



DEPARTMENT OF AUTOMOTIVE AND AERONAUTICAL ENGINEERING

Turboprop Aircraft Design Optimization - Tool Development

Task for a *Master thesis* according to university regulations

Background

Within the last years, several aircraft design tools have been developed in the Aircraft Design and Systems Group (AERO). The tool PrOPerA can be used for the conceptual design of turboprop and turbofan driven aircraft. It has been developed based on the tool OPerA which concentrates on the design of turbofan driven aircraft. The tool SAS Classic is a tool for the preliminary sizing of an aircraft. It has been used in the lecture aircraft design for more than a decade. Based on SAS Classic, it is planned to develop the tool SAS Optimization which enables the user to do automatic parameter variations as well as design optimizations based on an evolutionary optimization method.

Task

The first task of this thesis is to improve PrOPerA. In the first step, PrOPerA has to be tested by redesigning several turboprop driven aircraft. After that, suggestions for improvement have to be made. Based on these suggestions, improved methods have to be implemented in the tool and their benefit has to be evaluated. The second task is to develop the tool SAS Optimization based on SAS Classic.

The tasks of the project are as follows:

- Redesign of several turboprop aircraft using current PrOPerA version
- Proposal of improvements for the current PrOPerA version
- Development and implementation of new methods to improve PrOPerA
- Evaluation of the improvements
- Creation of SAS Optimization as a further development of SAS Classic

The report has to be written in English based on German or international standards on report writing.