



Institut Supérieur de l'Aéronautique et de l'Espace

RESEARCH MASTER INTERNSHIP

Département Aérodynamique, Energétique et Propulsion

Supervisor :

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INTERNSHIP DESCRIPTION

Domain : Internal Aerodynamics, Turbomachinery

Title : **DEVELOPMENT AND VALIDATION OF AN OFF-DESIGN 1D METHOD IN ORDER TO PREDICT THE MAP OF CENTRIFUGAL COMPRESSORS**

Topic:

The study focuses on a centrifugal compressor reference, published in the literature, for which an experimental database is available. The method currently studied, developed and applied to radial turbine in our department, for which original conclusions have been proposed and published, is extended to compressor application. The aim of this study is to perform this exportation, highlighting the physical meaning of the 1D model, and the relevance of the initial hypotheses. This reflexion, focused on the simple modelling of off-design behaviour, will be fed by RANS 3D stationary/time-depending simulations using the code Fine/Turbo. But the student must keep in mind, when building the model, that very little internal information on the flow pattern in the machine is available for designers. A process and a prediction tool must be proposed (coded in Fortran for example), with possible integration of a design tool. This development phase, based on simple equation, must be supported by a solid knowledge of the current state of the art.

Methods:

30 % Theoretical Research

70 % Applied Research

0 % Experimental Research

Possibility to go on a Ph.D.:

Yes

No

APPLICANT PROFILE

Knowledge and required level:

Aero-thermodynamics

Languages/Systems : Fortran, Unix

Applications should be sent by e-mail to the supervisor.