University of Stuttgart
Institut für Robuste Leistungshalbleitersysteme

Prof. Dr.-Ing. Ingmar Kallfass
ingmar.kallfass@ilh.uni-stuttgart.de
Institut für Robuste Leistungshalbleitersysteme
Pfaffenwaldring 47, D-70569 Stuttgart

EIVE

Exploratory In-Orbit Verification of an E/W-band Satellite Communication Link

Goals

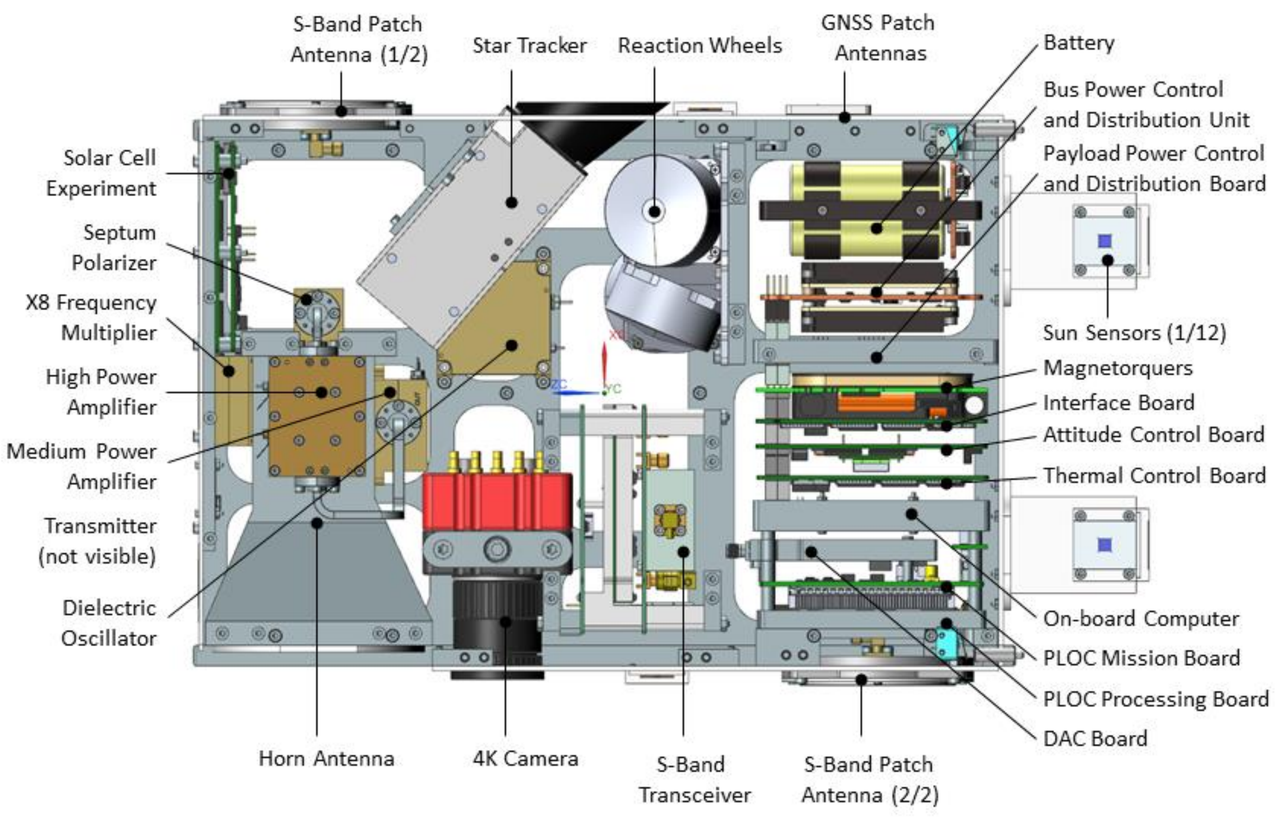
- Demonstrate and characterize 71-76 GHz downlink with different modulations and baudrates
- 4K Camera live data stream during fly-by
- Downlink stored housekeeping and payload data

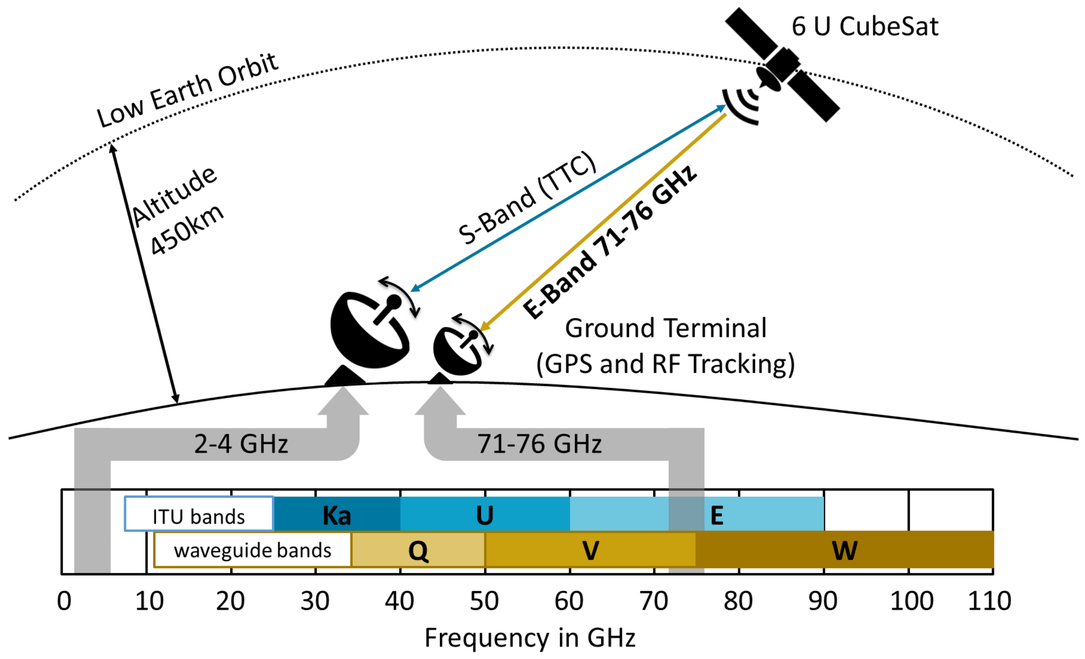
Motivation

- Increase downlink data rate for HF links
- Access new frequency bands
- Modelling of the atmospheric effects (rain, gas, humidity, etc) and creating a statistical data base of the atmospheric attenuation in the E-Band
- Measure the atmospheric attenuation and compare it with the ITU theoretical models
- Extend the ITU models for different elevations
- Transmit wirelessly live 4k video & image data

Timeline

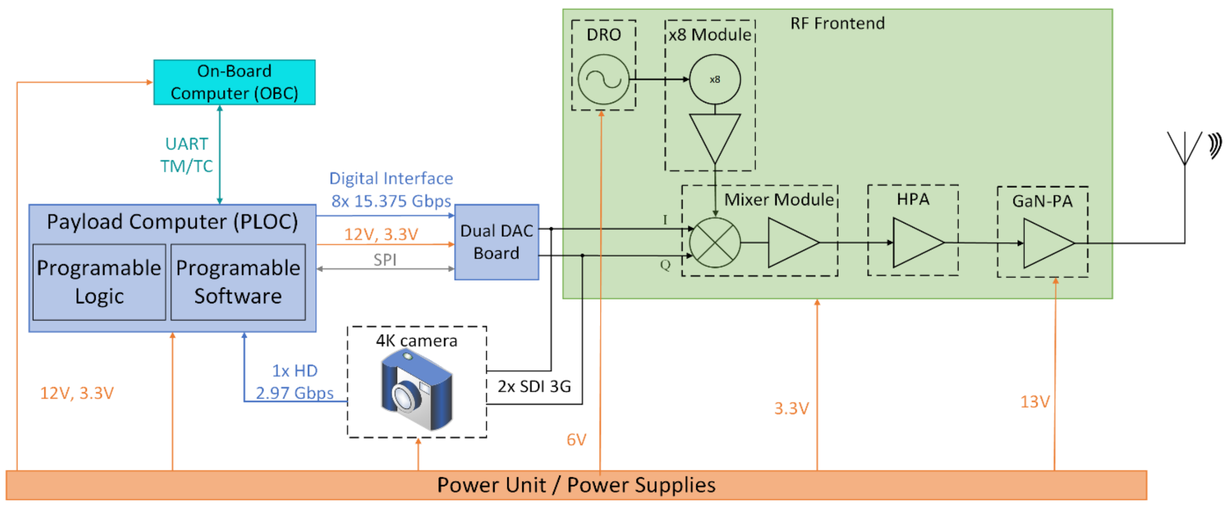
- Project kick-off: Q2 2019
- Preliminary design review: Q1 2020
- Verification and testing: Q3-Q4 2021
- Integration campaign: Q1 2022
- Satellite launch: Q2 2022
- End of mission: Q2 2023





Challenges

- Pointing precision of E-band antennas
- High peak power demand of 105 W
- Thermal management
- On-board digital data generation and handling



Technical characteristics (payload)

- Transmitted power: 33 dBm (2 W)
- Receiver noise figure: 2 dB
- Tx antenna gain: 33 dBi (1U cube aperture)
- Rx antenna gain: 59 dBi (1.2 m Cassegrain system)
- Expected E-band link throughput: 64 GB during a single satellite pass, under adverse weather conditions (95% availability).

More Information at: www.eive.space

Bundesministerium für Wirtschaft und Energie
DLR
Radiometer Physics A Rohde & Schwarz Company
Fraunhofer IAF
TESAT
Institute of Space Systems University of Stuttgart
Institut für Robuste Leistungshalbleitersysteme