A330-200
TECHNICAL TRAINING MANUAL

MECHANICS / ELECTRICS & AVIONICS COURSE

46 AIR TRAFFIC AND INFORMATION MANAGEMENT

GE Metric

For Training Purposes Only
Issued By SPL/GK March 2006

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■ **FQW4200**

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SYSTEM PHILOSOPHY

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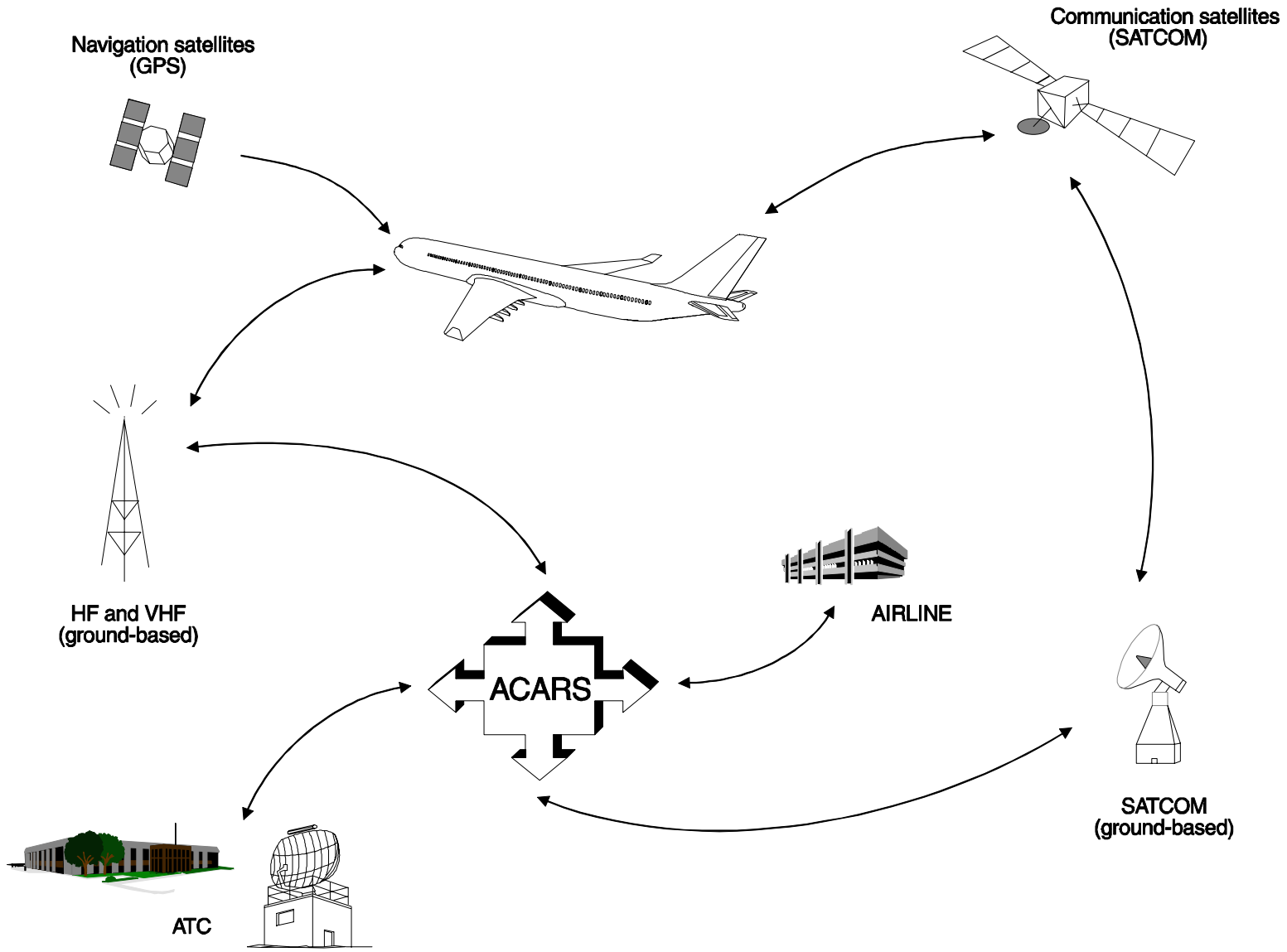
GENERAL

The Future Air Navigation System (FANS) concept, also known as Communication Navigation Surveillance/Air Traffic Management (CNS/ATM), covers the main evolutions of the way the airspace will be used in the years to come, ie: the CNS/ATM will allow the airspace to be used more efficiently.

The general objectives of CNS/ATM are:
- to increase airspace capacity,
- to enhance operational flexibility and
- to allow continued safety of air traffic.

These objectives are achieved through improvements in operations, such as reduced separations (laterally, longitudinally, vertically and in time), the possibility to have a dialogue and directly negociate between the aircraft and the Air Traffic Control (ATC) to optimize the flight, taking into account specific events or intentions.
To achieve the intended dynamic routings and reduced separations (ATM concept), aircraft will have to be equipped with specific systems for communication, navigation and surveillance (CNS tools).



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COMMUNICATION

CNS/ATM makes extensive use of data communications, betweeen aircraft and the airline and between aircraft and ATC, called Controller Pilot Data Link Communication (CPDLC).
These communications are available via VHF Data Radio (VDR), HFDR or via SATCOM for remote areas such as oceanic zones for instance.
On the ground, the ACARS network dispatches the data.
VHF and HF voice communications are therefore used as a backup.

NAVIGATION

GPS improves the dimensional navigation accuracy (Lat., Long., Alt., time) and the aircraft is able to navigate in all airspace and any part of the world.
To enhance the airspace use, a Required Navigation Performance (RNP) concept has been developed inside the Flight Management System (FMS).
This concept defines the capability an aircraft must have to navigate in a given airspace area.

SURVEILLANCE

For surveillance, the concept of Automatic Dependant Surveillance(ADS) has been developed. With ADS, an aircraft automatically transmits its position(and other data relevant to trajectory and weather) to the ATC via VDR, HFDR or SATCOM.

AIR TRAFFIC MANAGEMENT

The Air Traffic Management (ATM) optimizes the use of four dimensional airspace (including time) to improve the efficiency of airline operations and ATC.
This is expected to result in a reduction of separations between aircraft and more generally in improved ATC routings taking into account factors including the overall traffic, ATC restrictions or constraints. ATM is responsible for optimizing departure and arrival times and minimizing delays.

SSTUDENT NOTES:

STUDENT NOTES

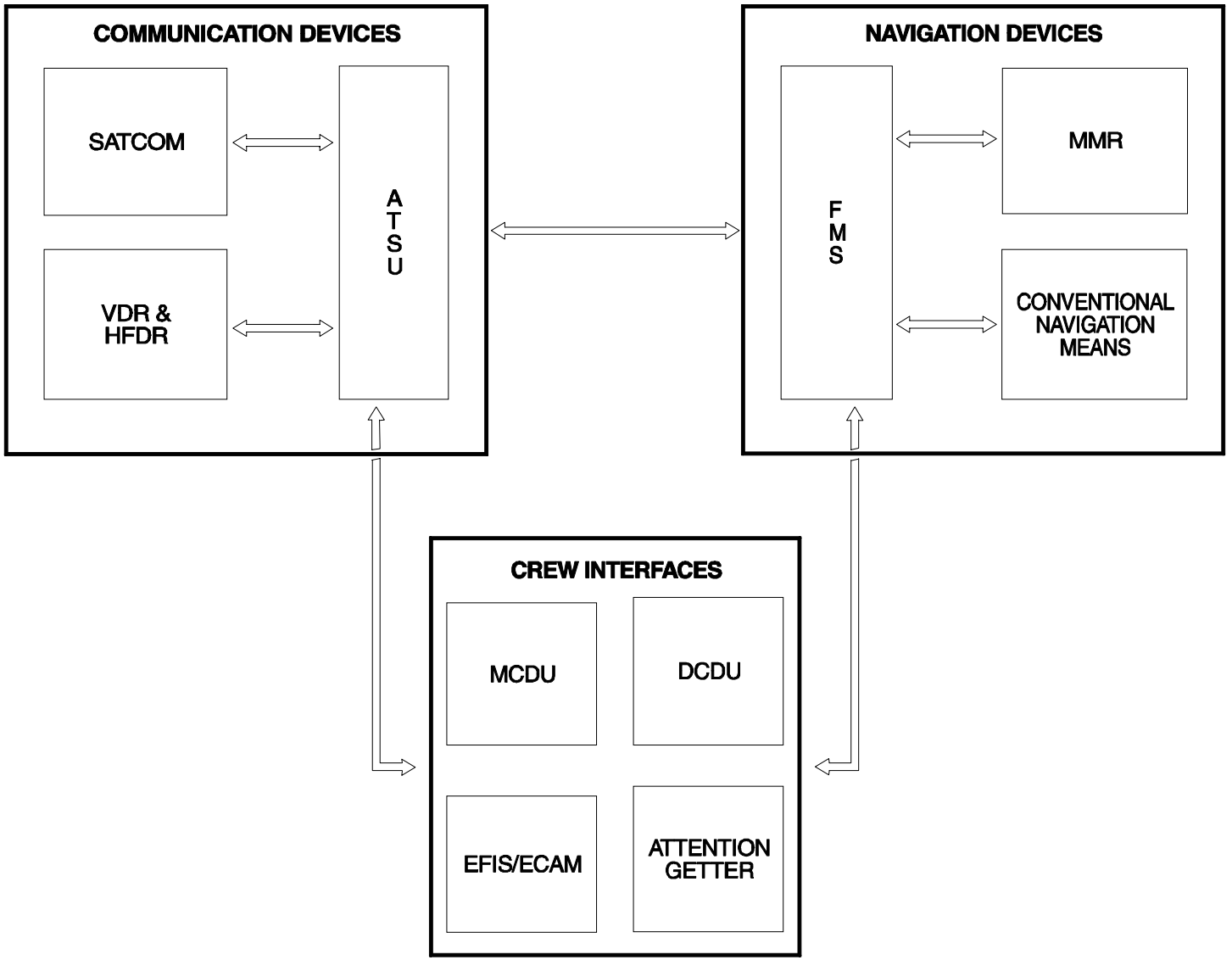
SYSTEM PRESENTATION

General
Communication
Navigation
Crew Interfaces
Data Transfer

GENERAL

The Communication Navigation Surveillance/Air Traffic Management (CNS/ATM) can be divided into three main components:

- The communication devices,
- the navigation devices and
- the crew interfaces.



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COMMUNICATION

The communication devices include:

- The SATCOM,
- the VHF Data Radio (VDR), the HF Data Radio (HFDR) and
- the Air Traffic Services Unit (ATSU).

The ATSU is a computer which manages all the communications to or from the SATCOM, VDR and HFDR.

NAVIGATION

The navigation devices include:

- The Multi Mode Receiver (MMR),
- the conventional navigation means (ADIRS, VOR-DME, ADF), and
- the FMS.

The MMR is a receiver which integrates ILS and GPS functions in a single unit. The MMR is also able to receive Microwave Landing System (MLS) or Differential Global Positioning System (DGPS) signals.
The FMS uses the data provided by MMR and conventional navigation means.

CREW INTERFACES

The crew interfaces include:

- The Data Communication Display Unit (DCDU),
- the MCDU,
- a specific attention getter pushbutton and
- the EFIS/ECAM.

The DCDU provides the display of all ATC exchanged messages.
Two DCDUs are located on the central part of the instrument panel, just above MCDUs.
The MCDU has a key "ATC COM" and datalink pages (from ATSU line key) related to CNS/ATM.
Two attention getter pushbuttons, marked "ATC MSG", are located on the left and right sides of the glareshield.

DATA TRANSFER

Navigation data received from the different navigation receivers and sensors is sent to the FMS.
Then, the information is displayed on EFIS/ECAM and on the MCDU.
FMS initializations or updates are still made using the MCDU.

Datalink messages received from VDR, HFDR or SATCOM are managed by the ATSU. The messages are sent to the cockpit interfaces.
To send messages, DCDUs or MCDUs are used according to the type of message.
Downlink messages are sent to the ATSU and emitted by the VDR, HFDR or the SATCOM equipment.

The FMS can also exchange data, like flight plans, position reports or reminders for the crew, directly with the ATSU.

STUDENT NOTES: