



Report on AIS data used as evidence in court cases

Submitted by

The Working Group on AIS data used in court cases (Jan Gabrielsen, Christina Schneider and Maarten Berrevoets)

1 Background

At the 13th Session of the IALA Legal Advisory Panel, which took place on 20-30 September 2014 at IALA Headquarters, a paper submitted by the German Federal Waterways and Shipping Agency postponed from LAP12 was presented and discussed (doc. LAP12/8/2).

Apparently, it could according to this paper be problematic to get judicial permission to use AIS data as evidence in court cases in some countries due to data protection issues and national legislation.

LAP therefore decided that a Working Group consisting of Jan Gabrielsen, Christina Schneider and Maarten Berrevoets should draft a paper on the use of AIS data in court cases in cooperation with the ENAV Committee (LAP13-output-1, Action item 11).

2 Method for compiling information

By e-mail of 6 February 2015 to the LAP Members, the Working Group asked the Members to provide it with information on the use of AIS data in court cases in their own country. The information should be in the form of a paper (½ - 2 pages), preferably with short descriptions/examples of court cases where AIS data have been used or where the use of AIS data have been rejected by the court. An information paper on the use of AIS data in court cases in Denmark was enclosed for inspiration.

At the 14th Session of LAP, which took place on 9-11 March 2015 in Shanghai, Jan Gabrielsen informed that so far only little information had been received from the various countries represented at LAP and urged others to submit similar information and requested the Secretariat to invite members to submit similar information (LAP14.0.1 Report LAP14).

3 Conclusions

The Working Group has received input papers from the following LAP Members: Australia, UK, Sweden, Denmark, Germany and the Netherlands. These input papers are contained in Annex A.

The inputs do not show any cases where national legislation or judicial practices make it impossible or difficult to use AIS data as evidence in court cases.

The Working Group has received a note from the Chairman of the ENAV Committee on the Accuracy of vessel position information derived from AIS data. The note is contained in Annex B.

The Danish input paper contains documentation that the maritime Administration has provided to the prosecution about the accuracy of AIS for use in court cases.

List of Annexes

| | |
|----------------|---|
| Annex A | Input Paper from Australia |
| Annex B | Input Paper from United Kingdom |
| | B-1: Judgement in the Case of The “Western Neptune” & The “St Louis Express” |
| Annex C | Input Paper from Sweden |
| Annex D | Input Paper from Denmark |
| | D-1: Translation of letter from the Danish Maritime Authority to the East Jutland Police (abstract) |
| | D-2: Technical analysis – AIS and VDR data |
| Annex E | Input Paper from Germany |
| Annex F | Input Paper from the Netherlands |
| Annex G | Accuracy of vessel position information derived from AIS data (Input Paper from the chairman of the ENAV Committee) |

ANNEX A Input Paper from Australia

AIS data has been used as evidence in a number of pilotage and pollution cases in recent years without controversy.

Garbage pollution – the XIN TAI HAI

A recent example of this process is demonstrated in relation to the illegal disposal of garbage into the sea in which the owner of the vessel XIN TAI HAI and its master were each convicted of strict liability offences against the *Protection of the Sea (Prevention of Pollution from Ships) Act 1981*.

In that case a fisherman travelling in the wake of the vessel saw approximately 20 garbage bags of waste torn and floating on the water. The bags were spilling contents into the sea and the witness took photographs of this. He also noted his GPS position and notified authorities who later attended the vessel identified by the witness, taking evidence from the log book about the location of the vessel at the time of the report by the witness.

AIS data was used to show that the identified vessel had been in the location recorded by the witness at the relevant time and also that there were no other vessels in the area.

The defendants entered guilty pleas although the master noted that shipboard procedures prohibited garbage disposal and that he had no knowledge that dumping was taking place. The use of the AIS data was not mentioned in the judgement (which is not usually published in such cases).

Evidence requirements

AIS data is presented by way of maps developed by the Australian Maritime Safety Authority GIS team or our State-based colleagues. Data in this form is considered to be a 'document' and a 'commonwealth record' for the purposes of the *Evidence Act 1995 (Cth)*.

AIS evidence is introduced into Court by way of a Witness Statement which, unless contested, is accepted without further submissions. The witness may be required to give evidence in person if the affected party so requests. This has happened once but the discussion did not go to the accuracy of the AIS data itself. The following sections of the *Evidence Act 1995(Cth)* are relevant in relation to these matters:

146 Evidence produced by processes, machines and other devices

(1) This section applies to a document or thing:

- (a) that is produced wholly or partly by a device or process; and
- (b) that is tendered by a party who asserts that, in producing the document or thing, the device or process has produced a particular outcome.

(2) If it is reasonably open to find that the device or process is one that, or is of a kind that, if properly used, ordinarily produces that outcome, it is presumed (unless evidence sufficient to raise doubt about the presumption is adduced) that, in producing the document or thing on the occasion in question, the device or process produced that outcome.

155 Evidence of official records

(1) Evidence of a Commonwealth record .. may be adduced by producing a document that:

- (a) ...; or
- (b) purports to be a copy of or extract from the record that is certified to be a true copy or extract by:
 - (i) a Minister, or a Minister of the State or Territory, as the case requires; or
 - (ii) a person who might reasonably be supposed to have custody of the record.

161 Electronic communications

(1) If a document purports to contain a record of an electronic communication it is presumed (unless evidence sufficient to raise doubt about the presumption is adduced) that the communication:

- (a) was sent or made in the form of electronic communication that appears from the document to have been the form by which it was sent or made; and
- (b) was sent or made by or on behalf of the person by or on whose behalf it appears from the document to have been sent or made; and
- (c) was sent or made on the day on which, at the time at which and from the place from which it appears from the document to have been sent or made; and
- (d) was received at the destination to which it appears from the document to have been sent; and
- (e) if it appears from the document that the sending of the communication concluded at a particular time—was received at that destination at that time.

167 Requests may be made about certain matters

A party may make a reasonable request to another party for the purpose of determining a question that relates to:

- (a) ..; or
- (b) ..; or
- (c) the authenticity, identity or admissibility of a document or thing.

169 Failure or refusal to comply with requests

(1) If the party has, without reasonable cause, failed or refused to comply with a request, the court may, on application, make one or more of the following orders:

- (a) an order directing the party to comply with the request;
- (b) an order that the party produce a specified document or thing, or call as a witness a specified person;
- (c) an order that the evidence in relation to which the request was made is not to be admitted in evidence;
- (d) such order with respect to adjournment or costs as is just.

(5) Without limiting the matters that the court may take into account in relation to the exercise of a power under subsection (1), it is to take into account:

- (a) the importance in the proceeding of the evidence in relation to which the request was made; and
- (b) whether there is likely to be a dispute about the matter to which the evidence relates; and
- (c) whether there is a reasonable doubt as to the authenticity or accuracy of the evidence that is, or the document the contents of which are, sought to be proved; and
- (d) whether there is a reasonable doubt as to the authenticity of the document or thing that is sought to be tendered; and
- (e) if the request relates to evidence of a previous representation— whether there is a reasonable doubt as to the accuracy of the representation or of the evidence on which it was based; and
- (f) ...; and
- (g) whether compliance with the request would involve undue expense or delay or would not be reasonably practicable; and
- (h) the nature of the proceeding.

ANNEX B**Input Paper from United Kingdom****The WESTERN NEPTUNE and the ST LOUIS EXPRESS**

I attach a copy of the Lloyd's Law Report in respect of the collision between the towed array of the seismic survey vessel WESTERN NEPTUNE (Claimants' Vessel) and the container ship ST LOUIS EXPRESS (Defendants' Vessel) in the Gulf of Mexico on 24 September 2007.

In summary, the Defendants' vessel collided with the array stretching astern from the Claimants' Vessel when she crossed astern of the WESTERN NEPTUNE cutting the array into two or otherwise damaging it. This resulted in the Claimants sustaining losses in the region of \$25M.

The Defendants accepted that the ST LOUIS EXPRESS should bear most of the blame for the collision on the basis that the vessel failed to take note of a radio request not to enter an exclusion zone; made an improper alteration of course; and failed to see or appreciate the significance of the lights on the stern buoys attached to the array. The Defendants, however, contended that some blame lay with the WESTERN NEPTUNE for failing to act with reasonable care. The judgment was that liability should be apportioned one third/two thirds in favour of the WESTERN NEPTUNE. The Judge also considered whether the array was to be treated as part of the WESTERN NEPTUNE for the purposes of the Collision Regulations.

The judgment provides a good example of where AIS data (importantly in combination with recordings from the VHF radios and radar screens) was used to reconstruct the passage of the two vessels prior to collision.

Furthermore, the judgment was given having regard inter alia to the use of AIS, with which both vessels were equipped, together with radar. The Claimants submitted and the Judge noted that the ST LOUIS EXPRESS failed to make effective use of AIS (and the details contained within it) as a navigational aid. The details of the WESTERN NEPTUNE available on AIS included its position; reference to its restricted manoeuvrability; and the existence of the tow and its length. No reference was made to the exclusion zone, which could have been included in a short safety-related message in the AIS details, although space is limited to 161 characters. The judgement referenced the UK Maritime & Coastguard Agency guidelines, which stress that AIS information should be used by seafarers with caution and that *"there is no provision in the COLREGs for the use of AIS information: therefore decisions should be taken based primarily on visual and/or radar information."* These regulations also highlight that not all ships are fitted with AIS and that some floating objects may not give a radar echo detectable by AIS. In the case of the WESTERN NEPTUNE the buoys making up the tail of the array were not included in the AIS system.

The reasons given for the judgment are summarised in paragraphs 110 to 115 of the judgment.

Considering the above, in an English Court of Law, AIS data is therefore unlikely to be regarded as conclusive on its own but, in combination with other corroborating information, can provide strong evidence.

Jon Price, Trinity House/25 October 2011

Annex B-1 Judgement in the Case of The "Western Neptune" & The "St Louis Express"

158

LLOYD'S LAW REPORTS

[2010] Vol 1

DAVID STEEL J]

The "Western Neptune" & The "St Louis Express"

[QBD (Admlty Ct)]

QUEEN'S BENCH DIVISION (ADMIRALTY COURT)

9–11, 16–17 March; 25 June 2009

THE "WESTERN NEPTUNE" AND THE "ST LOUIS EXPRESS"

[2009] EWHC 1274 (Admlty)

Before Mr Justice DAVID STEEL,
Sitting with Commodore Peter Melson and
Captain Nigel Pryke as Nautical Assessors

Collision action — Seismic survey vessel towing array of streamers — Defendant vessel colliding with towed array at night — Whether array subject to Collision Regulations — Whether towing vessel partially to blame — Collision Regulations 1996, Rules 3(g) and 7(d)(ii).

In September 2007 the claimants' seismic survey vessel *Western Neptune* was carrying out a survey in the Gulf of Mexico. She was towing a spread of 10 streamers and six gun arrays (the array). Each streamer extended for about 8,030 m (4.34 miles) astern of the vessel. The total width of the spread was some 1,080 m. The streamers were being towed at a depth of 12 m.

In addition to normal navigation lights, *Western Neptune* exhibited three restricted manoeuvrability lights. So far as the array was concerned there were buoys at the aft end of every streamer and at the forward end of the outer six streamers. Each buoy was fitted with a blue strobe light and a radar reflector. Apart from that, there were no lights between the stern of *Western Neptune* and the end of the streamers over four miles astern.

During the early hours of 24 September 2007 the defendants' vessel *St Louis Express*, a 40,146 mt gross container ship, collided with the array when she crossed about four miles astern of *Western Neptune*. The claimants alleged that the collision was caused by the negligence of *St Louis Express* and claimed damages in the region of US\$25 million.

The defendants accepted that *St Louis Express* should bear the preponderance of blame for the collision, on the basis that *St Louis Express* failed to heed a VHF request not to enter a "safety box" three miles ahead, three miles from either side and six miles behind *Western Neptune*; made an improper alteration of course to port so as to cross the path of the array; and failed to appreciate the significance of blue strobe lights on the stern buoys attached to the array. However, the defendants contended that *Western Neptune* was also to blame for the collision.

—Held by QBD (Admlty Ct) (DAVID STEEL J) that liability would be apportioned one third/two thirds in favour of *Western Neptune*:

(1) The array was to be treated as part of *Western Neptune* for the purposes of the Collision Regulations (see para 53).

(2) *Western Neptune* failed to act with reasonable care in that she failed to contact *St Louis Express* after her alteration of course to confirm the exclusion zone and *St Louis Express*'s intentions; failed to draw the attention of *St Louis Express* to the presence and significance of the tail buoys; failed thereafter to keep a good look out particularly as regards to the course of *St Louis Express* and her progressive alteration of course to port; and failed at the last to dive the streamers. However, those faults of *Western Neptune* were substantially less blameworthy or indeed causatively potent than those of *St Louis Express* (see paras 114 and 115).

The following cases were referred to in the judgment:

Hakki Deval, The [2006] EWHC 2809 (Comm);
Mineral Dampier and The Hanjin Madras, The (CA) [2001] 2 Lloyd's Rep 419;
Thomas Stone (Shipping) Ltd v The Admiralty (The Albion) (CA) [1953] 1 Lloyd's Rep 239.

This was the trial of the action arising out of a collision in the Gulf of Mexico between the defendants' vessel *St Louis Express* and a seismic array being towed by the claimants' vessel *Western Neptune*.

Jeremy Russell QC and Gemma Morgan, instructed by Holman Fenwick Willan, for the claimants; Nigel Cooper, instructed by Swinnerton Moore, for the defendants.

The further facts are stated in the judgment of David Steel J.

Judgment was reserved.

Thursday, 25 June 2009

JUDGMENT

Mr Justice DAVID STEEL:

1. This action arises out of a collision which occurred in September 2007 in the Gulf of Mexico. The losses sustained by the claimants are very substantial, said to be in the region of US\$25 million. Further it raises some interesting and novel issues. These issues have emerged despite the fact that there is a photographic record of the radar picture (including AIS data) on one of the vessels and there is an audio recording on the bridge of that vessel which includes all the VHF exchanges with the other vessels in the vicinity.

Western Neptune

2. *Western Neptune* is a seismic survey vessel. Her principal dimensions are 92.5 m in length and 23 m in beam. She is some 8,369 mt gross and 2,511 mt net. She is registered in Panama. She is powered by two Bergen diesel engines developing a total of 10,810 bhp. She is manned by a crew of 57 hands all told, most of whom worked in the survey departments. It is of passing interest that the crew was made up of 22 nationalities with English as a common language.

3. Her navigational aids include:

(i) A gyrocompass on the bridge and a further gyro compass in the seismic instrument and control room on B deck.

(ii) Three radars with ARPA, all interfaced with the gyro and speed log.

(iii) An electronic chart display and information system (ECDIS).

(iv) An automatic identification system (AIS) which was also interfaced with the main radar and with ECDIS.

4. *Western Neptune* is capable of towing up to 16 streamers and 10 gun arrays. Surveying is carried out by sending sound waves generated by compressed air released from the arrays and recorded by the hydrophones in the streamers. At the time of the collision *Western Neptune* was carrying out a wide azimuth survey of the Green Canyon in the Gulf of Mexico, about 150 miles south of New Orleans.

5. For this purpose she was towing a spread of 10 streamers and six gun arrays ("the array"). Each streamer extended for about 8,030 m (4.34 miles) astern of the vessel. With each of the streamers maintained about 120 m apart the total width of the spread was some 1,080 m. They were being towed at a depth of 12 m. Almost the entirety of this array was cut in two or otherwise damaged when the defendants' vessel *St Louis Express* crossed about 4 miles astern of *Western Neptune*, giving rise to this substantial claim.

6. The lines of the survey were planned on courses of 045° to 225° and were some 60 to 70 miles long. At the material time *Western Neptune* was on a south-westerly leg. The survey speed was maintained at about 4 to 5 knots. *Western Neptune* was supported by three other vessels. Two, *Ocean Odyssey* and *Geco Tau*, were also towing gun arrays and were positioned off the port side of *Western Neptune*, the three vessels being interspaced by 1,200 m and proceeding on the same course and speed.¹

7. The third vessel was positioned between one and 3 miles ahead of *Western Neptune*. It was a

"chase" boat called *Furore*. Its main function was to "chase" vessels such as fishing craft which presented a potential hazard ahead of the seismic convoy. It also acted as a "guard" vessel for the convoy by contacting approaching vessels on VHF channel 16 on behalf of *Western Neptune*.

8. *Furore* was an offshore support vessel (converted from a fishing vessel) of 235 mt gross and 70 mt net, some 34.7 m in length and 7.5 m in beam. She was powered by diesel engines of 1,235 bhp giving a maximum speed of 12 knots. She was equipped with three VHF units, an electronic chart display and two radars interfaced with AIS. *Furore* was usually accompanied by a second chase or guard boat *Torsvik*. However, on the day of the collision *Torsvik* was unavailable as she was effecting a crew change ashore. For reasons which were not revealed, she was not replaced.

9. So far as lights were concerned the position was as follows. *Western Neptune* was exhibiting normal navigation lights and a towing light above the stern light. However she was restricted in her ability to manoeuvre. Indeed she could scarcely make any material alteration in course or speed. For instance an alteration of course of 180° whilst maintaining the array would take several hours. Any material increase in speed would risk damaging the array: a significant reduction would risk the sinking of the array. Thus, in accord with rule 27(b) of the Collision Regulations, she was exhibiting three all-round lights, the highest and lowest being red and the middle white.

10. So far as the array was concerned there were buoys at the aft end of every streamer and at the forward end of the outer six streamers. Each such buoy was fitted with a high intensity blue strobe light and a radar reflector.² That apart there were no lights between the stern of *Western Neptune* and the end of the streamers over 4 miles astern.

11. The nature of *Western Neptune's* employment was the subject of a local notice to mariners issued by the United States Coast Guard ("USCG").³ This read:

LA ### GULF OF MEXICO ### Seismic surveys

Continuing until further notice, the m/v WESTERN NEPTUNE ... will be conducting seismic survey in an area [the coordinates are then set out]. The m/v WESTERN NEPTUNE ... will be towing 10-cables that are 5 nautical miles long. All vessels are requested to keep clear a minimum of 3 nautical miles forward and

² It was not entirely clear that the forward buoys were so lit but I will assume such was the case. The tail buoys also had GPS transponders but these only transmitted to *Western Neptune*.

³ It can be assumed that this notice was dispatched by NAVTEX: as regards any broadcast on VHF the vessels concerned were too far off the coast for reception.

¹ It follows that the three vessels were proceeding in line abreast some 2,400 m apart overall.

6 nautical miles astern. The m/v WESTERN NEPTUNE ... will be monitoring VHF FM Channels 13 or 16.⁴

12. In addition, the details of *Western Neptune* available (if selected) on AIS included the following:

- (i) Status: 3: Restricted manoeuvrability
- (ii) Type: 32: Vessel towing and length of the to ...
- (iii) Destination: TOWING 5NM LONG CABLE

13. AIS also carried details of the other three vessels in the convoy:

Ocean Odyssey

- (i) Status and Type: [as above]
 - (ii) Destination: GULF OF MEXICO
- Geco Tau*
- (iii) Status and Type: [as above]
 - (iv) Destination: GREEN CANYON

Furore

- (v) Status: 0: Underway using engine
- (vi) Type: 51: Search and rescue vessels
- (vii) Destination: GUARD WESTERN NEPTUNE

14. The collision occurred during the watch of the Second Officer of *Western Neptune*, Mr Eidsvik (the "OOV"). He had shadowed the newly-joined Third Officer from 22.00 to midnight on 22 September and took over his watch proper at 00.00 on 23 September. It was his recollection and that of the master of *Western Neptune* that the weather was overcast but clear with a south-south-easterly wind force 5 and moderate seas.

St Louis Express

15. *St Louis Express* is a motor container vessel of 40,146 mt gross and 18,097 mt net, some 243 m in length and 32 m in beam. She was powered by MAN diesel engines of 35,280 bhp. She was registered under the US flag at St Louis. She was equipped with two ARPA radars and with AIS.

16. She was engaged on a regular liner service between Europe and the US. At the relevant time she was in the Gulf of Mexico inward bound to Houston, Texas with a cargo of 11,224 mt of containerised cargo. Her sailing draught had been 7.10 m forward and 9.10 m aft. She was exhibiting normal navigation lights.

17. Her navigation officer was the Third Officer who had held a third mate's ticket for about two years and had only joined the vessel a few days

earlier.⁵ The weather was recorded as fair with good visibility save that "heavy rain was experienced on the Northern sector of the radar picture prior to the collision". The wind was assessed as easterly force 3. *St Louis Express* was on a course of 292° true at a speed of about 20 knots.

18. An important feature of the equipment onboard of *St Louis Express* was the presence of a Voyage Data Recorder ("VDR"). This furnished a recorded picture of the radar screen and the AIS display every 15 seconds.⁶ In addition there was a record of the conversation from the two VHF radios and from six microphones placed at various locations on the bridge.⁷

Approach of the two vessels

19. From this material it was possible to reconstruct the passage of the two vessels with considerable accuracy.

20. As regards the navigation prior to C-18 the position as derived from the VDR is as follows. As already noted *Western Neptune* was on a course of 225° true making about 4.5 knots through the water. With a Westerly current of about 0.5 knot the AIS readout gave her course over the ground as between 224° to 227° and her speed over the ground as between 4.4 to 5.1 knots.

21. At about 00.00 on 24 September 2007 *Western Neptune* was in position Lat 27° 21.1'N Long 090° 28'E. Having made a slight alteration of course to port *Western Neptune* was in the course of passing a rig called *Holstein Spar*. At about 00.50 the rig was abeam to starboard at a range of 1.2 miles. She resumed her original track at about 01.30. Thereafter she made no material alteration of course or speed.

22. At 00.00 on 24 September, *St Louis Express* was in position Lat 26°48'N, Long 89°39.7'W. She was on course of 292° at a speed of about 20 knots. The AIS readout recorded a course over the ground of about 291° to 294° and a speed over the ground of about 19.7 to 20.2 knots.

23. The AIS reveals that at 02.00 *Western Neptune* was on *St Louis Express*'s starboard bow bearing 311° true, distant 17.43 miles. The CPA was 1.79 miles and the TCPA was 59 minutes.

24. At this stage (02.00) there was another vessel on *St Louis Express*'s starboard bow. This was *Eagle Subaru*. She was on a COG of 195° with a SOG of 13.8 knots. She was bearing 327° distant 14.61 miles. The CPA was 0.8 miles and TCPA 34 minutes.

⁵ It struck the court as somewhat unusual for a third officer (particularly a fairly inexperienced one) to take the 00.00 to 04.00 watch.

⁶ This material was supplemented in the papers before the court by some snapshot pictures derived from the ECDIS equipment on *Western Neptune*.

⁷ The conversations were audible but with difficulty because of the unsatisfactory practice of the Third Officer playing loud music on the bridge.

⁴ There was then a reference to chart number 11340 being the chart in use on *St Louis Express*.

25. The VHF traffic log of *Furore* records that a VHF call to *Eagle Subaru* had been made by *Furore* at 0115. *Eagle Subaru* had been informed of the convoy's passing requirements and responded that she would pass 3 miles "behind".

26. By 02.14 the distance between *Western Neptune* and *St Louis Express* had closed to 13.5 miles with *Western Neptune* bearing 312° from *St Louis Express*. The CPA was 1.8 miles.⁸ Of more immediate significance however, was the fact that the range of *Eagle Subaru* had closed to 8.3 miles bearing 329° with a CPA of only 0.48 miles. In consequence the readout on *St Louis Express*'s AIS display began to categorise the target as "dangerous" and outlined the echo with a red triangle.

27. The situation by 02.20 was as follows:

(i) The *Western Neptune* flotilla was distant 11.9 miles from *St Louis Express* still bearing 313°, with a CPA of 0.73 miles.

(ii) *Eagle Subaru* was distant 6 miles from *St Louis Express* still bearing 329° with a CPA of 0.1 miles.

28. It was at this stage that *Furore* made VHF contact with *St Louis Express* reporting as follows:

07.20.59 Just for your information ahead of you on your starboard bow bearing from you 313° and range 11.8 nautical miles seismic convoy is seismic vessel WESTERN NEPTUNE towing 10 steel seismic cables with length 5 nautical miles behind and request safety box 3 nautical miles ahead, 3 nautical miles from either side and 6 nautical miles behind. Can you alter course a little bit to port and give CPA for WESTERN NEPTUNE of 3 nautical miles ahead of her.

29. The third officer of *St Louis Express* responded that he was altering course to port and appears to have called upon the helmsman to take up a heading of 270°. This course was achieved by 07.24. However in the meantime at 07.23 *Eagle Subaru* also made contact with *St Louis Express* by VHF:

07.23.31 ES: "I am asking for your intentions — are you altering to starboard, you are coming into a close quarter situation?"

07.23.37 ST LOUIS EXPRESS: "I am altering to port to keep out of the way of a ship towing a cable".

07.23.43 ES: "Please alter to starboard first, once you have cleared, then you alter to port, I repeat please alter to starboard".

07.23.53 ST LOUIS EXPRESS: "Roger that I am altering to starboard".

07.23.57 ES "Thank you very much sir, back to 16".

30. There ensued various instructions to the helmsman of *St Louis Express* to come to starboard progressively. By about 02.29 *St Louis Express* had steadied on a heading of about 333°. She remained on that course until 02.32. By this time *St Louis Express* was shaping to pass astern of *Eagle Subaru*. As regards *Western Neptune*, however, the position was now she was distant 8.4 miles bearing 309° from *St Louis Express*. But the CPA was 4.8 miles.⁹ Despite this *St Louis Express* came somewhat back to port onto 321°, thus reducing the CPA by 02.34 to 3.76 miles. *St Louis Express* then came back to starboard again. She reached a heading of 343° by 02.39 increasing the CPA to 5.53 miles.

31. *St Louis Express* began a slow alteration to port at 02.42. By 02.50 she had entered the "safety" zone around the convoy, heading 315° and with a CPA to *Western Neptune* of 5.15 miles. She continued her swing and steadied on a heading of 290° at 02.53. At this stage the flashing lights on the buoys would have been fine on her starboard bow, the closest distant about 2 miles. She remained on that heading until collision at 02.59 with the CPA commencing at 4.22 miles and slowly reducing to about 4 miles.¹⁰

Allegations of fault

32. It was accepted by the defendants that *St Louis Express* should bear the preponderance of blame for the collision. The basis of this concession appeared to be an admission of fault in the following respects thereby creating the situation of danger:

(i) *St Louis Express* failed to heed the requirement not to enter the exclusion zone.

(ii) *St Louis Express* made an improper alteration of course to port so as to cross the path of the array being towed by *Western Neptune*.

(iii) *St Louis Express* failed to see or to appreciate the significance of blue strobe lights on the stern buoys attached to the array.

33. The claimants submitted that this did not represent the entirety of faults committed by *St Louis Express*. In particular it was submitted that, consistent with systemic poor standards of navigation of the Third Officer:

(i) *St Louis Express* failed to make effective use of AIS (and the details contained within it) as a navigational aid;

(ii) *St Louis Express* failed to maintain a proper radar lookout.

⁸ This is significant since the master's standing orders for *St Louis Express* required a minimum CPA of 2 miles.

⁹ This of course takes no account of the array and the stern buoys.

¹⁰ Again all without regard to the array.

34. But the principal issue in the case was the question whether, as contended by the defendants, *Western Neptune* was also to blame for the collision. The focus of this charge can be summarised as follows:

(i) *Western Neptune* failed to inform approaching vessels such as *St Louis Express* of the presence of flashing lights on the tail buoys.

(ii) Following *St Louis Express*'s agreement to come to starboard to come astern of *Eagle Subaru*, *Western Neptune* failed to confirm with *St Louis Express* the need to avoid entering the "safety zone" around *Western Neptune* and her array and the need to pass clear astern of the array.

(iii) *Western Neptune* failed to communicate with *St Louis Express* when she altered course to port shaping to enter into the "safety zone" around *Western Neptune* and her array.

(iv) *Western Neptune* failed thereafter to alert *St Louis Express* that she was standing into danger by the use of VHF, lights, or flares.

(v) *Western Neptune* failed to dive her streamers to a depth that *St Louis Express* could safely pass over them.

Witnesses of fact

35. The claimants called the master of *Western Neptune* to give oral evidence. He was of course not a direct witness to the events leading up to the collision although he was able to give helpful supplementary evidence. He had served on board *Western Neptune* for many years and was able to speak with authority about the management of such a survey vessel. He was by any standards an impressive witness who was entirely frank in accepting criticism of some aspects of operations on the night of the collision.

36. The officer of the watch on *Western Neptune* was not called to respond to these criticisms. Whilst he monitored the VHF traffic between *Furore* and other vessels, he never participated himself. He heard *St Louis Express*'s agreement to turn to starboard to avoid crossing ahead of *Eagle Subaru*. In his note written after the collision he asserted that the last CPA from *St Louis Express* that he observed was 8 miles. This is clearly unreliable. Consistent with this apparent want of accurate observation he spent some time "in the last 5 minutes" in the washroom before thereafter concentrating solely on an adjustment of speed.

37. The defendants called no witness of fact. Indeed the statements taken from the master and even more so from the third officer were sparse on detail. There were a number of matters which I have no doubt the claimants would have wished to put to the master or third officer. Although sub-

stantial blame was accepted, the court's assessment of the degree of culpability had to be undertaken without the benefit of such material. In the result it was appropriate to resolve doubts in the claimants' favour. More significantly the absence of these witnesses presented a difficulty from the defendants' point of view in establishing the causative significance (if any) of a range of potential criticisms of the navigation and management of *Western Neptune*.

The convoy

38. The starting point to any consideration of the management of *Western Neptune* is to reflect on the size and scale of her convoy. In *Furore*'s VHF broadcast at 02.21 a request was made for a "safety box" around *Western Neptune* of 3 miles ahead, 3 miles on each side and 6 miles astern. Given the length of the tow and the lack of manoeuvrability this proposed exclusion zone was understandable and legitimate. Nevertheless the implications were quite far reaching. The request amounted to seeking to enforce a "no-go" zone covering 54 square miles of ocean.

39. Even disregarding the exclusion zone the convoy itself occupied considerable space. With two vessels alongside *Western Neptune*,¹¹ the furthest $1\frac{1}{2}$ miles away, a length of tow of over 4 miles and an array of stern buoys about $\frac{1}{2}$ mile wide, the convoy presented as akin to a vessel 4 miles long and 1 mile wide proceeding at 5 knots.

40. Whilst not unique, the convoy was by any standard unusual and called for appropriate warnings to shipping. Such should not have been and was, in some respects, not confined to VHF messages transmitted in the event of encountering an approaching vessel.

Notice to Mariners

41. As noted above, the claimants had taken steps to promulgate details of the survey operations in the USCG Local Notice to Mariners. Although *St Louis Express* was out of range of any VHF broadcast of this notice it can be safely assumed, so the Elder Brethren advise me, that it would have been sent out by NAVTEX. This would (or should) have been received by *St Louis Express* and should have been posted on the bridge.¹²

42. No complaint was made about the content of the notice. Nonetheless there were certain features of it which the Elder Brethren regarded as unsatisfactory and I agree with them. First it is somewhat

¹¹ *Geco Tia* and *Ocean Odyssey* were equally lacking in manoeuvrability.

¹² Although notably there was no mention of it in the passage plan nor any entry made on the working chart of *St Louis Express*.

surprising that the notice failed to incorporate the requirement to give a 3 mile berth on either side. If a vessel needs an exclusion zone with a wide berth on either side, it is desirable to include the entirety of the requirement in such a notice.

43. Secondly there was no reference in the notice to the make up of the fleet. It would have been desirable to assist mariners in their visual and radar lookout to draw attention to the fact that a group of four or five vessels were involved with the lead vessel responsible for making VHF contact (not *Western Neptune*) being ahead by at least 1 mile from the others.

44. Thirdly it was a matter of concern that no reference is made to the existence of the buoys (fitted with lights and radar reflectors) at each end of the cables. This complaint re-emerges in a different form in regard to the specific content of the VHF warnings to *St Louis Express*. It was an omission which the court regards as of some significance and is a topic to which I must return.

45. However as regards the first two defects I accept that they were probably not causative:

(i) The OOW of *St Louis Express* heard and acknowledged the message about the scale of the exclusion zone.

(ii) The identity and position of *Furore* and *Western Neptune* were fully available from the details on AIS.

AIS

46. In 2000 IMO adopted a new requirement under SOLAS for all eligible ships to carry AIS. The system was designed so as to use transponders to provide information about a ship to other ships and to coastal authorities automatically. The scheme became effective in 2004.

47. By way of example, guidelines for operational use of AIS were published by the MCA. These included as follows:

AIS will provide identification of targets together with the static and dynamic information listed in the IMO Guidelines para 12. Mariners should, however, use this information with caution noting the following important points:

(a) Collision avoidance must be carried out in strict compliance with the COLREGs. There is no provision in the COLREGs for the use of AIS information: therefore decisions should be taken based primarily on visual and/or radar information.

(b) The use of VHF to discuss action to take between approaching ships is fraught with dangers and still discouraged. (See MGN 167 — Dangers in the use of VHF in collision

avoidance.) The MCA's view is that identification of a target by AIS does not remove the danger. Decisions on collision avoidance should be made strictly according to the COLREGs.

(c) Not all ships will be fitted with AIS, particularly small craft and fishing boats. Other floating objects which may give a radar echo will not be detected by AIS.

48. The system provides information about many matters, including a ship's identity, type, position, course, speed and navigational status. The details of *Western Neptune* available on AIS are set out above. This included reference to both the existence of the tow and its length but no reference to the "exclusion zone". As the guidelines warn, objects such as the buoys making up the tail of the array are not included in the AIS system.

49. Attention was drawn by the Elder Brethren during the course of the proceedings to the facility for installing a "short safety-related message" in the AIS Details.¹³ It is a possibility that this facility could have been used to include details of the exclusion zone for *Western Neptune* but space was limited. Further, the examples given in the literature are such matters as the sighting of an iceberg or of an off-station buoy. In any event the point was not taken up by the defendants. This is perhaps not surprising given that the OOW of *St Louis Express* never selected "the details" of *Western Neptune* on the AIS system.

Steering and sailing rules

50. Before turning to the question of exhibiting lights at night I should first deal with the question as to whether the array is to be treated as part of *Western Neptune* for the purposes of collision avoidance under the rules. Rule 3(g) of the 1996 Collision Regulations provides that a vessel restricted in its ability to manoeuvre includes one engaged in a towing operation which severely restricts the towing vessel (and the tow) in its ability to deviate from its course. This clearly encompasses *Western Neptune*.¹⁴ In the result, by virtue of rule 18, *St Louis Express* was obliged to keep out of the way of her to the extent that the two vessels were in sight of one another.

51. Rule 3(g) provides that vessels shall be deemed to be in sight of one another only when one can be observed visually from the other. There is no difficulty of *St Louis Express* becoming visually in sight of *Western Neptune*. But the reverse is not so easy. In one sense the vessel that could be seen was

¹³ Apparently with a limit of 161 characters.

¹⁴ For this purpose it can be assumed that she was exhibiting the appropriate lights and/or shapes.

the *Western Neptune* and nothing else save for the flashing lights on the aft buoys. Indeed any reading of the CPA would be off *Western Neptune*. Does the array form part of the vessel from the perspective of the rules?

52. I asked the Elder Brethren for assistance on this hypothetical issue. Their response was as follows:

Rule 7d (ii), (Risk of Collision) speaks about bearing movement when approaching a very large vessel or a tow in the context of judging whether risk of collision exists. To this extent it would appear that a tow is to be considered as being similar to a very large vessel, and to be judged as such, in the context of the Rules.

From a practical point of view the tow always has to be treated as a part of the towing vessel for the purposes of collision avoidance since it has no life or being outside of the towing vessel and is unable to take any form of unilateral action. WESTERN NEPTUNE's array, as a tow part of which was on the surface, must therefore be considered as an integral part of WESTERN NEPTUNE herself.

53. I accept that advice and against that background I turn to the issue of both shapes and lights bearing in mind the need for consistency of treatment in the two different situations.

Shapes

54. Let us assume that the situation leading up to the collision had arisen in daylight. This first raises the question as to what shapes need to be exhibited by the towing vessel:

(i) By virtue of rules 3(g) and 27, *Western Neptune* would exhibit three shapes in a vertical line — the highest and lowest being balls and the middle a diamond.

(ii) This would be supplemented by shapes as required by rule 24:

(a) Since the tow exceeds 200 m a diamond shape where it can best be seen: rule 24(a)(v). As prescribed by Annex 1 this would have minimum dimensions of 0.6 m width and 1.2 m height.

(b) Subject to practicality (given that the "objects" being towed were inconspicuous and partly submerged) a diamond shape aft on the object being towed and an additional diamond shape "where it can best be seen and located as far forward as is practicable" (once again demonstrating a tow length of more than 200 m).

55. By any standards this is not easy to apply in the context of a submerged array with buoys at the forward end about 190 m from the vessel and more

buoys at the extreme aft end some 4 miles away from the towing vessel. Furthermore the buoys' dimensions were only 2 m in length and 0.7 m in beam. Attached to them was a small diamond shape at a height of 1.6 m (which doubled as a radar reflector). The height of this shape was probably only a 1 ft or 18 in. I assume that the buoys could not support diamond shapes of the prescribed size. Certainly the buoys and their shapes would not be readily visible from *Western Neptune*, even less so in any sea.

56. In one sense the short answer may be that it was impractical to exhibit the prescribed shapes. But this imports the obligation to take all possible measures to "indicate the presence" of the object: rule 24(h). Since the collision took place at night the issue was not of course considered. But the arrangements have to provide a seamless transition from night-time to daylight and vice versa. It does strike me (and the Elder Brethren agree) that these considerations in regard to the position in daylight and at twilight do much to support the need for a second guard boat. But the point need not be taken any further at this stage.

Lights

57. Now for lights. The rules provided that *Western Neptune* should exhibit a towing light above the stern light: rule 24(a)(iv). They were both required to have a minimum visibility of 3 miles: rule 22(a). As regards, the tow, rules 24(g) and (h) provide:

(g) An inconspicuous, partly submerged vessel or object, or combination of such vessels or objects being towed, shall exhibit:

(i) if it is less than 25 metres in breadth, one all-round white light at or near the forward end and one at or near the after end except that dracones need not exhibit a light at or near the forward end;

(ii) if it is 25 metres or more in breadth, two additional all-round white lights at or near the extremities of its breadth;

(iii) if it exceeds 100 metres in length, additional all-round white lights between the lights prescribed in subparagraphs (i) and (ii) so that the distance between the lights shall not exceed 100 metres;

(iv) a diamond shape at or near the aftermost extremity of the last vessel or object being towed and if the length of the tow exceeds 200 metres an additional diamond shape where it can best be seen and located as far forward as is practicable.

(h) Where from any sufficient cause it is impracticable for a vessel or object being towed

to exhibit the lights or shapes prescribed in paragraph (e) or (g) of this Rule, all possible measures shall be taken to light the vessel or object towed or at least to indicate the presence of such vessel or object.

58. The provisions of sub-rule (g) are difficult to apply to the "objects" being towed by *Western Neptune*. The Elder Brethren advise, and I accept their advice, that what was required was:

- (i) A white light on each of the centre buoys at the forward and aft end of the tow.
- (ii) A white light on the outside buoy in each row.
- (iii) White lights at no more than 100 m along the centre line of the array.

59. But the position was that:

- (i) the buoys were not exhibiting an all-round white light; and
- (ii) there was no light along the length of the tow for a distance of over 4 miles.

60. The only lighting was the blue strobe lights on the buoys.¹⁵ The claimants contended that such constituted appropriate compliance with sub-rule (h). It was submitted that it was impractical to exhibit the prescribed lights and that all possible measures had been taken to light or at least to indicate the presence of the object.

61. The proposition that it was impractical to exhibit the prescribed lights was not controversial at least in the sense that it was not possible to light the length of the array at intervals not exceeding 100 m. But it was the Elder Brethren's view (and I share it) that the vast unlit space astern of *Western Neptune* presented a considerable hazard to and from other vessels. Whether a separate streamer designed to carry lights at reasonable intervals (even if much more than 100 m) was wholly impractical is somewhat surprising, although it would no doubt be costly and inconvenient. Nonetheless it is accepted by the court that it was impractical albeit, with some reluctance.

62. But accepting the fact that such lighting is to be treated as unrealistic (and it certainly seems to accord with the practice in the industry) merely emphasises the high standard of care required to indicate the presence of the array by other means. This leads to considering such means under four headings:

- (i) Buoy lights.
- (ii) Strobe lights.
- (iii) Radar transponders.
- (iv) VHF warnings.

¹⁵ As already explained, whilst it is not at all clear it is to be assumed that the forward buoys also carried such lights.

Buoy lights

63. It was not suggested that exhibiting an all-round white light on each buoy was impractical. But it was contended that:

- (i) the requirement was *ultra vires*;
- (ii) the installation of strobe lighting was a proper and seamanlike substitute; and
- (iii) any deficiency was not causative since the flashing lights were seen by *St Louis Express*.

64. It is convenient to start with the scope of the regulations. Rule 24 makes provision for lighting objects under tow including inconspicuous or partly submerged objects. The editors of *Marsden: Collisions at Sea*, 13th Edition, suggest that such is *ultra vires* on the basis that the rules are limited to vessels: see Regulation 2(i)(a) of the Merchant Shipping (Distress Signals and Prevention of Collisions) Regulations 1996 (SI 1996/75). The enabling legislation is the Merchant Shipping Act 1995 (sections 85 and 86), a ship being "every description of vessel used in navigation" (section 313). Special provision is made for seaplanes and hovercraft but not otherwise.

65. That view is arguably correct. A ship would not include a raft, gas float and such like: *Fogarty, Merchant Shipping Legislation*, paras 20.27ff. But the better view is that the prescribed lighting for the tow is simply part of the prescribed lighting for the towing vessel. The point is of marginal significance since, as the editors point out, the failure to make arrangements for towed objects to carry adequate lights consistent with prescribed navigation lights would be a breach of the duty of good seamanship, a view with which the Elder Brethren concur.

Strobe lights

66. Should all-round white lights have been installed or were the blue strobe lights an appropriate substitute? Again, it was not suggested that there was any fault or at least causative fault in this respect. But again the court has some concerns about the practice:

- (i) It is fundamental that navigators understand the significance of the lights being exhibited by a vessel.
- (ii) Rules prohibit the exhibition of any other lights except for those which cannot be mistaken for the lights specified (see rule 24(b)).¹⁶
- (iii) There are only two references to flashing lights in the Collision Regulations:
 - (a) Rule 23(b) requires a hovercraft in a non-displacement mode to exhibit an all-round flashing yellow light.

¹⁶ It is of some note that there is now provision for marking wrecks with blue and amber flashing lights.

(b) Rule 36 which deals with signals to attract attention goes on: "For the purpose of this Rule the use of high intensity intermittent or revolving lights, such as strobe lights, shall be avoided".

67. That said it certainly appears to be customary in the survey industry for the end of each array to be lit by strobe lights. The topic is dealt with in an IMO note dated January 1997 entitled "The Marking of Seismic Streamers". The note recommends as follows:

2. Towed streamers can extend to considerable lengths (eg more than 8 km). Their ends can be out of sight of the towing vessel. Long unmarked streamers represent a danger to navigation to other vessels, which need to be warned that they may be running into danger.

3. To enhance safe navigation, seismic survey vessels should mark their towed streamers with tail buoys. Additionally, another buoy should be towed a short distance behind the towing vessel. All buoys should display by day and night an all-round high-intensity white light flashing the Morse signal "U" — "You are running into danger".

4. It will be clear to approaching vessels that the area of danger lies between the buoy towed close to the vessel, and the array of buoys towed on the tails of the streamers.

68. The arrangement for the streamers behind *Western Neptune* did not comply with this recommendation. The flashes on the tail buoys were continuous and not in the form of the Morse signal "U". The explanation proffered for selecting continuous flashing as opposed to "U" flashes was concern that confusion might arise given that the many oil rigs in the vicinity were equipped with lights flashing "U". The Elder Brethren doubt whether any confusion was likely given the proximity of the buoy light to the sea surface but accept that the decision was not unjustifiable.

69. Although the point not was considered in any detail at the trial, it would appear that the forward buoys were similar in type to the aft buoys and presumably lit in the same way. This is an important precaution because taken in isolation the lights on the tail buoys would give no information as to which side vessels should pass. But, as the recommendation states, the combination of flashing lights at each end of the array should make it clear on which side the danger lay. But given the scale of the tow, this suggestion may not be valid. It is all dependent on the visibility of the lights. The minimum is 3 miles but that would be of limited value with a length of over 4 miles.

70. However no complaint is made about any aspect of the lighting. The explanation may well be

that any defective lighting was not viewed as causative. It is clear that the lookout on board *St Louis Express* was poor. The precise point of contact with the streamers is controversial but it was no more than 200 m from the buoys. In the VHF exchange following impact there was this exchange:

0806: WESTERN NEPTUNE: "Yes, our cables are four and a half nautical miles long and you have passed over all ten of them just in front of the tail buoys ... so I guess you saw all the flashing lights on your starboard side".

ST LOUIS EXPRESS: "Roger that".

71. The master of *St Louis Express* then came on the bridge and questioned the OOW:

0817: Master: "So when did you sight the buoys under water or above the water."

OOW: "There was flashing lights but he didn't say anything about lights ... he said our cables extend so far out so the flashing lights figured to starboard and that is where they were."

72. In his statement the Third Officer of *St Louis Express* comments in the context of *Western Neptune's* question whether "he could see the tail buoys" that "I saw two white flashing lights which I believed to be lights from a stand-off buoy from the oil-rig". On any view *St Louis Express* passed unsafely close to the aft buoys. Indeed, on the claimants' case, within 20 m. In these circumstances there must be doubt whether the lights on them were seen at all before collision or at least until a very late stage.

73. The thrust of the Third Officer's comment to the master of *St Louis Express* was that he was aware of the cables extending out for some miles but had not been told that their end was marked by the flashing lights. Nonetheless the information from the VHF exchanges and the AIS system was more than adequate to demonstrate that the lights were at the aft end of the tow and should be left to port.

Radar visibility

74. The tail buoys were fitted, as already noted, with radar reflectors. In fact these were not picked up as echoes on the radar of *St Louis Express*. They were no doubt effective in suitable conditions although somewhat less effective in a seaway. In any event the likely explanation for the absence of any visible echo is that there had been over-adjustment of the anti-clutter controls whereby these weaker targets were erased. This explanation is the more likely given the identification of "heavy rain in the Northern Sector of the radar".

75. A further question thus arises as posed by the Elder Brethren as to whether the aft buoys should have been fitted with transponders (although again

this was not a complaint made by the defendants). The starting point in this discussion is IMO Resolution A.615 dated 19 November 1987 which adopted various recommendations made by the Maritime Safety Committee on "The Marine Uses of Radar Beacons and Transponders". Notably para 3.3 reads:

3.3 Where an operational requirement exists for a responding device, other than for radio navigational purposes, a transponder should be used. Examples of requirements suitable for transponders are:

1. Identification of certain classes of ships (ship to ship) and towed devices . . .

76. The IMO circular entitled "The Marking of Seismic Streamers" quoted earlier in this judgment drew attention to IMO Circular 154 dated April 1992 on the basis that it might have some relevance to the issue. IMO Circular 154 provided as follows:

2. Resolution A.615(15) recommends that Administrations, which permit radar transponders to be used on ships for safety purposes, should prepare guidelines to ensure that no misunderstandings should occur in the use or identification of the transponders.

3. In establishing guidelines on the use of radar transponders on ships, Administrations concerned should take into account the following:

1. ships and maritime activities permitted to be marked by transponders should, in order to ensure safe identification and proper actions by other ships, conform to criteria developed by the Administrations concerned and notified to IMO;

2. to avoid causing confusion on radar displays and to ensure proper identification of radar beacons (racons) in the area, the use of radar transponders in congested or constrained waters should be limited . . .

77. It was against that background that the UK MCA issued a guidance note in February 2001 where, in the context of IMO Circular 154, the point was made that "to avoid causing confusion on radar displays, and to ensure proper identification of navigation radar beacons (racons) in the area, the use of radar transponders in the congested and constrained waters around the United Kingdom is not normally permitted. Permission must be obtained from this Administration on a case by case basis". The Elder Brethren advise me that such permission should certainly be sought for this type of survey in, say, the English Channel and would probably be granted.

78. No equivalent documentation issued by USCG was in the papers. If permission was not

required it was in the Elder Brethren's view an obviously sensible precaution (not least because the radar reflectors as fitted were low down and pretty small). It is of course possible that the USCG would have adopted a similar policy to the MCA. In my judgment (in accordance with the advice of the Elder Brethren) if an application was required it ought to have been made. It is at least possible that the US Administration would have permitted the use of transponders on the *Western Neptune* array if an application had been made. If installed, vessels approaching the convoy would have identified a strikingly long straight line echo proceeding at the same speed and on the same course as the other echoes.

79. Nonetheless it is clear that standards within the industry did not include transponders on the tail buoys. Whether this is because such is a proper standard in any event or whether an application to fit them would fail matters not. Since there is an element of speculation in the passages above I make no finding of fault. That said the position should certainly be reviewed by way of a precursor to any continuing operations.

Warnings

80. The fact that the array had limited lighting and presented limited radar visibility merely emphasises the need for vigorous efforts to give effective warnings to other vessels of the requirement to give *Western Neptune* a very wide berth. An analogous example of such an obligation on the part of the towing vessel is to be found in *Thomas Stone (Shipping) Ltd v The Admiralty (The Albion)* [1953] 1 Lloyd's Rep 239.

81. I have already referred to the content of the USCG notice to mariners and the details available on AIS. Both emphasised the length of the tow although were less helpful on the scale of the exclusion zone. In reality the first line of defence was the VHF broadcasts made by *Furore* to oncoming vessels. Indeed it must be borne in mind that some vessels may not have received the notice to mariners and/or may not be equipped with AIS.

82. Various points arise at this stage:

(a) the need for caution when relying on VHF as a collision avoidance tool;

(b) the question of whether there should be regular broadcasts in addition to specific calls to approaching vessels;

(c) the content and source of the broadcast; and

(d) the question of the extent of confirmation and/or reconfirmation by the approaching vessel of the content of the broadcast.

Use of VHF

83. As regards to the need for caution this court has repeatedly warned about the risks involved in using VHF to assist in collision avoidance: see *The Mineral Dampier and the Hanjin Madras* [2001] 2 Lloyd's Rep 419. Of course the problem of misidentification has been much alleviated by the arrival of AIS: see *The Hakki Deval* [2006] EWHC 2809 (Comm). But misunderstandings by reason of language difference, poor radio reception, insufficiently prompt broadcasts and so on can still arise. All those features are material when considering this part of the case.

84. As regards the regularity of broadcasts it is significant that *Furore* only made contact with specific individual vessels. Thus at 01.15 she made contact with *Eagle Subaru* although the precise terms of the exchange which led to *Eagle Subaru* agreeing to pass 3 miles "behind" are not recorded in the papers. Nor is it apparent whether the exchange was overheard on *St Louis Express* (any confidence in such having been the case is somewhat undermined by the loud music being played on the bridge of *St Louis Express*).

85. The first call to *St Louis Express* was at 02.20 (C-39). In fact at that stage *Western Neptune* was distant 11.9 miles with a CPA of only 0.73 miles (although the CPA for *Furore* itself was 1.45 miles). But *Eagle Subaru* was already a "dangerous" target with regard to *St Louis Express*. She was only 6 miles distant with a CPA of just over a cable. *St Louis Express's* alteration to port at *Furore's* request provoked a complaint from *Eagle Subaru* and the subsequent substantial alteration to starboard by *St Louis Express*.

86. This state of affairs demonstrates, the Elder Brethren advise me, the desirability of regular broadcasts by *Western Neptune* of her position, course, speed and her lack of manoeuvrability and the size of the necessary exclusion zone. This should have been broadcast regularly, dependent on the level of oncoming traffic.

87. It was not suggested by the defendants that there was a fault in this respect. This again may be based on the proposition that any failure was not causative in that *St Louis Express* received and understood *Furore's* message and did so in sufficient time to take effective action.

Content of warning

88. This in turn leads to the contents and source of the message. As regards its content it is unfortunate that it contained no reference to the buoys and the lights on the tail of the tow. The Elder Brethren advise me that it was an obvious and necessary piece of information given the absence of any intermediate lights over a distance of some 4 miles, the

unusual nature of the flashing lights and the proximity of the drilling rigs.

89. It is also unfortunate that the message did not describe the nature and make up of the convoy. The message emanated from *Furore*. At no time was there any broadcast let alone any contact made by *Western Neptune*. Yet *Furore* was a mile or more ahead of *Western Neptune*. There was a need to interrogate AIS to establish the identity and relative positions of the four vessels in the convoy. In this context it may be of some note that, at the time of the collision between *St Louis Express* and the array, *Western Neptune* was distant 4.22 miles (and thus inside the exclusion zone measured from her) but *Furore* was distant 6.49 miles (and thus outside the exclusion zone measured from her). It would be entirely speculative to suggest that the third officer had regard to the CPA from the wrong vessel. But there are obvious risks of misunderstanding with a group of several vessels one of which made radio announcements to safeguard the others.

Confirmation

90. Next comes the question of confirmation. The initial broadcast was acknowledged by the Third Officer saying: "Roger that. I am altering course to port". Clearly the need to give a CPA of 3 nautical miles ahead by altering course to port had been understood. But whether the balance of the message about the scale of the safety box had been absorbed must have been somewhat unclear.

91. More importantly re-confirmation of *St Louis Express's* appreciation of the requirement ought to have been obtained once *Eagle Subaru* had requested an alteration to starboard. This exchange was overheard both on *Western Neptune* and *Furore* but neither vessel made any attempt to contact *St Louis Express*, let alone repeat the need for a wide berth if *St Louis Express* was to pass astern of *Western Neptune*.

92. It is by no means clear that *St Louis Express* appreciated the width or length of the exclusion zone (let alone the place of the flashing lights within it). Indeed the officer of the watch of *St Louis Express* expressed himself as content with what he regarded as a passing distance of 5.85 miles astern in a VHF conversation subsequent to the collision. No references were made by or to him after the event as regards to the required lateral distance of 3 miles. He certainly remained ignorant of the association of the lights with *Western Neptune* and complained as much afterwards to his master. Indeed he appears to have associated the flashing lights with a rig in the vicinity.

93. A possible explanation for a somewhat lax approach by *Western Neptune* to broadcasting the extent of the exclusion zone and its enforcement

was contained in the evidence of the OOW of *Western Neptune* to the effect that sometimes vessels were permitted to "cut the aft corner" of the zone so long as their course would lead to clearance. This is a somewhat unsatisfactory relaxation of the requirements of safety which would risk bringing in its train curtailed communication and sloppy lookout.

Lookout

94. I accordingly turn to the topic of lookout on *Western Neptune*. Those on *Western Neptune* and *Furore* saw *St Louis Express* come to starboard and shape to pass close to the exclusion zone. In fact encroachment into the zone would have been substantial had she remained on 333° as from 02.30. Clearance was not achieved even after *St Louis Express* came onto 347° as from 02.41. On that course she would have "clipped" the limit of the zone on *Western Neptune*'s port quarter. Be that as it may it was assumed throughout by *Western Neptune* and *Furore* that the passing would be safe and no particular observations were made of *St Louis Express* or her movements from about C-30.

95. Leaving aside the habit of accepting a short-cut as mentioned above, the lack of observations by those on *Western Neptune* may have been encouraged by an undue reliance on *Furore*.¹⁷ Those on *Geco Tau* and *Ocean Odyssey* were equally unobservant. But in fact *Furore*'s attention may have been transferred to further traffic approaching from ahead. If so the absence of a second guard boat (and particularly one in the vicinity of the exclusion zone aft of *Western Neptune*) would have been a further difficulty.

96. The Elder Brethren advised me as follows and I accept their advice:

(i) Following the VHF exchanges between *St Louis Express* and *Eagle Subaru* and the consequent alteration to starboard by *St Louis Express*, *Furore* (or *Western Neptune*) ought to have contacted *St Louis Express* again because the earlier agreement for *St Louis Express* to pass 3 miles ahead was no longer valid. *Furore* should have reminded *St Louis Express* of the scope of the exclusion zone and required acknowledgement that the *St Louis Express* would indeed pass 6 miles astern and 3 miles away from the tail buoys.

(ii) Thereafter and in any event the progress of *St Louis Express* should have been monitored. It would have been readily apparent that *St Louis Express* never came sufficiently to starboard to accord the necessary berth. Although the initial

alteration back to port by *St Louis Express* was gradual it should have been apparent that *St Louis Express* was actually about to enter the exclusion zone at 02.49 (C-10) when in a position some 2 miles ahead of the aftermost corner of the zone.

Post collision precautions

97. It is of some note that after the collision the claimants and the master of *Western Neptune* introduced some significant changes to navigational practice during surveying operations. It is important not to allow this development to justify the finding of fault without more. Nothing is so perfect that it cannot be improved:

People do not furnish evidence against themselves simply by adopting a new plan in order to prevent the recurrence of an accident. I think that a proposition to the contrary would be barbarous. It would be, as I have often had occasion to tell juries, to hold that because the world gets wiser as it gets older therefore it was foolish before: *Hart v L & Y Railway* (1869) 21 LT 261 at page 263 per Brownwell J.

98. But in fact I did not understand it to be controversial that the new practice in fact reflected good practice. The meat of the point is to be derived from the amendment to the masters' standing orders introduced on 1 October 2007 within a week of the collision:

Traffic Monitoring

All approaching vessels to be plotted on the appropriate radar including the AFT radar for targets passing astern of the WESTERN NEPTUNE. Due attention to be given to blind sectors, range, gain and clutter settings to control distortion to the picture.

All crossing traffic to have a past track activated ECDIS to help visually highlight any changes to courses.

Monitor radio traffic between chase vessels and other traffic and check that course alterations are sufficient.

Keep monitoring approaching traffic until they are safely clear of all equipment.

Ref VSI M6NPN/WO36 Traffic monitoring.

99. The need for continued oral contact and reconfirmation of the exclusion zone was covered by a further instruction dated 25 October 2007:

GENERAL

This instruction applies to chase vessels and bridge officers on the WESTERN NEPTUNE. The minimum required CPA from the WESTERN NEPTUNE for approaching traffic is 3 NM

¹⁷ I have already made reference to the visit to the washroom and the subsequent concentration on an adjustment of speed.

ahead, 3 NM to both sides and 6 NM astern. This should be advised to all approaching traffic with a CPA within or close to these limits. If the WESTERN NEPTUNE is in a turn, then due regard must be given to the streamers being in a loop off to the side.

A 3 step contact will be attempted made with all approaching traffic.

First contact

At minimum a range of 10-12 NM, or further vessels doing more than 20 knots, the first contact will be made to advise approaching traffic of our operations and minimum required CPA. The first contact will also be used to advise of most efficient deviation to meet required CPA.

Second contact

Once the vessel has deviated to meet the required CPA, the new course and/or speed will be checked by the duty officer on the WESTERN NEPTUNE. When the course and/or speed is verified as appropriate by the WESTERN NEPTUNE, the vessel will be contacted and requested to maintain this course and speed until contacted by the chase vessel or WESTERN NEPTUNE to confirm they are clear of the operation. The second contact should also be used to advise of the tail buoys and marking lights and also of any chase vessel located behind the cables to indicate which side to safely pass.

Third contact

When the vessel is safely clear of the operation, she will be contacted and advised that she is clear to alter back to original heading.

100. Finally on 28 December 2007 a new arrangement for guard vessels was introduced whereby if (but presumably only if) two such vessels were available, the second should be placed 1 mile astern from the tail buoys with all vessels being required to pass astern of the second guard vessel.

Warnings

101. Once it became apparent that *St Louis Express* was taking no or no adequate action to keep out of the exclusion zone, *Western Neptune* (or at least one of the vessels in the convoy) should have taken steps to warn *St Louis Express*. All appropriate means should have been adopted including the use of VHF, lights and flares. In fact it seems probable that a VHF call would have been sufficient to result in an alteration to starboard on *St Louis Express*'s part. An added sensible step would have been to use the searchlight both to attract attention and to try and light up the buoys. The range between the vessels probably militated

against effective use of sound signals. All this again identifies the desirability of a second guard boat.

Failure to dive the streamers

102. It is common ground that the streamers astern of *Western Neptune* could have been dived from 12 to 25 m in about five minutes. Allowing for a reasonable period for decision making the overall period for such an operation would have been little more than about six minutes. Subject to the precise position of the initial contact, the outcome of such an operation would have furnished a substantial margin of safety given *St Louis Express*'s draft. With reference to rule 17 the defendants contend that this was a step that should have been taken.

103. Was such an operation called for? It is notable that the initial reaction of the master of *Western Neptune* on being called to the bridge after the collision was to ask if the streamers had been dived. Furthermore, in response, the officer of the watch told the master "we are trying". This was not true but it pointed to the correct reaction to the situation of danger that had been created by *St Louis Express*.

104. Certainly in house "best practice" suggestions made within the claimants' organisation both before and after the collision included procedures for diving the gear. Albeit a measure of last resort, I have no doubt (nor do the Elder Brethren) that efforts to dive the streamers should have been undertaken to avoid or limit the damage, particularly given the vulnerability and value of the streamers. The ability to take such evasive action timeously is emphasised by the fact that at C-6 *St Louis Express* was already a whole mile inside the exclusion zone and, on a heading of 290°, was shaping to cross the aft end of the array.

105. There was a considerable dispute between the parties as to the precise position of contact on the outside streamer number 10. The claimants contended that it was about 20 m forward from the stern buoy; the defendants contended that it was at least 200 m forward of the buoy.

106. I was not persuaded that the resolution of this issue was particularly revealing although it is true that even when dived that part of streamer 10 in close proximity to the tail buoy would by definition not be lowered much if at all in the water (ie it would remain at about 4 m). Thus even when dived contact close to the buoy would still occur.

107. In my judgment the claimants' case on this issue (if it matters) is correct. I find the evidence of their expert Mr Thomas, based on the damage exhibited by the streamers, is entirely persuasive. In particular I accept his evidence that the strands of the streamer number 10 showed clear signs of being

pulled around the bows of *St Louis Express* while the other streamers had parted in straight tension. That is entirely consistent with the contemporary observation that *St Louis Express* crossed in very close proximity to the buoys.

108. Calculations made by the defendants' expert Mr Cavell do not persuade me that the observations derived from the damage give a misleading impression. There are obvious margins of error with regard to speed, course, current and so on which militate against an accurate calculation.

109. Nonetheless I do not accept the proposition that once the point of contact at 20 m forward of the tail buoy is established, failure to dive is shown not to be causative. It is clear that whilst the damage caused by the initial contact would have been unaffected, contact damage with some of the remaining streamers would probably have been avoided. In short the damage might not have been as extensive as it was although it would nonetheless have been substantial.

St Louis Express's navigation

110. There is no dispute that the situation of danger was created by *St Louis Express*. She had heard and understood *Furore's* request to stay out of the exclusion zone: indeed there would be no other reason for attempting to give *Western Neptune* such a wide berth if she had not. But she never adopted a course which kept her well outside the zone and more importantly came to port progressively from 02.41 (C-18) shaping to cut across the after section of the exclusion zone and thereafter across the stern of *Western Neptune* at an unsafe range of 4.3 miles. There was no navigational reason for this alteration: the rigs in the vicinity posed no obstacle. Indeed somewhat astonishingly she must have been steering a course with the flashing lights on the buoys almost dead ahead without appreciating their significance (assuming they were seen at all before impact).

111. All this was brought about by faulty visual and radar lookout together with:

- (a) Employing the clutter control to eliminate all clutter.

(b) Failing to identify the details of the convoy on AIS and in particular failing to identify the relevant towing vessel.

(c) Failing to call the master to the bridge as a close quarter situation developed.

112. For what it is worth I accept the claimants' submission that this navigation was symptomatic of sloppy practice on board the bridge of the *St Louis Express* that night in:

(a) Failing to incorporate the survey warning within the passage plan.

(b) Failing to include the survey area on the working chart.

(c) Playing loud music.

(d) Allowing *Eagle Subaru* to become a dangerous target on the ARPA radar when standing orders require a minimum CPA of 2 miles.

(e) Initially altering course to port across the bows of *Eagle Subaru*.

113. As already noted the defendant accepts that they must bear the preponderance of the blame.

Western Neptune's navigation

114. It is in effect accepted (and if not I find in accordance with advice from the Elder Brethren) that *Western Neptune* (whether directly or through the offices of *Furore*) failed to act with reasonable care in various respects:

(i) Failed to contact *St Louis Express* following her change of course to accommodate the *Eagle Subaru* so as to confirm the exclusion zone and *St Louis Express's* intentions.

(ii) Failed to draw the attention of *St Louis Express* to the presence and significance of the tail buoys.

(iii) Failed thereafter to keep a good look out particularly as regards to the course of *St Louis Express* and her progressive alteration to course to port from C-18.

(iv) Failed at the last to dive the streamers.

115. That said these faults of *Western Neptune* were substantially less blameworthy or indeed causatively potent than those of *St Louis Express*. I would apportion liability one third/two thirds in favour of *Western Neptune*.

In reference to action item 13 of the LAP 13 in October 2014 – and partly linked to action item 11 – we would from the Swedish Maritime Administration (SMA) like to share the process of data collection and administration of AIS in Sweden.

The SMA affirmed in 2012 a policy regarding streaming of AIS data. The use of AIS data will according to the policy serve the objectives of the national transport policy in ensuring an economically efficient and sustainable transport system for citizens as well as the industry. The objective of the SMA is to secure a high level of service to customers, whilst maintaining a high quality, avoid accidents and reduce the environmental impact.

Streamed AIS data from the SMA should be used for the following purposes:

- Increased accessibility for customers to the maritime transport system
- Improved maritime safety through reduced numbers of accidents and thus less casualties and reduced impact on the environment
- Improved efficiency in customers' businesses
- Reduce the total impact on the environment by the transport system

Sweden has historically considered AIS data to be reliable. It has not (to our knowledge) been questioned or challenged in a legal context. The SMA has extradited AIS data upon request, but we cannot confirm that it has been in reference to a legal dispute. As far as we know the data has never been subjected to a legal review.

On the issue of sharing AIS data Sweden has no restrictions, and the data can be shared in public upon request.

Uncertainty elements

The liability of AIS data should above all be based on the element of uncertainty. In our point of view AIS data has few sources of error which makes it a highly reliable instrument. The SMA has categorised the uncertainty factors under four headings: aboard ship, in the base station, in the transmitting process and in the data storage.

Aboard ship

- Manipulated data, intentional (intentional inaccurate position, or other sensor data to AIS transponder and intentional inaccurate data in the transponder)
- Manipulated data, unintentional (inaccurate position of antennae, or sensor parameters, unintentional inaccurate data in the transponder, typing error, etc.)
- Technical positional failure, or other sensor failures

In the base station

- Possible shutdown due to power failure (can lead to reboot)
- Possible shutdown due to transmission problems (can lead to loss of data)

Transmitting process

- Loss of positional reports (due to overload on VDL)
- Loss of statistical reports (static messages or voyage messages)

Data storage

- Possible shutdown in distribution servers (although unusual as they are redundant)
- Possible shutdown in data recording and storage system (although unusual as there are several systems)

ANNEX D Input Paper from Denmark

General remark

There are no Danish law restrictions on the use of AIS data or other technical evidence as evidence in court proceedings. It is up to the courts to decide how much weight to be given to particular evidence

Collisions with buoys

In case of collisions with buoys, AIS data, radar tracks as well as paint remains on the buoy or the ship are used as evidence. Normally, criminal proceedings will not be instituted. In recent years, it has not been necessary to institute civil proceedings since the issue of who is to pay has been solved through talks between the parties. During these talks, AIS data have been presented to the one responsible for the accident together with any radar tracks and reports of paint remains.

Cases related to pilotage issues

In cases related to pilotage issues – both cases on violations of mandatory pilotage requirements and previous cases where pilots have not respected landmarks – AIS data are of major importance. The first thing that the Danish Pilotage Authority does is to request such data. The AIS data form the basis of the Danish Pilotage Authority's decision whether to require any further information and whether to hand over the case to the police.

The prosecution at the Police of Northern Jutland and at the Police of Copenhagen has directly indicated to the Danish Maritime Authority that AIS data are of great value because they provide an exact overview of the incident very fast.

By far most cases related to pilotage issues are decided out of court through the adoption of a fine notice. The actual sequence of events is not questioned by the ships. Cases are normally referred to court for legal reasons (disputes over mandatory pilotage requirements or over the penalty level). AIS data are presented in all court proceedings, but they are normally not mentioned in the judgment.

Examples of court cases:

Case 1

A ship arrived from the North Sea carrying a cargo of oil and cast anchor in Aalbæk Bay in outer territorial waters. Another ship arrived from Gothenburg and cast anchor next to the first ship and had some of the oil reloaded (STS operation), and subsequently the first ship returned to Gothenburg. The ship owners were of the view that they did not have to take a pilot, partly due to the regime of the straits, partly because the ships had not been sufficiently close to the coast. In the court proceedings, AIS data were used to show the ships' routes before and after the STS operation (had not passed the straits), that the ships cast anchor right next to each other (performed an STS operation) and the ships' position during the STS operation (in outer territorial waters). The AIS data meant that the real facts of the case did not constitute an issue during the court proceedings.

Case 2

A ship carrying a cargo subject to mandatory pilotage had ordered a pilot, but had subsequently cancelled the order again since there was no berth in the port. Then, the ship proceeded to waters with mandatory pilotage and cast anchor while waiting for a berth in the port. Though the ship intended to order a pilot as

soon as there was a berth in the port, the ship was found guilty of having proceeded to the anchorage without a pilot. The navigational pattern was substantiated by means of AIS data.

Cases related to ship wrecks

Recent years have not seen any criminal proceedings in the area of ship wrecks where AIS has been used. As regards civil proceedings, the Danish Maritime Authority has in recent years had one case (Elkana) where the Danish Maritime Authority has required the expenses incurred in connection with wreck removal reimbursed.

Case 3

A ship was under tow from one port to another port where it was to be scrapped. However, the ship foundered on its way, and subsequently the Danish Maritime Authority required the expenses incurred in connection with the salvage operations reimbursed, inter alia by the towage company. Initially, the towage company claimed that a high-speed ferry had created unusually high waves and that these waves were the reason for the loss. As early as during the preparation of the case, the Danish Maritime Authority therefore presented AIS data showing that there had not been any high-speed ferry in the vicinity. During the main negotiations, the towage company had changed its explanation. Furthermore, the AIS data were presented in court.

Cases related to collisions

There is one civil case in which the Danish Maritime Authority is involved (Helle Saj). The case is about a collision between two dredgers in foggy weather (one owned by the Danish Coastal Authority and one privately owned). Over the radio, the ships had agreed to sail in a specific manner in relation to each other, but instead one of the ships sailed according to the regulations for preventing collisions at sea. AIS data were used to map their navigation, but one important issue in the marine investigation report was why one of the ships had not used the AIS system during its voyage. The case has not yet progressed so much that it is possible to make a summary as such.

Cases related to alcohol abuse

Case 4

In a court case on alcohol abuse involving a foreign cargo ship and foreign master, AIS data was used to determine the ship's lurching path.

Cases related to speeding

Case 5

In a case of speeding from 2014 the shipping company has contested the validity of the AIS system in relation to the specific speed measurements. The contestation is primarily based on the fact that it is not, at present, possible to procure data from the black boxes (VDR – Voyage Data Recorder) of the ferries related to the specific voyages.

The Danish Maritime Authority has made the two technical analyses of the two high-speed craft's AIS and VDR data. The analyses compare, inter alia, AIS data from other voyages where VDR data are available. It is demonstrated in the technical analyses that the AIS data are reliable as regards position, course and speed within the 2 per cent tolerance prescribed for the relevant test standards for the AIS systems and,

furthermore, that there is accordance between the AIS data and screenshots from the radars of the high-speed craft.

The Danish Maritime Authority's letter to the prosecution at the East Jutland Police and one of the analyses is contained in Annex D-1 and Annex D-2.

ANNEX D-1 Translation of letter from the Danish Maritime Authority to the East Jutland Police (abstract)

East Jutland Police
Advocacy for General Criminal Law
Ridderstræde 1
DK-8000 Aarhus C

Re. Your case [...]

By your address of [xx] this year, you have requested a comment because the shipping company and the five masters have contested the validity of the AIS system in relation to the specific speed measurements. The con-testation is primarily based on the fact that it is not, at present, possible to procure data from the black boxes (VDR – Voyage Data Recorder) of the ferries related to the specific voyages.

Our employees, Civil Engineer [XX] and PhD [YY], have made the two technical analyses of the two high-speed craft's AIS and VDR data. The analyses compare, inter alia, AIS data from other voyages where VDR data are available. It is demonstrated in the technical analyses that the AIS data are reliable as regards position, course and speed within the 2 per cent tolerance prescribed for the relevant test standards for the AIS systems and, furthermore, that there is accordance between the AIS data and screenshots from the radars of the high-speed craft.

[...]

Yours sincerely,

ANNEX D-2 Technical analysis – AIS and VDR data

Technical analysis – AIS and VDR data

Made by Civil Engineer [XX] and PhD [YY], Danish Maritime Authority, 4 September 2015

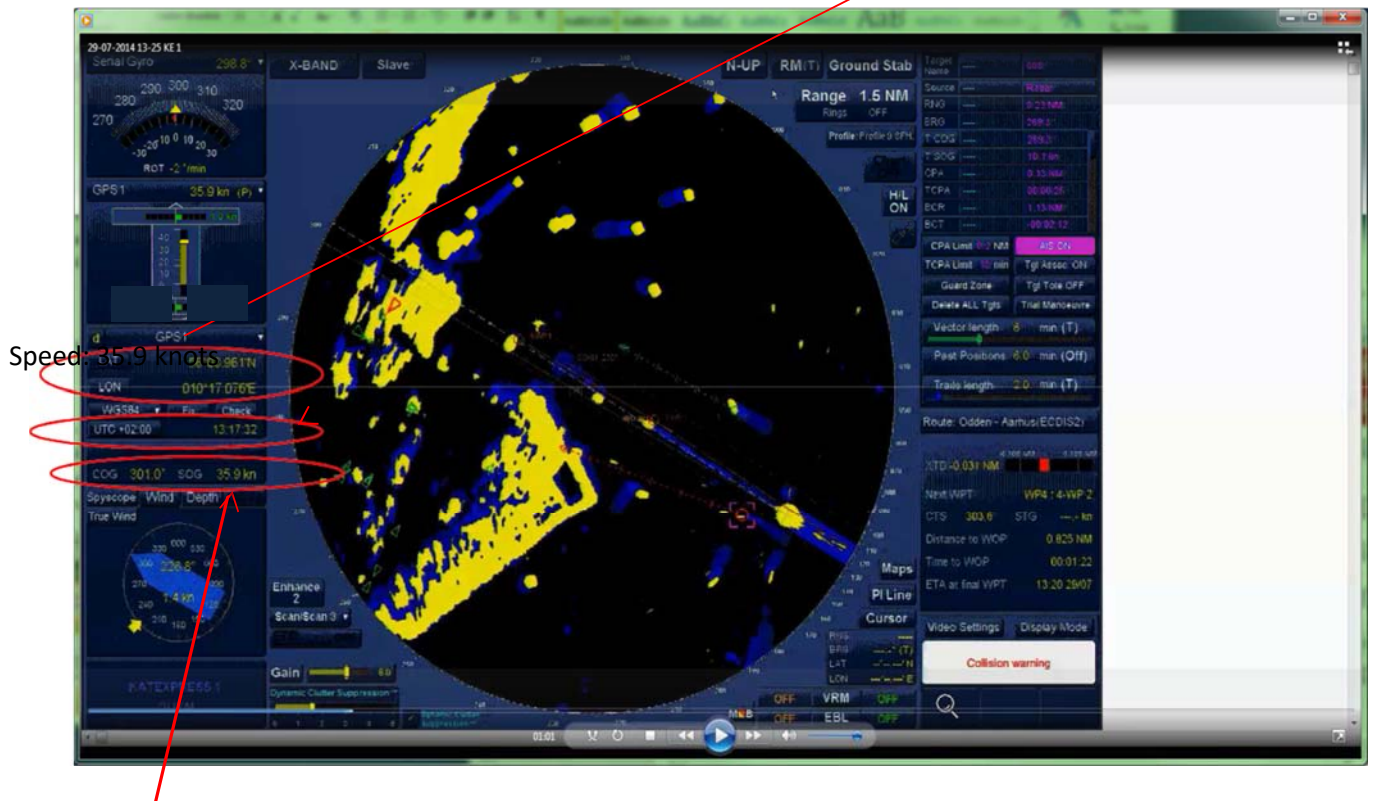
Summary

This document scrutinizes the navigation data recorded by the ship from a voyage made in 2015, from which data is available from the ship's VDR (Voyage Data Recorder – "the black box"). A quality check shows that the navigation data are reliable as regards position, course and speed within the 2 per cent tolerance established for Speed Over Ground measurements, and that data collected via the ship's AIS transmissions are in accordance with screenshots from the ship's radar.

Thus, the Danish Maritime Authority maintains that AIS data can be used for a correct evaluation of the ship's speed within a 2 per cent tolerance.

Ship's navigation data

The picture below shows the radar picture displayed on the ship at 13:17:32 Danish summertime (UTC + 02:00). The picture is a "screen dump" and originates from the ship's VDR (Voyage Data Recorder – "the black box"), which takes such screen dumps at intervals of approx. 15 seconds. This is how the instrument of the master of the vessel looked during the voyage



By means of the AIS (Automatic Identification System) system, the ship's navigational instruments transmit information over the VHF radio at intervals of a few seconds, thus enabling ships to see the identity, course and speed of nearby vessels. AIS signals are also picked up by the Danish Maritime Authority's nationwide network of base stations. Around 11:17:32 UTC (i.e. Danish summertime 13:17:32 UTC + 02:00), an AIS signal from the ship shows a position, course and speed corresponding to simultaneous data from the ship's radar.

KatExpress1.xlsx - Microsoft Excel

Formler Data Gennemse Vis Udvikler 360°

Normal Side-layout Vis Zoom Nyt vindue Arranger alle Frys ruder Vindue Gem arbejdsområde vindue Skift Makroer Makroer

Projektmappevisninger

C75 fx =B75-HELTAL(B75)

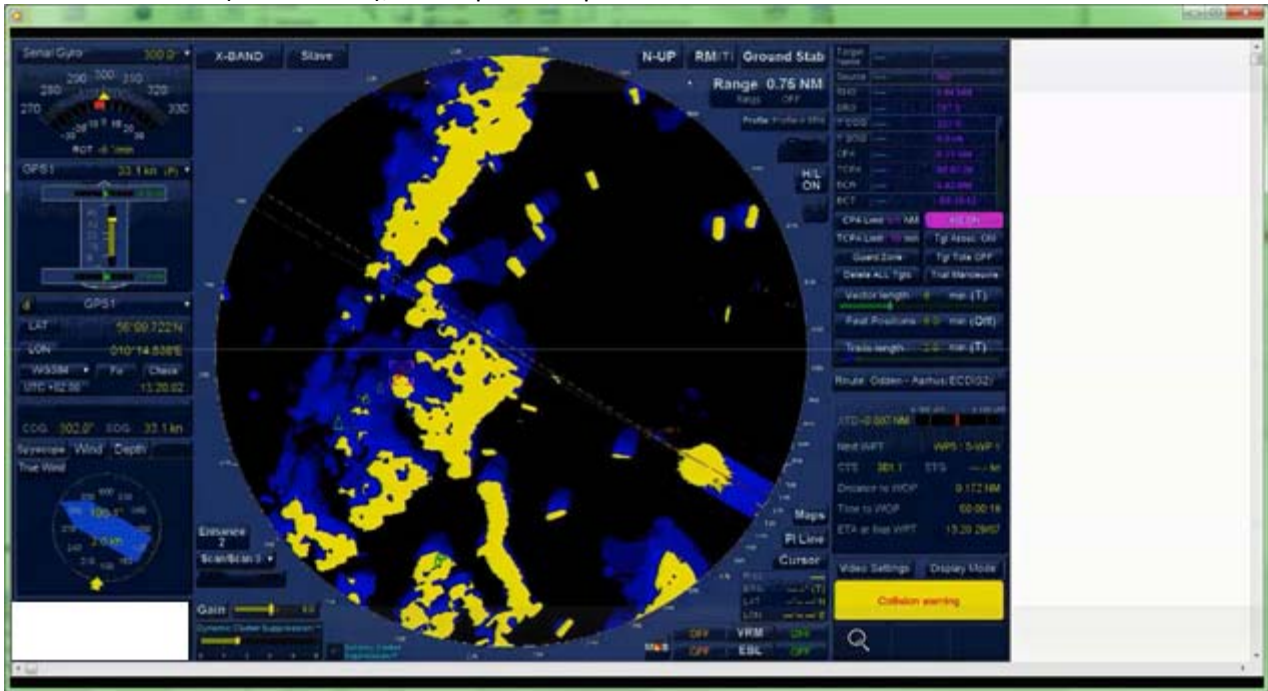
| | C | H | I | J | K | L | M | N |
|----|----------|-----------|------------|-----|---------|-----|---------|---|
| 1 | time | LAT | LON | rot | AIS sog | cog | heading | |
| 73 | 11:17:26 | 56 8,92 | 10 17,2 | 0 | 36,1 | 301 | 299 | |
| 74 | 11:17:28 | 56 8,9395 | 10 17,1587 | 0 | 36 | 301 | 299 | |
| 75 | 11:17:32 | 56 8,9597 | 10 17,0975 | 0 | 35,9 | 301 | 299 | |
| 76 | 11:17:36 | 56 8,98 | 10 17,05 | 0 | 35,8 | 301 | 299 | |
| 77 | 11:17:38 | 56 8,99 | 10 17,02 | 0 | 35,8 | 301 | 299 | |
| 78 | 11:17:40 | 56 9 | 10 16,99 | 0 | 35,8 | 301 | 299 | |

Ark5

Klar Middel: 55707:13:20 Antal: 44 Sum: 2116874:26:59 100%

Speed: 35.9 knots

At 13:20:02 hours (UTC + 02:00), the ship's radar picture shows this:



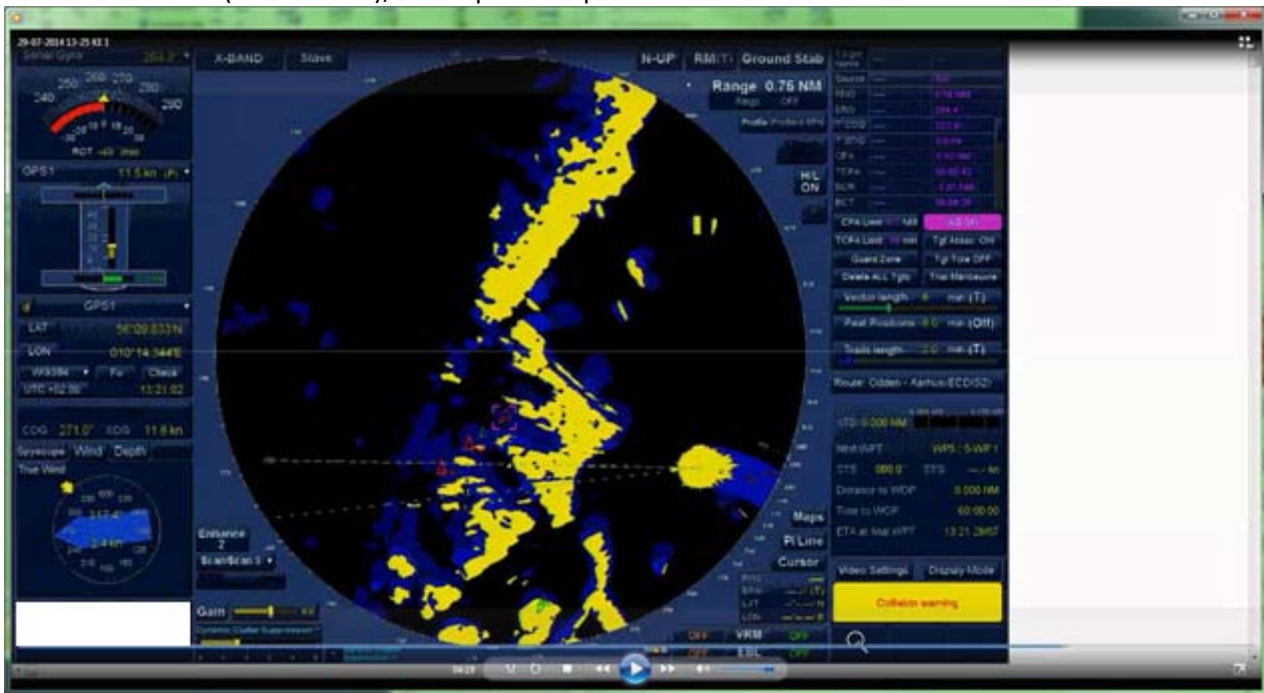
Speed: 33.1 knots

At approx. 11:20:02 UTC hours (= 13:20:02 UTC + 02:00), the AIS signal from the ship shows the same position, course and speed:

| | C | H | I | J | K | L | M | N |
|-----|----------|-----------|------------|-----|---------|-----|---------|---|
| 1 | time | LAT | LON | rot | AIS sog | cog | heading | |
| 137 | 11:20:00 | 56 9,71 | 10 14,9 | 0 | 34,1 | 302 | 300 | |
| 138 | 11:20:02 | 56 9,72 | 10 14,87 | 0 | 33,5 | 302 | 300 | |
| 139 | 11:20:04 | 56 9,7303 | 10 14,8316 | 0 | 32,7 | 302 | 300 | |
| 140 | 11:20:06 | 56 9,74 | 10 14,82 | 0 | 31,9 | 302 | 300 | |
| 141 | 11:20:08 | 56 9,74 | 10 14,79 | 0 | 31,1 | 301 | 300 | |
| 142 | 11:20:10 | 56 9,75 | 10 14,77 | 0 | 30,2 | 301 | 299 | |
| 143 | 11:20:12 | 56 9,76 | 10 14,74 | 0 | 29,2 | 301 | 299 | |
| 144 | 11:20:14 | 56 9,7716 | 10 14,7082 | 0 | 28,2 | 301 | 298 | |

Speed 33.5-32.7 knots. It should be noticed that, as regards both position and speed, the AIS measurement at 11:20:02 is somewhat to the one side and the measurement at 11:20:02 (2 seconds later) somewhat to the other side of the information from the radar picture. This is due to the fact that the sampling of radar pictures and AIS data is not synchronic and that the data displayed in the radar picture and transmitted via AIS have, consequently, not necessarily been recorded at exactly the same millisecond. It can be seen that the data in the radar picture correspond to the AIS data.

At 13:21:02 hours (UTC + 02:00), the ship's radar picture shows this:



Speed: 11.6 knots

At approx. 11:21:02 hours UTC (= 13:21:02 UTC + 02:00), the AIS signal from the ship shows the same position, course and speed:

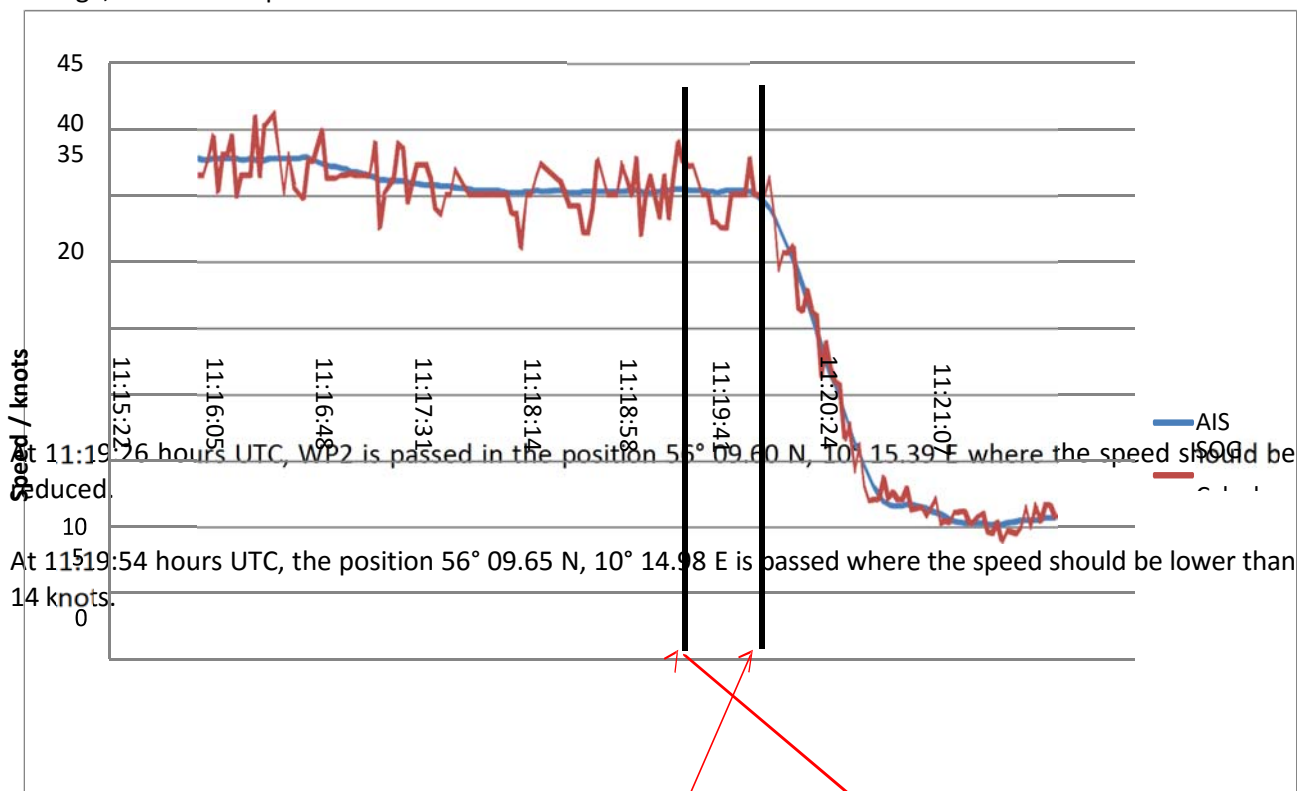
The screenshot shows an Excel spreadsheet with the following data table:

| | C | H | I | J | K | L | M | N |
|-----|----------|-----------|------------|-----|---------|-----|---------|---|
| 1 | time | LAT | LON | rot | AIS sog | cog | heading | |
| 164 | 11:20:54 | 56 9,84 | 10 14,4 | 0 | 11,6 | 278 | 272 | |
| 165 | 11:20:56 | 56 9,8375 | 10 14,3857 | 0 | 11,6 | 276 | 270 | |
| 166 | 11:20:58 | 56 9,84 | 10 14,38 | 0 | 11,7 | 275 | 269 | |
| 167 | 11:21:00 | 56 9,84 | 10 14,37 | 0 | 11,7 | 274 | 267 | |
| 168 | 11:21:04 | 56 9,8379 | 10 14,3399 | 0 | 11,5 | 271 | 263 | |
| 169 | 11:21:06 | 56 9,84 | 10 14,33 | 0 | 11,4 | 269 | 262 | |
| 170 | 11:21:08 | 56 9,84 | 10 14,32 | 0 | 11,2 | 268 | 260 | |
| 171 | 11:21:10 | 56 9,84 | 10 14,31 | 0 | 11,1 | 266 | 259 | |

The status bar at the bottom shows: Marker..., Middel: 55433:33:57, Antal: 44, Sum: 2106475:30:24, 100%.

Thus, it is found in several comparisons that the AIS data correspond to the instrument data that have been shown to the navigating officer on the radar.

A control of the ship's position fixing has been made by means of a visual inspection of the accordance between the position given and the ship's radar picture. The SOG (Speed Over Ground) measurement has been checked by measuring the distance travelled (on the basis of the ship's own GPS position reports received via AIS – which is identical to the positions displayed on the radar) over time (measured by the AIS base station network with high precision). In a comparison with the SOG displayed on the ship's radar and transmitted via AIS, our control measurement (which consists of much fewer measurement points than the ship's own SOG measurement and is thus subject to larger uncertainty) concludes that there is no reason to doubt the correctness of the ship's recorded navigation information and that the speed measurement is, on average, within the 2 per cent tolerance established in relevant test standards for SOG measurements.



ANNEX E Input Paper from Germany

1. General remarks

AIS data or other technical evidence can be used as evidence in German court proceedings. It is the decision of the court if the evidence can be used and to what extent. The collection of data in any form needs a legal basis to be considered as evidence in legal proceedings. In general AIS data, radar tracks and VHF recordings can be used in any legal dispute concerning maritime incidents (civil and criminal court proceedings as well as negotiations out of court). However only the Federal Waterways and Shipping Agency has the right to collect and store AIS, radar and VHF data within certain limits (see below).

2. Using AIS as a tool to prosecute speeding

Even though AIS was in fact used to investigate maritime incidents, there was no court decision dealing with the use of AIS.

a) the incident on the Kiel Canal

The Kiel Canal is an artificial waterway connecting the Baltic Sea with the North Sea. There is a speed limit (speed over ground) for the majority of ships of 8.1 kn (15 km/h). MV XX was passing several ships bunkering at a nearby pier. In cases like these passing ships are obliged to maneuver with great care in order to avoid waves. The pilot aboard the passing ship was accused of not advising the captain on board properly about the appropriate speed. The speed of the vessel, 8.7 knots over ground, was calculated based on AIS positions generated by the Federal Waterways and Shipping Agency. In the end the court decided that there was no misbehavior by the pilot. However long remarks about the use of AIS, the legal basis and the use in court proceedings were made by the court including an extensive professional expertise by an independent scientist. The approach of the Federal Waterways and Shipping agency was fully supported.

Legal basis for the data collection and short time storage of AIS data is § 9 of the "Seeaufgabengesetz" (Federal law), permitting the Federal Waterways and Shipping Agency as the only institution to collect AIS data. AIS data are considered personal data to some extent under German law due to the fact that it is possible to generate certain information about personal details of the crew etc. and the movement of the ship itself which is connected to the freedom of movement and economic interests. Therefore a legal basis is needed for collecting the AIS data.

Moreover the court emphasized the accuracy with which the AIS data are being collected. Reference was being made to the used navigational tools, like GPS, DGPS etc. in addition to the documentation of technical failures during the transmission of the signal. In case the prosecution, the police or any other competent authority requests the AIS data of an incident the relevant AIS data are being looked at manually in order to guarantee that the data are plausible and without technical failures or inaccuracies due to shadowing effects, eg bridges across the Kiel Canal etc. In that case explanatory notes from the competent authority are being given with the AIS data including "safety reductions" when deemed necessary.

Considering the calculated speed based on AIS data the court decided additionally that a "safety reduction" of 1 kn needs to be applied to the calculated speed.

b) lessons learned

Although the Federal Waterways and Shipping Agency lost the case, we gained a court decision that fully supported the collection, storage and use of AIS data to calculate the speed of ships and therefore prosecute regulatory and even criminal offences. Even though the decision was made by a lower court, it remains the only decision so far to deal with the use of AIS data. After the decision the calculation of speed was adapted and supplemented by the “safety reduction” of 1 kn to the calculated speed. Until today the legality of AIS data collected and used by the Federal Waterways and Shipping Agency was not challenged again.

ANNEX F Input Paper from the Netherlands

General remark

There are no law restrictions on the use of AIS data or other technical evidence as evidence in court proceedings. It is up to the courts to decide how much weight to be given to particular evidence.

Cases

There are only a few cases in which AIS data was used as one of the items of evidence. AIS is used as support, in none of the cases it is the primary item of evidence.

Case1

A collision between a inland vessel and a push-towing combination. AIS data were used to map the navigation. According to the AIS data the conclusion of the court was that the inland vessel was going too fast.

Case 2

A yacht was sailing (using its engine) on the North Sea using an inshore traffic lane, while an appropriate traffic lane within the adjacent traffic separation scheme was available. According to the International Regulations for Preventing Collisions at Sea this is an offence.

In this case the AIS data were used as support to convict the skipper.

4 ANNEX G**Accuracy of vessel position information derived from AIS data (Input Paper from the chairman of the ENAV Committee)**

Generally, the accuracy of information contained in AIS data, such as position, course, speed etc. depends on the accuracy of the sensors used to gather the information onboard the vessel.

It seems reasonable to assume that the accuracy of a vessels position derived from AIS data is equal to the accuracy of the position sensor used onboard the vessel. The AIS data include an indication of the positional accuracy transmitted by AIS ('low' or 'high'), depending on whether GNSS or DGNSS is used, however, unless it has been verified that this indicator is indeed showing the true value, one may need to assume that the positional information is based on plain GNSS (GPS) without any differential correction being applied.

IMO Resolution A.953(23) on the World-Wide Radio navigation System states the operational requirements for a radio navigation system used by vessels for navigation in those harbour entrances, harbour approaches and coastal waters with a high volume of traffic and/or significant degree of risk.

The resolution states that:

Where a radio navigation system is used to assist in the navigation of ships in all such waters, the system, including any augmentation, should provide positional information with an error not greater than 10 m with a probability of 95%.

While operators of GNSS systems obviously strive towards ensuring such levels of accuracy, it should be noted that there may be a 5% probability that the error is more than 10m at any given time.

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