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SPACE ELEVATOR IN THE ATMOSPHERE

Abstract

The space elevator faces hazards and challenges in the Earth's atmosphere that are quite different from the environment in space. Both the tether and the tether climbers will experience wind, electric storms and ice. On the other hand, in the next 1500 km near Earth, space debris is the main hazard. Part of the strategy for coping with space debris is to make the tether 1 metre wide so that it can sustain damage from objects smaller than 10 cm across. In the atmosphere, a much narrower tether is desirable. A tether climber requires arrays of photovoltaic cells as a power source, and these need protection in the atmosphere. The three main proposals for solving these problems are called box protection, spring forward and high stage one. The paper will describe the latest thinking and progress on these three candidate solutions.