Thesis Project Portfolio

The Hummingbird

(Technical Report)

Issues with the Implementation of New Defense Programs and the Threat of Failure

(STS Research Paper)

An Undergraduate Thesis

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

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Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

Implementation of New Technology into the Military and Its Effects on the Public

Technological advancements in the military are necessary to maintain the United States' status as a global superpower. New defense programs are consistently proposed to improve military performance and safety during combat, but the implementation process can threaten the success of the technology. This thesis focuses on the creation of a new technology for the military and how the public views the implementation of new defense programs. For the technical project, my team was tasked with designing a light attack aircraft that fulfills the criteria outlined by the American Institute of Aeronautics and Astronautics undergraduate competitions. My STS research focuses on the differing perspectives of magazine articles and government research papers regarding the implementation of new defense programs.

Light attack aircraft are very different from the advanced and maneuverable fighter jets utilized in the military today. They are designed for close-air support for ground troops in austere environments, meaning survivability and weapons systems are very important. This particular aircraft design needs to have short takeoff and landing distances especially on rugged terrain and loitering capabilities are necessary for targeting, surveillance, and reconnaissance missions. My team's design features 3000lbs of armaments, an integrated gun for ground targets, and a turboprop engine that reduces weight, cost, and flight speed. The final deliverable includes a detailed overview of the light attack aircraft design, aerodynamics, performance, and structural analysis.

There are two categories of sources discussing the introduction of new defense programs: defense and news magazines and government research reports. The magazine articles compare the acquisition of light attack aircraft to previous aircraft programs that they claim were

unsuccessful and believe that the same problems will occur with the new program. On the other side, the government research reports portray attempts to understand how to prevent problems that arise upon the implementation of new technology in order to have more successful defense programs. By analyzing the analogies used by both of the sources to compare this emerging technology to one from the past and understanding the public versus private dynamic between the sources, I've discovered that the groups have different definitions for success and have limited views when it comes to defense programs.

The technical and STS portions of my research I've learned how extensive the process of introducing new technology into the military can be and the externalities that can occur. Opinions on new defense programs are divided and if both groups open their minds and learn from one another, the process could be greatly improved. Although the task of completing both projects seemed overwhelming and nearly impossible, each accomplishment simplified the next step and every piece of the thesis fell into place throughout the year. I would like to thank Professor Jesse Quinlan for the patience and support he exemplified while helping my group try to navigate aircraft design, as we would have greatly struggled without him. Additionally, I would like to thank Professor Kathryn Neeley for guiding me throughout my STS research and helping me to not lose confidence throughout the process.