

21st IAA SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FUTURE (D4)
Modern Day Space Elevators Customer Design Drivers (3)

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A SURVEYS FOR EFFECT ON THE SPACE ELEVATOR BY ELECTRIC PARTICLES IN SPACE

Abstract

This study shows our survey for effects of electric particles on the space elevator in space. We released the construction concept for the space elevator in 2012 and we aim to complete it in 2050. It will reach 96,000km high from ground of earth so it passes the area where large amounts of particles, mainly protons and electrons are. Their densities are estimated by AE-8/AP-8 Radiation Belt Models (1). The space elevator will be moving as same speed as Earth rotation and cross the line of earth magnetic field. Then the inductive electromotive force will be generated on the cable and electric particles will flow into the cable. The amount of the current will be estimated by OML (Orbital Motion Limited) theory (2). We investigated how they affect the space elevator in term of thermodynamics and electromagnetism. The current will generate the large heat, and Lorentz force on the cable, so we simulated the behavior of the cable considering the vibration due to thermal expansion and Lorentz force and we will suggest assignments and improvement. The detail will be shown in the conference.