Preface

Reusable Launch Vehicle-Technology Demonstrator

ISRO successfully launched the Reusable Launch Vehicle Technology Demonstrator (RLV-TD) on 23 May 2016 from Sriharikota. RLV-TD was conceived to demonstrate the complex technologies needed for RLV like hypersonic aerodynamics, aero-thermal, structure, control, guidance and navigation, materials, actuation systems and system quality and reliability. RLV-TD is conceived as a winged body configuration to fly at subsonic, supersonic and hypersonic Mach number regimes, re-enter the earth's atmosphere and to demonstrate the landing manoeuvre. The reusable technologies are needed essentially to reduce the launch cost and achieve faster turnaround time. Mastering all these cutting-edge technologies required considerable amount of efforts in design, analysis, testing and experimentation, which have taken several years. Towards the success of RLV, national laboratories, industries and leading academic institutes like the IITs, IISc and IIST have made immense contributions. The choice of the winged body and the complexities of the reentry have brought new dimensions in this mission compared to conventional launch vehicles. Successful launch of RLV and demonstration of all associated technologies in this mission have proved the indigenization capability of India.

During the journey of RLV, several problems were encountered while developing the critical technologies; the flight has also provided a volume of data on the performance of the systems. Flush Air Data Sensing System (FADS) is one of the critical subsystems used in RLV-TD to carry out the surface pressure measurements from the nose cap of the vehicle and derive important air-data parameters such as angle of attack, angle of sideslip, Mach number which are needed by the flight control and guidance systems and also in the overall mission management. Although it was used in a passive mode in this flight, the satisfactory functioning of the system enables its use in the active loop in subsequent flights.

In order to disseminate the complexities of the technologies and share the exciting experience of the development, 12 technical papers encompassing the wide spectrum of areas like structures, aerodynamics, aerothermal, propulsion, control and guidance, integrated electro-hydraulic systems, quality assurance and a few selected technology development areas are presented in this special section. I earnestly hope that the readers would get an insight into complexities involved in the cutting-edge technologies used in RLV-TD. The successful flight of RLV-TD in its maiden attempt by ISRO gives the needed confidence to pursue further development efforts to meet the overall objectives of mastering the reusable technologies and thus reduce the cost of launching the spacecraft in the coming years.

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