

Interspill 2012, London

Integrated Oil Spill Detection and Response

Hubertus (Fritz) Wentzell

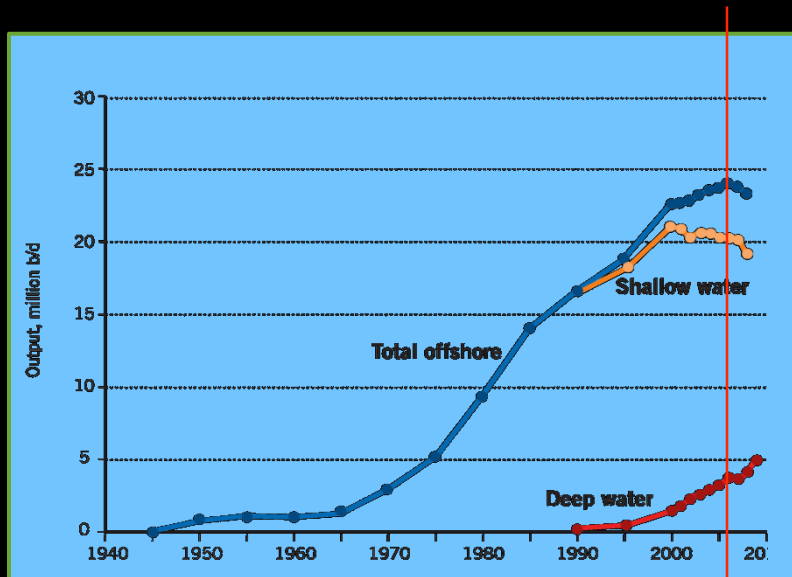
Rutter Inc.



RUTTER

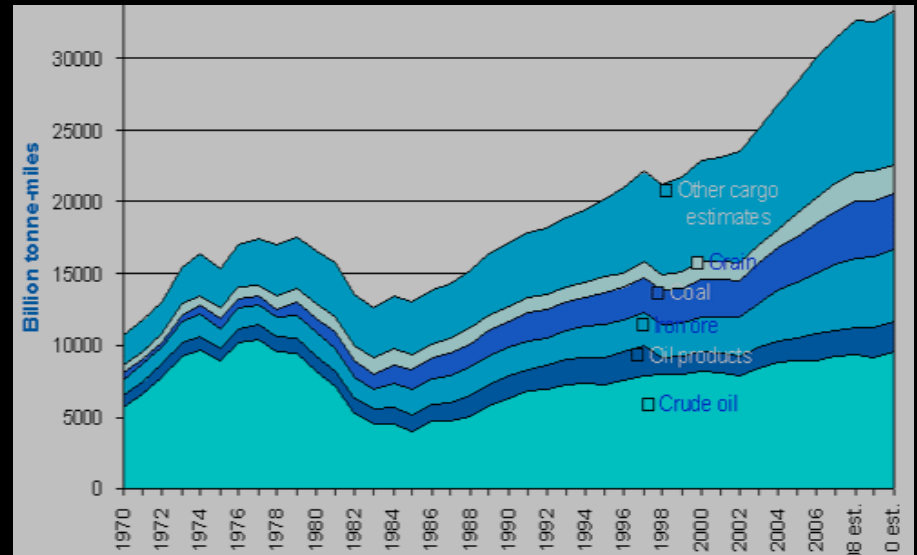
Importance of Oil Spill Detection and Response

Offshore Oil Production:



Source: O&G Journal / IHS Inc., US Energy Information Administration

Marine Transport:



Source: Fearnley's review

Oil Spills happen during

- Drilling
- Production
- Pipe Line Transport

Oil Spills happen during

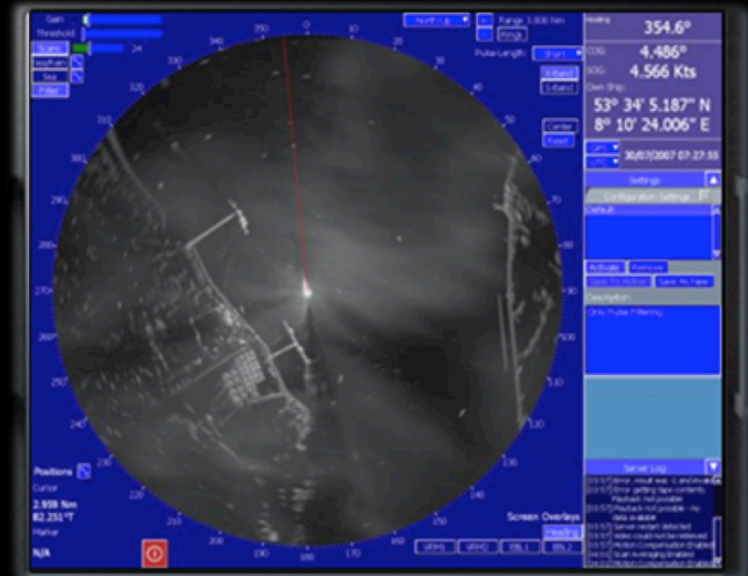
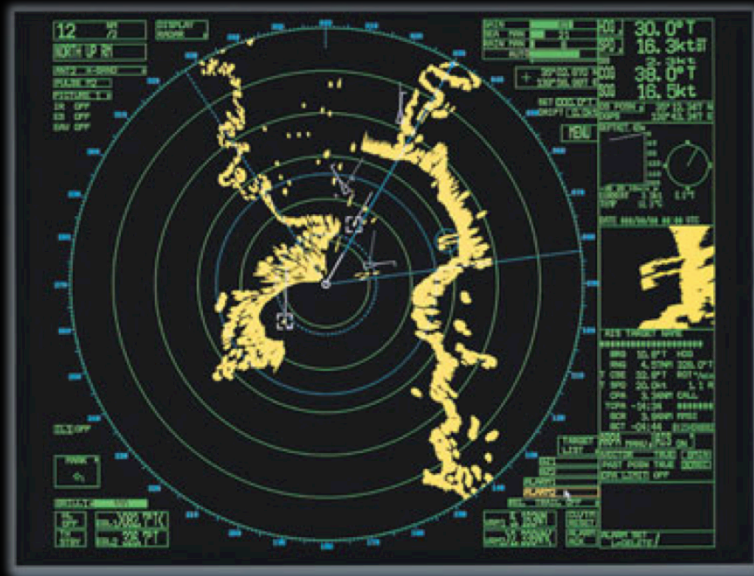
- Unlawful Vessel Tank Cleaning
- Loading
- Unloading
- Marine Accidents

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Methods of Oil Spill Detection

Type	Detection Period	Range / Area	Operation	Time to Detect
Satellite SLR	day & night	large	Off-line, manual, few times / 24 h	< 24 hours
Aircraft SLR	day & night	medium	manual, few times / day	< 24> hours incidental
Vessel/ Rig Radar	day & night	Up to 7 km	automatic, 7/24	immediate
Visual from Shore / Rig	Day, good visibility	< 3 km	manual	incidental
Local Sensor	day & night	< 50 m	automatic 7/24	immediate
IR-Camera (cooled)	day & night, good visibility	< 2 km (< 5 km)	manual / radar guided	incidental

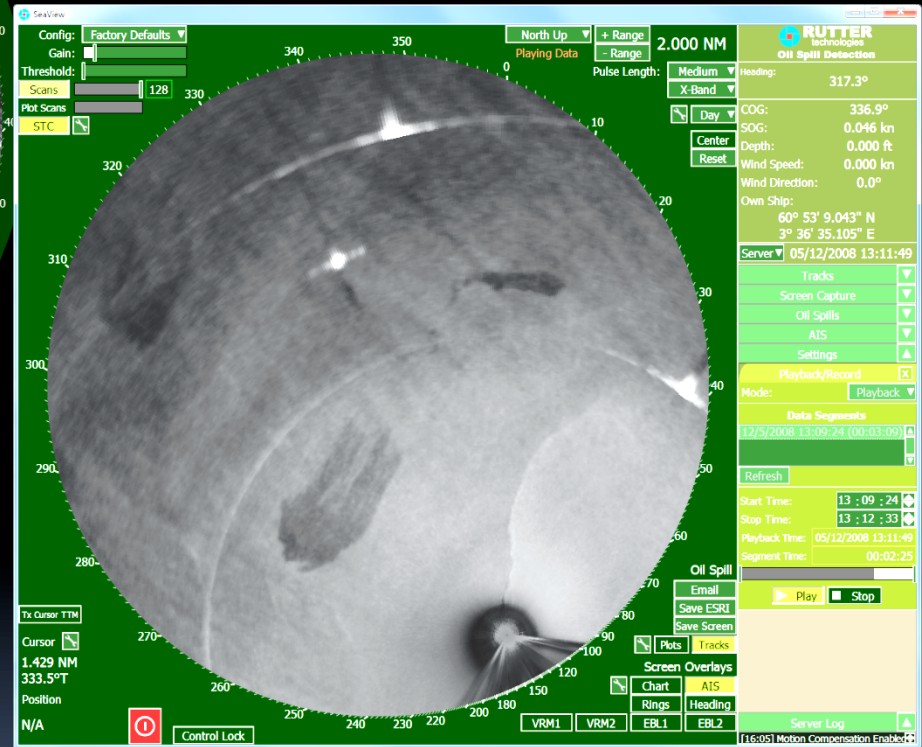
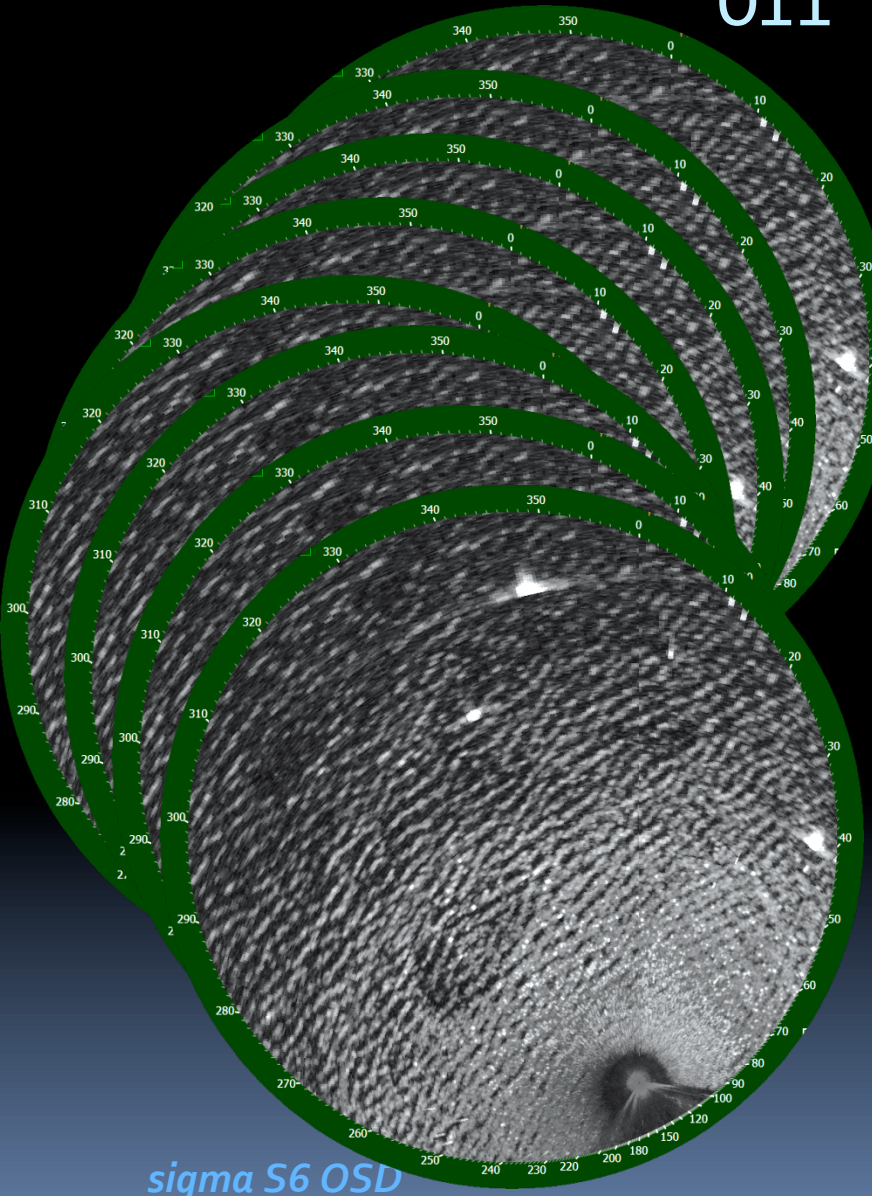
Standard versus Imaging Radar



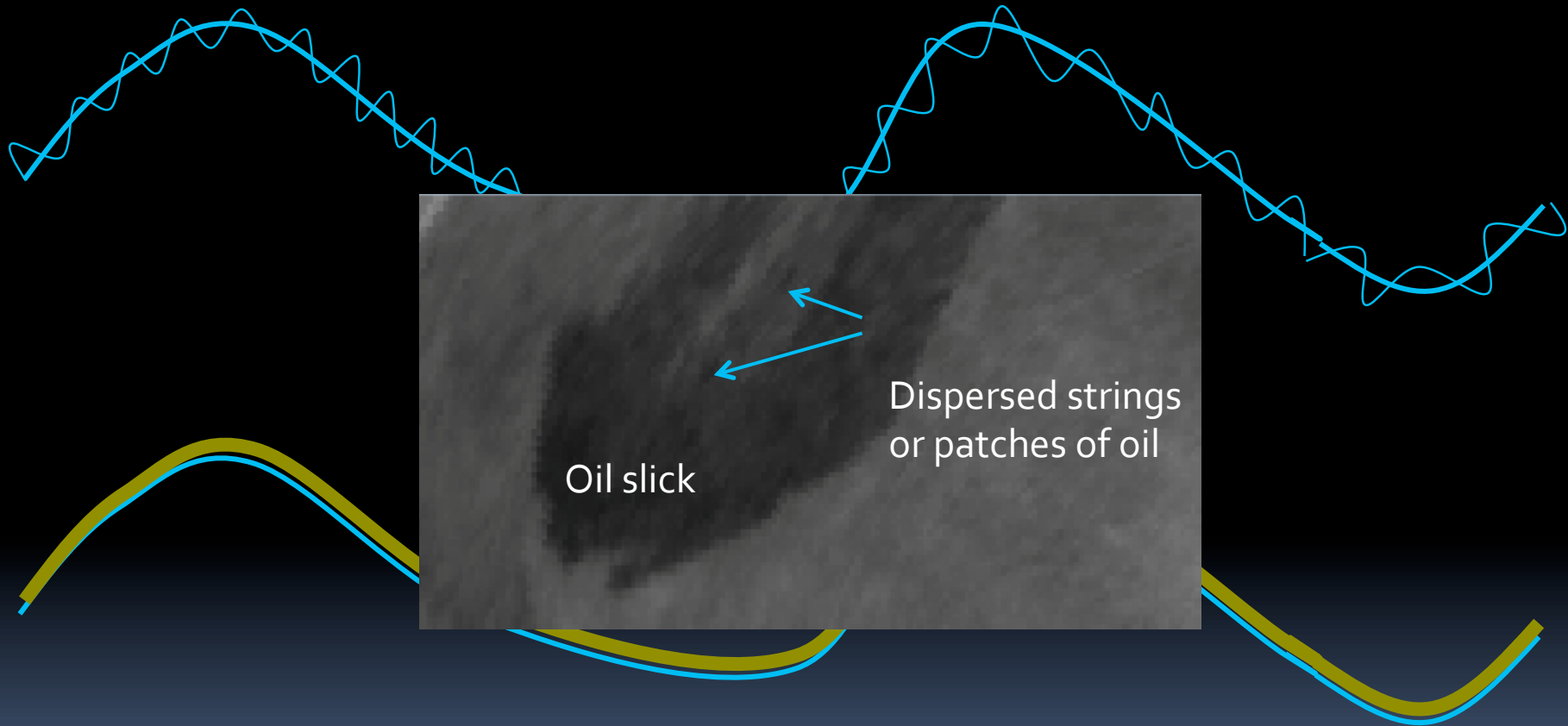
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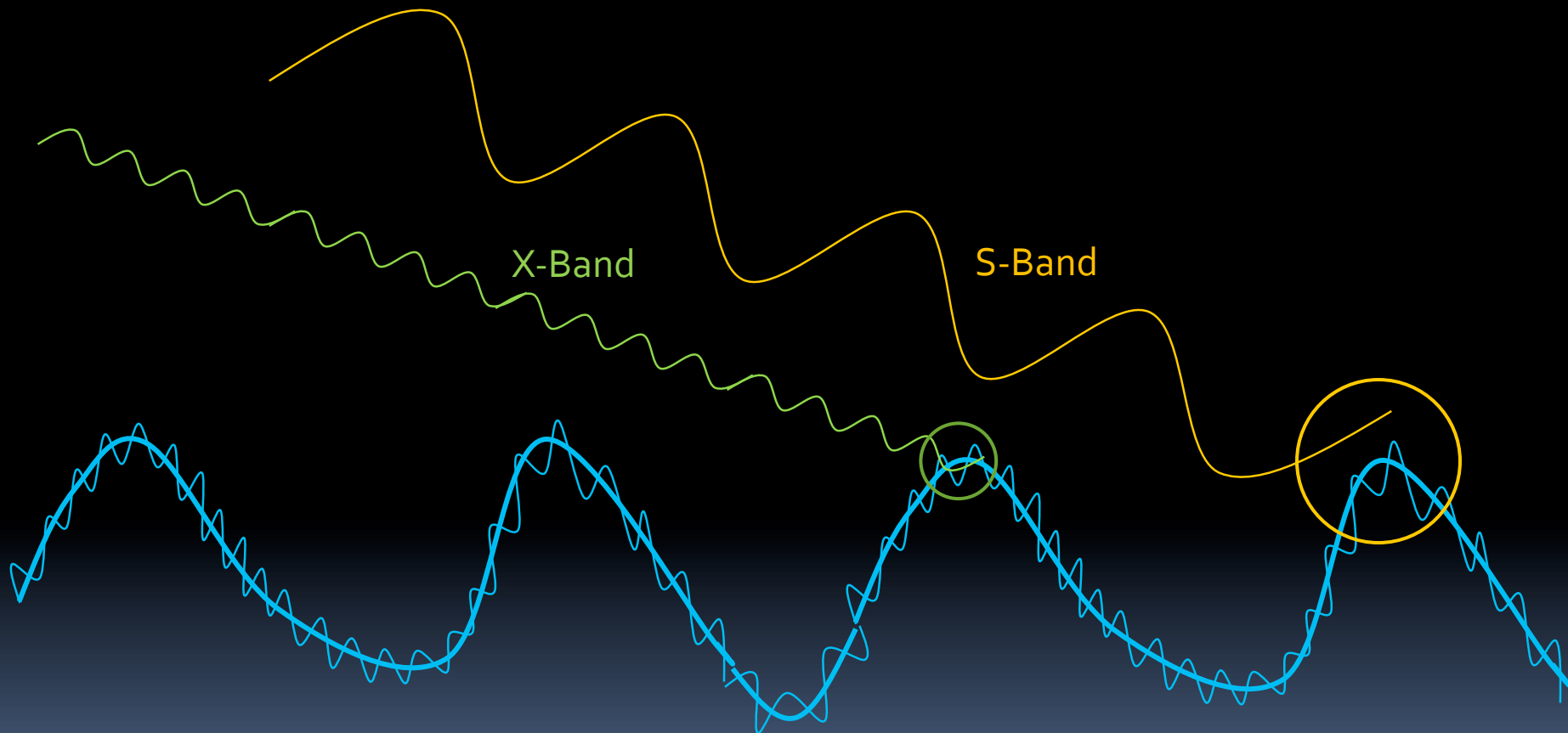
Oil Spill Detection by Radar



Oil Spill Detection by Radar



Oil Spill Detection by Radar

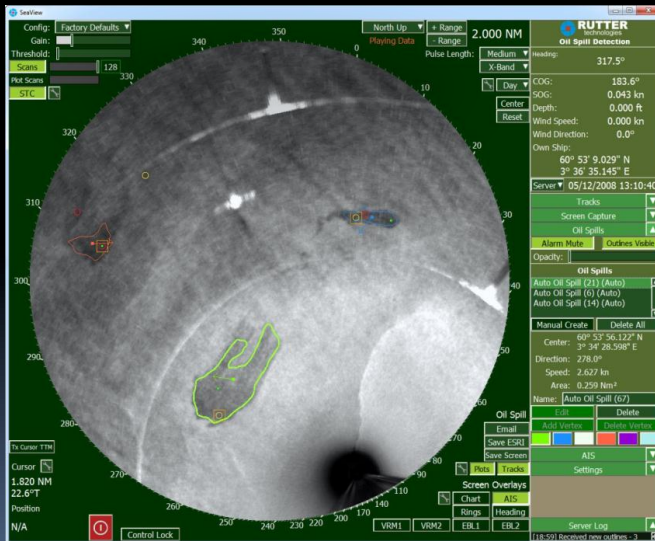


Oil Spill Detection & Response



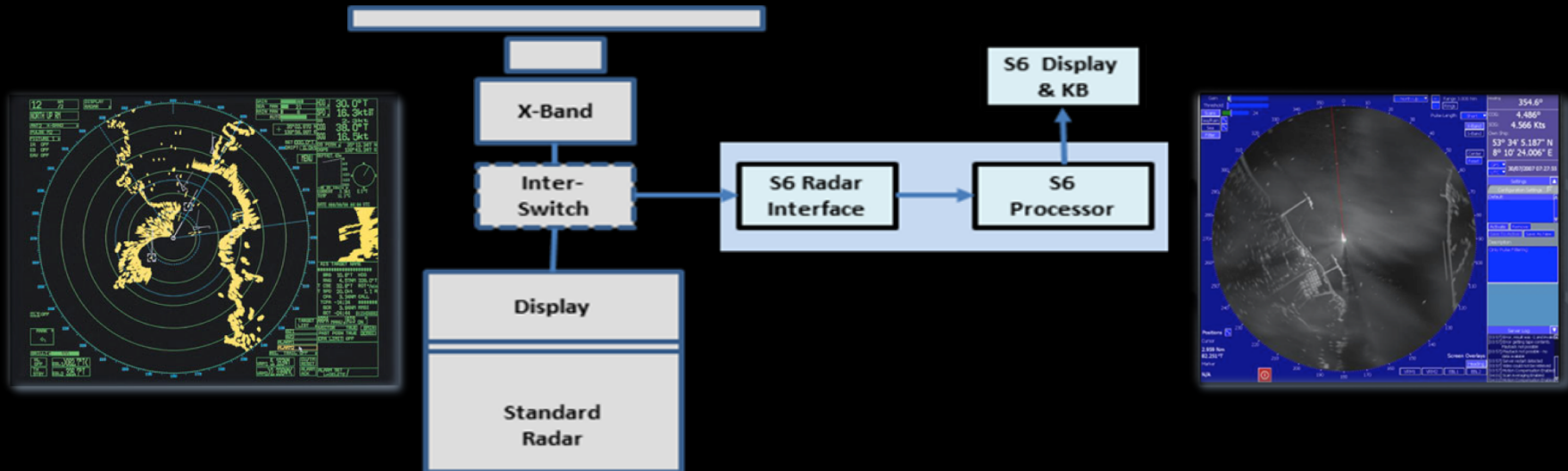
Detection of Oil Spills with Marine Radars:

- oil is damping capillary waves
- this attenuates radar signal returns from sea clutter
- detection is possible
 - from wind speed $> 2 - 3$ kt
 - out to > 4 NM / > 7 km
- signals must be motion compensated and averaged over many antenna revolutions
- oil spills are then presented as dark areas



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Standard versus Imaging Radar



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Sigma S6 for Demanding Applications



Ice,



Small
Icebergs



Oil

Targets



Birds

Spills



Vessels



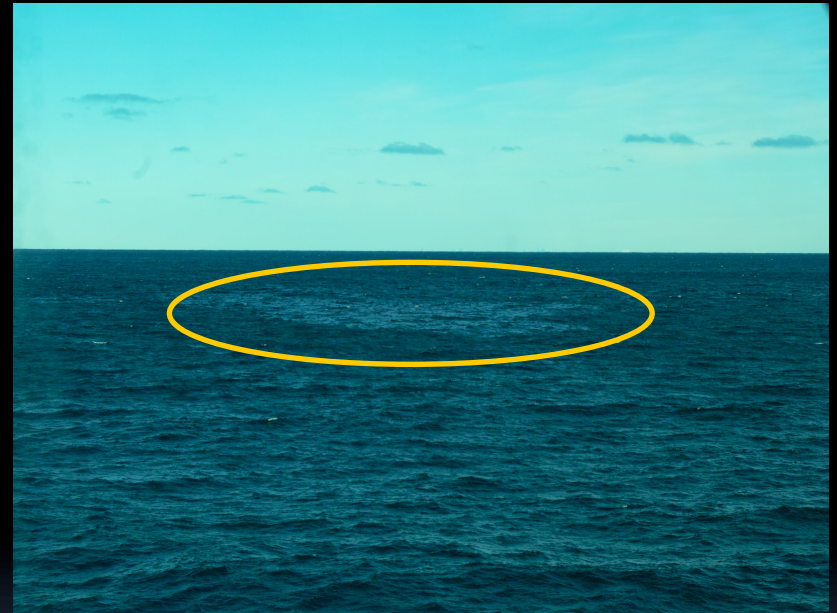
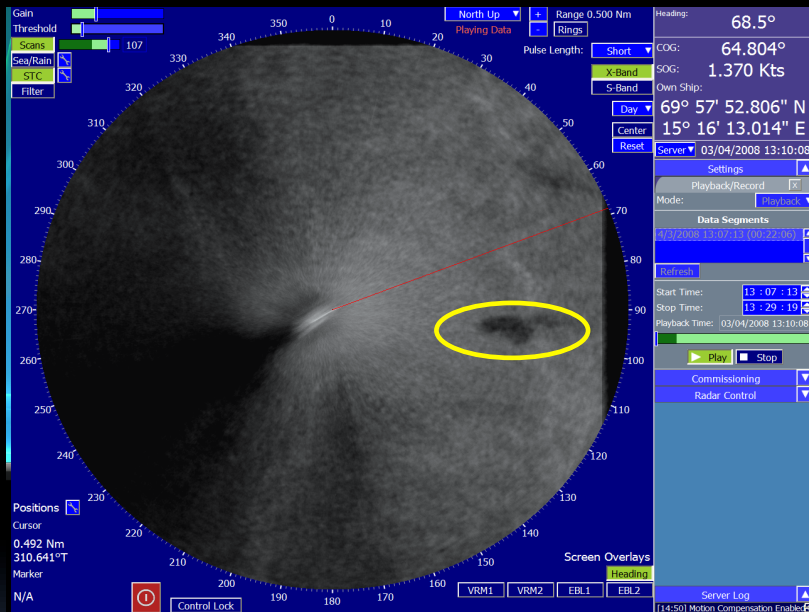
Platforms



Shore Stations

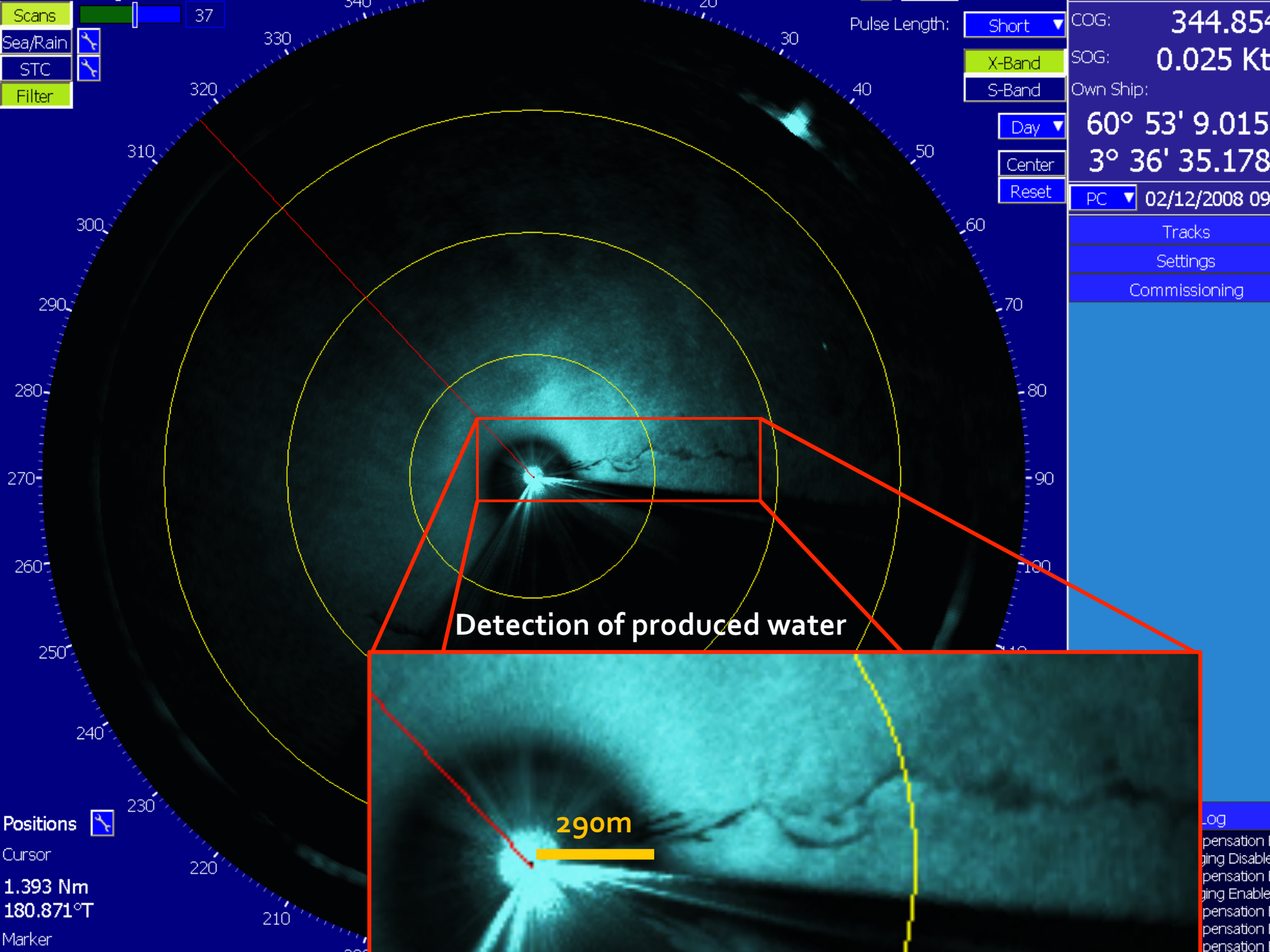
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Oil Spill Detection & Response

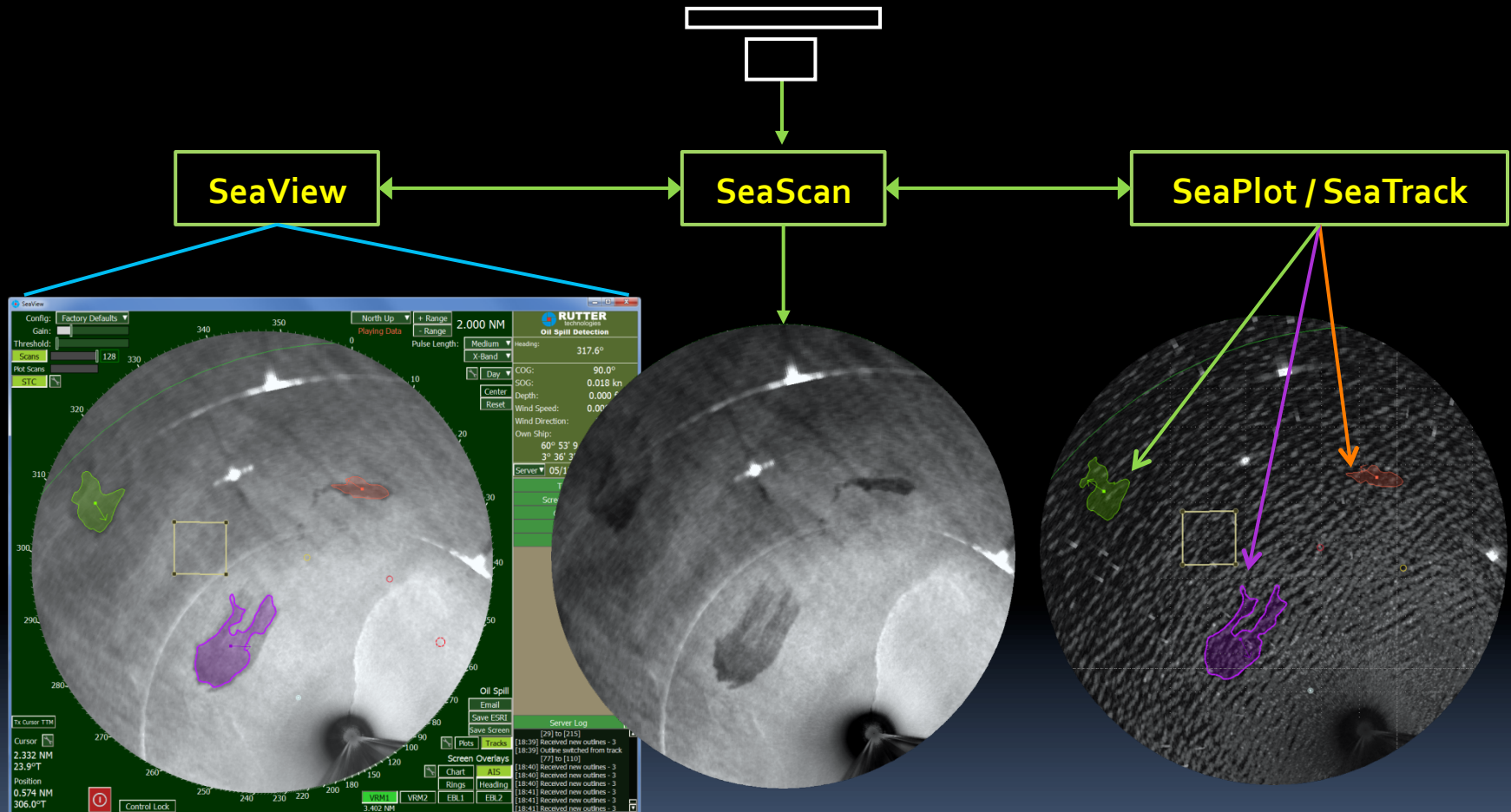


Oil Spill – 200L

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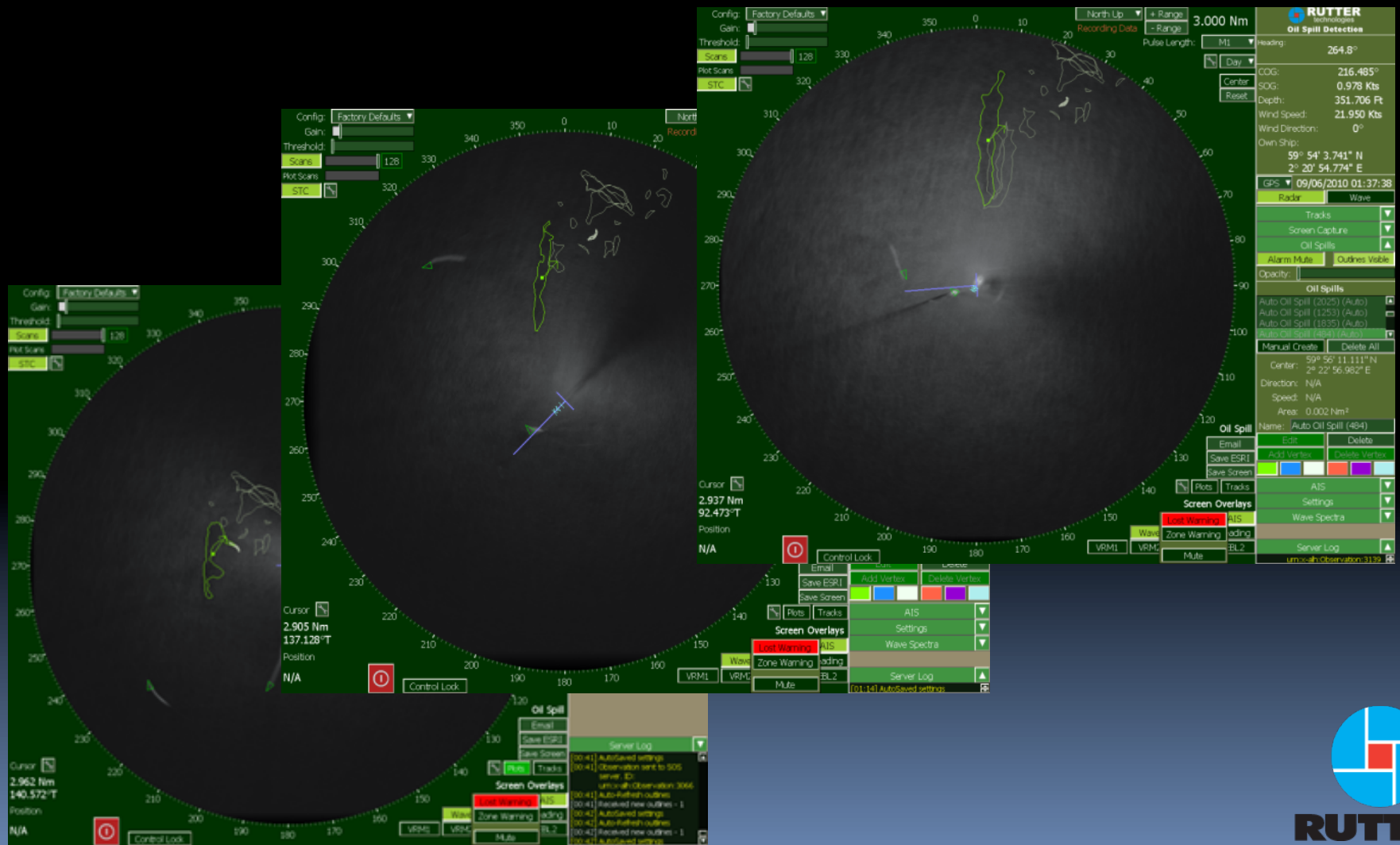
Oil Spill Detection & Response



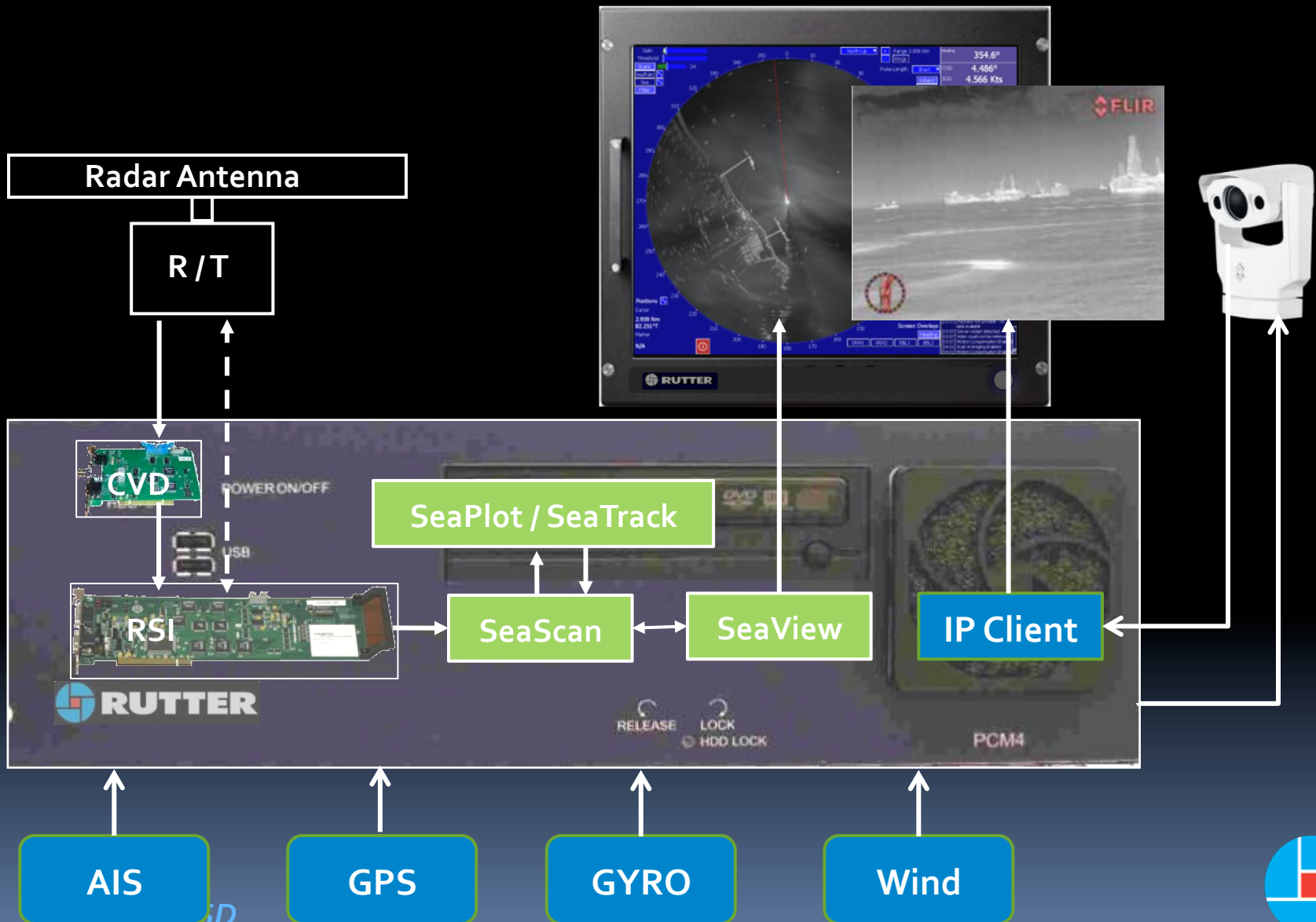
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Oil Spill Detection & Response



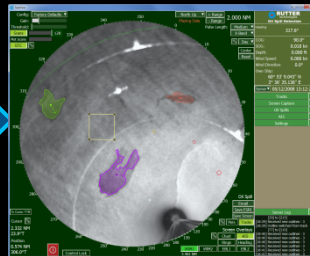
Principle Radar-100S6 + IR Configuration



Principle Radar-100S6 + IR Configuration



Radar
Sensor



Signal & Image
Processing



Tactical Communication
& Display



Infrared &
LLTV Sensors



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aptomar

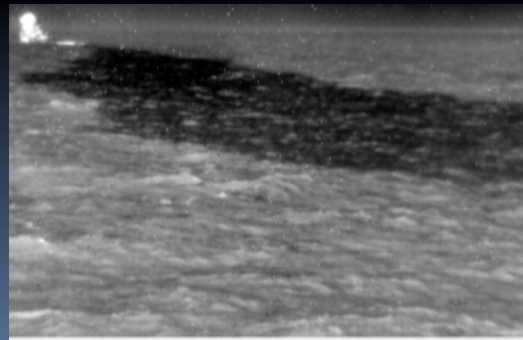


RUTTER

Oil Thickness Levels

Recoverable by Booms / Skimmers →

Oil on Water Thickness	< 5 μm	5 – 50 μm	50 – 200 μm	> 200 μm
Concentration (m ³ / km ²)	< 5	5 - 50	50 – 200	> 200
Human Eye	Sheen / Rainbow	Metallic	Transitional Dark or True Colour	Dark or True Colour
Sigma S6 OSD w. X-Band Radar	- > Visible	Visible	Visible	Visible
SECurus IR Camera	Not visible	grey - black	black - white	white

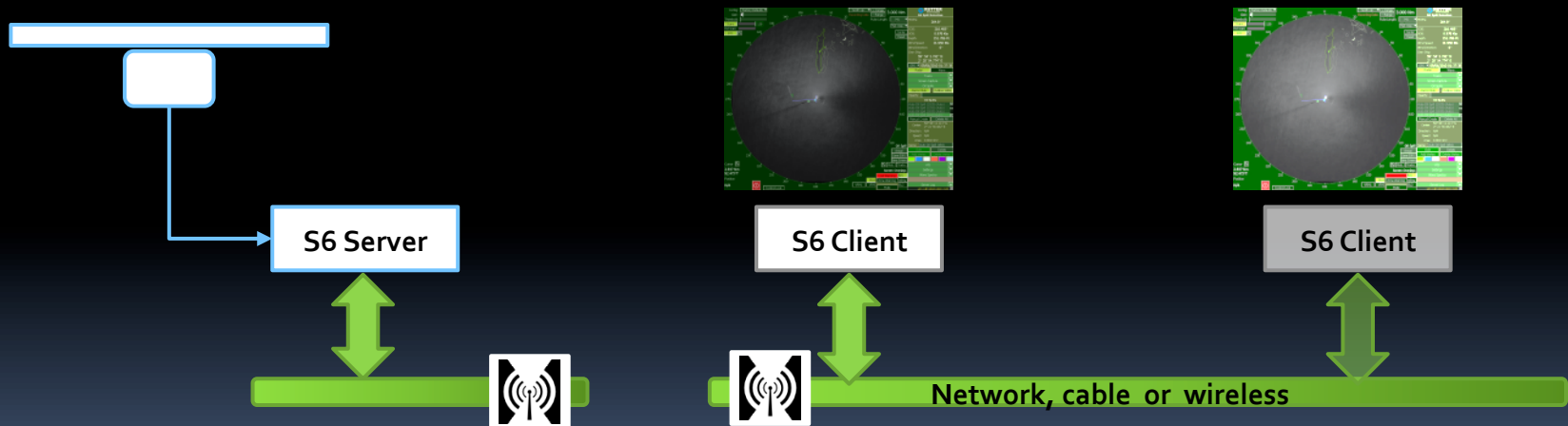


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Principle Radar-100S6 + IR Configuration



Sigma S6 Networking Capability





*Thank You for Listening
to Technology for
Marine Safety and
Clean Oceans*