Report on the investigation

of the Grounding and Loss

of the Fishing Vessel

RACHEL HARVEY

Peninnis Head, Isles of Scilly

on 1 October 1999

with one fatality

FILE: 1/6/111

Marine Accident Investigation Branch
Carlton House
Carlton Place
Southampton
SO15 2DZ

Report No 23/2000

Extract from
The Merchant Shipping
(Accident Reporting and Investigation)
Regulations 1999

The fundamental purpose of investigating an accident under these Regulations is to determine its circumstances and the causes with the aim of improving the safety of life at sea and the avoidance of accidents in the future. It is not the purpose to apportion liability, nor, except so far as is necessary to achieve the fundamental purpose, to apportion blame.

CONTENTS

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

DSC	-	Digital Selective Calling
EPIRB	-	Electronic Position Indicating Radio Beacon
GMDSS	-	Global Maritime Distress and Safety System
GPS	-	Global Positioning System
HRU	-	Hydrostatic Release Unit
kg	-	kilogram
kW	-	kilowatt, unit of power
LRC	-	Long Range Certificate
m	-	metre
MAIB	-	Marine Accident Investigation Branch
MCA	-	Maritime and Coastguard Agency
MHz	-	Megahertz
SFIA	-	Sea Fish Industry Authority
SSB	-	Single Side Band (radio)
UK	-	United Kingdom
UTC	-	Universal Co-ordinated Time
YTS	-	Youth Training Scheme

SYNOPSIS

(all times are UTC)

On 1 October 1999, an accident occurred off the Isles of Scilly, involving the grounding and subsequent loss of a fishing vessel, resulting in one fatality. The next day HM coastguard notified the Marine Accident Investigation Branch (MAIB). After gaining further information, MAIB inspectors, Captain Nick Beer and Mr Richard Barwick began an investigation.

The fishing vessel *Rachel Harvey* had been heading for St Mary's, Isles of Scilly, in poor weather and was approaching the eastern end of St Mary's Sound with six people on board.

The sole watchkeeper was navigating using a track control system that had been fitted in December 1998 and had been used extensively since. The system interfaced a Global Positioning System (GPS) navigator with the autopilot and enabled the autopilot to steer so as to maintain the vessel on a selected track.

The video plotter was not being used for navigation, and neither the intended track nor the vessel's position was plotted on the chart. The watchkeeper did not understand how the interface functioned, and tried to alter course using the autopilot's course setting knob while the interface was connected. The system did not allow it.

The vessel grounded on Peninnis Head, and foundered within two or three minutes. One of the crew lost his life. Due to a lack of substantive evidence it is impossible to come to a firm conclusion on the reasons why use of the track control system failed to ensure the vessel remained in safe water. However, irrespective of the reason why she did not track as planned, the fact that the position of the vessel was not closely monitored, by plotting on the chart or by use of the video plotter, meant that the failure went undiscovered. This fundamental shortfall in the vessel's navigational management was the principal causal factor in the grounding.

Recommendations are directed at improving safety and navigational training on board fishing vessels.

VESSEL AND ACCIDENT INFORMATION

Vessel

Name	:	*Rachel Harvey* (formerly *Le Cap* 3/98)
Type	:	Fishing vessel - potter
Registry	:	Jersey
Fishing Number	:	J91
Length Overall	:	17.62m
Length Registered	:	16.25m
Gross Tonnage	:	55.47gt
Built	:	1959
Hull Material	:	Wood
Propulsion	:	Diesel engine. Moteurs Baudouin 6P 15.2 S
Propulsive Power	:	246kW
Owner	:	W Harvey and Sons Ltd, Newlyn, Cornwall, TR18 5HF
Crew	:	6

Accident

Type of Accident	:	Grounding followed by foundering
Date of Accident	:	1 October 1999
Time of Accident	:	2046 UTC
Place	:	Peninnis Head, Isles of Scilly
Weather	:	Wind SW force 7, rain showers; mainly good visibility but poor in showers
Tide	:	North-easterly, 1 knot
Sea Conditions	:	Moderate (in lee of land)
Injuries	:	One fatality
Damage	:	Extensive hull damage; fishing vessel foundered
Pollution	:	Limited, up to about 4500 litres of diesel fuel

SECTION 1 - FACTUAL INFORMATION

1.1 Background to the Accident

The Jersey registered fishing vessel *Le Cap* was bought by the Newlyn-based company W Harvey and Sons Ltd in September 1996. The new owners decided to maintain her Jersey registration. She was renamed *Rachel Harvey* in 1998. In December that year, new navigational instruments were fitted, including an autopilot with an interfaced track control system.

Rachel Harvey was a specialist potting vessel. She operated 15 strings, each of 100 pots, which were generally laid in the area of the traffic separation zone between Land's End and the Isles of Scilly **(Figure 1 - chart extract)**. Her catch of crabs was intended mainly for the French market. A typical voyage of five or six days was preceded by a day or two of leave for the crew of six while the vessel was laid up in Newlyn. After preparations for sea were completed, including loading bait and other stores, *Rachel Harvey* departed and made passage of about three hours directly to the fishing grounds. During the next four or five days the crew hauled, rebaited and daily shot about 1000 pots. The catch was stored and kept alive on board in Vivier tanks. During fishing operations the skipper navigated and manoeuvred the boat from the wheelhouse, while the other five crew handled the pots. The separate roles involved in handling the pots and the catch were shared on a rotational basis by the five crew, each of whom shared equal status on board. The skipper generally chose to moor the vessel alongside in Hugh Town, St Mary's, Isles of Scilly, each night. The passage to Hugh Town from the fishing grounds was nearly always made through St Mary's Sound, although in exceptional circumstances Crow Sound was used. After fishing for four or five days, depending on the catch, *Rachel Harvey* made passage for a French port, where the catch was landed. The voyage was completed with a return passage to Newlyn.

When the accident occurred, the normal voyage cycle had been interrupted. *Rachel Harvey* had been forced to lay up in Newlyn for five days. One of the crew members had injured his back on the previous voyage, and a replacement crew member had not been immediately available. The period of inactivity ended when, after five days rest, the crew member's back had improved sufficiently to enable him to sail.

1.2 Narrative of Events (Times are UTC)

Rachel Harvey departed Newlyn between 1100 and 1130 on 1 October with six people on board. She arrived at the fishing grounds at about 1400 and began hauling immediately. The wind was south-westerly force 7 and the sea was rough, but this was within her working limits.

At 1900, after having hauled and shot about 600 pots, the skipper decided to halt the fishing and make passage to St Mary's. He asked the crew to let him know who was to take the first watch; one fisherman (F1) volunteered. The skipper generally left it to the crew to establish their own watchkeeping roster. He considered all but one of the five crew members to be competent to keep a navigational watch.

Using the GPS, the skipper selected the appropriate destination waypoint from the instrument's memory and noted the course required. He then steadied the vessel on the course and engaged the

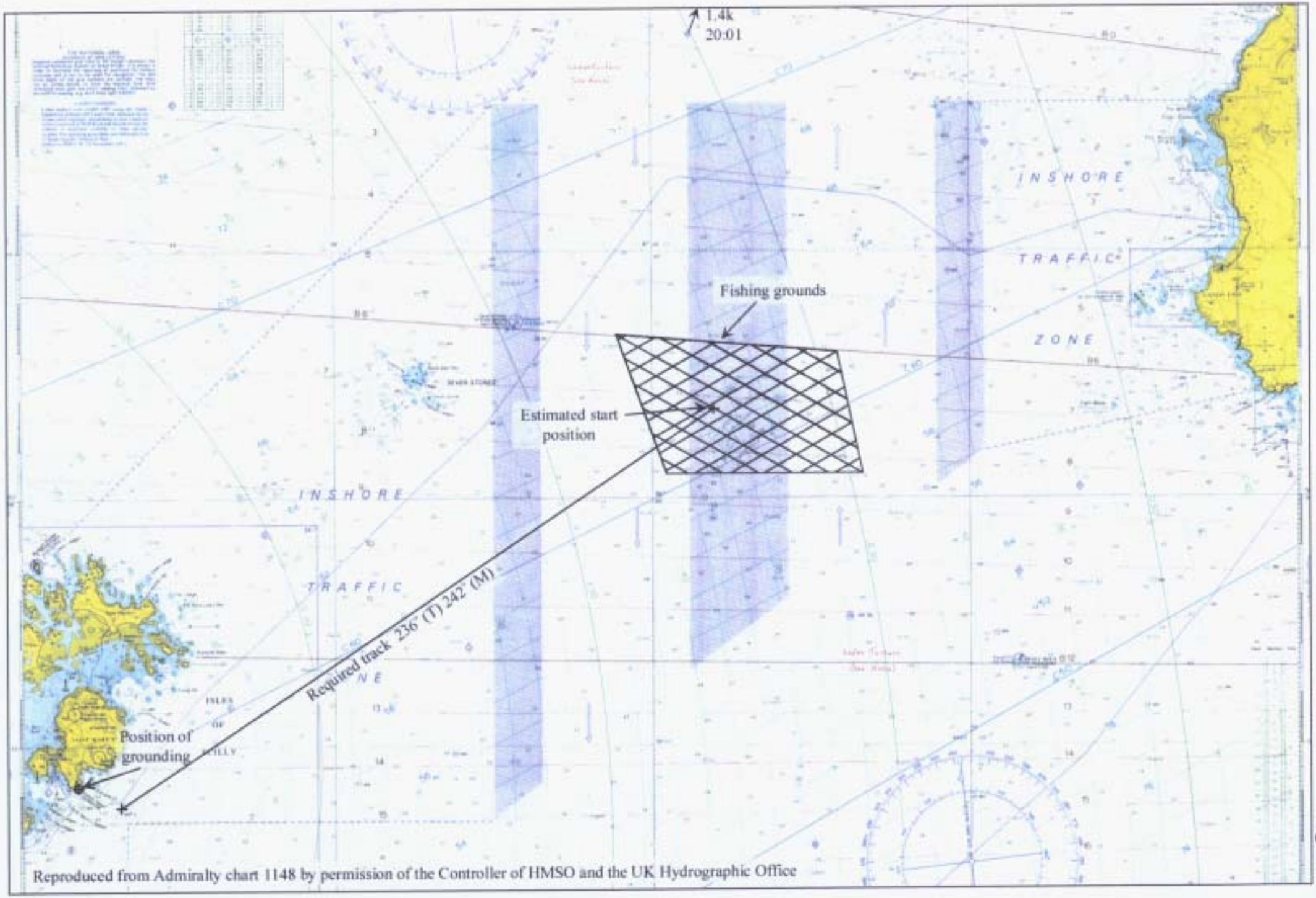

1.4k
20:01
INSHORE
TRAFFIC
ZONE
Fishing grounds
Estimated start position
INSHORE
TRAFFIC
ZONE
Required track 236° (T) 242° (M)
Position of grounding
Reproduced from Admiralty chart 1148 by permission of the Controller of HMSO and the UK Hydrographic Office

Figure 1

autopilot. Next he switched on the track control system by selecting "Lo" using the interface control switch **(see photograph 1)**.

With the track control system operating he handed the watch to F1, instructing that he should be called ten minutes before arrival at the waypoint.

It was also F1's duty to cook the evening meal, which generally coincided with arrival in harbour. To enable him to prepare the meal, F1 arranged to call another fisherman (F2) before arrival. F2 was called at about 2010 when the vessel was still 35 minutes from the waypoint. He went directly to the wheelhouse and F1 started work in the galley, situated directly behind the wheelhouse. There was no handover between the two watchkeepers.

F2 had navigated the vessel into St Mary's Sound on several occasions during his six months service on *Rachel Harvey*. However, previously it had been daylight with reasonably calm conditions. The skipper always used the same waypoint, which was permanently stored in the GPS's memory. When F2 came on watch, he noted a cross on the video plotter indicating Peninnis Head; he thought this was the waypoint towards which they were heading. He knew from his experience of previous passages that the waypoint appeared to be close to land. He considered that he needed to alter course slightly to port to clear the land. He turned the course selector knob and selected a new course, which he believed to be 10° further to port.

F2 monitored the navigation using one of the two radar displays, both of which were aligned with the ship's head up. One radar was set on the six-mile range scale, and the other was set on three. The force 7 wind was on the port bow and visibility was reduced in occasional rain and spray. F2 was concerned that the wind would be pushing the vessel to the north. It was yawing in the rough conditions. F2 concluded that his alteration of course to port had been insufficient and that the vessel was still heading, and being forced, too close to the land. The land appeared on, or close to, the heading marker on the radar. Accordingly, he adjusted the course setter control further to port.

F2 continued to monitor the navigation. He noted that the land appeared at close range on the radars, and he altered the range scale of one set from 6 miles to 1½ miles. He saw that the closest land was about a quarter of a mile away.

F2 could see Peninnis Head light on the starboard bow, but he was still concerned, so he adjusted the course setter control further to port. He did not want to disturb either F1 or the skipper unnecessarily. He had always intended to call the skipper when the vessel was off Peninnis Head, and she was nearing that point.

Soon afterwards something caused him to become very concerned, and he shouted to F1 to get the skipper. He looked out to starboard and saw breaking waves and rocks; a few seconds later the vessel was felt to judder as she grounded.

The skipper and F4 had jumped out of their bunks. The skipper went to the wheelhouse and pulled the engine controls back. Looking out of the windows, he saw waves breaking over the bows. He lifted the engine room hatch in the wheelhouse, saw water in the engine room, and called for his shoes so that he could go down into the space to pump the water out. However,

Photograph 1

The navigation autopilot after recovery

on looking out of the window again, he realised *Rachel Harvey* was sinking. He cancelled his request for shoes and told the crew to get their lifejackets.

F1, F2 and F4 went down into the cabin to fetch their lifejackets, and to ensure that Andrew Dyson and F3 were awake.

The skipper activated an automatic distress message using digital selective calling (DSC) on the main radio, and declared "Mayday" on VHF radio Channel 16. The time was 2046. He gave the position of the vessel, which he repeated at the request of the coastguard. He did this quickly, and then said he was abandoning ship. The skipper left by the wheelhouse door and jumped over the rails on the starboard side forward. He left as the vessel was sinking, and did not have time to collect his lifejacket.

F1, F2 and F4 had gone up to the podium after retrieving their lifejackets from the cabin. On the podium, which had no fishing equipment on it, F1 tried to release the liferaft. It was covered in soot from the main engine exhaust. The crew had only about 20 to 30 seconds to release it before the vessel sank. They were unsuccessful. It was dark, and the senhouse slip, which secured the raft to its cradle, could not be seen clearly enough to be released. The three crew left the vessel from the podium, as she sank under them.

When F3 left the cabin the water was around his feet. Andrew Dyson was rummaging in his bag, so F3 warned him to hurry up. F3 got as far as the main deck and just got out of the opening in the rails on the starboard side before *Rachel Harvey* sank. As Andrew Dyson was coming up the stairs he was observed by F3. This was the last time he was seen alive.

Rachel Harvey sank 2 to 3 minutes after grounding. Between 30 and 60 seconds later the liferaft came to the surface and inflated the right way up. It was still attached to the vessel. Initially, F4 was dragged by the current away from the liferaft, but he grabbed hold of the sea anchor rope, which he used to pull himself to the raft. He heard gas escaping from a valve, which he thought was a leak, so tried to stop it with his hand. However, this was normal; the valve was venting to prevent over pressure. When the valve stopped venting, he turned the liferaft around and found the canopy entrance. He had no difficulty in boarding the liferaft. The light inside was not working so he bent the canopy, momentarily, to shine the external light inside.

F4 found containers inside the liferaft. He was able to locate the torch, which he used to examine the other contents; he did not think the torchlight was particularly bright. He found silver packages containing food, which he put to one side, and a paddle, which he used to try to move the raft towards the others. He could hear their shouts. He made no appreciable headway, and was unaware that the liferaft was still attached to the vessel. He then searched for the flares, which he found with some difficulty, and fired off five rockets. He found the triggers for the rocket flares difficult to use with cold hands.

F1 tried to swim to the liferaft, but made no significant headway towards it against the current. He could see the external light on the liferaft. He thought about swimming to the shore, but heard the waves breaking against the rocks and thought it would be too dangerous.

The skipper was in the water with no lifejacket. Fortunately, a gas bottle surfaced beside him, which he clung to. The bottle was the spare 19kg propane cylinder which, although full, still floated. Little else rose to the surface. The skipper, F1 and F3 were shouting to each other, and subsequently managed to get together in a group. F1 and F3 were able to support the skipper with their lifejackets, even though F3 did not have his donned properly; he was only holding it. They saw the rockets set off by F4, and were aware of the blue flashing lights of emergency vehicles near Peninnis Head; they knew help was on the way. F2 had his lifejacket on, but he could feel his rigger boots pulling him down, so he kicked them off.

When *Rachel Harvey* sank, her Electronic Position Indicating Radio Beacon (EPIRB) released automatically and transmitted a distress message correctly.

The St Mary's lifeboat arrived 30 to 40 minutes later. The lifeboat crew saw the liferaft and, as the lifeboat approached, F4 used four hand-held flares, which he found easier to set off than the rocket flares. He threw the quoit as the lifeboat came close; the quoit and line were easy to find as they were right by the door.

F4 was picked up by the lifeboat and he indicated to the lifeboat crew that others were in the water towards the east-north-east. The searchlights on the lifeboat were used and the retro-reflective tape on the other survivors' lifejackets reflected the light well. The crew had not activated their lifejacket lights. F2 was located and picked up, followed by the group of three.

Andrew Dyson was later found near Gilstone rocks, face down with his arms spread out. He had a lifejacket over his head, but it was not tied around his waist. The lifeboat crew tried to resuscitate him as they returned to St Mary's. When they reached the quayside at Hugh Town, an ambulance crew and a doctor took over the resuscitation, but it was unsuccessful. The lifeboat returned to the scene of the accident and recovered the liferaft and the EPIRB, which, by then, had drifted to a position near Newfoundland Point.

1.3 The Crew

The 31 year old skipper had been a fisherman for 18 years. He had gained nearly all his experience on potters working out of Grimsby and Scottish ports, as well as from Dartmouth and Newlyn. He had worked for W Harvey and Sons Ltd for between four and five years, and had been skipper on *Rachel Harvey* for the past 18 months. He underwent a youth training scheme (YTS) course when he first came to sea, during which time he received the statutory training in first-aid, survival and fire-fighting, as well as introductory training in fishing and basic watchkeeping. In addition he had obtained a Long Range (Radio) Certificate (LRC). He did not have a certificate of competency, and was not required to hold one for service on *Rachel Harvey*.

Fisherman 1 (F1), aged 27, held a boatmaster's licence grade 2. He had worked on a salmon farm until 1995, and then on ships servicing North Sea oil rigs. He had moved to the West Country at the beginning of 1998, and had worked on a 26m fishing boat for 13 months before joining *Rachel Harvey* in July 1999. He had been relieved as navigational watchkeeper by F2 about 35 minutes before the grounding.

Fisherman 2 (F2), aged 25, had worked mainly as a fisherman since leaving school. He underwent a YTS course, during which he received the statutory training in first-aid, survival and fire-fighting, as well as introductory training in fishing and watchkeeping. His initial six years experience was gained on gill netting boats. He had left the sea for one and a half years before returning to the industry to work on *Rachel Harvey* six months before the accident. He was the watchkeeper at the time of the grounding

Fisherman 3 (F3), aged 26, had been a fisherman for five years. His first three years experience had been gained on day fishing boats. He had been working on larger boats like *Rachel Harvey* for the past two years. He had undergone the statutory training in first-aid, survival and fire-fighting. He joined *Rachel Harvey* about three weeks before the accident.

Fisherman 4 (F4), aged 34, had been a fisherman for 20 years. He had undergone training in basic sea survival, but not fire-fighting or first-aid. He has no fishing qualifications. He had once previously served on *Rachel Harvey* for three days earlier in the year, while his regular vessel was undergoing repairs. On this occasion he had joined the day before she sailed, and had not kept a navigational watch on the outward bound passage.

Mr Andrew Dyson, aged 35 (deceased), had relocated with his partner from London to Cornwall earlier in the year, and had first gone to sea as a fisherman on *Rachel Harvey* about two and a half months before to the accident. After one voyage he left and worked on another Newlyn-based fishing vessel, until rejoining *Rachel Harvey* for the voyage in question. He had not undertaken the statutory training in first-aid, fire-fighting or survival. His previous employment had been as a lifeguard and swimming instructor. He was described as physically fit and a strong swimmer.

1.4 Safety Training

The UK requirement for basic safety training is specified in *The Fishing Vessels (Safety Training) Regulations 1989*. The Jersey administration does not have an equivalent requirement. A number of the crew members, including Mr Dyson, had not undergone the minimum safety training which is required of all those who sail on UK registered fishing vessels.

1.5 The Owner - Risk Assessment

W Harvey and Sons Ltd has operated fishing vessels out of Newlyn for over 40 years. The company owns several vessels similar to *Rachel Harvey*, which specialise in live lobsters, crabs and crawfish.

At the time of the accident, in compliance with *The Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997*, the company had begun to consider risk assessments covering all the normal operations of its vessels. A trial risk assessment, based on a Standard Risk Assessment Form supplied by the Sea Fish Industry Authority (SFIA), had been compiled for one of its vessels, and the completed form had been submitted to the SFIA for comments. W Harvey and Sons Ltd had been one of the first fishing vessel owners in the country

to tackle this problem. It had been intended to use the first risk assessment as a model for those of other vessels in the fleet, including *Rachel Harvey*. Although the comments of the SFIA had been received, no risk assessment had been completed for *Rachel Harvey*'s operation at the time of the accident and, as the vessel was Jersey registered, there was no requirement for one.

1.6 The Vessel - General Description

Rachel Harvey was a wooden-hulled vessel of 16.25m registered length. She had a wheelhouse situated aft of mid-length, abaft which a platform (podium) was provided for storing empty pots and other equipment. To aid the security of the equipment, which was sometimes stowed on the podium and on the small after deck beneath, a tubular steel framework had been constructed (**photograph 2**).

The sleeping accommodation for the six crew was situated beneath the main deck aft of the wheelhouse. A ladder from the cabin led up to the galley area, which was immediately aft of the wheelhouse. A door from the galley led directly to the wheelhouse (**photograph 3**). Another door led aft on to the after deck.

The wheelhouse was well equipped with modern instrumentation, much of which had been newly fitted about nine months before the accident. The wheelhouse equipment included:

- Two radars, Furuno M1942 and Furuno M1940
- Video plotter, Furuno GD188
- Two GPS navigators, Furuno GP70 Mk 2, Furuno GPS 1GP50
- Echo sounder, Furuno FCV271
- Searchlight, Francis 11 inch
- Autopilot, Navitron NT 921 with interlocked watch alarm
- VHF radio, Furuno
- Radio, Furuno FS1550 SSB
- EPIRB, Jotron 305 with Hammer HRU.

A wheelhouse chair was sited facing forward within reach of the main instrumentation and controls.

The vessel's magnetic compass had been corrected about one month before the voyage in question. No significant deviation had been detected.

The main working deck was in front of the wheelhouse. A canvas shelter attached to a tubular steel framework protected the working deck. The view from the wheelhouse over the shelter was restricted, but adequate for safe navigation. The fish hold and Vivier tank were sited below the main working deck.

1.7 Safety Equipment

Rachel Harvey was fitted with the safety equipment required by UK fishing vessel regulations, which are largely reflected in those of the States of Jersey.

Photograph 2

Rachel Harvey

Photograph 3

Door from galley to wheelhouse

The liferaft was stowed on the port side of the podium. The main engine exhaust was forward on the wheelhouse top; it discharged aft towards the liferaft. The lifejackets were all stowed in the crew cabin **(Figure 2 - general arrangement)**. The lifejackets were fitted with lights that could be activated by pulling a toggle.

Cosalt in Newlyn had carried out a liferaft inspection on 28 May 1999. It had reinstalled the liferaft on *Rachel Harvey* and rigged the HRU. The internal light in the liferaft was activated by withdrawing a pin, which was attached to a lanyard. The inflation of the liferaft put tension into the lanyard that, in turn, pulled the pin out activating the light automatically. To conserve the battery and turn the light off, the pin would then have been replaced.

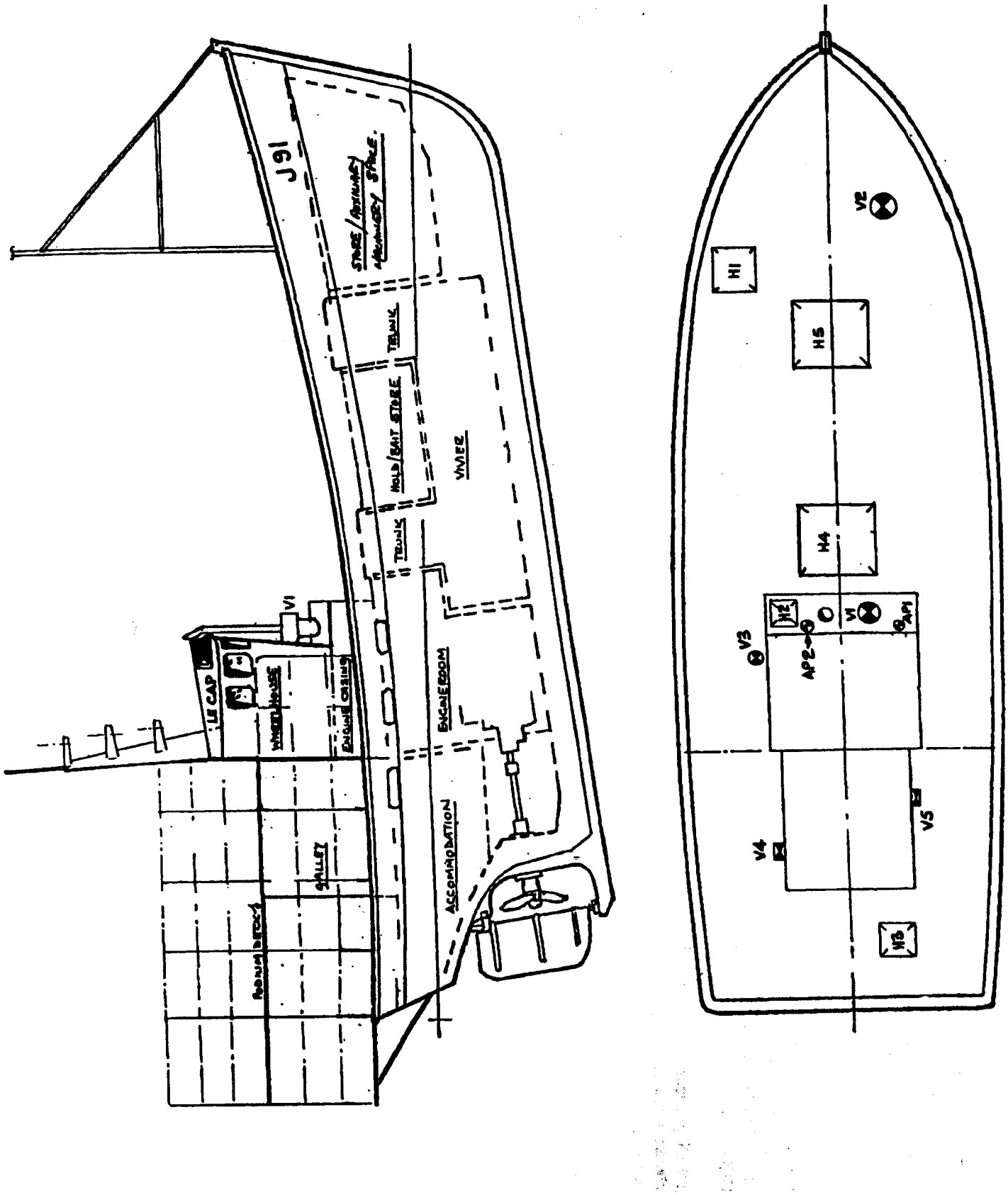
Rachel Harvey was fitted with a DSC radio, which, in the event of an emergency would, when activated, automatically transmit the name of the vessel and her position. The vessel was also equipped with an EPIRB, which was designed to float free automatically if the vessel foundered, and then transmit a distress message. *Rachel Harvey*'s EPIRB operated on both the 406MHz and 121.5MHz frequencies. The DSC radio and the EPIRB were both parts of the GMDSS.

1.8 The Heading and Track Control System

The Navitron NT 921 autopilot fitted to *Rachel Harvey*, was interfaced with one of the vessel's GPS receivers. Cross-track error information derived from the GPS receiver was passed electronically to the autopilot, which made appropriate heading alterations to bring the vessel back on the planned track.

The main functions of the instrument controls are as follows **(photograph 1)**:

- When the vessel is being hand steered, the *Autopilot Mode* switch must be turned to either the "stand-by" or the "off" position.
- When "off" is selected the instrument is disconnected.
- In the "stand-by" mode the central dial acts as a compass repeater; indicating the ship's head and following any variation caused by helm movements or outside influences. Turning the central knob in this mode has no permanent effect on the dial or indicated heading.
- The *Mode* switch must be turned to "on" for the full autopilot control to be engaged.
- In this mode the central dial remains fixed on a heading (initially the last heading recorded when the switch was moved to "on") and the autopilot then applies helm to best maintain that heading. Movement of the dial, and therefore the selected heading, can then be achieved by turning the central knob (course selector knob).
- When *Autopilot Mode* is "on", "rudder" and "yaw" controls are activated.
- The rudder control sets a limit on the maximum amount of rudder movement that can be used relative to the amount the vessel is off course. This is to stop excessive amounts of rudder being applied, which might cause over-steering.
- The "yaw" control dampens the response of the system in order to protect the steering machinery from unnecessary frequent movements when the vessel is yawing in a seaway.



General arrangement (before canvas shelter was fitted)

- When the autopilot is "on", small changes of heading can be achieved by turning the course selector knob but, for larger alterations of course, it is recommended that the autopilot is switched to "stand-by" or "off" in which modes hand steering by wheel or tiller is available.
- If the *Radionav Interface* switch is turned to either "lo" or "hi" settings while the autopilot is "on" cross-track error information can be obtained from the GPS navigator.
- The "lo" and "hi" settings dictate the frequency with which cross-track error information is acted upon. Generally the "lo" setting should be chosen for longer passages in unconfined waters where it is unnecessary to correct the cross-track error quickly. The factory set amount for the "lo" setting is one minute, but this could be adjusted by the user to be as high as three minutes. "Hi" resolution permits interrogation intervals of between 50 and 15 seconds.
- When cross-track error is initially identified, the track control system applies a heading correction of 5°. If cross-track error is still found to be increasing when next sampled, a further 3° of heading correction is applied and so on until the vessel begins to move back towards the required track. When the cross-track error is found to be decreasing, the applied heading correction begins to be reversed until the vessel is back on track and making good the correct course.
- If the course setter control knob is turned when *Radionav Interface* is on either "lo" or "hi" settings, the autopilot will alter the course as instructed. As the induced cross-track error is discovered and communicated to the autopilot, the heading will be gradually altered back towards that required to maintain the planned track. The actual track of the vessel will be temporarily offset from the planned track.

To enable cross-track error to be calculated, the co-ordinates of the planned track need to be entered into the GPS. This can be achieved by entering the latitude and longitude of the start and finish waypoints, or by selecting a stored finish waypoint and selecting "go to" from the vessel's present position.

On 1 October, the skipper selected the stored waypoint, WP1, which he had used on numerous previous occasions. He defined the track by selecting to "go to" that waypoint from the vessel's position at that time at the western end of his fishing grounds. He then noted the required course (240°), settled the vessel steering that course, selected autopilot "on" mode and turned the *Radionav Interface* switch to "lo". He checked that the vessel appeared to be steering correctly before handing the watch to F1 with the instruction that he required to be called ten minutes before reaching the waypoint. Cross-track error, heading, and distance and time to go information was available on the GPS display and on the radar display. Additionally, an indication of cross-track error could be seen on the autopilot instrument panel.

Divers recovered the autopilot, GPS and some plotter discs after the accident. Despite the MAIB's attempts to retrieve data from these instruments none could be recovered. Examination of the autopilot indicated the following settings at the time the vessel grounded **(photograph 1)**:

- The course setter display was found to be reading about 285°
- The autopilot was switched "on"
- The *radionav interface* switch was to "lo"
- "1" was selected on the "rudder" control
- "1" was selected on the "yaw" control.

1.9 Bridge Watchkeeping and Navigation

In general, while the vessel was actively fishing, the skipper manned the wheelhouse and had control of the navigation. When on passage, those crew members whom the skipper considered to be competent to keep a watch, shared the bridge watchkeeping duty. There was no strict rotation; it was left up to the crew to decide who would take the watch on each occasion. Generally, the length of each watch was about one and a half hours (or 10 miles passage distance). Except for the passage to and from France to land the catch, passage times were short, normally less than three hours.

The video plotter was not usually used for navigation on passage, although it was used during fishing operations to record the positions of the pots.

A chart of the area was available on the chart table but not often referred to.

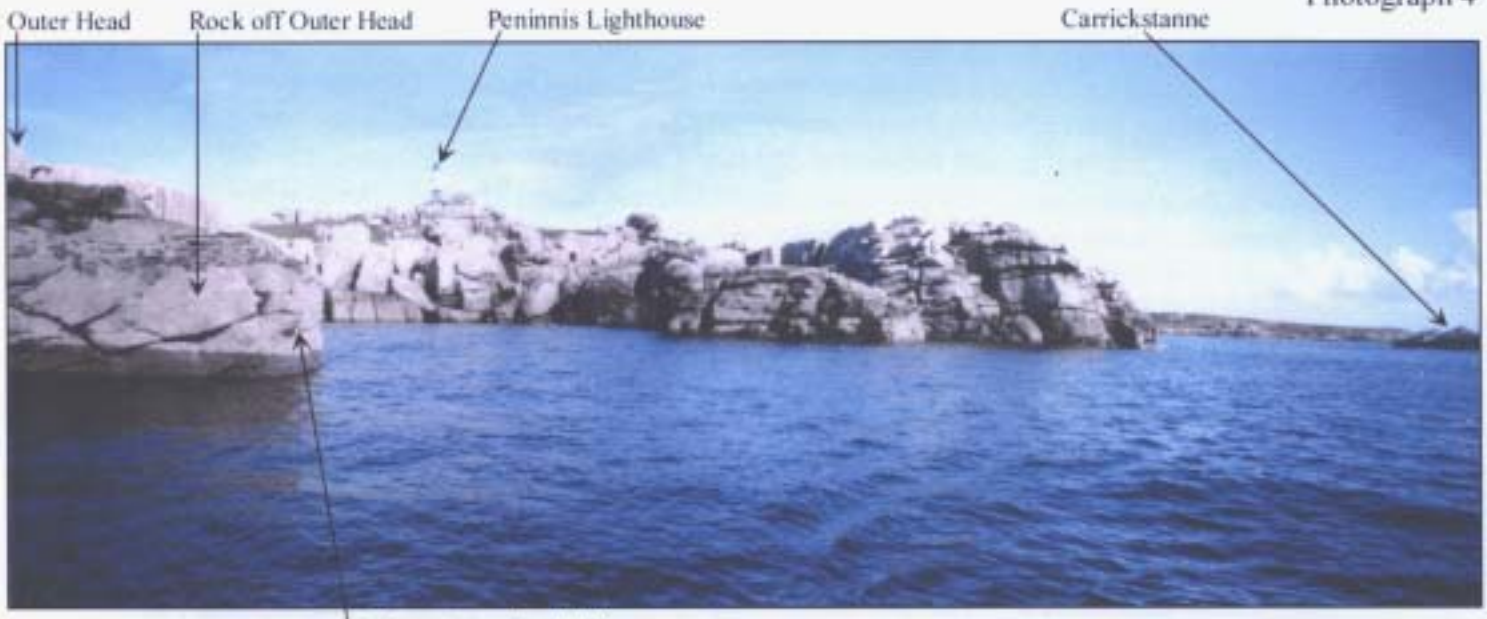
The track control system was used extensively by the skipper, sometimes during fishing operations and always on passage. During the nine months in which the system had been in operation on board, the skipper had found it a useful and reliable instrument. On the first voyage after it was fitted, the skipper entered strategic waypoints into the memory of the GPS. One such waypoint, intended as the principal landfall for visits to St Mary's, and numbered in the memory as WP1, was judged to have been about 1 mile east-south-east of Peninnis Head. The exact position of this waypoint is unknown as the memory could not be retrieved from the instrument after the accident, and no other record of it existed. It had been entered when the skipper considered the vessel to be physically in the appropriate position. He had judged this by eye using his experience, and then read off the position from the GPS, entered it in the memory, and called it WP1. The position had never been plotted on a chart. The waypoint had been used on nearly every passage from the fishing grounds to St Mary's since that time. The watchkeepers, from their experience, considered the point to be closer to the headland than the skipper had judged. F2 was under the impression that it actually marked the headland itself.

At the start of the passage to St Mary's on 1 October, the skipper handed over to F1, who was subsequently relieved by F2. The only indication of the vessel's performance in track-keeping was the digital and pictorial displays of cross-track information which could be viewed on the autopilot panel, the GPS and the radar. No positions or courses were marked on the chart, and neither the waypoint nor the track were displayed on the video plotter.

1.10 The Grounding

On 1 October, F2 was aware that strong tidal currents are sometimes present in the area to the east of St Mary's, but he was unaware of which direction they should be setting. The vessel was yawing considerably in the moderate to rough conditions, and visibility was very poor on occasions due to rain and spray. The wind was on his port bow, and he suspected that the vessel would be drifting off track to the north. He was also aware that on previous passages he had needed to alter course further to the south to clear the land. He was aware that the land appeared right ahead on the radar, which was aligned ship's head up, but, because of past experience, he was not surprised. He attempted to use the course selector knob to alter course to port to clear the land. When this

Photograph 4



did not appear to work he tried to alter further to port, but each time the vessel appeared to come back to starboard. F2 put this down to the effect of the wind and tide, and continued to try to alter course to port. He became aware that the land was very close after he altered the range of one of the radars to 1.5 miles. He did not know where the vessel was at this time but he could see Peninnis Head light just on his starboard bow. The vessel was only a quarter of a mile from the coast. He then saw seas breaking on rocks to starboard. He shouted for the skipper to be called, and the vessel grounded soon afterwards **(photograph 4)**.

1.11 Fatigue, Drugs and Alcohol

There is no evidence to suggest that drugs or alcohol were factors in the accident.

The watchkeeper, F2, had returned to the vessel from a five-day leave period on the morning of the accident. The working day had been shorter than normal, and F2 had slept before coming to the wheelhouse to begin his watch 35 minutes before the grounding. The evidence suggests that the watch alarm, which is interfaced with the autopilot, was operational, and there is no evidence that it was activated on the night of the accident.

SECTION 2 - ANALYSIS

2.1 Risk Assessment

The vessel's owners were in the process of forming risk assessments for all the vessels in their fleet at the time of the accident. A draft risk assessment had been completed for one of their vessels, which was intended to be used as a basis for the risk assessments of the others. Consideration has been given to how that risk assessment identified the risks relevant to this accident, and what controls were suggested to avoid them. The relevant section on the form is "Wheelhouse Operations" where "Inexperience" is identified under the heading "Possible Hazards" with "Vessel Loss and Deaths" identified under "Possible Consequences". The necessary control measures for this risk are stated to have been "training and sea survival courses" and "only experienced competent persons take a watch"(**Figure 3 - extract from risk assessment**). These two control measures are considered below in relation to the operation of *Rachel Harvey.*

2.2 Crew Training

Of the six persons on board *Rachel Harvey* on her last voyage, all but Andrew Dyson had at some stage in their careers attended a survival course. W Harvey and Sons Ltd regularly arranges for new crew members to attend the statutory safety courses. However, it only does this once a person has proved himself to be a valuable and reliable member of the crew. In that case, the company will pay the requisite course fees and regain the money later from the crew member's wages. Andrew Dyson had not served on *Rachel Harvey* for long enough to put him into this category.

W Harvey and Sons Ltd did not keep an accurate record of which of its employees had undergone statutory safety training; it considered this to be a matter for its skippers. However, *Rachel Harvey*'s skipper believed it to be a matter for the owner. A total of 21 people had sailed on *Rachel Harvey* during her last season of fishing. New crew members were frequently required, and it was not unusual for W Harvey and Sons Ltd, under these circumstances, to employ people who had been made unemployed from other industries, with little or no experience of fishing.

The regulations of the States of Jersey differ from those of the UK in that they do not require each fisherman to have undergone safety training. However, it would have been reasonable to expect a UK-based company, which owns a number of fishing vessels, to have ensured all its employees were trained in the three basic safety disciplines of survival, first-aid and fire-fighting. Neither the owner nor the skipper kept accurate records and, in the opinion of the MAIB, they failed to ensure that all new crew were adequately trained. If Andrew Dyson had attended a Basic Sea Survival Course his life might have been saved.

2.3 Watchkeeper Competence

Of the five crew aboard *Rachel Harvey*, the skipper considered four, F1, F2, F3 and F4, to have been competent to keep a navigational watch. The fifth, Andrew Dyson, had joined the vessel on its last voyage and had only joined the industry about ten weeks before the accident. F2, the

Standard Risk Assessment Form			WHEELHOUSE AND GALLEY			
Activity or area	Possible hazards	Possible consequences	F/P	S	F/P x S	Control measures necessary with respect to your vessel
Wheelhouse Operations	Falling asleep on watch	Vessel loss, deaths	1	3	3	BOAT FITTED WITH NOSY WATCH ALARM WATCH IS TRAINED BY SKIPPER & CHANGED REGULARLY
	Leaving wheelhouse unattended	Vessel loss, deaths	1	3	3	DOES NOT HAPPEN
	Inexperience	Vessel loss, deaths	1	3	3	CREW ARE GIVEN TRAINING & SEA SURVIVAL COURSES. SIGN & READ HEALTH & SAFETY FORMS. ONLY EXPERIENCED COMPETANT PERSONS TAKE A WATCH
	Bad posture when sitting and standing	Back injuries, leg problems	1	2	2	ADEQUATE CHAIR WITH GOOD BACK SUPPORT IN WHEELHOUSE
Galley	Inexperienced persons	Burns, scolds, cuts, fire	1	3	3	NEW CREW GIVEN 'IN HOUSE' TRAINING
	Cluttered working area	Trips and falls	1	2	2	WORKING AREAS KEPT FREE FROM CLUTTER WITHIN PRACTICAL LIMITS
	Slippery floor	Slips	1	2	2	MATS SUPPLIED AS REQUIRED. CLEANED REGULARLY
	Lack of hygiene	Food poisoning, disease	1	2	2	GALLEY IS KEPT CLEAN.
	The condition and use of LPG (Calor Gas) equipment	Explosion, fire, vessel loss, deaths	1	3	3	GAS BOTTLE CHANGED REGULARLY & KEPT ON PODIUM. COOKER REPLACED EVERY 2 YEARS OR SO.
Other						

Signature ..... Date ..... Wheelhouse and Galley

Extract from risk assessment

Figure 3

watchkeeper at the time of the accident, had served aboard *Rachel Harvey* for six months and had kept a watch on fishing vessels numerous times during several years at sea.

Due to the way she was operated, the safety of navigation and passage watchkeeping on *Rachel Harvey* relied largely on the proper operation of the GPS/autopilot interface, and on the ability of the skipper and watchkeepers to monitor it. To monitor it, a watchkeeper needs a thorough understanding of the indicated cross-track error information and the ability to take and plot positions on the chart. To be able to do this adequately, the watchkeepers needed some fundamental navigational knowledge, and specific training and instructions regarding the GPS/autopilot interface.

F2 had undertaken a Youth Training Scheme course on entry to the industry, but this had not included any substantial watchkeeping or navigational training. His navigational experience had been gained over about six and a half years at sea on fishing vessels. During the investigation it became apparent that F2 could not plot a position on a chart given its latitude and longitude, and he could not interpret the scale of a chart.

The only instruction he had received on the GPS/ autopilot interface was during his first voyage on *Rachel Harvey*, when one of the experienced crew had told him how it worked. He had never previously sailed with a track control system. After the accident he was aware of the existence of something called an interface, but he did not know what it did. He believed that to make small alterations of course when the autopilot selector switch was "on", he needed to turn the course selector knob to the required course setting. If a larger alteration of course was needed he thought that he must turn the autopilot selector switch to "off" or "stand-by" and then use the course selector knob. He knew there was a jogger (tiller) and a wheel but he had never used either. However, he had successfully kept the watch on board on numerous occasions and was confident in his ability to do so. He had altered course successfully a number of times during passages to and from France for collision avoidance, and had apparently steered the vessel past the waypoint into St Mary's Sound on previous passages using the methods outlined above. As has been explained in an earlier section, turning the course selector knob when the instrument is in "stand-by" mode has no effect on the steering. Turning the knob when the interface is selected and the autopilot is "on" will have a temporary effect, which will, in time, be counteracted by the instrument. It is conceivable that a successful alteration of course for collision avoidance could have been made by this latter method.

The first time he had made the passage inwards to St Mary's at night and in poor weather was on 1 October. On previous occasions he had been able to judge the success of any course alteration visually, by reference to the land or another ship. In the poor visibility and darkness of 1 October he needed to use the wheelhouse instruments.

In the MAIB's opinion, F2 had neither enough fundamental knowledge, nor sufficient training, on the specific instrumentation to safely keep a navigational watch on *Rachel Harvey* on the night of 1 October.

2.4 Hypotheses on the track control system's apparent failure to maintain the required track

Despite the known shortfalls in the operation of the vessel on the night of 1 October, nothing so far stated fully explains how the vessel came to ground. If the waypoint was where it is said to have been and the GPS/autopilot interface was correctly set up, and if F2 had turned the course setter knob to alter course to port, as he believes he did, *Rachel Harvey* should not have grounded.

After the event, the MAIB attempted to retrieve vital information from the GPS and plotter, which would have substantiated, or otherwise, the other evidence collected. However, these attempts were unsuccessful and many of the fundamental factors that led to this grounding will remain unknown. In the absence of firm evidence, consideration has been given to scenarios that could have led to the grounding. These are as follows:

2.4.1 F2 inadvertently altered course the wrong way

When the autopilot was recovered after the accident, the course setter display was found to be reading about 285°, the autopilot was switched "on" and the *radionav interface* switch was on "lo" **(photograph 1)**. The divers, who recovered the instrument, may have inadvertently altered the setting. However, assuming that this was not the case, the course setter reading of 285° indicates that F2 inadvertently turned the knob clockwise, from the original course of about 240°. By doing so in small increments he caused the vessel to track to the north of the planned route. Although the autopilot/*radionav interface* would have, in time, detected the induced cross-track error and applied appropriate corrections, the end result would have meant a curving track to the north of the required one.

During interviews after the accident, F2 gave every impression that he knew the correct way to turn the course setter knob to achieve an alteration of course to port. However, on the night of 1 October, in darkness and poor visibility, he had to rely solely on the instruments to tell him his actions were correct or otherwise. The MAIB believes that, in these circumstances, it is possible that he turned the knob the wrong way.

2.4.2 F2, having nearly reached the waypoint, altered course to 285°, towards St Mary's Sound

F2 had navigated the vessel into St Mary's Sound on previous occasions in daylight and good weather. He had, remarkably, achieved this by using the course setter knob to alter the vessel's heading, despite the interface being turned on. It is, therefore, conceivable that he tried to do the same thing on 1 October but misjudged the navigation and the effect of the wind and tide. If he had altered the course to 285° in this way a few minutes before the grounding, this would explain the setting found on the unit when it was recovered.

2.4.3 WP1 was not 1 mile to the east-south-east of Peninnis Head

The method of establishing WP1 was flawed because its precise location was never plotted on the chart. The skipper believes that it was about 1 mile east-south-east of Peninnis Head; the majority of the crew, from their experience, believes that it was closer to the land. Because the precise start and finish positions of the planned track were unknown and

not plotted on a chart; it must remain a possibility that one or both of them were not where they were thought to be, and this caused the vessel to ground.

2.4.4 Steering Fault

It is possible that a fault in the vessel's steering system caused her to steer to starboard of the planned track undetected.

In this respect, it should be noted that the vessel had a history of steering problems before the change of instrumentation that took place in December 1998. In particular, a problem had occurred which meant the vessel had a tendency to steer to starboard. After thorough investigation this fault was traced to corroded solenoids, which were replaced. In the nine months of operation since that time, the problem had not re-occurred and, therefore, the MAIB does not consider this past problem to have been a factor in this accident.

2.4.5 Instrumentation fault

It is possible that a fault with either the GPS or the autopilot unit allowed the vessel to track to the north undetected.

In this respect, it should be noted that immediately before her departure from Newlyn, *Rachel Harvey* had been fitted with a new rudder angle indicator, which was sited on top of the autopilot unit. The rudder angle indicator unit had been supplied by Navitron to be compatible with the autopilot unit. It was designed to take its information from the rudder angle display incorporated into the autopilot unit itself. The unit had been installed by Marconi Marine and tested prior to the vessel's departure. She had steered perfectly normally on the passage to the fishing grounds and while fishing. For this reason the MAIB believes that the fitting of this unit was not a factor in this accident.

2.4.6 Instrument setting fault

The Navitron autopilot had been supplied for fitting to *Rachel Harvey* with its various functions pre-set on standard factory settings. As is normal, on installation and during sea trials, the settings would have been altered as necessary and to suit the requirements of the customer, in this case the skipper. Once altered from the factory settings, the effects of the different settings are not known precisely. For the reasons outlined above, it is impossible to say what effect the settings that were found on *Rachel Harvey*'s recovered autopilot would have had on her track keeping ability **(photograph 1)**. If the factory settings had remained unaltered the following would have applied:

- Rudder "1" - a half a degree of helm would be applied for every degree of heading alteration required.
- Yaw "1" - maximum sensitivity to heading offsets – mean headings sampled to determine helm to be applied.
- Autopilot "on" - all functions of the autopilot active, including permanent helm to overcome effects of wind on the bow.
- *Radionav Interface* "lo" - cross-track error sampled every 60 seconds.

The setting on the yaw control would have caused unnecessary rudder movement. It was set incorrectly for the fairly rough sea conditions that prevailed.

The rudder control setting was very low and could have seriously affected the vessel's ability to maintain her track. Strong wind and tide were acting on the port bow and forcing the vessel off track to the north. A ½° of helm for every 1° of heading offset may not have been enough to overcome these forces. That the interface was set on low resolution ("lo") meant the unit would have been slow to detect the growing cross-track error, and it would have also been hampered by the rudder restriction in applying corrective action.

In the course of the investigation the MAIB was told that the operations manual for the autopilot was difficult to understand. A copy of the Navitron NT921 Installation and Operations Manual was studied and considered to be poorly laid out and difficult to follow.

It is possible that these factors combined to allow the vessel to track to the north of the planned route where she grounded, despite F2's attempts to alter the heading to port.

2.5 The Cause of the Grounding

Due to lack of substantive evidence it is impossible to come to a firm conclusion on the reasons why use of the track control system failed to ensure the vessel remained in safe water. Any one, or any combination of, the above hypotheses may have caused the vessel to be to the north of the required track by a sufficient amount to cause her to ground. However, irrespective of the reason why she did not track as planned, the fact that the position of the vessel was not closely monitored, by plotting on the chart or by use of the video plotter during the passage, meant that the fault went undiscovered. The MAIB believes, therefore, that this fundamental shortfall in the vessel's navigational management was the principal causal factor in the grounding.

Without confirmation of the vessel's position and her track made good, F2 did not become sufficiently concerned to call F1 or the skipper until grounding was imminent. From previous experience he knew that the course would take the vessel close to Peninnis Head, and he had suspected he would have to alter course to port to compensate for a northerly drift. Until immediately before the grounding, he probably remained confident that the course was a safe one because, when he could see it, Peninnis Head light appeared on the starboard bow. However, the light itself is sited about 200m inland from the end of the headland where the vessel eventually grounded.

2.6 Fatigue

Although the evidence suggests that fatigue was not a factor in the accident, the possibility that F2's performance was affected by drowsiness cannot be ignored. Whenever a single watchkeeper is permitted to keep a watch at night, sitting in a comfortable chair, there is a risk that he will either fall asleep or become drowsy. A watch alarm will not ensure that the watchkeeper is alert. Under these circumstances it is possible that wind and tide combined to reduce *Rachel Harvey*'s ability to

maintain the track with the rudder setting on "1", and she drifted off to the north, unbeknown to the watchkeeper.

2.7 The Evacuation

2.7.1 Structure and equipment impeding escape

The canvas awning and tubular steel framework around the main deck **(photograph 2)**, particularly around the after deck, might have impeded Andrew Dyson's escape. The fact that his body floated to the surface indicates he was close to successfully getting clear of the vessel. The escape route from the cabin was made much more complicated because the after deck was effectively caged-in.

2.7.2 Distress messages

Distress messages were transmitted in three ways: by DSC on the SSB radio, by VHF radio on channel 16, and by EPIRB. The coastguard received all these transmissions. The skipper is commended for activating the DSC distress signal and transmitting the VHF distress message; he did this rather than use the little time available to retrieve his lifejacket.

2.7.3 Liferaft

When the liferaft came to the surface it remained attached to the vessel by the painter. The depth of water at the position of the sinking was 24m.

The liferaft must have been inflated by tension on the painter. There is a weak link which is strong enough to inflate the liferaft, but will break after the liferaft has inflated if the wreck sinks to a sufficient depth. On *Rachel Harvey* it is apparent that the painter was long enough, in relation to the depth of water, to prevent the weak link parting during the initial stages.

During the rescue, the liferaft remained attached to the vessel, and therefore stationary. The crew were all carried away by the tide, except F4, who managed to pull himself back to the liferaft using the sea anchor rope. When F4 tried to paddle the liferaft he did not realise that it was still attached to the vessel; he believed the liferaft was being swept away from the people in the water. One crewman tried to swim to the liferaft, but was unsuccessful, as he was unable to swim faster than the tide.

The liferaft broke away from the wreck, possibly when the lifeboat came alongside to rescue F4.

The internal light in the liferaft did not come on automatically; this is the only item of safety equipment that did not function correctly. F4 used initiative and bent the canopy so the external light shone inside. He was then able to find the torch. The liferaft manufacturer is investigating the operation of the liferaft internal light.

The flares were used to good effect.

The fact that the liferaft stowage position had been sited in line with the main engine exhaust outlet was a poor design feature, which was a factor in the crew's inability to quickly release it.

2.7.4 Lifejackets

The lights on the lifejackets did not illuminate, because the crew did not activate them. *The Fishing Vessels (Safety Provisions) Rules 1975*, Rule 120, require that safety drills should be carried out every month; the States of Jersey Administration has implemented these Rules. The fact that no lifejacket lights were activated indicates that safety drills might not have been sufficiently comprehensive. The owner should ensure that comprehensive safety drills are carried out in future.

The skipper would have had ready access to a lifejacket if some had been stowed in the wheelhouse, in addition to the cabin.

SECTION 3 - CONCLUSIONS

3.1 Findings

1. New navigational instruments were fitted to *Rachel Harvey* in December 1998 [1.1]

2. *Rachel Harvey* had been laid up in Newlyn for five days prior to the accident due to a lack of crew [1.1]

3. *Rachel Harvey* had left Newlyn in the late morning of the day of the accident. She had then hauled, rebaited and shot about 600 pots during the afternoon before starting a passage to St Mary's at 1900. [1.2]

4. The skipper set-up and made sure that the track control system was operating before handing over to the first watchkeeper. [1.2]

5. F2 took over the watch at about 2010. [1.2]

6. F2 monitored the navigation by observing the radars. [1.2]

7. The vessel was yawing in the moderate to rough sea conditions. The south-westerly wind of force 7 was on the port bow. The visibility was poor in rain showers. [1.2]

8. F2 tried to alter the vessel's heading by turning the course setter knob on the autopilot. [1.2]

9. *Rachel Harvey* grounded at the extremity of Peninnis Head [1.2]

10. The vessel sank within two to three minutes of the grounding. [1.2]

11. All of the surviving crew were able to get off the vessel and all but one had lifejackets. [1.2]

12 Only one of the crew was able to board the liferaft; the others were carried away by the tidal stream. [1.2]

13. Some of the crew had not undergone training in sea survival, fire-fighting and first-aid. [1.3, 1.4]

14 The owners had started to carry out risk assessments for the operation of the vessels in their fleet. [1.5]

15. The wheelhouse was well equipped with modern instrumentation. [1.6]

16. The vessel's intended course was not plotted on the chart nor on the video recorder.

17. *Rachel Harvey* was correctly fitted with the safety equipment required by law. [1.7]

18. Distress messages were transmitted in three ways: by DSC, by VHF radio on channel 16, and by EPIRB. The coastguard received all transmissions. [2.7.2]

19. Only those of the crew who were considered competent by the skipper were permitted to keep a navigational watch. [1.9]

20. The track control system was used extensively by the skipper when the vessel was on passage. [1.9]

21. There is no evidence to suggest fatigue, drugs or alcohol were factors in the accident. [1.11]

22. Neither the owner nor the skipper kept proper records concerning the crew's qualifications and training. [2.2]

22. If Andrew Dyson had undertaken the course in basic survival at sea it may have saved his life. [2.2]

23. F2 had neither enough fundamental knowledge, nor sufficient training, to keep a safe navigational watch on *Rachel Harvey*. [2.3]

24. Because it was impossible to recover information from *Rachel Harvey*'s instruments to substantiate the witness evidence, many of the factors which led to the grounding will never be known. [2.4]

25. The Navitron autopilot's operations manual was found to be poorly laid out and difficult to understand. [2.4]

26. The tubular steel framework, which surrounded the after deck, impeded the escape of crew members as the vessel was sinking. [2.7.1]

27. To the skipper's credit, distress messages were transmitted successfully by three different methods. [2.7.2]

28. Initially the liferaft remained attached to the vessel while the crew in the water were swept away by the tide. [2.7.3]

29. The crew did not activate their lifejacket lights. [2.7.4]

3.2 Causes

3.2.1 The Immediate Cause

The cause of the grounding cannot be established beyond doubt due to a lack of substantive evidence. However, in broad terms, the grounding occurred due to poor navigational management and an over-reliance on the automatic track control system. [2.4, 2.5]

3.2.2 Underlying Causes

The watchkeeper lacked training in the operation of the bridge equipment. [2.3]

The watchkeeper did not know the vessel was being controlled by a track control system. [2.3]

The watchkeeper lacked the fundamental knowledge necessary to navigate safely. [2.3]

The skipper did not ensure that all his watchkeepers knew and understood the vessel's navigational equipment. [1.10, 2.2, 2.3]

The skipper relied too heavily on the track control system to keep the vessel in safe water. [2.5]

The skipper did not ensure that all the watchkeepers were competent to keep a safe navigational watch. [2.3]

SECTION 4 - RECOMMENDATIONS

On 10 November 1999 the MAIB issued Safety Bulletin 3/99 which included the following safety recommendations arising from this accident:

1. Owners and skippers are reminded that a track control system, unlike a video plotter or positions plotted on a chart, does not give a continuous visual indication of the vessel's position relative to the required track. It is essential to establish that clear water exists between the vessel's start position and the waypoint to which it is heading. While on passage and being steered automatically, the vessel's actual position must be checked by some reliable alternative means to ensure the projected track is safe. Such checks will alert the watchkeeper if he is standing into danger.

2. Modern technology has an important part to play in the safe navigation of vessels but, in untrained hands, it can lead to disaster. System handbooks are often difficult to understand. Hands-on training is most strongly recommended for watchkeepers to ensure they can use the equipment correctly, know its limitations and, above all, be familiar with the procedure to be used to override it to alter course.

3. Track control systems should never be used in confined waters or when operating in close company of other vessels.

4. A track control system will relieve the watchkeeper of certain routine tasks, but **NEVER** his primary responsibility of maintaining a proper lookout.

5. The Maritime and Coastguard Agency has issued a useful Guidance Note (MGN) 84(F) on navigational safety. Watchkeeping fishermen who may not be familiar with this document and its advice for keeping a safe navigational watch should read it carefully. It addresses over-reliance on the use of electronic navigation systems.

The following are additional recommendations

The States of Jersey Administration is recommended to:

1. Implement basic safety training regulations for fishing vessel crews as soon as possible.

Navitron Systems Ltd is recommended to:

2. Consider redesigning its operations manual for the NT 921 autopilot.

The Owner, W Harvey and Sons Ltd, is recommended to:

3. Ensure comprehensive safety drills are carried out at monthly intervals on board its vessels.

Glossary of Terms Used

Autopilot	-	an instrument that steers a vessel on a set compass heading
Cross-track error	-	deviation from the intended track
"Mayday"	-	international distress message transmitted by voice
Painter	-	a line attaching the liferaft to the vessel, via a weak link
Podium	-	the platform at the aft end above the main deck, used mainly as a store for pots, dan buoys, etc
Senhouse slip	-	a device used for securing the liferaft canister; releasing the slip allows manual deployment of the liferaft
Track Control System	-	a system that automatically maintains a vessel on a predetermined track
Vivier tank	-	a tank designed for storing live shellfish