STS-113 OVERVIEW

INT'L. SPACE STATION ASSEMBLY MISSION 11A

To Improve Life Here, To Extend Life to There, To Find Life Beyond.

That is NASA's vision.

"The best thing is we've got Americans and Russians and international crews who aren't just working together. They're actually getting along, making friends, building relationships. That's the visible part. The part that's much more important and not visible are the relationships being built on the ground."

Ken Bowersox, Expedition Six commander

"It's been so challenging for the hundreds of thousands of workers down here on the Earth to get it to go together so well. It's a tribute to the international program, both the job that NASA and the contractors are doing here, but also other nations around the world, to pull together to build something this incredible."

Jim Wetherbee, Endeavour commander

"We have so much to learn, but we have learned so much. It's amazing the strides that we have made … I think that the level of cooperation – from design people, engineering people, logistics people, flight controllers, training people, and flight crew, to management – just keeps getting better and better."

Michael Lopez-Alegria, STS-113 mission specialist

"Ninety-five percent of what's important about space station happens on the ground, when American engineers and Russian engineers get together. When a Canadian meets a Russian and they talk about what life is like in their countries. When we send somebody from Houston over to Japan, and he talks to somebody at dinner. The relationships that we're building are building a stronger world, and that's just as important as building our space station."

Ken Bowersox

To understand and protect our home planet
To explore the Universe and search for life
To inspire the next generation of explorers
…as only NASA can.

That is NASA's mission.

STS-113 Delivers, Installs P1

The major objective of the planned 11-day STS-113 mission of Endeavour is delivery of the 45-foot-long, 14-ton Port 1 (P1) Truss to the ISS. The segment, virtually identical to the one delivered on the recent STS-112/9A flight, will be attached to the port side of the centerpiece truss, the Starboard 0 (S0), which is home to the Mobile Transporter (MT), Mobile Base System (MBS) and the Canadarm2 robotic arm.

P1 continues the outboard expansion of the station's rail system in preparation for the addition of new power and international science modules in the years to come. With the addition of P1, the station's truss spans 134 feet.

P1 contains the Active Thermal Control System (ATCS) for the station that will be activated next year. This system serves a similar purpose to an automobile's radiator, except this system uses 99.9-percent pure ammonia. Additionally, the P1 houses a second Ultra High Frequency (UHF) communications system to provide enhanced and extended voice and data capability and a second mobile work platform for spacewalkers called the Crew and Equipment Translation Aid Cart (CETA). Like the S1 Truss, the P1 includes a Thermal Radiator Rotary Joint (TRRJ), which will provide the mechanical and electrical energy for rotating the station's heat-rejecting radiators.

Three spacewalks will be carried out to install and activate the truss and its associated equipment.

P1 is the third of 11 such contiguously installed truss structures that ultimately will expand the ISS to the length of a football field and increase its power through the addition of new photovoltaic

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Expedition Six Moves In

The Expedition Six crewmembers, Commander Kenneth Bowersox, Cosmonaut Nikolai Budarin and Astronaut Donald Pettit, will increase the International Space Station's science focus during their four-month increment aboard the orbiting laboratory.

They begin their stay when Endeavour docks to the orbiting laboratory on STS-113's Flight Day 3. That begins a hectic week that combines intensive briefings with their Expedition Five predecessors, transfer activities, support of three spacewalks and other elements of installation of the Port 1 (P1) Truss and just getting used to their new home.

In early December, Bowersox and Budarin will do a spacewalk of their own. During all these activities, they'll work on scientific investigations, continuing some experiments begun during Expedition Five and before, and initiating new experiments.

Bowersox and Budarin will do the December spacewalk. Pettit will provide intravehicular support, quarterbacking the spacewalk from inside the station. He also will operate Canadarm2, the station's robotic arm. The purpose of the spacewalk is to release Radiator Beam Launch Locks, reconfigure a power harness used to release the radiator panels for deployment, deploy a UHF antenna on P1, install a toolbox and a light on the Crew and Equipment Translation Aid (CETA), a kind of handcar, on the rail line on the Starboard 1 (S1) Truss, and perhaps install additional Spool Positioning Devices, ensuring that Quick Disconnect fittings will release.

With the spacewalk done, the crew

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MISSION OVERVIEW
Assembly Mission 11A

STS-113

STS-113 Delivers P1 Truss, Expedition Six Crew

If mirror image film of the STS-112 stay of Atlantis at the International Space Station (ISS) last month were available, it could be replayed to demonstrate the primary goal of Endeavour's crew to mount the next truss segment onto the station. Endeavour is to launch no earlier than Nov. 10 to install the Port 1(P1) Truss, virtually identical to the Starboard 1 (S1) Truss launched in October, and deliver the Expedition Six crew to replace the Expedition Five crew.

STS-113 (Station Assembly Flight 11A), Endeavour's mission, is the 16th dedicated to the construction of the orbiting science laboratory and the fifth crew rotation flight.

Veteran astronaut and Navy Capt. Jim Wetherbee will command Endeavour. The pilot is Air Force Lt. Col. Paul Lockhart. Two mission specialists, Navy Cmdr. John Herrington and Astronaut Mike Lopez-Alegria, will make three 6½-hour spacewalks to connect power and data cables between truss sections and install other external hardware. The Expedition Six crew, Commander Ken Bowersox and Flight Engineers Nikolai Budarin and Don Pettit, will replace Expedition Five — Commander Valery Korzun and Flight Engineers Sergei Treschev and Peggy Whitson, the first NASA ISS Science Officer.

On Flight Day 4, the day after rendezvous, Wetherbee uses the shuttle's robotic arm to lift the huge P1 Truss out of Endeavour's payload bay to hand it to the station's Canadarm2 under control of Whitson inside Destiny. She then carefully installs it on the port side of the S0 Truss. Capture bolts will structurally mate the two trusses after a claw-like device on the S0 grabs a fixture on the P1 segment.

With that done, Lopez-Alegria and Herrington go outside to begin the connection of power, data and fluid umbilicals between the newly attached trusses. They also will release launch restraints on the truss' crew platform cart and install a wireless video system transceiver on the Unity module.

The next day is highlighted by the formal handover of station command from Expedition Five to Expedition Six. The day includes inside transfer work and some off-duty time before the second spacewalk begins on Flight Day 6 to continue the connection of fluid lines between the P1 and the S0 segments and the installation of another wireless video system transceiver on the P1.

After another day of transfer work, Flight Day 8 will mark the third spacewalk, during which Lopez-Alegria and Herrington will focus on the installation of Spool Positioning Devices (SPDs) on Quick Disconnect (QD) fittings. They are being retrofitted on QDs as a precautionary to ensure the lines can be disconnected even if pressure builds up due to an internal leak. Fifty-one SPDs are being installed during this mission – 41 during the third spacewalk. Additionally, Lopez-Alegria and Herrington will install a pump used to transfer ammonia through the P1 and also connect ammonia and nitrogen lines to its Ammonia Tank Assembly.

The next day, shuttle and station crews will complete transfer work and get-ahead tasks. Shuttle and Expedition Five crewmembers say goodbye to Expedition Six before hatches are closed on Flight Day 10.

Lockhart will be at the controls as Endeavour undocks from the ISS for a fly-around of the complex for photo and television documentation.

After a day devoted to packing up gear, Endeavour's seven crewmembers will glide to a landing at the Kennedy Space Center to wrap up the orbiter's 19th mission and the 112th flight in shuttle program history.

Related Web Sites:
http://spaceflight.nasa.gov/shuttle/
http://spaceflight.nasa.gov/station/crew/
http://spaceflight.nasa.gov/station/assembly/
http://www.jsc.nasa.gov/Bios/astrobio.html
http://www.jsc.nasa.gov/Bios/cosmo.html
http://scipoc.msfc.nasa.gov/
http://www.ksc.nasa.gov/KSCDirect/index.htm

Crew Exchanges

Shuttle Mission	**STS-102**
ISS Assembly Mission	**5A.1**
Expedition One	Down
Time in Orbit	138 days
Expedition Two	Up

Shuttle Mission	**STS-105**
ISS Assembly Mission	**7A.1**
Expedition Two	Down
Time in Orbit	167 days
Expedition Three	Up

Shuttle Mission	**STS-108**
ISS Assembly Mission	**UF-1**
Expedition Three	Down
Time in Orbit	130 days
Expedition Four	Up

Shuttle Mission	**STS-111**
ISS Assembly Mission	**UF-2**
Expedition Four	Down
Time in Orbit	195 days
Expedition Five	Up

Shuttle Mission	**STS-113**
ISS Assembly Mission	**11A**
Expedition Five	Down
Time in Orbit	N / A
Expedition Six	Up

Shuttle Mission	**STS-114**
ISS Assembly Mission	**ULF-1**
Expedition Six	Down
Time in Orbit	N / A
Expedition Seven	Up

Shuttle Mission	**STS-116**
ISS Assembly Mission	**12A.1**
Expedition Seven	Down
Time in Orbit	N / A
Expedition Eight	Up

CREWMEMBERS Shuttle and ISS

STS-113

Meet the Crew

Pictured from left to right is the STS-113 crew:

Pilot: Paul Lockhart
Born April 28, 1956, in Amarillo, Texas. Graduated from Tascosa High School in 1974. Received a bachelor of arts in mathematics from Texas Tech University in 1978, and a master of science in areospace engineering from the University of Texas in 1981.

Mission Specialist 1: Michael Lopez-Alegria
Born May 30, 1958, in Madrid, Spain. Received a bachelor of science in systems engineering from the U.S. Naval Academy in 1980, and a master of science in aeronautical engineering from the U.S. Naval Postgraduate School in 1988.

Mission Specialist 2: John Herrington
Born September 14, 1958, in Wetumka, Oklahoma. Received a bachelor of science in applied mathematics from the University of Colorado at Colorado Springs in 1983, and a master of science in aeronautical engineering from the U.S. Naval Postgraduate School in 1995.

Mission Commander: James Wetherbee
Born November 27, 1952, in Flushing, New York. Graduated from Holy Family Diocesan High School, South Huntington, New York, in 1970. Received a bachelor of science in aerospace engineering from the University of Notre Dame in 1974.

Expedition Six crewmembers:

Mission Specialist 3 & Expedition Six Commander: Kenneth Bowersox
Born November 14, 1956, in Portsmouth, Virginia. Received a bachelor of science in aerospace engineering from the United States Naval Academy in 1978, and a master of science in mechanical engineering from Columbia University in 1979.

Mission Specialist 4 & Expedition Six Flight Engineer: Nikolai Budarin
Born April 29, 1953, in Kirya, Chuvashia (Russia). Graduated from the S.Ordzhonikidze Moscow Aviation Institute in 1979 with a mechanical engineering diploma. Awarded the titles of Hero of Russia, and a Pilot-Cosmonaut of the Russian Federation.

Mission Specialist 5 & Expedition Six Flight Engineer: Don Pettit
Born April 20, 1955, in Silverton, Oregon. Received a bachelor of science in chemical engineering from Oregon State University in 1978, and a doctorate in chemical engineering from the University of Arizona in 1983.

James Wetherbee
Commander

Paul Lockhart
Pilot

Michael Lopez-Alegria
Mission Specialist

John Herrington
Mission Specialist

Kenneth Bowersox
Commander,
Expedition Six

Nikolai Budarin
Flight Engineer,
Expedition Six
Rosaviakosmos

Donald Pettit
Flight Engineer,
Expedition Six

Valery Korzun
Commander,
Expedition Five
Rosaviakosmos

Sergei Treschev
Flight Engineer,
Expedition Five
Rosaviakosmos

Peggy Whitson
NASA ISS
Science Officer,
Expedition Five

P1 Truss

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modules and solar arrays.

An assembly mission in late 2003 will include relocation of the P6 Truss with the first set of U.S. solar arrays, delivered to the ISS as part of the STS-97/4A mission in December 2000. P6, with its solar wing assembly stretching 240 feet from wingtip to wingtip, is now positioned high above the Unity Node.

The arrival of the P1 marks an ongoing process of station construction that already has made substantial strides. In the fall of 2000, the ISS weighed 62 tons, was about 120 feet long and had an equivalent habitable volume to fill the average home garage.

Today, the ISS has habitable volume equal to that of a three-bedroom house. It consists of six modules, the world's most complex robotic arm for assembly and a rail system that eventually will span the 356-foot length of the station's truss structure.

As the station enters its fifth year since the first segment was launched Nov. 20, 1998, it has grown to include 19 elements representing contributions from all of the International Partners involved in the global project.

The ISS is 171 feet long, 240 feet wide, 90 feet high and has a mass in space of about 197 tons. The Destiny Lab has five scientific experiment racks. Experiments representing life sciences, material sciences and Earth observation studies are yielding a huge amount of data for researchers on Earth.

The three spacewalks on STS-113 to install and connect P1 will bring to 49 the number of spacewalks conducted for ISS assembly and maintenance. More than 300 hours in spacewalking time will have been devoted to ISS assembly and maintenance by the time STS-113 is completed.

Acknowledged as the most complex engineering project in history, the ISS continues its expansion to accommodate new scientific modules and solar arrays to provide the power needed to run thousands of systems and scientific investigations from every corner of our planet.

Station assembly has gone well, in terms of safety — NASA's No. 1 priority — and in placing in orbit, piece by piece, a spacecraft of unprecedented size and complexity.

Assembly to this point has included a series of challenging missions taking into orbit station modules and other station elements, as well as equipment and supplies. The equipment and supplies support not only the station crews, but the increasing scientific activity on the station as well.

The P1, with the S0 and S1 Truss segments, are bringing the station toward a new level of maturity that promises growing benefits as we continue humanity's exploration and development of space.

Expedition Six

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will be able to focus more on science — as the ISS begins to hit its stride as a unique, international research facility capable of improving human knowledge in areas as diverse as longer space voyages to physical and biological processes which could improve life on Earth.

Intense investigations of various aspects of human physiology will continue. Many of the experiments look at effects of long-term spaceflight, using crewmembers as subjects. Others use the microgravity of low-Earth orbit for basic scientific studies as well as investigations of processes that could be used in manufacturing with direct benefits to people on Earth.

Expedition Six will start four new science investigations. Two, in the Microgravity Science Glovebox, look at materials processing. A third is a microgravity physiological study looking at lower body muscles, and the fourth, a Protein Crystal Growth Single-locker Thermal Enclosure System (PCG-STES), is a revamped veteran of previous expeditions.

Eight experiments will be returned to Earth aboard STS-113 while 16 continue aboard the station from Expedition Five or earlier.

Expedition Six crewmembers will devote more than 240 hours to station scientific investigations, bringing the total of crew research hours to about 1,250 since continuous ISS human presence began in November 2000. Far more research time has been accumulated by experiments controlled by investigators on the ground — total hours should be well over 100,000 by the end of Expedition Six.

A new Progress cargo carrier is scheduled to arrive in late February. In early March, Atlantis will visit during STS-114, bringing the first other humans Expedition Six crewmembers have seen since Endeavour undocked after bringing them to the station. Among them will be their Expedition Seven replacements.