NASA Facts

National Aeronautics and
Space Administration

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International Space Station **April 1998**

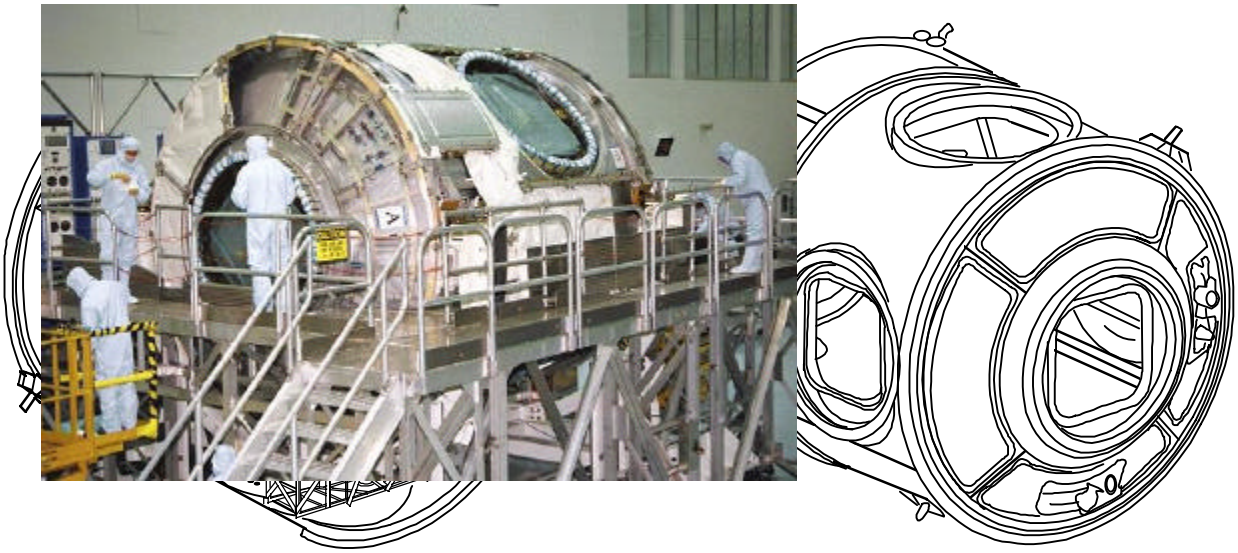
UNITY CONNECTING MODULE: CORNERSTONE FOR A HOME IN ORBIT

The FIrst U.S.-Built International Space Station Component

The first U.S.-built component of the International Space Station, a six-sided connecting module and passageway, or node, called the Unity node, will be the primary cargo of Space Shuttle mission STS-88, the first mission dedicated to assembly of the station

Scheduled for launch in the summer of 1998, the Unity node will lay a foundation for all future U.S. International Space Station modules with six berthing ports, one on each side, to which future modules will be attached. Built by The Boeing Company at a manufacturing facility at the Marshall Space Flight Center in Huntsville, Alabama, the node is the first of three such connecting nodes that will be built for the station. Sometimes labeled Node 1, the Unity node measures 15 feet in diameter and 18 feet long.

Carried to orbit aboard the Space Shuttle Endeavour, Unity will be mated with the already orbiting Control Module, or Functional Cargo Block (Russian acronym FGB), a U.S.-funded and Russian-built component that will have been launched earlier aboard a Russian rocket from Kazakstan. In addition to connecting to the Control Module, Unity eventually will provide attachment points for the U.S. laboratory module; Node 3; an early exterior framework, or truss for the station; an airlock; and a multi-windowed cupola.



Unity, seen in interior and exterior views, is a building block for future U.S. modules

Essential space station resources such as fluids, environmental control and life support systems, electrical and data systems are routed through the node to supply work and living areas.

More than 50,000 mechanical items, 216 lines to carry fluids and gases, and 121 internal and external electrical cables using six miles of wire were installed in the Unity node. The detailed and complex hardware installation required more than 1,800 drawings. The node is made of aluminum.

Node 1 launch processing at the Kennedy Space Center Two conical docking adapters will be attached to each end of the Unity node prior to its launch aboard Endeavour. The adapters, called pressurized mating adapters (PMAs), allow the docking systems used by the Space Shuttle and by Russian modules to attach to the node's hatches and berthing mechanisms. One of the conical adapters will attach Node 1 to the FGB, while the other will serve as a docking port for the Space Shuttle. The Unity node with the two mating adapters attached, the configuration it will be in for launch, is about 36 feet long and weighs about 25,600 pounds.

Attached to the exterior of one of the pressurized mating adapters are computers, or multiplexer-demultiplexers (MDMs), which will provide early command and control of the Unity node. The node also will be outfitted with an early communications system that will allow data, voice and low data rate video with Mission Control, Houston, to supplement Russian communications systems during the early station assembly activities.

The two remaining nodes are being built by the European Space Agency for NASA in Italy by Alenia Aerospazio. Nodes 2 and 3 will be slightly longer than the Unity node, measuring almost 21 feet long, and each will hold eight standard space station equipment racks in addition to six berthing ports. ESA is building the two additional nodes as partial payment for the launch of the Columbus laboratory module and other equipment on the Space Shuttle. Node 1 holds four equipment racks.

The International Space Station will allow scientists to conduct long-duration experiments and research in the environment of space. It is the largest peacetime scientific mission in history and combines the resources of 15 nations. When completely assembled in 2003, the International Space Station will have a mass of more than 1 million pounds and provide more than 46,000 cubic feet of pressurized living and working space for up to seven astronauts and scientists.