



L A T E R A L

NAVAL ARCHITECTS

MED

ENABLED BY **FFB**

IN COLLABORATION WITH

DEBASTO
DESIGNS



LATERAL

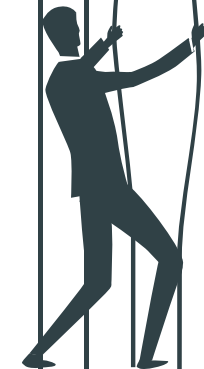
Lateral Naval Architects provide complete engineering expertise to the superyacht industry, from project conception to delivery.

Our core competence is engineering, but our unique focus is on meaningful innovation, to enable superyachts that meet the demands of today's owners and those of the future.

We believe that meaningful innovation starts with asking new questions.

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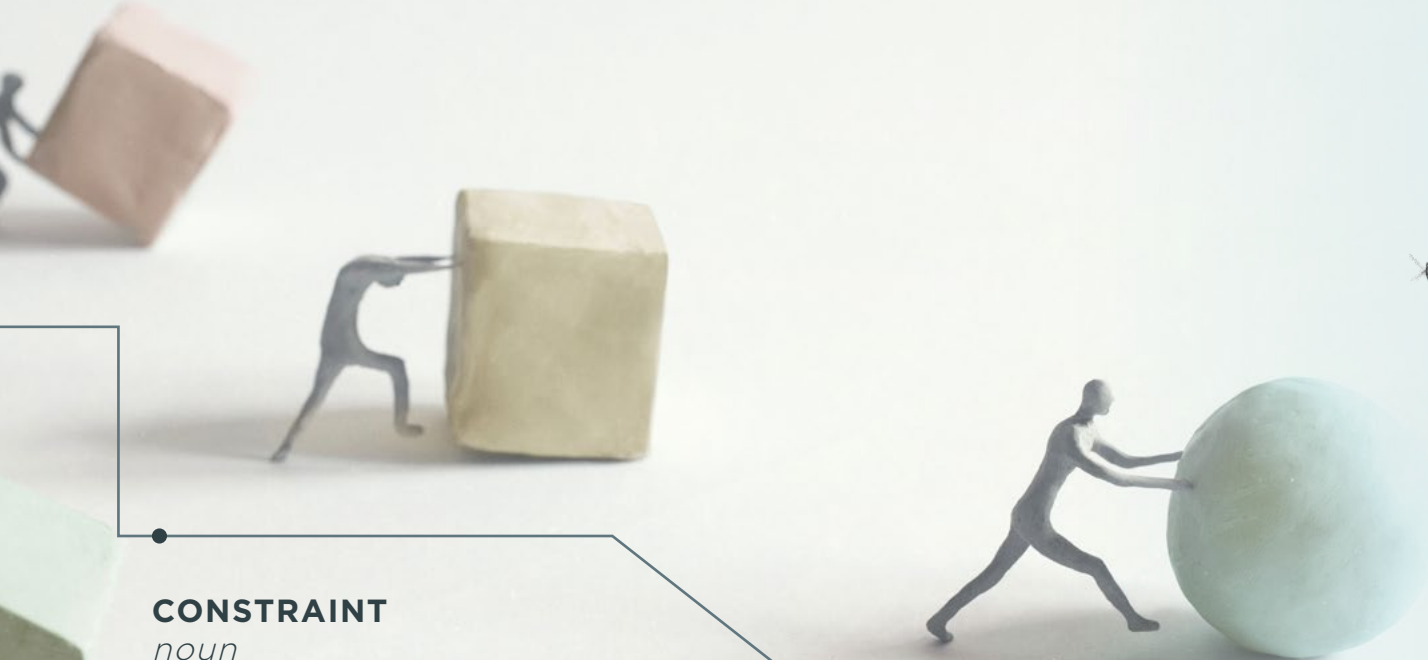




QUESTION

How can engineering
free us from the
**constraints evolved in
superyacht design?**

EVOLUTIONARY CONSTRAINTS



CONSTRAINT

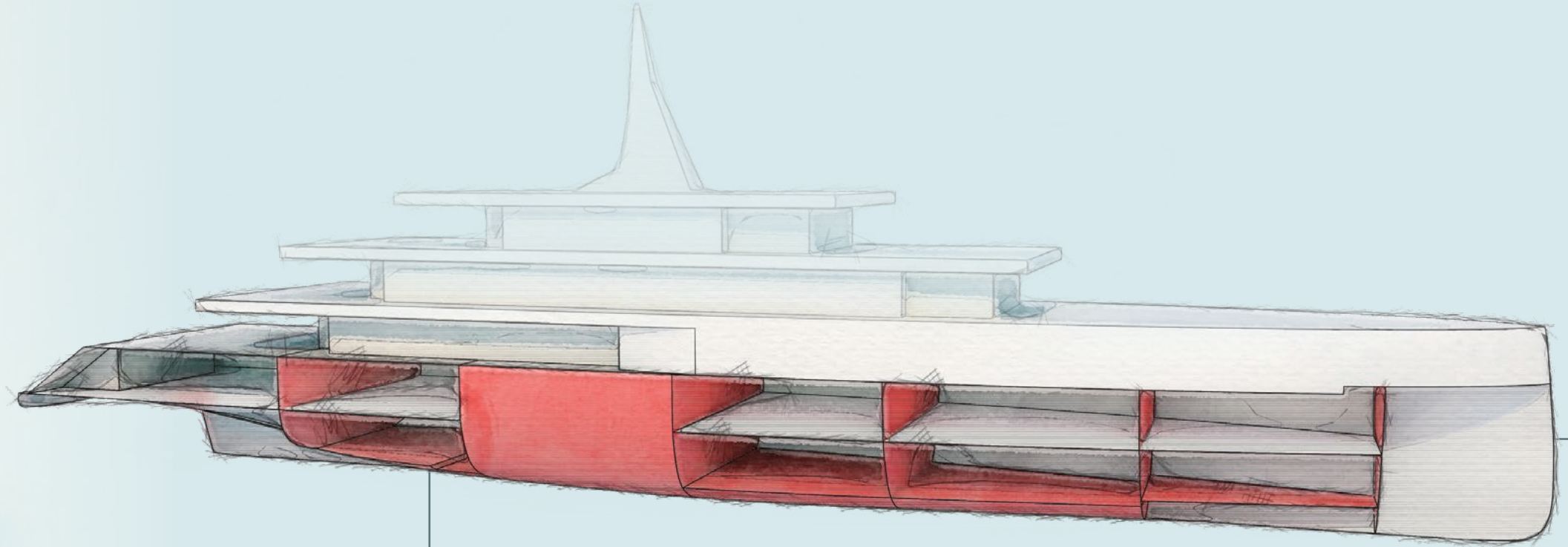
noun

A limitation or restriction.

EVOLUTION

noun

A process of continuous change through successive generations from a lower, simpler, or worse to a higher, more complex, or better state.



The development of the modern yacht has evolved over many decades. To meet regulatory requirements, naval architecture and engineering approaches have tended to follow a well-established format and, whilst every custom superyacht is unique, the technical backbone has evolved into a standardised solution.

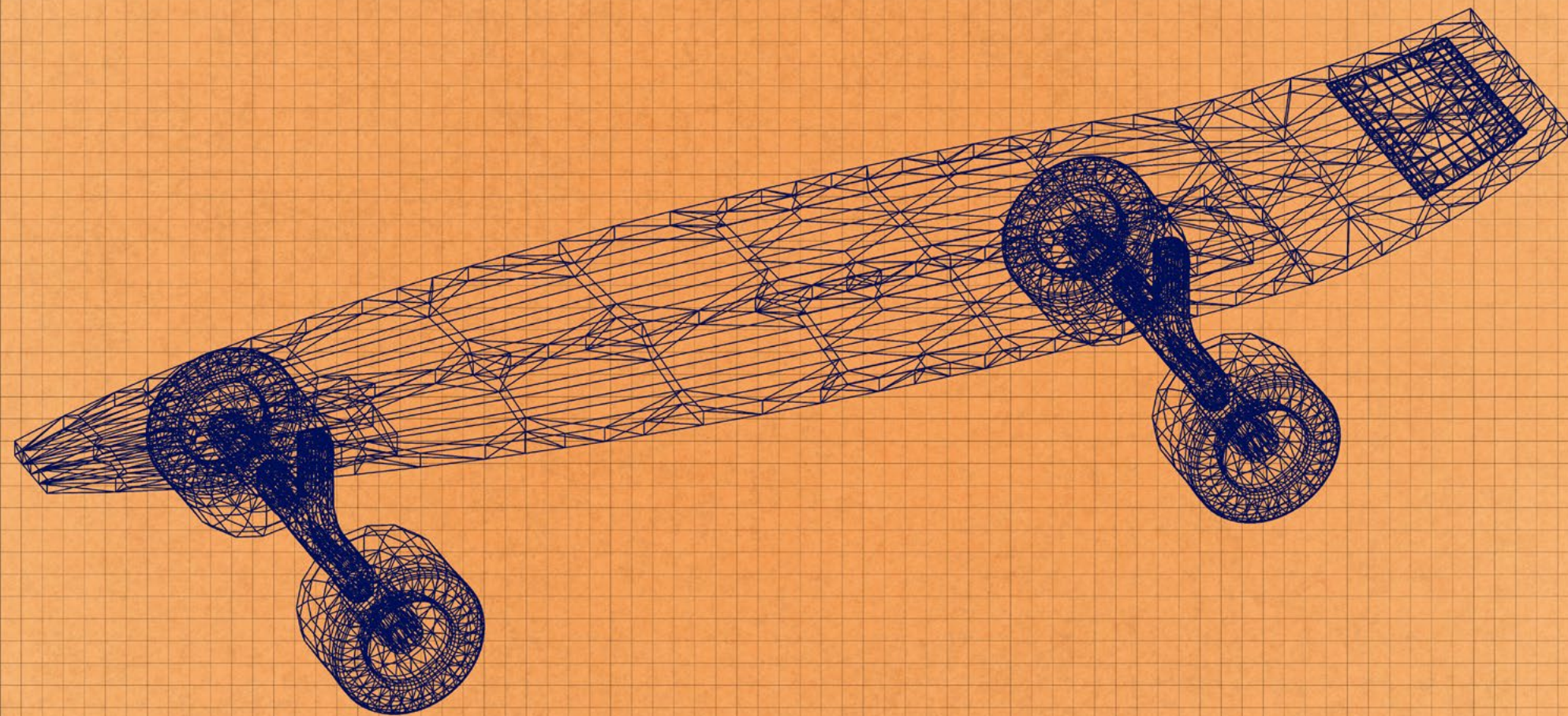
No solution is constraint free, however innovation can be achieved if the constraints are adjusted, giving new perspectives, and new possibilities.

We asked ourselves how the user experience could be elevated by creating a technical platform where, above the waterline there were no evolved constraints, no watertight bulkheads.

Could a more open plan architecture be achieved, and how would the design community innovate on such a blank canvas?



L A T E R A L



THE LATERAL SKATEBOARD

We began by imaging a skateboard.

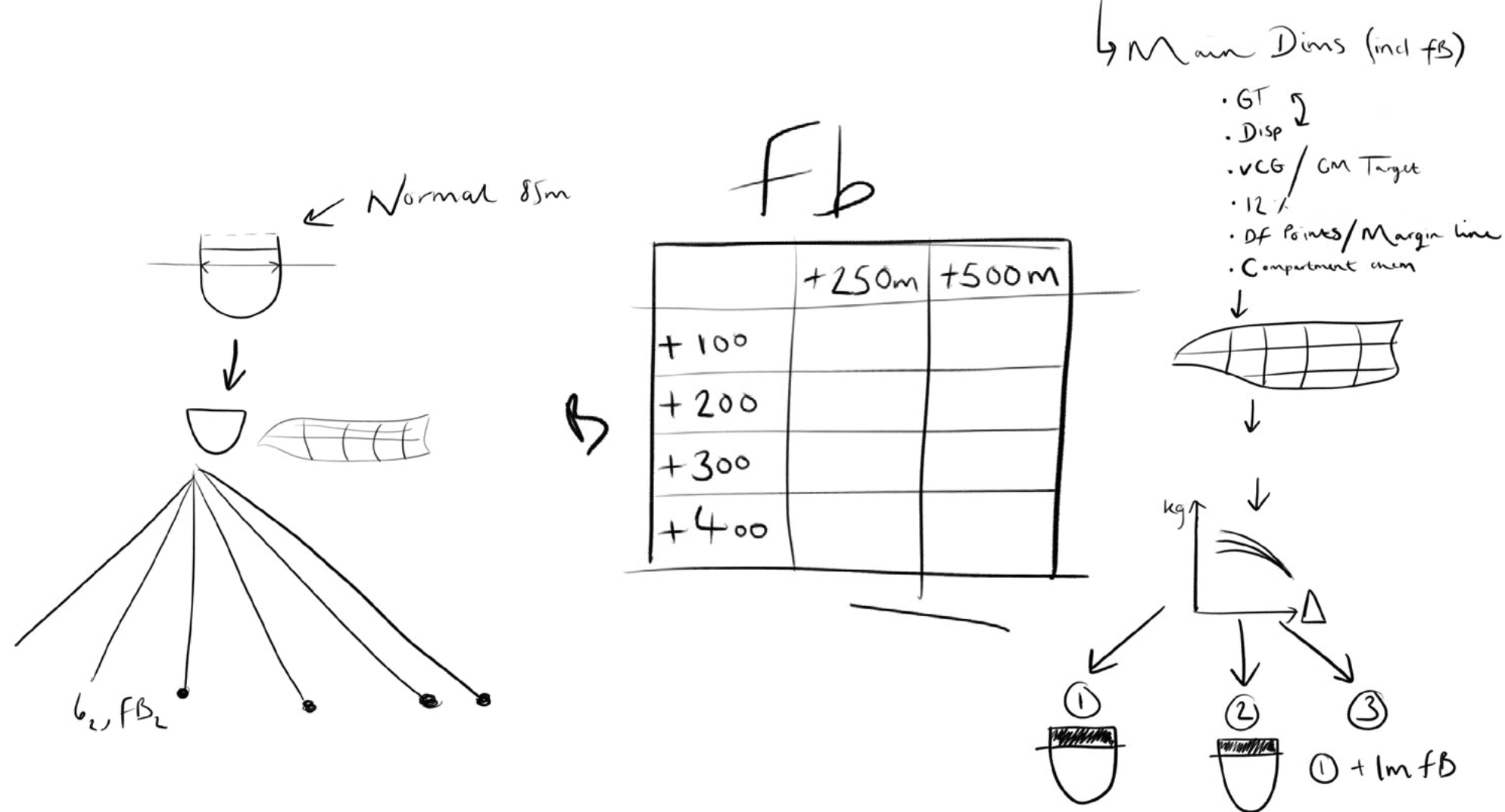
A simplistic representation of our aspired outcome; below the board's deck are all the necessary machinery, above the deck anything is possible, unconstrained by the technical parts.

RESEARCH

Removing watertight bulkheads demanded we find alternative means to meet 'damage stability' requirements.

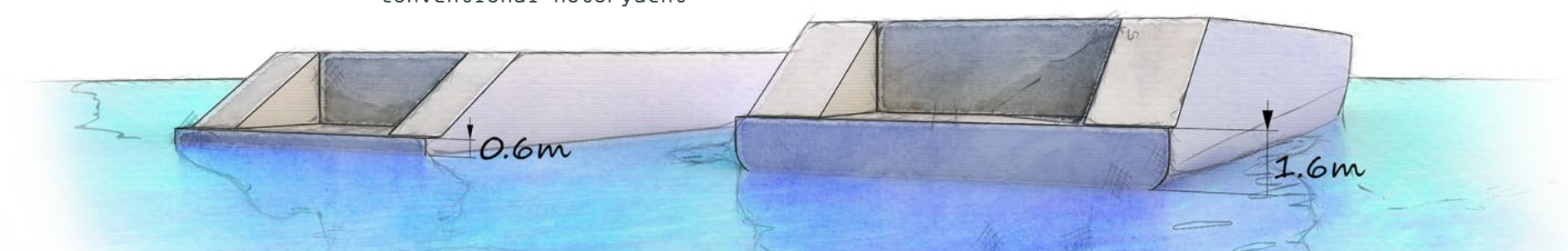
Using parametric modelling, and applying some lateral thinking to our methodology, we explored an extensive matrix of possibilities, searching for the solution space of feasibility.

Our modelling incorporated boundaries to respect the multifaceted nature of superyacht naval architecture.



Conventional Motoryacht

Free From Bulkhead Platform



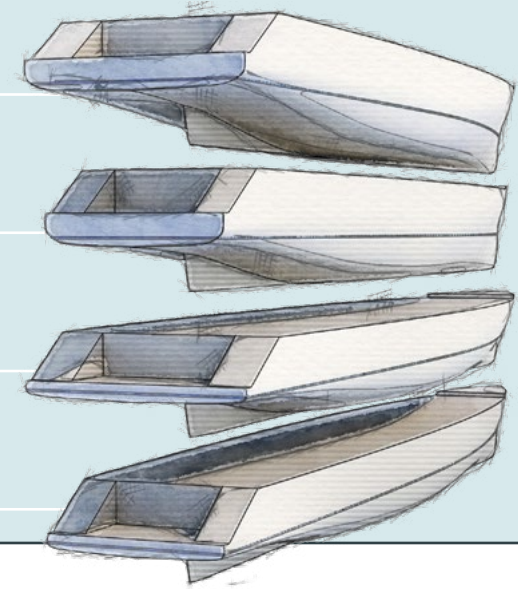
Via the alignment of a particular combination of beam and freeboard, the need for watertight bulkheads above the lower deck is negated. This also requires an unusual machinery arrangement to ensure the technical aspects of the platform can be adequately and practically packaged below the lower deck.

Both parameters

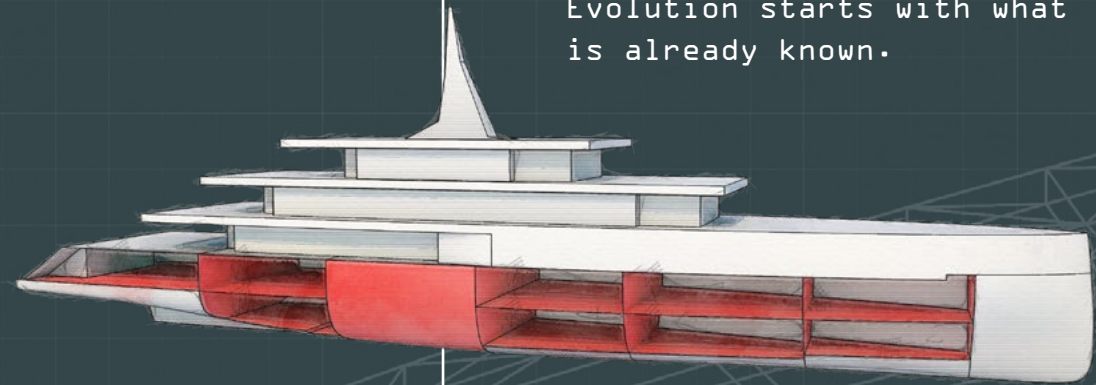
Freeboard

Beam

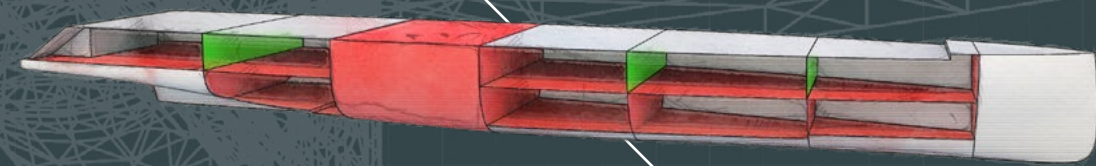
Baseline



Evolution starts with what is already known.

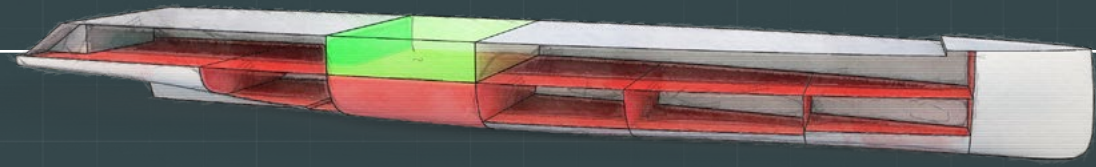


Conventional characteristics are superseded by new ones.



THE EVOLUTION OF IDEAS, **DRIVEN BY INNOVATION.**

Innovation brings forward improved versions of what once was.

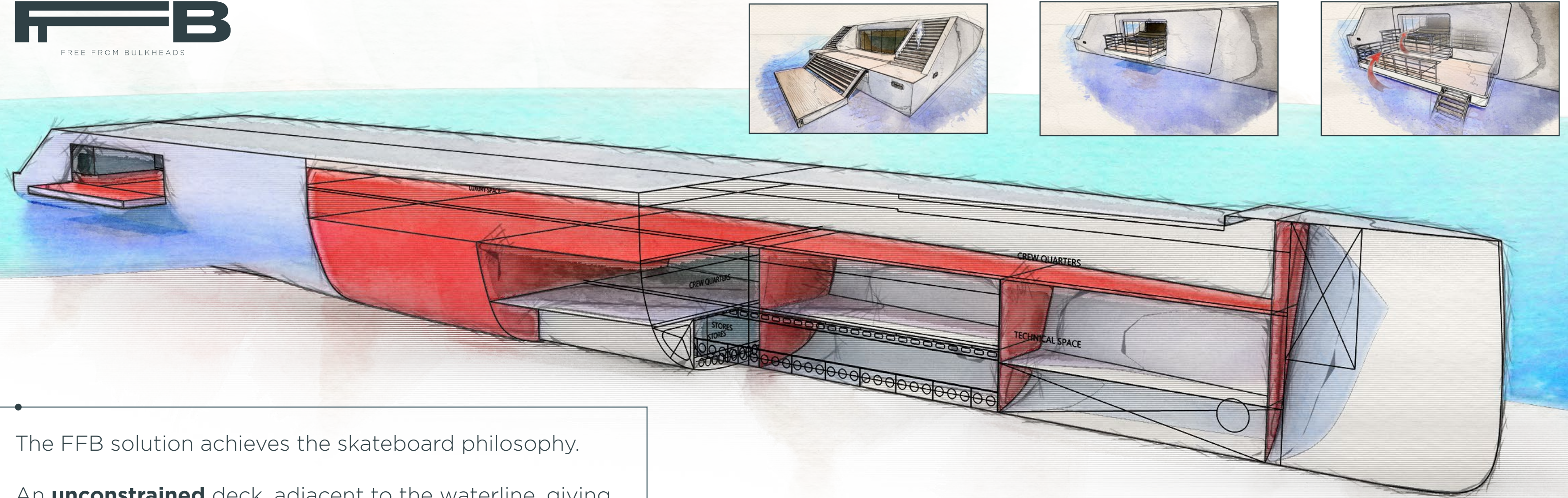


FFB
FREE FROM BULKHEADS



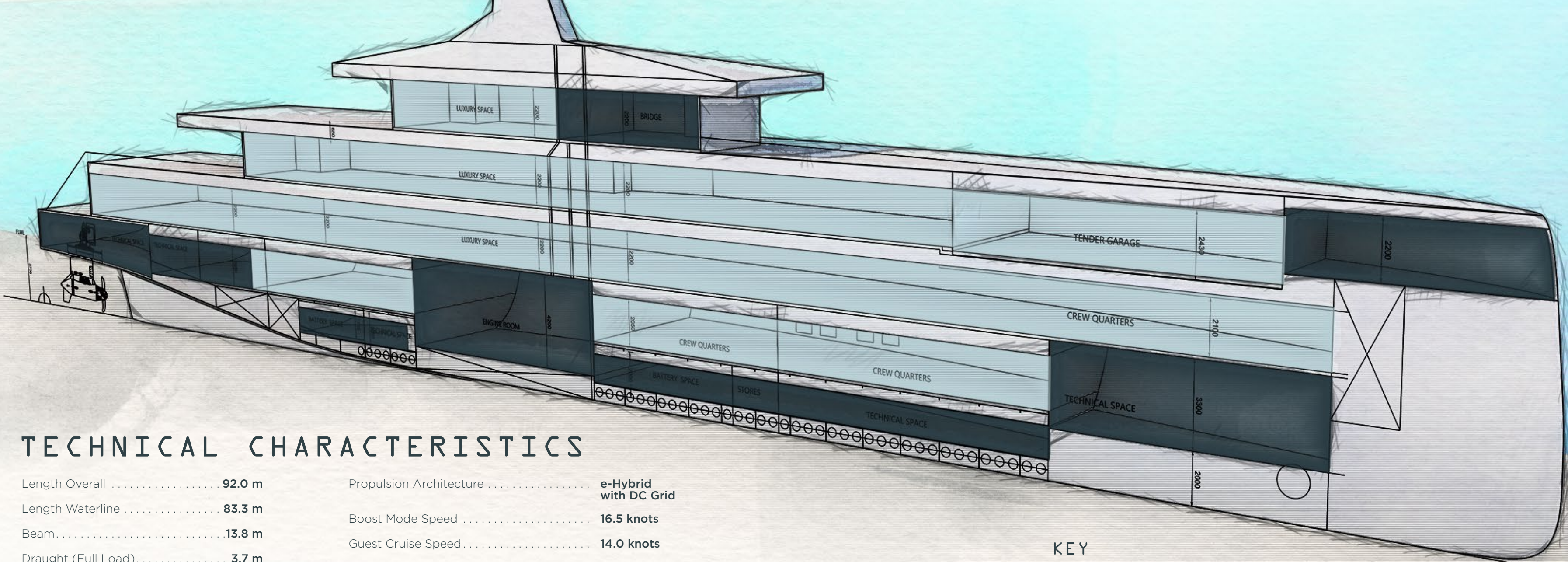
Innovation-driven evolution elevates the subject to a higher end state.





The FFB solution achieves the skateboard philosophy.

An **unconstrained** deck, adjacent to the waterline, giving the potential for greater design innovation in layout and ultimately an elevated user experience.



TECHNICAL CHARACTERISTICS

Length Overall **92.0 m**
 Length Waterline **83.3 m**
 Beam **13.8 m**
 Draught (Full Load) **3.7 m**
 Gross Tonnage **2300**
 Notation **REG Yacht Code Part A**

Propulsion Architecture **e-Hybrid with DC Grid**
 Boost Mode Speed **16.5 knots**
 Guest Cruise Speed **14.0 knots**
 Range Speed **11.5 knots**
 Range **7000 nm**

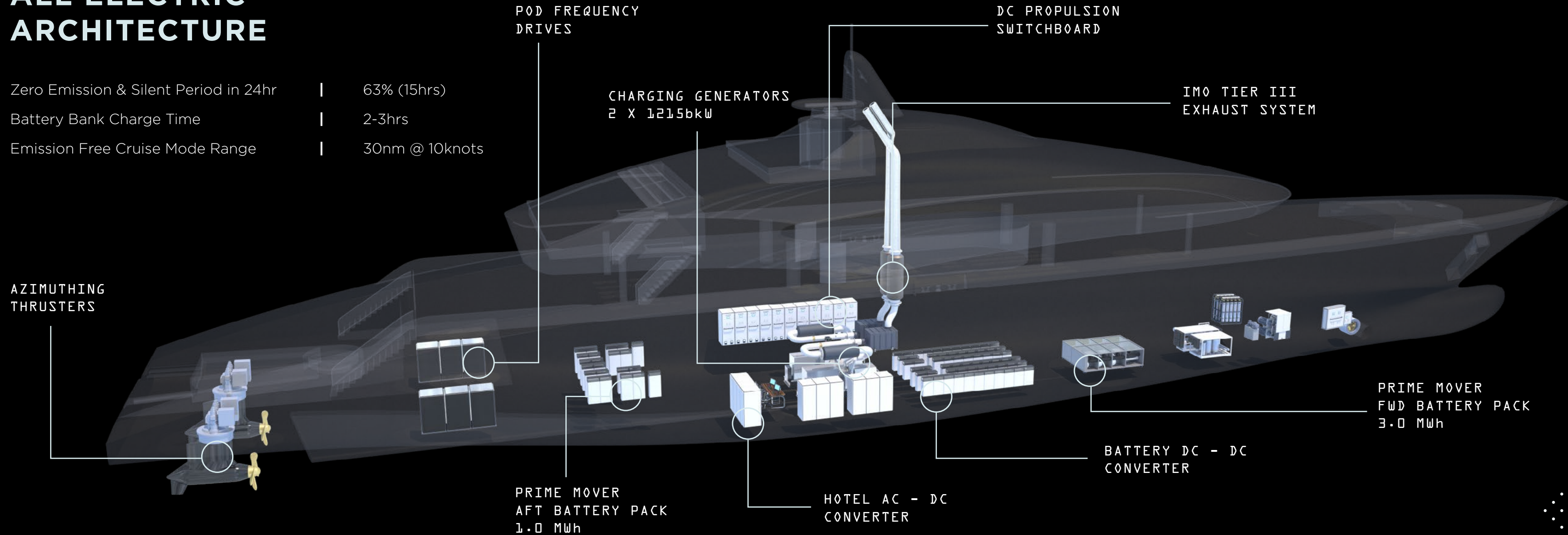
KEY

DESIGNER SCOPE

TECHNICAL SCOPE

ALL ELECTRIC ARCHITECTURE

Zero Emission & Silent Period in 24hr | 63% (15hrs)
Battery Bank Charge Time | 2-3hrs
Emission Free Cruise Mode Range | 30nm @ 10knots



POD FREQUENCY DRIVES

DC PROPULSION SWITCHBOARD

CHARGING GENERATORS
2 X 1215kW

IMO TIER III EXHAUST SYSTEM

AZIMUTHING THRUSTERS

PRIME MOVER AFT BATTERY PACK
1.0 MWh

HOTEL AC - DC CONVERTER

BATTERY DC - DC CONVERTER

PRIME MOVER FWD BATTERY PACK
3.0 MWh

**HOW CAN
NEW THINKING
ELEVATE
THE USER EXPERIENCE**





MED

LUIZ
DE BASTO



De Basto Design and Lateral Naval Architects have collaborated on the design of this refreshingly new concept for a true open yacht like no other. The result is an elegant 92-meter yacht with long lines for efficient cruising, low gross tonnage, and a brand-new approach to life on board.

At the heart of the concept is the open main deck called Agora, named after the public square and center of life in Ancient Greece. That's because this yacht celebrates the Mediterranean lifestyle and free-spirited thinkers. One of the greatest gifts of the Mediterranean civilization to the modern world is the ethos

for outdoor living and alfresco dining, known to contribute to well-being. This MED concept aims to deliver experiences and offer infinite flexibility.

De Basto, who has expanded on Lateral Naval Architects' Free From Bulkheads Platform (FFBP), envisioned the main deck as a social area open to fresh air, an inviting space for people to congregate and engage with each other and the surrounding nature. It is scientifically proven -- although the process of how this works is still unclear -- that exposure to salted air and sea is beneficial to human beings.

De Basto imagined the Agora as a multi-purpose, flexible space, partially open to the open air, which morphs with the time of day and the activities of the moment. Monumental structures, such as the staircase or select pieces of furniture serve as visual anchors, but the rest is left to the imagination so that it may be adapted to any occasion -- movie time, games, relaxation, parties, food festivals, art shows, etc.

The open approach also allows the design to outlive trends and fashions of the moment and to change during the yacht's life, just like the entire vessel herself.

There is more to this concept than first meets the eye. Inside the hull, below the Agora open deck, are two decks of private spaces with an open layout configuration. In the superstructure, which appears suspended above the Agora open deck, are two additional decks of public spaces, again with an open layout.

However, as a visual counterpoint to the openness of the main deck, these decks will feature few visible openings for maximum contrast, although they still will offer fantastic views to guests on board. In addition, tender garages, wing stations, mooring deck, etc, are all seamlessly integrated.

The superstructure, all in reflective glass, is polished like the pebble stone that inspired it

so that it mirrors its surroundings -- water, sunlight, clouds, moonscapes, or cityscapes. The hull's openings and windows are covered in serigraphy that matches the hull color so they are virtually invisible from the outside.

"I wanted to strip the profile of everything superfluous, leaving just the right number of elements to convey the concept," Luiz de Basto says. "The flying superstructure volume touches the hull delicately, dissolving the Main Deck into a void space and leaving the Agora Deck open."

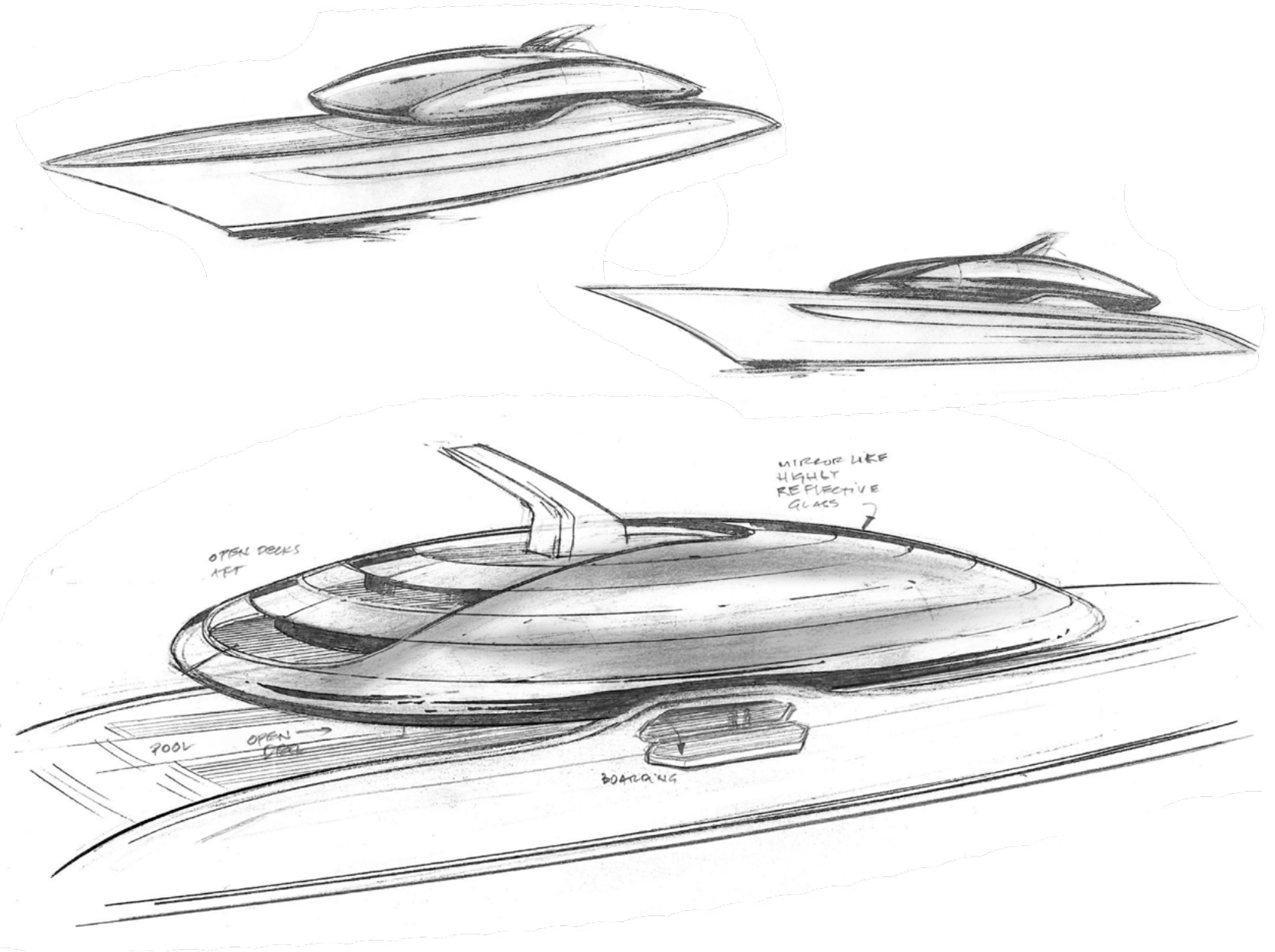
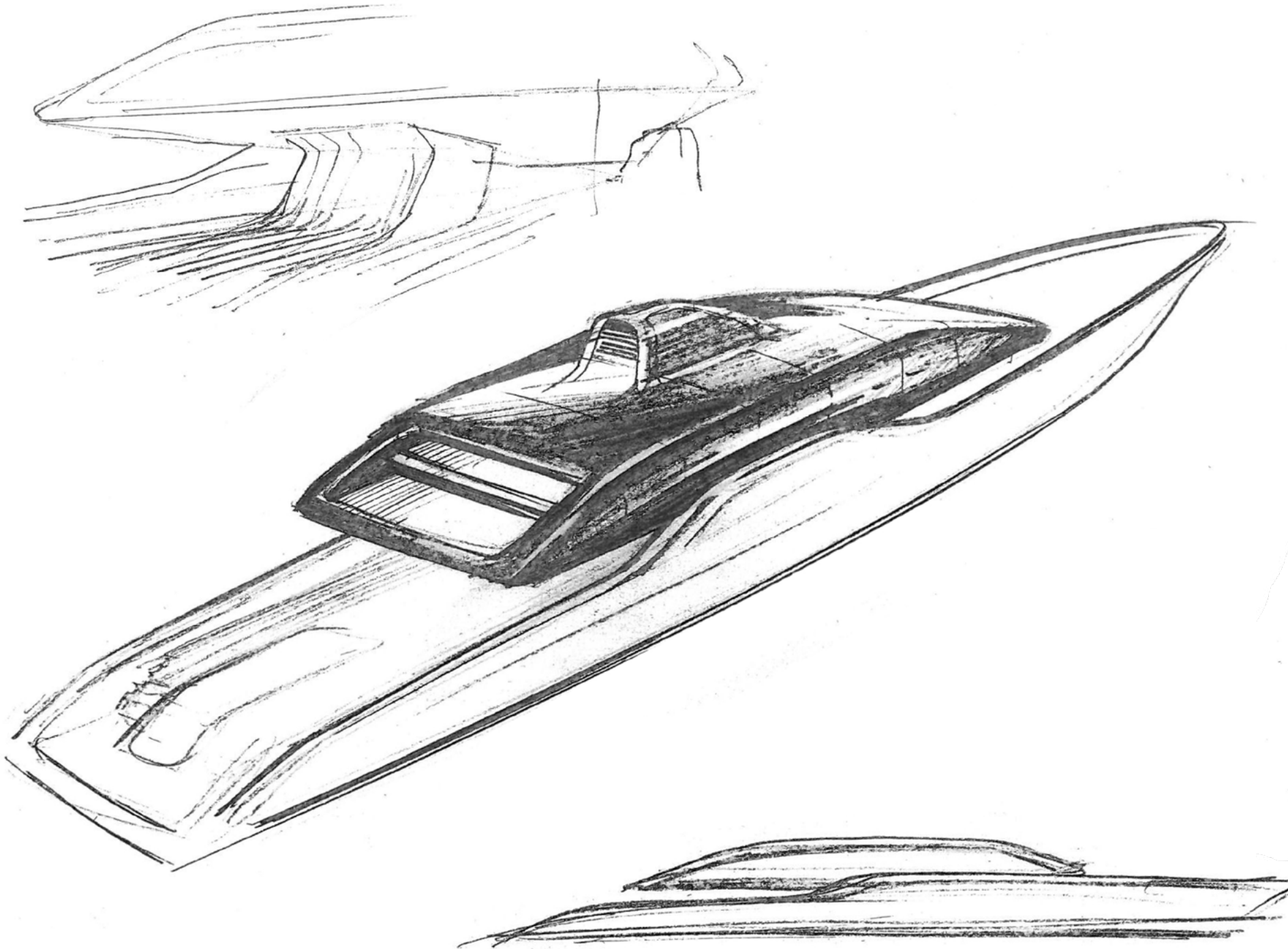
However attractive the final appearance, it isn't set in stone. "We are not interested in proposing an innovative profile only; we can make the design more conservative or modern,

according to the owner's preference," De Basto says.

Regardless of what the final look may be, the MED concept is buildable today. The experienced team at Lateral Naval Architects have worked out the engineering side, devising a structural lattice system that allows minimal support to give the impression of a floating superstructure.

"We designed this project for people who are curious about life, people who are courageous and want to build their own space. For them, we have re-thought what it means to live on board instead of designing another conventional yacht and making it work."

DEBASTO
DESIGNS









ENGINEERING ENABLING DESIGN

In the case of the challenge set by the designers, the use of lattice-framed structures offered a unique solution to the complex structural requirements of the yacht superstructure.

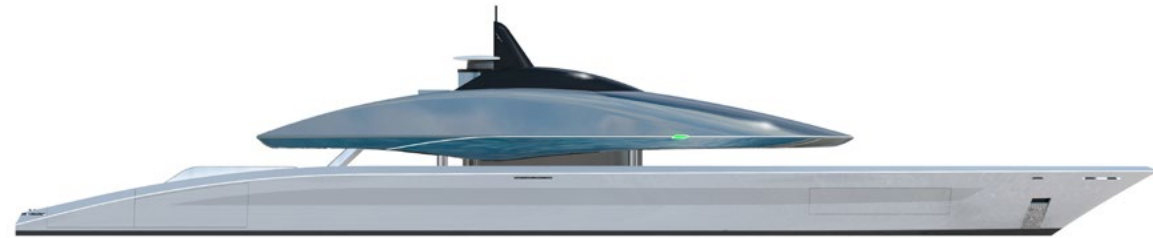
Drawing inspiration from bridges and buildings, the structural engineers were able to create a truss arrangement that provided the necessary strength and stability to withstand the dynamic loads and movements of a seagoing vessel.

To ensure the safety and durability of the structure, the engineers had to carry out first principle calculations using finite element analysis.

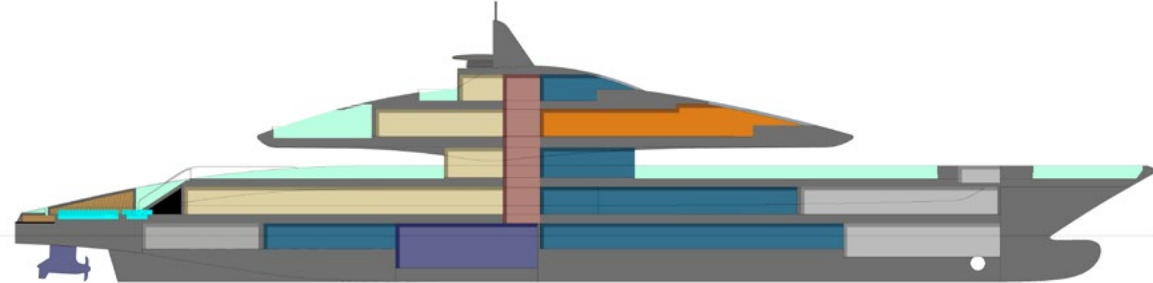
This involved using advanced computer simulations to model the complex interactions between the different components of the lattice structure and the various loads and forces acting upon it.

Despite the unique challenges presented by the yacht superstructure, the use of lattice-framed structures offered several advantages over traditional construction methods.

In addition to providing strength and stability, the lattice framework presents more surface area for windows compared to conventional designs, creating more natural light and a unique aesthetic appeal that was well-suited to the design of a yacht.



PROFILE



INBOARD PROFILE

- Owner
- Crew
- Technical
- Guests
- AC
- Exhaust



BRIDGE DECK

- Owner
- Crew
- Technical
- Guests
- AC
- Exhaust



UPPER DECK

- Owner
- Crew
- Technical
- Guests
- AC
- Exhaust

DESIGNED BY

DEBASTO
DESIGNS

MED

ENGINEERED BY



L A T E R A L



AGORA DECK

- Owner
- Crew
- Technical
- Guests
- AC
- Exhaust



LOWER DECK

- Owner
- Crew
- Technical
- Guests
- AC
- Exhaust



CREW DECK

- Owner
- Crew
- Technical
- Guests
- AC
- Exhaust

FFB

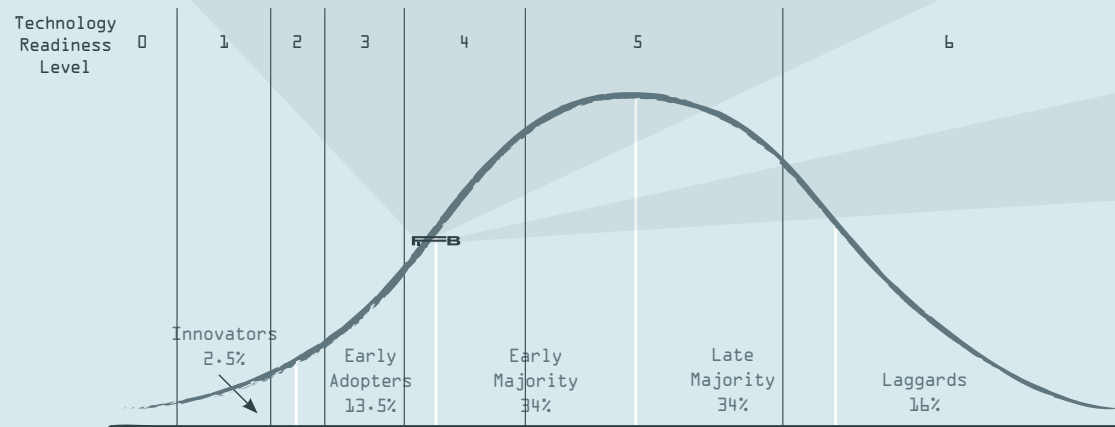
The use of large batteries on-board superyachts is not novel, there are many existing or in build projects utilising batteries at large scale. That said, the size of battery bank selected for the FFB platform is large compared with the size of the yacht. This is not a significant technical or commercial risk.

The innovative aspect of the Lateral e-Hybrid system is in the

holistic integration of the battery as the primary source of power and subsequent reduction in installed power and prime movers. This arrangement is in use for some commercial vessels and is a logical development of existing power management systems fitted to large yachts. It represents a low risk development that is optimising current available technology in a novel arrangement.

TECHNOLOGY READINESS LEVEL

- **TRL 0 – Blue Sky Idea**
Anecdotal concept with no analytical proof of feasibility.
- **TRL 1 – Paper Concept**
Exists only in paper proposals or academic research, analytically proven.
- **TRL 2 – Industrial Development**
Product is not being developed for a marine industry application however a test rig or prototype product exists to develop the technology to a real world application.
- **TRL 3 – Marine Product Development**
Product is not offered for sale, however a test rig or prototype product/ installation exists.
- **TRL 4 – First User**
At least 1 reference yacht, concept fully certified by authorities for marine use.
- **TRL 5 – Common Practice**
Multiple reference yachts and vendors available.
- **TRL 6 – Obsolete**
Obsolete by increased regulation or alternative technology.



Technology Readiness Level vs Diffusion of Innovation



ASK FURTHER QUESTIONS

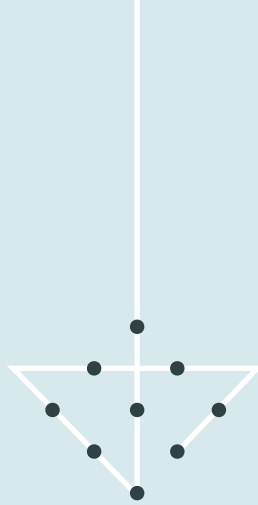
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