Results/Data

- After the completion of the pool testing, despite being comfortable within the pool environment, participants were only able to form a weak cognitive map.
- These results led us to continue testing to determine time it take a single person to create a strong cognitive map.
- Determined that using a vibrating device leads to improved cognitive spatial mapping abilities.
- Results vary on an individual basis.

Website

- Designed to be compatible with screen reader software used in the BVI community
- Explains the history and future of IPRO 310
- Updated survey available on the website in cooperation with The Chicago Lighthouse

Future Work

- Conduct significant amounts of testing in order to determine the range of laps required to form a strong cognitive map
- Incorporate the BVI community into pool testing
- Continue contact with BVI community
- Integrate updated survey onto website

Team Structure

Communication

Jay Park
Michaela Healton
Kim Dykeman
Tim Lipman
Smita Sarkar

Technology

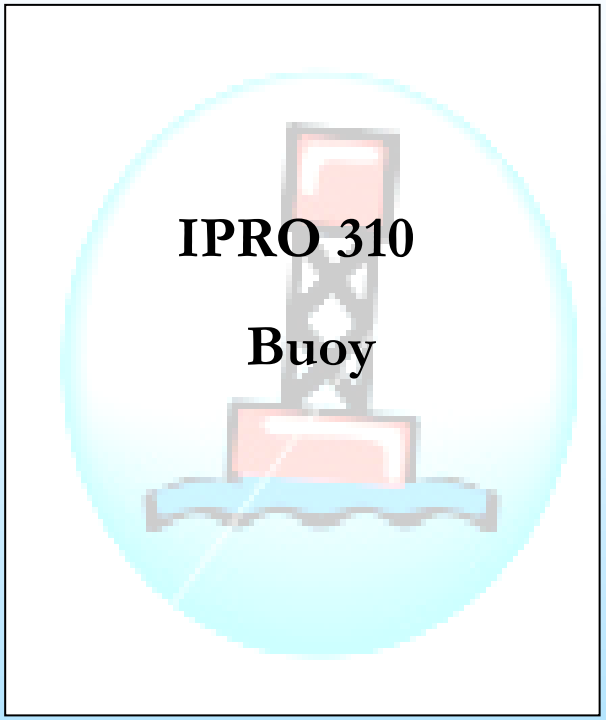
Jeff Reilly
Branden Toro
Philip Sirk
Ross Ludwig

A special thanks to:

ILLINOIS INSTITUTE OF TECHNOLOGY

The Chicago Lighthouse
for People Who are Blind or Visually Impaired

Communication



A Vision

for

Blind Swimmers

Statistics

- 1.8 million people with blind condition in the US (US Census)
- 7.8 million people with blind and visually impaired (BVI) condition in the US (US Census)
- Up to 80% abandonment rate of assistive technology (Michigan Dept of Education)

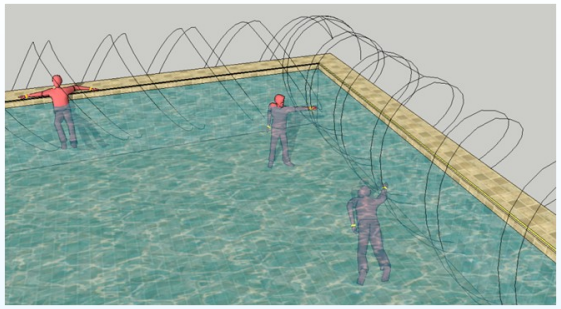
Mission Statement

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

Goals

- Since lack of assistance leads to a sedentary lifestyle, create an assistive technology that allows BVI individuals to, along with the rest of the nation, seek a more active lifestyle safely
- Develop a method of communicating available information between the device and the swimmer
- Include the BVI community in the design process using surveys, interviews, and BVI facility visits
- Incorporate surveys into the website to increase feedback from the BVI community

Research



- Mobility Training (current methods for cane training, dog training, etc.)
- Spatial Mapping (creating a model,)
- Communication Methods (tactile feedback, audio feedback, verbal feedback)

Testing

- Subjects: 6
- Gender: 4 male, 2 female
- Age Range: 18-24
- Testing was performed in Keating Pool and in the basement of the Herman Hall

Methodology

The Communication team developed a protocol using research and subject matter experts. Two BUOY participants were used within the pilot testing to modify the initial protocol.

The training protocol that was developed:

1. The subject enters the pool.
2. Subject walks two laps around the pool with assistance.
3. Subject is asked if they are comfortable to proceed with testing.
   A.) f comfortable, proceed to step 4.
   B.) If uncomfortable, subject returns to step 2.
4. Test Phase #1
   A.) If pass, subject proceeds to step 5.
   B.) IF fail, subject returns to step 2.
5. Subject is allowed to walk freely within the test perimeter.
6. Test Phase #2.
   A.) If pass, subject proceeds to step 7.
   B.) If fail, subject returns to step 2.
7. Subject is allowed to swim freely within the test perimeter.
8. Test Phase #3.
   A.) If pass, subject proceeds to step 9.
   B.) If fail, subject returns to step 2.
9. Subject exits the pool with the assistance of the guide.

This second protocol was tested with two volunteers at the Illinois Institute of Technology. This provided the Communication team with initial results. These initial results led us to believe that a longer period of time with a single subject will be necessary to create a strong cognitive map.

MISSION STATEMENT

Our mission is to develop, test, and implement assistive technology with the community to promote safety and improve independence of blind and visually impaired individuals (BVI).

Objectives

- Evaluate approaches in previous IPROs
- Research previously unconsidered technologies
- Design and develop a prototype for preliminary testing
- Evaluate performances of prototype and document findings

Conclusions

The technology team met all our objectives. We successfully managed to asses relevant technologies and decided on Radio. We then researched the technology and incorporated the knowledge into our design. We designed and built a prototype device that communicates tactile information to the swimmer. The tactile feedback design was based on the survey data collected from the previous three semesters. Theoretically there is a wide range of applications for the technology

Team Structure

Technology

Phillip Sirk
Jeff Reilly
Ross Ludwig
Branden Toro

Communication

Jay Park
Micheala Healton
Kim Dykeman
Smita Sarkar

ILLINOIS INSTITUTE OF TECHNOLOGY

A Special Thanks to:

The Chicago Lighthouse for People Who are Blind or Visually Impaired

WCBVI

TECHNOLOGY

BUOY

IPRO 310

The Next Generation

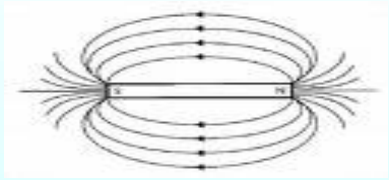
A Vision For Blind Swimmers

Technology

Designing and Building Prototypes for Assisting Blind and Visually Impaired Swimmers

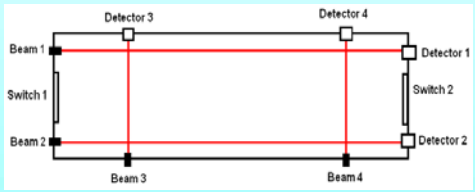
Technologies

1. Simple EMF



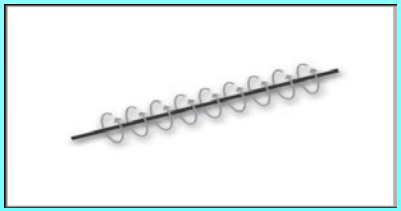
- Required to much electrical current to be practical.

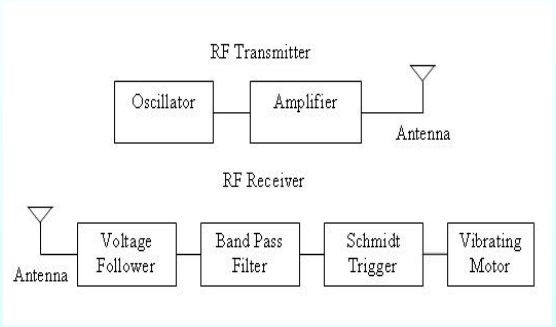
2. Laser



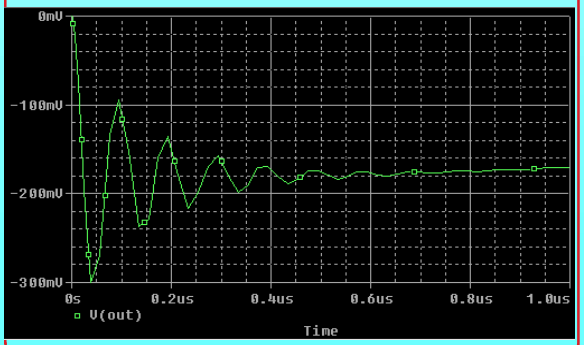
- Good implementation for the competitive scene
- Difficult to implement in a recreational setting.

3. Radiofrequency





- Designed a new transmitter and receiver
- Analyzed the circuit to determine optimal frequency and antenna length to account for signal attenuation and median transfer
- Used PSpice to simulate potential designs
- Began constructing Development stage prototype



Results

- Initial testing showed that the frequency required new operation amplifiers with higher slew rates

Next Steps

- Incorporate the receiver into a wrist band to maintain low profile
- Waterproof the receiver and the transmitter.
- Test cue conflict theory and it's effect