

# Oceanwings: a solution for decarbonising the shipping industry

by

■ **Marc Van Peteghem** ■

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## Overview

Marc Van Peteghem is an authority on cruising and racing multihull design. His agency designed Oracle, the trimaran which won the America's Cup in 2010 and was rigged with a furlable and automated wingsail. Adapting this system to motor boats saves energy consumption and reduces greenhouse-gas emissions in the shipping industry which accounts for 90% of world trade. On a more personal level, Marc Van Peteghem created the NGO Watever to help finance naval construction in Bangladesh, and in 2013 cofounded The Sustainable Design School which puts people at the centre of innovative solutions for sustainable development.

Report by Florence Berthezène • Translation by Rachel Marlin

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I started sailing when I was nine years old, and I knew immediately that I wanted to become a naval architect. When I began my studies about forty years ago, the world of naval architecture was very different from that of today. At that time, a naval architect did everything, from designing to making calculations about naval architecture and structure. This is no longer the case today.

Over the past fifteen years, I have been particularly interested in climate and societal change. I increasingly felt the need to become involved personally, and it was very important to me that the extraordinary vessels which we design in our agency have a real, practical purpose. This conviction found its expression in two activities that I undertook.

The first was in 2007 following a meeting with Yves Marre, a sailor with a social conscience. He had transported a barge, by sea, from the River Seine to Bangladesh, where he transformed it into a floating hospital on the Brahmaputra River in the north of the country – a remote zone whose inhabitants live in abject poverty. In the very early stages of his project, Yves had contacted my agency to ask us to design an ambulance-boat. This was exactly the opportunity I had been hoping to get myself involved in. Together we created the Watever association whose aim was to develop a shipyard and training centre based on analysis of the boats already used by the local population, in order to make them more efficient, and, above all, safer. The first type of boat we designed was made from composite materials. It was not suitable because it was too expensive, and the fishermen did not own the boats they used. This was a perfect example of a badly designed project when one is certain that one is doing the right thing, but the key components of the project have not been validated by the end-users.

The second activity I undertook was when I created The Sustainable Design School with Patrick Le Quément and Maurille Larivière in 2013. The aim of this school is to educate a new generation of young people about developing creativity using design tools in order to create a desirable future while not losing sight of the problems we face today. This school is located in Cagnes-sur-Mer. It is in its seventh year and has about one hundred students, 20% of whom are from abroad. We are part of the Cumulus association which brings together about 200 art and design schools throughout the world, and we have exchange programmes with schools in India, China, and the United States. It is an extremely stimulating environment because it is these new generations of young people who have the power to make change happen! Change is key to our thinking.

### VPLP Design: thirty-six years of naval architecture

Vincent Lauriot-Prévost and I created VPLP Design thirty-six years ago. This agency is first and foremost the story of a friendship. We met each other while we were both students. At that time, computers occupied 4 square metres, lines plan drawings used weight and batten, and surfaces were measured with planimeters.

#### *Skills and values*

VPLP Design has a team of 32 people including about fifteen engineers, four administrative staff, naval architects, and designers all of whom are based in our offices in Vannes and Paris. We work together. This is very important. We need all the skills our team offers, and by developing them, we are able to adapt and deal with every issue in a cross-disciplinary manner.

We are motivated by strong values, starting with those found in friendship, but also honesty and empathy. We also recognise the benefits of an interdisciplinary approach.

## *Sailing vessels*

We began by designing multihulls for racing and cruising. The success of our first racing boat encouraged us to design more. On a larger, industrial scale, we designed the first Lagoons for the Beneteau Group. In total, we have made more than 4,000 boats in polyester – I am not very proud of this, but there is still no alternative to this material –, yachts and racing boats.

We won our first Route du Rhum in 1990 with our friend Florence Arthaud. Since then, we have won this race every year, as well as having made several records around the world. We have had a great deal of luck but probably also a small amount of ability, and, above all, we have had exceptional sailors who keep placing their trust in us even though their profession has changed considerably. Today, computer-aided navigation is very important. In fact, we are currently developing a dynamic simulator which we can use to take into account structural problems.

For some time now, we have also been building monohulls including those which took part in the Transat Jacques Vabre and the Vendée Globe races.

Fifteen years ago, we would have predicted that we would be the potential end-users of the vessels we were designing, however, today this is simply not possible. Today sailing is not for mere mortals. Being on board is a kind of out-of-body experience! Formula 1 racing car designers know exactly what I am talking about.

On the one hand, boats travel at very high speeds. They are like carbon drums bouncing across the surface of the water at such speed that wearing a soundproof helmet is essential. Even if the sailor is lying inside the boat on his bunk, he is regularly thrown around. It is unbearable! On the other hand, there are an increasing number of parameters which need to be mastered, not to mention floating litter which is the cause of frequent accidents. At a speed of more than 30 or 40 knots, hitting litter is as violent a shock as a collision with a car. The most modern boats do not have open decks; they are entirely covered. Sailors can open hatches – the equivalent of putting one's head out of a window of a car travelling at 60 kilometres/hour when it is raining –, but the cockpit is completely protected. Ultimately, boats have become like surface-level submarines.

## *Shipping vessels*

In 2009, while we were carrying out in-depth studies into the power and ease of use of the gigantic wingsail of the BMW Oracle trimaran which won the 33rd America's Cup, we wondered whether this technology might be of interest to the shipping industry. In fact, this wingsail gives almost twice as much power as a traditional sail.

At any point in time, there are about 55,000 vessels sailing on the world's seas. These boats are international trade's life blood: 90% of world trade uses maritime transport. This is enormous!

In terms of kilogrammes transported, maritime transportation produces the least pollution. Because of the huge volumes which are transported, this is an important subject. Until recently, vessels consumed heavy fuel oil containing 3.5 to 4% sulphur as well as particles of sulphur oxide, nitrogen oxide and carbon oxide. Consequently, the IMO (International Maritime Organisation) decided that this pollution could not continue, and that vessels had to be fitted with scrubbers to clean the exhaust fumes. Unfortunately, the majority of these scrubber devices are open-looped and dump pollution into the sea. Most ships should therefore run on diesel fuel or at least a fuel which has less sulphur but the cost is 70% greater than heavy fuel oil. In all events, if we do nothing, greenhouse-gas emissions will increase by 250% between now and 2050.

In SECAs (Sulphur Emission Control Areas), the highest permitted sulphur content for fuels used by maritime vessels is 0.1%. There have been discussions for the Mediterranean to become a SECA. Northern Europe is in the process of becoming a NECA (Nitrogen Emission Control Area). The carbon tax looms heavily over this industry, and there is also a certain amount of social pressure which has a noticeable impact. A growing number of logisticians are becoming involved in approaches which pay more respect to the environment. In order for ship owners to commit themselves to making this effort, they need to see an interest in it for them from a marketing point of view. In any case, change is on the way.