Axiom-4 and Beyond

Posted at: 27/06/2025

Axiom-4 and Beyond: India's Evolving Role in Global Space Missions

Context:

India is on the verge of entering an elite group of nations with human spaceflight capability. The participation of **Group Captain Shubhanshu Shukla** in the **Axiom-4 mission to the International Space Station (ISS)** marks a significant step in this direction. Though the mission was not led by ISRO, it holds **strategic importance** for India's space ambitions, especially as the country prepares for the **Gaganyaan mission**.

Significance of Shubhanshu Shukla's Participation in Axiom-4

- **Historic milestone:** Shukla's presence aboard the ISS marks the **first time an Indian astronaut has participated in a commercial international space mission**.
- **Symbolic and strategic:** It symbolizes the **beginning of India's human spaceflight era**, even though the mission was not indigenous.
- **Not an isolated event:** This mission acts as a **stepping stone** toward India's own crewed mission, **Gaganyaan**, scheduled for **2027**.

Strategic Importance for ISRO and Gaganyaan

- **Bridging experience gap:**
    - Shukla was originally selected for **Gaganyaan**.
    - His participation in **Axiom-4** allows India to **gain operational exposure** to international launch systems and mission protocols.

- **Enhancing preparedness:**
    - Helps **refine safety procedures, training modules, and astronaut support systems**.
- **Team involvement:** An ISRO team supported the mission, providing valuable learning on **launch integration and operations**.

Global Human Spaceflight Landscape and India's Position

- **Current global status:**
    - Only **three countries** have independent human spaceflight capability: **USA, Russia, and China**.
- **India's goal:** India is on course to become the **fourth nation** with this capability.
- **Strategic autonomy:**
    - Without human spaceflight capability, India remains **dependent on foreign platforms**.
    - This limits India's role in **planetary exploration** and **deep space missions**.

India's Vision for the Future of Space Exploration

- **Private sector growth in LEO:**
    - The **Low Earth Orbit (LEO)** (200–2,000 km altitude) is increasingly crowded with **commercial satellites**, mostly from private firms.
    - This frees ISRO to **focus on deep space exploration**.
- **Own space station by 2035:**
    - As the **ISS is set to retire by 2030**, India plans to launch its **own space station by**

2035.

- This could position India as a **leading space power** in the post-ISS era.

Technological and Institutional Developments

- **Training infrastructure gaps:**
  - Shukla and other Indian astronauts were trained in **Russia and NASA**.
  - This highlights the **need for India's own astronaut training centre**.
- **Planned outcome:**
  - India aims to establish **domestic training infrastructure** that could also serve **international astronauts** in the future.
- **R&D potential:**
  - Human spaceflight enables **microgravity experiments**, crucial for innovation in **medicine, biotechnology, and material science**.

Geopolitical and Diplomatic Implications

- **Strengthening space diplomacy:**
  - India's involvement in **Axiom-4** reflects enhanced **India–US cooperation** in space technology.
- **Strategic leverage:**
  - Human spaceflight capability will give India **greater bargaining power** in future **multilateral missions and global space policies**.
- **Soft power projection:** Positions India as a **credible and independent space actor** on the global stage.

Conclusion

Shubhanshu Shukla’s journey aboard **Axiom-4** is more than a symbolic achievement—it represents a **critical inflection point** in India's transformation from a **space-faring nation to a space power**.
With **Gaganyaan** on the horizon, plans for an **Indian space station by 2035**, and increasing involvement in **global missions**, India is consolidating its **strategic, scientific, and diplomatic influence** in space.