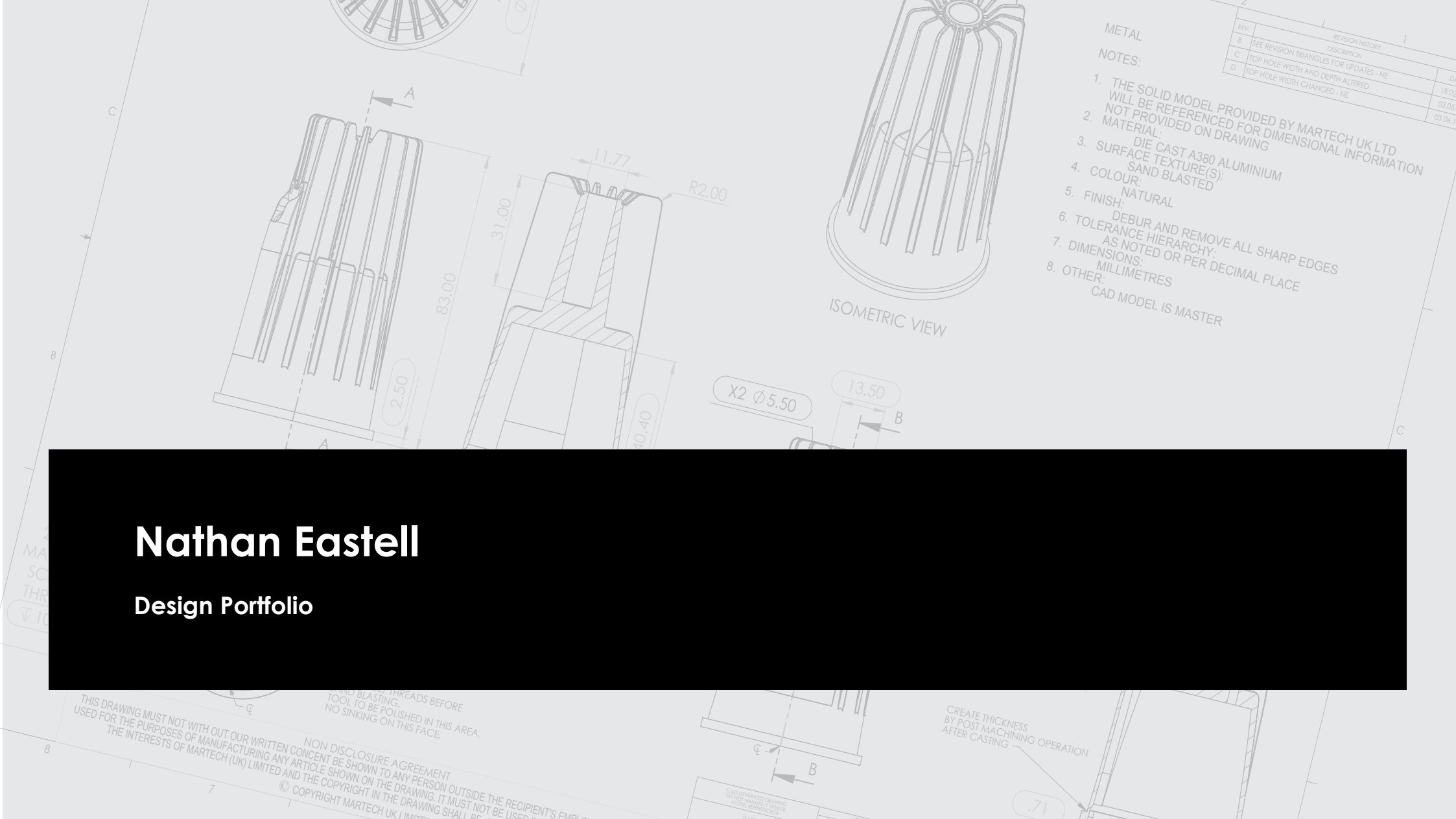


# Nathan Eastell

**Design Portfolio**


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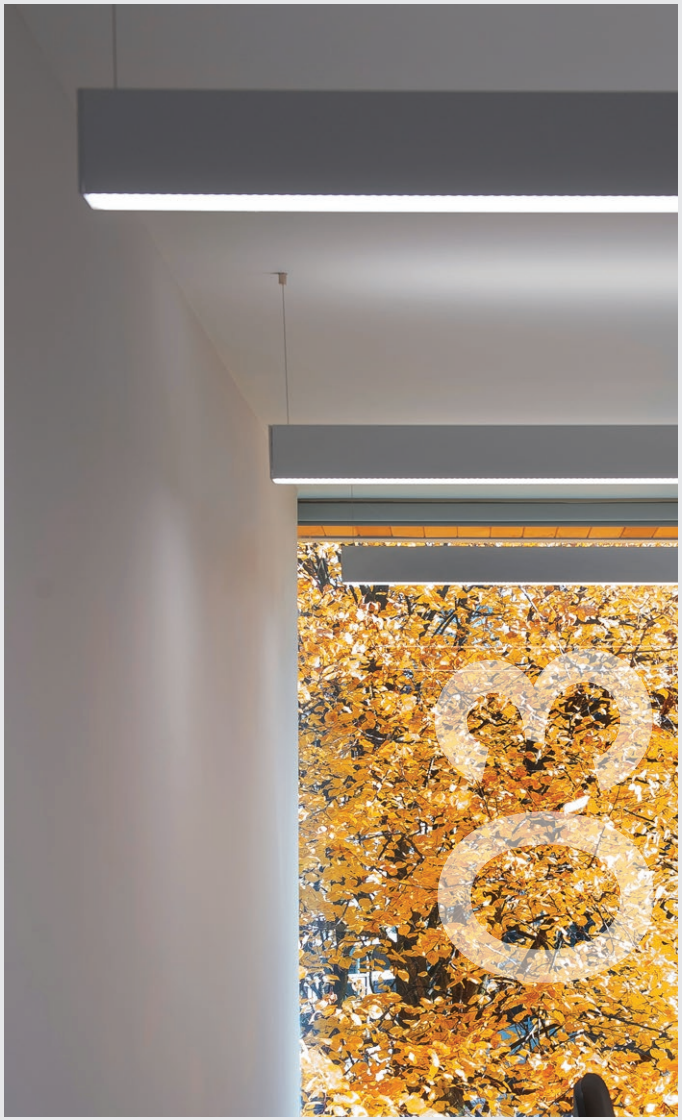
01


BIBO
02


03

# U-CORT

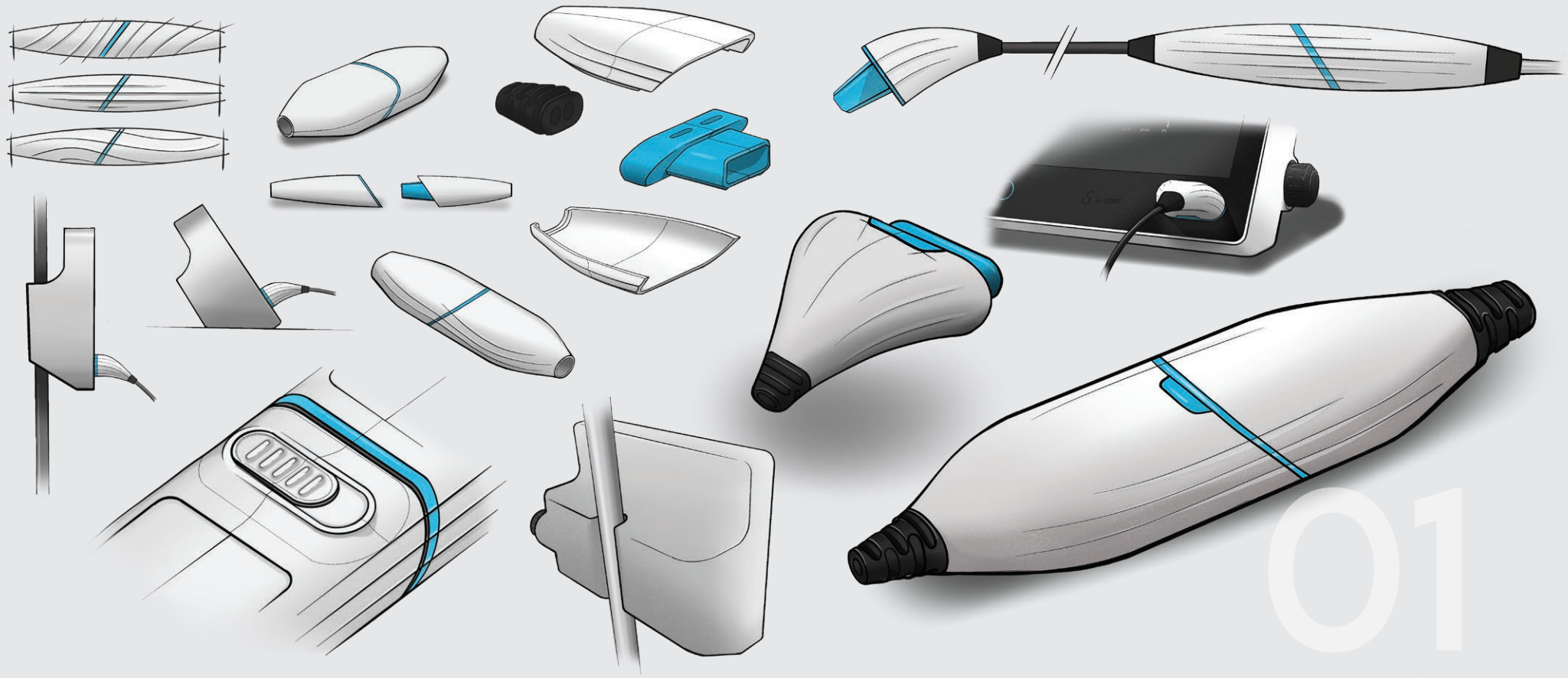
## PROJECT INTRODUCTION

The U-Cort project is a government backed University of Bristol research and development project that aims to provide medical professional with the ability to instantly and continuously monitor patient cortisol levels within a hospital environment.

## PROJECT SCOPE

I was the lead industrial designer for this project. I was tasked with taking the proof of concept lead set assembly and improving its aesthetic, manufacturability and assembly.


01


01


I inherited the proof of concept CAD from the mechanical engineers. At this stage the design was very utilitarian as placeholder CAD was 3D printed and used to debug and test the hardware / firmware to get to a working prototype.

From the V1 prototype I progressed through four design revisions, updating the industrial design when applicable, whilst also taking DFM (injection moulding) and DFA into consideration.

The V1 prototype allowed me to understand the internal layout of the lead set components, from this I was able to explore the lead sets potential form factor. I then combined my industrial design concept with the proof of concept learning's to create a V2 prototype and subsequently V3 and V4.

01

## SKETCHING AND DEVELOPMENT

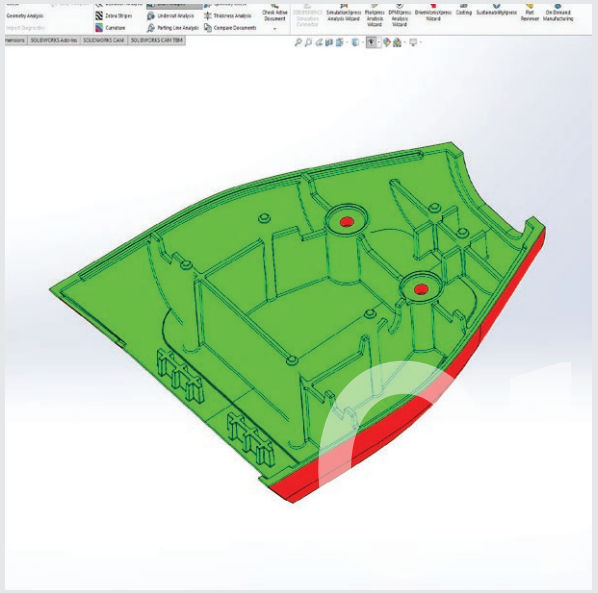
Sketching and LoFi models were initially used to identify a form factor to explore in CAD. The inherited CAD prototype was then walked back and the sketch and foam model learning's implemented in to a V1 prototype

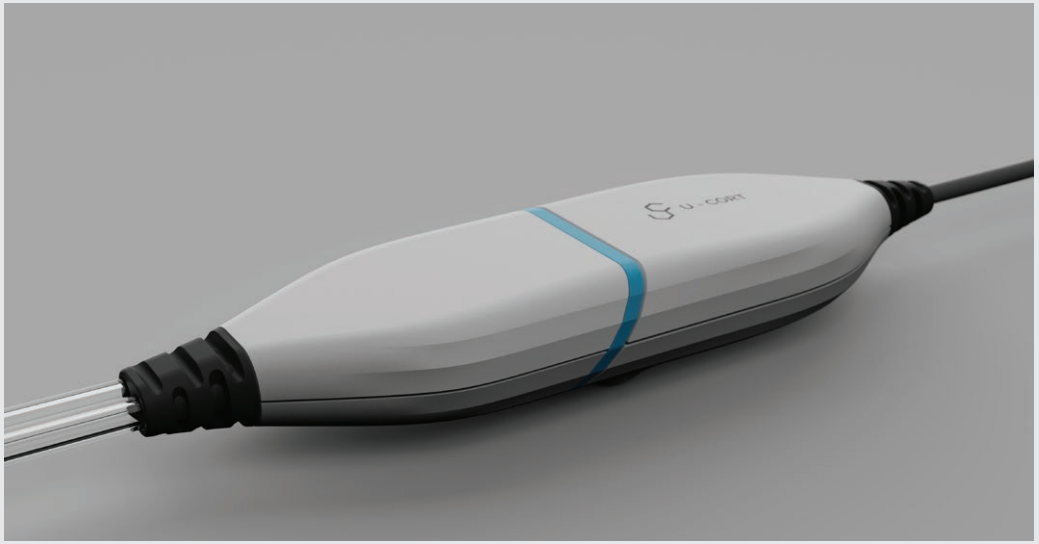
## 3D PRINTING

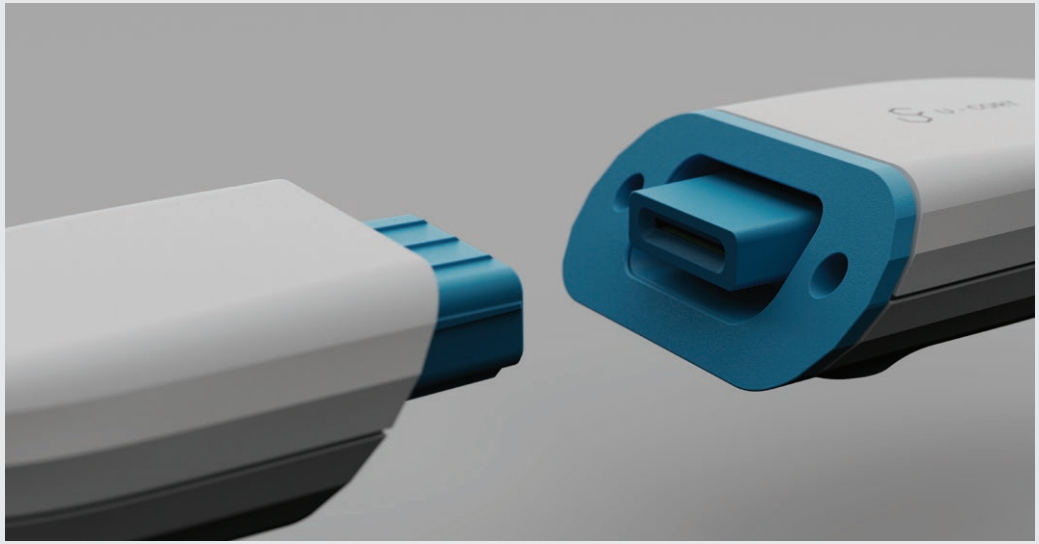
At each stage of the development process the leadset was printed for evaluation, this lead to incremental improvements of the design. The improvements being, strength of the housings through rib location, ease of unit assembly and consistency of split lines to name a few.

## DFM

All the lead set connector components are designed with the injection moudling process in mind. Appropriate wall thicknesses and draft angles are designed into each component.




U-CORT

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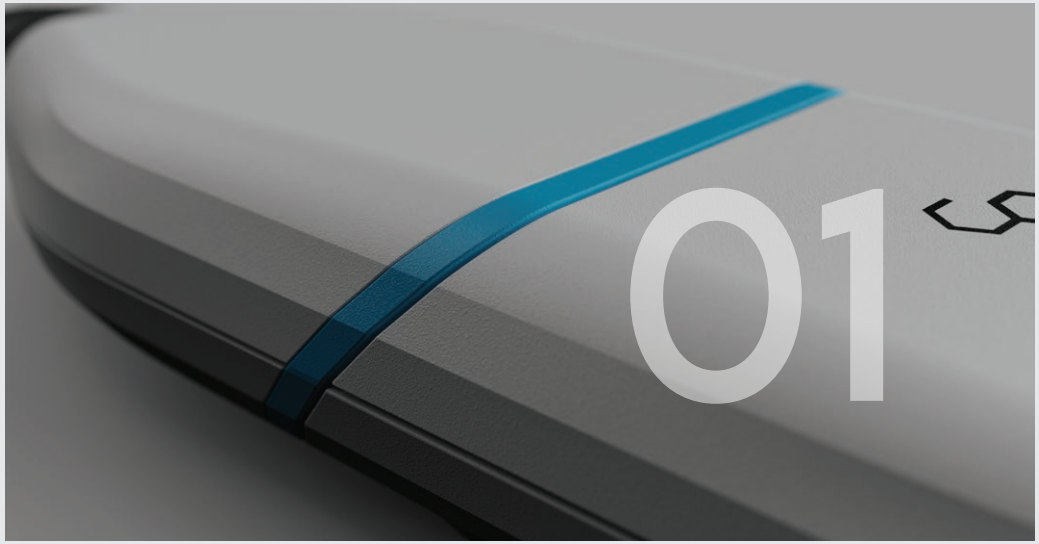
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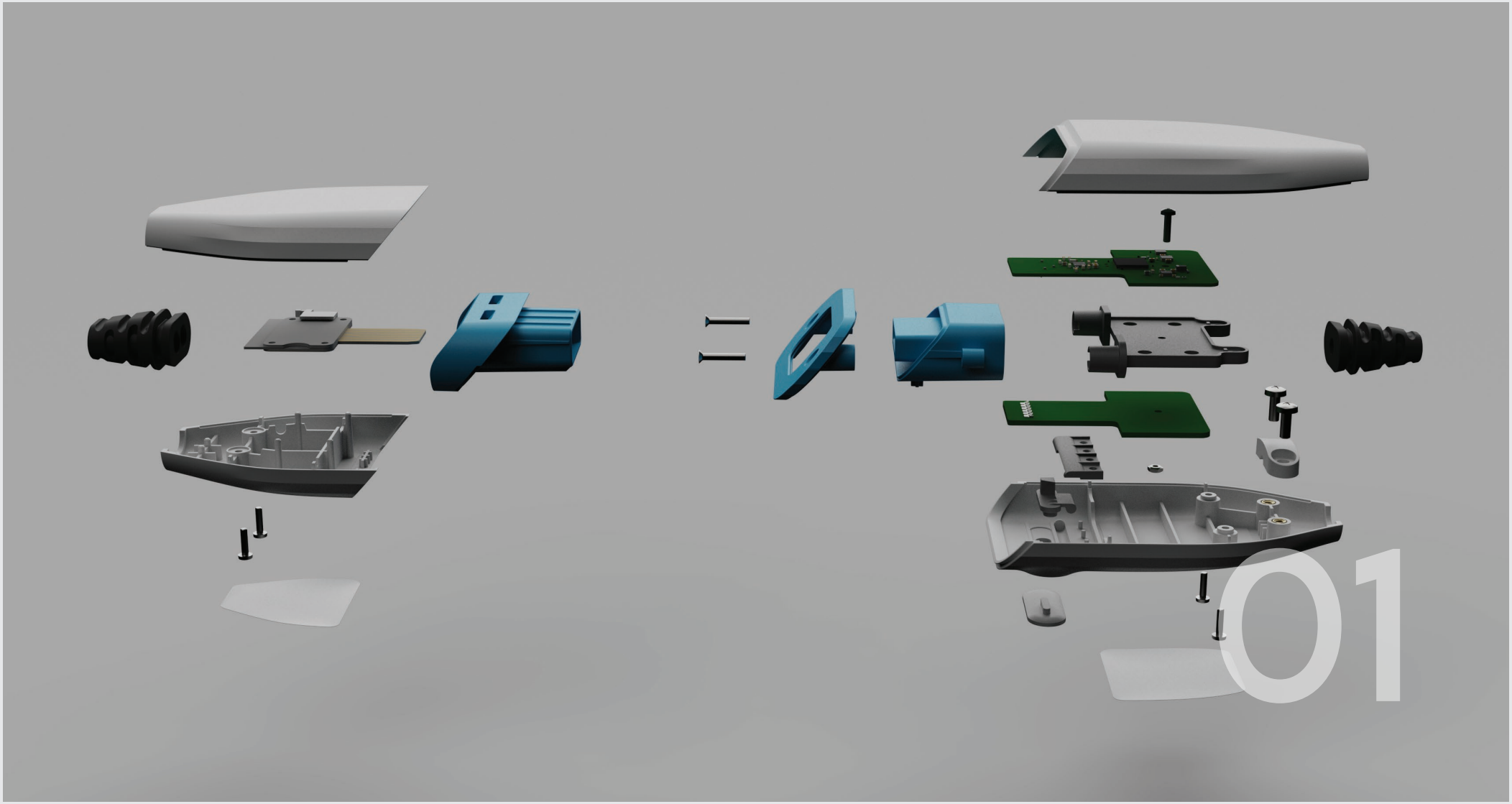

01

# BIBO

## PROJECT INTRODUCTION

BIBO are a global market leading company who specialise in on demand hot and cold water dispensing units. Their machines are for both commercial use where they offer a rental service and private use for independent households and companies wishing to purchase a BIBO out right.

## PROJECT SCOPE

I was the lead mechanical engineer on this project. My main task was to define the inner workings of the product chassis and glamor parts and how they would assemble. There was scope for some industrial design tasks as well, such as the multi tool, but the majority of my time was spent designing and developing the plastic components and ensuring they were ready for mass manufacture.

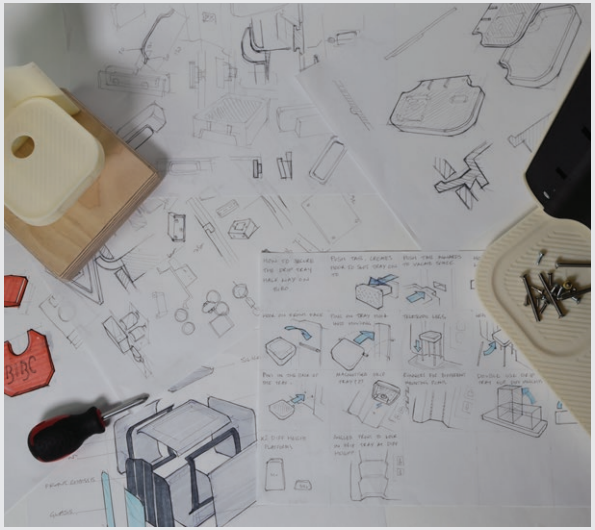

02


After inheriting the block CAD concept it was my responsibility to walk the design back and work out how many components would be needed and how they would assemble all whilst honouring the initial Industrial design concept. My main responsibility was to use my existing DFA / DFM knowledge to design each component and guide the project through the mechanical engineering phase and to initial production.

The main construction of the BIBO consists of large injection moulded panels which screw together using concealed screws to create a space frame. This frame is used to position all the internal workings of the product. The glamour panels are then slid in place using dog leg hooks and secured from the rear of the product using anti tamper screws.

## DESIGN TROUBLESHOOTING

Throughout the stage of work there was many obstacles to overcome. I set about solving each issue methodically using 'morph' sheets to identify possible solutions and then modeling and testing the most promising solutions until the issue was rectified.

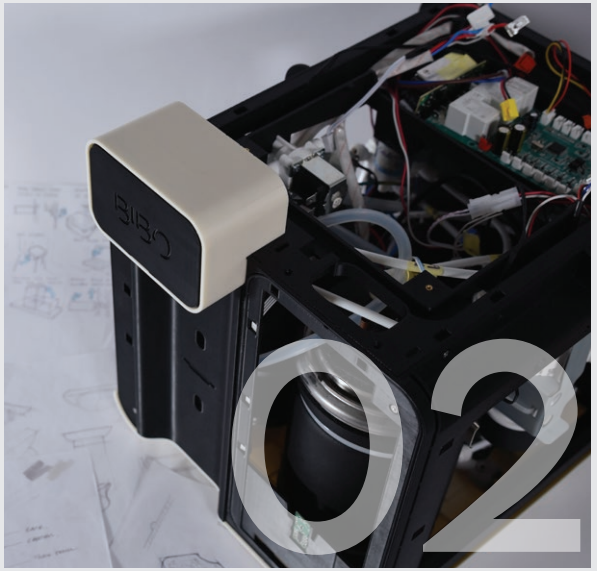


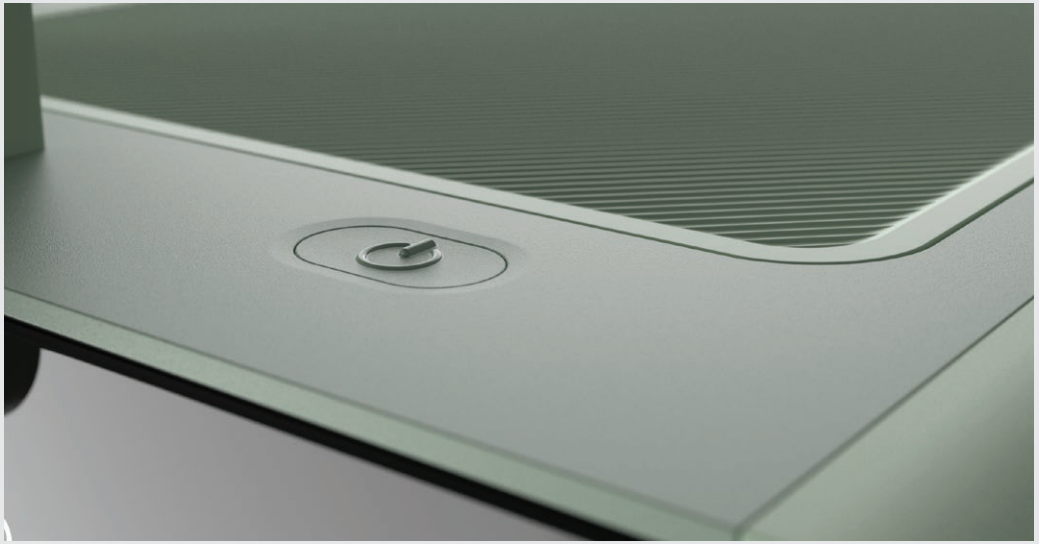
## COMPONENT VERIFICATION

I frequently 3D printed the components throughout the design engineering phase to verify and validate any design changes of the plastic components. This also helped us troubleshoot any assembly and maintenance issues that the product may face in the future and also design out any flaws early in the development.

## TEST BUILD ELECTRONICS

The internal geometry of the water dispenser had to accommodate specific electronics and hardware for the heating and cooling of water, all this had to be taken into consideration when designing the chassis to provide enough relief around the components but also enough strength in specific areas to support each component.




02

# PROFLUX

## PROJECT INTRODUCTION

Proflux is a highly configurable linear LED luminaire that can be infinite in length and mounted or suspended from a ceiling.. This product was designed whilst working at Martech OEM where I was delivering projects from cradle to manufacture.

## PROJECT SCOPE

The main objective of the project was to design and manufacture an extruded LED luminaire that would undercut the market leaders, whilst maintaining high manufacturing standards and integrating premium electronics.

I was the lead designer on this project and undertook all the industrial design and mechanical engineering through to 2D drawings . I also met with and sourced suppliers for all the components and conducted all the T1 ISIR sample checks for signing off on the tooled components. After I helped implement the product into production by over seeing test builds and creating work instructions for staff to follow when building each variant of the product.

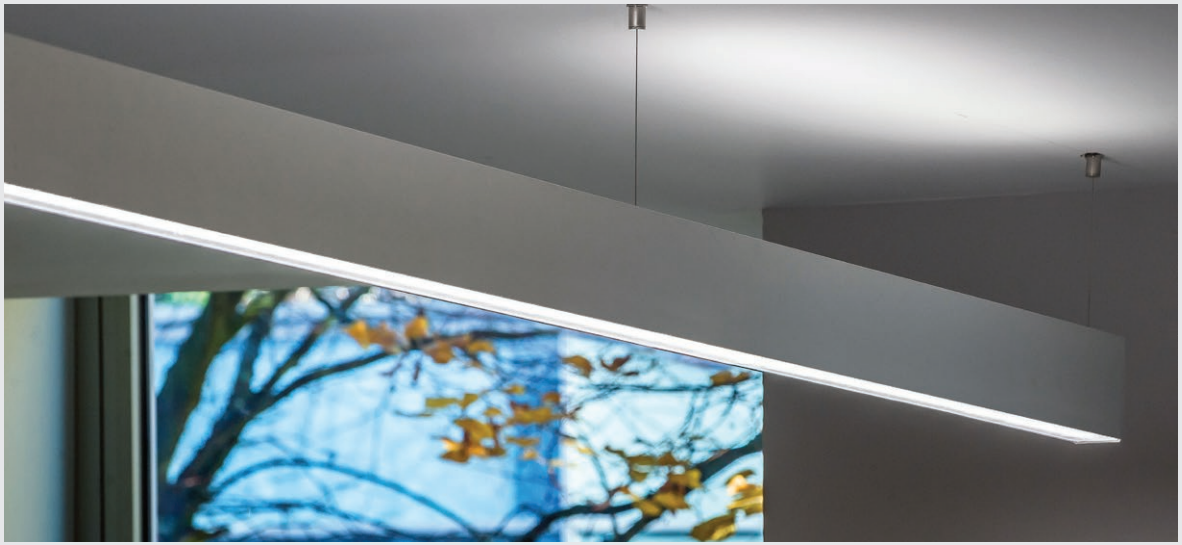
This project was run through a milestone stage gate process, the milestones being, research and concept proposal, concept development, DFM and finally implementation.

As the lead designer on this project I started off with market research and competitor analysis. This helped me to identify areas of the market where our competitors where weak and allowed me to design in unique USP's.

A series of concepts were presented to the board and design director and the chosen concept was then developed to a stage of scale prototyping to prove out the design and functionality of the components.

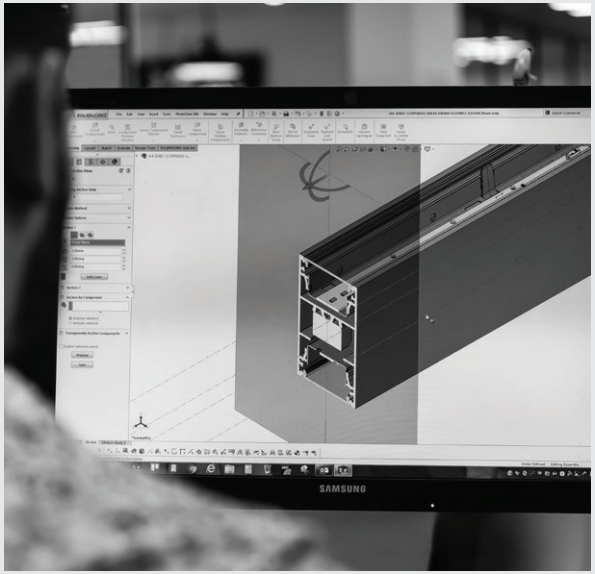
Once the design had been refined and approved I created manufacturing drawings for all components and implemented them into the PDM system. I managed all the manufacturing data and revision control between suppliers.

Once all the components had achieved sign off and the pilot build had been completed I transferred all the necessary data to the marketing team so they could launch the product officially.



## SOLIDWORKS

A combination of sold body and parametric modeling was used to create all the components for this project. For the different variations the configuration feature was heavily utilised for this project.

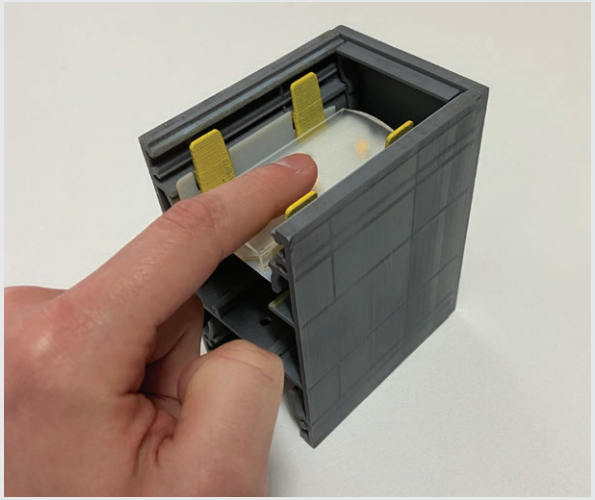



## DESIGNING FOR MANUFACTURE

Every component was designed with mass manufacture in mind taking into consideration a multitude of different manufacturing techniques. The most challenging part was matching the CMF on parts with different manufacturing origins and techniques.

## JIG DESIGN

Jig Design and production aids also came under my remit. Designing jigs to assist production and enabling them to build fittings more efficiently.  Below you can see the press jig that is designed to evenly locate the push fit end caps.

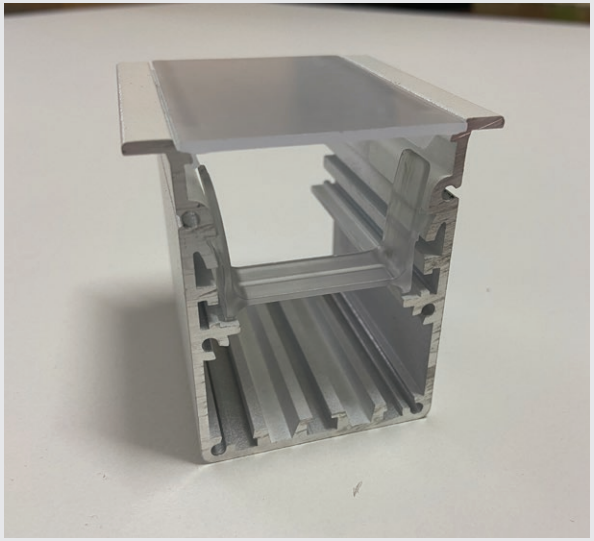


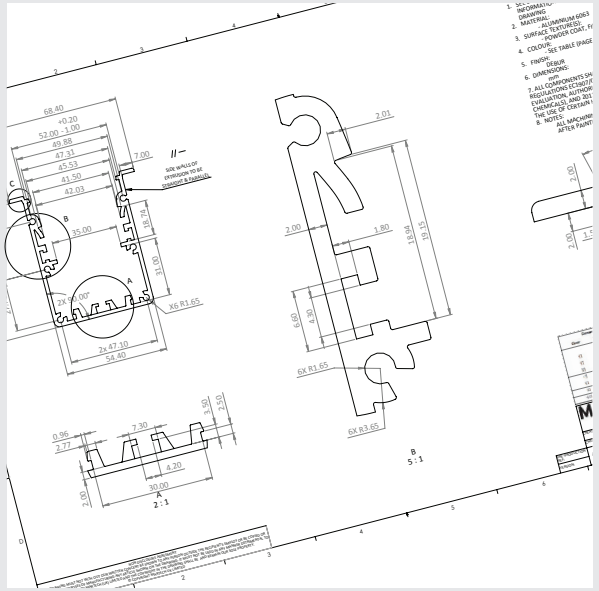
## SCALE MODEL

A section of the aluminium extrusion was printed so we could interact with the products snap fitting features and components. Although not the actual material, this prototype was invaluable as it helped identify and resolve potential issues before tooling.

## MANUFACTURING TECHNIQUES

Aluminium and Plastic extrusions were the two main manufacturing techniques used. Three variations of the aluminum extrusion and two of the plastic extrusion were designed. This cross section details how all the components interact. These components are extremely tolerance sensitive and had to be dimensioned accordingly with tolerance stacks taken into consideration.





## 2D DRAWINGS

2D drawing creation for all parts was required for manufacture. Taking into consideration manufacturing restraints and GD&T.


03