

# **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.  $\space$
- This this known as Crew module Atmospheric Re-entry Experiment (CARE).  $\space{\space{1.5}n}$
- Crew Escape System (CES) ISRO had tested the Crew Escape System, a mechanism for an advance warning.  $\n$
- System warns the crew module of anything going wrong with the rocket and pulls it away to a safe distance.  $\n$
- 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.
- It ensures that conditions inside the crew module are suitable for living.  $\n$
- The ECLSS -

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- i. maintains a steady cabin pressure and air composition  $\slash n$
- ii. removes carbon dioxide and other harmful gases  $\nphin$
- iii. controls temperature and humidity  $\space{\space{1.5}n}$
- iv. manages parameters like fire detection and suppression, emergency support

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 $\ensuremath{\mathbf{v}}\xspace.$  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.  $\ensuremath{\sc vn}$
- 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.  $\n$
- For a manned mission, the key distinguishing capabilities that ISRO has had to develop include

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 ${\rm i.}\,$  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  $\gamman n$ 

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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.  $\space{\space{1.5}n}$ 

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## Source: Indian Express

