Paper ID: 35980
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SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Future Space Transportation Systems Verification and In-Flight Experimentation (6)

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IXV CMC THERMAL PROTECTION SYSTEM POST-FLIGHT PRELIMINARY ANALYSIS

Abstract

The Intermediate experimental Vehicle (IXV) atmospheric re-entry demonstrator, developed within the FLPP (Future Launcher Preparatory Program) and funded by ESA, aimed at developing a demonstration vehicle that gave Europe a unique opportunity to increase its knowledge in the field of advanced atmospheric re-entry technologies. A key technology that has been demonstrated in real conditions through the flight of this ambitious vehicle is the Thermal Protection System (TPS) of the Vehicle. Within this program, AIRBUS SAFRAN LAUNCHERS has been in charge of the TPS of the windward and nose assemblies of the vehicle, and has developed and manufactured SepcarbInox® Ceramic Matrix Composite (CMC) protection systems that provided a high temperature resistant non ablative outer mould line (OML) for enhanced aerodynamic control.

After the successful flight of February the 11th, 2015, the vehicle has been recovered and the excellent behaviour of the TPS to the thermal loads of re-entry has been assessed. Recorded data have also been retrieved, which allows performing a preliminary analysis of this flight.

This paper will detail the first findings and conclusions made on this historical IXV flight based on the thermocouples and displacement sensors measurements. It will also describe some of the ongoing activities for the development of the Space Rider TPS. The Space Rider, also developed by ESA, is the successor of the iXV, and aims at demonstrating reusability aspects with minimum refurbishment, for six missions. It will be as far as possible based on technology already proven on the IXV.