

Thesis Project Portfolio

Corvus: Urban Air Mobility Solutions for Package Delivery

(Technical Report)

Why the Cell Phone's Social Construction Casts Drone Delivery into Uncertainty

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

In my technical project I worked on the development of a drone package delivery system. This included designing the drone itself along with the necessary ground systems and business case to support the concept's viability. To supplement this effort, my STS research paper focused on analyzing the potential social construction of this technology in rural and urban areas and comparing it that of the cell phone. This research is beneficial to the technical project because it analyzes the sociotechnical relationships and factors that are important to engineering practice.

As part of NASA's 2019-2020 University Design Challenge, my team were tasked with engineering a drone capable of meeting several strenuous design requirements. This includes creating a drone that is capable of fully autonomous delivery of packages weighing up to 5 pounds for a roundtrip distance of 20 miles in under 20 minutes. To meet these requirements, my technical group designed a tandem dual tilt-wing drone that can accomplish both vertical take-off and landing as well as horizontal flight configurations. This gives the drone the agility needed to delivery packages in confined urban areas but also the speed to get to its destination faster than most available methods.

Upon researching the attitudes of the stakeholders involved in drone delivery, I uncovered that there exist disagreements between the parties which threaten the success of the technology. Therefore, I focused my STS research on the potential social construction of drone delivery to see if I could gain insights about the viability of the system. More specifically, social construction refers to how the development or implementation of a technology is influenced by social factors like culture. To do this analysis, I used Leonardi and Hudson's study on the social construction of the cell phone across three cultures as an analytical framework. Using this study

and considering the relative success of the cellphone, I initially derived the claim that, if the drone delivery can have a similar social construction to that of the cellphone, then its implementation is more viable. However, this claim was not supported by the results as it was found that drone delivery does not create common motivations for adoption between the stakeholders. Therefore, ultimately this study instead highlights the importance of resolving stakeholder disagreements.

Together these projects provide a more holistic sociotechnical view of drone delivery than either would alone. The STS research supplements the efforts of the technical project by considering the social factors and relationships that are crucial to understanding the potential success of drone delivery. This has been an important lesson for my understanding of engineering practice as these projects together have shown that both technical and social aspects must be considered when designing a technology. Furthermore, as engineers we are often entrenched in our own technical aspirations or viewpoints that we fail to consider where other factors may be important. Therefore, the symbiotic relationship displayed by these projects in sociotechnical analysis encourages more diverse collaboration among disciplines as it provides for a more holistic solution of engineering problems.