

**Thesis Portfolio**

**CECIL, 1U Amateur Radio CubeSat**

(Technical Report)

**Analyzing How the Growth of the Commercial Space Industry Has Affected American  
Public Perception in Governmental Space Missions**

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science  
University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree  
Bachelor of Science, School of Engineering

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## **Table of Contents**

Sociotechnical Synthesis

CECIL, 1U Amateur Radio CubeSat

Analyzing How the Growth of the Commercial Space Industry Has Affected American Public Perception in Governmental Space Missions

Thesis Prospectus

## Sociotechnical Synthesis

The relationship between the technical thesis and the STS research topic is relatively straightforward in that they are both related to the field of aeronautical engineering. The technical thesis involves the design and completion of a student-designed and operated satellite while the STS research involves an analysis of how the private-commercial space industry is developing and how that development will affect the governmental space industry. The satellite is a product that is directly involved in, and operated within the bounds of, aeronautical engineering due to its very nature of being operational in Low-Earth Orbit, while the STS research looks into specifically how the area of aeronautical engineering is viewed within American society.

In more specific terms, the technical thesis is centered around the design and development of a 1U CubeSat, which is a small satellite approximately 10cm on each side. The purpose of this satellite is to establish an amateur radio satellite that the university, as well as any amateur radio enthusiasts, can access and take images of the Earth during the course of its orbit. By establishing an operational satellite that has frequent communication with the university, the prestige and accomplishments of the university will be enhanced, especially in regards to the aerospace engineering field.

The STS research paper, on the other hand, is specially researching how the commercial space industry will affect the American public's relation to the governmental space industry, i.e. NASA. The particular subject analyzed is the commercial space industry and its projected effects upon American society. More specifically, the exact question being analyzed is as follows: Due to the current and expected growth of commercial space flight within the United States, how does one expect the public perception of how the government conducts missions related to the space industry change? The method of research primarily consists of documentary research and analysis under the application of the Wicked Problem Framework. Upon completion of research collection and analysis, a notion of how the United States public will react to future government-sponsored space missions should be formed; in turn, this will act as an indicator of how future missions and policies will be affected. Furthermore, this will allow for an inference about how the space industry will develop in the coming decades.

Though this combination of topics, I have been able to work on a smaller, technical scale (CubeSat) as well as gaining an understanding of how the aeronautical field affects the nation on a larger scale. By having a view into both fields, large and small, a deeper connection about their relations has been established. The relationship has allowed for a nuanced understanding of

**the field of aerospace engineering as a whole to be developed, in that I have been able to gain insight into the inner working of how to develop a technical artifact as well as understanding how the American public view the field and their relationship to it.**