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SPACE PROPULSION SYMPOSIUM (C4)
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VINCI® PROPULSION SYSTEM: TRANSITION FROM ARIANE 5 ME TO ARIANE 6

Abstract

The intent of this publication is to provide an overview of the development of the VINCI® engine over the 2015-2016 period.

The VINCI® is a cryogenic expander cycle engine combining the required features of this cycle, i.e. high performance chamber cooling and high performance hydrogen turbo-pump, with proven design concepts based on the accumulated experience from previous European cryogenic engines such as the HM7 and the VULCAIN®. VINCI® will power the cryogenic upper stage engine of the future ARIANE 6 European Launcher.

The VINCI® preliminary design was initiated in the frame of the Ariane 5+ program managed by CNES under delegation of ESA. Between 2006 and 2008, its engineering and testing were conducted under the ESA Future Launcher Preparatory Program (FLPP). Since 2009 until end 2014, VINCI® was developed as the upper stage main propulsion system for the next evolution of the ARIANE 5 launcher developed by AIRBUS Defense Space as launcher prime contractor. VINCI® is now the engine of AIRBUS SAFRAN LAUNCHERS Ariane 6 Upper Liquid Propulsion Module.

At the end of 2014, the VINCI® successfully passed the Critical Design Review that was held after the major sub-system (combustion chamber, fuel and oxygen turbopumps) had passed their own Critical Design Review all along the second half of 2014.

In December 2014, a Ministerial Conference at government level gave priority to the ARIANE 6 program as European future launcher. In the framework of this decision VINCI® was confirmed as the engine to equip ARIANE 6 cryogenic upper liquid propulsion module. This publication shows how the VINCI® development is progressing toward qualification whereas incorporating the requirements of the new ARIANE 6 configuration.

This publication will show how the VINCI ® development progress toward the qualification and how the new Ariane 6 configuration is taken into account. We will especially focus on the M5R campaign on the P4.1 test bench (Germany) with vacuum operating conditions and on the M4R2 at the PF52 (France) that will allow us to test new thermodynamic conditions at engine inlet, as results of Ariane 6 requirements.