

IAF SPACE PROPULSION SYMPOSIUM (C4)
Liquid Propulsion (1) (1)

Author: Ms. Pamela SIMONTACCHI
ArianeGroup SAS, France, pamelasimontacchi@ariane.group

Mrs. Amaya Espinosa
ESA - European Space Agency, France, Amaya.Espinosa@ext.esa.int

Mr. Sébastien Sagnier
ArianeGroup, France, sebastien.sagnier@ariane.group

Mr. Roland Blasi
ArianeGroup, Germany, roland.blasi@ariane.group

Mr. Emmanuel Edeline
ArianeGroup SAS, France, emmanuel.edeline@ariane.group

Mr. Jean-Noel Caruana
European Space Agency (ESA), France, jean-noel.caruana@esa.int

Ms. Sandra Boujnah
Centre National d'Etudes Spatiales (CNES), France, sandra.boujnah@cnes.fr

PROMETHEUS: PRECURSOR OF NEW LOW-COST ROCKET ENGINE FAMILY

Abstract

Prometheus is the precursor of a new European liquid rocket Engine family designed for low-cost, flexibility and reusability.

This programme, initially undertaken through cooperation between the French national space agency CNES and Ariane Group, entered in the ESA Future Launcher Preparatory Programme after the ESA Ministerial Conference in December 2016, with Germany, Italy, Belgium, Sweden and Switzerland joining France in the funding.

A major aim of Prometheus project is to design, produce, and test an advanced low-cost 100-tons class LO_x/LCH₄ reusable Engine. This Engine, designed for 1ME recurrent cost, targets also flexibility in operation through variable thrust, multiple ignitions, compatibility to main and upper stage operation, and minimized ground operations before and after flight.

To reach those ambitious objectives, an extreme design-to-cost approach is mandatory, as well as innovative technologies and advanced industrial capabilities; among the main levers, there are the extensive recourse to Additive Manufacturing for the production of engine components, the introduction of a full electric command system and the on-board Rocket Electronic Engine Computer (REEC) for Engine management and monitoring.

In addition, Prometheus programme promotes the application of Agile and Frugal methodologies to get maximum profit in product innovation and value creation in operation.

This paper presents the global status of Prometheus advancements and gives a specific insight regarding the oncoming milestones: 2021 first engine delivery, 2022 engines tests realization on Themis 1G and engine test campaign preparation at P5 in DLR Lampoldhausen.

Prometheus is a key reusability technology under validation to prepare future propulsion solutions for European access to space.