

IAF SPACE SYSTEMS SYMPOSIUM (D1)
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Author: Mr. Ty Lee
Maxar Technologies, United States, ty.lee@maxar.com

Mr. Scott Tilley
Maxar Technologies, United States, scott.tilley@sslmda.com

Mr. Al Tadros
Maxar, United States, al.tadros@sslmda.com

IMPLEMENTATION OF THE NASA POWER AND PROPULSION ELEMENT LEVERAGING A
COMMERCIAL SATELLITE BUS**Abstract**

The NASA Power and Propulsion Element (PPE) will form the initial element of the proposed Gateway to be constructed in cislunar orbit. Planned to be launched in 2022, with initial operations in the target Near Rectilinear Halo Orbit (NRHO) scheduled to begin after a one year demo period, the PPE will be a 50 kW class Solar Electric Propulsion equipped spacecraft signifying a revolution in in-space transportation capability. Maxar is the prime contractor for the Power and Propulsion Element and is an industry leader in high power systems and electric propulsion, with 38 Hall-effect thruster based spacecraft launched and over 100,000 hours of firing time in space including multiple Electric Orbit Raising (EOR) missions. By leveraging the Maxar 1300 commercial communication satellite bus, we can realize a low risk, affordable, and highly reliable PPE. This paper describes the development of a PPE concept based on the Maxar 1300 commercial satellite bus. It describes how the mission environment and expected Gateway operations were matched to the 1300 capabilities. It lays out a set of commercial partner mission objectives which advance the state of the art in technologies for the 1300 bus, while demonstrating cislunar transport and communications services. Finally, it describes the associated system architecture and concept design based on 1300 bus elements, and explores potential future commercial uses for this capability. In particular, PPE solar electric propulsion and cislunar communications capabilities are described in detail with respect to commercial applications.