|  |
| --- |
| IALA Guideline |

1???

IALA GUideline on integration and use of International Mobile Telecommunications (IMT) technologies for Marine AtoN over IMT-2030 – draft 2024-02

Edition 0.1

Document date

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

|  |  |  |
| --- | --- | --- |
| Date | Details | Approval |
| 03/2024 | Revision of Initial skeleton | N/A |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

1 Introduction 6

1.1 Background 6

1.2 Scope 6

1.3 objectives 7

2 Use cases of maritime buoyage system (MBS) 7

2.1 use case on … 8

3 Use cases of positioning, navigation and timing (PNT) 8

3.1 use case on … 8

4 Use cases of vessel traffic services (VTS) 8

4.1 use case on … 8

5 Use cases of digital maritime services 8

5.1 use case on … 8

6 Conclusion and recommendations 9

7 Definitions 9

8 Acronyms 9

9 References 9

ANNEX A Use cases and potential requirements on MBS 10

A.1 Use case on … 10

A.X.1 Description 10

A.X.2 Pre-conditions 10

A.1.3 Service Flows 10

A.X.4 Post-conditions 10

A.X.5 Existing features partly or fully covering the use case functionality 10

A.X.6 Potential New Requirements needed to support the use case 10

ANNEX B Use cases and potential requirements on PNT 11

B.X Use case on … 11

B.X.1 Description 11

B.X.2 Pre-conditions 11

B.X.3 Service Flows 11

B.X.4 Post-conditions 11

B.X.5 Existing features partly or fully covering the use case functionality 11

B.X.6 Potential New Requirements needed to support the use case 11

ANNEX C Use cases and potential requirements on VTS 12

C.X Use case on … 12

C.X.1 Description 12

C.X.2 Pre-conditions 12

C.X.3 Service Flows 12

C.X.4 Post-conditions 12

C.X.5 Existing features partly or fully covering the use case functionality 12

C.X.6 Potential New Requirements needed to support the use case 12

ANNEX D Use cases and potential requirements on DIGITAL MARITIME SERVICES 13

D.X Use case on … 13

D.X.1 Description 13

D.X.2 Pre-conditions 13

D.X.3 Service Flows 13

D.X.4 Post-conditions 13

D.X.5 Existing features partly or fully covering the use case functionality 13

D.X.6 Potential New Requirements needed to support the use case 13

List of Tables

Table 1 Major system milestones for IMT (3GPP) technology 7

List of Figures

**No table of figures entries found.**

List of Equations

**No table of figures entries found.**

# Introduction

*Editor’s note: The term ‘beyond 5G’ is to be replaced by the official term used by 3GPP for IMT-2030 systems later.*

## Background

In November 2023, the International Telecommunication Union (ITU) released a comprehensive framework aimed at guiding the development of standards and radio interface technologies for the sixth generation of mobile systems. This framework is detailed in the Recommendation ITU-R M.2160, titled “Framework and overall objectives of the future development of IMT for 2030 and beyond.” The IMT-2030 Framework Recommendation delineates 15 capabilities essential for sixth-generation technologies, with nine capabilities building upon the existing infrastructure of 5G (IMT-2020) systems. Moreover, the IMT-2030 initiative is anticipated to significantly contribute to enhanced environmental, social, and economic sustainability. It is also designed to support the objectives of the Paris Agreement under the United Nations Framework Convention on Climate Change. The International Telecommunication Union (ITU) has published the framework for the development of standards and radio interface technologies for the sixth generation of mobile systems whose details are contained in Recommendation ITU-R M.2160 on the “Framework and overall objectives of the future development of IMT for 2030 and beyond” in November 2023. The IMT-2030 Framework Recommendation identifies 15 capabilities for the IMT-2030 technologies and nine of those capabilities are derived from existing 5G (IMT-2020) systems. IMT-2030 is also expected to help address the need for increased environmental, social, and economic sustainability, and also support the goals of the Paris Agreement of the United Framework Convention on Climate Change. [1]

For the development of IMT-2030, companies and industry associations are scheduled to submit proposals for the IMT-2030 Radio Interface Technology (RIT) for ITU-R consideration in early 2027. These submissions will then be evaluated against the agreed minimum requirements prepared by ITU’s expert group on IMT systems (ITU-R Working Party 5D), with the prospect of getting a final set of IMT-2030 technology standards approved by 2030.

Accordingly, 3rd Generation Partnership Project (3GPP), which produce the Reports and Specifications that define mobile systems including radio access, core network and service capabilities commenced the studies and works for the development of beyond 5G system aligned with IMT-2030 framework within the context of 3GPP standardization [2].

Furthermore, 3GPP is expected to continue to cater to various industries’ demands for digital transformation through communication products and solutions based on 3GPP standards. These efforts will incorporate inputs stemmed from insights and market demands provided by those industries, integrating them into the 3GPP standardization process.

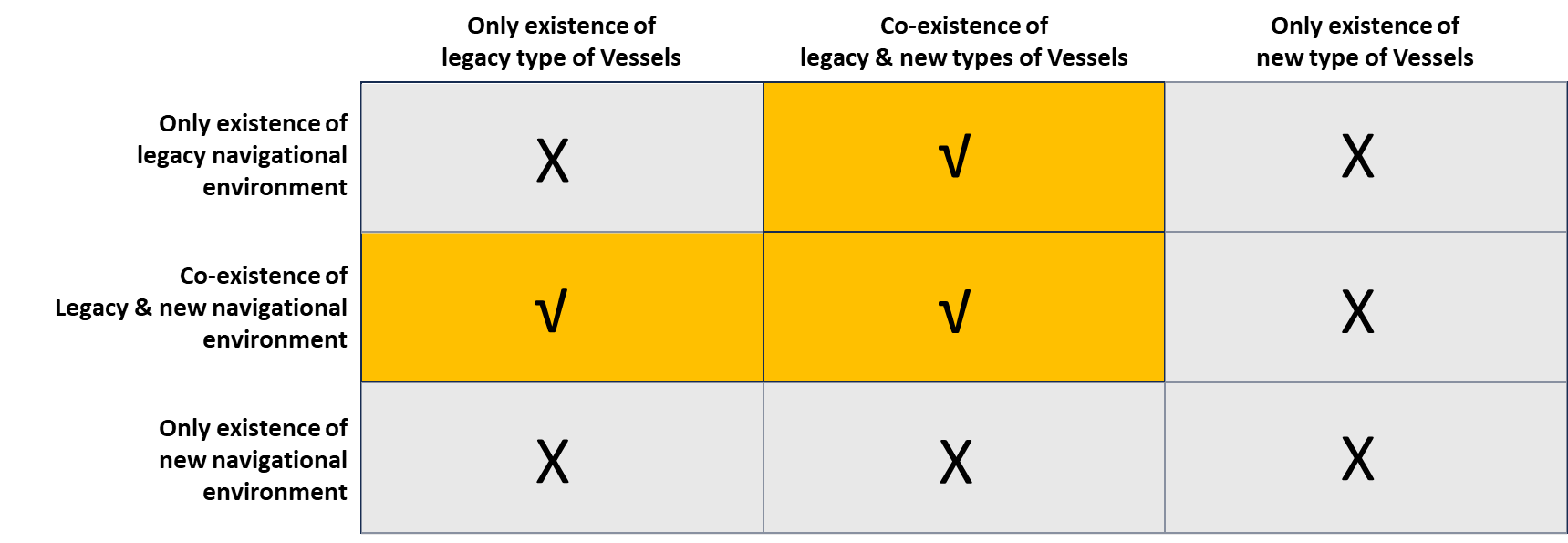
Hence, it is imperative to promptly formulate use cases and service requirements including regulatory aspects for Marine AtoN over IMT-2030. These inputs will play a vital role in the maritime sector’s involvement in 3GPP standardization efforts, aligning with the 3GPP timeline for studies and works starting from Release 20 onward for ITU-R IMT-2030.

## Scope

This Guideline develops use cases and service requirements including regulatory aspects for Marine Aids to Navigation (AtoN) over IMT-2030 (beyond 5G) to formulate inputs as served for incorporating demands of Marine AtoN related stakeholders into 3GPP standardization for IMT-2030 (beyond 5G) to be applicable for maritime communication system.

The navigational environments and type of vessels are assumed as follows, which are highlighted with orange color in Figure 1.

* Co-existence of legacy and new navigational environment with legacy type of vessels only
* Legacy navigational environment only with the co-existence of legacy type of vessels and new type of vessels (e.g., autonomous ships)
* Co-existence of legacy and new navigational environment with co-existence of legacy type of vessels and new type of vessels



1. Navigational environment and type of vessels considered in this Guideline

*Editor’s note: ‘Legacy type’ and ‘new type’ meaning will be clarified later after concrete use cases are introduced in this Guideline.*

In addition, maritime and in-land waterway navigational environments are considered when Marine AtoN over IMT-2030 is applied.

*Editor’s note: The term ‘in-land waterway’ is used here to mean the inclusion of ports, fairways, windfarm etc. but the more proper term than in-land waterway will be looked for later to describe all use cases occurred in terrestrial area. The primary focus on navigational environment is given to the open sea area and its extension to in-land waterway etc.*

## objectives

The objectives of this Guideline are as follows to ensure the safety and efficiency of Marine AtoN within the IMT-2030 (beyond 5G) as maritime communication system.

1. Identify legacy use cases that must be supported by the Marine AtoN over IMT-2030.
2. Develop new use cases that are likely to find applicability in the Marine AtoN over IMT-2030.
3. Define potential service requirements, including regulatory consideration, for Marine AtoN over IMT-2030, drawing from both identified legacy use cases and newly developed use cases.
4. Formulate the input based on these use cases and potential service requirements to be submitted for 3GPP standardization.

# Use cases of maritime buoyage system (MBS)

To be added.

## use case on …

*Editor’s note: The sub-sections will be further developed to capture the key points and description from IALA perspective.*

To be added.

# Use cases of positioning, navigation and timing (PNT)

To be added.

## use case on …

*Editor’s note: The sub-sections will be further developed to capture the key points and description from IALA perspective.*

To be added.

# Use cases of vessel traffic services (VTS)

To be added.

## use case on …

*Editor’s note: The sub-sections will be further developed to capture the key points and description from IALA perspective.*

To be added.

# Use cases of digital maritime services

*Editor’s note: This section may be sub-categorized later depending on use cases introduced in this section.*

## use case on …

*Editor’s note: The sub-sections will be further developed to capture the key points and description from IALA perspective.*

To be added.

# Conclusion and recommendations

*Editor’s note: The section will be developed later..*

To be added.

# 

**Marine AtoN (Marine Aids to Navigation)** – A device, system or service, external to vessels, designed and operated to enhance safe and efficient navigation of individual vessels and/or vessel traffic within IALA whose aim is to foster the safe, economic and efficient movement of vessels, through improvement and harmonization of aids to navigation worldwide and other appropriate means, for the benefit of the maritime community and the protection of the environment *(From IALA Constitution)*

# Acronyms

Marine AtoN Marine Aids to Navigation

MBS Maritime Buoyage System

# References

1. [www.itu.int](http://www.itu.int)
2. [www.3gpp.org](http://www.3gpp.org)
3. Use cases and potential requirements on MBS

This annex provides use cases and potential requirements on MBS to be formulated as inputs into 3GPP standardization for IMT-2030 based on use cases developed from IALA perspective which are introduced in Section 3.

## A.1 Use case on …

### A.X.1 Description

<Describe what the use case intends to achieve.>

### A.X.2 Pre-conditions

<List any pre-conditions that need to exist for this use case, preferably as a bulleted list, e.g. UE is registered to the network.>

### A.1.3 Service Flows

<Describe the sequence of events that explain what needs to happen, preferably as a numbered list, e.g. 1. User makes a voice call, 2. Called party receives alerting message.>

### A.X.4 Post-conditions

<Describe the end result e.g. Called party can decide whether to accept call based on information displayed on UE screen.>

### A.X.5 Existing features partly or fully covering the use case functionality

< Highlight existing features in the existing set of normative specifications that partly or fully cover this use case.>

### A.X.6 Potential New Requirements needed to support the use case

<Provide draft new requirements that are needed to realise the use case, and that are not yet covered in any normative specification.>

1. Use cases and potential requirements on PNT

This annex provides the example of use cases and potential requirements on PNT to be formulated as inputs into 3GPP standardization for IMT-2030 based on use cases developed from IALA perspective which are introduced in Section 4.

## B.X Use case on …

### B.X.1 Description

<Describe what the use case intends to achieve.>

### B.X.2 Pre-conditions

<List any pre-conditions that need to exist for this use case, preferably as a bulleted list, e.g. UE is registered to the network.>

### B.X.3 Service Flows

<Describe the sequence of events that explain what needs to happen, preferably as a numbered list, e.g. 1. User makes a voice call, 2. Called party receives alerting message.>

### B.X.4 Post-conditions

<Describe the end result e.g. Called party can decide whether to accept call based on information displayed on UE screen.>

### B.X.5 Existing features partly or fully covering the use case functionality

< Highlight existing features in the existing set of normative specifications that partly or fully cover this use case.>

### B.X.6 Potential New Requirements needed to support the use case

<Provide draft new requirements that are needed to realise the use case, and that are not yet covered in any normative specification.>

1. Use cases and potential requirements on VTS

This annex provides the example of use cases and potential requirements on VTS to be formulated as inputs into 3GPP standardization for IMT-2030 based on use cases developed from IALA perspective which are introduced in Section 5.

## C.X Use case on …

### C.X.1 Description

<Describe what the use case intends to achieve.>

### C.X.2 Pre-conditions

<List any pre-conditions that need to exist for this use case, preferably as a bulleted list, e.g. UE is registered to the network.>

### C.X.3 Service Flows

<Describe the sequence of events that explain what needs to happen, preferably as a numbered list, e.g. 1. User makes a voice call, 2. Called party receives alerting message.>

### C.X.4 Post-conditions

<Describe the end result e.g. Called party can decide whether to accept call based on information displayed on UE screen.>

### C.X.5 Existing features partly or fully covering the use case functionality

< Highlight existing features in the existing set of normative specifications that partly or fully cover this use case.>

### C.X.6 Potential New Requirements needed to support the use case

<Provide draft new requirements that are needed to realise the use case, and that are not yet covered in any normative specification.>

1. Use cases and potential requirements on DIGITAL MARITIME SERVICES

*Editor’s note: This annex may be sub-categorized later depending on use cases introduced in this annex.*

This annex provides the example of use cases and potential requirements on digital maritime services to be formulated as inputs into 3GPP standardization for IMT-2030 based on use cases developed from IALA perspective which are introduced in Section 6.

## D.X Use case on …

### D.X.1 Description

<Describe what the use case intends to achieve.>

### D.X.2 Pre-conditions

<List any pre-conditions that need to exist for this use case, preferably as a bulleted list, e.g. UE is registered to the network.>

### D.X.3 Service Flows

<Describe the sequence of events that explain what needs to happen, preferably as a numbered list, e.g. 1. User makes a voice call, 2. Called party receives alerting message.>

### D.X.4 Post-conditions

<Describe the end result e.g. Called party can decide whether to accept call based on information displayed on UE screen.>

### D.X.5 Existing features partly or fully covering the use case functionality

< Highlight existing features in the existing set of normative specifications that partly or fully cover this use case.>

### D.X.6 Potential New Requirements needed to support the use case

<Provide draft new requirements that are needed to realise the use case, and that are not yet covered in any normative specification.>