

Thesis Project Portfolio

**Geospatial Tracking:
Development of Alert Software for Real-time Aerial and Maritime Tracking System**

(Technical Report)

Impacts of Ridesharing in Urban Society

(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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Sociotechnical Synthesis

My technical project focuses on the design and development of an alert application for a geospatial tracking system. The purpose of this project was to provide an efficient way to detect certain events of interest in a geospatial system where a large amount of location data is being streamed and displayed in real-time. This application was created using the programming language Scala and was designed to interact with an instance of Apache Kafka and a database of saved user queries. The application would filter through a set of real-time data until one of the observations met the condition of one of the user queries. This would then trigger an alert to be created and sent out to another instance of Apache Kafka. The project was successful at efficiently creating real-time alerts and provided me with a deeper understanding of backend software design and testing. The topic of my technical report and research paper are not directly related.

My STS research paper focuses on examining the positive and negative impacts of on-demand ridesharing services on urban areas. The paper uses the multi-level perspective as the framework for the analysis of the context and background surrounding ridesharing and its growing dominance over other forms of non-personal transportation. In the paper, I discuss how ridesharing services like Uber and Lyft have nearly replaced traditional taxi services and have become what is referred to as a regime by the multi-level perspective. Actor-network theory is used in my STS research paper as the main framework for the analysis of the current impacts of ridesharing. The positive impacts include increased convenience and reliability for regular riders, while some of the negative impacts include a decrease in the usage of public transportation and an increase in traffic congestion and greenhouse gas emissions. The result of the impact analysis done in my STS research paper was a clearer understanding of the interactions between the

complex network of actors connected to ridesharing and the proposition of potential solutions that could mitigate the negative impacts.