

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

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DEVELOPMENT OF ADVANCED RE-ENTRY SYSTEMS BASED ON INFLATABLE HEAT SHIELDS
IN THE EFESTO PROJECT: PRELIMINARY IOD MISSION AND SYSTEM DEFINITION

Abstract

The European Union H2020 project EFESTO is coordinated by DEIMOS Space with the goals of improving the TRL of Inflatable Heat Shields for re entry vehicles in Europe from 3 to 4/5 and paving the way to an In Orbit Demonstration (IOD) that could further raise the TRL to 6. This paper provides a synthesis of the EFESTO design and experimental achievements and sums up the inflatable heatshield IOD mission and system design. This is the final step of the EFESTO project. First, the initial IOD design resulted from a dedicated Concurrent Engineering Facility (CEF) session is introduced. The session core consisted of trading-off the system configuration options derived from the sequential design and testing campaigns, including the inflatable structure and F-TPS key subsystems. Additional aspects, such as launcher and landing site selection, were considered. The driving rationale is the maximization of the scientific return of the experiment while also taking into account feasibility considerations related to the current European space sector capabilities and market opportunities. The subsequent design phase focused on harmonizing the CEF mission and system definition and extending it with a preliminary

assessment of the IOD system realization and mission implementation. This final output represents a unique contribution of the EFESTO project to the European know-how in inflatable heatshield technology and promotes the relevance of the EFESTO consortium in the frame of a European re-entry technology roadmap.