



Astronauts Stuck at ISS

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Why in News?

Astronauts **Sunita Williams** and Barry "Butch" Wilmore are staying on the [International Space Station \(ISS\)](#) until February 2025 due to technical issues with the [Boeing Starliner spacecraft](#) that brought them there in June 2024.

- NASA is working to resolve the issues, which raise concerns about astronaut safety, the ISS's capacity, and the effects of prolonged space travel on human health.

Note:

- [Starliner](#) is a spacecraft designed for carrying astronauts to space, featuring a crew capsule, **reentry capability, and a non-reusable service module** providing life support and propulsion systems.
 - **SpaceX's Crew Dragon** and [NASA's SpaceX Demo-2](#) provide similar spacecraft services like Starliner.

How did the Astronauts Get Stuck in ISS?

- Williams and Wilmore travelled to the ISS in June on **Boeing's Starliner**, its **first crewed mission**.
- **Despite a pre-launch helium leak and additional leaks** during the journey, Starliner arrived at the ISS, but new issues remain unresolved.
- **Regular cargo spacecraft deliveries ensure a steady supply of essentials, allowing the ISS to support the crew for an extended stay.**
- **Earlier Instances of Longer Stays in Space:**
 - **Russian cosmonaut Valeri Polyakov** holds the record with 438 days on the **Mir Space Station** (Russian Space station deorbited in 2001) in 1994-95.
 - **US astronaut Frank Rubio** completed 371 days (2022-23) on the ISS.

What is the Impact on the Human Body in ISS?

- **Bone Density Loss:** Prolonged exposure to microgravity can lead to several health issues for astronauts as they can lose up to **1% of bone mass per month** due to the **lack of gravitational force**, increasing the risk of **osteoporosis and fractures**.
- **Muscle Atrophy:** Muscle mass and strength can diminish significantly in microgravity,

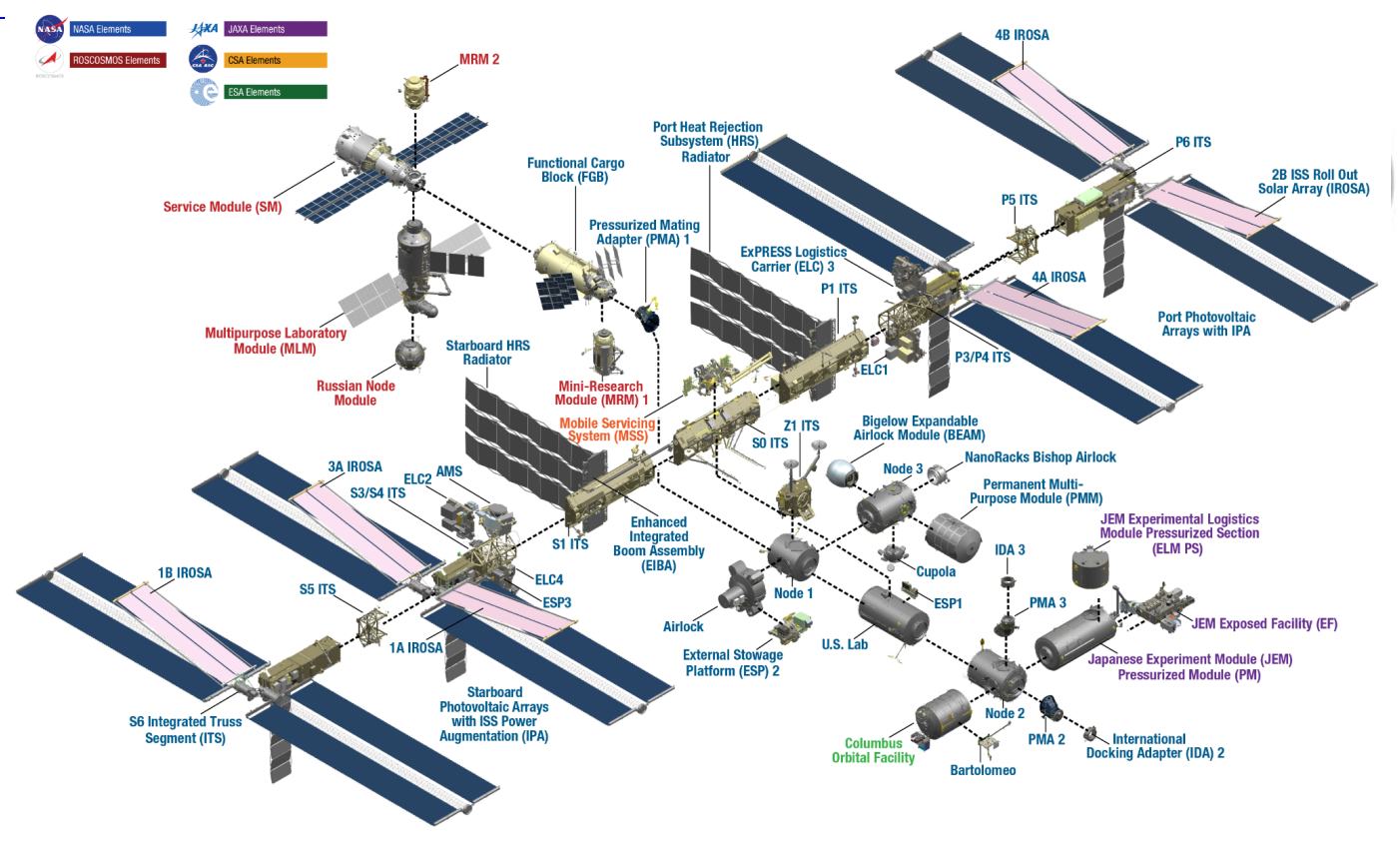
necessitating rigorous daily exercise routines to mitigate these effects.

- **Vision Problems:** Changes in **fluid distribution in the body** can lead to increased **intracranial pressure**, causing vision-related issues, often referred to as **Spaceflight Associated Neuro-ocular Syndrome (SANS)**.
- **Cardiovascular Changes:** The heart can change shape and size in microgravity, leading to potential **cardiovascular issues**.
- **Psychological Effects:** Extended isolation and **confinement can also impact mental health**, leading to **stress, anxiety**, and other psychological challenges.

International Space Station (ISS)

- It is the **largest man-made structure in space**, and was launched in **1998**.
- It functions as a habitat for astronauts and has been continuously occupied since 2000.
- **Participating Agencies:** The ISS is a joint effort of the space agencies of the **United States (NASA)**, **Russia (Roscosmos)**, **Europe (ESA)**, **Japan (JAXA)**, and **Canada (CSA)**.
- **Orbit:** The ISS orbits approximately **400 kilometres above Earth**.
- **Speed:** It travels around Earth at about **28,000 kilometres per hour**, completing an orbit **every 90 minutes**.
- **Objectives:** The ISS aims to **advance our understanding of space and microgravity**, support new scientific research, and exemplify international collaboration.

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Read More: [Space Missions in 2024](#), [Impact of Spaceflight on Brain Fluid Dynamics](#)

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q.1 In the context of space technology, what is “Bhuvan”, recently in the news? (2010)

- (a) A mini satellite launched by ISRO for promoting the distance education in India
- (b) The name given to the next Moon Impact Probe, for Chandrayaan-II
- (c) A geoportal of ISRO with 3D imaging capabilities of India
- (d) A space telescope developed by India

Ans: (c)

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