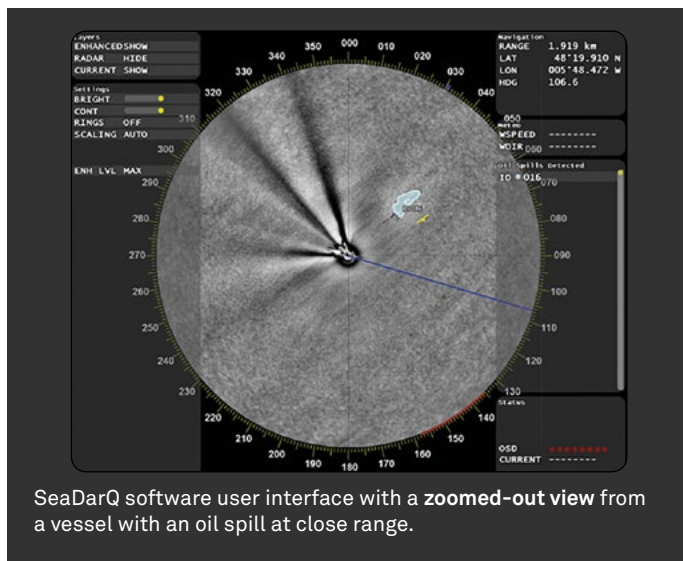


SeaDarQ radar

Nortek's SeaDarQ radar offers three applications: Oil spill detection, hydrography and the detection of small objects. The system monitors the sea surface within a range of several kilometres around the radar. Oil spills are detected automatically. Advanced algorithms identify even the smallest spills and reduce false alarms to a minimum. In the hydrographic mode the system measures surface currents in a selectable area at a fine resolution. Nortek's SeaDarQ radar is being used on oil platforms and FPSOs, at port entrances, on oil spill recovery vessels and platform supply vessels, as well as in scientific studies.

SeaDarQ Workboat

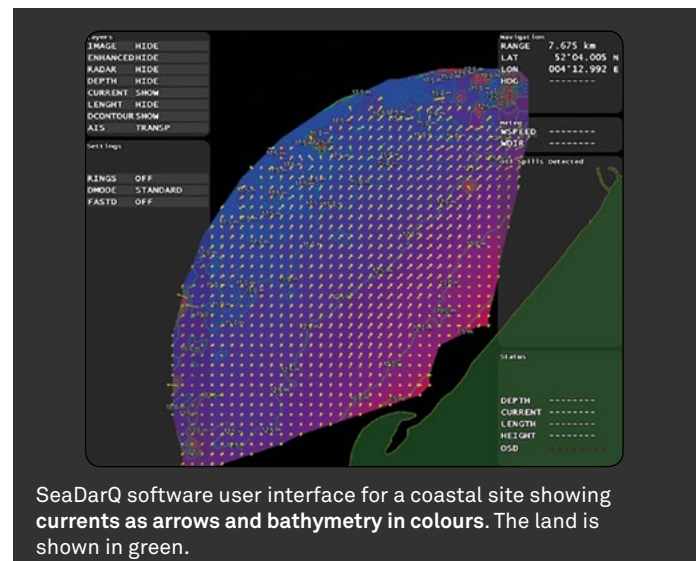
- the cost-efficient basic tool



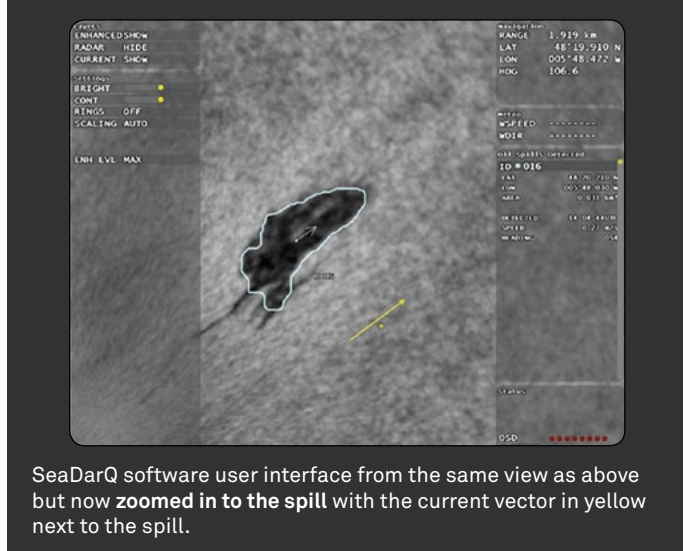
SeaDarQ software user interface with a zoomed-out view from a vessel with an oil spill at close range.

SeaDarQ Pro

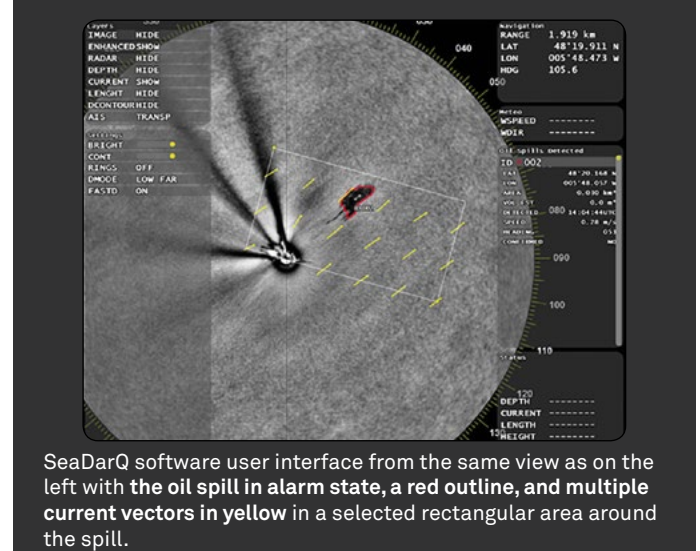
- the full-scale advanced option



SeaDarQ software user interface for a coastal site showing currents as arrows and bathymetry in colours. The land is shown in green.



SeaDarQ software user interface from the same view as above but now zoomed in to the spill with the current vector in yellow next to the spill.



SeaDarQ software user interface from the same view as on the left with the oil spill in alarm state, a red outline, and multiple current vectors in yellow in a selected rectangular area around the spill.

SeaDarQ Workboat applications:

- Oil spill detection
- Current vector
- Scientific data acquisition

SeaDarQ Pro applications:

- Oil spill detection
- Hydrography
- Detection of small objects
- IR camera
- SeaDarQ Online



Technical specifications

SeaDarQ radar

→ SeaDarQ Acquisition Unit	→ SeaDarQ Workboat and Pro
Video input	-10 to +10 V analog, selectable input source
Trigger input	0-18 V
Azimuth input	0-15 V / RS422 pulses, up to 4096 pulses/revolution*
North reset input	0-15 V / RS422 pulses, up to 4096 pulses/revolution*
Data communications	RS422*; baud rates: 4800, 9600, 38400 bps
NMEA interfaces for housing	GPS, Gyro, AIS, Meteo, Echo
Housing	19" rack mountable, height 2HE
Supported radar types	Sperry BridgeMaster E series Raytheon MK II Furuno FAR-2xx7 series Terma Scanter 2000 series GEM SU047 JRC selected Generic types
Power consumption	30 W
Dimensions	480x90x300 mm (19" rack mountable 2HE)
Weight	3.42 kg

→ SeaDarQ PRO Software License	
General	
Image presentation	Display of radar reflection intensity, zooming, panning, scrolling, overlay of geocode information, AIS, world coastline database. Software STC (Sensitive Time Control), adjustable gain control
Detection range	Depends on wind conditions.
Resolution	Better than 3.75 m (short pulse modes)
Operational wind speed	> 2 m/s (auto switch-off at low wind speeds when meteo sensor is connected)
Vessel movement compensation	Real time Recording of raw data Snapshot (GeoTIFF)
Other software features	Diagnostics (Sperry radar, PC)
Language	English and Chinese

→ SeaDarQ Pro Hydrography License	
Current speed	Range: ± 2 m/s; accuracy: ± 0.1 m/s
Resolution	0.1 m/s
Current direction: Accuracy	5-10°; measurements apply to upper water layer
Bathymetry	Resolution 0.1 m, accuracy 0.2 m Range 3-30 m (shallow water waves)
Conditions	Sufficient wave height of Hm0 > 0.5 m is required for this module to display currents properly.
Grid sizes	100x100 m up to 1000x1000 m

→ SeaDarQ Pro Oil Spill Detection License	
Spill animation	Up to 2 hours
Oil spill tracker	Display of area, speed, direction, time of first detection
Polygons	Polygon outline and area
Ship shadow detector	Detection of ships and shadows behind ships
Shadow detection	Detection of shadows behind land and fixed objects
Detection modes	Low false alarm rate / normal / high detection rate
Alarms	Audible / on screen

NORTEK B.V.
 Schipholweg 333A
 1171 PL Badhoevedorp
 The Netherlands
 Tel.: +31 (0)20 654 3600
 E-mail: info@nortek-bv.nl
 www.nortekgroup.com

→ SeaDarQ Workboat License Oil Spill Detection	
Image presentation	Display of radar reflection intensity, zooming, panning, scrolling, world coastline database, software STC (Sensitive Time Control) AUTO, adjustable gain control, shadow detector.
Detection range	Depends on wind conditions
Resolution	Better than 3.75 m (short pulse modes)
Operational wind speed	> 2 m/s
Vessel movement compensation	Real time
Other software features	Diagnostics (Sperry radar, PC)
Language	English or Chinese
Oil spill tracker	Display of Area, Speed, Direction
Polygons	Polygon outline and area
Ship shadow detector	Detection of ships and shadows behind ships
Detection modes	normal
Current speed	range ± 2 m/s; accuracy ± 0.1 m/s
Resolution	0.1 m/s
Conditions	Sufficient wave height of Hm0 > 0.5 m is required
Number of current vectors	1 (one)

→ Processing Unit	→ SeaDarQ Workboat	→ SeaDarQ Pro
Motherboard:	IMB-185 Mini-ITX Board	SuperMicro X10DAi Board
• Processor:	Intel i7-4770	Intel Xeon E5-2620
• Memory:	8 GB	16 GB
Hard disk	240 GB SSD	120 GB SSD + 4TB HDD
Operating system	Windows™ 10 UK Pro-64 bit	Windows™ 10 UK Pro – 64 bit
Housing	19" rack mountable 1HE	19" rack mountable 4HE
Power consumption	250 W max	665 W max
Dimensions	480x45x300 mm	480x180x300 mm
Weight	4.12 kg	18.78 kg
Operator control	Keyboard and mouse	Keyboard and mouse

→ Sensors and Accesories		
Radar	-	Sperry BridgeMaster E series with 8 ft VV antenna, 48 rpm
IR camera / gyro stabilized	-	FLIR M618CS with IR & daylight. Requires extra software license
IR camera / non-stabilized	-	FLIR M625L with IR and low light. Requires extra software license
SeaDarQ camera interface and acquisition unit	-	Nortek SeaDarQ interface for IR + optical. Requires extra software license
Meteo sensor	-	Vaisala WXT530 with wind speed and direction
dGPS + gyro	-	Hemisphere Vector GPS V103 with position, heading, pitch and roll.
19" rack	-	Schroff Novastar Series
Computer monitor	-	LCM-190G-AL-RM-MK-10N

→ Connections		
SeaDarQ Online	-	See separate brochure
Aptomar	-	Connect to the Aptomar TCMS