First of Twin Boeing-built Trusses Ready for International Space Station

The International Space Station's truss system begins expanding after space shuttle Atlantis delivers the Boeing-built S1 (starboard one) truss to the orbital outpost in October.

When completed, the 10 segments of the truss system built by Boeing [NYSE: BA] will eventually span more than 300 feet or about the length of a football field. It will house the space station's solar arrays and carry power, data and environmental services that support life support systems throughout the station.

NASA Systems, based in Houston, is a business unit of Boeing Integrated Defense Systems and is NASA's prime contractor for the International Space Station and responsible for design, construction and integrating the components. The company also supports NASA in operating the ISS. The girder-like S1 will be attached to the S0 (starboard zero) truss delivered in April 2002. The P1 (port one) truss will be delivered by Endeavour in November 2002 and attached to the opposite side of the S0 truss.

In addition to Boeing, hundreds of subcontractors around the United States and 16 international partners have contributed components and expertise to the complicated project of building space hardware like the S1, S0 and P1 trusses.

"The challenges the Boeing team faced are akin to constructing a Swiss watch," said Thomas Davies, Boeing S1 and P1 truss production manager. "Everything we designed was built with close tolerances and must operate flawlessly in space."

As an example, Davies cited that 20-foot-long aluminum beams used as part of the S1's radiator assembly had to be milled with a 1/50 to 1/25 of an inch tolerance for flatness. In comparison, a new snowflake is about 1/50 of an inch thick and a U.S. dime is about 1/25 of an inch thick.

Tight tolerances are required for the temperature extremes found in space. Items as long as radiator assemblies can expand and contract as much as two to three inches depending on the structure's complexity and materials used. Since the radiator beam assembly also moves, tolerances are tight so parts do not interfere with each other.

The S1 truss carries three radiator panels extended in orbit as part of the cooling system for the space station's electronics. Each radiator is about 75 feet long and about 11 feet wide. A computer controls the position of the radiators relative to the sun so they remain in the shade for maximum effectiveness.

The system operates similar to a car radiator and uses almost pure ammonia. The household variety has about 1 percent ammonia by strength. Ammonia is used rather than water because of its low freezing point and ability to transfer heat.

Boeing began construction of the 45-foot long S1 truss in Huntington Beach,Calif., in May1998. The truss moved to a Boeing facility in Huntsville,Ala., in March 1999 for completion and then to Boeing Florida Operations at Kennedy Space Center, Fla., in October 1999 for flight processing. Boeing delivered S1 to NASA in November 2001.

S1 TRUSS STATISTICS:

- **Weight:** 27, 717 lbs. (12,598 kg.)
- **Dimensions:** 45 ft. x 15 ft. x 13 ft. (13.7 m x 4.5 m x 3.9 m)
- **Construction:** Primarily aluminum
- **Purpose:** To carry power, data and environmental services along the integrated truss structure. Also to provide heating and cooling to electrical components throughout the station via the radiators on the truss.

A unit of The Boeing Company, Boeing Integrated Defense Systems is one of the world's largest space and defense businesses. Headquartered in St. Louis, Boeing Integrated Defense Systems is a $23 billion business. It provides systems solutions to its global military, government and commercial customers. It is a leading provider of intelligence, surveillance and reconnaissance; the world's largest military aircraft manufacturer; the world's largest satellite manufacturer and a leading provider of space-based communications; the primary systems integrator for U.S. missile defense; NASA's largest contractor; and a global leader in launch services.

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