



# International Space Station: Payload Operations Center

The Payload Operations Center at NASA's Marshall Space Flight Center in Huntsville, Ala., provides the heartbeat for International Space Station research operations.

As NASA's primary space station science command post, the payload operations team coordinates all U.S. scientific and commercial experiments on the station, synchronizes payload activities of international partners, and directs communications between researchers around the world and their onboard experiments.

The Payload Operations Center integrates research requirements, planning science missions and ensuring that they are safely executed. It integrates crew and ground team training and research mission timelines. It also manages use of space station payload resources, handles science communications with the crew, and manages commanding and data transmissions to and from the orbiting research center.

Coordinating research operating schedules across Canada, Europe and Japan, as well as remote telescience workstations in the United States, the Payload Operations Center processes hundreds of payload commands per day. It also continuously monitors the health and status of scientific instruments deployed on the space station. Since 2001, the center has worked with 1,309 scientific investigators performing 1,251 research investigations.

The Payload Operations Center is staffed around the clock by three shifts of flight controllers.

## **Payload Operations Director (POD)**

The POD manages day-to-day operations of payloads aboard the space station. This position is the single point-of-authority to the International Space Station Mission Control Center flight director at Johnson Space Center in Houston for all of NASA's payload operations. The POD oversees team members responsible for managing payload mission planning, ground commanding of space station payloads, communications with the crew, and use of the payload support system, the video system and the data systems. The POD ensures compliance with established safety requirements, flight rules and payload regulations. The POD also leads the review and approval of all change requests to the timeline.

## **Operations Controller (OC)**

The Operations Controller is responsible for ensuring scheduled research activities are accomplished safely and on time, and managing and tracking available resources. The OC monitors troubleshooting of onboard systems to identify possible impacts to payload operations, and coordinates resolution of anomalies.

## **Timeline Change Officer (TCO)**

The TCO assesses change requests for impacts to the current science timeline, payload hardware assets and resources required for science, such

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as crew time and electrical power. The TCO also evaluates requests by scientists for changes to the experiment timeline, and then implements changes to the science operations plan aboard the station.

### **Payload Rack Officer (PRO)**

The PRO is responsible for the configuration of EXPRESS payload racks in the International Space Station's Destiny laboratory, and for coordinating the configuration of systems resources to all NASA payload racks. When a new payload is installed, the PRO configures the rack interfaces to properly support the payload. The PRO also monitors the health and status of both the payload and the rack and, if necessary, coordinates troubleshooting of the payload support structure and payload interfaces.

The PRO also is responsible for managing all ground commanding of U.S. payload systems and experiments on the station. The PRO manages the command link, receives and sends command files to the mass storage device and configures the system to allow flight controllers in the Payload Operations Center and remote users to send commands to their equipment on the space station.

### **Data Manager Coordinator (DMC)**

The Data Management Coordinator is responsible for command, control, data handling, communications and tracking for science payloads on the space station. The DMC manages the integrated high-data-rate Ku-band communications link between the ground and the station. This position manages data system traffic, downlink video, assures ground data quality with NASA users, and assesses data system change requests. The DMC ensures that the data system is properly configured to support payload operations. The DMC also is responsible for managing video coverage of research activity on the station. The DMC monitors, configures and coordinates the use of the video system.



### **Payload Communications Manager (PAYCOM)**

The PAYCOM, using the call sign, "Huntsville," is the prime communicator with the International Space Station astronaut crew regarding payload matters. The PAYCOM is responsible for enabling researchers around the world to talk directly with the crew about their experiments, and for managing payload conferences. Additionally, the PAYCOM reviews requests for changes to payload activity to assess their impact on the crew.

### **Lead Increment Science Representative (LIS Rep)**

The LIS Rep provides research priorities to the Payload Operations Center cadre for its planning and implementation of the research mission. Working with the Lead Increment Scientist, payload mission integration teams, remote research teams and other users, the LIS Rep tracks payload status and accomplishments, and manages research-related issues.

### **Stowage**

The Stowage position evaluates onboard stowage and inventory every day, ensuring the crew can find parts and materials they need for their research and experiment activities. Additionally, Stowage recommends locations where the crew should put hardware when not in use, and helps maintain a database of the location and configuration of all payload science equipment.

By serving as virtually an extra space station crew member, this team of ground-based flight controllers helps increase experiment efficiency which saves precious crew time for operations that require a human touch. The Payload Operations Center can send commands to the space station as fast as eight per second. It's the Payload Operations Center's mission to ensure each crew member has the knowledge and the resources they need on-orbit to achieve the highest possible science results.



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