Design Project II

Design of Elephanta ferry service with new experience for tourists

Samyak Khobragade
176390011 (2017-19)

Mobility and vehicle design
IDC, IIT Bombay.

Guide- Prof. Nishant Sharma

IDC School of Design
अभिकल्प विद्यालय

DECLARATION

I declare that this written report represents my own idea in my own words, and where others, ideas or words have been included, I have mentioned the original source. I also declare that I have adhered to all principles of academic honesty and integrity and have not falsified, misinterpreted or fabricated any idea, data, facts or source in my submission.

I understood that any violation of the above will be cause for disciplinary action by the institute and can also penal action from the source from which proper permission has not been taken, or improperly cited.

Signature - 

Name - Samyak Khobragade

Roll No - 176390011

Date -

Approval sheet

This is Mobility and Vehicle Design project entitled " Design of Elephanta ferry service with new experience for tourists", by Samyak Khobragade is approved in partial fulfilment of the requirement for Master of design in Mobility and Vehicle Design.

Project Guide: 

Internal Examiner: 

External Examiner: 

Table of contents

1. Introduction

India has an incredible history and that history has left its marks in the form of historical places. It is a gateway for us to connect to the past and learn from its glorious heritage. And over the years these historical places have become popular tourist spots. The current ferry service doesn't contribute to the experience of a historical trip it just connects the endpoints. The problem is that tourists visit Elephanta but their experience is not so good because most of them barely know the facts, stories and importance of the sculptures. If this information is provided to them along with a comfortable journey their experience of the actual trip will become rich.

The current ferry service is obsolete in terms of technology and design. It does not have proper seating, wood is still used as main building material, safety equipments are not accessible and proper sanitation is also missing.

Government of Maharashtra has allowed private operators to operate ferry service between Gate way of India and Elephanta in 2017. So there is an opportunity for this project to have an impact in the real world.

This service has the potential to improve the image of Mumbai in front of the world as 9 million foreign tourists visited Mumbai in 2016 (The number of foreign visitors is increasing every year)and Elephanta is a very popular destination among tourists in Mumbai.
People of all age groups and gender visit Elephanta which gives an opportunity to attract a large audience.

2. About Elephanta

Elephanta Caves are series of sculpted caves devoted to Lord Shiva. These caves displays various forms of Lord Shiva and important incidents from Shiva Mythology. It is the most extraordinary piece of art and example of greatest devotion. The caves with symbolic parts and the Shrine was the temple of the almighty and people would come to submit in his devotion. After thousands of years and mindless destruction it still holds the same magic, people still come to him to get lost in his world. the island was passed down through many attributers or rulers from the 'Badami Chalukyas', 'Konkan Mouryas', 'Rashtrakutas' till 'Portuguese' rule began in 1534.

The Portuguese called the island Elephanta on seeing its huge gigantic statue of an elephant at the entrance.. This cave was renovated in the 1970s after years of neglect, and was designated a UNESCO World Heritage Site in 1987 to preserve the artwork. It is currently maintained by the Archaeological Survey of India (ASI).

Img 1. Elephanta main cave entrance

Img 2. Trimurti sculpture (Main cave)

2.1. Current experience

The journey to the caves itself is a memorable experience. Since it's an island, tourists have to catch a ferry from Gateway of India (Mumbai). It is approximately an hour's journey 10 km away from the coast of Mumbai.
After getting down from the ferry one can decide to take the toy train for 1.5 km distance or walk. Although many take the Toy train from the port till the entrance of the village.
Now comes the path which leads to caves with steps along with shops selling all sorts of handicrafts and souvenirs. You also come across small food/snacks stalls and hotels. All shops and hotels are run by locals. The walk is about 15 minutes.
Once you reach the entrance of the cave,right in front of the gate there is the ticket counter. Then there is a empty space, often people take rest in that area because of the tiredness of the trek. On the right one can see Cave no. 1 or the Main Cave. Near the entrance, you find a panel which shares information about Elephanta Caves in three languages - Hindi, Marathi and English.

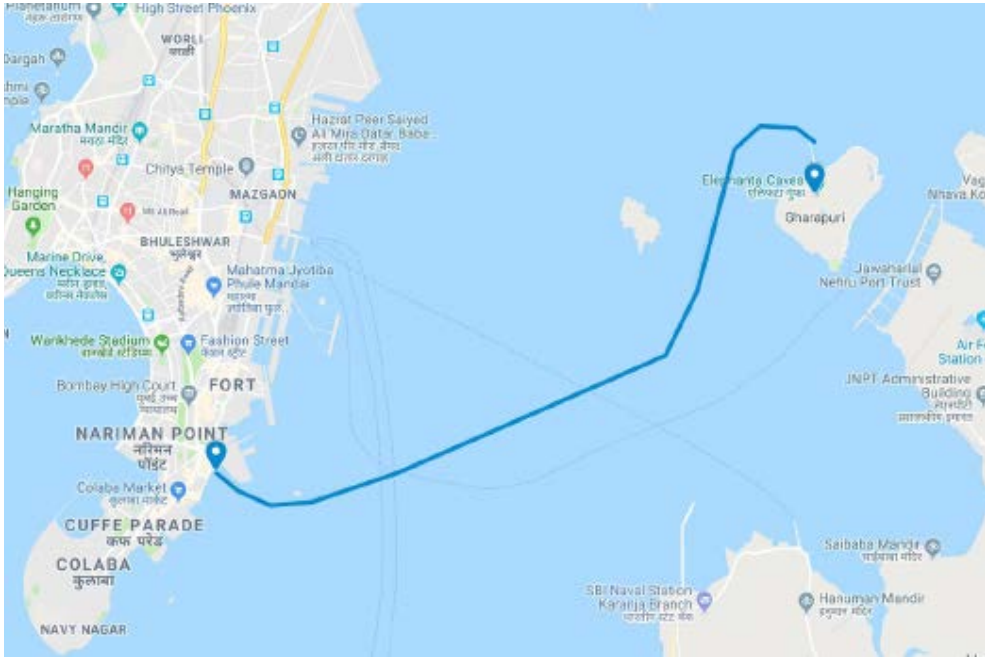
Location:
The caves are located on Elephanta island locally known as Gharapuri ("the city of caves") in Mumbai harbour, 10 kilometres east of Apollo Bandar near gate way of India. It takes 45-60 minutes for the current ferry to cover this distance.


Img 3.Apollo bandar (Gate way of India)


Img 4. Current Elephanta ferry


Img 5. Toy train (Elephanta)


Img 6. Souvenir shops (Elephanta)



Img 7. Elephanta ferry route

Research phase

Study of current and existing services

3. Existing services

3.1 Kerala water taxi- This "Hop-on Hop-off" boat service is operated on the backwaters of Kochi and in the Muziris region, The state department of tourism uses air conditioned boats for guided tours along the historic locations in Muziris. The tourists can take a boat; visit the museum and take another boat from their respective location as the boats are continuously running between the locations. The main intent behind this service is to provide a comfortable mode of transportation to the tourists so that they can enjoy the museum visits.

Img 8. Kerala water taxi

3.2 Chicago History Cruise- This ferry tour of Chicago is mainly focused on history and architecture of the city. Since Chicago is not a old city this tour uses the architecture as medium to tell the history of this city. Chicago museum started this 90 minutes long Ferry service "Chicago along the river", where they provide guided tours through the waterways inside the city. They also give information brochures to the tourists.


Img 9. Chicago history cruse

3. Existing services

3.3 Macau Day Trip from Hong Kong- This Day trip shows the history of Macau through monuments of European settlements, old Buddhist temples and modern hotels and casinos. Since the distance is long fast modern boats are used and size of the vessels is also large to accommodate the needs of the passengers. It is a combination of Modern technology like jetfoil and catamaran vessels and traditional storytelling by local guides to assist the tourists.

Img 10. Macau day trip ferry

3.4 Amsterdam tourist ferry- The historical boat sails from Amsterdam IJburg to the medieval Amsterdam Castle Muiderslot (Muiden Castle) and Fortress Island Pampus, both part of the UNESCO world heritage fortress stretch around Amsterdam. The journey takes 45 minutes and this service aims to bring the tourists close to the culture of Amsterdam with the help of traditional vessels and tours guided by local guides.

Img 11. Amsterdam tourist ferry

3. Existing services

3.5 Hampi VR- This virtual trip service is provided by India VR tours. The tourists can rotate 360° viewing in any direction and zoom in for closer details. Users don't have to visit the actual place for site viewing as the 360 degree images can be accessed from anywhere. But the tactile feedback is missing from the experience. The main motive of this service is to explore the possibilities of virtual reality in tourism so that the can be accessed by anyone.

Img 12. Hampi VR setup

3.6 Ajanta VR- Ajanta Ellora Virtual reality project is a collaboration with MTDC and central government of India. Professor Sumant Rao from IDC IIT Bombay is also involved in this project. This project aims to create an interactive and virtual environment for the tourists. In order to enhance the current experience this service uses both augmented and virtual reality options. Users can see the 360 degree images and gain information from anywhere and when they visit the caves the AR option helps to enhance the experience.

Img 13. Ajanta VR application

3. Existing services

3.7 Mogao caves- The Mogao caves form a system of 492 temples 25 km (16 mi) southeast of the centre of Dunhuang. The first caves were dug out in 366 AD. This service is available on steam VR; Dunhuang experience is a total of eight caves to develop a basic coverage and it is consistently updated with new data. The user can see the caves without visiting the location. The motive behind this service is to give virtual access of the cave to tourists.

Img 14. Magao caves VR setup

3.8 London street museum AR- This application is developed by the museum of London and it is free of charge. It provides an augmented view of the city which user can access with a mobile phone. Street museum app can recognize a user's location and then overlay a historic image onto the camera view. The Street museum app, which was released several years ago, has now been updated with over 100 new locations and images, ranging from 1868 to 2003. The aim of this service is to provide a simple yet effective medium of giving information.

Img 15. London street museum application

4. Study of the current ferry service

The ferry starts from Apollo Bandar besides Gate way of India and without any stop in between takes the tourists to Elephanta jetty. On a busy holiday nearly 20 vessels are operational. The vessel has a capacity of 100 people and each vessel makes 5-6 round trips in one day. Hence around 10000 people Elephanta caves on an average holiday. The trip takes 45-60 minutes depending on the water turbulence. A round way ticket costs 200 Rs per person and extra 10 Rs are charged to sit on the upper deck.

The driver's cabin is on the upper deck and has poor visibility while sitting, driver has to stand up for better view. There is no equipment for navigation except a compass; the drivers rely on their experience for navigation. The vessel runs on a Ashok Leyland marine diesel engine which is noisy. The ingress/egress is also a problem because there is no platform on the boat.

The boat is very different from other vessels as it has different controls for speed and navigation and different crew members operate these controls.

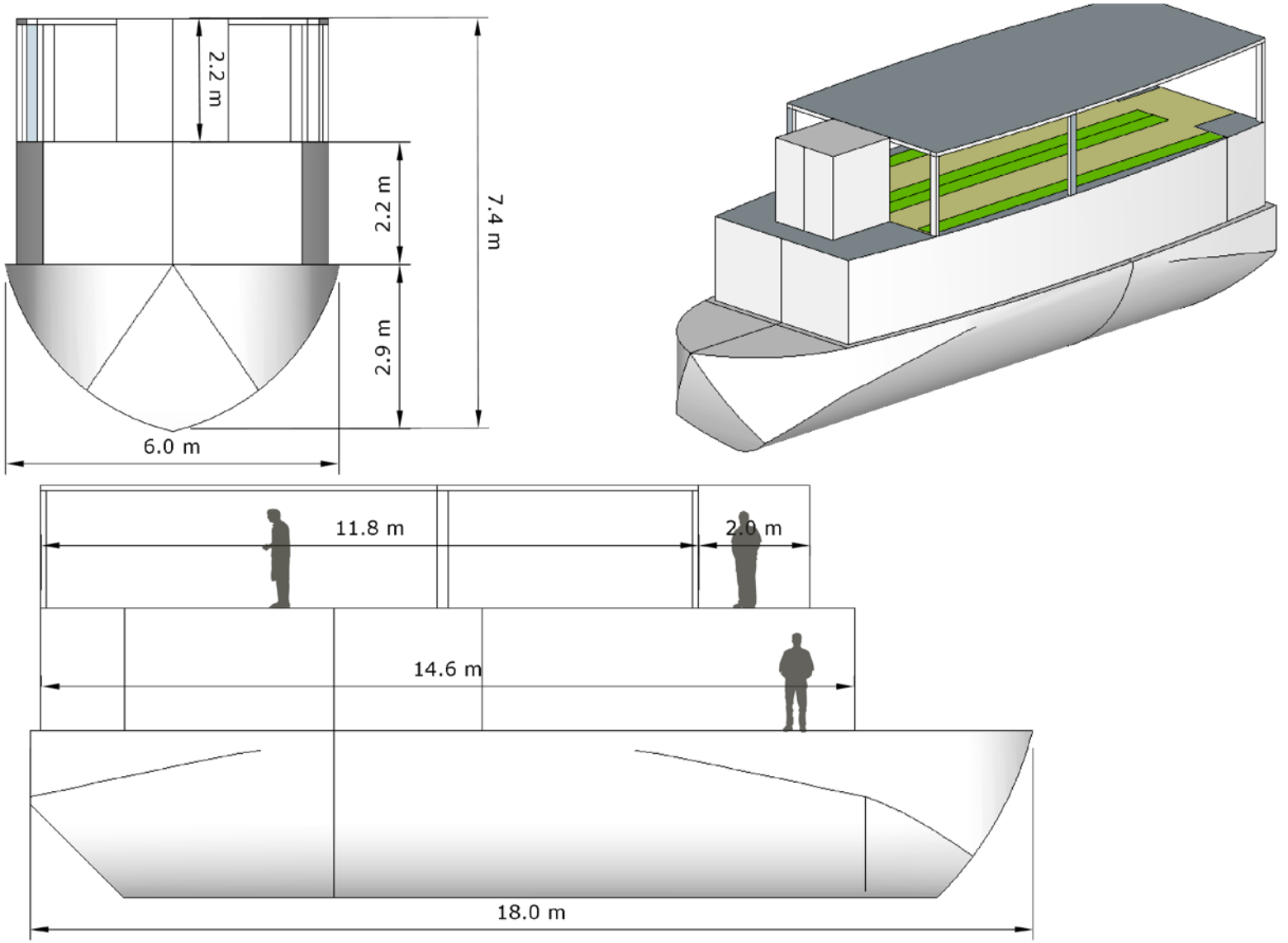
Img 16. Upper deck Elephanta ferry

Img 18. Drivers cabin

Img 17. Current Elephanta ferry

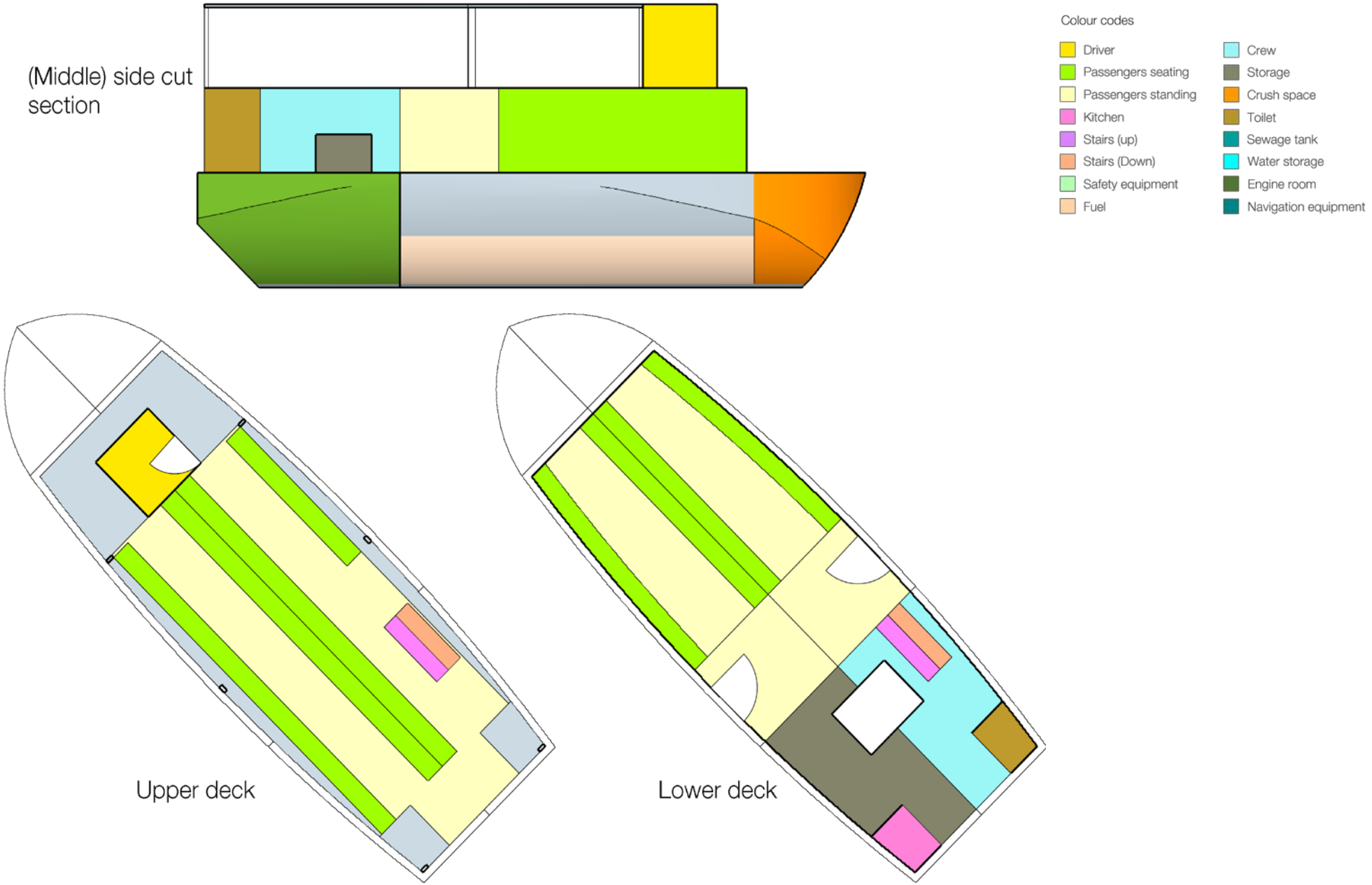
Img 19. Elephanta ferry Ingress

4. Study of the current ferry service



Img 20. Dimensions of current Elephanta ferry

4. Study of the current ferry service



Img 21. Layout of current Elephanta ferry Ingress

5. User study

A Brief user study was carried with the drivers, crew and the tourists in order to understand the needs and aspirations of the users.
The nature of the user research was qualitative; Semi-structured questionnaires were created in order to start a conversation and once the users were engaged in the conversation more questions were asked to gather insights.

Refer annexure for user study questionnaire and results

5.1 User study insights

1. The crew needs a separate compartment for resting, eating etc.

2. Proper storage for water and food supply is needed.

3. The driver needs centralized controls, better visibility and navigation equipment.

4. Tourists prefer videos and guides for taking information.

5. Scenery is also part of the experience.

6. The boat has to faster and more stable.

7. Passengers prefer snacks being served to them rather than going to the snack counter.

8. Tourists want access to the front of the boat.

9. Passenger's prefer central seating.

10. Passengers prefer the spacious and open nature of the vessel.

Img 23. Serving tea and snack on Elephanta ferry

Img 24. Passengers sitting on upper deck to enjoy the view

5.2 Identified problems

1. Instability of the vessel.
2. Drivers visibility and navigation equipment.
3. Safety equipments for passengers and its storage.
4. No separate compartment for the crew.
5. No information about the site provided during the journey.
6. No storage for water and food supply.
7. Passengers want a front deck to enjoy the view.
8. Long journey time.
9. Serving snacks to the passengers.
10. Sewage dumped directly into the sea

5.3 Possible solutions

1. Instability of the vessel.
   Trimaran is a boat with three hulls; two supporting hulls attached to central main hull. It provides swift and smooth ride even on rough waters.

2. Drivers visibility and navigation equipment.
   A front deck on mezzanine level clears the vision of the driver and GPS or radar can be provided for navigation.

3. Safety equipments for passengers and its storage.
   Safety equipments can be provided under the passenger seats like airplanes and additional equipments can be provided under the passenger seating area on lower deck.

4. No separate compartment for the crew.
   Crew spends most of the day on the boat, so crew cabins must be provided for storage and resting.

5. No information about the site provided during the journey.
   Since the tourists prefer the information in the form of guided tours or visuals; The upper deck can have a screen and lower deck can have hologram space and local guide to provide a virtual tour of Elephanta.

6. No storage for water and food supply.
   Two water storage tanks can be provided on the supporting hulls and storage for food can be close the kitchen.

5.3 Possible solutions

7. Passengers want a open deck to enjoy the view.
   Open deck can be provided on the mezzanine level or the upper deck for passengers to enjoy the scenery.

8. Long journey time.
   Light material like FRP can be used to make the hull and efficient power train can ensure faster travel.

9. Serving snacks to the passengers.
   The snacks can be served on trolley like it is done in flights and ramps can be used instead of stairs.

10. Sewage dumped directly into the sea
    A ecopot sewage tank under the toilet will solve the problem of waste treatment.

Design phase

Design of the ferry

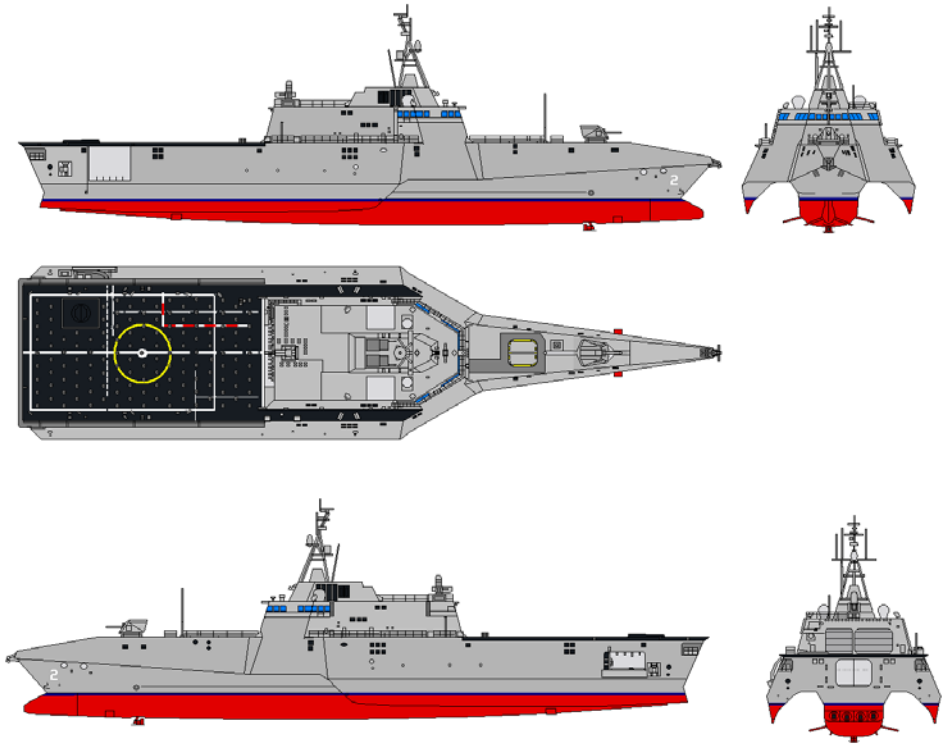
6. Design brief

The aim of this project is to design the interior and exterior of a ferry for Elephanta and the design must fulfil the following requirements

- The service should provide an interactive experience of the historical trip through videos, guides etc.
- The ferry should fulfil the basic needs of passengers and crew like safety, storage, sanitation, navigation, comfort etc.
- The ferry should have lesser or equal foot print to the existing vessel and the capacity should be 100 people.
- The ferry must have an open deck for the passengers.

7. Trimaran design

- A trimaran has three hulls and it is combination of traditional mono hulls and catamarans.
- The central hull is big and the two supporting hulls (ama's) are comparatively small.
- The central hull provides most of the bouncy (about 80-90%)
- The ama's mainly provide stability and have less draft. The length can be half of the total length.
- Trimarans have better speed than same sized mono hulls due to slender hulls.
- Cross deck in a trimaran is structurally more stable than a catamaran due to the central deck.
- The trimaran boats are comparatively new in the boat industry and they lack of implementation in commercial usage.
- Due the elaborate hull structure extra engineering required for structure.
- Extra design effort is required in designing a trimaran due to the complexity.
- More material is required for hull manufacturing due to increased number of hulls.



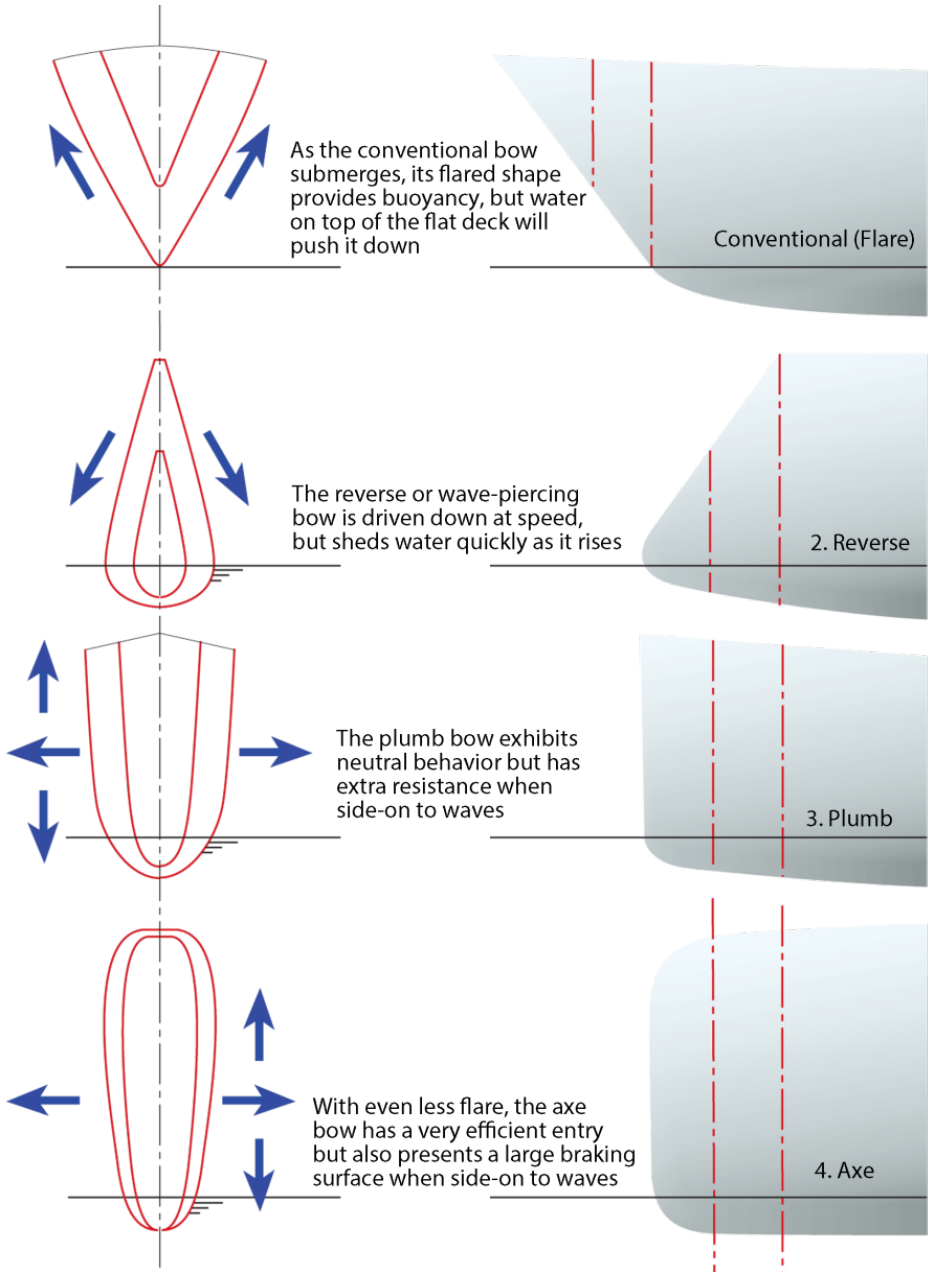
Img 25. USS independence trimaran

Img 26. FRP trimaran

7.1 Hull design

Bow is the frontal part of the hull; It plays an important role in boat design because it effects the stability, efficiency and speed of the vessel. There are mainly four types of bows conventional, reverse, plumb and axe; each of the bow type has its own advantages and disadvantages. The reverse bow was chosen for the vessel due to the following reasons

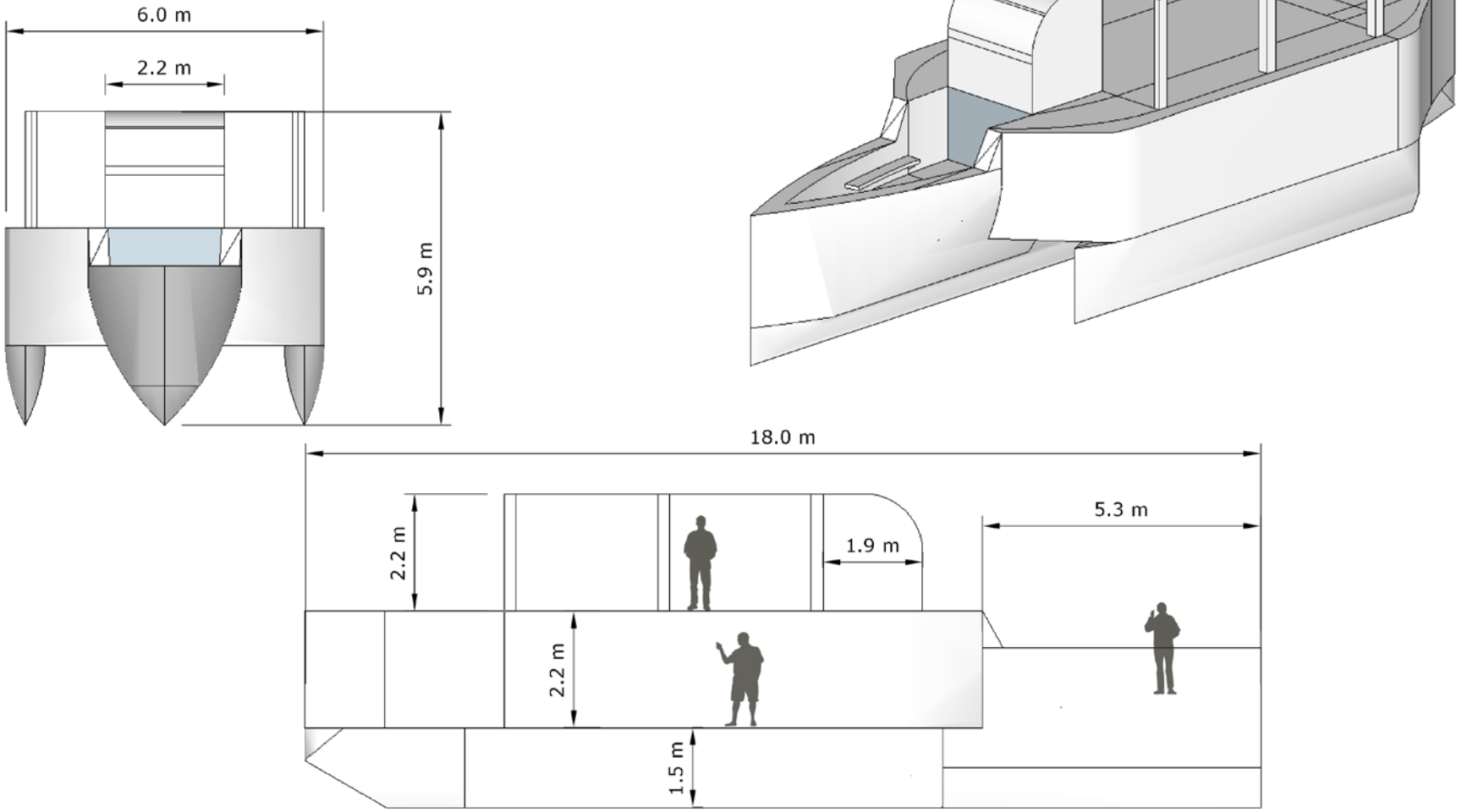
- Reverse bow has the best wave piercing ability than all the other bows.
- This kind of bow is more suitable for comparatively small vessels due to manufacturing constrains.
- Reverse bow help to maintain a constant speed and the water spray is also less.
- The vessels with reverse bow are stable due to tear drop shape of the hull.
- Less drag of reverse bow results in better fuel efficiency.



Img 27. Type of bows

8. Layouts

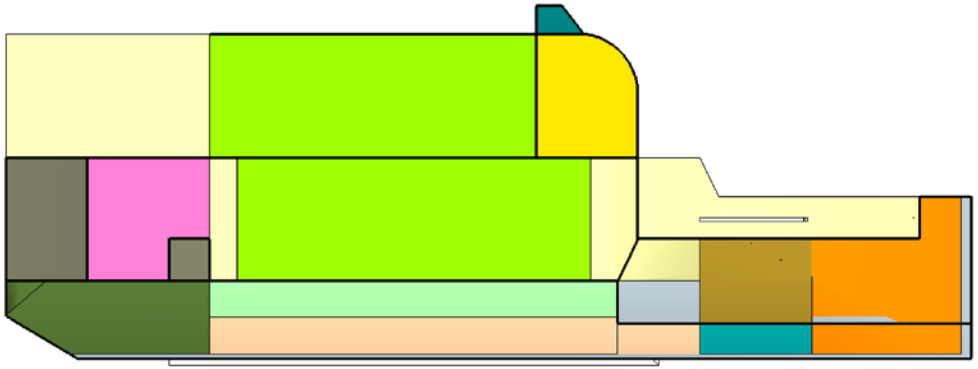
Layout 1



Img 28. Layout 1 dimensions

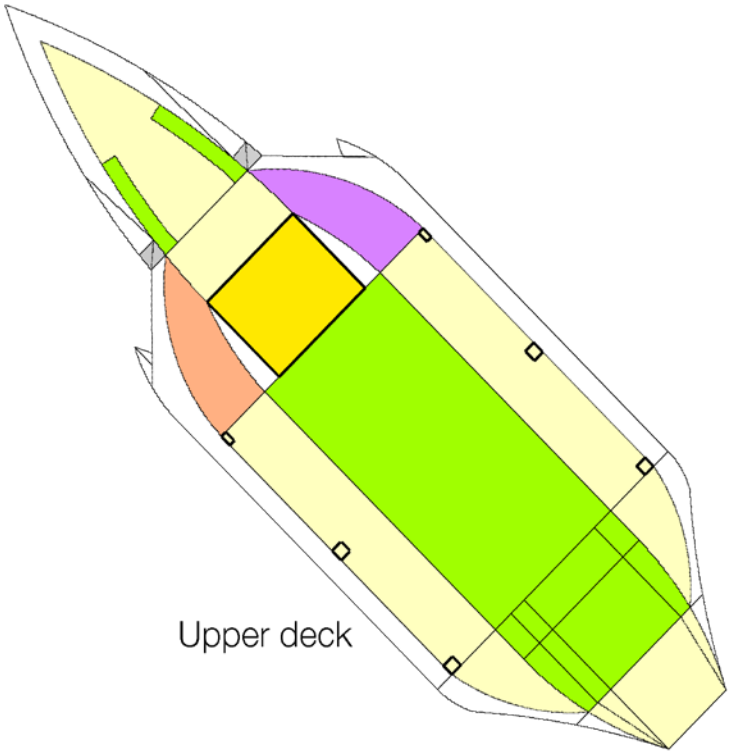
8. Layouts

(Middle) side cut section

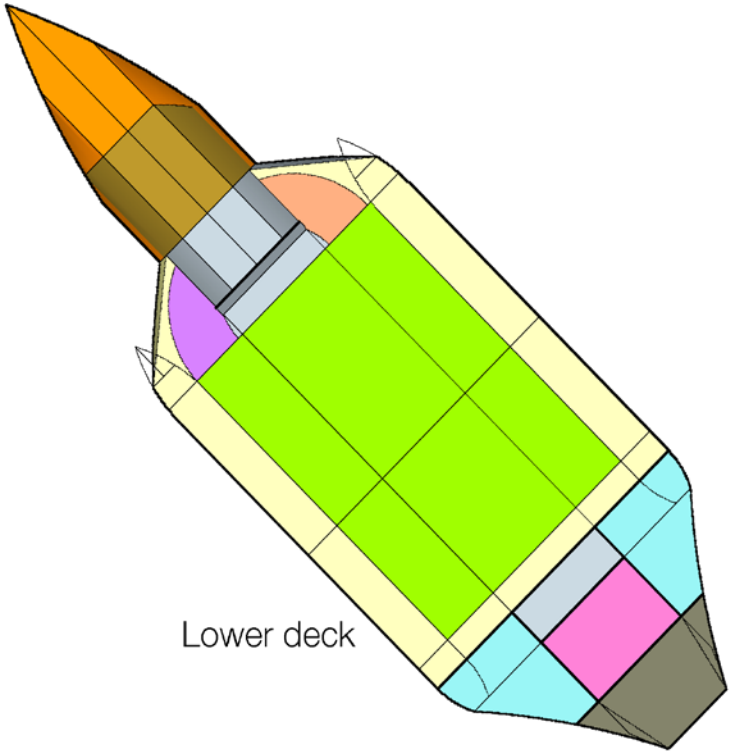


Colour codes

- Driver
- Passengers seating
- Passengers standing
- Kitchen
- Stairs (up)
- Stairs (Down)
- Safety equipment
- Fuel
- Crew
- Storage
- Crush space
- Toilet
- Sewage tank
- Water storage
- Engine room
- Navigation equipment

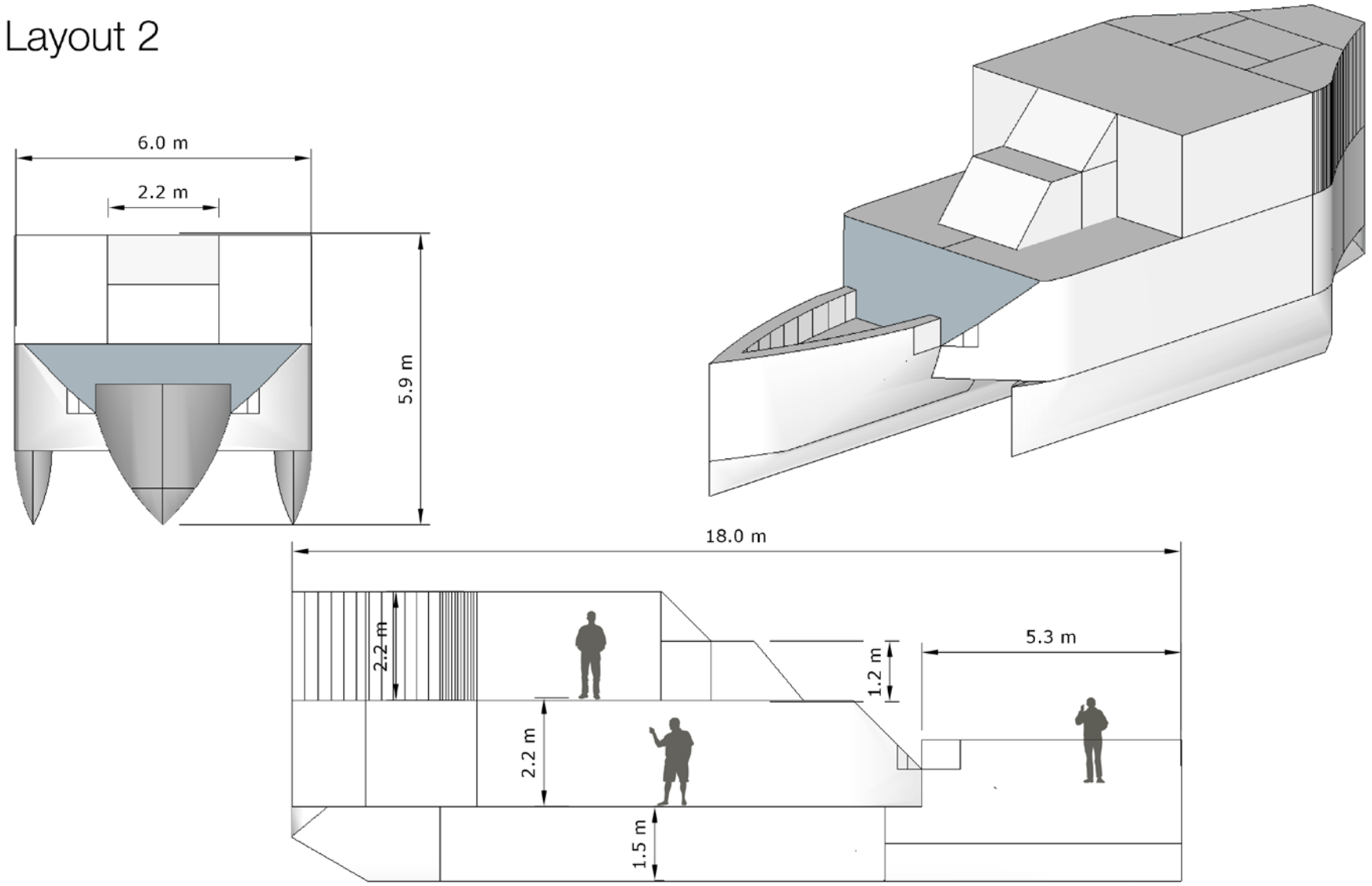


Upper deck



Lower deck

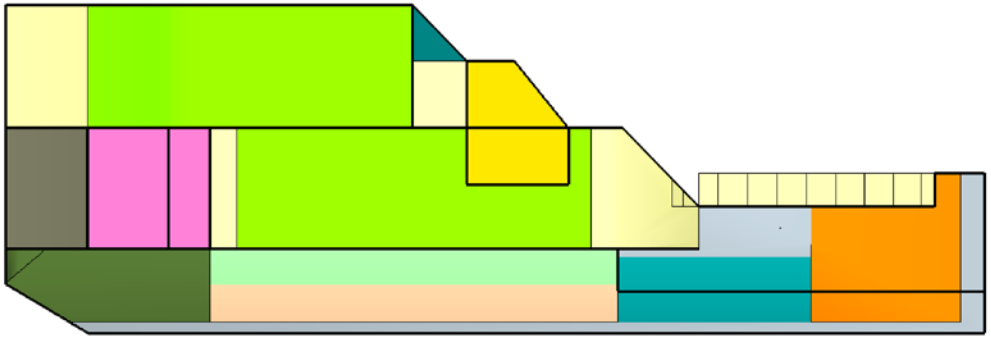
Img 29. Layout 1



Img 30. Layout 2 Dimensions

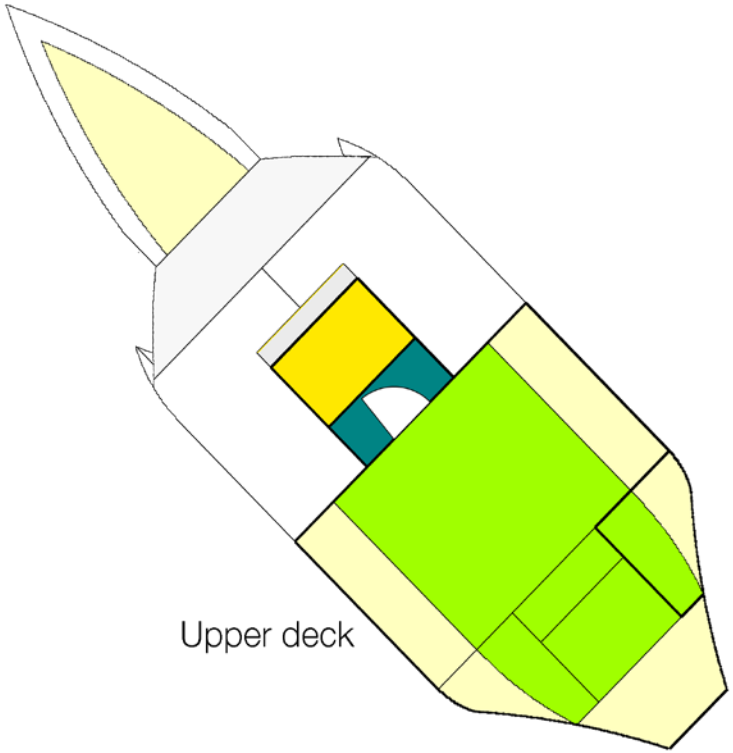
8. Layouts

(Middle) side cut section

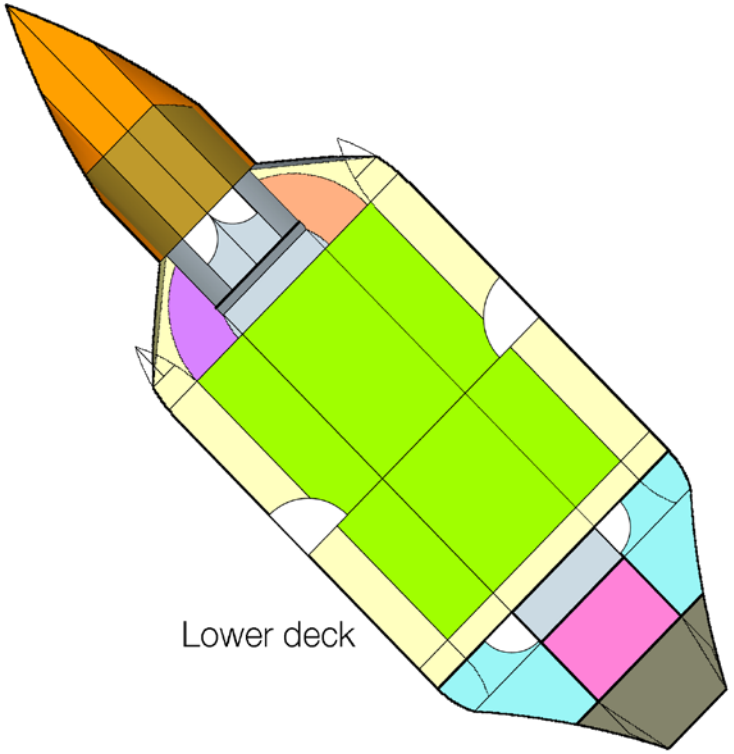


Colour codes

- Driver
- Passengers seating
- Passengers standing
- Kitchen
- Stairs (up)
- Stairs (Down)
- Safety equipment
- Fuel
- Crew
- Storage
- Crush space
- Toilet
- Sewage tank
- Water storage
- Engine room
- Navigation equipment



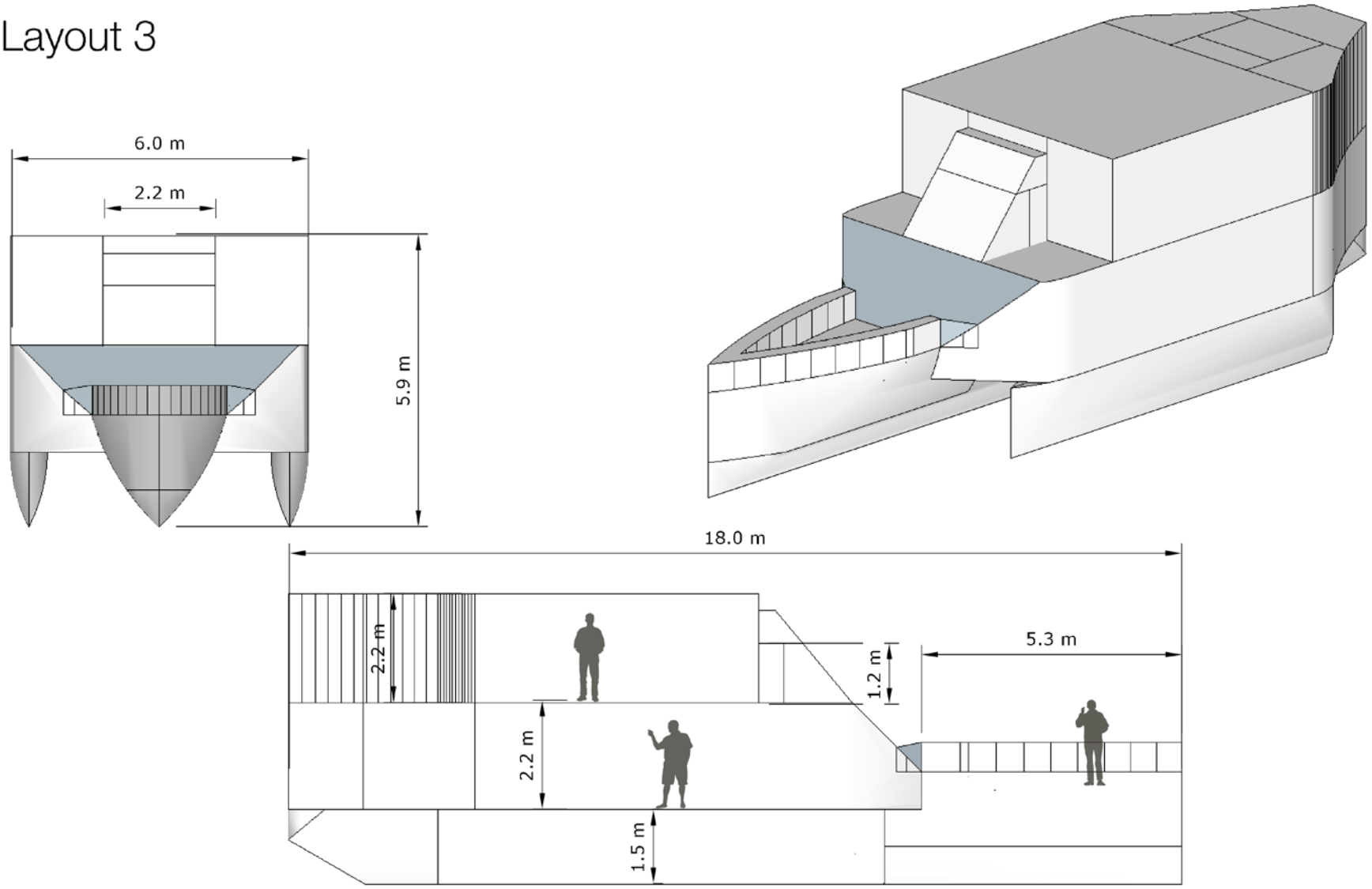
Upper deck



Lower deck

Img 31. Layout 2

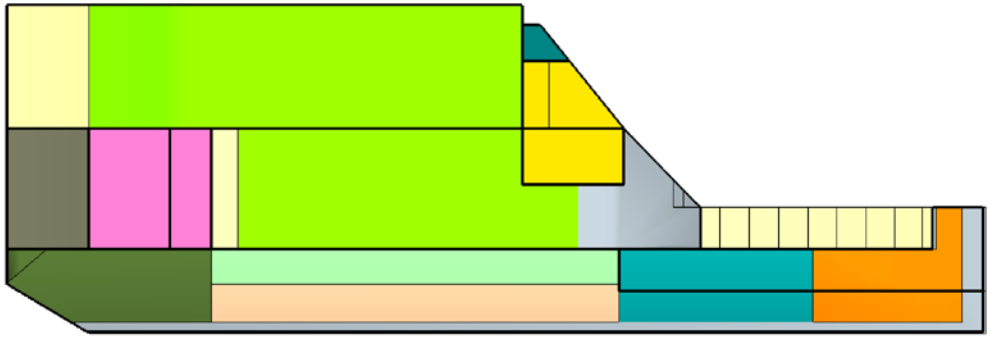
Layout 3



Img 32. Layout 3 dimensions

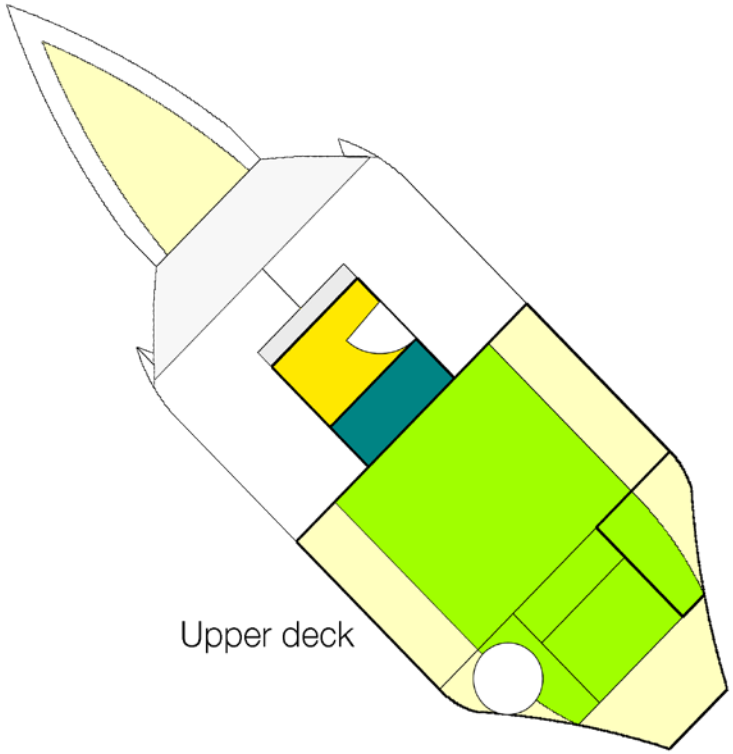
8. Layouts

(Middle) side cut section

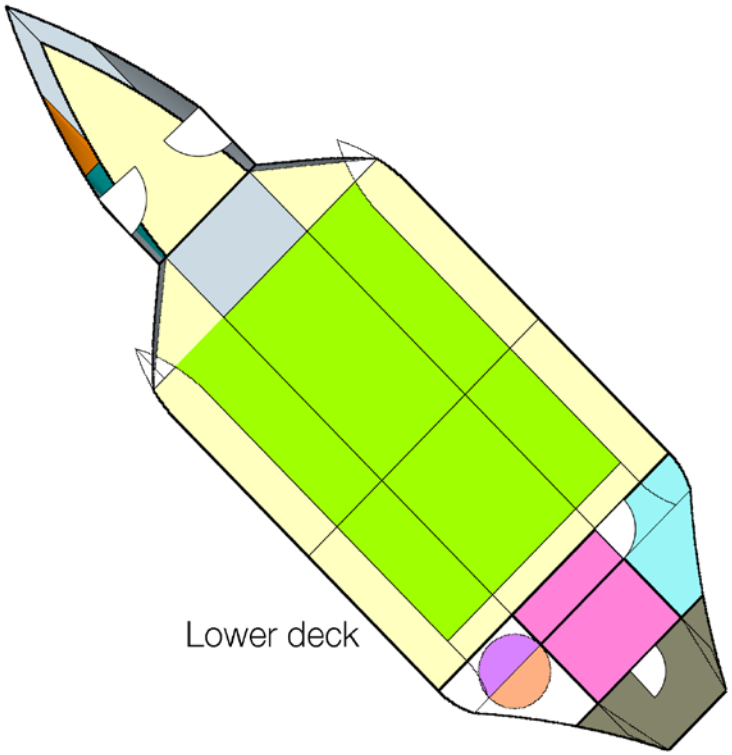


Colour codes

- Driver
- Passengers seating
- Passengers standing
- Kitchen
- Stairs (up)
- Stairs (Down)
- Safety equipment
- Fuel
- Crew
- Storage
- Crush space
- Toilet
- Sewage tank
- Water storage
- Engine room
- Navigation equipment

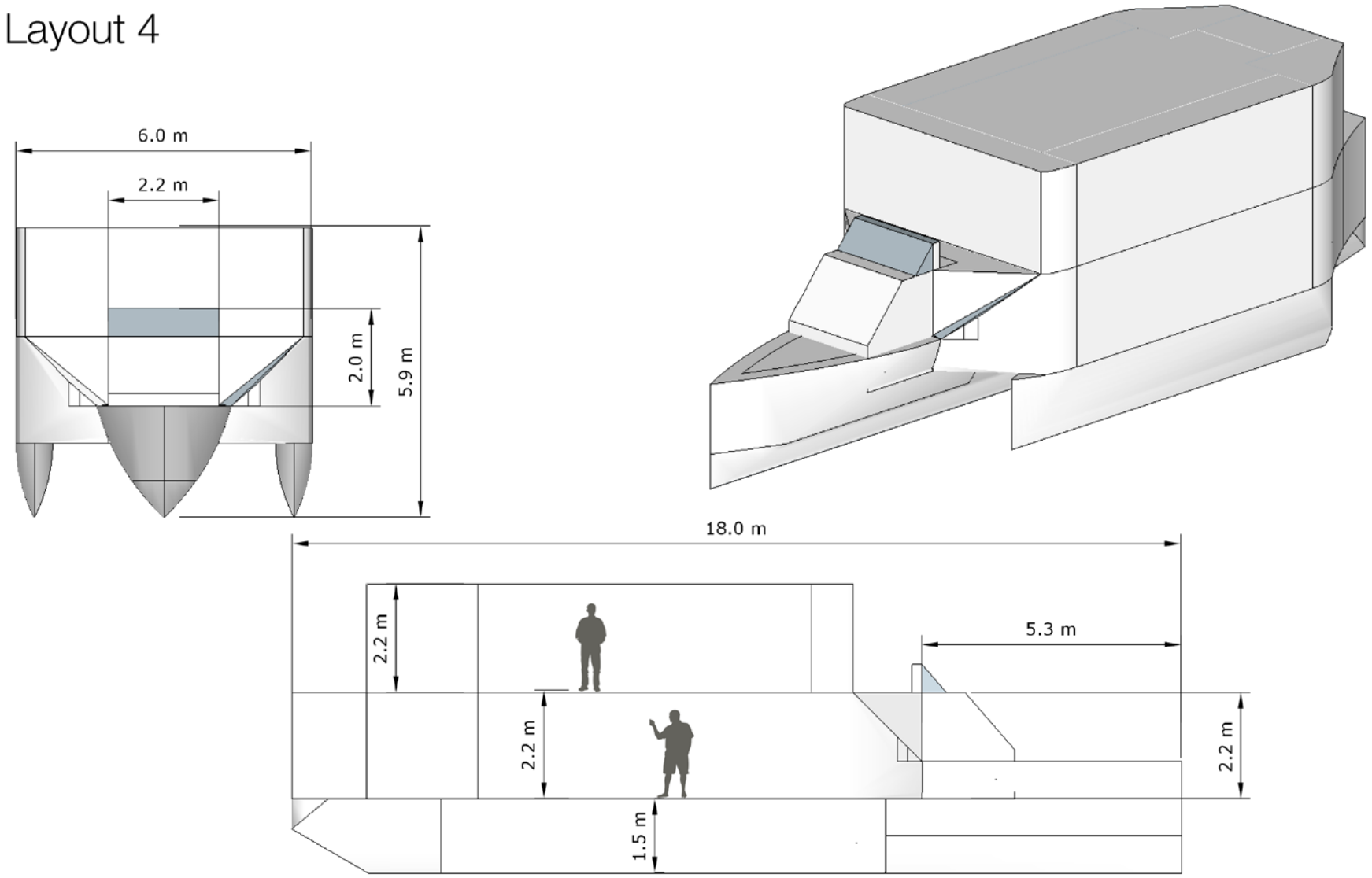


Upper deck



Lower deck

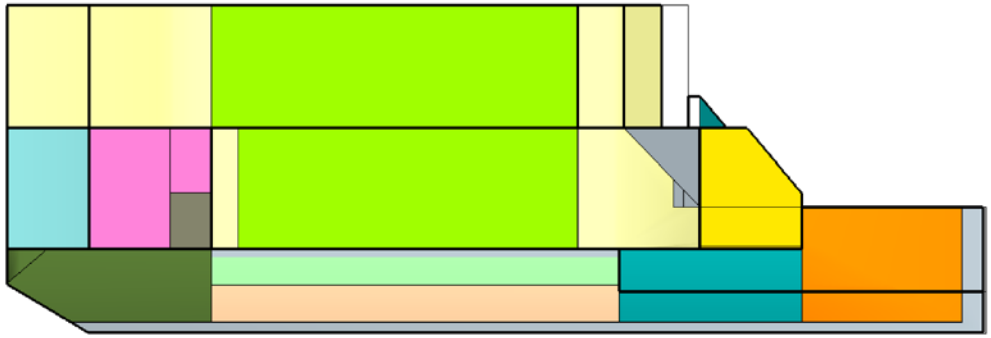
Img 33. Layout 3



Img 34. Layout 4 dimensions

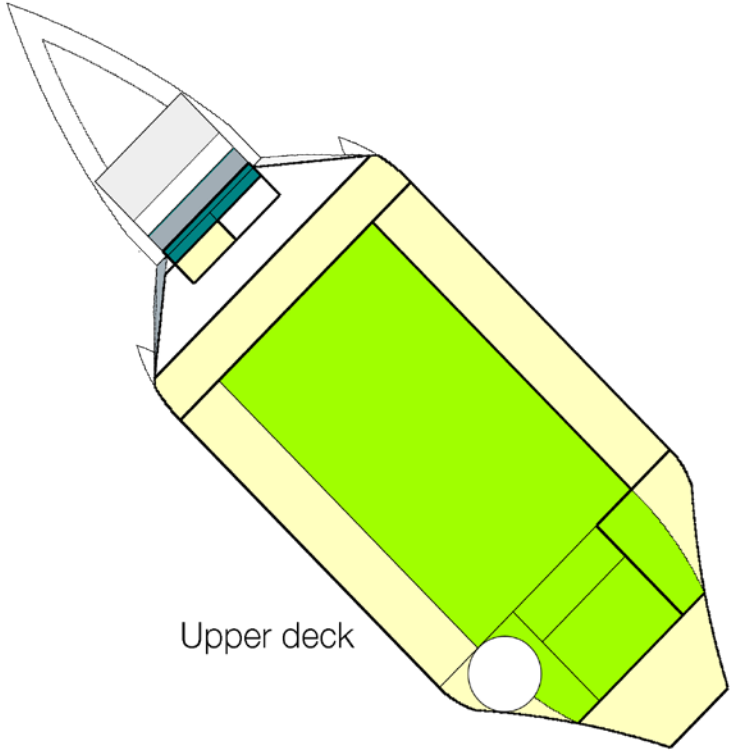
8. Layouts

(Middle) side cut section

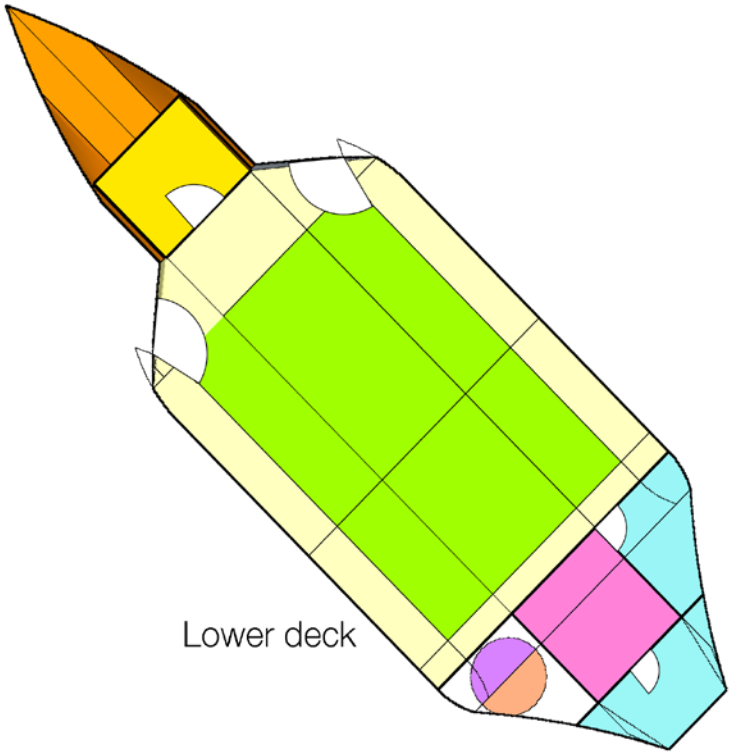


Colour codes

- Driver
- Passengers seating
- Passengers standing
- Kitchen
- Stairs (up)
- Stairs (Down)
- Safety equipment
- Fuel
- Crew
- Storage
- Crush space
- Toilet
- Sewage tank
- Water storage
- Engine room
- Navigation equipment

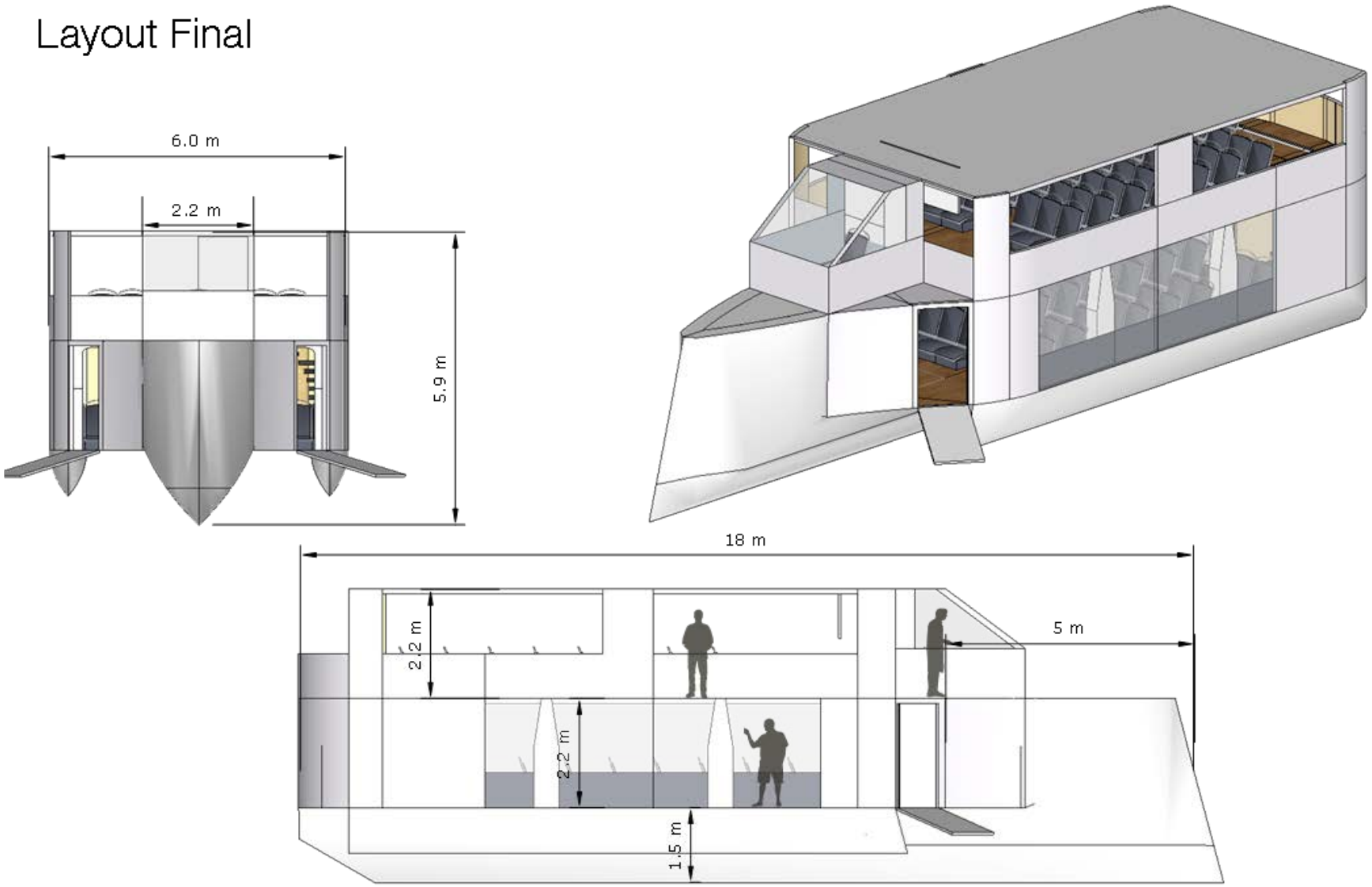


Upper deck



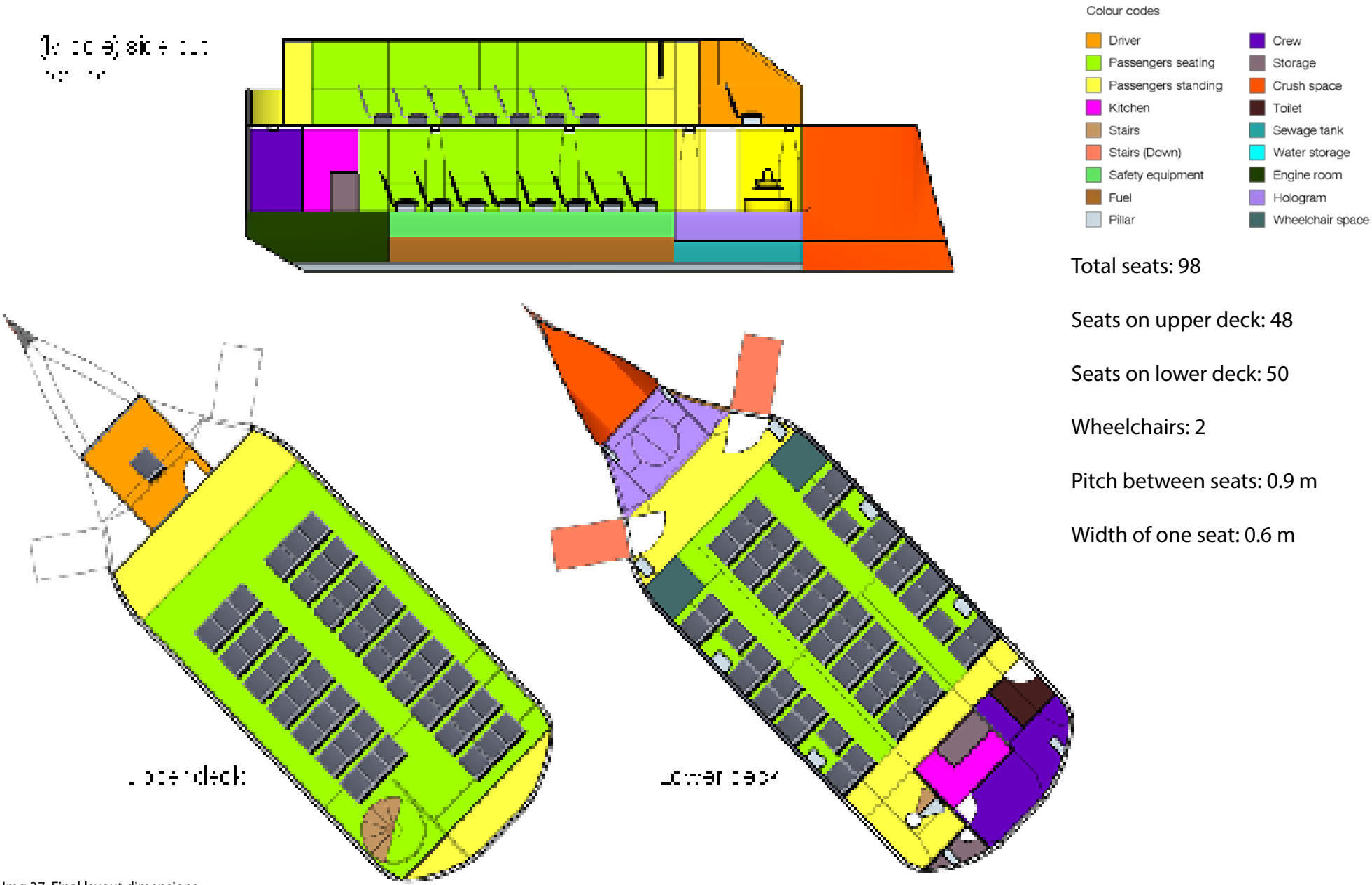
Lower deck

Img 35. Layout 4



Img 36. Final layout dimensions

8.1 Final Layout



Total seats: 98

Seats on upper deck: 48

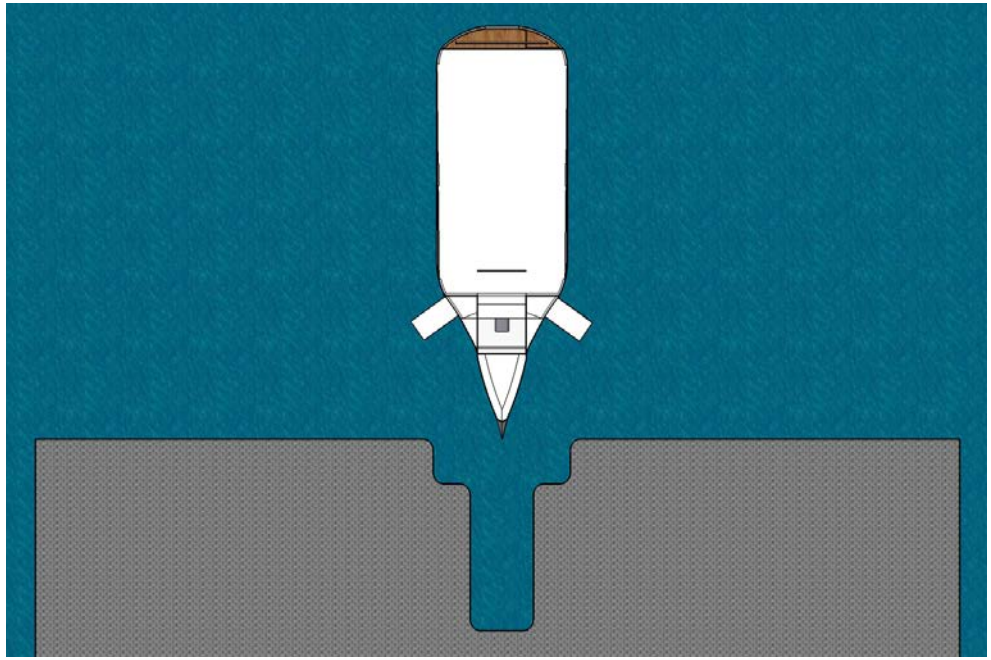
Seats on lower deck: 50

Wheelchairs: 2

Pitch between seats: 0.9 m

Width of one seat: 0.6 m

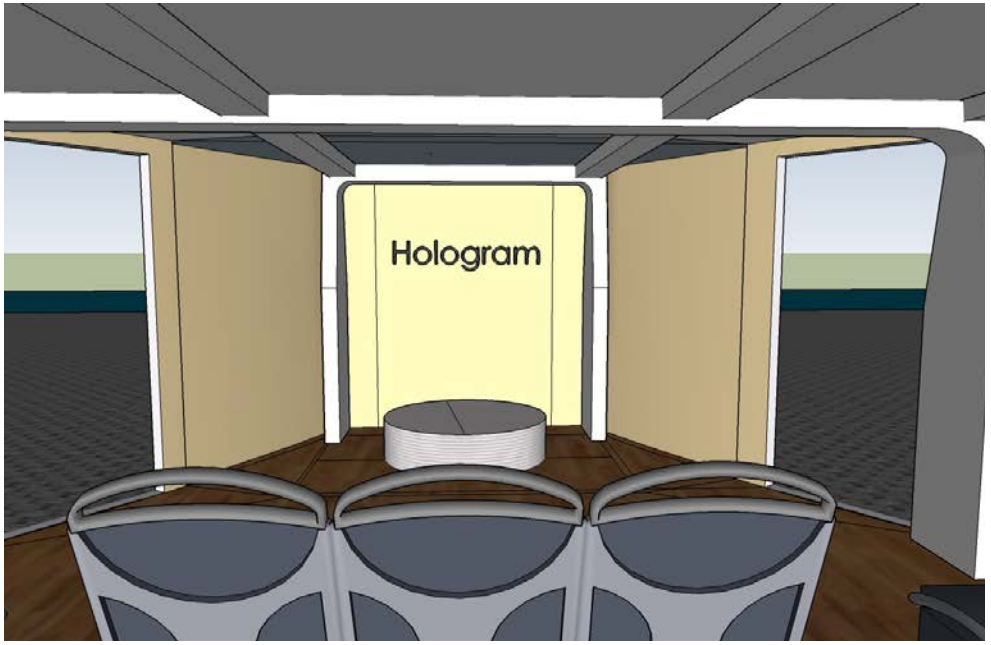
Img 37. Final layout dimensions



Img 38. Docking on floating terminal

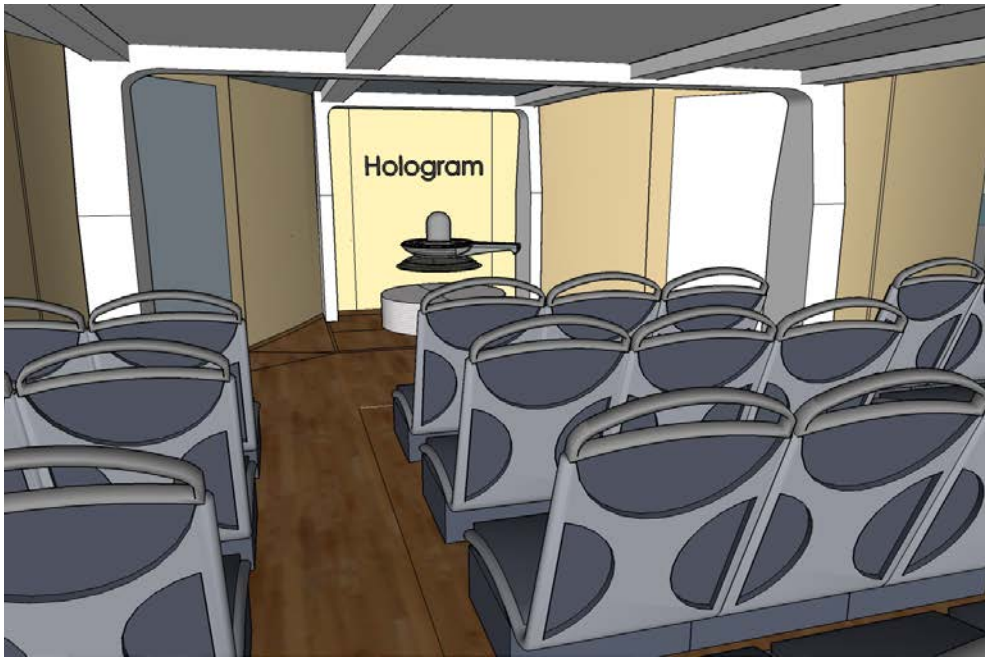
Img 39. Retractable ramp for ingress/egress

Img 40. Main entrance



Img 41. Ingress/Egress

Img 42. Lower deck



Img 43. Hologram setup


Img 44. Upper deck


Img 45. Video setup

9. Trends in boat design

The current trends in the boat design in boat design industry are inspired by various other industries like architecture, automobile industry etc. and technology also plays an important role in setting new trends.

Bigger builds
The new-build sector continually pushes the limits of boat design. What was once considered a large yacht at 180 feet (55 m) is now standard. Due the use of fibre glass as building material for the hull this trend has emerged.

Unique silhouettes
Since boats and yachts are not mass produced owners and ship makers want their product to be unique and distinctive. The aspirations of users are the reason behind this trend.

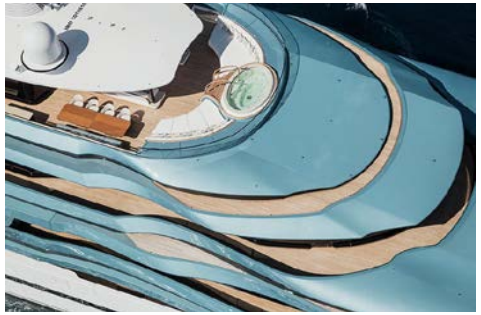
Expansive windows
Steel and aluminium will always be the preferred choice of materials for yacht construction, but the introduction of structural glass has allowed boat architecture to reach new levels of sophistication. Designers can now play with larger windows, leaving a more aesthetically pleasing finish, both above and below the waterline.

Skeletal structure and Flowing lines
A fleet of five yachts has been designed by British architect Zaha Hadid Collectively they are called Unique Circle; five 90m-long (300ft) vessels, built by the German shipbuilder Blohm+Voss. The designs include one with an eye-catching alien form. The framework is also supposed to resemble the skeletal structure of marine animals.

Levels
Because of advancement in structural design and new materials having multiple decks on a boat is very common trend in boat industry. The users also want multiple decks for different activities.


Img 46. Yacht with helipad


Img 47. Yacht with multiple deck


Img 48. Yacht with unique silhouette


Img 49. Tokyo ferry


Img 50. Structural glass wall


Img 51. Yacht with structural glass


Img 52. Yacht with multiple levels


Img 53. Yacht with skeletal structure

10. Design theme

The following keywords for the interior and exterior were generated after analysing the insights and studying the trends in boat design. With the help of the following keywords a inspiration board and separate mood boards for interior and exterior were created.

Monolithic

Modern.

Open

Spacious.

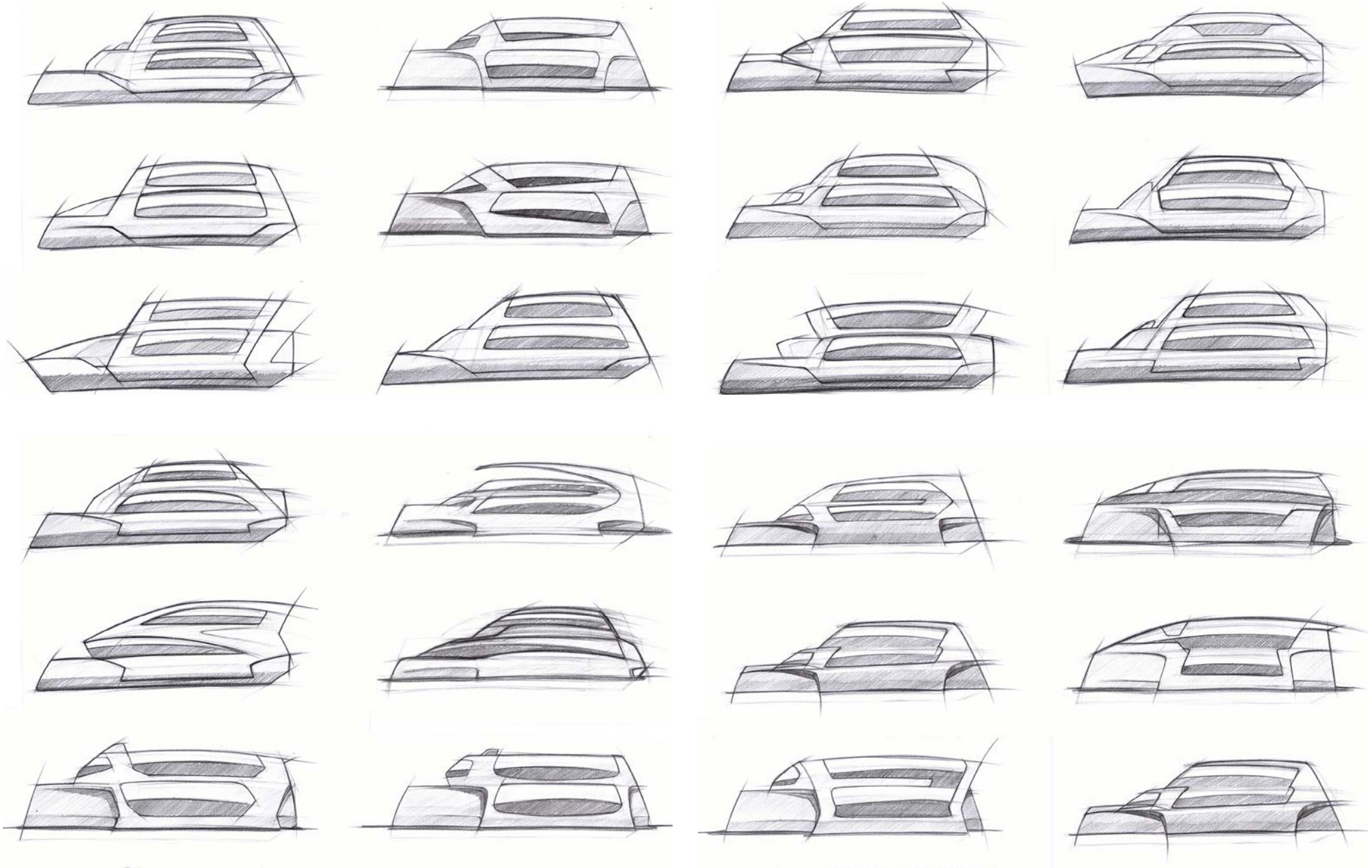
Img 54. Inspiration board

Img 55. Image board (Exterior)

Img 56. Image board (Interior)

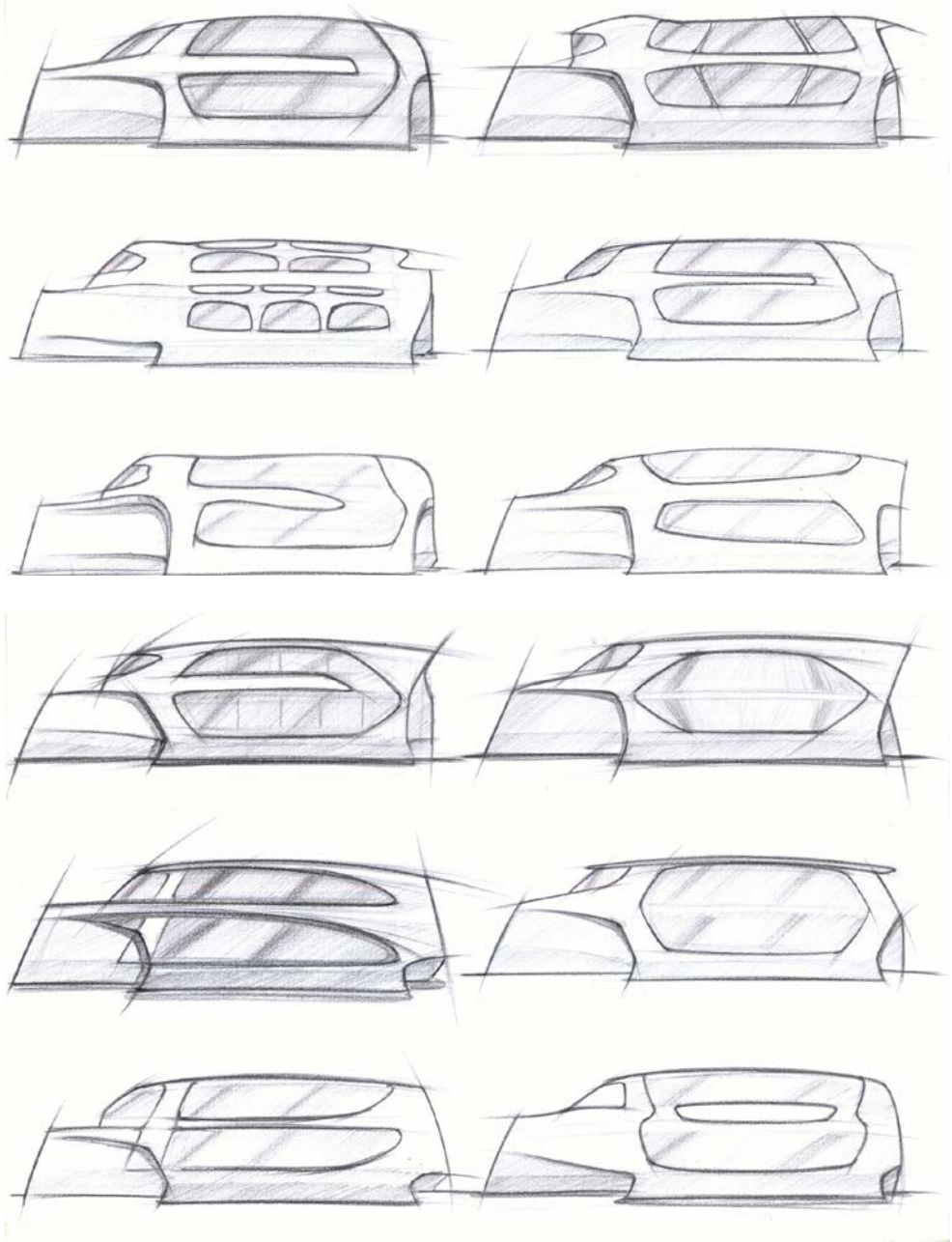
11. Sketch explorations

Initial ideation sketches to explore the possibilities of layouts.

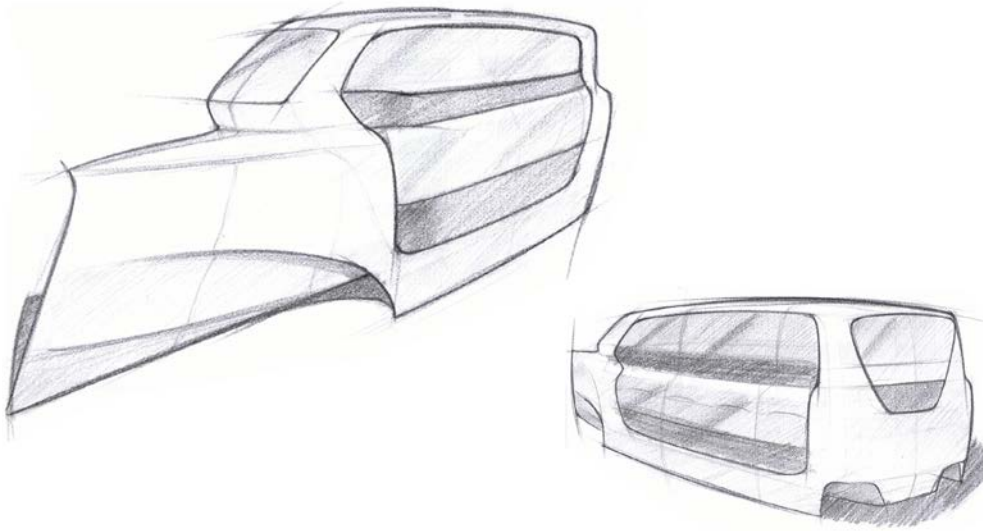


Img 57. Ideation sketches

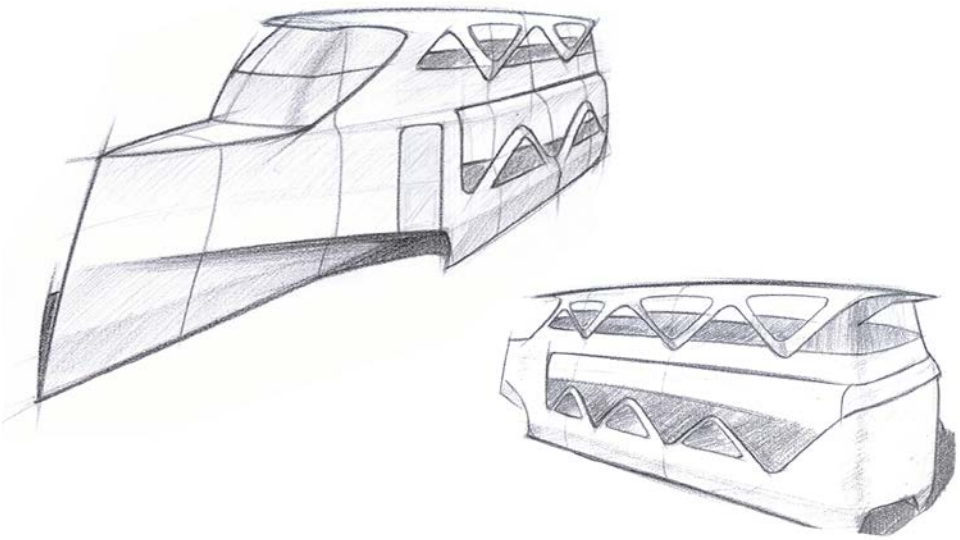
11. Sketch explorations



Img 58. Ideation sketches

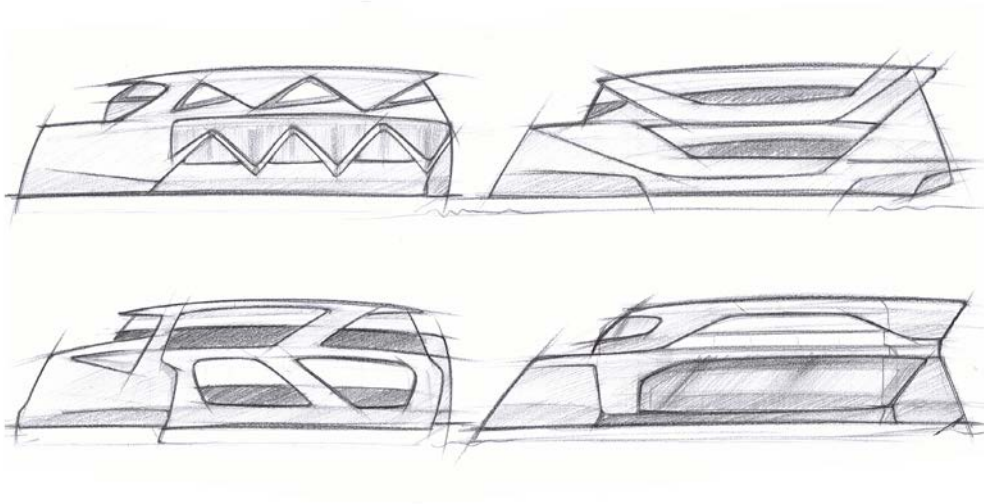


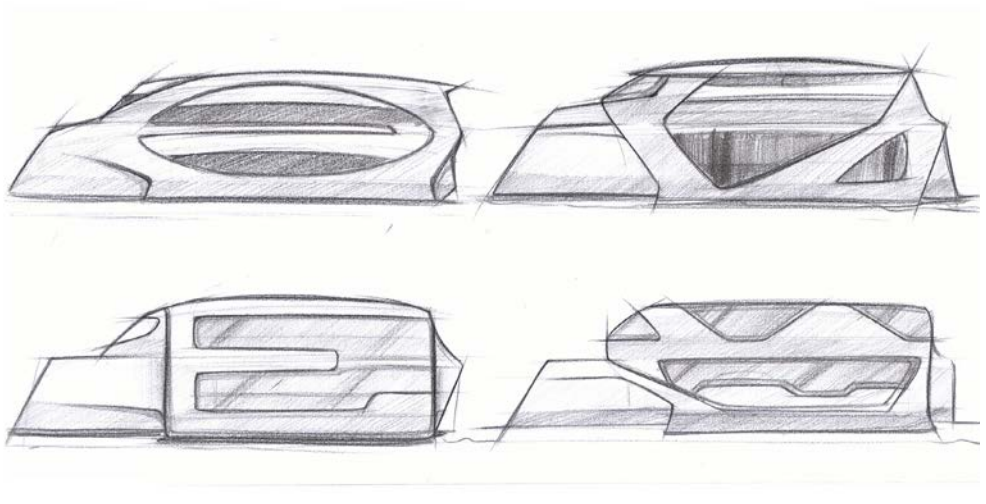
Refined concepts with consideration of the design theme.



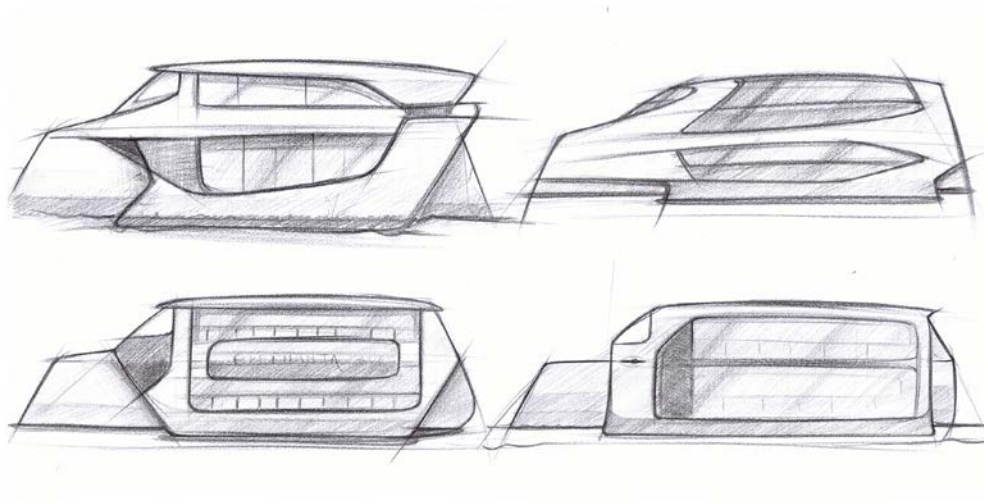
Img 59. Ideation sketches (Perspective)

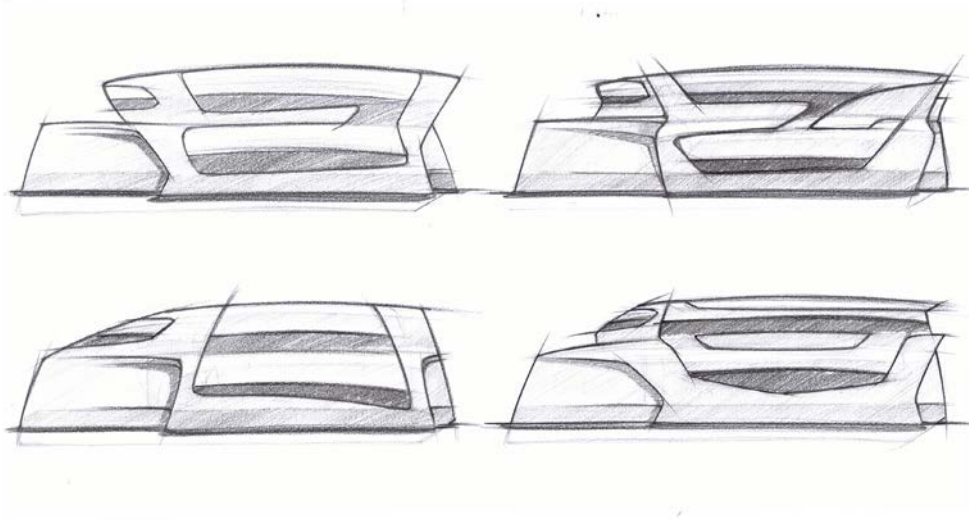
11. Sketch explorations





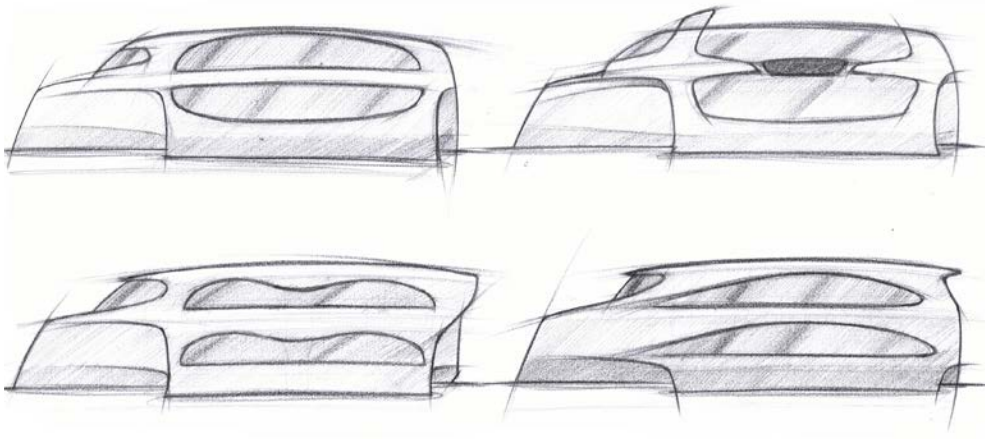
Refined concepts with consideration of the design theme and design trends.



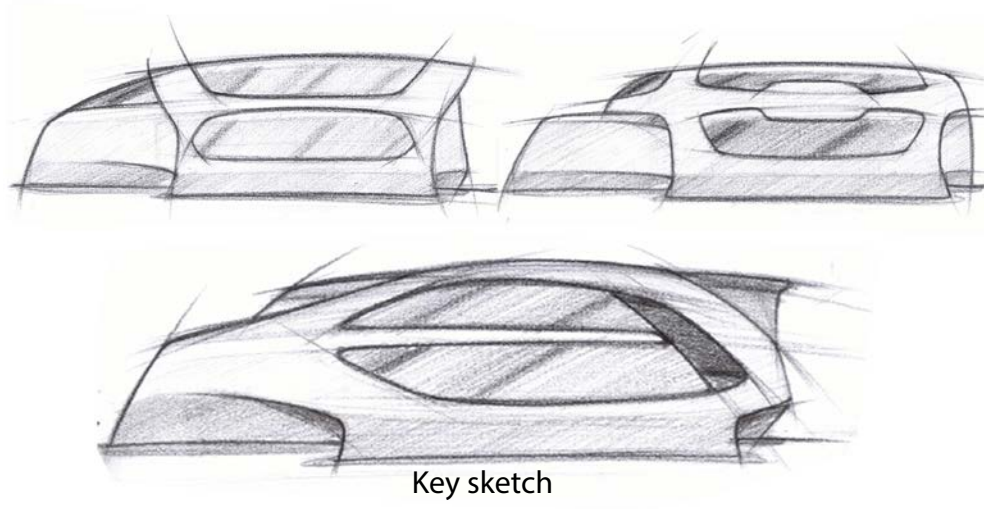


Img 60. Ideation sketches

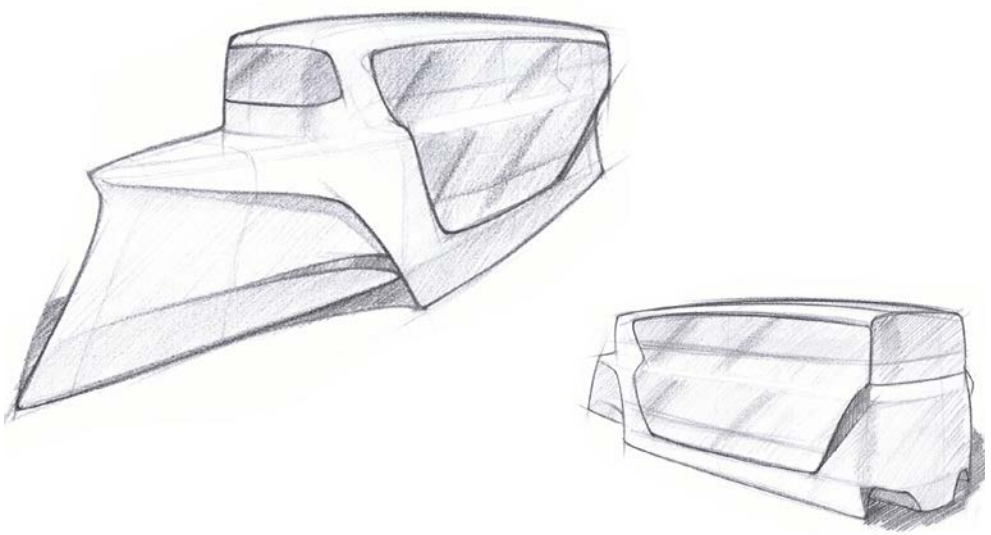
11. Sketch explorations



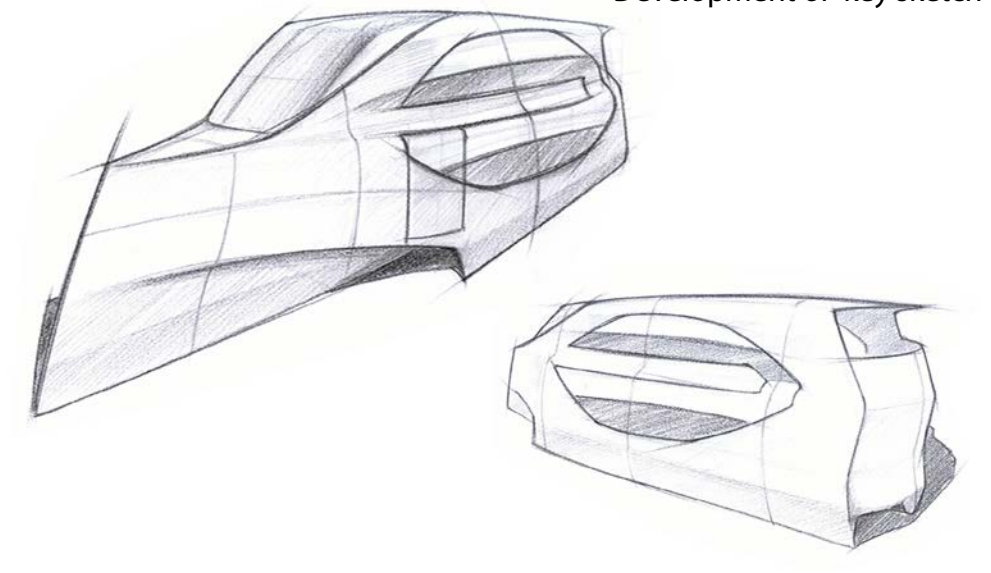
Img 60. Ideation sketches



Img 61. Ideation sketches

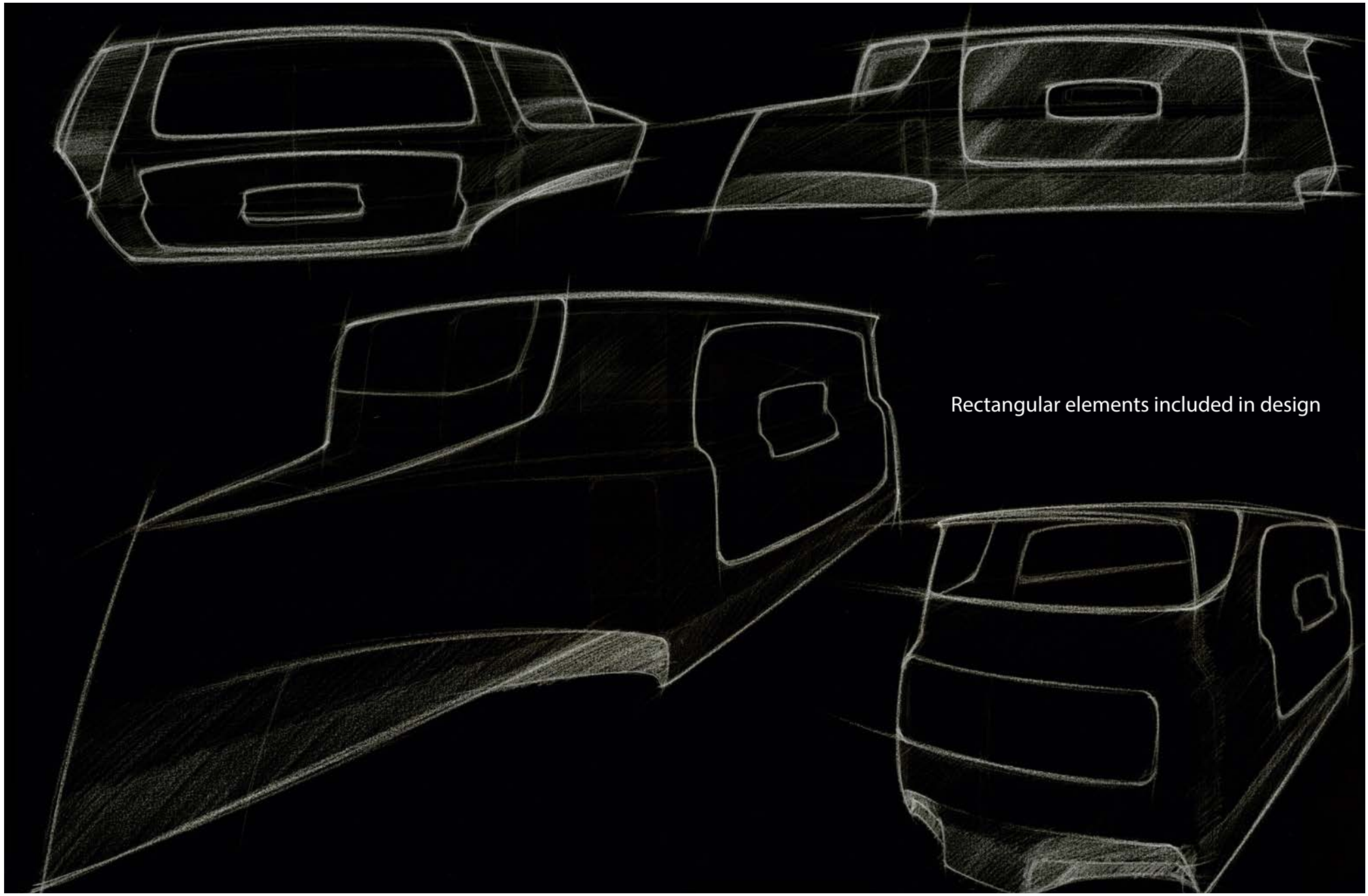


Development of key sketch

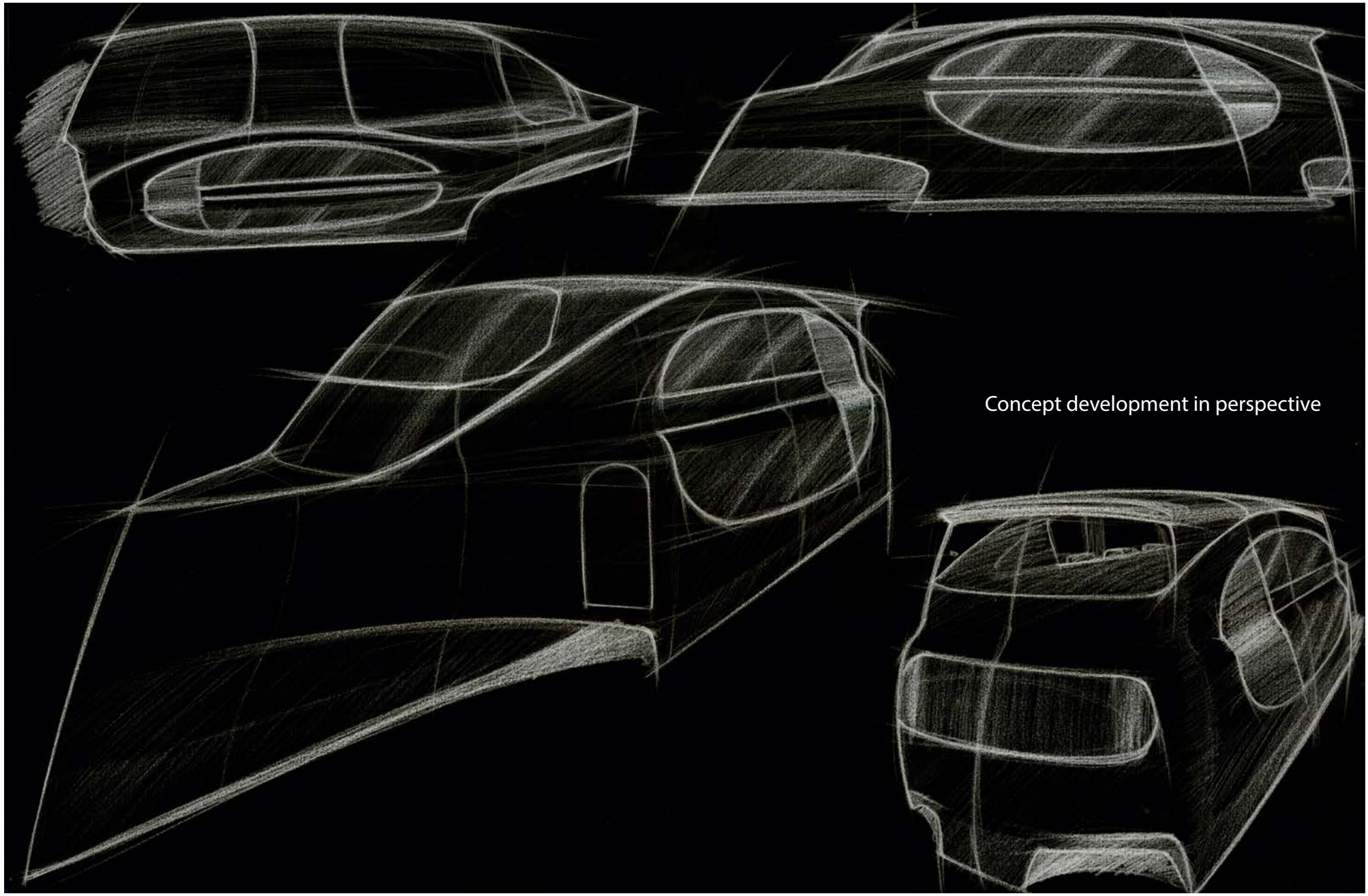


Img 62. Ideation sketches (Perspective)

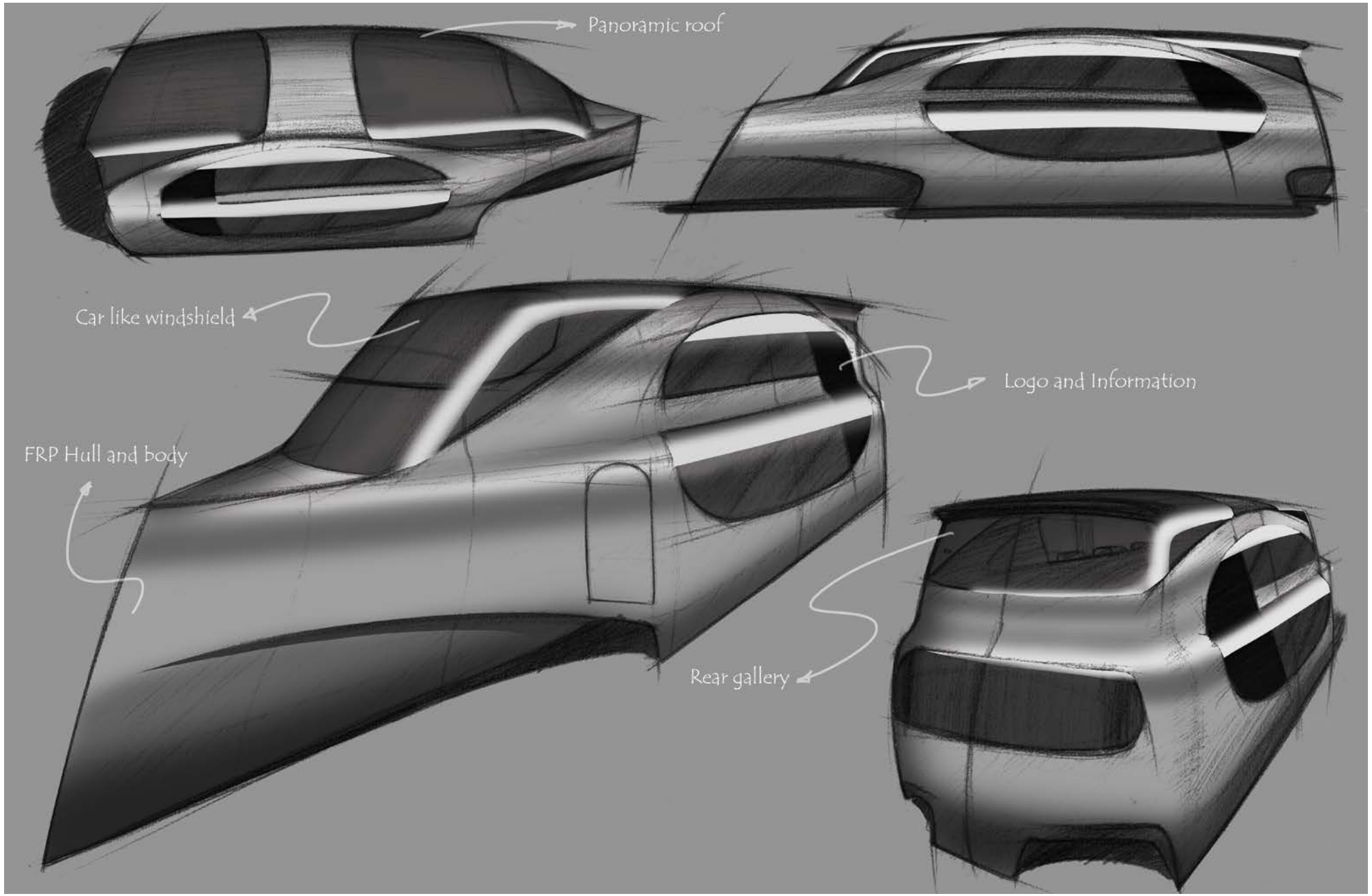
11. Sketch explorations



11. Sketch explorations



12. Final concept



12.1 Clay model of the final concept

A 1:30 clay model for the exterior of the final concept was created and a scale model for the interior of the ferry was also made.

Img 63. Rough thermocol model as base for clay.

Img 64. First layer of clay.

Img 65. Masking and planing.

Img 66. Rough finish of clay model

Img 67. Final finish of clay model

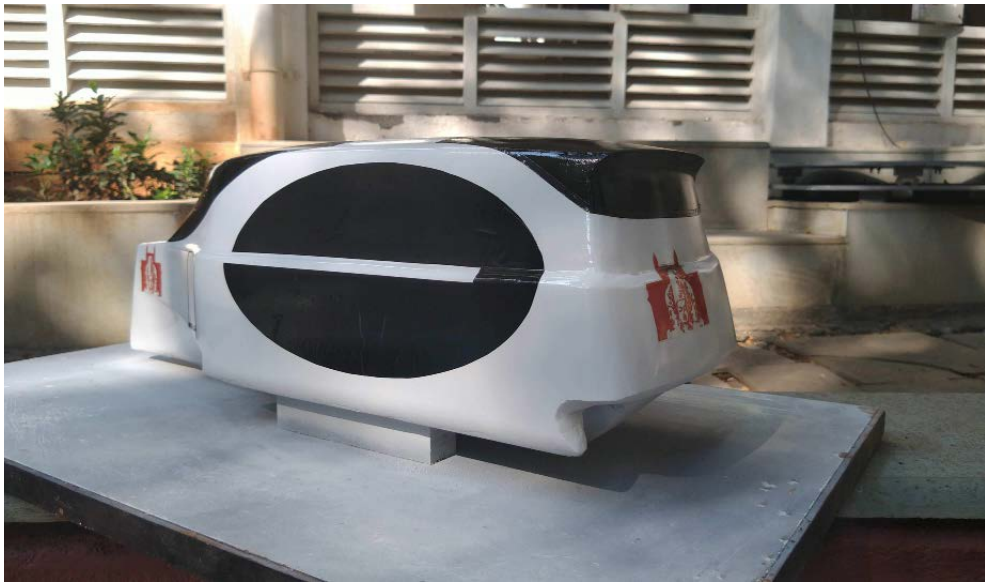
Img 68. Coat of primer

Img 69. Painting the finished model

Img 70. Final outcome

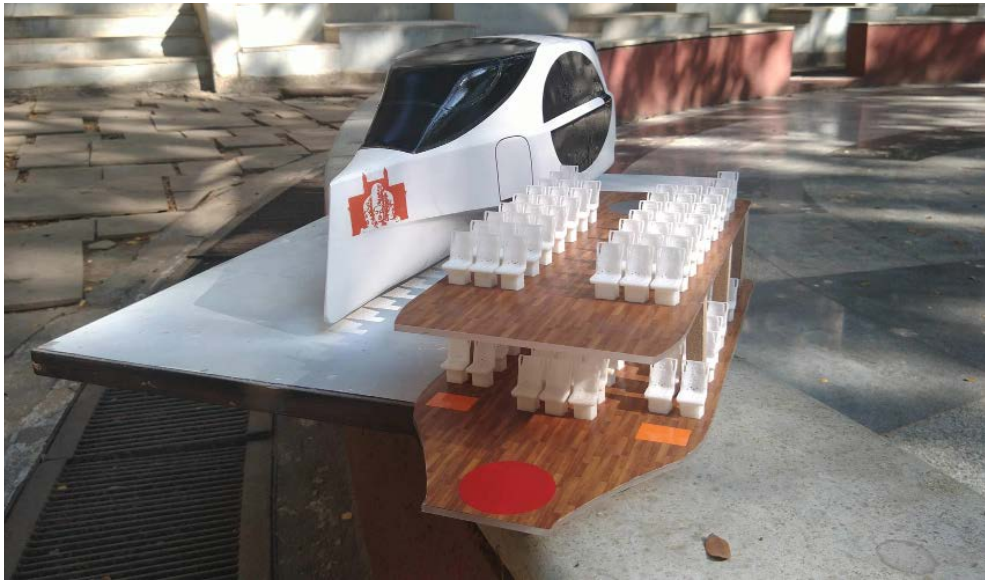
12.1 Clay model of the final concept

Img 71 Front quarter view

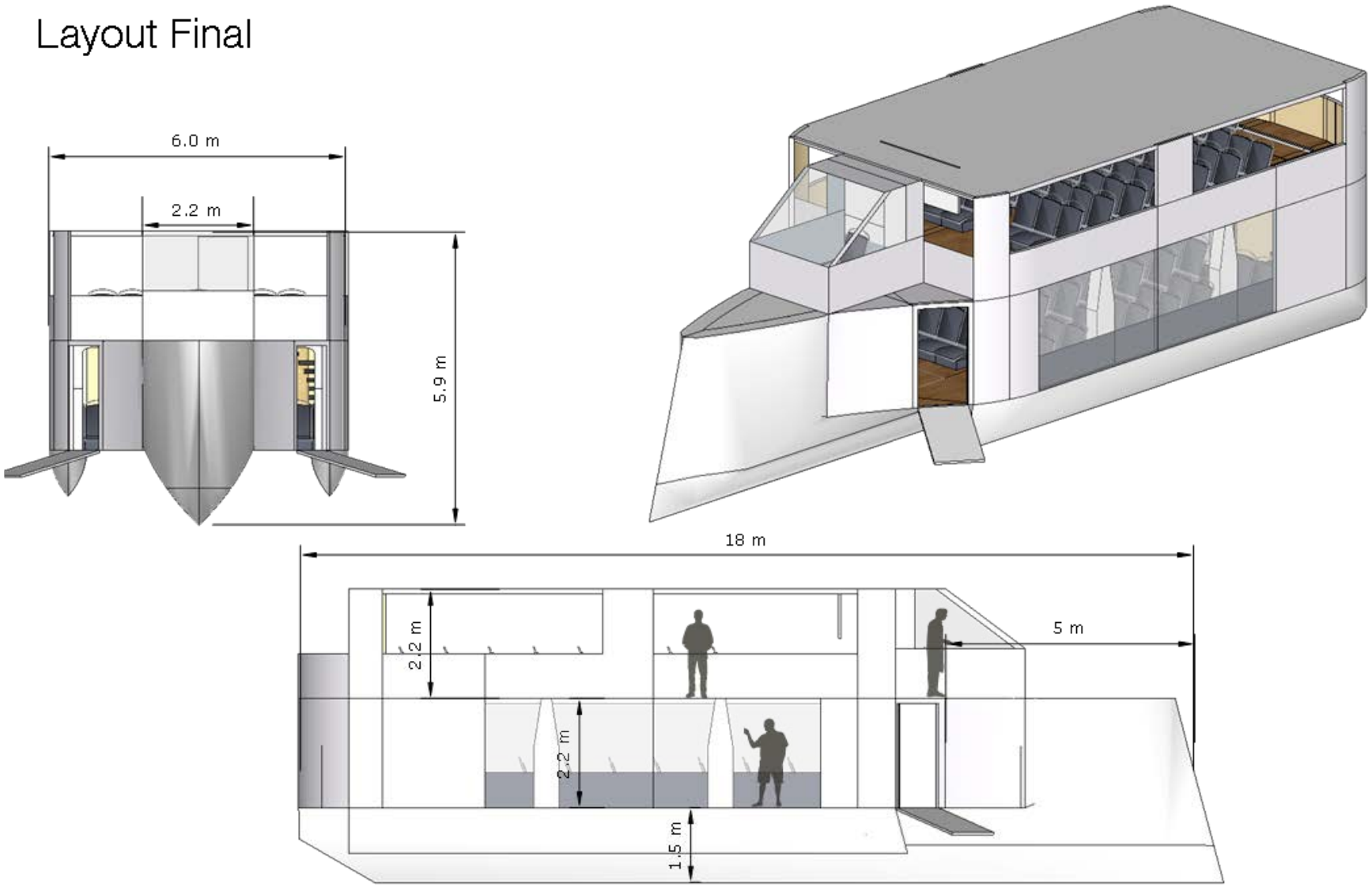


Img 72. Rear quarter view

Img 73. Final model



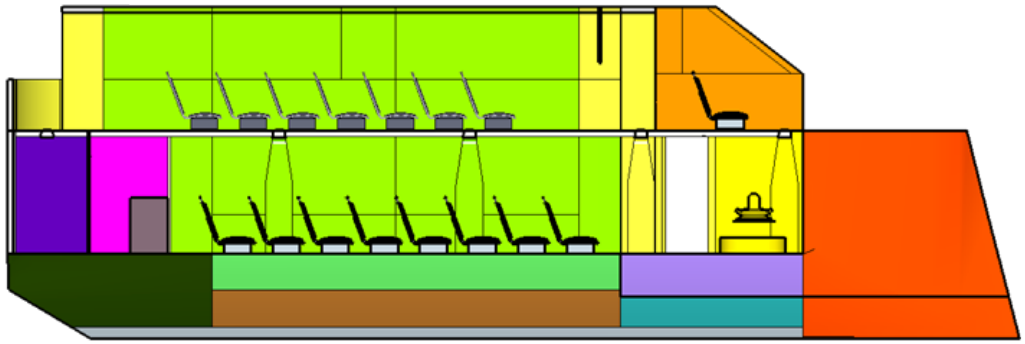
Img 74. Interior mock up model



Img 75. Final layout dimensions

12.2 Final Layout

(Middle) side cut section



Colour codes

- Driver
- Passengers seating
- Passengers standing
- Kitchen
- Stairs
- Stairs (Down)
- Safety equipment
- Fuel
- Pillar
- Crew
- Storage
- Crush space
- Toilet
- Sewage tank
- Water storage
- Engine room
- Hologram
- Wheelchair space

Total seats: 98

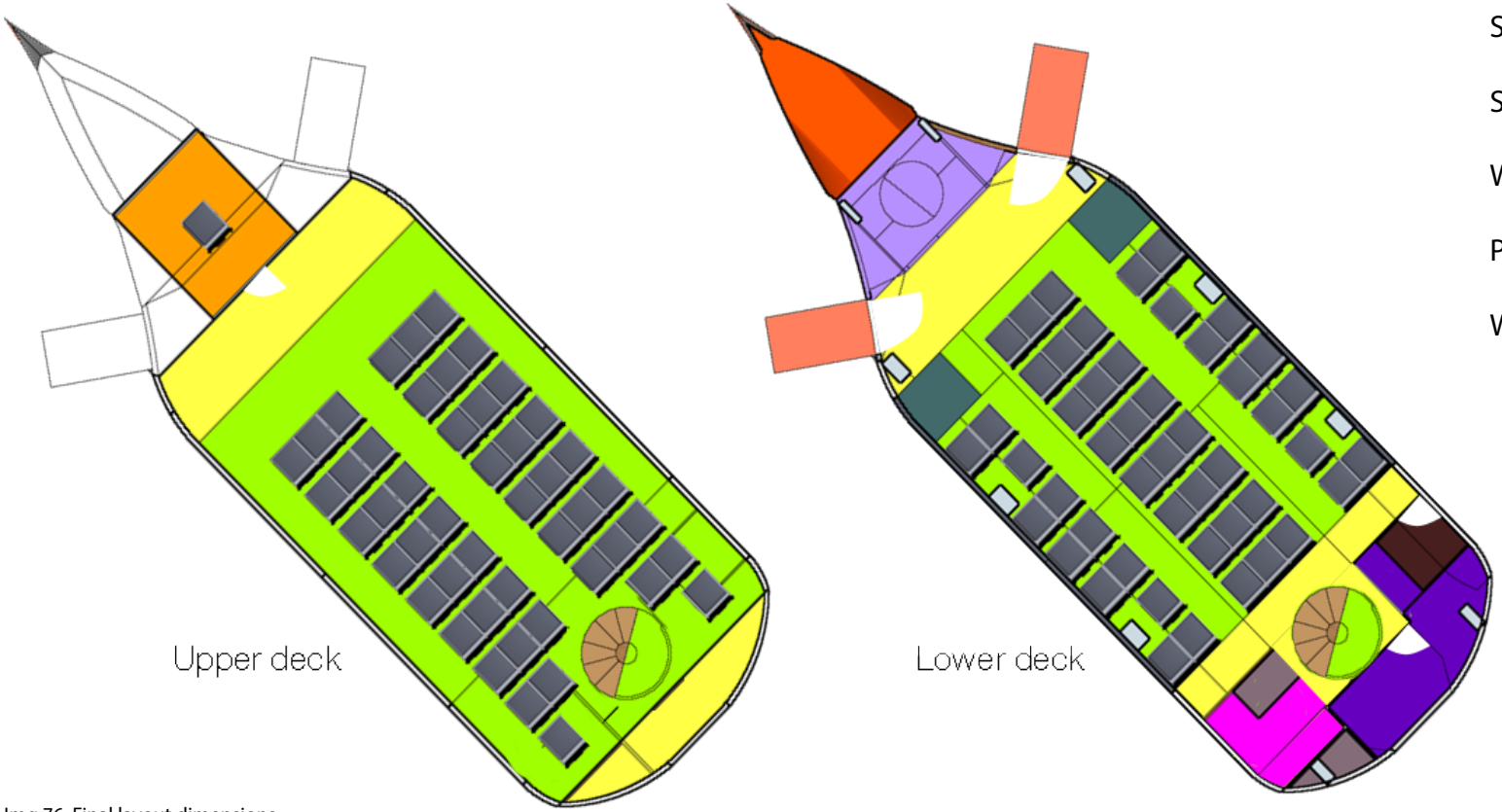
Seats on upper deck: 48

Seats on lower deck: 50

Wheelchairs: 2

Pitch between seats: 0.9 m

Width of one seat: 0.6 m



Img 76. Final layout dimensions

12.3 Final Interior renders and mock up

Img 77. Lower deck

Img 78. Lower deck

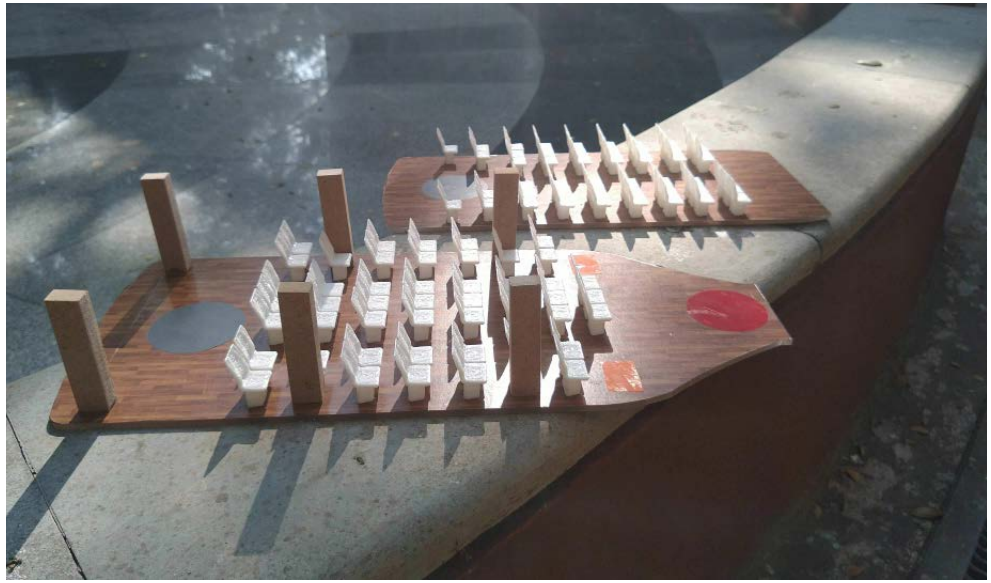
Img 79. Lower deck

Img 80. Upper deck

12.3 Final Interior renders and mock up

Img 81. Upper deck

Img 82. Upper deck



Img 83. Interior mock up model

Img 84. Interior mock up model

13. Annexure

13.1 User study questionnaire

Questions for the tourists

Q1. Do you visit historical sites often? If yes why?

Q2. What was your motivation to visit Elephanta?

Q3. Have you travelled in any other ferry service? If yes how do you compare it to Elephanta ferry service?

Q4. What do you think about the duration of the journey?

Q5 Are you updated with current technology? If yes to what extent?

Q6. What do you feel about the cost of travel?

Q7. Did you research about Elephanta before hand? If yes how?

Q8. How was your experience of the Elephanta ferry?

Q9. In which way would you like to conceive information about Elephanta?

Q10. Would you like to Visit Elephanta again or recommend others? If yes why?

Questions for the driver

Q1. How many years you have been driving this ferry? How did you learn?

Q2. How many boats are operating in the service? Capacity of each boat?

Q3. Price and life span of the boat?

Q4. What are your working hours?

Q5. Where do they make the boat?

Q6. What are the problems associated with this job?

13.2 User study results

Driver : Suram Thakur Age: 54

Q1. How many years you have been driving this ferry? How did you learn?
Almost 30 years. Family business

Q2. How many boats are operating in the service? Capacity and speed of each boat?
20-25 boats, capacity of 100 people each. speed 6-7 knots.

Q3. Price and life span of the boat?
Price 30-40 lac, life span 50 years and inspection every year.

Q4. What are your working hours?
9am to 7pm

Q5. Where do they make the boat?
Apollo and Elephanta Bandar.

Q6. What are the problems associated with this job?

* Tourists block the view some times
* Big ships create turbulence and have faster speed.
* Responsibly of the safety of tourists
* No job when ferry is closed.

Q7. How many crew members are there?
5 crew members (2 drivers, 2 for docking, 1conductor)

Q8. What other activities do you perform on the boat?
Cooking, maintenance and sleeping.

Q9. What makes this boat different from others?
Bigger Size and different controls for speed and direction.

Img 22. Elephanta ferry driver (Suram Thakur)

13.2 User study results

The tourists

1. People visit historical sites because they find a connection with religion

Statements-
T1 Family of three (A.K.Verma - 52)
"It is an old temple of lord Shiva and Parvati"

2. Tourists who like art, architecture and mythology visit historical sites.

Statements-
T2 Two friends (Javed - 28)
"Suna tha ki yaha ki murtiya bhot acchi hai."

T3 Group of five from Portugal (Miguel - 29)
"I like mythologies and old architecture."

3. Indians find the Elephanta ferry service better compared to other ferry services in India.

Statements-
T1 Family of three (A.K.Verma - 52)
"Boats are comparatively bigger and spacious; snacks and chai is also available on board"

T2 Two friends (Javed - 28)
" The upper deck is not there in other ferries"

4. Foreigners find the vessels obsolete compared to their previous experiences.

Statements-
T3 Group of five from Portugal (Miguel - 29)
"I have travelled most of the Europe and experienced loads of ferry services; this ferry is quite old fashioned"

5. Tourists find basic information about Elephanta on the internet.

Statements-
T1 Family of three (A.K.Verma - 52)
"Searched on the internet about how to reach Elephanata."

T3 Group of five from Portugal (Miguel - 29)
"I did a little research on the internet about Elephanta and the ferry service."

6. Passengers feel that the ferry ride is bumpy and noisy.

Statements-
T3 Group of five from Portugal (Miguel - 29)
"Boat ride was bumpy."

T1 Family of three (A.K.Verma - 52)
" There was engine noise on the lower deck"

T2 Two friends (Javed - 28)
" Can't stand up to take photos."

13.2 User study results

The tourists

7. Tourists prefer guides and short video for taking information.

Statements-
T1 Family of three (A.K.Verma - 52)
"I would prefer a guide, everything cannot be searched on inter net."

T3 Group of five from Portugal (Miguel - 29)
"I have worked on VR; maybe in future but now I will prefer video or guide."

8. Tourists enjoy the scenery along with the historical site.

Statements-

T2 Two friends (Javed - 28)
" The view of Gate way of India was really good."

14. Biblography

1. Macau day trip. Retrieved from www.tripadvisor.com: https://www.tripadvisor.com/AttractionProductReview-g294217-d11449459-Macau_Day_Trip_from_Hong_Kong-Hong_Kong.html
2. Elephanta history. Retrieved from elephanta.co.in: http://elephanta.co.in/
3. Trimaran design. Retrieved from multihulldesigns.com: https://multihulldesigns.com/designs_other/150trimaranferry.htm
4. (2018, June 8). Retrieved from www.christiesrealestate.com: https://www.christiesrealestate.com/blog/ruler-of-the-waves-top-6-yacht-design-trends/
5. activities. Retrieved from kaliningrad.ru: https://visit-kaliningrad.ru/en/charm/activities.php
6. Adams, N. (2018, Sept 10). Retrieved from www.youtube.com: https://www.youtube.com/watch?v=5eepu_owFHI
7. Adams, N. (2018, July 2). Retrieved from www.youtube.com: https://www.youtube.com/watch?v=FjRSgUm03tk
8. ancient and augmented reality meet in jerusalem. (n.d.). Retrieved from www.israel21c.org: https://www.israel21c.org/ancient-and-augmented-reality-meet-in-jerusalem/
9. Boscawen, G. (2017, Aug 30). design. Retrieved from www.superyachtnews.com: http://www.superyachtnews.com/design/land-vs-yachting-design-trends
10. chicago-boat-cruises. (n.d.). Retrieved from www.chicagoline.com: https://www.chicagoline.com/chicago-boat-cruises/history-cruise
11. Chowdhury, A. (2017, Feb 22). Travel. Retrieved from economictimes.indiatimes.com: https://economictimes.indiatimes.com/industry/services/travel/8-9-million-foreign-tourists-visited-india-last-year-up-11-from-2015/articleshow/57296453.cms
12. Dowling, S. (2015, Sept 22). story. Retrieved from www.bbc.com: http://www.bbc.com/future/story/20150922-the-future-shape-of-luxury-yachts
13. Mancini, A. (2017, Mar 13). Retrieved from www.superyachtcontent.com: https://www.superyachtcontent.com/alberto-mancini-superyacht-design/
14. R. Lamb, “High Speed, Small Naval Vessel Technology Development Plan,” Carderock Division, Naval Surface Warface Center, NSWCCD-20-TR-2003/09, Bethesda, MD, May, 2003.
15. M. Waters, “A Look At Wave Piercing Bows on Multihulls,” Sail Magazine, 21 May 2015.

15. Abstract

Mumbai is one of the most popular tourist destination in India for both national and International and Elephenta caves is very popular tourist destination since it is a UNESCO world heritage site and it is a gateway for us to connect to the past and learn from its glorious heritage. The caves are located on Elephanta island locally known as Gharapuri ("the city of caves") in Mumbai harbour, 10 kilometres east of Apollo Bandar near gate way of India. It takes 45-60 minutes for the current ferry to cover this distance. The current ferry service doesn't contribute to the experience of a historical trip it just connects the endpoints. The problem is that tourists visit Elephanta but their experience is not so good because most of them barely know the facts, stories and importance of the sculptures. If this information is provided to them along with a comfortable journey their experience of the actual trip will become rich.

The project started with a research of similar services around the globe which enhance the experience of a historical trip followed by an observational user study to identify the problems in the Elephenta ferry service. Thereafter a brief user study was carried with the drivers, crew and the tourists in order to understand the needs and aspirations of the users. The nature of the user research was qualitative; Semi-structured questionnaires were created in order to start a conversation and once the users were engaged in the conversation more questions were asked to gather insights. After the research the design brief was created with the help of the insights gathered from the user study. The ideation process started with exploring different volumes and layouts for the vessel followed by creation of the design direction in accordance with the user aspirations and mood boards were created. The ideation of exterior started after deciding the package and design direction and numerous concepts were explored by the means of sketching and rendering. The appropriated concept was selected and developed further. To understand the proportions and volume, 1:60 scale model of the final concept was made along with a mock-up model for the interiors.

The current elephanta ferry service is obsolete in terms of technology and experience and there is a need of a new vision for this service. This project presents the possibility of a experience based service of international standards which enhances the experience of a historical with the help of technology and design.