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Agenda item 5.2

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Workshop proposal on the Application of International Mobile Telecommunication (IMT) to Marine AtoNs

# Summary

This document proposes an IALA workshop by DTEC Committee in order to give guidance to IALA members for the application of International Mobile Telecommunication (IMT) to Marine AtoNs.

# Background

During intersessional work of the WG2/TG-6.2.1 of the DTEC Committee, the huge potential of the International Mobile Telecommunication (IMT) family of systems for the ‘wet’ domain and consequentially a need for consideration and discussion of the application of the IMT family of systems were recognised. As the result, this proposal of an IALA workshop on this issue to DTEC 3 was prepared.

# Discussion

By the submission of the document NCSR 7/INF.6 entitled ‘3rd Generation partnership project (3GPP) in the maritime domain’ in November 2019 to the IMO’s NCSR Sub-Committee, IALA has made the maritime domain aware of the potential of the IMT family of systems for the first time. At that point in time, the focus was on the IMT-Advanced system (aka LTE aka 4G) as applied to maritime.

In the meantime, the IMT family of systems was progressed massively by the ITU – both ITU-R and ITU-T sectors concurrently – towards ‘IMT-2020 and beyond’ (aka 5G) and recently towards ‘IMT-2030 and beyond’ (aka 6G). ITU-R alone has published substantial documentation on the key performance indicators and functionalities of each of those systems, thus providing a precise picture of their capabilities.[[1]](#footnote-1)

The key performance indicators and functionalities appear to be such powerful to cover a large variety of present and emerging requirements of the maritime domain, including those connectivity requirements stemming from broad introduction of the ‘S-100 world’ and of remotely operated/autonomous vessels.[[2]](#footnote-2)

Also, in the context of Cellular-Vehicle-to-Everything (C-V2X),[[3]](#footnote-3) there have been developed direct mode functionalities for high bandwidth direct vehicle-to-vehicle communications without the need or even the presence of an IMT base station; to the extent that AIS-like functionality is implemented in C-V2X by this means.[[4]](#footnote-4)

Finally, the terrestrial and satellite domains are being more and more merged seamlessly with the progression from IMT-Advanced to IMT-2020 (present technology edge) to IMT-2030 (available in the future from 2030 onwards).

Accordingly, the global 3GPP standardisation consortium has scheduled the relevant ‘Releases’ in accordance with the ITU-R defined time frame for IMT-2030 (compare Figure 3 of Rec. ITU-R M.2160) – these are meant to be executed rigidly, as was the case with IMT-2020 (compare Fig. 1 of Rec. ITU-R M.2083). According to this schedule, “system deployment” phase for IMT-2030 is starting 2030, while the necessary standardisation will be finalised beforehand in 2029 – this is parallel to the time frame as the introduction of the S-100 world to the shipboard ECDIS, including the S-421 overlay, in accordance with IMO Resolution MSC.530(106)**Rev1** (done at MSC108, 2024).[[5]](#footnote-5) Hence, urgency of addressing this emerges.

The application of IMT-2020/5G in the maritime domain was addressed already by presentations at the IALA Symposium 2021 and the IALA Conference 2023. 3GPP has approached IALA for the identification of use cases and/or requirements respectively for the ongoing development of IMT-2030/6G. IALA DTEC Committee has established an IMT Task Group on this topic as part of its Working Group 2 – Emerging Technologies.

During intersessional work of this IMT Task Group, it became clear that there is likely no need to develop any new radio component for any application of IMT systems to the wet domains (maritime and inland waterways), but rather likely only apply the existing ‘features’ (a technical term of the IMT/3GPP) developed due to the requirements of other stakeholder domains (called ‘verticals’ at IMT/3GPP). Again, there is a substantial documentation of ITU-R demonstrating this point with unprecedented precision content-wise (compare Reports ITU-R M.2520 (2022) and ITU-R M.2534 (2023)).

Consequentially, it was concluded that all of this could best be brought to the attention of IALA membership by means of a dedicated workshop in 2025 from which also tangible IALA draft documents can be expected to emerge. It is noted that IALA has agreed to hold a “Workshop and Seminar on Maritime Radionavigation and Radiocommunication in Digital Era” in 2026 which is much broader in scope. The workshop proposed here to take place in 2025, taking into account the urgency described above and with a topical focus on the application of IMT technologies to the wet domains, can only support the 2026 workshop and seminar by providing deeper insights. The proposal of the workshop is attached as annex of this document.

NB: The term ‘wet’ domain is used to juxtapose both maritime and inland waterways domains with relevant land-based i.e. ‘dry’ domains of IMT applications such as ITS/automotive or rail. Strictly speaking, IALA focusses on marine AtoNs. However, there are globally many countries where maritime traffic subject to IMO rules takes place in waterways inland of the baselines defined by UNCLOS, such as in estuary approaches to sea ports, or in sea canals. Several administrations responsible for marine AtoNs are also responsible for inland waterways, proper, i.e. not subject to IMO rules, and IALA over the years has maintained good relations with organisations like PIANC that consider both wet domains. Seamless technology applications appears to be desirable for areas of mixed traffic and for economy of deployment. A similar logic is operative in the S-100 world with the recognition of the need for S-401/S-402 corresponding with S-101/S-102 for inland waterways proper. The IMT systems family is applicable to both wet domains likewise and seamlessly, hence mentioned here this way.

# Action requested to the Committee

The Committee is requested to consider the proposal and act as appropriate.

**Workshop Proposal**

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| --- | --- |
| **Vision** | **International Mobile Telecommunication (IMT) for Marine AtoNs** |
| **Proposal** | Workshop on development of guidance to IALA members for their consideration of future plan |
| **Purpose(s)** | 1. To inform on relevant developments in the IMT system family, in particular regarding the present IMT-Advanced (4G/LTE), IMT-2020 (5G) and the emerging IMT-2030 (6G) technologies 2. To identify adaptable ‘features’ of the IMT system family to marine AtoN domain 3. To identify technical, regulatory and operational challenges when applying IMT system family to marine AtoN domain 4. To consider IALA’s continued role in the application of IMT system family to the marine AtoN domain |
| **Goal(s)** | 1. Introduction of participants to the IMT system family in general, and regarding IMT-2020 / IMT-2030 in particular, from an application perspective, taking specifically into account relevant application developments in other application domains (“3GPP verticals”) for potential likewise application to the wet domain 2. Adapt existing “features” of IMT systems as developed by other “verticals” to the domain of Marine AtoNs 3. Content definition and initial draft of a future “IALA guideline on the application of IMT systems for Marine AtoNs” 4. Consideration of setting up of an initiative group (MRP) for the maritime domainat 3GPP |
| **Who** | The workshop will provide a forum for discussion and development of IALA position and documentation on the application of IMT system family. It is envisaged that invitations will be sent to:   * Marine aids to navigation authorities and providers * Maritime authorities such as IMO, ITU, IEC, CIRM, RTCM * Association of seafarers * Ship owners/ operators * Industry members involved in radio communication equipment and systems * WWA target countries * Inland waterway organisations and/or authorities such as PIANC, IEHG, regional inland waterway network organisations in Europe, and … |
| **Size of Group** | It is expected that the Workshop will attract a group of up to [50] persons. |
| **Where** | [UN-city Bonn-upon-Rhine, Germany – headquarters of the German Federal Waterways and Shipping Administration] [to be confirmed] |
| **Duration** | Monday to Friday of the same week |
| **When** | [End of August 2025] (due to the urgency of the provision of connectivity for e.g. S-100 world and MASS)  Note: A “Workshop and Seminar on Maritime Radionavigation and Radiocommunication in Digital Era” is scheduled for 2026; the workshop proposed here can contribute significantly to the understanding of the IMT technologies and thus supports the 2026 workshop, which is broader in scope. |
| **Cost to Participants** | TBD |
| **Process** | TBD |
| **Steering Committee** | Proposed Steering Committee for the Workshop:  Chairs and vice chairs of IALA DTEC Committees and its relevant WGs  Representatives from the host organization [WSV/Germany] [to be confirmed]  IALA Secretariat and WWA |

1. Recommendation ITU-R M.2083 (2015) refers to IMT-2020 key performance indicators; Rec. ITU-R M.2160 (2023) refers to those of IMT-2030. [↑](#footnote-ref-1)
2. Report ITU-R M.2527 (2023), paragraphs 5.10 refers for maritime applications, for example; compare also IMO NCSR108/12/5 (New Zealand) for an initial analysis of connectivity requirements due to S-100 world. [↑](#footnote-ref-2)
3. Reports ITU-R M.2520 (2022) from an IMT application perspective and ITU-R M.2534 (2023) from a Connected automated vehicle perspective refer. [↑](#footnote-ref-3)
4. „In PC5 Mode 4, vehicles autonomously select transmission resources based on sensing the environment and perform time synchronization using GNSS. There is no involvement of the cellular network in this mode” (Report ITU-R M.2520 (2022), para 4.1.1 and other refer). [↑](#footnote-ref-4)
5. Note that IMO Resolution MSC.530(106) (2023) has been expressively revoked by this Rev1 of MSC108 (May 2024), and does not exist anymore, formally speaking. [↑](#footnote-ref-5)