The world's first luxury icebreaking cruise vessel

Over the past two years Aker Arctic has designed the first Polar Class (PC) 2 icebreaking cruise ship in close cooperation with Stirling Design International and the luxury expedition cruise company PONANT. The construction of the vessel will begin later this year at the Norwegian shipyard VARD, which has previously built icebreaking vessels based on Aker Arctic designs.

The *PONANT Icebreaker* intends to take passengers to previously never explored polar destinations, such as the true geographic North Pole, the Weddell Sea, the Ross Sea and Peter I Island. This will be possible due to her PC 2 ice class and her excellent ice breaking capabilities. "There are not many icebreakers in the world which can manage the same," says Maximilian Vocke who is chief designer and the project manager, from Aker Arctic.

Before starting to design the vessel, Aker Arctic gathered and analysed ice data over a period of ten years to establish how harsh and demanding the circumstances for the cruise ship would be. "The cruises will go to the Arctic region in the summer, when the ice is least thick and at its softest, and to Antarctica when the southern hemisphere has its summer. Nevertheless, these are not easy regions for any vessel," Vocke adds.

Unique vessel

The hull is a modern PC 2 icebreaking hull design, which combines smooth icebreaking ahead in up to 2.5 m thick multi-year ice, and astern in severe ice conditions using a double acting ship principle (Aker Arctic DAS™) and a twin azimuthing propulsor arrangement. The vessel's performance is comparable to existing polar icebreakers but with lower ice resistance ensuring better fuel economy. This concept is the first commercial application of its kind for both efficient icebreaking and open water operation in high arctic conditions.

The recently introduced Polar Code has many requirements regarding passenger and environmental safety, and this vessel fulfils them all and more. "Other expedition cruise vessels for polar cruises currently under construction are PC 6 or 7 ice class," Vocke says. "PC 2 is a completely different story and opens a lot of new possibilities for an expedition vessel."

One of the rule requirements for passenger vessels is that a vessel must be able to return safely on its own even when damaged. For the defined operational areas of the *PONANT Icebreaker* this was discussed at an early stage of the concept development with both the selected classification society and the Flag Administration. A vessel must also carry equipment for five days of evacuation off the vessel, i.e. tents, warm clothes and food.

Passenger safety has been one of the crucial points in the design of this vessel. "The choice of a high ice class, taking all the requirements of the Polar Code into account, the 'safe return to port'-concept and winterization aspects, i.e. how all the machines and equipment can function in a cold climate, are all

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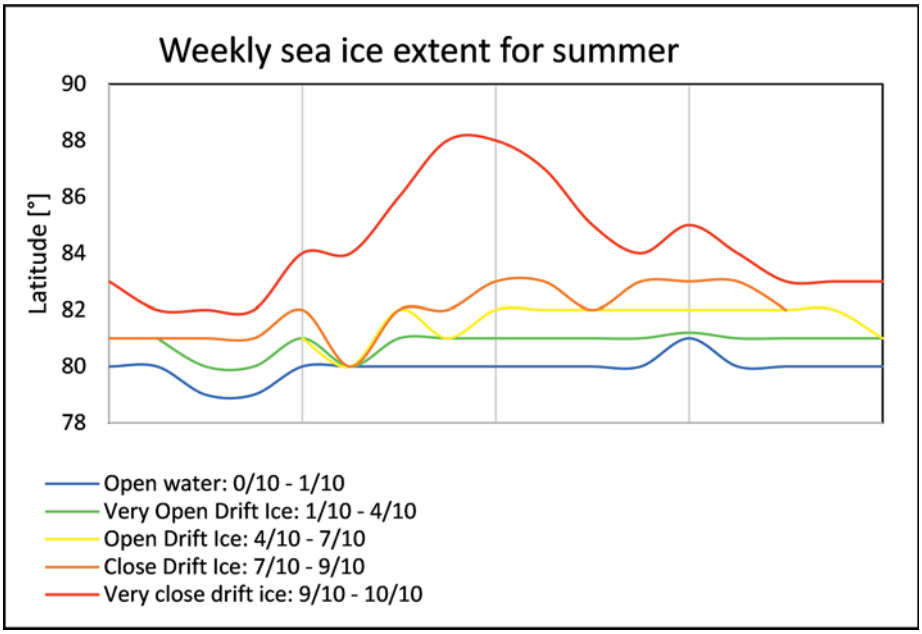
important with passenger safety in mind," Vocke emphasizes.

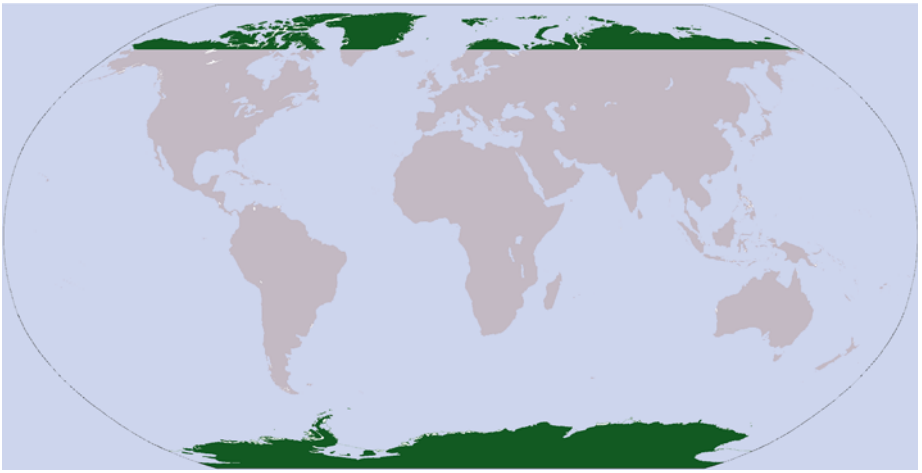
Hybrid fuel options
PONANT is particularly committed to preserving the environment and protecting the poles. For this reason, highly advanced choices have been made. This will be the first hybrid cruise ship powered by liquefied natural gas (LNG) and electric batteries in addition to oil fuel. The advantage of LNG is that the emissions are considerably lower than for oil fuel. LNG-fuel produces no sulphur oxide (SO_x) and very low nitrogen oxide (NO_x) and carbon dioxide (CO_2) emissions. The cruise ship complies with future IMO (International Maritime Organisation) and ECA (Emission Control Areas) regulations and fulfils the so called "Clean Ship" requirements with advanced wastewater treatment, energy optimisation, a heat recovery system and zero emissions in its electric hybrid mode.

During the concept development phase Aker Arctic was responsible for everything from the main deck downwards, as well as the machinery and design of the steel hull. Stirling Design International was responsible for the upper decks and interior design, while PONANT provided the guidelines for the development and ensured that the overall concept met their company's requirements. The steel hull will be constructed at VARD in Romania and then towed to Norway for finalizing work, interiors and finishing.

"VARD will perform the basic design and we will take care of ice related aspects, such as the hull form, steel classification drawings, model tests and propulsion design," Vocke adds.



Aker Arctic analysed ice data for a period of ten years before beginning to design the vessel to ensure that she would have the required features to manage the harsh conditions in the polar regions.



The vessel will bring passengers to previously unreachable areas.

The PONANT icebreaker is a new step in the cruise industry.

PONANT already has several expedition cruise vessels, but none of them can break ice as this vessel can. "A cruise vessel like this one has never been built before," says Vocke.

This is a completely new, innovative vessel concept and therefore, after detailed calculations and careful evaluations, Aker Arctic decided to revise the initial design slightly so that the vessel can function efficiently in all the demanding areas it will sail in.

"It is a new step in the cruise industry," Vocke emphasises. "Technically the hull is optimised for both icebreaking and open water. All the machinery and equipment chosen is highly advanced and environmentally friendly. At the same time the vessel will be thoroughly luxurious."

"In addition to the exciting areas the passengers will be visiting, they will have the chance to experience icebreaking. It will be a unique experience not many have had before."

Vocke also wants to thank all the partners in this project. "The cooperation between all the partners has been extremely positive. We have all had the same interest in advancing this unique project and to make it come true."

Technical details

Length	150 m
Beam	28 m
Draught	10 m
Power plant	Dual-fuel engines and electric batteries
Propulsion	2 x 17 MW ABB Azipod
Ice class	Polar Class 2
Classification society	Bureau Veritas
Flag	France
Staterooms	135
Passengers	270
Crew members	187
Passenger facilities	Two panoramic restaurants Grill restaurant Spa & Wellness salon
Zodiac boats	16
Helicopters	2

Passengers will have the chance to experience exciting areas. Photograph N. Dubreuil.