# ENAV WG3 Telecommunications Interesessional Meeting

# Report for July 2018 Intersessional

# General

The IALA ENAV working group 3 (WG3-telecommunication) met at the *Your World International Conference Centre*, Yiwu, China the week of July 16-20, 2018, hosted by China MSA and sponsored by Zhe Jiang Space-Iching Science and Technology Co. Ltd. (Zhe Jiang SIST). The focus for the meeting included: status of activity on VDES and R-mode; review and revise IALA document on AMRD (to be provided to ARM Committee in October 2018); further development on the VDE-SAT report prior to ITU WP 5B; review and revision of IALA Guideline 1139 on technical specification of VDES; and identify actions to take to promote VDES.

In conjunction with the meeting, the *China International Maritime Technology Summit in 2018* was held on July 16, 2018. The focus of the Seminar was developments in VDES, including R-Mode using VDES. The Seminar and IALA ENAV WG3 Intersessional meeting were hosted by China MSA and sponsored by SIST. A report on the outcomes of the Seminar was provided separately.

The WG3 intersessional agenda included:

1. General:

* Review of the outcomes from the IALA eNAV WG3 intersessional meeting held in January, 2018 at ESA/ESTEC.
* Review of Agenda and working process
* Outcomes from IALA Conference, Incheon, Republic of Korea, May 2018
* Update on the outcomes of ITU WP5B meetings
* Review of developments on R-Mode and VDES

1. Review of VDES technical guideline (G1139)
2. VDE-Sat PDNR ITU-R M.[VDE-SAT]
3. ITU WP5B / WRC-19
4. Autonomous Marine Radio Devices (AMRD)
5. Discussion – Transition Strategy – maritime communications
6. Strategy to promote VDES
7. VDES and R-Mode
8. Any other business
   1. Items to note for agenda for eNAV22 in October 2018
      1. ITU activity on ITU-R M.1371
      2. Developments in 3GPP and implications for VDES
   2. Development of a correspondence group to discuss ASM link layer (terrestrial/satellite aspects)
   3. VDES and MCP (discussion on internet protocol)
9. Close
   1. Next Meeting – IALA eNAV22 to be held October 8-12, 2018 at IALA Offices, Saint Germain en Laye, France.

All documents related to the meeting are available on the file share at:

<http://www.iala-aism.org/file-sharing/ws-working-groups-working-space/WG3/20180716_Intersessional-China>

Members can register with IALA for access to the fileshare.

## Review of outcomes – ESA/ESTEC ENAV WG3 Intersessional, January 2018

J Carson-Jackson led a review of the outcomes of the last WG3 intersessional meeting. Most action items were noted as completed or closed, with the following comments:

*Action Item 9– Pete Besio to convene a correspondence group to develop a ‘marketing strategy’ for VDES.*

It was noted that, due to extenuating circumstances, this had not been possible. The action item was noted as closed, and the matter was discussed at agenda item 7 – Strategy to promote VDES.

*Action Item 11 – members to investigate opportunities to access and assess the sat-downlink, noting the offer from Space Norway to assist with access to the NorSat-2 VDE SAT signal, on the proviso that results from any studies done are provided to ITU in a timely manner. Members who are interested in pursuing this opportunity should contact Lars Løge or Hans Christian Haugli.*

It was reported that some discussions have been held, and the opportunity still exists. It was agreed to carry this action item forward.

Action - members to investigate opportunities to access and assess the sat-downlink, noting the offer from Space Norway to assist with access to the NorSat-2 VDE SAT signal, on the proviso that results from any studies done are provided to ITU in a timely manner. Members who are interested in pursuing this opportunity should contact Lars Løge or Hans Christian Haugli.

## Review of Agenda and Working Process

The agenda for the meeting was reviewed and agreed. A plan for the work of the week was confirmed, including both plenary and working group sessions.

Four working groups were identified, noting the timing for the work would be dependent on the availability of experts for each item.

|  |  |
| --- | --- |
| Working Group | Chair / Rapporteur |
| 1. R-Mode / VDES Discussions | Jan Safar; Krzysztof Bronk |
| 1. Revision G1139 (including link layer discussions) | Hans Haugli; Johnny Schultz |
| 1. VDE-SAT PDNR | Lars Løge |
| 1. AMRD document review | Ernie Batty |

## 19th IALA Conference

J Carson-Jackson reviewed the report of the 19th IALA Conference, noting the presentations that were of particular interest to the development of VDES.

The presentation on 3GPP was noted, and discussion identified opportunities to work with 3GPP further. A representative from 3GPP provided a short update, noting there would be participation from 3GPP at the IALA ENAV 22 meeting (October 8-12 2018).

## Report of ITU meeting

S Bober provided a briefing on recent ITU meetings and expectations for the IALA work. He noted the support from delegations during the meeting, highlighting the need for delegations to not only be briefed, but also to speak up during the ITU meetings.

Due to the timing of the IALA meetings, the report provided covered both ITU-R WP5B held from 6th to 17th November 2017 and from 21st May to 1st June 2018

A number of items were highlighted, including:

* Alternative frequency plan for VDE Satellite downlink;
* Draft Conference Preparatory Meeting (CPM) text, including 6 different methods for the solution of agenda item 1.9.2 (VDE-SAT);
* Activity at ITU on AMRDs
* Revision of Recommendation ITU-R M.1371-5; and
* Support for the modernization of GMDSS – NAVDAT.

In addition, S Bober noted the upcoming meeting of the IMO/ITU Experts Group to be held 3-7 September, 2018 (deadline for input 24 August 2018). It was agreed that the IALA Recommendation R-1016 on Mobile Aids to Navigation (MAtoN) be forwarded to this meeting.

Action – the IALA Secretariat forward IALA R-1016 on Mobile Aids to Navigation for consideration at the IMO/ITU Expert Group (deadline for input 24 August 2018).

Action – the revision of Recommendation ITU-R M.1371-5 be included in the agenda for the working group at ENAV22.

## Review of developments in R-Mode and VDES

The outcomes of the *China International Maritime Technology Summit in 2018* on the developments of R-Mode and VDES were noted. K Bronk provided an overview presentation of the work being undertaken by the R-Mode Baltic Consortium. In addition, R Raulefs provided some further detail on the activity.

It was agreed that this information would be further considered at agenda item 8. Copies of the presentations were provided on the fileshare folder for the meeting.

# Review of VDES Technical Guideline (G1139)

Following confirmation from ITU WP 5B that ITU-R M.2092-0 will not be opened for review until after WRC-2019, the group agreed to review and update of the IALA Guideline 1139 – Technical Specification for VDES, approved by IALA Council in Dec 2017. The content of G1139 will be used for an input from IALA to ITU for the revision of 2092-0 (working towards 2092-1) following WRC-19. It is expected this will occur at the first meeting ITU WP5B in early 2020. This document can also provide guidance for the IEC development of VDES related testing standards.

The group considered the input “IALA G1139 Ed.1 Technical specification of VDES\_Dec2017 JO V5-JHKIM” from Pieter Winter. This input was split into two parts, the first was the general editorial comments limited to Annex A and the second was the Link Layer changes provide in Annex C.

The group was able to review the Annex A changes and achieved consensus. The group decided that the changes in Annex C were too extensive to be considered line by line during the short time we had. As a result, the group will take this on as homework. The goal will be to compile a list of concerns and questions in the next few weeks, then send this input back to the Link Layer correspondence group via Johnny Schultz to address the concerns. Members can register interest in correspondence groups through the [www.e-navigation.nl](http://www.e-navigation.nl) website. Further information on registering can be provided by Jeffrey van Gils.

The group considered two inputs from China which were presented during the *China International Maritime Technology Summit in 2018*. Consensus was reached on all but one item – proposed changes to the SyncWord. It was felt that this would be a fundamental change to the packet structure.

The group also considered further input on the Annex B which was a result of an email exchange between J Schultz and P Winter. The concerns raised dealt with packet table bit counts and byte alignment; link layer issues; and presentation interface concerns. The group was able to reach consensus on the initial items but was unable to address all items in the time available. It was agreed that the remaining items would be resolved through correspondence.

The work resulted in 4 documents which will be the source documents for developing the required change proposals as per the standard procedure for changes to G1139. These documents are located on the IALA file share: “WG3/20180716\_Intersessional-China/Working/ASM Link Layer/ASM CP sourcefiles”. J Schultz agreed to prepare the change proposals and distribute them before the next ENAV meeting.

Action – Those members interested in joining the link layer correspondence group were asked to contact Pieter Winter as soon as possible. Members can register interest in participating in correspondence groups through the [www.e-navigation.nl](http://www.e-navigation.nl) website, further information can be provided by Jeffrey van Gils.

Action – J Schultz was asked to prepare change proposals for G1139 based on the work carried out at the Yiwu Intersessional Meeting, July 2018 and the link layer correspondence group.

## IEC Liaison re G1139

A liaison was received from IEC WG15 with a number of technical question for G1139. S Bober led a sub-group to review the IEC liaison. The questions raised by IEC were addressed and a response (July2018-Yiwu\_W-07-IALA-LiaisonResponse-IECWG15) developed. It was agreed that this response will be provided to the IEC WG15 meeting to be held in 10-14 September, 2018 at BSI in London.

Action – S. Bober was asked to forward the response to the IEC Liaison to IEC WG15 (July2018-Yiwu\_W-07-IALA-LiaisonResponse-IECWG15) for consideration at their next meeting 10-14 September, 2018 at BSI in London.

# VDE SAT

The VDES-SAT subgroup was led by Lars Løge and met for two sessions during the meeting.

ITU Rapporteur Stefan Bober presented his report from the last ITU-R WP 5B meeting, which was held in Geneva in May this year. The main outputs from that meeting was an revised version of the Working Document towards a Preliminary Draft New Report ITU-R M.[VDES-SAT](ITU-R Document 5B/538 (Annex 27)) and the Draft CPM Text on WRC-19 Agenda Item 1.9.2 (ITU-R Document 5B/538 (Annex 5)).

Following the report from the ITU-R WP 5B meeting status reports from the regional preparations on WRC-19 AI 1.9.2 were provided by the meeting participants as appropriate. Five of the six regional organizations are still at the stage where the position on the agenda item is limited to “support studies on the agenda item in ITU” and “ensure incumbent services are protected”. CEPT (Europe) have more defined position, stating that they support the allocation of frequencies to VDE-SAT on a secondary basis according to frequency plan alternative 2 in the Working Document towards a Preliminary Draft New Report ITU-R M.[VDES-SAT](ITU-R Document 5B/538 (Annex 27)). However, there are still conflicting views with the respect to the PFD-mask to be applied to the VDE-SAT downlink.

Hans Haugli presented results from measurements and testing of both the VDE-SAT up- and downlink. The results confirm the assumptions and link budgets for the VDE-SAT. Parts of the results included successful distribution of ice chart image using the VDE-SAT downlink and successful reception of position reports from ships at sea using the VDE-SAT uplink.

The Draft CPM Text on WRC-19 Agenda Item 1.9.2 (ITU-R Document 5B/538 (Annex 5)), as prepared by ITU-R WP 5B, was reviewed with particular focus on the six methods proposed to resolve the agenda item. The open and clarifying discussion around the various methods resulted in common understanding and it was agreed to prepare a Draft IALA position for approval at ENAV22.

The Working Document towards a Preliminary Draft New Report ITU-R M.[VDES-SAT](ITU-R Document 5B/538 (Annex 27)), as prepared by ITU-R WP 5B was reviewed. A number of editor’s notes and other items was discussed and, the review resulted in 15 new tasks for the task list in addition to the 3 open tasks from previous meetings. The open tasks were discussed and 6 of the tasks were closed. For the remaining tasks, responsibilities were assigned for providing input to resolve the tasks for ENAV22.

A draft ITU briefing note for IALA members was reviewed, and it was decided to create a correspondence group with the task of preparing the briefing note for approval at ENAV22. Furthermore, it was agreed to prepare a similar briefing note with respect to IMO by the same correspondence group.

The work of the SWG resulted in two working documents: July2018-Yiwu\_W-01\_PDNR-VDE-SAT-tasks\_R2, and July2018-Yiwu\_W-02\_IALABrief-ITU-WP5B-2018\_R2.

Action – Members who have been identified for tasks specified in the task list (July2018-Yiwu\_W-01\_PDNR-VDE-SAT-tasks\_R2) were asked to complete these tasks prior to ENAV22.

# Preparation for ITU Wp 5b and WRC-19

In the review of the output from ITU WP5B, and discussion on the development of the PDNR\_ITU-R\_M\_VDES-SAT a number of aspects related to the preparation for ITU WP 5B (November 2018 and May 2019) and ITU WRC-19 (November 2019) were discussed. It was agreed that there is benefit in the provision of the IALA Briefing Note to IALA members and this should be continued.

In addition, it was noted that there would be benefit in preparing a similar style briefing note on VDES for IMO, including the IMO/ITU Expert Meeting 3-7 September 2018, and, if appropriate, IMO MSC100 (December 2018).

The preparation of the briefing note for ITU was identified in the discussion on VDES-SAT and included in the action items in the task list (July2018-Yiwu\_W-01\_PDNR-VDE-SAT-tasks\_R2).

# autonomous marine radio devices

The work on AMRD addressed two elements:

* Review of draft IALA document to provide guidance on AMRD
* Review of liaison from ITU to IALA regarding AMRD, including coordination of activities

A GoToMeeting was held with participants of the ENAV WG3 intersessional meeting, ARM Chair Phil Day, and ENAV Chair Hideki Noguchi. This provided an opportunity to coordinate activities related to AMRD. A summary of the GoToMeeting will be provided separately.

## Draft IALA Document on AMRD

The review of the IALA document was led by E Batty and included a detailed review of the document commenced at the January 2018 (ESA/ESTEC) intersessional meeting. Revisions were included and an updated document was developed. It was agreed that the document, July2018-Yiwu\_W-03\_Draft IALA Doc-AMRD, will be provided to ARM for consideration at the meeting in October 2018.

## Liaison note from ITU to IALA on AMRD

The liaison from ITU regarding autonomous maritime radio devices (AMRD) was reviewed. It was noted that the response from IALA will require input from ENAV WG3 and ARM. A draft (template) liaison note from IALA to ITU on AMRD was prepared (July2018-Yiwu\_W-04\_Liaison-IALA-ITU-WP5B\_AMRD). A process to coordinate the input was agreed:

* At ENAV 22, ENAV WG3 to finalise the technical input to the liaison and forward the document to ARM;
* ARM to provide the operational input and finalise the liaison to ITU
* IALA Secretariat to facilitate an electronic review process with IALA Council for the liaison, noting the ARM committee ends on 19 October 2018 and the deadline for input to ITU is 29 October 2018
* IALA Secretariat to forward the liaison from IALA on AMRD to ITU on or before 29 October 2018.

Action – J Carson-Jackson was asked to summarise the outcomes of the GoToMeeting between ENAV and ARM related to AMRD.

Action – J. Carson-Jackson was asked to forward the draft IALA Document on AMRD (July2018-Yiwu\_W-03\_Draft IALA Doc-AMRD) to the ARM Committee for consideration at their meeting in October, 2018.

Action – The draft liaison note from IALA to ITU on AMRD (July2018-Yiwu\_W-04\_Liaison-IALA-ITU-WP5B\_AMRD) be forwarded to ENAV 22 for finalisation of technical elements.

# Transistion – maritime digital communications

M Card noted the work plan for the group for the coming 4 years includes a review of digital maritime communications. Discussion highlighted the current activity to identify additional digital channels in the Maritime Mobile Band to support AMRD.

Discussion noted that there could be opportunity to identify an agenda item for consideration at WRC-2023 to provide a means to accommodate digital systems in the VHF maritime mobile band.

Existing digital technologies and systems can be identified for inclusion in this discussion such as the standards that apply to digital voice services described in ETSI TS 102 658 and ETSI EN 300 720, which are already used on vessels.

As identified at the ESA/ESTEC Intersessional meeting in January 2018 the procedure for provision of agenda items would be through an input paper to ITU WP5B in November 2018 or May 2019.

Consider an agenda item for WRC-23 to be introduced at WRC-19 to provide radionavigation allocation for VDES R-mode.

Action – Members were asked to consider suitable agenda items for WRC2023 and provide as input through their representatives to ITU-WP5B meeting in November 2018 or May 2019.

Action – ENAV22 to develop a liaison note to ITU WP5B regarding potential agenda items for WRC-23, to be introduced at WRC-19, on digital communication aspects including: providing a means to accommodate digital systems in the VHF maritime mobile band; and, in conjunction with ENG/PNT WG, providing a radionavigation allocation for VDES R-Mode.

# R-Mode over VDES

Following presentations on R-mode provided by the Dalian Maritime University (DMU), the General Lighthouse Authorities of the UK & Ireland and representatives of the R-mode Baltic project, discussions took place in a breakout group on various aspects of AIS / VDES R-mode.

Discussion results were documented in a working paper (July2018-Yiwu\_W-05\_VDES-R-Mode-Discussion). The document highlights the need for resilient position, navigation and timing (PNT); summarises system requirements for AIS/VDES R-mode; compares AIS vs VDES R-mode; discusses propagation channel characterisation and waveform design; and identifies some initial thoughts on equipment, standardisation and regulatory matters.

Proposed next steps were identified, including items for further discussion at ENAV 22. It was agreed that a review of the system requirements for VDES R-mode identified by IALA ENAV/ENG PNT WG will be carried out, and that J Safar will liaise with the chair of the ENG/PNT WG (A Grant) prior to ENAV22. In addition, ENAV 22 will review the system requirements specification for AIS R-mode produced by the R-mode Baltic project and consolidate the system requirements for VDES R-mode.

Action – Members review the working document on VDES R-mode (July2018-Yiwu\_W-05\_VDES-R-Mode-Discussion) and provide comments, as appropriate, as input to ENAV 22.

# strategy to promote vdes

Suggestions on how to promote and provide information on VDES to user groups – both afloat and ashore – were discussed during the panel discussion in the Seminar and during the intersessional meeting. This resulted in the development of a mind map, which was developed into a working paper (July2018-Yiwu\_W-06\_Promote-VDES in MSWord; July2018-Yiwu\_W-06a\_Promote-VDES in mindmap). It was agreed that a small group would develop this further, in the form of a style of ‘marketing plan’ taking into account the document from the E2 project D1.27 Report on VDES Information Plan implementation v4.

Action – J Carson-Jackson was asked to forward the E2 output document D1.27, along with the results of the discussions at the Yiwu Seminar (July2018-Yiwu\_W-06\_Promote-VDES; July2018-Yiwu\_W-06a\_Promote-VDES) and intersessional meeting, for consideration at ENAV22.

# any other business

A number of items were identified for work at either this meeting, or inclusion in the agenda for ENAV22.

## Items to note for agenda for eNAV22 in October 2018

* + 1. ITU activity on ITU-R M.1371
    2. Developments in 3GPP and implications for VDES

## ASM link layer (terrestrial/satellite aspects)

J Schultz noted discussions regarding over terrestrial and satellite aspects of the ASM.  A specific concern had been expressed with regards to the FEC requirements, and with the co-habitation of the satellite and terrestrial services.  The group discussed the possibility of using other FEC option and modifying the ASM link layer.

Noting the discussion on moving VDES from development to implementation, it was agreed that there would be no fundamental change to the existing FEC or the ASM link layer.  It was noted that there could be an opportunity to allocate a percentage of slots (for example 5-10%) exclusively for the satellite service to mitigate the co-habitation problem.

## VDES and Maritime Connectivity Platform (MCP) (discussion on internet protocol)

There was insufficient time at the intersessional to discuss the MCP element further, however there was agreement that a means to link the VDES and the ‘wider world’ is required. The paper provided by P Mueller will be forwarded for further consideration at ENAV22.

Action – J Carson-Jackson to rename and forward the input paper on VDES and internet protocol, provided by P Mueller, as an input to ENAV22.

## VDES – from development to implementation

A discussion on how to move VDES from development to implementation was held.  The working group recognised that the ongoing changes to the technical specification were inhibiting production of equipment required to implement VDES on both the ship and shore side.  Core elements were agreed to enable the transition of VDES from development to implementation:

* Stability – there is a need for stability in the technical documentation to enable development of equipment;
* Minimum Viable Product – there is a requirement to identify a Minimum Viable Product (MVP) that will work ship-ship, ship-shore and shore-ship with the initial focus on both AIS and ASM;
* Compatibility – there is a requirement that MVP from different suppliers be compatible / interoperable with each other;
* No Changes – while there is opportunity to fix technical issues or simplify the standard for implementation, it was agreed that there will be no new technical changes to the ASM components introduced.

It was noted that the IALA G1139 has been developed to provide assistance and clarifications to ITU-R M.2092-0; and that G1139 will be provided to ITU following WRC-19 to work towards ITU-R M.2092-1.

The focus on stability of the IALA G1139 document will be on ASM, with input provided to IEC to facilitate the development of a testing standard.  A number of elements were identified related to the discussion:

Turbo Coding – K Bronk, M Wong and R Raulefs agreed to identify references in the public domain to provide guidance on decoding of turbo coding and provide these at ENAV 22.  It was agreed that these would be included in G1139 as an informative annex.

Based on the operational ASM implementation carried out by JRC, Y Miyadera agreed to identify areas where fixes to IALA G1139 may be required, noting the agreement not to introduce changes to IALA G1139.

There is a requirement for an audit of the overall document with both internal and external references.  This would include a detailed review of the IALA G1139 document and confirmation of the fixes have been completed.  It was noted that the review of the IEC WG15 questions would form part of the document audit, and that the development of the testing standard by IEC WG15 may provide the overall audit of the technical aspects of VDES as identified in G1139.

There is a need to carry out compatibility testing.  E Batty noted that a compatibility test proposal had been developed as part of the E2 activity.  The approach would see at least two but preferably three manufacturers carry out compatibility tests, with an opportunity at a later stage to include satellite aspects in the testing.  J Schultz agreed to solicit manufacturers who may be able to participate in compatibility testing.

Action – K Bronk, M Meowang and R Raulefs agreed to identify references regarding Turbo Coding that are in the public domain to provide guidance on decoding of turbo coding and provide these at ENAV 22.

Action – Y Miyadera agreed to identify areas where fixes to IALA G1139 may be required, noting the agreement not to introduce changes to IALA G1139.

Action – Members were asked to carry out a detailed review of G1139 and provide comments and corrections to ENAV22.

Action – E Batty was asked to provide the interoperability testing proposal from E2 for review at ENAV22.

# Closing and date of next meeting

The members of the working group thanked China MSA and SIST for organizing the China Maritime International Technology Summit in 2018 and the IALA ENAV WG3 Intersessional meeting. The strong sponsorship of SIST and the excellent organisation and facilities were recognised.

M Card noted the excellent organisation and support for the Summit and the intersessional meeting, with special thanks to Mr. Wang Zelong, Deputy Director General, China MSA and Mr. Wen, President of SIST.

The members of the working group noted their appreciation for the efforts of Liang Yang and Yongqiang Lu in organising the seminar and providing ongoing support during the intersessional meeting.

ENAV 22 will be held October 8-12, 2018, at the IALA Offices in Saint Germain en Laye, France.

# Output and Working Papers

Output papers (‘O’) will be provided to ENAV22. Working (’W’)papers will be forwarded to the next meeting of the WG3.

| Number | Title | Action |
| --- | --- | --- |
| Output 01 | July2018-Yiwu\_O-01\_Report-WG3-Intersessional | Forward to IALA Secretariat |
| Working 01 | July2018-Yiwu\_W-01\_PDNR-VDE-SAT-tasks\_R2 | Members to note actions and complete before ENAV22 |
| Working 02 | July2018-Yiwu\_W-02\_IALABrief-ITU-WP5B-2018\_R2 | Forward for completion at ENAV22 |
| Working 03 | July2018-Yiwu\_W-03\_Draft IALA Doc-AMRD | Provide to ARM for their October meeting. |
| Working 04 | July2018-Yiwu\_W-04 \_Liaison-IALA-ITU-WP5B\_AMRD | Forward to ENAV22 |
| Working 05 | July2018-Yiwu\_W-05\_VDES-R-Mode-Discussion | Forward to ENAV22 |
| Working 06 | July2018-Yiwu\_W-06\_Promote-VDES  July2018-Yiwu\_W-06a\_Promote-VDES | W-06 provided in MSWord; W-06a provided in Mindjet Mindmap.  Forward to ENAV22 |
| Working 07 | July2018-Yiwu\_W-07-IALA-LiaisonResponse-IECWG15 | Confirm process to forward to IEC WG15 meeting in September 2018 |
|  |  |  |

# Attendees

|  | **First Name\*** | **Last Name\*** | **Company\*** |
| --- | --- | --- | --- |
|  | Xiang | Qian |  |
|  | Xin | Sun | Beijing Tertiary University |
|  | Wei | Wang | Chang’an University |
|  | Yin | Mengchaeo | Chengdu Space and Technology Co. Ltd. |
|  | Li | JinLong | China Academy of Launch Vehicle Technology |
|  | Cao | Jianwen | China Aerospace |
|  | Liu | Dong | China Aerospace |
|  | Long | Linjin | China Aerospace |
|  | Haoxian | Liu | China Aerospace |
|  | Liang | Zliang | China MSA |
|  | Lu | Yongqiang | China MSA |
|  | Xuyao | Zhou | China MSA |
|  | Xing | Shaojin | China MSA |
|  | Peng | Zhang | China MSA |
|  | Xuyao | Zhou | China MSA |
|  | Laing | Zhang | China MSA |
|  | Yu | Jin Chao | China MSA |
|  | Gao | Beili | China Waterborne Transport Research Institute |
|  | Li | Donghony | China Waterborne Transport Research Institute |
|  | Wu | Zichun | Dalian Maritime University |
|  | Sun (sunny) | Xiaowen | Dalian Maritime University |
|  | Yi | Jiang | Dalian Maritime University |
|  | Ronald | Raulefs | DLR |
|  | Antti | Kukkonen | Furuno Finland Oy |
|  | Jan | Safar | General Lighthouse Authorities of the UK & Ireland |
|  | Michael | Card | IALA |
|  | Minsu | Jeong | IALA |
|  | Ernie | Batty | IMIS Global |
|  | Kim | Jeonghyeon | I-Storm Co.,Ltd. |
|  | Yoshio | Miyadera | Japan Radio Co. |
|  | Masayuki | Takahashi | Japan Radio Co. Ltd. |
|  | Huang | Jinliang | JMU University |
|  | Cho | Deukjae | Korea Research Institute of Ships and Ocean Engineering |
|  | Juntae | Kim | Korean Register |
|  | Jin-ho | Yoo | Korean Register of Shipping |
|  | Zhany | Longhy | Nanjing University of Science and Technology |
|  | TingTing | Xia | Nanjing University of Science and Technology, China |
|  | JingJing | Zhang | Nanjing University of Science and Technology, China |
|  | Wang | Lei | Nanjing University of Science and Technology, China |
|  | Junjie | Wang | Radio Management Officer, MOT |
|  | Ross | Norsworthy | REC Inc., RTCM |
|  | Li | Hongxing | Shanghai Spaceflight Institute TT & C and Telecommunication |
|  | Liu | Yuhong | Shanghai Spaceflight TT&C and telecommunication |
|  | Michael | Maowang | Southeast University, China |
|  | Hans Christian | Haugli | Space Norway |
|  | Lars | Løge | Space Norway |
|  | Jillian | Carson-Jackson | The Nautical Institute |
|  | Johnny | Schultz | United States Coast Guard |
|  | Stefan Karl | Bober | WSV / FVT (German Waterways and Shipping Administration) |

# Action Items

1. [*Action - members to investigate opportunities to access and assess the sat-downlink, noting the offer from Space Norway to assist with access to the NorSat-2 VDE SAT signal, on the proviso that results from any studies done are provided to ITU in a timely manner. Members who are interested in pursuing this opportunity should contact Lars Løge or Hans Christian Haugli. 2*](#_Toc521354615)
2. [*Action – the IALA Secretariat forward IALA R-1016 on Mobile Aids to Navigation for consideration at the IMO/ITU Expert Group (deadline for input 24 August 2018). 3*](#_Toc521354616)
3. [*Action – the revision of Recommendation ITU-R M.1371-5 be included in the agenda for the working group at ENAV22. 3*](#_Toc521354617)
4. [*Action – Those members interested in joining the link layer correspondence group were asked to contact Pieter Winter as soon as possible. Members can register interest in participating in correspondence groups through the www.e-navigation.nl website, further information can be provided by Jeffrey van Gils. 4*](#_Toc521354618)
5. [*Action – J Schultz was asked to prepare change proposals for G1139 based on the work carried out at the Yiwu Intersessional Meeting, July 2018 and the link layer correspondence group. 4*](#_Toc521354619)
6. [*Action – S. Bober was asked to forward the response to the IEC Liaison to IEC WG15 (July2018-Yiwu\_W-07-IALA-LiaisonResponse-IECWG15) for consideration at their next meeting 10-14 September, 2018 at BSI in London. 4*](#_Toc521354620)
7. [*Action – Members who have been identified for tasks specified in the task list (July2018-Yiwu\_W-01\_PDNR-VDE-SAT-tasks\_R2) were asked to complete these tasks prior to ENAV22. 5*](#_Toc521354621)
8. [*Action – J Carson-Jackson was asked to summarise the outcomes of the GoToMeeting between ENAV and ARM related to AMRD. 6*](#_Toc521354622)
9. [*Action – J. Carson-Jackson was asked to forward the draft IALA Document on AMRD (July2018-Yiwu\_W-03\_Draft IALA Doc-AMRD) to the ARM Committee for consideration at their meeting in October, 2018. 6*](#_Toc521354623)
10. [*Action – The draft liaison note from IALA to ITU on AMRD (July2018-Yiwu\_W-04\_Liaison-IALA-ITU-WP5B\_AMRD) be forwarded to ENAV 22 for finalisation of technical elements. 6*](#_Toc521354624)
11. [*Action – Members were asked to consider suitable agenda items for WRC2023 and provide as input through their representatives to ITU-WP5B meeting in November 2018 or May 2019. 6*](#_Toc521354625)
12. [*Action – ENAV22 to develop a liaison note to ITU WP5B regarding potential agenda items for WRC-23, to be introduced at WRC-19, on digital communication aspects including: providing a means to accommodate digital systems in the VHF maritime mobile band; and, in conjunction with ENG/PNT WG, providing a radionavigation allocation for VDES R-Mode. 6*](#_Toc521354626)
13. [*Action – Members review the working document on VDES R-mode (July2018-Yiwu\_W-05\_VDES-R-Mode-Discussion) and provide comments, as appropriate, as input to ENAV 22. 6*](#_Toc521354627)
14. [*Action – J Carson-Jackson was asked to forward the E2 output document D1.27, along with the results of the discussions at the Yiwu Seminar (July2018-Yiwu\_W-06\_Promote-VDES; July2018-Yiwu\_W-06a\_Promote-VDES) and intersessional meeting, for consideration at ENAV22. 7*](#_Toc521354628)
15. [*Action – J Carson-Jackson to rename and forward the input paper on VDES and internet protocol, provided by P Mueller, as an input to ENAV22. 7*](#_Toc521354629)
16. [*Action – K Bronk, M Meowang and R Raulefs agreed to identify references regarding Turbo Coding that are in the public domain to provide guidance on decoding of turbo coding and provide these at ENAV 22. 8*](#_Toc521354630)
17. [*Action – Y Miyadera agreed to identify areas where fixes to IALA G1139 may be required, noting the agreement not to introduce changes to IALA G1139. 8*](#_Toc521354631)
18. [*Action – Members were asked to carry out a detailed review of G1139 and provide comments and corrections to ENAV22. 8*](#_Toc521354632)
19. [*Action – E Batty was asked to provide the interoperability testing proposal from E2 for review at ENAV22. 8*](#_Toc521354633)