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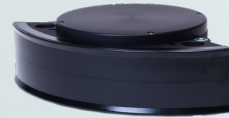
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NORBIT next-generation high-resolution, long-range, forward-looking imaging sonars for multiple deployment operations.

WINGHEAD F11

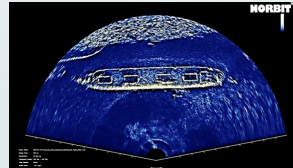


First FLS produced



WBMS FLS Compact

In 2012, NORBIT developed an innovative platform for Wide Band Multibeam Sonar (WBMS) systems. This project established the basic mechanical and signal processing platform for the WBMS product line, which has become a highly successful and essential tool in the industry for mapping and imaging.



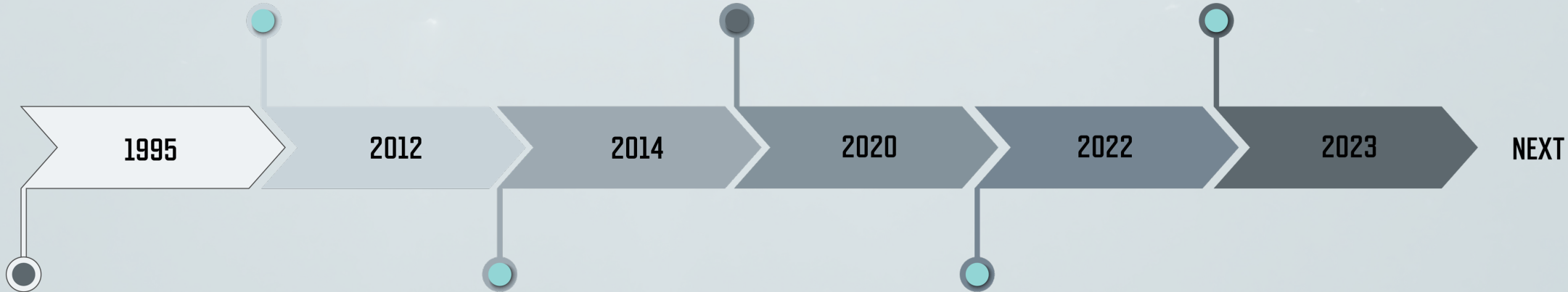
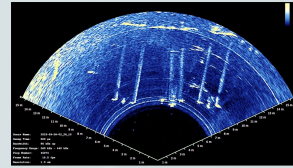
WINGHEAD Sonar Platform Released

In 2020, NORBIT innovated its platform further to produce the WINGHEAD Multibeam family of sonars using advanced experience with cutting-edge electrical and signal processing capabilities.



WINGHEAD F11

WINGHEAD F11 represents the pinnacle of NORBIT's skills as a multibeam sonar manufacturer and provides one of the most versatile and easy to operate imaging systems on the market.

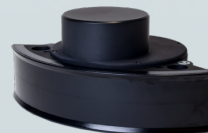


NORBIT ASA Founded

NORBIT ASA was founded in 1995 in Trondheim, Norway as a technology provider in complex electronic, mechanical, and signal processing solutions.

WBMS FLS Wide

In 2014, NORBIT Releases a new version of the WBMS FLS with a wider horizontal coverage



WBMS FLS OEM

Release of OEM FLS products

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WINGHEAD F11 Integration

All platforms supported





WINGHEAD F11 Shown with an "angle adjustable bracket" attached to NORBIT's Carbon Fiber PORTUS Pole for surface vessel work.

Summary of Benefits

- Highest bandwidth processing available in the industry
- Superior range resolution, curved array and signal processing equals unmatched data quality in a compact system.
- NORBIT provides integration support for turnkey solutions requiring custom cables/adaptation to 3rd party connectors.
- Adding additional software processing chains is possible by an agile public interface for real-time or after-action processing.

Technical Highlights

- Compact system with processing inside the sonar and one interface cable.
- The curved array technology provides 180-degree horizontal coverage and >25-degree vertical coverage for comprehensive area imaging.
- The 80kHz bandwidth yields <10mm Range Resolution
- 0.5 deg beams with up to 1024 beams.
- Ultra-compact design for easy installation on most UUV, ASV, ROV, and Surface Vessels.
- Can be combined with NORBIT's GuardPoint Software for intruder detection.
- Standard depth rating 900m or 4500m
- Outputs standard S7K Imagery Format



NORBIT's focus on compact high-performance sonar products ensures easy delivery and simple setup.

To present results in a meaningful way, the outputs of the WINGHEAD F11 are displayed based on range performance using the following range scales:



Short Range Inspections:
Range 1-50m



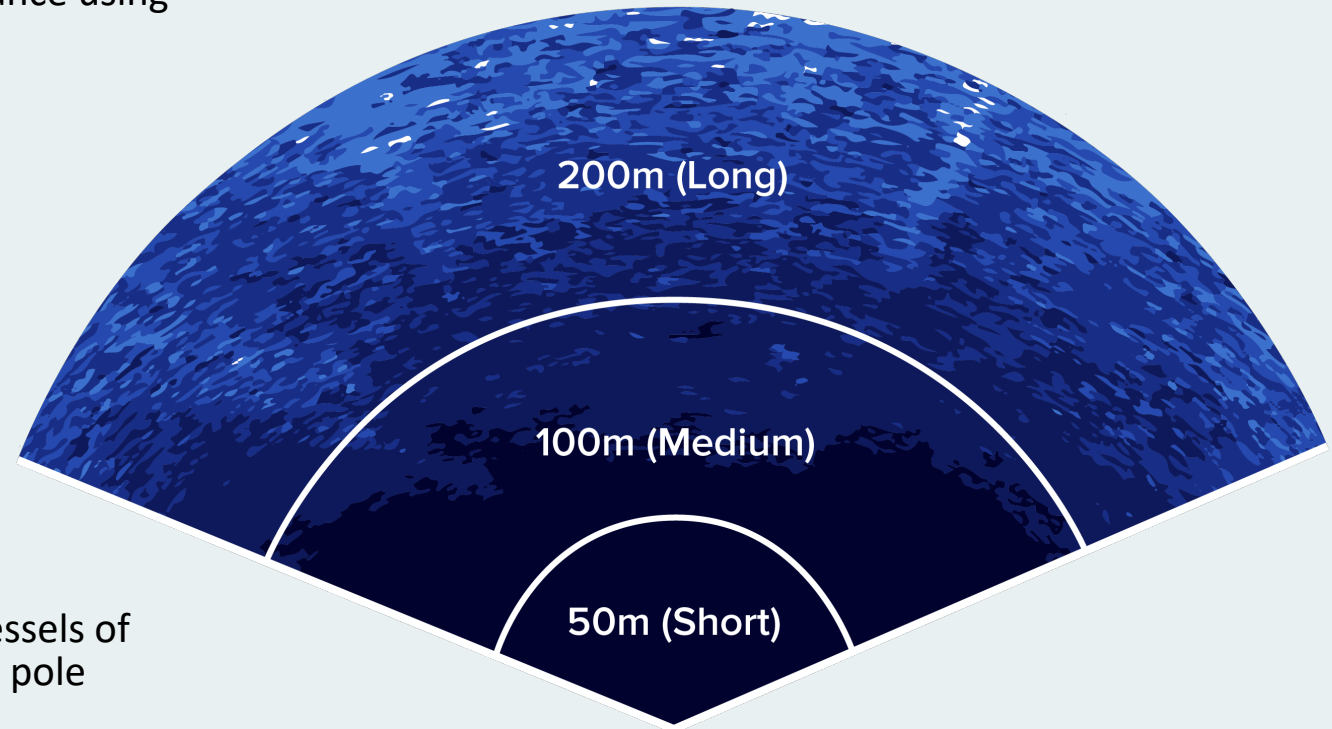
Mid-Range Navigation And Wide Area Search:
Range 50-100m

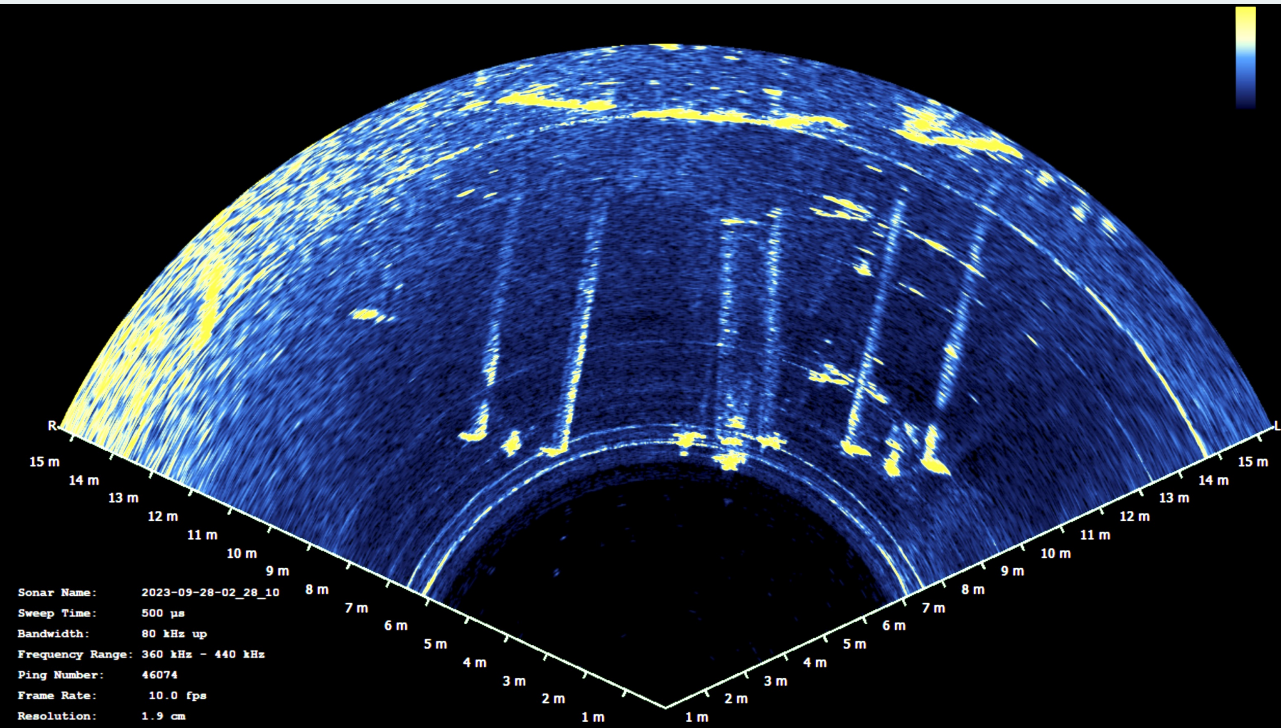
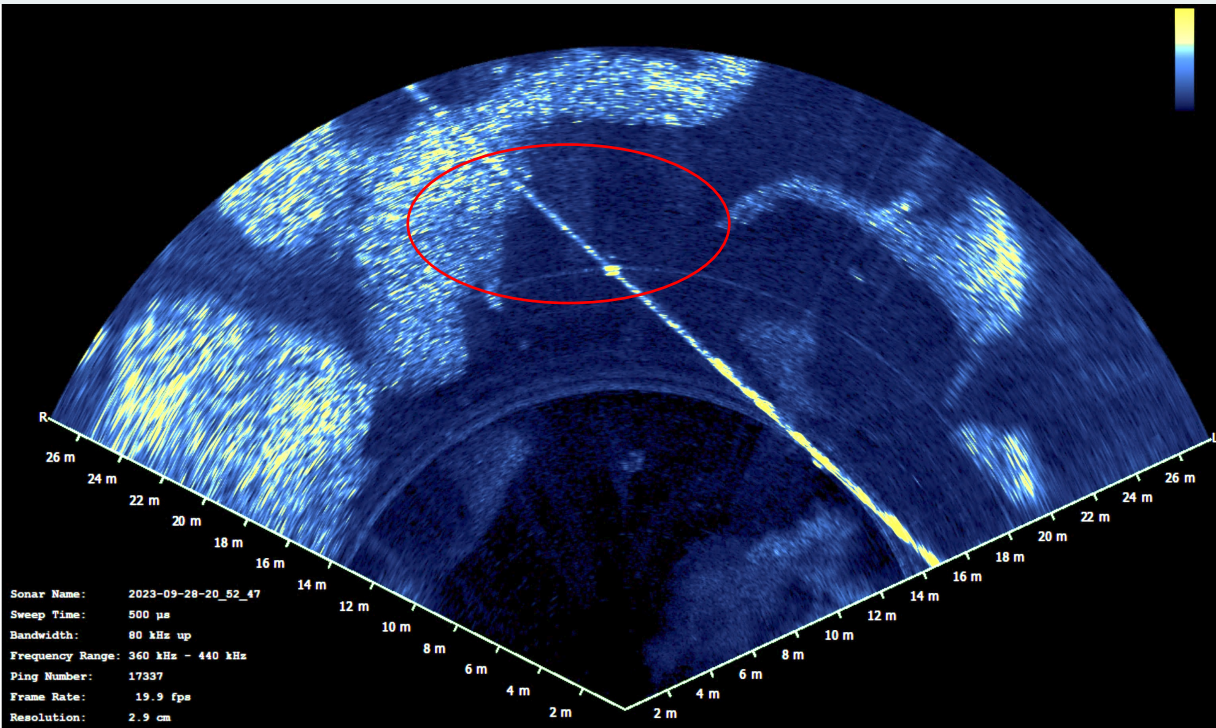


Long Range Detection/Search/Navigation:
Range 100-200m

Data was collected using NORBIT's surface vessels or vessels of opportunity equipped with a standard NORBIT PORTUS pole mount and custom angle adjustable brackets.

Various targets were chosen to highlight recognizable objects and features at different ranges.

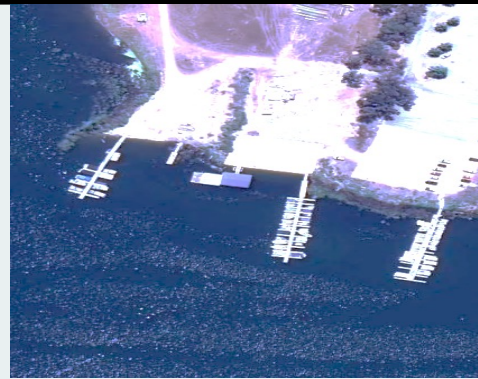




Objective: **Imaging surface & subsurface structures: surface buoys, line, and fish schools**

Range: **35m**

Water Depth: **20-40m**



Objective: **Imaging approach to floating docks.**

Range: **20m**

Water Depth: **3-5m**

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Results – Short Range Search and Recovery, Navigation

Objective: Investigate Crane Wreckage circa 1946

Location: River Danube, Budapest, HU.

Range: 50-60m

Water Depth: 2-8m

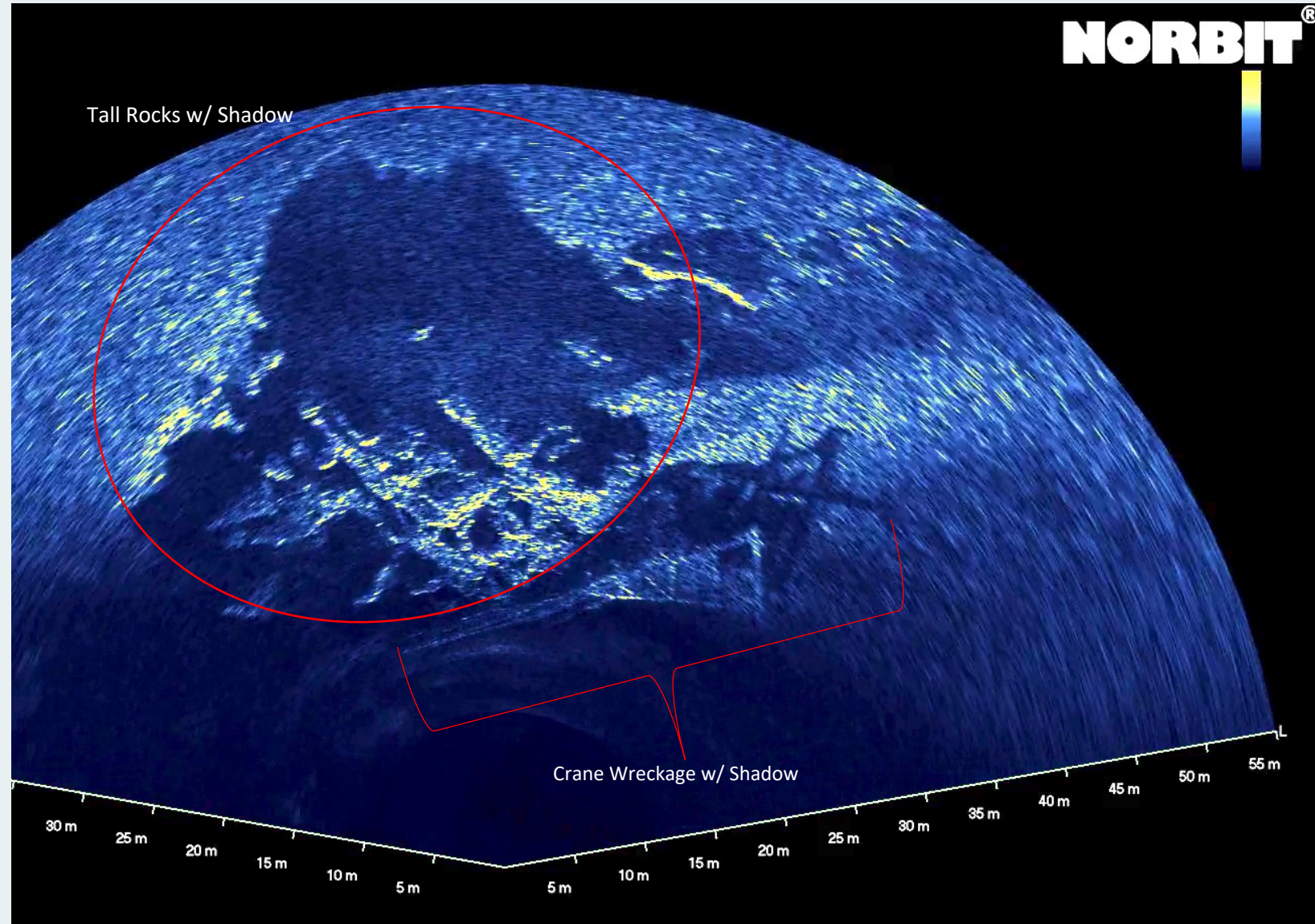
History:

In this image, the superior performance of the WINGHEAD F11 can be seen when imaging details of complex structures ahead of a vehicle. The structure of tall rocks and man-made objects is easily identified in the middle of the river, a high-traffic shipping and recreational waterway that requires constant management as the depth varies widely from 2-5m+ through the year.

Using historical images allows for confirmation of what the sonar detects. In this case, the sonar image shows the wreckage of a crane that was lost during the reconstruction of the Liberty Bridge in Budapest after WWII.



Construction of the central part of the bridge on 12 July 1946 (Source: Fortepan / Hungarian Museum of Technology and Transport / Collection of Historical Photographs / Ganz Collection / TFGY 2017.1.1105)



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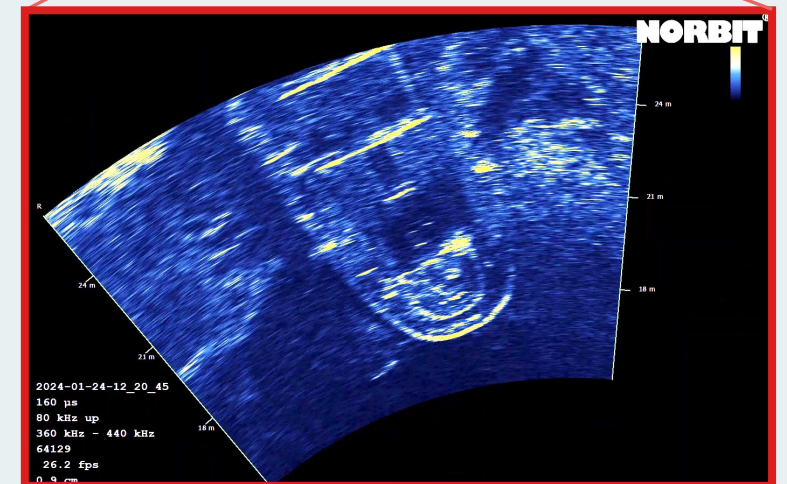
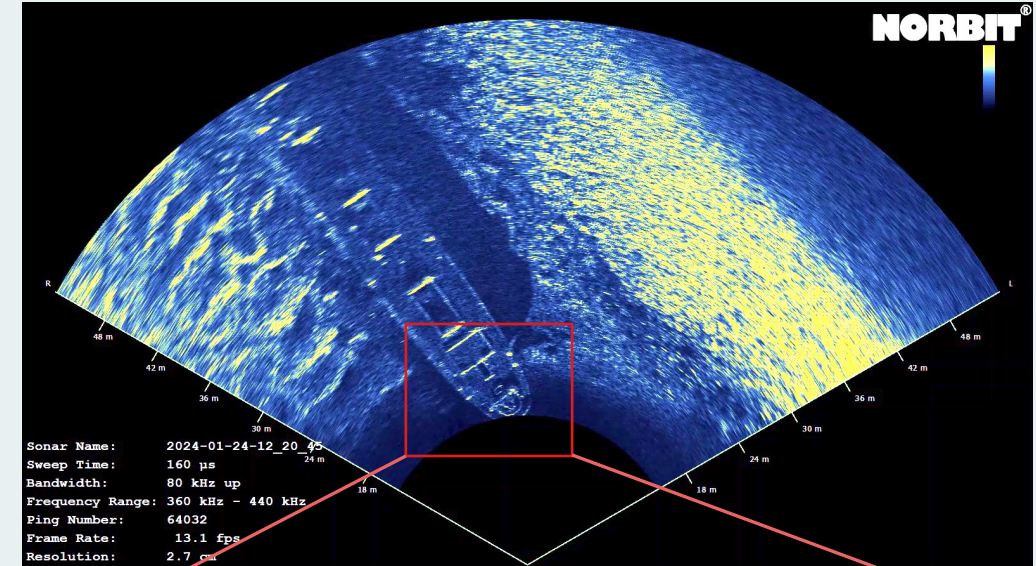
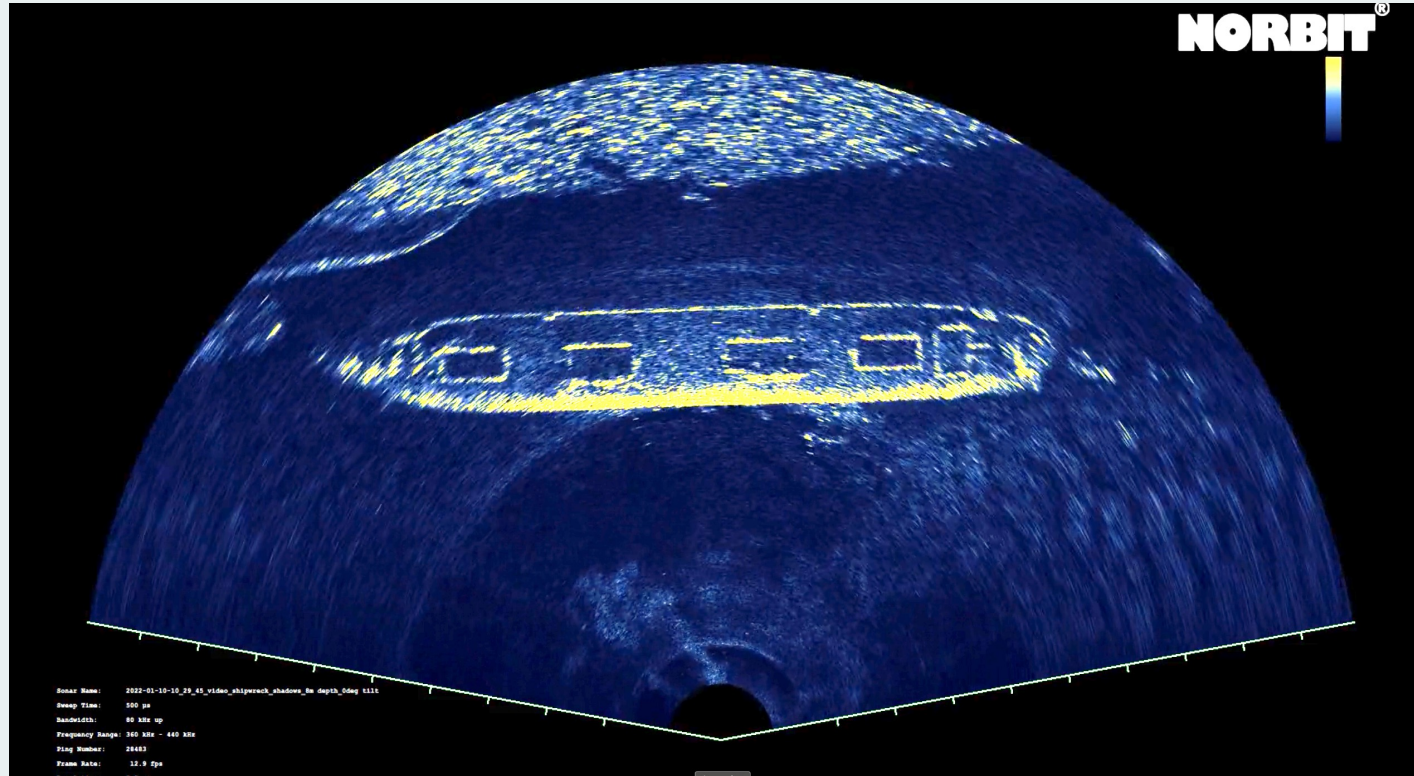
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Results Mid-Range Detailed Inspection Using Acoustic Zoom

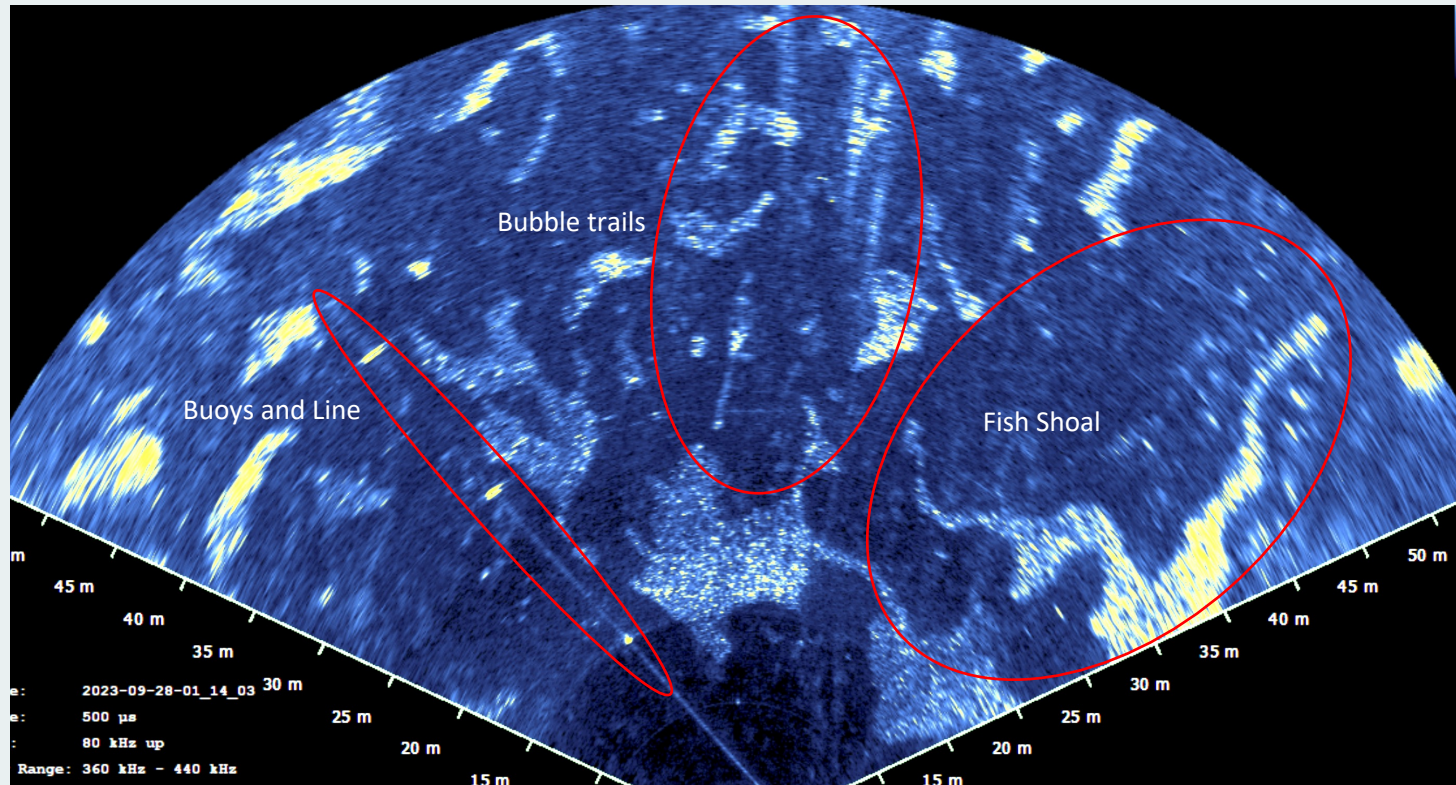
Objective: Investigate a Sunken barge next to the shoreline in high traffic area

Range: 50-60m

Water Depth: 5-8m



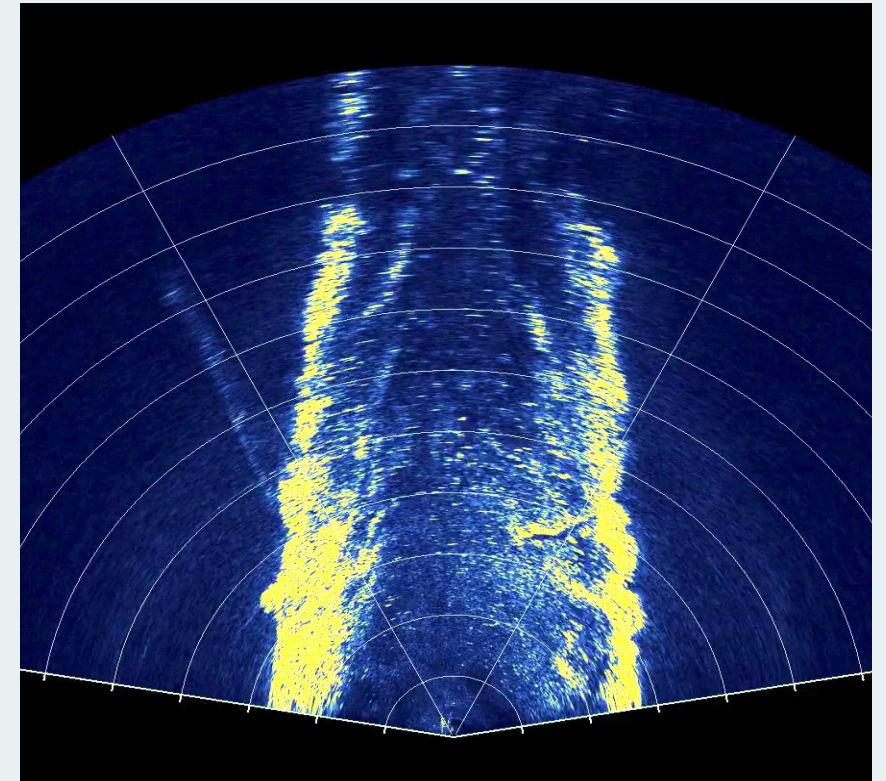
The Acoustic Zoom feature in NORBIT GUI allows for detailed inspection/analysis by an operator.



Objectives: Imaging surface buoys/line, large shoals of fish, piscivorous birds, and bubble trails in water column.

Range: 60m

Water Depth: 30-60m



Objective: Narrow channel navigation in shallow water

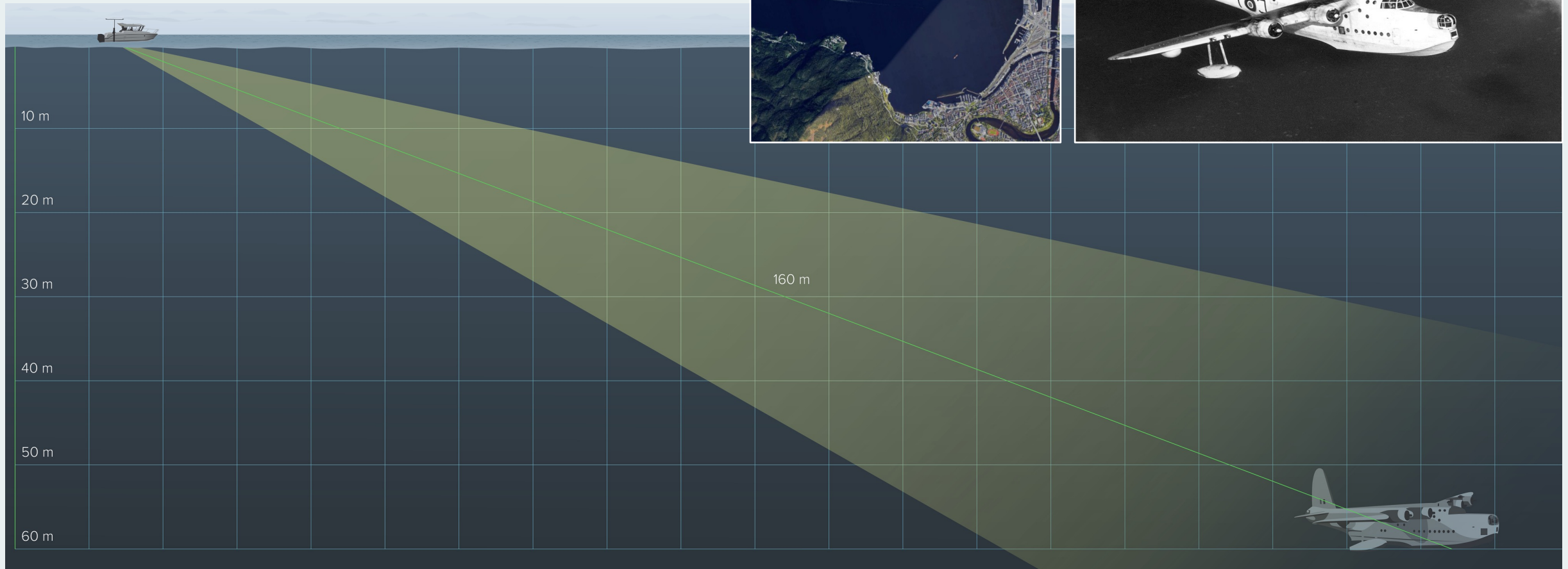
Range: 50m+

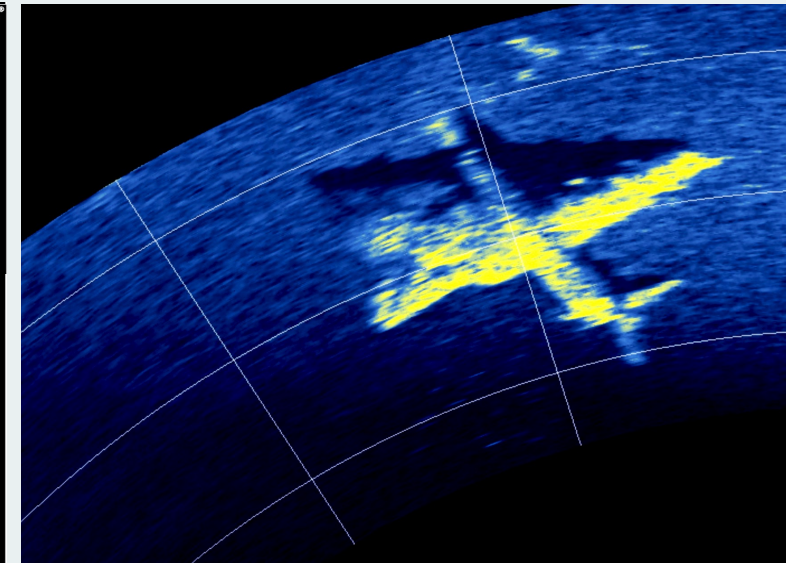
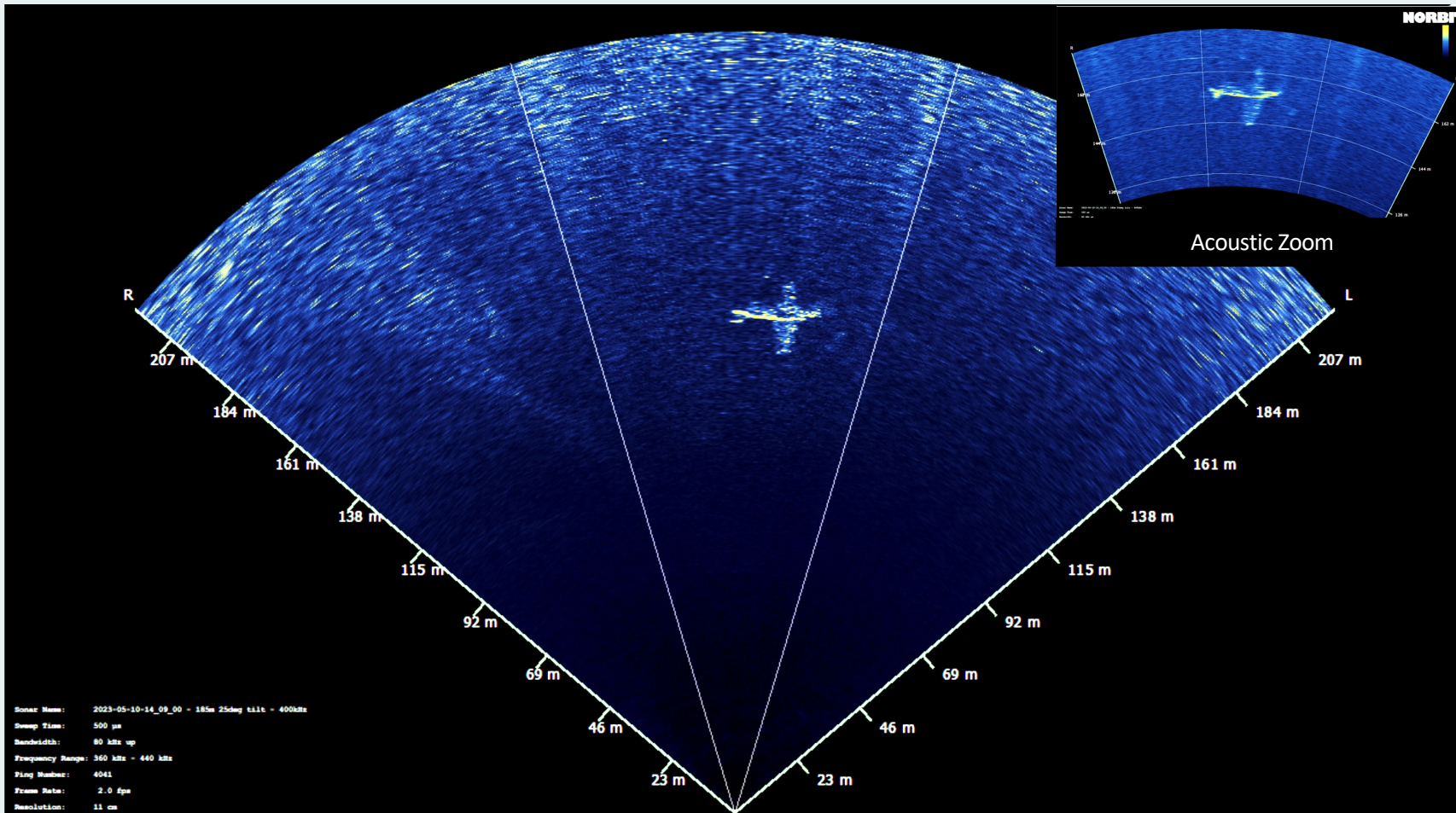
Water Depth: 5m

Objective: **Locate wreck of downed aircraft
in Trondheim Fjord, Norway**

Range: **>160m from small surface vessel**

Water depth: **~100m**





Imaging a wreck from various angles with WINGHEAD F11 allows the operator to understand the location and orientation of an object.

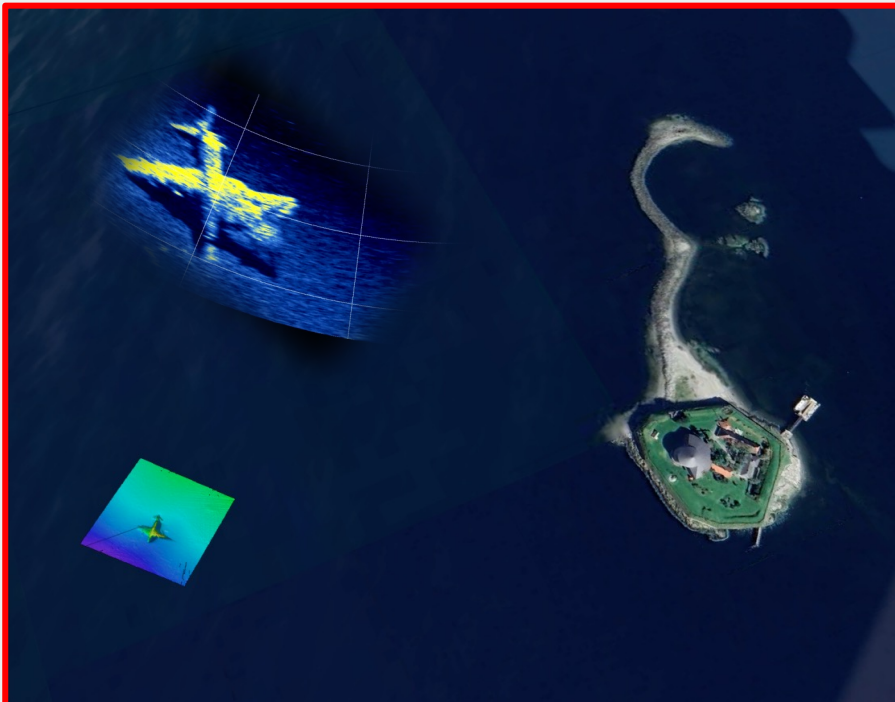
Note that the acoustic shadow of this wreck indicates that the structure is not sitting flat on the sea floor.

This is later confirmed using the NORBIT iWBMS high-resolution mapping system.

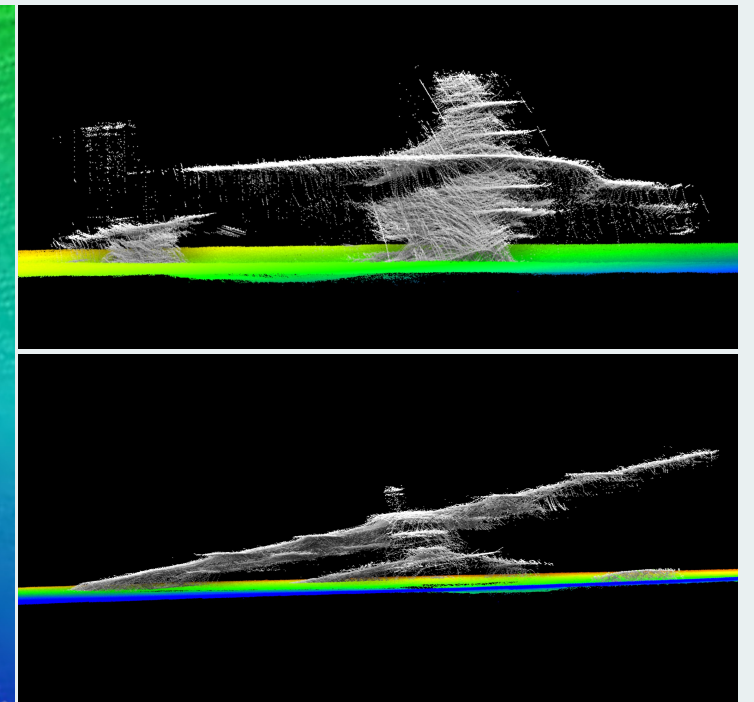
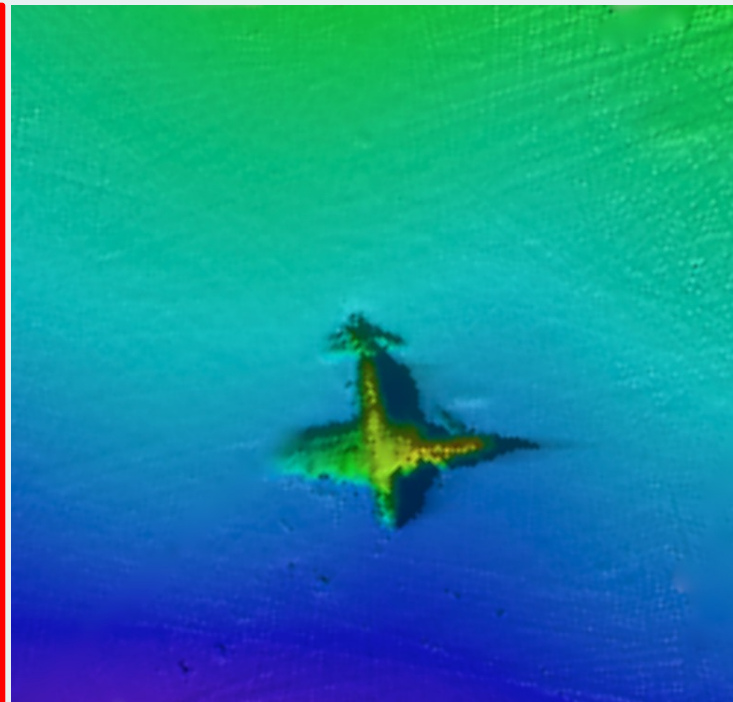


Once an object of interest is located using the imaging sonar, a detailed bathymetry map can be quickly made using a mapping sonar, such as the NORBIT iWBMS. Combining imaging from WINGHEAD F11 for long range localization enables a more efficient definition of a specific survey area, thus saving time.

In this example we show the outputs of the mapping survey that confirms the location and orientation of the wreck on the seabed.



Mapped Wreckage DTM + WINGHEAD F11 Image



Detailed Point Cloud from NORBIT iWBMS



Applications:

- Navigational Aid, Obstacle Avoidance
- MCM, Intruder Detection
- Offshore Energy Exploration
- Dive Team Support, EOD, S&R
- Underwater Infrastructure Inspection
- Marine Research and Exploration
- Fisheries and Aquaculture

Explore More:

FLS Sonar Family



WINGHEAD Sonar Family



Product Accessories and Software



Case Study:
Rapid Environmental Assessment





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For more information contact:

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