

IALA Recommendation A-123

On

The Provision of Shore Based Automatic Identification System (AIS)

Edition 2

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Document Revisions

Revisions to the IALA Document are to be noted in the table prior to the issue of a revised document.

Date	Page / Section Revised	Requirement for Revision
June 2007	Entire Document	Rewritten to include ITU requirements and AIS as a maritime safety-related service.

**Recommendation on the Provision of Shore Based Automatic Identification Systems (AIS)
(Recommendation A-123)**

THE COUNCIL:

RECALLING the function of IALA with respect to safety of navigation, the efficiency of maritime transport and the protection of the environment;

RECOGNISING that IMO has concluded that AIS will improve the safety of navigation and the protection of the environment;

RECOGNISING ALSO that there is a mandatory carriage requirement for AIS equipment on SOLAS Convention vessels, which entered into force on 01 July 2002 and will be completed not later than 01 July 2008.

RECOGNISING FURTHER that documentation of IMO, ITU and IEC refer to the provision of an AIS shore infrastructure as part of the overall operational system;

NOTING that National Members provide shore infrastructure to support the goal of IMO to improve the safety of navigation and the protection of the environment;

NOTING ALSO that IALA has contributed substantially to the development of AIS through collaboration with IMO, ITU and IEC, as well as through the publication of stand-alone documents;

NOTING FURTHER that IALA has developed and maintains Recommendations and Guidelines on AIS;

CONSIDERING that there is an urgent need for shore based AIS to facilitate the interchange of data with shipping.

ADOPTS the Principles Relating to the provision of Shore Based Automatic Identification System (AIS) Services in the Annex to this recommendation; and,

RECOMMENDS that National Members and other appropriate authorities providing marine aids to navigation services adopt the provision of shore based AIS services in accordance with the principles set out in the Annex to this recommendation.

Annex

Considerations relating to the provision of shore based AIS.

1. Introduction

AIS is an autonomous and continuous broadcast system, operating in the VHF maritime mobile band. AIS exchanges information such as vessel identification, position, course and speed from ship to ships and between ships and shore.

Chapter V of the 1974 SOLAS Convention (as amended) requires mandatory carriage of Automatic Identification System (AIS) equipment on all vessels constructed on or after 01 July 2002. Implementation for other types and sizes of SOLAS Convention vessels is continuing and will be completed not later than 01 July 2008.

SOLAS Chapter V, Regulation 19, section 2.4.5 states that:

"AIS shall

- 1. provide automatically to appropriate equipped shore stations, other ships and aircraft information, including ship's identity, type, position, course, speed, navigational status and other safety-related information;*
- 2. receive automatically such information from similarly fitted ships;*
- 3. monitor and track ships; and*
- 4. exchange data with shore-based facilities."*

In addition, the IMO Performance Standards for AIS state:

"1.2 The AIS should improve the safety of navigation by assisting in the efficient navigation of ships, protection of the environment, and operation of Vessel Traffic Services (VTS), by satisfying the following functional requirements:

- .1 in a ship-to-ship mode for collision avoidance;*
 - .2 as a means for littoral States to obtain information about a ship and its cargo; and*
 - .3 as a VTS tool, i. e. ship-to-shore (traffic management).*
- 1.3 The AIS should be capable of providing to ships and to competent authorities, information from the ship, automatically and with the required accuracy and frequency, to facilitate accurate tracking. Transmission of the data should be with the minimum involvement of ship's personnel and with a high level of availability."*
- 1.4 The installation, in addition to meeting the requirements of the Radio Regulations, applicable ITU-R Recommendations and the general requirements as set out in Resolution A.694 (17), should comply with the following performance standards."*

From this, the provision of IMO for AIS shore infrastructure can be inferred. It should be noted however, that there is neither a stipulation of IMO to any competent authority to implement a VTS nor to implement AIS into existing VTS. However, since IMO stated, that AIS improves the safety of navigation and operation of VTS, competent authorities should consider implementing AIS into VTS.

IMO's provision for AIS shore infrastructure was taken up by ITU-R when creating Recommendation ITU-R M.1371, which included a so-called AIS base station. When drafting a test standard for Class A and Class B shipborne AIS stations, IEC also took the existence and specific role of AIS base and repeater stations into consideration.

National Members and other appropriate authorities should therefore consider the provision of an AIS shore infrastructure so that the full benefit of the system can be realised in terms of navigation safety and protection of the environment.

2. ITU's additional operational requirements for AIS shore infrastructure

As a peer organisation to IMO, ITU recognised the potential of the AIS also for areas of shore-based application, other than ship reporting and VTS, namely maritime, safety-related information services, aids to navigation and Search and Rescue:

"The ITU Radiocommunication Assembly considering (...)

- d) that such a system should be used primarily for surveillance and safety of navigation purposes in ship to ship use, ship reporting and vessel traffic services (VTS) applications. It could also be used for other maritime safety related communications, provided that the primary functions were not impaired;*
- f) that such a system would be capable of expansion to accommodate future expansion in the numbers of users and diversification of applications, including vessels which are not subject to IMO AIS carriage requirement, Aids-to-Navigation and Search and Rescue."*
(Recommendation ITU-R M.1371)

Hence, the VTS would not be the only shore-based application to which the AIS would be of relevance. Hence, the design of the technical AIS shore infrastructure, in order that it may be used universally, should be designed such that it would not limit the use of AIS information to VTS's needs, only. This statement does not reduce the prominent role of the VTS as the primary shore-based user of the AIS information. It imposes a fundamental technical design philosophy, however, which will be explained in more detail below.

3. IMO's RECOMMENDATION FOR THE PROTECTION OF THE AIS VHF DATA LINK

IMO RESOLUTION MSC.140 (76) recommends that:

.3 Administrations should take steps necessary to ensure the integrity of the radio channels used for AIS in their waters.

Hence administrations are responsible for monitoring and managing the VDL such that the principal function of Class A mobile stations is protected.

4. AIS as a maritime, safety-related information service

From a VTS or, more generally speaking, from the point of view of a competent authority, the AIS provides an information service for shore-based VTS, traffic management schemes, ship reporting systems and other shore-based safety-related services.

This service consists of information delivery between ships and shore and vice versa. Thus the service of information exchange between ships and maritime, safety-related shore services, such as VTS, is one important part of the AIS (refer to SOLAS Regulation 19, §2.4.5, Nr. 4, as cited above). This information comprises, amongst others, the maritime, safety-related data items listed in IMO SOLAS Regulation 19 (see above).

Consequently, approaching the AIS from any shore-based application's point of view, there will be an AIS Service delivered at a functional interface.

5. The AIS Service in relation to other services

Figure 1 shows the relationship of the AIS service to other services, such as RADAR, voice communication, aids to navigation.

Figure 1: The AIS Service in relation to other services



User

Provide Human-Machine-Interface						
Provide Operational Application(s) for this User						
Ship Data Processing and Storing Services						
.....	Ship's Position / Dynamic Data Correlation Service				 (additional services)
..... (additional services)	AIS Service	Radar Service	Radio Direction Finding Service	Long Range Monitoring Service (additional position related services) (additional services)

6. Benefits of AIS

- AIS provides many benefits, including increased situational awareness, improved navigational safety, maritime security and automatic reporting in areas of mandatory and voluntary reporting schemes. It also improves many aspects of ship-to-shore and shore-to-ship communications, including efficiency in vessel traffic and port management. AIS provides a means of monitoring aids to navigation and to exchange safety information. AIS complements other situational awareness tools to provide a common operational picture. AIS assists in obtaining detailed ship traffic statistics.
- Specifically, with regards to VTS, AIS can enable automatic ship reporting and increase navigational safety by providing enhanced data regarding the:
 - o traffic situation, including vessel positions, movements, identities and intentions;
 - o fairway situation, including meteorological and hydrological conditions.

Specifically, with regards to aids to navigation, AIS can:

- o complement existing aids to navigation;
- o provide information such as local and regional navigational warnings, real time tidal heights, tidal stream and local weather;
- o provide integrity monitoring of Aids to Navigation.
- Specifically, with regards to SAR operations AIS provides improved coordination of SAR assets during the response phase.
 - o There are additional regional benefits such as ice breaker operation management, etc.

7. Provision of AIS

When considering the provision of AIS, the following publications should be taken into account:

- **1974 SOLAS Convention**, Chapter V Regulation 19 (as amended); establishes the IMO carriage requirements for AIS
- **IMO Recommendation on Performance Standards for an universal shipborne Automatic Identification System (AIS)**, (MSC 74(69) Annex 3);
- **IMO Resolution MSC.140 (76) Recommendation for the protection of the AIS VHF data link;**
- **ITU Recommendation on the Technical Characteristics for an Automatic Identification System Using Time Division Multiple Access in the VHF Maritime Mobile Band** (current revision of ITU-R M.1371)
Describes the radio communication and information characteristics of AIS
- **IALA Technical Clarifications on Recommendation ITU-R M.1371** (current revision)
Additional technical guidance on ITU-R M.1371

- **IALA** Guideline No. 1028 on the Automatic Identification System (AIS)
Volumes 1 Part 1 Operational Issues, Edition 1.3
- **IALA** Guidelines on the Universal Automatic Identification System (AIS)
Volumes 1 Part II – Technical Issues, Edition 1.1, December 2002
- **IALA** Recommendation A-124 on AIS Shore Stations and Networking
Aspects Related to the AIS Service
Describes the implementation of AIS shore based network, TBD
- **IALA** Recommendation A-126 on the use of Automatic Identification
System (AIS) in marine aids to Navigation
Describes the implementation of AIS in ATON, TBD
- IALA future e-NAV concept
- **IEC** 61993-2: Maritime Navigation and Radiocommunication Equipment
and Systems - Class A Shipborne equipment of the Universal Automatic
Identification System (AIS) - Operational and Performance requirements,
methods of testing and required test results
Test standard for Class A mobile station
- **IEC** 62287: Maritime Navigation and Radiocommunication Equipment
and Systems - Class-B ship-borne equipment of the automatic
identification system (AIS) Part 1 ; carrier-sense time division multiple
access (CSTDMA) techniques – Operational and performance
requirements, methods of test and required test results
Test standard for Class B “CS” mobile station
- **IEC** [62320-1] : Maritime Navigation and Radiocommunication
Equipment and Systems – Automatic Identification system (AIS)- Part 1:
AIS Base Stations- Minimum Operational and performance requirements,
methods of test and required test results
Test standard for base stations
- **IEC** [62320-2] : Maritime Navigation and Radiocommunication
Equipment and Systems – Automatic Identification system (AIS)- AIS
AtoN stations- Minimum Operational and performance requirements,
methods of test and required test results
Test standard for AtoN station
- Future IEC documents:
AIS Repeater Station
General purpose AIS Station,
SART-AIS Station
- There are additional regional documentations for the provision of AIS,
such as the EU Vessel Traffic Monitoring Directive 2002/59.

Flow Chart for planning the provision of Shore Based AIS

