

SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FAR FUTURE (D4)
Space Elevator Feasibility and Technology (3)

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THE INTERACTION OF A CONDUCTING SPACE ELEVATOR WITH MAGNETIC AND ELECTRIC
FIELDS IN THE NEAR-EARTH SPACE PLASMA

Abstract

Most current space elevator designs have a cable stretching to approximately 15 Earth radii. Beyond a few Earth radii from the surface of the Earth there are large daily variations in magnetic and electric fields as well as plasma flows. Additionally there are occasionally magnetic storms and solar events which cause much larger changes. A conducting space elevator will carry current in response to the electric field. The current will perturb the local magnetic field and also interact with it applying a force on the space elevator cable. A low-mass cable of high conductivity will be most susceptible to these fields. In this paper we will examine the interaction of a space elevator with realistic magnetic and electric fields.