IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Upper Stages, Space Transfer, Entry and Landing Systems (3)

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

Mr. DANIELE FRANCESCONI
Thales Alenia Space Italia (TAS-I), Italy
Mr. STEFANO GALLUCCI
AVIO S.p.A., Italy

SPACE RIDER: THE REUSABLE EUROPEAN PLATFORM FOR IN-ORBIT EXPERIMENTATION

Abstract

The successful IXV flight occurred in Feb. 2015 represents an outstanding cornerstone along the European space transportation roadmap. The demonstration of the atmospheric re-entry capability and of the mastering of so complex systems opens the horizon to wider space applications focusing on the availability of a reusable platform for in-orbit experimentation. 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 SPACE RIDER System is made of the AVUM Orbital Module (AOM) plus the Re-entry Module (RM). The AOM is composed by the fourth stage of the VEGA-C launcher, which interfaces through the new AVUM Life Extension Kit (ALEK) with the Re-entry Module (RM). A series of 6 flights is foreseen with the same reusable RM The SPACE RIDER mission, after the ascent phase powered by the VEGA-C launcher, will provide an orbital experimentation phase up to two months long to perform free-flyer applications (micro-gravity and radiation exposure experiments) and In-orbit Demonstration Validation(IOD-IOV), such as Earth observation, Earth science and telecommunications. A Multi Purpose Cargo Bay (MPCB) with opening doors will allocate the experimentation payload(s) and will provide flexible services supporting the experimentation (e.g.: power, thermal control, mechanical, data, telemetry and telecommand interfaces). The mission scenario is designed to accomplish the system housekeeping and the payload(s) needs at the same time, performing all the maneuvers and attitude controls required to accomplish the experimentation objectives. At completion of the two months experimentation, the AOM will perform the de-orbiting maneuver and, after its separation from the RM, will follow a destructive re-entry together with the ALEK, while the RM with the embarked payload will reentry through the atmosphere and will complete its mission with a soft landing. After a turnaround of six months, the completion of the planned inspection and refurbishment will make the SPACE RIDER system ready for the next mission. The Program has just contracted from the European Space Agency (ESA) its phases B2-C in January 2018, targeting the System CDR in September 2019. The industrial consortium is led by a Thales Alenia Space and ELV Co-primership.