16   Avionic Systems

Definitions of the avionic system are given here in the same way as above for the non-avionic systems. Introductory information can also be obtained from the related literature given in the Bibliography.

16.1   Auto Flight (ATA 22)

Definition

> *Those units and components which furnish a means of automatically controlling the flight of the aircraft. Includes those units and components which control direction, heading, attitude, altitude and speed.* (**ATA 100**)

The most important parts of the auto flight system are the *autopilot* and the *auto throttle* (auto thrust) system.

Following **ATA 100** the autopilot is...

> *that portion of the system that uses radio/radar signals, directional and vertical references, air data (pitot-static), computed fight path data, or manually induced inputs to the system to automatically control the flight path of the aircraft through adjustment to the pitch/roll/yaw axis or wing lift characteristics and provide visual cues for flight path guidance, i.e.: Integrated Flight Director. This includes power source devices, inter-locking devices and amplifying, computing, integrating, controlling, actuating, indicating and warning devices such as computers, servos, control panels, indicators, warning lights, etc.*

and the auto throttle is...

> *that portion of the system that automatically controls the position of the throttles to properly manage engine power during all phases of flight / attitude. This includes engaging, sensing, computing, amplifying, controlling, actuating and warning devices such as amplifiers, computers, servos, limit switches, clutches, gear boxes, warning lights, etc.*

16.2 Communication (ATA 23)

Definition

> *Those units and components which furnish a means of communicating from one part of the aircraft to another and between the aircraft or ground stations, includes voice, data, C-W communicating components, PA [Passenger Address] system, intercom and tape reproducer-record player.* (**ATA 100**)

Based on **ATA 100** the communication system includes:

- Speech communication: Radio communication air-to-air, air to ground. HF, VHF UHF radio communication, in-flight telephone, and satellite receiver.
- Data transmission & automatic calling: Selcal (Selected Call) and ACARS (Aircraft Communicating Addressing and Reporting System)
- Passenger address and entertainment system[1]:
  Entertainment: Audio, overhead video, in seat video, interactive video, in seat telephone, video on demand, and Internet systems. Seat power supply system for passenger laptops.
  Passenger address system: The system to address the passengers from the cockpit or the cabin crew station, playback of automatic recordings, boarding music, or acoustic signs. Passenger
- Audio integrating: Controls the output of the communications and navigation receivers into the flight crew headphones and speakers and the output of the flight crew microphones into the communications transmitters.
  Includes also the *Interphone*: Used by flight and ground personnel to communicate between areas on the aircraft.
- Integrated automatic tuning of navigation transmitters and receivers.
- Cockpit voice recorder.

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[1]   In **ATA 2200** the *passenger address and entertainment system* has become the "Cabin Systems (ATA 44)" in its own right. Definition: "Those units and components which furnish a means of entertaining the passengers and providing communication within the aircraft and between the aircraft cabin and ground stations. Includes voice, data, music and video transmissions.

16.3   Indicating / Recording Systems (ATA 31)

Definition

> *... coverage of all instruments, instrument panels and controls... Includes systems/units which integrate indicating instruments into a central display system and instruments not related to any specific system.* (**ATA 100**)

Based on **ATA 100**, part of the indicating /recording system are:
- The instrument and control panels (Figure 16.1)
- Independent instruments (that are not related to any other aircraft system)
- Flight data recorder, recorders for performance or maintenance data
- Central computers, central warning and display systems
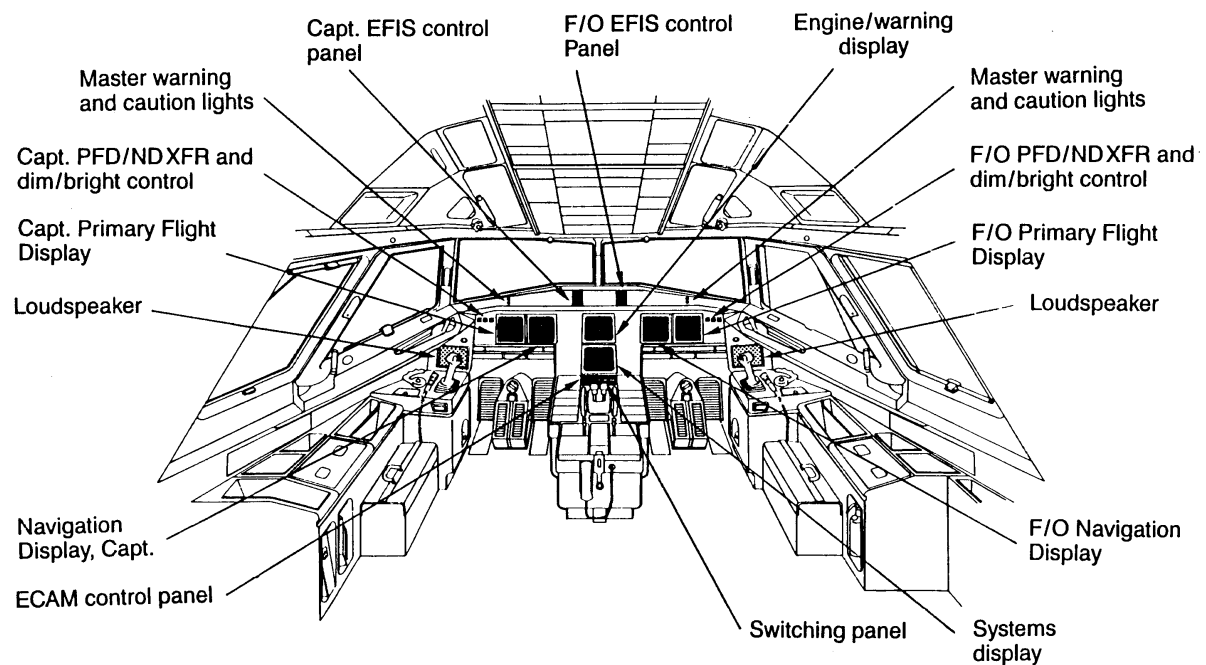
Figure 16.1   A321 general cockpit arrangement and instrument layout

16.4 Navigation (ATA 34)

Definition

> *Those units and components which provide aircraft navigational information. Includes VOR, pitot, static, ILS, ... compasses, indicator, etc.* (**ATA 100**)

Based on **ATA 100** data handling of the navigation system includes:

- Flight environment data (pitot/static system, rate-of-climb, airspeed...)
- Magnetic data (magnetic compass)
- Independent data (inertia guidance systems, weather radar, doppler, proximity warning, collision avoidance)
- Dependent data (DME, transponder, radio compass, LORAN, VOR, ADF, OMEGA, GPS)
- Data from landing and taxiing aids (ILS, marker).