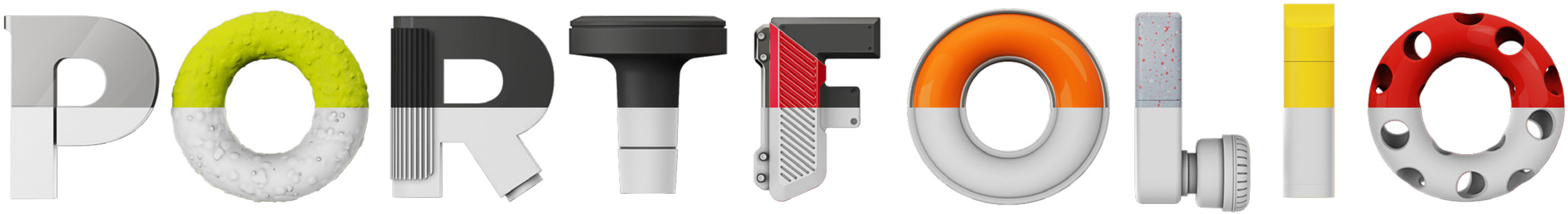


JOVAN VULIC

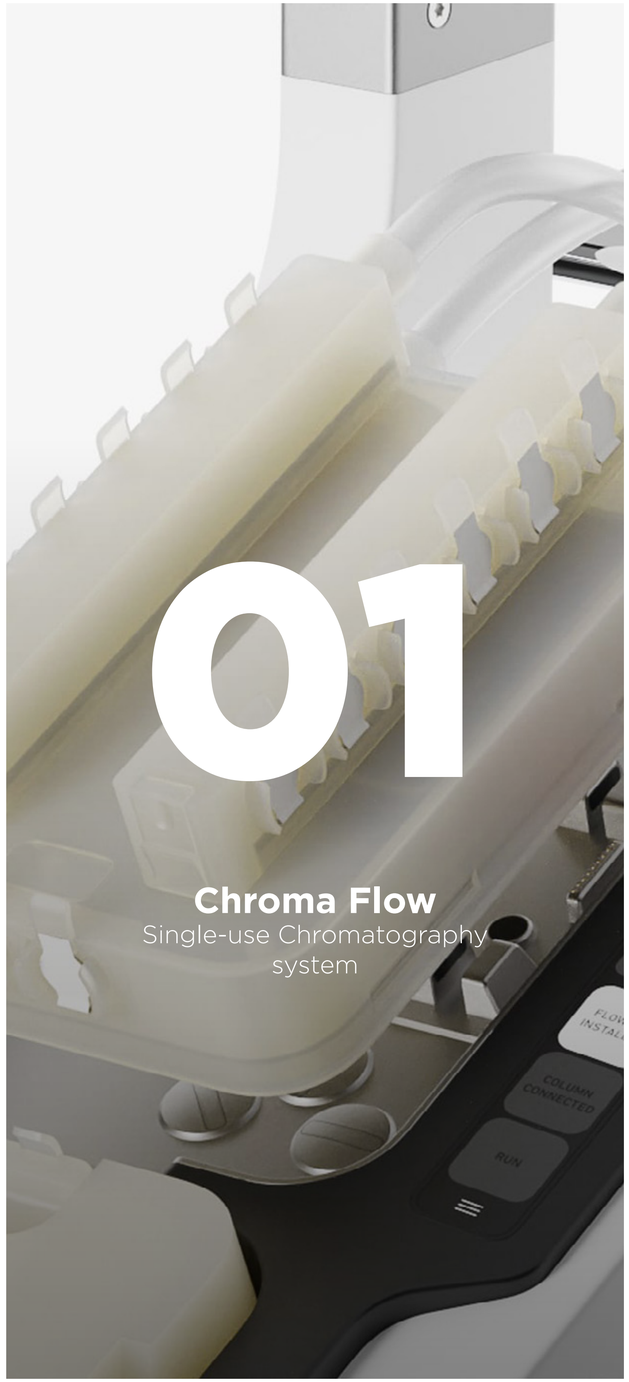
2023

Hello!

My name is Jovan Vulic and I am an Industrial designer born in Zimbabwe, raised in Serbia, currently studying my final year of the Advanced Product Design Master course at the Umeå Institute of design, Umeå, Sweden.

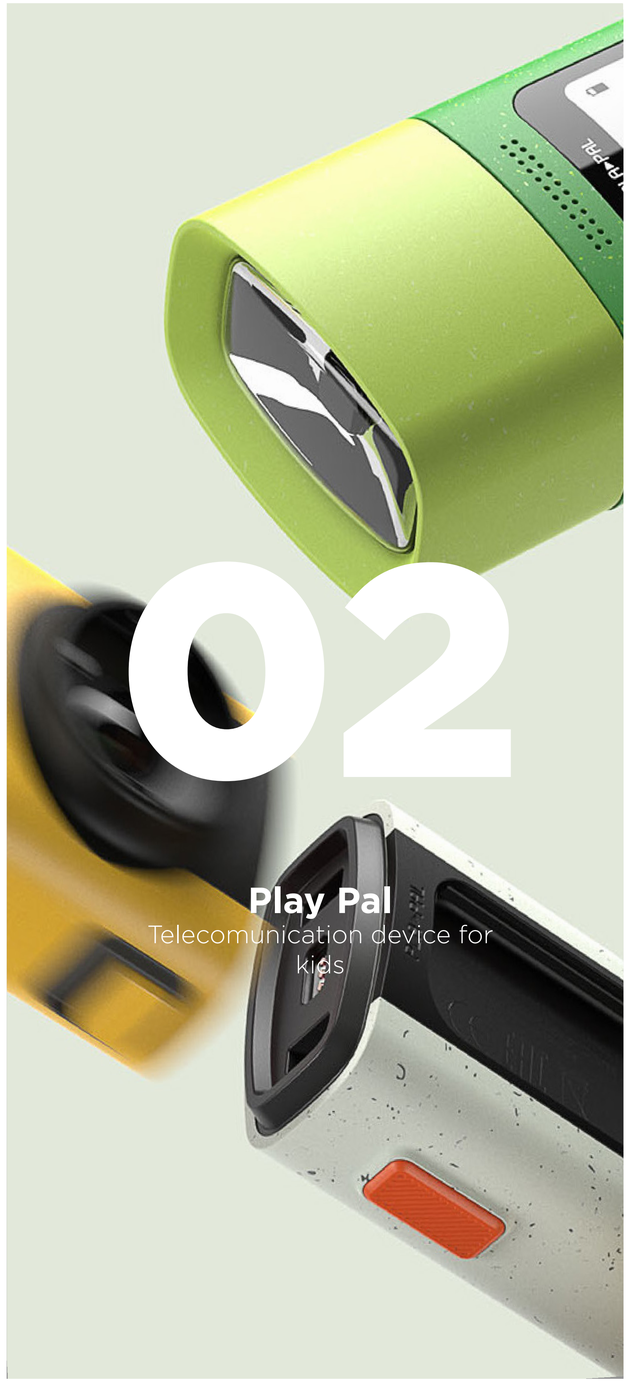
By utilising my design skills and empathy I strive to design for positive impact, no matter how significant, as it is my strong belief that we as designers have the knowledge and the tools to shape and influence the world in hopes of creating a better future.

Linkedin: https://www.linkedin.com/in/jovan-vulic-712a97222
Email: vulicjovan@gmail.com, hello@vulicjovan.com
Phone: +74-76-591-85-08



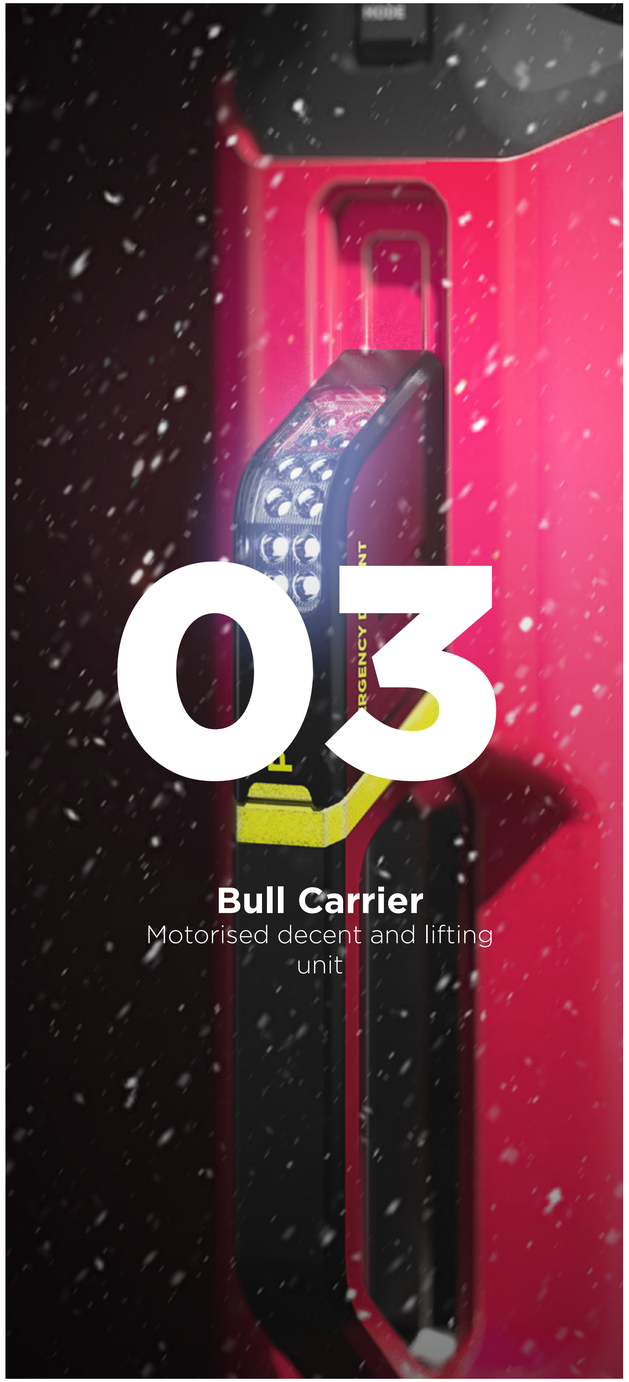
01

Chroma Flow
Single-use Chromatography system



02

Play Pal
Telecomunication device for kids



03

Bull Carrier
Motorised decent and lifting unit

04

Cake Screwdriver
Screwdriver designed for refurbishment

Chroma flow

Single-use Chromatography system

Conceptual product solutions
Project duration: 10 weeks
Team member: Stijn Van Cuijk
Umeå Institute of Design, 2023

Chroma Flow is a single use chromatography system for small to medium-sized batches in biopharmaceutical manufacturing. It provides a new workflow enabling the sustainable production of pharmaceuticals according to the model of precision medicine, where treatments are tailored to specific groups, improving their effectiveness.

To achieve this, Chroma Flow is designed as a compact and agile machine, increasing efficiency in small to medium-sized batch manufacturing. It effectively utilizes precious clean-room space through its tall and slim design. The single-use flow kit is consolidated into a single optimized flow block, taking just a few seconds to install.

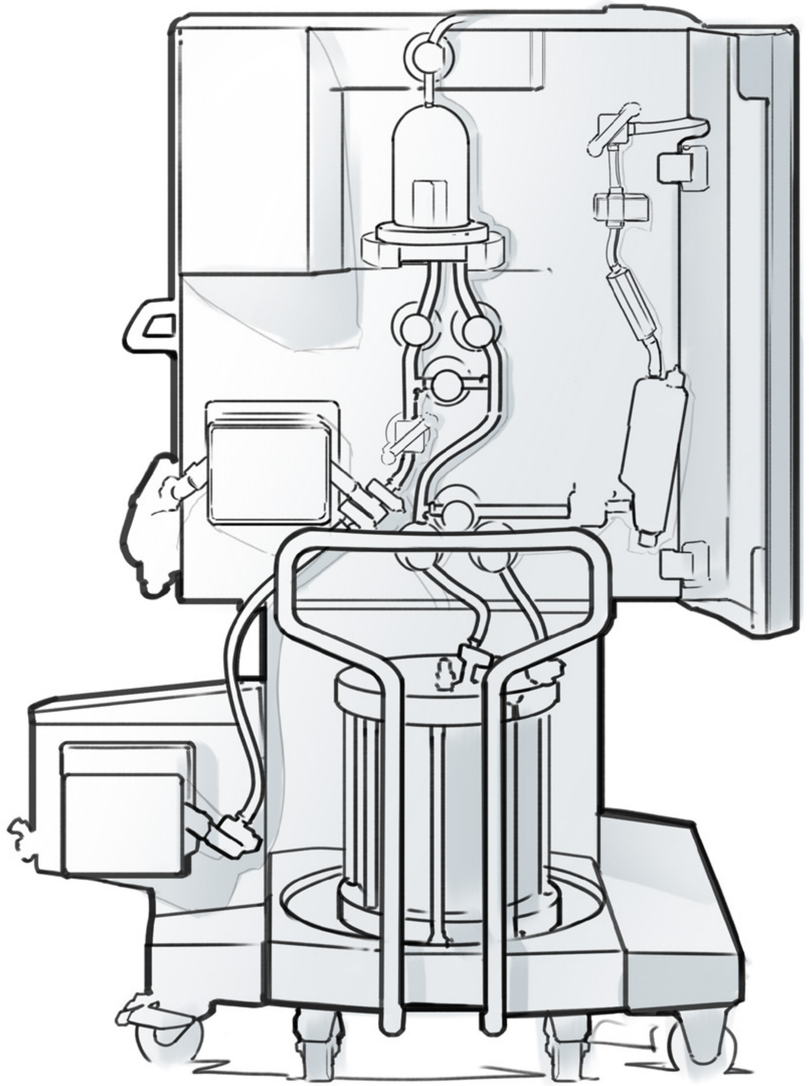
01

Background

This project is a collaboration with Cytiva, a leading supplier of technology within the life sciences space who are trusted for their excellence in providing technologies and services that advance and accelerate the development, manufacture, and delivery of therapeutics.

In a maturing technology space, Cytiva is looking for other differentiators in addition to pure technology specifications, in order to help their customers be ready for the future and improve throughput. Having ‘human at the core’ and ‘dynamically modern’ as their core design principles, they asked us to come up with a conceptual product solution that is future ready and led by best-in-class end to end user experience design.

In addition to the user experience focus, the importance for future products to be more sustainable was emphasized. We were asked to explore new sustainable solutions for the next generation of single use products.



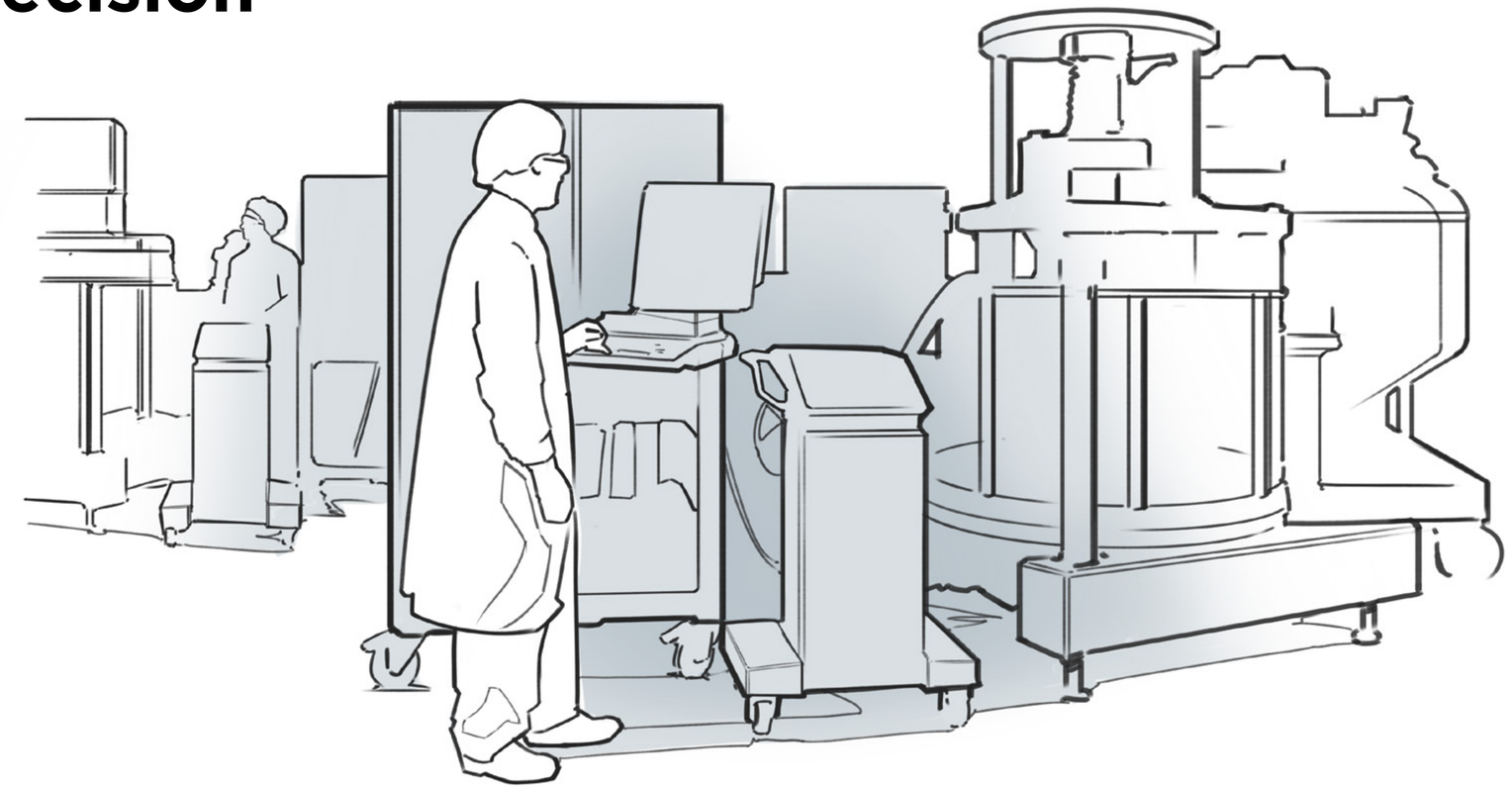
Preparing chromatography for a future with precision medicine

Chromatography

Chromatography is a separation technique used in biopharmaceutical manufacturing to purify large biological molecules such as proteins, antibodies, and enzymes, which are used in vaccines and other pharmaceuticals.

Precision medicine

Precision medicine is a medical model that separates people into different groups—with medical decisions, practices, interventions and/or products being tailored to the individual patient based on their predicted response or risk of disease.



Challenges

Batch size and capacity

Facilitate the production of smaller batches, while retaining the same volume capacity that makes medication affordable for people.

Machine footprint

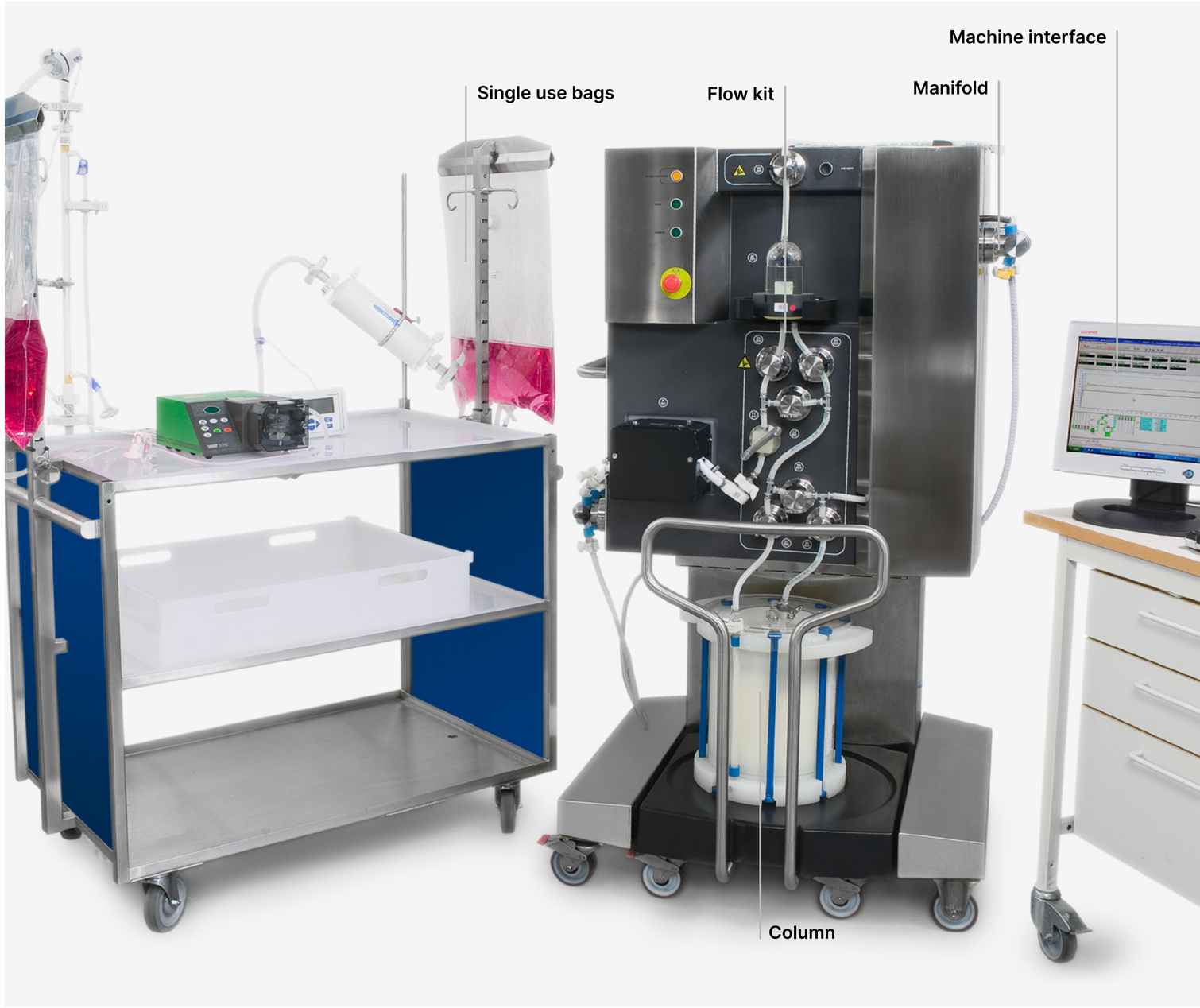
Cleanroom space is costly and energy intensive. Making the most of cleanroom space is necessary to make the solution financially and environmentally viable.

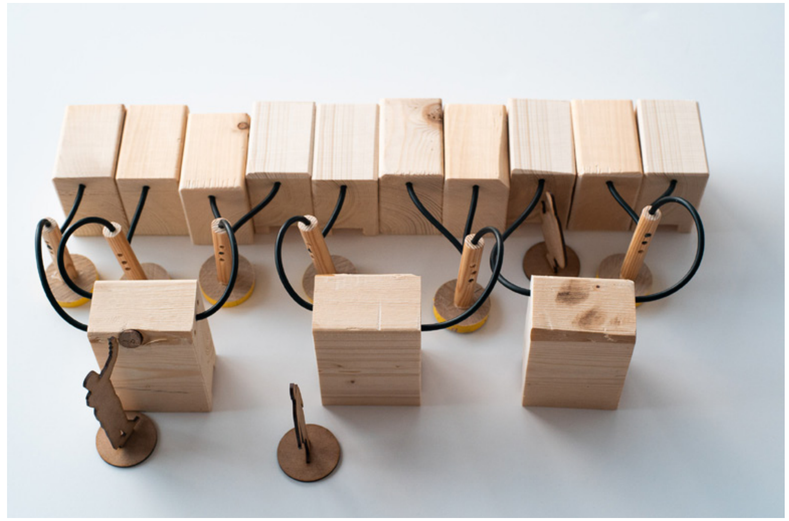
Sustainability of single use

Single use components provide many benefits in bioprocessing, but how can we make sure they are properly reused or recycled after use?

Flow kit installation

With current machines, the flow kit consists of a web of connected tubes that is ergonomically challenging to handle, and requires time consuming manual operations to install onto the machine.

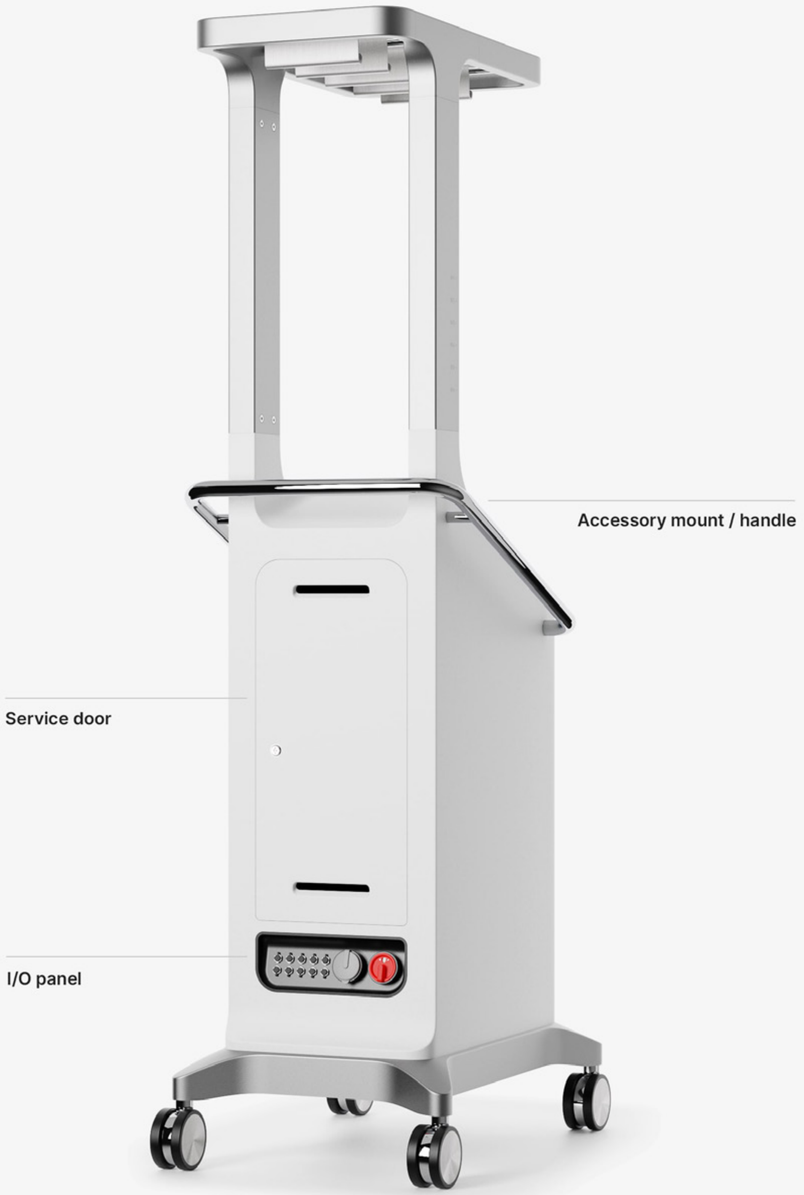


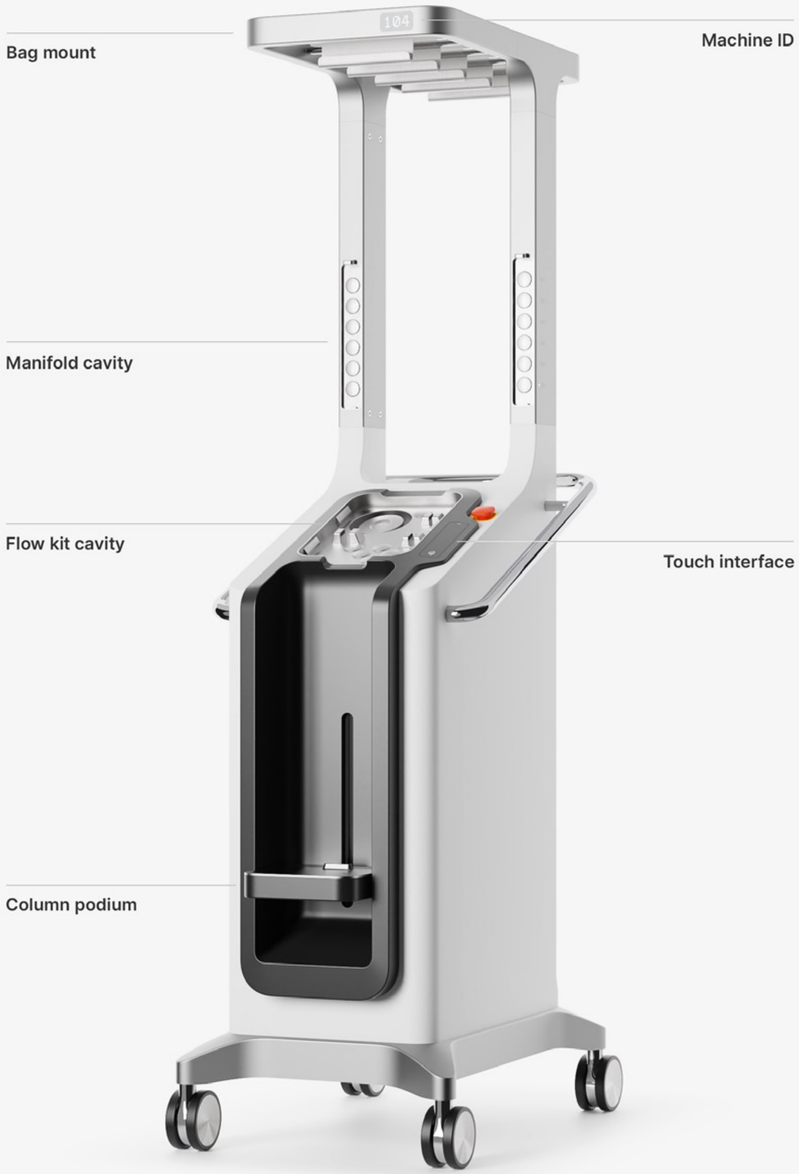


Machine Hardware Design

Chroma Flow represents a new, agile approach to the chromatography workflow. A focus on intuitive human-machine interactions resulted in an architecture that is designed to be open and welcoming, with the main interactive surface angled towards the user in an inviting gesture. Besides a more approachable aesthetic, this architecture allows the user to see all installed components at a glance, logically structured according to the liquid's flow path.

The slim design answers the need for more effective use of clean room space. With the main areas of interaction all located at the front, it allows for tighter arrangements of multiple machines next to each other. The tall stature is counterbalanced by a widened base, giving the machine a stable and trustworthy stance. Through meticulous attention to detail and finish, we aimed to craft a product expression fit for purpose in highly demanding cleanroom manufacturing environments. While challenging the established aesthetics of bioprocessing equipment, the carefully curated materials and finishes evoke a sense of precision, clarity, and durability.





Details

Through meticulous attention to detail and finish, we aimed to craft a product expression fit for highly demanding cleanroom manufacturing environments. While challenging the established aesthetics of bioprocessing equipment, the carefully curated materials and finishes evoke a sense of precision, clarity, and durability.

Sustainability of Single-Use

Due to the nature of single-use column chromatography, there are many disposable parts. These consist of a flow kit with separate inlet and outlet manifolds, and a column. Counter intuitively, the environmental impact of these single-use components is considerably less than that of their reusable counterparts.

This is caused by the large amount of energy required for cleaning reusable systems to bioprocessing standards. Still, we found it important to make sure the single-use components can be properly recycled after use, keeping easy disassembly and optimal material use in mind. The main material used for all components is pure uncoloured polypropylene, which will result in high grade material waste streams.

Flow-Kit Installation

The installation of the single-use components is one of the crucial steps to insure the chromatography process runs successfully. The setup needs to be done correctly to prevent leakage and contamination. We have set out to streamline this process by reducing the amount of tubing compared to current single-use systems, and optimizing the positioning of the various components to insure safe and correct installation.

Based on the column size, the machine will automatically set the column podium to the correct height.
The column can then be positioned using the integrated ergonomic handle.

The flow block is positioned in the cavity, after which both manifold can be clicked into place. After confirming the installation on the touch display, the machine will apply pressure to fix the components in place.

The single use bags and other peripherals can then be installed. When all components are connected, the machine is ready to go.

Like with each step of the process, the operator confirms a completed setup on the touch display. Now the chromatography process can start.

Chroma flow

Project Video: https://vimeo.com/797632192

PLA▶PAL

Telecomunication device for kids

Strategic Product Design
Project duration: 10 weeks
Team member: Laurenz Simonis
Umeå Institute of Design 2021

PlayPal is a telecommunication device designed around the physical and social needs of kids. Catering to and enhancing their daily activity's, whilst keeping them in contact with their parents. Finnaly, PlayPal aims to support a healthier relationship with technology.

reddot award 2022
best of the best

CORE77 DESIGN AWARDS
2022 NOTABLE

02

We Are In A Midst Of A Mental Health Crisis.

The rise of digital technology has brought a lot of positives to the world. However, growing up in a generation that has information ready on hand at any time, brings new problems to the table heavily affecting young teenagers and adults.

Impact Of Social Media Has Taken Its Toll.

The need for showing a seemingly perfect life has become a burden for many. And a long side instant gratification social media has been pushing the limits to what a person is capable of going through for attention and sense of belonging.

80 % Of Parents Think, That Owning A Smartphone Under Age 12 Is Not Okay.

A majority of parents agree that children should be at least 12 years old. This is often toppled by the fact that parents need to be able to get a hold of their children.

Yet As Of 2019, More Than 50 Percent Of Children At Age 11 Already Own a Smartphone, 60 Percent More Than In 2015.

In reality, smartphone ownership among kids has risen dramatically over the past years and it is not showing any signs of decline any time soon.

KIDS ARE ON THEIR PHONES TO SOON.

Our research has found that the age from which kids have access to the internet is getting lower. As a consequence, kids are being exposed to content that is not appropriate for their age (violence, news casts, sex...).

BUT PARENTS NEED TO GET AHOLD OF THEIR KIDS EASILY.

In a survey from 2016, 90 percent of parents answered the reason for getting their kids wireless service is to get a hold of them easily. This has been confirmed in our personal research time and time again.

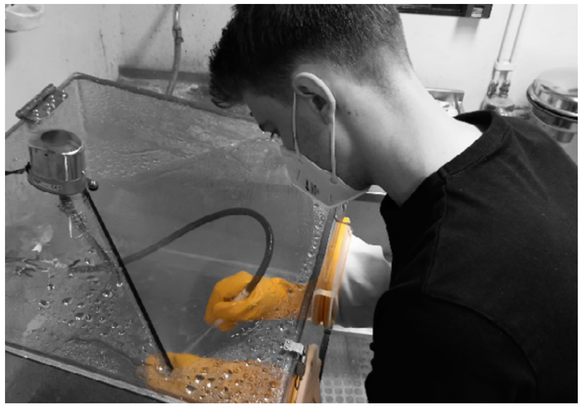
...So We Asked Ourselves...

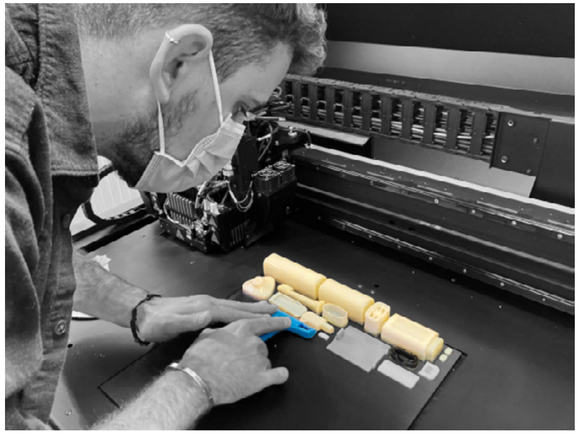
How may we help kids to ease into smartphone use and establish a healthy relationship with technology?

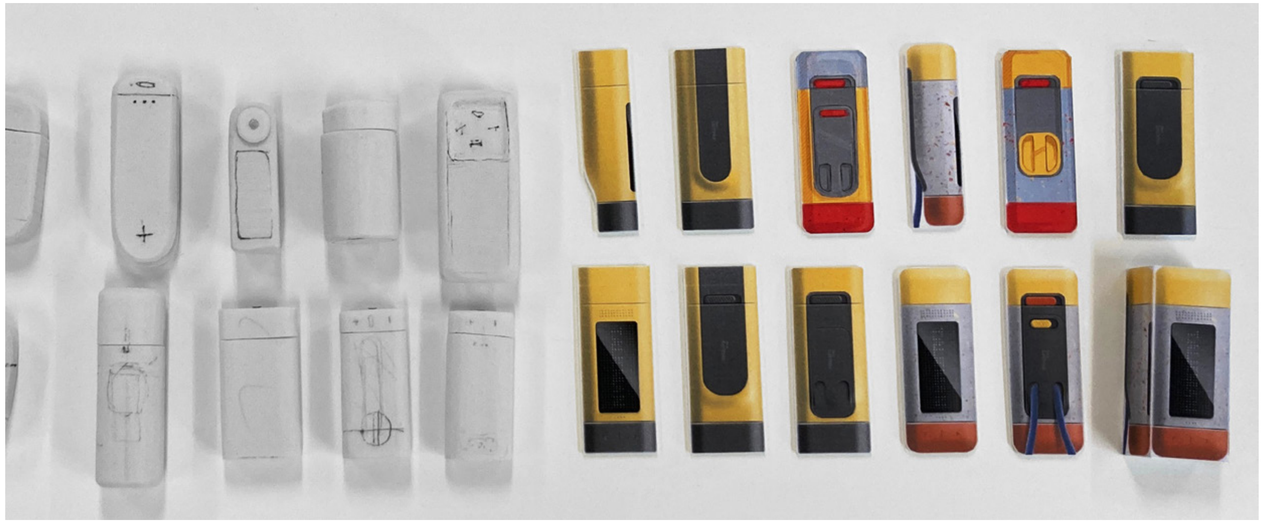
How may we allow parents to get hold of their children easily while protecting the kids from early exposure to the internet?

Product development

During the development we tried to put ourselves into kids heads and come up with the most fun and joyful device we possibly could. having in mind possible restrains and simbolic values(esthetic and funtional) to deliver a playful, robust but still tech-y design.



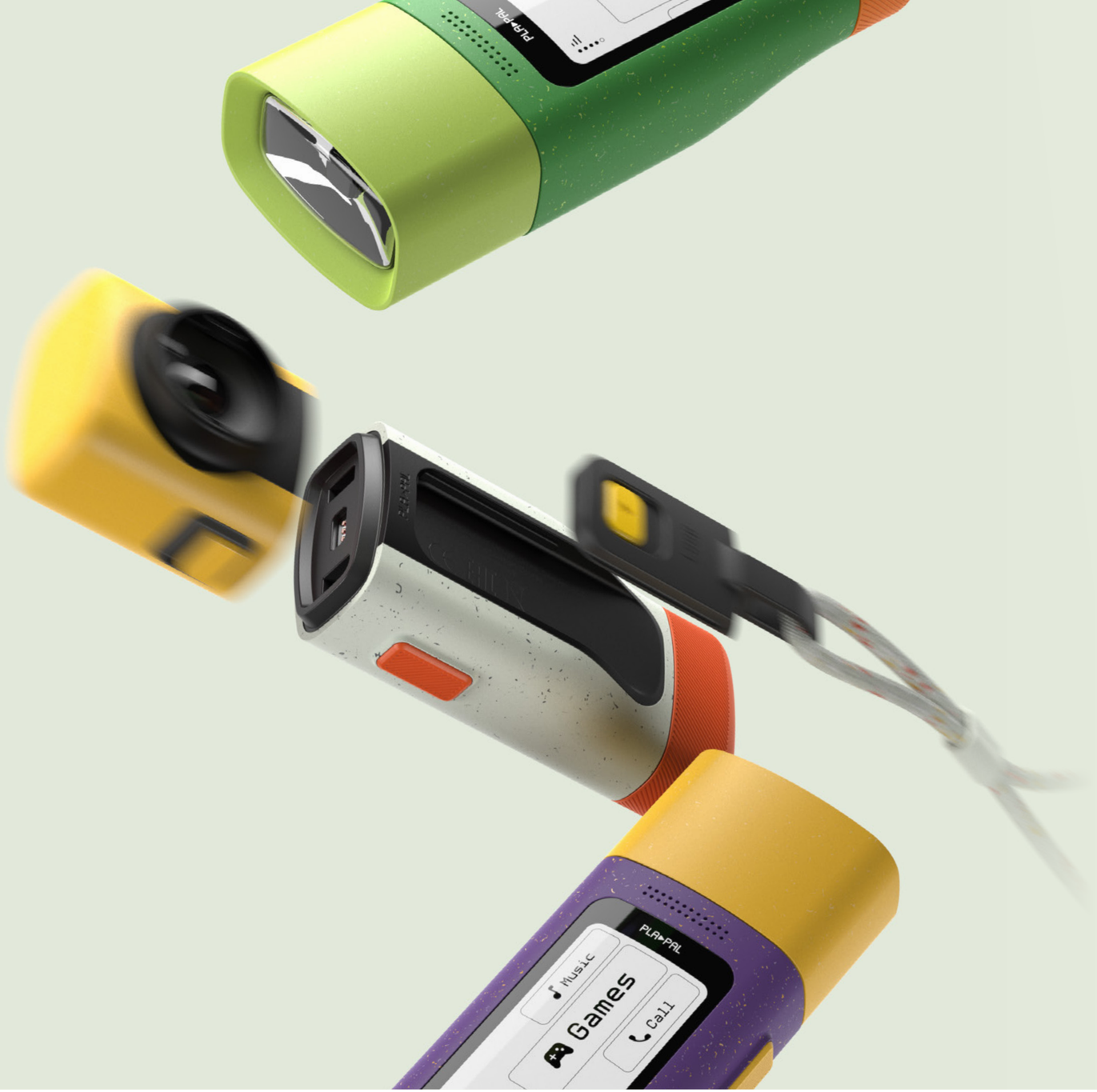




Say Hello to Play Pal!

Welcome to a world filed with curiosity, exploration and fun toghether with your knew companion, Play Pal!

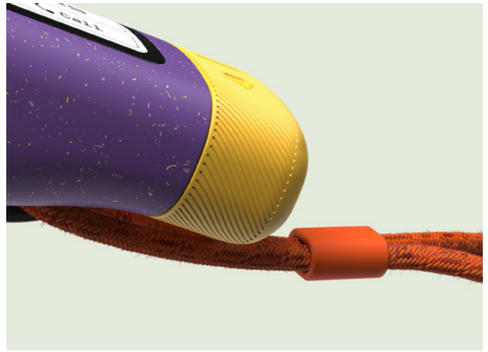
Project Video: https://vimeo.com/585667258

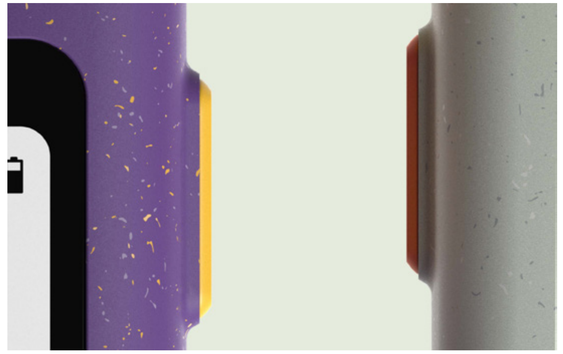


Overview

The main body holds all the functionality need for telecommunication, but the modules is where the fun starts!

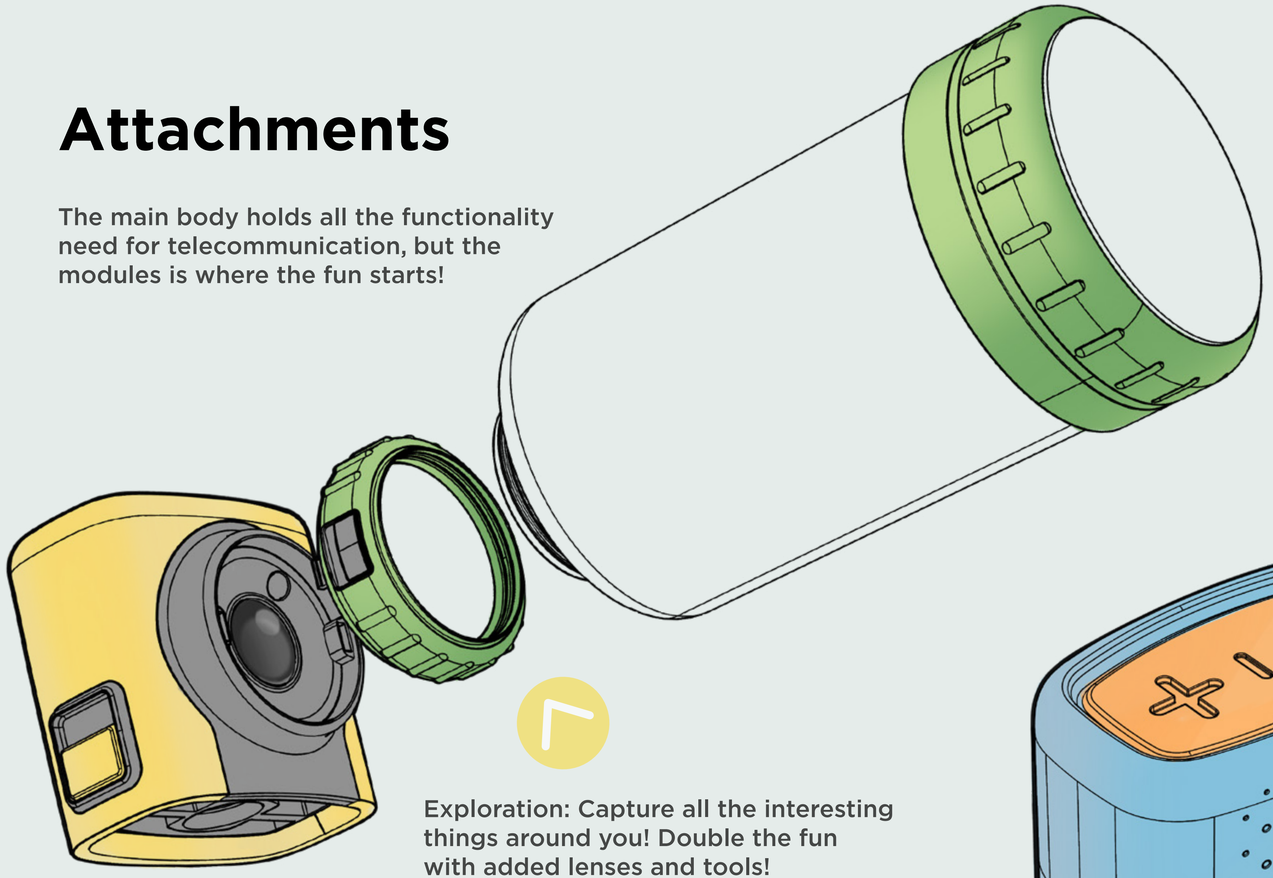
Allowing to personalize the experience depending on each child's preference, they form the heart of the concept. We also imagine these modules to be traded among friends or used in collaboration to create an even greater experience when bringing more than one Playpal to the party. The attachments and modules slide and click smoothly into place and are detached via designated release button. The action button changes its purpose depending on the module/setting. Scrolling through the different options is just pure fun using the joystick!





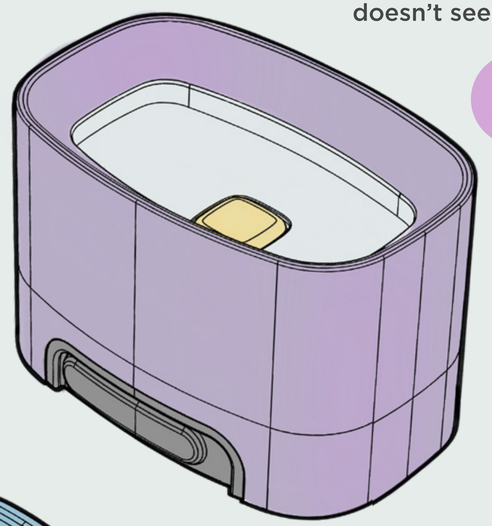
Attachments

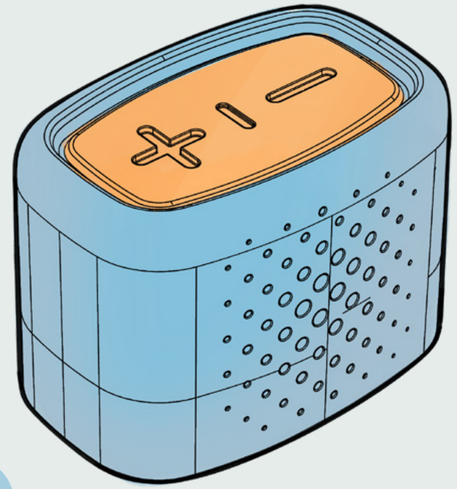
The main body holds all the functionality need for telecommunication, but the modules is where the fun starts!



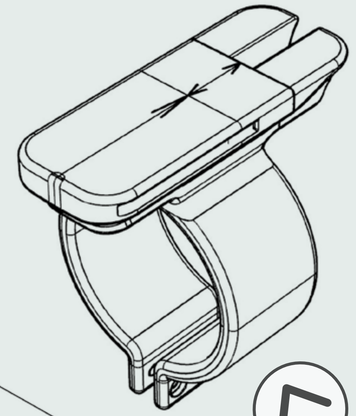
Exploration: Capture all the interesting things around you! Double the fun with added lenses and tools!

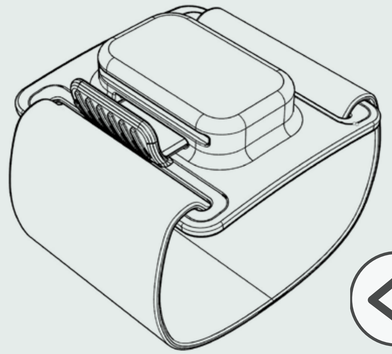
Sight: Suddenly that that nearby forest doesn't seem so scary anymore!





Sound: Jam along with your friends record and playback voices and maybe distort them?





Around the wrist or on your bike frame, with detachable holders Play Pal tags along every adventure!

Use case

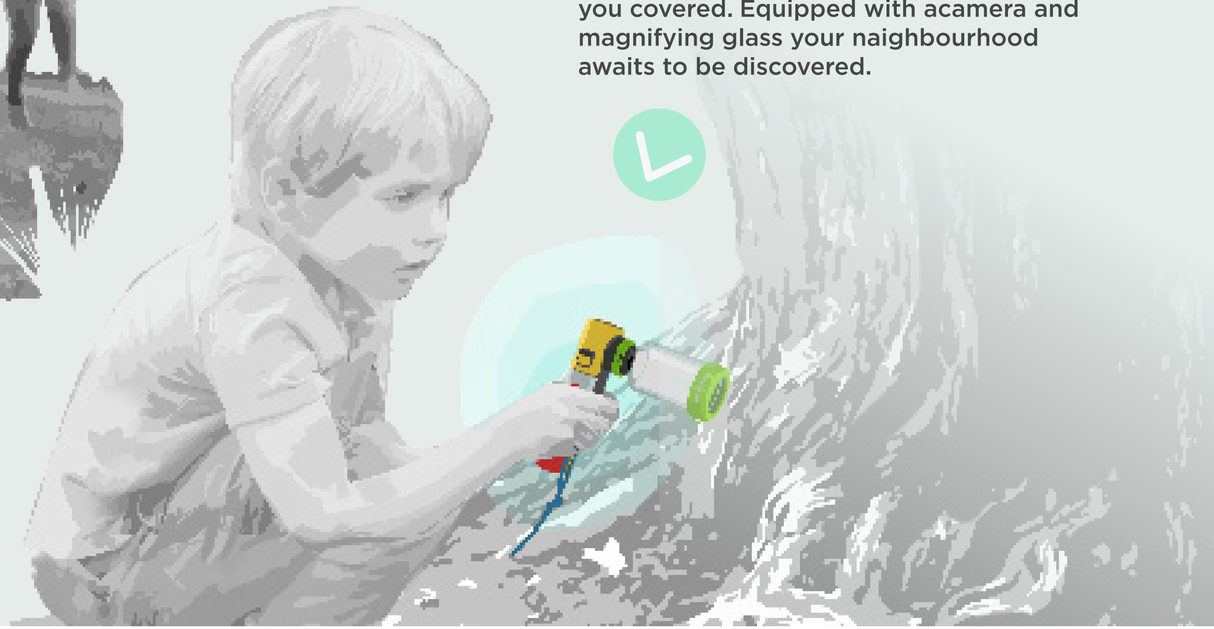
Playpal offers four fun new ways to play with your friends outside. How about for example Hide and seek 2.0, with a limited area to play in that shrinks to make the game more intense and information on who survived the longest undetected?...

.Or try to beat your firends best lap-time on your local custom set up racetrack?

.

...Playpal as a Walkie-Talkie, or in combintaion with the Sound-module to jam along to your favourite song with your friends, record and playback voices and maybe distort them in a funny way?.. ...

Or maybe you just feel like exploring a bit on your own today? Playpal has got you covered. Equipped with acamera and magnifying glass your naighbourhood awaits to be discovered.



Product Ecosystem

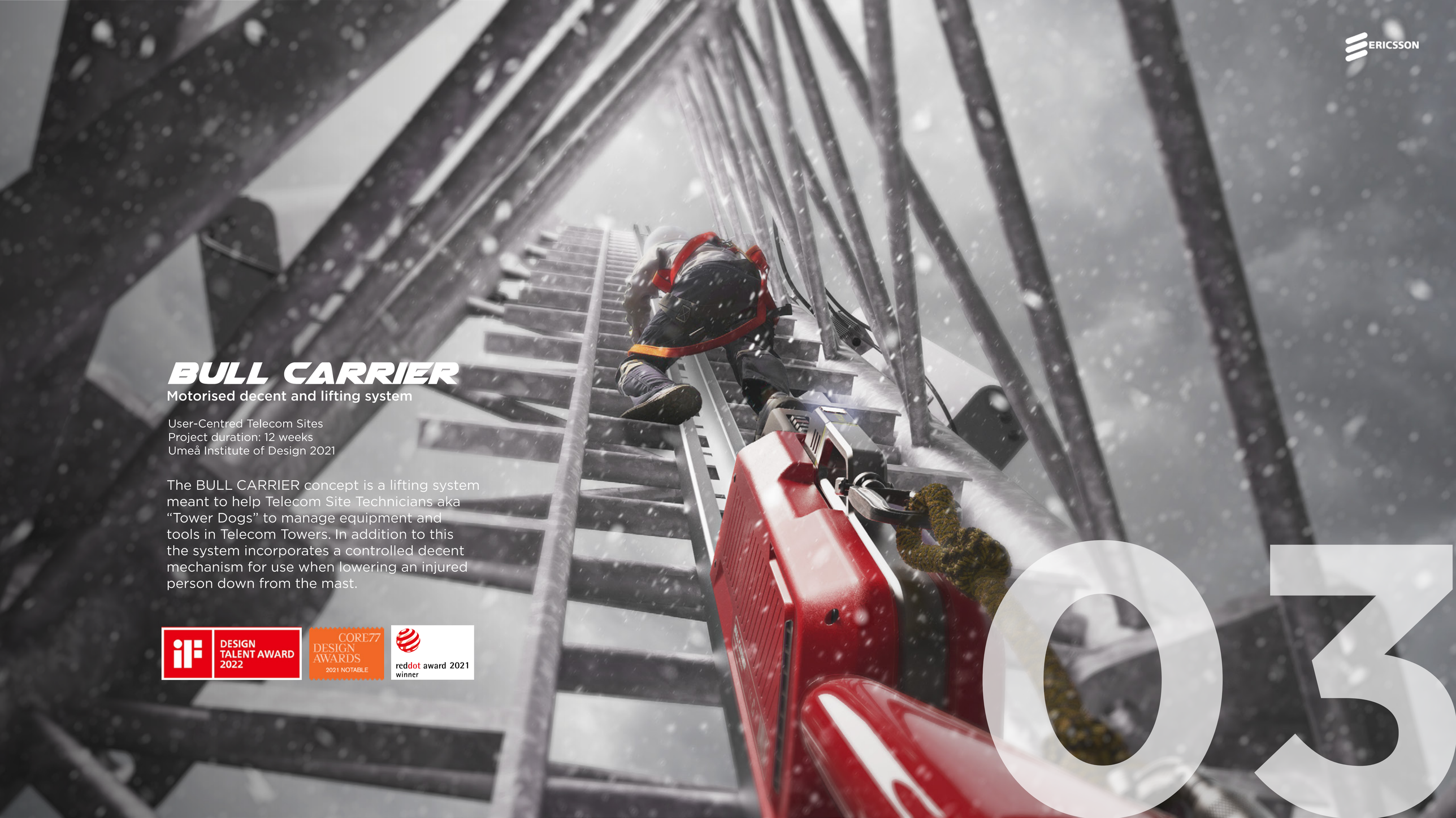
We we're aiming to design the Playpal as a 3-way experience. Both stakeholders involved get their own dedicated features and all the information they need, but when they come together is when the magic happens.

Children: The main user of the physical Playpal. Being a trusty companion on all adventures, Playpal offers a wide range of features to explore and connect, while alwaysbeing able to reach out for a parent if needed.

Children plus parents: The difital side of Playpal enables the children to relive their discoveries and achivements in their parents company. This way, parents get to share their childrens experience and can help them ease into the use of digital devices in a controlled enviroment.

Parents: the parents side of the digial Playpal allows for parents to keep track of their childrens activities and whearabouts, making them independent while just being a call away.


So what were you
up to today my dear?
Photos



BULL CARRIER

Motorised decent and lifting system

User-Centred Telecom Sites
Project duration: 12 weeks
Umeå Institute of Design 2021

The BULL CARRIER concept is a lifting system meant to help Telecom Site Technicians aka “Tower Dogs” to manage equipment and tools in Telecom Towers. In addition to this the system incorporates a controlled decent mechanism for use when lowering an injured person down from the mast.

DESIGN TALENT AWARD 2022

CORE77 DESIGN AWARDS 2021 NOTABLE

reddot award 2021 winner

03

Background

This project focuses on “4G” and “5G” tower construction and the workers, better known as cell site technicians, who tirelessly work to ensure that the mobile/telecom connections function seamlessly throughout the globe. Cell site technicians are people whose responsibility is to build, maintain and repair a group of telecom cell sites (masts), radio towers etc. Their line of work entails them to operate in many different environments as well as weather conditions.

Field Research

Field studies were organised in two groups of students and took place at two cell sites across two weeks. During this time together we had the opportunity not only to see but also help out the workers from “Telog” during the construction of a 4G mast as well as setting up new equipment in a ski resort. the task was to get a better understanding of the people who work on these sites, their lives, their struggles and the things they love about the job as well as their values.

Lisa
Telecom site technician

Gunnar
Telecom site technician

Week 1- Mårtsbo

The beginning of our research journey starts in the village of Mårtsbo near Gävle, where we had a chance to see the process of building and lifting a 4G mast. Going through every part of the process gave as an extensive insight to the daily tasks but also difficulties that the cell site technician might face during the construction and set up of the mast.

Week 2- Sälen

During the second part of the research trip a group of students had the opportunity to experience a totally different work environment than that of the Gävle group. From the swampy marshlands near the sea, to a ski resort near the border with Norway.

Challenges

Tool Managment

In most cases workers carry their tools buy attaching tool bags on to the harnesses. The same applies to equipment needed to be installed. This can result in large load that the worker has to carry for even hundreds of meters up into the tower in certain situations.

Safety

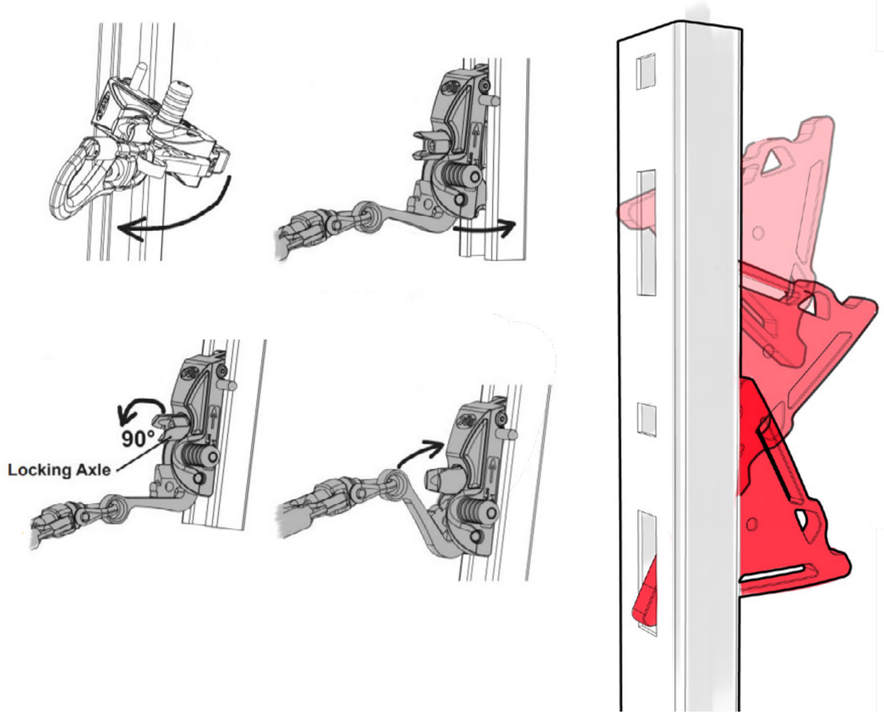
.

In most cases “Tower dogs” work in groups of two people and though not so frequent, accidents occur that can sometimes be fatal. However, help can’t always arrive so swiftly. For this reason looking into ways of improving their working conditions is a crucial topic and must be taken with great consideration.

“..If something happens up there…
We only have each other..”

Proof of Concept

The final direction utilises a kog system to deliver lift with the additional help from a set of wheels that provide stability while in use. Lowering heavy equipment and/or injured personnel is achieved by a “controlled decent” via motorised braking. This gives the design a possibility to become compact which in term makes it easier to carry and manage.



BULL CARRIER

The Bull Carrier is a motorised lifting system that utilises a kog drive to lift equipment up into the telecommunication tower.

The unit is compact, leaving room for the workers to move around it. The handle situated on top of the product is used to carry and put into place on to the tower. The solution incorporates a central construction on which the components are attached to. This provides a sturdy platform on which equipment and tools could be secured on to. The final result decreases the work load and the chances of tools falling while climbing and working in the tower.

Storyboard

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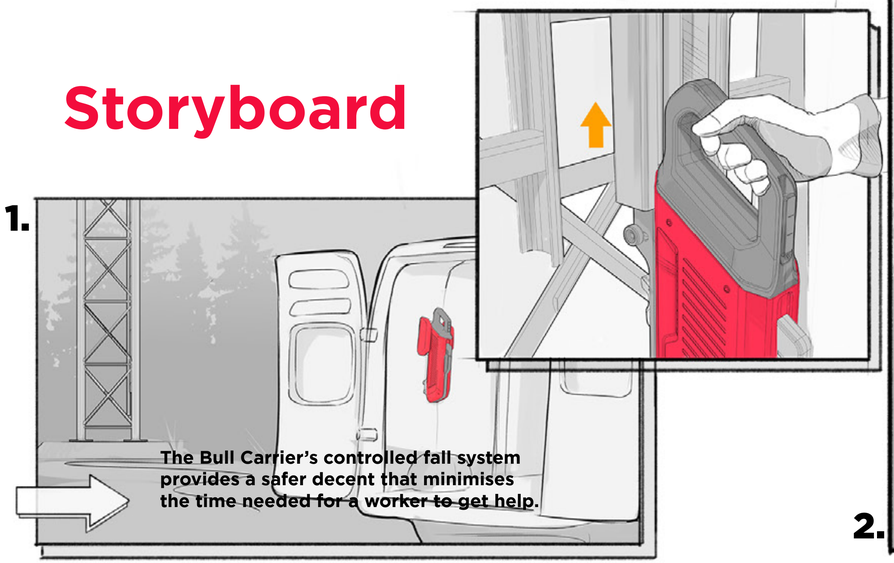

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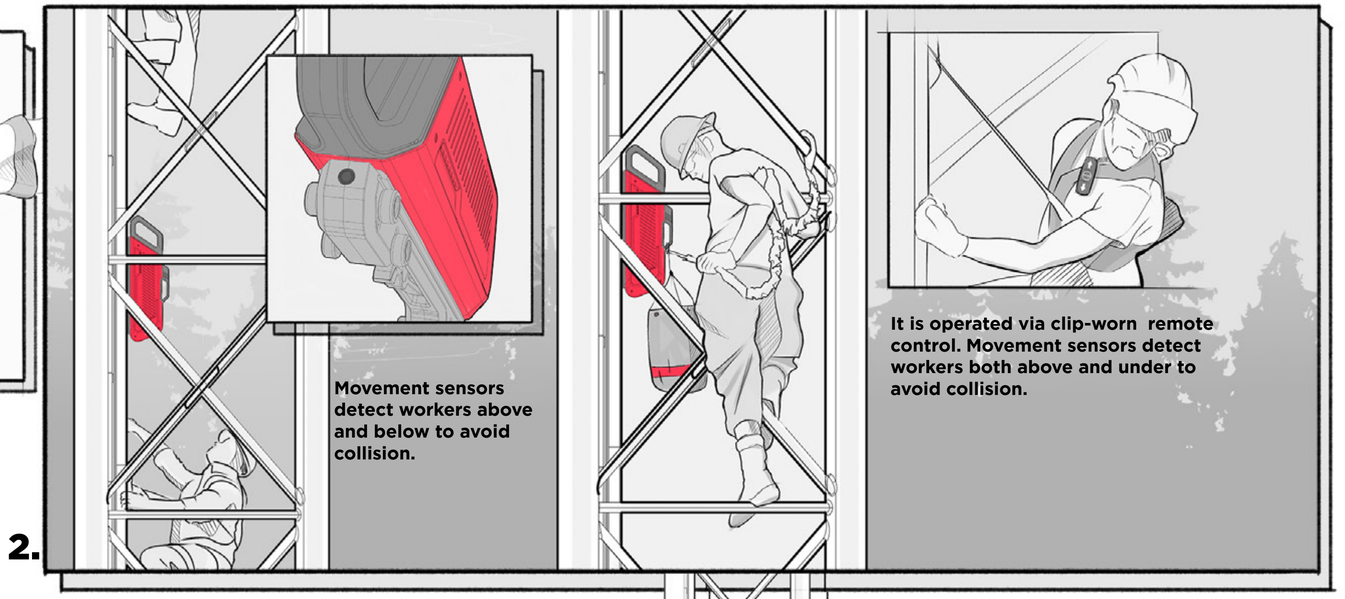

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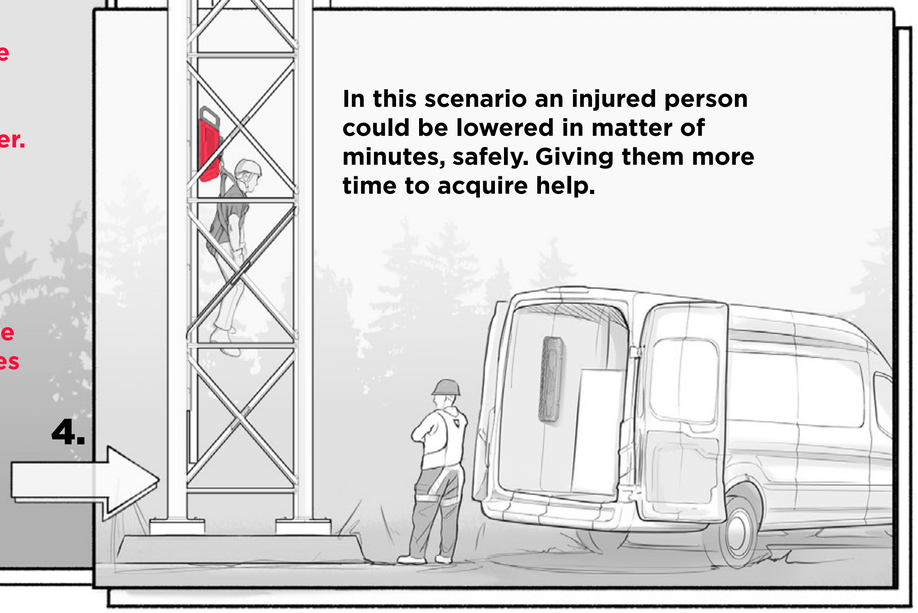

Details

The final direction utilises a kog system to deliver lift with additional help from a set of wheels that provide stability while in use. Lowering heavy equipment and/or injured personnel is achieved by a “controlled decent” via motorised braking.

REMOTE

CASE

BULL CARRIER

Project Video: https://vimeo.com/757893593

cake

Electric Screwdriver

Product Analysis and Construction
Project duration: 5 weeks
Umeå Institute of Design 2021

The aim of this project is to design a product that is made to be refurbished easily and how it through its design, over time, could communicate when it is in its 2nd or maybe even 3rd life cycle.

04

Brand board

CAKE is a Swedish electric bike company born out of a passion for gravity sports, and on a mission to develop high-quality, sustainable performance products. CAKE realizes that the development of electric drivetrains will bring positive change to the future of motorbikes and that our customers appreciate this too.

CAKE offers a wide range of applications, from sports to service vehicles. The Osä is especially versatile utilising its central beam (inspired by a work bench) to secure different holders and baskets depending on the user's needs.


cake
screwdriver 01

Use Case

The Cake screwdriver has been envisioned as a companion that comes toghether with any adventurers Cake Bike. It can be used as an aid when tinckering with the bike but also serves as an aditional tool for “Makers” on the go!

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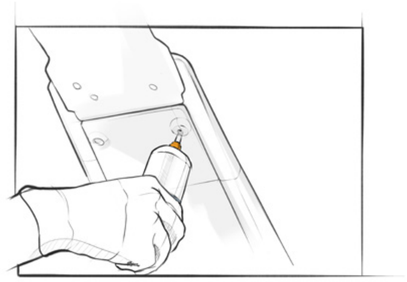

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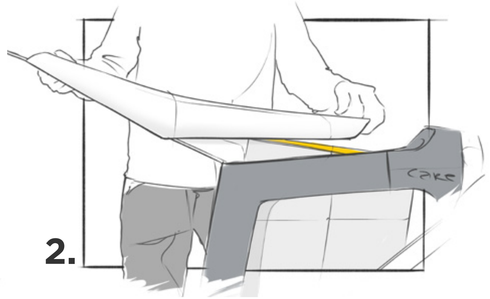

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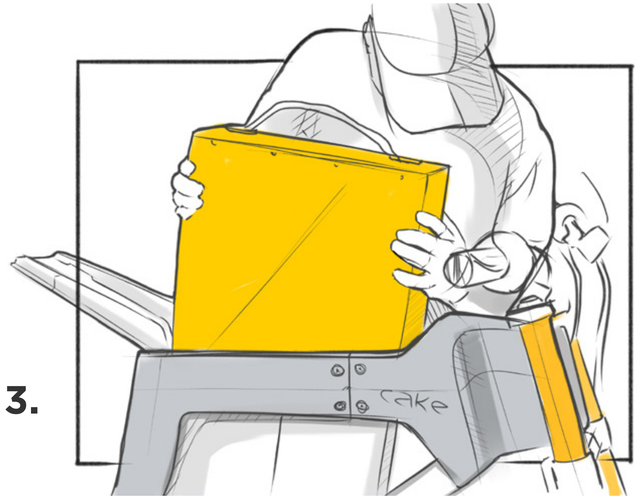
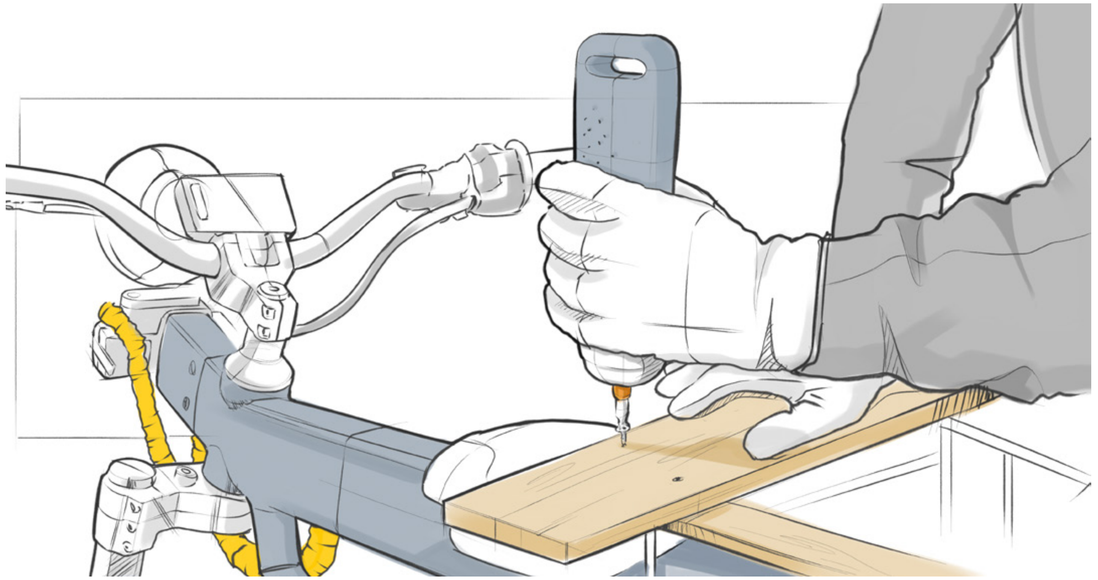
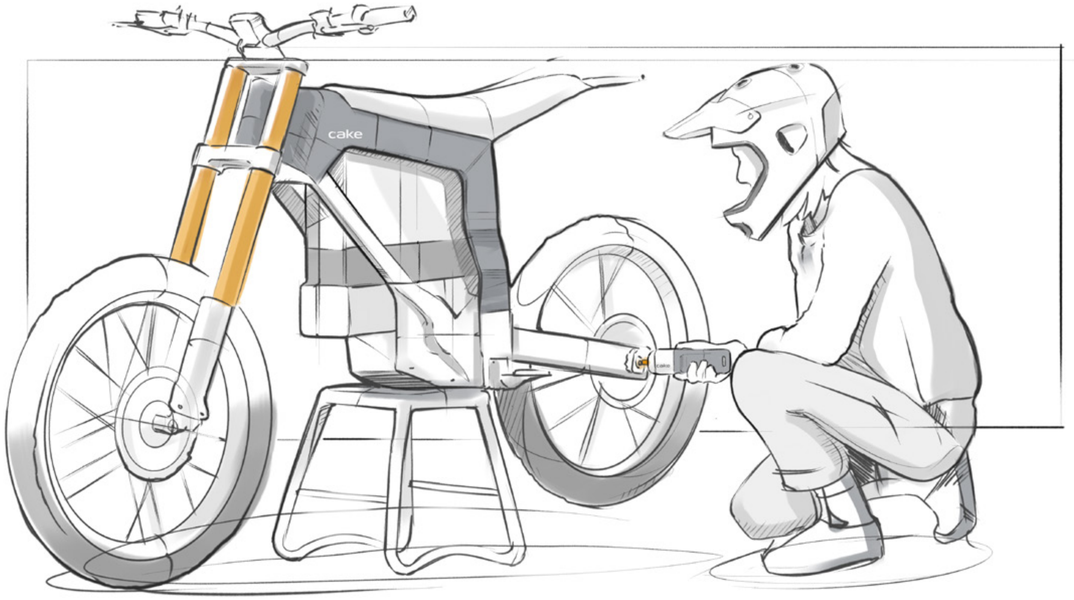
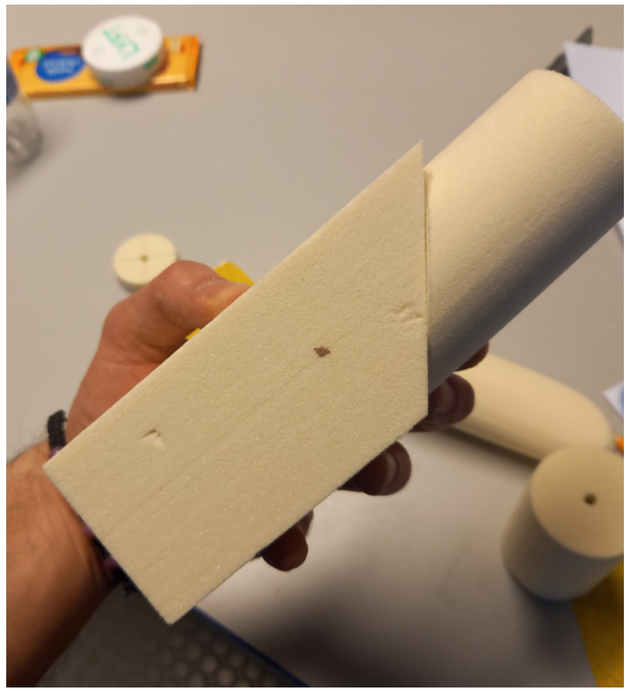
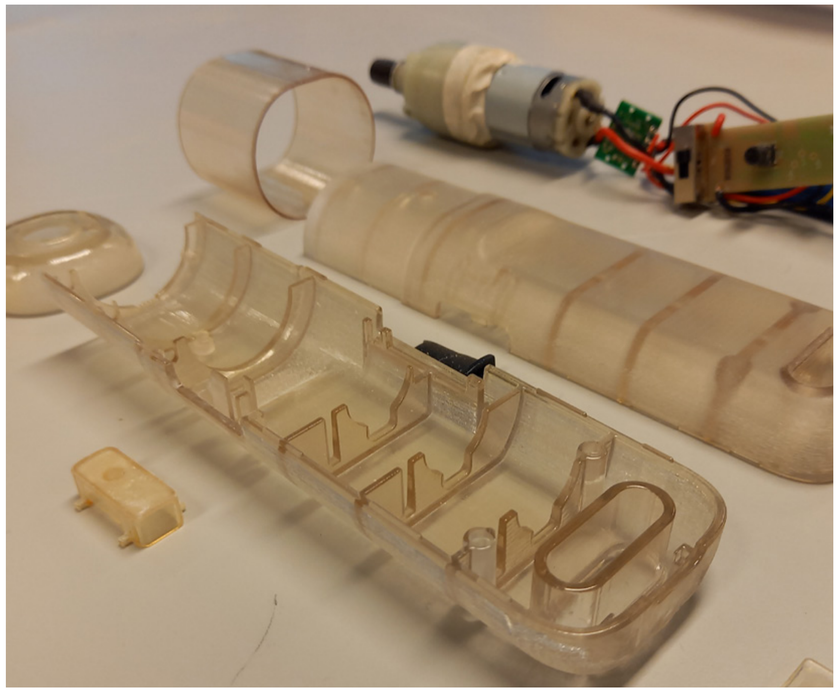
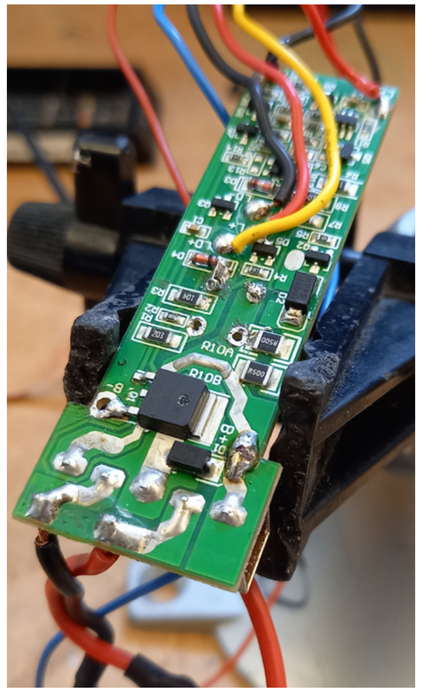










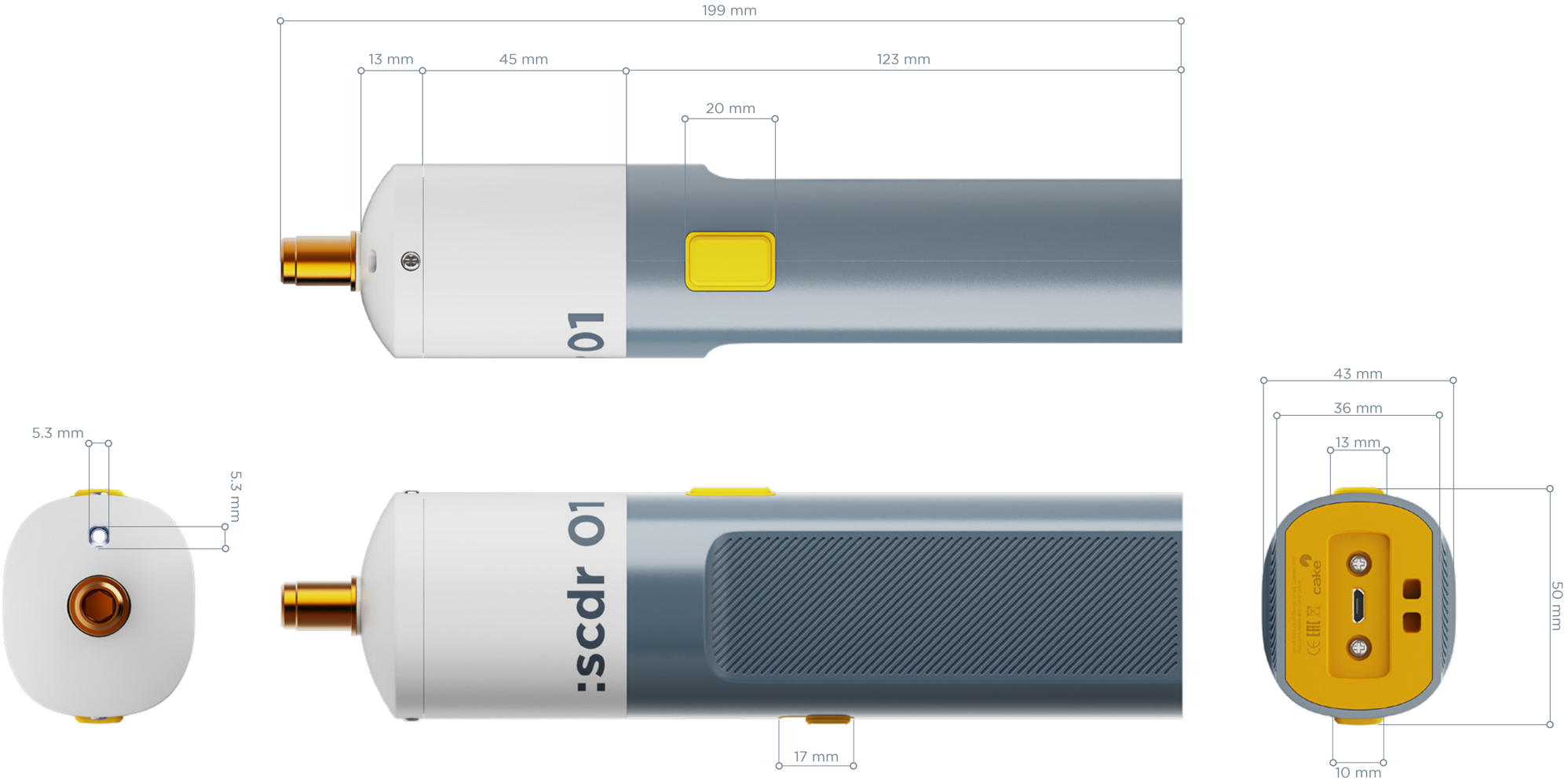


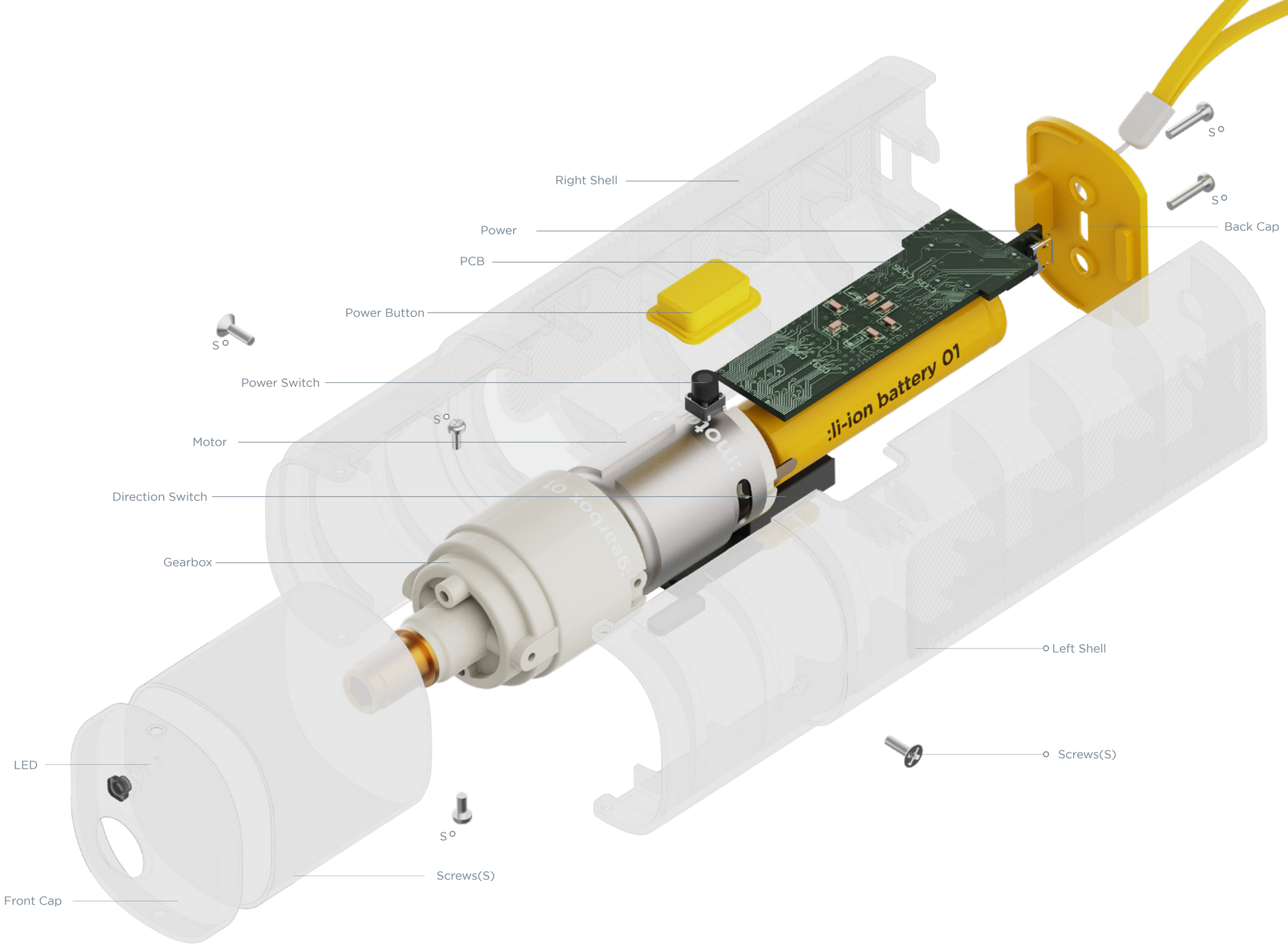
Final Design

The final design features a compact, elongated simple shape. The challenge of using Cake as an inspiration is not only following the esthetics of the product but the philosophy as well. The design is easily disasembled to provide quick access to broken components.

The front cap features a 360 light guide to better illuminate while in use. The on/off and direction buttons are colored yellow to signify them as interaction points. The hole in the back is meant to attach the drill to a carabineer, rope etc. depending on the users needs.

Dimensions

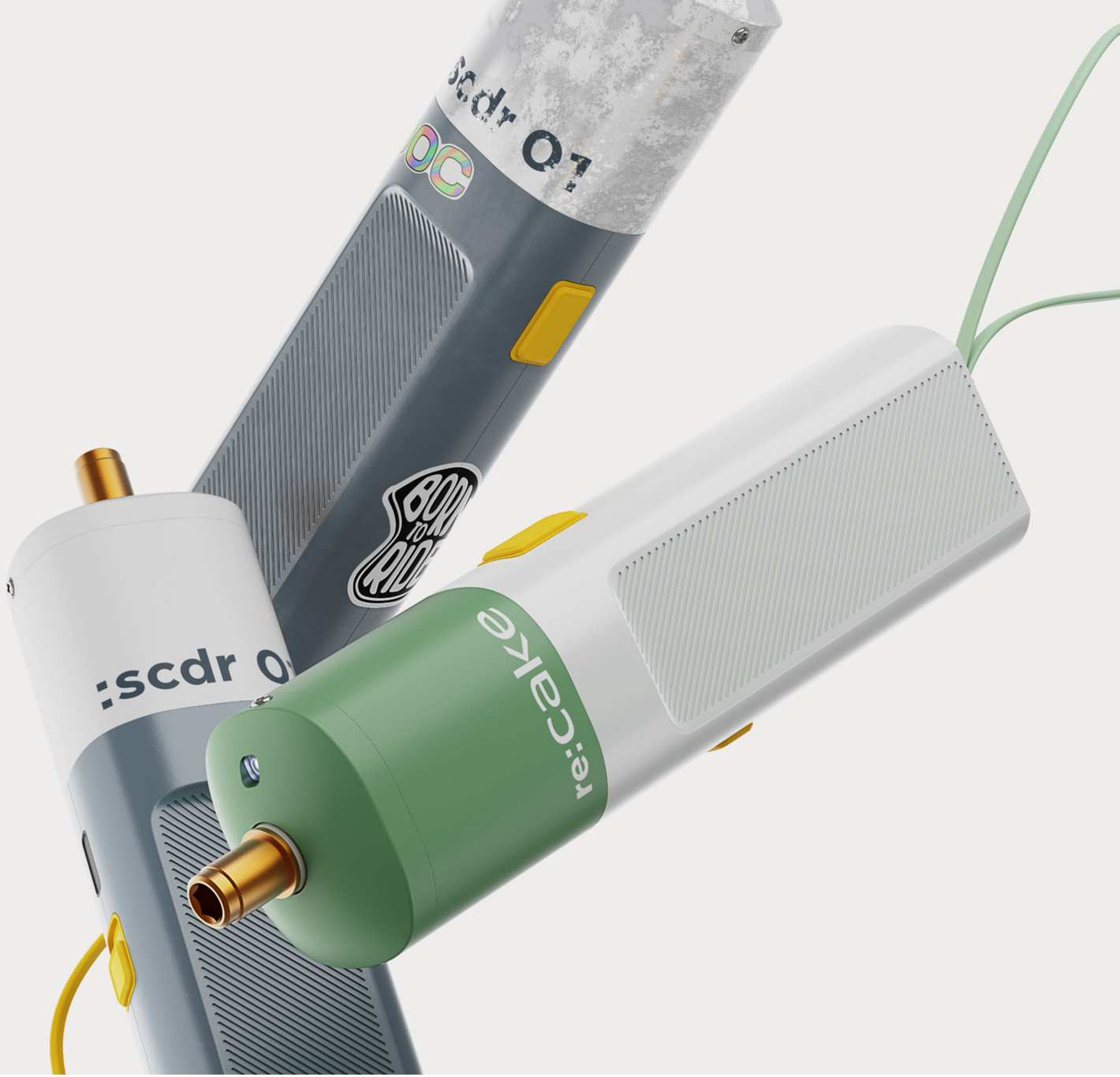

199 mm
13 mm
45 mm
123 mm
20 mm
5.3 mm
5.3 mm
:scdr 01
17 mm
43 mm
36 mm
13 mm
50 mm
10 mm
cake


Right Shell
Power
PCB
Power Button
Power Switch
Motor
Direction Switch
Gearbox
LED
Front Cap
Screws(S)
Left Shell
Screws(S)
Back Cap
li-ion battery 01

RE:CAKE

The metal extrude serves multiple purposes, first being a fastening feature to further secure the two main shells. Furthermore it serves as a visual representation of refurbishment. After the first life cycle it could show its use through the patina or dents created during its use.

After changing broken components or cleaning, the manufacturer could return the refurbished product back on the market in its new distinguished form, at a lower price. This way the period before shredding parts could be significantly prolonged, thus reducing the carbon footprint of this product.



Supporting Anti-poaching

As Cake has been a big support in African Anti-Poaching initiatives, I have set out to visualise the screwdriver with a compatible CMF to their Electric Bush Bike.

hello@vulicjovan.com
+74-76-591-85-08