Deorbit Device Competition

SSCD
Sailing System for CubeSat Deorbiting

Author/Presenter: Federico Bernardi

Co-author: Giorgio Vignali

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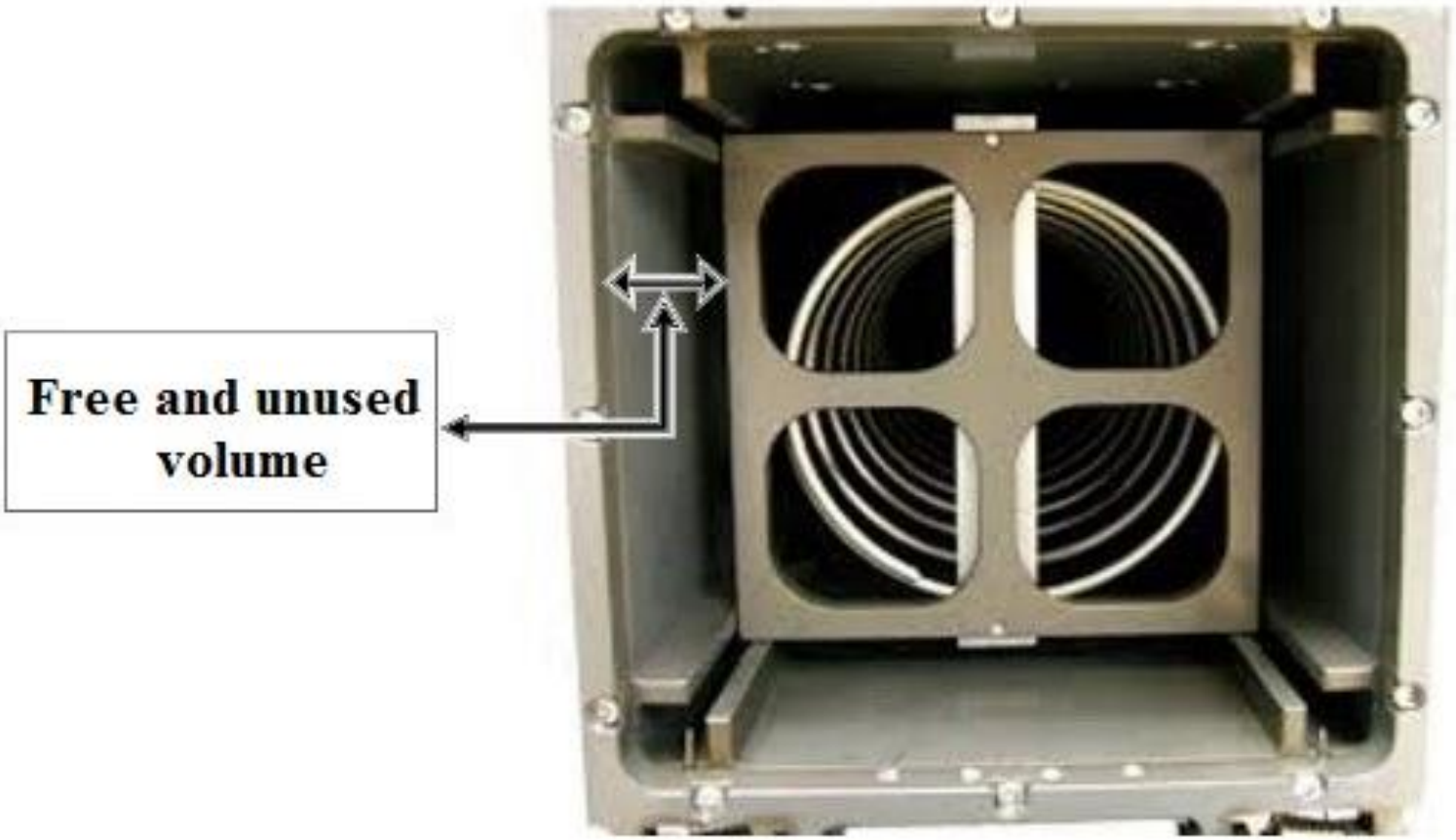
The project

- The designed **SSDC** (**Sailing System for CubeSat Deorbiting**) allows the deorbiting of a CubeSat by exploiting the free and unused volume offered by the standard solar panels without changing the nominal configuration of main subsystems

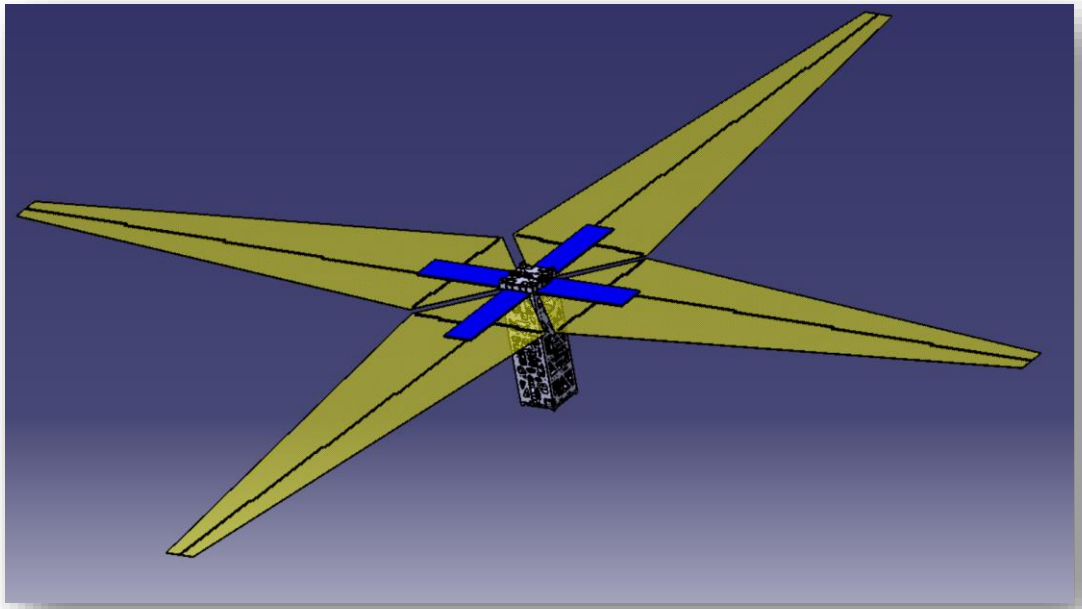
Main Constraints

- Maximum thickness of 7mm
- Low power
- Low weight
- High reliability
- Integration with other subsystem

The core idea



General Overview

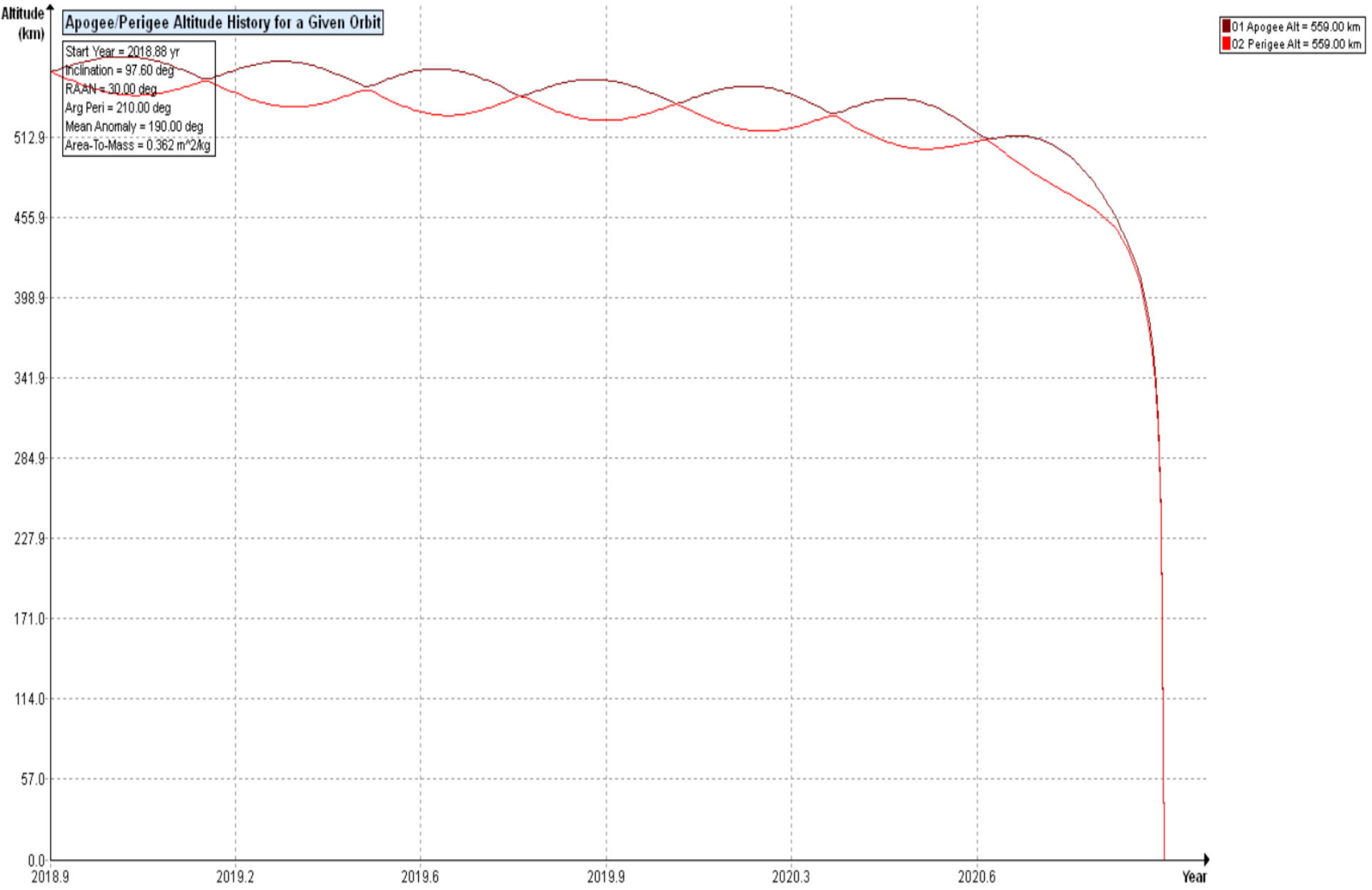


- The SSDC system is composed of **four** "**wings**". Each of them increase the cross-section of the satellite of 0.36 m². totally the system deploy a sail of 1.44 m²

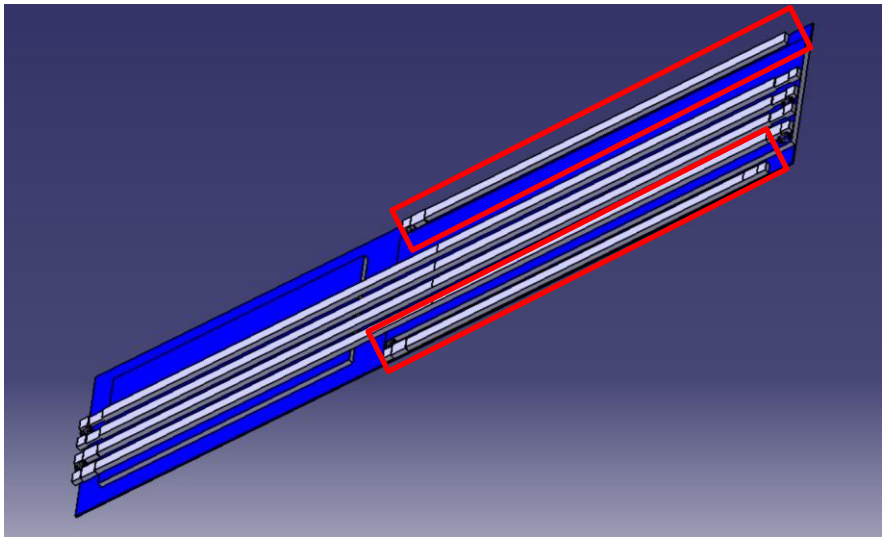
Orbit Parameters

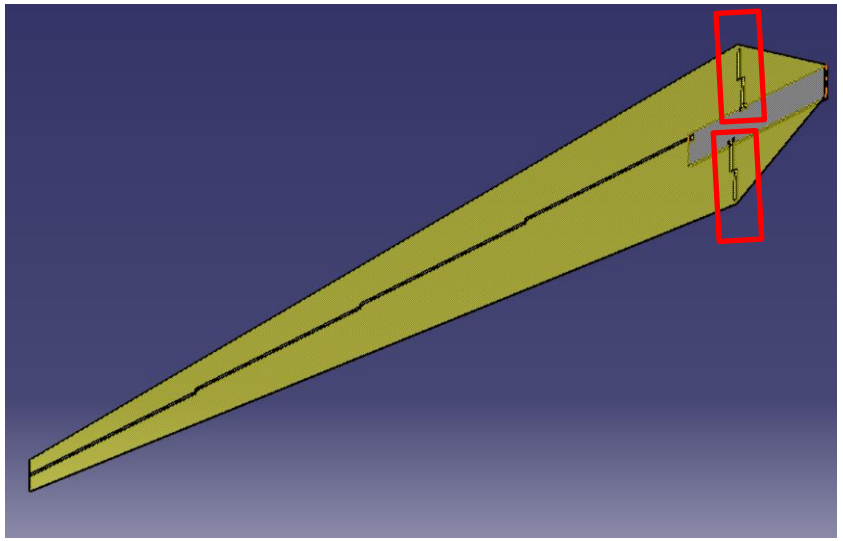
- The **DDC guidelines** gives only two main constrains, one about the **CubeSat orbit parameters**:
    - Semi-major axis of 6930 km;
    - Inclination of 97.6 degrees;
    - Eccentricity equal to 0.002;
    - R.A.A.N. of 30 degrees;
    - Argument of Perigee of 210 degree;
    - Mean Anomaly of 190 degree at the in orbit insertion time.

Orbital Decay Analisys



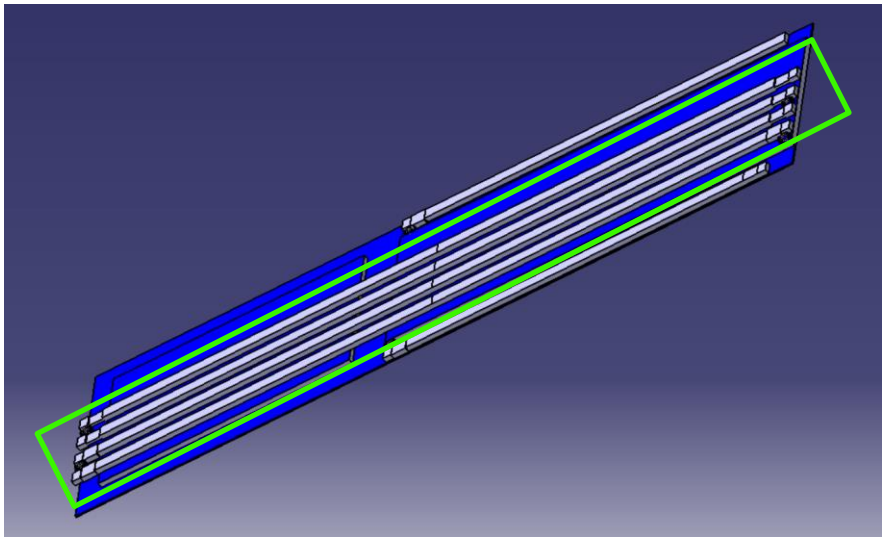
The Mechanics

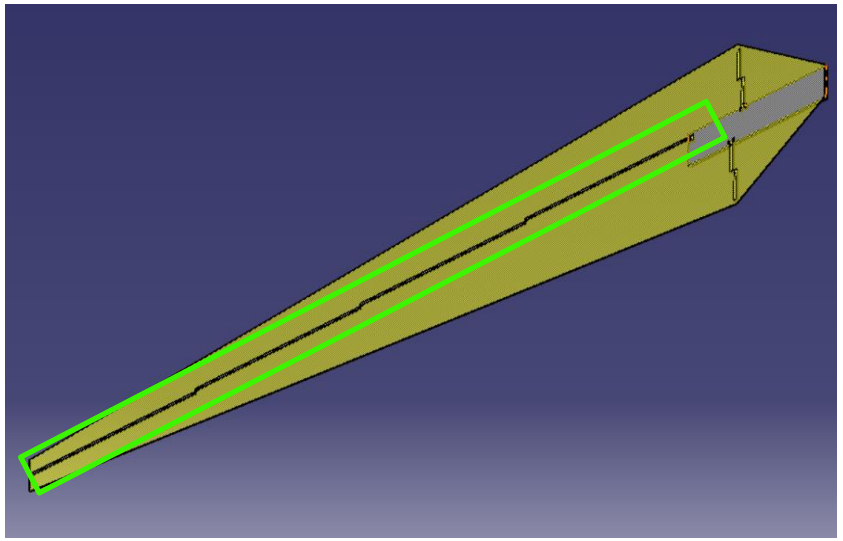




- Deployment system composed of:
  - 2 external bars (rotation of 90 deg)
  - 4 internal bars (rotation of 180 deg)

The Mechanics





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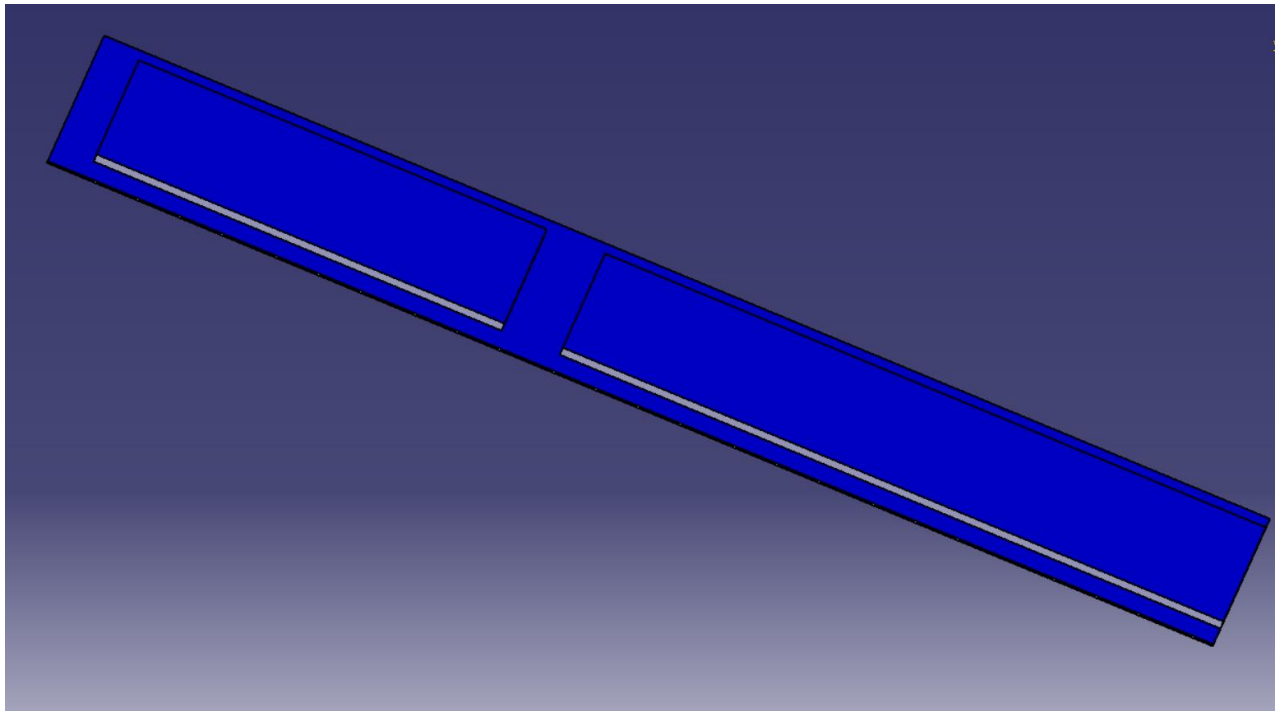
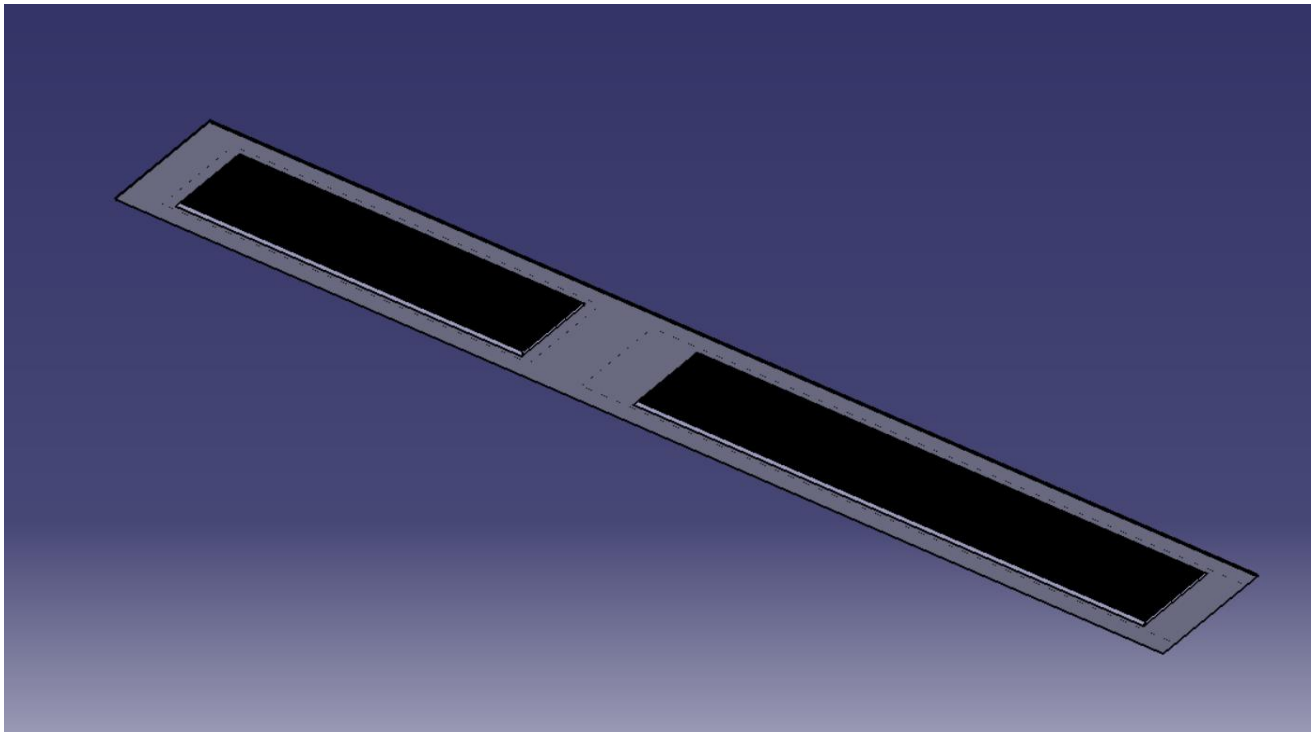
Main Components: Structural Plate



INTERNAL FACE

- Aluminium
- 80x300x2.5 mm
- Face in front of the CubeSat structure

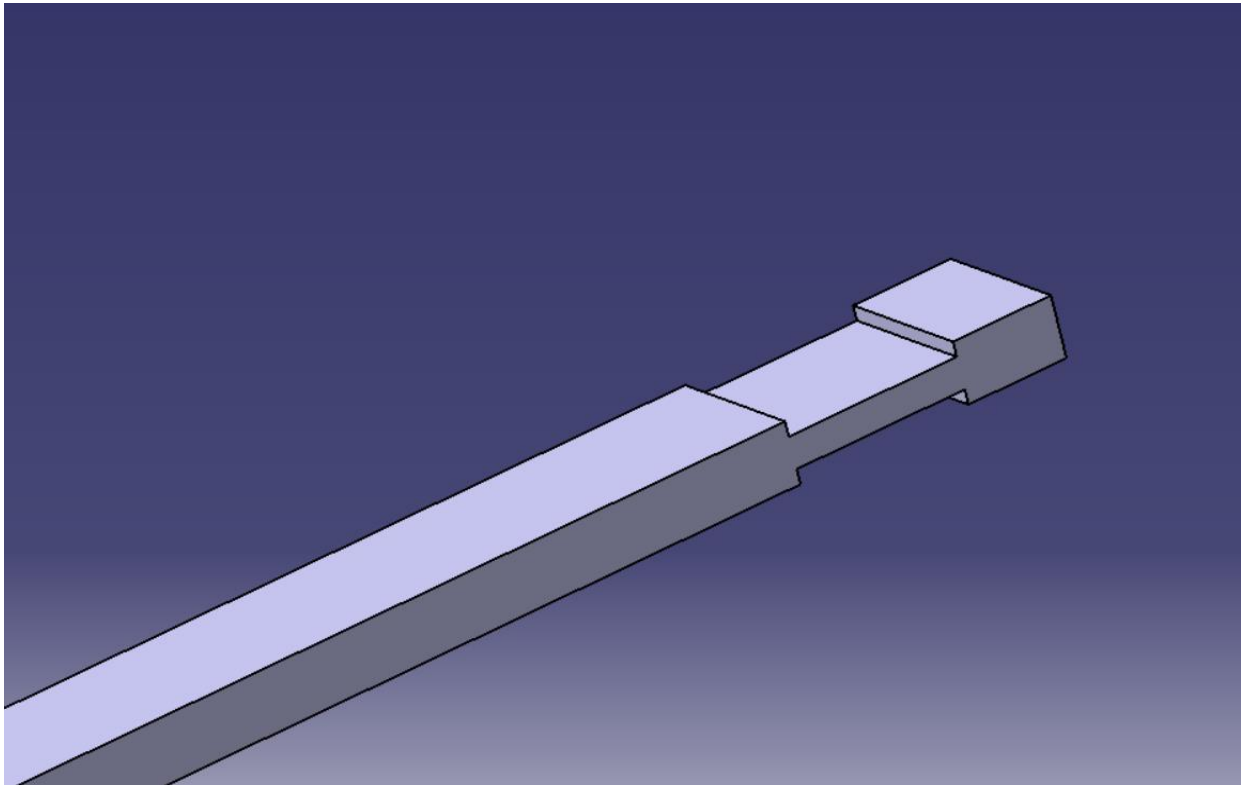
Main Components: Structural Plate



EXTERNAL FACE

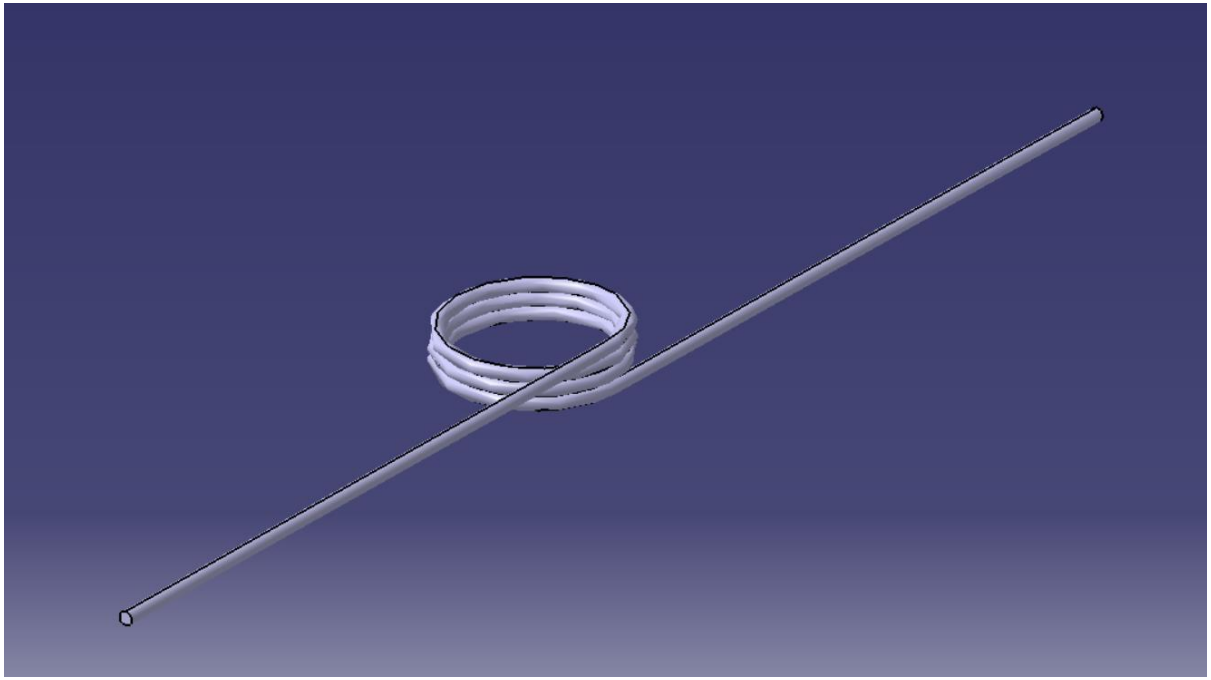
- Aluminium
- 80x300x2.5 mm
- Two pockets for the solar cells

Main Components: The Rods



- Aluminium
- 2 rods: 160x50x2mm
- 4 rods: 300x50x2 mm

Main Components: Spring

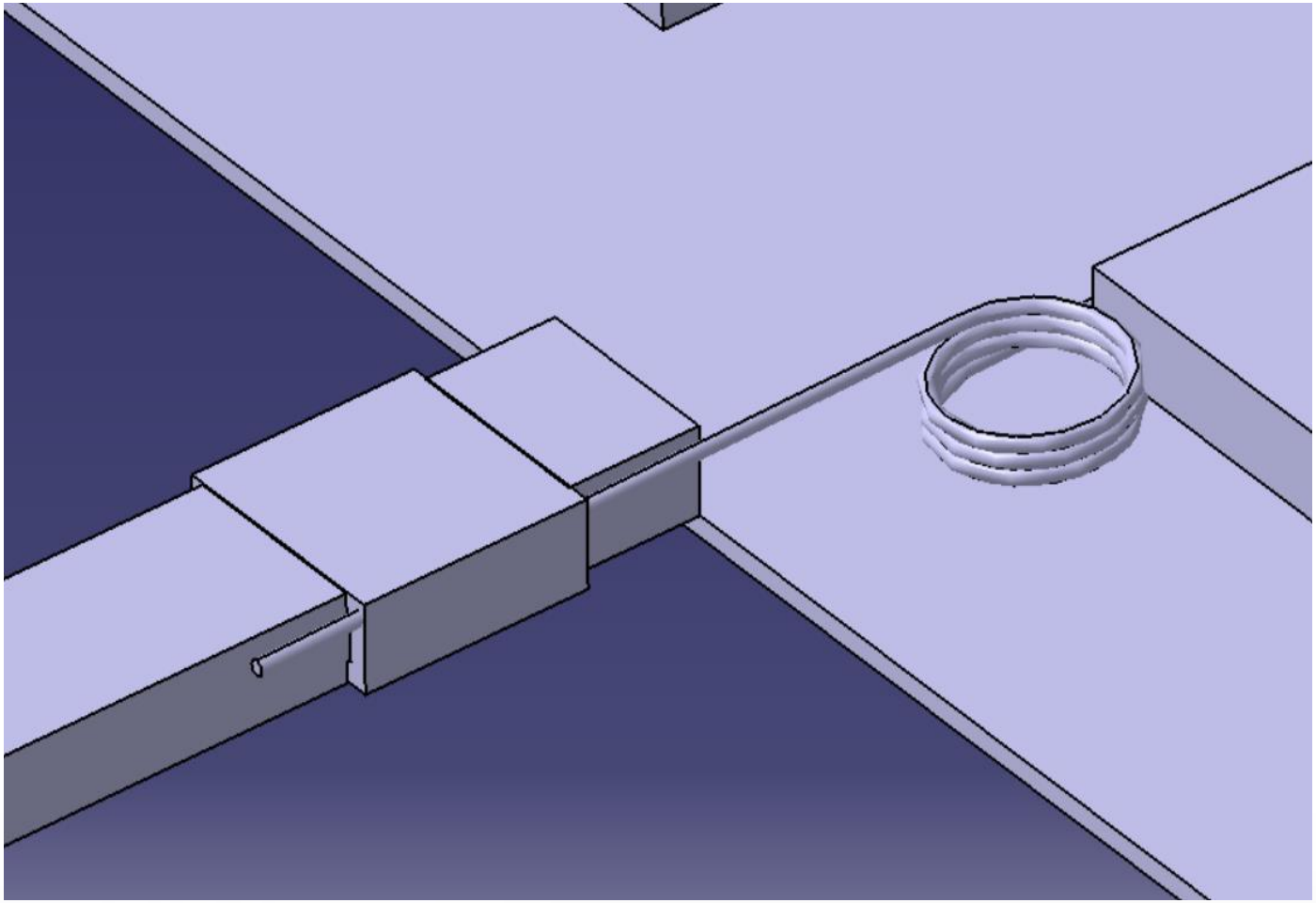


- Armonic steel
- Maximum thickness: 2mm
- Maximum rotation angle: 180 deg

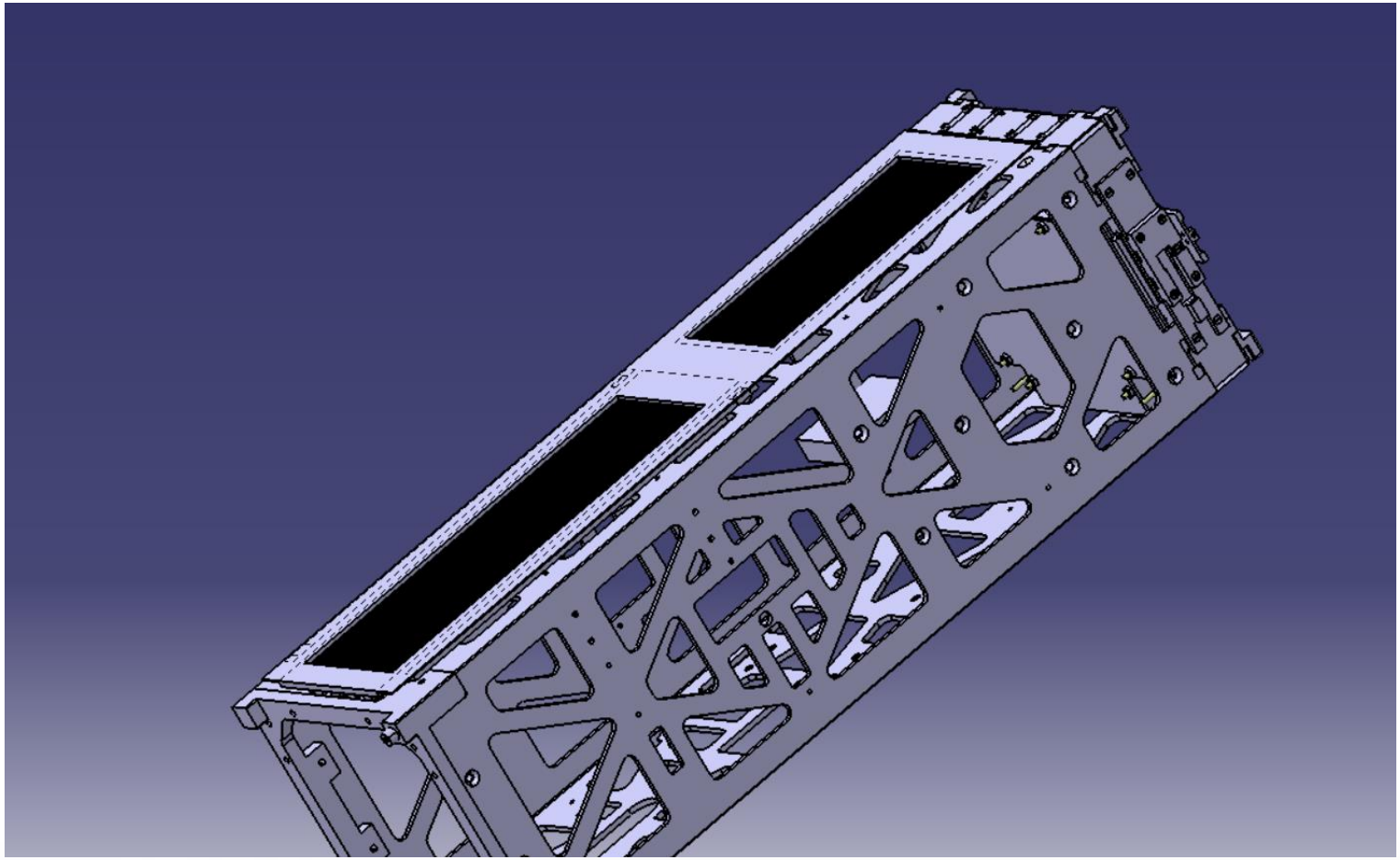
Main Components: The sail

- Mylar
- Thickness: 190 μm
- Tensile strength: 190 MPa

Mechanical connection



The deployment



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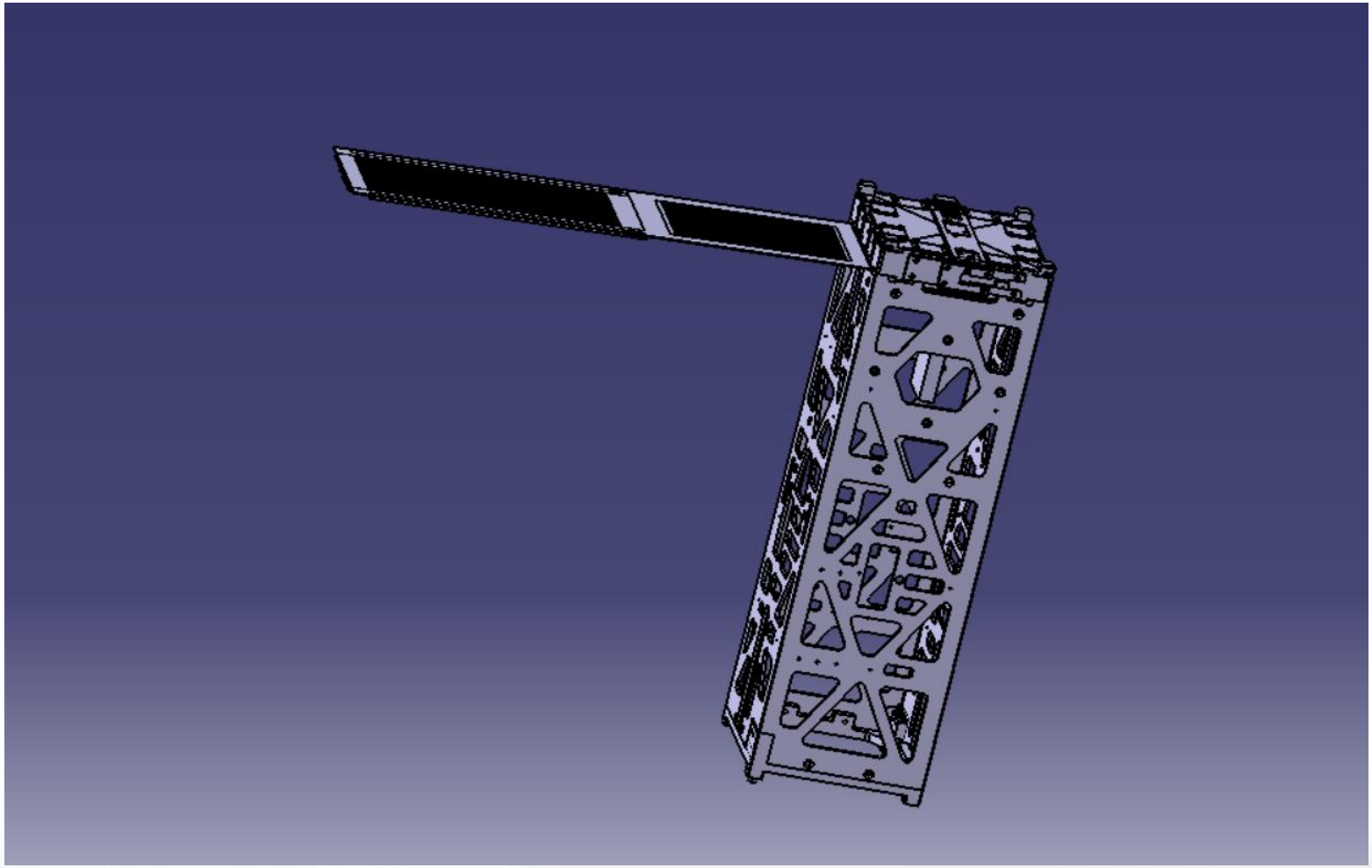

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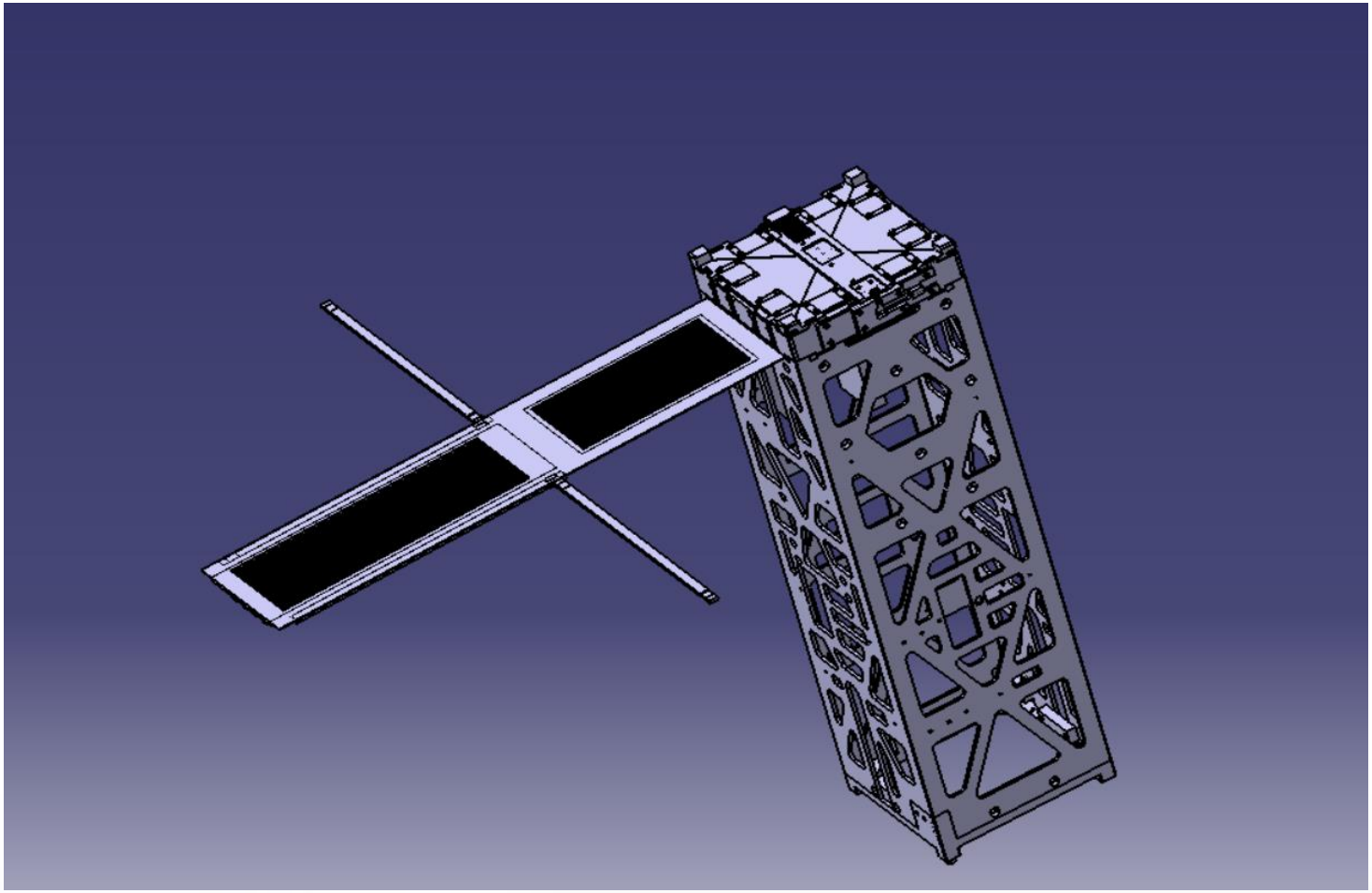

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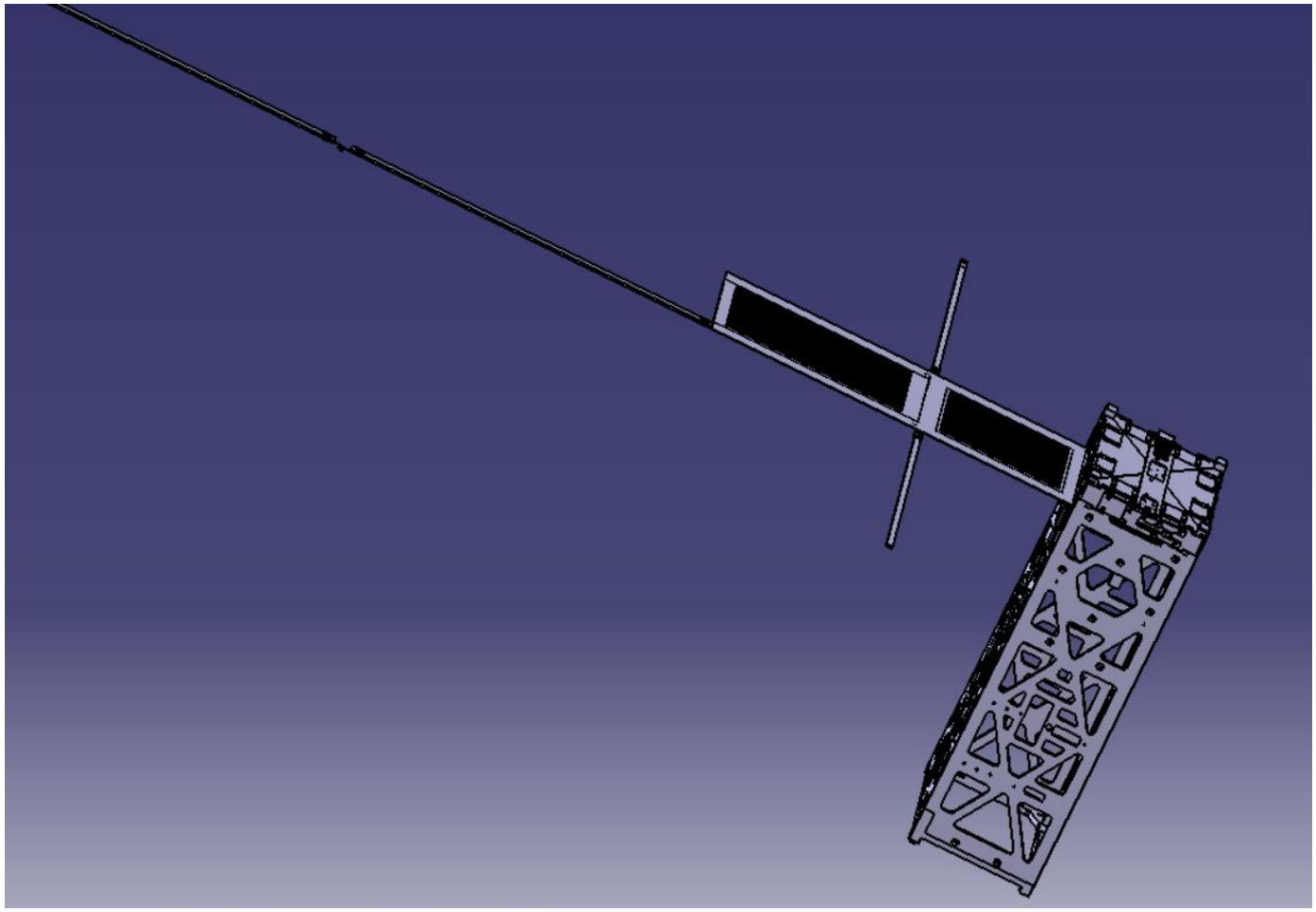
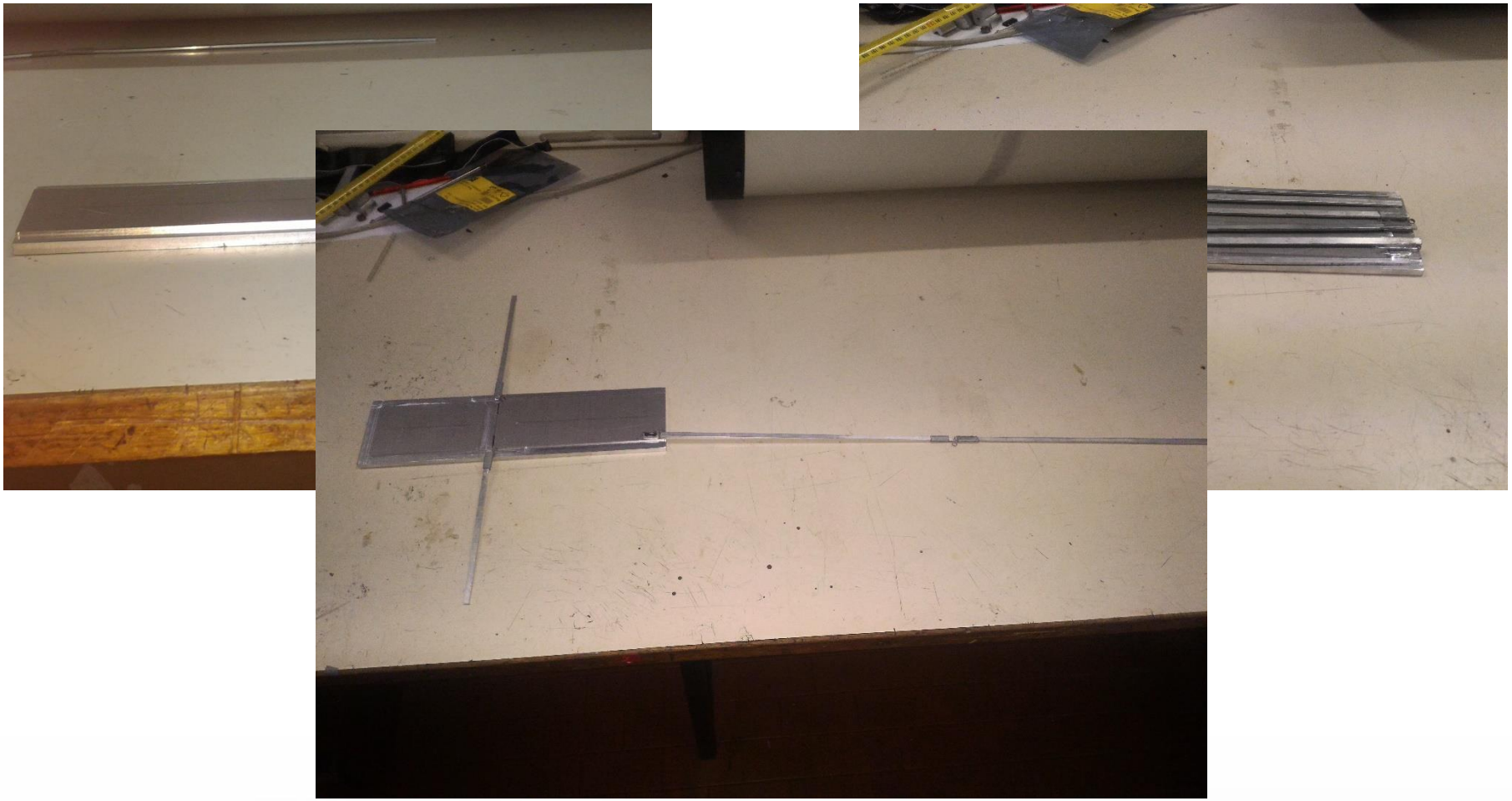


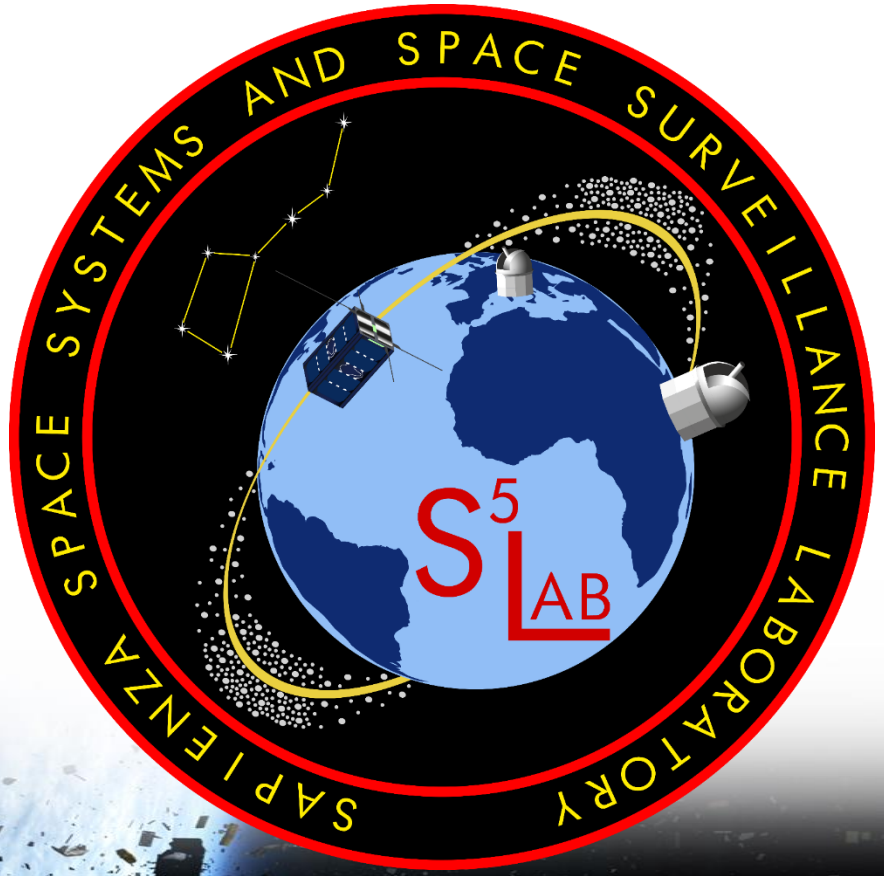
First prototipe



THANKS FOR LISTENING!

For further details:

- **federik2226@gmail.com**



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Competition