



Studien- oder Masterarbeit
(deutsch oder englisch)

Preliminary Design and Analysis of a Rocket Engine with a Spherical Combustion Chamber

At the Institute of Space Systems (IRAS), research is focused on rocket engines for in-space propulsion. These engines usually have a cylindrical combustion chamber due to manufacturability. Additive manufacturing opens up new freedoms of design. This enables the design of spherical combustion chambers that should show enhanced cooling capabilities and better stress resistance. The aim of this thesis is the design of a spherical combustion chamber and comparative analysis with existing cylindrical designs.

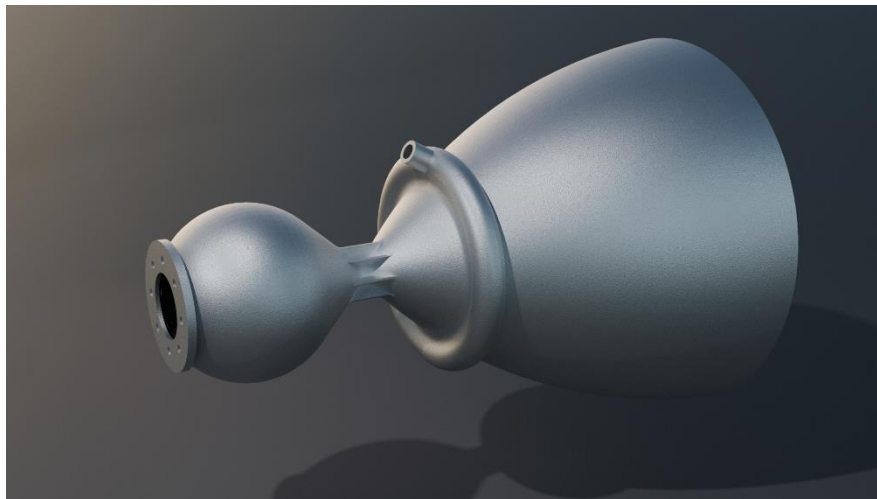


Figure 1: Rendering of an example for a spherical combustion chamber with large expansion ratio nozzle.

Tasks and Deliveries Include:

1. Conduct a literature review
2. Design of a spherical combustion chamber
3. Analysis of heat transfer and stresses during operation
4. Comparison to cylindrical chambers and final evaluation
5. Documentation in a comprehensive thesis with presentation

Skills and Knowledge:

- Proficient in CFD software and tools
- Familiarity with NASA's CEA Tool
- A solid understanding of combustion simulation would be an asset.
- High motivation for thermodynamics
- Knowledge in heat transfer mechanics (Wärme- und Stoffübertragung) would be beneficial.

Kontakt: M.Sc. Tobias Stelzer
Tel. 0531 / 391-9977, E-Mail: tobias.stelzer@tu-braunschweig.de
Hermann-Blenk-Str. 23, 38108 Braunschweig