SWARM-EX Educational Programs in the Development of a Collaborative CubeSat Swarm

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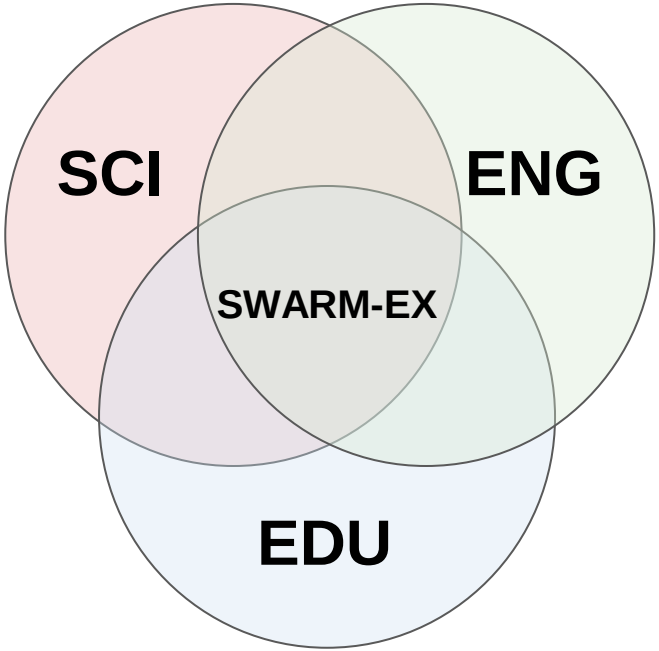
Program Goals

- Persistence and correlation in EIA/ETA features
- Changes in EIA/ETA features that occur over timescales of <90 minutes



- Formation flying
- Collision avoidance
- Detach & reconnect
- Propulsion
- UHF crosslink
- CDMA downlink

- Intercollegiate CubeSat Mentoring Program
- CQ Slack channel
- Efforts to track student engagement/progress

Georgia Tech

Olin College of Engineering

Multi-University Collaboration

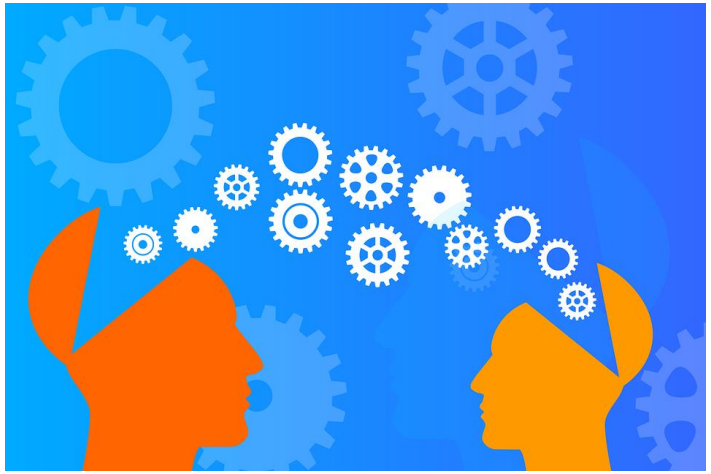
- Six institutions: The University of Southern Alabama (USA), Stanford University (SU), The University of Colorado Boulder (CU), Georgia Tech (GT), Olin College, and Western Michigan University (WMU)
- The SWARM-EX mission provides a unique opportunity for STEM education and allows for cross-institutional mentorship between experienced and new CubeSat programs


Olin College
of Engineering
Georgia
Tech
Olin College
of Engineering

Our Team

Current Efforts

- Providing cross-institutional mentoring activities
- Development and implementation of a repository for CubeSat knowledge and expertise
- A survey of student participants
- Seminar Series



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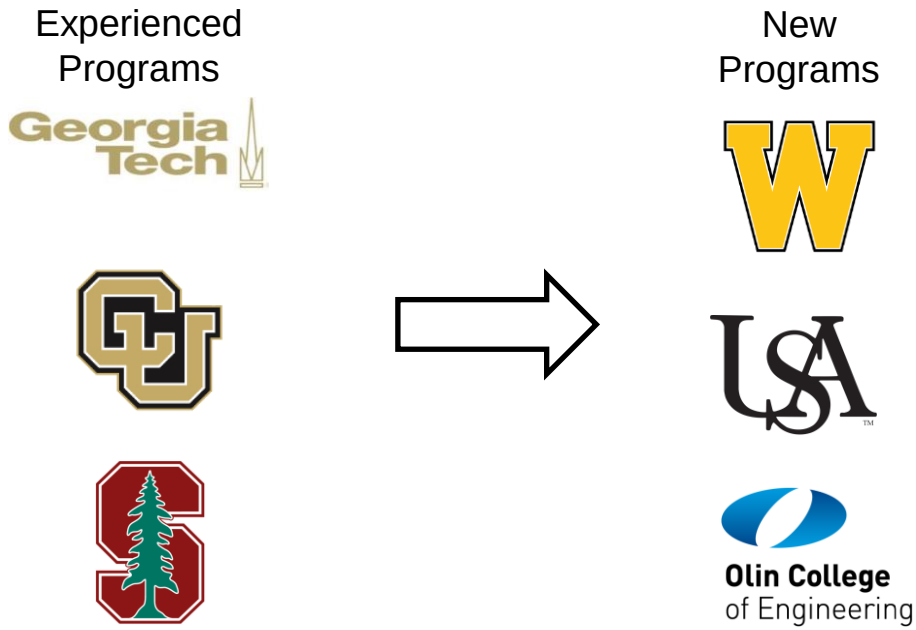
Cross-Institutional Mentoring



Surveys

- Four Surveys
  - Demographic
  - Entry
  - Annual
  - Exit

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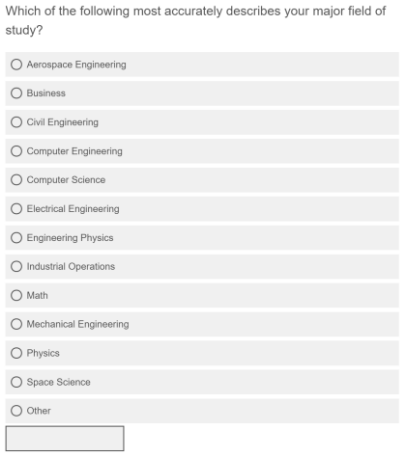
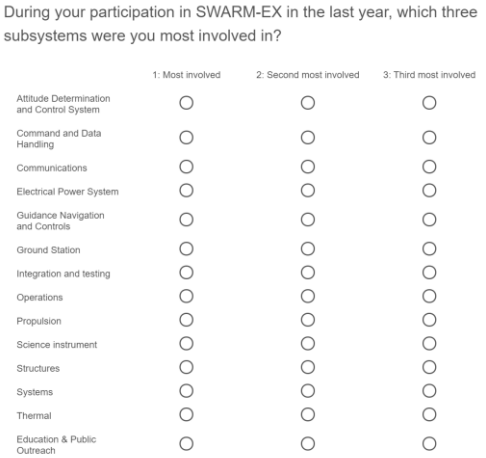
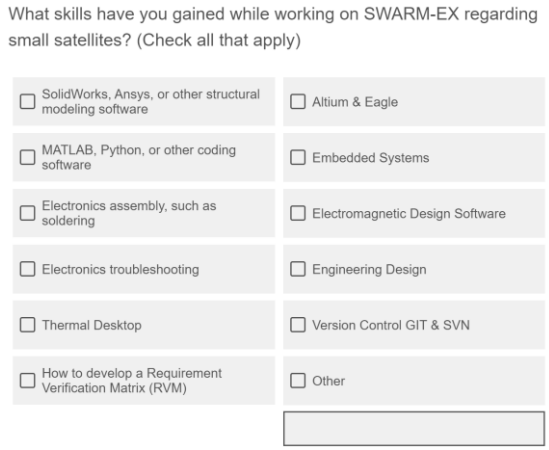
Survey Purpose

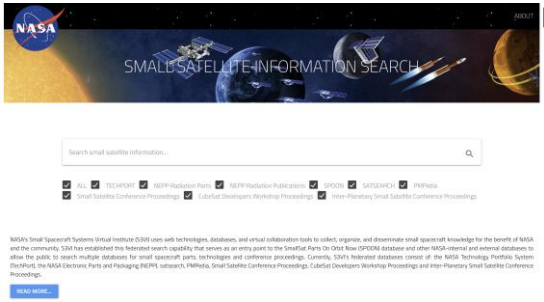
- Identify and track students technical capabilities and CubeSat knowledge levels throughout their time working on the SWARM-EX project
- The outcome of surveys is to gain a better understanding of what participants bring and take away from the project







Current CubeSat Resources & The SWARM-EX CubeSat Slack Channel



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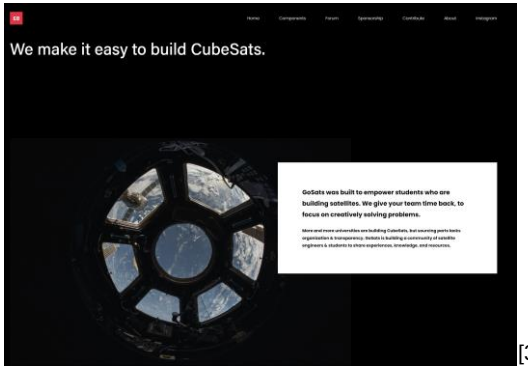

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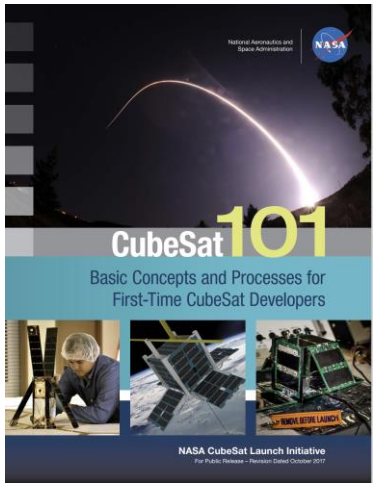

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slack

Launching Cubesat Questions

CubeSat Slack Channel

- The CubeSat Questions Slack Channel introduces students and new CubeSat teams to experts and experienced teams
- Subject matter experts from 16+ universities
- Total Members: 98

- Student from Western Michigan University asking questions on GPS telemetry, housekeeping data, and CubeSat deployment
- They received responses from experts with detailed explanations

CubeSat Knowledge Documents

- Academic Material: Lectures and Webinars
- Frequently Asked Questions Document
- Getting Started Document for CubeSat

Seminar Series

- The seminar series is a set of lectures covering various topics put on by members of the SWARM-EX project allowing students' to participate in discussions on topics which interests them improving their general knowledge in applied STEM
- Upcoming Topic: In-situ measurements and science instruments & SWARM-EX instrumentation Presenter: Dr. Marcin Pilinski
- Previous Topics
  - CU-E3 CubeSat Mission — Presenter: Brodie Wallace
  - Academic Journey and Past Research Projects — Presenter: Dr. Scott Palo
  - Application of Engineering Principles to Army/MFO Operations in Egypt — Presenter: Shane Lowe

Future Work

- Cross-institutional mentoring
- The CQ Slack Channel will continue to be open to additional groups and institutions
- Completing of surveys
- Continuing of seminar series

Questions?

References

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