

TOPIC OF THE WEEK

NOV '18 (22 TO 28)

International Space Station

International Space Station (ISS) completed 20 years on November 20, 2018. The project was started by Russian space agency Roscosmos while it launched its Zarya module from the Baikonur Cosmodrome in Kazakhstan on November 20, 1998.

The launch followed NASA's Unity module. The pair was joined in low-earth orbit, which started a 13-year construction effort of the most ambitious construction project in the history of humanity. The result of the effort the International Space Station was a habitable artificial satellite, which currently serves as a giant orbiting observatory and laboratory.

Background:

The International Space Station on November 20, reached a two-decade milestone since the launch of its first module. On this day in 1998, aerospace engineers from Russia and the United States celebrated the lift-off of the Russia-built, US-funded unit Zarya ("sunrise") as it took off from Kazakhstan's Baikonur Cosmodrome.

The most significant thrust for the success of the project was the co-operation between former Cold War rivals- the United States and Russia (part of Soviet Union that disintegrated in 1990). Following the collapse of the Soviet Union in 1991, the US tapped Russia's skilled but idle space industry to help bring down costs and expedite Ronald Reagan's 1984 vision of a "permanently manned space station."

Key Highlights:

ISS is the largest manned object in space, 357ft long, just a yard short of a full-length football field.

- It weighs 419,725kg including the weight of space crafts. The space station can accommodate as many as six space crafts at one time.
- It is the single most expensive object ever built at £93.4bn.
- It is the third brightest object in the Earth's night sky after the moon and Venus.
- The space station travels at a speed of 4.791 miles per second, fast enough to go to the moon and back in a single day.

- It orbits the earth approximately once every 90 minutes or 16 times in a 24-hour period.
- It passes over 90 per cent of the earth's population in the course of its orbital path.
- The zero gravity causes astronauts to float while doing their daily activities.
- The orbiting station has been continuously occupied since November 2000.
- On September 2, 2017, Nasa's Peggy Whitson set the record of being the longest-serving human in space.

Significance:

ISS serves as the largest, peaceful, scientific collaboration in history. The multinational partnerships have helped defray the burden of the ISS's functioning. The continuous staffing of the orbiting laboratory with a multinational team of six has also relied on heavy intercontinental collaboration.

According to NASA, 230 individuals from 18 countries have visited. The collaborations between mission

controls have also helped sustain missions. After NASA discontinued the Space Shuttle program in 2011, Russia's Soyuz spacecraft started selling rides.

The cosmic collaborations on the station have also guaranteed that even amid diplomatic standoffs, communication channels between ISS nations cannot be closed off completely. During the 2014 Crimea crisis, when the Russian and US relations were mired in sanctions, their space agencies -NASA and Roscosmos - continued to cooperate on the Space Station.

Challenges:

The cost of the ISS has been a source of contention, with the bill estimates being between \$100 and \$150 billion.

Conclusion:

The governments are looking to explore the Moon, Mars and beyond but the future of the 20-year-old ISS remains unclear, as NASA has committed funds only until 2024. There also have been preliminary talks of de-orbiting the station and crashing it into the Pacific Ocean or handing over the keys to private companies.

Still, this research has been ambitious, focusing on how different substances and compounds, like cells, tissues and liquids, react when freed from the constraints of gravitational forces. Many studies have looked at the human body's response to long-duration spaceflight, a vital field to understand for the survival of humans during the 500-odd-day journey to and from Mars. The information extracted from exercises such as two astronauts' record year-long stay on the station is crucial in helping humans push boundaries of space exploration.

Suggested Reading:

- <https://www.timesnownews.com/technology-science/article/international-space-station-iss-completes-20-years-in-space-10-interesting-facts-to-know-about-iss/318744>
- <https://www.nasa.gov/image-feature/20-years-ago-construction-began-on-the-international-space-station>