

THE PROBLEM

Blind or visually impaired swimmers cannot locate themselves in the pool. They have difficulty knowing when they are approaching the end of the lane and whether or not they are on center within the lanes. This can cause them to veer into the lane dividers or even the pool walls, which could potentially lead to serious injuries.

Competitive swimmers need two sighted people to stand at both ends of the lane, and tap them with a tapper stick (a pole about 5 - 6 ft tall with a tennis ball or other soft material at its tip) on the head or the shoulder to let them know that they are approaching the end of the lane.



There are approximately 10 million blind or visually impaired people in the United States alone. Only about 5% participate in sport or other physical exercises because they are scared of getting hurt while engaging in such activities.

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Volunteer Swimmers



I PRO - 310

Designing
Prototypes for
Assisting Blind
Swimmers



Would You
Feel Safe
in the
Water if
You
Couldn't
See?

There are ten million blind or visually impaired people in the U.S.

Many of them don't exercise at all, let alone swim, because they feel afraid.

They don't feel safe because they can't locate themselves in their surroundings.

For those that do participate in athletic events, the methods used to allow them to compete make them dependent on other people.

Our Goal and Overarching Principle:

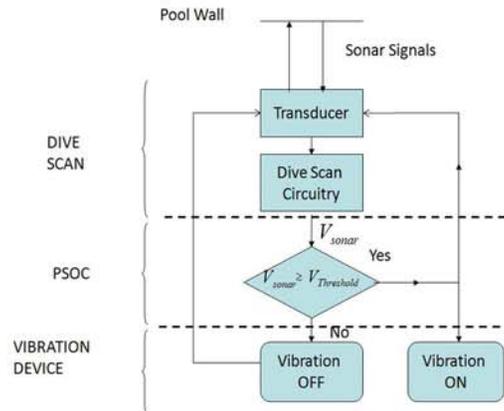
to design safe, reliable, and effective assistive devices for blind and visually impaired swimmers.

ACTIVE

The active device is an electronic device worn by the swimmer which locates the end of the lane using sonar technology and alerts the swimmer by means of a vibration.



The transducer sends a constant sonar signal out and calculates the time it takes for the signal to return. This time is converted into a distance, which is sent through the PSoC (Programmable System on Chip) and the vibration device is triggered based on the input from the PSoC. For our device we have set this triggering distance to 5 feet (which means, the vibration device will go on as soon as the device is 5 feet from the end of the lane).



The entire device is housed in a waterproof casing and is attached to the swimmer by means of an adjustable belt.

PASSIVE

The passive device is a mechanical device that is attached to the lane markers on the pool. It has several arms called tappers that are extended inwards into the pool lane and guide the swimmer down the center of the lane by means of soft brushes to the skin.



The tappers in the pool are made of pipe insulation material with different materials at their tips to give the swimmers different sensations when they are at different positions in the lane. Some of the materials used were puffer balls, scouring pads, and rubber weather stripping.



The passive device was initially built by the summer 2007 IPRO team but has now been improved upon significantly by our team. Swimmers at our pool tests responded very positively to our device proving that the design changes we made were successful.