



NANORACKS

Readiness, Formations, and Resilience - New Deployment Capabilities

CubeSat Developers Workshop 2017

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OUR EXISTING SATELLITE OPPORTUNITIES



NanoRacks CubeSat Deployer (NRCSD)
Over 140 Deployed To Date

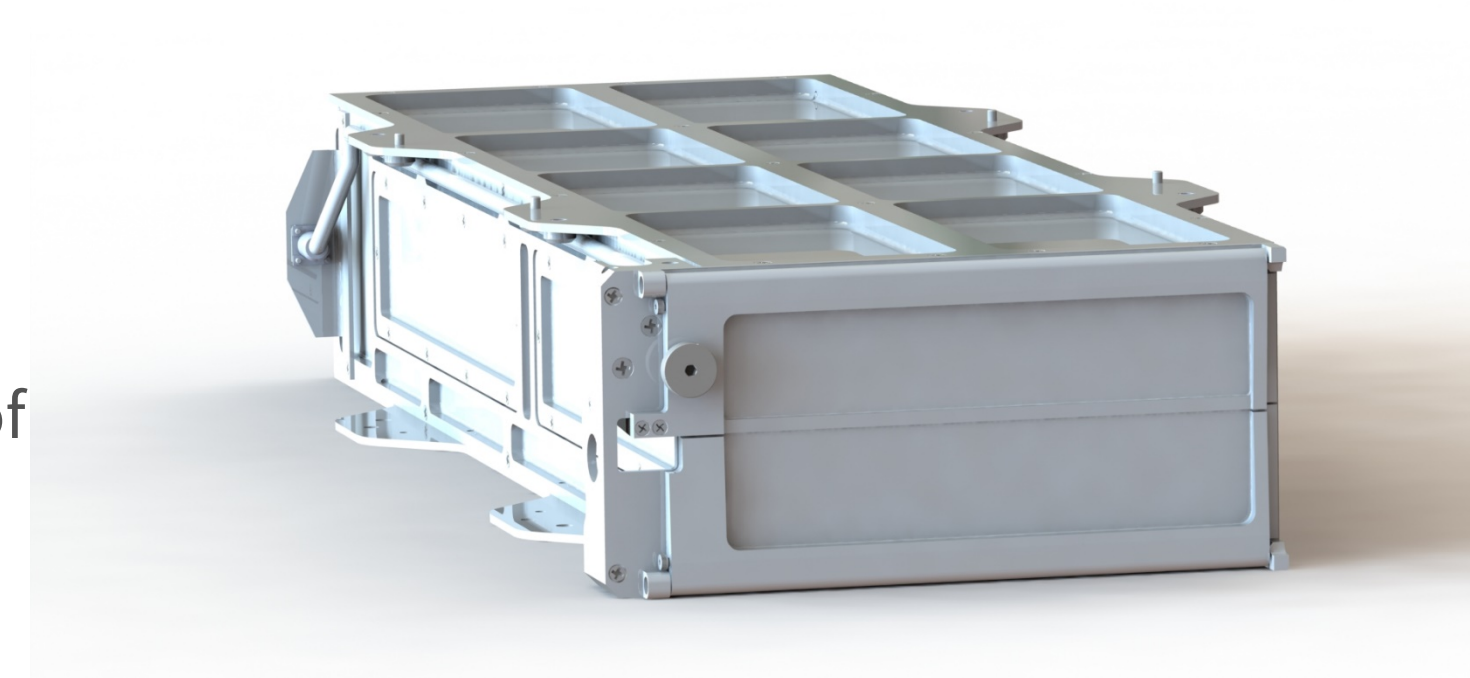


External Cygnus
Third Mission Launched OA-7



Kaber
Largest class of NanoRacks satellites to-date

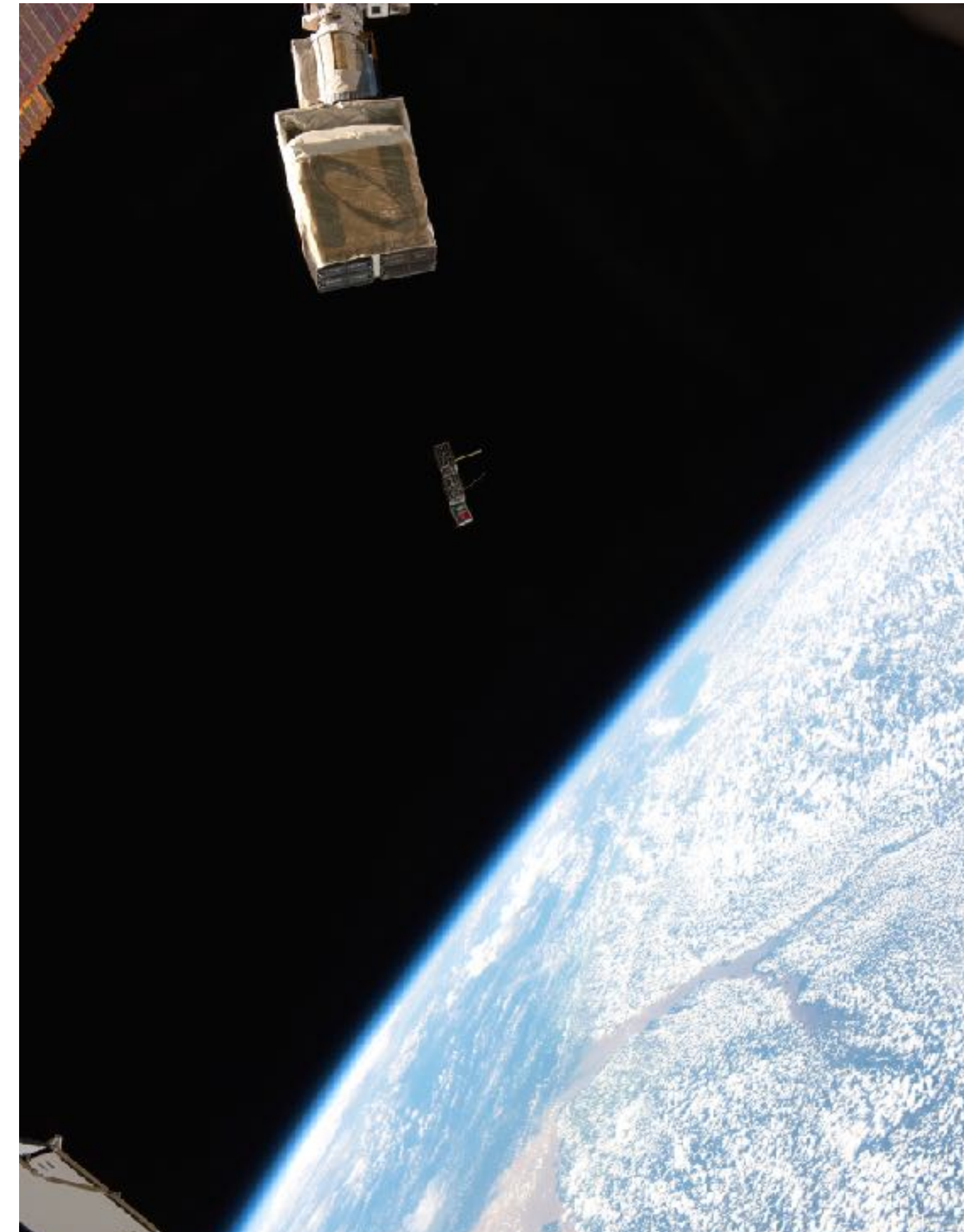
Doublewide Deployer (2x3U Form Factor)
First Mission on SpaceX-12, 3
NASA ELaNa Sponsored CubeSats: Goddard, JPL and University of Illinois





DEVELOPING CONCEPT: STASH AND DEPLOY

- NanoRacks LLC, via the Company's Space Act Agreement with NASA, has deployed nearly 150 CubeSats from the International Space Station and the Cygnus Spacecraft
- Critically, for the first time in 2016, NanoRacks stored customer satellites on the space station for six months before being deployed. All satellites functioned normally, with a battery degradation, on average, of just 2%
- **Therefore, it is possible today to send earth observation satellites to the ISS, store on station, and deploy as needed, eliminating the need to launch on demand**
- **Additionally developing 'standby' program for CubeSats ready for launch - including university satellites - to get on missions as late as possible should a gap open up**

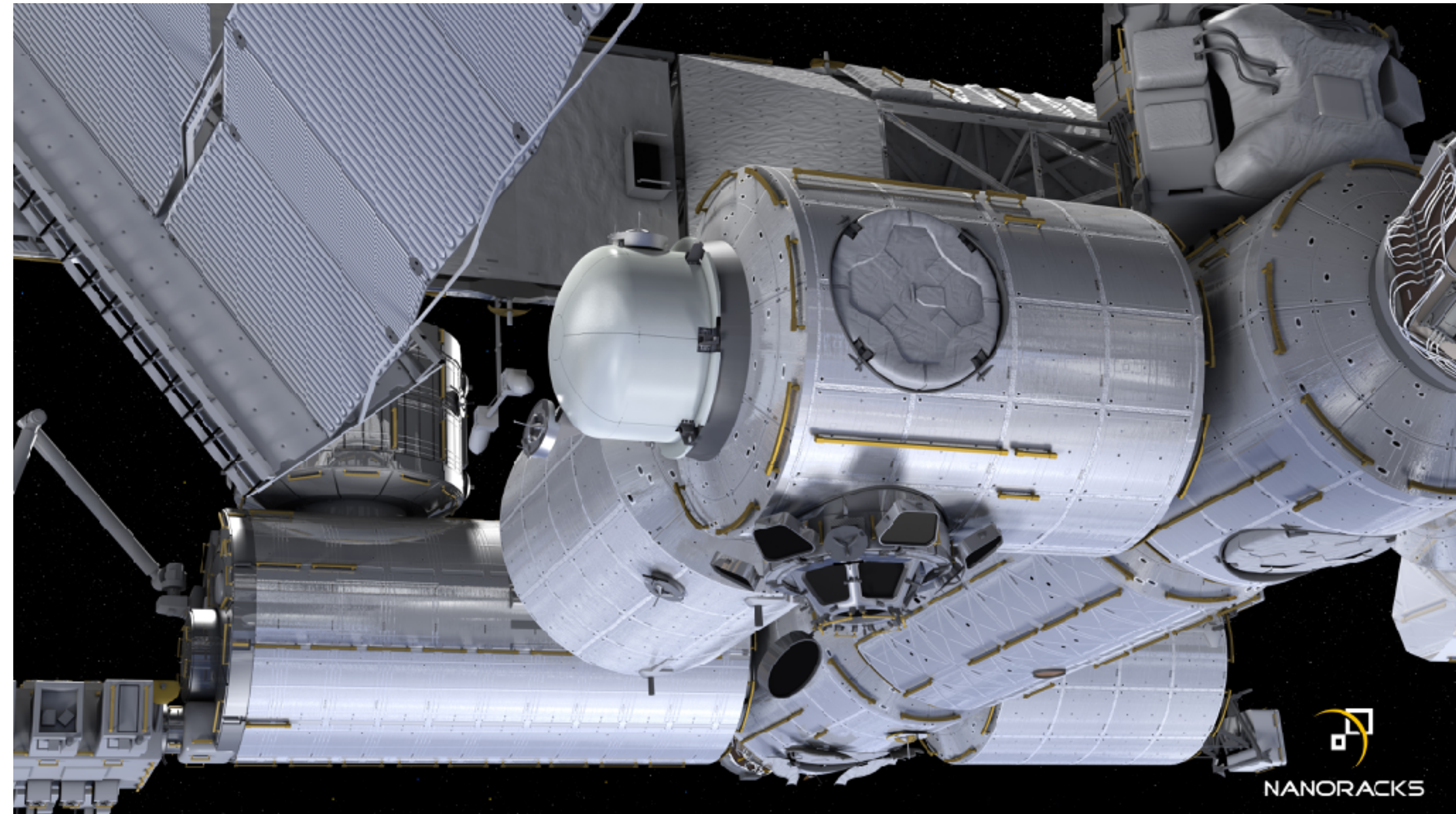


CubeSats being deployed from the NanoRacks CubeSat Deployer (NRCSD) in May 2016.

IN-SPACE SATELLITE ASSEMBLY AND DEPLOYMENT ON THE ISS



- In-space satellite manufacturing and deployment from orbital platforms has enormous strategic benefit, including:
 - Rapid responsive launch of satellites based on in-orbit or ground-based events
 - Operational resiliency
 - Ease of satellite replacement
 - Reduced risk from launch anomalies
 - No need to wade through launch bureaucracy
 - Reduced third-party knowledge of satellite configuration & mission
 - Opportunities begin with NanoRacks Airlock Module
 - Assembly operations currently being tested on Kaber-class satellite on orbit



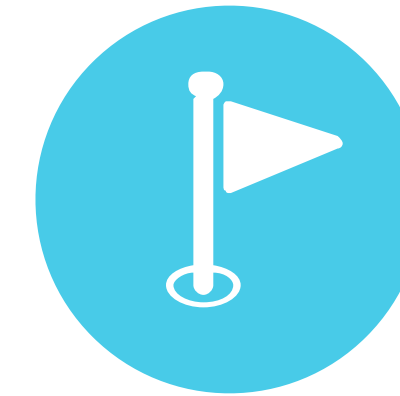
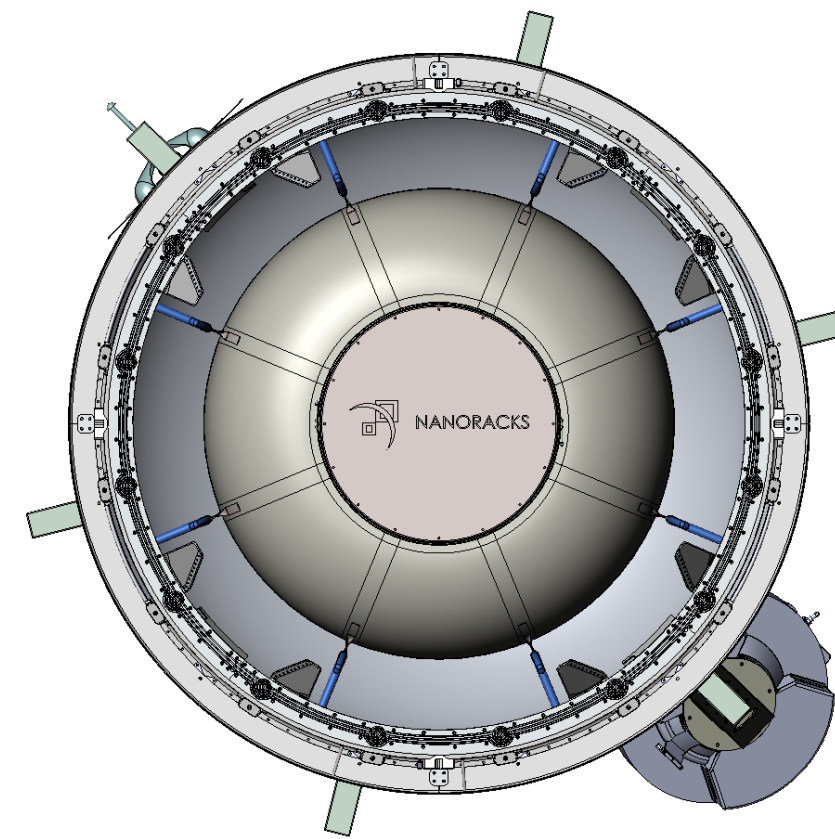
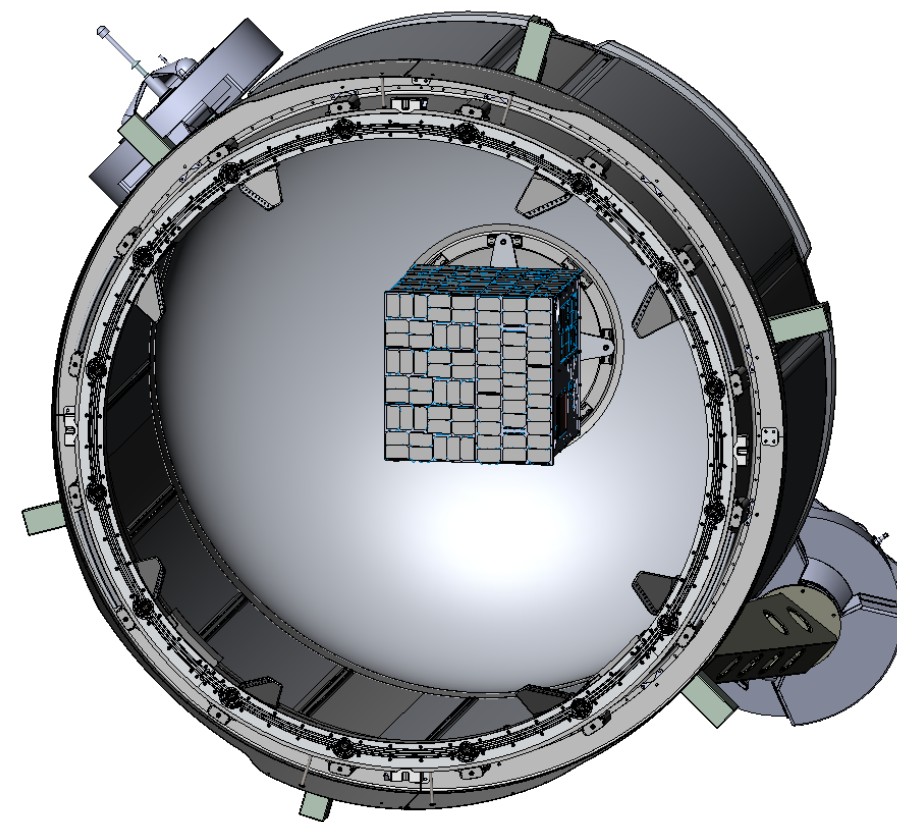
AIRLOCK



FIRST EVER COMMERCIAL AIRLOCK ON INTERNATIONAL SPACE STATION



The NanoRacks Airlock will allow for maximum operational flexibility and more control over satellite deployments and also allow for unique hosted payloads.



HOSTED PAYLOADS

Expose technology to the space environment without power, data, and physical restraints that come with smaller platforms. Test booms, release mechanisms, receivers, and long-duration exposure - without need for CubeSat form factor



SATELLITE DEPLOYMENT

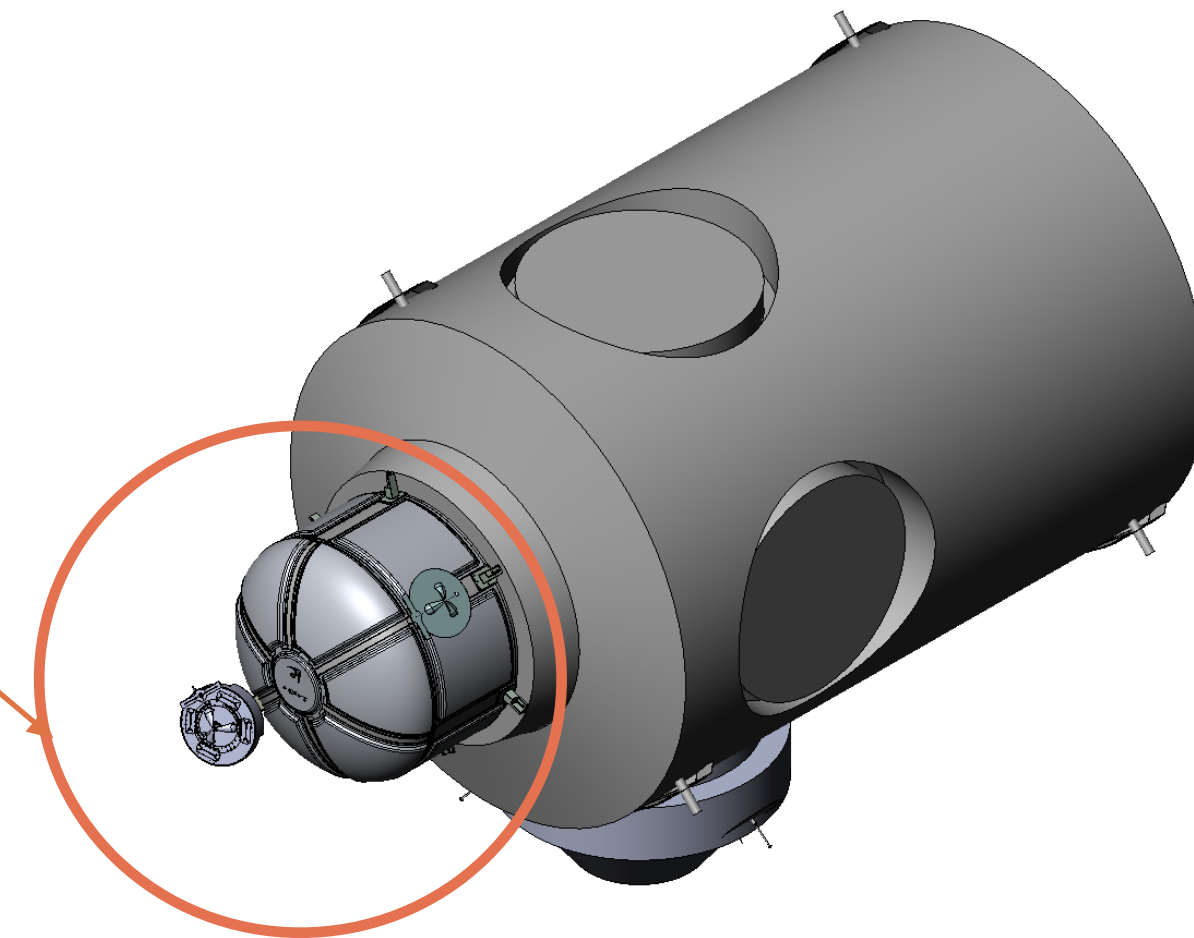
The NanoRacks Airlock has more than 144U capability per cycle for satellite deployment, including multiple types of Kaber-class payloads in one Airlock sortie



NEW TECHNOLOGIES

Our Airlock will accelerate the testing of new space-based technologies on the ISS and provide a pathway for NASA utilization as well

NanoRacks Airlock to scale, positioned on Node-3 on the ISS



Phase 1 Safety Review Completed March 2017

NOTABLE CUSTOMERS



National Center
for Earth and Space
Science Education



HAPPENING NOW ON NANORACKS EXTERNAL PLATFORM (NREP)

Second Mission In Progress

CID and DM Deployed on NREP Week of 4/24

CID - Florida Institute of Technology, Thermo Fisher Scientific

Studying effectiveness of charge-injection device (CID) can function in space, paving the way for use in studying planets orbiting around distant stars

DM-7 - Honeywell, Morehead State University

Demonstrating validation of Dependable Multiprocessing (DM), a new type of computer software system that uses several commercially available processors working together to increase computing speed and reduce errors in the space environment.

HAPPENING SINCE OA-7 LAUNCH

NanoRacks Largest CubeSat Launch to Date

38 SATELLITES

QB50 Brought to ISS!

This international consortium, coordinated by the von Karman Institute and sponsored by the European Commission, brings together universities from all over the world to study the lower thermosphere. 28 CubeSats launched on OA-7.

Quick Deployment Turnaround

The 34 internal CubeSats from the OA-7 launch on April 18 will be deployed by mid-May. External CubeSats to be deployed mid-July

We're excited that this mission also includes three satellites selected through the NASA CubeSat Launch Initiative (CSLI) as part of the seventeenth installment of the Educational Launch of Nanosatellites (ELaNa) missions.

NanoRacks External Cygnus Deployer

OA-7 is the third flagship mission of NanoRacks External Cygnus Deployer. Carrying 4 Spire Lemur CubeSats, Cygnus will deploy these satellites from 500 km after departing ISS, pending all nominal Cygnus operations.



THANK YOU

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