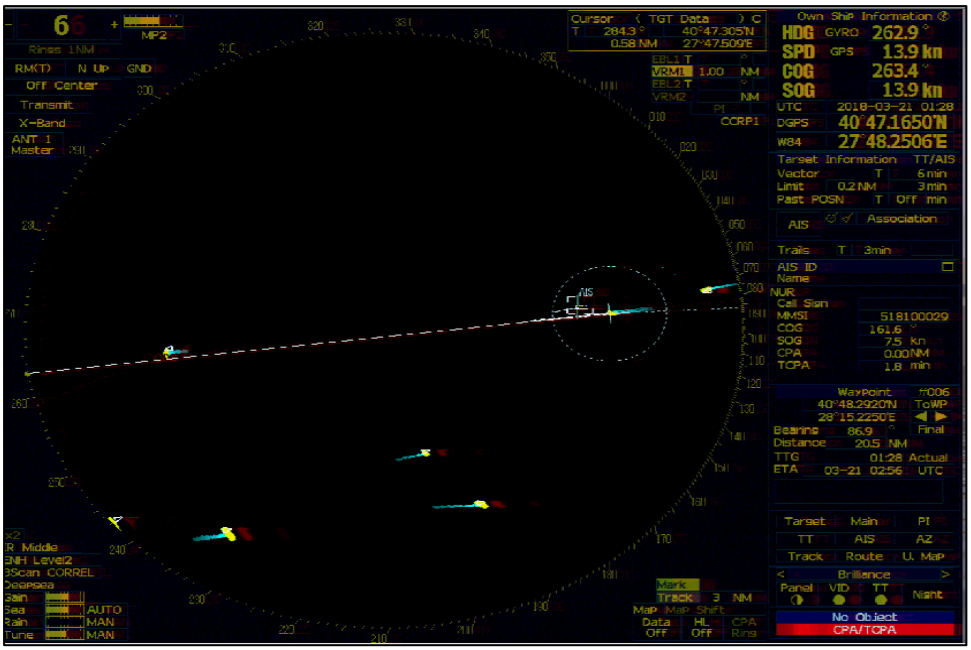
*Marine Safety Investigation Unit*

Transport Malta




# MARINE SAFETY INVESTIGATION REPORT

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**Safety investigation into the collision involving the**

**Maltese registered ro-ro vessel**

# *NEPTUNE HELLAS*

**and the Cook Islands registered general cargo vessel**

# *NUR*

**in the West lane of the Turkish Straits TSS**

**Marmara Sea**

**on 21 March 2018**

**201803/022**

**MARINE SAFETY INVESTIGATION REPORT NO. 05/2019**

**FINAL**

Investigations into marine casualties are conducted under the provisions of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011 and therefore in accordance with Regulation XI-I/6 of the International Convention for the Safety of Life at Sea (SOLAS), and Directive 2009/18/EC of the European Parliament and of the Council of 23 April 2009, establishing the fundamental principles governing the investigation of accidents in the maritime transport sector and amending Council Directive 1999/35/EC and Directive 2002/59/EC of the European Parliament and of the Council.

This safety investigation report is not written, in terms of content and style, with litigation in mind and pursuant to Regulation 13(7) of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011, shall be inadmissible in any judicial proceedings whose purpose or one of whose purposes is to attribute or apportion liability or blame, unless, under prescribed conditions, a Court determines otherwise.

The objective of this safety investigation report is precautionary and seeks to avoid a repeat occurrence through an understanding of the events of 21 March 2018. Its sole purpose is confined to the promulgation of safety lessons and therefore may be misleading if used for other purposes.

The findings of the safety investigation are not binding on any party and the conclusions reached and recommendations made shall in no case create a presumption of liability (criminal and/or civil) or blame. It should be therefore noted that the content of this safety investigation report does not constitute legal advice in any way and should not be construed as such.



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ISM managers Neptune Lines Shipping & Managing

VDR - MV *Neptune Hellas*

# GLOSSARY OF TERMS AND ABBREVIATIONS

| | |
|---|---|
| AB | Able bodied seaman |
| AIS | Automatic Identification System |
| ARPA | Automatic Radar Plotting Aid |
| COLREGs | The International Regulations for Preventing Collisions at Sea 1972, as amended |
| COG | Course over ground |
| CPA | Closest Point of Approach |
| DPA | Designated Person Ashore |
| DWT | Deadweight |
| E | East |
| ECDIS | Electronic Chart Display and Information System |
| EBL | Electronic Bearing Line |
| GHz | Gigahertz |
| GMDSS | Global Maritime Distress and Safety System |
| GPS | Global Positioning System |
| GT | Gross tonnage |
| kW | Kilowatts |
| LR | Lloyd's Register of Shipping |
| m | Metres |
| $m^3$ | Cubic metres |
| MMSI | Maritime Mobile Service Identity |
| MSIU | Marine Safety Investigation Unit |
| mt | Metric tonnes |
| N | North |
| NE | Northeast |
| nm | Nautical miles |
| NMEA | National Marine Electronics Association |
| OOW | Officer of the Watch |
| RMRS | Russian Maritime Register of Shipping |
| Rpm | Revolutions per Minute |
| Ro-ro | Roll on Roll off |
| SMS | Safety Management System |
| STCW Convention | The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 2010, as amended |
| (T) | True |
| TCPA | Time for Closest Point of Approach |

| | |
|---|---|
| TSS | Traffic Separation Scheme |
| TSVTS | Turkish Straits Vessel Traffic Service |
| TT | Target tracking |
| UTC | Coordinated Universal Time |
| VDR | Voyage Data Recorder |
| VHF | Very High Frequency |
| VRM | Variable Range Marker |
| VTSC | Vessels Traffic Service Centre |

## SUMMARY

The ro-ro cargo vessel *Neptune Hellas* was in transit from Borusan, Gemlik, Bursa, Turkey to Piraeus, Greece, when on 21 March 2018 at 01:30 (UTC), she was involved in a collision with the general cargo vessel *Nur* in the West lane of the Turkish Straits Traffic Separation Scheme, Marmara Sea, in position 40° 47.01' N 027° 47.69' E.

Prior to collision, both *Neptune Hellas* and *Nur* were proceeding on a Southwesterly course towards the Çanakkale Strait. At the time of the collision, *Neptune Hellas* was making approximately 13.8 knots and *Nur* was proceeding in the same direction with a speed of about 8.0 knots. The collision happened when *Nur* turned to port when she was being overtaken by *Neptune Hellas* from the former's port side. Eventually *Nur*'s port bow first made contact with the starboard side of *Neptune Hellas* and then with her port quarter.

Structural damages to the bow and quarter were sustained by *Nur*. *Neptune Hellas* reported damages to her starboard side shell plating above the waterline. No pollution or injuries were reported and both of the vessels were able to proceed and drop anchor at a safe anchorage area by their own means.

As a result of the safety investigation and taking into consideration the safety actions taken, the Marine Safety Investigation Unit (MSIU) has issued one recommendation to the mangers of MV *Nur*, in order to improve the navigational safety of their vessels.

# 1 FACTUAL INFORMATION

## 1.1 Vessel, Voyage and Marine Casualty Particulars

| | | |
|---|---|---|
| Name | *Neptune Hellas* | *Nur* |
| Flag | Malta | Cook Islands |
| Classification Society | Lloyd's Register of Shipping | Russian Maritime Register of Shipping |
| IMO Number | 9440148 | 9389370 |
| Type | Ro-Ro cargo | General cargo |
| Registered Owner | Sea Harmony Co. Ltd. | Ege Maritime Inc. |
| Managers | Neptune Lines Shipping & Managing Enterprises SA | Ege Denizcilik Mursel Teksen |
| Construction | Steel (Double hull) | Steel (Double bottom) |
| Length overall | 168.06 m | 81.00 m |
| Registered Length | 158.00 m | 76.00 m |
| Gross Tonnage | 36,711 | 1,972 |
| Minimum Safe Manning | 15 | 9 |
| Authorised Cargo | Vehicle carrier with strengthened decks to carry ro-ro cargo | General/bulk cargo |
| Port of Departure | Borusan, Gemlik Bursa, Turkey | Chornomorsk, Ukraine |
| Port of Arrival | Piraeus, Greece | Alexandria, Egypt |
| Type of Voyage | Short International | International |
| Cargo Information | Vehicles and trucks (2741.23 mt) | 3009.17 mt of cargo in bulk |
| Manning | 25 | 13 |

| | |
|---|---|
| Date and Time | 21 March 2018 at 0130 (UTC) |
| Type of Marine Casualty or Incident | Serious Marine Casualty |

| | | |
|---|---|---|
| Location of Occurrence | | Turkish Straits TSS (Marmara Sea)<br>40° 47.01' N 027° 47.69' E |
| Place on Board | Overside | Forecastle and forecastle deck |
| Injuries/Fatalities | None | None |
| Damage/Environmental Impact | None | None |
| Ship Operation | On passage | On passage |
| Voyage Segment | Transit | Transit |
| External & Internal Environment | | Fair with good visibility, wind Southerly Force 4-5. Sea state was South Southeast, slight to moderate. |
| Persons on Board | 25 | 13 |

## 1.2 Description of Vessels

### 1.2.1 *Neptune Hellas*

*Neptune Hellas* is a 36,711 GT / 12,322 DWT ro-ro cargo ship, built in 2009, in the Republic of Korea. She has 10 cargo decks, with one centre/side (starboard side) and one stern ramp.

*Neptune Hellas* is owned by Sea Harmony Company Limited and managed by Neptune Lines Shipping & Managing Enterprises S.A. The vessel is registered in Malta and classed with Lloyd's Register of Shipping (LR). The vessel has a length overall of 168.06 m and beam of 28.00 m. Her depth to freeboard deck is 13.28 m and her summer draft is 9.017 m.

The vessel's propulsion power is provided by one Hyundai – MAN B&W 7S50 MC, two stroke marine diesel engine, producing 11,620 kW at 127 rpm, driving a single fixed pitch right-handed propeller. The vessel was also fitted with a semi spade rudder and two bow thrusters of 900 kW each and one stern thruster with a power of 700 kW. The reported service speed of the vessel was 19.6 knots.

*Neptune Hellas* is fitted with the required electronic navigation aids as listed in the Record of Equipment for Cargo Ship Safety Equipment Certificate – Form E. These included standard and spare magnetic compasses, gyro compass and repeaters, pelorus or compass bearing device, two ARPA Radars (Maker JRC), one S-band 3 GHz and one X-Band 9 GHz, ECDIS along with back-up arrangements and an AIS.

The navigation bridge is located forward with open bridge wings, whilst the view from the bridge is not obscured by any fittings at the forward end of the ship (Figure 1).


**Figure 1: View from the bridge window**

The main navigation control console is fitted in the centre of the wheelhouse, right behind the bridge windows. The console incorporates navigation stations at each side with VHF, one S-band radar and one ECDIS monitor on the starboard and one X-band radar, one ECDIS monitor and an AIS on the port side. Both radar sets were interphased with GPS, AIS and ECDIS. The vessel's primary means of navigation was ECDIS.

The radars in use had automatic[1] and manual acquisition functions and it was also possible to track up to 100 targets, calculating course, speed, range, bearing, and collision avoidance information *i.e.*, closest point of approach (CPA), and time to

[1] Automatic acquisition is achieved by means of acquisition / guard zones. If the guard zone is set, the system evaluates the echoes entering the acquisition/guard zones and if any target is detected, it becomes a radar target and is automatically acquired by the system. A target acquired by this way appears with a flashing symbol to notify the OOW of the new target (automatic) acquisition. At the same time, an alarm appears in the ARPA display accompanied by buzzer noise to notify the OOW that a target has been acquired automatically and is moving inside the zone. Automatic target tracking begins only after this alarm (target in zone) is acknowledged. The radar can also trigger audible and visual alarms for 'dangerous targets' (*i.e.*, when CPA and TCPA values are smaller than the limits that were set for them by the user).

CPA (TCPA)). The AIS interphase allowed for the call sign and MMSI data of the targets to be displayed on the radars' screen.

The central section of the main console was fitted mainly with the steering gear pumps panel, bow thrusters' controls, main engine telegraph, gyro compass, autopilot control and the wheel (Figure 2).

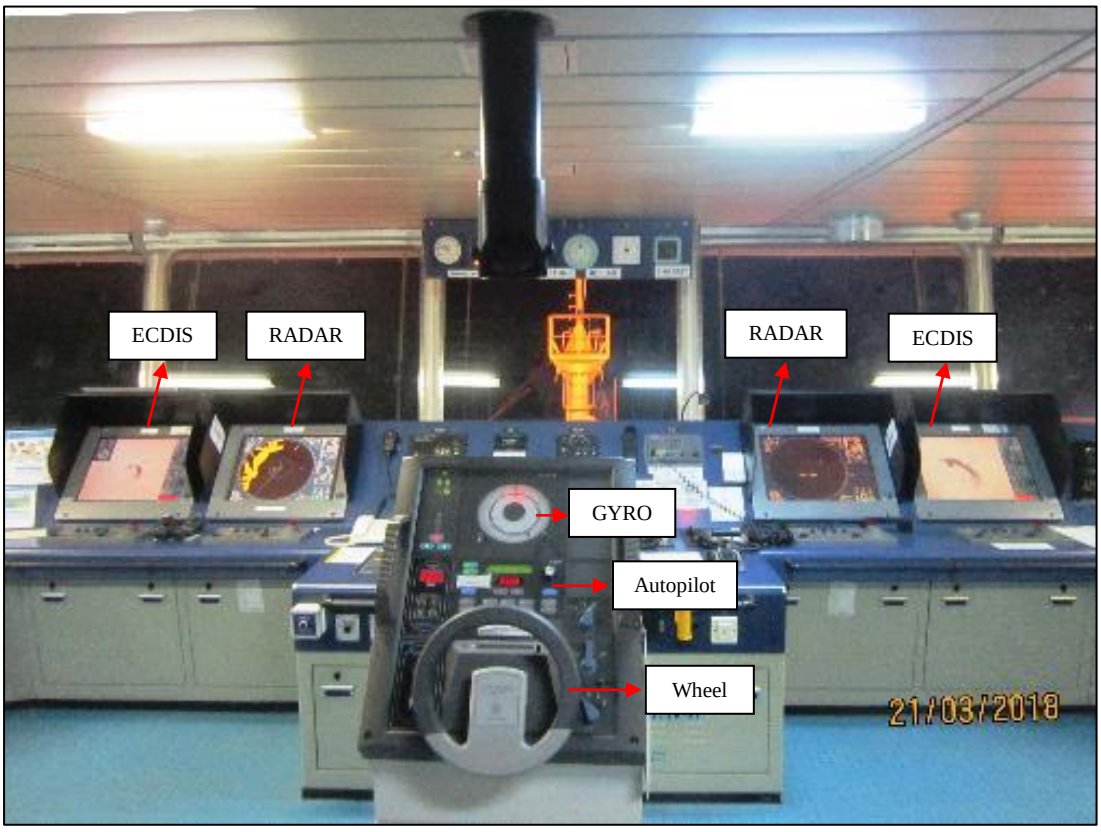


**Figure 2: Main console on the bridge**

The GMDSS console and chart table were located behind the navigation console on port and starboard side respectively. Figure 3 shows the general layout of the bridge.

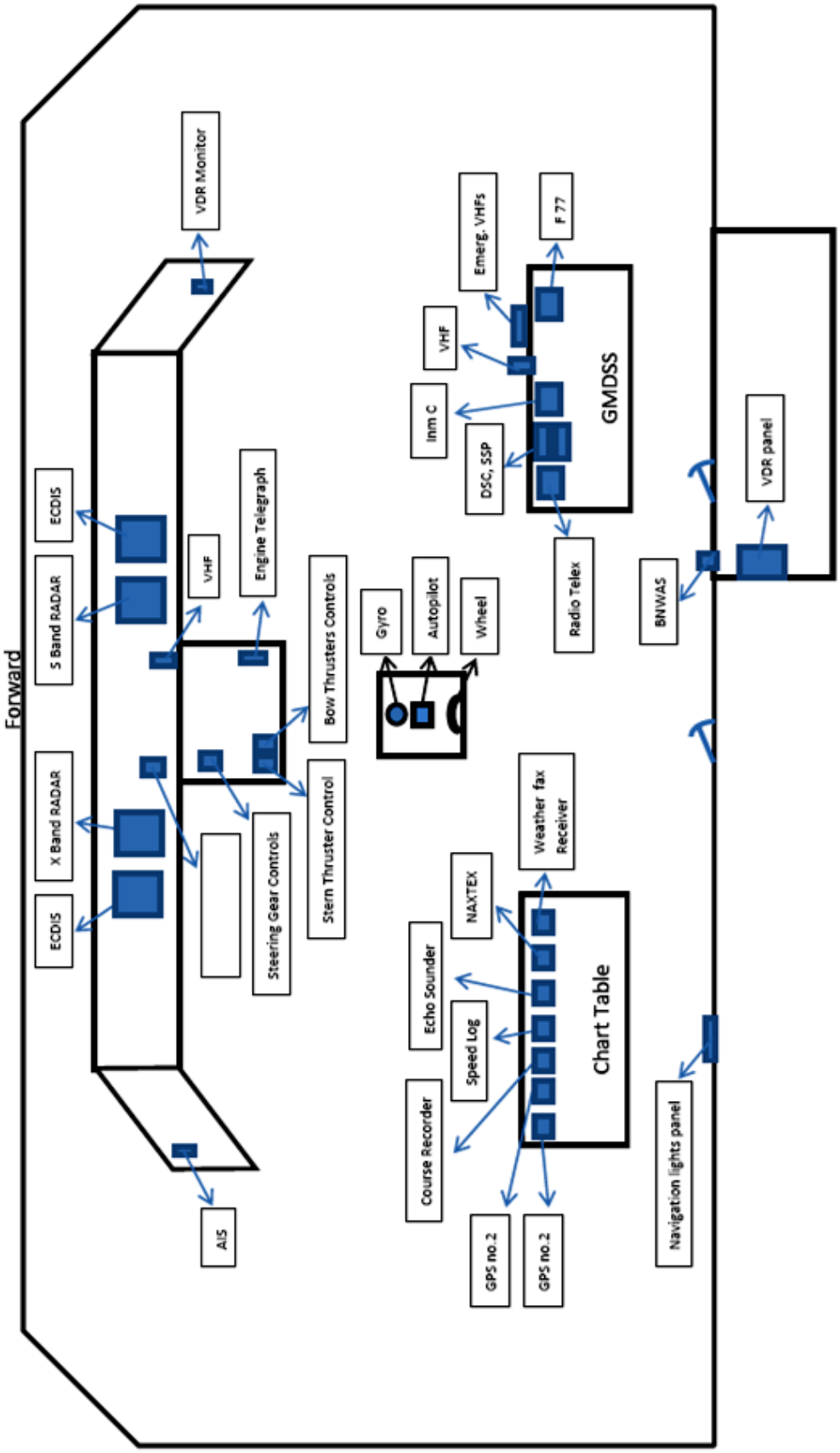


**Figure 3:** ***Neptune Hellas*** **bridge layout**

### 1.2.2 *Nur*

*Nur* is a 1,972 GT / 3,348.5 DWT gearless general cargo ship, built in 2006, in China. *Nur* is fitted with two cargo holds with a total grain capacity of 4468.1 $m^3$.

*Nur* is owned by Ege Maritime Inc. and managed by Ege Denizcilik Enterprises S. A. The vessel is registered in the Cook Islands and classed with Russian Maritime Register of Shipping (RMRS). The vessel has a length overall of 81.0 m and beam of 13.60 m. Her moulded depth is 6.80 m and has a summer draft of 5.50 m.

Propulsive power is provided by a 6-cylinder G6300 – ZC16BH Wuxi, medium speed diesel engine, producing 1,324 kW at 600 rpm. This drives a single, five-bladed right hand fixed pitch propeller to a reduction gearbox. The vessel reaches a service speed of 9.5 knots.

## 1.3 Crew on *Neptune Hellas*

At the time of collision, *Neptune Hellas* had a crew complement of 25. All the crew members were Ukrainian, except for the chief engineer who was Greek. The working language on board the vessel was English.

The vessel was manned in excess of the number established in the Minimum Safe Manning Document, issued by the flag State Administration on 26 May 2015.

### 1.3.1 Bridge team and navigational watch arrangements

The bridge-watch team consisted of the second and two third officers. No navigational watch was kept by the chief officer during the voyage. The customary '4-on, 8-off' navigational watch system was kept on board, as follows:

| | |
|---|---|
| second officer | 0000 – 0400 / 1200 – 1600; |
| third officer | 0400 - 0800 / 1600 – 2000; |
| third officer | 0800 - 1200 / 2000 – 2400. |

In accordance with the watch schedule posted on the bridge, one AB and two deck cadets were the designated look-outs for each of the four-hour navigation watch during day and night.

During port operations, the watchkeeping hours are divided between the second and the two third deck officers. This arrangement was also stipulated in the watch schedule posted on the bridge, while the chief officer was on standby during all times.

### 1.3.2 The master

The master, who was 53 years old, joined *Neptune Hellas* on 11 January 2018. He had over 32 years of seagoing experience and had been employed by the vessel's managers since 2004. He had been serving as a master for two years. His Certificate of Competence was issued in 2014 and he was competent to serve as a master on vessels with no limitations. His certificate was recognised by the flag State Administration in accordance with the provisions of regulation I/10 of the STCW Convention, as amended. His service with the Company included sea time as chief officer.

### 1.3.3 The second officer

The second officer, who was the navigational OOW at the time of collision, was 29 years old and had seven years of seagoing experience. He joined *Neptune Hellas* on 20 February 2018. His Certificate of Competence was issued in 2013 with no limitations. He had also been issued with an 'Endorsement Attesting the Recognition of a Certificate' by the flag State. He had been employed by the Company for seven years. In addition to navigational watches at sea and in port, he was also responsible for the corrections of charts (ECDIS) and publications, filling of the GMDSS logbook and the medical store.

### 1.3.4 The look-out

The AB, who was on the bridge as lookout was 41 years old and had 12 years of seagoing experience, out of which eight years as AB. He joined the vessel on 07 March 2018. The AB had been working with the Company for 10 years.

## 1.4 Turkish Straits, Traffic Separation Scheme and Vessel Traffic Service

The Turkish Straits covers the Sea of Marmara (110 miles), Istanbul Strait (18 nm) and Çanakkale Strait (38 nm). The Sea of Marmara is an inner sea, connected to Black Sea via the Istanbul Strait and the Aegean Sea via the Çanakkale Strait. The surface current at the entrance to the Aegean Sea averages between 1.5 and 2.5 knots,

whereas at the entrance to Marmara Sea, it is rarely higher than 0.5 knots. In strong NE winds, the current may increase to 1.5 knots[2].

Turkish Straits is regulated by the Maritime Traffic Regulations, 1998 and apply to all vessels. These Regulations are intended to control maritime traffic and safety of navigation of vessels in the Turkish Straits.

In 2003, the Turkish Straits Vessel Traffic Service (TSVTS) came into operation. It is operated in accordance with the Maritime Traffic Regulations and IMO Resolutions A.827 (19) and A.857 (20). The TSVTS provides information, navigational assistance and traffic organisation services for the safety of marine traffic and protection of the environment. Vessels transiting the Turkish Straits participate in the vessel reporting system. The TSVTS areas include the Sea of Marmara, Istanbul Strait and Çanakkale Strait. The TSVTS over the Sea of Marmara is covered by the Çanakkale Strait VTS, which is controlled by Gelibolu[3] sector.

A Traffic Separation Scheme (TSS) adopted by the IMO in 1995, was introduced throughout the Turkish Straits. The TSS provides traffic lanes, separated by a traffic line or zone. Directional arrows are marked on navigational charts to indicate the general direction of traffic flow. Navigation in the TSS is subject to Rule 10 of the International Regulations for Preventing Collisions at Sea (COLREGs).
Annex 2 of IMO Resolution A.827(19) stipulated the following with respect to navigation through the Strait of Istanbul, the Strait of Çanakkale and the Marmara Sea:

- *vessels navigating in the Straits shall exercise full diligence and regard for the requirements of the traffic separation schemes;*
- *vessels shall follow the TSS within the Straits;*
- *vessels entering the Straits to participate in the reporting system (TUBRAP); and to make use of the information broadcasts that are provided;*
- *pilotage is strongly advised for masters in order to comply with the requirements of safe navigation;*

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2 Source: https://msi.nga.mil/MSISiteContent/StaticFiles/NAV_PUBS/SD/Pub140/Pub140bk.pdf

3 Collision between *Nur* and *Neptune Hellas* occurred in the TSS controlled by Gelibolu sector.

- *a vessel that is not able to comply with the requirements of the TSS shall inform the traffic control station well in advance.*

A schema of the TSS controlled by Sector Gelibolu is shown in Figure 4.

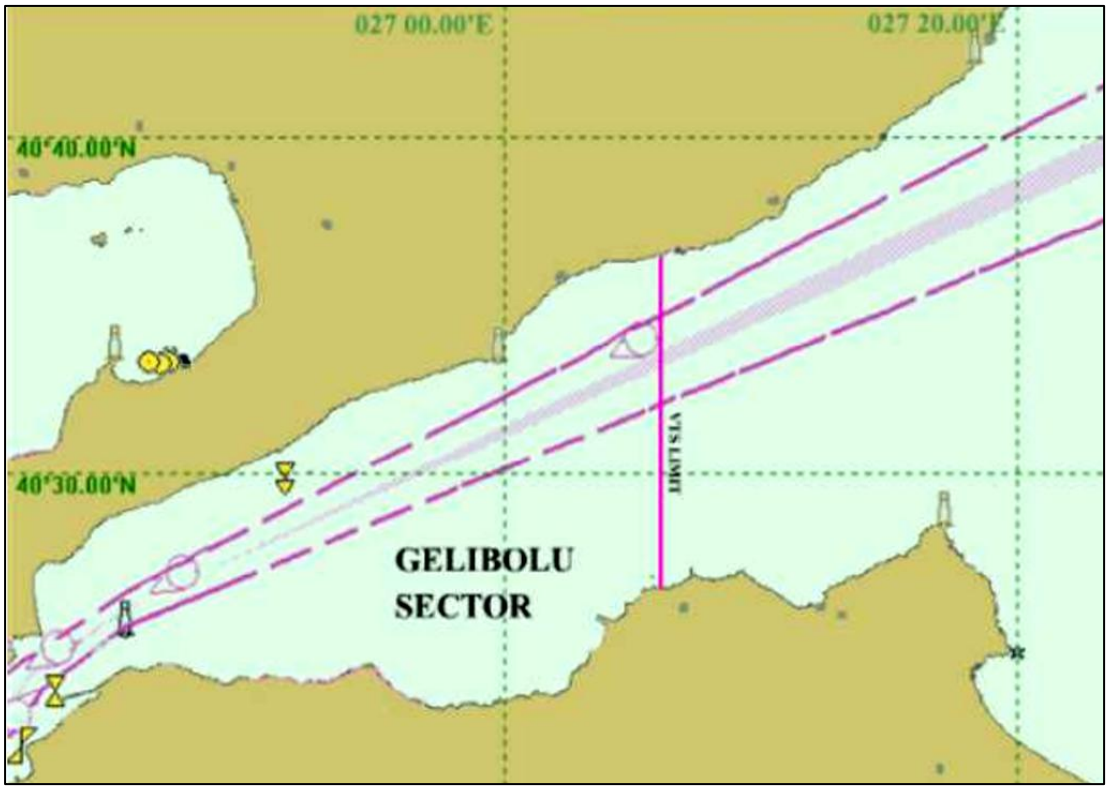


**Figure 4: Traffic Separation Scheme in Sector Gelibolu**[4]

## 1.5 *Neptune Hellas*' Passage Plan

The vessel's trading pattern consisted of round trips from Derince, Turkey, Borusan, Turkey, Piraeus, Greece, to Limassol, Cyprus, Ashdod, Israel, Alexandria, Egypt and back to Derince, Turkey.

*Neptune Hellas*' passage plan was prepared berth to berth although the position fixing methods were not indicated in the plan. It was also observed that the planned speed over ground was recorded as less than 10 knots, which did not reflect the vessel's actual passage speed.

[4] Source: http://www.turkmar.com.tr/_resimler/_siteResimler/TURKISH-STRAITS-VTS-GUIDE.pdf

It was planned that after departing from the port of Borusan in the Marmara Sea, the vessel would proceed to the Çanakkale Strait (Figure 5) through the TSS. She would then enter the Aegean Sea and proceed to her destination Piraeus, Greece.

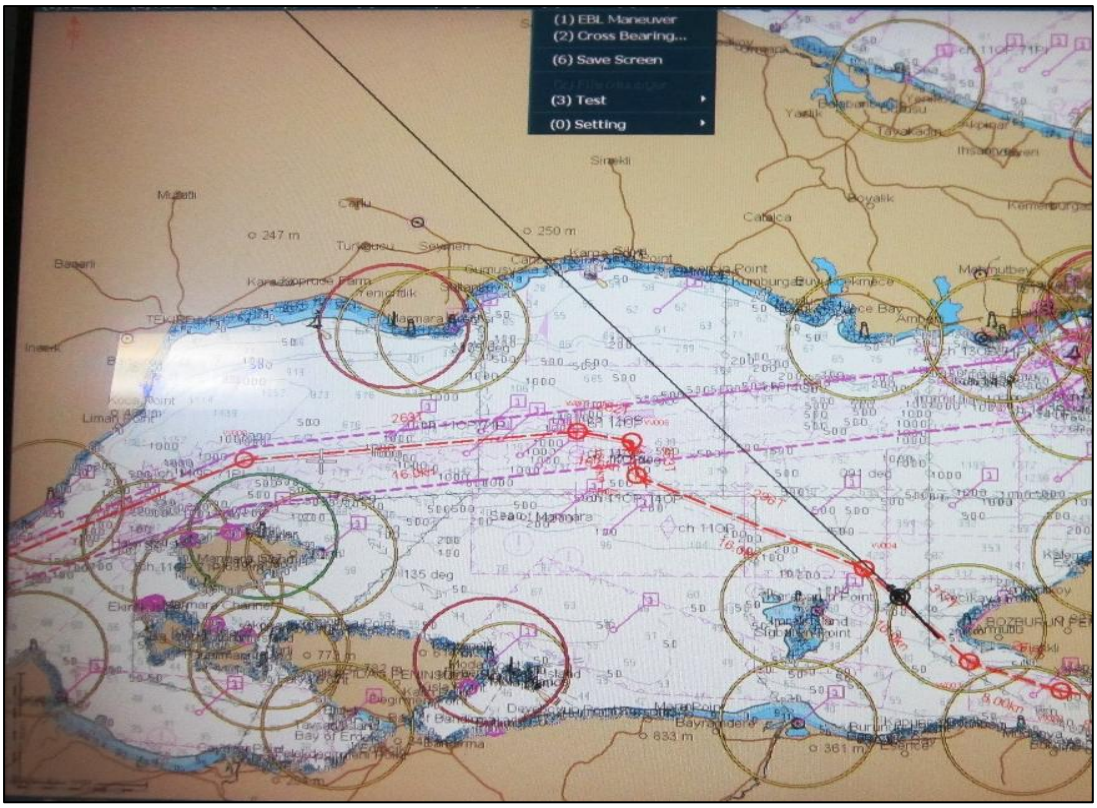


**Figure 5: Planned course in the Sea of Marmara**

## 1.6 Environment

At the time of the collision, the weather in the area was fair (moderate to gentle breeze) and the visibility was good. Wind was blowing from the South with a Beaufort Force of 4 to 5. Air temperature was recorded at 13 °C. Sea temperature was 11 °C.

## 1.7 Narrative[5]

### 1.7.1 Events on *Neptune Hellas*

Following the completion of the cargo loading operations, the vessel departed from Borusan Port, Gemlik, Bursa, Turkey on 20 March 2018 at 2030, heading to Piraeus,

[5] Unless otherwise indicated, all times are UTC.

Greece. Following completion of the departure manoeuvres, the Borusan pilot disembarked the vessel on 20 March 2018 at 2040.

While the vessel was proceeding in the Marmara Sea on the planned route, towards the closest entrance point of TSS, the master released the conn to the designated OOW and left the bridge at around 2140. The OOW had been on the bridge since departure from the port and continued the navigation watch together with the deck cadet, who was the assigned lookout.

Eventually, the watch was taken over by the second officer, who arrived on the bridge at around 2150, just before commencement of his watch. The dedicated lookout also came to the bridge and took over his watch at the same time. The vessel was in position 040˚ 30.9' N 028 44.5' E, navigating in the Marmara Sea on a course of 317°, making about 14.4 knots. The navigational watch handover was carried out as per relevant Company procedures. The bridge equipment was reported to be in good working condition with both radars in use, one set to a range of six nautical miles (X-band) and the other at 12 nm.

Until the collision, the voyage was uneventful, with no reported traffic congestion. The weather and visibility were convenient for safe navigation. On 21 March 2018, at around 0020, the vessel arrived at the waypoint within the TSS (40° 49.13' N 028° 9.97' E). The course was altered to 263° (T) and the vessel started to proceed within the TSS, in the general direction of the traffic flow towards the Çanakkale Strait.

The OOW recalled that he was not occupied with any job other than the navigation. Moreover, regular contacts were made with the Vessels Traffic Service Centre (VTSC) to report the vessel's movements when passing from one sector to another. The last contact with VTSC prior to collision was at around 0110 to confirm / agree pilot boarding time at the Çanakkale Strait entrance.

The OOW stated that he first plotted when *Nur* was approximately one nm on the starboard bow, proceeding on a course of 260° (T), speed 8.8 to 9 knots with an approximate CPA of seven cables.

The OOW stated that due to her low speed, he decided to overtake *Nur* and since the vessel was on the starboard bow (of *Neptune Hellas*), overtaking seemed to be practicable / safe to the OOW by keeping course and speed. Therefore, he did not make any course alteration and continued his approach towards *Nur* to overtake from her port side. He stated that the CPA on the radar (before the overtaking) was about five cables. Speed and course of *Nur* remained unchanged and *Neptune Hellas* was proceeding with course of 263° (T) and at speed of 14.0 knots.

The OOW stated that during the overtaking, *Nur* suddenly started to turn to port towards *Neptune Hellas*. Meantime, both of the vessels were navigating in Sector Gelibolu and *Nur*'s sudden / sharp turn was noticed by the VTSC / Sector Gelibolu who called *Neptune Hellas* and tried to warn about the danger.

Upon noticing the danger, the OOW on board *Neptune Hellas* instructed the lookout to switch the steering to manual and alter the course hard to port[6]. The vessel's heading had already changed from 263° (T) to 210° (T) when the OOW concluded that collision was inevitable and in an effort to reduce the impact, he ordered a hard to starboard rudder.

At around 0130, *Nur* made contact with the starboard side shell plating of *Neptune Hellas,* first with her port bow then with her port quarter, in position 41° 47.01' N 027° 47.69' E, and then cleared from the aft end. The OOW stated that prior to the collision, no communication had taken place with *Nur*.

After the collision, the OOW instructed the helmsman to proceed on the planned route line with steady course and called the master to notify him of the collision. In the meantime, the vessel was being called by the VTSC continuously to which, the second officer responded and informed the shore authority of the collision.

The master arrived on the bridge shortly after the collision and could observe *Nur* in way of starboard quarter, moving away. The OOW was standing on the starboard wing, checking the vessel's shell plating for any visible damages. In the meantime, the master confirmed with the VTSC and confirmed damages to the side shell plating, although the extent would be evaluated later and reported accordingly.

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6 The vessel's heading changed by around 2° to 3° to starboard.

Crew members were requested by the master to check the decks and the engine-room to assess the extent of damages. Thereafter, he established communication with the Company's DPA, who was notified of the collision. The master also confirmed that the vessel was able to proceed by her own means. The vessel was instructed to deviate from her course and proceed to Tekirdag, Turkey to drop her anchor for further investigations and evaluations.

*Neptune Hellas* proceeded to Tekirdag and safely anchored at 0350 in the position 40° 54.6' N 027° 30.8' E.

### 1.7.2 Events on *Nur*

*Nur* sailed from Chornomorsk, Ukraine on 17 March and commenced her voyage towards Alexandria, Egypt, with a cargo of 3009.17 mt of ferro alloys in bags. *Nur* had 13 crew members on board.

The vessel arrived at the North entrance to the Istanbul Strait on 19 March 2018 at about 0500 and commenced her voyage through the Strait. Eventually, the vessel dropped her anchor at about 0715 to take bunkers and provisions. *Nur* heaved up her anchor at 1840 and proceeded with her voyage on a course of 237° (T) as per the traffic separation scheme established in the Marmara Sea.

At about 1935, *Nur* altered course to 261° (T) in position 40° 55.13' N 028° 50.60' E. The voyage was uneventful with conventional 4-on 8-off navigation watches being kept. On 21 March, at 0100, the chief mate took over the navigation watch from the second officer in accordance with Company procedures. The chief mate stated that an AB as part of the navigation watch had also been posted on the bridge. He also recalled being informed by the second mate that the ship which was about two nm from the port quarter would be overtaking *Nur* from the port side.

At 0129, VTSC / Sector Gelibolu advised *Nur* that she was navigating dangerously, heading towards *Neptune Hellas* and enquired about her intentions. The OOW responded in Turkish "ustume geliyor, ustume geliyor…" (vessel is coming towards me).

The chief mate stated that *Neptune Hellas* made a sudden alteration to starboard while she was overtaking *Nur* on the latter's port side (Figure 6).

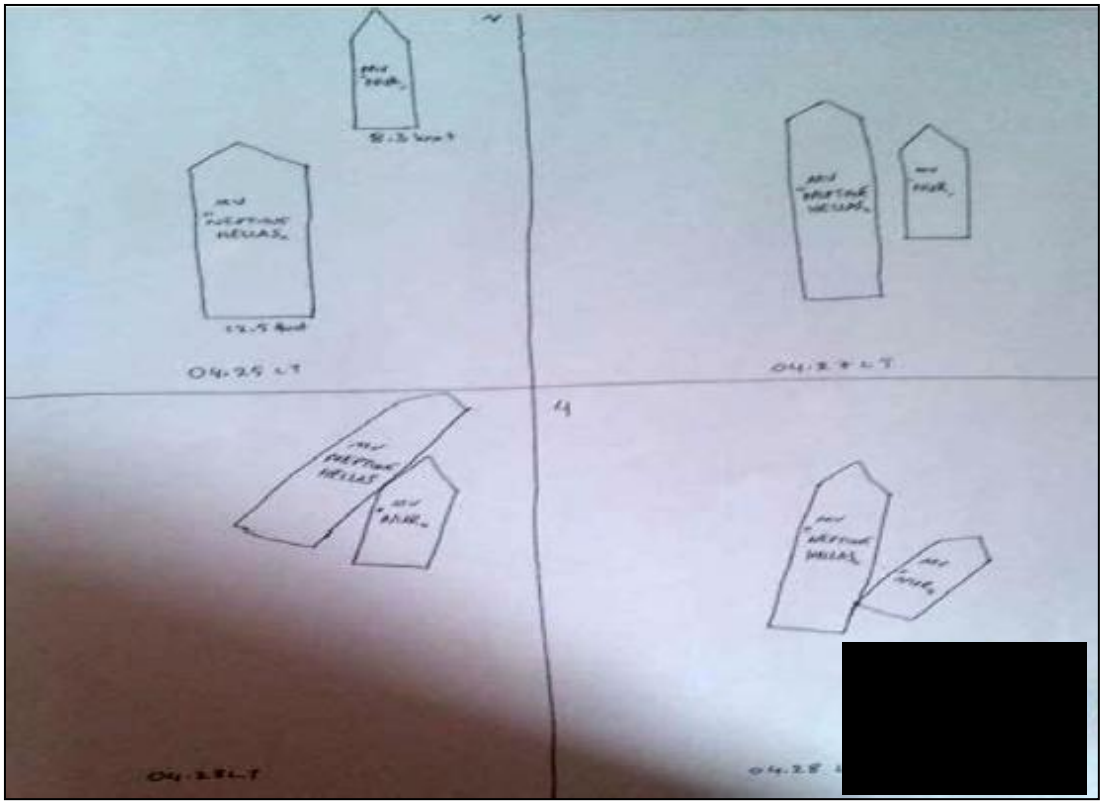

**Figure 6: A sketch prepared by the master of *Nur* to explain the collision between the two vessels**

According to the chief mate, *Neptune Hellas*' contact with *Nur*'s port side bow was followed by a second contact between *Nur*'s port aft quarter and *Neptune Hellas*' starboard stern quarter.

Soon after the collision, the master arrived on the bridge and following a brief discussion with the chief mate, he sounded the general alarm. The master requested an update on the general condition of the vessel and a confirmation that no injuries had been sustained. It was confirmed that none of the crew members was injured and that there was no flooding in any of the vessel's compartment.

## 1.8 VDR Data

*Neptune Hellas* was fitted with a VDR, type MED-VDR Rev. 2 and version 3.01. The following data could be stored in the VDR for at least 12 hours:

- status and error conditions of all systems connected via NMEA telegrams;
- screenshots (every 15 seconds) of the main radar;
- voice on the bridge, captured via microphones; and

- radio traffic (one channel);

The data covering the time prior to the collision and the actual collision (which is tabulated in Table 1), was saved and used for the purpose of the safety investigation.

**Table 1: VDR data from *Neptune Hellas***

| ***NEPTUNE HELLAS*** | | | | ***NUR*** | | | | Observations |
|---|---|---|---|---|---|---|---|---|
| Time (UTC) | COG | SPD | HDG | COG | SPD | CPA/ TCPA | Dist. nm | Events on the bridge of *Neptune Hellas* |
| 01:20:00 | 264.2 | 14.1 | 263.8 | Not plotted | | | Approx. 1.7 | Conversation between second officer and lookout in native language. |
| 01:25:00 | 262.3 | 13.8 | 261.8 | Not plotted | | | Approx. 1.0 | Conversation between second officer and lookout in native language. Other stations speak on the VHF. |
| 01:26:00 | 262.3 | 13.8 | 261 | Trail of *Nur's* echo indicates that she started turning to her port side. | | | approx. 0.9 | No action / movement on the bridge of *Neptune Hellas*. |
| 01:27:00 (Figure 7). | 261.4 | 13.8 | 260.6 | According to the trail of echo, *Nur* continues to turn towards *Neptune Hellas.* | | | approx. 0.8 | No action on the bridge of *Neptune Hellas*. Conversation between second officer and lookout in native language. Other stations speak on the VHF. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 01:27:10 | 261.4 | 13.8 | 260.6 | | According to the trail of echo, *Nur* continues to turn towards *Neptune Hellas*. | | approx. 0.75 | VTSC/Sector Gelibolu calls *Neptune Hellas* at the same time radar cursor moves, indicative that second officer is checking *Nur'*s position.<br><br>Main points of the conversation between VTSC and second officer:<br><br>*VTSC: Neptune Hellas* Sector Gelibolu;<br><br>*OOW:* Yes, *Neptune Hellas*;<br><br>*VTSC:* Information, according to my screen, *Nur* is turning to South, can you see? Can you have eye contact with *Nur?*<br><br>*OOW:* OK, I see, I will do…<br><br>*VTSC:* Understood, can you see that vessel on your radar screen?;<br><br>*OOW:* Yes, yes, I see, I see;<br><br>*VTSC:* Understood, keep clear from that vessel, the vessel did not give any information to us, keep clear from *Nur*. She is navigating dangerously. |
| 01:28:04<br><br>(Figure 8) | 263.4 | 13.9 | 262.9 | 161.6 | 7.5 | 0.0/ 1.8 min | Less than 0.55 | *Nur* was plotted by OOW on the radar. Vessels are on a collision course. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 01:28:15 | Variable, Vessel turning towards her port side | | | *Nur* continues to turn to her port side. | | 0.02/ 1.5 min | - | Conversation in native language (presumably OOW instructs look-out to change the steering control from auto to manual). Wheel first turned to starboard, and immediately afterwards hard over to port. Vessels are on a collision course. |
| 01:29:00 | Variable vessel turning towards her port side. | | | *Nur* continues to turn to her port side. | | 0.03/ 0.9 min | | Conversations between OOW and lookout in native language. VTSC and *Nur* speak on VHF. Brief details of which is as follows:<br>*VTSC: Nur*, sector Gelibolu;<br>*Nur:* Sector Gelibolu, *Nur*;<br>*VTSC: Nur* what is your intention? According to my screen you are proceeding to *Neptune Hellas*, you are navigating dangerously.<br>*Nur:* (Repeatedly screaming on the VHF in Turkish), "ustume geliyor, ustume geliyor…", (vessel is coming towards me). |
| 1:29:39<br>Figure 9) | Variable vessel turning towards her port side. | | | Variable | | 0.03/ 0.4 min | - | Wheel of *Neptune Hellas* hard to starboard. |
| *01:30:32*<br>*Figures 10 and 11)* | *228.6* | *9.4* | *224.2* | *219* | *5.8* | - | - | *Collision between Nur and Neptune Hellas.* |

| | |
|---|---|
| 01:30:42 | VHF communication between *Neptune Hellas* and VTSC:<br>*<u>VTSC</u>*: *Neptune Hellas,* Sector Gelibolu, what is your situation?<br>*<u>OOW</u>:* It is collision. |

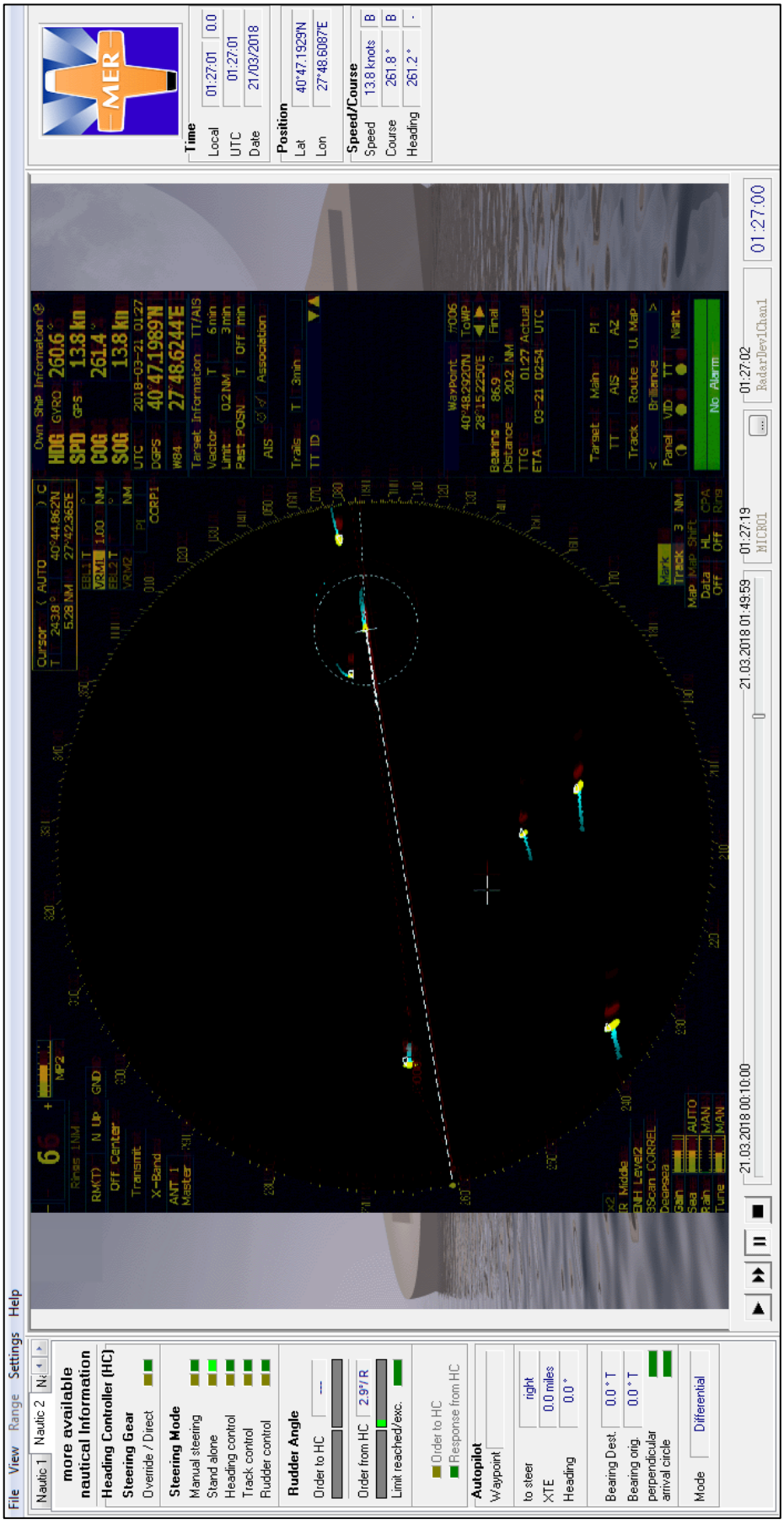


**Figure 7: Situation at 0127**

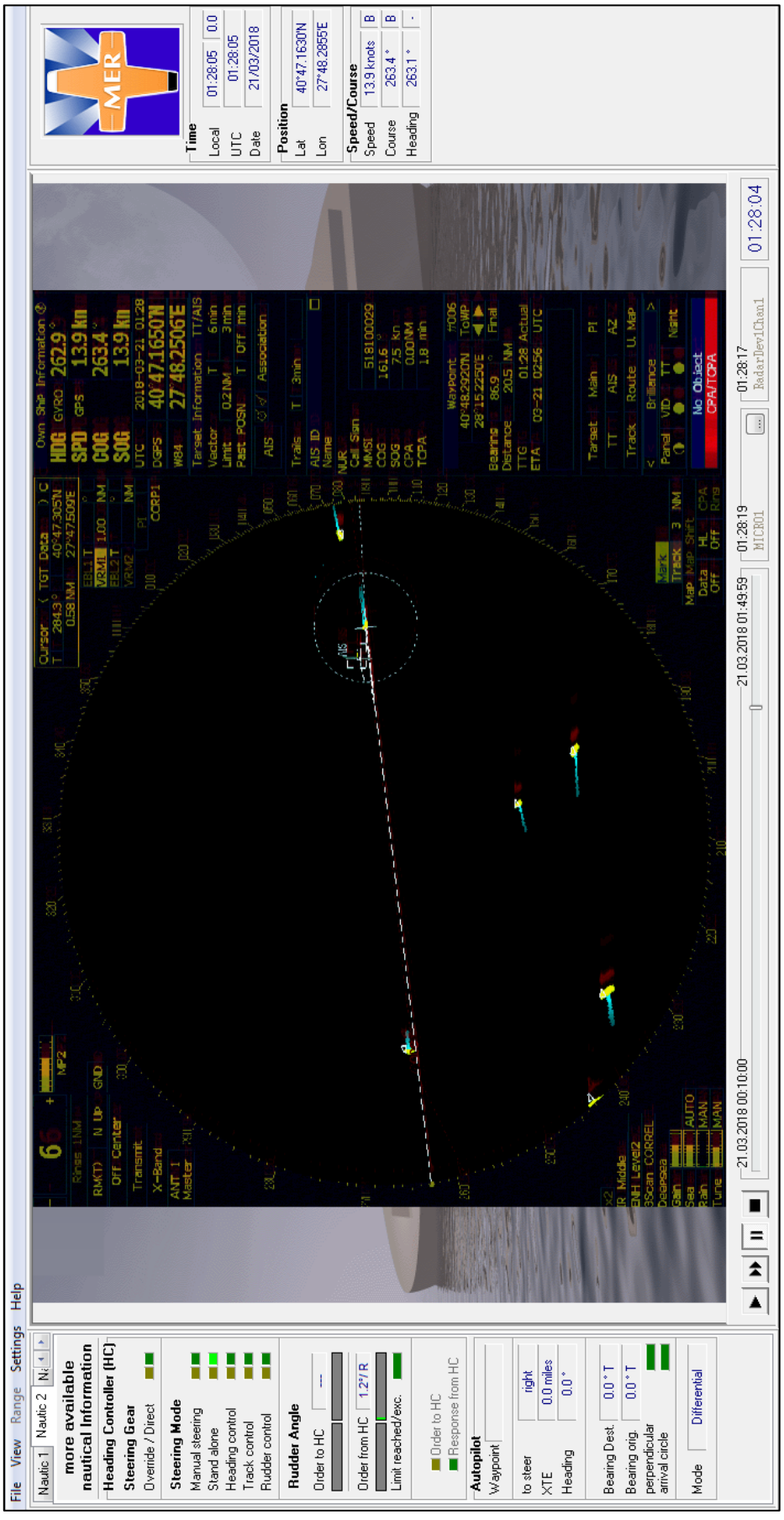


**Figure 8: Situation at 0128:04**

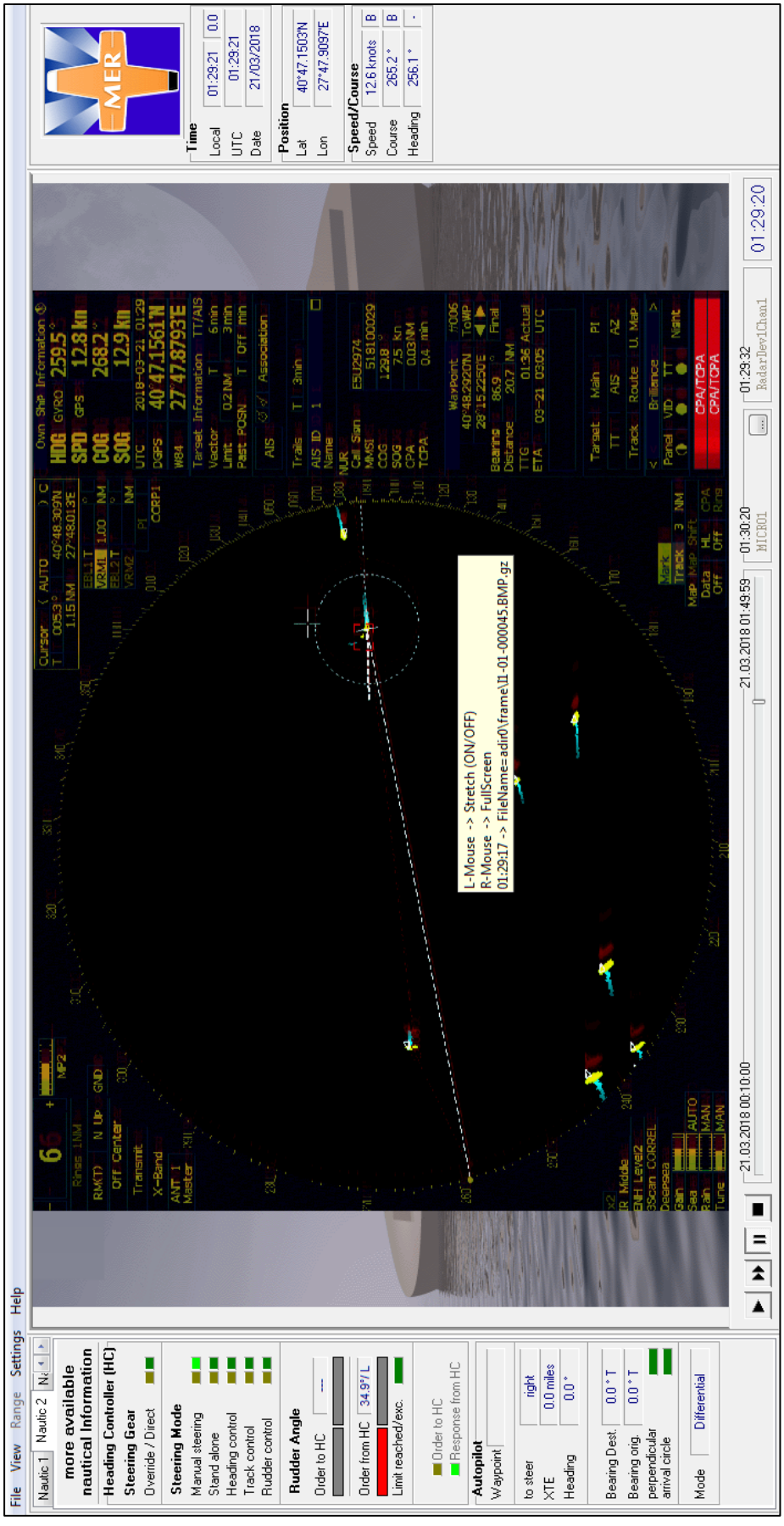


**Figure 9: Situation at 0129:20**

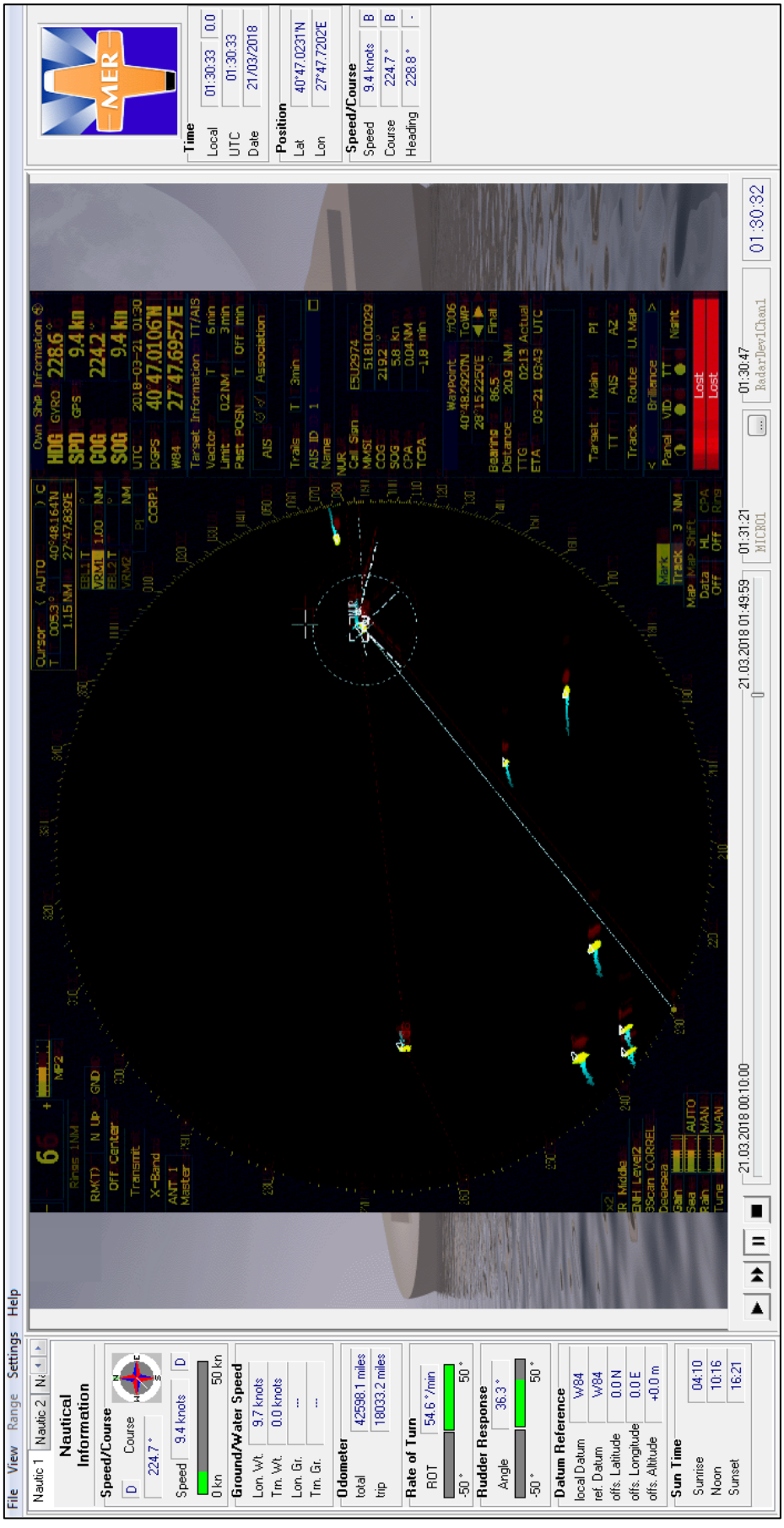


**Figure 10: Situation at 0130:32**


**Figure 11: Damages in way of starboard side shell plating**

## 1.9 Reported Damages

### 1.9.1 Damages to *Neptune Hellas*

As a result of the collision, structural damages, including ruptures, indentations and paint scratches were observed in way of starboard side shell plating of *Neptune Hellas* and above the waterline (Figure 12).

**Figure 12: Damages in way of starboard side shell plating**

### 1.9.2 Damages to *Nur*

Structural damages were observed on the vessel (Figures 13 and 14).

**Figure 13: Damages to the forecastle deck**

**Figure 14: Damages in way of the poop deck and side shell plating**

A damage survey carried out by the vessel's Classification Society revealed damages to the following areas:

- forecastle deck plating with associated framing in the bow area in way of frames 111 to 127;
- bulwark with guard rails and reinforcement on the forecastle deck in the bow area, in way of frames 4 to 15;
- side shell plating on port side and associated framing in way of frames 114-127 and the aft end in way of frames 4 to 15;
- air ventilation, sewage and sounding pipes and associated leakage protection boxes in the bow, port side and poop deck areas;
- mooring equipment (hawse pipe, bollard, roller and fair leads foundations on the forecastle and poop deck;
- air condition room side shell plating scuttle on the port side;
- guard rails on the poop deck – port side; and
- poop deck plating and associated framing in way of frames 4 to 15.

# 2 ANALYSIS

## 2.1 Purpose

The purpose of a marine safety investigation is to determine the circumstances and safety factors of the accident as a basis for making recommendations, to prevent further marine casualties or incidents from occurring in the future.

## 2.2 Lookout

Rule 5 of the COLREGs states that:

> *Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision*.

Section A-VIII/2 part 4-1 of STCW 2010 (as amended) describes the principles to be observed in keeping a navigational watch. Section 13 states:

> *The officer in charge of the navigational is the master's representative and primarily responsible at all times for the safe navigation of the ship, and for complying with the International Regulations for Preventing Collisions at Sea, 1972, as amended.*

Section 14 emphasises requirements of Rule 5 of the COLREGS, and further explains that lookout shall serve the purpose of:

- *Maintaining a continuous state of vigilance by sight and hearing as well as by all available means, with regard to any significant change in the operating environment;*
- *Fully appraising the situation and the risk of collision, stranding and other dangers to navigation; and*
- *Detecting ships or aircraft in distress, shipwrecked persons, wrecks, debris and other hazards to safe navigation.*

On board *Neptune Hellas,* the second mate was the OOW, assisted by an AB for lookout duties. The watch was handed over as per SMS procedures on taking over

bridge watch. The S- and X-band radars were respectively set on 12 and 6 nm range and both radars had manual and auto-acquire facility to track targets. Thus, apart from the look-out on the bridge, all navigational aids were operational and readily available to affect a safe navigational watch in accordance with the bridge standing orders and master's night orders. The account given by the OOW indicated that *Nur* was first acquired on the radar when he was alerted by the VTSC, approximately one nm distant from *Neptune Hellas*.

The VDR records show that the call was made between 0127:10 and 0128:03 (Table 1) and it was during this period that the look-out was ordered to take the helm to affect an immediate collision avoidance manoeuvre. Thus, it appears that sustained visual lookout was not maintained and the change in *Nur*'s aspect was not observed. Moreover, *Nur* which had been detected on the radars well before being alerted by the VTSC, was neither manually acquired nor was the auto-acquire function used to give early warning of change of course by *Nur*.

The bridge on board *Nur* was manned by the chief mate and a seafarer forming part of the bridge watch. At handover, the chief mate was informed by the second mate that a vessel on her port quarter was overtaking *Nur*. The fact that the chief mate claimed that *Neptune Hellas* had altered her course towards *Nur* when she was abeam (Figure 7), suggested that *Nur*'s course in the TSS was not being monitored and the chief mate was oblivious of his own vessel's sudden deviation from the planned route.

### 2.3 Actions on board *Neptune Hellas* and *Nur*

VDR records show that prior to collision, *Neptune Hellas* was sailing on autopilot, with a steady course and speed. Although the voyage was uneventful, she was in a TSS, there were other sailing vessels in the area, and it was dark hours.

It can be concluded from the screenshots obtained every 15 seconds from the X-band radar (set at six nm range) and the voice records that the use of electronic navigation aids was not effectual. From 10 minutes and up to two minutes prior to the collision, the radar cursor did not move and other features *i.e.*, VRM and EBL did not change. In addition, none of the targets / echoes in the range of the radar were acquired and

automatic target acquisition was not set / in use. In this mode of operation, information from the radar on the risk of collision was limited.

The VDR data indicated that at around 0126, when *Nur* was approximately 0.9 nm ahead of *Neptune Hellas'* starboard bow, the former started turning sharply, unexpectedly and unannounced to port towards *Neptune Hellas*. This was displayed on the radar screen by the vessel's trail (although, at this time the target had not yet been acquired by the OOW). It did seem that this had led to a reaction neither from the OOW nor from the look-out – at least not initially - and it would appear that both crew members were unaware of this change of course by *Nur*.

The safety investigation could observe that between 0127:10 and 0128:15 (Table 1), the cursor on the radar was moved and placed on *Nur*'s echo by the OOW. At the same time, VTSC called *Neptune Hellas* to warn the vessel about the danger. During *Nur*'s manoeuvre towards her port side, *Neptune Hellas* was less than one nm away but the vessel was only acquired when both vessels were at a distance of about 0.55 nm from each other, at around 0128. The radar displayed the following information:

- COG: 161.6°;
- Speed: 7.50 knots;
- CPA: 0 TCPA 1.8 minutes.

It was at this time that the look-out was instructed to take control of the wheel.

During VTSC communication with *Neptune Hellas* and subsequent VHF call to *Nur*, there were no references to potential technical problems to the steering gear, rudder or related controls on board *Nur*. However, the OOW on *Nur* claimed that he had observed *Neptune Hellas* manoeuvring towards his ship. Reviewing the data from the VDR, it was clear that any change in course from *Neptune Hellas* (to starboard) was brief at change-over to hand steering (before the OOW ordered the helm hard over to port), and had happened after *Nur*'s course alteration to port. The ultimate order to manoeuvre the vessel to starboard, which was reportedly observed by *Nur* (Figure 6) was an attempt by the OOW to lessen the impact of the contact when it became certain that collision could not be averted by the manoeuvre of *Neptune Hellas* alone.

From the evidence submitted by *Neptune Hellas*, the safety investigation did not have any indication as to the reasons behind *Nur*'s alteration of course to port at a very close distance to *Neptune Hellas.*

## 2.4 Overtaking and Reporting of Accidents

Vessels navigating the Turkish Straits participate in the vessel reporting system and their movement is regulated by the Turkish Straits Maritime Traffic Regulations. There are no specific provisions in the Regulations for overtaking vessels in the Marmara Sea sector. However, TSVTS User's Guide[7]stated that a vessel overtaking another shall inform the TSVTS Centre, who shall assess the traffic situation and provide information or instructions to the vessel. Moreover, the Guide recommended that in the event of any accident occurring within the TSVTS area and which may either interfere with the vessel's capability to safely manoeuvre, or creates a danger to the marine environment and surrounding areas, should immediately notify the TSVTS Centre so that necessary precautions may be taken.

Prior to the collision, *Neptune Hellas* and *Nur* were navigating in the Marmara Sea, controlled by Sector Gelibolu. Both vessels were 'direct passing vessel[8], as defined in the Regulations; bound for Çanakkale Strait and Aegean Sea, and following the general direction of traffic flow in the TSS. *Neptune Hellas* was astern of *Nur*. Although *Neptune Hellas* had not made any formal report to overtake *Nur*, both *Nur* and VTSC were aware that *Neptune Hellas* was overtaking and there were no indications that *Nur* intended to cross the TSS. The fact that the unintended course deviation by *Nur* was neither reported nor checked by her watchkeepers suggests that the lookout on *Nur* was not constant and her alteration to port was missed altogether by the OOW.

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7 http://www.turkishstraits.com/upload/docs/ug_en.pdf.

8 Maritime Traffic Regulations define a 'direct passing vessel' as a vessel planned not to call a port, berth or place within Turkish Straits, and reported same in her Sailing Plan to the Turkish authorities before entering the Straits.

## 2.5 *Nur's* AIS Data and Assessment of Situation

Analysis of *Neptune Hellas*' VDR data suggested that she was not experiencing any issues and the crew members were aware of no risk of collision overtaking *Nur*.

In November 2018, during the course of this safety investigation, *Nur*'s AIS position analysis (Figure 15) was submitted to the MSIU. According to this data analysis, the steering gear system on board *Nur* had malfunctioned at 0121:55 (eight minutes before the collision) and this failure accounts for the vessel's abrupt swing to port until her contact with *Neptune Hellas* (Figure 15). The heading marker line which is logged steady on 256° was reportedly due to an error in the transmission of gyro data to the AIS. This sudden and unexpected change of direction was neither reported by *Nur* nor anticipated by *Neptune Hellas*, which significantly altered the conditions under which *Neptune Hellas* was overtaking *Nur*; leaving no time for the OOW to effectively manoeuvre her out of the way.

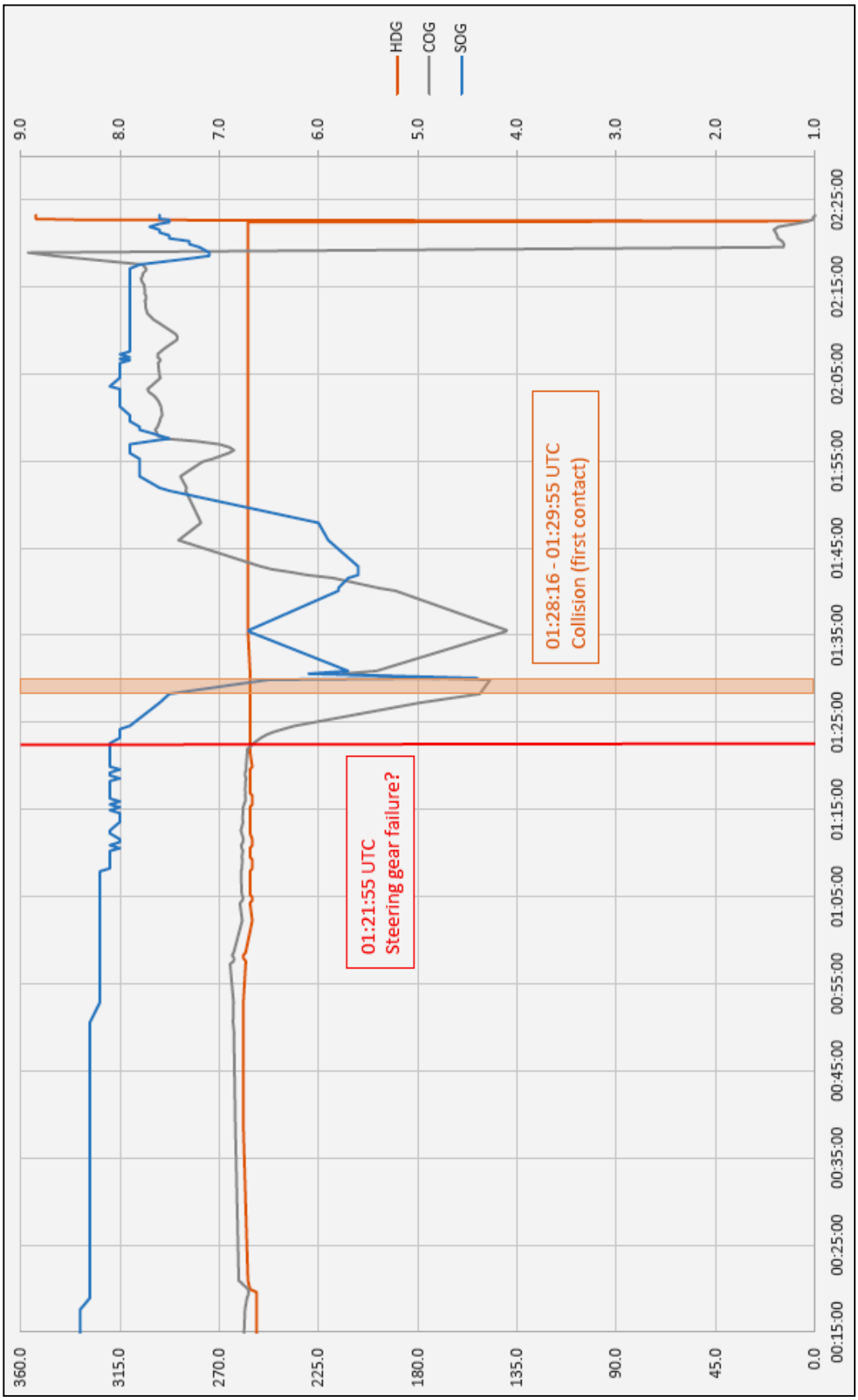


**Figure 15: *Nur*'s AIS data analysis and COG graph**

**THE FOLLOWING CONCLUSIONS, SAFETY ACTIONS AND RECOMMENDATIONS SHALL IN NO CASE CREATE A PRESUMPTION OF BLAME OR LIABILITY. NEITHER ARE THEY BINDING NOR LISTED IN ANY ORDER OF PRIORITY.**

# 3 CONCLUSIONS

Findings and safety factors are not listed in any order of priority.

## 3.1 Immediate Safety Factor

.1 The collision happened following *Nur's* alteration of course to port when *Neptune Hellas* was overtaking *Nur*.

## 3.2 Latent Conditions and other Safety Factors

.1 The use of electronic navigation aids was not effective;

.2 None of the targets/echoes in the range of the radar were plotted and automatic target acquisition was not set / in use;

.3 Information from the radar on the risk of collision was limited;

.4 *Nur's* turn to port was neither expected nor announced;

.5 There was no initial reaction from *Neptune Hellas* to *Nur's* manoeuvre;

.6 There were neither any communication attempts, nor any other cautionary actions by *Nur* prior to the accident;

.7 There were no extraordinary events by the two vessels, until *Nur's* sudden alteration of course to port side;

.8 The distance between the two vessels was close enough to compromise an evasive manoeuvre to avoid a collision;

.9 The overtaking manoeuvre was being affected without a clear indication of the CPA between the two vessels.

# 4 ACTIONS TAKEN

## 4.1 Safety Actions Taken During the Course of the Safety Investigation

During the course of the safety investigation, Neptune Lines Shipping & Managing Enterprises SA, took the following safety actions:

- A Circular was issued to all vessels in the fleet, highlighting the causes of the accident;
- Additional training was planned for the bridge team, focussing on proper look out and overtaking situations;
- Masters have been instructed to verify the radar settings for automatic acquisition of targets and that it is set correctly and that this is made known to the bridge team members;
- Look out duties and overtaking procedures have been considered as the main focus areas during scheduled internal audits; and
- Additional look out and overtaking posters have been placed on the bridge of all ships in the fleet.

# 5 RECOMMENDATIONS

In view of the conclusions reached,

**Ege Denizcilik Mursel Teksen is recommended to**:

***05/2019_R1*** bring this safety investigation report to the attention of crew members serving on board fleet vessels in order to address the importance of continuous lookout during the navigational watch.