India Sends Second Astronaut to Space

Source: IE

Why in News?

India achieves a historic milestone as **Group Captain Shubhanshu Shukla** becomes the **second Indian to travel to space**, after **Rakesh Sharma in 1984**, and the **first Indian to set foot on the International Space Station (ISS)**.

- He is part of the **Axiom-4 (Ax-4) mission**, a commercial spaceflight to the **ISS.**

What is the Axiom-4 Mission?

- **About: Axiom Mission 4 (Ax-4)** is the **fourth private spaceflight** to the **International Space Station (ISS)**, operated by **Axiom Space**, a US-based space infrastructure company. It marks the **fourth collaboration between NASA and Axiom Space**, following the successful **Ax-1, Ax-2, and Ax-3 missions**.
- **Crew Composition:**
  - **Peggy Whitson (USA)**: Mission Commander and former NASA astronaut with **675+ days in space**.
  - **Group Captain Shubhanshu Shukla (India)**
  - **Sławosz Uznański-Wiśniewski (Poland)**: **ESA reserve astronaut**.
  - **Tibor Kapu (Hungary)**: **Payload specialist**.
- **Key Objectives of Axiom-4:**
  - **Commercial Space Initiatives:** Promotes **space tourism** and **private research** in **Low Earth Orbit (LEO)**, supporting Axiom Space's goal of building the **first commercial space station** and transitioning operations from the **ISS** to **private infrastructure**.
  - **Scientific Research & Experiments:** Enables **microgravity research** in **materials science**, **biology**, **Earth observation**, and **space agriculture**. Key studies include:
    - **Human factors:** Impact of screen exposure in microgravity.
    - **Astrobiology:** Survival of **tardigrade (water bears)** in space.

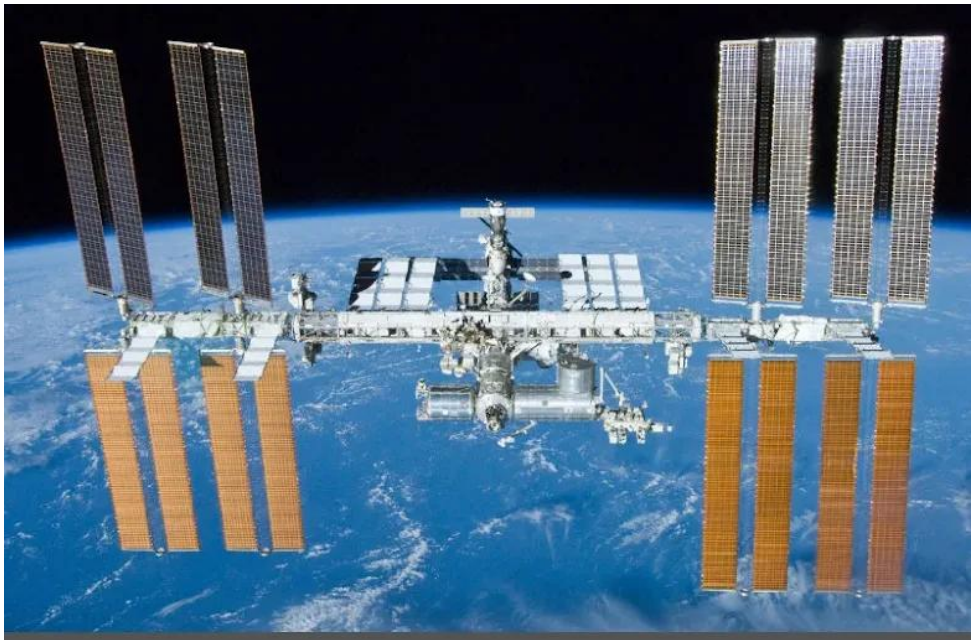
        - **Space agriculture:** Effects on **six crop varieties** (including **moong dal**) and **cyanobacteria**, relevant to **life support systems**.
    - **Global Collaboration:** Features **60 experiments** from **31 countries** (including India, USA, Poland, Hungary), making it the **most research-intensive Axiom mission** and highlighting international cooperation in space science.

What is the Significance of the Axiom-4 Mission for India?

- **Support for Gaganyaan:** Axiom-4 provides critical **hands-on experience** for India's planned **Gaganyaan mission**, especially in **crew operations**, **microgravity research**, and **space biology**, laying the groundwork for future **independent human space missions**.
- **Strategic & Technological Edge:** Human spaceflight is a key **strategic capability** for future missions to the **Moon, Mars, and beyond**. India's role in **Axiom-4** strengthens its position in the **global space arena**, supporting long-term goals like an **Indian space station by 2035** and a **human lunar mission by 2040**.
- **Global Standing & Economic Growth:** ISRO's **active partnership** in mission planning and execution showcases India's **technological competence** and boosts its **international standing**.
    - It also opens avenues for **private sector participation** and **foreign investments**, vital for expanding India's **share in the global space economy**.
- **Youth Engagement and STEM Promotion:** The mission inspires the youth, promotes **STEM education**, and helps build a **skilled talent pipeline** for India's expanding space sector, ensuring sustained innovation and national capacity building.

What are the Key Facts Related to the International Space Station (ISS)?

- **About**: The **International Space Station (ISS)** is the **largest habitable artificial satellite** in **Low Earth Orbit (LEO),** functioning as a unique **space laboratory** for scientific research and international cooperation.
- **International Collaboration**: A **joint venture of 15 countries**, led by 5 space agencies (**NASA**, **Roscosmos**, **European Space Agency**, **JAXA**, and **Canadian Space Agency**).
- **Microgravity Laboratory**: The **ISS** hosts **3,000+ experiments** from **108+ countries**, enabling research in **science, medicine, and Earth observation**. Its **microgravity** aids in studying **human adaptation** and developing **Earth-relevant innovations**.



International Space Station: Interesting facts:a

The International Space Station is a large spacecraft. It orbits around Earth. It is a home where astronauts live.

The space station is also a science lab. Many countries worked together to build it. They also work together to use it.

The space station is made of many pieces. The pieces were put together in space by astronauts. The space station's orbit is approximately 250 miles above Earth.

The first piece of the International Space Station was launched in 1998. A Russian rocket launched that piece. After that, more pieces were added. Two years later, the station was ready for people.

The space station is as big inside as a house with five bedrooms. It has two bathrooms, a gymnasium and a big bay window. Six people are able to live there. It weighs almost a million pounds.

The space station is a home in orbit. People have lived in space every day since the year 2000. The space station's labs are where crew members do research.

Astronauts and supplies are ferried by the U.S. space shuttles and the Russian Soyuz and Progress spacecraft.

Information courtesy - www.nasa.gov

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q. What is the purpose of the US Space Agency's Themis Mission, which was recently in the news? (2008)

(a) To study the possibility of life on Mars
(b) To study the satellites of Saturn
(c) To study the colourful display of high-latitude skies
(d) To build a space laboratory to study the stellar explosions

Ans: (c)

Q. Consider the following statements: (2016)

1. The Mangalyaan launched by ISRO
2. is also called the Mars Orbiter Mission
3. made India the second country to have a spacecraft orbit the Mars after USA
4. made India the only country to be successful in making its spacecraft orbit the Mars in its very first attempt

Which of the statements given above is/are correct?

(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Ans: (c)