

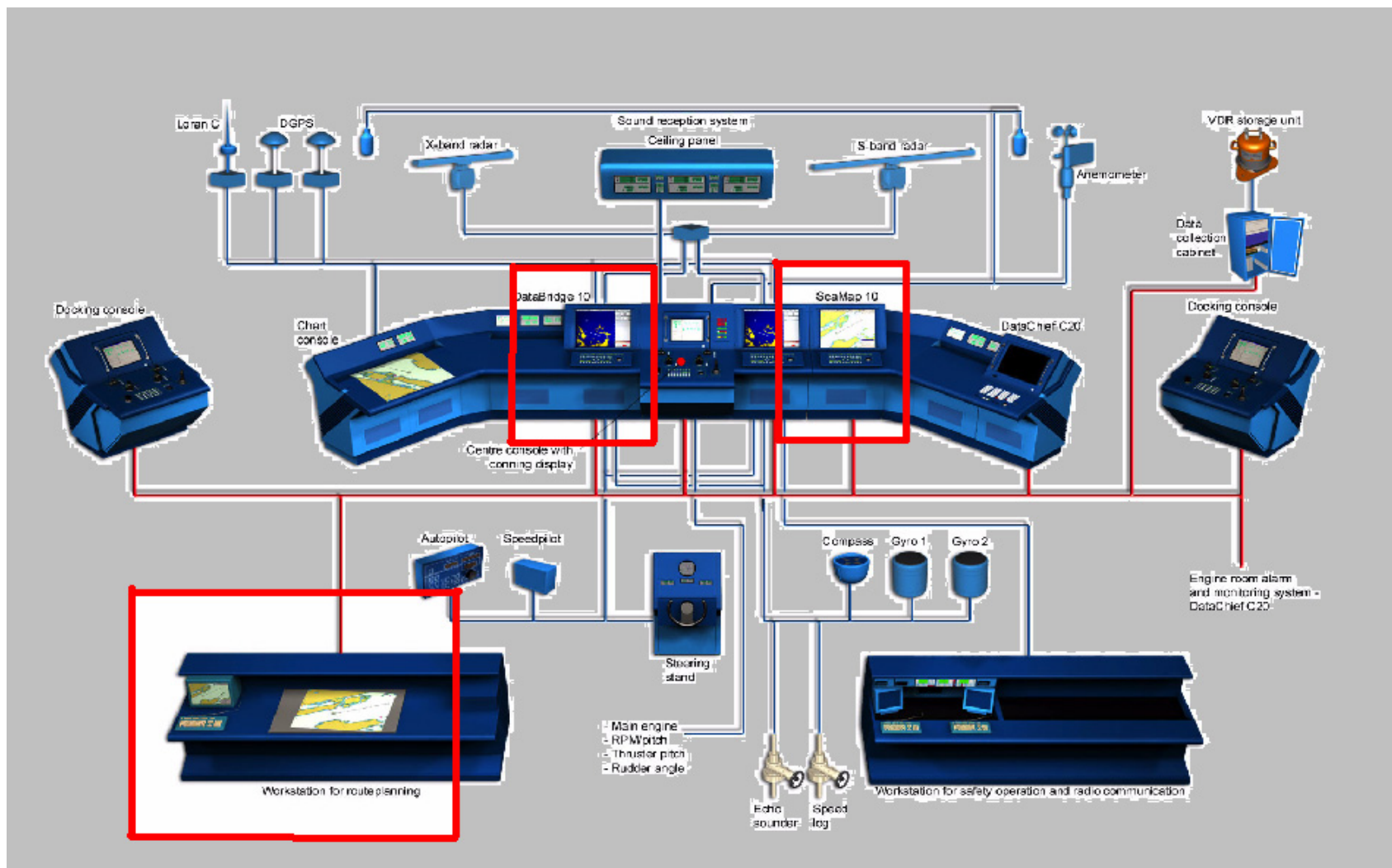


- Foredrag på Maritim Innovasjon 2007
 - 28. november 2007
 - DnV, Høvik
 - Morten Zachrisen
- Utvikling, DP & Navigasjon
 - Kongsberg Maritime

eFarled Implementation on Onboard Systems: ECDIS, Radar, Planning Station



KONGSBERG





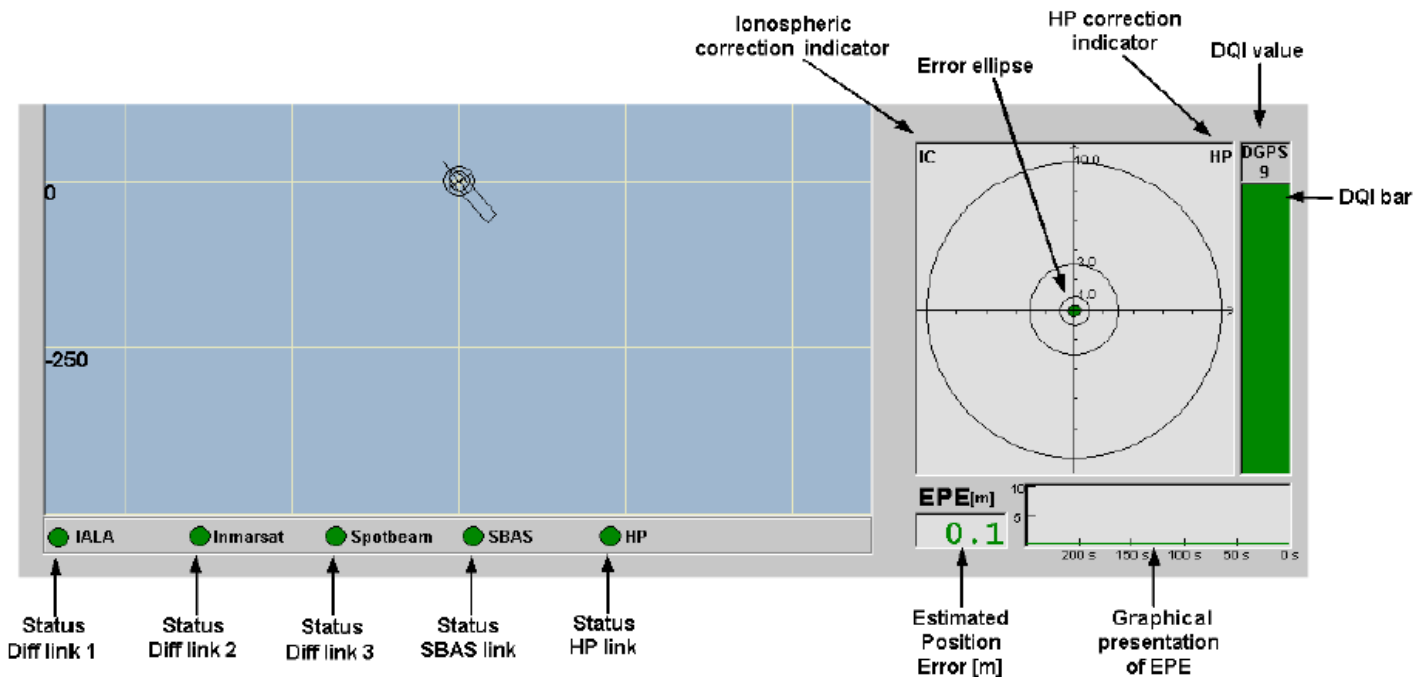
Next Generation ECDIS

- ECDIS = Electronic Chart Display and **Information System**
- Improved position integrity (from Kongsberg Seatex)
- Extended AIS support (from Norcontrol IT/Seatex)
- Using extended functionality in C-Map SDK 4
- New VTS provided services (from Norcontrol IT)
- New Weather services (from met.no/CMR)
- Other services based on WMS (Web Map Services)
- New Search and Rescue Patterns
- New Navtex database support

eFarled –Kongsberg Seatex

Goal:

- Establish a concept, methodology and prototype system for secure maritime position determination based on future satellite navigation infrastructure.





Extended AIS support

- Class B targets (small vessels)
- Weather buoy information
- Radar targets (from VTS)



Extended functionality from C-Map SDK4

- Tide tables
- Tidal stream data
- Daylight information
- C-Routes automatic route generation
- Weather forecast data
 - Weather data overlay
 - Weather time series
 - Weather overlaid on route plan
- Synchronization of databases and updates on bridge network
- Dynamic licensing



KONGSBERG

World-wide tide tables

Untitled - ECDIS

DR 55°29.664'N 008°03.049'E NO OFS 037.8° CMG 15.7 kn SMG 1:50 000 VEC NOM SCL BET CHA Browse TGT VID ! Depth= m Board < >

Chart Route AIS/Radar OwnShip
Note Tools System Options

CHCL Tides Database: Professional+
HORTEN
Pos.: 59°26.000'N 010°29.000'E Go To
Timezone: UTC + 01:00 SemiDiurnal
Time: Local Time At Object
Graph Table
◀ ▶ Set Current Time

Time: 10 07 12:51 Water Level: 0.50m
No Input From Position Sensor
WARN ALARM

The main display shows a map of a coastal area with various navigational markers, including depth soundings (e.g., 185 deg, 188 deg), and a route (red dashed line) with waypoints W28 and W29. A pink dashed line indicates a depth contour.



Automatic construction of routes (C-Routes)

The screenshot shows the ECDIS interface with a map of the North Sea. A red line represents a route from Aberdeen (marked with a target icon) to Stavanger. The top status bar displays: DR, 57°09.329'N 002°01.900'W, NO OFS, 037.8° CMG, 15.7 kn SMG, 1:3 000 000, VEC, NOM SCL, BET CHA, Browse, TGT, VID, Depth= m, Board, Chart, Route, AIS/Radar, OwnShip, Note, Tools, System, Options.

The 'Waypoint List' window shows the following data:

W	Name	Lat	Lon	Leg	Spd...	ETD/Wait	Radius	Offtra...	Max...	Message
7		58°57.284'N	005°20.671'E	RHL	14.0	00:00	0.25NM	300m	0.0	
8		58°59.558'N	005°26.602'E	RHL	14.0	00:00	0.25NM	400m	0.0	
9		59°00.497'N	005°29.086'E	RHL	14.0	00:00	0.25NM	400m	0.0	
10		59°01.719'N	005°32.322'E	RHL	14.0	00:00	0.25NM	110m	0.0	
11		59°02.196'N	005°32.654'E	RHL	14.0	00:00	0.25NM	100m	0.0	
12		59°02.687'N	005°32.994'E	RHL	14.0	00:00	0.25NM	130m	0.0	
13		59°02.825'N	005°34.936'E	RHL	14.0	00:00	0.25NM	130m	0.0	
14		59°02.181'N	005°36.684'E	RHL	14.0	00:00	0.25NM	250m	0.0	
15		59°00.920'N	005°40.102'E	RHL	14.0	00:00	0.25NM	35m	0.0	
16		58°59.196'N	005°42.546'E	RHL	14.0	00:00	0.25NM	35m	0.0	
17		58°58.903'N	005°43.167'E	RHL	14.0	00:00	0.25NM	35m	0.0	
18		58°58.509'N	005°43.697'E	GC	14.0	331836:00	0.25NM	0m	0.0	

The 'CMCL C-Routes' window shows a list of ports: ABERDEEN (United Kin...) and STAVANGER (Norway). The 'Calculate Route' section has 'Minimum Depth' set to 5.0m and 'Calculate' button.



Route editing and validation

The screenshot displays the ECDIS software interface. At the top, the status bar shows: DR, 57°09.329'N 002°01.900'W, NO OFS, 037.8° CMG, 15.7 kn SMG, 1:7 500, VEC, NOM SCL, Browse, TGT, and VID. The main map area shows a route plan with waypoints W1, W2, W3, and W4. A validation dialog box is open on the right side of the screen.

Route Validation Dialog Box:

- Route Name: Aberdeen-Stavanger
- Safety Contour: 6m
- Validation Period: 20071110
- Options: Validate (unattended), Validate and View, Validate Manually, View
- Route Type: Full Route
- Table:

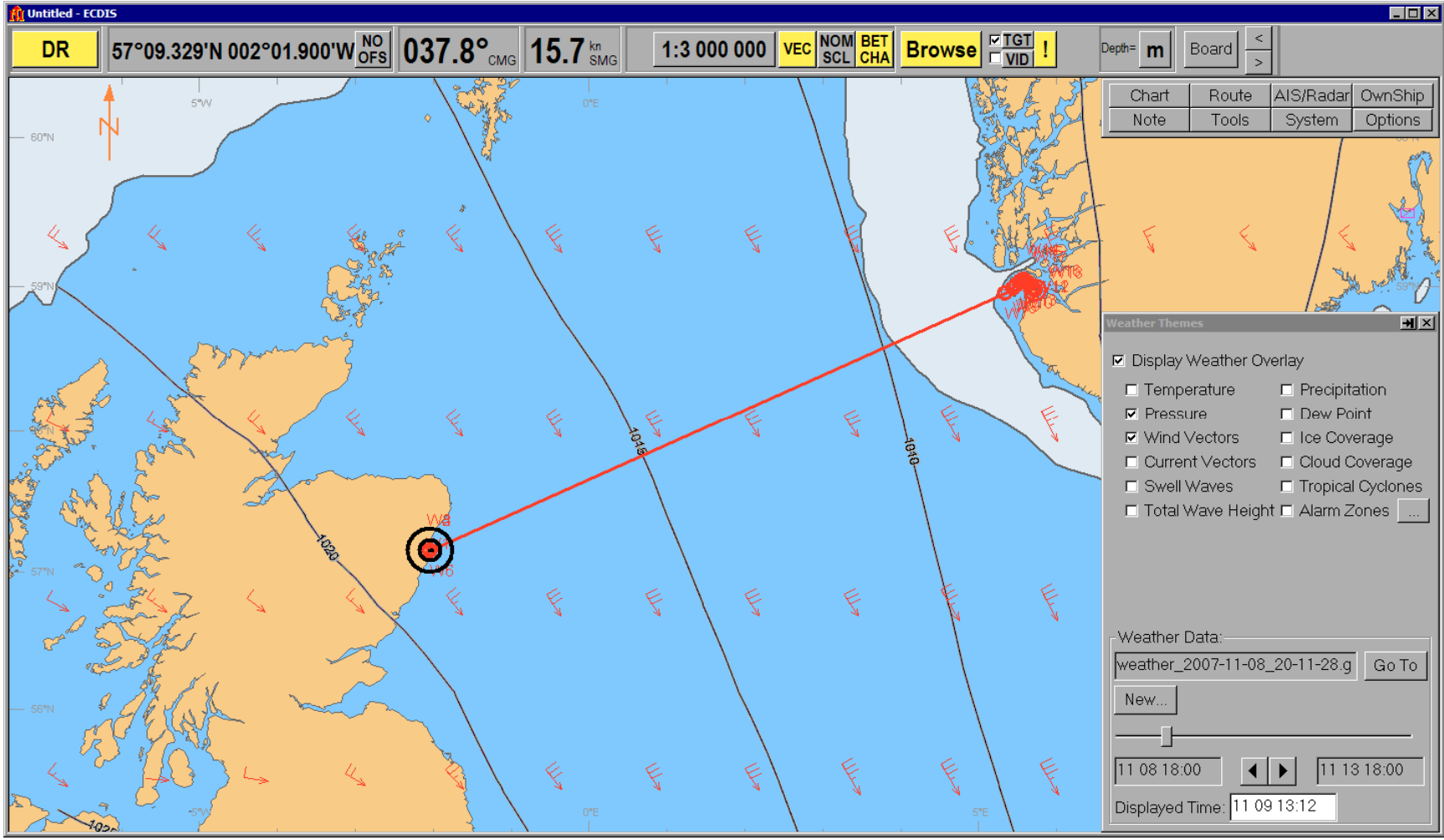
WP:	G.	W.	Chart:
Leq1	0	4	CP: Z15AN24A (Not ENC)
Leq2	0	6	CP: Z15AN24A (Not ENC)
Leq3	0	3	CP: Z15AN24A (Not ENC)
Turn3	0	6	CP: Z15AN24A (Not ENC)

Below the table, there are dropdown menus for Groundings (Caution area) and Warnings (Caution area). The Object class is set to Caution area, and the Information is MOBILE RORO TERMINAL. The dialog also includes buttons for Start, Start On, Cancel, Previous, Next, and Save. A status bar at the bottom of the dialog shows "No Input From Position Sensor" and "WARN" and "ALARM" buttons.



KONGSBERG

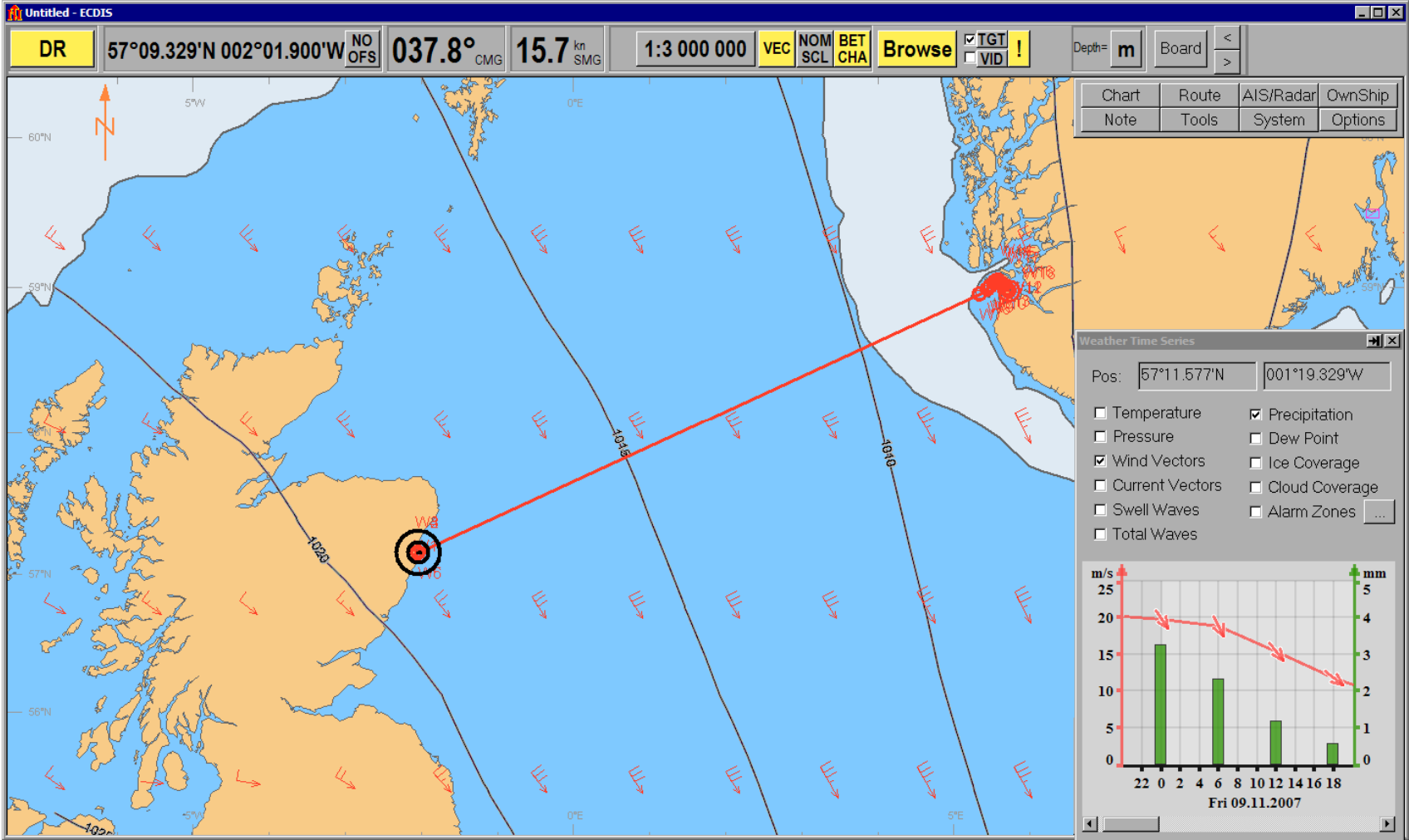
Weather prediction overlay on chart





KONGSBERG

Weather time series at Aberdeen





Route simulation with weather alarm - 1

DR 57°09.285'N 002°01.853'W NO OFS 037.8° CMG 15.7 kn SMG 1:3 000 000 VEC NOM SCL BET CHA Browse TGT VID ! Depth= m Board < >

Chart Route AIS/Radar OwnShip
Note Tools System Options

Weather Alarm Zone Definition
Wind Speed > 22.0kn
OR
Total Wave Height > 5.0m

Weather Along Route
Route: Aberdeen-Stavanger

- Temperature
- Precipitation
- Pressure
- Dew Point
- Wind Vectors
- Ice Coverage
- Current Vectors
- Cloud Coverage
- Swell Waves
- Alarm Zones ...
- Total Waves

Waypoint List
Route Name: Aberdeen-Stavanger Close Save Route not validated.

W	Name	Lat	Lon	Leg	Spd...	ETD/Wait	Radius	Offtra...	Max...	Message
1		57°08.727'N	002°05.291'W	RHL	14.0	071110 14.00	0.95NM	16m	0.0	
2		57°08.582'N	002°04.628'W	RHL	14.0	00.00	0.33NM	16m	0.0	
3		57°08.486'N	002°04.424'W	RHL	14.0	00.00	0.14NM	16m	0.0	
4		57°08.471'N	002°04.246'W	RHL	14.0	00.00	0.14NM	18m	0.0	
5		57°09.247'N	002°02.160'W	RHL	14.0	00.00	0.95NM	140m	0.0	
6		57°09.338'N	002°01.886'W	RHL	14.0	00.00	0.95NM	14m	0.0	
7		58°57.284'N	005°20.671'E	RHL	14.0	00.00	0.25NM	300m	0.0	
8		58°59.558'N	005°26.602'E	RHL	14.0	00.00	0.25NM	400m	0.0	
9		59°00.497'N	005°29.086'E	RHL	14.0	00.00	0.25NM	400m	0.0	
10		59°01.719'N	005°32.322'E	RHL	14.0	00.00	0.25NM	110m	0.0	
11		59°02.196'N	005°32.654'E	RHL	14.0	00.00	0.25NM	100m	0.0	
12		59°02.687'N	005°32.994'E	RHL	14.0	00.00	0.25NM	130m	0.0	
13		59°03.825'N	005°34.036'E	DPT	14.0	00.00	0.35NM	130m	0.0	

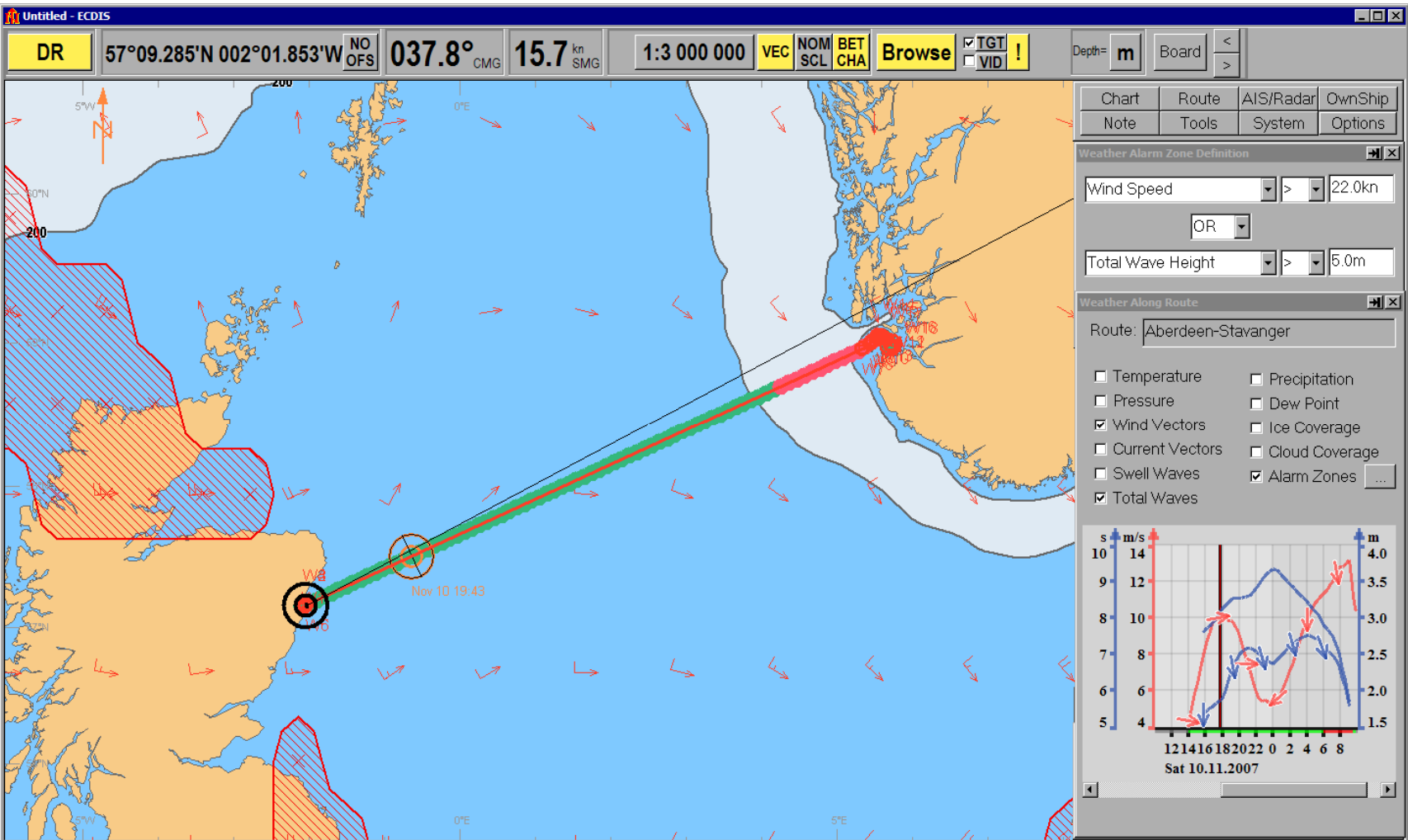
Select All Mark Insert Delete Copy Paste Reverse Undo GoTo Validate Critical Points

Datum: WGS-84 Local Offset from WGS-84 E: Layout: Entry Validation Full

s m/s 10 14
9 12
8 10
7 8
6 6
5 4
1416182022 0 2 4 6 8 10
Sat 10.11.2007

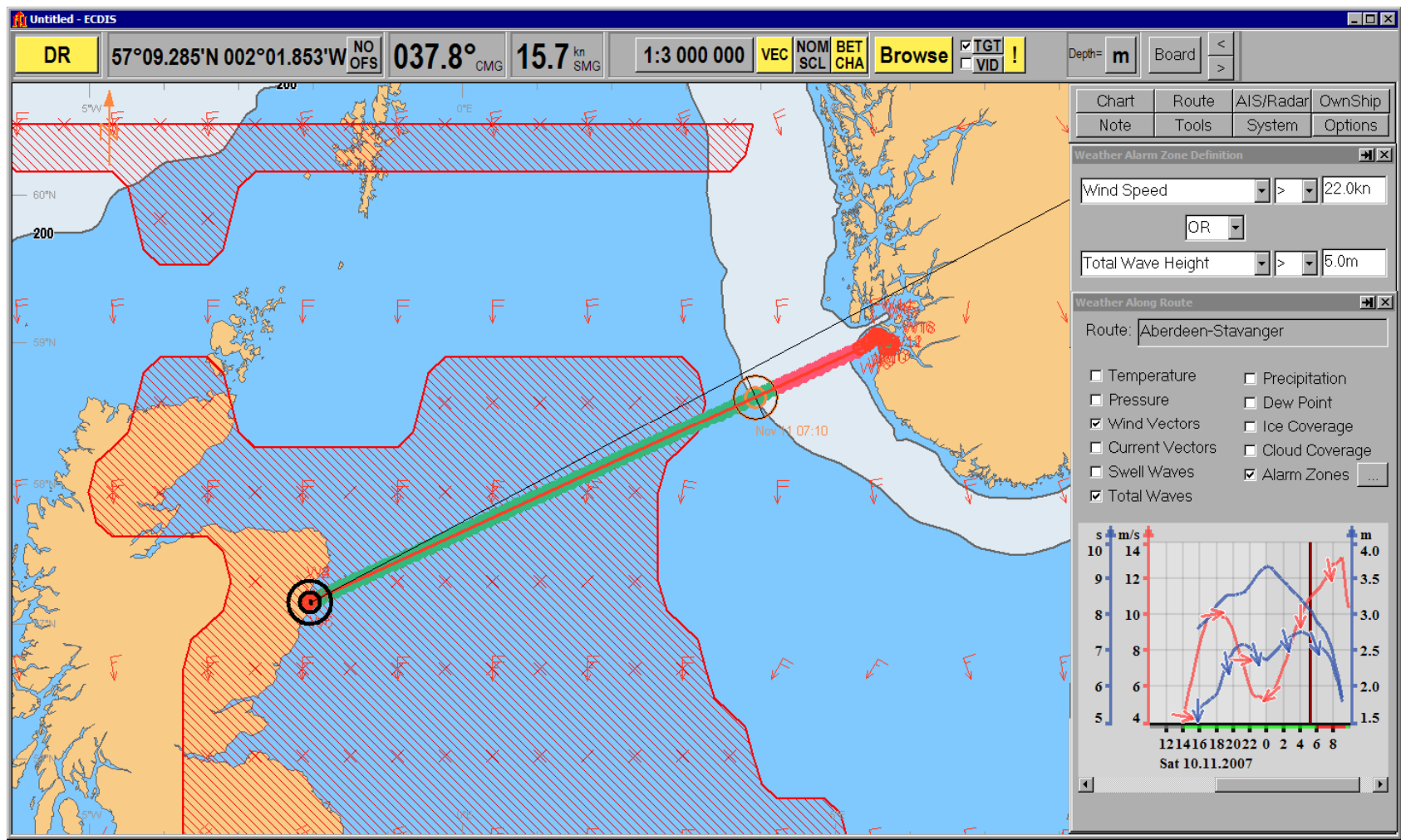


Route simulation with weather alarm - 2



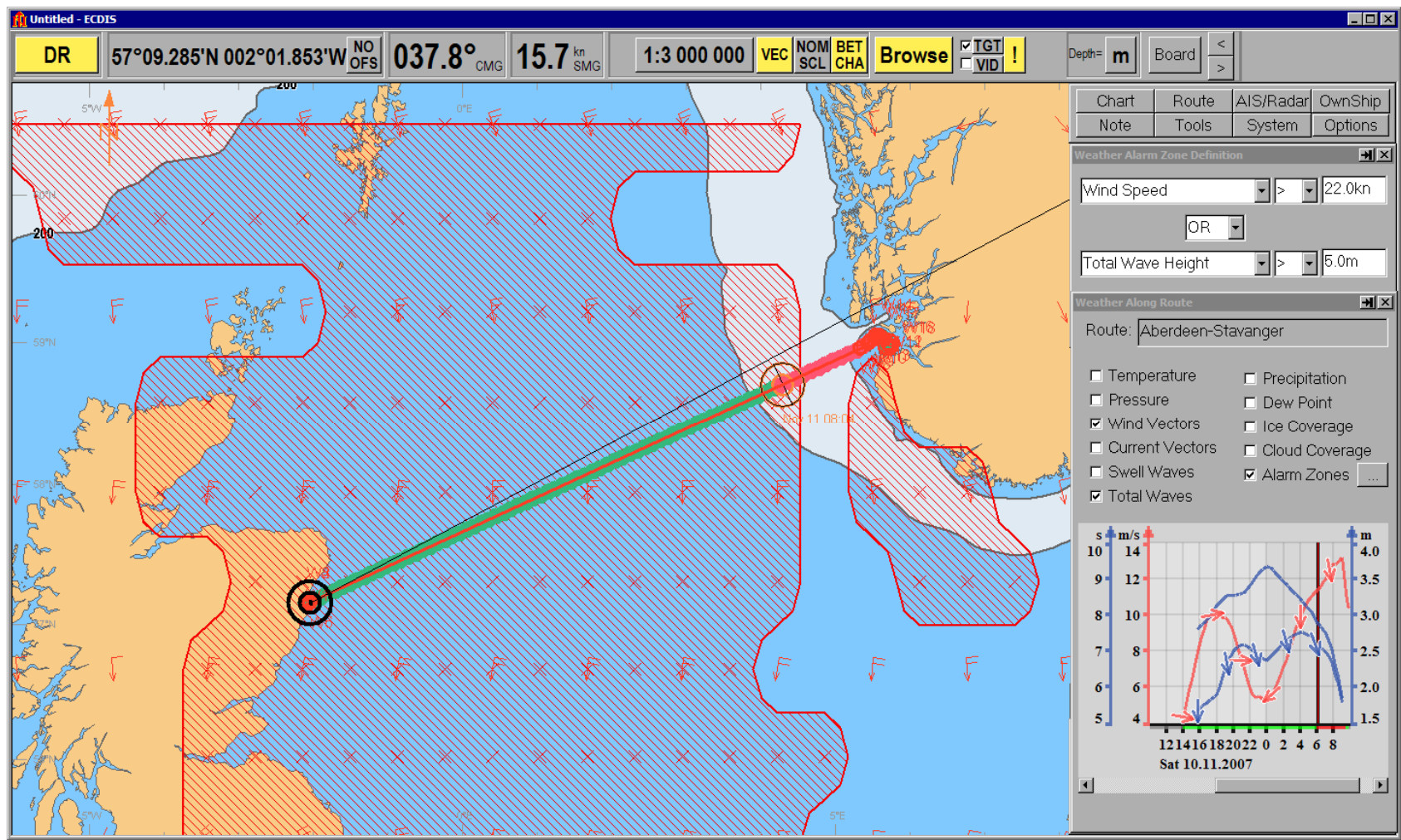


Route simulation with weather alarm - 3





Route simulation with weather alarm - 4





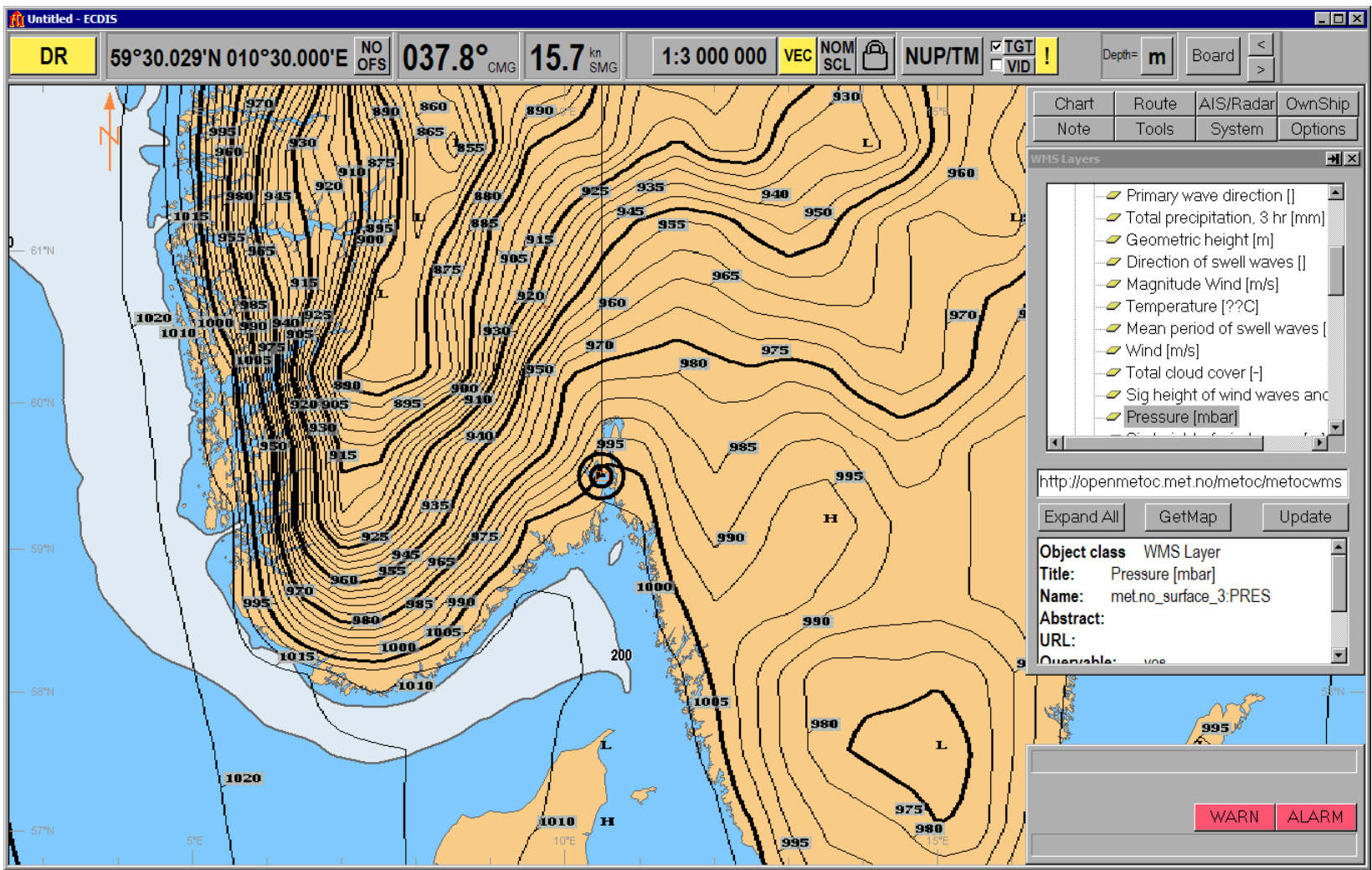
WMS-based services

- ECDIS as WMS-Client:
 - ECDIS/Planning overlay should be able to generate requests and display WMS pictures from WWW or local servers (sonars...)

- ECDIS as WMS-Server:
 - ECDIS/Planning should be able to provide chart image (or site map...) to local clients (sonars, DP, passenger information system...)



WMS Weather Display - Pressure





KONGSBERG

WMS Weather Display - Wind

Untitled - ECDIS

DR 59°30.029'N 010°30.000'E NO OFS 037.8° CMG 15.7 kn SMG 1:3 000 000 VEC NOM SCL NUP/TM TGT VID ! Depth= m Board

Chart Route AIS/Radar OwnShip
Note Tools System Options

WMS Layers

- Total precipitation, 3 hr [mm]
- Pressure reduced to MSL [m]
- met.no_surface
 - Primary wave direction []
 - Total precipitation, 3 hr [mm]
 - Geometric height [m]
 - Direction of swell waves []
 - Magnitude Wind [m/s]
 - Temperature [??C]
 - Mean period of swell waves [
 - Wind [m/s]

<http://openmetoc.met.no/metoc/metocwms>

Expand All GetMap Update

Object class WMS Layer
Title: Wind [m/s]
Name: met.no_surface_3:GRD
Abstract: (UGRD VGRD)
URL:
Queryable: yes

No Input From Position Sensor

WARN ALARM



WMS Weather Display – Object Information

The screenshot shows the ECDIS interface with the following data in the top status bar:

- DR
- 59°30.029'N 010°30.000'E
- NO OFS
- 037.8° CMG
- 15.7 km SMG
- 1:3 000 000
- VEC
- NOM SCL
- NUP/TM
- TGT VID (checked)
- Depth: m
- Board

The main display area shows a map with a grid of pink wind vectors. A target symbol is centered on the map. The right-hand panel contains the following information:

Object Info

Object Information

- WMS layer feature
- Land area
- CMCL Non-ENC dataset

Object class WMS layer feature

time 2007-11-26T14:05:17.005

Wind_dir_from 334 deg

Wind_mag 7.7 m/s

Actual Pos. 59°31.122'N 010°27.408'E

No Input From Position Sensor

WARN ALARM



Port VTM WMS– Information services

Information services

- Need for distribution of information from the port to arriving ships
 - local weather condition in the port
 - wind
 - wave height
 - current
 - depth at the berth (3 D visualization of the floor)
 - berth plan
 - approach route (proposed sailing-route)
 - non-AIS targets, where the targets equipped with AIS transponder are removed from the snapshot
 - status of lights and buoys in the fairway
 - search & rescue areas
 - temporary restricted areas



Port VTM WMS– WMS/AIS

Method(s) for distributing information to the ships

- The intention is to extract/convert port information to a WMS server at the VTS center for the ships to “download”.
- The information will be structured in layers such that the client (user) can ask the server for the information content, thereafter retrieve the specific information the client is looking for.
- Primarily this method has been used for distributing “static” information
- For “dynamic” information the Pseudo-AIS message will be used to send non-AIS tracks from shore to ships.



Port VTM WMS - Capabilities

Port VTM WMS

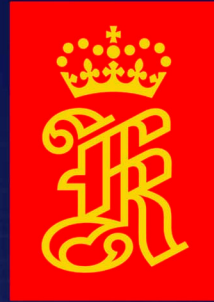
Address

- Oslo Harbour
 - Port Weather Condition
 - Port Facilities
 - Port Approach Route
 - Status on Light and Buoys
 - Temporary AoIs
 - VTS Radar video
 -



Remaining challenges

- How to make the user interface intuitive and self explaining
- How to fully utilize the WMS technology as an onboard infrastructure
- ...



KONGSBERG

WORLD CLASS – through people, technology and dedication