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Final

Architecture Note
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**First, we had an idea; then we built the Roadmaps;
and then we laid out the Strategic Approach. Recently
we assessed the technology readiness of the
Transportation System. Now we need Funding, so the
Approach can become the Plan.**

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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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The Galactic Harbour

Our Strategic Approach must become our Plan

Introduction

As I mentioned last month, the theme for our 2018 Conference in Seattle will be something like ... "The Space Elevator Transportation infrastructure is closer than you think". The theme will also include a thorough discussion of the Multi-Stage Space Elevator (MSSE). We are preparing to present the topics in an antagonist versus protagonist format; seeking to get net judgements of each of the seven positions cited in ISEC's preliminary Technology Readiness Assessment (TRA) of the Space Elevator Transportation System; and the MSSE as well. The full discussion of the conference themes is discussed elsewhere in the April Newsletter.

The "pro vs. con" positions will complete the initial substantiation of the preliminary TRA. Based on that stance, we believe that ISEC can legitimately approach funding sources to get the resources we need to transform our Strategic Approach into a development plan.

How to get there

First let's review the preliminary TRA:

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 viable 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 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 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.

The Strategic Approach

Our strategy is to link the Space Elevator Transportation System to the Space Elevator Enterprise; within a Unifying Vision known as the Galactic Harbour

The Strategic Approach is ISEC's guiding theme for the technical development of a Space Elevator. The Space Elevator Transportation

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System will be the core, priority construction activity; and, its success will be the foundation of the Space Elevator Enterprise System. They will be built in a manner separate from each other but not in isolation. This “separate but not segregated” paradigm establishes both the prioritization and collaboration between and within our near parallel development efforts.

Moving from an approach to a plan

First, let us recall our definition of IOC for the Space Elevator Transportation System; our first destination at the end of development:

The Space Elevator Transportation System is comprised of one Earth Port with two tether termini, multiple Apex Anchors each supporting 100,000 km Tethers, 14 Tether Climbers, and a single Headquarters and Primary Operations Center. The GEO Node supports the Space Elevator Transportation System with a range of “overhead” functions; e. g. test, safety, and support.

The Architecture Engineering sequence to develop a Strategic Plan for the Space Elevator Transportation System:

1. Present substantiation (at the 2018 SEATTLE conference) of the seven elements the prelim TRA statements.
2. Evaluate the “for and against” aspects of all seven preliminary TRA statements.
3. Formally publish the preliminary Technology Readiness Assessment (TRA) in the proceedings of the Conference.
4. Build roadmaps of Verification and Validation tests, experiments, and demonstrations as evidence that the engineering development of the Space Elevator is ready to proceed. Much of that roadmap set will be the various verification and validation tests and demonstrations discussed in the ISEC position paper #2014-1; *Space Elevator Architecture and Roadmaps*.
5. It is expected that the culminating V & V efforts will:
 - a. Correlate to the segment structure of the Space Elevator Transportation System,

- b. Correlate to the seven cited items in the preliminary TRA, and
 - c. Match the technology & engineering maturation index of the “Sequences”
6. Seek funding to execute the roadmaps.

Subsequent to the 2018 Conference

The Conference theme does NOT say the Space Elevator Enterprise System is closer. ISEC needs to construct a similar transformation and roadmap process for the Enterprise System. That scheme needs to be looked at closely, and must include the eventual customers, clients and partners of the Enterprise. It also must include the various industry members who will construct our Galactic Harbour; the Transportation System and the Enterprise System.

The “separate but not segregated” paradigm of our Strategic Approach cites the need for collaboration between our near parallel development efforts. In order to initiate that collaboration, targeted outreach efforts must begin by early 2019. The Space Elevator Transportation System will be the core, priority construction activity; and, its success will be the foundation of the Space Elevator Enterprise. They must be built in a manner separate from each other but not in isolation

A quick look at “Outreach topics”

1. Begin a Technology Readiness Assessment for those technology and engineering activities within the Enterprise System.
2. Contact DARPA regarding their declaration that technology development is needed for on orbit servicing.
3. Contact the FAA regarding their role in Space Traffic Management and acknowledgement of a Space Elevator as part of that traffic management.
4. Contact industry (where the technology REALLY resides) to openly discuss the Space Elevator topic. We need to:

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1. Get closer with key industry players; especially those whose future business activities are GEO Centric.
2. Get those industry players to send their proprietary Requests for Information to us.
3. Get these same industry players to accept us as business partners ... in the future

In closing

We Have a lot of work to do, but the goal of a functional space elevator is closer than ever!

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