



L A T E R A L

NAVAL ARCHITECTS



FREE FROM BULKHEADS



# 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.





## QUESTION

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



L A T E R A L

# 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.

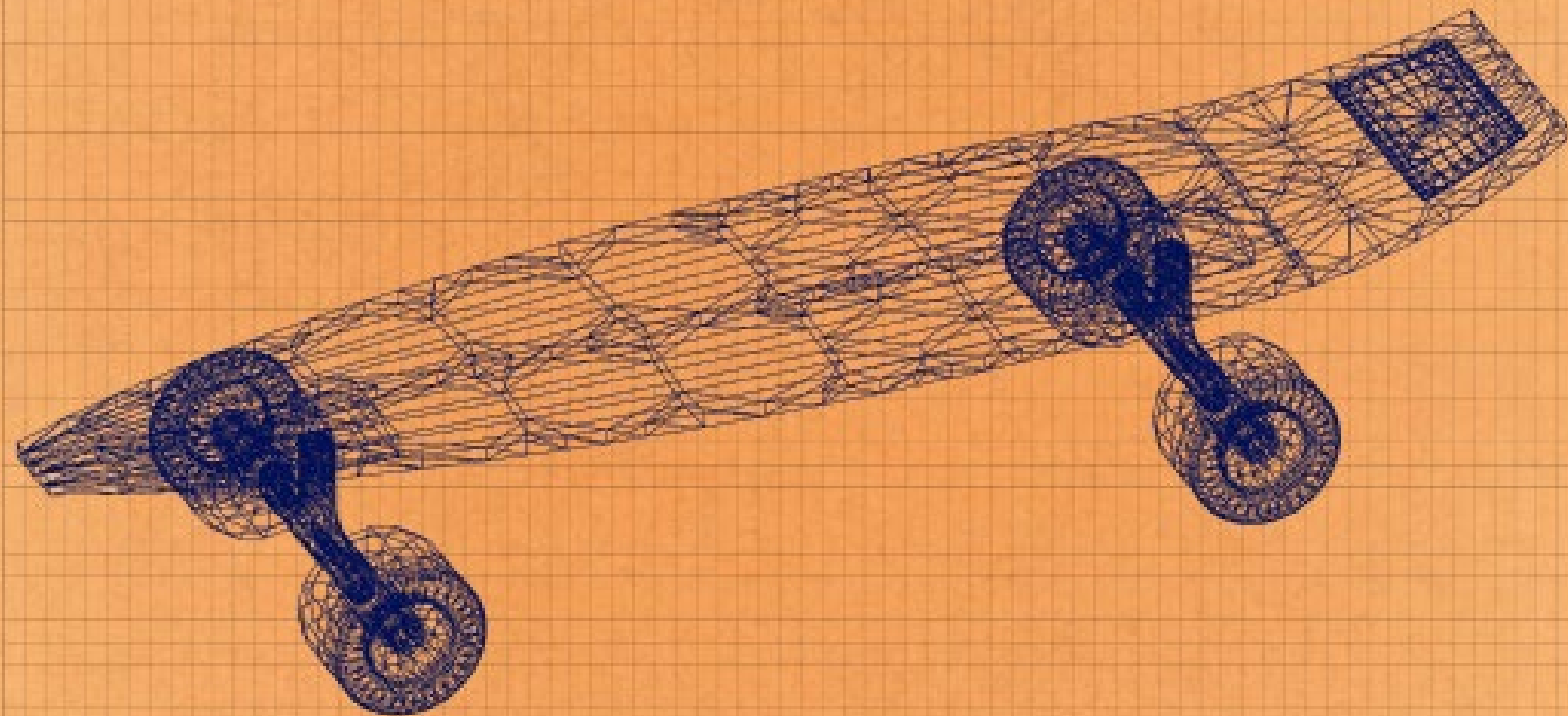
No solution is constraint free, however innovation can be achieved if the constraints are adjusted, giving new perspectives, and new possibilities.

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.

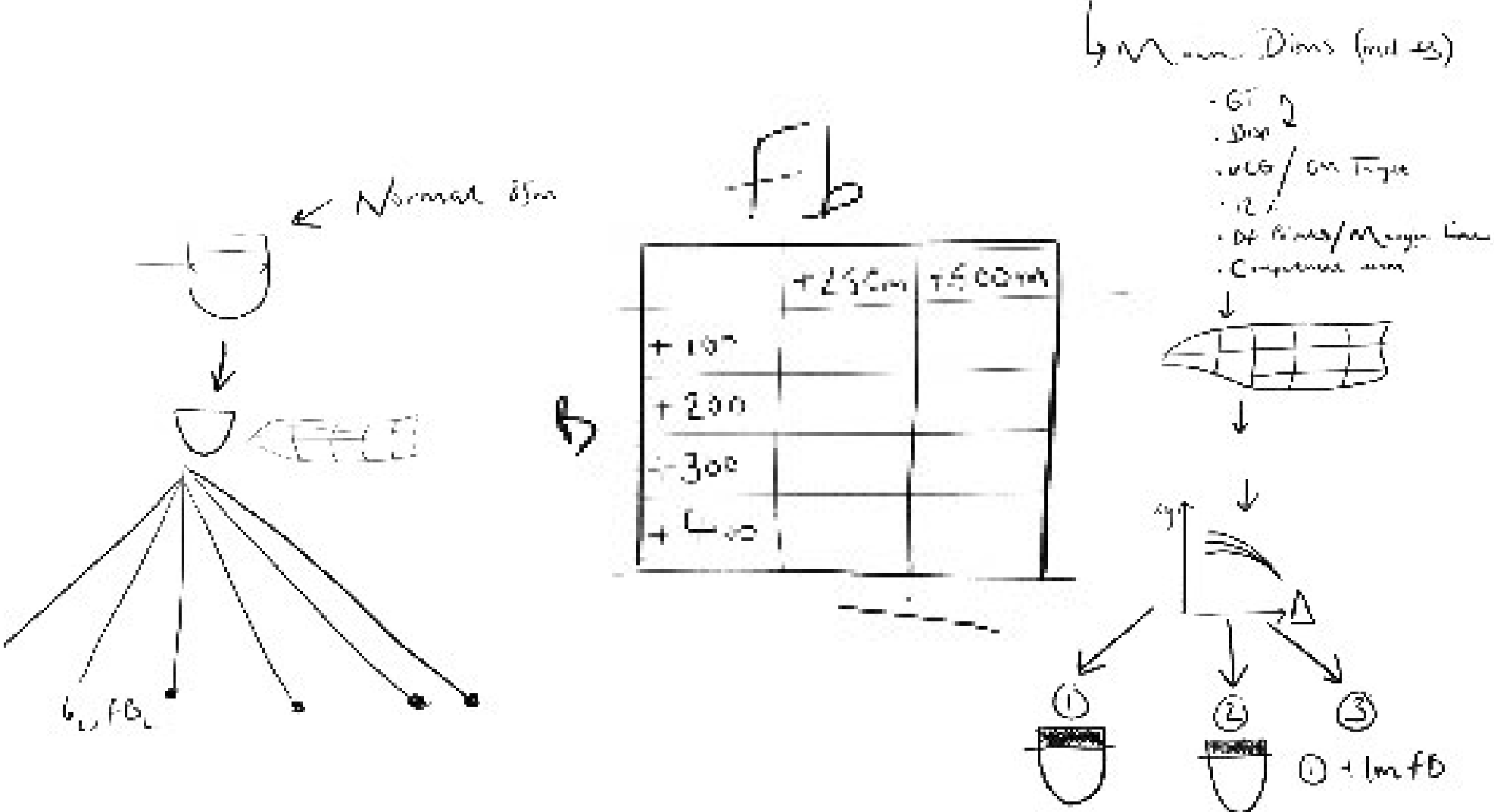
A simplistic representation of our aspired outcome; below the board's deck are all the necessary machinery, above the deck anything is possible, unconstrained by the technical parts.

# RESEARCH

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

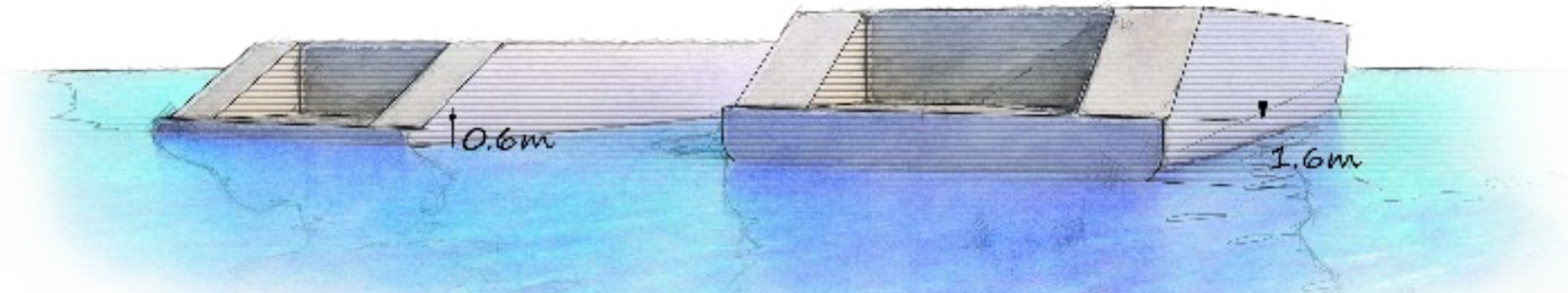
Using parametric modelling, and applying some lateral thinking to our methodology, we explored an extensive matrix of possibilities, searching for the solution space of feasibility.

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



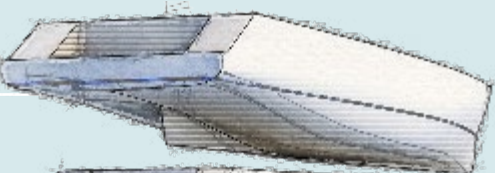
Conventional Motoryacht

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



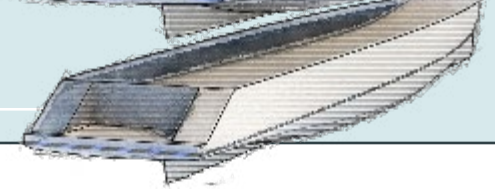
Freeboard



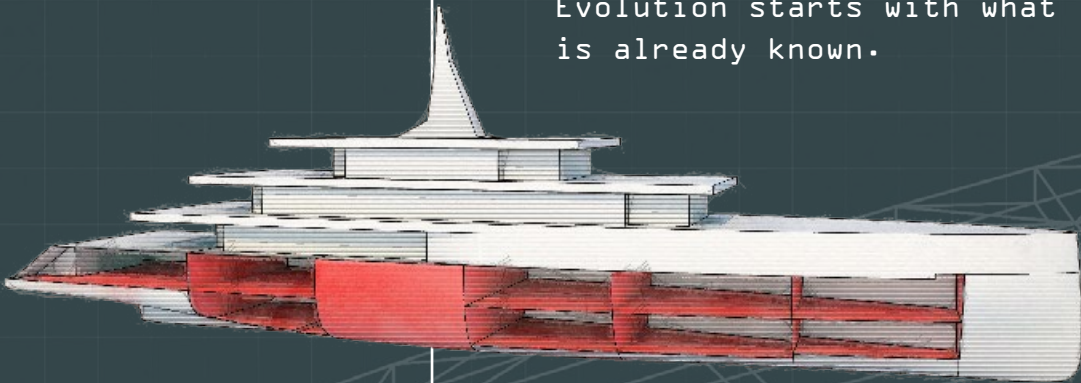
Beam



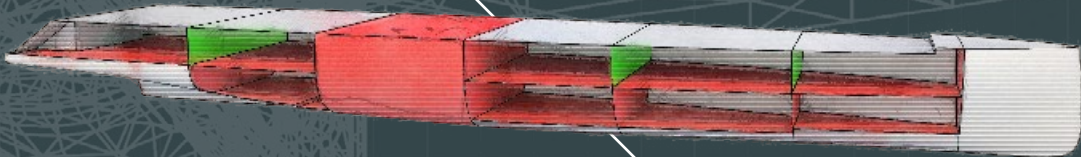
Baseline



Evolution starts with what  
is already known.

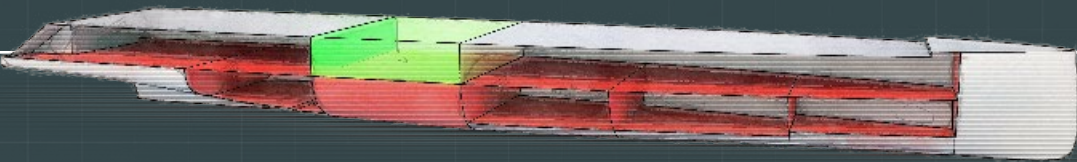


Conventional characteristics  
are superseded by new ones.



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

Innovation brings forward improved  
versions of what once was.



**FFB**  
FREE FROM BULKHEADS



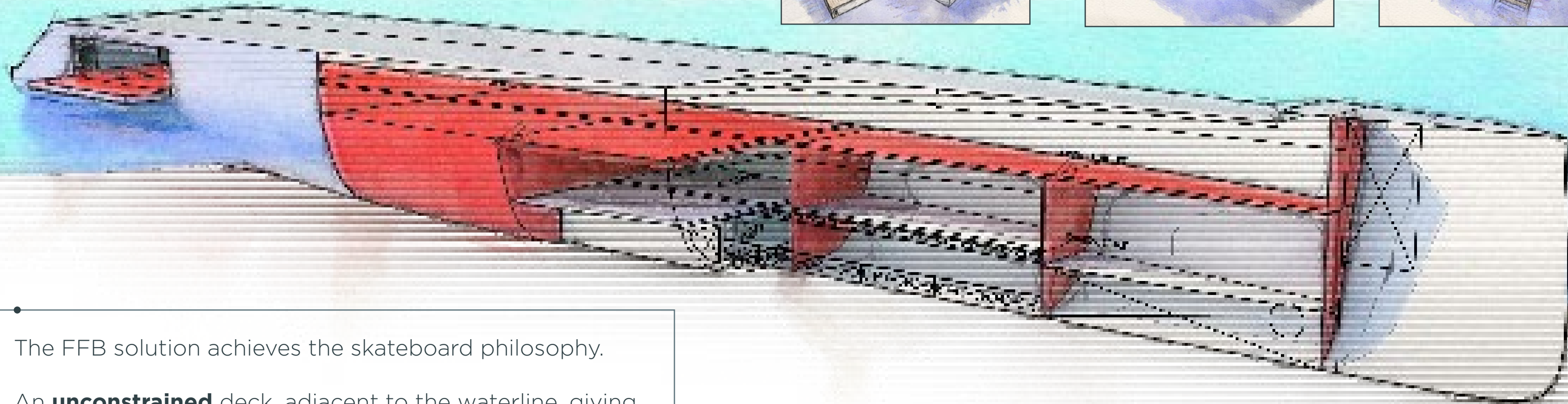
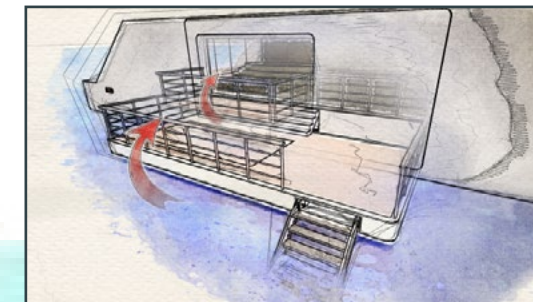
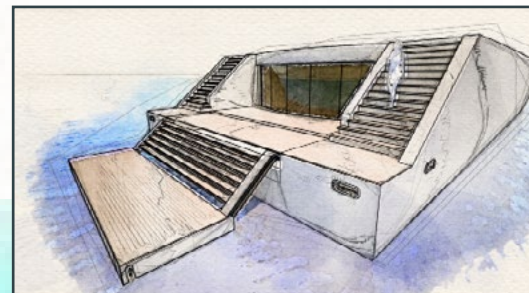
Innovation-driven evolution  
elevates the subject to a  
higher end state.



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



L A T E R A L



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.

# ALL ELECTRIC ARCHITECTURE

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

AZIMUTHING  
THRUSTERS

POD FREQUENCY  
DRIVES

CHARGING GENERATORS  
2 X 1215kW

DC PROPULSION  
SWITCHBOARD

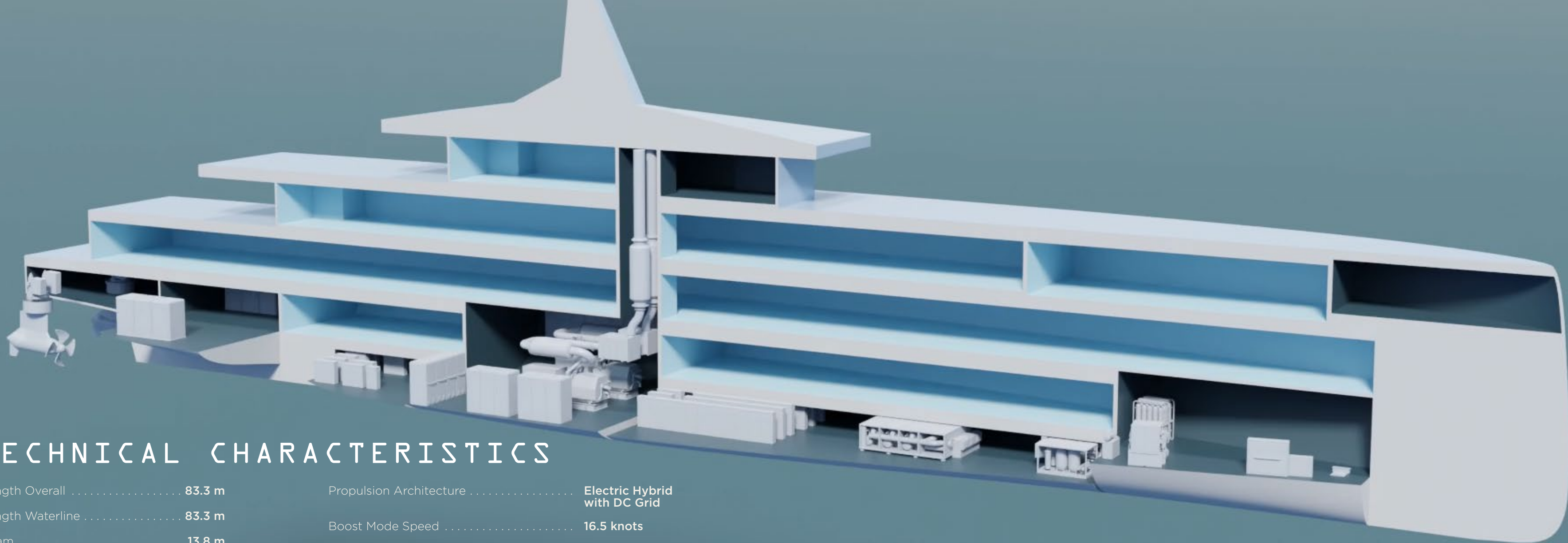
IMO TIER III  
EXHAUST SYSTEM

PRIME MOVER  
AFT BATTERY PACK  
1.0 MWh

HOTEL AC - DC  
CONVERTER

BATTERY DC - DC  
CONVERTER

PRIME MOVER  
FWD BATTERY PACK  
3.0 MWh



## TECHNICAL CHARACTERISTICS

Length Overall ..... **83.3 m**  
Length Waterline ..... **83.3 m**  
Beam.....**13.8 m**  
Draught (Full Load)..... **3.7 m**  
Gross Tonnage .....**2500**  
Notation .....**REG Yacht Code Part A**

Propulsion Architecture ..... **Electric Hybrid  
with DC Grid**  
Boost Mode Speed ..... **16.5 knots**  
Guest Cruise Speed..... **14.0 knots**  
Range Speed ..... **11.5 knots**  
Range ..... **7000 nm**  
Luxury Space ..... **900 sq.m**

### KEY

DESIGNER SCOPE

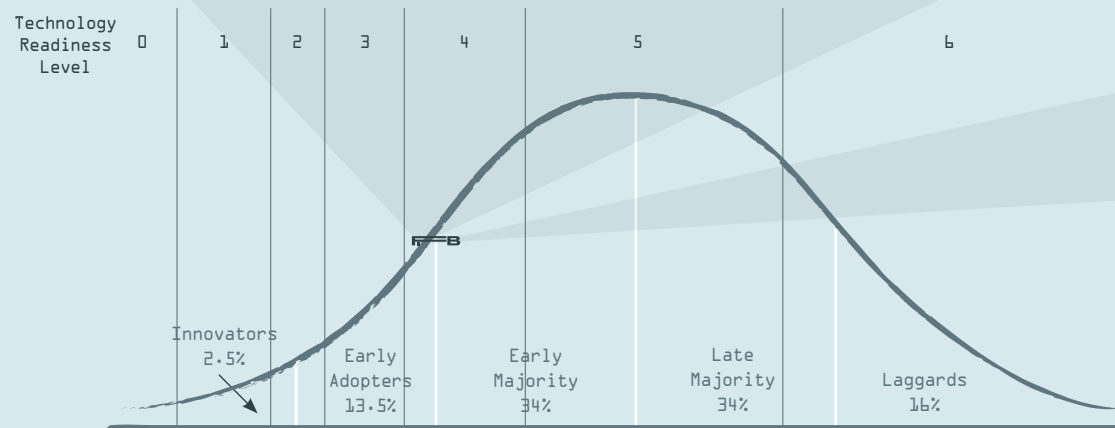
TECHNICAL SCOPE



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.



## ASK FURTHER QUESTIONS

### Adrien Thoumazeau

Senior Naval Architect / Research & Development Coordinator  
athoumazeau@lateral.engineering  
T +44 (0)23 8022 8855

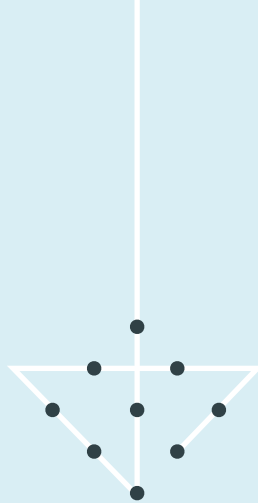


### Simon Brealey

Chief Mechanical Engineer  
sbrealey@lateral.engineering  
T +44 (0)23 8022 8855



L A T E R A L



BUILDING 13,  
SHAMROCK QUAY,  
WILLIAM STREET, SOUTHAMPTON,  
SO14 5QL, UK

T +44 (0)23 8022 8855

[WWW.LATERAL.ENGINEERING](http://WWW.LATERAL.ENGINEERING)