

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Governmental Human Spaceflight Programs (Overview) (1)

Author: Dr. Michele Gates
NASA Headquarters, United States, michele.m.gates@nasa.gov

Mr. Michael Barrett
NASA Glenn Research Center, United States, michael.j.barrett@nasa.gov

Mr. Caram Joe
National Aeronautics and Space Administration (NASA), Johnson Space Center, United States,
joe.m.caram@nasa.gov

Ms. Melissa McGuire
NASA Glenn Research Center, United States, melissa.mcguire@nasa.gov

Ms. Debra Ludban
National Aeronautics and Space Administration (NASA), Johnson Space Center, United States,
debra.e.ludban@nasa.gov

Mr. Daniel Rey
Canadian Space Agency, Canada, daniel.rey@canada.ca

Mr. R. Marshall Smith
National Aeronautics and Space Administration (NASA), United States, Marshall.Smith@nasa.gov
Mr. Ronald Ticker

National Aeronautics and Space Administration (NASA), United States, Ronald.L.Ticker@nasa.gov
Mr. Scott Tilley
Maxar Technologies, United States, scott.tilley@sslmda.com

THE LATEST ON THE POWER AND PROPULSION ELEMENT: FIRST ELEMENT OF THE
LUNAR GATEWAY

Abstract

The Power and Propulsion Element (PPE) is in design and development to be the first element in the Lunar Gateway. Significant effort has been expended over the last year securing partners and moving forward towards the highly anticipated launch of PPE. The PPE is an important part of Agency sustainable human exploration strategies and plans and is an early element in NASA's lunar framework.

As the foundational element in the Lunar Gateway, the PPE provides important functionality for the integrated spacecraft including orbital transfers, initial controls, station keeping and power to additional Gateway modules. With launch targeted in 2022, PPE will bring early space communication capabilities to cislunar space, including to and from Earth, space-to-space, and space-to-the Moon. The PPE spacecraft potentially provides additional benefits such as through external research payloads.

Gateway can serve as a reusable command module in cislunar space for missions to the lunar surface and a testing ground for future missions to deeper space. Subsequent buildup plans for Gateway include additional modules for habitation, logistics, utilization, and other critical infrastructure for human and robotic missions. The Gateway will facilitate exploration capabilities and development for NASA as well as its commercial and international partners on and around the Moon and into deep space.

After a year of study in partnership with companies and broad interaction with industry, NASA plans to present to the IAC 2019 the PPE design flight system concept and capabilities of the selected PPE partnership approach for development. In addition partnering with companies, important vehicle physical

interfaces with Agency government partners include those planned with the European Space Agency and Canadian Space Agency. Ongoing lunar architecture efforts have also progressed the strategic context and plans for the Lunar Gateway and value of the PPE in it.

This paper details progress during the past year including milestones accomplished in NASA's partnership procurement, technical and programmatic results, as well as updates from Agency partners planning to fly systems on the PPE. The strategic context for PPE and implementation approaches used by NASA and partners are also presented. The paper provides a summary update to the paper presented in IAC 2018.