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OVERVIEW

Sonar for Underwater Search and Recovery Teams

12/11/2019

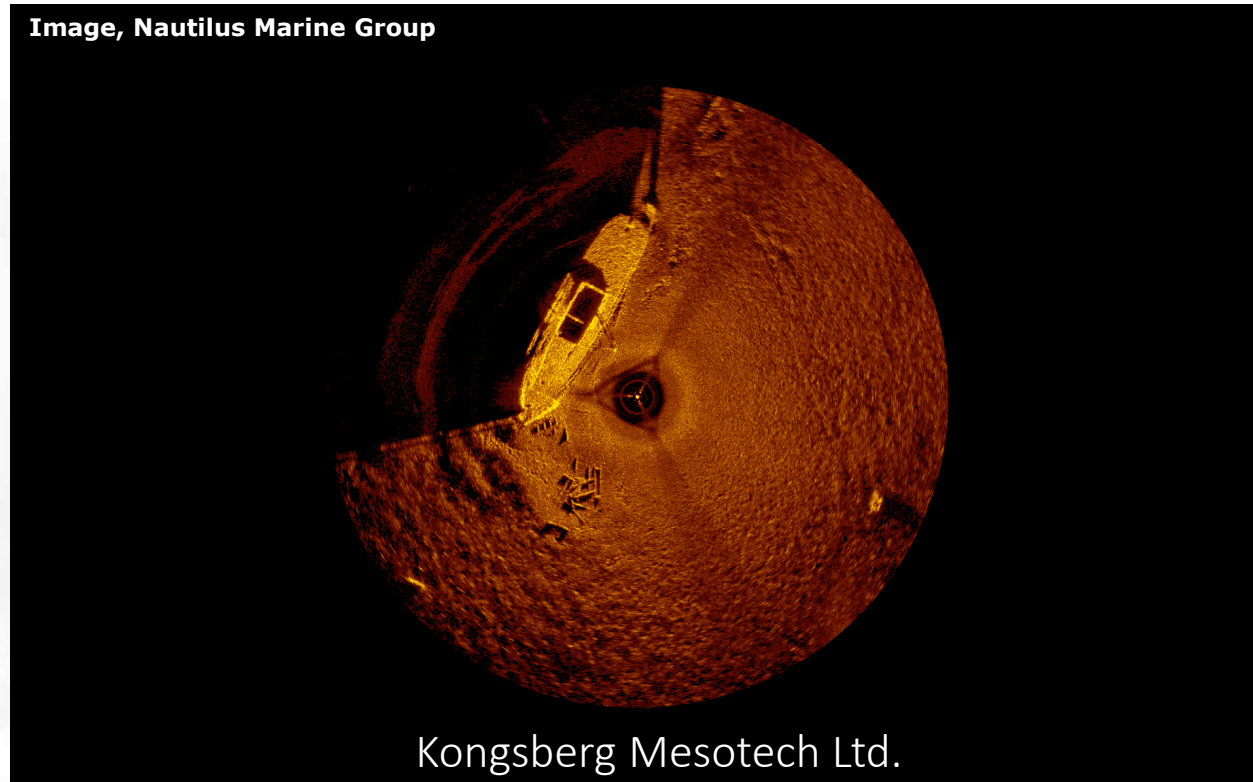
Kongsberg Mesotech Ltd.



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SAR Sonar Overview

- Sonar for Search And Recovery... *SAR*





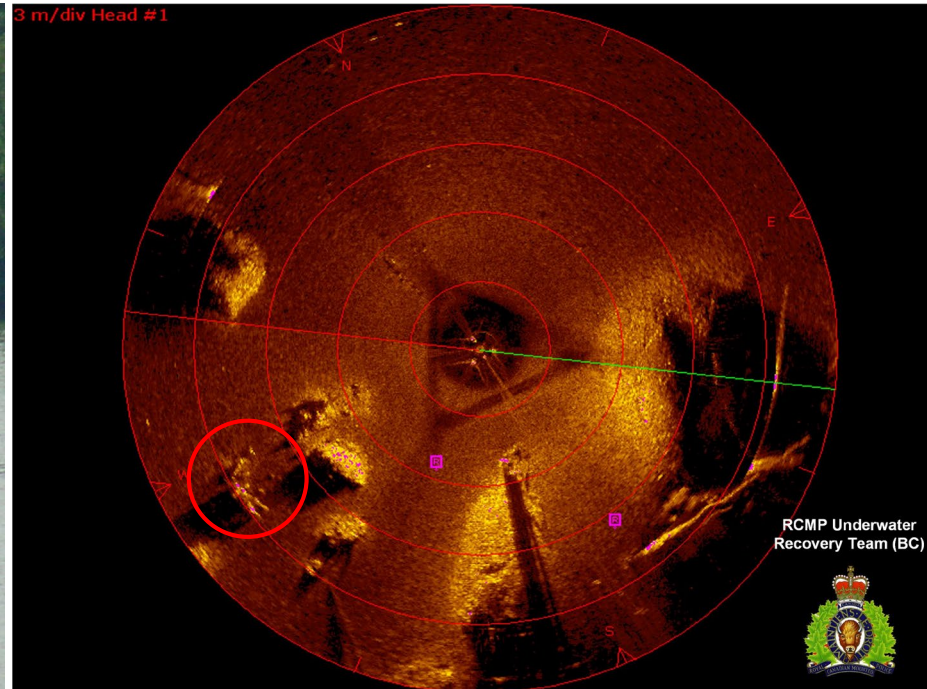
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SAR... in 3 Words

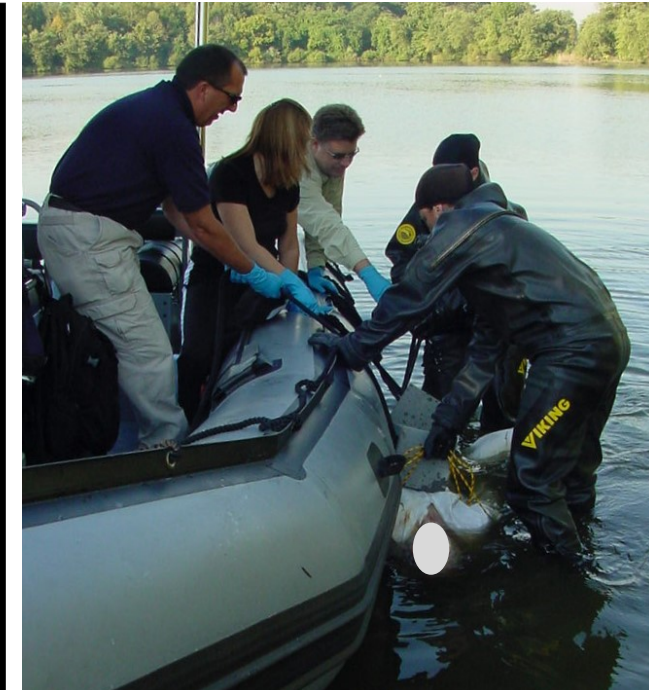
Understand these 3 words: they define the SAR mission



SEARCH



LOCATE



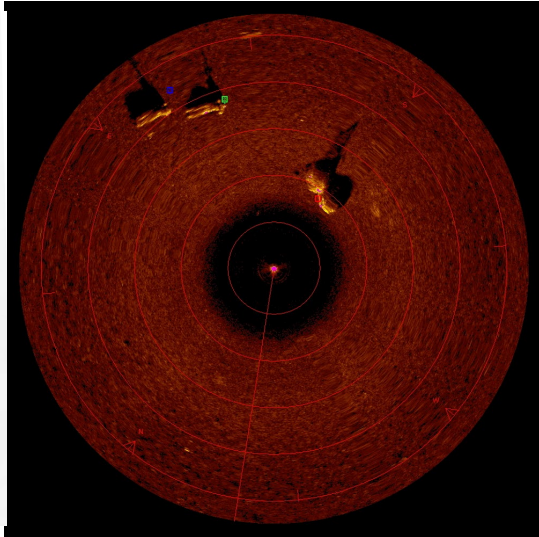
RECOVER



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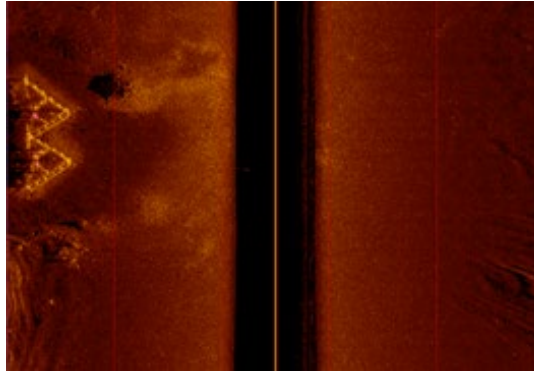
Sonar Systems

Applicable to SAR Operations



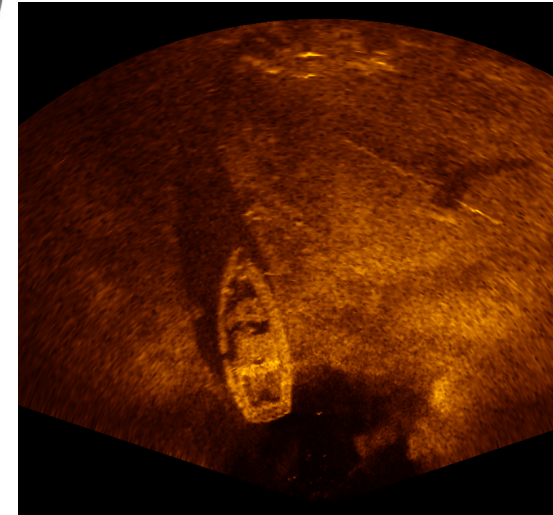
SCANNING SONAR

for smaller area search and
guiding divers in real-time to
targets



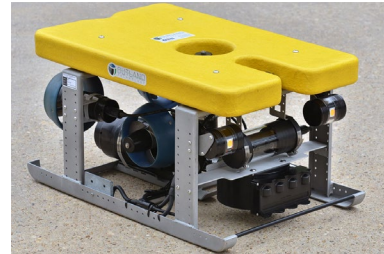
SIDE-SCAN SONAR

for wide-area search and
establishing target positions



MULTIBEAM SONAR

for search and identification,
typically ROV deployed








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Sonar Systems

Why would you use one system over another?

	Scanning Sonar	Side Scan Sonar	Multibeam Sonar
			
Boat required	✗	✓	✗
ROV required	✗	✗	✓ (or pole mount)
Training requirements	Low	Medium	Medium
Area survey size	small	LARGE	Medium
Survey speed	Slow	Fast	Medium
Works in high current	✓ (with custom mounting)	✓ (tow into current)	✗
Works under ice	✓	✗	✓
Use for real-time directing diver to target	✓	✗ (use drop markers on targets instead)	✓



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Why Sonar over Using Divers?

Too often we think all diving is done in crystal-clear water...



Image © Mark W. Atherton

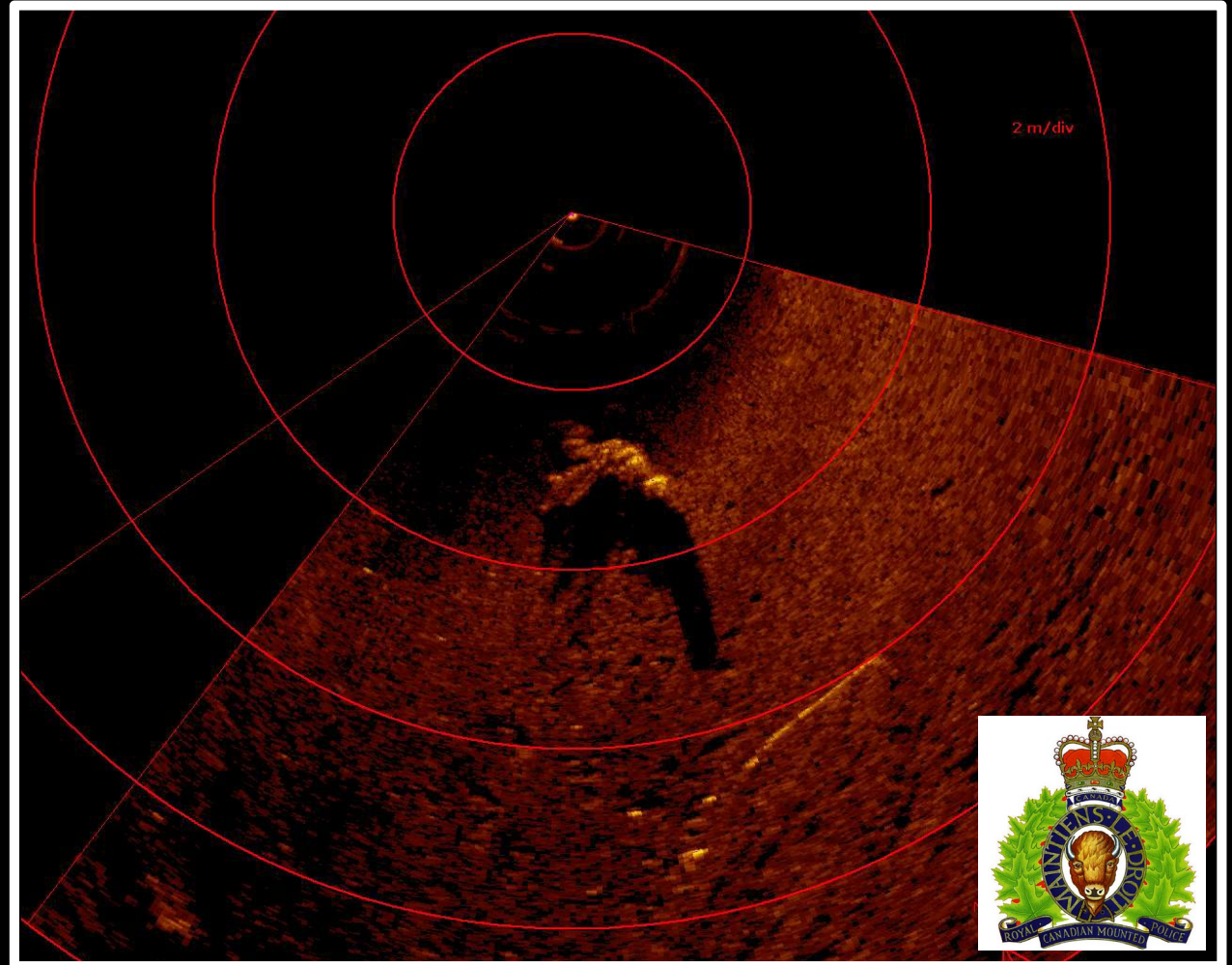


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The REALITY of SAR Diving

This is what they observed after the RCMP dive team deployed the scanning sonar

A homicide victim wrapped up in a sleeping bag and chains located 15 min of starting the sonar search





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Besides Efficiency, the Other Prime Reason for Sonar...

- Sonar doesn't care about black water or high current...
- Deploying sonar before the dive allows topside to identify targets of interest and potential entanglement hazards – BEFORE committing the diver...



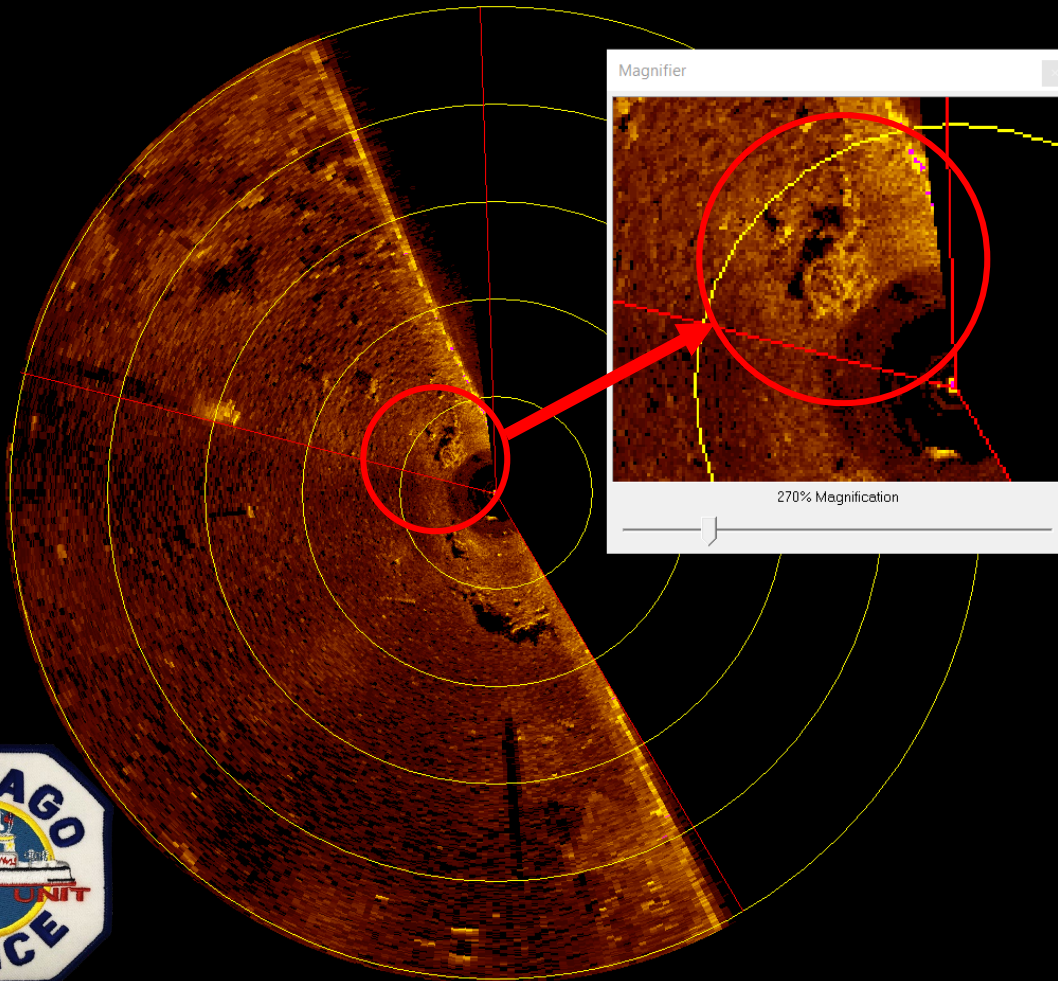
Diver Safety





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Locating Potential Diver Hazards – Prior to Diving



- Before a training dive in a Chicago canal, the Marine Police sonar operator spotted a suspicious and potential entanglement hazard.
- It was later identified by the diver to be a mass of rusted barbed wire; visibility was approximately 10" (25cm).

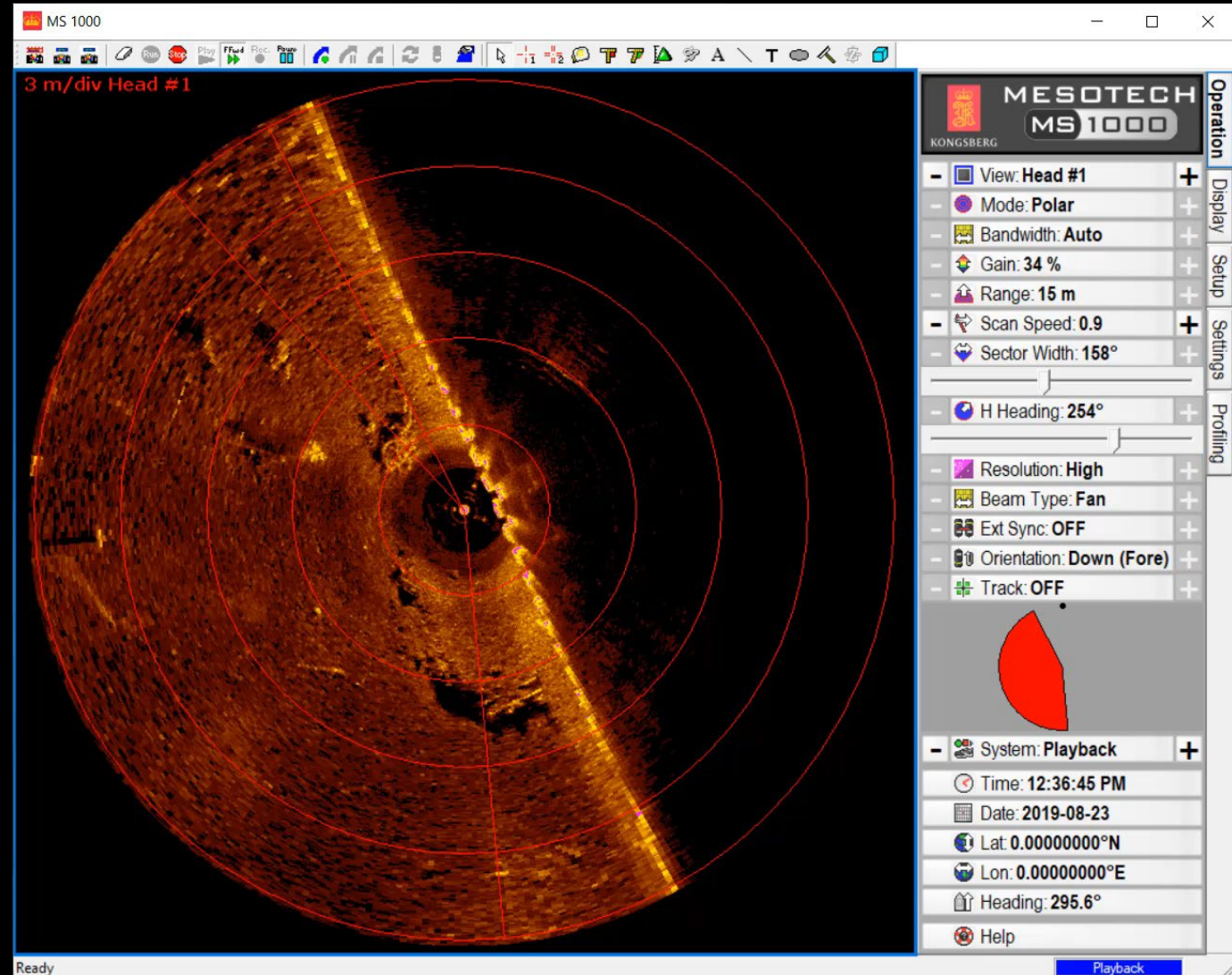




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Guiding a Diver in Real-Time With Scanning Sonar

Diver's first time being guided to targets by sonar; in-water visibility was approx. 10" (25cm).





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Guiding Divers in Real-Time to a Body

From leaving surface to leaving bottom *with the body*, the dive time was 8 min and 32 seconds.

Water depth 221' (67m)

Divers recover a body in Castaic Lake, CA

The scanning sonar is tripod-deployed and the divers are guided to target using the sonar and through-water coms.

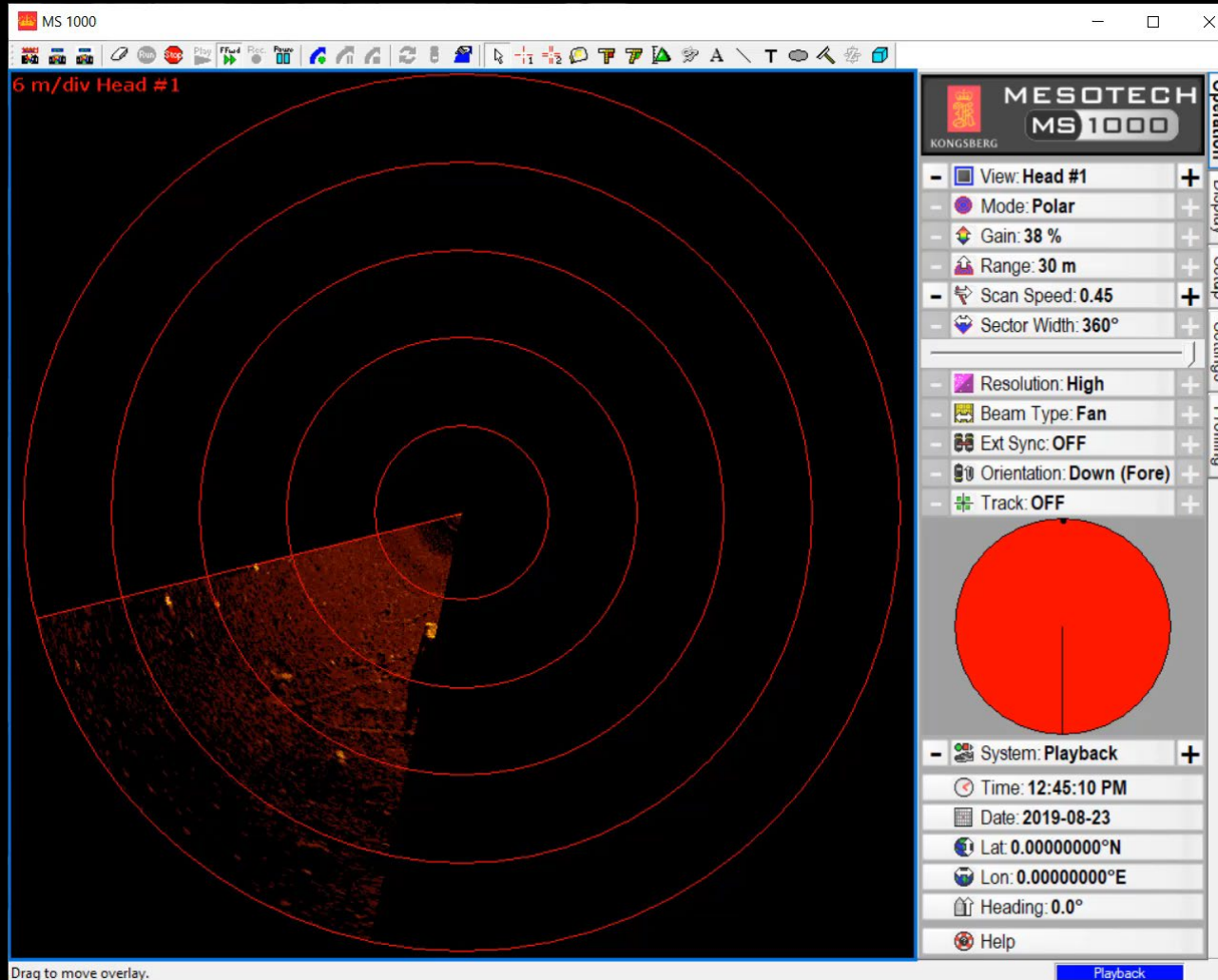


Image courtesy Jeff Morgan, San Bernardino Sheriffs Dept.

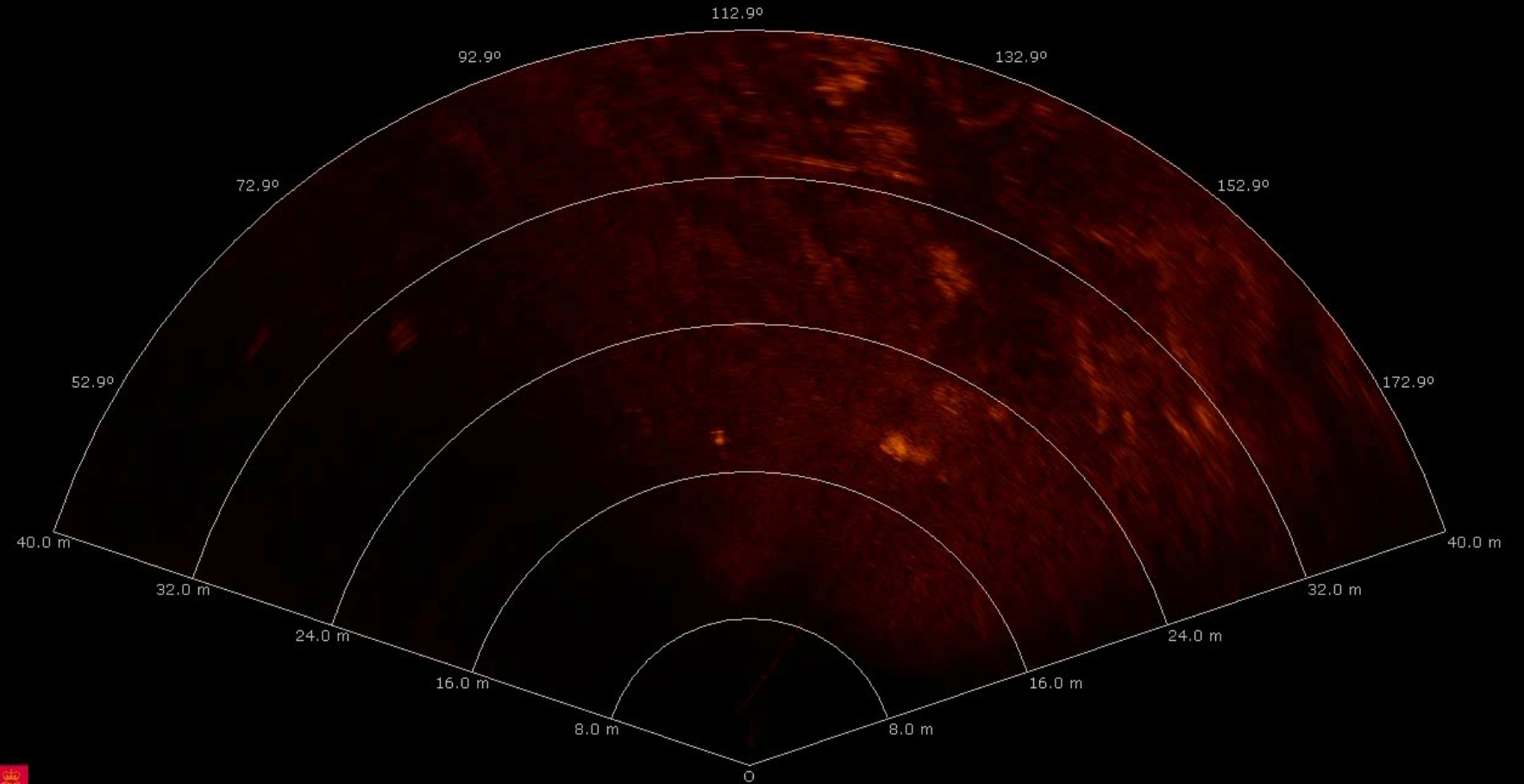


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Guiding a Diver in Real-Time with Multibeam Sonar



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WORLD CLASS – Through people, technology and dedication

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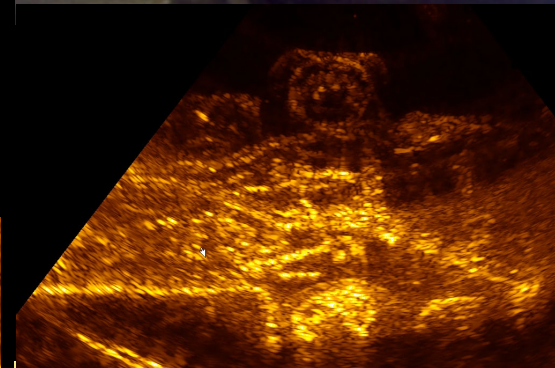
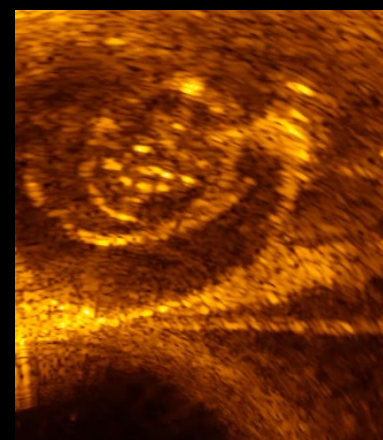
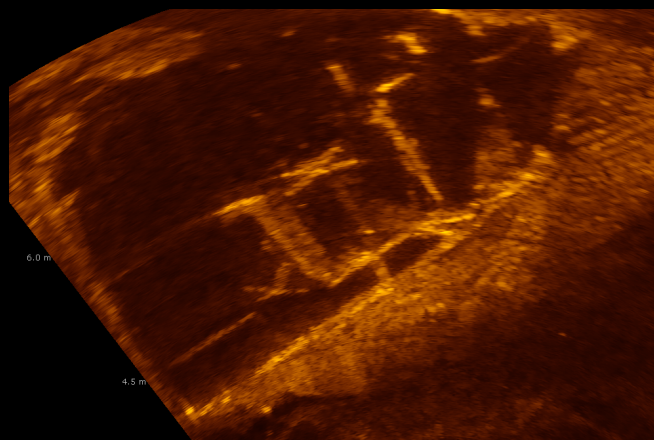
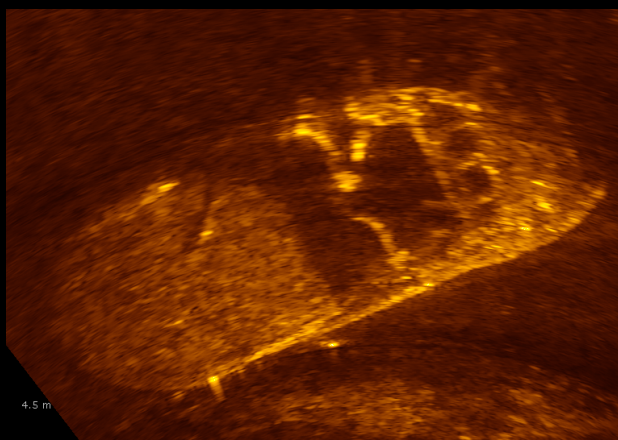
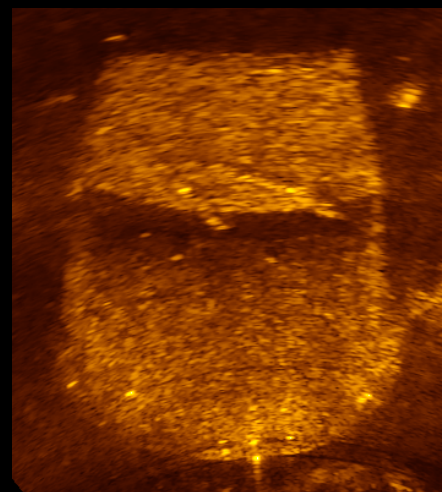
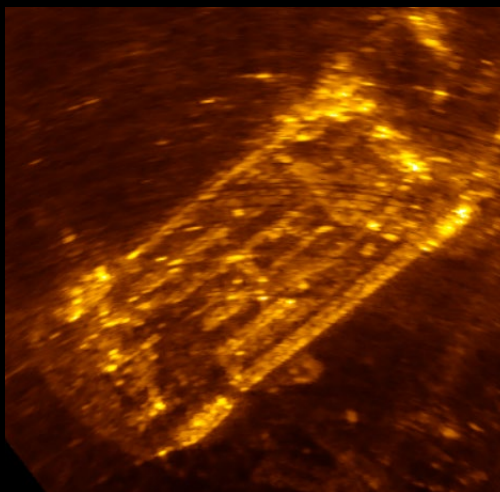
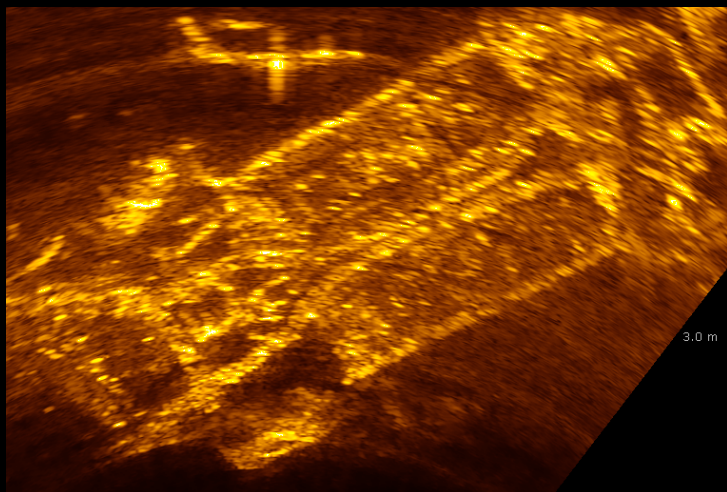
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Flexview Multibeam Imaging Sonar

Abandoned Cars

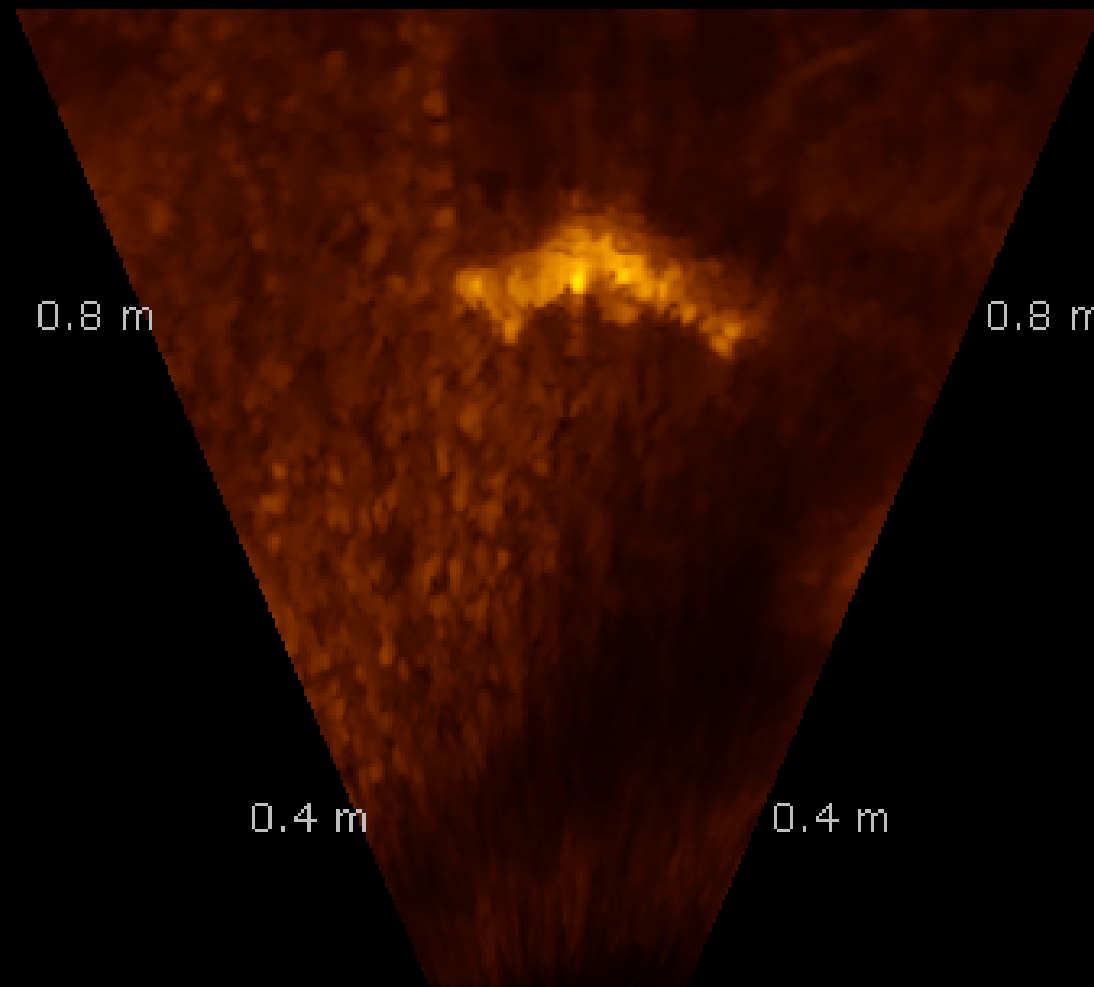




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Flexview Multibeam Imaging Sonar

Handgun

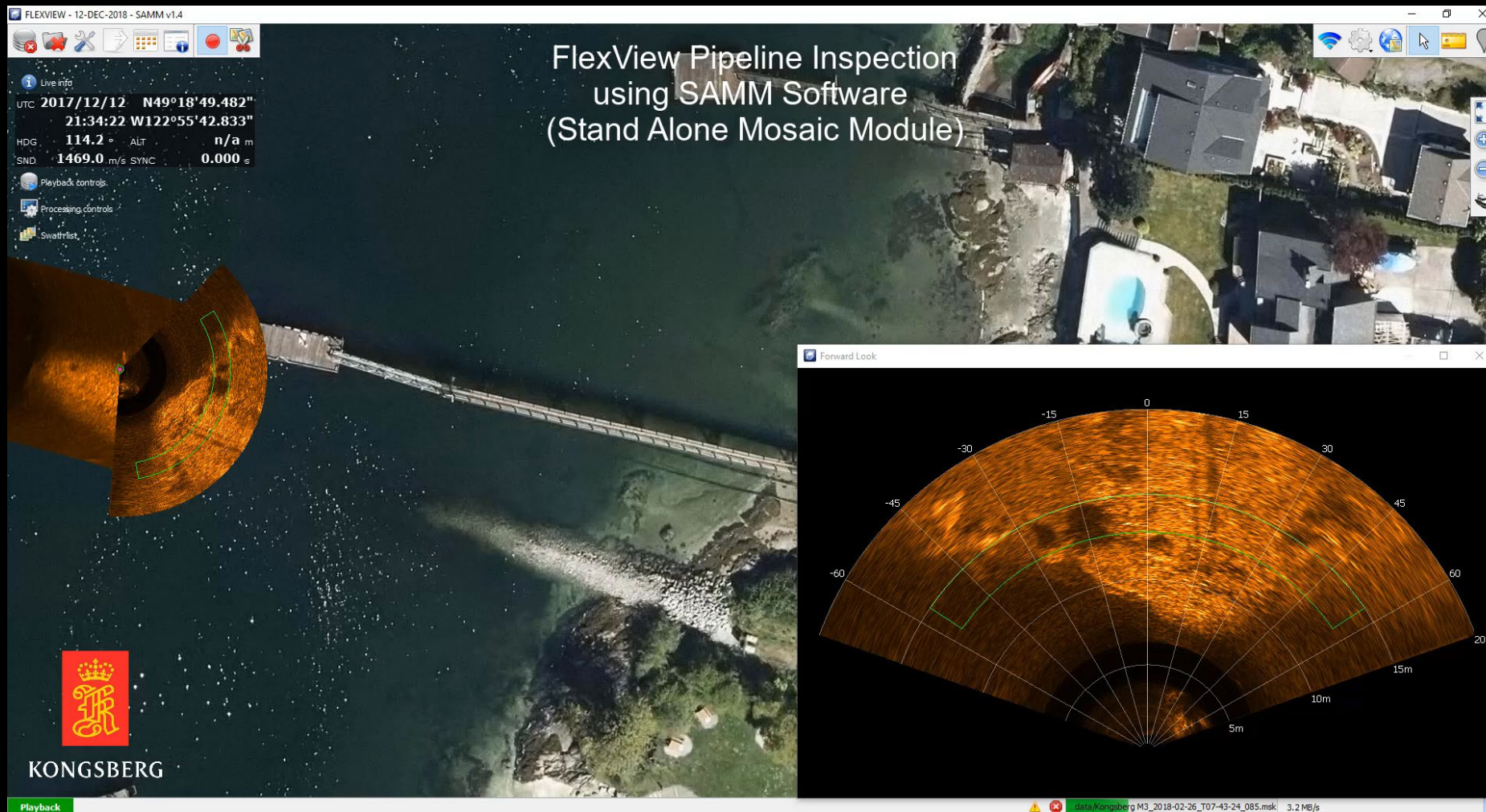




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Flexview Multibeam Imaging Sonar

Stand Alone Mosaic Module (SAMM)





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Flexview Multibeam Imaging Sonar

Sonar Mosaic with SAMM

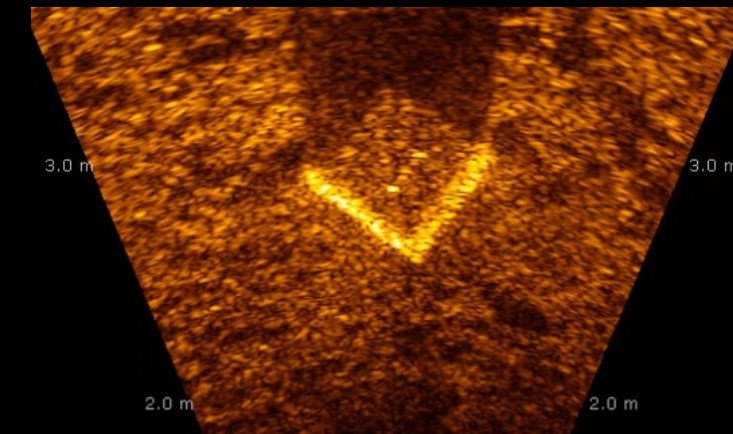




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Flexview Multibeam Imaging Sonar

700kHz

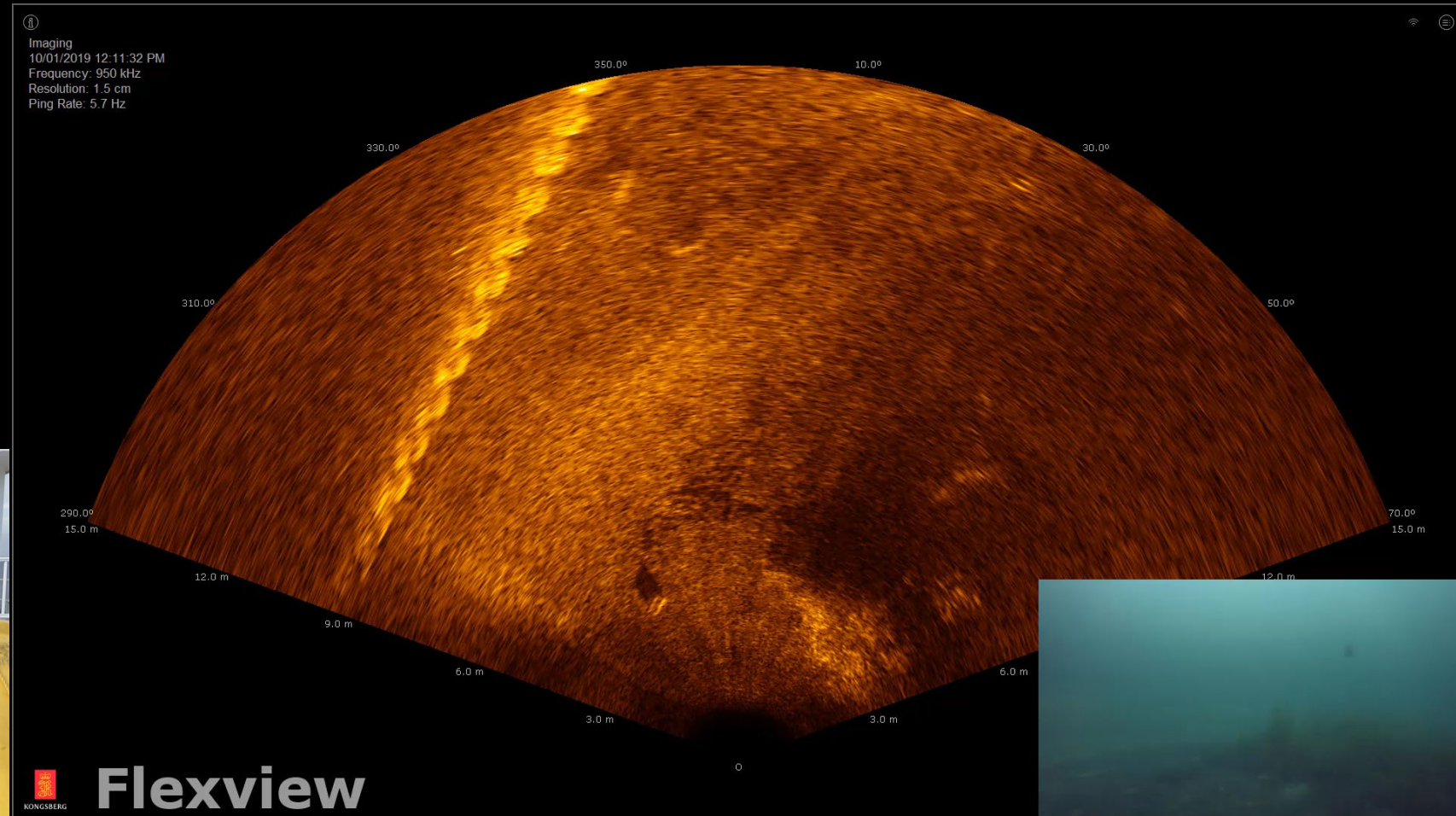




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Underwater search with an ROV

Flexview Multibeam Imaging Sonar





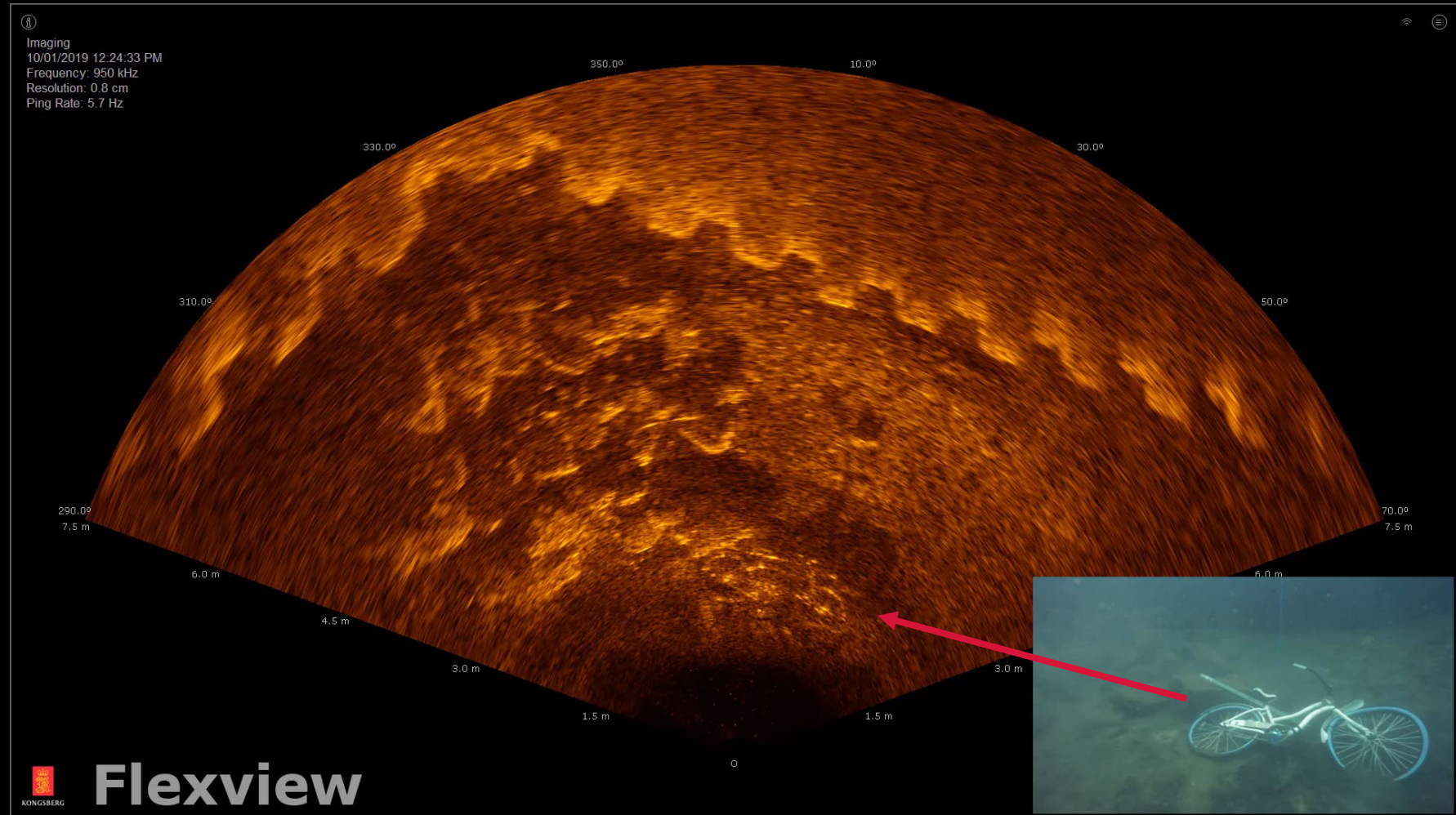
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Underwater search with an ROV

Flexview Multibeam Imaging Sonar



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What Roll does Sonar Play in SAR Dive Team Support?

#1

Safety:

- The safest place for a diver is on the surface. When the diver is in the water, sonar can be used to monitor where the diver is, guide the diver to where he/she needs to be and detect potential entanglement hazards.



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What Roll does Sonar Play in SAR Dive Team Support?

#2

Efficiency:

- Sonar technology covers search areas faster... without risking having to put a diver into unknown conditions.
- Potential targets can be marked and even geo-referenced before calling in the dive team.



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What Roll does Sonar Play in SAR Dive Team Support?

#3

Documentation:

- Metrics can be generated from sonar images; distances between targets and debris field areas are easily calculated. Recorded sonar data provides a permanent document that can be presented in court.



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What do SAR Teams Say about Sonar?

“Sending a police officer underwater in zero visibility without scanning sonar is like sending an officer on patrol without a bulletproof vest.”



Image © Mark W. Atherton



Image © Mark W. Atherton

Sgt Rob Riffle, Dive Team Supervisor,
Winnipeg Police Services





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Support

Contacts

- **Scanning Sonar** – Mark Atherton mark.atherton@km.kongsberg.com, (or Colin Smith)
- **Side Scan Sonar** – Richard Dowdeswell richard.dowdeswell@km.kongsberg.com
- **Multibeam Sonar** – Colin Smith colin.smith@km.kongsberg.com



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Questions?

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