

Yakski: An Electric Waterjet Propulsion System  
(Technical Report)

Sustainable Mobility: Are Electric Cars the Answer?  
(STS Research Paper)

An Undergraduate Thesis Portfolio  
Presented to the Faculty of the  
School of Engineering and Applied Science  
In Partial Fulfillment of the Requirements for the Degree  
Bachelor of Science in Mechanical Engineering

by

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May 8, 2020

## Preface

How can the impact of the transportation sector on climate be reduced? In the U.S., the transportation sector accounts for the largest share of total greenhouse gas emissions. A more sustainable mobility future will require both technical and social change.

How can the efficiency of personal watercraft propulsion be improved while reducing their environmental impact? Current personal watercraft designs leak harmful pollutants into the environment, cannot operate in shallow waters, and are often large and cumbersome. The goal of this project was to design and build an electric propulsion system that can be mounted on a kayak. Computer-aided design was used to model the system, and computational fluid dynamics were used to optimize the waterjet design. 3D printing was used to test components and validate CFD results, and the final design employs 3D-printed waterjets. A functional prototype was created, and the propulsion system was successfully integrated on a kayak. Future researchers may develop a more robust electronic setup to prevent premature failure during testing and a lighter mounting system.

In the U.S., how are proponents and critics of electric vehicles (EVs) competing to advance their versions of sustainable mobility? Depending upon the sources of electric power and on system efficiencies, electric vehicles may emit much less greenhouse gas than conventional internal combustion engine vehicles. Proponents of electric vehicles, including EV developers, publicize their low emissions, lobby Congress for public subsidies for EVs, and demand the infrastructure EVs need. Some critics contend that EVs do not warrant public subsidies; others fault EVs as a distraction from efforts to promote more sustainable alternatives

to car dependency. The prevailing version of sustainable mobility will determine how the U.S. reduces its carbon footprint in the transportation sector.

## **List of Contents**

1. Preface
2. Technical Report: Yaksi: An Electric Waterjet Propulsion System
3. STS Research Paper: Sustainable Mobility: Are Electric Cars the Answer?
4. Prospectus