NanoRacks Microgravity Research Platforms: “Big Science in a Small Box”

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Who are We?

• Commercial payload services & developer

• Partners with CASIS & NASA

• ~300 payloads since 2009

• Have our own Space Act Agreement

NanoRacks has been the first to...

• 1st company to own and market their own hardware on the space station
• 1st company to coordinate deployment of a satellite from the space station
• 1st company to own and operate External ISS Platform
• 1st Kickstarter customer to get to space (ArduSatisfy)
• 1st self paying high school space project (VCS of San Jose)
• 1st electroplating in space (VCS project)
• 1st terpenes in microgravity research (Ardbeg)
• 1st national space STEM program with no NASA funding (NCESSE)
• 1st Vietnamese satellite in LEO (FPT University of Hanoi)
• 1st Israeli program on station (Fisher Program)
• 1st Saudi program on station (KACST)
• 1st commercial payload on SpaceX (Multiple)
• 1st company to place customers on all ISS launch vehicles:
  – Space Shuttle, Soyuz, Progress, ATV, HTV and SpaceX
NanoRacks Internal Science Platforms

Frames 1, 2, & 3

MixStix

Plate Reader

Microscope-3
NanoRacks Platform 1 & 2

- Platform lives in middeck locker/rack
- USB 2.0 Connection
- Provides Data & Power
- 16 Connections for NanoLabs
NanoRacks Module 24: NanoRocks

• “Learning How The Solar System Formed, from Inside the Space Station”
• Dr. Josh Colwell, Dr. Adrienne Dove, and Dr. Todd Bradley, University of Central Florida, Florida, USA
NanoRacks Module 26: Heart Effect Analysis Research Team conducting FLy Investigations and Experiments in Spaceflight (HEART Flies)

Sharmila Bhattacharya, NASA Ames
Peter Lee, Stanford University
NanoRacks Platform-3

• More power!
• Up to 50W
• USB & Serial connections
• Used with Airbus/DLR

My_BioRack Centrifuge system
NanoRacks Mix Stix

- 1-3 contained samples
- 10 mL total volume
- Wet or dry samples
Mix Stix: St. Nessan’s Co. College
Effects of microgravity on the solidification of reinforced concrete

- Re-inforced concrete in micro-g?
- Buildings on moon, etc.
- Concrete + fibers
Mix Stix: The Investigation of Countermeasures to Modulate and Augment the Immune System (UR-1)

- Five Universities
- Radiation effects on immune cells & possible countermeasures
- NASA Minority University Research and Education Program (MUREP)
NanoRacks Plate Reader

- Measures properties of materials using light absorbance or emission
- Common lab instrument
- Can use most standard microplate formats
- COTS Molecular Devices Plate Reader modified for flight
Project MERCCURI/Science Cheerleaders

- Microbiology experiment
- Project MERCCURI: Dr. Jonathan Eisen, UC Davis & graduate students
- Science Cheerleaders: Citizen Science & STEM outreach
Project MERCCURI/Science Cheerleaders

Best Sprint

- **#1** Parkway Middle School Bacillus horikoshii
- **#2** Pop Warner Chittenango Bacillus pumilus
- **#3** Mars Exploration Rover (JPL) Paenibacillus elgii
NanoRacks Microscope-3

- USB Microscope
- 20 -240X Magnification
- 5 MP pics/video
- XY Translation Stage
- Holds any low profile microplate
- LED light
- White or black background
NanoRacks External Science Platforms

External Platform

Cubesat Deployer

Kaber
NanoRacks External Platform
NanoRacks Cubesat Deployer
NanoRacks St. Thomas More School Cathedral Satellite-1 (STMSat-1)

- First PreK to 8th grade cubesat
- Fund-raisers to pay for cubesat
- Has small camera to relay images to students
- STMSat-1 website: http://www.stmsat-1.org/
NanoRacks St. Thomas More School
Cathedral Satellite-1 (STMSat-1)
NanoRacks Kaber

- For deployment of larger sats ~100 kg
- Non-cubesat formfactor
Thank You!

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