



MIST

Mechanical & Thermal sub-team

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Thermal: Kjell Gordon



1. Goals of the Semester

2. Satellite integration

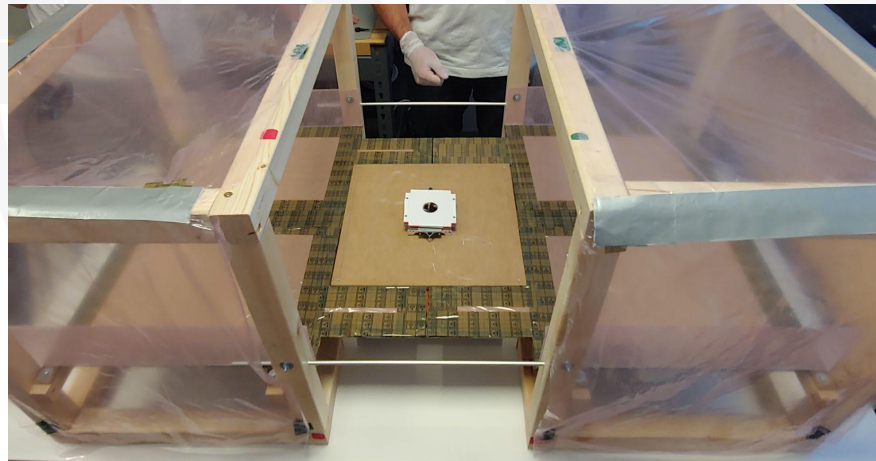
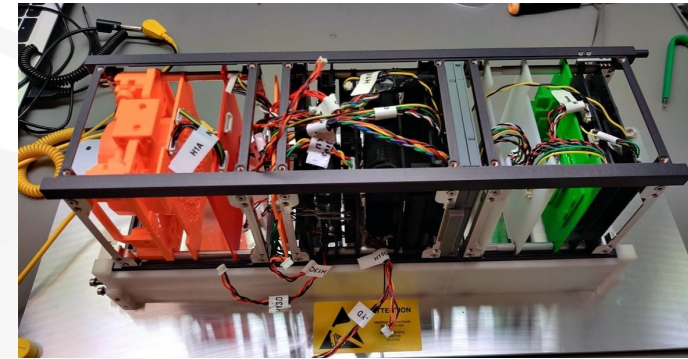
3. Leak test

4. Thermal testing

5. Other tests



- Integrate the satellite
- Leak test of NanoProp
- Communication- and deployment test
- Thermal tests





- ~~• Integrate the satellite~~
- Leak test of NanoProp
- Communication- and deployment test
- ~~• Thermal tests~~

Reasons:

- Problems
- In practice 3 members (instead of 8)



Status:

- Not integrated

Reasons:

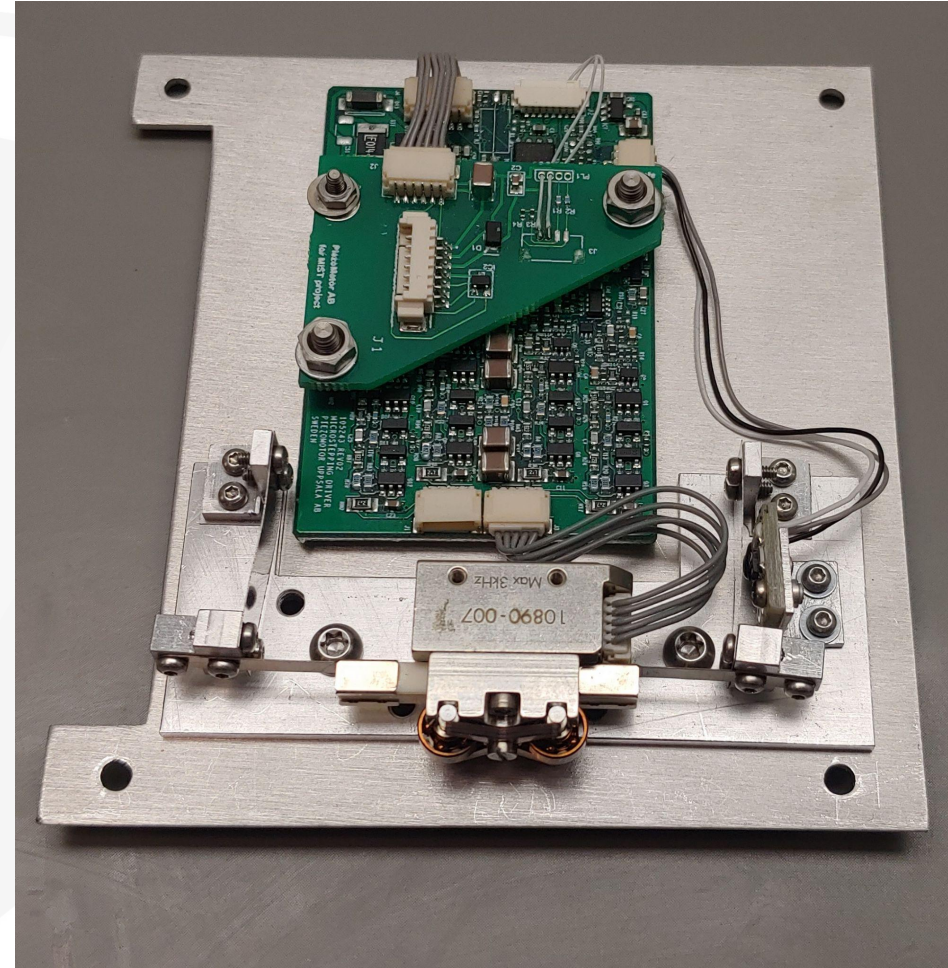
- Too many problems
 - Bugs in the OBCSW (AntS), ADCS (SIL) - **solved** (FT and ADCS have some remaining tests to do)
 - Problems with experiments
 - LEGS (**screws, sensor calibration**) - **solved**
 - CUBES-1, CUBES-2 (VBAT protection, software, **nonconforming materials**) - **ongoing work**
 - NanoProp + NanoProp Helper Board (VBAT protection, **leak test, thrusters**) - **ongoing work**
 - SiC (VBAT protection, broken gold wire?) - **ongoing work**
 - SEUD not delivered - **ongoing work**

Accomplishments:

- New holes for mounting the motor board
- Applied Loctite and tightened 30/30 screws
- Re-calibration of optical sensor

Remaining work:

- Add some Epoxy

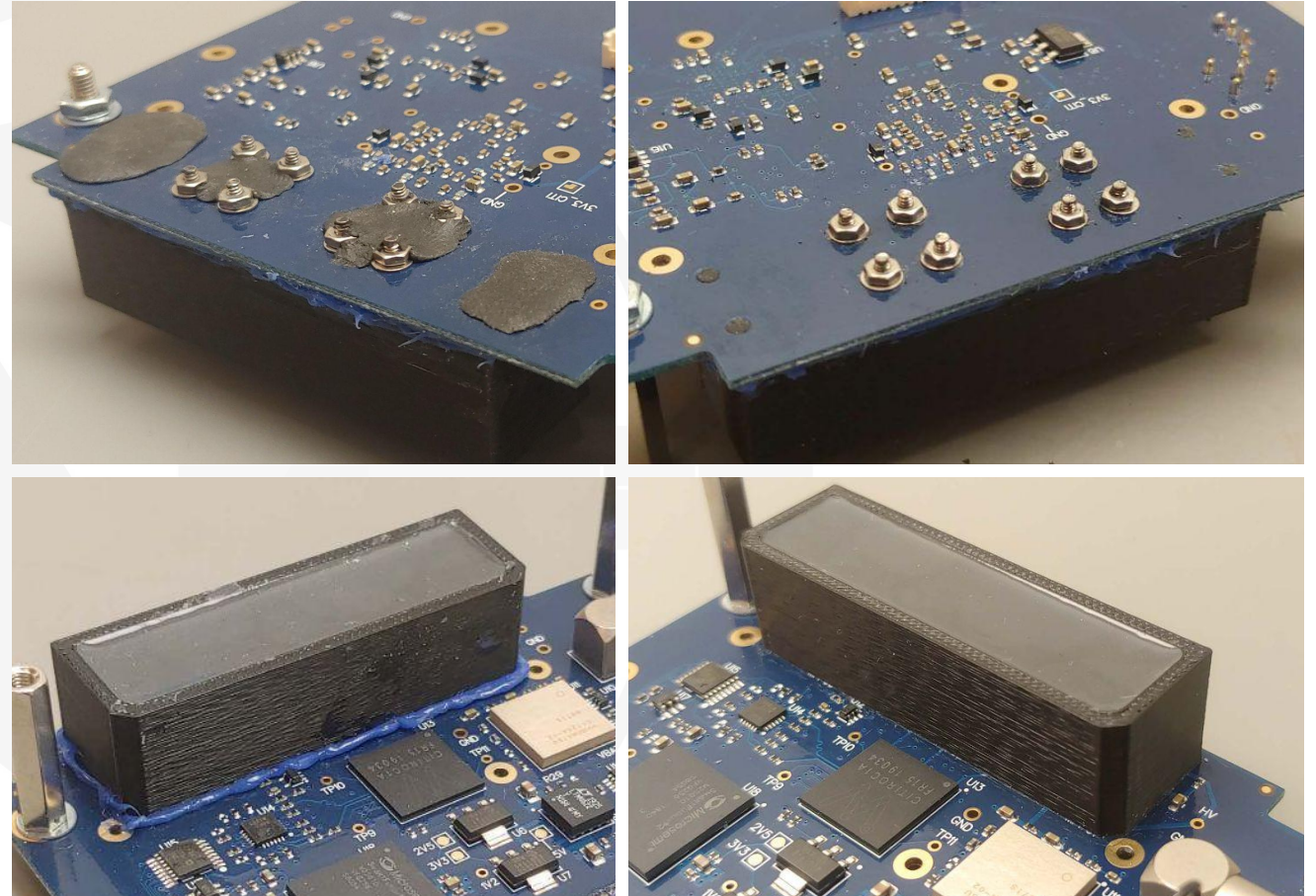


Accomplishments:

- Some of the non-conforming materials have been removed
- Plan for outgassing test of RTV and 3D-printed mould

Remaining work:

- Perform outgassing test
- Add some Epoxy

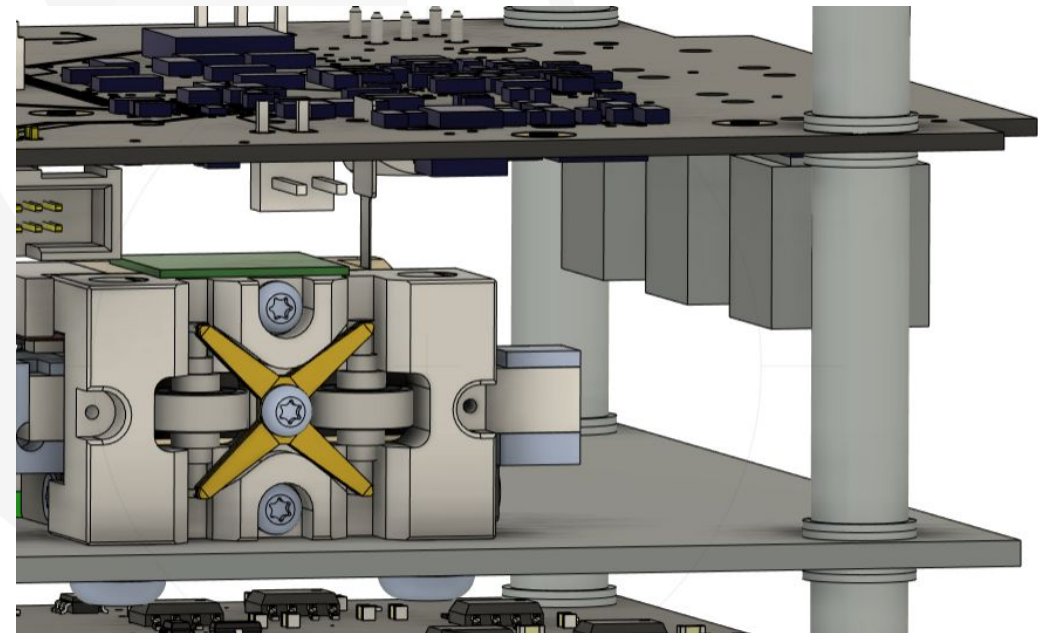
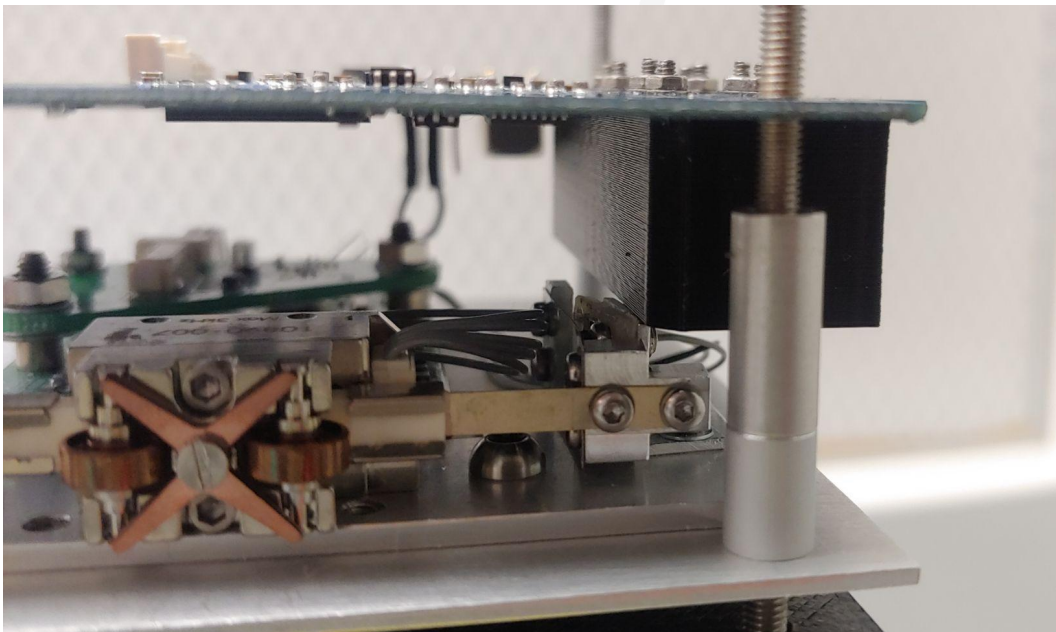


Problem:

- PiezoLEGS and CUBES cannot be mounted as close together as originally planned

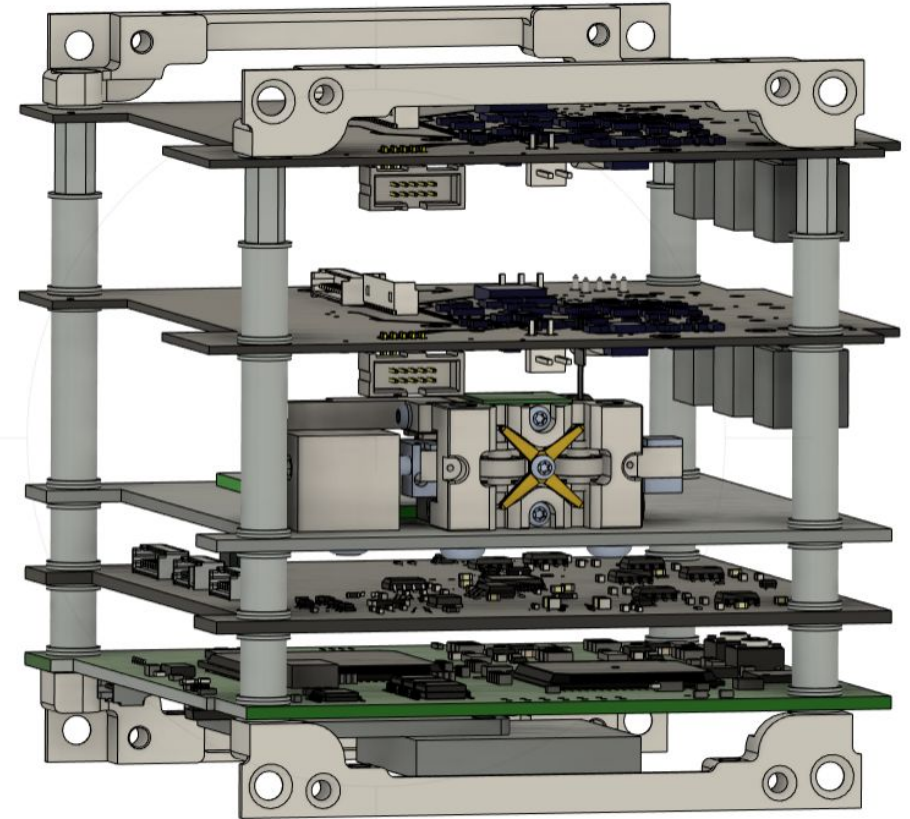
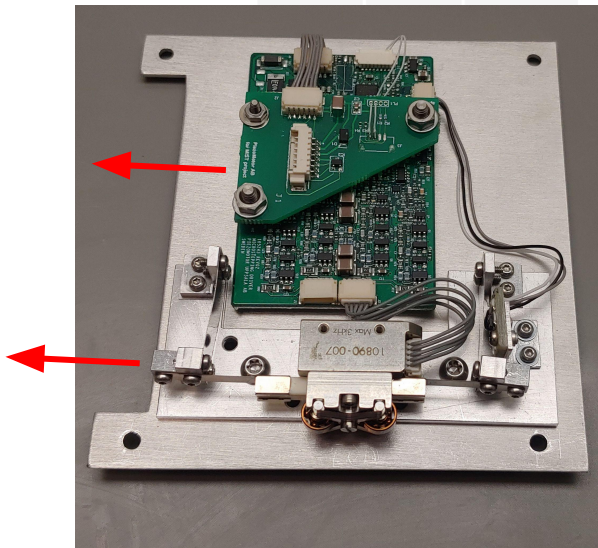
Cause:

- Final design of PiezoLEGS and CUBES different from CAD-drawings - both are larger!



Solutions:

- a) Adjust distances between experiments:
 - CUBES-2 - LEGS: **+7 mm**
 - CUBES-1 - CUBES-2: **-3 mm**
 - SiC - SEUD: **-4 mm**
- b) Manufacture new aluminium mounting board for LEGS





Questions?



Some aspects:

- New screws - grade 5 titanium
- Vibration test
 - Test the satellite twice: first time with mock-up solar panels
 - Makes it possible to inspect the inside of the satellite
 - Makes it easier to disassemble the satellite if needed
- Epoxy/Loctite
 - Loctite on all screws, Epoxy on most connectors (+ SD card?)

Biggest challenge: Lack of knowledge about details within the project





Questions?



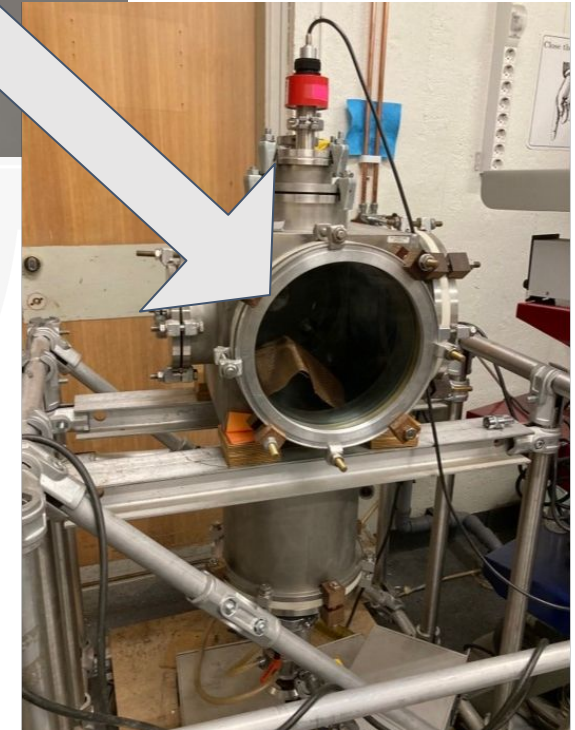
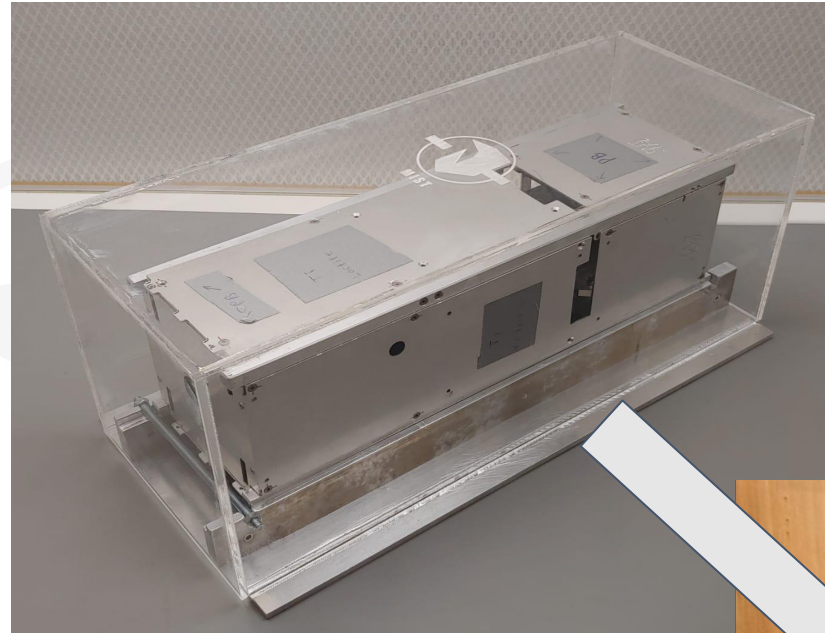
Purpose:

- To ensure no leakage in propulsion system under vacuum environment

Accomplishments:



- Created a vacuum tank 3D model
- Manufactured leak test equipment
 - Aluminum satellite holder by manual mill
 - Acrylic satellite cover by laser cut



Purpose:

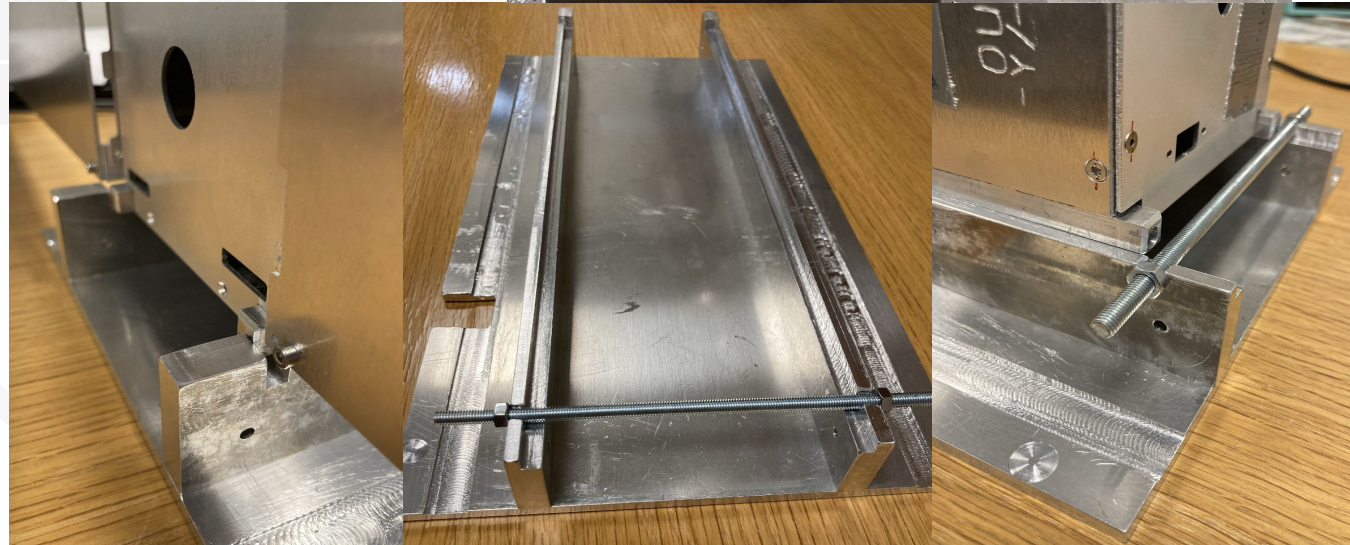
- To hold satellite
 - during transportation and
 - inside vacuum tank throughout leak test

Structure:

- 2 side parts
- 1 base part
- 1 threaded rod
- 2 nuts
- 6 screws

Machining processes:

- Milling, Drilling, Tapping



Purpose:

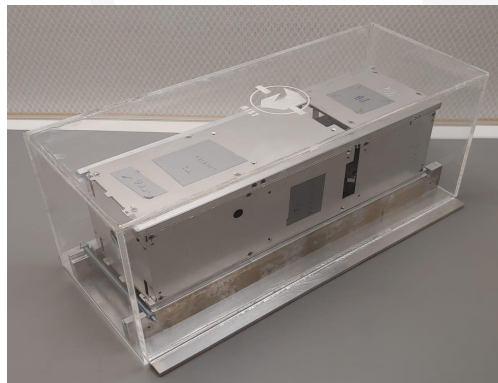
- To cover satellite during transportation
- Prevent contamination

Structure:

- 5 acrylics plates
- Loctite super glue

Manufacturing process:

- Laser cutting
- Glueing





Questions?



TBT: Thermal Balance Test

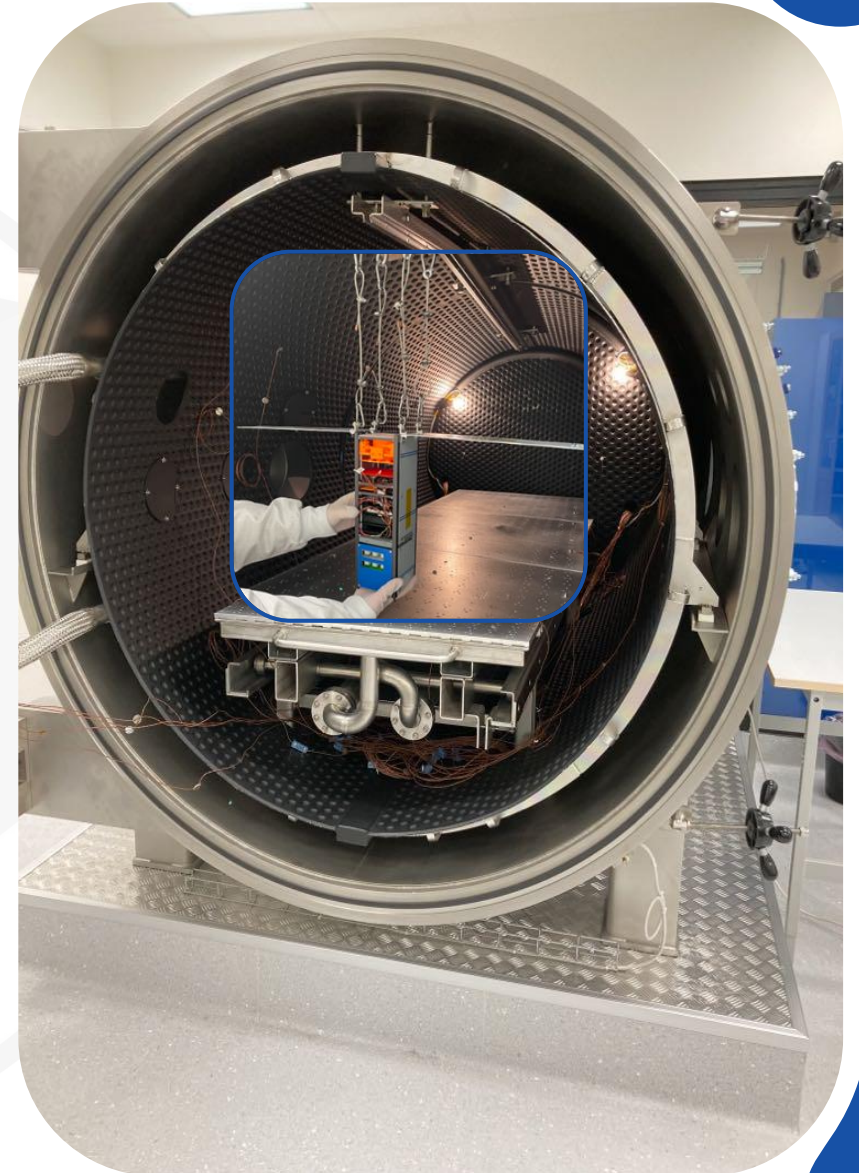
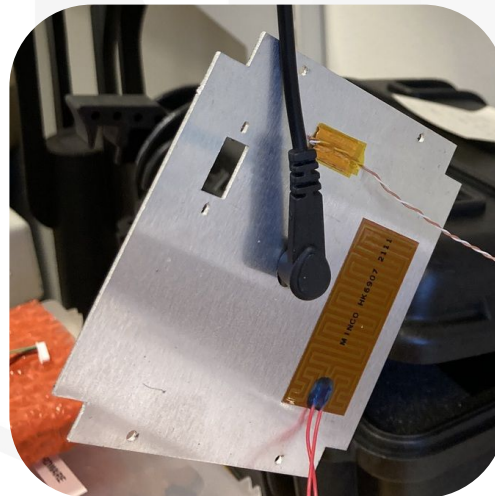
- Apply thermal gradients
- Measure temperature difference over interfaces

TVCT: Thermal Vacuum Cycling Test

- Equipment verification at thermal extremes

Ongoing work:

- Test procedure document
 - New revision
- Nanoprop automatic heating scope definition
- Old heater adhesive testing
 - No changes
- Thermal simulation corrections
 - Heater placements and size
- Heater functionality control
 - Heater loosening safety
 - Documentation





Questions?





Communication and Deployment test

Accomplishments:

- Successful rehearsal during the summer
- Some minor problems, most have been remedied

Remaining (mechanical) work (~30h):

- Reviewing and revising instructions for the test
- Buy cameras
- Some remaining work on the transportation box

Vibration test

Accomplishments:

- New adapter manufactured during the summer
- New screws for adapter and pod

Remaining work (~120h):

- Insert helicoils into vibration adapter
- Write new instructions for the vibration test
- Perform a new rehearsal

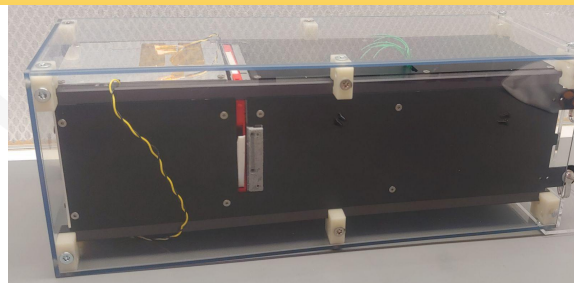
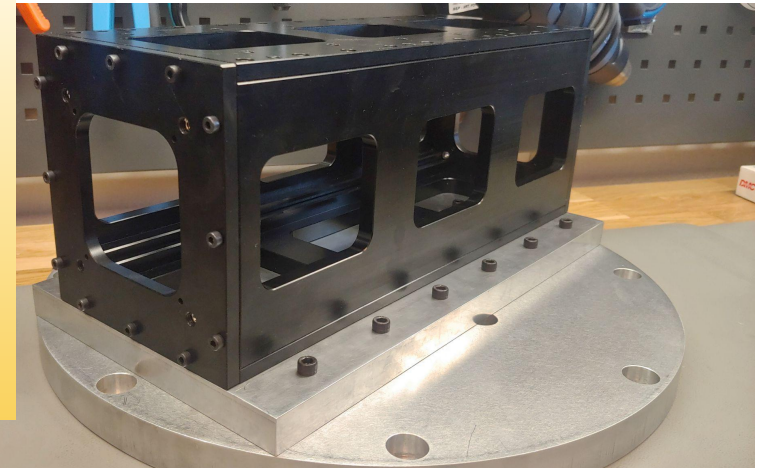
Magnetic calibration

Accomplishments:

- We have a plan!

Remaining work (~20h):

- Minor modifications of transportation box
- Visit test facility and write down step-by-step instructions





The End!



Questions?

