

SPACE PROPULSION SYMPOSIUM (C4)
Propulsion System (1) (1)

Author: Mr. Patrick Danous
Snecma, France, patrick.danous@snecma.fr

Mr. Patrick Alliot
Safran Aircraft Engines, France, patrick.alliot@snecma.fr
Mr. Emmanuel Edeline
Safran Aircraft Engines, France, emmanuel.edeline@snecma.fr
Mrs. Anne LEKEUX
CNES, France, anne.lekeux@cnes.fr
Mr. Bruno Vieille
European Space Agency (ESA), France, bruno.vieille@esa.int

THE VINCI PROPULSION SYSTEM : NEW STEPS TOWARD QUALIFICATION

Abstract

The present paper is an abstract for a publication to be presented at the 2014 IAC in Toronto.

This publication represents the continuation of a series of IAC publications that described the early VINCI 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 focus on the results that constitute major milestones before entering the final phase of the development, i.e. the qualification phase.

The intent of this publication is to provide an overview of the development of the VINCI propulsive system over the 2013-2014 period, the propulsive system encompassing the engine itself and the functions that contribute to the stage propulsion.

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 HM7b and the Vulcain. The Vinci engine is the reference cryogenic upper stage engine for the future European Launchers, ARIANE 5ME and ARIANE 6. 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 the M5 engine test campaign and through additional component tests such as the dynamic seal package tests for the oxygen turbopump and bearing tests of the fuel turbo-pump.

In parallel the equipments of the propulsive system such as the components of the pressurization and helium command systems are entering the detailed design phase after having successfully passed the preliminary design reviews.