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

**NOTE**

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

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## *St Apollo* (BA 359) Grounding and flooding in Inninmore Bay, Sound of Mull, Scotland 24 August 2015

### SUMMARY

At approximately 0327 (UTC+1<sup>1</sup>) on 24 August 2015, the 17m scallop dredger *St Apollo* (BA 359) grounded on a rocky shelf at the eastern entrance to the Sound of Mull, Scotland. The vessel was not damaged, but listed on the falling tide. Its skipper and four crew abandoned into a liferaft and were recovered by the Oban all weather lifeboat. *St Apollo* eventually came to rest on its starboard side in a depth of 5m of water. The vessel was later salvaged but was declared to be a constructive total loss. There were no injuries and no significant pollution.

*St Apollo* had been entering the Sound of Mull from the south-east on an autopilot controlled heading when, it is reported, the vessel unexpectedly altered towards the north. The wheelhouse watchkeeper immediately alerted the skipper, but the vessel grounded before he arrived on the bridge.

Image courtesy of Alan Smillie, MarineTraffic.co



© Alan Smillie  
MarineTraffic.com

*St Apollo*

<sup>1</sup> All times in this report are Universal Co-ordinated Time +1.

During the investigation, the cause of the unexpected alteration of course could not be determined. In addition, the absence of comprehensive positional records prevented an accurate reconstruction of *St Apollo*'s movements. However, it was apparent that the wheelhouse watchkeeper was unable to effectively deal with the change in circumstances so close to navigational dangers.

A recommendation has been made to the owner of *St Apollo* aimed at improving watchkeeping practices and enhancing the safety on any vessel he may own in the future.

## FACTUAL INFORMATION

### Narrative

At approximately 1700 on 23 August 2015, *St Apollo* arrived alongside in Oban on the west coast of Scotland (**Figure 1**). The vessel's skipper and four crewmen landed a catch of scallops and provisioned the vessel with stores, fuel, water and ice. Two liferafts were also replaced.

At about 2000, *St Apollo*'s skipper and three of the crew went ashore to a public house. The remaining crewman stayed on board. While in the public house, the skipper and crewmen ate a meal and consumed between 2 and 4 pints of beer each. The four men returned to *St Apollo* and went to their bunks at about 2200.

At 0200 the following morning, *St Apollo*'s crew awoke and readied the vessel for sailing. At 0222, *St Apollo* left the quay and headed into Oban Bay. The skipper was in the wheelhouse while the crew tidied the deck. As soon as the vessel was clear of the harbour, the skipper selected automatic steering and input a route to the fishing grounds between the island of Coll and the Isle of Mull (**Figure 1**) into a Decca Fishmaster plotter. Shortly after, the skipper handed the watch over to one of the crew and instructed him to follow the route on the Decca Fishmaster. The skipper and the remaining crew then went to their bunks.

By 0305, *St Apollo* was to the west of Lismore (**Figure 2**) and was making good a course over the ground of 318° at a speed of 9kts<sup>2</sup>. The visibility was good, the sea state slight, the wind was a moderate breeze from the east-south-east and the predicted tidal stream was south-easterly at 0.5kt. The wheelhouse watchkeeper was sitting in the wheelhouse chair and was monitoring the vessel's position relative to the intended track shown on the Decca Fishmaster plotter.

It is reported that the watchkeeper adjusted the autopilot heading as *St Apollo* passed through a navigational waypoint close to the south-east end of the Sound of Mull. It is also reported that the intended north-westerly track towards and through the south-east end of the Sound of Mull passed at an equal distance from Eilean Rubha an Ridire to the north-east and Glas Eileanan to the south-west.

At about 0325, soon after *St Apollo* had altered course, the vessel entered a rain squall. The watchkeeper reduced the range scale set on one of the two radar displays available from 1.5nm to 0.75nm in order to monitor the vessel's passage through the Sound. Moments later, he felt the vessel turn approximately 30° to starboard. He reduced *St Apollo*'s engine speed by an undetermined amount and then went through to the mess area aft of the wheelhouse from where he shouted to the skipper in the cabin below.

The skipper was woken by the watchkeeper's shouts. He got up, put on jogging bottoms and shoes and made his way to the wheelhouse. As he did so, *St Apollo* grounded on the south shore of Eilean Rubha an Ridire (**Figure 2**), a small island on the north side of the eastern end of the Sound of Mull.

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<sup>2</sup> Position derived from the Vessel Monitoring System (VMS). Fishing vessels are required to transmit identification, position, course and speed details every 2 hours, which is done automatically via the satellite-based VMS.

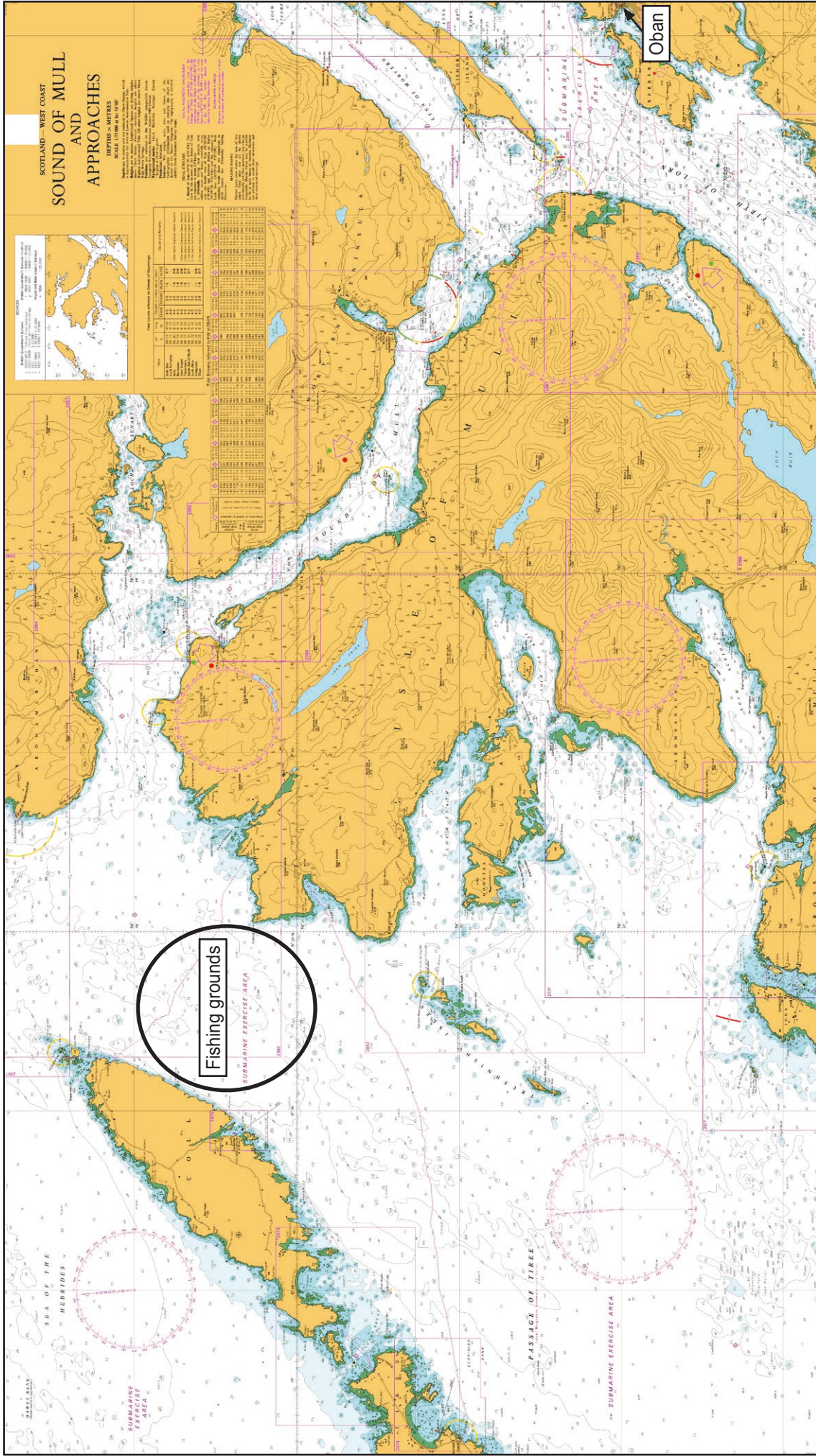


Figure 1: Chart showing Oban and St Apollo's fishing grounds

## Post-grounding

The skipper arrived in the wheelhouse and took *St Apollo's* engine out of gear. The remaining crew had been woken by the watchkeeper's shouts or by the vessel grounding and they mustered in the mess area. The skipper told the crew to don lifejackets, start the bilge pumps and inspect below decks for damage.

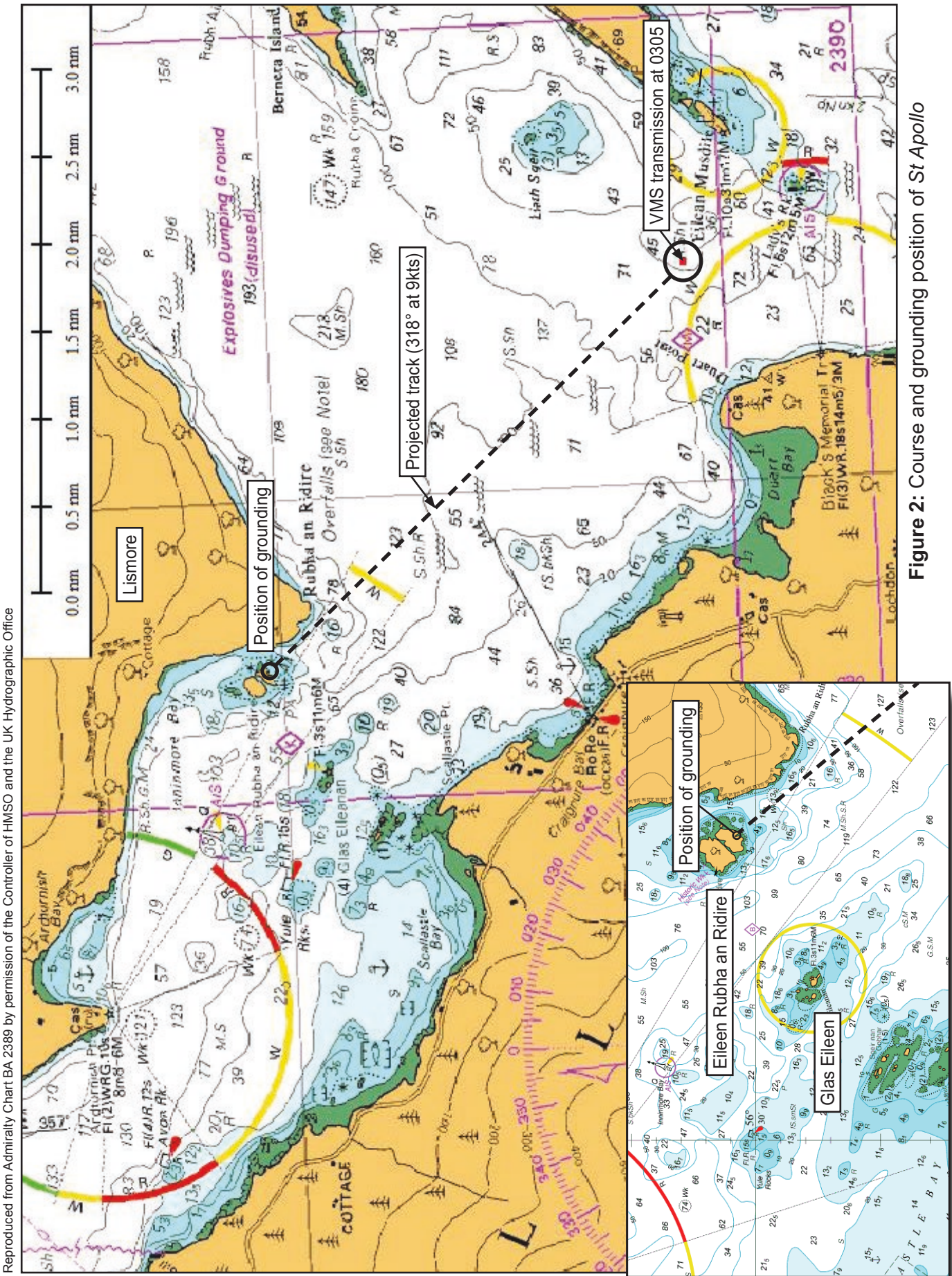


Figure 2: Course and grounding position of *St Apollo*

Reproduced from Admiralty Chart BA 2389 by permission of the Controller of HMSO and the UK Hydrographic Office

The crew soon reported that *St Apollo* did not appear to be taking water and so the skipper attempted to re-float the vessel. He set the engine gear to astern and moved the rudder from side to side, but *St Apollo* did not move. However, the vessel started to list to starboard and the skipper realised that the tide was falling<sup>3</sup>. At 0338, the skipper advised Stornoway Coastguard of the situation via very high frequency radio (VHF) channel 16. Two of the crew readied a liferaft.

Stornoway Coastguard tasked the Oban all weather lifeboat (ALB) and rescue helicopter R177 to assist. The Oban ALB arrived on scene at 0426. By 0435, *St Apollo's* starboard list had increased to approximately 35° and water had started to flood over the starboard bulwarks. The skipper and the crew abandoned into the liferaft (**Figure 3**), which they then paddled to the waiting ALB.

At 0505, *St Apollo* toppled onto its starboard side and was partially submerged (**Figure 4**) in approximately 5m of water. The ALB returned to Oban with *St Apollo's* crew. On arrival, the police breathalysed the skipper for alcohol and the test was clear. The crew were not breathalysed.

Image courtesy of Blast Productions



**Figure 3:** *St Apollo's* crew abandoning the vessel

Image courtesy of the Maritime and Coastguard Agency



**Figure 4:** *St Apollo* partially submerged

<sup>3</sup> The predicted low water in Oban was at 0732 and it was neap tides.

## Evidence recovery and salvage

On 1 September 2015, divers commissioned by the MAIB recovered the hard disk drive from the Decca Fishmaster plotter inside *St Apollo's* wheelhouse. Hard disk drives were also removed from the Trax and Olex plotters on board. The disk drives were examined by digital forensic data recovery experts to try and extract positional data and details of the intended route from Oban to the fishing grounds. Unfortunately the disk surfaces were contaminated to such an extent by oil and water that no data could be recovered.

On 15 September 2015, *St Apollo* was salvaged by North West Marine Ltd on behalf of the vessel's insurers. Flotation bags were used to bring the vessel upright (**Figure 5**) and entrained water was then pumped out. *St Apollo* had sustained little damage to its hull apart from slight distortion in way of the foot of the keel, forward. However, water ingress had damaged the vessel's engines and electrical systems. *St Apollo* was towed to Oban where it was determined to be beyond economical repair. The vessel was subsequently declared a constructive total loss.

Image courtesy of Iain Butterworth



**Figure 5:** *St Apollo* being salvaged

## Vessel

*St Apollo* was built in Hull in 1979 of steel construction to operate as a side trawler in the North Sea. The vessel's layout comprised a forepeak store, fish hold, engine room and crew cabin. A galley and mess room were located on the main deck aft of the wheelhouse.

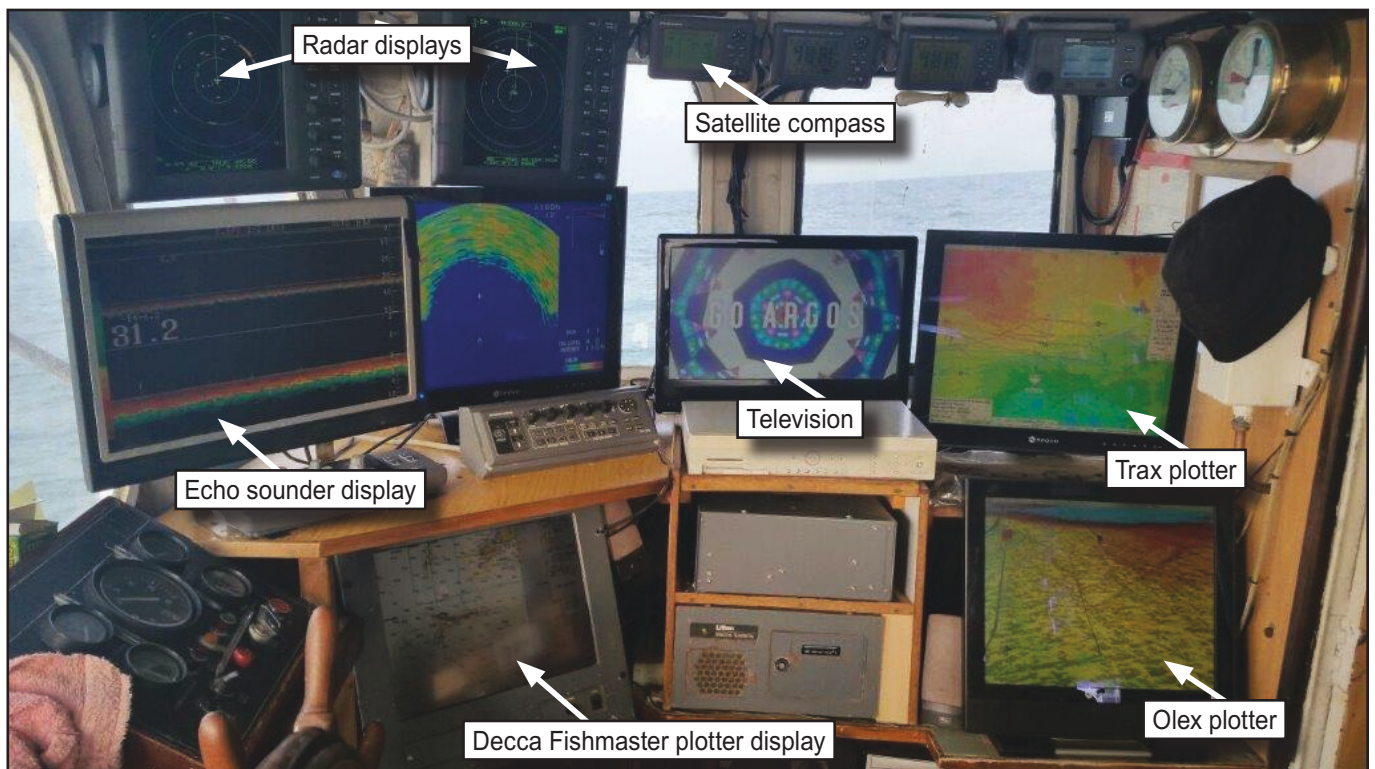
In addition to the Decca Fishmaster, Olex and Trax plotters, *St Apollo*'s navigational equipment included:

- 2 x Furuno Global Positioning System (GPS) receiver units
- 2 x Furuno radars
- 3 x VHF radio units (one fitted with DSC)
- A Koden class 'A' Automatic Identification System (AIS) transceiver
- A Furuno satellite compass
- A Navitron autopilot
- A watch alarm (integral to the autopilot)
- A magnetic compass

**Figure 6** shows the electronic equipment fitted on the starboard side of the wheelhouse.

It was reported that, with the autopilot engaged, the watch alarm alerted about every 4 minutes and it would sound in the cabin one deck below if not re-set promptly. The button to re-set the alarm could be reached from the wheelhouse chair.

During *St Apollo*'s passage from Oban on 24 August 2015, the radars were set on 3nm and 1.5nm range scales. The vessel was not transmitting on AIS.



**Figure 6:** *St Apollo*'s wheelhouse equipment (starboard side)

## Heading information

The primary heading input for the Navitron autopilot was the Furuno satellite compass. It is reported that the satellite compass had failed on one or two previous occasions while the vessel was towing fishing gear on an autopilot controlled heading. As a result, *St Apollo* had veered off course and it had required the intervention of the watchkeeper to manually steer the vessel back to its intended heading. The cause(s) of the loss of satellite compass information was not identified.

The magnetic compass was intended to automatically provide heading input to the autopilot in the event of the loss of the satellite compass input. Examination of *St Apollo*'s wheelhouse following the vessel's salvage identified that the difference between the vessel's magnetic compass heading and a satellite derived heading was 83°. However, the magnetic compass appeared to have been water-damaged.

## Crew

*St Apollo*'s skipper was a 52 year old UK national. He had worked in the fishing industry since 1978 and had owned *St Apollo* since 1997. The skipper held a Second Hand (Special)<sup>4</sup> Certificate of Competency.

The crewmen were also UK nationals and were share fishermen<sup>5</sup>. Three of the crewmen had all completed the four mandatory Seafish<sup>6</sup> safety courses<sup>7</sup>. The fourth crewman had completed all of the courses except a safety awareness course.

*St Apollo*'s wheelhouse watchkeeper at the time of the grounding was one of two crewmen on board who had completed a 5-day bridge watchkeeping course. He was 23 years old and had worked on board *St Apollo* since gaining his under 16.5m skipper's certificate<sup>8</sup> in 2010. He routinely used the Decca Fishmaster plotter to monitor the vessel's position, but was not aware of what scale the plotter had been set. He did not understand the significance and use of sector lights or the purpose of cardinal buoys. He was also not aware that *St Apollo* was equipped with a magnetic compass.

## Recent operating pattern

*St Apollo*'s area of operation was dependent on the scallop fishery. Over the summer of 2016, the vessel had operated out of Scarborough and Peterhead, but had been fishing off Mull for several weeks. Fishing trips typically lasted for 10 days, with the vessel's catch being landed into Oban. When in Oban, which was twice per trip, the vessel usually also embarked provisions and left on the same day. The skipper preferred to steam through the Sound of Mull and spend a night in Tobermory before departing for the scallop grounds.

*St Apollo* had last landed its catch in Oban on 20 August 2015 and then moved to Tobermory, where it stayed alongside overnight. The vessel then fished between Coll and Mull from 0645 on 21 August until 1300 on 23 August.

For the passages to and from the fishing grounds, the skipper or either of the two bridge-trained crewmen stood the wheelhouse watch. During fishing operations, the skipper stood the daylight watches

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<sup>4</sup> The Second Hand (Special) Certificate of Competency was replaced by the Class II Deck Officer (Fishing) certificate and is an equivalent qualification (*The Fishing Vessels (Certification of Deck Officers and Engineer Officers) Regulations 1984*).

<sup>5</sup> Share fishermen – fishermen who are self-employed and whose wages are determined by the value of the vessel's catch.

<sup>6</sup> Seafish – the Sea Fish Industry Authority works across all sectors of the UK seafood industry to promote good quality and sustainable seafood, and to improve the safety and standards of training for fishermen.

<sup>7</sup> New entry fishermen must complete basic safety courses in sea survival, elementary first-aid, fire-fighting and health and safety. Fishermen with two years' experience must also complete a 1-day mandatory safety awareness course run by Seafish.

<sup>8</sup> The under 16.5m skippers' certificate is a voluntary qualification administered by Seafish, aimed at increasing the navigational and engineering knowledge of skippers and watchkeepers on small fishing vessels.



and all of the crewmen took turns to stand the watches when towing during darkness. Tows typically lasted for between 1.5 and 2 hours and all of the crew were used during hauling, sorting and stowing the catch.

The channel for vessels entering the Sound of Mull from the south-east reduces to 4.2 cables in width as it passes between Eilean Rubha an Ridire to the north-east, and outlying rocks near Glas Eileanan to the south-west. Safe passage between these islands is marked by the white sector of the light at Ardtoraish Point, which has a visible range of 6 nautical miles. Once through this gap, a northerly cardinal buoy marks the edge of a 10.5 metre area of shallow water at Inninmore Bay. However, *St Apollo* would have been able to pass safely to the south of the cardinal buoy provided it stayed north of the port-hand lateral buoy marking Yule Rocks (**Figure 2**).

## ANALYSIS

### The grounding

If, as reported, *St Apollo*'s navigational track through the south-east end of the Sound of Mull, was equidistant from the dangers off Eilean Rubha an Ridire to the north-east and Glas Eileanan to the south-west (**Figure 2**), the vessel clearly grounded as a result of being to the north of the intended track. However, the absence of a record of the route in use, any positional data immediately before the grounding, or any material evidence of an electronic or mechanical failure, prevents a detailed and accurate analysis of the circumstances. Therefore, it is difficult to determine whether *St Apollo*'s grounding was due to navigational error, equipment malfunction, or a combination of both.

The width of the navigable channel between Eilean Rubha an Ridire and Glas Eileanan was 0.42nm. At a speed of 9kts, it would have taken *St Apollo* approximately 3.5 minutes to travel from the intended track to its grounded position (a distance of 0.5nm assuming a 30° turn to starboard from the base course). Therefore, as *St Apollo* grounded very quickly after the sudden and unexpected change of heading was noticed, it is likely that the vessel was already significantly to the north of the planned route.

Nonetheless, the watchkeeper still had enough time to reduce the engine speed and to alert the skipper. That he did not attempt to turn *St Apollo* towards safe water or stop the vessel by putting the engine astern, indicates that he panicked to some degree. This was probably due, among other things, to insufficient situational awareness, a lack of equipment knowledge and a low state of arousal.

### Position monitoring

A projection of *St Apollo*'s course and speed made good (318° at 9kts) from the position transmitted by VMS at 0305 (**Figure 2**), runs directly to the grounding position at 0327 and possibly suggests that the vessel's heading was not altered during the intervening period. However, it is evident from the absence of the watch alarm sounding in the accommodation, and the watchkeeper's shout to the skipper before the grounding, that the watchkeeper had not fallen asleep.

Although the watchkeeper reportedly adjusted the autopilot and the radar range scale when approaching the Sound of Mull, he was not aware of *St Apollo*'s movement to the north before he felt the vessel turning. In this respect, the watchkeeper's use of the Decca Fishmaster plotter on an inappropriate scale, his focus on electronic equipment rather than keeping a lookout ahead, and his psychological state were possibly contributory factors.

The watchkeeper had experienced a disrupted sleep pattern over the previous 4 days' fishing and had probably slept for fewer than 6 hours in the previous 24. He did not have to move from the wheelhouse chair to monitor the vessel's position on the Decca Fishmaster plotter or to re-set the watch alarm when required. It was a quiet watch with little stimulation. Therefore, it is likely that the watchkeeper was in a low state of arousal.

Although the watchkeeper had consumed 3 pints of beer between 2000 and 2200, the alcohol had probably been fully metabolised by the time he took over the wheelhouse watch at about 0230.<sup>9</sup> Therefore, alcohol was probably not a contributory factor.

### Loss of heading control

The reported loss of heading control immediately before *St Apollo* grounded could have been caused by one of several factors. These include the unintentional selection of manual steering, the loss of compass input to the autopilot and the failure of the autopilot itself. Of these, the loss of compass input to the autopilot, which had occurred on previous occasions following the failure of the satellite compass, was the most likely. Anecdotal evidence indicates that interference to the GPS satellite signal reception can occur in rain squalls, as experienced on this occasion. However, that the heading input to the autopilot did not appear to automatically transfer to the magnetic compass following the loss of the satellite compass, cannot be resolved. Incorrect installation, equipment failure and magnetic compass inaccuracy are all possibilities. *St Apollo*'s magnetic compass was observed to be in error by 83° following the vessel's salvage, but by then the compass had clearly been damaged and this discrepancy cannot be taken to indicate a pre-grounding problem.

### Watchkeeping arrangements

By having two wheelhouse watchkeepers who had completed a bridge watchkeeping course, in addition to its qualified skipper, *St Apollo* was more richly manned than many similar size vessels. The skipper's employment of these watchkeepers when on passage to and from the fishing grounds ensured a degree of competence in the wheelhouse that enabled him and the remainder of the crew to rest.

The completion of a bridge watchkeeping course, however, does not guarantee competence, which is the combination of knowledge, skill, experience and behaviour. In this case, the wheelhouse watchkeeper had completed the under 16.5m skippers' certificate in 2010. However, it is evident from his reliance on the fish plotter for position monitoring, his lack of his understanding of sector lights and buoyage, his lack of awareness regarding the magnetic compass and his failure to attempt to turn *St Apollo* away from danger or to put the engine astern, that he was not equipped to meet the challenges he faced alone and at night in such confined waters.

Skippers need to be mindful of a number of factors that must be taken into account when considering watchkeeping arrangements. In this respect, Marine Guidance Note 313 (F) – *Keeping a Safe Navigational Watch on Fishing Vessels* provides excellent advice, much of which is pertinent to the circumstances of this accident. Among other things, the MGN highlights the dangers of using video plotters for navigation, the importance of equipment and navigation knowledge, the need to ensure that watchkeepers are fit for duty and that a good lookout is kept. Although fishing vessels seldom use an additional lookout, on this occasion it would not only have provided a stimulus to the watchkeeper, but it would also have helped to ensure that he did not have to leave the wheelhouse in order to alert the skipper.

### Post-grounding actions

The skipper's actions following *St Apollo*'s grounding were generally well considered and timely. Despite being woken from sleep, he quickly arranged the assessment of the vessel's watertight integrity before attempting to re-float the vessel. His alerting of the coastguard was also timely and the abandonment was managed effectively and was well-judged. However, had more effort been made to close and secure all watertight doors, hatches and openings to prevent the ingress of water (**Figure 3**) the outcome for the vessel might have been less catastrophic.

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<sup>9</sup> 3 pints of beer equals approximately six units of alcohol. Alcohol generally metabolises within the human body at a rate of one unit per hour.

## The use of AIS

The Merchant Shipping (Vessel Traffic Monitoring and Reporting Requirements) (Amendment) Regulations 2011 require UK registered fishing vessels of more than 15m length overall to carry and operate an AIS at all times. Unfortunately, like *St Apollo*, many fishing vessels carry AIS and receive information from other vessels, but skippers opt not to transmit positional and navigational data for commercial reasons. On this occasion, AIS would not have prevented *St Apollo*'s grounding. Nonetheless, transmitting on AIS has the potential to enhance the safety of fishing vessels, particularly when fishing in or near busy shipping routes. Therefore, compliance with its carriage and use requirements is a prudent precaution.

## CONCLUSIONS

- *St Apollo*'s grounding was due to navigational error, equipment malfunction, or both.
- It is likely that *St Apollo* was already significantly to the north of its planned route when the unexpected swing to starboard was noticed.
- The reactions of the wheelhouse watchkeeper were impaired by insufficient situational awareness, a lack of equipment knowledge and a low state of arousal.
- The wheelhouse watchkeeper was unable to meet the challenges he faced alone and at night in such confined waters.
- The cause of the reported loss of heading control immediately before *St Apollo*'s grounding could not be determined.
- The skipper's actions following *St Apollo*'s grounding were well considered and timely.

## ACTION TAKEN

### MAIB actions

The MAIB has issued a safety flyer to the fishing industry to highlight the advice provided in MGN 313(F).

## RECOMMENDATIONS

***St Apollo*'s owner/skipper** is recommended to:

- 2016/129** Enhance the safety of any vessel he may own in the future by applying the best practice guidance promoted in MGN 313 (F) and complying with the requirement to operate AIS.

Safety recommendations shall in no case create a presumption of blame or liability

## SHIP PARTICULARS

Vessel's name	<i>St Apollo</i>
Flag	United Kingdom
Classification societ	Not applicable
IMO number/fishing number	BA 359
Type	Scallop dredger
Registered owner	Private
Manager(s)	Private
Year of build	1979
Construction	Steel
Length overall	18.2m
Registered length	17.04m
Gross tonnage	51
Minimum safe manning	Not applicable
Authorised cargo	Not applicable

## VOYAGE PARTICULARS

Port of departure	Oban, Scotland
Port of arrival	Not applicable
Type of voyage	Coastal
Cargo information	None
Manning	5

## MARINE CASUALTY INFORMATION

Date and time	24 August 2015 at 0327 (UTC+1)
Type of marine casualty or incident	Serious Marine Casualty
Location of incident	56° 30.05 N 005° 41.75 W
Place on board	Multiple locations
Injuries/fatalities	None
Damage/environmental impact	Constructive total loss, no environmental damage
Ship operation	On passage
Voyage segment	Mid-water
External & internal environment	Dark with good visibility. The wind was east-south-east force 4 and the sea was slight.
Persons on board	5