
RIT2021
SPACE INNOVATION GROWTH COOPERATION
SPACE INNOVATION FORUM
October 12-13, 2022


TESTBEDS &
CLUSTERS
Olle Persson LTU
October 12-13, 2022

WP 2 TESTBEDS

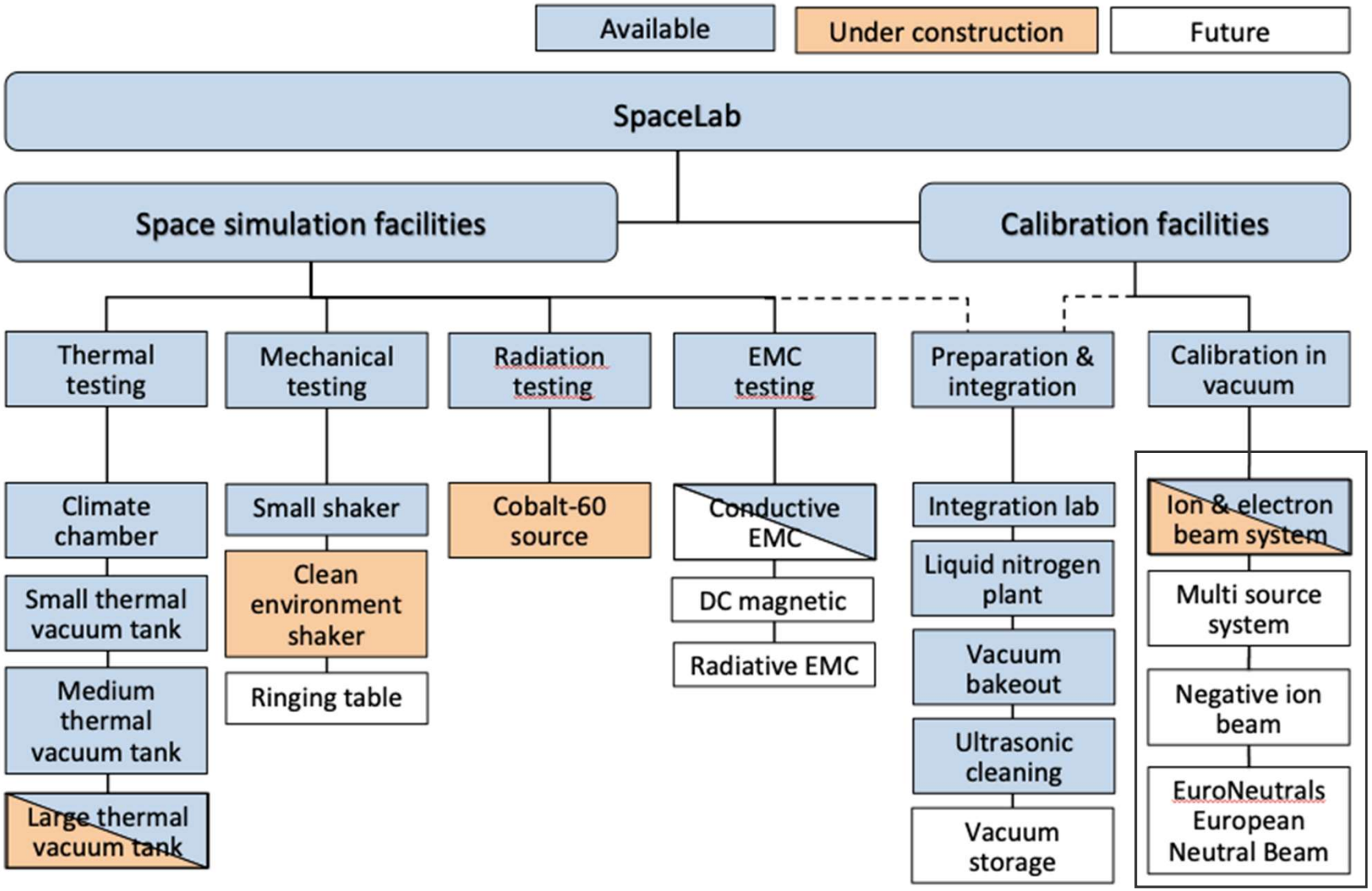
Test, Test and test again

Kiruna is uniquely equipped for testing of advanced space equipment with 60 years of experience.

- Environmental test chambers
- Shakers
- Clean rooms
- Non friction tables
- And more

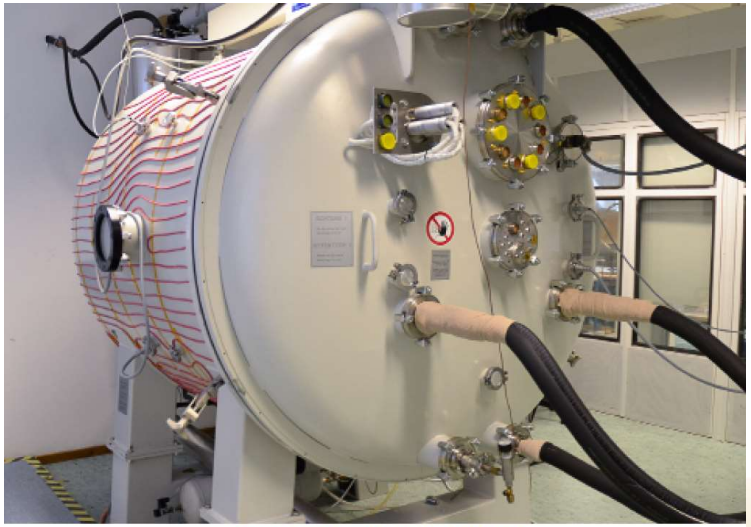
Space lab 2.0

Olle Norberg


Available
Under construction
Future
SpaceLab
Space simulation facilities
Calibration facilities
Thermal testing
Mechanical testing
Radiation testing
EMC testing
Preparation & integration
Calibration in vacuum
Climate chamber
Small thermal vacuum tank
Medium thermal vacuum tank
Large thermal vacuum tank
Small shaker
Clean environment shaker
Ringing table
Cobalt-60 source
Conductive EMC
DC magnetic
Radiative EMC
Integration lab
Liquid nitrogen plant
Vacuum bakeout
Ultrasonic cleaning
Vacuum storage
Ion & electron beam system
Multi source system
Negative ion beam
EuroNeutrals European Neutral Beam

New SpaceLab equipment in 2023

Cobolt-60 radiation source moved from Uppsala to Kiruna



SOLAR SIMULATOR

Upgrade of the solar simulation vacuum system. UV solar lamps and liquid nitrogen cooling remains the same.

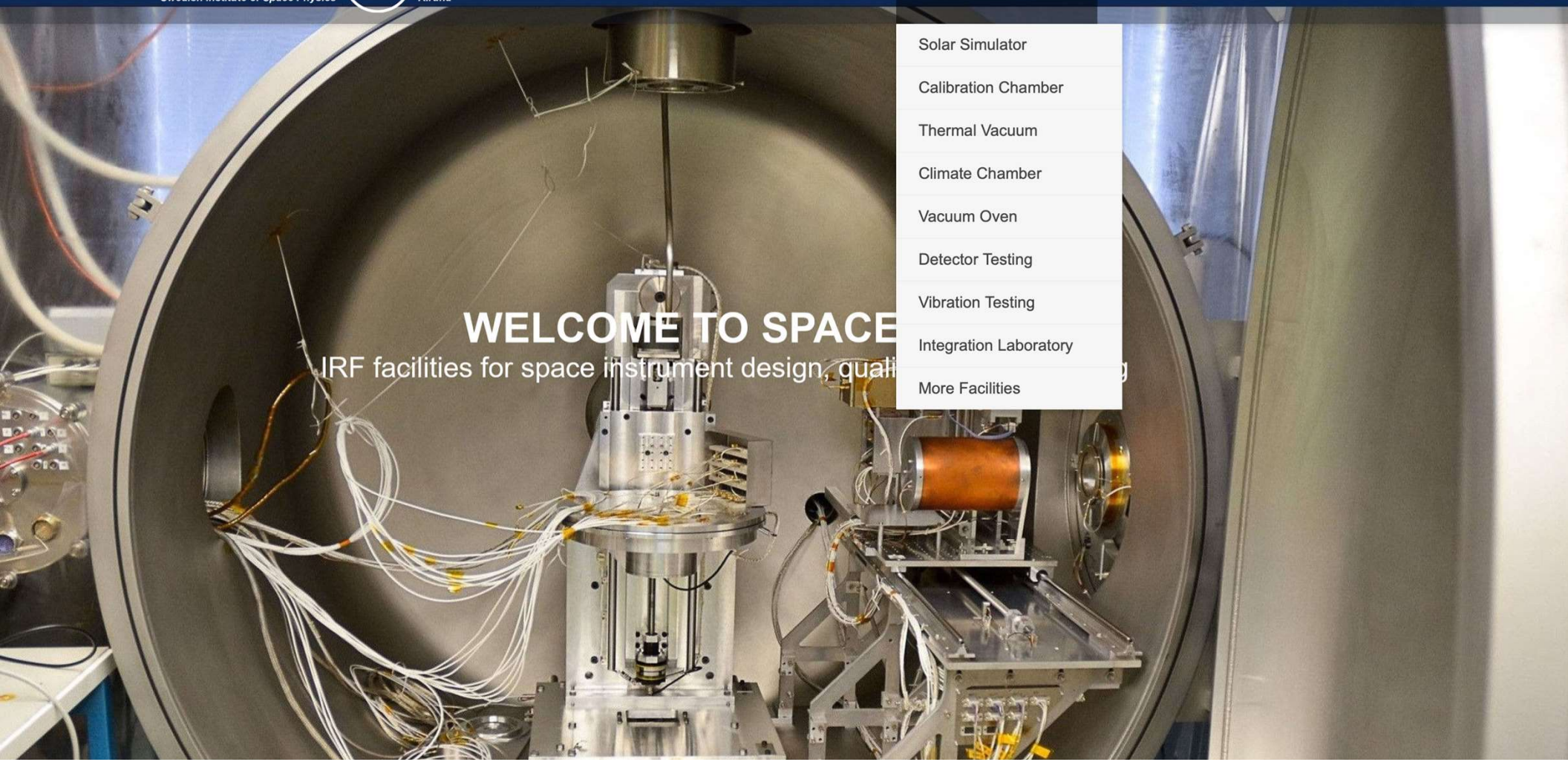
New vibration testning facility

spacelab.irf.se

SPACE LAB
Swedish Institute of Space Physics Kiruna

ABOUT SPACELAB | CURRENT FACILITIES | CONTACT & BOOKING | SEARCH

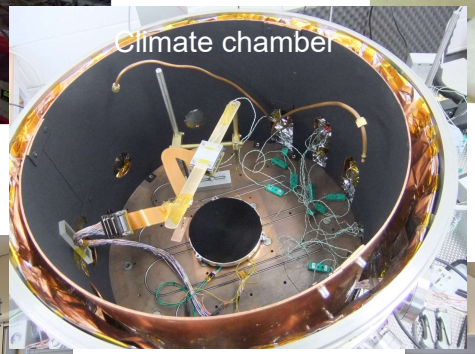
- Solar Simulator
- Calibration Chamber
- Thermal Vacuum
- Climate Chamber
- Vacuum Oven
- Detector Testing
- Vibration Testing
- Integration Laboratory
- More Facilities

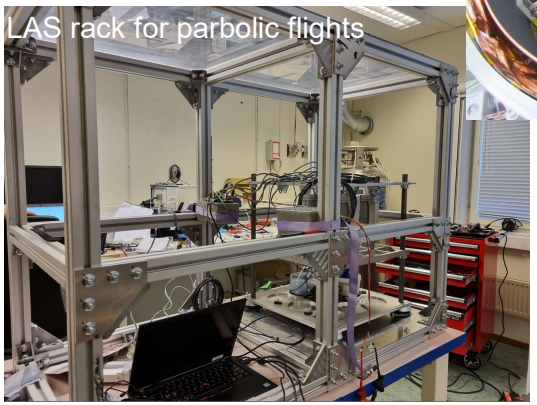


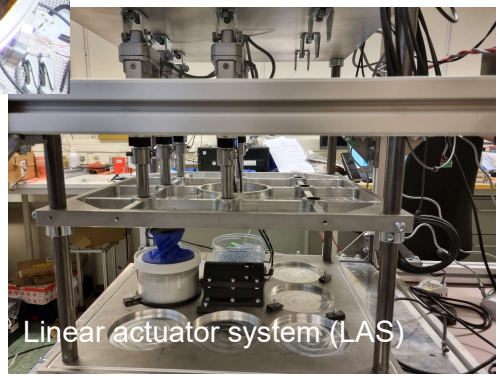
Nanosat Lab

Chris Nieto

The planetary Ices Laboratory







- Mass and energy fluxes within planets and their atmospheres
- Snow, ice and dirt in terrestrial and space environments
- Instrument development for use on spacecraft
- Data analysis from deep space probes
- Thermal & mechanical properties and processes of solid surfaces in the solar system

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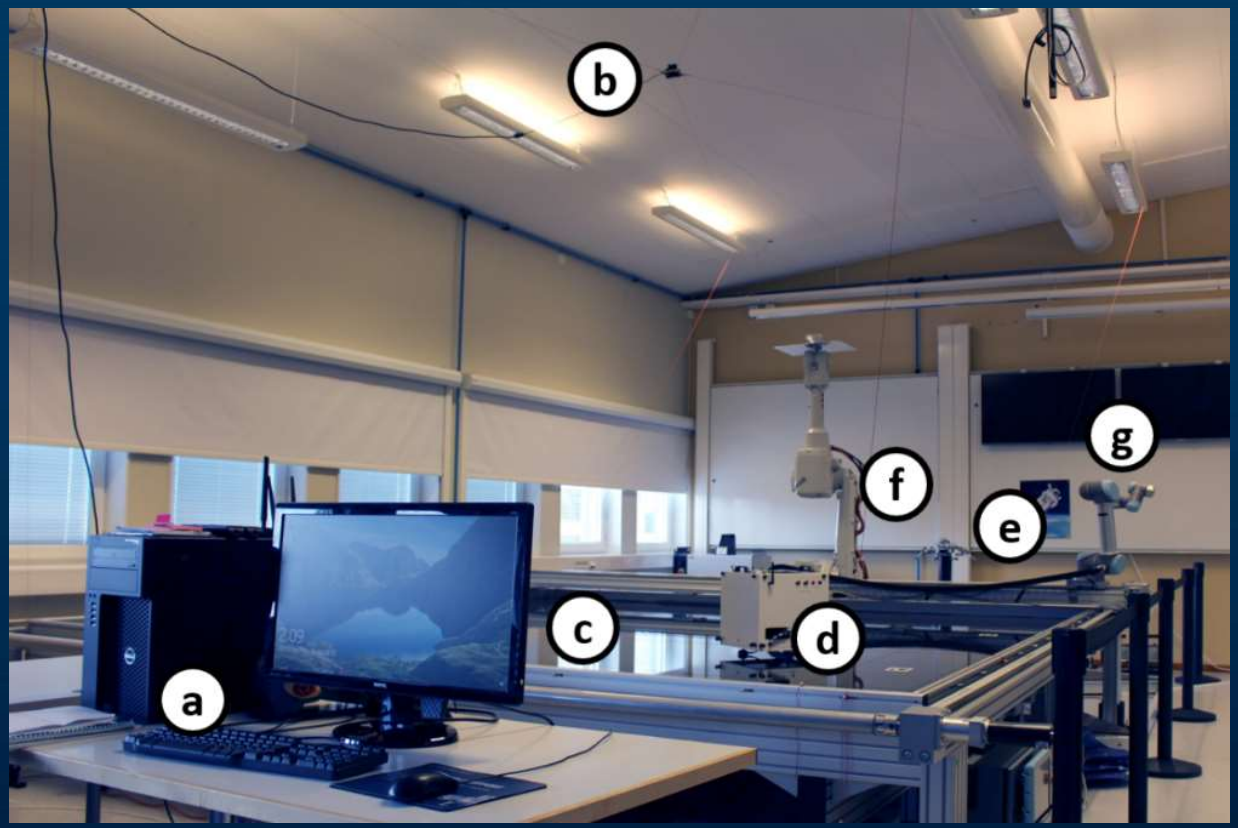
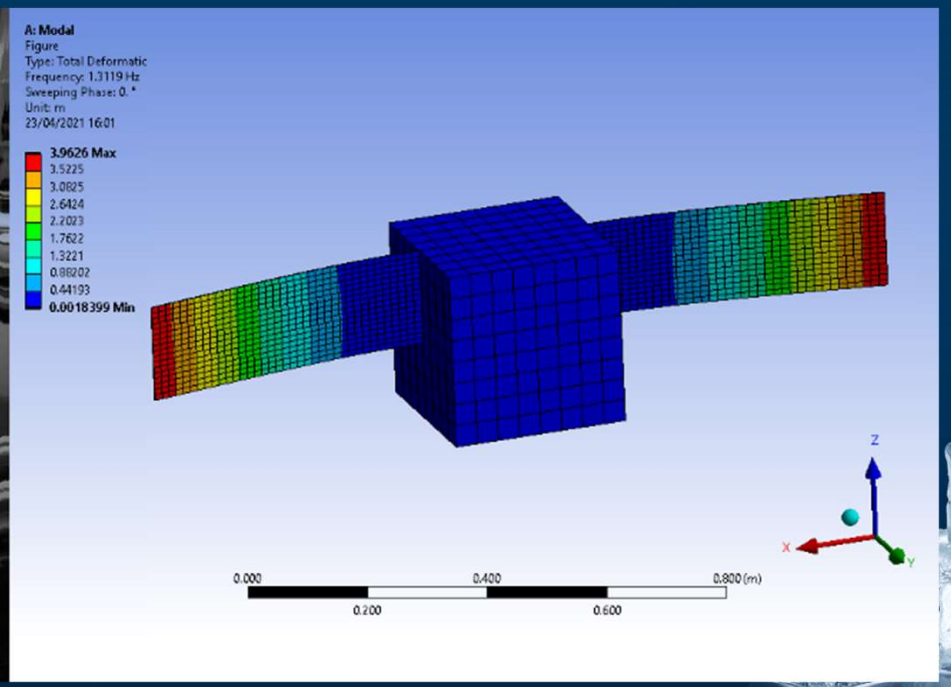
Hardware-in-the-Loop Simulation Testbed



Attitude control with flexible appendages



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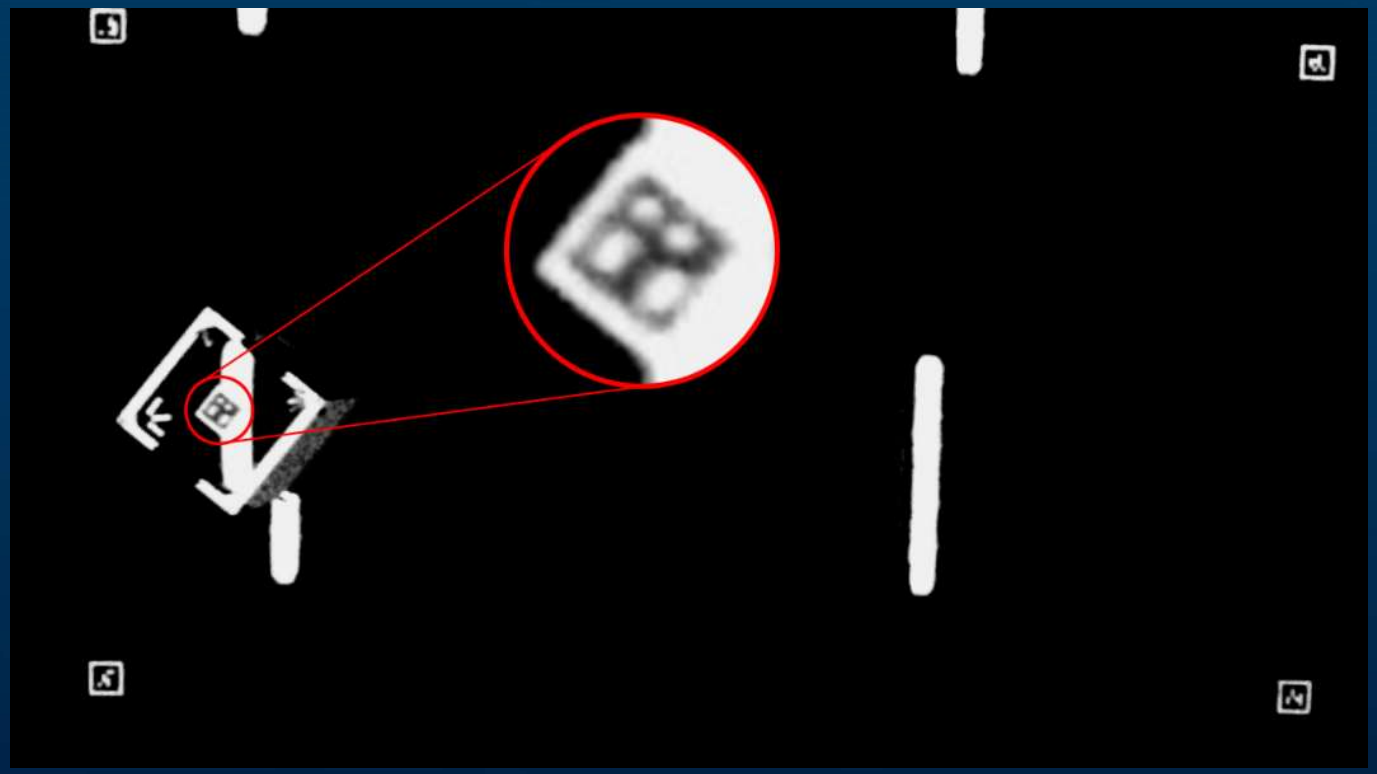
Guidance and Navigation strategies



What can we do

1. Proximity maneuvers
   - inspection, rendezvous, docking and berthing
2. Cooperative maneuvers
   - swarm coordinated navigation, close encounters and collision avoidance
3. Hardware-in-the-loop simulation tests
4. End-to-end test
   - Avionics
   - Payloads

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Planetary Ices Lab

Erika Kaufman

Astroid Engineering Lab

Georgeios Tsirvoulis

ASTEROID ENGINEERING LAB

Mikael Granvik, Assoc. Prof.
Athanasia Toliou, Assoc. Sen. Lect.
Georgios Tsirvoulis , Assoc. Sen. Lect.

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Asteroid Engineering Lab

- Increasing interest in the study of asteroids

Credit: NASA/Johns Hopkins APL

Credit:ATLAS Project, University of Hawaii

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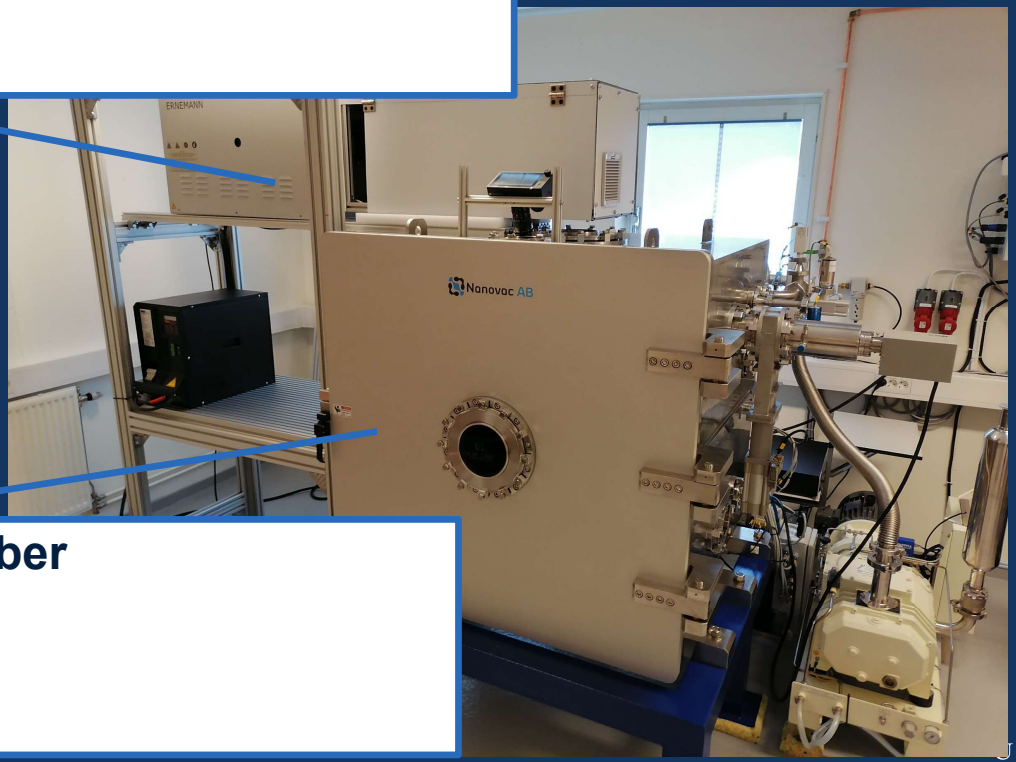
Asteroid Engineering Lab

Xenon arc light source

max power

/cm2 max irradiance



1m³ Vacuum Chamber

table for “dirty” operation

L-200 RGA

ustable platform

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Asteroid Engineering Lab

2x Chronos 1.4 High speed cameras

2x Regular recording cameras

1x Thermal camera

24x Type K Thermocouples

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Asteroid Engineering Lab

- Samples
  - Asteroid Analogues (serpentine, olivine , pyroxene)
  - Asteroid Simulants (synthetic meteorite-like)
- Understand disruption mechanisms on asteroids
- Explore asteroid mining possibilities

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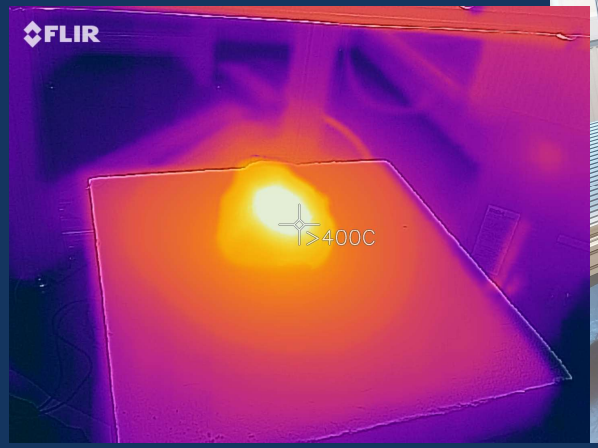
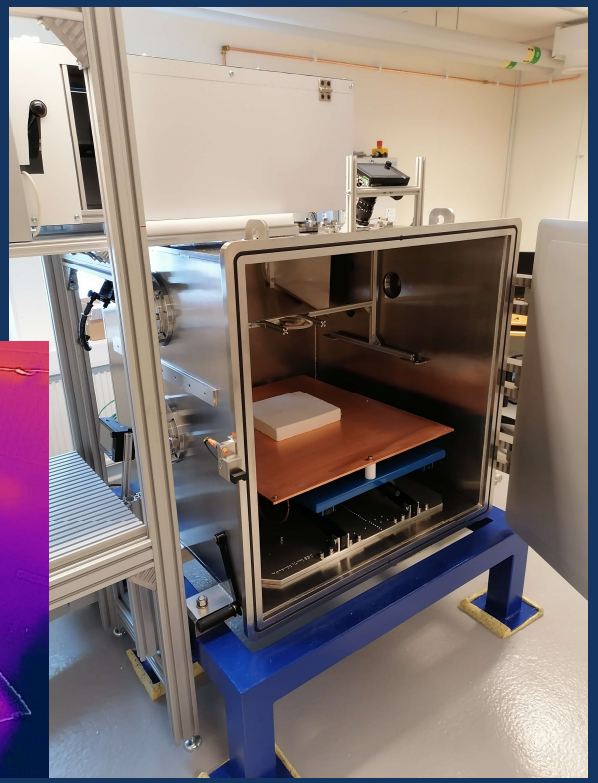
Asteroid Engineering Lab

- Testing possibilities
  - Outgassing
  - Bakeout
  - Irradiation

- Call Olle!!!





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Business cases

Jonas Hjelm / Olle Persson

- ✓ New government rules
- ✓ New space, small enterprises
- ✓ Easy access
- ✓ Kiruna is a Space place
- ✓ One stop shop
- ✓ Test beds in RISE


TESTBEDS
Olle Persson
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THANK YOU
SPACE
INNOVATION
GROWTH
COOPERATION