NASA Facts

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STS-112/Atlantis

ISS to Receive First Starboard Truss Segment and CETA Cart

The International Space Station (ISS) will receive a new truss segment, additional assembly components and radiators and new science experiments during Mission STS-112, the 15th ISS assembly mission.

It is the 26th flight of Atlantis and is the 111th Space Shuttle flight to date. The six-member crew, along with several Station components and science experiments, will ride to the Station aboard Atlantis.

Primary payloads on Mission STS-112 include the S1 Integrated Truss Segment (ITS) and a Crew Equipment Translation Aid (CETA) cart.

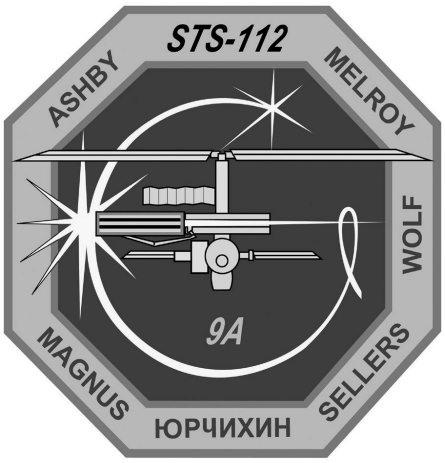
During Mission STS-112, mission specialists will use the Station's robotic arm to transfer the S1 Truss from Atlantis' payload bay and attach it to the starboard side of the S0 Truss on the Station. The S1 Truss is a 45-foot-long, 15-foot-wide and 10-foot-tall, half hexagonal-shaped aluminum structure that weighs approximately 31,000 pounds. The truss is the next major addition to the Station's backbone that will eventually span more than 300 feet to carry power, data and environmental services for the orbiting outpost. When complete, the ends of the truss structure will also house the Station's solar arrays.

The primary function of the S1 Truss is to provide the first of two External Active Thermal Control System (EATCS) loops for the ISS. The S1 EATCS loop allows the flow of approximately 637 pounds of anhydrous ammonia through three heat rejection system radiators that will constantly rotate to optimize cooling to the Station.

The radiators are mounted to a rotating structure on the S1 Truss that is controlled by the Thermal Radiator Rotary Joint motors. The thermal control system will be activated on a future ISS mission.

The S1 Truss will also house communications systems, attachment points for external experiments and other subsystems.

Mission specialists will perform three spacewalks to attach the CETA cart to the Mobile Transporter already installed on the S0 Truss and configure other



equipment on the S1 Truss for on-orbit operations. The CETA cart will provide crew members access along the Mobile Transporter rails for future extravehicular activities. Mission specialists will reposition and activate an S-band antenna, a video camera stanchion and a light stanchion also installed on the ITS. All three spacewalks will be conducted from the Station's Joint Airlock Quest.

The S1 Truss also will serve as a mounting platform for the S3 and S4 Truss Segments that will be delivered to the Station on future missions.

Mission STS-112 will carry several science experiments to the Expedition 5 crew on the Station. These include the Plant Generic Bioprocessing Apparatus (PGBA), Commercial Generic Bioprocessing Apparatus (CGBA), the Protein Crystal Growth Single-locker Thermal Enclosure System housing the Protein Crystallization Apparatus for Microgravity (PCG-STES-PCAM) and samples for the Zeolite Crystal Growth Furnace (ZCG) experiment.

The PGBA experiment will ride to the Station on the middeck of Atlantis. The experiment, once transferred to the Station, involves the germination of plant seeds at various time intervals during the mission period in space. Mission specialists on the Station will monitor

the seeds inside the PGBA apparatus to maintain light, temperature, humidity and oxygen levels.

The mature plants will be harvested from the PGBA, processed and placed in the CGBA apparatus, in the same EXPRESS rack. The CGBA apparatus will act as a refrigerator to stabilize the plant material for post-flight analyses. A second crop of plants cultivated in the PGBA will be returned to Earth to allow an even greater range of tests.

Scientists will compare the growth results of the preserved samples from space with a control group of plants cultivated on Earth to determine how a gravity-free environment affects the production of secondary compounds within plants in space.

The PCG-STES-PCAM experiment is a protein crystal growth experiment that will make the journey to the Station. The primary goals of this experiment are to establish a protein crystal growth facility that will greatly increase experiment and co-investigator capacity, increase the size of the protein crystals and study the effects of microgravity on the growth and quality of protein crystals.

The ZCG experiment will process the new samples inside an improved version of a previously flown furnace that was redesigned to grow ferroelectric and silver halide materials. During this experiment, mission specialists aboard the Station will study how the subtle changes in the chemical formulation of zeolite crystals affect their growth. The goal is to grow larger crystals with fewer defects than those grown on Earth and to produce nano-materials.

Returning to Earth aboard Atlantis on this mission are soybean plants grown in the Advanced Astroculture experiment and PCG-STES protein crystals for analysis, experimental capsules for drug delivery from the Microencapsulation Electrostatic Processing experiment. Also returning are liver cell tissue samples cultured in the StelSys experiment and Zeolite Crystal Growth samples processed during the mission.

The exchange of scientific experiments represents research in the fields of medicine, biotechnology, agriculture, petroleum processing and pharmaceuticals.

The Crew

Jeffrey S. Ashby will serve as commander on his third Space Shuttle flight. He previously served as pilot on Mission STS-93 in July 1999 and Mission STS-100 in April 2001, and has logged more than 400 hours in space. He was born and raised in the Colorado mountains. Ashby received a Bachelor of Science degree in mechanical engineering from the University of Idaho and a Master of Science degree in aviation systems from the University of Tennessee. He is also a graduate of the Naval Test Pilot School and the Naval Fighter Weapons School (Top Gun).

Pamela Ann Melroy will serve as pilot on her second Space Shuttle flight. She served as pilot on Mission STS-92 in October 2000. During this mission the crew successfully attached the Z1 Truss and Pressurized Mating Adapter 3 to the ISS. She was born in Palo Alto, Calif., but considers Rochester, N.Y., to be her hometown. She has a Bachelor of Science degree in physics and astronomy from Wellesley College, Mass., and a Master of Science degree in earth and planetary sciences from Massachusetts Institute of Technology.

Mission Specialist **David A. Wolf, M.D.**, will make his second Space Shuttle Flight on Mission STS-112. He served as a mission specialist on Mission STS-58 in October 1993, a mission dedicated to Spacelab life sciences research. Dr. Wolf also trained at the Gagarin Cosmonaut Training Center in Star City, Russia, to prepare for a long-duration stay aboard Mir. Dr. Wolf has logged 142 days in space including a 4-hour EVA in a Russian Orlan space suit and served as a Board Engineer for 119 days aboard the Russian Space Station Mir. He received a bachelor of science degree in electrical engineering from Purdue University and a doctorate of medicine from Indiana University. He was born in Indianapolis, Ind.

Sandra H. Magnus, Ph.D., will make her first Space Shuttle flight as mission specialist on Mission STS-112. She joined NASA in 1996 and worked in the Astronaut Office Payloads/Habitability Branch. Magnus was assigned as a "Russian Crusader," which involved travel to Russia in support of hardware testing and operational products development. She received her bachelor's degree in physics and a master's degree in electrical engineering from the University of Missouri-Rolla, and a doctorate from the School of Material Science and Engineering at the Georgia Institute of Technology. She was born in Belleville, Ill.

Piers J. Sellers, Ph.D., will serve as a mission specialist aboard Atlantis on his first Space Shuttle flight. Sellers was born in Crowborough, Sussex, United Kingdom. He received a bachelor of science degree in ecological science from the University of Edinburgh, Scotland, and a doctorate in biometeorology from Leeds University, United Kingdom. He joined NASA as an astronaut candidate in 1996 and served in the Astronaut Office Computer Support Branch. He most recently served in the Astronaut Office Space Station Branch prior to his selection for Mission STS-112.

Fyodor N. Yurchikhin, Ph.D., a cosmonaut with the Russian Space Agency, will serve as a mission specialist on his first Space Shuttle flight. Yurchikhin qualified as a mechanical engineer, specializing in airspace vehicles, at the Moscow Aviation Institute and graduated from the Moscow Service State University with a Ph.D. in economics. He was born in Batumi, in the Republic of Georgia, Russia.