

Class B Accident Report

Aratere & Kent Close Quarters

Wellington Harbour on 1
October 2004

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REPORT NO: 04 3559

ARATERE & KENT – CLOSE QUARTERS

A close quarters situation developed between the passenger vessel *Aratere* and the coastal trader *Kent* during an overtaking manoeuvre in Wellington Harbour on 1 October 2004.



Details of Vessel, Owner & Management, Classification, Navigational Equipment, Manning & Crew:

Name of Vessel:	<i>Aratere</i>
Vessel Type:	SOLAS Passenger Ship
Port of Registry:	Wellington
Flag:	New Zealand
IMO No.:	9174828
MSA No.:	123845
Official No.:	876418
Built:	1998
Construction Material:	Steel
Length Overall (m):	150
Registered Breadth (m):	20.25
Gross Tonnage:	12 596
Net Tonnage:	3 779
Propulsion:	4 x Wartsila medium speed diesel generator sets, each developing 3 300kW at 750 RPM. These deliver electrical power to a motor on each of two shafts.
Normal Sea Speed:	19.2 knots
Rudders:	Twin high-lift hinged rudders capable of independent operation.
Owner Details	
Owner:	Toll (NZ) Consolidated Ltd
Operator:	Interislander
Class	
Classification Society:	Det Norske Veritas
Master's Details	

The Master of *Aratere* holds a Master Foreign Going Certificate of Competency, obtained in 1980. He holds pilotage exemption certificates for Wellington and Marlborough Sounds, which were obtained approximately 10 years ago. He attended a Bridge Resource Management Course in 2000, and an Advanced Marine Pilot Training Course in 2002.

He had 10 years sea experience before joining Interislander in 1981. He was promoted to the position of master in 1994 and has commanded *Aratere* for three years. He has completed over 3 000 trips in and out of Wellington Harbour as a watch officer and a similar number as Master.

- **Chief Officer's Details**

The Chief Officer of *Aratere* holds a Master Foreign Going Certificate of Competency, obtained in 2003. He holds pilotage exemption certificates for Wellington and Marlborough Sounds, which were obtained in 2003. He attended a Bridge Resource Management Course in 2000, and an Advanced Marine Pilot Training Course in February 2004. He has 34 years experience at sea and has worked for Interislander since 1994. In that time he has been in and out of Wellington approximately 4 000 times as a watch keeping officer.

- **Quartermaster's Details**

The Quartermaster of *Aratere* holds a Local Limit Launchmaster Certificate of Competency, obtained in 1996; a Certificate of Competency as an Able-bodied Seaman, obtained in 1998 and a Certificate of Competency as an Integrated Rating, obtained in 2002. He has worked on *Aratere* since 1998.

- **Navigational Equipment**

Radar: 2 x Norcontrol 3cm & 10cm

Navigation System: Norcontrol integrated ship control system, incorporating ARPA (Automatic Radar Plotting Aid, ECDIS (Electronic Chart Display Information System) and AIS (Automatic Identification System).

- **Passengers & Crew**

At the time of the incident *Aratere* had 3 passengers and 27 crew on board.

Details of Vessel, Owner & Management, Classification, Navigational Equipment, Manning & Crew:

Name of Vessel:	<i>Kent</i>
Vessel Type:	Coastal Trader
Port of Registry:	Castletown Bere
IMO No.:	7627950
Official No.:	379439
Built:	1977
Construction Material:	Steel
Length Overall (m):	122.95
Registered Breadth (m):	21.85
Gross Tonnage:	6 862
Net Tonnage:	2 058
Propulsion:	2 x V12PA6 Pielstick engines, twin out-turning propellers.
Normal Sea Speed:	15 knots
Rudders:	Twin, semi balanced

- **Owner Details**

Owner: Strait Shipping Ltd

- **Class**

Classification Society: Lloyds Register of Shipping

- **Master's Details**

The Master of *Kent* holds a Master Foreign Going Certificate of Competency, obtained in 1989. He holds pilotage exemption certificates for Wellington, Marlborough Sounds and Nelson, which were obtained approximately 10 years ago. He attended a Bridge Resource Management Course in Auckland in 2001. He has 25 years sea experience with the Union Steam Ship Company of New Zealand Limited, and has served with Strait Shipping since 1992. He was

promoted to Master in 1996 and has been Master of *Kent* since 2001. He has completed over 3 000 trips in and out of Wellington Harbour

- **Third Officer's Details**

The Third Officer of *Kent* holds a Master Foreign Going Certificate of Competency, obtained in 1989. He attended a Bridge Resource Management course in 2001. He had 10 years experience with the Shipping Corporation before being employed as Third Officer on *Kent* in 2002.

- **Navigational Equipment**

Radar: Decca Bridge Master E 10cm ARPA
Decca Bridge Master 3cm

Depth Sounder: Furuno Colour Video Sounder FCV-550/551
Furuno Sounder-Recorder-Type FE-D 814A

GPS/Satellite Navigation: Leica MZ 41GPS Navigator

Electronic Chart Plotter: Endeavour 5 Navigator

- **Passengers & Crew**

At the time of the incident *Kent* had 12 passengers, 2 stock drivers and 15 crew on board.

Accident Investigator: Ian Webb

NARRATIVE

At approximately 0553 hours New Zealand Standard Time (NZST) on 1 October 2004, *Kent* passed Barrett Reef Buoy, situated at the entrance to Wellington Harbour, inward bound to Wellington. The vessel was on the line of the leads, steering a course of 016°(T) at a speed of approximately 14 knots over the ground. *Aratere* was a little over one mile astern of *Kent* and following her into the Harbour at a speed of approximately 19 knots over the ground.

The weather was a light northerly breeze of 10 knots, fine and clear. It was forty seven minutes before predicted high water springs and charted information indicates a flood tide of approximately 0.1 knots was running at the time. *Kent* was being steered by automatic pilot. The Master and Watchkeeping Officer were on the bridge, but there was no helmsman present. The Master monitored the automatic steering.



PHOTOGRAPH 1 - BRIDGE OF *KENT*

Aratere was being steered manually by a Quartermaster as a result of a recent Maritime Safety Authority of New Zealand (MSA) restriction prohibiting the use of her automatic computer controlled navigation tracking system within harbour limits. The Quartermaster had steered the vessel on about five occasions since he joined the vessel in 1998. The Master and Chief Officer were also on the bridge.

At approximately 0556 hours, when *Kent* was approximately half way between Barrett Reef Buoy and Steeple Beacon, *Aratere* called her on Very High Frequency

(VHF) channel 14 and requested permission to overtake on **Kent's** starboard side. This was agreed to.

At approximately 0559 hours, shortly before passing Steeple Beacon (*See Figure 1 – Chart Extract of Wellington Harbour, showing a plot of Aratere and Kent, based on VDR [Voyage Data Recorder] information from both vessels*), **Kent** altered course to port onto a course of 006°(T), moving towards the western side of the navigable channel to give **Aratere** more sea room (*See chart extract for Kent positions 06:03:09 to 06:05:07*).

At 0608 hours, when **Kent** was just north of the Rear Lead (*See chart extract and Figure 2*), **Aratere** passed abeam of **Kent** at a distance of 1.4 cables (260 metres) on her starboard side. **Kent** still had approximately two minutes to run to her next designated alter course position, which is marked by the transit of Point Halswell and Point Jerningham (*See chart extract*). **Kent** was west of her normal inbound track by about 1.4 cables. **Aratere** was on her normal inbound track as **Kent** had allowed sufficient sea room not to require a deviation of her course. **Aratere** was steering a course of 005°(T) (*See chart extract, positions for 06:08:09*).

The Master of **Aratere**, in his interview with the MSA, stated they passed **Kent** about half way between Falcon Shoals Beacon and the Rear Lead (*See chart extract*), approximately 2 cables south of the Rear Lead. This is contrary to the VDR evidence, which shows the two vessels were abeam of each other when approximately 4 cables north of the Rear Lead. The Master of **Aratere** confirmed his vessel was within a few metres of her programmed track (*See chart extract, positions for 06:08:09*).

At 0609 hours, when the stern of **Aratere** was just forward of **Kent's** bow and **Aratere** was pulling away at a relative speed of 5 knots, **Aratere** commenced turning to port. The Quartermaster was instructed to steer 345°(T), an alteration of 20 degrees to port from her previous course of 005°(T). The recommended wheel over position on this leg of a vessel's inward passage (which was used by **Kent**) is when Point Halswell and Point Jerningham are in line (*See chart extract*). The Master of **Aratere** stated in his interview with the MSA Investigator, a week after the incident, that **Aratere** was two cables north of this transit before he commenced altering course to port. He stated he had delayed making the alteration because of the presence of **Kent**, but did not wait until **Kent** altered to port, which occurred at 0610 hours, as he did not wish to approach any closer to Somes Island (*See chart extract*), which was ahead of him.

When **Aratere** made the alteration of course to port, VDR information indicates the 10 metre sounding contour, to the south of Somes Island, was situated 1.38 miles distant. At a speed of 19 knots, this would have taken **Aratere** four minutes to cover.

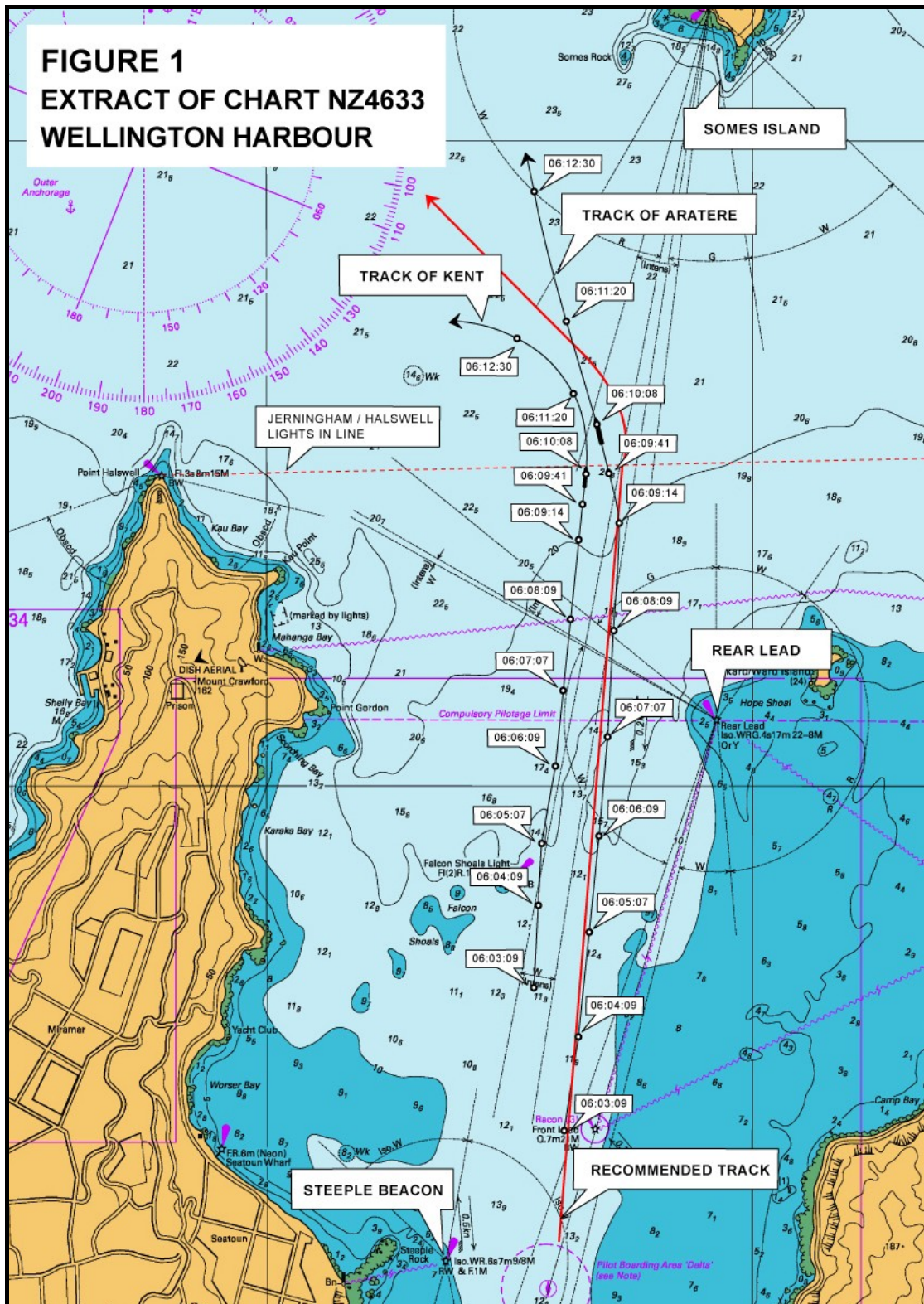


FIGURE 1 – CHART EXTRACT

If *Aratere* had delayed altering course until *Kent* had started to alter, after reaching the recommended wheel over position on the Halswell/Jerningham transit line, *Aratere* would have had a distance to run to the 10 metre contour south of Somes Island of 1.06 miles, which would have taken just over 3 minutes to cover at a speed of 19 knots.

However, reference to the radar images taken from *Aratere*'s VDR information shows she was in fact 1.8 cables south (*MSA emphasis*) of the Jerningham/Halswell transit line when the above alteration of course to port became apparent on the radar images (*See chart extract, position of Aratere at 06:09:14*). At the time when the Master altered course 20° towards *Kent*, the stern of *Aratere* was just forward and some 260 metres to starboard of *Kent*'s bow. This occurred one minute before *Kent* reached the recommended wheel over position.

The Master of *Aratere* stated in his evidence to the MSA Investigator that *Kent* was bearing four points (45°) abaft the beam of *Aratere* and three cables distant when he made the alteration. This distance was measured from the radar range rings. However, the VDR information shows that *Kent* was in fact 30° abaft the beam and 1.2 cables (222 metres) distant (*MSA emphasis*), measured from bridge to bridge. *Aratere* has an overall length of 150 metres.

Aratere did not advise *Kent* of her manoeuvre by VHF and *Aratere* did not give a whistle signal to indicate her manoeuvre to port, as required by New Zealand Maritime Rules Part 22.34 [Rule 34 of the International Regulations for Preventing Collisions at Sea (Colregs)]. The sounding of such a signal may have alerted the Master of *Kent* of *Aratere*'s intended alteration before the alteration became visually apparent. Although the turn to port was for navigational reasons, *Aratere* was still manoeuvring under the New Zealand Maritime Rules Part 22.13(4)(b) [Rule 13 (d) of the Colregs], as she was not “finally past and clear” of *Kent*.

The Master of *Aratere* stated that he looked astern before altering course. The Chief Officer stated he was standing on the port side of the bridge looking astern. The Chief Officer did not challenge the Master's decision to alter course at that time.

The Master of *Kent*, who was concerned about *Aratere* altering course to port across the bow of his vessel, immediately sounded six short and rapid blasts on the ship's whistle in accordance with Collision Prevention Rule Part 22.34(4) [Rule 34 (d) of the Colregs]. He took no evasive action. The Master of *Aratere* stated that he heard the whistle signal given by *Kent* about 10 seconds after *Aratere* commenced altering course to port.

The Master and Third Officer of *Kent* saw officers on the bridge of *Aratere* running across to the port side of the bridge to look at them. According to the Master of *Kent*, it was at this point that *Aratere* veered to starboard. However the Master and Chief Officer of *Aratere* dispute this version of events. Moreover, the alleged alteration back to starboard is not confirmed by VDR data taken from *Aratere* and is contrary to the evidence of the Quartermaster of *Aratere*.

Without any prior advice from the Master of *Aratere* as to his intentions, the Master of *Kent* would have been expecting *Aratere* to make an alteration of 55° to port, not

the 20° that was ordered by the Master of *Aratere*. This is because the recommended course for the next leg of the inbound passage to Wellington, after reaching the Halswell/Jerningham transit, is 310°(T), equating to a course alteration of 55 degrees from the previous course of 005°(T). The Master of *Aratere* stated that he restricted the course alteration to 345°(T), because of the proximity of *Kent*. The Chief Officer of *Aratere* noted that the vessel's heading was passing 349°(T), an alteration of 16° to port of her previous heading, when he heard *Kent* give the whistle signal. The VDR data shows *Aratere* remained on a course of 345°(T) until 0613 hours when she altered course towards her berth at Wellington.

The Master of *Kent* estimated that the closest point of approach (CPA) to *Aratere* was 100 metres. The Master of *Aratere* estimated that the CPA was about 3 cables (555 metres). It was his evidence that the alteration to port would not take him across the bow of *Kent* and that his superior speed made the situation safe.

The chart plot shows that the CPA, between the bow of *Kent* and the stern of *Aratere*, was 125 metres. Information from the shore-based surveillance radar at Beacon Hill Signal Station, situated at the entrance to Wellington Harbour, indicates that the separation was 137 metres.

Following the whistle signal given by *Kent*, *Aratere* called *Kent* on VHF and advised they were steering 345°(T). *Kent* replied that *Aratere* was too close. *Kent* then called Beacon Hill Signal Station and asked if they still had them on radar and whether they were recording the events. The Signal Station replied in the affirmative.

Whilst both vessels had acquired each other on their respective ARPA radars, the acquisition was lost by the radars of both vessels due to their close proximity to each other.

Both vessels continued on passage to their respective berths at Wellington without further incident.

FINDINGS

1.1 Wellington Harbour Recommended Tracks

There are recommended tracks for entering and leaving Wellington Harbour. They are designed to give, so far as is possible, safe separation between inward and outward bound vessels. They have clear points or transits to steer for on each course leg, and for the wheel over positions to alter course from one course leg to the next. All pilots and pilot exempt masters are examined on their knowledge of these recommended tracks.

The Port of Wellington Exemption Manual states in part for inbound traffic:

“Continue with the leads in line (or to the starboard side of the channel if meeting outward traffic) until Steeple Beacon is abeam. Somes Island light will now be green. Steer 005° with Somes Island fine to starboard until Point Jerningham is in transit with Point Halswell.

When in this position alter to 310° or 315° to put Mount Kaukau TV mast (41° 14.1'S 174° 46.77'E) ahead and Ward Island astern.”

The Jerningham/Halswell transit denotes the wheel over position. The alteration in course to put the Mount Kaukau TV mast ahead is approximately 50°, and the track taken up by the vessel when the TV mast is ahead, will depend on the amount of helm applied and the rate of turn. This is recognised in the manual by giving the course as “310° or 315°”. The actual track is not critical in this part of the harbour because of the amount of sea room available. The wheel over position depicted on *Aratere’s* passage plan and ECDIS was 6 cables south of this transit (*See Radar Image from Aratere VDR*). *Kent* was using the recommended wheel over position of the two points, Jerningham and Halswell, in line.

1.2 Proposed Changes to The Port of Wellington Exemption Manual

Following circulation of the draft report on this incident to interested parties, the Marine Manager/Chief Pilot of Centreport Wellington stated:

“I admit that there is some actual confusion over the user’s interpretation of the content of the above. Although it clearly says “When in position alter to 310° or 315°”, good navigational practice provides for advance (the distance travelled in the direction of the previous course after the rudder is put over to come onto a new course) in making any turn. This incident and report has focused my attention on this wording and I undertake to review this with the (Wellington Regional Council) Harbourmaster to make allowance for and to provide for the notion of different wheel over positions along the track which is required to keep vessels with different turn characteristics ultimately to the required tracks.”

“We will also reconsider our terminology regarding ‘recommended’ and may change this to read (as an example) “strongly recommended to keep to the tracks described for the reasons...etc”.

The above represents a shift in navigation policy from the designated wheel over positions, set out in the Port of Wellington Exemption Manual, to designated tracks. However, at the time of the incident, and until the review of the Exemption Manual is completed and promulgated, the current documentation refers to wheel over positions. This has the possibility of causing confusion, as occurred in the incident under review, between the master of one vessel (*Kent*) adhering to the recommended wheel over positions and the master of the other vessel (*Aratere*) following specific tracks, with earlier wheel over positions, which allow for rate of turn and advance.

1.3 *Aratere’s* Alter Course Position

From his evidence, it seems that the Master of *Aratere* was not aware that the wheel over position on the vessel’s programmed track was 6 cables south of the recommended wheel over position. He was expecting *Kent* to alter course onto the next leg at about the same time as he altered course. He was not aware that he had in fact altered course early, in relation to the recommended wheel over position, and that *Kent* was standing on until she reached the Halswell/Jerningham transit in accordance with the exemption manual.

The Master of *Aratere* stated that he was 2 cables north of the Halswell/Jerningham transit before he altered course to port, whereas the VDR information shows he was 1.8 cables south of it when the alteration became evident on the VDR radar images.

The Master of *Aratere* thought he was 3 cables clear of *Kent* and wished to alter to port so as not to approach Some’s Island too closely. At the time of the alteration of course to port, *Aratere* was about 125 metres off *Kent* (stern to bow) and 1.38 miles from the 10 metre contour south of Some’s Island.

The above indicates that the Master of *Aratere* had poor situational awareness. He was relying solely on the information shown on the radar display and was not integrating this with the excellent visual references available. *In commenting on the draft report the Master denied that he had poor situational awareness and said that he was keeping a good visual lookout.* Also, the Master was not receiving any verbal information from the Chief Officer, such as the position of *Kent* relative to *Aratere*, contrary to established Bridge Resource Management (BRM) techniques.

1.4 Formal Review of Pilot Exempt Masters

Centreport Limited, who employ Wellington Pilots, conduct an annual formal review, or audit, of their individual pilots. This is carried out by one of their unrestricted pilots using a check list. The procedure is designed to preclude the possibility of a pilot developing bad habits. Centreport Limited is currently giving consideration to conducting periodic reviews using an external auditor, to ensure that the group as a whole does not develop common bad habits.

New Zealand Maritime Rules Part 90 – Pilotage, does not address the issue of auditing pilots or exempt masters. Nor is there any local or national structure in place for the Maritime Safety Authority of New Zealand, or Harbourmaster, to periodically audit pilot exempt masters. If such a structure had been in place then it is reasonable to expect that the difference in planned and recommended wheel over positions would have been detected and rectified. Interislander did not have an internal peer review procedure in place at the time of this incident.

Strait Shipping, in responding to the draft report, stated: “As part of our commitment to ensure ongoing excellence in our safety performance we will consider introducing an annual review of bridge procedures for each exempt Master either through internal procedure or by an outside agency”.

1.5 Collision Prevention Rules

New Zealand **Maritime Rule Part 22.13** [Rule 13 of the Colregs)] states:

“22.13 Overtaking

1. Despite anything contained in subsections 1 and 2 of section 1 of this Part, any vessel overtaking any other must keep out of the way of the vessel being overtaken.
2. A vessel will be considered to be overtaking when coming up to another vessel from a direction of more than 22.5 degrees abaft its beam, that is, in such a position where at night the sternlight, but neither of the sidelights of the vessel being overtaken, would be visible.
3. When a vessel is in doubt as to whether it is overtaking another, it must assume that it is and act accordingly.
4. Any subsequent alteration of bearing between the two vessels-
 - (a) does not make the overtaking vessel a crossing vessel within the meaning of this Part; and
 - (b) does not relieve the overtaking vessel of its duty to keep clear of the overtaken vessel until it is finally past and clear (*MSA emphasis*).”

The Master of *Aratere* failed to fulfil his obligations under Collision Prevention Rule Part 22.13 (4) (b) [Rule 13 (d) of the Colregs], in that he did not keep clear of *Kent* until finally past and clear.

1.6 Navigation Practice On *Aratere*

The following extracts from the International Chamber of Shipping Bridge Procedures Guide are pertinent to this incident:

“3.3. Navigation

3.3.1 General principals

3.3.1.2 Monitoring the progress of the ship

Good navigational practice demands that the OOW (Officer On Watch):

- Understands the capabilities and limitations of the navigational aids and systems being used and continually monitors their performance;
- Uses the echo sounder to monitor changes in water depth;
- Uses dead reckoning techniques to check position fixes;
- Cross checks position fixes using independent sources of information: this is particularly important when electronic position-fixing systems such as GPS or Loran C are used as the primary means of fixing the position of the ship;
- Uses visual navigation aids to support electronic position-fixing methods i.e. landmarks in coastal areas and celestial navigation in open waters;
- Does not become over reliant on automated navigational equipment, including electronic chart systems, thereby failing to make proper navigational use of visual information.”

“Navigation with a pilot on board

3.3.3.4 Monitoring the pilotage

The safe progress of the ship along the planned tracks should be closely monitored at all times. This will include regularly fixing the position of the ship, particularly after each course alteration, and monitoring underkeel clearance.

Verbal orders from the pilot also need to be checked to confirm that they have been correctly carried out. This will include monitoring both the rudder angle and RPM indicators when helm and engine orders are given.”

Aratere was in pilotage waters, navigating in close proximity to the shore and to another vessel. In such circumstances adherence to sound navigational practice and procedures was of paramount importance. Neither vessel had a pilot on board; the masters of both vessels were pilot exempt and were acting as pilots.

From the evidence it is clear that *Aratere*'s Master was relying on the information given on the radar display and was not additionally using the visual references available for navigation in Wellington Harbour. He was relying solely on a device that should be regarded only as an aid to navigation.

1.7 ISM (International Ship Management) Audits

Internationally, ISM audits are generally conducted by the relevant classification society. This was the case in New Zealand until April 2004 when the MSA took over ISM auditing from classification societies, as the MSA was not satisfied that ISM audits were being conducted properly.

An ISM auditor will check the vessels documentation, passage planning, record keeping, manuals and procedures. They will interview a selection of crew members to ensure that they are aware of their responsibilities under the procedures, and are following them. If nothing untoward comes to light in the checks and interviews the audit will go no further. A Safety Management Certificate (SMC) was issued by the MSA to *Aratere* on 16th June 2004, valid until 14th June 2009. The SMC was issued following an ISM audit carried out by the MSA that failed to discover the poor navigational practices on board *Aratere*. The auditor did not sail on the vessel to observe operation of the vessel at sea.

1.8 Flag State Inspections

Flag State Inspections are spot inspections carried out by the MSA of SOLAS (International Convention for the Safety of Life at Sea) vessels registered in New Zealand. Port State Inspections are carried out by the MSA of SOLAS vessels registered offshore. Both types of inspections are similar in scope and thoroughness, thereby presenting a level playing field. Inspectors do not sail on vessels to observe their operation at sea. In the opinion of the Investigator this is a failing in the inspection procedures.

Flag State Inspections cover documentation, charts, publications, qualifications and a survey of emergency equipment including life saving apparatus, fire fighting apparatus and pollution prevention equipment.

If an inspector uncovers any deficiencies that cause him concern this would invite a more detailed inspection, which could include functional aspects of the vessel's operation. The inspections are carried out in port and there are no local or international requirements to monitor practices at sea. However, other administrations do monitor practices at sea. The last Flag State Inspection of *Aratere* was conducted by the MSA on 5 November 2004, in Picton. No deficiencies were noted on that date. The inspector did not sail on the vessel.

1.9 Bridge Resource Management (BRM)

BRM techniques are intended to reduce the potential for one man error. A vessel's passage from berth to berth should be carefully planned and all members of the bridge team, including the helmsman, should be aware of that plan; should do their part to ensure that the plan is adhered to and should challenge the master or officer of the watch if they observe the vessel is deviating from the plan.

Planning will fail if a suddenly presented dangerous situation requires a violent emergency manoeuvre. Training, contingency planning and experience can handle such a situation, but the vessel is more vulnerable to human error and misjudgement as there is no time to plan or discuss the manoeuvre with the bridge team. A deviation from a planned route to avoid a specific situation, such as a collision avoidance manoeuvre in ordinary circumstances, or an overtaking manoeuvre, does not fall into the above category. In this situation the Master should involve the whole bridge team in developing a plan for the manoeuvre.

BRM applies between vessels when they are manoeuvring in close proximity. The Master of *Aratere* informed *Kent* of his intention to overtake well before the event. This gave *Kent* the opportunity to challenge *Aratere* if they thought necessary, or to modify their passage plan in a controlled manner to accommodate the situation. *Kent* agreed to the manoeuvre and moved to port of their track to provide *Aratere* more sea room. Each vessel clearly understood the intentions of the other as regards the initial passing manoeuvre.

At the time *Aratere* altered course to port across *Kent's* bow, the Chief Officer of *Aratere* reported that he was standing on the port side of the bridge and observing

Kent. However, he did not challenge the Master's decision to alter course to port, having regard to the close proximity of **Kent**. The Chief Officer did not volunteer information on the progress of **Aratere** as she passed **Kent** and was silent regarding the position of the stern of **Aratere** being laterally only just past the bow of **Kent**, when the alteration of course to port was made.

The Master did not advise the bridge team that he was about to alter course, thereby giving them no opportunity to consider his decision and challenge it prior to the helm order being given. They were put in the position of having to react to a suddenly presented situation. Notwithstanding BRM principles, the ordinary practice of good seamanship demands that the Chief Officer challenge the Master when a helm order is given which will result in a situation that is in contravention of the Collision Prevention Rules.

Similarly, the Master of **Aratere** did not inform **Kent** by VHF that he was about to alter course to port, nor did he give the whistle signal of two short blasts to indicate this manoeuvre in accordance with New Zealand Maritime Rules Part 22.34 (1) [Rule 34 (a) of the Colregs]. The Master of **Kent** was unable to challenge the decision and was suddenly presented with a situation that caused him significant concern.

A close quarters situation between **The Lynx**, operated by Interislander, and **Suilven**, owned and operated by Strait Shipping Limited, occurred on 23 December, 2002. The Maritime Safety Authority investigation report concluded in part:

“If the basic techniques of Bridge Resource Management (BRM) had been followed in this incident, including the establishment of an open communication style on the bridge that encouraged challenge and the appropriate response from the whole bridge team, it is unlikely that this close quarters situation would have arisen. Accordingly, it is recommended that the management of The Interisland Line critically review whether the Master of **The Lynx** and other relevant personnel should be required to undertake a refresher course in BRM training.”

Interislander responded as follows:

“The Interisland Line have since initiated further BRM training of some of their Ship's officers and masters and are taking appropriate measures to enforce the principles of BRM.”

On 5 July 2003 a collision occurred between **Aratere** and **San Domenico**. The Maritime Safety Authority Investigator noted the following under “Contributing Factors”:

“At the time of the accident the Night Master of *Aratere* had completed a Bridge Resource Management (BRM) course. The Second Mate had completed a Bridge Team-Building module but not a BRM course. Amongst other things, BRM calls for the need for contingency planning in the event of something unforeseen happening and the need for an exchange of information between all members of the bridge team that is based upon a shared mental concept of the overall plan. This did not occur in this instance.”

The Investigator in that case attributed causes of the accident including the following:

“Poor communication and passage planning between *Aratere* and *Arahura* which resulted in the Night Master of *Aratere* believing he had insufficient room to turn off the ferry terminal.

Poor Bridge Resource Management on *Aratere* during the final approach to the berth.”

1.10 Failures on the bridge of *Aratere*

The Master’s decision to alter course across the bow of *Kent* was inappropriate to the circumstances. The Master is highly qualified and experienced. Thus, the decision was an error of judgement rather than a result of lack of knowledge or skill. There were several failures on the bridge of *Aratere* that resulted in this error being made:

- **Active Failures**

Lowle¹ reports a definition of active failure:

“Active failures are the failures close to the accident event that defeat the controls and defences on the hazard and target trajectories. In many cases these are the actions of people i.e. unsafe acts.”

- The Master of *Aratere* did not visually check the situation properly before giving the order to alter course and assumed that he was past and clear of *Kent*.
- The Master of *Aratere* assumed that *Kent* would alter course at or about the same wheel over position that he used.
- The Master of *Aratere* did not discuss his plan for the manoeuvre, including his intention to alter course, with the bridge team.
- The Master of *Aratere* did not advise *Kent* that he was about to alter course either by VHF or by sound signal.

¹ Captain M. Lowle *Getting to Grips with the Human Factor*. UK P&I Club

- The Chief Officer of *Aratere*, who was visually observing the situation, did not keep the Master informed and did not challenge the Master's order to alter course.
- Courses were not drawn on paper charts and even basic beam bearing positions were not plotted on *Aratere*. There was over reliance on electronic means of navigation.

- **Latent Failures**

Lowle² reports a definition of latent failure:

“Latent failures are deficiencies or anomalies that create the preconditions that result in the creation of active failures. Management (the so-called policy or decision maker) decisions often involve the resolution of conflicting objectives. Decisions taken using the best information at the time may prove to be fallible with time. Also the future potential for adverse effects of decisions may not be fully appreciated or circumstances may change that alter their likelihood or magnitude”

- Procedures were not in place to monitor navigation practices, or to detect and avoid errors or deficiencies in navigational practice. The company's procedures did not provide a comprehensive guide to the standard of navigation required. Masters and officers have attended BRM courses and appreciate the principles of BRM but did not follow them properly. There were no effective procedures within the company to ensure that BRM principles are followed in the correct manner. ISM and Flag State Inspections were unlikely to pick up such failings in navigational practice as currently auditors and inspectors do not sail on the vessels.
- Organisation within the company allowed warning signs, highlighted in the *Aratere/San Domenico* accident and *The Lynx/Suilven* incident to be largely overlooked. Any action taken by Interislander as a result of these reports was inadequate and was not sufficiently followed up to ensure the desired effect was achieved.
- There was a lack of internal peer auditing and monitoring to ensure there was a fleet wide compliance with company procedures.

1.11 Safety Culture

Reason³ reports a definition of safety culture:

² Captain M. Lowle *Getting to Grips with the Human Factor*. UK P&I Club

³ Reason, J. *Managing the risks of organizational accidents*. Ashgate, Burlington USA, 1997.

“Shared values (what is important) and beliefs (how things work) that interact with an organization’s structures and control systems to produce behavioural norms (the way we do things around here)”.

Elements of this close quarters situation indicate the possibility of an underdeveloped safety culture in the company at the time the incident occurred namely:

- the non-use of BRM techniques for conducting the manoeuvre described in this report;
- the history of non-use of BRM techniques in other incidents;
- the non-use of paper charts (also evident in other incidents).

Given the facts of this incident, the MSA is not assured that the company has taken “appropriate measures to enforce the principles of BRM,” as recorded in the 2002 MSA investigation report on the incident between *The Lynx* and *Suilven*.

It should be noted that Toll (NZ) Consolidated Limited took over management of Interislander from Tranzrail Limited in March 2004, and there is evidence that significant changes in company procedures and culture are taking place. Such changes take time to formulate and bring into fruition.

1.12 Navigation Practice on Board *Kent*

The Master of *Kent* did not take avoiding action when *Aratere* altered course across his bow. Although *Aratere* was ahead and had superior speed, she was very close. A mechanical malfunction on *Aratere* could have immediately made the situation very dangerous. It may have been prudent for *Kent* to alter course and/or reduce speed to mitigate this danger. *In commenting on the draft report, the Master of Kent disagreed that avoiding action, on his part, was required.*

Courses were drawn on paper charts on the bridge of *Kent* but positions were not plotted. The vessel was navigated from the electronic chart display and cross checked by visual references, such as leading lines and transits.

The International Chamber of Shipping Bridge Procedures Guide paragraph 3.3.3.5 states:

“Monitoring the pilotage

The safe progress of the ship along the planned tracks should be closely monitored at all times. This will include regularly fixing the position of the ship, particularly after each course alteration, and monitoring underkeel clearance.”

It is normal practice, as a minimum, to plot beam bearing positions at each course alteration. Beam bearings, coupled with radar ranges or parallel indexing lines, obviate the necessity of plotting a position from a series of bearings or from GPS derived latitude and longitude co-ordinates.

1.13 Lack of Helmsman on the Bridge of *Kent*

Wellington Navigation and Safety Bylaw 6.2.1 states in part:

“The master shall ensure that while within Wellington Harbour:

automatic-steering pilot devices are not to be used, unless a helmsman is standing by in the immediate vicinity of the helm or wheel, otherwise the vessel is to be in the hand-steering mode;”

The Shorter Oxford English Dictionary defines “immediate” as:

“Of a person or thing in relation to another; not separated by any intervening agent or medium. Nearest, next or close in space or order.”

Although this incident occurred in Wellington Harbour, both vessels transit Queen Charlotte Sound to Picton, in the Marlborough Pilotage District, and both masters are pilot exempt for Picton. Thus, it is appropriate to consider the use of a helmsman in the Marlborough Pilotage District.

Marborough District Council Navigation Bylaw 3.5 (a) states:

“automatic steering ‘pilot’ devices, if fitted, are not to be used, unless a helmsman is standing by, to take over manual steering immediately on this being required, in the immediate vicinity of the helm or wheel.”

STCW Code A-VIII/2.35 states in part:

- “.1 the need to station a person to steer the ship and put the steering into manual control in good time to allow any potentially hazardous situation to be dealt with in a safe manner: and,
- .2 that with a ship under automatic steering it is highly dangerous to allow a situation to develop to the point where the officer in charge of the navigational watch is without assistance and has to break the continuity of look-out in order to take emergency action.”

The International Chamber of Shipping Bridge Procedure Guide - paragraph 3.4.2, states in part:

“In areas of high traffic density, in conditions of restricted visibility and in all other potentially hazardous situations a helmsman should be available on the bridge, ready at all times to take over steering control immediately.”

A reasonable interpretation of the above Wellington Navigation and Safety Bylaw, Marlborough District Council Navigation Bylaw, and the STCW Code (Standards of Training Certification and Watch-keeping) is that the helmsman on duty remains within the immediate environs of the helm and is capable of being summoned verbally to the helm without the use of a radio or telephone. The Bridge Procedure Guide states very clearly that the helmsman should be on the bridge. *Kent* did not have a helmsman on the bridge or standing by in the immediate vicinity of the wheel. A helmsman is a dedicated position and may not be filled by the master or the officer of the watch.

1.14 Lack of use of Echo Sounder on board *Kent*

Wellington Navigation and Safety Bylaw 6.2.2 states:

“While within Wellington Harbour all aids to navigation on board vessels, including but not limited to radar and depth recording devices, are to be in continuous operation and are fully utilised.”

Bridge Procedures Guide 3.3.1.2 above also refers.

The echo sounder on the *Kent* was not turned on.

1.15 Beacon Hill Communications Station

The Signal Station, operated by the Greater Wellington Regional Council and controlled by the local Harbourmaster, is situated near the summit of Beacon Hill, on the western side of the entrance channel to Wellington Harbour. It provides continuous communications and visual and radar surveillance of the channel and port approaches.

The Station operations manual states in part:

“Maintain a constant visual watch for any unusual occurrence that may affect the safety of any vessel (commercial or recreational), and for any vessel which is:

- standing into danger;
- manoeuvring in an erratic manner, or
- ignoring the Rules for Prevention of Collisions at Sea or the Navigation and Safety Bylaws.

Monitor the safe passage and conduct of all vessels passing through the harbour entrance and vessels within harbour limits.

Acquire all radar targets, which are vessels between Harbour Limits and Ward Island.”

The manual lacks clear instructions to the Signalmen to monitor vessels compliance with the recommended tracks, or to report instances of significant non-compliance to the Harbourmaster.

1.16 Reported Incidents of Close Quarters Situations Involving Interislander & Strait Shipping Vessels Since February 1999

Interislander

At the time of writing this report, there are twenty one reported incidents on record. They are broken down as follows:

- One under investigation.
- Fourteen involving vessels under 500 gross tonnes in pilotage waters. Seven of these incidents were considered very minor and were not the subject of an investigation. In all the remaining seven incidents the smaller vessel was found at fault for not observing the Collision Prevention Rules or Harbour Bylaws. In one of these incidents the master of *Aratere* was advised not to divert from the passage plan without permission from the Harbourmaster.
- Two involving vessels greater than 500 tonnes in pilotage waters. Poor communications were blamed for both incidents.
- Four involving vessels at sea. In one case, a disagreement between parties was resolved and a formal investigation was considered unnecessary. The other three incidents were investigated which resulted in the officer of the watch of *Arahanga* being censured in one case, the officer of the watch of *Aratere* being criticised in another and the master of *Lynx* being censured in the third.

The Master involved in the present investigation was involved in a close quarters situation with a small fishing vessel in the approaches to Picton. This incident was resolved and a full investigation was not warranted.

The three reported incidents at sea may constitute a trend towards aggressive ship handling involving minimal passing distances, which masters and watch keeping officers should be aware of and guard against.

Strait Shipping

At the time of writing this report, there are five reported incidents on record. They are broken down as follows:

- Three involving vessels under 500 gross tonnes in pilotage waters. Two of these incidents were considered very minor and were not the subject of an investigation. In the remaining incident the smaller vessel was found at fault for not observing

the Collision Prevention Rules or Harbour Bylaws.

- One involving a vessel greater than 500 tonnes in pilotage waters. The master of *Santa Regina* was censured as a result of the investigation.
- One involving a vessel at sea. The investigator commended the master of *Kent* for his actions.

The Master involved in the current investigation was not involved in any of the above reported incidents.

In analysing the above information it must be borne in mind that Interislander vessels complete more crossings than Strait Shipping vessels, and thus are at risk of being involved in more incidents.

SAFETY RECOMMENDATIONS

1. It is recommended that Interislander:

- a. Engage an external expert on BRM techniques to audit the use of these techniques on the bridges of all vessels of their fleet and to provide advice on management methods to support masters and crew in the use of BRM techniques on an on-going basis. The auditor should be re-engaged six months after the production of the audit report to assess effective compliance with any recommendations contained in that report.

In response to this recommendation, Interislander advised that BRM techniques had been audited by external experts and that they are currently undertaking extensive training of their seagoing and management personnel both with regard to BRM techniques and pilotage training at the Star Cruises simulator in Malaysia.

- b. Audit their vessels to ensure BRM training and practice covers development of unplanned situations and communication with other vessels.

In response to this recommendation, Interislander advised that during April and May 2005, BRM audits had been conducted on all their vessels and that management had provided feedback to ship's masters and crew on their performance, pointing out the importance of ensuring good intra and inter ship communication at all times.

- c. Ensure that the ISM manuals of all vessels in their fleet clearly state the standard of navigation required on vessels in their fleet.
- d. Institute a system of peer review to ensure that all ISM manual requirements are being followed.
- e. Institute a system of periodic external review to ensure that the ISM manuals are adequate, that the peer review system is operating satisfactorily, and that the standard of navigation complies with international standards and all international legislation and internationally accepted recommendations and procedures.
- f. Examine its procedures and culture around reporting and acting on departures from good seafaring practices and the occurrence of incidents, to ensure that there is an open and supportive climate for these activities.

In response to recommendations c., d., e. and f. above, Interislander stated that their ISM procedures are currently under critical review and would be upgraded as appropriate to ensure robust safety management on all their vessels.

It is further recommended that:

2. The Maritime Safety Authority monitor the compliance with, and especially the effect of, recommendations 3, 4 and 5 above.
3. The Director of Maritime Safety, under New Zealand Maritime Rule Part 90.10 (4), institute a programme of monitoring and reviewing the performance of pilot exempt masters, compatible with a monitoring and review system appropriate for pilots.
4. The Director of Maritime Safety censure the Master of *Aratere* for failing to keep clear of *Kent* until finally past and clear, as required by New Zealand Maritime Rule Part 22.13 [Rule 13 of the Colregs].
5. The Maritime Safety Authority issue a Marine Safety Notice warning of the dangers of over reliance on electronic navigation equipment and emphasising the advice given in the International Chamber of Shipping Bridge Procedures Guide.
6. The Maritime Safety Authority send a copy of this report to all New Zealand Harbourmasters with a covering letter stating the Maritime Safety Authority's expectations on the use of a helmsman in pilotage waters.
7. The Wellington Harbourmaster instruct Beacon Hill Signalmen to monitor vessel compliance with the recommended tracks and report instances of significant non-compliance to the Harbourmaster. This recommendation should be read in conjunction with any recommendations made by the Port and Harbour Risk Assessment that is being conducted at the time of writing this report.
8. The Wellington and Marlborough Harbourmasters issue a letter advising all pilot exempt masters for their respective pilotage districts of the requirements and expectations of the use of a helmsman on board pilot exempt vessels in their districts.
9. The Wellington and Marlborough Harbourmasters define the words "immediate vicinity" in their respective navigation bylaws for better clarification of this wording.
10. Strait Shipping Limited immediately utilise a helmsman on, or in the immediate environs of, the wheel, so that they can be summoned to the wheel verbally, without the use of radio or telephone, when the vessel is in pilotage waters, in compliance with the Wellington Navigation and Safety Bylaws and Marlborough District Council Navigation Bylaws. The master should also take steps to ensure that the helmsman is sufficiently practiced in steering the vessel to be able to do so competently in emergency situations.

11. Strait Shipping Limited advise all masters in their employ to fully comply with all relevant bylaws. In particular it is basic and good seamanship to operate the echo sounder at all times when navigating in confined waters. In this regard the attention of all mariners is drawn to the paramount importance of using all aids to navigation, including echo sounders, in harbour limits.

It is also recommended that:

12. Centreport promulgate the updated Exemption Manual to all Wellington pilot exempt masters once the updating process has been completed.

ADDENDUM TO THE REPORT

1. After the completion of this report, information was received that the bridge microphones on board *Aratere* were in fact switched on at the time of this incident and were available on the VDR recordings. This was contrary to previous advice given by Interislander that the microphones had been switched off. The Investigator reviewed these recordings and the following is a transcript of the pertinent conversation that occurred during the incident.

Note: times given are in NZST to conform with times quoted in the report. Times recorded by the VDR are in UTC (Universal Co-ordinated Time), which is twelve hours behind NZST.

06 08 27	Master:	<i>Steer 340</i>
06 08 29	Helmsman:	<i>340</i>
06 08 56	Master:	<i>Amidships</i>
	Chief Officer:	<i>Amidships</i>
06 08 57	Helmsman:	<i>Amidships</i>
06 09 10	Master:	<i>What's her heading now?</i>
06 09 14	Helmsman:	<i>345</i>
06 09 15	Master:	<i>Steady 345</i>
06 09 16	Helmsman:	<i>345</i>
06 09 36	Kent:	<i>Sounds six short and rapid blasts</i>
06 09 49	Helmsman:	<i>345</i>
06 09 58	Master (VHF):	<i>Kent this is <i>Aratere</i>, we are steady on 345</i>
06 10 03	Kent (VHF):	<i>Aratere, Kent, you are a bit close.</i>
06 10 44	Chief Officer:	<i>There is no reason why he couldn't come to port.</i>
06 11 06	Master:	<i>He's just coming round now.....coming in line now <i>Jerningham</i> whatever, alteration to port.</i>
06 11 15	Kent (VHF):	<i>Call to Beacon Hill (Radio Station) confirming they (Beacon Hill) had the situation on radar.</i>

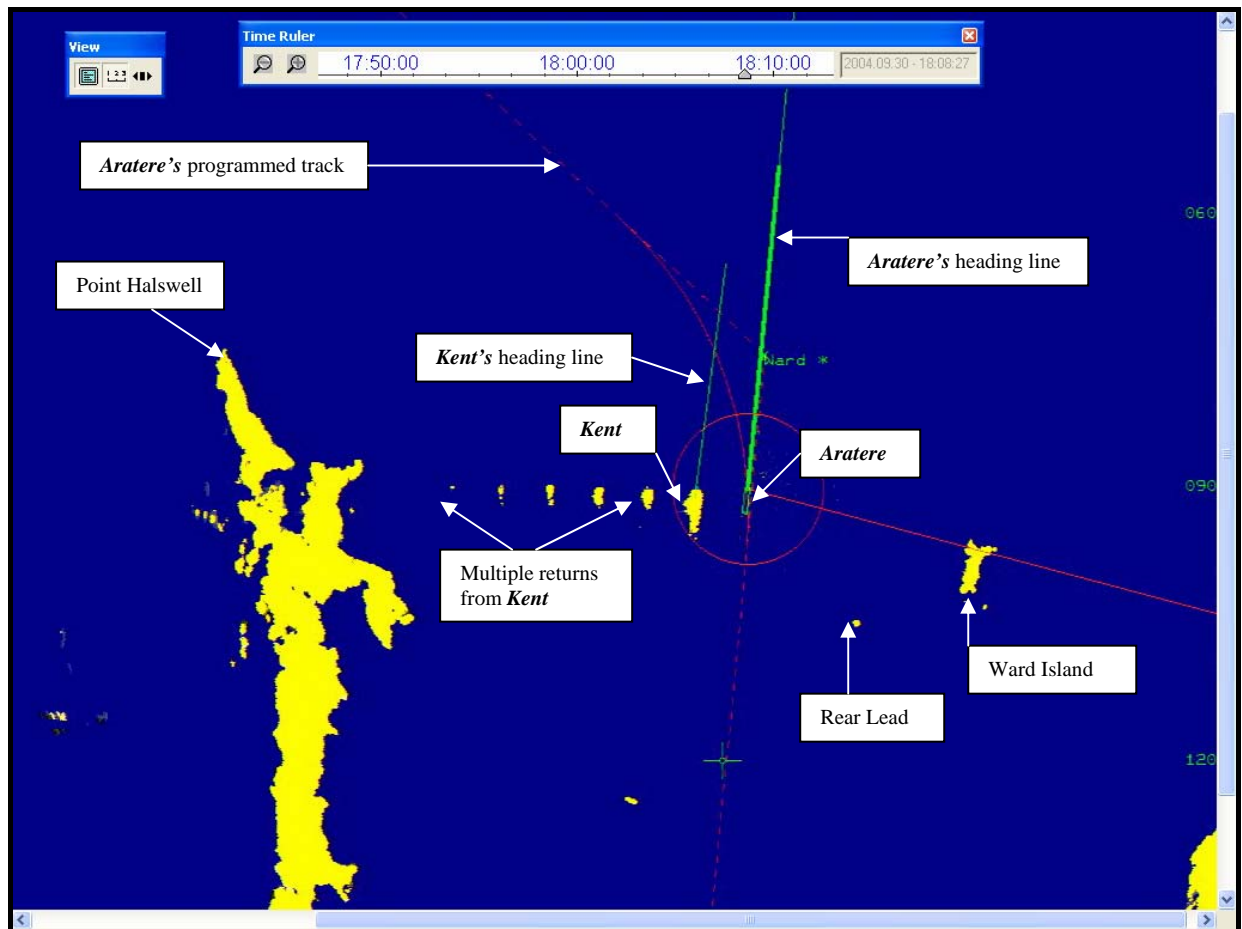


FIGURE 2

Figure 2 above, represents *Aratere's* VDR radar picture taken at 06 08 27 hours (NZST), when her Master gave the order to steer 340°. This equated to an alteration of 25° to port of the course she was steering at that time (005°). At this stage, *Kent* is only just abaft *Aratere's* port beam. The echo from *Kent* is extended by returns from the side lobes as well as the main radar beam.

As a result of the combination of hearing the voice input to the VDR whilst at the same time observing *Aratere's* track in real time, the Investigator was able to determine that when the order was given by the Master to steer 340°, *Aratere* was on her programmed wheel over position namely, six cables to the south of the Halswell/Jerningham transit. This compares with the earlier assessment of the Investigator, based solely on his review of the images of the radar pictures downloaded from *Aratere's* VDR, that the vessel was 1.8 cables south of this line when the alteration of course occurred (*see pages 10 and 13 of the report*). In the opinion of the Investigator, the action of altering course to port at a time when *Kent* was just abaft the port beam of *Aratere*, represents a classic example of rule-based behaviour by the Master. Notwithstanding that the Master was aware of the close proximity of *Kent*, as exemplified by his order to steer 340° instead of the next programmed course of 310° and, twenty seven seconds later, giving the order “amidships”, he nevertheless decided to alter course on reaching the programmed wheel over position, in accordance with the vessel's planned inward track to Wellington.

Lowle⁴ defines rule-based behaviour as:

“Intended action inappropriate to circumstances. Sound rule applied in inappropriate circumstances. Application of unsound rule sometimes brought about by severely reduced scope of allowable action over time or by failure to keep abreast of changes (creeping entropy)”.

2. On 3 May 2005, following a collision between a Cook Strait ferry and a recreational craft, the Director of Maritime Safety imposed a number of conditions on the operation of Interislander and Strait Shipping Company vessels. These conditions included the requirement to have on the bridge a dedicated helmsman and, during the hours of darkness, a dedicated lookout, while operating in pilotage areas.

⁴ Captain M. Lowle *Getting to Grips with the Human Factor*. UK P&I Club