

## Summary

A research has been done on the design of a casing of a handheld device. The past year No Nonsense Technical Solutions (NNTS) has been working on the functionalities of this device and made a prototype to test the proof of concept. The casing for this prototype was mainly designed to function as a shell for the hardware and had a focus on the manufacturability of 25 devices instead of it being mass produced. This causes the casing to be not as optimal for the final design as it should be. Therefore, the goal was to redesign the casing of the device to meet all the requirements.

The requirements when creating the casing for this device can be summarized in a number of main aspects. First, the casing should be ergonomic. This means that it should be easy for the user to use and understand the device. To determine how this could be achieved, a PACT analysis is conducted. Here information is gained about the user, functionalities the device should support, the context it will be used in and technologies it should have.

Besides the usability of the device, the ergonomics of the casing also includes the shape of the casing. It is important the device fits the hand of the user and has a sturdy handfeel. Furthermore, the device should be able to be used in the hand of the user and when placed on the table and should be as compact as possible to be able to be stored easily. To explore the different shapes the device could have, cardboard models are made from the different components needed in the casing and reassembled in different shapes the casing could have. To create a sturdy handfeel and a compact device that fits the hand of the user, the hardware is placed at the front of the device. By doing this, the front is thicker which gives the user the feeling of more security when holding it. Because the device also needs to be placed sturdy on the table, the back is also made thicker to be able to place it straight on the table. By having a thinner part where the hand can be placed, the device fits the hand of the user better.

The second aspect is that the casing should be able to be mass produced. Because the device needs to be as cheap as possible and a large amount of devices need to be produced, the decision has been made to injection mold the casing. Because the casing contains multiple curves due to the thicker front and back, there has been made use of a curved parting line for the casing to be able to be released from the mold. The decision has been made to split the device in half across the horizontal plane to make it easier to assemble the hardware inside the casing. For the assembly of the hardware, the decision has been made to use snap fit joints. This decreases time and therefore the costs of the manufacturability. Finally, with a Moldflow analysis the casing has been tested if it is able to be injection molded.