SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS (D2)
Future Space Transportation Systems (4)

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ESA'S NEXT GENERATION LAUNCHER
STATUS OF THE FLPP LAUNCH SYSTEM CONCEPT INVESTIGATIONS

Abstract

The launch system concept investigations for the Next Generation Launcher are part of the ESA Future Launchers Preparatory Programme (FLPP) which has the objective to prepare the technical and programmatic elements for making an informed decision on the best launch system to respond to the future institutional needs, while maintaining competitiveness on the commercial market.

The conception of the Next Generation Launcher (NGL) is driven by the requirement to provide a highly flexible launch system at minimized exploitation cost with a wide range of performance and mission capabilities to be operational around 2025. This flexibility is expressed by the requirement to cover a performance range from 3.0 tons up to 8.0 tons in GTO with an intermediate step at 5.0 tons while being furthermore capable of performing missions into a variety of other orbits such as MEO, GEO, LEO and SSO. The required performance flexibility shall be achieved by using the same core configuration for the launch vehicle while providing the performance augmentation mainly by means of solid propellant strap-on boosters. Besides these baseline requirements the extension of certain system architectures for demanding institutional missions (heavy low earth orbit payload insertions) based on a Common Core Booster approach is being investigated as well.

The system investigations concentrate on expendable NGL system concepts. A first set of activities covering launcher system for the short (Building Block) and long term (NGL) was performed and was completed end 2008. The currently ongoing second set of activities continues this work but concentrates on four selected NGL concepts only. The major objective of the second slice of the system concept investigations is to optimise and consolidate selected NGL architectures and their design WRT performance, flexibility, and cost. A second important objective is to identify in parallel the critical technologies required by the NGL system concepts as well as to identify those technologies supporting the launcher competitiveness factors such as launch system flexibility, reliability but in particular exploitation cost.

The investigations are being performed by an industrial team lead by Astrium-ST SAS as the prime contractor and consisting of further thirteen companies from nine ESA member states.

This paper details the status and results of the industrial activities for the different launch system concepts, certain important design and technology trade-offs, technology identification and the link with the associated FLPP technology and demonstrator projects concerning cryogenic upper stage technologies, materials and structures and high thrust cryogenic engines.