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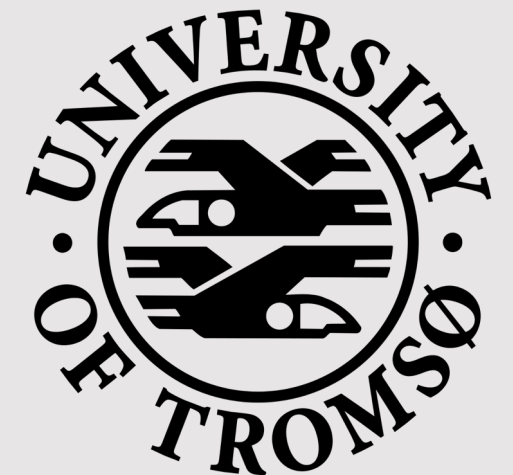
NORBIT WBMS Bathy Sonar: ROV Installation Example / CAGE mission to monitor methane sips in the Arctic Ocean

About CAGE

The Centre for Arctic Gas Hydrate, Environment and Climate (CAGE) is a research center located at UiT The Arctic University of Norway in Tromsø.

CAGE's main goal is to study methane release from gas hydrates beneath the Arctic Ocean and its effect on oceans and the global climate in the future.

CAGE is an important contributor to the Arctic marine geology research.





Survey Location

The mission had two study areas at Storfjordrenna—a deep subsea channel in the Barents Sea, south of Svalbard, Norway.

Water depths varied from ~380-390m at study area 1 and ~330-350m at study area 2.

First study area featured prominent pingo-like structures (PLF) — seafloor mounds leaking plumes of gas bubbles into the water column.

Second study area was a joint PLF-crater feature with scattered gas flares and large blocks of rocks at the bottom of the crater.

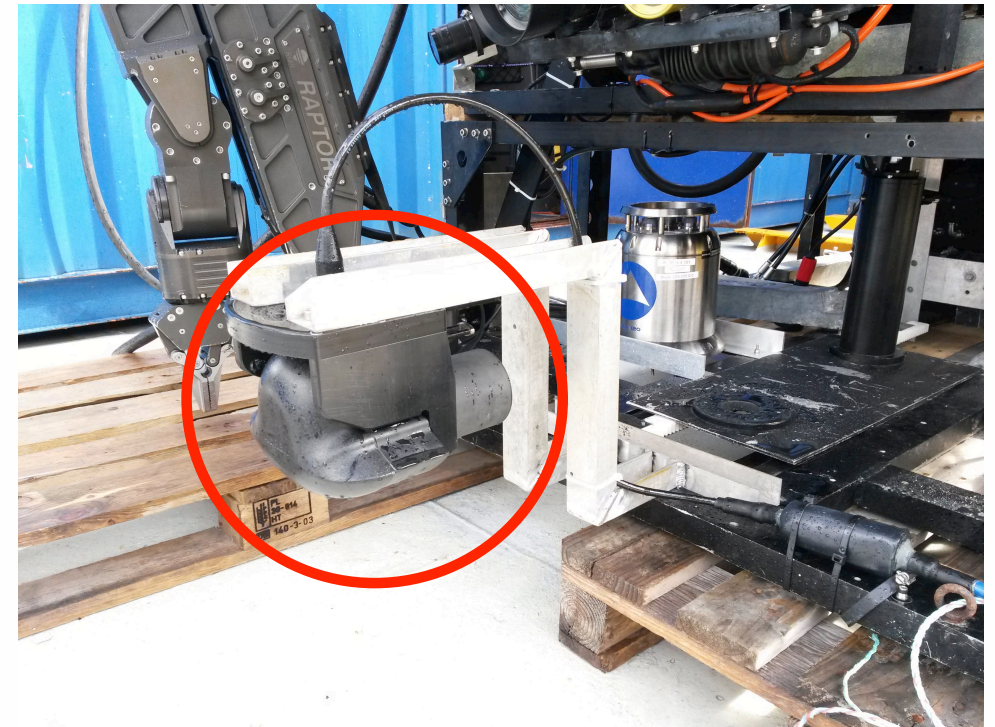
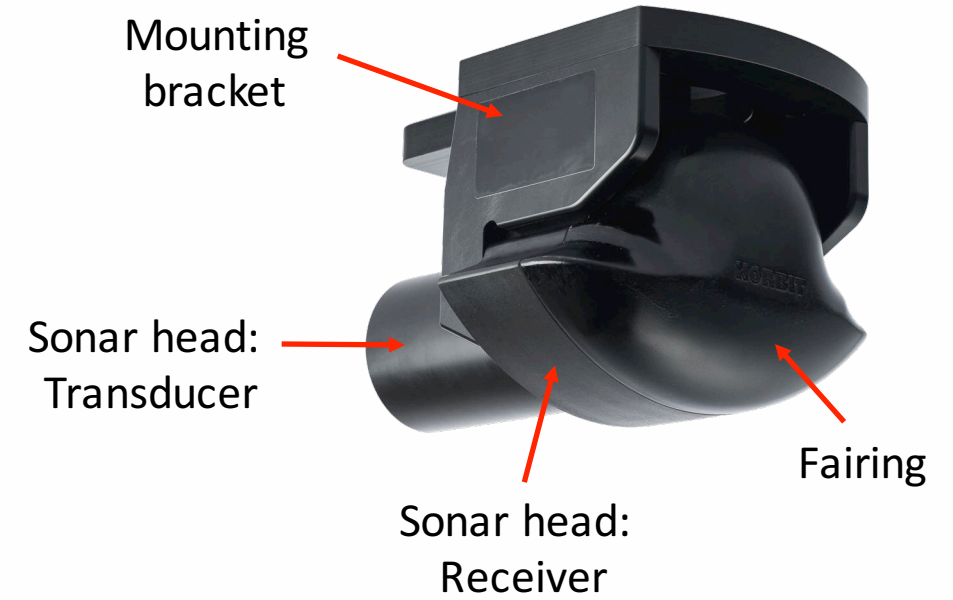
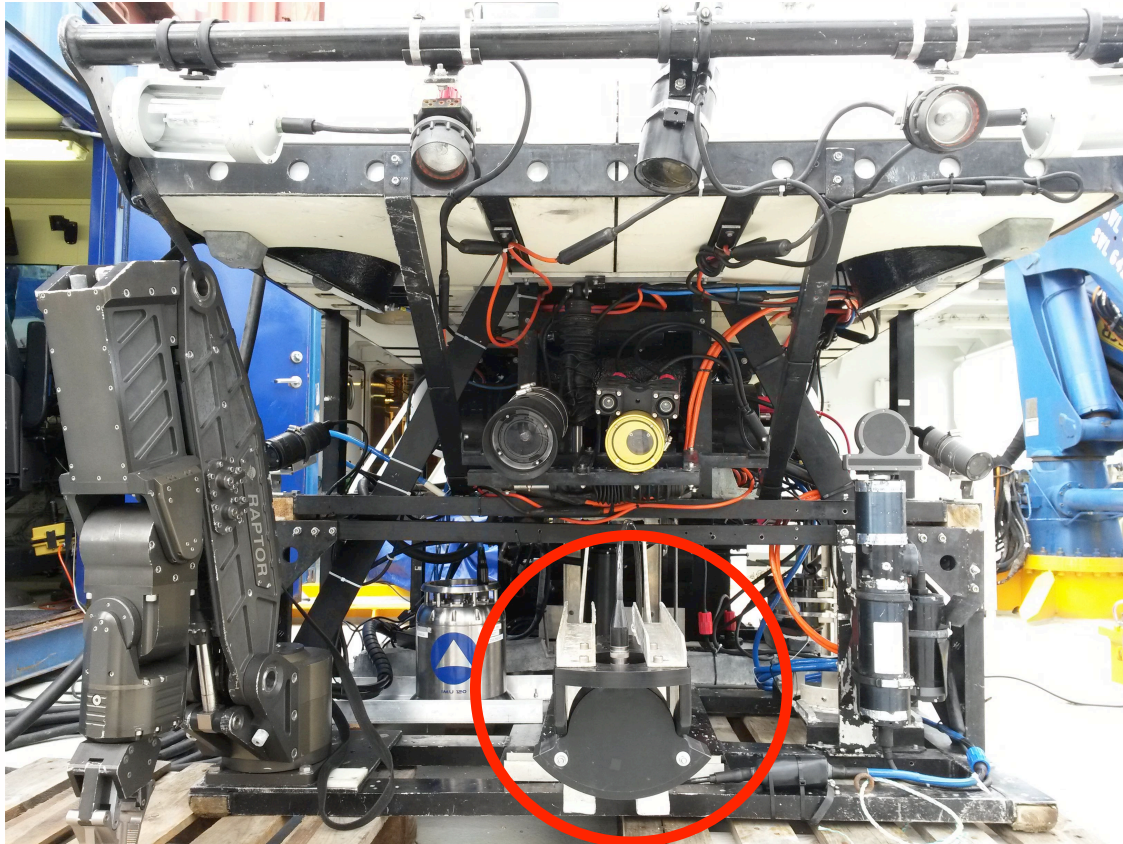
Survey Setup

For the purpose of this mission, NORBIT WBMS Bathy Sonar was installed on the SUB-fighter 30k ROV, designed by Sperre AS for NTNU/AMOS (Centre for Autonomous Marine Operations and Systems at the Norwegian University of Science and Technology in Trondheim).

WBMS Bathy is an ultra compact high-resolution multibeam sonar designed for use on all platforms. With approximately 40W power consumption, the system is suitable to operate from battery. NORBIT wideband multibeam technology facilitates long range realtime data collection and at the same time achieves high resolution data.



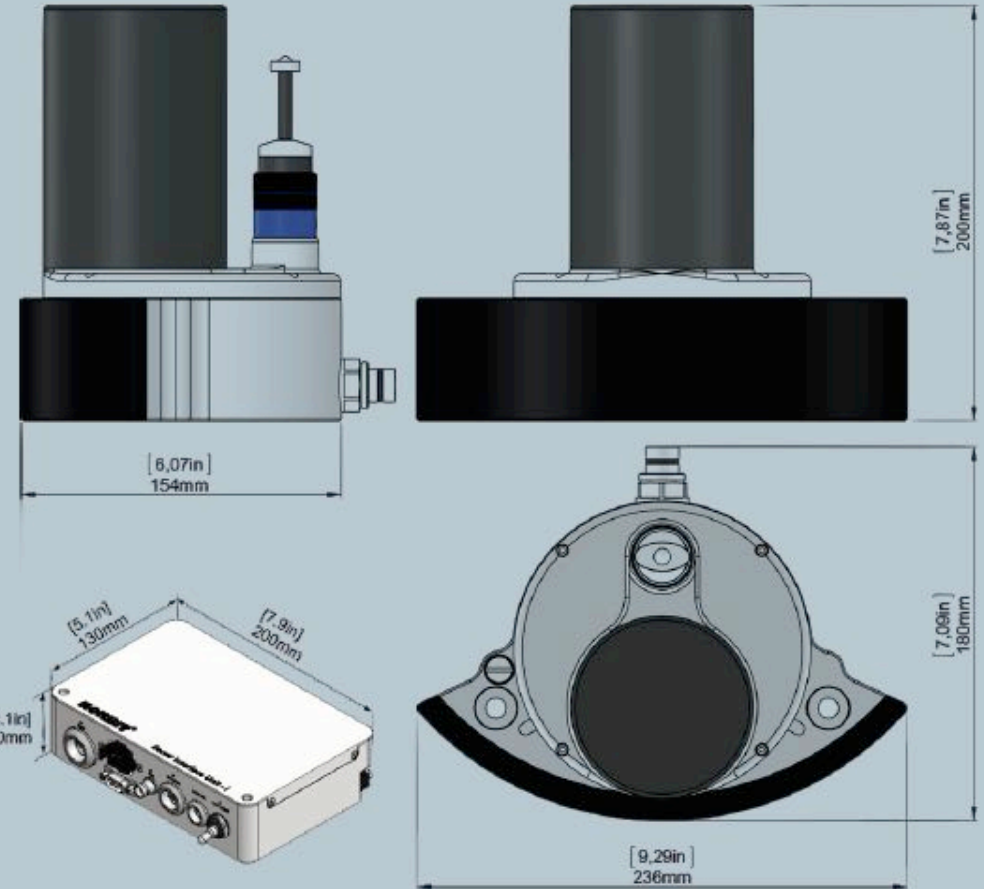
Survey Setup



NORBIT WBMS Bathy Specifications

TECHNICAL SPECIFICATIONS

SWATH COVERAGE	7-210° (SHALLOW WATER IHO SPECIAL ORDER >155°)
RANGE RESOLUTION	<10mm (ACOUSTIC)
NUMBER OF BEAMS	256-512 EA & ED
OPERATING FREQUENCY	400kHz w/80kHz BANDWIDTH (FREQ. AGILITY 200-700kHz) (LOW FREQ MODE AND HIGH FREQ ULTRA RESOLUTION MODE)
PING RATE	UP TO 50Hz, ADAPTIVE
DEPTH RANGE	0.2-275m (160m TYPICAL)
RESOLUTION	0.9° ACROSS, 1.9° ALONG @400kHz. OPTION: ALONG 0.9° 0.5° ACROSS, 0.9° ALONG @700kHz
WEIGHT	<4.5kg(AIR), 3kg(WATER)
POWER CONSUMPTION	40W (55W MAX)
VOLTAGE	10-28VDC or 100-240VAC (ROV DIRECT: 22-29VDC)
INTERFACE	ETHERNET
STANDARD CABLE LENGTH	8m, OPTIONS: 25m, PIGTAIL, MAX 600m VDSL
DEPTH	100m OPTIONAL: 900m, 4500m, 6000m
OPERATING TEMPERATURE	-4°C to +40°C (TOPSIDE -20°C to +55°C)
STORAGE TEMPERATURE	-20°C to +60°C
ENVIRONMENTAL	TOPSIDE: IP67: DUST TIGHT, PROTECTED AGAINST THE EFFECT OF IMMERSION UP TO 1m



Part #12003

Survey Mission

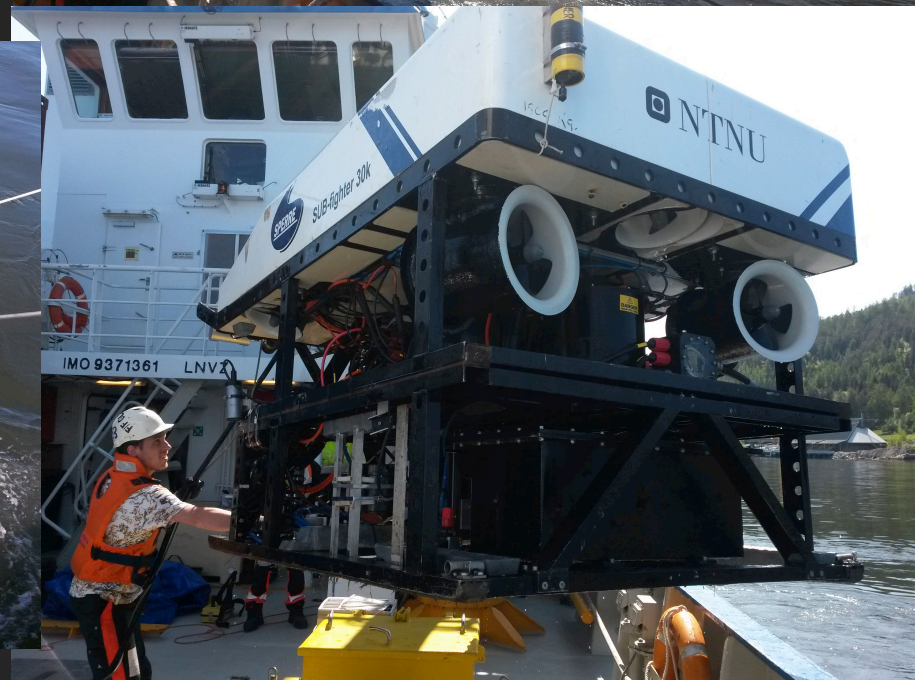
CAGE studies shallow geological fluid flow systems capable of transporting significant amount of gas (mainly methane) from the seabed up to the ocean floor and into the water column.

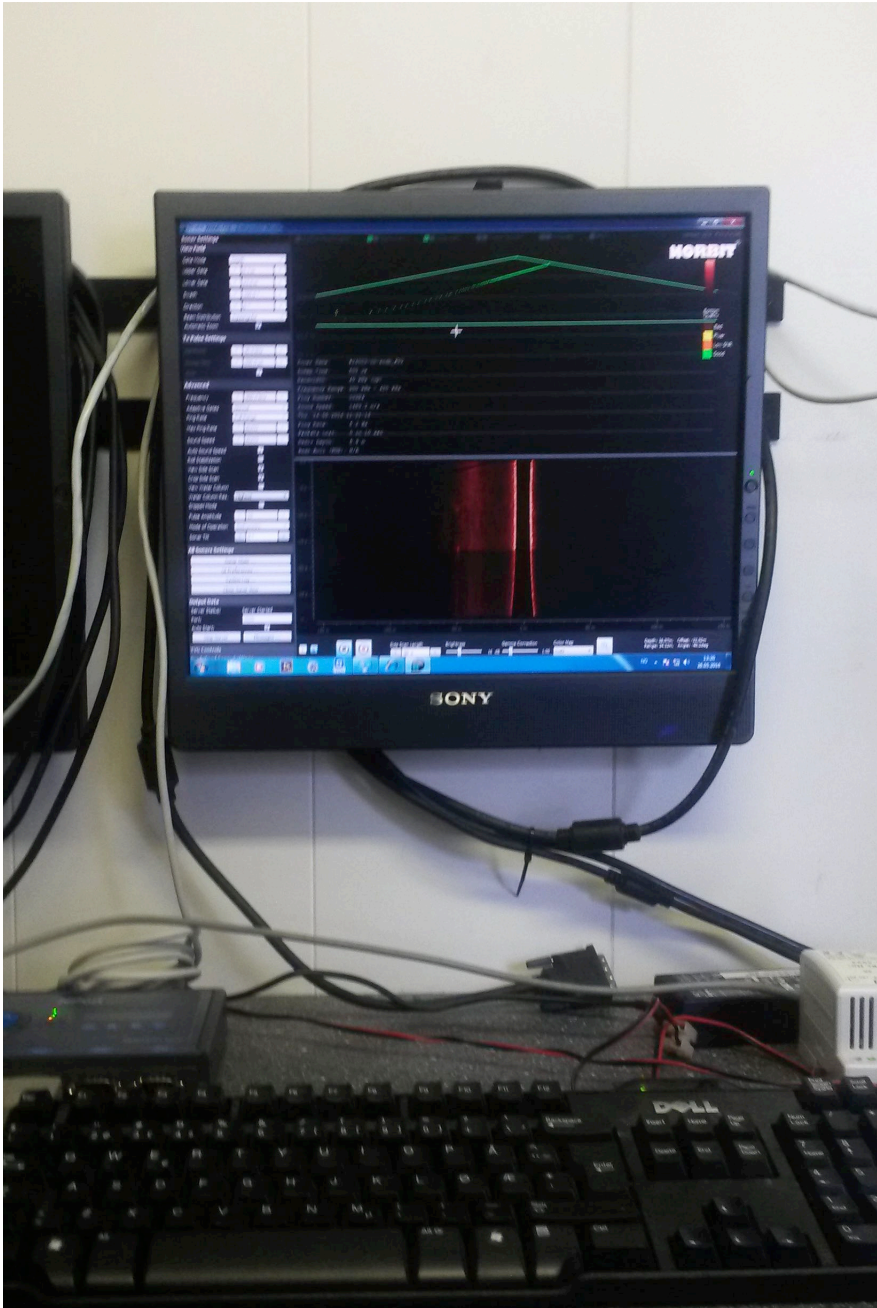
Normally, ship-mounted multibeam systems provide sufficient resolution (up to several meters at target water depths) allowing for fine-scale characterizing of the seafloor and mapping the gas flares in the water column. However, for detailed mapping of gas bubble streams and focused sediment sampling, high-precision multibeam systems are required.

One of the crucial objectives of the survey was to use NORBIT multibeam sonar for studying the methane seeps at the seabed.

Another important objective was mapping of the objects at the seafloor (e.g. boulders, blocks of geological rocks), which may be hazardous for CAGE's seafloor observatories that require flat and featureless surface to be landed on. Therefore, ROV mounted multibeam is a perfect tool, providing the seafloor maps with 10th of cm resolution and neat gas flare positioning.







Control station on the
vessel

Conclusion

Conducting surveys in harsh and remote areas like the Arctic can be very challenging. The CAGE mission has proved the practicality of deploying the ROV equipped with the high-precision NORBIT multibeam system for conducting surveys in such areas. The high level of details required by the survey objectives could not have been achieved in the studied areas by conventional ship-mounted multibeam systems. Therefore, ultra-compact yet powerful NORBIT system that allows for an easy integration onto the ROV has proven to be a successful solution.

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