

46ESS-16: Full Authority Digital Electronic Control Systems for Aero Gas Turbines

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The history of the gas turbine engine development has mainly been one of mechanical innovation that led to higher and higher performances.

Despite all the improvement achieved in many key areas, such as materials, thermodynamics and aerodynamics, the control system of an aero engine is the one that enables it to operate at its best in every situation.

This paper provides an overview of the evolution that the control system has undergone, starting from the 1970s, when it was firstly introduced as an electronic supervisor, until the recent days, where it has the complete control of all the engine parameters.

Such a control system is called Full Authority Digital Electronic Control, or FADEC, and in this paper the main reasons why it has been implemented are discussed and explained.

In the final chapter is presented what could be expected from the future generation of controllers, what are the main differences and how the architecture will change in order to extend the operability limits of the engine as well as insure higher safety margins.