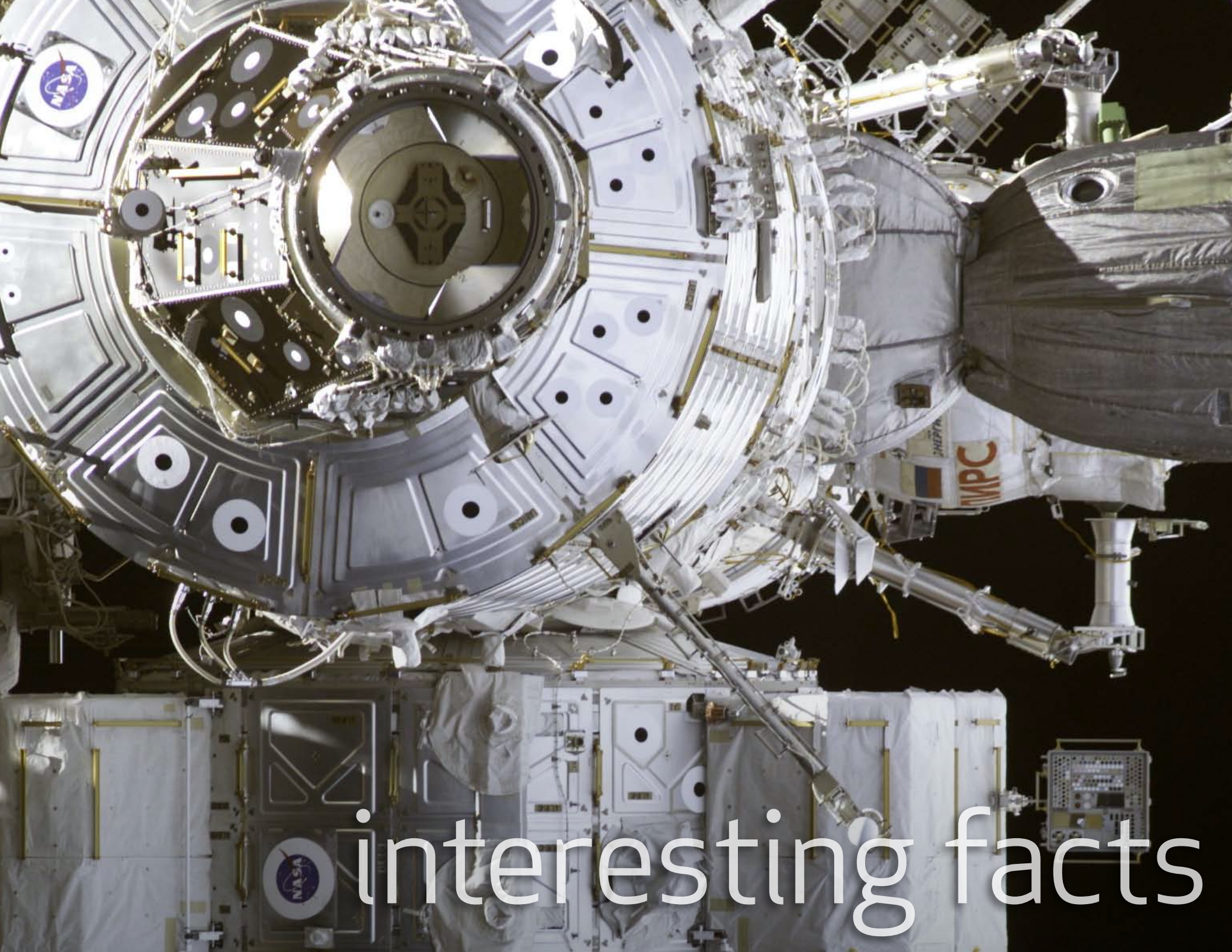


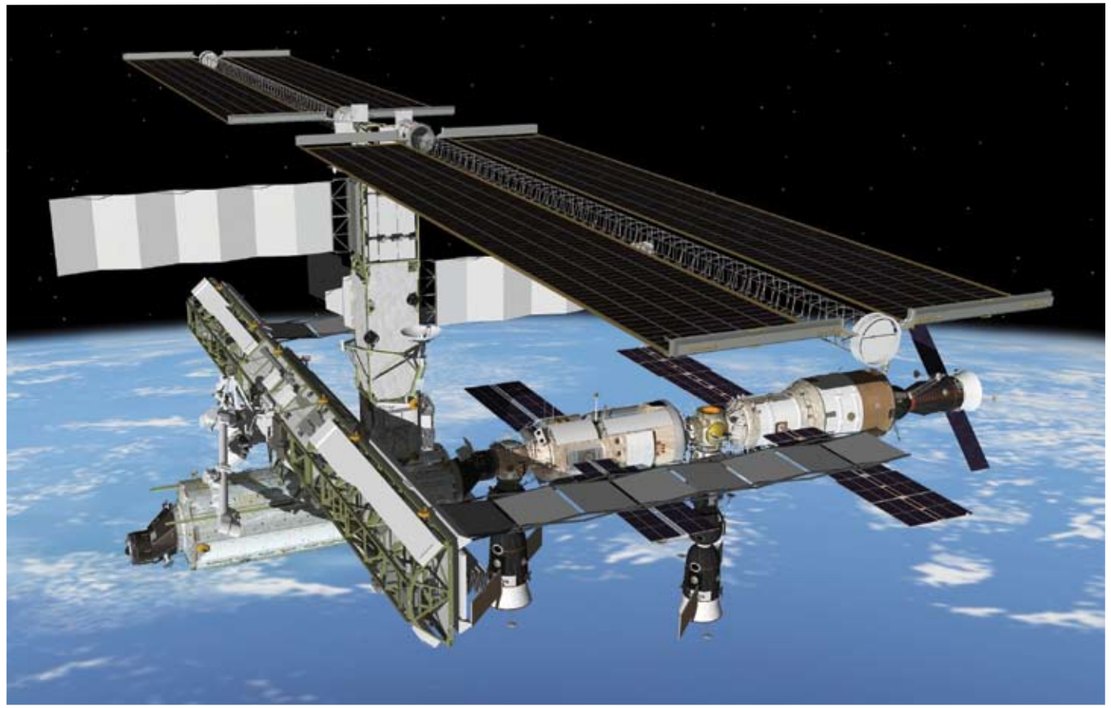
interesting facts

Interesting Points

- The ISS effort involves more than 100,000 people in space agencies, at 500 contractor facilities, and in 37 U.S. states. That's almost half of the entire population of the U.S. state of North Dakota.
- As of June 2006, the number of crewmembers and visitors who have traveled to the ISS included 116 different people representing 10 countries.
- Living and working on the ISS is like building one room of a house, moving in a family of three, and asking them to finish building the house while working full time from home.
- As of June 2006:
  - Includingthe launch of the first module—Zarya at 1:40 a.m. e.s.t. on November 20, 1998—there have been 55 launches to the ISS (37 Russian flights and 18 U.S./ Shuttle flights).
  - The 38 Russian flights include 3 modules (Zarya, Zvezda, and Pirs), 13 Soyuz crew vehicles, and 22 Progress resupply ships.
- At Assembly Complete, 80 space flights will have been scheduled to take place using five different types of launch vehicles.

EVA

- As of August 2006:
  - Spacewalks (EVAs): 69 (28 Shuttle-based, 41 ISS-based) totaling 410 hours.
- Building the ISS in space has been compared to changing a spark plug or hanging a shelf while wearing roller skates and two pairs of ski gloves with all your tools, screws, and materials tethered to your body so they don't drop.



Physical Parameters

Mass

- The mass of the ISS currently is 186,000 kg (410,000 lb) (equivalent to about 132 automobiles).
- At Assembly Complete, the ISS will be about four times as large as the Russian space station Mir and about five times as large as the U.S. Skylab.
- At Assembly Complete, the ISS will have a mass of almost 419,600 kg (925,000 lb). That's the equivalent of more than 330 automobiles.
- The entire 16.4-m (55-ft) robot arm assembly will be able to lift 99,790 kg (220,000 lb), which is the mass of a Space Shuttle orbiter.

Habitable Volume

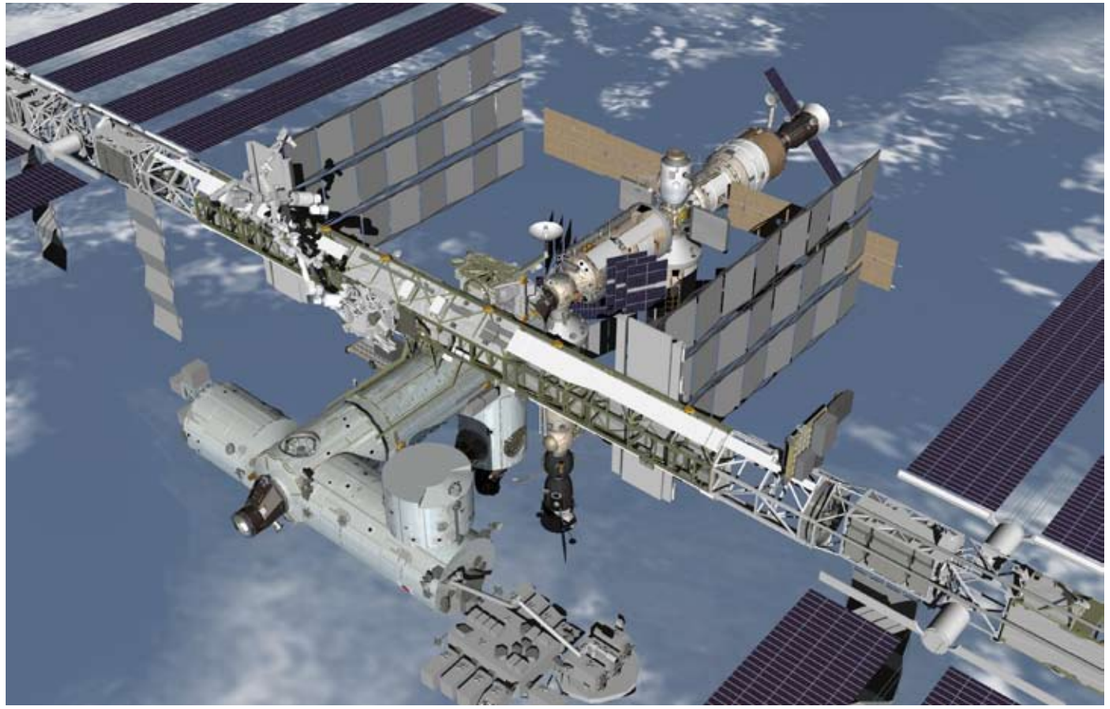
- The ISS has about 425 m^3 (15,000 ft^3) of habitable volume—more room than a conventional three-bedroom house. There are 9 research racks on board plus 16 system racks and 10 stowage racks.
- At Assembly Complete, more than 120 telephone-booth-size rack facilities will be installed in the ISS for operating the spacecraft systems and research experiments.
- When completely assembled, the ISS will have an internal pressurized volume of 935 m^3 (33,023 ft^3), or about 1.5 Boeing 747s, and will be larger than a five-bedroom house.

Physical Dimensions

- The ISS solar array surface will be large enough to cover the U.S. Senate Chamber more than three times over at Assembly Complete.
- A solar array's wingspan of 73 m (240 ft) is longer than that of a Boeing 777, which is 65 m (212 ft).
- At Assembly Complete, the ISS will measure 110 m (361 ft) end to end. That's equivalent to the length of a U.S. football field, including the end zones.

Electrical Power

- The solar array surface area currently on orbit is 892 m^2 (9,600 ft^2), which is large enough to cover 75% of the U.S. House of Representatives Chamber (42 m x 28 m = 1,176 m^2) (139 ft x 93 ft = 12,927 ft^2).
- At Assembly Complete, 12.9 km (8 mi) of wire will connect the electrical power system.
- Currently, 26 kW of power is generated.
- At Assembly Complete, the solar array surface area is 2,500 m^2 (27,000 ft^2), an acre of solar panels.
- At Assembly Complete, there will be a total of 262,400 solar cells.



- At Assembly Complete, a maximum 110 kW of power, including 30 kW of long-term average power for applications, is/will be available.

Thermal Control

- Currently, there are 21 honeycombed aluminum radiator panels, each measuring 1.8 m x 3 m (6 ft x 10 ft), for a total of 156 m^2 (1,680 ft^2) of ammonia-tubing-filled heat exchange area.
- At Assembly Complete, there will be 42 honeycombed aluminum radiator panels, each measuring 1.8 m x 3 m (6 ft x 10 ft), for a total area of 312 m^2 (3,360 ft^2) of ammonia-tubing-filled heat exchange area.

Module Berthing

- To ensure a good seal, the Common Berthing Mechanism automatic latches pull two modules together and tighten 16 connecting bolts with a force of 8,618 kg (19,000 lb) each.

Meals

- Crews have eaten about 23,000 meals and 20,000 snacks, which equals 18,150 kg (40,000 lb) of food. Approximately 3,630 kg (4 tons) of supplies are required to support a crew of three for about 6 months.
- Based on input from ISS crew members, the most popular on-orbit foods are shrimp cocktail, tortillas, barbecue beef brisket, breakfast sausage links, chicken fajitas, vegetable quiche, macaroni and cheese, candy-coated chocolates, and cherry blueberry cobbler. The favorite beverage to wash it all down? Lemonade.

Crew Hours

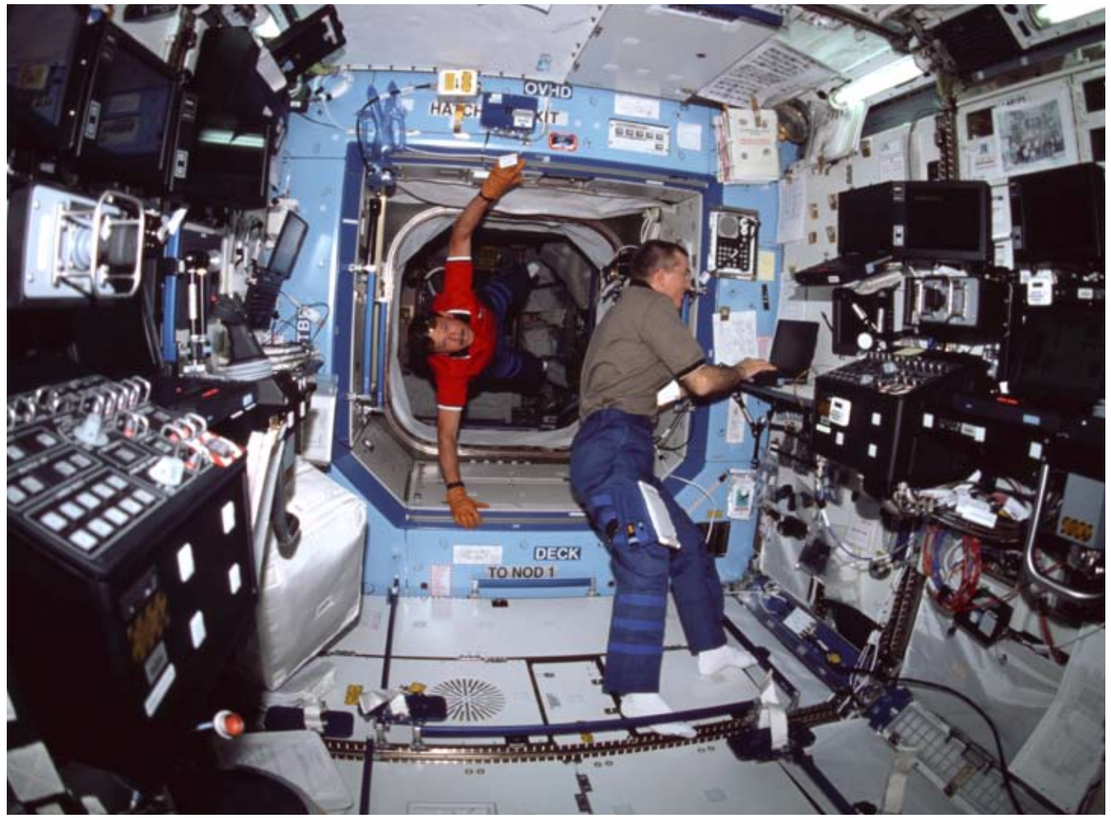
- While a year of Space Shuttle operations (seven crew members, 11-day missions, five flights per year) results in 9,240 total crew hours, 1 year of ISS operations—26,280 total crew hours (three crew, 365 days)—is almost three times that amount.

Environmental Control

- ISS systems recycle about 6.4 kg (14 lb) or 6.42 L (1.7 gal) of crew-expelled air each day. 2.7 kg (6 lb) of that comes from the U.S. segment. The processed water is then used for technical or drinking purposes.
- The ISS travels an equivalent distance to the Moon and back in about a day. That's equivalent to crossing the North American continent about 135 times every day.

Data Management

- Fifty-two computers will control the systems on the ISS.
- The data transmission rate is 150 Mb per second downlink with simultaneous uplink.
- Currently, 2.8 million lines of software code on the ground will support 1.5 million lines of flight software code, which will double by Assembly Complete.



- In the International Space Station's U.S. segment alone, 1.5 million lines of flight software code will run on 44 computers communicating via 100 data networks transferring 400,000 signals (e.g., pressure or temperature measurements, valve positions, etc.).

- The ISS will manage 20 times as many signals as the Space Shuttle.

Research and Applications

- Expedition crews conduct science daily, across a wide variety of fields, including human research, life sciences, physical sciences, and Earth observation, as well as education and technology demonstrations (*http://exploration.nasa.gov/programs/station).*

- As of June 2006, 90 science investigations have been conducted on the ISS over 64 months of continuous research. Nine research racks are on board. More than 7,700 kg (17,000 lb) of research equipment and facilities have been brought to the ISS.

- Research topics have been diverse—from protein crystal growth to physics to telemedicine. New scientific results from early Space Station research, in fields from basic science to exploration research, are being published every month.

- Some 100 scientists, from as many institutions, have been principal investigators on ISS research, either completed or ongoing. NASA research has involved lead investigators from the U.S., Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, and Spain. On some experiments, these principal investigators represent dozens of scientists who share data to maximize research.

- The ISS provides an excellent viewing platform for Earth; its range covers more than 90% of the populated areas of the planet. Station crews have taken more than 200,000 images of Earth—almost a third of the total number of images taken from orbit by astronauts.

- About 700,000 NASA digital photographs of Earth are downloaded by scientists, educators, and the public each month from the "Gateway to Astronaut Photography of Earth" (*http://eol.jsc.nasa.gov*).

- In 2005, ISS astronauts took key photographs of the hurricane damage in Mississippi and Louisiana, as well as damage and recovery efforts from the tsunami in Sri Lanka; documented floods and droughts; and took detailed photographs of cities around the world, from London to Jeddah to Irkutsk.

Education

- Educational activities relating to the ISS include student-developed experiments; educational demonstrations and activities; and student participation in classroom versions of ISS experiments, NASA investigator experiments, and ISS engineering activities.

- From early 2000 through April 2006, 24 unique types of educational programs involved 31.8 million students, and over 12,500 teachers participated in ISS-based education workshops.

- In the EarthKAM experiment, nearly 1,000 schools and 66,000 middle school students have controlled a digital camera on board the ISS to photograph features of Earth. The students have investigated a wide range of topics such as deforestation, urbanization, volcanoes, river deltas, and pollution.

- In-flight education downlinks (part of Education Payload Operations) have linked crewmembers aboard the ISS with students around the world. The students have studied the science activities on the ISS and living and working in space in preparation for asking questions of the crewmembers. Through broadcasts sponsored by Channel One and the U.S. Department of Education, over 30 million students have been able to watch the interviews.

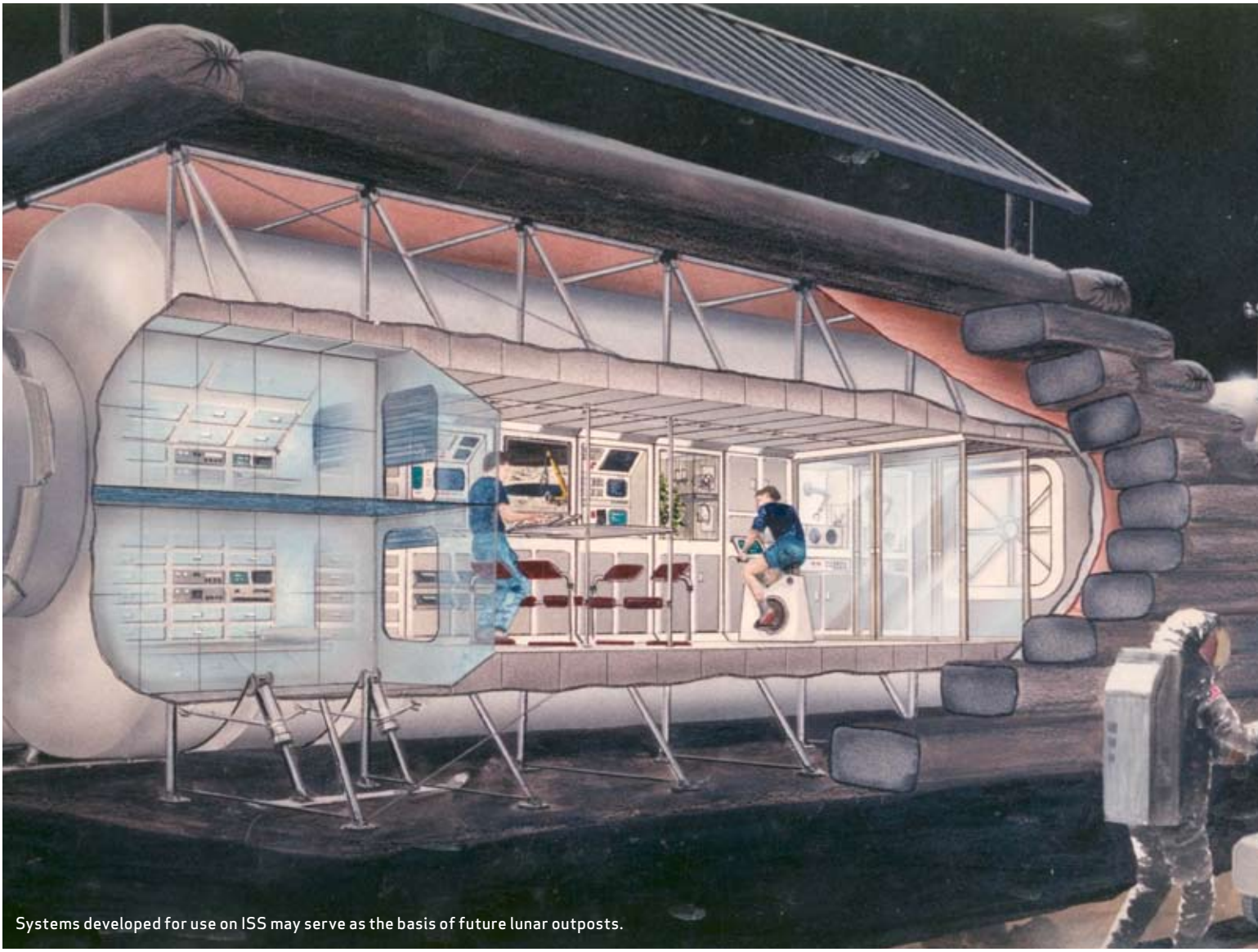
Crew Medical Care

- Information from biomedical research on ISS is designed to develop countermeasures to the negative effects of long-duration space flight on the human body so that future astronauts will be able to explore more safely. For example,

  - Resistive exercise allows astronauts to do weight training while they are weightless and is being studied to see if it can slow the rate of bone loss that occurs in space.

  - Genetic techniques will soon be used to examine the microbial environment of the Space Station, and culture studies will determine the effect of the space environment on the growth of microbes. This will allow better assessment of the risks of pathogens to crewmembers on long-duration missions.

- Medical ultrasound will be used as a diagnostic tool should a crewmember be hurt, even if the rest of the crew has not been previously trained in how to do a specific type of scan. The same telemedicine techniques benefit patients in rural areas and may eventually allow ultrasound images taken on ambulances to be sent ahead to the hospital.



Systems developed for use on ISS may serve as the basis of future lunar outposts.

The International Space Station (ISS) is instrumental to the exploration of space.

Efficient, reliable spacecraft systems are critical to reducing crew and mission risks. The development and testing of systems of the ISS will reduce mission risks and advance capabilities for missions traveling interplanetary distances.

As we expand permanent human presence beyond low-Earth orbit to the Moon and, later, to Mars and beyond, we will face challenges in management; integration; remote, long-duration assembly and maintenance operations; science and engineering; and international culture and relationships. The ISS Program is providing critical insight and amassing new knowledge in all of these areas, and the ISS experience can help to guide our success in space exploration.