

# Redesign and development of a stationary outdoor augmented reality device

July 2020

Enschede, The Netherlands

Author

T.A. Hams (Tiemen)

t.a.hams@student.utwente.nl

Bachelor Thesis Assignment  
Industrial Design Engineering  
University of Twente

## Subject

Redesigning 100%FAT's VirtuScope into a compact version with a more competitive price and to extend the product's functional environment to the outdoors.

## Background information

100%FAT (Fusion of Art & Technology) is a company based in Enschede that focuses on developing products with augmented and virtual reality, spatial audio, motion graphics, 3D art, light, 2D animation, and video. The company helps organisations to tell their story with creative and intuitive interactive instalments. To do this, 100%FAT often researches and implements innovative and upcoming technology that help reaching the goals of every project. The company currently experiences an upcoming interest in interactive Augmented Reality technology. Some years ago, the company already developed the VirtuScope, which makes use of this technology. However, the product uses older soft- and hardware which cannot be updated to newer versions, and generally does not meet the company's standards anymore. The company now focusses on new, client-tailored versions of the VirtuScope. One of these got the working title VirtuScope Light, a more compact scope intended for open and urban areas. The need for this re-design originated from the company's goal of offering their customers an immersive AR experience for a more competitive price, and to extend the product's functional environment to the outdoors. They aim to do this by using new technology and design aspects, which will hopefully result in a better price point and a broader client target group.

## Relevance

AR is an upcoming technology in which more and more organisations already invest. The project itself is of importance to 100%FAT since they can use their knowledge in the growing market, gain more experience and expand their client target group. The development of this product not only helps the company grow its client base but also makes them one of the first developers of outdoors AR devices. Also, this research can serve as a base for future development of similar products, since the company offers the VirtuScope to be tailored to client's wishes.

## Research question

How can an Augmented Reality scope be redesigned into an outdoor AR scope that is resistant to environmental challenges?

## Approach with intermediate results

Most of the research remains theoretical due to the consequences of the COVID-19 outbreak during which this assignment was executed. The thesis starts with research on background information of the environment the VSL is intended to function in. From this research, requirements are set up that function as a guideline throughout the project and are used as a checklist to assess whether the development leads to the necessary results. Then, research into the upcoming market of the VSL is performed by means of a competitor analysis. The thesis continues with extracting data from both the performed research and the development of similar products within 100%FAT's R&D database. This data is used to create designs of which one direction is chosen to further develop. The circular process of empathising, defining, ideating, prototyping, and testing leads to a more and more developed and defined version of the VSL. The end result is a functional prototype which enables testing of multiple design aspects. The results help determining the feasibility of the project and allow the requirements to be critically assessed on their potential to be met. This helps the company with their future development and gives insight into the viability of the project.

## Results

Based on the performed research and the progress of development, a recommendation is made in which potential future development and products tests are discussed. The conclusion comprises a review of the research question and a discussion of the way and degree to which they are answered. It can be concluded that the chosen development direction offers potential to be manufactured and function according to the company's wishes. Final tests assessing the assembly and mechanism functioning resulted in satisfactory and promising results. Since the end-deliverable is a functional prototype, many requirements cannot yet be considered met. Additional development and testing of features outside the scope of this thesis are needed to properly assess these requirements. What can be said, however, is that every requirement has the potential to be met. As an additional task, idea generation for potential branding of the product has been done. The research gives a good impression of the potential of the project and the value of further developing it towards a finished end product.

## Conclusion & Recommendations

The research questions of this thesis have been answered throughout the duration of the project. The conducted research and the development of a specific direction for the VSL can be used as a base model to develop client-specific versions of the product if necessary. The discussed recommendations offer ways to further develop and test the product's next steps, such that it can meet its requirement at the end of its full development process. Much of the results remain theoretical, and thus offer opportunities to choose and experiment with a myriad of possible solutions. It is recommended to further define and optimise the existing design aspects to improve the product's final performance.

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