Gaganyaan: Mated Modules, Sequenced Separation

Study/source context: ISRO announcement: 16 October 2026 | VSSC, Thiruvananthapuram
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Space technology: systems and testing

News Context:

On 16 October 2026, ISRO announced the completion of the series of separation tests of Gaganyaan's Crew Module (CM) and Service Module (SM). The test setup had been built at the Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram. This is an announcement of a test, not of a crewed flight having been completed.

The Relationship of the Two Parts:

Gaganyaan's Orbital Module consists of the CM and the SM. Before launch the two are joined, and until the orbital phase is complete they work like one integrated module. The Orbital Module is not just another name for the CM.

The joining of electrical and fluid services remains through umbilical connections. Here, umbilical means a connection of equipment and services, not the name of some independent launch vehicle.

From the Orbital Module to separation
Joined structure: Crew Module + Service Module

Orbital phase: the two work like an integrated module

Before re-entry: separation of the Crew Module from the Service Module

A ground simulation, not proof of an actual flight

The Sequence of Separation:

Before beginning re-entry into the Earth's atmosphere, the CM separates from the SM. According to ISRO, several events related to pyrotechnic devices and jettison systems occur in a precise sequence in this. Do not understand it as a single act of cutting one wire.

What Did the Test Examine?

The test setup simulated the entire CM-SM combination and examined the condition of several umbilical connections severing. ISRO mentioned the adequacy of the separation design and the shock-tolerance of the CM's important sub-systems.

These include sub-systems such as avionics, inertial navigation, the thermal protection of the heat shield and the umbilical shroud. The purpose is to check that the systems remain safe during separation.

The Correct Meaning of Success:

A ground simulation and confirmation obtained from an actual flight returning from orbit are different. ISRO described the test as the confidence needed for the separation system of the first uncrewed G1 mission. In the release, the target for G1 is 2026 - it is not an announcement of a successful flight having taken place.

The exact number of tests, the individual dates and detailed pass criteria are not in the release. No estimate of them has been added here. It would also not be proper to take the date of the announcement as the actual date of all the tests.

Prelims Style: Practice Questions

Question 1. Which sequence matches ISRO's description?

(a) The CM and SM join after re-entry

(b) The two remain separate before launch and never join

(c) Integrated operation in the orbital phase, then separation before re-entry

(d) The first ground check after the success of a crewed flight

See Answer and Reason
Answer: (c). The two remain integrated until the orbital phase; they separate before re-entry.

Question 2. The umbilical connection is related to what?

(a) The electrical and fluid services between the CM and the SM

(b) Only the name of the launch site

(c) A sea relief vessel

(d) An independent satellite constellation

See Answer and Reason
Answer: (a). ISRO has described the joining of electrical and fluid servicing between the two modules.

Question 3. The combination was simulated at VSSC and separation tested. What does this not establish?

(a) The design was examined in a ground test

(b) The shock-tolerance of some sub-systems was checked

(c) The severing of umbilicals was simulated

(d) A crewed Gaganyaan has completed a successful return from orbit

See Answer and Reason
Answer: (d). A ground test is not proof of a crewed orbital flight having been completed.

Source:

ISRO: CM-SM separation tests, 16 October 2026