

Case Study

4th June 2018, Porcher Industries, Badinières

Kites for cargo!

A new goal for Yves Parlier and technical textiles

leader Porcher Industries

As the world's leading manufacturer of fabrics for paragliding, the Sports and Leisure Business Unit of Porcher Industries, is working with sailing legend Yves Parlier on an ambitious new project that could soon see cargo ships sustainably powered by kites, saving 20% of fuel costs.

In the 2000 Vendée Globe single-handed race, Yves Parlier was setting a hectic pace which kept him well ahead of his competitors for the whole of the first month. Then disaster struck.

A week before Christmas, ferocious winds sent the mast of his boat, *Aquitaine Innovations*, crashing down, breaking it into pieces.

The rules of the race prohibit competitors from seeking outside help, but Parlier was determined not to be beaten and sent a defiant telex to that effect.

He was then obliged to nurse the boat for three weeks and four thousand kilometres to remote Stewart Island, just off the coast of New Zealand.

There, drawing on his past experience in the metallic composites industry, he carried out an ingenious repair job by joining the shattered mast together in two places – with resin cured in a makeshift oven powered by light bulbs as the air temperature was so low.

During the weeks of repair work, he eked out his rations with mussels collected from

rocks below the tideline before setting off to sail more than halfway around the world under a makeshift rig half the size of the original, surviving on fish and seaweed.

Hero's welcome

Yves returned to France – six weeks after the other competitors – to a hero's welcome, earning the nickname 'The Extra-Terrestrial' for his exploits and being elected the nation's top sports personality in 2002. He was also awarded the Chevalier Medal of the Legion of Honor and went on to set two offshore 24-hour distance sailing records in 2006, before a broken ankle made competitive racing difficult for him.

That long, arduous Vendée Globe journey back to France, however, kept haunting him. "I kept thinking that if only I'd had a kite on board, it would have been a much better way of returning to France," he says today, "and how useful a kite could be generally in an emergency, and also for cutting down fuel consumption."

Advantages

In exploring alternatives to the vast amounts of pollution that bigger boats cause through fuel consumption, sails set a historic precedent – at least when the wind can be fully exploited.

There are, however, a number of advantages kites have over sails, Parlier explains – not least the fact that they don't require a mast that is always vulnerable to the elements.

"They are also easy to pack away into a relatively small container on board when not in use," he says. "On bigger cargo ships and container vessels there is certainly no place for a mast on the bridge between the cockpit and the front of the boat. It would cause too much of an obstruction. A kite, on the other hand, could be packed away into a container and would cause no such obstruction when flying above the vessel."

There are also considerable aerodynamic advantages to be gained from the kite being flown at height above the vessel, through the exploitation of drag, which Parlier has

researched in detail, assisted by his son, Nico, who just happens to be the 2017 Formula Kite World Champion with a new tubeless kite using skytex 27.

Beyond the Sea

From these initial ideas, a purposeful consortium called Beyond the Sea has emerged. It brings together Yves Parlier's company, Yves Parlier Océa, with the Marseille-headquartered shipping group CMA CGM, the Ensta Bretagne engineering college in Brest, Cousin Trestec a leader in rope manufacturing of Wervicq-Sud, and technical textiles leader Porcher Industries.

The project is an excellent fit for Porcher Sport, as the leading supplier globally of materials for paragliding. The company's Skytex® brand is the world's lightest fabric available for this end market and they also have a large portfolio of brands for spinnaker sails, parachutes and hot air balloons plus a new generation of high performance reinforcements based on pure cellulose fibres that are highly compatible with bio-based resins.

LibertyKite

With a €15 million grant from regional authorities for development work, Beyond the Sea has now reached the stage of launching its first product, the LibertyKite, intended as an emergency system for small boats of up to 18 metres or so in length.

"The fabric we are currently producing for the LibertyKite is a lightweight, high tenacity polyester ripstop fabric that is specially woven and finished in-house by Porcher Industries," says Daniel Costantini, Sports and Leisure, Head of Sales.

"The LibertyKite is a very simple system which doesn't need an auto-pilot or electronics, but it could be very useful if a mast should break or an engine fails," Yves Parlier says. "In

fact, it could save your life, or that of your boat, allowing you to steer clear of any dangers and get back to shore. It's very robust, but also extremely light and packs very small." In the long-term, however, he is thinking big – envisaging electronically-controlled kites of up to 2,000 square metres in size becoming part of a new hybrid propulsion system for cargo ships.

Challenges for Porcher Industries

For Porcher Industries, however, this poses challenges relating to more than simple scale. "We are developing proprietary fabrics based on a new fibre for the larger kites for cargo ships, specifically to improve the resistance of the material which would be very heavily loaded," says Daniel Costantini. "There are many design details to be considered. Some parts of the kite would need to be inflatable in case the kite falls into water, but at the same time, there need to be areas of reinforcement based on composites to protect the structure against potential damage".

Trials

"We are already now trialling kites of fifty square metres on two 30-metre-long fishing boats off the coasts of Canada and France," Yves Parlier says. "The system employed is much more complicated than LibertyKite, involving electronics, and an on board computer connected to the motor. It's intended for much more automatic and high performance operations, but I don't want to say too much about how it works yet, as it's very much an essential part of our intellectual property, but we have developed accurate software simulation for how the bigger kites can be operated and how they will respond to wave movements.

"There are challenges on both the technical and financial sides," Yves Parlier concludes, "but we intend to have a viable system within a couple of years. After that, it's a question

of convincing the cargo companies of the system's viability. We believe it can save around 20% of the fuel costs involved."

It hardly needs pointing out that Yves Parlier is a man who has overcome some very considerable obstacles in the past. Sceptics should beware The Extra-Terrestrial.

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About Porcher Industries.

As a major actor in high performance technical textiles and composites, Porcher Industries is active in five key markets: Aeronautics and Defence, Automotive, Construction, Industry and Electronics, Sport and Leisure. Present in Europe, China, the United States, Brazil and Russia, the group employs 1,950 staff and has a turnover of 305 M€.