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

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EXPLOITING GEO

Abstract

The space elevator opens up many exciting prospects for permanent infrastructure and for launching to interplanetary space. Among these are the opportunities for building large and varying structures at the geosynchronous altitude (GEO) of 35,786km. The advantage of GEO is that structures can be built up without loading the tether. For example, a generation starship with a mass of many thousands of tonnes could be lifted in parts of ten or twenty tonnes at a time assembled. Launching it would have no effect on the tether at all.

It is possible to extend the station at GEO in any of the three orthogonal directions. Extending away from Earth requires a balancing mass nearer Earth. For example, a 1000-tonne station 1000km further from Earth requires a similar mass positioned 950km nearer Earth. They place an additional tension of 0.15

An extreme extension would be to place a hotel at one or two days journey from Earth. The tether would need to have more than twice the mass needed for the other scenarios and could be lengthened to launch even faster interplanetary spacecraft at the furthest end – the apex anchor. At the hotel customers would experience two thirds or one third gravity. Such a hotel would doubtless be a major tourist attraction and would generate substantial revenue.