

Development of an acoustic network model of a Sequential Aero Engine Test Rig (RQL)

Type: Bachelor Thesis/ Semester Thesis
Content: experimental
Possible start: now

Job Description

The “Flightpath 2050” report documents Europe’s vision for aviation to drastically reduce pollutant emissions of NO_x. Rich-Quench-Lean combustors (RQL) are a chamber design that has lower NO_x emissions and is currently in use with kerosene. With the technological improvements to sequential combustion, the risk of combustion instabilities, such as the Growl/Rumble phenomenon, rises. This phenomenon describes a low-frequency noise that can risk damaging engine components. Entropy and equivalence ratio waves are suspected as possible causes for this phenomenon.

This student thesis is the first step toward the investigation of Growl/Rumble in an RQL combustion chamber. With the means of acoustic forcing thermoacoustic instabilities can be detected. This thesis is going to be the base of the thermoacoustic investigation and aims to characterize the acoustic behaviour of the test rig without combustion.



Figure 1: Lean combustion zone in the RQL combustion test rig

Therefore, analytical tools are used to create a network model of the test rig. This network model is then validated with experimental data and further refined.

Your Tasks

- Get to know the RQL test rig
- Setting up the network model of the test rig
- Validation of the network model with experimental data
- Refinement of the network model

Our Requirements

- Basic knowledge of fluid mechanics and thermodynamics
- Ability to work independently
- Optional: Knowledge of acoustics

Our Offer

- Gain insight into the fascinating research field of combustion instabilities/thermoacoustics
- Working on highly relevant topics within an international research team

Contact

If you have any questions or are interested in working with our team, please send your application to Thuy An Do (thuyan.do@tum.de).