SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS (D2)
Future Space Transportation Systems Technologies (5)

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OVERVIEW ON TECHNOLOGIES DEVELOPMENT APPLICABLE TO CRYOGENIC UPPER STAGES WITHIN ESA, FUTURE LAUNCHERS PREPARATION PROGRAM (FLPP)

Abstract

In the frame of FLPP-CUST (Cryogenic Upper Stage Technologies) Project, a set of technologies, applicable to future cryogenic upper stages were identified, to cover the needs related to re-ignitability and improved performances for long ballistic phases of Next Generations Launchers (NGL). Presentation on technologies selection process was already reported in a dedicated paper in IAC-08-D2.5.4.

This paper presents the progress made by European Industry involved in the development of the selected technologies. These technologies are mainly related to management of the cryogenic propellants in ballistic phase, namely Propellant Management Devices (PMD) ,Gas Port Phase Separator (GPPS), Propellant Preconditioning (PPC) but also for technologies required to improve thermal insulation mainly for liquid Hydrogen tank such as Versatile Thermal Insulation (jettisonable concept) and Sandwich Common Bulkhead which has a thermo-mechanical function.

The paper will provide an overview of each concept and assessments on stage level of expected performances of each technology. The assessment will include a rough presentation of advantages and drawbacks of each technology wrt other technologies fulfilling similar function. The expected gain at stage level of each technology will also be addressed.

The paper will conclude with the presentation of coming activities and technologies road map for the ones in development and also for future developments.