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Conceptualizing Space Elevators and Tethered Satellites (3)

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DESIGN AND DEVELOPMENT OF THE TETHER MOVING SYSTEM USING NANOSATELLITE

Abstract

The Space Elevator, an alternative to rockets, has been proven feasible by both Dr. Bradley Edwards and the IAA. This system can be divided into three main parts, the space station, tether and climber. Ourselves included, many groups have been developing prototype climbers. Each year there is a Space Elevator Challenge (SPEC), many skills and techniques have been developed through these climbs. The highest vertical climb height achieved to date is 1km. However, each of these climb tests were performed from the ground up, and no testing has been done in space. Furthermore, whether a climber will function properly in space while moving along a tether, what effect it has on the space station and tether itself, has never been demonstrated. So, we are planning this project (STARS-Me), to test a climber in a space environment. For this mission, a climber will move between two tethered satellites. Since the main satellite needs to contain a climber, the Nanosatellite has been chosen. After separating into an upper and lower section, the climber will move out along the tether. By logging the motion of the satellites as the climber moves, it will be possible to measure the effect the climber has on the tethered satellite system. In the future, it is our desire to design a climber that can change the system's orbit utilizing the Coriolis effect. The benefit of using a climber for orbital changes is in its relatively low energy consumption, when compared with fuel or electro dynamic tether designs. We are also looking into using this technique for the collection of space debris. Now we made Three BBM and Success to moving tether. Next Step is entering the actual EM model that constructed in space using. In this Paper, we aim to examine the tether extension mechanism, the climber movement mechanism and develop the mission system for a Nanosatellite. STARS - Me is planning experiments using a 2U Nanosatellite. It is necessary to store the convex tether and the climber in the mission system which has severe restriction of size. We examine the structure of a mission system that can satisfy these requirements.