Gaganyaan Mission – Crew Module–Service Module Separation Test

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Why in News?

The Indian Space Research Organisation (ISRO) has completed a series of Crew Module (CM)–Service Module (SM) separation tests ahead of the first uncrewed Gaganyaan mission (G1), targeted for launch in 2026.

Gaganyaan Mission

- **Aim** – To demonstrate India's human spaceflight capability by sending a crew of 3 astronauts to an orbit of approximately 400 km for a three-day mission and bringing them safely back to Earth.
- **Purpose of the Tests** – The tests validate the design and reliable functioning of the separation system, including its ability to withstand mechanical shocks.
- **Crew Module (CM)** – It houses the astronauts during the mission and is designed to return them safely to Earth.
- **Service Module (SM)** – It supports **the** Crew Module during the orbital phase of the mission. The CM and SM together form the Gaganyaan Orbital Module.
- **CM–SM Separation** – The two modules remain connected during launch and the orbital phase.
    - Before atmospheric re-entry, the Crew Module separates from the Service Module.
- **Separation System** – It uses precisely sequenced separation events, pyrotechnic devices and jettisoning mechanisms.
    - Umbilical connections carrying electrical and fluid services must also be severed.
- **Critical Systems Tested** – These include avionics, inertial navigation systems, thermal protection systems, heat shields, deployable umbilical shields and crew-module uprighting mechanisms.
- **Test Facility** – The test setup was established at the Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram, Kerala.
- **Mission Recovery** – The Crew Module is intended to re-enter Earth's atmosphere and splash down in Indian sea waters.



Reference

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