

Thesis Portfolio

Corvus: Urban Air Mobility Solutions for Package Delivery
(Technical Report)

Privatization of Spaceflight: A Result of Aerospace's History
(STS Research Paper)

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Sociotechnical Synthesis

The aerospace industry is constantly evolving, both in the air and in space. Drones and UAVs (Unmanned Aerial Vehicles) have been the topics of headlines as of late, and sparked a debate on what the future may look like as UAVs permeate society. Spaceflight too has generated a lot of interest with the process of privatization and the emergence of private companies with capabilities to launch shuttles to space and entering into the realm of space tourism. While at first glance these two topics may seem unrelated, both technological implementations will be disrupting the norm within the industry and their extent of implementation is dependent on social circumstances. UAV technology is desired not only by individuals for leisure purposes, but also many companies for delivery and other services, especially urban areas. However, this will greatly change the landscape of airspace because of the low altitude they fly at, and potential interference with the public. In a very similar way, privatizing spaceflight adds many more stakeholders and causes a need to integrate systems between the private and public sectors.

The technical project is the design and analysis of a UAV design with specifications to meet logistical urban package delivery needs. The design is to be submitted to the 2019-2020 NASA Aeronautics University Design Challenge; therefore, the specifications were designed so as to meet the specifications outlined in the challenge. There is a focus on safety, ability to perform autonomously, and performance. The proposed design meets or exceeds the project requirements incorporating a tiltwing design allowing for vertical take off and landing (VTOL) capabilities, as well as a traditional cruise configuration with an efficient transition between the two. The business plan proposed also shows the implementation process of this technology and

the elements needed to integrate the proposed design within the boundaries of current regulations.

The STS research investigates the privatization of spaceflight looking through the lens of the STS Framework of Sociology of Scientific Knowledge and trends within the history of the aerospace industry. It can be seen how advancements within the aerospace industry and the success of the technological advancements are a result of social factors and not just the scientific validity. The privatization of spaceflight proposes many challenges however could yield great benefits not only for the private companies but also the governmental parties. The current landscape today has parties capable of achieving spaceflight within the private sector and looking to expand, however it is important to note that is not sufficient to privatizing the industry, as social factors, especially the perception of the society on its impact and importance impact and dictate its ultimate implementation.

There was great benefit working simultaneously on both projects previously mentioned. As seen within the STS research, the sole focus of an engineering cannot be solely focused on its empirical validity, but also must take into consideration the many social factors and barriers to its implementation. Within the technical report there also exists a business case explaining the feasibility of the design and throughout the design process changes were taken into consideration not only to enhance performance of the drone, but also to help ensure it could be accepted by society. Thus when conducting engineering projects it is crucial to consider the current social factors influencing the implementation of a technology as well as the perception of society in order that the proposed technology can bring out the greatest benefit.