

## International Space Station Opportunities For SMEX 2007 Missions of Opportunity

NASA has determined that there may be payload opportunities for small space science payloads to be attached to the International Space Station. Available external attach points include both zenith and nadir pointing locations. NASA has available annual launch opportunities after 2010 on the Japanese HTV launch vehicle.

External accommodations for payloads include Express Logistics Carriers (ELCs) mounted to the ISS truss structure, the Japanese Experiment Module-Exposed Facility (JEM-EF) and the Columbus Orbiting Facility-Exposed Facility (COF-EF). Internal accommodations for smaller instruments are also available in the pressurized environment via the Window Observational Research Facility (WORF).

Payloads launched to the ISS on the ELC logistics carriers can be accommodated with dimensions up to approximately 1.25 m x 1.15m x 0.85 m and with mass up to approximately 225 kg. The ISS provides both power (120 V & 750 W, or 28V & 500 W) and data handling (6 Mbps science, 1 Mbps 1553 housekeeping) for attached payloads.

Payloads launched to the ISS on the HTV external payload pallet can be accommodated with dimensions up to 0.8 m x 1.0 m x 1.85 m and with mass up to 500 kg (including all accommodation). For ascent, the HTV can provide 50 VDC heater power up to 70W and one health monitor temperature feedback. On orbit, the JEM-EF provides power (120 V operational power up to 3KW and 120 survival power 100W), data handling (High rate fiber data line for downlink, up to 6 Mbps science Ethernet, up to 1 Mbps 1553 command line), active cooling loop connections, and structural attachment for all JEM-EF attached payloads.

The ELC and the HTV can also accommodate payloads that can be translated on-orbit to the Columbus External Facility. The Columbus-EF can accommodate payloads with dimensions up to approximately 1.25 m x 1.15m x 0.85 m and with mass up to approximately 179 kg. The ISS provides both power up to 1.25 kW via two power feeds and data handling (up to 1.55 Mbps science, 1 Mbps 1553 housekeeping data) for attached payloads.

The WORF, mounted directly over the Destiny Module Science Window in the U.S. Laboratory, will accommodate Earth and space science research utilizing an 0.8 m<sup>3</sup> payload volume. The science window is an optical quality fused silica window with over 92% transmittance in the visible and near infrared (425 to 860 nm ), over 60% transmittance in the infrared to 1100 nm, and 35-50% transmittance from 1100-2500 nm. Wavefront error of the window is less than 1/10<sup>th</sup> wave. The WORF Rack provides structural mounting, 28v power, thermal conditioning and data handling via Ethernet, and IEEE 1553.

Attached payloads must be certified for transportation and use in a human tended vehicle. Payloads would be required to complete PDR approximately 36 months before launch,

CDR approximately 24 months before launch, and be delivered for certification and integration approximately 9 months before launch.

Further information on the opportunities and constraints for ISS attached payloads may be found at [http://www.nasa.gov/mission\\_pages/station/science/nlab/platform.html](http://www.nasa.gov/mission_pages/station/science/nlab/platform.html).

For further information on International Space Station payload constraints, launch opportunities, and other technical matters, please contact Mr. Rod Jones, ISS Payloads Office, NASA Johnson Space Center, Houston, TX 77058; Telephone: (281) 244- 6187; E-mail: [pdl.helpdesk@msfc.nasa.gov](mailto:pdl.helpdesk@msfc.nasa.gov).