National Aeronautics and Space Administration

International Space Station: Assembly Complete with Shuttle

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This illustration depicts the International Space Station in its completed and fully operational state with elements from the United States, Europe, Canada, Japan, and Russia. The Space Shuttle transports a crew of six scientist astronauts to relieve the crew already aboard the International Space Station.

The early space program and experiments conducted on the Space Shuttle have made remarkable contributions to medical research and the study of life on Earth. The Space Station is the next step: a permanent laboratory for long-term research, drawing upon the resources and scientific expertise of 13 nations in a cooperative effort. The new design of the Space Station will provide more laboratory space, more electrical power, a larger crew, and greater international participation. The nations involved include: the United States, Canada, Italy, Belgium, Netherlands, Denmark, Norway, France, Spain, Germany, the United Kingdom, Japan, and now, Russia.

The Space Station will be a testbed for the technologies of the future, and a laboratory for research on new, high-technology industrial materials. Experimental research in the near absence of gravity produces new insights into industrial processes in materials that cannot be replicated on Earth–including increased understanding of fluid physics and combustion that can lead to making lighter, stronger superalloys and energy conservation on Earth. Space vehicles research will improve communications, computer software, utility, and transportation industries.

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

The Space Station will provide a unique environment for research on the growth of protein crystals, which aid in determining the structure and function of proteins. Such information will greatly enhance drug design and research in treatment of diseases. Crystals already grown on the Space Shuttle are superior to anything grown on Earth for research into cancer, diabetes, emphysema, parasitic infections, and immune system disorders.

On board, crewmembers will study materials that could not exist and processes that could not take place in full Earth gravity. Materials include polymers for everything from paint to contact lenses, semiconductors for high-speed computers and electronics, and high-temperature superconductors for efficiency in electrical devices.

Significant Dates

Date	Schedule	Payload
11/97	First U.S. Element Launch	FGB
5/88	First Russian Element Launch	Service Module
5/98	Continuous Human Presence	Soyuz
3/2000	Japanese Lab Launch	JEM Pressurized Lab
2/2001	ESA Lab Launch	Attached Pressurized Module
2/2002	Habitation Module Launch	U.S. Habitation Module
6/2002	Assembly Complete/ Continuous Full Crew Presence	Soyuz CTV

Facts & Figures

End to End Width (Wingspan)	361 feet (110.03 meters)
Length	290 feet (88.39 meters)
Weight	831,000 pounds (376,941.6 kilograms)
Operating Altitude	220 miles (407.44 kilometers) (average)
Inclination	51.6 degrees to the Equator
Atmosphere	14.7 pounds per square inch 101.36 kilonewtons per square meter (same as Earth)
Crew size	6

Transportation Flights

Space Shuttle Flights	
Assembly	20
Utilization/Outfitting	6
Total	26
Russian Flights	
Assembly	14
Crew Transport	15
Reboost (propulsion)	29
Total	58
ESA Assembly Flights (Ariane 5)	1