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

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TESTING THE DESCENT AND RECOVERY OF ESA'S INTERMEDIATE EXPERIMENTAL VEHICLE

Abstract

In the field of the re-entry spacecraft developments, the last years have shown how critical it is to reach a high level of confidence in the functioning of their Descent and Recovery subsystems by achieving a solid verification of their functionality and performance all along the mission timeline. Testing in a fully representative environment is the only possibility to obtain this.

This paper describes the ESA's Intermediate eXperimental Vehicle (IXV) end-to-end test of its Descent and Recovery subsystems being under preparation by its prime contractor Thales Alenia Space Italia with the major contribution of the Italian Aerospace Research Centre (CIRA) and several aerospace industries: APCO (Switzerland), RUAG (Switzerland), PIONEER (US), AEROSEKUR (Italy), AVIO (Italy).

It describes:

- The design of the IXV Test Model with the same dimensions and weight of the IXV Flight Model at the instant of parachute opening. Special care is taken to match the Outer Mould Line (OML) that will ensure the fidelity of the aerodynamic response;
- The flight models of the main parachute and floatation balloons that, once integrated in the Test Model, constitute the core of the product under test;
- The flight models of the parachute hatch, floatation hatches and thermal protection system contributing to the fidelity of the interfaces;
- The Test Avionics dedicated both to the commanding of the descent and recovery sequence with flight representative algorithm and to the acquisition of several measurements aimed at the reconstruction

of the trajectory and the splashdown loads;

- The Test Mission including the Testing Range in the Mediterranean Sea, the carrier helicopter and the mission timeline that matches, within certain constraints, that of the IXV flight.

In conclusion, the feasibility of testing in real conditions the descent and recovery subsystems requires a specific engineering effort to design the Test Mission in line with the Flight one. It requires a big involvement of the teams in charge of those subsystems in the Flight Model and of other system-level disciplines like Mission Analysis, Structure & Mechanisms and Aerodynamics.