Thesis Project Portfolio

Hoo-Rizon 1: Subscale Sounding Rocket

(Technical Report)

Global Collaboration in Space Technology

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

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Sociotechnical Synthesis

My capstone research concerns international collaboration in space technology. Specifically, it seeks to contribute to the development of a formalized framework for the United States to be a leader in this industry that currently does not exist. International collaboration in space technology is complex, and many frameworks and efforts attempt to reconcile these complexities. My analysis consists of using the ISS as a case study example of successful international space technology collaboration by finding and highlighting successful mechanisms used on various missions throughout its history. Additionally, I explored efforts to create international frameworks such as the 2007 Global Exploration Strategy and more recent NASA frameworks to determine which elements from these can be included in a formalized framework for the US.

Space technology has always impacted entire nations of people and has been influenced by global geopolitics, war, and patriotism. Understanding how different people groups have interacted and shaped this technology is key since it informs how the technology can be utilized in the future. The main theory used in the analysis is the Social Construction of Technology. Fundamentally, space technology has been heavily shaped by the powers at play who use the technology. What started as missiles for war has grown into spacecraft that can advance national security and global status. It is important to understand how key nations such as the USA, Russia, and Japan, as well as their citizens, have influenced and interacted with space technology to inform ways the United States can continue to lead on this front.

Through this research, I have found three key ways the US can continue to be a leader in space technology by leaning on international collaboration. The first of these is through public-private partnerships. Inviting the private sector into space technology can make global collaboration more efficient and less bureaucratic if the right safeguards are put into place. The second key finding is the need for compromise. Being a leader doesn't just require being firm in your beliefs, but it requires occasionally compromising for the sake of the particular mission or project. The final main finding is the general upside of direct collaboration with other nations, particularly for the benefit of enhanced scientific and logistical capability. When considering the context of my capstone project, which is the development of a sub-scale sounding rocket, these findings can inform how projects such as these can be successfully carried out while allowing project teams and their sponsor nations to be leaders in the process.