

Spacecraft Design Lab

AA136/236



Fall-Winter 2019

What Are We Doing Here?

We are going to:

- Design
- Build
- Test
- Fly (!!!)

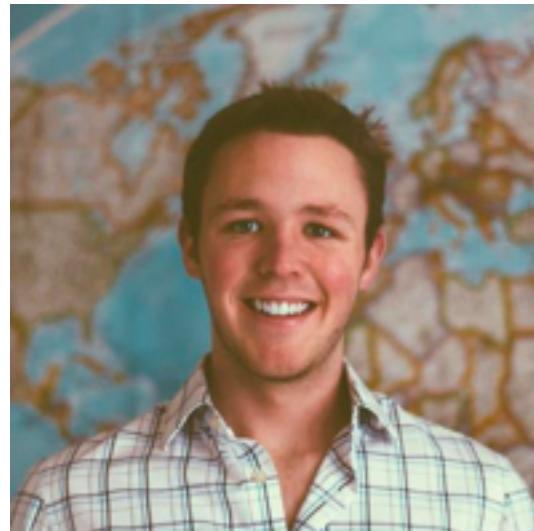


a small satellite over the next 6-9 months.

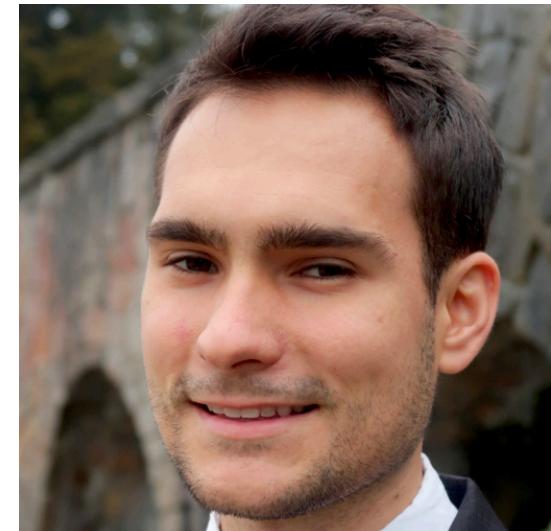
Course Team



Zac Manchester
Assistant Professor
Lead Instructor

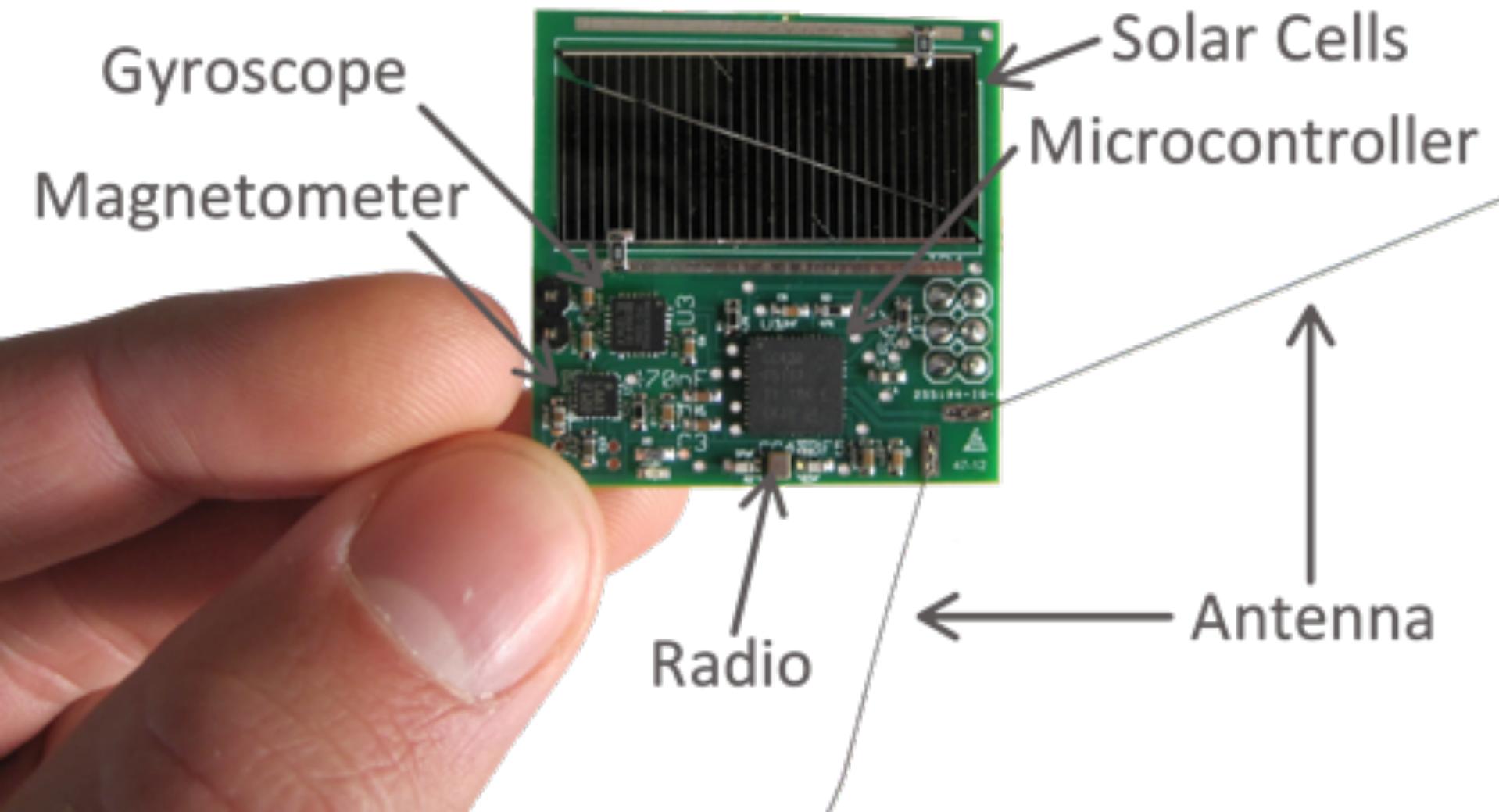


Max Holliday
Grad Student
Avionics/Electrical Lead



Andrew Gatherer
Grad Student
Mechanical/GNC Lead

Background

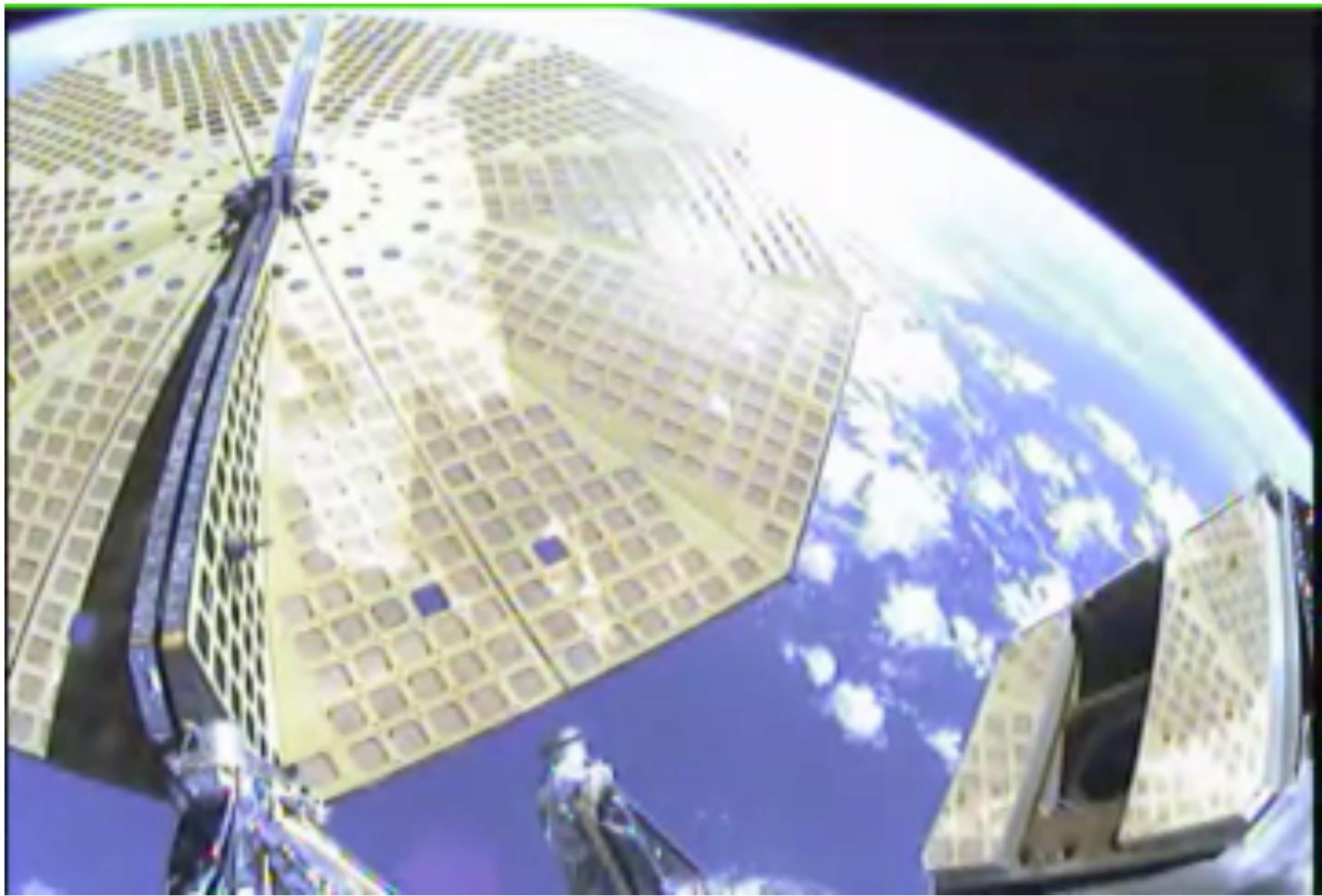


KickSat Mission



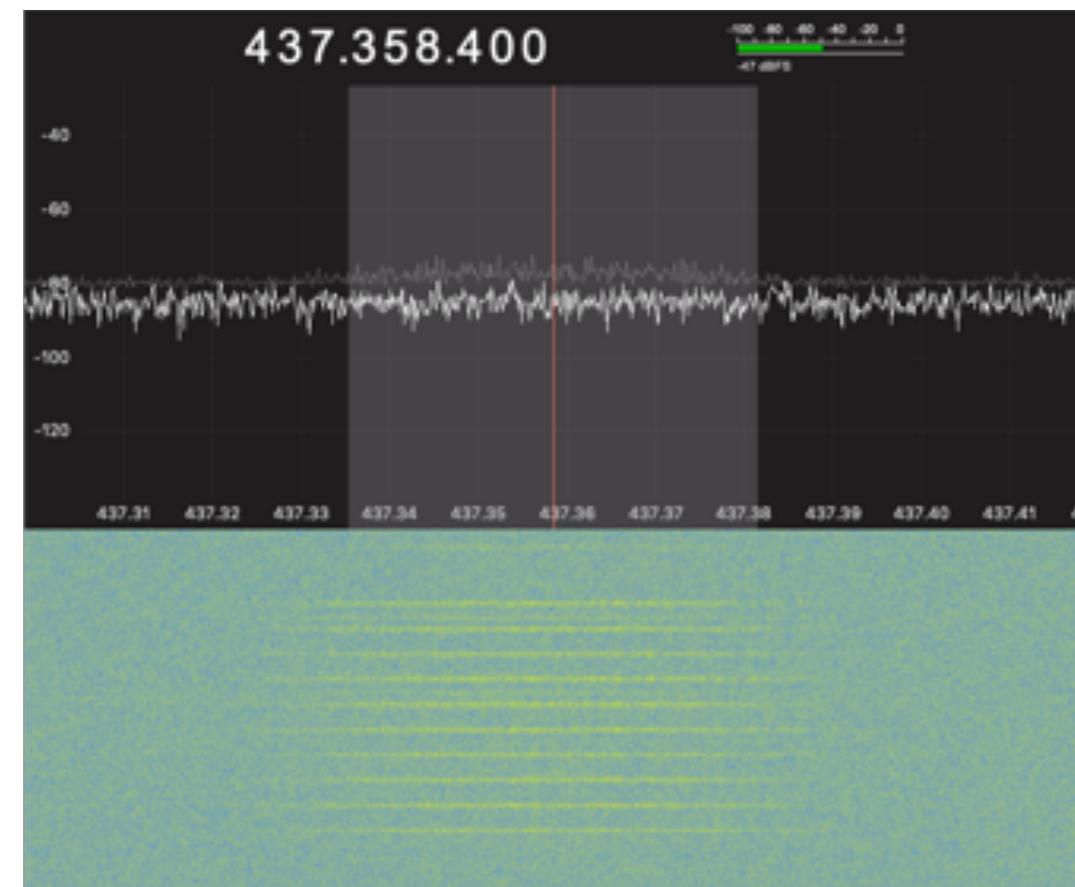
Video Courtesy Ben Bishop

KickSat-2

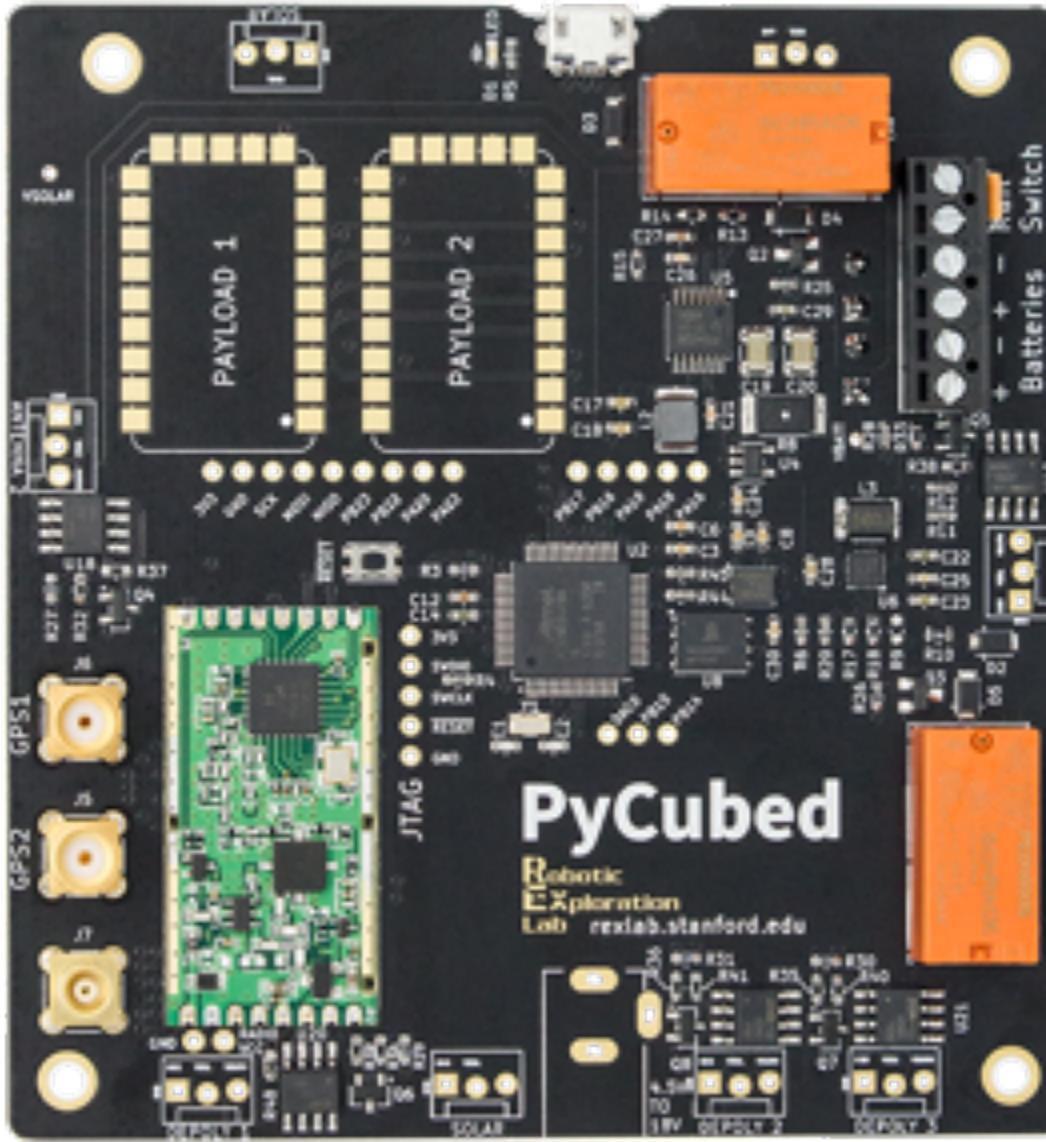


KickSat-2

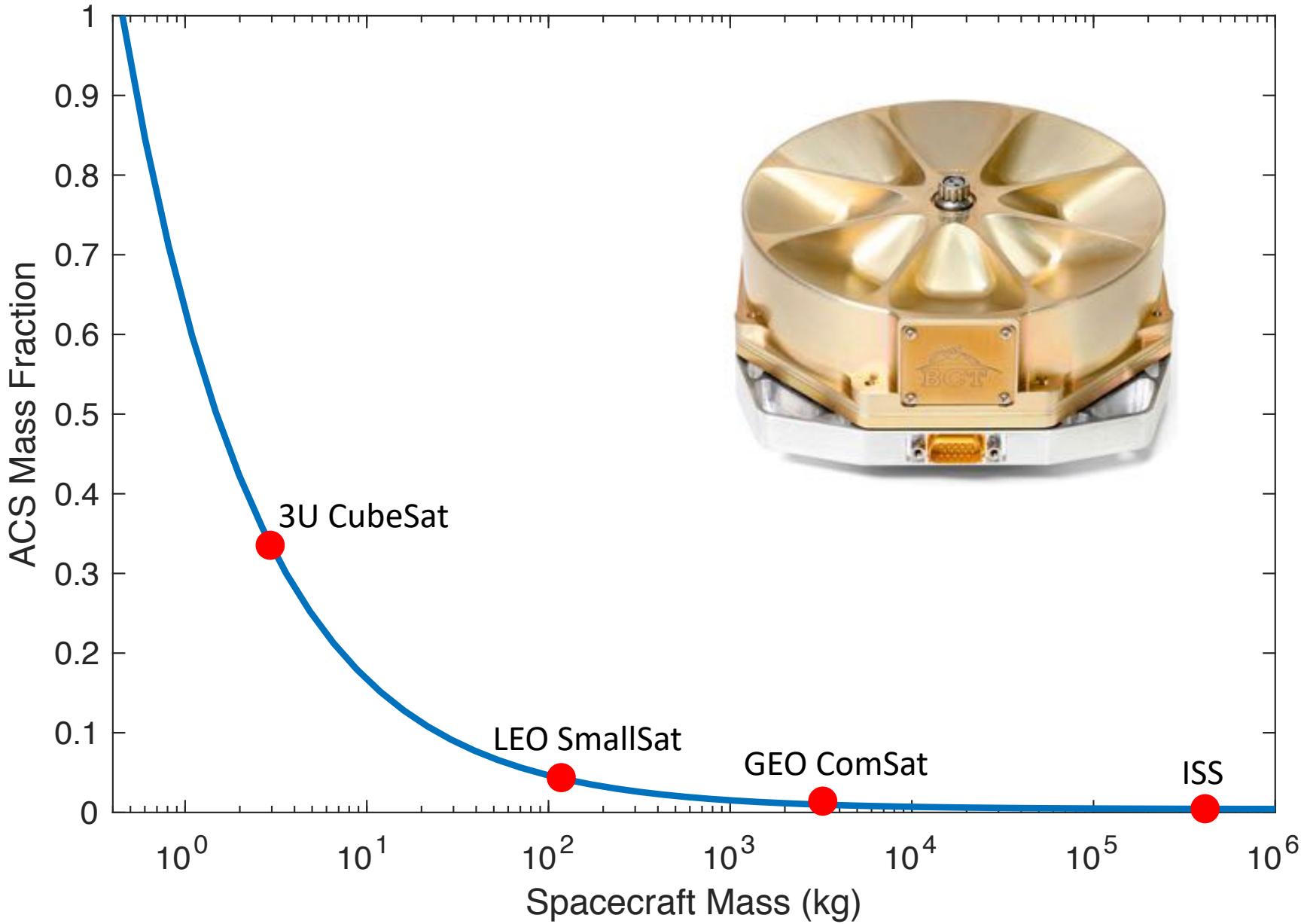
437.358.400



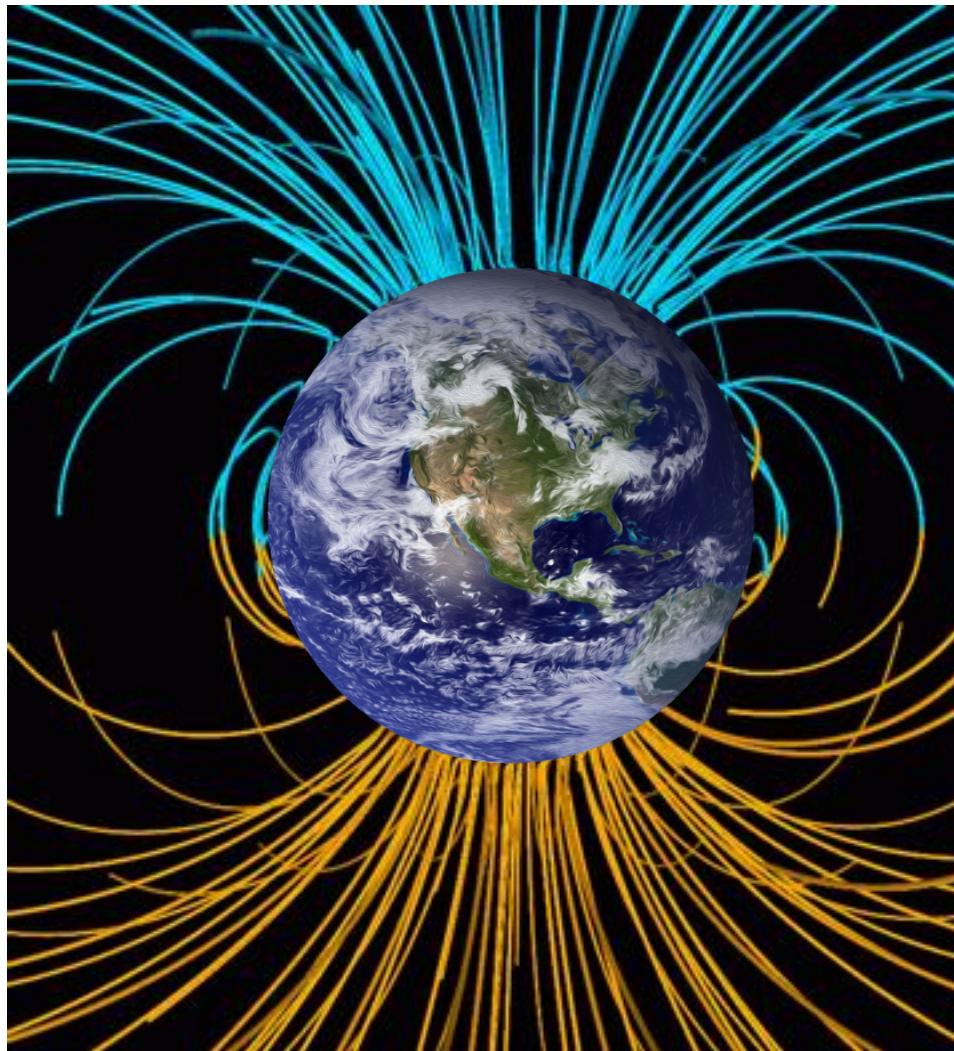
PyCubed: Open-Source Avionics



Actuators: A Big Problem For SmallSats



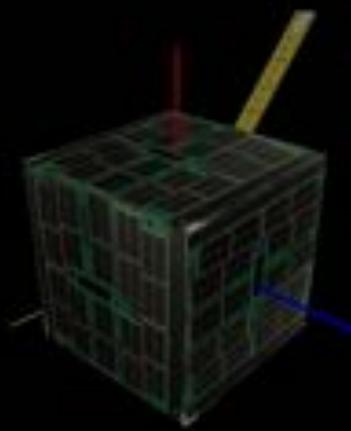
Magnetic Torque Coils



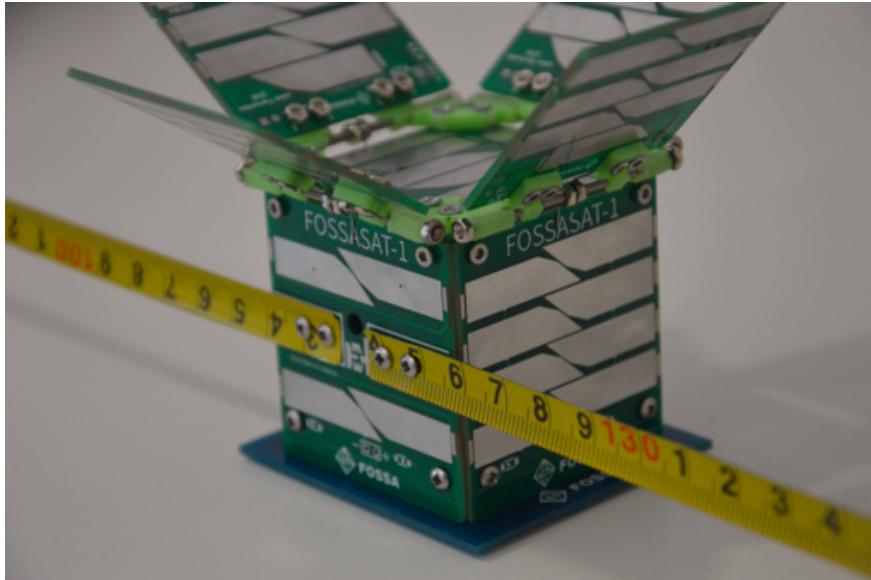
$$\tau = m \times B$$



Model-Predictive Control



PocketQubes



PyCubed-1 Mission

- Demonstrate smallest-ever spacecraft with full 3-axis attitude determination and control
- Camera payload
- LoRa radios for communication and (hopefully) ranging.
- Delivery tentatively scheduled for March-April 2020
- Launch in late spring or early summer on Falcon-9
- 500 km sun-synch orbit



Logistics

- This class will be **hands-on** and **fast-paced**.
- Students are expected to put in **9 hours per week** for **3 credits**.
- There will not be regularly scheduled lectures. Instead, we will have a **weekly all-hands meeting** and **weekly sub-team meetings**.
- Use of Slack, GitHub, and project management/issue tracking tools is **mandatory**.
- **Enrollment is limited** and is at the discretion of the instructor. Priority will be given to seniors. **Decisions will be made by Wednesday**.

Course Survey

<https://forms.gle/6LWDr6dR2NjoD3Q4A>

