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IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
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THE NATIONAL PROCEED PROGRAM - INNOVATIVE LAUNCHER TECHNOLOGIES TO ENHANCE CRYOGENIC UPPER STAGES

Abstract

Competitiveness in Space Business and cost-efficient access to space requests for state of the art technologies which evidence reliability and cost savings by adjusting the right balance between performance improvement and recurring / non-recurring costs. The dilemma of new and innovative technologies aiming for application in launchers originates from their lower maturity and confidence. Thus a sufficient technology readiness level (TRL) and confidence level of a specific technology has to be verified beforehand to allow launcher programs to gain related benefits. This shows the discrepancy between new and innovative technologies aiming for implementation and the maturity and reliability requested by the launcher program prior to implementation. In consequence technology programs such as ESA's FLPP (Future Launch Preparatory Program) or national agency programs are essential to close these technology maturity gaps. One of these technology programs is called PROCEED which stands for "Program to Enhance Crygenic Upper Stage Technologies to Extend European and German Competences in Future Launcher Developments". The national PROCEED program is funded by the German Space Agency (DLR) and by ArianeGroup and aims at developing and extending upper stage competences for next generation launchers. It combines the evaluation and maturation of 16 promising technologies and tools which are oriented towards ARIANE 6 and which have the potential to significantly enhance the upper stage performance or to significantly reduce costs. The presentation will give an overview on the PROCEED program and on the corresponding technologies and tools which are clustered according to their evolvement potential in 3 branches, i.e. System Improvements, Smart Avionics, and Equipped Insulated Tank Demonstrator. Several development areas such as launcher integration, additive manufacturing, launcher intelligent sensor topology, and CFD tools are comprised. Being in the second half of the PROCEED program the presentation focuses on achievements where emphasis is put on technology demonstration and the validation of results.