BEARS

DARE THE LIMITS

RFT · TU berlin

Work Group

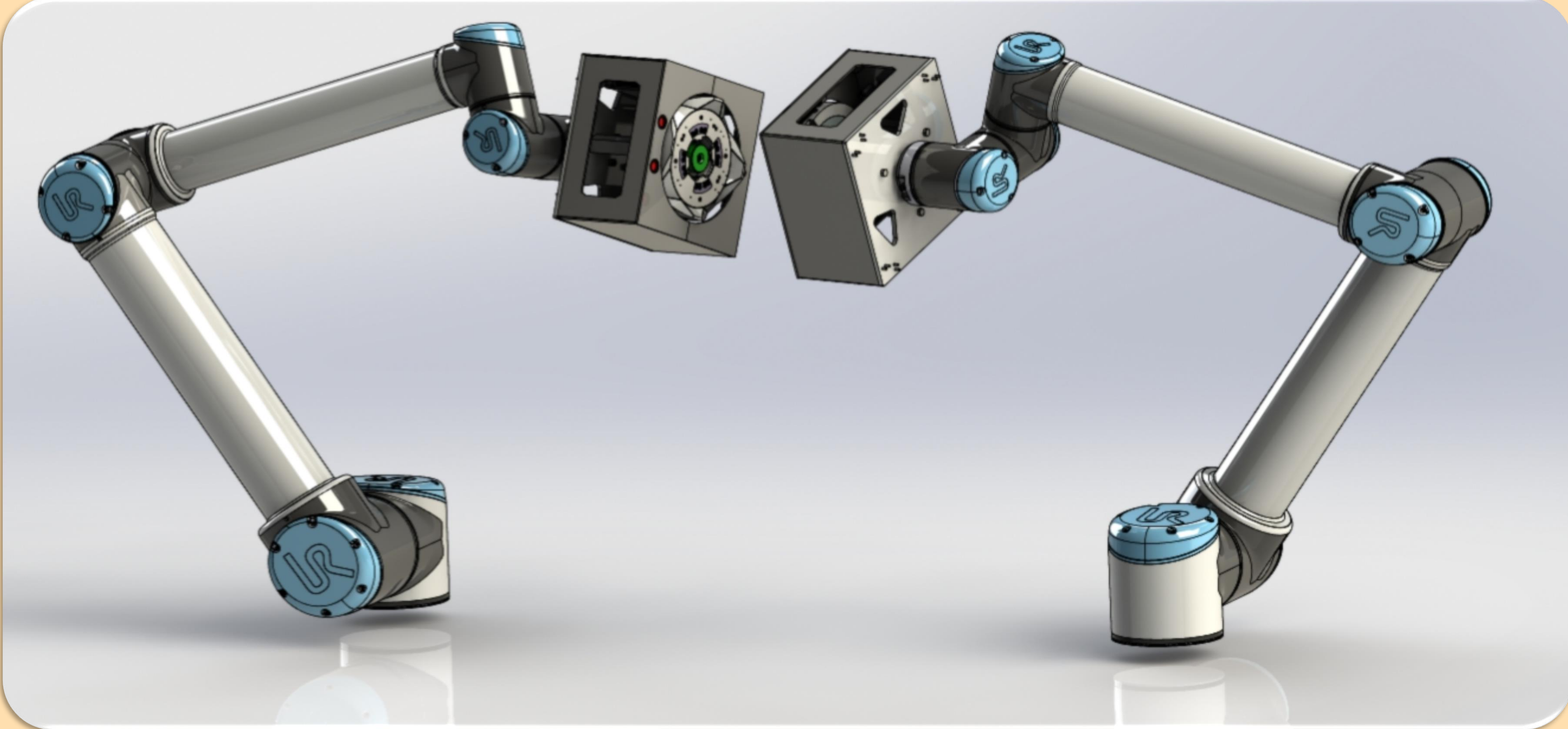### Science & Experiments
R&D of satellite tech. and space-related experiments: Docking 🪐 Simulation, novel fuel tanks

WOBBLE2 · CAREER

## CubeSat Robotic Environment for Educational Research

A DLR-funded research project for hands-on investigation of RVD (Rendezvous and Docking) maneuvers aided by two robotic arms with 4U CubeSat structure-like EndEffectors. This project focuses on Active Debris Removal and On-Orbit Servicing of a so-called target satellite in requirement of maintenance or assistance in de-orbiting to comply with regulations.
The robotic arms are used to compensate earth's gravitational influence and simulate in-orbit relative movement and contact dynamics of two satellites.
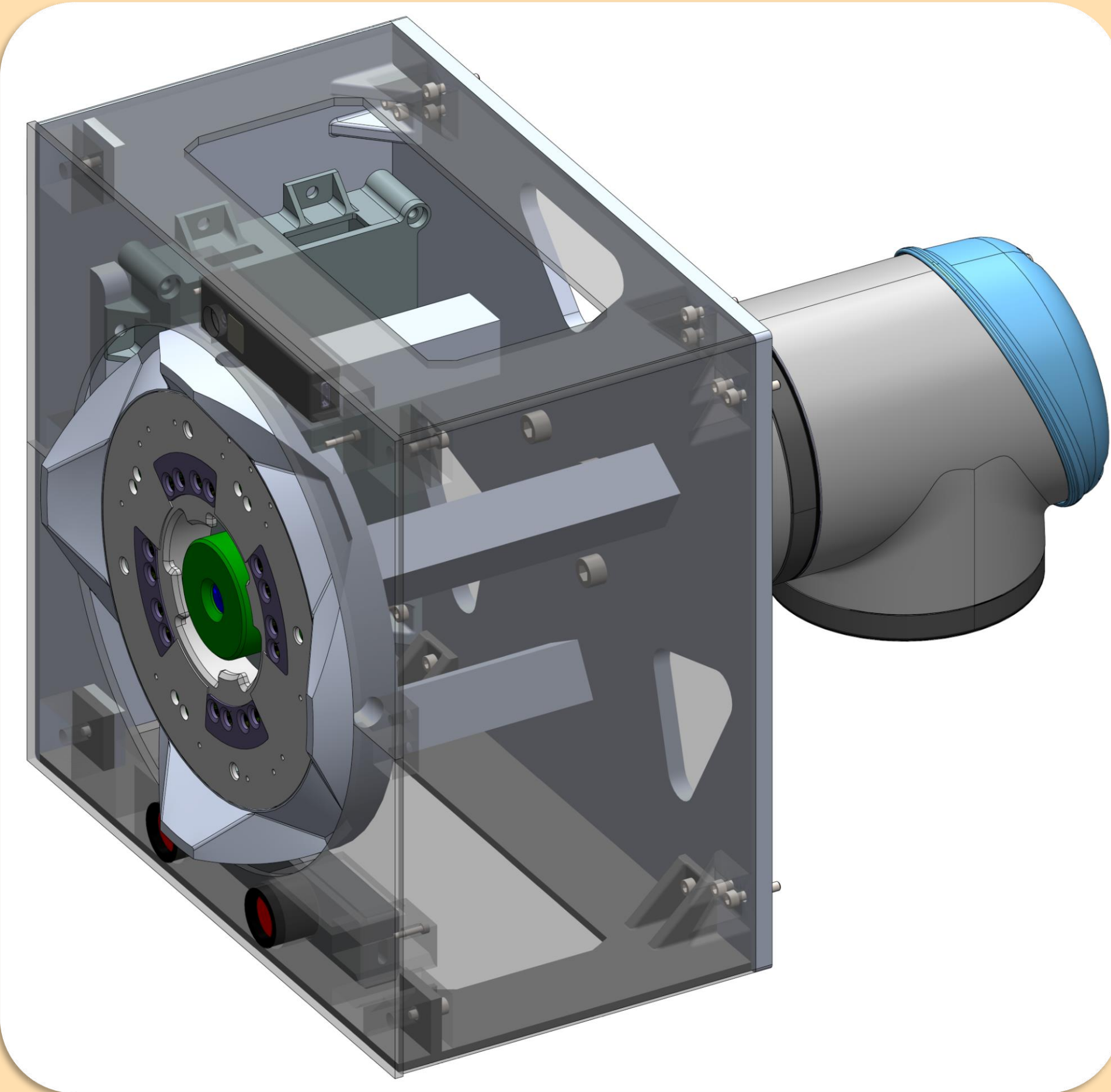
The two EndEffectors are developed to resemble the simulated active and passive satellites and house different types of docking interfaces. The integration of the interfaces into a satellite-like structure is the central objective in the design of the EndEffectors. These interfaces are mounted to an aluminum Backplate at each robotic arm's end to lead contact forces directly into the robotic arm and save weight. All other panels are made from 3D-printed PLA and host the small navigation sensors.
The EndEffectors additionally provide housing to the iSSI control box and cabling.
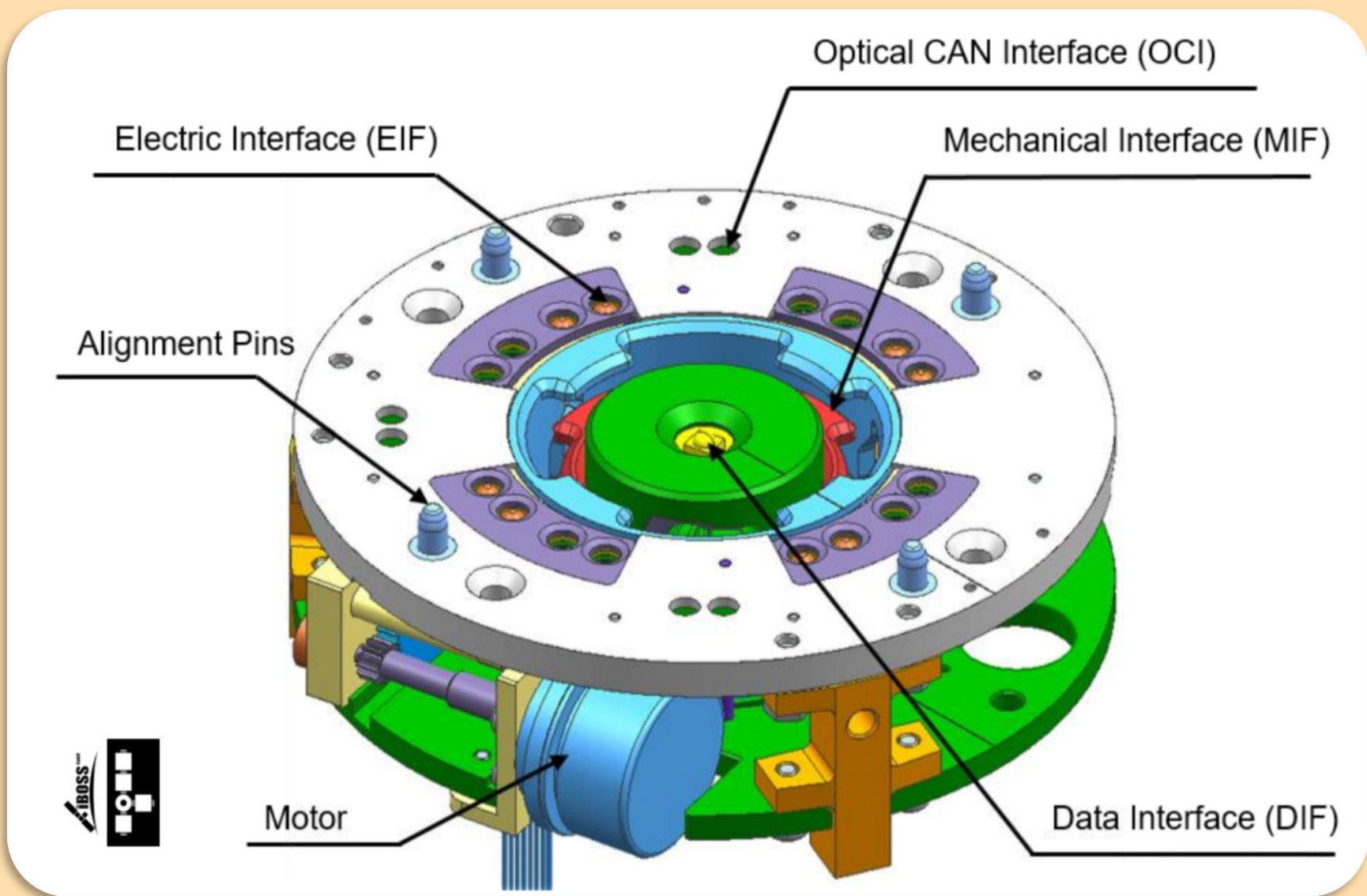
The iSSI docking interface enables mechanical, electrical and data connection of both systems. It is intended for both uncooperative and cooperative docking and would enable in-orbit battery recharge and data exchange.
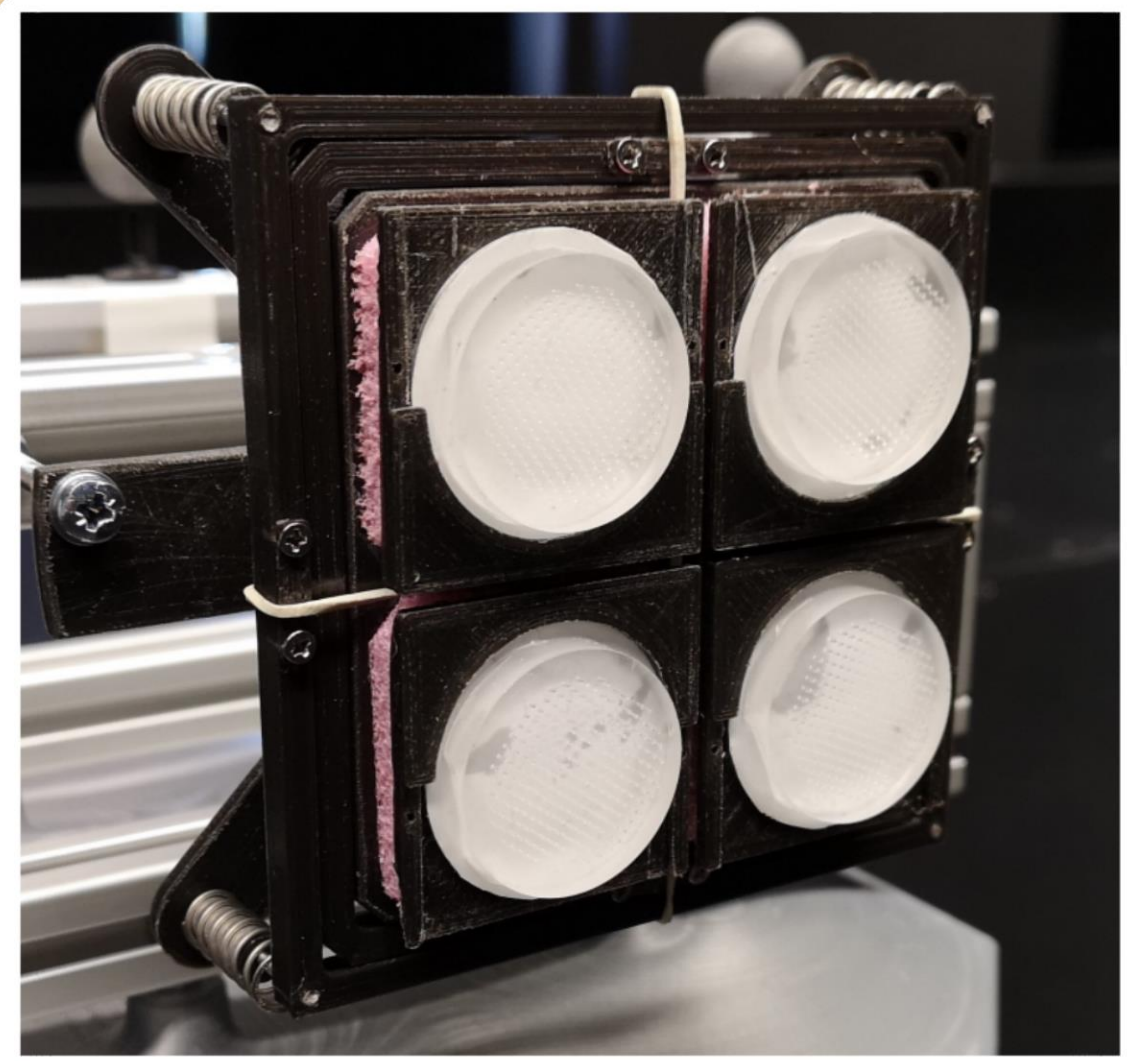
(b) The Sylgard 184 gecko material mounted to the chaser mechanism prototype

Gecko-inspired material featuring a damping mechanism for uncooperative docking is also being developed at the chair of space technology and can be swiftly interchanged with iSSI interface for different RVD scenarios.

Contact: n.mirrafati@campus.tu-berlin.de & talin.aswad@campus.tu-berlin.de

"**B**erlin **E**xperimental **A**stronautics **R**esearch **S**tudent Team" is a registered club founded in 2022 at the Technical University of Berlin that enables students to work on hardware and develop software for space-related projects

CLEAN SPACE DAYS 2024
8th to 11th October 2024
Poster Session

esa

#CSD2024