

YACHTS

EMIRATES



LEADSHIP COMO 46M

SILVER SPIRIT

CREATED FOR A RACING DRIVER AND HIS IRRESISTIBLE DESIRE TO CRUISE

TOP 10
TRENDS
FOR 2015
FROM ECO CHIC TO
FAST TRAWLER

EVOLUTION OF THE CATAMARAN

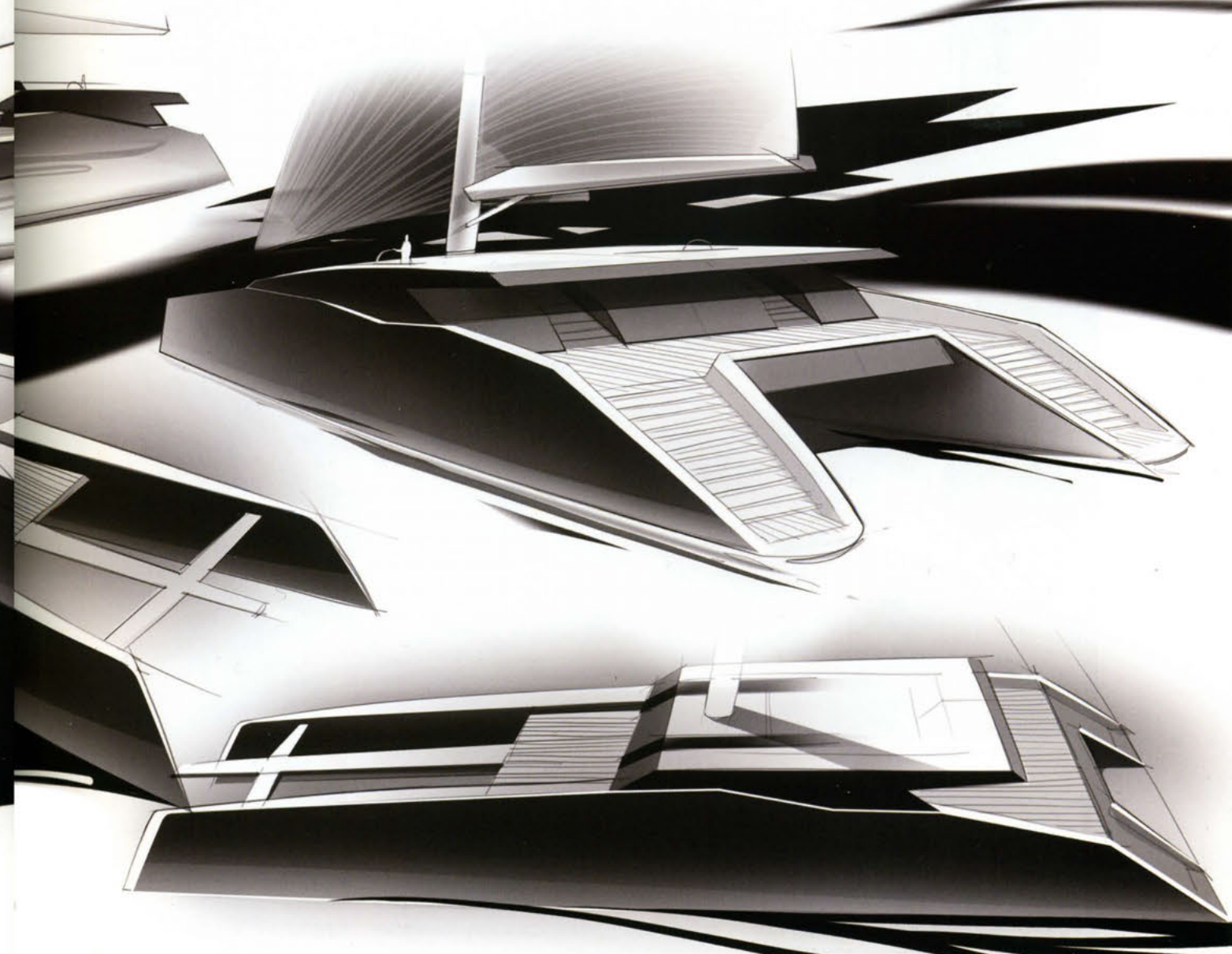
WILL THE SUNREEF'S
OF THE FUTURE BE
HYDROFOILS?

CONCEPTS

OCEANCO 110M
BLOHM + VOSS 80M
TANKOA 80M

FEATURED YACHTS:

OCEANIC YACHTS 90' STS | PERSHING 70 | GALEON 660



SUNREEF YACHTS

EVOLUTION OF THE CATAMARAN

We speak to Sunreef Yachts' project engineer, Grzegorz Wladzinski about how the 'big cats' of the future may well be the most technologically advanced craft on the sea.

By Steve Chalmers



The Yachts team started 2015 with a surprise visit from the 70 Sunreef Power, Damrak II. She was in Dubai for a stopover, and knowing her Captain well, we graciously accepted his invitation to join him on a cruise to the Burj al Arab. It was late afternoon and the normally settled waters around the Palm Jumeirah were getting increasingly choppy. The last time we were out in such an angry Gulf, our trip was accompanied by the sound of smashing plates, shattered glasses and our exotic fruit selection ended up on the teak deck. But that was on a mono hull. Damrak II is a catamaran. Excellent stability is just one of several specific features that make catamarans a perfect alternative for traditional yachts. No matter what sort of trouble the sea can make, the twin hulls keep the ride tight, safe and fast, but while discussing these very merits, Captain Petro, with a cheeky grin, said "You haven't seen anything yet!" It turns out that Sunreef is working on some radical new designs. They don't have to worry about living

Sunreef is working on a number of high performance catamaran concepts.

space (big cats are often twice as spacious as similar length mono-hulls), and cruising range is also a forgone conclusion, so the Polish shipyard has been working on something close to the Yacht's team's heart - high performance. Enter Sunreef's Project Engineer, Grzegorz Wladzinski. Educated at the Technical University of Gdansk, he has been with Sunreef for four years and his main focus is the development of new hull designs. Nothing new there, all shipyards have either their own designers, or collaborate with naval architects, but Grzegorz is pushing the boundaries of catamaran design into a different league - his hulls are foiled. Grzegorz wants his catamarans to fly. As anyone who's watched the America's Cup will already know, foiling catamarans can move over the water at immense speed. The AC72 sailed at 50mph - and it was powered by wind. Grzegorz wants to take that technology and add a number of multi-cylinder engines, giving his hulls the potential of 70 knot maximum speeds...

GRZEGORZ WLADZINSKI ON FOILING

Hydrofoils are definitely in vogue at the moment, so we asked Grzegorz where they came from, how they work and why the marine industry is so interested in foiling.



Grzegorz's visions of luxury foiling cats will soon be reality.

GW: "The first hydrofoils were created in 1861 by English engineer, Thomas Moy. At the time, he tested his aircraft wings in the water, as he considered it more accurate than in the air and therefore, by chance, he became the inventor of the foil. However, decades later, between 1895 and 1916, the Meacham brothers were the first to design and test real foils. Although there were many experiments carried out by other researchers in Europe and America, they were the ones who created a flying machine, which nowadays would be labelled as a hydrofoil. Peak of popularity for these units occurred in the second half of the twentieth century, when they were created both for commercial and military use primarily by the United States, Canada, Switzerland and Russia. However in the 80s, the cost of servicing was so high, it resulted in a downturn in hydrofoil production... but not for long. The technology development enabled further improvements and progress in work on a larger scale. Therefore, I would say that hydrofoils are currently undergoing a renaissance and are becoming more and more attractive on the market."

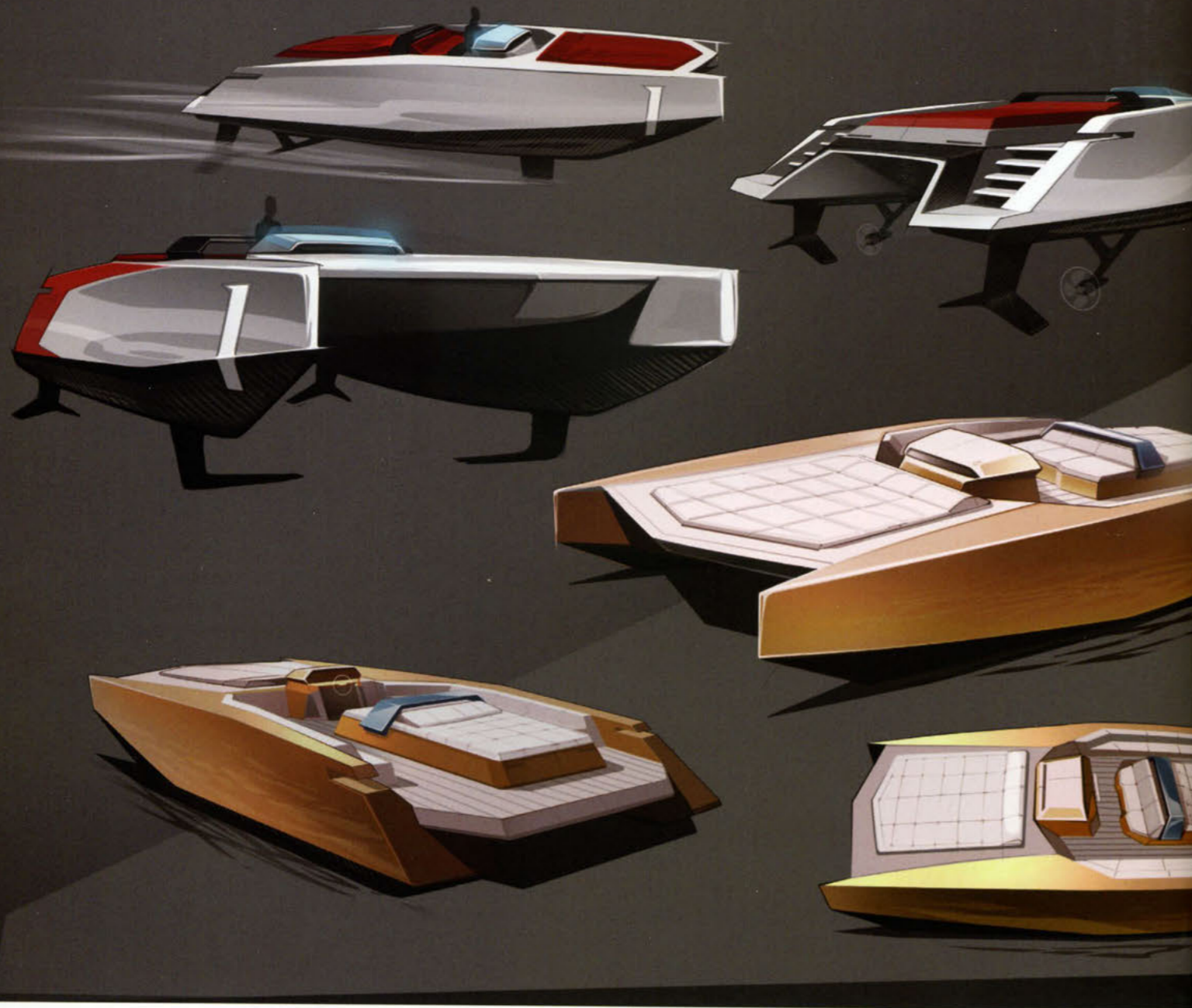
Hydrofoils move a lot faster because the hulls do not have to overcome the resistance of the water and they move above it. Please explain how the system works.

GW: "A hydrofoil is a craft supported by foils mounted under the hull. They look like wings and work the same way as the wings on planes do. At the start, the boat moves normally, but with increasing speed the dynamic lift, which acts on the foils, grows causing an elevation of the hull above the surface of the water. Water flows

rapidly over the top part of the foil (where the pressure is lower) and the pressure difference between the lower and the upper parts of the panel causes the appearance of the lift force. Additionally, at high speed, the hull is above the water, encountering much less resistance from the air which has less density than water. The purpose of the system is to achieve the maximum dynamic lift at minimum level of power of resistance. Minimizing the wave resistance, the boat moves faster using less driving power. A very important factor is longitudinal and transverse stability when it moves over the surface of the water. The geometrical characteristics of multihulls provide much better transverse stability than in monohulls, so the use of foils on the catamaran offers a wide range of benefits and passengers feel much more comfortable on board during the voyages."

During the Cannes Yachting Festival, Sunreef Yachts revealed the concept of the world's first hydrofoil system for luxury catamarans. You have worked on this project for a long time, do you think it will revolutionise the market? And what is the future of hydrofoils?

GW: "As I mentioned, hydrofoils have been reborn. The great fascination around them during the America's Cup is the best proof, as the hydrofoils will be racing again next year. The vision of units flying over the surface of the water is so impressive that it has been decided that such a spectacular competition is worth seeing once again. Therefore I am sure that our concept is definitely a big event in the industry. At the moment, we are working



in our project, the panels are retractable and kept in specially shaped hull "pockets" which are much better for the aesthetics look of this luxury product and the hydrodynamic properties for when the boat is moving in a displacement mode, not as a hydrofoil. As for the panels themselves, we are thinking about using both high-strength steel and composites. We have patented the appropriate model of the hulls with the retractable hydrofoil system, which as a whole is an innovative solution, so I cannot reveal any more technical details."

At the moment, you have created a hydrofoil system for the Sunreef 40H power catamaran. Are you planning to introduce it to other larger units?

GW: "We started working on a 40ft luxury catamaran. This is our first model of this type, so we have been focusing mainly on its improvement, but what I can say is that we are slowly starting to think about the 60ft and 80ft yachts."

How do you maintain the system's efficiency? What can be done to prolong its usage?

GW: "Hydrofoils are technically very complicated vehicles - just like airplanes, but the key to extend the life of such a unit is the correct culture of use ie. avoiding overloading the unit, maintaining the panels and the hydraulic systems in proper condition and accurate staff training. Of course, after some time, the system will naturally wear itself out and then it will need replacing."

What speed will a 40-footer with such a system obtain?

GW: "The most comfortable speed range for the hydrofoil is about 30-40 knots. This is the speed at which the physical phenomenon called cavitation is not dominant. Above 50 knots this process begins to grow so vigorously that it affects on the overall efficiency of the foils. At 60-70 knots the cavitation process is so dominant that it definitely worsens the ratio of resistance force to dynamic lift. In addition, the foils moving near the

free surface are exposed to an intense phenomenon called "ventilation of foil" which means that the air is sucked from above the water that additionally reduces the efficiency of the foils. Although we are aware of a number of problems that we encounter while moving in our hydrofoil at supercavitation speed range, I have to mention that we were already working on optimizing the hull and the foils arrangement to achieve up to 70 knots at the stage of design. During the first sea trials, we will focus primarily on maintaining the unit at subcavitation speeds, meaning a maximum 40 knots. The stability of the boat at any speed range in both displacement and hydrofoil mode will be a very important parameter. When attempts are passed successfully and data will be similar to the design assumptions, we will obviously raise the bar higher."

The future of the luxury catamaran is an exciting one, and we will be following the foiling development closely here at Yachts. ■

on a pioneer project of a luxury catamaran enriched by the hydrofoil system. We are now implementing it. Apart from the luxury leisure boats I also see the future of hydrofoils in fast and comfortable passenger ferries, patrol and rescue boats and special purpose entities."

What kind of customers do you think would be interested in buying a yacht with this system?

GW: "Sunreef catamaran owners are people who like our custom-made designs as well as industry innovations, which is why we try to stay at the forefront of technology. The retractable hydrofoil system is an innovative solution that will enhance the attractiveness of our yachts and definitely distinguish them on the market. What must be underlined, is the fact that navigating a hydrofoil requires

A top speed of 70 knots is possible with a foil set up.

much more experience from the skipper, so he needs to gain appropriate skills to safely handle the unit."

What is different in the hulls which feature the foil system? And what are the foils made from?

GW: "Our hulls are adapted to have the retractable hydrofoil system installed. It has the appropriate geometrical parameters including a specially designed bottom line, a frame line and hydrodynamic parameters, which have a very large impact on the overall efficiency of the hydrofoil. In order to reduce the complexity of the system and to improve the stability of the unit, we applied V-shaped foils (free surface-piercing foil system). These panels do not require the use of a complex series of stability control systems. I have to mention that

