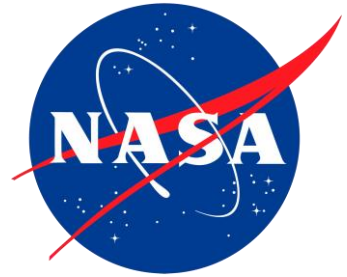
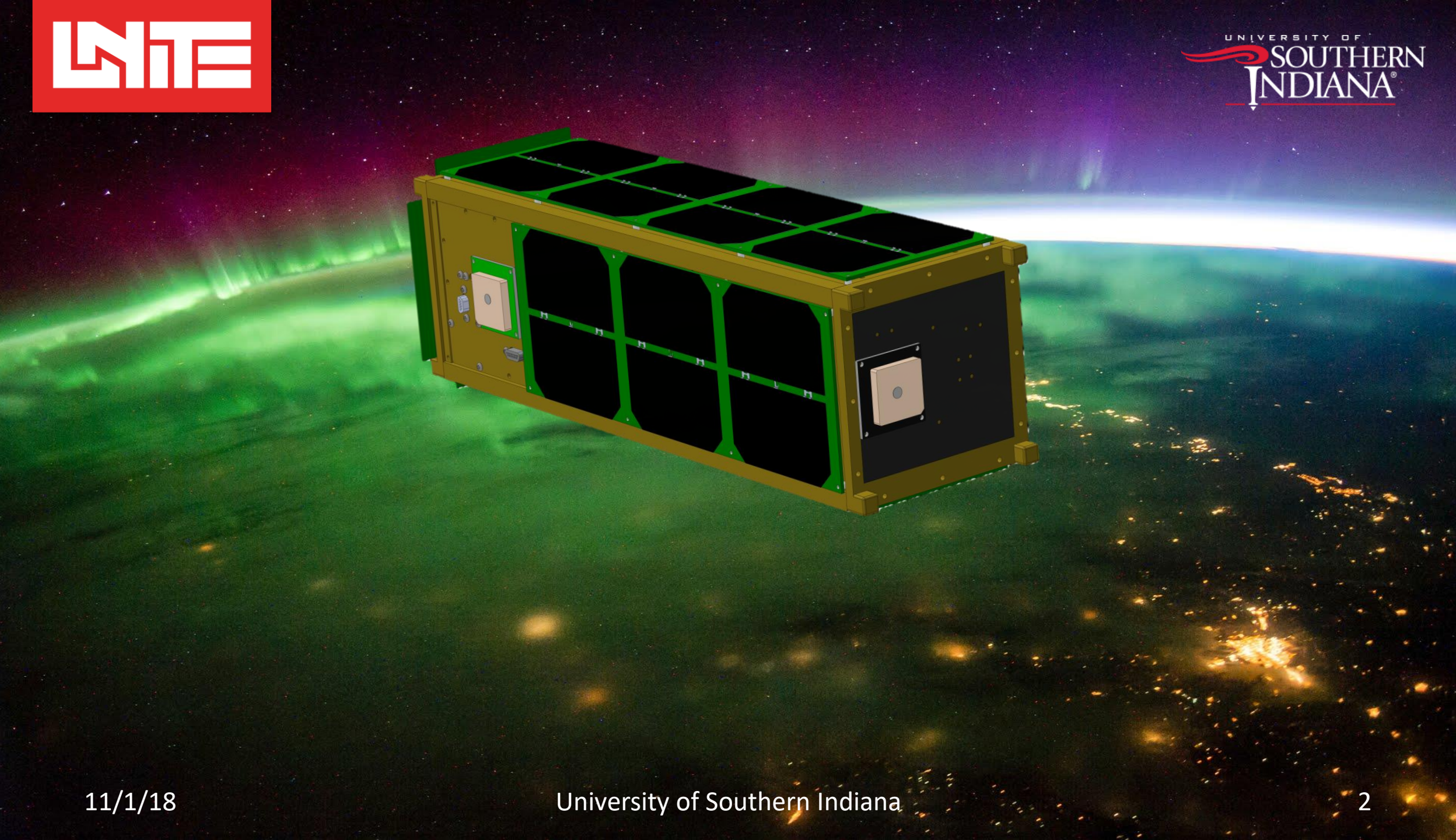
UNIVERSITY OF SOUTHERN INDIANA®



UNITE CubeSat

UNDERGRADUATE • NANO • IONOSPHERIC • TEMPERATURE • EXPLORER

USI BOARD OF TRUSTEES



Mission Objectives

- **The objectives of the UNITE 3U CubeSat mission are to:**
  - **Conduct space weather measurements** in the lower ionosphere using a Langmuir plasma probe.
  - **Measure exterior and interior temperatures** of the spacecraft for comparison to a thermal model.
  - **Track orbital decay** of the spacecraft in the lower ionosphere and during final hours of re-entry.
- Primary mission, beginning January 2020, is conducted in the lower ionosphere. Data is increasingly valuable as the spacecraft descends towards disintegration.

UNITE CONCEPT OF OPERATIONS

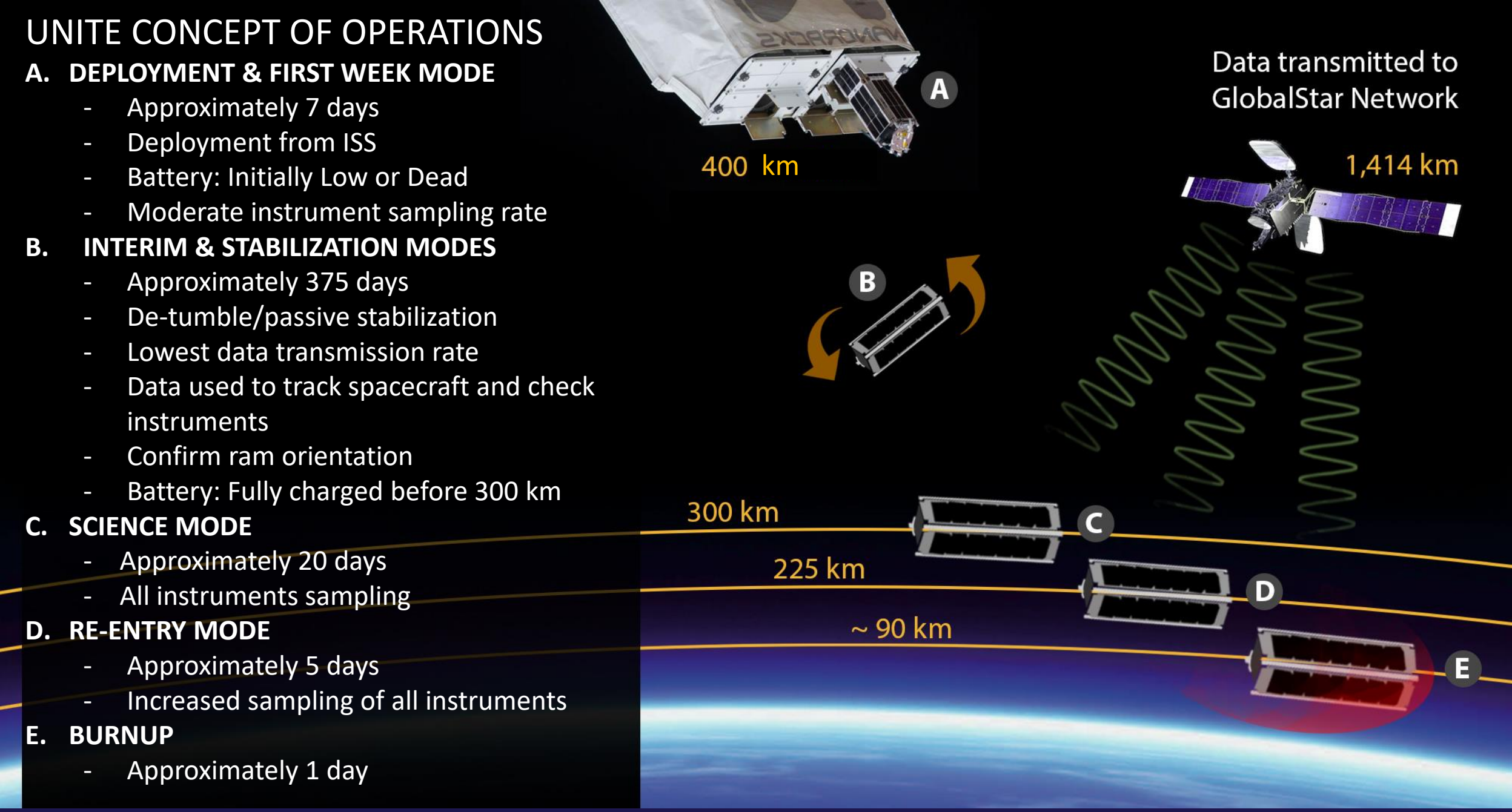
A. DEPLOYMENT & FIRST WEEK MODE
- Approximately 7 days
- Deployment from ISS
- Battery: Initially Low or Dead
- Moderate instrument sampling rate

B. INTERIM & STABILIZATION MODES
- Approximately 375 days
- De-tumble/passive stabilization
- Lowest data transmission rate
- Data used to track spacecraft and check instruments
- Confirm ram orientation
- Battery: Fully charged before 300 km

C. SCIENCE MODE
- Approximately 20 days
- All instruments sampling

D. RE-ENTRY MODE
- Approximately 5 days
- Increased sampling of all instruments

E. BURNUP
- Approximately 1 day



UNITE Launch Status

Launch Details

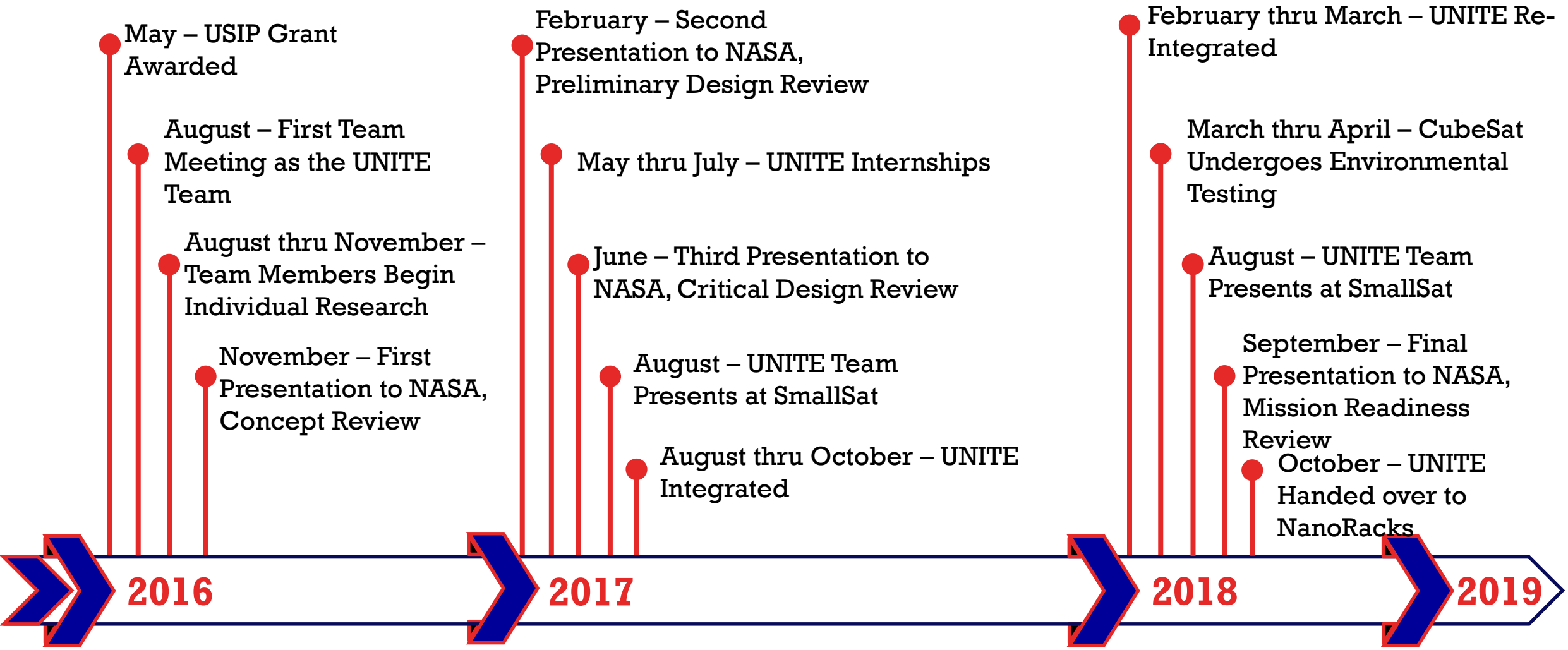
- UNITE will be launched from Cape Canaveral, Florida
- UNITE's launch vehicle is the SpX-16 Dragon and Falcon 9
- UNITE's launch date is December 4th, 2018 on a Commercial Resupply mission
- UNITE's deployment date from the ISS is 1-3 months after the launch date

UNITE CubeSat Team

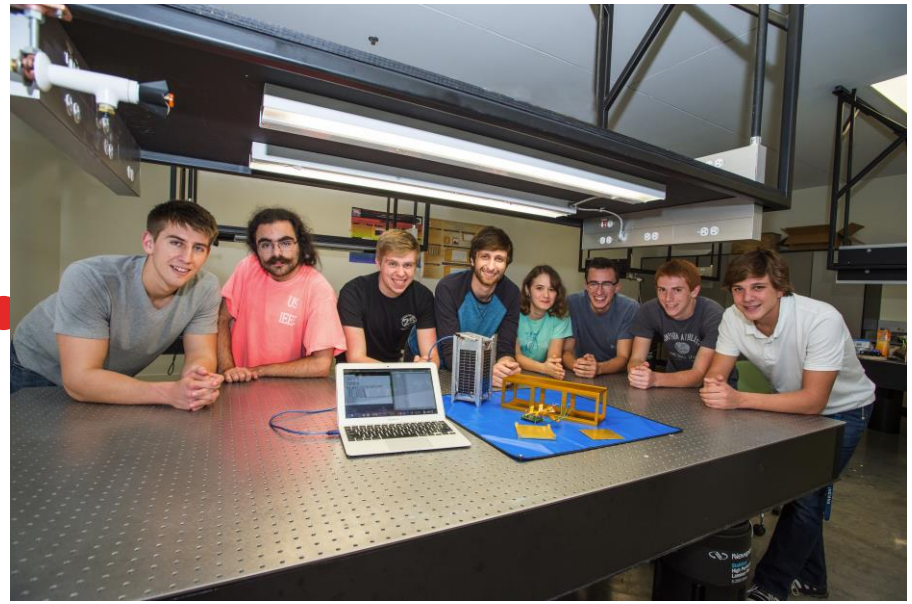
USI'S CUBESAT EXPERIENCE

"Rocketing from the beginning to the current state"

Project Timeline



Project Timeline



May – USIP Grant Awarded

August – First Team Meeting as the UNITE Team

2016 2017 2018 2019

Project Timeline

August thru November – Team Members Begin Individual Research

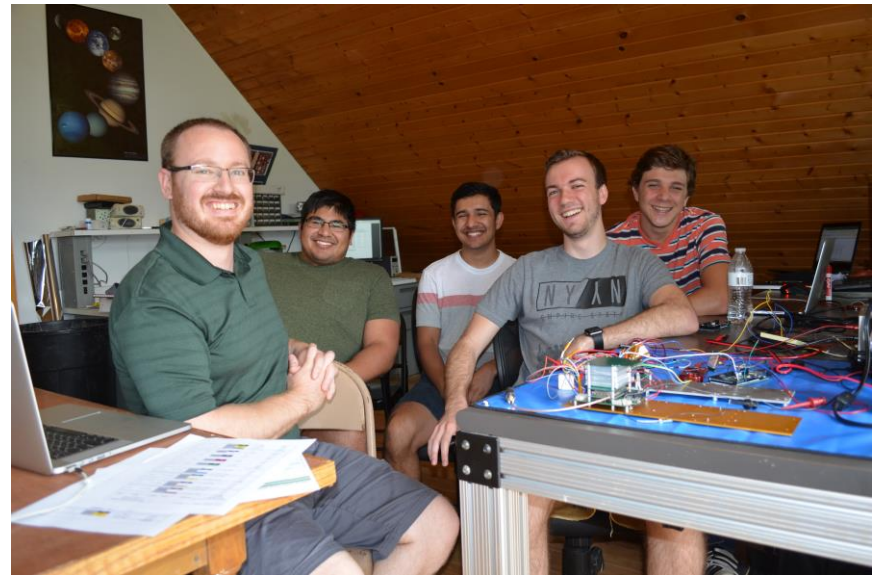
November – First Presentation to NASA, Concept Review

2016 2017 2018 2019

Project Timeline

February – Second Presentation to NASA, Preliminary Design Review

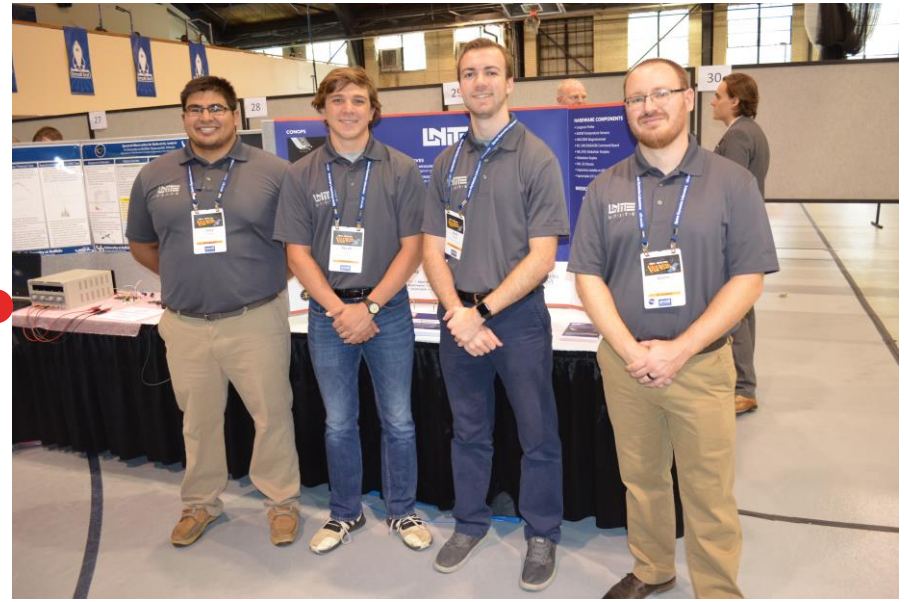
May thru July – UNITE Internships



2016 2017 2018 2019

Project Timeline

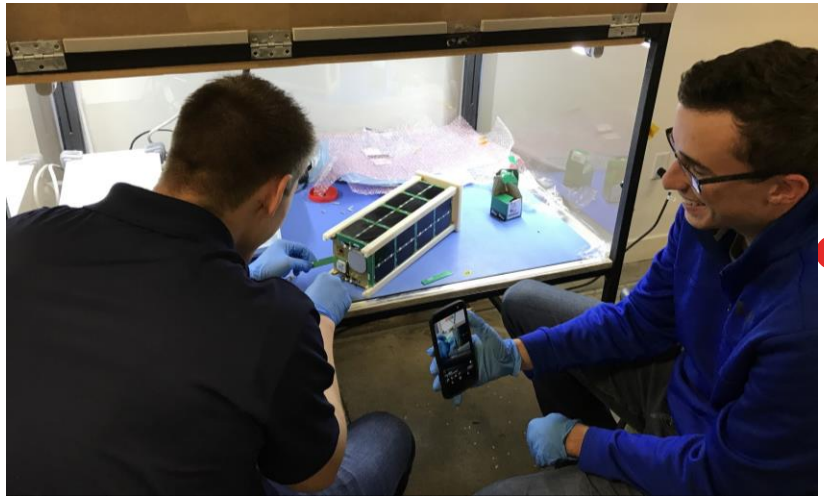
June – Third Presentation to NASA, Critical Design Review



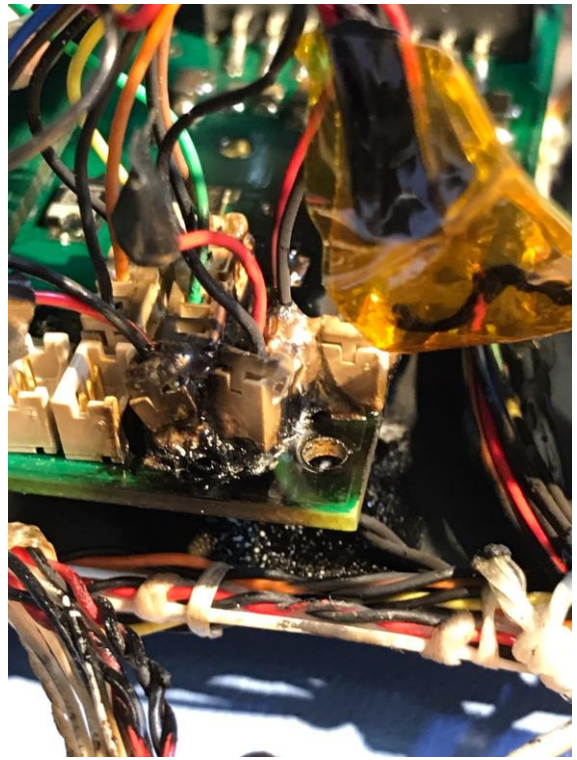
August – UNITE Team Presents at SmallSat

2016 2017 2018 2019

Project Timeline



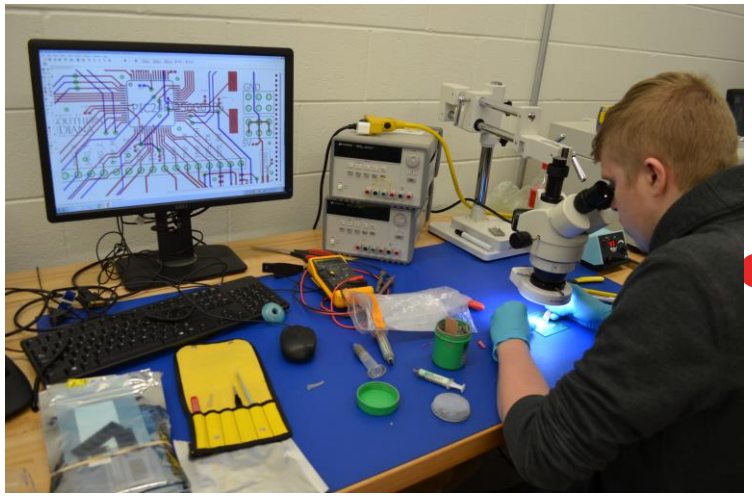
August thru October – UNITE Integrated

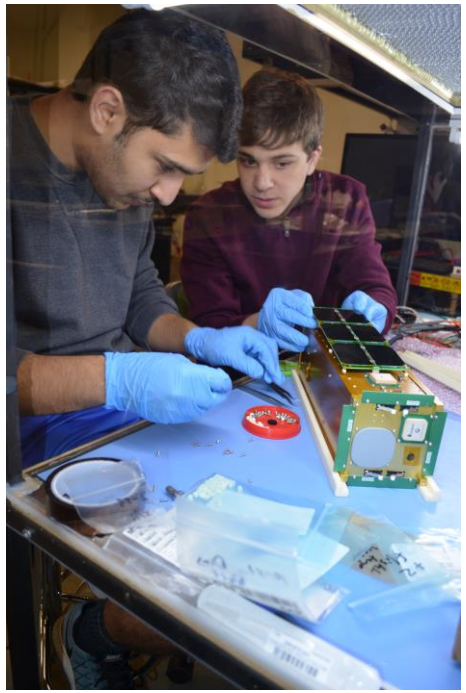


October – UNITE had a small Electrical Fire

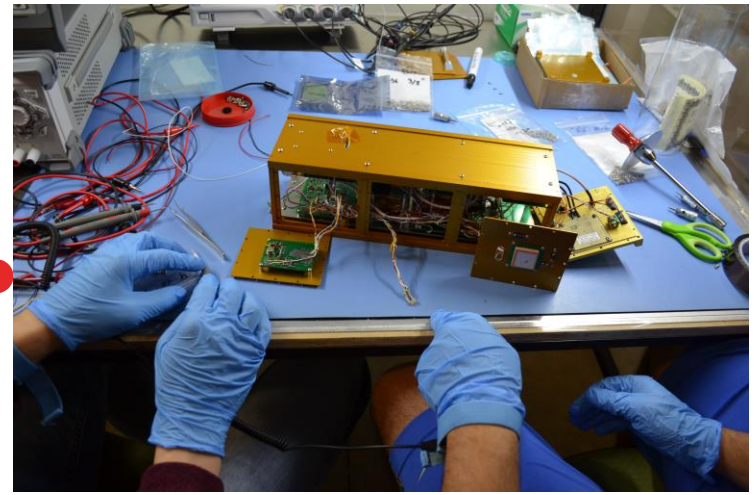
2016 2017 2018 2019

Project Timeline





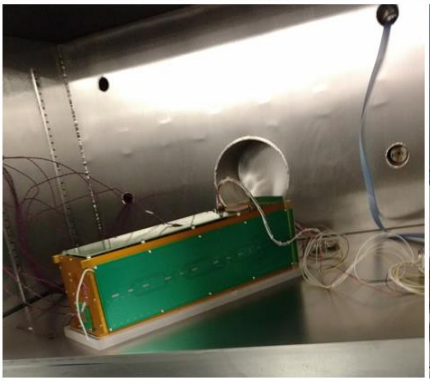
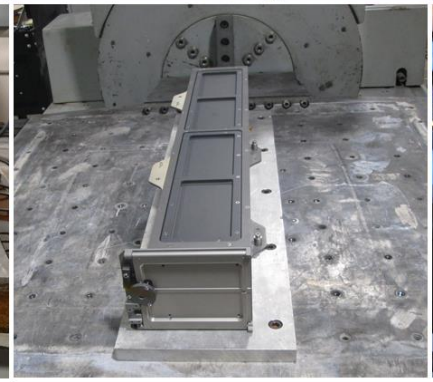
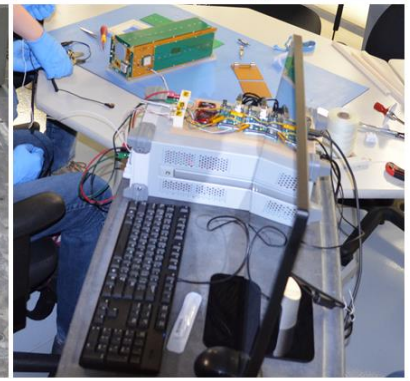
February thru March – UNITE Re-Integrated



2016 2017 2018 2019

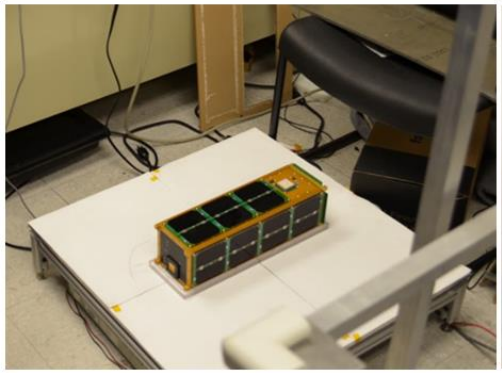
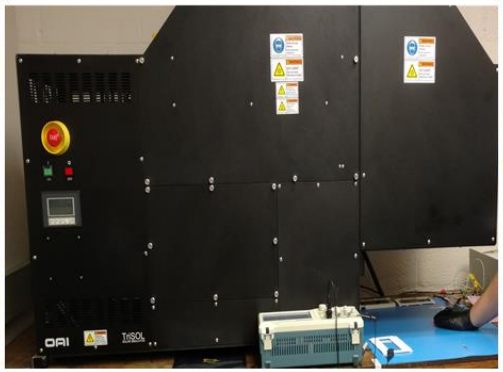
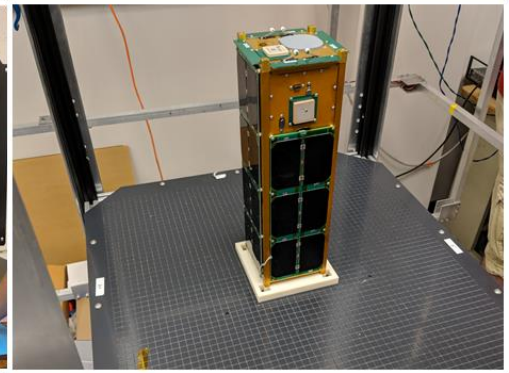
Project Timeline

March thru April – CubeSat Undergoes Environmental Testing

Thermal Vacuum Testing	Soft Stow Vibration Testing	Battery Level Vibration Testing	Day in the Life Testing
			

2016 → 2017 → 2018 → 2019

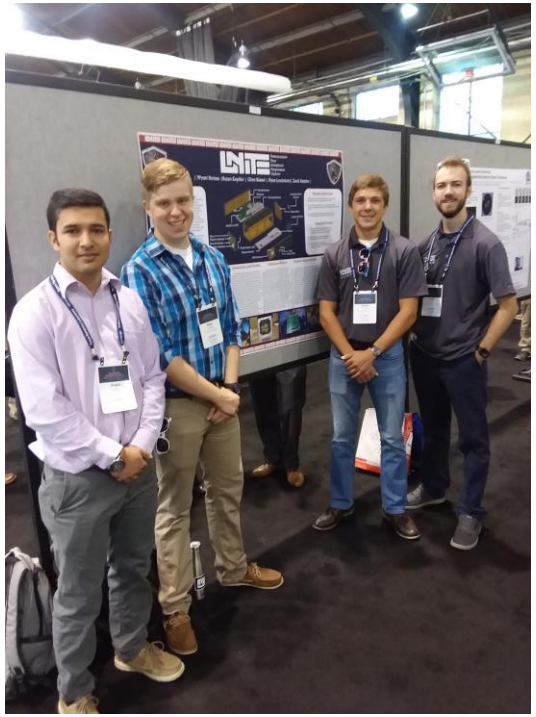
Project Timeline

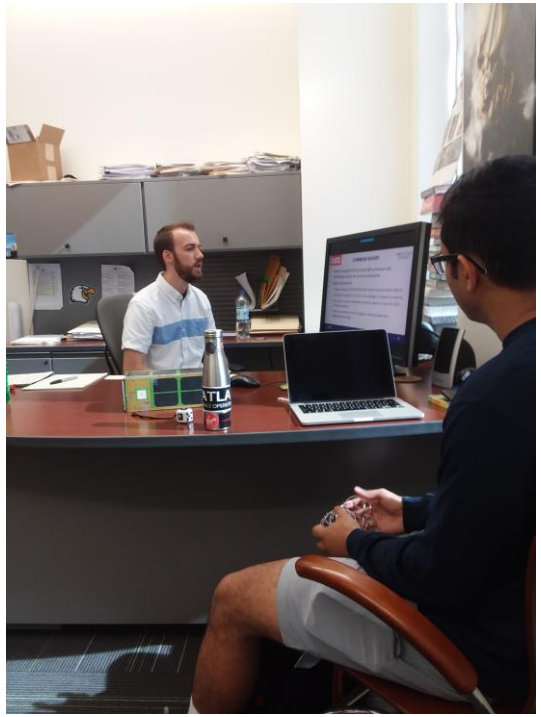
Center of Gravity Analysis	Solar Array Analysis	Helmholtz Cage Analysis
		

March thru April – CubeSat Undergoes Environmental Testing

2016 → 2017 → 2018 → 2019

Project Timeline





August – UNITE Team Presents at SmallSat

September – Final Presentation to NASA, Mission Readiness Review

October 2018 – UNITE Handed over to NanoRacks

2016 2017 2018 2019

Project Summary

- $200,000 grant from NASA through USIP
- 2+ years from proposal submittal to current state
- 15 students have worked on the project
- Extremely unique opportunity for students
- First satellite built by a public institution in Indiana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THANK YOU