

Master Thesis work (30 credits/20 weeks – 1-2 student[s]) - Uncertainties and Design Margins - A robust design approach for jet engine component design

About us

GKN Aerospace is the world's leading multi-technology tier 1 aerospace supplier. With 33 manufacturing locations in 12 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

The aerospace industry is, for safety reasons a naturally conservative business area, where uncertainties are mitigated using design margins and design factors, which are taken into account whenever design studies and design optimizations are carried out. In parallel there is a question of how robust a technical solution is, when tolerances and variation are taken into account for the manufacturing methods used.

Within GKN Aerospace Engines Trollhättan there is a method developed called "Reliability Based Life Prediction" or "probabilistic VMEA" referenced in literature. This statistical and analytic method can give insights and provide missing information on design margins if it is appropriately used.

Assignment description

- Activities:
 - Interview study:
 - Describe the current awareness of how uncertainties are handled at GKN aerospace. What are the challenges and opportunities?
 - Literature study:
 - What is the state of the art of design margins? What are some good examples in literature on Design Margins and uncertainties?
 - Prescriptive study:
 - Identify success factors and criteria
 - How can GKN introduce a way to work more specifically with design margins?
 - What are the improvements which can be made in the current working process?
 - Exemplify and validate a solution:
 - Run a pilot computational study to show how to work with design margins.

Research Questions

- RQ1: What are the current industrial challenges related to the design process for design margins?
- RQ2: What is the process of working with design margins at GKN and how can it be improved?

Qualifications

- A background in Mechanical Engineering or Engineering Physics with interest in Applied Mathematics and Statistics. Some experience in design work is favorable.

Application

Last application date: 2024-11-30. Interviews will be carried out and the position can be occupied whenever the candidate(s) have been found.

Send CV and letter presenting yourself to Sören Knuts,

soren.knuts@gknaerospace.com.

