



IALA ENG COMMITTEE

REPORT OF THE 13TH SESSION OF THE IALA ATON ENGINEERING AND SUSTAINABILITY (ENG) COMMITTEE

22 March to 19 April 2021

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19 April 2021

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International Association of Marine Aids to Navigation and Lighthouse Authorities
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**Report of the 13th Virtual Session of the IALA
AtoN Engineering and Sustainability (ENG) Committee
22 March to 19 April 2021
Executive Summary**

The 13th meeting of the ENG Committee (ENG13) was held virtually from 22 March to 19 April 2021.

The session was attended by 129 registered participants from 30 countries. 30 participants attended for the first time.

Working in four working groups, the Committee considered 73 input and produced 21 output documents.

The Committee provided comments to the following Standard:

- ENG13-12.3.10 S1030 on the Radionavigation services

The Committee finalised the following draft Recommendations:

- ENG13- 12.1.2 R0110 Ed.5 Rhythmic Characters of Lights on Aids to Navigation
- ENG13-12.3.1 Draft IALA Recommendation on Provision of GNSS Augmentation Services for maritime applications

The Committee finalised the following Guidelines:

- ENG13-12.1.1 G1134 Surface Colours Used as Visual Signals on AtoN

The following liaison notes were prepared:

- ENG13-12.2.1 Liaison to ARM on 3rd party Quality Control
- ENG13-12.3.2 Liaison to CIRM on Enhanced Radar Positioning System
- ENG13-12.3.3 Liaison to ETSI on Radar Standards
- ENG13-12.3.4 Liaison to Council on ERPS Standardisation Workshop
- ENG13-12.3.6 Liaison to RTCM on responses to SC104
- ENG13-12.3.7 Liaison to PAP re RTCM questions
- ENG13-12.1.3 Liaison to ARM on Update of IALA Maritime Buoyage System and other Marine Aids to Navigation (MBS), the future IALA Recommendation R1001

The Committee proposed a dedicated Workshop on Enhanced Radar Positioning System (ERPS):

- ENG13-12.3.5 ERPS Workshop proposal

The Committee reviewed the following document:

- ENG13-12.0.8 NAVGUIDE Chapter 3, 7&8

Planned intersessional work:

- Marine Light Terms of Measurement
- Third Party AtoN Provider Quality Control
- Extreme environmental conditions
- Solar Panel Guideline, provisional meeting date of the 1st June
- Radar reflector (TBC)
- Review telemetry Guideline 1008
- R-Mode MF, please contact the task lead (Michael Hoppe (Michael.Hoppe@wsv.bund.de) before the end of June 2021.

The following table shows a summary of the ENG Committee task plan for the work period 2018-2023 and the progress made to date.

Overall status of the ENG Committee 2018-2023 Work Programme after ENG13:

Task		WG	Start Session	Planned End Session	Revised End Session	Progress Indicator			Status Overview
						Green	Yellow	Red	
Standard 1010 – AtoN planning and service requirements									
1.1.1	Revised guidance on Simulation Technology to revise G1097 in cooperation with ARM task 1.2.4	2	8	14					
1.2.1	Develop Guidance on checking that 3rd party AtoN providers are providing what they are obliged to provide– 3rd party AtoN provider quality control. (Joint ARM cooperation)	2	9	14					
Standard 1020 – AtoN Design and delivery									
2.1.1	Review and update V-119 on the Implementation of Vessel Traffic Services (R0119) (Output to be a revised Recommendation and associated Guideline),(includes task 1.1.3)	1	8	12					Both for approval to Council
2.1.2	Develop Guideline on Port Traffic Signals	1	11	14					
2.1.3	Develop E-112 Leading Lights and 1023 Leading Lines into a Guideline	1	9	14					
2.1.4	Complete Guideline 1061 Illumination of structures	1	10	14					
2.1.5	Update Guideline 1048 LED technologies and their use in signal lights	1	10	14					
2.1.6	Review & update guideline 1043 on Light sources Note: The old task in the 2014-2018 work period was Merge and update Guideline 1043 On Light Sources and Guideline 1048 on LED Technologies and Guideline 1049 on the Use of Modern Light Sources in Traditional Lighthouses (Task 5.1.9). Should this old task replace 2.1.5 and 2.1.6 as Task 2.1.5?	1	10	14					
2.1.7	Develop a guideline for E-106 Retroreflective materials	1	8	9					Completed
2.2.1	Develop E200-3 on light measurement into a Guideline	1	11	14					Likely to be next work plan
2.2.2	Develop new recommendation on marine light Terms of Measurement	1	12	14					Possibly needs to be pushed into new work plan
2.2.3	Develop E200-5 on Optical Performance into a Guideline	1	12	14					
2.2.4	Revise Guideline on effective intensity	1	9	11					Completed
2.2.5	Develop Guidance on monitoring of function and degradation of AtoN light sources	1	9	14					
2.2.6	Develop Guidance on service factor	1							

2.2.7	Develop Guidance on Colour fading of AtoN (plastic and painted) – methods to measure and assess	1	10	14					
2.2.8	Finish guideline G1148 Marine Signal Lights - Calculation of Luminous Intensity and Range Develop Guidance on service factors	1	8	10					Completed
2.2.9	Update Guideline 1041 on Sector Lights	1	9	14					
2.3.1	Develop guidance to identify appropriate standards for AtoN equipment with extreme environmental conditions. Humidity, temperature, enclosure ratings, UV etc) Also including peak intensity specification for LED AtoN, batteries, optic service factor, thermal cap, etc.	2/1	10	14					
2.3.2	Complete guidance on Maintenance of AtoN structures	2	8	12					Completed
2.3.3	Develop Guideline on Tidal flow data capture and display	2	8	14	15				
2.3.4	New Recommendation on the Responsible Design & Maintenance of AtoN (updated to include safety, sustainable design, and relevant building codes and standards)	2	8	10					Completed
2.3.5	Joint workshop with all 4 technical committees on Cyber Security in AtoN operations	2	8	12	14				
2.4.1	Develop Guidance on what constitutes a good marine AtoN solar panel	2	10	14					
2.4.2	Deliver a Workshop - IALA AtoN Engineering	1	11	13	14				
2.4.3	Monitor Battery development for use in AtoN	2	8	14					
2.5.1	Develop guidance quantifying characteristics to meet nautical and operational requirements and ways to verify them	2	8	13	14				
2.5.2	Develop new guideline on radar reflector (reflection) properties	2	8	13	14				
2.5.3	Creating an overview guidance on floating AtoN	2	8	13	14				
2.6.1	Develop Guidance on modern equipment in traditional lighthouses	2	10	14					
2.6.2	Monitor Climate Change to inform IALA of impact and potential adaptation requirements for AtoN providers	2	8	14					
2.6.3	1.1.1. IALA Heritage website: - Establish a World Heritage Lighthouse Cyber Centre, accessible via the IALA website. - Establish a database on World Heritage Lighthouses.	4	8	14					
2.6.4	Establish a concept for nominating one lighthouse as World Heritage Lighthouse of the year for each 'World AtoN Day'.	4	8	14					

2.6.5	Deliver Heritage Workshop	4	8	11	14				
2.7.1	Revise Recommendation R1004 to reference the UN Sustainable Development Goals	2	8	10	14				Completed
Standard 1030 – Radionavigation services									
3.1.1	Resilient PNT (applicable to all technical domains) – (identification, potential impact and mitigations)	3	8	11	14				
3.2.1	Terrestrial radionavigation systems	3	10	12					Completed
3.2.2	R-Mode (MF)	3	10	14					
3.2.3	R-Mode (AIS/VDES)	3	10	14					Task closed – VDES GL moved to ENAV
3.2.4	Workshop on R-Mode in 2019	3	9	10					Completed
3.2.5	Develop and maintain relevant Product Specifications eg. S-245 eLoran ASF data, S-246 eLoran transmitting station almanac, S-247 Differential Loran reference station etc.	3	10	14					
3.2.6	Guidance on timing and synchronisation	3	8	12	14				
3.2.7	eRacon (standard approach) ; Review recommendations ENAV146 & R-101 & Guideline 1010	3	11	13	14				Run over into the new work period
3.3.1	Consideration of how and when to use SBAS in maritime.	3	9	13	14				
3.4.1	Consideration of how and when to use SBAS in maritime.	3	9	12					
3.4.2	Review existing DGNSS infrastructure and provide guidance for current system	3	10	12	14				
3.4.3	New Recommendation on augmentation for maritime use	3	8	10	13				
3.4.4	Provide guidance, strategy and advice on potential new uses of marine beacon DGNSS infrastructure	3	9	11					Item merged with 3.4.2
3.4.5	High accuracy systems	3	10	14					Run over into the new work period
3.5.1	Review and update current documentation under the preview of PNT WG	3	8	14					
3.5.2	Monitor developments in GNSS, DGNSS, radar, resilient PNT, e-Pelorus, terrestrial systems, R-Mode, inertial and any other relevant areas etc.	3	8	14					
3.6.1	Update to ITU M.823, potential replacement for A.915, Liaison with IMO, ITU, RTCM, etc on related topics and project areas.	3	8	14					
3.7.1	Input to MSP, Integrity considerations for resilient PNT, cybersecurity impact for PNT data, DATUM considerations	3	10	14					
Standard 1050 Training and Certification									
4.1.1	Development and review of WWA courses	1,2,3	8	14					
4.2.1	Navguide updates and review	VC	9	14					
Standard 1060 – Digital communication technologies									

5.1.1	Review telemetry Guideline 1008	2	10	14				
5.1.2	Review of engineering support for e-navigation services, (including hot/cold climates & radio propagation). TO BE CONFIRMED	3	8	14				

Legend:

Green – progress as planned

Yellow – task needs more time, target time prolonged

Red – very little progress on the task, target time prolonged

Grey - task completed / deleted

Blank – task not started

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Report of the 13th Session of the IALA ENG Committee

GENERAL

The 13th session of the IALA AtoN Engineering and Sustainability Committee (ENG) was held virtually from 22 March to 19 April 2021.

There were a number of new arrangements carried out in the Dashboard area in response to comments, concerns and requests from the previous session's virtual committee questionnaire and to fulfil the expectations of the Committee participants. As done in the previous session, the following platforms were used:

- MS Teams (to conduct meetings)
- Outlook Groups (to communicate with the Committee participants, sharing and seeking for document approval)
- Nextcloud Platform (to support the collaborative work of the committees, sharing documents, uploading, and downloading and make them available to all the Committees at any time)

These tools were supported by the revamping of the [IALA Dashboard](#), developed and maintained by the Secretariat that is designed to enhance the user experience of participants and provide situational awareness regarding committee activity.

The Chairman was Simon Millyard, and the Vice Chairman was Michel Cousquer. The Secretary for the meeting was Jaime Alvarez.

1. OPENING

Simon Millyard introduced himself and the WG chairs and individually welcomed newcomers to IALA.

1.1 Welcome from the IALA Secretary-General and Deputy Secretary-General

The Secretary-General welcomed all participants and was extremely glad to see them all, albeit on a computer screen. The Secretary-General expressed his wish to come back to normal again and thanked the Chair and Vice Chair of the Committee for their hard work in preparing for this meeting and for facilitating the friendly and hardworking atmosphere for which the Committee is known. The Secretary-General noted that notwithstanding the COVID-19 pandemic restrictions, IALA and the World-Wide Academy were on track with their respective work programmes and planned activities.

Each of the four Committees and the Legal Advisory Panel met remotely once again, during March and April, in accordance with established procedures. These innovative working arrangements proved remarkably effective for the meetings in the latter part of last year. In total, 546 attendees from 35 countries and sister organisations logged on, and 139 participants attended for the first time. The Secretary-General informed that the updated version of the arrangements will be discussed later on the agenda.

The Secretary-General took the opportunity to recall that this success is a great tribute to the flexibility of the committee participants, and he thanked all for the tremendous efforts and work in the well-known spirit of IALA.

As stated by the Secretary-General, Face-to-face meetings remain IALA's preferred mode of operation, and the secretariat is planning for the committee and panel meetings to take place with a physical element at the IALA Headquarters during the second half of this year. A physical element because the meeting will most probably be in a new hybrid version with a combination of virtual and physical meetings. The Headquarters is currently being updated with new Wi-Fi and equipment for a more hybrid and virtual post pandemic method of working.

However, everything – especially long-term planning - is of course, uncertain for the moment, and IALA will have to follow the health situation very carefully. There is a risk that all meetings for the rest of 2021 will actually be virtual.

All information on the postponed 2020 IALA Symposium is available from the official [website](#). After the Steering Group meeting last week, the Netherlands Ministry of Infrastructure and Water Management and the Secretariat have been finalizing the details of the programme together with the online registration arrangements.

The Secretary-General also mentioned that on the initiative of the Netherlands and Singapore, Policy Advisory Panel has established a cross committee MASS task group. The group will examine the way forward for IALA regarding the MASS developments.

The Secretary-General reported that the Minister for Maritime Affairs of France signed the Convention on the International Organization for Marine Aids to Navigation on 27 January 2021 on behalf of the French Republic. The Convention is now open for signature by interested States during the next 12 months. Thereafter, it will be open for accession by any State that is a member of the United Nations. He was confident of speedy progress as many of the 50 States who agreed to adopt the Convention at the Diplomatic Conference held in Kuala Lumpur in February 2020 indicated their readiness to sign it. The text is also ready in the six official languages of the UN on the web site.

The Secretary-General informed that the coming issue of the Bulletin will be the last printed version. Its long-established provision of important updates on IALA and WWA activities will however, continue via the regularly e-mailed, electronic newsletter – the e-Bulletin. He encouraged all to send your ideas or articles to the secretariat for the next editions.

The Secretary-General wished all the participants good luck and thanked them once again for their contribution to global safety of navigation over this busy period.

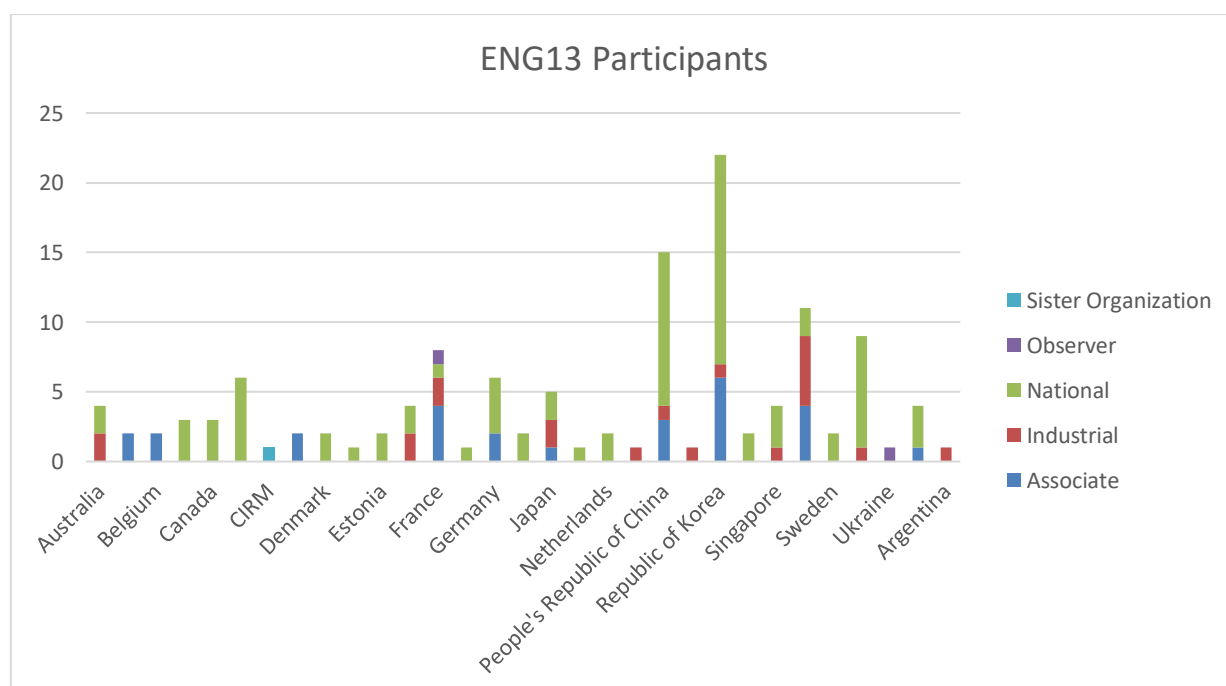
1.2 Approval of the agenda

The agenda (ENG13-1.2.1) was adopted.

1.3 Apologies and Introductions

The session was attended by 129 registered participants from 30 countries. 30 participants attended for the first time.

The following chart shows an analysis of participants:



The list of Committee Members who attended ENG13 is shown in ANNEX B. New participants were welcomed in addition to those returning to the Committee. The Committee received apologies from Jörg Unterderweide and Fernando Romero.



1.4 Working arrangements for ENG13

The following statements were read to Committee members:

IALA is required to comply with the General Data Protection Regulations of the European Union. In the report of this meeting, IALA will include a list of participants with their contact information. Any participant who wishes to remove their personal information from the participants' list should advise the Committee Secretary as soon as possible.

If anyone present has knowledge of any patents, including pending Patents, held either by themselves or by other organisations or individuals, the use of which may be required to practice or implement the content of IALA Documents being developed or worked on in this Committee to inform the IALA Secretariat.

Jaime Alvarez introduced the updates on the working arrangements for the Committee working period:

- Related to the time zone, even if there is no standard time window for meetings to take place, the task group leaders must take into consideration the time zones that the groups participants reside in when scheduling meetings.
- Related to the Silent Approval Process, the chair and working group chairs will determine whether to send document(s) to participants for silent approval for a discretionary period of not less than 3 calendar days; and deemed approved if no substantial comments are received. Whether comments are substantial are at the discretion of the Chair, who may revert the document for further work.

The Secretary presented the Dashboard developed by IALA staff and will continue to be the One-Stop-Shop for conducting the Committees and centralised all the information, status and meeting needs for the member during the Committee working period. A new view of the calendar has been set up, providing a more understanding description of the meetings and discussions on going across the four Committees and within the ENAV Committee. The Dashboard includes the following information within the All Committees area and the dedicated Committee section:

- All Committees bulletin board and ENAV bulletin board
- Committee Action Plan
- Meeting Calendar
- Presentations scheduled

- Information Related to Silent Approval Process
- Link to the Nextcloud (file-share) Platform
- Link to the Meeting Documents
- IALA Style Guide and Working Arrangements links

1.5 Style Guide

The Secretary presented the recently released [IALA Style Guide](#) designed to assist those members in preparing and reviewing IALA documentation. The purpose of this guide is to provide a common language, structure, and appearance.

This document is divided into three main parts:

- Style - Content (section 2) - this includes the preferred standards for grammar, language, punctuation, and spelling.
- Structure – Structure and formatting (section 3) - this includes how documents should be structured and ordered and includes the use of customised styles and fields in Microsoft Word.
- Appendices – including a supplementary table of spelling, a summary of the styles applied within the document templates and an extract from the IALA Brand Guidelines to illustrate the corporate colours.

1.6 ENG committee structure

The Chair then introduced and gave the floor to the Working Group Chairs and Vice Chairs:

- WG1 Light & Vision Physics chaired by Malcolm Nicholson
- WG2 Technical Knowledge and Sustainability chaired by Peter Schneider and Jörg Unterderweide
- WG3 Radionavigation Services chaired by Alan Grant
- WG4 Heritage Forum chaired by Peter Hill

2. REVIEW OF ACTION ITEMS FROM ENG12

Input paper ENG13-2.1.1 refers. Action items for the IALA Secretariat from ENG12 were noted as complete. WG chairs were requested to review Members actions.

3. REVIEW OF INPUT PAPERS

3.1 Input papers

It was noted that all input papers were available on the IALA website. The Committee considered 73 input papers, some of them were received the week before the opening plenary. Chairman recalled participants to forward the input papers before the deadline in order to provide enough time to be read

4. REPORTS FROM OTHER BODIES

4.1 Reports from IALA

4.1.1 IALA Council

Minsu Jeon, IALA Technical Manager, provided the committee with the report of Council 72 (ENAV27-3.1.1), which was held in December 2020. The meeting noted that:

The Council approved five recommendations and nine guidelines, and the followings are related to the ENG Committee:

- R1020 Terrestrial Radionavigation Services, Ed.2.0, Dec 2020

- G1135 Effective intensity, Ed.2.0, Dec 2020

And the Council advised further committee discussion on the following documents:

- Draft Recommendation on Provision of GNSS Augmentation Service for Maritime Applications

4.1.1.1 Drivers & Trends

Chairman stressed the fact that the Drivers and Trends document (ENG13-4.1.1.1) was discussed in depth during Council 72 where the Council look at 9 Maritime trends relative to AtoN.

1. Increased Digitalization, including big data and future communication;
2. Development of autonomous, automated and unmanned vessels;
3. Need for increased connectivity and interoperability;
4. Cyber-crime vulnerability and cyber security;
5. Changes in trade patterns due to global economic developments;
6. Large cruise ships going to remote locations like the Arctic;
7. Competing use of the oceans (Marine Spatial Planning); and
8. Demand for efficiency in the transport chain.
9. High demand for sustainable and environmentally friendly operations and development.

Chairman requested to bear in mind these points above when running out the work on the working groups.

4.1.1.2 Position document on the Development of AtoN

This document has the purpose of describing the Positions that IALA will take concerning certain critical technical and operational aspects of its work with the object of assisting the work of the technical Committees of IALA and informing IALA members. The Policy Advisory Panel has the task to maintain this document with the inputs from the Committees.

David Jeffkins (Australian Maritime Safety Agency – AMSA) took the floor to provide an update regarding the Australian DGPS network, the DGPS stations were established around late 1990-2020 and Australia took the decision to turn off the service on 1 July 2020. In the process of removing the DGPS equipment, AMSA make available them to IALA national members if they are interested, please contact David Jeffkins.

4.1.1.3 Heritage Lighthouse Award

WG4 Chair Mr. Peter Hill provided background on the accolade of IALA Heritage Lighthouse of the Year from 2019 first issued to Cordouan Lighthouse and in 2020 which has been conferred by Council upon Santo Antônio da Barra Lighthouse. This year, there are 29 nominations coming from 18 different countries.

Nominations are open for the 2021 accolade – this link is at IALA members disposal <https://www.iala-aism.org/heritage/> for more information.

4.1.2 IALA Policy Advisory Panel (PAP)

4.1.2.1 Technical Documents Catalogue

Chairman announced the updated publication made available by the secretariat, putting all the Standards, Recommendations and Guidelines together (ENG13-4.1.2.1).

4.1.2.2 Sustainability

Chairman also stressed sustainability is one of the vital aspects of the UN Sustainable Development Goals and highlighted in the Drivers and trends document. The Council is continuing to lead the activity to bring this goal to the IALA framework. Chairman asked the IALA Participants to think and take in mind about the tasks that IALA could support for promoting the Sustainability topic.

4.1.2.3 2022-2026 Work Programme

By the decision of the council in March 2021, the 20th IALA conference in Brazil has been postponed from 2022 to 2023 bearing in mind the current world-wide situation with respect to the COVID-19 pandemic and to provide certainty to all stakeholders and to increase the likelihood of a successful physical event. The call for abstracts due in March 2021 will also be postponed.

With the deferment of the General Assembly, the Committee work programme needs to be ready for the Council by the first half of 2022. A preliminary draft of the ENG work programme 2023 2027 (ENG13-4.1.2.3) is under development and the chair asked all the participants to look at the drivers and trends document and liaise with the WG Chairs, Committee Chair / Vice Chairs and the Secretariat to progress on the revised 4 years work programme.

Following the Conference and General Assembly in 2023, it is foreseen that the regular interval of two years between the Conference and Symposium will be re-established. Therefore, Singapore will host the Symposium in 2025 with India hosting the Conference and General Assembly in 2027.

The current work program will be extended by two additional sessions, comprising ENG15 and ENG16.

With respect to the planned workshops for which postponement or cancellation decisions have not yet been made, the workshop on Marine Aids to Navigation in the Autonomous World will take place virtually in May 2021 starting from the 20 to the 28 May. The workshop on Cyber Security, will be hosted virtually from 1 – 5 November 2021. Decisions on dates for the workshop on AtoN Engineering and the Heritage Workshop have yet to be confirmed.

4.1.2.4 MASS task group

At its 72nd session, the Council discussed the development of MASS and reaffirmed its position that there is a need to increase focus on developing MASS related IALA guidance. The Netherlands and Singapore agreed to develop an input paper to PAP on Impact of MASS on Marine Aids to Navigation (PAP41-6.1.5.1). Recalling further the documents related to MASS and MASS related infrastructure:

- C71-8.5.1 The impact of MASS on VTS (the Netherlands)
- VTS49-8.2.4 Scoping exercise on the implications of MASS on VTS documents (China MSA)
- ENG12-3.1.27.2 Report of international meeting for MASS infrastructure

The MASS task group will consist of a representative from each technical committee plus industry and IALA experts under the chairmanship of The Netherlands and Singapore with secretarial support from IALA. Any ENG committee member interested in this topic should contact the ENG Chairman.

Maarten Berrevoets took the floor and informed about the paper coming from Singapore & the Netherlands which was submitted to PAP on Impact of MASS on Marine Aids to Navigation (PAP41-6.1.5.1) that includes the discussions on the topic addressed across all IALA Committees with the purpose of:

- adopting a common framework;
- facilitating MASS discussions across Committees;
- support developments to the task related to MASS and future VTS including emerging technologies and human elements for future work program; and
- provide a framework to develop IALA documents to implement new and advanced technologies.

The purpose of the group is to facilitate MASS related work within IALA and focus the work on developing relevant guidance to members. The group meets periodically to discuss MASS developments, study national and regional MASS projects and progress MASS related work across the technical committees. The group reports to the Policy Advisory Panel which assigns the groups work and decides on its composition.

A Life-cycle approach is foreseen for the development and implementation of this project in 4 steps:

- Determine future scenarios / user needs: has been started for future scenarios for VTS services making use of the four IMO degrees of MASS. Task force will align all Recommendation and provide advise on the set of scenarios.
- Determines purpose and services of the VTS of the future: VTS service provision in accordance of the different IMO degrees.
- Scoping exercise: potential impact of MASS on the IALA Standards, Recommendations, Guidelines.
- Identify task, Recommendations, Guidelines and regulations: during the progress of these steps, the outputs will be populated across of the four Committees to seek for progressing some of the tasks which will feed into the committee work plans.

4.1.2.5 Revised Standards

IALA Standards aim at harmonizing AtoN worldwide to cover services and technologies and is the top-level technical document in IALA covering 34 technical topics. There is an action to review these Standards and will follow the process depicted below:

Refer to PAP40-6.1.4.1

Plan and Timeline of the activities		
Organ and Date	Activity	Comment
PAP 40 2 nd half 2020	Draft and agree on the plan	
Committees 2 nd half 2020	Review the Standards edition 1.0 (this may include an intersessional work)	Secretariat prepares an input paper to the committees and provide the Standards and the structure in annex below in editable format
PAP 41 1 st half 2021	Review any comments received from the committees	
Committees 1 st half 2021	Complete the draft standards edition 2.0	Secretariat provide the input from PAP 41 to the committees
IAP 1 st half 2021	Reviews and provides advice on the draft Standards edition 2.0	
PAP 42 2 nd half 2021	Finalises the draft Standards edition 2.0 for Council approval	
Council 74 2 nd half 2021	Approve forwarding the draft Standards edition 2.0 to General Assembly	
2 nd half 2021	Information process to all Members and other organisations	Communication officer to coordinate
General Assembly 1 st half 2022	Approve the Standards edition 2.0	Brazil
Post General Assembly	Publicising the Standards to membership and other organisations	Communication officer to coordinate

Figure 1 The standard review approval process

4.2 IMO Meetings

Minsu Jeon presented the status of IMO meetings highlighting the fact that most of the meetings of last year have been postponed due to the pandemic situation.

Minsu Jeon drew the attention of the committee that a paper NCSR 7-3-4 on Interaction between offshore wind farms and maritime navigation by France and the Netherlands that directly refers to the IALA Recommendation O-139 on Marking of man-made offshore structure, R1010 on the Involvement of Maritime Authorities in Marine Spatial Planning and G1121 on Navigational Safety within Marine Spatial Planning.

4.3 IHO/IALA liaison

IALA Secretariat is keeping communications with IHO. Regular IALA IHO Technical Cooperation meeting was held on 14 October 2020 virtually and discussed the following points of the agenda:

- Update on S-100
- IHO testbed activities
- General developments of S-200 including ENG Product Specifications S-240 series
- IALA Guideline on web service based S-100 data exchange
- Definition of S-201 features and attributes

In the frame of cooperation in S-100 and S-200, IHO has published S-240 in the website for test and validation. Related to eLoran product specification S-245, S-246, S-247 the work is still on going.

Minsu Jeon informed about the process to liaise with IHO in regards with technical matters:

1. Prepare a paper to IHO
2. Technical cooperation meeting IALA / IHO

4.4 ITU

Topics of IALA interest: GMDSS, VDES, AIS, ARMD, NAVTEX. Below topics are of IALA interest in ITU WP5B meeting on 9 to 20 of November 2020:

- Revision Recommendation ITU-R M.2092-0 (VDES) : the status of the document is as preliminary draft review expected to be approved in November 2021
- Electromagnetic interference (EMI) from LED and other sources

Malcolm Nicholson asked the Secretariat to provide further detail on EMI because of the possible difference between interference coming from LED or from the power supply of LED. There is a possible impact on ENG WG1 / WG2. Paul Mueller added new elements to the discussion.

4.5 IEC

Manuel Lopez briefed about the standardisation process in IEC of the Satellite Based Augmentation System shipborne receivers. The New Work Item starting the process in IEC Technical Committee 80 (Maritime navigation and radiocommunication equipment and systems) was submitted in February 2021 by the consortium comprised by Bureau de Normalisation de l'Aéronautique et de l'Espace (BNAE), Cerema, European Satellite Service Provider (ESSP) with the support of the European Committee for Standardisation, (CEN) and the European Committee for Electrotechnical Standardisation (CENELEC) the European Commission (EC) and the GNSS Agency (GSA).

The New Work Item proposal is open until 11 June to vote in favour with participation (active review) by the IEC Standardisation bodies enabling the process to present the final draft of IEC-61108 Part 7 for SBAS to IEC TC80.

4.6 RTCM

Alan Grant provided a brief update on RTCM activities informing the Committee that the focus that will be subject to WG3 work is around the next generation of DGNSS broadcast standards allowing generic messages moving forward to multiconstellation messages. RTCM is aligning the number of requirements of these messages that could cover the user needs.

4.7 PIANC

Minsu Jeon briefed about the monitoring activity of IALA in the work in PIANC, any subject in the scope of IALA will be coordinate with them.

4.8 CIE

Alwyn Williams ENG WG1 vice-Chair reported on CIE, it is noted that a technical report on the use of LEDs in transport signalling is nearing completion and may be published later this year. The report is analogous to

IALA Guideline 1048. A mid-term conference is planned promptly and Alwyn will inform if any relevant document to IALA is presented during the conference.

4.9 Digital@Sea

Digital@Sea initiative is a broader version of the e-navigation underway conferences. By the coordinating group, it was decided to widen the scope to cover broader technical subjects under the new initiative such as MASS, SMART Navigation, SMART Port and etc. Digital@Sea webinar will be held during the Symposium on 10:00 UTC, 14 April 2021, with the Danish Maritime Authority (DMA), Korea Ministry of Oceans and Fisheries(KMOF), United State Coast Guard (USCG), and Radio Technical Commission for Maritime Services (RTCM). Presentation is available through this [link](#).

4.10 ESNB Tsunami monitoring

IALA Secretariat was contacted by ESNB to contribute with their task force on Climate risk reduction. One of the task is develop technologies augmenting tsunami monitoring using high accuracy GPS and DGNSS data with the ships and radar. Minsu Jean invited members to contribute if deemed interesting the number of tasks in ESNB. The topic of Tsunami Monitoring has been included in the next work plan as part of the complimentary use of AtoN.

5. REPORTS FROM RAPORTEURS

5.1 Update on IALA VTS-ENAV Symposium 2021

On behalf of the Symposium hosts, Maarten Berrevoets provided ENAV27 with a brief update. The Symposium will start on Monday 12 April and will finish with a closing session the 16 April 2021. There will be a unique working place for networking and broadcast of relevant sessions. All sessions will start at 11.00 UTC for three hours and will be recorded and posted on the Symposium and IALA website. The programme for the event and speakers are advertised, and the registration is open on the Symposium website.

6. ADVERTISING ONLINE PRESENTATIONS

Seven presentations were presented during the ENG Working Period. The presentations are available on the website <https://www.iala-aism.org/committee-dashboards/repository-of-committee-presentations/>.

Date	Time (UTC)	Title	Presenter
23-Mar	14:00	RTCM report	Ed Wendlandt
24-Mar	WG3 plenary 10:00	SBAS standardization	Elisabet Lacarra / Manuel Lopez
	11:45	SBAS and gLab	Ginés Moreno López / Manuel Lopez
29-Mar	11:00	The Intelligent Measurement of the Character of Aids to Navigation Light	Wang Lingyan
	11:20	The application of Beidou remote control and monitoring system in China	Chen Dequan
	TBC	Impact of MASS on AtoN	Harmen van Dorsser
31-Mar	11:00	Four-Season Universal light Buoy in Frozen Ports	Li Aang

7. WORK PROGRAMME (2018 - 2022)

The ENG Committee Workplan for the 2018-2022 work period was reviewed. Paper ENG13-7.1 refers.

The ENG Work Programme Task Register for 2018-2022 was reviewed. Paper ENG13-7.2 refers.

The following shows a summary of progress on the Task Plan at the end of ENG13.

Action item:

The IALA Secretariat is requested to forward the ENG Committee Task Plan for 2018-2022, ENG13-7.2 to ENG14.

8. ESTABLISH WORKING GROUPS

8.1 Establishing working groups

Four working groups were established, as outlined below. A list of working group participants is at ANNEX C.

Working Group		Working Group Chair	Working Group Vice Chair
WG 1	Visual & Physical AtoN	Malcolm Nicholson	Alwyn Williams
WG 2	Knowledge & Sustainability		Peter Schneider Jörg Unterderweide
WG 3	Radionavigation Services	Alan Grant	Michael Hoppe
WG 4	The Heritage Forum	Peter Hill	Jonghun Kim

9. WORKING GROUP 1 – VISUAL & PHYSICAL ATON

The working group met virtually during ENG13 and was made up of 13 members and they considered 13 input papers. Some of the papers received were for information, whilst others were input to developing guidelines. The main aim of this session was to continue the work identified in the work program and update the task register.

An additional task, not on the work programme was to update R0110 on Rhythmic Characters of Lights on Aids to Navigation with the characteristics of Mobile AtoN. This was completed during the session and agreed by the working group. Once approved this revision will be advised to the IHO.

Action Item:

The IALA Secretariat is requested to forward the output paper ENG13-12.1.2 on the amended R0110 on Rhythmic Characters of Lights on Aids to Navigation to Council for approval.

The IALA Secretariat is requested to advise IHO on the contents of updated document ENG13-12.1.2 via the technical cooperation meeting and report to ENG14.

9.1 Develop Guideline on Port Traffic Signals (Task 2.1.2)

This task commenced at ENG10 following the results of a survey conducted by the ARM Committee and is expected to take two sessions to complete. The survey found that although authorities using the traffic signal codes could produce the codes, they were having some issues with the practical implementation. Due to other work items taking longer than anticipated, this task was postponed until the next work programme. However, some input is expected during the current work programme.

9.2 Develop E-112 Leading Lights and 1023 Leading Lines into a Guideline (Task 2.1.3)

This task was due to commence at ENG9 for four sessions. Due to other work items taking longer than anticipated, this task was postponed until the next work programme. However, some input is expected during the present work programme

Action Item:

Frank Hermann and Pärtel Keskküla are requested to provide an input paper to ENG14 on the task to Develop E-112 Leading Lights and 1023 Leading Lines into a Guideline.

9.3 Update Guideline 1048 LED technologies and their use in signal lights (Task 2.1.5)

A late input paper was received directly to the WG1 Chair and Vice Chair, which was briefly reviewed during the WG1 plenary. It will be used as a starting point at ENG14 to continue this task and is available through this [link](#).

Action Item:

Malcolm Nicholson is requested to review the partially combined Guidelines on LED technologies and their use in signal lights and submit an input paper to ENG14.

9.4 Review & update guideline 1043 on Light sources (Task 2.1.6)

Refer to 9.3 (Task 2.1.5)

9.5 Develop E200-3 on measurement of light into a Guideline (Task 2.2.1)

An input paper (ENG13 3.1.1.9) on this subject was received from China MSA. A presentation was made to the Committee on the subject of the paper by Wang Lingyan. This task was due to start at ENG11 for four sessions. However, this work can only be started when task 2.2.2 on Marine Light Terms of Measurement has been completed. Refer to task register ENG8-12.2.12 for the scope of work.

Action item:

The **IALA Secretariat** is requested to forward input paper ENG13 3.1.1.9 to ENG14 as a working paper.

9.6 Develop new Recommendation on Marine Light Terms of Measurement (Task 2.2.2)

The input paper on this subject was reviewed, with some progress being made. However, due to the somewhat complex and potentially far-reaching nature of the document it was decided that more consideration was to be given to the definitions. An alternative suggested title for this recommendation was proposed as 'Marine Signal Lights: Standard Performance Characteristics'.

Action item:

Alwyn Williams is requested to arrange an intersessional meeting to progress the work on Marine Light Terms of Measurement.

9.7 Develop E200-5 on Optical Performance into a Guideline (Task 2.2.3)

This task started at ENG13 for three sessions. Refer to task register ENG8-12.2.12 for the scope of work. The task group met virtually and discussed the way forward. It was felt that the existing recommendation was very dated and that the approach would be to take the new IALA Guideline format and populate the relative title headings and then see where the information fitted to these headings.

Action item:

Malcolm Nicholson is requested to amalgamate the input paper from WSV ENG13-3.1.1.3 Optical Performance of a Projector Sector Light into the revised Guideline on Optical Performance and submit an Input Paper to ENG14.

Alwyn Williams is requested to submit an input paper on the revision of Recommendation R0200 Marine Signal Lights Part 0 – Overview (E-200-0).

9.8 Revise Guideline on effective intensity (Task 2.2.4)

Completed at ENG12.

9.9 Develop Guidance on monitoring of function and degradation of AtoN light sources (Task 2.2.5)

This task was due to commence at ENG9 and it was envisaged to add to Guideline G1077. Refer to task register ENG8-12.2.12 for the scope of work. An input paper from Peter Dobson and Alwyn Williams was received, but due to the prioritisation of other work, it was not reviewed in detail. However, in order to gain practical data over time, it is proposed to delay this work item until the next work programme.

Action item:

Michel Cousquer is requested to remove Task 2.2.5 for the 2018-2023 work programme and add it to the 2023-2027 work programme.

9.10 Develop Guidance on service factors (Task 2.2.6)

Task completed in ENG10 as it has been incorporated into Guideline G1148.

9.11 Develop Guidance on Colour fading of AtoN (plastic and painted) – methods to measure and assess (Task 2.2.7)

Work on the draft Guideline was concluded during the session with input from China, Germany and Australia. The draft was reviewed at the final plenary and sent for silent approval.

Action Item:

The **IALA Secretariat** is requested to forward the output paper ENG13 on Surface Colours used as Visual Signals on AtoN to Council for approval.

9.12 Finish Guideline G1148 Marine Signal Lights - Calculation of Luminous Intensity and Range (Task 2.2.8)

Task completed at ENG10.

9.13 Update G1041 on Sector Lights to define 'Angle of Uncertainty' (Task 2.2.9)

This task was due to start at ENG9 for two sessions. However, due to working on other documents this task was not started. Refer to task register for scope of work and updated time frame for completion.

Action Item:

Malcolm Nicholson is requested to review G1041 with regard to the definition of 'angle of uncertainty' and submit a revision to the text to ENG14.

9.14 Deliver a Workshop – AtoN Engineering (IALABATT/ IALALITE) (Task 2.4.2)

Following the approval from Council and submission from Australia to host the workshop, a steering committee meeting was held during ENG12. A decision to postpone the workshop until the next work programme was made.

9.15 Response to Liaison note from ARM regarding revision of MBS R1001 (ARM12-11.2.1.1)

The ARM Committee requested comment from ENG on the revision of the MBS, The draft revisions were considered at ENG13 and the response is an ENG13 output ENG13-12.1.4.

Action Item:

The **IALA Secretariat** is requested to forward the liaison and annex to ARM, ENG13-12.1.3 and ENG13-12.1.4 on Update of IALA Maritime Buoyage System and other Marine Aids to Navigation (MBS), the future IALA Recommendation R1001.

10. WORKING GROUP 2 – KNOWLEDGE & SUSTAINABILITY

The Working Group was joined by 40 members of 19 nations who participated in five Task Groups. The Working Group reviewed 25 input papers. Some of these documents were for information, some Liaison notes and the remainder were input to the guideline development. Based on 2 input papers from China (4 season plastic buoy, use of Beidou in RCMS) additional presentations were given during ENG13. The key tasks for the ENG13 session for Working Group 2 are highlighted below; however, the overarching goal was to continue with the work as identified in the 2018-2022 work program.

10.1 Review and update Guideline 1097 (Task 1.1.1.)

This task is continued by ARM, since both “G1058 Use of Simulation as a Tool for Waterway Design and AtoN Planning” and “G1097 Technical Features and Technology Relevant for Simulation of AtoN” are supported by ARM. ENG has co-coupled the work of ARM and is ready for further support.

10.2 Third party quality control (Task 1.2.1.)

The Working Group continued to develop a new guideline on third party AtoN provider quality control. Three online meetings with 9 participants were held during ENG13 to progress the work, which included updating the guideline content and editing of the document. It is recommended that the draft guideline be forwarded to the ARM Committee for their review and feedback to allow the document to be finalized for approval at ENG14.

Action Item:

The IALA Secretariat is requested to forward the draft guideline on Third Party AtoN Provider Quality Control (ENG13-12.2.2) to ENG14.

The IALA Secretariat is requested to forward the Liaison Note on Third Party AtoN Provider Quality Control (ENG13-12.2.1) and draft guideline (ENG13-12.2.2) to the ARM Committee for review and request their feedback to ENG14 and intersessional working group through the secretariat.

That Committee Participants are requested to provide any examples of contracting out maintenance and renewal activities including pre-qualification of Contractors and monitoring of their performance to ENG14.

10.3 Extreme environmental conditions (Task 2.3.1.)

The Task Group consisted of 16 participants, with varied assistance (between 11 to 15) though three sessions over the ENG13 period. The Task Group continued developing the draft Guideline to identify and describe the extreme environmental conditions capable to generate a negative impact on AtoN and identify the appropriate standards for AtoN Equipment too. The participants worked on the latest version of draft Guideline in extreme environmental conditions, generated during ENG12, and continued developing topics such as the incidence on AtoNs when occurrence hurricanes, ice situations, marine growth, strong winds with sandstorms and strong tidal currents. The Guideline will be reviewed at ENG14 and during the scheduled intersessional meetings for the next period.

Li Ang gave a presentation on Four Season light buoy and as associated input paper (ENG13-3.1.2.6) was recognised. The Task Group members have continued developing this document, sharing data from different regions with similar extreme environmental conditions but with different solutions and will continue at ENG14.

Due to the planned interconnection of this Draft Guideline with Guideline 1108 “The Challenges of Providing AtoN Services in Polar Regions” and Guideline 1136-Ed.1 “Providing-AtoN-Services-In-Extremely-Hot-and-Humid-Climates”, the task group consider feasible to merge between the two documents to obtain a unique document covering all the environmental issues. It is proposed as a task for the next work programme 2023 – 2027.

Action Item:

The IALA Secretariat is requested to forward the draft Guideline on Extreme Environmental Conditions (ENG13-12.2.3) document to ENG14.

That Committee Participants are requested to share their experiences and examples from their specific areas and to provide input paper for ENG14.

That Task Group leaders (2.3.1) are requested to merge Guideline 1108, Guideline 1136 and the draft Guideline on Extreme Environmental Conditions and WG chair is requested to propose this output as a new item to the work plan 2023 – 2027.

10.4 Tidal flow data capture and display (Task 2.3.3.)

The ARM committee reviewed the existing draft guideline and proposed a revised title and layout. No work was done on this during ENG13. The work will continue from ENG 14.

Action Item:

The IALA Secretariat is requested to forward “ENG12-3.1.28.4 Liaison note to ENG on Guideline on Tidal Current Signal System post plenary (ARM11-13.2.4)” and “ENG12-3.1.28.4.1 Annex 1 Draft G on Meteorological and Hydrological Data Dissemination post plenary (ARM11-13.2.4.1)” to ENG14.

10.5 Solar Panel Guideline (Task 2.4.1)

The task group met on four separate occasions throughout the ENG 13 session to develop the Draft Guideline on Properties of a good marine solar module. The meetings were attended by 19 participants from 11 different countries, providing a good spread of experience. The group made good progress on the structure of the document bringing together some of the key area in a logical manner to inform the readers. Some good inputs were provided by the China Maritime Safety Agency (CMSA) around the impact of wind pressure on solar modules which was integrated into the guideline. The draft guideline is developing well with the various inputs from contributors.

The task group requests examples of problems experienced with marine solar module from members to further inform the group of typical problems experienced by AtoN operators.

Further work is planned intersessionally, with a provisional meeting date of the 1st June.

Action Item:

The IALA Secretariat is requested to forward the draft Guideline on the Properties of a good Marine Solar module (ENG13-13.2.4) to ENG14.

The IALA Secretariat is requested to set the meetings for intersessional work on the draft Guideline on the Properties of a good Marine Solar module.

10.6 Develop guidance quantifying characteristics to meet nautical and operational requirements and ways to verify them (Task 2.5.1)

The work on this task was postponed to ENG14.

10.7 Radar Reflector (Task 2.5.2.)

Because of missing of input the working group had only one session during the ENG13 to review and discuss the draft guideline "Radar Reflector (Reflection) Properties". The session was attended by 7 participants from 6 different countries. New content (simulation results of different radar reflector types) will be available to ENG14. Intersessional work is necessary, but not yet planned.

Action Item:

The IALA Secretariat is requested to forward the draft Guideline on Radar Reflectors on AtoN (ENG13-13.2.5) to ENG14.

10.8 Creating an overview on Guidance on Floating AtoN (Task 2.5.3.)

Work on this task was postponed to ENG14.

10.9 Review of IALA World-Wide Academy model courses (Task 4.1.1.)

The Working Group reviewed seven IALA World-Wide Academy Marine Aids to Navigation Level 2 Technician courses. The content and scope of the model courses were reviewed, and minor changes were proposed to six model courses. During the review, it was noted that there may be some repetition of learning outcomes between some of the model courses in Module One. As such, it was decided to defer consideration of ENG13-3.1.0.17 on the maintenance of plastic buoys to enable it to be reviewed in conjunction with the associated model course on the maintenance of steel buoys. This would also enable any repetition of content between the courses related to buoy handling, cleaning and maintenance to be identified and resolved.

Action Item:

The IALA Secretariat is requested to forward the six updated IALA World-Wide Academy Marine Aids to Navigation Level 2 Technician courses to the council for approval (ENG13-12.0.1–6).

The IALA Secretariat is requested to forward IALA Model Course C2001-7 Maintenance of Plastic Buoys (ENG13-3.1.0.17) to ENG14.

10.10 NAVGUIDE Updates (Task 4.1.2.)

Chairman updated several NAVGUIDE chapters. During the session with WG2 members, the changes were discussed and accepted.

10.11 Review telemetry Guideline 1008 (Task 5.1.1.)

The Task Group met twice during ENG13 working period allowing the review of this guideline to progress. The meetings were attended by 10 participants from 5 different countries. There was an interesting input paper and presentation from China on the use of Beidou as part of their RCMS as well as some good discussion and contributions from all parties during the task group meeting. The task group continued the review of the draft guideline, reflecting how such monitoring system have evolved since the last revision. Discussion around the scope of the guideline considered the impact of additional interconnectivity and data capture, beyond AtoN monitoring.

Work will continue intersessionally, with a provisional meeting date of the 25th May.

The task group request examples on the application of RCMS from members to allow the guideline to reflect current practice and technologies.

Action Item:

The IALA Secretariat is requested to forward the draft Guideline on Remote control and monitoring of marine aids to navigation (ENG13-12.2.6) to ENG14.

11. WORKING GROUP 3 – RADIONAVIGATION SERVICES

The WG Chair and Vice Chair express their gratitude to WG participants for their hard work and effort during this busy period. The WG Chair and Vice Chair would also like to thank all of the Task Group leaders for their time and effort in progressing their work items in this new approach.

As the new IALA document share will not be cleared after each meeting, working documents have been placed in a folder marked as such within each task's sub-folder.

11.1 Resilient PNT (Task 3.1.1)

During this session the draft guideline on resilient PNT was progressed, with the latest version carried over as a working document. It is envisaged that this task will continue over ENG14 and ENG15.

Action Item:

The IALA Secretariat is requested to forward the draft Guideline resilient PNT (ENG13- 12.3.9) to ENG14.

11.2 Terrestrial radionavigation systems (Task 3.2.1)

This item has been completed.

11.3 R-Mode (MF) (Task 3.2.2)

The Committee progressed the development of the draft Guideline on R-Mode implementation using MF radio beacons. The Committee reviewed two input documents associated with timing and sources of time (ENG13-3.1.3.1 and ENG13-3.1.3.11).

The latest version of the draft Guideline has been put in the working documents folder for further consideration at ENG14.

The Committee considered holding an intersessional meeting to progress the work further before ENG14. Interested parties are invited to email the task lead (Michael Hoppe) by 30 of June 2021.

Action item:

That Committee members interested in participating in an intersessional meeting to support R-Mode MF activities are invited to contact the task lead (Michael Hoppe (Michael.Hoppe@wsv.bund.de) by the 30 June 2021.

11.4 R-Mode (AIS/VDES) (Task 3.2.3)

At ENG12 it was agreed that the technical specification of R-Mode activities over AIS/VDES frequencies would be managed by the IALA ENAV Committee. The R-Mode (MF) Guideline would include operational considerations for all R-Mode configurations.

11.5 Workshop on R-Mode in 2019 (Task 3.2.4)

This item has been completed.

11.6 R-Mode testbed progress coordination (Task 3.2.5)

The Committee reviewed and consider the latest timeline for R-Mode development and received updates on the Baltic Sea R-Mode testbed.

11.7 Develop and maintain relevant product specifications (Task 3.2.6)

The latest versions of the eLoran station almanac (S-246) and differential eLoran reference station almanac (S-247) product specifications were considered and updated during this session, including references to S-240 and introducing new annexes. Further work is required on these product specifications and these are expected to be finalised at ENG14. It is anticipated that work on S-245 will be progressed at ENG14.

Action item:

That Committee members are invited to the latest draft product specifications (S-246 and S-247) (available within the file share) and to provide comments to the task leader (Younghoon Han yhhan@kriso.re.kr) before ENG14.

11.8 Guidance on timing and synchronisation (Task 3.2.7)

There was no work on this task during this session. The Committee notes the lack of expertise in this area and invites members to consider supporting this topic.

Action item:

That Committee members are invited to consider whether they or any of their colleagues have expertise in timing and synchronization aspects required to support ENG Task 3.2.7. Please let the WG3 Chairman (Dr Alan Grant - alan.grant@gla-rad.org) know of suitable experts who can support this topic.

11.9 eRaCon (standard approach); Review recommendations ENAV146 & R-101 & Guideline 1010 (Task 3.3.1)

The Committee reviewed a number of input papers provided by CIRM (ENG13-3.10.0.19) as well as documents provided by ETSI TGMARINE. Two liaison notes responding to these inputs have been developed

and the draft Guideline on 'The use of enhanced radar positioning systems' has been further developed during this session.

The Committee also identified the need for a workshop on the standardisation of the Enhanced Radar Positioning System and prepared a workshop request for consideration by Council and a corresponding liaison note.

Action item:

*The **IALA Secretariat** is requested to forward liaison note ENG13-12.3.2 for CIRM "On enhanced radar positioning systems" to Council for approval.*

*The **IALA Secretariat** is requested to forward liaison note ENG13-12.3.3 "On radar standards" on Racons to the ETSI TGMARINE via Andrea.Lorelli@etsi.org with copy to pete.hizzey@wanadoo.fr.*

*The **IALA Secretariat** is requested to forward the liaison note ENG13-12.3.4 and corresponding workshop request ENG13-12.3.5 to Council for its consideration.*

11.10 Consideration on how and when to use SBAS (Task 3.4.1)

This task is complete.

11.11 Review of existing DGNSS infrastructure and provision of guidance for current system (Task 3.4.2)

The Committee considered questions raised by RTCM on the future use of its version 2.4 standard. Recognising the wide ranging implications of the response and that not all service providers were in attendance, the Committee has prepared a liaison note to PAP seeking its advice and clarification on how best to survey IALA members and sister organisations. The Committee also prepared a Liaison Note to RTCM explaining the intention to survey members.

The Committee also progressed the Guideline on DGNSS with the latest version carried over to ENG14.

Action item:

*The **IALA Secretariat** is requested to forward liaison note ENG13-12.3.6 for RTCM "IALA response to RTCM questions" to Council for approval.*

*The **IALA Secretariat** is requested to forward liaison note ENG13-12.3.7 "Potential IALA survey to collate a response to RTCM request" to PAP.*

11.12 Recommendation on augmentation for maritime use (Task 3.4.3)

A revision to the draft Recommendation was made following comments received by Council and the revised version was developed and submitted for approval.

Action item:

*The **IALA Secretariat** is requested to forward ENG13-12.3.1, Draft Recommendation on Provision of GNSS Augmentation Service for maritime applications" to Council for approval.*

11.13 Provide guidance, strategy and advice on new uses of marine beacon DGNSS infrastructure (Task 3.4.4.)

This work item has been merged with Task 3.4.2 and will be closed.

11.14 High accuracy systems (Task 3.4.5.)

The Committee reviewed the existing Guideline related to high accuracy systems (G1127 - systems and services for high-accuracy positioning and ranging) and developed a plan for updating this guideline. The document will be further revised at ENG14.

The Committee identified a potential need for a guideline on precise point positioning (PPP). This will be discussed further at ENG14.

11.15 Review and update current documentation under the purview of PNT WG (Task 3.5.1)

The Committee reviewed the Radionavigation Services Standard and provided comments to the Secretariat. The Committee considered updates to the IALA WWRNP, however recognising the similarities in the text between this document and the NAVGUIDE, sought advice from PAP (via the Committee Chairman) on how these two documents and the IALA position paper relate moving forward.

11.16 Monitor developments in GNSS, DGNSS, radar, resilient PNT, e-Pelorus, terrestrial systems, R-Mode, inertial and any other relevant areas etc. (Task 3.5.2)

The Committee discussed a number of general topic areas, including a funding call for the re-transmission of SBAS data across Europe, updates to NMEA standards and future IALA work plan items.

11.17 Liaison with sister organisations (IMO, ITU, RTCM etc.) on related topics (Task 3.6.1)

No further items to report under this action item. A liaison note to RTCM has been considered under item 11.11.

11.18 Input to MSP, Integrity considerations for resilient PNT, cybersecurity impact for PNT data, datum considerations (Task 3.7.1)

The Committee reviewed the liaison note on cyber security (ENG13-3.1.0.9) and the plan for the cybersecurity workshop (ENG13-3.1.0.10).

11.19 Development and review of WWA courses (Task 4.1.1)

No updates during this session.

11.20 NAVGUIDE updates and review (Task 4.2.1)

The Committee reviewed the radionavigation section of the NAVGUIDE. A revised document ENG13-12.3.8 NAVGUIDE 2018 ENG WG3 amendments is available on the fileshare (ENG13>WG3>NAVGUIDE) and all Committee members are invited to review the amendments prior to ENG14. Comments received will be reviewed with a view of producing a final version for approval at that meeting..

Action item:

That Committee members are invited to consider the proposed amendments for the radionavigation section, as available on the ENG13 section of the fileshare. Please let the WG3 Chairman (Dr Alan Grant - alan.grant@gla-rad.org) know of any errors or omissions prior to ENG14.

12. WORKING GROUP 4 – THE HERITAGE FORUM

ENG WG4 – Heritage Forum considers its overall objective to be;

“To further the declaration and recommendations contained within the Incheon Declaration and within IALA Recommendation R1005 – ‘Conserving the built heritage of lighthouses and other aids to navigation’.

Over the course of ENG 13, WG4 received the participation of 13 persons from 7 nation states, the complete list of those participating is available in the ANNEX C.

The group was pleased to receive the document;

- on the plan for making the award for IALA Heritage Lighthouse of the Year 2021 - Sihyeon Park National Lighthouse Museum of Korea and accompanying presentation.

The group met twice over the course of ENG13 – on Monday 29th March and on Monday 12th April. The second meeting comprised the judging panel for IALA Heritage Lighthouse of the Year 2021. In addition to the above participation list, the group were pleased to be joined for part of its first meeting by Mr Omar Frits Eriksson and by Mr Minsu Jeon who kindly provided advice and information on the agenda.

12.1 Heritage seminar (Task 2.6.5)

Originally planned to run in conjunction with ENG11 in Salvador, Brazil, the event remained in limbo pending a more certain future in regard to COVID-19 restrictions. Considerable work had been put into organising the seminar – especially by Brazil – prior to the disruption caused by the pandemic.

The group noted the possibility of re-scheduling once the future becomes a little clearer and also the potential combination with a virtual seminar - although a site visit was noted as being an integral part of the seminar. The potential to fit the event around the IALA General Assembly in Rio (deferred to May 2023) was considered and Alberto Piovesana Jr agreed to investigate further the options.

Action Items:

Alberto Piovesana Jr (Diretoria de Hidrografia e Navegação of the Brazilian Navy) is requested to investigate the options for a Heritage Seminar in Brazil in 2023 and report back to WG4 at ENG14.

12.2 IALA Heritage Lighthouse of the Year 2020 – Santo Antônio da Barra Lighthouse (Task 2.6.4)

Two articles had been written – one by Alberto Piovesana Jr and another by Peter Hill about IALA Heritage Lighthouse of the Year 2020 (Santo Antônio Da Barra Lighthouse) and these had been published in the most recent IALA Bulletin.

The artwork designed and produced by Korea for the presentation was sent to IALA Headquarters but still remains there. Unfortunately the pandemic has prevented all opportunities for in-person presentation of the award. Alberto Piovesana and the secretariat to discuss options for patriating the artwork outside of the meeting.

12.3 IALA Heritage Lighthouse of the Year 2021 and beyond (Task 2.6.4)

It was agreed that nominations should now be open for 2021 Heritage Lighthouse of the Year with the deadline for the submission of nomination forms to be the 28th February 2021 for consideration by WG4 at ENG13. All nominations previously submitted would also be re-considered.

Further to a presentation from Sihyeon Park (National Lighthouse Museum of Korea) about the design of the 2019 and 2020 awards, the group was asked to consider whether future years' awards should continue to be individually designed or whether a single reoccurring design should be settled upon. The group agreed that from 2021 this should be a single reoccurring design as that would provide an established 'brand'.

Action Items:

Yongchan Bae (MOF, Korea) is requested to oversee and resource the design and construction of the artwork to be presented to IALA Heritage Lighthouse of the Year accolade holder 2021 using the design established in 2020.

That Committee members are encouraged to submit nominations for IALA Heritage Lighthouse of the Year 2022 and/or to encourage colleagues within their organisations to do so.

The IALA Secretariat is requested to encourage IALA National Members to submit nominations for IALA Heritage Lighthouse of the Year 2022.

12.3.1 The Artwork for the Award

Sihyeon Park (National Lighthouse Museum of Korea) presented a paper entitled 'Plan for making the award for IALA Heritage Lighthouse of the Year 2021'. The design for the 2021 artwork was very well received, and the group expressed its gratitude to the generosity of Korea in supporting the award.

The group was reminded that it had previously agreed that 2021 would be the last time there would be a bespoke design for the artwork and that the 2022 artwork would follow either that of 2021 or of a previous

year. Jonghun Kim agreed to discuss and agree on which of these designs the 2022 artwork would be based upon.

There was some discussion as to the future of artwork production after 2022 – the year that Korea had generously offered to produce the artwork up until. Although not an immediate problem, consideration will need to be given at the next ENG as to whom will be sponsoring and commissioning the artwork thereafter. The sponsoring organisation would clearly require a significant say in respect to the form that such artwork (or plaque as the case may be) would take.

The presentation of the artwork to the recipient of IALA Heritage Lighthouse of the Year 2021 remains problematic due to the pandemic, and a virtual presentation is likely. With this in mind, it made sense for the artwork to be transferred directly from Korea to the recipient, bypassing IALA Headquarters.

12.3.2 The Means for Determining IALA Heritage Lighthouse of the Year 2021 Commendation

WG4 was delighted to note that 12 new nominations had been received for consideration in the 2021 award - bringing the total nominations to date to 29 lighthouses from 18 nations.

The growing number of nominations increased the logistical challenge of making a recommendation to IALA Council for Heritage Lighthouse of the Year. WG4 Chair expressed his view that it was important to maintain an element of consensus in determining the award and an emphasis that this was not a competition and there is no winner. All nominees are considered to be IALA Heritage Lighthouses and the individual lighthouse selected as Heritage Lighthouse of the Year is chosen as being the lighthouse best placed to promote the objectives of the Incheon Declaration and IALA Recommendation R1005 in a given year. WG4 and IALA, more generally, is not well placed or resourced to provide the in-depth consideration and procedures or the checks and balances that a more competitive award would demand.

In this context, it was agreed that WG4's commendation to IALA Heritage Lighthouse of the Year 2021 would be determined by a Judging Panel of willing WG4 participants meeting on 12th April 2021. In advance of that meeting, judges agreed to 'score' each nomination using a scoresheet produced by the Chair of WG4 and to submit these to the Chair by 8th April to amalgamate so as to determine the three lighthouses that the Judging Panel would consider.

A short review of this methodology was held at the end of the Judging Panel. The challenges of ensuring a fair and consistent means of narrowing down the field were considered, along with the selection criteria and the challenges of scoring a lighthouse from a judge's own nation. Further review will take place prior to and during WG4 at ENG14 with a view to the 2022 award.

12.3.3 IALA Heritage Lighthouse of the Year 2021 Commendation

The following ENG13 WG4 participants met on 12th April 2021 as judges to determine which lighthouse to commend to Council as IALA Heritage Lighthouse of the Year 2021;

Name	Nation	Organisation
BAE Yong Chan	Republic of Korea	Ministry of Oceans and Fisheries
BURNS Gillian	Scotland	Northern Lighthouse Board
GUO Zhenyu	People's Republic of China	China Maritime Safety Administration
HILL Peter	England/Wales	Trinity House (Chair)
LI Ai	People's Republic of China	China Maritime Safety Administration
PIOVESANA Jr. Alberto	Brazil	Diretoria de Hidrografia e Navegação of the Brazilian Navy

RANXUAN Ke	People's Republic of China	Navigation Institute of JiMei University
WOOD Amy	Australia	AMS Group
YANG Di	People's Republic of China	China Maritime Safety Administration

Also in attendance were Jonghun Kim, Sihyeon Park, and Pärtel Keskküla

Prior to the meeting, Judges had scored each lighthouse to narrow the field down to 3 lighthouses for IALA Council to consider in its determination of IALA Heritage Lighthouse of the Year 2021. These 3 lighthouses are detailed as follows together with a summary of their outstanding characteristics;



Figure 2 Lizard Lighthouse, England

Lizard Lighthouse's antiquity takes us back before the days of rotating optics when a distinctive character of a light could only be created either the periodicity of the light – or by having more than one light. For this reason, Lizard Lighthouse acquired two towers in 1751. The two towers with their coal braziers necessitated more lighthouse keepers, and 7 cottages were built to accommodate them, making the site a hive of activity.

Once a rotating optic was introduced to the Eastern tower in 1903 (for a time making it the most powerful lighthouse in the world), the Western tower became redundant. In time, the fog signal and engine rooms also became redundant and on automation, the 7 cottages were no longer essential. With such a large but under-utilised compound, a comprehensive plan for the re-purposing of these parts of the site was put together. The engine room (still with much of its historic plant) was made into a heritage centre from which the public could tour the operational tower. The cottages were converted to holiday cottages. The expansive lawns were featured with buoys. Public toilets were created and the wider site is again the hive of activity that it used to be. This beautiful, ancient and fascinating lighthouse has become an essential stop for visitors at mainland Britain's most southerly point. In this site can be seen the story of lighthouse development over hundreds of years whilst in its exhibits the story is told of the continued importance of AtoN.



Figure 3 Palmido Lighthouse, Korea

This unique lighthouse ticks all the boxes. Within a cohesive single site there is a striking modern operational tower from 2003 and a historic tower (the tower it replaced) dating from 1903 – itself the oldest ‘modern’ lighthouse in Korea. Not to mention public visitor facilities including a museum, observation deck, and outdoor areas.

Palmido Lighthouse’s history is entwined with some of the most significant events in modern Korean history, embedding it firmly in national and international consciousness. The historic tower is in a good state of conservation, preserving many original features.

Although significant change has been necessary to meet modern navigational requirements, in making those changes, the wider cultural and heritage value and potential of the lighthouse has been embraced wholeheartedly. The new tower, whilst decidedly contemporary in design and dwarfing its diminutive predecessor, retains elements of traditional lighthouse design aiding the visual relationship between the two towers. The retention of rotating optic technology in the new tower provides additional continuity. The cone-shaped building from which the tower protrudes is itself reminiscent of a beacon in its appearance and allows for a small footprint and a big observation deck.

At the 19th IALA Conference in Incheon, Korea in 2018. The Incheon Declaration agreed there encouraged Members “to recognize that the significance of historical lighthouses extends beyond the navigational and architectural value to include maritime culture and history, social history, environmental aspects and that there is great value in documenting, researching and interpreting these for the benefit and inspiration of future generations.” This lighthouse from the city of Incheon itself, encapsulates that laudable goal.



Figure 4 Cape Byron Lighthouse, Australia

This operational lighthouse and its former keepers' accommodation incorporates an interpretative centre, maritime museum, administration office, and café. It is a major tourist attraction with 500,000 visitors a year.

It is a stunning lighthouse in a beautiful position, and is in a remarkable state of preservation. It retains its rotating 1st-order bivalve Fresnel lens – the first and only one of its kind in Australia. Not only does it retain the mercury bearing system, but also the original lifting device for maintaining the mercury bath. The lighthouse also lays claim to being one of the first to have been built out of precast concrete blocks.

There is however one outstanding characteristic of this lighthouse that is not obvious from looking at it. That is the comprehensive work which has been undertaken to understand the lighthouse's importance to different interest groups from a cultural and heritage perspective. Such value is identified as going way beyond its function as an AtoN, whilst acknowledging that this remains its primary function. A 100-page Cape Byron heritage Management Plan expertly (and in detail) identifies the historical and cultural values (including physical features) and how to protect, conserve, tell and present its story. The Management Plan results from the AMSA Heritage Strategy 2018 which facilitates this joined up approach to the management of Australia's lighthouse heritage and enables each site to be seen in a wider context.

Such a comprehensive, holistic and proactive approach is truly exemplary. The example of Cape Byron Lighthouse can be seen as a gold standard in the management of world lighthouse heritage.

After some discussion, ENG13 WG4 (Heritage Forum) determined to commend Cape Byron Lighthouse, Australia to IALA Council as IALA Heritage Lighthouse of the Year 2021.

Action Items:

The IALA Secretariat is requested to forward the commendation of ENG13 WG4 Cape Byron Lighthouse (ENG13-12.4.2) to determine IALA Heritage Lighthouse of the Year 2021 to the Council.

The IALA Secretariat is requested to organise a formal acknowledgement of the award to the recipient at a suitable event to which the recipient is in attendance.

Yonchan Bae (MOF, Korea) is requested to oversee and resource the design and construction of the artwork to be presented to IALA Heritage Lighthouse of the Year accolade holder 2022 based upon one of the previous years' designs in consultation with Jonghun Kim (MOF - Paichai University, Korea) and to liaise with IALA Secretariat with regard to the destination and timing of transfer of the 2021 artwork.

That Committee members are requested to consider whether their respective organisations would be interested in sponsoring the award after 2022.

12.4 Heritage Lighthouse Database and Cybercentre (tasks now combined and re-named 'IALA Heritage Webpage') (Task 2.6.3.& 2.6.4)

Mr Omar Frits Eriksson and Mr Minsu Jeon updated WG4 as to the progress of the website. The Group were pleased to hear that a new populated webpage may be available to go online over the coming weeks, factoring in feedback that WG4 had previously given.

It was confirmed that the page would be separate from IALA's main pages and that its ongoing editing and updating would need to be undertaken by WG4. Gillian Burns (NLB), Siheyeon Park (National Lighthouse Museum of Korea) generously agreed to fulfil this role as Editors with assistance from Peter Hill (WG4 Chair). IALA Secretariat would provide technical advice and, where necessary structural changes. It may also be possible for website editor training to be provided.

Action Items:

Gillian Burns (NLB) and Siheyeon Park (National Lighthouse Museum of Korea) are requested to ensure that the IALA Heritage website is up-to-date, accurate and complete, directly undertaking editorial changes and liaising with IALA Secretariat and with Peter Hill (WG4 Chair) as necessary.

The IALA Secretariat is requested to expedite the website going online, to assist the editing team in their role as editors and to assist in any required structural changes to the website.

12.5 Consideration of matters to progress into the work programme 2022 2026

WG4 tasks in the draft Task Plan 2022-2026 (subsequently deferred to 2023) were noted and agreed as being the following

Task	Expected output
Set up and maintain the Heritage web page on the IALA website	Developed Heritage web page
Heritage LH of the Year award	Maintain the Award
Write the Heritage module for the WWA L1.1 AtoN Manager course	New module on Heritage to include in the L1.1 course.
Review of documents	All documents pertinent to heritage reviewed

12.5.1 Potential additions to Task Plan

A potential additional item was suggested by Jonghun Kim as being the publication of a book celebrating IALA Heritage Lighthouses. To be pursued further into the next work plan, this would first require an investigation and paper detailing the practicalities, including costs, means of funding and so on, noting that there unlikely to be Secretariat resource available for this.

12.5.2 New module on Heritage to include in the L1.1 course

In advance of the new Task Plan period Amy Wood (AMS Group, Australia) presented notes setting out the potential structure of the module. This was gratefully received by the group and WG4 participants were asked to give the notes further consideration intercessional and to provide feedback at or before ENG14.

12.5.3 UN Sustainability Goals and Input Paper ENG13-3.1.4.1

WG4 noted the paper proposing to change work area 2.6 within the Task Plan from 'Heritage & Legacy to Heritage & Culture' and supported this change which better reflected the goals of the group and the Incheon Declaration.

It was noted that IALA Recommendation R1004 recommends that IALA National members and other Marine Aids to Navigation authorities responsible for the provision of Marine Aids to Navigation “endeavour to support the United Nations Sustainable Development Goals (UN SDG)”. It was further noted that ‘Culture’ forms an integral part of the UN Sustainability Goals – in particular **UN SDG Goal 11, Target 11.4** which is to **“Strengthen efforts to protect and safeguard the world’s cultural and natural heritage”**. As such, the WG4 and its output directly contribute to IALA and its members supporting the UN SDG in accordance with R1004.

Action Items:

That Committee Members are requested to note WG4’s satisfaction with the draft task plan proposals in so far as they relate to WG4.

Jonghun Kim (Ministry of Oceans and Fisheries - Paichai University) is invited to investigate the practicalities of publishing a book celebrating IALA Heritage Lighthouses and, if such investigation shows it to be financially and logistically achievable, to submit an informal paper to WG4 at ENG14 for consideration setting out these practicalities.

Review of output and working papers

The Committee reviewed and endorsed the reports of each Working Group. The Committee approved the output and working documents as indicated in ANNEX E.

13. REVIEW OF SESSION REPORT

The report of the meeting (ENG13-14.1) was considered and approved. Committee Participants were requested to advise any corrections/amendments within one week, following which the final version of the report will be issued via the IALA web site.

Action item:

The IALA Secretariat is requested to forward the summary of the ENG13 Committee report (ENG13-14.1) to Council to note.

14. DATE AND VENUE OF NEXT MEETING

The next session of the ENG Committee is planned to be held virtually in October 2021. The date will be decided by the Extra Ordinary PAP in May 2021 and will be informed to the members.

Other IALA events will be publicised on the IALA website.

15. CLOSE OF THE MEETING

The Committee Chairman thanked the Vice-Chair, working group Chairs and all Participants for their hard work and output during the session and the four-year work period. He thanked the IALA Secretariat for their support.

16. LIST OF ANNEXES

- 1 Agenda
 A copy of the agenda is at ANNEX A.
- 2 Participants
 A list of participants is at O.
- 3 Working Group Participants
 A list of working group participants is at ANNEX C.
- 4 Input Papers

A list of input papers is at 0.

5 Output and Working papers

A list of output and working papers is at ANNEX E.

6 Action Items

A list of action items is at 0.



13th Meeting of the AtoN Engineering and Sustainability Committee (ENG13)

The 13th meeting of the **AtoN Engineering and Sustainability Committee** will be held from 22 March – 19 April 2021 virtually.

The opening plenary will commence at 1100 – 1300 UTC on Monday 22 March 2021, and the closing plenary will begin at 1100 – 1300 UTC on Monday 19 April.

AGENDA

Opening Plenary

2. Introduction
 - 2.1. Welcome address from the Secretary-General/Deputy Secretary-General
 - 2.2. Approval of the agenda Simon Millyard
 - 2.3. Apologies and Introductions Simon Millyard
 - 2.4. New working arrangements for ENG13 Jaime Alvarez
 - 2.5. Style Guide Jaime Alvarez
 - 2.6. ENG committee structure Simon Millyard
 - 2.6.1. WG1 Overview
 - 2.6.2. WG2 Overview
 - 2.6.3. WG3 Overview
 - 2.6.4. WG4 Overview
3. Review of action items from last meeting Simon Millyard / Jaime Alvarez
 - 3.1. Review of action items from ENG12
4. Review of input papers Simon Millyard
 - 4.1. Review of input papers to ENG 13
 - 4.2. Input papers for action/allocation
5. Reports from other bodies
 - 5.1. IALA
 - 5.1.1. IALA Council
 - 5.1.1.1. Documents approved by Council Minsu Jeon
 - 5.1.1.2. Drivers & Trends Simon Millyard
 - 5.1.1.3. Position document on the Development of AtoN Simon Millyard
 - 5.1.1.4. Heritage Lighthouse Award Peter Hill
 - 5.1.2. IALA Policy Advisory Panel (PAP)

5.1.2.1.	Technical Documents Catalogue	Simon Millyard
5.1.2.2.	Sustainability	Simon Millyard
5.1.2.3.	2022-2026 Work Plan	Simon Millyard
5.1.2.4.	MASS task group	Maarten Berrevoets / Harmen van Dorsser
5.1.2.5.	Revised Standards	Minsu Jeon
5.2.	IMO	Minsu Jeon
5.3.	IHO	Minsu Jeon
5.4.	ITU	Minsu Jeon
5.5.	IEC	Manuel Lopez
5.6.	RTCM (version 2.4 broadcast standard)	Alan Grant
5.7.	PIANC	Minsu Jeon
5.8.	CIE	Alwyn Williams
5.9.	Digital@Sea	Minsu Jeon
5.10.	ESBN Tsunami monitoring	Minsu Jeon
6.	Reports from rapporteurs	
6.1.	Update on IALA VTS-ENAV Symposium 2021	Maarten Berrevoets
7.	Advertising Online Presentations (planned during the working period)	
7.1.	RTCM (23 rd March – 14.00)	
7.2.	SBAS standardisation (24 th March – 10.00 / WG3 Opening)	
7.3.	SBAS and gLab (24 th March – 11.45 / TG-3.4.1)	
7.4.	The Intelligent Measurement of the Character of Aids to Navigation Light (29 th March – 11.00)	
7.5.	The application of Beidou remote control and monitoring system in China (29 th March – 11.20)	
7.6.	Four-Season Universal light Buoy in Frozen Ports (31 st March – 11.00)	
8.	Overview of planned work for ENG13	
8.1.	WG 1 - Visual & Physical AtoN	Malcolm Nicholson
8.2.	WG 2 - Knowledge & Sustainability	Peter Schneider/ Jörg Unterderweide
8.3.	WG 3 - Radionavigation Services	Alan Grant
8.4.	WG 4 - Heritage	Peter Hill
9.	Establish Working Groups and Task Groups	
10.	END OF OPENING PLENARY	
11.	Working Groups/Task Groups progress work plan	
12.	CLOSING PLENARY	
13.	Review of output and working papers	
14.	Review of session report	
15.	Date and venue of next meeting	
16.	Close of meeting	Simon Millyard
17.		

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SCHNEIDER	Peter	Federal Waterways & Shipping Administration	
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SUN	Qian	China Waterborne Transport Research Institute	qbcouple@163.com
SUN	XiaoWen	China Maritime Safety Administration - Dalian Maritime University	
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WANG	Chunying	Tianjin Tianyuanhai Technology Development Co., Ltd.	
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ZARKUA	Aleksandre	State Hydrographic Service of Georgia	arjaneli@yahoo.com
ZHANG	Zhimin	China Maritime Safety Administration	894548401@qq.com

ANNEX C WORKING GROUP PARTICIPANTS

Working Group 1 Visual & Physical AtoN

Chair – Malcolm Nicholson

Vice Chair – Alwyn Williams

	Members	Organisation / Country
1	Malcolm Nicholson (Chair)	Sealite, Australia
2	Alwyn Williams (Vice Chair)	GRAD
3	Frank Hermann	Federal Waterways & Shipping Administration
4	Johnny Menard	Swedish Maritime Administration (SMA)
5	Jonas Lindberg	Sabik Oy
6	Jorgen Royal Petersen	Danish Maritime Authority (DMA)
7	Julio Fidel Sierra Almaguer	Oficina Nacional Hidrografia y Geodesia - GEOCUBA
8	Sami Lasma	Finnish Transport Infrastructure Agency
9	Wang Lingyan	China Maritime Safety Administration

Working Group 2 Knowledge & Sustainability

Chair – Peter Schneider

Chair – Jörg Unterdeuweide

	Name	Organisation / Country
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1	Jörg Unterdeweide (Chair)	German Federal Waterways & Shipping Administration, Germany
2	Peter Schneider (Chair)	German Federal Waterways & Shipping Administration, Germany
3	Alain GODDYN	Engie Solutions
4	Alison RABY	Plymouth University under Trinity House
5	Amy WOOD	Australian Maritime Systems
6	Dan MANCHESTER	Australian Maritime Systems
7	David JEFFKINS	AMSA
8	Eng Soon AW	Maritime and Port Authority of Singapore
9	Gillian BURNS	Northern Lighthouse Board
10	Greg HANSEN	AMSA
11	Guanzheng LI	China Maritime Safety Administration
12	Guillermina PEREZ DEL CASTILLO	Crux Marine
13	Henry ARRIAGADA	Armada de Chile, Dirección General del Territorio Marítimo y Marina Mercante
14	Ivan VARGAS	Pharos Marine Automatic Power Ltd
15	Jaffer ABDULLA	Middle East Navigation Aids Service (MENAS)
16	Jim Foye	NZ Administration
17	Jorge Torres	Instituto Oceanográfico de la Armada Ecuador
18	Jose Carlos DIEZ	Puertos del Estado
19	Julio Fidel SIERRA ALMAGUER	Oficina Nacional Hidrografia y Geodesia - GEOCUBA
20	Li Ai	China Maritime Safety Administration
21	Lingyan WANG	China Maritime Safety Administration
22	Mahdi AL MOSAWI	Middle East Navigation Aids Service (MENAS)
23	Marco Krings	German Federal Waterways & Shipping Administration, Germany
24	Mariano Luis MARPEGAN	Hidrovia S.A
25	Monica HERRERO	Mediterraneo Señales Maritimas
26	Peter DOBSON	Trinity House
27	Pierre Luc DELAGE	Canadian Coast Guard
28	Richard VERMEER	Ministry of Infrastructure and Water Management The Netherlands
29	Rob DALE	Trinity House
30	Ronan AUTRET	Cerema
31	Sam DAMEN	Australian Maritime Systems
32	Sarah BURGER	Canadian Coast Guard
33	Seppo VIRTANEN	MeriTaito Ltd Seahow

34	Shaheen MIRZA	Middle East Navigation Aids Service (MENAS)
35	Simiao Antonio MUNGUAMBE	INAHINA Mozambique
36	Stein Ivar HANSEN	Norwegian Coastal Administration
37	Wayne DANZIK	US Coast Guard
38	William Butler	AMSA

Working Group 3

Radionavigation Services

Chair – Alan Grant

Vice Chair – Michael Hoppe

	Name	Organisation / Country
1	Dr Alan Grant	GLA Research and Development (GRAD)
2	Michael Hoppe	Federal Waterways & Shipping Administration
3	Akira Yamamoto	Furuno
4	Andre Chateauvert	Canadian Coast Guard
5	Bill Cairns	American Pilots Association
6	Bjornar Kleppe	Norwegian Coastal Administration
7	Carlos Daroca	ESSP SAS
8	Dr Qian Sun	China Waterborne Transport Research Institute
9	Dr Stefan GEWIES	DLR
10	Eoghan Lehane	Commissioners of Irish Lights
11	Geoff Bell	Australian Maritime Systems
12	Gillian Burns	Northern Lighthouse Board
13	Ginés Moreno López	GMV Aerospace and Defence S.A.U
14	Harold Kiffer	US Coast Guard
15	Ivan Vargas	Pharos Marine Automatic Power Ltd
16	James Owen	Pharos Marine Automatic Power Ltd
17	Javier Argul	Puertos del Estado
18	Jeffrey van gils	Ministry of Infrastructure and Water Management
19	Jesper Backstedt	Swedish Maritime Administration
20	Kaisu Heikonen	Finnish Transport Infrastructure Agency
21	LAN Wenjun	China Maritime Safety Administration
22	Lu Dou	China Waterborne Transport Research Institute
23	Manuel Lopez	European GNSS Agency (GSA)
24	Marcos López Cabeceira	GMV Aerospace and Defence S.A.U
25	Maria Mota	European GNSS Agency (GSA)
26	Mikel Card	Zeni Lite

27	Pablo Racionero	Pharos Marine - Automatic Power
28	Paul Mueller	Tideland Signal Corporation
29	Philip Lane	Comité International Radio Maritime
30	Qian Sun	China Waterborne Transport Research Institute
31	Rodrigo Gonzalez	ESSP SAS
32	Sanghyun Park	Korea Research Institute of Ships & Ocean Engineering (KRISO)
33	Sewoong Oh	Korea Research Institute of Ships & Ocean Engineering (KRISO)
34	Sul Gee Park	Korea Research Institute of Ships & Ocean Engineering (KRISO)
35	xavier hernoe	Direction des Affaires Maritimes
36	Xiaowen Sun	China Maritime Safety Administration - Dalian Maritime University
37	Younghoon Han	Korea Research Institute of Ships & Ocean Engineering (KRISO)

Working Group 4

Heritage Forum

Chair – Peter Hill

Vice Chair – Jonghun Kim

	Name	Organisation / Country
1	Peter Hill (Chair)	Trinity House, UK
2	Jonghun Kim (Vice-Chair)	PaiChai University, Korea
3	Amy Wood	Australian Maritime Systems
4	Capitain Piovesana	Brazilian Navy, Brazil
5	Hideki Noguchi	Japan Coast Guard, Japan
6	Ke Ranxuan	Navigation Institute of JiMei University, China
7	Mike Bae	Aids to Navigation Div., MOF, Korea
8	Sak LEE	Aids to Navigation Div., MOF, Korea
9	Sihyeon Park	National Lighthouse Museum, K-AtoN, Korea
10	Yonghun Cho	Aids to Navigation Div., MOF, Korea
11	Yong Chan Bae	Ministry of Oceans and Fisheries, Republic of Korea
12	Gillian Burns	Northern Lighthouse Board
13	Zhenyu GUO	China Maritime Safety Administration
14	Li Ai	China Maritime Safety Administration
15	Di Chan	China Maritime Safety Administration

ANNEX D LIST OF INPUT PAPERS

All papers were posted to the Committee website

Meeting	Agenda Item	Output Paper Title	Source	Action
ENG13	1.2.1	Draft Agenda_v0.2	IALA Secretariat	All
ENG13	1.4	IALA Virtual Committee Working Arrangements Feb 2021	IALA Secretariat	All
ENG13	1.5	IALA Style Guide Ed 1.0 January 2021	IALA Secretariat	All
ENG13	2.1	Review of action items from ENG12	IALA Secretariat	All
ENG13	2.1.1	Report of ENG12_Final	IALA Secretariat	All
ENG13	3.0	Input paper Committee meeting template	IALA Secretariat	All
ENG13	3.0.1	List of Input papers	IALA Secretariat	All
ENG13	3.1.0.1	Draft revision S1010 AtoN Planning & Service Requirements	IALA Secretariat	All
ENG13	3.1.0.2	Draft revision S1020 AtoN Design and Delivery	IALA Secretariat	All
ENG13	3.1.0.3	Draft revision S1030 Radionavigation Services	IALA Secretariat	All
ENG13	3.1.0.4	Draft revision S1040 Vessel Traffic Services	IALA Secretariat	All
ENG13	3.1.0.5	Draft revision S1050 Training and Certification	IALA Secretariat	All
ENG13	3.1.0.6	Draft revision S1060 Digital Communication Technologies	IALA Secretariat	All
ENG13	3.1.0.7	Draft revision S1070 Information Services	IALA Secretariat	All
ENG13	3.1.0.8	Liaison note to other committees regarding revision of MBS R1001 (ARM12-11.2.1.1)	ARM Committee	All
ENG13	3.1.0.8.1	Annex to ARM Liaison note MBS R1001	ARM Committee	All
ENG13	3.1.0.9	Liaison note Cyber Security ENAV26-12.1.2	ENAV Committee	All
ENG13	3.1.0.10	Draft Technical Programme IALA Workshop on Cyber Security V1.2 ENAV27-7.3.1	ENAV Committee	All
ENG13	3.1.0.11	IALA Model Course C2000 Level 2 Technician Training Overview Ed3.1	IALA WWA	All
ENG13	3.1.0.12	IALA Model Course C2001-1 Introduction to Marine Aids to Navigation Ed1.1	IALA WWA	All
ENG13	3.1.0.13	IALA Model Course C2001-2 Introduction to AtoN Buoyage Ed2.1	IALA WWA	All

ENG13	3.1.0.14	IALA Model Course C2001-3 Buoy Handling and Safe Working Practices Ed2.1	IALA WWA	All
ENG13	3.1.0.15	IALA Model Course C2001-5 Buoy Cleaning Ed2.1	IALA WWA	All
ENG13	3.1.0.16	IALA Model Course C2001-6 Introduction to Buoy Positions Ed2.1	IALA WWA	All
ENG13	3.1.0.17	IALA Model Course C2001-7 Maintenance of Plastic Buoys Ed2.1	IALA WWA	All
ENG13	3.1.0.18	ENG13 Level 2 AtoN technical model courses for review	IALA WWA	All
ENG13	3.1.0.19	CIRM liaison note to IALA ENG 13 on ERPS	CIRM	All
ENG13	3.1.1.1	Cover note for Draft Guideline G1134 on Surface Colours used as Visual Signals on AtoN	Jørgen Royal Petersen	WG 1
ENG13	3.1.1.2	Intersessional G1134 Surface Colours Used as Visual Signals on AtoN 2021-02-03 version 011	Jørgen Royal Petersen	WG 1
ENG13	3.1.1.3	Task 2.2.4 E-200-5 Projector Sector Light	WSV	WG 1
ENG13	3.1.1.4	Projection-sectorlight-2021-02-05	WSV	WG 1
ENG13	3.1.1.5	Projector_Calculator_2021_02_05	WSV	WG 1
ENG13	3.1.1.6	R0110 Ed.5 Rhythmic Characters of Lights on Aids to Navigation_Working	GRAD	WG 1
ENG13	3.1.1.7	Recommendation R0110 Draft Cover Note	GRAD	WG 1
ENG13	3.1.1.8	Draft Recommendation R0203 Ed.2 - Working 20201006 (1)	ENG WG1	WG 1
ENG13	3.1.1.9	Intelligent Measurement of the Character of Aids to Navigation Light	China MSA	WG 1
ENG13	3.1.2.1	WP Task 1.2.1 Draft Guideline QC for 3rd Party AtoN Service Providers	ENG WG2	WG 2
ENG13	3.1.2.2	WP Draft Guideline AtoN equipment exposed to Extreme Environmental Conditions	ENG WG2	WG 2
ENG13	3.1.2.3	WP Draft_Guideline_solar_modules - 09-10-20 Rev A - Output working paper to ENG13 ENG12-3.1.6.2	ENG WG2	WG 2
ENG13	3.1.2.4	WP 201013_Draft_Guideline_Radar_Reflectors	ENG WG2	WG 2
ENG13	3.1.2.5	WP G1008-Ed3-Draft UPDATE Remote Control and Monitoring - 12-10-20 Rev C - Output WP ENG12-3.1.5.2	ENG WG2	WG 2
ENG13	3.1.2.6	Four-Season Universal light Buoy in Frozen Ports	China MSA	WG 2
ENG13	3.1.2.8	Revised Draft_Guideline_solar_modules	China MSA	WG 2
ENG13	3.1.2.9	Force analysis of solar panel under the wind condition	China MSA	WG 2
ENG13	3.1.3.0	Plan for WG3 work over the ENG13 period	WG3 Chairs	WG 3
ENG13	3.1.3.1	Time synchronization methods of R-mode base stations and slot map of VDE ranging signal	China MSA	WG 3

ENG13	3.1.3.2	Dual-mode transformation of maritime RBN-DGPS stations in China	China MSA	WG 3
ENG13	3.1.3.3	HAS Guidelines input paper	GMV	WG 3
ENG13	3.1.3.4	IALA Guideline - High Accuray Systems (draft)	GMV	WG 3
ENG13	3.1.3.5	WP Draft G on R-Mode Implementation using MF & VHF transmissons_merged_post_TG03work14th October	ENG WG3	WG 3
ENG13	3.1.3.6	WP IALA Guideline on future of marine radiobeacon DGPS-DGNSS Master ENG12 post meeting 3 (1)	ENG WG3	WG 3
ENG13	3.1.3.7	WP Draft Guideline 1147 pfm 15 October 2020 (1)	ENG WG3	WG 3
ENG13	3.1.3.8	WP IALA Guideline - Resilient PNT (draft)	ENG WG3	WG 3
ENG13	3.1.3.9	WP Draft IALA Recommendation on Provision of GNSS Augmentation Services for maritime applications.doc	ENG WG3	WG 3
ENG13	3.1.3.10	IALA Input paper Maritime SBAS guidelines	GMV	WG 3
ENG13	3.1.3.11	Input paper Use of Galileo Timing to support implementation of R-M...	GMV	WG 3
ENG13	3.1.3.12	IEC Standarisatation for SBAS maritime receivers	ESSP	WG 3
ENG13	3.1.3.13	NCSR 8-4-2 - Comments on document NCSR 841 - Satellite-Based Augmentation Systems (Australia and New Zealand)	IMO	WG 3
ENG13	3.1.3.14	ETSI TGMARINE reply to IALA LS on Radar Standards	ETSI	WG 3
ENG13	3.1.3.15	CIRM Reply to ETSI ERM TGMARINE on solid state radar questionnaire	CIRM	WG 3
ENG13	3.1.3.16	Compatibility problems related with pulsecompression solid state marien radars	ETSI	WG 3
ENG13	3.1.3.17	FVT_Lab_tests_on_the_suppression_of_interferences_from_other_radar_installations	ETSI	WG 3
ENG13	3.1.4.1	Input paper change from Legacy to Culture	Peter Hill	WG 4
ENG13	3.1.4.2	WG4 Plan	Peter Hill	WG 4
ENG13	4.1	Report of PAP41	IALA Secretariat	All
ENG13	4.1.1	Report Council 72 Final	IALA Secretariat	All
ENG13	4.1.1.1	IALA Current drivers and trends ed1.2	IALA Secretariat	All
ENG13	4.1.1.2	IALA Position Document on the Development of Marine AtoN Services 2019	IALA Secretariat	All
ENG13	4.1.2	Revision of IALA Standards (PAP40-6.1.4.1)	IALA Secretariat	All
ENG13	4.1.2.1	Technical documents Catalogue 12 Feb 2021	IALA Secretariat	All

ENG13	4.1.2.3	ENG Work plan draft 2022-2026	IALA Secretariat	All
ENG13	4.1.2.3.1	IALA Strategic Vision 2018-2026	IALA Secretariat	All
ENG13	4.1.2.3.2	Input paper 2022-26 work plan	IALA Secretariat	All

ANNEX E LIST OF OUTPUT AND WORKING PAPERS

Output documents are submitted for review/action by a body other than the Committee initiating the document.

Meeting	Agenda Item	Output Paper Title	Source	Action
ENG13	12.0.1	IALA Model Course C200 Level 2 Technician Training overview (ENG13-3.1.0.11)	ENG13	WWA
ENG13	12.0.2	IALA Model Course C2001-1 Introduction to Marine Aids to Navigation Ed1.1	ENG13	WWA
ENG13	12.0.3	IALA Model Course C2001-2 Introduction to AtoN Buoyage Ed2.1	ENG13	WWA
ENG13	12.0.4	IALA Model Course C2001-3 Buoy Handling and Safe Working Practices Ed2.1	ENG13	WWA
ENG13	12.0.5	IALA Model Course C2001-5 Buoy Cleaning Ed2.1	ENG13	WWA
ENG13	12.0.6	IALA Model Course C2001-6 Introduction to Buoy Positions Ed2.1	ENG13	WWA
ENG13	12.0.8	NAVGUIDE Chapter 7&8	ENG13	PAP
ENG13	12.1.1	G1134 Surface Colours Used as Visual Signals on AtoN	ENG13	Council
ENG13	12.1.2	R0110 Ed.5 Rhythmic Characters of Lights on Aids to Navigation	ENG13	Council
ENG13	12.1.3	Liaison ARM on Update of IALA Maritime Buoyage System and other Marine Aids to Navigation (MBS), the future IALA Recommendation R1001	ENG13	ARM
ENG13	12.1.4	Draft R1001 Ed1 The IALA Maritime Buoyage System	ENG13	ARM
ENG13	12.2.1	Liaison ARM on 3rd party Quality Control	ENG13	ARM
ENG13	12.3.1	Draft IALA Recommendation on Provision of GNSS Augmentation Services for maritime applications	ENG13	Council
ENG13	12.3.2	Liaison CIRM on Enhanced Radar Positioning System	ENG13	Council
ENG13	12.3.3	Liaison ETSI on Radar Standards	ENG13	Council
ENG13	12.3.4	Liaison Council on ERPS Standardisation Workshop	ENG13	Council
ENG13	12.3.5	ERPS Workshop proposal	ENG13	Council
ENG13	12.3.6	Liaison note RTCM on responses to SC104	ENG13	Council
ENG13	12.3.7	Liaison note PAP re RTCM questions	ENG13	PAP
ENG13	12.3.10	WG3 comments on the Radionavigation services standard	ENG13	PAP
ENG13	12.3.11	WG3 comments on the IALA position paper	ENG13	PAP
ENG13	12.4.1	Input paper change from Legacy to Culture	ENG13	PAP
ENG13	12.4.2	Input to Council IALA Heritage Lighthouse of the Year 2021 Commendation	ENG13	Council

Working papers will remain within the Committee for further review during ENG14.

Meeting	Agenda Item	Output Paper Title	Source	Action
ENG13	12.0.7	IALA Model Course C2001-7 Maintenance of Plastic Buoys Ed2.1	ENG13	ENG14
ENG13	12.2.2	Third Party AtoN Provider Quality Control	ENG13	ENG14
ENG13	12.2.3	Draft Guideline on Extreme Environmental Conditions	ENG13	ENG14
ENG13	12.2.4	Draft Guideline on the Properties of a good Marine Solar Panel module	ENG13	ENG14
ENG13	12.2.5	Draft Guideline on Radar Reflectors on AtoN	ENG13	ENG14
ENG13	12.2.6	Draft Guideline on Remote control and monitoring of marine aids to navigation	ENG13	ENG14
ENG13	12.3.8	NAVGUIDE 2018 ENG WG3 amendments	ENG13	ENG14
ENG13	12.3.9	Draft Guideline on resilient PNT	ENG13	ENG14

Action Items for Secretariat

1. The **IALA Secretariat** is requested to forward the ENG Committee Task Plan for 2018-2022, ENG13-7.2 to ENG14. 18
2. The **IALA Secretariat** is requested to forward the output paper ENG13-12.1.2 on the amended R0110 on Rhythmic Characters of Lights on Aids to Navigation to Council for approval. 18
3. The **IALA Secretariat** is requested to advise IHO on the contents of updated document ENG13-12.1.2 via the technical cooperation meeting and report to ENG14. 18
4. The **IALA Secretariat** is requested to forward input paper ENG13 3.1.1.9 to ENG14 as a working paper. 19
5. The **IALA Secretariat** is requested to forward the output paper ENG13 on Surface Colours used as Visual Signals on AtoN to Council for approval. 20
6. The **IALA Secretariat** is requested to forward the liaison and annex to ARM, ENG13-12.1.3 and ENG13-12.1.4 on Update of IALA Maritime Buoyage System and other Marine Aids to Navigation (MBS), the future IALA Recommendation R1001. 20
7. The **IALA Secretariat** is requested to forward the draft guideline on Third Party AtoN Provider Quality Control (ENG13-12.2.2) to ENG14. 21
8. The **IALA Secretariat** is requested to forward the Liaison Note on Third Party AtoN Provider Quality Control (ENG13-12.2.1) and draft guideline (ENG13-12.2.2) to the ARM Committee for review and request their feedback to ENG14 and intersessional working group through the secretariat. 21
9. The **IALA Secretariat** is requested to forward the draft Guideline on Extreme Environmental Conditions (ENG13-12.2.3) document to ENG14. 21
10. The **IALA Secretariat** is requested to forward “ENG12-3.1.28.4 Liaison note to ENG on Guideline on Tidal Current Signal System post plenary (ARM11-13.2.4)” and “ENG12-3.1.28.4.1 Annex 1 Draft G on Meteorological and Hydrological Data Dissemination post plenary (ARM11-13.2.4.1)” to ENG14. 22
11. The **IALA Secretariat** is requested to forward the draft Guideline on the Properties of a good Marine Solar module (ENG13-13.2.4) to ENG14. 22
12. The **IALA Secretariat** is requested to set the meetings for intersessional work on the draft Guideline on the Properties of a good Marine Solar module. 22
13. The **IALA Secretariat** is requested to forward the draft Guideline on Radar Reflectors on AtoN (ENG13-13.2.5) to ENG14. 22
14. The **IALA Secretariat** is requested to forward the six updated IALA World-Wide Academy Marine Aids to Navigation Level 2 Technician courses to the council for approval (ENG13-12.0.1–6). 23
15. The **IALA Secretariat** is requested to forward the draft Guideline on Remote control and monitoring of marine aids to navigation (ENG13-12.2.6) to ENG14. 23
16. The **IALA Secretariat** is requested to forward the draft Guideline resilient PNT (ENG13- 12.3.9) to ENG14. 23
17. The **IALA Secretariat** is requested to forward liaison note ENG13-12.3.2 for CIRM “On enhanced radar positioning systems” to Council for approval. 25
18. The **IALA Secretariat** is requested to forward liaison note ENG13-12.3.3 “On radar standards” on Racons to the ETSI TGMARINE via Andrea.Lorelli@etsi.org with copy to pete.hizzey@wanadoo.fr. 25
19. The **IALA Secretariat** is requested to forward the liaison note ENG13-12.3.4 and corresponding workshop request ENG13-12.3.5 to Council for its consideration. 25

20. The **IALA Secretariat** is requested to forward liaison note ENG13-12.3.6 for RTCM “IALA response to RTCM questions” to Council for approval. 25
21. The **IALA Secretariat** is requested to forward liaison note ENG13-12.3.7 “Potential IALA survey to collate a response to RTCM request” to PAP. 25
22. The **IALA Secretariat** is requested to forward ENG13-12.3.1, Draft Recommendation on Provision of GNSS Augmentation Service for maritime applications” to Council for approval. 25
23. The **IALA Secretariat** is requested to encourage IALA National Members to submit nominations for IALA Heritage Lighthouse of the Year 2022. 27
24. The **IALA Secretariat** is requested to forward the commendation of ENG13 WG4 Cape Byron Lighthouse (ENG13-12.4.2) to determine IALA Heritage Lighthouse of the Year 2021 to the Council. 31
25. The **IALA Secretariat** is requested to organise a formal acknowledgement of the award to the recipient at a suitable event to which the recipient is in attendance. 31
26. The **IALA Secretariat** is requested to expedite the website going online, to assist the editing team in their role as editors and to assist in any required structural changes to the website. 32
27. The **IALA Secretariat** is requested to forward the summary of the ENG13 Committee report (ENG13-14.1) to Council to note. 33

Action Items for Participants

28. **Frank Hermann** and **Pärtel Keskküla** are requested to provide an input paper to ENG14 on the task to Develop E-112 Leading Lights and 1023 Leading Lines into a Guideline. 19
29. **Malcolm Nicholson** is requested to review the partially combined Guidelines on LED technologies and their use in signal lights and submit an input paper to ENG14. 19
30. **Alwyn Williams** is requested to arrange an intersessional meeting to progress the work on Marine Light Terms of Measurement. 19
31. **Malcolm Nicholson** is requested to amalgamate the input paper from WSV ENG13-3.1.1.3 Optical Performance of a Projector Sector Light into the revised Guideline on Optical Performance and submit an Input Paper to ENG14. 19
32. **Alwyn Williams** is requested to submit an input paper on the revision of Recommendation R0200 Marine Signal Lights Part 0 – Overview (E-200-0). 19
33. **Michel Cousquer** is requested to remove Task 2.2.5 for the 2018-2023 work programme and add it to the 2023-2027 work programme. 20
34. **Malcolm Nicholson** is requested to review G1041 with regard to the definition of ‘angle of uncertainty’ and submit a revision to the text to ENG14. 20
35. **That Committee Participants** are requested to provide any examples of contracting out maintenance and renewal activities including pre-qualification of Contractors and monitoring of their performance to ENG14. 21
36. **That Committee Participants** are requested to share their experiences and examples from their specific areas and to provide input paper for ENG14. 22
37. **That Task Group leaders** (2.3.1) are requested to merge Guideline 1108, Guideline 1136 and the draft Guideline on Extreme Environmental Conditions and WG chair is requested to propose this output as a new item to the work plan 2023 – 2027. 22
38. **That Committee members** interested in participating in an intersessional meeting to support R-Mode MF activities are invited to contact the task lead (Michael Hoppe (Michael.Hoppe@wsv.bund.de) by the 30 June 2021. 24

39. **That Committee members** are invited to the latest draft product specifications (S-246 and S-247) (available within the file share) and to provide comments to the task leader (Younghoon Han yghan@kriso.re.kr) before ENG14. 24
40. **That Committee members** are invited to consider whether they or any of their colleagues have expertise in timing and synchronization aspects required to support ENG Task 3.2.7. Please let the WG3 Chairman (Dr Alan Grant - alan.grant@gla-rad.org) know of suitable experts who can support this topic. 24
41. **That Committee members** are invited to consider the proposed amendments for the radionavigation section, as available on the ENG13 section of the fileshare. Please let the WG3 Chairman (Dr Alan Grant - alan.grant@gla-rad.org) know of an errors or omissions prior to ENG14. 26
42. **Alberto Piovesana Jr (Diretoria de Hidrografia e Navegação of the Brazilian Navy)** is requested to investigate the options for a Heritage Seminar in Brazil in 2023 and report back to WG4 at ENG14. 27
43. **Yongchan Bae (MOF, Korea)** is requested to oversee and resource the design and construction of the artwork to be presented to IALA Heritage Lighthouse of the Year accolade holder 2021 using the design established in 2020. 27
44. **That Committee members** are encouraged to submit nominations for IALA Heritage Lighthouse of the Year 2022 and/or to encourage colleagues within their organisations to do so. 27
45. **Yonchan Bae (MOF, Korea)** is requested to oversee and resource the design and construction of the artwork to be presented to IALA Heritage Lighthouse of the Year accolade holder 2022 based upon one of the previous years' designs in consultation with Jonghun Kim (MOF - Paichai University, Korea) and to liaise with IALA Secretariat with regard to the destination and timing of transfer of the 2021 artwork. 31
46. **That Committee members** are requested to consider whether their respective organisations would be interested in sponsoring the award after 2022. 31
47. **Gillian Burns (NLB) and Sihyeon Park (National Lighthouse Museum of Korea)** are requested to ensure that the IALA Heritage website is up-to-date, accurate and complete, directly undertaking editorial changes and liaising with IALA Secretariat and with Peter Hill (WG4 Chair) as necessary. 32
48. **That Committee Members** are requested to note WG4's satisfaction with the draft task plan proposals in so far as they relate to WG4. 33
49. **Jonghun Kim (Ministry of Oceans and Fisheries - Paichai University)** is invited to investigate the practicalities of publishing a book celebrating IALA Heritage Lighthouses and, if such investigation shows it to be financially and logistically achievable, to submit an informal paper to WG4 at ENG14 for consideration setting out these practicalities. 33



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