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**Title: TECHNOLOGY MATURATION FOR THE NEXT GENERATION
REIGNITABLE CRYOGENIC UPPER STAGE**

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Following the ESA decision in November 2012, both the Ariane 5 Midlife Evolution (A5ME) development as upgrade of the existing Ariane 5 launcher, as well as the preparation of NGL / Ariane 6 as its successor will be pursued further. Both launchers rely on enhanced performance Upper Stages including the cryogenic re-ignitable VINCI engine. Thanks to this reignition capability, this new Upper Stage shall be "versatile" in the sense that it shall fulfil customer needs on a broader spectrum of orbits, not limited to those typically used for commercial telecommunications satellites (i.e. mainly Geosynchronous Transfer Orbits, GTO). In order to meet the challenges of versatility, new technologies are currently being investigated. These technologies are mainly related –but not limited– to propellant management during the extended coasting phases with the respective heat transfer into the tanks and the required multiple engine re-ignitions.

Within the frame of the ESA Future Launchers Preparatory Programme (Period 2 Slice 1), the Cryogenic Upper Stage Technology project (CUST) aimed to mature critical technologies to such a Technology Readiness Level (TRL) that they can be integrated into the baseline A5ME Upper Stage development schedule. In addition to A5ME application, these technologies can also be used on the future next generation European launcher.

For CUST1.2, Astrium responsibilities comprise roles as both overall Upper Stage responsible and Prime Contractor, as well as maturation activities for selected technologies.

After an overview on the Astrium tasks as system responsible, this paper gives some details on the elaboration of requirements including the link to the application programmes (in particular A5ME and NGL / Ariane 6). In the following sections, it describes the technologies selected for maturation, namely Sandwich Common Bulkhead, Versatile Thermal Insulation, Propellant Management Devices, a Gas Port Phase and Propellant Pre-conditioning. Followed by an evaluation on the technologies' impacts on a future Upper Stage and the maturation status achieved in CUST1.2, it concludes with an outlook on the next steps for follow-up activities.