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International Space Station grows again with STS-92

Discovery flight marks 100th mission in shuttle program

Space Shuttle *Discovery* is poised to deliver the next in a series of major hardware components to the International Space Station during the STS-92 mission, scheduled to launch no earlier than 8:30 p.m. CDT Oct. 5. During the mission, which represents the 28th flight of the orbiter and the 100th mission in shuttle program history, the ISS receives its first truss segment, a framework structure to house communications and motion control equipment.

A seven-person crew will be commanded by Brian Duffy, (Col., USAF), who will be making his fourth flight into space. Duffy will be joined on the forward flight deck by Pilot Pam Melroy (Lt. Col., USAF), who will be making her first flight into space as the third female shuttle pilot in history, following in the footsteps of Eileen Collins and Susan Kilrain.

Two teams of space walkers and an experienced robot arm operator will collaborate to install the so-called Z1 (Z for zenith port) truss structure on top of the U.S. *Unity* connecting node on the growing station and to deliver the third Pressurized Mating Adapter (PMA 3) to the ISS for the future berthing of new station components and to accommodate shuttle dockings. The Z1 truss will be the first permanent lattice-work structure for the ISS, setting the stage for the future addition of the station's major trusses or backbones. The Z1 fixture will also serve as the platform on which the huge U.S. solar arrays will be mounted on the next shuttle assembly flight, STS-97.

The Z1 contains four large gyroscopic devices, called Control

Moment Gyros, which will be used to maneuver the ISS into the proper orientation on orbit once they are activated following the installation of the U.S. Laboratory *Destiny* on the STS-98 mission early next year. The Z1 is also home for the station's S-band and KU-band communications equipment, which

will permit enhanced air-to-ground voice capability and the first full bandwidth U.S. television capability from the ISS next year.

Dr. Leroy Chiao, who performed two space walks on one of his two previous shuttle flights, will join Bill McArthur (Col., USAF) in *Discovery's* cargo bay for a pair of space walks on the fifth and seventh days of the flight. Chiao and McArthur, who is

making his third space flight, will connect electrical cables between the Z1 structure and *Unity*, connect cables and hardware associated with the ISS' KU-band and S-band communications gear and install electrical converter units for the station.

Dr. Jeff Wisoff, who conducted a space walk on the first of his three previous flights, and Mike Lopez-Alegria (Cdr., USN), who is making his second flight into space, will perform two space walks on the sixth and eighth days of the flight, supervising the installation of the PMA 3 to one of the Common Berthing Mechanism docking ports on *Unity*, connect cables and electrical components from the new adapter to the ISS and set up a variety of equipment on the new Z1 structure itself.

Koichi Wakata of the Japanese Space Agency (NASDA) will play a crucial role throughout the flight, using *Discovery's* Canadian-built robot arm to install the Z1 truss onto *Unity*, then maneuvering the space walkers for four consecutive days as they perform their assembly tasks. This is Wakata's second flight into space.

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Ownership of *Destiny* research laboratory transitions to NASA

The U.S. research laboratory *Destiny*, which will become the centerpiece of the International Space Station when it is launched early next year, successfully achieved a major milestone last month and is now well on its way toward its final destination: space.

Jay Greene, NASA deputy ISS program manager, and Joe Mills, Boeing vice president and deputy ISS program manager, recently concluded a two-day Acceptance Review Board at Kennedy Space Center by signing the final documents turning over the Boeing-built research laboratory *Destiny* to NASA for pre-launch preparations. The board was held August 30 and 31.

Before turning over space station hardware to NASA, representatives from Boeing and the space agency review all the engineering and testing documents to ensure an element is ready for the next phase of pre-flight preparations.

"While there is much work ahead to prepare the Lab for its mission, the hardware and software has surpassed our expectations throughout its initial acceptance testing and, when launched, will be a magnificent tribute to the hundreds of

NASA and Boeing engineers who worked so hard to build and prepare this vehicle for its ultimate mission," said Greene. "It has been a pleasure to watch the NASA/Boeing team come together to accomplish this major milestone in the ISS program."

Boeing began construction of the 28-foot, 16-ton, state-of-the-art research

laboratory in 1995 at the Marshall Space Flight Center in Huntsville, Alabama. The Lab was shipped to KSC in 1998. Astronauts will work inside the pressurized facility to conduct research in numerous scientific fields. Scientists throughout the world will use the research results to enhance their studies in medicine,

engineering, biotechnology, physics, materials science, and Earth science.

Inside *Destiny* are five systems racks that will provide life-sustaining functions on board including electrical power, cooling water, air revitalization, and temperature and humidity control. Each rack weighs about 1,200 pounds. Six additional systems racks will be flown to *Destiny* in February 2001. Thirteen racks that

will provide platforms for a variety of scientific experiments will follow on subsequent missions.

Over the next few months, leading up to a January 18, 2001, launch date, *Destiny* will complete a series of tests and milestones including closing both hatches for the last time on Earth. Also several astronaut crews including the three members of the Expedition One team, who will become the station's first inhabitants when they arrive in November, will perform an equipment interface test. The Expedition One crew will integrate *Destiny* into the ISS architecture in January 2001.

Nearly 90 percent of the station's hardware has been manufactured and more than 280,000 pounds is at KSC undergoing final assembly and pre-flight testing. When the ISS is fully assembled in 2006, *Destiny* will be among a complement of six main research laboratories available to astronauts. The other labs are the U.S.-built Centrifuge Accommodation Module; the European Space Agency laboratory called Columbus; the Japanese experiment module called Kibo; and two Russian research modules. ■



Photo by Mary Welch courtesy of The Boeing Company

NASA Deputy International Space Station Program Manager Jay Greene, left, and Boeing Vice President and Deputy ISS Program Manager Joe Mills conclude a two-day Acceptance Review Board at Kennedy Space Center by signing the final documents turning over the Boeing-built research laboratory *Destiny* to NASA for pre-launch preparations.



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