

Thesis Project Portfolio

AIAA 2021-2022 Undergraduate Aerial Firefighting Aircraft

(Technical Report)

Prison Inmates as Firefighters: California's Controversial Policy

(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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Spring, 2022

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Table of Contents

Sociotechnical Synthesis

AIAA 2021-2022 Undergraduate Aerial Firefighting Aircraft

Prison Inmates as Firefighters: California's Controversial Policy

Prospectus

Sociotechnical Synthesis

The AIAA hold an annual design competition in which teams of ten members may submit an aircraft design based on a series of constraints. This year's prompt dealt with Responsive Aerial Firefighting Aircraft or RAFA. The goal of this competition is for teams to develop a conceptual aircraft that can be a cost effective, novel aircraft to aid in total fire suppression. This comes in light of the devastating 2020 California wildfires. Additionally, in 2021, the Boeing 747 Supertanker was retired from service. The Supertanker was by far the largest tanker in service able to hold over 19,000 gallons of fire retardant. With its retirement, new methods of fire prevention and mitigation must be created. An in-depth analysis into a new firefighting aircraft will be discussed within this paper.

In addition to the regular ground teams and firefighting aircraft, California has developed a program involving prisoners as firefighters. The California Department of Correction (CDCR) hosts a program in which non-violent criminals may work in Fire Camps and earn money. This program has existed for decades, but in the wake of covid-19 some camps were shut down. However, some in California believe this program to be beneficial and should be expanded. Additionally, as wildfires increase in frequency and magnitude, there is a distinct shortage of man-power. One negative aspect of this program is the actual pay the inmates receive. Some organization like the ACLU see this as potential exploitation given how dangerous the work is. On the other hand, former members of the program only speak highly of the experience. This complex situation will be analyzed using the Social Construction of Technology STS framework.

When it comes to the problem of firefighting, there are high-tech solutions and low-tech solutions available. The difficult problem facing Californian officials is which solution to devote funding towards. On one hand, aerial firefighting covers a large area and helps control fires spread. However, it is extremely expensive making it restricted to only large fire complexes. On the other hand, inmates provide a cheap source of labor on par with traditional firefighters. The downside is the risk it poses to the inmates and whether or not they are being exploited.