IALA GUIDELINE

G1033
THE PROVISION OF AIDS TO NAVIGATION FOR DIFFERENT CLASSES OF VESSELS, INCLUDING HIGH-SPEED CRAFT

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DOCUMENT REVISION

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1. INTRODUCTION

In the provision of Marine Aids to Navigation (AtoN), authorities must take into consideration the different classes of vessels using the AtoN. IALA has provided information for the use of AtoN within the *IALA NAVGUIDE*. The information is presented as a list of tools that are available to the AtoN authority (authority).

To respond to developments in the maritime environment and, in particular, the development of larger and faster vessels, IALA has carried out a review of AtoN requirements through a detailed questionnaire, research and analysis. The result of this work has identified a specific requirement for guidance on the provision of AtoN for high-speed craft (HSC).

2. OBJECTIVES

The objective of these guidelines is to provide information to authorities on the particular AtoN requirements of HSC and to also provide an assessment matrix when considering AtoN for different classes of vessels.

For the purpose of these Guidelines, as per the definition identified by the International Maritime Organization (IMO), HSC are defined as:

> "craft capable of maximum speed, in metres per second (m/s), equal to or exceeding: $3.7\nabla^{0.1667}$
>
> where: ∇ = volume of displacement corresponding to the design waterline (m^3) excluding craft the hull of which is supported completely clear above the water surface in non-displacement mode by aerodynamic forces generated by ground effect[1]. "

3. GENERAL

The *IALA NAVGUIDE* provides clear guidance on the risk analysis process and the various AtoN available for providing AtoN for different classes of vessels. In addition, IALA Guideline G*1018 Risk Management* has been produced.

As required, the various AtoN included in the *IALA NAVGUIDE* should be used as a "tool box" from which the most appropriate AtoN are chosen.

From an operational safety point of view, IMO has already considered how to deal with craft of lightweight construction that operate at substantially greater speed than conventional craft and which are not easily accommodated under traditional maritime safety instruments such as *SOLAS* and the *International Convention on Load Lines 1966*. IMO developed the *Code of Safety for Dynamically Supported Craft* in 1977 and also the *Codes of Safety for High Speed Craft* in 1994 (IMO resolution *MSC.36(63)*). Due to rapid development in the HSC sector, in Dec. 2000 the Maritime Safety Committee adopted amendments to *SOLAS Chapter X* (Safety Measures for High Speed Craft). These codes cover all types of HSC operated in contact with the sea surface, including planing vessels, multi-hull craft and air cushion vessels.

1 The speed represented by the formula but expressed in knots is $7.192\ \nabla 0.1667$

4. CONSIDERATIONS FOR HIGH SPEED CRAFT

The specific needs of HSC may require a revised approach to AtoN service delivery. These considerations are presented in detail, with options for responding to the needs of HSC.

4.1. GENERAL CONSIDERATIONS FOR HSC

The general considerations for HSC include the:

- Navigator's view and aural reception on the bridge of certain types of HSC
- Nature of the waterways traversed (Open vs confined – in open water there may be little need for specific AtoN for HSC, however, when entering more restricted waters the master's visual and spatial references are of primary importance. In many cases, due to reaction times, this may supersede navigation by electronic means.)
- Traffic densities, water depths & tidal streams
- Geographic or environmental considerations in relation to conspicuity of the AtoN provided (For example, colour of AtoN – there may be problems with green marks in summer with a background of forests or the conspicuity of daymarks in snow.)

4.2. PROVISION OF ATON FOR HSC

When assessing the provision of AtoN for HSC there are many factors to take into consideration. There are responses that can be used to mitigate these concerns and it is likely that a combination of such responses will be required to address the specific requirements in an authority's area of responsibility. It was noted that some authorities illuminate the buoy number by LED (Light Emitting Diode) with good effect. In addition, with the trend towards plastic and aluminium buoys, authorities should take into account the particular reflective qualities of these materials and should consider the need for passive or active radar reflectors on these AtoN.

Considerations to address AtoN requirements for HSC include:

- For coastal passages, authorities should consider shortening the period of flashing lights and increasing the flash length. A flash length of at least 1.0 seconds should be considered.
- For coastal passages and port approaches, the provision of AIS (Automatic Identification System) on buoys and beacons is considered to be most advantageous. The availability of additional information such as meteorological and hydrological data is particularly important for HSC.
- For harbours and port approaches, lights should have a multiple flash character rather than a single flash, for example, Fl (3) 15 seconds rather than Fl 15 seconds for more rapid identification.
- For harbours and port approaches, authorities may wish to note that work is presently being undertaken by IALA on the application of "blue" lights.
- For harbours and port approaches, authorities may consider the use of laser lights.
- For channels without turns or bends, a form of synchronization of lights should be considered.
- Authorities should consider the divergence of lights. For instance, it should be noted that when in close proximity and when viewed from above, there may be difficulty in seeing an LED buoy light or beacon which is fitted with a solar panel on top.
- In channel or inter-island navigation, indirect lighting of beacons is considered particularly effective.
- The deployment of racons on specific AtoN is considered to be of particular benefit for HSC.

4.3. NEW DEVELOPMENTS

Today, most HSC are passenger and/or car ferries, however it is recognized that HSC are developing quickly and that the use of HSC will likely expand. In the future HSC may be involved in other transport applications and they may not follow fixed passenger or car ferry routes.

Of particular interest are vessels that could come under a generic term of "Extreme High Speed Craft " such as wing-in-ground (WIG) craft. The present *Interim Guidelines for WIG Craft* (IMO *MSC/Circ.1054*) indicate that the significant differences between WIG craft and HSC include, among others, the substantially higher speeds of WIG craft and consequently larger distances travelled in a given time at operational speed; the possibility of "amphibious " WIG craft operated from a land base; the addition of aviation terminology for the safety of WIG craft in the operational mode and the capacity of a WIG craft to utilize its airborne mode to mitigate hazards.

IMO and ICAO (International Civil Aviation Organization) have agreed that any WIG craft capable of sustained flight outside the influence of ground effect should also be subject to the rules and regulations of ICAO. Other craft, including those with limited "fly-over " capability, should be covered only by the maritime regulatory regime[2]. Type A craft are of particular interest to authorities, as they will fall within the maritime regime. It is noted that the commercial use of these crafts and their size and carrying capacity will likely increase in the future. While these crafts are not specifically considered within the scope of these guidelines, it is recommended that the development of these crafts be monitored closely, and guidance provided on the provision of AtoN as more information becomes available.

5. ASSESSING REQUIREMENTS FOR PROVISION OF ATON FOR DIFFERENT CLASSES OF VESSELS, INCLUDING HSC

Based on the IALA Guideline *G1018 Risk Management*, a specific, step by step risk assessment in order to better quantify the range and type of AtoN required, as applicable to different vessel types, has been developed.

In developing the assessment matrix, the approach taken is to develop a matrix for various vessels and waterways. In essence, this is a simplified "fill in the blanks "risk management model that can be used in conjunction with other risk assessment tools.

The process for assessing requirements for provision of AtoN for different classes of vessels, including HSC, is at ANNEX A. This process identifies the navigational needs of different classes of vessels, and is further explained in an MS Excel spreadsheet, provided as an information tool only. For access to the full MS Excel spreadsheet tool, please contact the IALA Secretariat at contact@iala-aism.org.

6. CONCLUSIONS

The provision of AtoN by any Authority must take into account all relevant factors, including the classes of vessels. In the provision of AtoN, the use of existing guidance, as promulgated in the IALA *NAVGUIDE* and other related documents, continues to provide a valid starting point. As applications of vessels change or as new designs are introduced, it is important to identify the AtoN requirements of such new vessels. There may also be new ways of using existing AtoN, as well as the further development of new AtoN, such as LED, laser lights, blue lights, AIS, etc.

Therefore, the ongoing monitoring of developments in vessel design and characteristics, the altered usage or the requirements of the AtoN user and new developments in AtoN design must continue.

2 IMO Interim Guidelines for wing-in-ground (WIG) craft, MSC Circ. 1054, 16 Dec. 2002.

7. DEFINITIONS

The definitions of terms used in this Guideline can be found in the *International Dictionary of Marine Aids to Navigation* (IALA Dictionary) at http://www.iala-aism.org/wiki/dictionary and were checked as correct at the time of going to print. Where conflict arises, the IALA Dictionary should be considered as the authoritative source of definitions used in IALA documents.

8. ABBREVIATIONS

AIS	Automatic Identification System
AtoN	Marine Aid(s) to Navigation
Circ.	Circular (IMO)
Fl	Flashing
HSC	High speed craft
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
LED	Light-emitting diode
MS	Microsoft
MSC	Maritime Safety Committee (IMO)
Racon	RADar beaCON (Radar transponder beacon)
SOLAS	International Convention for the Safety of Life at Sea (IMO 1974 as amended)
VTS	Vessel traffic services
WIG	wing-in-ground

ANNEX A ASSESSING REQUIREMENTS FOR PROVISION OF AtoN FOR DIFFERENT CLASSES OF VESSELS, INCLUDING HSC

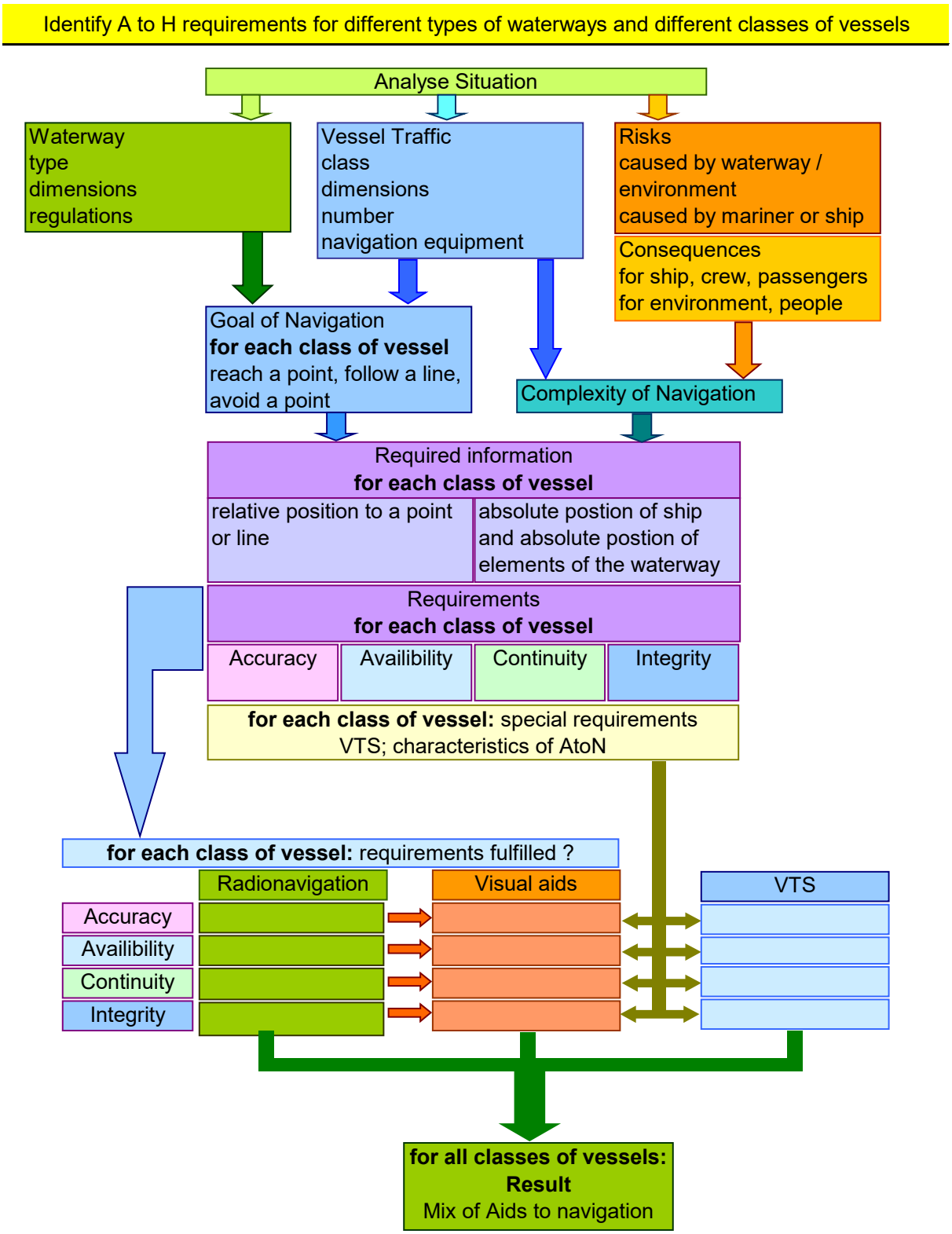

Figure 1 Assessing requirements for provision of AtoN for different classes of vessels, including HSC