

Internship Project- TATA Elxsi

Styling of a military truck for the Indian Army and designing the interior cabin for a mine-blast proof design

Duration : May15th to June 16th
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WHAT IS TATA ELXSI ?

TATA Elxsi has been a forerunner in the field of product design in India for the past few years. Their efforts towards the automotive sector have been especially prolific and professional, with the backing of the TATA enterprise. They have been successfully changing the face of Automotive Design in India apart from holding the position of being perhaps the only design house of any International reckoning.

WHY TATA ELXSI ?

Being primarily interested in the field of transportation, this opportunity to intern with them helped me in developing a deeper understanding of the basics of automotive design, besides acquiring hand-skills and proficiency with rendering software. I also managed to garner technical know-how of manufacturing processes and structural understanding of vehicles.

The process of working under a team was a real eye-opener and helped me perform at a professional level given the tight deadlines to work within.

Learning from the experts in the field was hard initially, but keeping up with them gave a remarkable insight as to how a professional designer goes about his job. Besides this, workshops were held once every week, bringing all departments, both technical and the design groups for brainstorming sessions to deal with design problems that were live projects handled by the firm.

Project Abstract: To design a light-combat vehicle for the Indian Army.

Project Purpose: This project was done as part of the internship course where the main intention was to learn the principles behind styling in automotives, manufacturing & construction processes with limitations in design owing to military warfare use.

The aim of the project was to

Develop a mine-blast proof design for an LMV

Responding to needs of soldiers for use in warfare.

The project was completed in the following phases:

1. Analyzing the existing military trucks
 - In International and Indian market
 - Highlighting the semantic profile of these vehicles
 - Understanding the features & functions in trucks
 - Categories of light combat vehicles for the Army.
2. Developing styling concepts for the exteriors
 - Retaining a carry-over design of the chassis
 - Using flat, bullet-proof panels on sides
 - Incorporating existing features of lamps, external accessories from the manufacturer's existing products
3. Concept development for the interiors
 - Developing a mine-blast proof cabin for the users
 - Providing adequate storage solutions for artillery & supplies
 - Using the appropriate interior accessories for war-use

Benchmarking:

Given the short phase for the project, I was lucky to get the opportunity to study the existing models in both the International and the Indian market and to benchmark a few of the successful examples highlighting the most advantageous features for warfare use. Besides this, I was also required to identify the semantic qualities of military vehicles and create a vocabulary to guide the design team for styling cues.

VISUAL QUALITIES

M998 (HUMMER)






WAR BEAST

INVINCIBLE

STURDY

EASY MANOEUVERING

CRUSADER

ROBUST

RUGGED

STEALTHY

INVULNERABLE

FUNCTIONAL

DEFENDER

SENTINEL

CHAMELEON

CREATURE OF THE WILD

CHALLENGING

FLEXIBLE

WEATHER-PROOF

SURVIVOR

CONFIDENCE

POWERFUL

COMMANDING

CHARGING MACHINE

RAW

Visual cues for understanding Identity and styles of military trucks

VISUAL QUALITIES



SUNVISORS ABOVE WINDSHIELD
HIGH APPROACH ANGLE
HEADLIGHTS AT LOWER LEVEL,
WELL BELOW THE NOSE LEVEL
ABSENCE OF BUMPERS - EASY ACCESS



HIGH GROUND CLEARANCE
PROVISION FOR PARAPHERNALIA ON
SIDE
SMALLER WINDOWS ON SIDE
HIGH WHEEL ARCHES



MUSCULAR EXPRESSION with
SURFACE ARTICULATION
HARSH INTERSECTION of
FACETED SURFACES
HEADLIGHTS INTEGRATED
into FRONT FACE
NO APPROACH ANGLE

Reconnaissance vehicles
employed by
the Indian Army

Existing models from the
International market and
their advantageous visual
qualities were highlighted

VISUAL QUALITIES



RECESSED WINDSCREEN WITH
SUNVISOR
REAR VIEW MIRROR PROVIDED
CIRCULAR OPENINGS ON TOP FOR
EGRESS
ACCENTUATED TUMBLEHOMES



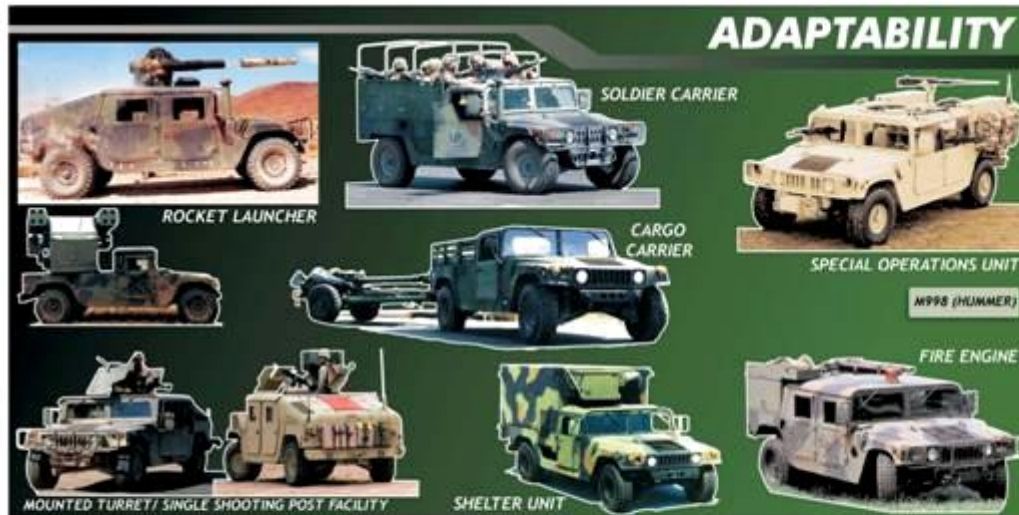
SUPPORT STRUCTURE FOR
FIRING ACTIVITY
PROMINENT HEADLIGHTS
WINCH KIT ON FRONT END



WINDSHIELD WATER
RESERVOIR
PROVISION FOR
PARAPHERNALIA TO BE
STRAPPED ONTO
BONNET
AIR VENTS ON SIDE

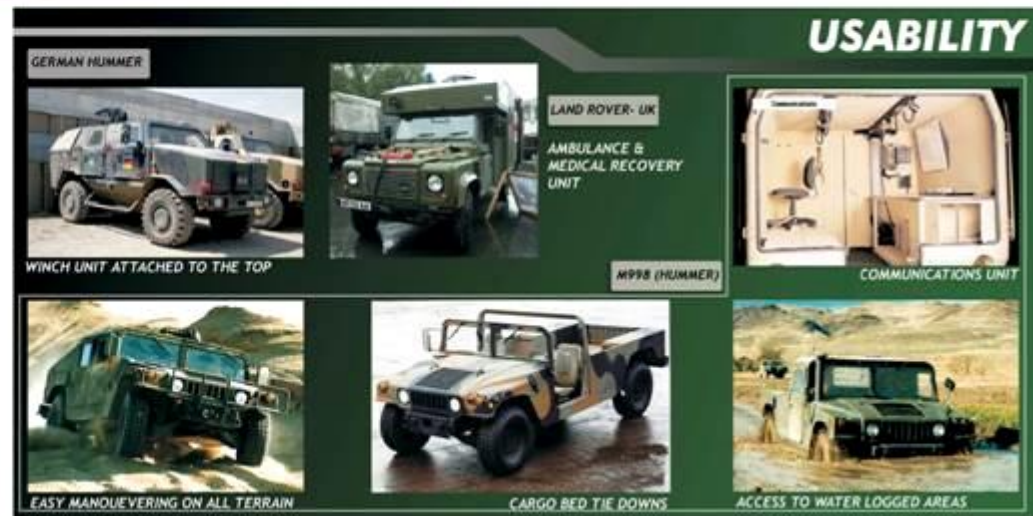


BACK HATCH FOR
DEPLOYING SOLDIERS



Studying the changes in silhouettes with each functional need

Understanding the arrangements for various important functions within the given frame



PACKAGE DETAILS

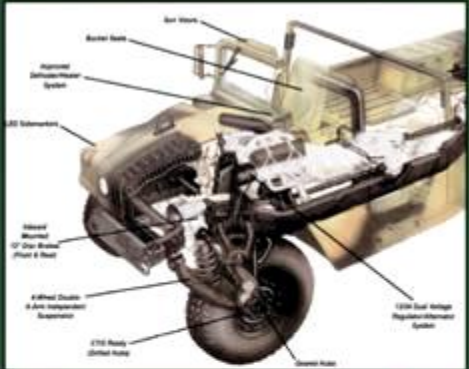
SEPARATE BODY BOLTED ONTO MAINFRAME



M998 (HUMMER)



KIT CONTAINING PANELS TO BE BOLTED ONTO MAINFRAME



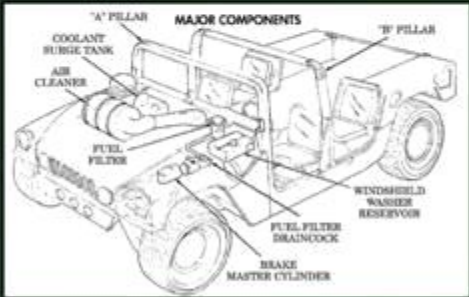
SECTIONAL VIEW

VINYL DOORS FOR EASY INGRESS





GRILL EXTENDS BEYOND THE BODY



MAJOR COMPONENTS

PROPELLER DETAIL OF THE AMPHIBIOUS VEHICLE FOR FRENCH ARMY



RENAULT LAV-FRENCH ARMY

Understanding how assembly issues were tackled
Studying the various kits available for making different combinations



Highlighting the exterior accessories used for warfare

Marking the different lamps employed in the vehicle for special purposes like blackout lamps, marker lamps etc.



The next step in the process was the development of the concept. Having gone through the various examples in the existing market and identifying the visual cues of typical military trucks, the design team was divided into three groups to develop three concepts, each with a unique advantage.

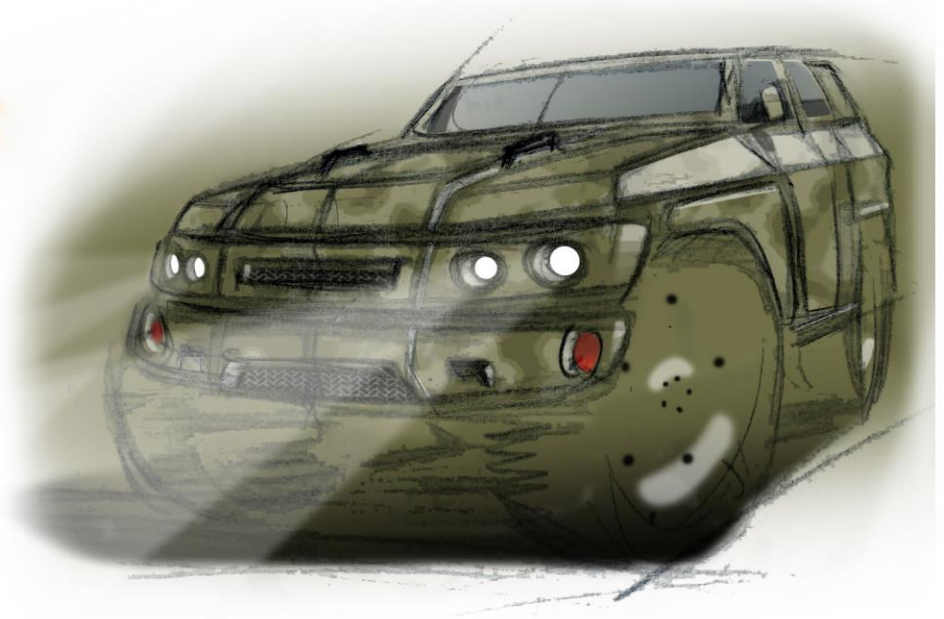
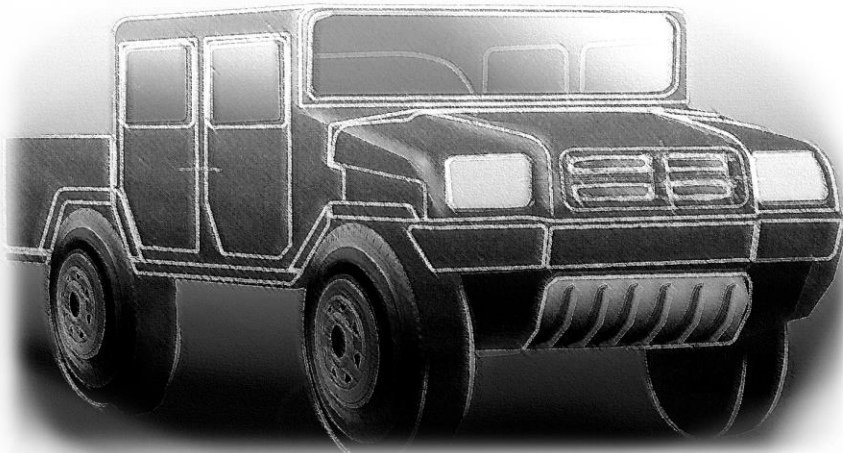
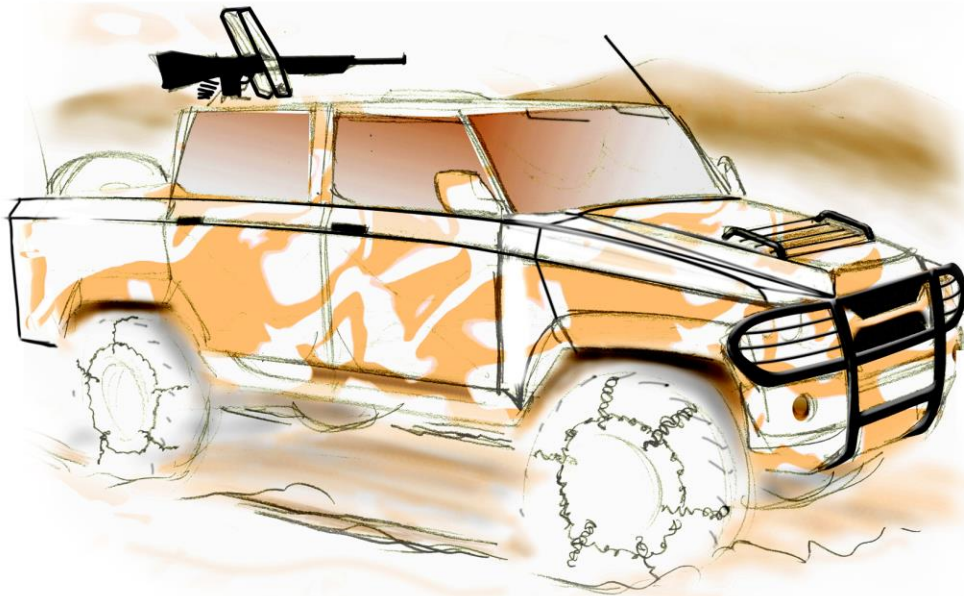
The first concept would stress more on the ease of manufacturing with the least freedom taken for styling expressions. The second concept would deal with portraying the ideal styling cues with a more challenging manufacturing process. The third concept would be radically different in terms of aesthetic appeal, but most challenging with manufacturing processes, dealing with SMC parts.

This stage was for the first concept presentation and the exteriors were not dealt with in detail and after the concepts were selected, they would be detailed out further for the second stage presentation to be held a week later.

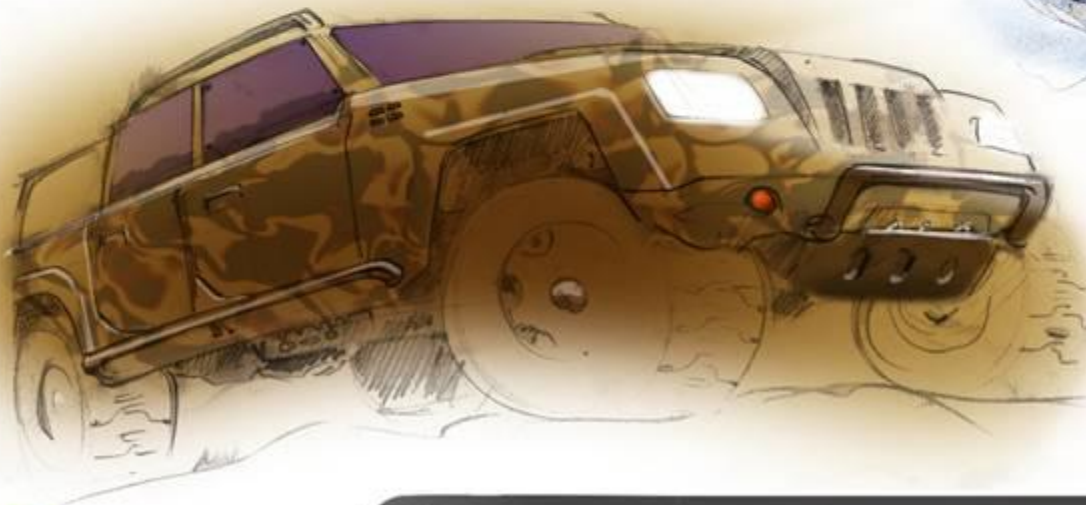
initial concepts



initial concepts



initial concepts



initial concepts



final concept

Veer



final concept

ashwamedh

ashwamedh



final concept



ashwamedh

ashwamedh

final concept



Xo

exoskeleton

final concept



exo

skeleton



exo

skeleton

- **Concept Development** (Variations)
- **New concepts** (Bhima ,Randoot)
- **Interiors**



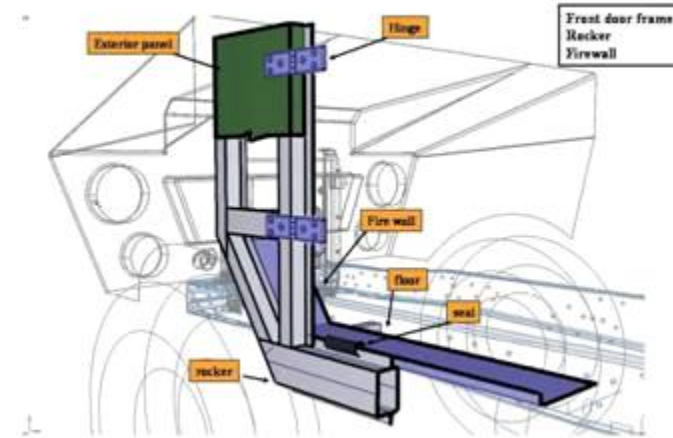
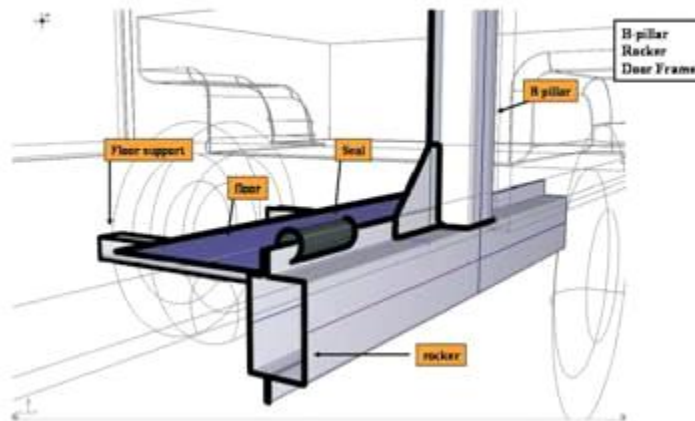
ashwamedh

The different combinations possible were explored with the basic concept of the Ashwamedh. One being the typical two-door + load bay design.

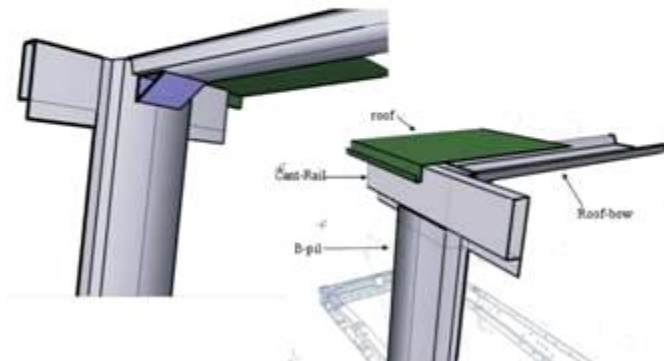
The second one being the two-door + load bay design along with a canvas top.

The third option was for the civilian use with more SUV identity imparted with softer features.

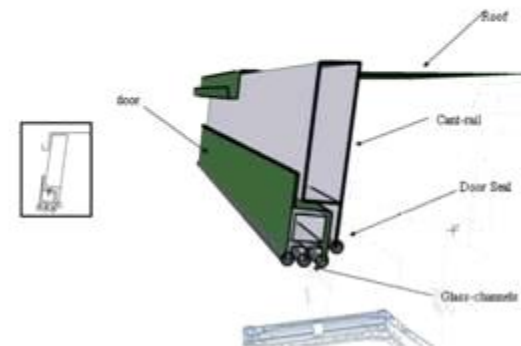
Details were worked on to understand which sections would be used for the B-pillar, rocker and roof bow respectively.



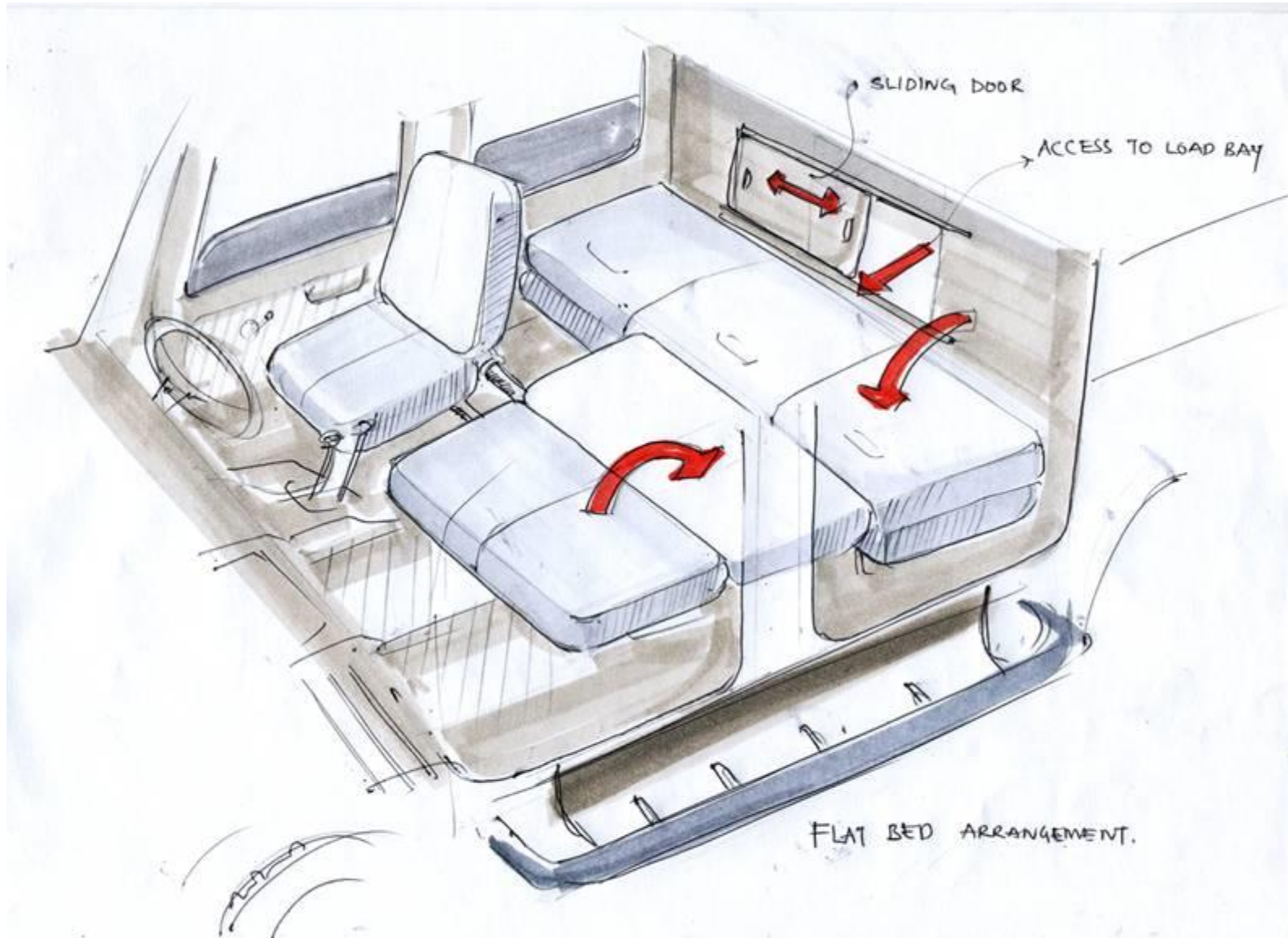
Vertical (Section D) Cast rail/roof/B-pillar

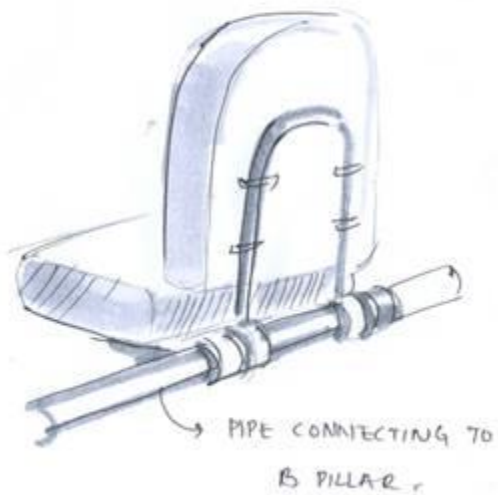
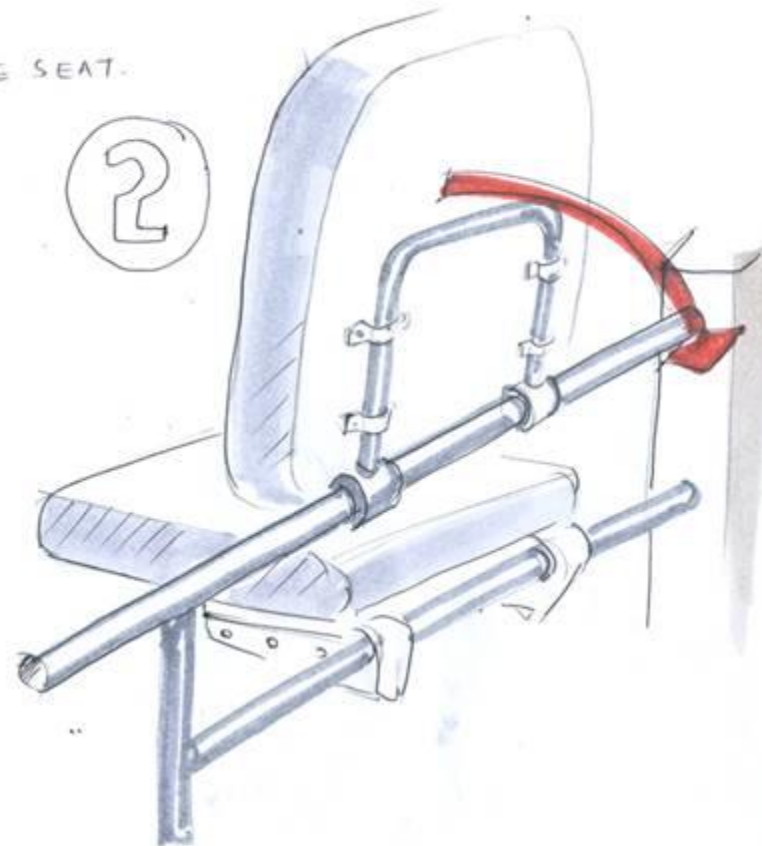
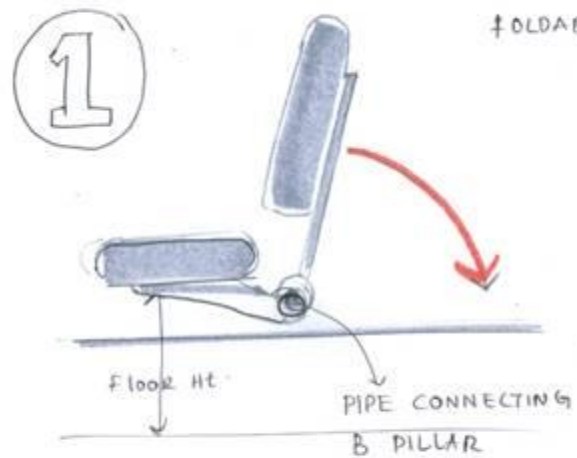


Vertical (Section E) Cast rail/Door-glass

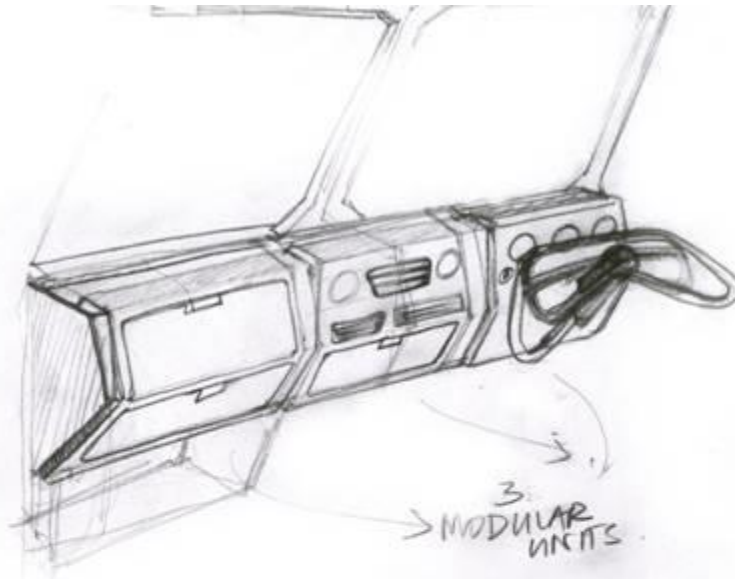


initial concepts





initial concepts



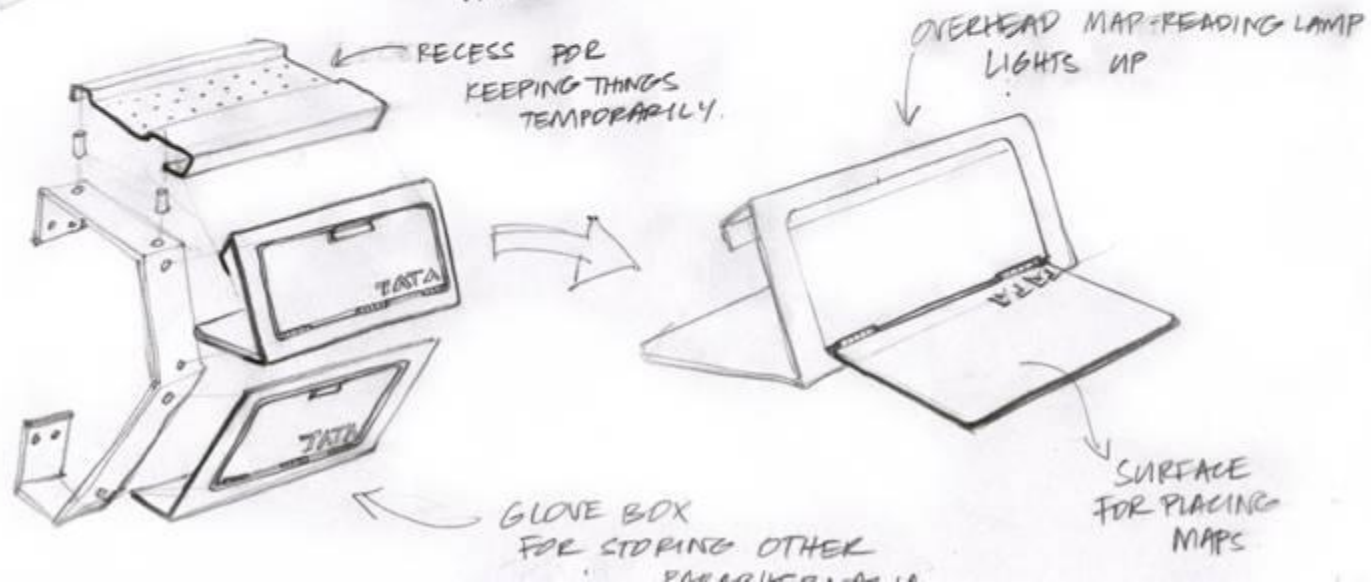
① DRIVER'S DASHBOARD CONTROLS

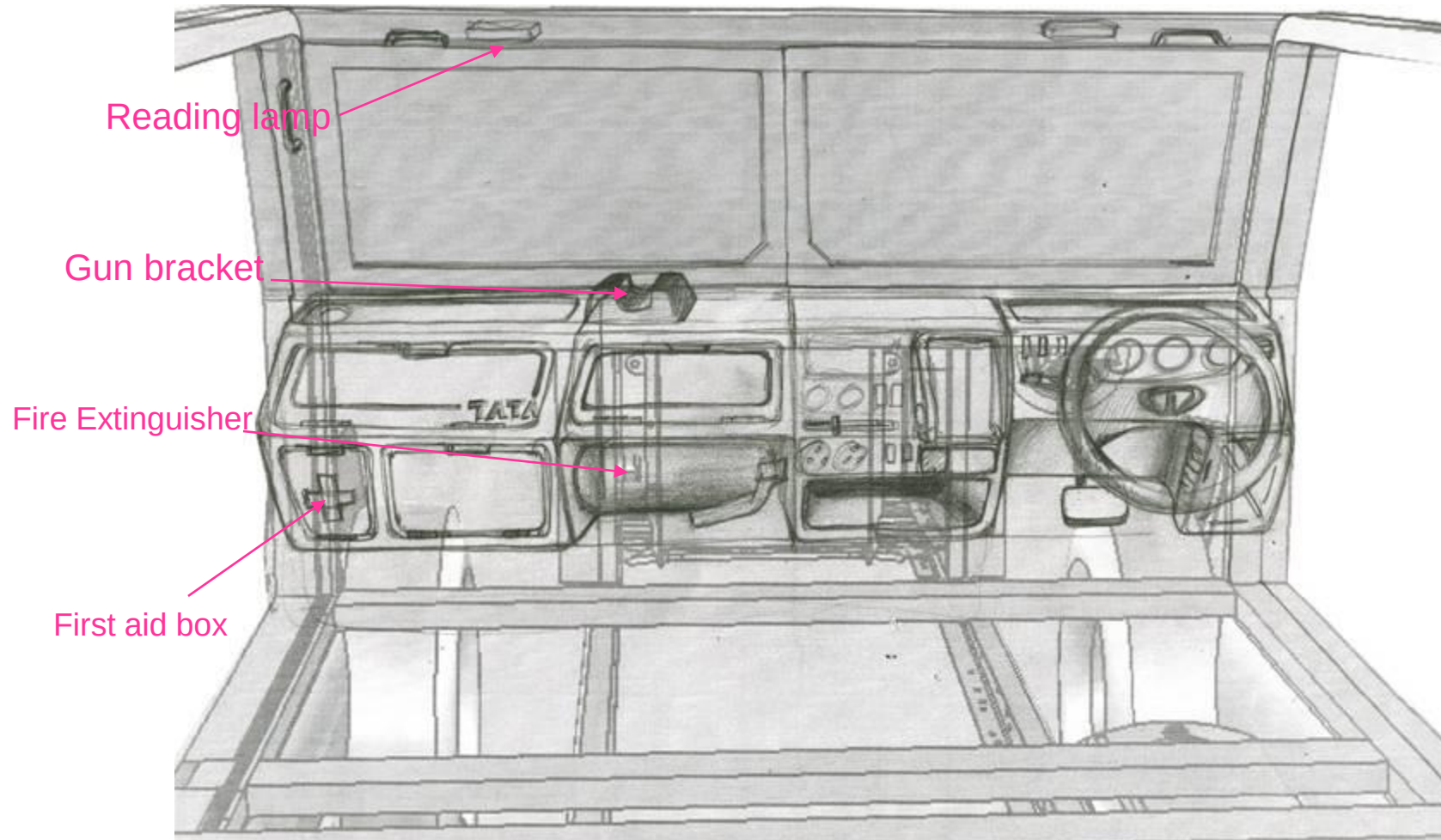
INSTRUMENT CLUSTER

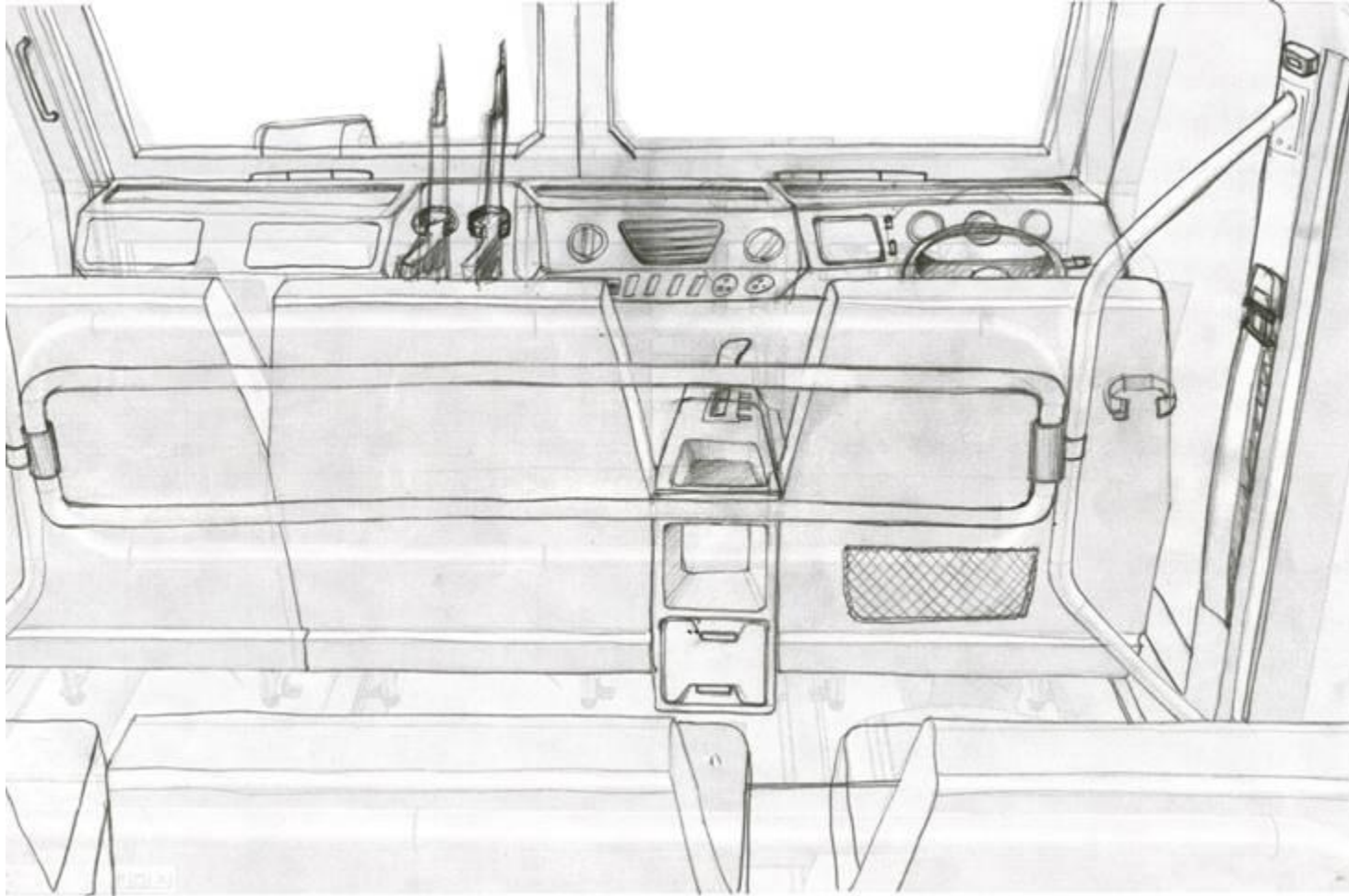
- SPEEDOMETER.
- FUEL INDICATORS.
- TEMP. & BATT. INDICATORS.

② HVAC UNIT + EXTRA STORAGE UNIT BELOW.

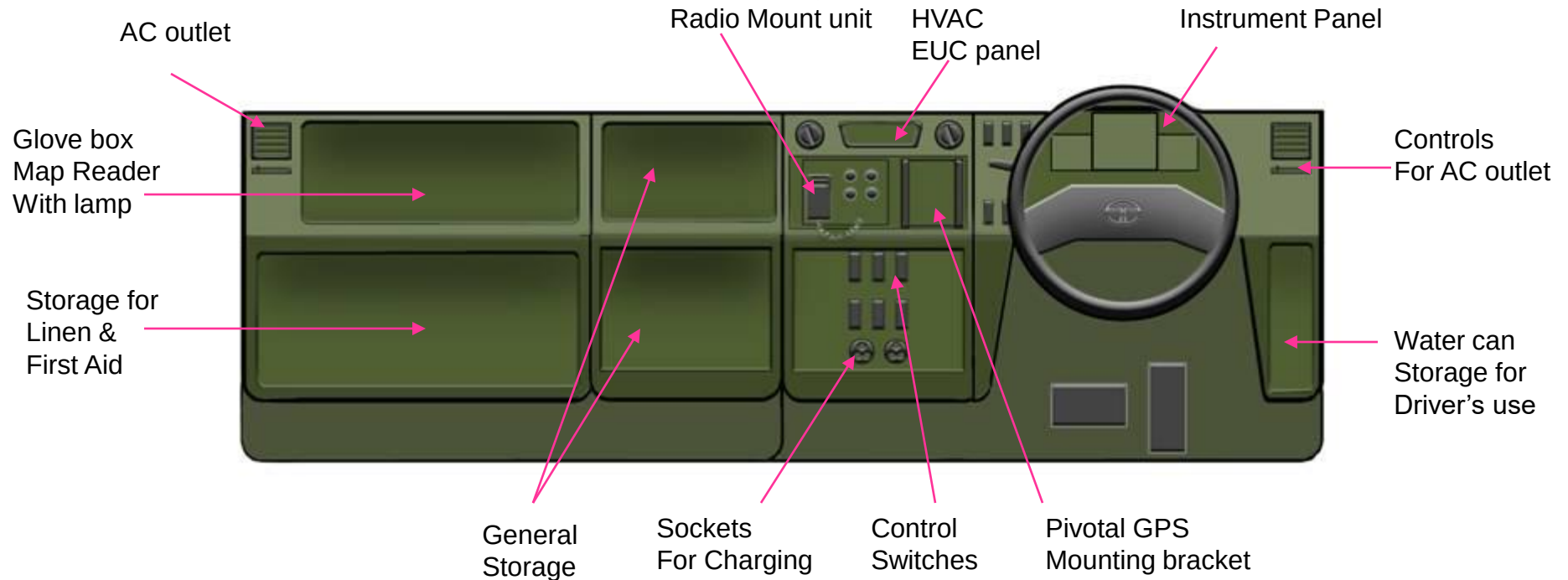
③ GLOVE BOX & STORAGE







DASH BOARD LAYOUT





Variation 8 seater



ashwamedh

ashwamedh

Front variations



Side rake



Straight Side panels

ashwamedh

ashwamedh

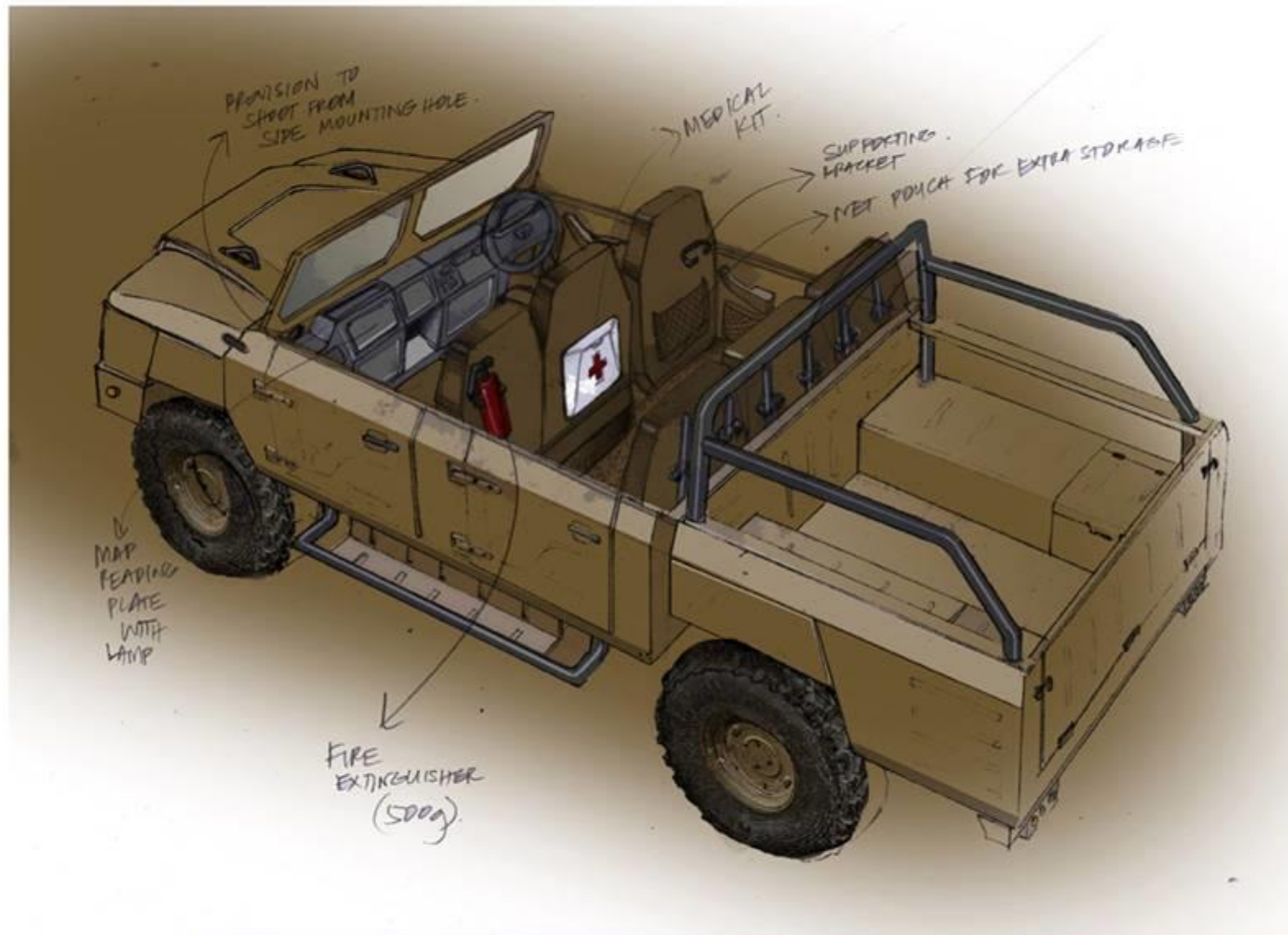
Front variations



ashwamedh

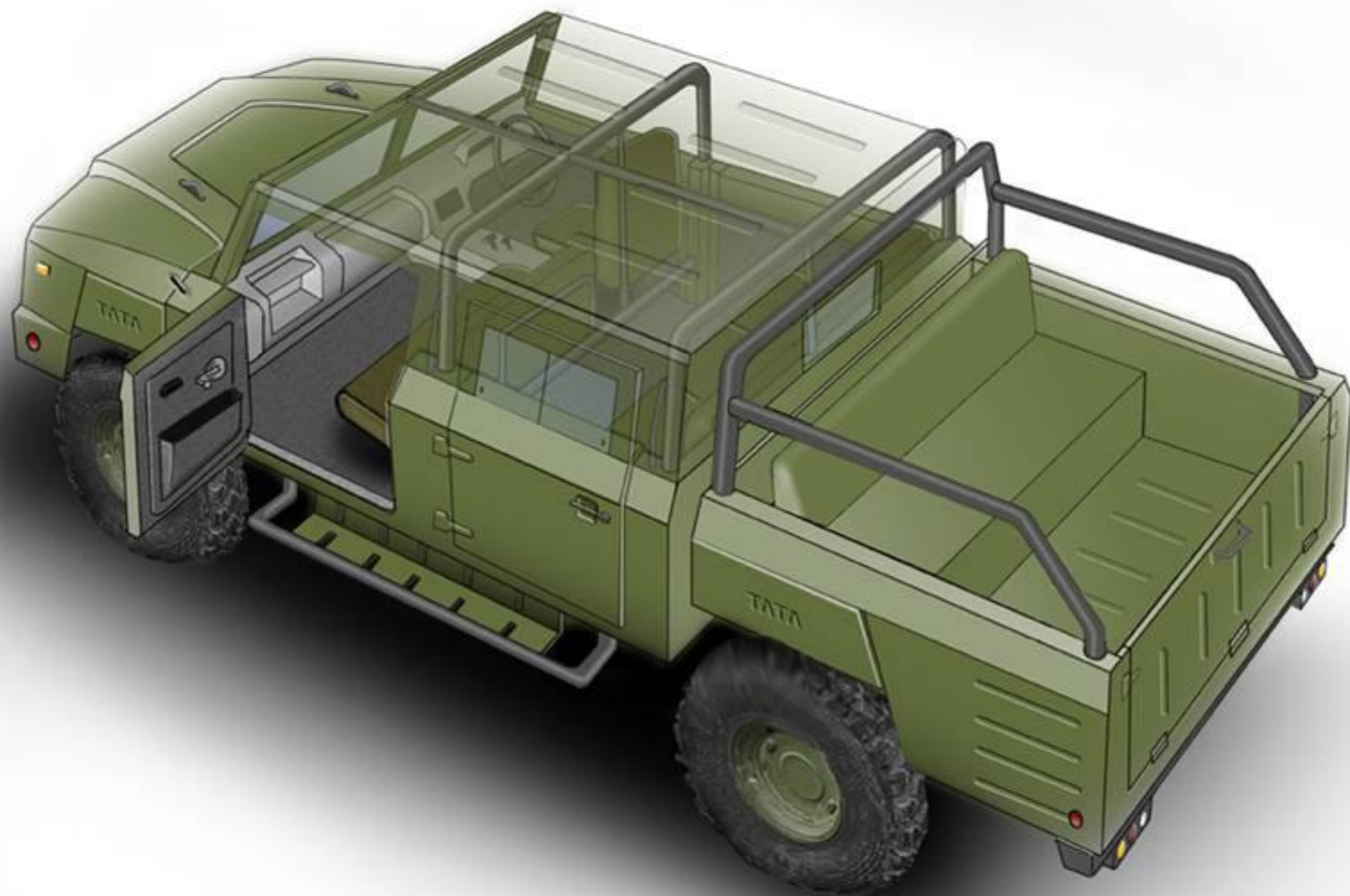
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Interior



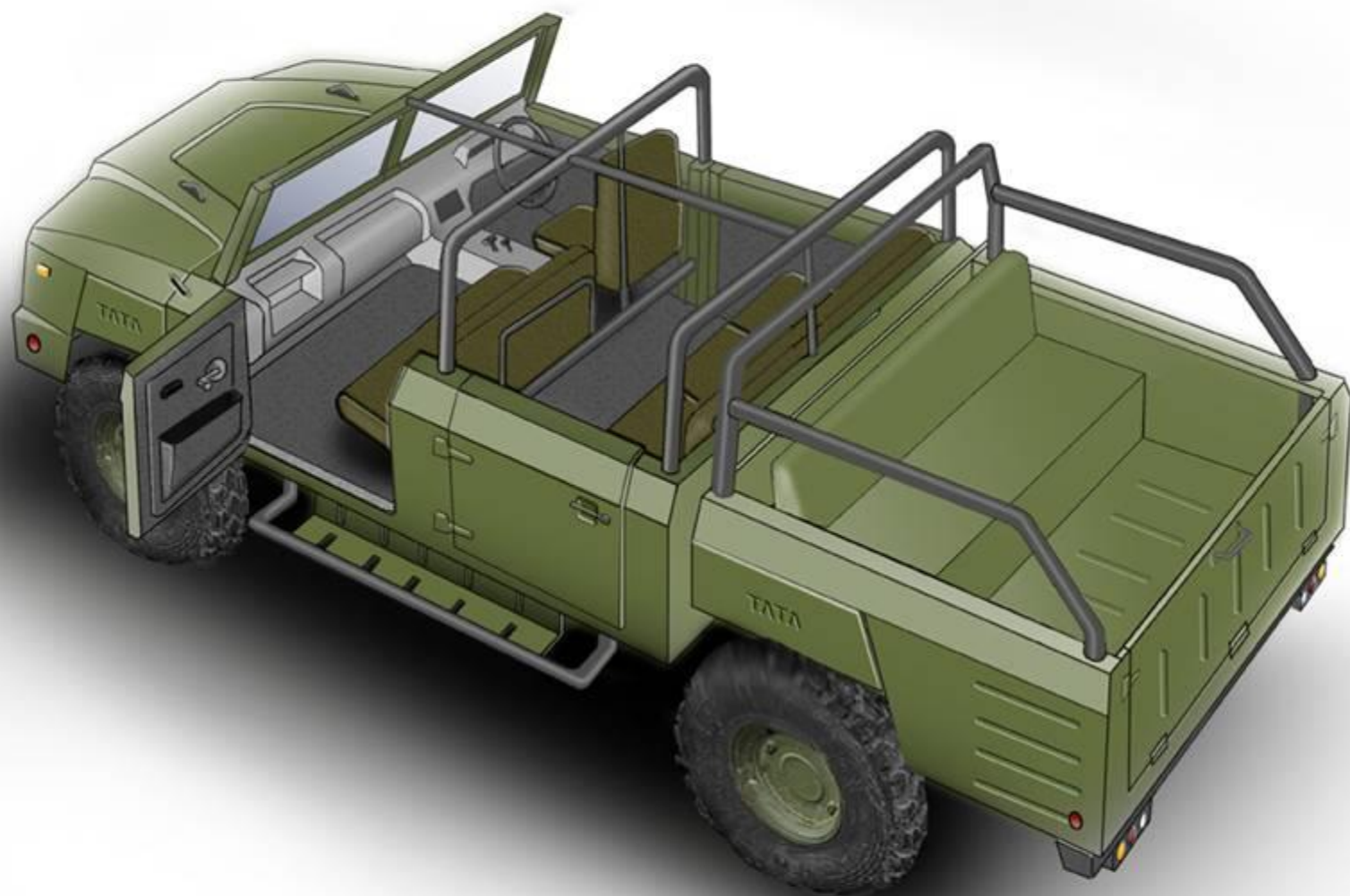
ashwamedh

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bhima

bhima

final concept - exterior



r a n d o o t

final concept - exterior side



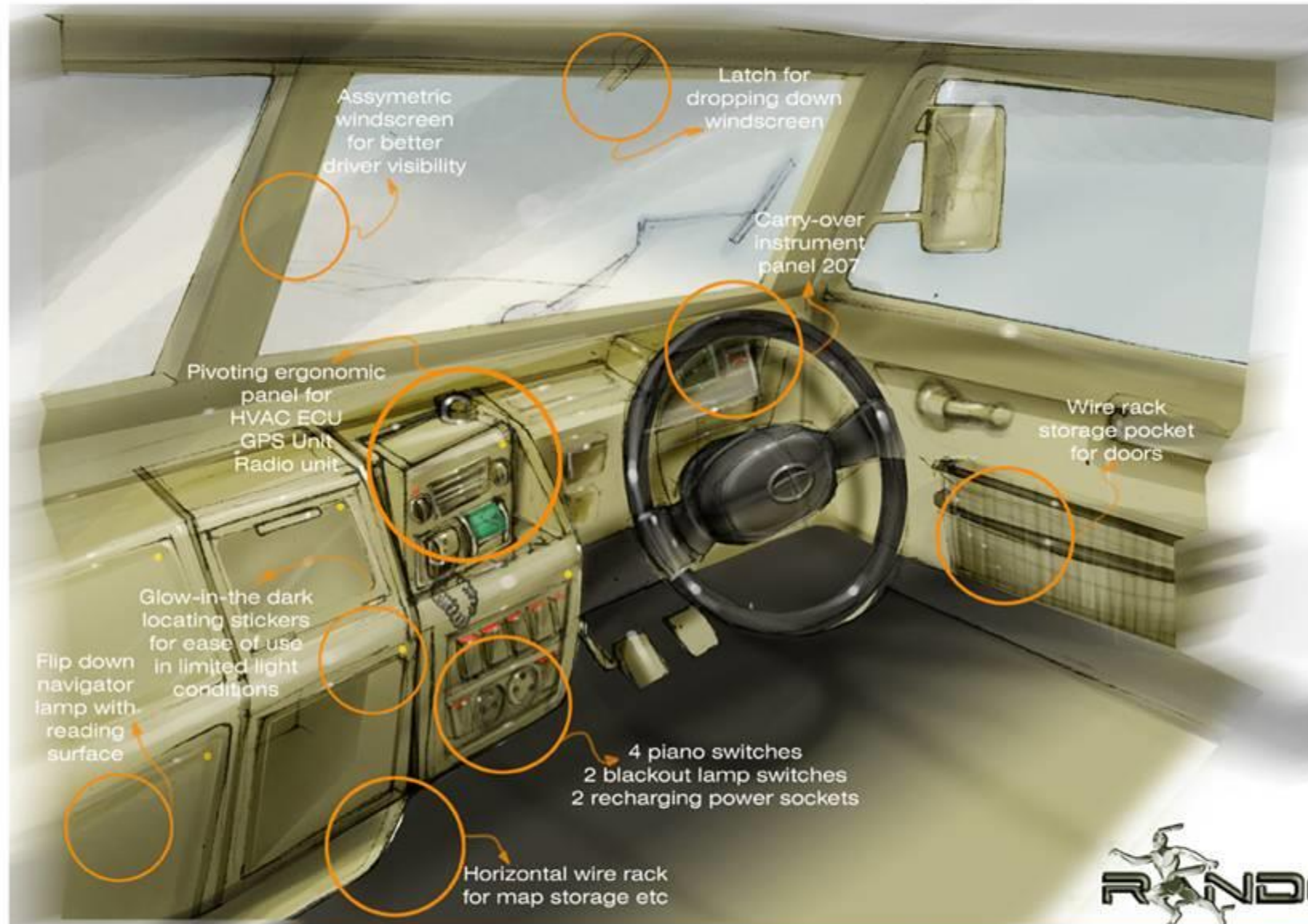
RANDOOT

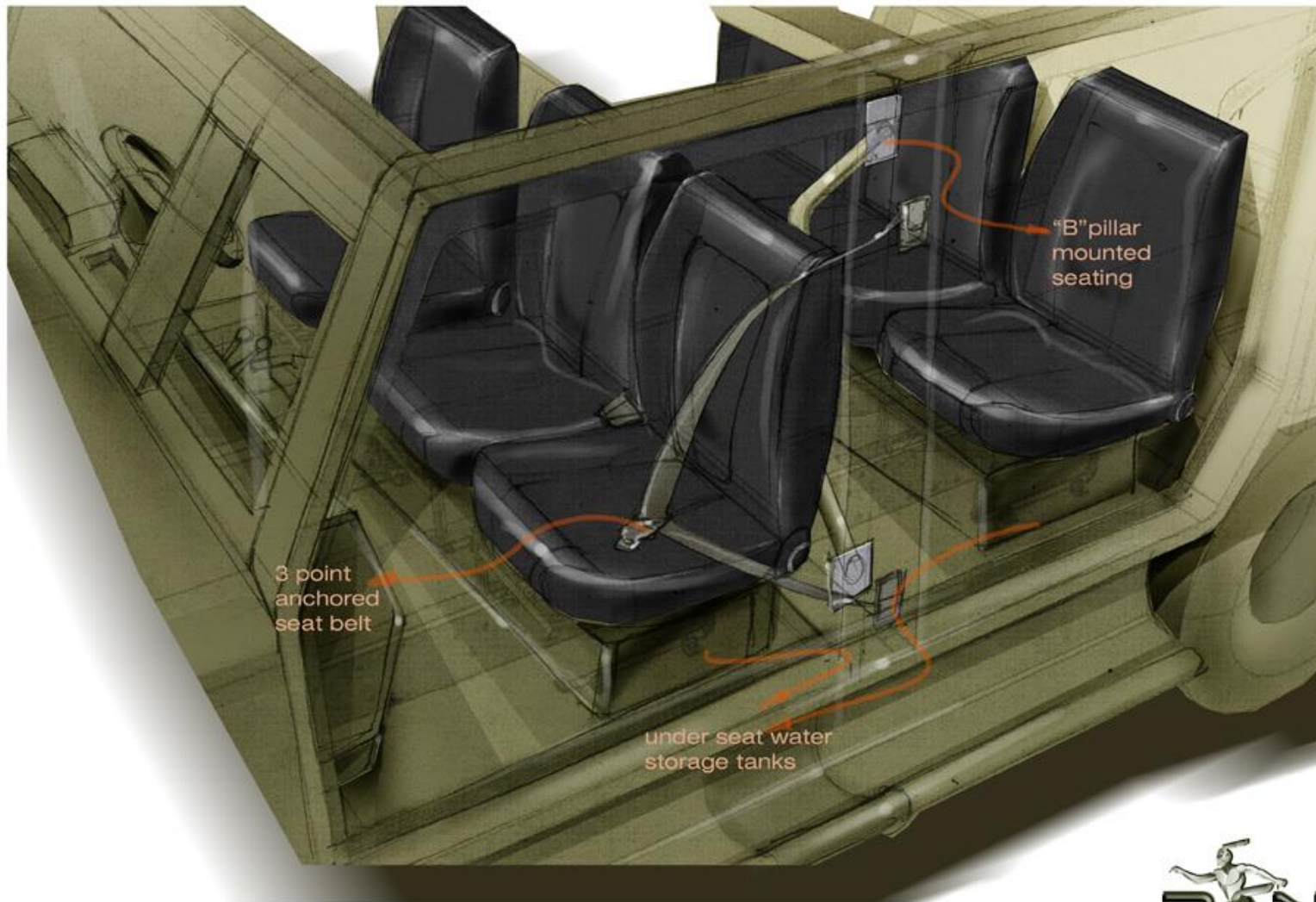
randoot

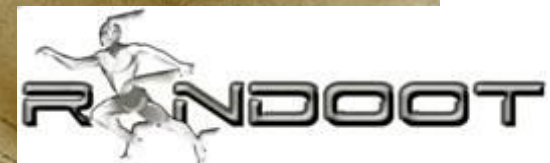
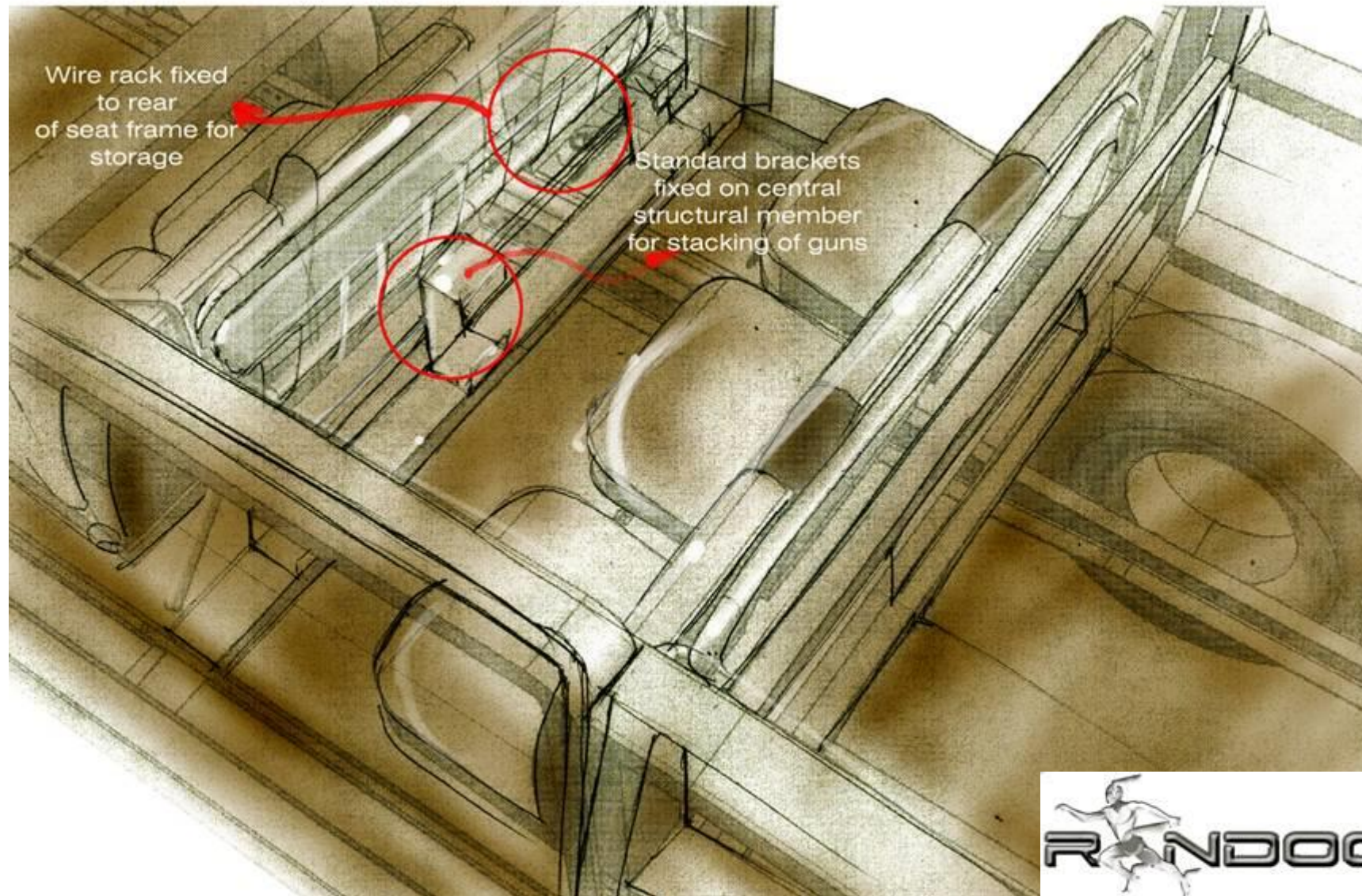
final concept - exterior

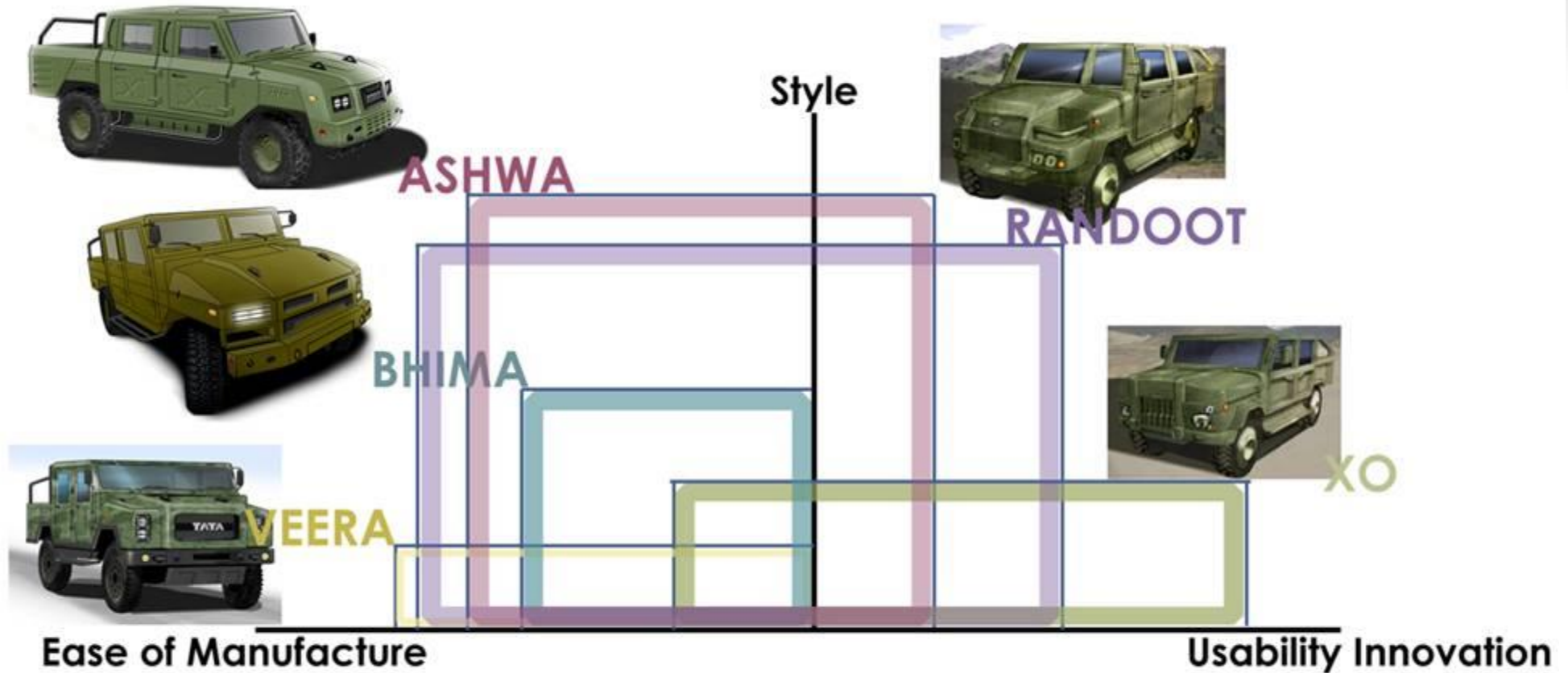


RANDOOT









LEARNINGS:

It was an enriching experience working with the design team at TATA Elxsi. They proved to be the best professional design firm that I could have been associated with at this stage of my career. Right from learning the basic terminology of the different parts of an automobile, to quick rendering techniques and brainstorming sessions with all departments, the one month at this prestigious firm gave me a brief look into the design process of a professional consultancy.

Thank you