# Bachelor-/Studienarbeit

Development of Refuelling Payload for ELISSA

In-space refuelling is a technology which will be key to the future of spaceflight. By refuelling spacecraft, it will be possible to extend their life, as well as reduce the cost of performing large manoeuvres, thereby unlocking new types of missions. It will also enable a hub-and-spoke approach, where large launch vehicles are used to launch multiple spacecraft to a parking orbit. These spacecraft are then taken to their destination orbit by refuellable tugs, which are also capable of performing servicing.

There are still many challenges to be addressed before in-space refuelling becomes routine. One of these is the attitude control of the two spacecraft during the refuelling procedure. The Experimental Lab for Proximity Operations and Space Situational Awareness (ELISSA) at the institute of space systems (IRAS) is a 4 x 7 m air bearing table, used to simulate the frictionless environment of space. Robotic free-flyers are used to simulate spacecraft and validate control algorithms for various mission scenarios.
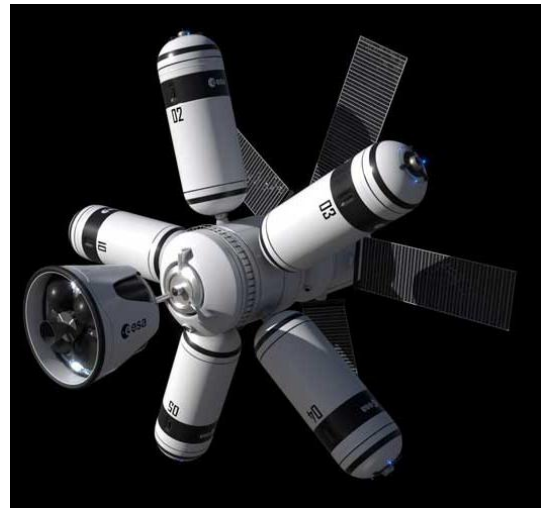
The goal of this thesis is to design, manufacture and test a refuelling payload for the ELISSA free flyers. Further work will then use this payload to develop control algorithms for the refuelling process.

In general, the tasks to be completed are:
- Requirement capture for the payload
- Concept generation and trade-off of refuelling payload designs
- Prototyping and testing
- Manufacture and testing of final design
- Integration within the ELISSA ecosystem.

Key skills which would be useful for the successful completion of this project are:

- Hand-on experience in designing and building small engineering projects
- Programming experience in python or C++
- Basic understanding of electronics

If interested, please send Declan Jonckers your CV and grade transcript.

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