

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

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THE EXPERT QUALIFICATION AND ACCEPTANCE CAMPAIGN: A MULTI-PURPOSE
EXPERIENCE FOR FUTURE RE-ENTRY MISSIONS

Abstract

EXPERT is developed by the European Space Agency (ESA) in order to provide Scientific Community and Industry with quality data on critical aero-thermodynamic phenomena encountered during hypersonic flights as well as end-to-end system experience related to development, manufacturing and qualification of re-entry vehicle hardware, software and hypersonic instrumentation. EXPERT is equipped with 15 experiments provided by several scientific institutions all around Europe. The experiments address the following phenomena: TPS material characterization, surface catalysis and oxidation, plasma spectroscopy, laminar to turbulent transition, flow separation and reattachment, shock-boundary layer interactions, base flow characteristic and aerodynamic characterization of flap control surfaces. The paper focus on the peculiarities of the qualification and acceptance test campaign for the EXPERT project as precursor of new generation of re-entry operational vehicles. Environmental and functional test campaign from equipment to system level has allowed the successful delivery of the integrated system, leading to robust solutions for future manifold applications. EXPERT will benefit future atmospheric re-entry activities ranging from cargo to human orbital transportation systems as well as re-usable launchers and scientific probes.