Master Thesis - “CFD predictions of conjugated heat transfer including supercritical fluid” (30 credits/20 weeks –1 student)

About us

GKN Aerospace is the world’s leading multi-technology tier 1 aerospace supplier. With 55 manufacturing locations in 15 countries, we serve over 90% of the world’s aircraft and engine manufacturers. We design and manufacture innovative smart aerospace systems and components. Our technologies are used in aircraft ranging from the most used civil aircraft to the world’s advanced 5th generation fighter aircraft and the Ariane orbital rockets used by ESA.

Project Background

GKN Aerospace are working on technology development for the next generation aircraft engine, facing new challenges requiring innovative solutions. A heat exchanger fitted in the front part of the engine is investigated, using inlet air to cool a supercritical fluid acting as refreigerant for the system. A conceptual model has been established to predict both inner and outer heat transfer qualities of aforementioned heat exchanger. It is intended to be used to explore several sets of CFD settings which could impact the result. Additionally, an investigation of a noticeable mass flow imbalance in the refrigerant flow and how it affects the overall heat exchanger performance is to be performed.

Assignment Description

The objective of the master thesis is to develop a best practice guide for conjugated heat transfer CFD simulations with supercritical fluids as well as investigating how mass flow imbalance in the heat exchanger channels affect the overall efficiency of the heat exchanger.

- Main content of the thesis:
  - Performing CFD simulations with various simulation setups. To be compared with correlation coefficients.
  - Mass flow imbalance sensitivty analysis for overall heat transfer efficiency.
- Project milestones:
  - Define the scope and time plan for the thesis work
  - Litterature study
  - Familiarize with intended CFD softwares (ANSYS-CFX,FLUENT,ICEM CFD)
  - Model part of the heat exchanger for high fidelity CFD analysis
  - Post processing with optimal CFD setup
  - Report closing
- Thesis report stating:
  - Best practice for CFD conjugated heat transfer analysis with supercritical fluid
  - The accuracy of CFD prediction versus analytical correlation coeffients.
  - How CFD predicts cooling channel mass flow imbalance effect on overall heat exchange performance

Qualifications

- M.Sc student
- Desired background/abilities
  - Completed course(s) in fluid mechanics
  - Knowledge of CFD software
  - Knowledge/completed course in heat transfer
  - General interest in CFD

Apply by

Send your resume and cover letter to henrik.holmstrom@gknaerospace.com

Last date for application: 2022-12-01