

Designing a sensor casing for posture-improving body sensors.

2 page summary



Roel Spierenburg

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During the assignment, a sensor casing was designed for Awear. Awear is a start-up settled in Novel-T at the University of Twente. The start-up is creating body sensors that remind people to keep a good posture. The target group of the sensors are people recovering from injury or people in working fields with a great change of posture problems, such as construction workers. Since the company was founded a little over a year ago, many aspects need to be designed. This includes the sensor hardware, the coding, the attachment method to the body and the casing. This project focused on the design of the casing for the sensors.

To create an optimal end result, ergonomics, aesthetics, functionality and manufacturing of the casing were paramount. These aspects were considered for design decisions and were tested with small test groups throughout the process. At the start of this assignment, very few constraints were considered during ideation. There were no set limitations regarding manufacturing possibilities, hardware, or attachment methods. In the weeks to follow, these limitations were gradually set to develop a final concept.

The ideation phase of the design started with rough shape designs sketches with pencil. Later, details were added with Copic marker sketches. This concept generation phase ended with digital drawings, CAD models, 3d printed and laser-cut parts. All of the material was used for the experiments to come.



Figure 1: Ideation phases, starting from the left



Figure 2: Laser-cut and 3d printed models

Figure 3: Shield design process visualized

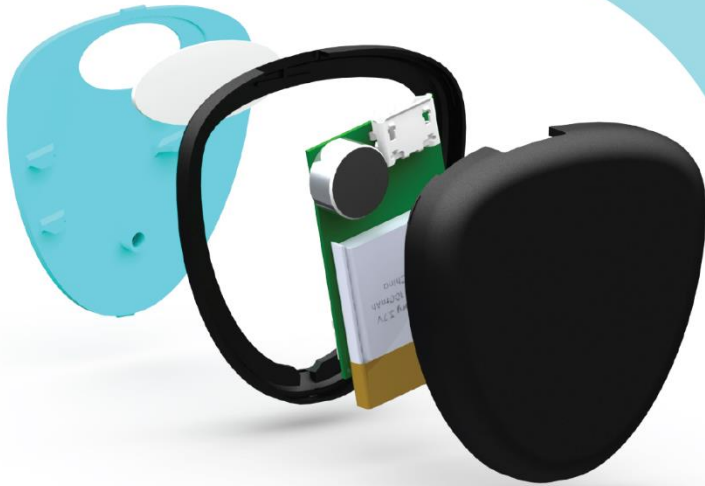
For the final concept, a manufacturing recommendation was given that explained what production methods were possible, what materials could be used, and what this might cost. This recommendation was split up into two parts. The first part covers the short term applications for the casing production for prototyping and MVP (Minimal Viable Product) testing. For this scenario, it was suggested to have the first 20 models made with either SLS (Selective laser sintering) or (MJF) Multi Jet Fusion by a third party. The second part covers the long term recommendation in the scenario that this exact model would be mass-produced over the course of five years. A small design change was made for this scenario that fused the two top parts into one single part. The change was made due to the suggestion to have the parts injection moulded, which would save production costs by requiring one less mould to be made. In both scenarios, the button was suggested to be 3d printed. The cost estimation for one sensor with these recommendations was 1 euro per sensor casing.

The Shield Design

Casing design concept for awear.

The sensor casing was designed for physiotherapy patients. The sensors monitor movements of the user and angles between the sensors, which keeps them aware of their posture during recovery. The casing consists of four parts.

Three parts keep the hardware in place and one flexible button. The casing was designed to look like a modern, medical product.



An alternative design was made to save on production costs if the concept were to be mass-produced. The total cost goes down from €1.50 to €1.- per sensor.



The shape represents safety and security.



The sensor was designed to be placed within pockets of a stretch suit or pants that go underneath the user's clothes. The sensor's shape was designed to optimize orientation for calibration.

