

Thesis Portfolio

Design and Construction of a Kinetic Art Weather Display
(Technical Report)

The Colonization of Mars: Ethical Concerns Regarding the Future of Human Life
(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

Jack Davis
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Department of Mechanical and Aerospace Engineering

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Sociotechnical Synthesis

The STS research paper discusses the topic of the colonization of Mars, as well as the historical and ethical subtopics that are relevant to understand motivations for the movement. The technical paper describes the creation of a mechanical weather display that is capable of showing the current weather pattern of Charlottesville, VA similar to a “fake window.”

The STS thesis pertains to the debate of whether humans should begin to focus on developing technologies that will allow them to colonize Mars in light of worsening conditions on Earth. An analysis of this topic will be done through the study of the History of Technology, which aids in the analysis of technological development in the context of important social issues in the past and present. This method allows for studies and comparisons between the space race of the 1960s and current programs and initiatives that are being implemented today. The research and development of this paper allowed me to understand the context and historical turmoil surrounding space travel, as well as how historical opinions can affect decision-making today. The study of a popular topic through an ethical lens emphasized the importance of looking at technology beyond the purpose it is created for. I also further understood how mainstream media can affect the perception of technology and movements, as many technologies often overlook the social issues underlying a debate to begin with, as is the case with Mars.

The technical report discusses my capstone project, which is a mechanical display that moves to show the current weather pattern on it. The purpose of this technology is to combine mechanical design with computer and electrical engineering to form a useful product. The window display was designed to serve as a bright spot in a space such as a basement or a laboratory where there are no windows or natural light. The presence of a window and natural light has been proven to show positive effects on a person’s mental health. The product was

modeled with Solidworks, a 3D modeling software, and created using tools such as a laser printer, 3D printer, and a CNC Mill. Through the development of this project, I learned how to bring ideas from a 3D modeling software to creating them in real life. This involved learning the modeling software, programming computer chips and motors using Spin code, and assembling components and the final product using tools available in the laboratory. I understood the process of budgeting for a project, managing space, and making a final product that is understandable and functional.

The technical thesis and STS thesis are not directly related. However, the display described in the technical portion could potentially serve as a means to lessen the impact for colonists who travel from the Earth to Mars. With a fake window that depicts weather patterns of a familiar climate and adapts to show real-time images, colonists may feel more at ease in a new environment because they have a connection to their home.