Product Design

Portfolio.

Sarthak Tavate 2023

CV

2023

Sarthak Tavate

As an ambitious and perseverant individual, I am always keen on learning new skills and getting hands-on experience in the product design field. Form and functional problem solving through design process is my key area of interest.

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Education.

L'Ecole de Design, Nantes, France

Exchange Student, Brand Design (2021)

MIT Institute of Design, Pune, India

BDES. Product Design (2018 - 2022)

Experience.

Accenture (Aug 2022- current)

As a UX Designer, worked on internal Accenture projects for the top management. As a 3D designer, worked on a Metaverse project for a Japanese leading beauty and wellbeing MNC.

Schneider Electric (Jan 2022- April 2022)

As an intern worked on a product that commercialized.

Achievements.

A'design Award Winner (Gold)

A' Design Award is the World's largest, most prestigious and influential design accolade, the highest achievement in design.

Exibition at MOOD, Italy

Physical exibition of design at the Museum of Outstanding Design (MOOD) held on 18th June 2021 in Como, Italy.

International Stage

A non-member esteem at the World Design Consortium (WDC). International publications in Packaging of the World, Designers.org, Recursos Culturales.

Software Skills.

- Fusion 360
- Solidworks
- Rhinoceros 3D
- Blender
- Keyshot
- Illustrator
- Photoshop
- Indesign
- AfterEffects
- Premiere Pro
- Figma

Analogue Skills.

- Research
- Sketching
- 3D Modelling
- 3D Rendering
- Prototyping

Languages.

- English
- Hindi / Marathi
- French (Beginner)
- Italian (Beginner)

Extra Curricular.

- Inter-batch Football Team
- Inter-college Table Tennis Team
- Sports Meet swimming relay
- Sports Meet cricket Team

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01

APC Expedition

Internship | Graduation Project

4 months | 2022

Table of Contents

About the Project

Design Brief

Redesign the Schneider Electric APC's Back-UPS Pro series of Uninterruptible Power Supply devices in a new context with new features and attributes.

Timeline

Product Research

About the Product

What is an Uninterruptible Power Supply device

An uninterruptible power supply (UPS), also known as a **battery backup,** provides backup power when your regular **power source fails or voltage drops** to an unacceptable level. A UPS allows for the **safe, orderly shutdown** of a computer and **connected equipment.** The **size and design** of a UPS determine **how long it will supply power.**

Schenider Electric's APC Back-UPS Pro

Compact Design Line Interactive UPS with **Load Capacity of 1500VA.** Output Frequency (sync to mains) : 47 - 63 Hz Sync to mains. **Three Battery Backed up** and **Surge Protected** 6A, 2/3 Pin **Output Power Socket. Automatic Voltage Regulator** (AVR) with Wide Input Voltage Range 145-290V, Transfer Time - 10 ms typical : 12 ms maximum 1x7.2Ah Battery provides 20 - 75 min. Back-Up time as per the load. **Generator Compatible;** Compatible with low power loads e.g. Wi-Fi router, DSL modem. **Cold start capability** allows the load to power on just on battery; **Stays quiet** during a changeover from mains to generator.

Product Research

Product features

Ideal Backup Power For Outdoor Camping Travel :

The power station is only 9 x 5.5 x 7.5 inches, easy to carry wherever you go. Portable power supply features plenty of ports for most kinds of appliances. PURE SINE WAVE AC output ports(110V 300W, 500W peak), DC output ports(12&24V 96W), USB output ports(5V/3.1A max), 18W type-c output port.

110V Pure Sine Wave AC Output :

Pure sine wave power will protect your sensitive devices, to have a better working performance. More than 10 years specializing in lithium-ion battery products.

Solar Generator With 100W Solar Panel :

Get the power any where, fully charged by solar panels in 7 hours with full sun light.

Eco-Friendly Clean Outdoor Power :

Safeguards you and your devices by over-voltage protection, over-current and over-temperature protection. Battery Management System (BMS) can continue to escort you.

Package Includes & Customer Service :

300W Portable Power Station, User Manual + Accessories.

Product Research

Product ergonomics

The portable power station is a mobile product with it's **own carrying handle.** Ideally the **weight** of a power station depends on the **capacity of charge** it can hold. Average sized portable power stations of **250 wH weigh approx. 4kg.** Taking this specification into consideration, **the ergonomics of the product were experimented with a singular 4kg with a similar grip.**

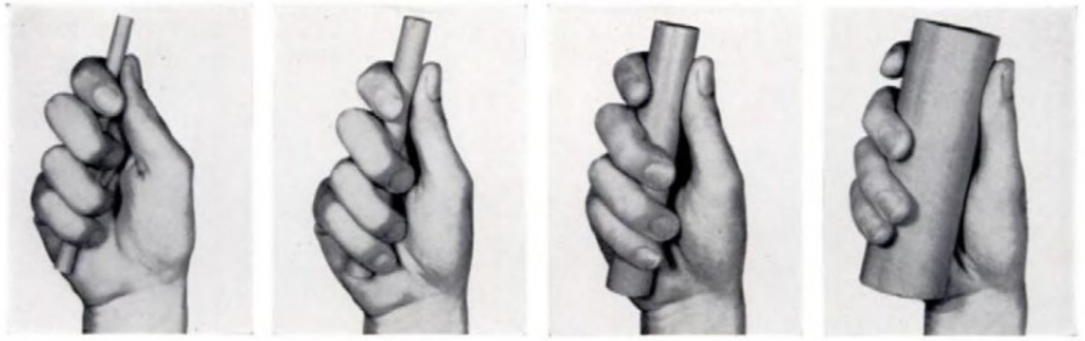


Figure 12 "An arbitrarily chosen series of postures illustrating some of the phases of the power grip complex." (Napier, 1956)

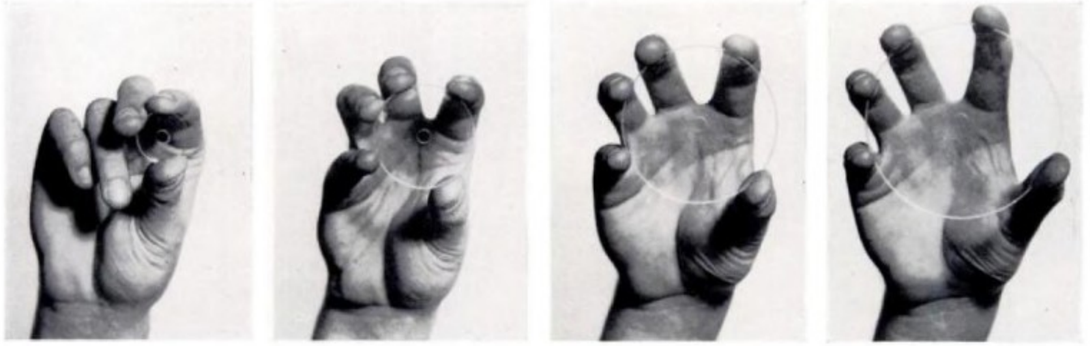
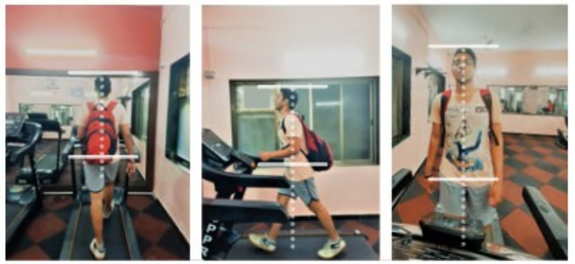


Figure 13 "An arbitrarily chosen series of postures illustrating some of the phases of the precision grip complex." (Napier, 1956)

Power grip is always to be preferred over a **precision grip** when a **larger muscular force** must be applied to hold the object. The **precision of a power grip relies on the position of the thumb.** Where there is little or none need for precision, the **thumb wraps around the digits** to help **contribute to the grip force** of the rest of the fingers.

Product Research

REBA ergonomics



Carrying 4kg weights in a backpack as an alternate carrying methodology

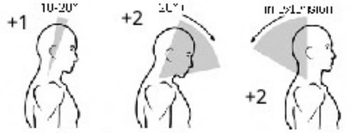
REBA

The Rapid Entire Body Assessment (REBA) was developed to "rapidly" evaluate risk of **musculoskeletal disorders (MSD)** associated with certain job tasks.

REBA score 3 means that the person is in a low risk condition but must **ensure precaution** when working excessive hours with repitition. **Frequent breaks** are required whenever necessary and **wrist flex exercises** must be practised in regular intervals.

A. Neck, Trunk and Leg Analysis

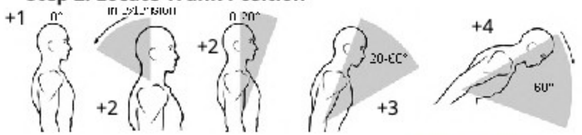
Step 1: Locate Neck Position



Step 1a: Adjust...
If neck is twisted: +1
If neck is side bending: +1

+1
Neck Score

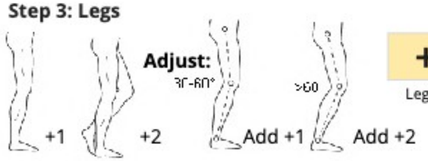
Step 2: Locate Trunk Position



Step 2a: Adjust...
If trunk is twisted: +1
If trunk is side bending: +1

+2
Trunk Score

Step 3: Legs



+1
Leg Score

Step 4: Look-up Posture Score in Table A

Using values from steps 1-3 above,
Locate score in Table A

2
Posture Score A

Step 5: Add Force/Load Score

If load < 11 lbs. : +0
If load 11 to 22 lbs. : +1
If load > 22 lbs.: +2
Adjust: If shock or rapid build up of force: add +1

+
0
Force / Load Score

Step 6: Score A, Find Row in Table C

Add values from steps 4 & 5 to obtain Score A.
Find Row in **Table C**.

=
2
Score A

Scoring
1 = Negligible Risk
2-3 = Low Risk. Change may be needed.
4-7 = Medium Risk. Further Investigate. Change Soon.
8-10 = High Risk. Investigate and Implement Change
11+ = Very High Risk. Implement Change

Scores

Table A

		Neck											
		1				2				3			
	Legs	1	2	3	4	1	2	3	4	1	2	3	4
Trunk Posture Score	1	1	2	3	4	1	2	3	4	3	3	5	6
	2	2	3	4	5	3	4	5	6	4	5	6	7
	3	2	4	5	6	4	5	6	7	5	6	7	8
	4	3	5	6	7	5	6	7	8	6	7	8	9
	5	4	6	7	8	6	7	8	9	7	8	9	9

Table B

		Lower Arm					
		1			2		
	Wrist	1	2	3	1	2	3
Upper Arm Score	1	1	2	2	1	2	3
	2	1	2	3	2	3	4
	3	3	4	5	4	5	5
	4	4	5	5	5	6	7
	5	6	7	8	7	8	8
	6	7	8	8	8	9	9

Table C

Score A	Score B											
	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	2	3	3	4	5	6	7	7	7
2	1	2	2	3	4	4	5	6	6	7	7	8
3	2	3	3	3	4	5	6	7	7	8	8	8
4	3	4	4	4	5	6	7	8	8	9	9	9
5	4	4	4	5	6	7	8	8	9	9	9	9
6	6	6	6	7	8	8	9	9	10	10	10	10
7	7	7	7	8	9	9	9	10	10	11	11	11
8	8	8	8	9	10	10	10	10	10	11	11	11
9	9	9	9	10	10	10	11	11	11	12	12	12
10	10	10	10	11	11	11	11	12	12	12	12	12
11	11	11	11	11	12	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12	12	12	12	12	12

1
Table C Score

+

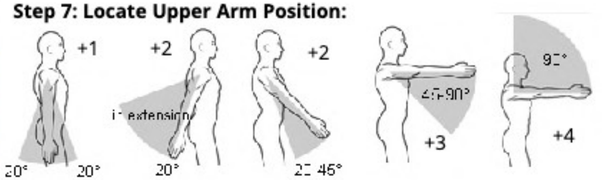
2
Activity Score

=

3
REBA Score

B. Arm and Wrist Analysis

Step 7: Locate Upper Arm Position:



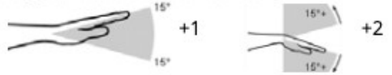
Step 7a: Adjust...
If shoulder is raised: +1
If upper arm is abducted: +1
If arm is supported or person is leaning: -1

+1
Upper Arm Score

Step 8: Locate Lower Arm Position:

+1
Lower Arm Score

Step 9: Locate Wrist Position:



+1
Wrist Score

Step 9a: Adjust...
If wrist is bent from midline or twisted : Add +1

Step 10: Look-up Posture Score in Table B

Using values from steps 7-9 above, locate score in Table B

1
Posture Score B

+

Step 11: Add Coupling Score

Well fitting Handle and mid rang power grip, ***good: +0***
Acceptable but not ideal hand hold or coupling acceptable with another body part, ***fair: +1***
Hand hold not acceptable but possible, ***poor: +2***
No handles, awkward, unsafe with any body part, ***Unacceptable: +3***

0
Coupling Score

=

Step 12: Score B,

Find Column in Table C
Add values from steps 10 &11 to obtain Score B. Find column in **Table C** and match with Score A in row from step 6 to obtain Table C Score.

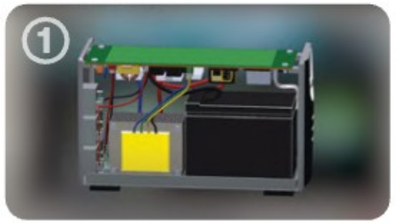
1
Score B

Step 13: Activity Score

+1 1 or more body parts are held for longer than 1 minute (static)
+1 Repeated small range actions (more than 4x per minute)
+1 Action causes rapid large range changes in postures or unstable base

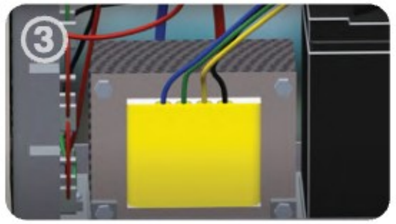
Product Research

Technical parameters

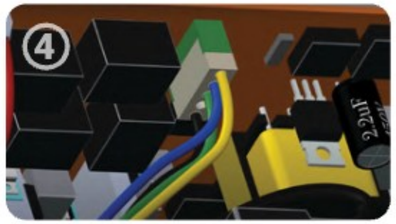


The UPS contains a **battery, transformer,** and a **Motherboard**, there is also a **daughterboard** for the front panel.

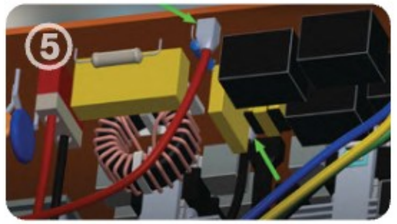
There is a **12V 7.2 Amp-hour Lead-acid battery**, with a fast-charging voltage of 14.5 to 14.9 volts, and a standby charge of 13.6 to 13.8 volts.



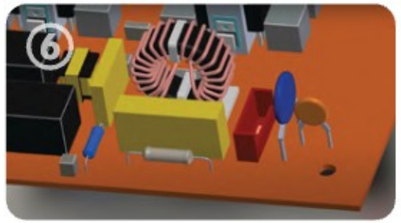
And, These **4 wires are from the primary winding of the transformer.** The black wire is common and other wires are **different taps.**



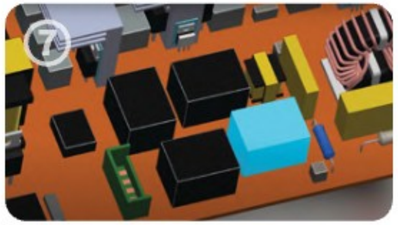
The **4 wires are connected to the Motherboard** through this pin. Then we have these two wires, they are connected to the output sockets.



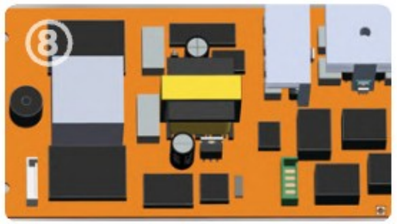
These are the components of the board. This **red connector is the input from the mains AC.** This is the safety and filter section for the input.



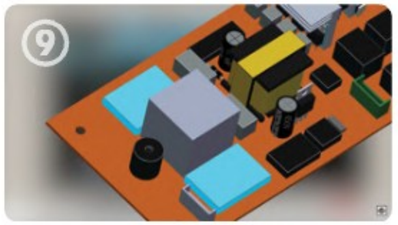
There is a MOV, or **varistor , safety capacitor, filter capacitor, coupled inductor, and fuse.**



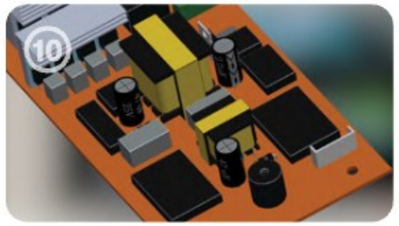
There are **4 relays,** the first relay is used to **connect the live wire to the circuit.** When the UPS is shut down, the live wire is disconnected from the rest of the circuit.



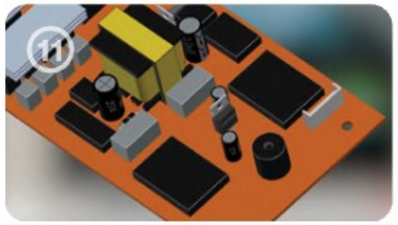
This is the **charger circuit used to charge the battery** and to keep 13.6 to 13.8-**volt continuously at its terminals.**



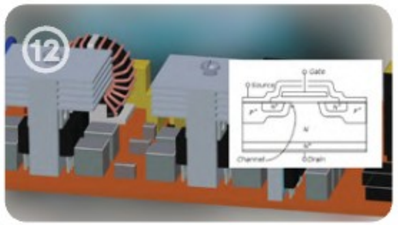
The diode and resistor are below the PCB as block components. Now, these **blocks contain the main controls of the board.** They are used to monitor and control all the parts of the circuit.



The **power supply for controllers**, can be a small **transformer with a rectifier and a filter.** Or it can be a voltage regulator.

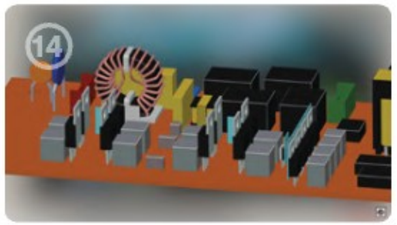


As the **controllers use very low current, voltage regulators can be used** or any other type of power supply can be used.

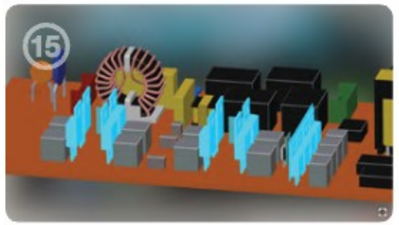


The back of the power **MOSFETs is connected to its drain terminal,** hence we use the **heatsink as a terminal**, and connect it to the transformer's secondary winding.

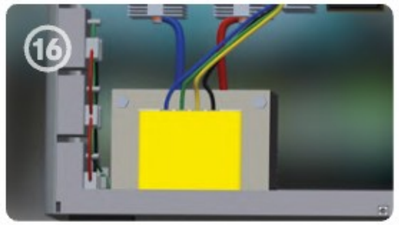
For example, we have a 13.6 volts peak voltage, and the output requires 340 volts peak voltage. The **voltage is increased by 25 times.** Thus **we need 25 times the output current at the input.**



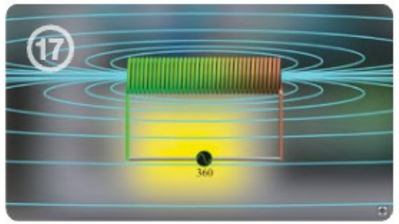
Hence, you can see **two or more MOSFETs in parallel to distribute the current.** This high current also generates high heat, hence we use the **heatsink to dissipate it**.



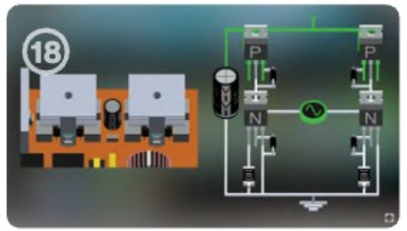
These 4 MOSFETs are used to control the MOSFETs of H-Bridge. They are **used to provide high voltage,** to the gate of H-Bridge MOSFETs, **from the low voltage signal of the controller.**



There's a reason why the transformer has 4 wires. The **primary winding** of the transformer, and it is made of **36 turns.**



There are **360 volts to the winding, the windings will have 10 volts per turn.** There is a voltage difference of 10 volts between each turn.



At last, there can be variation in the inverter sections, that is, **rather than an H-bridge**, there can be a **push-pull inverter configuration**.

Product Research

Technical parameters

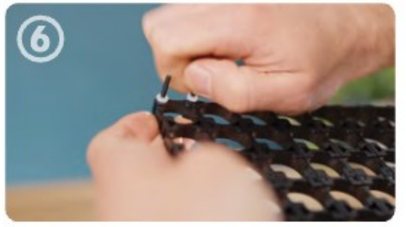
Manufacturing a **21700 type battery**. A **steel container forms the battery casing**, which holds the electrodes, an anode and a cathod.

The **anode is the zinc paste** located in the separator. The **cathode consists of silvery matte rings made of manganese dioxide, graphite** and electrolyte.

Injection Moulded Battery mounts for housing each of the batteries is used to keep in place and **avoid contaact between** singular battery units for safety purposes.

There are **12 rows and as each of the 12 rows will act as parallel sets** all of the individual cells in each row need to be the same way around.

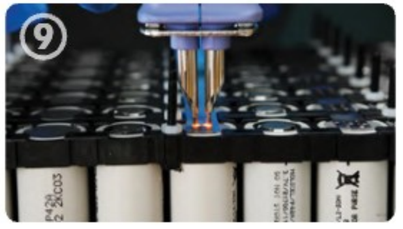
Inserting the **second row** they all need to be **inserted the other way around** for the purpose of **series wiring.**



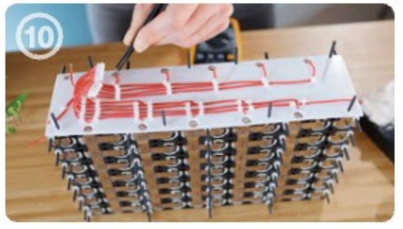
The upright black rods are actually **non-conductive nylon bolts** in series wiring. Screwing the nylon bolts in place with **nylon nuts.**

The idea is to use them for a **very secure mounting method** and **electrical insulation system.**

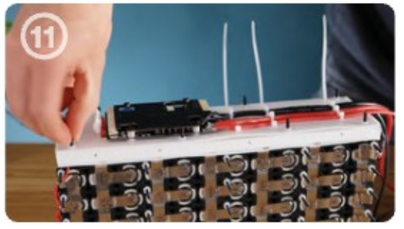
To wire up the cells, **soldering is a bad idea** inevitably results in the **battery being heated up to quite extreme degree causing** internal damage and harming its lifespan and stability.



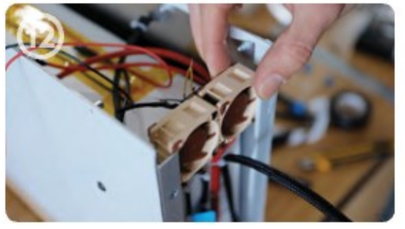
Spot welding which basically involves **conducting a low voltage high current** between two pegs to **weld a nickel strip** directly onto the cell's contacts.



Balancing tabs on the battery allow the **BMS balancing leads be routed to the tabs**. Make sure that they can **never touch each other** thanks to plenty of cable ties.



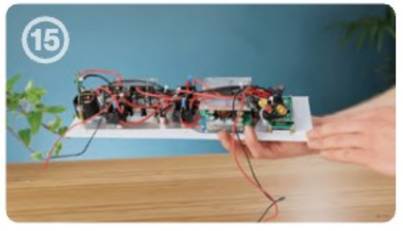
After making sure that the **voltage climbs** as expected for each pin cover the tabs and act as a spacer for the next layer. Black cable to one of these strips is for hooking up to the **lowest cell's negative terminals.**



Small fans with high RPM are fixed to the top to push air through this **upper chamber** that is important as the **power delivery circuitry** is housed here.

Adding a **current and voltage meter** as it will be useful for seeing **how many watts the battery is delivering** as well as **how much power is left.** (OEM)

As pulling power through the voltage regulators have a total power limit of **200 watts each** which is where some of these dean's connectors come in handy **they're capable of high currents.**



This is to be **hooked up directly to the output of the bms** which means to have **access to the full 50 volts** coming off the battery so it's going to be very important for super high powered devices.

With everything wired up, now **hook it up to the output of the bms** using plenty of **heat shrink** to keep everything secure.

Casing of the product has to be **Injection molded, injecting molten thermoplastic into a mold.**

Primary Assembly of the product takes place with **connectors**.

User research

User demographics

WHOLESALE SALES OF TENTS AND CAMPING SHELTERS IN THE U.S.

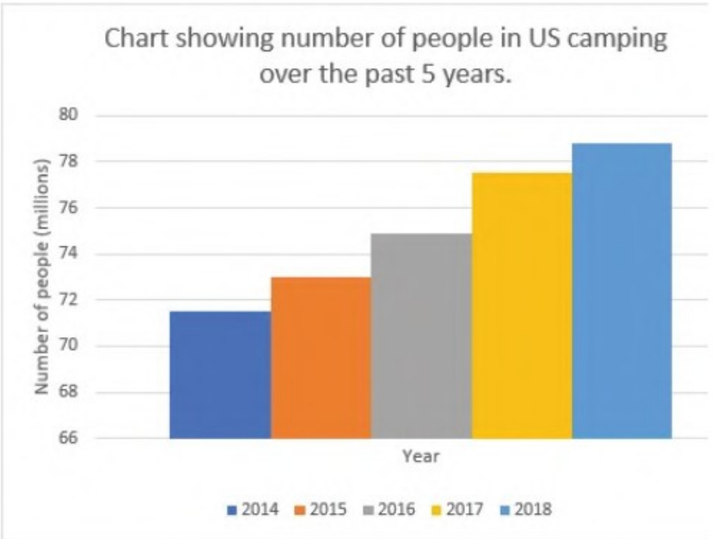
368.7m USD

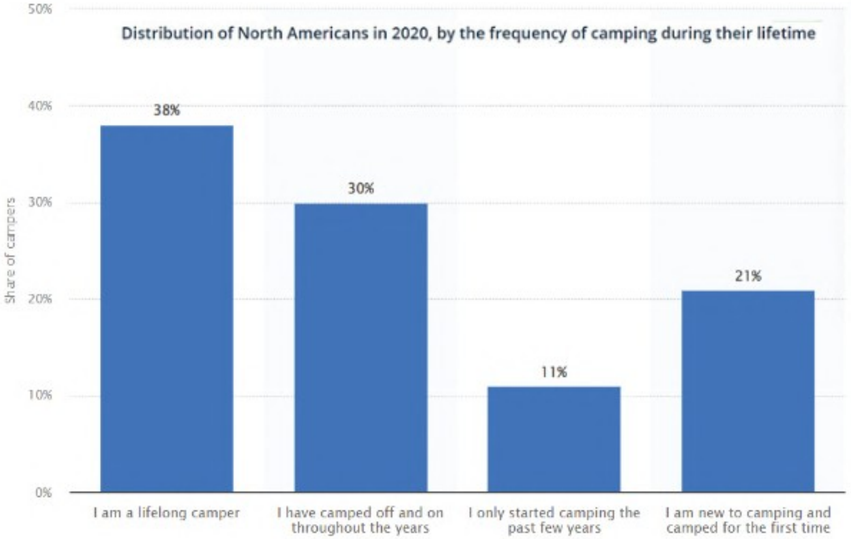
CAMPING ITEM THAT IS REPLACED THE MOST FREQUENTLY IN THE U.S.

Fueled lanterns

SHARE OF AMERICANS WHOSE PRIMARY CAMPING ACCOMMODATION IS A TENT

64%





The North American Camping Report has discovered since 2018 the **interest in this type of vacation has dramatically increased,** there are now **7 million new camper households** in the U.S. **It is rising in popularity** because of its **affordability**, the range of activities available, as well as it being the perfect opportunity for families to spend quality time together. It allows those who love the wilderness and want to enjoy the fresh air a chance to escape to nature whilst being close to home if they wish.

In 2018, **families choosing to camp grew by 1.4 million, reaching an overall all-time high of 78.8 million households.** Camping statistics show people are expressing an interest in all forms, from **luxury glamping to the standard tent.** Ultimately, it caters to everyone as people are finding exciting and alternative ways to camp that suits their needs. **84% of campers stated that they intend to camp more in 2019,** demonstrating the immense interest in this type of trip, even in the digital age. **Every year 1 million new families** in the U.S. start camping. **81% of campers** say their main goal is to **spend time with their family and friends.**

User Persona

Rick Bennet

Wildlife Photographer

Age: 48

Location: Cairns, Australia

About Him

Rick is a passionate wildlife photographer which takes him to the Australian wilderness around the continent.

He quit his job as an accountant to follow his love for the wild. Rick takes on solo trips, since he believes that he is way more patient to have the perfect photo than any of his companions ever would be.

Personality

Extrovert

Sensitive

Thinker

Goals

- Taking breathtaking photographs
- Publishing in international Magazines
- Ensuring environmental protection

Brands

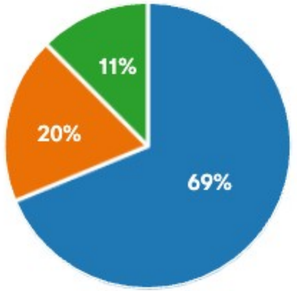
- Nikon
- Samsung
- Fossil

WILDLIFE PHOTOGRAPHER

Primary research
Online survey

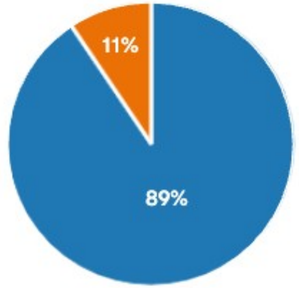
The average age of a trekking group participants.

16-25 years	45
26-40 years	13
41-60 years	08



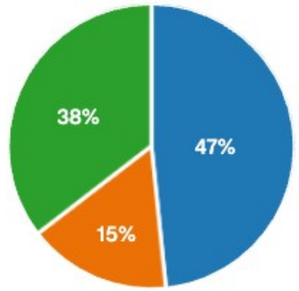
The statistic of participants having used a power bank / portable power station.

Yes	59
No	07



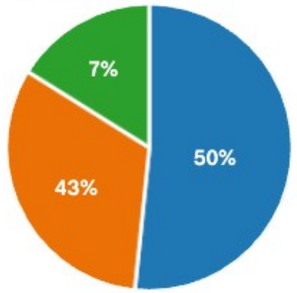
The statistic of an average participant's frequency of using a battery backup.

1-2 times a day	31
1-2 times a week	10
Frequently	23



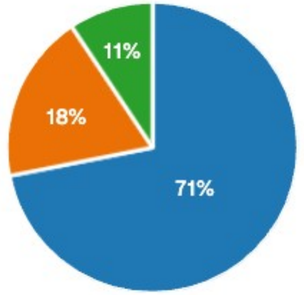
The statistic of participants using a typical capacity of a battery backup in (mAh).

10000 - 30000 mAh	33
30000 - 50000 mAh	29
50000 - 150000 mAh	04



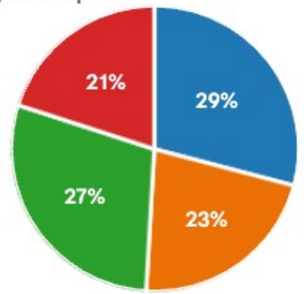
The statisitic of an average participant trekking.

Yes very often	46
Yes sometimes	12
No never	08



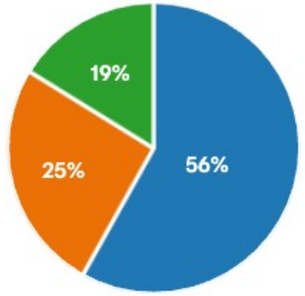
The problems faced by a partcipant using a battery backup.

Checked in Luggage contained	33
Power Bank was not sufficient	25
Power Bank was difficult to carry	30
Power Bank was difficult to find	21



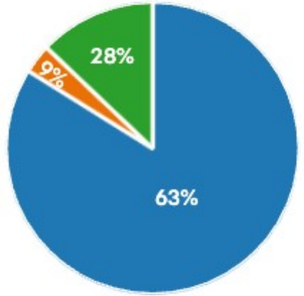
The frequency of camping trips taken per participant.

Very often	37
Sometimes	16
Never	13



The average participant facing frequent discharge of their devices when camping.

Yes	41
No	06
Maybe	19



Taking up trekking as a neche to research the usage gadgets that require power banks.

The survey conducted amongst various trekking groups on Facebook shows the **various criteria of useful information.** Those specific segments that are especially avid social media enthusiasts.

Major competitors

Segment Comparison

Sr. no.	Product	Dimensions LxWxH cm	Weight	Wattage	Cost	Color
1.	Goal Zero Yeti	26 x 20 x 20 cm	5.9 kg	1000 W	₹ 76,535	Grey-Black
2.	Jackery Explorer	33 x 23 x 28 cm	6 Kg	1000 W	₹ 85,482	Orange-Black
3.	Duracell PowerSource	50 x 23 x 32 cm	5 Kg	850 W	₹ 87,999	Black
4.	Anker Powerhouse	25 x 14 x 20 cm	4.63 Kg	800 W	₹ 93,999	Black

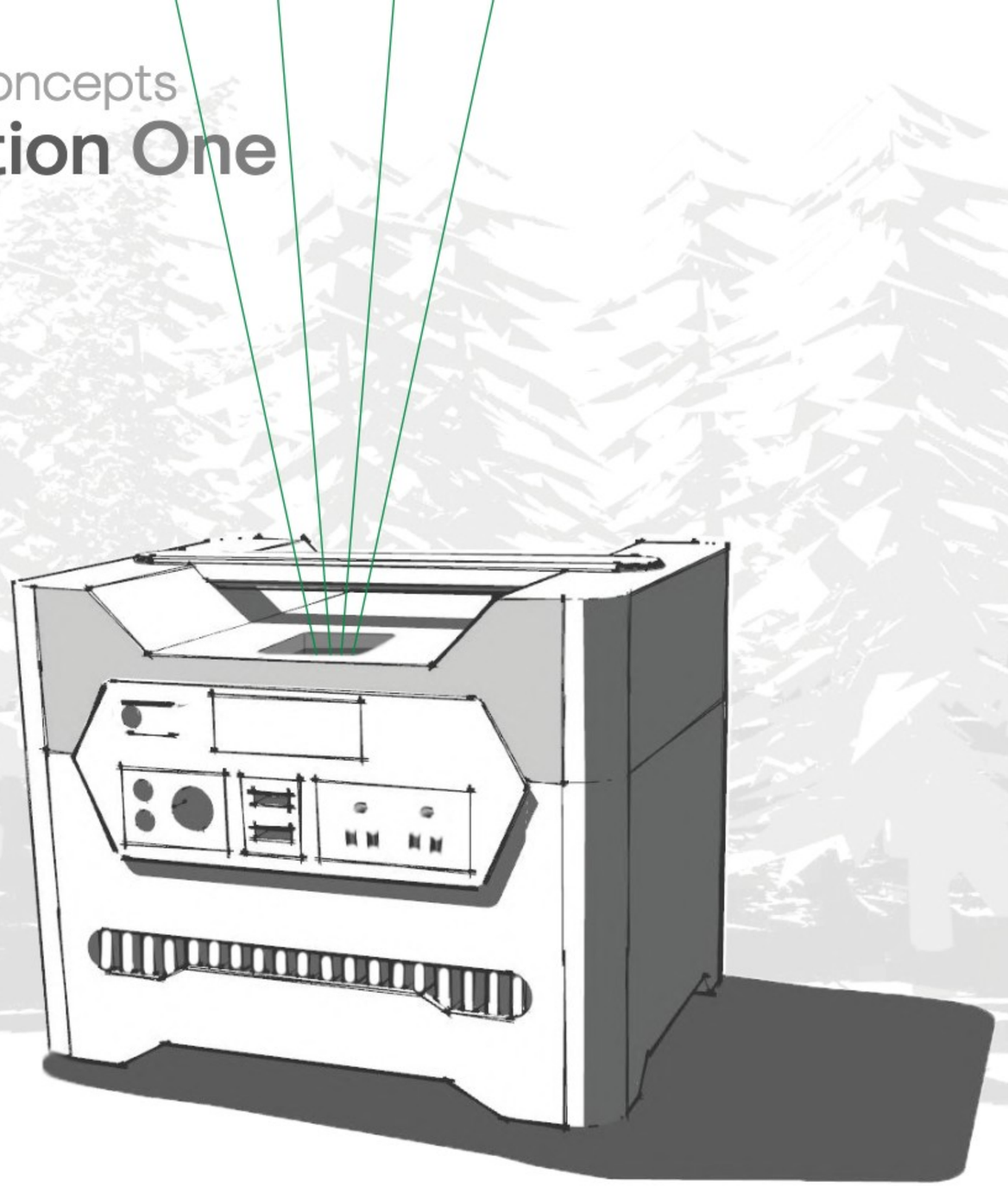
Concepts

Ideation One

SOS signaling with lasers is an opportunity to the thousands of recreational enthusiasts that **go missing in the wilderness** every year. It overcomes the **shortcomings of equipment** such as flare torches, flare guns, relay torches, fireworks since all of these equipments are for **single use purposes.**

Signaling with lasers is capable of **lasting days on end** since they will be powered by a portable battery backup. LASERs or Light amplification by simulated emission of radiation require a **power source with a big storing capacity.**

The **high power lasers** used would be also be visible during the day. In the spectrum of light **green lasers are visible both during the day and night** unlike red lasers only visible during the night.



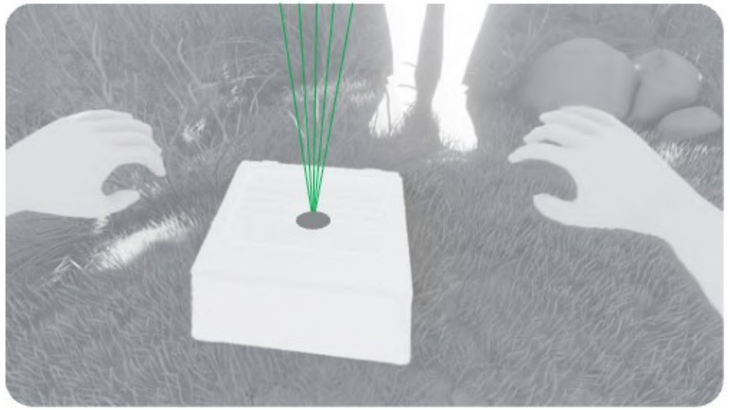
Ideation 1

Story Boarding

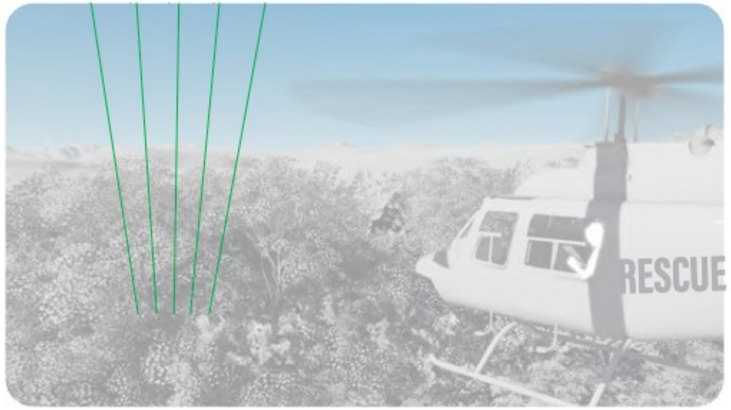
The **Benetton family** decides to embark on a **trekking trip** in the **Yellowstone National Park.**

They spend most of their **first day hiking** and decide to **set up camp** near a lake with an picturesque view.

On the **next day** they decide to go further but this time they decide to take **a forest pass** to the other side which **seemed like a shorter walk**.



After **a whole day**, they realised **they were lost** and needed rescue, they **initiate the SOS feature.**

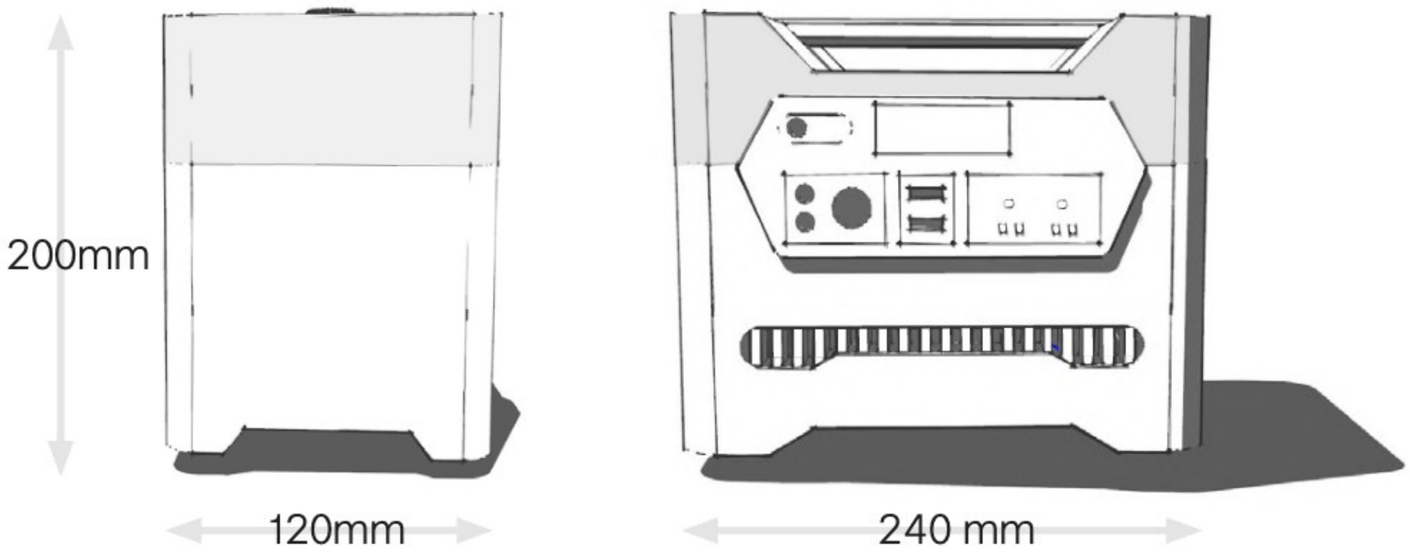


The **Search the rescue** team making their **routine surveillance** spot the **distress call** through the air.

Lily their daughter is **overjoyed** to find out their **signal was seen** and they **were rescued.**

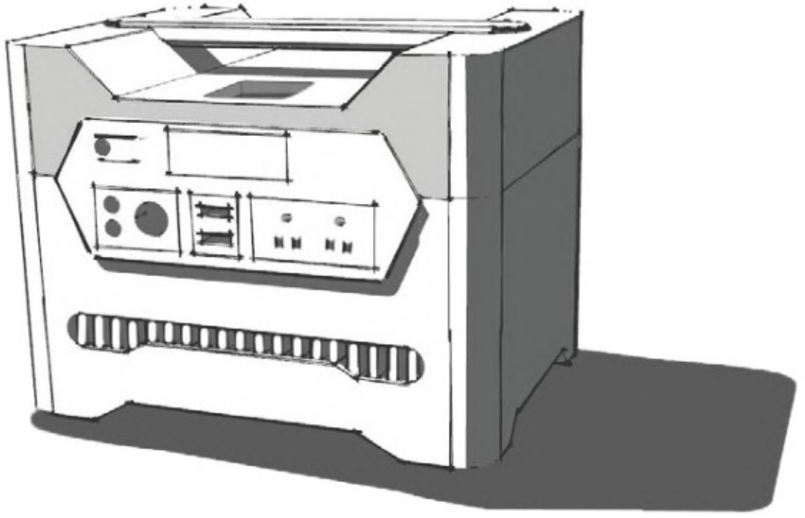
Ideation 1

Scale and **Dimensions**



The **height** of the concept is **200 mm,** keeping in mind the **least possible space** to occupy since the **context of the product** is used in hiking, mountaineering, trekking, rock climbing, hunting, camping, forest exploration, where the **space and weight** to carry **is limited.** The **width is 120 mm** considering it **does'nt create a bulge** in the backpack. The **breadth is 240 mm.**

The **dimensions** of the concept have been kept **proportionate** to the **average human hand** with the **height of 220 mm** with the **finger diameter of 15mm.** This was to ensure the mass of the product combined with the comparitively lighter weight of 4kg is **ergonomically easy to carry** also that the **hand must accomodate** the **handle adjoining space.** Hence the **height scale** with respect to the average hand **is 1:1.**



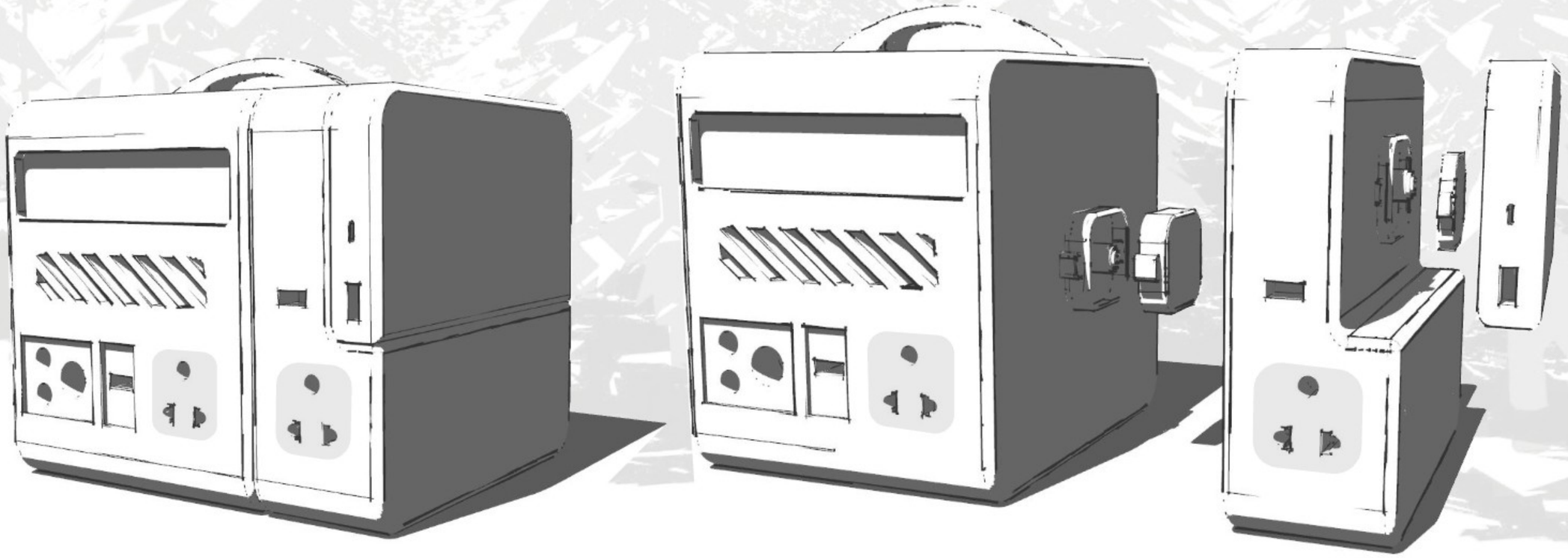
Ideation 1

Concept Interaction

Concepts

Ideation Two

The concept is inspired to solve the problem of power adaptability where the **bulk and weight could be avoided** when using a **device that needs lesser mAh battery backup.** For varied use cases, **low capacity** is requisite like charging phones and smartwatches. **Medial capacity** for powering laptops, camera batteries, drone batteries. And **high power** for powering coolers, mini fridges, fans etc. For such use cases where **modularity means carrying less weight** around and **personalising** the required **output** when need be.



Ideation 2

Story Boarding

Alec is a **student/vlogger** and is passionate about **film making and travel vlogging.** He has a lot of **filming gear including the iphone.**

When **vlogging** in the **university** about his student life he carries the **segment 3** of the power station that he needs to **charge his iphone and mic.**

The following weekend he decides to go on **a short hiking trip** with some friends, this time he carries the **segment 2** of the power station.

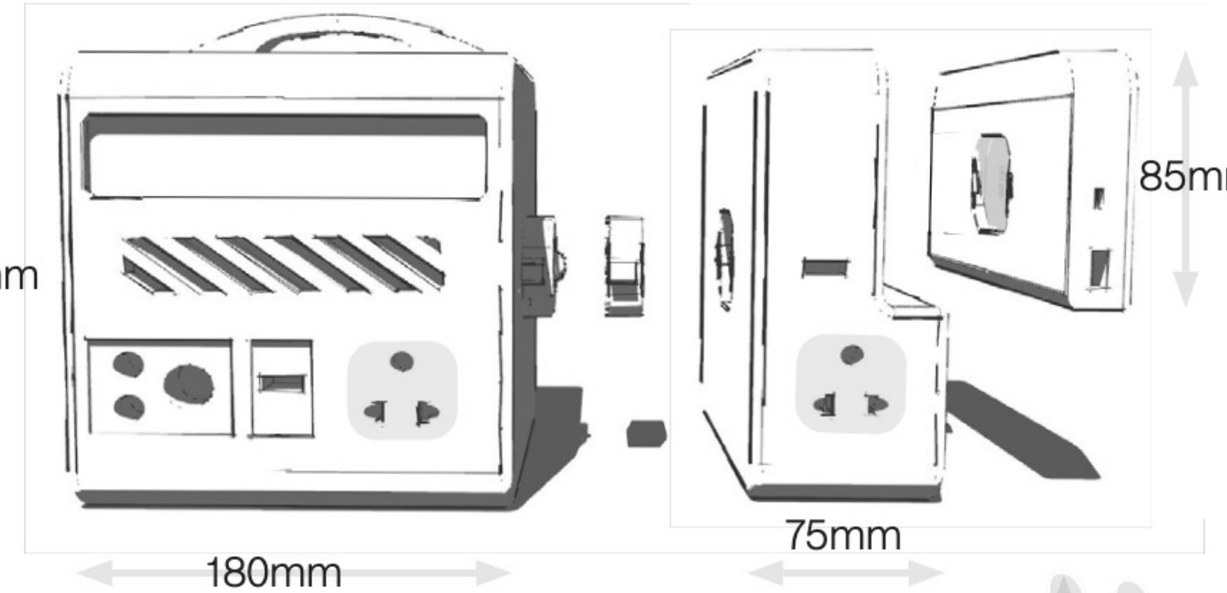
Alec uses the **segment 2** of the power station to charge his **iphone, drone and his GoPro.**

The next weekend he takes his car on a **beach camp** with friends, this time he takes the **entire power station.**

Alec uses the **power station** to charge his **mini fridge** to keep his drinks chilled.

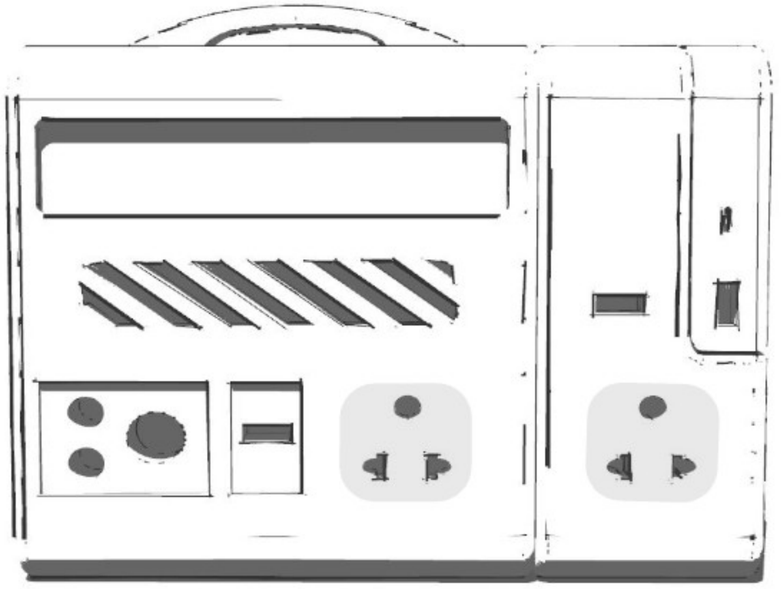
Ideation 2

Scale and **Dimensions**



The **height** and **width** of the concept is **180 mm,** the **bigger segment** is shaped as a **cube** for **accomodating the smaller segments** hence making a **cuboid**. The **medium segment** is made **slim** for carrying in **backpacks** with the **breadth of 75mm.** The **small segment** is basically the dimensions of an **20000 mAh** capacity **power bank** with the **height of 85 mm** so that it can fit into **pockets and carryons.**

The **dimensions** of the concept have been kept **proportionate** to the **average human hand** with the **height of 220 mm** with the **finger diameter of 15mm.** This was to ensure the mass of the product combined with the comparitively lighter weight of 4kg is **ergonomically easy to carry** also that the **hand must accomodate** the **handle adjoining space.** Hence the **height scale** with respect to the average hand **is 1:1.**



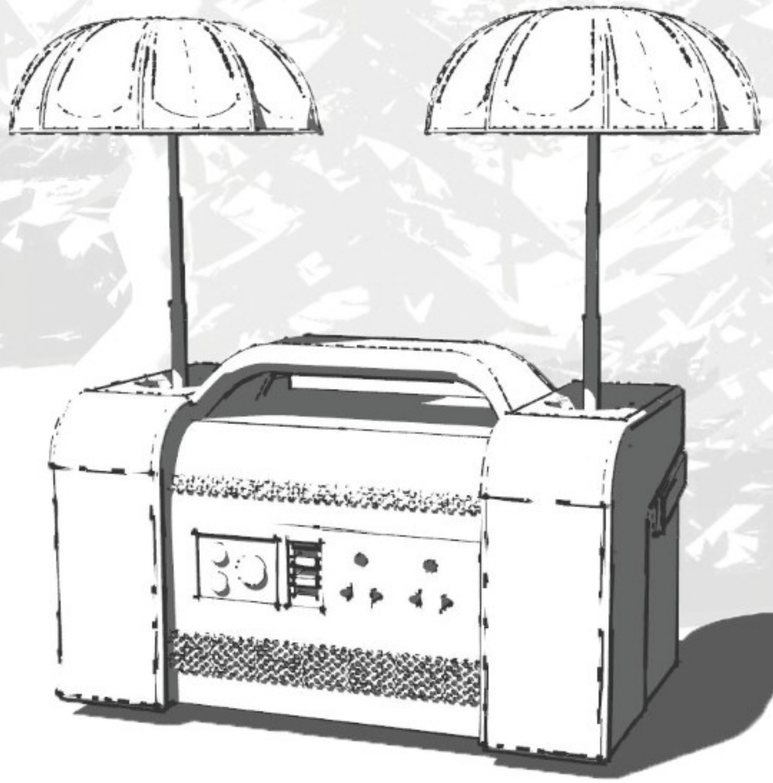
Ideation 2

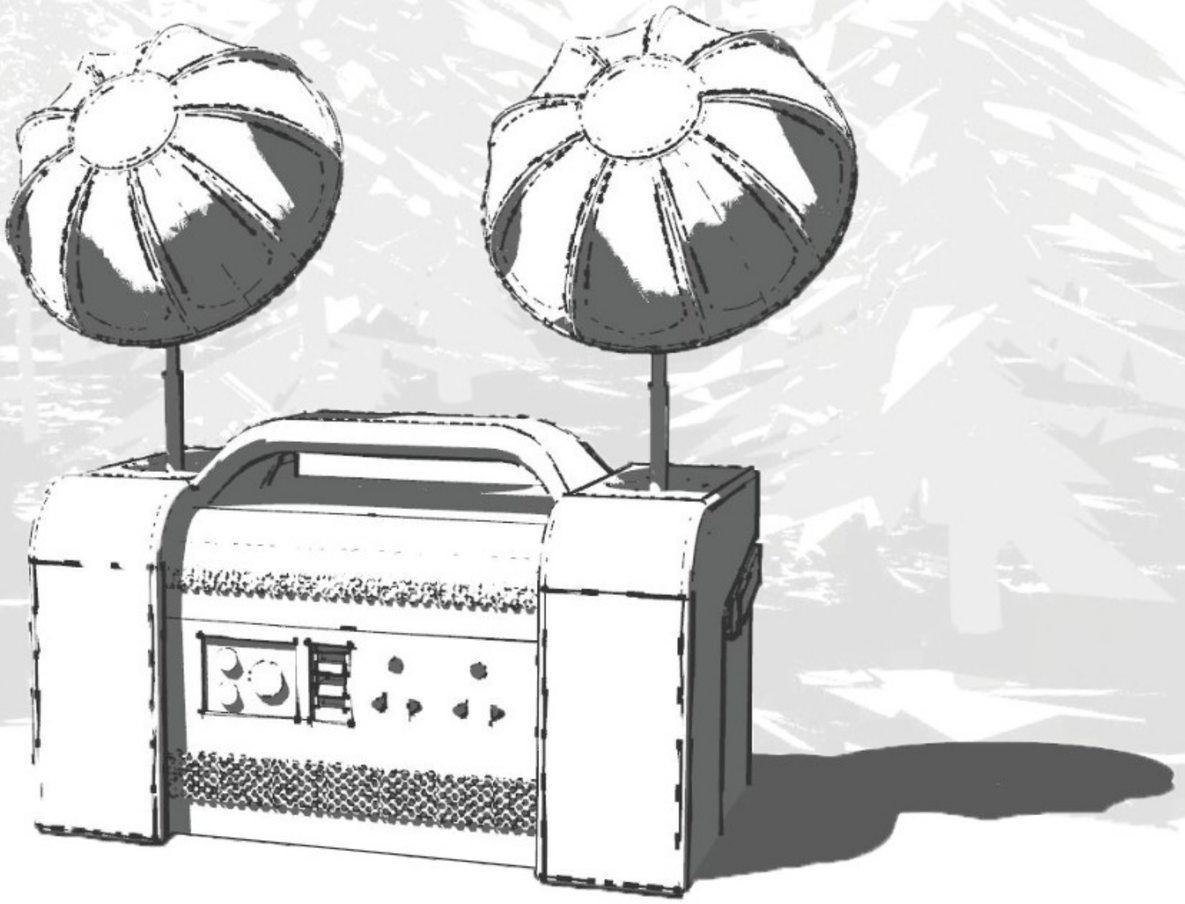
Concept Interaction

Concepts

Ideation three

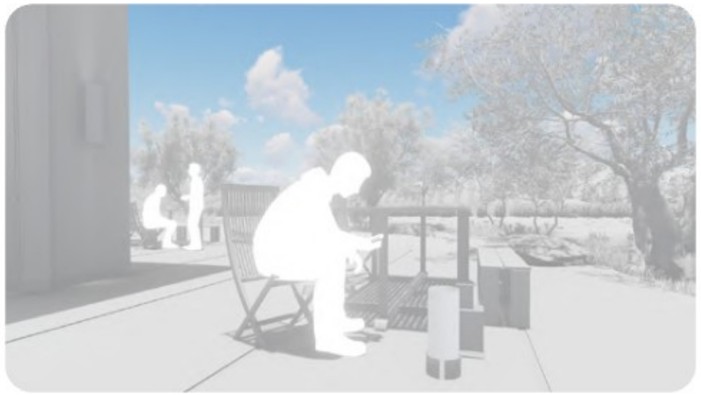
The concept is inspired to solve **the hassle of carrying solar panels** with the product, that not only **weight a lot** but **also are bulky** due to the need to have **larger surface area** facing the sun. To offer a solution to the **bulk and weight problem** this concept uses **inbuilt solar panels** that can be **adjusted to a larger surface** area by opening the umbrella more and with the **use of a spiral design.** The two individual **panels** can also be **tilted front/back** and **left/right** to **optimise** the **sun direction.** The panels are equidistant from each other and have **enough space** in between to **reach the handle** to move the product.





Ideation 3

Story Boarding



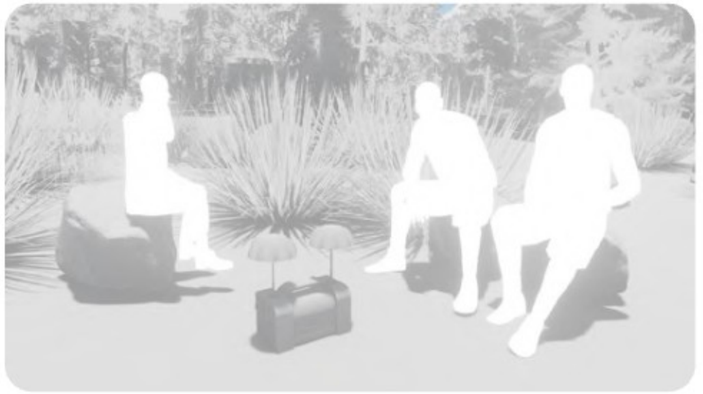
The Instax group madeup of 3 college friends started their own videography venture and they head out to Nevada for a shoot.

The Instax prepare for thier shoot readying all the equipment needed to be brought along. They make sure to charge up their devices.

They also charge their portable power station as they're aware that they'll be needing extra juice for the remote location.

The reach their destination and head out to find a perfect cinematic spot.

They complete their day full of professional camera video shots, drone shots, microphone equipment records and thier devices run out.



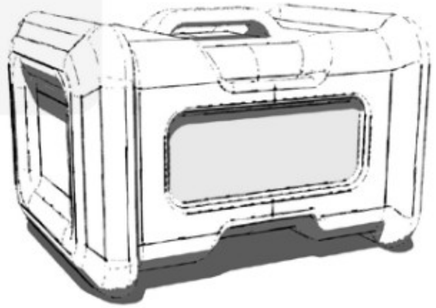
While they rest, they setup the power station to charge with solar. And simultaneously the equipments are charged saving their day.

Ideation 2

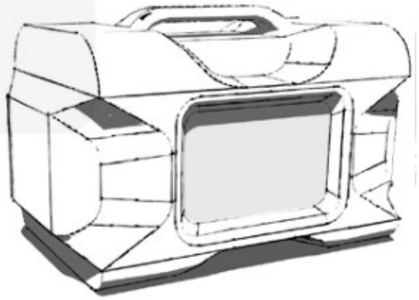
Concept Interaction

Detailing

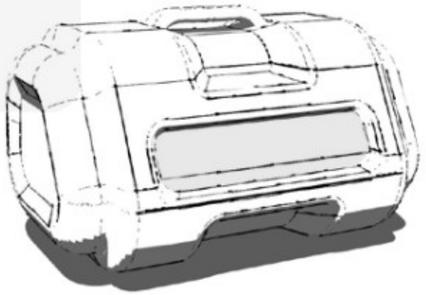
Form Explorations



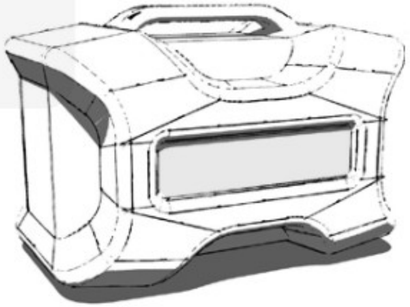
Bulk Appeal
Step Down Form
Protective look
Simple design



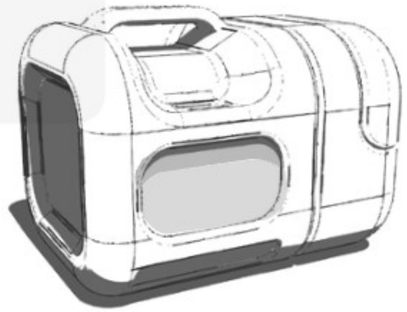
Strong Chamfer Appeal
Flowing Form
Sharp look
Sophisticated Design



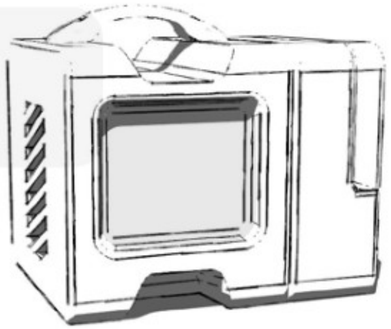
Stable Appeal
Balanced Form
Soft Look
Simple Design



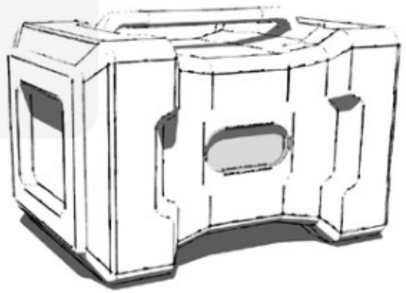
Action Appeal
Flowing Form
Dynamic Look
Sophisticated Design



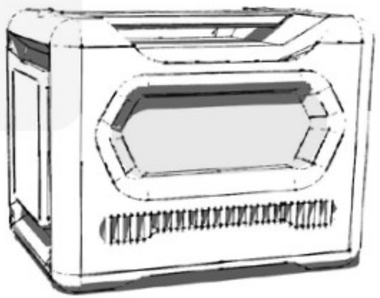
Ergonomic Appeal
Balanced Form
Soft look
Simple design



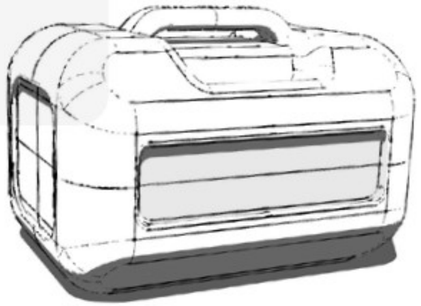
Retro Appeal
Sectioned Form
Soft look
Simple design



Futuristic Appeal
Extruded Form
Protective look
Sophisticated Design



Classic Appeal
Sturdy Form
Strong Look
Simple Design

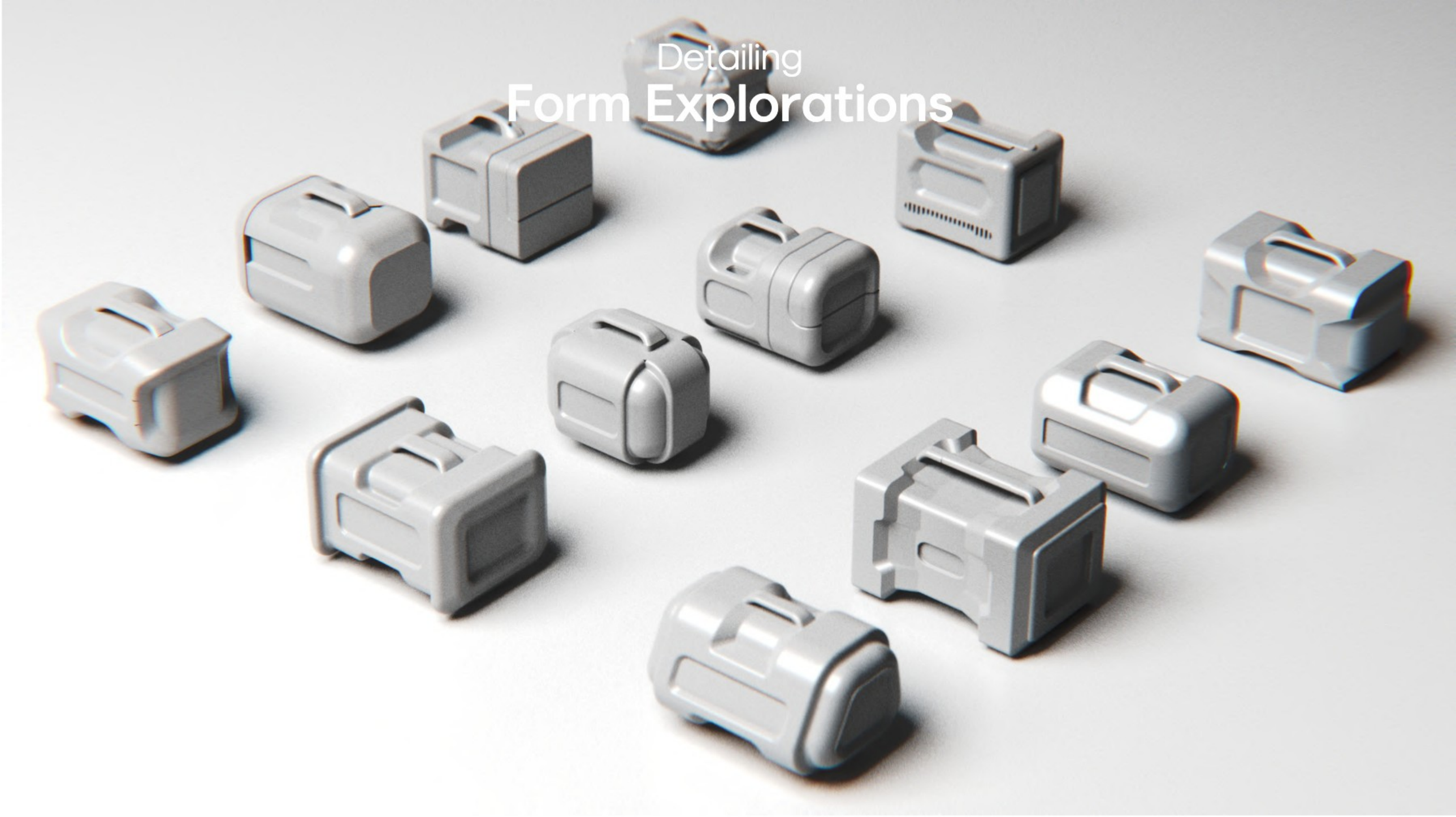


Compact Appeal
Static Form
Soft Look
Simple Design

Rounded Appeal
Smooth Form
Protective Look
Simple Design

Detailing

Form Explorations



Detailing

Visual Language

Character Lines

Feature Lines

Detailing

CAD Model

Modelled in **Autodesk Fusion 360** (Education License).

Top View

Back View

Left View

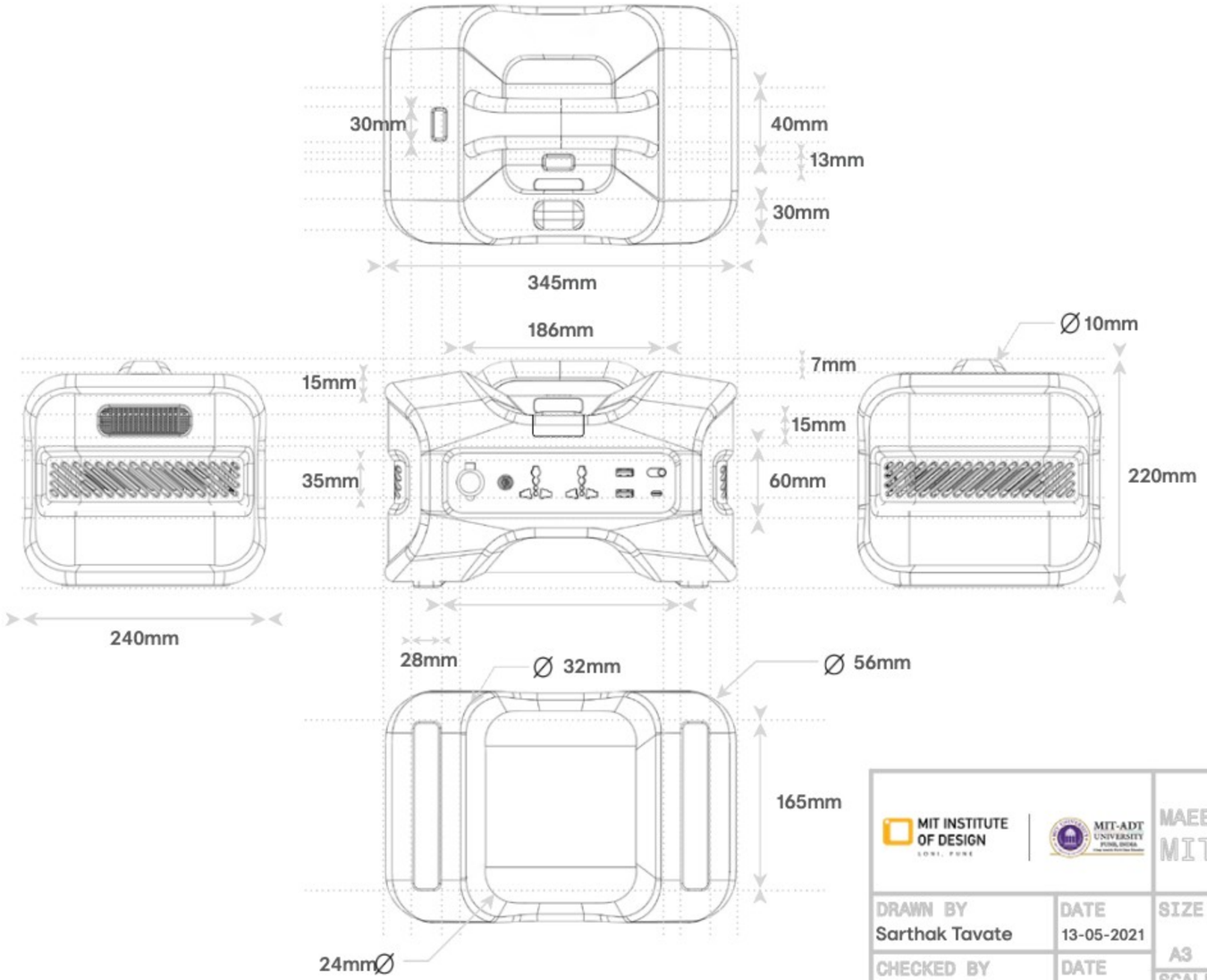
Front View

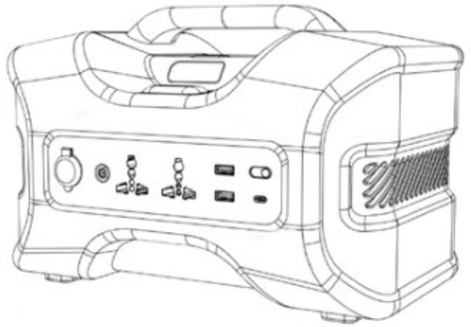
Right View

Bottom View

Detailing

Technical Drawing





MIT INSTITUTE OF DESIGN LONI, PUNE | MIT-ADT UNIVERSITY PUNE, INDIA		MAEER'S MIT INSTITUTE OF DESIGN	
DRAWN BY Sarthak Tavate	DATE 13-05-2021	SIZE A3	DRAWING TITLE APC Expedition
CHECKED BY Prof. Dhimant Panchal	DATE 29-05-2021	SCALE 1:4	

Detailing

Product Materials

Acrylonitrile butadiene styrene plastic

Affordable, Waterproof, Riggid, Lightweight

ABS + Polycarbonate composite

Affordable, Waterproof, Riggid, Lightweight, stronger, lustrous

Styrene butadiene rubber

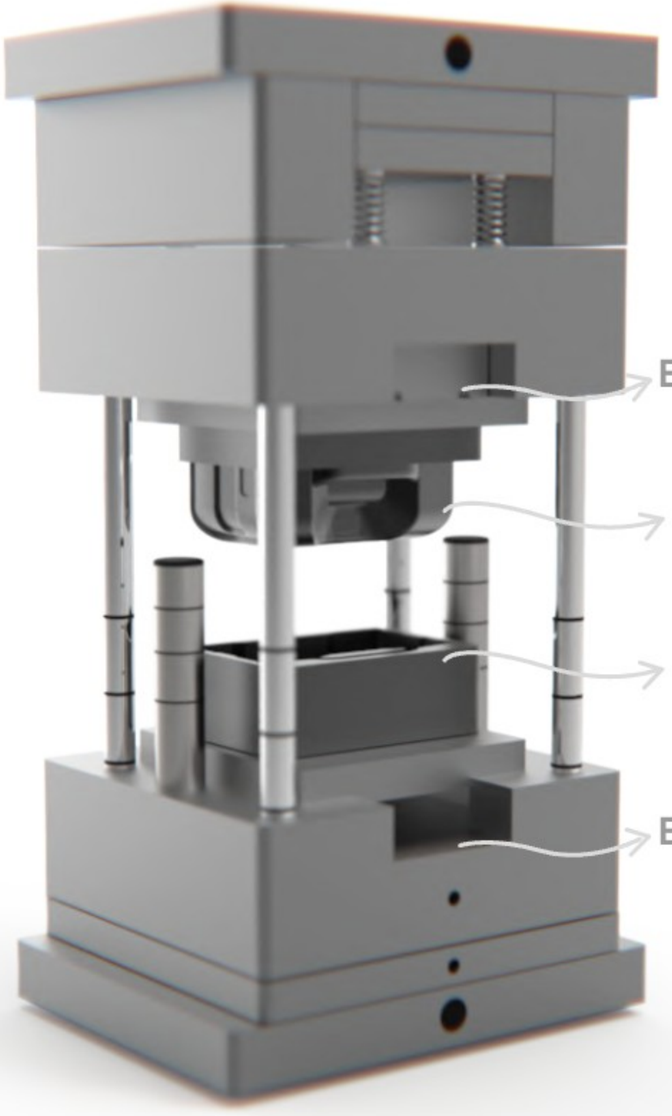
Durable, Grippable, Shock absorbing

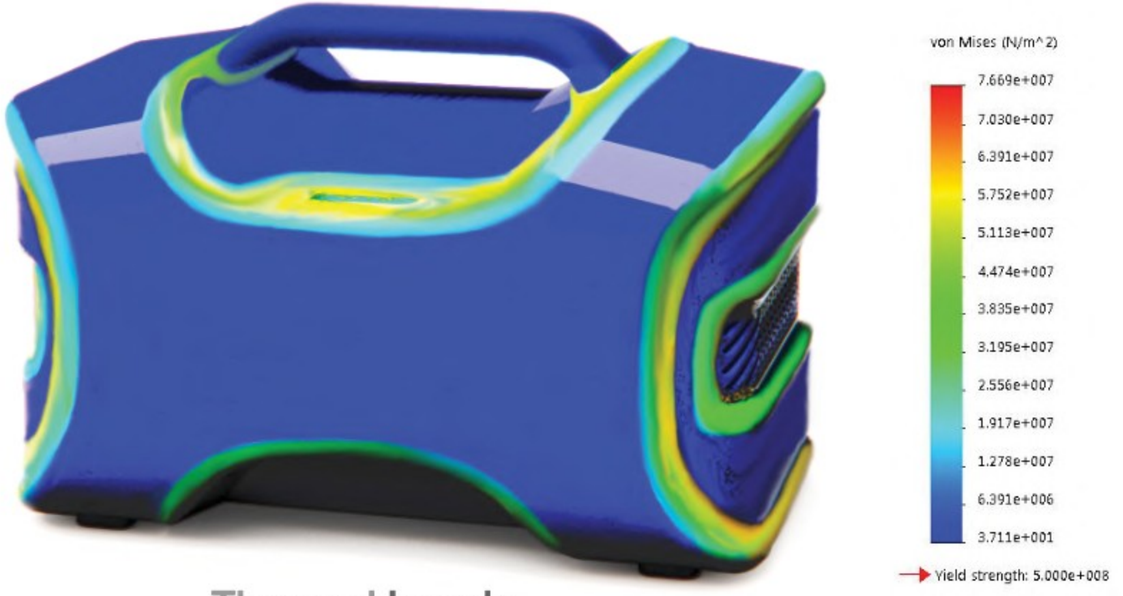
Standard Manufactured Parts

Sourced from OEM's (Original equipment manufacturer)

Detailing

Manufacturing Processes





Thermal Levels

Injection Moulding

A hopper feeds the **thermosetting polymer** into a **heated barrel** and screw. The screw **melts the plastic** and **injects the liquid polymer** into a temperature-controlled **split mould** tool that **creates the shape** of the product. Injection moulding is used for **high volume manufacturing** and **many components** can be manufactured in a **short space of time.**

Detailing

Color Material Finish

Black #1

Black Final

Grey Final

Grey #1

Black #2

Black #5

Grey #5

Grey #2

Black #3

Black #4

Grey #4

Grey #3

Detailing

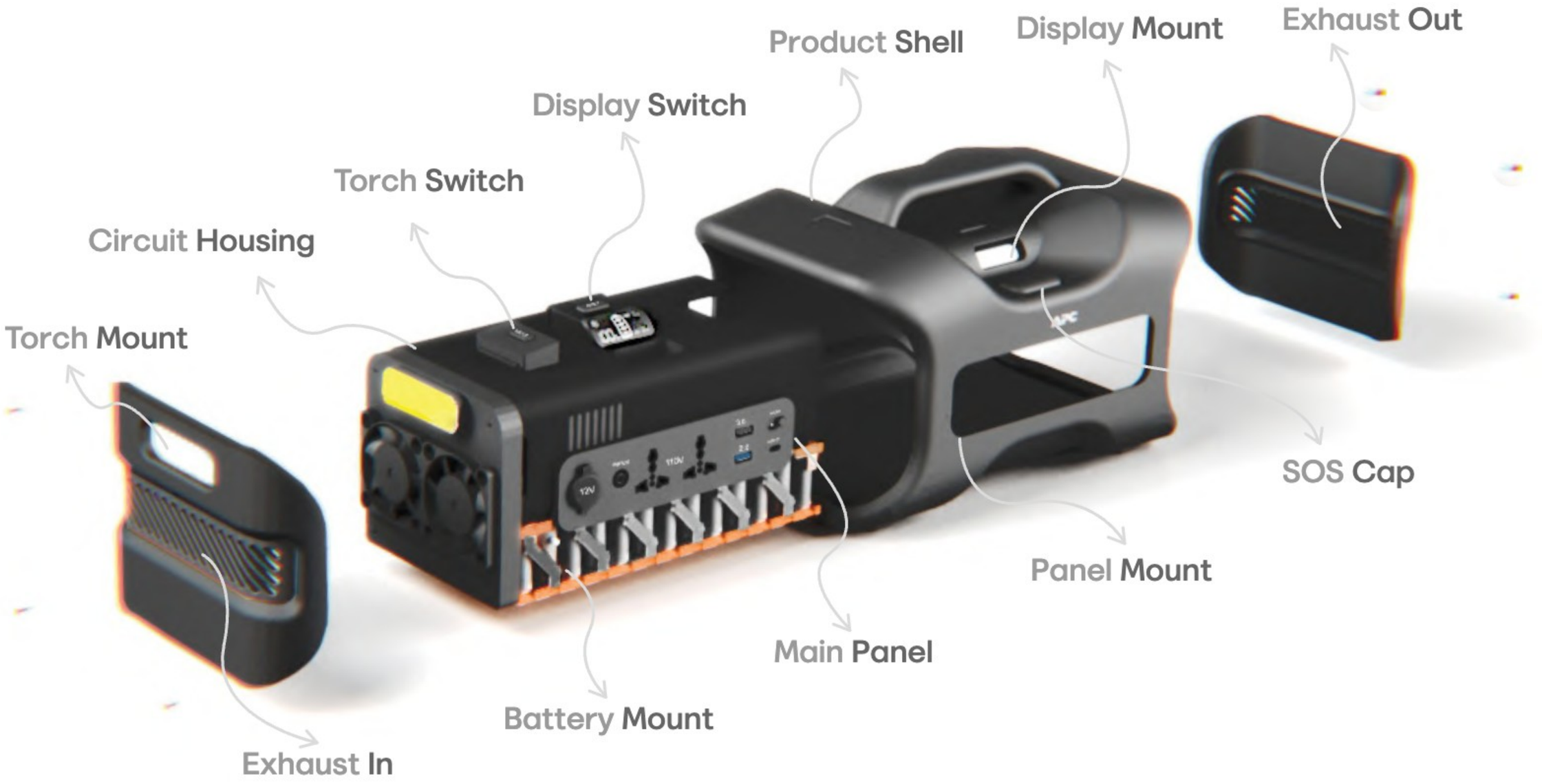
Color Material Finish

Medial Gloss	Matt Finish	Screen Print
#7F7F7F	#464645	#FFFFFF

Medial Gloss	Matt Finish	Screen Print
#B2B2B1	#474746	#FFFFFF

Detailing

Product Internals



Detailing

Product Internals

BMS System

Display LCD

Display Switch

Torch Switch

Circuit Housing

BMS Circuit

Torch Circuit

Fan Circuit

SOS Housing

Circuit Housing

Main Panel

Battery Housing

Battery Units

Secondary Mount

Detailing

Environmental Renders

Detailing

Environmental Renders


Detailing
Renders
APC Expedition
APC
INPUT
12V
110V
2.0
3.0
MODE
USB-C
DISPLAY
100%
INP
OUT

Detailing

Product Interaction

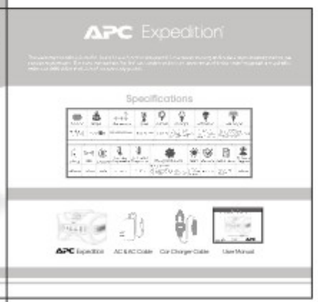
Detailing

Product Packaging

Top

Left

Right



Bottom

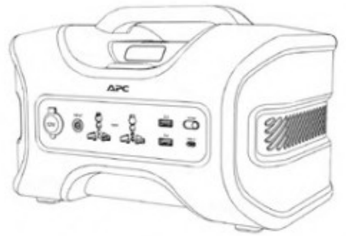
Back

Detailing

User Manual

USER MANUAL

FEATURES • TECHNICAL SPECIFICATIONS • HOW TO CHARGE • FAQs • WHAT'S IN THE BOX



Congratulations on your new APC Expedition!

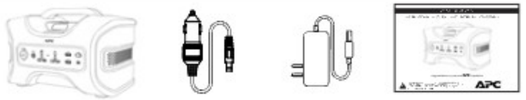
CHARGE FIRST! Before using your new APC Expedition, plug it into a suitable power outlet until it is fully charged. Then you can start your exciting journey with it.

SPECIFICATIONS

Capacity	Weight	Dimensions	Input	Car Port	AC Output	USB Output	USB Output
86.4Wh/21.6Ah (1002Wh)	Around 4 kg	345 x 235 x 220mm	24V=7.5A 6.33A	12V=10A	1x1.6V~5.0A 60Hz 1200W max (surge 2000W surge) pure sine	2 x USB-C PD Output: 5V=3A 9V=3A 12V=2.5A	USB-A Output: 5V=2.4A max charge 5V Output: 5V=2.4A 9V=1.67A 12V=1.2A

Battery	SOS	Lifecycles	Operating Temperature	Recharging Temperature	Management System	MPPT	Warranty	Certifications	Technical Support
Lithium-ion	SOS Laser	≥ 700	-10 ~ 45°C	0 ~ 40°C	Supports Solar Panel Charging	≥98%	24 months	FCC, RoHS, UN38.3	Lifetime

WHAT'S IN THE BOX



APC Expedition | Car Charger Cable | AC & AC Cable | User Manual

ATTENTION

- Not permitted on aircrafts.
- To preserve the battery lifespan, please use and recharge at least once every 6 months.
- Use original or certified charger and cables.
- Avoid extreme temperature.
- Avoid dropping.
- Do not disassemble.
- It's not waterproof,do not expose to liquids.
- Please dispose of batteries and electronic goods in accordance with local regulations.

DISCLAIMER

- Our company cannot be held liable for damages caused by fire, earthquake,use by a third party, other accidents, intentional misconduct on the part of the customer, abuse or other abnormal conditions.
- Do not repair any damage to the AC plug or power supply on your own.
- The warranty covers all terms and conditions of the warranty. Contents that are not specified in the warranty terms and conditions are beyond our responsibility.
- Our company assumes no liability for damages caused by incorrect use or non-compliance with this instruction manual.

Intended use: The APC Expedition portable power unit is intended as a power supply for electronic devices with a maximum power consumption of 1000W. Our product is not suitable to be used with equipment that relates to one's own personal safety and relies heavily on electricity, such as medical devices, equipment for nuclear facilities, the manufacture of air and spacecraft, etc. We therefore assume no liability for accidents involving personal safety, fires, or machine failures, caused by using our product with the aforementioned devices.

FC RoHS

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received, including interference that may cause undesired operation.

SAFETY INSTRUCTIONS

Read the following instructions to ensure safe usage.

DANGER
Serious appliance may cause very likely lead to serious injury* or death

- DO NOT disassemble, repair or modify the unit or the battery.
- DO NOT place the unit close to or in a fire or expose it to direct long-term sunlight
- DO NOT charge, use or store the unit in an environment with a high possibility of rain or moisture.
- Only use the original and safety power cord in the unit. Never connect the output to mains power and any other sources.
- DO NOT touch the unit or the plug-in ports if your hands are wet.
- DO NOT connect any metallic objects to the AC input or output.
- DO NOT let your eyes / hand come close to the unit should light in your eyes.
- DO NOT dispose the unit together with household waste.
- DO NOT use any inappropriate power on us
- Do NOT operate the unit above the specified input voltage.
- DO NOT use the unit if it is not functioning correctly
- DO NOT move the unit if it is recharging or in use.

WARNING
Serious appliance may cause to serious injury** or death

- Use and operate the unit safely in a clean and dry environment. Do not wet the unit directly and keep away from water
- Check the unit prior to every use. Do not use the unit if it is damaged, broken
- Do not use the unit if the power cord is damaged or broken
- Keep the unit away from children. DO NOT let children use the power supply unit.
- Keep this product away from pets
- DO NOT use or store the unit in an area of environment with high temperature.
- Shield the unit from contact of fire and contact conducted by your skin or clothing, with the effort of avoid with high water.
- In a storm, unplug the power cord from the socket.
- DO NOT charge the unit via power supply systems that operate outside of 20~30Volt.
- DO NOT place the unit on its side or upside down while in use or charge.
- DO NOT use accessories for other usage.

CAUTION
No use appliance may lead to injuries and/or property damage***

- Small, possible odors, overheating or other abnormal circumstances observed, stop using the unit immediately and disconnect the AC adapter or car battery cable from it.
- The unit complies with all legal requirements for transport of dangerous goods.
- Make sure that the unit is properly secured when transporting it in a motor vehicle.
- Only charge, use and store the unit within an ambient temperature of 0 to 40 °C (32 ~ 104 °F).
- Don't lift the unit by only its plug if it has accidentally fallen, was dropped or was exposed to wetness.
- Carefully read the instructions for the electric devices that you intend to connect to your power supply unit.
- Make sure that the device you are connecting is switched off before you connect it.

* Severe injuries include: blindness, burns, electric shock, fractures, poisoning, etc., which can lead to complications, hospitalization or prolonged treatment.
** Injuries include burns, electric shock, etc., which do not lead to hospitalization or prolonged treatment.
*** Property damage - including buildings, belongings and pets, etc.

POWER

LCD Screen Button
Press the power button to check the remaining battery.
AC Button/ DC 12V Button / USB Button
Turn off each output by pressing its power button as it does not turn off automatically as it will drain the battery out.

LCD

Power Level Percentage
Check the battery level by pressing the display button before use. If battery is at a low level, charge first.

LCD screen flickers around 10 times when battery capacity drains to 20% and 10%.

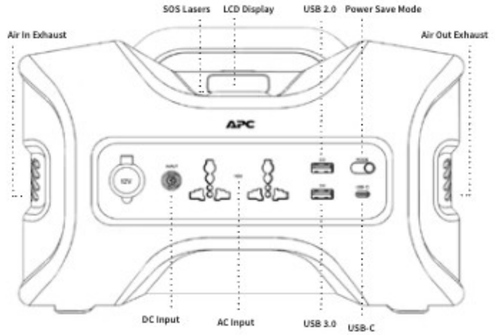
Power of Input & Output (W)
If the Jackery Explorer's total output exceeds 1000W, it will automatically shut off.

Please ensure the power consumption is less than 1000W, then press the power button.

Low & High Temperature Alarm
The Explorer 1000 can power your devices at temperatures ranging from -4 ~ 104°F (-20 ~ 104°F). If your working temperature is outside this range, the Explorer 1000 may stop working.

LED FLASHLIGHT

Press button for LED flashlight, hold on button for 2-3 seconds for SOS function, press button one more time to turn off.



CHARGING

Here are some common devices and their power requirements for each charging port.

DC Output
Car Fridge (60 W) Around 66 Hours
Drone (50 W) Around 20 Recharges

AC Outputs
12" Laptop (30 W) Around 13.5 Recharges
32" TV (60 W) Around 16 Hours
Drone (90 W) Around 17 Recharges

USB Outputs
Smartphone (18 W) Around 100 Recharges
Motion Camera (5 W) Around 180 Recharges

Expedition will be turned off automatically in 12 hours when being drawn under 10W power for power saving

RECHARGING

Before use or storage, plug your Expedition into the wall until it is fully charged. If the display shows less than 20% capacity, plug it into a power source, like an AC outlet or a solar panel, as soon as possible. There are five ways to recharge:

Wall Charger Around 7.5 Hours
Car Charger Around 14 Hours
Solar Panels (Optimal Recharging Varies) Around 17 Hours
Electric Generator Around 7.5 Hours

WARRANTY

Limited Warranty
APC warrants to the original consumer purchaser that the APC product will be free from defects in workmanship and material under normal consumer use during the applicable warranty period identified in the "Warranty Period" section below, subject to the exclusions set forth below. This warranty statement sets forth APC's total and exclusive warranty obligation. We will not assume, nor authorize any person to assume for us, any other liability in connection with the sale of our products.

Warranty Period
The warranty period is 24 months. In each case, the warranty period is measured starting on the date of purchase by the original consumer purchaser. The sales receipt from the first consumer purchase, or other reasonable documentary proof, is required in order to establish the start date of the warranty period.

Remedy
APC will repair or replace (at APC's option) any APC product that fails to operate during the applicable warranty period due to defect in workmanship or material. If a valid claim is made during the applicable period, APC, at its option, will either (1) replace the product, or (2) exchange the product with a product that is of equal value. A replacement product assumes the remaining warranty of the original product or 180 days from the date of replacement, whichever is greater. Customer is responsible for the return shipping costs.

Limited to Original Consumer Buyer
The warranty on APC's product is limited to the original consumer purchaser and to any subsequent owner.

Exclusions
APC's warranty does not apply to (i) any product that is misused, abused, modified, damaged by accident, or used for anything other than normal consumer use as authorized in APC's current product literature, or (ii) any product purchased through an online auction house. APC's warranty does not apply to the battery cell unless the battery cell is fully charged by you within seven days after you purchase the product and at least every 6 months thereafter.

How to Receive Service
To obtain warranty service, contact our customer service team at hello@apc.com.

The information contained herein is subject to change without notice. The only warranties for APC products and services are set forth in the warranty statements accompanying such products and services. APC shall not be liable for technical or editorial errors or omissions contained herein.
First Edition December 2021 Document Part Number: 203760-UM-001 This user guide describes features that are common to most models.

FAQs

What type of battery is in an Expedition ?
Explorer 1000 contains a battery pack which consists of an array of cylindrical 18650 lithium-ion battery cells with high energy density.

How do I know if my Expedition is charged?
To check the charge level of the Expedition, refer to the LCD Battery Display.

Can I charge the Expedition while supplying power at the same time?
The Explorer 1000 could power other devices while recharging itself.

How do I know if my device will work with the Expedition ?
You will need to check the amount of power your device requires. This may require some research on your end. An online search or examining the user guide for your device should suffice. To be compatible with the Expedition you should use devices that require less than 1000W.

CONTACT US

www.apc.com | hello@apc.com | +91-962335882 (Mon-Fri 9:00AM - 5:00PM (IST)) | apc.inc | apcinc | apc_inc | apc.ind.

APC

Parchment 1

Parchment 2

Detailing

Product Prototyping

Packaging

Packaging

User Manual

Accessories

Processes

CNC Machining

Laser Cutting

Filing & Sanding

Detailing

Final Prototype

Please reach out to view the detailed product research report.

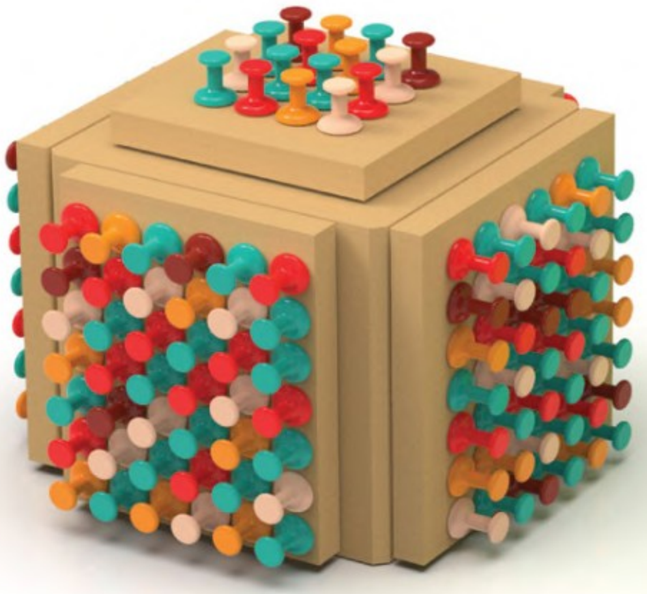
02

Pineapple Pins

Self Initiated | Problem Solving

4 weeks | 2020

A'DESIGN AWARD
WINNER 2021
GOLD



Product Brief

PROLOGUE

Pineapple Pins is a hypothetical brand that features the packaging solution for the forever persisting problem of picking, using and storing of push pins.

Inspired by the structure and existence of the Pineapple fruit. The rythmic arrangement of sharp scales on the outer walls of the fruit form the essence of the product packaging.

ABOUT

Pineapple Pins packaging is an easy, uninjuring four step solution for all age groups and for every scenario involving the usage of push pins.

A long time was spent in the research and development of the product, to make it one versatile solution of a kind.

Right from the correct size to be ergonomic, unit be convenient, made from eco-friendly materials, being user friendly, being safe from kids, being structurally apt, repeated number of uses, being able to be stored hassle-free to easily being able to slipped into pockets and carry-ons, the R&D has come a long way.

CHALLENGES

Commercial packaging for push pins around the world is witnessed to be in small plastic boxes with a lid. Most of those lids are attached and move to close the box because of the elasticity given to the material hinge.

Secondly, when a user tries to grab pins from the stack of random needles, the user's fingers get pricked. The user also cannot hold pins in his/her fists, again because of injuries.

Thirdly, when working in a congestive and a lot happening space, there is always a delusion of the box of pins falling and the user having to pickup single pieces of needles spread all over the space.

The initial approach to solving the problem was with development of a product that can constitute the pins at the shell. Taking the cost efficiency and practicality into consideration, if the problem is solved by a packaging solution to make the cycle easier and environment friendly.

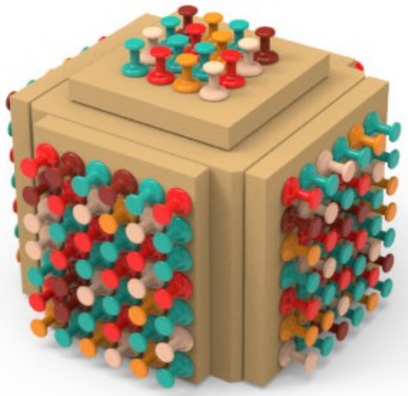
Pineapple Pins

1

2

3

4



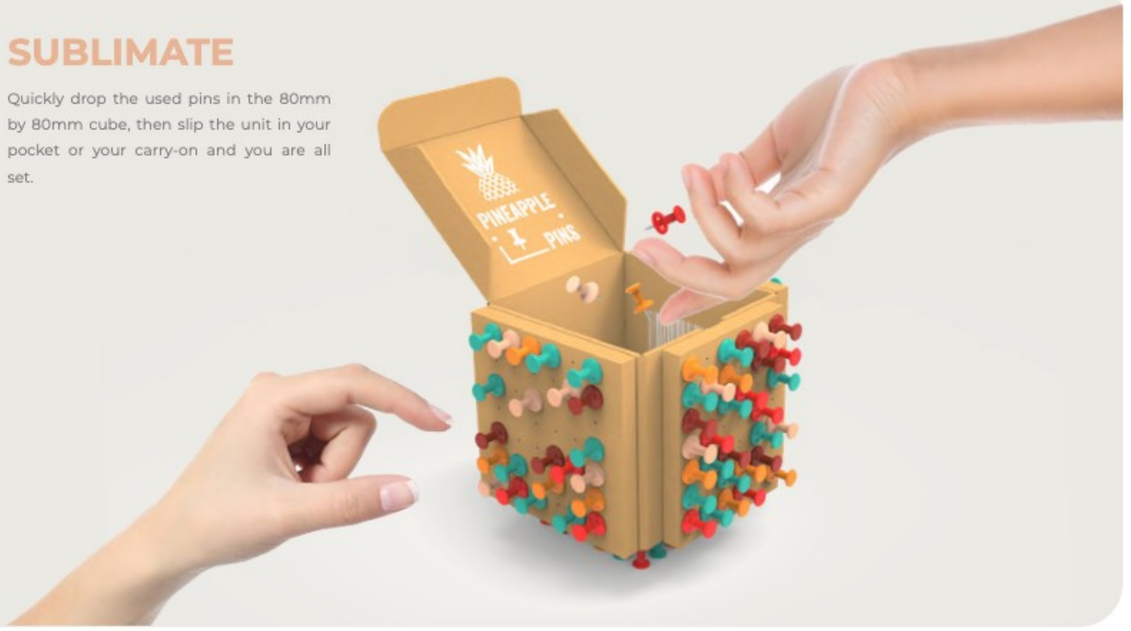
Pineapple Pins

TEAM UP

Don't hesitate to work with your team. During central stage of transition, the unit can be laid on the floor, held in one hand whilst multiple users use it.

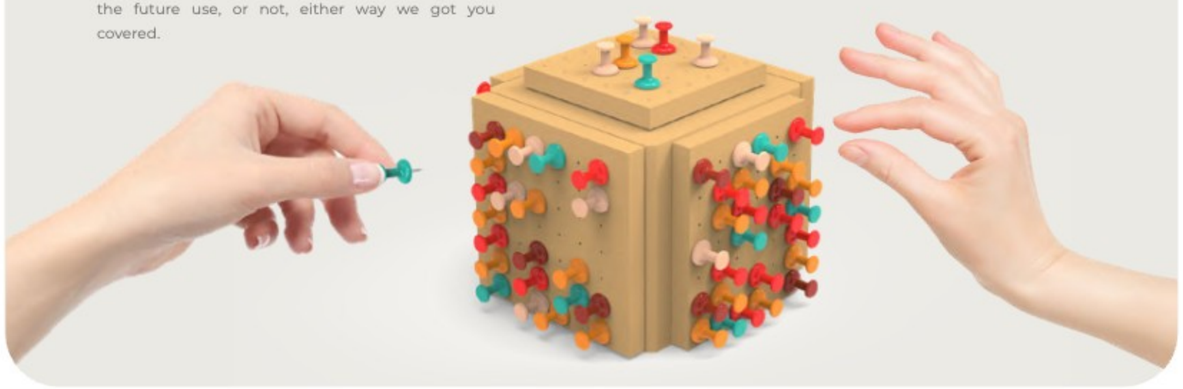
SUBLIMATE

Quickly drop the used pins in the 80mm by 80mm cube, then slip the unit in your pocket or your carry-on and you are all set.



STACK

Make a committed investment of one second for the future use, or not, either way we got you covered.

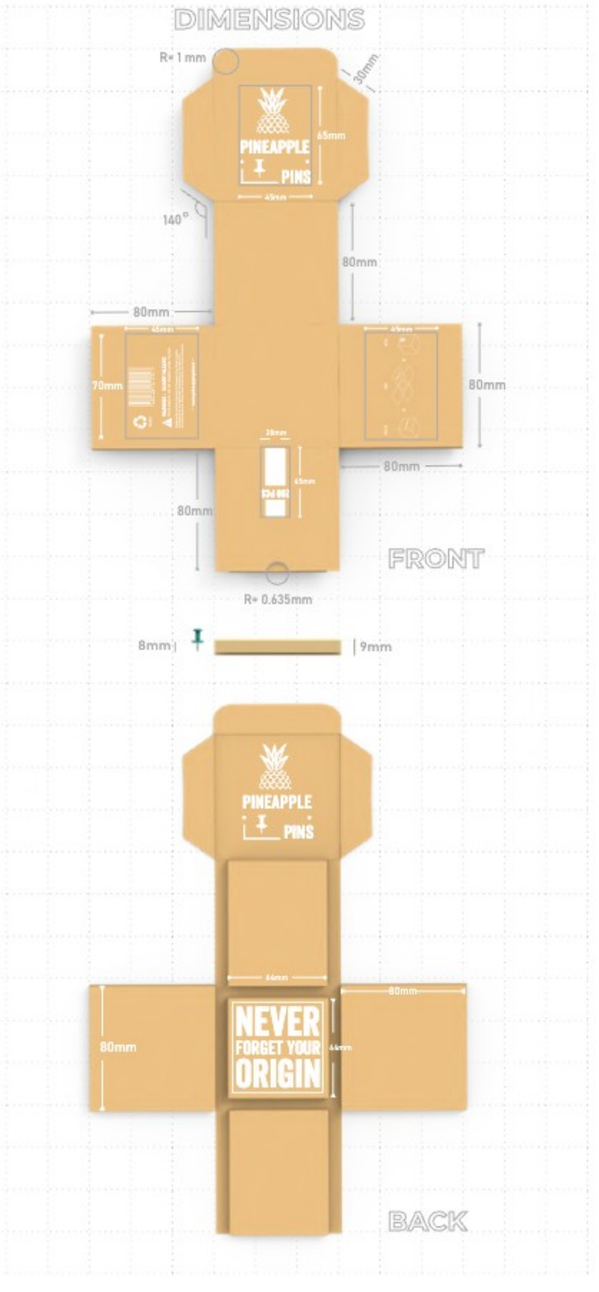


LOGO

PINEAPPLE
PINS

The logo, like everything else has been handcrafted to perfection. The text, the lines and the two dots form an enclosed space representing the box. The pin symbol is representative of the location of all the pins or inside lined. The two dots that complete the enclosure are the representatives of the push pins when pierced inside the soft board, as seen by the user. (The two most important elements inthe project, the user and the push pins.)

Product Specifications



Manufacturing

Materials

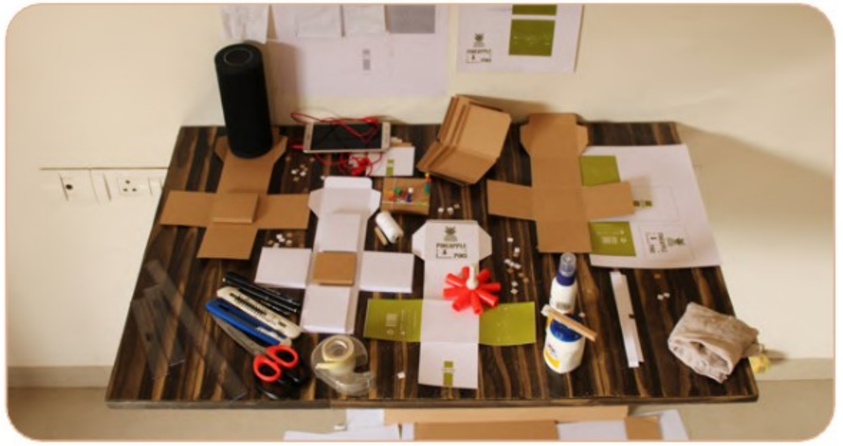
Corrugated	Cardboard	File Paper
Thickness - 4mm	Thickness - 1mm	Thickness - 1mm
Folding not accurate	Folding causes splits	Folding accurate +/- 0.1mm
Pin insert reusable	Pin insert nonreusable	Pin insert reusable
Cost / sq. m - INR 25	Cost / sq. m - INR 28	Cost / sq. m - INR 25.5

Special Edition

ABOUT

Inspired by the World Environment Day (WED) emphasising the eco-friendly nature of the packaging solution, introducing Pineapple Pins Special Edition. The vaired CMF is a subtle green and white combination with an impulsive message inside that is revealed when the packaging is opened. The message reads 'Never forget your origin' on the soil-ground coloured board to remind the users of their roots and to care for mother nature.

Product Prototyping



1. Spacing between the pins so that two fingers easily accomodate in the designated space, keeping in mind the quantity control was the priority number one at all times.

2. Then was the placement of the sets of pins along the three different sizes of cuboids so that they don't hinder in the joining and opening processes.

3. The last validation was the proeficiency of use, application of stress on edges, corners and faces of the cube and the ergonomic viewpoint of one handed use.

03

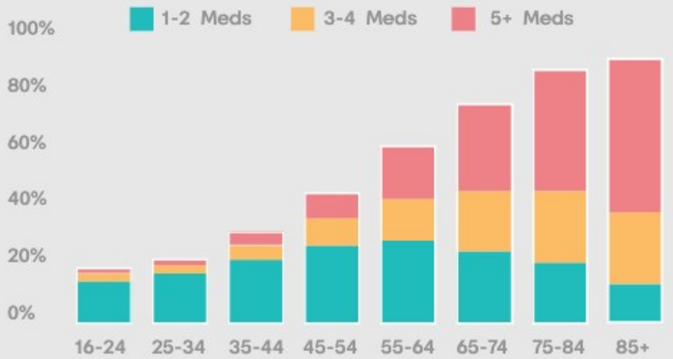
Project Nova

Solo Project | Special Needs

5 weeks | 2020

Salient **Research**

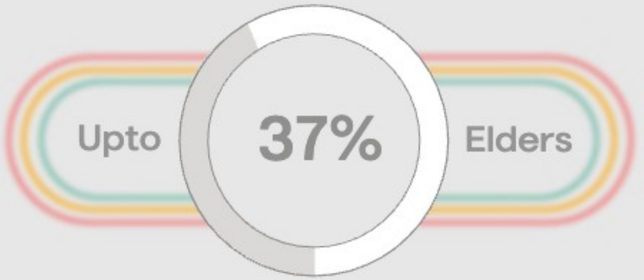
Numbers



Elders 65 years and above are the majority user group susceptible to increased medicine intake.

Source- US census Bureau (2018-2019)

Impact



Of age 65 and above do not take drugs as prescribed by their doctor. Causes are maninly lack of supervision, memory loss, and weak motor skills.

Source- NHS Digital (2017)

Repurcussions

Repurcussions of incorrect dosages are severe especially for elders. Health implications, financial instability, liabilty for the family are also amplified.

Source- Merck and Co. Inc.

Problem **Statement**

The challenging nature of medicine intake by elders due to their lack of supervision, memory problems, weak motor skills, need of use daily, multiple intervals of intake in a day, lack of guidance, readability issues on prescriptions and medicine packets, recognition of correct medicines, ending up taking multiple doses due to memory problems, complex user cycle.

Target Users

Biography

Lives in a family of 5 members. Has family members as caretakers. Requires muscle pain and digestive meds.

Needs

Requires a helper to assist with jobs like fetching water and taking medicines. Has balance issues and cannot move around much.

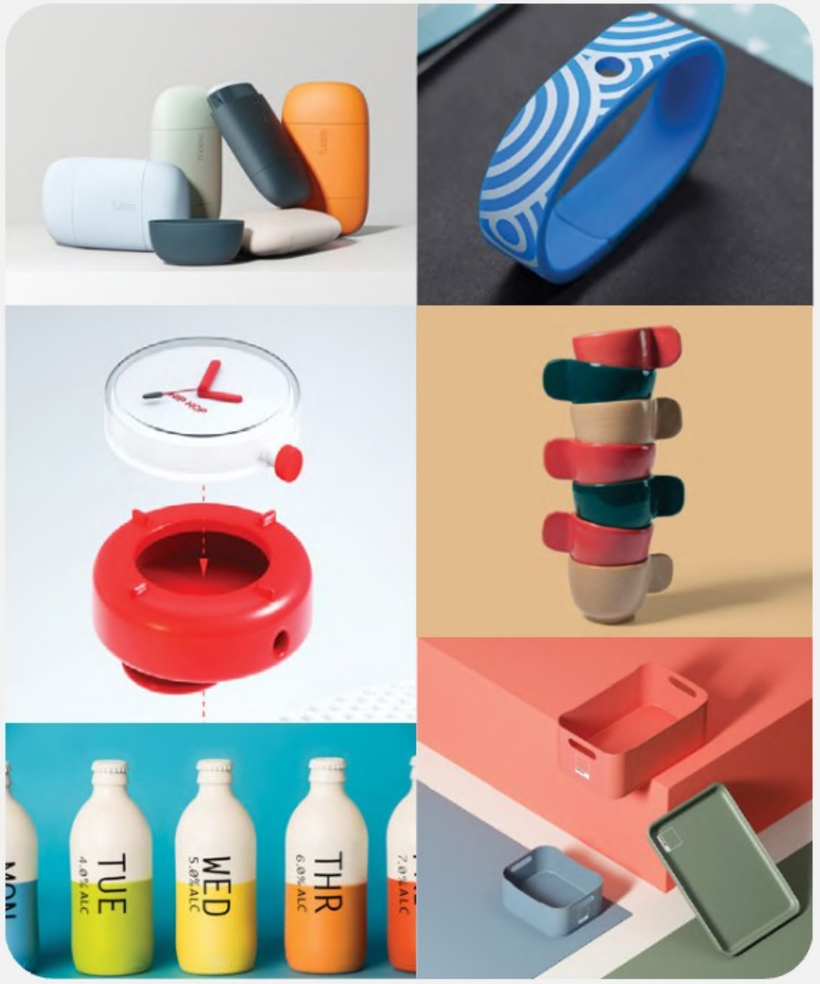
Pain Points

1. Not remembering to take meds.
2. Water availabilty for medicines.
3. Confusion in reading prescriptions
4. Managing required food intake

	Seeking meds.	Preparing meds.	Preparing Water.	Check dosage.	Intake dosage.	Additional Ointments.	Finishing up
Activity							
Goals	Finding the storage unit	Taking the meds out of the housing	Filling the water container	Prescription, Quantity check	Injesting the meds/ mixing	Application	Scrapping the meds housings & restoring
Interaction	Storage Box	Meds Housing	Water Container	Meds	Meds, Water container	Ointments	Meds housing Storage unit
Experience							
Improvement	All in one place Unit	Stakeholder required	Inbuilt water container	Guidence required	Spillage proof	All in one place (Unit)	Storage Unit

Product **Ideation**

Product **Board**



Ideation **Sketches**

Product **Features**

Compact **Unit**

Clutched **Grip**

Three **Segments**

Nibblet **Snap**

Color **Coding**

Product **Features**

Spring **Button**

Opening **Units**

Product **Internals**

Snap **Fit**

Handle **Grip**

Product **Specifications**

Product **Aesthetics**

Color Swatches

#F2808A

#FFD6D9

#FFC064

#FFD7AB

#00C2C0

#A4F7F5

Product **Dimensions**

Color Swatches

#FF5061

#FA9320

#EBD105

#98D61B

#0AD7C5

#0CB4F1

#C90BCA

Product **Materials**

Polypropylene

FG-Silicone

Stainless Steel

Polypropylene


Three Segments


MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
Multi-Oriental


Clutched Grips

UX SOLUTION


Shop
Nova
Log In
Stockroom
After Lunch Dose
13:00
Slide
Snooze

Design **Process**

Idea

Market
Existing Solutions
Competition
Trends

Users
Target-Users
Personas
Profiles

Problems
User-related
Ineffectivity
Innovation

Approach
User-Based
Practicality
Usability

Strategy
Systems-Design
Design Principles
KPI's

Ideation
Users Sympathy
Sketching
Story-Boarding

Prototype
Wireframes
Mockups
Low-Fidelity

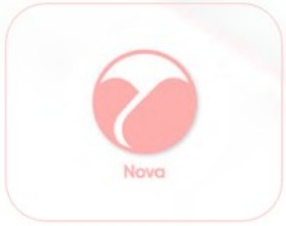
Experience
User-experience
Attention
Retention

Hi-Fi
Wireflows
Proof of Concept
Clickables

Testing
Heuristics
User Testing
Refinement

Product

Design **Aspects**



Logo

Gilroy

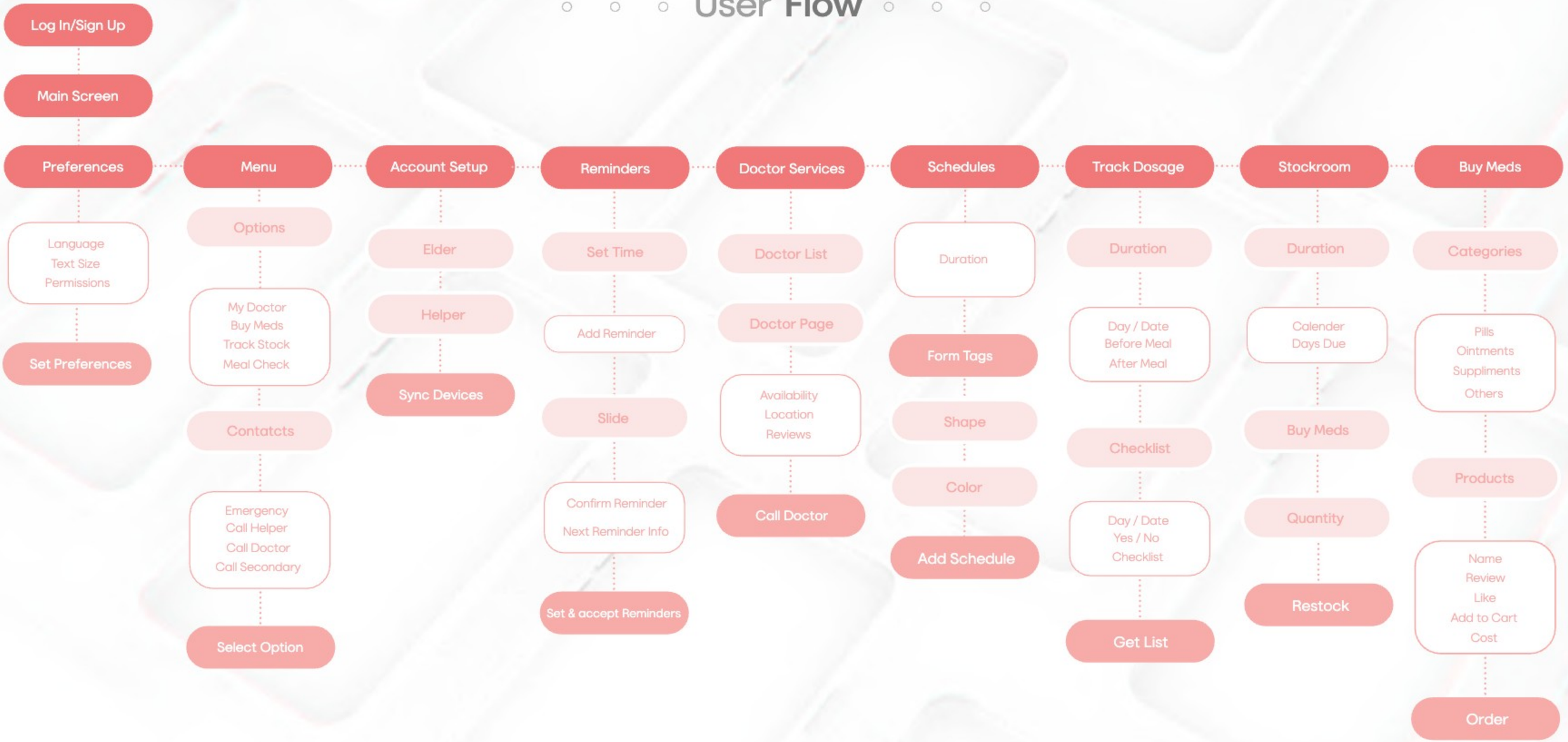
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
1 2 3 4 5 6 7 8 9 0

Font

#ffa9a9 #facac0 #d6d8da

Colors

User Flow


Log In/Sign Up
Main Screen
Preferences
Language
Text Size
Permissions
Set Preferences
Menu
Options
My Doctor
Buy Meds
Track Stock
Meal Check
Contatcts
Emergency
Call Helper
Call Doctor
Call Secondary
Select Option
Account Setup
Elder
Helper
Sync Devices
Reminders
Set Time
Add Reminder
Slide
Confirm Reminder
Next Reminder Info
Set & accept Reminders
Doctor Services
Doctor List
Doctor Page
Availability
Location
Reviews
Call Doctor
Schedules
Duration
Form Tags
Shape
Color
Add Schedule
Track Dosage
Duration
Day / Date
Before Meal
After Meal
Checklist
Day / Date
Yes / No
Checklist
Get List
Stockroom
Duration
Calender
Days Due
Buy Meds
Quantity
Restock
Buy Meds
Categories
Pills
Ointments
Suppliments
Others
Products
Name
Review
Like
Add to Cart
Cost
Order

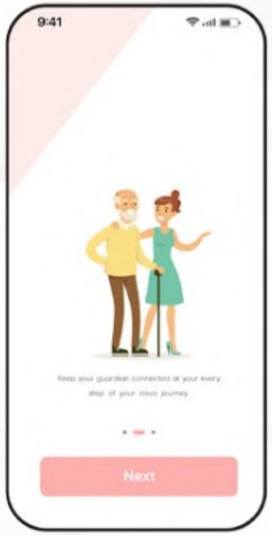
Design **Features**

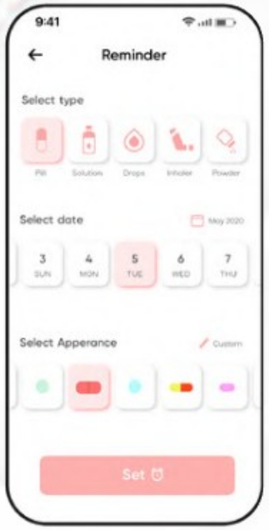
Guardian system

The Idea is basically a two account system each focuses on their seperate task flows and usability of the person using it. The Helper will fill out important tasks that are sort to be difficult for the elders to fill. The Elder part of the application would be the user centric easy navigational features.

Easy mode comes in handy with additional easy features like the virtual assistant. Elders can seek help from the assistant for any guidance in setting up or 'how to' with a voice assisted function.

LINKED ACC. EASE OF USE





Get Organized

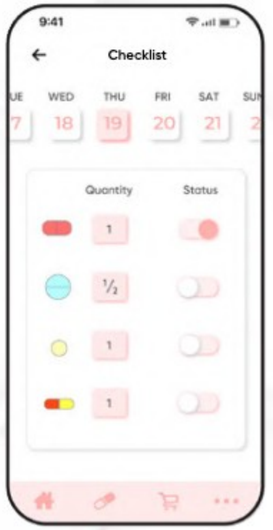
Configure the appearence of the medicine just once to help you connect with the medicine name and appearance when taking them for the prescribed dose duration. Customize the appearence of the med usually pills by shape and color coding the pill with a preloaded shape and color window that has all the pill shapes and colors that exist. An icon would be created with the name and the look of the med.

COLOR CODING SHAPED ICON

Get Reminders

The reminder alarm is succeeded by the checklist tab where the user taps on individual meds to confirm the intake with the quantity mentioned. The icon is marked with a white space so it is clickable to reveal the name which is secondary and icon itself does the job. Recieve a checklist after confirmation.

DURATION TIME INTERVAL



Detailed Checklist

The caregiver / guardian gets a notification once the elder successfully takes a dose. The dose is represented as all the med icons for a quick peek. The notification can be viewed on the notification window and can be expanded through the app to view a more detailed checklist with names and the next dose.

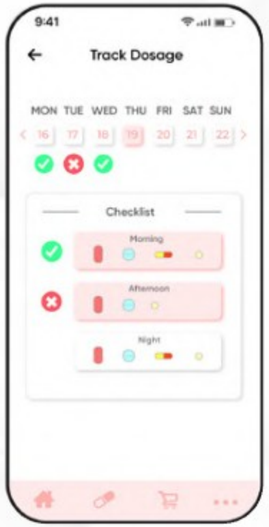
ENSURE EASE OF USE

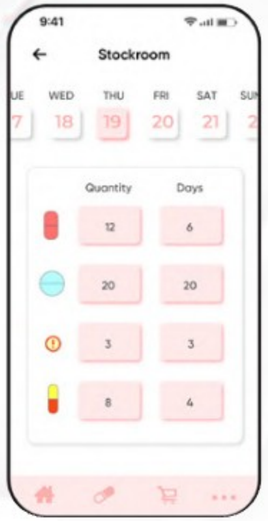
Design **Features**

Track Dosage

The meds will be tracked with every accepted reminders, individual pills in the checklist will point out if a particular pill was left out. Custom icons of pills are displayed for easy assesment. With the number of meds taken on track, the quantity gets counted as well. Stockroom has the quantity mentioned and the user can further buy new meds.

NOTIFICATIONS KEEP TRACK





Stockroom

The med stock is tracked within the app when buying the med from the online pharmacy inside the app. The stockroom will keep track of all the meds being taken through individual reminders and will prompt if the quantity of the meds runs low. Restock the meds when required and the meds will be suggested in the cart within the prescription.

CHECKLIST STOCKROOM

Digital Pharmacy

Users get the option to choose to buy meds from a nearby pharmacy or simply buy meds online. The nearby stores can be viewed with the location of the device turned on. Online meds can be bought by either typing or speaking into the mic. Predictive text on meds makes searching easy.

STORE ONLINE

Consult Doctors

Videocall doctors from your comfy space and get online ready prescriptions for medicines. The doctors can be chosen according to the time slot of availiblity and or cost wise. This feature is available in both the accounts and the doctors can be paid via online transactions. The Elder account will recieve guided help.

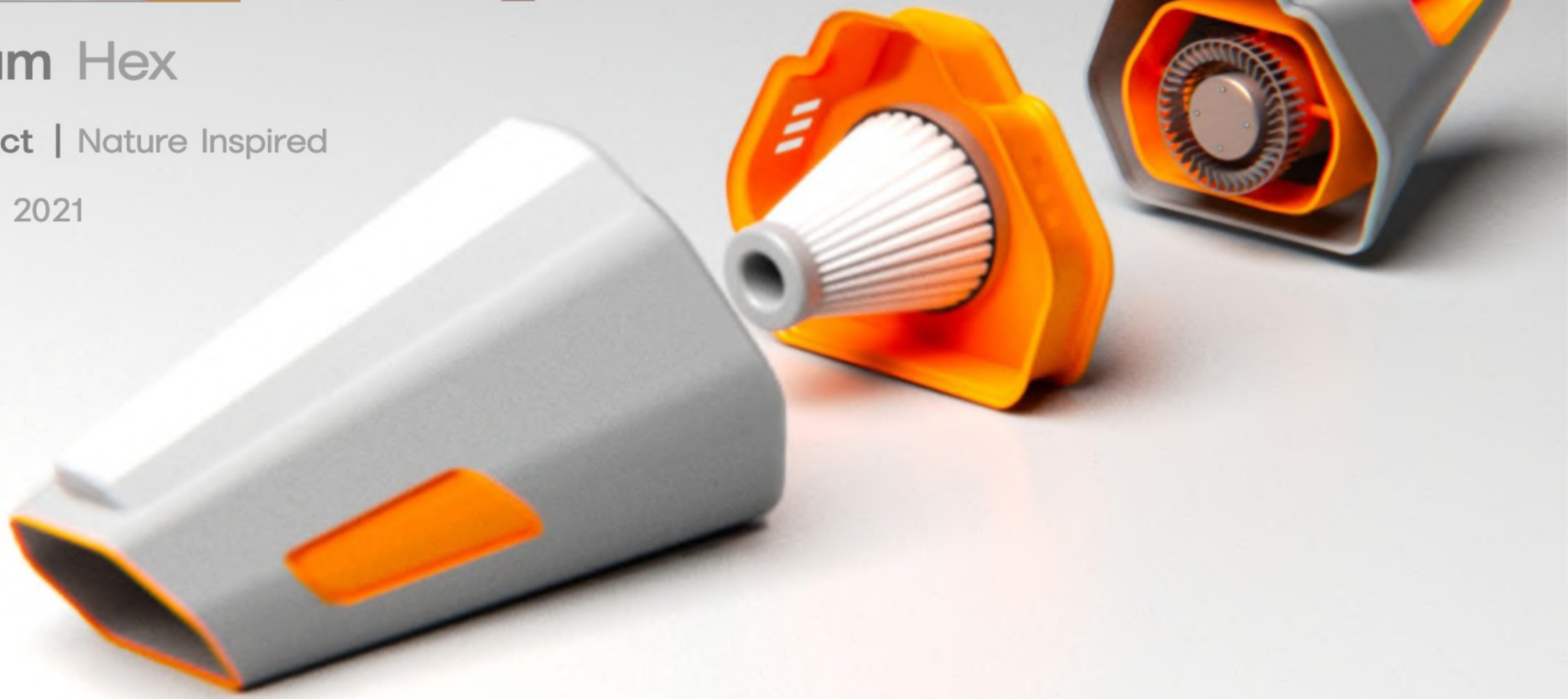
CALL DOCTOR PRESCRIPTION

04

Vacuum Hex

Solo Project | Nature Inspired

3 weeks | 2021



Vacuum Hex

Design Brief

Taking inspiration from a natural biological living form, design a product that correlates to the form and aesthetics.

Product Inspiration

RUFOUS KINGFISHER

Size

Wingspan

Weight

Pear shaped head

Stepped feathers

Emphasized eyes

Ridged claws

Dynamic Beak

White highlights

Streamlined Body

Beak Nostril

Streamlined Body

Head Stabilization

Packed Feathers

Product **Ideation**

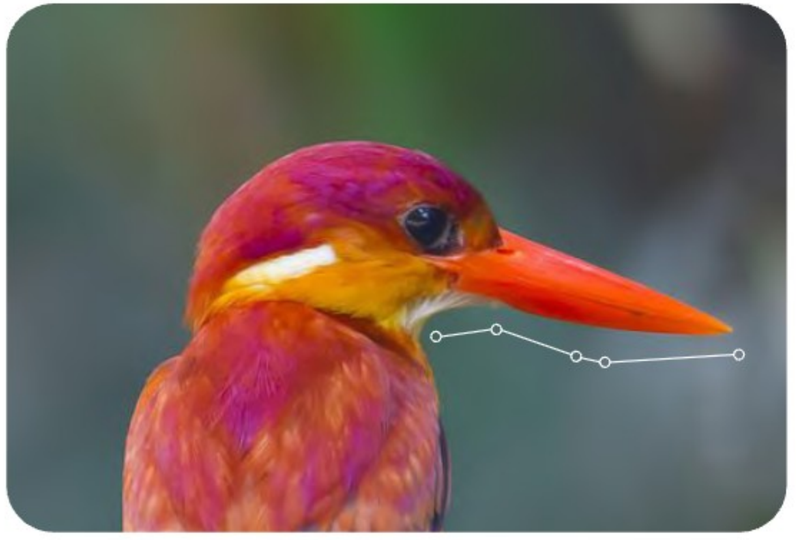
Product **Board**

Ideation **Sketches**

Design Aspects

Streamline

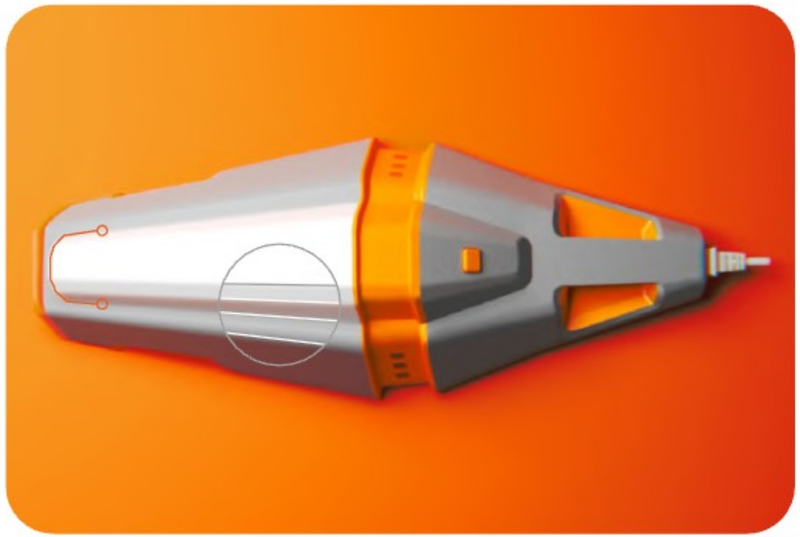
The sharp beak is blended into a smooth round head, is inferred in the product form to blend the flow of the front and the rear of the product. Its uniform convergence on the tips of both ends is also incorporated into the form.



Dynamic

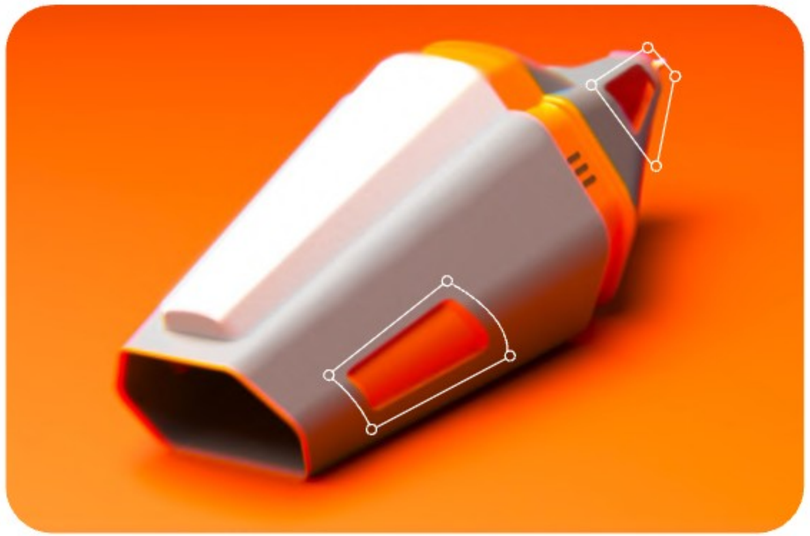
The acute and organic form of the beak was converted into a inorganic form and used as an inspiration to get a dynamic form. Also the beak merging with the head creates a linear flow, the latter used as an inspiration for the handle part of the product.

Design Aspects



Bevels

The form blend into steps on the bird's feathers have been inspired into the form as chamfers are signified in the form of step ups and downs. Appropriate fillets have been followed to go with the dynamic form.



Balance

The white quadrals on the neck of the bird have been used as a highlight in the product form. The white quadrals relay balance principle of design. Similarly the orange handle at the back has been balanced by the orange highlight in the front.

Design Aspects

Emphasis

The eyes of the bird offer contrasting emphasis around it. A similar emphasis has been used when designing the power button. It is also strategically placed so as to get the inclination towards the handle where the user's thumb is well in range.

Rhythm

The nostril of the bird flows with the form and towards the end of the beak. This design intervention was adopted in the exaust holes of the product. The cutout is a set of three cubiodal holes flowing with the movement of the streamlined form and creates a visual tempo in the product.

Product Specifications

Materials

ABS **Plastic**

Pleated **Foam**

Fabricated **Steel**

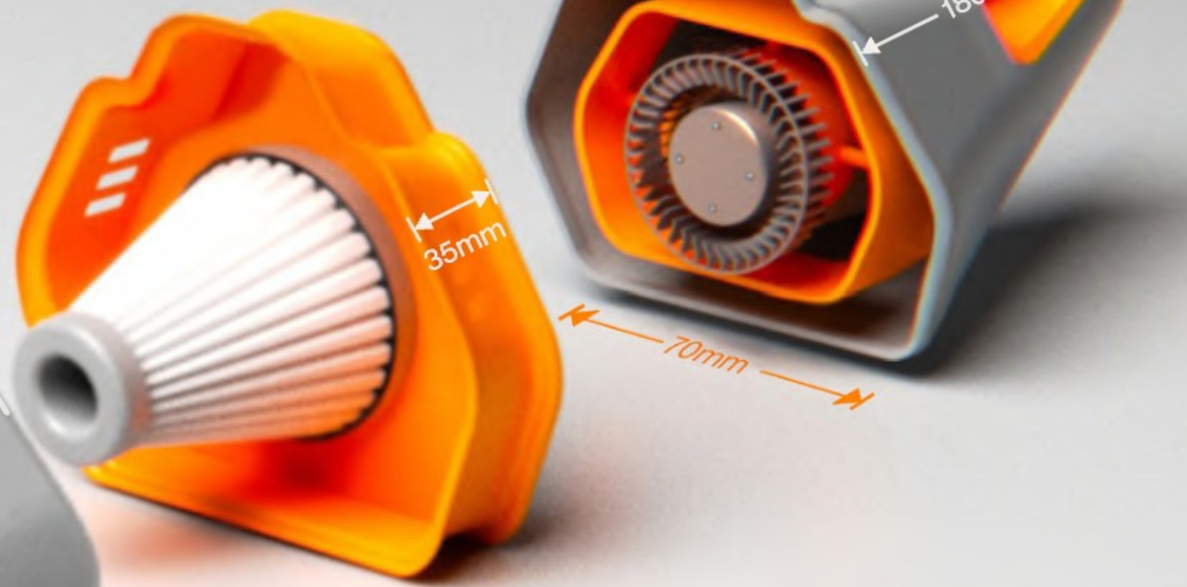
Color Swatches

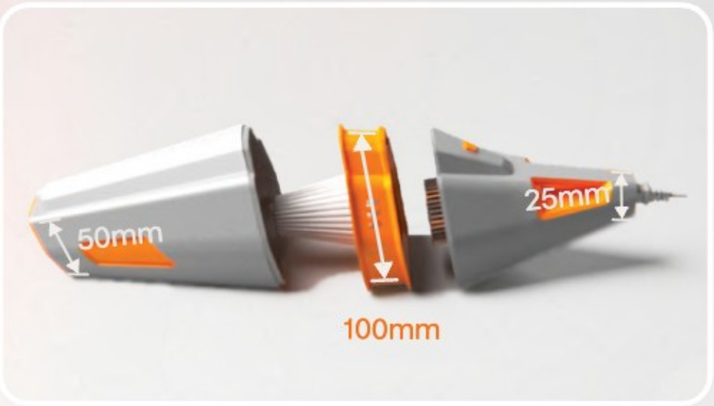
#FFFFFF

#A38C84

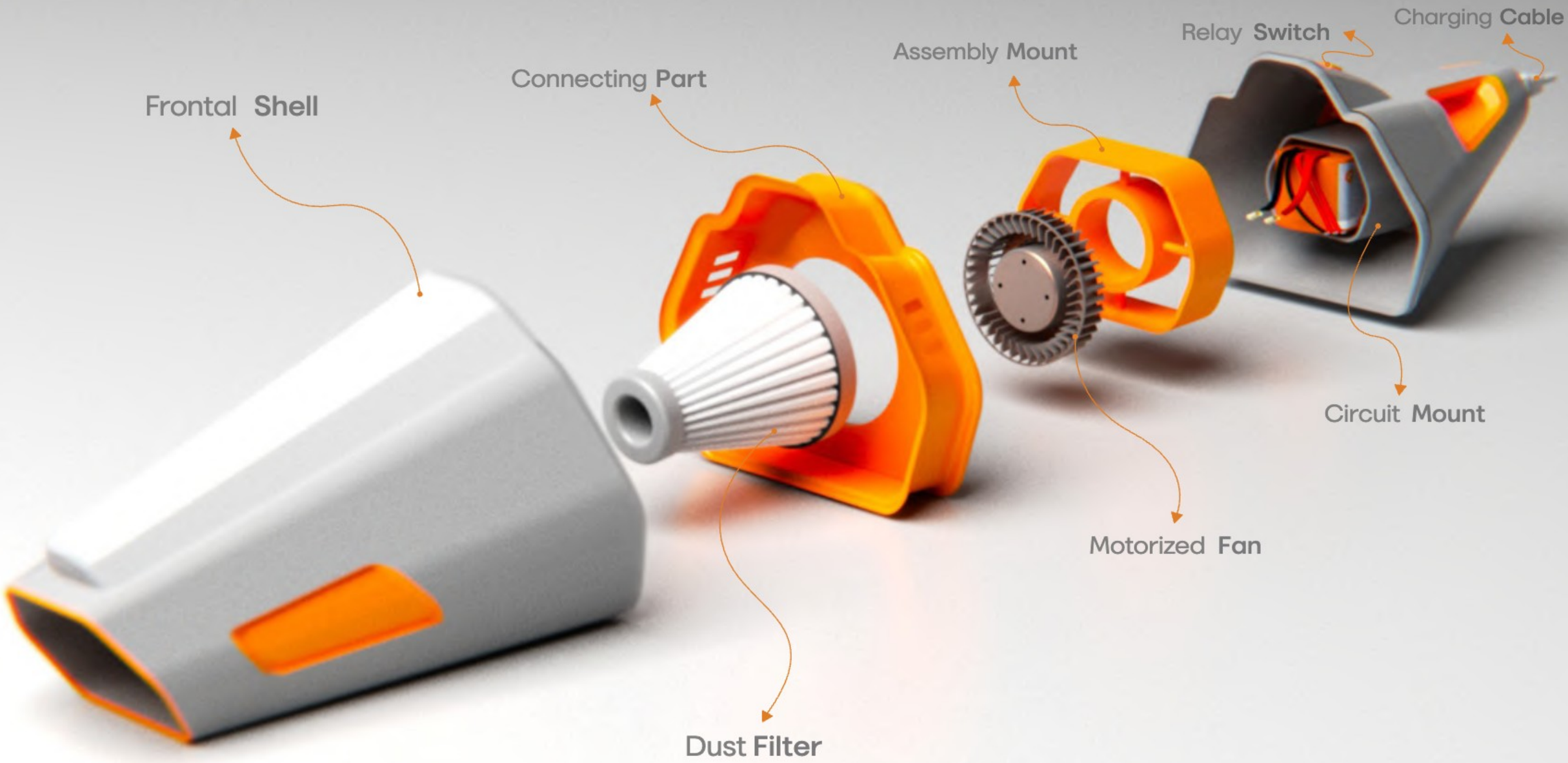
#B6B6B6

#FE8401





Exploded View



Product Distinctions

Assembled Product

Primary Assembly

Secondary Assembly

Easy to Clean

No-tool Assembly

Assembly Mounts

Green Design

The assembly of the product is categorised in three segments that can be disassembled by snap-on battens and hence no tools are required. This makes the product easy to disassemble, and clean. Furthermore different parts are assembled in assembly mounts. The overall approach helps the user to self repair and replace parts making the product sustainable.

05

Philips Z Speaker

Solo Project | Form Transition

3 weeks | 2019

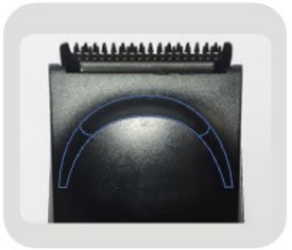
Product Brief

Availing the design language of an existing product keeping in mind the brand identity, transitioning a new form and designing a speaker that incorporates all the visual features of a chosen parent product. The objective was to design a practical form blended with the accurate CMF keeping in mind the parent product inspiration.

PHILIPS QT4009

Form Analysis

Elements



Smooth Chamfer

Step Chamfer

Fillet

Character Line

Texture

Colour Scheme

PHILIPS QT4009

Principles

Rhythm

Scale

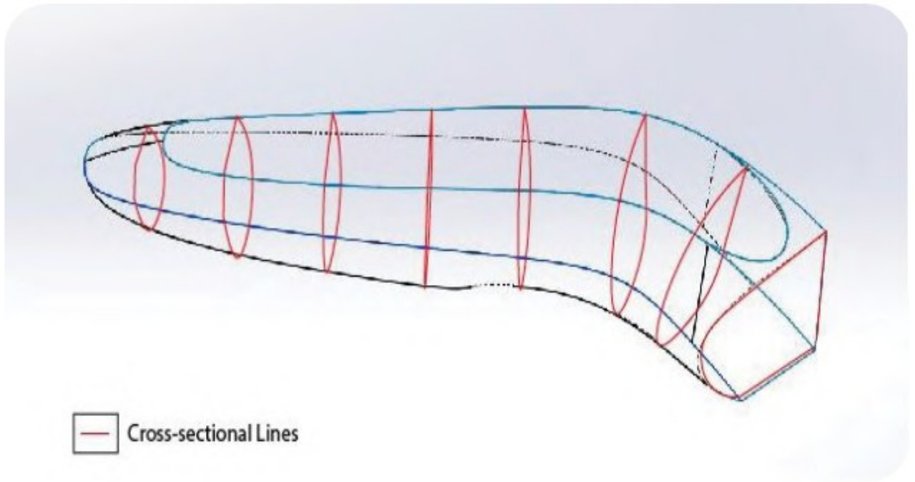
Harmony

Contrast

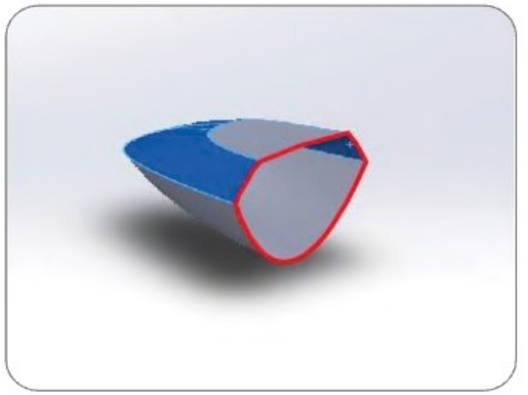
Emphasis

Balance

Cross-Section Analysis



1



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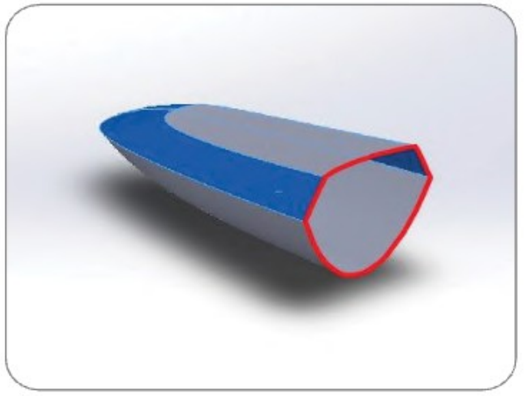

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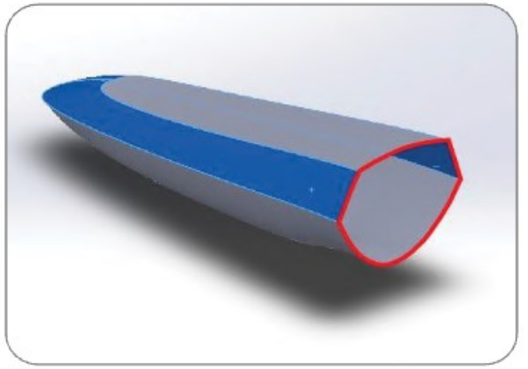

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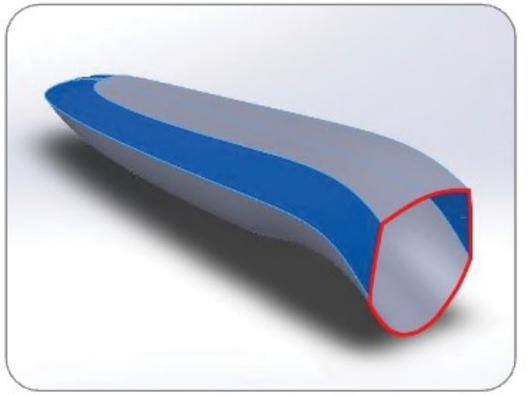

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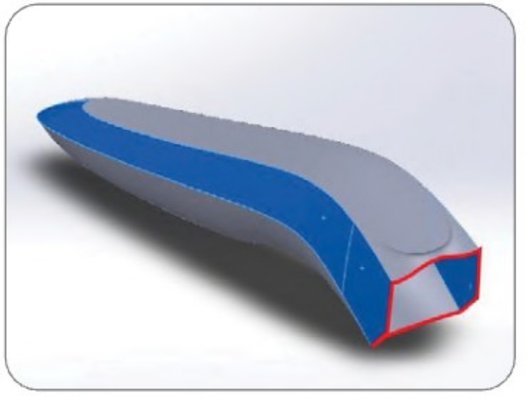

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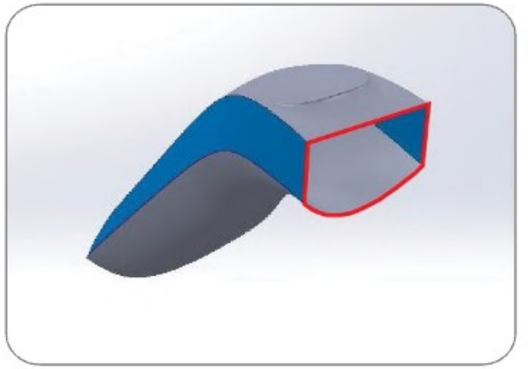
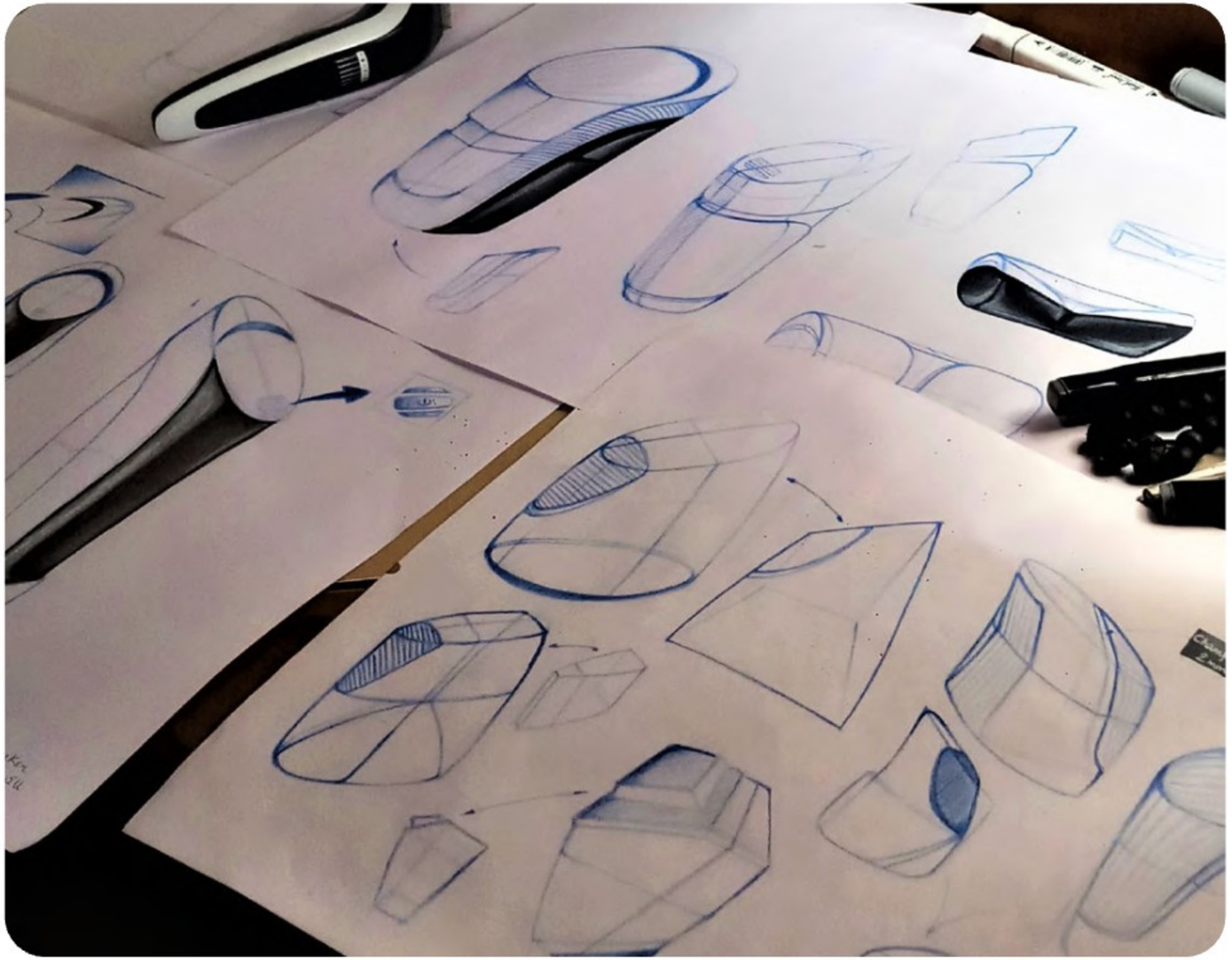


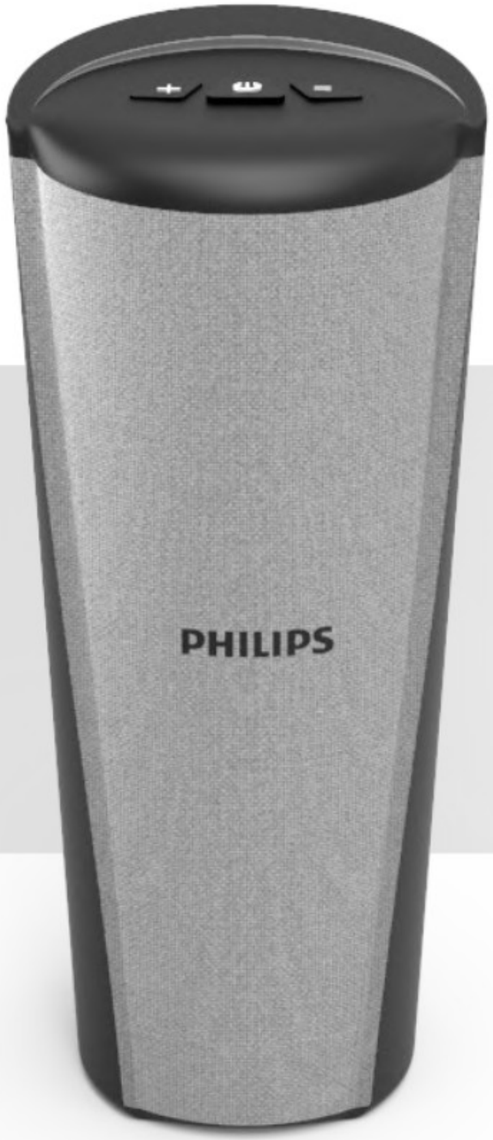
Product Ideation

Product Board

Ideation Sketches



Design Aspects



Design Aspects

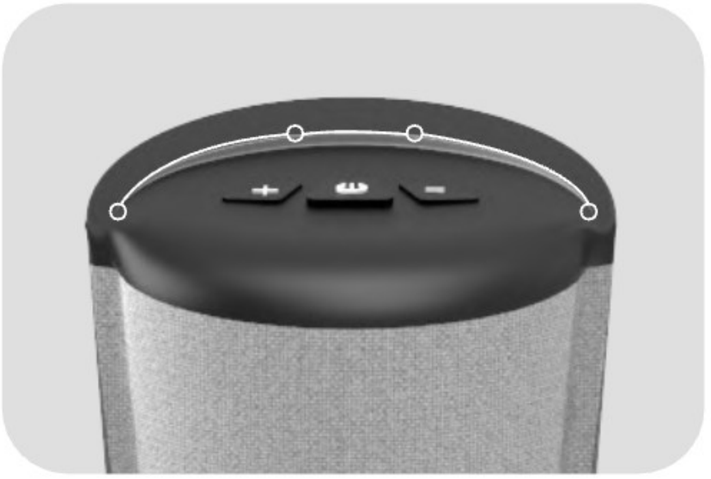
Chamfer

The form profile was inspired from a segment top view of the trimmer. The element was chosen because of it's angled flux chamfer. The flux made the profile look dynamic and flowing in conjunction.

Flow

The principle flow of the trimmer was inspired in the speaker to have a similar flow along the line of action. Also the balance around the line of action has been followed with the same contrasting color scheme.

Design Aspects



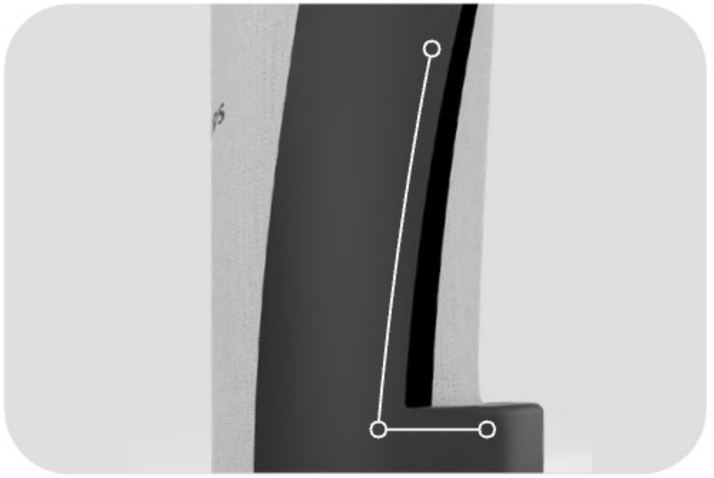
Bevel

The form blend into steps on the trimmer has been inspired as an element on the speaker where the bevel connects the chamfer rails and makes the flow a continuous loop. This design aspect also highlights the base form of the speaker.

Taper

The tapering base form of the trimmer has been incorporated in the speaker design to add sophistication and dynamic features. The rails around the product also have been color marked with contrasting color scheme for consistency.

Design Aspects



Character Line

The character line on the trimmer that highlights a step-down feature has been used as an inspiration for the base of the trimmer. The character line on the speaker is also accompanied with a chamfer as on the trimmer.

Silhouette

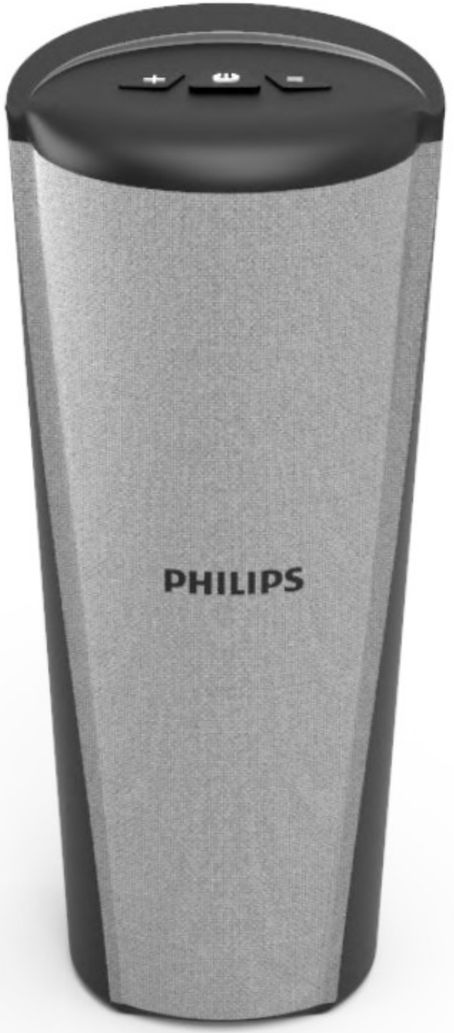
The silhouette of the blade is considered to form the base profile of the speaker buttons. The buttons profile also is kept tapering inside to blend with the form of the speaker. The buttons panel is also tilted towards the user.

Product Features

AUX

USB 2.0

USB TYPE-C



POWER / MODE

VOL + / PLAY +

VOL - / PLAY -

Product **Specifications**

Product **Materials**

Polypropylene

Polyester Grill

Product **Prototype**

Color **Swatches**

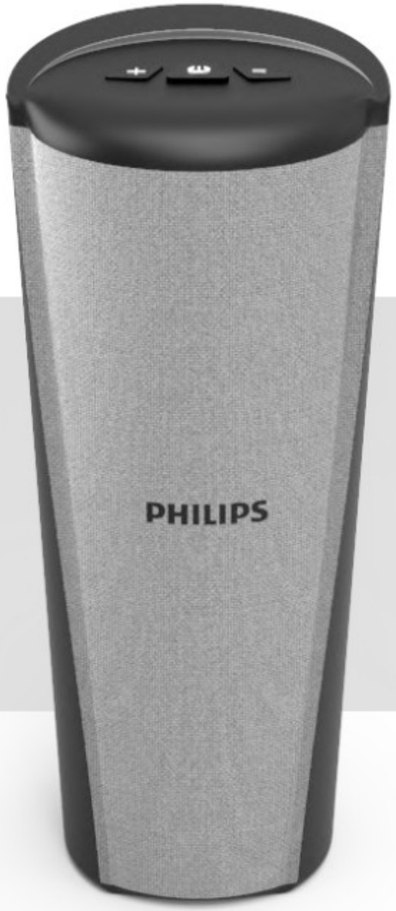
#C3C3C3

#3C3C3C

#FFFFFF

Product **Dimensions**

Product Internals



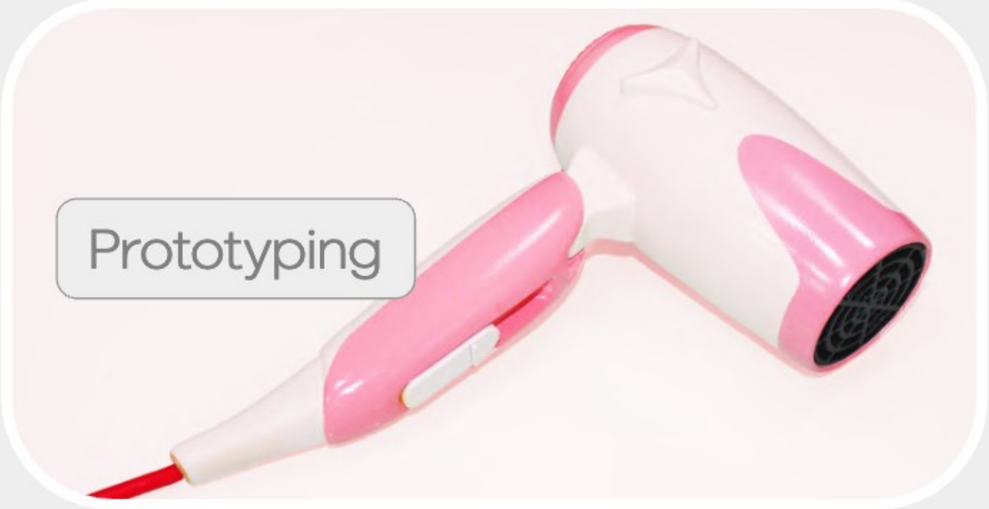

LIPS

06

Additional Projects

Titan Suitcase

Prototyping

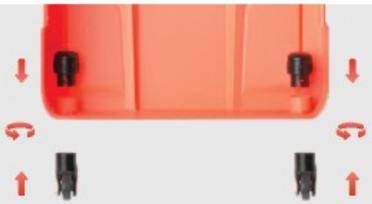


IKEA Paperweight

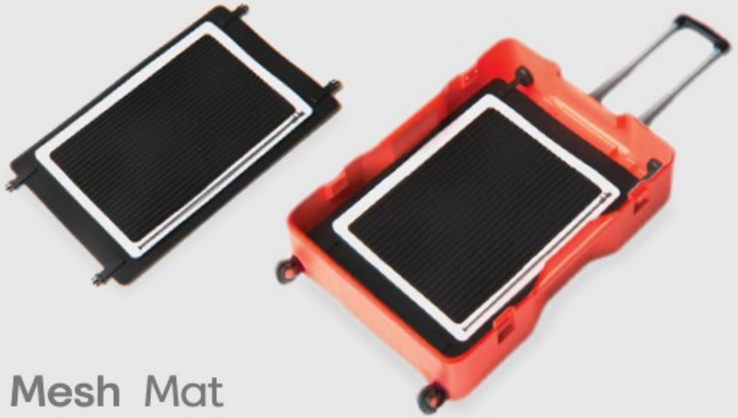
Titan Suitcase

Modular Design

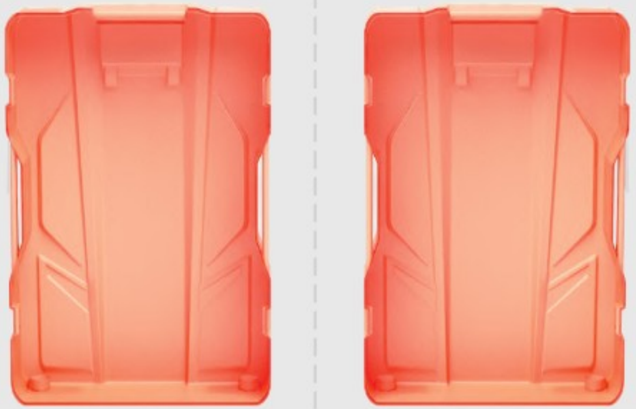
Wheel Mounts



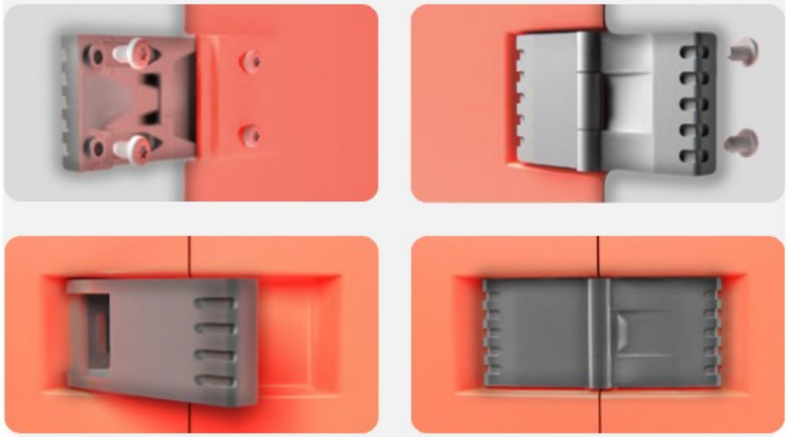
Wheel joinery



Mesh Mat



Symmetric design



Flap Assembly

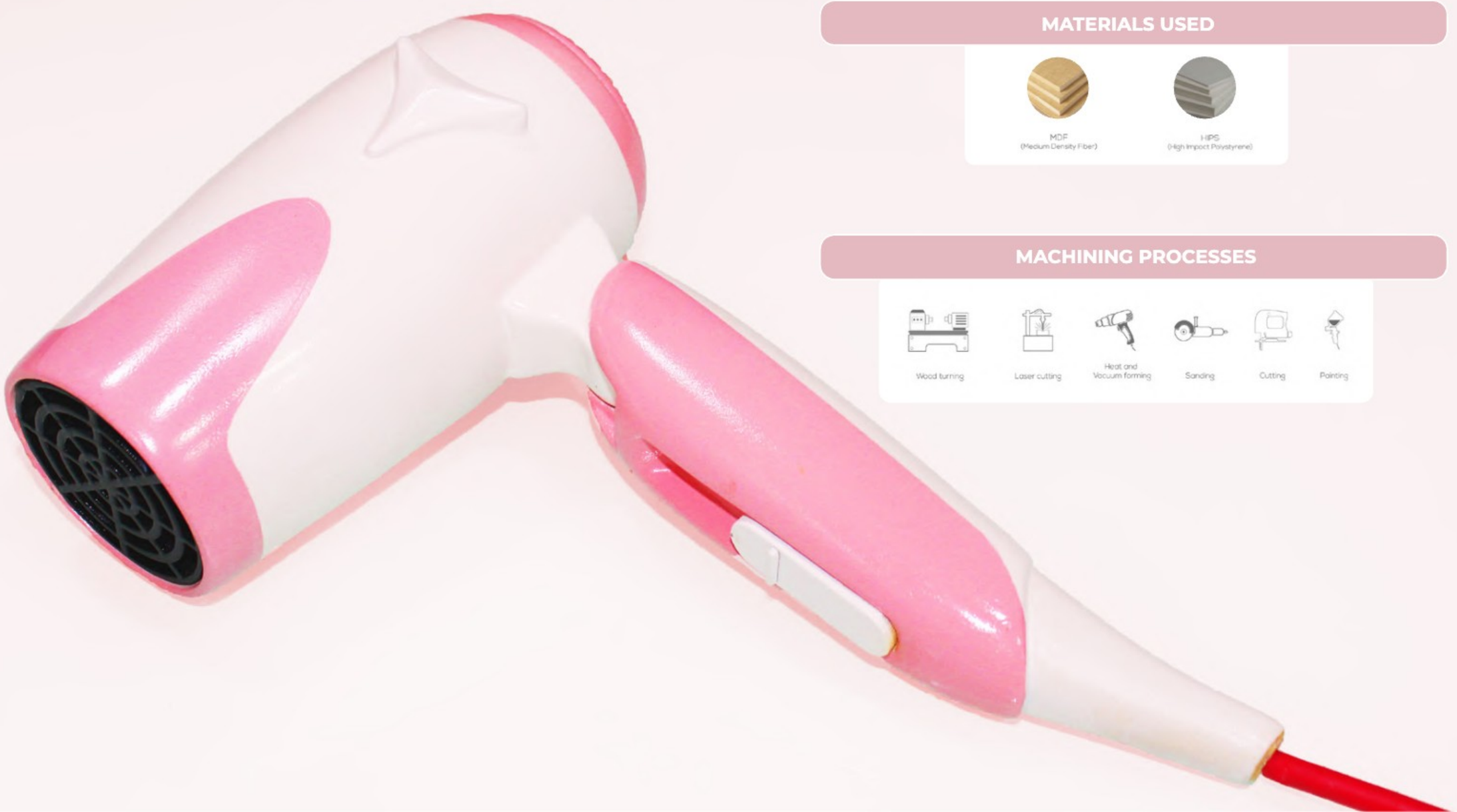
Access Pouch

Dismountable Handle

Stackable Body

Mat and wheel joinery

Product Prototyping



MATERIALS USED

MDF
(Medium Density Fiber)

HIPS
(High Impact Polystyrene)

MACHINING PROCESSES

Wood turning

Laser cutting

Heat and
Vacuum forming

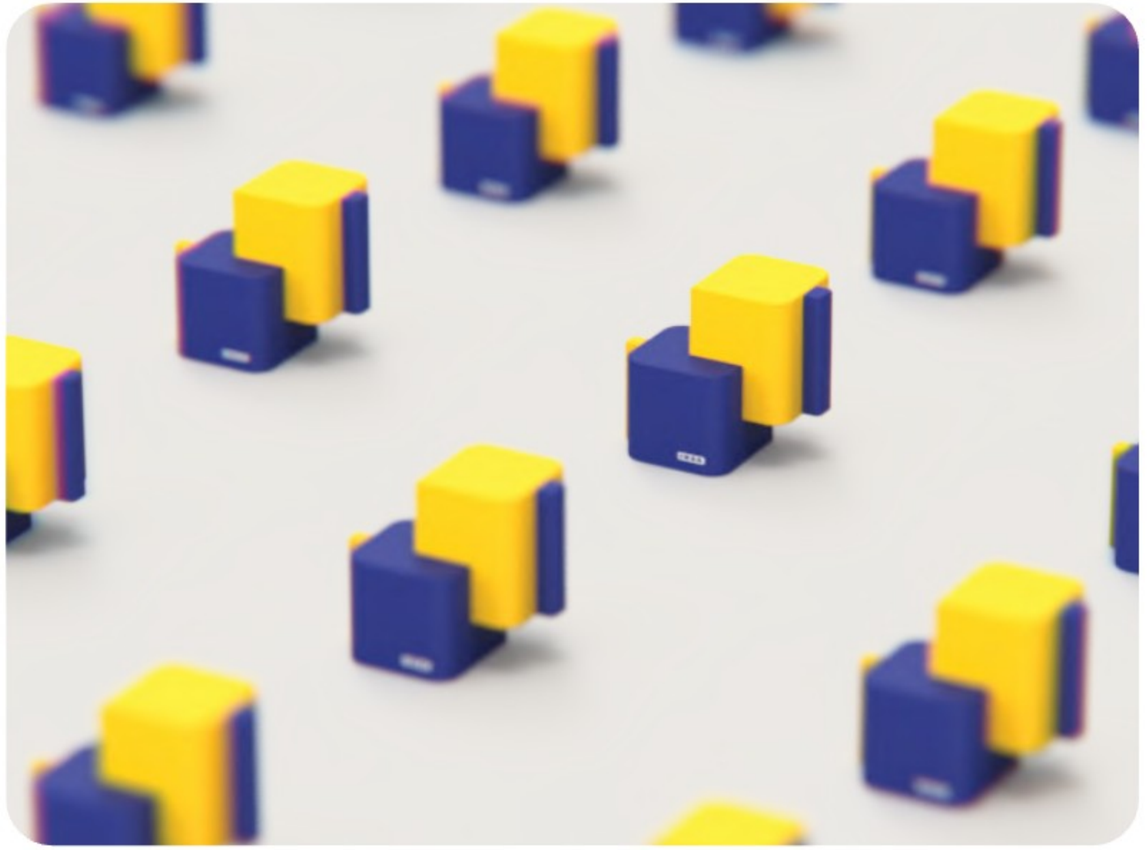
Sanding

Cutting

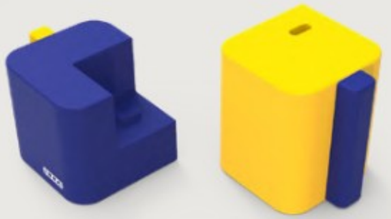
Painting

Form & Function

IKEA® PAPER WEIGHT



Symbolic of the brand identity



Snap fit joinery

Self-assembling design

Two point paperweight

Thank You!

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//sarthaktavate@myportfolio.com/