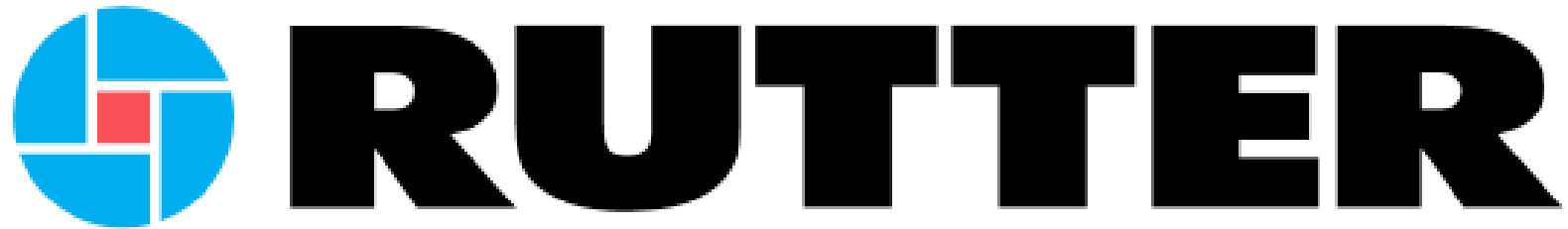
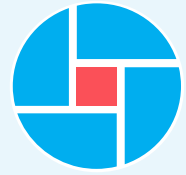


NOFO 2025 Oil On Water Trails



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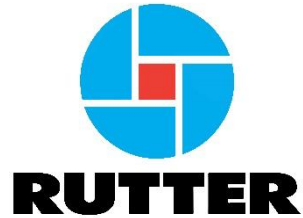
RUTTER

See Beyond

Using Radar To Enhance Maritime Safety, Security and Environmental Surveillance

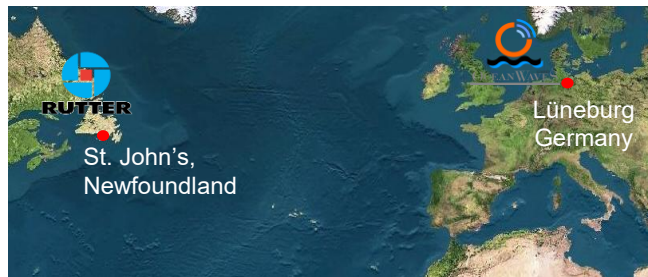


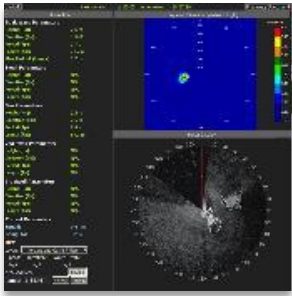
Who We Are



- Headquarters in St. John's, Newfoundland, Canada
- Incorporated in 1998
- Specializing in detection of **oil incident, ice,** and **small target**

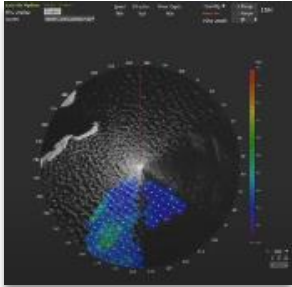
- Located in Lüneburg, Germany
- Incorporated in 2000
- Acquired by Rutter in 2012
- Specializing in **real-time wave** and **surface current monitoring**





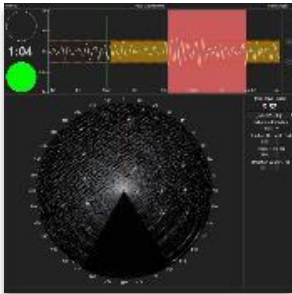
WaMoS® II

Real-time determination of significant wave parameters (height, length, period and direction) and surface currents.



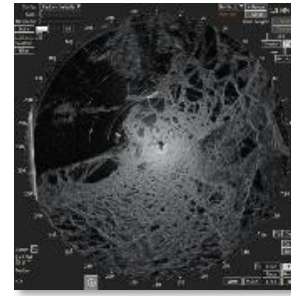
Current Monitor™

Real-time determination of high resolution surface currents and bathymetry.



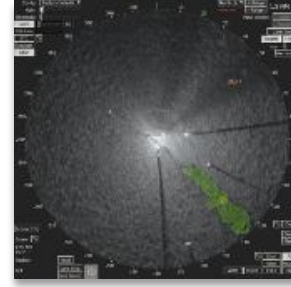
WaveSignal™

Wave & heave prediction up to 180 seconds horizon.



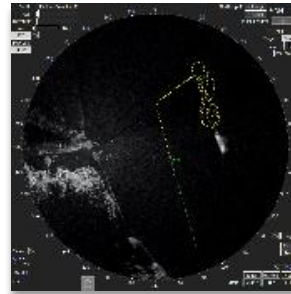
Ice Navigator™

Differentiates between open water, ice pans, open water leads in ice fields, ice ridges, ice bergs, etc.



Oil Spill Detection

Real-time automatic detection, tracking and outlining of surface oil slicks



Small Target Surveillance

Automatic detection and tracking of multiple, small, Slow or fast-moving targets.



Rutter Unify™

SaaS solution hosted seamlessly integrating Rutter's sigma S6 systems across vessels, offshore platforms, and shore-side radar sites into a single platform..

[More info and downloads <--](#)

How Does a Radar 'See' Oil?

Oil Spill Detection Radar works on the fundamental properties of capillary wave detection and suppression vs the surrounding ocean surface.

- Wind forms capillary waves on the surface of the water (System requires 2.5 m/s)
 - A capillary wave is defined as a wave that is less than 1.73 cm in wavelength
- The waves cause reflections (backscatter) for X-band radars
- Oil dampens capillary wave formation and depresses radar backscatter
- *sigma* S6 Oil Spill Detection system monitors for the depressed radar backscatter



For Rutter Inc. NOFO Trials provided a platform for proving the Theoretical vs Actual of Technology advancements in pursuit of environmental protection for all stakeholders

Rutter Objectives June 2025 Trials :

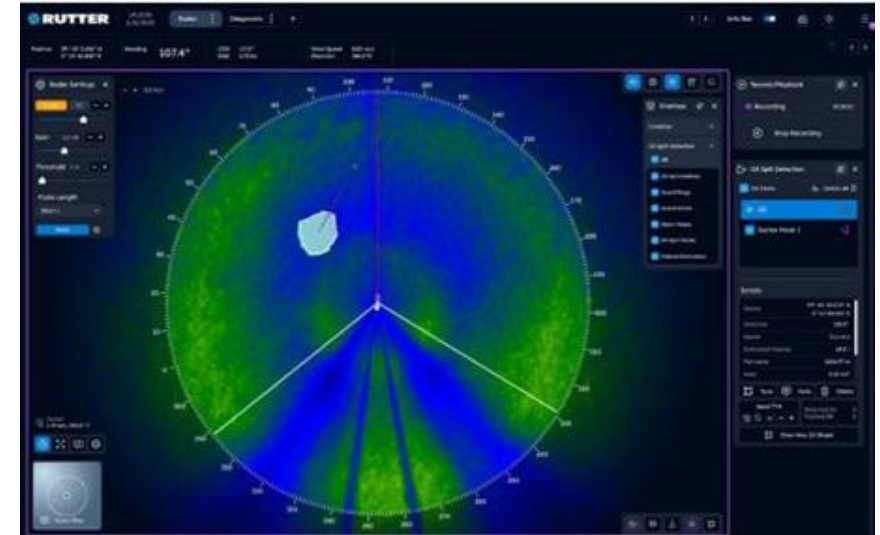
- Solid State Radar testing (How well does it work vs Magnetron?)
- Verify Marine Gas Oil (MGO) detection
- Test of New ML (Machine Learning) algorithms
 - Improved detection and tracking
 - Auto tune feature field trial
 - False positive detection, improving accuracy and reduce Alarm fatigue for bridge users
 - Volume estimation using the new algorithms
- Field test Rutter UNIFY™ web enabled system for Coordinated oil Spill Clean (Vessel / Operator/ Command Center/ Regulator)
- Reference / Proof to Operators proving system will work as designed

Solid State Radar testing

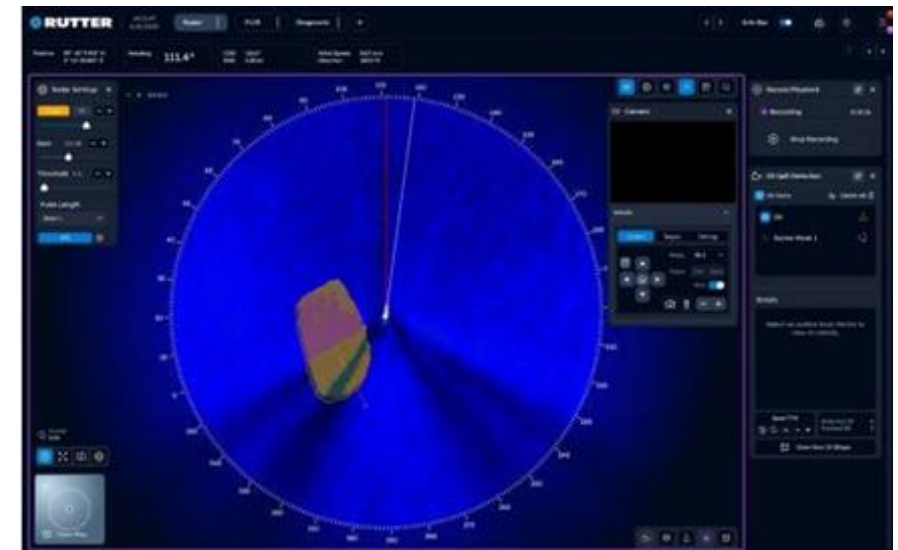
Testing allowed Rutter to prove that our system was able to reliably Automatically Detect and Automatically track Oil on Water with both the Magnetron as well as the Solid State Furuno which had not been proved before.

Timeline HRS	0	1	3	8	9,5	15	22	23
Brent Crude	Auto	Auto	Visible	Auto	Auto	Auto	Not visible	Not visible
MGO	Visible	Auto	Auto	Auto	Auto	Auto	Visible	Visible

However, the Trial also showed there are strengths of Magnetron based system over Solid state



Solid-State Oseberg Blend Crude

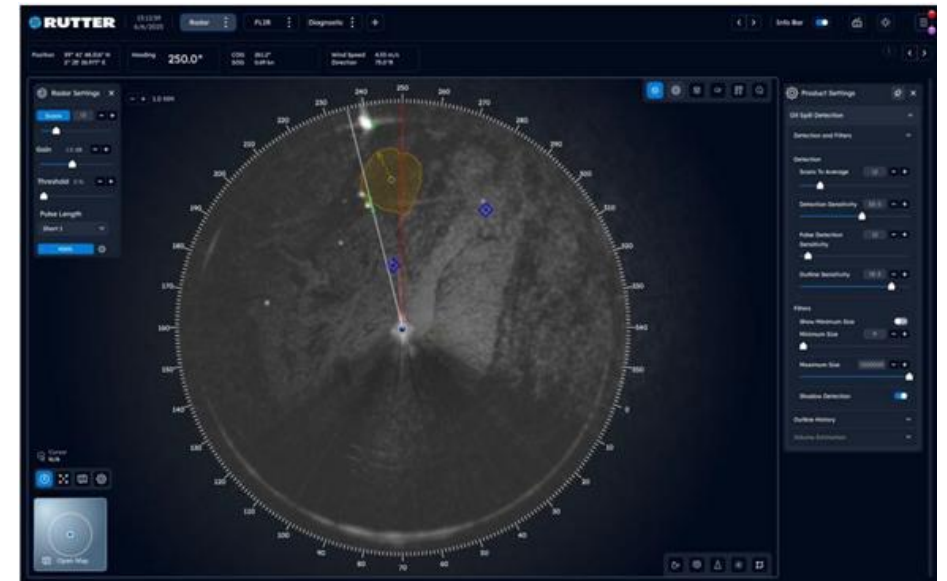


Magnetron Oseberg Blend Crude

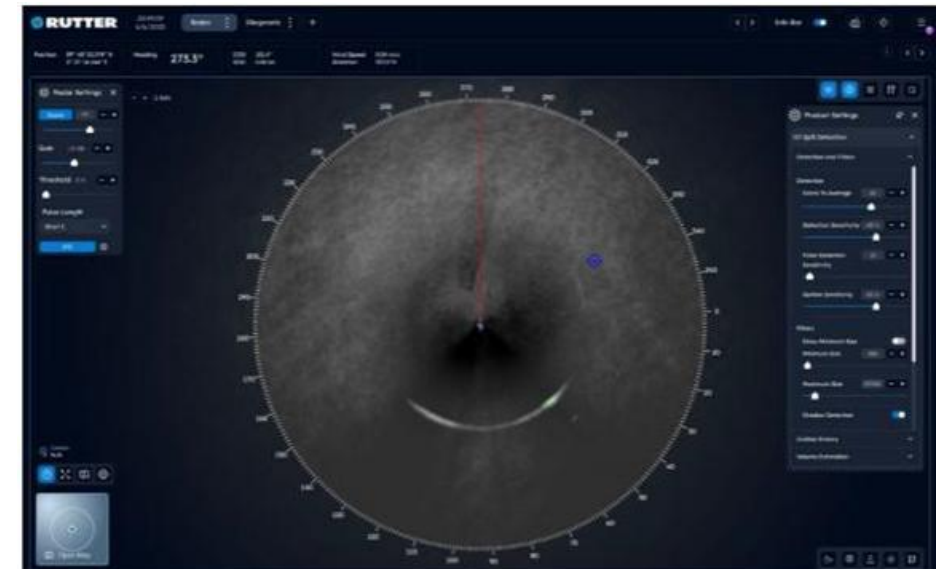
Marine Gas Oil (MGO)

Testing allowed to prove that our system was able to reliably Automatically Detect and Automatically track MGO on Water with both the Magnetron as well as the Solid State Furuno which had not been proved before.

Timeline HRS	0	1	3	8	9,5	15	22	23
Magnetron	Auto	Auto	Visible	Auto	Auto	Auto	Auto	Auto
Soild State	Visible	Auto	Auto	Auto	Auto	Auto	Visible	Visible



Magnetron



Solid-State

Os6 Continual Improvement: AI-Machine Learning Tuning and Detection

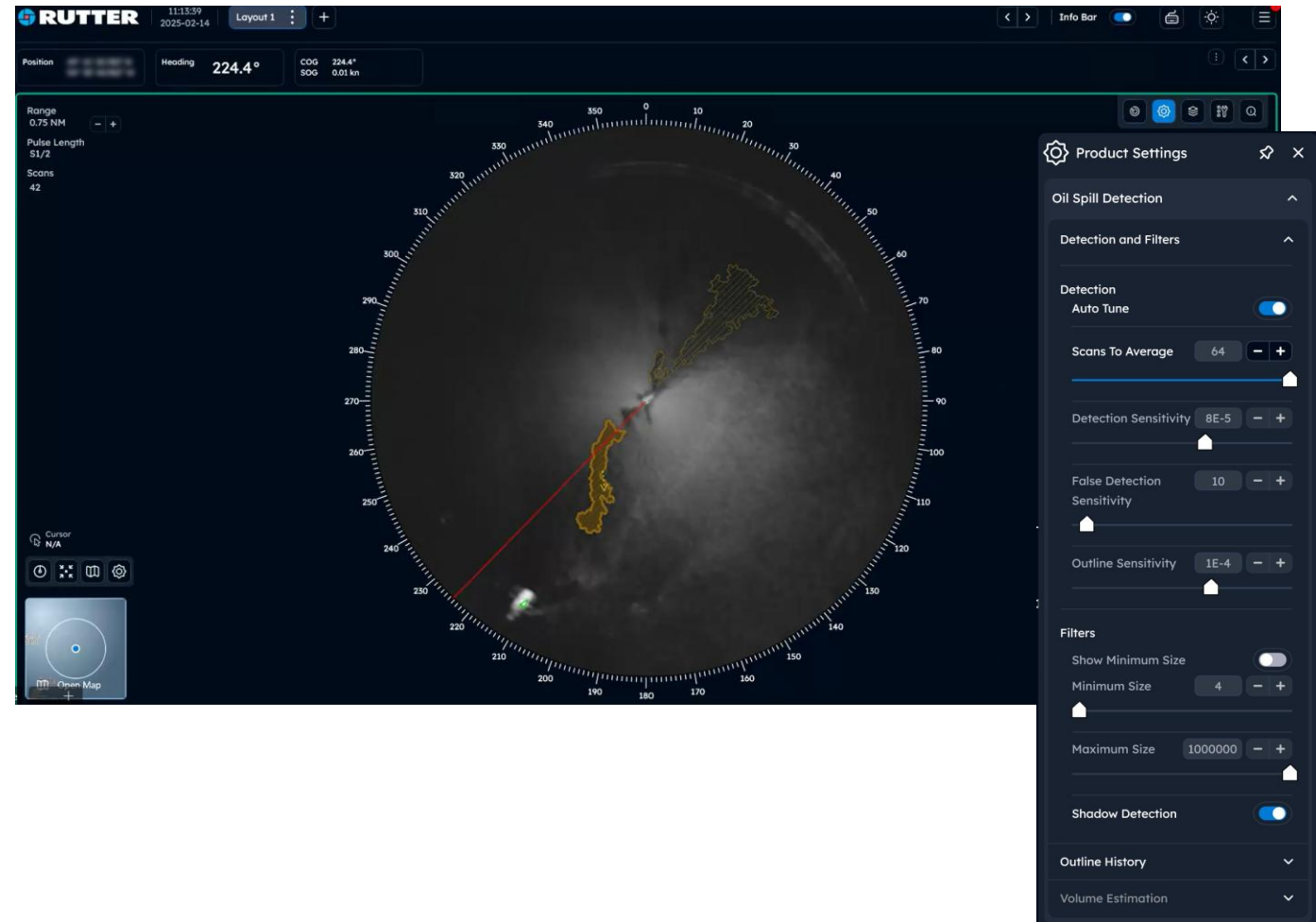
Reduced **minimum** number of scans for detection from **128 to 10 radar scans**.

Improved **detection probability**, outline accuracy and drift direction.

Greatly reduced **false positives**.

Simplified interface.

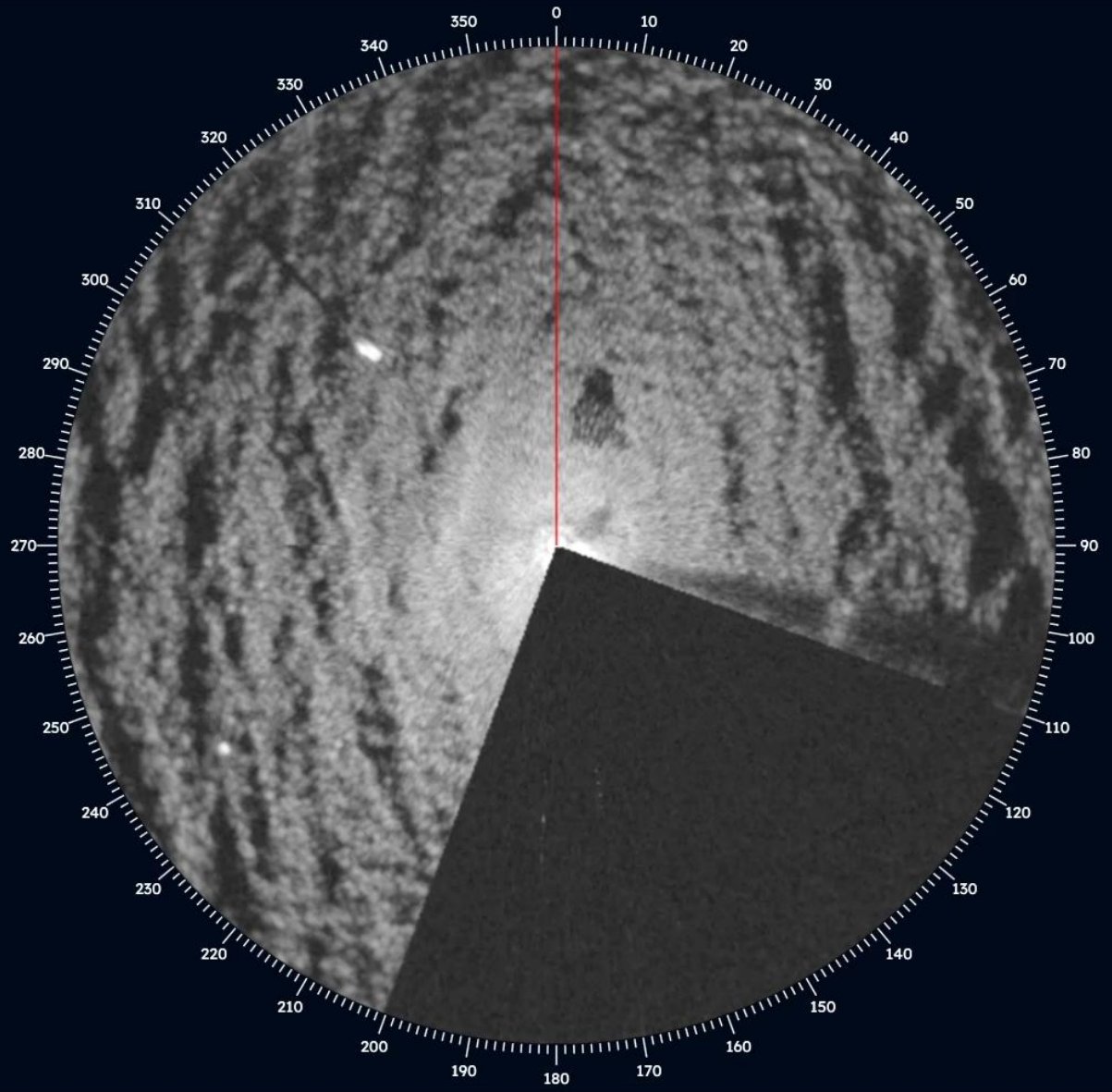
Auto-tuning based on sea conditions.



Machine Learning (ML) for Tuning and Detection

- Rutter developed new ML algorithms from the ground up which would:
 - Reduce Detection time (64 scans to 10)
 - Automatically tune the system with changing sea conditions
 - Increase Volume Estimation accuracy

Range
0.50 NM - +
Pulse Length
Short
Scans
2



Cursor
N/A
[Icons]

[Map Icon] Open Map

[Icons]

Os6 Continual Improvement: Human Factors & Alarm Fatigue

Operators face constant alerts from multi-sensor systems. This information overload leads to:

- Missed critical events
- Delayed response
- Desensitization to alarms

Cognitive fatigue reduces situational awareness and decision-making quality.

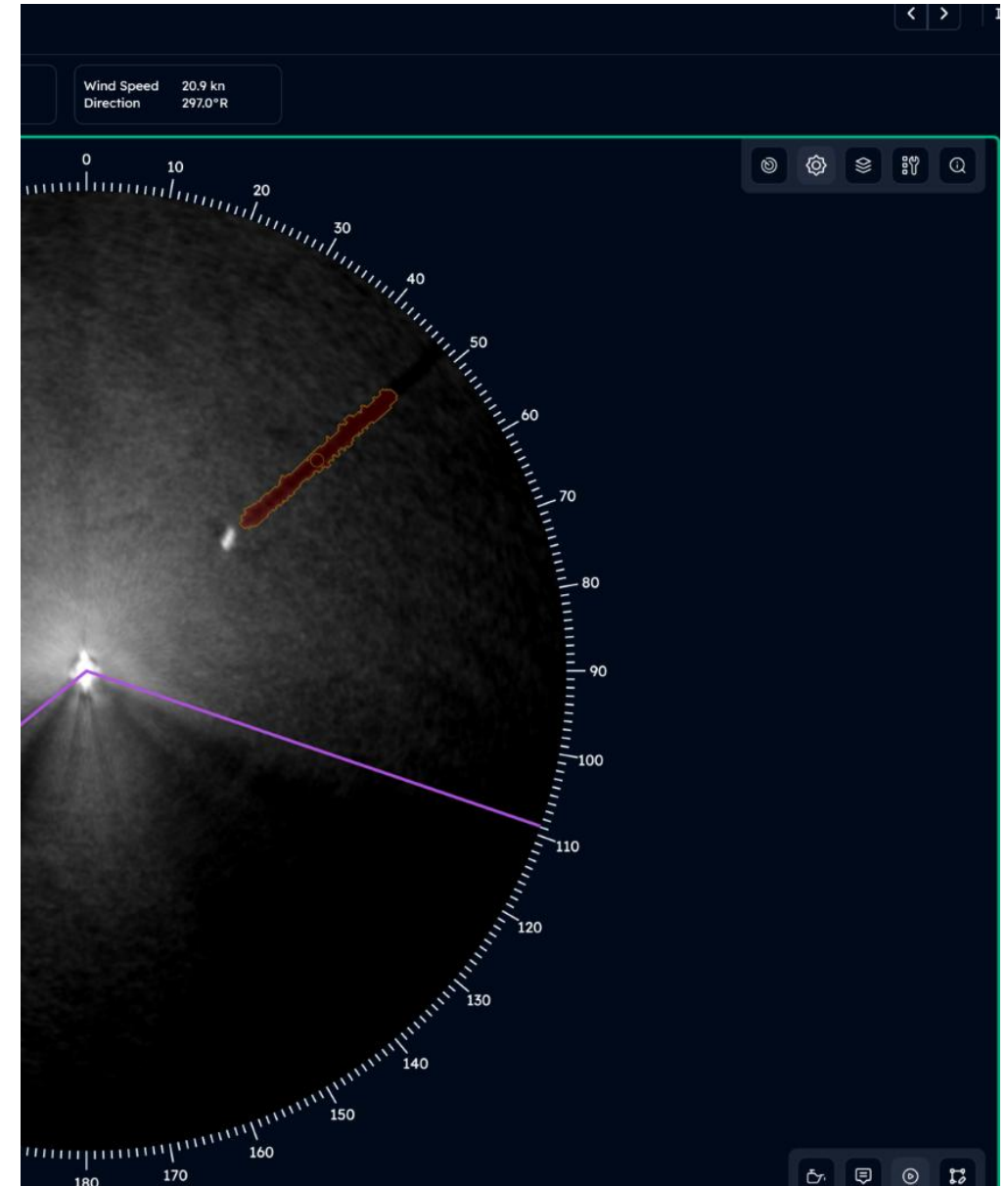
We combat this by having:

- Focused radar-based alerts with customizable thresholds
- Automated spill outlining and volume estimation
- Real-time actionable data with minimal interpretation needed
- Active research programs to reduce false positives



False Positive “Prove In”

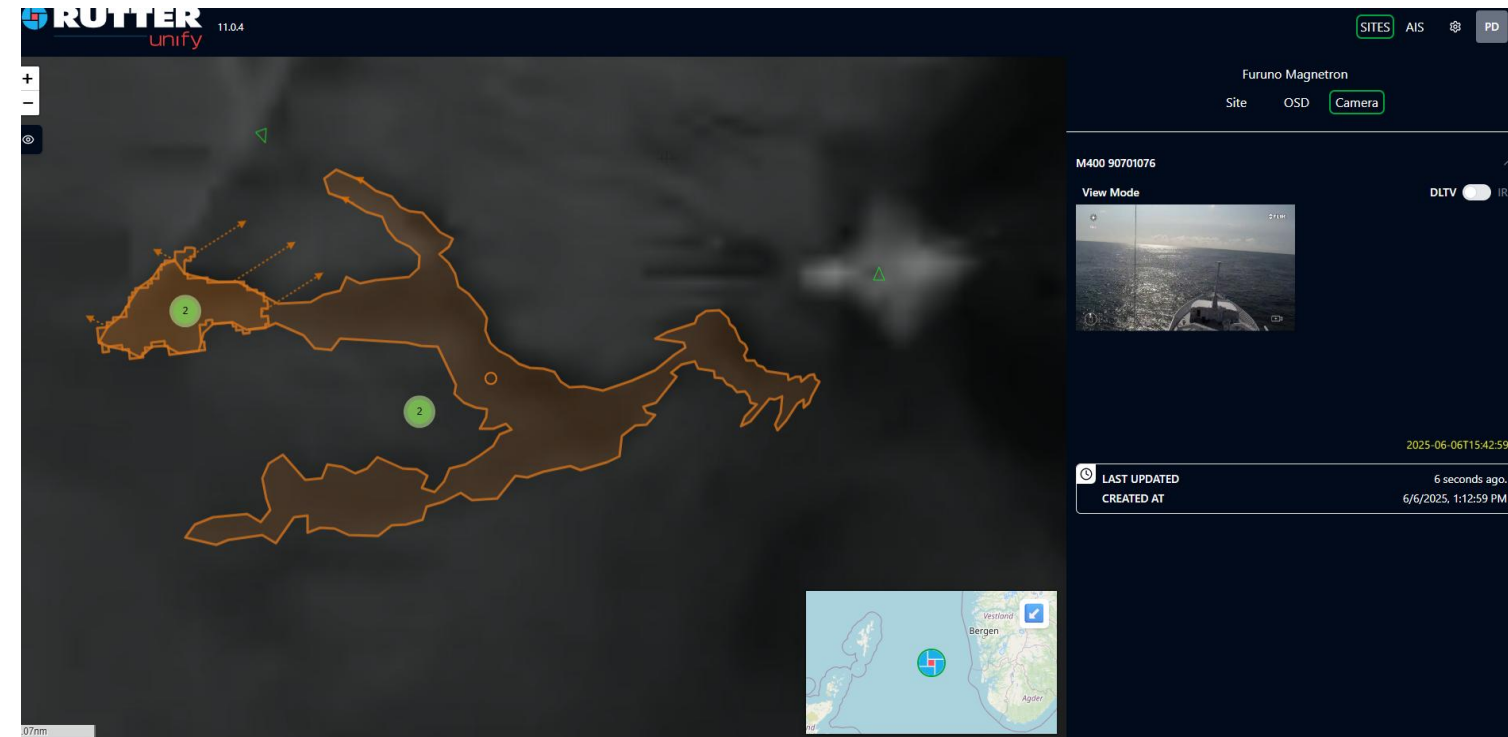
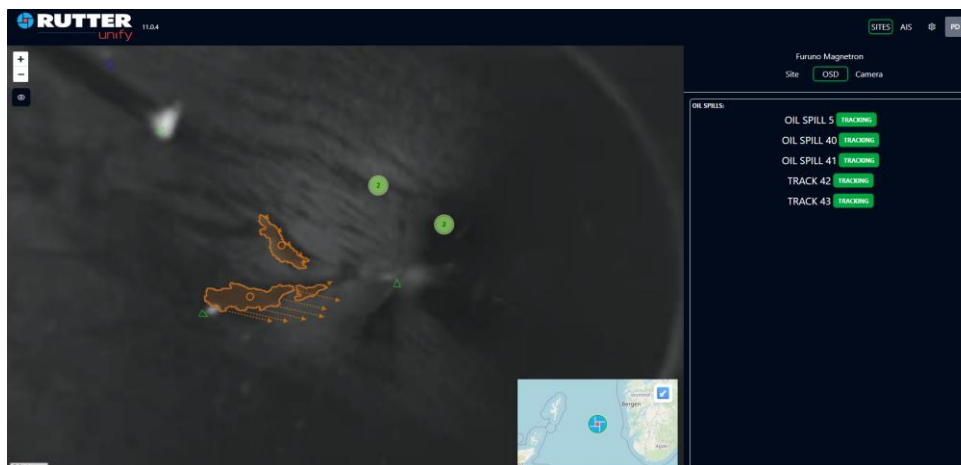
- Working closely with the Clean Gulf Associates (cleangulfassoc.com) vessel crews we developed a new user-friendly user interface as well as a robust false positive elimination algorithm which we were able to successfully test in a live oil setting during the 2025 NOFO trial



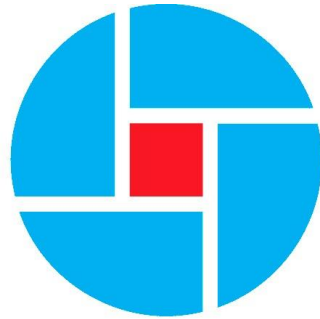
Rutter UNIFY™ Validated

- Oil on water test provided the opportunity to share with encrypted access to multiple individuals inside the response team to the Web based Rutter UNIFY™ system. We were able live stream oil spill deployment and cleanup via web access. This included an integrated camera on the vessel, AIS etc.

Os6 Oil-in-Water Testing: NOFO 2025



Images obtained realtime during spill exercise via cloud from St. John's , NL, CANADA



RUTTER

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