

# Facts



National Aeronautics and  
Space Administration

**John F. Kennedy Space Center**  
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## STS-101/Atlantis

### Newly Upgraded Shuttle To Dock With International Space Station

Space Shuttle Atlantis - the most updated Space Shuttle ever to fly with more than 100 new modifications, including a state-of-the-art "glass cockpit" - will dock with the International Space Station, setting the stage for the arrival of the Russian-made Zvezda service module this summer.

Zvezda, scheduled for launch in July, will serve as the early living quarters and lab space for the first long-duration crews to reside aboard the Station beginning in the fall.

The Atlantis crew will perform maintenance tasks on board the Station and deliver approximately one ton of a variety of logistics and supplies to the orbiting outpost. Maintenance tasks will include replacing up to four new batteries and associated electronics in the Russian Zarya control module.

Four cooling fans, three fire extinguishers, 10 smoke detectors and an on-board computer will also be installed on Zarya. In addition, a suspect radio frequency power distribution box will be replaced on Unity's six-sided docking node.

Equipment includes personal clothing and hygiene gear, medical and exercise equipment, computer equipment and printers, and hardware for the Station's Ku-band communication system. Also to be delivered: a centerline camera for Unity's common berthing mechanisms to which other Station components will be attached.

After docking, one six-and-a-half hour spacewalk is planned. The Russian "Strela" cargo boom, which will assist in further station assembly and outfitting, will be installed on the outside of Zarya, and a faulty radio antenna on Unity will be replaced.

The International Space Station represents a global partnership of 16 nations. The million-pound Station will include six laboratories and provide more space for research than any spacecraft ever built. Internal volume of the Station will be roughly equal to the passenger cabin volume of a 747 jumbo jet.



More than 40 space flights and multiple space vehicles - the Space Shuttle, the Russian Soyuz rocket, the Russian Proton rocket, the European Space Agency's Ariane 5 and the Japanese H-II rocket - will deliver the various Space Station components to Earth orbit. Assembly of the more than 100 components will require a combination of human spacewalks and robot technologies. When the ISS is completed, an international crew of up to seven will live and work in space for durations of three to six months.

STS-101 will also feature the first flight of the new Shuttle "glass cockpit," technically called the Multifunction Electronic Display Subsystem. This new system replaces obsolete instruments and three monochrome computer screens with 11 full-color graphical displays. The new cockpit weighs less, uses less electricity, provides more backup instruments and sets the stage for a future "smart cockpit" now in development for the Shuttle.

After a 10-month refurbishment period, Atlantis' more than 100 new modifications include: an airlock relocated to the payload bay to prepare for Station assembly flights; an updated communications system; installation of several weight reduction enhancements; additional protection for the cooling

system; and strengthening of the crew cabin floor.

STS-101 will take flight with the 98th Shuttle launch. The 21st flight of Atlantis will begin with a liftoff from Launch Pad 39A. Atlantis will ascend at a 51.6-degree inclination to the equator for direct insertion into orbit. The mission is scheduled for ten days.

Landing is planned for Kennedy Space Center's Shuttle Landing Facility.

## The Crew

Commander James Halsell Jr. (Col., USAF), a veteran of four space flights, has logged over 1,021 hours in space. He was pilot on STS-65 and STS-74 and was mission commander on STS-83 and STS-94. From February-August 1998, he served as NASA Director of Operations at the Yuri Gagarin Cosmonaut Training Center in Star City, Russia.

The Louisiana native graduated first in his test pilot school class and has performed test flights in F-4, F-16 and SR-71 aircraft. He has a bachelor of science degree in engineering from the United States Air Force Academy, a master of science degree in management from Troy University and a master of science degree in space operations from the Air Force Institute of Technology. He became an astronaut in July 1991.

Pilot Scott Horowitz (Lt. Col., USAF), Ph.D., has flown as pilot on two other missions, STS-75 and STS-82. Born in Philadelphia, Horowitz considers Thousand Oaks, Calif., to be his hometown.

Horowitz has a bachelor of science degree in engineering from California State University at Northridge and master of science and doctorate degrees in aerospace engineering from Georgia Institute of Technology. He served as a research scientist in the aerospace industry and was a professor for two universities. During his Air Force career, Horowitz served as a T-38 instructor pilot, an F-15 fighter pilot and a test pilot for A-7s and T-38s. Horowitz began his astronaut training in August 1992.

Mission Specialist Susan J. Helms (Lt. Col., USAF) is veteran of three space flights, STS-54, STS-64 and STS-78. She was born in Charlotte, N.C., but considers Portland, Ore., to be her hometown.

Helms has a bachelor of science degree in aeronautical engineering from the U.S. Air Force Academy and a master of science degree in aeronautics and astronautics from Stanford University. As a flight test engineer, Helms has flown in 30 different types of U.S. and Canadian military aircraft. She became an astronaut in July 1991.

Mission Specialist Yuri Vladimirovich Usachev is a cosmonaut for the Russian Aviation and Space Agency. During his two stays aboard the Russian space station Mir, Usachev logged 376 days in space and performed six spacewalks. This is his first Space Shuttle flight.

Usachev was born in Donetsk, Rostov on Don

Region, Russia, and has a degree in engineering from Moscow Aviation Institute. Upon graduation, he went to work for Energia, participating in groups working with EVA training, future construction in space, public relations and ergonomics. He was chosen as a cosmonaut candidate in 1989.

Mission Specialist James S. Voss (Col., USA, ret.) is a veteran of three space flights. He flew as a mission specialist on STS-44 and STS-53 and was the payload commander on STS-69. He was born in Cordova, Ala., but considers Opelika, Ala., to be his hometown.

Voss earned a bachelor of science degree in aerospace engineering from Auburn University and a master of science degree in aerospace engineering sciences from the University of Colorado in 1974. He has worked at the Johnson Space Center since November 1984 and was selected as an astronaut candidate by NASA in June 1987. Voss and Williams will conduct the space walk on the fourth day of the STS-101 mission.

Mission Specialist Mary Ellen Weber, Ph.D., has made one previous spaceflight, STS-70. She was born in Cleveland, but Bedford Heights, Ohio, is her hometown.

Weber has a bachelor of science degree in chemical engineering from Purdue University and a Ph.D. in physical chemistry from the University of California at Berkeley. She worked in research and development in the computer chip industry before being selected for astronaut training in 1992.

Mission Specialist Jeff Williams (Lt. Col., USA) will be making his first space flight. He was born in Superior, Wis., but considers Winter, Wis., to be his hometown.

Williams has a bachelor of science degree in applied science and engineering from the U.S. Military Academy, a master of science degree in aeronautical engineering from the U.S. Naval Postgraduate School and a master of arts degree in national security and strategic studies from the U.S. Naval War College. Williams, who served as a test pilot, has logged approximately 2,000 hours in more than 50 different aircraft. He was selected for an Army assignment at Johnson Space Center in 1987 and for astronaut training by NASA in May 1996.

### Related NASA web sites

Mission and crew press kit:

[www.shuttlepresskit.com/](http://www.shuttlepresskit.com/)

Mission and crew - Johnson Space Center:

[spaceflight.nasa.gov/](http://spaceflight.nasa.gov/)

Shuttle countdown - Kennedy Space Center:

[www.ksc.nasa.gov/shuttle/countdown/](http://www.ksc.nasa.gov/shuttle/countdown/)

Multimedia prelaunch guest presentation:

[www-pao.ksc.nasa.gov/kscpao/briefing/](http://www-pao.ksc.nasa.gov/kscpao/briefing/)