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STS-106/Atlantis

Preparation of the International Space Station for First Resident Crew

In a further step toward permanently living and working in space, Space Shuttle Atlantis will visit the third brightest star in Earth's sky – the International Space Station – to prepare the orbiting outpost for the arrival of its first international crew.

Space Shuttle Atlantis will once again return to space on its second of back-to-back missions to the International Space Station (ISS). Mission STS-106 will prepare the ISS for its first resident crew and begin the outfitting of the newly arrived Zvezda Service Module launched this past July.

Zvezda will serve as the support and control components for the rest of the Station as well as the early living quarters and lab space for the first long-duration crew, “Expedition One,” to reside aboard the Station beginning this fall. The Zvezda will serve as the support and control components for the rest of the Station. After docking with the Station, the seven-member crew of Atlantis will perform support tasks on orbit, transfer supplies and prepare the Zvezda living quarters by unloading supplies from a double SPACEHAB module in the rear of Atlantis’ cargo bay and from the newly arrived Russian Progress resupply ship docked to the aft of Zvezda.

In addition, Atlantis’ Mission Specialists, Ed Lu and Yuri Malenchenko will perform a six-and-a-half hour Extravehicular Activity (EVA) or spacewalk. The primary goal of the EVA is to connect through the electrical lines and data cables from the Service Module to the rest of the Station. This is only the second time there has been an astronaut- cosmonaut-team to perform a space walk from the Space Shuttle.

Atlantis will dock with the Station on Flight Day 3. During the EVA, Mission Specialist Rick Mastracchio will maneuver the Shuttle’s robotic arm to position the EVA crew for the installation of a magnetometer on the outside of the module. The magnetometer is like a three-dimensional compass that is sensitized to tell the orientation of Zvezda and the entire Station with respect to Earth.

After completion of the EVA, the Space Station will be stocked with basic life-support systems such as 784 lbs. of water, 858 lbs. of food, a 13-lb. food warmer and numerous crew safety items. In addition, removal and replacement of two Functional Cargo Batteries (FGB) or Zarya module batteries will be undertaken in preparation for mission STS-92. The crew will also install the ergometer or bicycle, and treadmill that Station crews will use to keep in shape. During the five-day transfer, the crew will move nearly 5,000 lbs. of Russian and U.S. hardware and equipment from the SPACEHAB module to the Space Station.

After completion of tasks, Atlantis will undock from the Station and conduct a flyaround to document the exterior of the Station with photography. Engineers on Earth will use the photographs to study the effects of the space environment on the Station for future EVA planning.

STS-106 will take flight with the 99th Shuttle launch. The 22nd flight of Atlantis will begin with a liftoff from KSC’s Launch Pad 39B. Atlantis will ascend at a 51.6-degree inclination to the equator for direct insertion into orbit. The mission is scheduled to last for 10 days. Landing is planned for KSC’s Shuttle Landing Facility.

The Crew

Veteran commander Terrence W. Wilcutt (Col., USMC) has logged more than 724 hours in space on three Shuttle missions. Missions include STS-68, which was part of NASA's Mission to Planet Earth; STS-79, the fourth in the joint American-Russian Shuttle-Mir series of missions; and STS-89, which included the eighth Shuttle-Mir docking mission. Prior to joining NASA, Wilcutt was assigned as a test pilot and project officer for Strike Aircraft Test Directorate (SATD) at the Naval Aircraft Test Center in Patuxent River, Md. There, he flew 4,400 flight hours in more than 30 different aircraft. He was selected as an astronaut candidate by NASA in January 1990.

Born in Russellville, Ky., Wilcutt graduated from Western Kentucky University with a bachelor of arts degree in mathematics. After teaching math in a local high school, he entered the Marine Corps. Wilcutt attended the Naval Fighter Weapons School (Topgun) and then served as an F/A-18 fighter weapons and air combat maneuvering instructor. He was selected to attend US Naval Test Pilot School were he earned the title "Distinguished Graduate."

Pilot Scott D. Altman (Cmdr., USN) previously flew as pilot on STS-90 and has logged more than 381 hours in space. STS-90, Neurolab, was a 16-day Spacelab flight during which the seven-person crew aboard Space Shuttle Columbia served as both experiment subjects and operators for 26 individual life science experiments focusing on the effects of microgravity on the brain and nervous system.

Altman was born in Lincoln, Ill., but considers Pekin, Ill. to be his hometown. He received a bachelor of science degree in aeronautical and astronautical engineering from the University of Illinois, and a master of science degree in aeronautical engineering from the Naval Postgraduate School. Altman was selected as an astronaut candidate in December 1994 and has logged more than 3,400 hours in more than 40 types of aircraft.

Edward Lu (Ph.D.) served as mission specialist on STS-84, NASA's sixth Shuttle mission to rendezvous and dock with the Russian Space Station Mir. Lu traveled 3.6 million miles in 144 orbits of the Earth, logging a total of 221 hours and 20 minutes in space. Before joining NASA, Lu was a postdoctoral fellow at the Institute for Astronomy in Honolulu, Hawaii. Since that time, Dr. Lu has developed a number of new theoretical advances that have provided for the first time a basic understanding of the underlying physics of solar flares.

Lu was born in Springfield, Mass., but considers Honolulu, Hawaii, and Webster, N.Y., to be his hometowns. He earned a bachelor of science degree in electrical engineering from Cornell University and a doctorate in applied physics from Stanford University. He was selected by NASA as an astronaut in December 1994.

Mission Specialist Yuri Ivanovich Malenchenko (Col., Russian Air Force) served as commander of Mir 16 and logged 126 days in space, including two space walks totaling 12 hours. During his flight, he also controlled the first manual docking of the Russian Progress spacecraft with the Station.

He was born in Svetlovodsk, Kirovograd Region, Ukraine and graduated from S.I. Gritsevets Kharkov Higher Military Aviation School with a pilot-engineer's diploma and from Khukovsky Air Force Engineering Academy. After graduating from Military Aviation School, he served as pilot, senior pilot and multi-ship flight lead before being assigned to the Cosmonaut training center.

Mission Specialist Boris V. Morukov (M.D., Ph.D.) will be making his first flight aboard STS-106. He was born in Moscow, Russia and received a doctorate in medicine from the 2nd Moscow Medical Institute (now Moscow Medical University).

For more than 20 years, Morukov has been involved in providing medical operations support for manned space flights. He was first selected for medical-cosmonaut service in 1976. As a cosmonaut-physician Morukov completed medial training in cardiology, gastroenterology, otolaryngology, stomatology, opthalmology, and cardiopulmonary resuscitation.

Mission Specialist Richard A. Mastracchio also will be making his first Shuttle flight. From 1993 until 1996, he worked as an ascent/entry Guidance and Procedures Officer (GPO) in Mission Control at NASA's Johnson Space Center, Houston, Tx. In that capacity he had both pre-mission and real time Space Shuttle support responsibilities in the areas of onboard guidance, navigation and targeting. During that time, he supported 17 missions as a flight controller.

Born in Waterbury, Conn., Mastracchio received a bachelor of science degree in electrical engineering and computer science from the University of Connecticut, a master of science in electrical engineering from Rensselaer Polytechnic Institute, and a master of science degree in physical science from the University of Houston-Clear Lake. In April 1996, he was selected as an astronaut candidate by NASA.

Mission Specialist Daniel C. Burbank (Lt. Cmdr., USCG) is currently working on technical issues for the Astronaut Office Operations Planning Branch and the International Space Station at Johnson Space Center. His first assignment as an astronaut is aboard the STS-106 flight. Before joining NASA, Burbank logged more than 3,000 flight hours, primarily in coast guard helicopters. He has flown 1,800 missions of which more than 300 were search and rescue missions.

Born in Manchester, Conn., Burbank considers Tolland, Conn. to be his hometown. Burbank received a bachelor of science degree in electrical engineering from the U.S. Coast Guard Academy, and a master of science in aeronautical science from Embry-Riddle Aeronautical University. He was selected by NASA as an astronaut in April 1996.