



OLIVIER VAN NIEUWMEGEN

Industrial Design Portfolio

Higo

Telemedical device





The story behind Higo

Higo is a telemedical device that provides at-home medical measurements by utilizing five interchangeable modules for eight physical examinations. The data measured with the device is sent to a doctor for diagnosis.

Developed by a team of three engineers at ManGo Product Design, my role involved overseeing the overall design, engineering the mechanical components, and establishing the production process.

The development took almost two years and resulted in a certified Class IIa medical device. The project involved collaboration with experts in electronics, optics, and medical research.





The design journey

With a focus on child health, the design had to be friendly and inviting. The large touchscreen, resembling a smartphone, plays a critical role in the user interaction.

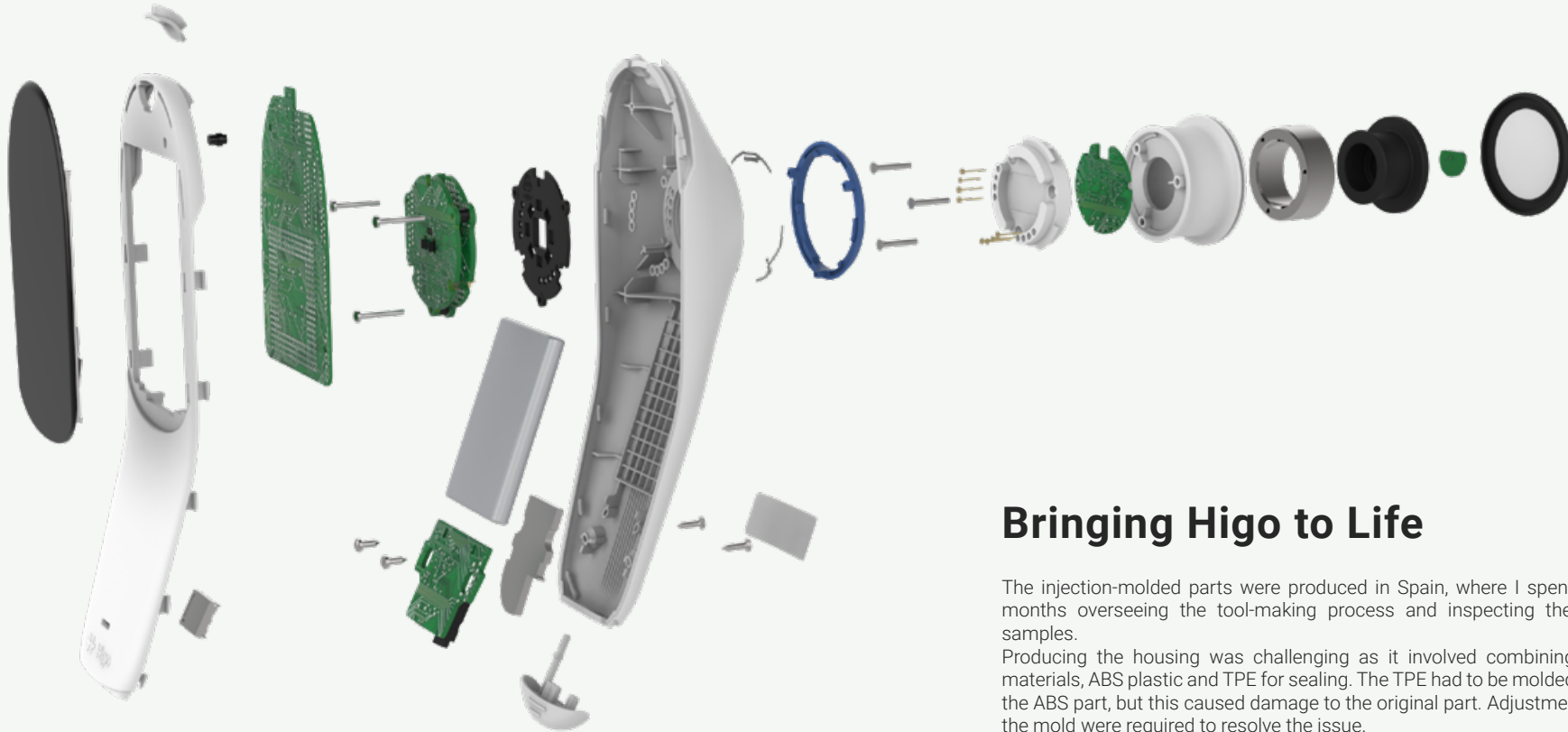
Rounded and soft shapes were used to convey a friendly character. For example, the display glass features rounded edges, the UI has rounded corners, and the back of the device has a soft shape that extends into the modules.

The angled handle provides comfortable grip in various positions, such as the pen grip for precise ear navigation with the otoscope. The device is water-resistant with an IPX2 rating, featuring a rubber-capped USB connector and headphone plug.



Final concept sketch of Higo





Bringing Higo to Life

The injection-molded parts were produced in Spain, where I spent four months overseeing the tool-making process and inspecting the first samples.

Producing the housing was challenging as it involved combining two materials, ABS plastic and TPE for sealing. The TPE had to be molded over the ABS part, but this caused damage to the original part. Adjustments to the mold were required to resolve the issue.

Higo is composed of 25 plastic parts, primarily made of medical-grade ABS. Due to the impact of COVID and global shortages, obtaining the material in the desired color took significant effort to minimize delays.



Doctors evaluating foam models



Results

The first batches of Higo have been produced, and Higo Sense (the company behind Higo) is working towards making it accessible to the masses. In April 2023, the project was rewarded with an iF Design Award.

The project offered valuable experience in designing products for injection molding and in the production process itself. It also offered insight into the development of a medical-certified product, including planning, project management, and certification with a notified body.



Lightyear Zero

Solar car exterior lighting



Illuminating the Lightyear

The Lightyear Zero is an innovative, long-range all-electric vehicle powered by solar energy. I collaborated with the team of Lightyear and Granstudio (an Italian mobility concept design studio) on the exterior lighting units of the first prototype car.

I was responsible for the design, engineering, prototyping, and manufacturing of all exterior lighting units for the prototype vehicle. My focus was on creating the 3D CAD models of the front units, while my colleague handled the rear units.

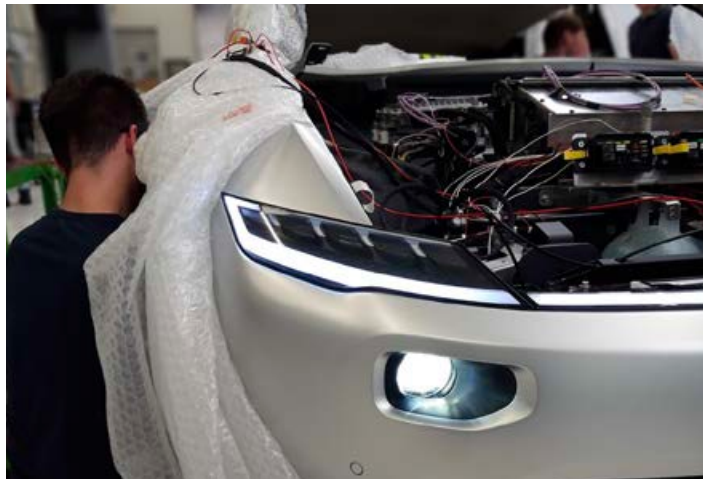




From Design to Functional Lighting

My task involved translating the exterior lighting design into functional, energy-efficient, and lightweight units that met EU vehicle regulations.

The process entailed thorough research into competitor products for gaining insights into car lighting solutions, testing with proof-of-concept prototypes and ultimately resulting in the creation of functional prototypes of the exterior lighting units. The aesthetic design for the car was developed by Granstudio, who presented us with a design proposal for the exterior lighting.



Results

The launch of the Lightyear Zero has been postponed indefinitely as the company has shifted their focus to developing a new model, the Lightyear Two. Although my involvement in the exterior lighting design of the Lightyear Zero has ended, the experience will remain a valuable addition to my portfolio.

This project allowed me to develop myself in transforming an external design into a producible 3D model while considering car lighting regulations. The design we received from Gran Studio consisted only of exterior surfaces and was not producible in any way.





Vision Tech
LED nasal speculum

Innovating Nasal Inspection

The Vision Tech nasal speculum is revolutionizing the traditional nasal inspection tool by introducing an integrated LED light, enabling doctors to inspect the nasal cavity without the need for a headlamp. I designed this nasal speculum at ManGo Product Design for Vision Tech. The handle of the speculum features an interchangeable LED module powered by a battery, which illuminates the nozzle through optical fiber. This enables the removal of all electronics for sterilization in an autoclave.







Redesigning the Speculum

A traditional nasal speculum has a frightening and surgical appearance. I redesigned the speculum to give it a more inviting look for both patients and doctors.

I blended soft organic shapes with a recognizable texture on the handle and replaced the standard spring with a hidden torsion spring ensuring ergonomic comfort and avoiding finger entrapment. Numerous prototypes were created to refine the ergonomic design of the speculum.





Results

The nasal speculum is now available for purchase, produced in limited quantities. The project provided me with valuable experience in working with potential manufacturers, understanding different production methods and medical materials.

This project offered me the opportunity to travel to China and engage with potential manufacturers to explore design and production possibilities.



QuantiFire

Hearable device for firefighters



The story behind QuantiFire

QuantiFire is a smart communication device designed to protect firefighters from the effects of prolonged heat exposure, which is a leading cause of death for firefighters. It measures physiological indicators, such as heart rate and body temperature, and provides warnings if the risk of failure becomes too high.

I developed QuantiFire as a result of my Master of Science (MSc) graduation project, which was conducted at the Schiphol Airport fire brigade. The project aimed to explore how smart technology could assist fire services.



From Research to a Concept

The project aimed to examine challenges faced by firefighters which led to two design directions: measuring heat exposure and improving communication. I decided to merge both into a single product, the QuantiFire earpiece.

Research on heat exposure effects led to the conclusion that the ear is ideal for accurately measuring heart rate and body temperature. These two indicators are crucial indicators of heat exposure risks.

To ensure user-friendliness and comfort, I explored various shapes and sizes. The ear-insert is molded specifically for each firefighter through ear impressions taken by a hearing care professional.





Headphone jack

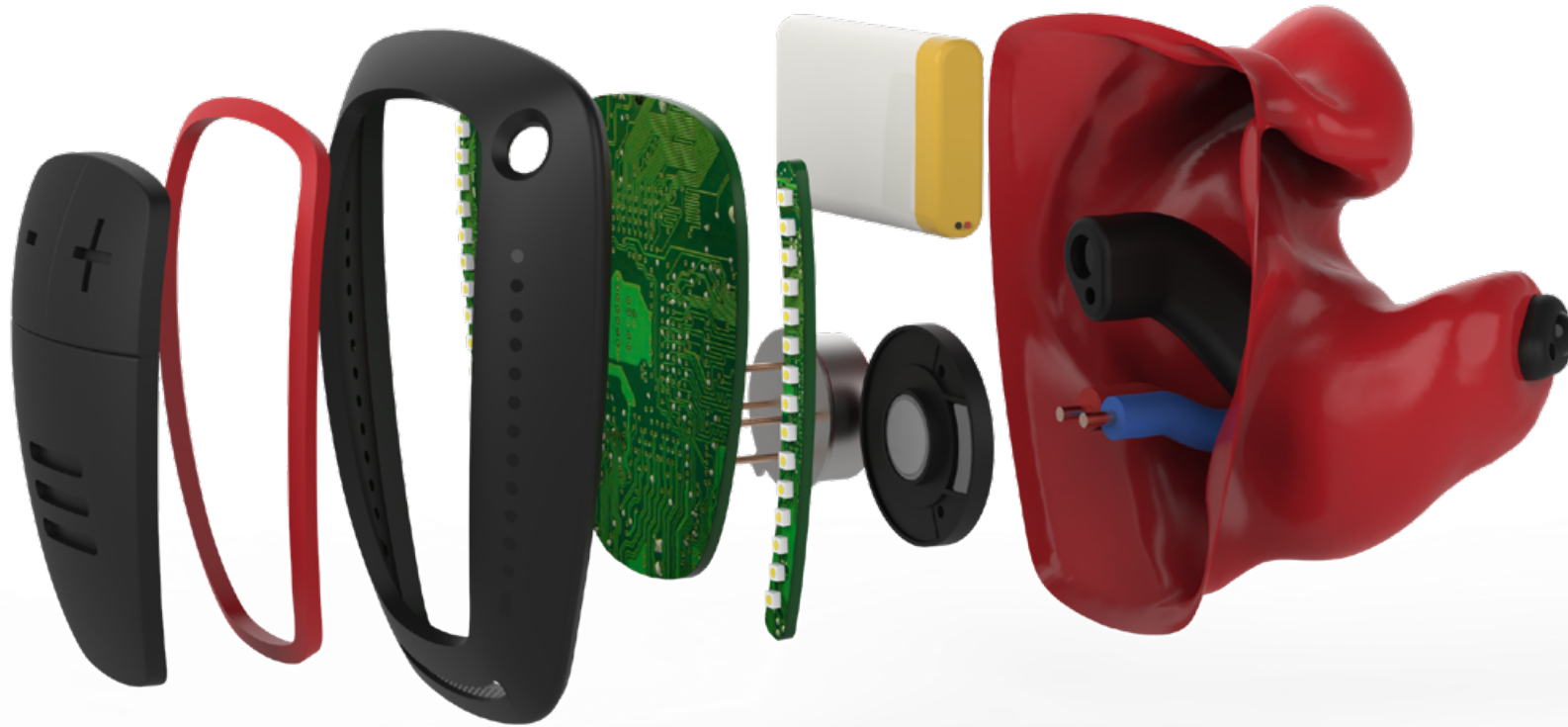
Volume buttons

Indicator lights

Temperature sensor
In ear audio

Pulse sensor
Ear bone conductor





Results

The Schiphol fire brigade had planned to advance the development of QuantiFire, however the costs involved developing the algorithm and electronics made it challenging to progress. Despite this, I successfully completed my graduation project and received a cum laude designation. I completed the project with a proof-of-concept prototype, visual models and a paper prototype of the smartphone app.

QuantiFire uses data analysis to predict whether health problems may arise. Further validation of the data analysis required more measurement data than was possible within the scope of my graduation project.



Princess
Pure Fondue Line





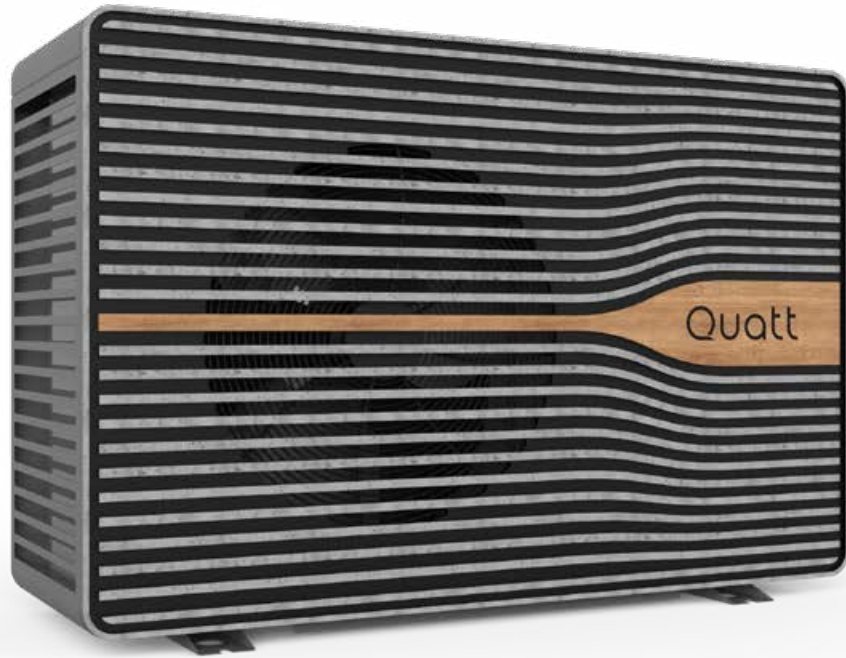
Designing the pure line

For Princess, I designed two innovative kitchen appliances for their Pure line - an electric fondue and a hotpot. Both products feature a stylish bamboo tray that showcases the signature aesthetic of the Pure line.

I was responsible for creating the concept design of the two products. My focus was on ensuring the products were visually appealing and aligned with the overall aesthetic of the Pure line.



Quatt
Heatpump



An aesthetic heat pump

Quatt, a Netherlands-based scale-up, is dedicated to accelerate the energy transition. Their mission is to make cost-effective hybrid heat pumps for all kind of households. They eliminating the middlemen by selling to the consumer directly.

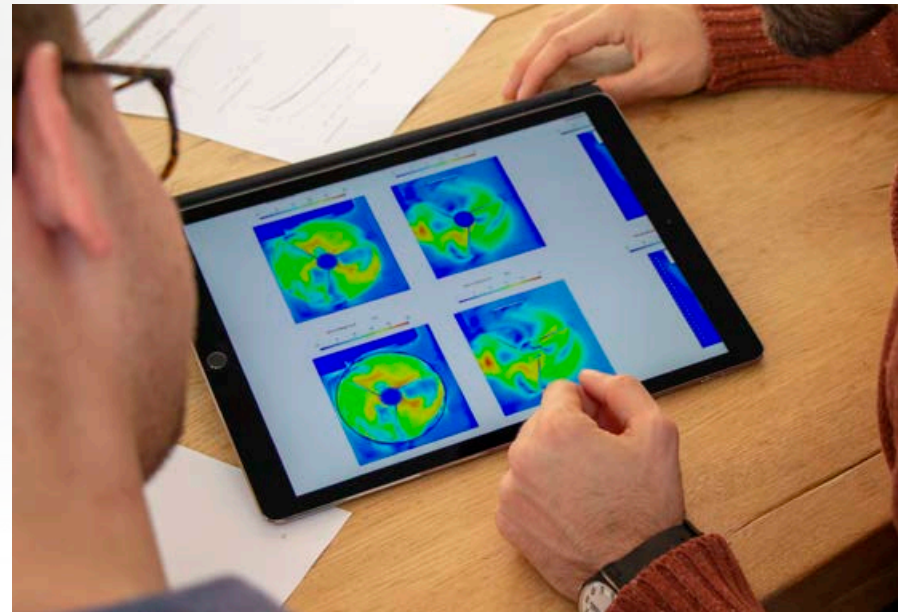
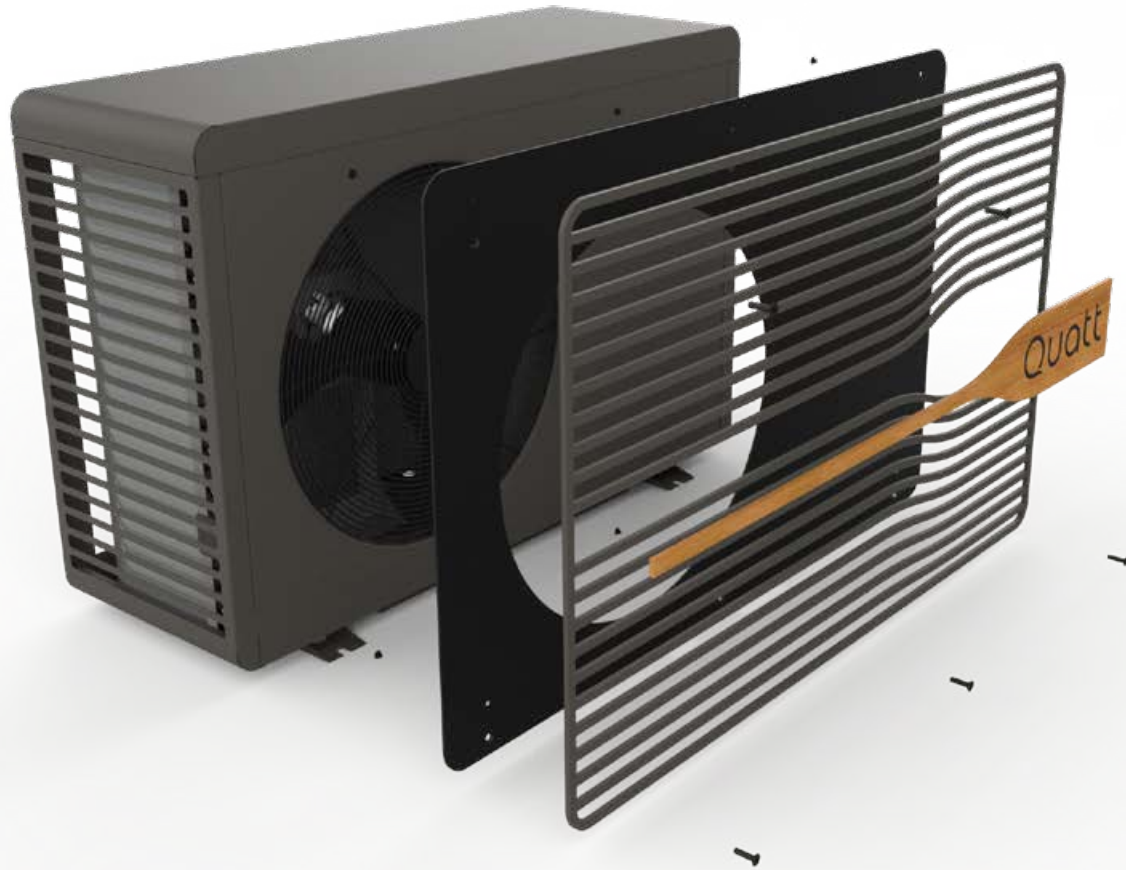
My role in this project was to engineer the conceptual design of Quatt into a feasible and scalable product.



Heat pump engineering

Quatt had already conducted a pre-sales of their heat pumps based on the design concept, therefore maintaining alignment with the design concept was imperative. The challenge was that the front panel was dual-colored and contained a wooden detail. The initial step involved identifying cost-effective production techniques capable of delivering the desired aesthetics and enduring outdoor conditions for a minimum of 15 years. Based on an extensive research, I selected a production method that is also used in creating automobile grilles.





Technical development

For heat pumps, efficiency is the most important aspect. As such, I integrated CFD analyses early into the design process. With these insights, we fine-tuned the airflow dynamics within the existing framework, optimizing performance. Multiple prototypes were created to validate both efficiency (reaching 80%) and aesthetic appeal.



About me

Growing up in a family that valued both art and sciences inspired me to create products that can make a real difference in people's lives. I have always been a dreamer with a passion for innovative ideas, with an eye on the importance of feasibility and cost-effectiveness.

I believe that a good product seamlessly integrates into the user's life by adding value without requiring excessive attention.

My experience working in a variety of projects, from consumer accessories to professional healthcare products, has helped me refine my skills in conceptualization, prototyping, and engineering. It has given me the ability to tackle a wide range of design challenges.

Beyond my role as an industrial designer, I am a co-founders of Studio Thirty One, a company with a mission to make complex concepts easily understandable through the magic of (animation) videos.

Olivier Sebastiaan van Nieuwmegen