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USE OF MOBILE AIDS TO NAVIGATION

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1. INTRODUCTION

IALA recognises the necessity to mark moving hazards to navigation and has developed this guideline to assist its members and other Competent Authorities when they consider the use of Mobile Aids to Navigation (MAtoN) to mark a moving or drifting hazard to navigation.

Consideration has been given to the requirements of the Nairobi International Convention on the Removal of Wrecks of 2007, COLREGs and other IALA guidelines.

2. SCOPE

This guideline provides information relating to the operational use of MAtoN for the marking of moving or drifting hazards to navigation.

It includes information on instances where MAtoN can be used, responsibilities for their use, how moving or drifting hazards can be marked, and other pertinent guidance.

While this guideline cannot address every conceivable use of MAtoN, it is intended to provide useful information to assist national members and Competent Authorities in managing the marking of moving or drifting hazards.

Appropriate IALA sources and references should be consulted for additional relevant information.

3. DEFINITION

A MAtoN is defined as a non-fixed or un-moored AtoN; it does not include a fixed or moored buoy that is adrift from its station, temporarily or otherwise.

A MAtoN can be fitted with an Automatic Identification System (AIS) device transmitting message 21.

Note: MAtoN should not be used for marking unmanned vessels; the lights exhibited by these vessels should comply with COLREGS, or other Competent Authority regulations.

4. TYPICAL USES

MAtoN may be used, but not limited to, the following moving/drifting applications:

- Ocean Data Acquisition System (ODAS) (e.g. to gather data on currents and weather);
- Wreckage (e.g. containers, debris);
- Water quality and pollution monitoring equipment;
- Dynamic guard zones and convoys;
- Underwater operations;
- Enhancing navigational safety during military operations (e.g. no sail zones during minesweeping, target exercises areas);
- Towed and deployed applications (e.g. cable laying);
- Search & Rescue applications.;
- Special events (e.g. swimming competitions).

5. TYPES OF MATON

MATON can be deployed either physically or virtually. Competent Authorities should determine the most appropriate type of MATON for each situation, based on the available equipment and assessment of risk.

5.1. PHYSICAL MATON

A physical MATON is usually a special mark with MATON specific light characteristics (see Table 1). Physical MATON should also be designed to meet the characteristics shown in Table 1:

Table 1 MATON Characteristics

General Characteristics	
Type of AtoN, colour, and shape	Special Mark. Colour yellow. Shape optional, but not in conflict with lateral marks.
Top mark	Single yellow "X" shape. To increase conspicuity, and if practical, the top mark of a special mark should be used.
Additional marks	For hazards with a low profile or partly submerged and where visual observations are primarily undertaken from the air, an additional mark, such as a circular symbol, can be added, if practicable.
Position sensor	If AIS is used, the Electronic Position Fixing System (EPFS) in use must be in accordance with the latest version of ITU-R M.1371 - <i>Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile frequency band.</i>
Light Characteristics (if light fitted)	
Colour	Yellow
Rhythm	Flicker 1s (5 Hz) Eclipse 0.7s, Flicker 1s (5 Hz) Eclipse 0.7s, Flicker 1s (5Hz) Eclipse 0.5s, Fl 1s Eclipse 0.5s, Fl 1s Eclipse 3s. Nominal range 3 nm.

Additional considerations include:

- Radar reflectors to increase radar conspicuity, and if practical, a radar reflector should be installed.
- Reflective markings, if any, should be in accordance with IALA Recommendation R0106(E-106) Retroreflecting Material in Aids to Navigation Mark Within the IALA Maritime Buoyage System.



5.2. VIRTUAL MATON

A virtual MAToN electronically marks a hazard using an AIS Virtual AtoN message.

A virtual MAToN should only be used when there is capability to automatically update the position of the hazard in, or near, real time. The update rate should be equal to or better than the physical AIS AtoN transmission rate, typically no more than 3 minutes. A virtual MAToN position should not be updated by estimation of the hazard's position.

The use of virtual MAToN should be approved and strictly controlled by the Competent Authority. Virtual MAToN should be implemented on the principles contained within IALA Recommendations and Guidelines on virtual aids to navigation.

When using virtual MAToN, the Competent Authority must also consider safety related messaging, geofencing, and updating of relevant Maritime Safety Information (MSI).

5.3. PROGRAMMING AIS MATON

An AIS MAToN is considered to be an AIS AtoN and will broadcast AIS Message 21 (Aids to Navigation Message). It should be programmed using the coding information prescribed in the latest version of ITU-R M.1371.

Competent Authorities may wish to complement the broadcast of Message 21 above, with a broadcast free text safety related message (AIS Message 14) to warn of the hazard.

When deploying a MAToN fitted with AIS, Competent Authorities should be guided by IALA G0126 (A-126), Guidelines on the use of the Automatic Identification Systems (AIS) in Marine Aids to Navigation Services.

6. DEPLOYMENT

6.1. PHYSICAL MATON

The Competent Authority should choose an appropriate method for the installation and deployment of physical MAToN, depending on the type and nature of the hazard (e.g. datum markers for search and rescue, icebergs, oil slick, pollution barriers, etc.).

Special consideration must be given to:

- Safety of personnel;
- National work safety requirements;
- Equipment and resources available;
- Sea state and weather conditions;
- Priority accorded to the severity of the hazard;
- Other issues, as necessary.

6.2. VIRTUAL MATON

Deployment of a virtual MAToN should:

- Only be done if the position of the hazard can be known, and updated in, or near, real time;
- Conform to IALA Guidelines and Recommendations on virtual AtoN.



6.3. PROMULGATION

The promulgation of MSI is considered fundamental to the deployment of MAtoN and is complementary to the marking of the hazard to navigation. MSI is the established means for Competent Authorities to advise mariners of the location and other characteristics of the MAtoN.

Competent Authorities should, therefore, promulgate the particulars of the MAtoN by all appropriate means, including through the promulgation of MSI and Notices to Mariners.

Hazards should remain marked until the Competent Authority has assessed that information about the hazard has been sufficiently promulgated, or there is no longer a risk to the safety of navigation.

Promulgation should include details of the MAtoN, including:

- Description of the hazard that is being marked;
- The type of MAtoN used, whether physical (e.g. spar or pillar) or virtual;
- If lighted:
 - Colour
 - Flash character.
 - Nominal range.
- Positional data, as deemed appropriate by the Competent Authority;
- Any applicable rules and regulations;
- Duration for which the promulgation of MSI is valid (e.g. duration after which the location is uncertain);
- Request for sighting reports;

6.4. PROMULGATION BY VTS

When a MAtoN is planned to be deployed in a VTS area, it is important to liaise with the VTS Authority, so that it can promulgate information on the MAtoN, as part of its information service.

Such information can include:

- Characteristics of the MAtoN, including its location and duration of deployment;
- Any limitation on ship manoeuvrability in the VTS area.

It should be noted that a VTS may also be the provider of MSI in some instances.

7. MONITORING AND REPORTING

7.1. MONITORING

The purpose of monitoring the location and state of the MAtoN, is to know where the hazard to navigation is at all times. This is so that the information can be promulgated to mariners and other interested parties by the best available means. It is also necessary when recovering physical MAtoN.



The MAtON can be monitored by:

- Use of the Competent Authority's assets (e.g. helicopters, boats, UAV) in the vicinity of the MAtON;
- Remotely (e.g. radar, satellite, AIS and telecommunications and other technologies);
- Requesting vessels in the vicinity to report visual and radar sightings and/or AIS detections of the MAtON;

7.2. REPORTING

The location and state of the MAtON will be of interest to local and national authorities, transiting vessels and those operating in the vicinity of the hazard.

Therefore, information on the MAtON should be reported when it:

- Is deployed;
- Is altered or changed;
- Is removed, discontinued, or damaged;
- Is missing;
- Leaves or drifts beyond its pre-determined coverage area;
- Drifts into the waters of another Competent Authority.

If possible, the location of a MAtON should be 'self-reporting' and detectable to vessels in the vicinity (light/AIS etc.).

8. DISCONTINUATION OF MATON

MAtON may be discontinued when the Competent Authority considers that the hazard to navigation no longer exists. This decision can be made by the Competent Authority, either unilaterally, or after consultation with other stakeholders and interested parties.

When discontinuing a MAtON, Competent Authorities should ensure that any MAtON, whether physical or virtual, are removed entirely, so as to avoid confusing mariners. This is to be followed promptly by the promulgation of appropriate MSI to either cancel existing MSI or advise of the discontinuation of the MAtON.

When a moving hazard stops moving, it can no longer be marked by a MAtON, and a transition to another appropriate AtoN must be made in a timely manner. This should be followed promptly by the promulgation of appropriate MSI to advise of the change.

If the hazard location involves two or more national jurisdictions, it is essential that Competent Authorities liaise with each other regarding the marking of the hazard and promulgation of information on it.

9. RESPONSIBILITIES

9.1. DESIGNATED RESPONSIBILITY

Mobile hazards pose a risk to safe navigation. Therefore, the person, organisation, or government body responsible for the mobile hazard, should ensure that the hazard is marked adequately.

The Competent Authority should advise the person, organisation, or government body responsible for marking the mobile hazard of the correct guidance for the use of MAtON.



The Competent Authority must advise the person, organisation, or government body marking the mobile hazard of their responsibility to remove, and report, the MAtoN when no longer required.

9.2. INABILITY TO MONITOR

A Competent Authority or owner that loses the ability to monitor their MAtoN, still retains responsibility for it until either:

- The MAtoN is retrieved, has sunk, or is no longer a hazard to navigation or;
- Responsibility for the MAtoN is assumed by another operator or Competent Authority.

9.3. COST OF MARKING MOBILE HAZARDS

In accordance with Article 10 of the Nairobi International Convention on the Removal of Wrecks 2007, the registered owner of the wreck may be liable for the costs of locating, marking, and removing the hazard.

10. REFERENCES

- [1] IALA Recommendation O-139 on The Marking of Man-Made Offshore Structures
- [2] IALA Recommendation E-110 Rhythmic Characters of Lights On Aids To Navigation
- [3] IALA Recommendation O-143 Virtual Aids to Navigation
- [4] The Nairobi International Convention on the Removal of Wrecks adopted Nairobi, 18 May 2007
- [5] IALA Recommendation R1015 Marking Of Hazardous Wrecks
- [6] IALA Recommendation R0106(E-106) Retroreflecting Material in Aids to Navigation Mark Within the IALA Maritime Buoyage System.
- [7] IALA Guideline 1046 Response Plan for the Marking of New Wrecks
- [8] ITU document 5B/411-E November 2017
- [9] ITU-R M.1371-5 - Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile frequency band

11. ACRONYMS

AIS	Automatic Identification System
MAtoN	Mobile Aids to Navigation
MSI	Maritime Safety Information
VHF	Very High Frequency
MBS	(IALA) Maritime Buoyage System
ODAS	Ocean Data Acquisition System
UAV	Unmanned Aerial Vehicle
VTS	Vessel Traffic Services