

Kentucky
Space

CubeLabSM Payload Developers Workshop

Affordable Access to Space for your ideas

July 11-15, 2011

Lexington, Kentucky

Kris Kimel
Kentucky Space



In collaboration with
NASA Kentucky
Space Grant and EPSCoR Programs

International Space Station

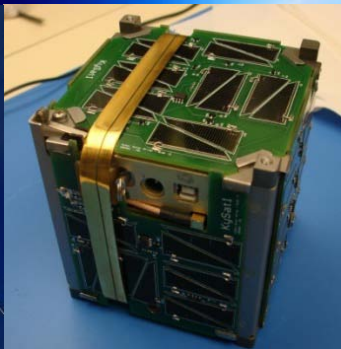


Kentucky Space Missions



Image courtesy of NASA

New NanoRacks/CubeLabSM Standard on the ISS, July 2010



First Student Built Satellites to be Launched by NASA (ELaNa/Glory) March 2011

First CubeSat Ejected into Sub-Orbital Space, March 2010



Balloon-1, July 2008
(Background Image)



Garvey
P-12A

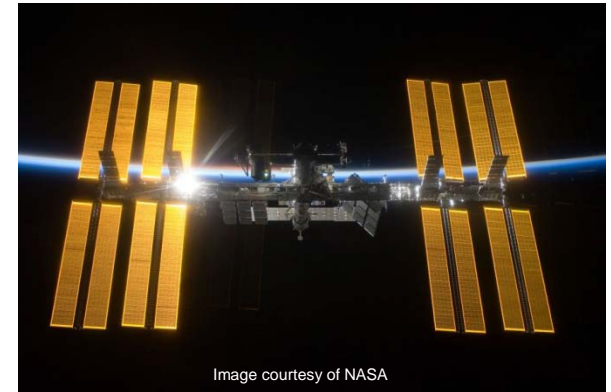


First Flight, Composite
Super Loki, December
2007



Research on the ISS

- Control for a variable that wasn't really possible before gravity
- Unique aspects of μG
 - Mass Transfer Dominated by Diffusion
 - No Sedimentation
 - Greatly Diminished Gravity Driven Convection
 - No Hydrostatic Pressure
 - Decreased Hydrodynamic Pressure



So how does this affect...

Some examples:

- **Plant Growth**

- Water Distribution in Root Zones
- Root & Stem Growth
- Gravity Perception
- Seed Exposure

- **Cell Biology**

- No low-g genetic “memory”
- Changes Observed in
 - Gene Expression
 - Virulence
 - Replication

- **Crystal Growth**

- Improved Yield Suitable for Diffraction Analysis
- Analysis Showed:
 - Increased Resolution
 - Decreased Mosaicity
 - Increased Crystal Volume

- **Materials Science**

- MicroStructure Control
- Reduced Wall Contact
- Dendrite Growth
- Directional Hardening

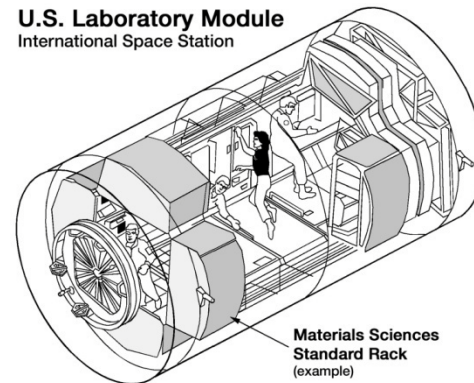
Getting On Orbit

- **Nominal**

- Attend and Petition Science Workgroup
- Receive Approval
- 18-36 Month Process to Get On Orbit
- Certify Hardware for Flight Readiness
- Schedule Operation Time
- Develop Procedures for Operation
- Support Real Time Operations
- Collect Data

- **CubeLabSM**

- Contact Kentucky Space
- Negotiate Launch Process Date with Partner NanoRacks LLC
- 6-12 Month Process to Get On Orbit
- Work with KS Team in Kentucky to Certify For Flight
- Collect Data



CubeLabSM Modules

- Low cost platform for micro-gravity research
- Repeatable Access
- Downmass Negotiable
- Based on the CubeSat and USB Standards
- ICD Available for Developers
- Currently Operating On Orbit
- Manifest Possibility on All Flights To and From Station
- Over 100kg Still Available in 2011

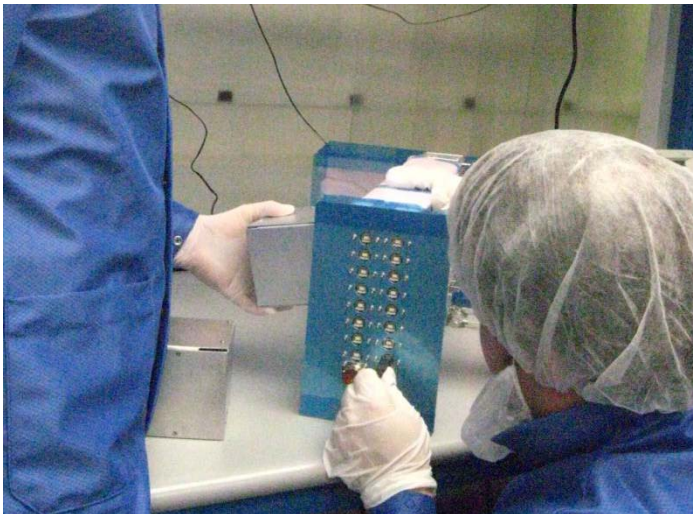


Image courtesy of NASA

CubeLabSM Process

- Work with KS Team in Kentucky
 - Proven Track Record
 - Successful Operations on the ISS
 - Other Successful Missions
- to...
 - Schedule Launch and Possible Return
 - Develop Flight Hardware
 - Ensure Hardware Meets Flight Criteria
 - Discuss Operations and Negotiate ISS Crew Time
 - Develop Procedures and Crew Training Material
 - Collect and Store Data



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This unique 4+ day workshop will cover all aspects of designing, developing, integrating and operating science experiments aboard the International Space Station (ISS) using the existing NanoRacks R&D Platform and supporting CubeLabSM modules.

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- Topics Will Include:
 - Overview of microgravity dynamics and research opportunities and the unique capabilities of the ISS.
 - Experiment options, the NanoRacks R&D Platform and CubeLabSM payload standards.
 - Designing payloads for multiple launch vehicles and for operation aboard the ISS.
 - Astronaut operations training and astronaut interaction with payloads.

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Registration Fee

\$1,450

Workshop brochures available through the general inquiries contact

Contacts

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