

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

Author: Ms. Maria Teresa Signorelli
Thales Alenia Space Italia (TAS-I), Italy

Mr. Angelo Denaro
Thales Alenia Space Italia (TAS-I), Italy

Mr. Fabio Caramelli
European Space Agency (ESA), Italy

Mr. Lorenzo Vignini
Thales Alenia Space Italia, Italy

SPACE RIDER: PAYLOADS AGGREGATE DESIGN AND PREPARATION PROCESS
THROUGHOUT THE WHOLE MISSION LIFETIME

Abstract

The Space Rider program, is an uncrewed, automated and reusable robotic laboratory, part of space transportation systems of European Space Agency (ESA), representing the first opportunity in Europe to implement routinely flights to LEO and back to Earth, thanks to a fast refurbishment turnaround time, ensuring in-orbit experimentation to Payload Users. Multi-Purpose Cargo-Bay, located in the central section of the cargo-bay of the re-entry vehicle, is the compartment in which the experiment Payloads are embarked and thanks to the servicing subsystems (power, data management, thermal control, mechanical load attenuation, direct exposure to space...) provides the Payloads with the most comfortable environment and efficient interfaces, allowing to perform any kind of experimentation from microgravity up to observation of the Earth and deep space, so as to achieve complete satisfaction of the Customer's expectations (s).

Scope of this paper is to provide an overview of the engineering effort spent on the Payload Aggregate design and preparation process needed to support vehicle and the Payloads accommodated in the Multi-Purpose Cargo-Bay throughout the whole mission lifetime allowing them to achieve the objectives of experiment. It provides a description of the technical challenges and solutions that are not limited to the design, development, and qualification of the so-called Payload Aggregate, but also to the manufacturing of the aggregate parts and tools needed to assist and support the Payloads during their ground preparation, their integration in the vehicle, their in-orbit operations and finally their retrieval to be returned to Customers.