Thesis Portfolio

CECIL, 1U Amateur Radio CubeSat
(Technical Report)

The Relationship between Science Consultants and the Film Industry
(STS Research Paper)

An Undergraduate Thesis
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TABLE OF CONTENTS

Outer space is a vast, never ending void of which humans know very little about. We are constantly exploring the unknown, and will probably do so for the rest of humanity's existence. Since there is still so much knowledge that is not yet known about space, the possibilities are endless. The subject of outer space has a large amount of public interest, so everyone can be affected by the knowledge that we gain from the discoveries that are made. By using engineers and new technologies, more and more information is being uncovered in relation to this every day. Two industries in particular, the film industry and the satellite industry, are very popular among the public. Many scientists and engineers work in these industries, and the public can be very affected by what happens here. Satellites give us all kinds of information about what is going on in space, and films, particularly films set beyond Earth, give the public an idea of what is actually out there. Both of these topics have a large amount of public interest, making them great examples of mutual shaping in society. The knowledge that the public gains from these mediums can also be skewed, so it is extremely important that the information that is put out into the world is accurate. They also include technologies that have so much potential based on the findings of space exploration and research. Not only can space exploration inspire new ideas for film technology, but film science can inspire real world technologies, too.

My Technical project as a 4th year at UVA is to design and build a communications satellite that can link to amateur radio sites all around the world. My specific sub team on this project is the orbit, attitude determination, and control systems team. In previous years, UVA has not had much success in communicating with their own satellites, so this mission has the goal of perfecting this communication. A camera will also be placed on the satellite to take images of the Earth from orbit. One of the hardest decisions that had to be made was what attitude control system to use. The attitude of the satellite must be one so that the camera is always pointed at the

Earth. My team had to decide which one to use, and we ultimately decided on a passive magnetic stabilization system. This system consists of permanent magnets placed inside of the satellite that align with the Earth's magnetic field. Unfortunately, this project was a two year project, so my team only got to design it. Next year's class will complete the construction of the satellite, and hopefully will launch it next summer. After it is completed, the mission should give the university more credibility in its aerospace program, and should pave the way for many more undergraduate satellites to be designed and built.

My STS thesis topic is the relationship between scientists and engineers and the film industry. In this thesis, I studied a few films that take place in space and explored the technologies that were used to make them. One major focus of this thesis is a figure called the science consultant. A science consultant is an engineer or scientist brought in to work closely with filmmakers. Their main goal is to provide accurate information to the filmmakers so that the science in these films is correctly portrayed. One problem with science fiction films is that the science in them is not always accurate, so the science consultants usually are a fix to that problem. In my study of the films *2001: A Space Odyssey, Gravity,* and *Interstellar,* I found that there is actually an extremely complicated relationship between filmmakers and science consultants. Sometimes the goals of the story do not line up with the science that is shown in the film, and this becomes a problem when the public receives incorrect scientific information. My thesis explores these ideas, and the importance of accurate scientific representation is brought to the spotlight.

Both of these projects have been very insightful. In my technical project, I learned a lot about the designing and building phases of satellites, and the systems that are used on them. In my research thesis, I learned so much about the film industry that I did not know about before. I

believe that I successfully showed the importance of people behind the scenes of all films, especially science consultants and special effects artists. The importance of public perception of science was also brought to light. In addition, I uncovered the complicated relationship between all of the crews behind the scenes of science fiction films. To further my research, other films in addition to the three that I chose could definitely be explored in more depth. Overall, these two projects showed the importance of space exploration and the public perception of science.