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Modern Day Space Elevator Transformational Strengths and their Applications (3)

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ELECTROMAGNETIC COIL ENHANCED SPACE ELEVATORS: ADVANCING GREEN ACCESS TO SPACE

Abstract

This paper presents an innovative approach to transporting logistics and payloads to geostationary orbit, approximately 35,786km (22,236miles) above sea level, without relying on conventional rockets, thus ensuring sustainability. The proposed method utilizes electromagnetic coils to propel a climber along a 100,000km (62,137miles) tether. By harnessing electromagnetic propulsion principles, similar to those observed when a metal piece interacts with a magnetic field, the climber, acting as the metal body, experiences a force perpendicular to the current flowing through the coils and the magnetic field. This concept allows the climber to ascend, with the coils only installed until the climber surpasses Earth's gravitational pull, after which inertial force carries it forward. Upon re-entry, the current direction would reverse which will apply force in the reverse direction,similarly the speed of the climber can be controlled by controlling the magnitude of current. As the strong magnetic field created can affect the functionality of sensitive payload, the climber would be constructed from materials like mu-metal, permalloy, or ferrite, capable of shielding against magnetic flux. Additionally, addressing concerns such as centrifugal force acting on the apex anchor which is a major challenge to overcome can be mitigated by designing a heavier base for the structure which will balance the weight . This proposed method offers a sustainable and rocket-free solution to space transportation, addressing environmental challenges and paving the way for a "green road" to space.