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Space Elevator as Transportation Infrastructure to Access Space (3)

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CHANGING THE ECONOMIC PARADIGM FOR BUILDING A SPACE ELEVATOR

Abstract

The development of the traction Space Elevator concept started in 1959 with Yuri Artsutanov. From an early stage, researchers identified the traction cable or tether as the technical bottleneck of this space infrastructure, and it has marked the rhythm of its development. While this technical approach has generated great benefits, moving ahead the product design and architecture, it has left out other important areas, such as the potential economic impact of Space Elevators. During Bradley Edward's studies for NASA in 2002-2003, the economic scope was only covered on two points: the estimated cost analysis for its construction; and how its cost per kilogram compared with rockets. The economics of space elevators has not progressed much since then, and new papers either refer to the 2003 paper or update the data of these exact two points. With the current global trends favoring a burgeoning space economy, it is even more crucial than ever to develop a long-term sustainable economic overview for Space Elevators to accelerate the development of this megaproject. This paper analyzes the economics of Space Elevators as infrastructure and a platform, utilizing relevant historical examples, such as the standardization of shipping containers, the transcontinental railroad, and the Panama Canal to explore its economic value and developmental impact. Infrastructure, at its core, provides value through the reduction of transaction costs. Therefore, trying to close a business case for infrastructure by charging high transaction costs is a doomed venture. However, expanding the picture to view the impact on the economy from increased access to value and more efficient markets through lower transaction costs and infrastructure becomes a very lucrative, stable, and reliable investment. Cost per kilogram is the language of rockets – strategic investment, ubiquitous access, and uninterrupted exchange of resources are the staples of space elevators. Space Elevators are an evolution of launch technologies. Rockets are capable tools to lift payloads to orbit, including human cargo, but they are impractical tools for the mass quantities, distances, and timelines needed for our ongoing space ambitions. The focus of this paper is on establishing the value of a space elevator as part of a larger economic ecosystem and using that foundation as grounds for acquiring the financial leverage that will be required to construct it. To achieve this target, this paper presents a roadmap for the business development and financial milestones along the path to building this megaproject.