IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Launch Vehicles in Service or in Development (1)

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ARIANE 6 - DEVELOPMENT AND QUALIFICATION OF LARGE STRUCTURES & TANKS

Abstract

In the frame of the ARIANE 6 program, MT Aerospace AG is responsible for design, analysis, test and qualification as well as for series production of the main metallic structures, the metallic bare tanks and tank components of the new heavy European launcher. Due to new market needs this product development was strongly driven by cost and performance requirements.

As design definition authority (DDA) MT Aerospace AG has the responsibility for the development of those lightweight structures as well as for the propellant tanks of upper and lower stage with strong interactions between these main components with regard to the overall launcher architecture and performance.

Due to increased launch rate and ambitious cost requirements new manufacturing processes as well as automated assembly technologies were key topics within the development program using a design-to-manufacturing approach.

The applicable manufacturing technologies and concepts will be presented. This includes shot peen forming performed on cylinder segments and domes, automated riveting for the assembly of the structures and friction stir welding applied to all aluminium tank structures.

An extensive qualification program which included material, process and full scale qualification considering also all industrialisation aspects was performed. The flightworthiness of all products has been demonstrated.

This paper describes the design, technology development, industrialization and qualification aspects of the ARIANE 6 MT Aerospace AG workshare, focusing on Inter Tank Structures and metallic bare tanks for upper and main stage, Vulcain Aft Bay panels and forward and rear skirt of the Equipped Solid Rocket Motor. All products have successfully passed the relevant qualification milestones. The manufacturing of development and qualification models as well as of the first flight units has been completed.