AISM Association Internationale de Signalisation Maritime

IALA International Association of Marine Aids to Navigation and Lighthouse Authorities

IALA Recommendation O-130

On

Categorisation and Availability Objectives for Short Range Aids to Navigation

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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
April 2011	References updated	Periodic review

IALA Recommendation on Categorisation and Availability Objectives for Short Range Aids to Navigation

(Recommendation O-130)

THE COUNCIL:

RECALLING that one of the aims of the Association is to foster safe, economic and efficient movement of vessels by the improvement and harmonisation of aids to navigation world-wide;

RECALLING ALSO that IMO SOLAS Chapter V, Regulation 13, includes the requirement that Contracting Governments undertake to arrange for the establishment and maintenance of such aids to navigation as, in their opinion, the volume of traffic justifies and the degree of risk requires;

RECALLING FURTHER that IMO Resolution A.953(23) identifies the required signal availability for world-wide radionavigation systems and that other IALA Recommendations identify availability requirements for hyperbolic radionavigation and differential GNSS augmentation systems;

RECOGNISING that IALA Recommendation E-105 On The Need to Follow National and International Standards advises in Recommendation (2), that purchasing authorities include reliability and quality requirements in their specifications when procuring Aids to Navigation equipment;

RECOGNISING ALSO the importance of describing the management objectives for the operational performance levels of Short Range Aids to Navigation provided to mariners and the need to provide guidance to National Members on suitable and realistic levels of operational performance;

NOTING that it is possible to identify the required level of availability during the design phase of Short Range Aids to Navigation by taking into account the known theoretical relationship between individual component reliability and system availability;

HAVING CONSIDERED the proposal of the ANM Committee, prepared in consultation with the EEP Committee;

ADOPTS the Availability for Short Range Aids to Navigation, given in the Annex to this Recommendation; and,

RECOMMENDS that National Members and other appropriate Authorities providing marine aids to navigation services categorise their Aids to Navigation in accordance with the categories set out in the Annex to this Recommendation.

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1 INTRODUCTION

Availability of Aids to Navigation (AtoN) has traditionally been linked to the size and complexity of the individual AtoN or system of AtoN concerned – for example, major lighthouses have been rated as Category 1 and light buoys as Category 3. While this correlation has been relevant in the past for AtoN system of AtoN changes occurring in navigational safety requirements and in the technologies used in AtoN have indicated a need to review the basis on which availability is defined.

The adoption of contemporary risk management practices enables AtoN management authorities to define, preferably in consultation with mariners and other stakeholders, the availability requirements for the AtoN or system of AtoN concerned, and to assess its future categorisation based upon its navigational significance. The resulting categorisation of the AtoN or system of AtoN may result in some traditional higher category aids being downgraded and, alternatively, the potential for lower category aids to be upgraded.

1.1 Scope

This document provides a method to categorise and calculate AtoN availability for both AtoN and system of AtoN. It does not consider other AtoN considered in the mix of AtoN such as radio-navigation systems or Vessel Traffic Services (VTS).

1.2 Definitions

1.2.1 Short Range Aids to Navigation

All AtoN intended for use within visual, audible or radar range of the mariner.

1.2.2 System of AtoN

A group of complementary short range AtoN intended to collectively provide sufficient and timely information with which to safely navigate vessels within and through a waterway.

1.2.3 Availability

The probability that an AtoN or system of AtoN, as defined by the Competent Authority, is performing its specified function at any randomly chosen time. This is expressed as a percentage of total time that an AtoN or system of AtoN should be performing their specified function.[1]

1.3 Considerations

The Categorisation of AtoN should be based on a Risk Assessment methodology that assesses the navigational significance of an AtoN or system of AtoN, taking into consideration factors such as:

- Waterway significance;
- Areas of environmental sensitivity;
- Nature and type of cargo;
- Nature and type of navigation;
- Traffic density;
- Mix of AtoN and their coverage;

[1] Reference: as adapted from the IALA Guideline No. 1035 To Availability and Reliability of Aids to Navigation - Theory and Examples.

- Climate (ice, fog etc.);
- National concerns and priorities.

1.4 Assessment Aspects

The categorisation of an AtoN or system of AtoN also depends on aspects such as:

- Existing technology;
- Logistics;
- Redundancy;
- Accessibility;
- Other navigational services available to the mariner including, pilotage, VTS, GNSS, etc.

Categorisation should be determined or confirmed, wherever practicable, in consultation with mariners and other stakeholders who use the particular short range AtoN or system of AtoN.

Formal procedures for collecting, processing and recording availability data should be established.

2 CATEGORIES

There are three categories of AtoN, reflecting their navigational significance.

2.1 Category 1

An AtoN or system of AtoN that is considered by the Competent Authority to be of vital navigational significance.

For example, lighted AtoN and racons that are considered essential for marking landfalls, primary routes, channels, waterways, dangers or the protection of the marine environment.

2.2 Category 2

An AtoN or system of AtoN that is considered by the Competent Authority to be of important navigational significance.

For example, it may include any lighted AtoN and racons that mark secondary routes and those used to supplement the marking of primary routes.

2.3 Category 3

An AtoN or system of AtoN that is considered by the Competent Authority to be of necessary navigational significance.

2.4 Overall

The Categorization of a system of AtoN is independent of the rating of the individual aids within the system. Such a system can be composed of various Categories of AtoN.

For example, a system rated as Category 2 could include individual AtoN that are rated Category 1, 2 or 3. A buoyed channel rated Category 2 may have an entrance/fairway buoy rated Category 1.

3 AVAILABILITY OBJECTIVES

The table below provides overall availability objectives for each category of AtoN or System of AtoN as provided by the Competent Authority.

Table 1 Categories of percentage availability

CATEGORY	AVAILABILITY OBJECTIVE	CALCULATION PERIOD
1	99.8%	Availability Objectives are calculated over a continuous three year period, unless otherwise specified
2	99.0%	
3	97.0%	

The minimum availability of any individual AtoN should be 95%.

Where the availability of an individual AtoN consistently falls below 95%, consideration should be given to the discontinuance or replacement of that AtoN.

4 CALCULATION OF AVAILABILITY

Availability should be calculated using the following equation, with the most accurate time available:

$$\textbf{Availability} = \frac{\textbf{Total Time - Down Time}}{\textbf{Total Time}} \quad \text{[expressed as a percentage (\%)]}$$

4.1 Availability

Is the availability calculated over a continuous three (3) calendar year period and expressed as a percentage.

4.2 Total Time

Is the time that an AtoN or System of AtoN should be performing their specified function.

4.3 Down Time

Is the sum of the periods during which the AtoN or system of AtoN are unable to perform their specific function. It does not include those periods when the mariner has been notified of a discrepancy by prior publications through a Preliminary Notice to Mariners.[2]

The IALA NAVGUIDE should be consulted for further information on calculating availability.

A failure is the malfunction of an AtoN or system of AtoN to display its proper characteristics or to be on its assigned position for its intended use by the mariner. As such, a failure of a technical function is not necessarily considered an AtoN discrepancy.

For example, if the main power supply has failed but the light continues to function at normal intensity on standby power, this is not considered a failure, since the AtoN continues to provide its characteristics to the mariner. The failure may be caused by equipment malfunction, or scheduled or unscheduled maintenance work.

[2] Two (2) months notification, as defined by the International Hydrographic Organization (IHO) Technical Resolution.

5 RELATED DOCUMENTATION

The latest editions of the following IALA documents are relevant to the identification of availability objectives for AtoN or system of AtoN:

[1] IALA Aids to Navigation Manual (NAVGUIDE);

[2] IALA Guideline No. 1004 on Levels of Service;

[3] IALA Guideline No. 1018 Guidelines on Risk Management;

[4] IALA Guideline No. 1035 on Availability and Reliability of Aids to Navigation - Theory and Examples;

[5] IALA Guideline No. 1037 on Data Collection for Aids to Navigation Performance Calculation.