I Swim, You Swim, We All Swim
Agenda

- Problem Statement
- Mission
- Team Organization
- Goals
- Progress
- Team Specific information
  - Current obstacles & solutions
  - Anticipated challenges
Statement of the Problem

Background:

- 1.8 million people in the US are completely blind (US Census)
- 7.8 million blind and visually impaired (BVI) people in the U.S (US Census)
- Up to 80% abandonment rate of Assistive Tech. (Michigan Dept of Education)
  - Did not match needs, lack of training, family/school/workspace non-accepting

Problems:

- Safety
- Independence
- Concealment of device
- Detect obstructions
Buoy Mission Statement

“To develop, test, and implement assistive technology with the community to promote safety and improve independence of blind and visually impaired (BVI) swimmers.”
**Team Organization**

**Active Team 1: Invisible Fence Tech.**
- Coleman Baar (ME): LEAD
- Kevin Kruse (BME)
- Li Li (EE)
- Maggie Ng (BA)
- Zhi Ma (EE)
- Ryan Freund (CE)

**Active Team 2: Sonar Tech.**
- Meghan Murdock (ME): LEAD
- Lorne Turrentine (ME)
- Hsuen Yew (BME)
- Bingjian Zhang (EE)
- Jeff Reilly (Physics)
- Mohammed Rehman (ECE)

**Documentation**
- Jeff Reilly (Active 2): LEAD
- Coleman Baar (Active 1)
- Lorne Turrentine (Active 2)
- Ryan Freund (Active 1)

**Media**
- Li Li (Active 1): TEAM LEAD
- Bingjian Zhang (Active 2)
- Mohammed Rehman (Active 2)
- Zhi Ma (Active 1)

**Survey**
- Maggie Ng (Active 1): LEAD
- Meghan Murdock (Active 2)
- Hsuen Yew (Active 2)
- Kevin Kruse (Active 1)

**Faculty and Advisors**
- Frank Lane (Rehab Psych), David Gatchell (BME), Ken Schug (Chem)
Goals

• Test the application of invisible fence and sonar technology
• Be cognitive of incorporation into swim wear
• Involve BVI community
• Initiate long term testing of Passive Device
• Document our progress
Progress

Major Teams:

• Utilized decision matrix from previous IPRO
• Facilitated “3 Ideas” brainstorming session
• Purchased both technologies
• Wrote test plans
• Conducted pool testing

Sub-teams:

• Completed project plan, posted class minutes
• Created website (long term survey initiative)
• Revised “user-needs” survey
• Contacted IIT legal Dept
• Identified location for passive device testing

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Introduction

The problem posed with blind and visually impaired (BVI) swimmers is one of safety and independence. BVI individuals need to be able to orientate themselves in a swimming pool and avoid obstructions like lane-lines, pool walls and other swimmers for a safe experience. Additionally, it is important to BVI swimmers to maintain their independence and maintain a low profile during this experience. The Buoy team will focus on the design, testing and implementation of assistive technology focused on a pool environment with continuous input and feedback from the BVI community. A current passive device created in previous IPROs will be field-tested in a BVI pool for the semester in order to identify failure-modes of the device and collect real-world BVI user feedback to discover areas for improvement. Additionally, two groups have been organized to assess the use of invisible-fence and ultrasound technology in the creation of new assistive technology. Surveys and interviews will be conducted with the BVI community on a continuous basis to ensure the Buoy team is meeting the needs of the market.
Research/Survey Sub-team

Current Obstacles & Solutions:

• Location to test passive device
  • Wisconsin Center for the BVI
• Modified “user-needs” survey
• Liability & consent
  • Working with IIT Legal & IRB (Institutional Review Board)

Anticipated challenges for this semester:

• Administer survey at The Chicago Lighthouse
• Train Wisconsin Center staff on the installation, storage and maintenance of passive device
Sonar Technology

Invisible Fence Technology
Sonar Technology

Current obstacles & solutions:

- RHIT pilot ruled out sonar
  - Device on swimmer
- Test plans created
  - Preliminary testing of sonar device performed

Anticipated Challenges for this semester:

- Angle and range of sonar detector
- Refraction through changing mediums
- Adjust frequency to pass through water
Invisible Fence Technology

Current obstacles & solutions:

- Build new or utilize existing technology
- Ordered device
  - Researched various brands
- Test plans without device
  - Tentative test plans created

Anticipated Challenges for this semester:

- Creating perimeter of invisible fence
- Modification of the receiver
- Ease of installation
Needs / Questions / Requests

Continued use of Subject Matter Experts
• Military expert
• Research & Development @ Invisible Fence Co.
• Dr. Roman Kuc (Yale University, Intelligent Sensors)
• The Chicago Lighthouse for the Blind
Q & A