**PROJECT OVERVIEW**

**Surf Limitless** was tasked by Quality of Life Plus in the production of a motorized waveski for an individual with paraplegia. The project was designed for Mark Thornton, a surfer and US Army veteran who was an active 68 Bravo aircraft power plant repairman. In 1991, Mark was injured in an explosion leaving him with T4 paraplegia. With the waveski as his preferred way to surf, Mark requested a device for him to surf more independently. Therefore, the team designed a battery powered jet impeller propulsion system integrated into Mark’s waveski granting him the ability to maneuver through the ocean and to get through the breaking waves with full independence.

**DESIGN ANALYSIS**

The team prioritized the safety of the design by ensuring that the electronics provided sufficient power at a safe rate. This required intensive research on battery and thermal safety alongside research on waterproofing the design to prevent water damage.

**THE WAVESKI**

A waveski is essentially a type of surfboard where the rider sits on top of the surfboard with a paddle. Mark connected the team with Steve Boehne of Infinity Surfboards to shape a new waveski for the project with funding provided by One More Wave, a non-profit organization for veterans.

**MAIN COMPONENTS**

The motorized waveski was designed to use a MHZ Watercraft Jet SB Booster jet impeller as the primary source of propulsion which is powered by:
- SSS 56104 790KV brushless motor
- Maytech 300A OPTO ESC
- Maytech wireless controller
- MaxAmps LiPo 11,000 4S 44.4V battery

Where the battery can be recharged with:
- EV-Peak A9 12S DC balance charger
- MaxAmps 24V power supply

**FABRICATION**

The team fabricated two watertight enclosures to house the electronics and a stainless steel motor mount.

**TESTING**

The team tested for functionality, battery safety, and water tightness of the jet propulsion system to maximize project quality.

**SURF LIMITLESS**

Sean Dapiran  
Project Lead

Sydney Castillo  
Manufacturing Lead

Ladan Eslami  
Procurement Engineer

Antoni Michael Aguilar  
Design Lead

**ACKNOWLEDGEMENTS**

We would like to acknowledge Dr. Scott Shaffar, Annemarie Orr and Quality of Life Plus for giving us this opportunity and providing guidance and support throughout the project. We would also like to acknowledge our BAE mentor from QL+, Dana Poirier, who provided guidance and valuable feedback in progressing the project forward. Steve Boehne of Infinity Surfboards who shaped our projects waveski while contributing to the project’s design, and Mike Lester who provided helpful assistance in manufacturing the project’s components. Lastly, we would like to thank Mark Thornton for communicating with us by sharing his thoughts on how we can best design the project to improve his surfing experience.

**FINAL PRODUCT CAD MODEL**

**SYSTEM LEVEL DIAGRAM**

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