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The Modern Day Space Elevator as a Permanent Transportation Infrastructure (3)

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FUELING THE (NEAR) FUTURE: THE CASE FOR EARTH-BASED SPACE ELEVATOR SUPPLY TO L1

Abstract

This research explores the viability of Earth-based space elevators for supplying rocket fuel to the Earth-Moon Lagrange Point 1 (EML-1) logistics hub compared to Lunar In-Situ Resource Utilization (ISRU). Space elevators offer a simpler, more cost-effective alternative to the lengthy development required for lunar-based fuel production. The key to delivery efficiency is their ability to transport approximately 70% of the mass from the lift-off point to space, enabling efficient mass delivery to mission destinations like EML-1 versus less than 2% by rockets. The Apex Anchor, strategically located on the space elevator, enhances this system by providing large-scale assembly, fuel distribution, spacecraft refueling, and cargo storage. Additionally, the Apex Anchor supports a 14-hour trip to lunar region for emergency backup and supply chain needs, further improving logistical capabilities.