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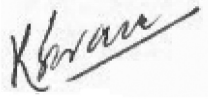
MESSAGE

Reusable Launch Vehicle (RLV) capable of carrying payloads to designated orbital destinations, returning to earth for servicing and then performing another mission within days has been the dream programme of all space faring countries. Research is being carried out worldwide to prove the concept of a cost effective and fully Reusable Launch Vehicle. The need to develop RLVs stems from the inherent advantages like low cost for space access, less turnaround time and minimizing space debris. The concept is becoming increasingly relevant in these days due to stiff competition from private enterprises as well as emphasis on low cost a ccess to space.

Having established its presence in the space arena with operational launch vehicles to Low Earth Orbit (LEO) and Geostationary Transfer Orbit (GTO), and successful demonstration of re-entry missions like Space Capsule Recovery Experiment (SRE) and Crew Module Atmospheric Re-entry Experiment (CARE), it is prudent for ISRO to make humble beginnings into this highly challenging and emerging area, by demonstrating some of the critical technologies that are required for an RLV through a Technology Demonstrator Vehicle (TDV).

ISRO successfully carried out flight testing of Reusable Launch Vehicle-Technology Demonstrator (RLV-TD) on 23 May 2016. RLV-TD has been configured to act as a flying test bed to evaluate the critical technologies, namely, hypersonic aero-thermodynamics of winged body, evaluation of re-usable Thermal Protection System (TPS) and hot structure and re-entry guidance, navigation and control. These technologies will be useful in realizing an operational RLV in the future.

The aerodynamic configuration of TDV was finalized with due consideration on flight profile and mission requirements to provide the required Lift-to-Drag ratio ensuring controllability in all regimes. The structural design followed aircraft design principles with improvements in choice of materials to withstand severe aerodynamic and thermal loads and incorporating thermo-structural analysis and testing. The Navigation, Guidance and Control was designed catering to all flight regimes including lift-off, ascent, coasting, re-entry, controlled descent and splash down. Though the flight is with a scaled down model, this technology demonstration experiment has yielded a treasure trove of invaluable data on hypersonic flight of a winged vehicle through atmosphere. Sharing of the scientific data through the special section of *Current Science* with the national aero-space community at large will enable better understanding of the data as well as enable future research in this direction. I sincerely appreciate the work done by the editors in bringing out this special section.



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