

The VINCI upper stage engine: the demonstration of maturity

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ABSTRACT

The present paper is an abstract for a publication to be presented at the 2013 EUCASS in Munich, Germany. This publication represents the continuation of a series of publications that presented the early engine design and latter on showed how the first engine test campaigns since 2005 led to a reference system configuration with reliable transients and steady state operation. The publication will contain information already presented in order to make it self-standing and easirer to comprehend for readers unfamiliar with the engine. The highlights of the present development period which are the focus of the 2013 publication and are to be detailed in the complete publication are expressed with a specific typography in this abstract.

SUMMARY

The intent of this publication is to provide an overview of the progress of the VINCI development over the 2012-2013 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. The Vinci engine is the reference cryogenic upper stage engine for the future European Launchers. Additionally, the high performance of this engine and its restart capability offer potential applications on various future launcher upper stages as well as orbital spacecrafts.

The current phase of the VINCI development is focused on confirming the system design maturity through additional engine test campaigns with the M4 and M5 engines.

In 2012 and 2013, the M4 engine test campaign is implemented with the objective to test the engine improvements necessary to comply with the requirements of the new A5ME launcher and to prepare the extensive test program to be performed in a second phase of development aiming at qualifying the engine for flight.