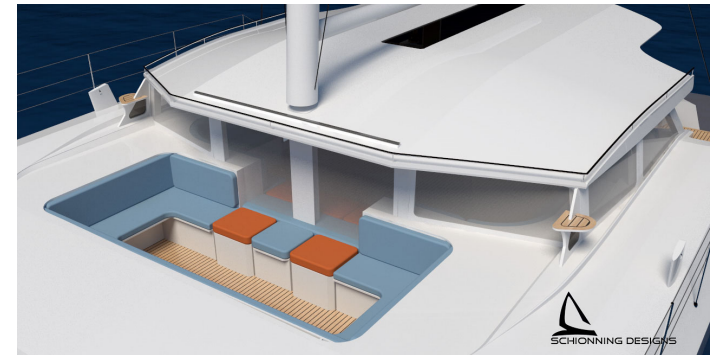


The Arrow 1500 Day Charter

Study Plans

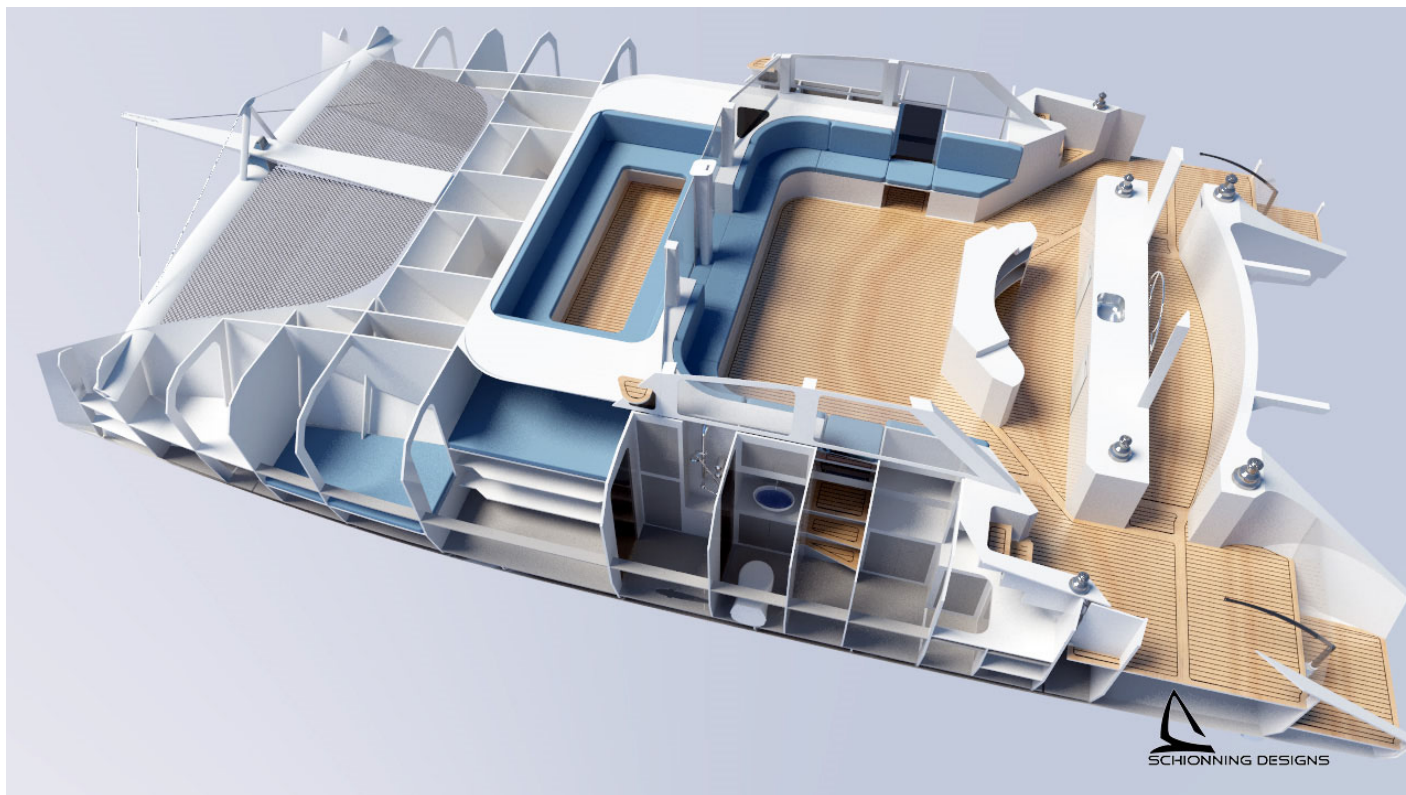




LOA	15.00 Metres
BOA	8.00 Metres
DRAFT	0.500 Metres
Headroom (Throughout)	Full Standing
MAST HEIGHT	19.00 Metres
SAIL AREA (Main+Headsail)	87+40 Sq Metres
PAYLOAD	2800 kg
DISPLACEMENT	8,500 kg
BRIDGEDECK CLEARANCE	0.800 Metres
PASSENGER CAPACITY	32 Guests
FUEL CAPACITY	350 Litres
WATER CAPACITY	500 Litres
MOTORS	2 x 20-40hp Diesels
SAILING SPEEDS	15—25 Knots +

Commercial designs are nothing out of the ordinary for the Schionning Designs team, having completed a number of custom design projects in survey including a number of sailing catamarans, a 16 metre passenger ferry for Vanuatu, and a number of smaller transfer vessels. The demand is now increasing, in particular for a charter catamaran that can not only accommodate as many guests as possible but also perform adequately when under sail without having to motor-sail. This led to the creation of the Arrow 1500 Day Charter (DC).

The design was initially commissioned by a French family that runs charter tours on the west coast of France. One major requirement is the ability to be wheelchair-accessible, with the bridgedeck floor kept at one level



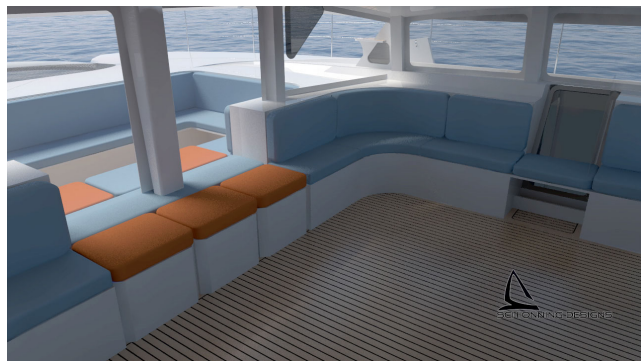
throughout and comfortable boarding access via two opening doors set into the transom sides. The bridgedeck has been kept clear and open-plan for just this reason, with comfortable seating set around the perimeter, large opening windows for ventilation and a 360 degree view. At the transom is a large turning circle allowing all passengers to have a chance to skipper the boat. A bar and serving counter is positioned in front of the centralised helm station, with a sink and an abundance of storage for glassware, crockery, food and drinks. Alternatively this area can be used to house bar fridges or other desired appliances. The helm station itself is full-width and spacious, allowing the

skipper an uninterrupted view of the entire boat, including a glass panel in the cabin roof to keep an eye on the sails when underway. The track runs behind this with winches set strategically within arm's reach and all ropes running neatly to the helm to avoid them becoming a hazard for guests.

Access below is via two sets of stairs from the bridgedeck, covered by a hinging seat bottom to maximise sitting space and hatch doors allow or restrict guest access as necessary. The layout features four double sized cabins afore intended for use by the owners and crew, meaning the boat can be lived aboard while running charter operations.

Design Overview

Arrow 1500 DC



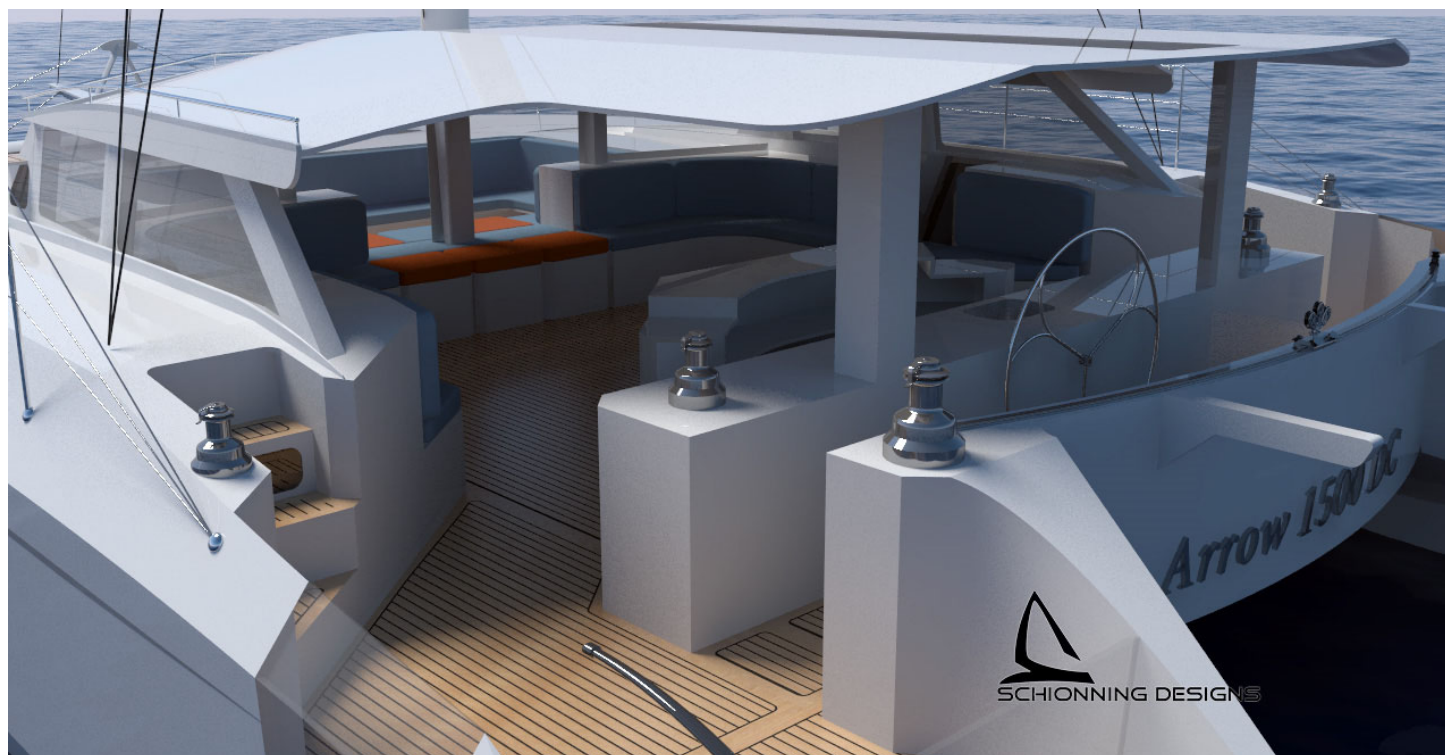
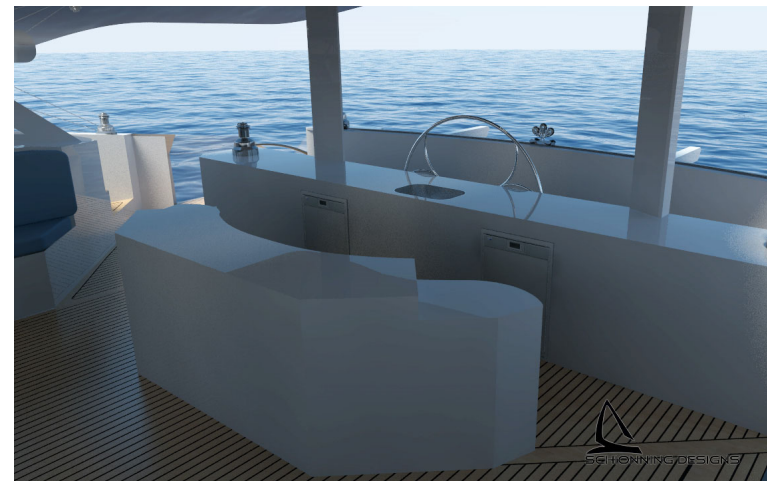
In the port hull is the head complete with basin, separated from the shower beside it. Access to the forward cabin is through the shower making it easy to divide this and keep the area private from guests. The spacious cabins have both a queen sized bunk and additional single bunk situated forward giving the ability to comfortably sleep six adults. Aft in the port hull is a workshop/storage area, or this could be used as a private changing room for those aboard.

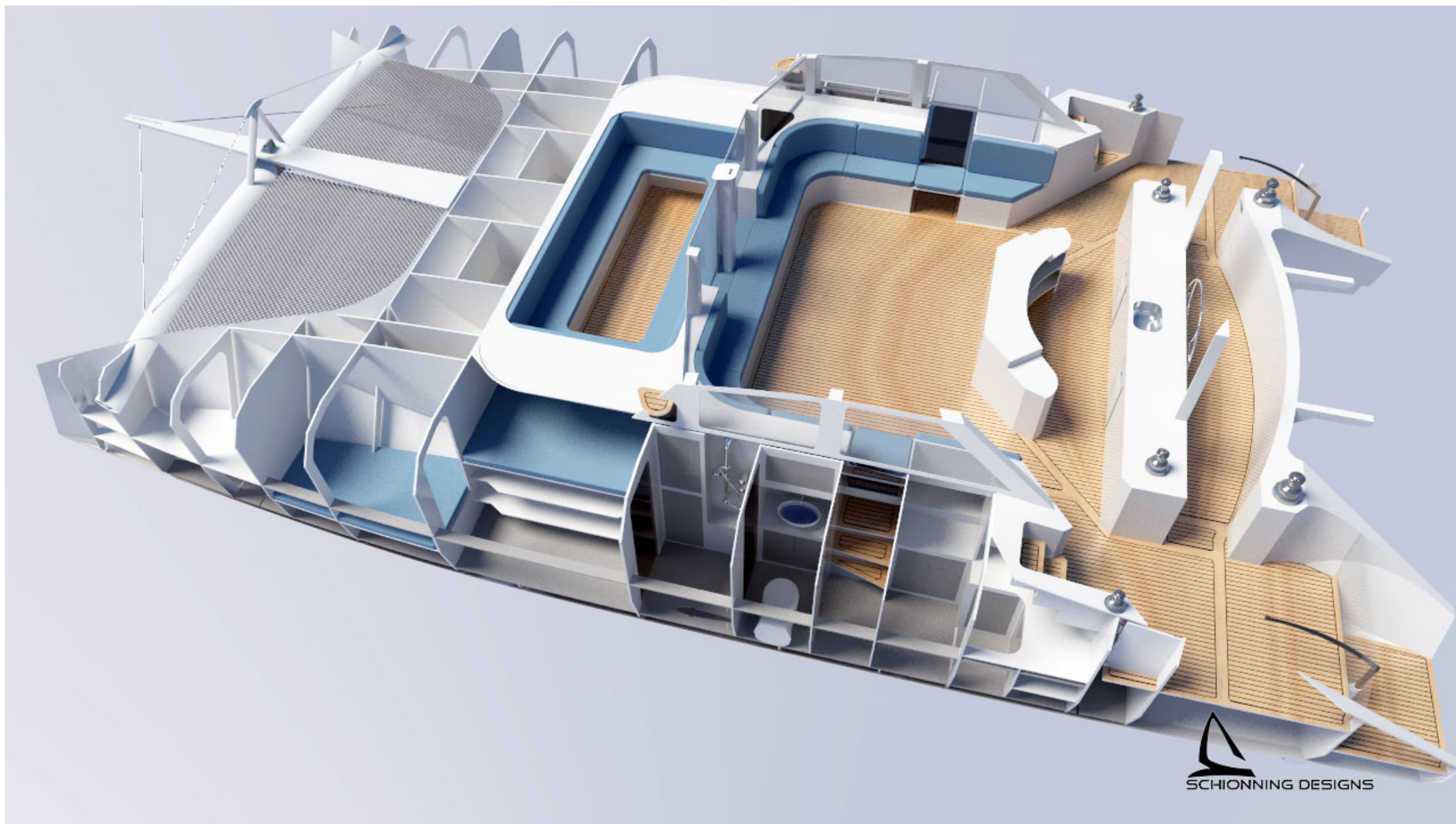
Descending the steps into the starboard hull you will find a large and practical galley with stove-top, oven, double sink, dishwasher and a generous amount of bench space for food preparation. The galley area runs all the way aft giving enough space for two people to work comfortably, and all available space has been utilised for storage. Moving forward is the second queen cabin, again separated with a door or privacy screen.

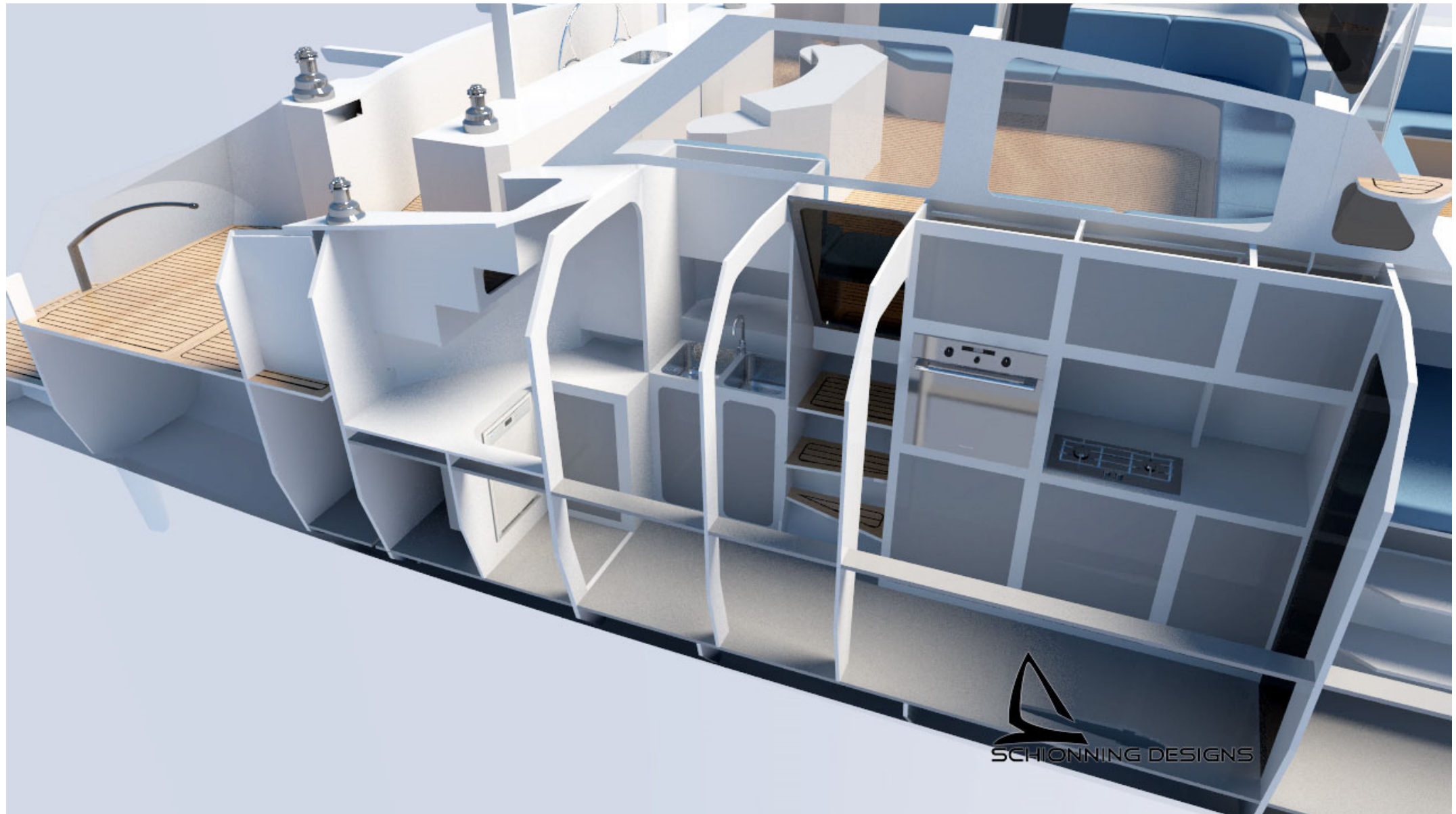
The Arrow 1500DC sports wide, flat side decks for access to the spacious foredeck that is kept as clear and uncluttered as possible to maximise the usable area. The cabin roof has grab-rails running around the perimeter to give guests a secure hand-hold when moving around the boat and secure safety-railing runs down each hull to avoid any guests disembarking unintentionally. The

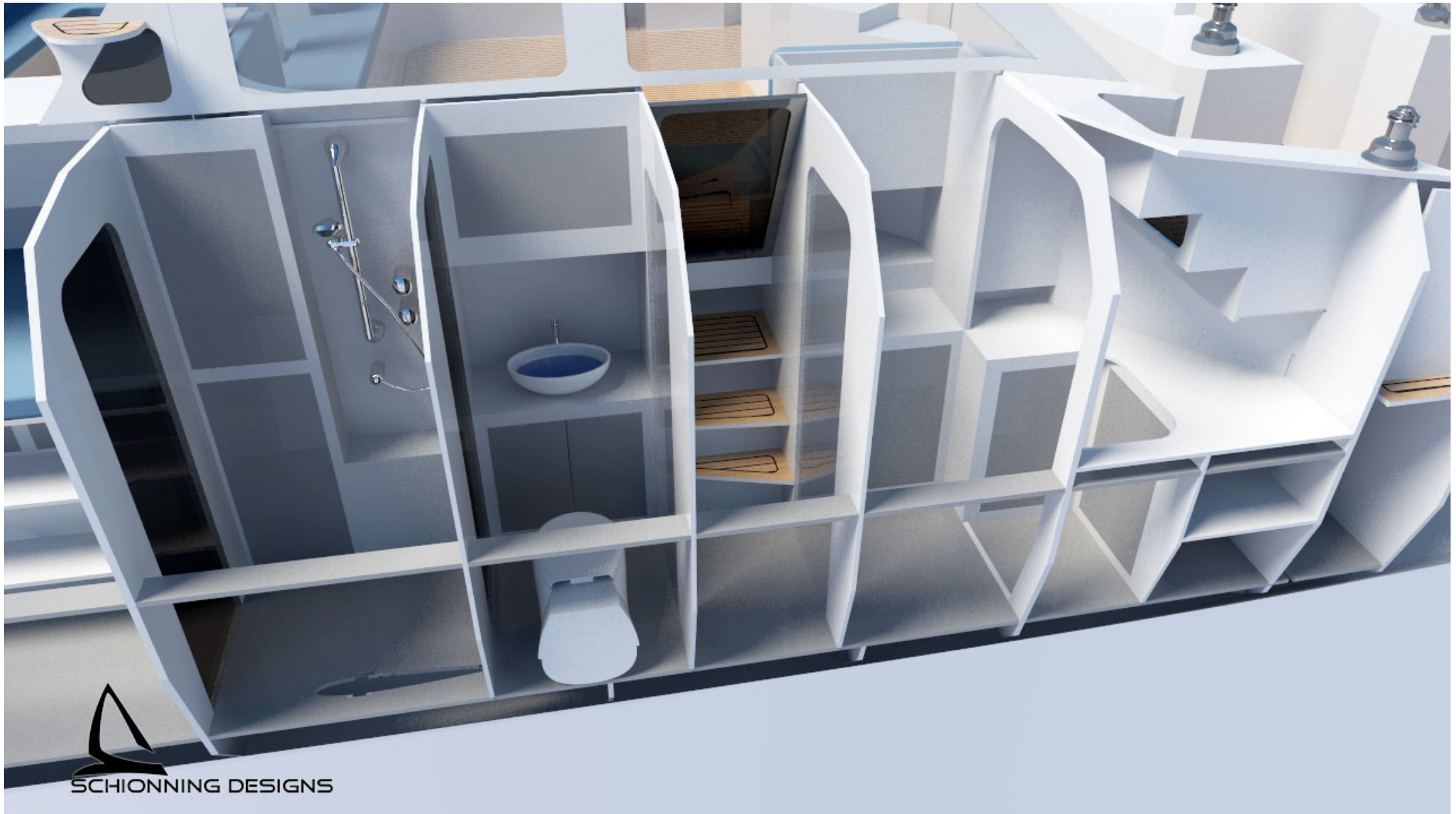
forward cockpit is a real feature of this design, sunken down to match the bridgedeck level, it can be accessed from either inside the cabin or from the fore-deck. Comfortable cushioned seating will keep guests relaxed as they take in the fresh air and beautiful views, all while safely out of the way of any sail controls or ropes. Large opening panels blend the forward cockpit with the open plan bridgedeck and provide much needed ventilation in warmer climates.

The Arrow 1500 Day Charter joins our growing range of commercial designs, including the Prowler 1040 Dive Cat, the Euro 1460 bi-rig and the Prowler 1100 Water Taxi.

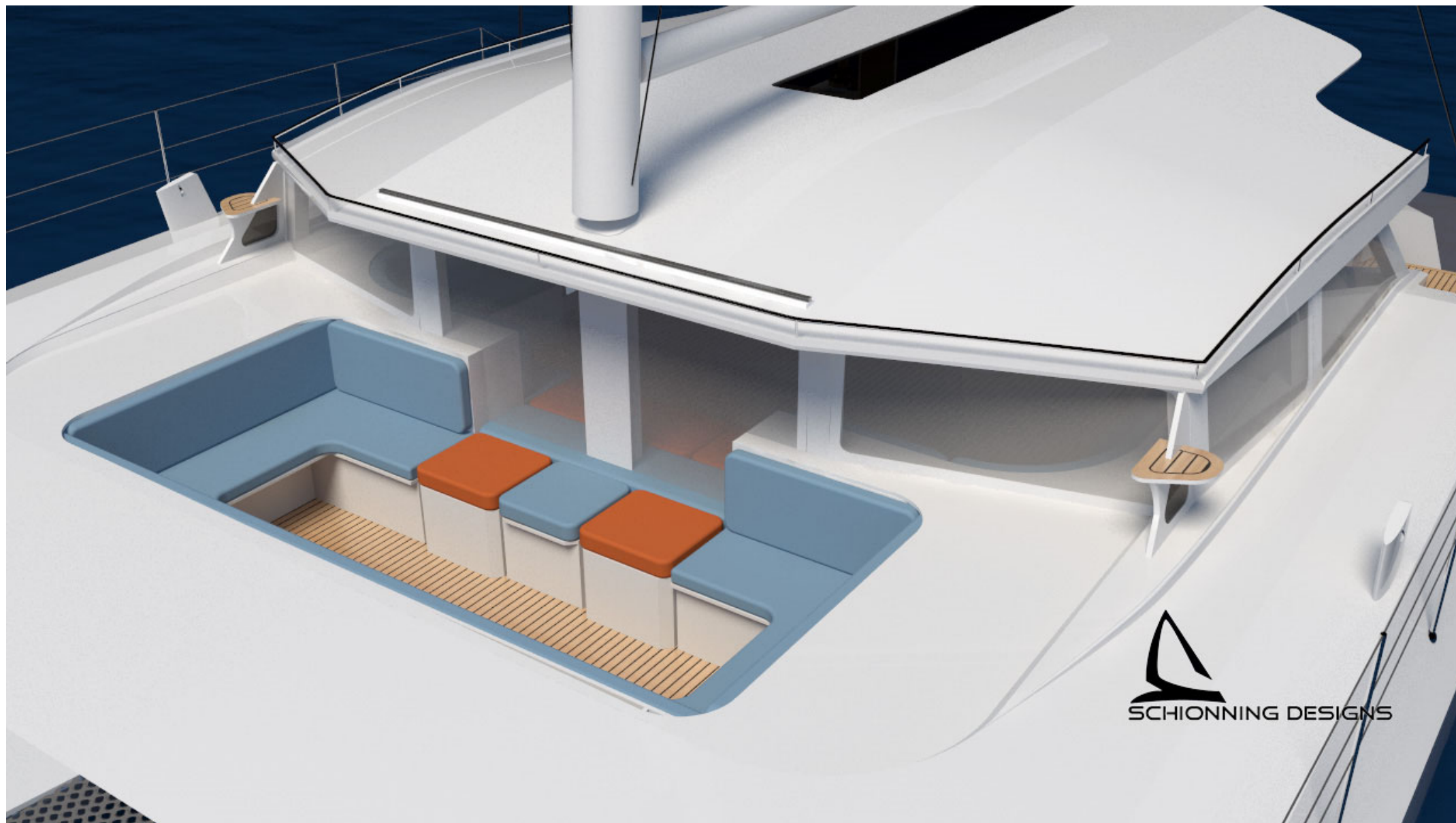




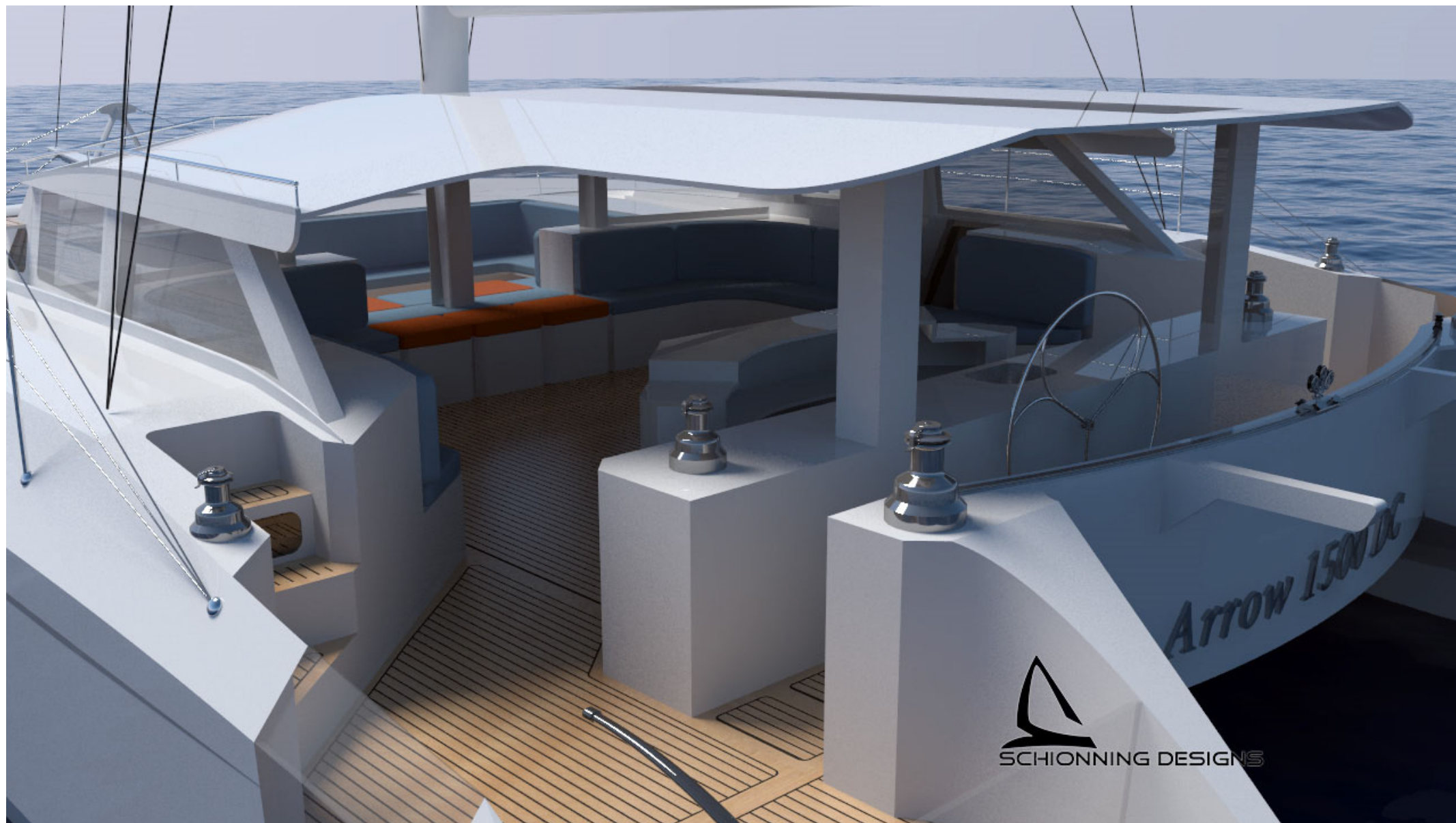


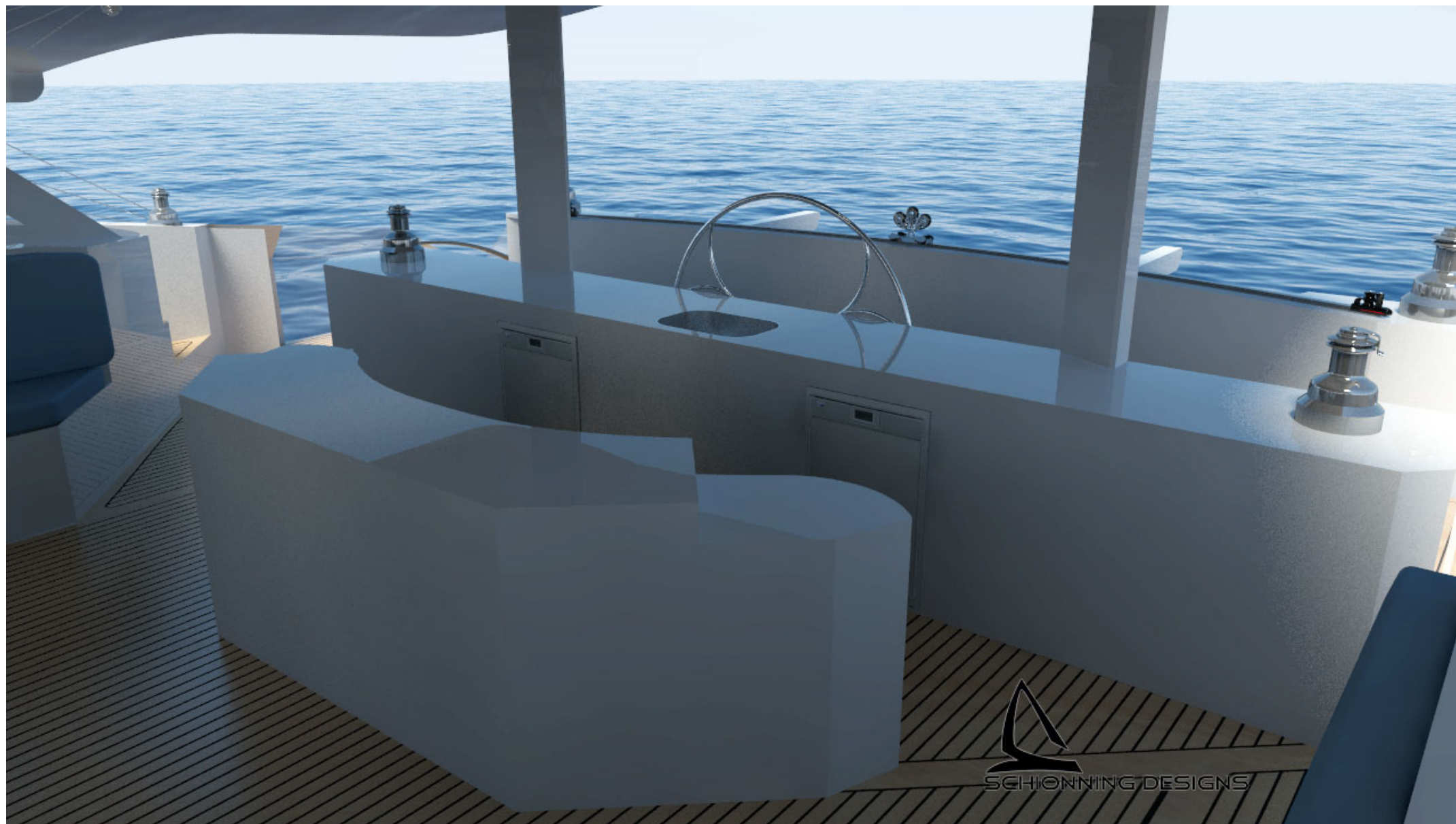




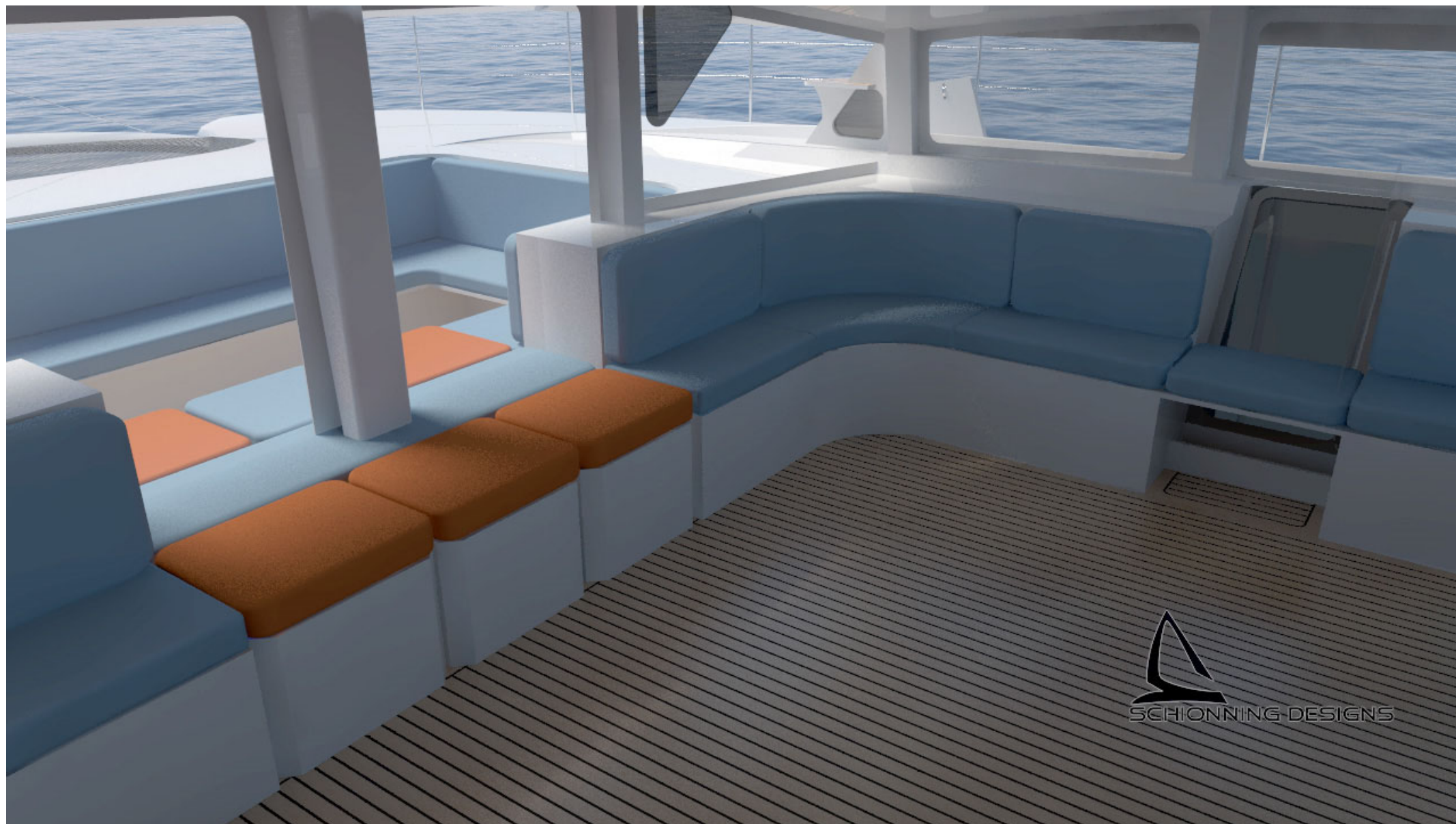












Our designs are based on cored composite construction techniques using West System epoxy resin and knitted fabrics. But given the range of today's composite technologies, which solution works best for catamarans and why?

Resin Choices

We use West System epoxys for their high strength and adhesive values. It also fully protects the boat against water absorption and it can not develop the dreaded Osmosis. We choose ATL Composite's resin systems for their superior quality, reliability and value for money. Having worked closely with the ATL Composites team and their products for many years, we know we can stand by their material solutions, and rely on great service should something unexpected happen.

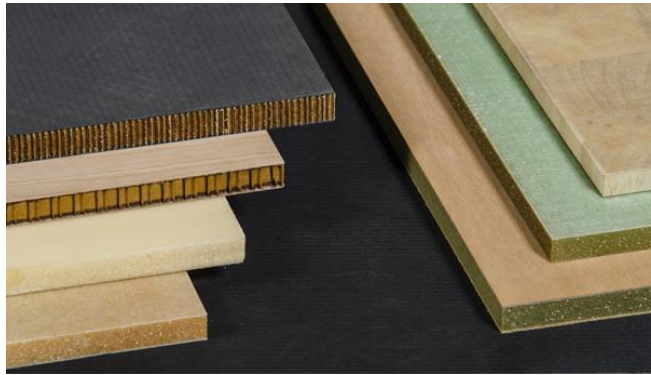
Cloths

We prefer Colan brand cloths for their quality and low resin absorption, custom made for Schionning Marine at six (6) stitches per square inch for easy wet-out and rounding corners. This may not seem important but when working with a material for an extended period of time, the small things make all the difference.

CORES - Which one to use?

The core choice is usually quite confusing. Cores have different capabilities and properties, and their benefits I feel are utilized fully in our catamaran designs. A quick look at their abilities:

Balsa end grain (150 kg/cubic metre) has exceptional qualities including very high compression strength, extremely good shear capabilities and fantastic sheer stiffness. Compressive strength is the resistance to collapsing when pressure is applied perpendicular to the surface as when pushing directly onto the material with the point of your finger. Balsa is far stronger than Foam (80kg/cubic



metre) in compression. Foam is stronger than honeycomb type cores, both the paper and the plastic.

Balsa is also far better than foam or honeycomb in sheer. This is when the core sample is held flat between your hands, one hand slid one way and the other slid the opposite way, when the core tears through the middle the core has failed in sheer. The amount of stretch you feel before the core shears is sheer stiffness. To compensate for sheer weakness the core is made thicker. So 13mm Balsa may be equal in sheer to 19mm Foam.

Paper Honeycomb (50kg/cubic metre) is very efficient and lighter than the other core choices. This can be used for external use but needs extreme care to prevent water penetration. Ideally it is used for all internal furniture and smaller bulkheads. Should water get into the core you lose 50% of its values. It can be suction dried and restored back to full strength, though this can be a long process. Paper Honeycomb has similar strength and sheer ability in the vein lines and about 80% across the veins compared to Foam.

Our hull skin thickness is quite thin, we therefore find the core works harder and it's stiffness is noticed in the finished structure (sheer stiffness). Generally a balsa or WRC shell is noticeably stiffer than a foam boat using equivalent laminates. Balsa has very good values and we can produce a shell using

a very light laminate. It will be very stiff and very resilient to fatigue.

There are many boats sailing that are built from **foam** so even with its poorer values it works well. Initially one would expect this cat shell to be lighter as it is ½ the weight of Balsa. We do have to compensate for its weaknesses and will then add at least double the reinforcement on the outside to spread that compression load over more core and need a triaxial type weave to compensate for the veneer content that runs fore and aft on the Durakore. Secondly, we need to increase the Core thickness to compensate for the shear value, usually neutralizing the weight advantage. Thirdly, foam absorbs a lot more resin into the open surface cells than timber and so increases weight. Fourth, foam is an inert type material tending to follow the surface and not naturally stay fair, fairing usually uses more bog and again adds weight. Fifth, because of the inert characteristics, foam requires a much more complex control mould, this takes a lot more time and is slightly expensive.

The end result using Foam in my experience is always a heavier shell with less stiffness. Professional builders can achieve a good result but usually use vacuum bagging and very good molds to achieve this. The Wilderness 1230 has a foam option. It weighs 200kg less than the Balsa version.

Honeycomb needs to be much thicker and needs much heavier laminates which makes it a silly choice for cat shells. (Nomex excluded)

Western Red Cedar has all the advantages of strip Durakore, but has a real weight penalty because of its higher core weight.

These are the reasons we prefer Durakore and Duflex Panels for our home built designs.

Arrow Kit Overview

Arrow 1500 DC



The Arrow 1500 is built using a Pre-Cut Duflex Panel kit which can be supplied from Australia or Germany.

Duflex panels are 1200mm x 2400mm and come with scarf joins on the long edges. The panels are made with either foam or end grain balsa cores, and 1 x 600gm Biaxial cloth with epoxy resin on each. After removing the peel ply and resin sealer coating has been applied, you glue the scarfs together in the required order. When glued, you'll see the full size boat parts are cut but left in place in the panels held by tags which when cut release all the parts which are now ready for assembly.

The two hulls are built separately and upside down



over bulkheads which are set in place on a strongback. The strongback material is not supplied in the kit.

Once the hulls are joined and fully taped and any additional glassing underwater is done, the hull bottoms are faired and then turned. You then align and level the hulls before fitting the major cross bulkheads, bridgedeck and forward beam, voilà a catamaran! Well not quite but you're well on your way. After this furniture, cockpit and cabin continue the construction until the shell is complete. The cabin is also built with Duflex and is assembled separately over temporary frames which are supplied in the kit, then fitted on the boat.

Construction plans are detailed and we supply a building manual that although has been written around our original Wilderness design kits, it has all the information you need from basic how to use the materials, what tools you need to tips on fairing, fittings, doors, everything and with loads of photo's too. As well as this, we are available via email or skype/phone support

if you get stuck with anything or want to be sure.

Shed size needs to be 2-3m wider than the boat, 4m longer and ideally, the height should be 2.5m plus the boat height.

For more information on construction and kits, see our web site www.schionningdesigns.com.au and look for "Our Kits" tab.

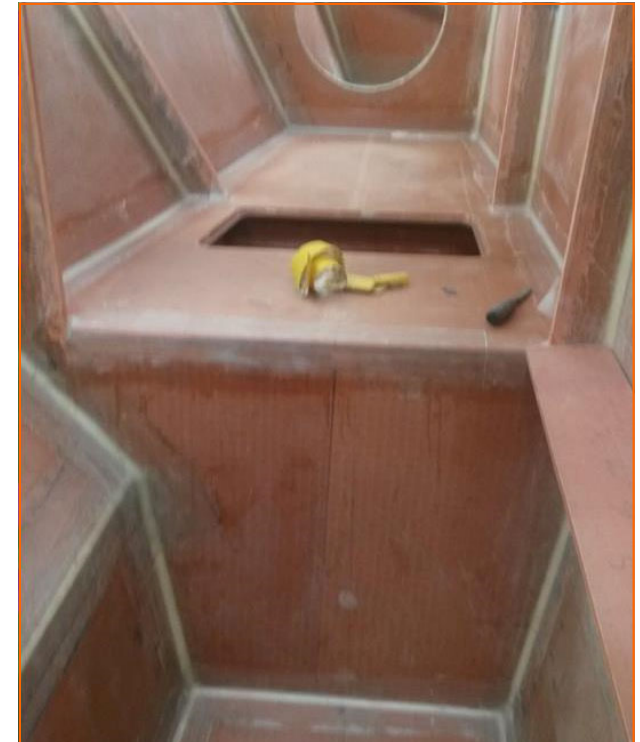
www.catbuildingblog.com is the site by Christian Loehr showing his Arrow 1200 construction in Germany.

"Our kit is coming along very well and I'm glad to say we have all the port side bulkheads up and 5 side panels are all dry fitted and will be glued in place in the next few days. The kit is fitting together very well".

D. Moore, Arrow 1200 (Malaysia)

Arrow Kit Construction

Arrow 1500 DC



The success of our designs I feel, stems from the practical common sense approach of a boat builder, coupled with many years of live aboard experience and over 100,000 nautical miles in some of the worst conditions in the world. This experience makes one aware of the power of the sea and the need for a boat to be able to survive these conditions, protect her crew physically and psychologically as well as being a fast comfortable vehicle for all the good times. I am sure you will find our designs reflect our sailing and live-aboard experience and will give you the offshore confidence to sail safely anywhere in the world. Multihulls are '*beautiful, safe, cruising boats*'. We hope you find them as exciting as we do.

WHAT MAKES A GOOD MULTIHULL?

Choosing a design can be difficult so we hope that this introduction helps clear the way a little.

Cat design is not just a matter of two hulls floating a cabin above the water. Only in fairly recent years have the basic elements of design and an understanding of their effect on the use and performance of the finished boat been properly understood.

*The basic principles of good design should **ALL** be present in the boat you're considering building or buying. These will blend together to produce an excellent and safe multihull.*

THE BASICS ELEMENTS OF A GOOD DESIGN:

Good Engineering Our boats are well proven. With over 400 Schionning cats on the water, and many performing under extreme stress whilst racing, we proudly claim we have never had a structural engineering failure of any sort

in our designs. We work with some of the best Aerospace engineers in the composite industries to achieve this.

Flat Decks The flatter deck lines have a number of advantages. Secure footing while reefing, anchoring and in rough conditions. Life lines should be at a sensible protective height instead of set down a level. A flat deck is great for socializing, sunbathing or as a kids playground too.

Buoyancy Buoyancy distribution is the placement of buoyancy in the hulls. Our designs have between 50 and 60 separate sealed buoyancy tanks built into every shell so they are almost unsinkable. Most old designs hobbyhorse (rock fore and aft), this makes them uncomfortable and inefficient. Modern designs have the buoyancy pushed towards the hull ends damping down the hobby-horsing tendencies and giving a lot more safety downwind where the buoyant hulls stop nose-diving. Coupled with a lot of reserve buoyancy higher up in the forward hulls this adds an enormous amount of safety and gives you confidence when sailing off the wind.

A soft 'V'd entry quickly picking up reserve buoyancy with lots of reserve higher up is an ideal combination.

Good Bridgedeck Clearance High Bridgedeck Clearance is essential. A short cabin length with long hull overhangs is a good safety feature. Good clearance on a cruising cat is 600mm – 800mm, a Performance cat 700mm – 900mm and a Racing cat 800mm – 1000mm. Chamfer panels add high reserve buoyancy and need less clearance than a similar cat without them. They also reduce wave slamming and add strength.

SAILING ABILITY AND PERFORMANCE

Power to weight ratios show how well a cat will sail in light conditions. As wind strength increases, one reefs the power to stay at safe acceptable speeds (this is different for different people).

The Bruce Number is a commonly used value and very useful in comparing cats, displacement is not always reliable and will vary with load. A Bruce Number = 1 is very slow, 1.3 – 1.4 is a good cruising value, 1.5 – 1.9 reflects a very fast cat. Boats like the French 60' Tri's and "Club Med" are running to extremes like 2.3.

A light and efficient cat can often sail out of trouble and outrun severe weather patterns, shorten passage times and avoid bad weather by getting there in the existing weather window. Most good designs will tack through 90 degrees at a speed of 8 – 10 knots while reaching at 10 - 13 knots comfortably with Main and No. 1 in 15 knots of wind.

Daggerboards are efficient and allow very shallow draft for beaching. With a strong reinforced bottom and with kick up rudders, it's easy to beach our cats. Should you want shallow keels to protect inboard motors, then a combination of shallow keels and fixed rudders are a good option, daggerboards would still be fitted as usual.

Low Drag is a good characteristic. Slim hulls reduce drag and are efficient. A good cruising cat would have a Waterline beam to length ratio of 11.5 to 12.5:1. A performance cruising cat 12.5 to 14:1 and a racing cat 14 to 20:1.

It is important to note that **ALL** these elements must be present in a design to make any of them valid. For example, a design can be really good looking, have high bridge-deck clearance

a powerful rig and sail plan and be built reasonably light and show a fair displacement, but then have an 8:1 Beam to Length ratio. She'll be a good looking, powerful boat but it will be impossible to go forward, except slowly!

There is no reason why a good modern design does not have all of these features. If you find some of these lacking it is usually for the wrong reasons. A lot of cats have very little bridge-deck clearance because the designer is concentrating on a low profile cat which looks good or being dictated by interior accommodation and ignoring the fact that the boat will pound badly at sea. This is not only noisy and uncomfortable but can well be the cause of structural problems. Our designs have been developed around these practical elements of good design and then we accommodate personal comforts and lifestyle choices.

WHICH DESIGN...

We have many different design ranges. All incorporate the elements of good design discussed above so choosing a style, size and layout comes next. Layouts and some things like steering position can often easily be changed so don't be put off if you really like a particular design but find a few small elements you don't like, talk to us and we'll see if we can incorporate your choices.

We've taken particular care with the balance of construction methods in our designs, making them light and strong yet easy to build in small sections, most of which are manageable by a group of friends when they need turning over and moving. The blend of strip planking and light flat panels kept in single plane form, makes building easy and quick and produces a finished catamaran of classic good looks which will not date quickly, giving you very good investment security.

CAN I AFFORD TO BUILD?

One of the first steps in changing your dream into reality is figuring out whether you can afford the boat (or more likely, how much money you 'don't' have!). Two realities here are, firstly, two similar sized boats with similar displacement, built of similar materials, will cost much the same to build. Designers' estimates of materials are often inaccurate and sometimes minimized to lead one to believe their design will be cheaper to build. This is definitely not the case, **similar boat, similar price!** Your choice should therefore be towards the boat that suits you best and is a good investment. Secondly, we know a lot of people who could not afford their boat at the onset so don't be discouraged. Once you start building it is surprising how you focus your interest, spare time and money into your new project. With our new owner-builders we suggest they start with the smaller items which can be built in the garage, carport, (lounge?) etc. These initial items use very little material and money but use a lot of time, so at the early stages you can get a lot done while you wait for your old boat or car or house etc. to sell. These items are; dagger-boards and cases, motor pod, forward beam and catwalk, cabin roof, rudders, dinghy etc. The experience and confidence gained building these bits speeds up the second stage of larger items and gets the whole project finished much sooner.

Good luck with your research and project, don't hesitate to contact us should you need further information or a chat about our designs.

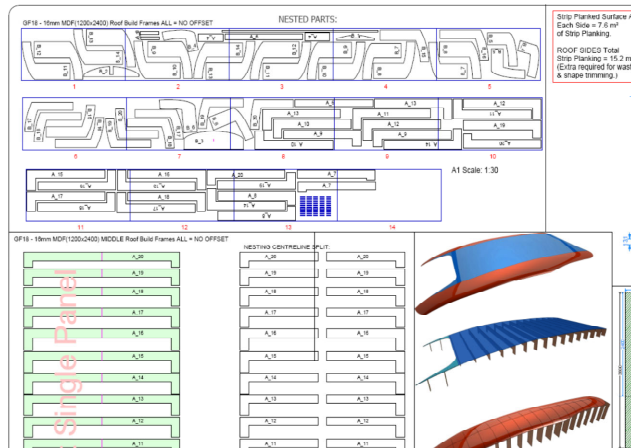
Jeff Schionning



Wilderness 1340X

Plans and Ordering

Arrow 1500 DC



Advice is readily available to help with your design choice and various options available.

COST OF PLANS:

The Arrow 1500DC plan price is AUD\$21,000.00. The PDF plans are delivered via a secure private download link.

UNLIMITED BACK UP SERVICE: Our back-up service is unlimited, our professional boat builder (Jeff Schionning) will be here to guide you through any problems throughout your entire project. Email and phone support is available during business hours Monday to Friday.

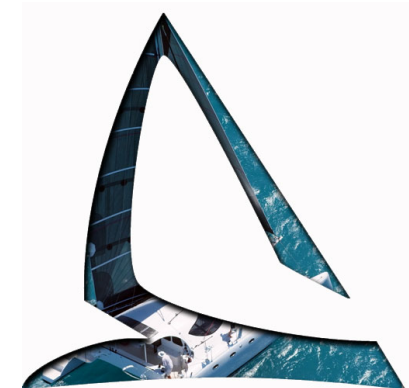
HOW TO ORDER PLANS: We require a signed and faxed or mailed PLAN ORDER FORM with every plan order. This form explains the terms and conditions and plans will not be mailed until a signed order form is received.

PAYMENT: WE ACCEPT: Bank cheques or direct deposit into our bank account. Please email info@schionningdesigns.com.au for our account details. Credit cards are not accepted for plan purchases.

PLAN DELIVERY: Plans are delivered electronically via a private and secure download link. The plans consist of A1 and A3 plan sheets and the A4 boat building manual, all in PDF format. Other delivery options can be arranged if required.

Building a boat is definitely a challenge but with good plans, our helpful friendly support and the modern materials available, it's never been easier. The investment of time and money is very worthwhile, offering a rich life experience, fun reward when you launch her and financially you can certainly stand to gain substantially.

We look forward to hearing from you again and wish you the very best with your project.



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