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

Author: Mr. ANGELO DENARO
Thales Alenia Space Italia, Italy, ANGELO.DENARO@THALESALENIASPACE.COM

Mr. DANIELE FRANCESCONI
Thales Alenia Space Italia (TAS-I), Italy, daniele.francesconi@thalesaleniaspace.com
Mr. STEFANO GALLUCCI
AVIO S.p.A., Italy, STEFANO.GALLUCCI@AVIO.COM
Mr. Fulvio Spaziani
AVIO S.p.A., Italy, Fulvio.spaziani@avio.com
Mr. Neil Paul Murray
ESA, Italy, Neil.Paul.Murray@esa.int
Mr. Josè Longo
ESA, Italy, Jose.Longo@esa.int

REUSABILITY AND REFURBISHMENT APPROACHES DRIVING SPACE RIDER PLATFORM ENGINEERING PROCESSES

Abstract

SPACE RIDER is conceived to enable routine "access to" and "return from" space to any Payloads end users which want to experiment, demonstrate and validate in LEO a variety of application payloads and technologies for subsequent return and analysis. The achievement of the 400 Km target orbit is allowed by the VEGA C launcher, being the 2 months orbital experimental phase ensured by the AOM (modified VEGA C fourth stage acting as service module) integrated with the Re-entry vehicle (RM), the latter representing the evolution of the IXV demonstrator. The capability for a subsequent re-entry through the Earth atmosphere is realized by the RM reusable module that, after a precision landing will undergo a 6 months of refurbishment before the re-flight. The Space Rider System is therefore designed as an orbital reusable platform able to perform in-orbit payload experimentation (microgravity, Earth and space observation, radiation exposure) allowing potential capabilities for enlarged applications (dual use, in-orbit servicing, satellite inspections). The Space Rider mission integrates the payloads orbital operations with the capability to overcome the severe re-entry environment and to perform a precision landing: all ingredients characterizing the first European experimentation platform at payloads end users' disposal for repeated flights. In this context, the reusability of the Space Rider re-entry vehicle is a pervasive requirement driving any level of the System (from materials up to components, subsystems and proto-flight system) and any stage of the engineering process. The present paper deals with the new cost-effective approaches that the project is defining to properly carry-on design, development and qualification stages finalized to the commercialization of a 6 flights reusable vehicle, keeping the best balancing between reusability, refurbishment and replacement of the Space Rider constituent equipment and subsystems.

Keywords: Re-entry Module, AVUM Orbital Module, reusable platform, in-orbit experimentation, payload, IXV, Re-Entry Descent and Landing (EDL).