

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

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## FLPP NEO MUSE - MULTIFUNCTIONAL UPPER STAGE EXPRESS

**Abstract**

The Ariane launchers have by now a large and excellent background on upper stages. Hydrogen/Oxygen cryogenic propulsion has been mastered on upper stage since the very first launch of Ariane in 1979. The H10-III upper stage of Ariane 4 can still be considered today a benchmark in terms of structural index and performance. The storable upper stage of Ariane 5 (EPS) is an excellent example of an efficient versatile solution. The ESC-A being essentially an adaptation of the Ariane 4 upper stage propulsion system to the constraints of Ariane 5, the reference to be taken as the receiver of future improvements is the upper stage (ULPM) of Ariane 6 currently in development.

The space transportation sector in Europe copes with the evolutions of the satellites and their mission profiles, and prepares the arrival of innovative services. Therefore, FLPP NEO Multifunctional Upper Stage Express “MUSE” System and Technology anticipates the trends and creates new opportunities by preparing future launcher upper module architectures and enabling technologies through integrated demonstrators. These architectures and technologies will expand the range of services and anchor competitiveness.

The upper stages are a key element of the launcher competitiveness, especially to the payload performance and to the range of possible mission profiles. Concrete and effective avenues to significant payload performance increase and high mission versatility are identified, while at the same time lowering or at least not increasing the serial production cost.

The overarching objective is to trade, optimise and consolidate credible architectures possibilities and their design, engineering rules and technologies w.r.t. maximisation of their value for the available market which naturally includes performance, costs, revenue and flexibility.