

CUBESAT

# Overview and Lessons Learned

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# CubeSat Program Overview

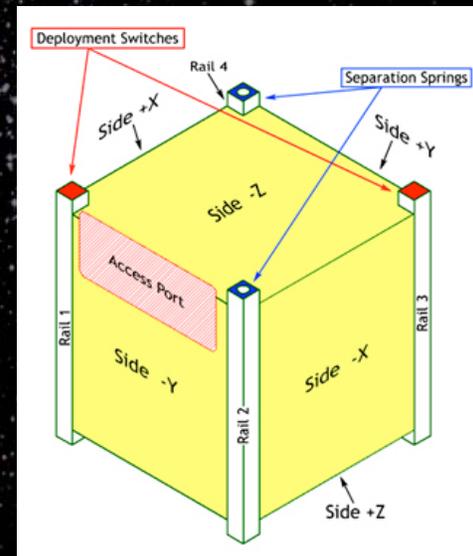
- 60+ universities, private companies, government organizations building picosatellites
- Program designed so that students can participate in entire life cycle of a space mission
- Use concepts of standardization and ridesharing to meet objectives
- Currently 10 CubeSats in orbit



# Basis for the Standard

CubeSats: a practical platform for experimentation in the smallest form factor possible.

- Simple Standard (manageable for universities)
- Standard based on
  - Size of available COTS components (Solar cells, batteries, transceivers, etc.)
  - P-POD dimensions and features
  - Self-imposed safety standards
  - LP environmental and operational requirements



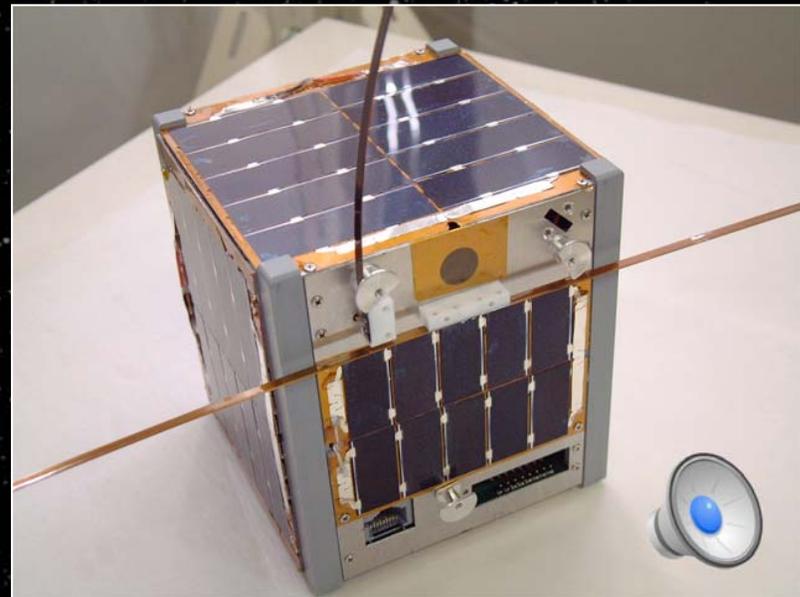
# Poly Picosatellite Orbital Deployer

- Standard deployment system
  - Tubular frame
  - Spring assisted ejection
  - Payload of 3 single CubeSats
- P-POD mission objectives
  - Protect LV and primary payload
  - Safe/reliable deployment
  - Compatibility with many LV



# Recognizable Beacons

- Locating the CubeSat after deployment
  - Health status / contingency mode
  - Acquisition of signal
  - Community support
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- Normal CubeSat  
1/2 to 1 watt RF
  - U of Tokyo (XI-IV)  
Only 80 mW beacon  
Morse Code  
Comes in crystal clear!



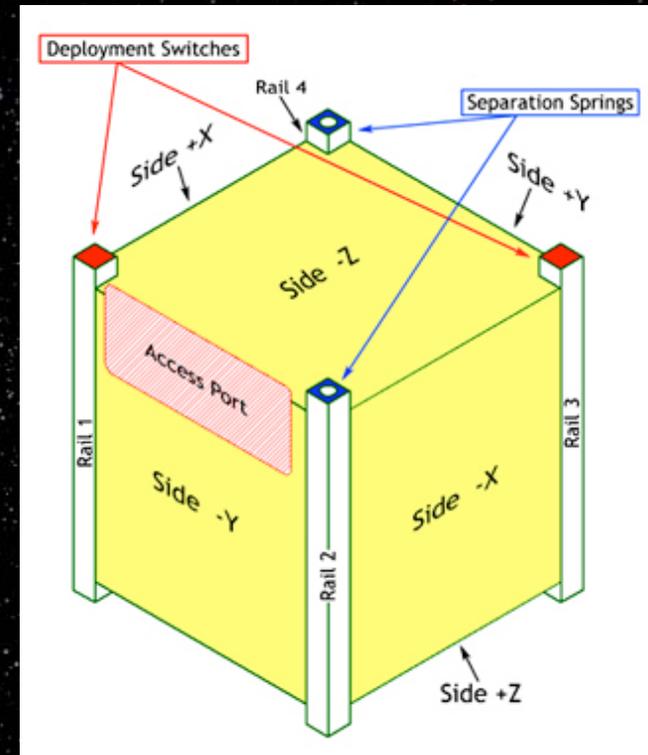
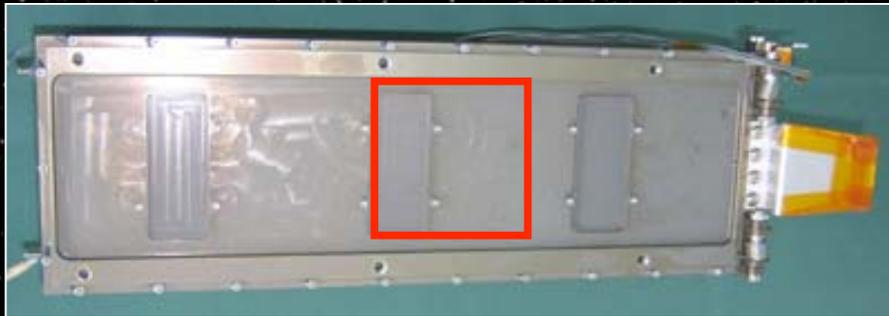
# The Ground Segment

- Start working on earth stations early!
- Should be operational well before launch
- Practice tracking other CubeSats
- Great way for new programs to get involved



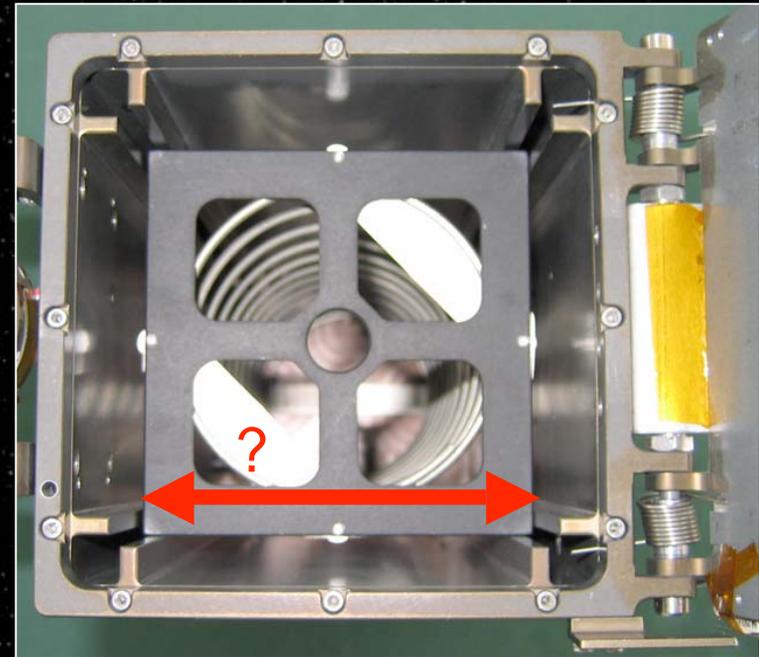
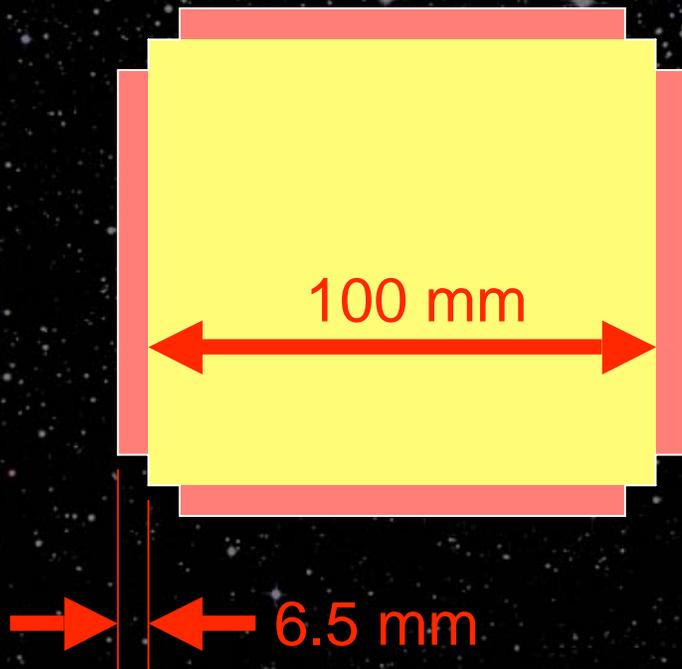
# CubeSat Specification

- Read the specification carefully
- The “top” of the CubeSat in the spec drawing actually goes in the P-POD first
- Contact us with questions or concerns!



# P-POD Interior Dimensions

- Follow dimensions outlined in the specification
- Do not encroach on your margin
- You will NOT fly if you don't fit!



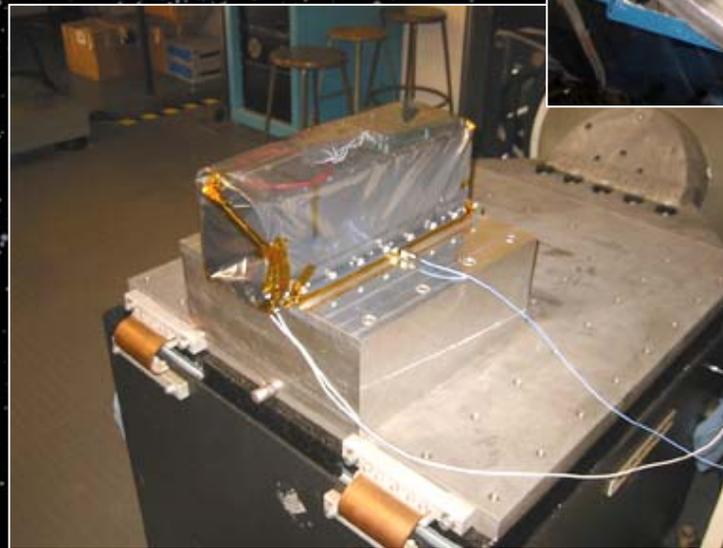
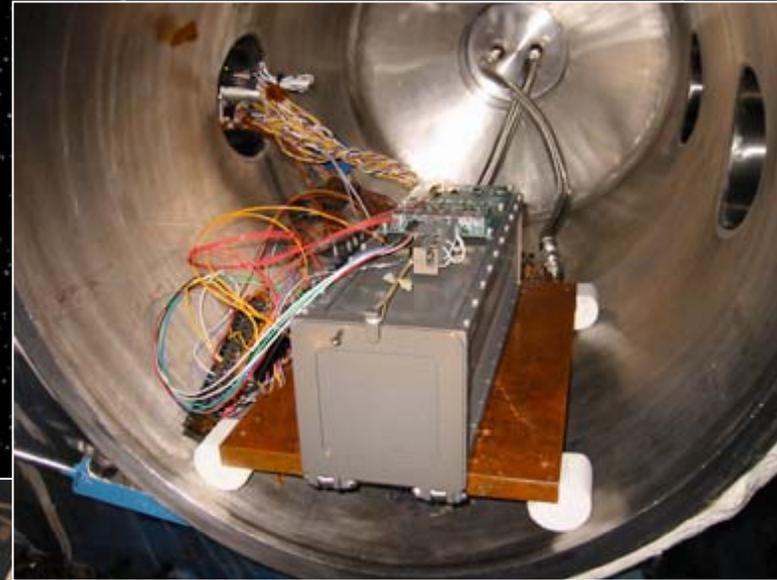
# Tap Into Resources

- Take advantage of the community
  - Different schools = different specialties
  - We can put you in touch with other schools
- Help each other out with test facilities
- Earth stations and collecting data for others



# Test Early and Often

- Test carefully/methodically
- Understand different stages
  - Prototype
  - Qualification
  - Acceptance
- Expect failures!



# Take Fit Checks Seriously

- Fit checks are for your own good...
- Go into fit checks and reviews with highest fidelity hardware possible

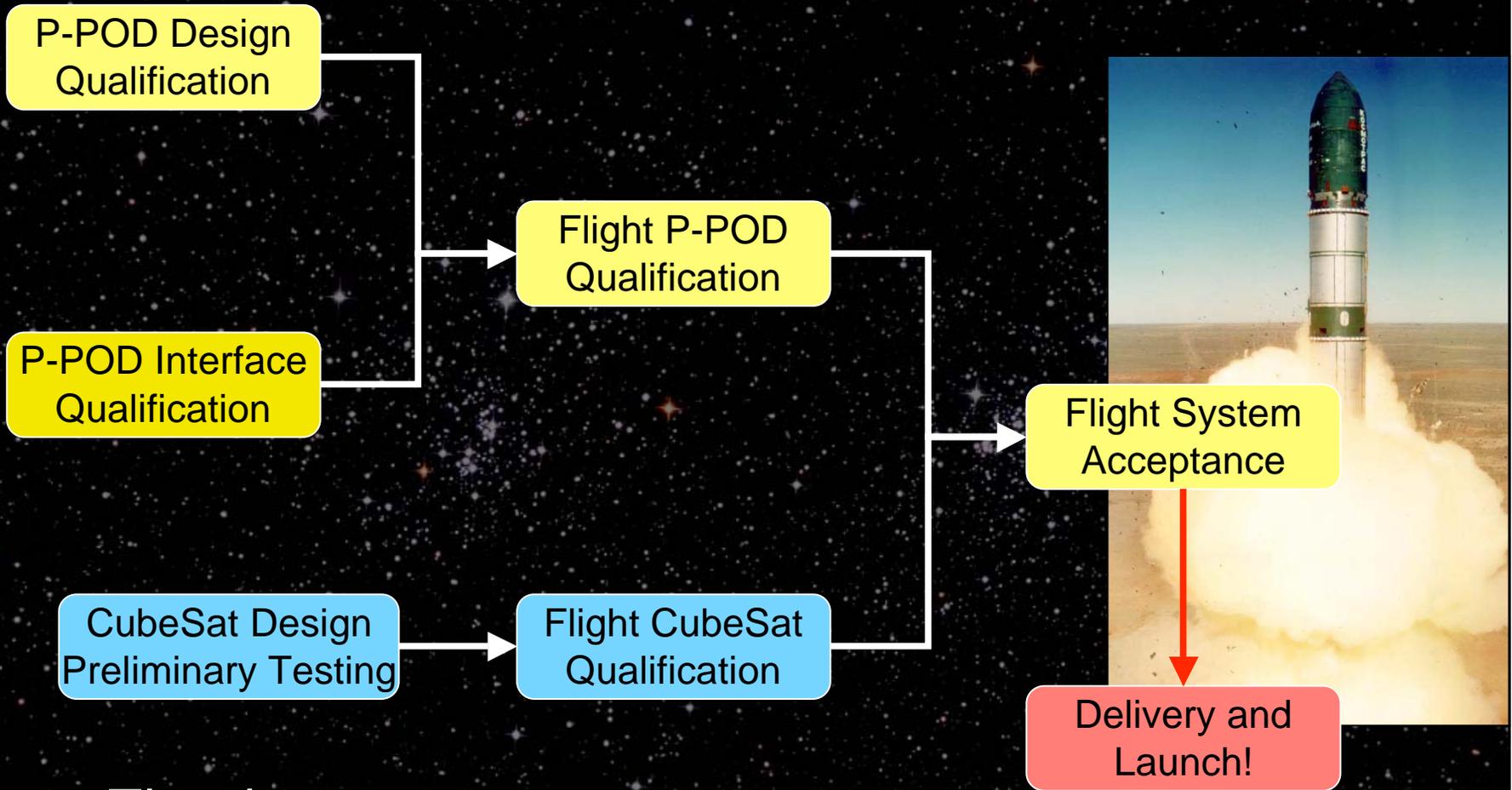


# Test Like You Fly, Fly As You Test

- Do not cut corners during testing
- Test everything exactly as it will fly
- Don't make last minute changes
- Repeatable Procedures



# Launch Flow



• Thank you...