

Mission Overview

- Develop and launch a 2U CubeSat into Low Earth Orbit (LEO)
- Execute research experiments in LEO for the payload: Variable Emissivity Device (VED)

COMMUNICATIONS

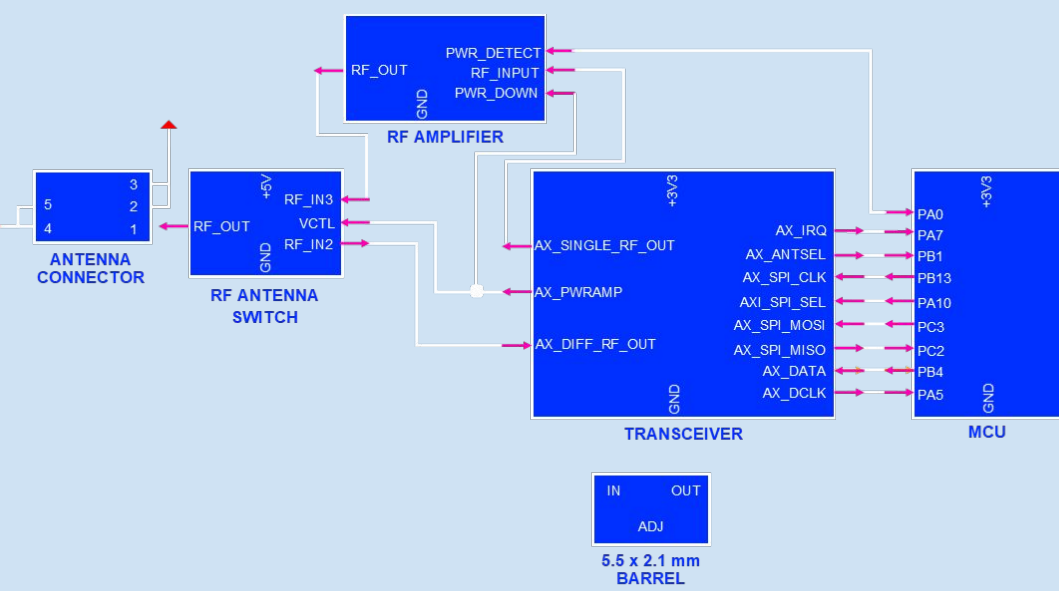


Figure 1: Embedded Communications 2nd Iteration of Transceiver Protoboard. Includes MCU and Transceiver chips

- Programming and installing an on-board transceiver system
- The transceiver consolidates all on-board data and packages for transmission.
- Ground station receives data and transmits commands to the satellite via a Software Defined Radio (SDR)

AVIONICS

- Utilizes a magnetorquer for attitude control
- Onboard computer runs with FreeRTOS on STM32 chip

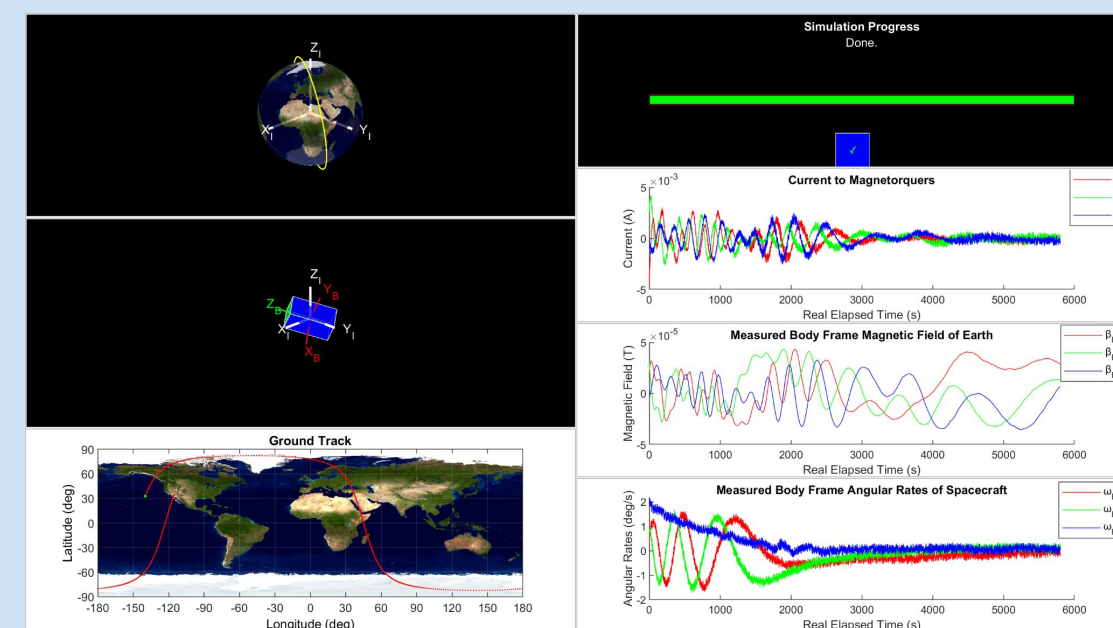


Figure 2: Depiction of ADCS Bdot simulation

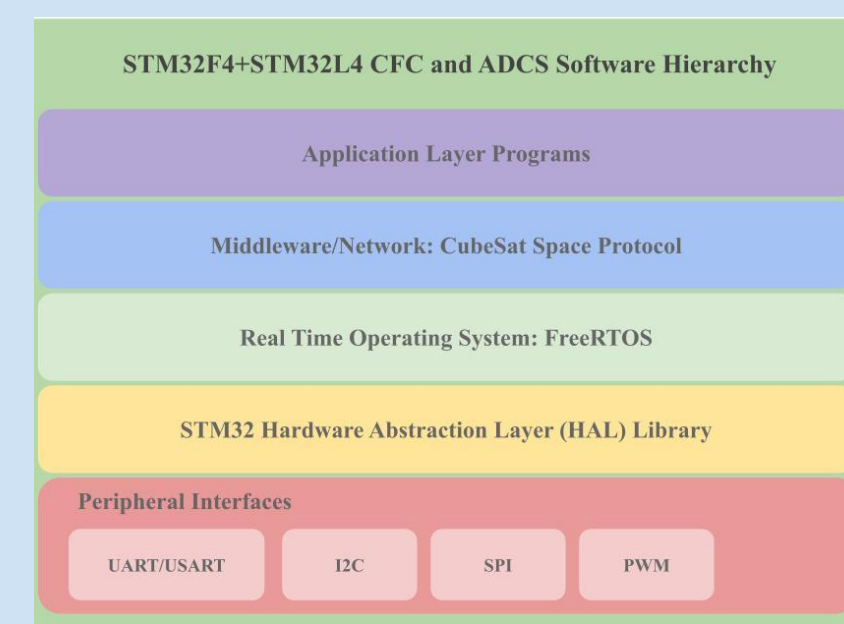


Figure 3: ADCS and CFC Software Hierarchy Diagram

ANTSAT 01



Figure 5: Preliminary SolidWorks model of AntSat 01

SPONSORS



ACKNOWLEDGEMENTS

Thank you to Northrop Grumman, General Atomics for their financial support provided, and STMS for technical support on the VED.

STRUCTURES

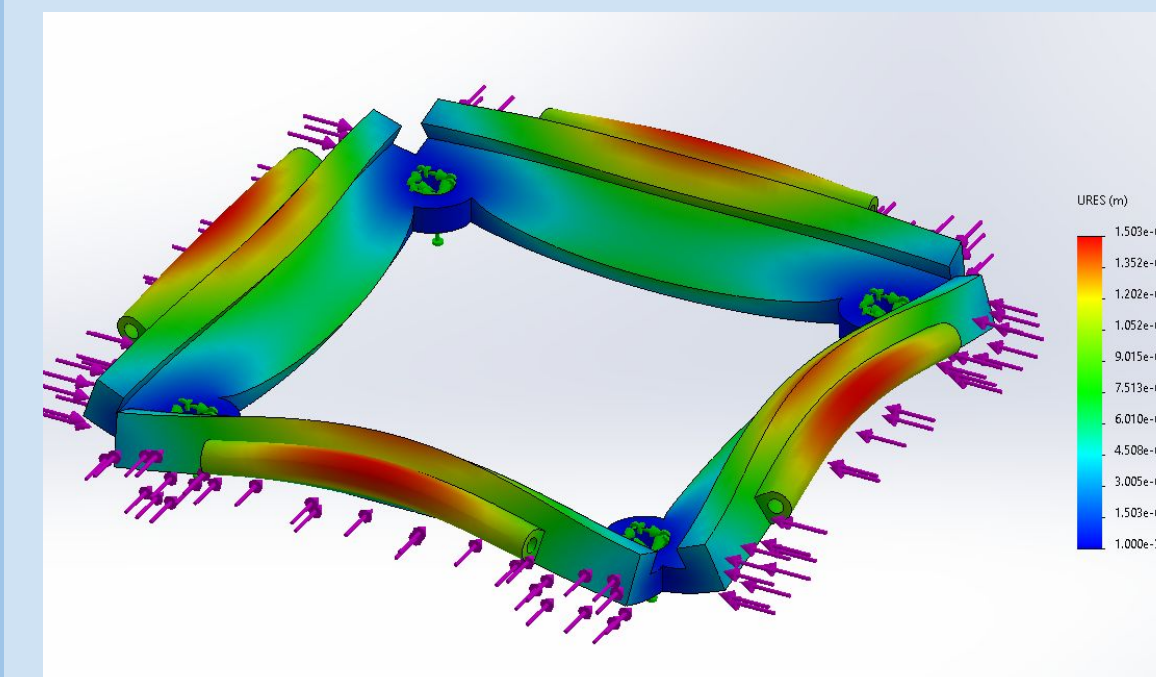


Figure 6: Panel deployment static sim

- Coordinate with other subsystems to plan hardware deconflict during systems integration
- Prototype panel deployment mechanism and support structures as well as conduct static, thermal, and vibrational tests for launch conditions.

Developer Operations

- Create developer automations, server administration, and develop internal software tools.
- Implementing continuous integration pipeline to automatically test and statically analyzes firmware for MISRA C conformance



Figure 7: MISRA Logo

POWER

- Developing an Electric Power System (EPS) using battery cells, solar panels, and heaters
- EPS controls, regulates power budget, and maintains operational temperature.

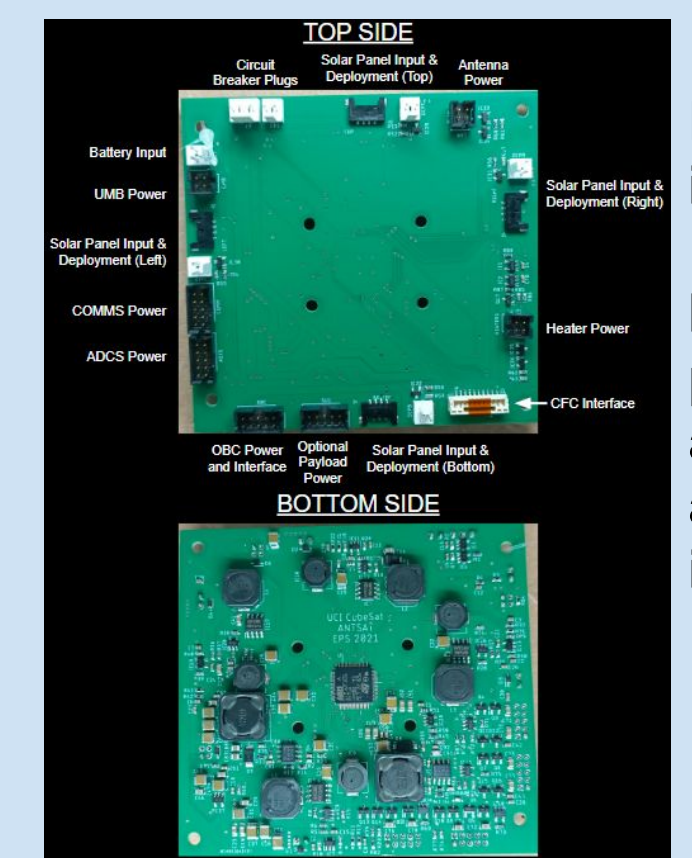


Figure 8: First iteration EPS PCB including headers for power input and output and control interface.

CONCLUSION

Future Improvement

- Begin work on plans to integrate VED into satellite
- Develop testbeds to demo software
- improve deployment systems and conduct further testing

Impact

- VED experiment will hopeful lead to accessible methods of thermal management on future spacecraft
- Future generations of students to gain experience developing space systems

PAYLOAD

- VED is a device that changes color and emissivity in response to varying voltage
- We want to test its performance in response to direct solar radiation.



Figure 4: Variable emissivity sample changing in response to solar radiation