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Arctic Exploration: Experience Drives Innovation

A company's experience has enabled it to develop technologies and processes that extend the operating season and allow efficient, predictable and safe acquisition of high-quality data near as well as under ice.

CONTRIBUTED BY ION

The Arctic Ocean contains an estimated 25% of the world's remaining hydrocarbon resources, and a growing number of major E&P operators are focusing on developing the area. Operating conditions can be hostile, and traditional seismic methods are only possible for a short season, typically one month to two months in some areas.

In the days of Scott and Amundsen, Arctic exploration required extraordinary bravery. Success was measured by how many lived to tell about it. Today, the key to success is well-informed circumspection, supported by meticulous planning and access to the right technology.

Planning a survey in the Arctic requires detailed knowledge and analysis of seasonal ice patterns over many years, enabling the selection of vessels that can maximize the probability of acquiring the required data within the season. ION's Narwhal for Ice Management system incorporates these and many other variables, providing unique tools to plan Arctic surveys and then guide full project execution. ION has more than 25 years of experience in delivering Arctic data acquisition systems and has been acquiring data in the Arctic for almost 10 years. The company's Arctic multient client data library contains more than 70,000 km (43,496 miles) of high-quality basin scale 2-D seismic and more than 250,000 km (155,343 miles) of aeromagnetic and gravity data. This library covers the waters off the northeast coast of Greenland, the Chukchi Sea and both the U.S. and Canadian Beaufort seas. ION recently made available 17,000 km (10,563 miles) of data in the Russian sector of the Arctic. All that experience has enabled the company to develop technologies and processes that extend the operating season and allow efficient, predictable and safe acquisition of high-quality data near ice and even under ice.

The best way to work around ice is to avoid it, but when ice gets in the way, properly equipped vessels can still operate safely and productively. ION has developed specialized towing systems that allow equipment to be towed below the ice without causing damage to sources and streamers. Tow-



ION has Arctic seismic operations offshore Northeast Greenland. (Source: ION's GeoVentures division)

ing below the ice ensures cost-effective acquisition of high-quality, low-noise data. On a recent project, the company's crew acquired about 10 times the volume of data acquired by a competing crew working in similar conditions.

Although under-ice towing reduces streamer self-noise, noise created by the icebreaker as it fractures the ice, source-generated energy scattering off the ice can create significant challenges. ION's GX Technology data processing group has developed specialized noise-removal techniques to ensure that high-fidelity deep seismic images are obtained.

In areas where access for seismic crews is challenging, potential fields data, such as gravity gradiometry, can be used to fill in the blank spaces between the lines of a 2-D seismic grid. This type of multimeasurement integrated interpretation proved very successful on a recent ION BasinSPAN project offshore Greenland. The company's SPAN programs can be used to build basin scale geologic frameworks and focus exploration budgets in the most prospective areas. ION is continuing to build its ArcticSPAN library of multient client data and already is planning to move to the next phase of Arctic exploration by applying its skills and experience to 3-D surveying above the Arctic Circle. To learn more, visit ION at booth 1445. ■