

SPACE PROPULSION SYMPOSIUM (C4)  
Propulsion Systems I (1)

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PROGRESS OF THE VINCI ENGINE DEVELOPMENT

**Abstract**

The intent of this publication is to provide an overview of the progress of the VINCI development over the 2009-2010 period and the main challenges targeted through the following phase. 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 has been selected as the base of the future Ariane 5 evolution (so called A5ME) powering a new cryogenic upper stage. 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. From 2005 to 2008, four engine test campaigns demonstrated the validity of the system configuration and initiated the endurance verification. Reliable and reproducible steady state and transient operation, restart capability were obtained. The next step in improving the system design maturity relies on additional engine test campaigns with the M3 and M4 engines. The main objective of the M3 campaign is to perform tests with the full deployed nozzle and complete the coverage of the operating domain, corresponding to A5ME application. Subsequently, the M4 engine test campaign is planned to be performed in 2011 with the objective of covering the full operating domain in compliance with the requirements of the new A5ME launcher. It will prepare the extensive test program to be performed in a second phase of development aiming at qualifying the engine for flight.