Thesis Portfolio

AIAA Austere Field Light Attack Aircraft Request For Proposal
(Technical Report)

Evaluating the Societal Impact of Future Commercial Hypersonic Flight Technologies
(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

Marcus Dozier
Spring, 2021

Department of Mechanical and Aerospace Engineering

Table of Contents

Sociotechnical Synthesis

AIAA Austere Field Light Attack Aircraft Request For Proposal

Evaluating the Societal Impact of Future Commercial Hypersonic Flight Technologies

Thesis Prospectus

Sociotechnical Synthesis

Aviation is a constantly evolving and advancing field-- the modern planes we fly today would have been unimaginable to early aviators and they will only continue to be innovated upon into the future. It is the role of the designer to consider both the intentional and unintentional societal and ethical implications of their technology and strive to prevent any negative manifestations their technology may take on during its lifetime. This task becomes quite challenging when the engineering assignment itself has an inherently evil nature.

My technical project revolved around the American Institute of Aeronautics and Astronautics (AIAA) "Austere Field Light Attack Aircraft" request for proposal (RFP). My group was tasked with designing a comprehensive close-support attack aircraft. There are many ethical aspects to my technical project, the most pressing being it's obvious involvement in war. For our design, there exists the morbid duality that the more effective our design is, ultimately the more enemy forces will be neutralized in its service lifetime. It was summarized, that engineers of military technology must prioritize the lives and safety of their own countrymen, both military and civilian, and strive to mitigate the total loss of human life where possible, through their designs and involvements; they should also understand the necessity of a nation's military and the considerable implications the military, as an economic industry, has on a nation's survival (University of Sheffield, 2016). In the case of the technical project, these societal and ethical frames were considered by the team: the main priority of our designed light attack aircraft is survivability, the need to protect the crew above all else transcends all aspects of our design. This project speaks to the role of engineering as a force for evil instead of good, but an essential one nonetheless. The technical subject of the STS prospectus and the technical topic for the Department of Mechanical and Aerospace Engineering are not related.