



## SAFETY INVESTIGATION REPORT

201512/005

REPORT NO.: 21/2016

December 2016

The Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011 prescribe that the sole objective of marine safety investigations carried out in accordance with the regulations, including analysis, conclusions, and recommendations, which either result from them or are part of the process thereof, shall be the prevention of future marine accidents and incidents through the ascertainment of causes, contributing factors and circumstances.

Moreover, it is not the purpose of marine safety investigations carried out in accordance with these regulations to apportion blame or determine civil and criminal liabilities.

### NOTE

This report is not written 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 report may therefore be misleading if used for purposes other than the promulgation of safety lessons.

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This safety investigation has been conducted with the assistance and cooperation of the Bahamas Maritime Authority and the Dover Channel Navigation Information Service of the UK's Maritime & Coastguard Agency.

### SUMMARY

At 0004 on 05 December 2015, the Maltese registered bulk carrier *Maraki*, and the Bahamas registered vehicle carrier *Ivory Arrow*, collided in position 51° 22.2' N 002° 08.5' E, in a crossing zone between Dover Strait TSS and West Hinder TSS.

*Maraki* was Northbound in the Dover TSS. *Ivory Arrow* was on her starboard bow, coming out of the West Hinder TSS. Both vessels were in sight of one another. Radar targets were acquired and the ARPA had indicated a close quarter

situation.

*Maraki* altered course to starboard to keep out of *Ivory Arrow*'s way. Unaware of the action taken by *Maraki*, *Ivory Arrow* altered her course to port. Subsequently, both vessels collided. No injuries and no pollution were reported, however, both vessels sustained structural damages.

The MSIU has issued one recommendation to the managers of both vessels designed to enhance navigational safety.

## MV MARAKI Collision with MV *Ivory Arrow* In the TSS Crossing between Dover Strait and West Hinder TSS 05 December 2015



## FACTUAL INFORMATION

### Vessels

The Maltese registered *Maraki* was a 15,950 gt, dry-bulk carrier, owned and managed by Thalkat Shipping S.A., Greece<sup>1</sup>. She was built by Imabari Shipbuilding Co. Ltd., Japan in 1994, and was classed by NKK. The vessel had a length overall of 169.51 m, moulded depth of 13.65 m and a moulded breadth of 25.50 m.

*Maraki* had a summer deadweight of 26,472 tonnes. Propulsive power was provided by a 5-cylinder Mitsubishi 5UEC50LSII, two-stroke, single acting diesel engine, producing 5,442 kW. This drove a fixed pitch propeller at 110 rpm to give a service speed of 14.40 knots.

The Bahamas registered motor vessel *Ivory Arrow* was a 57,718 gt, vehicle carrier, owned by Ivory Maritime Ltd. and managed by Ray Car Carriers Ltd. of Isle of Man. She was built by Stocznia Gdynia SA, Poland in 2004 and classed with DNV GL. The vessel has a length overall of 200 m, moulded depth of 32.64 m and a beam of 32.30 m.

*Ivory Arrow* has a summer deadweight of 21,300 tonnes. Propulsive power is provided by a 7-cylinder Sulzer 7RTA62U, two-stroke, single acting diesel engine, producing 15,519 kW at 113 rpm. This drives a fixed pitch propeller to give a service speed of approximately 20.0 knots.

### Crew members

There were 22 crew members on board *Maraki*. All crew members were Filipino nationals, except for the master, chief engineer and the cook who were Greek nationals. The master was 62 years old. He had been promoted to master in 2000 and joined *Maraki* on 21 January 2015. The working language on board was English.

<sup>1</sup> The Maltese Registry was closed on 01 March 2016 in terms of Article 28(1) of the Maltese Merchant Shipping Act.

*Ivory Arrow* was manned by 27 crew members from Greece, Bulgaria, Ukraine and the Philippines. The master, a Bulgarian national, was on the bridge at the time of the accident. However, the second mate had the con as the OOW. The OOW was 25 years old and was also a Bulgarian national. An AB was on the bridge serving as a lookout and carrying out helm duties.

The crew compliments on *Maraki* and *Ivory Arrow* were in excess of the number stipulated in the Minimum Safe Manning documents issued by the respective flag State administrations.

### Environmental conditions

The weather in the Dover Strait area and West Hinder TSS crossing was clear with visibility of about 10 nautical miles (nm). The wind was Southwest, Beaufort Force 6 to 7 and the sea was rough.

### Narrative<sup>2</sup>

*Maraki*, loaded with 16,901 tonnes of sunflower seed, sailed from Nikolayev, Ukraine on 20 November 2015. During the evening of 04 December 2015, *Maraki* was navigating in the Dover Strait TSS, bound for Amsterdam. At about midnight she was close to Hinder 1 Buoy<sup>3</sup>. The second mate was the navigational OOW but the master had the con. An AB was on look-out duty. *Maraki* was steering 000° and the speed over ground was 12.5 knots.

*Ivory Arrow* sailed from Antwerp on 04 December 2015 bound for the Suez Canal through the West Hinder TSS. At 2330, she cleared Wandelaar VTS area and the master handed the con to the second mate. The master, however, remained on the bridge, instructing the OOW to call him before the vessel clears West Hinder TSS.

<sup>2</sup> Unless otherwise stated, all times are UTC.

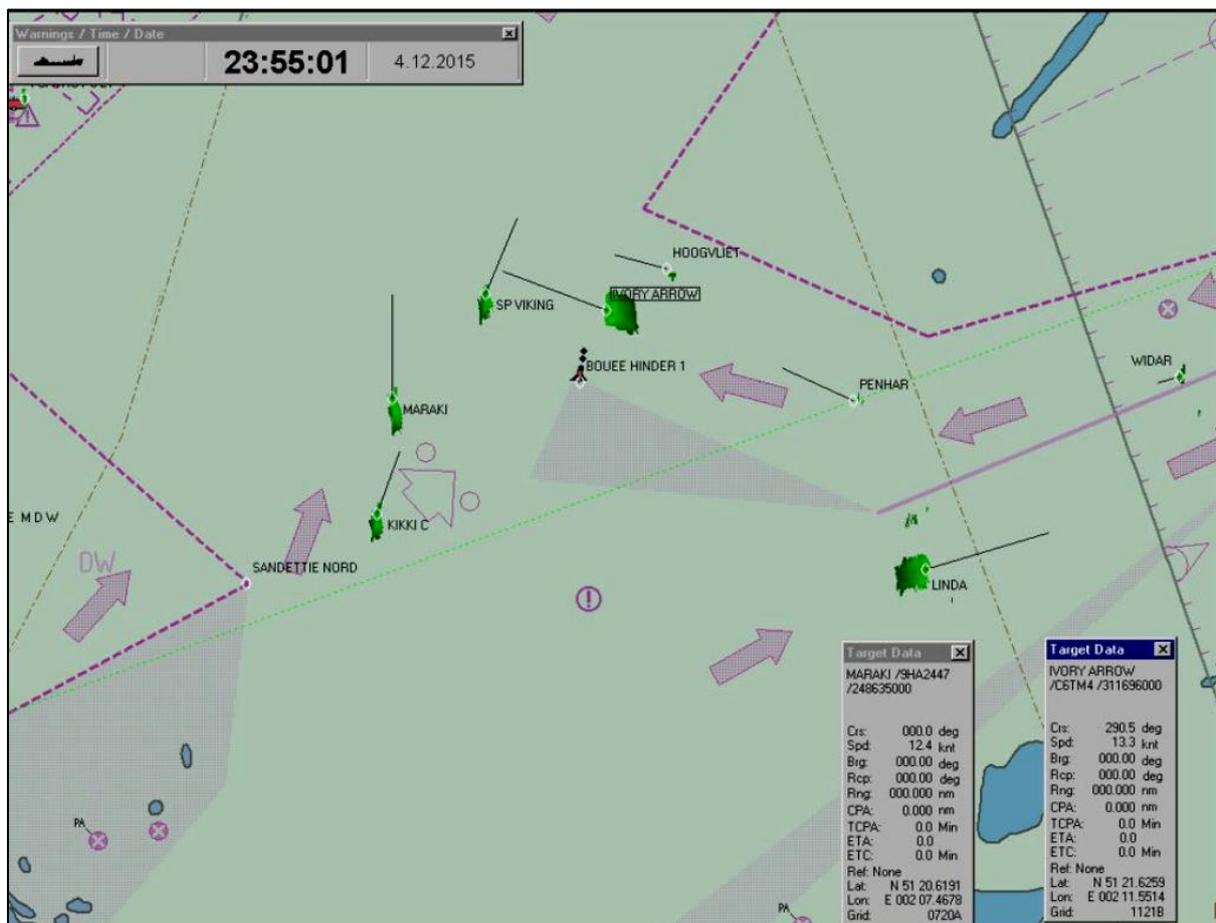
<sup>3</sup> Hinder 1 Buoy marks the limit of West Hinder TSS adjoining Dover Strait TSS.

Shortly after *Maraki* overtook *Kikki C* at a passing distance of 0.5 nm off Sandettie Nord Buoy, the master sighted a vessel in the West Hinder TSS at a six nautical mile range. The vessel, which was showing her red side light and masthead lights, was eventually identified on the AIS as *Ivory Arrow*. The master stated that the ARPA indicated a CPA of about one cable.

At 2340, the OOW on board *Ivory Arrow* acquired *Maraki*'s target on the S-band radar. The second mate reported a CPA of 0.7 nm with *Maraki* crossing the bow. At 2355, *Ivory Arrow* passed Hinder 1 Buoy on her port side, steering 290° and making 13.3 knots. *Hoogvliet* was on her starboard quarter and *SP Viking* was ahead, crossing her bow from port to starboard (Figure 1). At about 2359, *Maraki*'s master started giving helm orders to starboard.

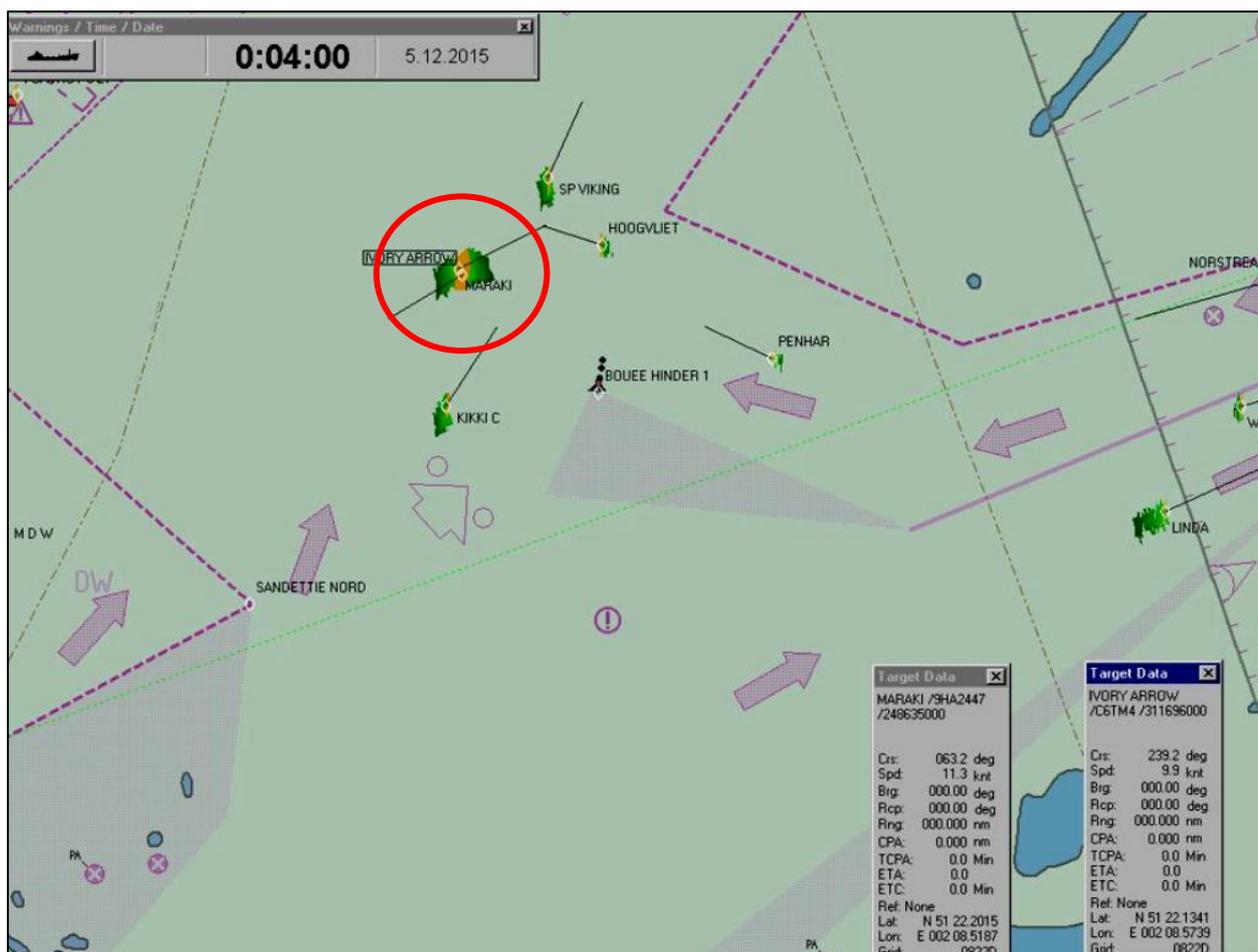
The second mate on *Ivory Arrow* stated that he observed the CPA reducing to 0.2 nm and ordered the helm hard over to port. *Maraki*'s master reported that he observed the navigation lights of *Ivory Arrow* fine on the starboard bow, swiftly changing from red to green and ordered the helm hard over to port. However, as the vessel started to swing to port, the starboard bow grazed the starboard quarter of *Ivory Arrow*.

A second contact was made abreast of *Maraki*'s cargo hold no. 5. The collision happened at 0004 on 05 December 2015 in the crossing between Dover Strait TSS and West Hinder TSS in position 51° 22.2' N 002° 08.5' E (Figure 2).



**Figure 1: VTS image at 2355/01 s, showing vessels in the vicinity of Hinder Buoy 1**

*Source: Dover Channel Navigation Information Service of the UK's Maritime & Coastguard Agency.*



**Figure 2: VTS image at 0004/00s showing position of collision between *Maraki* and *Ivory Arrow***

*Source: Dover Channel Navigation Information Service of the UK's Maritime & Coastguard Agency.*

There were reported neither any injuries nor pollution but both vessels had sustained structural damages. VHF radio communication was established but neither vessel required any assistance.

### Events following the collision

Immediately after the collision, both masters reduced speed. The general alarms were sounded and emergency stations were called. The master on *Maraki* briefly stopped the vessel to inspect the damages and check for water ingress. No water ingress was found. The master reported the accident to Cap Griz Nez VTS and resumed her voyage to Amsterdam.

No breach in the hull was reported on board *Ivory Arrow*. After reporting the accident to

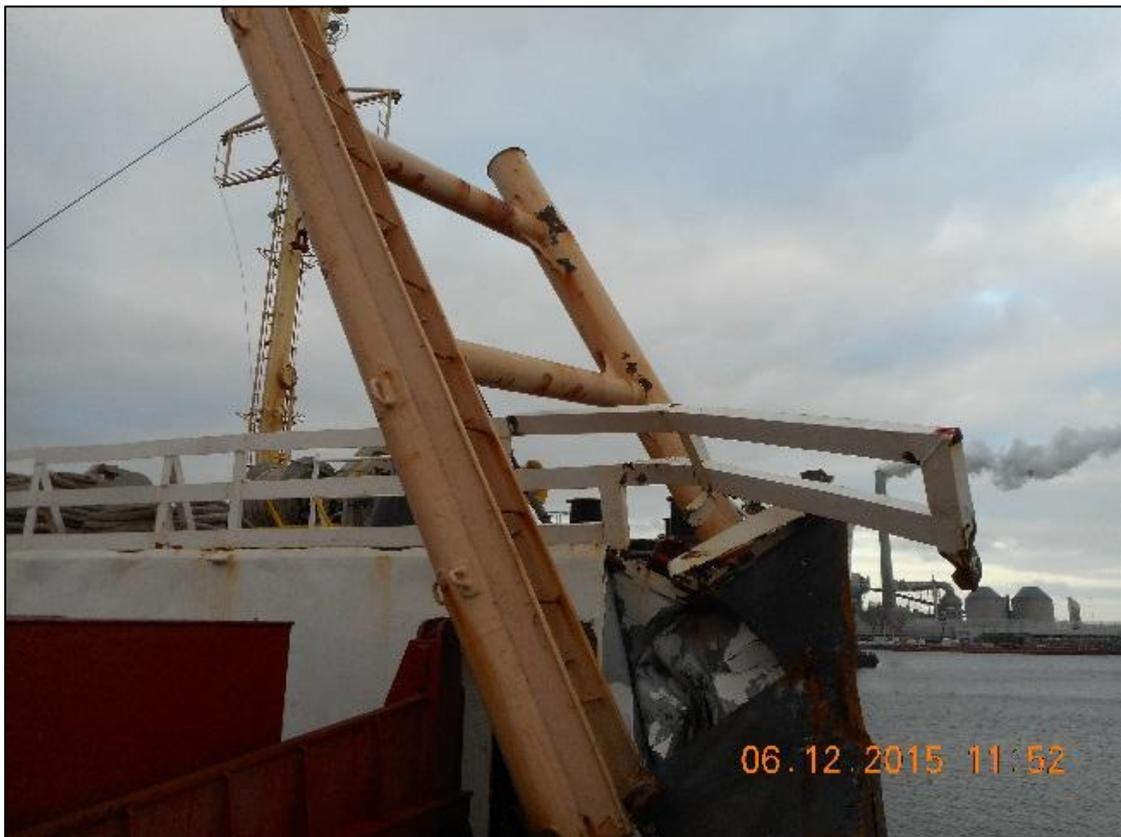
Dover Coastguard, *Ivory Arrow* set course for Flushing, Belgium.

### Structural damages

Extensive structural damage was reported by *Maraki*. Her starboard shell plating in way of cargo hold no. 5 between frames 41 and 64, longitudinals (strakes 1 to 4), web frames and brackets were found deformed. The forecastle starboard bulwark, deck and shell plating were indented. On the main deck, in way of cargo hatch no. 1, deck and shell plating up to the break of the forecastle were damaged. The bulwark, log stanchion, web frames, stiffeners and associated members were distorted (Figures 3a and 3b).



**Figure 3a: *Maraki's* shell plate damage iwo cargo hold no. 1**



**Figure 3b: View of damaged bulwark and log stanchion on *Maraki***

*Ivory Arrow's* Class surveyor reported damages to the starboard transom corner between car decks nos. 5 and 7 up to 9 frames.

Internal structural members were also damaged (Figure 4).



**Figure 4: *Ivory Arrow's* damaged starboard transom**

## ANALYSIS

### Aim

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

### Fatigue, drugs and alcohol

The hours of rest and work of the bridge teams on *Maraki* and *Ivory Arrow* were in accordance with the Maritime Labour and STCW Conventions' requirements. With respect to drug and alcohol use, the MSIU was unable to obtain documentary evidence from both vessels<sup>4</sup>.

Nonetheless, during the course of the safety investigation, the MSIU did not observe particular actions from both vessels, which would have suggested either fatigue or abuse of alcohol/drugs.

### Collision dynamics and actions taken on board *Maraki*

Both vessels' tracks and navigational information recorded by the CNIS VTS were analysed. Extract of key navigational information is shown in Table 1. Visibility in the vicinity of Hinder 1 Buoy was reported at 10 nm. Both *Maraki* and *Ivory Arrow* had acquired radar targets and were in sight of one another. A CPA of 0.90 nm, at 2345, gradually decreased, becoming steady at about four cables between 2350 and 2359.

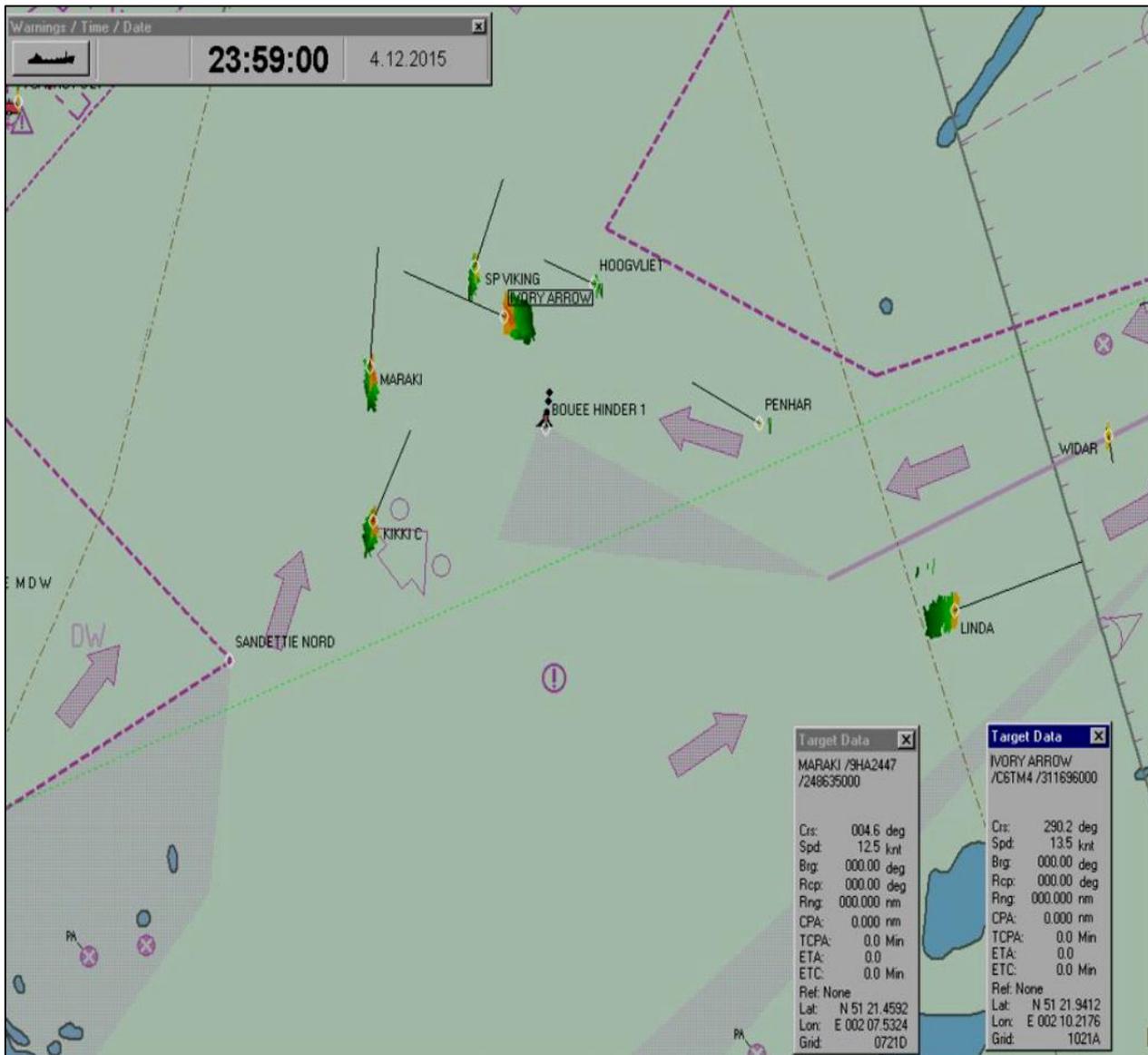
Table 1: Key navigational information extracted from VTS data

Time UTC	Maraki		Ivory Arrow						Observations
	Course °	Speed Knot	Course °	Speed	Bearing °	Range nm	CPA nm	TCPA mm	
23 45 00	000	12.4	279.0	13.6	063	5.30	0.903	18.3	-
23 50 00	000	12.4	290.0	13.7	065	4.00	0.405	15.9	CPA gradually decreasing to around 0.40 – 0.45 nm.
23 55 00	000	12.4	290.5	13.3	068.5	2.75	0.462	11.1	Ivory Arrow passing Hinder 1 buoy. Entering north lane of Dover TSS.
23 58 00	359.2	12.4	291.0	13.5	072	2.00	0.445	8.0	Maraki initiated course alteration to starboard.
23 59 00	004.6	12.5	290.2	13.5	074	1.75	0.390	6.5	
00 00 00	014.4	12.4	287.1	13.2	076	1.44	.308	4.8	Ivory Arrow initiated course alteration to port.
00 01 00	019.2	12.4	286.4	13.2	078	1.11	0.244	3.5	
00 02 01	031.5	12.2	285.5	13.1	080	0.76	0.121	2.2	
00 03 00	043.7	11.8	274	12.7	085	0.39	0.088	1.0	
00 04 00	063.2	11.3	239.2	9.9					Collision.

<sup>4</sup> It has to be clarified that the managers of *Ivory Arrow* stated that the vessel operates as a 'dry ship'.

A close quarter situation was evident, with *Maraki* crossing the course of *Ivory Arrow*. The OOW on the latter ship had identified his own ship as a stand-on vessel and expected *Maraki* to take action<sup>5</sup>. The master of *Maraki* appeared fully aware of his obligation to keep clear. However, his actions took place when *Ivory Arrow* had come within the two nautical mile range.

At about 2359, he initiated a helm order to come around a heading of 075°; assuming that *Ivory Arrow* would maintain her course (Figure 5). No signals were sounded to indicate her manoeuvre to starboard and the distance between the two vessels quickly decreased.



**Figure 5: VTS image showing relative position of *Maraki*, *Ivory Arrow*, *SP Viking* and *Hoogvliet* at 2359**

*Source: Dover Channel Navigation Information Service of the UK's Maritime & Coastguard Agency.*

<sup>5</sup> Rule 15 states that “When two power-driven vessels are crossing so as to involve the risk of collision, the vessel which has the other on her own starboard side shall keep out of the way and shall, if the circumstances of the case admit, avoid crossing ahead of the other vessel.”

The first situation assessment made by the master on board *Maraki* must have been influenced by factors such as experience and expectations. It was highly possible that if the situation assessment was inaccurate, then the decision (and outcome) would have also been inaccurate.

In the meantime, the OOW on *Ivory Arrow* read a CPA of two cables on his radar and ordered the helm to port<sup>6</sup>, assuming that *Maraki* would not be taking any action as a give-way vessel and instead would maintain her course. *Maraki*'s master observed that the vessels had turned towards each other and ordered the helm hard over to port. However, at this point in time, the collision was unavoidable.

#### **Action by *Ivory Arrow***

The OOW had assessed the situation in accordance with the COLREGs and was expecting *Maraki* to take action. Nonetheless, action was eventually taken to avoid collision as required in Rule 17(a)(ii)<sup>7</sup>. The action, however, was not taken in accordance with the requirements of Rule 17(c)<sup>8</sup> since the alteration to course was done to port.

No evidence was found to suggest that *Ivory Arrow* was in any way constrained to reduce her speed or alter course to starboard instead of port. However, the safety investigation has not excluded the possibility

of *Ivory Arrow* being hampered in her manoeuvre to turn to starboard by the slow moving vessels *SP Viking* and *Hoogvliet* (Figure 5).

#### **Sound signals**

Rule 34(a) of the COLREGs regulates the use of the whistle for manoeuvring when vessels are in sight of one another. Rule 34(b) requires that whistle signals may be supplemented by "light signals, repeated as appropriate, whilst the manoeuvre is being carried out."

Although *Maraki* and *Ivory Arrow* were in sight of one another, neither vessel sounded the signal prescribed in Rule 34(a). Moreover, in the case of *Ivory Arrow*, the OOW made no attempt to sound a warning signal as prescribed in Rule 34(a) to address the uncertainty of collision avoidance action by *Maraki*, given that the latter was the give-way vessel.

#### **Look-out and calling the master**

Under the STCW Code, a proper look-out that is able to give full attention to lookout duties in compliance with Rule 5 of the COLREGs is required. In the interests of safety, the Code further states that no other duties shall be undertaken or assigned to look-out including manual steering.

It was evident that the OOW on *Ivory Arrow* was alert to the risk of collision with *Maraki*. He was keen to remove himself from that danger and he put the look-out on hand steering, ready to take action. No replacement was called and who could have helped him either to detect *Maraki*'s manoeuvre or to assess whether sufficient sea-room was available on the starboard side before deciding to alter to port.

In the absence of a dedicated look-out, it is likely that the OOW had inaccurate situational awareness. He did not notice *Maraki*'s (late) manoeuvre and responded

<sup>6</sup> The OOW had not detected *Maraki*'s collision avoidance action.

<sup>7</sup> Rule 17 (a)(ii) states that "The latter vessel may however take action to avoid collision by her manoeuvre alone, as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action in compliance with the Rules."

<sup>8</sup> Rule 17 (c) states that "a power-driven vessel which takes action in a crossing situation in accordance with subparagraph (a)(ii) of this Rule to avoid collision with another power-driven vessel shall, if the circumstances of the case admit, not alter course to port for a vessel on her own port side."

before ascertaining the underlying cause of diminished CPA. It was also likely that during the brief but critical moments, he was anxious and preoccupied with the developing situation, and overlooked the master's instructions to call him before leaving the West Hinder TSS.

The potential inaccuracy in situation awareness may have been exacerbated by the fact that the OOW did not benefit from team support (e.g. communication and problem-solving), given that he was the only crew member engaged in the decision-making processes on the bridge. Being the sole lookout, the OOW was unable to share his understanding of the situation, especially when *Maraki* did not take timely action as required by a give-way vessel<sup>9</sup>.

It was also challenging for the OOW to form plausible scenarios on what was happening and solve the complex situation which was developing around him as both vessels' CPA decreased. The OOW did not have access to the collective experience of other crew members (e.g. the master) and hence, his ability to grasp the significance of the cues / conditions (and react earlier) would have been compromised.

## CONCLUSIONS

1. A close quarter situation was evident, with *Maraki* crossing the course of *Ivory Arrow*;
2. The OOW on *Ivory Arrow* had identified his own ship as a stand-on vessel and expected *Maraki* to take action;
3. The master of *Maraki* appeared fully aware of his obligation to keep clear. However, his actions took place only

<sup>9</sup> Rule 16 states that "Every vessel which is directed to keep out of the way of another vessel shall, so far as possible, take early and substantial action to keep well clear."

when *Ivory Arrow* had come within the two nautical mile range;

4. *Maraki* sounded no signals to indicate her manoeuvre to starboard;
5. The master on board *Maraki* assumed that *Ivory Arrow* would maintain her course;
6. The first situation assessment made by the master of *Maraki* must have been influenced by factors such as experience and expectations;
7. The OOW on *Ivory Arrow* read a CPA of two cables on his radar and ordered the helm to port, assuming that *Maraki* would not be taking any action as a give-way vessel and would maintain her course;
8. *Ivory Arrow*'s course alteration to port rather than starboard may have been due to slow moving vessels on her starboard side;
9. In the absence of a dedicated lookout, it is likely that the OOW on *Ivory Arrow* had inaccurate situational awareness;
10. The potential inaccuracy in situation awareness may have been exacerbated by the fact that the OOW did not benefit from team support.

## RECOMMENDATIONS

Thalkat Shipping S.A. is recommended to:

**21/2016\_R1** Circulate a copy of this safety investigation report on board all vessels under its management to highlight the hazards of close quarter situations.

Ray Car Carriers Ltd. is recommended to:

**21/2016\_R2** Adopt recommendation 21/2016\_R1.

**SHIP PARTICULARS**

Vessel Name:	<i>Maraki</i>	<i>Ivory Arrow</i>
Flag:	Malta*	Bahamas
Classification Society:	NKK	DNV GL
IMO Number:	9104158	9277838
Type:	Bulk Carrier	Vehicle carrier
Registered Owner:	Maraki Shipping S.A.	Ivory Maritime Ltd.
Managers:	Thalkat Shipping S.A.	Ray Car Carriers Ltd.
Construction:	Steel	Steel
Length Overall:	169.51 m	199.96 m
Registered Length:	161.19 m	188.29 m
Gross Tonnage:	15950	57718
Minimum Safe Manning:	16	14
Authorised Cargo:	Dry bulk	Vehicles

**VOYAGE PARTICULARS**

Port of Departure:	Nikolaev	Antwerp
Port of Arrival:	Amsterdam	Suez Canal
Type of Voyage:	International	
Cargo Information:	Sun Flower Meal	NA
Manning:	22	27

**MARINE OCCURRENCE INFORMATION**

Date and Time:	05 December 2015 at 0004 (UTC)	
Classification of Occurrence:	Serious Marine Casualty	
Location of Occurrence:	51° 22.2' N 002° 08.5' E	
Place on Board	F <sup>3</sup> castle deck / Overside	Overside
Injuries / Fatalities:	None	
Damage / Environmental Impact:	None	
Ship Operation:	In passage	
Voyage Segment:	Transit	
External & Internal Environment:	Clear weather with a visibility of about 10 nautical miles. The wind was Southwest, Beaufort 6 to 7 and rough sea.	
Persons on board:	22	27

\* Registry closed on 01 March 2016 in terms of Article 28(1) of the Maltese Merchant Shipping Act.