

Fluids and Space Engineering Seminar

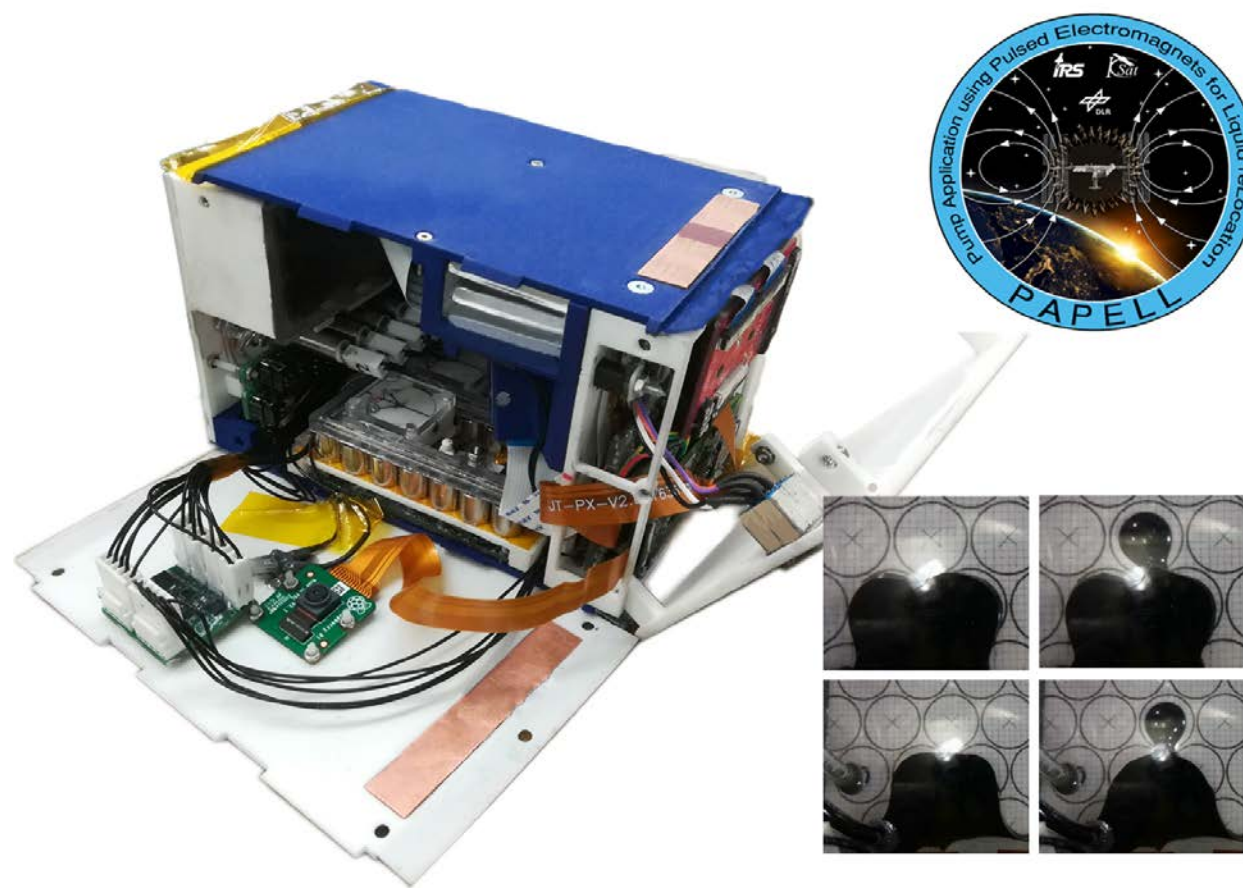
Date: Wednesday, November 13, 2019 at 13:00

Location: ZARM, Room 1730

PAPPELL - Ferrofluidmanipulation on the ISS

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PAPPELL flight model (left) and collage of ferrofluid manipulation (lower right)

The Pump Application using Pulsed Electromagnets for Liquid relocation (PAPPELL) experiment is a technology demonstrator that performed basic proof of concept of ferrofluid manipulation on the International Space Station from mid to the end of 2018. Ferrofluids are superparamagnetic liquids that react by attraction to sufficiently strong magnetic fields, while being magnetically neutral in the other case. This allows actuation without mechanical components that are prone to wear and tear and hence have a limited lifetime. A long lifetime, high reliability, minimal wear component that can perform the function of a mechanism without requiring high precision manufacturing tolerances or exotic materials is interesting to engineering in general and spaceflight in particular.

The experiment was able to demonstrate the basic conditions required of a digital microfluidic circuit in the micro gravity environment of the ISS, indicating potential for numerous application. The PAPPELL experiment proposal was a winning entry of the „Überflieger“ competition of the German Aerospace Centre by members of the Small Satellite Student Society University of Stuttgart (KSat e.V.) and supported by the Institute of Space Systems University of Stuttgart (IRS). The experiment was part of the „Horizons“ mission of the ESA astronaut Alexander Gerst.