

IAF SPACE SYSTEMS SYMPOSIUM (D1)
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CONCEPT FOR 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.

SSL produces the highly reliable 1300 spacecraft bus, and is an industry leader in high power systems and electric propulsion, with 35 Hall-effect thruster based spacecraft on orbit and over 100,000 hours of firing time in space. By leveraging the SSL 1300 commercial communication satellite bus, we can realize a concept for a low risk, affordable, and highly reliable PPE.

Recently, SSL performed a study for NASA on a concept for the PPE by adapting the 1300 bus. This paper will describe the development of a PPE concept based on the SSL 1300 commercial satellite bus. It will describe how the mission environment and expected Gateway operations were matched to the 1300 capabilities. It will lay 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 will describe the associated system architecture and concept design based on 1300 bus elements, and will explore potential future commercial uses for this capability. In particular, the advances in solar electric propulsion will be described in more detail as applied to commercial applications.