

NASA Facts

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FACT SHEET

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SPACE SHUTTLE DISCOVERY (STS-116)

Space Shuttle Discovery's STS-116 mission to the International Space Station is one of the most complex ever. Seven shuttle astronauts and three station astronauts will work closely with flight controllers at NASA's Johnson Space Center, Houston, to reconfigure the station's electrical power and cooling systems. The station has been running on a temporary electrical system since 1998. In the new, permanent configuration, it will incorporate power from the Port 4 (P4) solar arrays that were installed during STS-115. Shuttle Discovery also is delivering a new station crew member and an important new element for the station's girder-like truss. The 4,000-pound Port 5 (P5) truss element will extend the left side of the overall truss, which will allow P4 solar panels to rotate. And it sets the stage for the future relocation of the P6 solar arrays. STS-116 astronaut Sunita Williams will replace Expedition 14 Flight Engineer Thomas Reiter, who will return to Earth aboard Discovery. Shuttle inspection techniques again are a priority. Two days could be added to the 12-day mission for a focused inspection of the shuttle's heat shield, known as the thermal protection system. This would be in addition to inspections on flight days 2 and 11, as well as, the 'backflip' maneuver Discovery performs before docking to allow the station's crew to photograph the shuttle's belly. *(For more details, Press Kit p. 1-9)*

CREW



Mark Polansky

Commander

- Veteran of one spaceflight, pilot on STS-98 in 2001
- Age: 50, Hometown: Edison, N.J., enjoys skiing and ice hockey



Bill Oefelein (Oh'-fe-line)

Pilot (Commander, U.S. Navy)

- First spaceflight
- Age: 41, Hometown: Anchorage, Alaska, attended the U.S. Navy Fighter Weapons School, also known as TOPGUN



Nicholas Patrick

Mission Specialist

- First spaceflight, will operate the shuttle's robotic arm
- Age: 42, Hometowns: London, England and Rye, N.Y.



Bob Curbeam

Mission Specialist (Captain, U.S. Navy)

- Veteran of two spaceflights, will perform three spacewalks
- Age: 44, Hometown: Baltimore, Md., also attended TOPGUN



Christer Fuglesang (Fyu-gull-sang)

Mission Specialist, European Space Agency

- First spaceflight, will perform two spacewalks
- Age: 49, Hometown: Stockholm, Sweden, enjoys skiing and sailing



Joan Higginbotham

Mission Specialist

- First spaceflight, will operate the station's robotic arm
- Hometown: Chicago, enjoys bodybuilding, cycling and motivational speaking



Sunita Williams

Mission Specialist (Commander, U.S. Navy)

- First spaceflight, will perform one spacewalk and replace space station crew member Thomas Reiter
- Age: 41, Hometown: Needham, Mass., enjoys bow hunting, windsurfing and triathlons



The **STS-116 patch** depicts the shuttle rising above the Earth and the space station. The U.S. and Swedish flags trail the shuttle, depicting the international composition of the crew. The seven stars of the constellation Ursa Major are used to provide direction to the North Star, which highlights where the P5 truss element will be installed on the station.

(Press Kit p. 17-26)

MISSION FIRSTS

- Before any rewiring can be done, half of the station's Port 6 (P6) solar array that has been providing temporary electricity must be folded up on flight day 5. (*Press Kit, p. 7*)
- To achieve the new power setup, ground control will shut down the entire U.S. portion of the station in stages. This complex procedure has never before been attempted. (*Press Kit, p. 46-47*)

MISSION HIGHLIGHTS (*For a day-by-day timeline of the mission, Press Kit p. 10-11*)

- **Three Spacewalks:** (*Press Kit, p. 65-70*)
 - Each will last approximately six hours. Astronauts will:
 - First spacewalk or EVA #1: On flight day 4, Curbeam and Fuglesang align and connect the P5 truss segment to P4.
 - Second spacewalk: On flight day 6, Curbeam and Fuglesang reconfigure power on channels 2 and 3 of the station's electrical system.
 - Third spacewalk: On flight day 8, Curbeam and Williams reconfigure power on channels 1 and 4 of the station's electrical system
- **Discovery delivers:** (*Press Kit, p. 71-78*)
 - P5 truss - The shuttle robotic arm will transfer the P5 to the station's robotic arm which then places the component on the truss.
 - SPACEHAB - The pressurized module contains 5,800 pounds of cargo.
 - Integrated Cargo Carrier - The unpressurized module can carry 8,000 pounds of cargo.
- **Replace & Repair Work:**
 - The external television camera on the Camera Port 3, known as the CP#3, will be repaired for use on the next shuttle mission, STS-117
 - A gyroscope on the station's treadmill known as TVIS (Treadmill Vibration Isolation System) will be repaired during the second spacewalk.
 - During the third spacewalk, a newly-designed component will be installed in the station's CDRA (Carbon Dioxide Removal Assembly).
- **Atmospheric Neutral Density Experiment** (*Press Kit, p.81*)
 - On flight day 12, two microsatellites will be launched from Discovery's cargo bay.
 - They will measure the density and composition of the low Earth orbit atmosphere.
 - The data will be used to better predict the movement of objects in orbit.

IMPROVED SAFETY

- First flight of a space shuttle main engine with an Advanced Health Monitoring System installed. (*Press Kit, p. 89*)
 - The system is designed to detect vibrations and monitor the flow of fuel within the high-pressure fuel pumps on the main engine.
 - It will be in monitor-only mode during the STS-116 mission and will not be able to shut down an engine if necessary.
 - Data from this mission will help determine whether the system will operate in "active" mode.

FACTS & FIGURES

- STS-116 is the 117th space shuttle flight, the 33rd flight for shuttle Discovery and the 20th flight to the station.
- This is the 29th nighttime shuttle launch and the first since Endeavour lifted off on STS-113 on Nov. 23, 2002.
- During an average day on the station, flight controllers give approximately 800 commands. During the highly-choreographed portion of this mission, flight days 6-8, controllers are expected to give about 4,500 commands.
- Ground teams have trained for nearly six years to ensure the mission timeline is as efficient and safe as possible.
- Approximately 16,000 people across the country contribute to NASA's Space Shuttle Program.