Accommodating Technology Demonstrations on the ISS

GEORGE C NELSON, PH.D.

JANUARY 31, 2017
The ISS is available for technology demonstrations that support NASA’s goals. These include exploration and commercialization.
The ISS is available to both NASA directed efforts as well as those from other government agencies and the private sector.

The Center for Advancement of Science in Space (CASIS) is the “front door” through which all non-NASA utilization enters the ISS program.

The Technology and Science Research Office welcomes efforts from across NASA.
What are the requirements?

- Do not hurt the crew.
- Do not hurt the vehicle.
- Design your effort to meet your needs.
New customer driven integration flow

- Tell us when you are ready to fly and we will build an integration schedule for you that accommodates your schedule.
- Along the way we will assess progress toward your goal and inform you if the target schedule is at risk.
How can ISS support my investigation or demonstration?

- Multiple facilities available.
- Pressurized and unpressurized.
- Deployable and fixed locations.
- Power, Data, Thermal, Crew Time, Upmass, Downmass are all covered by the ISS Program for accepted payloads.
External locations

- Express Logistics Carriers (ELC): Four large carriers along the truss of the vehicle holding multiple payloads with options for Zenith, Nadir, Ram and Wake exposure/viewing.

- The Japanese Experiment Module Exposed Facility (JEM-EF): 5 sites available to NASA with both zenith and nadir exposure as well as either RAM or Wake.

- The Columbus Exposed Facility (Columbus EF): Four total sites looking for forward and aft as well as starboard.

- Multiple external commercial facilities can reduce your costs for smaller investigations that largely focus on exposure.
International Space Station (ISS) External Research Facilities

ELC2 (ULF6, 2011)
AMS

ELC3

ESP-3

Keel Side

Keel Side

ELC4 (ULF5)

Columbus
External Payload Facility
(2 sites NASA, 4 sites total)

Kibo
External Facility
5 sites NASA, 10 sites total
Internal Locations

- The Express Rack is the typical location for internal ISS investigations.
- However, there exist numerous facilities, both in and out of racks that address particular investigator needs.
**Middeck Locker**

- 4 rear captive fastener attachments
- Friction hinge
- Dual door locks
- Installation tool guides on 4 corners
- Weight – 12 lbs

**Sub Rack size payload capability with standard utilities such as power, data, cooling and gases**

**International Sub rack Interface Standard Drawer**

- 4 PU (Panel Unit)
- Blind Connectors
- Locking Handles
- Weight – 27 lbs
- Rated to at least 37 lbs

**Express 8/2 Configuration**

- International Standard Payload Rack
- Secondary Structure & Subsystems

**ExPRESS Rack**

8/2 Payload Configuration (8 Middeck Lockers, 2 Powered ISIS Drawers)
Where to look for opportunities

- NSPIRES
  https://nspires.nasaprs.com/external/
- CASIS
  http://www.iss-casis.org
- Existing investigations
  https://www.nasa.gov/mission_pages/station/research
With whom should I speak?

- The appropriate (based upon funding) front door is the right place to start.
  - Technology and Science Research Office, OZ3, George Nelson, 281.244.8514 & george.nelson-1@nasa.gov
  - CASIS, http://www.iss-casis.org/About/ContactUs.aspx
- Thursday a Research Integration Manager, Brian Kelly and a Lead Increment Scientist, Yuri Guinart-Ramirez will be here to answer your questions concerning payload integration and operations on board ISS.
Important Reference Material

- Series of researcher’s guides, https://www.nasa.gov/mission_pages/station/research/researcher_guide

All can be located through your favorite search engine or by drilling through the webpages starting at nasa.gov or https://www.nasa.gov/mission_pages/station/