



Marine Safety Investigation Unit



Transport Malta



MARINE SAFETY INVESTIGATION REPORT

Joint investigation into the collision between the
Maltese registered general cargo

MARTI PRINCESS

and the German registered container ship

RENAME SCHULTE

off Bozcaada Island

27 June 2009

Marine Safety Investigation Report No. 03/2012

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.

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The objective of this safety investigation report is precautionary and seeks to avoid a repeat occurrence through an understanding of the events of 27 June 2009. Its sole purpose is confined to the promulgation of safety lessons and therefore may be misleading if used for other purposes.

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CONTENTS

	List of References and Sources of Information	v
	Glossary of Terms and Abbreviations	vi
	Summary	1
1	FACTUAL INFORMATION	
1.1	Ships' Particulars	3
1.2	Certification and Manning	7
1.3	Voyage History	7
	1.3.1 Events on board <i>Marti Princess</i>	7
	1.3.2 Events on board <i>Renate Schulte</i>	10
1.4	Weather Conditions	12
1.5	Vessel Tracks	12
1.6	Damage Sustained	20
	1.6.1 Damage on board <i>Marti Princess</i>	20
	1.6.2 Damage on board <i>Renate Schulte</i>	20
2	ANALYSIS	
2.1	Missing Evidence	24
	2.1.1 Physical evidence – VDR data	24
	2.1.2 Human evidence – <i>Ilgaz</i> crew members	25
2.2	Close Quarters Situation – <i>Marti Princess</i> and <i>Ilgaz</i>	25
2.3	Collision – <i>Marti Princess</i> and <i>Renate Schulte</i>	27
	2.3.1 Development of a close-quarters situation	27
	2.3.2 Signals to attract attention	28
2.4	Behavioural Analysis	28
	2.4.1 Situation awareness	29
	2.4.2 Decision on partially correct information	30
	2.4.3 Reality vs. perception	31
	2.4.4 Modelling SA	32
	2.4.5 Bridge resource management	34
	2.4.6 Fatigue	35

2.5	Missing Barriers	36
2.5.1	AIS and radar interface	36
2.5.1.1	Target list on the AIS equipment	37
2.5.1.2	AIS equipment automatic updating	38
2.5.2	Use of radar set	39
3	CONCLUSIONS	
3.1	Immediate Cause	41
3.2	Other Findings	41
	Recommendations	43
Annex 1	Hours of work and rest forms	44
Annex 2	Relevant pages from the deck logbook on the day of the collision	51

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GLOSSARY OF TERMS AND ABBREVIATIONS

AIS	Automatic Identification System
ARPA	Automatic Radar Plotting Aid
BL	Base line – this represents the lowest extremity of the moulded surfaces of the ship. At this point, where this line cuts the midship section, a horizontal line is drawn, which acts as a datum or baseline for all hydrostatic calculations
BRM	Bridge Resource Management – the use of all the available resources-information, equipment, and people to achieve safe and efficient maritime operations ¹
COLREGS	The Convention on the International Regulations for Preventing Collisions at Sea, 1972
CPA	Closest Point of Approach
FO	Fuel Oil
GMDSS	Global Maritime Distress and Safety System
GO	Gas Oil
GOC	General Operator's Certificate
GPS	Global Positioning System
GT	Gross Tonnage
i.w.o.	In way of
LT	Local Time
M	Metres
MAIB	Marine Accident Investigation Branch
mm	Millimetres
mt	Metric Tonnes
OOW	Officer of the Watch
S	Seconds
S-VDR	simplified Voyage Data Recorder
SA	Situation Awareness
SOLAS	The International Convention for the Safety of Life at Sea, 1974, and its Protocol of 1988, as amended
STCW	The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended
VDR	Voyage Data Recorder
VHF	Very High Frequency
VTS	Vessel Traffic Services

¹ Adapted from Lauber (1984) as cited in O'Conner & Flin (2003).

SUMMARY

The 6,019 GT Maltese registered general cargo ship *Marti Princess*, and the 14,619 GT German registered container ship *Renate Schulte* collided on 27 June 2009 whilst navigating in the Aegean Sea close to Bozcaada island. *Marti Princess* was southbound. *Renate Schulte* was northbound. The weather was predominantly dark with no moonlight although visibility was reported to be between five to seven miles. *Marti Princess* was proceeding at about 10.5 knots and *Renate Schulte* was doing about 16.5 knots.

On *Marti Princess*, the OOW and the master had just made an alteration in course to pass behind the stern of another ship – *Ilgaz*, and was coming back to the original heading. Both crew members did not see *Renate Schulte* ahead until a few minutes before the collision.

On board *Renate Schulte*, the OOW was monitoring *Ilgaz*. *Marti Princess* was noticed at about 2200 on radar when she was between four and five nautical miles apart. When the ships were about two nautical miles away, *Renate Schulte* called *Marti Princess* by her name on the VHF radio on more than one occasion to establish her intentions. However, no reply was heard and some time later, the look-out reported that he could see both sidelights – evident that *Marti Princess* was dead ahead on a reciprocal course.

At about 2209, both ships began to take evasive actions but now, very close to one another, there was insufficient room to turn and avoid the collision. At 2210, both ships collided, with *Renate Schulte*'s bow striking the port side of *Marti Princess*'s cargo area and missing the accommodation block by a few metres. The impact caused severe damage to *Marti Princess* in way of cargo hold no. 2. *Renate Schulte* sustained damage in her bulbous bow area. Both vessels were unable to proceed and salvors were contracted to separate the two vessels. No injuries and no pollution were reported.

There were various factors related to the International Regulations for Preventing Collisions at Sea, which were identified during the joint safety investigation; however, the investigation also identified missing/deactivated barriers and it also discusses in

some detail situation awareness – a contributing factor which was also identified. Recommendations have also been made to both ISM managing companies.

The accident was jointly investigated by Malta and Germany under the International Maritime Organization's (IMO's) Code for the Investigation of Marine Casualties and Incidents.

1 FACTUAL INFORMATION

1.1 SHIPS' PARTICULARS

Name	<i>MARTI PRINCESS</i>
Type of Ship	General Cargo
Call Sign	9HRK9
Port of Registry	Valletta
IMO Number	9519377
Official Number	11517
Owners	Black Tetra Shipping Ltd
ISM Managers	Atlas Gemi Isletmeciligi Ltd., Turkey
Classification Society	China Classification Society
Class Notations	★CSA ★CSM
Gross Tonnage	6019
Net Tonnage	3502
Summer deadweight	8637 t
Summer draught	6.50 m
Length overall	128.60 m
Beam	18.00 m
Moulded depth	8.80 m
Year of built	2008
Builder	Zhejiang Hongsheng Shipbuilding Co. Ltd.
Hull number	HS0601
Engine and propulsion	Single medium speed main engine driving a fixed pitch propeller



Name	<i>RENATE SCHULTE</i>
Type of Ship	Container
Call Sign	DGEF
Port of Registry	Hamburg
IMO Number	9057147
Official Number	90117
Owners	MS " <i>RENATE SCHULTE</i> " Vorsetzen Schiffahrtskontor GmbH & Co. KG
ISM Managers	Bernhard Schulte Shipmanagement (Deutschland) GmbH & Co. KG
Classification Society	Germanischer Lloyd
Class Notations	 100 A5 E  MC E AUT
Gross Tonnage	14619
Net Tonnage	7890
Summer deadweight	20250 t
Summer draught	10.113 m
Length overall	166.10 m
Beam	25.30 m
Moulded depth	13.050 m
Year of built	1994
Builder	Stocznia Szczecinska S.A. / Szczecin
Hull number	B186-II/4
Engine and propulsion	Single medium speed main engine driving a fixed pitch propeller



Figure 1.1i: MV *Marti Princess*



Figure 1.1ii: MV *Renate Schulte*

1.2 CERTIFICATION AND MANNING

All Statutory certificates on board *Marti Princess* and *Renate Schulte* were valid at the time of the accident. *Marti Princess*' Minimum Safe Manning Certificate required that the vessel to be manned by a master, chief officer, two navigational officers of the watch, one chief engineer, a second engineer, one engineering officer of the watch, five deck ratings and two engine ratings. At least two deck officers were required to be holders of a GMDSS General Operator's Certificate (GOC). There were 18 crew members on board.

Renate Schulte was manned by 17 crew members and was also complying with the Minimum Safe Manning Certificate issued by the flag State Administration.

All certificates of competency were valid at the time of collision and endorsed by the flag State Administration of the vessel as required by the relevant international regulations.

1.3 VOYAGE HISTORY²

1.3.1 Events on board *Marti Princess*

When *Marti Princess* cleared the Canakkale Straits on 27 June 2009 at about 2010, the master decided to retire to his cabin. The bosun was the duty look-out. The second officer, who was not the OOW at the time, was also on the bridge, preparing the necessary passage documents for the owners and the charterers. However, until 2110, the master was still occasionally visiting the bridge.

By 2145, the owners/charterers report was ready and the master was informed accordingly. The master made his way to the bridge, checked the documents just prepared for him, and sent them to the owners and charterers at about 2150. At the time, the bridge chart room curtains were drawn closed. Until then, the voyage was uneventful. During his presence on the bridge, the master neither heard any exchange of messages on the VHF, nor did the OOW inform him of any particular situation around the ship.

² Unless otherwise stated, time is local time (LT).

Once all the messages were completed, the master checked the chart and proceeded to the bridge. Upon positioning himself in front of the bridge control panel, the master observed a ship on his vessel's starboard bow. The ship seemed very close – to the extent that the master could see the stern light very clear. He also observed two other ships on *Marti Princess*' port bow, about 5° and 10° respectively. Since the ship on the starboard bow was relatively close, the master asked the OOW to indicate the speed and distance of the vessel³.

The OOW checked the distance between *Marti Princess* and *Ilgaz* and reported a distance of about five nautical miles. Somewhat surprised, the master requested the OOW to redo his calculations as the ship seemed to be much closer than five nautical miles. The OOW checked again the situation and this time he reported that the distance was eight cables⁴. Considering the close distance between the ships, the master ordered the OOW to change over to hand steering and alter course to starboard; the intention being to pass clear of *Ilgaz*. Given the close proximity of the two vessels, the master followed the situation and the manoeuvre visually rather than by radar.

Once *Ilgaz* was on the port side of *Marti Princess* (following the manoeuvre), the OOW asked the master whether he could manoeuvre the ship back to the original course. Focusing entirely on *Ilgaz*, and with his mind at rest that the vessel was now clear, the master gave his consent to the OOW. The vessel was still on hand steering at the time and the OOW had already started the manoeuvre, when the master noticed another ship almost dead ahead, with both navigational lights clearly visible.

The vessel also appeared to be very close. The master proceeded to the AIS to check the northbound vessel's name. However, he was not able to identify the ship, concluding that the AIS ship list was sorted in distance order. The equipment was not interfaced with the radar either and therefore there was no way for the master to identify the ship by her name from the radar set. At about 2209, the master called the ship on his starboard side, which at the time was less than half a nautical mile away, requesting that both ships pass port to port.

³ The vessel eventually turned out to be the Turkish registered *Ilgaz*.

⁴ One cable is equal to 185 m.

Course was also altered from 208° to 265°. Approximately thirty seconds later, the master repeated his request, this time addressing the ship dead ahead. At no point in time did the master refer to *Renate Schulte* by her name.

At 2210, *Marti Princess* and *Renate Schulte* collided South west of Bozcaada Island in position 39°42.37'N 25°47.07'E. At the time, *Marti Princess* was making 10.5 knots. The master of *Marti Princess* also estimated that whereas *Ilgaz* was making eight knots, the *Renate Schulte*, which was in ballast, was making about 19 knots. *Renate Schulte* hit *Marti Princess* on her port side, almost perpendicular to cargo hold no. 2. With the impact, the no. 1 crane jib cleared its crescent and swung out to sea over the vessel's starboard side.

The chief officer, who was in his cabin at the time, was awakened by the tremendous noise and shock, which vibrated across the entire ship. On the bridge, the general alarm was immediately activated. The situation was discussed briefly between the master and the chief officer, the latter proceeding to the main deck to conduct an initial damage assessment of the ship's structural condition. By then, most of the crew members had already boarded the starboard lifeboat, ready to abandon the ship. At around 2225, the starboard lifeboat was lowered and released from the davits falls, although it was secured to the vessel's main deck. Minutes later, the port side lifeboat was also lowered with four other crew members inside. Only three crew members remained on the ship.

At about 2230, no. 3 cargo hold manhole was opened for inspection. The hold seemed dry. However, the initial assessment revealed that *Marti Princess* sustained a huge tear on her port side, approximately 10 m wide and 5 m deep in a triangular shape. The hatch covers for cargo holds nos. 2, 5 and 7 were displaced from their respective coaming. On the other hand, cargo hold no. 6 hatch covers were lost overboard. It was also noticed that cargo hold no. 2 was open to sea and the water level inside the hold was at the ship's waterline. It was concluded that the 3,000 mt of cement in cargo hold no. 2 were completely wet (table 1.3a).

Table 1.3a: *Marti Princess* draft changes prior and after the collision

	<i>Forward Draft</i>	<i>Aft Draft</i>
On departure	5.60 m	7.43 m
After collision ⁵	6.60 m	> 7.40 m

Further soundings revealed that there was an increase in the departure soundings in the forepeak tank, double bottom tank no. 1, top side tank no. 1, and the bilges in cargo hold no. 1. However, the situation was deemed stable and consequently, seven crew members boarded the vessel again.

1.3.2 Events on board *Renate Schulte*

Renate Schulte sailed from France to Casablanca, in Morocco. Upon arrival, the last containers were discharged but a new charter party was not signed. Initially, the vessel anchored in the proximity of the Spanish Coast waiting for orders. However, the master was instructed to leave the 12 nautical mile territorial seas. Eventually, the vessel proceeded to Tuzla, Turkey for her scheduled dry-docking.

At 2140, whilst on her way to Tuzla, the OOW on board *Renate Schulte* consulted his starboard S-band radar, which was operated off-centre on a range of about 12 nautical miles – providing a range of about 18 nautical miles ahead of the ship. The OOW became aware of *Ilgaz* when she was on his port bow and at a distance that was calculated to be 11 nautical miles. *Ilgaz* crossed the bow of *Renate Schulte* from port to starboard, with a CPA of about 0.5 nautical miles. There was no dense traffic in the area and the OOW could only observe six other ships.

When *Marti Princess* was first detected on the radar, shortly before 2200, she was on the starboard side of *Renate Schulte* at a distance of about five nautical miles. *Marti Princess* was crossing *Renate Schulte*'s bow from starboard to port. Consequently, the OOW focused his attention on *Ilgaz*. As soon as *Ilgaz* cleared the bow of *Renate Schulte*, and with *Marti Princess* about to cross her bow, the *Renate Schulte* altered course to starboard by about 27° within 5 minutes so as to encourage *Marti Princess* to cross ahead, but only so far as to be sure of clearing the stern of *Ilgaz* so as not to confuse it.

⁵ Aft draft was not recalled during the interviews.

At 2200, VTS Canakkale called *Renate Schulte* on VHF, asking for the vessel's particulars. The conversation lasted about two minutes and no information on the traffic situation was exchanged.

Sometime later, the look-out reported a ship, one point on the starboard bow, showing her green sidelight. The vessel was initially not visible to the look-out because of the vessel's deck cranes. Following the look-out's remark, the OOW switched the radar to the six-mile range setting. At this time (approximately 2203), *Marti Princess* was about 2.2 nautical miles ahead and still on *Renate Schulte*'s starboard bow. The OOW on *Renate Schulte* identified *Marti Princess* from the AIS (which was interfaced with the radar). He therefore called *Marti Princess* by her name on the VHF four times between 2204 and 2207. However, there was no reply. Some time later, the look-out reported that he could see both sidelights. It became evident that *Marti Princess* was dead ahead on a reciprocal course.

The OOW was quite surprised with the manoeuvre made by *Marti Princess* and concluded that the vessel must have altered course to her starboard to give way to *Ilgaz* although shortly after, she came back to her initial course with a port alteration in a sinusoidal fashion⁶. Analysing the situation, the OOW concluded that a further alteration to starboard was only possible to a limited extent since although *Ilgaz* had cleared *Renate Schulte*'s bow, the former was still on her starboard side and almost abeam. In fact, the OOW observed that any alteration to starboard *i.e.* towards *Ilgaz*, was even more limited because the latter vessel had altered course to starboard from 181° to 195° after clearing *Renate Schulte*.

At 2207, when the distance between *Marti Princess* and *Renate Schulte* had reduced to about one nautical mile, the OOW on *Renate Schulte* ordered the look-out to call the master on the bridge. At 2209, *Renate Schulte* changed over to manual steering and altered course to port to avoid hitting *Marti Princess* in her accommodation. Shortly after, the vessel collided with *Marti Princess*.

⁶ See table 1.5a. *Marti Princess* altered course to starboard from 22:01:31 to 22:06:32. Then, she altered course to port until 22:09:25 and then back to starboard.



Figure 1.3i: *Marti Princess* and *Renate Schulte* on the morning following the collision

1.4 WEATHER CONDITIONS

Sunset was at about 2000. At the time of the collision, it was predominantly dark with no moon light. However, visibility was good, roughly five nautical miles. There were force 3 winds with calm seas and no swell. The officers on *Renate Schulte* reported a visibility of about eight nautical miles.

1.5 VESSEL TRACKS

Turkish authorities recorded the tracks of the vessels involved. The plots of the vessels started at 2147 (LT) and ended at 2215 (LT), after the collision had occurred.

The plots show that *Renate Schulte* maintained her track of about 0250 until about 2206, when she altered course to 034.60 after *Ilgaz* cleared her bow. Her speed over the ground was about 16.5 knots. *Marti Princess* was making about 10.5 knots until the collision.

Still AIS images between 2141 and 2210 have been included in this safety investigation report as figures 1.5i to 1.5ix. A synopsis of the vessels manoeuvres are tabulated in Table 1.5a.

Table 1.4a indicates that had the OOW on board the *Marti Princess* kept his course, *Ilgaz* would have crossed the bow of *Marti Princess* at a distance of three cables and would have passed *Renate Schulte* on her starboard side nine cables away. On the

other hand, *Ilgaz* would have passed *Renate Schulte* on her starboard side at a distance of 2.1 nautical miles. These issues will be analysed further in section 2 of this report.

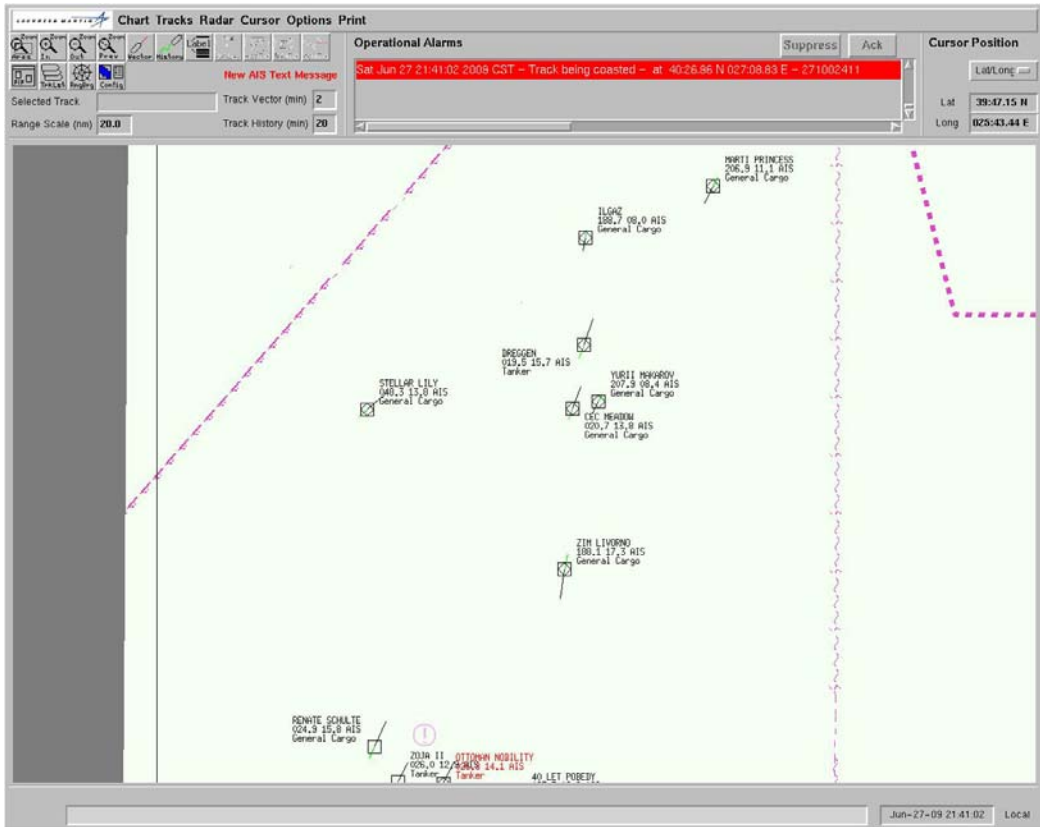


Figure 1.5i: Situation at 2141:02 (LT)

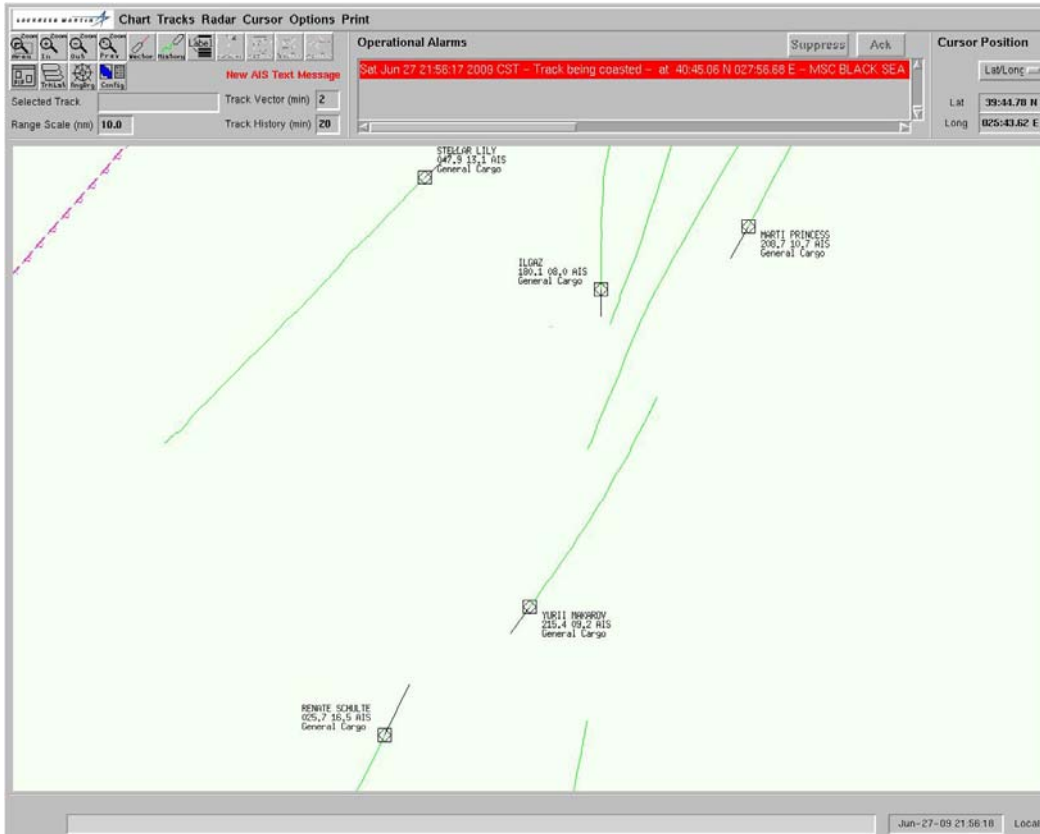


Figure 1.5ii: Situation at 2156:18 (LT)

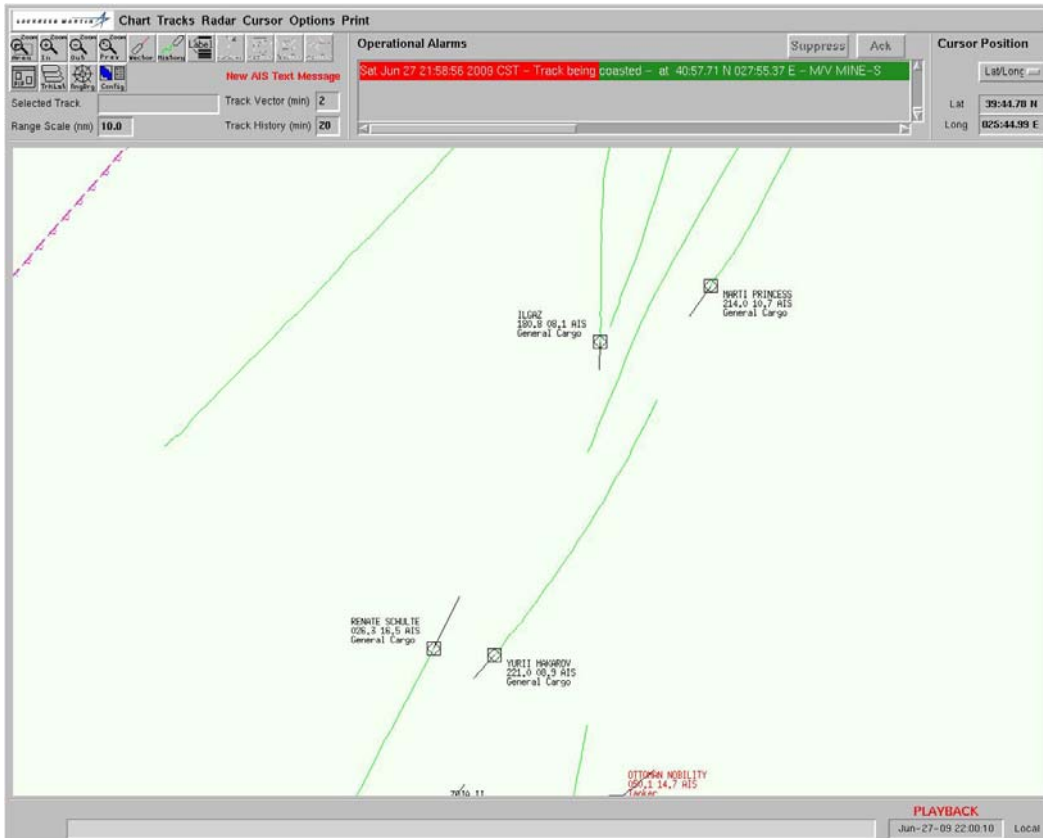


Figure 1.5iii: Situation at 2200:10 (LT)

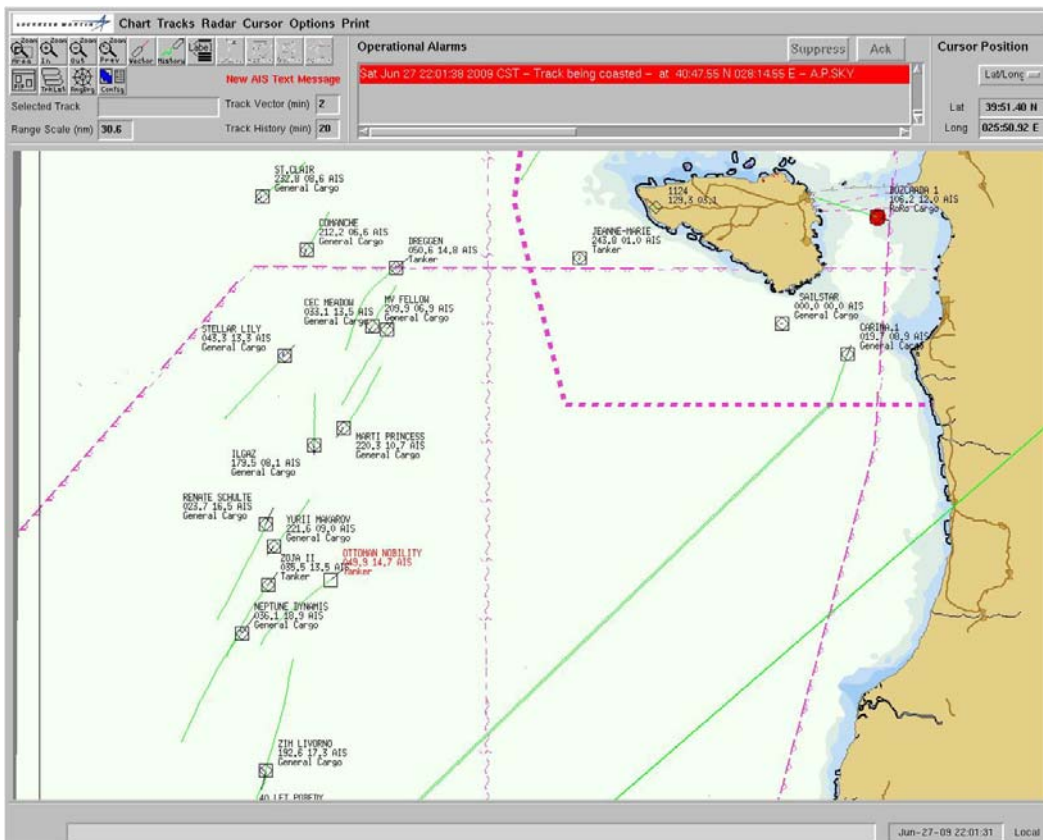


Figure 1.5iv: Situation at 2201:31 (LT)

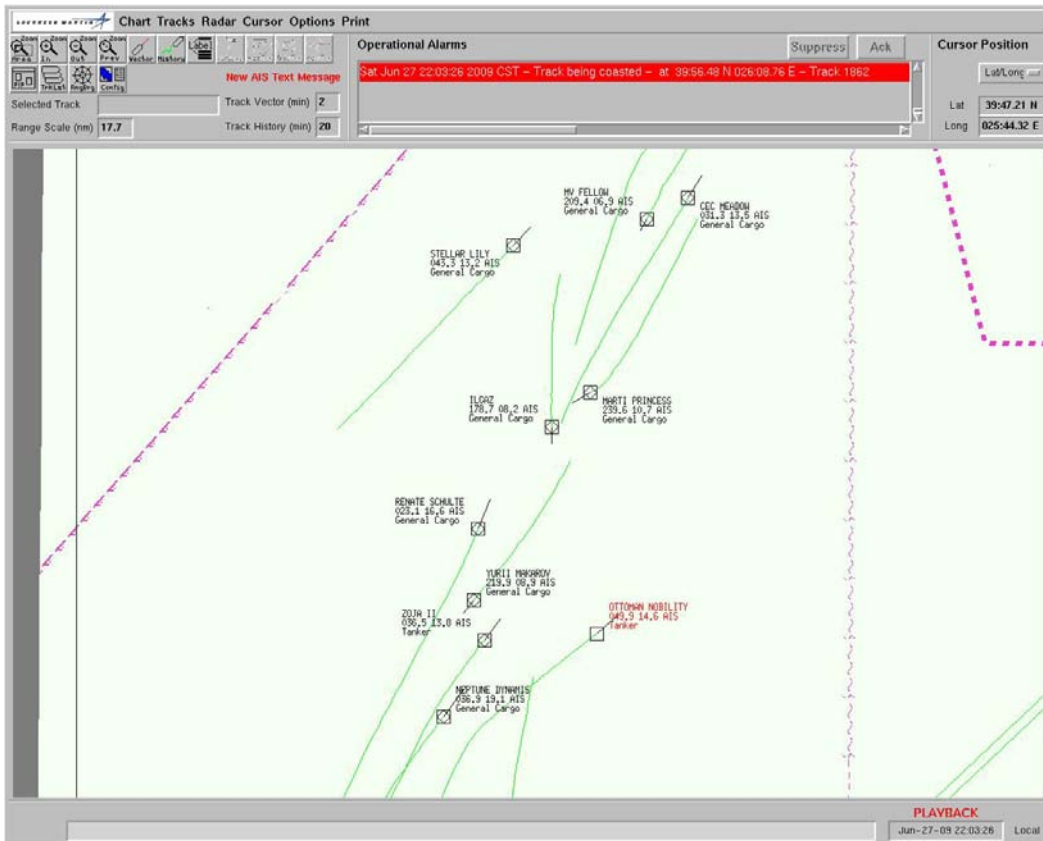


Figure 1.5v: Situation at 2203:26 (LT)

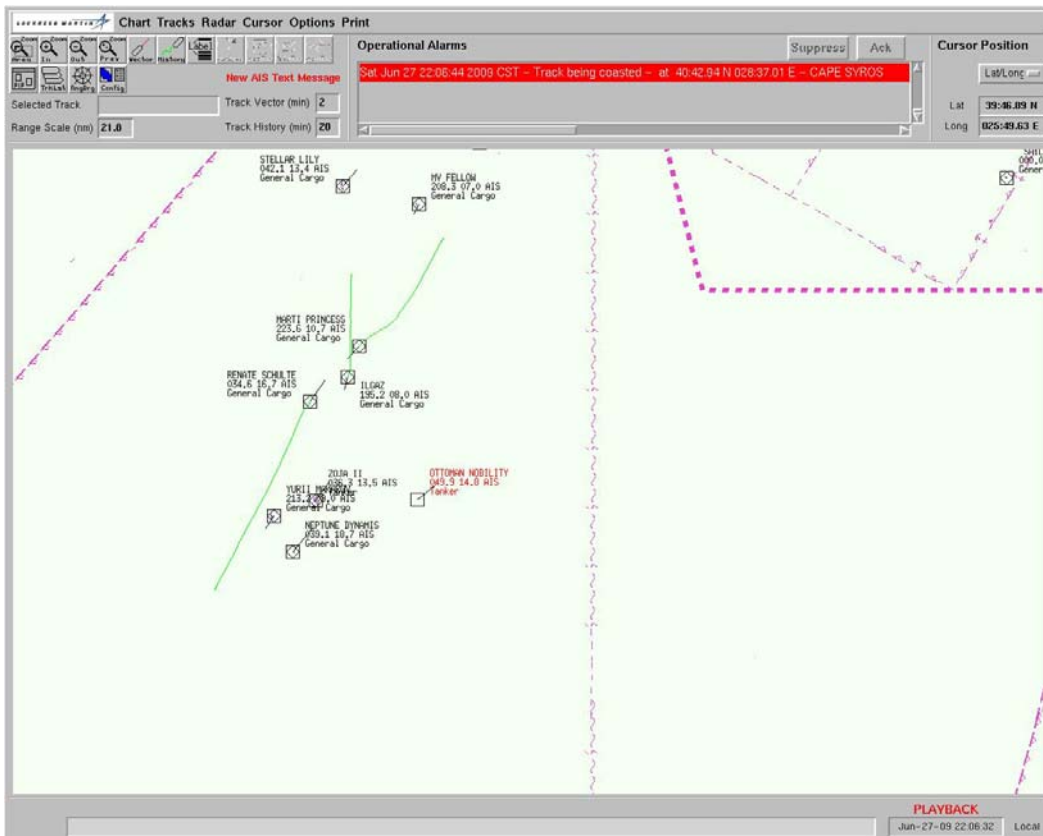


Figure 1.5vi: Situation at 2206:32 (LT)

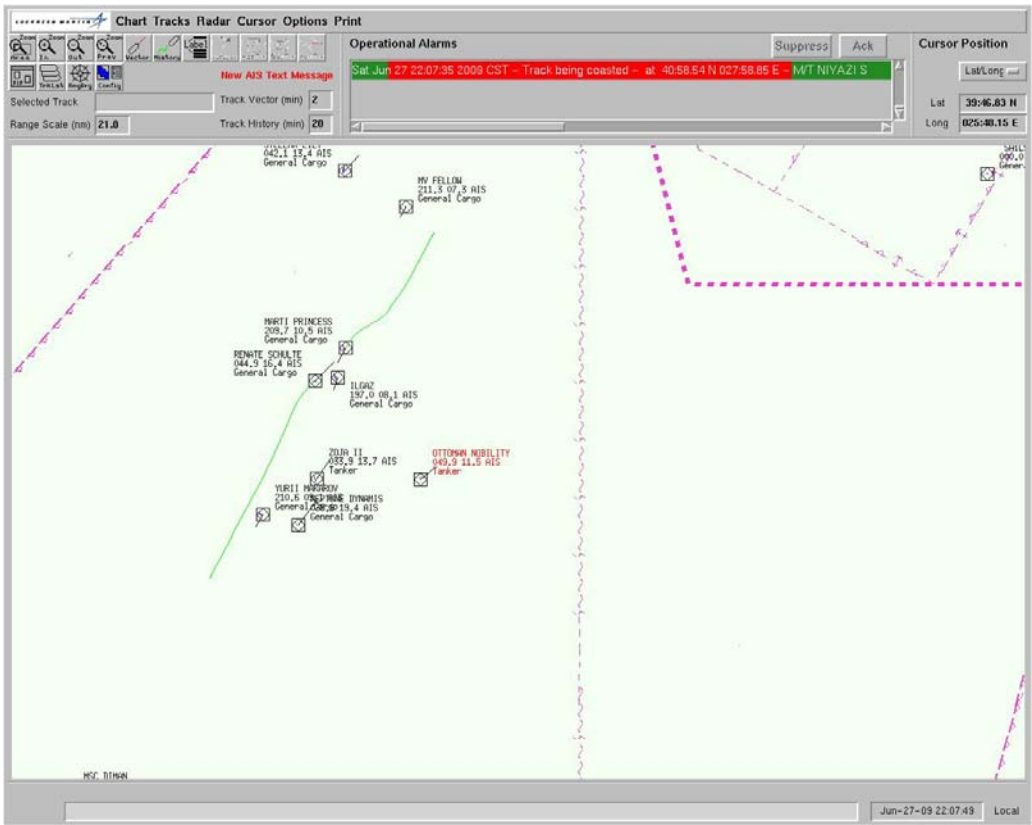


Figure 1.5vii: Situation at 2207:49 (LT)

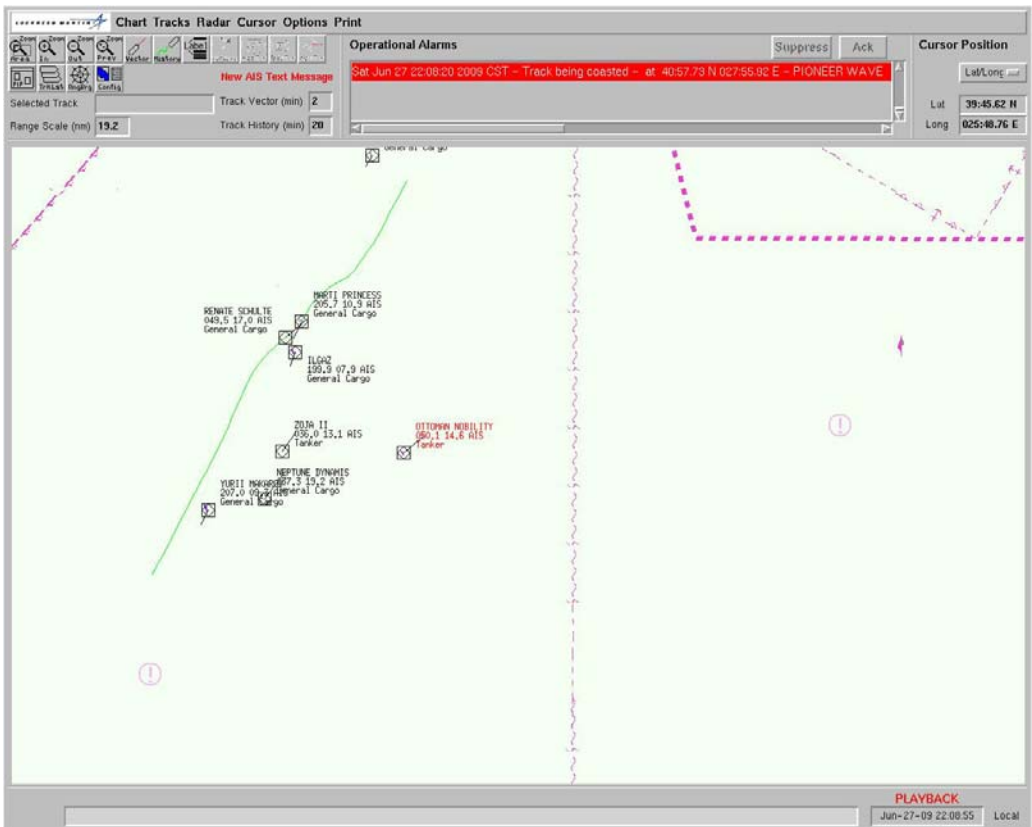


Figure 1.5viii: Situation at 2208:55 (LT)

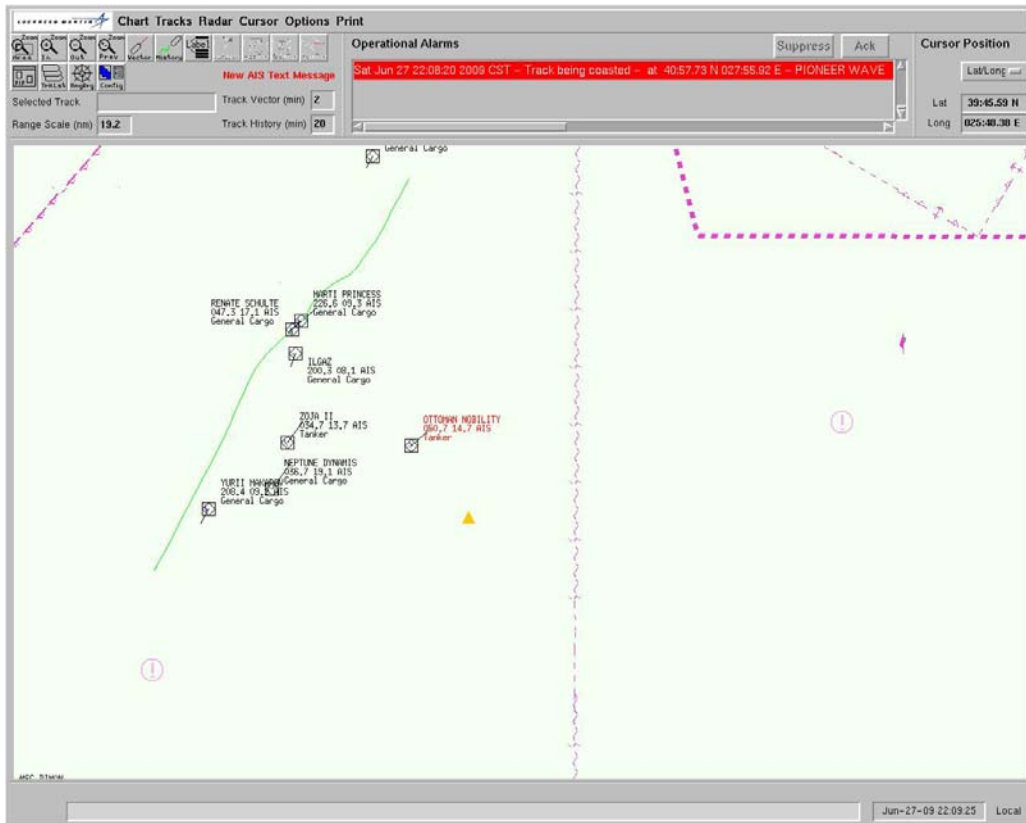


Figure 1.5ix: Situation at 2209:25 (LT)

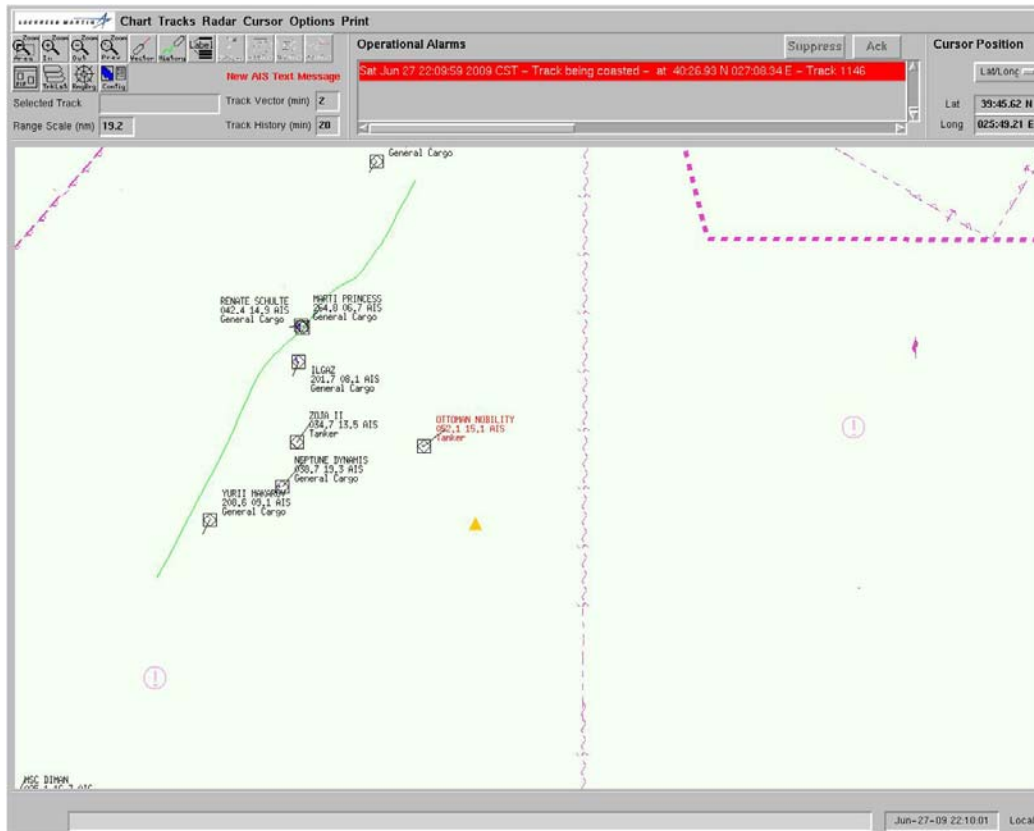


Figure 1.5x: Situation at 2210:01 (LT)

Table 1.5a: AIS Evaluation as obtained from VTS Canakkale

Time	Vessels	Course	Speed	Alterations	Distance to RS in nautical miles	Distance to MP/IL in nautical miles
21:41:02	IL	188.7	08.0	-	11.0	2.7
	MP	206.9	11.1	-	13.1	
	RS	024.9	15.8	-		
21:56:18	IL	180.1	08.0	Port	4.9	1.6
	MP	208.7	10.7	Starboard	6.1	
	RS	025.7	16.5	-		
22:00:10	IL	180.8	08.1	-	3.4	1.2
	MP	214.0	10.7	Starboard	4.4	
	RS	026.3	16.5	-		
22:01:31	IL	179.5	08.1	-	2.7	1.0
	MP	220.3	10.7	Starboard	3.7	
	RS	023.7	16.5	-		
22:03:26	IL	178.7	08.2	-	2.2	0.9
	MP	239.6	10.7	Starboard	3.1	
	RS	023.1	16.6	-		
22:06:32	IL	195.2	08.0	Starboard	0.9	0.7
	MP	223.6	10.7	Port	1.6	
	RS	034.6	16.7	Starboard		
22:07:49	IL	197.9	08.1	Starboard	0.7	0.6
	MP	209.7	10.5	Port	1.0	
	RS	044.9	16.4	Starboard		
22:08:55	IL	199.9	07.9	Starboard	0.3	0.6
	MP	205.7	10.9	Port	0.4	
	RS	049.5	17.0	Starboard		
22:09:25	IL	200.3	08.1	-	0.5	0.6
	MP	226.6	09.3	Starboard	0.2	
	RS	047.3	17.1	Port		
22:10:01	IL	201.7	08.1	Starboard	0.7	0.6
	MP	264.8	06.7	Starboard	0.0	
	RS	042.4	14.9	Port		

1.6 DAMAGE SUSTAINED

Both vessels sustained considerable damage as a result of the collision, and in the subsequent salvage operation to separate the two vessels. *Renate Schulte*, however, was the vessel that sustained more damage during the salvage operation, whereas *Marti Princess* sustained most of the damage as a result of the collision.

1.6.1 Damage on board *Marti Princess*

On 02 July 2009, a class surveyor boarded *Marti Princess* to carry out an occasional survey as a result of the collision with *Renate Schulte*. The reported damage included:

- Shell plating i.w.o. frames 79-94 torn from 1.5 m above the BL to the upper deck;
- Port side deck plating and longitudinal girder and sloping plate of. no. 2 port top side tank completely broken i.w.o. frames 82-96;
- Cargo hold coaming i.w.o. frames 82-96 broken and torn;
- Starboard deck plating and under deck longitudinals i.w.o. frames 83 to 92;
- Starboard longitudinal girder i.w.o. frames 82-92 broken;
- Starboard shell plating indent i.w.o. frames 83-92 from upper deck downwards for a distance of 900 mm;
- Deformed deck plating i.w.o. port side forward cargo hold # 2 hatch cover;
- Aft hatch coaming of cargo hold no. 2 broken and deformed;
- Missing pontoons and opening/closing gear; and
- Damaged fire main, cable piping, and bulwark i.w.o. cargo hold no. 2.

1.6.2 Damage on board *Renate Schulte*

Since *Renate Schulte* was in ballast condition (and *Marti Princess* fully loaded), most of the sustained damage as a result of the impact was in way of her bulbous bow.

Furthermore, because of salvage work that had to be carried out in order to separate the two ships, about 120 mt of steel were cut from the forward end. Additionally, the entire electrical cabling to the fore end of the ship had to be renewed, also as a direct result of the salvage operation.

A damage survey on *Renate Schulte* revealed the following heavy damages as a direct result of the impact:

- No. 1 cargo hold side shell and attached frame;
- Starboard side and port side shell from frame 193 to bow and from bottom plate to 1 m above from the 2nd stringer deck and bottom plate ballast tank 1;
- Fore peak tank (inclusive bulbous bow and internal structures) lower parts heavily damaged and holed;
- Bow thruster heavily damaged, side shell and attached frame holed from starboard side, stringer deck heavily damaged and buckled; and
- Bow thruster electric motor damaged.



Figure 1.6i: The bow of *Renate Schulte* after it was cut by salvors



Figure 1.6ii: *Renate Schulte* following the salvage operation



Figure 1.6iii: *Marti Princess* with her cargo hold no. 2 completely open to sea



Figure 1.6iv: *Marti Princess* sustained most of her damage i.w.o. cargo hold no. 2 and down to 1500 mm above the BL

2 ANALYSIS

Two main manoeuvres were considered in the analysis of the evidence. The first manoeuvre related to the close quarters situation between *Marti Princess* and *Ilgaz*. The second part of the analysis discusses the manoeuvres between *Marti Princess* and *Renate Schulte*. The analysis will initially focus on the collision regulations, which applied in the prevailing circumstances. It will then focus on the context in which these decisions were taken.

2.1 Missing evidence

The investigation into this collision encountered two major stumbling blocks, which limited available evidence from the accident site.

2.1.1 Physical evidence - VDR data

Efforts by Malta and Germany focused on establishing if the VDRs were installed on the ships, and if in the affirmative, to ensure that the data was preserved. It transpired that whilst *Renate Schulte* was not fitted with a VDR, *Marti Princess* was fitted with Brightsky VDR. The ship managers were instructed to preserve the data, which was eventually provided on a compact flash memory card.

Since none of the investigative authorities had the necessary resources to replay the data, the memory card was sent in confidence to the UK's Marine Accident Investigation Branch (MAIB) in Southampton. By virtue of their contacts, knowledge, and experience gained in the downloading, decoding and replaying of VDR data, the inspectors at MAIB obtained a copy of the VDR replay software. It transpired that there was a problem with the ship's configuration file. This prevented the data from loading up.

A query was directly sent to the manufacturer for a copy of the vessel's configuration file. MAIB was also able to obtain the contact details of the VDR's service engineer. However, numerous attempts to contact him proved futile. Eventually, the manufacturer's representatives came back and offered to look into the data themselves. The data was therefore copied forensically as a back-up and the memory card sent to the manufacturers in China.

Several weeks later, the manufacturers reported that they have managed to read the data on the memory card, however, the data started from 08 October 2008. Brightsky suggested that the VDR may have been turned off prior and at the time of the collision. To this extent, no VDR data was available for analysis.

2.1.2 Human evidence – *Ilgaz* crew members

Germany and Malta were willing to interview the crew members on *Ilgaz*, in view of her close proximity to the collision site. It was perceived that the perspective of the crew members on *Ilgaz* was potentially different from that of the ships involved, albeit witnessing the same occurrence.

After confirming that *Ilgaz* was flagged in Turkey, the Turkish authorities were approached on 07 July 2009 and an enquiry made to establish if it was possible to (at least) obtain a detailed statement of what had been observed from the ship before and at the time of the collision by the OOW.

Shortly after, on 15 July 2009, the Turkish authorities advised that they had approached the managing company of *Ilgaz* about the possibility of interviewing or obtaining a statement from all the crew members who were on the bridge of *Ilgaz* just before and at the time of the collision of the other two ships. However, the managers of the ship advised the Turkish authorities that the captain and the officers were about to disembark for their annual vacation and it was therefore not possible to ask for a statement at that stage. The matter was followed shortly after, however, the safety investigation never managed to obtain any additional information.

2.2 Close quarters situation–*Marti Princess* and *Ilgaz*

The first obligation of *Marti Princess* was not to alter course to starboard to avoid *Ilgaz* but to properly monitor the situation in order to determine whether or not there was a risk of collision and to avoid an evasive action, which would have led to another close quarters situation. The investigation was unable to determine why the OOW (and the look-out) on *Marti Princess* did not monitor the situation until it was brought to his attention by the master of the vessel when he visited the wheelhouse at about 2150.

Evidence indicated that no contact was established between *Marti Princess* and *Ilgaz* during the overtaking situation. It is not being suggested that the VHF should have been used in order to prevent a collision from happening (although the introduction of AIS has changed this belief). However, a proper look-out monitoring the situation, together with an early radio contact with a positively identified ship to establish one another's intentions, would have helped avoid having the two ships pass just about eight cables apart.

It was acknowledged that in this particular situation, *Marti Princess*, as an overtaking vessel, was under the obligation to keep out of the way of *Ilgaz* as prescribed in Rule 13 of the COLREGs. However, the manoeuvre that was undertaken was neither substantial nor conducted in ample time as required by Rules 8(b) and (c), eventually resulting in another close quarters situation in contravention with Rule 8(c). Whilst the overtaking situation developed, it seemed that either *Ilgaz* remained comfortable that *Marti Princess* would eventually alter course, or else, it was unaware of the approaching vessel⁷.

A plot of the situation by both vessels could have prevented the close quarters situation and a potential collision. In fact, an alteration to starboard by *Marti Princess* alone (as the give-way vessel) to a new heading of 296°, would have meant that *Marti Princess* crossed *Renate Schulte* course at 90°, and still passing behind the stern of *Ilgaz*. It was considered that the actions of *Marti Princess* alone could have both prevented the collision with *Ilgaz*, and the close quarters situation with *Renate Schulte* a few minutes later.

⁷ Since there was no access to *Ilgaz*, the context on board this vessel was never explored by the safety investigators.

2.3 Collision – *Marti Princess* and *Renate Schulte*

This section discusses the context, which potentially led to the collision between *Marti Princess* and *Renate Schulte*.

2.3.1 Development of a close-quarters situation

The initial navigational situation between *Marti Princess* and *Renate Schulte* was a head on situation, which had to be considered when assessing the later development of the close quarters situation, eventually ending in the collision.

Once the close quarters situation with *Ilgaz* was over, the situation continued to develop. By 2202, *Marti Princess* had altered course to starboard to pass clear of the stern of *Ilgaz*. It can be stated that by this manoeuvre alone, a crossing situation was created between *Renate Schulte* and *Marti Princess*, the latter being on the starboard side of *Renate Schulte*. *Renate Schulte* then came to starboard as far as it could, bearing in mind that it had *Ilgaz* close on its starboard side as well. The initial situation between *Marti Princess* and *Renate Schulte* was a starboard to starboard passing.

It has also been stated above that the manoeuvre by *Marti Princess* to starboard alone could have minimised the complexity of the situation, had she maintained her course and only turned back after being clear not only of *Ilgaz* but also of *Renate Schulte*. In turning back to her original course immediately after passing the stern of *Ilgaz*, and without fully assessing the situation, *Marti Princess* forced herself and *Renate Schulte* into a close quarters situation; a resultant situation which violated Rule 8(c).

The point to be raised was that *Renate Schulte* noticed *Marti Princess* at an early stage, yet the OOW only concentrating on *Ilgaz* without detecting the further manoeuvres of *Marti Princess*. *Renate Schulte* maintained course and speed until very late, attempting an evasive action, which did not prevent the collision. The OOW on *Renate Schulte* claimed that although he was aware of *Marti Princess*, he only noticed *Marti Princess* almost dead ahead at a somewhat late stage and assumed that she had altered course to starboard to give way to *Ilgaz*.

The OOW on *Renate Schulte*, however, did not notice that *Marti Princess* was almost on a reciprocal course until being informed by the look-out. In fact, the approaching *Marti Princess* surprised the OOW. Furthermore, the fact that the OOW could only

presume that the alteration to starboard by *Marti Princess* was carried out in order to give way to *Ilgaz*, was also indicative that the dynamics of the situation were not being followed by means of a full situation appraisal.

The fact that during the development of this situation, the OOW on *Renate Schulte* was also busy dealing with VTS Canakkale on VHF might have contributed to being distracted from continuously assessing the situation. The OOW also confirmed that it was the look-out who notified him of *Marti Princess* closing in. To make the situation more complex, the look-out could not see *Marti Princess* immediately since his line of vision was obstructed by his own vessel's cargo cranes. That may be suggestive that the look-out was positioned on the port side of the bridge.

At this critical stage, *Renate Schulte* neither slackened her speed nor reversed her means of propulsion. At this time, a manoeuvre to starboard by *Renate Schulte* was limited by the presence of *Ilgaz* and restricted even further because the latter ship altered course towards *Renate Schulte* from 181° to 196°; a manoeuvre which, *per se* contravened Rule 2(a). The OOW of *Renate Schulte* eventually instructed his look-out to leave the bridge and call the master.

It was therefore very evident that, although the situation was quite different on the two ships involved, inaccurate situation awareness – at least during the later stages of the situation – on both bridges contributed to the collision.

2.3.2 Signals to attract attention

Available evidence did not indicate that signals were used to attract the attention of one another, especially when it became clear that the close-quarters situation was imminent. The discussion on behavioural analysis further down, aims to give more meaning to this inactions by the OOW on both ships, which did not follow the requirements of the respective safety management systems.

2.4 Behavioural analysis

The third officer on board *Marti Princess* was under the impression that *Ilgaz* was five nautical miles away when in actual fact, the two vessels were only eight cables apart. This raised the immediate thought that no course alterations would have been carried out by *Marti Princess* had the master not drawn the attention of the OOW.

This seemed to be indicative of a situation where the OOW has either misinterpreted the data from the radar, was (psychologically) disconnected from the surrounding situation, or a combination of both.

The OOW on *Renate Schulte* had noticed the presence of *Marti Princess* at an early stage, but eventually only concentrated on *Ilgaz*. After being distracted from continuously monitoring the development of the situation by a VHF conversation, he did not reassess the situation but continued his conduct to the extent that he was surprised when his look out finally drew his attention of the approaching *Marti Princess*. This raised the immediate question when, if at all, the OOW of *Renate Schulte* would have recognised that since first being detected, *Marti Princess* had manoeuvred in an unexpected way.

2.4.1 Situation awareness

There is a significant correlation between awareness and the development of the sequence of events. Situation awareness (SA) during a navigational watch is only achievable, if the navigational officer is well aware of the situation around him. Not only, but since the situation is dynamic, evolving and eventually developing into a new situation, it is imperative that the monitoring of dynamic situations by the OOW is continuous and uninterrupted, thereby engaging in the monitoring of the situation and the dynamics within.

The inaccuracy of SA on *Renate Schulte* became evident the moment *Ilgaz* crossed the former ship's bow and the *Renate Schulte* OOW started altering course to starboard. *Ilgaz*, as the vessel closest to his own, had completely occupied the attention of the OOW. Turning to starboard at a stage when *Ilgaz* was clear, indicated that the OOW was aware of the presence of *Marti Princess* as a second ship. However, not closely monitoring her actions any further or instructing his look-out accordingly, and occupied with answering the VHF request from VTS Canakkale, demonstrated that the OOW's SA accuracy had been compromised during a situation which was dynamic, evolving and eventually developing into a new situation.

Equally for *Marti Princess*, prior to the crossing situation with *Ilgaz*, there were at least three instances on board *Marti Princess*, which if one had to take into consideration the above, indicated that the OOW did not have an up-to-date SA. The

OOW claimed that the manoeuvre to give way was carried out for a ship proceeding west. Analysis of AIS and VTS data indicated that the only manoeuvre carried out was because of *Marti Princess* being a give-way vessel, and *Ilgaz* being a stand-on vessel. However, *Ilgaz* was proceeding south and not west.

The second lack of SA was manifested when the OOW claimed that the distance between *Marti Princess* and *Ilgaz* was five nautical miles. Not only did he fail to verify on the radar set, but even by looking outside the wheelhouse (as the master did), it would have become evident that the actual distance between the two ships was even less than one nautical mile. Furthermore, even as a result of the fact that he was not aware of the real distance, no course alteration would have been made, had the master not been on the bridge and so ordered. If both *Marti Princess* and *Ilgaz* maintained their respective courses, *Ilgaz* would have crossed the bow of *Marti Princess* at a mere distance of three cables.

2.4.2 Decision on partially correct information

Whilst the master managed to intervene and succeeded in his manoeuvre to avoid a potential collision between *Ilgaz* and his ship, this meant that none of the crew members focused on the wider context in order to determine the consequences of their manoeuvres *vis-à-vis* the northbound *Renate Schulte*. None of the crew members on *Marti Princess* was aware of these developments and the close-quarters situation which had by then developed between the two ships. The fact that the OOW on *Marti Princess* asked for the master's authorisation to steer back to the original course once the stern of *Ilgaz* was cleared, suggested that either:

1. he was unaware of *Renate Schulte*; or
2. he was aware of *Renate Schulte* but felt confident that if his request was not acceptable by virtue of the presence of *Renate Schulte*, the master would have indicated so. In so doing he would have shifting the burden (and the conn) onto the master.

Whilst there is no empirical evidence to indicate that the latter option was what actually happened, it is certain that due to the evolving situation between *Ilgaz* and *Marti Princess*, the master was unaware of *Renate Schulte*. It was therefore clear that there was no way that he would have raised the concern with the OOW until at a late

stage. *Per se*, this was indicative that neither crew members had accurate SA. It may be therefore claimed that the risk associated with this situation became significant. With *Ilgaz* on his starboard side and *Marti Princess* about to cross his vessel's bows, the OOW on board *Renate Schulte* seemed confident to have cleared this three-ship encounter. With a distance of less than five nautical miles between *Renate Schulte* and *Marti Princess*, a relative speed of about 27 knots at that time, and no room for further alterations to starboard because of *Ilgaz*, he either ignored or did not fully appreciate the fact that this set-up would not have allowed for anything unexpected to happen; therefore a situation which would have required continuous monitoring. Moreover, he was distracted by a VHF communication.

It has to be appreciated, however, that later on, when the situation on board *Marti Princess* and *Renate Schulte* was clear enough that both vessels were going to collide, both OOWs (and also the master on *Marti Princess*) started to experience a time-pressured situation. Under such circumstances, one would expect that risk is not quantified accurately and any decision taken on the basis of that (incorrect) quantification may be an erroneous one⁸.

2.4.3 Reality vs. perception

In both close quarters situations, (*Ilgaz / Marti Princess*, and *Marti Princess / Renate Schulte*), the crew members had a gap in their knowledge between the actual situation and the perceived status. The difference between the two situations was that whereas in the first close quarter, the master of *Marti Princess* was able to recover the situation, in the latter situation he was not (because of his unawareness of *Renate Schulte* and because of the close proximity of the latter ship). This unawareness was also the reason as to why *Marti Princess* course alteration to starboard was not extended further to the west. On *Renate Schulte*, the perception was that *Marti Princess* would remain on her course and thus the situation was seen as clear - whereas in reality, the latter made a manoeuvre thereby creating the close quarters situation.

⁸ See Deutsch, S. (2008). Reconceptualising expertise: learning from an expert's error. In J. M. Schraagen, L. G. Militello, T. Ormerod & R. Lipshitz (Eds.), *Naturalistic decision making and macrocognition* (pp.301-316). Aldershot: Ashgate Publishing Ltd.

It is therefore evident that the lack of accurate SA amplified the problem further still – to an extent that eventually both ships collided. When discussing the issue of SA, considerations of the surrounding context had to be made. The situation around the ship, *i.e.* traffic (even if not considerable), and night time, augmented the complexity of the decision-making process.

The environment factor was, however, not limited to just visibility. There were other features that influenced the decisions taken. Other influencing factors, which have been identified include:

1. the OOW on board *Marti Princess* did not detect a critical situation with *Ilgaz*;
2. master of *Marti Princess* had to reach a decision in a relatively short time due to the close quarters situation with *Ilgaz*;
3. the master and the OOW did not detect a critical situation with *Renate Schulte*;
4. data from the radar was either missed or not interpreted correctly by the OOW;
5. AIS data did not help the master to recover the situation in view of how the data was sorted;
6. there was no communication between the OOW and the master about the critical situation⁹;
7. the OOW on board *Renate Schulte* detected *Marti Princess* early but then only concentrated on *Ilgaz*;
8. when the encounter with *Ilgaz* was cleared, he did not regard the situation with *Marti Princess* as critical; and
9. he got distracted by a VHF call and did not re-assess the situation afterwards to take emergency action, *e.g.* crash stop.

2.4.4 Modelling SA

There are several theories, which (attempt) to explain SA. An interesting approach was developed in 1995 for the aviation domain; however, its core concepts can be

⁹ The OOW had no issues to communicate; he was neither aware of the close quarter with *Ilgaz* nor with the *Renate Schulte* coming north.

applied in other domains, including the maritime¹⁰. The three-tier model by Endsley is represented below.

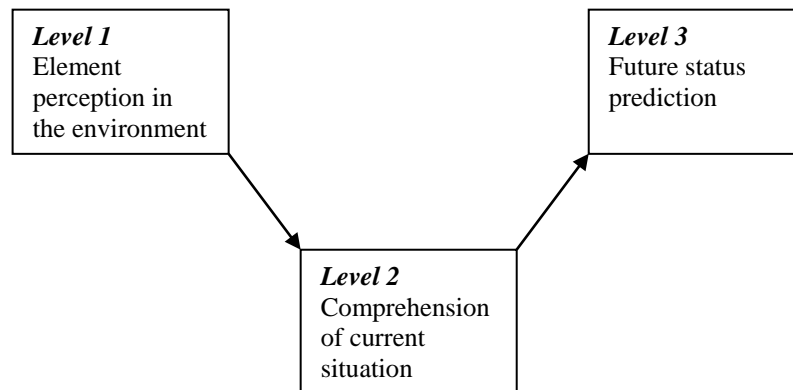


Figure 2.3i: Perception to prediction modelling of situation awareness (adopted from Endsley (1995))

Applying this model to the maritime domain, level 1 SA, which is considered to be the lowest level of SA, was linked to the OOW perception of the data and environmental information, which was available from navigational instruments, other crew members on the bridge, the ship behaviour and cues from other ships navigating in the area / in close proximity. Processing of information, however, does not occur at level 1 SA. It is only the perception of the cues, which happens at this stage.

The perception of the environmental elements leads to the comprehension of the situation. At this stage, crew members analyse the situation, the significance of what is being observed from/in the wheelhouse, and reach a judgement as to what actions need to be taken or avoided. This is the stage where experience plays a major role. In fact, it can be claimed that there is a correlation between experience and level 2 SA, where the most experienced crew members tend to achieve a higher degree of level 2 SA. Level 3 SA is considered to be the highest level of SA and encapsulates the predictions, which crew members do to anticipate potential problems early enough to act upon these problems.

Whilst the model makes a clear implication on the importance of the interaction between the crew members and the environment, it also indicates the importance that level 1 SA has on the other two levels. It is therefore evident that it would have been extremely difficult for the master and/or the OOWs to take respective adequate

¹⁰ See Endsley, M. R., (1995). Toward a theory of situation awareness in dynamic systems. *Human*

manoeuvres, unless the environment was thoroughly and well perceived. It is for this reason that it was concluded that for instance, the decision made by the master on board *Marti Princess* did not constitute a loss of SA but partial information which was reaching him.

Such was manifested, for instance, by the lack of consideration given to the fact that the vessel would have found herself on a collision course with *Renate Schulte*. The focus on the close quarters situation with *Ilgaz* and the lack of communication exchange between the two crew members contributed to perception problems, leading to a misunderstanding of the environmental factors¹¹. It was therefore evident that the underlying mechanisms related to the problems with Level 1 SA were perception and attention. There were several factors, which have been identified as either having contributed or may have contributed to problems at Level 1 SA.

2.4.5 Bridge Resource Management

It has already been stated elsewhere that the situation preceding the close-quarters and therefore the eventual collision, was both complex and dynamic. The situation from the time the close quarters situation was identified until just before the collision, developed over a short period of time. This again reiterates the importance of maintaining an accurate overall SA. One way of achieving that, and which has already been referred to briefly in the discussion on SA, is team work and communication.

Teamwork (as an integral part of bridge resource management (BRM)) necessitates the need to have each team member aware of his respective team members' activities and duties. It is submitted, however, that team communication is only one facet of teamwork. Two other important aspects, which need to be taken into consideration, are navigational aids (hardware) and the interaction between the crewmembers and the hardware. It can be stated that effective team work can only be achieved if the members of the team (in the case of *Marti Princess* – the master and the OOW) share the same perspective of the environment.

Factors 37(1), 32-64.

¹¹ Research in the aviation domain proved that most of the errors committed by flight crew happen at Level 1 SA. Several suggest the same applies to the maritime domain. See Grech, M. R. (2005). *Human error in maritime operations: assessment of situation awareness, fatigue, workload and stress*. Unpublished PhD Thesis, The University of Queensland, Queensland.

Considering the facts that the OOW was unaware of the distance to *Ilgaz*, and not having perceived the developing situation with *Renate Schulte*, was an indication that the master and the OOW were not sharing the same perspective of the environment. On *Renate Schulte*, the look-out communicated with the OOW by reporting the lights and calling the master. Both crew members were aware of the critical situation even if the prevailing factors were not counteracted in the most effective way.

2.4.6 Fatigue

The crew members kept records of their own working hours (and therefore also their own off duty hours in an indirect manner). Although the available records indicated that the crew on board *Marti Princess* were in compliance with the STCW Convention, detailed analysis of the record sheets revealed two major problems.

The first problem related to the design of the Record Form. The Form did not distinguish between recreational period and hours of sleep. In fact, both these activities are captured under hours of rest. Unless there was another form, which recorded the hours of (quality) sleep, it may be concluded that the company did not have any means to monitor the actual hours of (quality) sleep of the crew. The same applied to the crew members. Available evidence did not allow for an assessment on whether or not fatigue was a contributing factor to this collision, considering that fatigue and hours of (quality) sleep are so strongly correlated.

The second problem was the validity of the Form, *i.e.* how accurately it recorded the hours of rest and work or how much were the records truly representative of the actual number of hours of rest and work. In order to get a picture of the accuracy of the Form, the crewmembers' working hours Form for the master, chief officer, second officer and third officer were compared with the logbook entries for the day of the collision. These forms are reproduced in Annex 1.

The analysis immediately indicated that the entries in either the logbook, or the crew working hours records may be inaccurate. The relevant page from the deck logbook is reproduced as Annex 2. On 26 June 2009, the vessel completed its loading operations at 2300. By then, 8,000 mt of cement in bulk were loaded. The pilot was on board at 0250 and the vessel singled up at 0255. *Marti Princess* casted off at 0300.

Comparing these timings with the crew working hours Form when the vessel casted off at 0300, only the second officer was on duty during the departure stand-by. Whilst there was no doubt that during a departure stand-by (and arrival), all hands will be on deck, this indicated that the vessel either did not depart at 0300, or else the crewmembers' working hours Form was not compiled accurately.

The engine-room logbook indicated that the main engine was started at 0145, whilst the change over from GO to FO was carried out at 0330. In comparison with the deck logbook, the engine-room did not contain similar anomalies and the records indicated that during the stand-by, the chief engineer, second and third engineers were in the engine-room. Having said that, the problem with the design of the Form remained; even in the case of the engine-room department, the Form did not allow for the monitoring of the crewmembers' hours of sleep.

In view of the above, it cannot be concluded whether or not fatigue contributed to the collision and/or the crew of *Marti Princess* actually complied with international regulations on hours of work.

The Record Forms of hours of work and rest for the crew of *Renate Schulte* (Annex 1) were analysed and found to be written according to the required watch keeping plan. There were no doubts or anomalies in the working hours as recorded by the crew members. However, whilst the work and rest periods complied with international regulations, the problem in the design of the Form, as with regards to the hours of rest vs. hours of sleep, was also identified in the case of the *Renate Schulte*. In this respect, it could not be established whether or not hours of rest could be transposed or taken to mean hours of sleep.

2.5 MISSING BARRIERS

A number of missing barriers were identified on board *Marti Princess* and were considered to have contributed to the problems of inaccurate SA.

2.5.1 AIS and radar interface

The fact that the OOW on *Marti Princess* was unaware of the prevailing situation could be indicative of improper lookout in accordance with Rule 5. The term 'proper lookout' should not be interpreted solely to the OOW or the duty rating. Proper

lookout refers also to the effective use of navigational aids (in addition to sight and hearing).

2.5.1.1 Target list on the AIS equipment

It has been established that the AIS equipment was not interfaced with the radar sets fitted on board. Notwithstanding, review of the technical specifications of the radar set indicated that the radar set had a built-in AIS interface process unit. In conjunction, the AIS fitted on board provided for multiple interfaces, including the radar set¹². The fact that the AIS and radar set were not interfaced, was augmented by another problem.

As it has been explained elsewhere, the list of vessels stored in the AIS system was in such a way that in the short (critical) time when the information was needed, it was not readily available – to the extent that it was not utilised. This matter was further analysed in the ship documents for any requirements on the matter. Both the master's standing orders and the SMS manuals were checked. Whilst the master's standing orders required the OOW to perform periodic checks of, *inter alia*, the navigational equipment and be familiar with the use, capabilities and limitations, the navigation section of the SMS manual required the OOW to, *inter alia*,

1. be aware of the equipment, its status and performance limits; and
2. makes effective use of all navigational equipment that can be used during navigation.

One particular research project¹³ highlighted the association of AIS and radar data and indicated at least four benefits of target association in cases of head-on situations, two of which were directly related to the situation just discussed:

- positive identification of approaching vessel; and
- identification of all vessels in the vicinity.

¹² It needs to be specified, however, that notwithstanding the availability of technology, there is no requirement which specifies that the radar and the AIS need be interfaced.

¹³ MCA Research Project 456 provides further details on the subject matter.

The equipment could not be used to its full capabilities due to the way the information was displayed on the AIS equipment¹⁴.

2.5.1.2 AIS equipment automatic updating

The interface of AIS and radar was considered to be a very important prevention barrier; an important feature for the navigation OOW. To this extent, the investigation focused on the subject matter and further evidence was eventually obtained. During the course of the investigation, the managers submitted that the information provided by the master (*i.e.* that the list of ships on the AIS was in alphabetical order rather than sorted by range) was in fact erroneous.

It was explained that whilst the list of ships in the AIS equipment was displayed as ship/name/range/bearing, the indexing on the AIS screen could only be made by range; in such a way that the nearest vessel to *Marti Princess* would be listed at the top. It was stated, however, that the AIS equipment did not update automatically; rather it updated every 10 s.

If this were the case, then the problem was such that the AIS equipment was not achieving its objective – even if considered to be a source of supplementary information to that derived from navigational systems. IMO Assembly Resolution A.917(22) laid down the objective of AIS equipment, *inter alia*, enhancing the safety and efficiency of navigation and the protection of the marine environment; its purpose related to the safety of navigation and protection of environment being,

1. help identify vessel;
2. assist in target tracking; and
3. assist situation awareness.

Furthermore, the Assembly Resolution specified that the information from a shipborne AIS had to be transmitted continuously and automatically without any intervention or knowledge of the OOW.

¹⁴ It has already been stated that this status affected Level 2 SA. The master was unable to get the name of the ship instantly. The master felt that in view of the close quarters situation which had developed, time was too short to accurately assess bearing and distance and compare it to the AIS data.

2.5.2 Use of radar set

As it has already been indicated in sub-section 2.5.1, the AIS was not interfaced with the radar and hence, the matter will not be discussed any further.

Prior to the collision, there was one radar in use and it was also established that the radar was on relative motion and not a true motion picture; a mode which portrays the motion of the target relative to the motion of the observing ship. The CPA limit was set at one nautical mile. With these settings, it would have been expected that the alarm would have sounded, for instance, with *Ilgaz* at a distance of eight cables.

Further inquiring revealed that target acquisition function was set on manual.

Notwithstanding, the OOW was still required to plot all relevant targets around the ship.

**THE FOLLOWING CONCLUSIONS AND
RECOMMENDATIONS SHALL IN NO CASE CREATE
A PRESUMPTION OF BLAME OR LIABILITY.
NEITHER ARE THEY LISTED IN ANY ORDER OF
PRIORITY.**

3 CONCLUSIONS

Causes, latent conditions and other contributing factors are not listed in any order of priority.

3.1 Immediate Cause

The collision was the result of a series of decisions on both vessels, which were based on inaccurate situation awareness.

3.2 Other Findings

1. *Marti Princess* did not monitor the developing situation with *Ilgaz* in order to determine whether or not there was a risk of collision. [2.2]
3. No data on the accident was stored on the VDR installed on board *Marti Princess*. [2.1.1]
5. The early alteration of *Marti Princess* to her previous course resulted in a close quarters situation with *Renate Schulte*. [2.3.1]
6. The OOW on board *Renate Schulte* focussed on *Ilgaz*, had no perception of risk of encounter with *Marti Princess* and was distracted by a VHF call. [2.3.1]
7. Albeit late in her evasive manoeuvre, *Renate Schulte* was restricted to alter course further to her starboard because of the *Ilgaz*. [2.3.1]
9. Both vessels did not use any signals to attract one another's attention. [2.3.2]
10. The foci of the two crew members on *Marti Princess* was limited to *Ilgaz*, whilst missing on the wider context which included the *Renate Schulte*. [2.4.2]
11. The OOW on board the two vessels experienced a time-pressured situation. Under such conditions, risk is not quantified accurately. [2.4.2]
12. It could not be established whether or not fatigue contributed to the inaccurate situation awareness on board *Marti Princess*. [2.4.6]
13. The missing interface between the AIS equipment and the radar on board *Marti Princess* augmented the problem of inaccurate situation awareness. [2.5.1.1]

14. The information as displayed on the AIS equipment on board *Marti Princess* augmented the problem of inaccurate situation awareness. [2.5.1.2]

4 RECOMMENDATIONS

Atlas Gemi Isletmeciligi Ltd., Turkey is recommended to:

03/2012_001 Ensure that OOWs exploit the benefits of all navigational equipment;

03/2012_002 Verify that records of hours of work and rest accurately reflect the situation on board their respective ships.

Bernhard Schulte Shipmanagement (Deutschland) GmbH & Co. KG is recommended to:

03/2012_003 Ensure that OOWs exploit the benefits of all navigational equipment;

Annex 1 Hours of work and rest forms¹⁵

Marti Princess - Deck officer 1 Form

Gün / Day	Bu form tüm personel için kullanılacaktır. Personel dinlenme saatleri günde 10, haftada 77 saatten az olmalıdır. Günlük dinlenme süreleri, biri en az 6 saat olmak üzere 2 bölüme halinde verilebilir. Gerekliğinde günlük dinlenme süresi 8 saate indirilebilir ancak bu en fazla 2 gün üst üste olabilir ve haftalık toplam 77 saatin altında olmalıdır. Acil durumlarda Kaptan bu kuralın dışına çıkabilir. This form shall be used for all personnel. Minimum hours of rest shall not be less than ten hours in any 24-hour period and 77 hours in any seven-day period. Hours of rest may be divided into two periods, one of which shall be at least six hours in length. When necessary daily rest period may be reduced to 8 hours provided that any such reduction shall not exceed beyond two days and not less than 77 hours of rest are provided each seven-day period. In emergencies Master may divert from this rule.																								Sağır veya Lunan Sea or Port	TOTAL			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
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6																													
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Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-	
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13																													
14																													
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-	
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17																													
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19																													
20																													
21											X	X		X	X	X	X			X	X								8
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-	
22								X	X	X	X	X		X	X	X	X		X										10
23								X	X	X	X	X		X	X	X	X			X									10
24								X	X	X	X	X		X	X	X	X			X									10
25								X	X	X	X	X		X	X	X	X			X									10
26								X	X	X	X	X		X	X	X	X					X	X						10
27								X	X	X	X	X		X	X	X	X			X	X	X							12
28																													
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-	
29																													
30																													
31																													
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-	



¹⁵ Some details have been omitted from these Forms to ensure confidentiality. The Forms are not annexed in any particular order.

Marti Princess - Deck officer 2 Form

* Gün / Day	Bu form tüm personel için kullanılacaktır. Personel dinlenme saatleri günde 10, haftada 77 saatten az olmamalıdır. Günün dinlenme süreleri, birden az 8 saat olmak üzere 2 bölüme halinde verilebilir. Gerekliğinde günlük dinlenme süresi 8 saate indirilebilir ancak bu en fazla 2 gün tatil öste alabilir ve haftalık toplam 77 saatin altında olmamalıdır. Acil durumlarda Keptan bu kuralı esnetmeye yetkilidir. This form shall be used for all personnel. Minimum hours of rest shall not be less than ten hours in any 24-hour period and 77 hours in any seven-day period. Hours of rest may be divided into two periods, one of which shall be at least six hours in length. When necessary daily rest period may be reduced to 8 hours provided that any such reduction shall not extend beyond two days and not less than 77 hours of rest are provided each seven-day period. In emergencies Master may overrule from this rule.																								Seyir veya Liman Sea or Port	TOTAL			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1																													
2																													
3																	X	X	X	X								4	
4				X	X	X	X			X						X	X	X	X									9	
5				X	X	X	X			X	X					X	X	X	X									10	
6				X	X	X	X			X	X					X	X	X	X									10	
7				X	X	X	X			X	X					X	X	X	X									10	
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-	
8				X	X	X	X									X	X	X	X									8	
9				X	X	X	X									X	X	X	X									8	
10				X	X	X	X									X	X	X	X									8	
11				X	X	X	X							X	X	X	X	X	X									10	
12				X	X	X	X		X	X						X	X	X	X	X	X	X						12	
13				X	X	X	X		X	X						X	X	X	X									10	
14				X	X	X	X			X	X		X	X	X	X	X	X	X									12	
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-	
15				X	X	X	X		X	X						X	X	X	X	X								11	
16				X	X	X	X									X	X	X	X									8	
17				X	X	X	X									X	X	X	X									8	
18				X	X	X	X									X	X	X	X									8	
19				X	X	X	X									X	X	X	X									8	
20				X	X	X	X									X	X	X	X									8	
21				X	X	X	X									X	X	X	X									8	
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-	
22				X	X	X	X									X	X	X	X									8	
23				X	X	X	X									X	X	X	X	X								9	
24				X	X	X	X									X	X	X	X									8	
25				X	X	X	X	X	X							X	X	X	X									10	
26				X	X	X	X									X	X	X	X									8	
27				X	X	X	X	X	X							X	X	X	X					X	X			12	
28																													
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-	
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31																													
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-	

Marti Princess - Deck officer 3 Form

Gün / Day	Bu form tüm personel için kullanılacaktır. Personel dinlenme saatleri günde 10, haftada 77 saatten az olmamalıdır. Gündüz dinlenme süreleri, biri en az 8 saat olmak üzere 2 bölüme bölünebilir. Gerekliğinde günlük dinlenme süresi 5 saate indirilebilir ancak bu en fazla 2 gün birden olmamalı ve haftalık toplam 77 saatin altında olmamalıdır. Acil durumlarda Kapitan bu kurulları değiştirebilir. This form shall be used for all personnel. Minimum hours of rest shall not be less than ten hours in any 24-hour period and 77 hours in any seven-day period. Hours of rest may be divided into two periods, one of which shall be at least six hours in length. When necessary daily rest period may be reduced to 5 hours provided that any such reduction shall not extend beyond two days and not less than 77 hours of rest are provided each seven-day period. In emergencies Master may depart from the rule.																								Seyir veya Liman / Sea or Port	TOTAL	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
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5																											
6																											
7																											
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																											-
8																											
9																											
10																											
11																											
12																											
13													X	X	X	X								X			5
14	X	X	X									X	X	X	X		X							X			9
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																											-
15	X	X	X									X	X	X	X									X			8
16	X	X	X									X	X	X	X		X	X						X			10
17	X	X	X									X	X	X	X									X			9
18	X	X	X									X	X	X	X		X							X			9
19	X	X	X									X	X	X	X									X			8
20	X	X	X									X	X	X	X									X			8
21	X	X	X									X	X	X	X		X	X						X			10
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																											-
22	X	X	X									X	X	X	X									X			8
23	X	X	X									X	X	X	X									X			8
24	X	X	X									X	X	X	X		X	X						X			10
25	X	X	X									X	X	X	X		X	X	X					X			11
26	X	X	X									X	X	X	X		X							X			9
27	X	X	X									X	X	X	X		X	X					X				10
28																											
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																											-
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31																											
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																											-



Marti Princess - Deck officer 4 Form

Gün / Day	Bu form tüm personel için kullanılacaktır. Personel dinlenme saatleri günde 10, haftada 77 saatten az olmamalıdır. GÜNLÜK dinlenme süreleri, biri en az 6 saat olmak üzere 2 bölüm halinde verilebilir. Gerekliğinde günlük dinlenme süresi 6 saate indirilebilir ancak bu en fazla 2 gün üst üste olabilir ve haftalık toplam 77 saatin altında olmalıdır. Acil durumlarda Kaptan bu kuralı tam denebilir. This form shall be used for all personnel. Minimum hours of rest shall not be less than ten hours in any 24-hour period and 77 hours in any seven-day period. Hours of rest may be divided into two periods, one of which shall be at least six hours in length. When necessary daily rest period may be reduced to 6 hours provided that any such reduction shall not extend beyond two days and not less than 77 hours of rest are provided each seven-day period. In emergencies Master may deviate from this rule.																								Seçir veya Lisans Sec or Port	TOTAL						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24								
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Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-				
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20																																
21																X	X	X	X			X	X	X	X					8		
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-				
22								X	X	X	X				X	X					X	X	X	X						10		
23								X	X	X	X										X	X	X	X							8	
24								X	X	X	X										X	X	X	X							8	
25								X	X	X	X				X						X	X	X	X							9	
26								X	X	X	X			X	X						X	X	X	X							10	
27								X	X	X	X			X							X	X	X	X							9	
28																																
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-				
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31																																
Haftalık toplam çalışma ve dinlenme saatleri / Total weekly work and rest hours :																												-				

Renate Schulte - Crew member 1

Renate Schulte

Date	June 2009																								Comments	NOT TO BE COMPLETED BY THE SEAFARER		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24	Hours of rest in any 24-hour period	Hours of rest in any 7 day period
01-Jun-09																										Berthing / Shifting Valencia	14.5	95.5
02-Jun-09																											13.5	97.5
03-Jun-09																											14	98.5
04-Jun-09																											11	97
05-Jun-09																											11.5	93
06-Jun-09																											11.5	94.5
07-Jun-09																											10.5	95.5
08-Jun-09																										Arr.+Berthing+Dep Alicante	12.5	94
09-Jun-09																										Dep.Alicante	11.5	94.5
10-Jun-09																										Arr + Dep. Fos	10.5	93
11-Jun-09																										App.+ Arr+ Dep Barcelona	12	92.5
12-Jun-09																										Valencia	12.5	96
13-Jun-09																										Dep.Valencia	13	96
14-Jun-09																										Algeciras	14.5	99
15-Jun-09																										Dep.ALG, Casablanca, Off Hire	9	95
16-Jun-09																											14	95
17-Jun-09																											14	98
18-Jun-09																											15.5	101
19-Jun-09																											15.5	101.5
20-Jun-09																											15.5	102.5
21-Jun-09																											15.5	100.5
22-Jun-09																											15.5	107
23-Jun-09																											15.5	106.5
24-Jun-09																											15.5	108.5
25-Jun-09																											15.5	108.5
26-Jun-09																											15.5	108.5
27-Jun-09																										22h18 Il collision	14.5	107.5

Renate Schulte

June 2009		Periods of work are shaded																								Comments	NOT TO BE COMPLETED BY THE SEAFARER				
		Hours of rest in 24-hour period																									Hours of rest in any 24-hour period	Hours of rest in any 7 day period			
Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24						
10-Jun-09																											14	Port/Sea	14	158	
11-Jun-09																												14	Sea/Port	14	148
12-Jun-09																												14	Sea/Port	14	136
13-Jun-09																												12	Sea	12	128
14-Jun-09																												14	Sea/Port	14	118
15-Jun-09																												12	Port	12	106
16-Jun-09																												11		11	96
17-Jun-09																												14	Sea	14	96
18-Jun-09																												14	Sea	14	96
19-Jun-09																												14	Sea	14	96
20-Jun-09																												14	Sea	14	98
21-Jun-09																												16	Sea	16	100
22-Jun-09																												14	Sea	14	102
23-Jun-09																												14	Sea	14	102
24-Jun-09																												14	Sea	14	102
25-Jun-09																												14	Sea	14	102
26-Jun-09																												14	Sea	14	102
27-Jun-09																												14		14	100

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Renate Schulte

June 2009 [Redacted]

NOT TO BE COMPLETED BY THE SEAFARER

Date	Periods of work are shaded																								Hours of rest in 24-hour period	Comments	Hours of rest in any 7 day period		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			24	any 24-hour period	any 7 day period
09-Jun-09																										24		24	168
10-Jun-09																										14		14	150
11-Jun-09																										11	arr-dep BCN	10	145
12-Jun-09																										13	arr VLC	8	134
13-Jun-09																										14		13	124
14-Jun-09																										16		14	116
15-Jun-09																										12		12	104
16-Jun-09																										14		12.5	94
17-Jun-09																										14		13	94
18-Jun-09																										14		14	97
19-Jun-09																										12		12	96
20-Jun-09																										12		12	94
21-Jun-09																										15		12	94
22-Jun-09																										12		12	94
23-Jun-09																										14		12	94
24-Jun-09																										14		14	94
25-Jun-09																										14		14	94
26-Jun-09																										14		14	96
27-Jun-09																										16		14	100
28-Jun-09																										24		16	108
29-Jun-09																										24		24	120
30-Jun-09																										24		24	130

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Sahife No: 277
Page No.

Arifin 22 ci SATURDAY Günü HERKE den MONTOUR
Month Day From To

SAAT Hour 00.00	OLAYLAR Journals	VARDİYA ZABİTİNİN İMZASI Watch Officer
01.00		
02.00		
03.00	0250 P.O.B. 0255 SINGLE UP 0300 CAST OFF	
04.00	0400 WATCH HANDED OVER TO C/O ACC TO MSI 4.9.2-06. 0415 C.O.S.P	
05.00	0420 P.OFF AK TO 231° (T) 0420 MSI 4.9.2-01 CARRIED OUT.	
06.00		
07.00		
08.00	0800 WATCH HANDED OVER TO 2RD.OFF. ACC TO MSI 4.9.2-06	
09.00	0900 DAILY TESTS & CHECKS CARRIED OUT. MSI 4.9.2-09	
10.00		
11.00		
12.00	1200 WATCH HANDED OVER TO 2RD.OFF. ACC TO MSI 4.9.2-06	
13.00		
14.00		
15.00		
16.00	1555 A/C TO 235° (T) 1600 WATCH HANDED OVER TO C/O ACC TO MSI 4.9.2-06	
17.00	1610 ABEAM OF CELIBOLU. ENTERED CANAKKALE STR. 1620 P.O.B MSI 4.9.2-0.5A CARRIED OUT.	
18.00	1630 MSI-4.9.2-0.5 CHECK LIST CARRIED OUT	
19.00	1915 P.OFF CANAKKALE STR. PASSED KAPTAN KÖPRÜSÜNDÜ, 1920 KANAKALE FENERİ BORDOLANMI	
20.00	2000 WATCH HANDED OVER TO 2ND ACC TO MSI 4.9.2-06	
21.00		
22.00		
23.00	2210 RENATE SCHULTE ADLI GEMİDE GATIŞTIK.	
24.00		

TANK İSKANDİLLERİ Tank Soundings							
No.	Is.	Or.	Sa.	No.	Is.	Or.	Sa.
No.	Port.	Centre	Starboard	No.	Port.	Centre	Starboard
1				7			
2				8			
3				Baş pik:..... Fore Peak			
4				Kıç pik:..... After Peak			
5						
6						

¹⁶ Some details have been omitted to ensure confidentiality.