

## **The Gateway Program as Part of NASA's Plans for Human Exploration Beyond Low Earth Orbit**

**Emma Lehnhardt<sup>a</sup>, Dylan Connell<sup>a</sup>**

<sup>a</sup> *National Aeronautics and Space Administration (NASA), Johnson Space Center, United States*

This paper provides an overview and status of Gateway, humanity's first space station in lunar orbit as a vital component of the NASA-led Artemis missions to return humans to the Moon as preparation for the first human missions to Mars. Gateway is an aggregation point in deep space for a variety of spacecraft, including the crewed Orion vehicle, the Human Landing System that will ferry astronauts to and from the lunar surface, logistics supply craft, and vehicles transiting further into deep space beyond the Earth-Moon system, such as to Mars. NASA is building on decades of partnership with space agencies on three continents and multiple commercial partners to design, build, and launch Gateway's core elements to near-rectilinear halo orbit (NRHO) around the Moon, where it will operate for a minimum of 15 years. Gateway is humanity's next in-space science utilization platform, and its first in deep space, with three science payloads already selected to study solar and cosmic radiation.

This paper will provide an overview of the Gateway space station's major components in various stages of development, including the Power and Propulsion Element (PPE), Habitation and Logistics Outpost (HALO), the International Habitation (I-Hab) module, ESPRIT Refueling Module (ERM), the planned airlock, advanced external robotics systems, Deep Space Logistics supply craft, and next-generation autonomous Vehicle System Manager software. It will also provide an overview of how Gateway will be utilized for science, and highlight the space station's multilateral governance structure and international agreements.