Anavi Dhawan

INDUSTRIAL DESIGNER & SUSTAINABLE INNOVATOR

PORTFOLIO 2019

Hi there!

I am a recent graduate in product design. When working on design projects, I find it essential to keep in mind sustainability, the end user' real needs and the system around the product. I enjoy building, inventing and using applied sciences in my designs. Apart from design, I enjoy creating visual art and photographs, cooking and origami in my free time.

Client experience:

HAVELLS
College Partnership Project

accenture
College Partnership Project

bang*
Internship

PROJECTS

1/ Enlumena HAVELLS

A solution to static home decor lighting.

2/ Passive pre-cooler

A solution to reducing food loss.

3/ Hang

A damage-free solution for decorating walls.

4/ Frugal Mobility accenture

Ecosystem of mobility solutions for St. Jean, Villeurbanne, France.

5/ Quick Projects

HAVELLS

ENLUMENA

Fluid decor lighting for upper-middle class Indian homes

THESIS PROJECT
3.5 MONTHS, JAN-APRIL'19

Designed for Havells.

What Havells Wanted

Lighting for ***everyday living***
(residential lighting)

Lighting ***beyond static illumination***
(value addition, multi-purpose)

Lighting that is ***holistic***
(keeping in mind future of homes, sustainable)

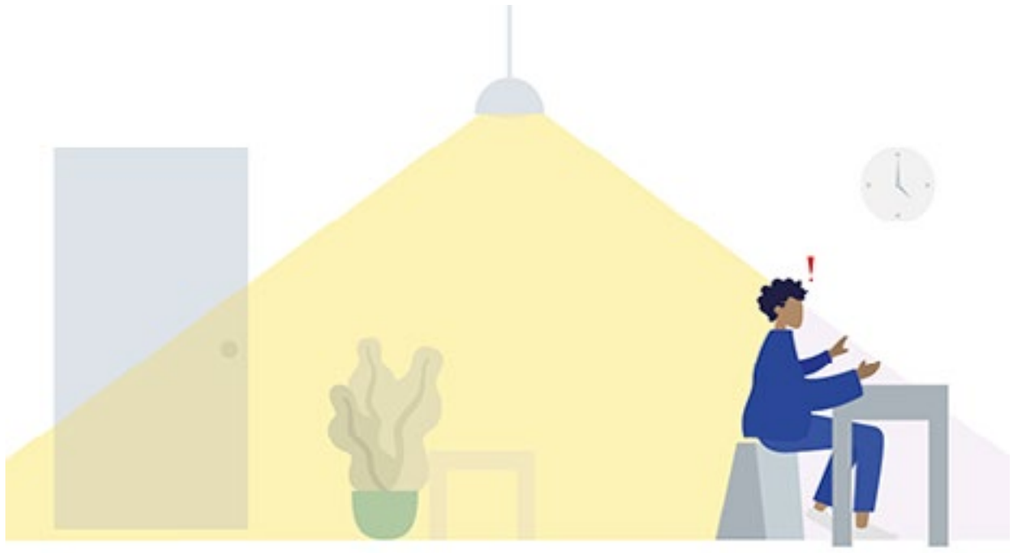
Lighting that ***connects emotionally***
(human-centric experience, inspiring form)

HAVELLS:

- Established at an industry level
- A new name in consumer décor lighting

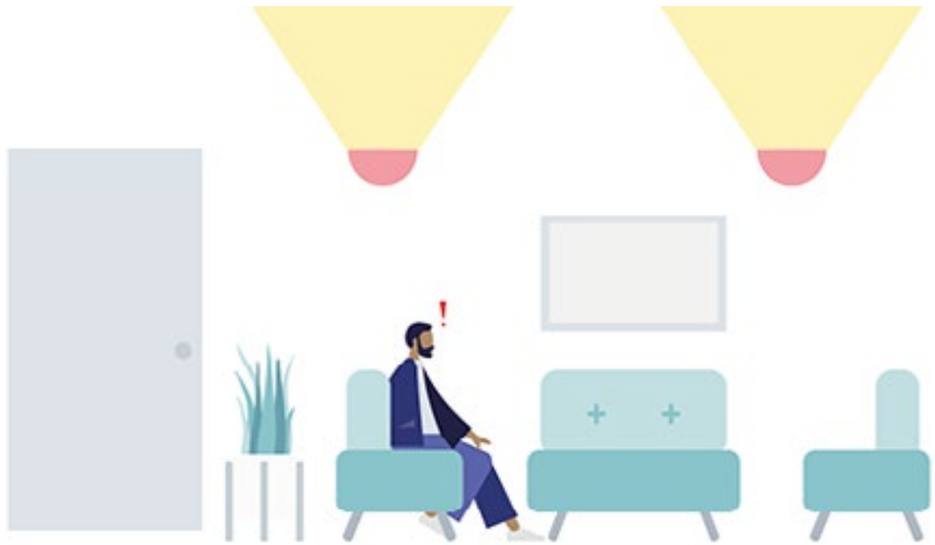
Current range of consumer decor lighting

Why is Adjustable (position of) Lighting Needed?



Position of light for task based activities.

Investment in multiple task lights.



Position of light in relation to furniture.

Glare from front-facing tube-light.

Product Positioning

Key words for the design language:

Robust

Inspire

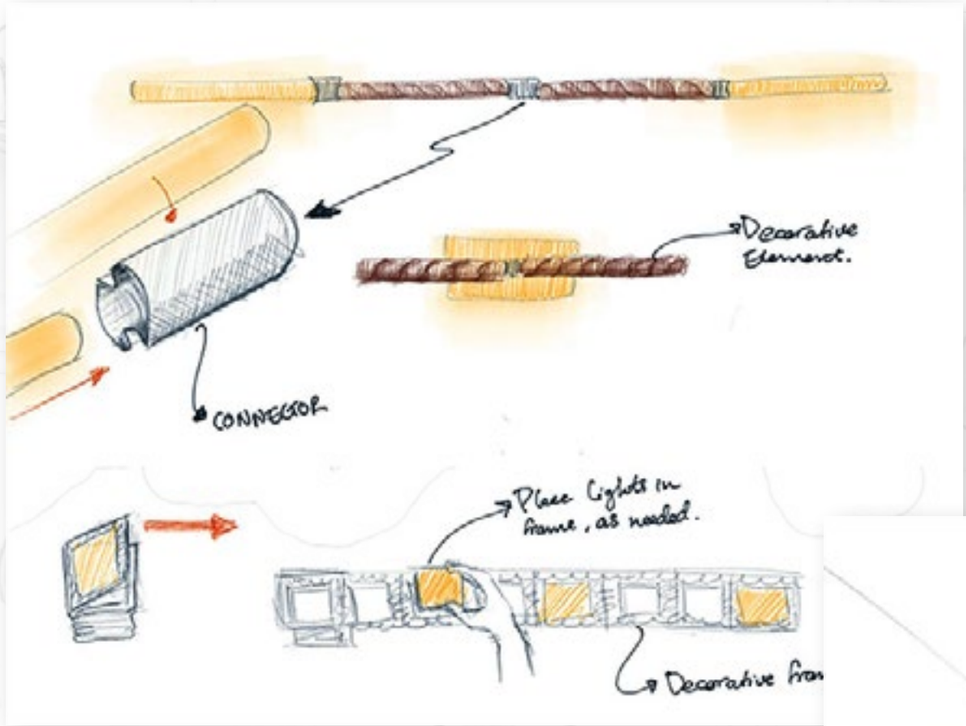
Customer Delight

Leadership by Example

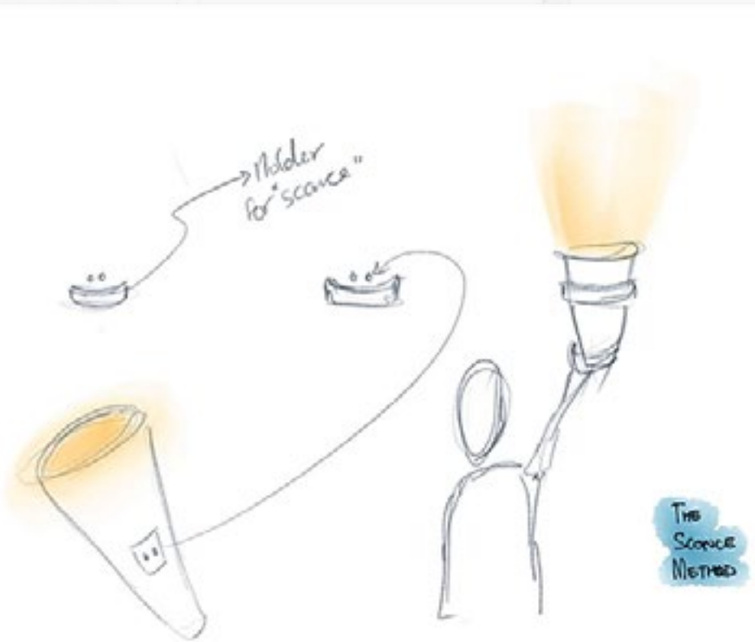
Integrity & Transparency

Pursuit of Excellence

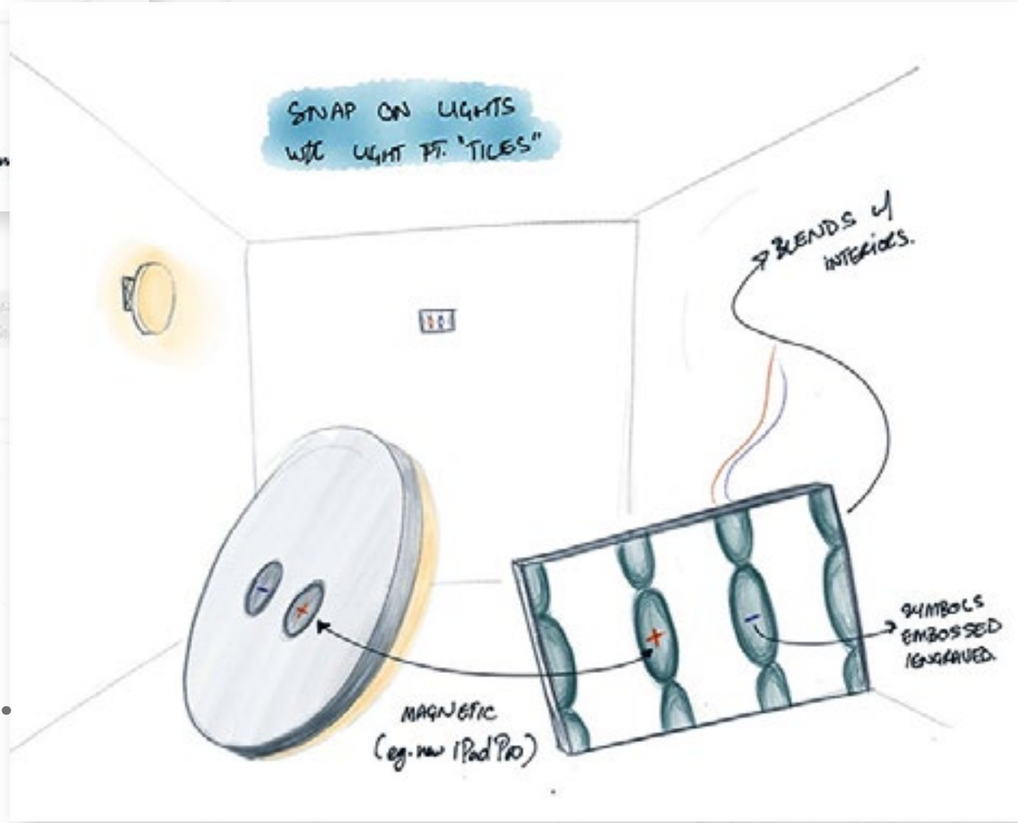
Combining Ideas



CONDUCTION THROUGH DÉCOR



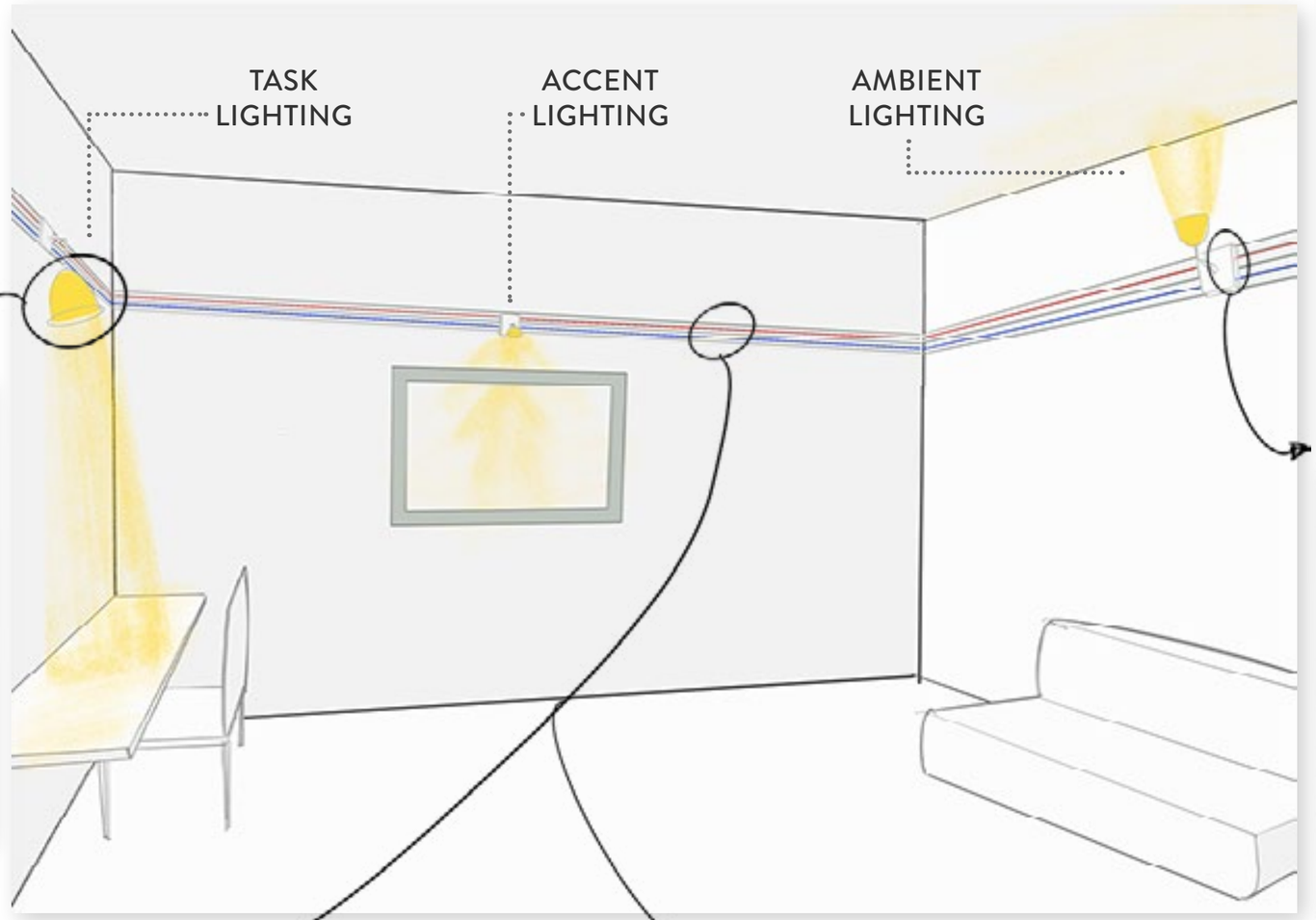
MULTIPLE LIGHT POINTS INTEGRATED AS WALL MOULDING



DETACHABLE LIGHT + MAGNETIC CONDUCTION

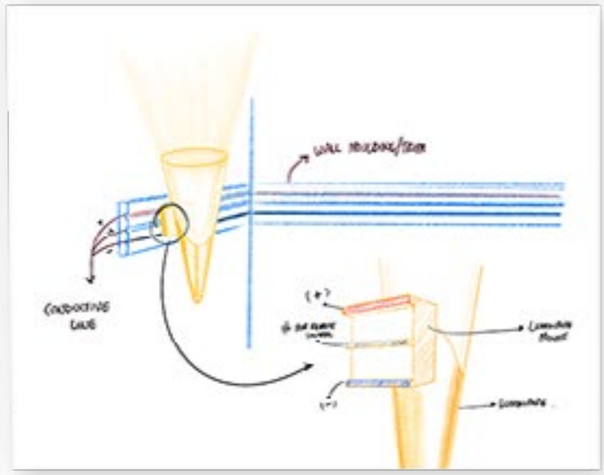
Developing the Concept

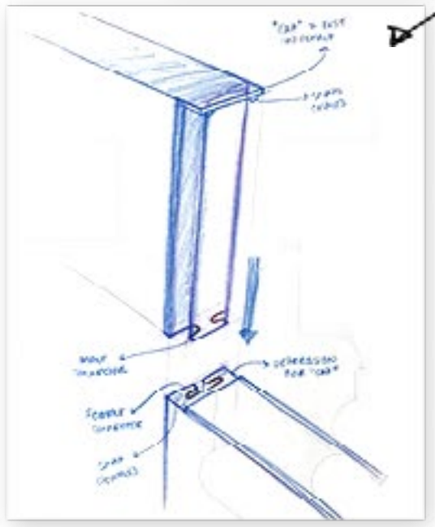
Options for the various features of the lighting track and luminaire.



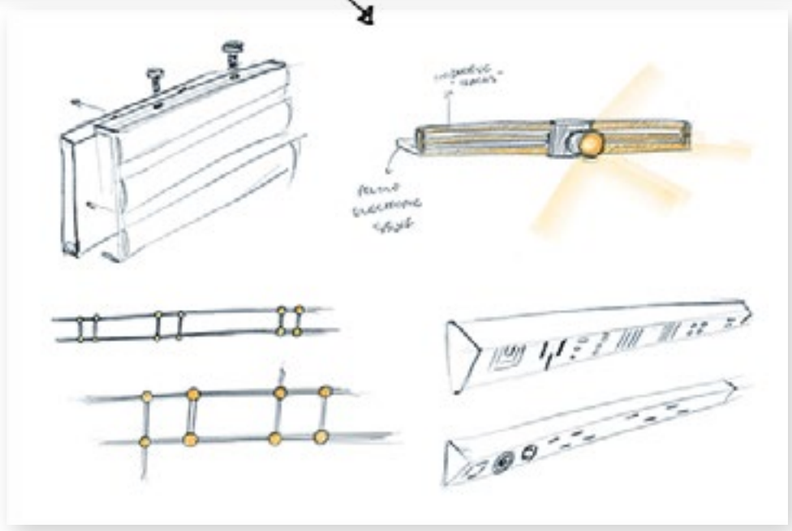
LIGHT FORM DEVELOPMENT

LIGHT TO TRACK CONNECTION

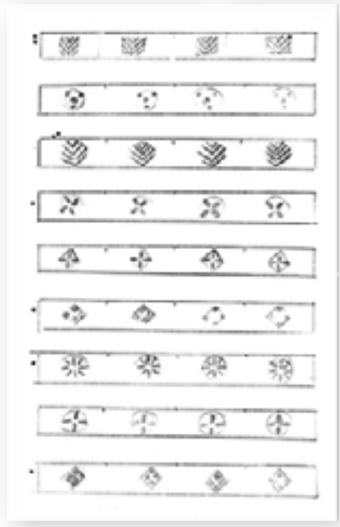




LIGHTING TRACK EXTENSION

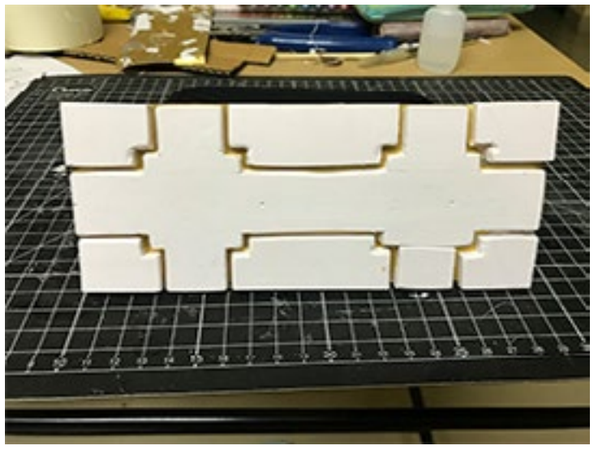
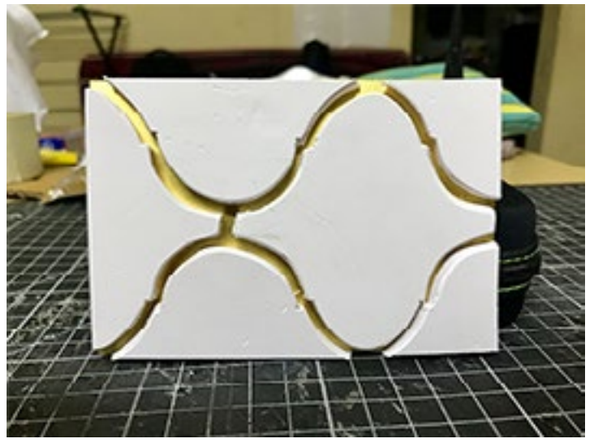
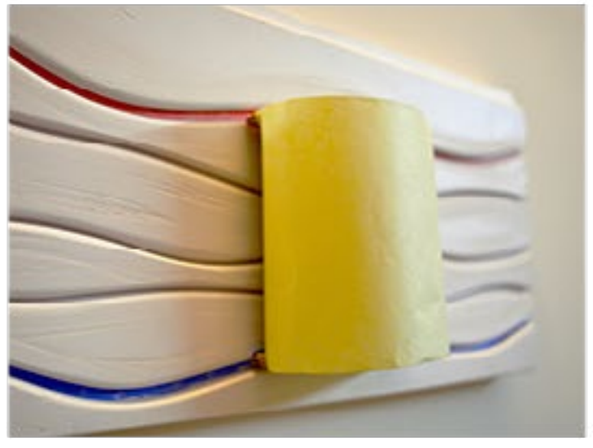


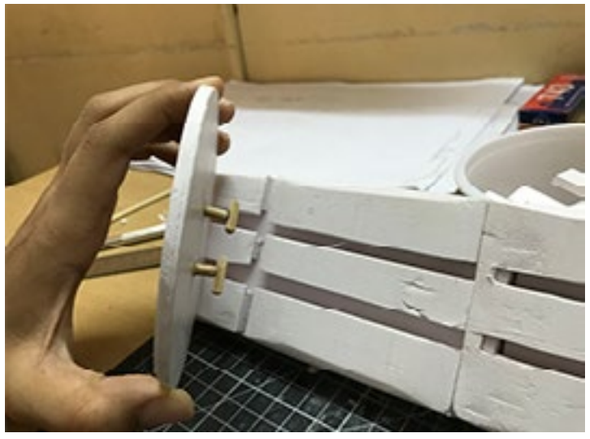
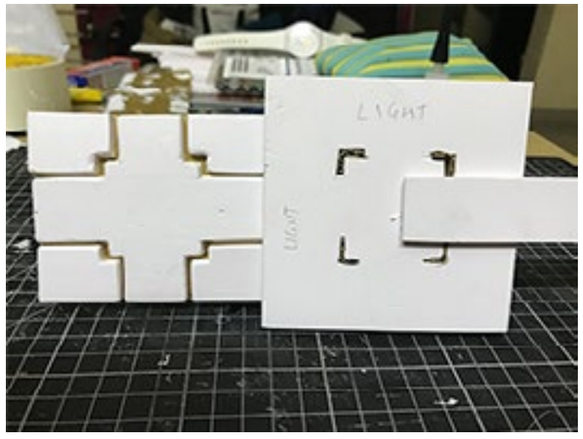
LIGHTING TRACK FORM & ELECTRICAL CONDUCTION

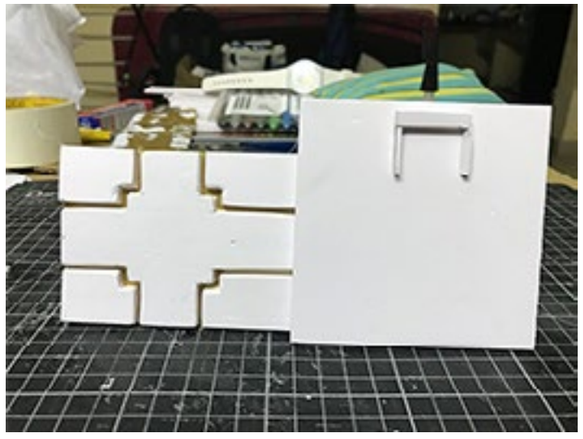
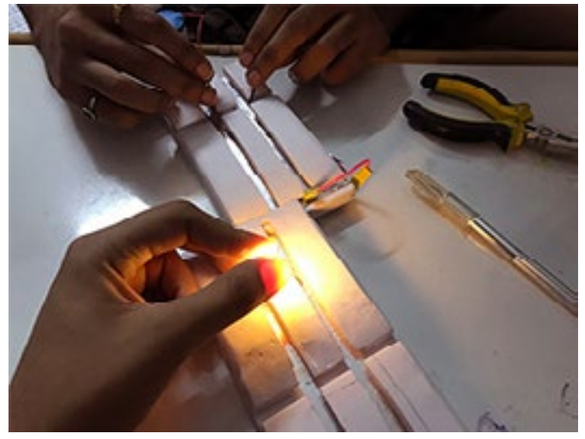


Developing the Concept

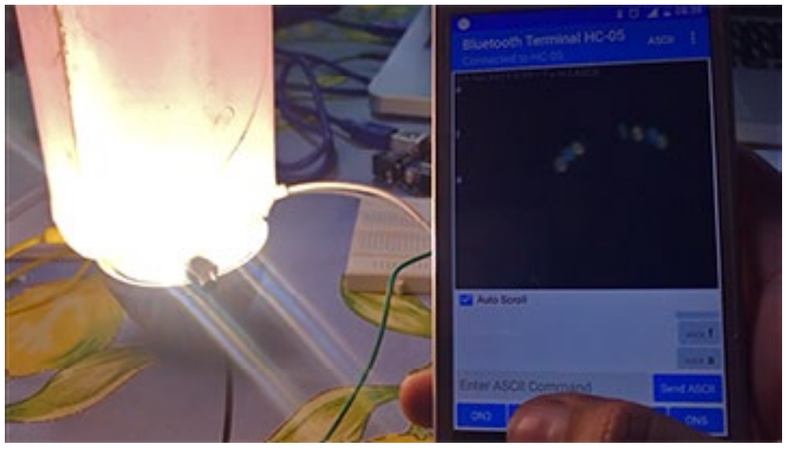
Testing usability & forms for the lighting track and its electrical connections through mock-ups.



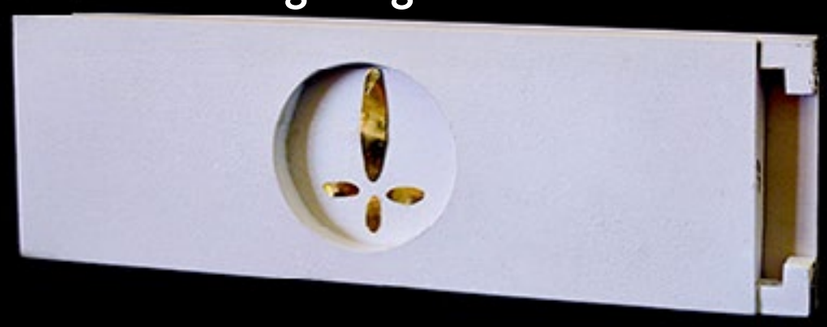


Prototype

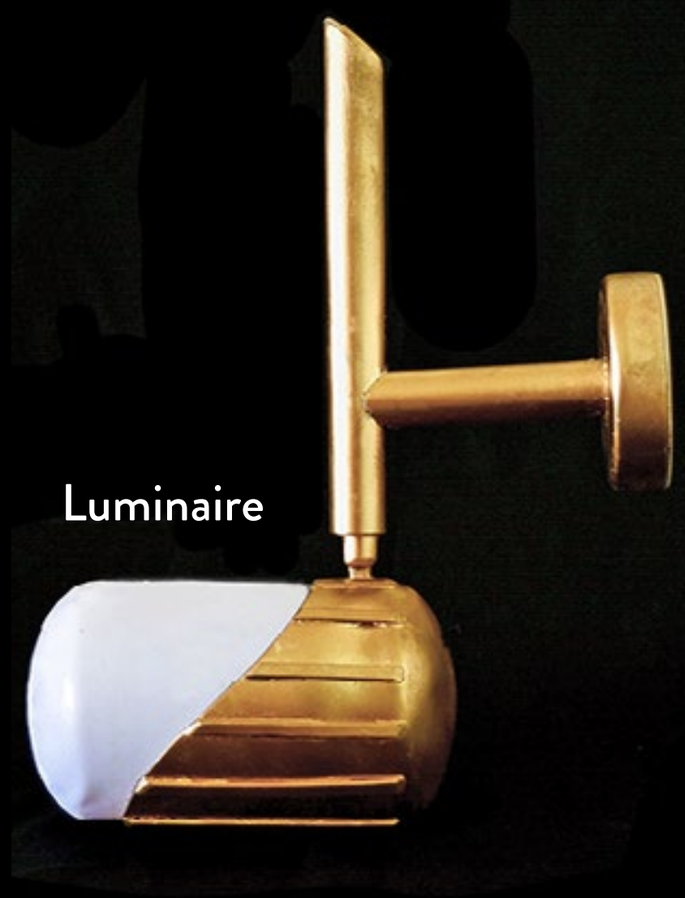
Luminaire: 2mm vacuum formed HIPS, 1mm vacuum formed PC, PVC, electrical & other components
Lighting track: 2mm HIPS, brass sheet, electrical & other components

Lighting Track (3’)

Lighting Track extension (1’)



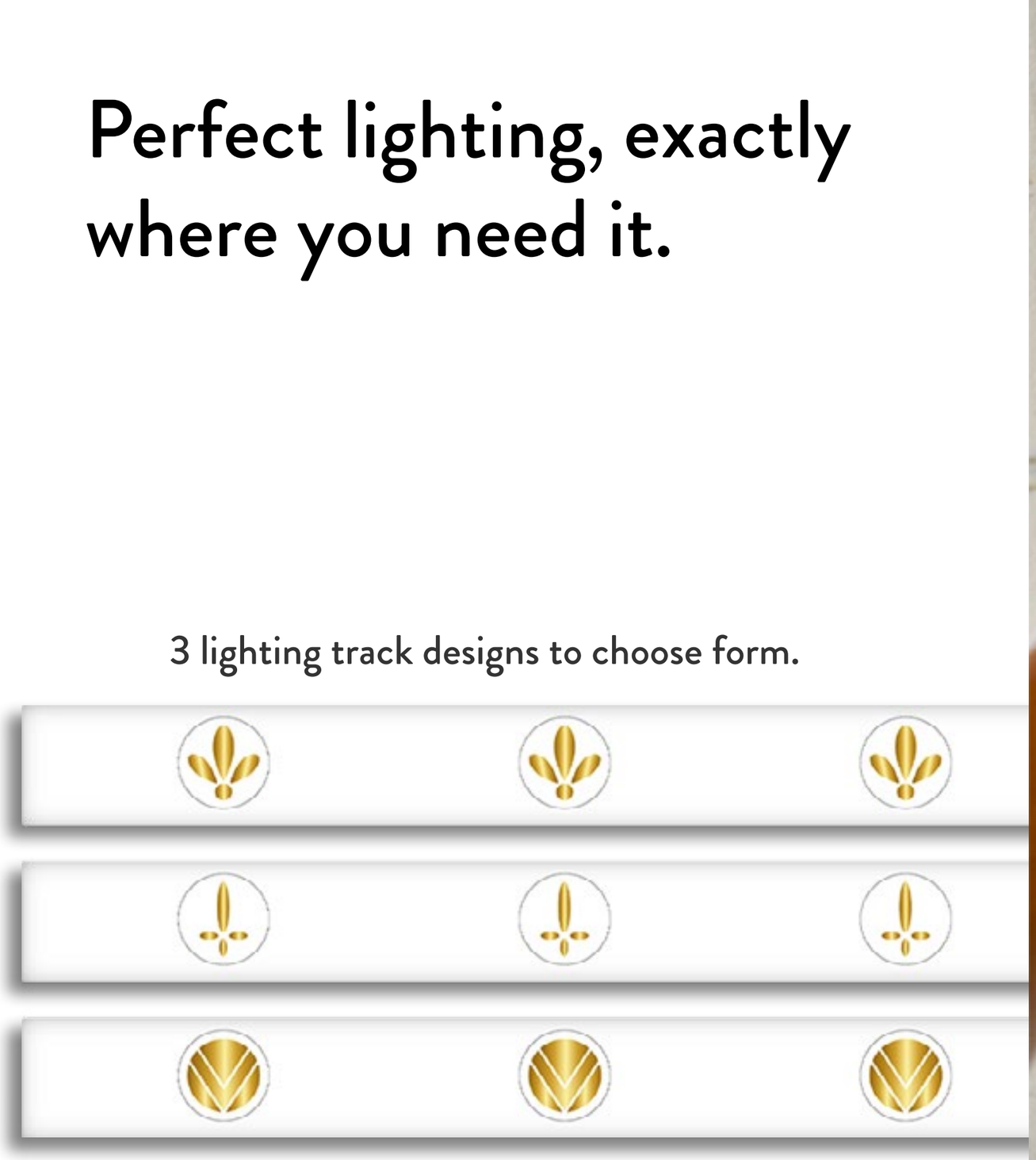
Brass conductive terminals
on luminaire



Luminaire

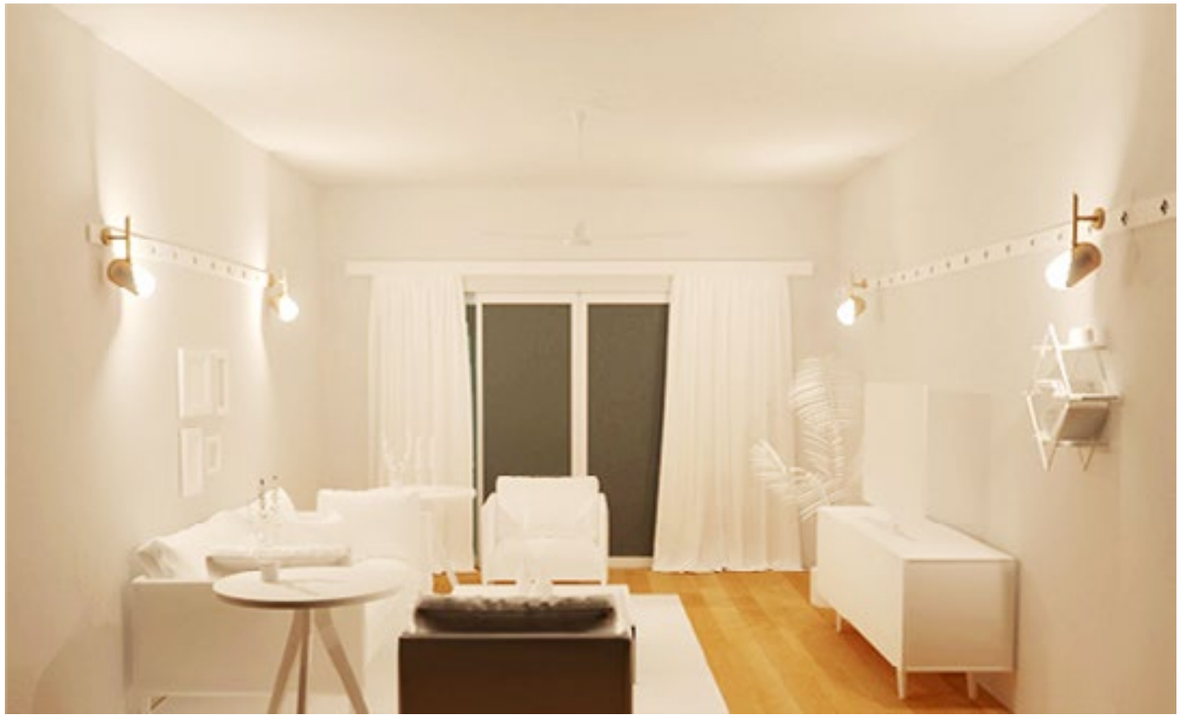
Perfect lighting, exactly where you need it.

3 lighting track designs to choose form.

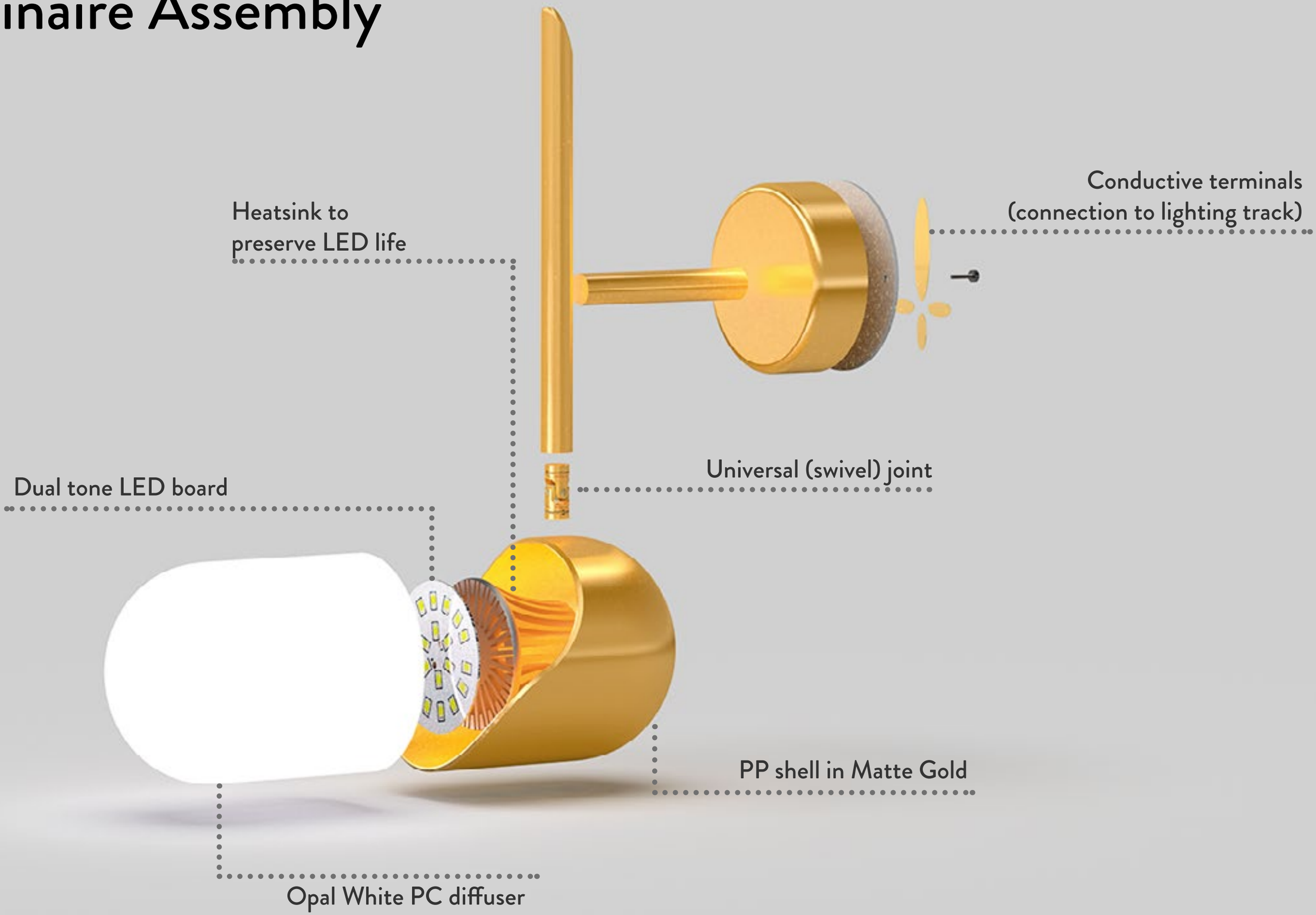


Features

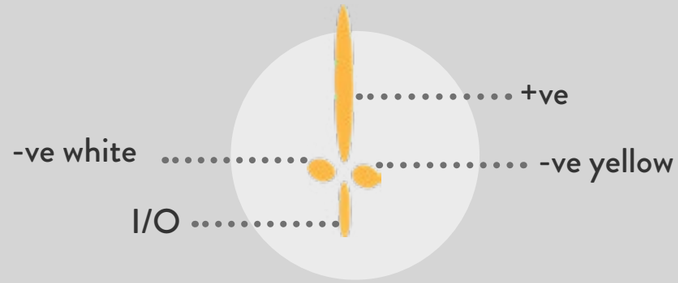
- Adjustable position of light through decorative lighting track
- Plug-in/plug-out luminaire (magnetic + snap-fit)
- Directional light
- Warm White to Cool Daylight (2800K-6000K)
- Dimmable



Luminaire Assembly



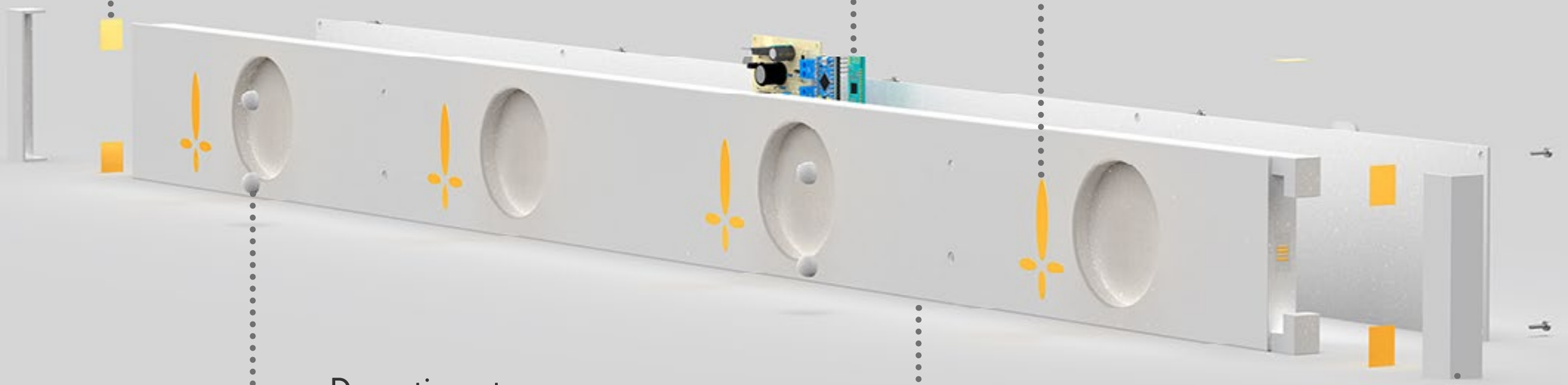
Lighting Track Assembly



Electronics (LED driver, BT module, relay PCB)

Brass conductive terminals (track to track)

Brass conductive terminals (light to track)



Decorative nuts for wall mounting

PP body with drywall texture to blend in.

Insulative cover

by Havells

Why adjust to light?

PASSIVE PRE-COOLER

Passive pre-cooling for horticultural farm produce

PRE-THESIS PROJECT
3 MONTHS, AUG-OCT'18

The Challenge: Food Loss

Food loss is the “decrease in quantity or quality of food” of all food produced for human consumption but not eaten by humans (FAO, 2014). It takes place majorly along the supply chain.

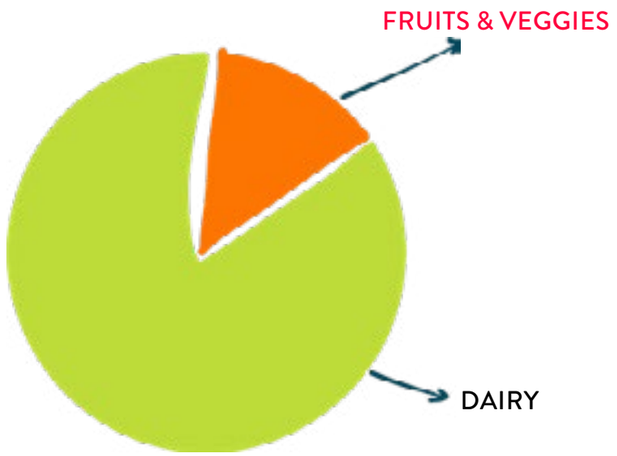
In India, the main causes are:

MULTIPLE INTERMEDIARIES & HANDLING

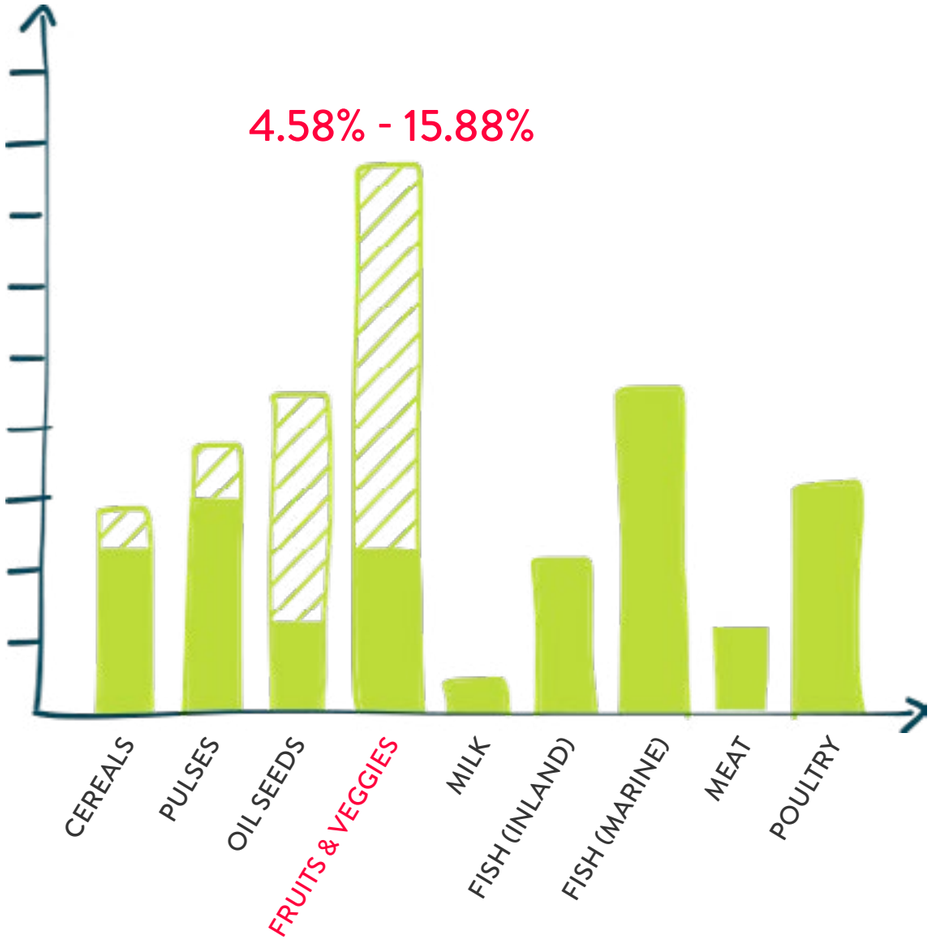
ABSENCE OF RELIABLE MARKET INFORMATION

SUB-STANDARD TECHNOLOGY & TECHNIQUES

TRANSPORT INEFFICIENCIES



Cold Storage Transport Allocation



Cumulative Losses in Crops

*Research has been done in context of India.

Sources: Report on Assessment of Quantitative Harvest and Post-harvest Losses of Major Crops and Commodities in India, CIPHET; Numadic.com; “Supply Chain Management in Agriculture”-Reading material, MANAGE

Types of Damage

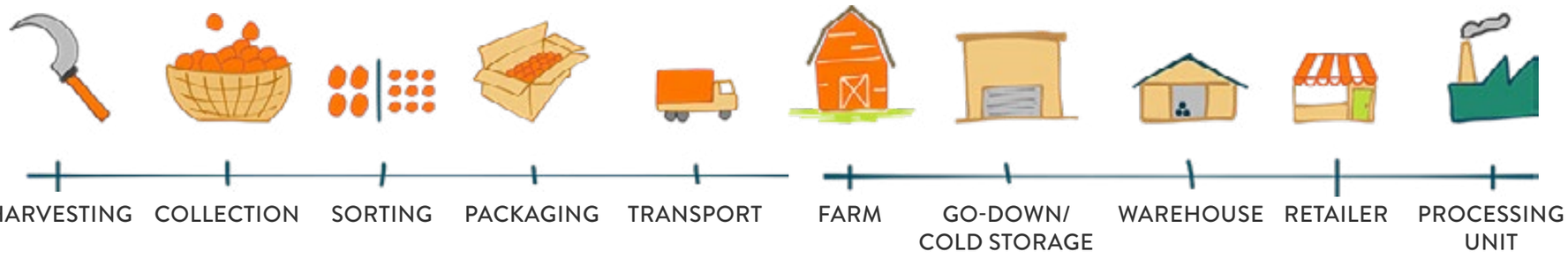
Metabolic Processes

Mechanical

Disease & Fungus

Birds, Rodents & Insects

Areas of damage occurrence



Why Pre-cooling?

Pre cooling refers to the removal of field heat, shortly after the harvest of a crop. Field heat must be removed as soon as possible, as the longer that produce stays at a higher temperature, the more will its shelf life reduce.

SLOWS DETERIORATION OF PRODUCE

BETTER QUALITY = BETTER PROFITS

REDUCES LOSS FOR FARMER

REDUCES LOSS ALONG THE FOOD CHAIN

HUNT STATEMENT:

EXPLORE MATERIAL & METHODS TO DESIGN A PRE-COOLING METHOD FOR CERTAIN TYPES OF FRUITS AND VEGETABLES TO BE USED BY FARMERS IN RURAL BANGALORE .

Source: Pre-cooling of Agricultural Products , https://energypedia.info/wiki/Pre-cooling_of_Agricultural_Products

Context

AKSHAYA
Founder of farmers' co-op & organic store

RAM
Owner & manager of farm

ABDUL
Marginal farmer

LAXMI
Labourer on farm

CONTEXT

Horticulture farms in Rural Bengaluru

Ideation

→ A YAKHCHAL

These ideas explored cooling using the principles of **Thermodynamics** and the **Venturi Effect.** Inspiration was taken from the **Yakhchal**, an ancient ice storage house.

The Concept

Solar Shading

Induced Ventilation

Evaporative cooling

Insulation

DOMED ROOF CREATES
PRESSURE DIFFERENCES

STALE, WARM AIR GOES OUT

INSULATION MADE FROM JUTE SHEETS, FILLED WITH COCONUT HUSK

EASY **GRIP**

HEXAGONAL FORM SO PRODUCE **DOES NOT GET STUCK** AT THE CORNERS

GROOVED TO PROVIDE
SOLAR SHADING TO WALL

FRESH AIR COMES IN THROUGH TINY HOLES TO REPLACE THE ESCAPED AIR

INSULATED & COATED WITH LIME WASH TO **PREVENT FUNGAL GROWTH**

SLIGHTLY SLOPED FLOOR TO LET **PRODUCE FLOW TOWARDS THE DOOR**

ELEVATED TO **FILL BAGS** WITH PRODUCE

Estimated to cool interior by 5-8°C

Usage

Farmers harvest produce either in the early morning or late evening, when the sun is low.

The passive cooler is drenched with water to start the evaporative cooling process.

The container can hold approx 40-50kg of produce.

An insulative layer keeps the roof from heating up too much in the Sun.

The produce is left in overnight or till it is ready to be taken to the market.

The marginally slopped floor encourages the produce to flow towards and out the ‘door’.

BENEFITS

- Retains quality & freshness for longer
- No electricity required
- Uses local resources and skill
- Copy-left design (can be reproduced by local community)

Building (1:1 prototype)

THE ROOF AND INSULATIVE COVER

THE BASE AND DOOR

The terracotta is mixed with 10% ash to improve the porosity after firing. More porous = better evaporative cooling.

Coiling method was used to create the structure.

The roof was made in two parts.

Coconut husk is filled inside the door as insulation.

Render in context

HANG

The damage-free frame hanging kit for rented spaces.

COLLEGE PROJECT
2+4 WEEKS, AUG-OCT'17

Decorating Walls

Hanging picture frames, clocks, paintings, etc. can be problematic and time consuming, especially in rented spaces.

Challenge: To solve the problem of damage to a vertical surface when binding/ hanging/attaching an object(s) onto it.

expertise ↩

↪equipment

↪repair

regulations↩

Geckskin® – Damage-free Mechanical Adhesive

Geckskin® works on the principle of **Van Der Waal's force**, forming a **mechanical bond** with the surface onto which it is pressed. There is no chemical adhesive or glue that is used.

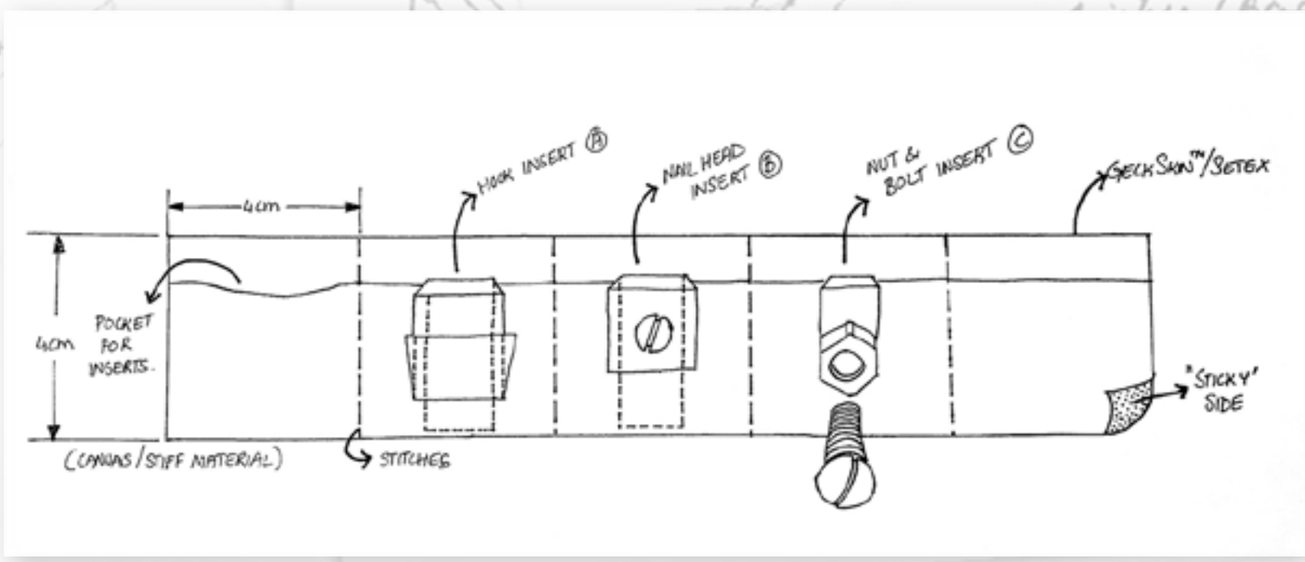
A **piece of 2"x2"** can hold up to **0.45kg** of weight. Griphook™, a product developed using Geckskin®, can be cleaned and **repositioned upto 2 times.**

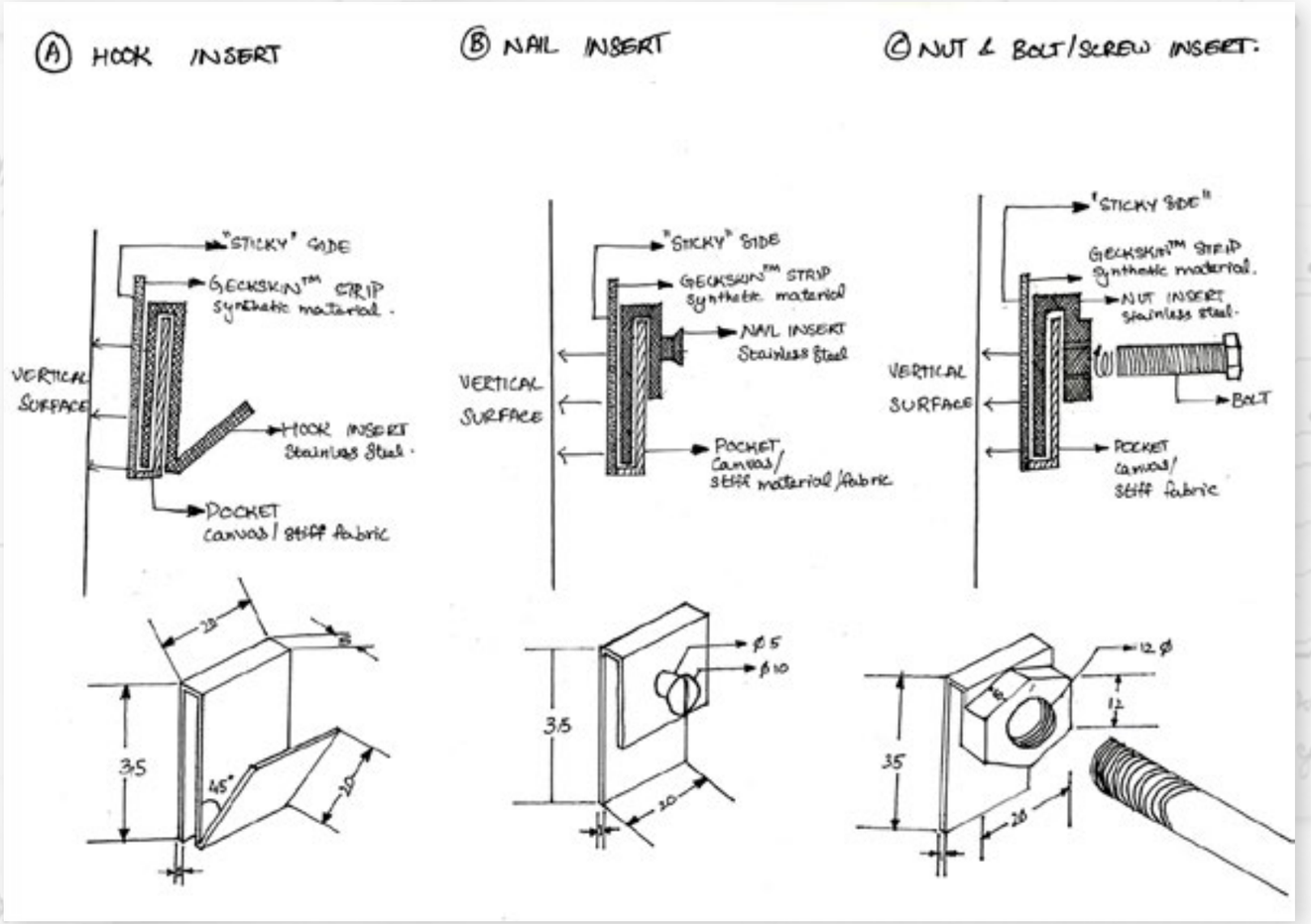
Images from geckskin.com

Phase 1: Initial concept

A strip of **Geckskin®, perforated** at regular intervals so that it **can be torn** and the **required amount could be used. Inserts A, B or C** can be inserted into the "**pocket**" to **suit the object that needs to be hung.**

Example, a hook insert for clothes, a nail head insert to hang a picture frame, a nut and bolt insert to hang something with a broad strap, and so on.





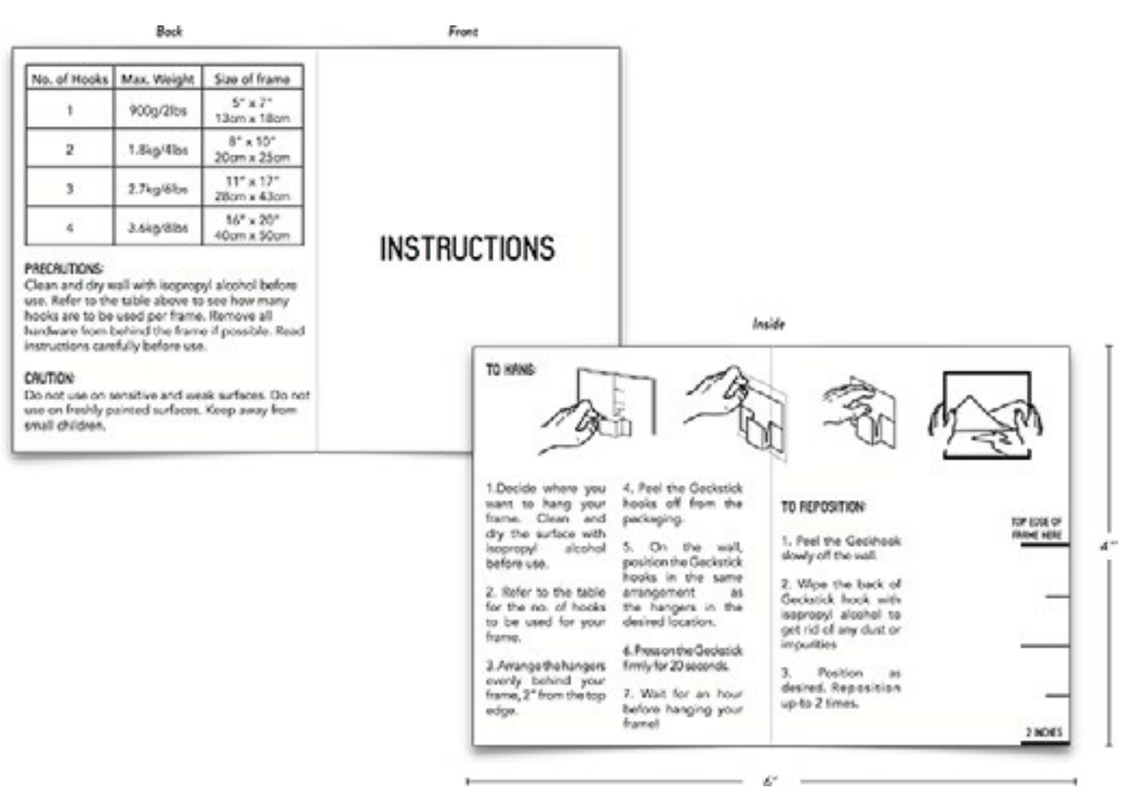
Phase 2: Redesign

Form Exploration

Testing Mock-ups

Weight tested = 900g approx

Prototype & Packaging



How to HANG

1. Choose your frame to hang. Refer to the box for weight restrictions.

2. Peel the liner from the hanger.

3. Centre it behind your frame. Stick it 2” below the top edge.

4. Peel the Geckskin® hook, and press it onto the desired clean surface.

5. Wait for an hour before hanging your frame.

You can also hang canvases directly onto the Geckskin® hook.

without a bang!

The re-usable frame hanger that doesn't damage your walls!

Reposition upto 2 times

No. of Hooks	Max. Weight	Size of frame
1	900g/2lbs	5" x 7" 13cm x 18cm
2	1.8kg/4lbs	8" x 10" 20cm x 25cm
3	2.7kg/6lbs	11" x 17" 28cm x 43cm
4	3.6kg/8lbs	16" x 20" 40cm x 50cm

Made with GECKSKIN®

accenture

FRUGAL MOBILITY

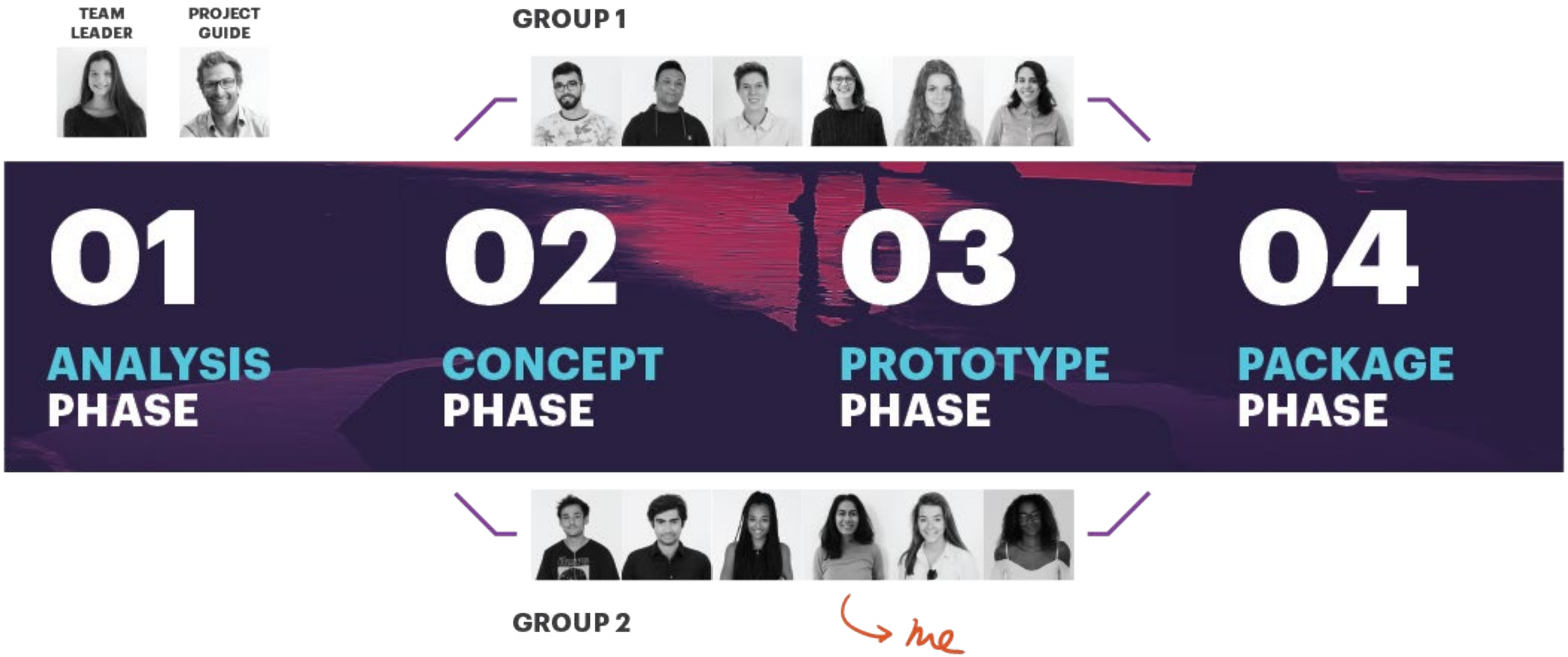
An ecosystem of mobility solutions for the St. Jean quarter of Villeurbanne, Lyon, France.

COLLEGE PARTNERSHIP PROJECT
3.5 MONTHS, MAR-JUN'18 (GROUP PROJECT)

MOVIN'ON by Michelin

Designed in partnership with Accenture. Featured in Movin' On 2018 Summit.

My Role

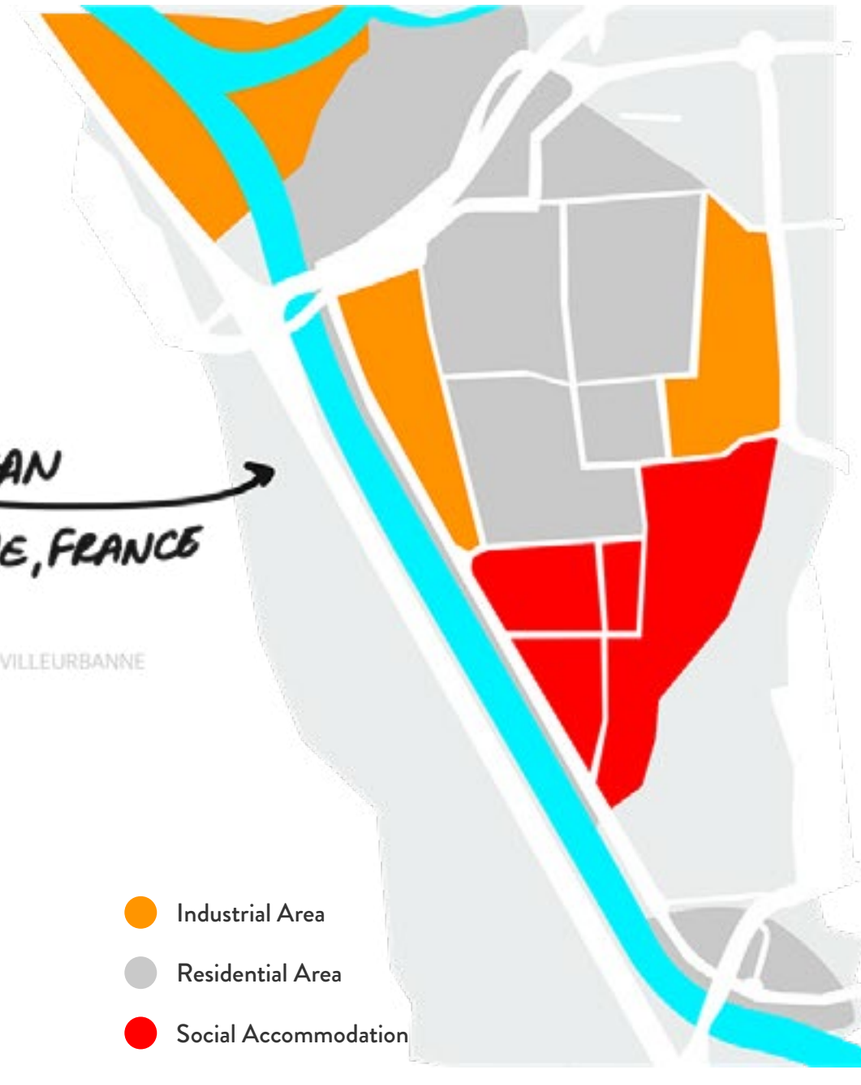


We worked as a group **researching, brainstorming, conceptualising** and thinking of surface level details. I was involved in developing the concept of the **Multi-modal Pole**, the **modular bicycle station**, the **mobility application 'Trans-It'**, and **planning the touchpoints** of the various solutions in the ecosystem.

The Challenge

"Imagine a versatile system to empower people, in order to ease access to employment and drive social innovation, through frugal mobility."

ST. JEAN
VILLEURBANNE, FRANCE



4000
INHABITANTS

450
UNEMPLOYED
OF WHICH
200
ARE PEOPLE UNDER
26 YEARS OLD

2800
IN SOCIAL LODGEMENT

NO DOCTOR

NO POST OFFICE

NO POLICE STATION

2 BUS LINES

What is Frugal Mobility?

Using less resources to make more affordable and inclusive solutions in order to provide better mobility.

CYCLE RICKSHAW
FOCUS ON THE NEEDS

SEATY LOCK
MULTIFUNCTIONAL

DRIVER-LESS
SMART MOBILITY

The Residents' Needs

"I would like to share my experience with young people and open their mind."

Sébastian, 35 y/o
EmerJean employee

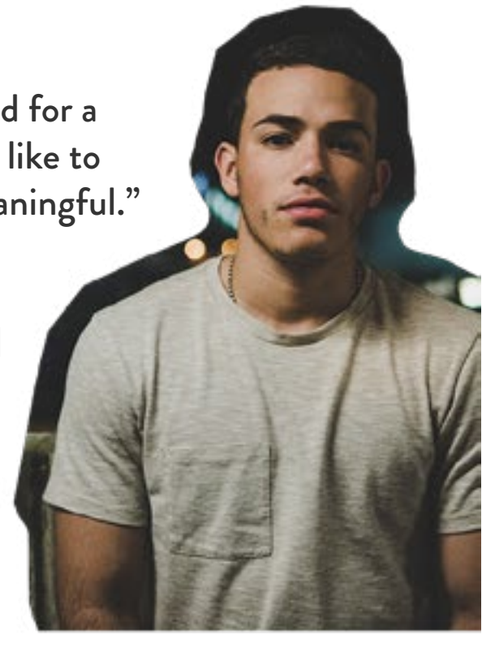
TRANSPORT
QUALITY & FREQUENCY

SOCIAL
ENHANCE COMMUNITY SPIRIT

UTILITY
SENSIBLE & UPDATED INFRASTRUCTURES

"I've been unemployed for a long time and I would like to create something meaningful."

Karim, 26 y/o
Young unemployed

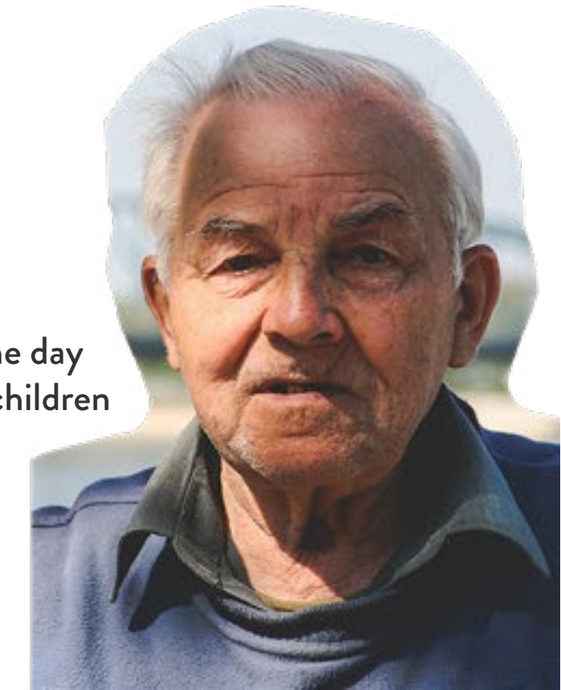


"I like quiet environments. I feel anxious in large cities, especially in public transport."

Agnès, 16 y/o
Studies in Villeurbanne

"My favourite time of the day is when I pick my grandchildren up from school."

René, 68 y/o
Retired

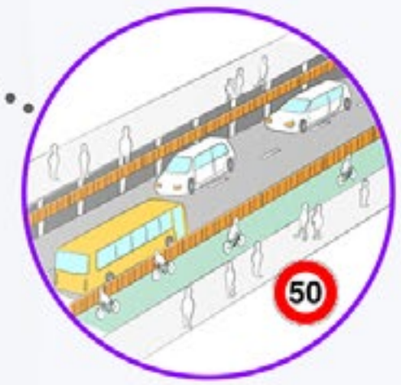


Initial Concepts: Group 1

MULTI-MODAL SPACE
Offers mobility for different purposes.

DEMATERIALISED BUS STOP
Agile bus stop using fewer resources.

SHARED TRANSPORT: "TUKAWAY"
Share a tuk-tuk with your neighbour.



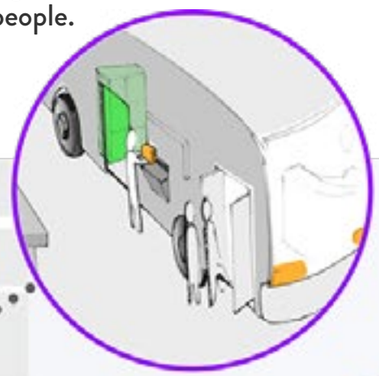
NEW PRINCIPLE MOBILITY AXIS
A modular axis adapted to the area.

NEW PRINCIPLE MOBILITY AXIS
NATURE AREA

NEW PRINCIPLE MOBILITY AXIS
SCHOOL AREA

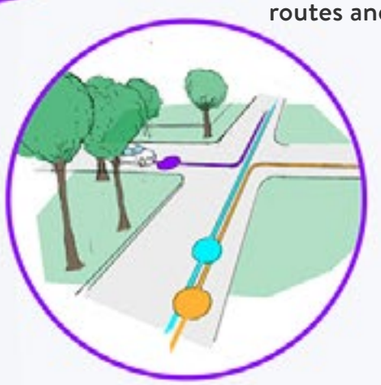
Initial Concepts: Group 2

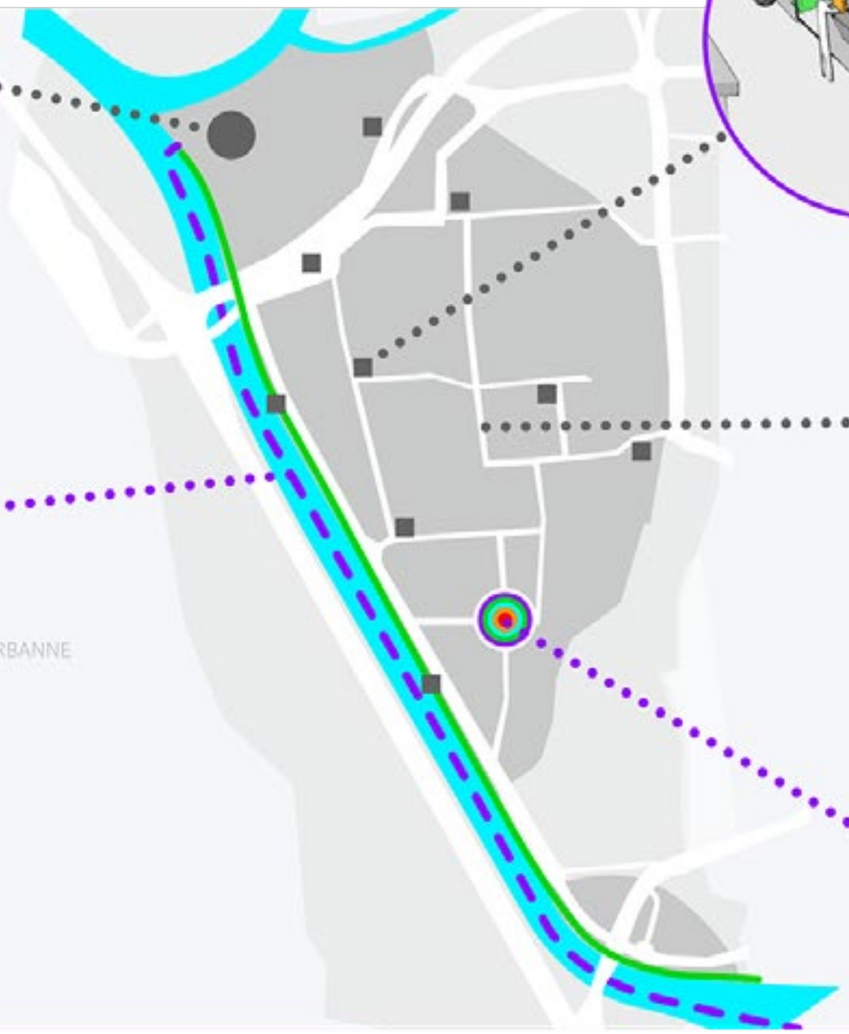
BUS TRADER
Brings mail services to people.



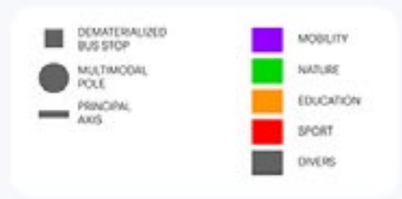
VALORISED FLEA MARKET
A social place to promote local economy.

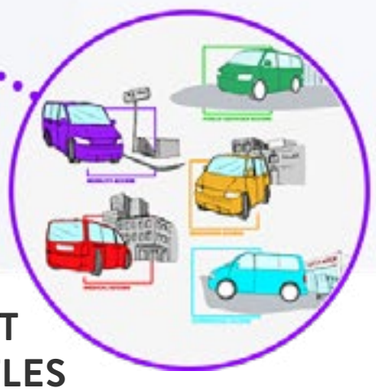
FRIENDLY SIGNAGE
Guides travelers about bus routes and destinations.





LIVELY CANAL
A new way of mobility.





DIRECT SHUTTLES
Dedicated to specific needs.

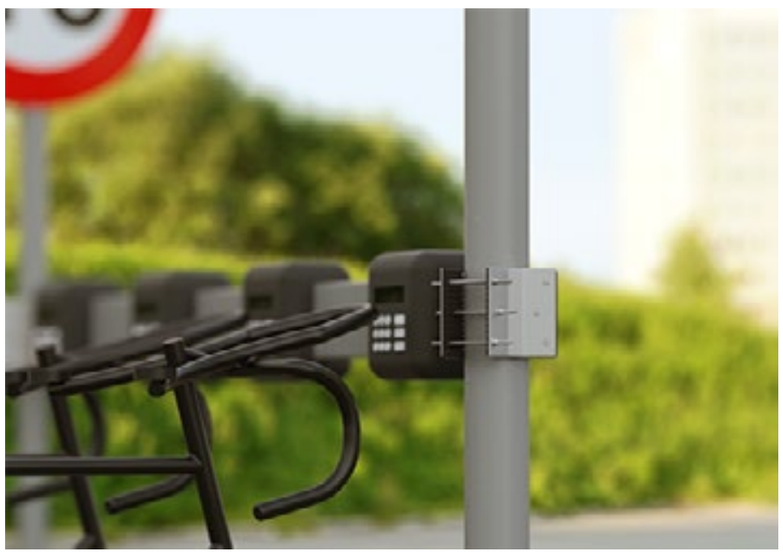
Multi-modal Space

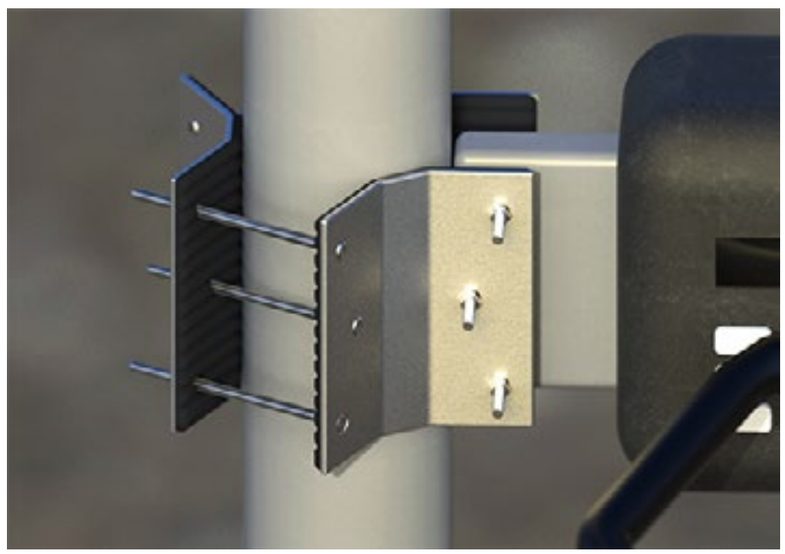
TO CANAL: UP-CYCLED FERRIES

BICYCLE SHARING:
DOCKING STATION

TO CARPOOL
PARKING SPACE

Pole Clamp for Bicycle Docking Station

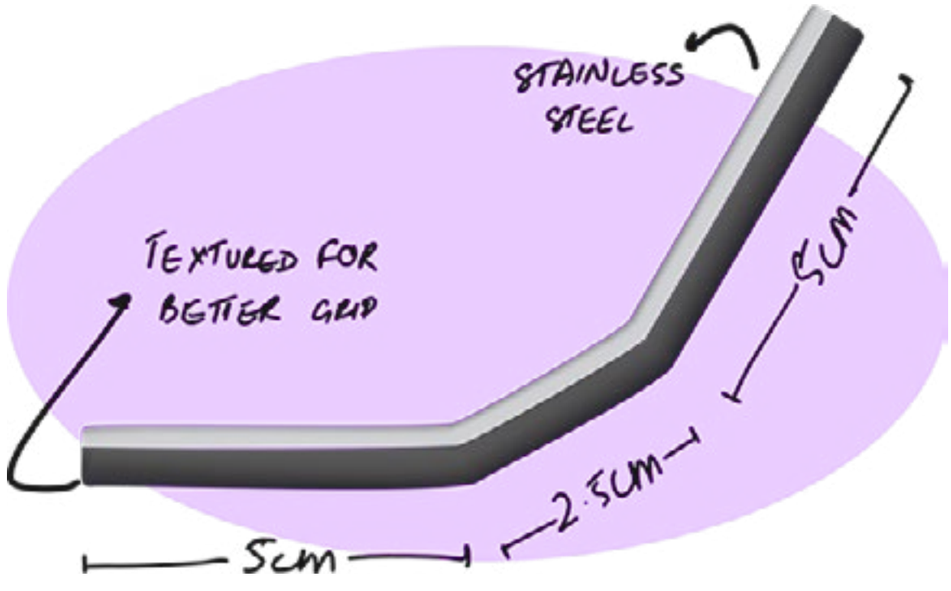




The “docking station” for the bicycles is attached to a signage pole and lamp post with the clamp.

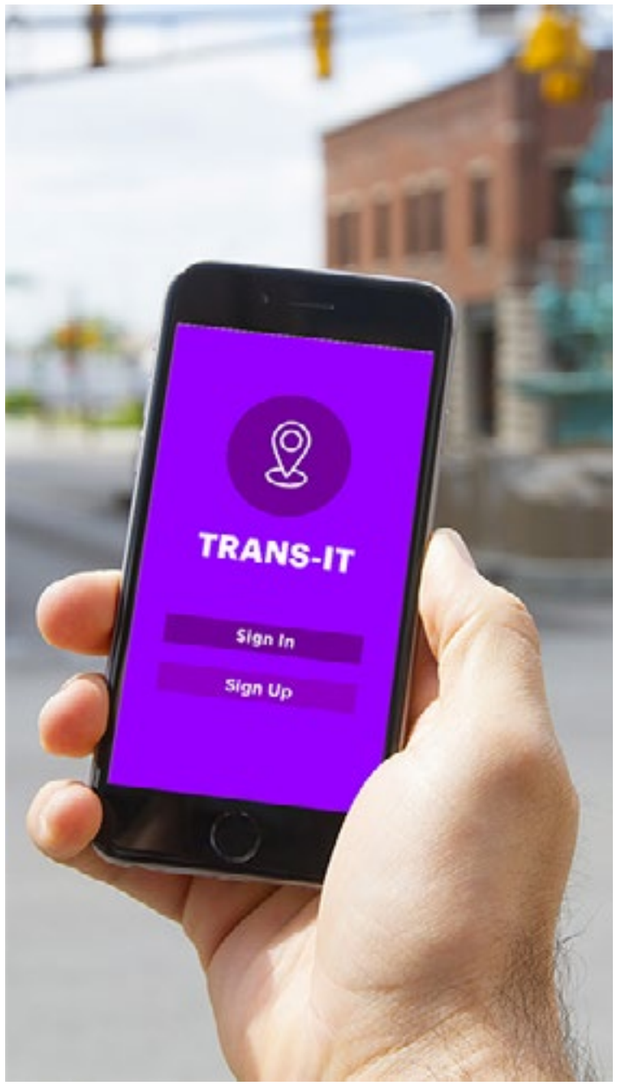
The clamp can fit onto poles of diameter ranging from 4cm to 15cm.

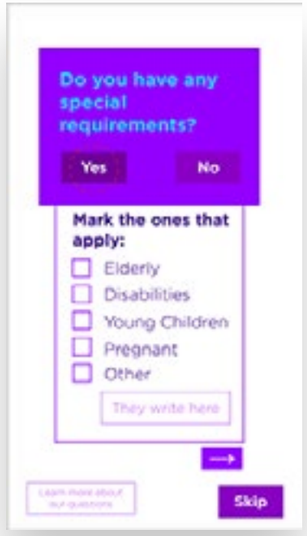
The bicycle stations needed to be **frugal & movable** to combat the problem of unused stations in previous locations. The “stations” are mounted onto **existing public infrastructure** like signage poles and street lights.

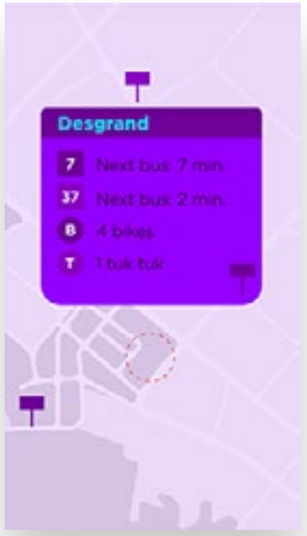


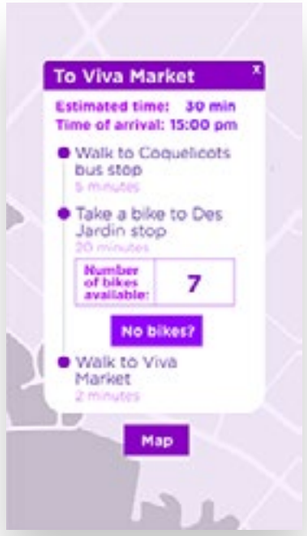
A Universal Mobility Application

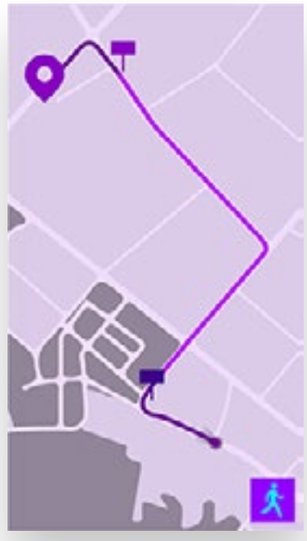
A mobility application that provides the best route **tailored to each user's needs.**

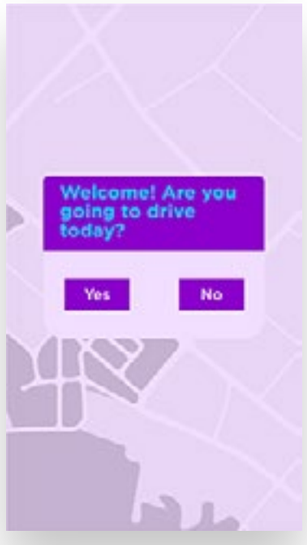


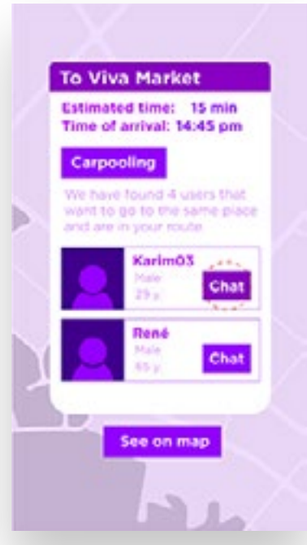


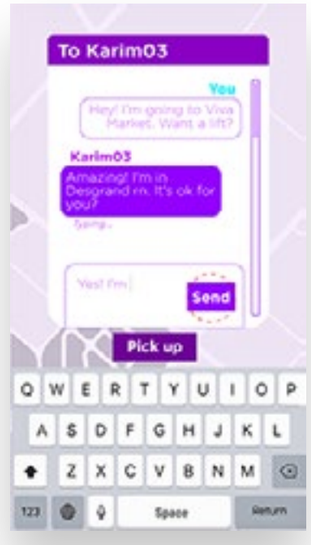












A Complete Ecosystem

MULTI-MODAL POLE
Create a connected place dedicated to mobility, with complementary transportation options.


POLE CLAMP SYSTEM


LAST MILE TRANSPORT

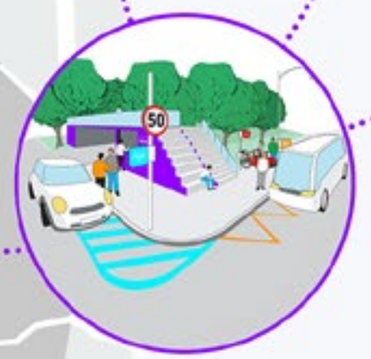

CONNECTED DEVICE

LIVELY CANAL
Valorise an unused space into a new path of mobility.


GREEN ENERGY


OPTIMISED SPACE


UP-CYCLED FERRIES



TUK AWAY
Offer a shared solution of mobility to go further, together.


ADAPTED VEHICLE


EASY PLUG

BUS TRADER
Bring people basic services by using an existing solution of mobility.


AGILE VEHICLE


INTEGRATED FURNITURE

Quick Projects

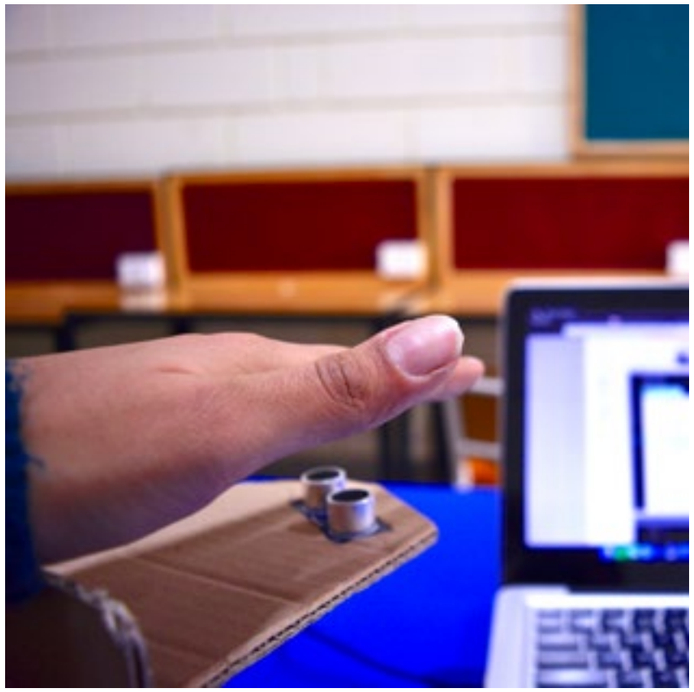
Pulley 2.0

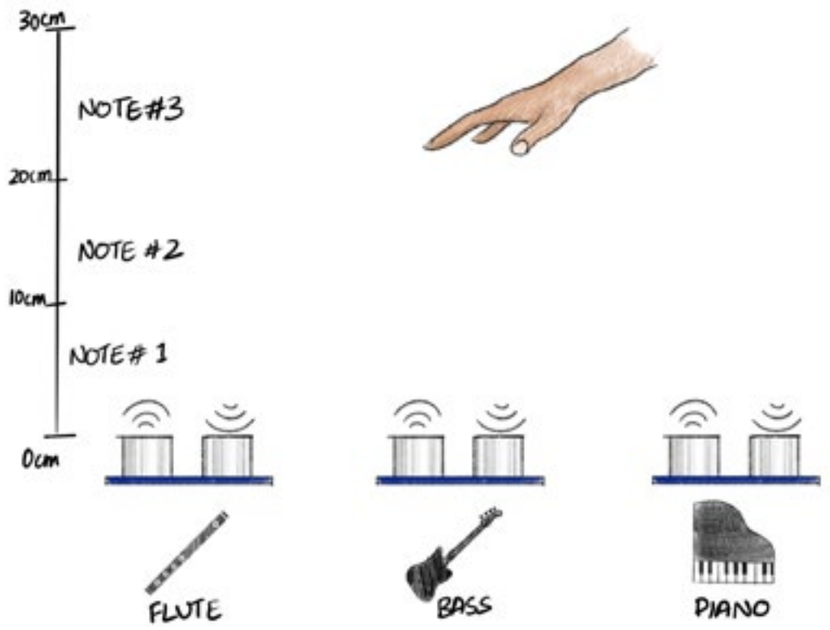
Traditional block and tackle pulleys are sold in **fixed sets.** What if you wanted to **add/remove one extra pulley** to the pulley system? Typically, you'd have to **buy another set of pulleys** and re-thread the pulley system.

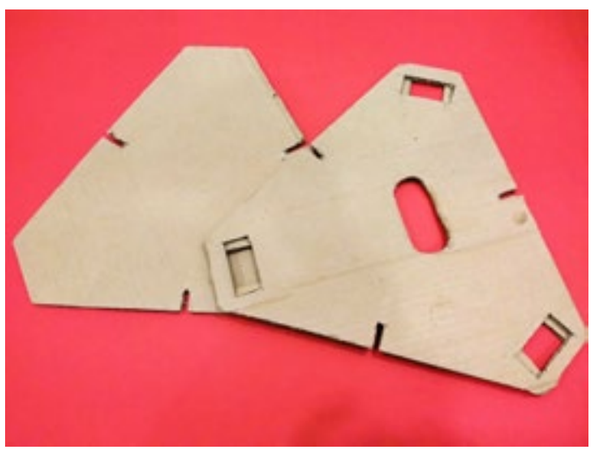
The Pulley 2.0 is a **versatile** pulley that can be **attached** to other such pulleys to **form any compound/simple pulley system.**

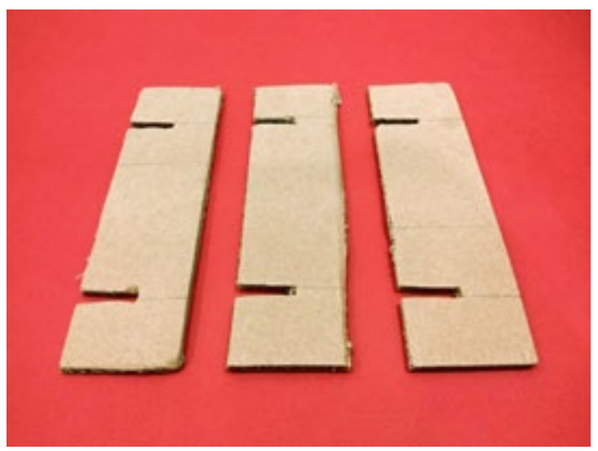
Air Instruments

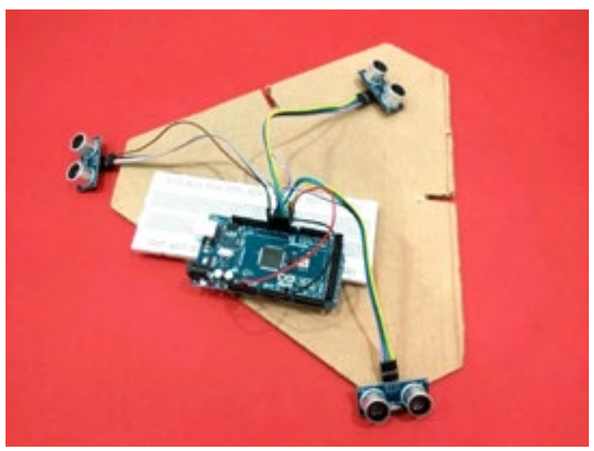
With Air Instruments, you can **produce notes without physically touching** anything. The console has **3 ultrasonic sensors** that are coded to produce distinct sounds when an object is placed above them at different heights, in this case, notes of the **Flute, Bass and Piano**. **Arduino** IDE and **Processing 3** was used to write the code.











Carver's Toolbox

Built from a block of Sal wood. Carved with chisels and a Dremel.

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Thank you for your time.