

MA2016-3

**MARINE ACCIDENT  
INVESTIGATION REPORT**

**March 31, 2016**



The objective of the investigation conducted by the Japan Transport Safety Board in accordance with the Act for Establishment of the Japan Transport Safety Board is to determine the causes of an accident and damage incidental to such an accident, thereby preventing future accidents and reducing damage. It is not the purpose of the investigation to apportion blame or liability.

Kazuhiro Nakahashi  
Chairman,  
Japan Transport Safety Board

Note:

This report is a translation of the Japanese original investigation report. The text in Japanese shall prevail in the interpretation of the report.

# MARINE ACCIDENT INVESTIGATION REPORT

March 10, 2016

Adopted by the Japan Transport Safety Board

Chairman Kazuhiro Nakahashi


Member Kuniaki Shoji

Member Satoshi Kosuda

Member Toshiyuki Ishikawa

Member Mina Nemoto

<b>Accident Type</b>	Grounding
<b>Date and time</b>	Around 22:29, on December 20, 2014 (local time, UTC +9 hours)
<b>Location</b>	East of Uma Shima Island, Imabari City, Ehime Prefecture Around 153 degrees true bearing, 120m from Nagasehana lighthouse (Approximately 34° 07.0' N, 132° 59.5' E)
<b>Summary of the Accident</b>	<p>Cargo ship MIGHTY ROYAL, with 23 crews including a master onboard, was sailing northwest under pilotage of a pilot in the Naka Suido in the Kurushima Kaikyo Traffic Route and went aground at the shallow area on the east of Uma Shima, Imabari City, Ehime Prefecture at about 22:29 on December 20, 2014.</p> <p>MIGHTY ROYAL had some holes in the port side bottom, but there were no casualties.</p>
<b>Process and Progress of the Investigation</b>	<p>(1) Set up of the Investigation</p> <p>The Japan Transport Safety Board appointed an investigator-in-charge and another marine accident investigator to investigate this accident on December 21, 2014.</p> <p>(2) Collection of Evidence</p> <p>Interviews on December 21, 2014; January 8, 19, 20, 21, 23, March 6, 18, April 22, 23, June 29, 2015; On-site investigation and interviews on December 22, 2014; January 20, March 13, 2015</p> <p>(3) Comments from Parties Relevant to the Cause</p> <p>Comments on the draft report were invited from parties relevant to the cause of accident.</p> <p>(4) Comments from the Flag State</p> <p>Comments on the draft report were invited from the flag State of MIGHTY ROYAL.</p>

<p><b>Factual Information</b></p> <p>Vessel type and name</p> <p>Gross tonnage, IMO number</p> <p>Port of registry</p> <p>Owner</p> <p>Management company</p> <p>Class</p> <p>L×B×D, Hull material</p> <p>Engine, Output</p> <p>Date of launch, etc.</p>	<p>Cargo ship MIGHTY ROYAL</p> <p>22,046t, 8315009</p> <p>Chittagong, People's Republic of Bangladesh</p> <p>Vanguard Maritime LTD. (People's Republic of Bangladesh)</p> <p>Vanguard Maritime LTD.</p> <p>Lloyd's Register of Shipping (United Kingdom)</p> <p>179.91m x 30.50m x 15.30m, Steel</p> <p>Diesel engine, 5,928kW</p> <p>September 1, 1986</p> <p>(See photo 1)</p>  <p>Photo 1 MIGHTY ROYAL</p>
<p>Crew Information</p>	<p>A) Master (Nationality: People's Republic of Bangladesh) male, 39 years old</p> <p>Endorsement attesting the recognition of certificate under STCW regulation I/10, Master (issued by People's Republic of Bangladesh)</p> <p>Date of issue: November 27, 2013 (Valid until: October 15, 2015)</p> <p>Served as master of this vessel since November 2013 and had four times of experience with navigating through the Kurushima Kaikyo.</p> <p>B) Pilot (hereinafter referred to as “the said pilot”) Male, 63 years old</p> <p>First grade pilot for Naikai pilot area</p> <p>Date of issue: March 16, 2009</p> <p>Date of revalidation: February 4, 2014</p> <p>Date of expiry: March 15, 2019</p> <p>Started work as a pilot since April in 2009 and had experience of about 100 times of experience of navigation through the Kurushima Kaikyo.</p>
<p>Injuries to Persons</p>	<p>No</p>
<p>Damages to Vessel</p>	<p>Cracks and broken holes on the port side bottom and damage to the</p>

	port side bilge keel
Weather and Sea Conditions	<p>Weather: Weather - Fine, Wind direction - West, Wind force - 3, Visibility - Good</p> <p>Sea conditions: Tide - Beginning of falling tide, Tidal height - approximately. 2.7m, Tidal current (at approximately. 280m west of Nakato Shima tidal stream signal station) - North current of approximately. 10 kn, Time of change of the tide of the Kurushima Kaikyo - at 22:07 (from south current to north current)</p>
Events Leading to the Accident	<p>MIGHTY ROYAL (hereinafter referred to as “the Vessel”), with 23 crews (all are nationals of People’s Republic of Bangladesh ) including a master and the said pilot and another pilot and with almost full of about 37,300t of slag, left Fukuyama port in Hiroshima Prefecture for Chittagong Harbor, Bangladesh at around 19:10 on December 20, 2014.</p> <p>The said pilot started pilotage to pilot until the Vessel passes the west end of the Kurushima Kaikyo Traffic Route within the mandatory pilotage area down to Sekizaki, Oita Prefecture.</p> <p>The master came up to the bridge of this vessel at about 21:56 and took control in the front side of the No.2 radar, the officer who was on the watch was on lookout in the front side of the No.1 radar, able seaman was on helming, and the said pilot engaged in pilotage in the front side of the repeater compass, and the Vessel sailed southwest toward east end of the Kurushima Kaikyo Traffic Route. (See Figure 1 and Photo 2)</p> <div data-bbox="576 1323 1433 1720" data-label="Diagram"> </div> <p style="text-align: center;">Figure 1 Bridge layout</p>



Photo 2 Bridge of the Vessel

The said pilot requested the master to increase the speed up to maneuvering full ahead, and then entered the Kurushima Kaikyo Traffic Route from the east end at a speed of approximately 6-7 kn (speed over the ground; the same applies hereinafter) intending to sail through the Naka Suido.

At about 22:15 while the Vessel was sailing westward in the Kurushima Kaikyo Traffic Route, the master and the said pilot visually identified a "red lighted buoy" (hereinafter referred to as "the red buoy") in the center of the south end of Naka Suido, and a "green lighted buoy" ("the green buoy") in the east of the red buoy, and they thought those were buoys of gillnets, and then further identified visually a white light to the north and they thought there was a "small boat like a fishing boat of sorts" (hereinafter referred to as "the said small boat").

When the Vessel changed the direction into the true bearing of about 310°, the said pilot found out the position of the said small boat in the starboard ahead was close by "the waypoint to sail toward the Kurushima Kaikyo Bridge Lighting No. 2 (C2 lighting) in the Kurushima Kaikyo" ("the Waypoint") in Naka Suido.

The said pilot thought that the said small boat would sail away from the waypoint if lighted by the daylight signalling lamp and started to light the daylight signalling lamp to the said small boat.

At about the time when the said pilot handed over the handling of daylight signalling lamp to a deck officer to focus on pilotage duty, the said pilot recognized that the said small boat gradually moved from the starboard bow to straight ahead of the Vessel.

The said pilot instructed the able seaman to steer hard port to avoid the red buoy that was close to the bow in the south of Naka Suido, and after passing the red buoy on the starboard side, the said pilot instructed the master to blow the whistle toward the said small boat which was on the starboard bow and instructed the able seaman hard starboard to proceed to the waypoint.

	<p>The said pilot, as the Vessel came closer to the said small boat and felt the risk of collision, so to avoid the collision with the said small boat on the starboard bow, instructed the master to blow the whistle and instructed the able seaman hard port to avoid the said small boat.</p> <p>The said small boat moved toward port bow of this Vessel at around 22:28 and the said pilot thought there is no risk of collision anymore, thus turn to starboard and took hard starboard, but the Vessel went aground at the shallow area on the east of Uma Shima and went over at a speed of about 10kn at around 22:29.</p> <p>The said pilot reported the Kurushima Kaikyo Vessel Traffic Service Center this accident and was instructed to anchor north of Tsu Shima, Imabari City, outside of the Kurushima Kaikyo Traffic Route at about 22:30.</p> <p>The Vessel had water ingress to the port side ballast tanks from No. 1 to No. 4 and heeled about 6° to the port side, then took water to the starboard ballast tanks and reduced heeling to about 4° to the port side and anchored north of Tsu Shima at about 23:00. (See Attached Figure 1 Navigation Track, Attached Table 1 AIS*<sup>1</sup> Record (excerpt), Attached Table 2 VDR*<sup>2</sup> Voice Record (excerpt))</p>
Other Matters	<p>(1) Sighting information concerning the said small boat</p> <p>Crews on the two vessels which was following the Vessel witnessed a small boat on the port side when passing east of Uma Shima, however whether this was the said small boat or not is unknown.</p> <p>(2) Fishing operation in the Kurushima Kaikyo</p> <p>At the time of the accident, there was no member fishing boats of the fisheries cooperative associations that have fishing right in the area of the accident and there were no information that could identify the said small boat.</p> <p>(3) Information on whistle sound</p> <p>1) In the sound record on VDR between 22:26:29 and 22:28:08, the voices of the said pilot requesting a blow of the whistle three times and a sound of a blast of whistle (about 10 seconds) in answer to the first request were recorded, but</p>

\*<sup>1</sup> AIS (Automatic Identification System) is a system for automatic exchanges of the information of vessel ID, type, vessel name, vessel position, route, speed, destination or navigating conditions between the vessels or vessels and the navigation assistance facilities of land station.

\*<sup>2</sup> VDR (Voyage Data Recorder) is a device for recording the information into a recoverable capsule of the navigation data, such as vessel position and speed, exchange data of the VHF wireless phone or the voices over the bridge.

no sound of whistles were recorded in answer to the second and third requests.

- 2) The master was requested to blow whistle by the said pilot three times and operated the whistle blowing button three times.
- 3) After this accident, when whistle blowing test was conducted on the Vessel anchoring in the Obe bay in Imabari City, after one long blast followed by two short blast, the whistle did not sound for the fourth time. After removing drain from the air pipes for whistle operation, the whistle was sounded normally.
- 4) When the said pilot navigate through the Kurushima Kaikyo and when there were small boats near the course line of the vessel the said pilot piloting, small boats normally left the course line upon warning by blowing whistle or lighting daylight signalling lamp

(4) Information on psychological situation of the said pilot at the time of accident

The said pilot had had the information about the collision accident of a cargo ship and a fishing boat occurred two days before in the Seto Naikai (Ondo-no-Seto) in which a crew of the fishing boat was killed, and wished to avoid collision accident case with the said boat.

(5) Maneuvering characteristics of the Vessel

1) Ahead speed

Navigation speed	14.9kn
Harbor full ahead	10.0kn
Harbor half ahead	8.7kn
Harbor slow ahead	5.8kn
Harbor dead slow ahead	4.3kn

2) Turning ability

Turning test results (Revolution per minute 96, Speed 16.0kn, Rudder angle 35.5°)

Type	Starboard turn	Port turn
Advance <sup>*3</sup>	564m	587m
Time	1min 46sec	1min 42sec
Tactical diameter <sup>*4</sup>	610m	536m

<sup>\*3</sup> "Advance" is the ordinate distance traveled by center of gravity along the original course, measured from the point at 90[deg] change of heading from the vessel center gravity on turning.

<sup>\*4</sup> "Tactical diameter" is the straight transverse distance traveled by center of gravity along the original course, measured from the point at 180[deg] change of heading from the vessel center gravity on turning.

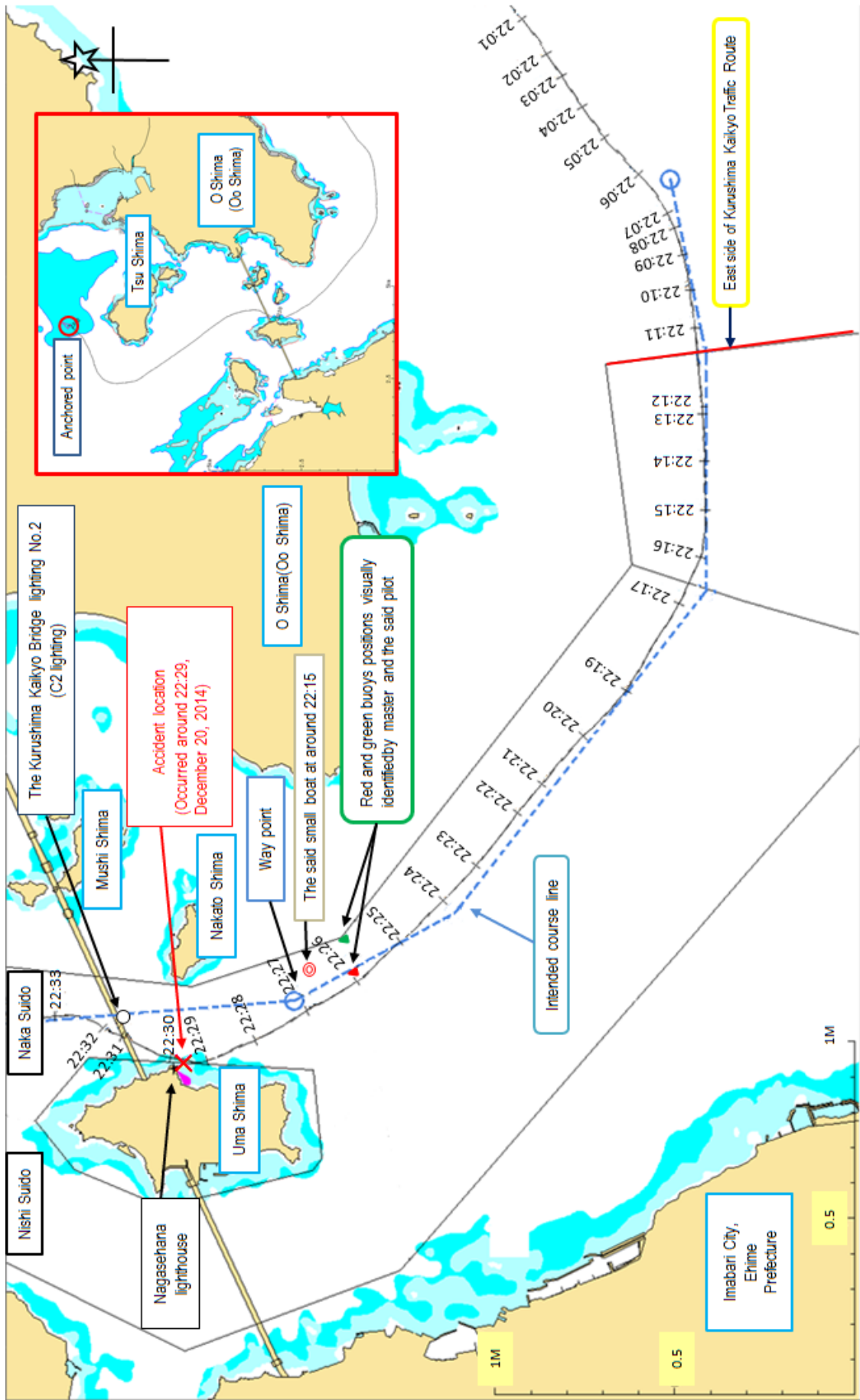


	Time	3min 40sec	3min 30sec
	(6) Draft information Draft of the Vessel was approximately 10.8m at both fore and aft.		
	(7) Information on area of the accident 1) According to the chart W132 (Kurushima Kaikyo), water depth around 120m southeast of Nagasehana is about 5.8m and the bottom sediment is rock. 2) Sailing Directions for Seto Naikai published by Japan Coast Guard describes about the Kurushima Kaikyo as follows. <i>At this strait there are islands scattered such as O Shima, Uma Shima, Nakato Shima, Tsu Shima, therefore the navigable width is narrow and bending and winding with poor visibility.</i> <i>Kurushima Kaikyo is divided into four straits.</i> <i>They are Nishi Suido in the W side of Uma Shima, Naka Suido between Uma Shima and Nakato Shima, Higashi Suido between Mushi Shima and O Shima(Oo Shima), and Kurushima-no-Seto between O Shima in the NW of Nishi Suido and Hashihama. Small vessels sail in Kurushima-no-Seto.</i>		
<b>Analysis</b> Involvement of crew Involvement of vessel or engine Involvement of weather or sea conditions Analysis of findings	Applicable Not applicable Not applicable (1) It is probable that the Vessel came close to the said small boat while the vessel sailing westward in the Kurushima Kaikyo Traffic Route because the said pilot when recognized the said small boat near the south end of the Naka Suido, thought that the said small boat would sail away from the course line of the Vessel upon lighting the daylight signalling lamp and continued sailing. (2) It is probable that the Vessel while sailing northwest in the Naka Suido which is in between Uma Shima and Nakato Shima in the Kurushima Kaikyo Traffic Route just after changing its tide to north current, took hard port as the Vessel came close to the said small boat on the starboard bow and		

	<p>despite taking hard starboard after the said small boat moved to the port bow, came close to the said small boat, and therefore, went aground at the shallow area on the east of Uma Shima.</p> <p>(3) It is probable that the said pilot thought the said small boat would sail away from the course line of the Vessel, because, when there were small boats on the course line of a vessel with the pilot piloting in the Kurushima kaikyo, small boats normally left the course line on warning by blowing of whistle or lighting of daylight signalling lamp.</p> <p>(4) It is somewhat likely that the second and third whistle were not sounded at the time of the accident as there were no sound of whistles recorded in answer to the second and third requests in the sound record on VDR, and as the whistle did not sound for the fourth time after one long blast followed by two short blast when the whistle blowing test was carried out.</p> <p>(5) It was not possible to determine the situation of the lookout and ship maneuvering of the said small boat as identification of the said small boat was not confirmed.</p>
<p><b>Probable Causes</b></p>	<p>It is probable that this accident was occurred because the Vessel, while sailing northwest at night in the Naka Suido in between the Uma Shima and the Nakato Shima in the Kurushima Kaikyo Traffic Route just after the tidal current turned northward, took hard port as the Vessel came close to the said small boat on the starboard bow and despite taking hard starboard after the said small boat moved to the port bow, came close to the said small boat, and therefore, went aground at the shallow area on the east of Uma Shima.</p> <p>It is probable that the Vessel came close to the said small boat because while the Vessel sailing northwest in the Kurushima Kaikyo Traffic Route, the said pilot, when recognized the said small boat near the south end of the Naka Suido, thought that the said small boat would sail away from the course line of the Vessel upon lighting the daylight signalling lamp and continued sailing.</p>
<p><b>Safety actions</b></p>	<p>The Licensed Inlandsea Pilot's Association held an accident prevention committee for this accident followed by the retraining for the said pilot using the navigation simulator.</p> <p>The following measures can be suggested to help prevent recurrence of similar accidents:</p> <ul style="list-style-type: none"> <li>• Small boats should appropriately monitor the behavior of large vessels taking into account of characteristics the large</li> </ul>

	<p>vessels in restricted waters such as they take time and distance to reduce speed or to stop, and have restriction in navigable area because of their deeper draft, and not to cross closely ahead of large vessels.</p> <ul style="list-style-type: none"><li>• The large vessels should appropriately monitor behavior of the approaching small boats and, taking into account of its own vessel's maneuverability, should make warning signals at an appropriate timing and take measures such as speed reduction in an early stage.</li><li>• A whistle should be appropriately maintained to be ready for blowing at any time.</li></ul>
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Attached Figure 1 Navigation Route Diagram



Attached Table 1 AIS Record (excerpt)

Time (hours:min:sec)	Vessel position*		Heading* (°)	Course over ground* (°)	Speed over ground (kn)
	Latitude (north) (°-')	Longitude (east) (°-')			
22:10:06	34-05.64582	133-02.42250	271	261.8	6.2
22:11:06	34-05.63232	133-02.20260	271	262.9	6.8
22:12:56	34-05.61150	133-02.02680	272	265.2	7.7
22:13:06	34-05.61000	133-02.00070	272	266.5	7.8
22:14:06	34-05.60508	133-01.84062	272	268.9	8.2
22:15:06	34-05.60322	133-01.67382	277	266.6	8.5
22:16:03	34-05.61648	133-01.51320	296	283.9	8.4
22:17:06	34-05.67588	133-01.35462	302	298.6	8.4
22:19:06	34-05.82402	133-01.05822	311	307.8	8.9
22:20:16	34-05.94258	133-00.90282	308	315.4	9.2
22:21:55	34-06.10788	133-00.66702	306	309.3	9.6
22:22:46	34-06.19140	133-00.53562	313	306.6	9.8
22:23:47	34-06.29622	133-00.38892	320	313.1	9.8
22:24:56	34-06.43020	133-00.22512	321	318.4	9.8
22:25:17	34-06.47412	133-00.18192	318	317.9	9.8
22:26:07	34-06.57522	133-00.06702	328	319.7	10.0
22:26:37	34-06.64380	133-00.01320	330	330.3	9.8
22:26:46	34-06.66552	132-59.99988	328	332.5	9.7
22:27:07	34-06.71532	132-59.96640	326	328.3	9.7
22:27:18	34-06.73752	132-59.94798	327	325.6	9.8
22:27:28	34-06.75912	132-59.92902	331	324.0	9.8
22:28:09	34-06.85962	132-59.86518	338	338.4	9.7
22:28:13	34-06.86958	132-59.86062	338	338.6	9.7
22:28:37	34-06.92760	132-59.82858	344	334.2	9.9
22:28:56	34-06.97572	132-59.80308	357	337.3	9.9
22:29:03	34-06.99372	132-59.79558	004	340.2	9.7
22:29:09	34-07.00830	132-59.79048	009	343.6	9.1
22:29:17	34-07.02438	132-59.78862	015	352.5	7.5

\* Positions of the vessel are the position of the GPS antenna installed on the upper side of the bridge ceiling. Headings and courses over ground are in true bearing.

Attached Table 2 VDR Voice Record (excerpt)

Time	Voice/Sound	Main voice/sound
Around 22:07:50	The said pilot	Full ahead.
Around 22:07:50	Officer	Full ahead.
Around 22:08:15	The said pilot	Two seven zero steady.
Around 22:09:11	Able seaman	Two seven zero steady, sir.
Around 22:09:26	The said pilot	Please increase eight zero.
Around 22:13:22	Master	Eight zero not possible, sir.
Around 22:13:32	Master	Seventy four maximum.
Around 22:13:32	The said pilot	Seventy five.
Around 22:14:31	The said pilot	Starboard twenty.
Around 22:14:37	Able seaman	Starboard twenty, sir.
Around 22:15:11	The said pilot	Midships.
Around 22:15:17	Able seaman	Midships, sir.
Around 22:15:41	Able seaman	Two nine zero, sir.
Around 22:15:49	The said pilot	Three zero zero, steady.
Around 22:16:42	Able seaman	Three zero zero, sir.
Around 22:17:41	The said pilot	Three zero five.
Around 22:18:05	The said pilot	Three one zero.
Around 22:18:36 ~ Around 22:18:45	—	<daylight singling lamp operation sound (crank, crank...crank, crank)>
Around 22:18:53	Able seaman	Three one zero, sir
Around 22:19:17 ~ Around 22:19:26	—	< daylight singling lamp operation sound (crank, crank...crank, crank)>
Around 22:19:48	The said pilot	Three zero five.
Around 22:20:44	Able seaman	Three zero five, sir.
Around. 22:20:46 ~ Around 22:20:54	—	< daylight singling lamp operation sound (crank, crank...crank, crank)>
Around. 22:21:41 ~ Around 22:21:50	—	< daylight singling lamp operation sound (crank, crank...crank, crank)>
Around 22:22:03	The said pilot	Starboard twenty.
Around 22:22:11	Able seaman	Starboard twenty, sir.
Around 22:22:44	The said pilot	Three two zero.
Around 22:22:44 ~ Around 22:23:04	—	< daylight singling lamp operation sound (crank, crank...crank, crank)>
Around 22:23:17	The said pilot	Officer please flush, flush, flush, flush

Around 22:23:50	The said pilot	Continue, continue, continue, continue.
Around 22:23:56	Able seaman	Three two zero steady, sir.
Around 22:24:19	The said pilot	Please continue, continue, continue, continue.
Around 22:24:42	The said pilot	Three one five.
Around 22:25:12	The said pilot	Starboard twenty.
Around 22:25:20	Able seaman	Starboard twenty, sir.
Around 22:25:31	The said pilot	Midships.
Around 22:26:02	Able seaman	Three two five, sir.
Around 22:26:09	The said pilot	Hard port, hard port.
Around 22:26:16	Able seaman	Hard port, sir.
Around 22:26:29	The said pilot	Whistle, whistle, whistle, master, whistle.
Around 22:26:29	Master	Whistle, whistle, whistle.
Around 22:26:34	The said pilot	Hard port.
Around 22:26:36 ~ Around 22:26:46	—	<Whistle blowing sound (bububu)>
Around 22:26:42	Able seaman	Hard port, sir.
Around 22:26:44	The said pilot	Hard starboard.
Around 22:26:57	Able seaman	Hard starboard, sir.
Around 22:27:15	The said pilot	Whistle, whistle, whistle, whistle, whistle.
Around 22:27:16	Master	Whistle, whistle, whistle.
Around 22:27:24	The said pilot	Midships.
Around 22:27:33	Able seaman	Midships, sir.
Around 22:27:38	The said pilot	Hard port.
Around 22:27:46	Able seaman	Hard port, sir.
Around 22:28:01	The said pilot	Hard starboard.
Around 22:28:08	The said pilot	Whistle, whistle, whistle, whistle, whistle, whistle.
Around 22:28:08	Master	Whistle, whistle, whistle, yeah, whistle, whistle.
Around 22:28:15	Able seaman	Hard starboard, sir.
Around 22:28:15 ~ Around 22:28:58	The said pilot	Hard starboard, hard starboard, hard starboard, ..., hard starboard, hard starboard.
Around 22:28:59	The said pilot	Ground.