ROSIsat

Radiation Orbital Shielding Investigation Satellite

ERØRA

Embry-Riddle Aeronautical University Daytona's first CubeSat designed entirely by students

Abstract

- CubeSats are becoming more popular for orbital missions as the cost of sending satellites into space decreases
- CubeSats are smaller than traditional satellites but still capable of important science-based missions at a lower cost
- ROSIsat will be the first student-built satellite for Embry-Riddle's Daytona Beach campus
- ROSIsat's main research mission is to shield onboard flight computer memory modules from space radiation using various materials and substances, including simulated Martian and Lunar regolith
- Most of the primary components of ROSIsat are being designed and integrated in-house, including the Chassis, Avionics Board and Radiation Shielding Experiment
- ROSIsat will provide students with educational, technical, scientific, and legal knowledge that can be applied in their academic and professional careers

Our Team

- 14 Freshmen and Sophomores
  - Freshmen and Sophomores get hands-on experience early in their education
  - Experience assists in future classes
- 10 Juniors and Seniors
  - Juniors and Seniors can apply knowledge obtained in classes

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ERORA Executive Officers

President: Jackson Lamb | **Vice President**: JT Lozano

ROSIsat Lead: Jacob Lahue

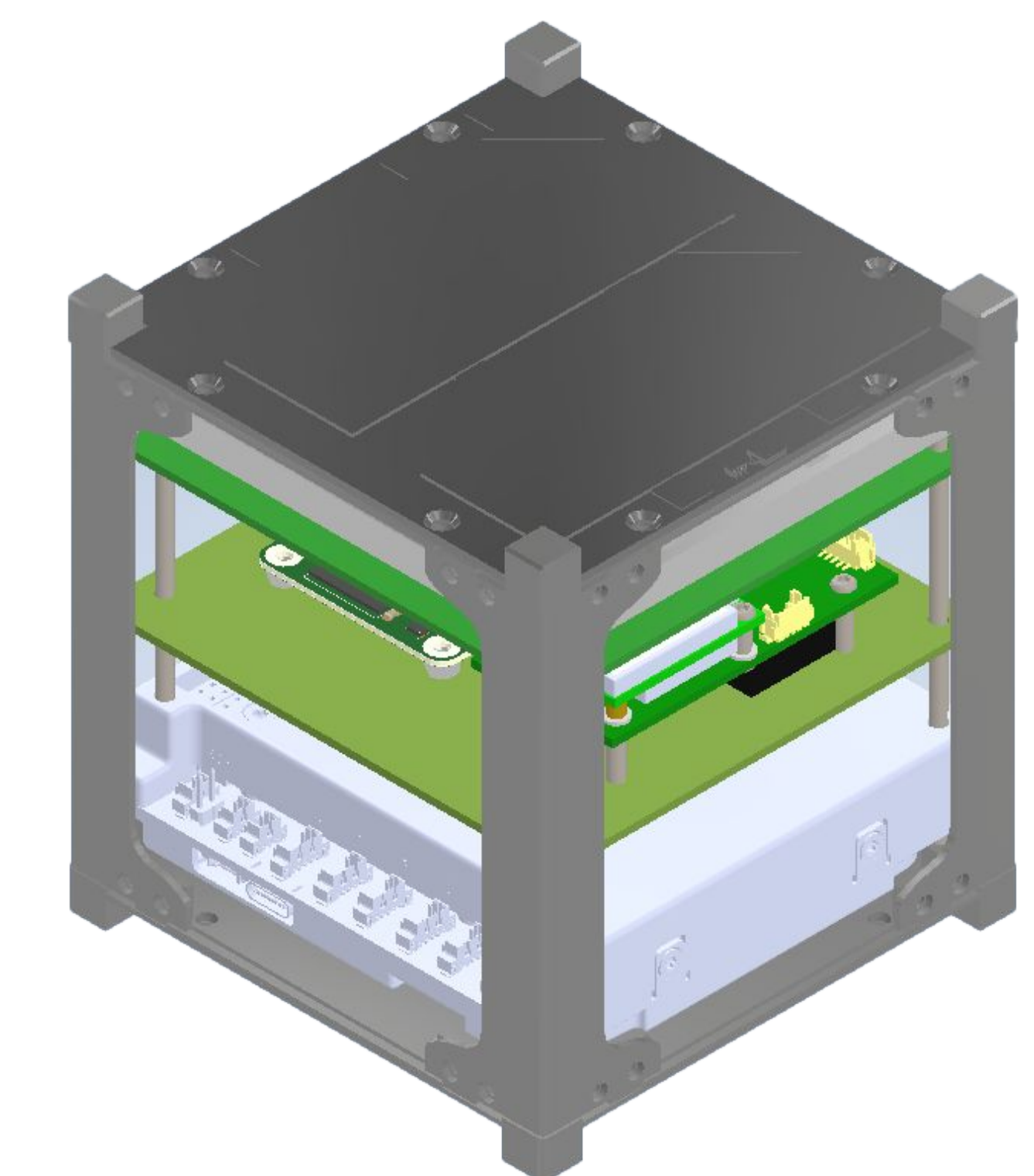**Club Advisor:** Professor Sean Crouse

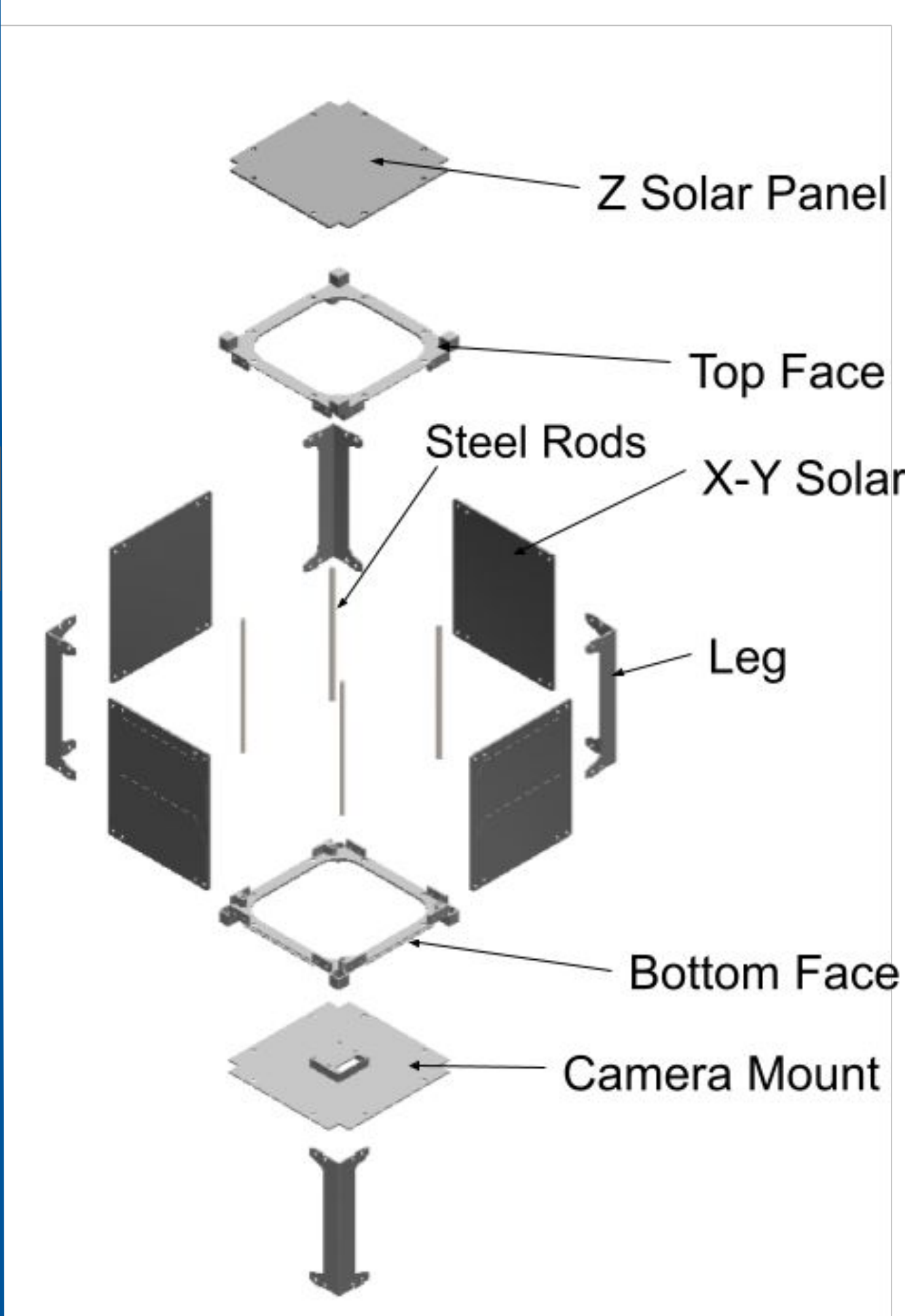Fig. 1: ROSIsat Combined View

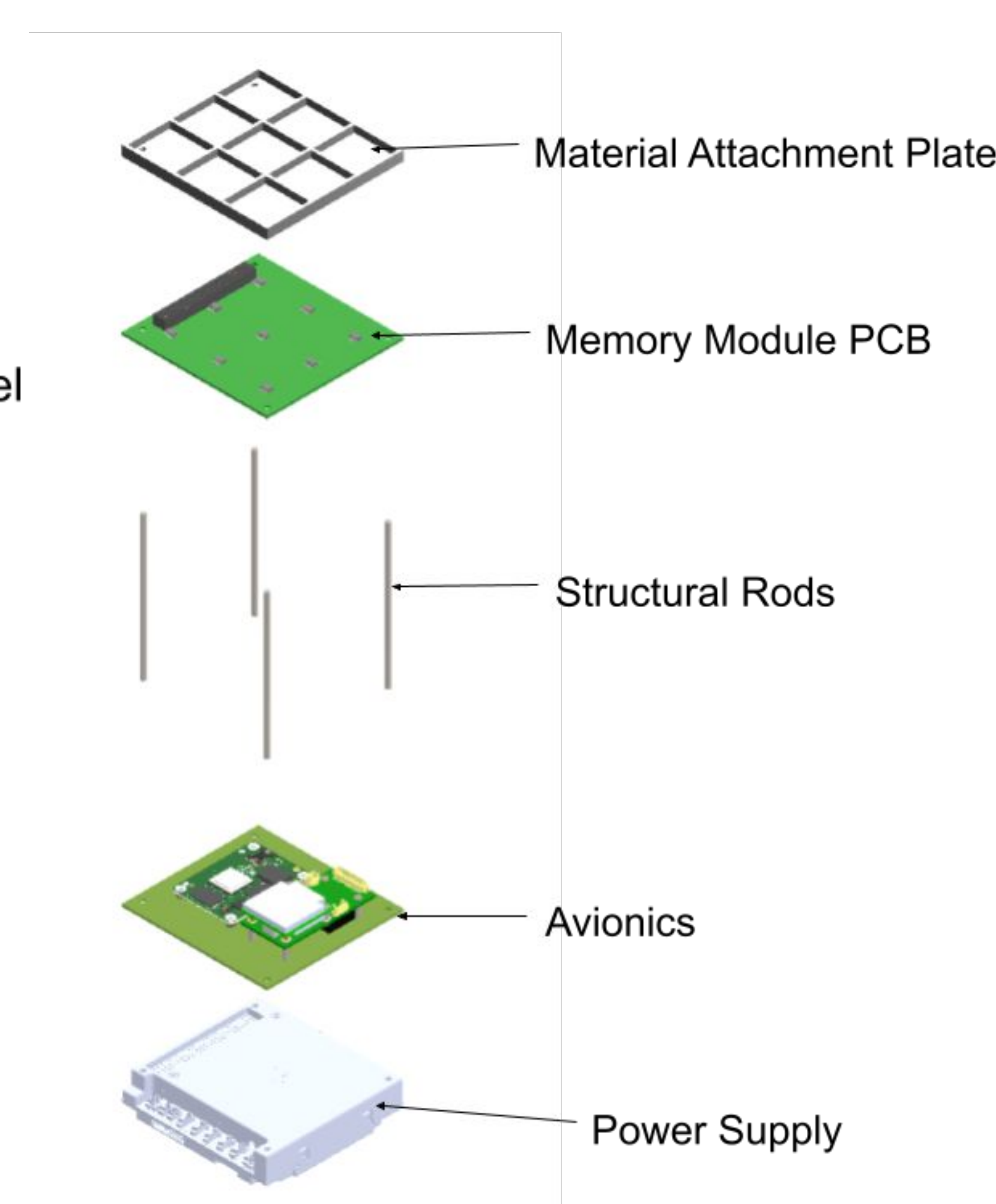Fig. 2: ROSIsat Chassis Exploded View

Fig. 3: Internal Components Exploded View

Payload

- ROSIsat aims to test different materials' efficiency as protection against solar radiation
- Materials will be mounted on Read-Only Memory chips containing random data strings
- A Raspberry Pi CM4 runs a program to check for bit errors caused by solar radiation, representing a material's failure to protect the chip
- The Raspberry Pi CM4 writes a file with the amount of bit errors, which will be transmitted back to Earth for analysis.

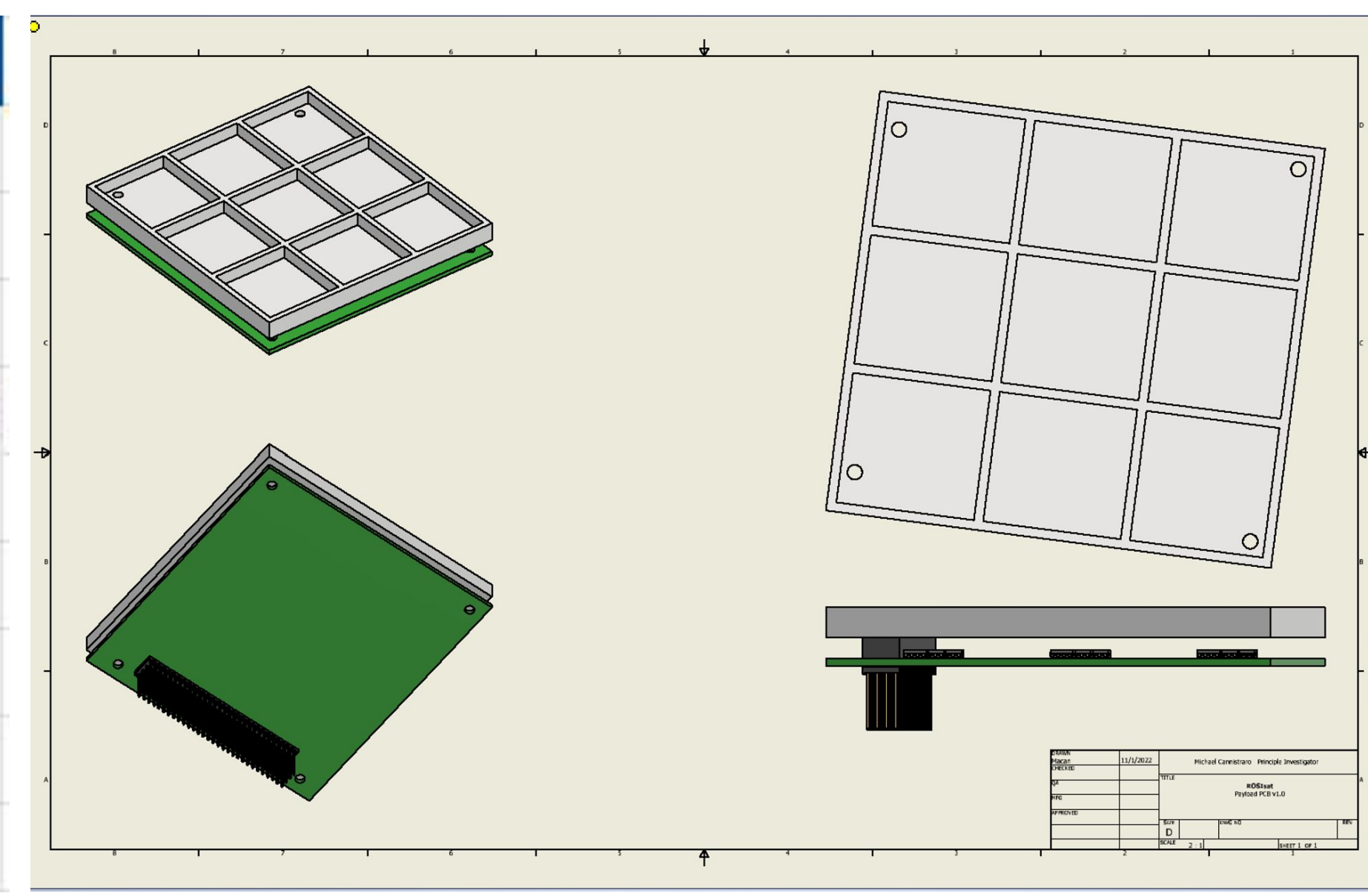| Materials |
| --- |
| Lead |
| Kevlar |
| Aerogel |
| Lunar Regolith Simulant |
| Martian Soil Simulant |
| Tungsten |
| Polyethylene |
| Control w/ Epoxy |
| Control w/o Epoxy |

Fig. 4: Material List (Left)
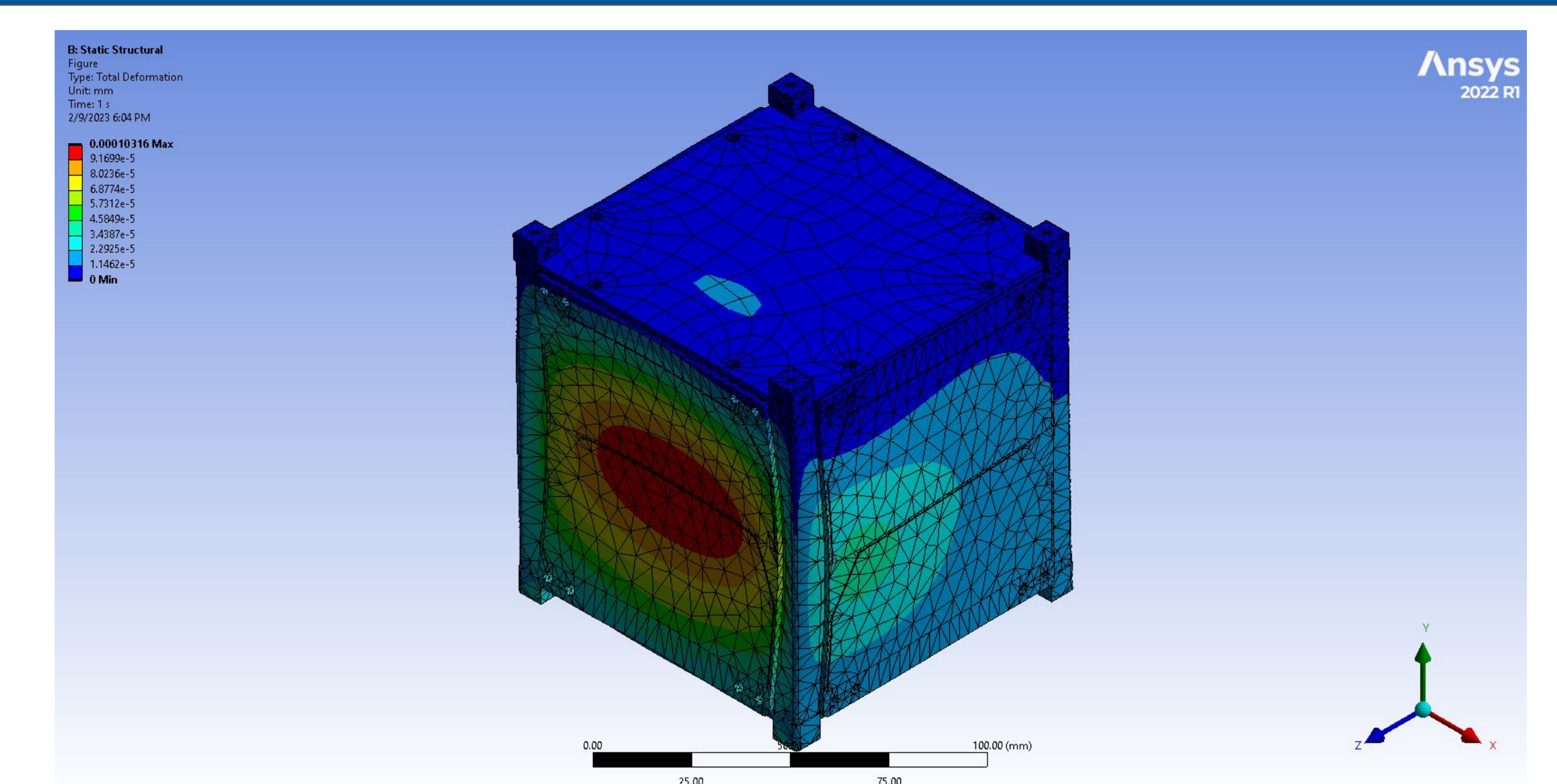Fig. 5: Radiation Shielding Experiment (Right)

Structural Analysis

Fig. 6: Finite Element Analysis of the chassis at launch