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DEVELOPMENT OF PERFORMANCE STANDARDS FOR RANGING MODE (R-MODE) IN RADIONAVIGATION RECEIVERS

Results of the IALA Workshop on Future Radionavigation and Radiocommunication Systems

Submitted by IALA

SUMMARY

<i>Executive summary:</i>	This document informs of the results of the IALA Workshop on future radionavigation and radiocommunication systems.
<i>Strategic direction, if applicable:</i>	2
<i>Output:</i>	2.17
<i>Action to be taken:</i>	8
<i>Related documents:</i>	MSC 109/19/2

Background

- 1 The Maritime Safety Committee, at its 110th session, agreed to include the development of performance standards for R-mode in radionavigation receivers proposed by MSC 109/19/2 (Austria et.al.) into the biennial agenda of the NCSR Sub-Committee.
- 2 IALA has developed various technical Recommendations and Guidelines related to both radionavigation and radiocommunication including R-mode for both MF (G1187) and VDES (G1158). Both documents are freely available at <https://www.iala.int/product/g1187/>, <https://www.iala.int/product/g1158/>.
- 3 Due to rapid development of digital technologies, a single RF-based system, such as VDES R-mode, can accommodate both PNT information and communication information thus can be used as both radionavigation system and radiocommunication system.
- 4 IALA, as an international organization for marine Aids to Navigation, considers that there is a need of guidance for its members to consider how future investment in radionavigation and radiocommunication systems could be used and decided to hold an IALA Workshop on this issue.

Workshop conclusions

5 The IALA Workshop on Future Radionavigation and Radiocommunication Systems was held from 9 to 13 February 2026, hosted by the Northern Lighthouse Board of UK at its headquarters in Edinburgh. The workshop was attended by 78 participants from 24 countries.

6 The Workshop participants considered the various presentations that were given, and reached the following conclusions:

- Considering the significant increase in navigational risk due to GNSS interference and AIS spoofing, IALA should encourage a safe navigation environment through the promotion, development, and implementation of resilient maritime PNT and radiocommunication services, in cooperation with relevant international bodies.
- More resilient PNT and radiocommunication technologies are available now, and in the near future, IALA should assist its members to prepare, implement, and operate these technologies through IALA publications.
- The IMT technology family, as of today (4G, 5G, terrestrial, and space), offers substantial radio communication capabilities readily applicable to the maritime domain. The firmly planned availability of 6G by 2030 will add many gradual improvements over 5G, including PNT and IoT; however, the maritime domain should not wait until 6G to engage with the IMT technology family.
- Despite significant development in radionavigation and radiocommunication technologies, physical AtoN remains a primary means for navigation and is essential for resilience.
- IALA should proactively monitor the rapid evolution of satellite technologies and prepare for the utilization of emerging satellite services, especially Low Earth Orbit (LEO) and 5G/6G non-terrestrial networks (NTN) to improve maritime safety and resilience.
- There is no harmonised way of detecting and reporting PNT service interferences. IALA should consider conducting a Workshop on this topic and inviting all relevant stakeholders, alongside the ongoing development of the IALA Guideline on GNSS interference.
- E-navigation maritime services (Initial descriptions of maritime services in the context of e-navigation MSC.1/Circ. 1610/rev1) should be reviewed and revised, taking specifically into account the introduction of the Resilient PNT service, and the task added to the IALA Work Programme.
- Several terrestrial radionavigation systems are being developed, such as eLoran, R-Mode, etc.; IALA should consider conducting a Workshop on interoperability and harmonisation of these systems.
- The required performance, e.g., bandwidth, latency, etc., for the emerging e-navigation services is unknown; therefore, IALA should consider collecting the needs and creating a method to estimate the required communication means for specific services in each region.

- The development of countermeasures against AIS spoofing is urgent, and authentication of AIS has been developed; in this regard, IALA should consider “a strategy” to encourage widespread implementation for both ship and shore.

7 The report of the Workshop is freely available at <https://www.iala.int/product/report-on-the-workshop-on-radionavigation-and-radiocommunication-technologies/>.

Action requested

8 The Sub-Committee is invited to note the information provided.

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