



STS-120: Providing a Connection to Research for the World

NASAfacts



Space Shuttle *Discovery* and the STS-120 crew will set the stage for expansion of the International Space Station's scientific research and power generation capabilities. STS-120, known as Station Assembly Mission 10A, will also deliver a new crew member to the orbital outpost.

Discovery will carry the Harmony Node 2 connecting module to the station. The crew will use robotic arms and conduct spacewalks to install Harmony, which will be the first pressurized module added to the station since September 2001. Harmony's addition sets the stage for the arrival of new research laboratories from the European Space Agency and Japan Aerospace Exploration Agency in upcoming assembly missions.

To increase the station's capacity to generate power, the STS-120 astronauts will relocate the Port 6 (P6) truss segment and solar arrays from the Zenith 1 (Z1) truss atop the station to the end of the Port 5 truss. Then, the P6's arrays will be redeployed and reactivated.

Astronaut Daniel Tani will travel to the station aboard *Discovery*. He will replace astronaut Clayton Anderson as a flight engineer on the orbital outpost. Anderson will return to Earth with STS-120, wrapping up a tour of duty on the station that began in June 2007.

STS-120 is scheduled to be a 14-day mission with five scheduled spacewalks. It will be the 120th shuttle flight and 23rd to visit the space station.



Crew

Pam Melroy is the commander of the seven-member crew. The retired U.S. Air Force colonel is a veteran of two shuttle flights to the space station – STS-92 and STS-112 – during which she served as pilot.

Melroy holds a bachelor of science in physics and astronomy degree from Wellesley College and a master of science degree in Earth and planetary sciences from the Massachusetts Institute of Technology (MIT). Melroy was an Air Force test pilot and has logged more than 5,000 hours in 45 different aircraft. Rochester, N.Y., is Melroy's hometown.

STS-120's pilot is U.S. Marine Corps Col. George Zamka. This will be Zamka's first space flight. He was born in Jersey City, N.J., and raised in New York City. Zamka received a bachelor of science degree in mathematics from the U.S. Naval Academy and a master of science degree in engineering management from the Florida Institute of Technology. Zamka, a test pilot, has logged more than 4,000 hours in 30-plus aircraft. He has also flown 66 combat missions.



STS-120 will have a total of six mission specialists -- Scott Parazynski, U.S. Army Col. Doug Wheelock, Stephanie Wilson, Daniel Tani, Clayton Anderson and Paolo Nespoli, who is from Italy and representing the European Space Agency (ESA).

Parazynski is a veteran space traveler with four space shuttle missions and three spacewalks to his credit. His previous flights include STS-66, STS-86, STS-95 and STS-100, which delivered a robotic arm, Canadarm2, to the space station. Parazynski holds a bachelor of science degree and a doctorate of medicine from Stanford University in California. Parazynski considers Palo Alto, Calif., and Evergreen, Colo., as his hometowns.

Wheelock will be making his first space flight when STS-120 launches. Before being selected as an astronaut in 1998, Wheelock served in the Army as a test pilot. He earned a bachelor of science degree in applied science and engineering from the U.S. Military Academy and a master of science degree in aerospace engineering from the Georgia Institute of Technology. Wheelock considers Windsor, N.Y., as his hometown.

Wilson traveled to the space station during STS-121 in 2006. She holds a bachelor's degree in engineering science from Harvard University and a master of science degree in aerospace engineering from the University of Texas. Prior to being selected to become an astronaut in 1996, Wilson worked with the Galileo spacecraft team at NASA's Jet Propulsion Laboratory in Pasadena, Calif. Wilson is a native of Pittsfield, Mass.

Nespoli was selected as an astronaut by the Italian Space Agency (ASI) and joined ESA's astronaut corps in 1998. STS-120 will be his first space flight. Prior to joining the corps, he worked as an engineer at ESA's European Astronaut Center in Germany. Nespoli earned a bachelor of science in aerospace engineering and a master of science in aeronautics and astronautics from the Polytechnic University of New York. He calls Verano Brianza, Milan, Italy, his hometown.

Tani made his first space flight when STS-108 delivered supplies and the Expedition 4 crew to the space station. During that flight he conducted a spacewalk. Tani, who considers Lombard, Ill., his

hometown, graduated with a bachelor and a master of science degree in mechanical engineering from MIT. Tani worked as an aerospace engineer and manager, including projects associated with NASA, before being selected to the 1996 astronaut class. Tani will become an Expedition 16 flight engineer on the space station and conclude his tour of duty when he returns to Earth with STS-122.

Anderson began his first space flight when STS-117 launched in June and became a station flight engineer two days later. He will return home with STS-120. During his stay in space, he conducted three spacewalks. Anderson holds a bachelor's degree in physics from Hastings College and a master of science degree in aerospace engineering from Iowa State University. His NASA career began in 1983. He worked as an engineer in various organizations before joining the astronaut corps in 1998. Anderson was born in Omaha, Neb., but considers Ashland, Neb., to be his hometown.

Harmony Connecting Module

Harmony, which is also known as Node 2, is 23.6 feet long and 14.5 feet wide and weighs 31,500 pounds. It was built for NASA by ThalesAlenia Space in Torino, Italy. The module will act as an internal connecting port and passageway to additional international science labs -- the European Space Agency's Columbus Research Laboratory and the Japanese Experiment Module Kibo -- and cargo spacecraft.

Harmony is a utility hub, providing air, electrical power, water and other systems essential to support life on the station. It will distribute resources from the station's truss to the Destiny lab, Columbus and Kibo.

In addition to increasing the living and working space inside the station by almost 2,666 cubic feet, its exterior will also serve as a work platform for the station's robotic arm, Canadarm2.

Launch and Docking

Discovery begins its two-day journey to the space station when it launches from Kennedy Space Center, Fla. The crew will spend flight day 2 preparing for its arrival at the station and using the shuttle's robotic arm and the 50-foot long Orbiter Boom Sensor System to inspect *Discovery's* heat shield.

On flight day 3, *Discovery* will link up to the station. Prior to docking, Melroy will guide the orbiter through a back-flip maneuver about 600 feet below the station to allow Expedition 16 crew members to take detailed photographs of the underside portion of *Discovery's* heat shield. The imagery collected from the



ground at launch and on flight days 2 and 3 will be analyzed by engineers on Earth.

After *Discovery* docks and the hatches open, the two crews will quickly go to work to prepare for the upcoming spacewalks, transfer cargo and swap out Tani and Anderson's specialized seat liners inside the emergency return Soyuz spacecraft. When Tani's seatliner is installed, it will mark the start of his tour of duty on the station.

Spacewalks and Joint Operations

On flight day 4, Parazynski and Wheelock will conduct the first spacewalk. They will prepare Harmony for its removal from *Discovery's* payload bay, retrieve an S-band antenna for return to Earth and disconnect umbilicals between the P6 and Z1 truss elements.



Crew members will use the station's robotic arm to unberth Harmony from *Discovery's* cargo bay and install it on the port side of the Unity Node 1.

The crew will enter Harmony on flight day 5 to begin outfitting the station's newest pressurized module. Also, the STS-120 crew will conduct a focused inspection of *Discovery's* heat shield, if required.

Flight day 6 features the second STS-120 spacewalk and the detachment of the P6 from the Z1. The P6, which will be grappled by the station arm, will be placed in an overnight parked position. The spacewalkers will also complete the outfitting of Harmony's exterior.

The crew will use the robotic arms on flight day 7 to move the P6 into position for installation during the flight day 8 spacewalk by Parazynski and Wheelock. The spacewalkers will assist the robot arm operators with the P6 attachment to the P5. The P6 solar array wings are scheduled to be redeployed following the spacewalk.

On flight day 9, the crews will transfer cargo and prepare for the fourth STS-120 spacewalk.

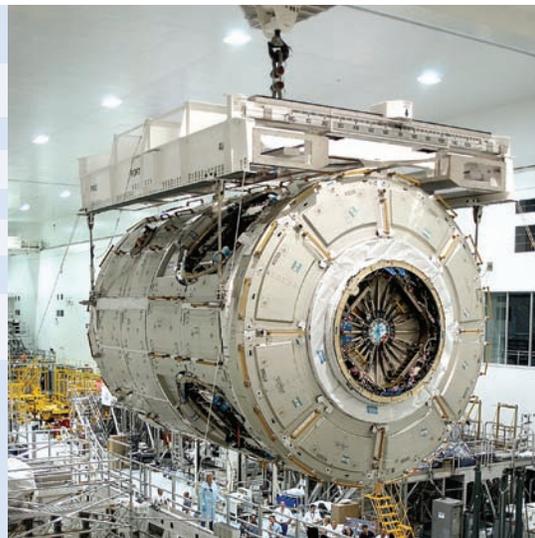
Parazynski and Wheelock will perform a demonstration of space shuttle thermal protection system repair techniques during the flight day 10 spacewalk. The primary purpose of the test is to evaluate Shuttle Tile Ablator (STA)-54 material and a tile repair ablator dispenser for potential use in a microgravity and vacuum environment.

One day later, Expedition 16 Commander Peggy Whitson and Flight Engineer Yuri Malenchenko, will conduct the fifth STS-120 spacewalk. They will complete several external station configuration tasks to prepare for Harmony's repositioning after *Discovery* leaves.

The STS-120 and Expedition 16 crews will wrap up joint operations before the hatches are closed on flight day 12.

STS-120 Quick Facts

Mission	STS-120 (120th flight)
Shuttle	<i>Discovery</i>
Station Assembly	10A (23rd shuttle flight)
Durations	14 days
Launch Site	Kennedy Space Center, Fla.
Landing Site	Kennedy Space Center, Fla.
Commander	Pam Melroy
Pilot	George Zamka
Mission Specialists	Scott Parazynski Doug Wheelock Stephanie Wilson Paolo Nespoli (ESA) Daniel Tani (to station) Clayton Anderson (from station)
Primary Payload	Harmony Connecting Module (Node 2)
Spacewalks	Five Flight day 4 (Parazynski and Wheelock) Flight day 6 (Parazynski and Tani) Flight day 8 (Parazynski and Wheelock) Flight day 10 (Parazynski and Wheelock) Flight day 11 (Whitson and Malenchenko)



Undocking and Landing

Zamka will undock *Discovery* from the station early on flight day 13 and complete a fly around of the newly remodeled space station. Later in the day, the STS-120 crew also will conduct a detailed inspection of *Discovery's* heat shield for any indications of micrometeoroid debris impacts.

On flight day 14, the shuttle crew will prepare for landing. *Discovery* is scheduled to conclude STS-120 on flight day 15 with a landing at the Shuttle Landing Facility in Florida.



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