SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FAR FUTURE (D4)
Space Elevator Design and Impact (3)

Author: Mr. Josh Berk
University of North Dakota, United States

Mr. Jeremy Straub
University of North Dakota, United States
Mr. Anders Kose Nervold
University of North Dakota, United States
Mr. Donovan Torgerson
University of North Dakota, United States

AN INTERNATIONAL SPACE TECHNOLOGY ROADMAP: DISTRIBUTED RISK REDUCTION FOR THE NEXT GENERATION FLAGSHIP OBSERVATORY

Abstract

Just after the launch of the Hubble Space Telescope, astronomers and space mission planners began planning for a follow-on observatory. This observatory, the James Webb Space Telescope (JWST), was to have a larger aperture and an infrared spectral domain. This telescope's capabilities, while scientifically valuable, have posed programmatic challenges. At an early stage of mission planning, the ambitious goals for critical system elements were far ahead of the technology development horizon. The failure to spend resources to understand and resolve this critical system risk early in the system development process has led to significant cost and schedule overruns.

With the launch of the JWST approaching, the astronomical community is beginning to consider what its goals and priorities for what the next great space observatory will be. While consensus on these topics has yet to occur, delivery of these objectives (in a cost and time effective manner) requires a technology development process. An internationally distributed effort to share the risk of technology development for this next great observatory is proposed.

This process will begin with the creation of a shared observatory technology roadmap. This will allow members of all prospective collaborating nations to have input on what is needed to facilitate the next generation of breakthroughs in astronomy. The roadmap will describe the desired technologies in an implementation-neutral way to facilitate different technologists taking different approaches to these important development challenges. Each nation should initiate programs to seed the technical development, as proscribed by the roadmap, and facilitate its maturation.

This paper presents the conceptual framework for a shared observatory technology roadmap. It considers the international relations challenge (including the motivation of prospective participants) of coordinating the proposed effort, evaluating it qualitatively. The United States National Aeronautics and Space Administration's (NASA) Space Technology Roadmaps and Space Technology Program are analyzed as a prototype for a this international effort. The role of the NASA Office of the Chief Technologist (OCT) in driving this technical innovation is considered and presented as a prospective template for use by the effort.