FUTURE AUTONOMOUS COMPACT TRANSPORT

MVD III-25

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Acknowledgement

I would firstly like to thank my guide, Prof. Nishant Sharma, James Kelly, Jaspreet Singh, Yashwardhan for the support and valuable inputs that he has provided during the course of project. I also thank Nicolas Proust for his inputs on the project.

Last but not the least, I would like to thank my Project Partner Dhananjay Chile for being a constant source of support and inspiration throughout the project.

Amol Bhangare
Date:-

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1 About TATA Motors

Background
Subsidiaries
Product Lineup
Impact Design

1.1 Background

Indian manufacturers Tata Motors have quite the history under their belt,starting with the company's foundation in 1945 as a locomotive producer.

Tata Motors is just one part of the business group Tata, formerly known as TELCO (Tata Engineering and Locomotive Company), which also has several other ventures, including a steel making plant and even a tea producing company.

Tata got into the motoring business in 1954 when it starting producing heavy trucks in a joint venture with Daimler-Benz AG. In 1960. the first truck rolled out of the factory's door in Pune, India, a copy of a German Daimler truck.

Their first car was the Tata Indica, a model that enjoyed an unexpected success both in India and on other European markets, despite the fact that car-analysts gave it bad reviews.

The Indica won people over with it's low fuel consumption and powerful engine. The second generation of Indica, the V2, was even more successful.

Indica's major success gave Tata Motors the financial power to take over Daewoo Motors in 2004, in a effort to take their brand more international exposure. Other surprising acquisitions by the Tata Group include Jaguar and Land Rover as of March 26th, 2008 for a net 2 billion US dollars.

1.2 Product Lineup

Tata Motors Cars is a division of Tata Motors which produces passenger cars under the Tata Motors marque. Tata Motors is among the top four passenger vehicle brands in India with products in the compact, midsize car, and utility vehicle segments.

COMPACT CARS

MIDSIZE

UTILITY VEHICLES

FUTURE AUTONOMOUS COMPACT TRANSPORT

TATA MOTORS DESIGN STUDIO

1.3 Subsidiaries

Jaguar Cars

Jaguar Cars is the luxury vehicle brand of Jaguar Land Rover,a British multinational car manufacturer headquartered in Whitley, Coventry, England, owned by the Indian company Tata Motors since 2008.

Jaguar's business was founded as the Swallow Sidecar Company in 1922, originally making motorcycle sidecars before developing bodies for passengercars.
Jaguar has, in recent years, manufactured cars for the British Prime Minister, the most recent delivery being an XJ in May 2010.[10] The company also holds royal warrants from Queen Elizabeth II and Prince Charles.

1.3 Subsidiaries

Land Rover

Land Rover is a British car manufacturer with its head-quarters in Gaydon, Warwickshire, United Kingdom which specialises in four-wheel-drive vehicles.
It is owned by the Indian company Tata Motors, forming part of their Jaguar Land Rover (JLR) group. It is the sec-ond oldest four-wheel drive car brand in the world.
The Land Rover name was originally used by the Rover Company for the Land Rover Series, launched in 1948. It developed into a brand encompassing a range of four-wheel-drive models, including the Defender, Discovery, Freelander, Range Rover, Range Rover Sport and Range Rover Evoque.

1.3 Subsidiaries

Tata Daewoo Commercial Vehicle Company

Tata Daewoo Commercial Vehicle Company Limited engages in the manufacture and distribution of trucks in South Korea. The company offers heavy and medium-duty cargo trucks; tractors; dump and mixer trucks; and special purpose trucks. It also exports its products to approximately 60 countries.

The company was formerly known as Daewoo Commercial Vehicle Company Ltd. and changed its name to Tata Daewoo Commercial Vehicle Company Limited in March 2004, as a result of the acquisition by Tata Motors Limited.

1.4 Design Network

UK | TATA Motors European technical centre

The TMETC design studio plays a pivotal role in the creation of design concepts of future Tata Motors passenger vehicles, part of TMETC's role as Tata Motors' Advanced Product Creation Centre for the next generation of passenger vehicles.

INDIA | TATA Motors Design, Pune

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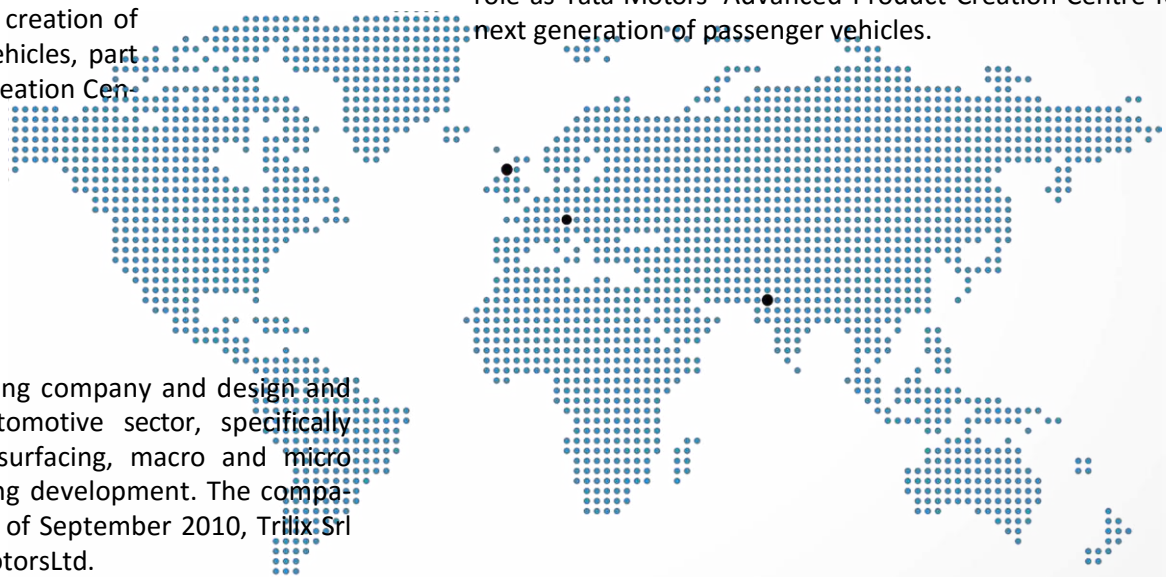


ITALY | Trillix SRL

Trilix Srl is a design and engineering company and design and engineering services in the automotive sector, specifically styling, architecture, packaging, surfacing, macro and micro feasibility, and detailed engineering development. The company is based in Grugliasco, Italy. As of September 2010, Trilix Srl operates as a subsidiary of Tata MotorsLtd.

1.5 IMPACT Design

The Exterior design will be defined through‘EXciting’, ‘EX-pressive’and‘EXtraordinary’features:

1.Exciting architecture and pleasing proportions will be standard e.g. best in segment size & location of the wheels, perfectly proportioned cabin to body ratio and hood to cabinrelationship

2.Expressive surfaces and graphics e.g. front face framed by the Humanity Line; dynamism amplified by the Sling-shot line; movement created by the Diamond Window

3.Extraordinary Details inspired byIndian Architecture

1.5 IMPACT Design

The Interior of the vehicle will be defined through‘INviting’,‘INtelligent’ and‘INtouch’features.

1.Inviting interior architecture and proportions including Layered Cockpit Design; Driver Focussed layout; Outstanding Textures, Fabrics and Materials

2.Intelligent Cabin Layout with clever storage spaces, surprise and delight features. All displays, commands and controls will be within easy and intuitive reach

3.Intouch and connected to the world inside and outside thevehicle

1.6 Design Elements

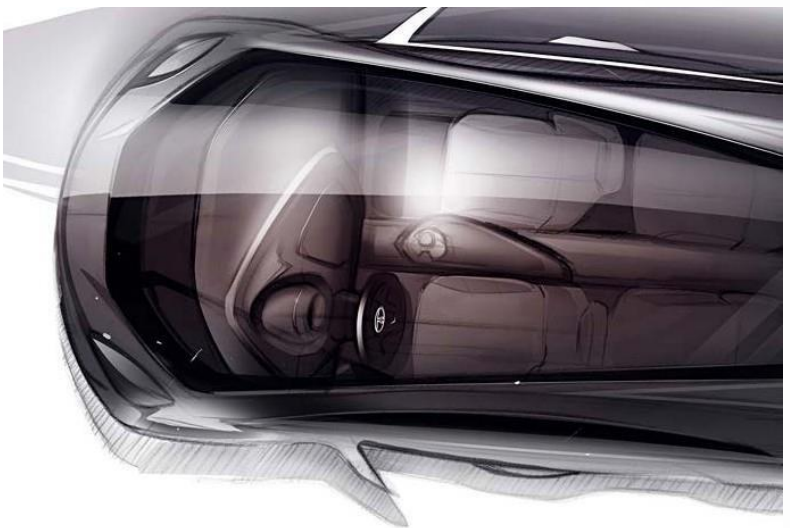
EXciting Architecture | **EXpressive** Surfacing | **EXtraordianry** Details

The Tata Megapixel is designed to express the energy and dynamism seen in Contemporary Design in India today. The design language of Megapixel , while inspired from traditional Indian Architectural and design details, is completely Global in its reach and appeal, comfortable in New York, London orMumbai.

1.6 Concept cars

The Tata Megapixel is designed to express the energy and dynamism seen in Contemporary Design in India today. The design language of Megapixel , while inspired from traditional Indian Architectural and design details, is completely Global in its reach and appeal, comfortable in New York, London or Mumbai.

The dynamic stance, sweeping silhouette andfloating C-Pillar express again the modernity and confidence of India today. The wide, single piece front 'mask' give the car a presence usually reserved for much larger cars. The single belt line which sweeps from the front quarter glass all the way around to the tailgate, visually stretch and lengthen what is otherwise a car with very compact dimensions.



2 Initial Brief

Statement
Challange of Autonomy
Deliverable
Duration

2.1 Brief Statement

Future vision of an autonomous vehicle [exterior] for TATA Motors

TATA Motors, the brand, represents a trusted companion to the urban/extra-urban/rural population in Indian. The versatility offered in terms of body styles and customization freedom, and cabin space fueled past successes in terms of on-road presence andnumbers sold.

Design Challenge:

Create a vehicle concept for a Future Autonomous Compact Transport [FACT]; with emphasis on the design of a new aesthetic for autonomy, the cabin spaces, and concepts for human-machine interaction: one of the most important aspects in the interior of an autonomous vehicle. Provide a clear explanation of the thinking behind the solutions, where the inspiration came from and justification for the directiontaken.

2.2 Explanation

A convincing proposal for an autonomous compact vehicle which communicates the “Do anything; Go anywhere” capability of the vehicle and that would make it relevant beyond the current customer base. The proposal would be simple and inviting that showcases the technology encapsulated in it and at the same time makes it self-explanatory rather than beingesoteric for the average customer.

2.3 Deliverables

Future vision of an autonomous vehicle [exterior] for TATAMotors

Mood boards, research sketches, explanatory sketches, persuasive rendering(s) and illustration(s) for a feasible, well thought out and detailed vehicle level solution which gels with the thematic interior proposal. The intent is to bring design sophistication in to this new category of transportation and eventually expand the product appeal to a wider market base as the ultimate transportation object. The final submission will include a proportional clay model supported by a CAS representation and detailed visualizations.

Design deliverables: The vehicle would have: A feasible powertrain; an instrument panel; flexible use of cabin space; scope for connectivity, new materials and manufacturing technologies; energy management/HVAC/audio-video systems and relevant controls etc.

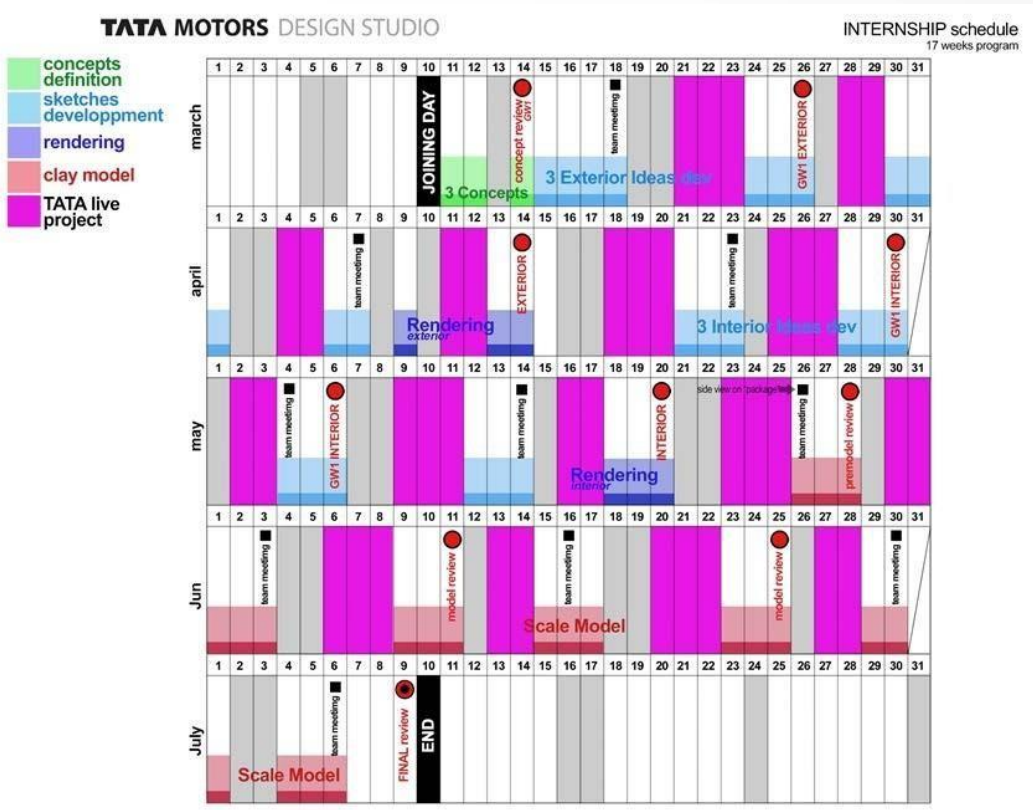
The vehicle would have an operating zone of size of a typical metropolis inclusive of extra-urbanareas.
The final submission should also include a brief discussion on obstacles that may arise with the advent of autonomous vehicles, both in vehicle design and usage, with potential approaches to overcome the same, all in the Indiancontext.

2.4 Schedule

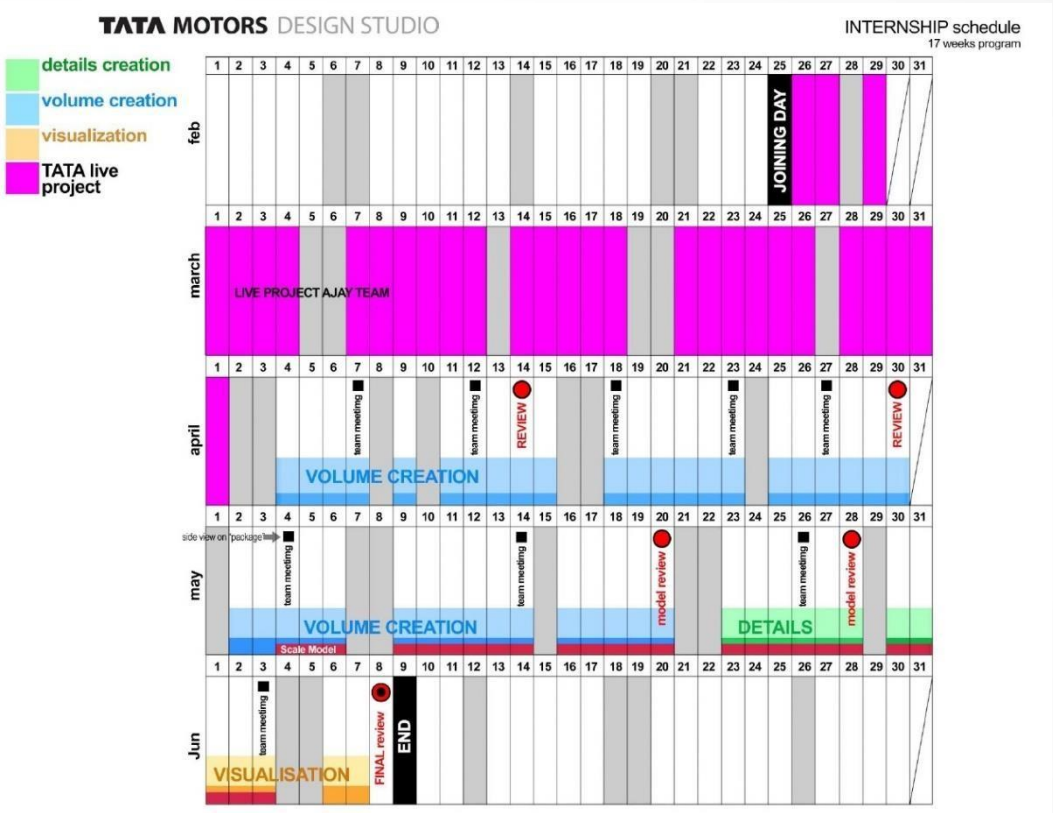
The schadule is divided between a research phase, exploration phase and refinement phase. The CAS model building will be simultaneously done after the key theme isfinalised.

The final deliverables include mood boards, story boards, sketch boards, renders and CAS model with an Animation.

DhananjayChile



AmolBhangare



3 Design Methodology

Reserach
Exploration
Developement
Deliverable

Phase 1

UNDERSTANDING
THE PROJECT BRIEF

-Initial briefing

Phase 2

PRIMARY RESEARCH

- About the product
- History of Product
- Market
- Current Users
- Competitors/Competition
- Visual semantics/ Understanding the changing Design DNA

-Packaging

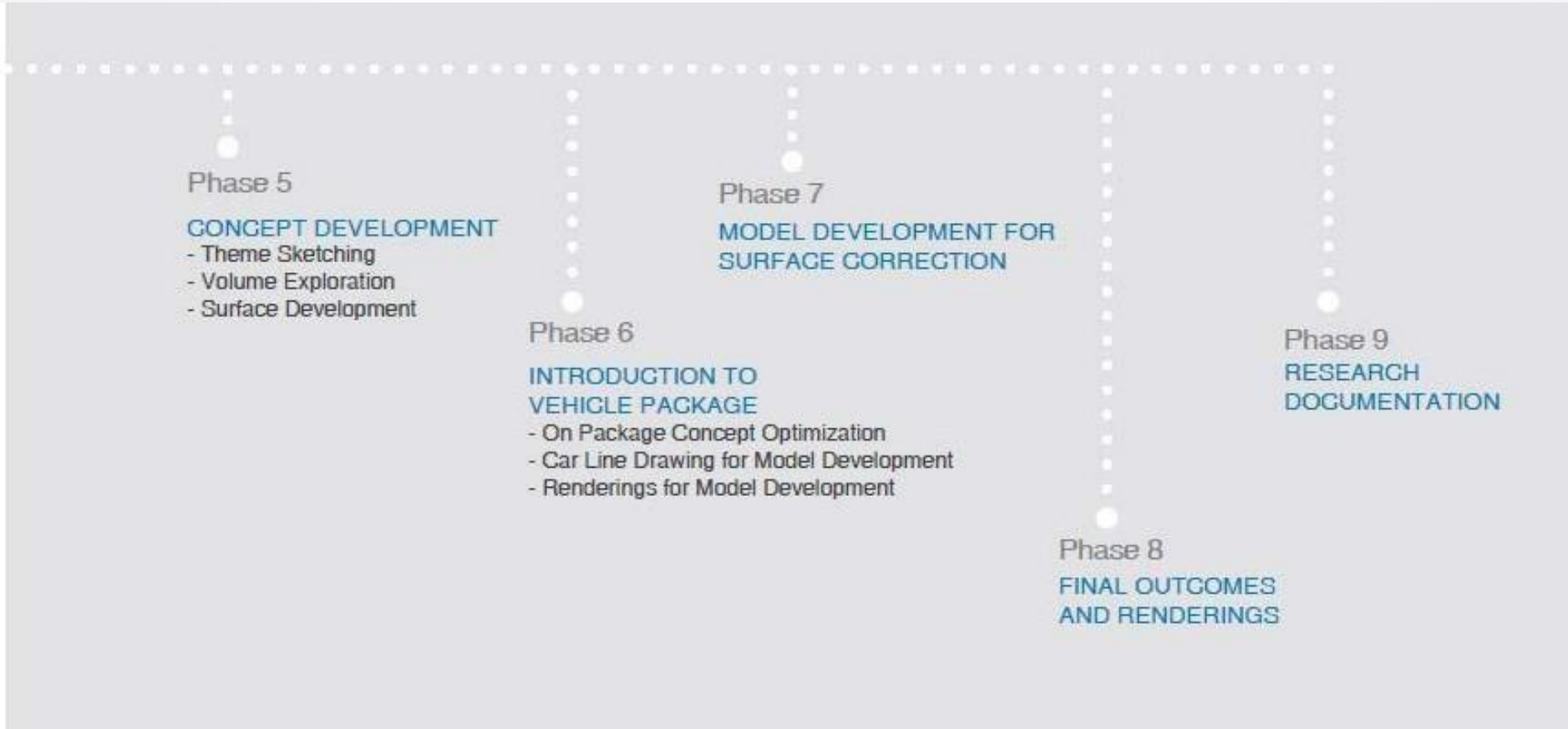
Phase 3

USER STUDY

- Present Scenario
- Initial Concept Sketches
- The User/ Storyboarding
- Brainstorming
- Proposed Vehicle Concepts
- Trend Study and Mood Board Images
- Validation/Verification

Phase 4

REDEFINITION
OF BRIEF


Phase 5
CONCEPT DEVELOPMENT
- Theme Sketching
- Volume Exploration
- Surface Development
Phase 6
INTRODUCTION TO
VEHICLE PACKAGE
- On Package Concept Optimization
- Car Line Drawing for Model Development
- Renderings for Model Development
Phase 7
MODEL DEVELOPMENT FOR
SURFACE CORRECTION
Phase 8
FINAL OUTCOMES
AND RENDERINGS
Phase 9
RESEARCH
DOCUMENTATION

4 Primary Research

Understanding Autonomy
Thinking ahead

4.1 Autonomy

Understanding Autonomy

Before getting started on the project, understanding the context, autonomy, automotive trends and forecasts is most important step. Answering questions like where to implement, target users, how it is going to affect mobility and mobility design in future has to be understood.

Mobility design is always affected by various factors like feasibility, methods of construction and technology available. Thus understanding such factors prior to design process will help create better mobility solutions.

4.2 Target User

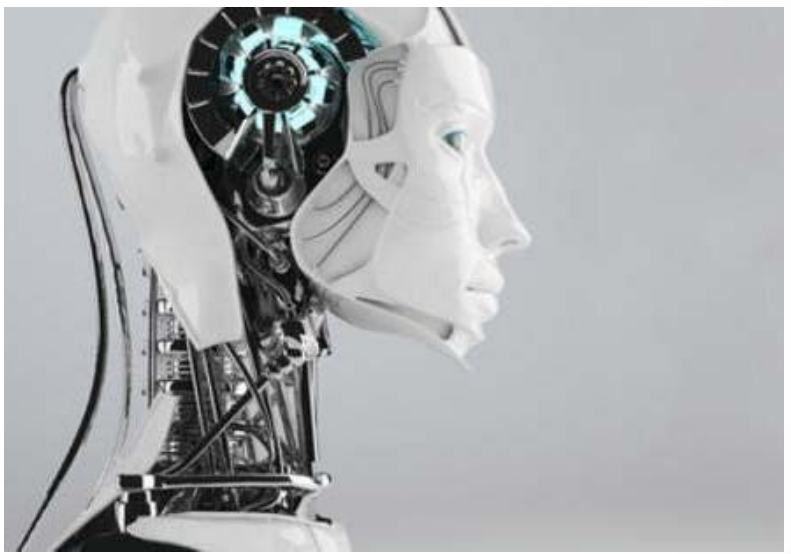
The autonomous car will make the portion of the population which is currently excluded from mobility e.g. children and very old peoplemobile.

Autonomous mobility will allow people to engage in unfamiliar activities while driving. Reading, working, socializing, sleeping, and eating will create a need for more flexible interiors that are also safe. With this evolution, we also need to address the emotional aspect of human driving since it will not only be difficult to give up control but many people simply enjoy driving.

4.3 Technology

The base technologies for this are sensor suits like radar, LIDAR, Infrared etc. supported by image recognition, processing and self learningalgorithms.

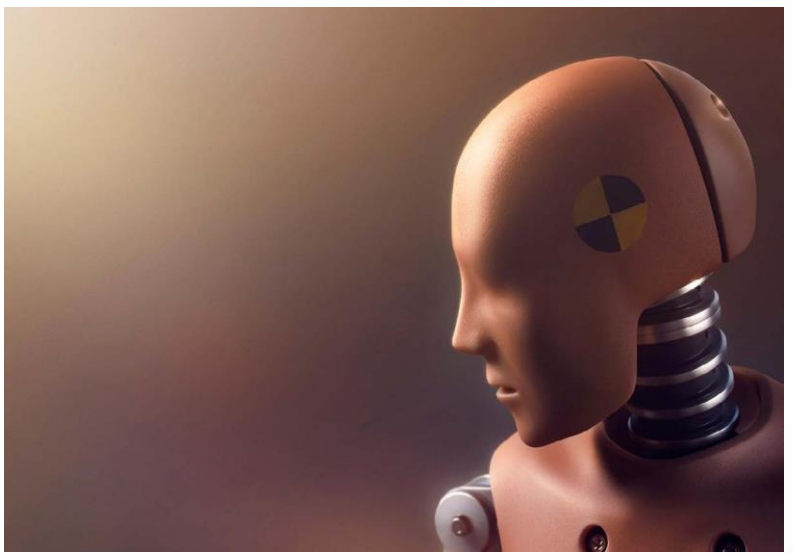
It's more than blind spot detection and forward collision avoidance. It does what no other car on the road today can do. It changes lanes with a touch of the turn signal control. It steers the car, not just in a straight line but around curves as well. It can match its speed to that of a car in front of it, even coming to a halt and starting for- ward again as needed. It can parallel park itself. Some cars do some of those things, but no other car does all of them.



4.4 Necessity

The biggest advantage of an autonomous car would be more safer travel as machines are free from human errors. The developing economies will benefit greatly and are more willing to embrace thistechnology.

Why is this happening? Ostensibly, it's because car makers want to eliminate car accidents. Every year, more than 30,000 Americans die as the result of collisions on the nation's roads. If every car has autonomous driving capability, most if not all of those incidents can be avoided. Pedestrians and bicyclists will be no longer be injured after being struck byautomobiles.



4.5 Timeframe

The timeframe for the autonomous car is around 2030 but depends on lot of factors such as technology development, infrastructure changes, and legal framework. The people's acceptance will always be a driving force for such concepts.

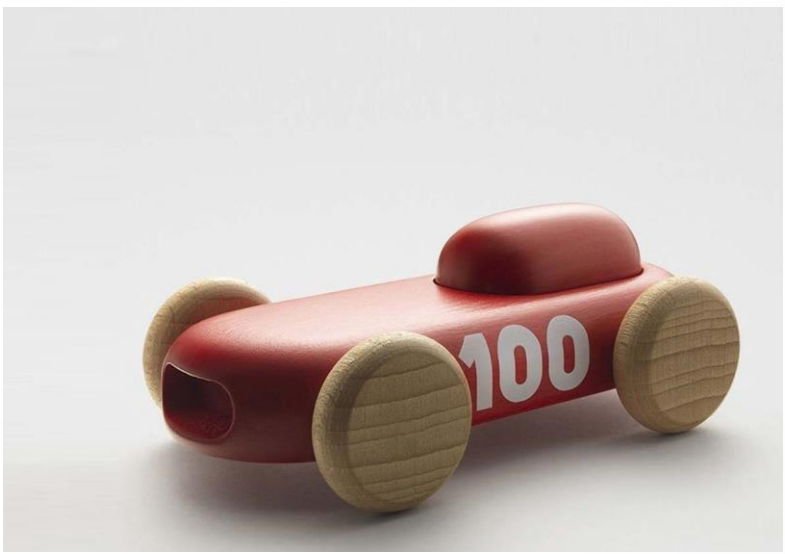
In addition to transforming the automotive industry, the rise of autonomous vehicles will likely have a profound impact on society. The ten developments described here provide a snapshot over the wide spectrum of possible outcomes linked to the increasing penetration of AVs in the market, offering industry leaders a look forward at this evolving landscape as it unfolds before them.

4.6 Effects

The autonomy is going to affect almost all aspects of car design and engineering. It can also make changes in ownership patterns and infrastructure demandsrelated to cars.

While OEMs are developing autonomous vehicles, a variety of other transport-mobility innovations are already hitting the road. Many of these take the form of pay-per-use models such as car sharing, carpooling, “e-hailing” taxi alternatives, and peer-to-peer car rentals.

These players are attracting investments and seeing impressive growth rates. The e-hailing model in particular has experienced strong growth given both annual investment funding and marketpenetration.



5 Theme Proposals

Move
Work
Play
Explore

MOVE

5.1 Urban car for Megacity

A car specifically designed for megacities. The Congestion in citycentres is a big problem all across the world, and carsharing is one solution to tackle it. With the advent of autonomous technology and smart space sharing solutions, the car can be shared in a way that retains the privacy of the owner and without troubling him or her too much.

"Commute Smart. Commute Well."

1

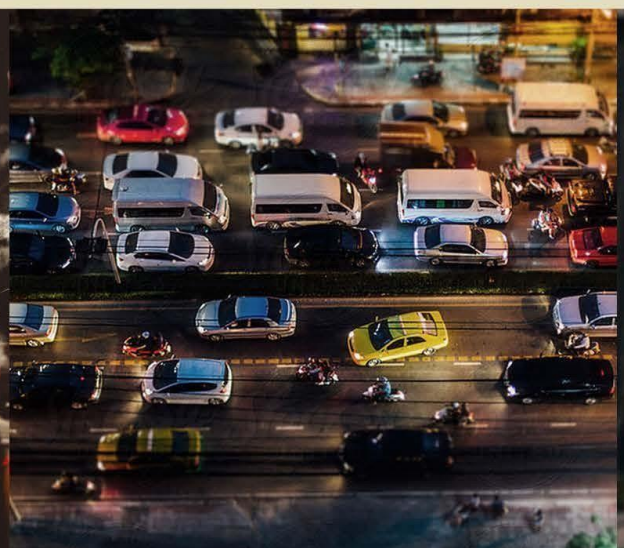
USER

Meet Kris, the engineer who works at a major tech MNC. Enjoys technology, always being the early adapter. Lives in a metro with all its pros and cons. Believer of "work hard, party harder".

LIFESTYLE

In any megacity across the globe, the commute from suburbs to city is long and ardeous.
Roads are still the same with ever increasing vehicles.

MEGACITY
LIVING



RUSH HOUR
TRAFFIC

EFFICIENT
TRANSPORT

1

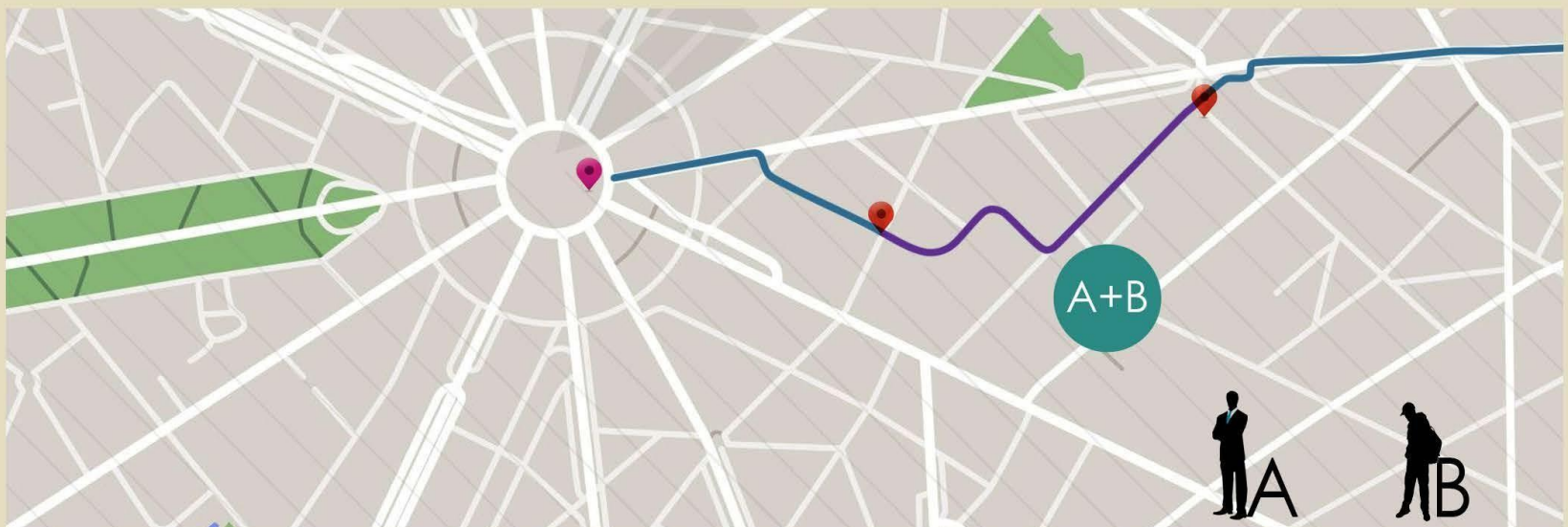
CONCEPT

A feel-good ambience for the commute which acts as an **easy share** vehicle
to create a **smarter** transportation system.

1

CONCEPT

A feel-good ambience for the commute which acts as an **easy share** vehicle
to create a **smarter** transportation system.



WORK

5.2 Cool MultiTalented Van

Most of the professional cars lack the cool factor. Can business mean fun and efficiency both? Can the vehicle deliver the goods to the clients autonomously, while still playing the role of an occasional gateaway machine? We think yes. The Work-meets-play-meets sophistication. A car with a dual personality, which can be an incredible comapnion.

"Work Hard, Have fun and make history."
-Jeffbezos

2

USER

Ayra, The self made start up owner. Loves her work, and is very ambitious. Wants to expand her business and is ever ready to try out new ideas for the same.

2

LIFESTYLE

These days, professional and personal lives are so intricately interwoven that users find themselves hopping between one world and the other.

RUNNING
A SHOP

DELIVERING
STUFF

WEEKEND
GATEAWAY

2

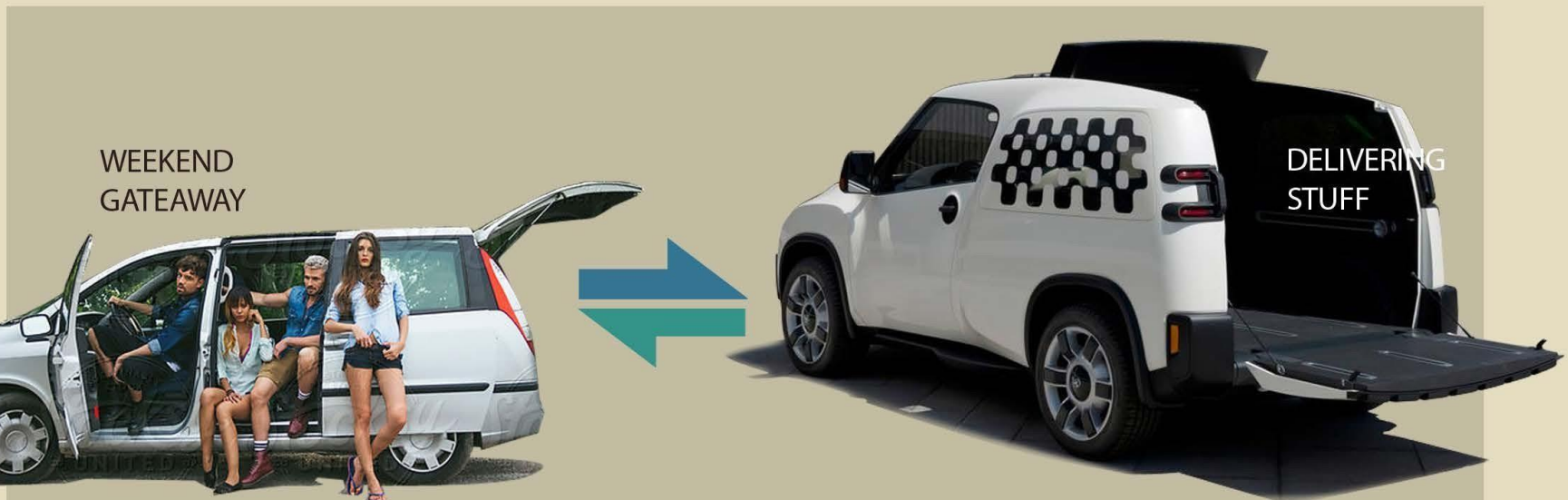
CONCEPT

The perfect **multi-talented** vehicle. An autonomous **business** vehicle which can double up equally as a comfortable passenger car

2

CONCEPT

The perfect **multi-talented** vehicle. An autonomous **business** vehicle which can double up equally as a comfortable passenger car



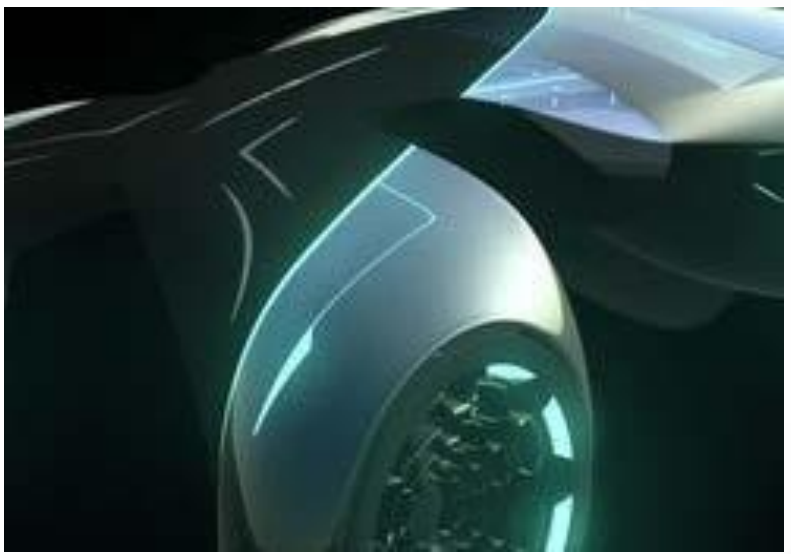
PLAY

5.3 Virtual Experience : Real World

A car which fuses the real and the virtual. Like in a video game, enjoy the fantasyland of planets, racetracks and much more with the inherent safety of Autnomous technology. Also, will be a great learning tool for younger generation in order to learn the art of driving and experiencing fun intotally different way.

"VIDEO GAMESopen worlds"

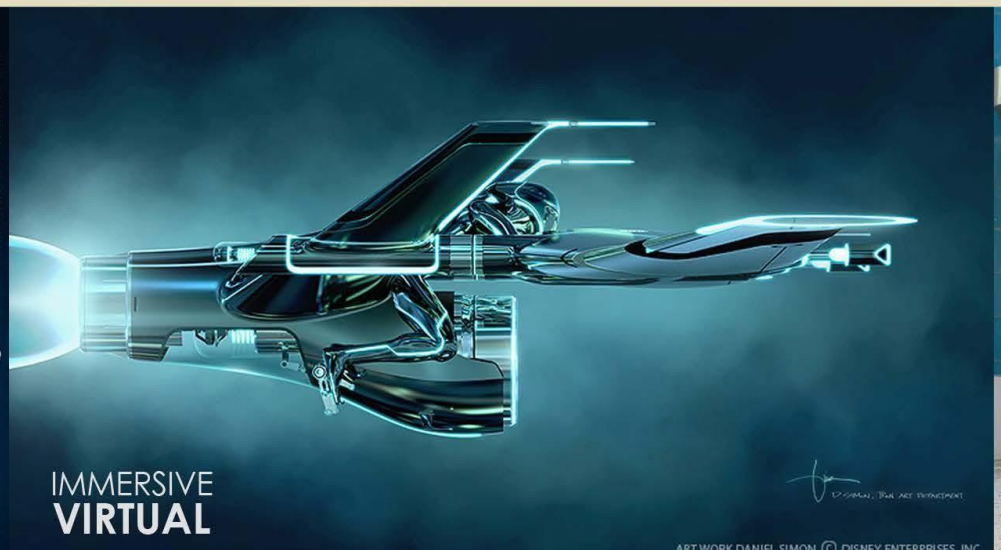
- Jon paulDyson



3

USER

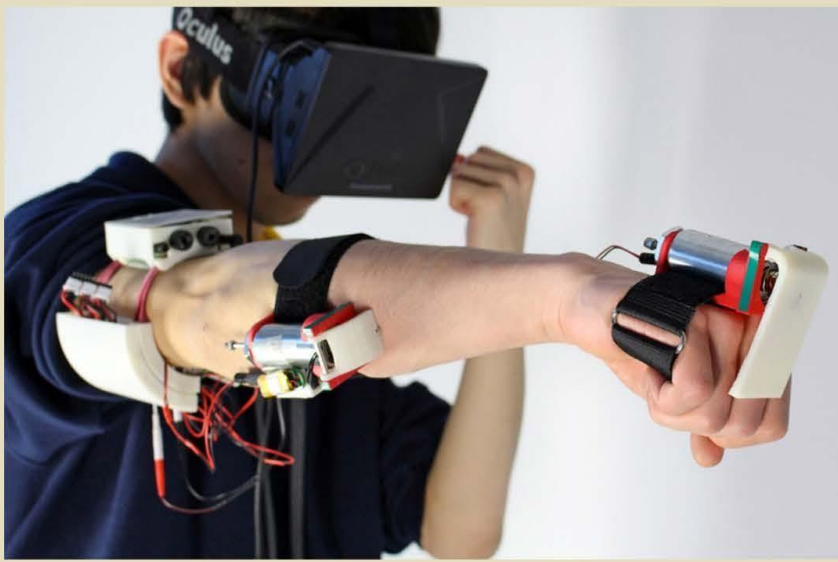
RISHI the Gamer prefers the fantasy world when it comes to express himself.
A hardcore gamer, he relishes the challanges in the digital realm. In real world, a curious and eager student.



3

LIFESTYLE

Augmented reality enables users to see three-dimensional objects in the real world.
It could revolutionize entertainment, like movies, games and sports.



VIRTUAL
REALITY

TECH
HOBBIES

SCHOOL
RUNS

3

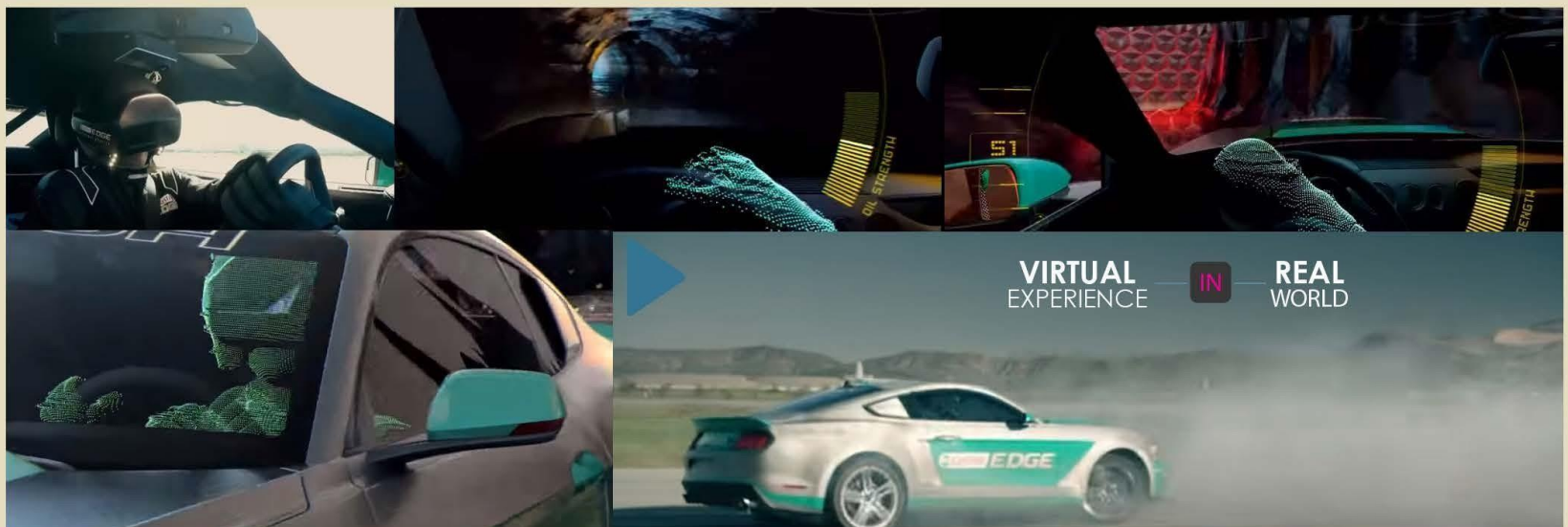
CONCEPT

fusion of video games technology and a real world driving **experience**, using an autonomous car and virtual reality , so a computer generated world responded to the driver's and car's movements in real time.

3

CONCEPT

fusion of video games technology and a real world driving **experience**, using an autonomous car and virtual reality , so a computer generated world responded to the driver's and car's movements in real time.



EXPLORE

5.4 Autonomous Explorer

A convincing proposal for an autonomous compact vehicle which communicates the “Do anything; Go anywhere” capability of the vehicle and that would make it relevant beyond the current customer base. The proposal also takes care of the legendary TATA offroad DNA which is a key strength of theBrand.

“I took the road less travelled, and that has made all thedifference.”

-Frost, Robert.

4

USER

Samir wants to explore new places,new culure. The job profile of a consultant allows him to explore his other passion, travel.
"I took the road less travelled, and that has made all the difference."

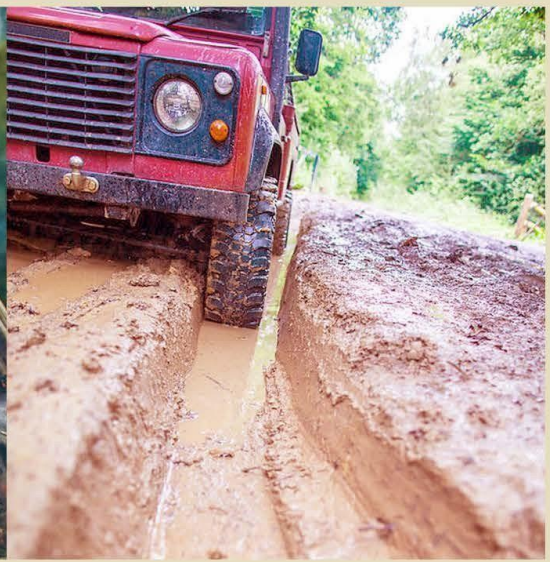
4

LIFESTYLE

Exploring the world by making own roads. Always on the go, ever ready to tackle the adventure. Living a nomads life in style and ease.

HOME ON
THE GO

MAKESHIFT
HABITATS

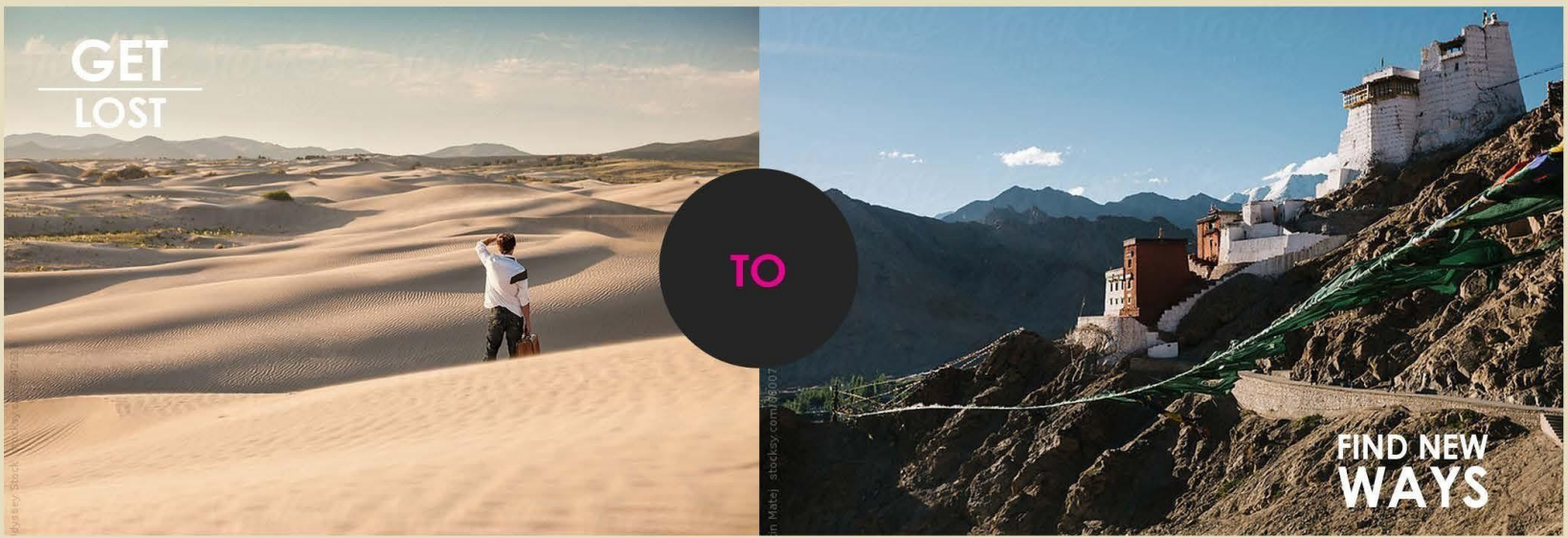


GO ANYWHERE
ALLTERRAIN

4

CONCEPT

A fun and capable **go anywhere** type of vehicle, having off road capabilities to explore the world. A practical and versatile vehicle for tomorrow with **compact** footprint.



4

CONCEPT

A fun and capable **go anywhere** type of vehicle, having off road capabilities to explore the world. A practical and versatile vehicle for tomorrow with **compact** footprint.

6 Theme Developement

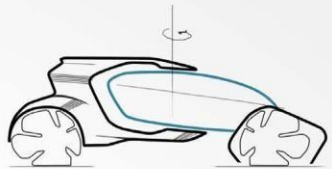
Redefination
Exploration
Synthesis
Refinement

6.1 Experience

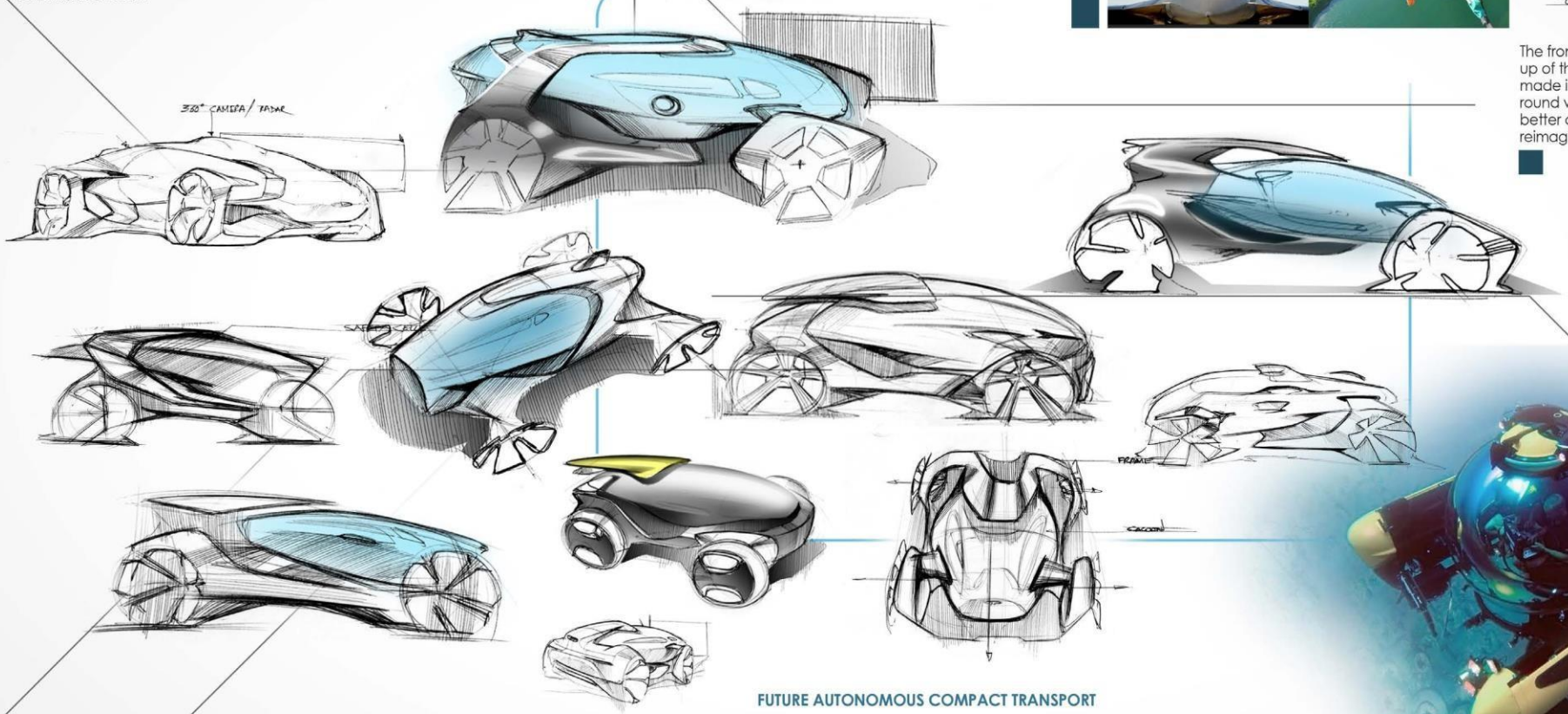
Typical car experience is characterised by the normal arrangement such as dashboard, doors etc. The exploration of the unknown can be a fun experience if the design can captalise on the freedom given by autonnomy.

REDEFINE | EXPERIENCE

Cross rivers and climb rugged hills as you venture through the beautiful landscape, all while seating in perfect safety. The open buuble canopy style enclosure gives you experience to remember, unlike typical car like seating and sight where its limited by the conventional architecture of a car.



The front part where the exporer sits is made up of the fighter jet canopy material and is made in a form of a coccoon to provide all round visibility to experince the surroundings better as the current dfashboad assembly is reimagined as a autonomous control unit.



FUTURE AUTONOMOUS COMPACT TRANSPORT

TATA MOTORS DESIGN STUDIO

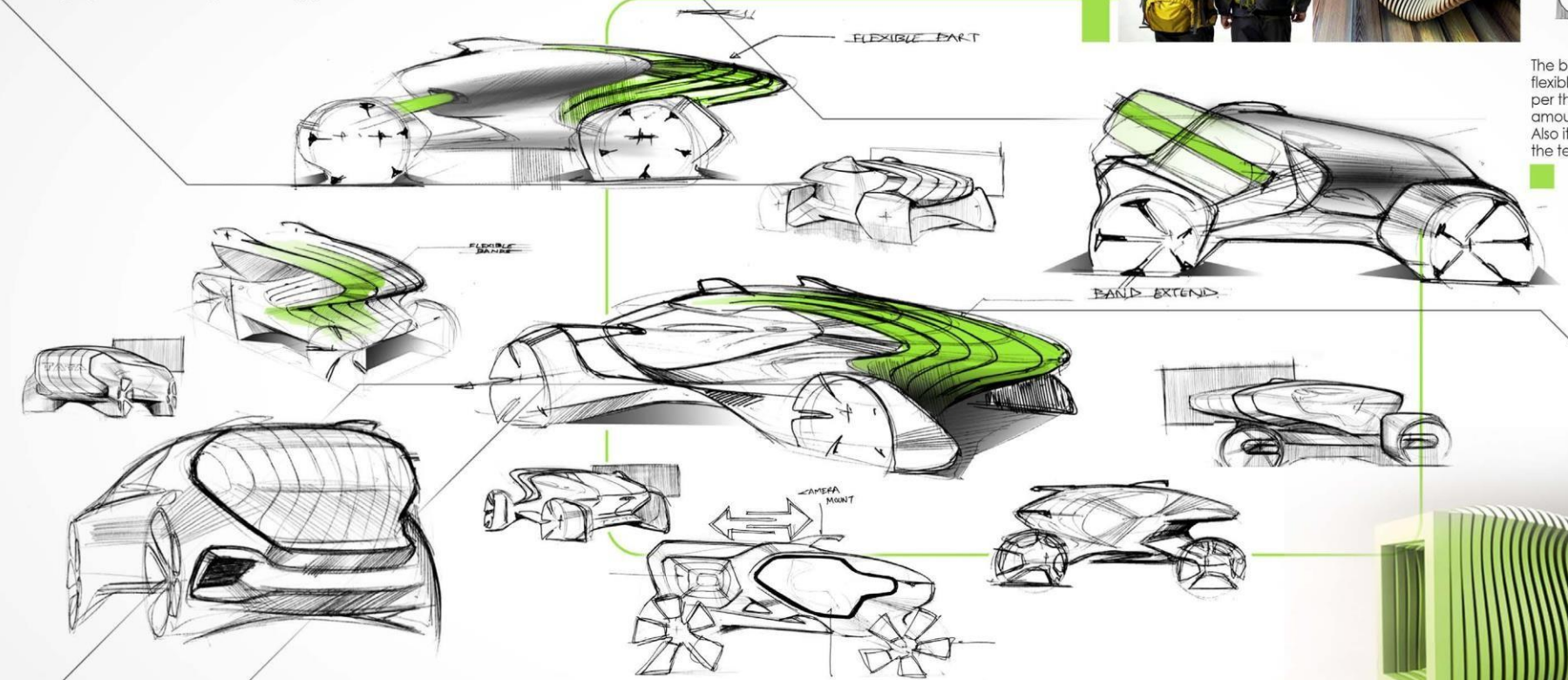
6.2 Function

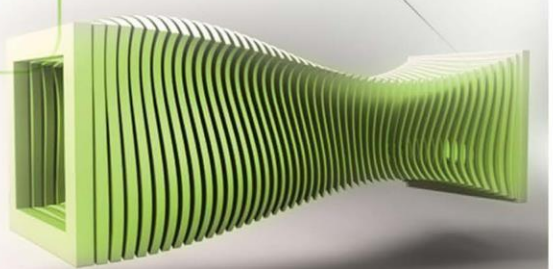
Outdoor exploration means being prepared for lot of eventualities and unplanned things. The vehicle as a living space becomes very important in this aspect. Imaginative use of space will be a key thing in determining the architecture.

REDEFINE | FUNCTION

Backpacking is an outdoor recreation where gear is carried in a backpack. Weight is necessarily key. This can be accomodated in a flexible and efficient way in the architecture, taking inspiration from hiking and trekking gear.

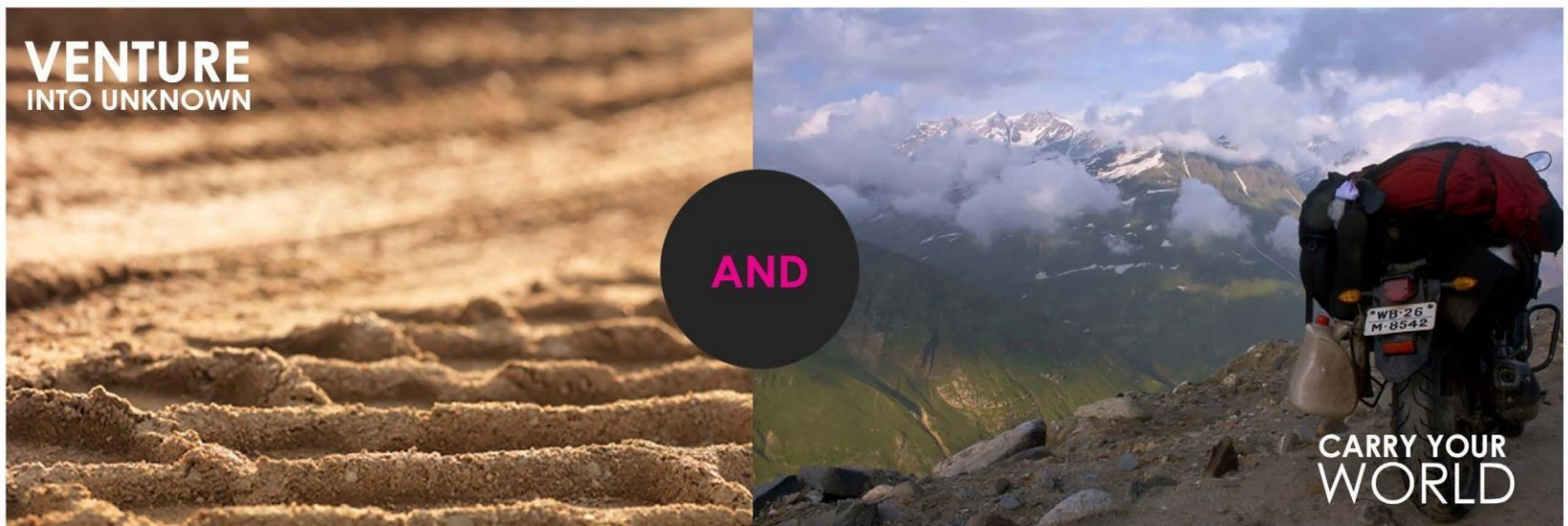
The back part is made up of parametric flexible material which changes its shape as per the requirements of the user and amount of luggage he or she is carrying. Also it can transform as a sleeping bag in the terrains where camping is a must.





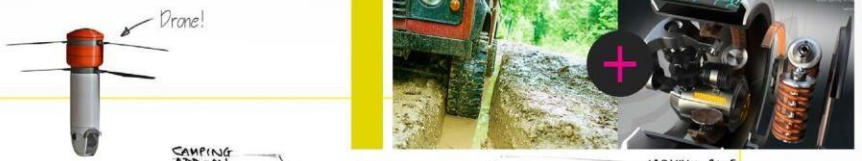
6.3 Capability

A fun and capable go anywhere type of vehicle, having off road capabilities to explore the world. Apractical and versatile vehicle for tomorrow with compactfootprint.



REDEFINE | CAPABILITY

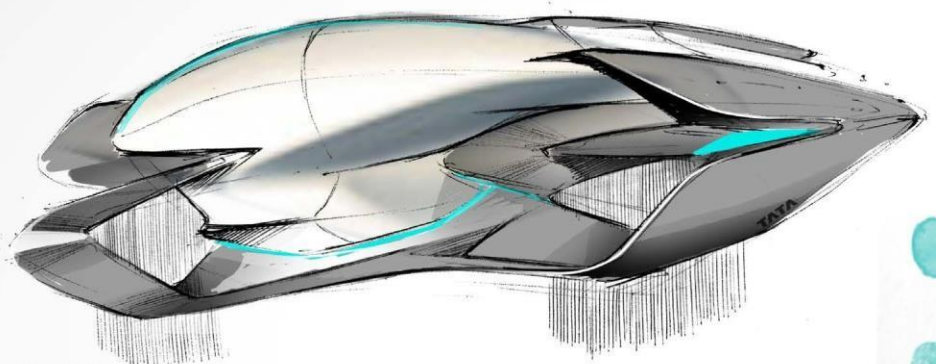
Traveling on off-road terrains require vehicles capable of accommodating off-road driving such as ATVs. These vehicles accommodate off road conditions with extended ground clearance, off-road tires and drive-train.



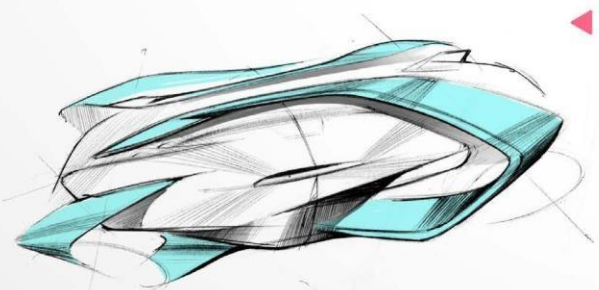
The vehicle platform is based on 4 active wheels, each having its own suspention, motor and power storage. The whole system acts as an intelligent group to achieve maximum performace under serious offroading conditions.

REDEFINE | ARCHITECTURE

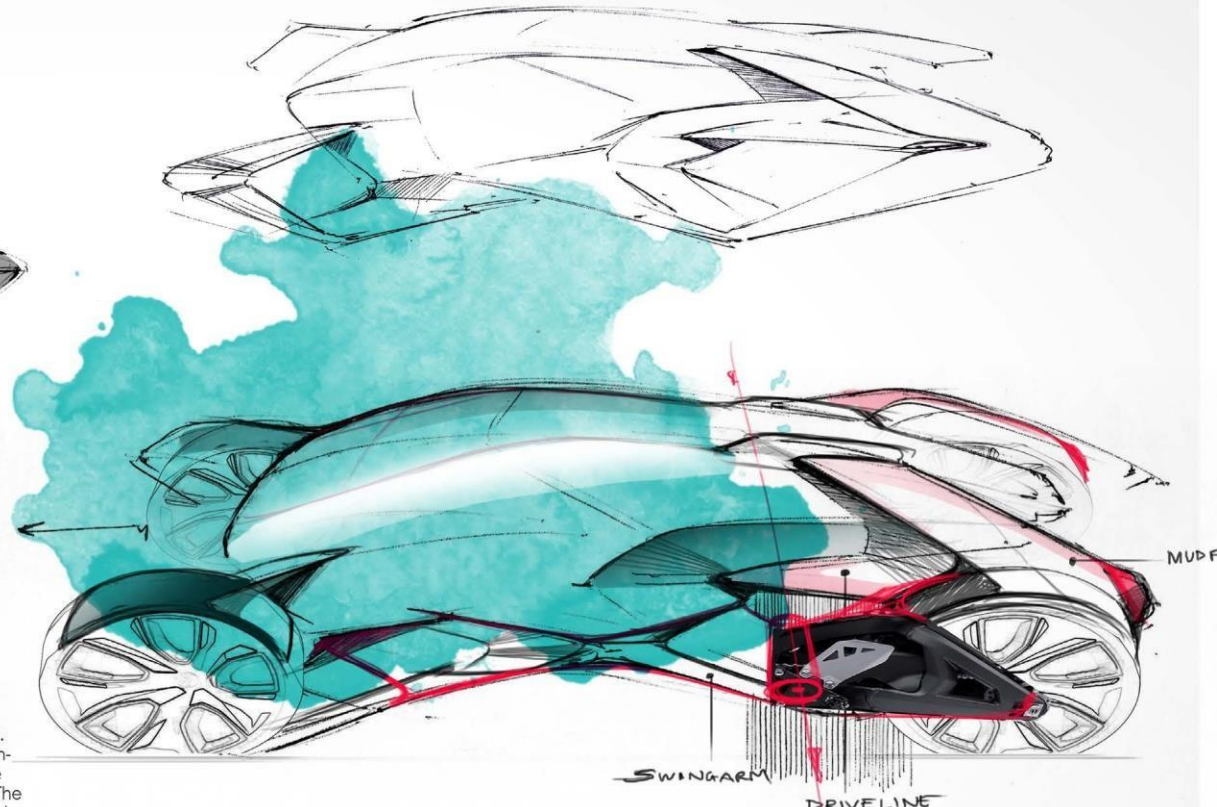
The form here is split into two parts, SHELL and FRAME. The inner shell encapsulates the driver and protects him while the frame houses entire powertrain and suspention with functional attachments to make the journey more easier.



MOODBOARD



The frame encapsulates the central shell. Frame houses the powertrain and suspention functions while the shell provides the protection and comfort for passengers. The contrasting form lagiages of the shell and frame will create a different and progressive aesthetics.



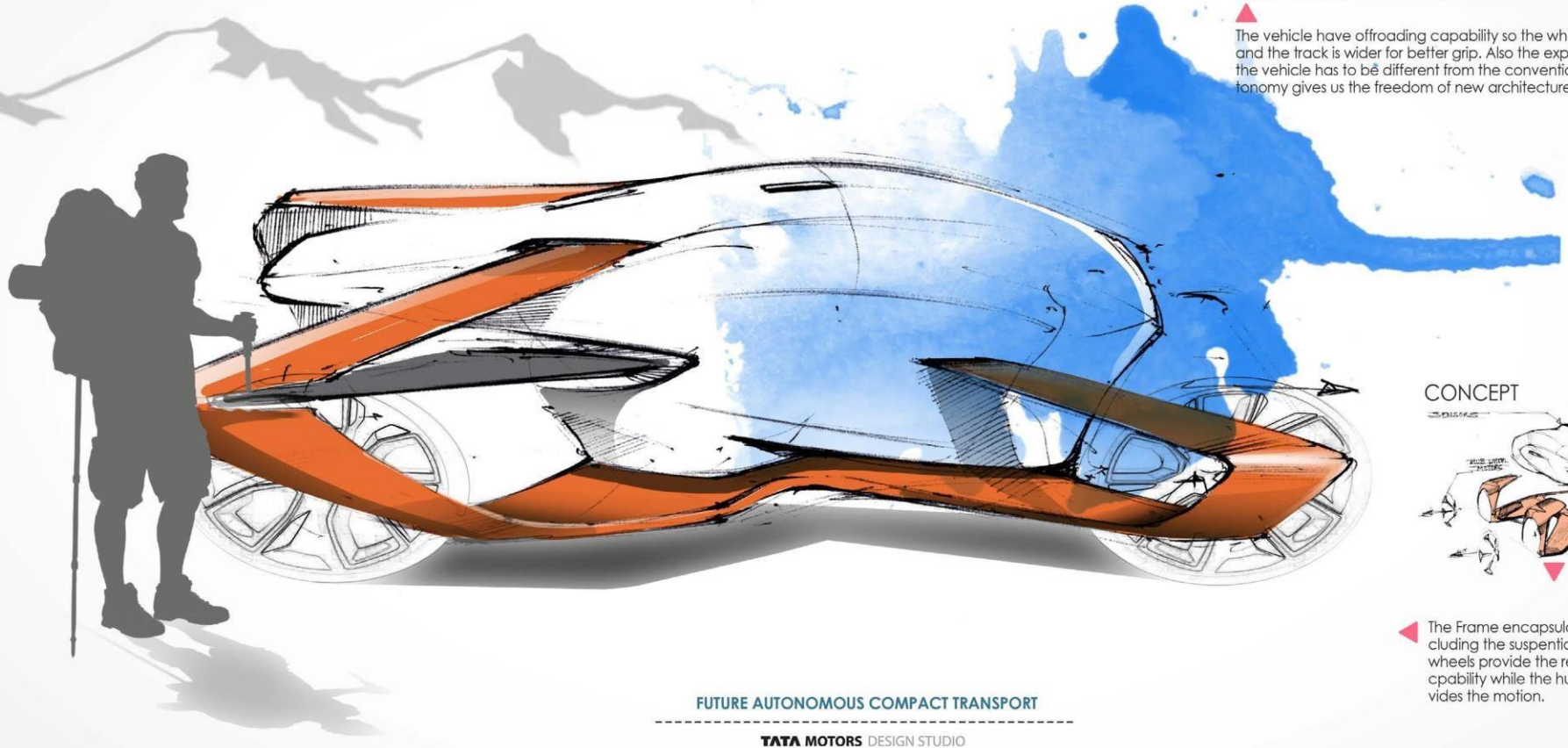
The frame houses powertrain in its entirity. Novel solutions such as a swing arm suspention are needed to give the vehicle offroading capabilities to venture rough terrains.

REDEFINE I ARCHITECTURE

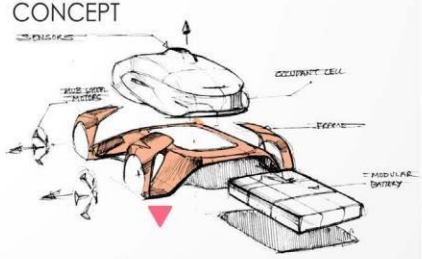
The form here is split into two parts, SHELL and FRAME. The inner shell encapsulates the driver and protects him while the frame houses entire powertrain and suspention with functional attachments to make the journey more easier.

ARCHITECTURE

The vehicle have offroading capability so the wheels are outboard and the track is wider for better grip. Also the experience from inside the vehicle has to be different from the conventional cars as the autonomy gives us the freedom of new architecture.



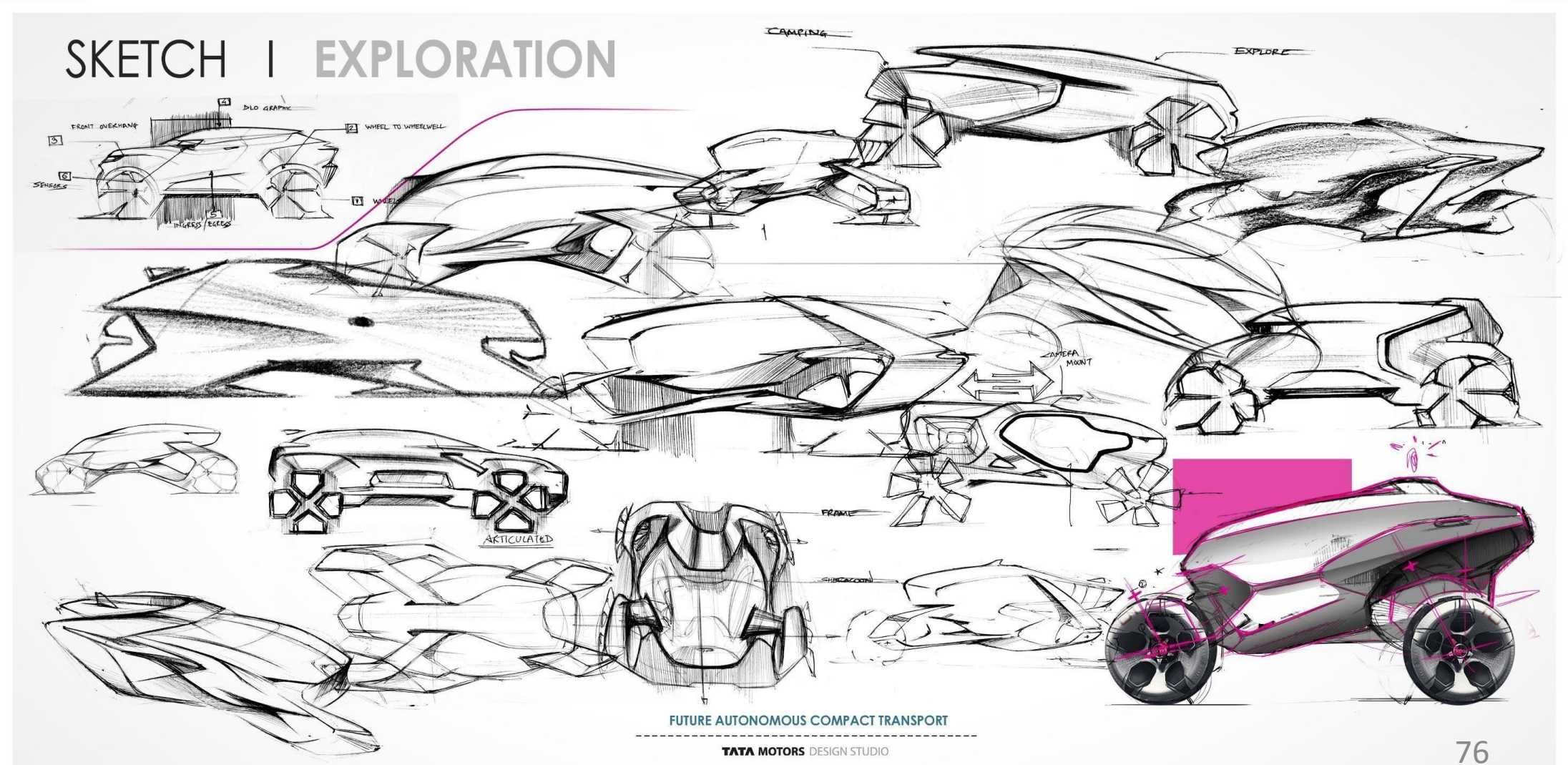
CONCEPT



The Frame encapsulates the powertrain including the suspention. The articulated wheels provide the required offroading cpability while the hub motors in wheel provides the motion.

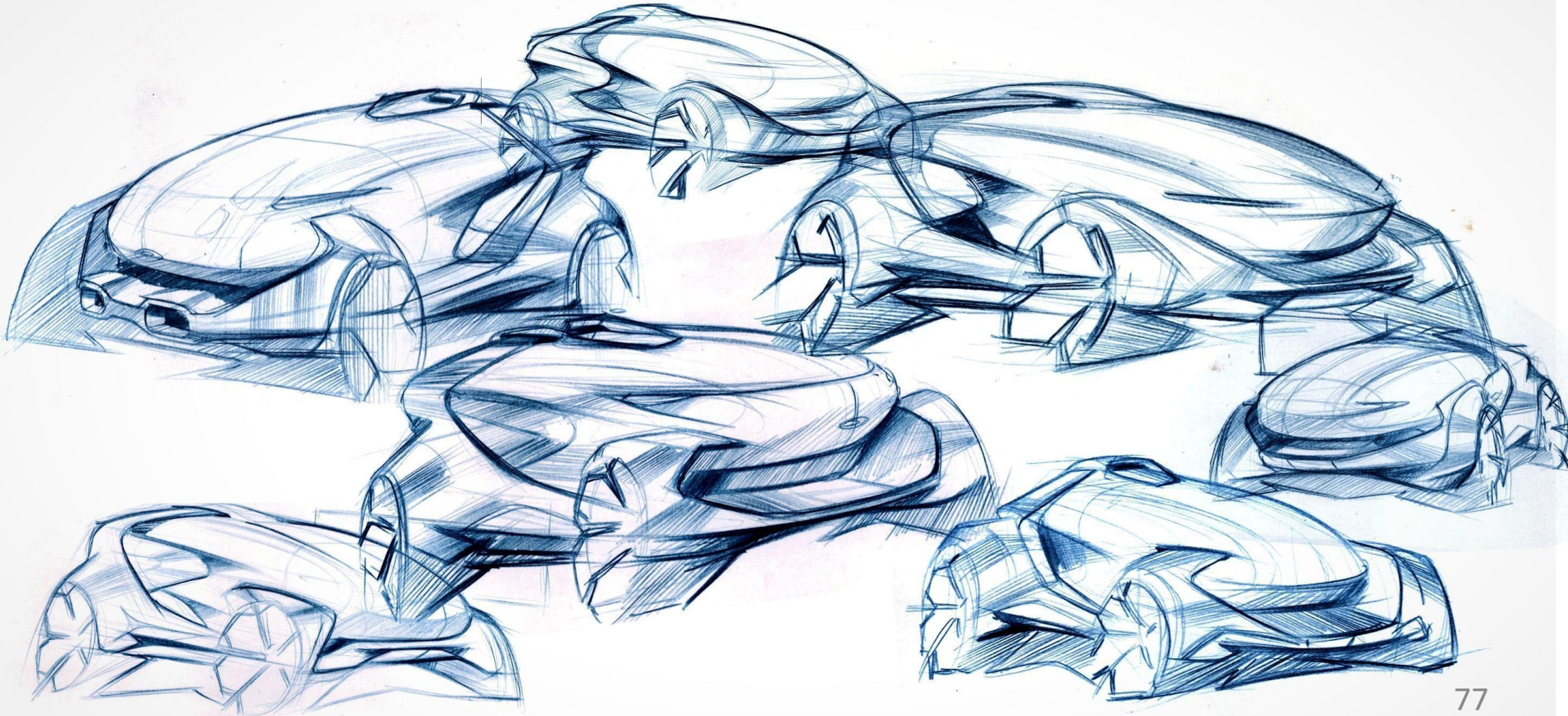
6.4 Explorations

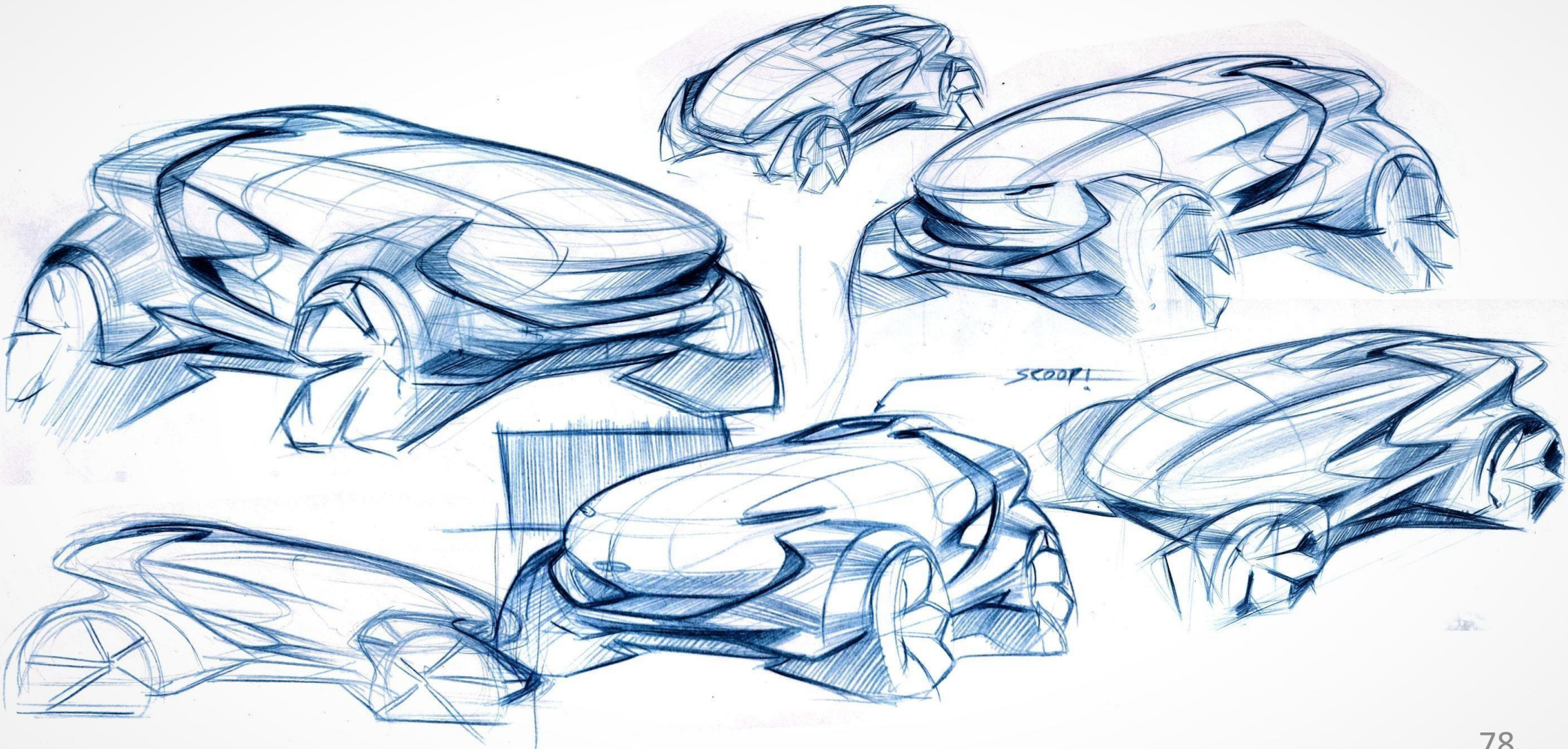
SKETCH I EXPLORATION

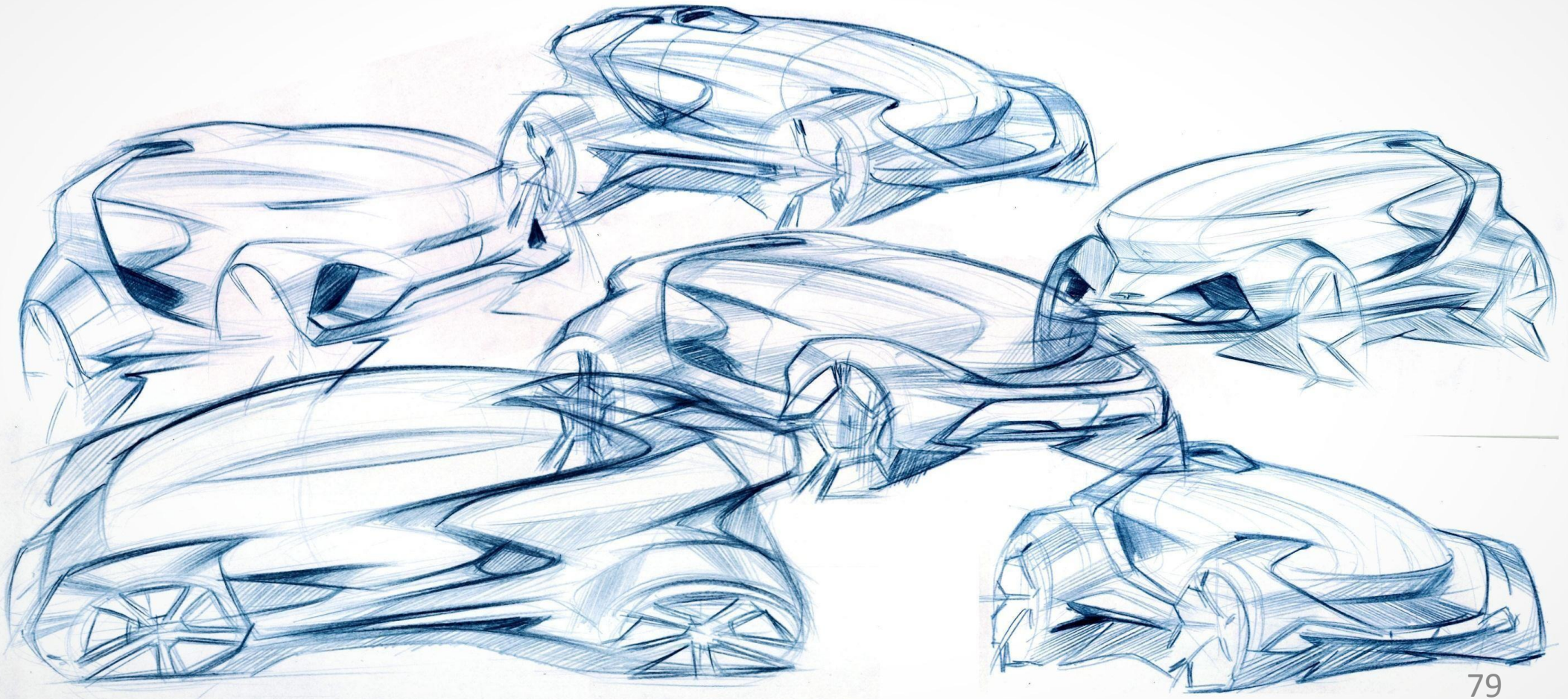


FUTURE AUTONOMOUS COMPACT TRANSPORT

TATA MOTORS DESIGN STUDIO

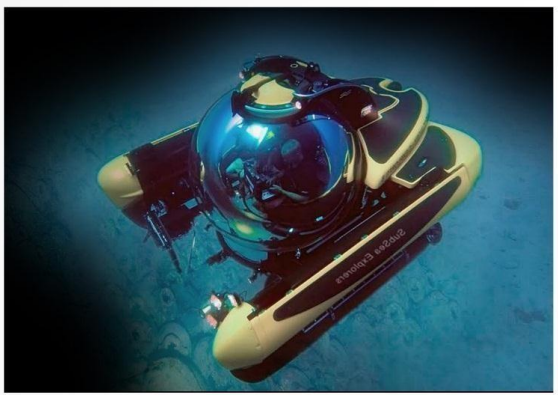



SCOOP!



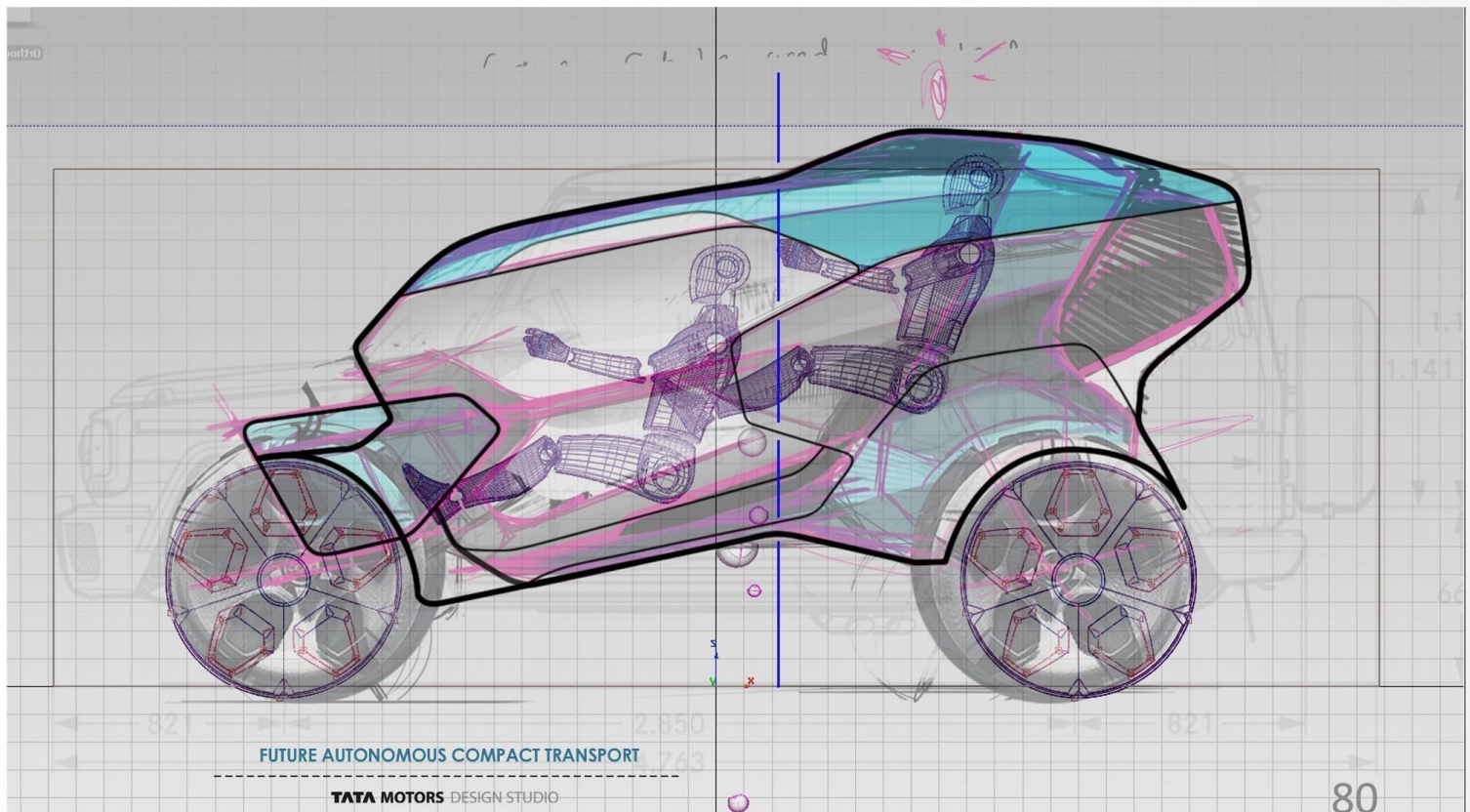
SYNTHESIS I EXPERIENCE

The form here is split into two parts, SHELL and FRAME. The inner shell encapsulates the driver and protects him while the frame houses entire powertrain and suspention with functional attachments to make the journey more easier.



The front part where the exporer sits is made up of the fighter jet canopy material and is made in a form of a coccoon to provide all round visibility to experince the surroundings better as the current dashboad assembly is re-imagined as a autonomous control unit.

The **explorer seat** at the back gives higher seating position and a better vantage point to explore the surroundings more interestingly.

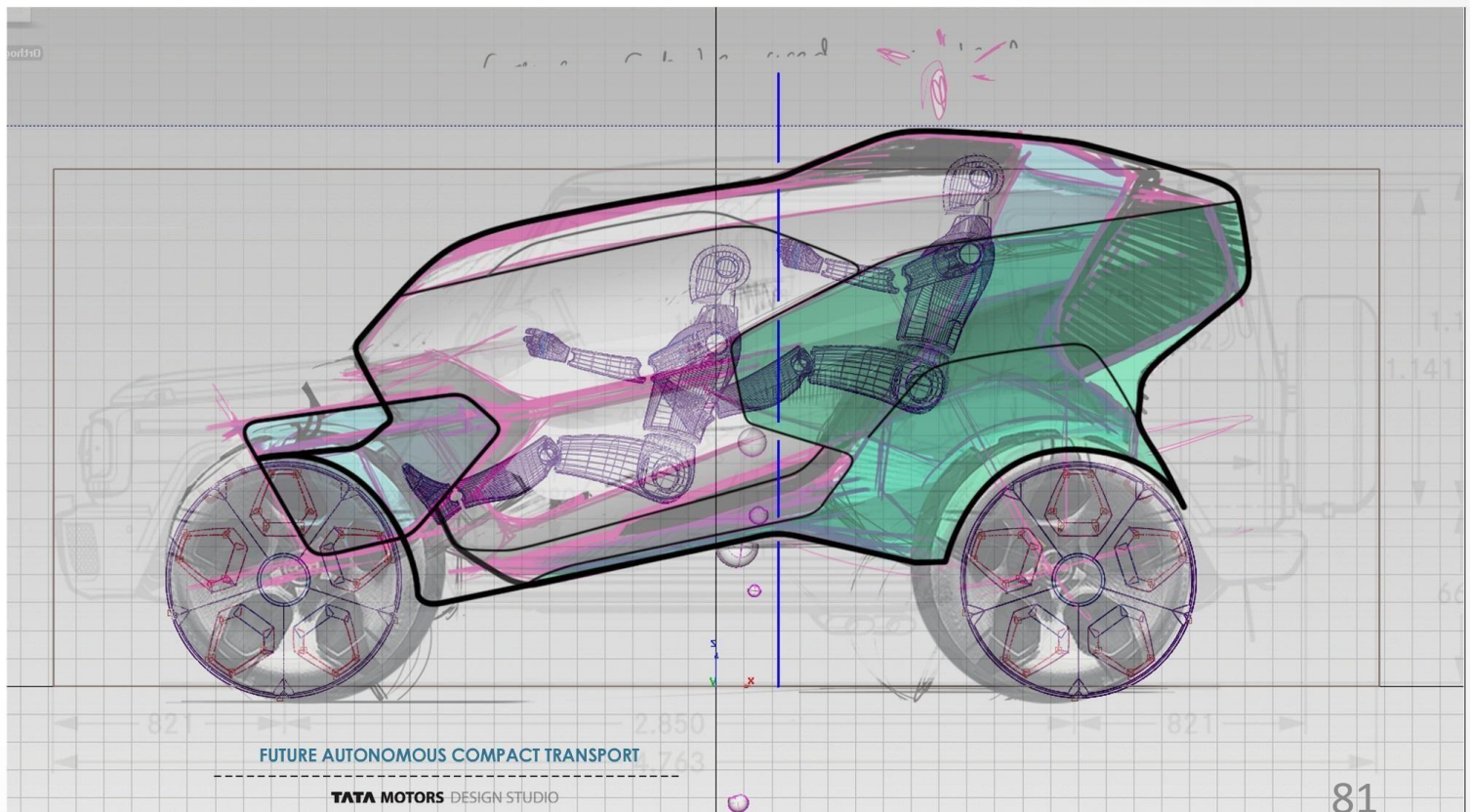


SYNTHESIS I FUNCTION

The form here is split into two parts, SHELL and FRAME. The inner shell encapsulates the driver and protects him while the frame houses entire powertrain and suspention with functional attachments to make the journey more easier.

The back part is made up of parametric flexible material which changes its shape as per the requirements of the user and amount of luggage he or she is carrying. Also it can transform as a sleeping bag in the terrains where camping is a must.

The **Flexible Storage space** at the back provides the vehicle with the backpacking character and it accomadates the Travelling kit as per the trip requirements.

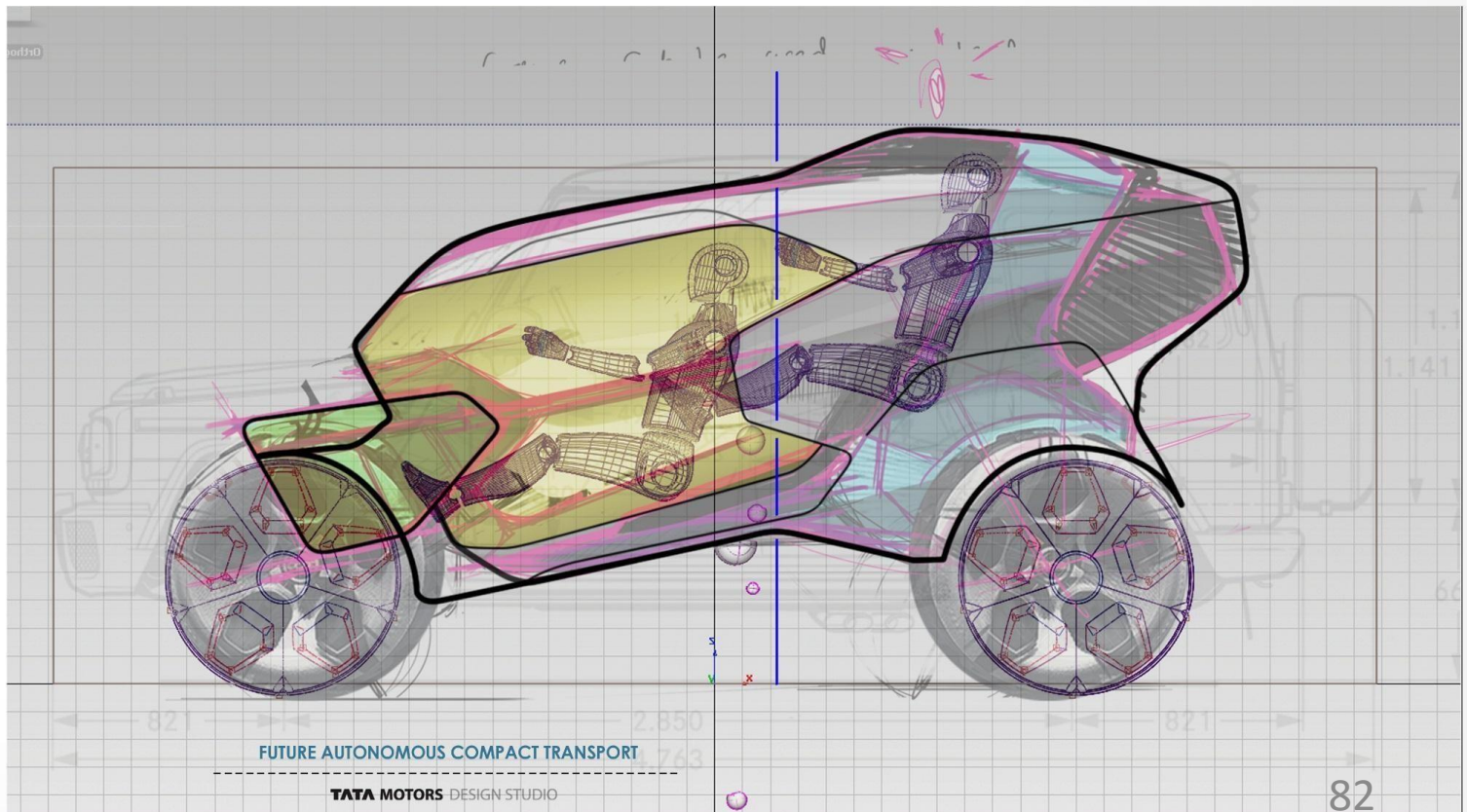


SYNTHESIS | CAPABILITY

The form here is split into two parts, SHELL and FRAME. The inner shell encapsulates the driver and protects him while the frame houses entire powertrain and suspention with functional attachments to make the journey more easier.

Traveling on off-road terrains require vehicles capable of accommodating off-road driving such as ATVs. These vehicles accommodate off road conditions with extended ground clearance, off-road tires and drive-train.

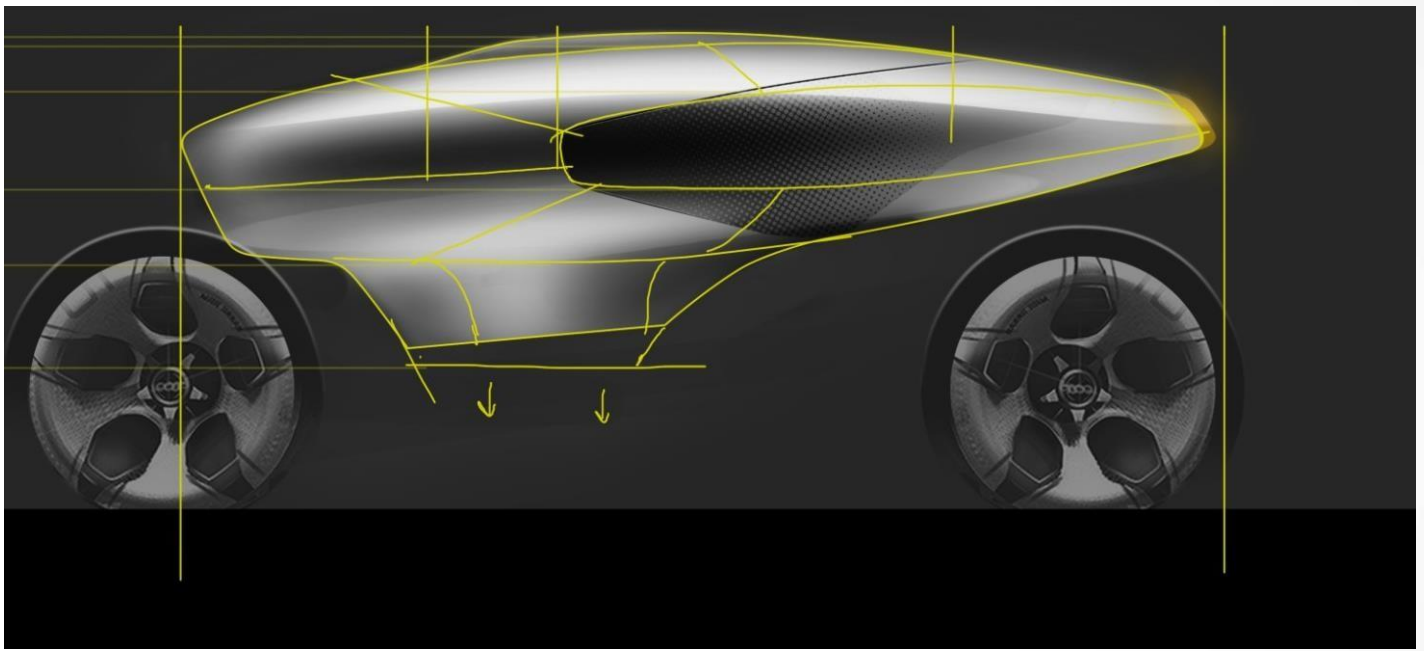
Articulated Construction gives the flexibility to tackle different and difficult terrains without the need of getting towed.



6.5 Refinement

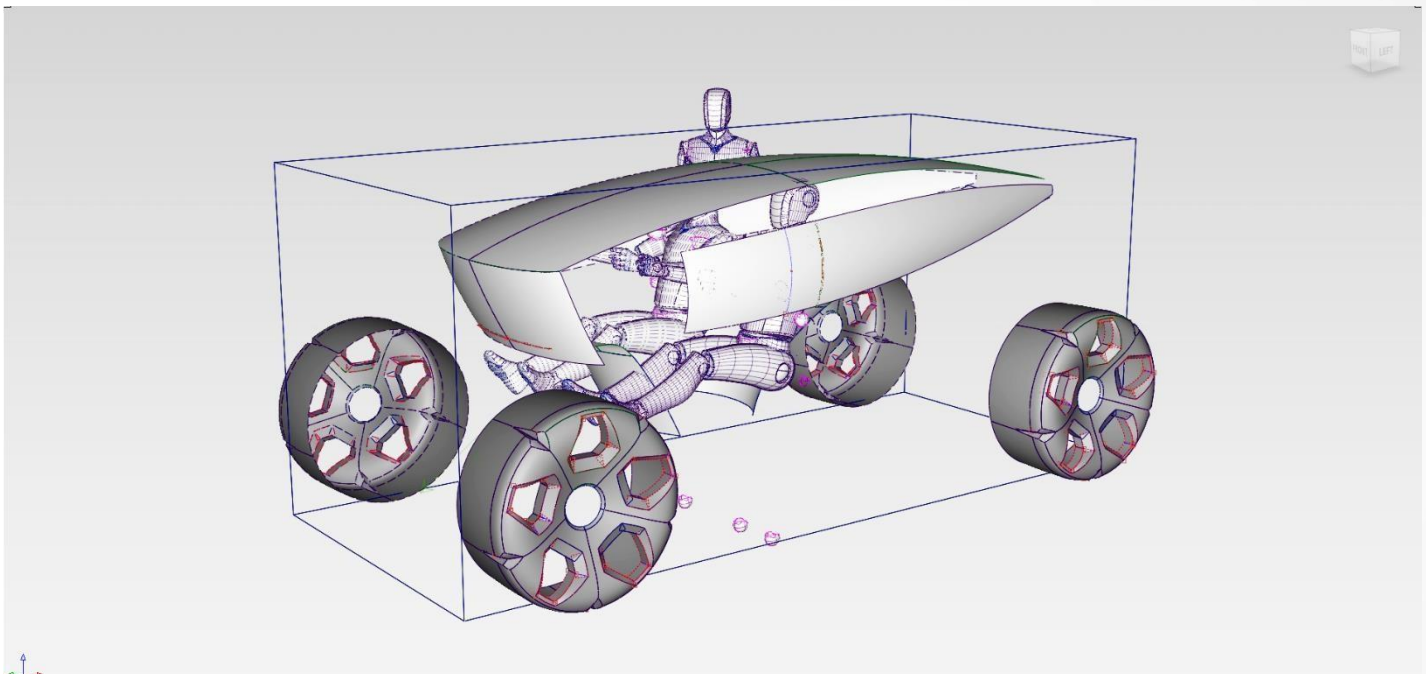
The car key sketch, after every feedback, is refined. The form has to be dynamic and proportions are needed to be of an explorer vehicle. Thus along with the sketching explorations, the CAS model was made to help imagine volumes, study surfaces and transitions.
Using the modified CAS as underlay, more explorations were done to help improve the design of the vehicle.

The core body was divided in patches to understand surfaces. This will serve as a base to build 1st gen CAS model. The CAS so made will be the base for defining dimensions and proportions.

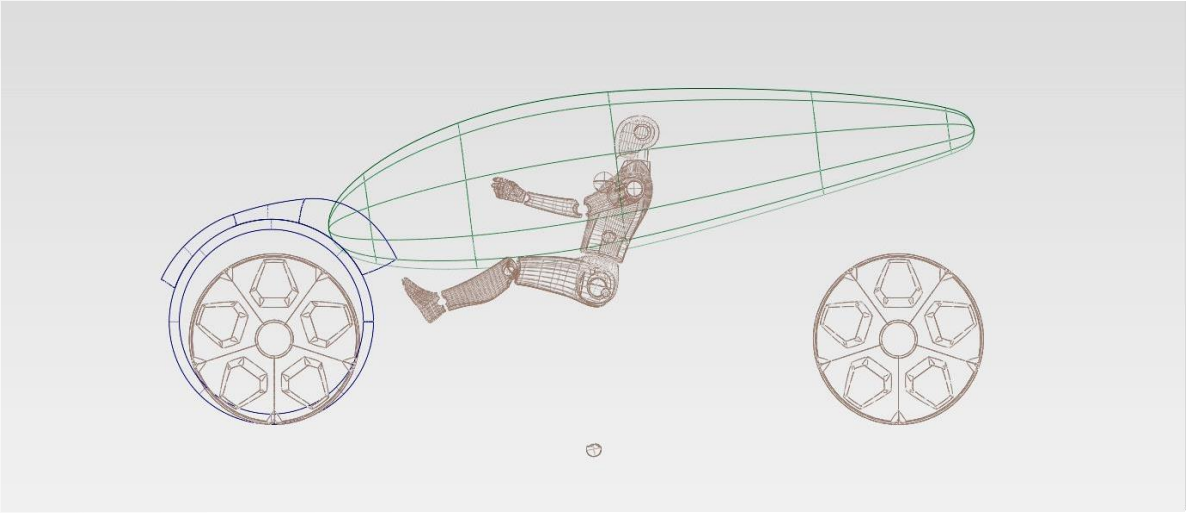


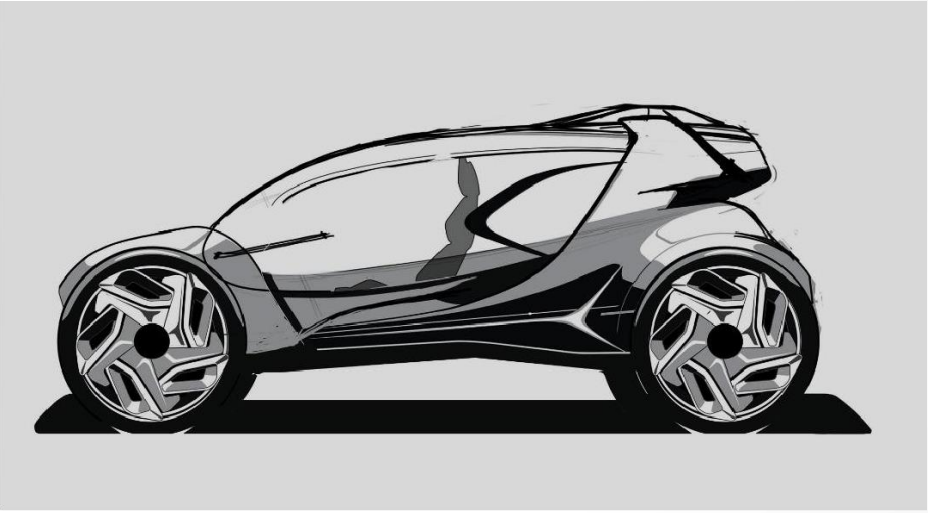
The bounding box is adjusted to the dimensions 3700x1800X1800 mm

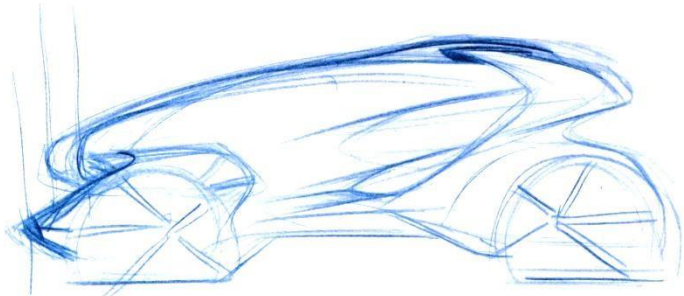
In order to workout the packaging, the proportions were refined by referring to mannequin in standing and driving positions. Initially the form was more static and thus core volume needed some refinement.



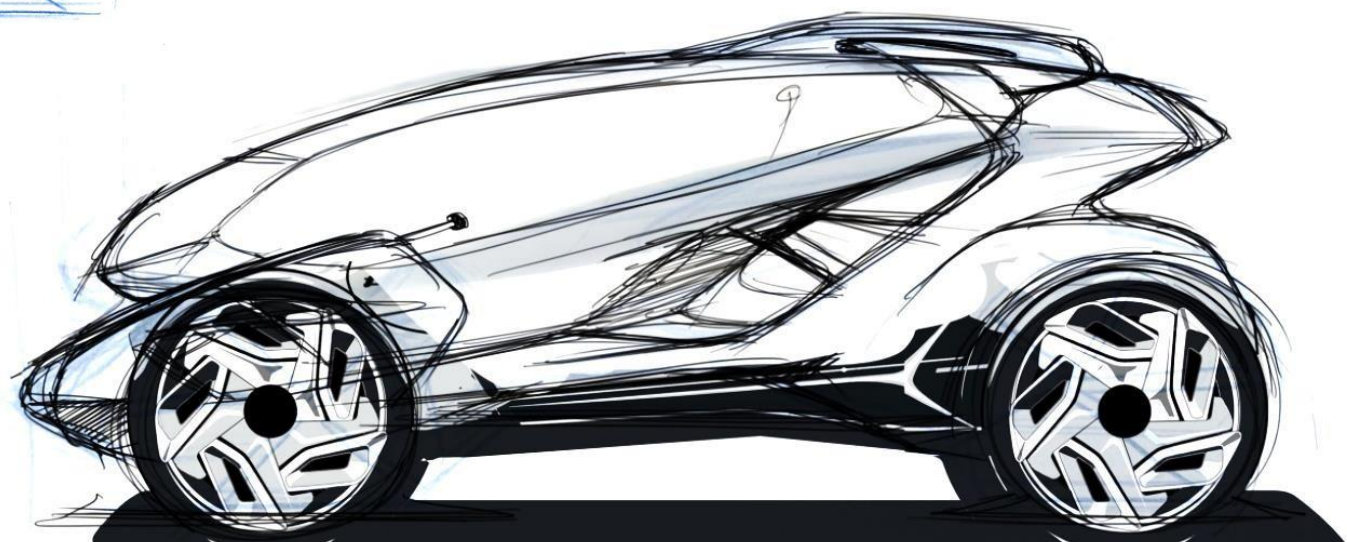
Quick CAS to refine volume and stance



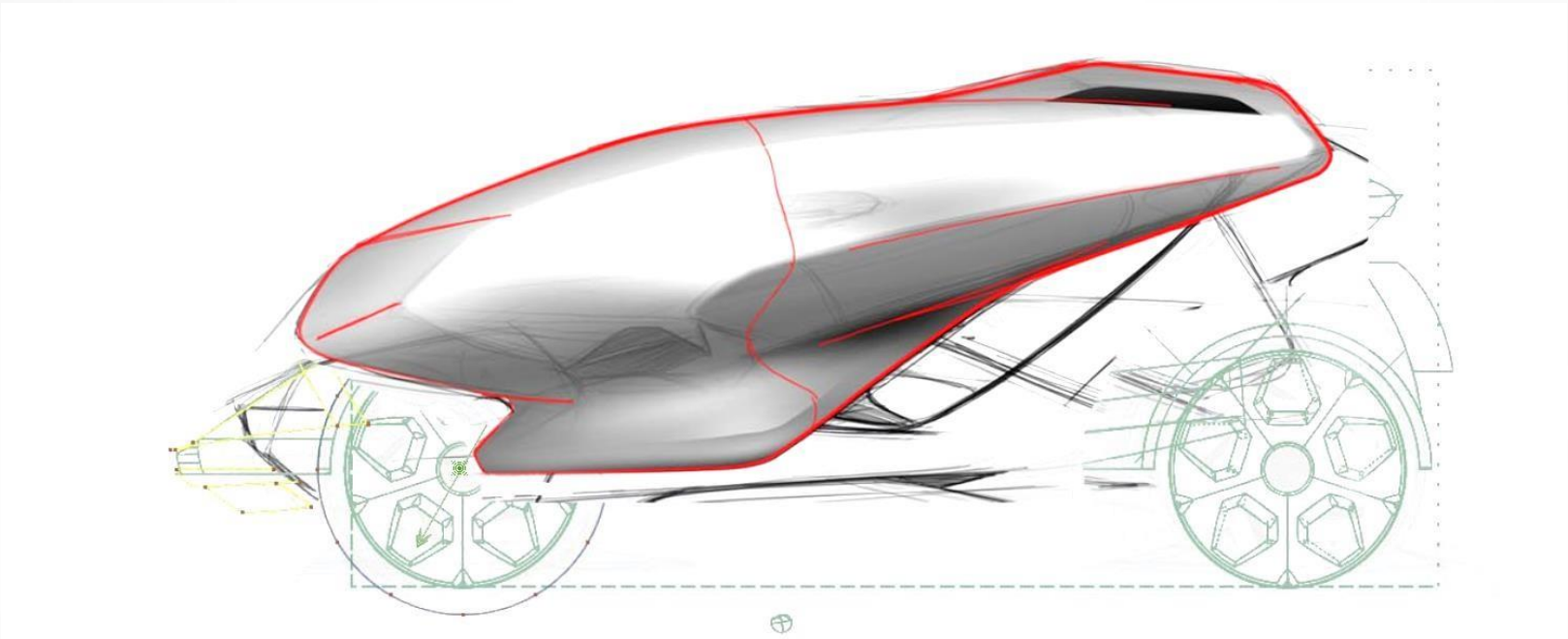




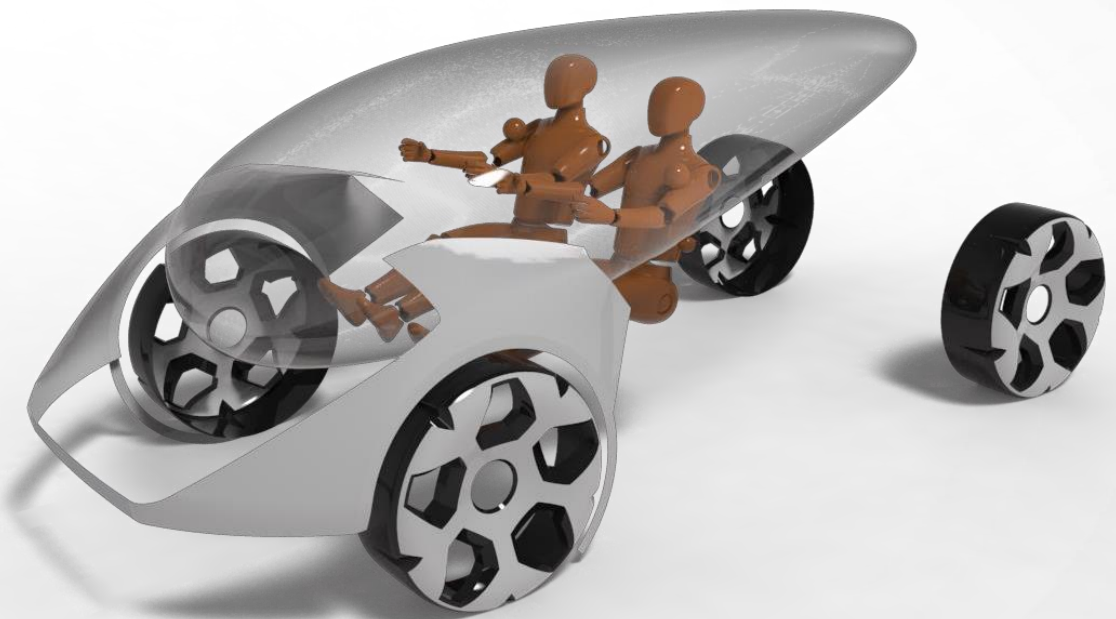
Based on the refined proportions, the key sketches are re-sketched to fit the proportions. This view will serve as base for the refined CAS model.



Defining Core Volume.



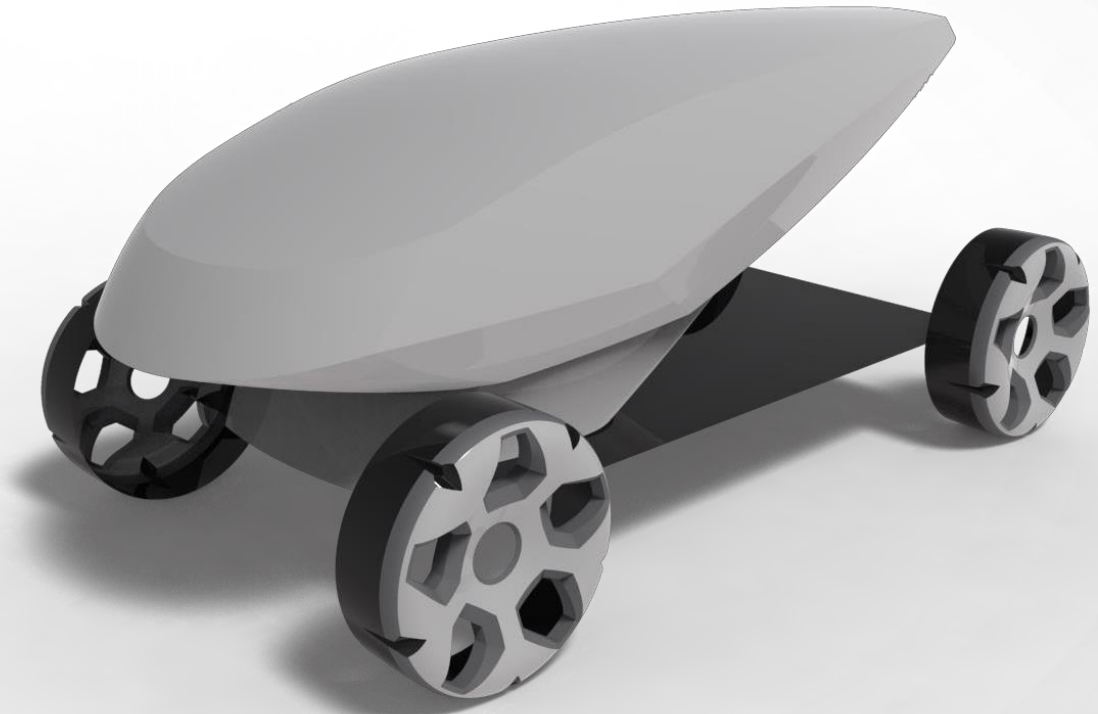
Raw surfaces are placed to check headroom, visibility, H-point etc. thus referring to this CAS, further modifications are made to the core volume.



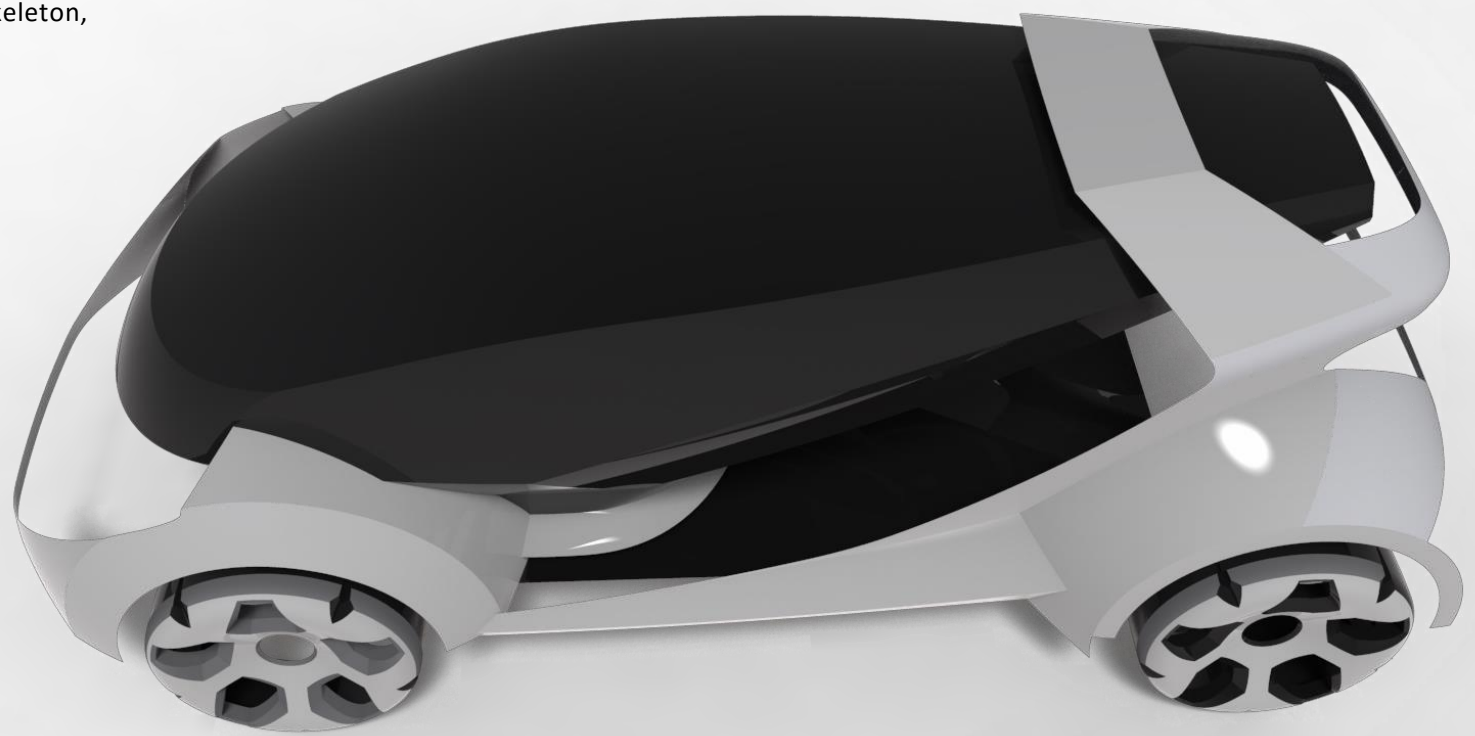
Refined core volume.

Un-filleted CAS gives idea of volume and its proportions.

Thus next step was to define exoskeleton around this core volume.

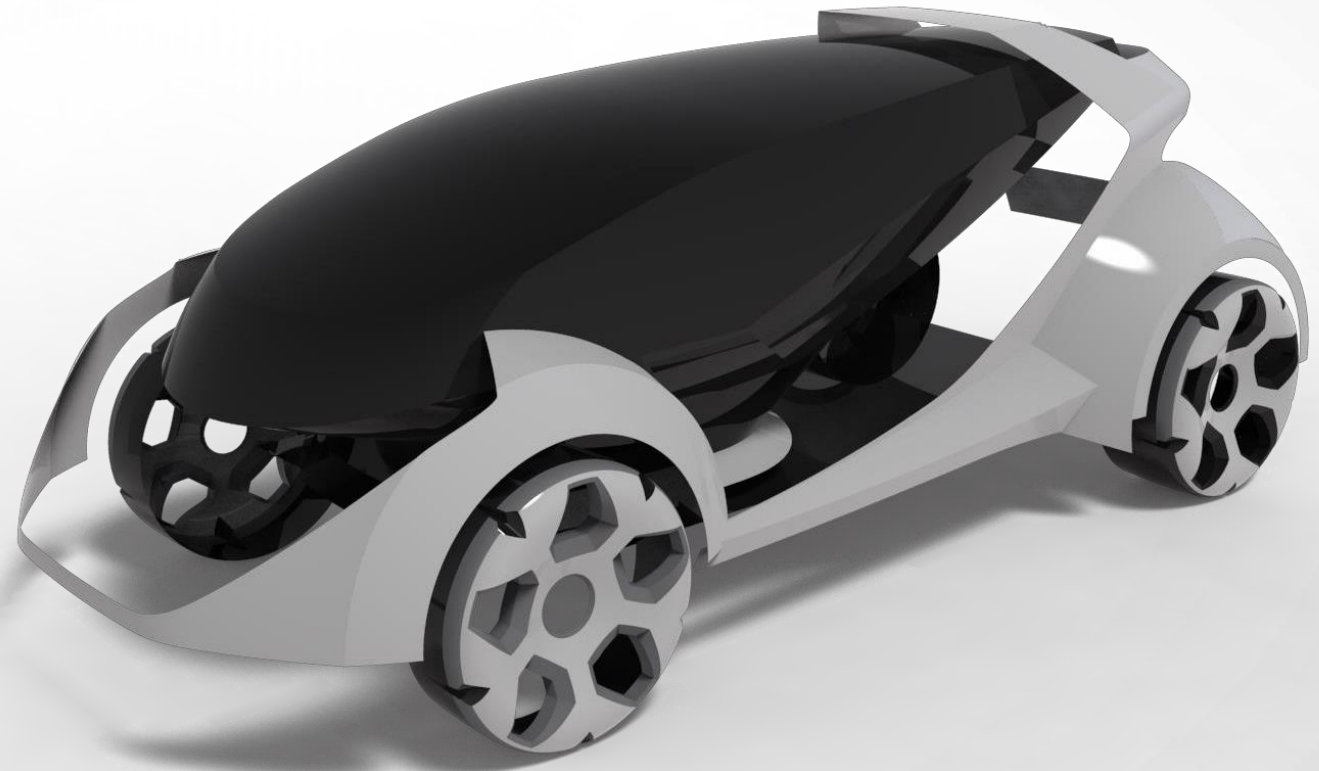


Defining relation between exoskeleton, chassis bed, and core volume.



Raw CAS to understand surface transitions and intersections.

The core volume was refined to show more dynamic nature. The reflections were checked to adjust surfaces to have more better aesthetics.



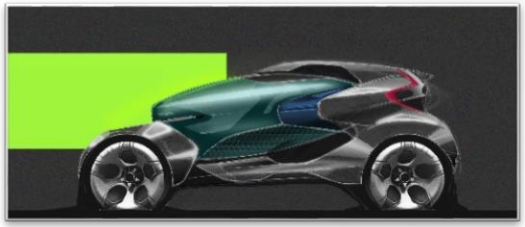
7 Final Concept

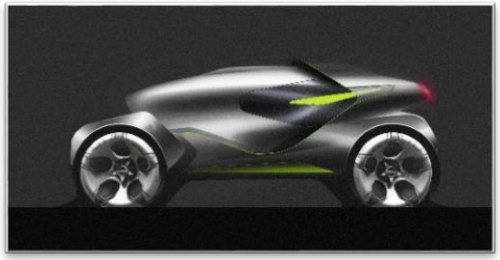
Detailed Renders

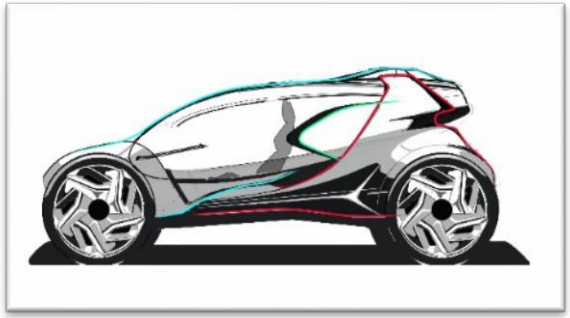
CAS Visualizations

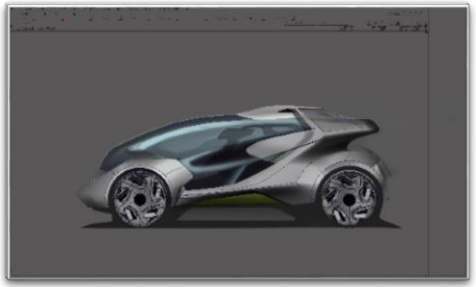

TATA

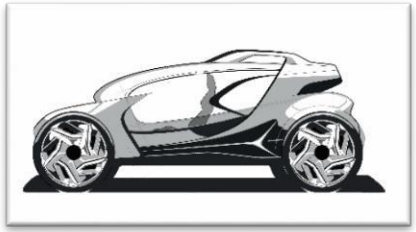
Concepts

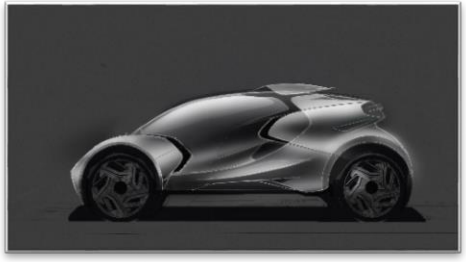






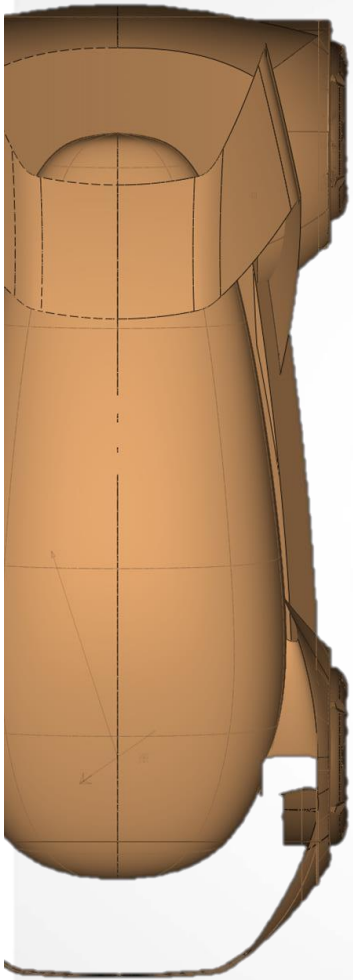




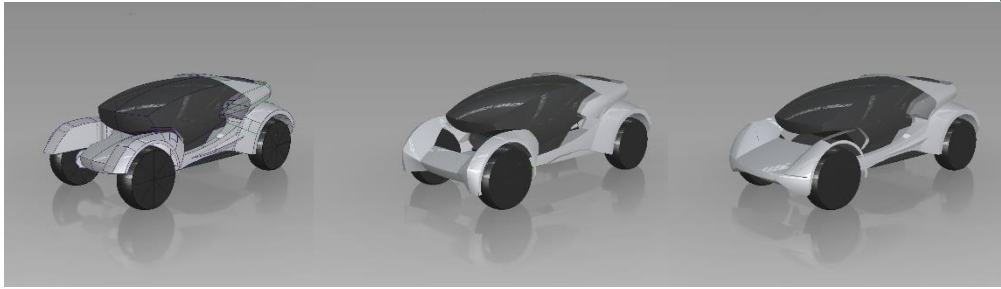


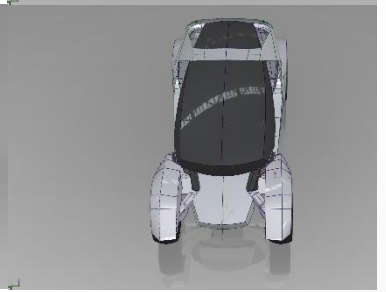
FUTURE AUTONOMOUS COMPACT TRANSPORT

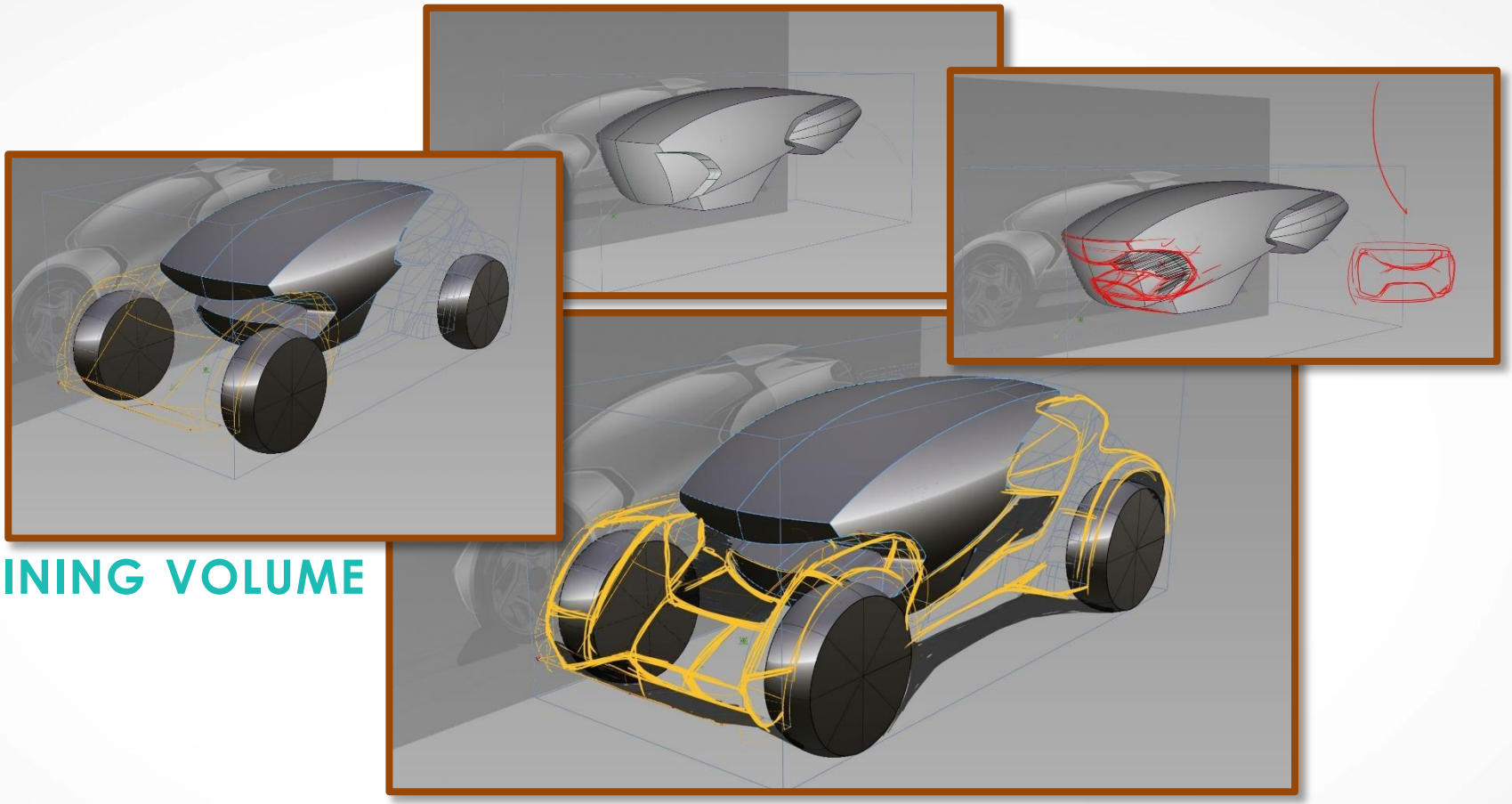
TATA MOTORS DESIGN STUDIO



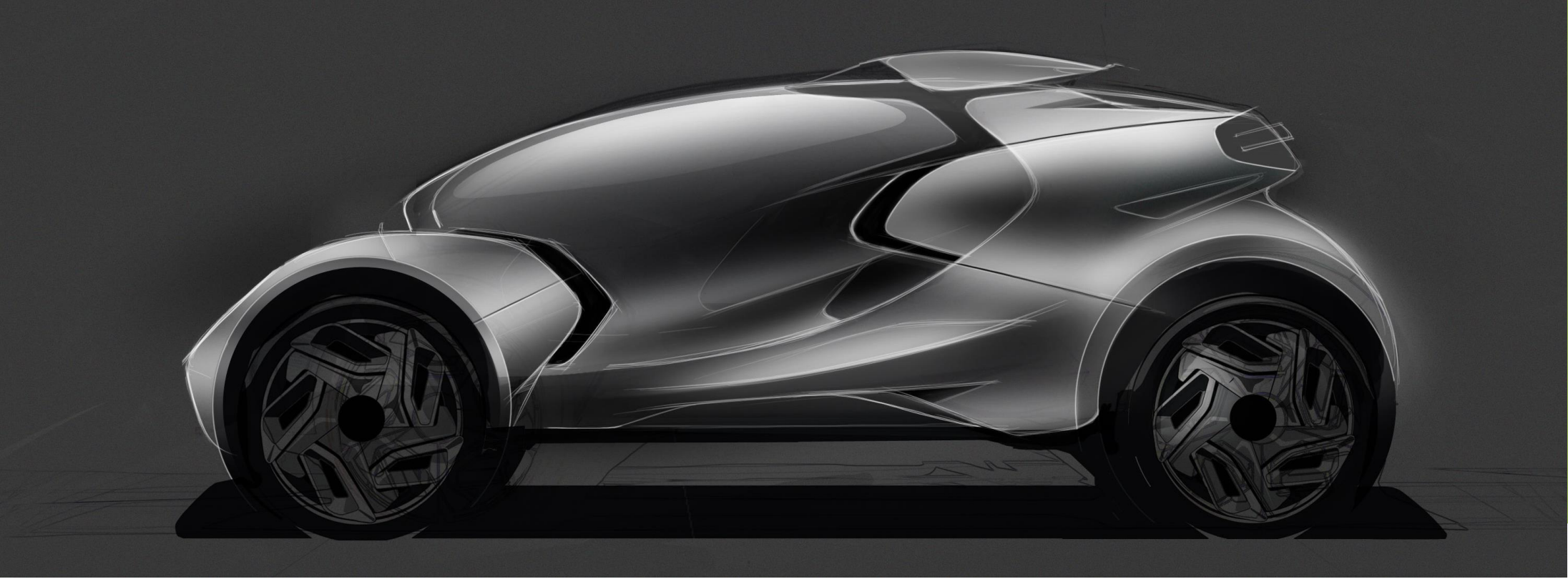
QUICK ITERATIONS



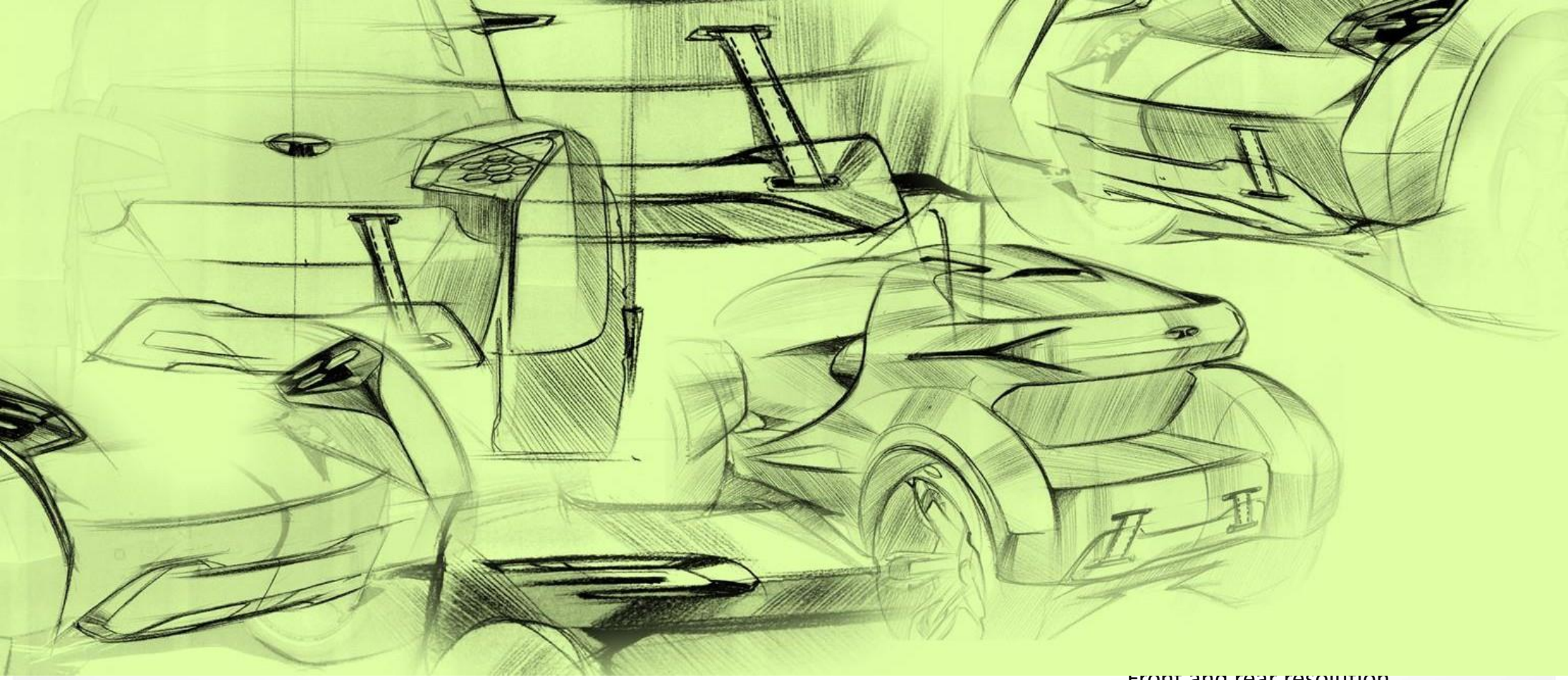




REFINING VOLUME

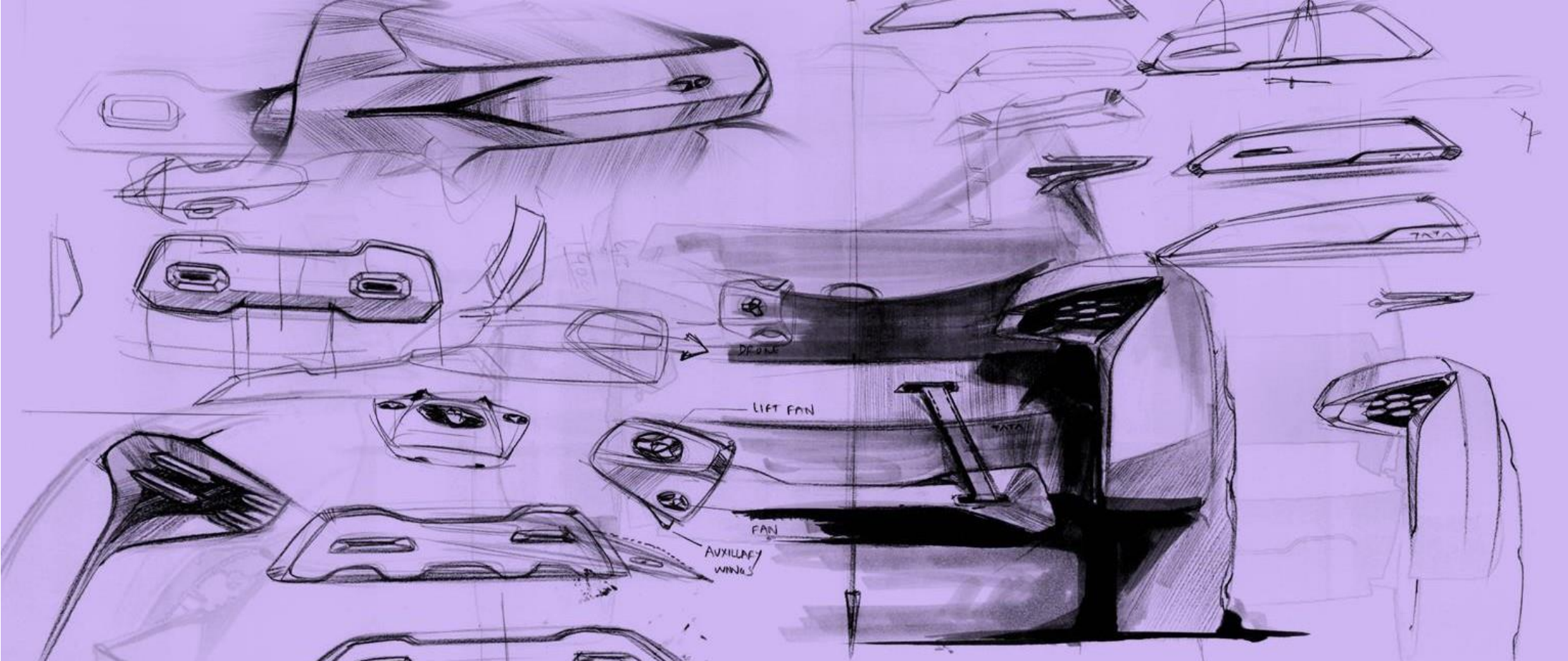


Key sketch By Dhananjay

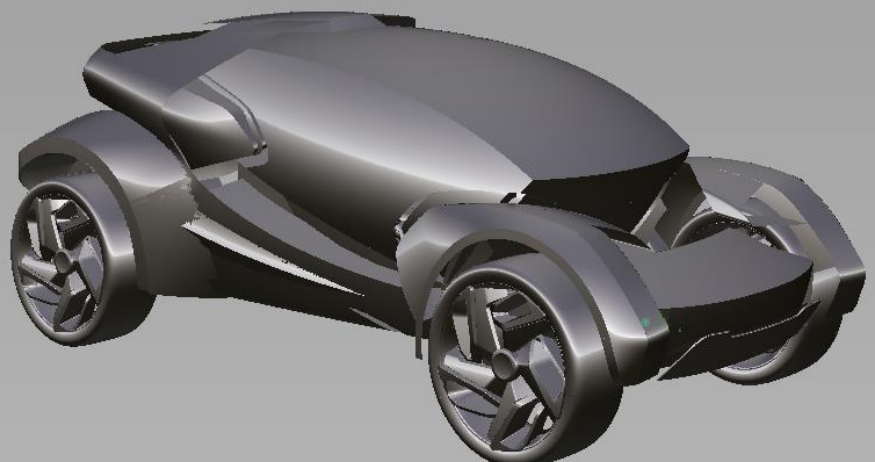


Front and rear resolution

CREATING DETAILS

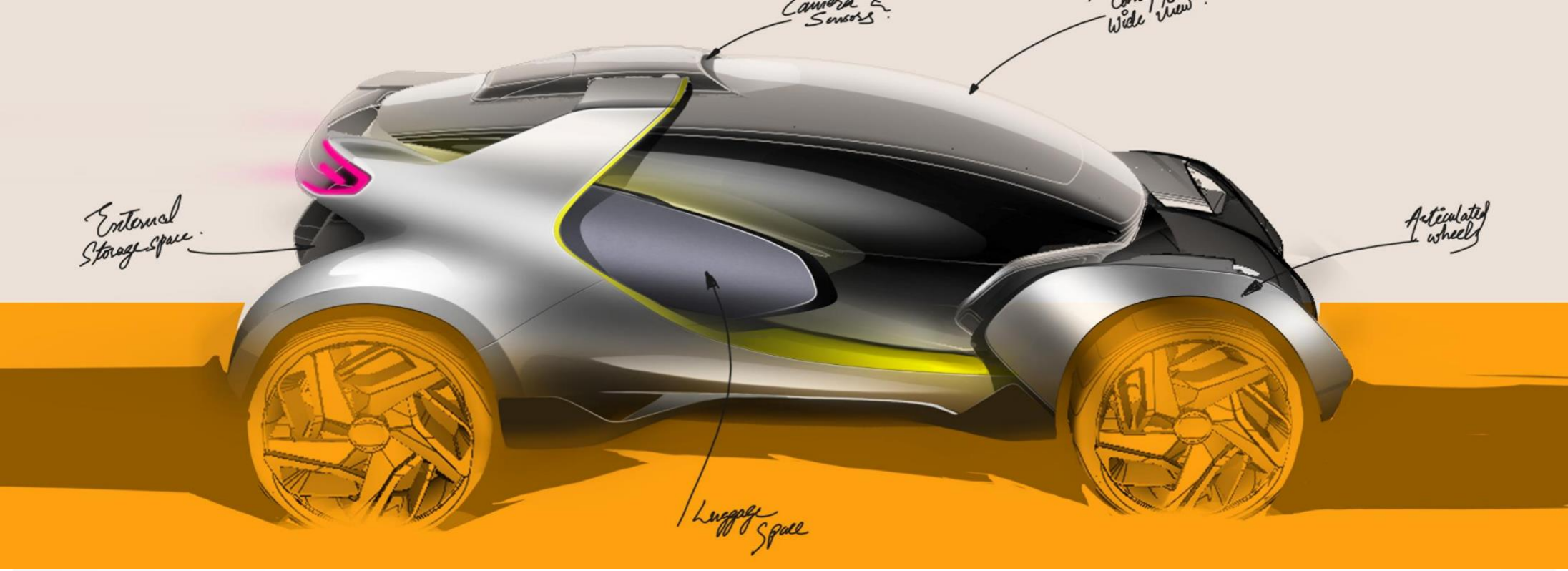


Headlamp and other details



Volume refinement

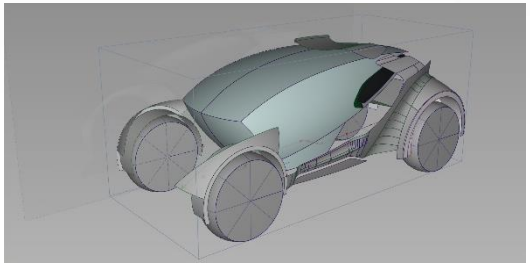
Using CAS as Base

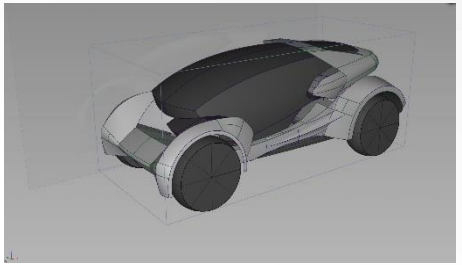


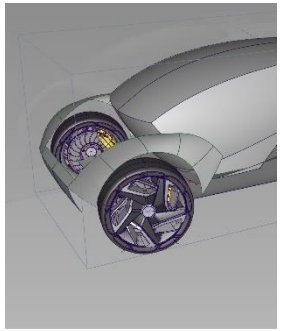
Refined key sketch

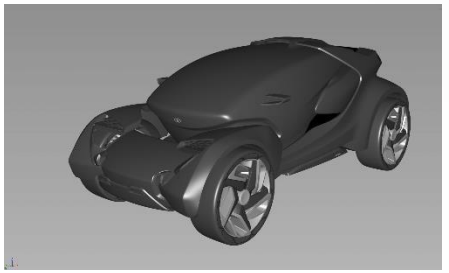
Final concept

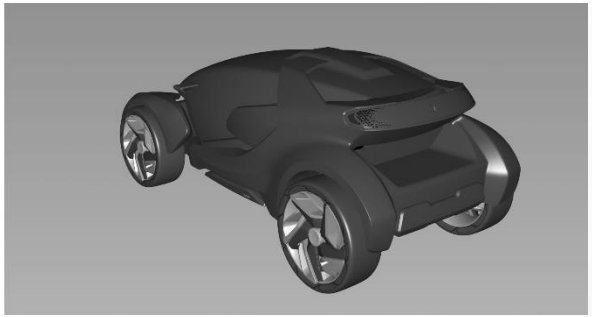
24 MAY - 12 JUNE

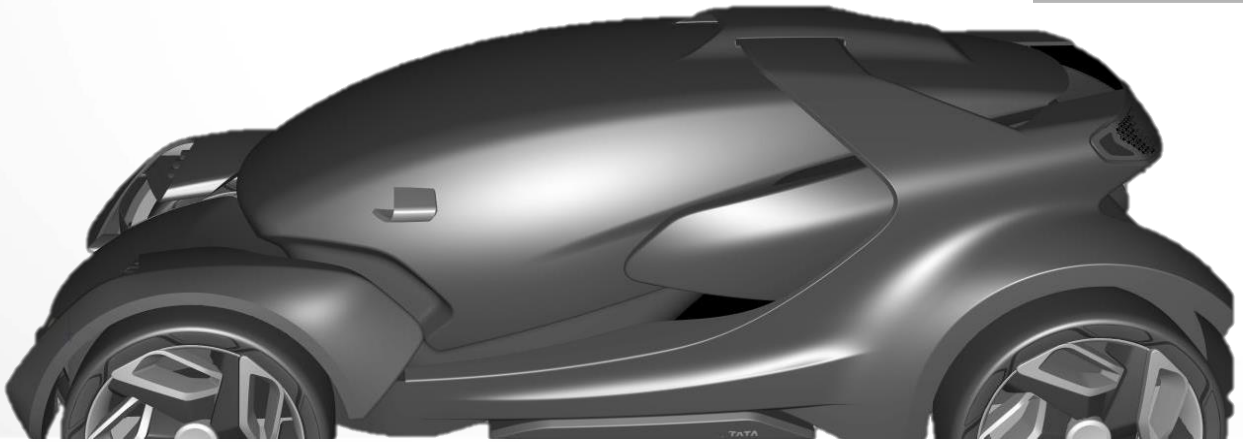


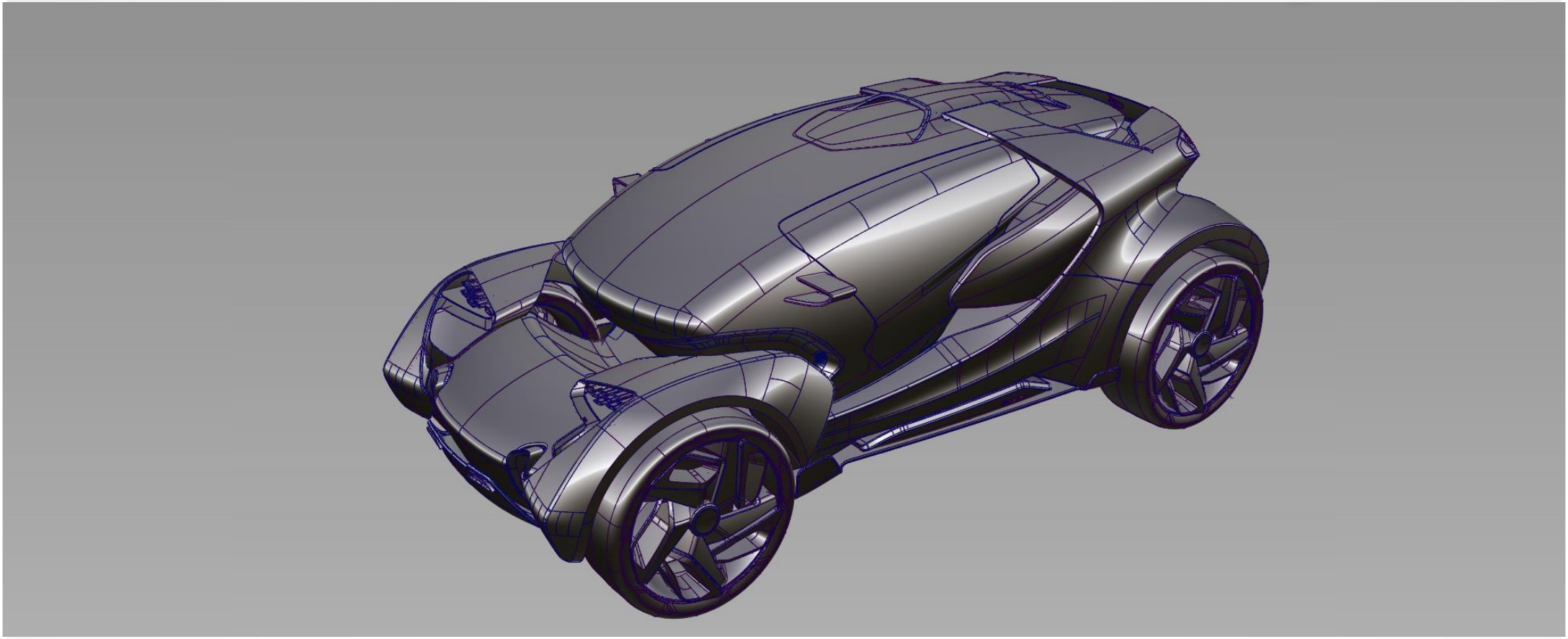




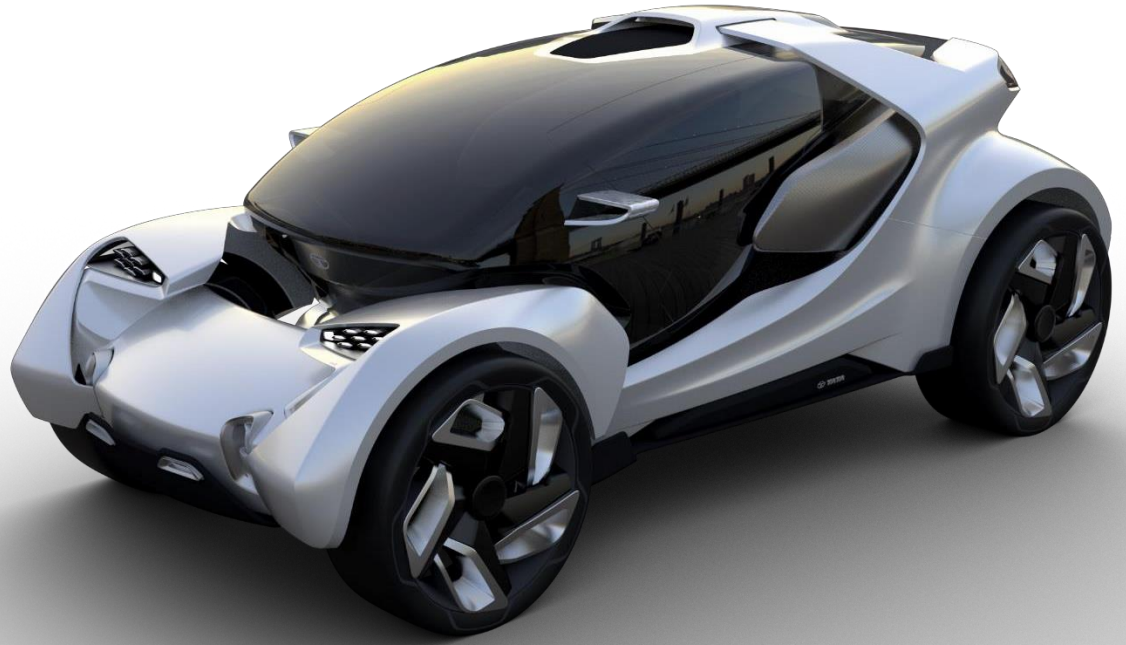








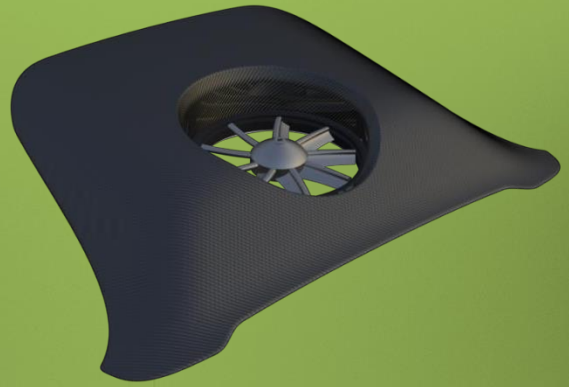
CAS model



Meet ‘neo’

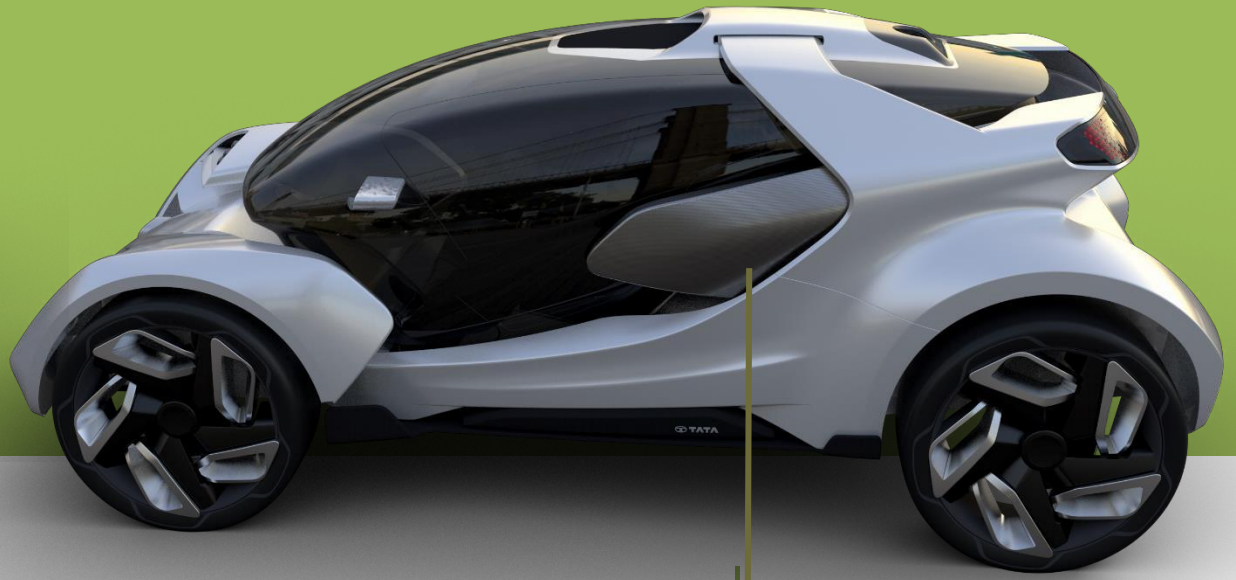
Explore
Experience
Engage

Terrain mapping Drone



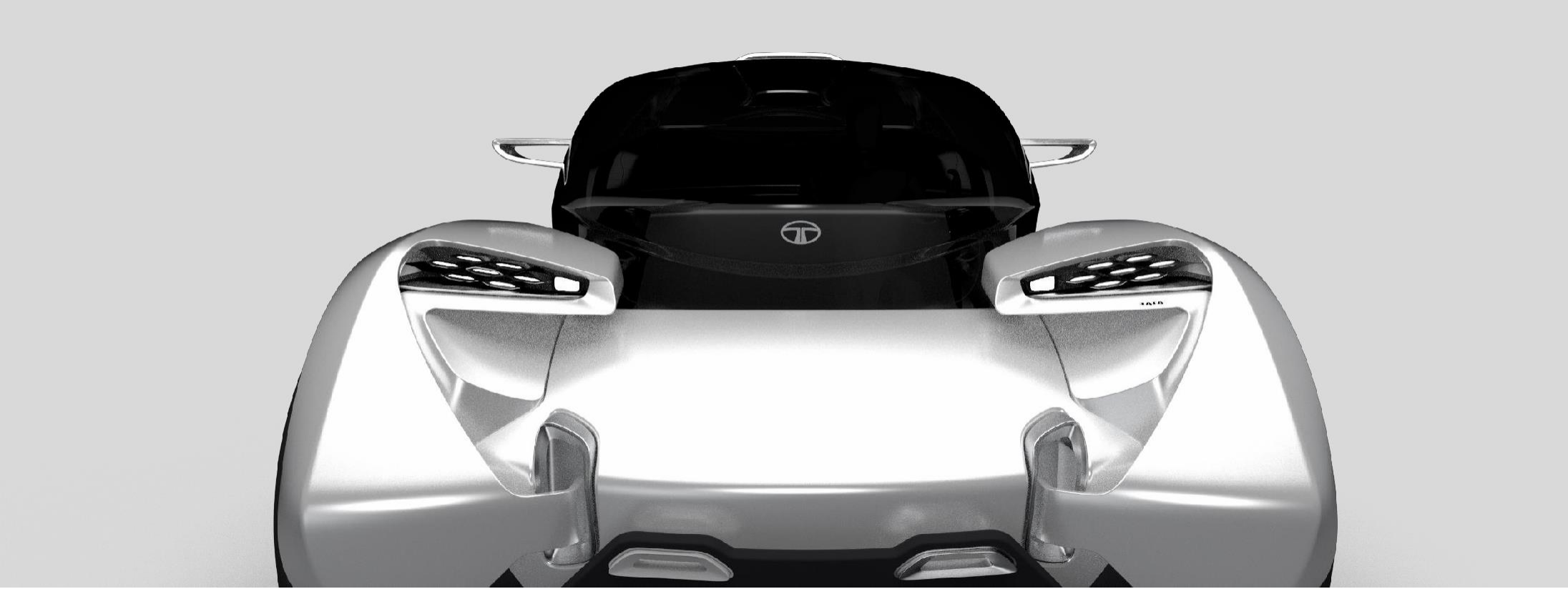
companion

YOU ARE NOT ALONE



Carry more

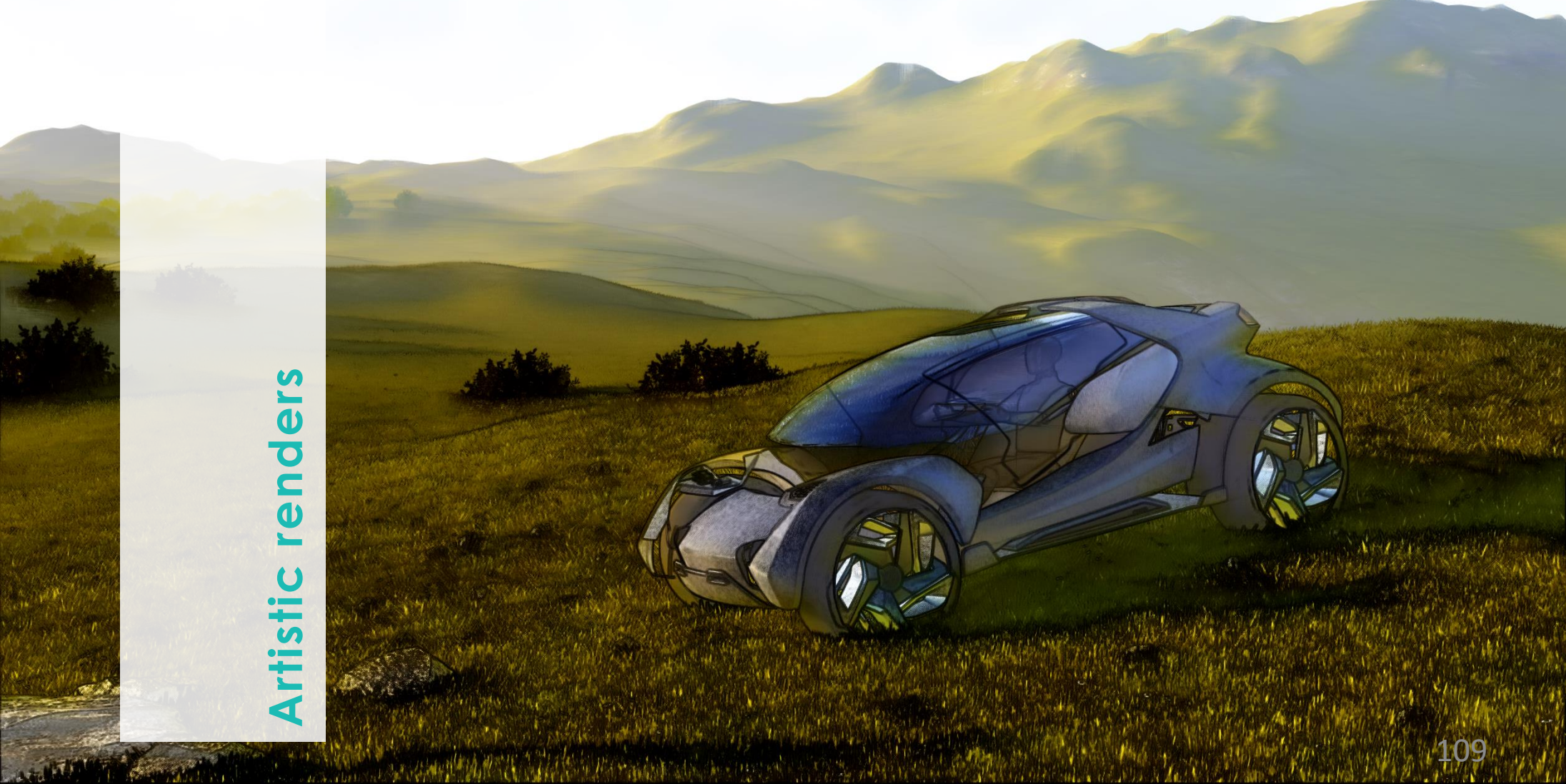
Expandable luggage unit



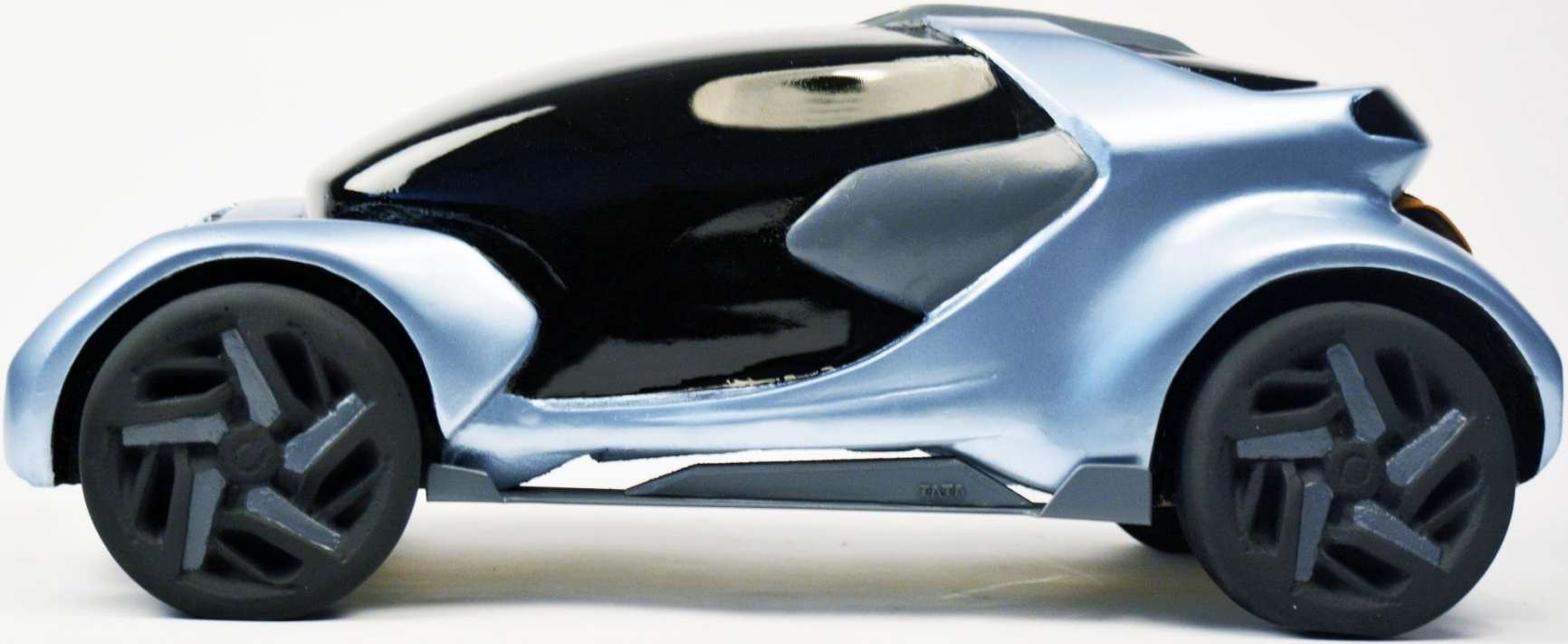
Front expression

Headlamp details

Artistic renders



Scale Model [1:5]


TATA

Thank you

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