BE ON THE MOVE

JIBEBE

Electrical Subsystem

Date:

06.05.2022

Agenda

01 INTRO

02 KEY METRICS

03 DEEP DIVES

04 FUTURE

05 Q&A

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INTRO

01

Jibebe

02

Tricycle

03

Tractor

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JIBEBE

Jibebe is a project formed as a collaboration between the Africa-Ai-JAPAN and Jomo Kenyatta University of Agriculture and Technology.

The project aims to deliver both a production-ready electric tricycle and the first fully autonomous electric tractor with self-tilling capabilites.

01

Tricycle

02

Tractor

JIBEBE AT A GLANCE

2 TOTAL PRODUCTS	12 NUMBER OF STUDENTS	3 SUBSYSTEMS
	4 MONTHS	6 FACULTY

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TRICYCLE

The electric tricycle was commissioned to be an alternative to the current human-powered mobility vehicles

It seeks to provide an easy and affordable mobility solution to disabled persons.
It was commissioned by the Association for the Physically Disabled of Kenya

AUTONOMOUS TRACTOR

The autonomous tractor was meant to be an improved electric version of the existing Shujaa Tractor.

It also adds features like being fully autonomous and having self-tilling capabilities

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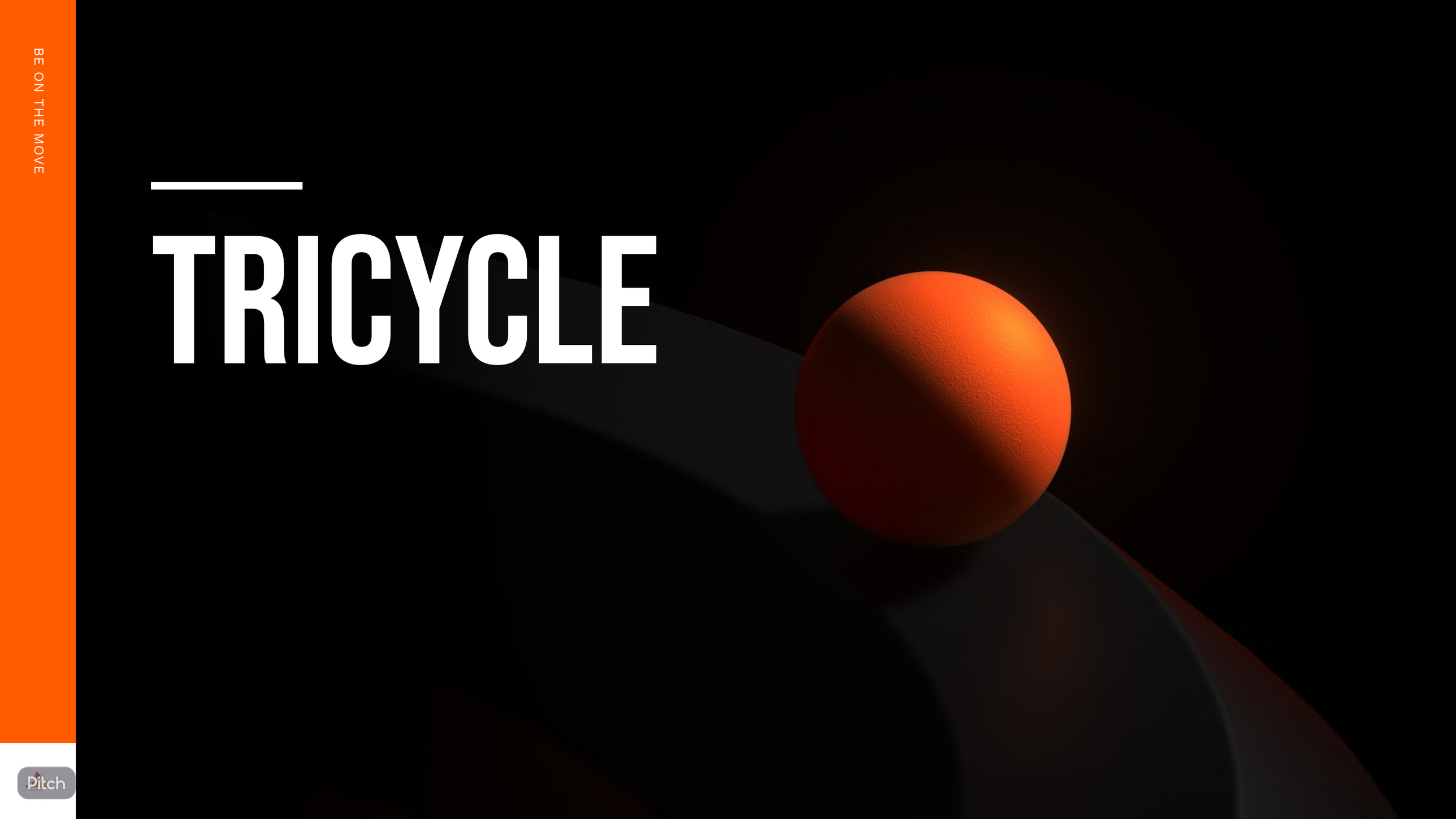
TRICYCLE



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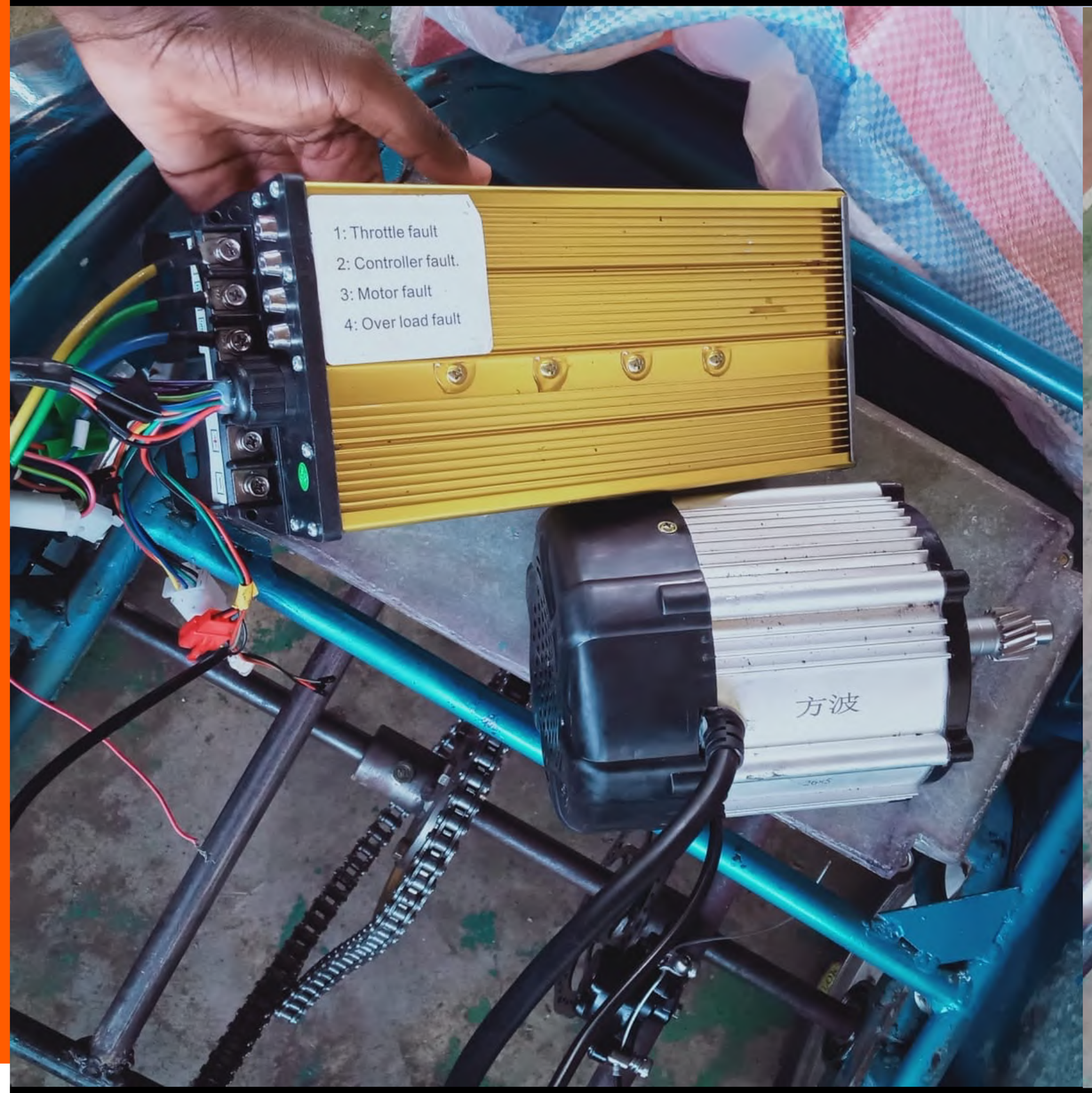

ELECTRICAL SYSTEM

Component Sizing

Sizing of both the motor to be used(BLDC) and sizing of the battery required to supply that motor.

This took into consideration both torque requirements and operation time requirements.

User experience

Design the systems which which the user interacts with the tricycle.
Starting and Stopping, security locks, speed display, battery display.
Reverse mode engagement and brake lights

PCB Design

Design of PCB to support all electrical functions e.g brake lights, buzzer, speed display

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KEY METRICS

BLDC Motor Power

1.2KW

Battery Capacity

48V 24AH

Top Speed

16KM/H

Operating time

3 HRS

Max Carrying weight(Rider inclusive)

150 KG

Charging time

5 HRS

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KEY METRICS

BLDC Motor Price

30,000

Battery Price

40,000

Throtlle Price

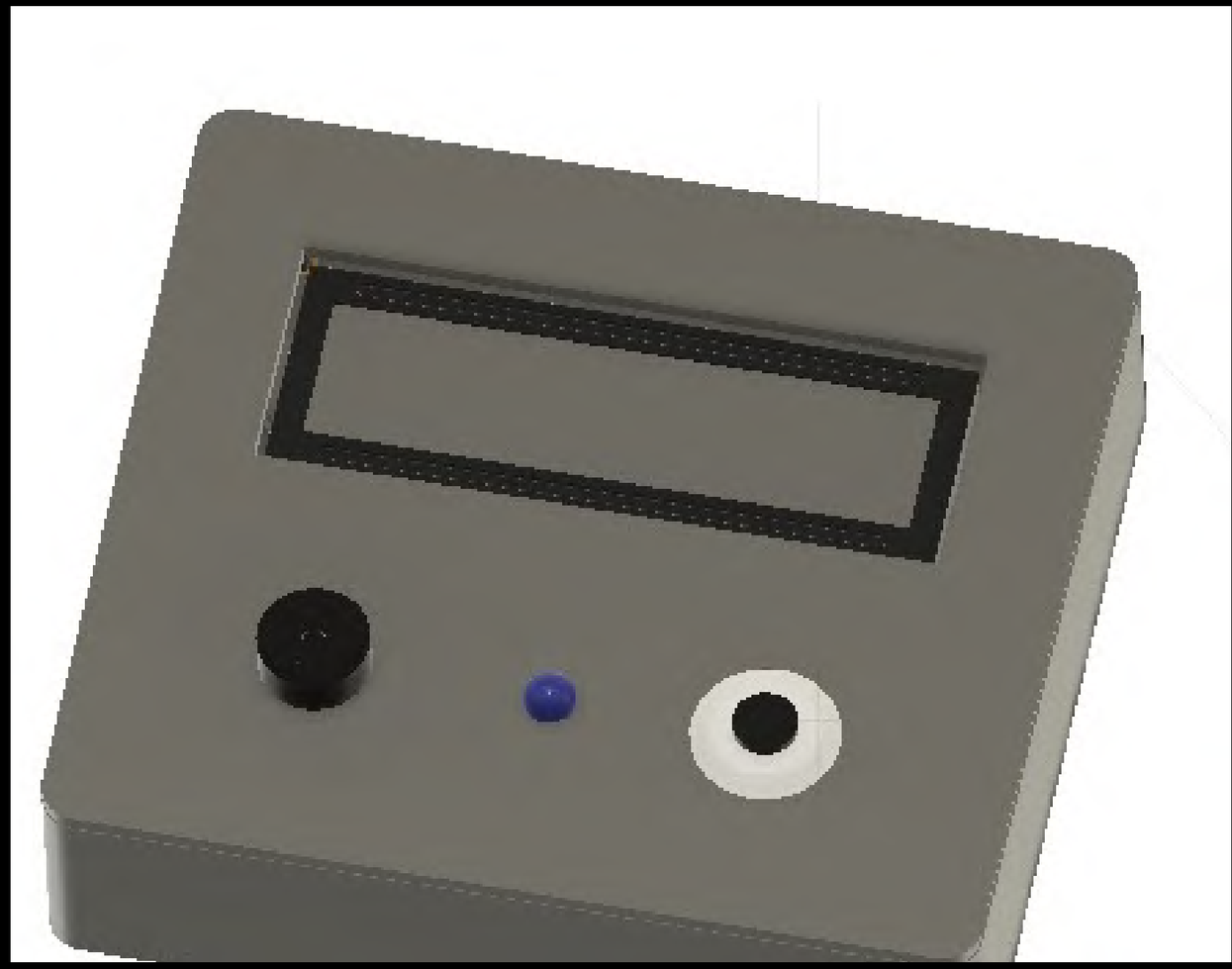
20,000

PCB & other components price

10,000

USER INTERACTION

The user is provided with a key for turning the system on or off.
They have a mounted hub for monitoring Speed, and Battery Percentage.
The hub also has provisions for engaging reverse mode.
They also have a charger for charging the battery.
This plugs into standard outlets.



MAKE WORK IN SPACE WORK FOR YOU

DEEP DIVES

01

Topic 1: PCB Design

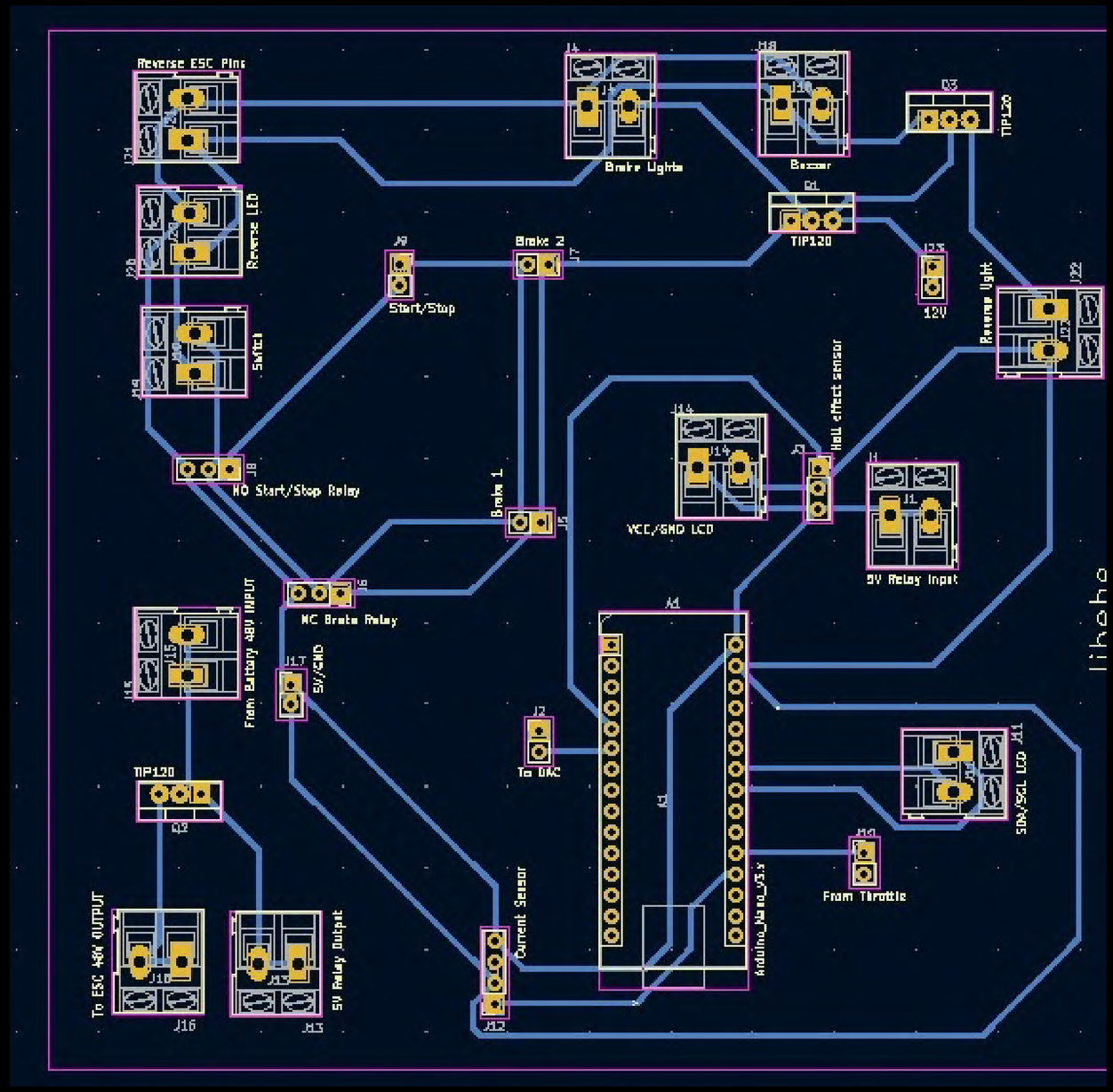
02

Topic 2: Speed and Throttle Control

PCB DESIGN

💡What am I seeing?

The final PCB of the Jibebe Tricycle system.
It handles speed and throttle control, braking, power distribution, logic control.

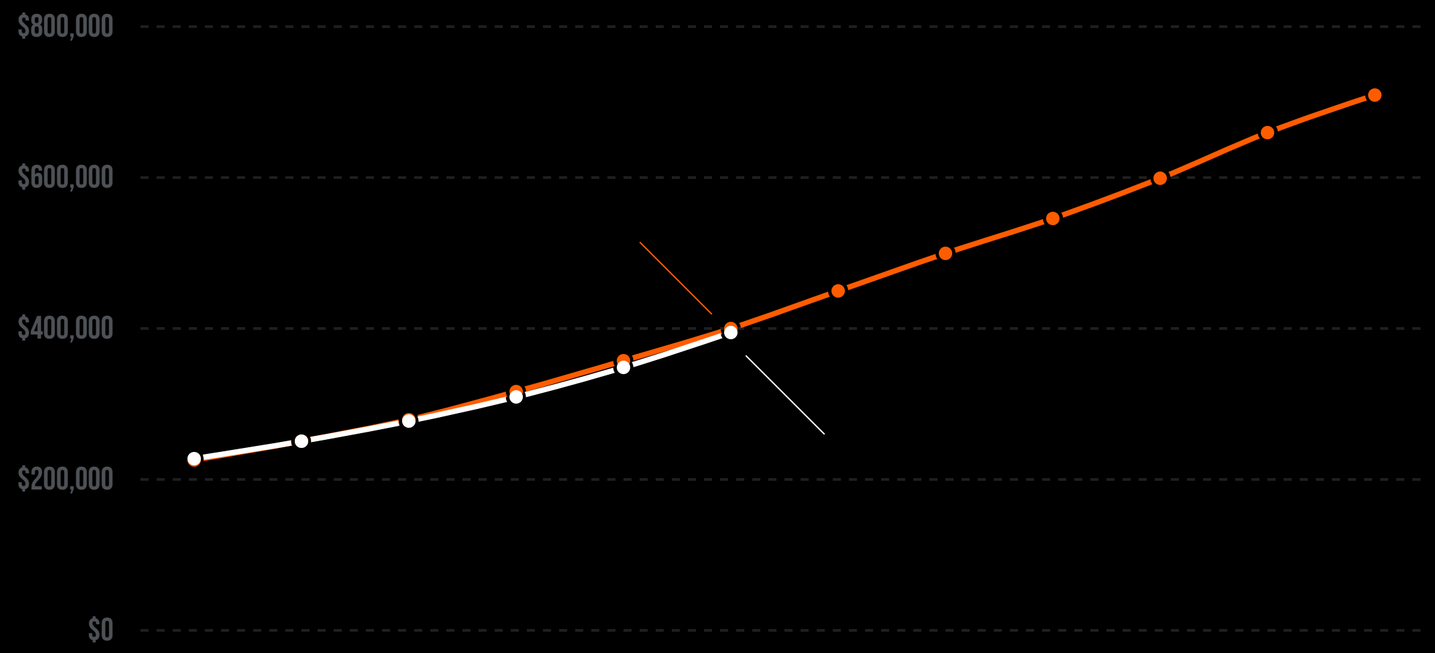


JIBEBE PCB

SPEED AND THROTTLE CONTROL

💡What am I seeing?

The team managed to design an innovative constant acceleration linear speed system.
This allowed the tricycle to start and travel smoothly without uncomfortable jerking.
A paper on solving the same phenomenon is being written by the electrical team



GRAPH OF SPEED VS TIME

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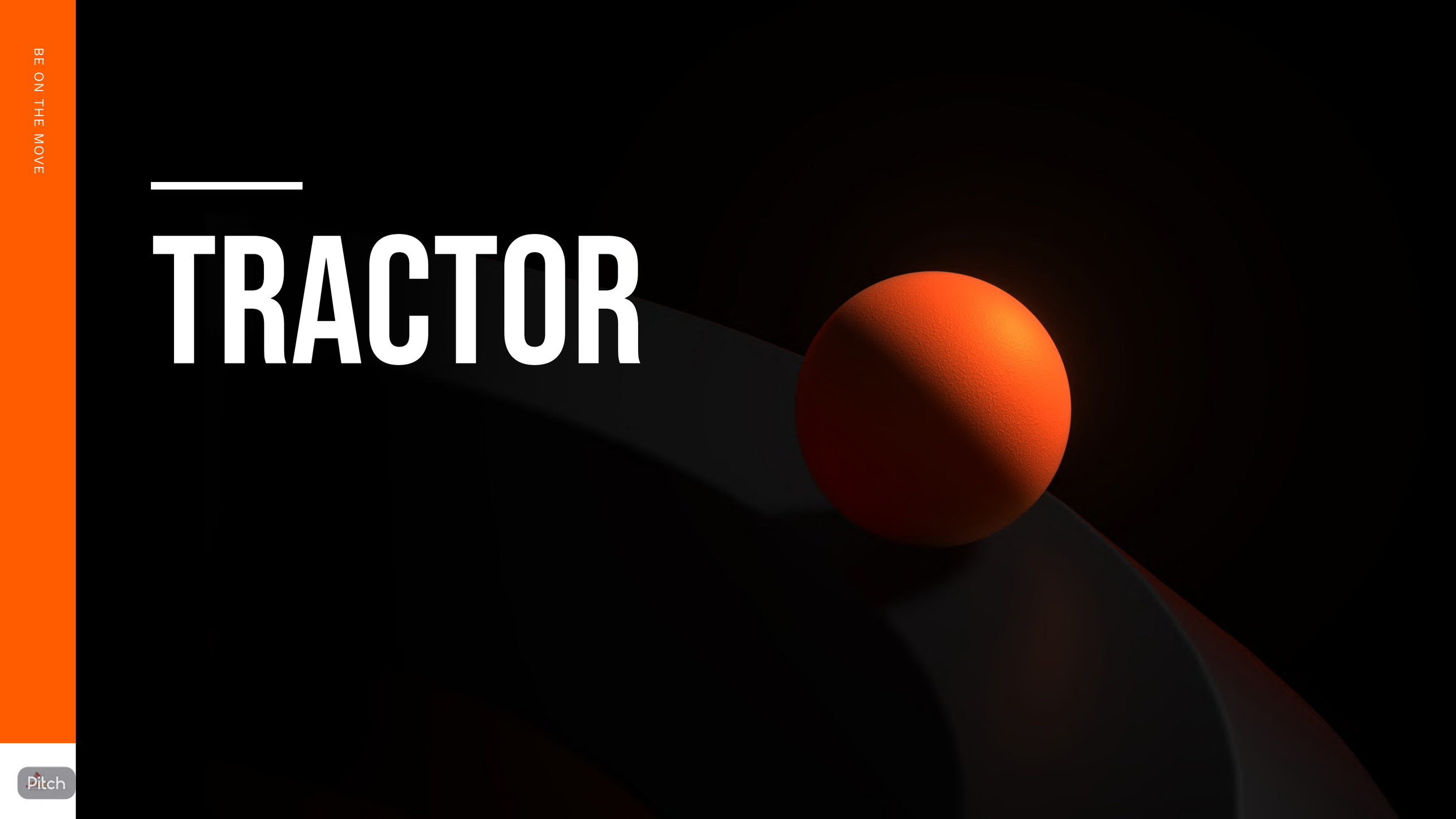
TRACTOR



ELECTRICAL SYSTEM

Component Sizing

Sizing of both the motor to be used(BLDC/AC) and sizing of the battery required to supply that motor.

This took into consideration both torque requirements and operation time requirements.

User experience

Design the systems which which the user interacts with the tractor.
Starting and Stopping, security locks, speed display, battery display.
Reverse mode engagement and brake lights

PCB Design

Design of PCB to support all electrical functions e.g brake lights, buzzer, speed display

TRACTOR TIMELINE

PHASE I

Major Component sizing and scope of work

PHASE II

Function design and PCB design

PHASE III

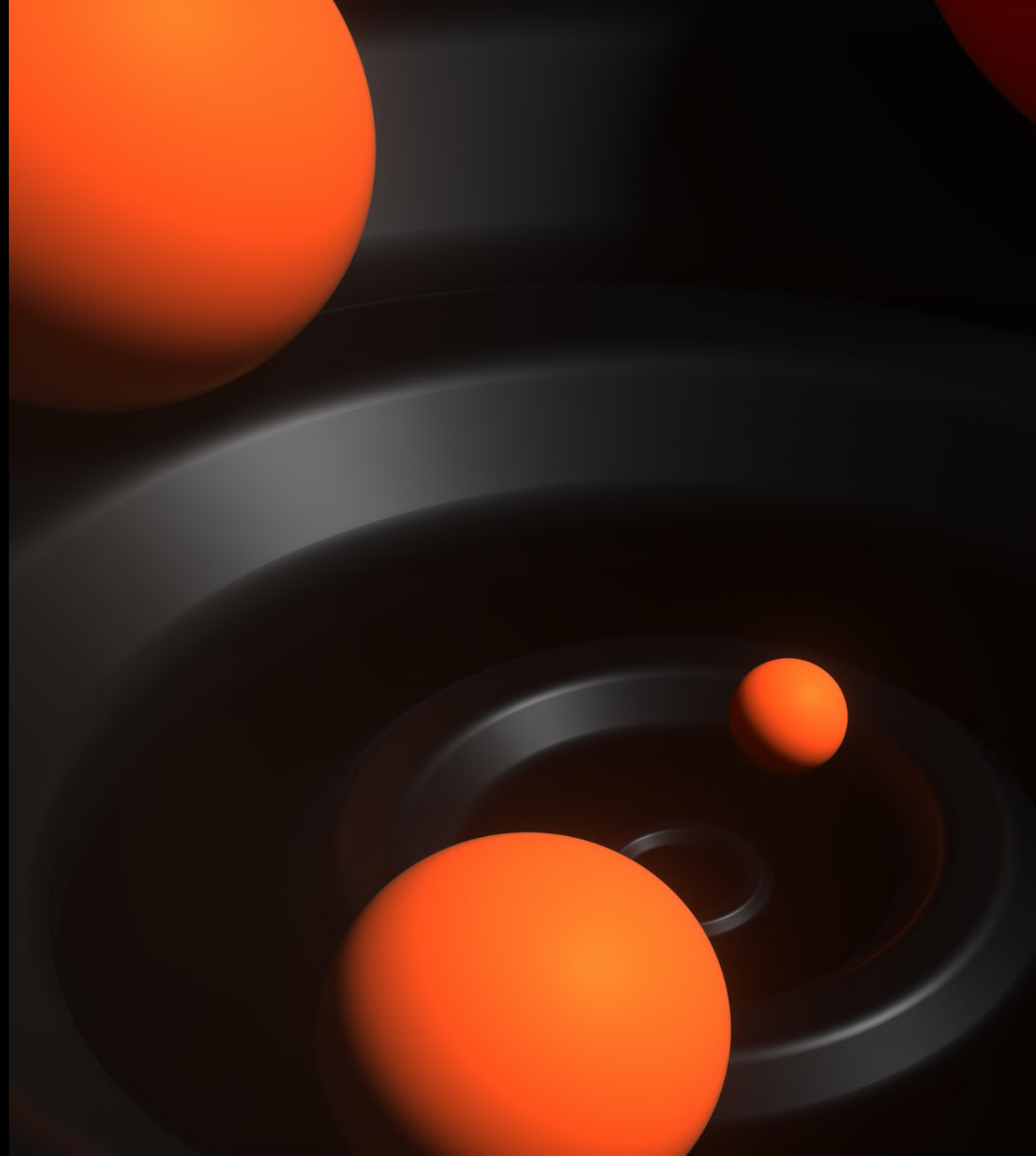
Alpha testing

PHASE IV

Subsystem Integration and Product launch

OBSTACLES

Lack of availability of required components in the country thus eading to delays in meeting objectives.



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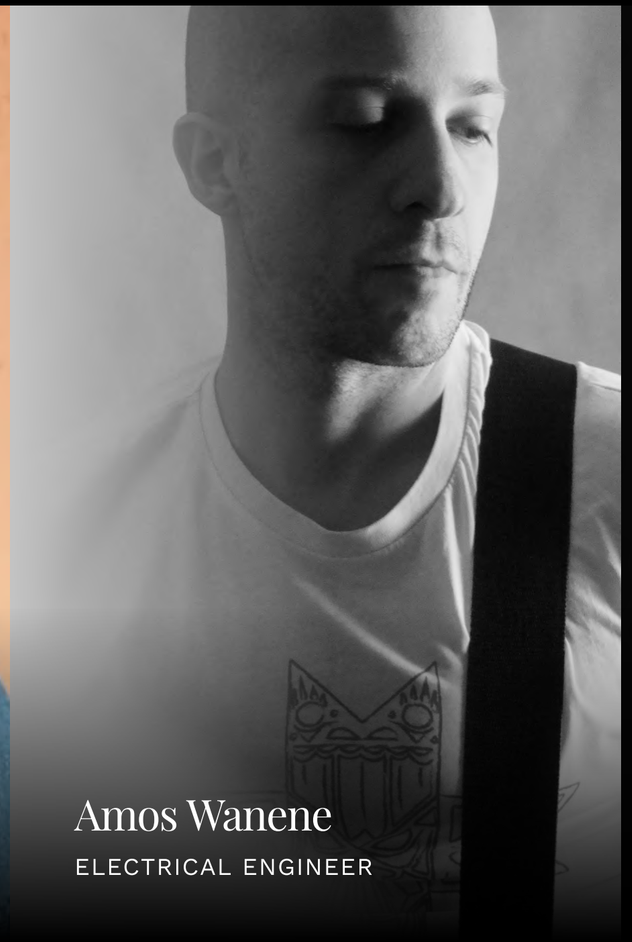
ELECTRIC TEAM

Paul Moses

COMPUTER ENGINEER



Amos Wanene

ELECTRICAL ENGINEER

Elias Cheruiyot

BIOSYSTEMS ENGINEER

Brian Willy

ELECTRICAL ENGINEER

Pitch

Questions

Q&A

Answers