Delivery of "Destiny" Laboratory on STS-98 Provides International Space Station Its Science Centerpiece

A new era in space-based science will begin when the Space Shuttle *Atlantis* delivers the U.S. research laboratory module "Destiny" to the International Space Station (ISS)during the STS-98 mission later this month. The Boeing-built laboratory will provide the first facility for continuous science research aboard the station, enabling unprecedented experiments to be performed in the near-zero gravity of space.

Atlantis, with its five-person crew, is scheduled to launch no earlier than January 19 from the Kennedy Space Center (KSC) in Florida. The *Atlantis* crew will work with the three-man Expedition One team currently in residence on the ISS -- a multinational, permanent, low-Earth-orbiting facility. Sixteen nations are involved in this largest and most complex international project ever undertaken.

"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, *Columbus*; the Japanese experiment module, *Kibo*; and two Russian research modules.

Astronauts will work inside the pressurized facility to conduct research in a variety of scientific disciplines. Scientists around the world will use the research results to enhance their studies in medicine, engineering, biotechnology, physics and materials science.

"Certainly, the research that will be conducted on "Destiny" will result in discoveries that benefit humankind," said Brewster Shaw, Boeing ISS vice president and general manager. "We continue to provide more capability for the ISS crew so they can accomplish the objectives that created the need for ISS in the first place -- science and technology investigations and long-term space flight."

Packed 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" on the next Shuttle flight, STS-102. Thirteen racks that will provide platforms for a variety of scientific experiments will follow on subsequent missions.

Outside of "Destiny", an exterior waffle pattern in the aluminum hull of the lab module provides extra strength. An insulated debris shield blanket, made of material similar to that used in bulletproof vests, covers the exterior. This blanket is covered by a thin aluminum debris shield, providing additional protection for the laboratory module's exposure to the harsh environment of space.

The 28-foot, 16-ton, state-of-the-art research laboratory was built by Boeing at Marshall Space Flight Center in Huntsville, Ala., and shipped to KSC in 1998. Since that time, a series of tests have been performed on the lab module at KSC to prepare it for launch into space to join the other components now comprising the ISS. Those components include the Russian FGB module, the U.S. "Unity" connection node module, the Russian "Zarya" service module, and the U.S. integrated truss structure P-6 power module.

In addition to delivering and connecting the laboratory module to the *Unity* node of the ISS, the STS-98 mission includes activation of the Control Moment Gyroscopes with delivery of electronics in the lab module, providing electrically powered attitude control. Two computers in the "Destiny" lab will be dedicated to keeping the space station in proper orientation (attitude)as it orbits the Earth once every 90 minutes.

Software containing over 300,000 lines of code will monitor and control the atmospheric and thermal conditioning, fire detection, and other key systems onboard Destiny. The Destiny software will also manage power, thermal, and vacuum services provided to the experimental payloads, as well as monitor the health and status of each payload.

Physical Description of the "Destiny" Laboratory module:
Material: Aluminum
Length: 8.5 meters (28 feet)
Length with attached Common Berthing Mechanism (CBM): 9.2 meters (30.2 feet)
Diameter: 4.3 meters (14 feet)

Weight: 14,515 kilograms (32,000 pounds)

Windows: One - 50.9 centimeters (20 inches)

In late October 2000, the three-man Expedition One crew was launched to the ISS aboard a Russian Proton rocket; they will remain on board until replaced by the Expedition Two crew - an event tentatively scheduled for

March of this year.

In late November 2000, the STS-97 mission's five-member crew aboard Space Shuttle *Endeavour* delivered an early external active thermal control system, a temporary cooling system that will provide heat rejection capability for the "Destiny" lab module. That system enables scientific research during the space station's early assembly. Also during the STS-97 mission, a collection of power system electronics, interconnections and two, 115-foot-long solar arrays to convert solar energy into electric power were delivered to the ISS.

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