ACCIDENT REPORT

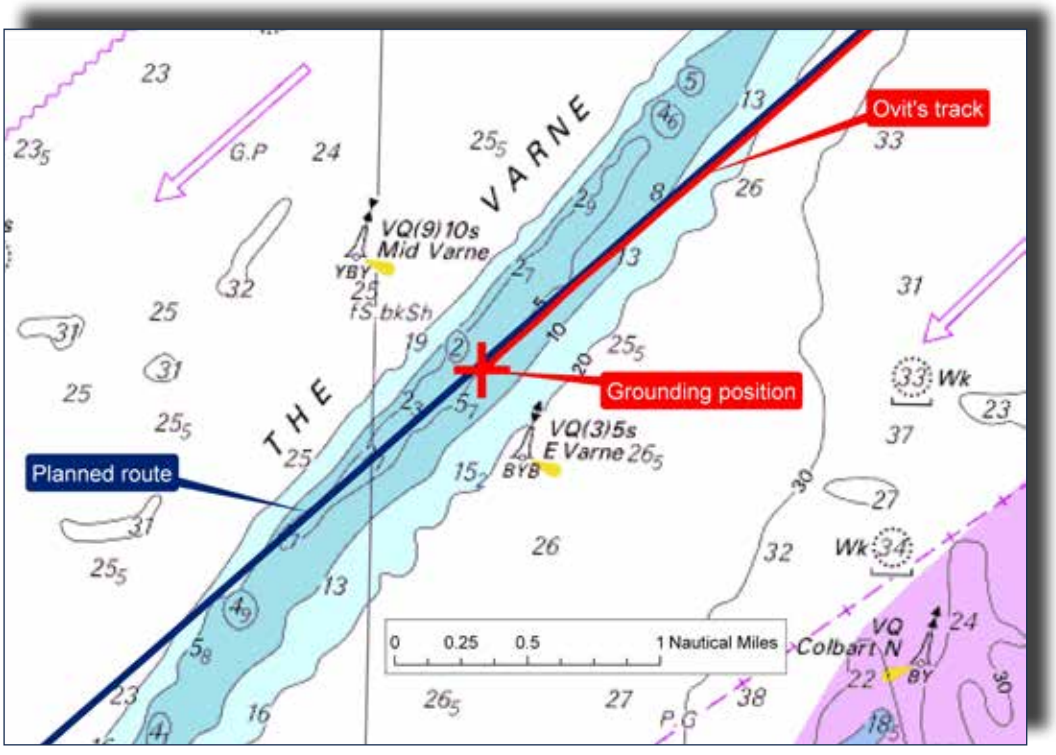
Report on the investigation of

the grounding of

Ovit

in the Dover Strait

on 18 September 2013



MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

LESS SERIOUS MARINE CASUALTY REPORT NO 24/2014 SEPTEMBER 2014

Extract from

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

Regulations 2012 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 14(14) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

ABS	American Bureau of Shipping
AIS	Automatic Identification System
ARPA	Automatic Radar Plotting Aid
BNWAS	Bridge Navigation Watch Alarm System
BRM	Bridge resource management
BV	Bureau Veritas
CNIS	Channel Navigation Information Service
CoC	Certificate of Competency
COG	Course over the ground
DNV	Det Norske Veritas
DP	Designated Person
DSC	Digital Selective Calling
ECDIS	Electronic Chart Display and Information System
ENC	Electronic navigational chart
GPS	Global Positioning System
ICS	International Chamber of Shipping
IEC	International Electrotechnical Commission
IHO	International Hydrographic Organization
IMO	International Maritime Organization
ISM Code	International Safety Management Code
kts	measurement of speed: 1 knot = 1 nautical mile per hour
m	metre
Maris	Marine Information Systems AS
MCA	Maritime and Coastguard Agency
MGN	Marine Guidance Note
MSN	Merchant Shipping Notice

nm	nautical miles
OCIMF	Oil Companies' International Marine Forum
OOW	Officer of the watch
PSC	Port State Control
SAR	Search and Rescue
SENC	System electronic navigational chart
SIRE	Ship Inspection Report Programme
SMC	Safety Management Certificate
SMS	Safety Management System
SOLAS	International Convention for the Safety of Life at Sea 1974, as amended
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended (STCW Convention)
TSS	Traffic Separation Scheme
UMS	Unmanned Machinery Space
UTC	Universal Co-ordinated Time
VDR	Voyage data recorder
VHF	Very High Frequency (radio)
VTS	Vessel Traffic Service
XTD	Cross Track Distance

Times: All times used in this report are UTC

CHIEF INSPECTOR'S FOREWORD

This is the third grounding investigated by the MAIB where watchkeepers' failure to use an electronic chart display and information system (ECDIS) properly has been identified as one of the causal factors. As this report is published, there are over 30 manufacturers of ECDIS equipment, each with their own designs of user interface, and little evidence that a common approach is developing. Generic ECDIS training is mandated by the International Maritime Organization (IMO), but it is left to Flag States and owners to decide whether or not type-specific training is necessary and, if so, how it should be delivered. As experience of ECDIS systems improves, evidence indicates that many owners are concluding that type-specific training is essential, though some are resorting to computer-based training once the watchkeeper is on board. In this accident, however, despite dedicated training ashore on the system they were to use, the operators' knowledge of the ECDIS and ability to navigate their vessel safely using the system were wholly inadequate.

Unfortunately, the current generation of ECDIS systems, though certified as complying with regulatory requirements, can be operated at a very low level of functionality and with key safety features disabled or circumvented. Training and company culture may mitigate these shortcomings to some extent, but can only go so far. While systems allow individuals to operate them in a sub-standard manner, there are those who will do so: such is human nature. For all shipping companies navigation is a safety-critical function and failure to navigate effectively can and does result every year in pollution, loss of vessels, and loss of life. It is to be hoped, therefore, that the next generation of ECDIS will embody features making them less vulnerable to the vagaries of human performance to achieve a better level of assurance that safe navigation is being consistently achieved.

Steve Clinch
Chief Inspector of Marine Accidents

SYNOPSIS

At 0434 on 18 September 2013, the Malta registered chemical tanker, *Ovit*, ran aground on the Varne Bank in the Dover Strait while on passage from Rotterdam, Netherlands, to Brindisi, Italy. The vessel, which was carrying a cargo of vegetable oil, remained aground for just under 3 hours; there were no injuries and damage to the vessel was superficial. There was no pollution. *Ovit* refloated on the rising tide and subsequently berthed in Dover.

Ovit's primary means of navigation was an electronic chart display and information system (ECDIS). The officer of the watch was following a route shown on the ECDIS display; the route passed directly over the Varne Bank.

The investigation established that:

- The passage was planned by an inexperienced and unsupervised junior officer. The plan was not checked by the master before departure or by the officer of the watch at the start of his watch.

- The ship's position was monitored solely against the intended track shown on the ECDIS. Navigational marks on the Varne bank were seen but not acted upon.

- The scale of the chart shown on the ECDIS was inappropriate. The operator-defined settings applied to the system were unsuitable and the system's audible alarm did not work.

- The officer of the watch's situational awareness was so poor that it took him 19 minutes to realise that *Ovit* had grounded.

- Although training in the use of the ECDIS fitted to the vessel had been provided, the master and deck officers were unable to use the system effectively.

- A Channel Navigation Information Service (CNIS) procedure, which should have alerted *Ovit*'s officer of the watch as the tanker approached the Varne Bank, was not followed because the procedure had not been formalised and an unqualified and unsupervised CNIS operator was distracted.

Recommendations have been made to the Maritime and Coastguard Agency, Transport Malta, The International Chamber of Shipping, the Oil Companies International Marine Forum and Ayder Tankers Ltd aimed at improving the standard of navigational inspections of vessels using ECDIS as the primary means of navigation. A further recommendation to the Maritime and Coastguard Agency is intended to ensure that the Channel Navigation Information Service is manned appropriately. A recommendation has also been made to Marine Information Systems AS intended to improve the functionality of its ECDIS 900.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *OVIT* AND ACCIDENT

SHIP PARTICULARS	
Vessel's name	*Ovit*
Flag	Malta
Classification society	American Bureau of Shipping
IMO number	9466611
Type	Oil/chemical tanker
Year of build	2011
Registered owner	Ovit Shipping Limited
Manager(s)	Ayder Tankers Limited
Construction	Steel
Length overall	117m
Gross tonnage	6,444
Minimum safe manning	14
Authorised cargo	Oil/chemicals
VOYAGE PARTICULARS	
Port of departure	Rotterdam, Netherlands
Port of arrival	Brindisi, Italy
Cargo information	9,500 tonnes of vegetable oil
MARINE CASUALTY INFORMATION	
Date and time	0434 UTC on 18 September 2013
Type of marine casualty or incident	Less Serious Marine Casualty
Location of incident	Varne Bank, Dover Strait
Injuries/fatalities	None
Damage/environmental impact	Hull coating loss. No pollution
Ship operation	In passage
Voyage segment	Mid-water
External environment	Wind: South-west force 3-4. Sea state: moderate. Visibility: good
Persons on board	14

Ovit

1.2 NARRATIVE

1.2.1 The grounding

During the early morning of 18 September 2013, the Malta registered tanker *Ovit* was transiting the Dover Strait. The vessel was on passage from Rotterdam, Netherlands, to Brindisi, Italy carrying a cargo of vegetable oil. The intended route through the Dover Strait **(Figures 1** and **2)** was prepared using the ship's electronic chart display and information system (ECDIS).

At 0230[1], the chief officer arrived on the bridge and took over from the second officer as the officer of the watch (OOW). He was joined by the deck cadet who was the assigned lookout. *Ovit* was following an autopilot controlled heading of 206° at a speed of between 12 and 13 knots (kts). The OOW selected the scale on the ECDIS display that closely aligned with the 12 nautical miles (nm) range scale set on the adjacent radar display. He then sat in the port bridge chair where he had a direct view of both displays **(Figure 3)**. At about 0300, the heading on the autopilot was adjusted to 225°.

As *Ovit* approached the Varne Bank, the deck cadet, who was standing on the starboard side of the bridge and using binoculars, became aware of flashing white lights ahead. He did not identify the lights or report the sighting to the OOW.

At approximately 0417, *Ovit* passed close by the Varne Light Float. From 0432 the ship's speed slowly reduced until the vessel stopped when it grounded on the Varne Bank at 0434 **(Figure 4)**.

1.2.2 Shore monitoring

At 0411, *Ovit*'s radar vector[2] crossed into the Channel Navigation Information Service's (CNIS) Varne Bank alerting zone. This activated an audible alarm in the operations room at Dover Coastguard. The ship's symbol on the CNIS display also changed from black to red and started to flash **(Figure 5)**. The CNIS operator '*authorised*' *Ovit*'s approach to the Varne Bank using a drop down menu on the CNIS display. This action silenced the audible alarm, and the ship's symbol stopped flashing and its colour changed to black. The operator then returned to a very high frequency (VHF) radio exchange with another vessel inside the CNIS area.

1.2.3 Post grounding

The OOW did not appreciate that *Ovit* had grounded. At 0437, an engineering alarm sounded and the OOW placed both azipod control levers to zero. He then telephoned the master in his cabin to inform him of the alarm. He also telephoned the second engineer and instructed him to check the engines.

At 0443, the second engineer telephoned the bridge and informed the OOW that 45° of ahead pitch was available on the starboard azipod. Accordingly, the OOW moved the starboard azipod control lever to 45° pitch ahead. The ship remained stationary, which led the OOW to assume that there was still a problem with the ship's engines.

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[1] This was 0430 ship's time (UTC+2 hours).

[2] A computer projection ahead of the ship, the length of which is a function of the ship's speed.

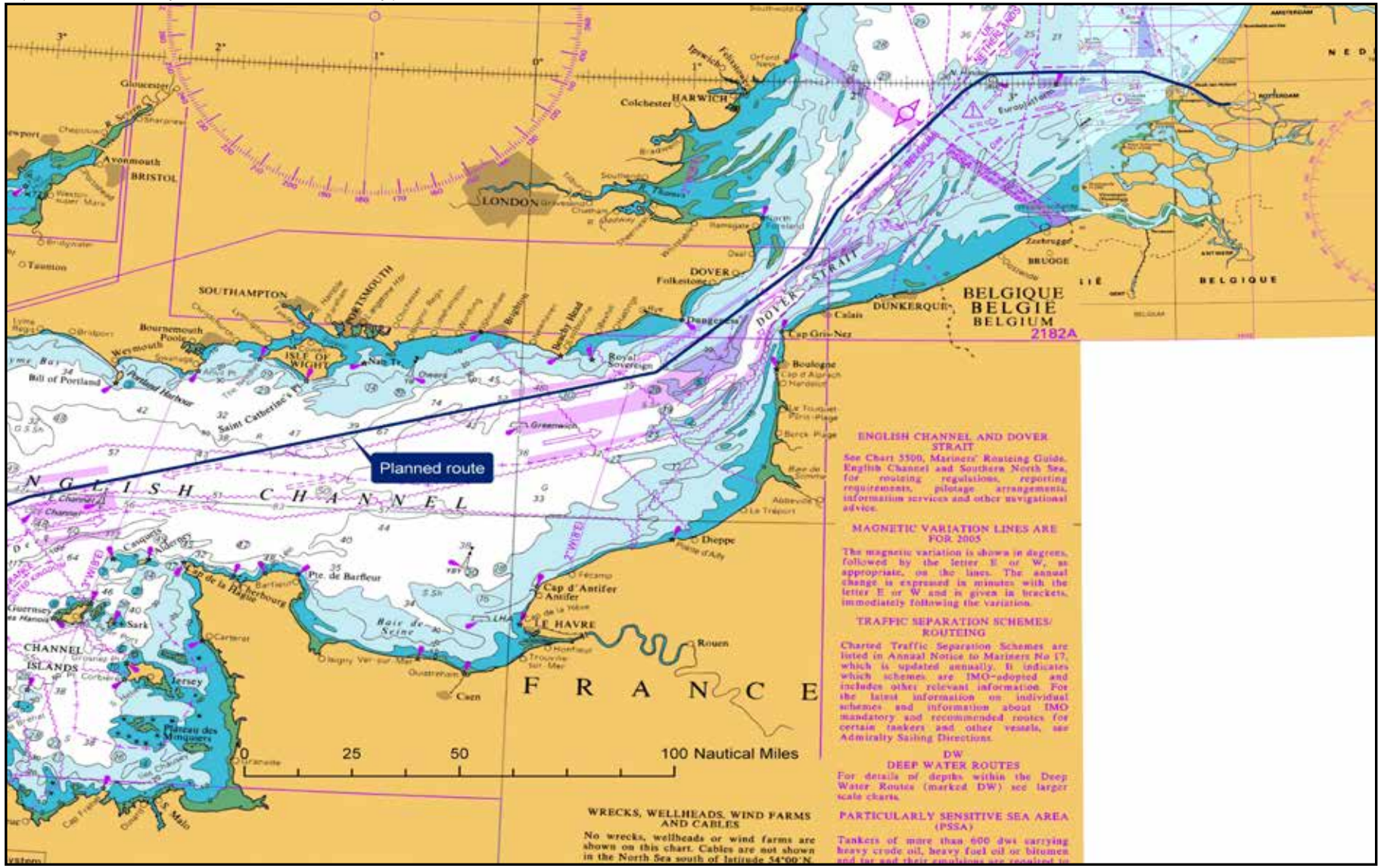


Figure 1: *Ovit*'s passage plan through the Dover Strait

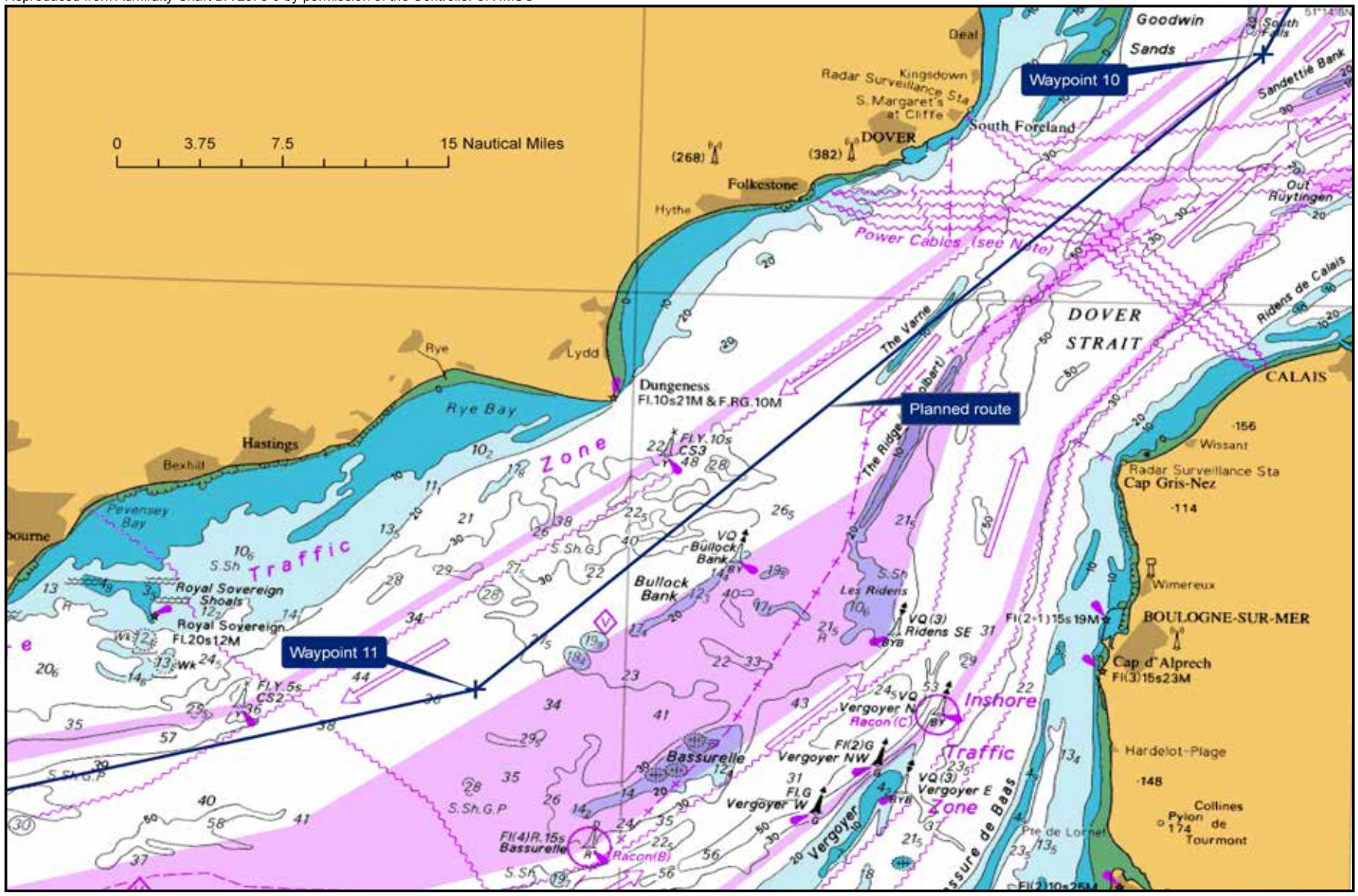


Figure 2: Detail of Dover Strait passage plan

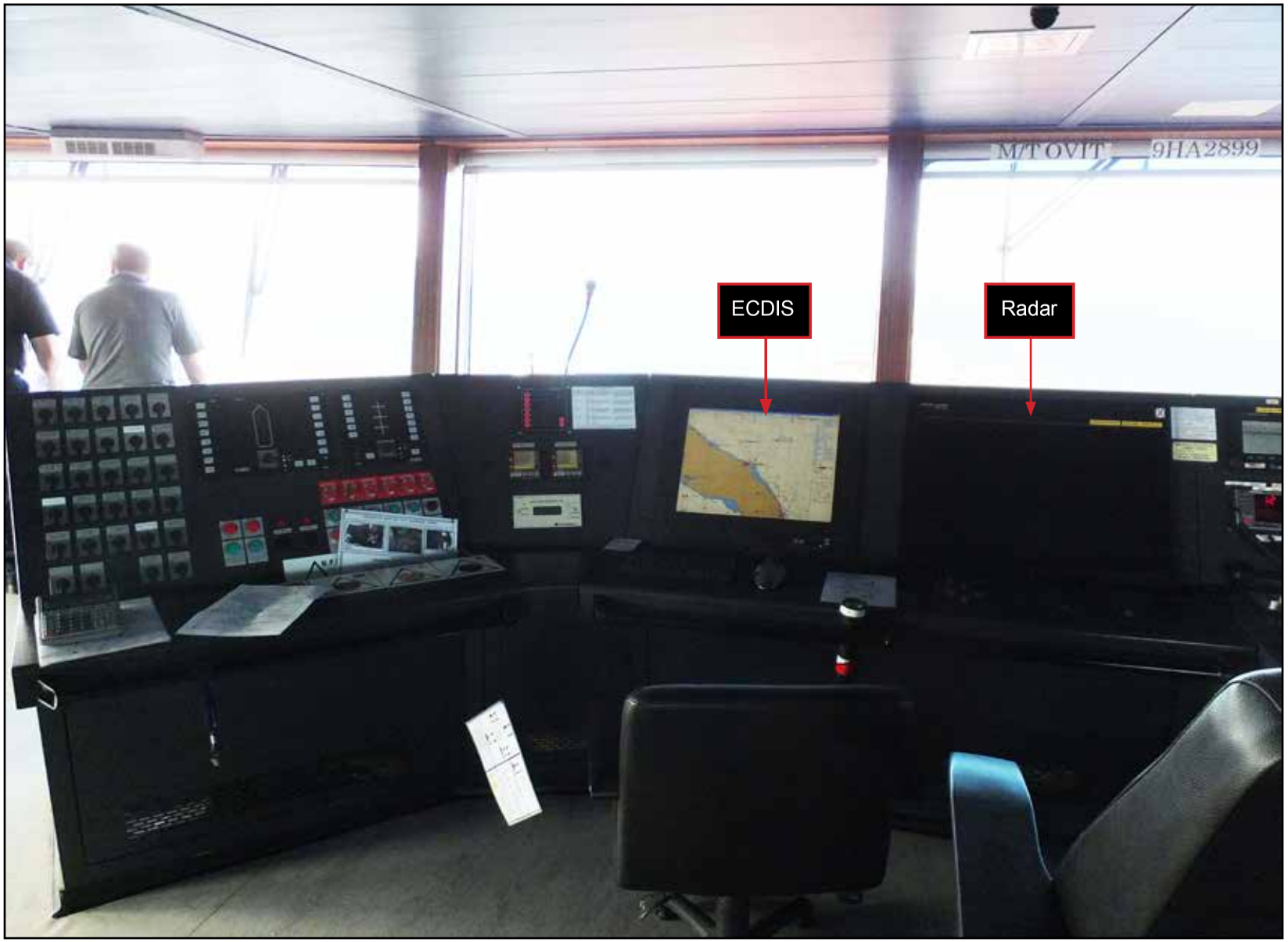


Figure 3: OOW view of bridge displays from the port bridge chair

Reproduced from Admiralty Chart BA 1892-0 by permission of the Controller of HMSO

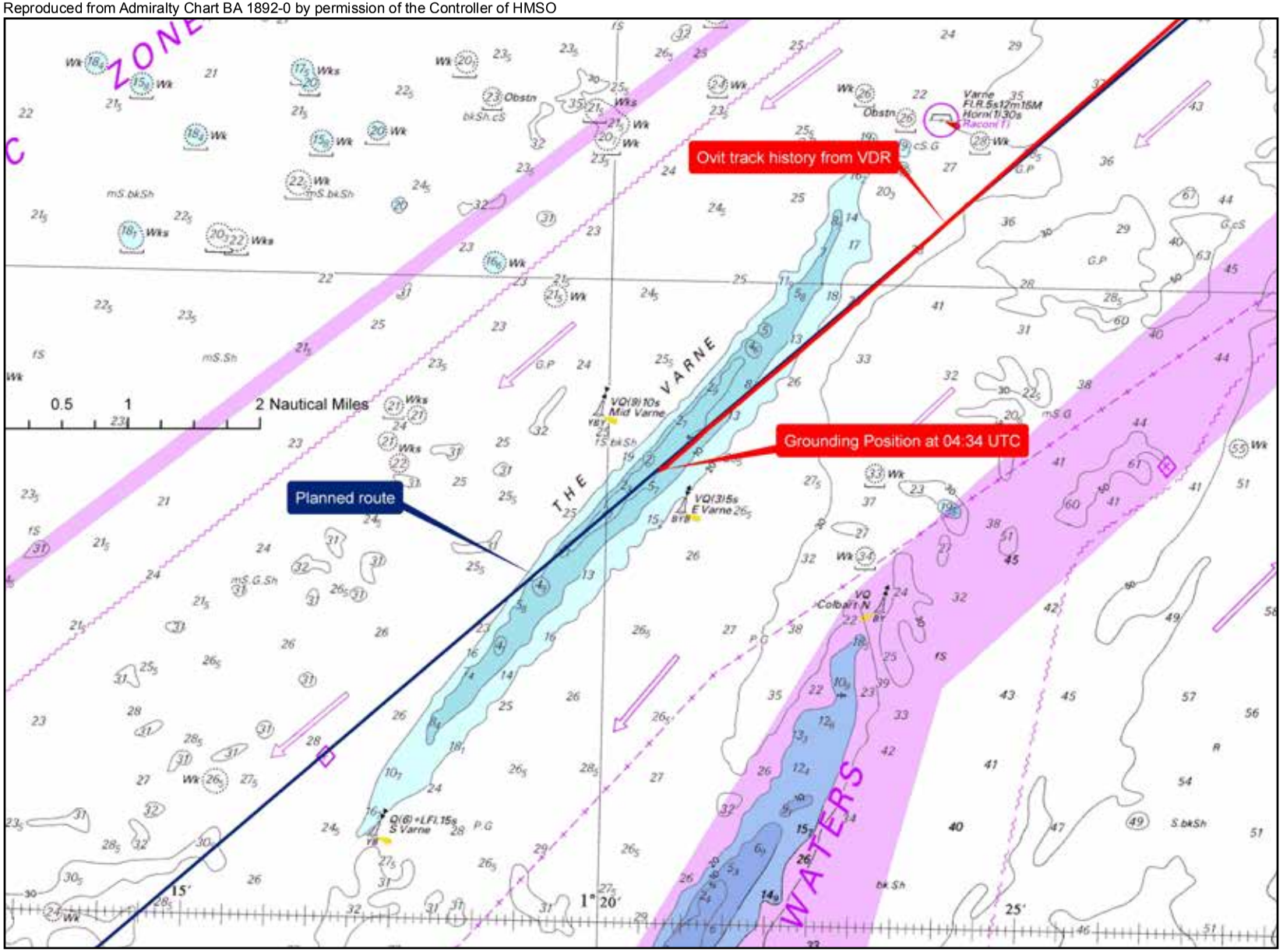


Figure 4: *Ovit*'s grounding position

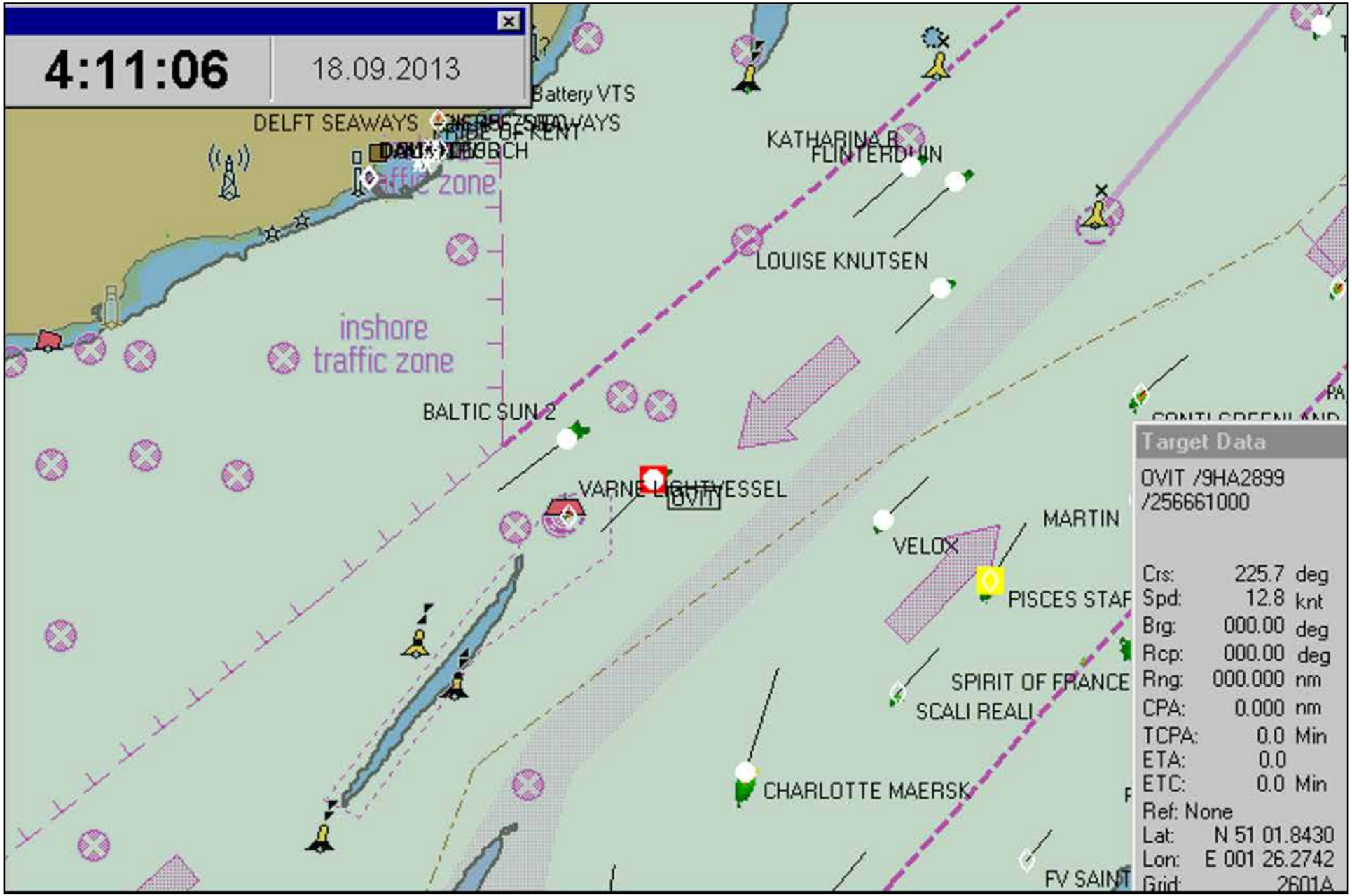


Figure 5: CNIS display as *Ovit* entered the Varne Bank alerting zone

Between 0449 and 0452, a series of VHF radio exchanges took place between the OOW and the CNIS operator. A transcript of these exchanges is shown at **Table 1:**

Time	Station	VHF transmission
04:49:15	CNIS	*"Ovit, Ovit, this is Dover Coastguard, channel 11, over"*
04:49:20	*Ovit*	*"Yes, this is Ovit, go ahead please"*
04:49:22	CNIS	*"Ovit, this is Dover Coastguard, according to our radar, sir, you may be on the Varne Bank, is everything OK on board sir?"*
04:49:30	*Ovit*	*"Yes, we have an engine breakdown problem, but I think in 5 minutes it will be OK"*
04:49:38	CNIS	*"Roger sir, that is understood, what is your current depth of water, over?"*
04:49:48	*Ovit*	*"Dover Coastguard, this is Ovit, could you please repeat"*
04:49:50	CNIS	*"Roger sir, what is your depth of water? How much water is currently underneath your vessel, over?"*
04:50:05	*Ovit*	*"My present draught is 7.9m, 7.9m, over"*
04:50:10	CNIS	*"Negative sir, what is the under keel clearance, over?"*
04:50:32	*Ovit*	After a pause *"It's approximately 10m, the under keel clearance"*
04:50:58	CNIS	*"Roger sir, this is Dover Coastguard, what is the nature of your engine difficulty over?"*
04:51:13	Ovit	*"My engine is azimuth pitch propellers"*
04:51:17	CNIS	*"Say again sir, over"*
04:51:21	*Ovit*	*"My engine is azimuth pitch propeller engine"*
04:51:58	CNIS	*"Roger sir, how long do you believe it will take to effect repairs, over?"*
04:52:04	*Ovit*	*"I think in 10 minutes, the problem will be solved"*
04:52:16	CNIS	*"Roger sir, if you could call us back in 10 minutes or once you have effected repairs, over"*
04:52:20	*Ovit*	*"OK, I understand"*

Table 1: Transcript of VHF radio exchanges between 0449 and 0452

At approximately 0453, the OOW zoomed in on the ECDIS display and noticed that *Ovit* was in an area of shallow water and he realised the vessel was aground. The OOW placed the starboard lever back to zero pitch and called the master, who came to the bridge. Between 0506 and 0509, there was a further exchange between CNIS and *Ovit*'s OOW **(Table 2)**.

05:06:28	CNIS	*"Ovit, Dover Coastguard"*
05:06:30	*Ovit*	*"Yes, go ahead please"*
05:06:35	CNIS	*"Ovit, Dover Coastguard, may I have a situation report on the repairs, over?"*
05:06:42	*Ovit*	*"Now the engineers are working and I think in 5, 10 minutes it will be OK"*
05:07:02	CNIS	*"Ovit, this is Dover Coastguard, please can you confirm sir; are you aground? Have you touched the bottom, over"*
05:07:36	*Ovit*	*"Dover Coastguard, this is motor tanker Ovit, now the speed over the ground is zero and, yes, there is a possibility of a grounding and now we are checking ballast tanks but it seems like there are no leakage to the ballast tanks"*
05:08:00	CNIS	*"Roger sir, say again regarding the ballast tanks over"*
05:08:08	*Ovit*	*"Now we are checking the ballast tanks manually, we are checking the soundings but there is no water inlet to the ballast tanks"*
05:08:20	CNIS	*"Roger sir, is there any damage to the vessel, over?*
05:08:26	*Ovit*	*"For now, there is no damage, for now there is no damage but we are keep checking"*
05:08:40	CNIS	*"Roger, and the state of the crew, is everyone okay, there are no injuries, over?"*
	Ovit	*"Negative, negative, no injuries, everybody is OK"*
05:08:50	CNIS	*"Roger sir, and what are your intentions?"*
05:09:14	*Ovit*	*"Now I think it is low water time and we will wait for the water level to get high, to the high water time, I think it's close to the noon time and when it's high water time, we will try to move the vessel"*

Table 2: Transcript of VHF radio exchanges between 0506 and 0509

During this period, the general alarm was not sounded and the crew were not mustered. As soon as it had been established that the ship had grounded, ballast tanks were checked for internal leaks and a visual search was made around the ship for pollution.

A photograph taken of the ECDIS display at 0602 is at **Figure 6**. Between 0716 and 0722, *Ovit* refloated on the rising tide. The vessel subsequently berthed alongside in Dover, UK, to enable the hull to be inspected by divers.

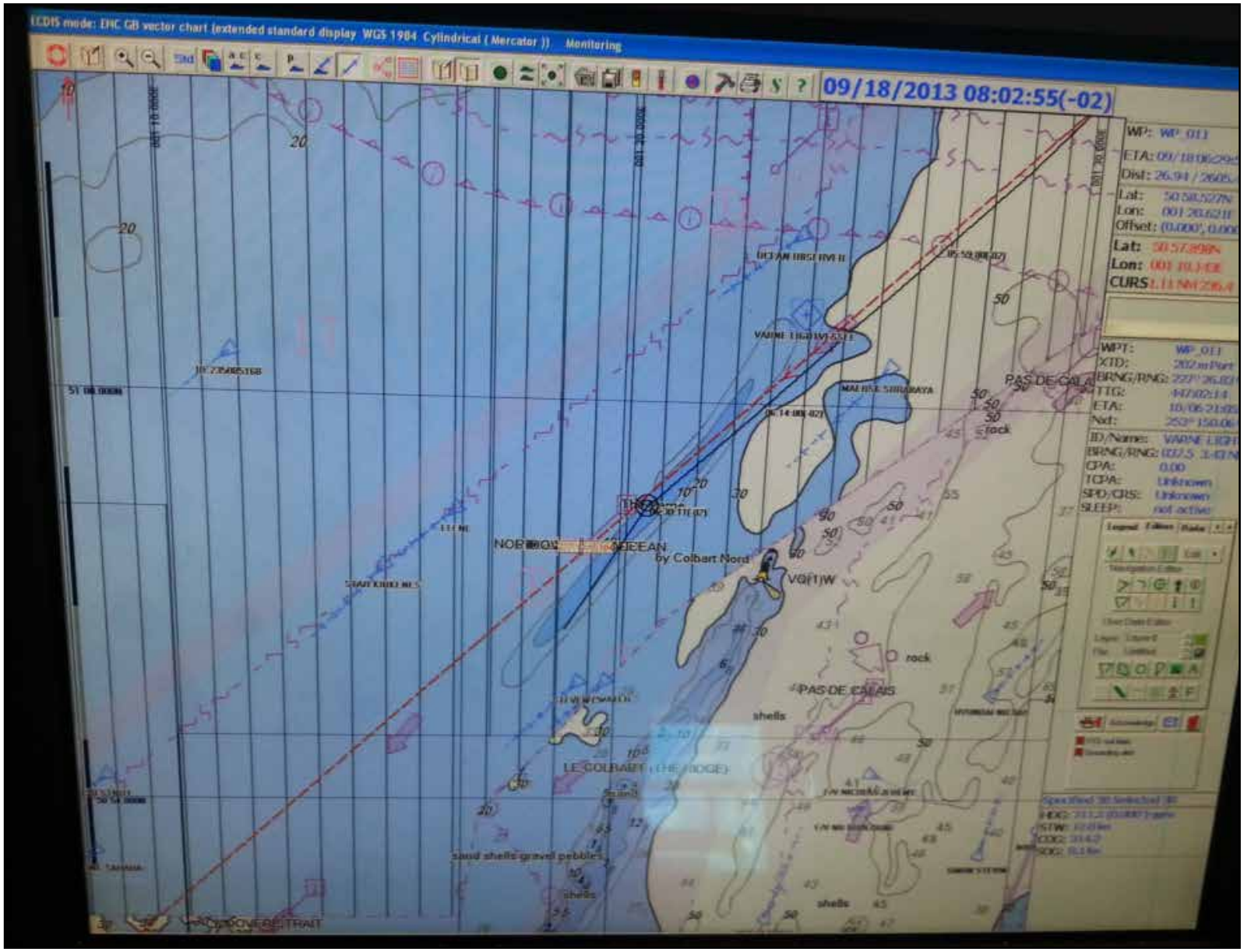


Figure 6: *Ovit*'s ECDIS display when the ship was aground

1.3 VESSEL EXAMINATION

While *Ovit* was berthed alongside in Dover:

- A dive survey established that damage to the vessel was limited to significant hull coating loss, particularly on the plating below the bilge keel on the starboard side.

- MAIB inspectors examined the ECDIS. Among their findings, which are included in **paragraph 1.8**, was that the system's audible alarm was not functioning.

- A port state control (PSC) inspection was undertaken by a surveyor from the Maritime and Coastguard Agency (MCA). *Ovit* was detained subject to an assessment of seaworthiness and rectification of the defective ECDIS audible alarm.

- A service engineer repaired the ECDIS after seeking advice from the equipment manufacturer's customer support team.

1.4 ENVIRONMENTAL DATA

Wind:	South-westerly, force 3 - 4
Sea state:	moderate
Visibility:	good
Morning civil twilight:	0502
Sunrise (Dover):	0535
Predicted low water:	0507 (1.1m)
Predicted high water:	1001 (6.7m)
Height of tide (0434 - grounding):	1.4m, falling
Height of tide (0716 - refloat):	4.2m, rising

1.5 CREW

1.5.1 General

All of *Ovit*'s 14-man crew were Turkish nationals. The crew's morale was reported as low. Several of the crew had expected to leave the vessel during recent port visits, including Hamburg, Germany, on 14 September 2013, but the crew changes had been cancelled. A planned delivery of cigarettes in Hamburg also did not arrive.

1.5.2 Deck officers

All the deck officers' International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended (STCW) certificates had been endorsed by the Malta Transport Authority.

The master was 35 years old and had been on board for 3 months. He had been at sea for 15 years and had held an STCW II/2 certificate of competency (CoC) for 8 years. *Ovit* was his first ship on which ECDIS was the primary means of navigation. In March 2013, he had completed a bridge resource management (BRM) training course.

The chief officer was 27 years old and had been on board for 2 months; it was his first contract as a chief officer. He had 5 years' seagoing experience and held an STCW II/2 CoC.

The second officer was 27 years old and had been on board just over 6 months. He had been expecting to leave the ship in Hamburg and was disappointed and demotivated by having to extend his time on board. The second officer had 4 years' seagoing experience and held an STCW II/1 CoC.

The third officer had been on board for 5 months and it was his first contract since being awarded an STCW II/1 CoC. His previous seagoing experience was as a deck rating for 4 years followed by 7 months as a deck cadet on board a general cargo ship. The third officer was expecting to be promoted to second officer when the second officer left the ship.

The deck cadet had been on board for 6 months and held an STCW II/4 CoC, which qualified him to stand a watch as a bridge lookout. He routinely accompanied the chief officer during his bridge watches at sea.

1.5.3 Watchkeeping routine

At sea, the deck officers kept bridge watches as follows:

- second officer: 0000 - 0400 and 1200 - 1600
- chief officer/deck cadet: 0400 - 0800 and 1600 - 2000
- third officer: 0800 - 1200 and 2000 - 0000

During cargo operations in harbour, the chief officer worked the hours necessary to supervise loading or discharge and the second officer and third officer alternated in 6 hour watches as the duty deck officer.

1.5.4 ECDIS training

All of *Ovit*'s deck officers had attended a generic ECDIS course and a type-specific ECDIS training course which focused on the Marine Information System AB Type 900 ECDIS (Maris 900) fitted on board *Ovit*. The type-specific training was delivered by STT Marine Electronics in Istanbul, which was endorsed by Marine Information Systems AS (Maris) as an authorised training provider for its systems.

Attendees at the Maris 900 training courses were a mix of senior and junior officers with varying degrees of experience at sea and with ECDIS. *Ovit*'s master was uncomfortable completing the course with junior officers. In particular, he found it embarrassing to ask questions.

1.6 NAVIGATION

1.6.1 Responsibility

The second officer was the ship's navigator. However, the master instructed the third officer to plan the passage from Rotterdam to Brindisi because it was assumed he would be taking over the second officer's responsibilities when the second officer left the vessel. In effect, the master instructed the third officer to assume the duties of navigator while the second officer was still on board. However, there was no handover in this respect between the second and third officers and the master had not submitted his intended re-designation of duties to the ship's manager for approval.

1.6.2 Passage planning

The passage plan for the voyage between Rotterdam and Brindisi was prepared by the third officer on 15 September 2013, while the vessel was at anchor off Rotterdam. He was not given any guidance by the master on how it should be prepared and no reference was made to previous, similar passages.

When the passage plan was completed, it was checked by the third officer by scrolling ahead and zooming in on each of the route's legs in order to identify the navigational dangers. The third officer's work was not supervised by the second officer. Prior to departure, the intended route was not checked by the master and there was no pre-departure brief among the deck officers.

The passage plan checklist, which was included in *Ovit*'s safety management system (SMS) and was completed by the third officer, is at **Annex A**. Against the line *'Are there any routing hazards?'* the *'no'* box had been ticked. In addition, for the question, '*Have the team members been made aware of any defective equipment?*' the response was '*yes*'. A voyage planning checklist for use in ECDIS fitted ships, which was also included in the vessel's SMS but had not been completed, is at **Annex B**.

1.7 MARIS 900 ECDIS

1.7.1 Approval and installation

The Maris 900 ECDIS was certified by Det Norske Veritas (DNV) to be compliant with the necessary regulations from the International Maritime Organization's (IMO) Convention for the Safety of Life at Sea (SOLAS) in November 2009 **(Annex C)**. For its certification, the system was tested using the International Electrotechnical Commission (IEC) standard 61174 (2008).

The Maris Type 900 fitted on board *Ovit* was supplied and installed by STT Marine Electronics in Istanbul. The installation certificate **(Annex D)** dated 1 April 2011 stated that '*all configuration have been done* [sic]. *System is tested in sea trial and seen OK* [sic].'

The system comprised a planning terminal on the starboard side of the bridge by the chart table **(Figure 7)** and a monitoring terminal on the port side bridge console **(Figure 8)**. Both computers were connected in a local area network and each system was supported by an independent, uninterrupted power supply.

Figure 7: ECDIS planning terminal

Figure 8: ECDIS monitoring terminal

The ship's gyro data, global positioning system (GPS), log speed, echo sounder, wind information and automatic identification system (AIS) were all connected to the ECDIS.

Ovit's Cargo Ship Safety Equipment Certificate, issued by the American Bureau of Shipping (ABS), confirmed that '*the ship complied with the requirements of the Convention as regards ship borne navigational equipment…and nautical publications.'* This certificate was valid until 3 May 2016.

1.7.2 Electronic navigational charts

The Maris 900 uses electronic navigational charts (ENC). An ENC is a '*vector chart, issued by or on behalf of a Governmental body that complies with the IHO*[3] *ENC product specification that is part of the chart data transfer standard known as S57*[4]*'.* ENC data is divided into 'cells' that contain hydrographic data intended for use between defined maximum and minimum scales. The first digit of the cell's number indicates the intended use and appropriate range scale as shown in **Table 3**.

Navigational purpose	Name	Scale Range
1	Overview	< 1:1499 999
2	General	1:350 000 – 1:1499 999
3	Coastal	1:90 000 – 1:349 999
4	Approach	1:22 000 – 1:89 999
5	Harbour	1:4 000 – 1:21 999
6	Berthing	> 1:4 000

Table 3: ENC cell range scales

1.7.3 Contours and depths

The following contour depths (in metres) could be set on the Maris 900 ECDIS:

- Deep contour
- Safety contour
- Shallow contour
- Safety depth

These values were selected on the S57 settings page **(Figure 9)**. The deep and shallow contour values only control colour shading. The safety contour and safety depth settings require values which are appropriate to the local navigational conditions and take into account; the ship's draught, the effect of squat and, where necessary, height of tide[5].

[3] International Hydrographic Organization

[4] An openly available data format defined in IHO Document S-66 Edition 1 '*Facts about Electronic Charts and Carriage Requirements*'

[5] The safety contour is a critical feature intended to show the operator a difference between safe and potentially unsafe water; crossing the safety contour is a mandatory ECDIS alarm. When a safety contour depth is set, if the selected contour is not available, the system defaults to the next deepest contour available. (For example, if the safety contour was set to 15m but the ENC contours available were only every 10m, then the display would show the safety contour at 20m.) The safety depth value is intended to assist the operator by highlighting spot depths less than the chosen setting by the use of a bold font.

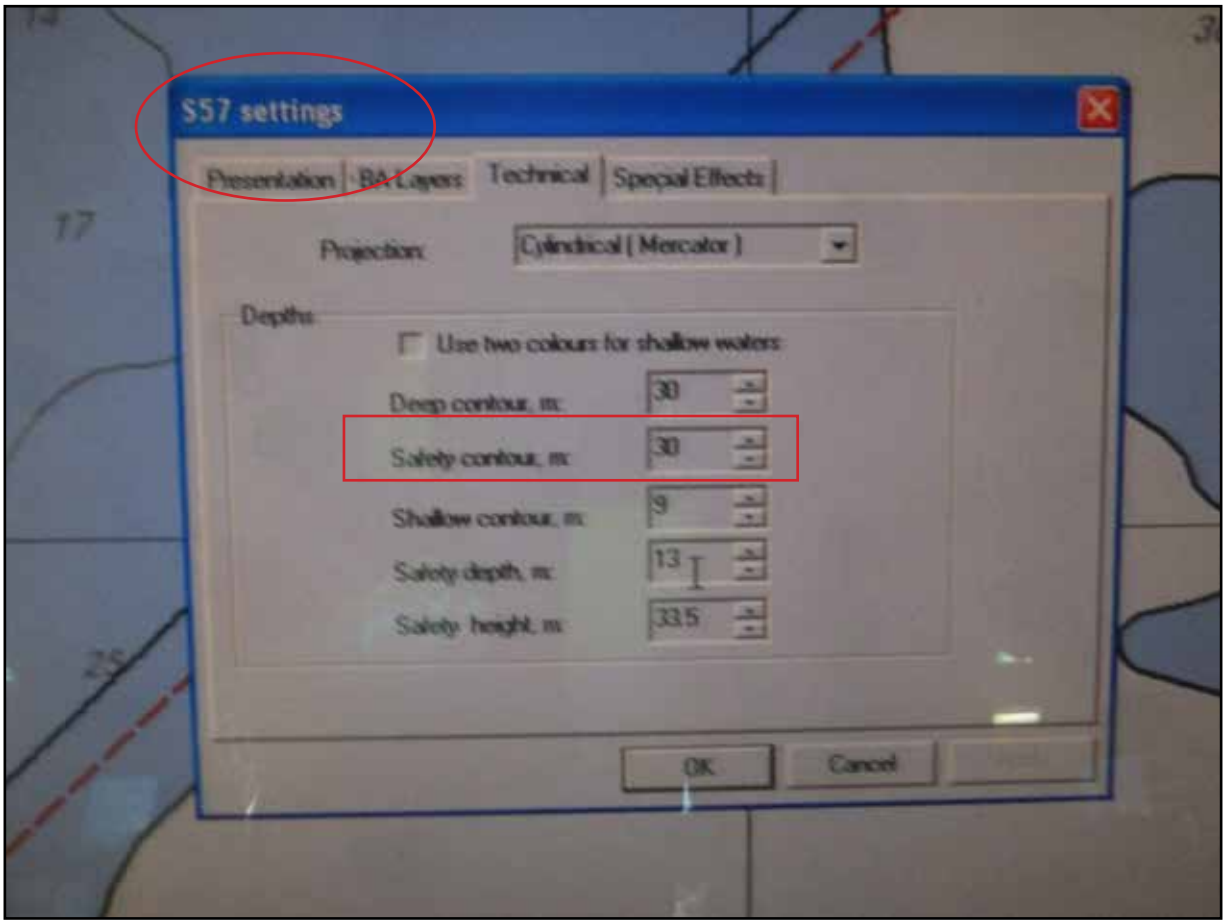


Figure 9: Maris 900 ECDIS 'S57' input page

1.7.4 Guard zone

The Maris 900 ECDIS uses a guard zone ahead of the ship to provide advance warning of dangers. The extent of the guard zone is defined by setting a time and an angle across the bow **(Figure 10)**[6]. The operator is also able to select whether the dangers identified in the guard zone are highlighted on the display. However, even if the operator selects for the dangers not to be highlighted, an audible alarm should still sound when a danger is identified inside the guard zone.

1.7.5 Depth alarms

The Maris 900 incorporates two depth alarms:

- The safety contour alarm activates if the guard zone crosses the selected safety contour. This is a mandatory alarm required by the IMO performance standards. The Maris 900 factory default setting value for the safety contour was 30m.

- The grounding alarm activates when the depth at the ship's position is less than the selected safety depth.

[6] The setting of an angle across a ship's bow generates a cone, the extent of which is determined by speed and the time set. For example, with an angle of 50° and a time of 5 minutes set, the guard zone of a ship at 12kts would extend 25° either side of the bow out to a range of 1nm.

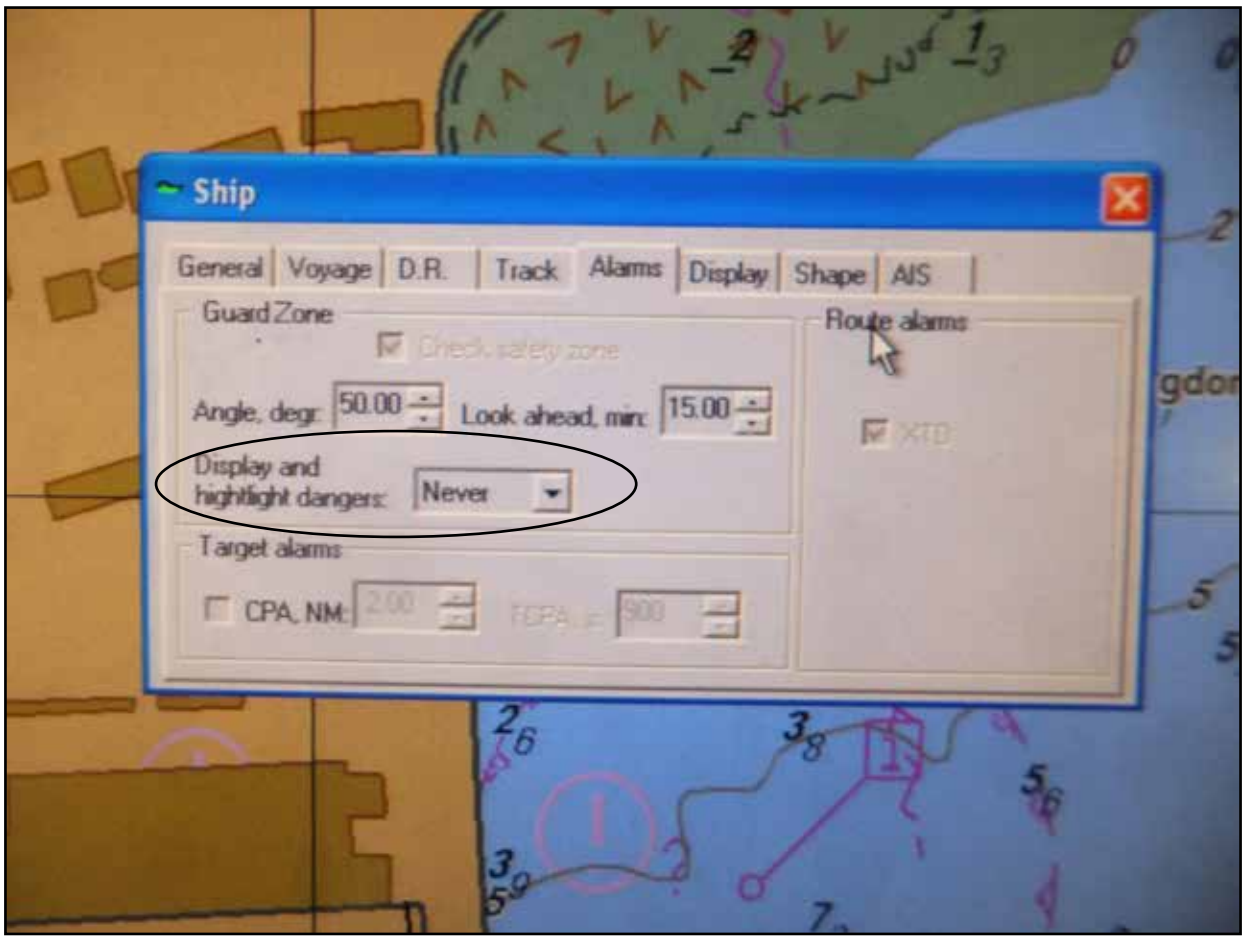


Figure 10: Maris 900 ECDIS guard-zone settings page

1.7.6 Alarm management

When a safety parameter is exceeded, the Maris 900 system activates an audible alarm. It also provides the reason for the alarm in the alarm panel on the display. Once the operator acknowledges the alarm, the audio signal is cancelled. However, the user guide states:

> *'The same alarm will not be triggered again but the message will remain displayed for as long as the relevant limitation is exceeded or until the function is purposely switched off. For example after acknowledgement, the message '**XTD out limits**' will remain displayed for as long as the XTD[7] exceeds the XTD limit value defined in the system or until the route is deactivated.'*

1.7.7 Route checking

When a passage plan has been completed and is activated for use, the Maris 900 ECDIS automatically defaults to the 'check-route' function. This feature checks the intended route for navigational hazards within a user-defined distance both sides of the track. When a vessel is underway, deviation from a pre-determined route (by exceeding the XTD value) is a mandatory ECDIS alarm.

[7] Cross Track Distance

1.7.8 Over-zoom notification

Referred to as the 'jail bars', the Maris 900 ECDIS system contained an over-zoom notification to alert an operator to the fact that important navigational detail may be missing from the display because of the scale in use. The jail bars can be seen at **Figure 6**. In addition, the Maris 900 ECDIS system had an 'auto-load' feature which, if selected, loaded the most appropriate scale ENC available.

1.7.9 Logbook and track recording

The Maris 900 user guide states that:

'*During the process of its operation, ECDIS automatically maintains two different electronic logbooks:*

- *Voyage record*
- *Twenty four hours logbook*

The voyage record stores every two hours the position, course and speed of the ship for half a year. The twenty-four hour logbook records both the navigational events and system events.'

The Maris 900 system also had a user-controlled track recording function which, if enabled, would display and record the ship's position at pre-defined intervals.

1.8 ECDIS USE ON BOARD *OVIT*

1.8.1 Examination

Following the grounding, MAIB examined and analysed *Ovit*'s ECDIS. The findings included:

- The audible alarm was not functioning. The audio output communications port had not been configured[8]. Therefore, when an alarm activated, no signal was sent to the integral speaker in the ECDIS display.
- The route in use was named '*Rotterdam-Vasto'* and had been selected for navigation on 16 September 2013. It had 47 waypoints and totalled 2749.84nm.
- The ENC cell in use was GB202675. ENC cell GB401892 was available. The ENC auto-load feature was switched off.
- The depth settings **(Figure 9)** were:
  - Deep contour: 30m
  - Safety contour: 30m
  - Shallow contour: 9m
  - Safety depth: 13m.

[8] Analysis of the ECDIS hard drive shows that other computer configuration settings were correctly set up at the point of installation.

- The cross track distance (XTD) was set to 0.00nm. The safety guard zone was set to 50° and 15 minutes. The 'display and highlight dangers' sub menu was selected to 'never' **(Figure 10)**.

- With the *Rotterdam - Vasto* route selected, the 'check-route' page highlighted a significant list of potential hazards including the risk of grounding on the Varne Bank **(Figure 11)**. The page was shown to *Ovit*'s deck officers who interpreted the 'no alarms' notation on the lower half of the page to mean that there were no hazards along the route.

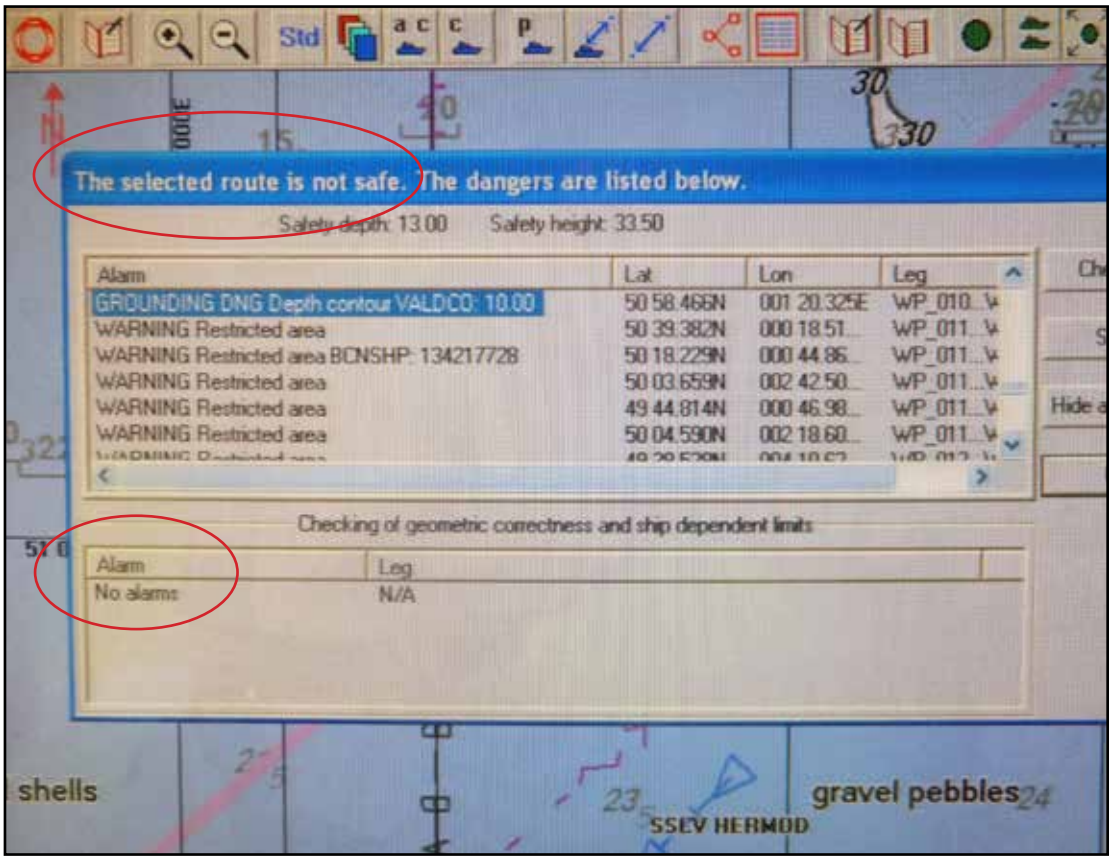


Figure 11: Maris 900 ECDIS check-route page

- Logbook recording was switched off. However, *Ovit*'s position at 0412 on 18 September 2013 was recovered. Neither MAIB nor Maris technical staff were able to recover historical track data between 16 and 29 September 2013. Data had been recorded outside of these dates.

- System alarms were recorded in the chart system log, which showed numerous XTD out of limits alarms.

1.8.2 Display in use

Figure 6 is a photograph of the ECDIS display on board *Ovit*, which was taken when the vessel was aground. Information shown includes:

- The over-zoom notification had activated (jail bars).
- The next waypoint was 'WP_11' which confirmed the route in use.
- The XTD in the grounding position was 202 metres (m) to port of the intended track.
- The 30m contour was highlighted as the safety contour.
- Two alarms were active:
    - 'XTD out limits'
    - 'Grounding alert'.

1.9 RECONSTRUCTION

1.9.1 Set up and limitations

With the assistance of Warsash Maritime Academy, *Ovit*'s grounding was reconstructed in a bridge simulator to gain an appreciation of the various factors potentially influencing the OOW's situational awareness. The inputs for the reconstruction included waypoints from *Ovit*'s passage plan, environmental data corresponding to that at the time of the accident, *Ovit*'s characteristics and positional data from the vessel's voyage data recorder (VDR).

Two independent ECDIS (not Maris) were used during the reconstruction. One system was set up to replicate the settings used in *Ovit* during the grounding, the other system was configured to show the optimum display available. The reconstruction considered both the planning and the monitoring aspects of the grounding.

1.9.2 Findings

Observations made during the reconstruction included:

- *Ovit* crossed the 30m safety contour at 0251 **(Figure 12)** and 0417.
- *Ovit* passed over a charted depth of 13m at 0427 which initiated the 'grounding alarm'.
- The Varne Light Float was sighted at a range of just over 10nm.
- The lights on the cardinal buoys marking the east and west sides of the Varne Bank were sighted at 5nm.

Figure 12: Reconstruction showing *Ovit*'s earlier 30m contour crossing

- There was a considerable difference between the ECDIS display with a safety contour set at 20m, and the display with the safety contour set at 30m **(Figure 13)**.

1.10 VESSEL OPERATION AND MANAGEMENT

1.10.1 General

Ovit was a 6,444 gross tonnage (gt) liquid chemical carrier built in Istanbul in 2011. The vessel was primarily engaged on European and Mediterranean routes and had transited the Dover Strait on 3 occasions in the 3 months before the grounding.

The vessel was owned by Ovit Shipping Ltd, registered in Malta and was one of nine chemical carriers operated by Ayder Tankers Ltd. The company, which was established in 2006, managed every aspect of its fleet from its head office in Tuzla, Istanbul. Its Document of Compliance (DoC) had been issued by Bureau Veritas (BV) and was valid until 25 September 2016. *Ovit*'s Safety Management Certificate (SMC) was also issued by BV and was valid until 14 February 2017.

1.10.2 Navigation equipment

In addition to the Maris 900, *Ovit*'s navigational equipment included:

- Sperry Marine Vision Master 3cm (X Band) radar
- Sperry Marine Vision Master 10cm (S Band) radar
- Sperry Marine R4 GPS navigation receiver
- Rutter NW04 VDR
- Martek Marine 'Nav-guard' Bridge Navigational Watch Alarm System (BNWAS)
- Sperry Marine Nav-pilot 4000 autopilot
- Sperry Marine ES5100 echo sounder.

At the time of the grounding, the BNWAS was switched off and no alarm depth had been set on the echo sounder.

1.10.3 Recruitment policy

Ayder Tankers Ltd recruited its crews through its manning office; manning agencies were not used. Job applications were scrutinised and then potential recruits were interviewed before a contract was signed. Newly employed senior officers spent a minimum of 2 days at the company's offices, to be briefed on the SMS and their responsibility for its implementation on board. *Ovit*'s master had attended the ship manager's office before joining the ship.

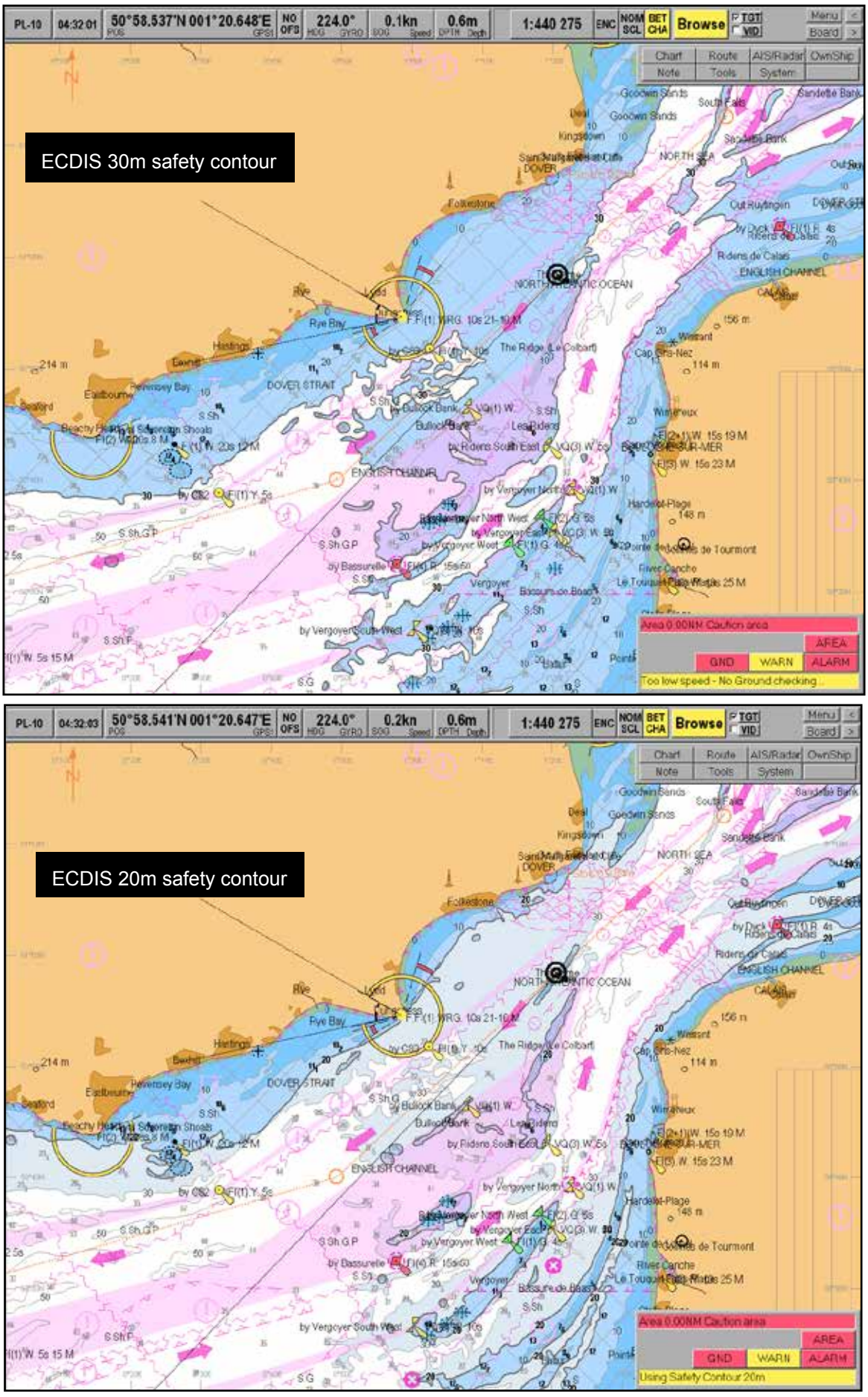


Figure 13: ECDIS display comparison of 30m and 20m safety contours

1.10.4 Safety management system

The implementation of the Safety Management Systems (SMS) on board Ayder Tankers' vessels was the responsibility of the Designated Person (DP), who was an experienced master and well established within the organisation. The company regularly issued circulars with updated safety information and the DPA conducted frequent visits to ships. The SMS contained detailed guidance and procedures for the safe operation of the ship. In particular:

Master's responsibility

The SMS set out the responsibilities of masters, which included:

'1.1.1 Master's responsibility:

- *Ensuring that all bridge personnel are fully familiar with the location and operation of all bridge controls and equipment*
- *Ensuring that the bridge is properly manned for the prevailing conditions*
- *Ensuring that a berth-to-berth passage plan is prepared and that safe distance from nearest grounding line are maintained'*

Passage planning

The SMS stated that the second officer was designated as the navigating officer and responsible for preparing a berth-to-berth passage plan and presenting it to the master. Key points included:

'3.2 Principles of passage planning:

The passage plan is to be in three sections:

- *Berth to commencement of sea passage (outward pilotage)*
- *Sea passage*
- *End of passage to berth (inward pilotage)*

3.2.1 The passage plan preparation checklist must be used. An overall assessment of the intended passage must be made by the master, in consultation with the navigating officer and the other deck officers. This will be when all relevant information has been gathered. This appraisal will provide the master and his bridge team with a clear and precise indication of all areas of danger, and identify the areas in which it will be possible to navigate safely taking into account the calculated draught of the ship and planned under keel clearance.'

Use of ECDIS

The SMS provided detailed instructions to ships on which ECDIS was the primary means of navigation. Specifically:

'7.12.13 safety checks:

- *The master and officers should ensure that ECDIS both visual and audible alarms are KEPT ON in the ECDIS.* [sic]

- *After completion planned passage plan, planned passage should be checked with entered parameters in ECDIS. This is called by safety checks. When safety checks carried out, ECDIS will warn you, if there are some unsafe situation* [sic].

SMS Section 7.12.14 provided guidance on the calculation of safety settings including the XTD **(Annex E)**.

Watch conditions

The SMS also included definitions for three watch conditions **(Annex F)** which were based on proximity of danger:

- Condition A: little traffic and good visibility

- Condition B: heavy traffic, poor visibility, entering / leaving port or crossing / entering separation zone

- Condition C: heavy traffic, dense fog.

1.10.5 Master's orders

Ovit's master had issued a personal set of bridge standing orders to accompany the company's SMS bridge manual. On 17 September 2013, he had also issued handwritten sea orders which were for '*From Rotterdam to Brindisi.'* However, neither the master's bridge nor sea orders included guidance on ECDIS safety settings.

1.10.6 Defect reporting

Ayder Tankers Ltd had a well-established procedure for its crews to record and report defects on board. However, no records were found indicating that the absence of an audible alarm in the ECDIS on board *Ovit* had been reported.

1.10.7 Navigation risk assessment

A risk assessment for navigation **(Annex G)** was held on board, which included the following identified hazards:

- *'High draft/less under keel clearance (UKC)* [sic]

- *Uncorrect position fixing* [sic]

- *Faulty passage plan'*

The mitigation for '*Faulty passage plan'* was *'Navigational Checklists / Bridge Procedures Guide'.*

1.11 AUDITS, INSPECTIONS AND SURVEYS

1.11.1 Navigation audits and survey

Ayder Tankers Ltd conducted an internal audit on board *Ovit* on 27 August 2012. The audit report stated that passage planning was '*okay'* and that the officers were familiar with ECDIS and its functions. A Flag State inspection in Malta on 1 November 2012 identified that the ship's deck officers were '*not in possession of type-specific ECDIS certificates.'* An annual safety equipment survey conducted by ABS on 16 July 2013 did not identify any problems with the vessel's navigation equipment.

1.11.2 Ship Inspection Report Programme

The Ship Inspection Report Programme (SIRE) is a significant industry initiative introduced by the Oil Companies' International Marine Forum (OCIMF) to enable risk-based analyses using data from vessel inspections.

A SIRE inspection was conducted on board *Ovit* on 8 September 2013. The navigation section of the inspection report contained two observations:

- *'Admiralty Pilot North Sea (East)(NP55) was out of date*
- *Port side gyro repeater was not operational'*

The report also commented that the passage plan was well prepared, ECDIS training certificates were held and detailed ECDIS procedures were included in the company bridge manual.

1.12 ECDIS CARRIAGE REQUIREMENTS

1.12.1 International

SOLAS Chapter V, Regulation 19 states:

'2.1.4. All ships…shall have nautical charts and publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage. An electronic chart display and information system (ECDIS) is also accepted as meeting the chart carriage requirements of this subparagraph. Ships to which paragraph 2.10 applies shall comply with the carriage requirements for ECDIS detailed therein;

2.1.5 back-up arrangements to meet the functional requirements of subparagraph .4, if this function is partly or fully fulfilled by electronic means

2.10 Ships engaged on international voyages shall be fitted with an Electronic Chart Display and Information System (ECDIS) as follows:

.1 passenger ships of 500 gross tonnage and upwards constructed on or after 1 July 2012;

.2 tankers of 3,000 gross tonnage and upwards constructed on or after 1 July 2012;

.3 cargo ships, other than tankers, of 10,000 gross tonnage and upwards constructed on or after 1 July 2013;

.4 cargo ships, other than tankers, of 3,000 gross tonnage and upwards but less than 10,000 gross tonnage constructed on or after 1 July 2014;

.5 passenger ships of 500 gross tonnage and upwards constructed before 1 July 2012, not later than the first survey on or after 1 July 2014;*

.6 tankers of 3,000 gross tonnage and upwards constructed before 1 July 2012, not later than the first survey on or after 1 July 2015;*

.7 cargo ships, other than tankers, of 50,000 gross tonnage and upwards constructed before 1 July 2013, not later than the first survey on or after 1 July 2016;*

.8 cargo ships, other than tankers, of 20,000 gross tonnage and upwards but less than 50,000 gross tonnage constructed before 1 July 2013, not later than the first survey on or after 1 July 2017; and*

.9 cargo ships, other than tankers, of 10,000 gross tonnage and upwards but less than 20,000 gross tonnage constructed before 1 July 2013, not later than the first survey on or after 1 July 2018.'*

1.12.2 Flag State

The Malta Transport Authority requirements for the carriage of ECDIS were set out in Transport Malta's Administration Requirements Document, Section 1, Article 1.20 which stated:

'Ships fitted with an ECDIS type approved in accordance with relevant international standards, including IMO Resolution A.817(19) as amended, and with adequate back up arrangements are accepted as meeting the chart carriage requirements of SOLAS 74 Chapter V regulation 27 when navigating in waters covered by Electronic Navigation Charts (ENC) officially issued by an authorised Hydrographic Office.

The following arrangements are accepted as fulfilling the back-up requirement:

- *A second type-approved ECDIS'*

The document did not specify the training standards required for ships' crews navigating solely using ECDIS.

1.13 ECDIS PERFORMANCE STANDARDS

The performance specifications for ECDIS are detailed in IMO Resolution MSC 232(82) which was adopted by the Organization on 5 December 2006. The requirement for performance standards includes:

5.8. It should be possible for the mariner to select a safety contour from the depth contours provided by the system ENC. ECDIS should emphasize the safety contour over other contours on the display, however, if the mariner does not specify a safety contour, it should default to 30m.

6.1. ECDIS should provide an indication if:

1. *the information is displayed at a larger scale than that contained in the ENC: or*

2. *own ship's position is covered by an ENC at a larger scale than that provided by the display.*

11.3.4. An indication is required if the mariner plans a route across an own ship's safety contour.

11.4.3. ECDIS should give an alarm if, within a specified time set by the mariner, own ship will cross the safety contour.

11.5.1. ECDIS should store and be able to reproduce certain minimum elements required to reconstruct the navigation and verify the official database used during the previous 12 hours. The following data should be recorded at 1 minute intervals:

1. *to ensure a record of own ship's past track: time, position, heading and speed; and*

2. *to ensure a record of official data used: ENC source, edition, data, cell and update history.*

11.5.2. In addition, ECDIS should record the complete track for the entire voyage, with time marks at intervals not exceeding 4 hours.

11.5.3. It should not be possible to manipulate or change the recorded information.

Appendix 5 lists the ECDIS features which are specified as alarms or indications. The 5 mandated alarms are;

- *'Crossing safety contour*
- *Deviation from route*
- *Positioning system failure*
- *Approach to critical point*
- *Different geodetic datum'.*

An alarm is defined as *'an alarm or alarm system which announces by audible means or audible and visual means, a condition requiring attention'.*

1.14 OPERATOR STANDARDS

1.14.1 OOW

The International Convention for Standards of Training and Certification of Watchkeepers 1995 (STCW) Table A-II/1 sets out the requirement for competence of officers in charge of a navigational watch in ships of 500gt or more. Specifically for those officers serving on ships fitted with ECDIS, their knowledge of the capability and limitation of ECDIS operations should include:

- *'a thorough understanding of ENC data, data accuracy, presentation rules, display options and other chart data formats*
- *the dangers of over-reliance*
- *familiarity with the functions of ECDIS required by the performance standards in force'.*

Proficiency in operation, interpretation and analysis of information obtained from ECDIS should include:

- *'safe monitoring and adjustment of information, including own position, chart data displayed and route monitoring*
- *efficient use of settings to ensure conformance to operational procedures, including alarm parameters for anti-grounding*
- *situational awareness while using ECDIS including safe water and proximity of hazards, set and drift, chart data and scale selection and suitability of route'.*

1.14.2 Senior officers

STCW Table A-II/2 specifies the minimum standard of competence required for masters and chief mates on ships of 500gt or more. It expands the knowledge levels detailed in Table A-II/1 to include, among other things:

- *'Use ECDIS log-book and track history functions for inspection of system functions, alarm settings and user responses*
- *Use ECIDS playback functionality for passage review, route planning and review of system functions.'*

1.15 OPERATOR TRAINING REQUIREMENTS

1.15.1 International Safety Management Code

The International Safety Management Code (ISM Code) provides a standard for the safe management of ships. Guidance in the ISM Code includes:

> *'6.2 The company should establish procedures to ensure that new personnel and personnel transferred to new assignments related to safety and protection of the environment are given proper familiarization with their duties.'*

1.15.2 Generic training

IMO model course 1.27 was issued by the IMO's STW sub-committee and offered guidance on generic ECDIS training. The model course 1.27 syllabus was intended to meet the requirements of the STCW Code, specifically the requirements of tables A-II/1 and A-II/2. Students completing the course should be equipped with the knowledge, skill and understanding to keep a safe navigational watch using an ECDIS system.

1.15.3 Familiarisation

The IMO published guidance regarding ECDIS familiarisation to member states in STCW.7 Circular Note, dated 22 May 2012. This guidance included:

'.5 Masters and officers certified under chapter II of the STCW Convention serving on board ships fitted with ECDIS are to be familiarized (in accordance with STCW regulation 1/14) with the ship's equipment including ECDIS;

.6 ECDIS manufacturers are encouraged to provide resources, such as type-specific materials, which could be provided on a CD or DVD. These resources may form part of the ECDIS familiarization training;

.9 Regulation 1/14, paragraph 1.5 of the STCW Convention, as well as sections 6.3 and 6.5 of the International Safety Management (ISM) Code requires companies to ensure that seafarers are provided with familiarization training. A ship safety management system should include familiarization with the ECDIS equipment fitted including its backup arrangements, sensors and related peripherals. To assist Member Governments, Parties to the STCW Convention, companies and seafarers, a record of such familiarization should be provided;

.10 Administrations should inform their Port State Control officers of the requirements for ECDIS training as detailed in paragraph 9 above. A certificate of competency issued in accordance with the 2010 Manila Amendments would be prima facie evidence of generic ECDIS training; however, a record of the ship specific familiarization of the ECDIS should be provided.'

1.16 VOYAGE PLANNING

STCW Section A-VIII/2, Part 2, states that:

'*Prior to each voyage the master of every ship shall ensure that the intended route from the port of departure to the first port of call is planned using adequate and appropriate charts and other nautical publications as necessary for the intended voyage, containing accurate, complete and up-to-date information regarding those navigational limitations and hazards which are of a permanent or predictable nature and which are relevant to the safe navigation of the ship.'*

1.17 WATCHKEEPING STANDARDS

STCW Section A-VIII/2, Part 3, states that:

'9. The master of every ship is bound to ensure that watchkeeping arrangements are adequate for maintaining a safe navigational watch. Under the master's general direction, the officers of the navigational watch are responsible for navigating the ship safely during their periods of duty, when they will be particularly concerned with avoiding collision and stranding.

14. The lookout must be able to give full attention to the keeping of a proper lookout and no other duties shall be undertaken or assigned which could interfere with that task.

20. Prior to taking over the watch, relieving officers shall satisfy themselves as to the ship's estimated or true position and confirm its intended track, course and speed, and UMS[9] controls as appropriate and shall note any dangers to navigation expected to be encountered during their watch.

36. Officers of the navigational watch shall…bear in mind that the echo sounder is a valuable navigational aid.

42. The officer in charge of the navigational watch shall give watchkeeping personnel instructions and information which will ensure the keeping of a safe watch, including a proper lookout.

48. The officer in charge of the navigational watch shall positively identify all relevant navigational marks.'

1.18 CHANNEL NAVIGATION INFORMATION SERVICE

1.18.1 Purpose

The CNIS was introduced in 1972 and provides a 24-hour radio and radar safety service for shipping within the Dover Strait. By collecting, recording and disseminating maritime information, the CNIS aims to provide the latest safety information to shipping in the CNIS area. CNIS is jointly provided by the UK and French Maritime authorities in Dover and Gris Nez respectively. In the UK, the MCA is responsible for the operation of CNIS, which it delegates to Dover Coastguard. The CNIS area is shown at **Figure 14**.

[9] Unmanned Machinery Space

Image courtesy of NP 286, Volume 1, Admiralty List of Radio Signals, Pilot Services, VTS Services and Port Operations (UK)

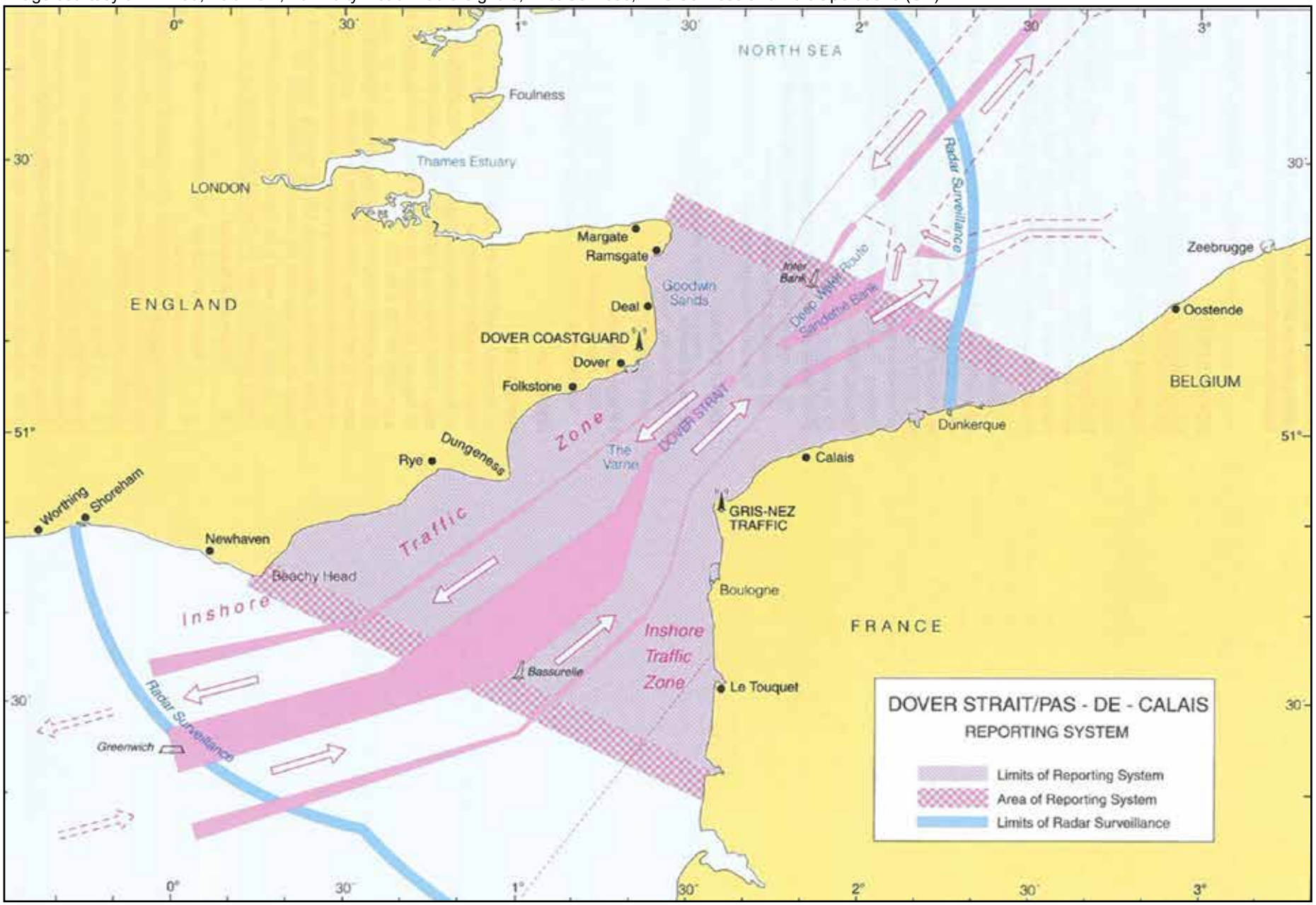


Figure 14: CNIS - coverage

1.18.2 Vessel traffic services

Merchant Shipping Notice (MSN) 1796, issued by the MCA in April 2006, designated vessel traffic service (VTS) stations in the UK in accordance with the Merchant Shipping (VTS Reporting Requirements) Regulations 2004. This notice defined the level of service available to shipping operating in designated VTS areas. Annex A of MSN 1796 designated the CNIS as an 'information service', which it defined as:

- *'A service to ensure that essential information becomes available in time for on-board navigational decision making'.*

1.18.3 Equipment and manning

The CNIS station within Dover Coastguard contains an array of displays showing integrated radar and AIS information which provide operators with a good situational awareness of shipping in the area. Operators also have access to VHF voice and digital selective calling (DSC) communication systems.

The CNIS operator's tasks include preparing and transmitting routine broadcasts as well as managing reports from ships entering the area. The CNIS station is continuously manned by a suitably qualified watch officer. However, it is acceptable for a trainee to operate the CNIS station provided a fully qualified operator is supervising.

1.18.4 Varne Bank alerting system

One of the duties of a CNIS watch officer is to monitor the Varne Bank alerting system. A warning activates in two stages:

- When a vessel's radar vector (based on the distance a vessel will travel in 6 minutes) **(Figure 5)** enters a radar guard zone set around the Varne Bank.

- When the vessel itself enters the guard zone.

When a vessel's vector crosses the boundary of the guard zone, an audible alarm is activated and the ship's symbol on the radar display changes colour from black to red, and flashes. The alert is shown as '*Approaching Varne*' on the operator's display. The operator then has two options:

1. *Acknowledge* – this mutes the audible alarm but the radar target continues to flash red. If this option is selected, the audible alarm will reactivate when the ship enters the radar guard zone.

2. *Authorise* – this mutes the audible alarm and the flashing red ship symbol turns black and stops flashing. The alarms do not reactivate when the ship enters the radar guard zone.

When the alarm first sounds, the operator is required to establish the vessel's intentions and, if a risk of grounding is identified, issue a warning via VHF radio. When the alarm is activated by a vessel which is able to navigate safely across the bank and is permitted to so, the vessel's movement is '*authorised*'.

The procedure to be followed on activation of the Varne Bank alerting system was circulated to all watch officers by e-mail by the CNIS manager on 29 April 2013. It was not included in Dover Coastguard's written procedures.

1.18.5 CNIS operator training

In order to qualify as a CNIS operator, watch officers were required to hold a VTS certificate (V103) and complete the '*CNIS Operator Assessment and Endorsement Procedure'.* The V103 qualification is the nationally recognised VTS operators' training scheme, which is endorsed by the MCA as the National Competent Authority for VTS services in the UK. The syllabus covers all aspects of VTS operations including traffic management, VHF radio work, communication co-ordination and dealing with emergency situations.

The '*CNIS Operator Assessment and Endorsement Procedure'* is also endorsed by the MCA and is a detailed training scheme covering the specifics of the CNIS system. Candidates were required to demonstrate a thorough knowledge of the system through supervised watchkeeping and a written exam. However, the syllabus did not contain a specific requirement for training on the Varne Bank alerting system.

1.18.6 Watch system

To provide 24 hour coverage, Dover Coastguard operates a four watch system. The duty watch is responsible for four key functions: CNIS, Sunk VTS[10], the monitoring of VHF channel 16 and search and rescue (SAR). This requires a minimum of four qualified operators within each watch to be available at all times. However, it was policy to have six operators (including trainees) available for day watches[11] and five for night watches[12].

The watch on duty overnight on 17/18 September 2013 comprised:

- a watch manager
- a watch officer
- two trainee watch officers (one from a different watch)
- a watch assistant.

Only three qualified operators were on watch because the senior watch manager and a part-time watch officer were both on leave. At the time of the grounding, the watch manager and watch officer were both absent from the operations room on a meal break. The responsibilities of the personnel remaining were:

- Sunk VTS - watch assistant (V103 qualified)
- CNIS - trainee watch officer
- VHF channel 16/SAR - trainee watch officer

[10] The North Sea Sunk area VTS is operated by Dover Coastguard

[11] 0800-2000 local time

[12] 2000-0800 local time

None of the three remaining operators were nominated by the watch manager to be 'in charge' during his absence.

1.18.7 CNIS manpower

Manpower shortfalls meant the duty watch was frequently unable to meet watch commitments without augmentation by operators from the 'non-duty' watches. As a result, it was commonplace for members of staff to work overtime on other watches to ensure the minimum manning levels were maintained. The risk associated with this difficulty in sustaining appropriate manning had been reported by Dover Coastguard managers to the MCA headquarters, but its actions were ineffective in easing the manning shortfall.

The *Watch Staffing Planning and Risk Evaluation* for the period 15-18 September 2013 is at **Annex H**. This assessment shows that, at the time of the grounding, the watch was at minimum manning. It also shows that the day watch on 15 September 2013 was two watch officers below the minimum manning level. The shortages highlighted in the evaluation were typical of the shortages experienced at other times.

1.19 PREVIOUS ACCIDENTS

1.19.1 *Lowlands Maine*

On 26 April 2006, the bulk carrier *Lowlands Maine* ran aground on the Varne Bank. During passage through the Dover Strait, the ship's chief officer made an alteration of course to regain track. The new course headed directly for the Varne Bank. Before the vessel had regained track, the third officer took over the bridge watch. The third officer fixed the ship's position and saw that the ship had regained track. However, he did not adjust the ship's heading back to the base course and the ship continued to head for the Varne Bank until grounding.

1.19.2 *LT Cortesia*

On 2 January 2008, the container ship *LT Cortesia* ran aground on the Varne Bank, causing the buckling of an internal bulkhead. The accident report published by the German Federal Bureau of Maritime Casualty Investigation concluded that the OOW had not properly assessed the shipping situation and that communications with the lookout were ineffective. The report also identified that the contour and alarm settings on the ECDIS were inappropriate.

1.19.3 *CFL Performer* – MAIB report 21/2008

On 12 May 2008, the Netherlands registered dry cargo ship, *CFL Performer*, ran aground on Haisborough Sand. The grounding occurred after the chief officer adjusted the passage plan in the ECDIS. The adjusted route, which took the vessel directly over Haisborough Sand, was not checked by the master. The MAIB investigation established that, despite ECDIS being used as a primary means of navigation, none of the ship's officers had been trained in its use. A recommendation was made to the MCA to support a proposal that ECDIS competencies were included in the STCW Convention.

1.19.4 ***CSL Thames*** – MAIB report 02/2012

On 9 August 2011, the Malta registered self-discharging bulk carrier, *CSL Thames*, grounded in the Sound of Mull. The grounding occurred after the OOW had made an alteration of course to avoid another vessel, but had not noticed that the new course would take the ship into shallow water. The audio alarm on the ship's ECDIS system, which could have alerted the OOW to the danger, was inoperative. In addition, the master and other watchkeepers' knowledge of the ECDIS system was insufficient.

SECTION 2 - ANALYSIS

2.1 AIM

The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making safety recommendations to prevent similar accidents occurring in the future.

2.2 OVERSIGHT AND SCRUTINY

It is evident from the planned track over the Varne Bank **(Figures 1** and **2)** that the route planned by the third officer was unsafe and had never been properly checked. The third officer had zoomed in on each leg of the route on the ECDIS in order to visually identify navigational hazards. However, this very basic approach was unlikely to identify all the dangers associated with the passage. The ECDIS check-route page **(Figure 11)** would have been more accurate and reliable. Nonetheless, the danger of passing over the Varne Bank should have still been readily apparent had the visual check been completed diligently.

The requirement to prepare a safe passage plan underpins safe navigation. Therefore, it is important that officers responsible for this task are sufficiently experienced and competent. In this case, the master's decision to direct the third officer to plan the passage was reasonable. The second officer's departure from the vessel was imminent and the third officer was soon to be promoted. The third officer had also been trained in the use of ECDIS and had used the Maris 900 during his 5 months on board. However, the complexity of the route and the inexperience of the third officer warranted a high degree of supervision and scrutiny. Instead, there was none. It is astonishing that the second officer did not assist, advise or monitor the third officer, and that the master did not check the intended route himself.

Although the second officer had been expecting to leave the ship, no formal handover of navigation officer responsibilities had taken place. The second officer was, therefore, still the navigating officer. He was demotivated because he had not been able to leave the ship in Hamburg, but this should not have impinged on the second officer's professional responsibility to provide oversight of the third officer and pass on the benefits of his experience. Indeed, it is a task that the master should have directed him to undertake.

2.3 BRIDGE WATCHKEEPING PRACTICES

2.3.1 Events leading to the grounding

When the chief officer arrived on the bridge, he did not check the route ahead to identify potential navigational hazards or the navigational marks likely to be encountered during his watch. Consequently, he was unaware that the ship's intended track passed over the Varne Bank. He was also ignorant of the cardinal marks marking the danger.

When *Ovit* grounded, the chief officer had been on watch for 2 hours. During this time, he had mainly remained seated in the chair in front of the ECDIS and radar displays **(Figure 3)**. However, his alignment of the scale set on the ECDIS with the

range scale on the adjacent radar display resulted in the ECDIS being on a scale of 1:151712, which was totally inappropriate for the area. Consequently, safety critical information was not displayed.

The chief officer did not appear to be concerned that the ECDIS display was showing 'jail bars' **(Figure 6)** which he could not avoid seeing. He was using ECDIS solely to monitor the vessel's position relative to its intended track, nothing more. The chief officer probably did not see on the display that *Ovit* crossed the safety contour at 0251 and 0417. Given the ECDIS settings, crossing the safety contour was a routine event which was likely to have been frequently ignored.

It is evident that the chief officer either did not look out of the bridge window, or he did not try and associate and correlate what he saw ahead of the ship with the information available from his radar, AIS and ECDIS. Therefore, even if the lookout had reported his sighting of lights ahead, it is uncertain whether the chief officer would have recognised their significance.

During the reconstruction **(paragraph 1.9)** the east and west cardinal marks became visible at a range of 5nm. Consequently, they could potentially have been seen by the OOW and the lookout 25 minutes before *Ovit* grounded. This was ample time in which to identify the buoys, highlight the error in the passage plan, and take corrective action.

2.3.2 Events following the grounding

At 0434, when *Ovit* stopped in the water between the cardinal marks delineating the limits of the Varne Bank **(Figure 4)**, the chief officer's situational awareness was so poor that he did not know that the vessel had grounded. It was only when an engineering alarm sounded at 0437 that he became aware that something was wrong. Even then, it is evident that he thought that the ship was stopped because of a machinery breakdown. Nonetheless, that the chief officer called the master after he moved the azipod control levers to zero pitch, indicates that he appreciated the seriousness of being without propulsion in a traffic separation scheme (TSS).

It was probably Dover Coastguard's call on VHF radio **(Table 1)** stating that *Ovit* might be on the Varne Bank that prompted the chief officer to change the scale on the ECDIS in order to see more information. Only then, at 0453, 19 minutes after *Ovit* had stopped, did the chief officer realise that the tanker had grounded.

Although the chief officer then again telephoned the master, the general alarm was not sounded and no crew muster was undertaken. Furthermore, it was not until prompted by the CNIS operator at 0507 that the chief officer informed Dover Coastguard that *Ovit* was aground **(Table 2)**. The vagueness and lack of accuracy of the chief officer's responses to the subsequent questions asked by the CNIS operator were unhelpful, particularly as the operator was trying to establish what had happened and the level of assistance that might be required.

2.4 BRIDGE ORGANISATION

An important element of passage planning is ensuring that the ship is adequately prepared to meet the demands of any navigational situation. In this case, the master was aware that when *Ovit* sailed from Rotterdam, several hours of pilotage would be followed by a long transit through the TSS, including the Dover Strait.

The Dover Strait is a demanding passage which presents a series of significant navigational hazards for shipping, including dangerous shallows and a high traffic density. However, the area is well surveyed and charted, dangers are marked by navigation aids and it is closely monitored by VTS stations in the UK and France. Nevertheless, it is coastal navigation and requires a high state of alertness and the ability to react quickly to the potential dangers.

The watch conditions detailed in *Ovit*'s SMS **(Annex G)** provided guidance on the levels of bridge manning in differing situations. In this case, *Ovit* was following a traffic lane, visibility was good and there were few other ships in the immediate area. Therefore, the applicable watch condition to be used arguably rested between 'watch condition A' (OOW and lookout) and 'watch condition B' (master, OOW and lookout). Namely, the master would probably be required to be on the bridge when approaching and passing key choke points, such as the Varne Bank.

However, although the potential dangers of heavy traffic and the proximity of navigational hazards warranted a cautious approach, they did not trigger any additional precautions on board *Ovit*. The passage through the Dover Strait was treated in exactly the same way as a passage in open water. Indeed, the master's decision to remain in his cabin when called by the chief officer at 0437, indicates an astounding level of complacency given that his vessel was apparently drifting in the Dover Strait with no propulsion available.

2.5 ECDIS

2.5.1 Use on board *Ovit*

ECDIS was the primary method of navigation on board *Ovit*; no paper charts were carried. Therefore, it was vital that the system was set up appropriately and that the officers operating the equipment were fully familiar with its functions. The circumstances of the accident show that the Maris 900 was not used effectively. In particular:

Safety contour

The safety contour setting is intended to offer the OOW a distinct difference between safe and potentially unsafe water; crossing the safety contour initiates an alarm to alert the watchkeeper. Using the formula in *Ovit*'s SMS,[13] **(Annex E)**, the safety contour value should have been set at 13.35m. The ECDIS would then have defaulted to the nearest deeper contour on the chart in use, which was the 20m contour. Instead, the safety contour was set to 30m, which was the manufacturer's default setting. A comparison of ECDIS displays using 30m and 20m safety contours **(Figure 13)** shows that use of the 20m setting would have provided a much clearer picture of where there was safe water available.

Route monitoring

A deviation from the planned route is a mandatory ECDIS alarm. However, the XTD alarm is only effective when the planned route is safe in the first place and an appropriate value for XTD is set. In this case, the XTD value was 0.00nm and therefore the XTD alarms were of no value.

[13] (Draft + squat) x 1.5 = (7.9 + 1) x 1.5 = 13.35m

ENC management

During the Dover Strait passage, the ENC in use was GB202657 which was a 'general' chart on a scale of 1:350,000 **(Figure 15)**. In coastal waters, this scale of chart would only be effective for planning purposes. ENC, GB401892 on a scale of 1:45,000 **(Figure 16)**, which was suitable for coastal navigation, was available on board but it was not in use. The ECDIS 'auto-load' feature, which would have automatically selected the best scale chart, was switched off.

Although the presence of the jail bars **(Figure 6)** should have alerted the OOW that something was wrong with the ECDIS display, the chief officer did not recognise their significance. Consequently, he did not manually load the better scale ENC.

Audible alarm

The ECDIS audible alarm is a mandated feature and is vital for alerting the operator to navigational danger or system failures. Without the correct configuration of the communications port, *Ovit*'s audible alarm was inoperable. Although the installation report **(Annex D)** stated that all configurations had been completed, it is possible that the audible alarm had never worked on board. However, it is also possible that the configuration of the alarm's communication port had been tampered with during *Ovit*'s time in service. Either way, the evidence gathered during this investigation indicates that the vessel's deck officers had operated the ECDIS without an audible alarm for a considerable period of time.

2.5.2 The Maris 900 system

In addition to the incorrect operation of the ECDIS by *Ovit*'s deck officers, some features of the Maris 900 ECDIS on board the vessel were either difficult to use or appeared not to comply with international standards, notably:

- At the top of the check-route page, it clearly stated that the selected route was unsafe **(Figure 11)**. However, it was unhelpful that the words 'no alarms' could be seen in the bottom left of the same page. The 'no alarms' information refers to system input data but, as shown by *Ovit*'s deck officers' understanding of the system, it can be inadvertently linked with the navigational safety data above it.

- Despite its critical importance, the safety contour setting is one of several indistinguishable settings on the same page **(Figure 9)**. The importance of the safety contour setting is not emphasised to the operator.

- The safety contour alarm should have activated shortly before *Ovit* crossed the 30m contour at 0417. However, the ECDIS display during the grounding **(Figure 6)** shows that only the XTD and grounding alarms were active. As the safety contour alarm is intended to activate when a vessel is about to cross the designated contour, it is almost certain that it did not function because the 'display and highlight dangers' option on the guard zone page was set to 'never' **(Figure 10)**. Effectively, this disabled a mandatory alarm.

- The ability to record and then retrieve a vessel's track history is a mandatory feature listed in the ECDIS performance standards **(paragraph 1.13)**. Other than the vessel's position at 0412, *Ovit*'s track history could not be recovered from the system after the grounding.

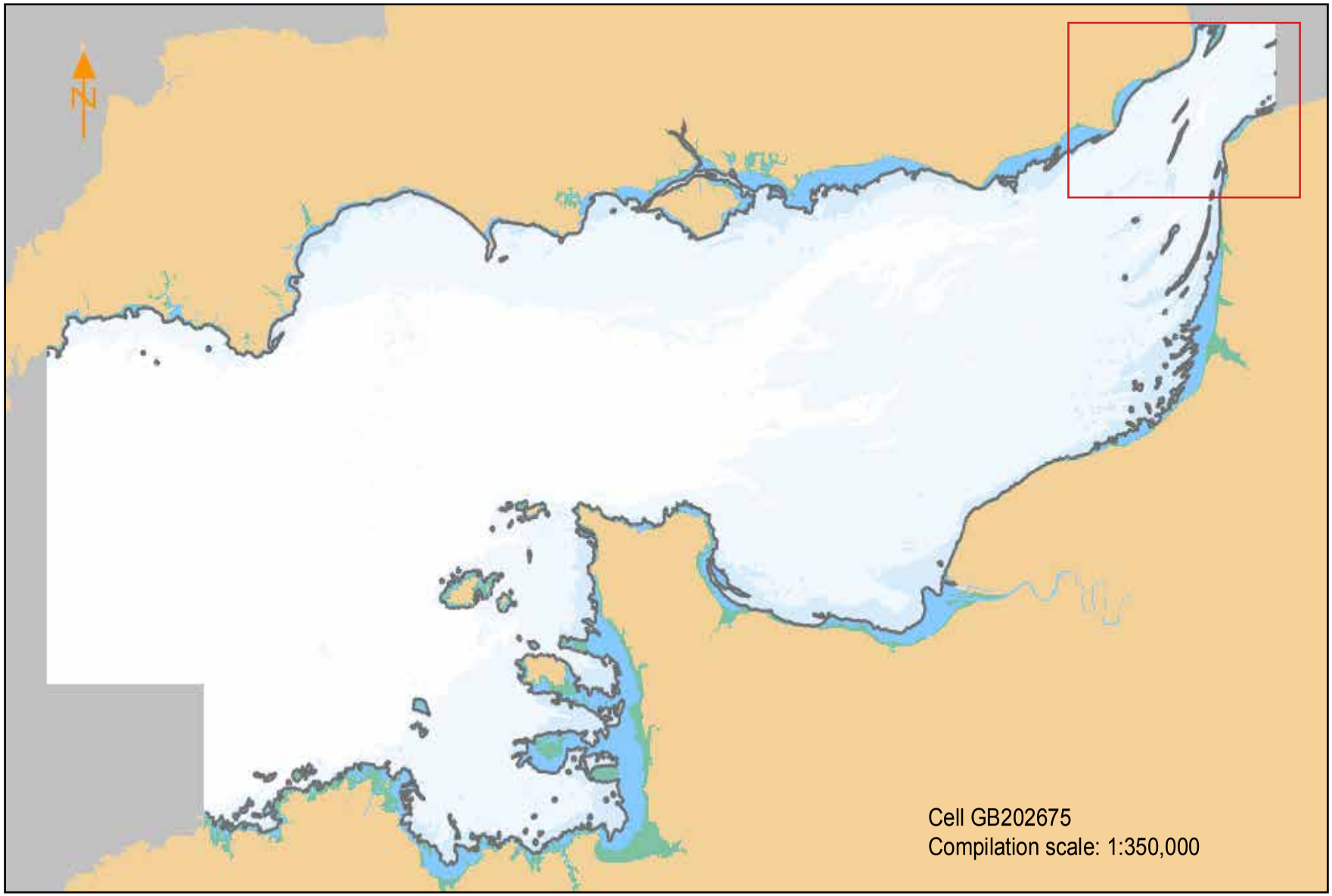


Figure 15: Area coverage of ENC cell 202675

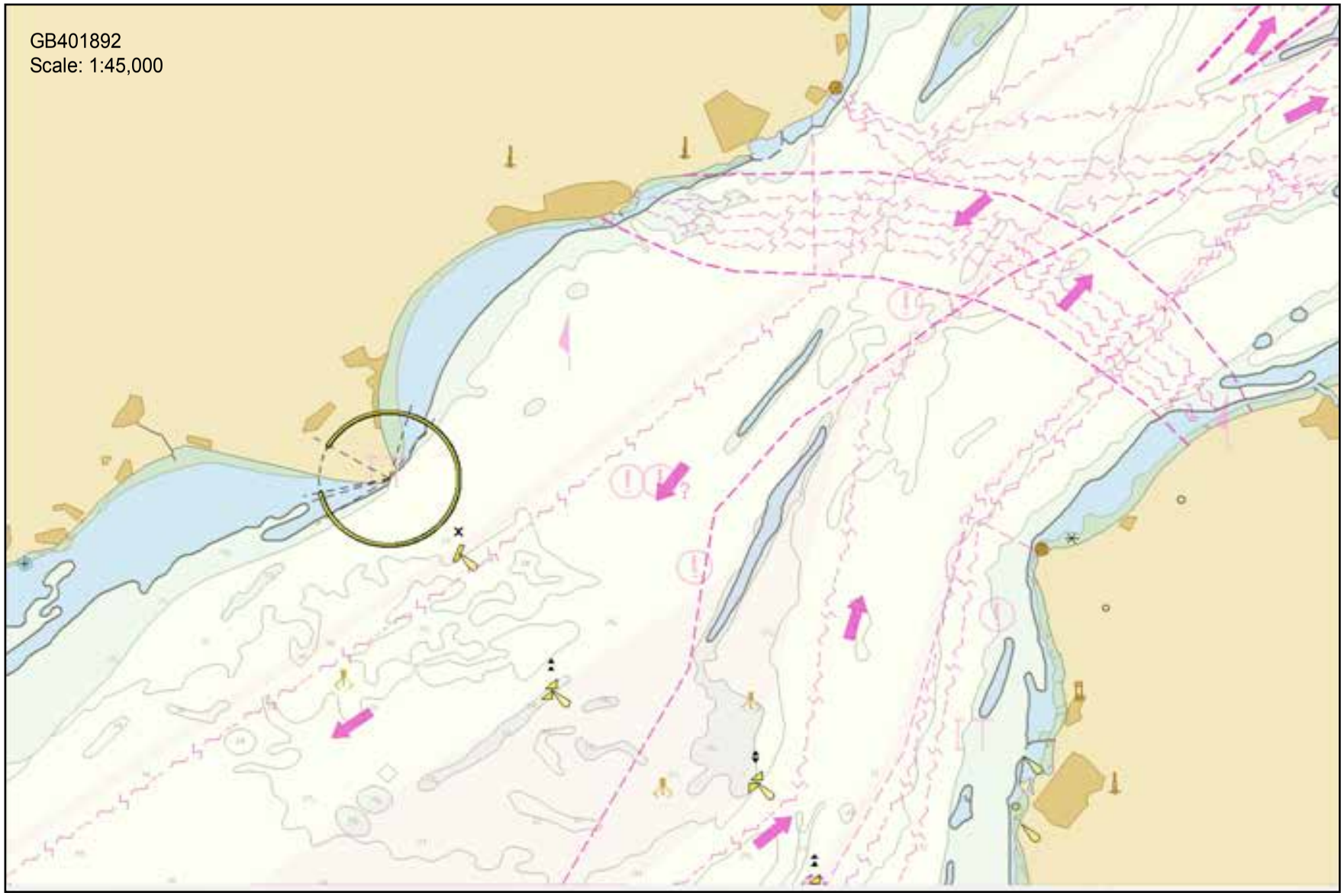


Figure 16: Area coverage of ENC cell 401892

2.6 ECDIS TRAINING AND FAMILIARISATION

Ovit's master and its deck officers had completed generic training on the use of ECDIS. They had also completed type-specific training on the Maris 900 system before joining *Ovit*. Nonetheless, it is evident that they were unable to safely and confidently operate the ECDIS on board the vessel. Therefore, while the officers' training satisfied the requirements of STCW and the ISM, they were unaware of the importance of critical safety settings and the significance of the system's alarms. In short, the training which the ship's officers had attended was apparently either ineffective, or insufficient, or both.

The relatively rapid introduction of ECDIS has led to a situation where large numbers of deck officers are having to be trained in its use in a short timescale. In this case, it led to ships' officers of varying ranks and experiences being trained in the same classroom. From the outside, this did not appear to have been a problem. However, it clearly presented difficulties for *Ovit*'s master, who felt unable to ask questions or admit a lack of knowledge because it could be identified as a weakness. Consequently, he gained little from the type-specific training and was unable to use the Maris 900 when he arrived on board. Therefore he was unable to meet his many responsibilities with regard to SOLAS and STCW.

The requirements for the delivery and content of ECDIS familiarisation has been debated for some time. Currently, it is left to the discretion of Flag States and ship owners to decide. The options available include shore-based courses and computer-based training from a variety of training providers. However, Flag States seem to differ on the suitability of including training on specific ECDIS models during generic courses.

Irrespective of the way the requirement for ECDIS familiarisation is met, it is essential that ship owners and managers ensure that it is effective. Given that some deck officers are familiar with and understand modern technology more than others, and that cultural influences also affect learning, this will not always be easy to achieve.

2.7 ONBOARD LEADERSHIP

The SMS bridge procedures provided on board *Ovit* by Ayder Tankers Ltd were comprehensive and included extensive guidance on the conduct of navigation using ECDIS. The master had also been briefed on the SMS by the ship managers during his visit to its offices before he joined *Ovit*. However, it is evident that the master and deck officers did not implement the ship manager's policies for safe navigation and bridge watchkeeping.

The serious shortcomings in the supervision of the passage planning and bridge watchkeeping practices, the lack of awareness of the increased risk when transiting the Dover Strait, and the incorrect or inappropriate use of the ECDIS, have already been discussed **(paragraphs 2.3, 2.4, 2.5** and **2.6)**. There are, however, a number of other departures from the onboard guidance which removed important safety barriers. These included:

- No pre-sailing brief took place among the deck officers before the ship sailed. Indeed, it is likely that such briefs were rarely held.

- The inoperative ECDIS alarm had not been reported. Instead, the deck officers were content to 'live' with the defect.

- The BNWAS was switched off and no safety depth setting was selected on the echo sounder.

- The *ECDIS –Voyage Plan – Check List* **(Annex B)** was not used.

The on board management of *Ovit* was dysfunctional. Morale was low; the second officer did not want to remain on board and the newly promoted chief officer had been put under pressure by the delays in crew handover and the unavailability of cigarettes on board. More importantly, the master provided insufficient leadership for a safety culture to be developed and instilled on his bridge.

A ship's master should have the confidence to set the standards for his bridge team, which should include leading by example and identifying and addressing training shortfalls. To achieve this, a master should have the necessary technical knowledge and professional skill. In this case, ECDIS was the primary means of navigation, but *Ovit*'s master was not confident using it. Therefore, he was reliant on his junior officers, who were also unable to operate the ECDIS effectively.

At the time of the vessel's grounding, the master had been on board *Ovit* for 3 months. This was ample time for him to better familiarise himself with the ECDIS operation, particularly its check-route function, which would have enabled him to oversee the work of his officers. By not making the effort to do this, the master set a poor example. Although *Ovit'*s master had been qualified as a master for 8 years and had completed a BRM course 6 months earlier, it is evident that his technical and management skills had not fully developed.

2.8 NAVIGATION AUDIT AND INSPECTION

2.8.1 Navigation audits

The serious shortcomings with the navigation on board *Ovit* highlighted in this investigation had not been identified during the vessel's recent audits and inspections **(paragraph 1.11)**. However, other than the SIRE inspection, the audits and inspections pre-dated the vessel's crew at the time of grounding, and the SIRE inspection occurred when the second officer was the ship's navigator.

Although the SIRE inspection occurred only 10 days before the grounding, the two navigation-related observations reported indicate that the inspection went into some detail. Nevertheless, the inspection did not identify the crew's lack of competence in using ECDIS, or the significant defect with its audible alarm.

It is recognised that audits and inspections are a sampling process; it would be impossible to check every facet of a ship's navigation within a reasonable timescale. However, as ECDIS is replacing paper charts as the primary means of navigation on many vessels, it is imperative that auditors and inspectors are able to identify problems in the way ECDIS are managed, maintained and used. The degree of understanding required of an auditor to check that ENC data in an ECDIS is up to date is clearly more complex than that required to check a written passage plan, and the correction status of paper charts and nautical publications.

Many auditors and inspectors do not have a background in navigation, and those that do might not have been trained in ECDIS. Consequently, few will have even a basic understanding of the system, leaving them ill-equipped to assess a core safety-critical function, that of safe navigation. Therefore, there is a strong case for the development and provision of tools that will enable auditors and inspectors to properly check the use and performance of this equipment.

2.8.2 Routine performance testing

Establishing that the VDR in a ship is performing correctly can be difficult due to the 'black box' nature of the system. As a result, VDR systems are subject to installation and annual performance checks. This IMO requirement[14] has to be conducted by a competent person and aims to confirm compliance with international performance standards.

As ECDIS is increasingly widely fitted in accordance with mandatory IMO carriage requirements, there would potentially be significant benefit from a testing regime similar to that for VDRs. This would enable Flag State, PSC and other inspectors such as OCIMF to be assured that a ship's ECDIS system had been subject to thorough and frequent performance testing.

2.9 DOVER COASTGUARD

2.9.1 Varne Bank alerting system

While the responsibility to avoid grounding lies with the ship's master, the Varne Bank alerting system provides a valuable additional safety barrier against this significant hazard in the Dover Strait. In this case, the alerting system did not work as intended.

An audible alarm sounded in the Dover Coastguard operations room at 0411 when *Ovit* approached the radar guard zone. At the time, the CNIS operator was communicating with another vessel and, instead of calling *Ovit* on VHF radio to determine the tanker OOW's intentions and if there was a risk of grounding, the operator cancelled both the audible and visual alarm by selecting '*authorise'*. By selecting *'authorise*' rather than '*acknowledge*' the alarms did not reactivate when the vessel entered the guard zone.

Ovit grounded 23 minutes later, but the CNIS operator did not investigate the possibility that the tanker had grounded until 0449 **(Table 1)**. Although it is evident that the operator was distracted at a crucial time, it is also apparent that the operator was not qualified for the role and was not supervised. In addition, there was no specific training for operators in the use of the alerting system and the alerting procedure had not been formalised.

2.9.2 Supervision

As the CNIS operator at the time of the grounding was unqualified for the role, it was inappropriate for the two fully qualified members of the watch to be absent from the operations room at the same time, leaving no one in charge. The presence in the operations room of either the watch manager or the watch officer could easily have been achieved through better management of the watch rota.

[14] IMO MSC.1/Circ.1222 dated 11 December 2006

Had the CNIS operator been properly supervised when the Varne Bank alarm sounded, it is highly likely that a rapid re-prioritisation and re-allocation of tasks would have been prompted. As Dover Coastguard communicated with *Ovit* without difficulty after the grounding, it is reasonable to conclude that, had a clear verbal warning been issued by Dover Coastguard on VHF radio at 0411, there would have been a good prospect of attracting the attention of either *Ovit*'s OOW or lookout in ample time to prevent the grounding.

2.9.3 Manpower

Notwithstanding that better management of the watch rotation could have avoided the trainee operator being left unsupervised, it is of concern that the chronic manpower shortages within Dover Coastguard constantly resulted in watches being under-manned and/or augmented by members of other watches. The *Watch Staffing Planning and Risk Evaluation* covering the period between 15 and 18 September 2013 **(Annex H)** shows that the duty watches at Dover Coastguard were below the minimum manning levels required to maintain an efficient service in its areas of responsibility. As this evaluation was typical of other evaluations, the watch managers were clearly placed under considerable and enduring pressure.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. The passage plan, which was prepared by an inexperienced and unsupervised junior officer, passed directly over the Varne Bank and was unsafe. [2.2]

2. The passage plan was not properly checked for navigational hazards using the ECDIS check-route function and it was not checked by the master. [2.2]

3. When taking over the watch, the OOW did not check the ship's intended track relative to any dangers to navigation that would be encountered on his watch. [2.3.1]

4. The OOW monitored the vessel's position solely against the intended track. Consequently, his situational awareness was poor. [2.3.1]

5. Although the lights from the cardinal buoys marking the Varne Bank were seen by the lookout, they were not reported. [2.3.1]

6. The passage through the Dover Strait was treated in exactly the same way as a passage in open water. Moreover, the master demonstrated an astounding level of complacency when his vessel was apparently drifting in the Dover Strait without propulsion. [2.4]

7. The deck officers were unable to safely navigate using the vessel's ECDIS. The route was not properly checked, inappropriate depth and cross track error settings were used, and the scale of ENC in use was unsuitable for the area. [2.5.1]

8. The ECDIS audible alarm was inoperative. Although the crew were aware of this defect, it had not been reported. [2.5.1]

9. ECDIS training undertaken by the ship's master and deck officers had not equipped them with the level of knowledge necessary to operate the system effectively. [2.6]

10. The SMS bridge procedures provided on board *Ovit* by Ayder Tankers Ltd were comprehensive and included extensive guidance on the conduct of navigation using ECDIS. However, it is evident that the master and deck officers did not implement the ship manager's policies for safe navigation and bridge watchkeeping. [2.7]

11. The on board management of *Ovit* was dysfunctional and the master provided insufficient leadership for a safety culture to be developed and instilled on his bridge. [2.7]

12. The serious shortcomings with the navigation on board *Ovit* highlighted in this investigation had not been identified during the vessel's recent audits and inspections. There is a strong case to develop and provide tools for auditors and inspectors to check the use and performance of ECDIS. [2.8.1]

13. The Varne Bank alerting system operated by Dover Coastguard did not work as intended. A VHF warning was not broadcast to *Ovit* because the CNIS operator was distracted. Also, the operator was not qualified for the role and was not supervised. In addition, there was no specific training in the alerting system, and the alerting

procedure had not been formalised. [2.9.1]

14. It was inappropriate for the two fully qualified members of the Dover Coastguard watch to be absent from the operations room at the same time, leaving the unqualified operator unsupervised. [2.9.2]

15. It is of concern that chronic manpower shortages within Dover Coastguard resulted in watches constantly being under-manned and/or augmented by members of other watches. [2.9.3]

3.2 SAFETY ISSUES NOT DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. Several of the features of the Maris 900 ECDIS on board *Ovit* were either difficult to use or appeared not to comply with international standards. [2.5.2]

2. As ECDIS is increasingly widely fitted in accordance with mandatory IMO carriage requirements, there would potentially be significant benefit from a testing regime similar to that required for VDRs. [2.8.2]

3.3 OTHER SAFETY ISSUES NOT DIRECTLY CONTRIBUTING TO THE ACCIDENT

1. It took the OOW 19 minutes to realise that *Ovit* was aground and a further 14 minutes to report the accident to Dover Coastguard. The OOW's vagueness when subsequently answering the coastguard's questions was unhelpful and potentially could have delayed assistance. [2.3.2]

SECTION 4 - ACTIONS TAKEN

Ayder Tankers Ltd has:

- Issued a company safety bulletin highlighting the issues raised by the grounding with the aim of increasing crew knowledge and safety culture.
- Included training on defect reporting system in in-house training.
- Directed all vessels to conduct a master-led risk assessment for navigation in the Dover Strait.
- Agreed a contract with a third party company for provision of navigational audits of ships.
- Moved to computer-based training for the familiarisation of deck officers in type-specific ECDIS.
- Taken action to ensure that ECDIS training imparted ashore is effectively implemented on board its vessels.

The Maritime Coastguard Agency/Dover Coastguard has, inter alia:

- Included the Varne Bank alerting procedure in its written instructions and embedded the use of the procedure in its operator training and assessment. The procedure has also been updated to limit the authorisation of the Varne Bank alarm to senior watch managers and watch managers only.
- Issued instructions that, where a CNIS operator has not completed a V103/1 VTS Operator course, the trainee operator is to be accompanied by a fully qualified operator sitting alongside at all times.
- Taken action to ensure that watch rotations over meal breaks are properly managed.
- Included the composition of the Dover Coastguard watches as a standing agenda item at monthly management meetings.
- Made arrangements for adjacent coastguard stations to take over Dover's SAR responsibilities in extremis to enable Dover Coastguard to focus on its VTS responsibilities (CNIS and Sunk).
- Invited watch officers at other coastguard stations to move to Dover Coastguard.
- Taken steps to ensure that incursions by vessels into the guard zone around the Varne Bank, which require CNIS operator intervention, are recorded and submitted to the UK Safety of Navigation Committee.

Marine Information Systems AS has:

- Introduced a software upgrade to the Maris ECDIS 900 system to ensure that logbook data recording is always active.

SECTION 5 - RECOMMENDATIONS

The Maritime and Coastguard Agency is recommended to:

139/2014 Forward a submission to the IMO Navigation, Communication and Search and Rescue Sub-committee, promoting the concept of carrying out annual performance checks on all ECDIS systems fitted to ships and in use as the primary means of navigation.

140/2014 Monitor the measures adopted to improve the quality of the VTS services provided by Dover Coastguard to ensure that vessel safety is not compromised, taking into account the importance of sufficient qualified operators being available.

Transport Malta, in co-operation with the Maritime and Coastguard Agency, is recommended to:

141/2014 Propose to the Paris Memorandum of Understanding Committee that a Concentrated Inspection Campaign be conducted of ECDIS-fitted ships to establish the standards of system knowledge among navigators using a list of pre-defined questions.

The International Chamber of Shipping (ICS) and the Oil Companies International Marine Forum (OCIMF) are recommended to:

142/2014 In conjunction with ECDIS experts, develop and promulgate a set of focused questions for use by surveyors and auditors when conducting audits and inspections on ECDIS fitted ships.

Ayder Tankers Ltd is recommended to:

143/2014 Take steps through audit and assessment to monitor the effectiveness of the ECDIS familiarisation provided to its deck officers.

Marine Information Systems AS is recommended to:

144/2014 Improve the management of safety critical information in its ECDIS 900 system, focusing on:

- The protection of recorded positional data in accordance with IMO standards.
- Highlighting the importance of safety contour data to the user.
- The activation of an alarm when the safety contour is about to be crossed in accordance with IMO standards.

Annex A

Voyage Planning checklist

Voyage planning checklist

Charts	Yes	No	Comments
• Are the charts we have in the largest scale available?..... Have we corrected for the latest Notice to Mariners	☑	☐	----------
• Navigational warnings?.....	☑	☐	----------
• Do our charts completely cover the area?.....	☑	☐	----------
• Are there any routing hazards?.....	☐	☑	----------

Sailing Directions			
• Are we following recommended routes?.....	☑	☐	----------
• Are we following local regulations?.....	☑	☐	----------
• Are we aware of potential hazards?.....			----------

Port information			
• Are we aware of local conditions?.....	☑	☐	----------
• Is berthing information available?.....	☑	☐	----------
• Is a VTS manual available?.....	☑	☐	----------
• Is a terminal book available?.....	☑	☐	----------
• Is a tug escort required?.....			----------

Tidal Atlas/Tables			
• Have we discussed stream strength directions?.....	☑	☐	----------
• Have we discussed tidal heights?.....	☑	☐	----------

Weather Reports			
• What is local forecast?.....	☑	☐	EGC & NAVTEX

Vessel Conditions			
• What is the draft and air draft?.....	☑	☐	----------
• What is the underkeel clearance?.....	☑	☐	Check Relevent Page

Maneuvering Data			
• Are we taking into consideration squad when sailing on shallow water..	☑	☐	Check Relevent Page

Chart Information (Following determined on the chart)	Yes	No	Comments
• No-go Areas?.....	☐	☐	----------
• Margins of safety plotted?.....	☐	☐	----------
• Plotted [illegible]	☐	☐	----------
• Have we calculated the wheel-over points [illegible]	☐	☐	----------
• [illegible]	☐	☐	

(Safety depth , safety contour, shallow depth, shallow contour)----------
(Safety depths, alarms must not be changed without master approval)

- Parallel Index References..... ☑ ☐ ----------
- Required speed at differing way points..... ☑ ☐ ----------
- Are land fall lights showed on the charts
- VTS calling points..... ☐ ☐ ----------
- Tidal Stream anticipated..... ☑ ☐ ----------
- Crew call out position..... ☑ ☐ ----------
- Tug meeting area..... ☑ ☐ ----------
- Abort position..... ☑ ☐ ----------
- Emergency Anchorages or emergency tracks?..... ☑ ☐ ----------
- What are our alternative or emergency tracks?..... ☑ ☐ ----------

Briefing

- We all navigators present?..... ☑ ☐ ----------
- Have fixing intervals been determinate?..... ☑ ☐ ----------
- Have fixing points determinate?..... ☐ ☐ ----------
- Have the primary navigation aids been determinated?..... ☑ ☐ ----------
- Have the secondary means been discussed?..... ☑ ☐ ----------
- Have the areas of high risk been determinated and discussed? ☑ ☐ ----------
- Has the bridge team discussed the information flow and agree upon it?..... ☐ ☐ ----------
- Has the charted plan been discussed?..... ☑ ☐ ----------
- Has the watch condition been determinated?..... ☑ ☐ ----------
- Have duties been assigned and understood?..... ☑ ☐ ----------
- Have the conditions for increasing the watch been determinated? ☐ ☐ ----------
- Have the team members been made aware of any defective Equipment?..... ☑ ☐ ----------

Annex B

ECDIS - voyage plan - checklist

ECDIS - VOYAGE PLAN - CHECK LIST

Vessel :
Voyage from : **To:** **Date:**

		YES	NO	NA
1	ENC charts with Permit for the entire voyage available in the ECDIS catalogue? *Tum seferi kapsayan ENC haritaları ve permitleri ECDIS katalogunda mevcut mu?*			
2	ENC charts updated with latest Base and Update CDs? *ENC haritalar enson baz ve guncelleme CD'si ile güncellenmiş mi?*			
3	Is the route prepared using safe settings for draught, Safety Contour and Depth Contours in compliance with the company Under Keel Clearence policy and with due to Squat Effect (Including Trim & Heel) ? *Rota hazırlanirken şirketin UKC polikası ve Squat effect (trim ile meyil'ide içeren) gerekliliklerini karşılayacak derinlik emniyet limitleri (Safety Contour, Depth Contours vb) ayarlarlanmış mı?* Shallow Contour:..... m Safety Depth :..... m XTD alarm : .....NM Safety Contour :..... m Offcourse alarm : .....deg Depth Contour :.....m Max Height : ..... m			
4	Estimated speed for each leg entered into voyage plan? *Sefer planının her ayağı için hız değerleri plana girilmiş mi?*			
5	Confirm WGS-084 has been selected for ECDIS, GPS and used charts. *WGS-084 datumunun ECDIS, GPS ve kullanılan haritalarda seçili olduğu kontrol edilmiş mi ?*			
6	Calculated ETA in route planning tool using present departure date? *Rota planlama modundaki kalkiş tarihi doğru olarak girilmiş mi?*			
7	Are USER CHARTS & NOTES created and/or updated for the voyage with containing as a minimum following items ? *Asağidaki minimum kriterleri iceren kullanıcı haritaları ve notları yaratılmış ve/veya güncellenmiş mi?*			
8	Pilot Reporting Points ? *Pilot raporlama noktaları ?*			
	MandatoryReporting Points ? *Mecburi raporlama noktaları ?*			
	Point Of No Return for Narrow Passages? *Dar kanallar için No Return noktası ?*			
	Contincency Anchorage ? *Acil demirleme mevkileri ?*			
	No Go Areas (Usuing Channel Limits & User Danger Areas) ? *Girilmez alanlar (kanal limitleri ve kullanıcı tehlike alanları seçilerek) ?*			
	Conspicuous targets for position fixing and Cross Checking reference? *Mevki koymak için şüpheli hedefler ve çapraz referans noktaları ?*			
	Paralel Index ?			
	Areas with high speed vessel ? *Yuksek hizli gemilerin calisma bolgesi ?*			
	Relevant Navtex warnings and T&Ps entered using Manual updates and Notes? *Yayınlanan Navtex uyarıları ve T&P düzeltmeleri manual update ve not kullanılarak girilmiş mi?*			
	Echo Sounder programmed in DBS mode ? Vessel draft + UKC ? Echo sounder karinadan(sensorden) derinliği ölçecek şekilde ayarlı mı ? draft +UKC ?			
9	Chart Alert Setting used for planning the Route: *Planlanan rota için ayarlanan harita uyarı kriterleri :*	Alarm	Indicator	On
	User chart Danger *Kullanıcı harita uyarısı*			
	Areas to be avoided *Uzak geçilecek alanlar*			
	Traffic Seperation Zone *Trafik Seperasyon Bölgeleri*			
	Restricted Area *Sınırlandırılmış Alanlar*			
	Caution Area *Dikkatli geçilecek Alanlar*			
	Offshore Production Area *Acikdeniz Uretim Alanlari*			

	Seaplane Landing Area *Deniz Uçaklari iniş Bölgeleri*			
	Submarine Transit Lane *Denizaltı Geçiş Hatları*			
	Marine Farm *Deniz Çiftlikleri*			
10	Voyage Plan checked together with User Charts & Notes using Voyage Specific Contour ? *Sefer planı kullanıcı haritaları ve notlarıyla birlikte sefere tanımlı limitlerle (madde 3) kontrol edildi mi ?*			
11	Voyage plan, Notes and User Charts switched to monitoring mode ? *Sefer planı, notları ve kullanıcı haritaları takip moduna alınmış mı ?*			
12	Voyage Log, Danger Targets Log and Distance Log resetted ? *Sefer kayıtlari, tehlikeli Hedef Kayıtları ve Mesafe sayacı silindi mi (reset) ?*			
13	Print Passage Plan Report ? *Pasaj Planı yazdırıldı mı ?*			

The methods to be used for cross-checking are by all other means available- such as visual bearings, radar position by range/distance, parallel Index etc. It is important for the Navigator practice all the traditional navigational skills and not to be overly confident in the information from the ECDIS During the voyage GPS signal should be monitored continuosly.
Gemi mevki mümkün olan her türlü çapraz mevki kontrol sistemleri (görsel kerteriz, radar mevkisi, paralel index vb.) ile kontrol edilmelidir. Her türlü geleneksel yöntemi kullanarak seyir yapmak ve sadece ECDIS'den gelen bilgilere bağlı kalmamak gözlemcı (vardiya zbt) için önemlidir. Sefer boyunca GPS sinyal kalitesi sürekli olarak takip edilmelidir.

Navigation Officer **Master**

Annex C

Maris 900 classification society approval

DET NORSKE VERITAS

EC TYPE-EXAMINATION CERTIFICATE

Application of: Council Directive 96/98/EC of 20 December 1996 on Marine Equipment as amended by directive 2008/67/EC, issued as "Forskrift om Skipsutstyr" by the Norwegian Maritime Directorate. This certificate is issued by Det Norske Veritas under the authority of the Government of the Kingdom of Norway.

CERTIFICATE NO. **MED-B-5430**

This is to certify that the
Electronic Chart Display and Information System (ECDIS) with backup, and Raster Chart Display System

with type designation(s)
MARIS ECDIS900
Multi Display and Rack computer

Manufacturer
Maritime Information Systems AS
NØTTERØY, Norway

is found to comply with the requirements in the following Regulations/Standards:
Annex A.1, item No. A.1/4.30 and Annex B, Module B in the Directive SOLAS 74 as amended, Regulation V/18, V/19 & X/3, IMO Res A.694(17) & A.817(19), IMO Res. MSC. 64(67), 86(70),191(79) & 232(82) and 2000 HSC Code 13

Further details of the equipment and conditions for certification are given overleaf.

Høvik, 2009-11-20
for **Det Norske Veritas AS**

[redacted]

Head of Department

Notified Body No.: **0575**

DNV local office:
DNV Sandefjord

This certificate is valid until
2014-11-20

[redacted]

Surveyor

Notice: The certificate is subject to terms and conditions overleaf. Any significant changes in design or construction of the product or amendments to the Directive or Standards referenced above may render this certificate invalid. The product liability rests with the manufacturer or his representative in accordance with Council Directive 96/98/EC, as amended.
The Mark of Conformity may only be affixed to the product and a Declaration of Conformity may only be issued when the production/product assessment module referred to in the council directive, is fully complied with.

Annex D

Ovit Maris 900 installation certificate

PRODUCT SERVICE REPORT

STT DENİZ TİCARET VE SERVİS LTD. ŞTİ.
POSTANE MAHALLESİ, RAUF ORBAY CADDESİ, SARMAŞIK SOKAK, NO: 28
34940 TUZLA – İSTANBUL / TÜRKİYE

Tel :+90 216 447 15 60 (pbx) Fax :+90 216 447 15 64
http : // www.stt.com.tr E-mail : stt@stt.com.tr

NORTHROP GRUMMAN
Sperry Marine

SAILOR.
Thrane & Thrane

CONTRACT : ☐	CALL : ☐	WARRANTY : ☐	INSTALLATION : ☒	SERVICE GUARANTEE : ☐	SERVICE REPORT NO: NB64-021
VESSEL: M/T OVIT NB64				OWNER: YARDIMCI GEMI INSA A.S	
LOCATION: TURKTER / ISTANBUL TURKEY		DATE: 01/04/2011		ETA:	ETD:
EQUIPMENT: MARIS ECDIS 900 (2 SET)				MOD:	SERIAL NO:

REASON FOR CALL:

SERVICES CARRIED OUT — SHIP'S POWER 24 VDC 220 VAC 60 HZ 3 PHASE

FAULT CONFIRMED AS REPORTED ..... FAULT NOT OBSERVED ..... FAULT INTERMITTENT ..... CABLING/GROUNDING CHECKED .....

FAULT REPAIRED ..... FAULT CODE ☐☐☐☐ NOT REPAIRED ..... GIVE REASON: NO SPARE ..... NO TIME ..... NEED INFO ..... OTHER .....

MATERIAL SUPPLIED									MATERIAL REMOVED				
QTY	PART NUMBER	REV	DESCRIPTION	SERIAL NO	NEW	SPEX	SHIP SPARE	OTHER	SERIAL NO	SPEX CENTER	SCRAP	EXCHANGE	OTHER

ENGINEER' REPORT

2 SET MARIS ECDIS DISPLAY UNIT, PROCESSOR UNIT, DANGLE, KEYBOARD AND MAUSE HAVE BEEN FITTED.
ALL CABLES HAVE BEEN RUN. ALL CONNECTION HAVE BEEN DONE. GYROCOMPASS, GPS1, GPS2, SPEED LOG, ECHOSOUNDER, WIND SPEED, AIS HAVE BEEN CONNECTED TO THE ECDIS SYSTEM.
SYSTEM IS POWERED ON. ALL CONFIGURATION HAVE BEEN DONE. SYSTEM IS TESTED IN SEATRIAL AND SEEN OK.
ECDIS SYSTEM HAS BEEN DELIVERED TO THE VESSEL UNDER THE NORMALLY OPERATION CONDITION.

HATTELAND	20.1 LCD Display	JH20T06MMD-E11-10316
A3300M	ECDIS Processor Unit	A3300M171803910
EX700	700V UPS	1YOL10050
403601E	Compact Keyboard	80170718
MARIS ID	MONITORING ECDIS	5757
ARCS USER PERMIT	35663E9EB6D74856	
ARCS PIN CODE	2938	
PRIMER USER PERMİT	36274A93DAC333D831750CEF3135	
HATTELAND	20.1 LCD Display	JH20T06MMD-E11-10307
A3300M	ECDIS Processor Unit	A3300M171803910
EX700	700V UPS	1YOL10058
403601E	Compact Keyboard	80170739
MARIS ID	PLANNING ECDIS	5758
ARCS USER PERMIT	35663E9EB6D74856	
ARCS PIN CODE	2938	
PRIMER USER PERMİT	36274A93DAC333D831750CEF3135	

ENGINEER NAME: [redacted] ENG SIGNATURE:

JOB COMPLETE YES ...X.... NO ..... FOLLOW UP REQUIRED YES ..... NO ....X NEXT PORT: ETA:

LABOR									EXPENSES	CUSTOMER ACCEPTANCE
DATE	ONBOARD IN	ONBOARD OUT	SHOP ST	SHOP OT	TRAVEL ST	TRAVEL OT	WAIT ST	WAIT OT	MILES	THE WORK DESCRIBED ABOVE HAS BEEN CARRIED OUT TO MY SATISFACTION
01/04/2011									HOTEL	PRINT NAME:
									MEALS	TITLE:
									AUTO 8 X 2KM	SIGN:
									AIR	SHIP'S STAMP:
									TTL EXP	
									TTL LABOR	
									TTL PRS 2PRS	

AYDER TANKERS A.S. Aydınlıspa Mah. Tersanaler Cad. 50. Sok. No:7 Tuzla / İSTANBUL Tuzla V.D. 110 055 0895 Tic. Sic. No: 581572 / 529154

THANK YOU FOR USING STT DENİZ TİCARET VE SERVİS LTD. ŞTİ.

Annex E

SMS depth and cross track distance setting formulae

7.12.13 SAFETY CHECKS

The Master and officers should be ensure that ECDIS both visual and audible alarms KEPT ON in the ECDIS.

After completion planned passage plan, planned passage should be checked with entered parameters in ECDIS, in ENC mode. This is called by safety checks. When safety checks carried out, ECDIS will warn you, If there are some unsafe situations. All alarms should be carefully read, checked and passage plan should be corrected as necessary. This parameters can be change as a name depending on to ECDIS model. The parameters shall be be adjusted minimum as below

SAFETY CONTOUR: The first thing that the navigator needs to do is to enter the ship's draft and air draft and establish the safety contour based on draft and the required Under keel Clearance (UKC).

The safety contour provides a visible boundary between "safe" and "unsafe" water with respect to depth, and is highlighted on the display to enable easy identification

For example, with a vessel of 6m draft the depth contour could be chosen as 8m. However, since most ENC data is supplied with preset contours, typically at 5m intervals the display will default to the next deepest contour which in this case would be 10m. All areas of less than 10m will show as blue and areas deeper than 10 will be displayed as white (see below diagram). So as long as the ship remains in the white area, she is, in theory, safe.

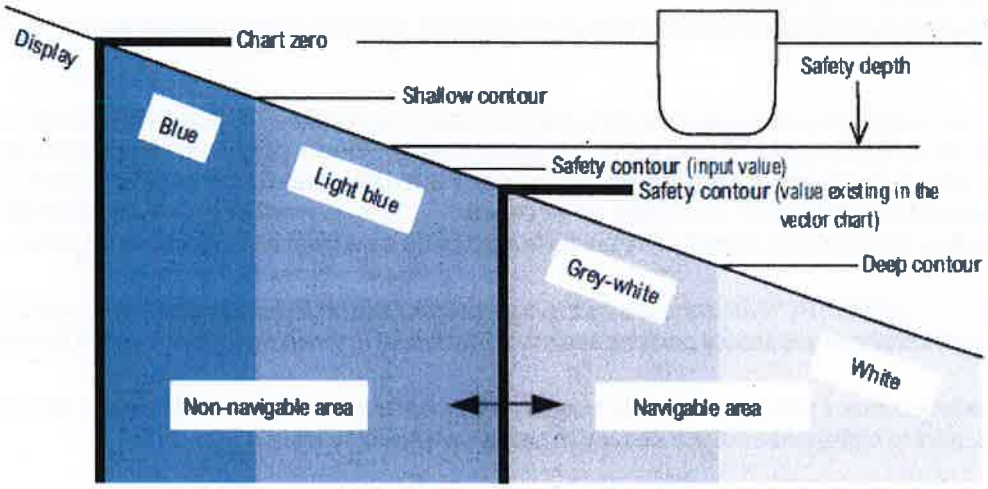
SAFETY DEPTH : The safety depth applies to spot soundings, the depth of which is insufficient for a vessel to safely pass over. In addition to the safety contour, this same depth of 8m can be set as the safety depth. In this case, if the navigator sets the ECDIS to display depths then all depths of less than 8m will show in bold type and those deeper than 8 will be a pale grey. This means that a depth of 9m, although within the 10m blue safety contour it will displayed in pale grey text whereas a depth of 7m will be displayed in bold black.

7.12.14 THE WHOLE SAFETY OF THE PASSAGE IS DEPENDENT ON THIS INFORMATION BEING CORRECT SO, IF A NAVIGATOR FAILS TO SET THIS CORRECTLY, THE SCENE IS SET FOR A DISASTER!

SHALLOW CONTOUR: The shallow and deep contours are utilised when the multi-colour depth display is selected. The area between the 0m contour and the shallow contour is coloured dark blue, the area between the shallow and safety contour is coloured light blue, and the area between the safety contour and the deep contour is coloured grey. This allows the gradient of the seabed to be graphically displayed. All of the area between the 0m contour and the safety contour is also hatched.

GUARD ZONE -NAVIGATIONAL DANGER: This is an anti-grounding alarm. Entered value shown in the ECDIS as a circle centred in your position. If a danger/depth enters inside the circle alarms sounds and warn the duty officer.

XTE: CROSS TRACK ERROR: cross track error should be entered leg by leg in the passage plan considering intended safety distance from the dangers, because of ECDIS consider only area, between the port and starboard XTE, during the safety checks. So if you enter XTE:0,1 nm for all passage leg, during the safety check ECDIS will not give you alarm if the danger far away from your planned route more than 0,1 nm, even 0,11 nm. During the channel passage 0,1 nm could be acceptable (wherever possible and practible) but in the open waters could not be less than 1nm.



NO	NAME	MINIMUM VALUE	OVERVIEW	
1	Depth Contour	20 meters	The area between the safety contour and the deep contour is coloured grey-white	
2	Safety Contour	(Draft + squat) x 1,5 in open water (Draft + squat) x 1,1 in pilotage water Draft: max draft	All areas of less than minimum entered value will show as blue	All areas deeper than minimum entered value will be displayed as white
3	Shallow Contour	(Draft + squat)	The area between the 0m contour and the shallow contour is coloured dark blue	
4	Safety Depth	(Draft + squat) x 1,5 in open water (Draft + squat) x 1,1 in pilotage water	all depths of less than minimum entered value will show in bold black type	All depths deeper than minimum entered value will be a pale grey
5	Safety Height	Air draft + 2 meters	Alarm will be given if not sufficient height	
6	XTE: Cross Track Error	Confined water: at least 0,1 nm wherever possible and practible Coastal water: min 1 nm Open water : min 4 nm	Alarm will be given if any danger available in the guard zone	
7	Guard zone (navigational danger)		Entered value shown in the ECDIS as a circle centred in your position. If a danger/depth enters inside the circle alarm sounds and warn the duty officer	

Annex F

SMS watch conditions

BASIC WATCH CONDITIONS

WATCH CONDITION - A

TRAFFIC - LITTLE OR NIL VISIBILITY - GOOD

1 O.O.W - COLLISION AVOIDANCE , NAVIGATION , CONNING

2 WATCH A.B - STEERING OR LOOKOUT AS MAY BE REQUIRED , DURING DAYLIGHT HOURS MAY WORK NEAR VICINITY TO BRIDGE PROVIDED HE IS READILY AVAILABLE.

WATCH CONDITION - B

TRAFFIC - HEAVY VISIBILITY - POOR

NAVIGATION AREA - LEAVING/ENTERING PORT , CROSSING/ENTERING SEPARATION ZONE

1 MASTER - CONNING , COLLISION AVOIDANCE

2 O.O.W - NAVIGATION + COMMUNICATION

3 WATCH A.B - STEERING/ LOOKOUT/ AS REQUIRED.

WATCH CONDITION - C

TRAFFIC - HEAVY VISIBILITY - DENSE FOG

1 MASTER - CONNING

2 2/MATE - NAVIGATION

3 C/MATE - ESSENTIAL BACKUP FOR MASTER

4 WATCH A.B - STEERING OR LOOKOUT

5 STAND BY A.B - LOOKOUT , AS MAY BE REQUIRED.

conn = control

MASTER TAKES THE CONN **VERBALY** WHENEVER **!!!**

Annex G

Ovit Deck risk assessment

AYDER TANKERS INC.

RISK ASSESSMENT - *RISK DEĞERLENDİRMESİ*

Description :

Department : DECK

Deck ☐ Engine ☐ Chartering ☐ Company ☐

Ref. No :

Date :

Hazard	Consequence	Severity	Likelihood	Initial Risk	Control Measures	duced Seve	Likelihood	Risk Factor	Reference Publications / Comments
Heavy Vessel Traffic	Property Damage Accident,	4	4		Master's, Company`s Standing And Daily Orders	2	3	6	
Main Engine Failure, Black	Property Damage Accident,	4	3	12	Inspection/ Maintenance Of Main/aux.engines Should	2	2	4	
Restrited Visibility	Property Damage Accident,	4	4		Master's, Company`s Standing And Daily Orders	3	2	6	
Navigation During Voyage By	Property Damage Accident,	4	4		Master Should Coordinate The Crew's Resting	2	2	4	
Vessel Security	Loss Of Containment,	3	3	9	Proper Security Level's Requirements To Be	2	1	2	
Adverse Weather Conditions	Property Damage Accident,	5	3		Local Weather Forecast To Be Monitored And	3	2	6	
Unsufficient Communication	Property Damage Accident	5	3		Ensure All Communication Means Functioning	3	2	6	
High Draft/ Less UKC	Property Damage Accident	5	3		UKC To Be Calculated And Passage/anchorage	3	2	6	
Uncorrect Position Fixing	Property Damage Accident	5	3		All Available Position Fixing Methods To Be Used	3	1	3	
Defective Navigational	Property Damage Accident	5	3		All Equipments To Be Checked Before	3	2	6	
Failure At Updating	Property Damage Accident	5	3		Ensure All Charts And Publications Corrected Up To	3	1	3	
Navigation In/out Of Pilotage	Property Damage Accident	5	3		Navigational Checklists / Bridge Procedures Guide /	3	2	6	
Faulty Passage Plan	Property Damage Accident	5	3		Navigational Checklists / Bridge Procedures Guide /	3	2	6	

Annex H

Dover coastguard manpower risk assessment

MRCC : Dover
Watch: B

Watch Staffing Planning and Risk Evaluation

Annex A

A

Non-SAR Activity Levels	Y / N
High	Y
Moderate	N
Low	N
Result	High

B

SAR Co-ordination Levels	Annual Inc	Month Inc
A	882	0
B	38	0
C	23	0
	943	0
Result		High

Evaluation Results **HIGH**

RCC Suggested Staffing Level

		WM	WO	CWA
Low				
Moderate				
High	8	2	4	2

Area Suggested Staffing Level

	WM	WO	CWA
Low			
Moderate			
High			

Events in Diary C — Yes/No:

Weather Conditions D — Yes/No:

Indicate the Qualified Staffing level required:

	Date	WM *	E WO	CWA
D	15/09/2013	2	4	2
D	16/09/2013	2	4	2
N	17/09/2013	2	4	2
N	18/09/2013	2	4	2

*or SMC qualified WO

Indicate the Qualified Staff level achieved

WM*	F WO	CWA
1	2	1
2	2	1
1	3	1
1	3	1

G

Does each watch have the sufficient mix of competencies — Yes / No: Yes

H

	Date Reviewed	Signature	Comments
1st Watch	15/08/2013		Watch 2 below minimum
2nd Watch	16/08/2013		1 overtime cover, Watch 1 below mm
3rd Watch	17/08/2013		1 overtime cover, Watch at mm
4th Watch	18/08/2013		1 overtime cover, Watch at mm

Marine Accident Report