International Space Station: Facts, History & Tracking

By Tim Sharp, Reference Editor | April 5, 2016 09:06pm ET

The International Space Station (ISS) is the most complex international scientific and engineering project in history and the largest structure humans have ever put into space. This high-flying satellite is a laboratory for new technologies and an observation platform for astronomical, environmental and geological research. As a permanently occupied outpost in outer space, it serves as a stepping-stone for further space exploration. This includes Mars, which NASA is now stating is its goal for human space exploration.

The space station flies at an average altitude of 248 miles (400 kilometers) above Earth. It circles the globe every 90 minutes at a speed of about 17,500 mph (28,000 kph). In one day, the station travels about the distance it would take to go from Earth to the moon and back. The space station can rival the brilliant planet Venus in brightness and appears as a bright moving light across the night sky. It can be seen from Earth without the use of a telescope by night sky observers who know when and where to look. You can use our Satellite Tracker page powered by N2YO.com to find out when to see the space station.
Five different space agencies representing 15 countries built the $100-billion International Space Station and continue to operate it today. NASA, Russia's Roscosmos State Corporation for Space Activities (Roscosmos), the European Space Agency, the Canadian Space Agency and the Japan Aerospace Exploration Agency are the primary space agency partners on the project.

Structure The International Space Station was taken into space piece-by-piece and gradually built in orbit. It consists of modules and connecting nodes that contain living quarters and laboratories, as well as exterior trusses that provide structural support, and solar panels that provide power. The first module, Russia's Zarya module, launched in 1998. The station has been continuously occupied since Nov. 2, 2000.

Starting in 2015, changes to the ISS were performed to prepare the complex for crewed commercial spacecraft, which will begin arriving as early as 2017. Two international docking adapters will be added to the station. Additionally, an inflatable module from Bigelow Aerospace is scheduled to arrive in 2016.

Current plans call for the space station to be operated through at least 2020. NASA has requested an extension until 2024. Discussions to extend the space station's lifetime are ongoing among all international partners; several countries, such as Canada, Russia and Japan, have expressed their support for extending the station's operations.

During the space station's major construction phase, some Russian modules and docking ports were launched directly to the orbiting lab, while other NASA and international components (including Russian hardware) were delivered on U.S. space shuttles.

How big is the International Space Station? The space station, including its large solar arrays, spans the area of a U.S. football field, including the end zones, and weighs 861,804 lbs. (391,000 kilograms), not including visiting vehicles. The complex now has more livable room than a conventional five-bedroom house, and has two bathrooms, gym facilities and a 360-degree bay window. Astronauts have also compared the space station's living space to the cabin of a Boeing 747 jumbo jet.

Crew size: A six-person expedition crew typically stays four to six months aboard the ISS. The first space station crews were three-person teams, though after the tragic Columbia shuttle disaster the crew size temporarily dropped to two-person teams. The space station reached its full six-person crew size in 2009 as new modules, laboratories and facilities were brought online.

Also in 2009, the record for the largest gathering in space was set during NASA's STS-127 shuttle mission aboard Endeavour. When Endeavour docked with the International Space Station, the shuttle's seven-person crew went aboard the orbiting lab, joining the six spaceflyers already there. The 13-person party was the largest-ever gathering of people in space at the same time. While subsequent NASA shuttle and station crews matched the 13-person record, it has never been topped.

With a full complement of six crewmembers, the station operates as a full research facility. In recent years, technology such as 3-D printing, autonomous Earth imaging, laser communications and mini-satellite launchers have been added to the station; some are controlled by crewmembers, and some controlled by the ground. Additionally, there are dozens of ongoing investigations looking at the health of astronauts staying on the station for several months.

Crews are not only responsible for science, but also for maintaining the station. Sometimes, this requires that they venture on spacewalks to perform repairs. From time to time, these repairs can be urgent — such as when a part of the ammonia system fails, which has happened a couple of times.

Spacewalk safety procedures were changed after a potentially deadly 2013 incident when astronaut Luca Parmitano's helmet filled with water while he was working outside the station. NASA now responds quickly to “water incursion” incidents. It also has added pads to the spacesuits to soak up the liquid, and a tube to provide an alternate breathing location should the helmet fill with water. NASA is also testing technology that could supplement or replace astronaut spacewalks. One example is Robonaut. A prototype currently on board the station is able to flip switches and do other routine tasks under supervision, and may be modified at some point to work “outside” as well. [Infographic: Meet Robonaut 2, NASA's Space Droid]
If the crew needs to evacuate the station, they can return to Earth aboard two Russian Soyuz vehicles docked to the ISS. Additional crewmembers are transported to the ISS by Soyuz. Prior to the retirement of NASA's space shuttle fleet in 2011, new space station crewmembers were also ferried to and from the station during shuttle missions. In 2017 or so, NASA expects to replace most Soyuz flights with SpaceX's crewed Dragon spacecraft and Boeing's CST-100.

Crews aboard the ISS are assisted by mission control centers in Houston and Moscow and a payload control center in Huntsville, Ala. Other international mission control centers support the space station from Japan, Canada and Europe. The ISS can also be controlled from mission control centers in Houston or Moscow. [Photos: Space Station's Expedition 32 Mission]

The ISS hosted its first one-year crew in 2015-16, with NASA's Scott Kelly and Roscosmos' Mikhail Kornienko, which drew international attention and acclaim. The agencies have expressed interest in running more one-year missions in the future, but have not made a commitment to date.