



2030 FORMULA 4 CAR

*A small, affordable electric single-seater open wheel race car.
For the national Formula 4 junior championships.*

Charlie Alen (7258657) / 3007AAD

2030 FORMULA 4 CAR

F4

A vehicle for a growing global motorsport market. Which can compete in all national Formula 4 junior championships, all over the world. A small, single-seater open wheel race car. With an electric powertrain.

WHY?

DEMAND IN
ELECTRIFICATION



IMPROVING
MOTORSPORT MARKET



GROWING YOUNG
AUDIENCE



KEY AREAS

Europe
North America
South America
Middle East
East Asia
Australasia



ICON 1

TARGET AUDIENCE



CHAMPIONSHIP
PROMOTERS



YOUNG ASPIRING
RACE DRIVERS



TEAM
OWNERS



YOUNG
SPECTATORS

DESIGN REQUIREMENTS



Simplicity



Reliability



Durability



Affordability



Entertaining Racing



Safety



Attractive Design



Sustainability

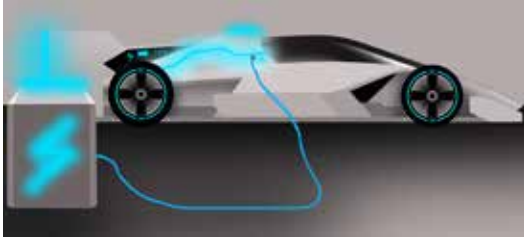


Performance

FUNCTION

F4

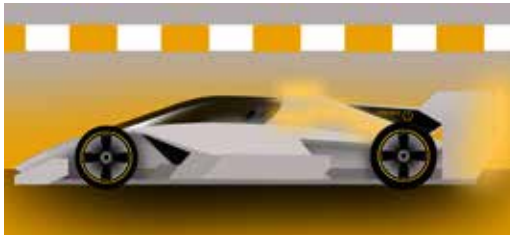
1



The car is prepared by the teams. Being charged up and fitted with chosen tyre and aerodynamic setup. Lights glow blue when charging. Soft, Hard and Wet tyre available.

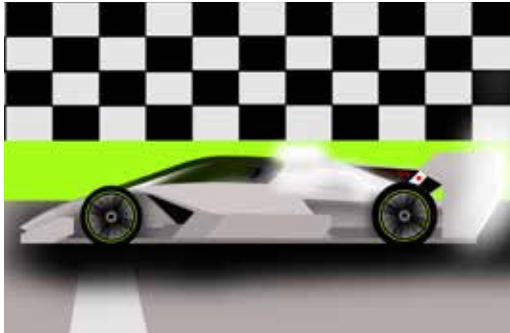


4



Cars will inform marshals in emergency scenarios. If the car is unsafe. Using the lights and sharkfin. With lights glowing orange.

7



Drivers race across the line. Finishing the race.

2



The car is fully prepared. With drivers climbing into the cars to start there race. Lights glow green when the car is charged.

5



Drivers use there HMD helmets (helmet mounted display) and steering wheels. To adjust settings and recieve information. Spectators using the Formula 4 app can view the race though any drivers POV. Using a VR option.

8



Drivers climb out of there vehicles. With the winner celebrating there victory. Cars are prepared for the next race.

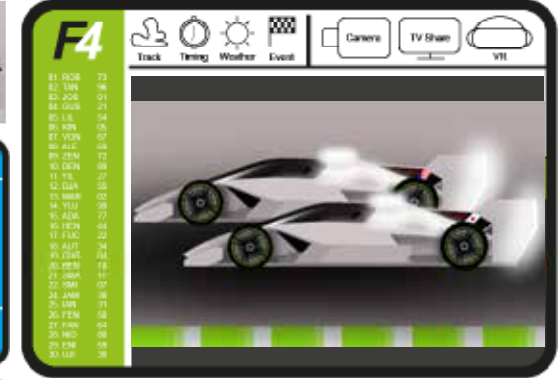
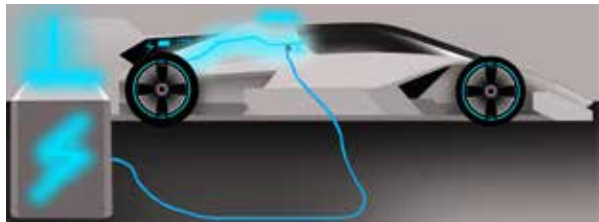
3



6



Superboost activated through steering wheel paddles. For one off boost that doubles the power.



Racing underway. With close wheel-to-wheel racing. Shark fin is used to show the driver, position and nationality. Spectators watch through a Formula 4 app with various viewing options.



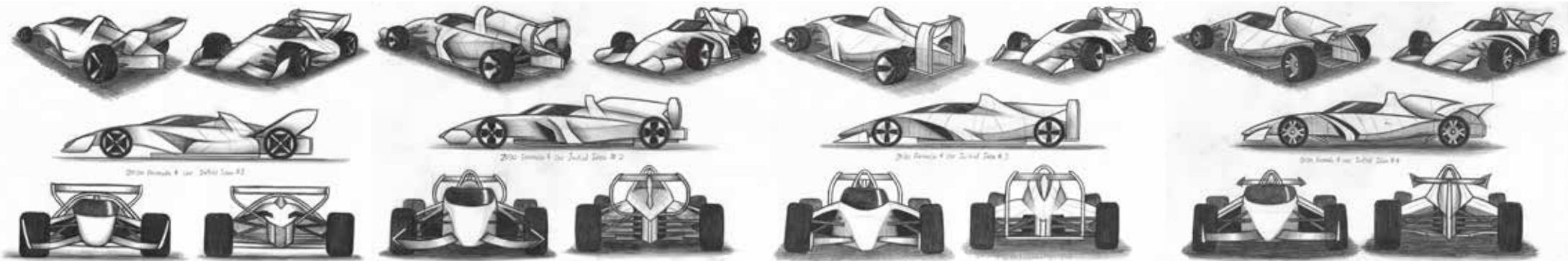
EXTERIOR DEVELOPMENT

F4



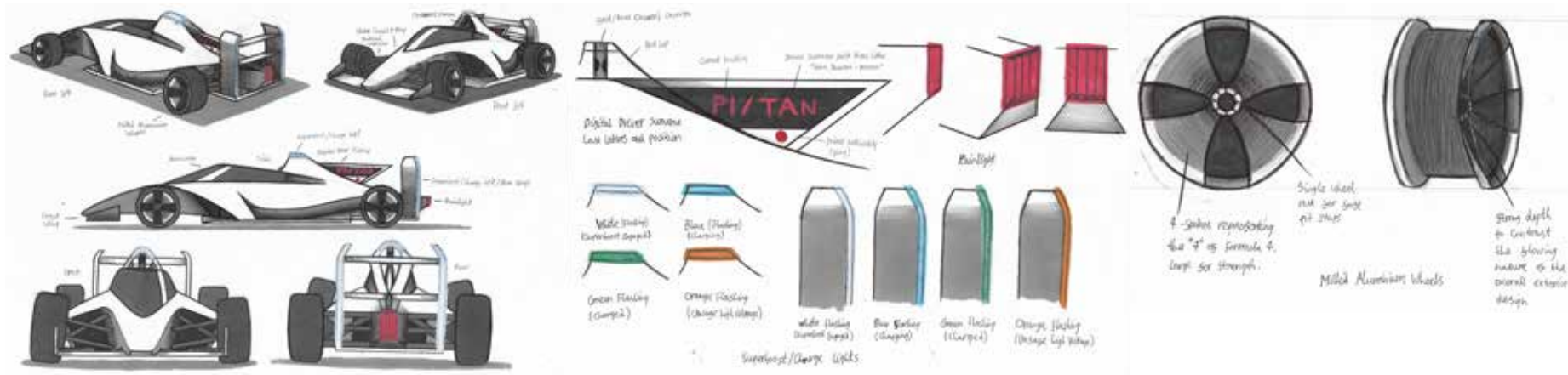
Inspiration moodboard. With current and concept race cars. Along with sharks and sculpture.

Initial concept sketches. Exploring various design ideas. With hard styrofoam models exploring form.

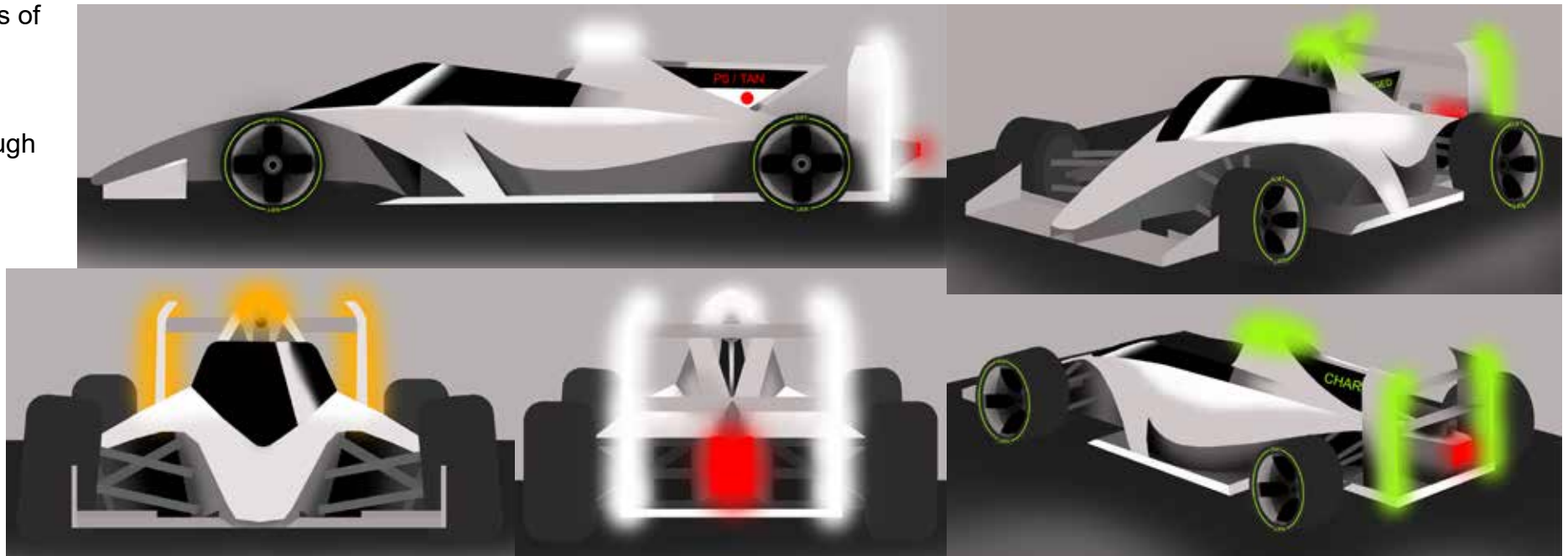


EXTERIOR DEVELOPMENT

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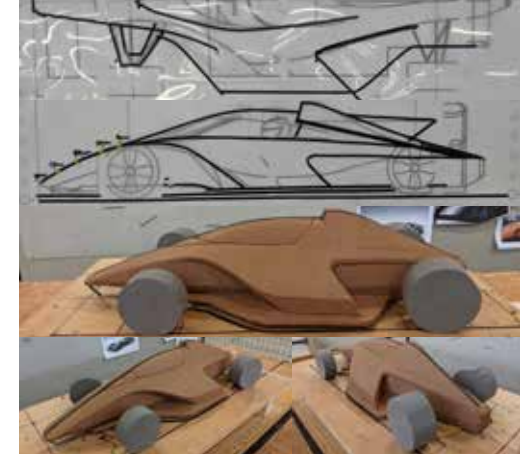
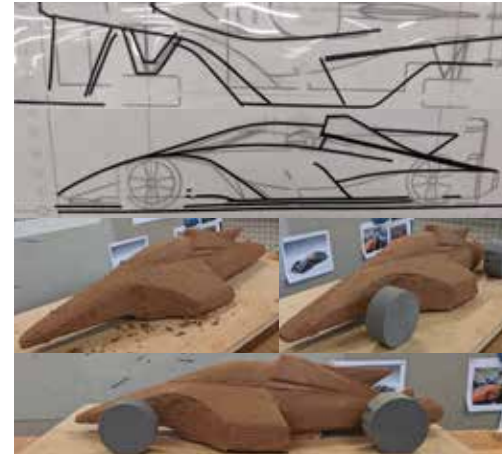


Photoshop renders of the original final design. Exterior design continued development through clay modeling.



EXTERIOR DEVELOPMENT

F4



After the original final design. I decided to revise the design through the clay modeling process. Using tape drawings on millar and the model itself. Making changes to the form and lines of the design. Along with introducing a canopy to the vehicle for improved safety and for a more futuristic look.



White lights for superboost. Flashes when engaged. Sharkfin display shows driver position, last name initials and nationality.



Blue lights for showing the car is charging. Slowly flashes when engaged. Sharkfin display shows the charge percentage.



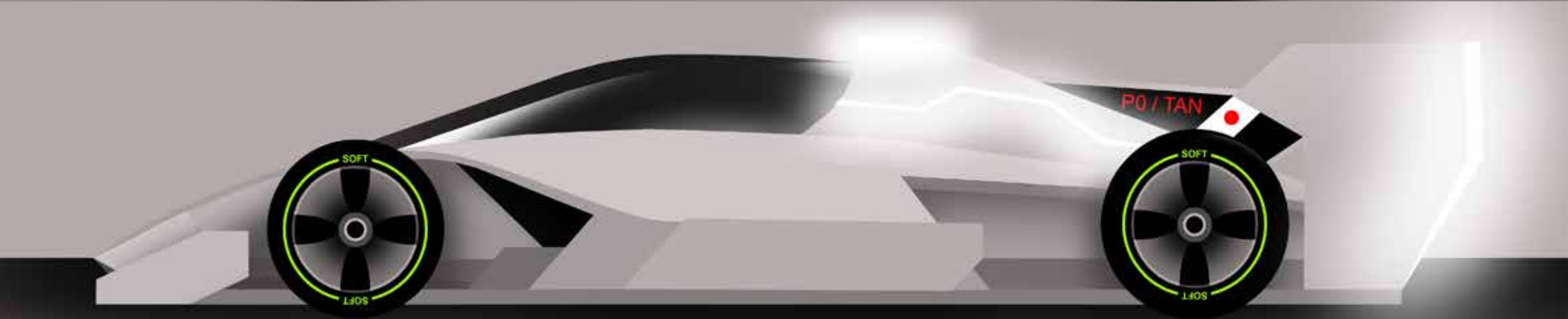
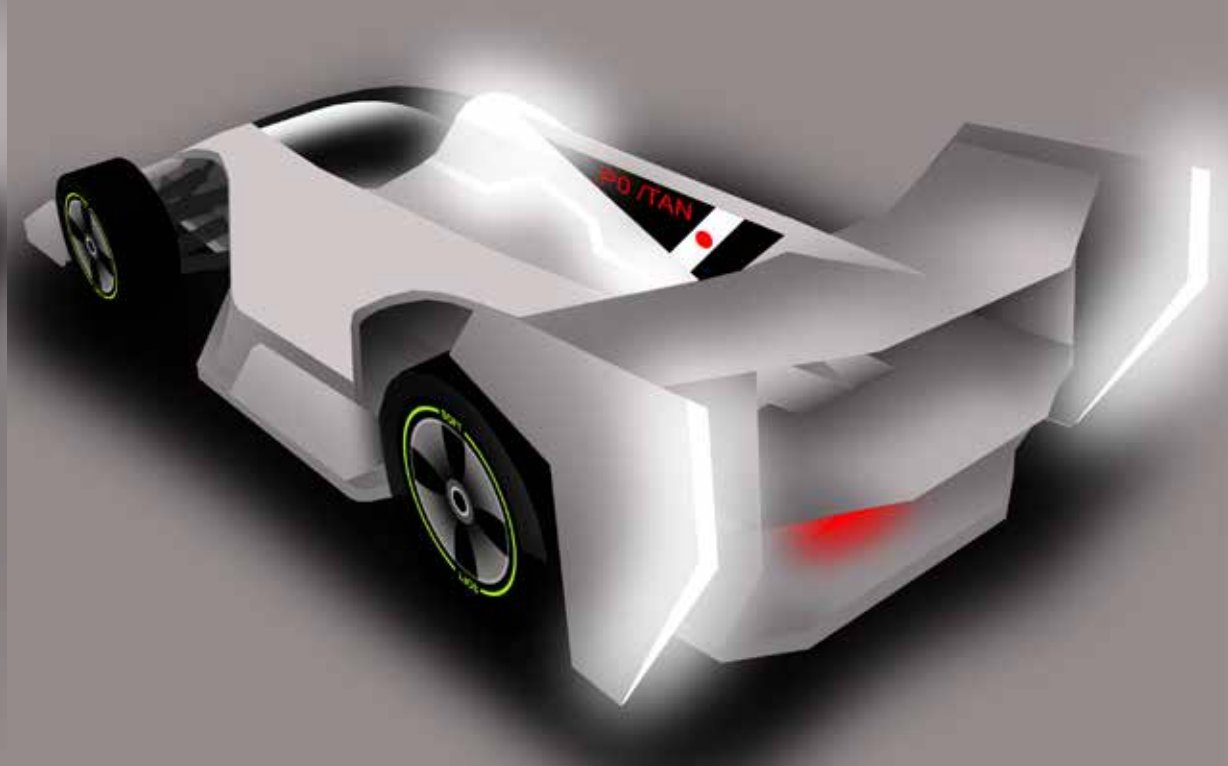
Orange lights for showing the car is unsafe. Sharkfin display shows a message saying "unsafe."



Green lights for showing the car is charged. Sharkfin display shows a message saying "charged."

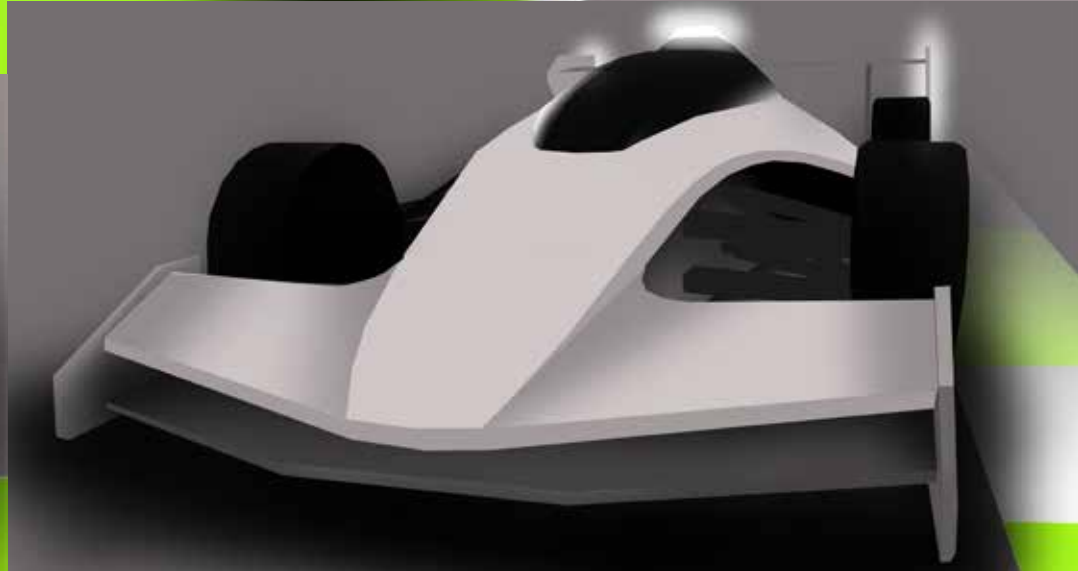
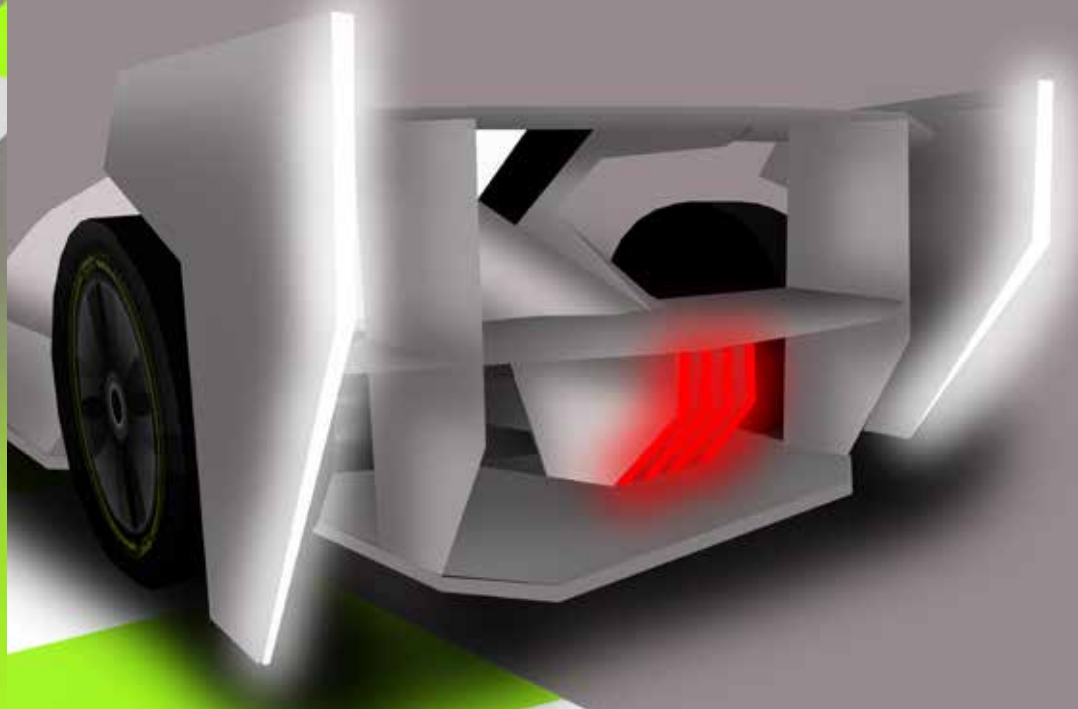
FINAL DESIGN

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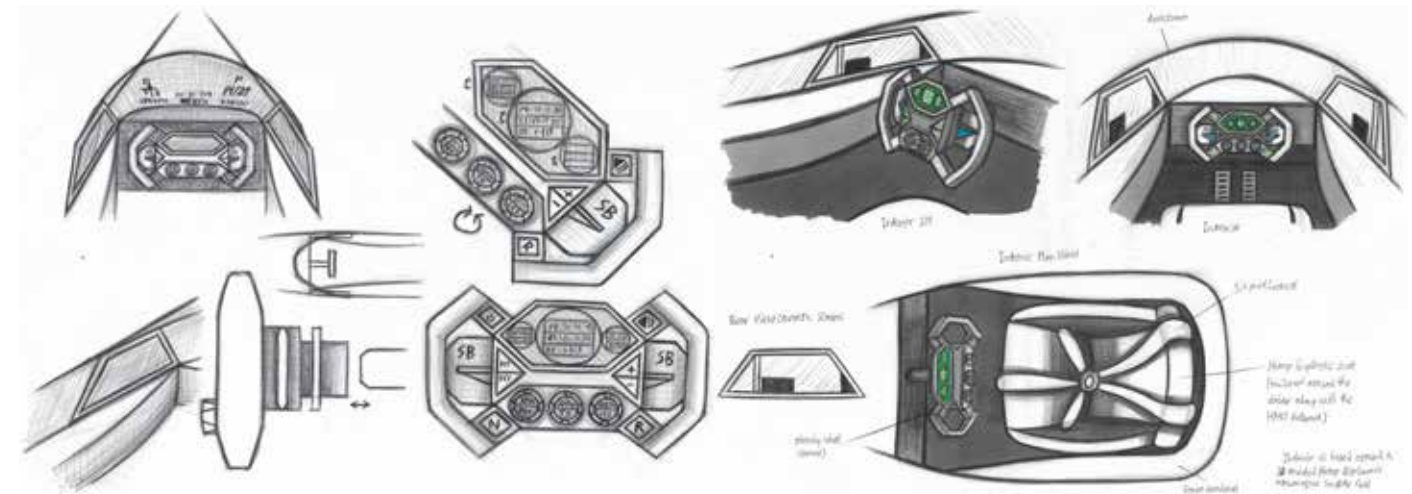


IN ACTION

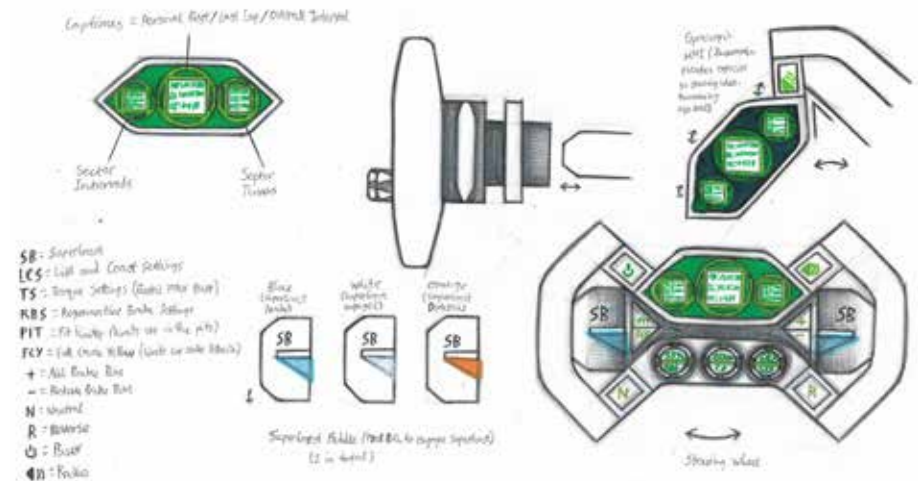
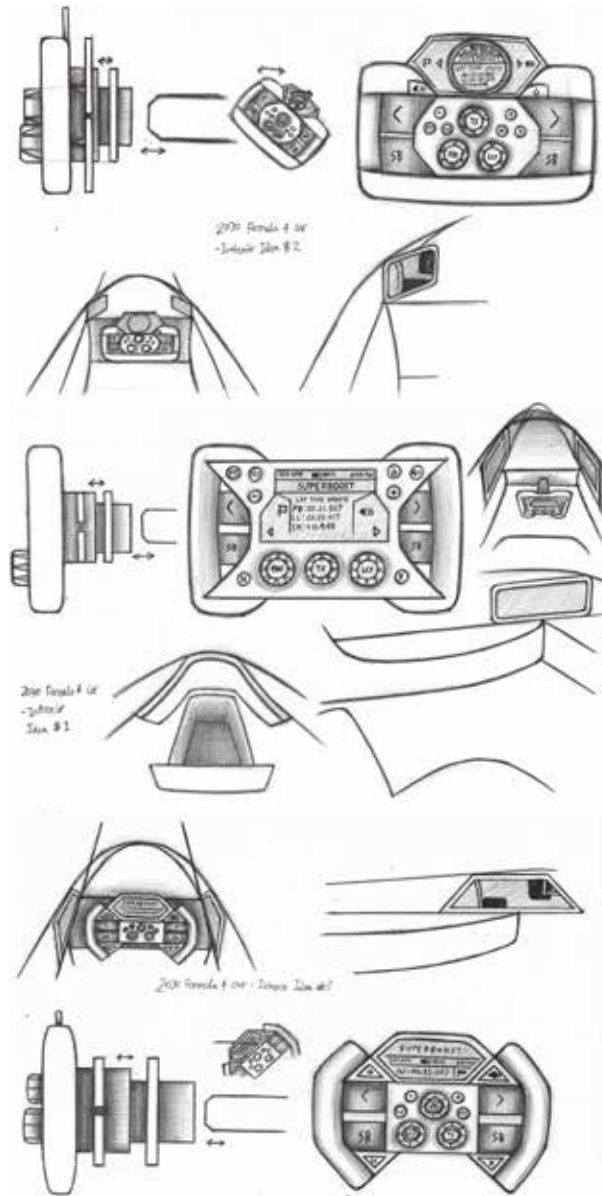
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Initial idea sketches for the interior. Exploring steering wheel design and general layout.

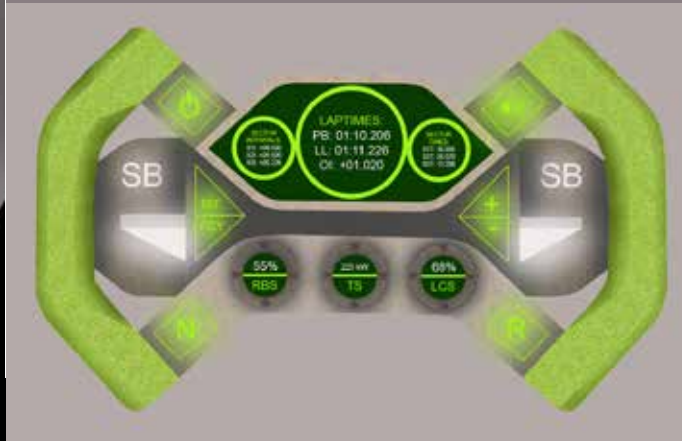
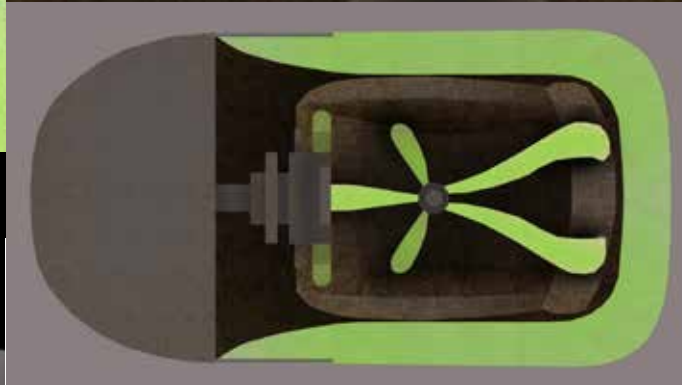
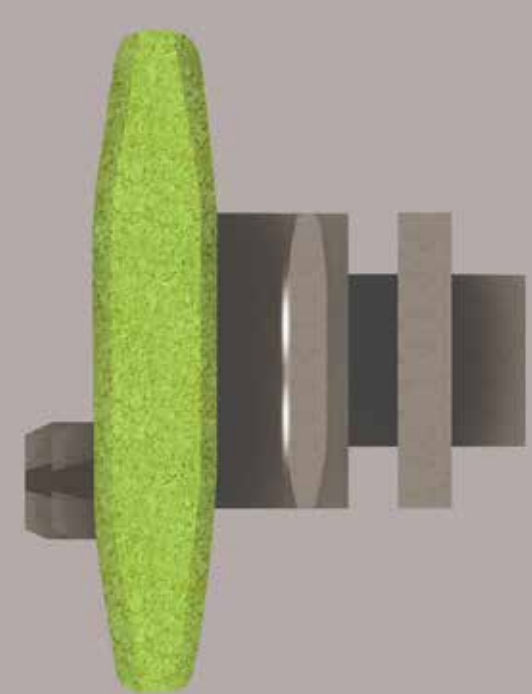
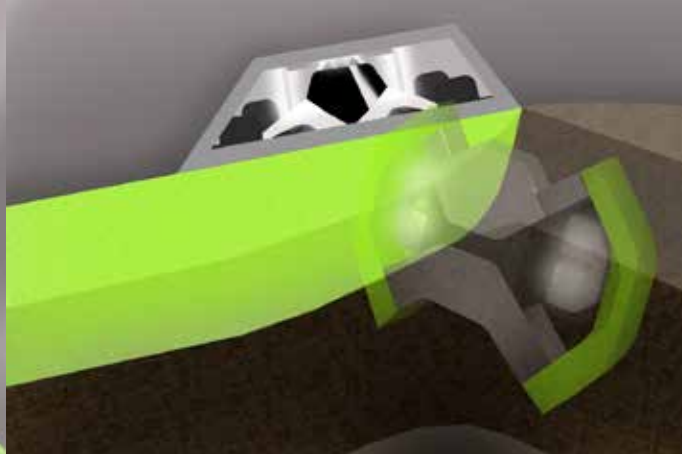
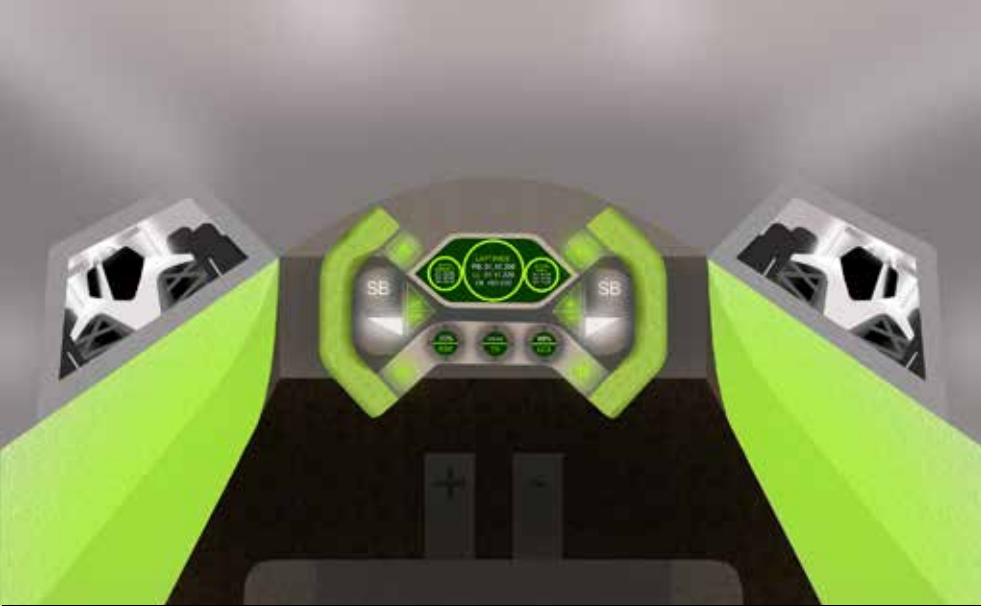


Development sketches for the interior. Refining the final designs layout and HMI.



INTERIOR RENDERS

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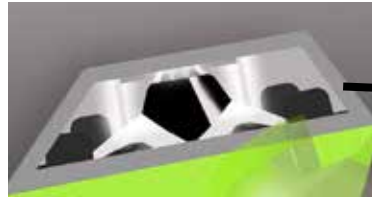


INTERIOR CMF

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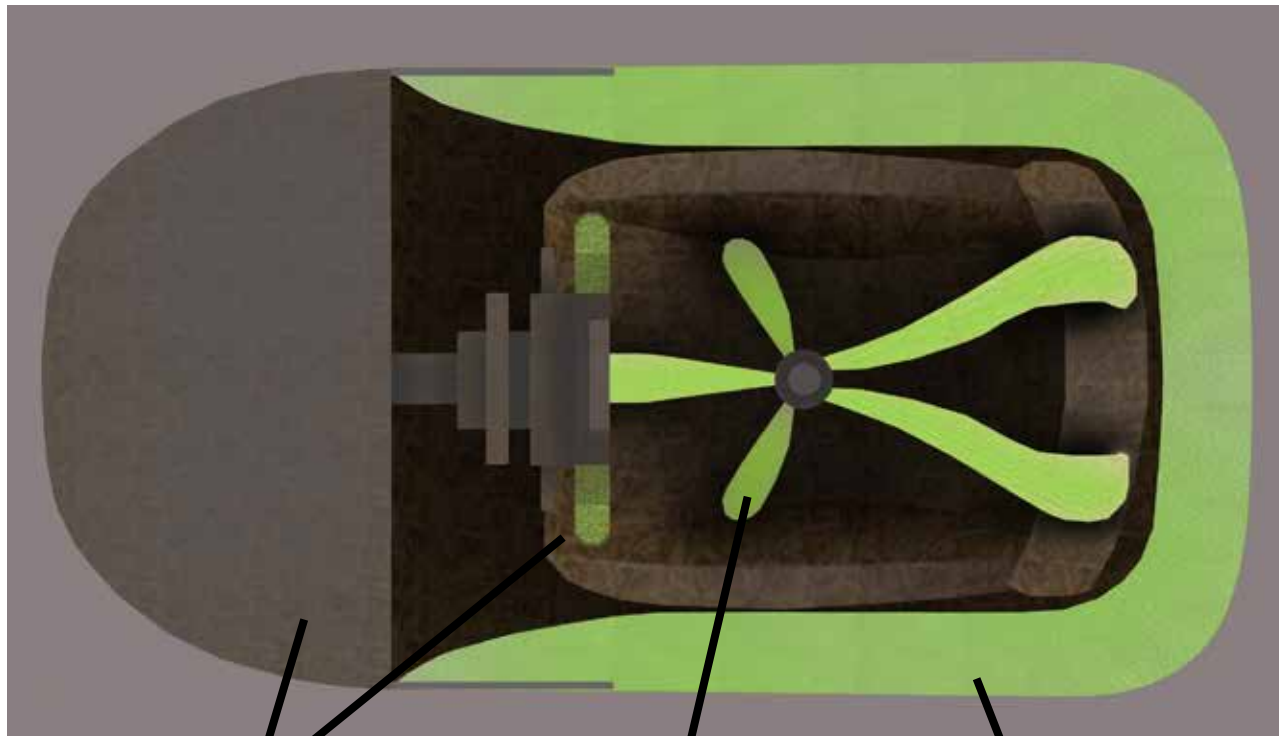
Steering wheel, seatbelts and headrest available in any colour. Colours are chosen by race teams and drivers.



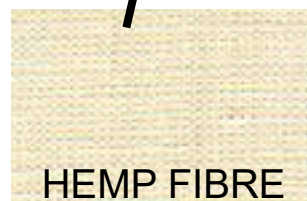
ALUMINIUM



CORK



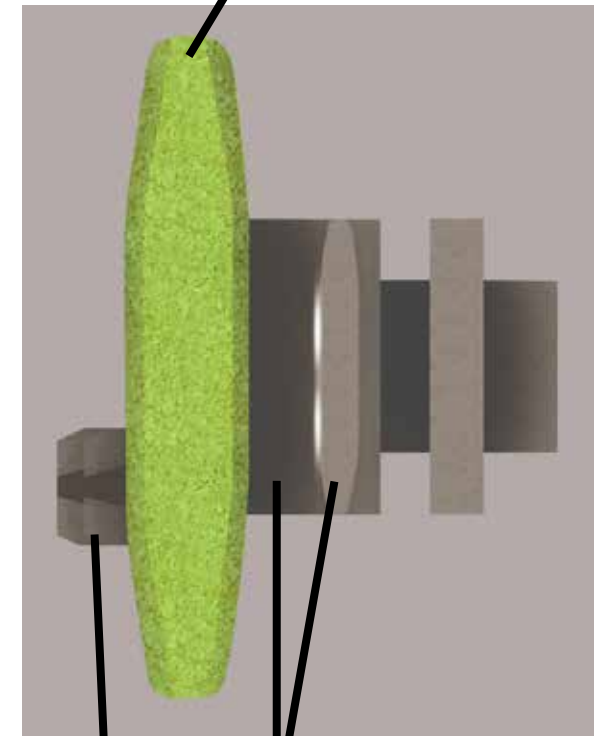
HEMP
BIOPLASTIC



HEMP FIBRE

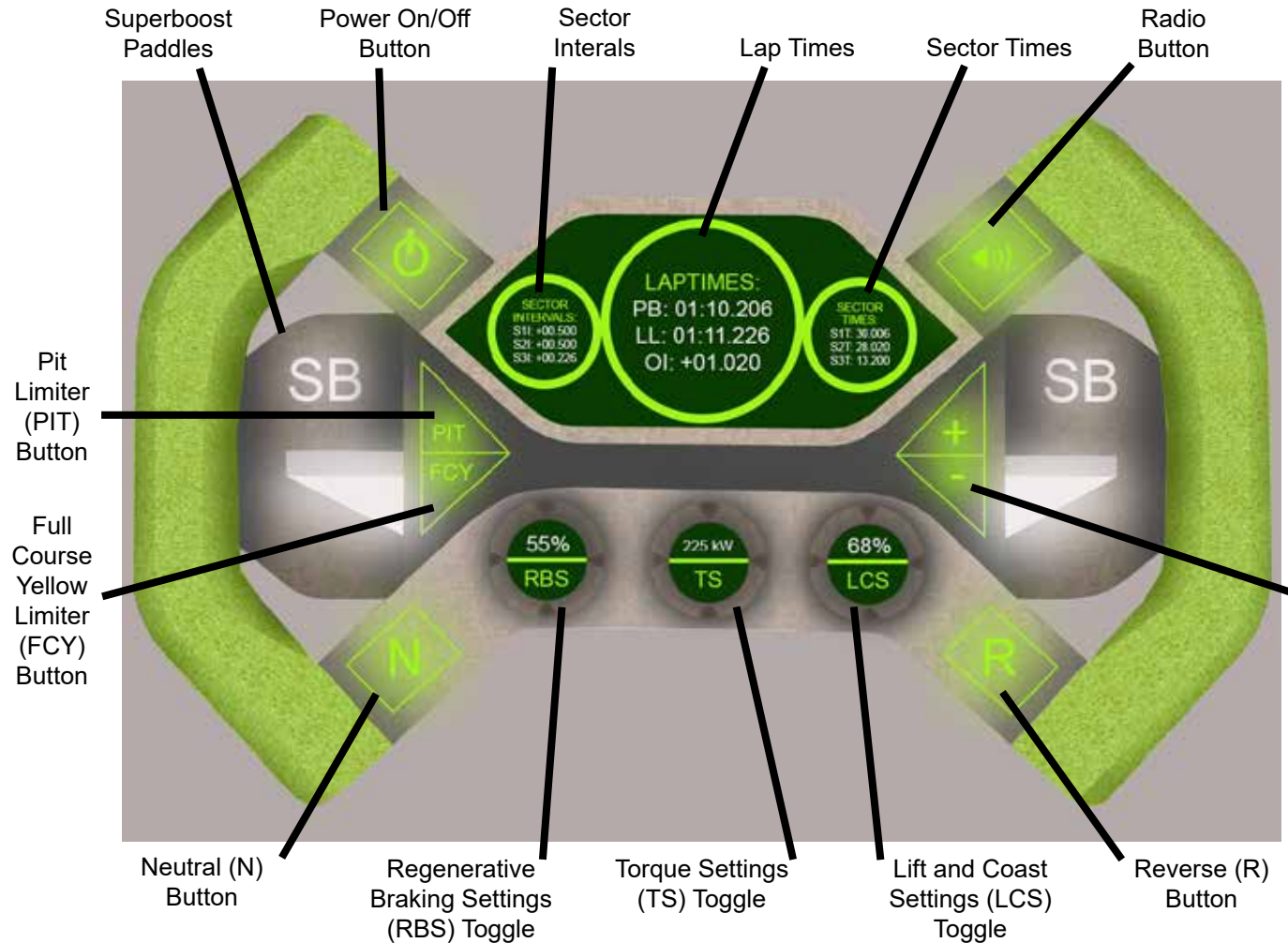


HIGH DENSITY
FOAM



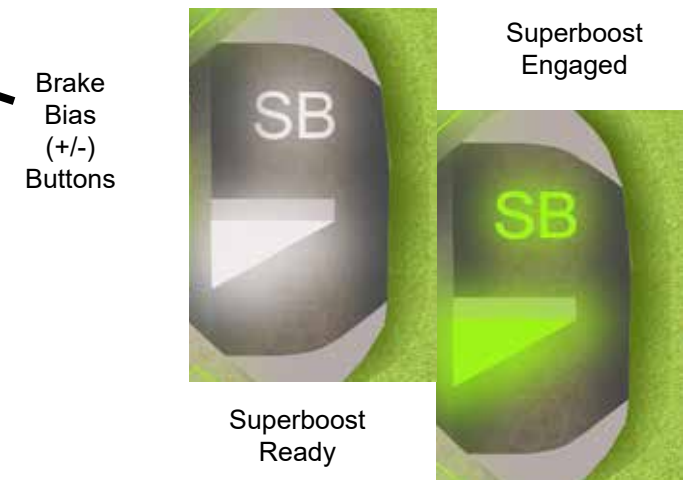
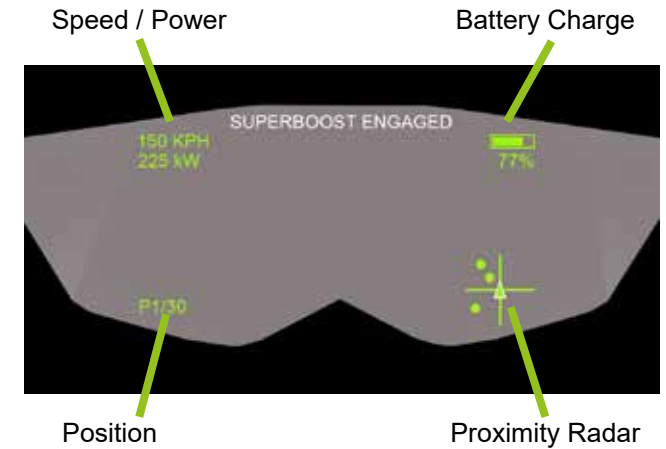
HEMP
BIOPLASTIC

The HMI and UX is focused on the steering wheel and HMD Helmet



STEERING WHEEL

HMD HELMET

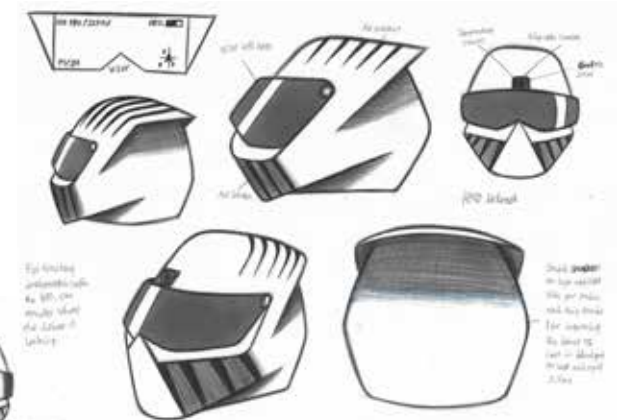


HMD HELMET

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HMD (Helmet Mounted Display) helmet contains a HUD display within the visor. Displays information to the driver within there line of sight. Allowing the driver to fully concentrate without distraction.

Inspired by the F-35 lightning jet helmet and current motorsport helmets.



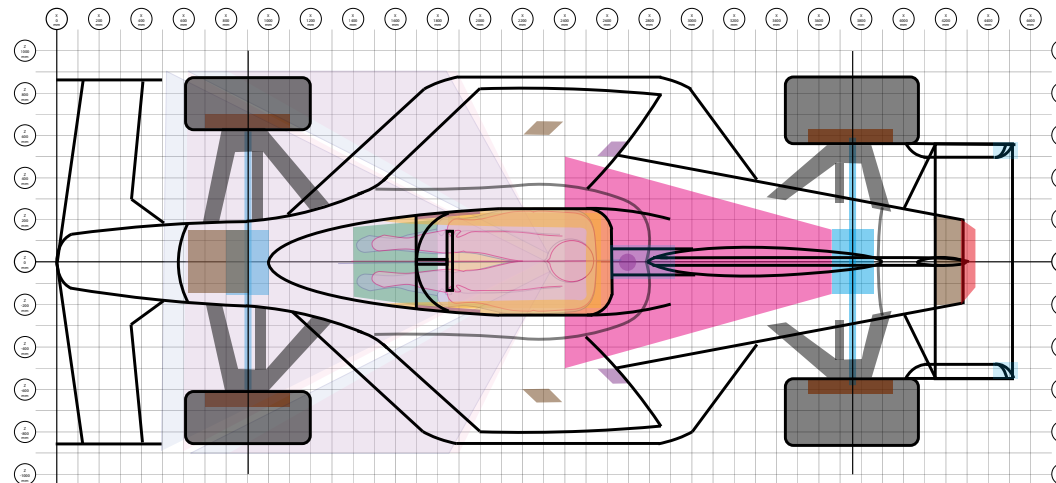
Initial idea and development sketches for the HMD helmet.

Final photoshop renders of the HMD helmet.



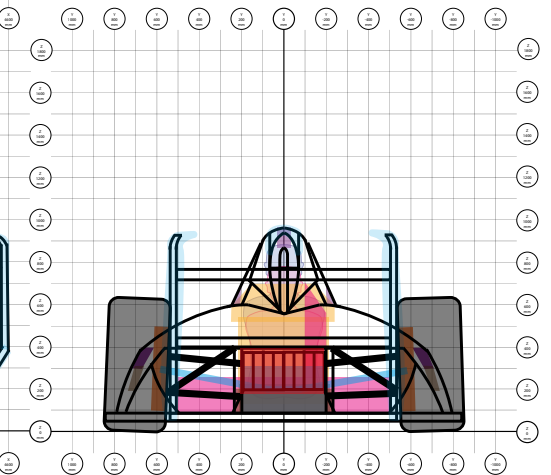
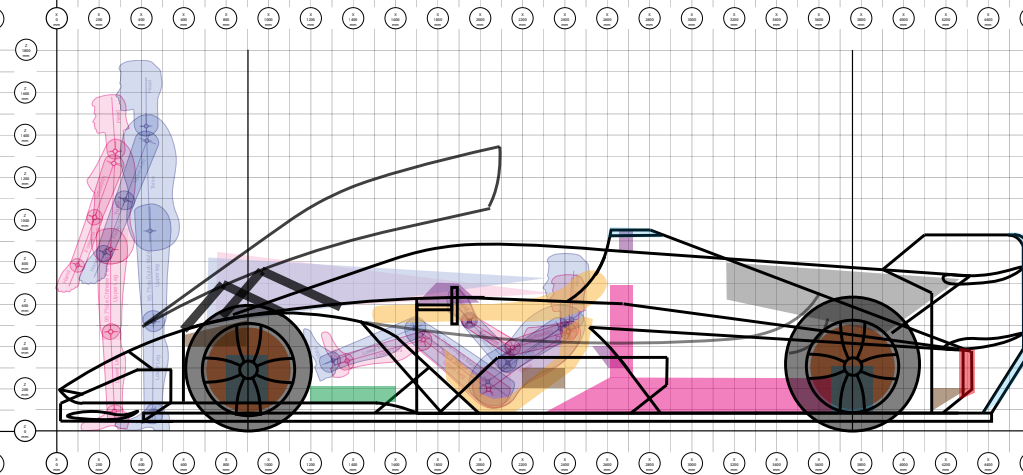
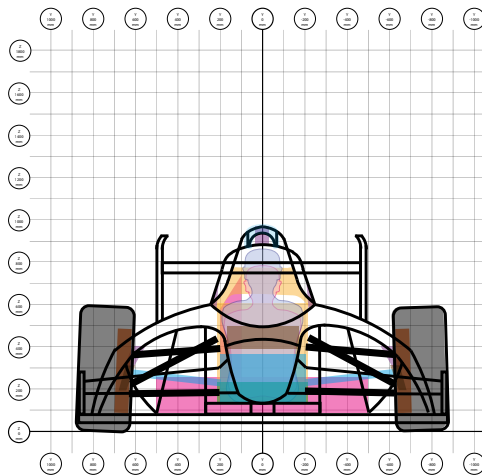


2030 Formula 4 Car Package Drawing



PACKAGE KEY:

- PMDC Electric Motor + Driveshafts
- Supercapacitor (Superboost)
- Carbon Electrode Battery Pack + Socket
- Headrest + Seat
- Onboard Cameras + Rear View Cameras
- Carbon Ceramic Disc Brakes + Regenerative Braking System
- Digital Driver Name/Position Display
- Charge/Warning/Superboost Lights
- Rainlight
- Pushrod Suspension
- Tires
- Dutch Male + Field Of Vision
- Chinese Woman + Field Of Vision
- Air Channels
- Proximity + Lidar Sensor



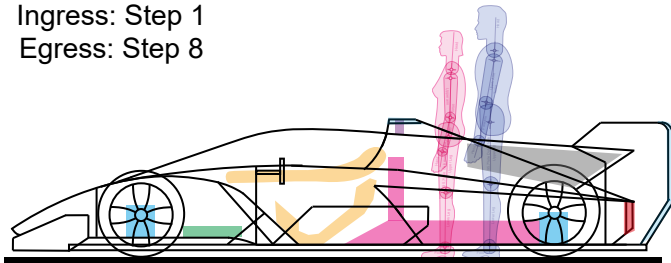
Charlie Alen / 7258657

1:1 Scale / Length (X): 4475 mm / Height (Z): 958 mm / Width (Y): 1738 mm

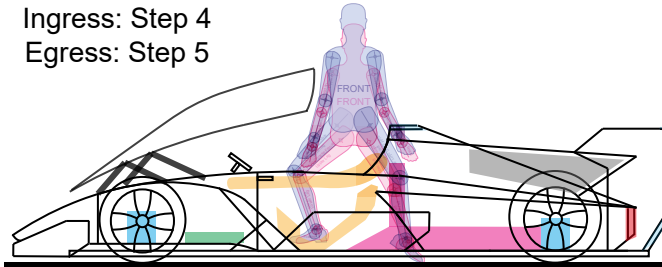
INGRESS + EGRESS

F4

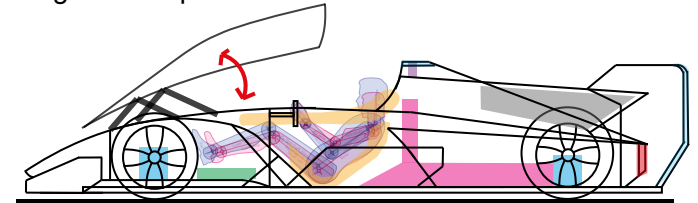
Ingress: Step 1
Egress: Step 8



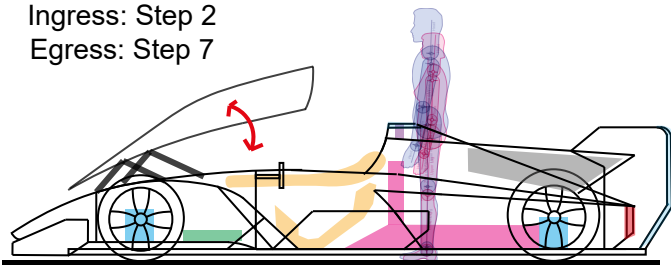
Ingress: Step 4
Egress: Step 5



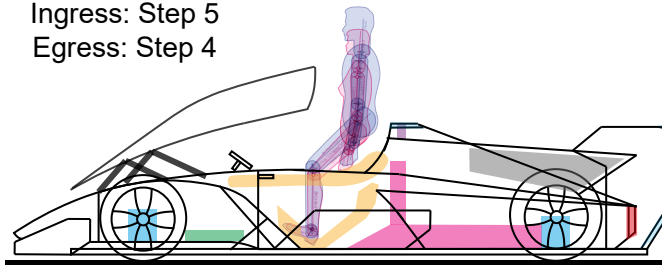
Ingress: Step 7
Egress: Step 2



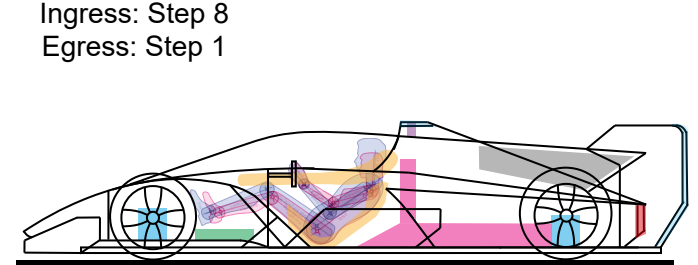
Ingress: Step 2
Egress: Step 7



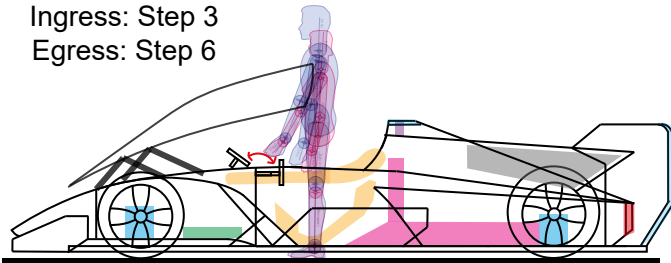
Ingress: Step 5
Egress: Step 4



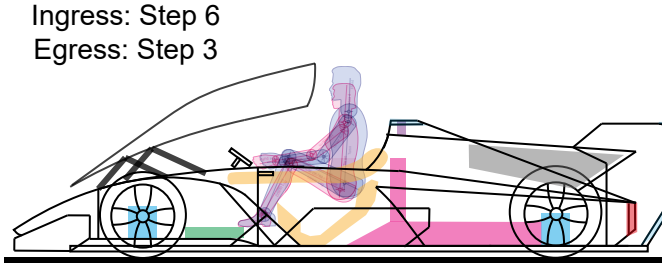
Ingress: Step 8
Egress: Step 1



Ingress: Step 3
Egress: Step 6



Ingress: Step 6
Egress: Step 3



2030 Formula 4 Car
Ingress + Egress

Charlie Alen
7258657

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HARD MODEL



Started by forming the basic shape. Removing excess material and sketching the design on the model. Later sanding down and cleaning the surfaces.



Moved onto creating the paddle shift and the quick release mechanism on the steering wheel. Added the toggles (made from recycled coke bottle lids). Continued cleaning the surfaces.



Prepared for paint with filler and primer. Painted with silver metal effect spray point.



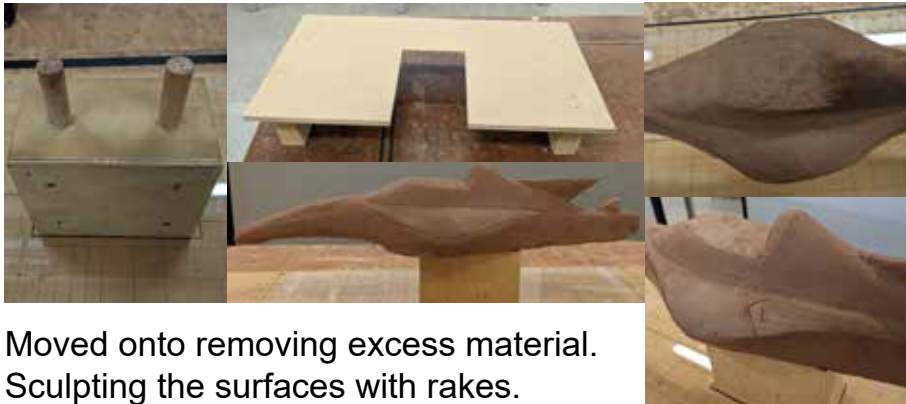
Final steering wheel hard model.

CLAY MODEL

F4



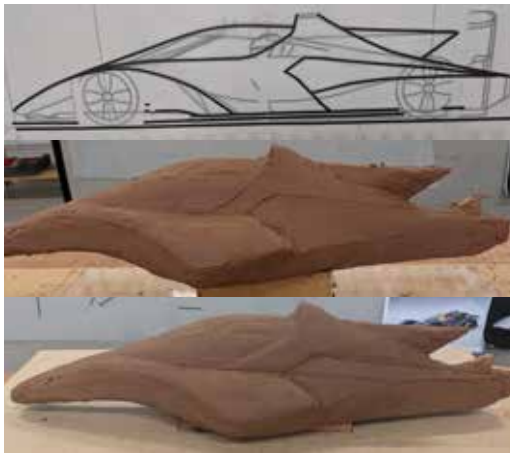
Started with making the armature with MDF and styrofoam. Next loading the armature using templates for assistance.



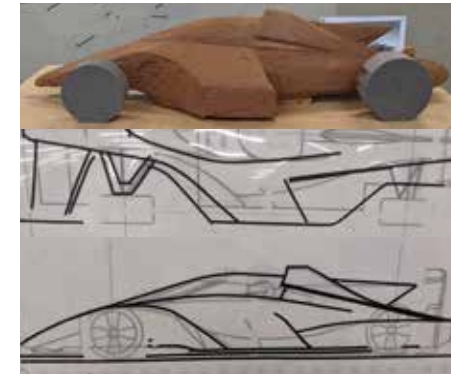
Moved onto removing excess material. Sculpting the surfaces with rakes.



Not satisfied. I reworked the top section of the bodywork. With a strong cut along the side.



After exploring the initial design's form. I explored a different concept. Focusing on the side profile. With a stronger connection between the sidpod and the top section of the bodywork.

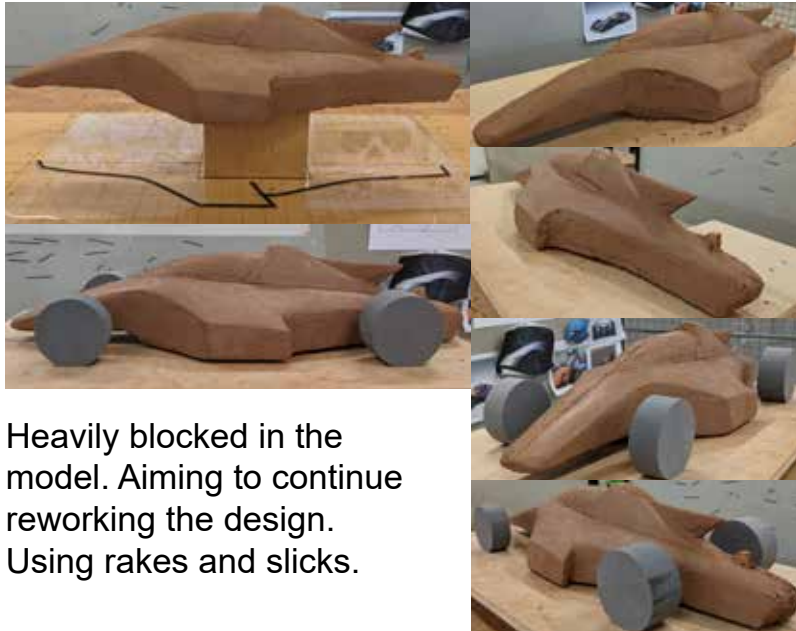


Reprofiled the rear section. Whilst extending the width of the side profile and creating stronger curvature. Using rakes and slicks. I also created wheels from styrofoam.



CLAY MODEL

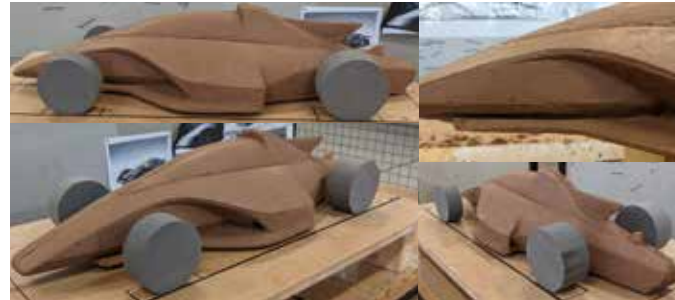
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Heavily blocked in the model. Aiming to continue reworking the design. Using rakes and slicks.



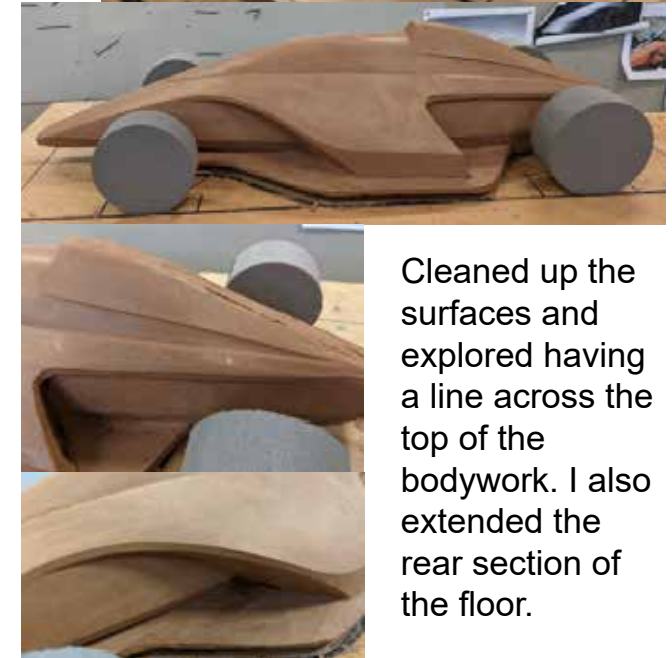
Began carving into the sidepod of the model. Creating an air intake and new floor. Whilst creating more curvature across the canopy.



Slicked down the surfaces. Whilst creating a spine below the nose and extending the length of the sidepod.



Removed the sharkfin and stretched the rear of the sidepods. Creating a more flowing and aerodynamic shape.



Cleaned up the surfaces and explored having a line across the top of the bodywork. I also extended the rear section of the floor.

CLAY MODEL

F4



Applied graphic tape to the model. Exploring ideas for a new graphic down the top of the bodywork. Whilst adding bigger wheels and MDF suspension pieces.



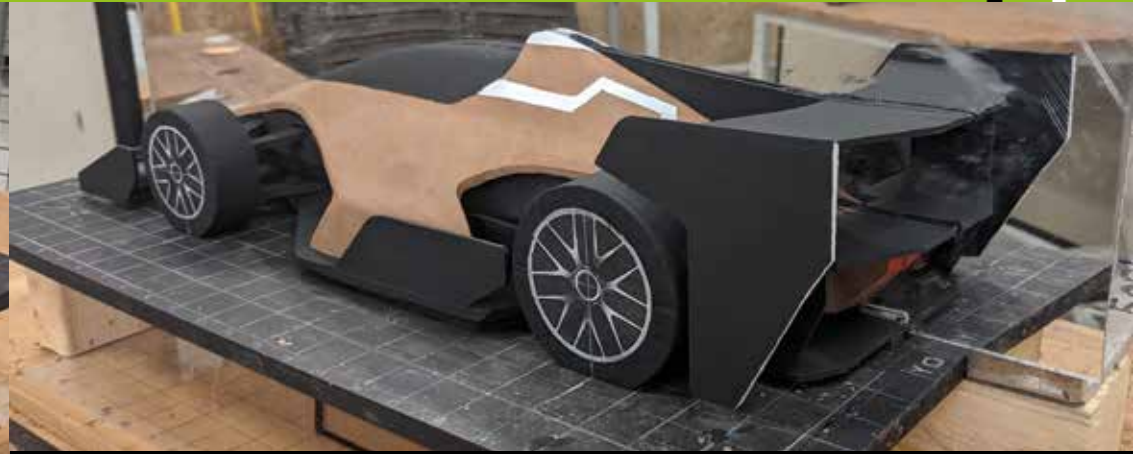
Extended the lower front section of the sidepod and fitted a front wing. Connecting the lower spine with the front wing. Also fitted a buttress along the side profile.



Fitted the rear wing and remaining hard components. Whilst also fitting a mirror to reflect the other side. Painted sections of the model and began cleaning up the surfaces again.

FINAL CLAY MODEL

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*THANK YOU
FOR READING*

