

# Finnish engineers design new keel

Ari Huusela is the first Nordic participant ever in the toughest of all sailing races: the Vendée Globe. In November, he will set off all alone on his three-month, non-stop voyage around the world aboard his IMOCA-class sailing boat. Aker Arctic is supporting his race and has helped him, jointly with four other Finnish companies, to obtain a new keel for his boat.

The Vendée Globe solo sailing competition has been called the Everest of the Seas. The sailors spend about three months alone on a boat, sailing around the globe clockwise over the Atlantic and Pacific Oceans. Fewer than one hundred competitors have managed to finish this extremely challenging race, taking place every fourth year since 1989.

## Towards new challenges

Ari Huusela began sailing as an adult and was immediately hooked. Beginning with Baltic offshore races, he has continually moved towards bigger challenges, and has raced across the Atlantic four times single-handed and once double-handed.

"In 2016, I watched the Vendée Globe race start and realised that I have more experience than some of the competitors, and that I could actually have a chance of finishing this extraordinary race," Huusela explains.

The following year he bought the IMOCA-class boat, now named STARK, and began preparing for the challenge.

## New keel

The boat has been revamped with, among other things, a new satellite system, more electronics, changes to the electrical system, new batteries and charging devices. However, the biggest change yet is the installation of an entirely new keel.



Häkkisen Konepaja has manufactured the new keel. From left Aki Tittonen, Seppo Saviranta, Antti Häkkinen, Ville Valtonen and Reko-Antti Suojanen. Photo courtesy of Häkkisen Konepaja.

Finnish companies Aker Arctic Technology, AH Woods, Häkkisen Konepaja, Mekano and Paneelia have joined forces with Owen Clarke Design / Merfyn Owen to design and manufacture the new keel, which is made of one single billet of forged and heat-treated extra-high-strength stainless steel.

"The yield strength is 800 MPa, which is even stronger than the special steel we use for icebreaker propellers," underlines structural engineer Ville Valtonen from Aker Arctic.

## Perfect for this boat

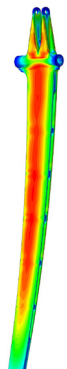
Aker Arctic has engineered the keel to fit into the place of the existing keel, and to carry the loads specified in the 2020 IMOCA Class Rules. Unlike a keel of typical cruising boats, the keel of an IMOCA 60 can be canted about 35 degrees to either side by hydraulic cylinders. This gives more righting moment, allowing the boat to carry more sail

and move at higher speeds. The keel is strong enough to carry five times its own weight and survive a grounding force of 27 tonnes, which is more than three times the weight of the boat.

"We use the same calculation tools in our icebreaker design work," adds Managing Director Reko-Antti Suojanen. "Both have in common that they are made from special materials for extreme conditions."

Huusela says he is extremely pleased that Finnish hi-tech know-how was used in this crucial part of the project.

Structural engineer Ville Valtonen has engineered the 4.8m-high keel fin, with a weight of about 960kg, to comply with IMOCA Class Rules.



## Eliminating risks

The new keel is especially important from a safety point of view. In 2012, three keels with older designs broke at the beginning of the race, and more stringent requirements for keel design were consequently introduced.

Safety is important for Huusela, being an airline captain for Finnair in his daily work.

"There are many similarities in preparing for a challenging sailing race and preparing for a flight. All potential risks have to be identified and eliminated in advance."

## Tolerating stress

Apart from modifying the boat, Huusela trains both physically and mentally to be able to manage stress levels during the race. He can only sleep for short periods, 15 to 45 minutes at a time for three months, as the boat will be moving at speed and other vessels could be nearby.

# for Ari Huusela's boat

Route map of the race

"When it is time to nap, I have to be able to relax and fall asleep fast."

Huusela tells amazing stories of what has happened to previous competitors and how they managed to solve problems alone, far at sea. No outside assistance is allowed.

"My target is to get to the starting line, sail around the globe and finish the race. I'm hoping to enjoy it a bit too!"

The 9<sup>th</sup> Vendée Globe starts from Les Sables d'Olonne in France on Sunday 8<sup>th</sup> November 2020. Follow the race and Ari Huusela on [www.vendeeglobe.org](http://www.vendeeglobe.org).



Ari Huusela has teamed up with Finnish icebreaker designer Aker Arctic to ensure that his new keel can withstand all the loads it will encounter on his quest around the globe. In the picture Ari Huusela, Ville Valtonen and Reko-Antti Suojanen.



The boats of Vendée Globe all measure 18.28 metres in length with a 4.5-metre draught. They have a large sail area and can move at over 30 knots downwind.