GKN AEROSPACE

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MSc thesis proposal	1 (1)

Thesis title Integrated aero-design of an intermediate compressor duct and upstream compressor stages	Business area Aerodynamics
	Study level Master
Period of time and amount of credits ~20 weeks, 30 credits	Number of students 1
Location Trollhättan	Contact person Fredrik Wallin
Language English	Start date 2014-01-20
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About us

GKN Aerospace is the aerospace operation of GKN plc, serving a global customer base and operating in North America and Europe. With sales of £1.5 billion in 2011, the business is focused around three major product areas - aerostructures, engine products and transparencies, plus a number of specialist products - electro-thermal ice protection, fuel and flotation systems, and bullet resistant glass. The business has significant participation on most major civil and military programmes. GKN Aerospace is a major supplier of integrated composite structures, offers one of the most comprehensive capabilities in high performance metallics processing and is the world leading supplier of cockpit transparencies and passenger cabin windows.

Background of thesis project

High technology components from GKN Aerospace Engine Systems can be found in 90% of the world's large commercial aircraft. A majority of these components are large load carrying structures. Aero-thermal aspects are very important for the design of these structures.

In modern turbo-fan engines there is a significant radial offset between the low-pressure (or intermediate-pressure) system and the high-pressure core. The low-/intermediate-pressure compression system is connected to the high-pressure compressor by an intermediate transition duct. These ducts have struts connecting the inner and outer flowpath in order to transfer loads and to allow for internal services, such as oil pipes and secondary air flow. The Research Center at GKN Aerospace Engine Systems is currently involved in a European research project, in which certain integration aspects of the duct and upstream compressor stages are addressed.

Assignment description

The focus of the thesis work would be to investigate the potential benefit of introducing compressor ducts with turning struts using CFD. Different turning strut configurations will be compared to a conventional configuration (with symmetrical, non-turning struts). The work will also include working with aerodesign of the rear compressor stage(s). The benefits and drawbacks with different integration concepts are to be evaluated on a system or subsystem level. In-house aerodesign tools will be used and CFD analysis will be performed using the commercial software ANSYS CFX.

Work will be performed at GKN Aerospace in Trollhättan, within the Research Center Department of Engineering Methods. The department has around 25 highly skilled employees, working within the fields of aerodynamics, solid mechanics, material testing etc.

Target

- Evaluation of benefits and drawbacks with different integration concepts
- Back-to-back comparison between conventional (non-turning strut) duct concept and different turning strut configurations

Qualifications

A background in Engineering Physics or Mechanical Engineering with focus on fluid mechanics is desirable. Some experience in CFD is considered favorable.

Apply by

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