

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

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INNOVATION ON UPPER STAGE ARCHITECTURE AND LOW COST MANUFACTURING
METHODS AT MT AEROSPACE**Abstract**

In this paper, innovations in the field of launcher upper stage architecture will be presented. Therefore, a set of promising technologies for the application in upper stages have been investigated among European industrial partners and then recommended by ESA for further development. MT Aerospace AG acting as the design authority in the project has selected a unique combination of these technologies being representative for an efficiently balanced upper stage architecture considering design-to-cost approach as well as ambitious payload performance targets. The applicability to a launcher system in general (e.g. Ariane 6 design) is given by the fact that the considered technologies and architectures can be utilized by Ariane 6 design responsables to improve the payload performance in the future development complementary to the current selected Ariane 6 baseline technologies. Furthermore, the considered technologies, stage architecture and manufacturing approaches presented hereafter offer an efficient alternative to reduce cost and mass of an upper stage. Focus of the investigation is an upper stage architecture featuring a Sandwich Common Bulkhead optimized for a GTO+ mission profile. Whereas the selected manufacturing methods are considered to provide a significant reduction of recurring cost. Moreover, low cost manufacturing approaches are further investigated. Focus of the cost reduction associated development is the investigation of the production method for stiffened cylinders (ISC). The ISC manufacturing method for cylinders describes a completely new fabrication method for generic application in launcher systems. The development was performed by in a joint approach by NASA, ESA, LMCO and MT Aerospace, and was conducted at MT Aerospace premises. The recent development of the ISC technology has resulted in a maiden flight in a sounding rocket. This paper presents the status and relevant results of the described developments and an outlook will be given on ongoing and planned activities.