

IAF SPACE EXPLORATION SYMPOSIUM (A3)
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ENHANCED AND EFFICIENT PROPULSION SYSTEM DESIGN FOR MOON VEHICLES FOR
TRANSPORTATION ACROSS MOON'S SURFACE.

Abstract

Lunar missions are one of the crucial missions that current space agencies, companies, and space tech startups are focusing their research and development and activities toward the moon, it is expected that the lunar economy to surpass 142 billion dollars in the next decades. Building a good infrastructure, acknowledging the technology gaps, additionally overcoming challenges with an advanced technological readiness level will be a huge step toward lunar economy plans as well as readiness for the lunar gateway concept toward Mars. One of the crucial challenges is building lunar exploration vehicles sustainably and efficiently serving the scientific payloads and infrastructure-building activities while on the moon's surface, the high power consumption and limited availability to refueling are crucial points during the vehicle's operational lifetime. In this study, a vehicle is designed with enhanced sustainability and efficient propulsion that works as a transportation system between the moon's surface regions as well as a gateway for other transportation and moon vehicles, to have successful, efficient, and integrated landings that will be discussed In this study planned for future lunar missions. This concept proposal will include high-level design and numerical analysis for the propulsion system and conceptual efficient design of the vehicle and comprehensive analysis between this and other state-of-the art lunar vehicles proposed or currently developed. The outcomes of this research will focus on the applicability, reliability, and sustainability of the proposed system, furthermore, the system will have added value with its ability to integrate with the current and the next planned missions, for achieving the highest outcomes of lunar mission and advanced lunar technologies.