

AIR BREATHING PROPULSION : ISRO COMPLETES SECOND TEST FLIGHT



The Indian Space Research Organisation (ISRO) successfully carried out the second experimental flight for the demonstration of Air Breathing Propulsion Technology on 22 July 2024. The Propulsion systems were symmetrically mounted on either side of a RH-560 Sounding rocket and launched from Satish Dhawan Space Centre, Sriharikota. The flight test achieved satisfactory performance of the Sounding Rocket along with successful ignition of the Air Breathing propulsion systems. Nearly 110 parameters were monitored during the flight to assess its performance. The flight data from the mission will be useful for the next phase of development of Air Breathing Propulsion systems. Prior to the mission, multiple ground tests were carried out at the various ISRO Centres including Vikram Sarabhai Space Centre (VSSC), Liquid Propulsion Systems Centre (LPSC)

and ISRO Propulsion Complex (IPRC) and also at the CSIR -National Aerospace Laboratories (CSIR-NAL), Bengaluru.

RH-560 is a two-stage, solid motor based sub-orbital rocket that is designed to be utilized as a cost-effective flying test bed for the demonstration of advanced technologies. It is the heaviest sounding rocket in the ISRO's family of sounding rockets and is launched from Sriharikota.

Sounding Rockets

With the establishment of the Thumba Equatorial Rocket Launching Station (TERLS) in 1963 at Thumba, a location close to the magnetic equator, there was a quantum jump in the scope for aeronomy and atmospheric sciences in India. The launch of the first sounding rocket from Thumba near Thiruvananthapuram, Kerala on 21 November 1963, marked the beginning of the Indian Space Programme . Sounding rockets made it possible to probe the atmosphere in situ using rocket-borne instrumentation. The first rockets were two-stage rockets imported from Russia (M-100) and France (Centaure). While the M-100 could carry a payload of 70 kg to an altitude of 85 km, the Centaure was capable of reaching 150 km with a payload of approximately 30 kg.

ISRO started launching indigenously made sounding rockets from 1965 and experience gained was of immense value in the mastering of solid propellant technology. In 1975, all sounding rocket activities were consolidated under the Rohini Sounding Rocket (RSR) Programme. RH-75, with a diameter of 75mm was the first truly Indian sounding rocket, which was followed by RH-100 and RH-125 rockets. The sounding rocket programme was the bedrock on which the edifice of launch vehicle technology in ISRO could be built. It is possible to conduct coordinated campaigns by simultaneously launching sounding rockets from different locations. It is also possible to launch several sounding rockets in a single day.

Operational Sounding Rockets

Currently, three versions are offered as operational sounding rockets, which cover a payload range of 8-100 Kg and an apogee range of 80-475 km.

Vehicle	RH-200	RH-300-Mk-II	RH-560-MK-II
Payload (in kg)	10	60	100
Altitude (in km)	80	160	470
Purpose	Meteorology	Aeronomy	Aeronomy
Launch Pad	Thumba Balasore	SDSC-SHAR	SDSC-SHAR

Several scientific missions with national and international participation have been conducted using the Rohini sounding rockets.

Source : ISRO, Department of Space