

## **Aggressive Intermediate Ducts Aerodynamics for Competitive & Environmentally Friendly Jet Engines (AIDA)**

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### **ABSTRACT**

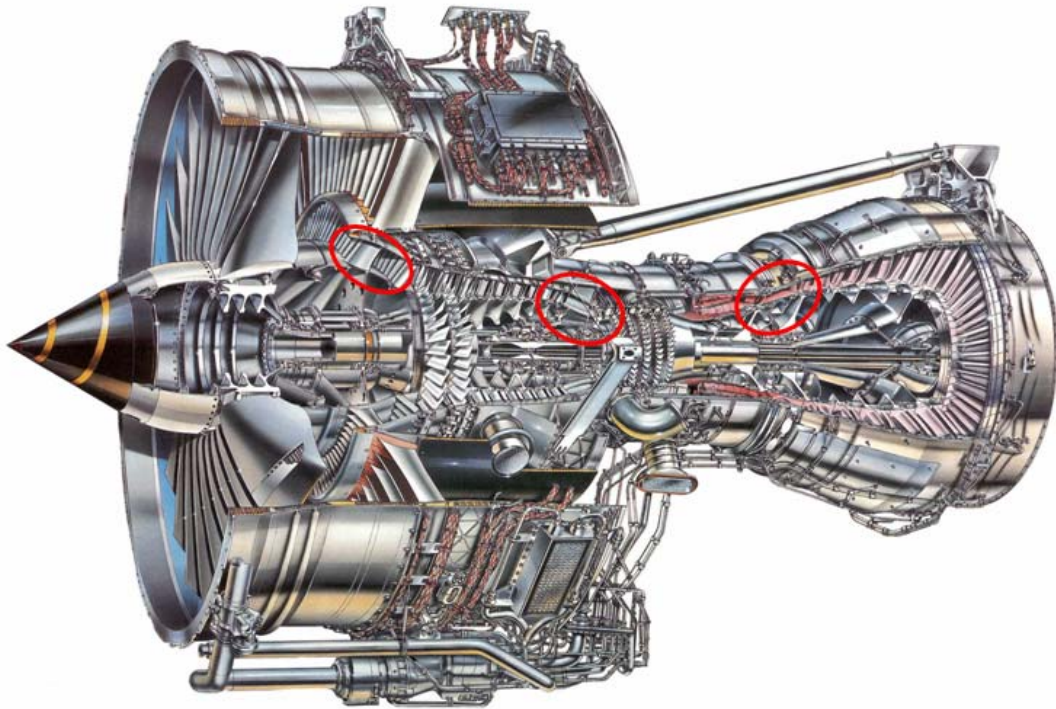
All the European aero-engine manufacturers together with three research institutes and five universities have joined their expertise in the FP6 Specific Targeted Research Project AIDA to reach beyond the state-of-the-art in aero-engine intermediate duct design.

In multi-spool jet engines, illustrated in the figure below, the low-pressure system has a larger radius than the high-pressure system and therefore, intermediate S-shaped transition ducts are needed to connect them. These annular ducts often carry loads and have thick structural struts passing through them, making them large, heavy and expensive structures of considerable complexity.

In modern aircraft engine design there is a constant pressure to decrease weight and noise, increase performance and speed up time-to-market. More aggressive transition-ducts have therefore become a key to meet these demands. The project targets are thus ambitious and represent in figures 20% shorter ducts together with 50% reduction in duct design lead time.

In light of these ambitious goals, AIDA was therefore endowed with seven test facilities delivering fifteen measurement database and an estimated personnel effort equivalent to eighteen experts working full time during four years.

The project is progressing towards its end and in this talk, some of the most advanced computational methods used and the results of these will be presented. The project has been successful to achieve an improved understanding of the flow in aggressive intermediate ducts and its interaction with neighbouring components, to perform high-quality testing of aggressive compressor and turbine ducts, to validate design tools and identify optimal strategies to control flows in very aggressive ducts.



Typical Modern High Bypass Ratio Jet Engine  
Compressor & turbine intermediate ducts highlighted in red