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PRODUCING A SPACE ELEVATOR TETHER USING A NEO: A PRELIMINARY ASSESSMENT

Abstract

Current research indicates that the construction of an Earth-to-Space space elevator is prohibitive due to the lower-than-expected strength values of Carbon Nanotubes and the proposed construction method. The currently proposed construction method relies on climbers that incrementally extend the initial tether. For a large target tether mass, it takes centuries to millennia to build-up a tether with sufficient carrying capacity. One possibility to circumvent this problem is to use in-situ materials in space like on a Near Earth Object to produce a carbon nanotube tether. This paper assesses the feasibility of producing a space elevator tether on a Near Earth Object. First, historical concepts are reviewed. Second, concepts for tether production are assessed and various mission architectures presented. Finally, a rough estimate of the economics of this approach is given. It is concluded that unless a much stronger tether material is discovered, the in-situ construction of a space elevator tether is probably the most promising way to make a space elevator feasible.