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NASA ENVISIONED FUTURE PRIORITIES FOR IN-SPACE TRANSPORTATION

Abstract

The National Aeronautics and Space Administration (NASA) of the United States of America (US) has ambitious objectives for robust logistics solutions to commercialization of geocentric space, sustained presence in Cis-Lunar space and on the Lunar Surface, Human Mars exploration and expanded deep space robotic exploration. Critical to all of these objectives is are robust and affordable in-space transportation solutions. Resilient logistics is a precursor to sustained development and leveraging commercial investments. A range of near term priority investments are required to enable the future envisioned state for In-Space Transportation. Advanced technology components and integrated system demonstrations for cryogenic fluid management are appropriate for viable human class propulsion and future leverage of In-Situ Resources Utilization propellant products. Space Nuclear Propulsion, both thermal and electric, investments enable human Mars exploration with reduced earth launches. Advanced propulsion investments enable lower cost development cycles and operations in addition to higher performance solutions for future robotic exploration. This paper provides a high-level overview of NASA's plans for the development of in-space transportation capabilities, a description of the state of the art, capability goals, technical challenges and gaps, and options for partnerships with industry and other agencies towards developing a robust power logistics infrastructure to support NASA's objectives.