

A photograph of a rowing team in a boat on water. The image is partially obscured by a blue rectangular overlay in the upper center. The overlay contains the title 'Rowing Proposal' in large yellow font, and the names of the team members: 'Braeden Benedict, Joe McGrath, Nick Rasdon, Brooks Meadowcroft, Abby Greentree' in a smaller yellow font. In the foreground, a blue rowing oar with a yellow shamrock logo is visible, splashing water. The background shows the white hull of the boat and the dark water with white foam from the oars.

Rowing Proposal

Braeden Benedict, Joe McGrath, Nick Rasdon,
Brooks Meadowcroft, Abby Greentree

Introduction

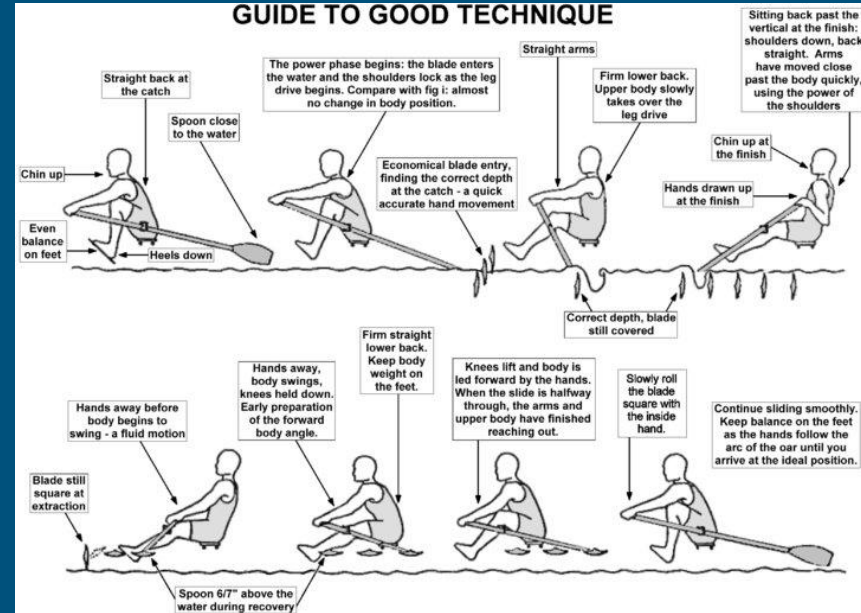
- 75,000 active participants in the United States
- 3rd largest delegation to the Olympic Games
- Requires great technique in addition to physical fitness



<http://www.usrowing.org/news/2018/10/28/sunday-makes-for-clearer-conditions-at-head-of-the-schuylkill/>

Problem Description

- Rowing technique is hard to perfect, but extremely important
- Can be difficult for a coach to provide helpful feedback to each rower
- Commercial devices need improvement
 - Expensive
 - Measure forces at the oarlock
 - Complicated to install



<https://www.rowperfect.co.uk/a-guide-to-good-rowing-technique/>

Proposed Solution

- Capture and displays the motion of each oar
 - Coaches or coxswains can track timing and technique
 - Identify the catch, roll-up, and finish in each stroke
- Components of our solution:
 - Data Collection
 - Accelerometer and Gyroscope
 - Bluetooth Communication
 - Bluetooth Enabled Microcontroller
 - Data Processing/Visualization
 - GUI with visual features
 - Wireless charging
 - Qi inductive charging



Features

- Hardware Features:
 - Devices will be mountable and water resistant
 - Sensors will reliably communicate data via bluetooth
 - Several BLE Microcontrollers available
 - MEMS accelerometer and gyroscope with a digital output via SPI or I2C
 - Rechargeable power supply
 - Qi Wireless inductive charging standard
- Software Features:
 - Motion of the oar will be isolated from the motion of the boat
 - Algorithm to determine the position of the oar from sensor data
 - Identify the parts of the stroke in the data
 - Display a GUI for the coxswain or coach

Conclusion

- Our Goal: Provide rowers with a way to visualize their performance and improve on their technique.
- Our Solution: Design a system which tracks a rower's movements through sensors attached to the oars, the data provided by the sensors will then be processed and displayed in a format that allows for a coach or coxswain to easily see where the rower is lacking in their technique.