

International Space Station (ISS) and SpaceX test flight to ISS

March 8, 2019

Manifest Pedagogy

The space exploration is in its peak may be it's through ISRO or NASA or SpaceX. Though SpaceX is a private space exploring entity, Its achievements have to be given importance at par with NASA's achievements. The recent stint of SpaceX with spaceflight to ISS is remarkable. After retirement of ISS, from 2024 China's Tiangong will be the only space station. Hence, the facts about ISS and Tiangong are important with respect to prelims. For Mains, one has to know the utility of space stations and shuttles too.

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About International Space Station

The International Space Station (ISS) is a multi-nation construction project that is the largest single structure humans ever put into space. Its main construction was completed between 1998 and 2011, although the station continually evolves to include new missions and experiments. It has been continuously occupied since Nov 2, 2000.

Purpose: According to the original Memorandum of Understanding between NASA and Rosaviakosmos, the International Space Station was intended to be a laboratory, observatory and factory in low Earth orbit. It was also planned to provide transportation, maintenance, and act as a staging base for possible future missions to the Moon, Mars and asteroids. In the 2010 United States National Space Policy, the ISS was given additional roles of serving commercial, diplomatic and educational purposes.

The ISS includes **contributions** from 15 nations. NASA (United States), Roscosmos (Russia) and the European Space Agency are the major partners of the space station who contribute most of the funding; the other partners are the Japanese Aerospace Exploration Agency and the Canadian Space Agency.

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.

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 km/h). 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.

The ISS serves as a microgravity and space environment research laboratory in which crew members conduct experiments in biology, human biology, physics, astronomy, meteorology, and other fields.

Space shuttle programme

- The Space Shuttle was a partially reusable low Earth orbital spacecraft system operated by the U.S. National Aeronautics and Space Administration (NASA) as part of the Space Shuttle program.
- Its official program name was *Space Transportation System (STS)*, taken from a 1969 plan for a system of reusable spacecraft of which it was the only item funded for development.
- The first of four orbital test flights occurred in 1981, leading to operational flights beginning in 1982.
- In addition to the prototype whose completion was cancelled, five complete Shuttle systems were built and used on a total of 135 missions from 1981 to 2011, launched from the Kennedy Space Center (KSC) in Florida.

Some of the important space shuttles of NASA:

1. First Shuttle Flight: STS-1 (Columbia)
2. First American Woman in Space: STS-7 (Challenger)
3. First African-American Astronaut Reaches Space: STS-8 (Challenger)
4. Shuttle Fleet's Spacelab Debut: STS-9 (Columbia)
5. First Untethered Spacewalk: STS-41B (Challenger)

SpaceX test flight to ISS

- SpaceX's Crew Dragon capsule embarked on its first test mission to the International Space Station, launching atop a Falcon 9 rocket from NASA's Kennedy Space Center (KSC).
- Nobody is aboard Crew Dragon on this six-day flight, known as Demo-1, save a sensor-laden dummy astronaut named Ripley.
- Crew Dragon is an advanced, updated version of SpaceX's Dragon cargo vehicle, which has flown 16 robotic resupply missions to the International Space Station (ISS) for NASA to date.
- In addition, Crew Dragon's solar panels are built into its trunk and the capsule docks directly with the orbiting lab. The cargo version, by contrast, sports traditional deployable solar arrays, and it's grappled by the ISS's huge robotic arm.
- Like the Falcon 9's first stage, cargo Dragon is reusable; it returns to Earth and makes parachute-aided splashdowns in the ocean.
- Demo-1 is a shakeout cruise. The mission is designed to put all of Crew Dragon's many systems through their paces in space to make sure the capsule is ready to take astronauts up and bring them down safely.