IAF SPACE PROPULSION SYMPOSIUM (C4)
Liquid Propulsion (2) (2)

Author: Mr. Masaki Adachi
Mitsubishi Heavy Industries, Ltd., Japan, masaki_adachi@mhi.co.jp

Mr. Akira Ogawara
Mitsubishi Heavy Industries, Ltd., Japan, akira_ogawara@mhi.co.jp
Mr. Noriyuki Hiramatsu
Mitsubishi Heavy Industries, Ltd., Japan, noriyuki_hiramatsu@mhi.co.jp
Mr. Hideto Kawashima
JAXA, Japan, kawashima.hideto@jaxa.jp
Mr. Teiu Kobayashi
Japan Aerospace Exploration Agency (JAXA), Japan, kobayashi.teiu@jaxa.jp

DEVELOPMENT STATUS OF ADDITIVE MANUFACTURING COMPONENTS FOR LE-9 ENGINE

Abstract

MHI has been making IRD efforts to develop AM (Additive Manufacturing) capabilities for rocket engine parts. Based on the successful results by MHI and by JAXA itself, JAXA is researching for applying AM parts to LE-9, the next booster engine under development. L-PBF(Laser-Powder Bed Fusion) technology is applied to 17 small- or middle-size parts, such as Injector element or Valve case, and DED(Direct Energy Deposition) technology is applied to 6 large-size parts, such as Injector body or Chamber manifold, making large contribution to cost reduction of their material and machining cost. Material property accumulation and destructive/non-destructive inspection for all parts were successfully completed in part-level qualification tests. All of L-PBF parts except for Injector element and 1 DED part were manufactured to be applied to Qualification Model Engine 1, which is currently under hot-firing test at Tanegashima Space Center. All of L-PBF and DED parts, including Injector element will be applied to Qualification Model Engine 2 and 3. This paper reports the overview of L-PBF and DED part qualification test and the latest application plan to LE-9 engine.