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FAULT MONITORING

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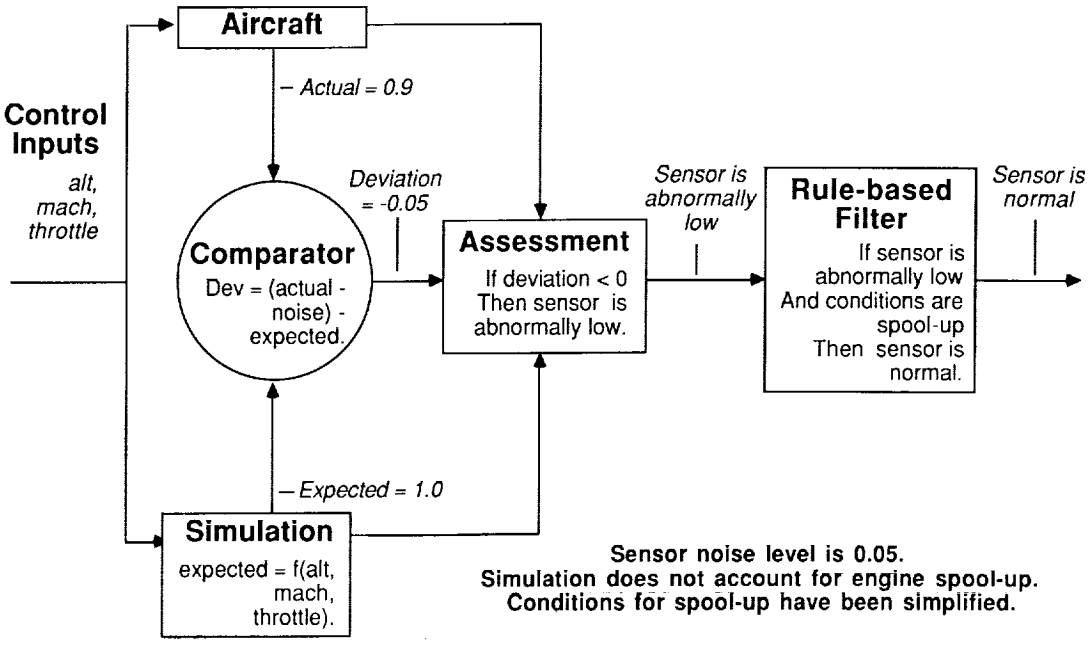
FAULT MONITORING IN THE AIRCRAFT DOMAIN

- **- Develops behavioral expectations**
  - Collects relevant data
  - Makes appropriate comparisons
  - Interprets data into information
- **Provides subsystem information which either directly or indirectly leads to an appropriate response.**
- **"Acts like a flight engineer"**

Information Requirements

- Caution and warning exceedances
- Degradations (abnomal but within range)
- Data interpretation
- Dynamic information (derivatives)
- Relative parameter information
- Low level of false alarms

MONITAUR ARCHITECTURE



IMPLEMENTATION

Characteristics

- Monitors turbofan engine
- Separate device data base
- Sensor-centered object oriented design
- Written in Common Lisp

Anticipated Benefits of MONITAUR Concept

- Early detection of abnormalities
- Minimal interpretation of data
- Quality system state description
- Low number of false alarms
- Relatively low implementation expense

REMAINING WORK

- **Determine false alarm rate**
  - **on Symbolics using aircraft data**
  - **on a PC in an LaRC test aircraft**
- **Implement for other subsystems (e.g. electrical, hydraulic)**
- **Implement on other test aircraft**

REMAINING ISSUES

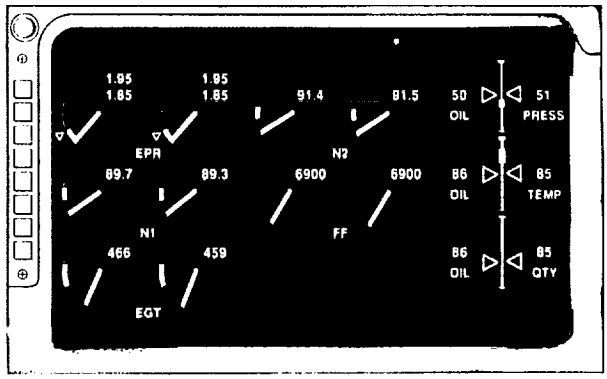
- Prioritize monitoring tasks
- Develop guidelines for knowledge acquisition of rules and noise levels
- Evaluate effects of faulty inputs to the model
- Assess the risk of false alarms

E-MACS

Engine Monitoring and Control System

Situation: *Normal engine power-up for takeoff.*

Traditional



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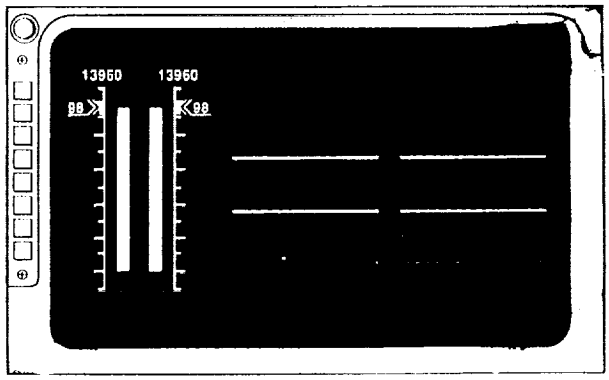
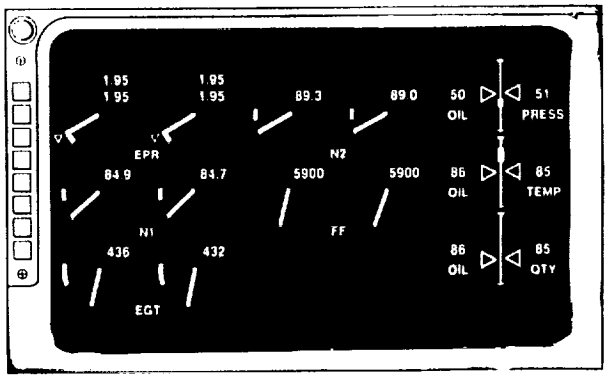


Situation: *Incorrect sensor (EPR). Similar to the 1982 Air Florida accident at Washington National Airport.*

Traditional



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