

Thesis Portfolio

The Vitality of Autonomous Driving Simulation

(Technical Report)

Increasing Social Understanding of Electric Vehicle's Environmental Impact

(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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Portfolio Table of Contents

- I. Sociotechnical Synthesis**
- II. The Vitality of Autonomous Driving Simulation**
- III. Increasing Social Understanding of Electric Vehicles Environmental Impact**
- IV. STS 4500 Thesis Prospectus**

Sociotechnical Synthesis

Given that electric cars continue to become a dominant and growing trend, the world should consider the entire fueling chain more seriously than ever. While it may be society's general understanding that electricity is a cleaner alternative to internal combustion engine cars, that is not always necessarily the case. The entire process of the electrification of the automotive industry must be considered. From the production of the vehicles themselves, to the source of their electricity the environmental impact carries weight.

For my technical project, I built the much of of an autonomous driving simulator. While it is not directly related to my STS Research there are certainly correlations. Autonomous vehicles are closely tied to the electrification of the automotive industries. Autonomous driving simulators are important because they allow for the safe testing of autonomous algorithms. With autonomy in cars being increasingly prevalent it is important that they are not rushed into a consumer environment so that the streets remain as safe as possible. Also integrating a human operator with an autonomous vehicle in a virtual space is the best way to learn.

For my STS Research, I studied how a surge in electricity demand resulting from electric cars would require a deeper look at the energy sector. I strongly advised readers to re-evaluate their perceptions of nuclear energy because it is a great alternative to most renewables to cleanly, safely, and effectively source electricity for an electric car fleet that will soon be entering the market. The common misguided perception is that renewables are clean and worthy of investment, while nuclear is dangerous and should be avoided. I challenge readers to reconsider why they have these opinions.

In conclusion, the automotive industry is experiencing growth and change more rapidly than ever before. With notable change comes both an opportunity for improvement, but also an

opportunity for mistakes. This is not to say that society should pump the breaks on changes, but rather; use caution. Autonomous vehicles should be tested thoroughly in safe virtual environments. Electric vehicles allow society to affect change, in terms of clean energy production, at the snap of a finger. Nuclear energy should be reconsidered as a growing and not stagnate industry to source electric vehicles. Society should take these changes and look at the entirety of what they are and what they affect in order to maximize the positive of their influence.