Space Tourism

Why in news?

Entrepreneur and pilot Gopi Thotakura is set to become the first Indian to venture into space as a tourist on the NS-25 mission of Blue Origin.

What is space tourism?

- Space tourism is a section of the aviation sector which seeks to provide tourists with the opportunity to become astronauts and experience space travel for recreational, leisure, or business purposes.

Types of space tourism	
Sub-orbital	• A suborbital flight is one that goes up into space, which is somewhat arbitrarily defined as either 50 miles or 100 kilometers in altitude but does not achieve orbit. • The spacecraft comes right back down to Earth.
Orbital	• An orbital flight is one that achieves orbit. • That is a state where the spacecrafts forward momentum balances out the pull of Earth's gravity so that it remains in that state, without requiring any further propulsion, indefinitely.

- **NS-25 mission-** It is fully reusable sub-orbital mission of Blue Origin which takes the passengers much further than the Karman line.

Kármán Line lies nearly 100 kilometres above our heads and is considered to be the boundary between Earth's atmosphere and outer space.

ISRO's space tourism
• Indian Space Research Organisation (ISRO) has announced plans to launch a space tourism program by the year 2030. • **Sub-orbital space travel**- The program is expected to include sub-orbital space travel, which involves a spacecraft reaching the edge of space and providing a brief period of low gravity before returning to Earth. • **Cost-**The estimated ticket cost for a space tourist is projected to be around Rs 6 crore. • **Reusable module**- ISRO is working on a space tourism module that is both safe and reusable, which is crucial for the economic viability of space flights. • **Gaganyaan program**- The development of technologies through the Gaganyaan program, India's maiden human spaceflight program, is contributing to the building blocks necessary for human space missions.

What is the significance of space tourism?

- **Space democratization-** It aims to make space more accessible to a broader range of people beyond trained astronauts and scientists.
- **Economic growth-** It has the potential to create new industries, generate revenue, and stimulate economic growth.
- **Advancements in space technology-** Advancements in lightweight materials, life support systems, and re-entry technology benefit not only tourists but also astronauts and scientific missions.
- **Environmental awareness-** Experiencing space firsthand can lead to a greater understanding of the fragility and interconnectedness of earth's ecosystems.
- **Promote education-** It can inspire people of all ages to pursue careers in science, technology, engineering, and mathematics (STEM).
- **Cultural exchange-** It has the power to promote cultural exchange and understanding by bringing together people from diverse backgrounds and nationalities.
- **Space as shared resource-** International cooperation in space tourism can pave the way for joint scientific missions, knowledge sharing, and peaceful exploration.

What are the challenges?

- **High-cost -** Currently, space tourism is expensive. A passenger generally has to pay at least a million dollars to reach outer space.
- **Safety concerns-**The inherent risks associated with space travel, such as launch failures and space debris, necessitate stringent safety protocols and risk mitigation strategies.
- **Regulatory issues-** The lack of comprehensive regulatory frameworks poses challenges for the space tourism industry. Establishing clear regulations is essential for ensuring safety and managing liability.
- **High costs**- The high cost of entry remains a significant barrier as a passenger generally has to pay at least a million dollars to reach outer space.
- **Technological limitations**- Current technology limits the frequency and capacity of space flights.
- **Environmental impact**-The environmental sustainability of space tourism is a concern, particularly regarding the carbon footprint of rocket launches and potential space debris1.
- **Medical risks -** Space tourism can cause health issues from microgravity, increased radiation exposure, and extreme acceleration.
- **Psychological challenges -** Long journeys and living in space can cause psychological problems, such as worrying about connecting with Earth and adapting to harsh conditions.

Approximately 3% of astronauts died during their space flight which is quite a high fatality rate.

Reference

- The Indian Express-What is space tourism