Oregon Tech RockSat-C 2018
Team based modular rocket payload

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Introduction
RockSat-C is a program for students to design, build, and launch a sounding rocket payload out of NASA's Wallops Flight Facility.

Objectives
RockSat-C Mission Objectives:
- Design and construct a multi-experiment payload emulating the methodology of a satellite
- Enable modules to have a "plug and play" type functionality with the canister

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- NASA Wallops Flight Facility
- Reed Research Reactor - Reed College
- OIT Alumni Association

Method
Launch - To DE activation - Begin data collection on lift off.
Apogee - T = 2.6 min - Altitude - 115 km - Modules collect data.
Safedown - T = 13 min - Data collected until power loss

Fig. 1: Previous RockSat-C launch from the Wallops Flight Facility

The Oregon Tech team proposed an experiment to RockSat-C which was accepted. During the design process, the team had to present our progress consistently and adhere to strict design constraints.

Fig. 2: Concept of Operations

Fig. 3: Oregon Tech (OT) placement on Orion rocket

Fig. 4: Payload canister and contents

The payload structure is based on a central column system. The column acts as the bus for power and data connections to run through. It also provides stability and strength for the modular payload bays.

Fig. 5: Radiation Signal Output

The radiation detection system was successfully tested. Shielding materials:
- Wax with no additives (control)
- 30% Strontium Carbonate in wax
- 30% Ferrous Oxide

Method/Results

Fig. 6: Functional Block Diagram

Modular Bay Experiments:
- FOG - Fiber Optic Gyroscope measures rotational velocity of rocket.
- REH - Collect energy from rocket vibration and gravitational forces.
- RSE - Radiation shielding with various materials, detected by Geiger Muller tubes.
- EDL - Logs environmental data.
- MEH - Collect energy using piezoelectric cantilever beam.
- DMS - Manage data from modules
- VCS - Will take high definition video throughout launch.
- EPS - Provides power to the rest of the rocket with a redundant battery bank.

Lessons Learned
- Multiple modules integrated in canister
- Collaborated with other senior projects
- Agile principles applied in organization
- Shared documentation
- Interdisciplinary work throughout

Fig. 7: Shared Leadership Diagram

Teamwork:
- Multiple modules integrated in canister
- Collaborated with other senior projects
- Shared leadership model followed
- Agile principles applied in organization
- Shared documentation
- Interdisciplinary work throughout

Next steps
6/13: Travel to NASA’s Wallops Flight Facility in Virginia
6/14 - 18: Inspection and integration
6/20: Present to potential 2019 RockSat-C teams
6/21: Launch!
7/13: Launch results documentation due
7/27: Final report due

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