

Gaganyaan Crew Module -3 Qualification Tests

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Why in News?

Recently, ISRO has successfully accomplished 3 major qualification tests for the Crew Module (CM) systems of the [Gaganyaan](#) mission.

Float Inflation Test - Crew Module Up-righting System (CMUS)

- **Purpose** - Ensures the Crew Module remains upright after splashdown in the sea.
- **System** - Stored cold gas-based up-righting mechanism.
- **Outcome** - Demonstrated successful inflation of primary flotation devices, meeting functional, performance, and inflation time requirements across operating pressure ranges.

Umbilical Separation Test - Crew Module Service Module Connect and Disconnect System (CSCDS)

- **Role** - Provides electrical and hydro-pneumatic umbilical link between Crew Module (CM) and Service Module (SM).
- **Functions** - Enables communication and fluid transfer for Environment Control and Life Support System (ECLSS).
- **Outcome** - Validated clean separation of CSU-2 (Crew Module side), structural stability of CM panel, and design margins for re-entry safety.

Structural Qualification Test - Apex Cover Separation Loads

- **Role** - Apex cover protects parachutes and subsystems during mission.
- **Process** - Separated at predetermined altitude using pyrotechnically actuated thrusters before parachute deployment.
- **Outcome** - Test rig applied 1.75× estimated loads; confirmed strain, deformation, and design margins, validating CM structural integrity during separation.

Reference

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