

The European Programme for Environmentally Friendly Aero Engines



A VITAL step towards clean, quiet aero-engines

- VITAL is a European R&T programme which aims to reduce aircraft engine noise and CO₂ emissions.
- VITAL is budgeted at 90 million euros, with half financed by the European Commission.
- VITAL is focusing on the low pressure section of the engine. The improved modules will be tested independently.

Major steps

- Programme start: January 1, 2005
- Term: March 31, 2010

VITAL objectives

- Noise -6 db
- CO₂ emissions -7%

Technology breakthrough

VITAL is addressing two major sources of noise to achieve its ambitious goals:

- fan noise, by reducing fan tip speed
- jet noise, by reducing the gas exhaust velocity

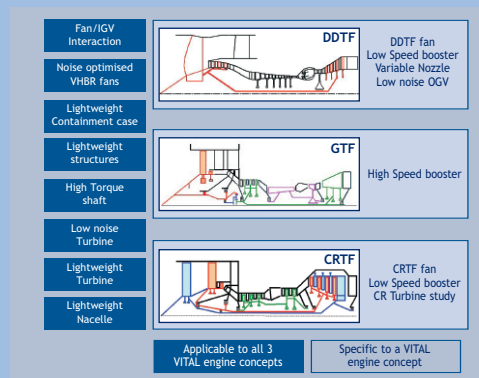
Increasing the engine's bypass ratio is moving towards these two goals. However, a higher bypass ratio alone is not enough to meet ACARE's ambitious noise reduction objectives.

New technologies that further allow to reduce the fan rotation speed should be developed. The main challenge facing VITAL is to reconcile the conflicting needs to reduce engine weight and still incorporate high-bypass technologies, since a high bypass ratio generally implies a larger diameter engine. An effective optimisation is needed to reduce fuel consumption and meet CO₂ emission objectives.

Three fan architectures

The technologies developed by the VITAL programme will be incorporated in three basic configurations involving the fan and the low-pressure section.

The improvements expected from each of these layouts will be evaluated by a whole engine assessment. Three basic architectures are being investigated:



VITAL programme partners

SNECMA (F)* AIRBUS France (F) ARTTIC (F) AVIO SPA* (I) CEIT (SP) CENAERO (B) CERFACS (F) CHALMERS UNIVERSITY (S) CIAM (RU) COMOTI (RO) CRANFIELD UNIVERSITY (UK) CSIR (SA) CTA (SP) DLR. (G) EAST-4D (G) FACC (A) FOI (S) FORCE TECHNOLOGY (DK) GKN AER (UK) GLOBAL DESIGN TECHNOLOGY (B) GRAZ UNIVERSITY (A) AIRCELLE (F) ITP* (SP) MS COMPOSITES (F) MTU AERO ENGINES* (G) NLR (NL) ONERA (F) PCA ENGINEERS (UK) PHOTON (G) POLITECNICO DI TORINO (I) ROLLS-ROYCE D* (G) ROLLS-ROYCE PLC* (UK) SHORT BROTHERS (UK) SWERA SICOMP AB (S) ISEA (F) TECHSPACE AERO* (B) TU DRESDEN (G) U. DI LECCE (I) U. FIRENZE (I)U. GENOVA (I) U. NOTTINGHAM (UK) U. OXFORD (UK) U. PIERRE-ET-MARIE CURIE (F) U. SOUTHAMPTON (UK) U. STUTTGART (G) UNIVERSITY WEST (S) UniBW MÜNCHEN (D) UNIVERSIDAD POLITÉCNICA DE MADRID (SP) VIBRATEC (F) VKI (B) VOLVO AERO* (S) VOLVO AERO NORGE (N) WSK (PL) CZIR (ZA)

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