



## IALA ENG COMMITTEE

# REPORT OF THE 10TH SESSION OF THE IALA ATON ENGINEERING AND SUSTAINABILITY (ENG) COMMITTEE

30 September to 4 October 2019

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Committee Secretary

**4 October 2019**

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

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**Report of the 10<sup>th</sup> Session of the IALA**  
**AtoN Engineering and Sustainability (ENG) Committee**  
**30 September to 4 October 2019**  
**Executive Summary**

The 10<sup>th</sup> meeting of the ENG Committee (ENG10) was held from 30 September to 4 October 2019 in IALA HQ. The session was attended by 82 participants from 28 countries. 11 participants attended for the first time and there was one observer.

Working in four working groups, the Committee considered 66 input papers and produced 25 output documents.

The Committee finalised the following draft Recommendations:

- Revised Recommendation R0111(E-111) on Port Traffic Signals
- Draft Recommendation on the Design and Operation of Marine Aids to Navigation

The Committee finalised the following Guidelines:

- Draft Guideline G1148 Determination of Required Luminous Intensity
- Draft Guideline on the Maintenance of AtoN Structures
- Draft Guideline on the SBAS Maritime Service

The Committee finalised the following Model Course:

- IALA Model Course L1.1 on Marine Aids to Navigation Manager Training

The following liaison notes were prepared:

- Liaison Notes to ARM10 on Port Traffic Signals, mooring buoy light divergence and wreck marker buoy release
- Liaison to RTCM regarding collaboration with SC104 and SC134
- Liaison Notes to LAP on the draft IALA Recommendation on Sustainability in the Provision of Marine Aids to Navigation and patent issues related to R-Mode

The following table shows a summary of the ENG Committee task plan for the work period 2018-2022 and the progress made to date.

Strategy Technical Domain	Tasks	Status
Standard 1010 – AtoN planning and service requirements	2 tasks	All tasks on schedule
Standard 1020 – AtoN Design and delivery	34 tasks	All tasks on schedule
Standard 1030 – Radionavigation services	18 tasks	All tasks on schedule
Standard 1050 Training and Certification	2 tasks	All tasks on schedule
Standard 1060 Digital communications technologies	2 tasks	All tasks on schedule

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# Report of the 10<sup>th</sup> Session of the IALA ENG Committee

## GENERAL

The 10<sup>th</sup> session of the IALA AtoN Engineering and Sustainability Committee (ENG) was held from 30 September to 4 October 2019 at IALA. The Chairman was Simon Millyard, and the Vice Chairman was Michel Cousquer. The Secretary for the meeting was Thomas Southall.

### 1. OPENING

Simon Millyard introduced himself and the WG chairs and welcomed both newcomers and those returning to IALA.

#### 1.1 Approval of the agenda

The agenda (ENG10-1.3.1) was adopted.

#### 1.2 Welcome from the IALA Secretary-General and Deputy Secretary-General

The Secretary-General welcomed all participants to Saint Germain-en-Laye and was pleased to see a growth in the number of attendees. The Secretary-General 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.

This is a very busy period for IALA. The VTS Committee met last week and the ENAV Committee meets next week, it is the best time of the year for the Secretariat to have so many Committee participants attending the various meetings. The VTS Committee finalised the revised IMO Resolution A.857(20) on Guidelines for Vessel Traffic Services last week. This will change VTS completely in the future and, importantly, raises the status of the IALA Standards within the IMO and brings their importance closer to SOLAS.

There are a lot of interesting IALA events approaching, especially the Heritage Seminar which will take place alongside ENG11 in spring 2020. A workshop on DGNSS on the future of Marine Radio Beacon DGNSS will be held between the 27 and 31 January 2020 in Edinburgh, United Kingdom. The combined VTS and ENAV Symposium to be held between the 25 and 29 May 2020 in Rotterdam, the Netherlands. Registration will be open soon via the symposium website - [www.iala-rotterdam2020.nl](http://www.iala-rotterdam2020.nl). An IALA Workshop on Cyber Security to be held between the 26 and 30 October 2020 in Quebec, Canada. Finally, the next IALA BATT/LITE event will take place in Australia in 2021. Do consider attending these interesting events.

A Diplomatic Conference will be held in Kuala Lumpur, Malaysia. This should be the final Diplomatic Conference where the participants will have the credentials from their respective Head of State to sign the final act of the new Convention for IALA paving the way for the change of status from a Non-Governmental Organization to an Inter-Governmental Organization. This will result in IALA gaining the same status as organisations such as the IMO and IHO.

The Secretary-General wished all participants a fruitful week and reminded everyone that the Secretariat was ready to help in any way possible.

#### 1.3 Administration and safety briefing

Thomas Southall provided a Safety and Administration briefing.

#### 1.4 Introductions and Apologies

The session was attended by 82 participants from 28 countries. 11 participants attended for the first time and there was one observer.



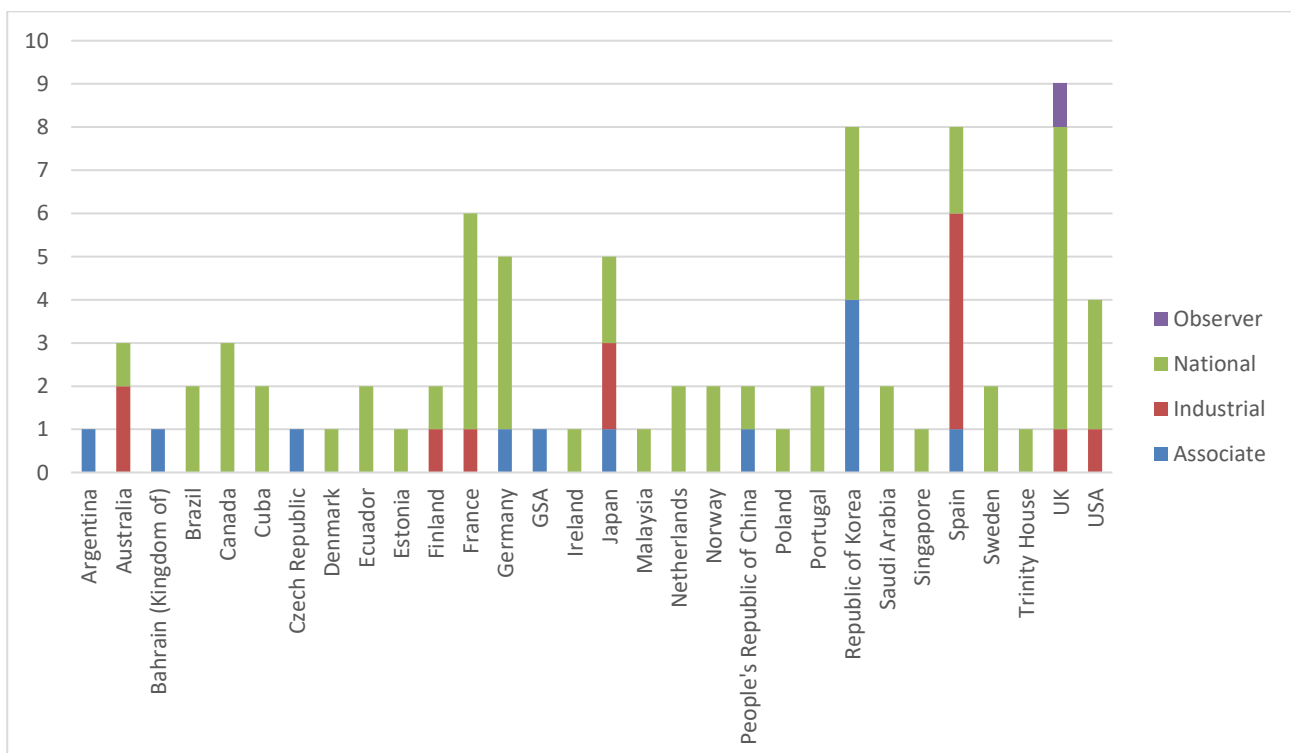
The list of Committee Members who attended ENG10 is shown in 0. New participants were welcomed in addition to those returning to the Committee. The Committee noted apologies from three Members who were unable to attend as noted in 0. It

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.*

The following chart shows an analysis of participants.



## 1.5 Programme for the week

The programme for the week, paper ENG10-1.5.1, was approved.

## 2. REVIEW OF ACTION ITEMS FROM ENG9

Input paper ENG10-2.1.1 refers. Action items for the IALA Secretariat from ENG9 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 66 input papers.

## 4. REPORTS FROM OTHER BODIES

### 4.1 Reports from IALA Council

The highlights from document ENG10-4.1.1.1 (report of Council 69) were presented to the Committee. The Council considered two important issues of relevance to the Committee, the future of DGNSS and a strategy workshop. The future of DGNSS will be further considered at a workshop in January 2020 to be held in Edinburgh.

The purpose of the workshop was to create a joint picture of possible future trends and global maritime developments, which are most likely to have an impact on IALA and how these may affect its priorities, structure and activities.

The workshop identified several important trends and developments, such as:

- the development of autonomous, automated and/or unmanned vessels;
- massive digitalisation, big data and associated risks such as cyber-security and information overload;
- the need for connectivity and interoperability of systems;
- the climate change and other environmental challenges;
- global economic developments and developments in trade patterns;
- the competition for utilizing the sea space and marine resources (MSP); and
- the demand for efficiency in the transport chain.

### 4.2 Report of the IALA Policy Advisory Panel

The Policy Advisory Panel (PAP38) met between the 11 and 13 September 2019. The Chair provided a summary of the meeting which included an update on the change of status to an Intergovernmental Organisation project and the growth of IALA membership. The PAP also considered the implications of maritime autonomous surface ships (MASS) on the work of IALA following a discussion at Council 69.

#### *Action item:*

*That **Committee participants** are requested to provide to the IALA Secretariat (Minsu Jeon) comments and suggestions on where maritime autonomous surface ship (MASS) issues may impact upon the work of IALA.*

### **4.3 Report from IMO Meetings**

The Committee noted reports from IMO MSC 101(ENG10-4.2.2) and the verbal report provided on IMO Council 122. The MSC101 considered input papers from IALA concerning the revisions to IMO Resolution A.857(20) on Guidelines for Vessel Traffic Services and the establishment of the World Marine Aids to Navigation Day. The IMO Council endorsed the revised IMSAS schedule and, within IALA, the VTS and ARM Committees will update their respective guidance documents for auditors and auditees.

### **4.4 Report on the ITU**

The Committee noted a report from the IALA Technical Operations Manager on liaison with the ITU. Working Party 5B meeting in May and considered IALA input papers and interests with respect to GMDSS and the satellite component of VDES. The issue of interference from LED light sources was also raised.

### **4.5 IEC**

No update was available on IEC activities.

### **4.6 Report on RTCM**

An input paper had been received from RTCM concerning a new proposed RTCM 10402.4 Recommended Standards for Differential GNSS (Global Navigation Satellite Systems) Service (ENG10-3.1.24).

### **4.7 Report on PIANC**

The IALA Secretariat maintains a liaison with PIANC and has received some invitations to participate in tasks. These have included the planning of fishing ports, seismic design guidelines for port structures and a design guideline for floating breakwaters. These are not of direct interest to IALA, but all topics and tasks are kept under review.

### **4.8 Report on CIE**

Dr Alwyn Williams provided the Committee with a report on CIE activity.

A presentation was given by Tony Bergen from Australia on the experiments his team has been carrying out on effective intensity of flashing lights. The results obtained match those obtained in the experiments by the GLA very well and provides a level of reassurance to the work reported at IALA in the past. A poster presentation on the colour shift of lights in the atmosphere was given, but the response was limited. If IALA wishes to pursue this, then it may be possible to formally ask CIE for assistance on this matter.

The conference had a short workshop on the Maintenance Factor, which is the equivalent of the service condition factor in IALA terms. CIE and ISO have been collaborating on Technical Standard 22012, which is a document that provides a pragmatic approach to calculating and applying the maintenance factor. IALA may wish to consider referring to this document rather than writing their own document on the same subject.

It should be noted that work on a standard LED light is on-going and will become more important as filament lamps begin to become difficult to obtain. In the meantime, it is recommended that IALA members with light measurement facilities stock up on spare reference lamps until a standard LED lamp is available.



## 4.9 Report e-Navigation Underway International 2019 Conference

The Committee noted the establishment of a new consolidated website for the e-Navigation Underway series which can be located at <https://www.e-navap.org/>.

## 5. REPORTS FROM RAPORTEURS

### 5.1 Power

Peter Dobson provided a presentation updating Committee participants on primary cells and carbon-based power capacitors. Presentation ENG10-5.1.1 refers.

### 5.2 Lights

No update was available with respect to light issues.

### 5.3 Buoys

Peter Schneider provided a presentation updating Committee participants with respect to the provision of bespoke plastic buoys in Germany and facilitated a discussion with respect to the environmental issues associated with plastic buoys. Presentation ENG10-5.3.1 refers.

### 5.4 PNT

A presentation on PNT issues was provided to Working Group 3 participants to inform their work for the week.

### 5.5 Environment

Simon Millyard provided an update on the work of the IPCC intergovernmental panel on climate change and introduced Committee participants to their newly published document on The Ocean and Cryosphere in a Changing Climate. A copy of the report can be obtained from the following link [https://report.ipcc.ch/srocc/pdf/SROCC\\_FinalDraft\\_FullReport.pdf](https://report.ipcc.ch/srocc/pdf/SROCC_FinalDraft_FullReport.pdf).

### 5.6 Use of drones

Jorgen Royal Petersen gave a presentation on the use of drones including the recent drone survey of the Royal Sovereign Lighthouse in the United Kingdom. Presentation ENG10-5.6.1 refers.

### 5.7 IALA Dictionary

Michel Cousquer gave a short update on the IALA Dictionary. The IALA Dictionary is supported by the Secretariat and the Committee were requested to use it in all their work and to use the Dictionary Amendment Proposal template form to advise of any required changes.

#### *Action items:*

*That **Committee Participants** are requested to ensure that definitions in IALA documents are consistent with the Dictionary.*

*The **Committee Participants** are invited to volunteer as Spanish / French translators for Dictionary terms.*

### 5.8 IALA Bulletin liaison

Michel Cousquer briefed the Committee on the need for contributions to the IALA Bulletin. Bulletin issues will be in June and December each year with e-Bulletin issues at two-month intervals.

#### *Action item:*

*That **Committee Participants** are requested to submit articles for the IALA Bulletin to Marie-Helene Grillet and for the e-Bulletin to Audrey Guinault.*

## 6. PRESENTATIONS

Five presentations were made during the opening plenary session. The presentations are available on the IALA Committee website.

### 6.1 IALA World-Wide Academy (WWA) – Kevin Gregory

Kevin Gregory described the recent activity in the World-Wide Academy since ENG9 (ENG10-6.1.1).

### 6.2 Enhanced Real-Time Positioning System using e-Radar & e-Racon – Aw Eng Soon

Aw Eng Soon from the Maritime and Port Authority of Singapore gave a presentation on the use of e-Radar and e-Racon systems in Singapore and the results of sea trials (ENG10-6.2).

### 6.3 Development status of e-Loran in Korea – Dr Tae-Hyun Fang

Dr Tae-Hyun Fang gave a presentation on the development status of e-Loran in Korea focussing on performance requirements, project status, timeline and applications of the system (ENG10-6.3).

### 6.4 Structural Condition Assessment of Rock Lighthouses – Professor Alison Raby

Professor Alison Raby from the University of Plymouth gave a presentation on the STORMLAMP structural condition assessment of lighthouses (ENG10-6.4). Professor Raby requested feedback on the content of her presentation (Alison.Raby@plymouth.ac.uk).

### 6.5 IALA R-Mode Workshop – Dr Stefan Gewies

Dr Stefan Gewies gave a presentation on the outcomes of the recent IALA workshop on R-Mode (ENG10-6.5).

### 6.6 Development of Auto Releasing Wreck Marker Buoys - Prof. Dr Seung-Gi Gug

Prof. Dr Seung-Gi Gug gave a presentation on the development of auto releasing wreck marker buoys (ENG10-6.6).

### 6.7 IALA Heritage Seminar and ENG11

Alberto Piovesana gave a presentation on the practical arrangements for the IALA heritage seminar and ENG11 Committee meeting to be held in Salvador between the 20 April and 1 May 2020.

### 6.8 Provision of IALA Level 2 Training

Monica Herrero and Mariano Marpegan gave a presentation on the delivery of IALA Level 2 technical training in Spanish.

## 7. REVIEW OF WORK PROGRAMME AND WG EXPECTATIONS

### 7.1 Work Programme review

The ENG Committee Workplan for the 2018-2022 work period was reviewed. Paper ENG10-7.1.1 refers.

The ENG Work Programme Task Register for 2018-2022 was reviewed. Paper ENG10-7.2.2 refers.

The following shows a summary of progress on the Task Plan at the end of ENG10.

Strategy Technical Domain	Tasks	Status
Standard 1010 – AtoN planning and service requirements	2 tasks	All tasks on schedule
Standard 1020 – AtoN Design and delivery	34 tasks	All tasks on schedule

Strategy Technical Domain	Tasks	Status
Standard 1030 – Radionavigation services	18 tasks	All tasks on schedule
Standard 1050 Training and Certification	2 tasks	All tasks on schedule
Standard 1060 Digital communications technologies	2 tasks	All tasks on schedule

**Action item:**

The **IALA Secretariat** is requested to forward the ENG Committee Task Plan for 2018-2022, ENG10-14.5.2, and the Task Register, ENG10-14.5.3, to ENG10.

## 8. ESTABLISH WORKING GROUPS

### 8.1 Establishing working groups

Three 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	Jordan Lane-Beveridge	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 was made up of 11 members and they considered eight 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.

### 9.1 Update E-111 Port Traffic Signals (Task 2.1.1)

A revised Recommendation was received as a working paper replicating the content of the original in the new IALA format. This was reviewed and following the response from the ARM Committee the recommendation is considered complete and should be sent to Council for approval.

**Action Item:**

The **IALA Secretariat** is requested to forward Draft Recommendation E-111 Port Traffic Signals ENG10-14.1.1 to Council for Approval

The **IALA Secretariat** is requested to forward a Liaison Note on Port Traffic Signals ENG-14.1.4 to the ARM Committee

### 9.2 Develop Guideline on Port Traffic Signals (Task 2.1.2)

This task commenced 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.

**Action item:**

The **IALA Secretariat** is requested to forward the working paper on the Guideline for the Implementation of Port Traffic Signals (ENG10-14.1.5) to ENG11.

### 9.3 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. However, the Working Group is still developing the Guideline on the calculation on intensity and this work item depends on its completion.

### 9.4 Complete 1061 Illumination of Structures (Task 2.1.4)

The revision of this Guideline is scheduled for ENG11-12. Refer to task register for the scope of work.

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

This task commenced at ENG9 for three sessions. It will now merge Guidelines 1043 & 1048. This work was started during the last work program but due to other priorities was not completed.

#### *Action Item:*

*That **Jonas Lindberg** is requested to work on the partially combined Guidelines on LED technologies and their use in signal lights and submit an input paper to ENG11.*

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

Refer to 9.5 (Task 2.1.5)

### 9.7 Develop a Guideline for E-106 Retroreflective materials (Task 2.1.7)

Task completed.

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

This task is due to start at ENG11 for four sessions. Refer to task register ENG8-12.2.12 for scope of work.

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

This task is due to start at ENG11 for two sessions. Refer to task register ENG8-12.2.12 for scope of work.

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

This task is due to start at ENG12 for two sessions. Refer to task register ENG8-12.2.12 for scope of work.

### 9.11 Revise Guideline on effective intensity (Task 2.2.4)

This task was due to start at ENG9 for two sessions. However, due to working on developing other documents this work item was not started. Refer to task register ENG8-12.2.12 for scope of work. It will begin at ENG11.

#### *Action item:*

*That **Malcolm Nicholson** is requested to review the revised guideline on effective intensity and submit an input paper to ENG11.*

### 9.12 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 an appropriate Guideline. However, the required input was not available. Refer to task register ENG8-12.2.12 for scope of work. Pending the required data this task will commence at ENG10.

#### *Action Item:*

*That **Alwyn Williams** and **Peter Dobson** are requested to provide an input paper to ENG11 on monitoring of function and degradation of AtoN light sources if sufficient data is collected.*

### 9.13 Develop Guidance on service factors (Task 2.2.6)

This task commenced during ENG10 alongside the development Guideline G1148 – Calculation of Luminous Intensity and Range. After several discussions, it was felt that this Guideline would be the natural placeholder for service condition factors.

Task Group: Alwyn Williams (Leader), Malcolm Nicholson, Partel Keskkula.

#### Action Item:

*The IALA Secretariat is requested to remove the task related to the development of guidance on Service Factors is task from the IALA Workplan and merge it with the task related to the development of Guideline G1148 on Calculation of Luminous Intensity and Range.*

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

This task commenced at ENG10 for two sessions. It is envisaged that this guidance will be incorporated into Guideline G1134 on Surface Colours Used as Visual Signals on AtoN, rather than Guideline G1077 or a new Guideline.

Task Group: Jorgen Royal Petersen (Leader), Johnny Menard & Patrick Hailstone.

#### Action Item:

*That Jorgen Royal Petersen, Johnny Menard and Patrick Hailstone are requested to work on the draft revision of IALA Guideline G1134 on Surface Colours Used as Visual Signals on Aton to update and include a section on colour fading and provide an input paper to ENG11.*

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

Work was completed and the working group reviewed the final draft with a view to sending to Council for approval.

#### Action Item:

*The IALA Secretariat is requested to forward Draft Guideline G1148 on the Determination of Required Luminous Intensity for Marine Signal Lights (ENG10-14.1.2) to Council for approval.*

### 9.16 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.

### 9.17 Deliver a Workshop - IALABATT/ IALALITE (Task 2.4.2)

Following the approval from Council and a submission from Australia to host the workshop the first steering committee meeting was held during ENG10. Provisional dates for the workshop and the ENG13 are 8 – 21 March 2021.

### 9.18 Vertical Divergence of Light for Marking Mooring Buoys

The Committee received a Liaison Note ENG10-3.1.5 from the ARM Committee on a request from the French authority to consider the marking of mooring buoys (ARM9-3.1). The Committee prepared a response to ARM providing information on vertical divergence issues.

#### Action item:

*The IALA Secretariat is requested to forward the Liaison Note on Vertical Divergence of Light for marking Mooring Buoys (ENG10-14.1.3) to the ARM Committee.*

## 10. WORKING GROUP 2 – KNOWLEDGE & SUSTAINABILITY

The Working Group was made up of 28 members whom were further divided into three sub-groups. The Working Group reviewed or started working on 16 input papers. Some of these documents were for information, some were for review (NAVGUIDE), and the remainder were input to Recommendation and Guideline development. The key tasks for the ENG10 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 and update the task register as required.

### 10.1 Third party quality control (Task 1.2.1.)

The Working Group began developing a guidance document on checking that third party AtoN providers are providing what they are obliged to provide (third party AtoN provider quality control). This document is being prepared with cooperation from ARM. The Working Group made significant strides in the development of this document and will continue at ENG11.

#### *Action Item:*

*The IALA Secretariat is requested to forward the draft Guideline on Third Party AtoN Provider Quality Control (ENG10-14.2.12) to ENG11.*

### 10.2 Extreme environmental conditions (Task 2.3.1.)

The Working Group began developing a guidance document to identify appropriate standards for AtoN equipment in extreme environmental conditions. Considerations include humidity, temperature and U.V. but also extreme weather events such as major storms, waves, and effects of major tidal swings, ice floes and vegetation floes. The Working Group members did some very good work on this document and will continue at ENG11. Mariano Marpegan presented photographs demonstrating the destructive power of floating vegetation released during flood periods that can bind to, and sink, floating aids to navigation.

#### *Action Item:*

*The IALA Secretariat is requested to forward the draft Guideline on Extreme Environmental Conditions (ENG10-14.2.9) document to ENG11.*

### 10.3 Maintenance of AtoN structures (Task 2.3.2)

A finalised version of this document has been submitted for approval by the Council. Guideline 1007 Lighthouse Maintenance and Guideline 1076 Building Conditioning should both be revoked following Council approval of the new Guideline on the Maintenance of AtoN Structures.

Guideline 1077 Maintenance of AtoN requires further assessment before determining what content should be transferred to other guidelines or whether a new guideline is developed.

#### *Action Item:*

*The IALA Secretariat is requested to forward the draft IALA Guideline on Maintenance of AtoN Structures (ENG10-14.2.2) to Council for approval and, when approved, revoke IALA Guidelines 1007 on Lighthouse Maintenance and 1076 on Building Conditioning.*

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

This task was introduced at ENG9 as a case study. The current draft Guideline on Tidal Current Signal System is a good start to an overall important document; however, there are additional considerations. The initial comment is that the requirement for a Tidal Current Signal System should be based on a risk assessment of a given tidal area and if the risk assessment results are such that a Tidal Current Signal System is required for a given area, then implementing such a system should enhance safe navigation in the area.

The second comment is that the Tidal Display concept, as outlined in the current draft version, is a valid means by which the tidal information can be shared to mariners; however additional methods including VHF transmission, telephone lines to call and receive information, and electronic transfer directly to mariners are relevant and should be included in the document.

The final comment is that the document should receive input from a greater audience of subject matter experts and be worked on by a variety of stakeholders at ENG committee prior where it will receive multiple perspectives with knowledge and background that can enhance this document. A such, it is recommended that a Liaison Note go out to the other IALA Committees for their review and input to broaden the document spectrum. The input from other IALA Committees will be addressed at ENG11.

*Action Item:*

*The **IALA Secretariat** is requested to forward the Liaison Note on tidal flow capture and display (ENG10-14.2.5) to the ENAV, ARM and VTS Committees and request their feedback to ENG11.*

#### **10.5 Develop a new Recommendation on Responsible Design and Maintenance (task 2.3.4)**

The Working Group produced a new Recommendation on the Responsible Design & Maintenance of AtoN (updated to include safety, sustainable design, and relevant building codes and standards).

*Action Item:*

*The **IALA Secretariat** is requested to forward the draft Recommendation on Responsible Design and Maintenance (ENG11-14.2.1) to Council for approval.*

#### **10.6 Workshop on Cyber Security (Task 2.3.5.)**

The IALA Workshop on Cyber Security will be held in Quebec City, Canada, in October 2020 and a Steering Committee has been established. The Working Group had a discussion at plenary and some excellent topics were brought up in the area of power requirements to run AtoNs and security systems, susceptible infrastructure (dams, weirs, synthetic AtoNs), and the ability of modern computers to run multiple software programs simultaneously and the potential vulnerability that may result from this practice.

#### **10.7 Solar Panel Guideline (Task 2.4.1)**

The Working Group started work on the Guideline “Properties of a good Marine Solar Panel” at ENG10 as a brainstorming. Many of these topics have been placed into a guideline template. The group structured them and filled in some more information. The work will continue at ENG11.

*Action Item:*

*The **IALA Secretariat** is requested to forward the draft Guideline on the Properties of a good Marine Solar Panel (ENG10-14.2.14) to ENG11.*

*That **Committee Participants** are requested to provide information on their experiences with the use of solar panels as input to ENG11.*

#### **10.8 Deliver a Workshop - IALABATT/ IALALITE (Task 2.4.2)**

Working Group 2 Committee Chair and Vice-Chairs attended the first Steering Committee meeting on Tuesday 1 October to scope ideas and intended outputs from IALALITE/IALABATT. It was a productive meeting, with thanks to the Australian Maritime Safety Authority for agreeing to host this event in March 2021 in Sydney, Australia followed by ENG13 also in Sydney, Australia.

#### **10.9 Develop guidance on quantifying buoy characteristics to meet nautical and operational requirements and ways to verify them (Task 2.5.1.)**

The brainstorming document from ENG9 has been reviewed. The content has been copied into the guideline template and structured.

*Action Item:*

*The **IALA Secretariat** is requested to forward the draft Guideline on quantifying buoy characteristics to meet nautical and operational requirements and ways to verify them (ENG10-14.2.15) to ENG 11.*



#### 10.10 Radar Reflector (Task 2.5.2.)

Work on this task was to continue at ENG10; however, it was recommended to postpone the further development on this Guideline to ENG11 as the presence of a key participant from WSV, Germany, is requested for input for this Guideline. The group is considering intersessional work on the guideline.

##### *Action Items:*

*The IALA Secretariat is requested to forward the draft Guideline on Radar Reflectors (ENG10-14.2.16) to ENG11.*

*That Committee Participants are requested to provide information about radar reflectors they use. They should, where possible provide data sheets, mechanical drawings, pictures, reflection characteristics (RCS, reflection diagram), measurement methods, measurement laboratories, results of trials, application examples on buoys, structures, etc. and simulation results and the software used.*

#### 10.11 Guidance on Floating AtoN (Task 2.5.3.)

The working paper ENG8-12.2.14 was reviewed. It was decided to defer the work to ENG11.

Professor Seung Gi Gug has offered a Buoy Stability Calculation package that he will soon translate into an English Version with manual to IALA. The Working Group wishes to thank Professor Seung Gi Gug for both his excellent presentation on self-deploying buoys to mark wrecks and his kind offer of the software.

##### *Action Item:*

*The IALA Secretariat is requested to forward the working paper on Brainstorming for Floating AtoN (ENG10-14.2.17) to ENG11.*

*That the IALA Secretariat forwards the Liaison Note on Auto Deployment of the Wreck Marker Buoy (ENG10-14.2.4) to ARM10.*

#### 10.12 Modern equipment in traditional lighthouses (Task 2.6.1.)

This task should be reassigned to Working Group 4.

#### 10.13 World Heritage Lighthouse Cyber Centre (Task 2.6.3.)

This task should be reassigned to Working Group 4.

#### 10.14 Database on World Heritage Lighthouses (Task 2.6.4.)

This task should be reassigned to Working Group 4.

#### 10.15 World Heritage Lighthouse of the year (Task 2.6.5.)

This task should be reassigned to Working Group 4.

##### *Action item:*

*The IALA Secretariat is requested to assign tasks 2.6.1 (modern equipment in traditional lighthouses), 2.6.3 (world heritage lighthouse cyber centre), 2.6.4 (database on world heritage lighthouses) and 2.6.5 (world heritage lighthouse of the year) to Working Group 4.*

#### 10.16 Monitor Climate Change (Task 2.6.2.)

Simon Millyard presented the Intergovernmental Panel on Climate Change – Special Report on the Ocean and Cryosphere in a Changing Climate at Opening Plenary. Potential work stemming from the report was discussed within the ENG Committee.



### **10.17 Draft Recommendation R1004 Sustainability in the Provision of Marine Aids to Navigation (Task 2.7.1.)**

Following comments made by PAP, further development work was undertaken on the draft Recommendation R1004 on Sustainability in the Provision of Marine Aids to Navigation Services. The document has reached a level of maturity and it was considered that it would benefit from review by the Legal Advisory Panel before finalization.

#### **Action Item:**

*The IALA Secretariat is requested to forward the draft Recommendation 1004 on Sustainability in the Provision of Marine Aids to Navigation (ENG10-14.2.3) to LAP for review*

### **10.18 Development and review of WWA courses (Task 4.1.1.)**

Working Group 2, moderated by Kevin Gregory, reviewed the document ENG10-14.1 Model Course L1.1 Aids to Navigation Manager Training Ed.3.1 Dec 2019, discussed some issues and made some minor changes.

#### **Action Item:**

*The IALA Secretariat is requested to send IALA Model Course Level 1.1 on Aids to Navigation Manager Training (ENG10-14.2.6) to Council for approval.*

The Working group WG2 discussed Input Papers ENG10-3.1.13, ENG10-3.1.13.1 and ENG10-3.1.13.2 on a “Proposed IALA Level 3 Foundation Training” from MENAS and thanked them for their contribution. Further discussion is needed on this topic.

#### **Action Item:**

*The IALA Secretariat is requested to forward Input Papers ENG10-12.2.13, ENG10-14.2.13.1 and ENG10-14.2.13.2 on a “proposed IALA Level 3 Foundation Training to ENG11.*

### **10.19 NAVGUIDE updates and review (Task 4.2.1.)**

The Working Group started the review of parts of the NAVGUIDE. This work will be continued in the following sessions.

#### **Action Item:**

*The IALA Secretariat is requested to forward the file NAVGUIDE Review 2019 (ENG10-14.2.11) to ENG11.*

### **10.20 Review telemetry Guideline 1008 (Task 5.1.1.)**

This document was briefly discussed, however, it will be addressed at ENG11.

#### **Action Item:**

*The IALA Secretariat is requested to forward the review of Guideline 1008 on telemetry (ENG8-12.2.14) to ENG11.*

## **11. WORKING GROUP 3 – RADIONAVIGATION SERVICES**

The Working Group Chair and Vice Chair express their gratitude to the Working Group participants for their hard work and effort during this busy week.

The Working Group considered the task plan and provided updates to the ENG Committee Chair and Vice Chair.

### **11.1 Resilient PNT (Task 3.1.1)**

The definition of resilient PNT was discussed and a new dictionary definition developed (output captured under a later item).

## 11.2 Terrestrial radionavigation systems (Task 3.2.1)

The Committee reviewed input papers ENG10-3.1.27 through to ENG10-3.1.28, on the draft product specifications for DGNSS station almanac (S-240), eLoran ASF data (S-245), eLoran station Almanac (S-246) and Differential eLoran Reference station almanac (S-247).

These product specifications (PS) were updated to reflect a change in IALA Guideline 1106, which has seen the introduction of a new chapter to these PS.

It was noted that S-240 has been reviewed previously and a draft version of the PS is available on the IALA website. Likewise, S-246 and S-247 have been inputs to previous meetings, albeit without the new additions. Committee members are invited to review these PS before ENG11, providing comments to the author (Younghoon Han ([yhhan@kriso.re.kr](mailto:yhhan@kriso.re.kr))) by 31 January 2020, so that they can be finalised at ENG11.

The long-term plan for the review and development of these PS was unclear. In collaboration with the Secretariat, the Committee has started the development of a short information paper to explain the role of these PS and the approval process. This paper is not yet finalised and will be held as a working paper until ENG11.

### *Action items:*

*The **IALA Secretariat** is requested to forward documents ENG10-14.3.10 S-240 DGNSS station almanac product specification, ENG10-14.3.9 S-245 eLoran ASF data product specification, ENG10-14.3.9.1 S-246 eLoran Station almanac product specification and ENG10-14.3.9.2 S-247 Differential eLoran Reference station almanac to ENG11 as working papers.*

*That **Committee Participants** are invited to review the different draft product specification documents (S-240, S-245, S-246 & S-247) and provide their comments to Mr Younghoon Han ([yhhan@kriso.re.kr](mailto:yhhan@kriso.re.kr)) by 31 January 2020.*

## 11.3 R-Mode (MF) (Task 3.2.2)

There are a number of work items under this topic, including a review of the successful R-Mode workshop held at the start of September (ENG10-3.1.26). A Liaison Note from ENAV on R-Mode VDES stakeholder requirements (ENAV10-3.1.2) was reviewed along with the stakeholder requirements (ENG10-3.1.2.1). The Committee made amendments to the stakeholder requirements and after discussion with the Secretariat, agreed that a new document format of an 'information paper' should be considered. The amended Stakeholder Requirements will be held as a working paper for both ENAV and ENG Committees.

The mind map (ENG10-3.1.26.1), roadmap (ENG10-3.1.26.2) and draft Guideline (ENG10-3.1.26.4) developed at the workshop were also reviewed and updated. The Secretariat is invited to forward these documents as working papers to ENG11 and ENAV24.

After reviewing the work to be done on this topic and the expected timeframe for its development, the Committee would like to hold an intersessional meeting to finalise the stakeholder requirements. It is felt that such an intersessional would work best if arranged with the ENAV Committee. Some members of the ENG Committee will also attend ENAV and a request for an intersessional is expected to be an outcome of that Committee.

The Committee reviewed an input paper on the use of Galileo timing in support of R-Mode (ENG10-3.1.12). It recognised that some administrations may wish for a completely GNSS free solution but noted that for some cases it could be a viable option if only short-range interference is considered a problem.

Finally, an update was received on developments related to a True Heading patent and its potential to affect the development of AIS/VDES R-Mode. This topic had been discussed at previous meetings and the Committee sought the advice of the Legal Advisory Panel (LAP). The Chair of Working Group 3 intends to have a conference call with the Chair of the LAP to discuss the technicalities behind the patent and the proposal. A liaison note to the LAP was prepared explaining the potential concerns and providing information on the patent, the recent developments and supporting documentation.

#### Action items:

*The **IALA Secretariat** is requested to forward documents ENG10-14.3.6.4 VDES R-Mode Stakeholder Requirements (post ENG10), ENG10-14.3.6.2 and ENG10-14.3.6.3 R-Mode roadmap (post ENG10), ENG10-14.3.6.1 R-Mode mind map (post ENG10) and ENG10-14.3.6 Draft R-Mode Guideline to ENAV24 and ENG11 as working papers.*

*The **IALA Secretariat** is requested to consider the development of a new document type, and information paper, to contain information that is not sufficient to be a Recommendation or Guideline on its own.*

*The **IALA Secretariat** is requested to forward Liaison Note on an update to the True Heading patent ENG10-14.3.2, and its supporting documents (ENG10-14.3.2.1 to ENG10-14.3.2.4), to the Legal Advisory Panel for review and comment.*

*The **Chair of Working Group 3** to have a conference call with the Chair of the LAP to discuss the technicalities behind the patent and the proposal.*

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

All R-Mode activities are captured under item 1.3.

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

The Committee reviewed the outcome of the R-Mode workshop and considered it a very successful event. The Committee expresses its gratitude to Dr Stefan Gewies for his hard work in arranging the workshop.

This item is now completed.

#### 11.6 R-Mode testbed progress coordination (Task 3.2.5)

No work on this item during this session.

#### 11.7 R-Mode: input to sister organisations on R-Mode standards (Task 3.2.6)

The Committee considered the need to provide updates to sister organisations on the technical development, progress and expected roadmap activities required to support R-Mode standardization. The Committee felt it was too early to prepare an update during this meeting, and it will be considered again at ENG11.

#### 11.8 Guidance on timing and synchronisation (Task 3.2.7)

The Committee reviewed input paper ENG10-3.1.12 on Galileo Timing as part of the R-Mode work but noted its relevance to this activity. It was recognised that the Committee could benefit from more expertise in this area and consideration will be given to additional attendees or input for the next meeting.

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

The Committee reviewed input paper on the latest eRadar and eRacon trials in Singapore. The Committee started developing guidance on eRacon signal specification, which included identifying new dictionary terms.

#### Action item:

*The **IALA Secretariat** is requested to forward working paper ENG10-14.3.8 Draft Guideline 1147 on Enhanced Radar Positioning System to ENG11*

*The **IALA Secretariat** is requested to forward new IALA dictionary definitions ENG10-14.3.4 to the Dictionary working group at PAP.*

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

Input papers ENG10-3.18 and ENG10-10.1 on drafts to the SBAS Guideline were considered. An input paper on the development of the BeiDou satellite constellation and its SBAS was also considered. The Committee welcomed the attendance of representatives from China to support these SBAS discussions and Guideline development.

The Committee completed the development of the Guideline on SBAS Maritime Service and the Secretariat is requested to forward it to Council.

#### *Action item:*

*The IALA Secretariat is requested to forward the draft Guideline on SBAS Maritime Service (ENG10-14.3.3) to Council for approval.*

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

The Committee discussed the planned IALA Workshop on the future of marine radiobeacon DGNSS, due to take place w/c 27 January 2020 in Edinburgh, Scotland. The future of marine radiobeacon is a timely topic and there was much interest in the event.

In a related topic, the Committee reviewed the IALA DGNSS list document and provided new introduction text for the Secretariat to consider. It was also agreed with the Secretariat that the DGNSS contact list on the website should be moved to a secure part of the website and that the reference to WG3 Chairman in the flow diagram for new beacon ID numbers should be amended to the Secretariat (noting the WG3 Chairman will continue to provide support).

#### *Action item:*

*The IALA Secretariat is requested to consider the proposed new wording for the IALA DGNSS list, captured in ENG10-14.3.5.*

*The IALA Secretariat is requested to move the DGNSS Contact list to a secure part of the website.*

*The IALA Secretariat is requested to amend the new station ID flow chart in the DGNSS list to replace WG3 Chairman with Secretariat.*

### 11.12 Recommendation on augmentation for maritime use (Task 3.4.3)

Input paper ENG10-10.2 was noted under this work item but the draft was not progressed in this work period.

#### *Action item:*

*The IALA Secretariat is requested to forward working paper, ENG10-14.3.7, Draft IALA Recommendation Rxxxx on GNSS Augmentation Service Provision, to ENG11.*

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

No work was conducted on this work item during this period, however it was noted as an important topic that will be discussed as part of the workshop on the future of marine radiobeacon DGNSS.

### 11.14 High accuracy systems (Task 3.4.5.)

The Committee received a presentation on high accuracy positioning options that are currently being developed and trialled in Poland. This information will help shape the Guideline on this topic.

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

There was no work conducted on this item during this work period.

#### **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 cyber security, e-Navigation document structure, PNT updates for plenary and other upcoming events.

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

The committee reviewed input ENG10.3.1.24, a liaison note from RTCM SC-104 which sought the views of the Committee on the development of RTCM broadcast standard V2.4.

RTCM is preparing a clean draft version of 2.4 and will ask IALA for comments, and user needs before release. Further, a revision of ITU-R M823 is needed as soon as a new RTCM SC-104 version 2.4 is approved.

It was noted that these topics will be best reviewed after the IALA workshop on the future of radiobeacon DGPS and a liaison note explaining that a full reply will be developed at ENG11 was prepared.

It was identified that there is an opportunity for IALA and RTCM to collaborate on integrity and R-Mode aspects and these were also covered in the Liaison note.

##### **Action item:**

*The IALA Secretariat is requested to forward the Liaison Note to RTCM regarding collaboration with SC104 and SC134 (ENG10-14.3.1) to Council for approval.*

*The IALA Secretariat is requested to forward the Liaison Note to RTCM regarding collaboration with SC104 and SC134 (ENG10-14.3.1) once approved.*

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

The Committee considered the forthcoming cybersecurity workshop and its attendance.

#### **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 considered the need to review the NAVGUIDE and will explore this further at ENG11.

### **12. WORKING GROUP 4 – THE HERITAGE FORUM**

Over the course of ENG10, the Working Group received the participation of 10 persons from seven countries and was particularly pleased to receive a visit from former group chair Bob Macintosh. The group received the following presentations:

- The heritage structures associated with lighthouses telling the story of evolving requirements and technology (Peter Hill),
- The cultural value of urban lighthouses to their town, focussing on La Rochelle example (Jong hun Kim),
- Maintaining a rotating lens without mercury – the Japanese example (Hideki Noguchi),
- The history and past work of the IALA Heritage Forum (Bob Mackintosh),
- Report on World Marine Aids to Navigation Day 2019 in Korea (Mike Bae).

### 12.1 Heritage seminar (Task 2.6.6)

The Heritage Seminar Steering Group met outside of the Working Group to discuss progress on the practical arrangements for the Heritage Seminar in Salvador, Brazil (21 to 24 April 2020) – ‘The Challenge of Change’. The Steering Group will meet again on 5 November 2019 to review progress.

It was noted that from the attendees of ENG10 Working Group 4 there would be speaker contributions from the UK and Republic of Korea. Although not present at ENG10 Working Group 4, France had also confirmed participation. More participation of the ENG Committee member is encouraged.

#### *Action Items:*

*That **Committee Participants** are encouraged to participate in the Heritage Seminar in Salvador, Brazil 2020 that is held back to back with ENG11.*

### 12.2 IALA Heritage Lighthouse of the Year 2019 - Cordouan Lighthouse (Task 2.6.5)

This was reviewed and it was agreed to have been a success that the group would like to build on in future years.

### 12.3 IALA Heritage Lighthouse of the Year – future nominations (Task 2.6.5)

It was agreed that nominations should now be open for 2020 Heritage Lighthouse of the Year.

In a review of the process, Working Group 4 agreed a proposal to provide to IALA Council a shortlist of three nominations together with its recommendation and reasons for final selection (IALA Council in no way to be bound by that recommendation). This will be provided to IALA Council at the end of each spring ENG Committee through the Committee reporting procedure. IALA Council would determine which lighthouse should hold the accolade of IALA Heritage Lighthouse of the Year at their June Council meeting of the same year.

The Republic of Korea had generously agreed to produce an award for 2020. It is hoped that this award may be presented to the IALA Member with responsibility for operating the lighthouse at World Marine Aids to Navigation Day each year or at IALA Council, however, if this is not practical then alternative arrangements for presentation would need to be agreed between the recipient organisation and the IALA Secretariat.

The Working Group were delighted to note that the nomination form had already been uploaded onto the IALA website under a new ‘Heritage’ link from the homepage.

#### *Action Items:*

*That the **IALA Secretariat** is requested to forward Input Paper ENG10-14.4.1 to Council regarding the process for the 2020 IALA Heritage Lighthouse of the Year. This process would comprise request for IALA Council to determine the recipient of annual IALA Heritage Lighthouse of the Year 2020 - subject to the arrangements detailed above.*

*That the **IALA Secretariat** is requested to forward to Liaison Note on nominations for the Heritage Lighthouse of the Year 2020 (ENG10-14.4.2) to ARM10.*

***Yong Chan Bae (Republic of Korea)** is requested to oversee and resource the design and construction of the artwork to be presented to each IALA Heritage Lighthouse of the Year accolade holder until the year 2022.*

*That **Committee Participants** are encouraged to submit nominations for IALA Heritage Lighthouse of the Year 2020.*

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

It was agreed that the Heritage Lighthouse Database and Cybercentre (both separately referenced in the Task Plan) carried the same objective. It was acknowledged that data on historic lighthouses is freely available on the internet – often presented nationally in a variety of formats. The difficulties of the Working Group carrying out research of its own were discussed as were the problems of potentially omitting very significant



heritage lighthouses. Further challenges of resourcing the management and updating of IALA website data was also discussed. However, there remained a benefit to IALA (particularly in its connection with the general public) in identifying and providing information on lighthouses of heritage significance and this could be intrinsically linked with the Heritage Lighthouse of the Year initiative.

It was agreed to pursue the creation of a 'Heritage' sub-domain of the IALA website that would serve to recognise existing Heritage Lighthouse of the year, promote nominations and form a growing database of nominated lighthouses that would be publicly accessible. This should include the nomination form and a cumulative list of all lighthouses nominated for Heritage Lighthouse of the Year with hyperlink to the submitted nomination details and photograph for each of these. This would serve as a growing database of heritage lighthouses.

The Republic of Korea generously agreed to upload and manage the required data for this webpage, subject to IALA's agreement and requirements and subject to prior review of such data by the Chair of ENG Working Group 4 and IALA.

#### **Action Items:**

*The **IALA Secretariat** is requested to make available a sub-domain of the IALA website available for the celebration of the relevant year's IALA Heritage Lighthouse of the Year and to liaise with Yong Chan Bae (Republic of Korea) and Peter Hill (ENG Working Group 4 Chair) in the layout / functionality of the webpage.*

*That **Yong Chan Bae (Republic of Korea)** takes on responsibility for the ongoing management and updating of the webpage in accordance with the procedures set out by the IALA Secretariat.*

*The **IALA Secretariat** is requested to update the work plan to reflect that items previously referred to separately as 'Heritage Lighthouse Database' and 'Cybercentre' (Task 2.6.3.& 2.6.4) are now combined and re-named 'IALA Heritage website'.*

## **12.5 Other matters not referenced in the Task Plan 2018-2022**

### **12.5.1 Overall objectives of the ENG WG4**

The overall mission of the Working Group 4 was discussed and was concluded to be best summarised as "To further the declaration and recommendations contained within the Incheon Declaration and IALA Recommendation R1005 – 'Conserving the built heritage of lighthouses and other aids to navigation'.

### **12.5.2 Definition of 'Heritage Lighthouse'**

It was noted that whilst the IALA dictionary included a definition of 'Historic Lighthouse', it did not contain a definition of heritage Lighthouse or aide to navigation. With the term 'heritage' being in regular parlance at IALA (not least in the title of ENG Working Group 4!), it was considered that a definition should be added to the IALA dictionary. A preference was expressed to replace the term 'Historic Lighthouse' with 'Heritage Lighthouse', but this was thought likely to be complex for the time being with so many existing documents referencing the former, but this should be born in mind should the IALA dictionary be reviewed in the future. It was also noted that heritage value exists not only for lighthouses but also other marine aids to navigation.

### **12.5.3 Work Programme for Committees 2018-2022 - Guidance Documents**

It was noted that within the Work Programme, the following Guidance documents were associated with ENG WG4 but was observed that these would seem to be in the ownership of other Working Groups.

- [G]1007 Lighthouse Maintenance (Dec 2005);
- [G]1076 Building Conditioning of Lighthouses (Dec 2009); and
- [G]1049 Use of Modern Light Sources in Traditional Lighthouse Optics (Dec 2007).

It was further noted that G1007 and G1076 were shortly to be superseded by a new Lighthouse Maintenance Manual being worked on by Working Group 2. Working Group 4 requested the opportunity to review this manual and Greg Hansen kindly talked the group through it. A single minor change was suggested.

Working Group 4 commenced a review of the remaining guidance documents associated with Working Group 4 with a view to assessing their ongoing relevance and any update requirements – especially in the context of the later 2017 IALA Complementary Lighthouse Use Manual. It was decided that these would be reviewed and updated at future ENG meetings.

It was also decided that a new document should be produced by Working Group 4, to provide guidance on how to assess the heritage value of a marine aid to navigation and how to ensure that conservation objectives are considered when altering heritage marine aids to navigation.

The question was raised as to how Working Group 4 should best input into guidance documents being developed by other Working Groups, but no conclusion was reached on this matter for the time being.

#### 12.5.4 Retaining Rotating Lenses

During general discussions, Hideki Noguchi of the Japan Coast Guard introduced the special rotating system that was developed to replace the mercury bath in order to keep the historic Fresnel lens moving. The Group requested him to report the more detailed information on the system in the future session of the Committee meeting.

##### *Action Items:*

*That **Hideki Noguchi** is requested to report the information of the special rotating lense system in the future session of the Committee.*

#### 12.5.5 Level 1.5 model course on lighthouse heritage projects

Kevin Gregory attended the group to assist in the Working Groups understanding of the World-Wide Academy and, in particular the outline model course L1.5 ‘Level1 – Module 5 – Historic Lighthouse Projects’. Whilst this remains a future possibility, it was agreed that the integration of Heritage matters into existing Level 1.1 and possibly 1.2 courses would be more realistic at this stage and would carry the greater objective of embedding Heritage values into the thinking of member organisations.

##### *Action Items:*

*That the **IALA World-Wide Academy** is requested to define a brief for Working Group 4 to provide the content for a Heritage section within the Level 1.1 and Level 1.2 courses, to include, allotted time, structure, and guidance on suitable similar materials (good examples of existing materials).*

### 13. REVIEW OF WORKING GROUP REPORTS AND OUTPUT 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.

### 14. ANY OTHER BUSINESS

Development commenced on the preparation of a reference list IALA documentation related to the ENG Committee providing a map of the IALA Standards and their associated Recommendations, Guidelines and Model Courses.

##### *Action item:*

*The **IALA Secretariat** is requested to forward the draft Reference List of documentation related to the ENG Committee (ENG10-14.5.1) to ENG11 for further development.*



## 15. REVIEW OF SESSION REPORT

The report of the meeting (ENG10-15.1) 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 ENG10 Committee report (ENG10-15.1) to Council to note.*

## 16. DATE AND VENUE OF NEXT MEETING

The next session of the Committee is from 27 April to 1 May 2020 in Salvador, Brazil.

## 17. CLOSING OF THE MEETING

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

## 18. LIST OF ANNEXES

- 1     Agenda  
      A copy of the agenda is at ANNEX A.
- 2     Participants  
      A list of participants is at 0.
- 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.



## 10<sup>th</sup> Meeting of the AtoN Engineering and Sustainability Committee (ENG10)

The 10<sup>th</sup> meeting of the **AtoN Engineering and Sustainability Committee** will be held from 30 September – 4 October 2019 at IALA Headquarters, Saint-Germain-en-Laye, France.

The opening plenary will commence at 1300 on Monday 30 September and the closing plenary will end at approximately 1300 on Friday 4 October.

Committee Chair, Vice-Chair and Working Group Chairpersons are requested to meet at 0900 on Monday 30 September 2019.

### AGENDA

1. Opening
  - 1.1. Administration and safety briefing
  - 1.2. Welcome address from the Secretary-General/Deputy Secretary-General
  - 1.3. Approval of the agenda
  - 1.4. Apologies and Introductions
  - 1.5. Programme for the week
  - 1.6. ENG committee structure
    - 1.6.1. WG1 Overview Malcolm Nicholson
    - 1.6.2. WG2 Overview Jordan Lane-Beveridge
    - 1.6.3. WG3 Overview Alan Grant
    - 1.6.4. WG4 Overview Peter Hill
2. Review of action items from last meeting
  - 2.1. Review of action items from ENG9
3. Review of input papers
  - 3.1. Review of input papers to ENG 10
  - 3.2. Input papers for action/allocation
4. Reports from other bodies
  - 4.1. IALA
    - 4.1.1. IALA Council
    - 4.1.2. IALA Policy Advisory Panel (PAP)
  - 4.2. IMO
    - 4.2.1. IMO Council
    - 4.2.2. IMO MSC
    - 4.2.3. IMO NCSR
  - 4.3. IHO/IALA liaison
  - 4.4. ITU

Minsu Jeon

- |      |                                                     |                       |
|------|-----------------------------------------------------|-----------------------|
| 4.5. | IEC                                                 |                       |
| 4.6. | RTCM                                                | Alan Grant            |
| 4.7. | PIANC                                               | Minsu Jeon            |
| 4.8. | CIE                                                 | Alwyn Williams        |
| 4.9. | E-Navigation Underway                               | Minsu Jeon            |
| 5.   | Reports from rapporteurs                            |                       |
| 5.1. | Power                                               | Peter Dobson          |
| 5.2. | Lights                                              | Alwyn Williams        |
| 5.3. | Buoys                                               | Peter Schneider       |
| 5.4. | PNT                                                 | Members of WG3        |
| 5.5. | Environment                                         | Simon Millyard        |
| 5.6. | Use of drones                                       | Jørgen Royal Petersen |
| 5.7. | IALA Dictionary                                     | Michel Cousquer       |
| 5.8. | IALA Bulletin liaison                               | Michel Cousquer       |
| 5.9. | Update on IALA VTS-ENAV Symposium 2020              |                       |
| 6.   | Presentations                                       |                       |
| 6.1. | Brief on WWA                                        | Kevin Gregory         |
| 6.2. | e-Racon                                             | Aw Eng Soon           |
| 6.3. | Development status of e-Loran in Korea              | Dr Tae-Hyun Fang      |
| 6.4. | Structural Condition Assessment of Rock Lighthouses | Professor Alison Raby |
| 6.5. | IALA R-Mode Workshop                                | Dr Stefan Gewies      |
| 7.   | Work Programme (2018 - 2022)                        |                       |
| 8.   | WG 1 - Visual & Physical AtoN                       |                       |
| 9.   | WG 2 - Knowledge & Sustainability                   |                       |
| 10.  | WG3 – Radionavigation Services                      |                       |
| 11.  | WG4 - Heritage                                      |                       |
| 12.  | Any other business                                  |                       |
| 13.  | Establish Working Groups                            |                       |
| 14.  | Review of output and working papers                 |                       |
| 15.  | Review of session report                            |                       |
| 16.  | Date and venue of next meeting                      |                       |
| 17.  | Close of meeting                                    |                       |

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Vice Chair – Jörg Unterdeuweide

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10	Greg Hansen	Australian Maritime Safety Authority
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19	Harold Kiffer	US Coast Guard
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8	Alberto Piovesana Junior	Brazil
9	Sarah Robinson	Hawkshill Consulting Limited, UK
10	Aw Eng Soon	Maritime and Port Authority of Singapore, Singapore



## ANNEX D LIST OF INPUT PAPERS

All papers were posted to the Committee website

Meeting	Agenda Item	Output Paper Title	Source	Destination
ENG10	14.1.1	IALA Recommendation R0111 on Port Traffic Signals	WG1	Council
ENG10	14.1.2	Guideline G1148 Determination of Required Luminous Intensity for Marine Signal Lights	WG1	Council
ENG10	14.1.3	Liaison Note to ARM on Mooring Buoys	WG1	ARM
ENG10	14.1.4	Liaison Note to ARM on Response to Port Traffic Signals	WG1	ARM
ENG10	14.2.1	Recommendation on Design and Operation in the Provision of Marine Aids to Navigation	WG2	Council
ENG10	14.2.2	IALA Guideline Ed.1 Maintenance of AtoN Structures	WG2	Council
ENG10	14.2.3	Recommendation on Sustainability in the Provision of Marine Aids to Navigation	WG2	LAP
ENG10	14.2.4	Liaison Note ARM regarding Auto Deployment of the Wreck Marker Buoy	WG2	ARM
ENG10	14.2.4.1	Annex - Auto Deployment of the Wreck Marker Buoy	WG2	ARM
ENG10	14.2.5	Liaison Note to all committees regarding Tidal Flow Proposal	WG2	All Committees
ENG10	14.2.5.1	Annex 1 - Draft Guideline on Tidal Current Signal System	WG2	All Committees
ENG10	14.2.6	Level 1.1 Marine Aid to Navigation Management Course	WG2	Council
ENG10	14.3.1	Liaison Note to RTCM	WG3	Council and RTCM
ENG10	14.3.2	Liaison Note to LAP regarding patents	WG3	LAP
ENG10	14.3.2.1	Annex 1 R-Mode Report	WG3	LAP
ENG10	14.3.2.2	Annex 2 - Comparison of AIS-R-Mode and True Heading Patent	WG3	LAP
ENG10	14.3.2.3	Annex 3 - EU Patent - EP3052956	WG3	LAP
ENG10	14.3.2.4	Annex 4 - RSN-2014-0292	WG3	LAP
ENG10	14.3.3	IALA Guideline Gxxxx on SBAS Maritime Service	WG3	Council
ENG10	14.3.4	Input to DWG - Dictionary Updates	WG3	Secretariat - DWG
ENG10	14.3.5	Updates to DGNSS list	WG3	Secretariat
ENG10	14.4.1	Input to Council on the Heritage Lighthouse Award Decision Process	WG4	Secretariat
ENG10	14.4.2	Liaison Note to ARM Requesting Nominations for the Heritage Lighthouse Award	WG4	ARM

## ANNEX E LIST OF OUTPUT AND WORKING PAPERS

Output documents are submitted for review by a body other than the Committee initiating the document. Working Papers are documents that will remain within the committee for further review.

Meeting	Agenda Item	Output Paper Title	Source	Action
ENG10	15.1	ENG10 Report	Secretariat	Council
ENG10	14.1.1	IALA Recommendation R0111 on Port Traffic Signals	WG1	Council
ENG10	14.1.2	Guideline G1148 DETERMINATION OF REQUIRED LUMINOUS INTENSITY FOR MARINE SIGNAL LIGHTS	WG1	Council
ENG10	14.1.3	Liaison Note to ARM on Mooring Buoys	WG1	ARM
ENG10	14.1.4	Liaison Note to ARM on Response to Port Traffic Signals	WG1	ARM
ENG10	14.1.5	WP Draft IALA Guideline on the Implementation of Port Traffic Signals (1)	WG1	ENG11
ENG10	14.2.1	Recommendation on Design and Operation in the Provision of Marine Aids to Navigation	WG2	Council
ENG10	14.2.2	IALA Guideline Ed.1 Maintenance of AtoN Structures	WG2	Council
ENG10	14.2.3	Recommendation on SUSTAINABILITY IN THE PROVISION OF MARINE AIDS TO NAVIGATION	WG2	LAP
ENG10	14.2.4	Liaison Note ARM regarding Auto Deployment of the Wreck Marker Buoy	WG2	ARM
ENG10	14.2.4.1	Annex - Auto Deployment of the Wreck Marker Buoy	WG2	ARM
ENG10	14.2.5	Liaison Note to all committees regarding Tidal Flow Proposal	WG2	All Committees
ENG10	14.2.5.1	Annex 1 - Draft Guideline on Tidal Current Signal System	WG2	All Committees
ENG10	14.2.6	Level 1.1 Marine Aid to Navigation Management Course	WG2	Council
ENG10	14.2.7	WP 1097 Ed.1.1 Technical Features and Technology Relevant for Simulation of AtoN-working 20190322	WG2	ENG11
ENG10	14.2.8	WP Draft Recommendation on Design and Operation in the Provision of Marine Aids to Navigation (ENG10-9.6) rev1	WG2	ENG11
ENG10	14.2.9	WP Notes on Develop guidance for AtoN equipment with extreme environmental conditions Task 2.3.1 rev2-1	WG2	ENG11
ENG10	14.2.10	WP Reference Table	WG2	ENG11
ENG10	14.2.11	WP NAVGUIDE 2018 v0.3	WG2	ENG11

ENG10	14.2.12	WP 3rd party AtoN provider quality control	WG2	ENG11
ENG10	14.2.13	WP Proposed IALA Level 3 Foundation Training (ENG10-3.1.13)	WG2	ENG11
ENG10	14.2.13.1	WP Level 3 module analysis 05082019 rev1 (ENG10-3.1.13.1)	WG2	ENG11
ENG10	14.2.13.2	WP Draft Level 3 Syllabus 05082019 rev1(ENG10-3.1.13.2)	WG2	ENG11
ENG10	14.2.14	WP IALA Guideline Solar Modules	WG2	ENG11
ENG10	14.2.15	WP Buoy Guidelines Structure	WG2	ENG11
ENG10	14.2.16	WP Guideline on Radar Reflectors	WG2	ENG11
ENG10	14.2.17	WP Task 2.5.3 Brainstorming (ENG8-12.2.14)	WG2	ENG11
ENG10	14.3.1	Liaison Note to RTCM	WG3	Council and RTCM
ENG10	14.3.2	Liaison Note to LAP regarding patents	WG3	LAP
ENG10	14.3.2.1	Annex 1 R-Mode Report	WG3	LAP
ENG10	14.3.2.2	Annex 2 - Comparison of AIS-R-Mode and True Heading Patent	WG3	LAP
ENG10	14.3.2.3	Annex 3 - EU Patent - EP3052956	WG3	LAP
ENG10	14.3.2.4	Annex 4 - RSN-2014-0292	WG3	LAP
ENG10	14.3.3	IALA Guideline Gxxxx on SBAS Maritime Service	WG3	Council
ENG10	14.3.4	Input to DWG - Dictionary Updates	WG3	Secretariat - DWG
ENG10	14.3.5	Updates to DGNSS list	WG3	Secretariat
ENG10	14.3.6	WP Draft Guideline on R-Mode Implementation Using MF Radio Beacon and VHF Transmissions Post Workshop (ENG10-3.1.26.4)	WG3	ENG11
ENG10	14.3.6.1	WP Mind Map R-Mode (updated) Review 04.10.2019	WG3	ENG11
ENG10	14.3.6.2	WP R-Mode Roadmap	WG3	ENG11
ENG10	14.3.6.3	WP R-Mode Roadmap 2019	WG3	ENG11
ENG10	14.3.6.4	VDES R-Mode Stakeholder Requirements Post ENG10	WG3	ENG11
ENG10	14.3.7	WP Draft IALA Recommendation on GNSS Augmentation Service Provision	WG3	ENG11
ENG10	14.3.8	WP Draft Guideline 1147 Enhanced Radar Positioning 02 October 2019-1	WG3	ENG11
ENG10	14.3.9	WP S-245 eLoran ASF Data Product Specification (ENG10-3.1.28.1)	WG3	ENG11
ENG10	14.3.9.1	WP S-246 eLoran Station Almanac Product Specification (ENG10-3.1.28.2)	WG3	ENG11

ENG10	14.3.9.2	WP S-247 Differential eLoran Reference Station Almanac Product Specification (ENG10-3.1.28.3)	WG3	ENG11
ENG10	14.3.10	WP S-240 DGNSS Station Almanac Product Specification	WG3	ENG11
ENG10	14.4.1	Input to Council on the Heritage Lighthouse Award Decision Process	WG4	Secretariat
ENG10	14.4.2	Liaison Note to ARM Requesting Nominations for the Heritage Lighthouse Award	WG4	ARM
ENG10	14.5.1	WP IALA Reference List ENG V2 20191001	Chair	ENG11
ENG10	14.5.2	WP ENG Task Plan 2018-22 (ENG10-7.1.2) Reviewed ENG10	Chair	ENG11
ENG10	14.5.3	WP ENG Task Register	Chair	ENG11

*Action Items for Secretariat*

1. The **IALA Secretariat** is requested to forward the ENG Committee Task Plan for 2018-2022, ENG10-14.5.2, and the Task Register, ENG10-14.5.3, to ENG10. 11
2. The **IALA Secretariat** is requested to forward Draft Recommendation E-111 Port Traffic Signals ENG10-14.1.1 to Council for Approval 11
3. The **IALA Secretariat** is requested to forward a Liaison Note on Port Traffic Signals ENG-14.1.4 to the ARM Committee 11
4. The **IALA Secretariat** is requested to forward the working paper on the Guideline for the Implementation of Port Traffic Signals (ENG10-14.1.5) to ENG11. 11
5. The **IALA Secretariat** is requested to remove the task related to the development of guidance on Service Factors is task from the IALA Workplan and merge it with the task related to the development of Guideline G1148 on Calculation of Luminous Intensity and Range. 13
6. The **IALA Secretariat** is requested to forward Draft Guideline G1148 on the Determination of Required Luminous Intensity for Marine Signal Lights (ENG10-14.1.2) to Council for approval. 13
7. The **IALA Secretariat** is requested to forward the Liaison Note on Vertical Divergence of Light for marking Mooring Bouys (ENG10-14.1.3) to the ARM Committee. 13
8. The **IALA Secretariat** is requested to forward the draft Guideline on Third Party AtoN Provider Quality Control (ENG10-14.2.12) to ENG11. 14
9. The **IALA Secretariat** is requested to forward the draft Guideline on Extreme Environmental Conditions (ENG10-14.2.9) document to ENG11. 14
10. The **IALA Secretariat** is requested to forward the draft IALA Guideline on Maintenance of AtoN Structures (ENG10-14.2.2) to Council for approval and, when approved, revoke IALA Guidelines 1007 on Lighthouse Maintenance and 1076 on Building Conditioning. 14
11. The **IALA Secretariat** is requested to forward the Liaison Note on tidal flow capture and display (ENG10-14.2.5) to the ENAV, ARM and VTS Committees and request their feedback to ENG11. 15
12. The **IALA Secretariat** is requested to forward the draft Recommendation on Responsible Design and Maintenance (ENG11-14.2.1) to Council for approval. 15
13. The **IALA Secretariat** is requested to forward the draft Guideline on the Properties of a good Marine Solar Panel (ENG10-14.2.14) to ENG11. 15
14. The **IALA Secretariat** is requested to forward the draft Guideline on quantifying buoy characteristics to meet nautical and operational requirements and ways to verify them (ENG10-14.2.15) to ENG 11. 15
15. The **IALA Secretariat** is requested to forward the draft Guideline on Radar Reflectors (ENG10-14.2.16) to ENG11. 16
16. The **IALA Secretariat** is requested to forward the working paper on Brainstorming for Floating AtoN (ENG10-14.2.17) to ENG11 16
17. That the **IALA Secretariat** forwards the Liaison Note on Auto Deployment of the Wreck Marker Buoy (ENG10-14.2.4) to ARM10. 16
18. This task should be reassigned to Working Group 4. 16
19. The **IALA Secretariat** is requested to assign tasks 2.6.1 (modern equipment in traditional lighthouses), 2.6.3 (world heritage lighthouse cyber centre), 2.6.4 (database on world heritage lighthouses) and 2.6.5 (world heritage lighthouse of the year) to Working Group 4. 16
20. The **IALA Secretariat** is requested to forward the draft Recommendation 1004 on Sustainability in the Provision of Marine Aids to Navigation (ENG10-14.2.3) to LAP for review 17
21. The **IALA secretariat** is requested to send IALA Model Course Level 1.1 on Aids to Navigation Manager Training (ENG10-14.2.6) to Council for approval. 17

22. The **IALA Secretariat** is requested to forward Input Papers ENG10-12.2.13, ENG10-14.2.13.1 and ENG10-14.2.13.2 on a “proposed IALA Level 3 Foundation Training to ENG11. 17
23. The **IALA Secretariat** is requested to forward the review of Guideline 1008 on telemetry (ENG8-12.2.14) to ENG11. 17
24. The **IALA Secretariat** is requested to forward documents ENG10-14.3.10 S-240 DGNSS station almanac product specification, ENG10-14.3.9 S-245 eLoran ASF data product specification, ENG10-14.3.9.1 S-246 eLoran Station almanac product specification and ENG10-14.3.9.2 S-247 Differential eLoran Reference station almanac to ENG11 as working papers. 18
25. The **IALA Secretariat** is requested to forward documents ENG10-14.3.6.4 VDES R-Mode Stakeholder Requirements (post ENG10), ENG10-14.3.6.2 and ENG10-14.3.6.3 R-Mode roadmap (post ENG10), ENG10-14.3.6.1 R-Mode mind map (post ENG10) and ENG10-14.3.6 Draft R-Mode Guideline to ENAV24 and ENG11 as working papers. 19
26. The **IALA Secretariat** is requested to consider the development of a new document type, and information paper, to contain information that is not sufficient to be a Recommendation or Guideline on its own. 19
27. The **IALA Secretariat** is requested to forward Liaison Note on an update to the True Heading patent ENG10-14.3.2, and its supporting documents (ENG10-14.3.2.1 to ENG10-14.3.2.4), to the Legal Advisory Panel for review and comment. 19
28. The **IALA Secretariat** is requested to forward working paper ENG10-14.3.8 Draft Guideline 1147 on Enhanced Radar Positioning System to ENG11 19
29. The **IALA Secretariat** is requested to forward new IALA dictionary definitions ENG10-14.3.4 to the Dictionary working group at PAP. 19
30. The **IALA Secretariat** is requested to forward the draft Guideline on SBAS Maritime Service (ENG10-14.3.3) to Council for approval. 20
31. The **IALA Secretariat** is requested to consider the proposed new wording for the IALA DGNSS list, captured in ENG10-14.3.5. 20
32. The **IALA Secretariat** is requested to move the DGNSS Contact list to a secure part of the website. 20
33. The **IALA Secretariat** is requested to amend the new station ID flow chart in the DGNSS list to replace WG3 Chairman with Secretariat. 20
34. The **IALA Secretariat** is requested to forward working paper, ENG10-14.3.7, Draft IALA Recommendation Rxxxx on GNSS Augmentation Service Provision, to ENG11. 20
35. The **IALA Secretariat** is requested to forward the Liaison Note to RTCM regarding collaboration with SC104 and SC134 (ENG10-14.3.1) to Council for approval. 21
36. The **IALA Secretariat** is requested to forward the Liaison Note to RTCM regarding collaboration with SC104 and SC134 (ENG10-14.3.1) once approved. 21
37. That the **IALA Secretariat** is requested to forward Input Paper ENG10-14.4.1 to Council regarding the process for the 2020 IALA Heritage Lighthouse of the Year. This process would comprise request for IALA Council to determine the recipient of annual IALA Heritage Lighthouse of the Year 2020 - subject to the arrangements detailed above. 22
38. That the **IALA Secretariat** is requested to forward to Liaison Note on nominations for the Heritage Lighthouse of the Year 2020 (ENG10-14.4.2) to ARM10. 22
39. The **IALA Secretariat** is requested to make available a sub-domain of the IALA website available for the celebration of the relevant year’s IALA Heritage Lighthouse of the Year and to liaise with Yong Chan Bae (Republic of Korea) and Peter Hill (ENG Working Group 4 Chair) in the layout / functionality of the webpage. 23
40. The **IALA Secretariat** is requested to update the work plan to reflect that items previously referred to separately as ‘Heritage Lighthouse Database’ and ‘Cybercentre’ (Task 2.6.3.& 2.6.4) are now combined and re-named ‘IALA Heritage website’. 23

41. That the **IALA World-Wide Academy** is requested to define a brief for Working Group 4 to provide the content for a Heritage section within the Level 1.1 and Level 1.2 courses, to include, allotted time, structure, and guidance on suitable similar materials (good examples of existing materials). 24
42. The **IALA Secretariat** is requested to forward the draft Reference List of documentation related to the ENG Committee (ENG10-14.5.1) to ENG11 for further development. 24
43. The **IALA Secretariat** is requested to forward the summary of the ENG10 Committee report (ENG10-15.1) to Council to note. 25

#### *Action Items for Participants*

44. That **Committee participants** are requested to provide to the IALA Secretariat (Minsu Jeon) comments and suggestions on where maritime autonomous surface ship (MASS) issues may impact upon the work of IALA. 7
45. That **Committee Participants** are requested to ensure that definitions in IALA documents are consistent with the Dictionary. 9
46. The **Committee Participants** are invited to volunteer as Spanish / French translators for Dictionary terms. 9
47. That **Committee Participants** are requested to submit articles for the IALA Bulletin to Marie-Helene Grillet and for the e-Bulletin to Audrey Guinault. 9
48. That **Jonas Lindberg** is requested to work on the partially combined Guidelines on LED technologies and their use in signal lights and submit an input paper to ENG11. 12
49. That **Malcolm Nicholson** is requested to review the revised guideline on effective intensity and submit an input paper to ENG11. 12
50. That **Alwyn Williams** and **Peter Dobson** are requested to provide an input paper to ENG11 on monitoring of function and degradation of AtoN light sources if sufficient data is collected. 12
51. That **Jorgen Royal Petersen**, **Johnny Menard** and **Patrick Hailstone** are requested to work on the draft revision of IALA Guideline G1134 on Surface Colours Used as Visual Signals on Aton to update and include a section on colour fading and provide an input paper to ENG11. 13
52. That **Committee Participants** are requested to provide information on their experiences with the use of solar panels as input to ENG11. 15
53. That **Committee Participants** are requested to provide information about radar reflectors they use. They should, where possible provide data sheets, mechanical drawings, pictures, reflection characteristics (RCS, reflection diagram), measurement methods, measurement laboratories, results of trials, application examples on buoys, structures, etc. and simulation results and the software used. 16
54. That **Committee Participants** are invited to review the different draft product specification documents (S-240, S-245, S-246 & S-247) and provide their comments to Mr Younghoon Han (yhhan@kriso.re.kr) by 31 January 2020. 18
55. The **Chair of Working Group 3** to have a conference call with the Chair of the LAP to discuss the technicalities behind the patent and the proposal. 19
56. That **Committee Participants** are encouraged to participate in the Heritage Seminar in Salvador, Brazil 2020 that is held back to back with ENG11. 22
57. **Yong Chan Bae (Republic of Korea)** is requested to oversee and resource the design and construction of the artwork to be presented to each IALA Heritage Lighthouse of the Year accolade holder until the year 2022. 22
58. That **Committee Participants** are encouraged to submit nominations for IALA Heritage Lighthouse of the Year 2020. 22

59. That **Yong Chan Bae (Republic of Korea)** takes on responsibility for the ongoing management and updating of the webpage in accordance with the procedures set out by the IALA Secretariat. 23
60. That **Hideki Noguchi** is requested to report the information of the special rotating lense system in the future session of the Committee. 24



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