Space Elevator Architecture

**Architecture Note #37**

***The Galactic Harbour – An Architecture***

***Ready for Development***

Michael A. Fitzgerald

Senior Exec VP and Co-Founder

Galactic Harbour Associates, Inc

Space Elevator Transportation & Enterprise Systems

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**Personal Prolog**

This is an Architecture Note. It is the opinion of the Chief Architect. It represents an effort to document ongoing science and engineering discussions. It 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.

Michael A. Fitzgerald

**Is the Galactic Harbour “really” ready for development?**

Pete Swan called me. It was early in 2019. Pete and I were getting ready for the ISDC 2019 conference, and then the subsequent IAC conference. Both conferences were being held in the Washington D.C. area, and we wanted to be ready for whatever what might happen. He and I were filled with excitement. We were completing the document that later became “Today’s Space Elevator”. The document was as complete a first description of a megaproject as Pete and I had ever dealt with.

Mega projects are unique beasts. They usually spend much of their early lifetime being described in any number of ways … “Too big!” “It will never fly!” … “You want to do what?!!” Pete and I have heard it all. Vern Hall, our Harbor Master, had heard it too. The “naysayers” could form their own political party or at least their own voting bloc. There was no way the Space Elevator / Galactic harbour will ever be built. Pete figured we should talk. We did. And this is what we decided:

**Standing on the shoulders of the visionaries who preceded us … The Space Elevator is ready for development!**

In the late 1980’s, I was assigned the job of “Chief of Integration” of the USAF’s mobile ICBM, and about the same time Pete was selected to build the space segment of IRIDIUM constellation. Vern’s was the Chief engineer of the Los Angeles Port’s Project 2020, a massive transformation of a busy harbor into an intermodal transshipment facility. It continues to serve the entire southwest United States. These three megaprojects were indeed massive, but they also set their own standards for change. Pete’s project included nearly 100 satellites, and an extensive ground support apparatus. My ICBM project included almost 2000 missiles (operational versions and test versions) and an immense support architecture. It also included two new Air Force bases; leading me to tease my good friends that at least my megaproject included golf courses – inside joke.

Vern’s megaproject struck a special message; locale assimilation – locales near and far. His transformed intermodal container harbor had to be assimilated into Southern California’s huge population and the tangle of freeways and train tracks built to support the tens of millions of people living within 100 miles of the harbor 🡺 (talk about an epicenter!) and, yet with net minimal environmental consequences. Further, the products flowing through had to reach Las Vegas, Phoenix, Salt Lake City, Denver and beyond; in a timely manner.

To varying degrees, we three fully succeeded and learned a great deal; the accumulation of which is probably worth a memoir or three. The question here is whether our next megaproject was ready to start. In a word – YES! There is a simple algorithm for questions like … “are we ready?” The response paradigm is simple. “I can you see the finish line, and how to get there! Let’s go!” So, the response from this panel of three 🡺 “YES! The time is now, and it is unanimous”.

**The time is now, because of the past and the future.**

**ISDC 2019 – Arlington, Virginia**

At the 2019 International Space Development Conference (ISDC) in Arlington, Virginia, a small crowd came to hear our story. It was exciting. The crowd absorbed our story of enterprises aloft and new & faster pathways to Mars. In that crowd were young and old, and that represents more than our unanimous Yes; The “Yes” from the cowd was an expression that humankind needs Space Elevators; operating within Galactic Harbours. The story had changed from “we can” to “we must”. The audience called for more information overall, more about our throughput, and more about our environmental protection story.

Soon after ISDC 2019, “Today’s Space Elevator” was published, and in it we reflected about the people that had gathered in front of the excited crowd. Featured on that stage was the Elevator "co-inventor" Jerome Pearson; recently deceased. He was a great fan for getting started. Also at the affair was Peter Swan, PhD; Chief Architect Michael Fitzgerald and current generation "excited students" James Torla and Souvik Mukherjee. The "moment" was more than an assembly of young and old. It was also a portrait of the stewards of the Space Elevator revolution -- from Inventor to Developer to the future Innovators. The unanimous was getting more unanimous.

**The time is now, the International view.**

**International Astronautical Congress 2019**

**Washington, D. C.**

With all that excitement at the ISDC 2019, we regrouped and pushed the story at the IAF Congress in Washington, D. C. in October 2019. The response was much the same. The audiences were just as enthusiastic and were more a world view. Concurrent with our various presentations at the conference in Washington, D.C. was the emergence of a few essential missions. They were requirements basis for the true space transportation infrastructure. The Space Elevator based Galactic Harbour enables logistical support to the coming missions that are critical to humankind, including:

* Efficient delivery of millions of tons of cargo to geosynchronous enables the full version of Space Based Solar Power.
* Efficient delivery of millions of tons of cargo to geosynchronous enables the establishment of space enterprises there. Businesses need to be connected to their supply chain.
* Efficient delivery of cargo to the Harbour’s Apex enables subsequent “free delivery” to the entire solar system. (See Architecture Note #35)

**The time is now. and collaboration with the “Launch Community” is also now.**

This is a note about advocacy. I am advocating the development and construction of the Space Elevator based Galactic Harbour. In this future, enterprises at GEO will be served by the vertical supply chain that reaches them. Cargo flights will depart from the Apex at least daily. The departures will be to the Moon, Mars, or other destinations in the solar system; conducted with precision and safety.

That forecast is not the demise of rocket based transportation, quite the opposite! It calls for a collaboration between the Elevator and Rocketry, and is discussed in “Space Elevators are the Transportation Story of the 21st Century”. This report in final is available at this site <https://www.isec.org/studies/#TransportStory> The Dual Space Access collaboration also has huge environmental benefits, as cited in - “Space Elevators, the Green Road to Space”. This report will be available soon, in final.

**In Closing – “now is now”**

WE have often said that we do not know all the answers, but we do know that the path we are on will get us to the answers, and to our vision. We have previously cited technical readiness. Then the conferences in 2019 convinced and motivated us to openly begin the pursuit of the Galactic Harbour. The pandemic and other events of 2020 had quite an impact on the world, showing clearly how we need each other. I sincerely believe that major beneficial projects like the Galactic Harbour are needed; and we should go for it. NOW!

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