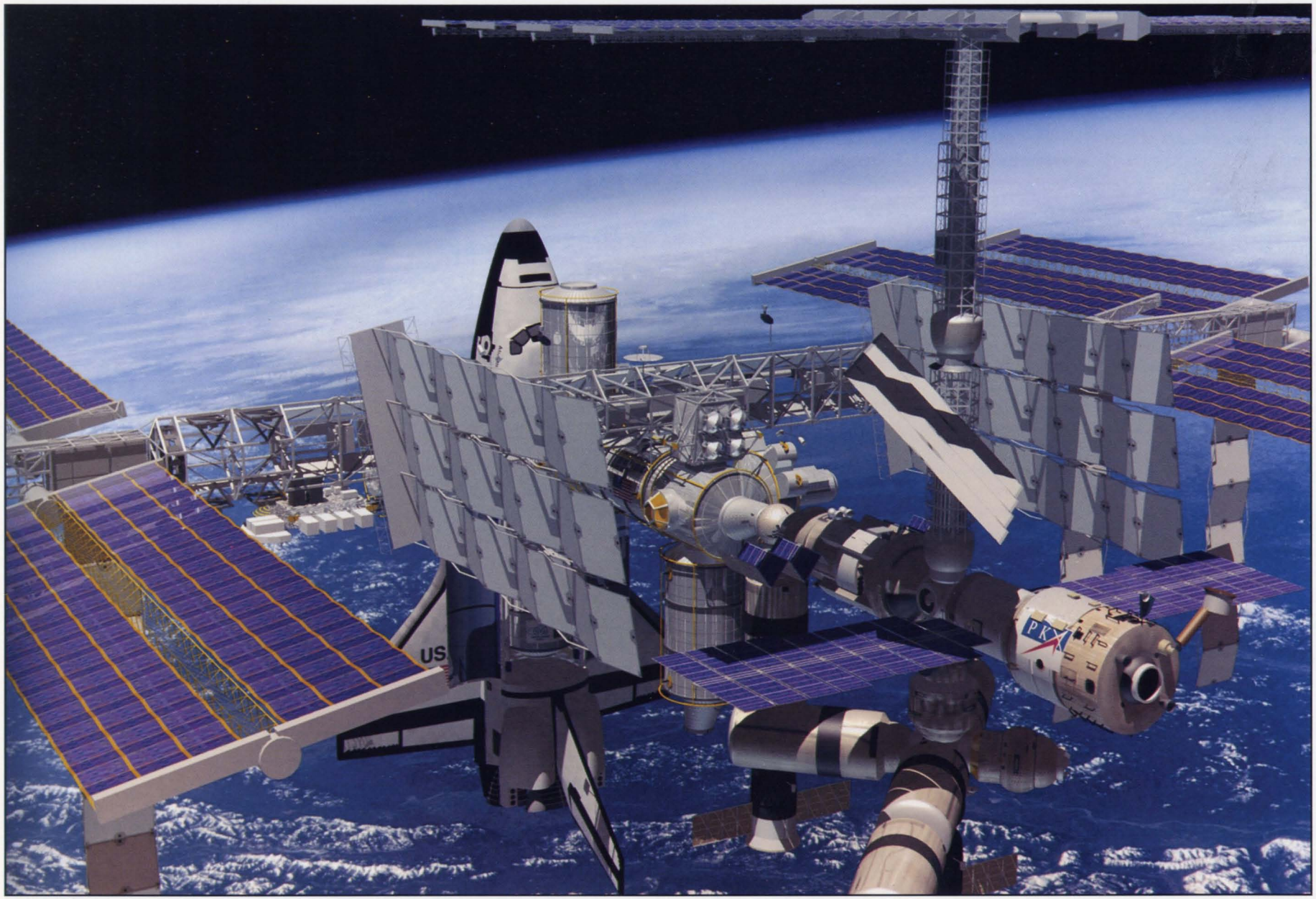
National Aeronautics and
Space Administration

International Space Station: Assembly Complete with Shuttle



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Assembly Complete with Shuttle

This illustration depicts the international Space Station when assembly is completed in June 2002 with elements from the United States, Europe, Russia, Japan, and Canada. The space shuttle, shown docked with the space station, transports science investigators to relieve crew members who have spent several months on orbit.

Research conducted previously in the human space-flight program onboard the first US space station Skylab, onboard Russian space stations and on the space shuttle have contributed greatly to medical research, technology advancement and to our understanding of life on Earth. The international Space Station will serve as a permanent laboratory for long-term research in Earth orbit, drawing on the expertise and resources of 13 nations in the largest cooperative science effort in history. Contributions from the international partners provide more laboratory space, more power, more logistical options and permit a larger crew. International partners in space station include the United States, European Space Agency member nations (Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Spain, and the United Kingdom), Russia, Japan, and Canada.

International Space Station will be a testbed for the technologies of the future and a research laboratory for new, high-technology industrial materials. Experimental research in the near weightless environment of space produces new insights into industrial process that cannot be replicated on Earth. The increased understanding of fluid physics and combustion gained in microgravity can lead to lighter, stronger superalloys and more efficient energy conservation. Research on advanced space vehicles will improve communications, computer software, utility, and transportation industries.

As an industrial research and development laboratory, international Space Station will test lower-cost heating and cooling systems, long-life power converters, safe chemical storage and transfer processes, and water purification, waste management and recycling systems.

The space station will provide an unequaled environment for research on the growth of protein crystals that help determine the structure of proteins that are characteristic of all living things. Such investigations will greatly enhance development of medicines for many life-threatening diseases. Protein crystals already grown on the space shuttle are superior to crystals grown on Earth for advanced research into cancer, diabetes, emphysema, parasitic infections, and immune system disorders.

On board the space station, crew members will study materials that could not exist and processes that could not take place in Earth's gravity. Such materials include polymers for everything from paint to contact lenses, semiconductors for the next generation of high-speed computers, and high-temperature superconductors for increased efficiency in electrical devices.

Significant Dates

Date	Schedule	Payload
11/97	First Element Launch	FGB (on Proton rocket)
5/98	Capability for 3-person crew	Soyuz
11/98	US Laboratory Launched	US Lab Module
12/98	SSRMS (Canada)	Canadian Remote Manipulator System
2/99	First Utilization Flight	International Stan dard Payload Rack
11/99	First Russian Research Module Launch	Russian RM-1
3/2000	Japanese Lab Launch	JEM Pressurized Module
8/2001	Centrifuge Launch	Centrifuge Accommodation Module
9/2001	European Lab Launch	Columbus Orbital Facility (on Ariane rocket)
2/2002	Habitation Module Launch	US Hab Module
6/2002	Assembly Complete	Full 6-person crew capability; Crew Transfer Vehicle

Facts & Figures

Wingspan	
End-to-End Width	361 feet (110.03 meters)
Length	290 feet (88.39 meters)
Mass (weight)	924,000 pounds (419,126.4 kilograms)
Operating Altitude	220 miles average (407.44 kilometers)
Inclination	51.6 degrees to the Equator
Atmosphere	14.7 pounds per square inch (psi) (101.36 kilonewtons per square meter) atmospheric pressure is same as Earth
Crew Size	6 people at assembly complete

Transportation Flights

(1997-2002)

Space Shuttle Flights	
Assembly	21
Utilization and Outfitting	6
Total Shuttle Flights	27
Russian Flights	
Assembly	15
Crew Transport	10
Reboost (propulsion)	19
Total Russian Flights	44
ESA Assembly Flights (on Ariane 5 rocket)	1
Launcher for Crew Transport Vehicle	1
Total Assembly/Transportation Flights	**73**

For more information via the World Wide Web see http://issa-www.jsc.nasa.gov/