



## Study- or Master Thesis

# Autonomous rendezvous and docking with a tumbling Target on the ISS



Fig 1: Docking experiment with a stationary target

Space debris objects are generally non-stationary, undergoing a rotational or even tumbling motion. A major concern in regards to Active Debris Removal (ADR) is how to approach and capture such an object. On-going research at the IRAS is the application of Gecko-Adhesives for docking, which have already been tested successfully on-board the ISS with a stationary target. Currently, the Massachusetts Institute of Technology (MIT) and German Aerospace Center (DLR) are conducting rendezvous experiments on-board the ISS with a tumbling target. This presents a unique opportunity to cooperate with the MIT and DLR to combine their individual research efforts with those of IRAS and conduct a complete rendezvous and docking experiment with a non-stationary Target on-board the ISS.

1. Construct an Astrobeek mock-up for ELISSA experiments
2. Integrate the MIT/DLR vision-based navigation, guidance and control algorithms for approach with the GNC algorithms for docking at IRAS
3. Perform on-ground tests on ELISSA
4. Migrate the combined solution to the Astrobeek environment and transition to ISS experiments

Contact: Dipl. Ing. Mohamed Khalil Ben-Larbi  
E-Mail: [m.ben-larbi@tu-braunschweig.de](mailto:m.ben-larbi@tu-braunschweig.de)  
Hermann-Blenk-Str. 23, 38108 Braunschweig

Markus Huwald, M.Sc.  
Tel. 0531 / 391-9977, E-Mail: [m.huwald@tu-braunschweig.de](mailto:m.huwald@tu-braunschweig.de)  
Hermann-Blenk-Str. 23, 38108 Braunschweig