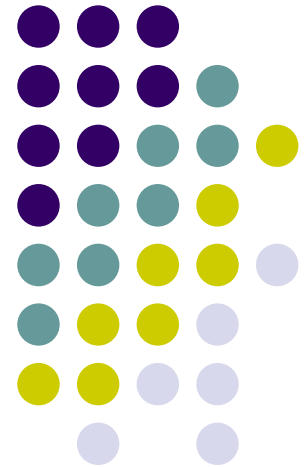
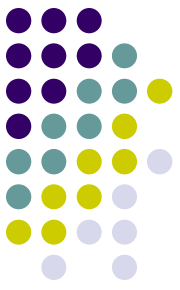


# Status of the Standards and Launch Integration Service within the US

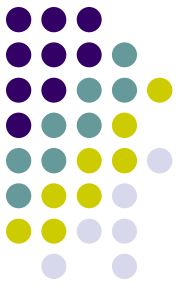




# CubeSat Initial Objectives

- Started in 1999: Stanford-Cal Poly Team
- Facilitate Access to Space
  - Rapid Development Time (1-2 years, Student Career)
  - Low-Cost
  - Launch Vehicle Flexibility
- Use Standards
- University Projects
- Industry Testbed





# Some Facts

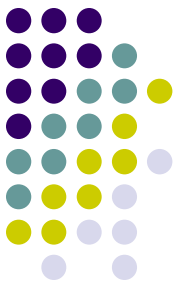
- 24 CubeSats in LEO (40 Launched)
- Over 100 Developers Worldwide
- Dedicated Workshops/Meetings
- CubeSat Industrial Suppliers



Photograph taken by AeroCube-2, April 17, 2007



# Challenges



- Moving from University to Industrial Model
  - Industry/Government Customers
  - Higher Performance/Cost Satellites
  - Increased Quality Required
  - Potential Cost Increases
- Must Maintain Access to Universities
  - Including New Developers
- Allow Risk (Failure is OK)
- Support higher launch rates
  - Address orbital debris issues
  - Ground station capability
- Maintain standard model
- Coordinate Across Community



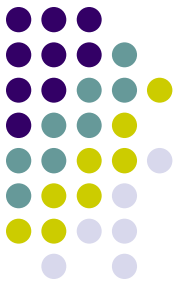
# Cal Poly's Current Launch Activities



- Provide CubeSat Access to US Launch Vehicles
  - SpaceX, OSC, ULA
- Support University Launches
  - ESA (VEGA), NASA, NSF
- Support US Government Activities
  - NASA, NRO, ARMY, . . .
- **NEEDED PARTNERS!!**
  - NPS & SRI International



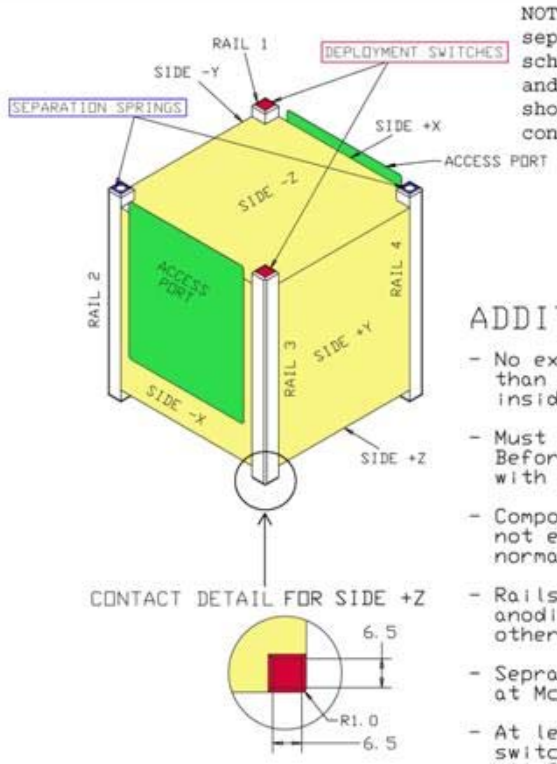
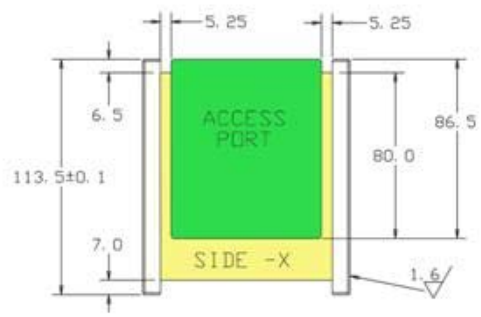
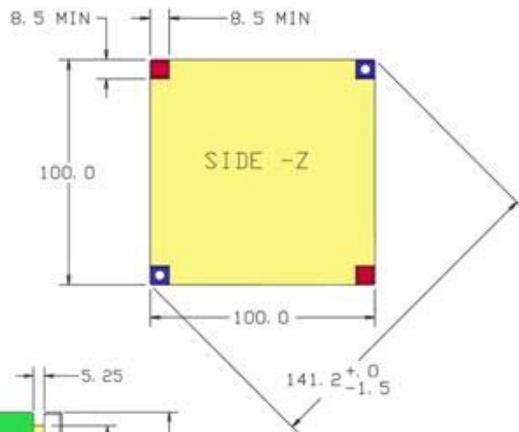
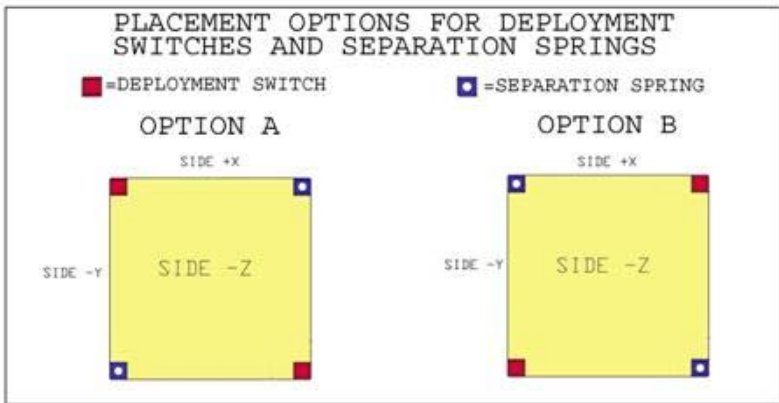
# Cal Poly-NPS-SRI Partnership



- P-POD™ Integration Services for any type of user
  - US Gov Organization, or partner countries
  - University or Industry, US or foreign
  - Centralized standard procedures and flight heritage
- Industrial, but not-for-profit Integration service
  - Low cost, rapid access to launch for all CubeSat developers
  - Create and support shared community resources
  - Avoid proprietary barriers to space access
- Interaction with Integration Team Should Start Early in the Development Process
  - Fit Check and Early Testing
  - Launch Vehicle Interfacing and Integration
  - ICD Documentation



# The CubeSat Standard



NOTE: Deployment switch and separation spring placement schemes shown in Option A and B. Deployment switches should be compatible with +Z contact points.

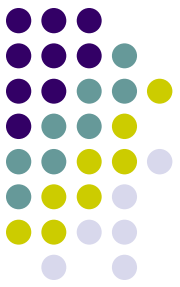
**ADDITIONAL NOTES:**

- No external components other than the rails may touch the inside of the P-POD.
- Must incorporate a Remove Before Flight pin OR launch with batteries fully discharged.
- Components on shaded sides may not extend more than 6.5 mm normal to the surface.
- Rails must be either hard anodized DR made of a material other than aluminum.
- Separation springs can be found at McMaster Carr (P/N 84985A76).
- At least one (1) deployment switch must be incorporated on all CubeSats.
- CubeSats cannot weight more than 1 kg.
- Center of gravity must be less than 2 cm from the geometric center.

<p>ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.</p> <p>ROUND ALL EDGES AND CORNERS.</p> <p>±0.1 mm DR BETTER.</p>	<p><b>CUBESAT SPECIFICATION</b></p> <p>CALIFORNIA POLYTECHNIC STATE UNIVERSITY AEROSPACE ENGINEERING DEPARTMENT SAN LUIS OBISPO, CA 93407 (805) 756 - 5087</p>	<p>REV: <b>D</b></p>
<p>DATE: August 1, 2007</p>	<p>NOT TO SCALE</p>	



# Standards Committee Established



- There are now many stakeholders including major government groups
- A standards committee was convened to allow for a controlled evolution of the Standard
  - Members include NRO, ORS, NASA (KSC and ARC), ULA, Orbital Science, SpaceX, Cal Poly
  - First formal meeting took place yesterday
- New Standard Documents for P-POD & CubeSat
  - Adopted by all Committee Members
  - Waiver Process for Deviations from the Standard
  - Cost/Restrictions for Non-Standard CubeSats