

Focus on CSIR services in research into power systems

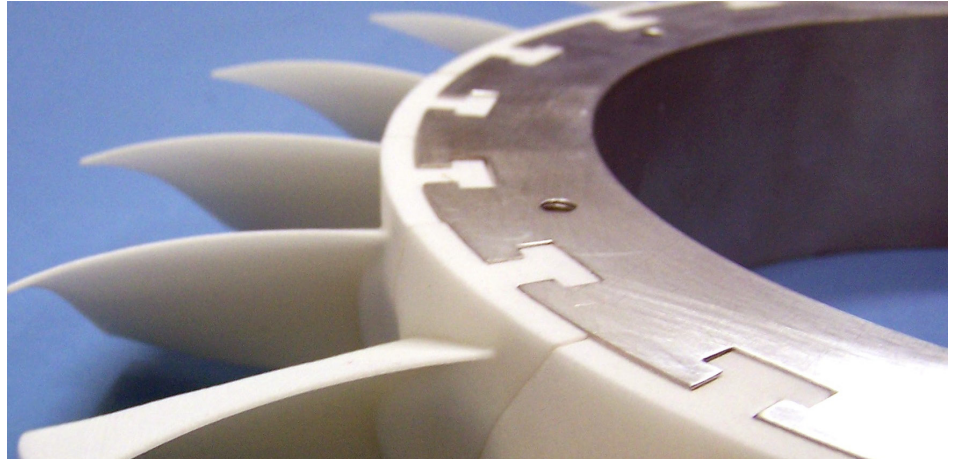
Focussed on propulsive gas turbines, this group has worked with all the major engine manufacturers including GE, Rolls-Royce, Volvo Aero and Klimov in domains ranging from compressor flutter, turbine aero-thermodynamics and cooling, secondary cooling circuits, and turbine design and cycle analysis. A variety of experimental techniques are used and the team has access to rotating and cascade facilities as well as specialist CFD and empirical analysis codes.

Research inputs

- Gas turbines
 - Cycle Modelling
 - Efficiency Enhancement
 - Live Improvement
- Concentrating Solar Power
 - Heliostat design
 - Ray-tracing, glint and glare analysis
 - System modelling

Capabilities

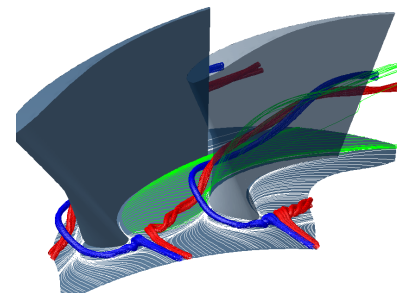
- Computational clusters running a variety of commercial and in-house analysis codes
 - Star CCM+, Numeca, Soltrace, Gas Turb, FlowNex etc.
- One-and-a-half stage low-speed turbine test rig
- Cascade and turbine test facilities
- Atmospheric combustor rig
- Measurement capabilities
 - Full suite of pressure probes
 - Hot-wire anemometry
 - Laser Doppler velocimetry
 - Particle image velocimetry



European Union framework Programme (FP) projects

- FP6 VITAL (EnVironmentALLY Friendly Aircraft Engines) (53 Partners):
The research is aimed at reducing aircraft engine noise and carbon dioxide (CO₂) emissions through the development and application of advanced technology in the low-pressure systems of aircraft engines. The CSIR analysed the effectiveness of 3D non-axisymmetric endwall contours on the performance of turbine blades in the presence of upstream blade rows and their wakes using computational fluid dynamics and a low-speed 1½ stage turbine test rig in partnership with AVIO Spa.
- FP7 FUTURE (27 Partners):
Studies into a reduction in development cost in current engine programmes, reducing weight and fuel consumption, and simultaneously increase the ability to efficiently manage flutter vibration problems

occurring on engines at service. The CSIR has developed a flutter excitation system in conjunction with Volvo Aero, Stellenbosch University and TU Darmstadt, Germany which was successfully used to test a transonic compressor.



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