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VULCAIN 2.1®, THE EUROPEAN REFERENCE FOR ARIANE 6 LOWER STAGE CRYOGENIC ENGINE

Abstract

The intent of this publication is to provide an overview of the development progress of the Vulcain 2.1®engine and its adaptation to Ariane 6 launcher.

The Vulcain 2.1® is a cryogenic gas generator cycle engine with two independent turbopumps. This engine is an evolution of the flight proven Vulcain 2® engine used on Ariane 5E®, with the same performances but introducing cost effective new technologies aiming at a global recurring cost reduction including launcher and ground operations. In particular this includes the implementation of a new nozzle extension using sandwich technology, the removal of some expendable pyrotechnic devices and the use of Lox tank Gox pressurization.

At the end of 2014, Conference at government level gave priority to the Ariane 6 program as Europe future launcher. In the framework of this decision Vulcain 2.1® engine was confirmed as the engine to equip Ariane 6 cryogenic lower stage. Year 2015 has been dedicated to engine and propulsive system trade-offs to comply with Ariane 6 launcher different configurations, with as main objectives recurring cost reduction, performance, reliability and simplification of operations.

Vulcain 2.1® will power the cryogenic lower stage of the future Ariane 6 European Launcher for both configurations, the heaviest one dedicated to single / double payloads for classical GTO/GTO+ orbits A64 (i.e. Powered by 4 Solid Rocket Motors), and the lightest one dedicated to a large panel of single institutional payload missions A62 (powered by 2 Solid Rocket Motors) which could use all the capacities of the engine.

This publication shows how the Vulcain 2.1® engine development is progressing toward qualification while incorporating the requirements of the new Ariane 6 configuration.