Hispano-Suiza Groupe SAFRAN

Electricity and electronics

Digital Engine Control

The **Full Authority Digital Engine Control**, better known as a **FADEC**, is one of the largest ECUs* on an aircraft. It is a microprocessor-based unit.

* Ndlr of Next-up : "Electronic control unit", or ECU is the generic term for the units that control and monitor aircraft systems, including the engines.

ECUs are the largest business for the Electrical Division. Hispano-Suiza's vast experience in engine control systems has driven the development of "smart" control systems in a number of other areas, including thrust reversers, braking, steering, landing gear, propeller deicing, and more.

The FADEC continuously processes and analyzes key engine parameters (up to 70 times a second), to make sure the engine operates at maximum potential. It manages the startup phase (which takes only about 40 seconds on the latest models), and then the entire operating envelope, from idle to full throttle.

Hispano-Suiza has developed three generations of FADEC systems for high-power commercial aircraft engines (in conjunction with BAE Systems). The latest member of this family is the **FADEC 3**, designed, produced and supported through FADEC International, a joint venture of Hispano-Suiza and BAE Systems.

The FADEC 3 is not only lighter than its predecessor, but has 10 times the computing power. This means it can incorporate new functions, especially **maintenance and diagnostics**, to better satisfy engine-makers' current and future needs. The FADEC 3 uses a larger share of off-the-shelf electronic components, has fewer connectors, and more input/outputs to handle more sensors and actuators. Last but not least, it can be used on several different types of engines, based on a common core of up to 80% of the system.
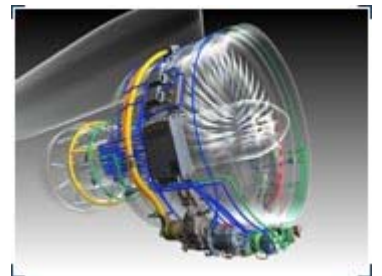
Starting in the late 1980s, the FADEC 1, 2 and 2+ have been used on the CFM56 (-5 and -7), CF6-80 and GE90.

The **FADEC 3** has now been chosen for the GE90-115B - today's most powerful engine at 115,000 pounds of thrust- powerplant of the Boeing 777-300ER and 777-200LR.
It is now being applied to five other engine programs :

- GP7200, one of the engines selected for the Airbus A380, built by the Engine Alliance joint venture between General Electric and Pratt & Whitney.
- CFM56-7B, by CFMI, an equal joint venture of General Electric and Snecma, for the Boeing 737 Next Generation family.
- General Electric CF6-80C2L1F to re-engine the C-5 Galaxy.
- Europrop International (EPI) TP400-D6 turboprop for the Airbus A400M; EPI is a joint venture of ITP,MTU Aero Engines, Rolls-Royce and Snecma.
- General Electric GEnx for the Boeing 787 and the Airbus A350.