

Former competitive swimmer designs pool navigation aid for visually impaired athletes

July 30 2021, by Megan Cox



Mirthe working on Optic.

Since its invention in the 1980s, the tapping method has been used to guide visually impaired swimmers in the pool.

This involves a coach or specially trained person warning a swimmer when they are close to the edge of the pool or when they need to turn by tapping them with a long foam-ended pole. However, if a signal is given

too early or late, it can lead to a swimmer being disqualified or injured.

Final-year project design student, Mirthe Hofstede has designed Optic—a navigation aid for visually impaired swimmers that allows them to navigate in the pool efficiently and safely.

The product removes the need for a tapper, who is prone to [human error](#), as Optic guides swimmers in real time.

Using infrared beams and ultrasonic distance technology, Optic detects a swimmer's distance away from the pool wall and whether they are swimming in the middle of the lane.

It comprises two sensor-containing components: a collapsible device that suctions to the pool wall, and a wearable device that attaches to a pair of goggles.

The sensors communicate information to the swimmer via the wearable device, which uses bone conduction to deliver information to the swimmer, transmitting sound by vibrating bones near the temple.

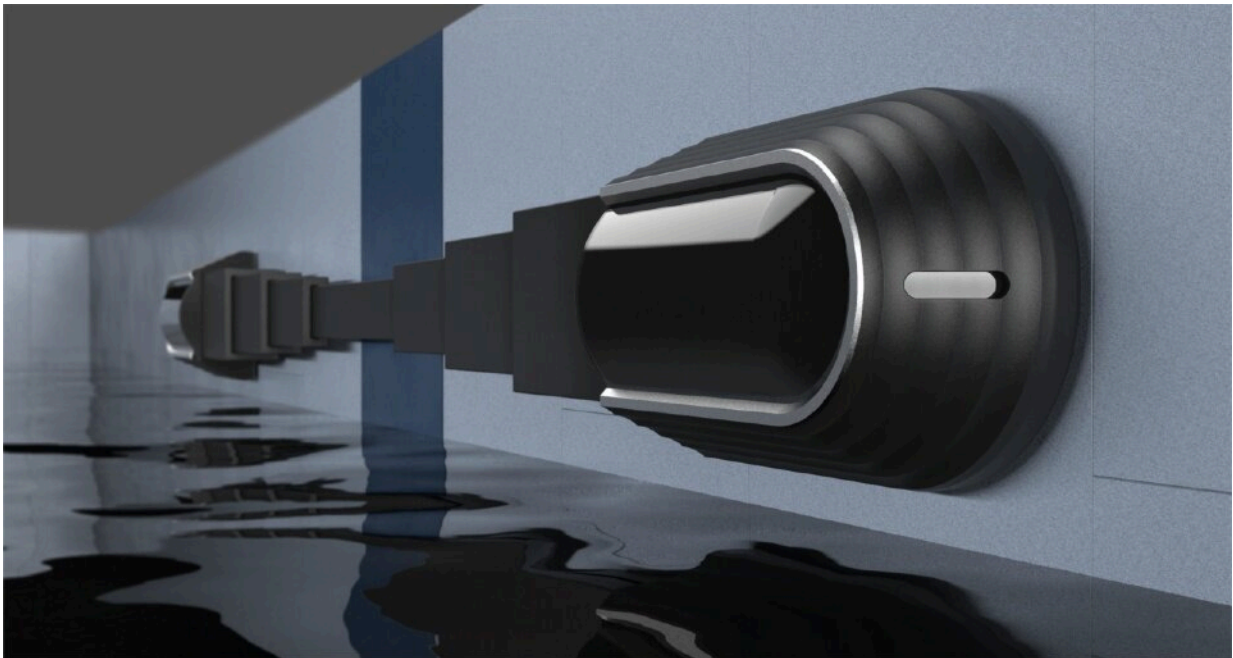


Optic components.

It counts down how far away a swimmer is from touching the wall and instructs them on how to stay in the middle of the lane—an issue visually impaired swimmers face as they cannot see the black line at the bottom of the pool that helps swimmers with sight stay in position.

Of the inspiration behind Optic, Mirthe said, "I used to be a competitive [swimmer](#). I trained in Malaysia and competed in national competitions in both Malaysia and the Netherlands and swam at the World Cup in Holland in 2013 at age 15. Swimming is an area where I have a lot of base knowledge and it's a passion of mine. When I came across visually impaired swimming in my research, I was surprised to find out that visually impaired swimmers have a high risk of injury, as well as no consistent navigation method which is used in both training and competition. I, therefore, set myself the task of solving this problem."

Mirthe created the product based on feedback shared by visually impaired swimmers and coaches.



Device that suctions to the pool wall.

She has prototyped a visual and electronic version of Optic, and found the infrared, ultrasonic, and [bone conduction](#) hearing technology operates accurately in a pool environment and gives swimmers detailed feedback. Now, Mirthe hopes to further develop the product through user testing with swimmers, trainers, and competition staff. Of her ultimate goal, Mirthe said: "I hope to one day see Optic being used in both training and competition environments in the future. By making Optic available to all swimmers, swimming [competition rules](#) can be changed and make Optic a necessary piece of racing equipment for visually impaired swimmers. I want to reduce the level of stress visually

impaired swimmers and their coaches currently feel throughout their swimming experience. Optic will give visually impaired swimmers the confidence to push their bodies to the very limit in [competition](#) and training without the uncertainty of not knowing where they are."



Optic head device.

Mirthe is showcasing Optic as part of the Degree Show 2021. For more information on the Show, visit the dedicated webpage [here](#).

Provided by Loughborough University

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