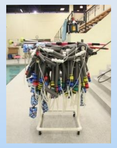
IPRO 310

A Vision for Blind Swimmers

IPRO It takes a team! INTERPROFESSIONAL PROJECTS PROGRAM

Designing and Building Prototypes for Assisting Blind and Visually Impaired Swimmers

HISTORY



Fall 2006
-Start of IPRO
-Market research
-General research
-Notre Dame modifications

Summer 2007
-SONAR research
-Passive redesign
-Passive testing

Spring 2008
-Vibrator belt concept
-Modified passive device

Fall 2008
-New storage device
-Selected two active technologies
-New management

Spring 2007
-Research
-Passive redesign
-Passive testing

Fall 2007
-SONAR application
-Passive device modifications

Summer 2008
-Modified passive device
-Created storage device
-Snorkel device

Spring 2009
-Discontinued SONAR
-EMF and laser application
-Long term passive testing

OBJECTIVES

- Design and develop a cost effective assistive technology prototype using current laser and/or electromagnetic field technology
- Include the BVI community in the design process using surveys, interviews, and BVI facility visits
- Modify the Buoy website so that it is accessible to the BVI community through existing screen-reader software

MISSION STATEMENT

"To develop, test, and implement assistive technology with the community that promotes safety and improves independence of blind and visually impaired (BVI) swimmers."

LASER

Description:

Create a boundary using laser alarms to alert the user when they are out of the specified boundary.

Tests:

- Tested underwater range of red and green lasers
- Tested various laser sensor designs
- Tested quality of radio receiver system

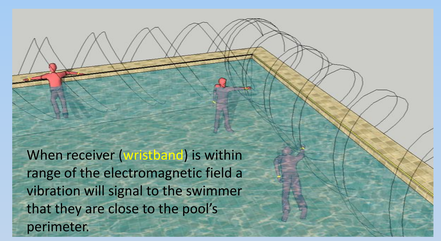
Results:

- Tested green laser successfully up to 51 ft
- Splashing had no effect on laser beam
- Radio receiver worked inconsistently beyond 15 ft

ELECTRO-MAGNETIC FIELD

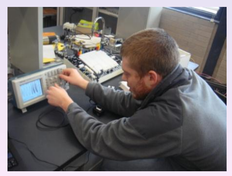
Description:

Create a receiver that detects an electro-magnetic field transmitted by a boundary wire



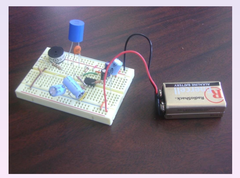
Tests:

- Determined detection distance of prototype using stock transmitter
- Determined frequency of signal generated by stock transmitter
- Studied electronic circuit concepts to modify receiver prototype

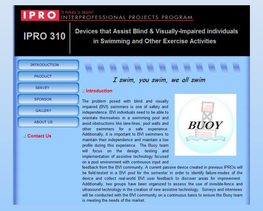


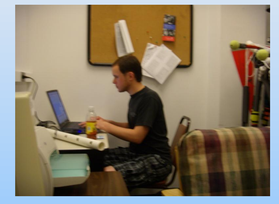
Results:

- EMF Prototype 1 could detect electro-magnetic field within 1 ft distance
- Signal generated by stock transmitter is encrypted
- EMF Prototype 2 circuit diagram was developed with a better knowledge of electronic circuits



WEBSITE





- Designed website to be compatible with screen readers used by the BVI community
- Explains the history and future of Buoy
- Contains information for those interested in learning about Buoy

NEXT STEPS

- Continue gathering survey data
- Continue contact with the BVI community
- Facilitate continuity of the website
- Design and develop a transmitter and wristband that is discreet, functional, and safe within a pool environment
- Design a detection system adjacent to lane lines
- Collaborate between EMF and laser technologies

ACKNOWLEDGEMENTS

The Chicago Lighthouse for People Who are Blind or Visually Impaired