

## Launch lessons: On ISRO's satellite launch problem

The loss of communication between the ground station and the Indian Space Research Organisation's latest satellite after its launch on March 29 is deeply disappointing. ISRO's mission aimed to place the communication satellite, GSAT-6A, in space. However, shortly after the second orbit-raising operation, the ground station lost track of the satellite on March 31, when it was on course for the final firing. Understanding why this happened is crucial. A launch operation can be simplified into the initial three stages, during which the satellite is boosted to different heights by the launch vehicle and then placed in a geosynchronous transfer orbit. This is an elliptical orbit into which a satellite is placed initially before being transferred into a geosynchronous orbit where it maintains a position above a fixed longitude. During each of these stages, a part of the rocket completes its role and disengages from the bulk. Then the satellite moves towards its final and desired orbit. The GSAT-6A was first raised to the elliptical orbit marked by the following parameters: its perigee, or point of closest approach to Earth, was 5,054 km; and its apogee, or point of farthest approach, was 36,412 km. This was followed up by a second orbit-raising operation on March 31. It was after this and during the third such operation that the ground station lost contact with the satellite. This is why it is being conjectured that the failure occurred because of a flaw outside the launch vehicle, the GSLV, perhaps from a short circuit or power glitch within the satellite itself.

### GSAT-6A still eludes ISRO

The last word has not been said on the mission, as ISRO officials continue to try to establish contact with the satellite. Yet, in complex scientific feats such as ISRO's projects, there is no mission so devoid of a learning aspect to it that it is deemed a total failure. The GSLV has had several successes in the past, and this is its 12th flight. For instance, it was used to launch the advanced communication satellite, GSAT-6, in August 2015. GSAT-6A's predecessor, GSAT-6, provides S-band services for two-way communications as in the case of mobile phones. The present mission, launched on March 29, was endowed with additional features, such as the high-thrust Vikas engine that gave it the capacity to carry a heavier payload. It had been reported that the mission would be a testing ground for ISRO's next moon mission. Given this background, ISRO should be open about the specific learning points from this launch exercise. Space science is exciting not just for the experts, but to many outside the field. Therefore, it is important that the agency presents itself more openly to the world.

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