



## Bachelorarbeit

(deutsch oder englisch)

# Analysis of In-Space Mission Scenarios for Cryogenic Propulsion Systems

The In-Space Propulsion group at IRAS is positioned at the forefront of cryogenic in-space propulsion research, which offer transformative potentials for space missions. As advancements continue to be made in this domain, there's a pressing need to identify and understand the optimal mission scenarios that can benefit from such propulsion technologies.



Figure 1: Space transportation ecosystem pillars

This thesis seeks to provide a comprehensive review of potential missions where cryogenic propulsion can play a pivotal role, followed by an in-depth analysis of the most promising scenarios and a derivation of critical requirements for the propulsion subsystem.

Tasks and deliveries include:

1. Conduct a literature review to collect various in-space mission scenarios that could potentially benefit from cryogenic propulsion systems.
2. Evaluate the advantages, challenges, and feasibility of employing cryogenic propulsion in the identified mission scenarios.
3. Based on the feasibility study, select the most promising mission scenarios that could best harness the benefits of cryogenic propulsion.
4. For the chosen scenarios, derive essential requirements for the propulsion subsystem, such as thrust, specific impulse, propellant choices, and operational constraints.
5. Compare the derived requirements across scenarios to identify commonalities and divergences, offering insights into potential standardization or customization approaches.

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