India’s Manned Mission to Space

Why in news?

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Indian Space Research Organisation (ISRO) has announced the definitive timeline for Gaganyaan mission.

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What is ISRO's plan?

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- ISRO has announced its first manned mission which is set to be a reality by 2022.
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- By this, an Indian astronaut will go on a space odyssey by 2022 on board ‘Gaganyaan’.
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- ISRO has roped in Indian Air Force pilots to identify the first set of astronauts for a human space flight.
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What are the works in progress?

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- **Launch vehicle -** The launch vehicle for this mission is planned to carry heavy payloads into space.
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- The spacecraft carrying human beings, called crew module, is likely to weigh in excess of 5 to 6 tonnes.
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- For this purpose, GSLV Mk-III (or) Launch Vehicle Mark-3 (LVM-3) is being developed.
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- This comes with cryogenic engine, with capabilities to deliver much heavier payloads much deeper into space.

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- **Re-entry & Recovery tech** - ISRO has already tested the GSLV Mk-III with experimental crew module.
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- It came back to Earth after being taken to an altitude of 126 km into space.
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- This this known as Crew module Atmospheric Re-entry Experiment (CARE).
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- **Crew Escape System (CES)** - ISRO had tested the Crew Escape System, a mechanism for an advance warning.
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- System warns the crew module of anything going wrong with the rocket and pulls it away to a safe distance.
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- After this, it can be landed either on sea or on land with the help of attached parachutes.
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- **Life support** - The Environmental Control & Life Support System (ECLSS) is meant for humans inside to live comfortably.
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- It ensures that conditions inside the crew module are suitable for living.
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- The ECLSS -
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i. maintains a steady cabin pressure and air composition
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ii. removes carbon dioxide and other harmful gases
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iii. controls temperature and humidity
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iv. manages parameters like fire detection and suppression, emergency support
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v. takes care of food and water management
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- **Astronaut training** - ISRO still plans to set up a permanent facility like a

foreign facility, to train candidates for the first manned mission.
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- Candidates would be trained for at least two years in living in zero gravity.
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- It would also include dealing with a variety of unexpected experiences of living in space.
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What are the challenges?

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- A manned space mission is very different from all other missions that ISRO has so far completed.
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- In terms of complexity and ambition, even the missions to the Moon (Chandrayaan) and Mars (Mangalyaan) are nowhere in comparison.
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- For a manned mission, the key distinguishing capabilities that ISRO has had to develop include
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i. the ability to bring the spacecraft back to Earth after flight
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ii. building a spacecraft in which astronauts can live in Earth-like conditions in space
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- Over the years, ISRO has successfully tested many of the technologies that are required.
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- However, many other challenging ones are still to be developed and tested.
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Source: Indian Express

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