



**IALA GUIDELINE**

G1153

TEMPLATE FOR THE REVIEW OF EMERGING TECHNOLOGIES FOR POSSIBLE USE BY IALA MEMBERS

**Edition 1.0**

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International Association of Marine Aids to Navigation and Lighthouse Authorities Association Internationale de Signalisation Maritime

**DOCUMENT HISTORY**

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

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# INTRODUCTION

The development of digital technologies continues to be rapid and it impacts on almost all aspects of the maritime industry, including maritime communications, aids to navigation and VTS. Digital technologies deal with the creation and practical use of digital or computerised information using devices, methods or systems. (Source http://www.dictionary.com)

Therefore, it is important to evaluate emerging digital technologies in consideration of user requirements and the needs of IALA membership. Such an evaluation will be a preliminary, high level, desktop study. It will identify the key features and capabilities advantages/disadvantages, limitations and application to aids to navigation, VTS and other services and systems within the remit of IALA.

For this purpose, a simplified set of assessment criteria has been established to provide a consistent review approach. However, it is recognised that innovation and new technologies cannot always be easily measured by extant processes. Accordingly, the review process is to be considered an initial step in determining further steps that may be taken to confirm that technology is appropriate and feasible for the use of IALA members. When providing information on a new technology the organisation which provides the information should also identify how the technology may be used by IALA members.

# STAGED APPROACH

While the template provided in this Guideline can be used in isolation, there is benefit in sharing the results of an initial review with IALA for consideration in the appropriate IALA Technical Committee. The staged approach is identified within the context of a review within the IALA ENAV Committee.

### STAGE 1: PROPOSE TECHNOLOGY

The proposers of a new candidate technology are requested to answer the questions in ‘Technology Candidate Response’ column within the table in Annex A. The proposal, along with any supporting input paper and presentation on the technology, should be provided as input to the appropriate IALA Technical Committee.

### STAGE 2: REVIEW

Once the table has been completed, if submitted, IALA will review the findings and identify next steps, including providing indication if the candidate technology appears to be suitable for further, more detailed, analysis.

Each element provided in the table will be reviewed and marked as red, amber or green, depending on the expert opinion as to the suitability of the technology to address that criteria.

# OUTCOME OF REVIEW

When a review is completed, a rating of red, amber or green will be identified. Technologies rated as red are not considered suitable for use within a given context; technologies rated amber could be considered for use with possible changes or developments; technologies rated green could be considered suitable for use within a given context.

## ANNEX A EMERGING TECHNOLOGIES – REVIEW TABLE

|  |  |  |  |  |  |  |  |  |  |
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|  | **Question** | **Technology Candidate Response** | | **Working Group Response** |  | **G**  **r e e n** | **A**  **m b e r** | **R**  **e d** |  |
| **Infrastructure** | **User** |  | **Status** | | | | |
| 1. | Where has the referral come from? | Inquires to Orolia from various interested users resulted in our meeting with Ernest Batty of IMIS Global and presenting our GNSS protection technology to him, which ultimately connected us to the IALA. |  |  |  | | | | |
| 2. | Name of technology and product name | Orolia’s M-SecureSync GNSS Interference Detection and Mitigation (IDM) device and software suite. |  |  |  | | | | |
| 3. | Functional description | The M-SecureSync system provides anti-jam and anti-spoof protections to the shipboard GNSS navigation and AIS systems. It also provides early warning of jamming and spoofing signals which may breach the protective measures so navigation to false signals does not occur. |  |  |  | | | | |
| 4. | Proposed user group | Navigators, Officers of the Watch |  |  |  | | | | |
| 5. | What are its Key limitations? | No technology can fully protect against all cases of jamming, as extremely powerful jammers can undermine any system. The current technology provides warnings if the protections are breached, however, it does not provide alternative navigation aids yet. These are still in the formative stages, but when they are operational, the M-SecureSync is designed to integrate with them to provide the signaling for switchover. For example, Low Earth Orbit (LEO) constellations are being deployed today which will provide an alternative navigation choice to GNSS. Also, in the future, it is expected that 5G cellular will provide precise positioning to rival GNSS and will be available in littoral situations. VDES-R Mode also shows promise to aid in navigation. All of these are optional additions to our technology when they become available. |  |  |  | | | | |
| 6. | Where is it currently used (geographic and/or industry)? | This is new technology which has not been deployed widely yet. We are entering initial trials with a major bulk carrier in 4Q2021 on two of their ships. |  |  |  | | | | |
| 7. | How is it currently used? | The equipment provides messages to the AIS and/or ECDIS to warn navigators of potential compromises to the GNSS signal integrity. See additional presentation material. |  |  |  | | | | |
| 8. | How could it be used within the maritime sector? | Yes. |  |  |  | | | | |
| 9. | Who developed it? | Orolia. |  |  |  | | | | |

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| 10. | Is it commercial, non- commercial or military? | The technology was born from military equipment but is now available commercially. |  |  |  | | | | |
| 11. | Is there an existing technology that meets the same requirements?  If so, what make this different? | No, not to our knowledge. |  |  |  | | | | |
| 12. | Ease of implementation? | It is early in its deployment, so strong conclusions cannot be made, but we have demonstrated its use with our partners SAAB (AIS) and Telko (ECDIS). |  |  |  | | | | |
| 13. | What are the constraints for implementation? | The equipment is rack mount and connects to existing GNSS antennas via simple coupler taps. It connects to the AIS and ECDIS via simple serial data cables. For demonstration and trails, we offer a portable transit case version which can be temporarily installed on any ship. |  |  |  | | | | |
| 14. | what is the capability of the technology? (i.e. nominal range; data throughput; support for audio / video?) | See attached additional information. |  |  |  | | | | |
| 15. | What is the scalability of the technology? | The warnings from this system can sent to other shipboard equipment via LAN and warnings can be displayed on a web interface. Several different anti-jam antenna solutions are available, depending on cost factors. Backup navigation information can be provided when it is available. This has been demonstrated in military applications, but alternative navigation techniques are not available commercially yet. When they are, this system scales to interface with them. |  |  |  | | | | |
| 16. | Is the technology backward compatible? | Yes. We connect to existing shipboard equipment via NMEA standard interfaces. |  |  |  | | | | |
| 17. | Is the technology dependant on another technology? | No. |  |  |  | | | | |

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| 18. | Can the technology be demonstrated? | Yes. We are entering initial trials with a major bulk carrier in 4Q2021 on two of their ships. |  |  |  | | | | |
| 19. | Are there any results and test bed? Please List | Not yet for maritime use. The technology has been developed over a decade in concert with the US military and it is used in a number of land-based application. |  |  |  | | | | |
| 20. | Is there a compliance summary? | The equipment has been qualified to IEC 60495 maritime environmental specs as well as to rigorous military specs such as MIL-STD-810. |  |  |  | | | | |
| 21. | Are there legal issues associated with the implementation of the technology? | No. |  |  |  | | | | |
| 22. | Are there any intellectual property rights (essential patents) associated with the technology? | Orolia owns IP for this technology. |  |  |  | | | | |
| 23. | Is the technology safe to use? | Yes. |  |  |  | | | | |
| 24. | Does the use of the technology require extra training? | Yes. Training programs are not available yet, but are in development. |  |  |  | | | | |
| 25. | Are there environmental considerations with the technology? | Several different types of anti-jam antenna systems are available, some of which are marine qualified, some of which are not. The rack mount electronics have been fully environmentally as described in item 20. |  |  |  | | | | |

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| 26. | What are the financial considerations for implementation and use? | There are a large variety of configurations and interfaces, depending on the ship’s needs, so each installation is quoted separately. |  |  |  | | | | |
| 27. | Is the technology secure (i.e. protected against hacking; privacy of data)? | Yes. The SecureSync is used extensively in military and critical commercial applications with proven cybersecurity features. The SecureSync was the first Time Server to be approved by the US Defense Information Systems Agency for use in their networks. See more information at [www.orolia.com](http://www.orolia.com) |  |  |  | | | | |
| 28. | Readiness (EU Technology Readiness level - TRL) (level  of maturity of technology) | TRL 6 Technology Demonstrated in Relevant Environment – though some components are at Level 9 – Proved Operationally, as a system for commercial maritime use, it is entering Level 7, Demonstration in an Operational Environment. |  |  |  | | | | |
| 29. | Can you provide independent references? | Yes, to be supplied separately. |  |  |  | | | | |