

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

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IXV AVIONICS, FROM DESIGN TO MISSION RESULTS

Abstract

The paper will focus on the Intermediate eXperimental Vehicle (IXV), the first European glider successfully performing an autonomous atmospheric reentry from a suborbital LEO trajectory. An introduction of the mission objectives will be provided, describing the selected trajectory envelope and the main spacecraft features. Core of the paper will be the avionics architecture, analyzed through the constituting subsystems and equipment, presenting the OTS/COTS/new development item's nature, the specific qualification approach that has been selected and the relevant test outcomes. The approach followed for acceptance and ground test campaigns will be described introducing the verification facilities designed and manufactured on purpose. The paper will also focus on the novelties introduced such as Ethernet-based protocol for the Data Acquisition System and the synergies with Ariane 5 and Vega equipment (batteries, IMU, flap actuator), pursued in order to comply with the design-to-cost requirement for the development of the avionics system of the reentry vehicle. The launch campaign activities involving the IXV Avionics will be presented, including the specific flight preparation tasks required for GPS operations. Finally the paper will provide some mission highlights of the first results based on the interpretation of the data received via telemetry and retrieved from the flight recorders, covering the behavior of the Data Handling System, the quality of telemetry recording and real time and delayed transmission, the performance of the batteries and the Power Protection and Distribution Unit, the ground segment coverage during visibility windows, and the performance of the GNC sensors (IMU and GPS) and actuators. The paper will then give some preliminary tracks of the IXV follow on, introducing the objectives of the Innovative Space Vehicle and the necessary improvements, to be developed in the frame of PRIDE.