

# Northern sea route transit - a first in the seismic industry.

The 3D seismic vessel Polarcus Alima has successfully transited from Norway to the Asia-Pacific region via the Northern Sea Route (NSR)—a first in the seismic industry. This achievement, which saved considerable time, fuel, emissions and cost compared to alternative routes, was only possible thanks to unique environmental features of the Polarcus seismic fleet.

Delivered in the first quarter of 2011 from the Drydocks World shipyard in Dubai, Polarcus Alima is a high ice-class 12-streamer 3D seismic vessel built to the ULSTEIN SX134 design. She is amongst the most environmentally sound seismic vessels in the market with diesel-electric propulsion; a high-specification catalytic reactor; double hull; and advanced ballast water treatment and bilge water cleaning systems. The vessel complies with the stringent Det Norsk Veritas DNV CLEAN DESIGN notation.

Polarcus Alima was scheduled for a series of 3D surveys in the Taranaki and Great South Basins offshore New Zealand after completion of her seismic operations in the Barents Sea, located north of Norway and Russia. The traditional route for the transit to New Zealand is via the Panama Canal or, for some larger vessels, the Suez Canal. The 3,000 nautical mile (5,560 km) NSR through the Arctic Ocean along the north coast of Russia provides a much shorter route, but it is partially covered by sea ice throughout the year and almost completely in winter.

Under the Russian Federation's 1990 Regulations for Navigation on the Seaways of the NSR, vessels sailing the route are required to hold an ICE-1A or higher ice class—a rating that is a unique feature of the Polarcus fleet in the seismic industry. In addition, Polarcus has developed a wide-ranging set of procedures for operating in harsh environments, and was formally awarded a Statement of Qualification from DNV of its Arctic Procedures at the annual Arctic Shipping Summit in Helsinki, Finland in early 2011.

## Planning for the voyage

Approximately one month prior to Alima completing her 2011 summer season in the Barents Sea area, Polarcus in-house maritime operations personnel began a detailed investigation into the viability and requirements for transiting to New Zealand via the NSR, which could save substantial time, cost, and fuel. Advice was sought from expert organizations including Atomflot, a Russian provider of specialist Icebreaking

Services and—through its Russian-Norwegian joint venture company Arctic Bulk AG—Tschudi Arctic Transit AS, a provider of transportation solutions in the region. Enquiries also began with the Northern Sea Route Administration (NSRA) in Moscow, the agency responsible for managing sea traffic through the route.

Detailed study of recent and forecast ice charts over the proposed transit period indicated that there was little risk of encountering any pack ice along the planned route, and Polarcus was confident that Alima was capable of completing the journey safely and efficiently. Administrative delays represented a major potential challenge, as applications for the transit should normally be presented to the NSRA 3 to 4 months in advance of sailing. Tschudi AS assisted with enabling the possibility of getting the necessary approvals completed in time, so detailed planning for the journey began. Polarcus performed a thorough risk assessment to highlight expected risks and prompt measures to mitigate the potential impact of these risks. An extra Chief Mate who was fluent in the Russian language would sail as part of the crew to aid communications with the icebreaker escorts arranged by Atomflot.

## Communication in remote sea areas

All ships must be equipped with ship-to-shore and bridge-to-bridge communications equipment suitable for the waters in which they will sail. The requirements, which depend on the regional availability of suitable communications channels, are defined in four bands. Sea Areas 1 and 2 are within the coverage of continuous Digital Selective Calling (DSC) alerting from a VHF or MF coast station respectively. Sea Area A3 is within the coverage of an Inmarsat geostationary satellite in which continuous alerting is available. Ships operating in Sea Area A4, which includes much of the Arctic region, need to make extra provision. Polarcus Alima already had HF Radio and Radio Telex systems to cover communications in Sea Area A4 but to provide extra coverage, an Iridium Communications system was fitted. Based on a constellation of 66 low-earth orbiting cross-linked satellites, this system provides voice and data communication services in all parts of the globe including poles, oceans and airways. Its users include the U.S. Department of Defense. The Iridium system was used for 12-hourly reporting to the NSRA, Atomflot, and their vessels when Alima's Vsat, Csat and Inmarsat B were outside of their satellite capabilities.

## Final preparations

Polarcus Alima arrived at Hammerfest in northern Norway on the 14th September and commenced preparations for the transit to New Zealand. Captain Sergey Minchenko of the Murmansk Maritime Agency visited the vessel in port to perform an inspection on behalf of the NSRA to enable the issuance of a permit allowing the NSR transit to take place. All issues contained within the inspection check list were found to be satisfactory and the permit was issued in the late afternoon of September 14. The vessel's Insurance Underwriters had previously been consulted and an agreement reached with Polarcus for the voyage, so everything was in place for the journey to begin.

## The Northern Sea Route transit

Polarcus Alima sailed on schedule from Hammerfest at 16:30 Coordinated Universal Time (UTC) on 15 September 2011. Course was set from Fruholmen towards the north end of the island archipelago of Novaya Zemlya, then onwards to a position of 78 00 N 084 00 E where at 20:35 on September 18 she rendezvoused with NS Yamal, a nuclear powered icebreaker operated by Atomflot. Yamal escorted Alima to and through the Vilkitskiy Strait to 77 44 N 108 05.5 E in the Laptev Sea. Polarcus Alima continued east along recommended routes, keeping in radio contact with Yamal and sending 12 hourly position reports to NSRA and Atomflot. At 1800 UTC on September 19 ice pilotage support was transferred from Yamal to NS 50 Let Pobedy, the world's largest icebreaker. Polarcus Alima's route then passed Pevek Point, where on September 23 radio contact was made with icebreaker Admiral Makarov. She then sailed on to Cape Dezhnev, the easternmost mainland point of Eurasia, and was through and out of the Bering Straits into the Pacific Ocean at 22:50 on September 24.

Whenever air temperature dropped below 0 degC, the heated deck walkway and railing systems on the vessel—standard equipment as part of the winterized basic class of her ULSTEIN SX134 design—were enabled. The coldest conditions experienced were in the East Siberian Sea, where air temperatures fell to -3 degC and sea water temperatures to 0 degC. By Pevek Point they had risen to +1 and +3 respectively. Large areas of shallow water were encountered, and even on the recommended routes, water depths as low as 15 m were not uncommon. Away from the recommended routes there are large areas of sea where charted soundings are at 4 km (2.5 mi) intervals, so it was essential to keep to the recommended routes to avoid risk of grounding.

To compensate for the quick passage across the meridians of longitude, it had been planned to change the clocks onboard by one hour every day; however this proved to be too rapid for most personnel. It was therefore decided to ease the time change to one hour every second day and by Shelagskiy Point, sunset was at 14:00 ships time (08:00 utc).

The crew onboard Polarcus Alima were keen to capture photographic memories of this unique voyage, but for the first 5 days there was moderate to thick fog. Groups of sea lions were sighted off Novaya Zemlya, but they quickly dispersed and it was not possible to get any quality photographs of them. There was a marked increase in wild life when approaching the Bering Straits, where whales were observed, but these were also too elusive to catch on camera. The best shoreward views of the passage were on 23 September when passing 8 km (5 mi) off Shelagskiy Point, which provided memorable photographs of a dramatic and desolate landscape.

The voyage from Hammerfest to the Bering Straits was completed in nine days, and Alima arrived in New Zealand on October 17 to commence seismic operations expected to run for up to 7 months. The time saved by using the Northern Sea Route is estimated at 8 days relative to the Panama Canal route and 13 days using the Suez Canal. "The successful navigation of Polarcus Alima along the NSR has been achieved through the dedication and hard work of our in-house operations personnel, the NSRA, and our crew onboard the vessel," said Rolf Rønningen, CEO Polarcus. "The result of this outstanding teamwork has been to achieve significant savings in fuel, emissions, and most significantly time during a milestone transit that effectively provides Polarcus a viable new sea bridge between two important operational markets."

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