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| JOINT IMO/ITU EXPERTS GROUP ON  MARITIME RADIOCOMMUNICATION  MATTERS  16th meeting  Agenda item X | IMO/ITU EG 16/x/x/  dd/MMM/2021r  ENGLISH ONLY |

**Agenda item title [IALA Secretariat to identify]**

**International Mobile Telecommunications in the Maritime Domain**

**Submitted by the International Association of Marine Aids to Navigation and Lighthouse Authorities and (IALA)**

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| **SUMMARY** | |
| *Executive summary:* | This document provides an update in the considerations made by IALA with respect to the developments of International Mobile Telecommunications (IMT), previously updated as 3GPP in the Maritime Domain. |
| *Action to be taken:* | Paragraph [9] |
| *Related documents:* | NCSR 7/12; NCSR 7/INF.6 |

**Introduction**

1. At the fifteenth meeting of the joint IMO/ITU Experts Group on Maritime radiocommunication matters, the technical standardization for a public mobile network in the context of maritime safety was reviewed.
2. Paragraph 8.9 of document NCSR 7/12 identified that IMO should be more proactive and get involved in the work of the 3rd Generation partnership project (3GPP). Noting that IALA had been approached already by 3GPP, the Group invited IALA to keep IMO informed of future developments.
3. IALA continues to follow the developments of 3GPP, recognising the work on mobile technologies at the ITU on International Mobile Telecommunications (IMT). IALA has moved to adopt the more generic terminology of IMT.

**Update on 3GPP developments**

1. 3GPP has provided IALA with information on developments in 5G, including those 5G enabling technologies specified in the 3GPP release 16 technical specification which could be applicable in the maritime domain. The following points are noted:

.1 Release 16 has been completed[[1]](#footnote-1). Release 16 brings IMT-2020 submission for an initial full 3GPP 5G system to completion.

.2 5G enabling technologies specified in Release 16 specifications can be applicable in maritime domain though they may need additional further work to provide more optimized performance and better user experience of maritime communication services over 5G system.

.3 3GPP TS 21.916 specification provides the summary of Release 16 work items including MARCOM[[2]](#footnote-2).

5 Ongoing standardization works in 3GPP is continuing, with enhancements to follow Release 17. Due to the impact of COVID-19, Release 17 completion date is likely to be delayed[[3]](#footnote-3).

**Development of IMT**

6 IALA continues to review the opportunities for integration and use of IMT to support marine aids to navigation. This has included a clarification of the major system milestones for IMT, as well as the common terminology used for referencing the technologies. The result of the current work at IALA regarding the developments of the technology from 1G in the 1980’s to current day is provided in Table X.

| **Generation** | **Major Systems Milestones** |
| --- | --- |
| 1G | Analogue technology, from the 1980s onwards. Various technologies were deployed, Nationally or Regionally, including:   1. NMT (Nordic Mobile Telephone), 2. AMPS (Advanced Mobile Phone System), 3. TACS (Total Access Communications System), 4. A-Netz to E-Netz, 5. Radiocom 2000, 6. RTMI (Radio Telefono Mobile Integrato), 7. JTACS (Japan Total Access Communications System) and 8. TZ-80n (Source:[wikipedia](http://en.wikipedia.org/wiki/1G)) |
| 2G | First digital systems, deployed in the 1990s introducing voice, SMS and data services. The Primary 2G technologies are:   1. GSM/GPRS & EDGE, 2. CDMAOne, 3. PDC, 4. iDEN, 5. IS-136 or D-AMPS. |
| 3G  IMT 2000 | The 3G system from 3GPP is based on evolved Global System for Mobile communication (GSM) core networks and the radio access technologies that they support.  This has allowed for the maintenance and development of GSM, with the evolution of General Packet Radio Service (GPRS) and Enhanced Data rates for GSM Evolution (EDGE), as well as further developments with the Universal Mobile Telecommunications System (UMTS) and High-Speed Packet data Access (HSPA).  3G brought a global vision to the evolution of mobile networks, with the creation of the ITU's family of IMT-2000 systems which included EDGE, CDMA2000 1X/EVDO and UMTS-HSPA+ radio access technologies. |
| 3G/4G  IMT Advanced | LTE and LTE-Advanced have crossed the “generational boundary” offering the next generation(s) of capabilities. With their capacity for high-speed data, significant spectral efficiencies and adoption of advanced radio techniques, their emergence has been the basis for all new mobile systems from Release 8 onwards.   It should be noted that LTE-Advanced (From Release 10) is 3GPP's ITU-R IMT-Advanced radio interface. LTE-Advanced is the first true 4G technology to be specified by 3GPP.  LTE-Advanced Pro is the name that helps the industry describe what has been achieved with the completion of Release 13. LTE Pro is set to be used by other sectors, beyond telecoms, including Critical Communications (blue light services & other Mission Critical systems), the machine-to-machine or Internet of Things (IoT) sector, Transport (Rail, ITS, etc), Education and many other areas. LTE-Advanced Pro is 3GPP's steppingstone to 5G systems. |
| 5G  IMT2020 | 5G brings another major technology step, with the creation of a 'New Radio' (NR).  Unlike with 4G, where 3GPP hesitated to join the generational march onwards beyond 3G, 3GPP have embraced the alignment of the industry on NR and on LTE-Advanced Pro to provide 5G – from 3GPP Release 15 onwards. |

**Possible use of IMT to support the provision of aids to navigation, including VTS**

7 IALA has identified typical uses of IMT, including:

.1 Monitoring of marine aids to navigation – where IMT provides a communications channel for remote Internet of Things (IoT) devices for monitoring a wide range of peripheral AtoN and their supporting sub-systems.

.2 Collection and dissemination of meteorological and hydrographic sensor data.

.3 Connection of multiple, remote, high bandwidth and low latency sensors, such as remote CCTV cameras, VHF voice coast stations, AIS AtoN and base stations.

.4 Dissemination of [IHO] S-100 Series of services.

8 IALA will continue to liaise with 3GPP and monitor the development of IMT, noting the ongoing activity on the inclusion of the vertical domain at 3GPP and the continuing work of IMT at ITU, including IMT-2020 and the work at ITU-R WP 5D ‘IMT towards 2030 and beyond’.

**Action Requested of the Experts Group**

9 The Experts Group is invited to note the information provided.

1. For a summary of Release 16 visit <https://www.3gpp.org/release-16>. [↑](#footnote-ref-1)
2. See or download 3GPP TS 21.916 at <https://www.3gpp.org/DynaReport/21916.htm>. [↑](#footnote-ref-2)
3. For further information visit <https://www.3gpp.org/release-17>. [↑](#footnote-ref-3)