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AIS – An Inexact Science

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KEY WORDS

1. AIS. 2. NUMAST.

1. INTRODUCTION. Good afternoon. I am pleased to be invited here today to give the NUMAST perspective concerning the introduction of the Maritime Automatic Identification System (AIS). For those of you, few I expect, that do not know of NUMAST: NUMAST stands for the National Union of Marine, Aviation and Shipping Transport Officers. With over 19 000 ship masters, officers, cadets and other marine professionals, including vessel traffic service (VTS) personnel, I believe we are well placed to comment on this significant technological development.

I must stress that the views that I put to you today are as a consequence of considerable internal debate, not least by our Mercantile Marine Service Association Professional and Technical Forum. The letters MMSA, I am sure, will be familiar to some of you. Now kept alive as an open forum within NUMAST comprising of senior officers, including shipmasters, harbour masters, chief engineers and marine pilots. This is not a technical paper; this is best left to others. I seek merely to express the concerns of mariners and, in so doing, touch upon the circumstances that have led us to where we are now.

2. BACKGROUND. Marine casualties are usually as consequence of either a sequence of events or a number of factors occurring at one very inconvenient time. Each in themselves may be insignificant, but when combined may have catastrophic results. It is often said that 80% of marine accidents are human or operator error. However, closer examination shows that this is somewhere in the region of 95% in cases of collision and grounding; I am always suspicious of round figures.

AIS represents a technological development that has the potential to provide considerable direct benefits to both mariners and shore-based authorities with consequential benefits to other parties engaged in shipping and society at large. But have the regulators got it right in imposing this particular system on the maritime industry? When the regulator fails it is usually the seafarer that pays, sometimes the ultimate price with their lives. Others suffer, including the ship owner, cargo owner,

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passengers, the insurer, and society in general in cases of widespread pollution. The system has received the endorsement of the International Maritime Organisation (IMO) by an amendment to the Safety of Life at Sea (SOLAS) Convention. This follows close scrutiny by the Maritime Safety Committee (MSC) of the IMO and its sub-committees. But how close, and what alternatives were explored? Those who attend IMO Committees and sub-committees I believe are no longer deluded that safety is the prime consideration.

Interest groups pursue their own aims, this is especially so in the area of marine equipment where some flag states see an opportunity to protect or stimulate a part of industry. The specification for sound detection direction equipment was perhaps one of the more exotic requests by a flag state to benefit its manufacturing. One can only visualise a large rotating ear horn with some amusement. One should not be too critical; usually sense prevails. None more so than the requirement to fit Voyage Event Recorders (VERs or VDRs if you prefer).

3. OPERATIONAL USE OF AIS. The initial reaction to AIS by ship owners, naturally, was to question if this was really necessary. It was and still is by some considered an 'expensive toy' that would pry into the private world of shipping. This is usually accompanied by the caveat that it does have some merits while seeking to bury it fast. After all, people on the shore would know it was one of their ships that had violated traffic rules or pumped that oily mixture overboard.

To be fair, this was not the reaction of all ship owners. It was largely confined to those who also resisted VERs. It was articulated by the flag states at IMO who serve such operators' interests. However, I do have sympathy with the good ship owners faced with an endless tide of regulation aimed at the worst.

The debate concerning the fitting of such equipment raised important issues over security and the possible misuse by pirates and armed robbers. The increased incidents of piracy and armed robbery fuelled this concern. The Master's right to switch off AIS is considered fundamental by NUMAST, especially where the vessel, crew, cargo and passengers are at potential risk from such attacks. This is confirmed by the increased risk from terrorist attack. Villains can, from their surveillance vehicle on shore or fast attack craft, track and identify a potential target. However, given the benefits of AIS that will no doubt multiply over time, I suggest a master has to think carefully before deactivating such a useful piece of equipment. It would not be appropriate to switch it off in north European waters where attack by pirates or armed robbers is unlikely. The decision may be easier in international waters off Indonesia. Passing through the Straits of Gibraltar it may be a more difficult call.

It is somewhat ironic that mandatory carriage became inevitable and indeed hastened following the events of 11 September 2001. Not of concern over seafarers being slaughtered. It was the ships that were identified as the potential threat. AIS is now seen as essential to maritime security.

There is no doubt that coastal states will insist on AIS being activated when entering their waters and calling at their ports. That is those that have invested sufficiently in shore infrastructure and perhaps even those that have not who simply feel they do not want to be seen to be left out. It would be useful if the authorities, especially flag states, were to provide clear and unambiguous advice when the risks outweighed the benefits and advised masters to switch it off.

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I am afraid Masters will be dammed if they do and dammed if they don't. The regulatory authorities will not be in the 'dock'. By 'dock' I mean the small one with rails or spikes on. Masters must justify their professional judgment. NUMAST will naturally support them in such circumstances. However, it would be useful if they received the support of their employers and the authorities.

4. THE CORRECT SYSTEM? Initially mariners were enthusiastic over the introduction of AIS; at last they could establish who that ship was on collision course. However, the system that is now being progressively fitted to ships is not, I suggest, the one of choice. For the regulator monitoring from the shore – YES, for the mariner – NO. Why?

There has been some, arguably not enough, discussion on the use of AIS as an aid to collision avoidance. This conference fills that void. The development of AIS has been driven by the need of regulatory authorities and not navigators; some would say it has been the communicators and manufacturers. That is for you to judge.

There is no doubt that the ability to identify vessels at long range and in relatively open waters makes AIS a welcome aid to collision avoidance. In congested waters at close range it is doubtful. One alternative system has been suggested, namely MIDAR: that is Marine Identity Data Automatic Response. By utilizing radar there is the minimum of interface requirements, presenting information on a contact or target directly on to the radar presentation with the option of additional information. No reliance on GPS, together with the elimination of the possibility of 'mistaken identity' makes this system attractive. All for about a quarter the cost.

However, limitations on range make it less attractive for VTS and there is not the benefit of the many 'added value' services of AIS. Once the standards were set in 1997 it was inevitable that an independent system, if you can call it that, would be preferred over a radar based system. A rearguard action by those promoting MIDAR, including action in parliament, i.e. the Third Standing Committee on Delegated Legislation in October 2002, failed to change the decision to adopt AIS. Quite frankly, it was too late and the requirement for maritime security now prevailed. However, a radar-based system is worthy of examination, particularly to aid identification in collision avoidance situations.

Information from, and the limitations of, AIS need to be fully appreciated. It is dependent upon the Global Positioning System (GPS). Being not reliant on the ship's radar has its benefits. Not least in respect to range and possible adverse effects of weather. But the fact that it is dependent on GPS, which arguably the navigator has become increasingly dependent upon, brings with it potential problems. Not least the setting up of GPS on the ship supplying the information via AIS.

Ground Track – Ground Speed are very different from Water Track – Speed through the water. From my experience lecturing in electronic navigation systems, and in particular radar and ARPA to marine students, this gives me cause for some concern. The appreciation of the complexities associated with ground stabilized and sea stabilized displays and the effect on true vectors makes me wonder how the watch keeper with insufficient knowledge will cope with AIS. An independent system from radar may have its benefits but the possibility of conflicting and confusing information, either imposed on the radar or independently displayed, has the potential for disastrous consequences.

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While we have strong reservations over the use of AIS as an aid to collision avoidance, the potential benefits should not be underestimated. The use to which this new technology is to be put is receiving much attention. The benefits to VTS are readily identifiable. On a recent visit to Lisbon, Portugal I was able to witness first hand the identification and tracking of ships so equipped. The impressive new control centre built with European assistance is no doubt the envy of all but the most prosperous ports.

Given this system is the technology of choice of the regulators, it is them that we look to exploit it to its fullest potential. The ability to network systems so as to provide a comprehensive Vessel Traffic Monitoring (VTM) regime will become reality – we hope. Together with radar stations, the ability to track all AIS equipped vessels will assist authorities in recognition and so address security concerns.

5. ADDITIONAL BENEFITS. The ability to track sub-standard vessels and readily identify those that present a hazard to the environment is perhaps a reason, in addition to that of cost, for the shipping industry's reluctance to initially accept this new technology. The European Traffic Monitoring Directive comes from a desire to address public and political concern over sub-standard shipping rather than maritime security.

The commercial benefits to ports and ship operators should not be overlooked. Besides the direct benefits associated with the direction and safety of traffic, the ability to exchange information more rapidly should make the port entry process more effective. The benefits are not confined to ports and operators; there are potentially considerable benefits to the mariner. The ability to exchange a quantity of information should not only assist with entry into port but also when entering and transiting traffic separation schemes. This is providing that the authorities do not insist on additional lengthy verbal communication, so distracting the watch keeper from essential navigational duties.

AIS has the potential to assist in Search and Rescue (SAR) operations. In this context it should be seen as complementing existing systems, including GMDSS. It may prove particularly useful in identification and control of surface assets engaged in SAR operations.

The possible advantages of information presented in 'real time' transmitted to vessels are only now being appreciated. Data on things such as tidal levels and state of navigational aids offers a level of up-to-date information inconceivable only a few years ago. NUMAST welcomes the initiatives of Trinity House in this area and looks to them, other lighthouse authorities and ports to invest in this vital safety area.

6. INSTALLATION AND TRAINING. In the development of additional applications of AIS it is important to engage with marine professionals, both the experienced and the new generation, especially the new generation. A failure to do so will bring about scepticism at best and hostility at worst. The dangers of information overload need to be appreciated on what are already hard pressed personnel. Even on cruise ships with thousands of souls at risk, owners, especially those not in the top quartile of the market, seek to manage with a lone watch-keeping officer often in the most congested waters.

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The lone watch keeper, perhaps assisted by one additional and relatively unskilled person, I suggest fails to meet the need of this new technological age. There is a need for close examination of the skills for what the industry refers to as ratings. Likewise the number and qualification of officers, especially on cruise liners and ro-ro passenger ferries with many times more passengers than a jumbo jet. It may mean one less person in the perfumery! It is not only a question of numbers, it is also an issue of quality. Training, assessment, examination processes need to be robust enough to ensure that mariners are equipped with the necessary skills to discharge their duties professionally and safely.

I shall not enter into the area of certification, there are other conferences for this, other than to state the industry knows and knows only too well that some certificates are worth only the paper they are printed on and little more. I doubt whether the individuals in possession of such certificates would benefit from AIS training. Marine professionals in general are keen to learn new skills and understand new equipment. However, it is not acceptable to put such equipment onboard, perhaps with an hour or two instruction from the manufacture. Knowledge of the capabilities and limitations of AIS is essential. Education and training in its use is very necessary. While additional specialist courses in AIS are useful for serving mariners and VTS personnel, it is vital that the knowledge required to utilize AIS safely is integrated into mainline marine education and training. Education and training are not enough. There is a need to ensure that the systems are not only suited for purpose but also to each other and to those that have to use and rely on them.

7. THE FUTURE. It is pleasing to note that problems associated with differing systems and the human interface are being addressed by a working group of the International Electro-technical Commission (IEC). At last – long last. However, I suspect the translation into tangible benefits may take some time. In the hands of the trained professional AIS, as it now is, has the potential to bring considerable benefits to the marine community both ashore and afloat. Presently it is installed on ships largely with well-qualified and highly motivated professionals. There is little doubt it will be successful but time will tell how successful. What loss will it bring by misuse and lack of understanding? Do we need an alternative system to resolve identification in close quarters situations in congested waters? That is for the industry to decide.

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