

L A T E R A L

NAVAL ARCHITECTS

INCEPTION

In collaboration with



ISAAC BURROUGH
DESIGN



LATERAL

Lateral Naval Architects provides 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.

lateral

/ˈlæt(ə)r(ə)l/ **adjective**

involving lateral thinking.

synonyms: unorthodox, inventive, creative, imaginative

futurology

/ˌfjuːtʃəˈrɒlədʒi/ **noun**

systematic forecasting of the future,
especially from present trends in society.

synonyms: futuristics, foresight, forward-looking

Lateral Futurology

/ˈlæt(ə)r(ə)l/ */ˌfjuːtʃəˈrɒlədʒi/* **way of thinking**

ability to conceive innovative superyacht
technical platforms which enable design
via the application of engineering and
technology. Breaking from established
thoughts, theories, rules, and procedures;
changing the paradigm.

synonyms: meaningful innovation, ask new questions

QUESTION

Design should challenge engineering.

In turn engineering must respond to enable more creative design in the simplest way possible. Engineering must deliver fresh ideas underpinned by a spectrum of technology enabling design to explore new avenues, ask new questions and challenge existing paradigms.

How can the application of commercially available technology and engineering deliver a platform offering greater design flexibility with fewer constraints?



INCEPTION



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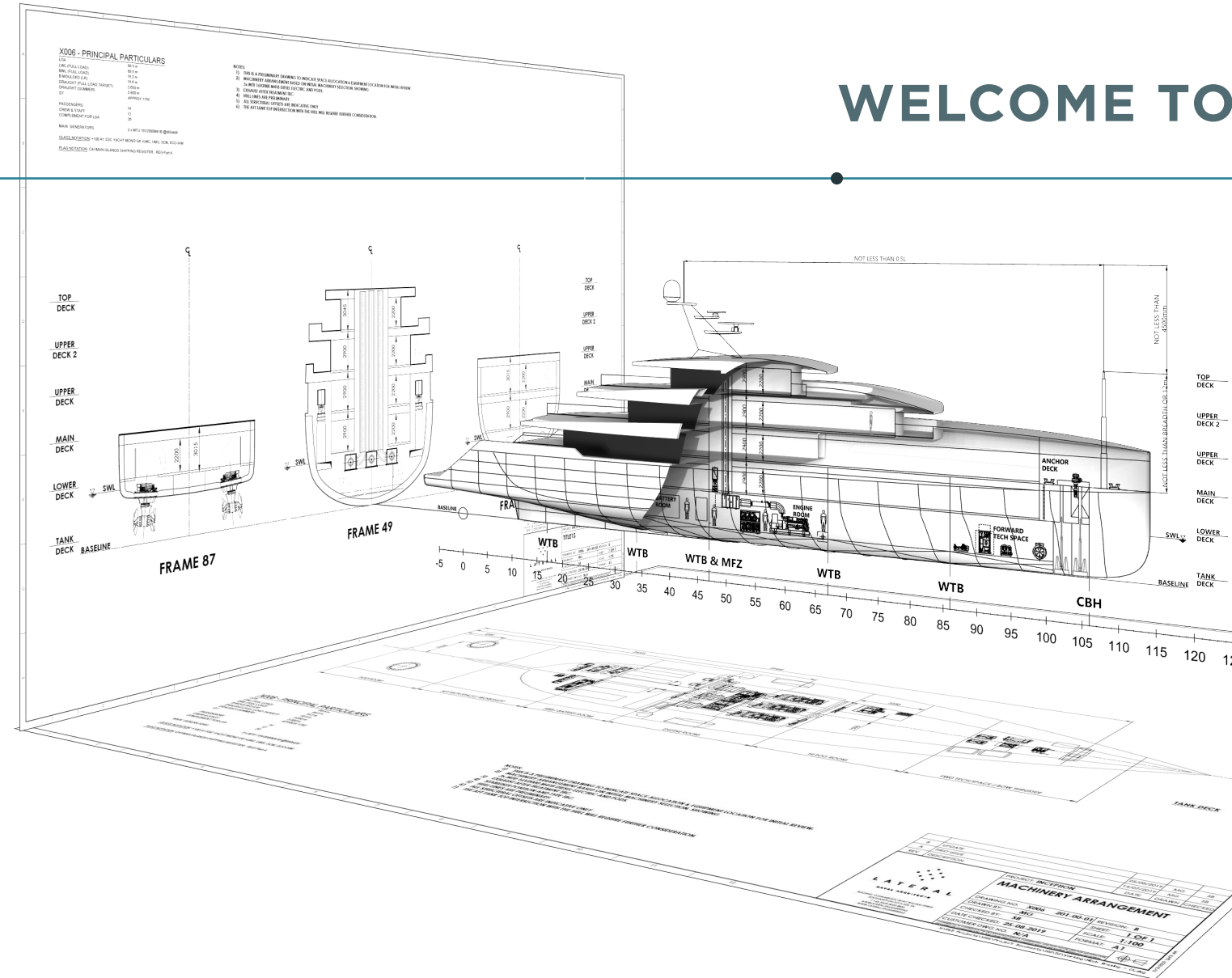
WELCOME TO INCEPTION

Conceived not as a specific design, but rather as a technical platform. A backbone and skeleton upon which a wide range of creative design intent can be applied in the development of a superyacht project.

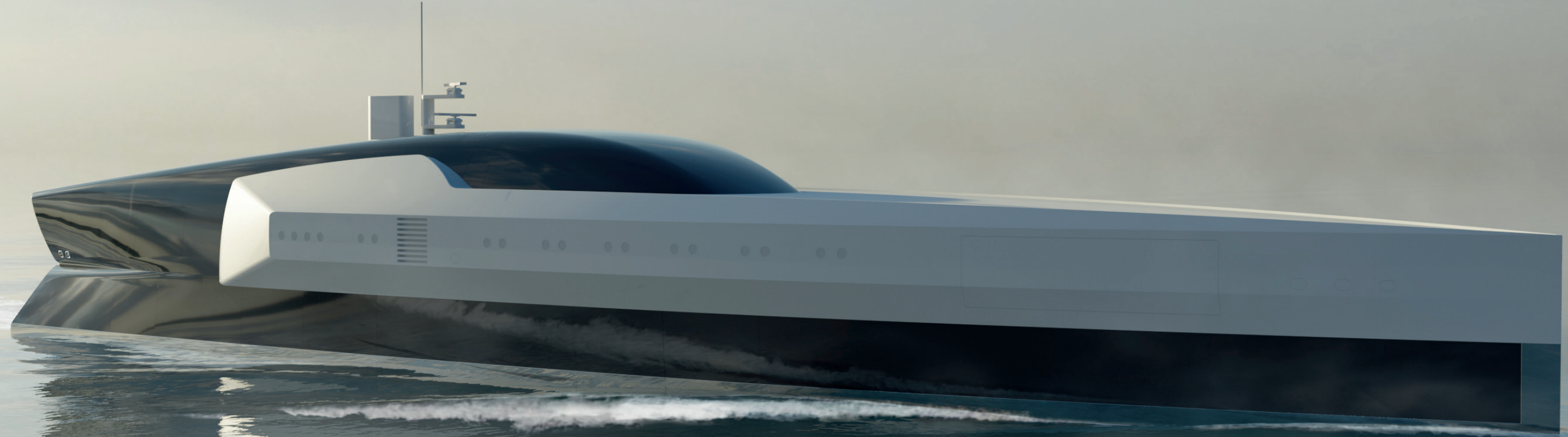
Inception employs Lateral's innovative E-Hybrid all electrical architecture to not only maximise the envelope of creative space available for design and layout, but also the flexibility of configuration. At the same time E-Hybrid architecture places the Inception Platform ahead of the leading edge with an all electric power storage and distribution architecture.

Lateral invited the design studio of Isaac Burrough to develop a design based on the Inception Platform. Within these pages you can find out more about the technology behind the Inception Platform, and how this has been interpreted by Isaac to the advantage of the design.

The result we believe is engineering enabling design.



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THE FUTURE IS ELECTRIC...

Electrification is the gateway to future technologies.

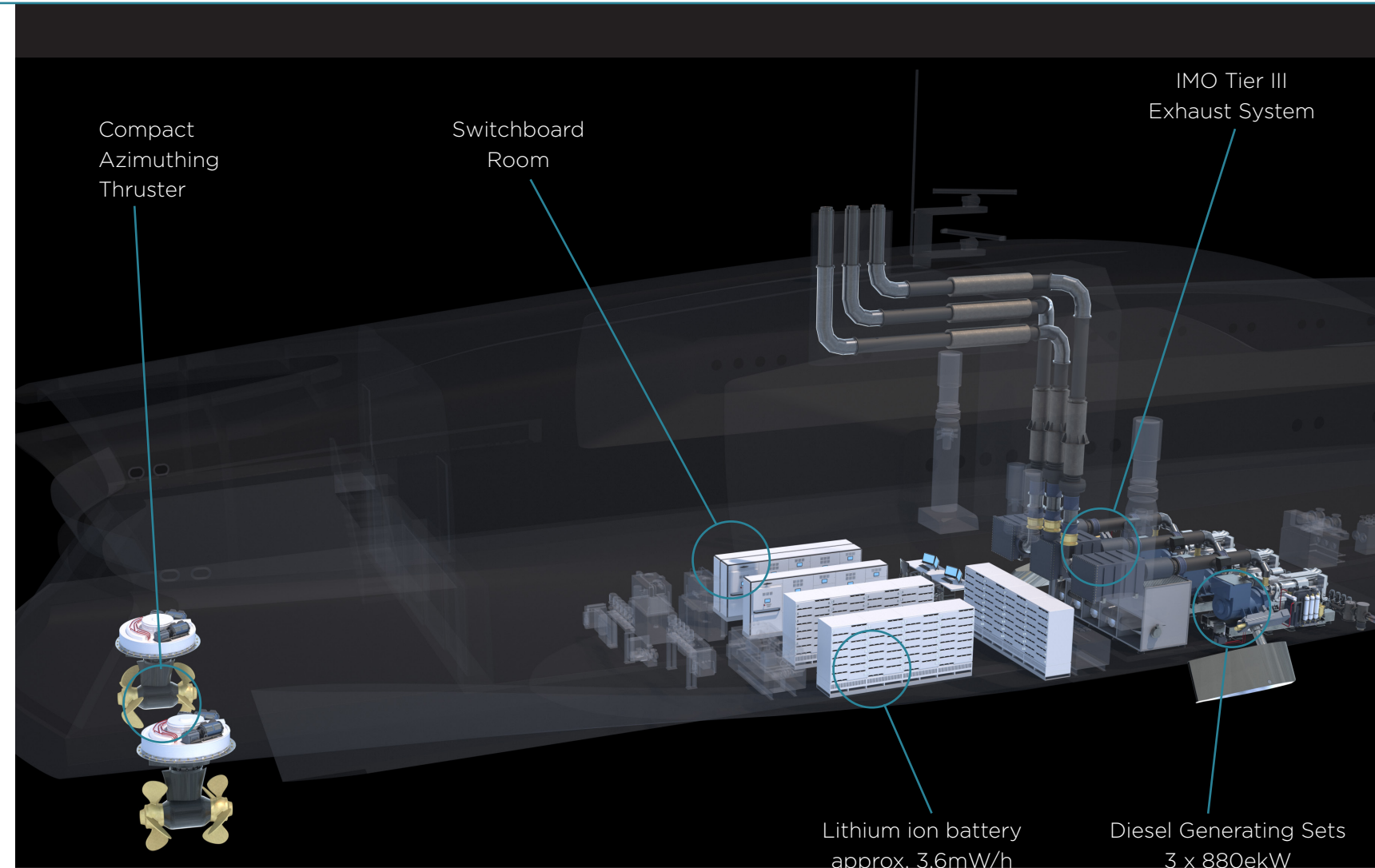
With an electrical architecture on board, Inception is configured to take advantage of future technologies, within an integrated energy system covering both hotel and propulsion loads.

Keeping pace with rapid advancement in battery technology, the next development of hybrid will see batteries becoming the primary power source on board, dictating that the next step beyond hybrid is perhaps not diesel electric, but rather electric diesel.

The Lateral **HYBRID** system is designed to incorporate the use of batteries as a primary source of energy. Diesel generators are provided for higher speed propulsion and battery recharging.

Batteries allow the varying power demands of a modern superyacht to be seamlessly met. This also enables the diesel generators to be selected purely on the basis of efficiency and optimum energy density.

The result is an elegant solution for now and the future using technology currently available.

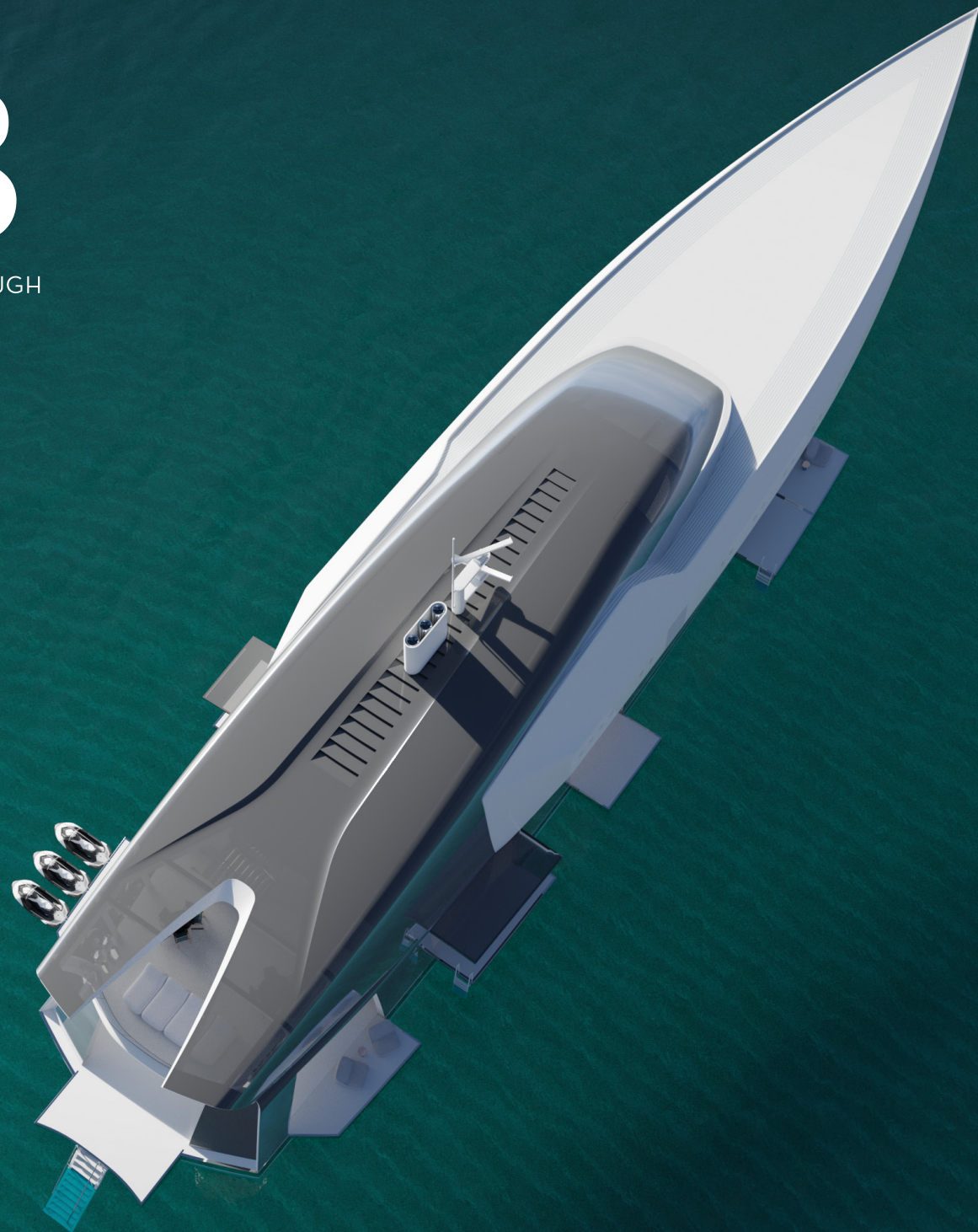


ELECTRIC ARCHITECTURE

- Higher fuel efficiency.
- Reduced emissions.
- Flexible in operation.
- Future proof.
- Compact design to fit on a single deck.
- Optimised generator loading.
- Noise – silent mode at anchor and underway.

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MODE OF OPERATION

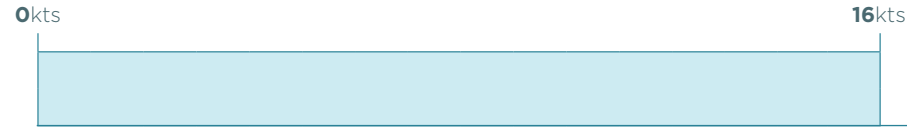
The Lateral **e-HYBRID** has two principle modes of energy management;

- Battery Discharge.
- Battery Charge.

The Lateral **e-HYBRID** system uses these two modes of energy management to support four typical operating scenarios;

- At Anchor
- Silent Cruise
- Extended Cruise
- Performance Cruise

At Anchor



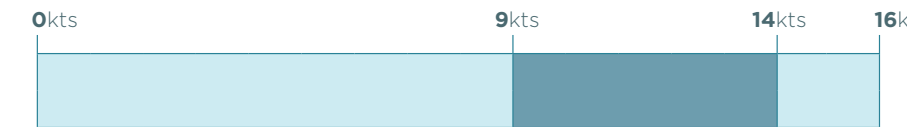
All power is supplied via the battery pack for 6 – 8 hours with zero emissions. The battery is charged during a 2 hour period with generators operating at maximum efficiency. The generators are selected not to match variable power requirements (as is current practice) but to provide optimum fuel efficiency and energy density for the extended operation of the yacht.

Silent Cruise



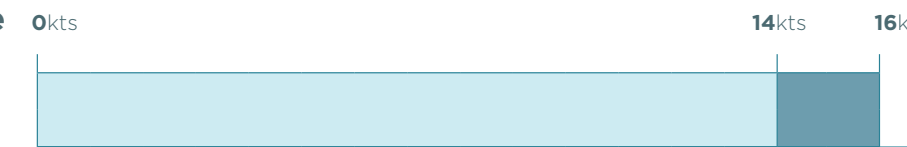
Power is provided via the battery pack only to assure silent cruising and zero emissions. The battery offers 3 hours operation at 10 knots or 6 hours operation at 6 knots.

Extended Cruise

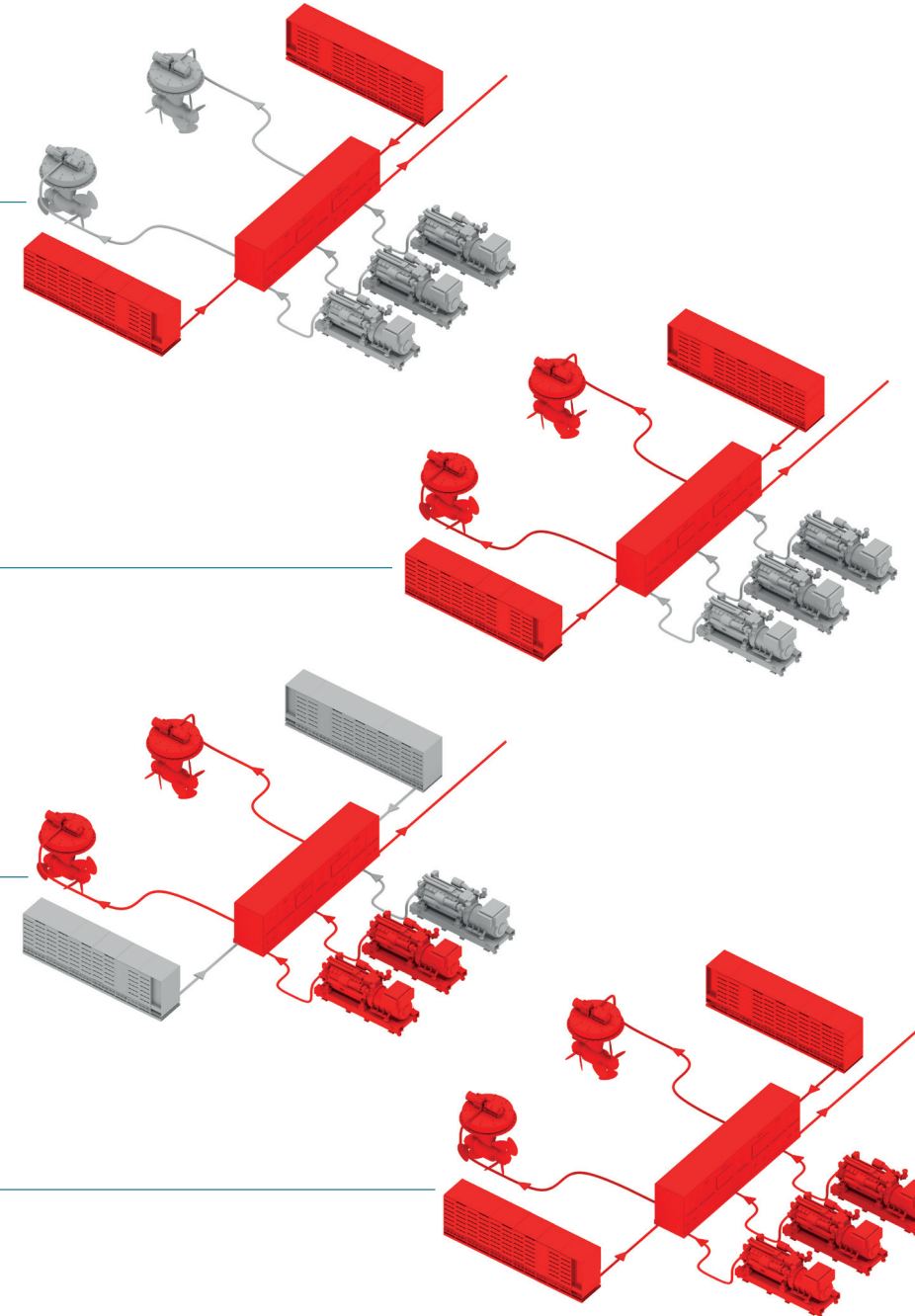


For efficient relocation or efficient long distance cruise, the power is provided by diesel generator(s) depending on speed requirement. Generator(s) will operate at peak efficiency to allow extended periods of zero emission cruising.

Performance Cruise



All the electric power is used to achieve a top speed up to 16 knots for up to 3 hours. In this mode the three generators and the battery pack work seamlessly together to deliver maximum power.



SYSTEM ADVANTAGES

- Allows periods of zero emissions to suit sensitive environments and improve the onboard experience.
- Complete flexibility of power management to suit any yacht operation without compromise.
- Allows for future upgrade to make use of alternative sources of energy when new technology allows.
- Fits in a single deck height engine room.
- Lower machinery running hours to give reduced maintenance.



SYSTEM DISADVANTAGES

- There will be a significant cost and weight increase related to the batteries, this will be offset by the reduced number of prime movers.
- Additional technical space is required for batteries, this does however allow novel technical space layouts to be integrated.
- The system has additional complexity that requires detailed engineering solutions throughout design and commissioning.
- Through life cost of battery replacement will be significant although this will be partially offset by reduced generator and machinery maintenance.





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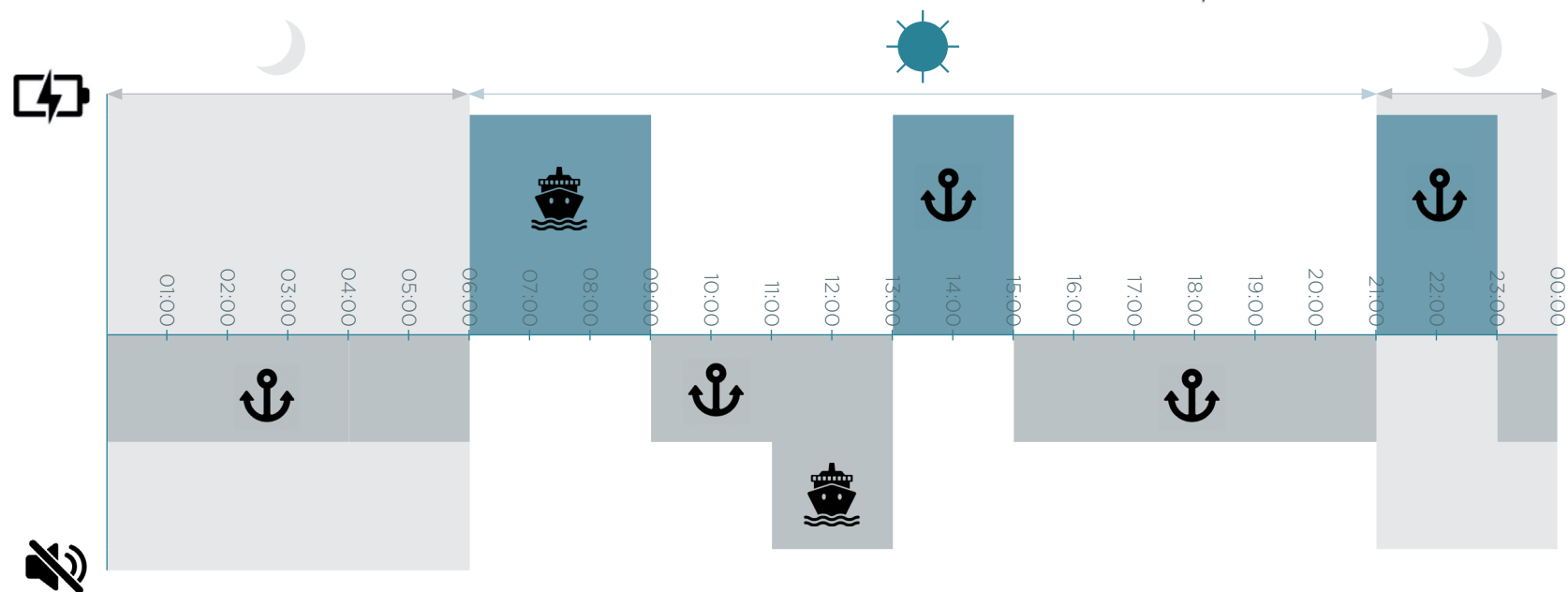
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ONE DAY ON BOARD INCEPTION

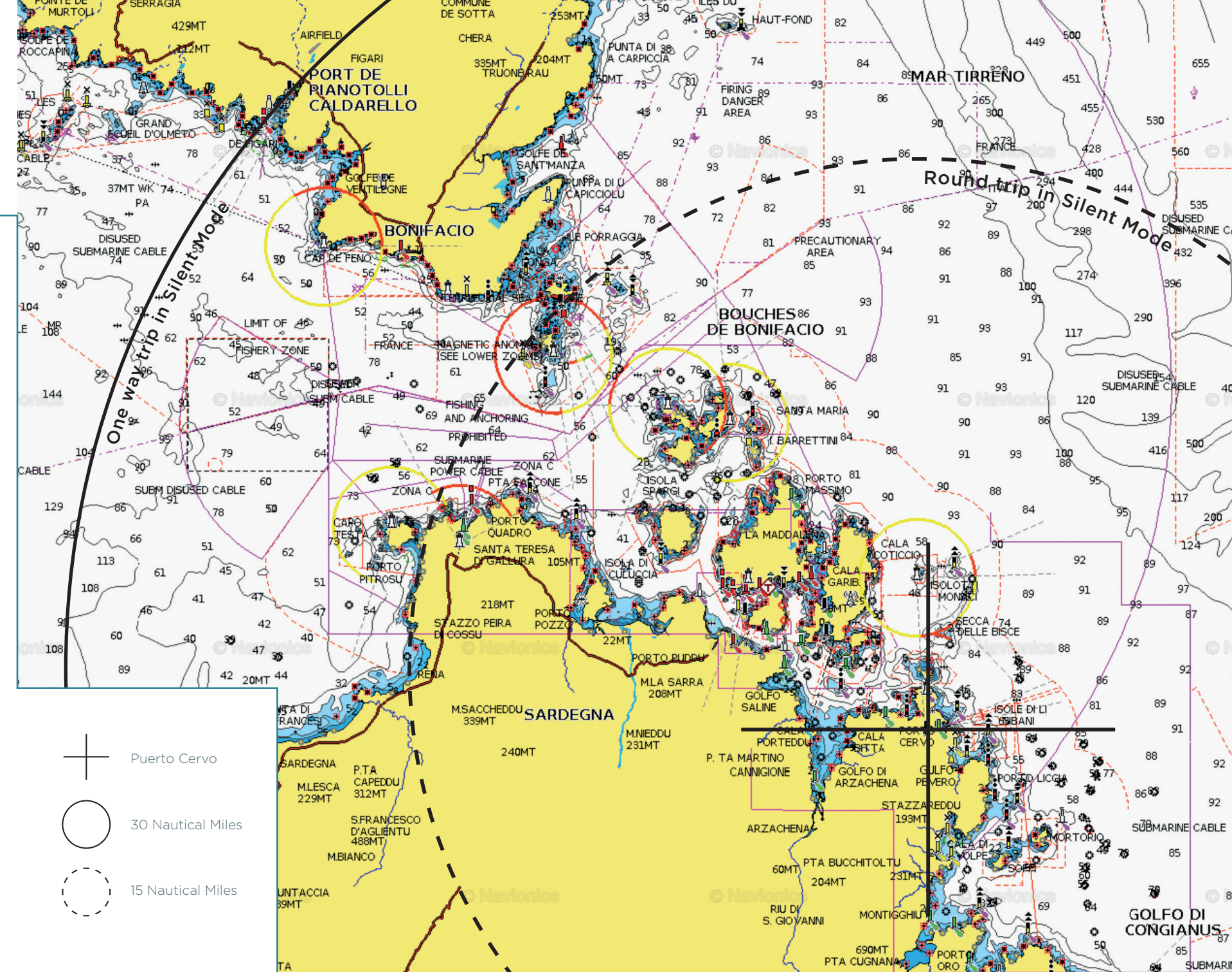
The **e-HYBRID** system is designed to suit a wide range of possible operating scenarios. This illustration presents one possible example of a day onboard Inception.

A typical 24hr cycle of operation has been assumed including:

- Overnight silent at anchor **7 hours**
- Daytime slow transit at 9 knots with charging **3 hours**
- Daytime silent at anchor **8 hours**
- Daytime silent cruise at 10 knots **2 hours**
- Daytime charging at anchor **4 hours**

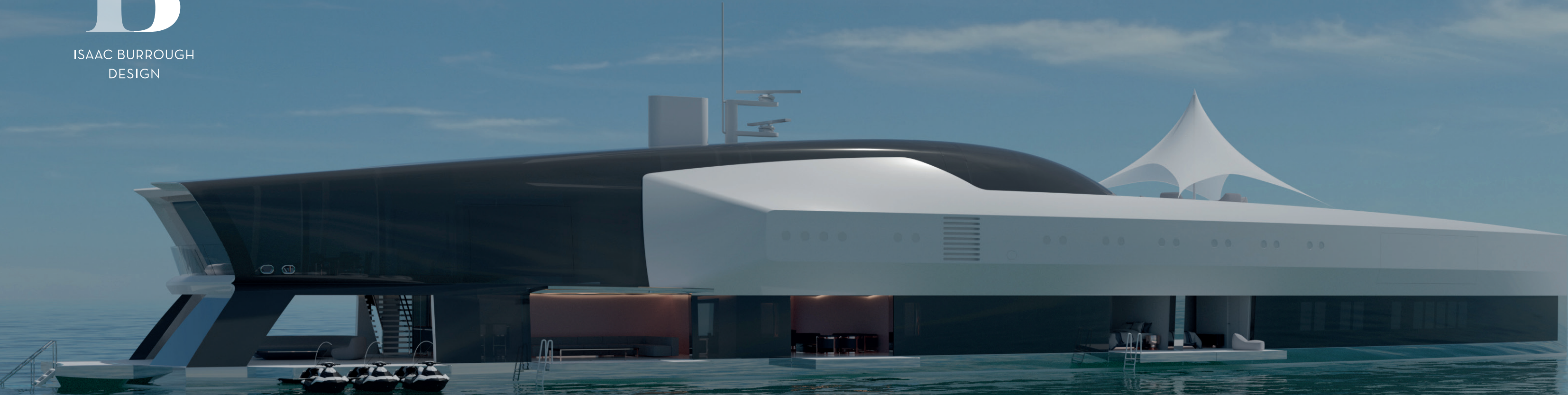


-  **At Anchor**
-  **Slow Cruising**
-  **Silent Modes**
-  **Charging Mode**



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The genesis for this project came from two ideas; creating a greater connection between guests and the ocean, and crafting a luxury experience around a single-level living space. When the team at Lateral presented their platform to me, and the flexibility it offers, I realised that this was a great opportunity to rethink the entire paradigm of a typical yacht layout.

This unique platform allows the entire lower deck to be used for accommodation. Almost all luxury areas are located on this single-level at the waterline, creating the ultimate terrace on the sea experience; giving guests unprecedented access to the water. Guests can easily move between different living areas thanks to a lack of staircases, creating a more cohesive and relaxing experience onboard.

Inception is all about being in and around the sea, from the moment you wake up and step onto your water-level terrace for a pre-breakfast dip, until late evening waterside dining and entertaining.

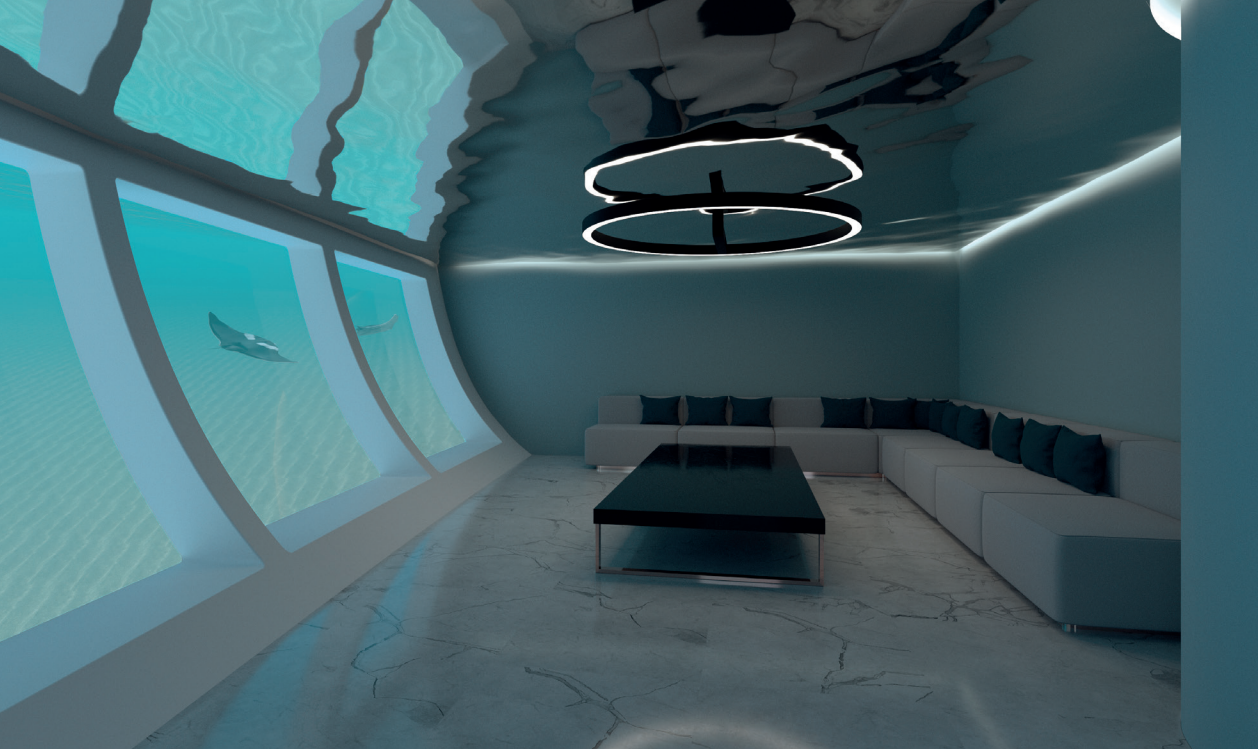
Inception caters to both active and passive relaxation. The aft portion of the yacht opens into one large open plan area; with an immense amount of toys onboard and fold-down terraces on all sides, this is the ultimate water sports experience.

The front part of the yacht is dedicated to passive relaxation, featuring a wellness area and a reading lounge where guests can relax and enjoy some tranquillity. Nearby, a submarine lounge allows to guests can enjoy the ocean from both above and below the surface.

The owner's suite is situated over two levels, a lounge at the waterline and a bedroom with ensuite on the level above. A unique mechanism allows both full height glass windows and extendable terraces. Featured on both levels, this gives the owner both elevated views and private access to the water.

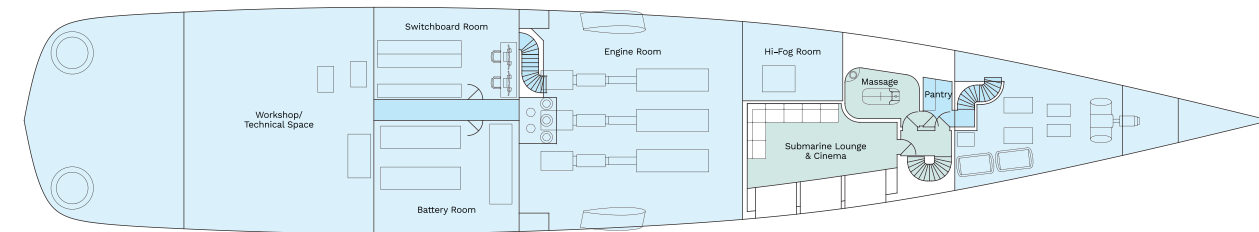
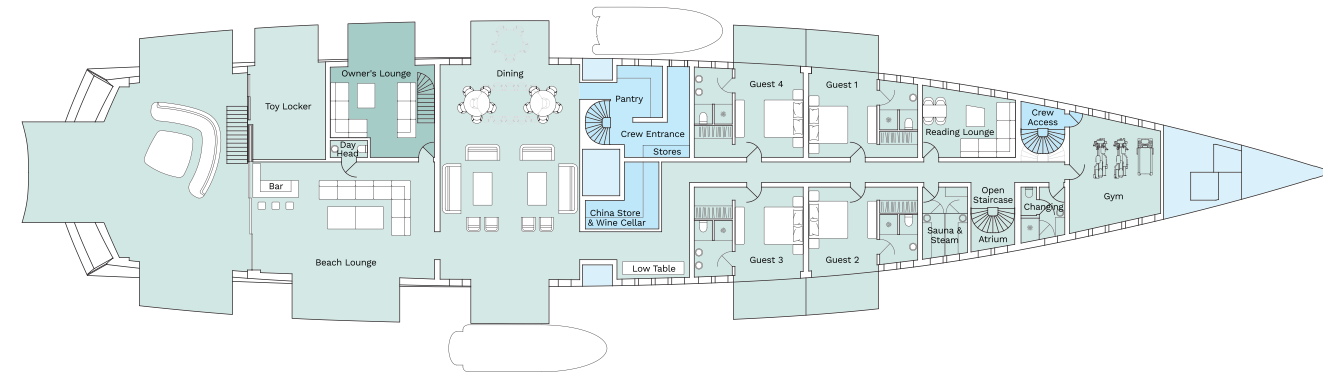
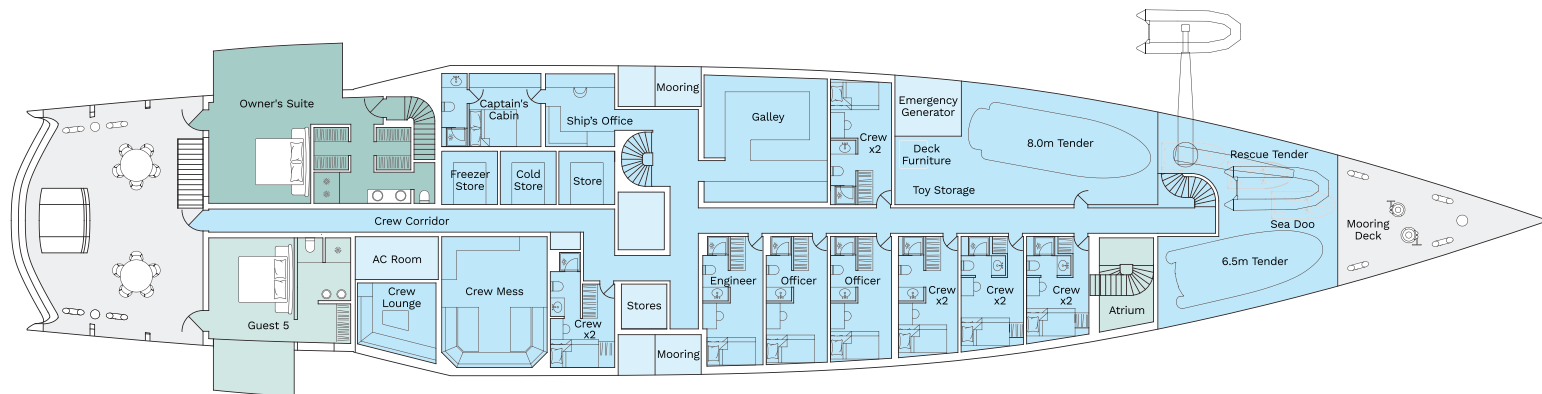
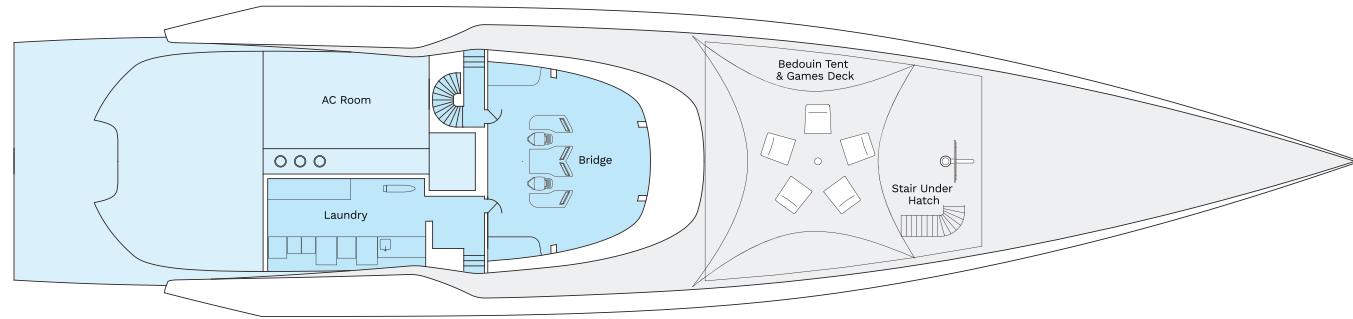
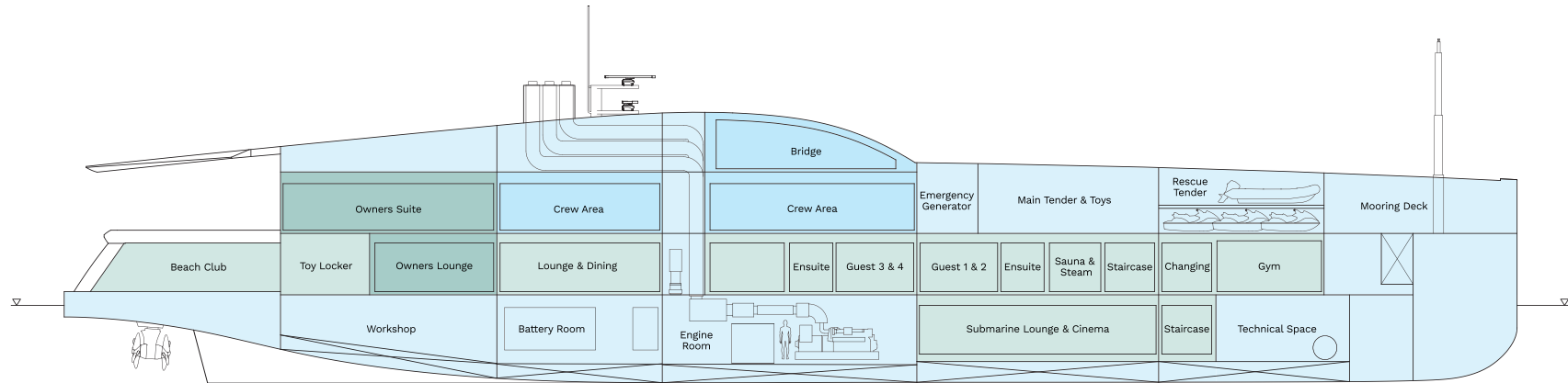
Sustainability extends beyond the technical platform; Inception features no use of teak or other rare woods. This not only protects these precious species of trees, but also enhances Inception's futuristic aesthetic.

A new technical platform combined with a pioneering design, Inception turns the traditional yacht layout paradigm on its head.



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Exterior and Interior Design



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Naval Architecture &
Engineering



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Length Overall **68.5 m**

Length Waterline **68.5 m**

Beam **12.5 m**

Draught (Half Load) **3.7 m**

Gross Tonnage **1750**

Class **✳ 100 A1 SSC Yacht Mono**

..... **G6 ✳ LMC, UMS, ECO (IHM)**

Notation **REG Yacht Code part A**

Performance Speed **16.0 knots**

Extended Cruise **12.0 knots**

Silent Cruise **10.0 knots**

Range **3750 Nm**

Main Propulsion Battery Pack... **3600 kW/h**


Generator Package **3 x 880ekW**


Guest Anchor Silent Mode **6-8 hours**

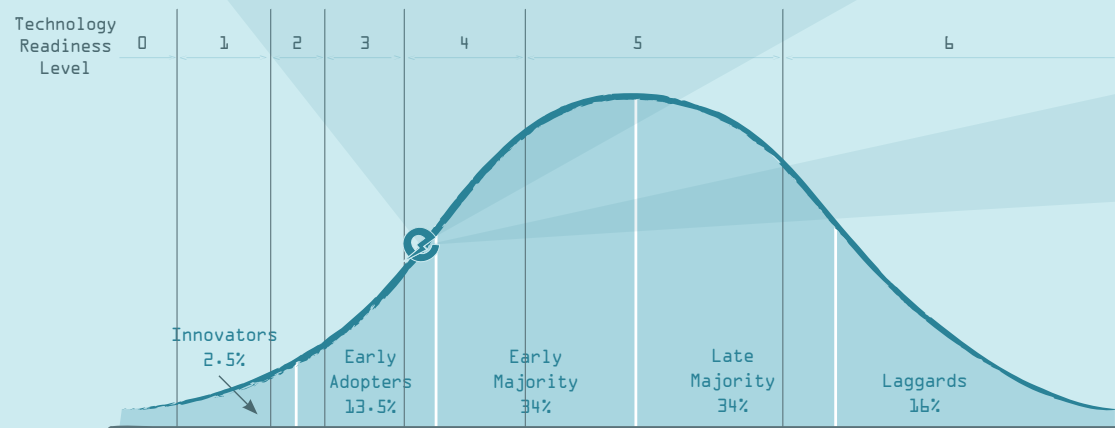
Silent Cruise Mode **3 hours**

Battery Bank Charge Time **2 hours**

LATERAL -HYBRID

There are several superyachts in build that are incorporating very large battery banks onboard. The Lateral -HYBRID system will require the scale of battery used to be doubled over the largest design currently in construction, or quadrupled over the oldest design in service. This is not a significant technical or commercial risk.

The innovative aspect of the Lateral -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. In this respect there are examples of this approach being taken outside the yacht industry. They remain unproven and are smaller in scale.



Technology Readiness Level vs Diffusion of Innovation

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

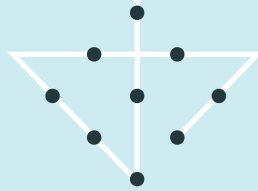
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