UCI Samueli
School of Engineering

UC CUBESAT

CONTACT
PROJECT LEAD:
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GOALS: The goal of UCI CubeSat is to design, test, integrate, and launch a modular microsatellite into low-Earth orbit in conjunction with Professor Rafique, Professor Kassas, and the ASPIN lab at UCI to test multiple payloads in orbit.

The team hopes to be the first student launch at UCI, creating a standard for future student launches and orbital research at UCI.

OBJECTIVES:
- Model the orbit and orbital conditions of the CubeSat throughout the mission lifetime
- Integrate components of various subsystems to collect data, manage power, and communicate with the groundstation
- Build and test a functional transceiving groundstation
- Integrate payload transceiver with overall satellite operations.
- Test the subsystems and CubeSat among operational and launch conditions
- Integrate and successfully launch the satellite
- Create thorough documentation and a foundation for future UCI orbital projects

SUBSYSTEMS:
Power: The external solar panels are responsible for charging the battery to provide sufficient power to subsystems, namely the transceiver and avionics system, which will draw the most power during usage.

Communications: Utilizing a transceiver set by ASPIN lab requirements, transmit science data to groundstation. The transceiver will consolidate all onboard data and package for transmission. Groundstation is responsible for receiving and transmitting operation codes to satellite.

Avionics: Utilizing a magnetorquer and reaction wheels, responsible for attitude control of the satellite and orbital maneuvers. Developing with RTOS to set up MCU (STM32) environment.

Figure 1. SolidWorks model of the 2 unit cubesat.

PAYLOADS:
VARIABLE EMISSIVITY SAMPLE:
Pictured to the right is the variable emissivity sample provided by Professor Rafique. The sample changes color and emissivity in response to varying voltages, and our job is to test its performance in response to direct solar radiation. Similar materials are hoped to be used as a cheap method of thermal management on future spacecraft.

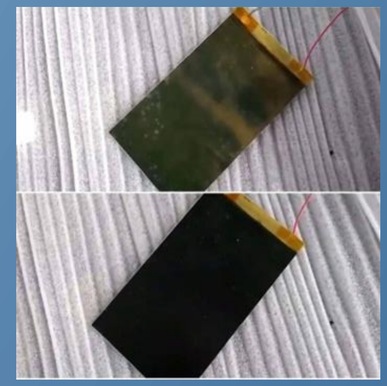

Figure 2. Variable emissivity sample changing in response to solar radiation.

SIGNAL OF OPPORTUNITY TRANSCEIVER:
In collaboration with the ASPIN lab at UCI, the satellite will carry a transceiver meant to function as a transmitter of a “signal of opportunity”, helpful in researching novel navigation methods in the absence of or in place of a traditional GPS signal.

TEAM MEMBERS:
Faculty Advisors:
Professor Zak Kassas
Professor Khalid Rafique

Graduate Manager: Mahdi Maaref

Project Lead / Systems Engineering: Taekyoo Won*

Power Systems / Payload: Fadi Samaan*, Jaeven Laron, Akash Idnani, Caleb Smith

Attitude and Orbit Control Systems / Avionics: Sergio Sandoval*, Armen Ter Avetisyan, Syed Taha Hassan Benedict Casasola, Adrian Osorio, Edwin Rivas

Communications: Baldwin Ngo*

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