Emerging Technologies – Candidate Technology Tracker

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>)

# Review of technologies

It is important to evaluate emerging digital technologies in consideration of user requirements and the needs of IALA membership. These evaluations are a preliminary, high level, desktop study. The reviews 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.

The simplified set of assessment criteria has been established to provide a consistent review approach, as provided in IALA G1153. The review process is 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 adopted or adapted for use by IALA members.

The Emerging Technologies – Technology Tracker is a summary of those technologies reviewed within the IALA ENAV Committee (WG2).

IALA is an international association that deals with Marine Aids to Navigation. The association aims to provide information and support to its members and the maritime community through its standards, recommendations, guidelines and other documents as accurately as possible. However, the planning, implementation and operation of Marine Aids to Navigation remains the sole responsibility of the respective national members, authorities, administrations or other entities according to their respective national law including the decision to use IALA’s standards, recommendations, guidelines and other documents.  IALA shall in no event be held responsible for any claim, damages or other liability, whether in an action of contract, tort or otherwise, arising from, or out of or in connection with the above-mentioned documents, the use of or other dealings with them.

# Summary of Technologies

When a review is completed, a rating of red, amber or green is identified. Technologies rated as:

* red are not considered suitable for use within a given context;
* amber could be considered for use with possible changes or developments;
* green could be considered suitable for use within a given context.

The Technology Tracker is updated following the completion of a technology review. The Technology tracker and supporting review document (completed G1153 review table) is provided on the IALA FileShare, under ENAV / Technology Review.

Candidate Technology Tracker

| **No.** | **Candidate Technology** | **Rating** | **ENAV Start Session** | **ENAV**  **Planned End Session** | **Revised End Session** | **Review  (% complete)** | **Comments** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 3GPP – 4G (including LTE) | Green | 22  Oct 2018 | 24 Oct 2019 | 24 Oct 2019 | 100% | Completed / forward to WG3 |
|  | LoRa (Lorawan) | Green (some amber) | 25 March 2020 | 26 Oct 2020 | 27 March 2021 | 100% | Completed |
|  | Digital VHF - dPMR | Green (some amber) | 24 Oct 2019 | 25 March 2020 | 31 Feb 2023 | 100% | Digital VHF voice technology is proven and could be suitable for use by IALA members. Amber elements relate to issues with IPR for the CODEC, and the ongoing work at ITU for the digitalisation of the maritime mobile VHF Channels. Further work on the development and implement of digital VHF voice for use in the maritime domain is required. |
|  | Leo Constellation Developments – including Virgin/OneWeb; SpaceX/Starlink; Amazon/Kuiper, (2026); Telsat Lightspeed, (2026); ESA | Green | 25 March 2020 | --- | 31 Feb 2023 | 100% | Developments in solid state antenna suitable for the maritime environment, along with increasing number of satellites in the constellations, could provide significant capability. Upfront costs for users related to the terminal, antenna and monthly data plan subscription. |
|  | NAVDAT – development in progress, updates provided to IMO. | On hold | 25 March 2020 | --- | --- | 10% | Noting the work at IMO on NAVDAT, deemed not suitable for full template review. May be reviewed if further input is received. |
|  | LiFi (Light Fidelity) | On hold | 25 March 2020 | --- | --- | 10% | No input or expertise available in WG2. Will review when more input is received. |
|  | Resilience in PNT: GPS/GNSS (presented by Orolia, technology called M SecureSync) | Amber (some green) | 28 Oct 2021 | 29 March 2022 | 29 March 2022 | 100% | Review template for Orolia covers both M SecureSync and GNSS Antenna. For M SecureSync, the systems is not yet mature, awaiting feedback from trials. There are patens on the technology. |
|  | Resilience in PNT: GPS/GNSS (presented by Orolia, GNSS antenna systems) | Green (some amber) | 28 Oct 2021 | 29 March 2022 | 29 March 2022 | 100% | Review template for Orolia covers both M SecureSync and GNSS Antenna. The GNSS antenna is a mature technology, appears to have ease of implementation. |
|  | 5G Precise Positioning (presented by Qualcomm) | In Progress | 28 Oct 2021 | 31 Feb 2023 | 32 Oct 2023 | 50% | Continuing |
|  | AI detection of ships in ports / Synthetic images (Presented by SeerBI) | Deciding next steps | 30 Oct 2022 | TBC |  | --- | To be decided |
|  | IMT 2020 on buoys (Presented by Jet Engineering) | Deciding next steps | 30 Oct 2022 | TBC |  | --- | To be decided |
|  | Metal Surface Wave communication (Presented by KRISO/ SWT, technology called MS@MS) | In Progress | 30 Oct 2022 | 32 Oct 2023 |  | 80% | To be completed through intersessional review |
|  | Ships Air draft remote measurement (Presented by China MSA) | Submitted | 30 Oct 2022 | 32  Oct 2023 |  | 10% | Commenced |
|  | SigFox (Irish Lights) | Proposed |  |  |  | --- |  |

Next steps:

1. China MSA - Ship air draft (Item 13) – request further detail on G1153 to complete evaluation for ENAV32
2. Irish Lights (Ronan Boyle) to complete SigFox evaluation for ENAV 32 (New item)