Title
Thermal control of the hot components in an aircraft turbine minimizing the air bled by the compressor.

Problem background
Several components in an aircraft turbine require a thermal control to tolerate the thermal stresses. In order to do so a large quantity of air is bled by compressor and this bleeding is a large cause for overall engine performances reduction. A very good knowledge of the thermal fields of flows and components is required in order to identify the zones which must be cooled with higher priority. The thermal fields are strongly influenced by a huge number of leakages and gaps which usually exist in turbine.

Research project objectives
The research program can be divided in several steps:

- adequate studies of the thermo-fluid-dynamic fields of turbine components and fluid flows within
- highlighting of the most important leakages which influence the thermo-fluid-dynamic fields and the most important zones which must be cooled
- exploitation of the experimental data obtained by using the experimental rig under construction for the Thermalcase project
- capability to carry on numerical simulations of the involved phenomena

Ph.D. Themes
- Thermal control and optimization of the turbine leakages and cooling flows
- Mapping and analysis of the most critical zones in a turbine case and shroud and maximum tolerable temperatures
- Numerical simulation of the turbine leakages and interaction between cooling flows and hot components

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