Paper ID: 58948
oral

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

Author: Mr. Akira Ogawara
Mitsubishi Heavy Industries, Ltd., Japan

MODULAR ENGINE CONCEPT – AN ECONOMICAL AND VERSATILE SOLUTION TO FUTURE PROPULSION SYSTEM

Abstract

Today's need for propulsion system is becoming much more diversified, while allocation of cost and schedule for its development and production is much more decreased. (1) Forecast shows increasing number of small satellites which will make demand for propulsion systems of small launchers or kick-stages. (2) Recent surge for space exploration is generating needs of new propulsion systems for in-space transportation, orbital maneuvering and descending/ascending. (3) Innovation of the propulsion systems for launch vehicles is also expected in order to deal with current need for low cost including reusability. The challenge is their requirements are diversified including their propellants. Modular Engine Concept can be a solution to this challenge, in which unit engine which can handle multiple propellant combinations without any changes or with minimal modifications is developed, and unit engines are assembled into one propulsion system according to the thrust each customer needs. Utilizing the latest AM technologies and using motor-driven pumps can make the unit engine very simple, which will lead to dramatic cost reduction of the propulsion system. This paper will report latest investigation status and results on Modular Engine by Mitsubishi Heavy Industries, Ltd. (MHI)