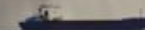




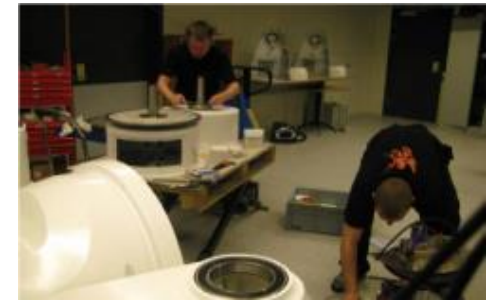
aptomar

safety at your fingertips



Aptomar

- Established in 2005
- Owned by Statoil, Investinor, Proventure Seed, Verdane Capitol
- Have developed and control all IPR and product value chain related to the SECurus system, the TCMS and its add-ons.



Aptomar

- Since 2008 we have delivered more than 100 oil spill management systems worldwide, amongst others to:



Statoil



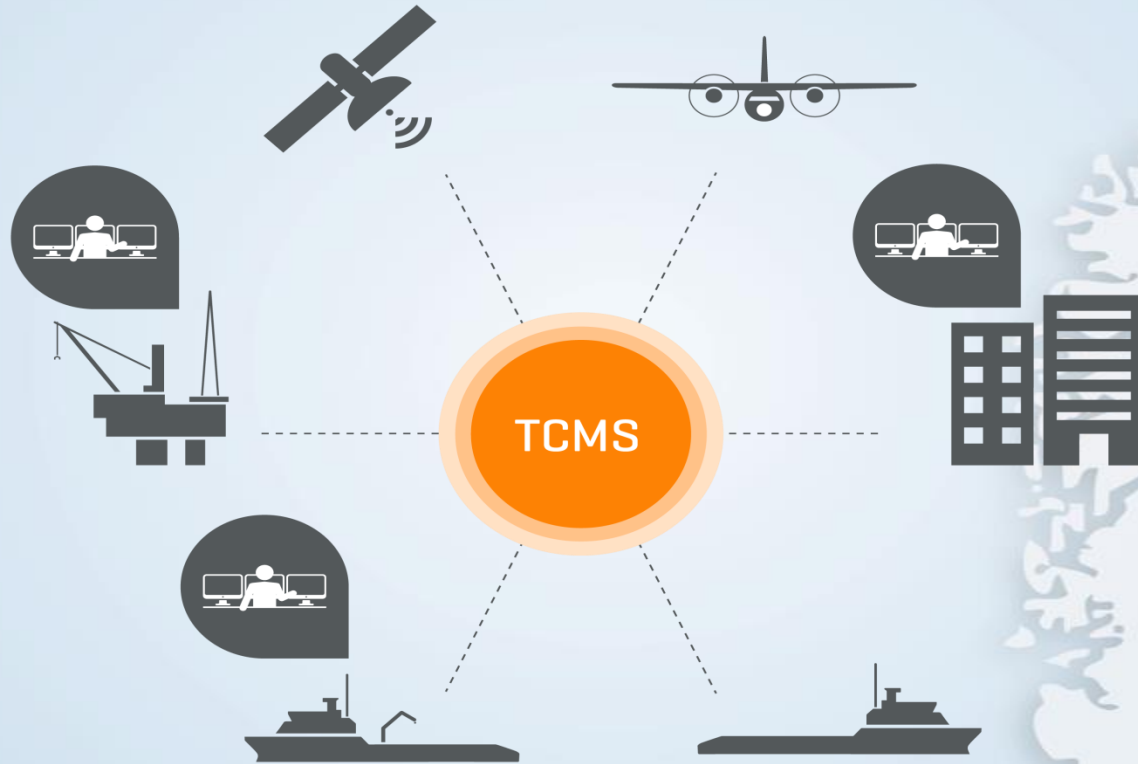
Kystvakten



KYSTVERKET



Tactical information, independent of location, in real time



Emergency Response Organisation

- Pollution response
- Emergency response

2nd line response - WebAccess
Connected only as required

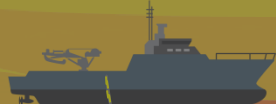
Onshore Operations Room

- Monitoring Operations
- ROV Operations

Maritime Control Centre

- Daily Operations
- Vessel or Collision Course
 - CTO Reporting
 - System monitoring

Tactical information, independent of location, in real time



Aptomar TCMS

- Tactical collaboration and management
- Remote operations
- Creating the Common Operating Picture



TCMS

Tactical Collaboration and Management System

- Tactical collaboration between sea, **land and air**
- Establish the **Common Operating Picture (COP)**
- Understand the situation, **prioritize action**, and see the result



TCMS

Distributed Situational Awareness

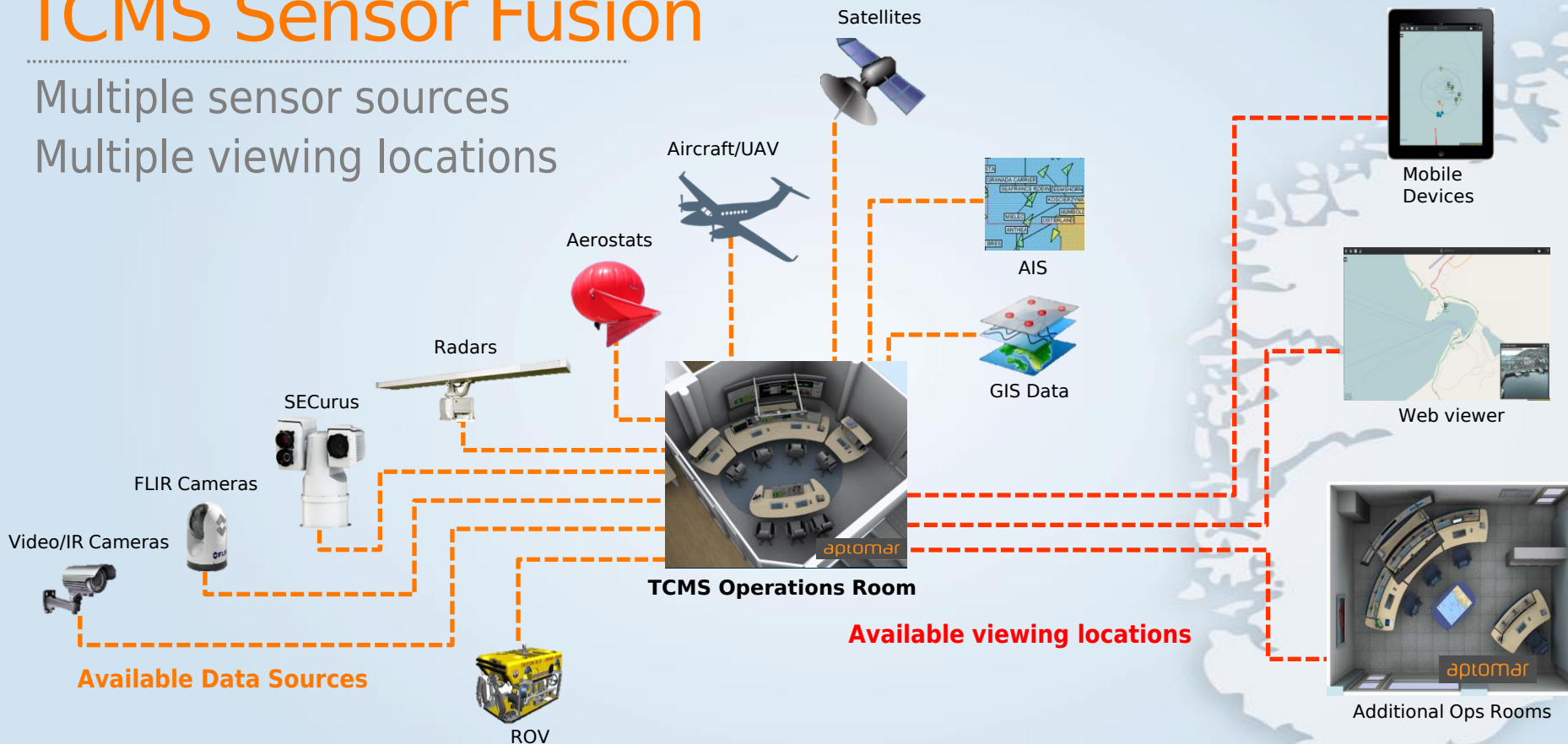
- Connect several TCMS operations rooms together
- Create a Common Operating Picture within your organization, and other organizations
- Easily establish TCMS operations rooms in existing infrastructure

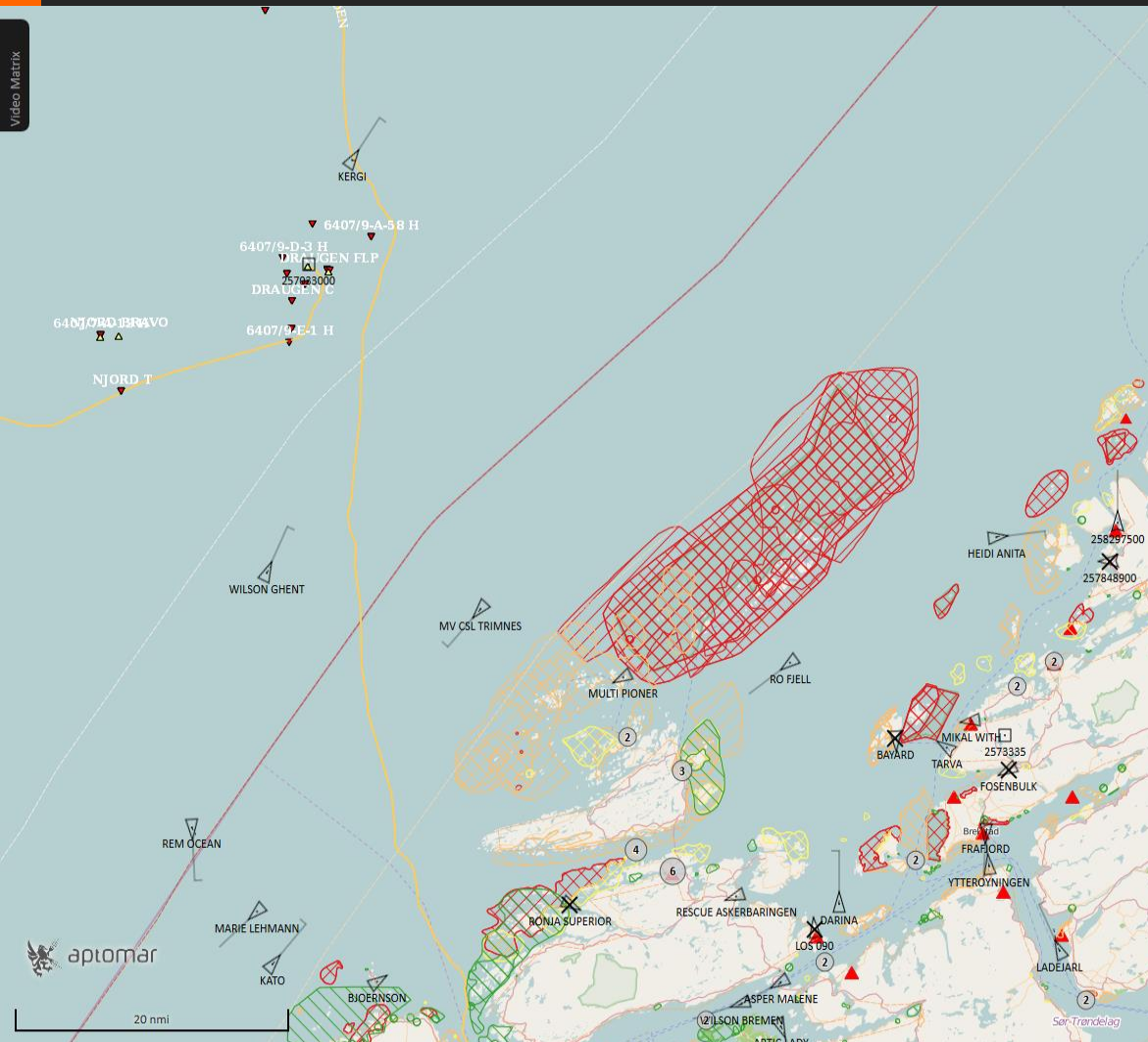


TCMS Sensor Fusion

Multiple sensor sources

Multiple viewing locations





GIS data integration

- User specific GIS data can be imported to create personalized operational charts
- Mark sub sea infrastructure, or expected vessel routes and call in points
- Different layers can be added and each can be displayed or hidden independently



Satellite image integration

Satellite images can be geo referenced and displayed in the chart area

- Identify the identity of AIS transmitting vessels

- Discover the position of non AIS transmitting vessels

- Identify the vessel that caused a detected illegal discharge

- Obtain high level overview of incident

TCMS-STAVANGER

N 58° 55.969'
E 5° 34.348'COG
0.0°HDG
0.0°SOG
0.0 kts13.06.2013
16:01:03 UTC+02ESVAGT STAVANGER N 60° 0.664'
E 2° 31.541'

MINI

NORMAL

DUAL

FULL

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER

ESVAGT STAVANGER



aptomar

SCREENSHOT

SENSORS
NO TARGETS

AIS & ARPA

USER DEFINED

CHART

GUIDES & TOOLS

1:89273
SCALENORTH UP
ORIENTATION

GOTO

CENTER
VESSEL

SECurus in the air

Aptomar provides the user interface and networking capability to add aerial mounted sensors to the TCMS network

Aircraft can share images and data with network and receive shared information from other sources

Used by the Norwegian Coastal Administration for pollution detection

LN-KYV

N 60° 5.733'
E 2° 21.281'

ALT 4000 ft

COG 194.7°

HDG 197.6°

SOG 206.8 kts

19.06.2014
06:34:59 UTC

OSEBERG SØR K



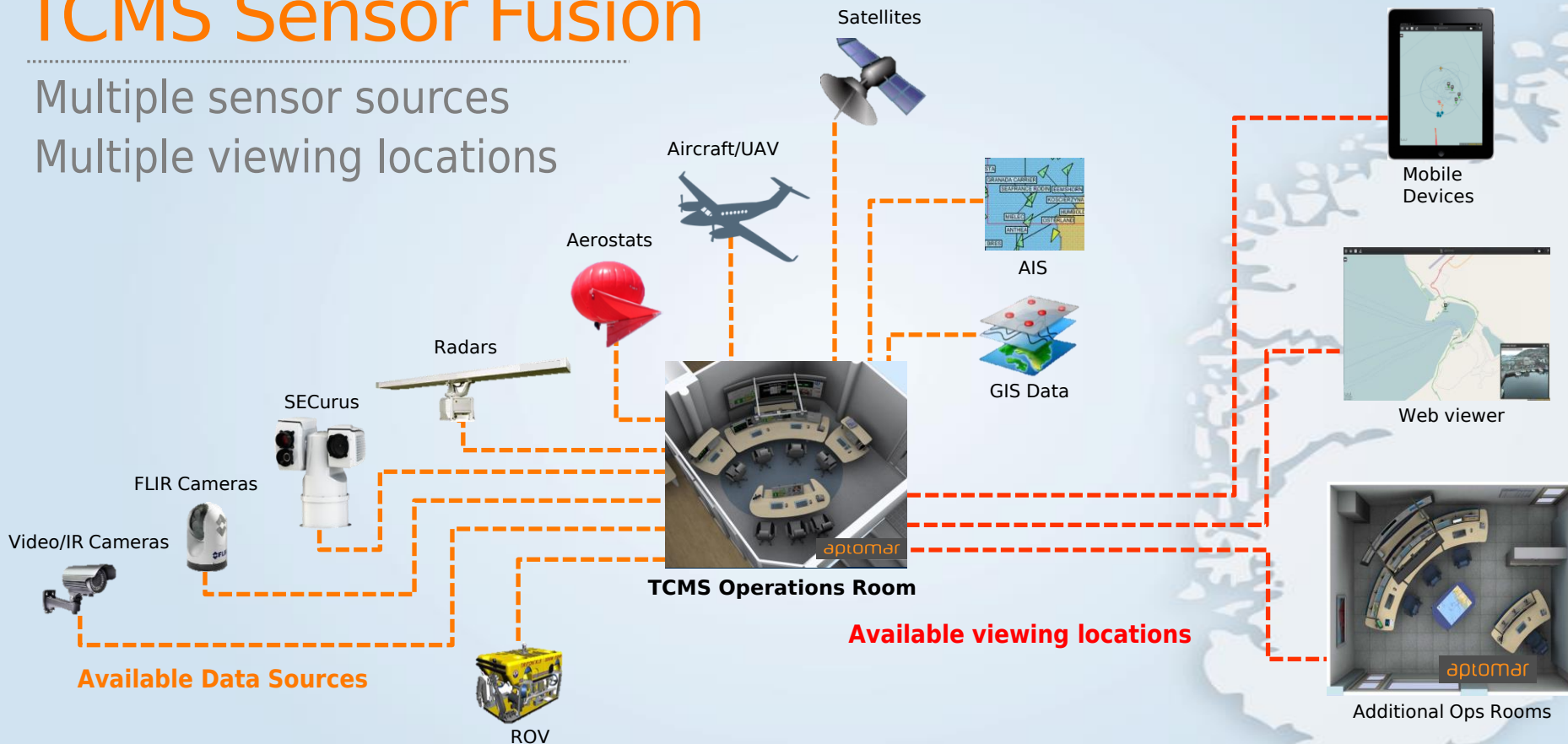
KV SORTLAND

MINI	NORMAL	DUAL	FULL
FLIR	N 60° 5.306' E 2° 21.002'	T BRG 198.0°	R BRG 0.4° DST 0.450 Nm
HDZ			
CAMERA HDZ	AUTO FOCUS	FREEZE	RECORD



TCMS Sensor Fusion

Multiple sensor sources
Multiple viewing locations



SECurus

Stabilised surveillance, documentation
and decision support tool



SECurus

Pointing unit

- 3 axis Stabilised camera platform
 - Stable video and still images
- High magnification daylight DV camera
 - Long range identification
- Long range Xenon searchlight
 - Stable illumination
- High sensitivity actively cooled Infrared
 - Long range vision day or night



Actively cooled IR Cameras offer significant range advantages over non cooled passive IR cameras

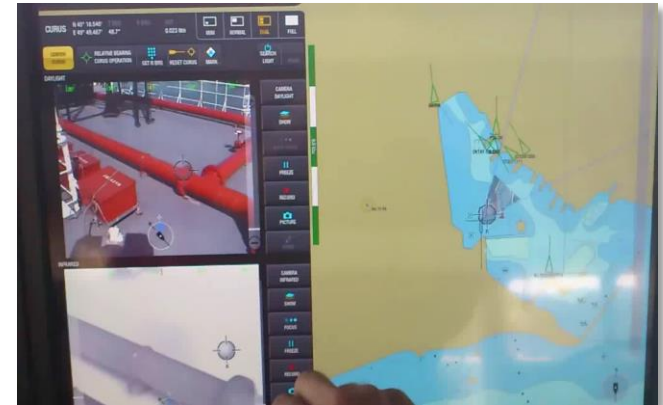


SECurus

Workstation

- 23" Maritime Touch Screen Display and Joy Stick
 - No Key board or track ball required
- Quick and Intuitive user experience
 - Easily operated by existing bridge crew
- Commercial Off The Shelf components
 - Cost effective installation and maintenance

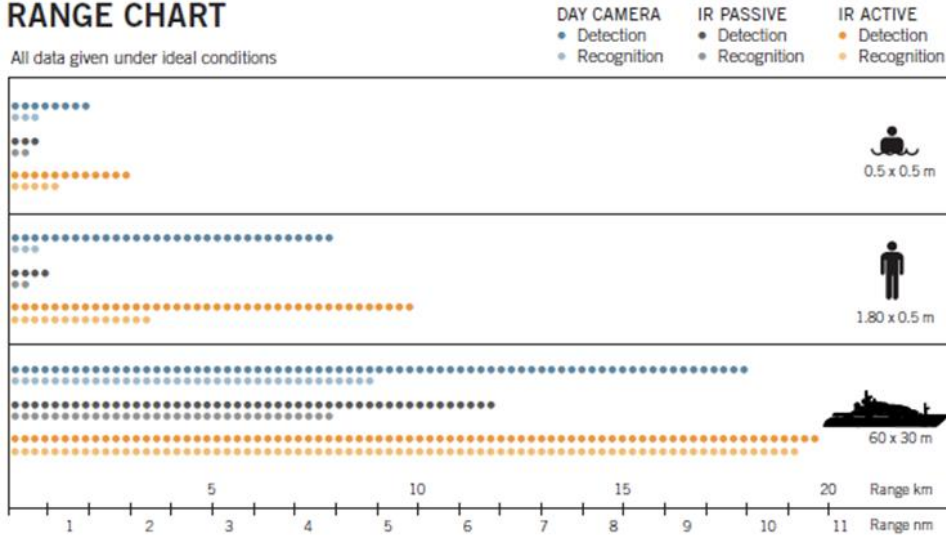
Only one day training is required to enable bridge crew to utilise system in daily operations



SECurus

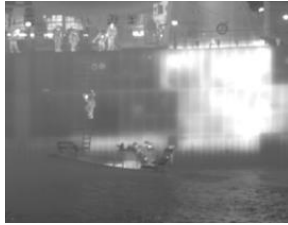
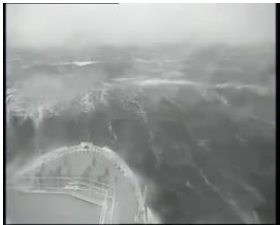
RANGE CHART

All data given under ideal conditions



Long range operations

- Stable videos and images independent of weather conditions
- Long range camera capabilities
- Person in water at 3km
- See vessels at 15-20km

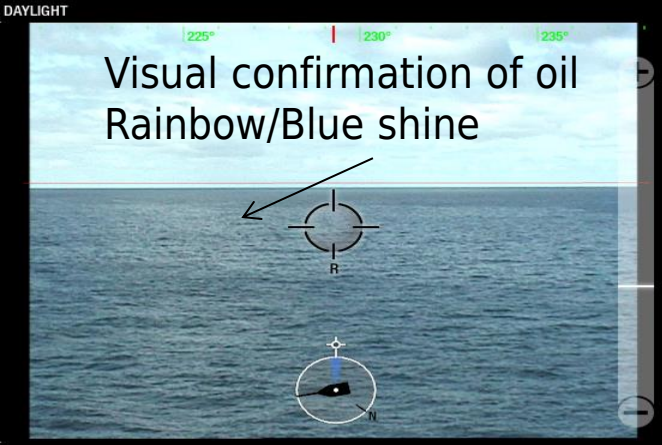




With the SECurus, and its cooled infrared sensor, the 10% area which contain 90% of the oil volume is easily detected, and size, position, volume and drift is estimated

SECURUS
N 60° 0.242'
T BRG 228.9°
R BRG 100.7°
DST 0.392 Nm
MINI
NORMAL
DUAL
FULL

CENTER CURUS
RELATIVE BEARING CURUS OPERATION
SET R BRG
RESET CURUS
MARK
SEARCH LIGHT
BEAM



CAMERA DAYLIGHT

SHOW

AUTO FOCUS

FREEZE

RECORD

PICTURE

IMAGE

CAMERA INFRARED

SHOW

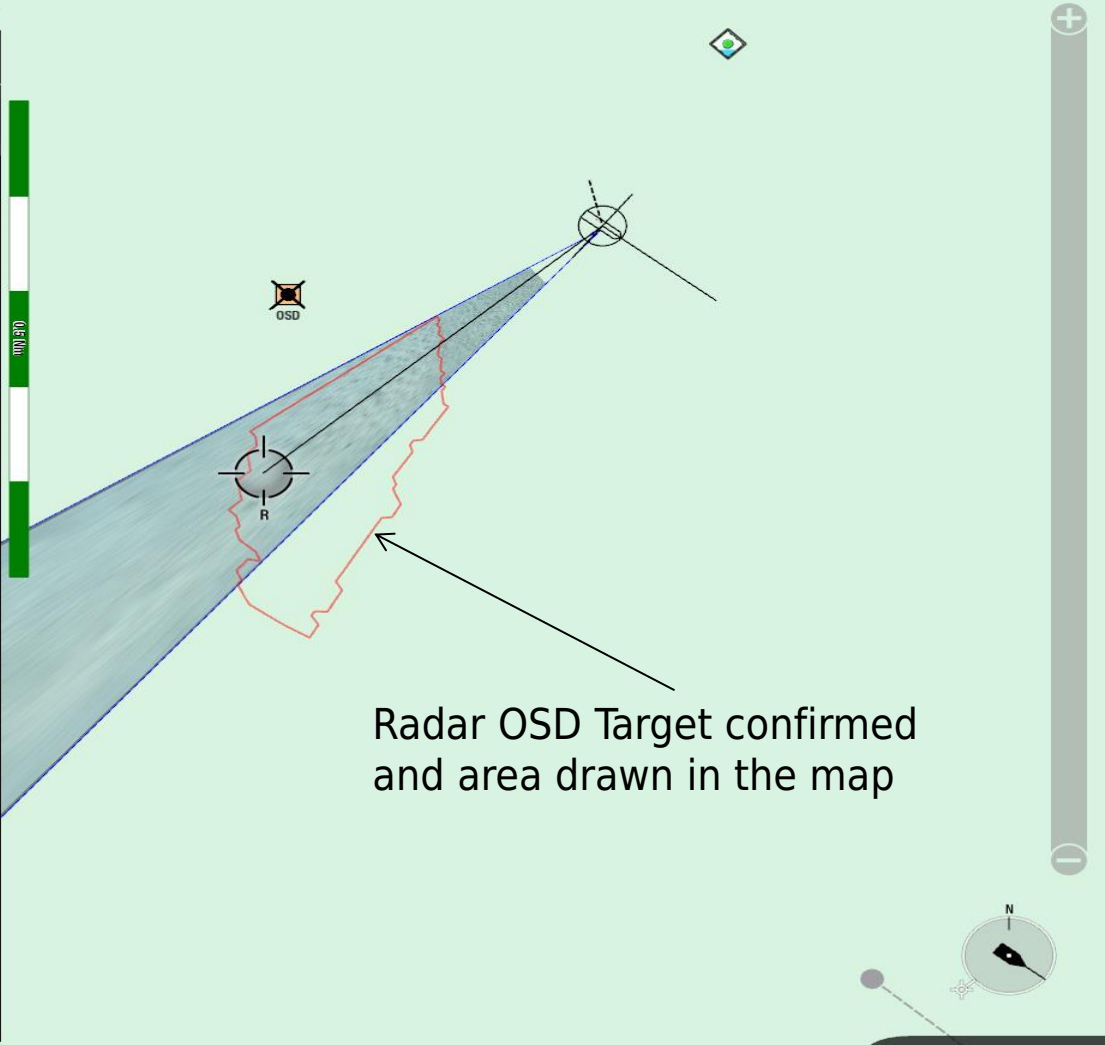
FOCUS

FREEZE

RECORD

PICTURE

IMAGE



Radar OSD Target confirmed and area drawn in the map



PICTURE & VIDEO ARCHIVE

SENSOR ARCHIVE

OBJECT ARCHIVE

PIC & VID ARCHIVE 1 EXT



ESVAGT BERGEN

N 60° 1.135'
E 2° 31.689'

COG 320.4°

HDG 345.1°

SOG 0.1 kts



15.06.2012
07:35:25 UTC+02

SECURUS

N 60° 1.723'
E 2° 30.639'

T BRG 318.3°

R BRG 333.1°

DST 0.788 Nm



CENTER CURUS

RELATIVE BEARING CURUS OPERATION

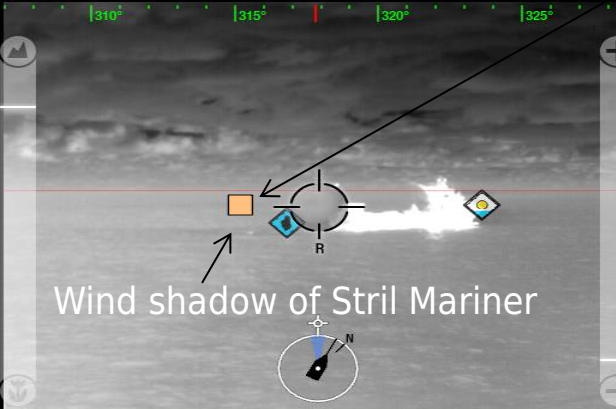


DAYLIGHT

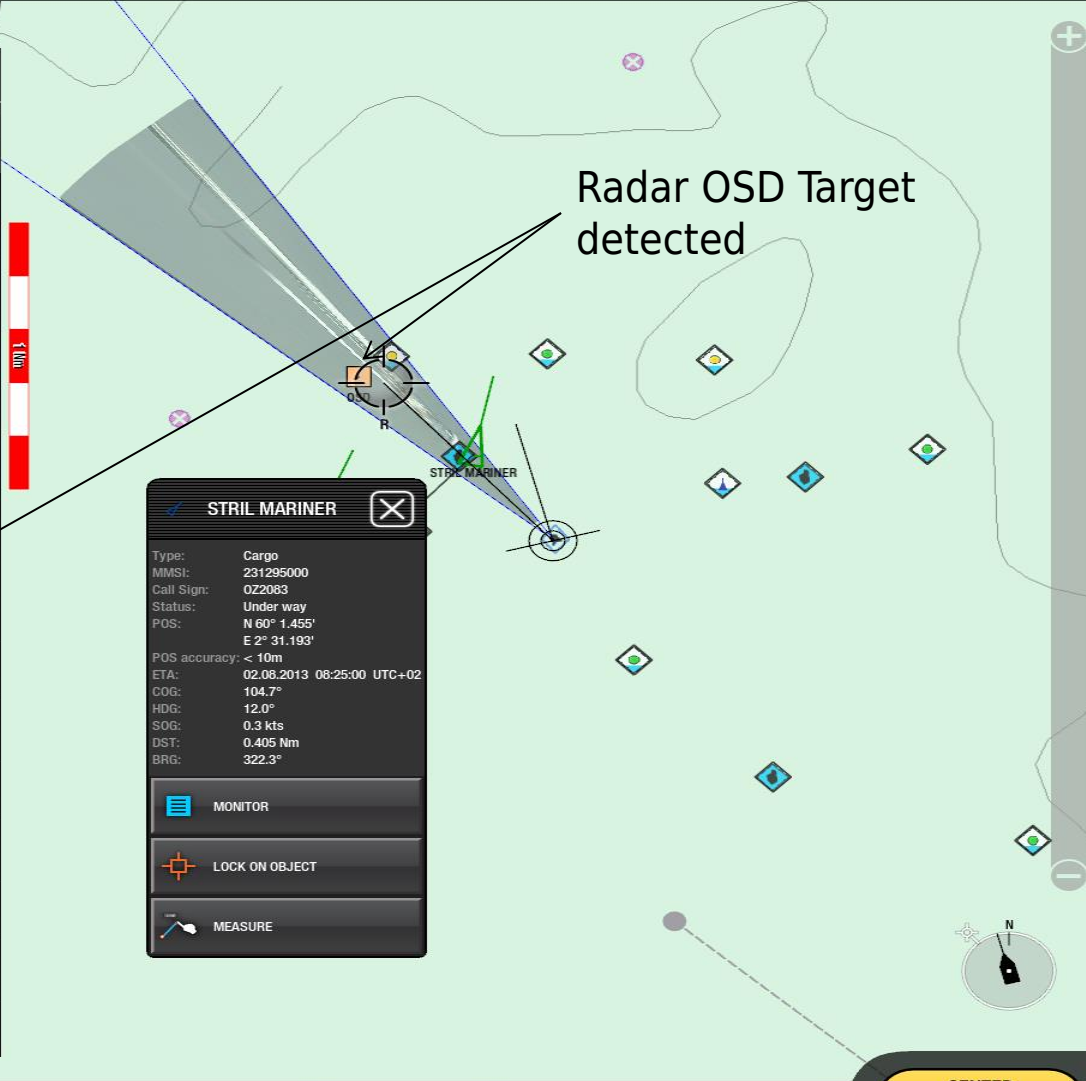


- CAMERA DAYLIGHT
- SHOW
- AUTO FOCUS
- FREEZE
- RECORD
- PICTURE
- IMAGE

INFRARED



- CAMERA INFRARED
- SHOW
- FOCUS
- FREEZE
- RECORD
- PICTURE
- IMAGE



Radar OSD Target detected

STRIL MARINER

Type: Cargo
 MMSI: 231285000
 Call Sign: OZ2083
 Status: Under way
 POS: N 60° 1.465'
 E 2° 31.193'
 POS accuracy: < 10m
 ETA: 02.08.2013 08:25:00 UTC+02
 COG: 104.7°
 HDG: 12.0°
 SOG: 0.3 kts
 DST: 0.405 Nm
 BRG: 322.3°

MONITOR

LOCK ON OBJECT

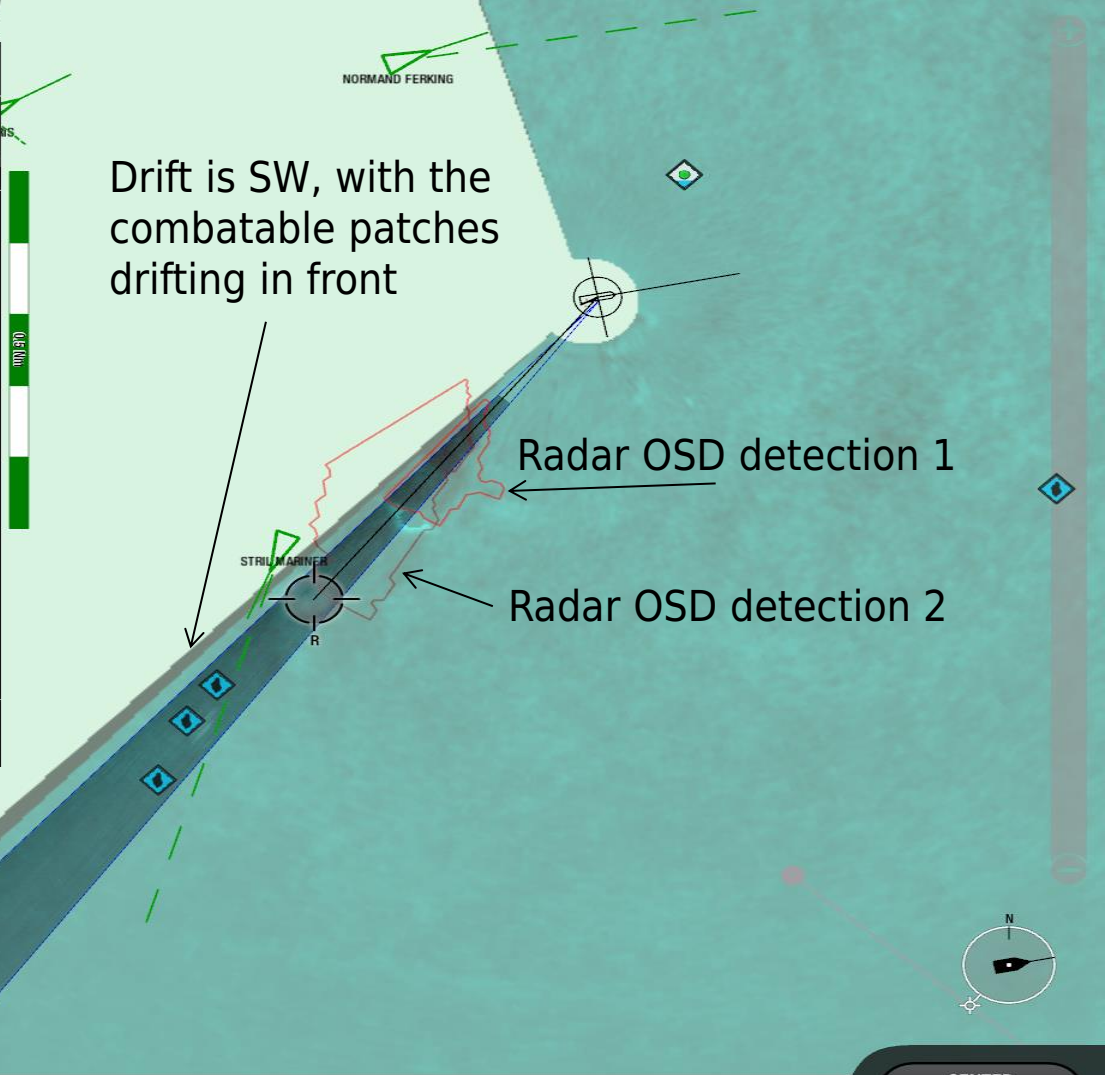
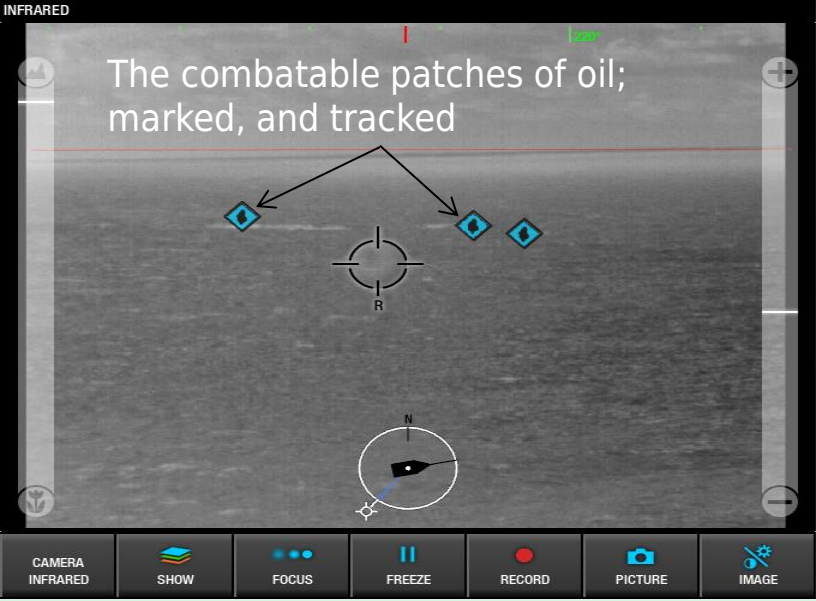
MEASURE

Wind shadow of Stril Mariner

SECURUS N 60° 0.099' T BRG 218.0° R BRG 139.4° DST 0.534 Nm

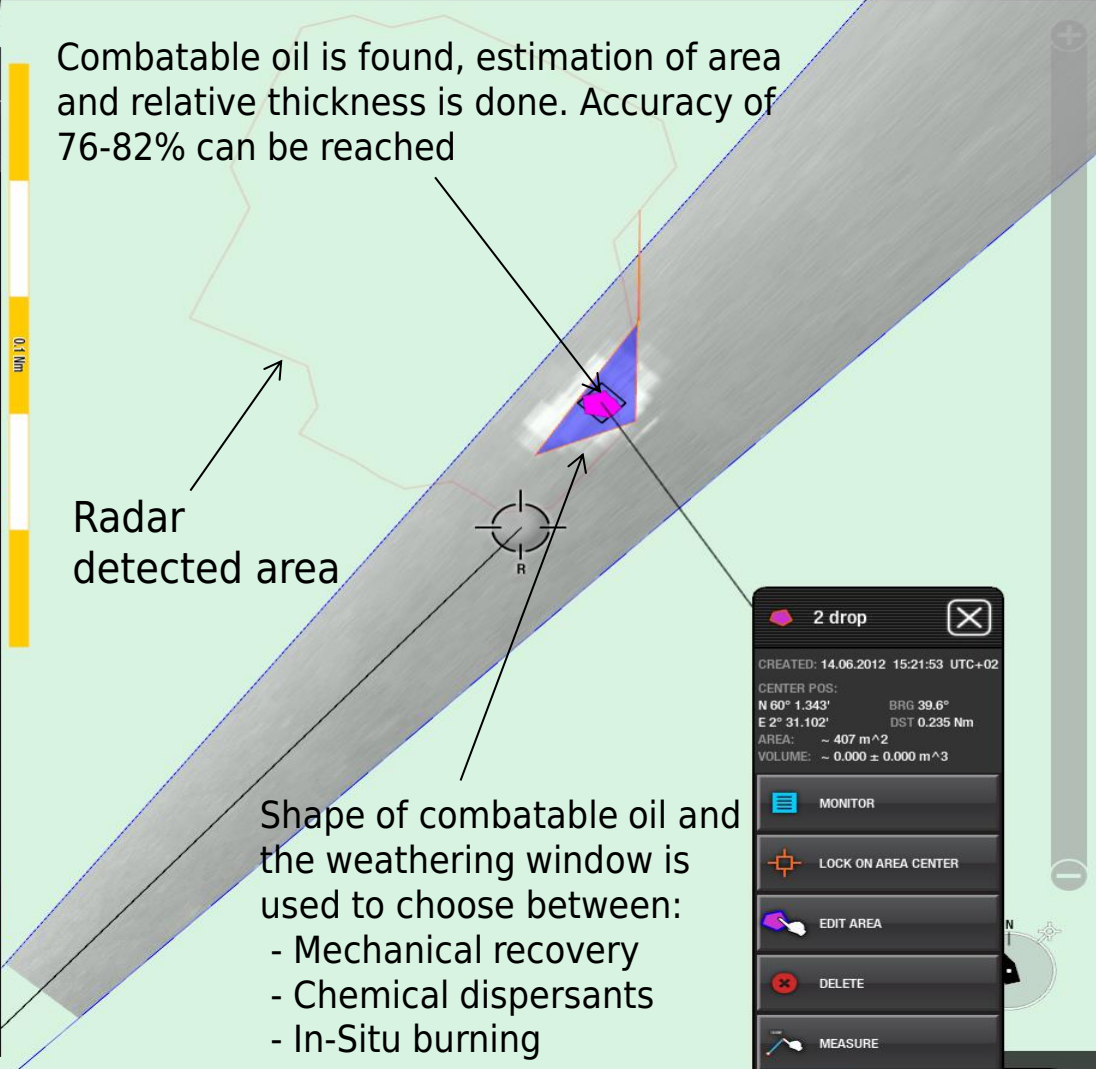
MINI NORMAL DUAL FULL

CENTER CURUS RELATIVE BEARING CURUS OPERATION SET R BRG RESET CURUS MARK SEARCH LIGHT BEAM



SECURUS
N 60° 1.321'
T BRG 40.9°
R BRG 55.1°
DST 0.211 Nm
MINI
NORMAL
DUAL
FULL
CENTER CURUS
RELATIVE BEARING CURUS OPERATION
SET R BRG
RESET CURUS
MARK
SEARCH LIGHT
BEAM

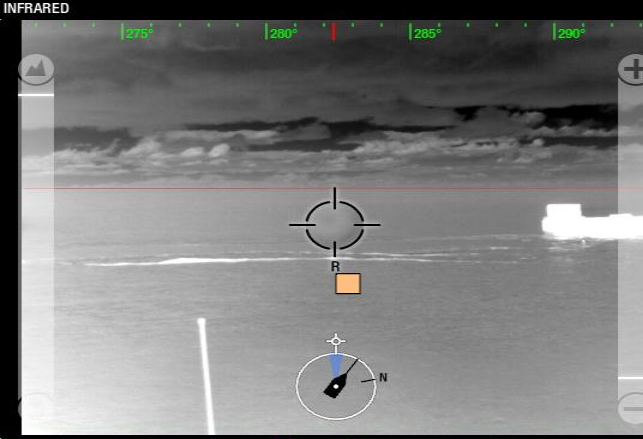
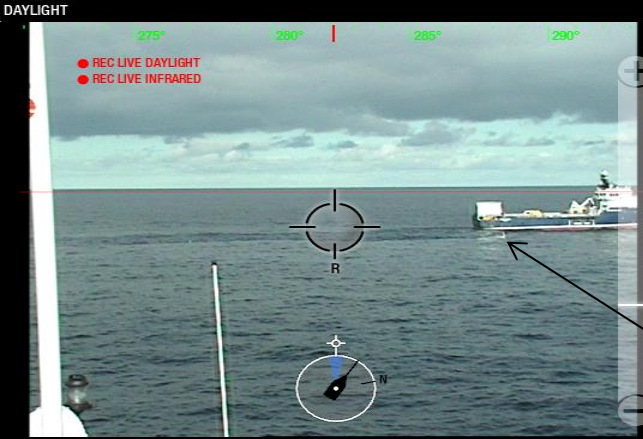
INFRARED
 The combatable patches of oil; marked, and tracked
 REC LIVE INFRARED
 CAMERA INFRARED
 SHOW
 FOCUS
 FREEZE
 RECORD
 PICTURE
 IMAGE
DAYLIGHT
 CAMERA DAYLIGHT
 SHOW
 AUTO FOCUS
 FREEZE
 RECORD
 PICTURE
 IMAGE



SECURUS N 60° 0.865' T BRG 282.9° R BRG 327.0° DST 0.383 Nm

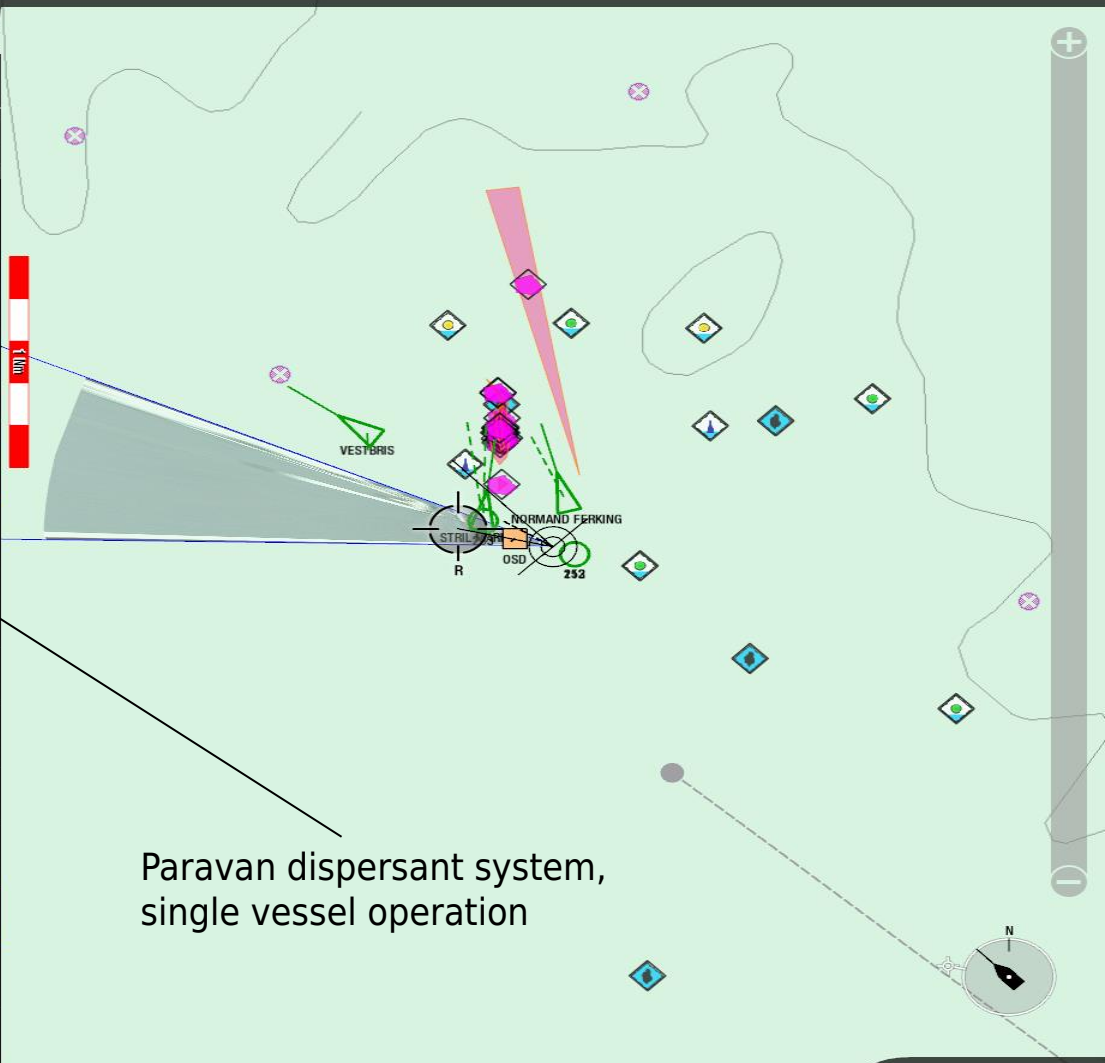
MINI NORMAL DUAL FULL

CENTER CURUS RELATIVE BEARING CURUS OPERATION SET R BRG RESET CURUS MARK SEARCH LIGHT BEAM



CAMERA DAYLIGHT
 SHOW
 AUTO FOCUS
 FREEZE
 RECORD
 PICTURE
 IMAGE

CAMERA INFRARED
 SHOW
 FOCUS
 FREEZE
 RECORD
 PICTURE
 IMAGE





CENTER CURUS

POSITION CURUS OPERATION

SET POS

RESET CURUS

MARK

SEARCH LIGHT

BEAM

INFRARED



ESVAGT BERGE

N 58° 24.609'
E 1° 43.724'

COG HDG
290.0° 285.1°

SOG
5.5 kts

27.02.2012
13:31:24 UTC+1

CURUS

N 58° 28.923'
E 1° 35.798'

T BRG R BRG
316.2° 31.1°

DST
5.984 Nm

CAMERA INFRARED

SHOW

FOCUS

FREEZE

RECORD

PICTURE

IMAGE

SCREENSHOT



PICTURE & VIDEO ARCHIVE

SENSOR ARCHIVE OBJECT ARCHIVE PIC & VID ARCHIVE

ESVAGT BERGEN

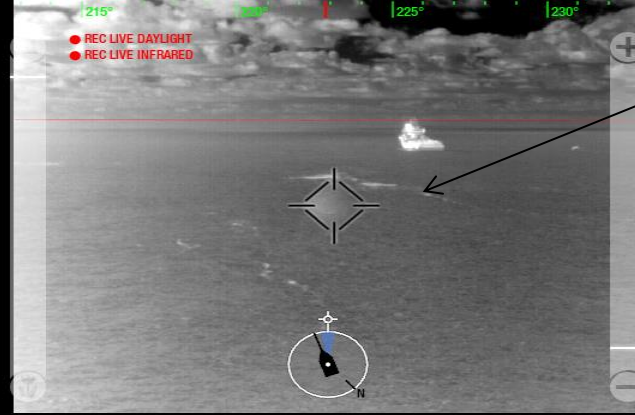
N 59° 59.467' E 2° 31.046' COG 201.5° HDG 202.7° SOG 2.0 kts 15.06.2012 11:35:21 UTC+02

SECURUS N 59° 59.334' T BRG 224.1° R BRG 21.4° DST 0.186 Nm

MINI NORMAL DUAL FULL

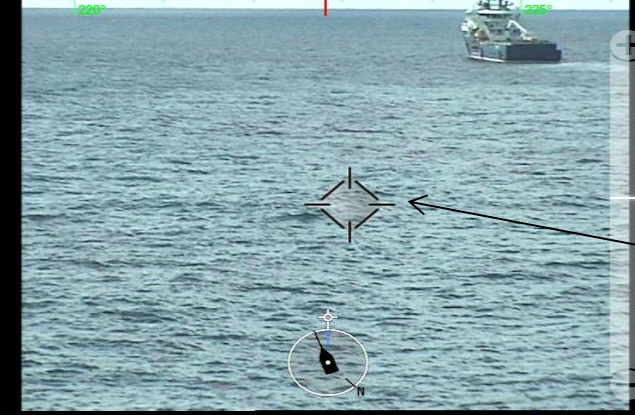
CENTER CURUS POSITION CURUS OPERATION SET POS RESET CURUS MARK SEARCH LIGHT BEAM

INFRARED



CAMERA INFRARED SHOW FOCUS FREEZE RECORD PICTURE IMAGE

DAYLIGHT



CAMERA DAYLIGHT SHOW AUTO FOCUS FREEZE RECORD PICTURE IMAGE

Within that sheen only portions are combatable and was left behind after the first round of applying dispersants

Large sheen visible with the human eye and with the radar OSD

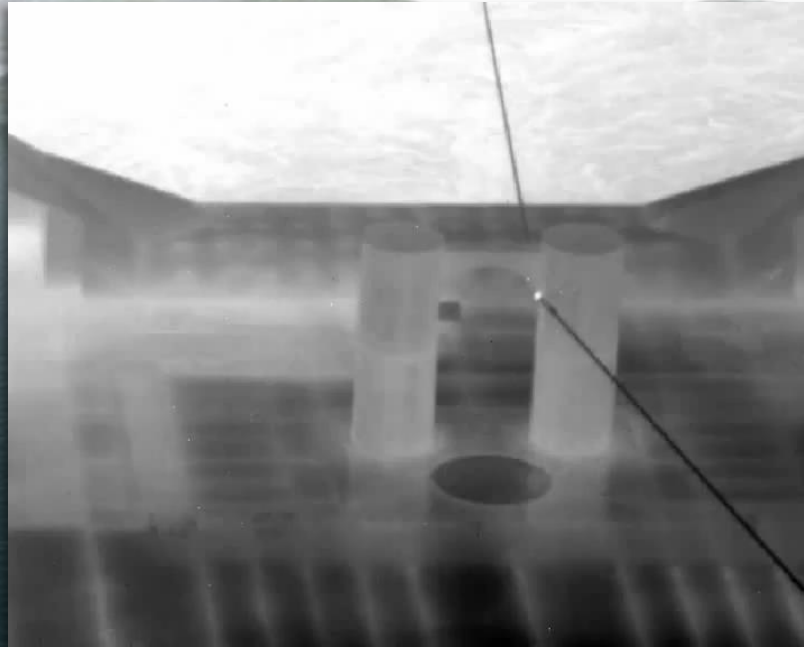
Fire Fighting



Towing



Monitoring tow lines



Ice Navigation



Alternative Sensor Options

Match Price and Specification



Note: SECurus is required for Georeferencing functionality



Integrated Field Monitoring

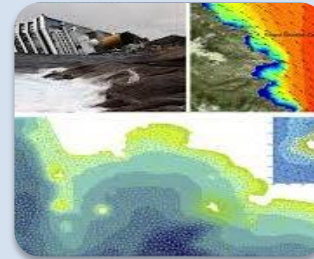
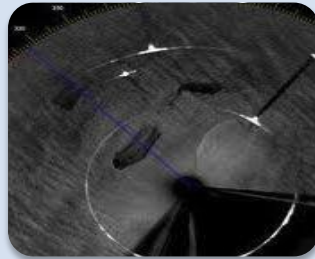
Services, systems, sensors

Improving safety, creating value and reducing cost



Integrated Field Monitoring

One system covering offshore surveillance and response



ICE management

- Ice detection and monitoring
 - Ice towing and deflection
- Ice map / ice charts
- Ice forecast
 - Safe navigation

Oil spill preparedness

- Clean to Operate
- Oil spill detection
 - Oil spill combating

Traffic and vessel management

- Vessel on collision course
- Logistics and vessel optimization
- Surveillance and security
- Anti-piracy

MetOcean

- Weather
 - Wind, currents, waves
- Safe approach and navigation

Search and Rescue

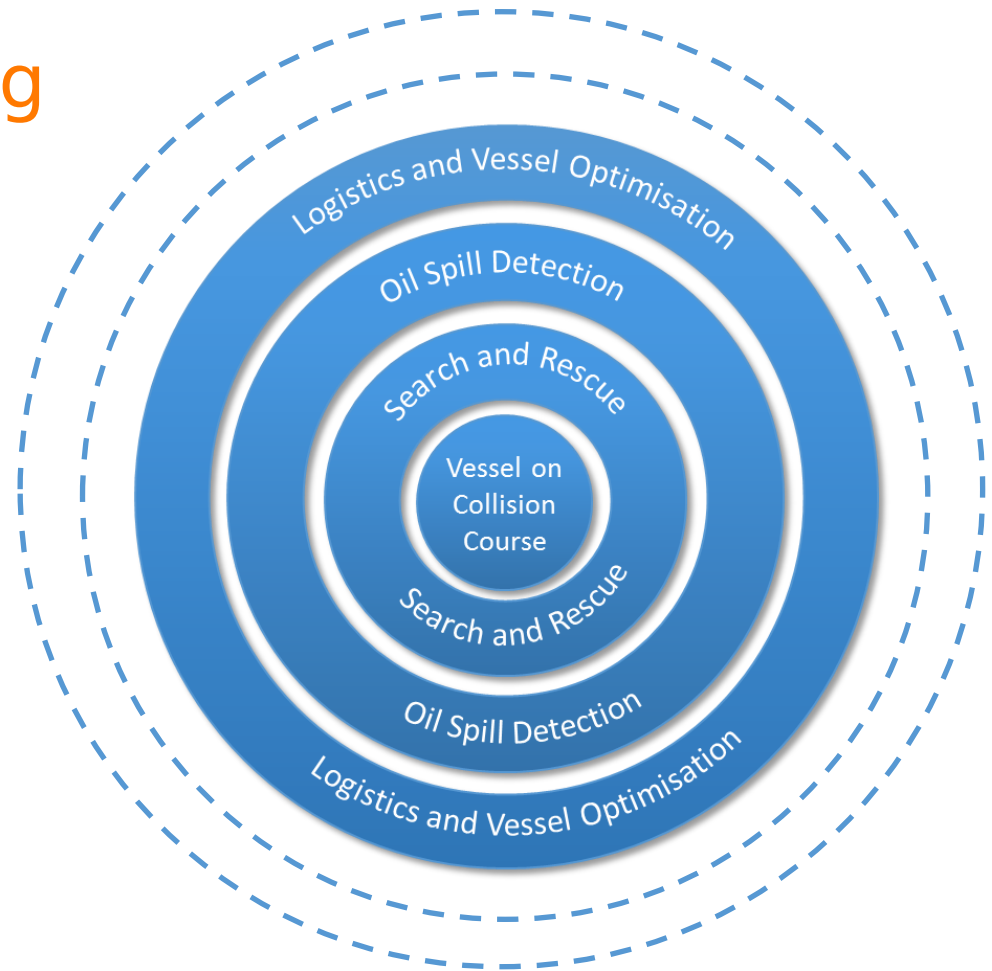
- Search and retrieval of people and assets



Aptomar Field Monitoring

Layered functionality

- Delivered as a turn key service.
- The service includes; 24/7 personnel, sensors, reporting, training and exercises.
- Turn key services reduces CAPEX and OPEX cost, letting E&P companies focus and invest in core business.
- Aptomar manages the personnel, competence and equipment, enhancing cost efficient and safe operations on behalf of the customer.
- Scalable and adaptable to provide monitoring and detection throughout full lifetime of E&P Field.



Sensor Fusion

Multiple sensor sources
Utilise existing sensors
One Common Operating Picture



24/7 Support to ERRV



Search and Rescue



Combating of unintended spills



Ice Management and forecasting

24/7 Monitoring from MCC



Monitor Clean To Operate



Detection of unintended spills



Vessels on collision course



APTOMAR Marine Control Center (MCC) (illustration)

Marine Control Centre

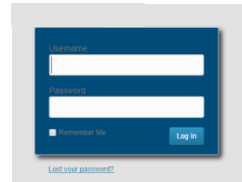
Delivering the service

- The service and 24/7 monitoring is managed by the Aptomar Marine Control Centre (MCC)
- The MCC manages the agreed services, communication plans, offshore and onshore procedures, training and exercises
- Direct communication with OIM, on-site ERRV and PSVs
- Will support 2nd line response if requested and agreed with Operator

Operational Setup

Customer Portal - All online

Secure login from any PC, tablet or phone browser

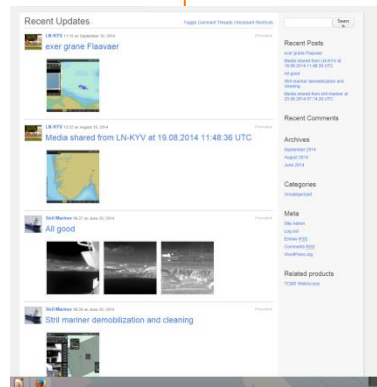


All sensors, work processes, training, monitoring and reporting is managed by Aptomar

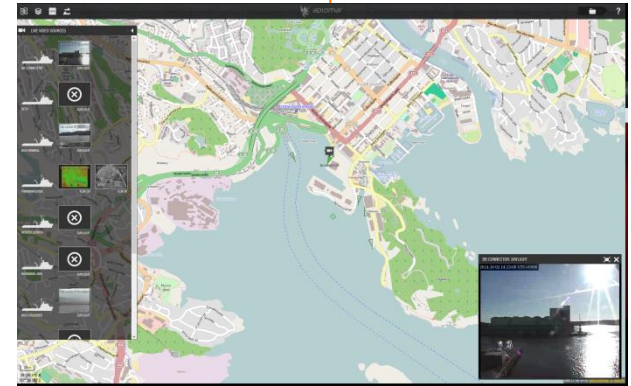
Interface to Operator is defined through the communication plan, describing who to contact, at which events

Operator can access live data, regular, and weekly reports, including written processes and manuals through the customised Customer Portal.

Weekly system status reports



Regular Clear To Operate reports



Live data from operation, during normal and ER operations



2nd line response - WebAccess
Connected only as required

Emergency Response Organisation

- Pollution response
- Emergency response

Onshore Operations Room

- Vessel Operations
- ROV Operations

Maritime Control Centre

- Daily Operations
- Vessel on Collision Course
- Vessel Reporting
- System monitoring

Thank you for your attention

Rupert Pearn

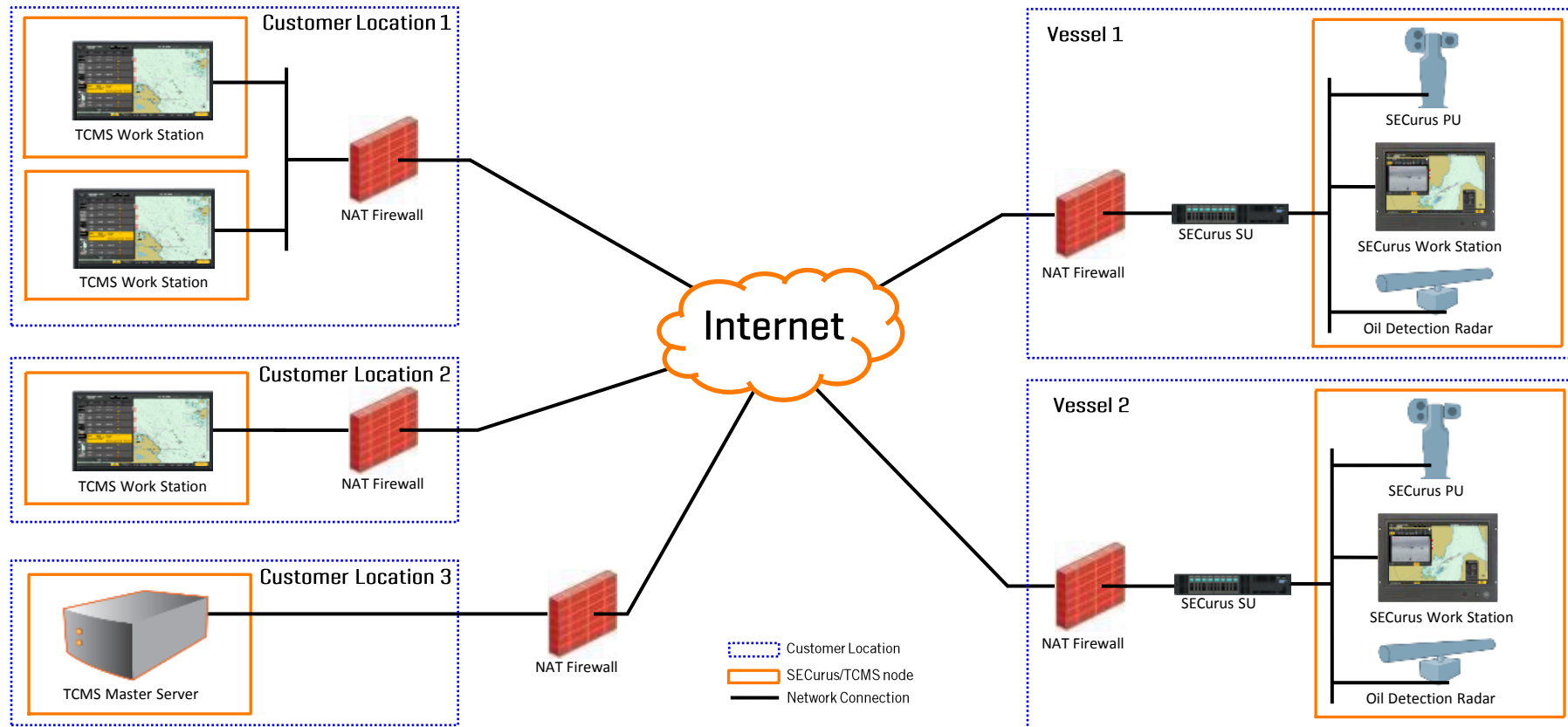
rupertpearn@aptomar.com +47 940 13 383



Support Slides



TCMS Architecture



TCMS Architecture

