

A Space-Based Solution to Improve Roadway Safety and Efficiency in Virginia:
Real-Time Winter Weather Data for Navigation
(Technical Report)

Urban Planning and the Destruction of Black Neighborhoods in the United States
(STS Research Paper)

An Undergraduate Thesis Portfolio
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by

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Preface

There are over 57,000 miles of roadways that need to be maintained by the state of Virginia and the Virginia Department of Transportation. These roadways are crucial to transportation efficiency and the daily lives of the public. This University of Virginia spacecraft design capstone project will develop solutions to address Virginia's transportation problems using data fusion and remote sensing methods. However, the urban planning of these infrastructures did not consider the social aspects of minority groups.

The students in the Spacecraft Design Course at the University of Virginia were tasked with a problem statement that focused on developing solutions to alleviate weather-related traffic congestion and improving roadway efficiency and safety in Virginia by sending predicted weather and traffic data to roadway users through a combination of the state-of-the-art that includes a combination of spacecraft, aircraft, and ground-based systems. A summary of the problem assigned to the real time weather data sub team is contained. Following that, are the findings that emerged from meetings with key stakeholders and subject matter experts, a literature review, and an advanced analysis. The solution requirements, data streams, and solution approach pertaining to this project are included as well.

Minority groups have been overlooked when it comes to the development of infrastructure. It seems as if city planners, engineers, and architects did not consider the social aspect of the urban planning process. Mainly, Black neighborhoods were displaced, and their sense of community was disrupted due to the excess of urban renewal projects. This paper examines the effects of these urban renewal projects on Black communities using Vinegar Hill, a predominantly black community in Charlottesville, Virginia that was all destroyed due to an urban renewal project, as a case study.

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