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Final

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The Preliminary Technology and
Engineering Readiness Assessment of
the Space Elevator Transportation
System

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Personal Prolog

This is an Architecture Note. It is the opinion of ISEC's Chief Architect. It represents an effort to document ISEC's ongoing science and engineering discussions, and is one of many to be published over time. Most importantly, it is a sincere effort to be the diary, or the chronicle, of the multitude of our technical considerations as we progress; along the pathway developing the Space Elevator.

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Is the Space Elevator Transportation System Ready? Let's Talk!

Introduction

The Architecture Note #14 called for a delineation of the Transportation System v the Enterprise System. The next formal step will be to assess the Technology Readiness of each portion of the Transportation System. ISEC is about to complete a preliminary Technology Readiness Assessment and present substantiation of that assessment at the SEATTLE conference in August 2018.

As a preview, ISEC's preliminary Technology and Engineering Readiness is summarized below. When one looks at all the various technologies and where they are in the Technology Readiness Level evaluations common to NASA projects, ISEC sees these preliminary assessments:

1. The Earth Port is buildable with today's available technologies and engineering expertise.
2. The Headquarters / Primary Operations Center is buildable today.
3. The Tether Climber is similar to a today's satellites, and ISEC sees no technology challenge to the construction of the Climber.
4. The GEO Node and Region technology needs are understood and ISEC assesses that the most of the GEO Node's Transportation System components can be built now.

5. The Apex Anchor will be a challenge. Its role is key to the building of the Space Elevator, but it is neither a technological nor engineering obstacle. The Apex Anchor can support the Space Elevator Transportation System; and could be built in the near future.
6. The Tether material is the pacing item for the development of the Space Elevator. Currently, there are at least three known materials that could mature into the needed “strong enough and long enough” material for a Space Elevator Transportation Tether; 100,000 kms long and strong enough to support its own weight and multiple Climbers.
7. The other voiced challenge to the Space Elevator Transportation System faces is collision avoidance. ISEC, and others, have studied the issue, and collisions are much less likely than most think. Even so, the Space Elevator Transportation System will be advised of approaching debris; even debris smaller than a pebble – in sufficient time to avoid it. Further, the Space Elevator Transportation System will work with the FAA’s Space Traffic Management program ensuring that the Tether operates only within uniquely assigned space locations. This traffic management approach will keep other operating space systems safely separated from the Elevator.

I need to make some things clear

The preliminary TRA is for the Transportation System. The Conference theme does NOT say the Galactic Harbour is as ready. That is so because we lack any Technology Readiness Assessment for those things going on within the Enterprise. I will discuss the Technology Readiness of the Enterprise System in next month’s newsletter.

Because a major government agency (DARPA) has declared that technology development is needed for on orbit servicing, and parking lots, and other such things; our stance is that the Enterprise system is not yet as ready (as the Transportation System).

Because industry is where the technology REALLY resides, ISEC needs the industry to openly discuss this topic. We need to get closer with key industry players; especially those whose future business activities are GEO centric. ISEC also needs to get those industry players to send their (very proprietary) Requests for Information to us. We also need these same industry players to accept us as business partners ... soon.

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In closing

It is time to start Verification and Validation activities! To prepare for that discussion; read the ISEC 2014 position paper; *“Space Elevator Architecture and Roadmaps”*

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