



PROJECT DETAILS

Customer: **Instabeat**

Application: **Fitness Device**

Technology: **Over-molded electronics**

Industry: **Consumer Electronics**

Location: **Lebanon**



THE DESIGN CHALLENGE

To optimize cardiovascular fitness, athletes target a specific heart rate to ensure they are getting the most out of their workouts. Although there are numerous devices for runners and bikers to monitor their heart rate during exercise, swimmers have to stop to measure their heart rate or use cumbersome monitors that are uncomfortable and create significant drag.

As a college student, Hind Hobeika created a prototype of a monitor that fits on swimming goggles to provide real-time heart rate feedback while swimming. Her design won third prize in the Stars of Science competition. In order to commercialize the device, she founded a company called Instabeat – its primary goal being to provide swimmers with a self-tracking, noninvasive experience to obtain a complete assessment of their workout.

However, significant design challenges emerged as the team worked to bring Hobeika's design to market. The device had to have water-tight seals and last through long-term exposure to sea water, chlorine and direct sunlight. It also required sufficient flexibility to adjust to any swimming goggles, but be rigid enough to hold firm against the swimmers head for good heart rate sensing.

To adapt the Instabeat into a commercially viable product, Instabeat hired Aavid, Thermal division of Boyd Corporation.

“ A ground-breaking swimming monitor that mounts onto every day goggles...Instabeat is now poised to revolutionize the way we swim. ”

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THE AAVID SOLUTION

Aavid refined the Instabeat design to be more reliable, compact and optimized for commercial manufacture. The prototype was created via a soft tool that held the electronics in place while silicon was hand poured and cast. The prototype was essential to refine the algorithms and heart rate measurement, but it was not water tight. This led to enhancing the design to use injection molding. However, as injection molding is a high-pressure, high-temperature process, this presented several challenges to the electronics. Aavid simulated the process to see whether the components would survive, and it was determined that the battery would need to be installed after molding.

In addition to simulation and algorithms, Aavid produced concepts, detailed mechanical design, electrical design, PC board layout, firmware design, heart rate monitor design, packaging design and mass manufacturing support.

The result: A ground-breaking swimming monitor that mounts onto every day goggles that can track, store, and display instant feedback on heart rate, while remaining water tight and not hindering the athletes' performance. Instabeat is now poised to revolutionize the way we swim.

For more information on how the Aavid can help you meet your mechanical, electrical and industrial design goals, contact them at aavid.com/designhelp.

