



# SNS COLLEGE OF TECHNOLOGY

COIMBATORE-35



## DEPARTMENT OF MECHATRONICS ENGINEERING

19MCT402-APPLIED MECHATRONICS ENGG.

### Unit – 3 AVIONICS

#### Radar Systems

Weather Radar detects water droplets, cloud turbulence and warning about storms. Fighter Aircrafts Radars Multi Mode Radars for ground attack role and interception role. The Radar must be able to detect aircraft upto 100 miles away and track several aircraft simultaneously (12 aircraft's). The Radar must have a look down capability to track low flying aircraft below it.

#### Infrared Systems

It is used to provide a video picture of the thermal image scene of the outside world by using fixed Forward Looking Infra Red (FLIR) sensor or a gimbaled IR imaging sensor. The thermal image picture at night looks similar to the visual picture in day time, but highlights heat sources such as vehicle engines. FLIR can also be installed in civil aircraft to provide enhanced vision in addition with HUD.

#### Task Automation Systems

These systems reduce the crew workload and enable minimum crew operation.

#### Navigation Management System

It comprises the operation of all radio navigation aid systems and the combination of data from all navigation sources such as GPS and INS systems, to provide the best estimation of the aircraft position and ground speed.

#### Autopilots and Flight Management Systems

The autopilot relieves the pilot in long range mission. FMS came into use in 1980's (Civil Aircraft). The FMS tasks are given below.

- (i) Flight Planning
- (ii) Navigation Management
- (iii) Engine control to maintain the planned speed
- (iv) Control of Aircraft Flight Path
- (v) Minimizing Fuel consumption
- (vi) Ensuring the aircraft is at the planned 3D position at the planned time slot (for Air Traffic Control).

#### Engine Control and Management

Modern jet engines are having the Full Authority Digital Engine Control System (FADEC). This controls flow of fuel. This control system ensures the engine's temperature, speed and acceleration in control. Engine health monitoring system record a wide range of parameters, so it will give early warning of engine. performance deterioration, excessive wear, fatigue damage, high vibrations, excessive temperature etc.,

#### House Keeping Management

Automation of the background task which are essential for the aircraft's safe and efficient operation. Background tasks include

- i) Fuel management
- ii) Electrical power supply management
- iii) Hydraulic power supply management
- iv) Cabin / Cockpit pressurization systems
- v) Environmental control systems
- vi) Warning systems & Maintenance and monitoring systems.