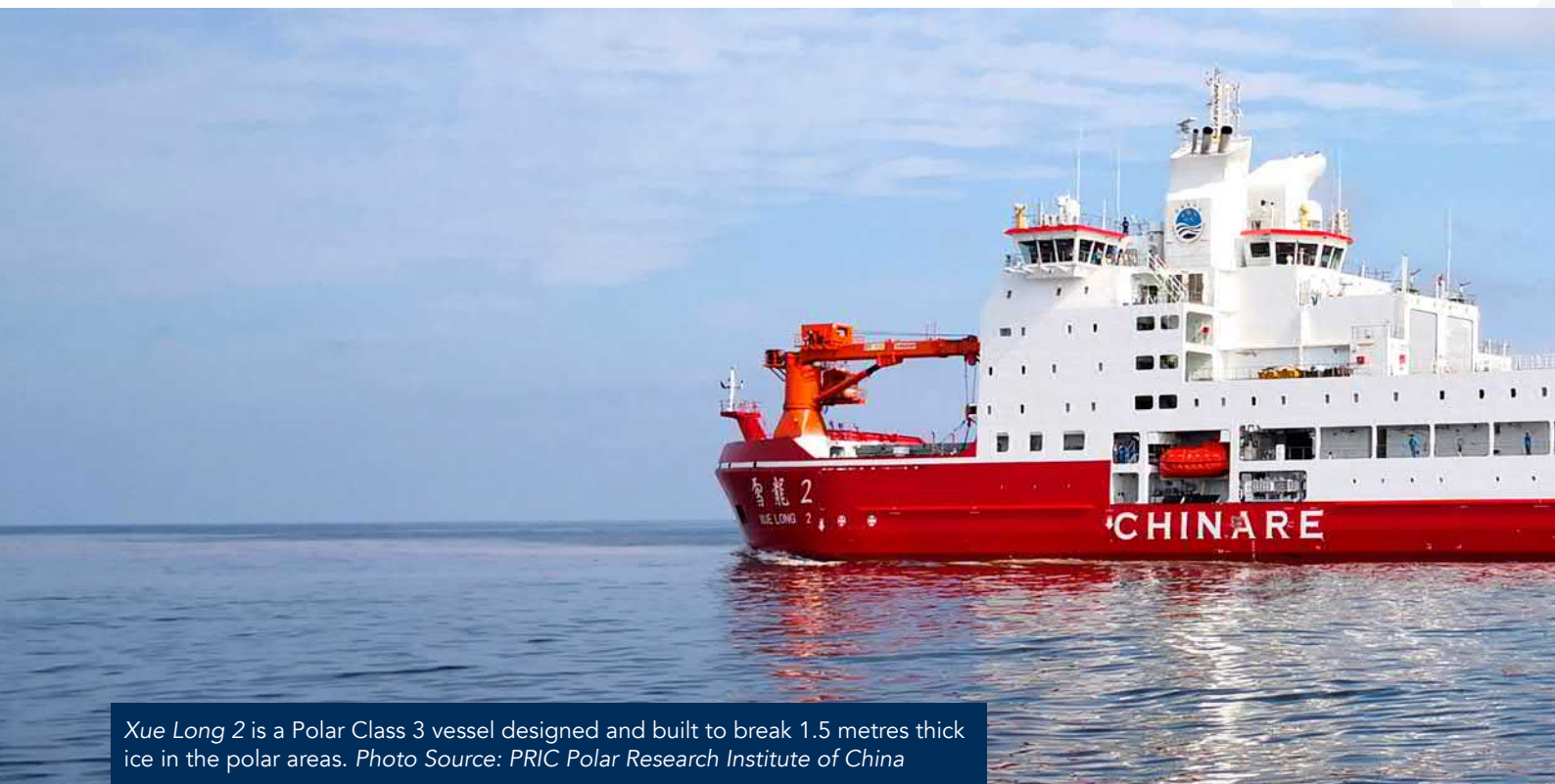


Xue Long 2 enters into service



Xue Long 2 is a Polar Class 3 vessel designed and built to break 1.5 metres thick ice in the polar areas. Photo Source: PRIC Polar Research Institute of China

China's first domestically built icebreaking research vessel, *Xue Long 2*, successfully completed her sea trials in June this year, where all design requirements were verified. In October, she will depart for her maiden voyage to Antarctica, where the full-scale ice trials will take place.

The long-term ship design and construction project for the Polar Research Institute of China culminated in the two-week sea trials in May/June 2019. Chief Designer Lars Lönnberg and Project Manager Kari Laukia from Aker Arctic participated in the voyage to ensure that the design objectives were met and gathered data on the ship's performance.

All requirements met

"Overall, the trip was a success, with the vessel fulfilling all specification requirements, and in some cases surpassing them," Laukia says. "This affirms our efforts in designing a technologically advanced polar research vessel through long term cooperation with our clients. The ship will be perfect for the use it is designed and built for, namely serving the permanent research stations in Antarctica and conducting sophisticated scientific research at sea and in the ice."

Xue Long 2, Chinese for "Snow dragon 2", departed from Jiangnan Shipyard in Shanghai, where it was built over the past two years, on 30th May 2019. All required sea trial tests were performed in the East China Sea

during two weeks, including the witnessing of tests required by both China Classification Society and Lloyd's Register, as the ship was built under survey of both classification societies in a dual class arrangement.

Testing the vessel

From the designer's perspective, the most important testing situations was the overall behaviour of the vessel, verification of seakeeping, fulfilling speed targets, ensuring the economical speed, inboard noise and vibration tests, and manoeuvrability in extreme situations.

"Sea conditions during the trials were mostly good and all vessel behaviour and seakeeping tests could be carried out to owner and class satisfaction," Laukia highlights. "The wind peaked up during a few days and wave height reached 3 metres, and the ship performance was further tested."

The economic speed of 12 knots was also verified. This speed will be used while sailing to Antarctica, as it only requires the use of one diesel engine and therefore saves fuel substantially. To reach a speed of 15 knots, two engines are used and in actual icebreaking situations all four engines can be used for maximum power.



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Focus on low noise and vibration

During the design stage extensive vibration analysis was used to refine the design with special arrangements made in order to achieve low vibration and noise levels. The full-scale tests confirmed that the vessel complies with China Classification Society's and Lloyd's Register's comfort class 2.

"Inboard noise and vibration tests were executed at the economical speed of 12 knots, the service speed of 15 knots and while using dynamic positioning," Laukia explains.

Low underwater noise is also important, as the vessel will move in the sensitive polar areas. Underwater radiated noise levels were consequently also measured during the trials.



From left: Zhimin Xiao, PRIC, Chief Officer; Lönnerberg Lars, Aker Arctic, Chief Designer; Laukia Kari, Aker Arctic, Project Manager; Xu Ning, PRIC, Head of Vessel & Craft Management Division of PRIC, Zhao Yanping, PRIC, Captain; Huang Rong, PRIC, Chief Engineer; Wu Gang, Maric, Chief Designer

Additional special features

The full technical details of *Xue Long 2* have been presented in a previous issue of Arctic Passion News (see issue 15). However, the vessel has a few special features worth highlighting.



Large seminar room

Xue Long 2 is equipped with a grand conference room suitable for up to 80 persons. The sloping floor allows good visuals from every seat to the stage area, which includes a speaker podium and a big screen for presentations, videos or movies.



Wide outside deck corridors

Internal logistics on the ship is efficient and transportation of equipment between the cargo hold and aft deck is easy using the wide outside deck corridors on the side of the vessel.



Multifunctional aft deck

The compact aft deck is equipped with large cranes, A-frames and a core sampler. It has designated spaces for seismic containers, which are loaded onboard when needed. The modular design of the deck allows the vessel to be equipped differently for each trip according to mission needs.

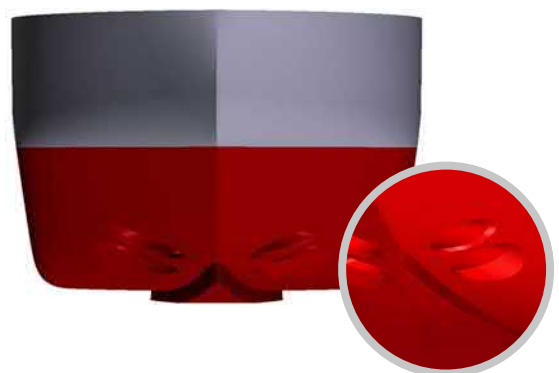


Scientific control room

All research vessels have scientific control rooms, but the one onboard *Xue Long 2* is especially spacious with big windows towards the moonpool workshop and the aft deck, enabling visual contact between researchers and the deck crew.

Box keel protects equipment

A specially designed box keel in the bow of the vessel protects scientific equipment from ice pieces and is designed so that underwater disturbance can be avoided while performing scientific tasks. The box keel has been tailored to retain icebreaking properties without increasing open water resistance.



Successful delivery

"The *Xue Long 2* Polar Scientific Icebreaker was successfully delivered at the Jiangnan Shipyard in China on July 11, 2019," comments Mr. Xu Ning, Head of Vessel & Craft Management Division of Polar Research Institute of China (PRIC).

"Since winning the basic design in July 2012, Aker Arctic has played an irreplaceable role in the ice performance prediction, icebreaking type and structural design of the *Xue Long 2* project. This resulted in the basic design achieving the double approval of China Classification Society (CCS) and Lloyd's Register of Shipping (LR). The class approval provided a solid foundation for the subsequent detailed design and production design. Aker Arctic carried out close cooperation with the Chinese participants, especially the domestic design institute China Marine and Ocean Engineering Design and Research Institute (MARIC). We appreciate Finnish Aker Arctic for its contribution and support to the successful construction of China's *Xue Long 2*."

Ice trials in October

Xue Long 2 will depart on her maiden voyage and first mission in October 2019. She is scheduled to sail first to Hobart, Australia, from where she will continue to Antarctica delivering equipment and supplies to the Chinese research stations located on the continent, as well as executing scientific research en route. The full-scale ice trials will be performed during this first trip to Antarctica.

"The bollard pull was verified in Shanghai after the sea trials in mid-June and met the specification requirement," Laukia adds. "This is an essential prerequisite for the ship's icebreaking performance in order to fulfil the icebreaking target of 1.5 metres level ice she is designed and built for." ■

A long history of cooperation

The Finnish embassy in Beijing opened in 1952, with bilateral trade relations developing quickly under the lead of ambassadors Helge von Knorring and Carl-Johan Sundström.

In 1953, the first commercial ship agreement was signed, based on which Finland delivered six 3,200 DWT steam cargo ships of Crichton-Vulcan design. The six vessels, named *Ho Ping 18*, *Ho Ping 19*, *Ho Ping 21*, *Ho Ping 22*, *Ho Ping 23* and *Ho Ping 24*, sailed from Finland to Shanghai and were delivered between 1955 and 1957.



SS *Rigel*, built in Turku in 1937, was the lead vessel in the series, of which six units were built for China between 1955 and 1957. Photo Source: FÅA- Silja Line, Maritime Museum of Finland, Finnish Heritage Agency

Text by Mikko Niini, CEO of Aker Arctic 2004–2014