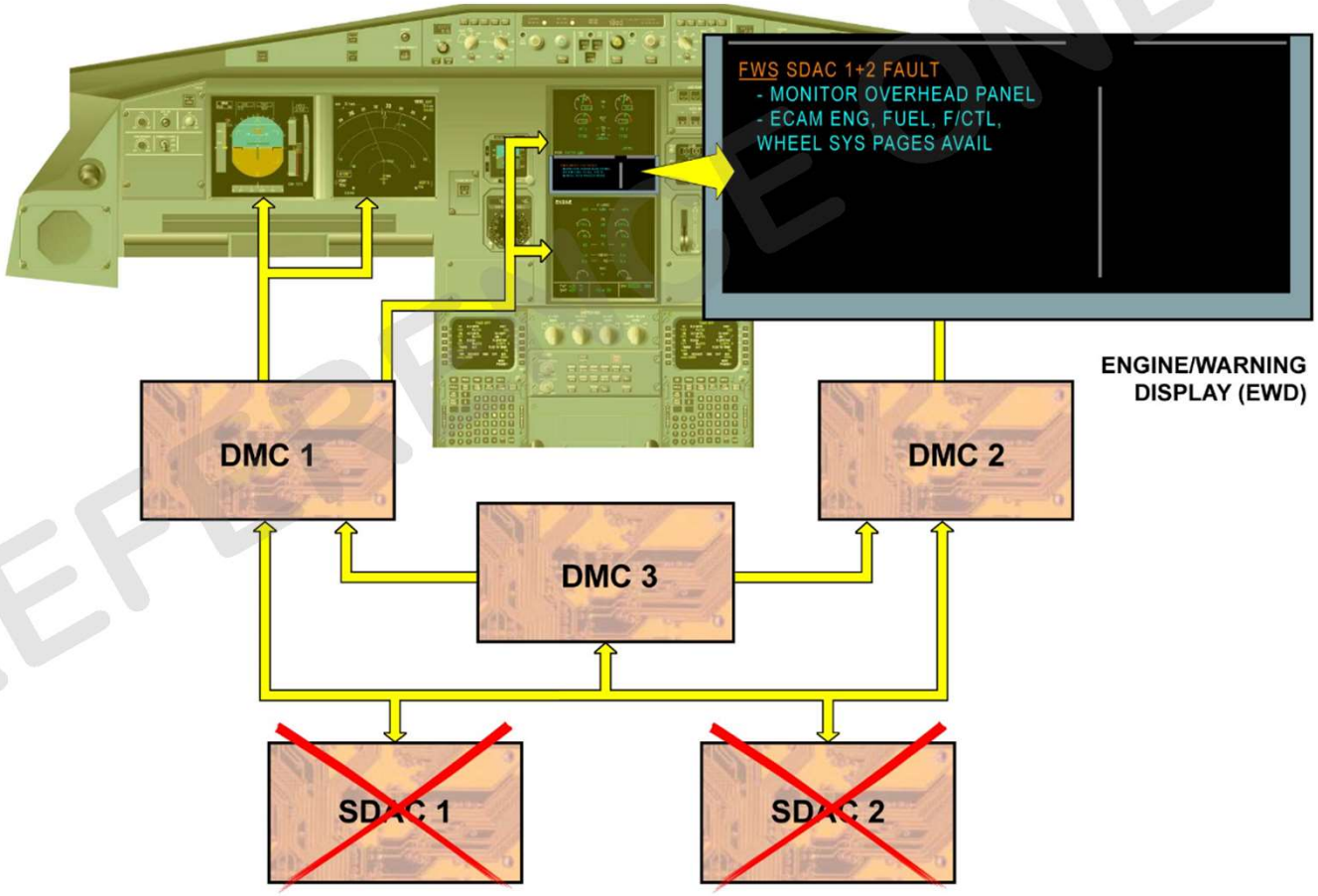
In the case of a SDAC failure, there is no operational consequence due to the redundancy of the EIS, the following message is displayed on the EWD: FWS SDAC 1 (or SDAC 2) FAULT.

Both SDACs failure, amber cautions lost

Most SD data lost

ECAM message. Pages avaible (direct ARINC 429)

In case both SDACs fail the amber cautions and most of the system displays are lost. The following message is displayed on the EWD: FWS SDAC 1+2 FAULT. ENG, FUEL, F/CTL and WHEEL ECAM page data is available because it is already in ARINC 429 format and not affected by SDAC failure.



FWC FAILURE

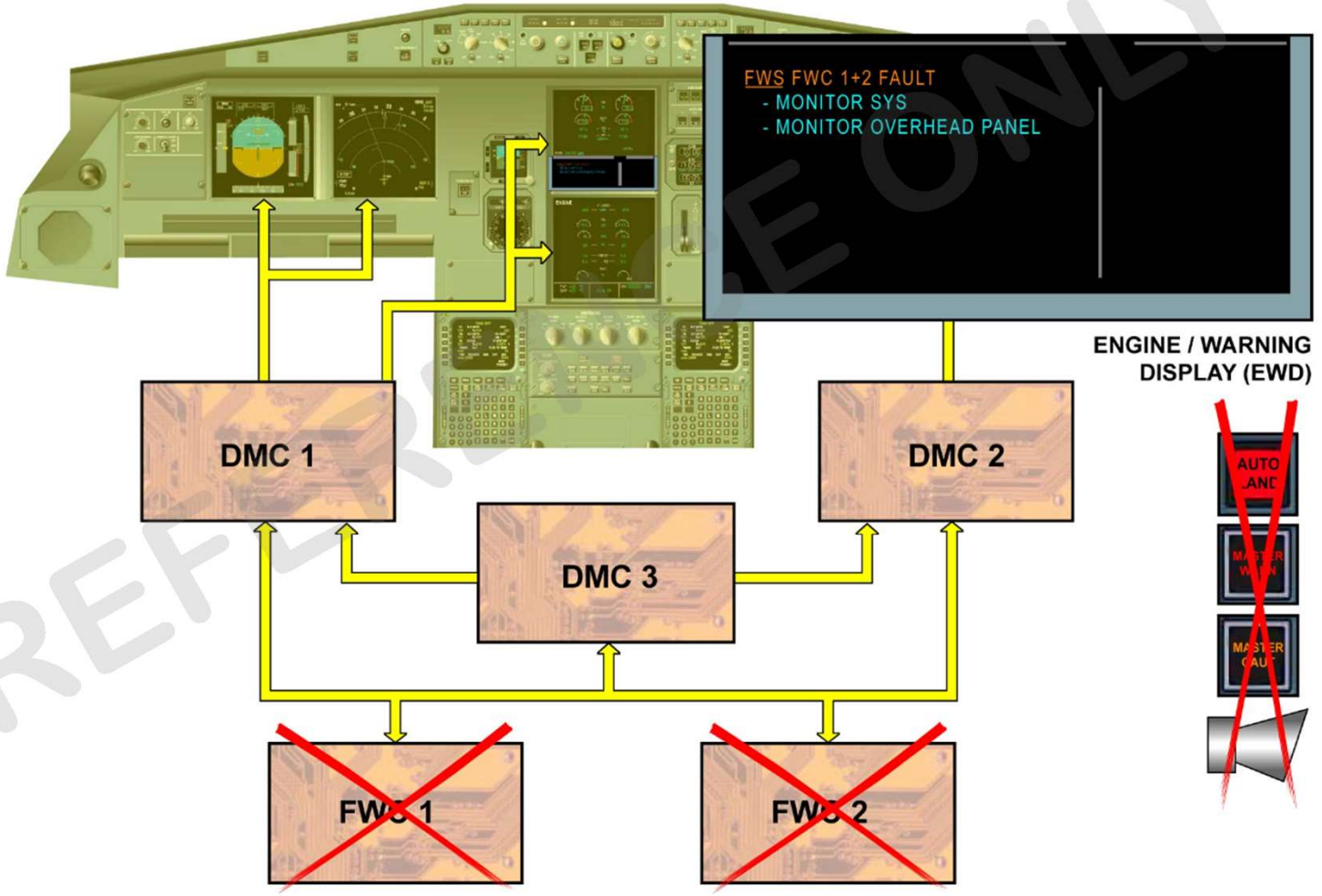
One FWC failure

In the case of a FWC failure, there is no operational consequence due to the redundancy of the EIS, the following message is displayed on the EWD: FWS FWC1 FAULT or FWS FWC2 FAULT. All attention getters and loudspeakers remain operative.

Both FWC failure

No data from the FWCs

If the DMCs receive no valid data from both FWCs, the message FWS FWC1 + 2 FAULT is displayed on the EWD. All other EWD messages, aural warnings and attention getters are lost.



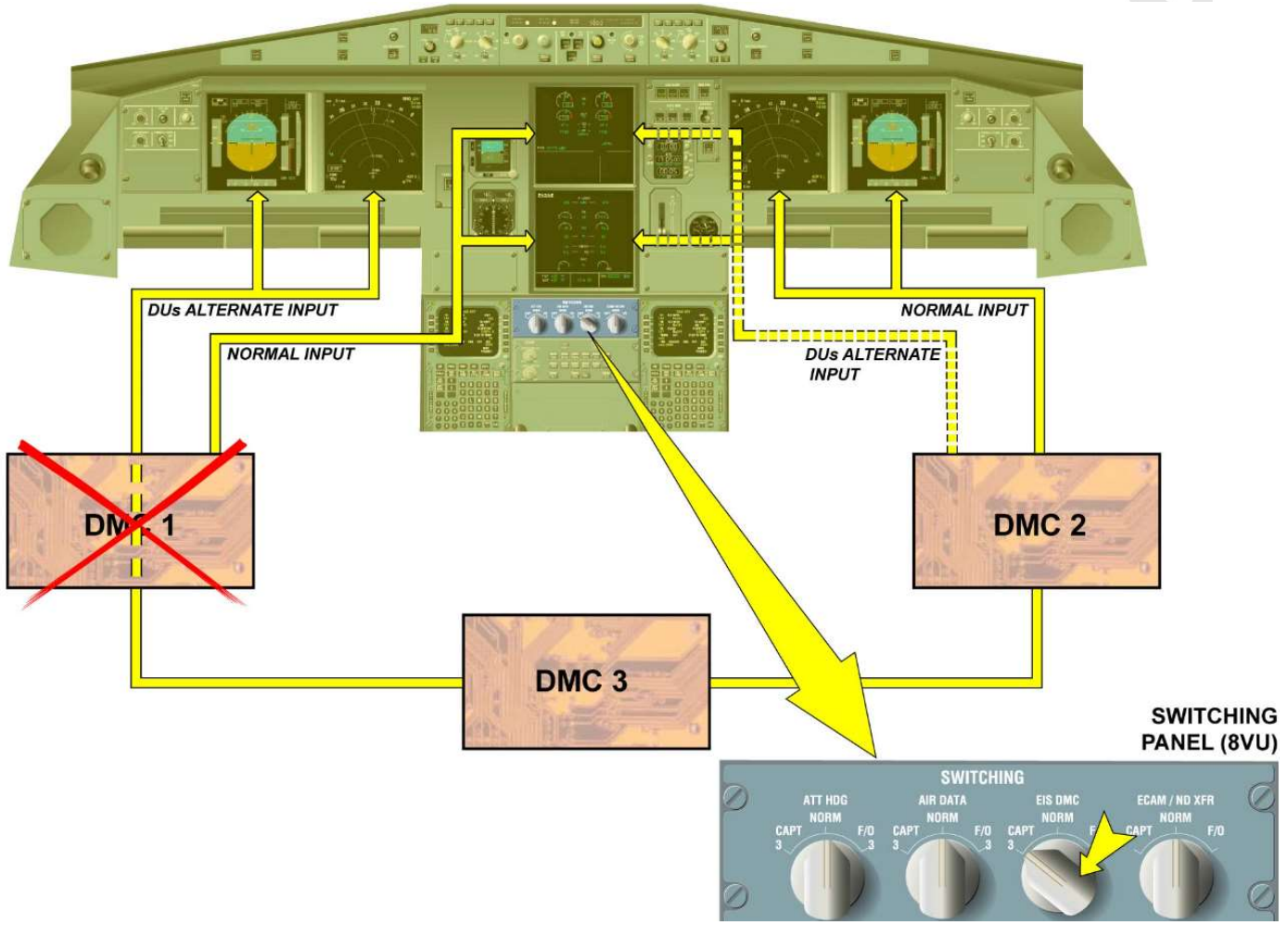
DMC FAILURE

DMC failure

DMC 2 automatic switching

DMC 3 manual switching

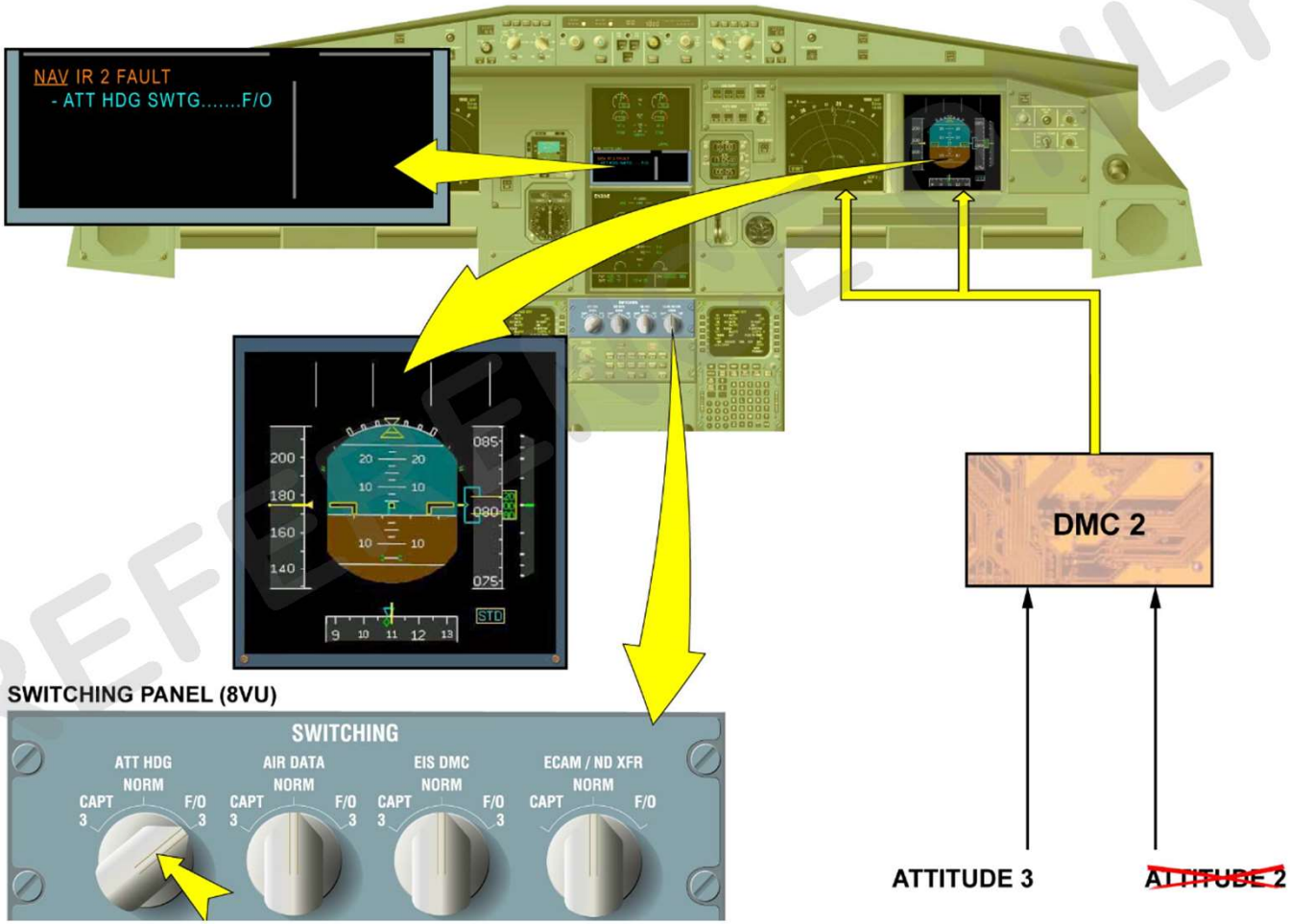
If DMC1 fails, DMC2 will automatically drive the ECAM DUs. The CAPT has to switch to DMC3 by rotating the EIS DMC switch on the switching panel to CAPT3 in order to recover also EFIS DUs through DMC3. If DMC 2 fails, the F/O has to switch to DMC3 by rotating the EIS DMC switch on the switching panel to F/O 3. Either the CAPT or the F/O may select the DMC3.



EXTERNAL SOURCE INFORMATION FAILURES

20 External source data failure
PFD/ND flags
ECAM warning and switching instructions

In the case of external source information failures, the lost information appears in red on the PFD or ND. It is possible to recover certain information by following the EWD instructions: in this example "ATT HDG SWTG F/O" on the switching panel. This enables manual source reconfiguration for attitude and heading data. On the EWD, the failed component is also displayed.




CFDS
COMPONENT LOCATION
REFERENCE ONLY
A/C ID
XY-ABCD
DATE
21NOV
GMT
1002
MAINTENANCE
POST FLIGHT REPORT
FLTN
XY-1234
LFPO

CFDIU (Centralized Fault Display Interface Unit)

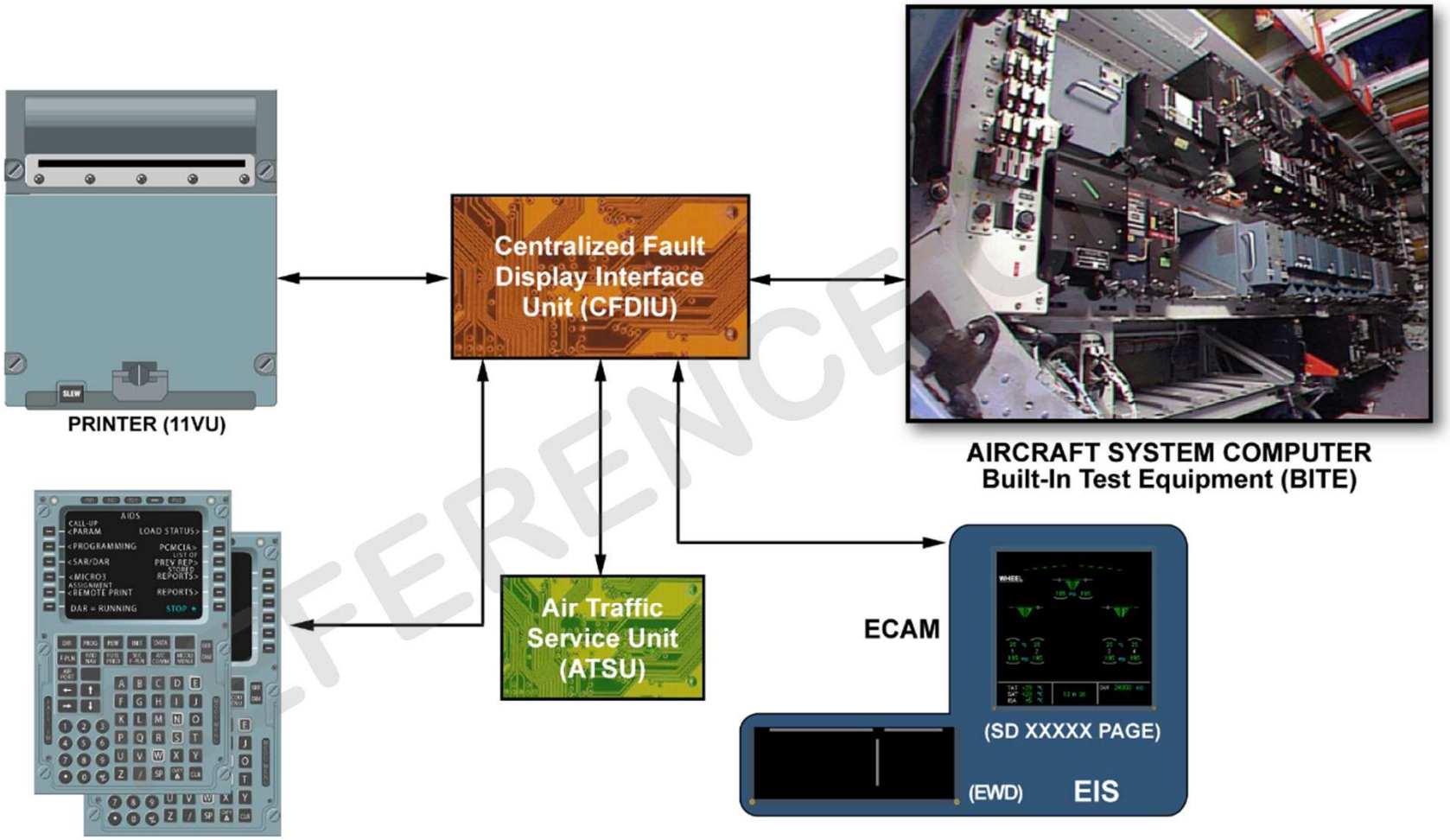
SYSTEM OVERVIEW

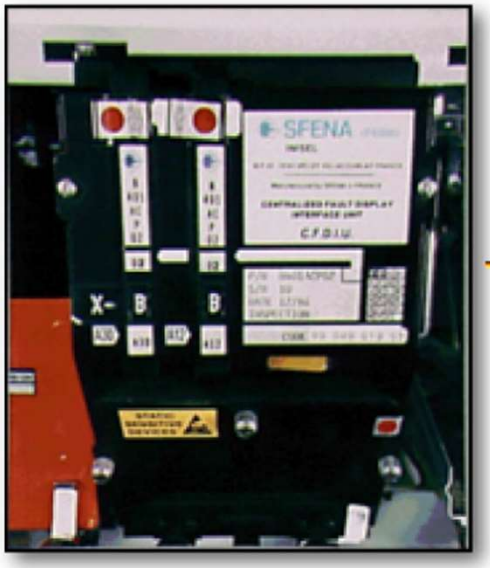
- CFDIU centralizes and memorizes all system failures information
- Reading or printing done with the MCDUs/Printer
- Most system computers have BITE
- The ECAM monitors A/C systems and transmits warnings to CFDIU

The Centralized Fault Display Interface Unit (CFDIU) centralizes and memorizes all information concerning A/C system failures. Reading or printing of the failure information is done in the cockpit with any MCDU or the printer. Most A/C system computers have a BITE. The BITE permanently monitors the system operation. When a failure is detected, it is stored in the BITE memory and is transmitted to the CFDIU. The ECAM, which generate warning and status messages, delivers these data to the CFDIU as well.

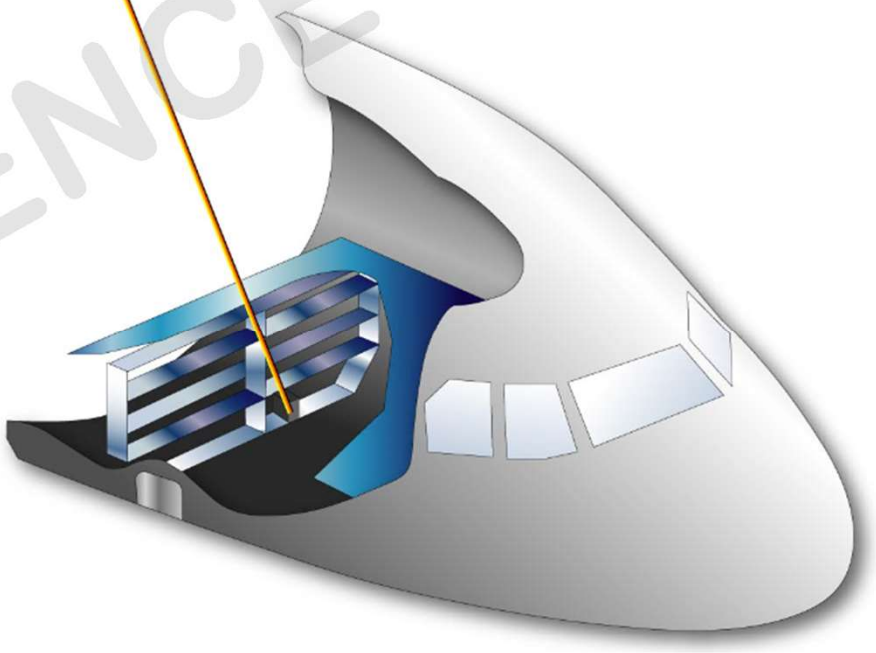
COMPONENT LOCATION

CFDS computers located in the aft avionics rack


Centralized Fault Display Interface Unit (CFDIU)
PRINTER (11VU)
AIRCRAFT SYSTEM COMPUTER
Built-In Test Equipment (BITE)
Air Traffic Service Unit (ATSU)
ECAM
(SD XXXXX PAGE)
(EWD)
EIS



Centralized Fault Display Interface Unit (CFDIU)




CFDS
Fault Processing
HYD
BLUE
YELLOW
PSI
PTU
RAT
ELEC
APU
AUTO EXTING
TEST
RESET
FADEC GND PWR
A/SKID &
N/W STRG
ON
OFF

CFDIU
> Functions: detects, locates and stores system faults
> Failure stored in BITE memory
> Failure transmitted to CFDIU

Most aircraft system computers are equipped with a Built-In Test Equipment (BITE). The BITE, which is an electronic device (hard + soft), monitors permanently the system operation. When a failure is detected, it is stored in the BITE memory and is transmitted to the Centralized Fault Display Interface Unit (CFDIU).

MEMORIZATION
> 4 Different if A/C on ground or in flight
> In flight: Full BITE functions & memorization
> On ground: memorization only in BITEs
> BITEs: flight & ground memory zones

Memorization of failures is different when the aircraft is on ground or in flight.
The full BITE functions and memorization operate in flight.
On ground, the memorization is done only in the BITEs. The BITEs are provided with flight and ground memory zones.

CFDIU
> Centralizes all system failures
> Printer: Allows printing failure information
> MCDUs: Access to CFDS functions
> CFDS = CFDIU + BITEs
> FWCs send ECAM messages to CFDIU
CFDIU memorize this message => CURRENT LES/LAST ECAM REPORT

The CFDIU centralizes all information concerning aircraft system failures. Reading or printing of all the failure information is done in the cockpit. The Centralized Fault Display System (CFDS = CFDIU + BITEs) functions are accessed through the MCDUs.
The Flight Warning Computers (FWCs) send the ECAM messages to the CFDIU by ARINC429 data busses. The CFDIU will memorize these messages to generate the CURRENT LEG/LAST LEG ECAM REPORT.

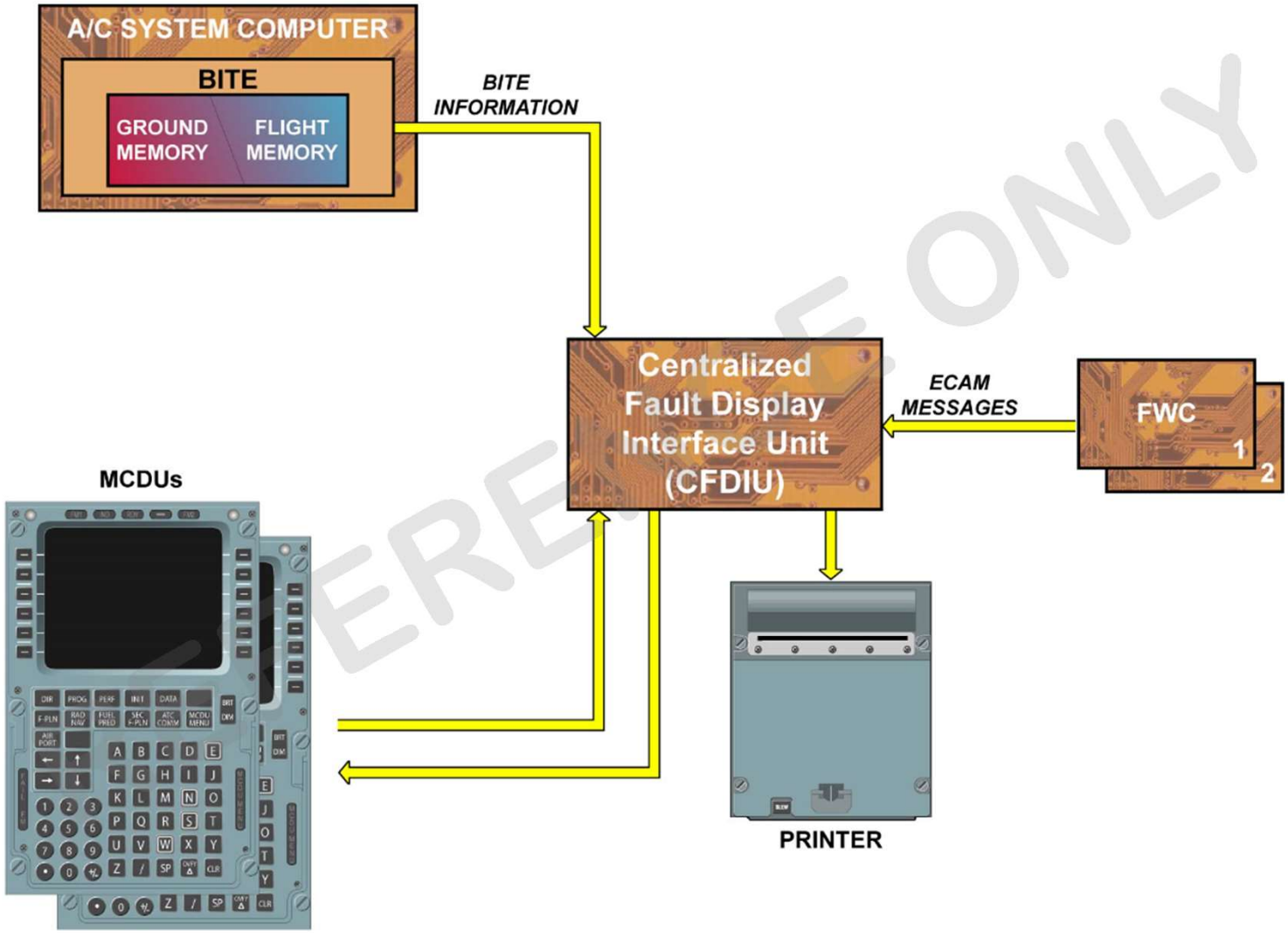
CFDS MODES
> 2 modes: NORMAL & MENU MODE
> Two CFDS modes are available: NORMAL and MENU modes. The MENU MODE is available only on ground.

NORMAL MODE
> Permanent and systematic operation in flight and on ground
> Fault data memorization in real time
> Generation of reports

In this mode, the CFDIU scans all the connected system outputs and memorizes the failure messages in order to generate the CURRENT (LAST) LEG REPORT and the CURRENT (LAST) LEG ECAM REPORT. In flight the CFDS always operates in the normal mode.

MENU MODE
> Interactive dialogue
> Only connected to 1 computer and 1 MCDU at a time
> Only selected on ground (interrupts normal mode)

In this mode, the CFDIU dialogues with one computer at a time in order to read the contents of its BITE memory and to initiate various tests. This mode can only be selected on ground and interrupts the normal mode of operation.



LAST/CURRENT LEG REPORT
- Purpose: present failure messages
- During flight: CURRENT LEG REPORT
- After flight: LAST LEG REPORT
- Message: Failure test, ATA reference, flight phase and time
- Correlation between "SOURCE" and "IDENTIFIER"
- CFDIU memorization capacity: 40 failures

A CURRENT LEG REPORT is elaborated during the flight. After the flight, its title becomes LAST LEG REPORT. The purpose of this item is to present the failure messages, concerning all systems, occurred during the last/current flight. Each message contains the test of the failure, the ATA reference and the flight phase and time at which the failure occurred. A function correlates the "SOURCE" failure message with the "resulting" failure messages.

SOURCE: Name of system affected by a failure.
IDENTIFIER: Name of system affected by an external failure, which is correlated with the "SOURCE" failure.
The CFDIU capacity for failure messages memorization is up to 40 lines.

LAST/CURRENT LEG ECAM REPORT
- Purpose: present EWD warning messages
- During flight: CURRENT LEG ECAM REPORT
- After flight: LAST LEG ECAM REPORT
- Primary or independent warnings
- Message: ECAM warning, ATA reference, flight phase and time
- CFDIU memorize up to (8) occurrences
- CFDIU memorization capacity: 40 warnings

A CURRENT LEG ECAM REPORT is elaborated during the flight. After the flight, its title becomes LAST LEG ECAM REPORT. The purpose of this item is to present the warning messages displayed on the upper ECAM display unit during the last/current flight. These are primary or independent warnings. Each message contains the ECAM warning, the ATA reference and the flight phase and time at which the warning was triggered. When several identical and consecutive warnings are transmitted, the CFDIU memorizes the first occurrence only and carries on counting with a maximum of 8. The occurrence counter is displayed between brackets at the end of the message. The CFDIU capacity for warning messages memorization is up to 40 lines.

POST FLIGHT REPORT
- Purpose: ECAM warnings and fault messages in a single report
- PFR = LAST LEG REPORT + LAST LEG ECAM REPORT
- Only printed on ground
- Messages separated into 2 parts: ECAM warning / Fault messages
- Beginning recording:
  Flight number inserted and first engine start (+ 3 minutes)
  Or A/C speed > 80 knots

End recording: A/C speed < 80 knots + 30 seconds

The Post Flight Report (PFR) is the sum of the LAST LEG REPORT and of the LAST LEG ECAM REPORT. The PFR can only be printed on ground. The list of ECAM WARNING MESSAGES and FAULT MESSAGES with the associated time, flight phase and ATA reference allow the maintenance crew to make a correlation for easier trouble-shooting.

Beginning of PFR recording:
- if flight number inserted prior to first engine start, first engine started + 3 minutes.
- if not, aircraft speed > 80 knots.

End of PFR recording:
Aircraft speed < 80 knots + 30 seconds.

DATE AT THE TIME OF PRINT

A/C ID	DATE	GMT	FLTN	CITY PAIR
XY-ABCD	21NOV	1002	XY-1234	LFBO LFPO

MAINTENANCE
POST FLIGHT REPORT

DATE AT THE TIME OF FLIGHT

A/C ID	DATE	GMT	FLTN	CITY PAIR
XY-ABCD	21NOV	0832/0941	XY-1234	LFBO LFPO

BEGINNING AND END OF PFR RECORDING

WARNING/MAINT. STATUS MESSAGES

LAST LEG ECAM REPORT

GMT PH ATA

0855 05 30-31 ANTI ICE F/O TAT
0855 05 30-11 WING A.ICE SYS FAULT
0920 05 27-00 F/CLT FLAP SYS 2 FAULT
0925 06 28-00 FUEL CTR TK PUMP 2 LO PR (5)

OCCURENCE COUNTER

FAILURE MESSAGES

LAST LEG REPORT

GMT PH ATA

0833 03 38-31-68 DIFF PRESS XCDR
0833 03 34-42-33 LRA-1 TRANSCEIVER
0833 03 23-24-34 NO ACARS MU DATA

0855 03 XX-XX-XX DME2:NO CTL SOURCE DATA
0855 03 29-34-11 SDAC1:B HYD AIR PRSS XMTR 2385GH
0859 04 23-73-34 NO CIDS 1 DATA
0859 04 26-17-34 NO SDCU DATA

SOURCE	IDENT.
TOILET	
RA 1	
CFDS	ECAM 2
	ECAM 1
DME 2	ADF
ECAM 1	ECAM 2
CFDS	
CFDS	ECAM1
	ECAM2

CORRELATION FUNCTION

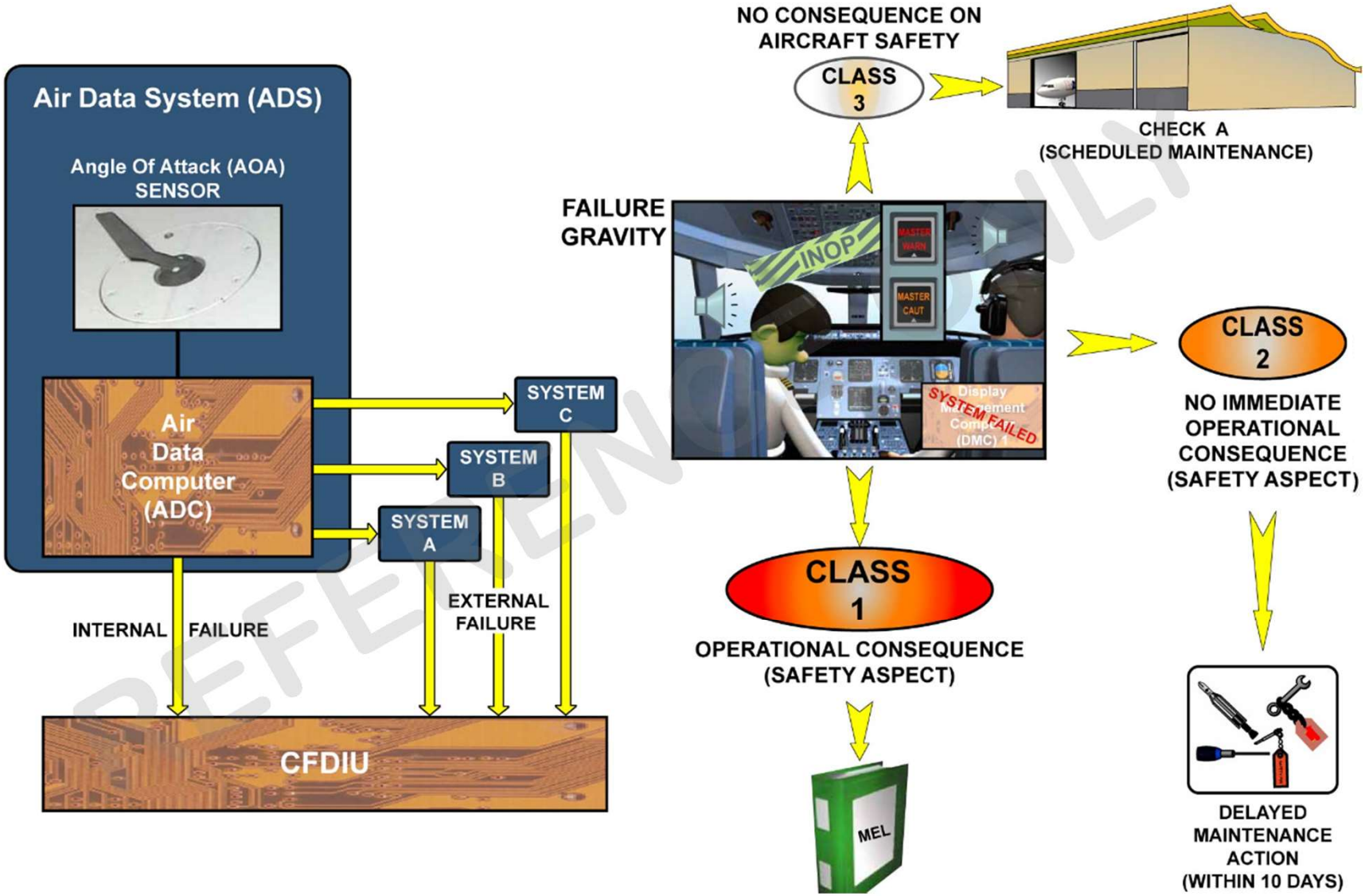
CFDS FAILURE CALSSIFICATION

INTERNAL/EXTERNAL FAILURES
BITE: Make difference between internal/external failure
E.g.: AOA sensor failure = ADS internal failure + A, B & C systems external failure

Each BITE can make the difference between an internal and an external failure. Let us suppose that an Angle-Of-Attack (AOA) sensor failure has been detected and that systems A, B and C are affected by this failure. The Air Data System (ADS) will transmit an internal failure while systems A, B and C will transmit an external failure.

FAILURE GRAVITY
Class 1 → Most serious, immediate maintenance action (refer to MEL)
Class 2 → Consequence if second failure occurs. Maintenance action within 10 days
Class 3 → No consequence on flight safety. Maintenance at the next scheduled check

The failures are classified according to their importance:
- class 1 failures are the most serious ones and require an immediate maintenance action subject to the Minimum Equipment List (MEL).
- class 2 failures may have consequences if a second failure occurs. A class 2 failure must be repaired within 10 days.
- class 3 failures can be left uncorrected until the next scheduled maintenance check




CFDS Aircraft
System Types
A/C ID
XY-ABCD
DATE
21NOV
GMT
1002
MAINTENANCE
POST FLIGHT REPORT
FLIGHT RECORDER
DO NOT OPEN
ECAM WARNING MESSAGES

TYPE 1 SYSTEMS

- Majority of A/C systems = type 1
- Last 64 flight legs memorization
- CFDIU connections: ARINC 429 input/output

Most systems are type 1 systems. These systems can memorize failures, which occurred in the last 64 flight legs. Type 1 systems are connected to the Centralized Fault Display Interface Unit (CFDIU) via an ARINC 429 input bus and an ARINC 429 output bus.

SINGLE COMPUTER

- 1 Computer → CFDIU
- E.g. VHF 1
- The first configuration in TYPE 1 is a single computer.
- Example: VHF 1 Transceiver.

MULTI COMPUTER

- X computers of same system
- 1 computer concentrate maintenance data → CFDIU
- E.g. FMGC 1 + FMGC 2 data to FAC 1 to CFDIU

The second configuration in TYPE 1 includes several computers in the same aircraft system. One computer concentrates the maintenance data of the other computers.
Example: Flight Management and Guidance Computers (FMGC) and Flight Augmentation Computer (FAC) with FMGC 1 as A, FMGC 2 as B and FAC 1 as C.

TYPE 2 SYSTEM

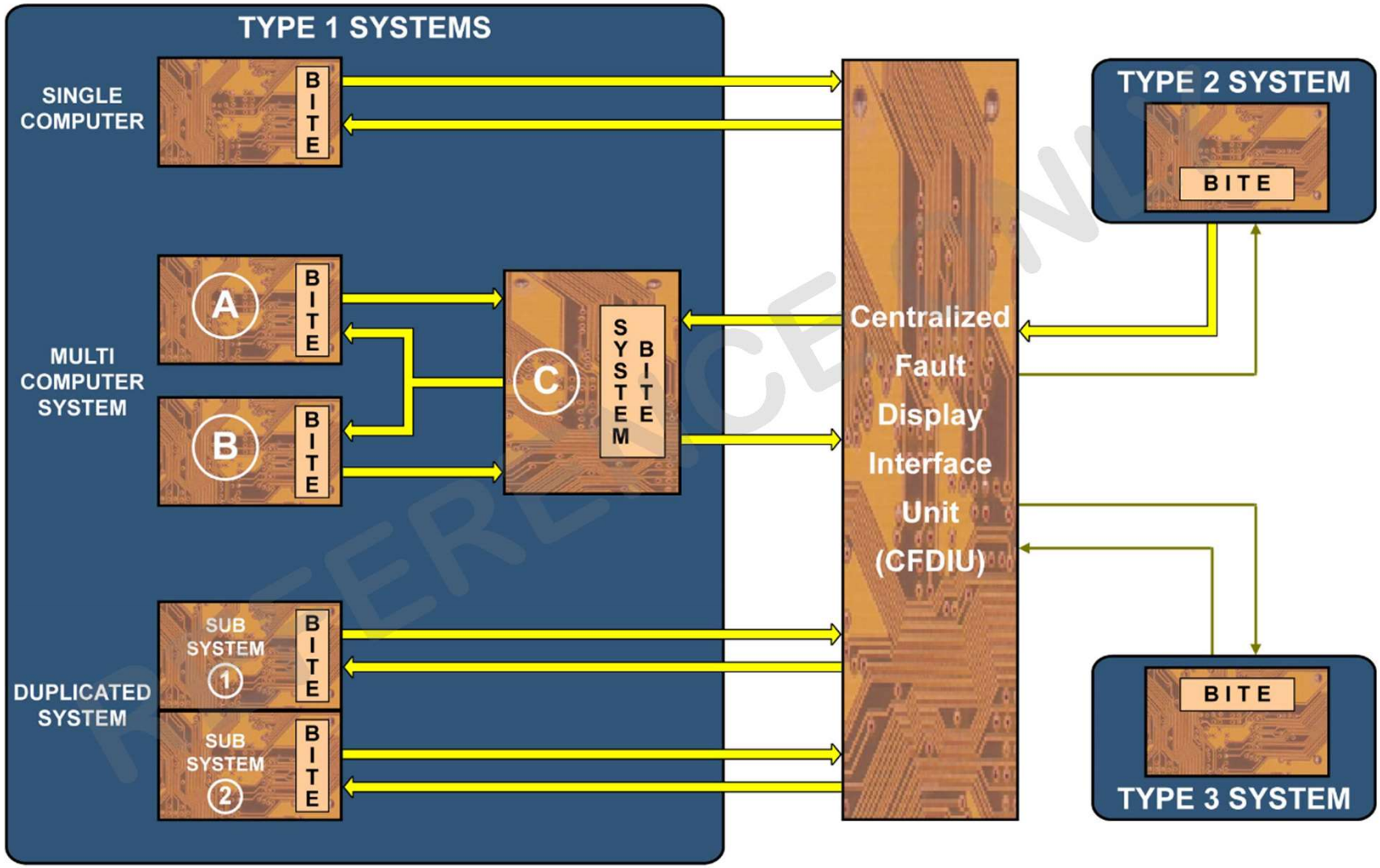
- Only last flight leg memorization
- Discrete signal: System test
- E.g. AEVC

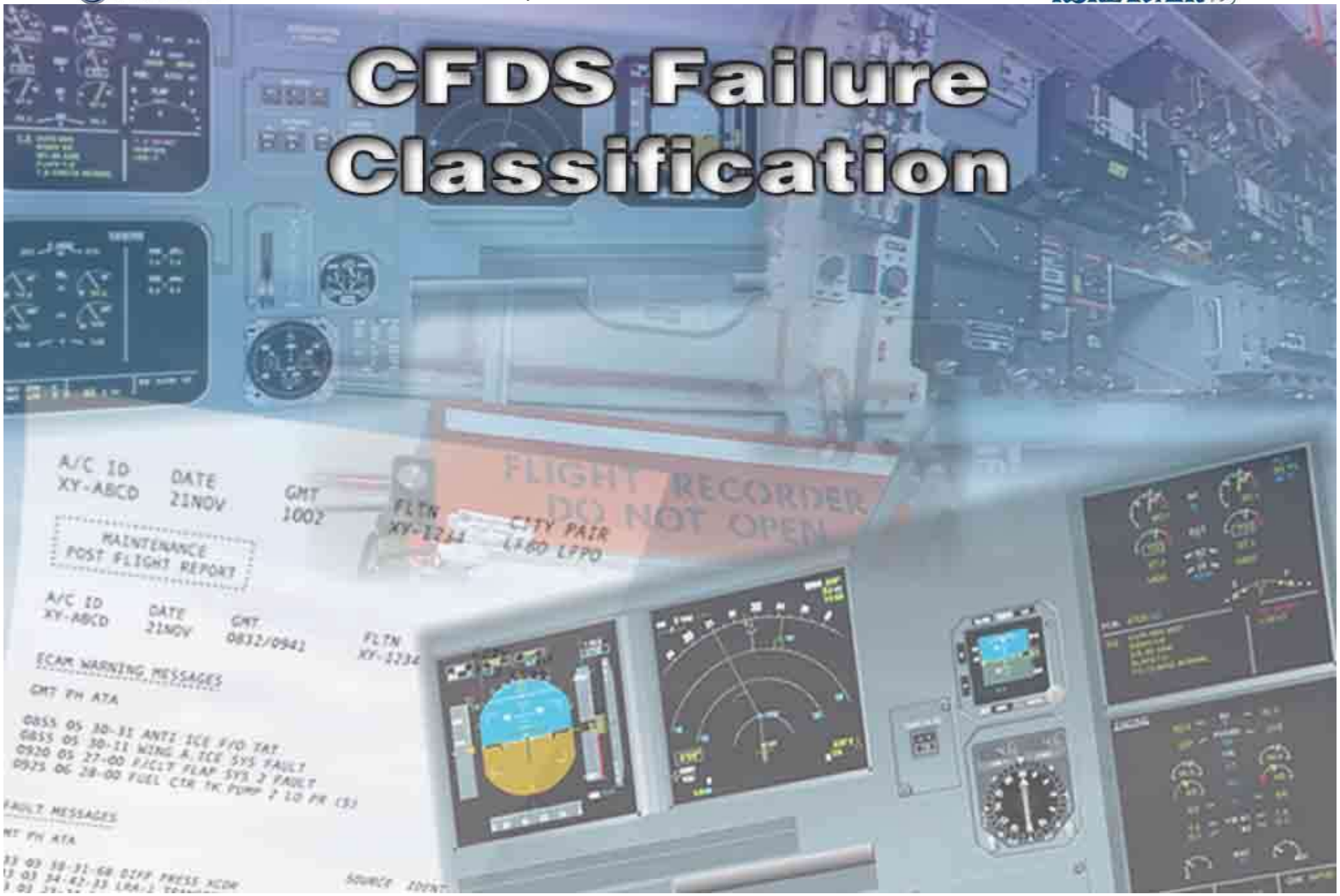
Type 2 systems memorize only failures from the last flight leg. The discrete signal is provided to initiate the test of the system.
Example: Avionic Electronic Ventilation Computer (AEVC).

TYPE 3 SYSTEM

- 2 discrete signals
- No failure message memorization
- Discrete input: Test or reset
- Discrete output: System "OK" or not
- E.g.: TRU

Type 3 systems are simple systems linked to the CFDS by only two discrete signals. Type 3 systems cannot memorize failure messages.
The discrete input permits to initiate the test or reset. The discrete output indicates if the system is OK or not.
Example: Transformer Rectifier Unit (TRU)


TYPE 1 SYSTEMS
SINGLE COMPUTER
BITE
MULTI COMPUTER SYSTEM
A
BITE
B
BITE
C
SYSTEM BITE
DUPLICATED SYSTEM
SUB SYSTEM 1
BITE
SUB SYSTEM 2
BITE
Centralized Fault Display Interface Unit (CFDIU)
TYPE 2 SYSTEM
BITE
BITE
TYPE 3 SYSTEM


CFDS Failure
Classification
A/C ID
XY-ABCD
DATE
21NOV
GMT
1002
MAINTENANCE
POST FLIGHT REPORT
FLIGHT RECORDER
DO NOT OPEN
ECAM WARNING MESSAGES

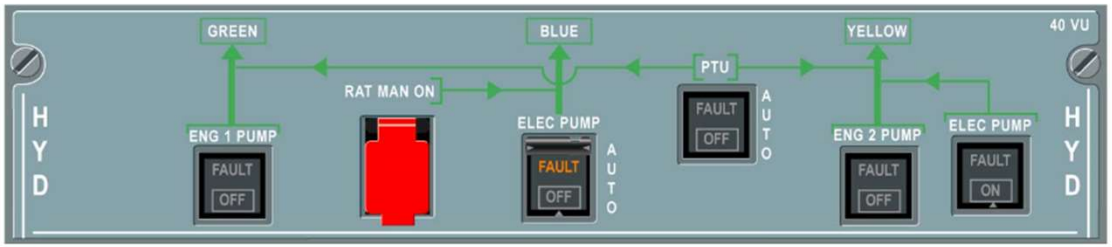
CLASS 1

- Operational consequence on flight
- Reports available on MCDU
- ECAM system information
- Warnings/flags
- MEL: "GO", "GO IF" or "NO GO“

Class 1 failures have an operational consequence on the flight. You can display the class 1 failures on the MCDU:
- in the LAST (or CURRENT) LEG REPORT.
- in the LAST (or CURRENT) LEG ECAM REPORT.

These faults are also indicated to the crew in flight:
- by the ECAM system (upper and/or lower Display Unit (DU)).
- by local warning in the cockpit.

Refer to the Minimum Equipment List (MEL):
"GO", "GO IF" or "NO GO".



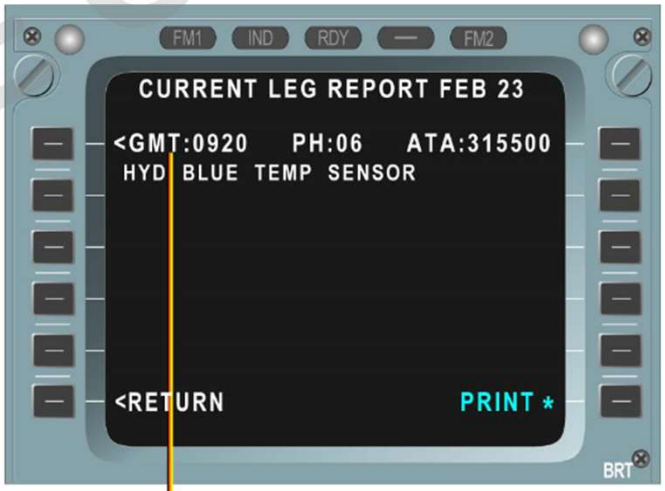
LOCAL WARNING ON SYSTEM CONTROL PANEL (HYDRAULIC)

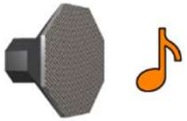
CLASS 1

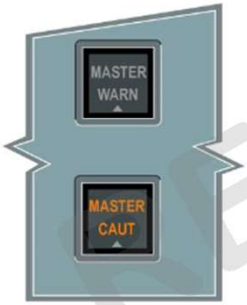
NATURE OF THE FAILURE

ACTION TO BE PERFORMED

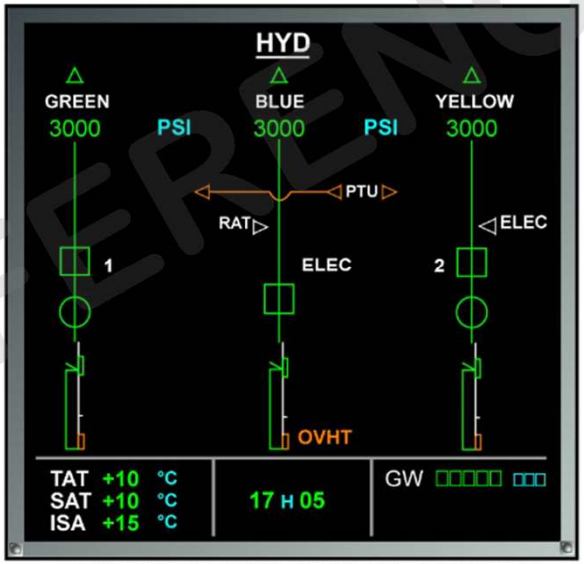
MCDU







(131 VU)



AUTOMATIC DISPLAY OF THE AIRCRAFT

TIME OF CFDS FAULT RECEPTION

CLASS 2

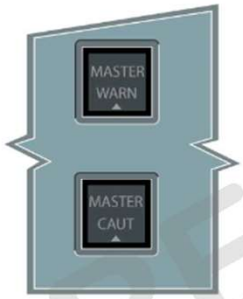
- No immediate operational consequence
- ECAM STATUS page information (manual selection)
- Reports available on MCDU
- Repairing delay = 10 days
- MEL: "GO" without condition

Class 2 failures have no immediate operational consequence and can be displayed on request on the ECAM STATUS page, under the MAINTENANCE title. You can display the class 2 failures on the MCDU:

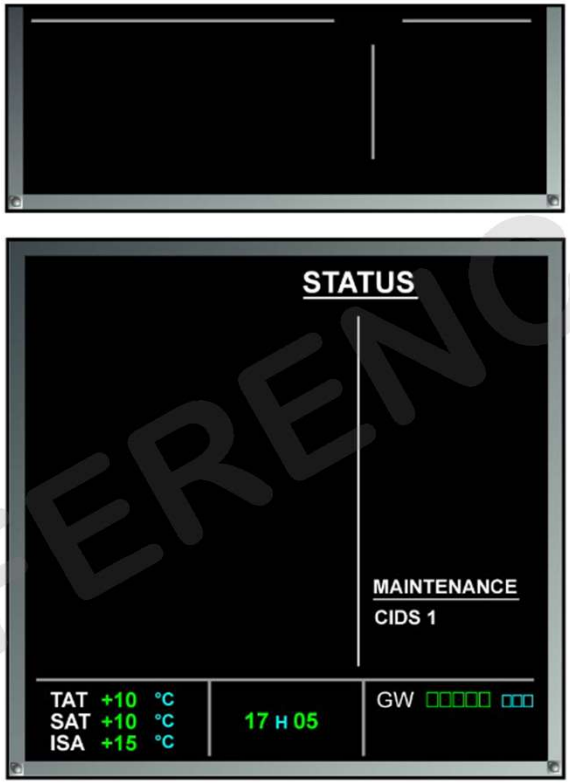
- in the LAST (or CURRENT) LEG REPORT.
- in the LAST (or CURRENT) LEG ECAM REPORT.

A class 2 failure has to be repaired within 10 days. Refer to the MEL: "GO" without condition. The example given here concerns the Cabin Intercommunication Data System (CIDS) fault.

CLASS 2

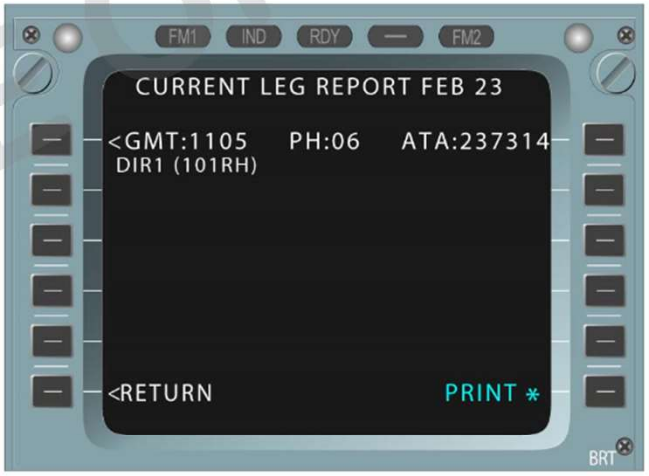


(131 VU)



MANUAL SELECTION OF THE "ECAM STATUS" PAGE

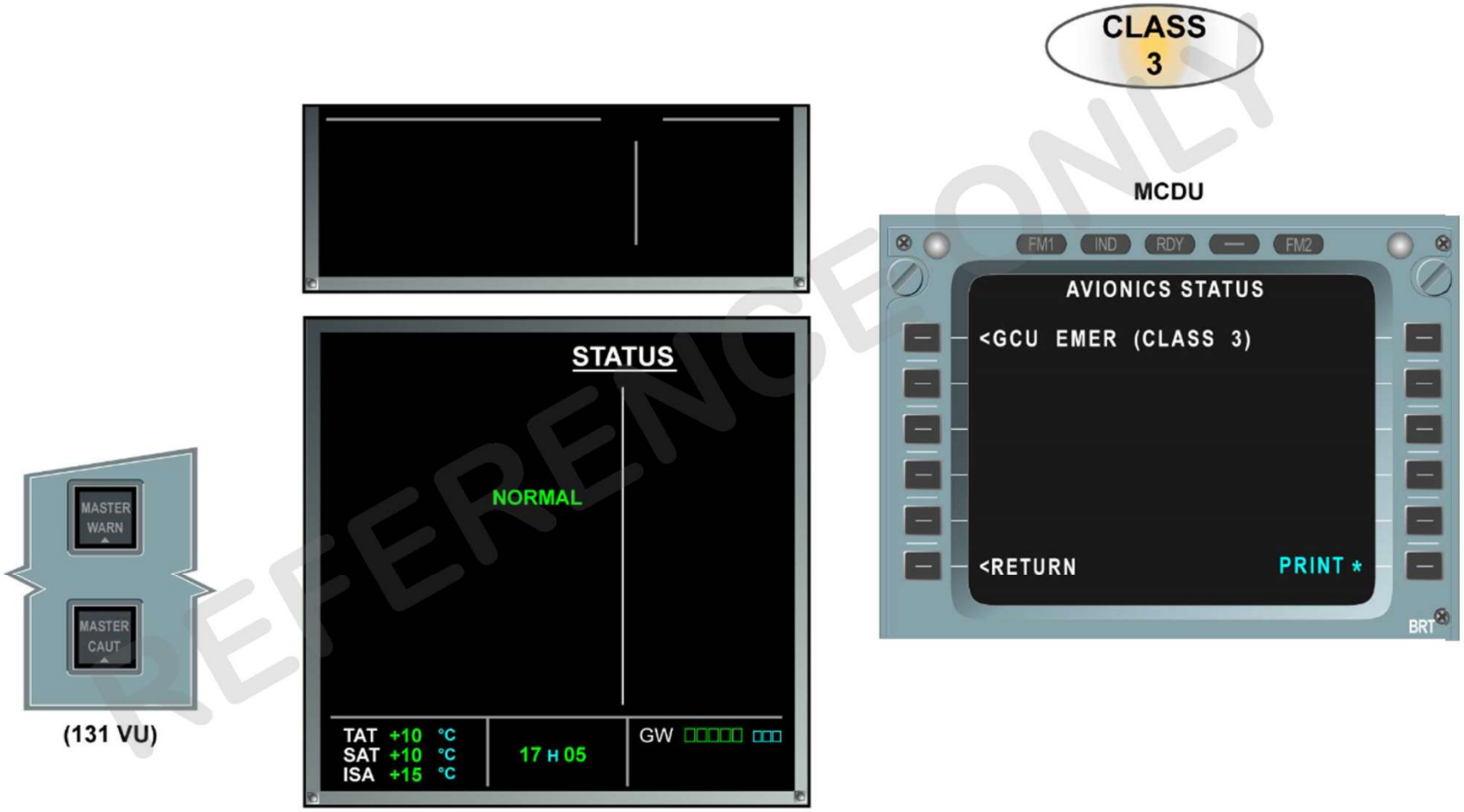
MCDU



CLASS 3

-No operational consequence
- None indication to the crew
- Maintenance information: AVIONICS STATUS (on ground)
- Do not refer to the MEL
- No fixed time for correction

Class 3 failures have no operational consequence. All aircraft systems remain available. These faults are not indicated to the crew but you can display the name of the systems affected by at least a class 3 failure in the AVIONICS STATUS (only available on ground). Do not refer to the MEL. Class 3 failures have no fixed time for correction. However, correction is recommended to improve the dispatch reliability. Class 3 failures may be corrected during the A CHECK programmed maintenance operations.



SYNTHESIS

- Class 1 and 2 failures: LAST (or CURRENT) LEG (and ECAM) REPORT
- Class 3 failures can be left uncorrected
- Class 1/2/3 display in AVIONICS STATUS on ground

Class 1 and 2 failures are displayed in the LAST (or CURRENT) LEG REPORT and in the LAST (or CURRENT) LEG ECAM REPORT.
AVIONICS STATUS displays, on ground, the title of the systems currently affected by any failure class.

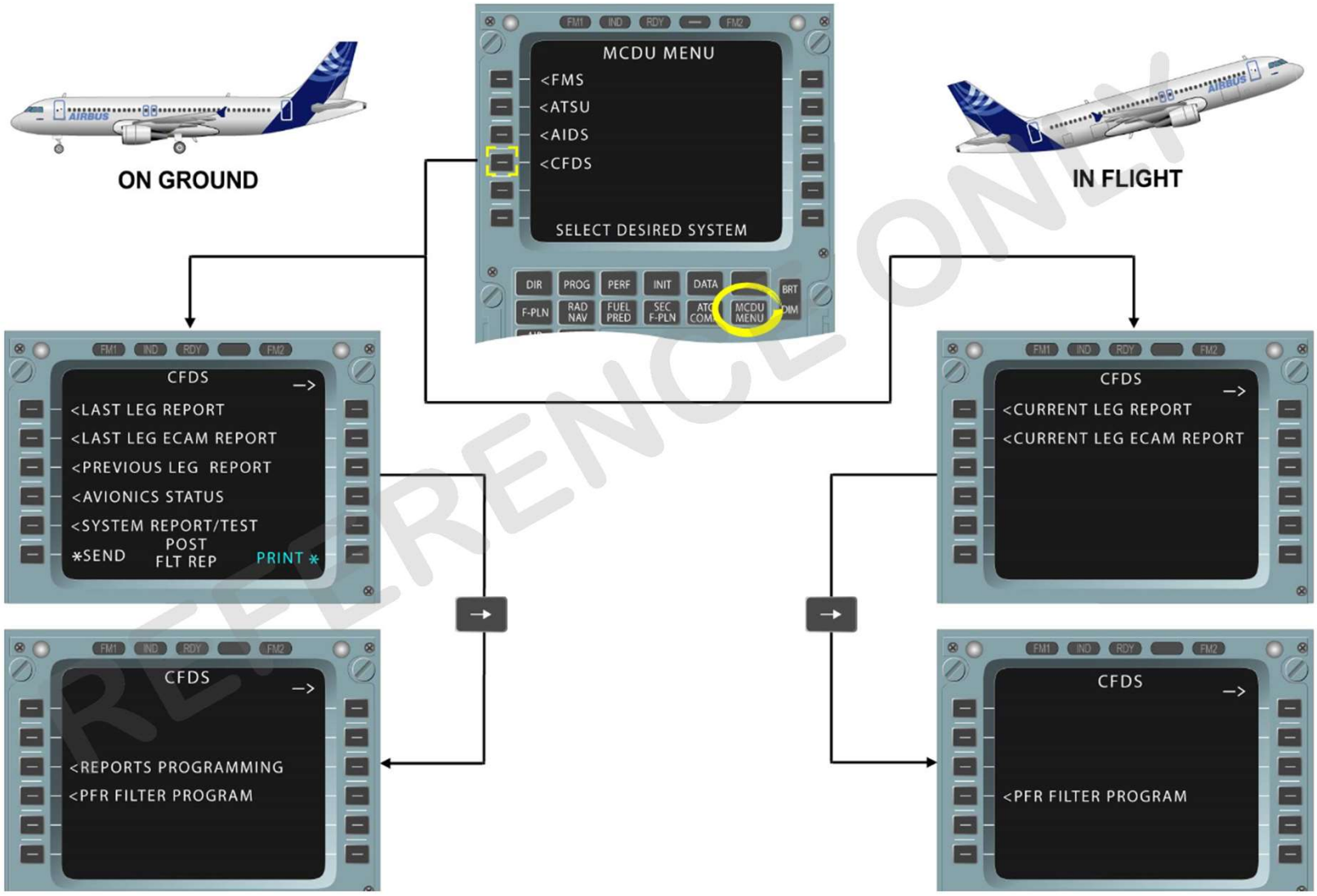
	CLASS 1 FAILURE	CLASS 2 FAILURE	CLASS 3 FAILURE
Operational consequence on the current flight	YES	NO	NO
Indicated to the pilots	YES Warnings/flags System pages	YES On the STATUS page	NO
Dispatch consequences	REFER TO MEL May be: "GO","GO IF" or "NO GO"	FUNCTIONS LOST INDICATED IN MEL "GO" without condition	NO REFERENCE IN MEL
Maintenance information	Have to be reported by the pilots in the log book. Are indicated at the end of each flight leg. MEL entry is required. 		Available on request. No fixed time for correction.


CFDS Reports
REFERENCE ONLY

CFDS REPORT

GENERAL
- On ground: all functions available
- In flight: only CURRENT LEG (ECAM) REPORT
- CFDS Menu: 2 pages

On ground, all the functions are available. In flight, only CURRENT LEG REPORT and CURRENT LEG ECAM REPORT are available.
Note: The Centralized Fault Display System (CFDS) menu comprises two pages.



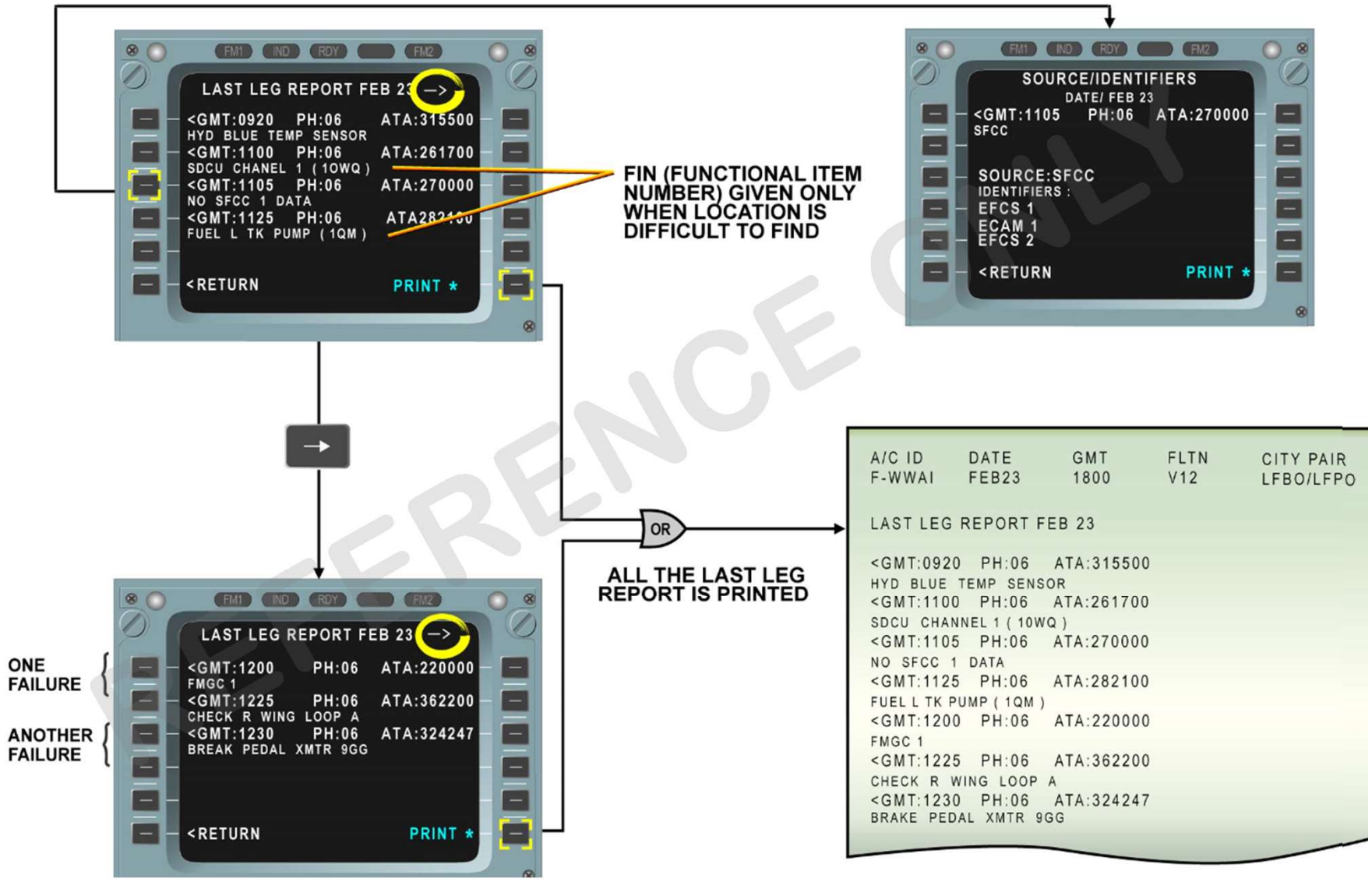
LAST/CURRENT LEG REPORT

- BITE information of A/C systems
- Capacity: 40 failures
- Internal failures (CLASS 1 & 2) only
- SOURCE/IDENT page = Possible causes
- On ground: LAST LEG REPORT
- In flight: CURRENT LEG REPORT
" → ": Report displayed on X pages
→ key: See following pages
- PRINT line key: All REPORT printed

The LAST LEG REPORT shows failure information delivered by the Built-in Test Equipments (BITEs) of the aircraft systems. It can store up to 40 failures occurred during the last leg. Pressing the Slat Flap Control Computer (SFCC) channel 1 (3L) line key allows access to the related IDENTIFIERS page.

The LAST LEG REPORT shows the internal failures (class one and two) only. The SOURCE/IDENTIFIERS page shows the list of systems affected by the source failure, which is an external failure for them. On the ground, the title of this item is LAST LEG REPORT. In flight, it is CURRENT LEG REPORT. When the report is shown on several pages, an arrow appears on the top right-hand corner.

The → key helps you to see the following pages. If you select the → key on the last page, you come back to the first page. When you select the PRINT line key, all the LAST LEG REPORT is printed, even if it contains several pages.



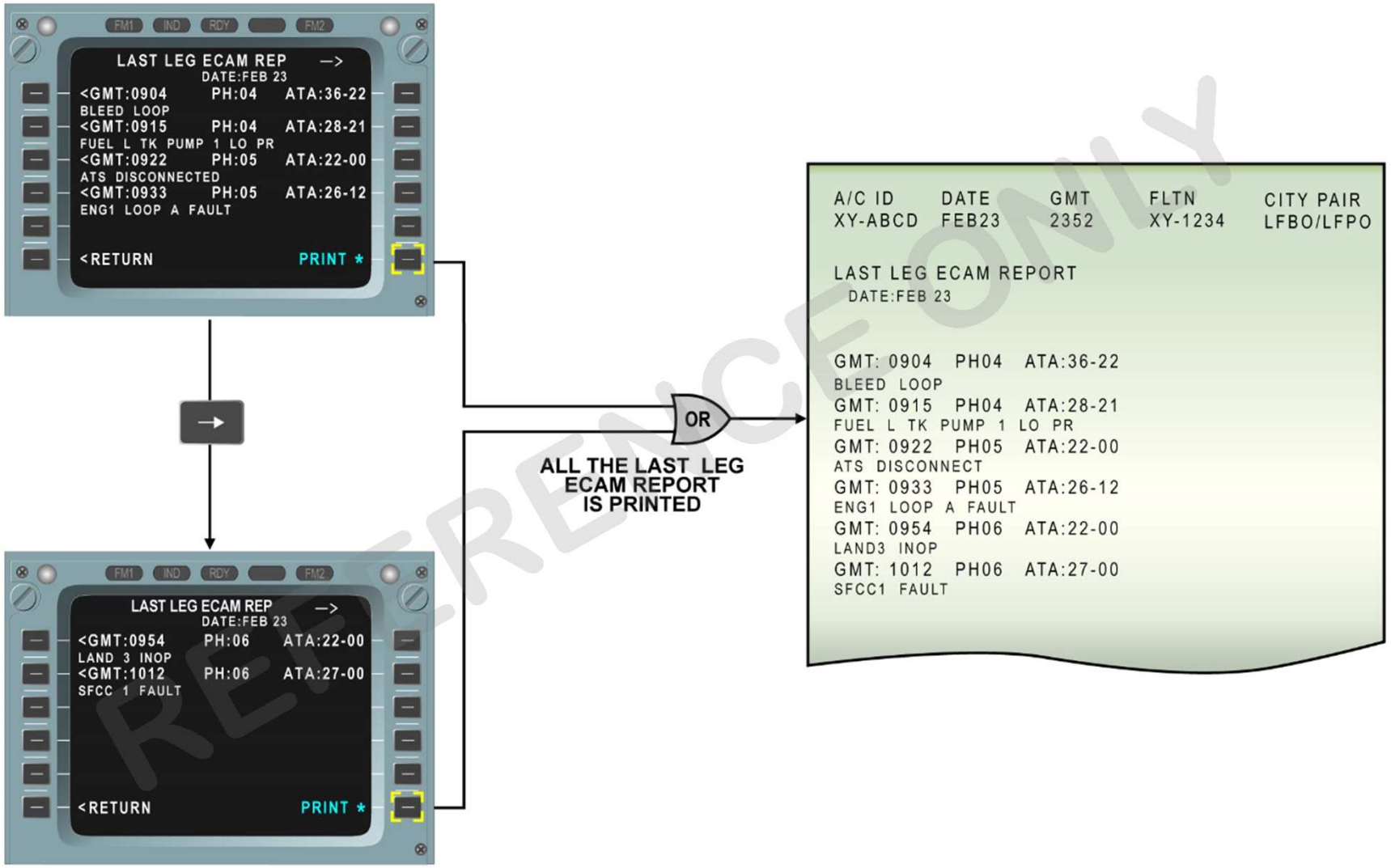
LAST/CURRENT LEG ECAM REPORT

- ECAM warning messages
- Messages sent to CFDIU by FWC
- Capacity: 40 warnings
- On ground: LAST LEG ECAM REPORT
- In flight: CURRENT LEG ECAM REPORT
- PRINT line key = All ECAM REPORT printed

The LAST LEG ECAM REPORT shows the list of Electronic Centralized Aircraft Monitoring (ECAM) warning messages sent to the Centralized Fault Display Interface Unit (CFDIU) by the Flight Warning Computers (FWC). It can store up to 40 warnings occurred during the last leg. On ground, the title of this item is LAST LEG ECAM REPORT; in flight it is CURRENT LEG ECAM REPORT. Documentary data appears on the print report:

- the A/C identification,
- date and Greenwich Mean Time (GMT),
- the flight number,
- the city pair.

When you select the PRINT line key, all the LAST LEG ECAM REPORT is printed.



PREVIOUS LEGS REPORT

- Sum of LAST LEG REPORTS
- New flight leg:
  LAST REPORT transferred into PREVIOUS
- Capacity: 200 failures, last 64 flight legs
- Displayed only on ground
- XX = number flight legs before last leg

INTM
- PRINT line key: Only displayed page printed

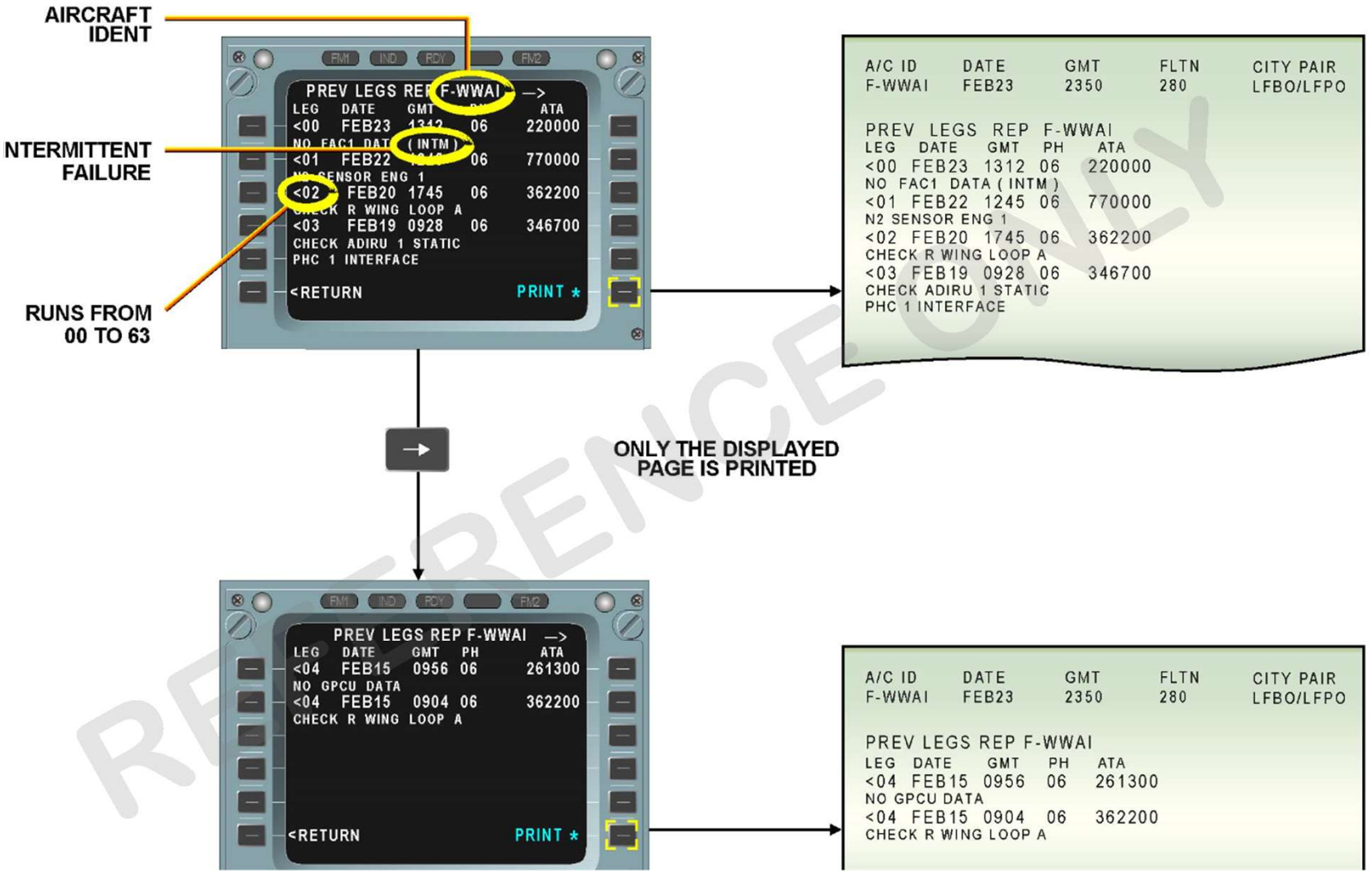
At each new flight leg, the content of the LAST LEG REPORT is transferred into the PREVIOUS LEGS REPORT. This report can store up to 200 failures over the last 64 flight legs. The PREVIOUS LEGS REPORT is displayed only on ground. Each failure message contains the same kind of data as the LAST LEG REPORT. For example:

FEB 22 1312
22-00-00
NO FAC 1 DATA (INTM)

It also contains a flight leg counter relative to the previous flight. XX is the number of flight legs before the last flight leg. For example: 01 (previous leg).

NOTE: As the leg number changes at ground/flight transition, the content of the LAST LEG REPORT is stored and identified in the PREVIOUS LEGS REPORT under the LEG -01. At flight/ground transition, the LAST LEG REPORT in the PREVIOUS LEGS REPORT is identified as 00.

"INTM" means that the failure has occurred intermittently. When you make a print of the PREVIOUS LEGS REPORT, only the displayed page is printed.

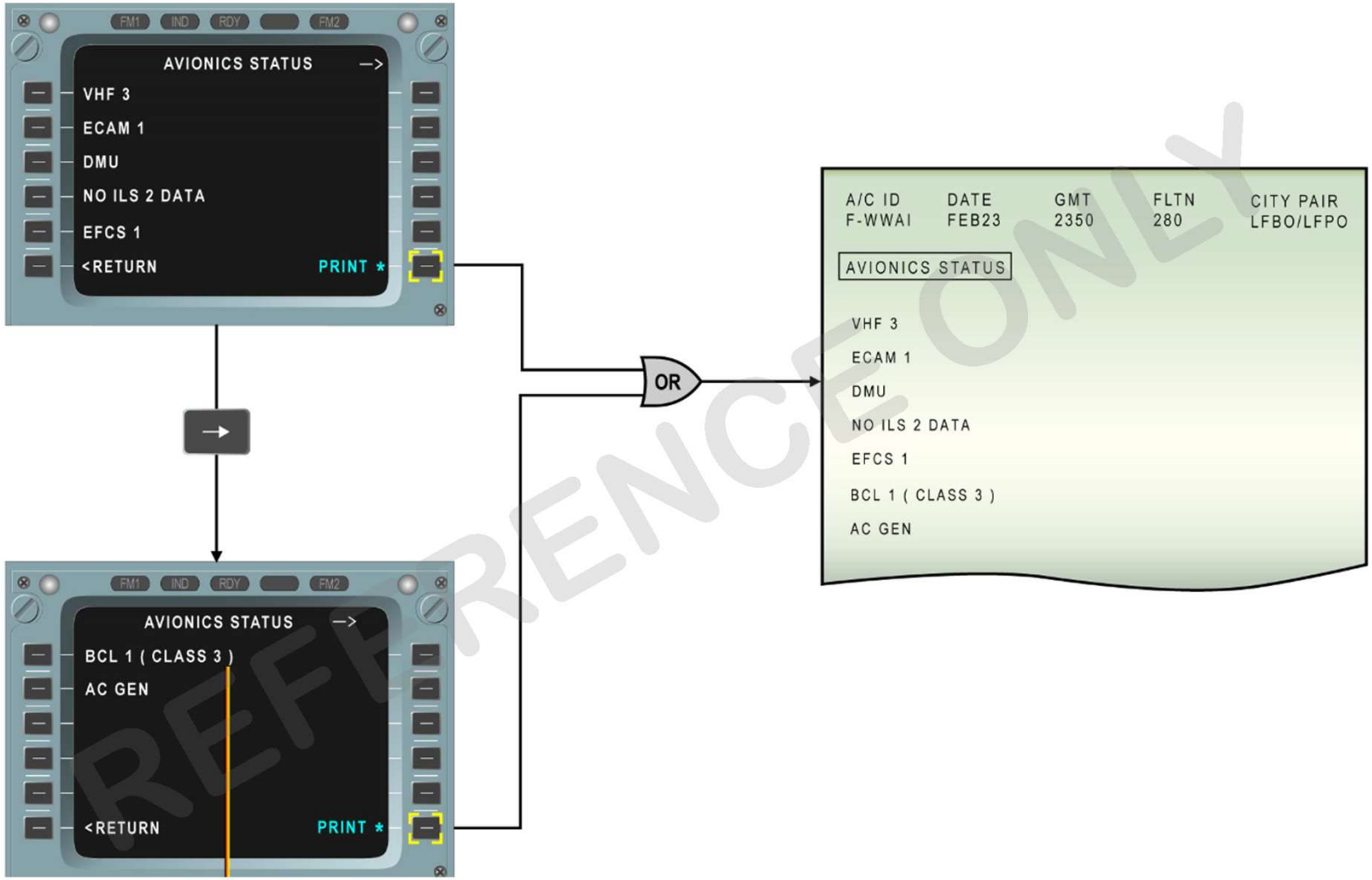


AVIONICS STATUS

- Systems currently affected by a failure
- Only on ground
- Information permanently updated
- I.e.: VHF 3 message: Failed system name
- NO X DATA message: System X no valid
- Internal or external fault (class 1,2 or 3)
- PRINT line key: All report printed

The AVIONICS STATUS presents the list of systems, which are currently affected by a failure. This function is only available on ground. The information presented is permanently updated. The message contains the name of the system presently affected by a failure, i.e. VHF3, or a NO X DATA message when the related system bus is not active. For example: NO ILS 2 DATA

The AVIONICS STATUS also indicates the class 3 failures. (CLASS 3) means that the system is affected by at least one class 3 failure. Note that there could also be class 1 or 2 failures. When you make a print, all the AVIONICS STATUS report is printed even if it contains several pages.



SYSTEM REPORT/TEST
- All systems list connected to CFDIU, in ATA order
- Only on ground
- Dialog between CFDS and each of the systems connected to the CFDS
- Type 1, 2 & 3 systems available

The SYSTEM REPORT/TEST function is available on the ground only. It enables a dialogue between the CFDS and one system computer. The SYSTEM REPORT/TEST menu page presents the list of all the systems connected to the CFDIU, in ATA chapter order. An example of each system type is available:

- in Landing Gear (L/G) for type 1 systems,
- in Air Conditioning (AIRCOND) for type 2 systems,
- in Electrical (ELEC) for type 3 systems.

SYSTEM REPORT/TEST-BSCU A (Type 1 system)
-Type 1: majority of A/C systems
- Menu depending on system itself
- Direct dialogue with system
- 3 basic functions
- Optional functions

Type 1 systems are the most common systems. The menu they present depends on the system itself. In the MENU mode, the menu is transmitted by the system itself. You talk directly with the system. The menu includes three basic functions:

- the LAST LEG REPORT,
- the PREVIOUS LEGS REPORT,
- the LRU IDENTIFICATION,

and optional functions, depending on the system for example:
- TROUBLE SHOOTING DATA,
- CLASS 3 FAULTS,
- TEST,
- GROUND SCANNING.

LAST LEG REPORT

- Last flight internal and external fault messages
- Failed LRU name
- Time and ATA reference

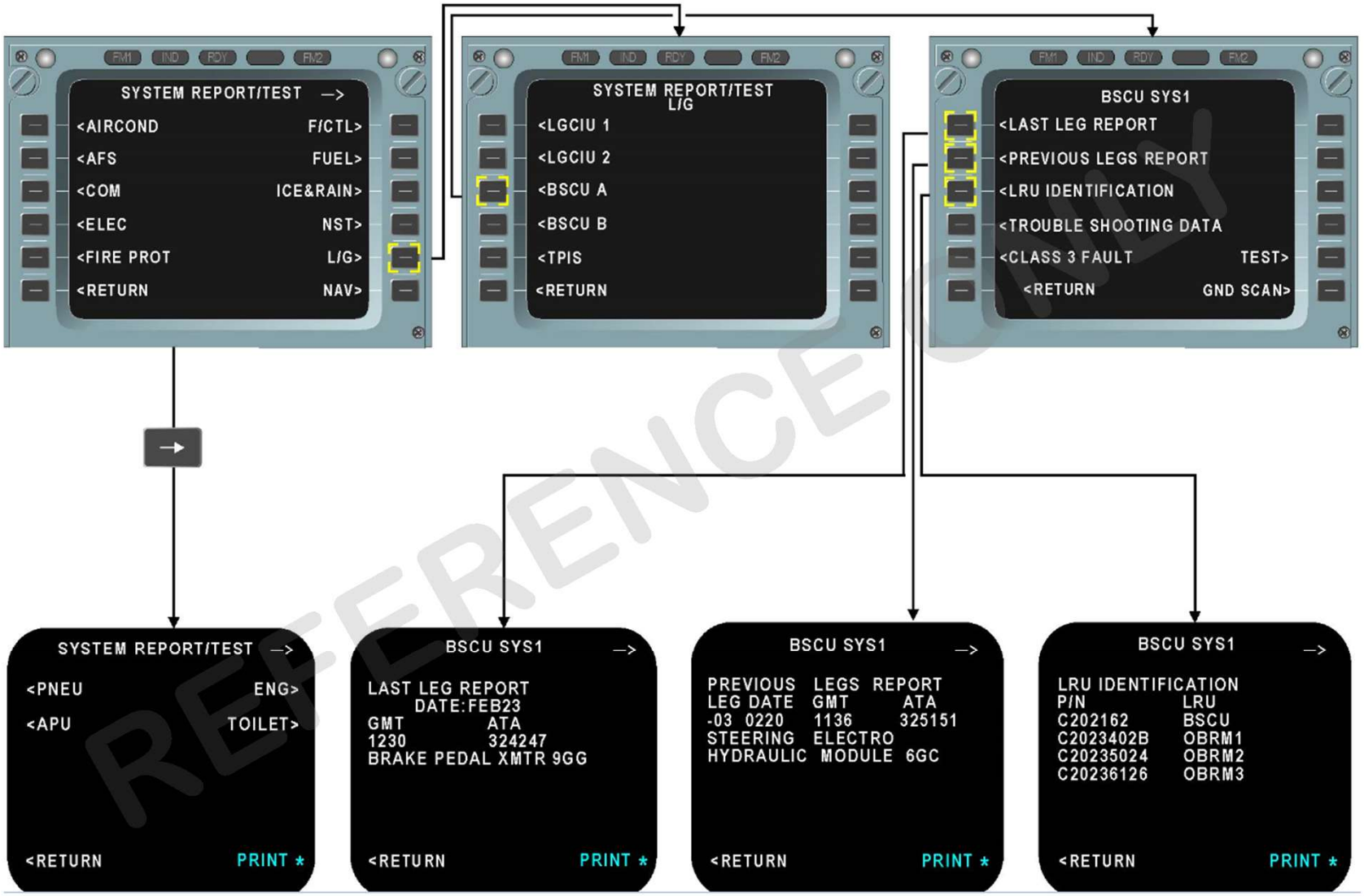
This function presents the internal and external failure messages concerning this system that appeared during the last flight. These failure messages contain the name of the failed Line Replaceable Unit (LRU) associated with the time at which the failure occurred and the ATA reference.

PREVIOUS LEGS REPORT
- Previous 64 flights internal and external failures
- Failed LRU name
- Time, date, flight number and ATA reference

This function presents the internal and external failure messages concerning this system that appeared during the previous 64 flights. The failure messages contain the name of the failed LRU associated with the time and date at which the failure occurred, the flight number (-00 to -63) and the ATA reference.

LRU IDENTIFICATION
- LRUs P/N

This function presents the Part Number (PN) of the LRUs.



TROUBLE SHOOTING DATA

- Fault complementary information
- Use for Trouble Shooting level 3 (engineering maintenance)
- System environment snapshot
- Computer internal parameters (A/C config...)
- Hexadecimal language on MCDU
- TSM allows message interpretation

This item presents complementary information concerning the failures for trouble shooting at level 3 (engineering maintenance). These messages contain data constituting a snapshot of the system environment at the moment of the failure or contain parameters internal to the computer (Aircraft configuration, valve positions,...). This information is presented on MCDU in hexadecimal language. When required, the Trouble Shooting Manual (TSM) gives the interpretation of the message.

CLASS 3 faults

- Class 3 failure messages
- Previous flights messages
- Equipment name
- Time, date, flight number and ATA.

This item presents class 3 failure messages concerning this system that appeared during previous flights. These failure messages contain the name of the equipment affected by a class 3 fault associated with the time, the date, the flight number and the ATA reference.

TEST

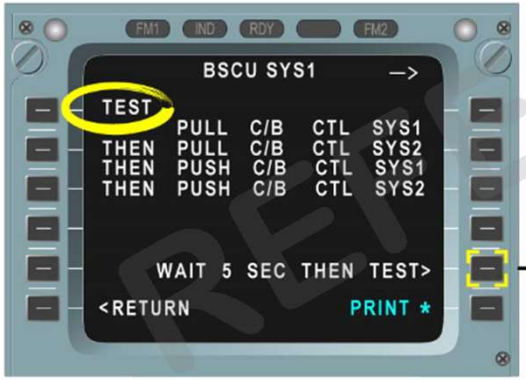
- System test initiation on MCDU
- Test results display on MCDU
- MCDU "Wait" message: long time test
- Operation managed by CFDIU

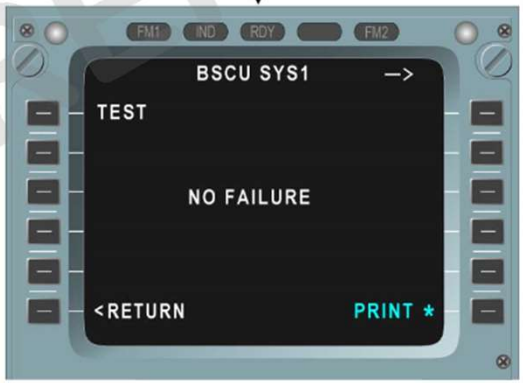
This item initiates system tests and shows the test results on the MCDU. The CFDIU transmits the code of the line key (TEST) to the system. The system BITE executes its test and may display a wait message to the CFDIU when the test lasts for a long time. At the end of the test, the BITE transmits the test results to the CFDIU for display.

GROUND SCANNING

- Internal and external failures
- On request
- Only on ground
- BITE forcing operation

This item presents the internal and external failures concerning this system and which are present when the request is made (on ground only). This report is established by forcing the operation of the BITE in system normal mode (same BITE operation as in flight).





SYSTEM REPORT/TEST-AEVC (Type 2 system)
- No MENU mode but PSEUDO-MENU mode
- No direct dialogue with system
- CFDIU reads permanently data from the system bus (except TEST)
- 1 basic function: LAST LEG REPORT
- Optional functions: TEST, CLASS 3 FAULTS

Type 2 systems present a menu with one basic function, the LAST LEG REPORT and optional functions depending on the system. Unlike Type 1 systems, Type 2 systems do not have a Menu Mode. These functions are presented on the MCDU by the CFDIU: you are in PSEUDO-MENU mode. You do not talk directly to the system. The system permanently transmits its data on the system bus, and the CFDIU reads them, except for the test. The menu includes one basic function:
- the LAST LEG REPORT,

and optional functions depending on the system, for example here
- TEST,
- CLASS 3 FAULTS.

SYSTEM REPORT/TEST-GCU EMER (Type 3 system)
- No MENU mode
- Functions displayed by CFDIU
- Only TEST or RESET
- Result display on MCDU

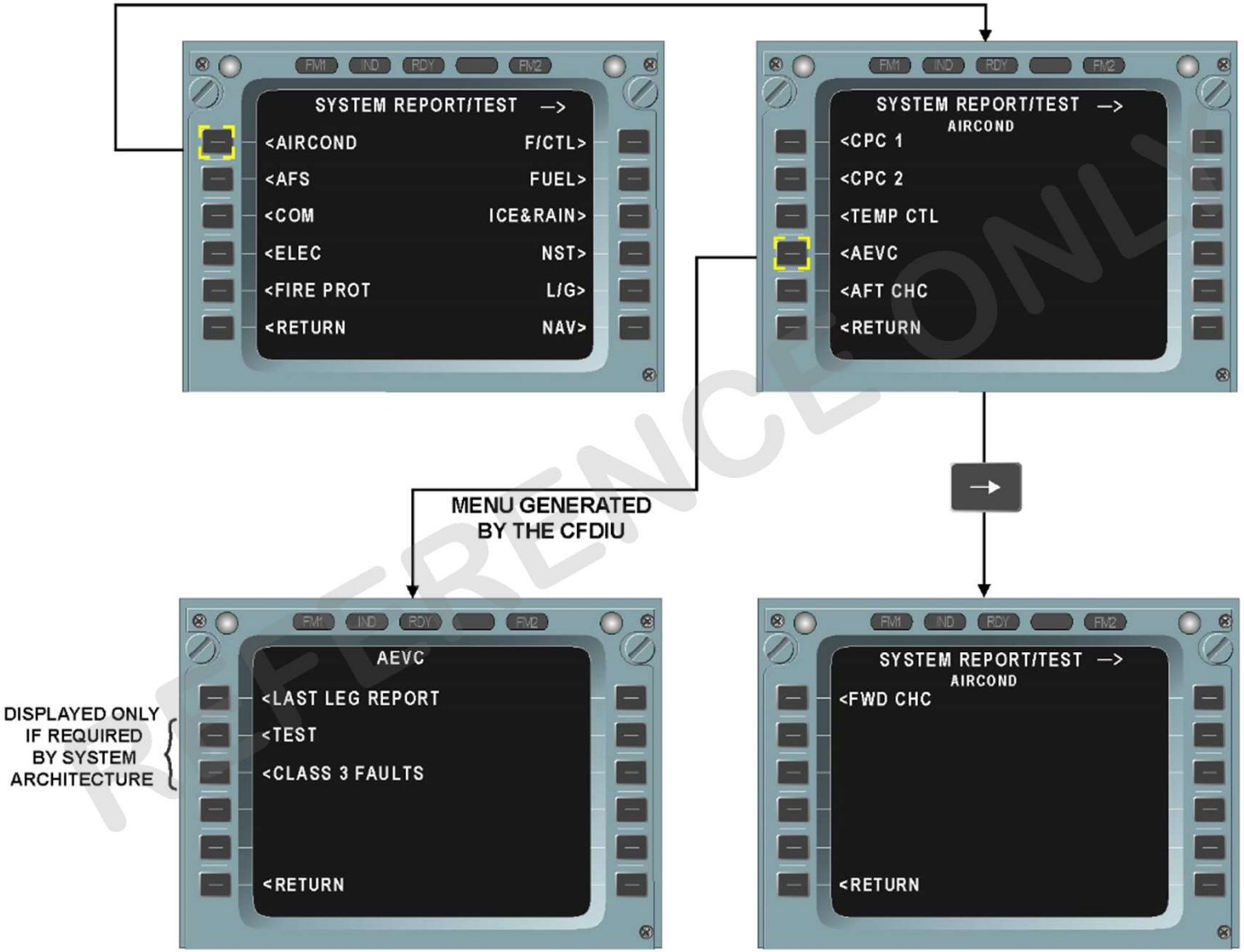
Type 3 systems present only one function on their menu. Type 3 systems have no MENU mode. The available functions are shown by the CFDIU. The only possible functions are TEST or RESET. When you make a test or a reset, the CFDIU initiates the test or the reset, receives the result and shows it on the MCDU.

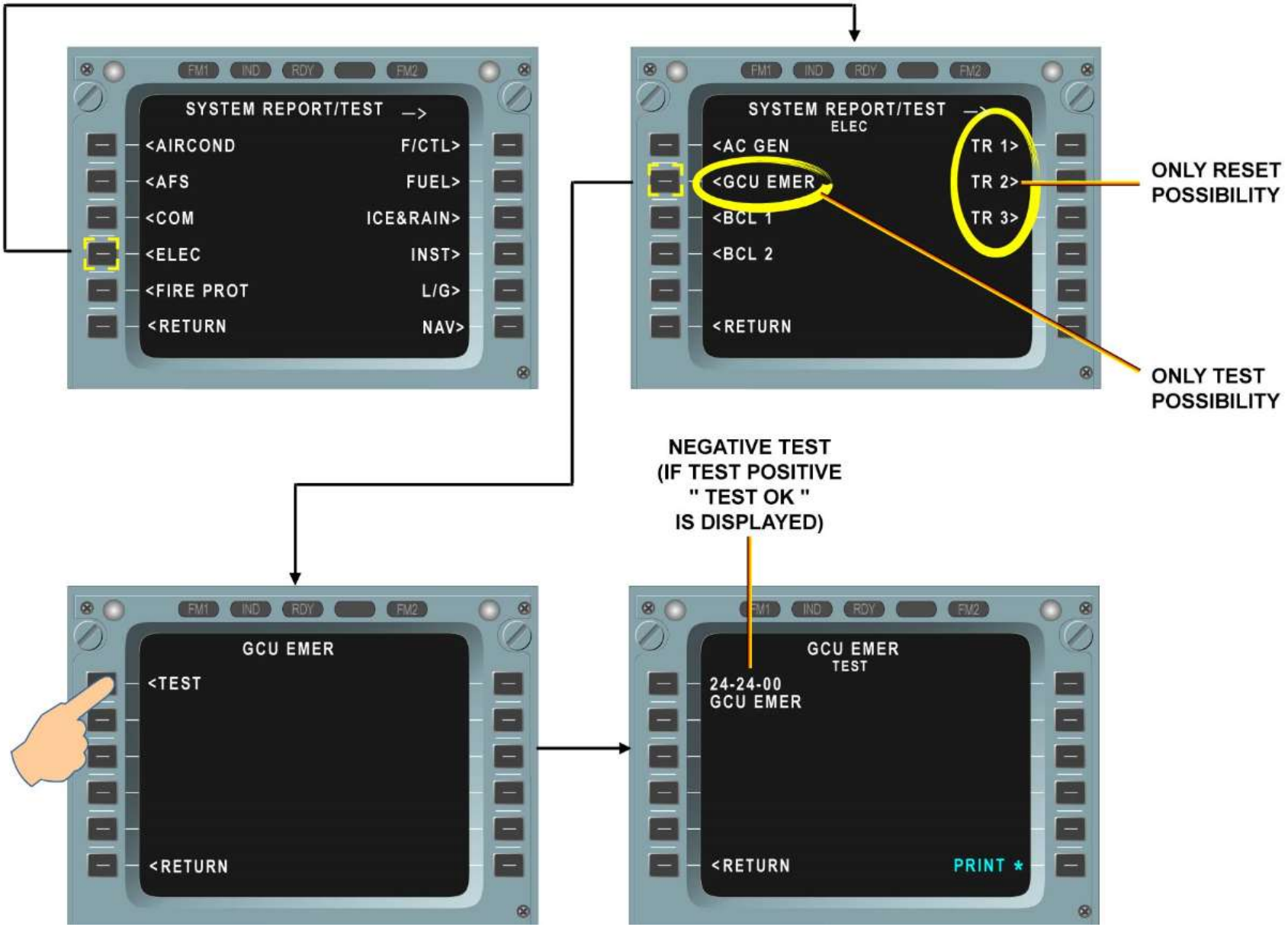
POST FLIGHT REPORT
- LAST LEG REPORT + LAST LEG ECAM REPORT
- Only available on printer
- ECAM WARNINGS = LAST LEG ECAM REPORT
- FAULT MESSAGES = LAST LEG REPORT

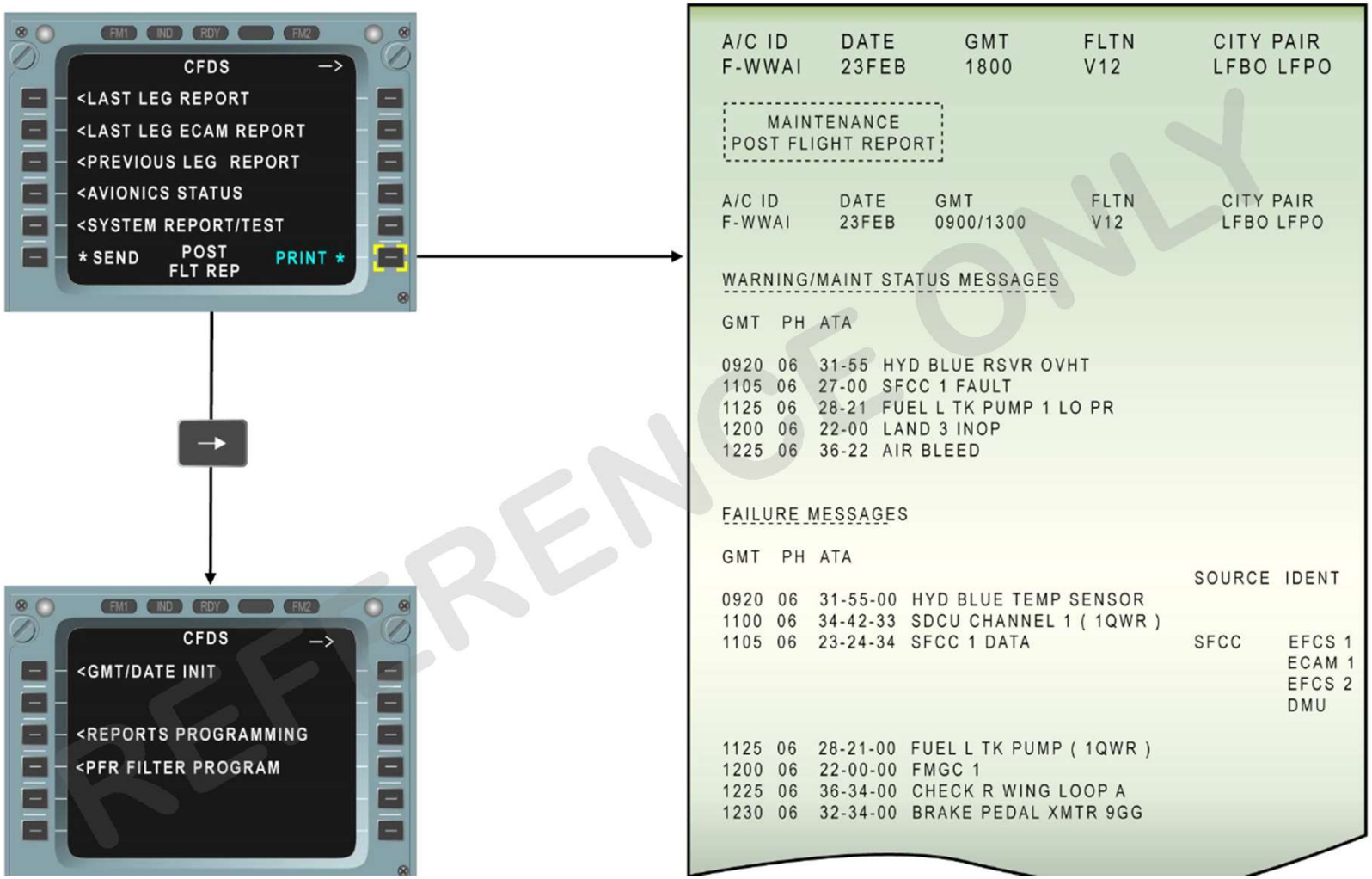
The POST FLIGHT REPORT (PFR) is the sum of the LAST LEG REPORT and of the LAST LEG ECAM REPORT. It is only available on the printer. ECAM WARNING MESSAGES show/give the LAST LEG ECAM REPORT. FAULT MESSAGES show/give the LAST LEG REPORT.

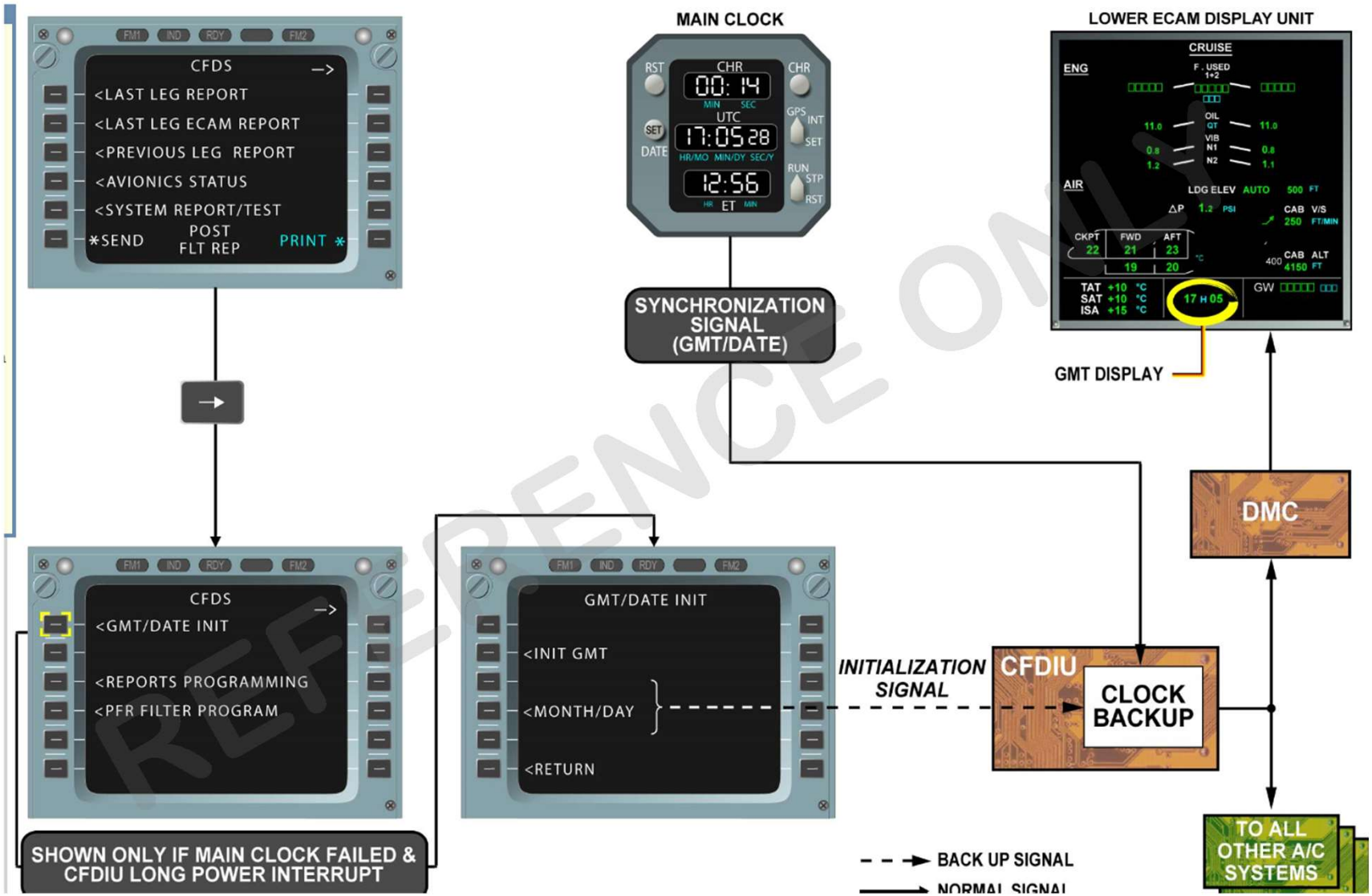
GMT/DATE INIT
- Available if clock failed + long power interrupt
- Normal operation: Clock transmit time to CFDIU
- Clock failure: CFDIU internal clock transmit time
- Time/date re initialization after power cut-off

The GMT/DATE INIT function is available only in case of clock failure and CFDIU power interrupt. In normal operation, the CFDIU receives the time from the clock. In the event of main clock failure, the CFDIU transmits the time and the date using its internal clock. The CFDIU shows the time on the ECAM Display Unit (DU). Re initialization of the time and the date will be only necessary after a power cut-off. It shall be carried out on MCDU through the GMT/DATE INIT function. GMT and date are entered by using the scratchpad.




FM1 IND RDY FM2
SYSTEM REPORT/TEST —>
<AIRCOND
<AFS
<COM
<ELEC
<FIRE PROT
<RETURN
F/CTL>
FUEL>
ICE&RAIN>
INST>
L/G>
NAV>
SYSTEM REPORT/TEST —>
ELEC
<AC GEN
<GCU EMER
<BCL 1
<BCL 2
<RETURN
TR 1>
TR 2>
TR 3>
ONLY RESET POSSIBILITY
ONLY TEST POSSIBILITY
NEGATIVE TEST (IF TEST POSITIVE " TEST OK " IS DISPLAYED)
GCU EMER
<TEST
<RETURN
GCU EMER
TEST
24-24-00
GCU EMER
<RETURN
PRINT *





REPORTS PROGRAMMING

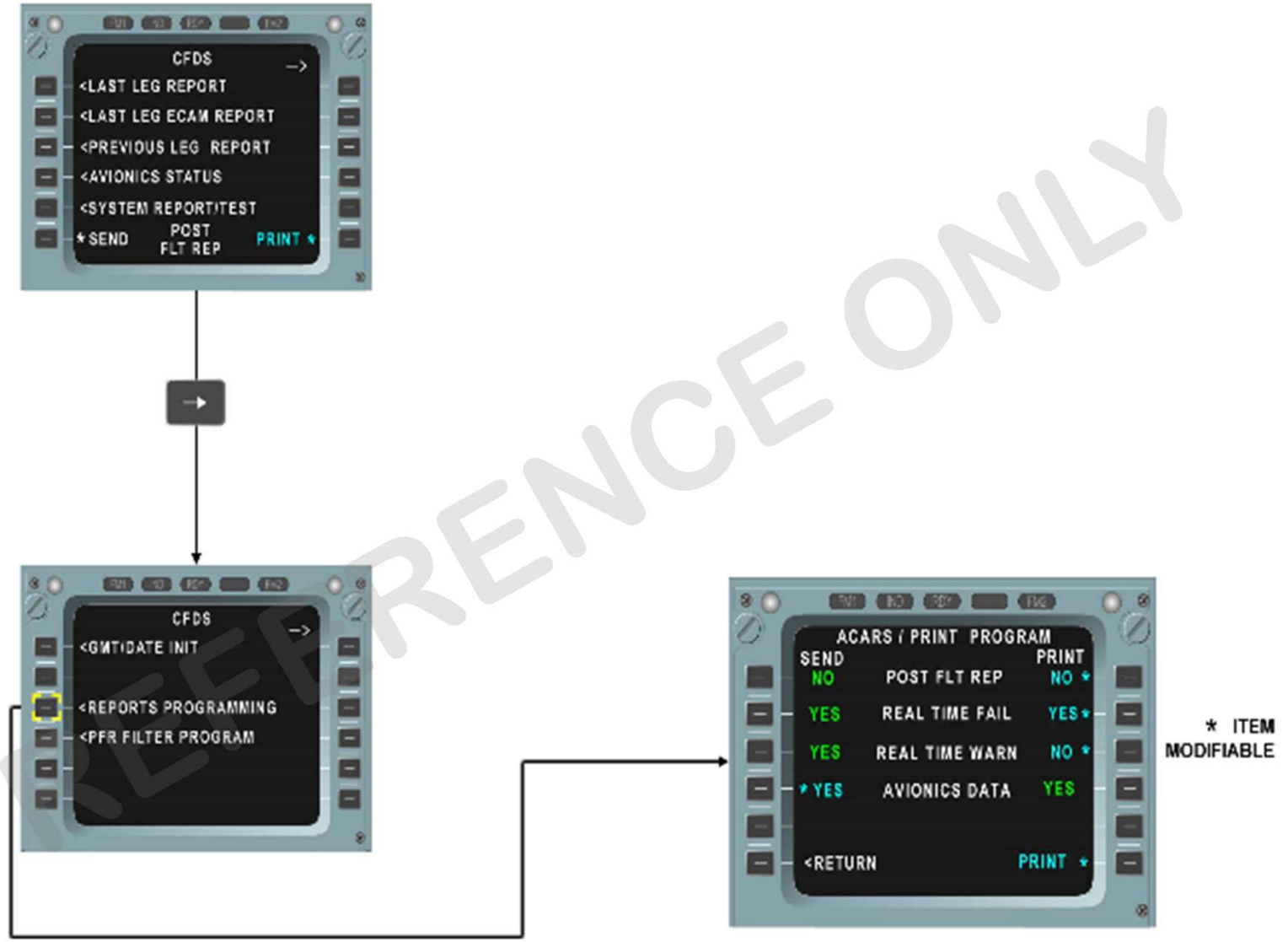
20 Automatic transmission (ATSU) or printing:
- PFR
- Real time failure
- Real time warnings
- Avionics data

"YES": automatic transmission or printing

AVIONICS DATA "YES": Page sent to ground on request
*: Items modifiable

ATSU: allows SEND column programming
System itself: allows avionics data print programming
This item sends the automatic transmission, via the Air Traffic Service Unit (ATSU), or printing of the following functions:
- PFR,
- real time failures,
- real time warnings and,
- avionics data.

If "YES" is selected for the send and print columns, the CFDIU will automatically transmit or print the PFR at the end of the flight or the failures and warnings in real time. For avionics data, "YES" in the send column, means that the system pages will be sent to the ground when the operator requests a print. A star beside "YES" or "NO" means that these items are modifiable. The programming of the send column is given by the ATSU and the programming of the print control for the avionics data is given by the system itself.



PFR FILTER PROGRAM

-Improve REPORTS operational use
- Spurious or unjustified failures/messages filtering

The purpose of this function is to improve the operational use of the PFR, CURRENT/LAST LEG ECAM REPORT and LAST LEG REPORT, by filtering all the spurious or unjustified failures/messages. It concerns the PFR printed at the end of the flight as well as the real-time failure and warning information transmitted by the ATSU.

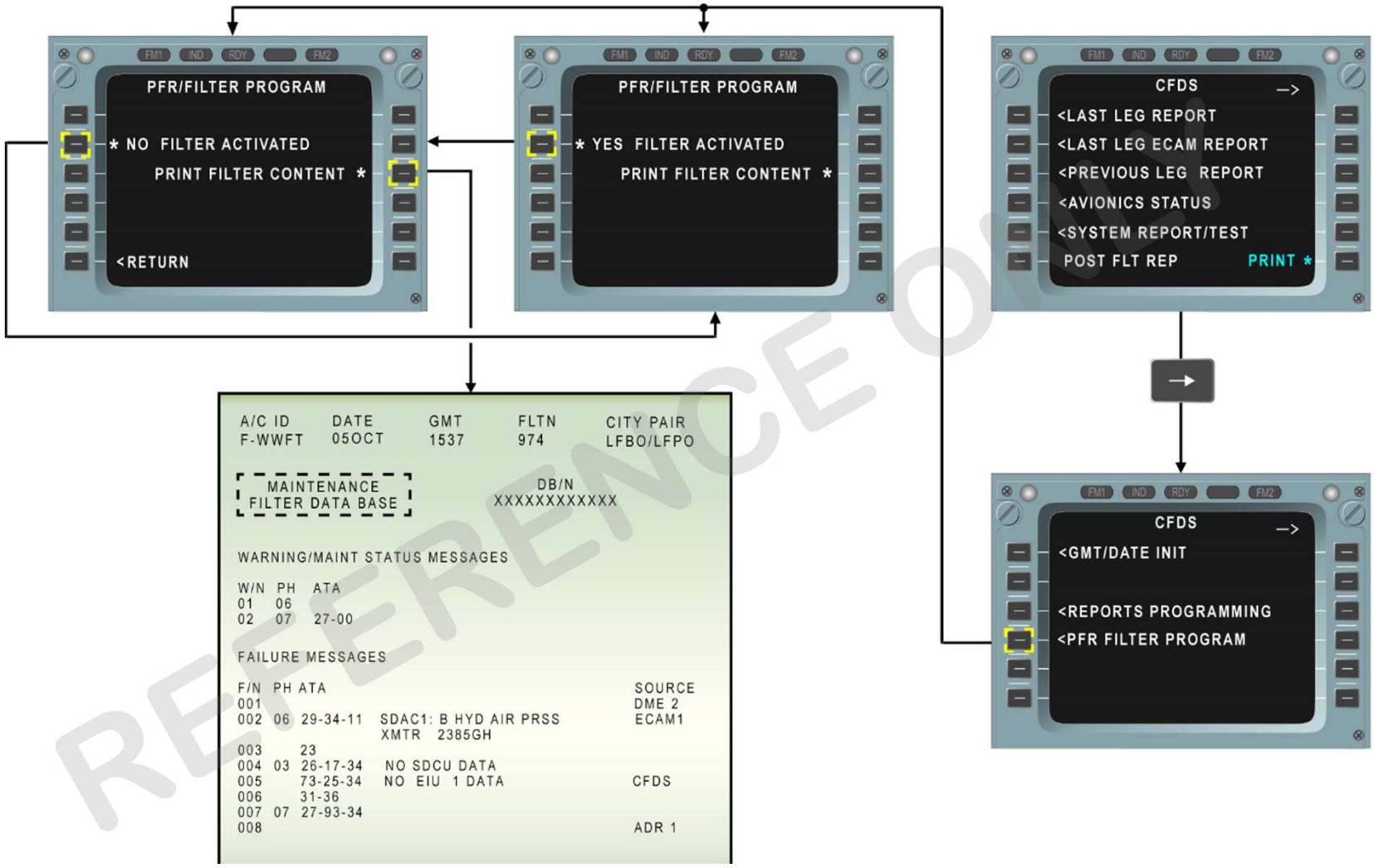
FILTER ACTIVATED

- Activated after correct uploading
- Line key 4L then 2L of maintenance menu
- DB customized from SIL 0028
- Periodically updated

The filter database is activated after correct uploading. It can be deactivated then activated again through the second page of the main maintenance menu by pushing line key 4L then 2L. This database is adapted from Service Information Letter (SIL) 0028 under diskette form. It must be periodically updated.

PRINT FILTER CONTENT

- Line key 3R: Print maintenance Filter DB
- Action on line key 3R starts the printing of the maintenance filter database.




CFDS Phases
REFERENCE ONLY

GROUND/FLIGHT TRANSITION
-Event 1: At the soonest or latest
- Depend on flight number entered before TO or not
- At the soonest: First engine start + 3 min
- At the latest: A/C speed > 80 knots
- At event 1: Leg number incremented

Transition to flight (Event 1) is defined at the soonest or at the latest depending on whether the flight number has been entered by the crew before take-off or not:

- at the soonest: First engine start + 3 minutes if flight number entered prior to first engine start.
- at the latest: Aircraft speed > 80 knots if flight number not entered prior to first engine start.

At event "1", the leg number is incremented.

IN FLIGHT PHASE
- Type 1 & 3: Event 1 up to A/C speed < 80 knots + 150s
- Type 2: From lift off + 30 s to touch down
- BITE: Detection and memorization (except Type 3)
- BITE: Internal/External faults transmission to CFDIU
- CFDIU: CURRENT LEG REPORT establishment
- PFR recording time

From event 1 until aircraft speed has been below 80 knots for 150 seconds, type 1 and 3 systems are considered in flight.
NOTE: Type 2 systems are only considered in flight from 30 seconds after lift off up to touch down.
In flight, the system Built-In Test Equipment (BITE) ensures:
- detection (Type 1/2/3 systems) and memorization in their flight memory (Type 1/2 systems only as type 3 system BITEs do not have any memory) of internal and external faults,
- transmission to the Centralized Fault Display Interface Unit (CFDIU) of internal and external faults for memorization and establishment of the CURRENT LEG REPORT.
This in flight phase corresponds to the Post Flight Report (PFR) recording time (Beginning and end of fault and Electronic Centralized Aircraft Monitoring (ECAM) warning message memorization in the CFDIU).

FLIGHT/GROUND TRANSITION
- A/C speed < 80 knots + 150 s
- CURRENT → LAST (PREVIOUS) LEG(S) REPORT

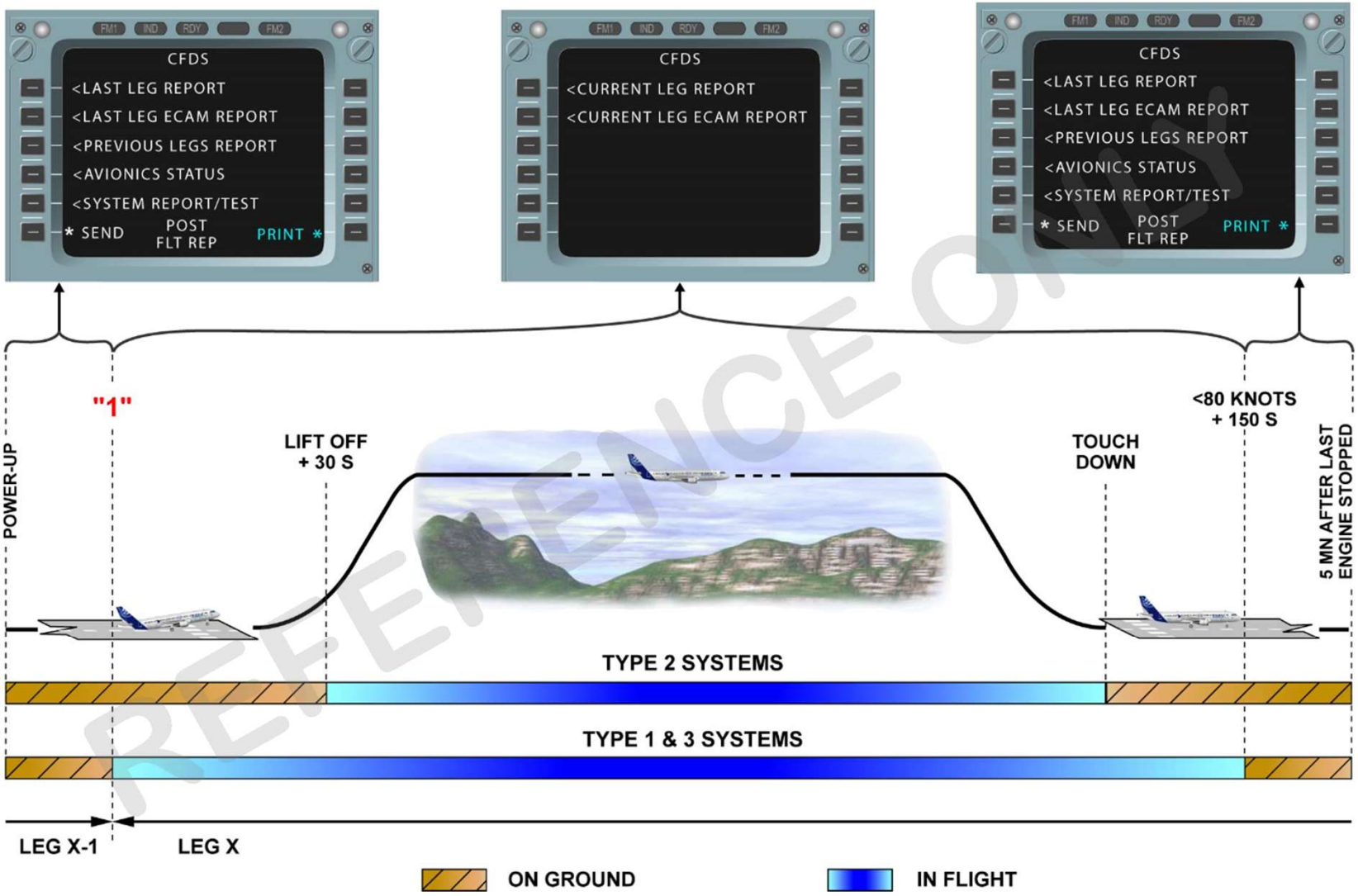
Transition to ground occurs when, after touch down, the aircraft speed has been below 80 knots for 150 seconds. At this time, the CURRENT LEG REPORT is renamed under the title LAST LEG REPORT and is stored in the PREVIOUS LEGS REPORT.

NOTE: As the leg has not changed, the content of the LAST LEG REPORT is identified in the PREVIOUS LEGS REPORT under the LEG -00.

ON GROUND PHASE
- BITE: Detection and memorization (except Type 3)
- BITE: Only internal faults transmission to CFDIU
- CFDIU: AVIONICS STATUS establishment
- All CFDS functions available on MCDU

On ground, the system BITEs ensure:
- detection (Type 1/2/3 systems) and memorization in their ground memory (Type 1/2 systems) of internal faults only,
- transmission to the CFDIU of internal faults for monitoring and establishment of the AVIONICS STATUS.

All Centralized Fault Display System (CFDS) functions (e.g. PFR printing) are available on request through the MCDUs.



CFDIU Functions

CFDIU MAIN FUNCTIONS

MEMORY
- CFDIU stores in NVM:
  - Failure messages
  - ECAM warning messages

The Centralized Fault Display Interface Unit (CFDIU) stores the failure messages and the Electronic Centralized Aircraft Monitoring (ECAM) warning messages in a Non Volatile Memory (NVM).

MANAGEMENT
- Failure information
- GMT, Date, ATA, LEG, Flight Phase
- Reports elaboration

The CFDIU manages failure information and adds data such as Universal Time Coordinated (UTC), DATE, ATA chapter, LEG, FLIGHT PHASE to elaborate reports.

CORRELATION
- CFDIU isolates or ignores malfunctions
- I.e.: "ADC FAILURE" causes "NO DATA FROM ADC"
- Last leg report: Only initial failure
- "IDENT" function

If a computer internal failure is detected, the CFDIU achieves a correlation function that means it isolates or ignores the malfunctions of systems relating to this failure. Example: ADC FAILURE causes NO DATA FROM ADC in other computers. The Centralized Fault Display System (CFDS) will present only the initial failure in the last leg report. The function IDENT will then present the systems affected by this failure.

MONITORING
- Scan input buses to detect transmitted failure
- Detect intermittent operation (INTM)

The CFDIU scans permanently all input buses in order to detect a transmitted failure message. The CFDIU detects intermittent operation of the systems and adds INTM to the failure message.

DETECTION
-Detect failure nature:
- Internal
- External
- Intermittent
- Class 3

The CFDIU can detect the nature of the failure by reading the ARINC words. Nature of failures:
- internal (i.e. SDAC FAULT)
- external (i.e. FWC 1: NO DATA FROM ADIRU1)
- intermittent; (INTM) added
- class 3; (CLASS 3) added.

INTERFACES

CLOCK
CFDIU sends GMT and date from clock to all type 1systems
CFDIU and BITEs use GMT and date for reports
The CFDIU permanently receives the UTC and the date from the aircraft clock and then sends these two parameters to all type 1 systems. The UTC and date are used by the system Built-in Test Equipments (BITEs) as well as the CFDIU for the various maintenance reports.

FAC
- CFDIU receives flight number and city pair
- City pair sent to ATSU and DMU part of FDIMU
- CFDIU counts number of identical ECAM warnings

The CFDIU receives the flight number and city pair from the Flight Augmentation Computer (FAC). The city pair (FROM/TO airport) is sent to the Air Traffic Service Unit (ATSU) and to the Data Management Unit (DMU)-part of the Flight Data Interface and Management Unit (FDIMU). The CFDIU counts the number (maximum 8) of identical and consecutive ECAM warning messages and records in the LAST LEG ECAM REPORT.

FDIMU
- CFDIU sends A/C identification from FDIU part to all type 1 systems
- CFDIU sends FDIU class 2 failures to FWC

The CFDIU receives the aircraft identification from the Flight Data Interface Unit (FDIU)-part of the FDIMU and sends this parameter to all type 1 systems. The CFDIU is used as an interface between the FDIU part and the Flight Warning Computer (FWC) to send some FDIU class 2 failures to the FWC in order to constitute the maintenance status.

- CFDIU sends DMU class 2 failures to FWC
- DMU class 2 used for maintenance status on ECAM

The CFDIU is used as an interface between the DMU-part of the FDIMU and the FWC to send some DMU class 2 failures. DMU class 2 failures are used for the maintenance status on the ECAM.

FWC
- CFDIU receives flight phases and ECAM warnings
- ECAM warnings used for LAST/CURRENT ECAM REPORT
- Only PRIMARY, INDEPENDENT and CLASS 2 failures received

The CFDIU receives the flight phases and ECAM warnings from the FWC. The ECAM warnings are used by the CFDIU to generate the LAST or CURRENT LEG ECAM REPORT. Only PRIMARY failures, INDEPENDENT failures and CLASS 2 failure messages (Maintenance status) are received.

DMC
- CFDIU sends Engine Serial Number from DMC to EVMU
- The CFDIU receives the engine serial number from the Display Management

Computer (DMC) and sends this parameter to the Engine Vibration Monitoring Unit (EVMU).

ATSU
- ATSU receives city pair from FAC through CFDIU

CFDIU can send:
Real time failure to ATSU
PFR to ATSU

The ATSU receives the city pair from the FAC through the CFDIU. The CFDIU can send real time failures and ECAM warning messages to the ATSU. It can also send the Post Flight Report (PFR) to the ATSU at the end of the flight.

EVMU
Receives engine serial number from DMC through CFDIU
DMC receives engine serial number from:
ECU for CFM engines
EEC for IAE and PW engines

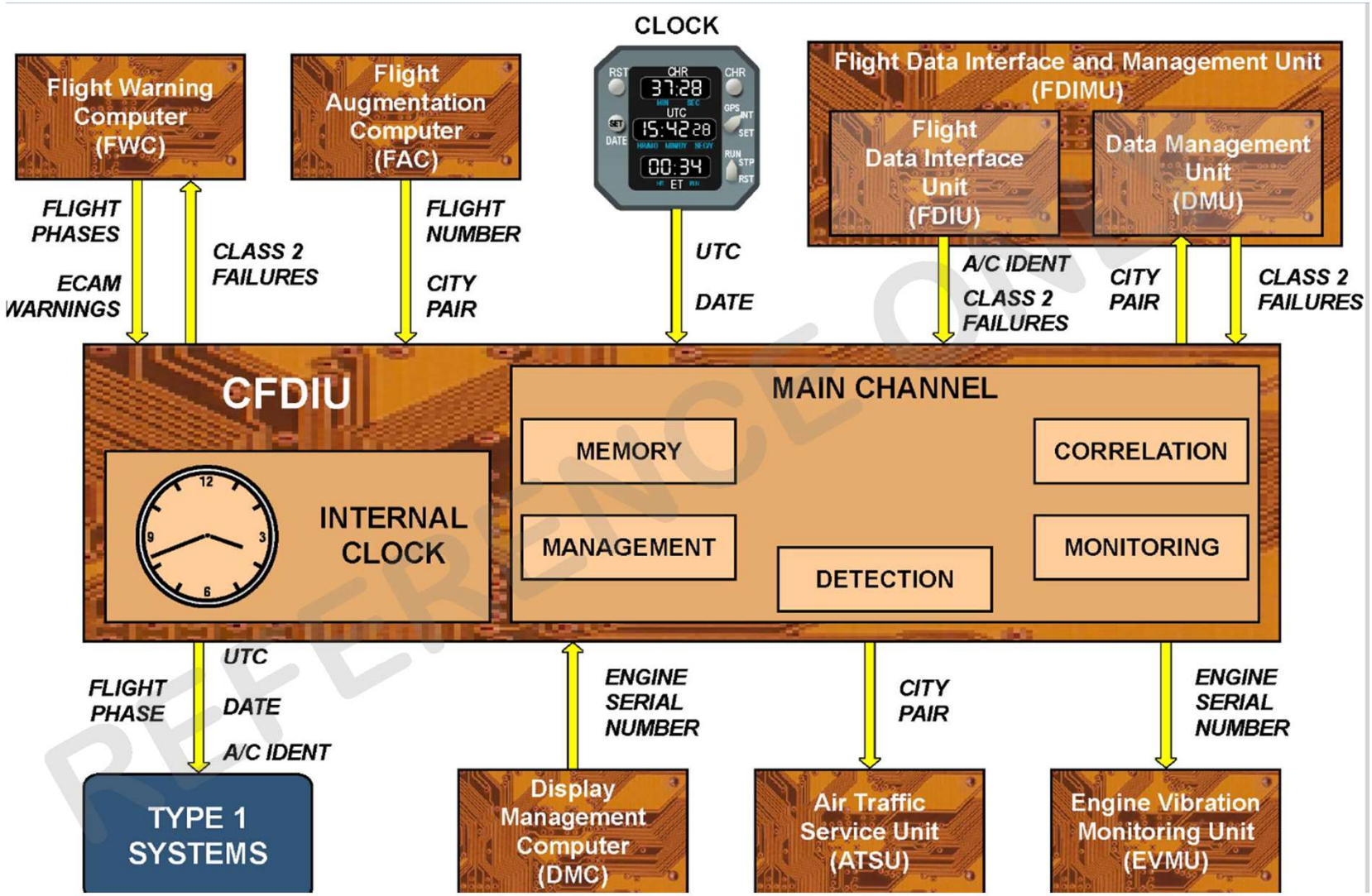
The EVMU receives the engine serial number from the DMC through the CFDIU. The DMC receives it from the Engine Control Unit (ECU) for CFM engines, or Electronic Engine Control (EEC) for IAE and PW engines.

ABNORMAL OPERATION
CLOCK BACKUP
- CFDIU internal clock takes over
- GMT/DATE INIT on CFDS menu enable initialization

If the aircraft clock fails, the CFDIU takes over and its internal clock sends UTC and date on the output bus to all type 1 systems. Upon power-on after A/C clock failure, the item GMT/DATE INIT is added to the CFDS menu. This option enables UTC and date initialization.

CFDIU FAILURE
- "CFDIU" message on ECAM MAINTENANCE STATUS

When the CFDIU is affected by an internal failure, the message CFDIU is displayed on the ECAM MAINTENANCE STATUS page.



Trouble Shooting Procedure with CFDS

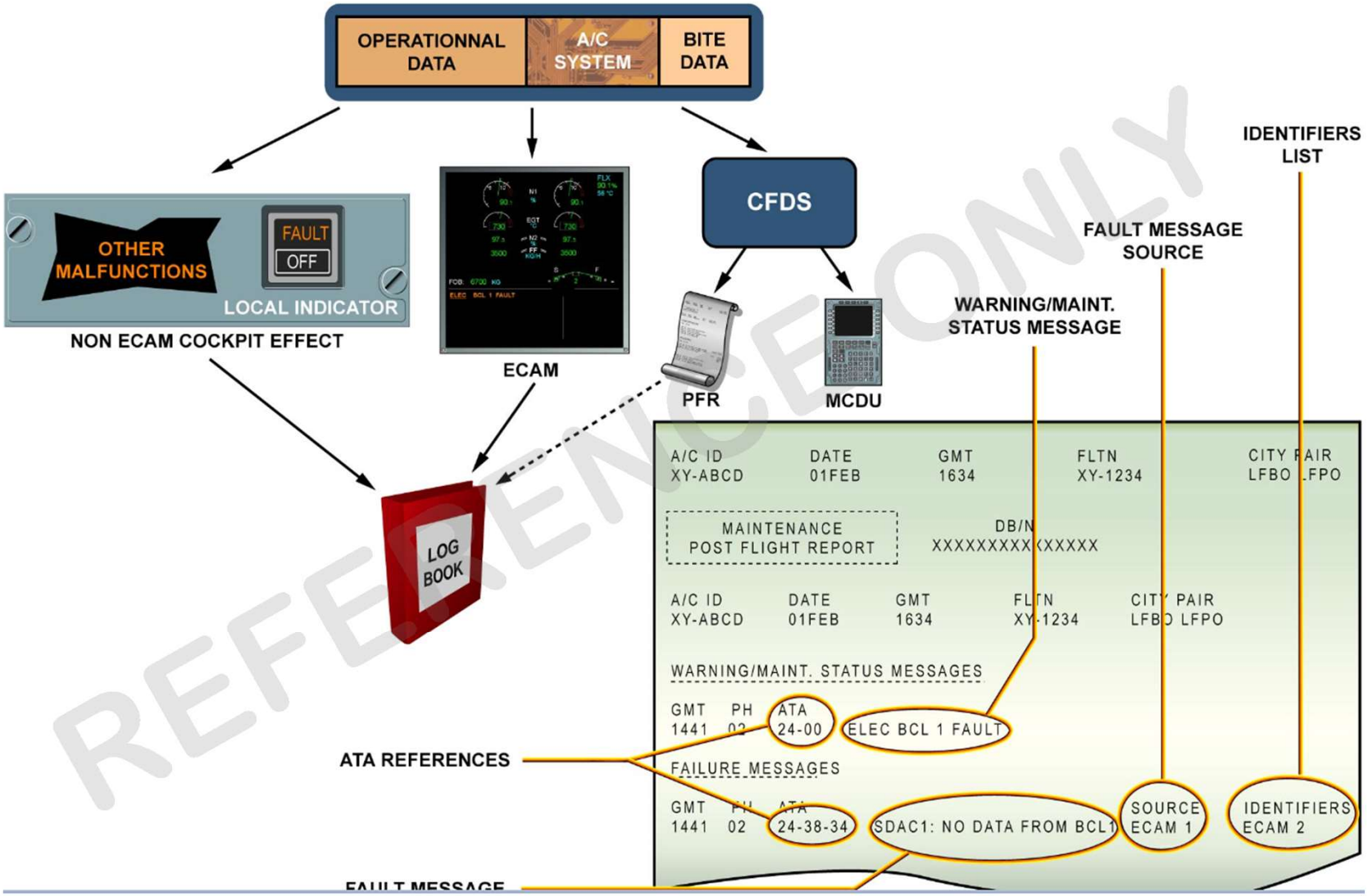
T/S PROCEDURE WITH CFDS

Logbook
Fault symptoms:
WARNING/MALFUNCTION + CFDS FAILURE message
WARNING/MALFUNCTION alone
CFDS FAULT message alone
After a malfunction, the crew reports the cockpit effect in the log book. The fault symptoms, relative to the cockpit effect, can be as follows:
- a WARNING/MALFUNCTION + Centralized Fault Display System (CFDS) FAILURE message (with possible associated warnings and system IDENTIFIERS).
- a WARNING/MALFUNCTION alone.
- a CFDS FAULT message alone.

PFR
For class 1 & 2 failure: give access to Airn@v faults list
Gives:
Warning/Maint status messages (if exist)
FAILURE message with source + ATA + IDENT list

If print not available: MCDU
SIL + maintenance knowledge = Specific data base creation
Load filter DB into MCDU, then activate it through MCDU

For the class 1 and 2 failures of CFDS monitored systems, the Post Flight Report (PFR) permits an access to the concerned list of faults in Airn@v. For this purpose, it gives the following information: WARNING/MAINT status messages (if it exists), FAILURE message with its SOURCE, ATA reference and IDENTIFIERS list. When the PFR print is not available, this information can be retrieved through the MCDU (in Normal mode or Menu mode). Service Information Letter (SIL) 00-028, made of "spurious maintenance messages", and the maintenance knowledge let the airlines create a specific data base to filter the messages to be displayed on the PFR. Once loaded into the Centralized Fault Display Interface Unit (CFDIU), this maintenance filter data base can be activated through the MCDU.



TROUBLE SHOOTING PROCESS

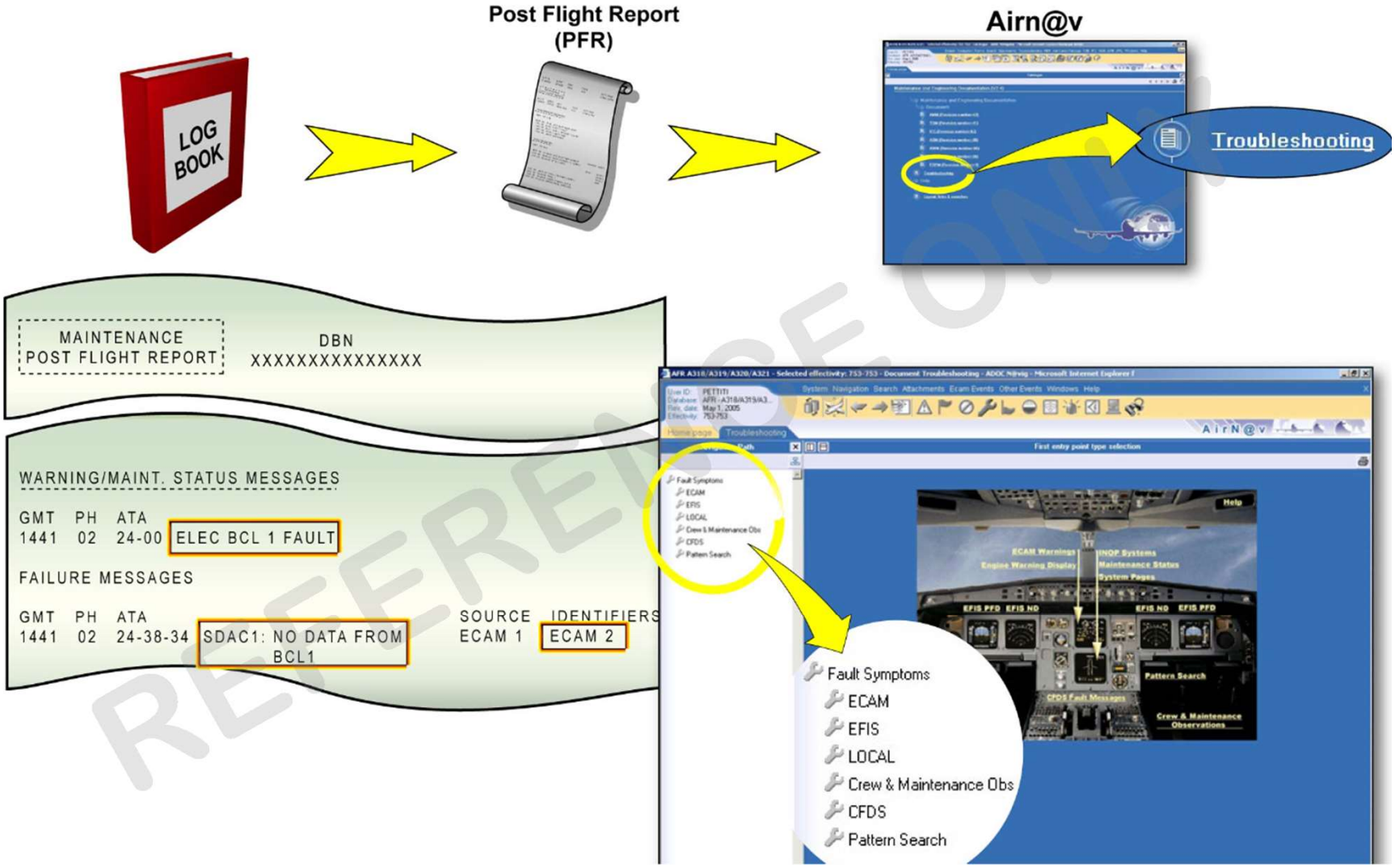
AIRN@V ENTRY

4 CFDS report: Direct access to Airn@v task numbers
TS documentation to get access to the fault symptoms:

- ECAM
- EFIS
- LOCAL
- Crew & Maintenance Observation
- CFDS

The CFDS report information gives a direct access to the fault isolation procedure task numbers through Airn@v. You have to select the Troubleshooting documentation to get access to the fault symptoms, which are the association of a warning/malfunction and/or CFDS fault message. The fault symptoms are divided into the five following sections:

- ECAM,
- Electronic Flight Instrument System (EFIS),
- LOCAL warning,
- Crew & Maintenance Observation and,
- CFDS.



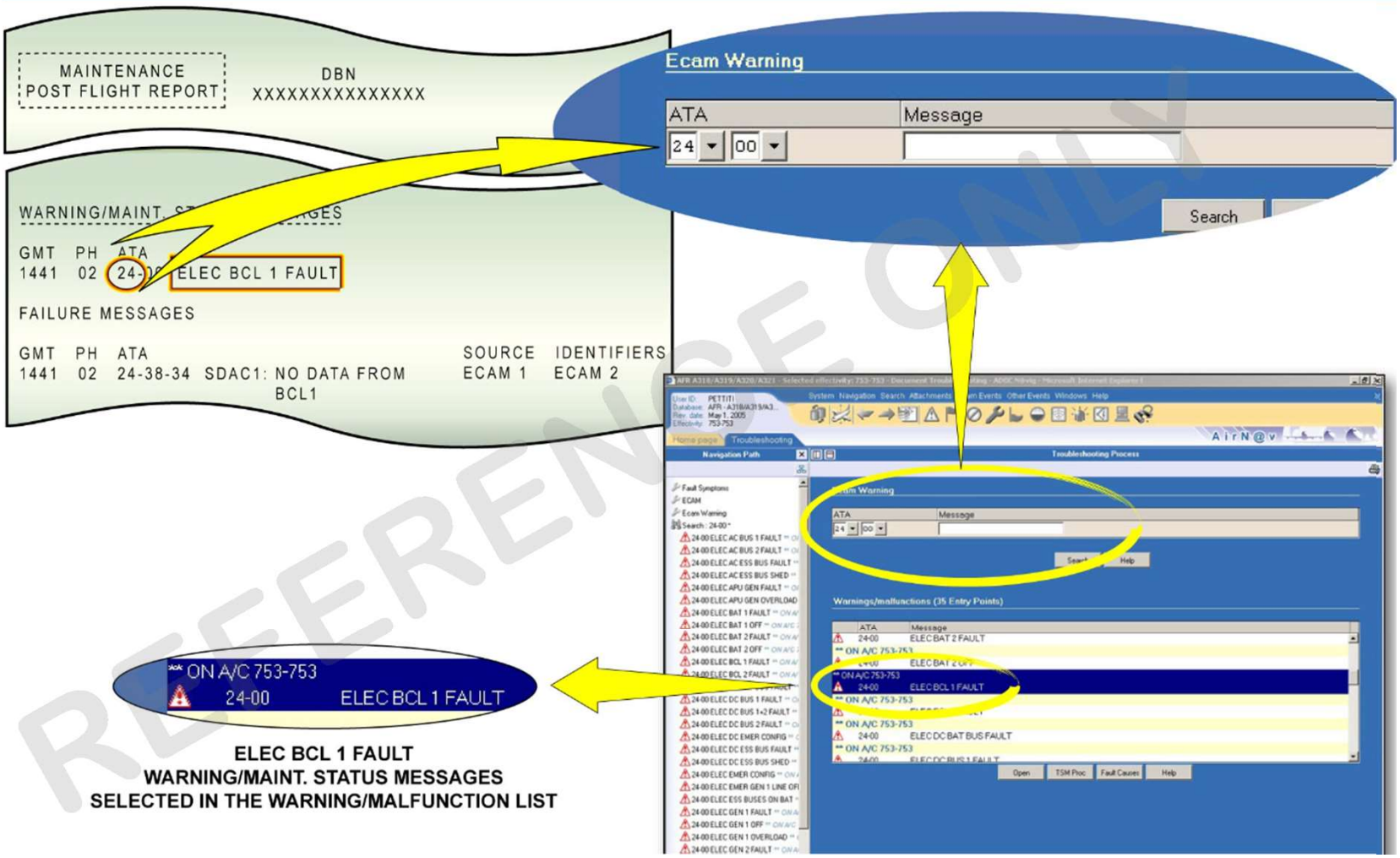
WARNING/MAINT. SELECTION

To find ELEC BCL 1 FAULT, which appears on PFR, enter:

The name in the Ecam Warning Message part or,
The ATA to have a list of warnings/malfunctions

To find the reported problem (ELEC BCL 1 FAULT in this example), you have to select ECAM Warning and enter the name of the WARNING/MAINT. STATUS MESSAGES, which appears on the PFR (or on the ECAM Display Unit). You can also enter the ATA chapter to have a list of Warnings/malfunctions, and then you select the related WARNING/MAINT status messages.

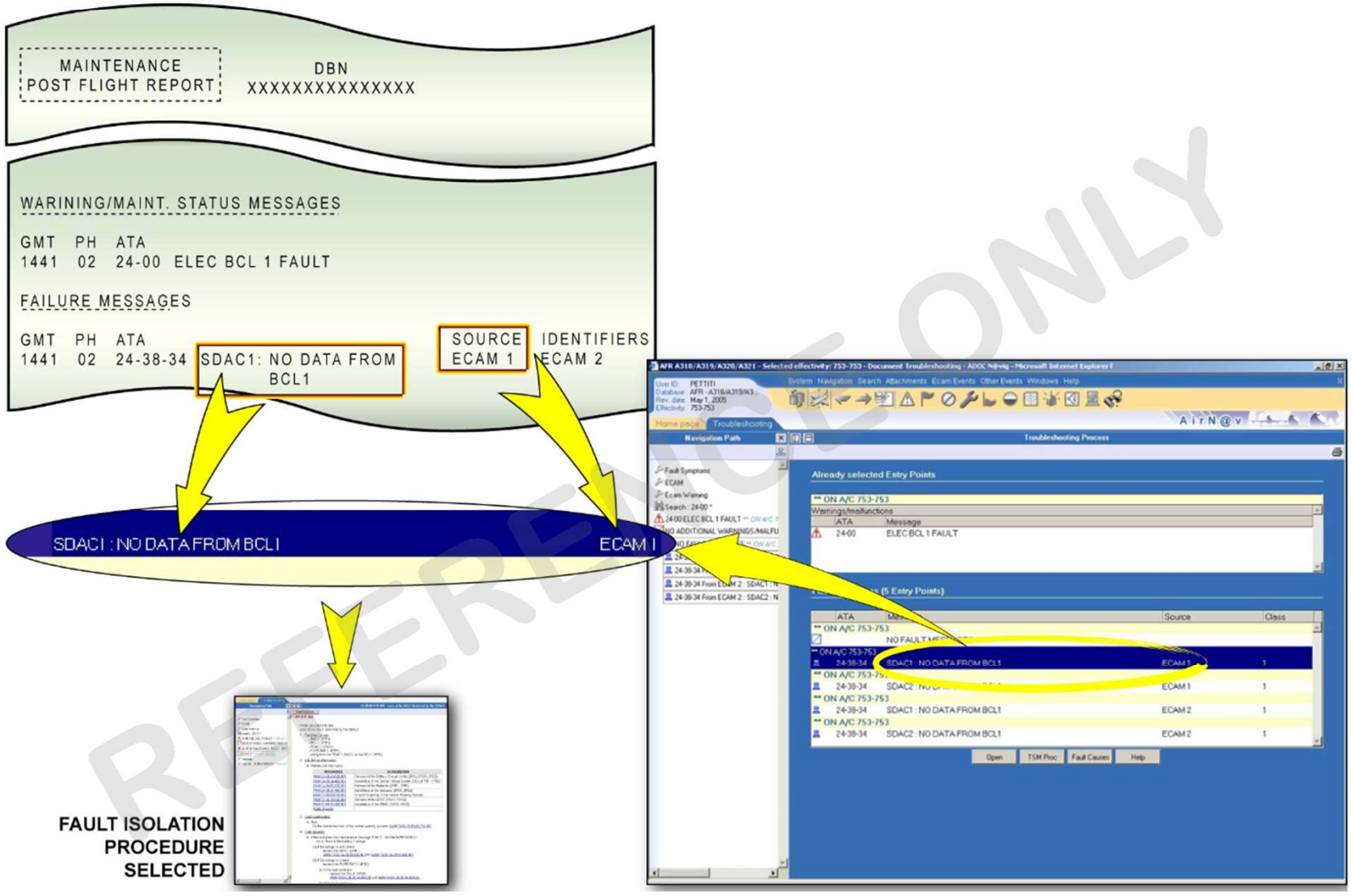
NOTE: If required, additional Warnings/malfunctions must be selected.



CORRELATION

Warning/malfunction + its correlated CFDS fault: Several fault isolation procedure
SOURCE items comparison between PFR & Airn@v CFDS messages list
Fault selected: Airn@v gives right access to fault isolation procedure

A Warning/malfunction with its correlated CFDS fault could have several associated fault isolation procedure tasks according to the systems, which have detected the fault. The PFR gives a SOURCE item, which must be compared with the SOURCE item of the CFDS Fault messages list in Airn@v. By selecting the appropriate fault message, the Airn@v system gives the right access to the fault isolation procedure.

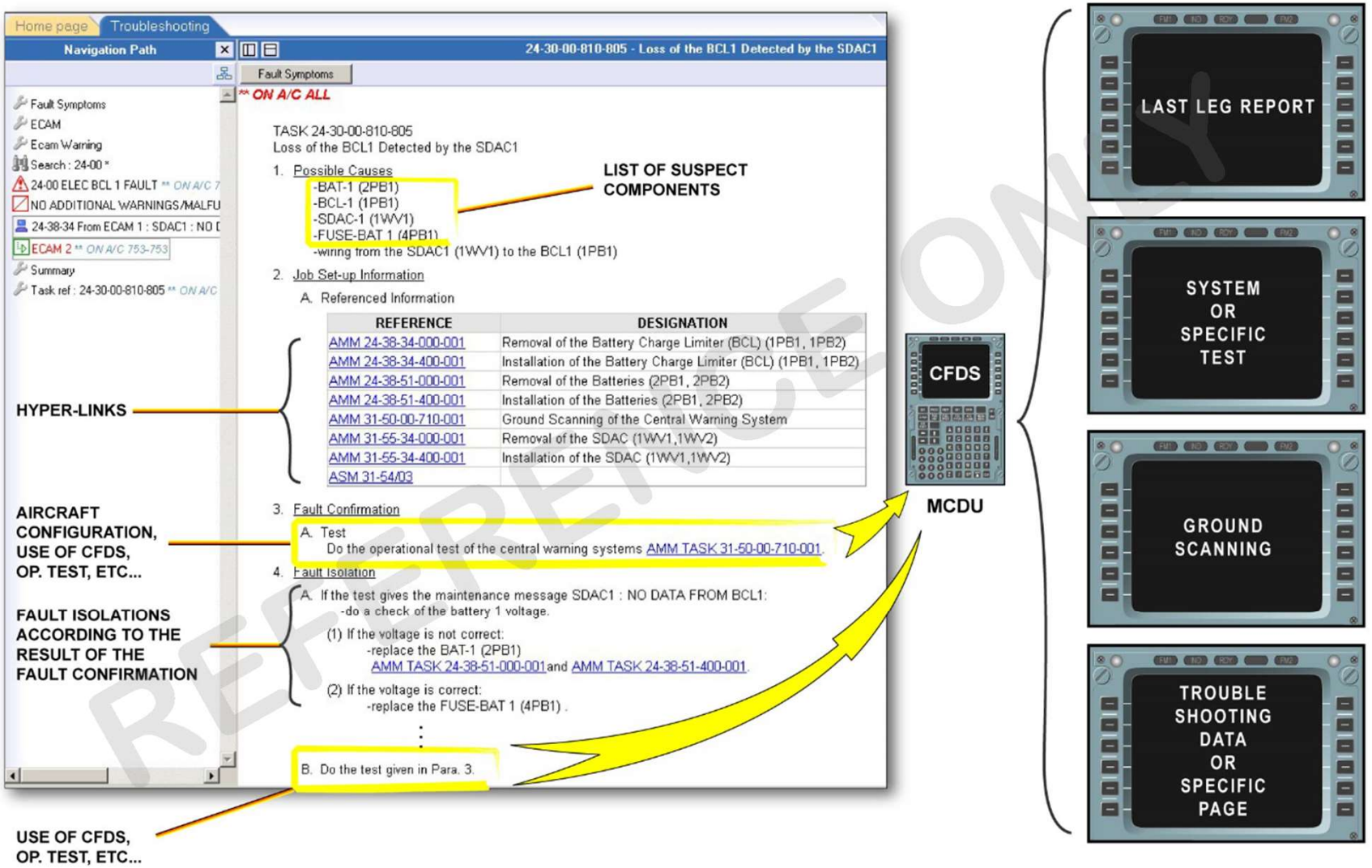


FAULT ISOLATION PROCEDURE

Consists of:

- Possible causes
- Fault confirmation (i.e.: operational or power-up test, GROUND SCANNING...)
- Fault isolation procedure (including LRU R/I, wiring check...)
- List of aircraft documentation references

The related fault isolation procedure task in Airn@v (task number 24-30-00-810-805) has a presentation of possible causes and the fault confirmation (for example by an operational test, power-up test or GROUND SCANNING). It also gives the fault isolation procedure including Line Replaceable Unit (LRU) removal/installation, wiring check, etc.... In addition, the procedure gives access to the useful aircraft documentation references knowing that all manuals contained in AirN@v are interconnected by hyperlinks, and all the schematics can be found and printed easily.




Post Flight Report
Filtering Function
REFERENCE ONLY
YELLOW
3000
PSI
PTU
RAT
ELEC
1
2
AUTO EXTING
RESET
1 FADEC GND PWR 2

PFR FILTERING F/C

PURPOSE
- Reduce spurious maintenance messages
- Keep only messages needing maintenance action

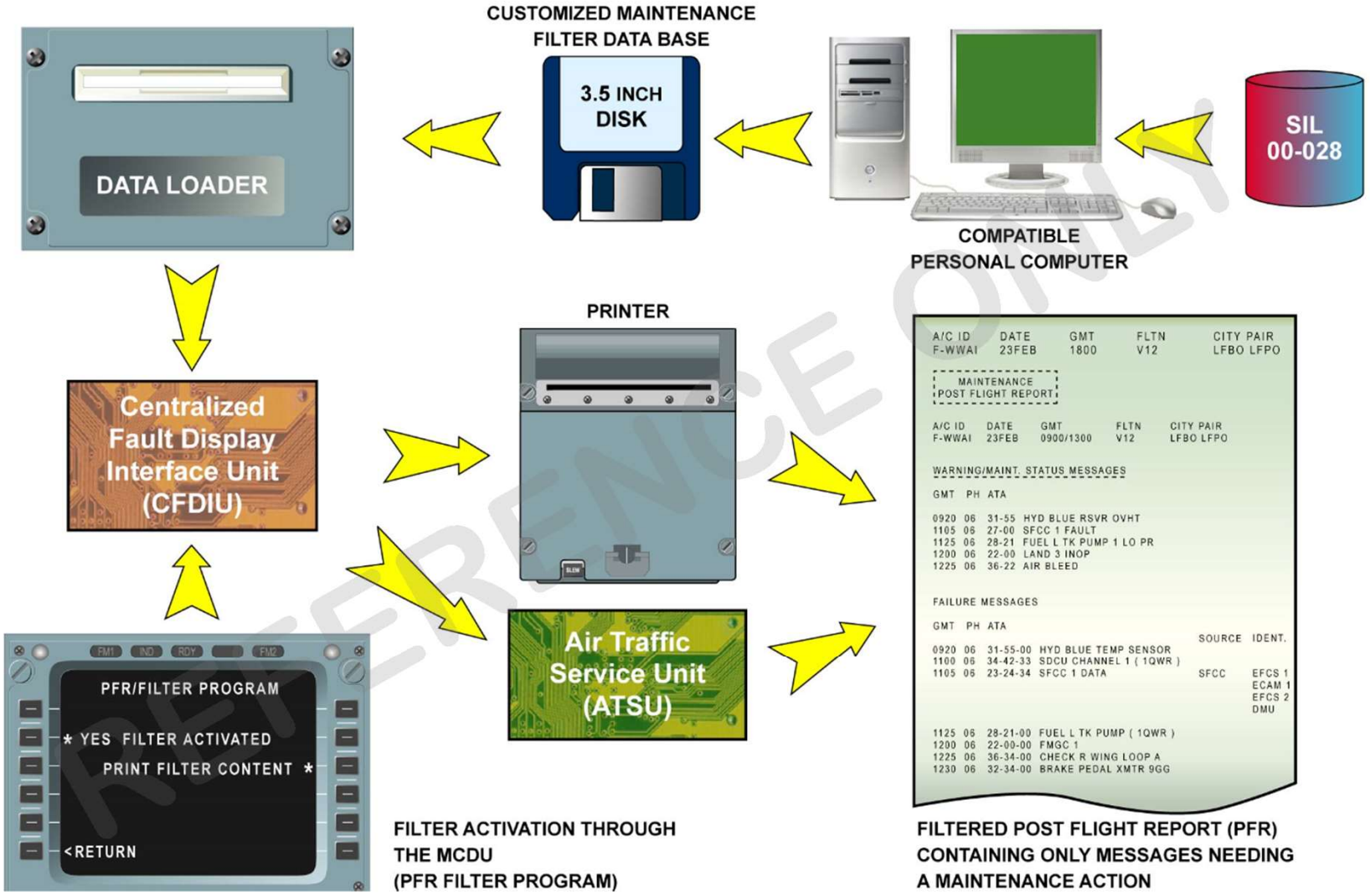
The purpose of the filtering function is to reduce the number of spurious maintenance messages. So the filtered Post Flight Report (PFR) contains only the messages needing a maintenance action.

FILTER DATA BASE CUSTOMIZATION AND LOADING
- Airbus establishes, keeps up to date and transmits SIL 00-028
- SIL 00-028 consists of a spurious maintenance messages data base
- Airline customizes SIL 00-028 to its fleet

Use computer + S/W
Filter DB → Floppy disk → Data loader → CFDIU
Using the feedback data from the airlines or the data from laboratory or flight tests, Airbus establishes, keeps up to date and transmits to the airlines a document called Service Information Letter (SIL) 00-028. SIL 00-028 consists of a "spurious maintenance messages

data base". This is an envelope data base, including the spurious messages concerning every possible Part Number (PN) from every vendor.

The airline is responsible for customizing this envelope data base to its fleet configuration using a compatible personal computer and dedicated software. The customized maintenance filter data base is first stored on a floppy disk, and then uploaded into the Centralized Fault Display Interface Unit (CFDIU) by means of the data loader.



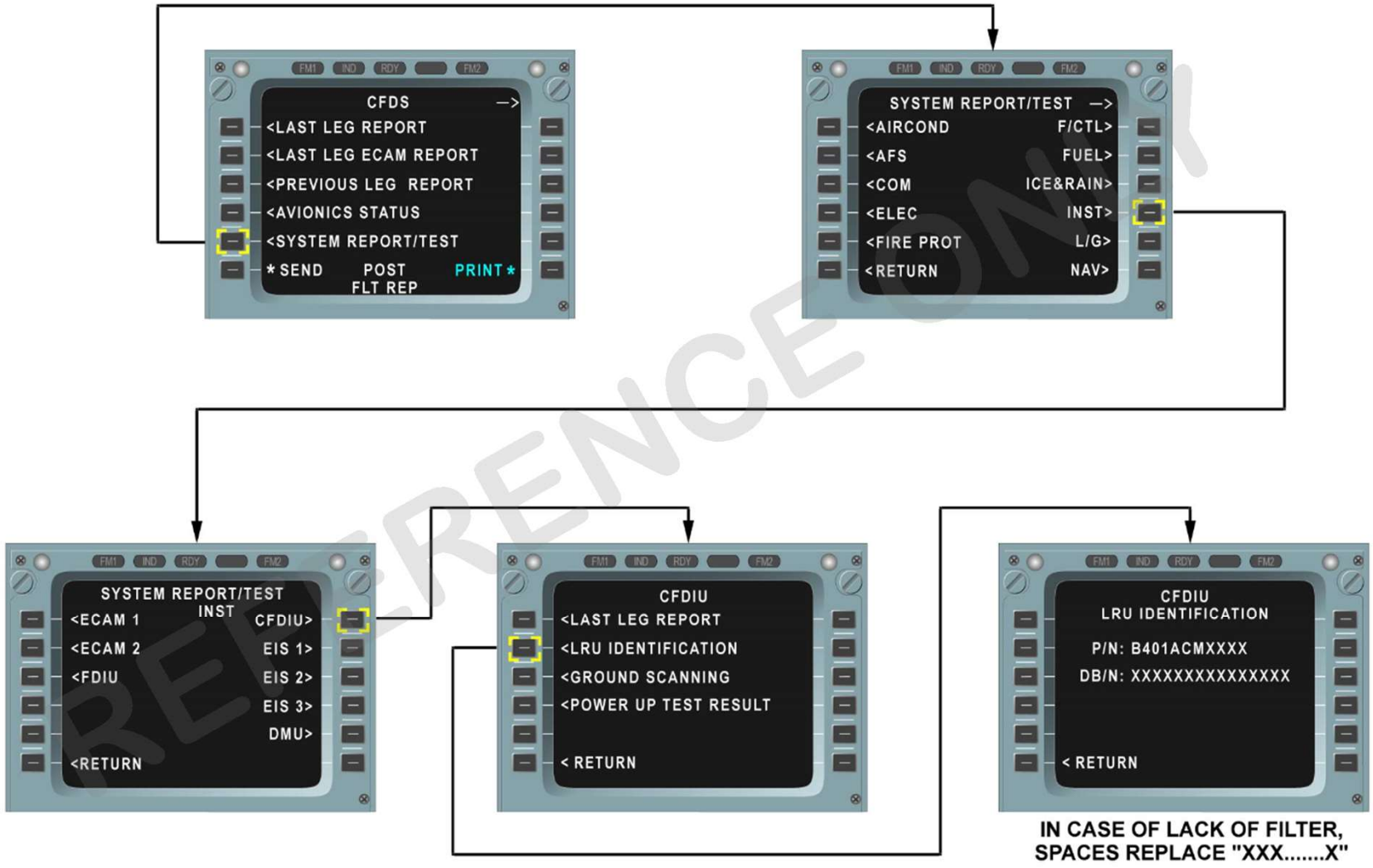
FILTER ACTIVATION THROUGH THE MCDU (PFR FILTER PROGRAM)

FILTERED POST FLIGHT REPORT (PFR) CONTAINING ONLY MESSAGES NEEDING A MAINTENANCE ACTION

FILTER DATA BASE IDENTIFICATION

- 15 character DB number
- Written on filtered PFR
- Can be displayed on MCDU

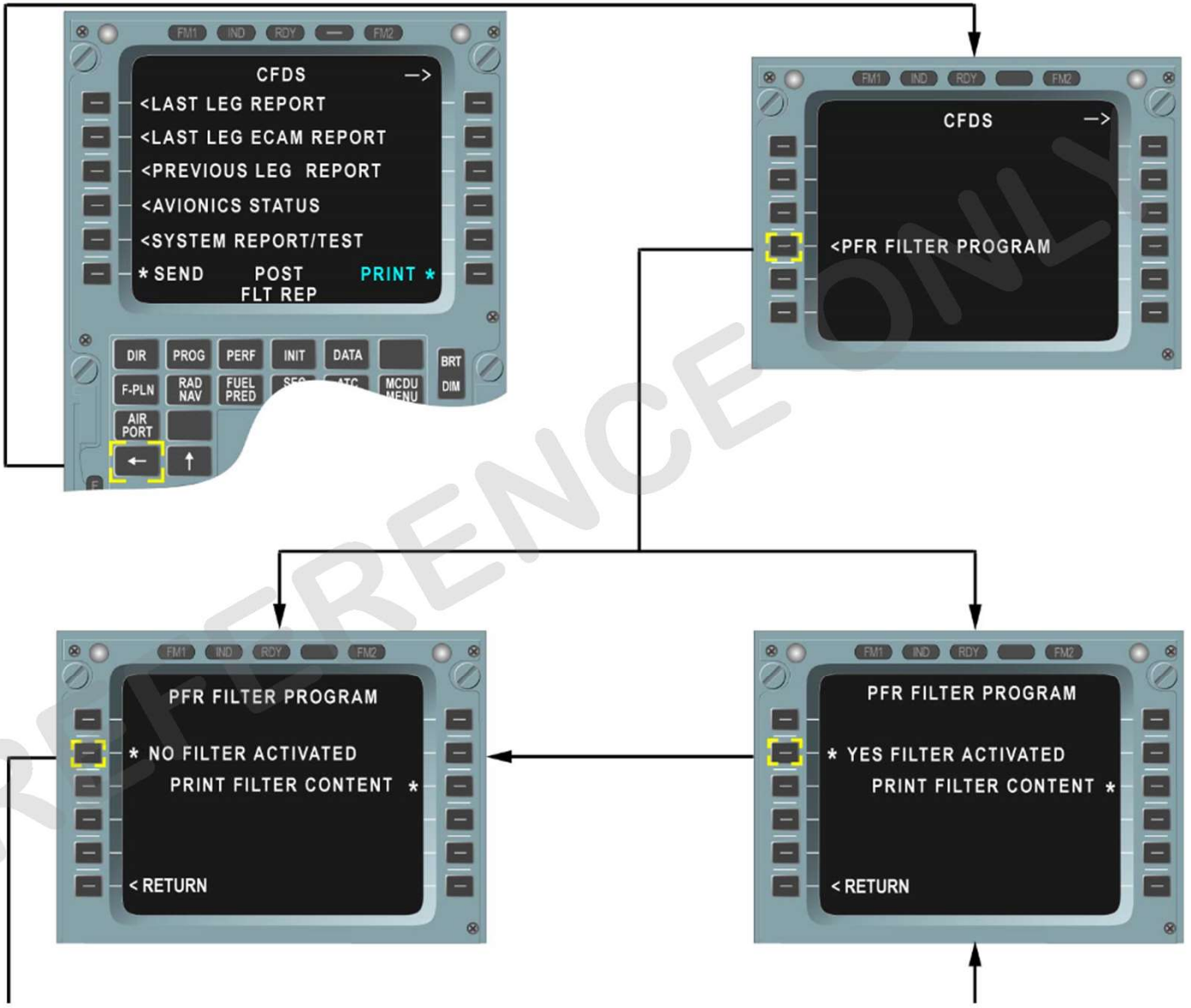
Each filter is identified by a 15-character data base number. The data base number is written on the filtered PFR and can be displayed on the MCDU.



ACTIVATION

- PFR FILTER PROGRAM function
- FILTER NOT ACTIVATED: PFR print or ATSU
- FILTER ACTIVATED: PFR filtered print or ATSU
- PRINT FILTER CONTENT function: DB printed

The filtered PFR is activated through the MCDU with the function called PFR FILTER PROGRAM.
When FILTER ACTIVATED is set to NO: The complete PFR can be manually or automatically printed or sent through the Air Traffic Service Unit (ATSU).
When FILTER ACTIVATED is set to YES: The filtered PFR can be manually or automatically printed or sent through the ATSU.
With the PRINT FILTER CONTENT function, the maintenance filter data base can be printed.



EXAMPLES

PFR not filtered, filtered + filter DB

These examples show a PFR not filtered, the maintenance filter data base and the PFR filtered.

```
A/C ID      DATE      GMT          FLTN          CITY PAIR
F-WWT       05OCT     1537         974           LFBO LFPO

   MAINTENANCE
POST FLIGHT REPORT

A/C ID      DATE      GMT          FLTN          CITY PAIR
F-WWT       05OCT     1351/1509    974           LFBO LFPO

WARNING/MAINT. STATUS MESSAGES

GMT   PH  ATA
1407  05  77-11  ENG 2 FADEC
1455  06  27-00  F/CTL ELAC 2 FAULT
1508  07  27-00  F/CTL SEC 3 FAULT

FAILURE MESSAGES

GMT   PH  ATA                                  SOURCE      IDENT.
1353  03  XX-XX-XX  DME2: NO CTL SOURCE DATA   DME2        ADF 1
1353  03  29-34-11  SDAC1: B HYD AIR PRSS      ECAM 1      ECAM 2
                     XMTR 2385GH
1354  04  29-34-11  SDAC2: B HYD AIR PRSS      ECAM 1      ECAM 2
                     XMTR 2385GH
1354  04  23-73-34  NO CIDS 1 DATA             CFDS
1354  04  26-17-34  NO SDCU 1 DATA             CFDS        ECAM 1
                                               ECAM2
1354  04  22-66-34  AFS: FAC2                  AFS
1354  04  26-17-34  NO EIU 1 DATA (INTM)       CFDS
1354  04  38-31-34  NO VSC DATA                CFDS
1407  05  23-XX-XX  VHF2: NO DATA FROM         VHF 2       VHF 3
                     CONTROL SOURCE
1407  05  73-22-52  FMU/HC/EEC2                EIU2FADEC
1413  06  30-11-51  R WAI FILTER OR VALVE      TEMP CTL
1424  06  31-36-34  NO DMU DATA (INTM)         CFDS
1446  06  31-32-34  RADAR1: NO DATA            RADAR 1
                     FROM CFDIU
1446  06  31-32-34  AFS: ELAC2                 AFS         EFCS 2
1508  07  34-12-34  CHECK ADIRU1 INPUT B /     ADR1        ADR 3
                     SFCC CKT
1508  07  27-93-34  SEC3                       EFCS 1      EFCS 2
```

NOT FILTERED PFR

```
A/C ID      DATE      GMT          FLTN          CITY PAIR
F-WWT       05OCT     1537         974           LFBO LFPO

   MAINTENANCE                        DB / N
FILTER DATA BASE                      XXXXXXXXXXXXXXX

WARNING/MAINT. STATUS MESSAGES

W/N   PH  ATA
01    06
02    06  27-00

FAILURE MESSAGES

F/N   PH  ATA                                  SOURCE
001                                            DME2
002   03  29-34-11  SDAC1: B HYD AIR PRSS      ECAM 1
                     XMTR 2385GH
003       23
004   04  26-17-34  NO SDCU  DATA
005       73-25-34  NO EIU 1  DATA             CFDS
006       31-36
007   06  27-93-34
008                                            ADR 1
```

MAINTENANCE FILTER DATA BASE

```
A/C ID      DATE      GMT          FLTN          CITY PAIR
F-WWT       05OCT     1537         974           LFBO LFPO

   MAINTENANCE                        DB / N
POST FLIGHT REPORT                    XXXXXXXXXXXXXXX

A/C ID      DATE      GMT          FLTN          CITY PAIR
F-WWT       05OCT     1351/1509    974           LFBO LFPO

WARNING/MAINT. STATUS MESSAGES

GMT   PH  ATA
1407  05  77-11  ENG 2 FADEC

FAILURE MESSAGES

GMT   PH  ATA                                  SOURCE      IDENT.
1354  04  29-34-11  SDAC2: B HYD AIR PRSS      ECAM 1      ECAM 2
                     XMTR 2385GH
1354  04  22-66-34  AFS: FAC2                  AFS
1354  04  38-31-34  NO VSC DATA                CFDS
1407  05  73-22-52  FMU/HC/EEC2                EIU2FADEC
1413  06  30-11-51  R WAI FILTER OR VALVE      TEMP CTL
1446  06  31-32-34  RADAR1: NO DATA            RADAR 1
                     FROM CFDIU
```

Printer Description and Operation

PRINTER CAPABILITY
- Onboard printouts: 1 system at a time

The printer provides onboard printouts concerning various aircraft systems one at a time.

USERS
- Formatted within system users
- Determines which input activated
- Switches on each system with priorities

Data to be printed is formatted within the various system users. The printer determines which input is active and switches on each system in order of their priorities.

MANUAL PRINT
- Triggered from MCDU

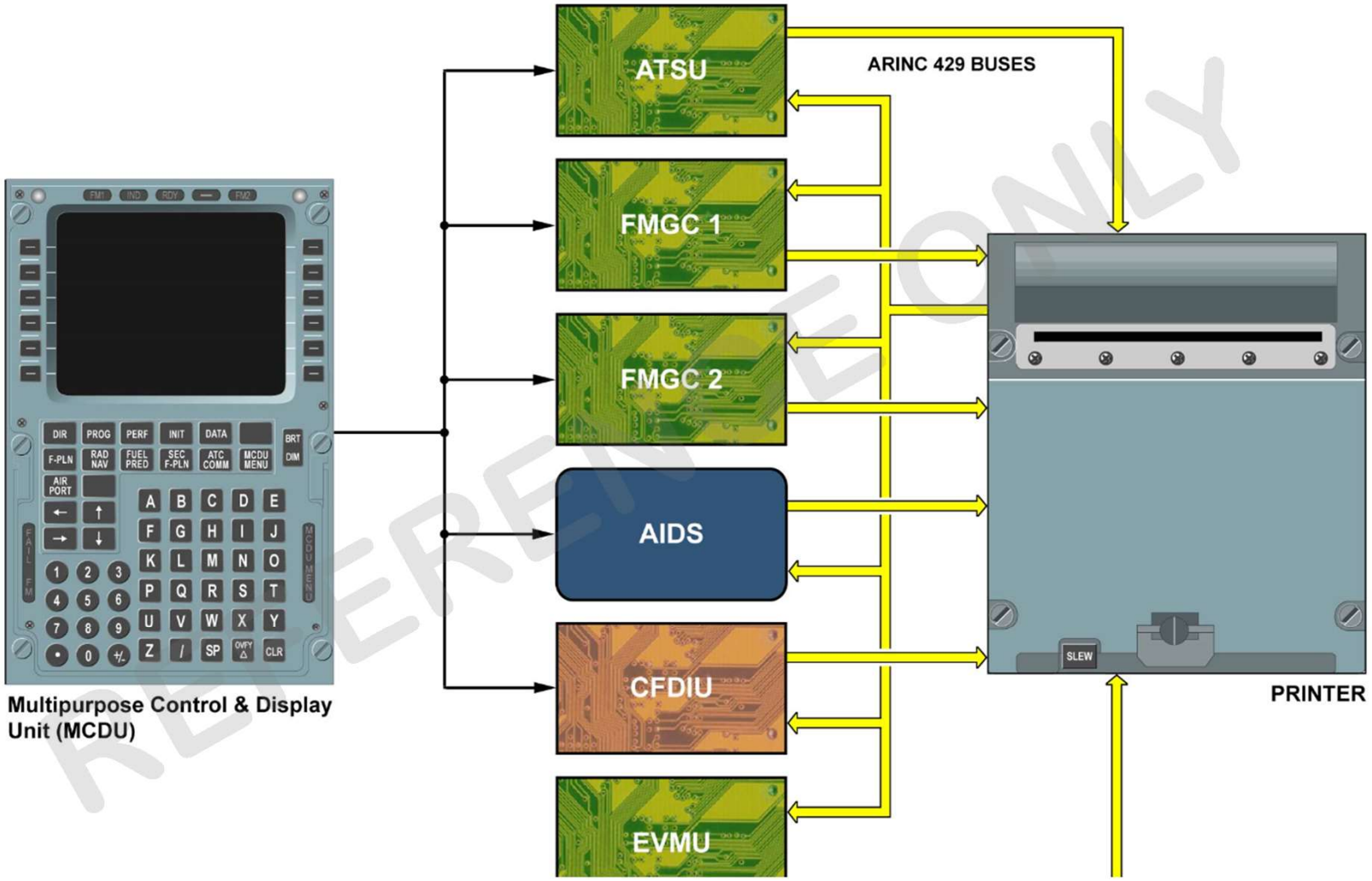
MCDU:

Print data displayed on screen
Or data stored in system reports

In manual mode, prints are triggered from the MCDU. The MCDU initiates printing of data displayed on MCDU screen or data stored in system reports.

AUTOMATIC PRINT

If function programmed in system computer
Ex.: CFDS POST FLIGHT REPORT upon ENG shutdown
Some reports are automatically printed provided that the automatic printing function has been programmed in the corresponding system computer.
Example: Automatic printing of the Centralized Fault Display System (CFDS) POST FLIGHT REPORT upon engine shutdown.



PRINTER PAPER LOADING

JOB SET-UP
AMM task
AMM Task 31-35-22-600-001

Energize A/C
Push SLEW P/BSW to remove paper
Energize the aircraft electrical circuits.
Push the SLEW P/BSW to remove the remaining paper from the printer.

PAPER CHG PROCEDURE
Turn locking system
Discard empty roll
Clean paper cutter
Install new paper roll
Engage paper under drive roller
Close and lock printer door
Turn the locking system to release the door.
Lift the door and discard the empty roll.
Clean the remaining paper off the paper cutter.
Install a new roll of paper on its support and check that the paper roll turns correctly.
Engage the paper under drive roller and check that paper is held tight.
Close and lock the printer door.

CLOSE-UP
De-energize A/C
Area clean
De-energize the aircraft electrical circuits.
Make sure that work area is clean and clear of tools and other items.
NOTE: Using the SLEW P/B move the paper out of the slot of the paper cutter and cut off the unwanted paper.

Servicing of the Printer

Job set-up

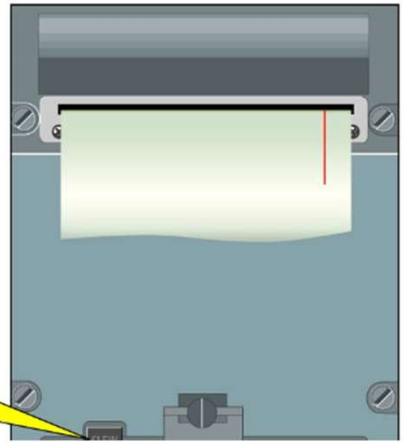
Push the SLEW pushbutton switch to remove the remaining paper from the printer.

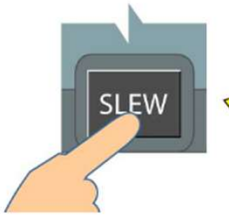
Procedure

Servicing of the Printer:

Close-up

A red stripe on the paper side indicates end of roll.





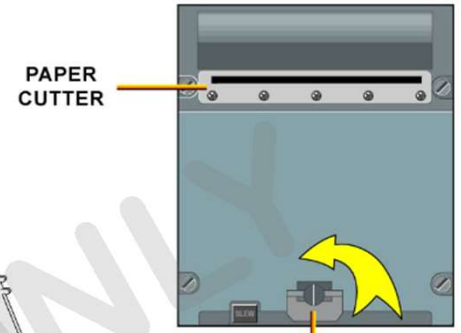
Servicing of the Printer

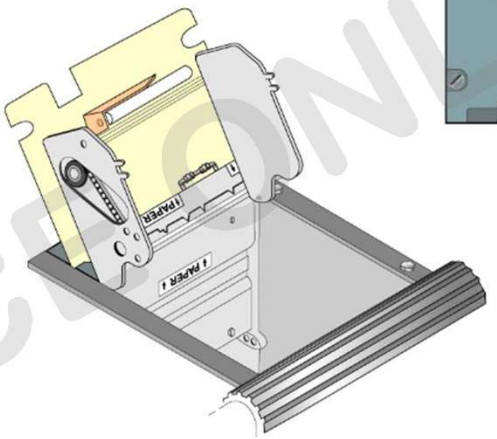
✓ **Job set-up**

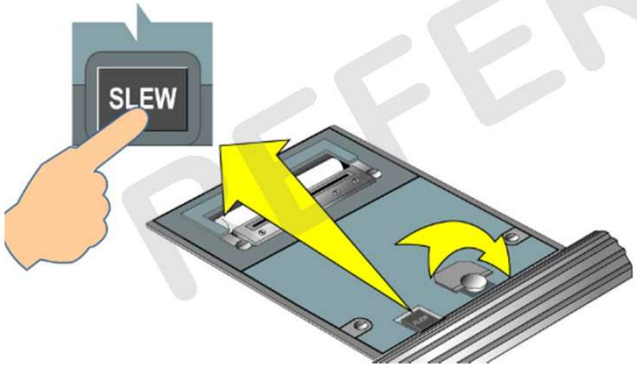
Procedure

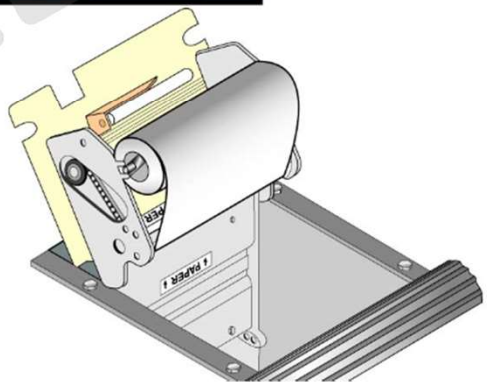
Servicing of the Printer:
(1)Release the door with the locking system.
(2)Lift the door.
(3)Move the empty roll from the right to the left to disengage it from its support.
(4)Clean the remaining paper off the paper cutter.
(5)Install the new roll of paper on its support.
(6)Manually engage the end of the paper under the drive roller.
(7)Close the door.
(8)Lock the door with the locking system.
(9)Push the SLEW pushbutton switch to move the paper out of the slot of the paper cutter.
(10)Use the cutter to remove unwanted paper.

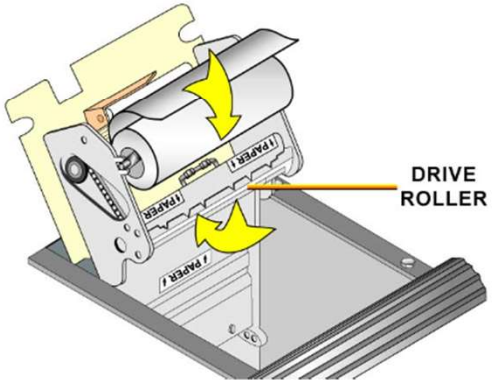
Close-up











Servicing of the Printer

- ✓ Job set-up
- ✓ Push the SLEW pushbutton switch to remove the remaining paper from the printer.

Procedure

- ✓ Servicing of the Printer:
- ✓ Close-up

TASK COMPLETED

✓

A paper roll allows a 90 feet printing.


RECORDING SYSTEM
COMPONENT LOCATION
A/C ID
XY-ABCD
DATE
21NOV
GMT
1002
MAINTENANCE
POST FLIGHT REPORT
FLTN
XY-1234
CITY PAIR
LF80 LFPO
FLIGHT RECORDER
DO NOT OPEN
A/C ID
XY-ABCD
DATE
21NOV
GMT
0832/0941
FLTN
XY-1234
ECAM WARNING MESSAGES
GMT PH ATA
0855 05 30-31 ANTI ICE F/O TAT
0855 05 30-11 WING A.ICE SYS FAULT
0920 05 27-00 F/CLT FLAP SYS 2 FAULT
0925 06 28-00 FUEL CTR TK PUMP 2 LO PR (S)
FAULT MESSAGES
PH ATA
03 38-31-68 DIFF PRESS XCDR
01 34-42-33 LRA-1
SOURCE IDENT

SYSTEM OVERVIEW

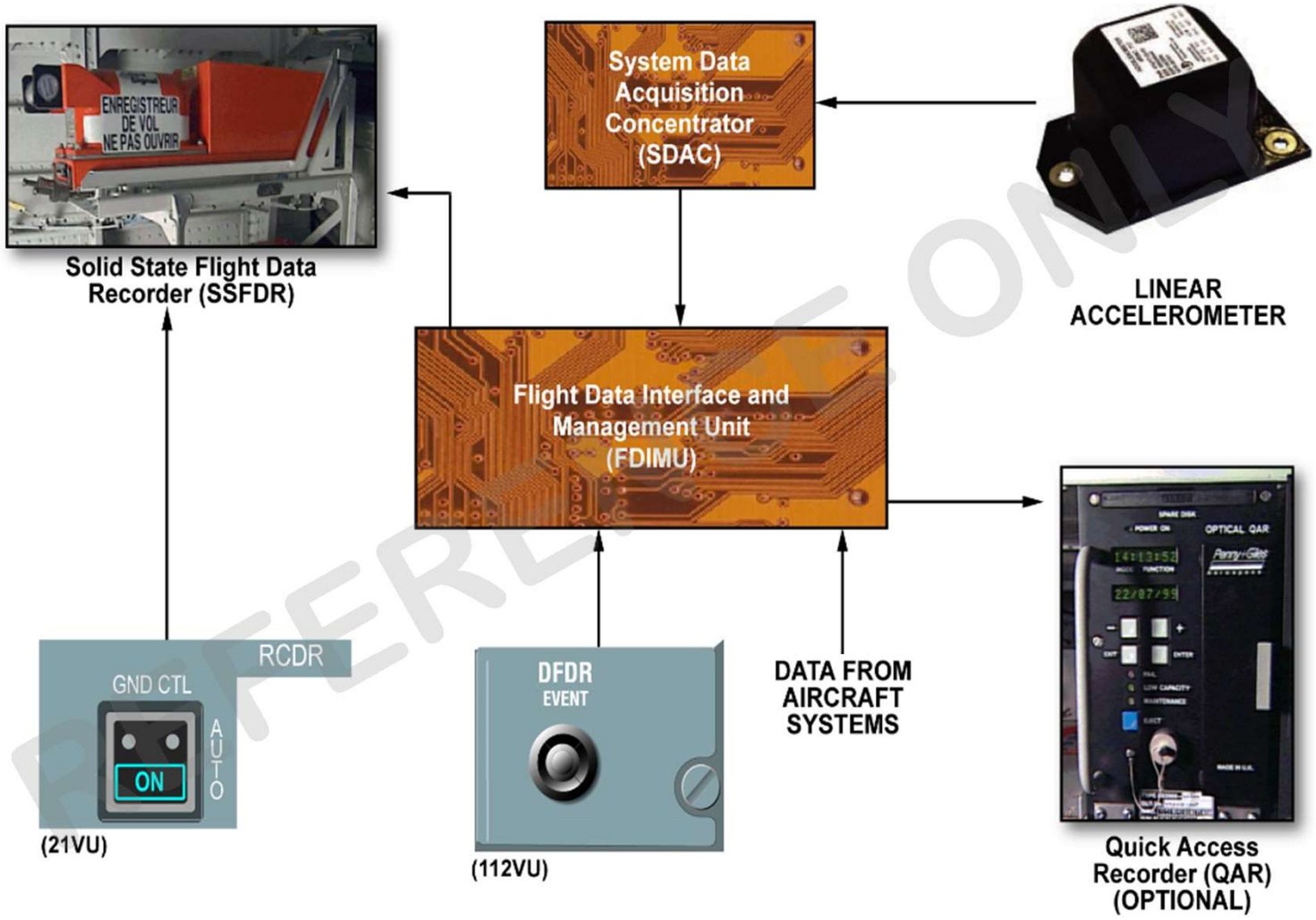
FDIU function integrated in the FDIMU
The Flight Data Interface and Management Unit (FDIMU) has two primary functions. The first is the Flight Data Interface Unit (FDIU) function.

FDIU acquires and formats several important flight parameters and system data before it supplies them to the SSFDR
To obey the mandatory requirements of crash recording, the FDIU acquires and formats several important flight parameters and system data before it supplies them to the Solid State Flight Data Recorder (SSFDR).

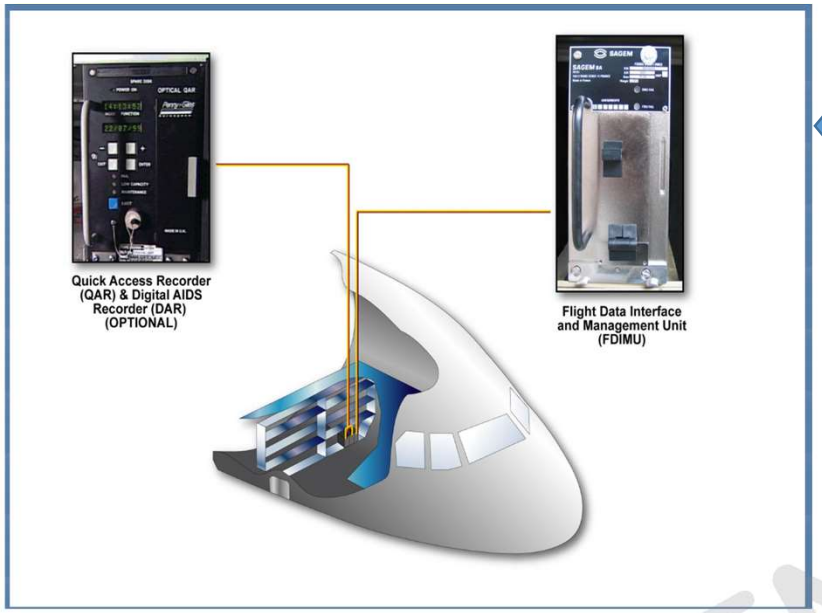
Acceleration of the A/C measured by the linear accelerometer
Signal digitalized by the SDAC and sent to the FDIU
The linear accelerometer measures the acceleration of the A/C in all three axes. The System Data Acquisition Concentrator (SDAC) digitizes the analog signal of the linear accelerometer and sends it to the FDIU.

QAR records the same parameters as the SSFDR
SSFDR operation is automatic
For maintenance and performance purposes, the optional Quick Access Recorder (QAR) records the same parameters as the SSFDR. The operation of the SSFDR is automatic.

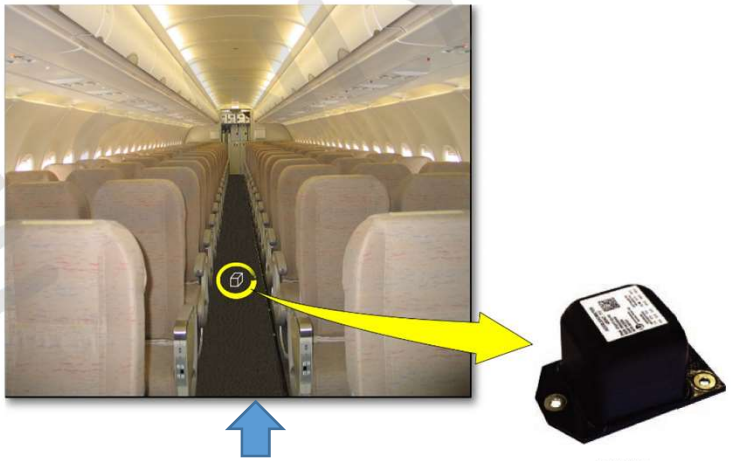
SSFDR can be supplied when the A/C is on ground, with a GND CTL P/B which is on the RCDR panel
An event mark can be set on the SSFDR memory with a DFDR EVENT P/B
On the overhead panel, there is a GrouND ConTroL P/B, which is on the ReCorDeR panel. This P/B lets the SSFDR be supplied when the A/C is on ground for preflight checks before engine start or for tests and maintenance. On the center pedestal, there is a Digital Flight Data Recorder (DFDR) EVENT P/B, which can be used to set an event mark on the SSFDR memory.



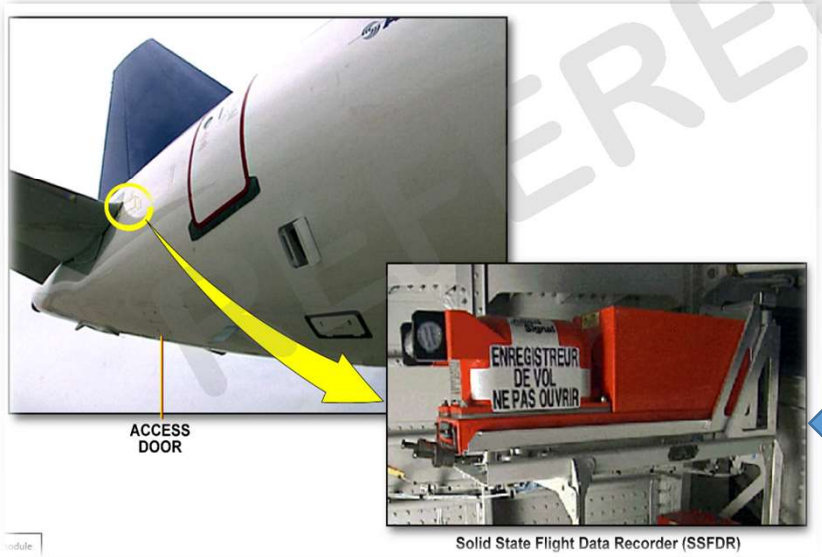
COMPONENT LOCATION



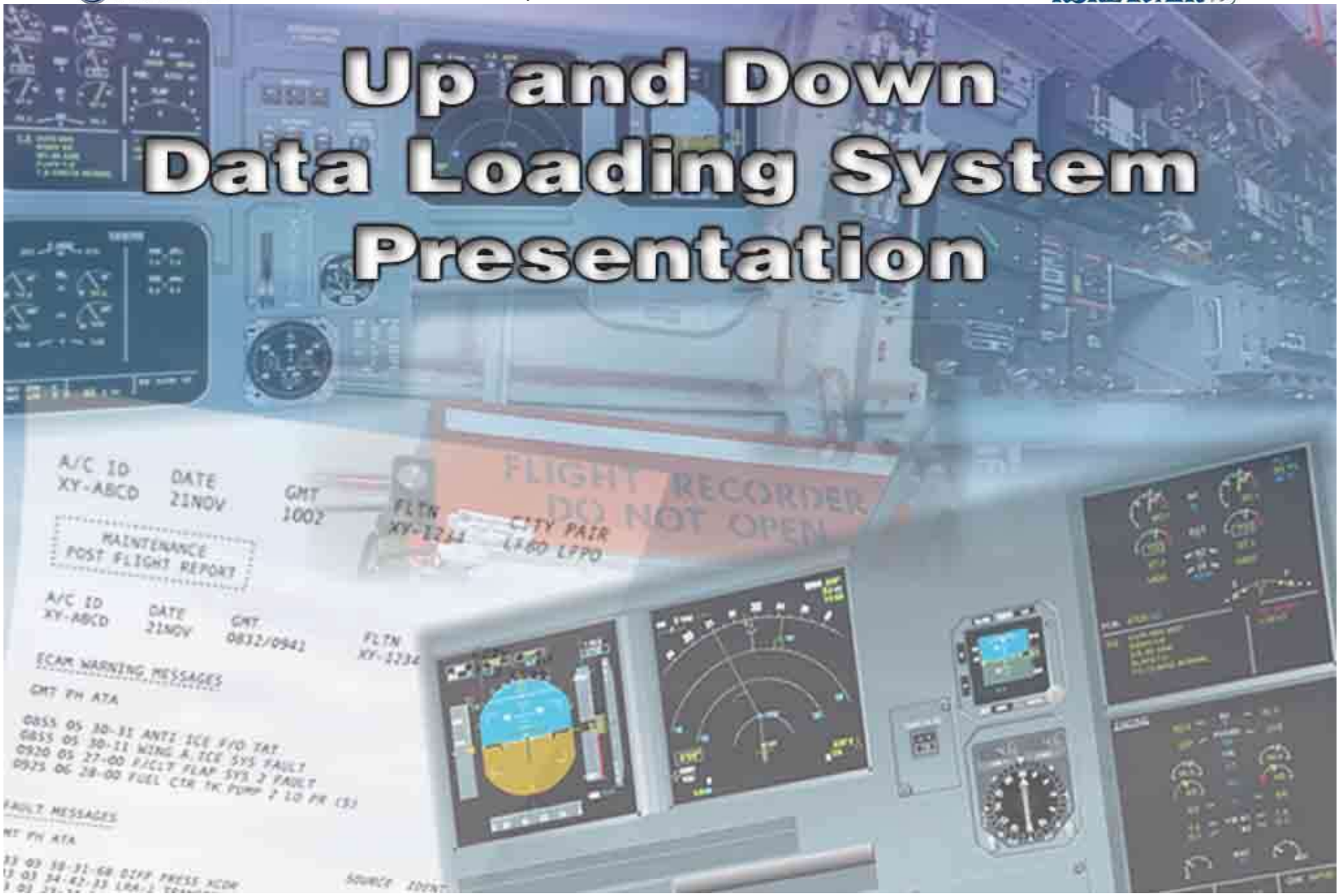
DFDRS and AIDS computers in the aft avionics rack
The DFDRS and AIDS computers are in the aft avionics rack.
FDIMU computer in the aft avionics rack
The FDIMU computer is in the aft avionics rack.



Linear accelerometer near the A/C center of gravity
The linear accelerometer is near the A/C center of gravity.



SSFDR installed above the CVR in an unpressurized area of the rear fuselage
The SSFDR is installed immediately above the Cockpit Voice Recorder (CVR), in an unpressurized area of the rear fuselage.


Up and Down
Data Loading System
Presentation
A/C ID
XY-ABCD
DATE
21NOV
GMT
1002
MAINTENANCE
POST FLIGHT REPORT
FLIGHT RECORDER
DO NOT OPEN
ECAM WARNING MESSAGES

DLRB

Interface between:

A/C computers

Ground data processing equipment

Used for Uploading /Downloading functions from a media

The data loading system is an interface between the aircraft computers and ground data processing equipment used for:

- Uploading function from a media (3.5 inch disk, CD-ROM or USB key) to update aircraft computer software or data bases (on ground),
- Downloading function, on ground, to a media (3.5 inch disk, CD-ROM or USB key) the data recorded by certain computers (e.g: CFDS, AIDS, ELACs, ...) for analysis.

COMPONENTS

Data loading system includes:

DLS

CDLC

DLRB

Data/soft up & down loading with:

A615A: PDL connectors, ATSU, ADIRU & FMS in HS

A615-3 in LS: All systems previously wired on MDDU

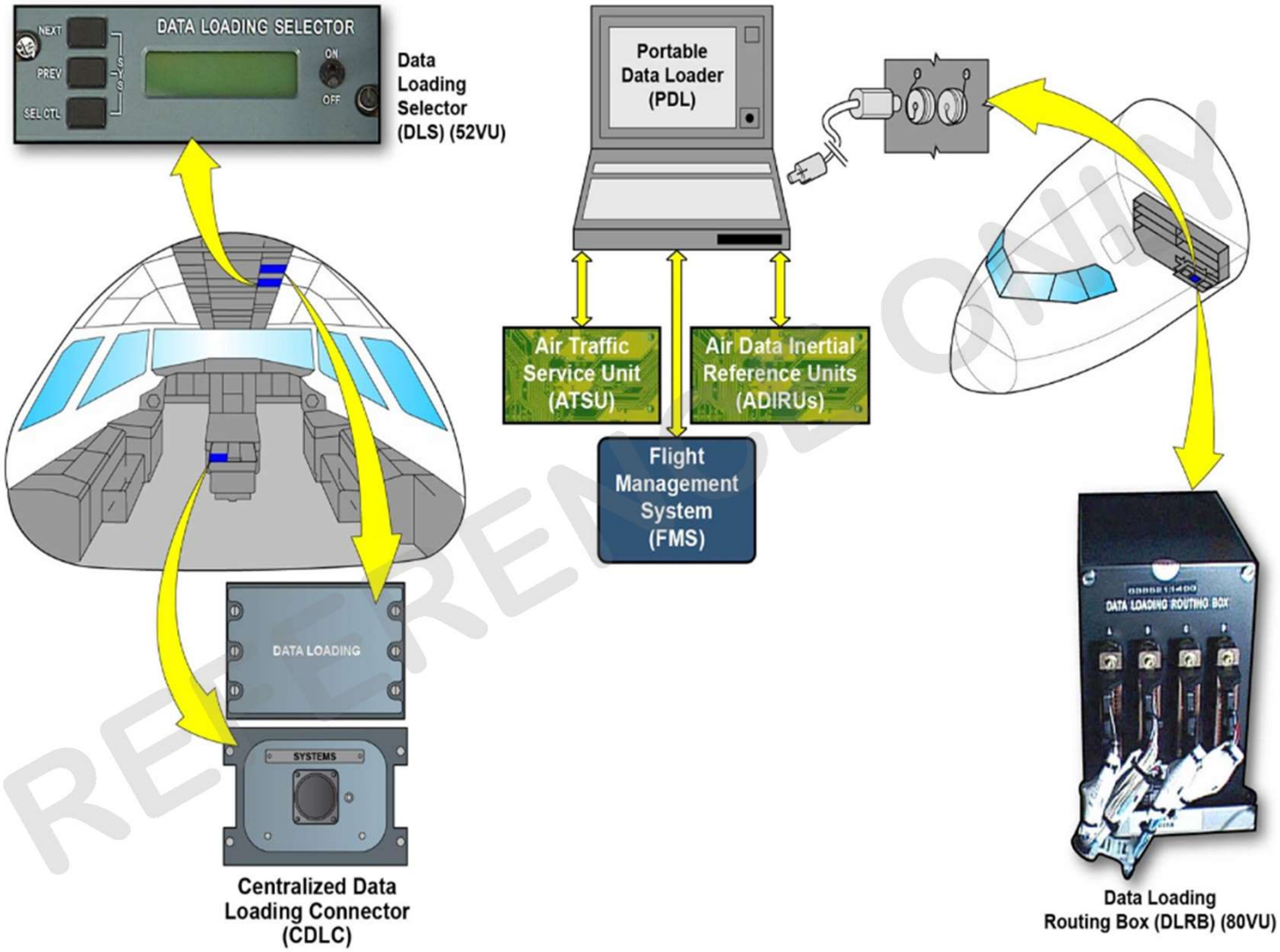
The up and down data loading system is composed of:

- a Data Loading Selector (DLS) to select the computer on which data will be loaded,
- a Centralized Data Loading Connector (CDLC) (53 pin connector) to perform the data loading operation when a portable data loader is connected. The CDLC is made of connector mounted on a plate, located on the overhead maintenance panel 52VU or on the pedestal panel 117VU, and protected by a blanking plate,
- a Data Loading Routing Box (DLRB) to route the input/output data between the disk unit and the target computer.

According to the options installed on the A/C, the Portable Data Loader (PDL) connectors are used for data/soft up and down loading in ARINC 615A like ATSU, ADIRU and FMS High Speed (HS) and all other systems which were previously wired on the MDDU (ARINC 615-3 in Low Speed (LS)). 2 Stowage boxes for disks are installed in the sidewall panels.

NOTE 1: Any PDL, compliant with ARINC 615-3 and ARINC 615-A can be used (according to specific adaptations).

NOTE 2: According to Airbus policy (Certified Procedure), the software media (e.g. floppy disk, CD-ROM) must be stowed in the cockpit stowage box after all maintenance activities involving software upgrade (the non storage of this media on board is under airline responsibility according to their local authorities).



GENERAL ARCHITECTURE

Up 26 systems can be connected
- Data bases / Software update
- 2 A429 buses (I/O) and associated Load Enable discrete

Up to 26 systems can be connected to the system for data bases/software update, by 2 A429 buses (I/O) and an associated Load Enable discrete (FLT/GND).

DLRB/DLS

Connections
- RS422 serial links
- Discretes

Computers on DLS menu from DLRB database

The Data Loading Routing Box (DLRB) and the Data Loading Selector (DLS) are connected by two RS422 bi-directional serial links (for dialog and maintenance purposes) and two discretes.

The DLS sends user commands to the DLRB and displays the result of these commands on its Liquid Crystal Display (LCD) screen.

The list of the computers displayed on the DLS is extracted from the DLRB database. This database must be uploaded to fit the aircraft configuration (by selecting the DLRB itself in the list of targets).

Note that the DLS ON/OFF selector switch is used to activate the DLRB through the ON/OFF discrete and not to command the DLS power supply. The DLS power is supplied by the DLRB through the POWER SUPPLY discrete.

LGCIU 1 (LOAD ENABLE)

LGCIU 1 input

DLRB/DLS power supply

The DLRB and the DLS only operate in ground condition. When the right hand Main Landing Gear (MLG) shock absorber is compressed, a discrete signal is sent by the Landing Gear Control and Interface Unit 1 (LGCIU 1) to enable the systems to operate.

LOAD ENABLE discrete from DLRB to each computer

In-flight inhibition

A LOAD ENABLE discrete, depending on the state of the LGCIU 1 discrete signal, is wired to each target computer to enable the loading functions on ground and inhibit them in flight. This discrete is sent to the Centralized Data Loading Connector (CDLC) first.

TARGET COMPUTERS

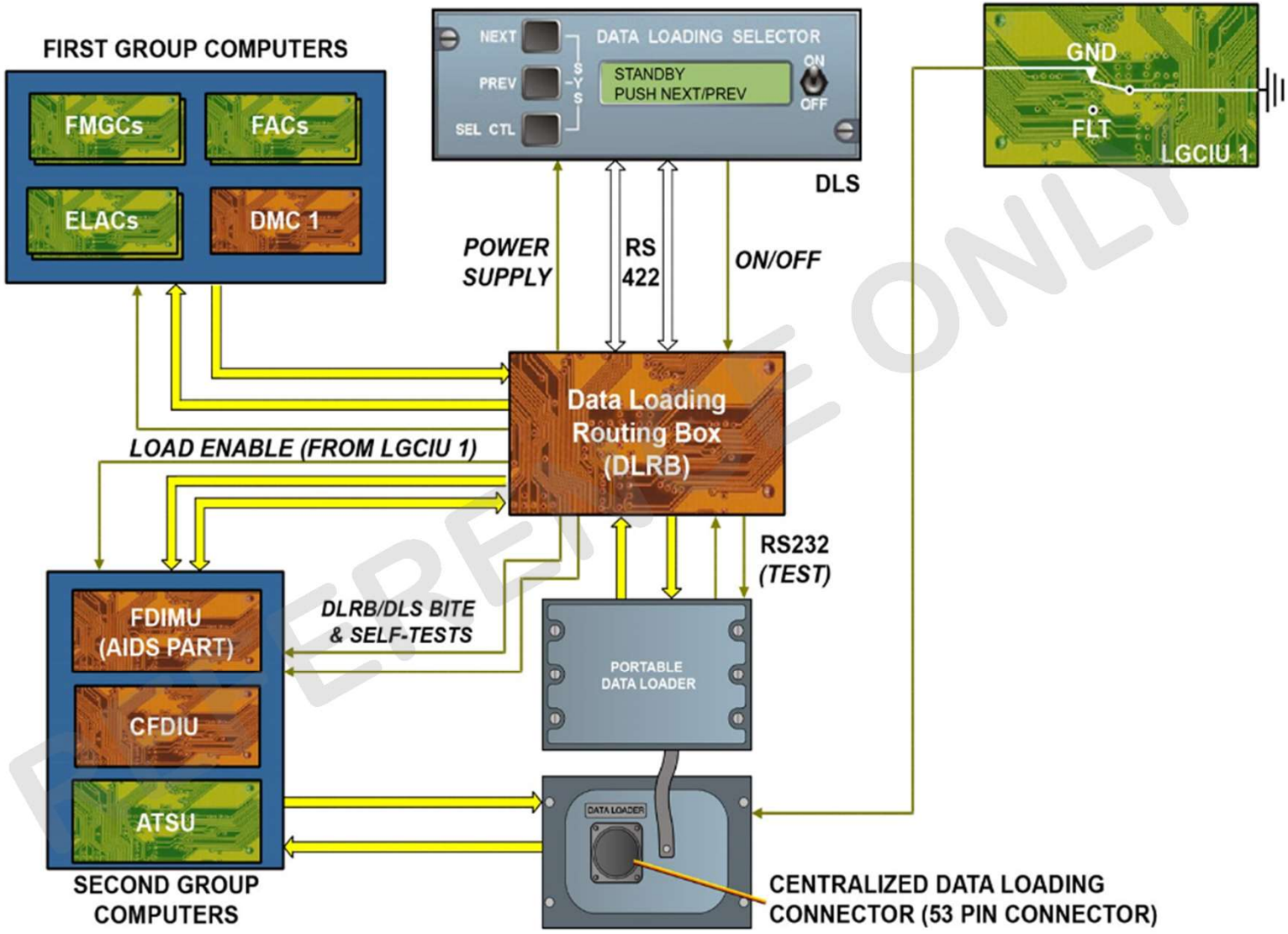
ARINC 429 connections with PDL through DLRB
2nd group
- Small number of computers
- Direct ARINC 429 connections with PDL
- LOAD ENABLE discrete ignored in flight for downloading

FDIMU has discrete and a direct A429 link with DLRB
- Upload of DFDRS and AIDS

The DLRB routes the data to be transmitted between the Portable Data Loader (PDL) and the computer selected on the pull-down menu of the DLS.
The three computers of the second group have direct ARINC 429 links with the PDL. These computers are also internally programmed to ignore the LOAD ENABLE discrete signal for downloading operations. Thus, for the computers of the second group, the downloading function is also operational in flight.
The Flight Data Interface and Management Unit (FDIMU) computer of the second group has discrete and one direct ARINC 429 link with the DLRB for upload of Digital Flight Data Recording System (DFDRS) and Aircraft Integrated Data System (AIDS) part of FDIMU via DLRB.

SYSTEM TYPES
DLRB/DLS: Type 3 system
- DLS via DLRB

The DLRB/DLS is a type 3 system. Note that the DLS BITE is first processed by the DLRB (via RS422).



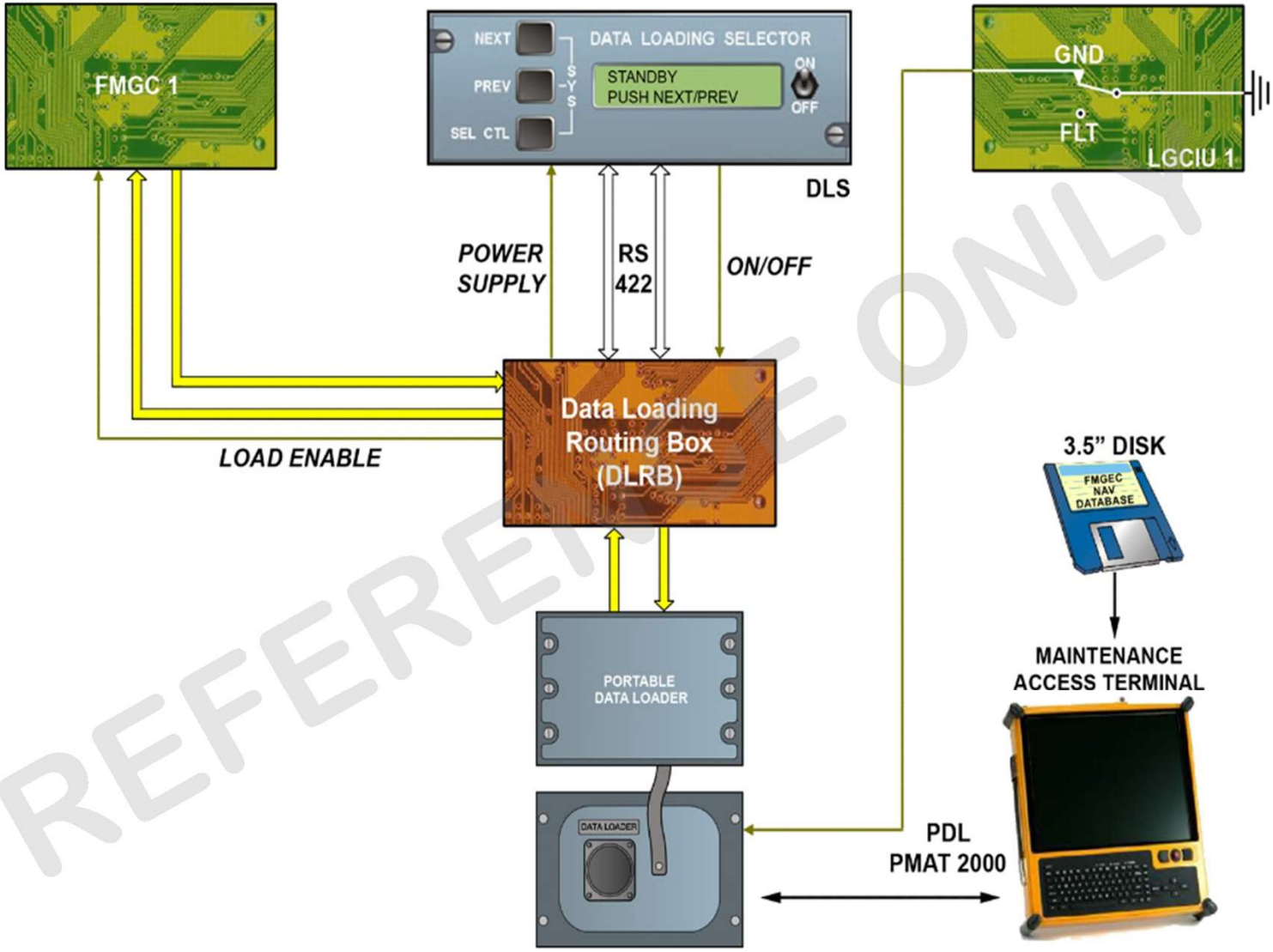
LOADING OPERATION

Operational use
Uploading or downloading
On ground only
Operational sequence
Computer selection on DLS

The loading mode is used, on ground only. Before you do a loading operation, refer to the applicable procedure related to the system in the Aircraft Maintenance Manual (AMM). The operator tasks are as follows:
- Remove the cover plate on the 52VU to install the PDL, and connect the cable to the PDL and to the CDLC on panel 52VU.
- Close the Circuit Breaker 14TD.
- Start the PDL (Refer to the PDL user guide; e.g. PMAT 2000).
- Select the target computer on the pull-down menu of the DLS (e.g. FMGEC 1 for NAV database uploading).

Insertion of the correct disk (which includes data definition) in the PDL
Disk inserted, Loading can start
- Then, put the applicable disk (which contains the configuration file that includes the definition of the data that will be transmitted) in the disk drive.
1) When the disk is in the disk drive, the loading can start.
10 PDL/target computer dialog
If dialog is OK, data transfer is done
Data transfer completed correctly
Automatic printout of database content
2) The PDL processes the data contained in the configuration file and a bi-directional protocol dialog starts through the ARINC 429 buses between the PDL and the target computer.
3) When the dialog is correct, the data is transmitted.
4) When the data transfer is completed and no anomalies are found, the database content is automatically printed.

XCheck the target computer software ref with the disk used on the applicable MCDU page
Stop PDL
For uploading, the operator must look on the applicable MCDU page to make sure that the reference of the uploaded software agrees with the software reference of the disk used for uploading.
After the check, the PDL can be stopped (Refer to the PDL user guide).



DOWNLOADING OPERATION

Operational use

Downloading only

On ground or in flight

Operational differences with semi-automatic downloading

No selection from DLS

Manual selection on MCDU

The downloading mode is only used, on ground or in flight, for special downloading operations, e.g. POST FLIGHT REPORT DUMP from the Centralized Fault Display Interface Unit (CFDIU) or Smart AIDS Recorder (SAR) unload from the Data Management Unit (DMU) part of the FDIMU. The downloading operation is different from the uploading operation as follows:

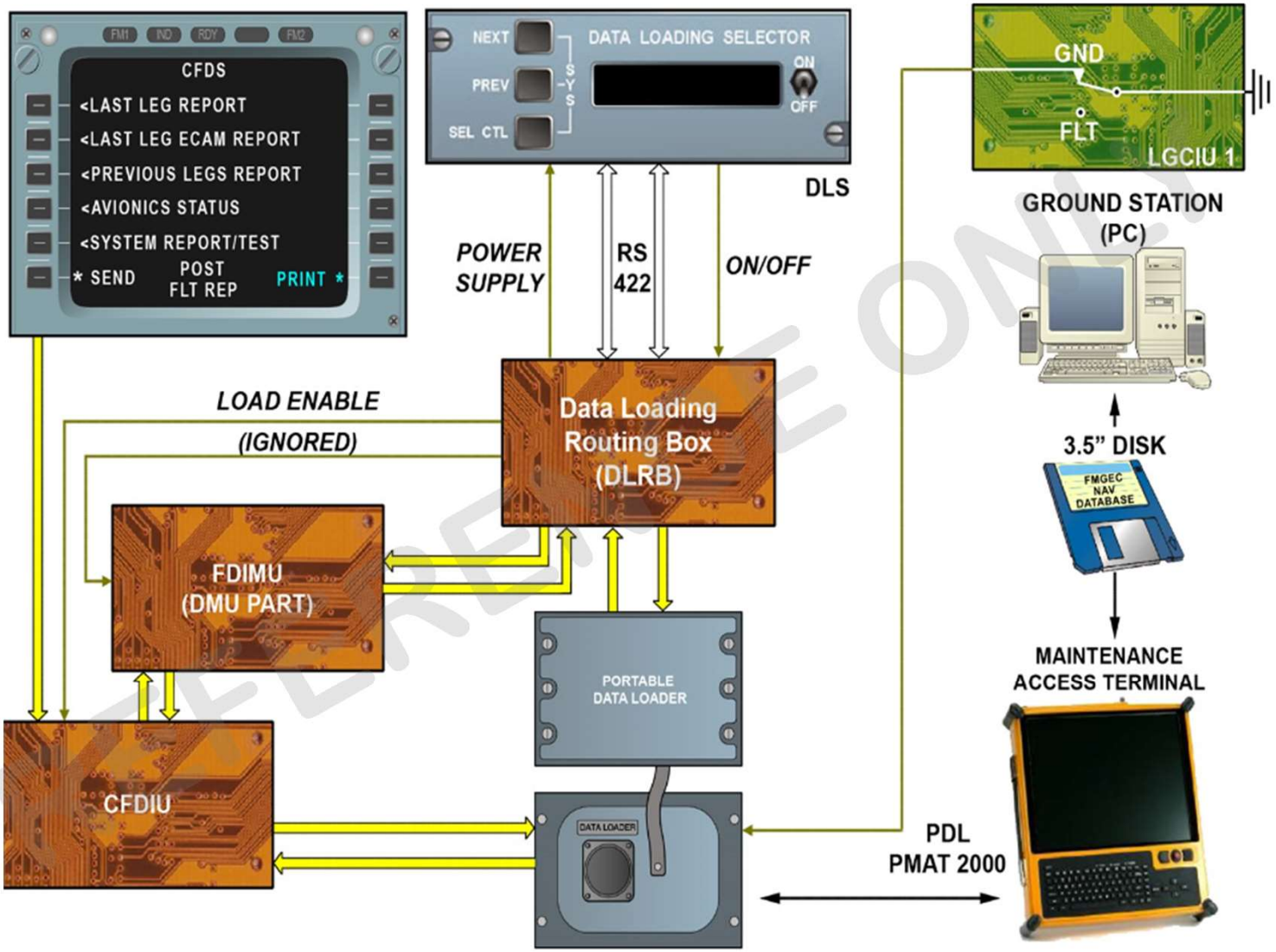
- no selection is made from the DLS and the data to be transmitted is manually selected on the applicable MCDU page,

Operational differences with semi-automatic downloading

Disk with target computer label only

Empty or unformatted disk possible

- the configuration file contained in the inserted disk only defines the label of the target computer. For an empty or unformatted disk, downloading is possible after a successful identification procedure between the PDL and the target computer.



DFDRS
Description and Operation

FDIMU
- FDIU and DMU function combination
- FDIU-part connected to DMU-part

Discrete & digital parameter received
Parameters processed
Functions:
- Conversion
- Comparison
- Check & BITE

Input conversion into numerical format for:
- DFDR
- Optional QAR

Sent data compared with DFDR recorded data
Return of transmitted data through playback data bus
Integrity checks of mandatory parameters
When ENG shutdown: Only LA is checked
BITE & monitoring functions
FDIU/DMU ARINC 429 link for PCMCIA recording

The Flight Data Interface and Management Unit (FDIMU) combines two functions which operate independently from each other: the Flight Data Interface Unit (FDIU) and the Data Management Unit (DMU). An internal data-bus connects the two parts. The FDIU-part receives discrete and digital parameters and processes them. The functions of the FDIU-part are:
- conversion,
- comparison,
- check and Built-In Test Equipment (BITE).

The FDIU-part converts the input parameters into a numerical format for:
- the Digital Flight Data Recorder (DFDR),
- the optional Quick Access Recorder (QAR).
-the Digital AIDS Recorder (DAR)

The FDIU-part compares the data that it sends with the data recorded by the DFDR. The recorded data is transmitted back to the FDIU-part through the playback data bus. For PCMCIA recording function, data transmission from the FDIMU part to DMU part is given through an internal ARINC 429 data bus. The FDIU-part checks the integrity of the mandatory parameters during the flight. After the flight, engines shutdown, only the Linear Accelerometer (LA) signal check is done. The FDIU-part includes BITE and monitoring functions.

DFDR

4 Stores FDIU-part collected data
Last 25 hours data
Data frame = Data received during 1 sec
BITE functions included
Status signal sent to:
- CFDIU through FDIU-part
- ECAM through SDACs

Energy control: Power interlock circuit
A/C immersed: ULB for recorder location during 90 days
ULB battery activated by fresh and salt water

The DFDR stores data, which the FDIU-part has collected during the last 25 hours. The data is recorded in data frames. Each frame contains data received during one second. The DFDR includes BITE functions. The DFDR status signal is sent to the Centralized Fault Display Interface Unit (CFDIU) through the FDIU-part and to the Electronic Centralized Aircraft Monitoring (ECAM) through the System Data Acquisition Concentrators (SDACs). The DFDR energization is controlled through the power interlock circuit. The underwater locator beacon installed on the front face of the DFDR gives the location of the recorder during 90 days if the aircraft is immersed in water following an accident. The underwater locator beacon has a battery, which is activated by both fresh and salt water.

QAR (OPTIONAL)

Stores same data as DFDR

Data needed for:

- On ground performance
- Maintenance or monitoring task

Data frames identical to DFDR

BITE functions included

Status signal sent to:

- Front face lamps
- CFDIU through FDIU-part

Energy control through power interlock circuit

The QAR stores the same data as the DFDR for on ground performance, maintenance or condition monitoring tasks. The data frames stored in the QAR are identical to the DFDR data frames. The QAR includes BITE functions. The QAR status signals (QAR MEDIA LOW, QAR FAIL) are sent to the lamps on its front face and to the CFDIU through the FDIU-part. The QAR energization is controlled through the power interlock circuit. If installed, the DAR records data in a formatted optical disk.

LINEAR ACCELEROMETER

Measures all 3 axes A/C acceleration

Measurement range:

- Vertical axis (Z): -3 to +6 g
- Longitudinal and lateral axis (X, Y): -1 to +1 g

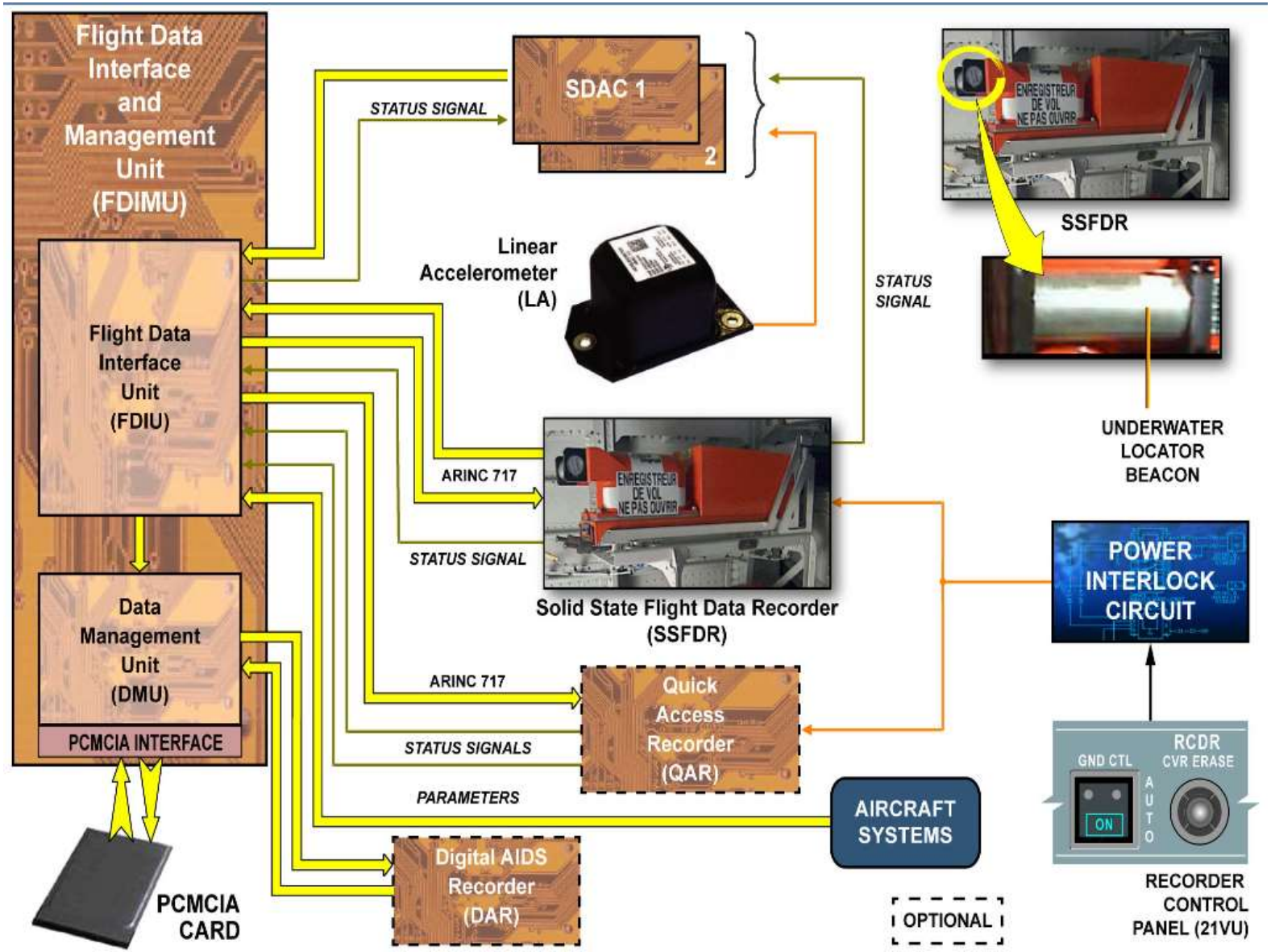
Analog signal sent to SDACs

Signal digitalized and sent to FDIU-part

The task of the LA is to measure the acceleration of the aircraft in all three axes. The range of measurement is:

- vertical axis (Z): -3 to +6 g,
- longitudinal axis (X): -1 to +1 g,
- lateral axis (Y): -1 to +1 g.

The LA generates an analog signal, which is sent to the SDACs. This signal is digitalized and sent to the FDIU-part through an ARINC 429 bus.


Flight Data Interface and Management Unit (FDIMU)
Flight Data Interface Unit (FDIU)
Data Management Unit (DMU)
PCMCIA INTERFACE
PCMCIA CARD
STATUS SIGNAL
SDAC 1
2
Linear Accelerometer (LA)
STATUS SIGNAL
ENREGISTREUR DE VOL NE PAS OUVRIR
SSFDR
UNDERWATER LOCATOR BEACON
ARINC 717
STATUS SIGNAL
Solid State Flight Data Recorder (SSFDR)
POWER INTERLOCK CIRCUIT
ARINC 717
Quick Access Recorder (QAR)
STATUS SIGNALS
PARAMETERS
AIRCRAFT SYSTEMS
Digital AIDS Recorder (DAR)
OPTIONAL
GND CTL
RCDR CVR ERASE
ON
AUTO
RECORDER CONTROL PANEL (21VU)


FDIMU Interfaces
GYRO
G
B
Y
APU
AUTO EXTING
TEST
RESET
ENG
1 FADEC GND PWR 2
HYD
GREEN
BLUE
YELLOW
3000
PSI
3000
PSI
3000
PTU
RAT
ELEC
1
ELEC
2
A/SKID &
N/W STRG
ON

ARINC 429 INPUTS

15 buses

10 of which shared with DMU-part

Most information is given to the Flight Data Interface and Management Unit (FDIMU) through ARINC 429 buses. The Flight Data Interface Unit (FDIU) part of the FDIMU receives 15 ARINC 429 buses 10 of which are shared with Data Management Unit (DMU) part.

NOTE: The Linear Accelerometer (LA) sends an analog signal to the System Data Acquisition Concentrators (SDACs), which digitalizes it before to send it to the FDIU-part.

ARINC 429 OUTPUTS

2 outputs:

- 1 to CFDIU for maintenance & test
- 1 to MDDU to load S/W

2 ARINC 429 output buses are supplied. The output bus to the Centralized Fault Display Interface Unit (CFDIU) is used for maintenance and test of the Digital Flight Data Recording System (DFDRS). The output bus to the Multipurpose Disk Drive Unit (MDDU) allows to load the application-software of the FDIU-part and DMU-part.

In option, for the SSFDR/QAR (ARINC 600), the recording speed can be 256 words/sec.

DISCRETE INPUTS

54 inputs for A/C identification coding

5 inputs for:

- DFDR status
- Event mark
- QAR FAIL
- QAR MEDIA LOW
- MDDU select

54 discrete inputs are given for aircraft identification coding. 5 other inputs are given for:

- Digital Flight Data Recorder (DFDR) status,
- event mark, Quick Access Recorder (QAR) FAIL,
- QAR MEDIA LOW information and,
- MDDU selection.

NOTE: The QAR is optional.

DISCRETE OUTPUT

1 output to SDACs

Display FDIU FAULT message on ECAM

1 discrete output is used by the SDACs to display the FDIU FAULT message on the Electronic Centralized Aircraft Monitoring (ECAM).

NOTE: To display the DFDR FAULT message on the ECAM, a DFDR status signal is directly sent by the DFDR to the SDACs.

ARINC 717 OUTPUT

Data to be recorded sent to :

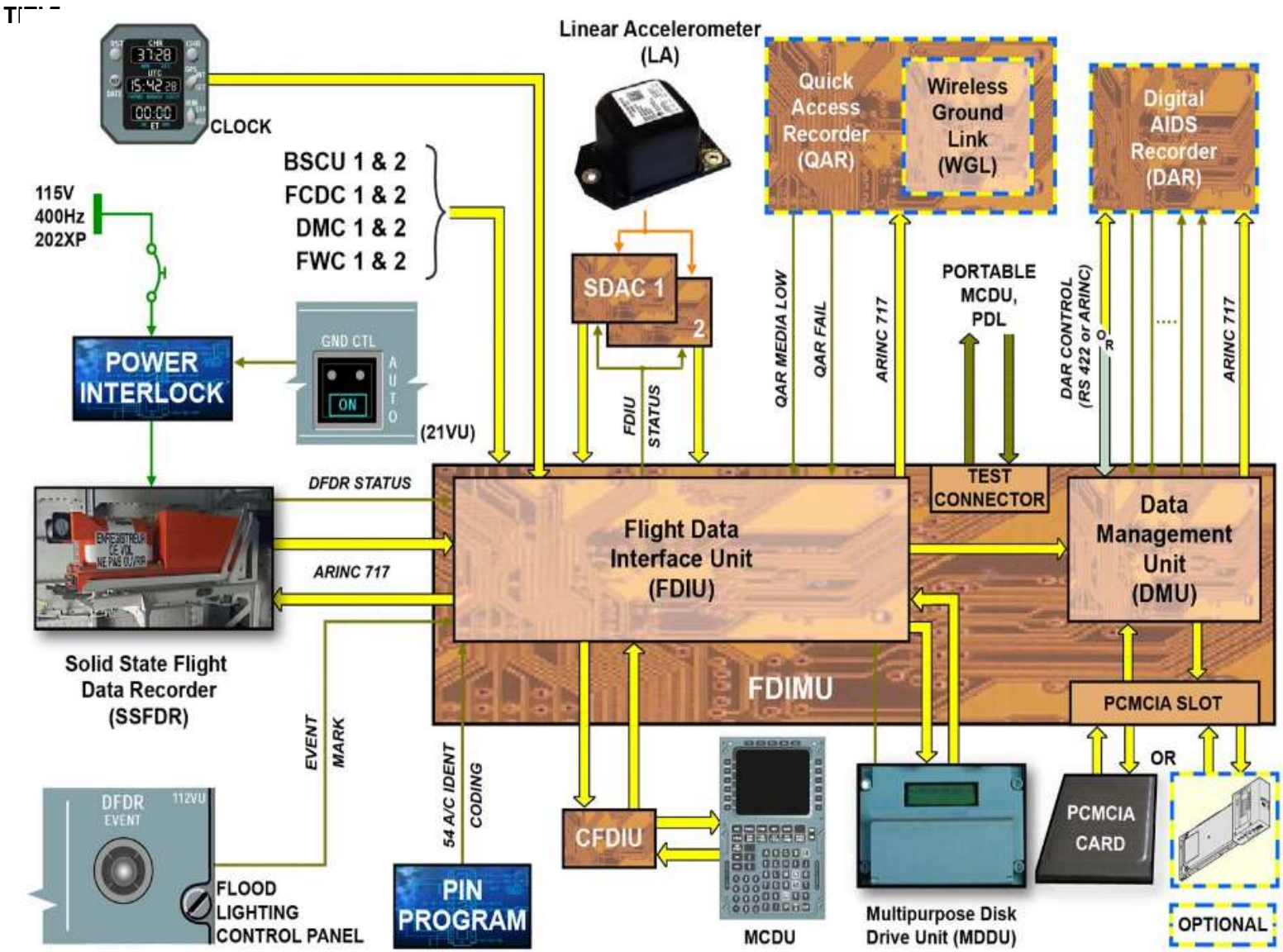
- DFDR
- QAR

The FDIU-part of the FDIMU sends the data to be recorded to the DFDR and the optional QAR through ARINC 717 output bus.

ARINC 717 INPUT
Recorded data verification
DFDR sends playback data to FDIU
To verify the recorded data, the FDIU-part of the FDIMU receives the DFDR playback data through ARINC717 input bus.

PCMCIA INTERFACE
S/W uploading
AIDS reports downloading
Optional SPC for WEFA function
A PCMCIA interface is integrated in the FDIMU to upload application-software and download Aircraft Integrated Data System (AIDS) reports with a notebook computer.
An optional Smart PCMCIA Card (SPC) hosting a SIM card can be inserted into the PCMCIA interface as an alternative to a normal PCMCIA card. The SPC enables Wireless Extension For ACMS (WEFA) function to transfer maintenance data to the ground.

RS 232
To connect portable MCDU or PDL
For maintenance test
To enable the connection of a portable MCDU or a Portable Data Loader (PDL), a test connector is installed on the front panel of the FDIMU. The interface for maintenance test and program is RS 232.


Linear Accelerometer (LA)
Quick Access Recorder (QAR)
Wireless Ground Link (WGL)
Digital AIDS Recorder (DAR)
CLOCK
BSCU 1 & 2
FCDC 1 & 2
DMC 1 & 2
FWC 1 & 2
115V 400Hz 202XP
SDAC 1
2
POWER INTERLOCK
GND CTL
ON
AUTO
(21VU)
FDIU STATUS
QAR MEDIA LOW
QAR FAIL
ARINC 717
PORTABLE MCDU, PDL
DAR CONTROL (RS 422 or ARINC)
OR
....
ARINC 717
DFDR STATUS
ARINC 717
TEST CONNECTOR
Flight Data Interface Unit (FDIU)
Data Management Unit (DMU)
FDIMU
PCMCIA SLOT
Solid State Flight Data Recorder (SSFDR)
EVENT MARK
54 A/C IDENT
CODING
DFDR EVENT
112VU
FLOOD LIGHTING CONTROL PANEL
PIN PROGRAM
CFDIU
MCDU
Multipurpose Disk Drive Unit (MDDU)
PCMCIA CARD
OR
OPTIONAL


Print Report Standard
Header Description
HYD
PTU
RAT
ELEC
1
2
AUTO EXTING
TEST
RESET
1 FADEC GND PWR 2
A/SKID &
N/W STRG
ON
OFF

FDIMU
Printed on each report
At the top: Report information
In the middle: A/C & flight information
At the bottom: General data
A standard header is printed on each report. It is composed of information about the report at the top, information about the aircraft and the flight in the middle and general data at the bottom. The even number lines are always blank.

FREE PROGRAMMABLE LINES
3 free programmable lines
Stored in OBRM 2
The content of these three lines is free programmable to enable airline specific messages and is stored in the On Board Replaceable Module (OBRM) 2.

REPORT NAME
Report identification, title and number
This line contains the report identification, title and number.

AIRCRAFT AND FLIGHT INFORMATION
Line CC:
- A/C ID
- DATE
- UTC
- FROM TO
- FLT

Line CC contains the following data:
- A/C ID means aircraft identification (example: F-AIWW),
- DATE means date (example JUN01),
- UTC means Universal Time Coordinated (example: hours/minutes/seconds),
- FROM TO means city pair identification (example: LFBO (Toulouse) EDHI (Hamburg)),
- FLT means flight number (example: 0019).

GENERAL DATA
Line C1:
- PH
- CNT
- CODE
- BLEED STATUS
- APU

Line CE:
- TAT
- ALT
- CAS
- MN
- GW
- CG
- DMU/SW (BO & G1)

Hexadecimal checksum
Each data line starts with two identification letters. In this example CC, C1 and CE are line identifiers. Lines C1 and CE contain the following data:
- PH 06 means flight phase 6,
- CNT 01204 means record counter. The three left most numbers are the numbers of reports that were previously initiated, either automatically or by the remote print button. The example shows 12 reports previously issued and the last report was 04: Take off report.
- CODE 4110 Trigger condition code,
- BLEED STATUS,
- Total Air Temperature (TAT) N435 means -43.5C,
- ALT 30000 means 30.000 feet,
- CAS 180 means 180 kts,
- MN 7000 means 0.700 Mach,
- Gross Weight (GW) 6000 means 60.000 kg,
- CG 250 means Center of Gravity at 25% Mean Aerodynamic Chord (MAC),
- DMU/SW BO is the Data Management Unit (DMU) software (S/W) identification and OBRM 1 S/W identification. G1 is the OBRM 2 S/W identification.

A checksum is printed in two hexadecimal characters at the end of each data line. In this example 97, A0 and 7D are the checksum of the data lines.

TRIGGER CONDITION CODE

To identify what caused generation of report

Numerical code:

1000: MCDU manual selection

2000: AIDS PRINT P/B

3000: Start logic programmed

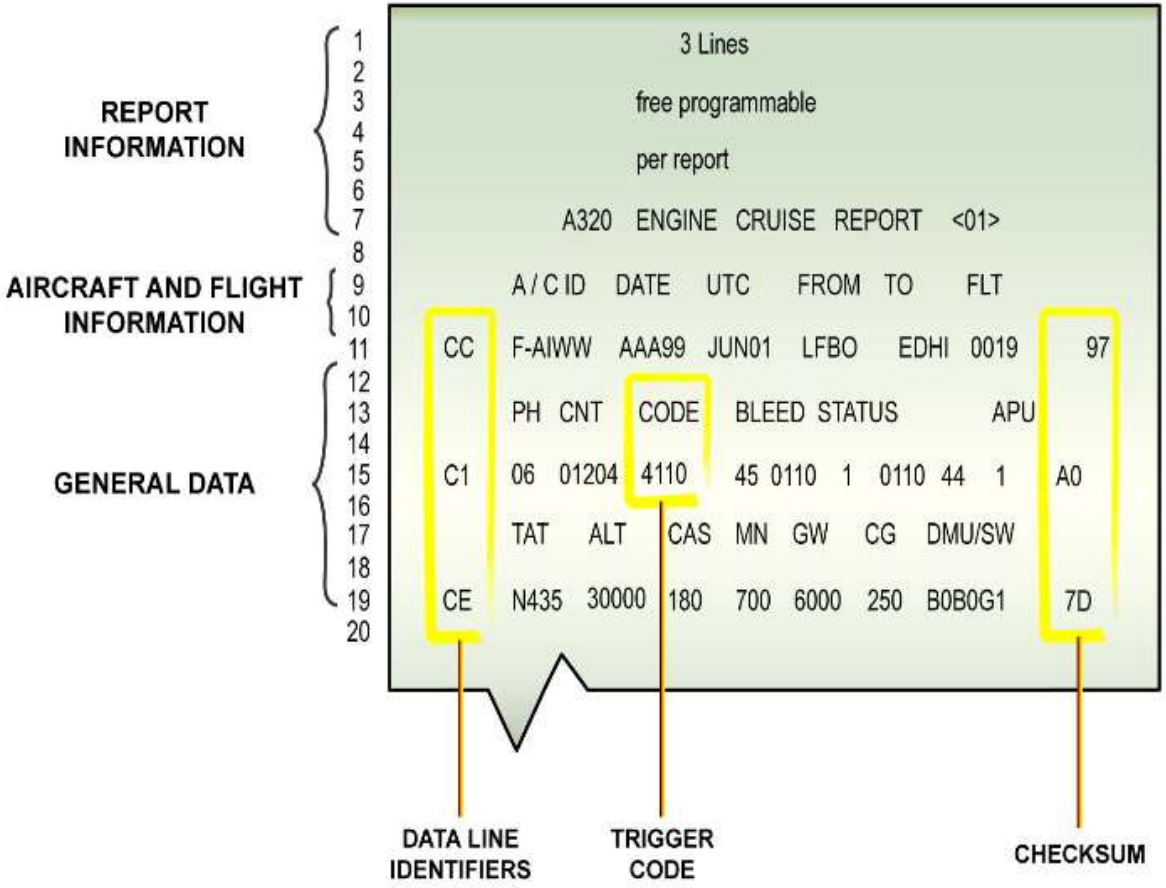
4000 to 7000: Combination of logic conditions

"T" right digit indication if report triggered via ACARS

To identify the trigger condition that caused the generation of a report, a numerical code is provided:

- 1000: Manual selection via MCDU,
- 2000: Flight phase dependent manual selection via Aircraft Integrated Data System (AIDS) PRINT P/B if programmed by the airline,
- 3000: Start logic programmed by the airline,
- 4000 to 7000: Report triggered by a combination of logic conditions (refer to Aircraft Maintenance Manual (AMM) 31-36-00 for the detailed trigger logics associated to each report),

In this example, the code is 4110. The three left most digits are the logic code number, which has triggered the report. The right most digit shows the number of the consecutive reports issued or it shows a "T" if the report was triggered via Aircraft Communication Addressing and Reporting System (ACARS).


REPORT INFORMATION
AIRCRAFT AND FLIGHT INFORMATION
GENERAL DATA
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
3 Lines
free programmable
per report
A320 ENGINE CRUISE REPORT <01>
A/C ID DATE UTC FROM TO FLT
CC F-AIWW AAA99 JUN01 LFBO EDHI 0019 97
PH CNT CODE BLEED STATUS APU
C1 06 01204 4110 45 0110 1 0110 44 1 A0
TAT ALT CAS MN GW CG DMU/SW
CE N435 30000 180 700 6000 250 B0B0G1 7D
DATA LINE IDENTIFIERS
TRIGGER CODE
CHECKSUM

BLEED STATUS

Discrete coded information:

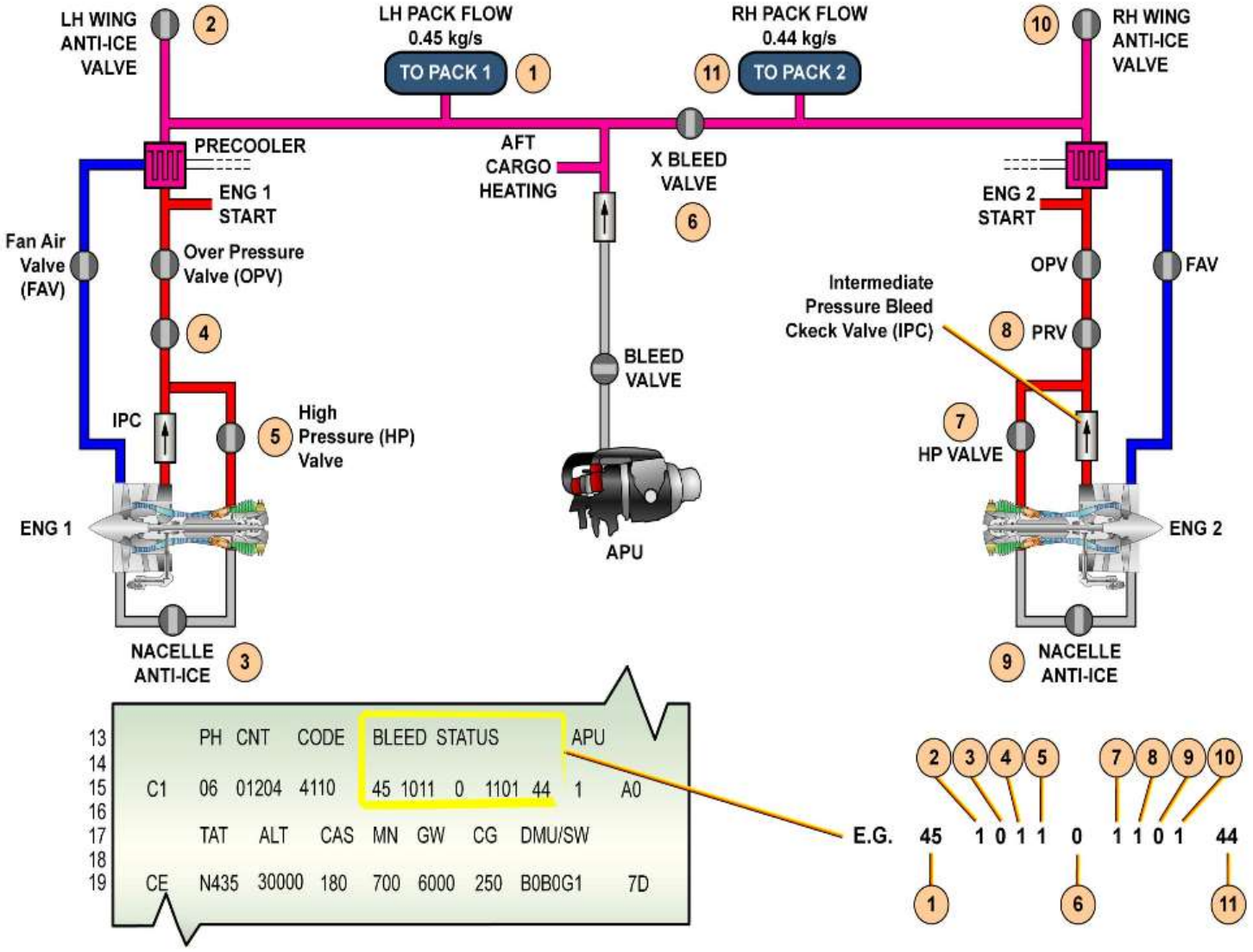
0 = valve closed

1 = valve open

Numerical values (see example)

Bleed status is indicated with discrete coded information and numerical values. In the discrete coded information, 0 indicates that the valve is closed and 1 indicates that the valve is open.

T


LH WING ANTI-ICE VALVE
2
LH PACK FLOW 0.45 kg/s
TO PACK 1
1
RH PACK FLOW 0.44 kg/s
11
TO PACK 2
10
RH WING ANTI-ICE VALVE
PRECOOLER
ENG 1 START
AFT CARGO HEATING
X BLEED VALVE
6
ENG 2 START
Fan Air Valve (FAV)
Over Pressure Valve (OPV)
OPV
FAV
Intermediate Pressure Bleed Ckeck Valve (IPC)
8
PRV
4
BLEED VALVE
IPC
5
High Pressure (HP) Valve
7
HP VALVE
ENG 1
APU
ENG 2
NACELLE ANTI-ICE
3
9
NACELLE ANTI-ICE
13 PH CNT CODE BLEED STATUS APU
15 C1 06 01204 4110 45 1011 0 1101 44 1 A0
17 TAT ALT CAS MN GW CG DMU/SW
19 CE N435 30000 180 700 6000 250 B0B0G1 7D
E.G.
2 3 4 5 7 8 9 10
45 1 0 1 1 0 1 1 0 1 44
1 6 11


Individual Print Report Description
HYD
PSI
3000
PSI
3000
PTU
RAT
ELEC
1
ELEC
2
APU
AUTO EXTING
TEST
RESET
1 FADEC GND PWR 2

GENERAL

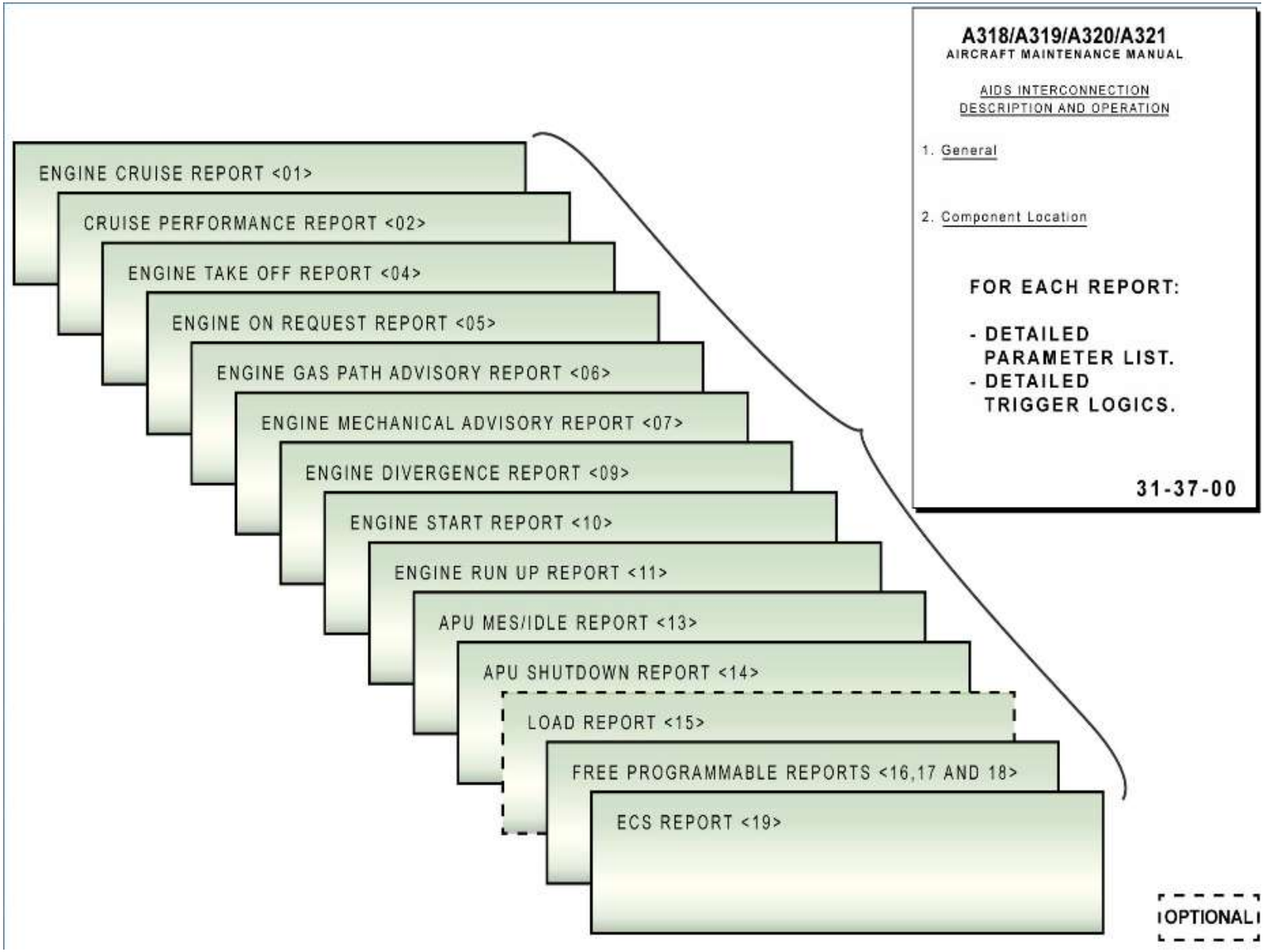
Report = Set of data related to a specific event
Alpha call-up parameters
16 different reports processed by DMU:
- 13 STD for engine & APU monitoring
- 3 free programmable reports (16,17 & 18)

STD report characteristics:
- Fixed trigger mechanism
- Fixed data collection
- Fixed output formatting

Report reprogrammable with GSE
Report manually generated via:
- MCDU
- Remote print button

A report is a comprehensive set of data related to a specific event (e.g. limit exceedance of engine parameters). The parameters contained in the reports are among the parameters provided with an alpha call-up (refer to Aircraft Maintenance Manual (AMM) 31-37-00 for the detailed parameter list associated to each report). The Data Management Unit (DMU) processes up to 16 different types of report:
- 13 standard reports for basic aircraft, engine and APU monitoring. These reports have fixed trigger mechanism, fixed data collection and fixed output formatting. Nevertheless, certain constants and limits within fixed trigger logics are reprogrammable. Specific trigger conditions can be created for each report by means of the Ground Support Equipment (GSE).
- 3 free programmable reports, numbered from 16 to 18, for airline specific investigation and trouble shooting.

In addition to the automatic trigger logics, all the print reports can be generated from the MCDU. During any flight phase the relevant report may be generated and printed using the remote print button located on the center pedestal.
NOTES:
- In this module, reports are given for a CFM engine. They may be slightly different to your aircraft configuration.
- Depending on the DMU, which is fitted on your aircraft, the LOAD REPORT <15> may not be applicable.


A318/A319/A320/A321
AIRCRAFT MAINTENANCE MANUAL
AIDS INTERCONNECTION
DESCRIPTION AND OPERATION
1. General
2. Component Location
FOR EACH REPORT:
- DETAILED PARAMETER LIST.
- DETAILED TRIGGER LOGICS.
31-37-00
ENGINE CRUISE REPORT <01>
CRUISE PERFORMANCE REPORT <02>
ENGINE TAKE OFF REPORT <04>
ENGINE ON REQUEST REPORT <05>
ENGINE GAS PATH ADVISORY REPORT <06>
ENGINE MECHANICAL ADVISORY REPORT <07>
ENGINE DIVERGENCE REPORT <09>
ENGINE START REPORT <10>
ENGINE RUN UP REPORT <11>
APU MES/IDLE REPORT <13>
APU SHUTDOWN REPORT <14>
LOAD REPORT <15>
FREE PROGRAMMABLE REPORTS <16,17 AND 18>
ECS REPORT <19>
OPTIONAL

ENGINE CRUISE REPORT <01>

A/C in stable cruise condition

It records:

- Engine 1 & 2 operating conditions
- Autopilot engagement status
- Generator load

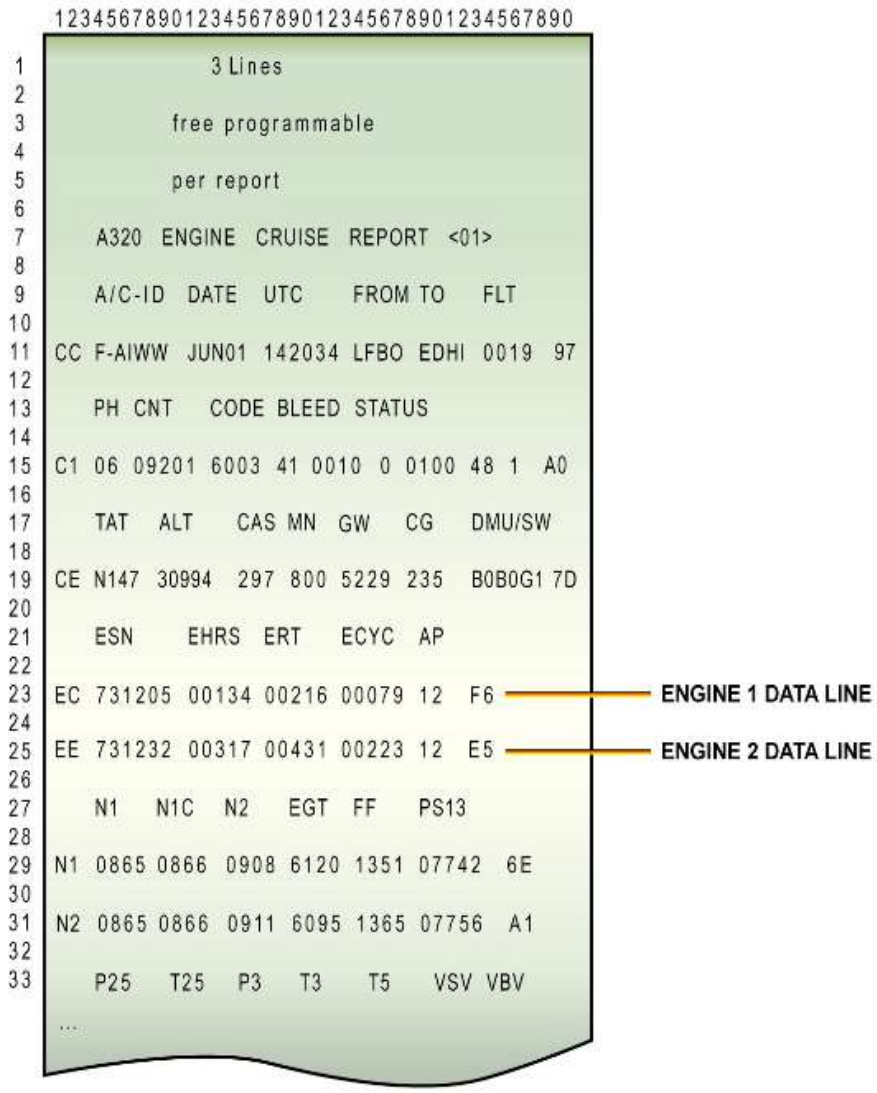
Data = averages over 20 s except:

- ESN
- Oil consumption
- EHRS
- ECYC

The report is generated when the aircraft is in stable cruise condition. It records operating conditions of engine 1 and 2 plus autopilot engagement status and generator load. All data is an average over 20 seconds with the exception of:

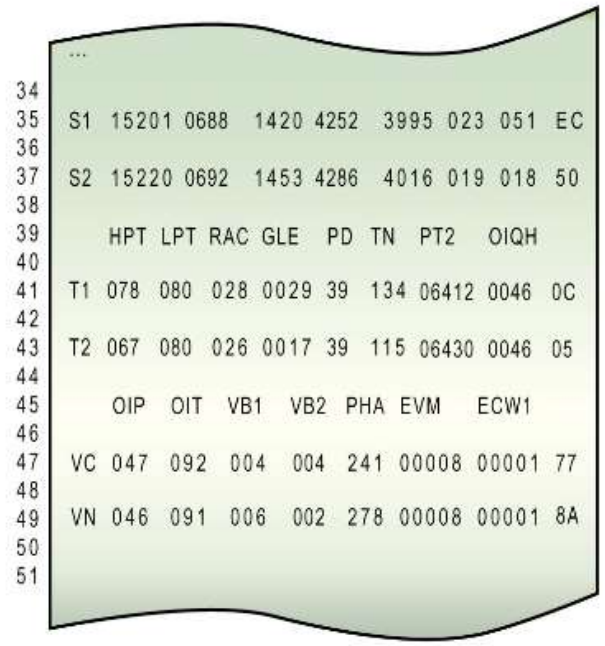
- Engine Serial Number (ESN),
- oil consumption,
- Engine flight hours (EHRS),
- Engine cycle (ECYC).

NOTE: In this lesson the reports are given as an example and will not be customized. They may differ from what you will actually find on your aircraft. Parameters are given for a CFM engine. This may be different to your aircraft configuration.



ENGINE 1 DATA LINE

ENGINE 2 DATA LINE



Alpha call up such as:
- **N1,**
- **N1C,**
- **N2,**
- **EGT,**
- **FF,**
- **PS13,**
- **etc...**

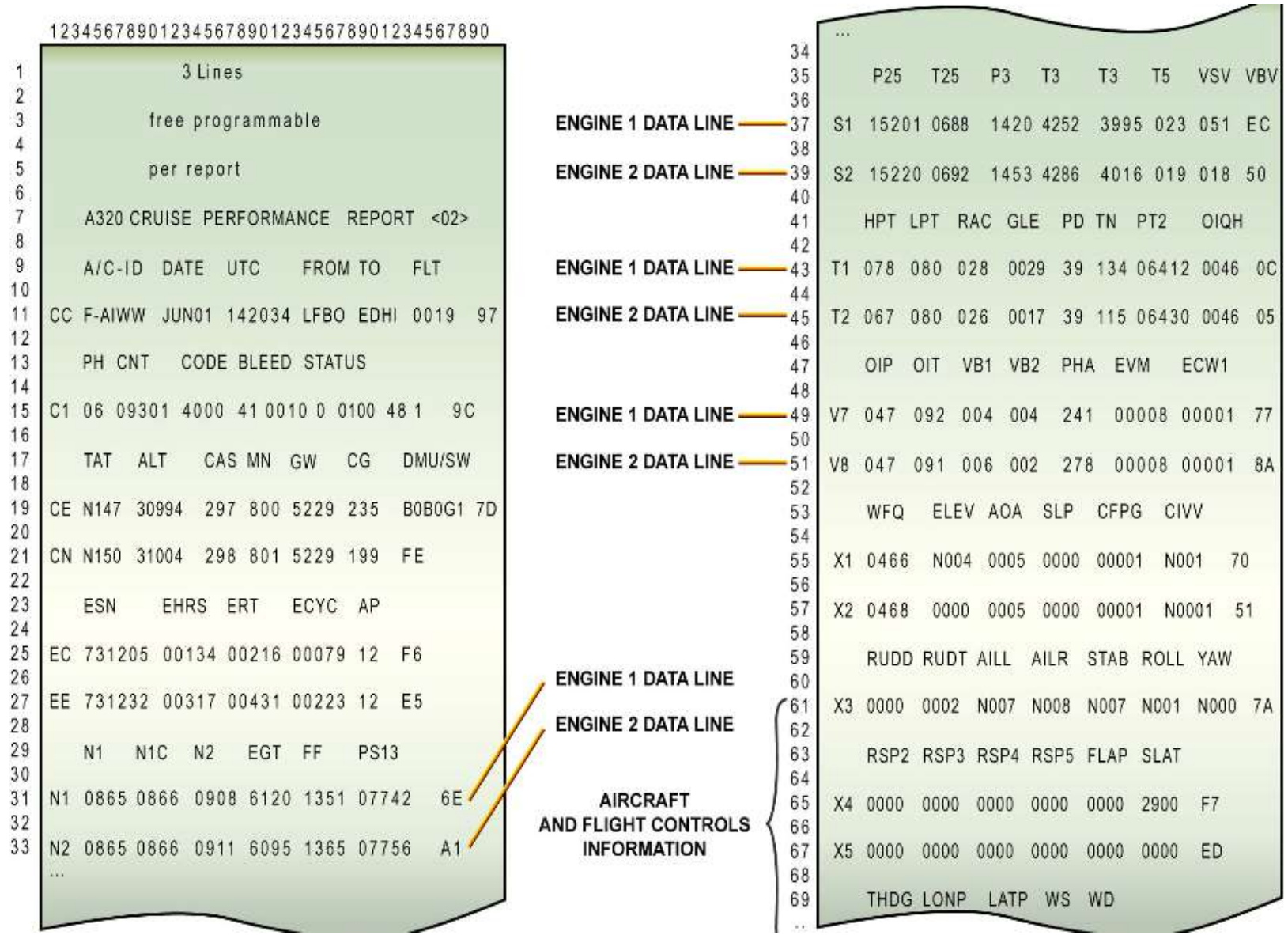
are listed in the appendix.

CRUISE PERFORMANCE REPORT <02>

Similar to report <01>
Exceptions:

- Sampled for longer periods
- More A/C info provided

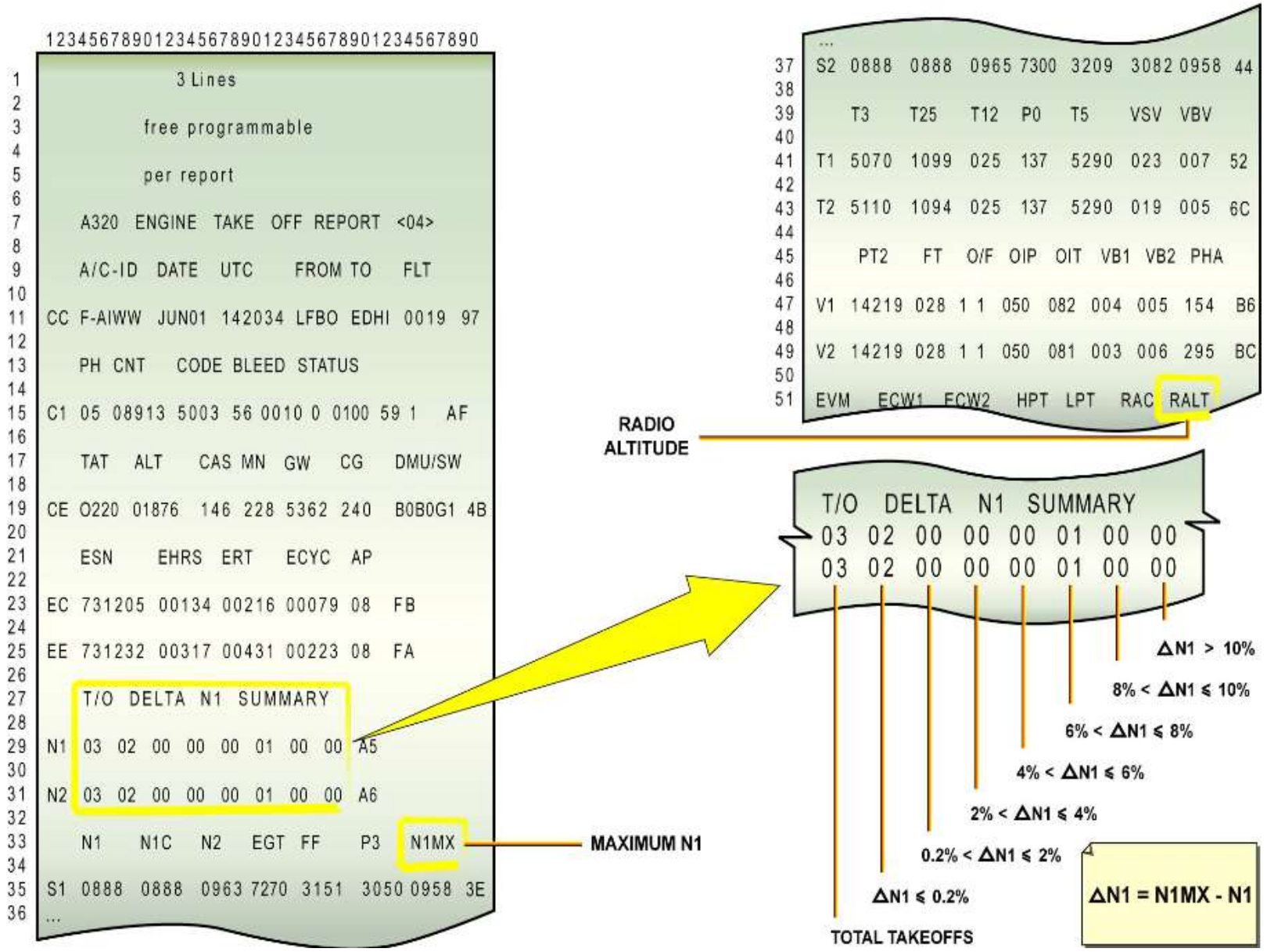
This report is similar to report <01> except that reports are sampled for longer periods and more information is provided about the aircraft.


1234567890123456789012345678901234567890
3 Lines
free programmable
per report
A320 CRUISE PERFORMANCE REPORT <02>
A/C-ID DATE UTC FROM TO FLT
CC F-AIWW JUN01 142034 LFBO EDHI 0019 97
PH CNT CODE BLEED STATUS
C1 06 09301 4000 41 0010 0 0100 48 1 9C
TAT ALT CAS MN GW CG DMU/SW
CE N147 30994 297 800 5229 235 B0B0G1 7D
CN N150 31004 298 801 5229 199 FE
ESN EHRS ERT ECYC AP
EC 731205 00134 00216 00079 12 F6
EE 731232 00317 00431 00223 12 E5
N1 N1C N2 EGT FF PS13
N1 0865 0866 0908 6120 1351 07742 6E
N2 0865 0866 0911 6095 1365 07756 A1
...
ENGINE 1 DATA LINE
ENGINE 2 DATA LINE
ENGINE 1 DATA LINE
ENGINE 2 DATA LINE
ENGINE 1 DATA LINE
ENGINE 2 DATA LINE
ENGINE 1 DATA LINE
ENGINE 2 DATA LINE
AIRCRAFT AND FLIGHT CONTROLS INFORMATION
...
P25 T25 P3 T3 T3 T5 VSV VBV
S1 15201 0688 1420 4252 3995 023 051 EC
S2 15220 0692 1453 4286 4016 019 018 50
HPT LPT RAC GLE PD TN PT2 OIQH
T1 078 080 028 0029 39 134 06412 0046 0C
T2 067 080 026 0017 39 115 06430 0046 05
OIP OIT VB1 VB2 PHA EVM ECW1
V7 047 092 004 004 241 00008 00001 77
V8 047 091 006 002 278 00008 00001 8A
WFQ ELEV AOA SLP CFPG CIVV
X1 0466 N004 0005 0000 00001 N001 70
X2 0468 0000 0005 0000 00001 N0001 51
RUDD RUDT AILL AILR STAB ROLL YAW
X3 0000 0002 N007 N008 N007 N001 N000 7A
RSP2 RSP3 RSP4 RSP5 FLAP SLAT
X4 0000 0000 0000 0000 0000 2900 F7
X5 0000 0000 0000 0000 0000 0000 ED
THDG LONP LATP WS WD

ENGINE TAKE OFF REPORT <04>

Generated few second after TO
Engine TO report intervals programmable
Contain engines data and radio altitude
T/O Δ N1= N1MX - N1
Concerns both engines
History erased if engine replaced

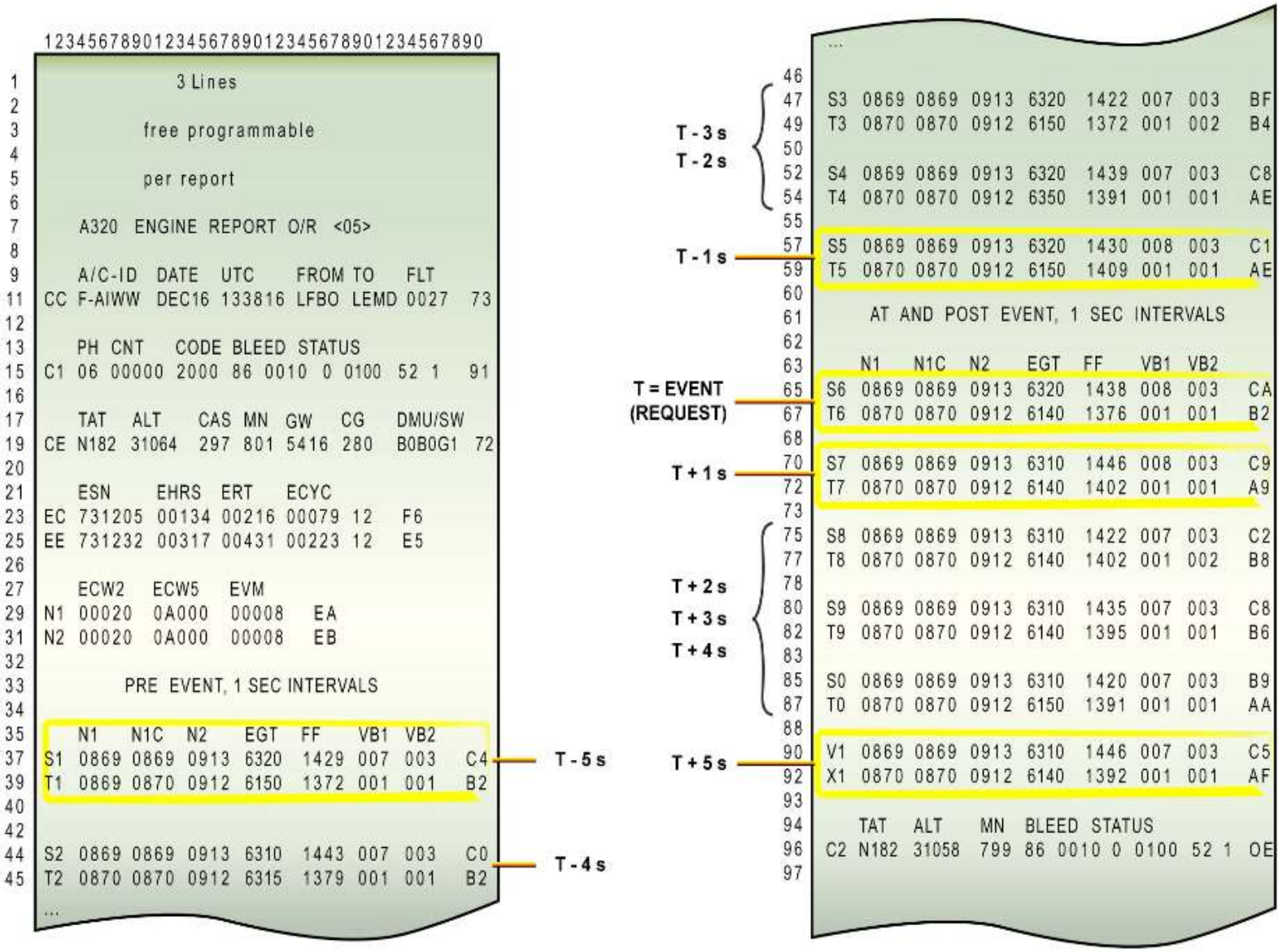
This report is generated a few seconds after takeoff (TO). The number of intervals between each engine TO report is programmable. It contains engine data at TO and radio altitude. T/O DELTA N1 SUMMARY is an history of N1 value compared to N1max for all the last takeoffs since the last generated report (Code 4000). This concerns both engines. This history is erased in case of engine replacement.


1234567890123456789012345678901234567890
3 Lines
free programmable
per report
A320 ENGINE TAKE OFF REPORT <04>
A/C-ID DATE UTC FROM TO FLT
CC F-AIWW JUN01 142034 LFBO EDHI 0019 97
PH CNT CODE BLEED STATUS
C1 05 08913 5003 56 0010 0 0100 59 1 AF
TAT ALT CAS MN GW CG DMU/SW
CE 0220 01876 146 228 5362 240 B0B0G1 4B
ESN EHRS ERT ECYC AP
EC 731205 00134 00216 00079 08 FB
EE 731232 00317 00431 00223 08 FA
T/O DELTA N1 SUMMARY
N1 03 02 00 00 00 01 00 00 A5
N2 03 02 00 00 00 01 00 00 A6
N1 N1C N2 EGT FF P3 N1MX
S1 0888 0888 0963 7270 3151 3050 0958 3E
...
S2 0888 0888 0965 7300 3209 3082 0958 44
T3 T25 T12 P0 T5 VSV VBV
T1 5070 1099 025 137 5290 023 007 52
T2 5110 1094 025 137 5290 019 005 6C
PT2 FT O/F OIP OIT VB1 VB2 PHA
V1 14219 028 1 1 050 082 004 005 154 B6
V2 14219 028 1 1 050 081 003 006 295 BC
EVM ECW1 ECW2 HPT LPT RAC RALT
RADIO ALTITUDE
MAXIMUM N1
T/O DELTA N1 SUMMARY
03 02 00 00 00 01 00 00
03 02 00 00 00 01 00 00
ΔN1 > 10%
8% < ΔN1 ≤ 10%
6% < ΔN1 ≤ 8%
4% < ΔN1 ≤ 6%
2% < ΔN1 ≤ 4%
0.2% < ΔN1 ≤ 2%
ΔN1 ≤ 0.2%
TOTAL TAKEOFFS
ΔN1 = N1MX - N1

ENGINE ON REQUEST REPORT <05>

Generated manually
In flight phase 1 to 3
Parameters recorded at 1 s intervals:
- From 5 s before request
- To 5 s after request

This report is generated in flight phases 1 to 3 by manual request. The parameters recorded are taken in 1 s intervals from 5 s before the request to 5 s after the request.


1234567890123456789012345678901234567890
3 Lines
free programmable
per report
A320 ENGINE REPORT O/R <05>
A/C-ID DATE UTC FROM TO FLT
CC F-AIWW DEC16 133816 LFBO LEMD 0027 73
PH CNT CODE BLEED STATUS
C1 06 00000 2000 86 0010 0 0100 52 1 91
TAT ALT CAS MN GW CG DMU/SW
CE N182 31064 297 801 5416 280 B0B0G1 72
ESN EHRS ERT ECYC
EC 731205 00134 00216 00079 12 F6
EE 731232 00317 00431 00223 12 E5
ECW2 ECW5 EVM
N1 00020 0A000 00008 EA
N2 00020 0A000 00008 EB
PRE EVENT, 1 SEC INTERVALS
N1 N1C N2 EGT FF VB1 VB2
S1 0869 0869 0913 6320 1429 007 003 C4
T1 0869 0870 0912 6150 1372 001 001 B2
S2 0869 0869 0913 6310 1443 007 003 C0
T2 0870 0870 0912 6315 1379 001 001 B2
T-5s
T-4s
T-3s
T-2s
S3 0869 0869 0913 6320 1422 007 003 BF
T3 0870 0870 0912 6150 1372 001 002 B4
S4 0869 0869 0913 6320 1439 007 003 C8
T4 0870 0870 0912 6350 1391 001 001 AE
T-1s
S5 0869 0869 0913 6320 1430 008 003 C1
T5 0870 0870 0912 6150 1409 001 001 AE
AT AND POST EVENT, 1 SEC INTERVALS
N1 N1C N2 EGT FF VB1 VB2
T = EVENT
(REQUEST)
S6 0869 0869 0913 6320 1438 008 003 CA
T6 0870 0870 0912 6140 1376 001 001 B2
T+1s
S7 0869 0869 0913 6310 1446 008 003 C9
T7 0870 0870 0912 6140 1402 001 001 A9
T+2s
T+3s
T+4s
S8 0869 0869 0913 6310 1422 007 003 C2
T8 0870 0870 0912 6140 1402 001 002 B8
S9 0869 0869 0913 6310 1435 007 003 C8
T9 0870 0870 0912 6140 1395 001 001 B6
S0 0869 0869 0913 6310 1420 007 003 B9
T0 0870 0870 0912 6150 1391 001 001 AA
T+5s
V1 0869 0869 0913 6310 1446 007 003 C5
X1 0870 0870 0912 6140 1392 001 001 AF
TAT ALT MN BLEED STATUS
C2 N182 31058 799 86 0010 0 0100 52 1 OE

ENGINE GAS PATH ADVISORY REPORT <06>

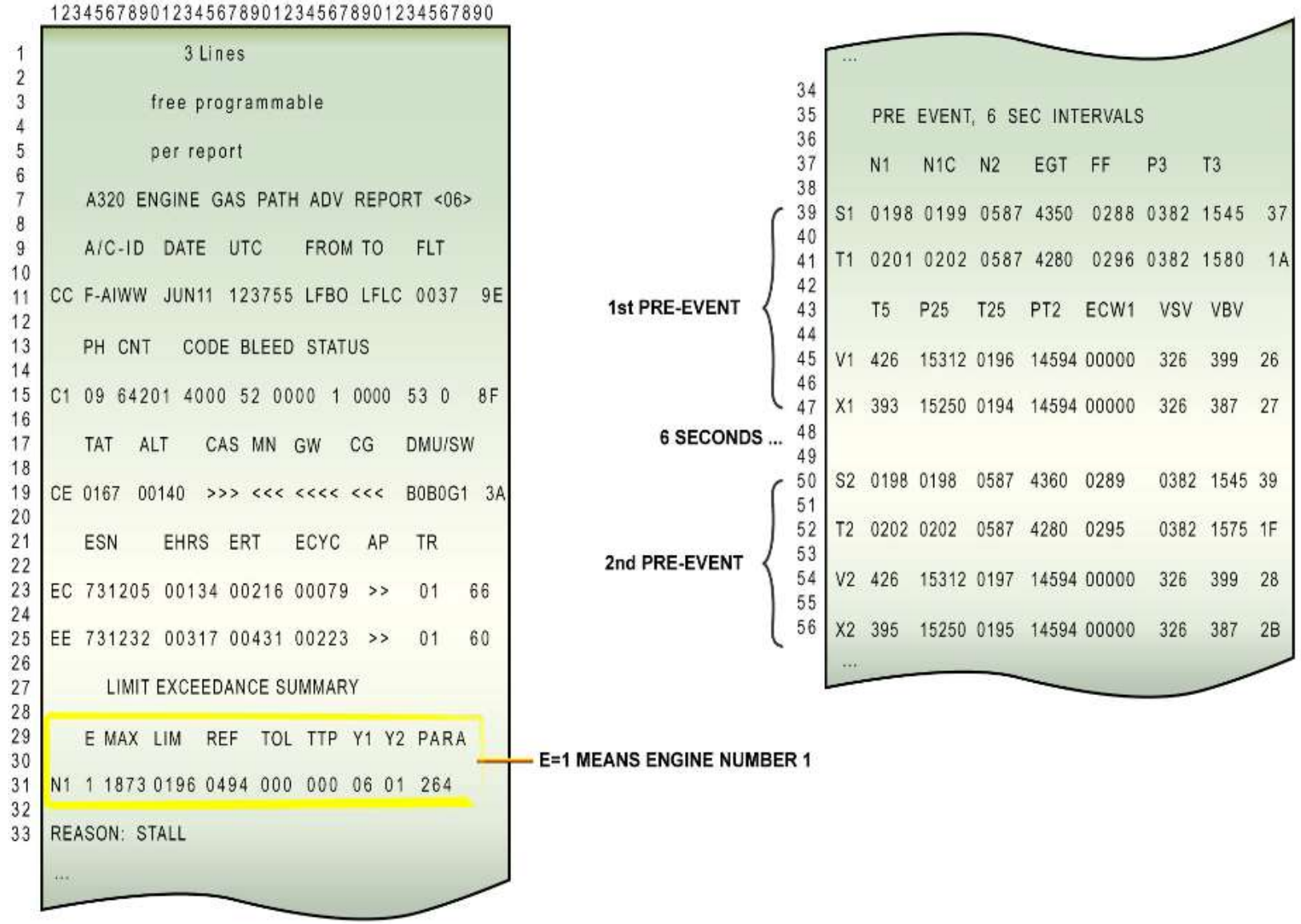
Trigger conditions:
- ENG Stall
- Exceedance of N1, N2 or EGT
- ENG auto shutdown

1 report per engine
Before event:
- 3 sets of parameters recorded
- 6 s intervals

After event:
- 5 sets recorded
- 1 s intervals

This report is generated when one of the following conditions is met:
- engine stall,
- N1 limit exceeded,
- N2 limit exceeded,
- Exhaust Gas Temperature (EGT) limit exceeded,
- engine auto shutdown.

There is one report for each engine. 3 sets of parameters are recorded at 6 s intervals before the event and 5 sets are recorded at 1 s intervals after the event.


1234567890123456789012345678901234567890
3 Lines
free programmable
per report
A320 ENGINE GAS PATH ADV REPORT <06>
A/C-ID DATE UTC FROM TO FLT
CC F-AIWW JUN11 123755 LFBO LFLC 0037 9E
PH CNT CODE BLEED STATUS
C1 09 64201 4000 52 0000 1 0000 53 0 8F
TAT ALT CAS MN GW CG DMU/SW
CE 0167 00140 >>> <<< <<<< <<< B0B0G1 3A
ESN EHRS ERT ECYC AP TR
EC 731205 00134 00216 00079 >> 01 66
EE 731232 00317 00431 00223 >> 01 60
LIMIT EXCEEDANCE SUMMARY
E MAX LIM REF TOL TTP Y1 Y2 PARA
N1 1 1873 0196 0494 000 000 06 01 264
REASON: STALL
...
E=1 MEANS ENGINE NUMBER 1
...
PRE EVENT, 6 SEC INTERVALS
N1 N1C N2 EGT FF P3 T3
S1 0198 0199 0587 4350 0288 0382 1545 37
T1 0201 0202 0587 4280 0296 0382 1580 1A
1st PRE-EVENT
T5 P25 T25 PT2 ECW1 VSV VBV
V1 426 15312 0196 14594 00000 326 399 26
X1 393 15250 0194 14594 00000 326 387 27
6 SECONDS ...
S2 0198 0198 0587 4360 0289 0382 1545 39
T2 0202 0202 0587 4280 0295 0382 1575 1F
2nd PRE-EVENT
V2 426 15312 0197 14594 00000 326 399 28
X2 395 15250 0195 14594 00000 326 387 2B
...

ENGINE MECHANICAL ADVISORY REPORT <07>

Report generated in case of exceedance:
- Oil temperature
- Oil pressure
- Engine vibrations

Before event:
- 5 sets of parameters recorded
- 4 s intervals

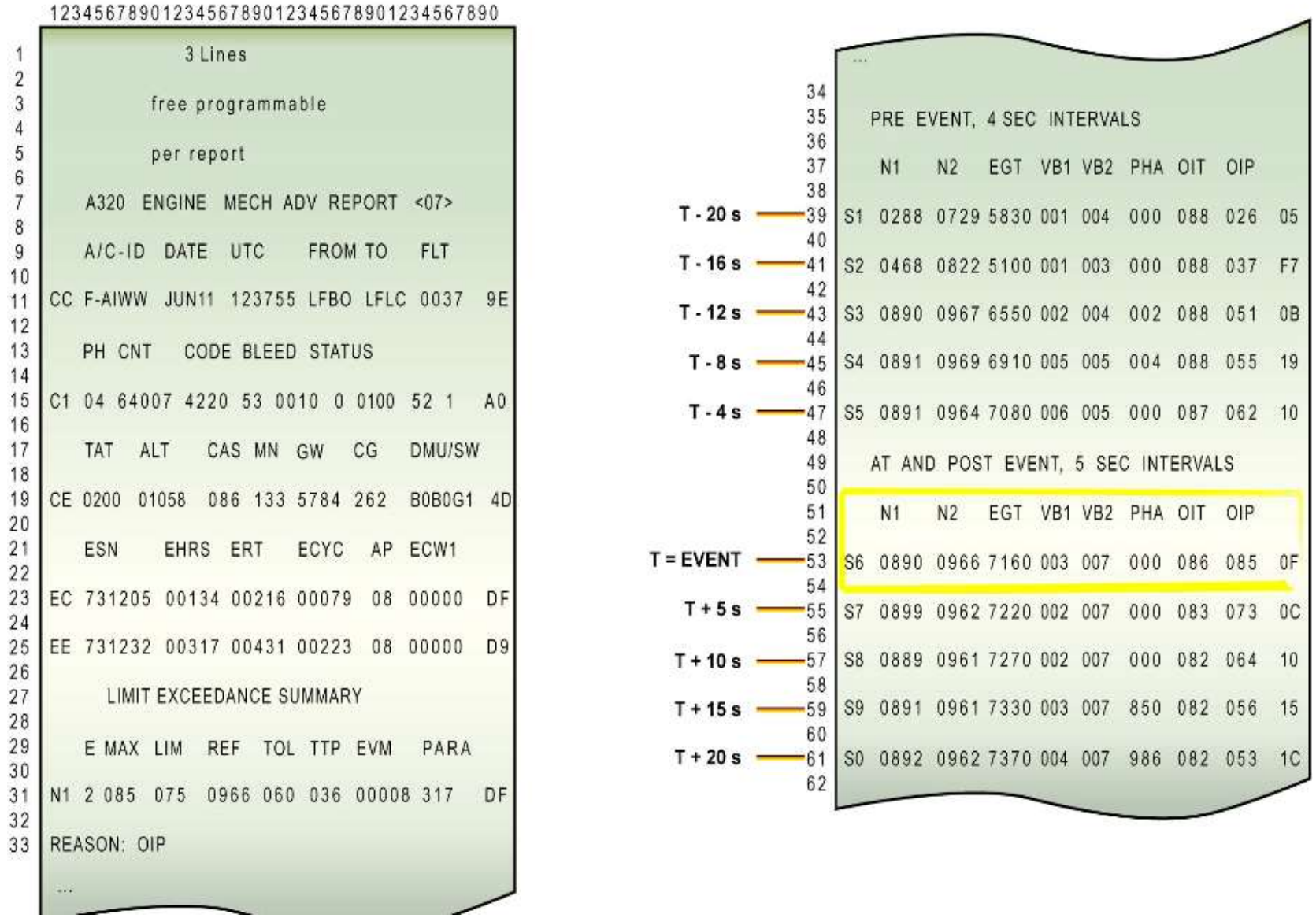
After event:
- 4 sets recorded
- 5 s intervals

1 report per engine

Recording stops when:
- Correct parameters recovered
- Or report completed

This report is generated when one of the following parameters is exceeded:
- oil temperature,
- oil pressure,
- vibration (N1 or N2).

5 parameter sets are recorded at 4 s intervals before the event and 4 parameter sets at 5 s intervals after the event. There is one report for each engine. Recording stops when exceeded parameters are back within operating conditions, or when the report as shown above is completed.


1234567890123456789012345678901234567890
3 Lines
free programmable
per report
A320 ENGINE MECH ADV REPORT <07>
A/C-ID DATE UTC FROM TO FLT
CC F-AIWW JUN11 123755 LFBO LFLC 0037 9E
PH CNT CODE BLEED STATUS
C1 04 64007 4220 53 0010 0 0100 52 1 A0
TAT ALT CAS MN GW CG DMU/SW
CE 0200 01058 086 133 5784 262 B0B0G1 4D
ESN EHRS ERT ECYC AP ECW1
EC 731205 00134 00216 00079 08 00000 DF
EE 731232 00317 00431 00223 08 00000 D9
LIMIT EXCEEDANCE SUMMARY
E MAX LIM REF TOL TTP EVM PARA
N1 2 085 075 0966 060 036 00008 317 DF
REASON: OIP
...
PRE EVENT, 4 SEC INTERVALS
N1 N2 EGT VB1 VB2 PHA OIT OIP
T - 20 s S1 0288 0729 5830 001 004 000 088 026 05
T - 16 s S2 0468 0822 5100 001 003 000 088 037 F7
T - 12 s S3 0890 0967 6550 002 004 002 088 051 0B
T - 8 s S4 0891 0969 6910 005 005 004 088 055 19
T - 4 s S5 0891 0964 7080 006 005 000 087 062 10
AT AND POST EVENT, 5 SEC INTERVALS
N1 N2 EGT VB1 VB2 PHA OIT OIP
T = EVENT S6 0890 0966 7160 003 007 000 086 085 0F
T + 5 s S7 0899 0962 7220 002 007 000 083 073 0C
T + 10 s S8 0889 0961 7270 002 007 000 082 064 10
T + 15 s S9 0891 0961 7330 003 007 850 082 056 15
T + 20 s S0 0892 0962 7370 004 007 986 082 053 1C

ENGINE DIVERGENCE REPORT <09>

Generated when:

EGT 1&2 difference > threshold limits

TN 1&2 difference > threshold limits

Before event:

3 parameter sets recorded

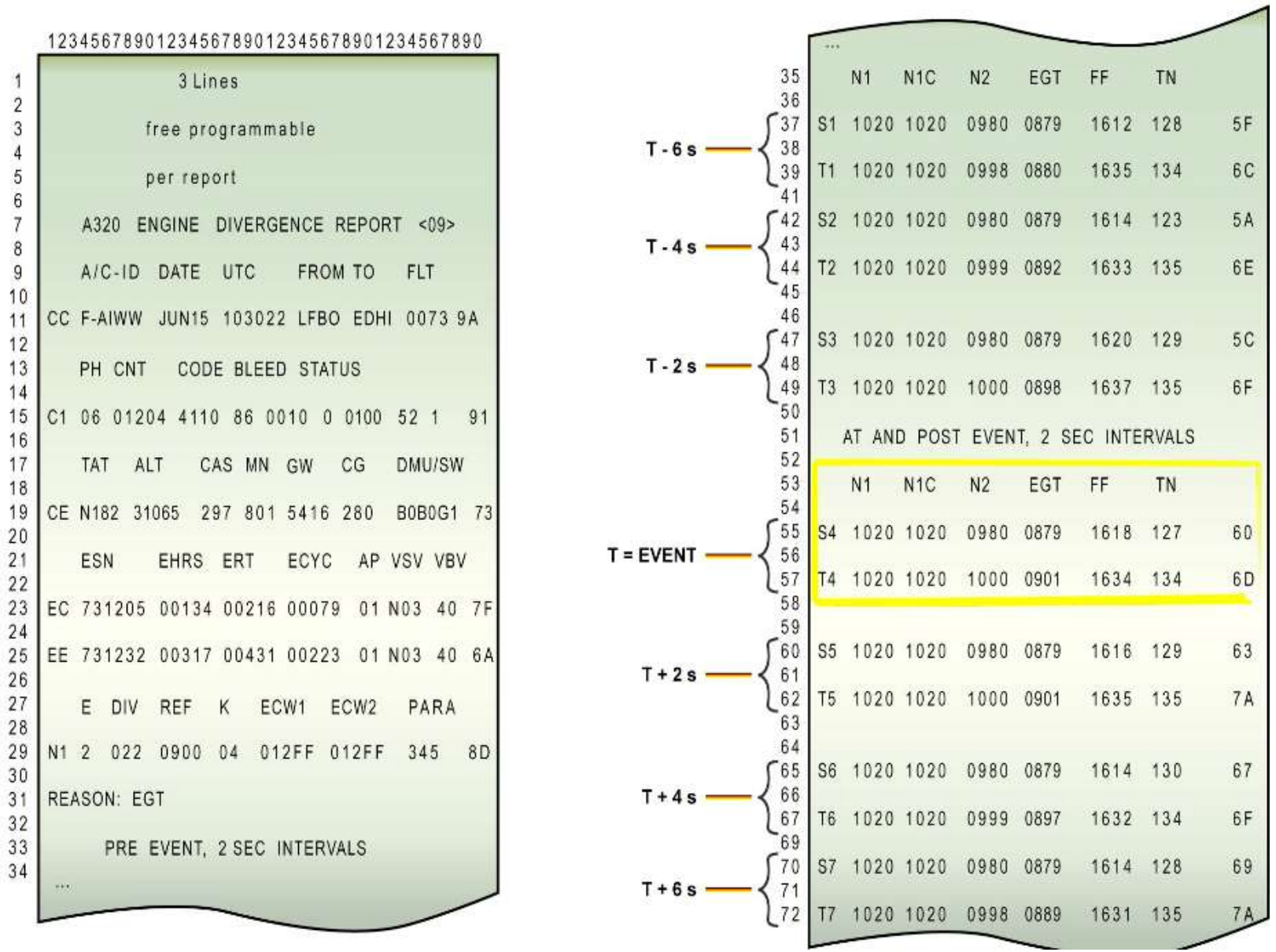
2 s intervals

After event:

3 sets recorded

2 s intervals

This report is generated when, under similar operating conditions, the difference between engines 1 and 2 EGT or TN (Nacelle Temperature) is greater than threshold limits. 3 parameter sets are recorded at 2 s intervals before the event and 3 parameter sets at 2 s intervals after the event.


1234567890123456789012345678901234567890
3 Lines
free programmable
per report
A320 ENGINE DIVERGENCE REPORT <09>
A/C-ID DATE UTC FROM TO FLT
CC F-AIWW JUN15 103022 LFBO EDHI 0073 9A
PH CNT CODE BLEED STATUS
C1 06 01204 4110 86 0010 0 0100 52 1 91
TAT ALT CAS MN GW CG DMU/SW
CE N182 31065 297 801 5416 280 B0B0G1 73
ESN EHRS ERT ECYC AP VSV VBV
EC 731205 00134 00216 00079 01 N03 40 7F
EE 731232 00317 00431 00223 01 N03 40 6A
E DIV REF K ECW1 ECW2 PARA
N1 2 022 0900 04 012FF 012FF 345 8D
REASON: EGT
PRE EVENT, 2 SEC INTERVALS
...
N1 N1C N2 EGT FF TN
S1 1020 1020 0980 0879 1612 128 5F
T1 1020 1020 0998 0880 1635 134 6C
S2 1020 1020 0980 0879 1614 123 5A
T2 1020 1020 0999 0892 1633 135 6E
S3 1020 1020 0980 0879 1620 129 5C
T3 1020 1020 1000 0898 1637 135 6F
AT AND POST EVENT, 2 SEC INTERVALS
N1 N1C N2 EGT FF TN
S4 1020 1020 0980 0879 1618 127 60
T4 1020 1020 1000 0901 1634 134 6D
S5 1020 1020 0980 0879 1616 129 63
T5 1020 1020 1000 0901 1635 135 7A
S6 1020 1020 0980 0879 1614 130 67
T6 1020 1020 0999 0897 1632 134 6F
S7 1020 1020 0980 0879 1614 128 69
T7 1020 1020 0998 0889 1631 135 7A
T - 6 s
T - 4 s
T - 2 s
T = EVENT
T + 2 s
T + 4 s
T + 6 s

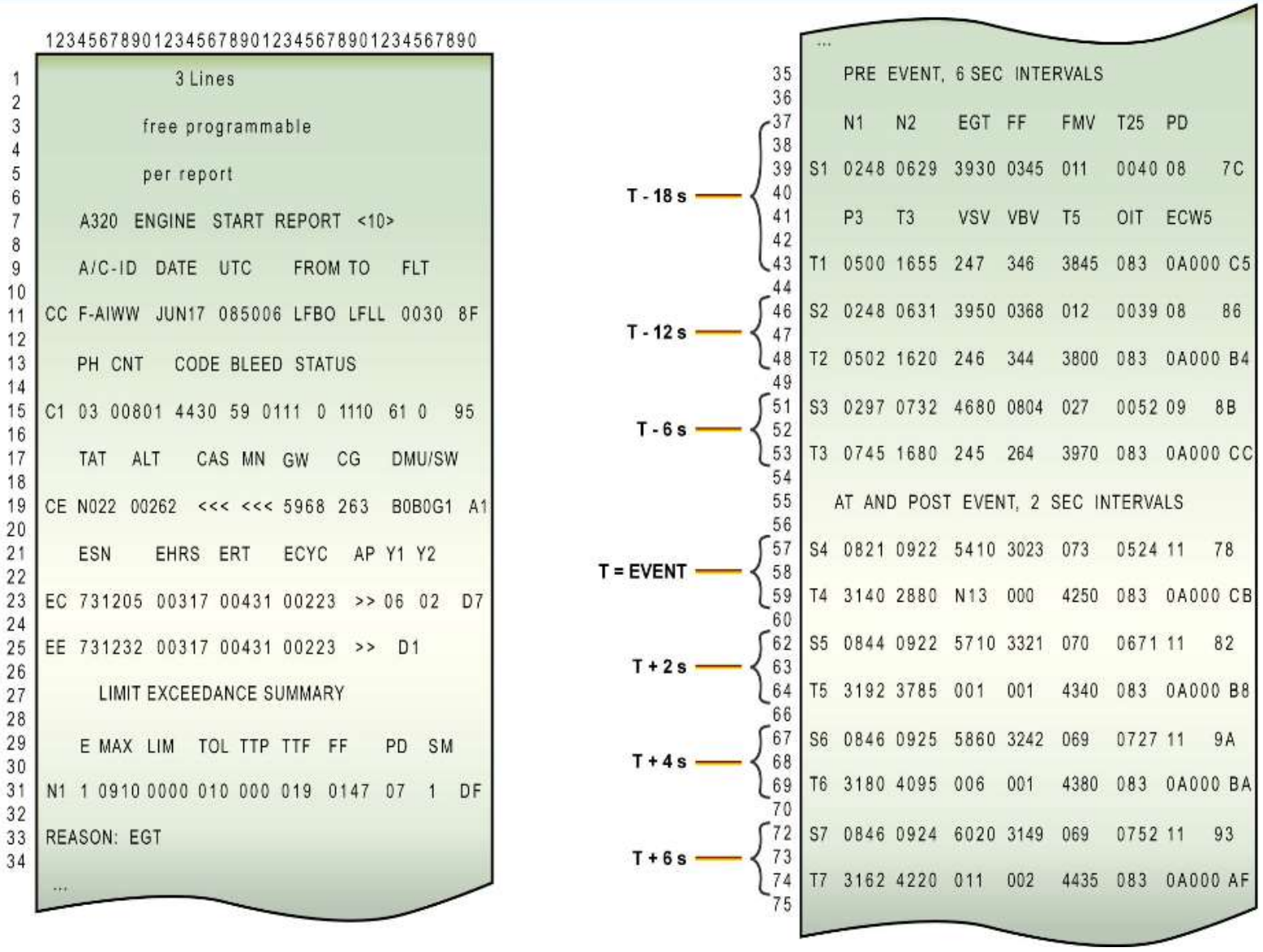
ENGINE START REPORT <10>

Generated:
- If engine start failure
- Every F10.1 th engine cycle
- Every X10 of consecutive legs

F10.1 & X10 programmable
Xmax = 9
Before event:
- 3 parameter sets recorded
- 6 s intervals

After event:
- 3 sets recorded
- 2 s intervals

1 report per engine
This report is generated in case of engine start failure or after every F10.1 number of engine cycles (F10.1 is programmable), or every leg for X10 consecutive legs (X10 is programmable and X10max = 9). 3 parameter sets are recorded at 6 s intervals before the event and 3 parameter sets are recorded at 2 s intervals after the event. There is one report for each engine.

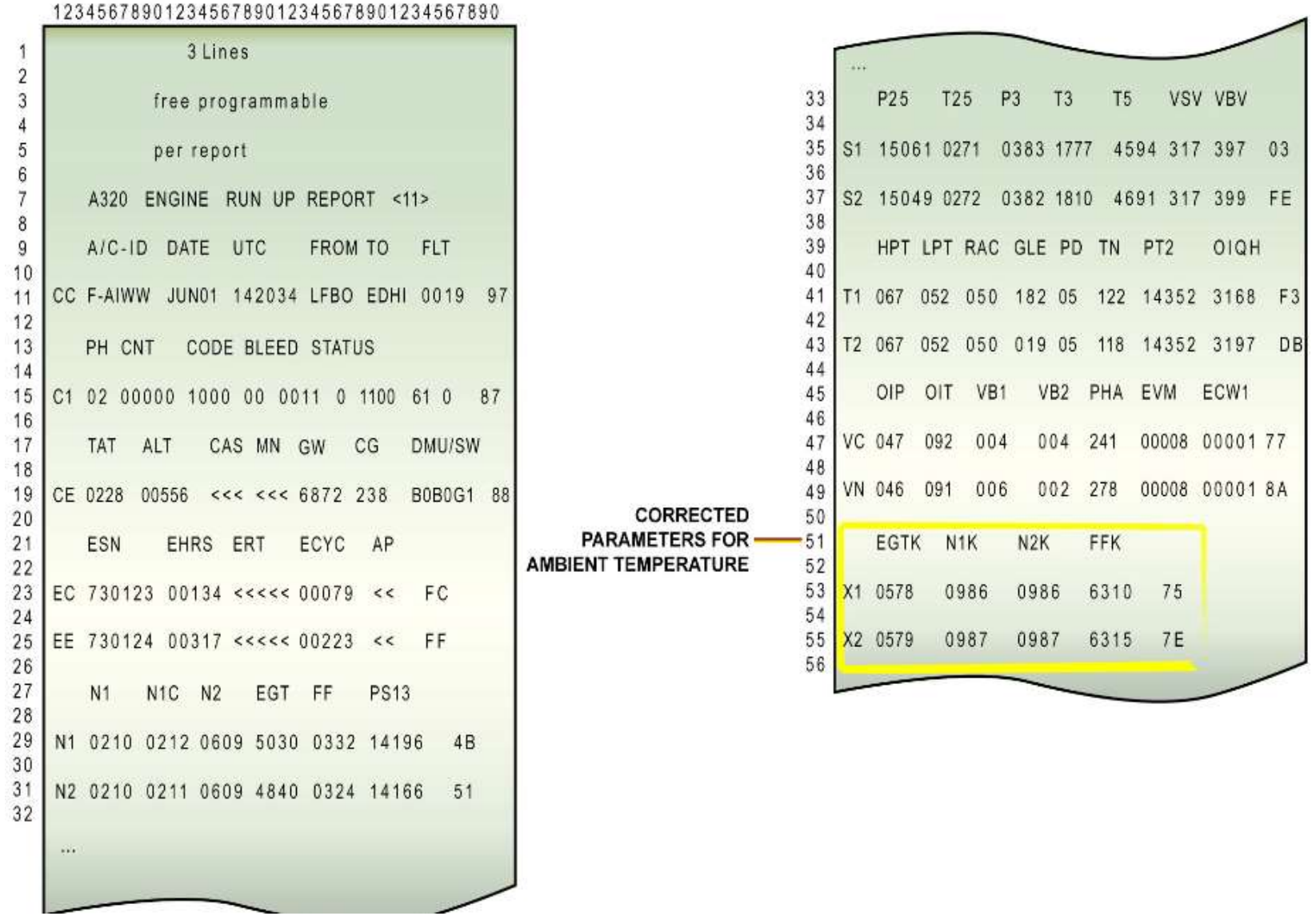

12345678901234567890123456789012345678901234567890
3 Lines
free programmable
per report
A320 ENGINE START REPORT <10>
A/C-ID DATE UTC FROM TO FLT
CC F-AIWW JUN17 085006 LFBO LFLL 0030 8F
PH CNT CODE BLEED STATUS
C1 03 00801 4430 59 0111 0 1110 61 0 95
TAT ALT CAS MN GW CG DMU/SW
CE N022 00262 <<< <<< 5968 263 B0B0G1 A1
ESN EHRS ERT ECYC AP Y1 Y2
EC 731205 00317 00431 00223 >> 06 02 D7
EE 731232 00317 00431 00223 >> D1
LIMIT EXCEEDANCE SUMMARY
E MAX LIM TOL TTP TTF FF PD SM
N1 1 0910 0000 010 000 019 0147 07 1 DF
REASON: EGT
PRE EVENT, 6 SEC INTERVALS
N1 N2 EGT FF FMV T25 PD
S1 0248 0629 3930 0345 011 0040 08 7C
P3 T3 VSV VBV T5 OIT ECW5
T1 0500 1655 247 346 3845 083 0A000 C5
T - 18 s
S2 0248 0631 3950 0368 012 0039 08 86
T - 12 s
T2 0502 1620 246 344 3800 083 0A000 B4
S3 0297 0732 4680 0804 027 0052 09 8B
T - 6 s
T3 0745 1680 245 264 3970 083 0A000 CC
AT AND POST EVENT, 2 SEC INTERVALS
S4 0821 0922 5410 3023 073 0524 11 78
T = EVENT
T4 3140 2880 N13 000 4250 083 0A000 CB
S5 0844 0922 5710 3321 070 0671 11 82
T + 2 s
T5 3192 3785 001 001 4340 083 0A000 B8
S6 0846 0925 5860 3242 069 0727 11 9A
T + 4 s
T6 3180 4095 006 001 4380 083 0A000 BA
S7 0846 0924 6020 3149 069 0752 11 93
T + 6 s
T7 3162 4220 011 002 4435 083 0A000 AF

ENGINE RUN UP REPORT <11>

Generated manually
Content:
- Report <01> data
- Corrected parameters for ambient temperature

Data are averages over 20 s except:
- ESN
- EHRS
- ECYC
- ERT

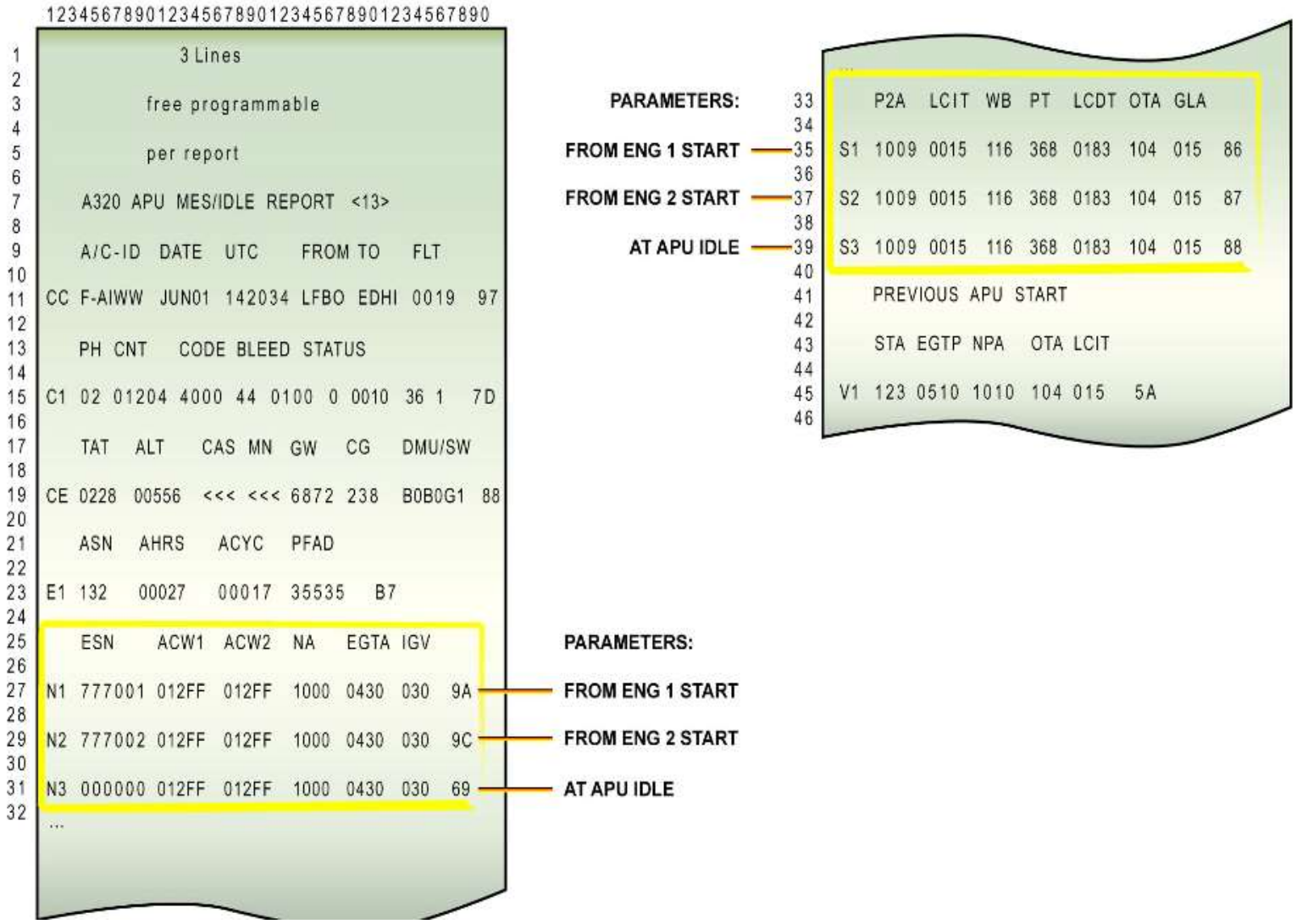
This report is basically a manually triggered report. It contains the same data as the engine cruise report plus corrected parameters for the ambient temperature. All data is an average over 20 seconds with the exception of:
- ESN,
- EHRS,
- ECYC,
- ERT (Engine Running Time).


1234567890123456789012345678901234567890
3 Lines
free programmable
per report
A320 ENGINE RUN UP REPORT <11>
A/C-ID DATE UTC FROM TO FLT
CC F-AIWW JUN01 142034 LFBO EDHI 0019 97
PH CNT CODE BLEED STATUS
C1 02 00000 1000 00 0011 0 1100 61 0 87
TAT ALT CAS MN GW CG DMU/SW
CE 0228 00556 <<< <<< 6872 238 B0B0G1 88
ESN EHRS ERT ECYC AP
EC 730123 00134 <<<<< 00079 << FC
EE 730124 00317 <<<<< 00223 << FF
N1 N1C N2 EGT FF PS13
N1 0210 0212 0609 5030 0332 14196 4B
N2 0210 0211 0609 4840 0324 14166 51
...
...
P25 T25 P3 T3 T5 VSV VBV
S1 15061 0271 0383 1777 4594 317 397 03
S2 15049 0272 0382 1810 4691 317 399 FE
HPT LPT RAC GLE PD TN PT2 OIQH
T1 067 052 050 182 05 122 14352 3168 F3
T2 067 052 050 019 05 118 14352 3197 DB
OIP OIT VB1 VB2 PHA EVM ECW1
VC 047 092 004 004 241 00008 00001 77
VN 046 091 006 002 278 00008 00001 8A
EGTK N1K N2K FFK
X1 0578 0986 0986 6310 75
X2 0579 0987 0987 6315 7E
CORRECTED PARAMETERS FOR AMBIENT TEMPERATURE

APU MES/IDLE REPORT <13>

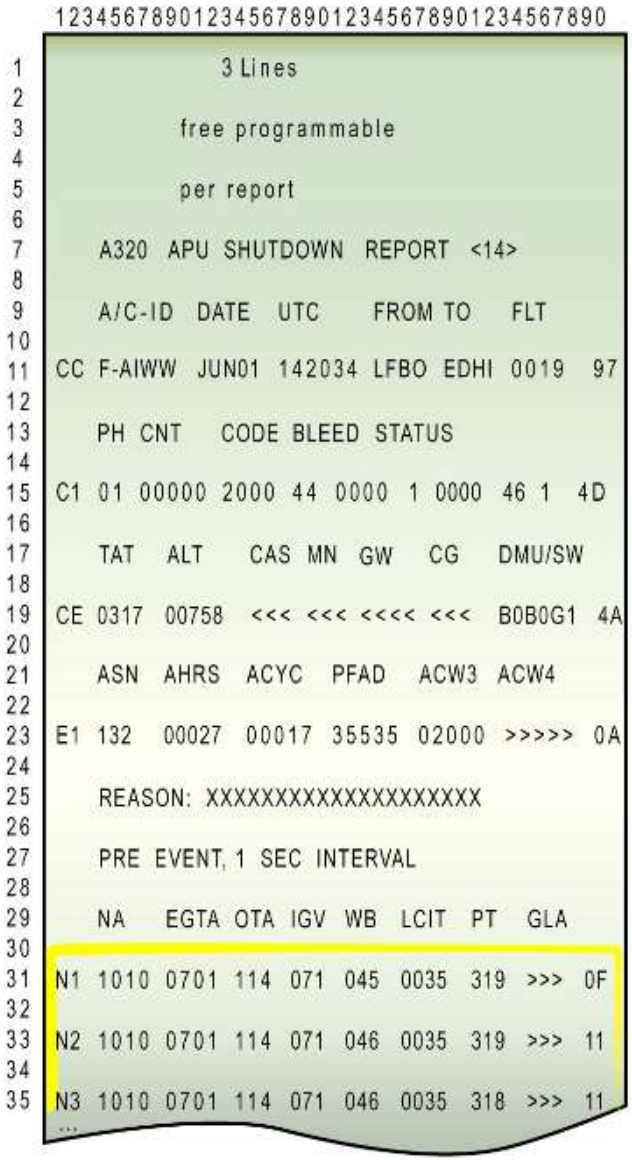
Generated when ENG started with APU
Contains APU data:
- During and after ENG start
- At APU idle

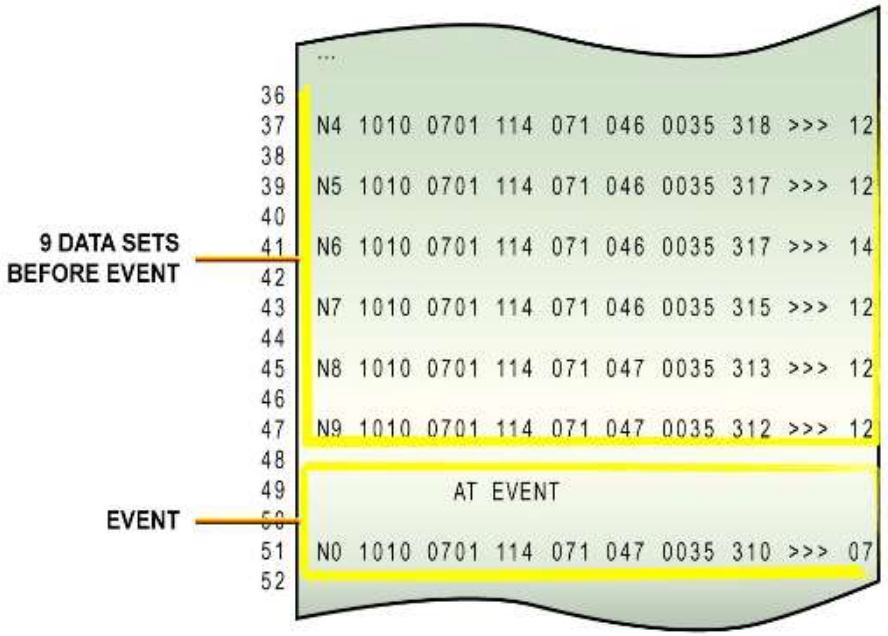
Contains last APU start parameters
This report is generated when the engine is started with the APU. It presents APU parameters during and after engine start, and at APU idle. It also presents the last APU start parameters.
NOTE: MES means Main Engine Start.


1234567890123456789012345678901234567890
3 Lines
free programmable
per report
A320 APU MES/IDLE REPORT <13>
A/C-ID DATE UTC FROM TO FLT
CC F-AIWW JUN01 142034 LFBO EDHI 0019 97
PH CNT CODE BLEED STATUS
C1 02 01204 4000 44 0100 0 0010 36 1 7D
TAT ALT CAS MN GW CG DMU/SW
CE 0228 00556 <<< <<< 6872 238 B0B0G1 88
ASN AHRS ACYC PFAD
E1 132 00027 00017 35535 B7
ESN ACW1 ACW2 NA EGTA IGV
N1 777001 012FF 012FF 1000 0430 030 9A
N2 777002 012FF 012FF 1000 0430 030 9C
N3 000000 012FF 012FF 1000 0430 030 69
...
PARAMETERS:
FROM ENG 1 START
FROM ENG 2 START
AT APU IDLE
P2A LCIT WB PT LCDT OTA GLA
S1 1009 0015 116 368 0183 104 015 86
S2 1009 0015 116 368 0183 104 015 87
S3 1009 0015 116 368 0183 104 015 88
PREVIOUS APU START
STA EGTP NPA OTA LCIT
V1 123 0510 1010 104 015 5A
PARAMETERS:
FROM ENG 1 START
FROM ENG 2 START
AT APU IDLE

APU shutdown report <14>

Abnormal APU shutdown
9 sets recorded at 1 s intervals before event
This report is generated when there is an APU auto shutdown due to a detected failure. 9 data sets are recorded at 1 s intervals before the event.

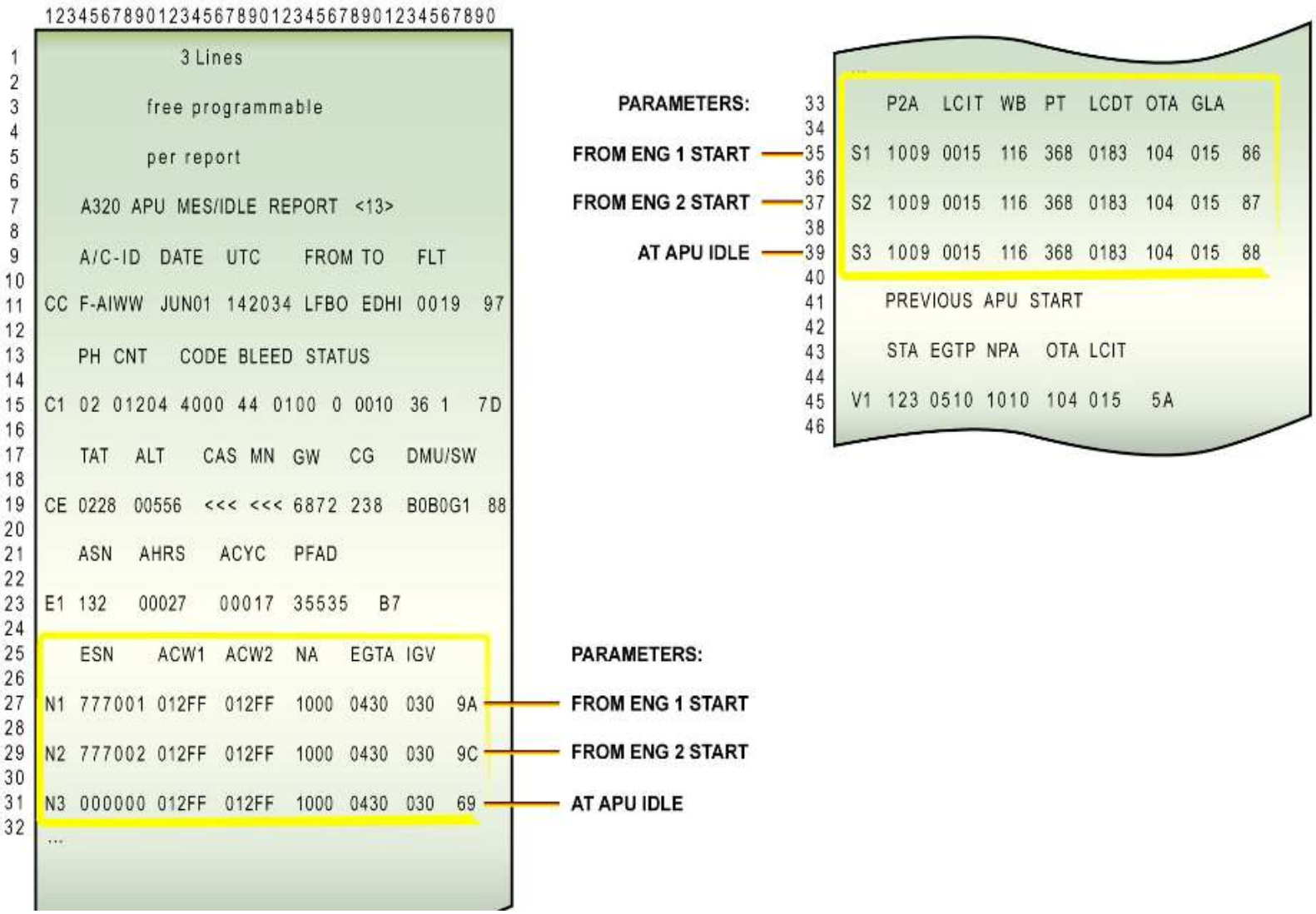

1234567890123456789012345678901234567890
3 Lines
free programmable
per report
A320 APU SHUTDOWN REPORT <14>
A/C-ID DATE UTC FROM TO FLT
CC F-AIWW JUN01 142034 LFBO EDHI 0019 97
PH CNT CODE BLEED STATUS
C1 01 00000 2000 44 0000 1 0000 46 1 4D
TAT ALT CAS MN GW CG DMU/SW
CE 0317 00758 <<< <<< <<<< <<< B0B0G1 4A
ASN AHRS ACYC PFAD ACW3 ACW4
E1 132 00027 00017 35535 02000 >>>>> 0A
REASON: XXXXXXXXXXXXXXXXXXX
PRE EVENT, 1 SEC INTERVAL
NA EGTA OTA IGV WB LCIT PT GLA
N1 1010 0701 114 071 045 0035 319 >>> 0F
N2 1010 0701 114 071 046 0035 319 >>> 11
N3 1010 0701 114 071 046 0035 318 >>> 11


9 DATA SETS
BEFORE EVENT
EVENT
N4 1010 0701 114 071 046 0035 318 >>> 12
N5 1010 0701 114 071 046 0035 317 >>> 12
N6 1010 0701 114 071 046 0035 317 >>> 14
N7 1010 0701 114 071 046 0035 315 >>> 12
N8 1010 0701 114 071 047 0035 313 >>> 12
N9 1010 0701 114 071 047 0035 312 >>> 12
AT EVENT
N0 1010 0701 114 071 047 0035 310 >>> 07

APU MES/IDLE REPORT <13>

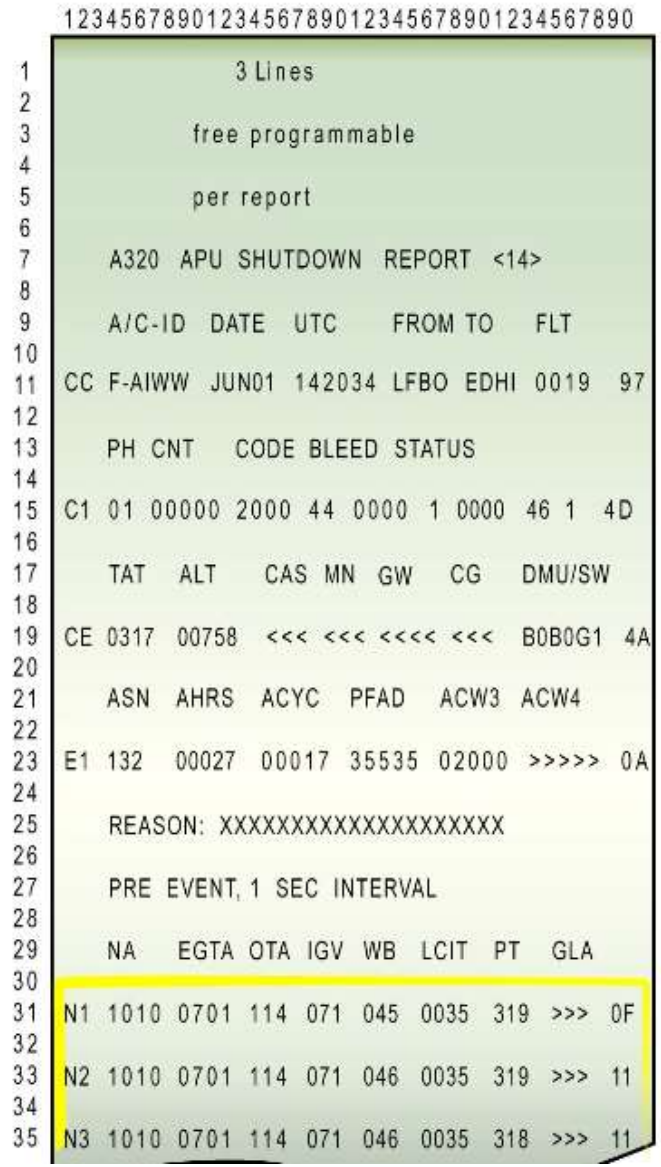
Generated when ENG started with APU
Contains APU data:
- During and after ENG start
- At APU idle

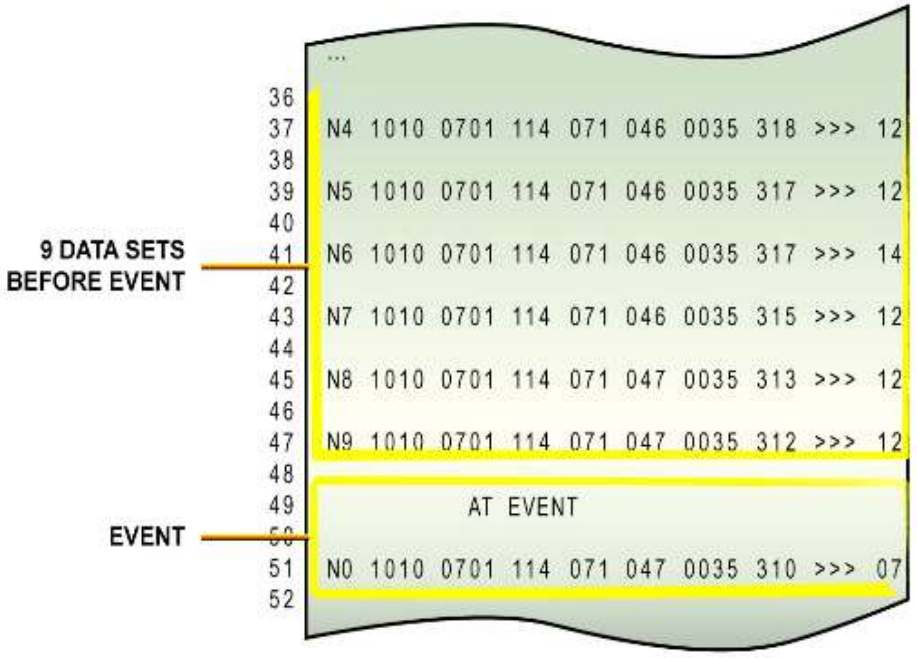
Contains last APU start parameters
This report is generated when the engine is started with the APU. It presents APU parameters during and after engine start, and at APU idle. It also presents the last APU start parameters.
NOTE: MES means Main Engine Start.


1234567890123456789012345678901234567890
3 Lines
free programmable
per report
A320 APU MES/IDLE REPORT <13>
A/C-ID DATE UTC FROM TO FLT
CC F-AIWW JUN01 142034 LFBO EDHI 0019 97
PH CNT CODE BLEED STATUS
C1 02 01204 4000 44 0100 0 0010 36 1 7D
TAT ALT CAS MN GW CG DMU/SW
CE 0228 00556 <<< <<< 6872 238 B0B0G1 88
ASN AHRS ACYC PFAD
E1 132 00027 00017 35535 B7
ESN ACW1 ACW2 NA EGTA IGV
N1 777001 012FF 012FF 1000 0430 030 9A
N2 777002 012FF 012FF 1000 0430 030 9C
N3 000000 012FF 012FF 1000 0430 030 69
PARAMETERS:
FROM ENG 1 START
FROM ENG 2 START
AT APU IDLE
P2A LCIT WB PT LCDT OTA GLA
S1 1009 0015 116 368 0183 104 015 86
S2 1009 0015 116 368 0183 104 015 87
S3 1009 0015 116 368 0183 104 015 88
PREVIOUS APU START
STA EGTP NPA OTA LCIT
V1 123 0510 1010 104 015 5A

APU shutdown report <14>

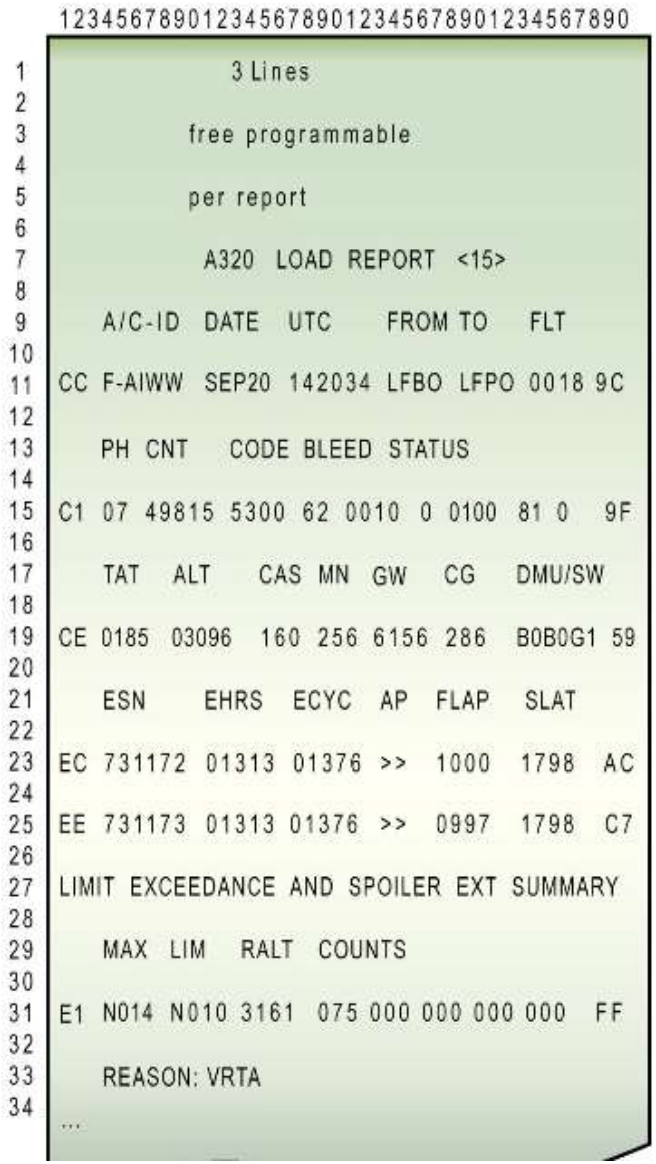
Abnormal APU shutdown
9 sets recorded at 1 s intervals before event
This report is generated when there is an APU auto shutdown due to a detected failure. 9 data sets are recorded at 1 s intervals before the event.


1234567890123456789012345678901234567890
3 Lines
free programmable
per report
A320 APU SHUTDOWN REPORT <14>
A/C-ID DATE UTC FROM TO FLT
CC F-AIWW JUN01 142034 LFBO EDHI 0019 97
PH CNT CODE BLEED STATUS
C1 01 00000 2000 44 0000 1 0000 46 1 4D
TAT ALT CAS MN GW CG DMU/SW
CE 0317 00758 <<< <<< <<<< <<< B0B0G1 4A
ASN AHRS ACYC PFAD ACW3 ACW4
E1 132 00027 00017 35535 02000 >>>>> 0A
REASON: XXXXXXXXXXXXXXXXXXX
PRE EVENT, 1 SEC INTERVAL
NA EGTA OTA IGV WB LCIT PT GLA
N1 1010 0701 114 071 045 0035 319 >>> 0F
N2 1010 0701 114 071 046 0035 319 >>> 11
N3 1010 0701 114 071 046 0035 318 >>> 11


9 DATA SETS BEFORE EVENT
EVENT
...
N4 1010 0701 114 071 046 0035 318 >>> 12
N5 1010 0701 114 071 046 0035 317 >>> 12
N6 1010 0701 114 071 046 0035 317 >>> 14
N7 1010 0701 114 071 046 0035 315 >>> 12
N8 1010 0701 114 071 047 0035 313 >>> 12
N9 1010 0701 114 071 047 0035 312 >>> 12
AT EVENT
N0 1010 0701 114 071 047 0035 310 >>> 07

LOAD REPORT <15>

Excessive loads to airframe during landing
A/C bounce can be detected
A/C aerodynamic data recorded
This report is generated if excessive loads have been applied to the airframe during landing. An aircraft bounce can also be detected. It records aircraft aerodynamics parameter sets before, at and after a hard landing.



```
    12345678901234567890123456789012345678901234567890
1                  3 Lines
2
3                free programmable
4
5                per report
6
7                 A320  LOAD REPORT  <15>
8
9       A/C-ID  DATE  UTC     FROM TO    FLT
10
11  CC F-AIWW  SEP20  142034 LFBO LFPO 0018 9C
12
13      PH CNT    CODE BLEED STATUS
14
15  C1  07 49815 5300 62 0010  0 0100  81 0   9F
16
17      TAT   ALT    CAS MN  GW    CG    DMU/SW
18
19  CE 0185  03096   160 256 6156  286   B0B0G1 59
20
21      ESN     EHRS   ECYC  AP   FLAP   SLAT
22
23  EC 731172  01313  01376  >>   1000   1798   AC
24
25  EE 731173  01313  01376  >>   0997   1798   C7
26
27  LIMIT EXCEEDANCE AND SPOILER EXT SUMMARY
28
29      MAX  LIM   RALT  COUNTS
30
31  E1  N014  N010 3161  075 000 000 000 000   FF
32
33      REASON: VRTA
34  ...
```

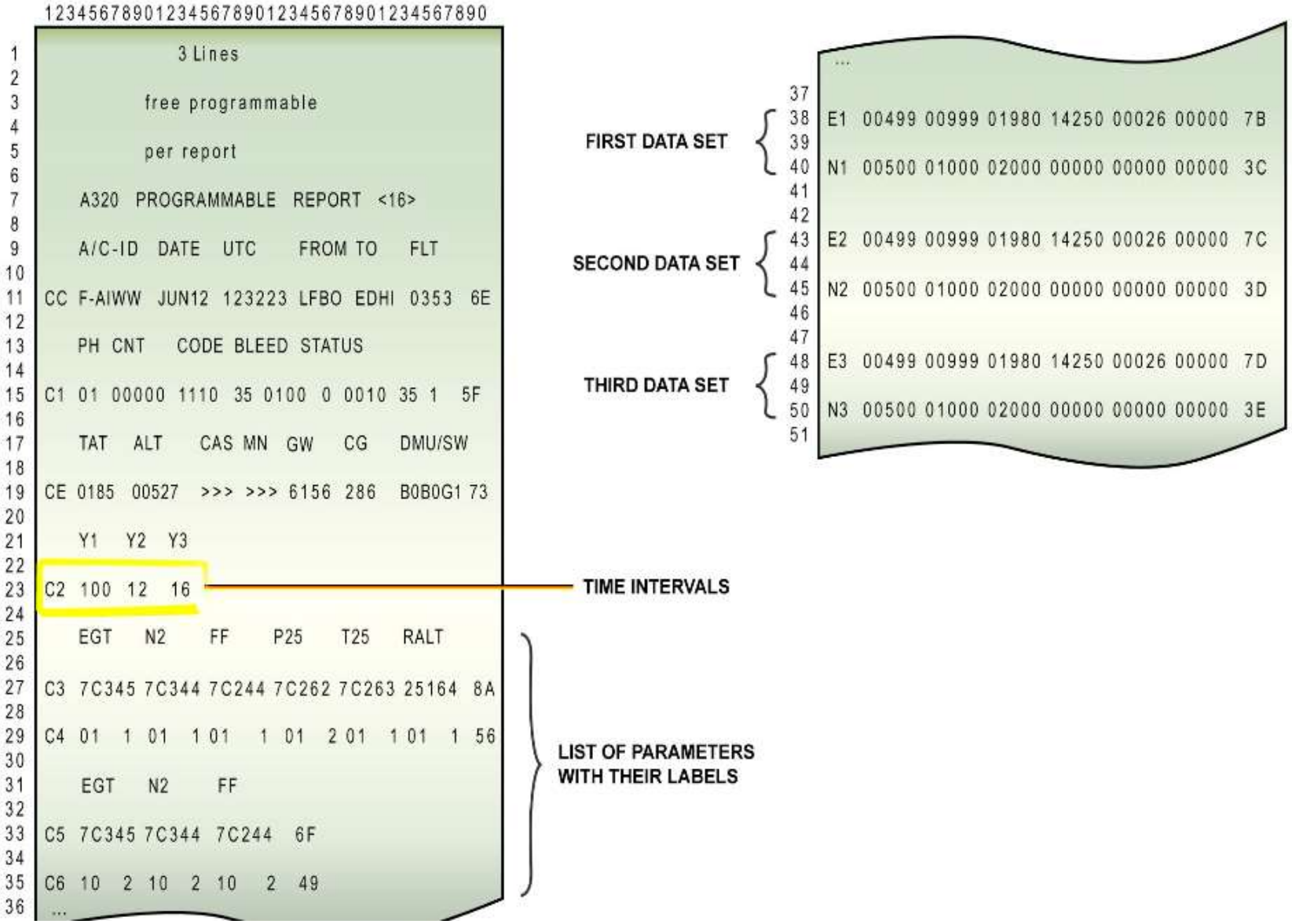
```
    ...
35      VALUES AT 1 SEC BEFORE LAND/EVENT
36
37      RALT  RALR PTCH PTCR ROLL ROLR YAW
38
39  S1  3179  0496  0114  N013  0002  0002  0000 17
40
41      VRTA   LONG   LATG
42
43  T1  N013   0022    N000  89
44
```

FREE PROGRAMMABLE REPORTS <16,17 AND 18>

When specific conditions programmed met
Data set = Up to 12 parameters
Maximum of 54 data sets
Airline choices:

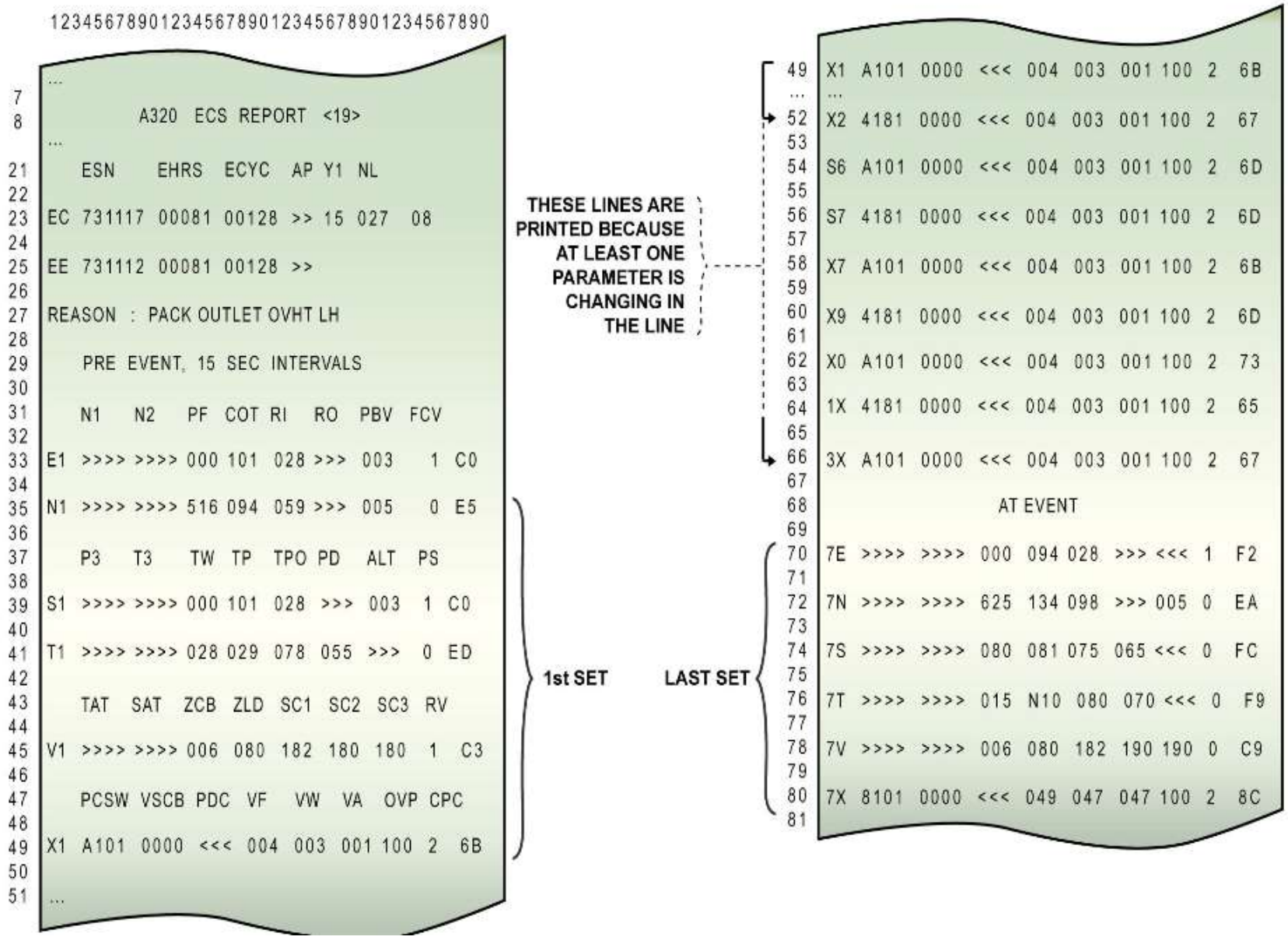
- Sampling intervals
- Average intervals
- History time of parameter recording

These reports are generated when specific conditions programmed by the airline are met. Each data set contains up to 12 parameters chosen by the airline. The report does not exceed 54 sets of data. The sampling intervals, the average intervals and the history time of parameter recording are chosen by the airline.


1234567890123456789012345678901234567890
3 Lines
free programmable
per report
A320 PROGRAMMABLE REPORT <16>
A/C-ID DATE UTC FROM TO FLT
CC F-AIWW JUN12 123223 LFBO EDHI 0353 6E
PH CNT CODE BLEED STATUS
C1 01 00000 1110 35 0100 0 0010 35 1 5F
TAT ALT CAS MN GW CG DMU/SW
CE 0185 00527 >>> >>> 6156 286 B0B0G1 73
Y1 Y2 Y3
C2 100 12 16
EGT N2 FF P25 T25 RALT
C3 7C345 7C344 7C244 7C262 7C263 25164 8A
C4 01 1 01 1 01 1 01 2 01 1 01 1 56
EGT N2 FF
C5 7C345 7C344 7C244 6F
C6 10 2 10 2 10 2 49
...
TIME INTERVALS
LIST OF PARAMETERS WITH THEIR LABELS
...
FIRST DATA SET
E1 00499 00999 01980 14250 00026 00000 7B
N1 00500 01000 02000 00000 00000 00000 3C
SECOND DATA SET
E2 00499 00999 01980 14250 00026 00000 7C
N2 00500 01000 02000 00000 00000 00000 3D
THIRD DATA SET
E3 00499 00999 01980 14250 00026 00000 7D
N3 00500 01000 02000 00000 00000 00000 3E

ECS REPORT <19>

Air conditioning or pressurization malfunction
Engine, A/C & environmental data recorded
Recording at and 4 min before event
15 s intervals
This report is generated when there is a malfunction in the air conditioning or pressurization system. It records engine, aircraft and environmental data at and 4 minutes before the event with 15 s intervals.
NOTE: ECS means Environmental Control System.


1234567890123456789012345678901234567890
A320 ECS REPORT <19>
ESN EHRS ECYC AP Y1 NL
EC 731117 00081 00128 >> 15 027 08
EE 731112 00081 00128 >>
REASON : PACK OUTLET OVHT LH
PRE EVENT, 15 SEC INTERVALS
N1 N2 PF COT RI RO PBV FCV
E1 >>>> >>>> 000 101 028 >>> 003 1 C0
N1 >>>> >>>> 516 094 059 >>> 005 0 E5
P3 T3 TW TP TPO PD ALT PS
S1 >>>> >>>> 000 101 028 >>> 003 1 C0
T1 >>>> >>>> 028 029 078 055 >>> 0 ED
TAT SAT ZCB ZLD SC1 SC2 SC3 RV
V1 >>>> >>>> 006 080 182 180 180 1 C3
PCSW VSCB PDC VF VW VA OVP CPC
X1 A101 0000 <<< 004 003 001 100 2 6B
THESE LINES ARE PRINTED BECAUSE AT LEAST ONE PARAMETER IS CHANGING IN THE LINE
1st SET
LAST SET
X1 A101 0000 <<< 004 003 001 100 2 6B
X2 4181 0000 <<< 004 003 001 100 2 67
S6 A101 0000 <<< 004 003 001 100 2 6D
S7 4181 0000 <<< 004 003 001 100 2 6D
X7 A101 0000 <<< 004 003 001 100 2 6B
X9 4181 0000 <<< 004 003 001 100 2 6D
X0 A101 0000 <<< 004 003 001 100 2 73
1X 4181 0000 <<< 004 003 001 100 2 65
3X A101 0000 <<< 004 003 001 100 2 67
AT EVENT
7E >>>> >>>> 000 094 028 >>> <<< 1 F2
7N >>>> >>>> 625 134 098 >>> 005 0 EA
7S >>>> >>>> 080 081 075 065 <<< 0 FC
7T >>>> >>>> 015 N10 080 070 <<< 0 F9
7V >>>> >>>> 006 080 182 190 190 0 C9
7X 8101 0000 <<< 049 047 047 100 2 8C


Print Report Standard
Header Description
HYD
PTU
RAT
ELEC
1
2
AUTO EXTING
TEST
RESET
1 FADEC GND PWR 2
A/SKID &
N/W STRG
ON
OFF

GENERAL INTERFACES

FDIMU (DMU-part) sends and receives data via ARINC 429 to:

- MCDU 1 & 2 (3 optional)
- Printer
- CFDIU

The Data Management Unit (DMU) part of the Flight Data Interface and Management Unit (FDIMU) sends data to MCDU 1 and 2 (the 3rd is optional), to the printer and to the Centralized Fault Display Interface Unit (CFDIU) through a single ARINC 429 data bus. Each one of these responds through a separate data bus.

NOTE: Only one MCDU can be used at a time for the Aircraft Integrated Data System (AIDS). The Aircraft Communication Addressing and Reporting System (ACARS) and the Multipurpose Disk Drive Unit (MDDU)(if installed) have individual input/output buses.

DAR INTERFACE

Discrete signals sent to FDIMU (DMU-part):

- BITE information
- DAR TAPE LOW

BITE and DAR TAPE LOW causes:

- "DAR" Class 2 message on ECAM
- DAR FAULT and DAR TAPE LOW Class 2 message in CFDS

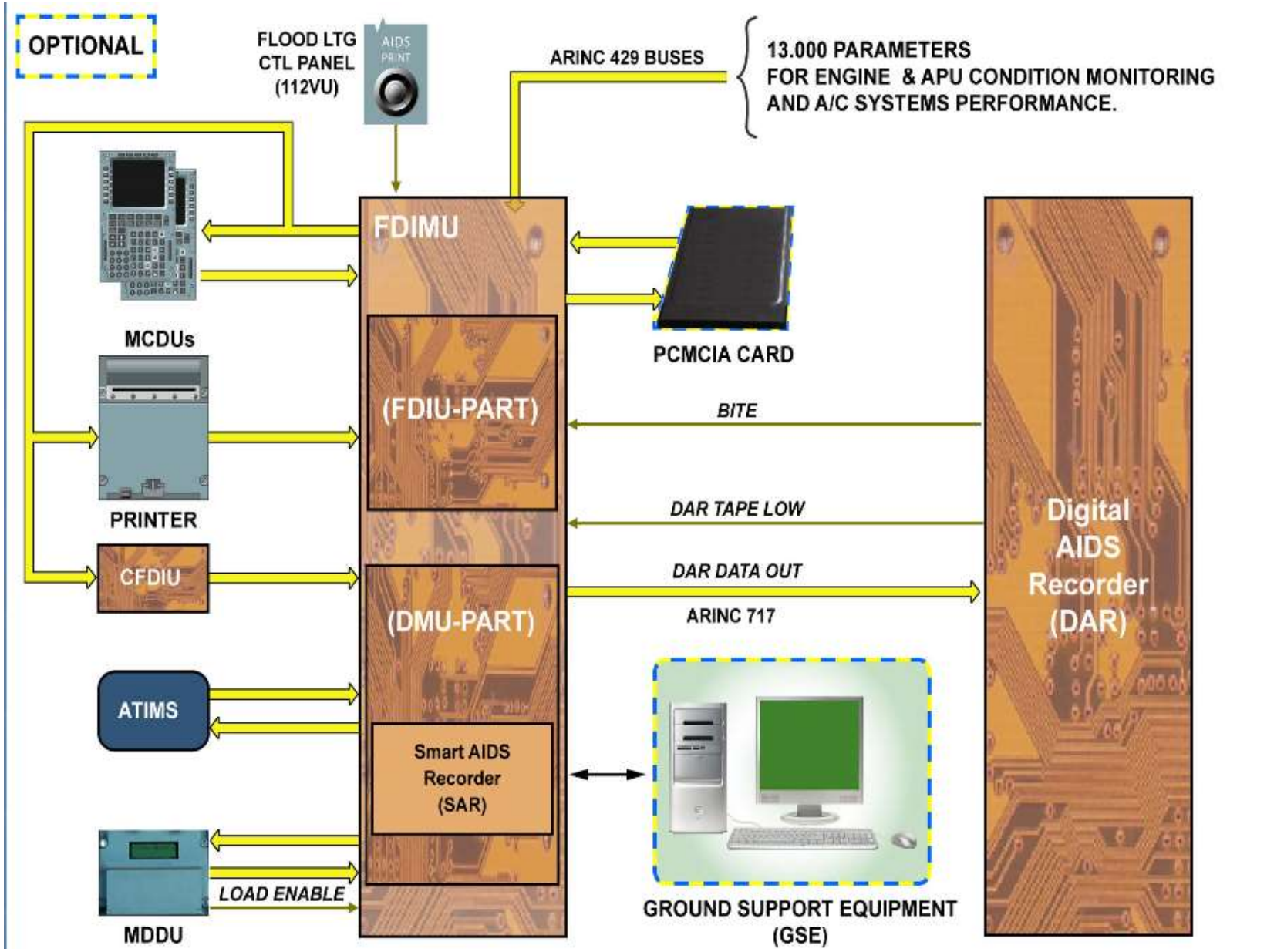
BITE and DAR TAPE LOW information is delivered from the Digital AIDS Recorder (DAR) to the FDIMU (DMU-part) through discrete signals. BITE and DAR TAPE LOW information causes a class 2 message on the Electronic Centralized Aircraft Monitoring (ECAM) maintenance status ("DAR") and two class 2 messages in the Centralized Fault Display System (CFDS) (DAR FAULT and DAR TAPE LOW).

FDIU INTERFACE

DFDR parameters sent to DMU

Parameters recorded on DAR

The Flight Data Interface Unit (FDIU) part of the FDIMU sends Digital Flight Data Recorder (DFDR) parameters to the DMU-part of the FDIMU through an ARINC 429 bus so that they can be recorded on the DAR.


OPTIONAL
FLOOD LTG CTL PANEL (112VU)
AIDS PRINT
ARINC 429 BUSES
13.000 PARAMETERS FOR ENGINE & APU CONDITION MONITORING AND A/C SYSTEMS PERFORMANCE.
FDIMU
(FDIU-PART)
(DMU-PART)
Smart AIDS Recorder (SAR)
MCDUs
PRINTER
CFDIU
ATIMS
MDDU
LOAD ENABLE
PCMCIA CARD
BITE
DAR TAPE LOW
DAR DATA OUT
ARINC 717
Digital AIDS Recorder (DAR)
GROUND SUPPORT EQUIPMENT (GSE)

SYSTEM INTERFACE

DMU-part receives 13.000 parameters via ARINC 429
Can be recorded by DAR
The FDIMU (DMU-part) receives approximately 13.000 parameters from various A/C systems through ARINC 429 data lines. These parameters can be recorded by the DAR.
NOTE: In addition, spares inputs are provided. Among these ARINC 429 inputs data lines, some of them are selectable for high or low speed from system computers.

PARAMETER CALL-UP

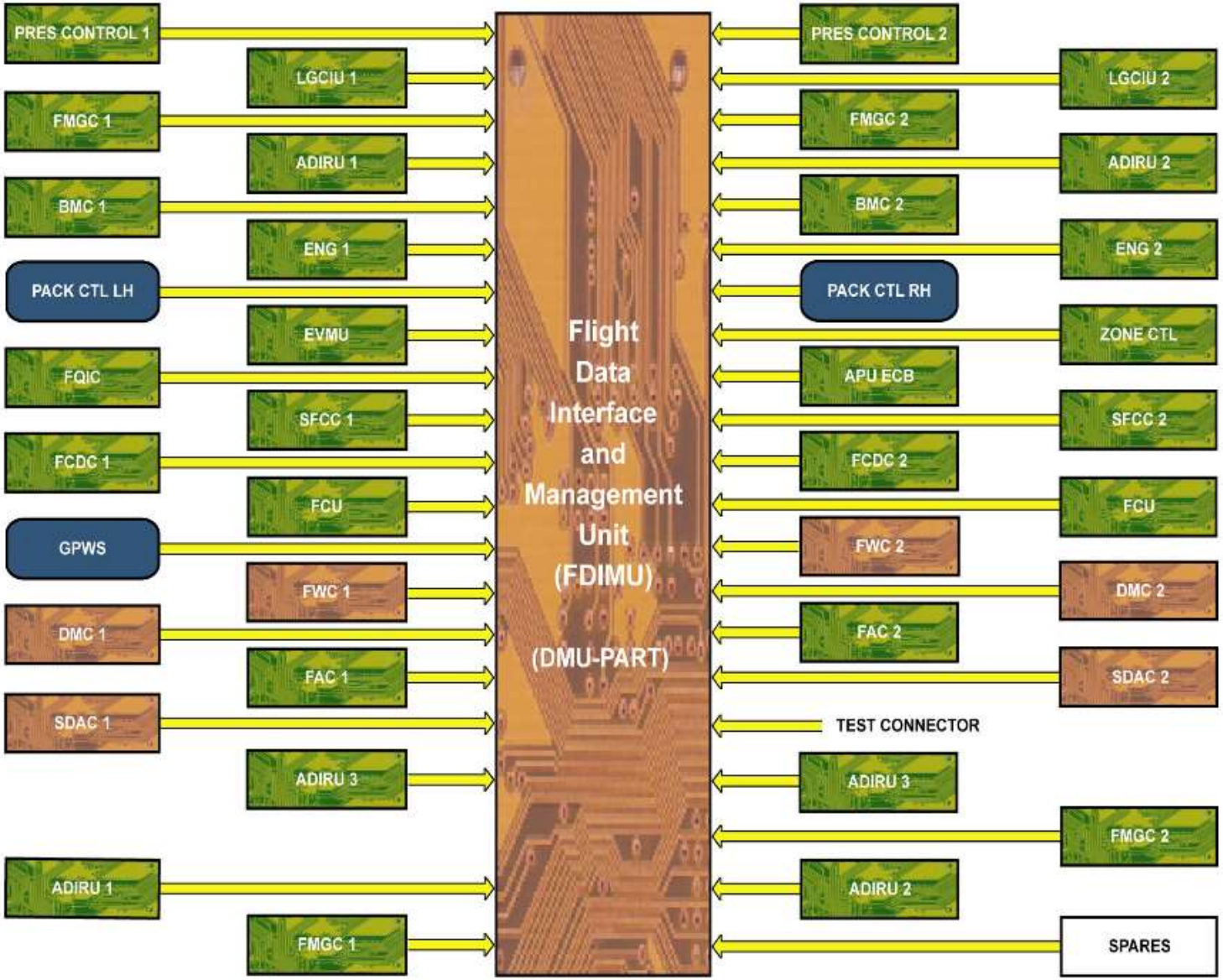
Parameters can be displayed:

- With label call-up
- With alpha call-up

At DMU delivery:

- 200 parameters already defined in alpha code
- 1.500 can be added by programming

Parameters transmitted on the connected data buses can be shown on the MCDU in binary code with the label call-up function. At FDIMU delivery, 200 parameters are already defined with alpha call-up code and can be shown on the MCDU in engineering units. Approximately 1.500 parameters can be added to the initial alpha call-up list by programming.


PRES CONTROL 1
LGCIU 1
FMGC 1
ADIRU 1
BMC 1
ENG 1
PACK CTL LH
EVMU
FQIC
SFCC 1
FCDC 1
FCU
GPWS
FWC 1
DMC 1
FAC 1
SDAC 1
ADIRU 3
ADIRU 1
FMGC 1
Flight Data Interface and Management Unit (FDIMU)
(DMU-PART)
PRES CONTROL 2
LGCIU 2
FMGC 2
ADIRU 2
BMC 2
ENG 2
PACK CTL RH
ZONE CTL
APU ECB
SFCC 2
FCDC 2
FCU
FWC 2
DMC 2
FAC 2
SDAC 2
TEST CONNECTOR
ADIRU 3
FMGC 2
ADIRU 2
SPARES

END