

**Bachelorarbeit**  
für  
Herrn/Frau cand. aer. N.N

**Development of a Performance Model of an Avco Lycoming  
ALF 502 Engine**

**Work description:**

Predicting the gradual engine deterioration is one of the keys to optimize aircraft rotations and maintenance schedules resulting in lowering the operating costs of an aircraft. Gradual deterioration is highly dependent upon environmental conditions and power setting. In the past, only single snapshots of flights were provided. Hence, large portions of the mission were unknown, making the development of predictive engine deterioration models close to impossible. New engines provide continuously recorded data giving the possibility to analyse the complete flight mission.

The NASA released a dataset of commercial flights where in-flight data are recorded continuously. Unfortunately, the provided measurements are insufficient for a throughout analysis of engine deterioration. A hybrid Ansatz including a thermodynamic engine model synthesizing the missing measurements would help to develop a deterioration prediction model.

Within the scope of this bachelor thesis, an existing thermodynamic model of an Avco Lycoming ALF 502 engine is to be improved in the power synthesis software NPSS. It means a preliminary research to understand the main engine parameters and familiarization with NPSS must be first carried out. Once the performance model of the engine is completed, the creation of an interface that enables the user to run the model easily and rapidly needs to be developed. The final presentation and thesis could be written either in English or German.

**Work schedule:**

- Literature research
- Familiarisation with the existing NPSS model and understand what could/must be improved
- Creation of the interface of the engine model
- Elaboration of the results and preparation of the final presentation

**Prerequisites:**

- Knowledge gained during Luftfahrtantriebe und Turbomaschinen
- Programming skills in C, Matlab/Python
- Minimum 102 LP (credits) required