EDITOR'S NOTES

NILAYA IN DETAIL

THE OWNERS' BRIEF

The word "knowledgeable" is often applied to a yacht owner with experience gained from owning a boat or two. Nilaya's owner far exceeds that description with thousands of sea miles both cruising and racing production and custom yachts.

"I have been sailing in dinghies since I was a child," the owner said. "My first yacht was a Swan 48, followed by several other Swans which I [was] cruising and racing for many years." With the last 12 years sailing and campaigning the previous 34m / 112ft Nilaya to many podium finishes, he his wife had a well-reasoned list of requirements before they and his long-time project manager Nigel Ingram of MCM Newport entered into discussions with Nauta Design and Reichel / Pugh about the next boat. It would be their second project with this pair.

Noting that their carbon fiber yacht produced a lot of noise and vibration – a motion he calls ‘nervous’ – for new boat, they wanted the light weight benefits of carbon but sought a quieter package that felt solid and was built to the highest standards.

For the new Nilaya, which would be 12m / 42ft longer, he and his wife sought a yacht that could offer their family and guests the opportunity to “explore the world in the utmost comfort and safety, but at the same time could offer an exciting and fast sailing experience.”

The brief included being fast in light winds to enable them to cruise without the engine as much as possible. Also required were optimal cruising safety features and robust and reliable construction of both structures and systems. “We wanted innovative technology but nothing experimental,” he said. “We also wanted her to be silent, a crucial quality in a yacht when it comes to quality of life on board, including the crew.”

They considered building in carbon fiber, but, with extensive cruising plans, they were drawn to the increased impact resistance of aluminum. “More comfort means more space but also less noise and a more gentle motion at sea. For achieving those goals, we decided to build the hull in aluminum,” the owner said.

“Working with Nauta and Reichel/Pugh on preliminaries, we saw that we could design an aluminum yacht that was close in terms of displacement to an equivalent carbon fiber yacht. If you can win regattas it means that she is fast and sails well. The design is essential for this, but fast also means lighter and still strong. Royal Huisman did a great [job] to build lighter by focusing on decreasing the weight of the structure and choosing lighter materials without compromising the quality. They used carbon where it had no influence on the noise level and titanium instead of [stainless] steel where useful. By doing so, the boat is approximately 15% lighter than what they normally build.”

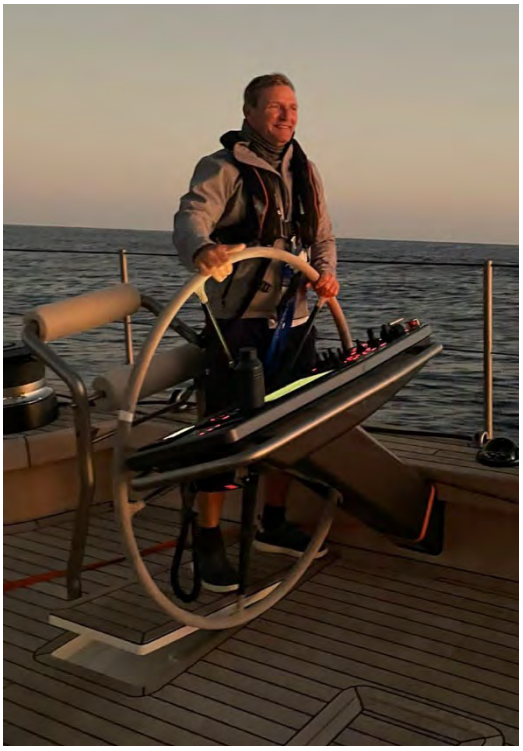
THE TRANSATLANTIC CROSSING: IN PICTURES

“We just finished an Atlantic crossing and I must admit that the yacht is very comfortable and fast; congratulations to Reichel / Pugh, Nauta and Royal Huisman!”

The owner of Nilaya

“It has been
an excellent crossing!
Fast trip across the big pond.
Nilaya is a fantastic fast
sailing boat: a dream to sail!
The deck layout and rig
are super functional,
which makes it even more fun.”
Bouwe Bekking,
owners’ pro race team captain

Royal Huisman's latest Panamax sloop, 47-meter / 154-foot Nilaya, sailed into English Harbour, Antigua, late in November after a fast Atlantic crossing that gave her owner and renown pro race team captain Bouwe Bekking as well as full-time skipper Romke Loopik plenty of all-conditions experience at the helm.



Nilaya's maiden ocean crossing facts:

- **2775 nautical miles**
- **mostly Beaufort 3 to 4**
- **10 days + 2 hours**
- **11.6 knots average**
- **top speed 20+ knots**

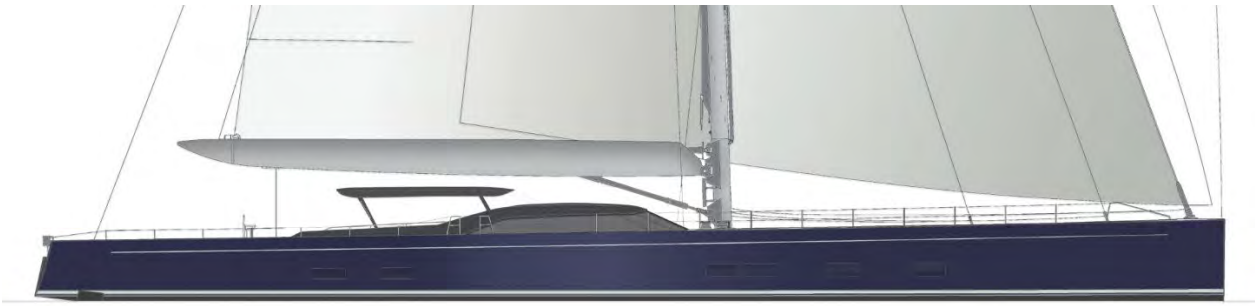
BELOW: NILAYA AFTER ARRIVAL IN ANTIGUA

DESIGN IS ALL ABOUT DETAILS AND PROBLEM SOLVING

“I started thinking that an aluminium hull weighs 60 to 70% more than a carbon boat, but the weight of the hull and deck is only about 15% of the total weight of a sailing yacht,” said Nauta Design co-founder Mario Pedol. “Our early intuition was that an aluminium construction sailing yacht could be much lighter than the existing aluminium fleet. Royal Huisman supported this vision with enthusiasm and accepted the challenging target of building a light displacement yacht. Extensive research work and CFD calculations ran by Reichel/Pugh confirmed our initial thought.”

RENDERING BY NAUTA DESIGN

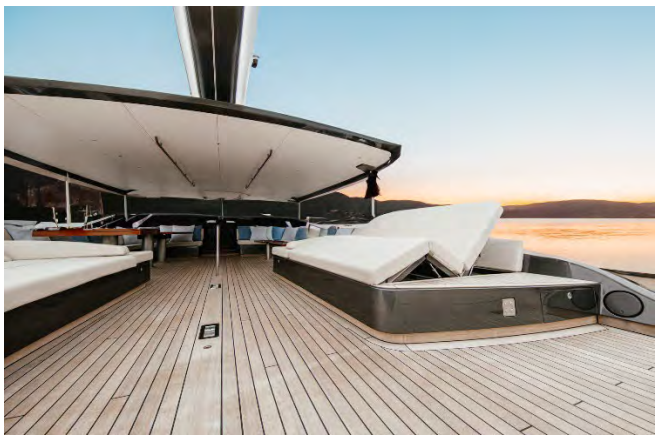
“The specific material became less relevant. The weight difference was acceptable in light of the owners’ other priorities,” said Pedol. Those other priorities included the strength of the material, the availability of repairs around the world, and the highest quality interior. “We set about discovering ways to minimize the difference and look for advantages elsewhere,” he said. The owners asked for a modern, sleek and powerful deck design keeping some parts of the look of their previous yacht, starting with a low, racy hull, a coach roof blending gracefully with a modern sheer line, and an efficient deck layout suitable for cruising and racing modes.



Beside the split helm station, the deck is arranged as three welcoming outdoor guest social areas: an opening beach platform / lounge at the transom, a shaded guest cockpit with sofas, dining and coffee tables, and a tender bay that transforms into a cozy and welcoming outdoor guest cockpit. This recessed seating area as well as the foredeck lounge can be covered with an awning is an attractive spot when the boat is on anchor on a hot day.

RENDERING (ABOVE) AND REALITY (BELOW).
THE GRAND STAIRCASE CAN BE RAISED
FOR LAUNCHING THE CREW TENDER

RENDERING (ABOVE) AND REALITY (BELOW)



A FULL-SIZE DINING TABLE TO PORT CAN BE EXTENDED TO HOST UP TO 10 - 14 GUESTS, FACING TWO COFFEE TABLES TO STARBOARD.. SUN LOUNGERS TRANSFORM INTO CHAISE LONGUE THAT ADJUST ACCORDING TO THE YACHT'S HEEL UP TO 25° - 30°. A FEATURE PLANNED FOR COMFORT EVEN ON LONG RANGE CRUISES

RENDERING (ABOVE) AND REALITY (BELOW)

To achieve their sense of a modern yet classic interior, the owner's decorator, May Vervoordt, chose the materials used in the styling of the interiors. Together with Vervoordt and the owners, Nauta conceived a color scheme for a modern look. White lacquered panels with a groove detail make the interiors fresh and bright. Mahogany furniture, flooring and ceiling frames gives classic warmth and a sense of breadth to the interior. Headroom is remarkable and domed ceilings increase the perceived height.

The main salon is the heart of indoor social life with a spacious dining area and comfortable lounge to port and spacious seating with fixed and loose furniture to starboard. Large windows allow almost 360° views for guests inside the salon when seated.

The entire space opens to the exterior guest cockpit protected by the carbon hard top. The salon has a clever pantry that disappears when not in use. Appliances such as a coffee machine, wine cooler, icemaker, fridge and a sink are concealed behind panels or in drawers, minimizing the time needed to secure the interior for sailing.

THE FORWARD CURVED WINDSCREEN
HAS THREE OPENING SECTIONS
TO LET BREEZE INTO THE COCKPIT

A few steps lower and forward is a relaxed TV lounge with sofas and bookshelves. This leads to the forward accommodations where a full-beam owners' suite features a walk-in closet, an office and seating areas, and a king-sized bed. Large hull windows bathe the room in natural light. The stateroom was a design challenge as it lies beneath the tender bay. The overhead balances the tender bay's central dip with higher side passages, giving an excellent perspective on the impressive width of the cabin. The VIP, which can be arranged as either twin berths or a double, is to port, opposite the TV lounge. Two more ensuite guest cabins are aft of the salon. Symmetrical and identical, these can also convert into double cabins, plus they're both equipped with additional Pullmans, meaning up to eight guests can accompany the owners.

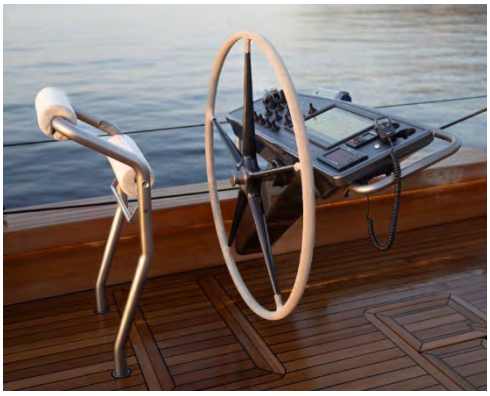
DESIGN MOCKUPS: GETTING IT RIGHT

Virtual reality may create an exciting first impression, but ergonomics, interactions and a “live” experience cannot be 100% imitated with a Virtual Reality headset or a digital 3D-model. When it comes down to assessing those few modified centimeters here or there, stepping on board is by far the best way to feel, adjust and optimize the design and ergonomics.

To that end, Royal Huisman emptied its voluminous paint hall and built a full-scale model from mast to swim step machined out of synthetic material months ahead of the start of the actual production. For several days the owner, his representatives and racing team explored every inch to plan coaming and seating heights, winch and hardware placement, lighting, details of the twin helm stations, grabrails, storage, etc. To make sure the coach roof would not impact seeing the bow, Royal Huisman raised the door and set a bow marker in the parking lot, simulating its exact distance and height off the water.

MOCKUP (ABOVE) AND REALITY (RIGHT). REMOVABLE GRABRAILS IN BETWEEN THE TRANSOM AND COCKPIT TO GUARANTEE SAFETY OF GUESTS AND CREW: NEVER MORE THAN TWO STEPS WITHOUT A GRABRAIL

MOCKUP (ABOVE) AND REALITY (BELOW)



Helm positions and simulated heel angles were tested to provide the best visibility to the bow. Careful study went into optimizing proportions to obtain a coaming protecting the guest cockpit and a bulwark protecting the aft cockpit, maneuvering area, and side passageways.

A wooden kicker between sections in composite and teak makes them visually lighter and more modern and also houses the rope lights that illuminate the deck at night

THE ULTIMATE EXPRESSION OF PERSONAL FREEDOM

STYLED 21M / 69FT RONDAL CARBON
COMPOSITE FURLING BOOM

HARNESSING THE WIND

For any high-performance cruiser, a carbon fiber mast, boom, and standing rigging are critical to keeping weight as low and centered for optimal balance. While Rondal has considerable carbon spar expertise, bringing the design of this component and its associated stays, blocks and chainplates – and adding the sailmaker into the design process – is a page out of a maxi-racer's playbook.

Nilaya is the first yacht of this size planned from the beginning to take full advantage of structured luff sail design pioneered by Doyle Sails, a choice that allowed the entire Rondal mast, rig, and components to be significantly lighter. With the naval architects, sailmaker and Rondal working together, accurate calculations on the loads and stresses under sail could be safely efficiently planned for the gear, deck, hull and frames.

Structured luff technology essentially changes the manner in which load in the luff of a sail is distributed and, by reducing luff sag, it allows the sail to achieve more driving force. An evolution of stiffening the luff of the sail with a cable or a forestay sleeve, fiber orientation within the sail creates stiffness and shares the load back through the sail, reducing compression loading on the mast. First employed for offwind code sails, the technology has spread to Doyle's upwind sails as well.

A cursory look at the feedback loop of involving all parties in this design and engineering process, including the boat's crew who know how the boat will be sailed, shows how the Featherlight synergy can accomplish weight savings in all component parts without compromising performance. The new sail design reduces mast stress, allowing for a thinner spar. With accurate sail load predictions, the standing rigging keeping the mast in column matches the loads for safety but keeps from adding weight by overbuilding them to estimated numbers. Knowing how much power will be developed by the sails helps correctly design the keel, calculate the ballast and even specify the frame spacing and hull plate thickness needed to keep the boat from flexing or deforming over time. This allows great confidence in knowing where material thickness can be safely reduced and where use of carbon fiber backing bonded to aluminum will produce the proper strength without infringing on interior space or impacting balance. Without this collaboration with Rondal as the system integrator at the design phase, it would have been impossible to assure safety margins and the least possible structural weight.

CARBON RIG WITH CURVED SPREADERS

“Bringing in the mast and sail designers early in the process has significant advantages,” said naval architect Jim Pugh. “From the aero CFD side, Rondal and the sail designers shared high quality data about sail forces and loads that we integrated into the hydro CFD studies of the candidate hulls. This markedly improved the quality of the CFD hull testing and the resultant performance prediction.”

The new sails also drove a spar innovation. To take advantage of the very narrow headsail sheeting angles possible, Rondal created a radical new curved carbon fiber spreader design and also supplied new generation hybrid (carbon and aluminum) captive winches, hatches, and various sail handling gear. Most deck hardware is titanium.

RETHINKING THE MAST BASE AND INTEGRATING
THE HALYARD TURNING BLOCKS AND THEIR JAMMERS
INTO THE MAST COLLAR LIGHTENED
AND SIMPLIFIED THE DECK CONSTRUCTION

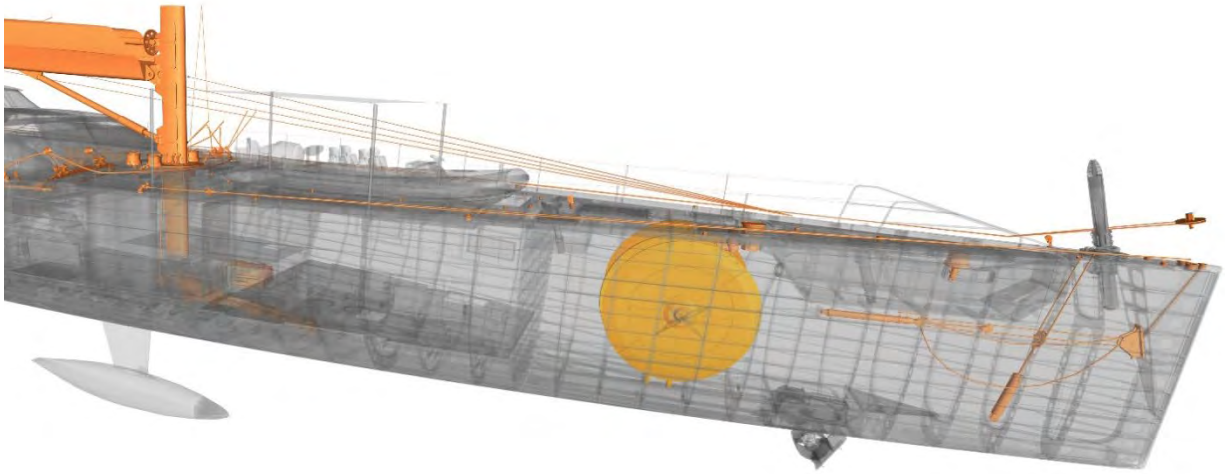
EXPANDING RONDAL'S ROLE

Royal Huisman's sister company, Rondal, flexed its engineering muscle and carbon expertise, shifting from product supplier to system integrator. Working with the builder and naval architects through design and build, the team determined where carbon composites could be used to maximize the advantage of stiffness and weight savings.

Rondal created a range of custom carbon fiber gear including keel trunk, recessed tender bay, hybrid carbon / aluminum captive winches, forepeak sail drums, the crew companionway entrance, steering pedestals, the 17.5m / 57ft long carbon composite coach roof, guest cockpit structure, watertight bulkhead, carbon hatches, and more.

THE SHELTERED GUEST COCKPIT AND CARBON CREW COMPANIONWAY

ABOVE: A PERFECT FIT. INSTALLING THE CARBON COMPOSITE DECKHOUSE AND GUEST COCKPIT STRUCTURE. NOTE THE ULTRA-LIGHT AND SLIM CARBON KEEL TRUNK.
RIGHT: CARBON WATERTIGHT BULKHEAD



RONDAL CREATED A RANGE OF CUSTOM CARBON FIBER GEAR INCLUDING THE FOREPEAK SAIL DRUMS

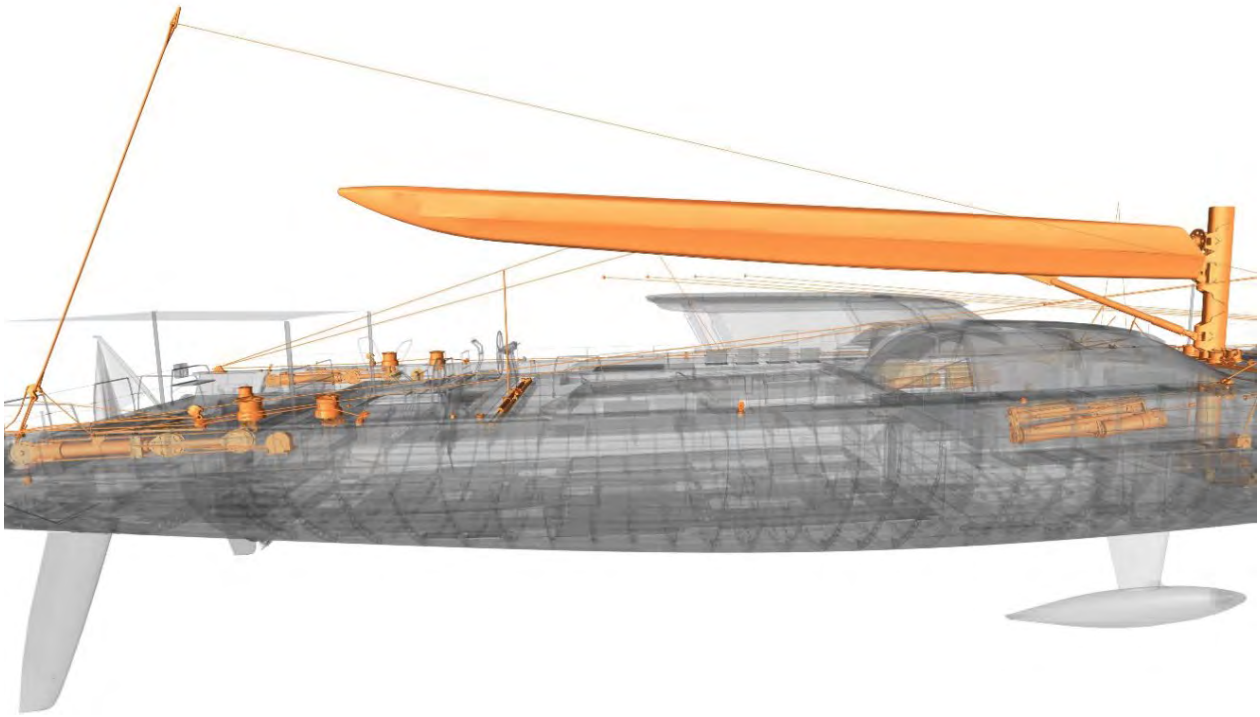
When it came to the primary propulsion for this Panamax speedster, Rondal's team worked closely with the naval architects on the sail plan and rig loading and with sailmaker on the specifics of managing the new structured luff sails pioneered by Doyle Sails, a choice that allowed the entire Rondal mast, rig, and components to be lighter.

Nilaya's blade jib, for example has no headstay lock but uses lashings instead, a switch that saved 100kg / 220lbs. The towering mast is tapered in two directions at the top, a small refinement that saved 50kg / 110lbs, but weight saved in a very significant place.

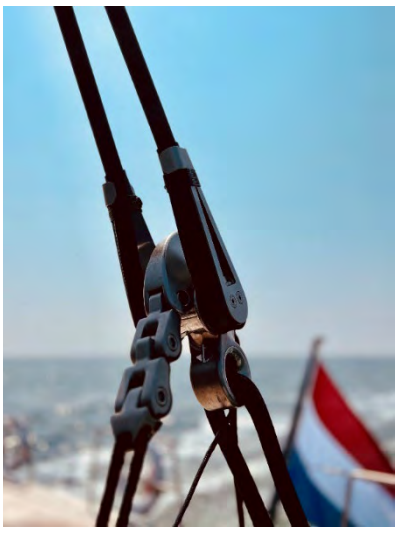
PANAMAX CARBON MAST HEIGHT: 62.5M / 205FT (FULL AIR-DRAFT: 63.9M / 209FT)

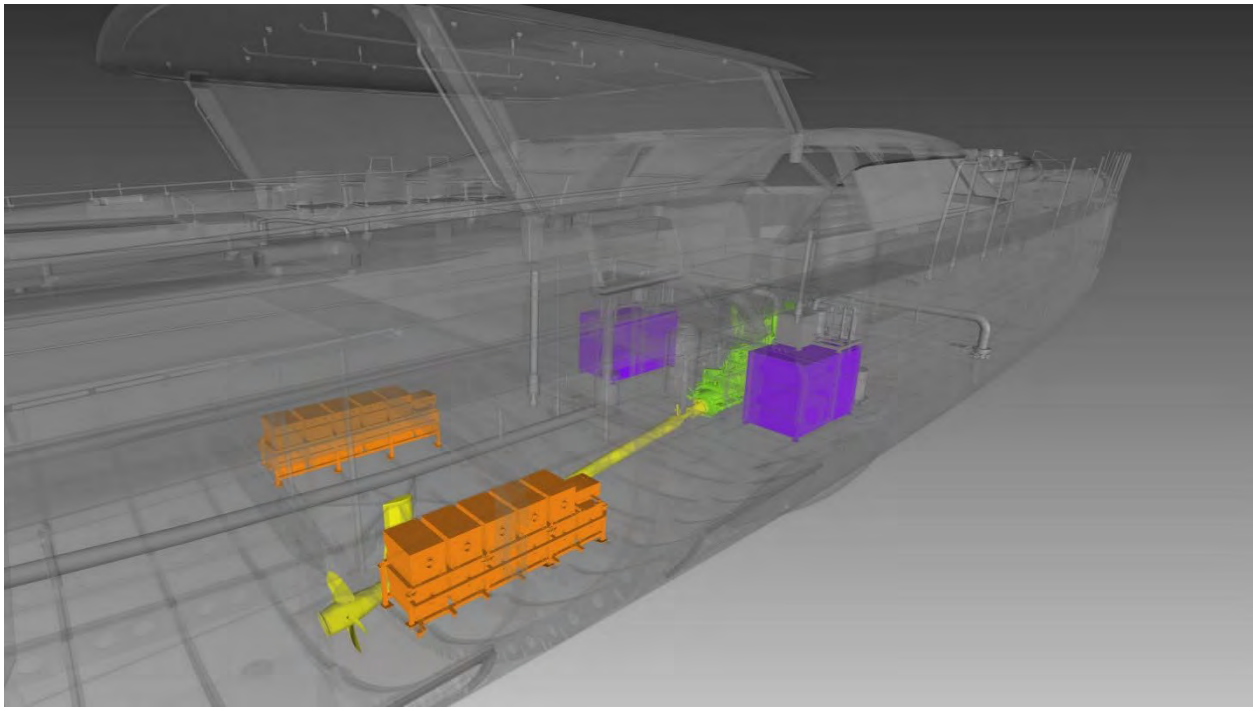
ABOVE: NILAYA'S MAST IS TAPERED IN TWO DIRECTIONS AT THE TOP
BELOW: CARBON LAZARETTE HATCH WITH MANUAL CENTRAL LOCKING SYSTEM
(NOTE THE INTERCONNECTING CARBON BARS) AND HYBRID CARBON / ALUMINUM CAPTIVE WINCHES

To take advantage of the very narrow headsail sheeting angles, Rondal created a radical new curved carbon fiber spreader design that is more aerodynamic than anything previously available plus they allow more J2 area.



Another first was replacing traditional running backstays with locks – this by owner request. The arrangement saves 1,200kg / 2,645lbs over the typical arrangement utilizing captive winches below deck and three to four cubic meters of volume in the lazarette.





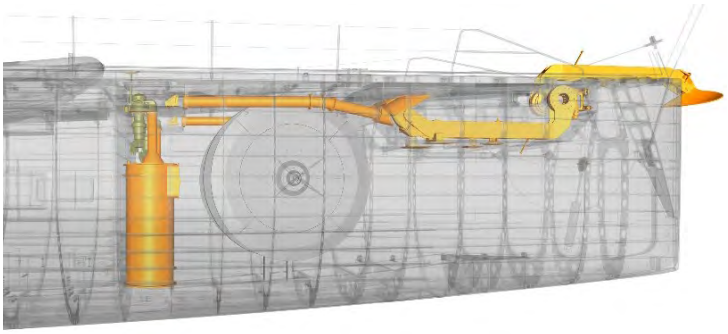
AMPING UP AUXILIARY POWER

Aboard Nilaya, the owners and their team are the first to say that sailing is the main source of propulsion. To meet the demand for an emergency “get home” engine, Royal Huisman developed a ”tribrid” propulsion system.

This flexible system offers three ways to power the variable pitch propellor without a supplemental third engine or gearbox, thus saving 2,000kg / 4,409lbs. The system consists of a Scania (640 kW @ 1800 rpm) + 140 kW permanent magnet motor, 2x 129 kW variable speed generators, and a 180 kWh battery pack for silent operations, and peak shaving.

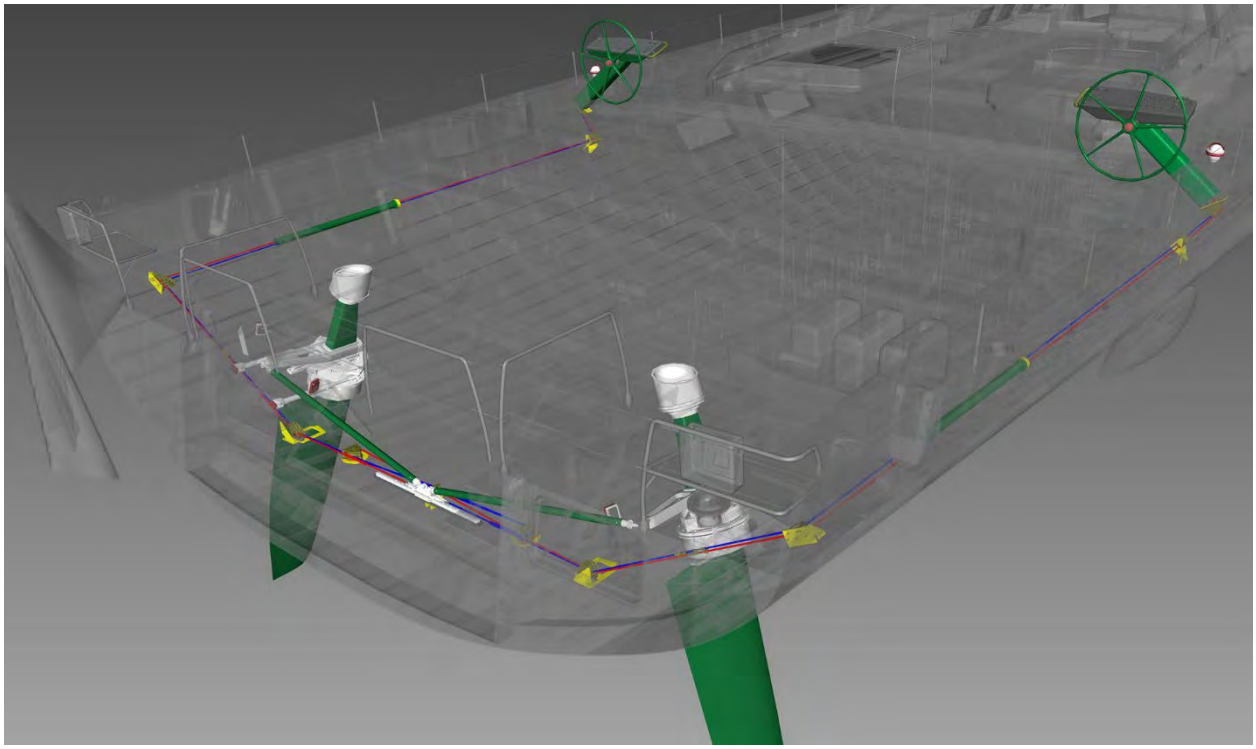
When motoring, it is possible to turn off a second genset, while the engine within the shaft line provides energy for the hotel. The relatively smaller main engine is possible because maximum power output is provided when both the engine and electric motor are running. With this boost function, the main engine is running at a more economical rate at cruise speed. Its battery pack has the added benefit of allowing the yacht to operate silently in carbon exclusion areas.

CENTRALIZED AT MAIN POSITIONS
LIKE THE HELMSTATIONS
AND ENGINE ROOM:
ROYAL HUISMAN'S PROVEN
ALARM & MONITORING SYSTEM
WITH INTEGRATED CONTROLS.
THE CAPTAIN OR ENGINEER CAN
WITH ONE CLICK SEND
THIS INFORMATION TO THE SHIPYARD
FOR REALTIME DIAGNOSIS
AND SOLUTION IN THE EVENT
OF A MALFUNCTION

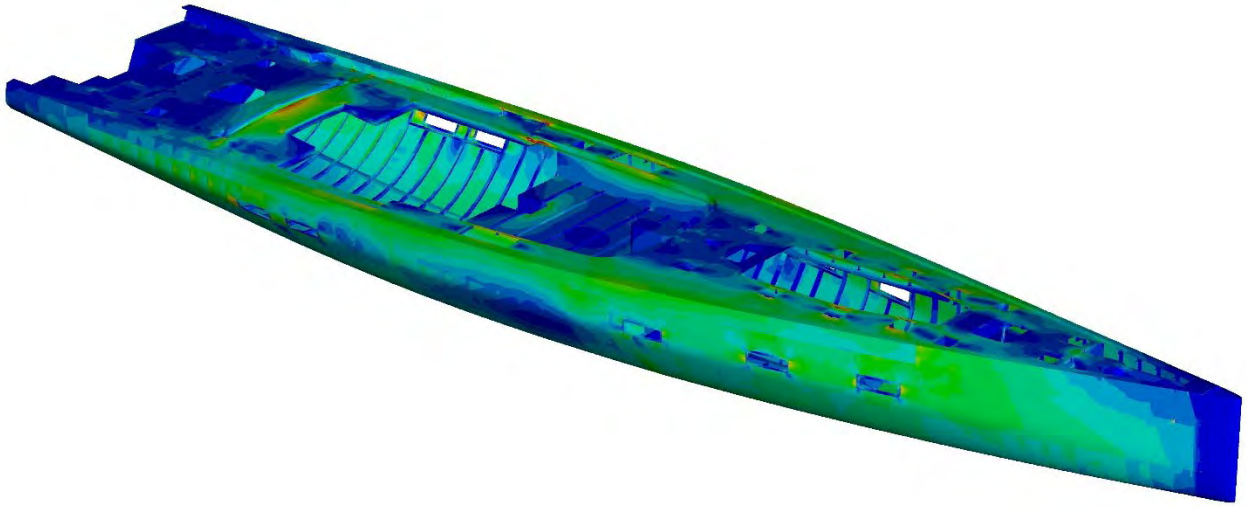


WEIGHTSAVING TWIN ANCHOR
SYSTEM WITH GFRP CHAINLOCKERS
AND TITANIUM SWING OVER ARMS

RACE PRACTICE IN PALMA: SUB 10 KNOTS TRUE WIND SPEED



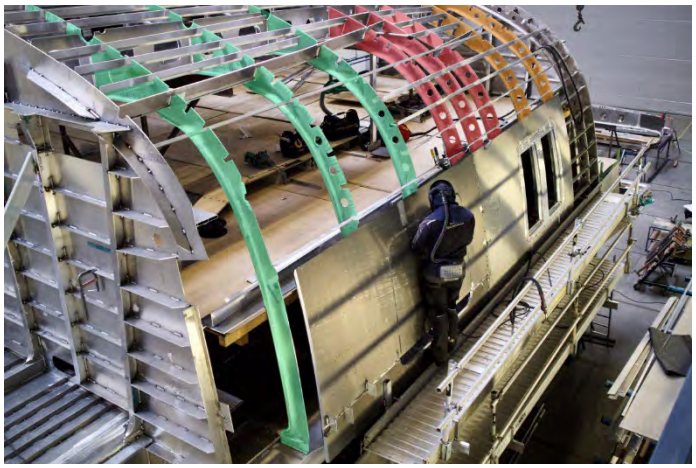
TWIN RUDDER STEERING SYSTEM



THE INFINITE USES OF FINITE ELEMENT ANALYSIS

Finite element analysis is a complex mathematical geometric computation used for predicting how a part or an entire product will react under stresses such as load, force, heat, vibration, etc. Being able to look at a part in three dimensions also predicts how the part will react as the same stresses are being applied in its neighboring parts, thus identifying potential weak or vulnerable points that can be corrected in design. Think of it as a kind of digital prototyping but far more accurate and much faster.

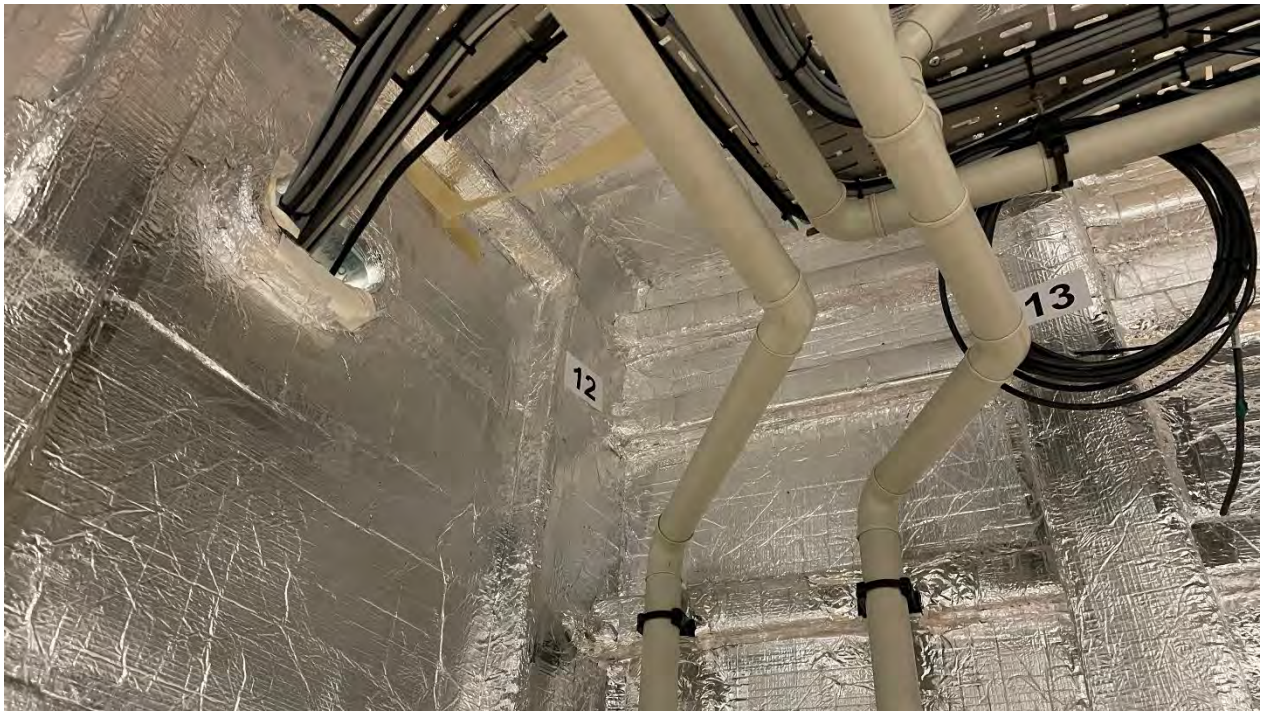
Finite Element Analysis of Nilaya's 3D model allowed detailed engineering to "a much higher level," according to Jim Pugh. The structure and plate thickness were optimized computationally in FEA predicting longitudinal stiffness or deflection, without so much as touching that first piece of metal or carbon fiber. The structure and plate thickness were optimized computationally in FEA predicting longitudinal stiffness and deflection, without so much as touching that first piece of metal or carbon fiber.



SMART POSITIONING OF FRAMES

INSPIRED BY ESA AIR SPACE: ROYAL HUISMAN'S CONCURRENT DESIGN AND ENGINEERING

ABOVE: HULL TURNING IN SEPTEMBER 2021. BELOW: VARIOUS WEIGHT SAVING SOLUTIONS



The proof of the plan is in the numbers. Sure, every builder knows weight is the enemy of efficiency, but does the Featherlight™ system really deliver the goods? Featherlight™ makes Nilaya the world's lightest aluminum sailing superyacht by length. The numbers of the process speak for themselves, saving several tons in the process.

A critical look at the standard HVAC system led to substituting direct expansion and fan coils for each room, shaving 600kg / 1,323lbs from systems weight.

The ”tribrid” propulsion system eliminates the need for a supplemental engine and gearbox, thus saving 2,000kg / 4,409lbs.

Tapering the top of the mast: a small refinement that saved 50kg / 110lbs, but weight saved in a very significant place.

Reducing standard teak decking from an average thickness of 15-16 mm down to 9mm saved 1300kg / 2866lbs with no change to the deck appearance.

Harnessing the power of a Panamax rig takes substantial hardware but what-if thinking led to weight savings. For example, Nilaya’s blade jib uses lashings instead of a headstay locks saving 100kg / 220.4lbs.

NILAYA'S CHRISTENING CERMONY AT HET SCHEEPVAARTMUSEUM (NATIONAL MARITIME MUSEUM) IN AMSTERDAM

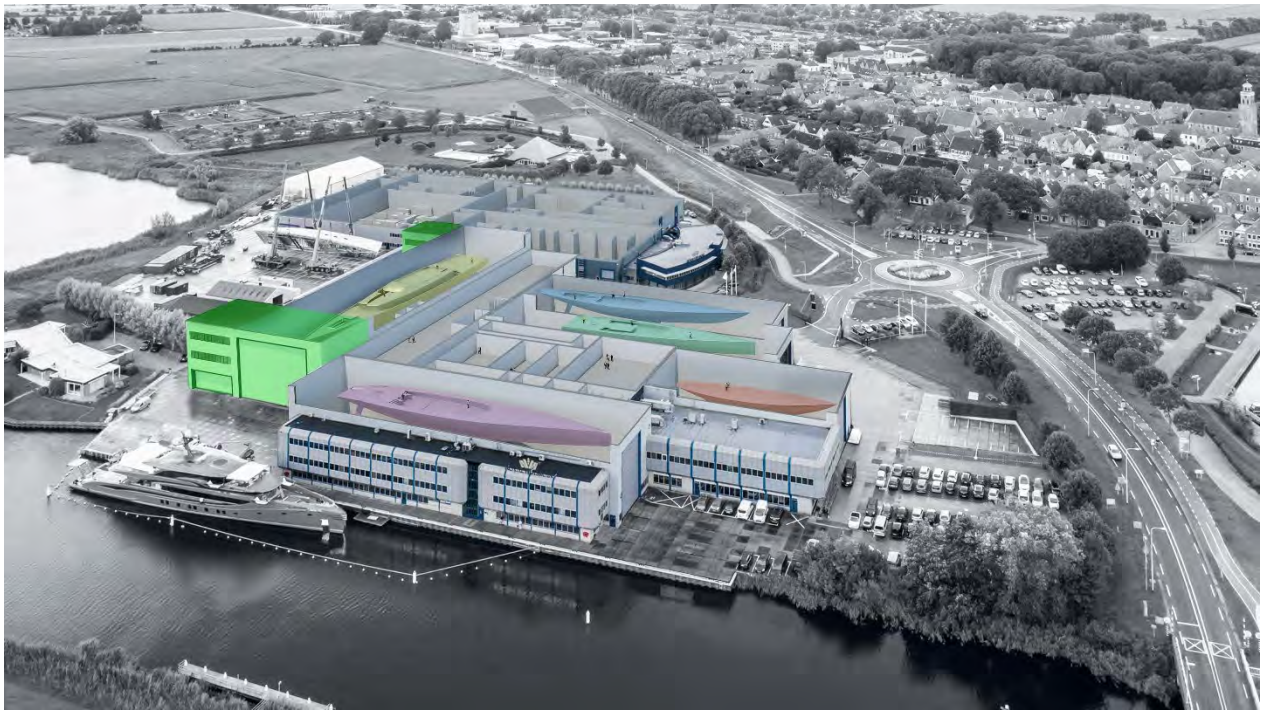
Replacing traditional running backstays with locks and hydraulic rams – this by owner request – save 1,200kg / 2,645lbs over the typical arrangement utilizing captive winches below deck and preserved three to four cubic meters of volume in the lazarette in the bargain.

Perhaps the biggest leap forward was the development of new hybrid carbon / aluminum captive winches that are half the weight of the conventional all-metal captive winch. These hybrids utilize an economical aluminum bracket and housing but a carbon drum. The new drum construction allows the diameter of an 18 ton pulling-power winch to be trimmed from 600mm / 23.5in to 450mm / 17.8in, the weight dropping simultaneously from 890kg / 1,962lbs.

SPRING 2023: SEATRIALS ON THE NORTH SEA

In summary, continuous weight monitoring throughout the build achieved the ambitious goal of slicing **11% of the construction weight** of its typical advanced aluminum cruising yachts with equipment, sailing and mechanical systems and interior furnishings creating more savings for a **15% total reduction**.

Learn more? royalhuisman.com/featherlight



ROYAL HUISMAN'S NEWBUILD SHIPYARD IN VOLLENHOVE:
HOME OF THE WORLD'S FINEST CUSTOM SUPERYACHTS

ABOUT ROYAL HUISMAN

Unlike most shipyards today, Royal Huisman has been building sailing vessels since it was founded in 1884. Many things have changed and the shipyard has evolved from "a local builder of wooden workboats" to receiving the Dutch Royal Warrant 40 years ago. Still, the core business model has never changed – the shipyard team builds unique quality vessels by hand, including 26 yachts measuring longer than 40m / 131ft.

Over the years, the shipyard team developed many smart solutions, several of which became industry-trendsetters. It has a rich history of in-house innovations that have been the backbone of the shipyard's success. Royal Huisman has built 173 aluminum yachts during the last 60 years and added carbon fiber to its capability last century. The shipyard's latest revolutionary Featherlight™ method is a holistic lightweight approach to yacht building combining various complimentary weight-saving solutions utilizing aluminum and carbon fiber components.

Royal Huisman employs a team of more than 350 highly motivated and competent people, from skilled craftsmen to expert concept designers working at facilities for custom builds in Vollenhove and the Amsterdam region. This second location in the Amsterdam region is an addition to the existing shipyard, with a focus on Huisfit projects.

MAIN SPECIFICATIONS

Yacht name:	Nilaya
Type:	High-performance cruiser sloop
Shipyard number:	Project 405
Length overall:	47m / 154ft
Length waterline:	45m / 147ft
Beam:	10m / 33ft
Draft:	4.5 - 6.9m / 15 – 23ft
Accommodation:	8 - 10 owners / guests + 8 crew
General concept, ext. & interior design:	Nauta Design
Naval architecture:	Reichel / Pugh
Owners' newbuild representative:	Nigel Ingram, MCM Newport
Owners' pro race team:	Bouwe Bekking
Builder:	Royal Huisman
Construction:	Aluminum + carbon composite

Classification:	Lloyd's SSC hull certificate
Hybrid propulsion:	Scania DI 16 090M (640kW @ 1800 rpm)
	+ 140kW PM motor / generator on gearbox
Variable speed generators:	2x Volvo D4-175 129kW @ 2800rpm
Battery system:	180kWh for silent operations, silent period
	+ peak shaving
Speed:	16kn / 12kn cruising
Fuel capacity:	15,000l
Range:	2750Nm @ 10kn
Thrusters:	Retractable bow + stern, 75kW
Tenders:	7m X-tender RIB + 4m inflatable

Rig:	Carbon Panamax mast + furling boom, Rondal
Sail handling:	Integrated Sailing System, Rondal
Rigging:	Carbo-Link elliptical, carbon
Mast height:	62.5m / 205ft, full air-draft: 63.9m / 209ft
Sail area:	1269sq m / 13,659sq ft upwind
	2141sq m / 20,045sq ft downwind
Sails:	Doyle Sails, Structured Luff
Delivered:	1 June 2023

ST. BARTHS BUCKET

Update 25 March 2024 - The regatta is a wrap. Nilaya: Winner of Race 3. Her race captain, Bouwe Bekking, posted: “First event for the ‘new’ Nilaya: steep learning curve. We sailed better every day, but even with two perfect races it was impossible to beat the ketches on handicap in ORCsy. C’est la Vie” Nilaya overall: third in ‘Les Gazelles’ class. Jim Pugh, Nilaya’s naval architect and president of Reichel/Pugh adds:

> **“Sailing Nilaya in the St. Barths Bucket was the ultimate superyacht race experience. This was her first regatta and the yacht performed magically under the owner’s helmsmanship on the spectacular racecourses.”**

Jim Pugh continues: “Nilaya will win many regattas in between miles of epic cruising on different oceans of the planet. It was a pleasure to collaborate with Royal Huisman, Nauta, and others in bringing the owners vision to fruition. Nilaya is a true sailing yacht that redefines the future of luxury and super yachting.”

NOTE TO YACHTING PRESS

As you might know Royal Huisman works closely with our clients and members of the yachting press. We do this in order to give all our media friends equal support and opportunity. The images from this press release can be available on request via: Jurjen van ‘t Verlaat: jurjen@royalhuisman.com or +31 527 243131.