

MODULE 5. DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT

SYSTEMS

5.1 Electronic Instrument Systems

Typical systems arrangements and cockpit layout of electronic instrument systems.

5.2 Numbering Systems

Numbering systems: binary, octal and hexadecimal;
Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.

5.3 Data Conversion

Analogue Data, Digital Data;
Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.

5.4 Data Buses

Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications.

5.5 Logic Circuits

Identification of common logic gate symbols, tables and equivalent circuits;
Applications used for aircraft systems, schematic diagrams.

5.6 Basic Computer Structure

(a) Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM);
Computer technology (as applied in aircraft systems).

5.10 Fibre Optics

Advantages and disadvantages of fibre optic data transmission over electrical wire propagation;
Fibre optic data bus;
Fibre optic related terms;
Terminations;
Couplers, control terminals, remote terminals;
Application of fibre optics in aircraft systems.

5.11 Electronic Displays

Principles of operation of common types of displays used in modern aircraft, including

Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display.

5.12 Electrostatic Sensitive Devices

Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.

5.13 Software Management Control

Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.

5.14 Electromagnetic Environment

Influence of the following phenomena on maintenance practices for electronic system:

EMC-Electromagnetic Compatibility

EMI-Electromagnetic Interference

HIRF-High Intensity Radiated Field

Lightning/lightning protection

5.15 Typical Electronic/Digital Aircraft Systems

General arrangement of typical electronic/digital aircraft systems and associated BITE

(Built In Test Equipment) testing such as:

ACARS-ARINC Communication and Addressing and Reporting System

ECAM-Electronic Centralised Aircraft Monitoring

EFIS-Electronic Flight Instrument System

EICAS-Engine Indication and Crew Alerting System

FBW-Fly by Wire

FMS-Flight Management System

GPS-Global Positioning System

IRS-Inertial reference system

TCAS-Traffic Collision Avoidance system

Integrated modular Avionics

Cabin System

Information system