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

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PROMETHEUS : EUROPEAN NEXT GENERATION LIQUID ROCKET ENGINE

Abstract

Now that Ariane 6 development is on track, Europe will have a more competitive Launch System from 2020. Despite that, with a fast evolving Space landscape (emerging needs, renewed competition), Europe has to think about Ariane long term future from now on, by identifying and maturing relevant technologies. As the French Space Agency, CNES must anticipate this preparation. Future generation of space transportation systems after Ariane 6 shall aim at breaking the space cost barrier through all levers: simplification, rationalization, reusability, flexibility. It has been decided to start by the propulsion topic which usually takes the longest time to be mature. Our trade-off led to the choice of a new propellant combination: Oxygen / methane propulsion. The ongoing developments of different engines worldwide confirm the interest of this combination for rocket propulsion both for cost reduction and reuse aspects. Firstly, CNES and Airbus Safran Launchers have initiated the development of a demonstrator in order to bring the technologies of a low cost and reusable oxygen / methane propulsion at a sufficient level of maturity. The "PROMETHEUS" (Precursor Reusable Oxygen METHane cost Effective propUlsion System) project which is now in the frame of ESA with our European partners shall meet this goal. Under the lead of a design team integrating industrial and institutional partners, the Prometheus engine integrates the most promising solutions from RT and other programs and will be managed in a highly disruptive approach with the usual projects regarding the configuration choices, the technologies, manufacturing processes and the development methods. The objective through this project is to design, manufacture and test a 100 ton class variable thrust, LOX/LCH4, reusable, prototype engine, integrating its own health monitoring system and with a very ambitious reduction of recurring cost, while maintaining competitive performances. This paper will present the trade-off analysis performed leading to the present configuration, the different technologies chosen and the objectives of demonstration.