

SPACE PROPULSION SYMPOSIUM (C4)
Propulsion Technology (2) (5)

Author: Mr. Pierre VINET

Airbus Defense and Space, France, pierre.vinet@astrium.eads.net

Mrs. Sonia Magniant

Airbus Defense and Space, France, sonia.magniant@astrium.eads.net

Mr. Roland Blasi

Airbus Defence and Space, Germany, roland.blasi@astrium.eads.net

Mr. Jean Philippe DUTHEIL

Airbus Defence and Space, France, jean-philippe.dutheil@astrium.eads.net

Mr. Taiichi MOTOMURA

IHI Corporation, Japan, taiichi_motomura@ihi.co.jp

AIRBUS DEFENCE AND SPACE LOX/METHANE PROPULSION DEMONSTRATORS

Abstract

The LOX/Methane propellant combination is worldwide in discussion as propellant combination for future expendable and reusable low cost launch vehicles. It makes sense for Airbus Defence and Space to invest in a set of liquid rocket propulsion Pathfinder Demonstration Models related to LOX/Methane technology to gain know-how, to progress an technology readiness level by reaching first testing, and to gather design and programmatic oriented data relevant for assessing this propellant combination option for various Space Transportation applications (launch vehicle 1st stage, re-usable launcher launch stages, space exploration propulsion module, suborbital vehicles propulsion...). In this frame, research and development of a 400kN class LOX/Methane liquid rocket engine was initiated in 2007, as well as the design of engine main components for allowing concept validation by testing. - a PDM-Thrust Chamber (TC) has been manufactured and is ready for test in 2015. - a PDM-Gas Generator (GG) has finished its first test campaign in 2013. - a PDM-TurboPump (TP) is under manufacturing by an industrial partner up to end 2014, for test in 2015. Before, a number of experiments at subscale level (injectors) were conducted to study and evaluate LOX/Methane injection combustion performance, combustion efficiency and instability, soot formation etc. Turbomachinery component tests were also conducted on critical component (inducer, bearing, dynamics seals...). Foreseen possibility, as following step once the sub-systems demonstrator tests are carried-out and show positive results, can be the performance of test on a complete PowerPack, and eventually on a complete "Pathfinder Demonstrator Model" of LOX/Methane rocket engine, on basis of the combination of the already existing 3 sub-system PDMs (TC, GG and TP).