

ENAV WG3 DIGITAL COMMUNICATION SYSTEM WORKING GROUP INTERSESSIONAL MEETING

REPORT FOR AUGUST 2019 INTERSESSIONAL

1 GENERAL AND ADMINISTRATIVE ITEMS

The IALA ENAV working group 3 (Digital Communication System Working Group) met at the *IALA Headquarters in St. Germain*, the week of August 19-23, 2019. The focus for the meeting included the review of the outcomes of related meetings, status from ITU and WRC meetings; review and revision of IALA G1139 (VDES Technical); review of revision of ITU-R M.1371-5. The meeting was chaired by Stefan Pielmeier, RTCM and co-chaired by Stefan Bober, WSV.

A request for notification of any patents, including pending patents, the use of which may be required to practice or implement VDES or other work of the Committee. No patents were noted.

The WG3 intersessional agenda/report content (based on eNAV task plan) includes:

1. Administrative items
 - a. Security Briefing, apologies
 - b. Outcomes of IALA Council (rev. 3 of G-1139 approved and on IALA web)
 - c. Agenda for the week:
 - i. Inputs & plan
 - ii. proposals
 - iii. agree on agenda
2. Updates on activities related to Maritime Digital Communications / VDES
3. Outcomes of Related Meetings
4. Briefing note for WP5B/WRC-19 participants
5. Shore infrastructure & revision of document architecture for AIS/VDES according to IALA Doc. Structure
 - a. VDES/MCP integration aspects & shore infrastructure [Michael Wang]
 - b. Document structure
6. Wednesday: R-Mode meeting (split-out) [Johan, Jeffrey, Ronald, Jan]
7. Roadmap for testing of VDES
8. Promoting/supporting VDES: [together with Roadmap]
9. Revision/Future of E-144, G-1095 ASM harmonization/alignment
 - a. The problem is how to ensure changed ASM are making it into regulations and ECDIS?
 - b. liaison to ARM & IHO [Hideki, Minsu to help]
10. Rework of VDES technical guideline (G1139)
 - a. How to transition from G1139 to ITU-R M.2092 timeplan
 - b. Change Log open items progress check
 - c. New incoming change proposals/comments on Edition 3
11. ITU-R M.1371-5 revision work
12. Development of interim IALA Guidelines on the use of AIS message for MASS (Maritime Autonomous Surface Ship) trial [Hideki]
13. AMRD actions as identified during the meeting
14. Any Other Business
 - a. As identified during the meeting.
15. Close of session
16. Output and working papers
17. Attendees
18. Action Item list

All documents related to the meeting are available on the file share at: https://www.iala-aism.org/file-sharing/ws-working-groups-working-space/WG3/20190819_Intersessional_StGermain

Members can register with IALA for access to the file share.

The agenda was reviewed and agreed. The plan for the work during the week was confirmed, with adjustments identified as required based on the status of discussions.

2 UPDATES ON ACTIVITIES RELATED TO MARITIME DIGITAL COMMUNICATIONS / VDES

2.1 Canada VDES trial

Jean Francois reported of the Quebec trial, showing units from CNS and the VDES1000; measuring the impact of VDE on AIS signals. Conclusion, in lab, without interference 1.5% of AIS messages are lost; when transmitting 80% duty cycle at a potential shore station, up to 30% of the AIS receptions are lost; at least 20dB better than the 60dB cavity filters would be needed to separate VDE TX and AIS RX for acceptable; Ross names that a co-site interference Mitigation System (CIMS) is a solution to create another 50dB separation by that technology.

Techniques that could reduce interference:

- Use cavity filters
- Use CIMS
- Use simplex
- Use AIS TX ship position to calculate distance and avoid disturbing far away ships
- Use VDE receiver distance to reduce power in case possible

(upper leg Shore->Ship, lower leg Ship->Shore), no RX AIS messages were lost.

Conclusion: all features of VDES need to work in simplex and half-duplex mode.

See INPUT/CCG report VDES Interferencev2.docx

2.2 Jan Safar: GLA VDES related projects

GLA is working on R-Mode, defining requirements on the complete R-Mode concept including MF; this work will result in a new IALA information paper "Stakeholder Requirements for R-Mode".

R-Mode workshop will be held at IALA Headquarter to discuss more deeply all R-Mode items at 9th-12th of September, 2019. The Agenda is presented by Jan, all WG3 members are invited to register for the workshop at the IALA secretary.

Jan informed about the available presentation from the UK Space Agency VESTA Satellite project in the ENAV23 presentations folder.

The e-Navigation service demonstrator project started in 2Q2019 using existing MCP parts, IHO data models and ECDIS, MRN, VDES with VDES1000.

Conclusion: A standard for a VDES gateway to maritime services is needed.

See INPUT/GLA-VDES_Projects_Update-1v0.pdf

2.3 Ronald Raulefs/DLR: SciPPPer

The project has the goal to achieve partial automation of inland water navigation on the river, towards and within locks where GNSS cannot provide the required accuracy of e.g. down to 1 cm inside the lock.

There are latency requirements of seconds/minutes dependent on the RTK/PPP information as well as after loss of satellite sight.

The motivation is to allow relaxing requirements on ship crews in the future, allowing also for autonomous manoeuvring.

Conclusion: accurate position system using the VDES communication channel to provide the relevant data

For more information, see INPUT/DLR_20190517_SCIPPER_AISS.ppt

2.4 SeaSWIM Testbed

Johan from SAAB informed us about the existence of the SeaSWIM Testbed and referred any interested members to the document INPUT/SeaSWIM-Specification-v3.0.pdf.

2.5 Hans Haugli on Norsat-2 progress

The Norsat-2 now tests a new service to rebroadcast AIS messages for a whole region. This works since yesterday on board of a vessel near Svalbard using VDE-SAT TX Waveform 34 with 31.7dBHz threshold (1/4 rate) in digital “bent pipe” mode with 15% duty cycle. Every 2 seconds, all other ships positions are retransmitted in broadcast mode. See presentation at “INPUT/VDES service demonstrations Norway rev 2.pdf”. VDE-SAT RX is not used.

Using the intelligence from other ships tracks, the Norwegian vessel reached the north pole within 1 week sailing from Svalbard.

3 OUTCOMES OF RELATED MEETINGS

3.1 Report from ITU Region 2

Ross Norsworthy gave an update on the support by 13 countries to NAVDAT. The AMRD proposal was approved by 13 countries consistent with the draft recommendation provided (100mW and non-harmful interference). VDE-SAT Downlink is supported as primary service by 9 countries (0 opposing) on the 525kHz band with a PDF from method B (protecting the railroad services). The future agenda item to support R-Mode on VDES is approved as well.

3.2 APT APG19-5

Yoshio presented INPUT/20190818_Outcome_of_APG19-5.docx report of the preliminary proposal with highlights: AMRD is agreed on channel 2006 only; VDE-SAT is agreed as secondary service without PFD with method F; R-Mode over VDES is supported; digital voice over VHF is supported; voting on the proposal is ongoing as we meet.

3.3 Report of ITU WP5B

S Bober provided a briefing on recent ITU meeting. INPUT/IALA Report of ITU-R WP5B meeting May 2019-1.docx.

3.4 IEC TC80 WG 15

S Bober provided an update: VDE-ASM test standard started, the goal is public availability of VDE-ASM as “specification” aimed end of 2019. Start of the work towards a test standard for VDE-TER is envisioned as well for late 2019. All input is welcome.

3.5 NAVDAT

Hideki raised the question if IALA needs to provide a recommendation on NAVDAT or if the ITU reports and recommendations for NAVDAT are sufficient.

Yoshio points out that WRC-19 only will secure the MF and HF frequencies, the technical specification work will be part of the next ITU cycle for approval at WRC-23. It is the role of ITU to coordinate the technical specification work. IMO will decide on inclusion NAVDAT into GMDSS.

For now, the workgroup will track the progress of ITU and IMO.

4 BRIEFING NOTE FOR ITU WP AND WRC-19 PARTICIPANTS

The group agreed that the IALA position sent out after ENAV23 is sufficient for now.

5 VDES/AIS SHORE AND SYSTEM INFRASTRUCTURE DOCUMENTS

Michael Wang presented INPUT/PRESENTATIONS/VDES network architecture - functional components and topology.pdf.

The group agreed that the presented system architecture for service transport over VDES at this moment represents a long-term vision. All group members are invited to provide different proposals and proposals for incremental steppingstones that lead us towards that architecture.

Jean-Francois will present a method of how to transport S-200 documents through file transfers over VDES as a use case of service transport over VDES.

The group agrees that WG3 is not responsible for defining services but is responsible to define how VDES components need to be integrated into a shore system that can transport services, i.e. by use of the predefined MCP ways of service delivery, but also providing by other means. Eventually, that shore infrastructure has to be document alongside with AIS in a revised shore infrastructure specification.

The group agreed that we need a document architecture to capture future shore infrastructure for VDES (including AIS) and to split out a sub-workgroup headed by Jean-Francois to propose such new document structure of all AIS and coming VDES (including R-Mode) recommendations and guidelines in the IALA document system. It will be taken into account as requested by Hideki, to adhere to the general concept of having a short recommendation, referring to the more detailed guidelines. Jeffrey van Gils joins the group.

The group revised the subgroups output on shore infrastructure document structure and agreed that Hideki and Jeffrey are informally aligning this structure and responsibilities with the ARM, ENG, PAP and VTS committees. The input from ARM will be available at ENAV25. The goal for WG3 is to have an agreed framework for the documents we have to create for the NAVDAT, VDE-ASM, VDE-TER and VDE-SAT. See Action Item 4 and Action Item 5. The output document can be found at WORKING/Review of eNavigation documentation structure V2.docx.

6 WEDNESDAY: R-MODE WORKING GROUP

A split-out group was formed to work on preparing the upcoming IALA R-Mode workshop with the goal being to create a G1139 Annex capturing the VDES R-Mode description. All file references are prefixed by INPUT/G1139/R-Mode/

Agenda	Summary	Action items - Responsible	Due by
Information about R-Mode telcos	<ol style="list-style-type: none"> Two presentations done by Krzysztof Bronk (NIT) – VHF Measurements with AIS signals in the VDE spectrum and by Markus Wirsing (DLR) - analysis of the sequence: https://www.iala-aism.org/file-sharing/ws-working-groups-working-space/WG3/20190819_Intersessional_StGermain/INPUT/G1139/RMode/2nd%20Telco Document about clock requirements: https://www.iala-aism.org/file-sharing/ws-working-groups-working-space/WG3/20190819_Intersessional_StGermain/INPUT/G1139/RMode 	void	

	<p>AccurateTimeSource_R-Mode_VDES base stations_v1.docx</p> <p>3. Accepted paper about R-Mode theoretical bounds from Jan Safar https://www.iala-aism.org/file-sharing/ws-working-groups-working-space/WG3/20190819_Intersessional_StGermain/INPUT/G1139/RMode</p> <p>Accepted abstract about R-Mode theoretical bounds from Markus Wirsing https://www.iala-aism.org/file-sharing/ws-working-groups-working-space/WG3/20190819_Intersessional_StGermain/INPUT/G1139/RMode</p> <p>Filename: MWirsing_Oceans_Abstract.pdf</p>		
Discussion and deriving ToC for the Annex of G1139	<p>ToC is available here: R-Mode-G1139Annex_v03.docx</p> <p>Responsible people provide contributions to each section of the Annex.</p> <p>A table of content for the document of an Annex of G1139 for R-Mode was agreed, together with responsibilities for input for each section till the R-Mode workshop (8/9/19). The intention is to have a draft document ready before the R-Mode workshop to continue working on the workshop. The outcome document of the workshop shall be used for a change-proposal for ENAV-24.</p>	Krzysztof Bronk, Jan Safar, Stefan Gewies, Ronald Raulefs	3.9 (before Telco)
Timeline for Annex of G1139	<p>03rd of Sept.: First inputs</p> <p>09th of Sept.: Discussion at workshop to revise Annex</p> <p>23rd of Sept.: Finalize change proposal for ENAV 24</p>	All	
Inputs for WRC-19	Feedback from Yoshio was that for WRC-19 an agenda item for WRC-23 is supported by all regions. Despite R-Mode as a Radio navigation service needs to be approved at WRC-23 for VDES we should include R-Mode now at G1139-4 for ITU-R M.2092-1.	void	
Requirement documents	<p>Please provide feedback till telco to be prepared for the R-Mode workshop.</p> <p>Documents are:</p> <p>Filename: Stakeholder Requirements: Will be updated by 2019-08-30</p> <p>Filename: System Requirements: GLA-VDES_R-Mode-SysRD-0v2.docx</p>	All	3.9 (before Telco)
R-Mode workshop	<p>Recent program:</p> <p>Filename: Draft Technical Programme IALA Workshop on R-Mode 2019_20190821.pdf</p>	All	
Telco before workshop	<p>Arrange date for Telco to prepare R-Mode workshop and progress on Annex:</p> <p>https://doodle.com/poll/7r3cgu8x3x4nz7bd</p>	All	27.8.

7 VDES TESTPLAN

This item is carried forward to ENAV24 after initial discussion.

8 PROMOTING/SUPPORTING VDES

See Action Item 14.

9 REVISION/FUTURE OF E-144 ASM HARMONIZATION/ALIGNMENT

Carried forward to ENAV24.

10 G1139 WORK PROGRESS

The group reviewed the following incoming change proposals received under INPUT/G1139.

The accepted changes will be implemented by Johnny Schultz prior to ENAV24.

10.1 Michael Wang: Scrambling on VDE

“INPUT/G1139/ 20190819_G1139_Change Proposal for VDE signal scrambling rev.docx”

This is proposed for the ship station to be able to distinguish between signals from different base stations overlapping at the receiver.

The group recognized this as a significant enhancement which might solve neighbouring cell interference issues but introducing significant impact on the current system. The group acknowledges the proposal, and will consider it for future revision of 2092, but feels it is premature to accept it into G1139 before submission to ITU towards ITU-R M.2092-1.

10.2 Chris from Exact Earth:

Chris presented INPUT/G1139/20190807_G1139_CP_item67_exactEarth.docx to the group containing corrections and proposals to add a new ASM 3-slot SAT UL.

This is motivated by significant interest in sensor/monitoring applications that require only an uplink of small messages.

This change proposal is considered to be an enhancement, that cannot be accepted into G1139 before proposed to ITU-R M.2092-1, as we agreed only to handle errors on ASM.

A revised change proposal is expected at ENAV24.

10.3 Michael Wang: Timing advance for VDE-SAT

The proposal INPUT/20190819_G1139_Change Proposal for VDE-SAT timing.docx was presented by Michael and appreciated by the group. Hans pointed out that it can improve VDE-SAT downlink and therefore it was accepted for further processing after 2092-1.

10.4 Michael Wang: VDE-SAT channelization and transmission structure

The proposal WORKING/Change Proposal for VDE-SAT channelization and transmission structure.docx was presented by Michael.

It includes a method that optimizes the use of VDE-SAT resources, simplifying the bulletin board and provides a more agile resource allocation.

It also can be considered to unify the terrestrial and satellite resource allocation methods.

The group recognized its high potential, the proposal is therefore kept as a WORKING document for further consideration at later ENAV meetings.

10.5 Decision on further process on G1139 until ENAV25

Due to the above 2 change proposals, the group discussed further process for G1139 work.

G-1139 needs to be closed for approval by the ENAV committee and council so it can be an input to ITU WP5B in May 2020. That will require the group to finish work on G1139 during ENAV25. An intersessional in January is envisioned (invitation will follow).

Therefore, the group will use the remaining time and effort on *stabilizing* G-1139 towards ITU-R M.2092-1.

This stabilization means we will concentrate on fixing errors only in G-1139 rev.3 and avoid taking in changes that could endanger our goal of stabilization.

A categorization for Error Fix versus Enhancement in the Change log indicates that prioritization. Enhancements will be considered after ENAV25 again, when we start working on revision of ITU-R M.2092-1 towards ITU-R M.2092-2.

10.6 Answers to IEC questions

The group answers back to IEC questions using members of the group to carry the answers back to IEC VDES workgroup.

10.7 Bulletin Board

The group decided to maintain the flexibility of the bulletin board but identified the urgent need for a change proposal to ENAV24 on how to authenticate it using signature.

10.8 Change Log open items progress check

The group walked through the change log (INPUT/G1139/20190807_G1139_WD_changelog.pdf) and noted the new status on each of the open items.

10.9 Incoming error corrections

The group reviewed the received requests for error corrections and updated the change log according to the groups decision on each item.

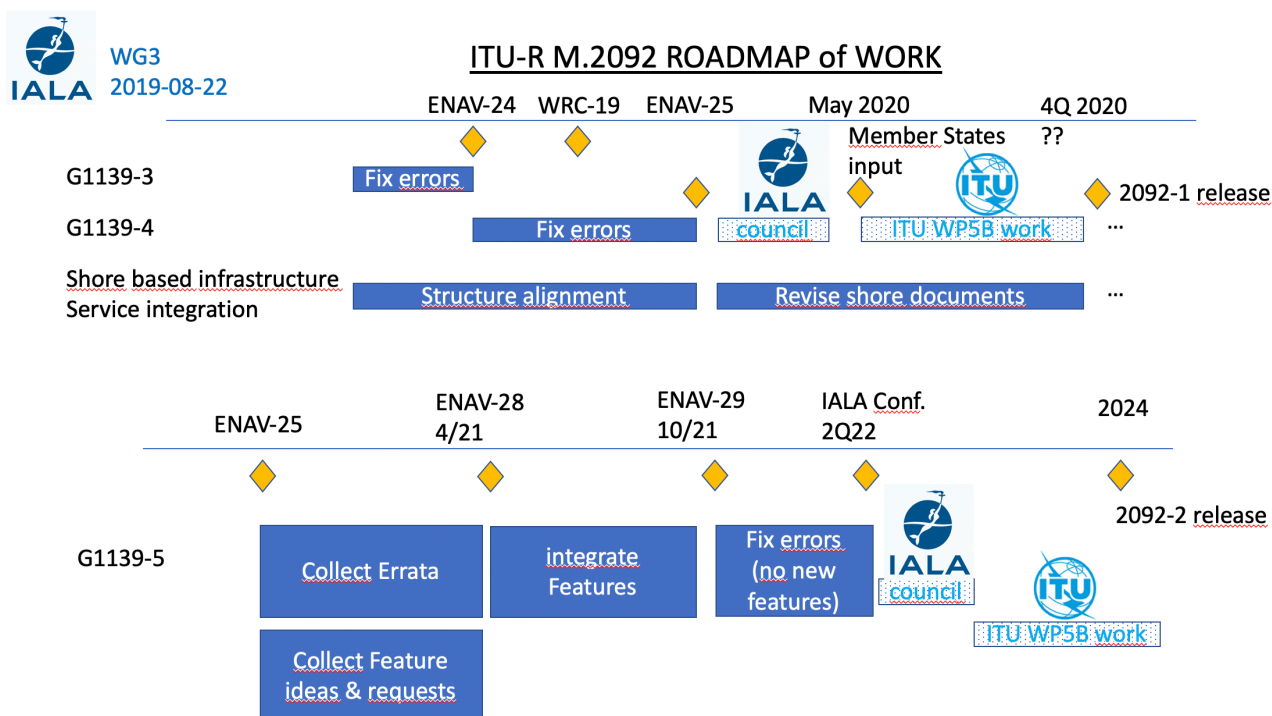
10.10 Outlook for Wg3 work on ITU-R M.2092 for the next years

The group agreed on the phase approach for the finalizing G1139 working toward ITU-R M.2092-1, concentrating on fixing errors up to ENAV25, releasing it for council approval and use in ITU WP5B from ENAV25 on. The group will receive input from Action Item 6 back at the February intersessional to help preparing WP5B on the G1139 input.

After ENAV25, the group agrees to prioritize documenting how services can be provided through VDES in an integrated VDES/AIS infrastructure starting with the development of a agreed document structure, see section 5. A draft envisioned goal is to finalize that work until ENAV28.

Between ENAV25 and ENAV28, VDES errata and enhancement requests are collected by WG3 from beginning operations and tests, with the purpose to help members to get VDES operational. This is supported by errata/mitigation lists and a collection of enhancement proposals.

After ENAV28, the group envisions to start work on changes to ITU-R M.2092-1 towards ITU-R M.2092-2.



WORKING/ 20190822_2092_WG3_phases_ver1.pptx

All workgroup members are invited to provide an improved version of that plan towards ENAV24.

11 ITU-R M.1371-5 REVISION WORK

11.1 New Liaison with ITU WP5B for revision on ITU-R M.1371-5

Carried forward to ENAV24, as next WP5B meeting is e/o April 2020.

12 DEVELOPMENT OF INTERIM IALA GUIDELINES ON THE USE OF AIS MESSAGE FOR MASS TRIAL [HIDEKI]

Hideki shortly presented the INPUT/20190727_MASS.docx. The group agreed that Hideki, Jeffrey, Stefan Bober, Johnny and Yoshio will prepare an interim guideline as input to ENAV24, see Action Item 10.

13 AMRD ACTIONS AS IDENTIFIED DURING THE MEETING

We received a liaison note from ITU WP5B we need to take into account for ENAV24.

The group agrees to the proposed solution and requests ENAV to coordinate with ARM in further approval for consideration by IALA to be liaised to ITU-R WP5B.

14 ANY OTHER BUSINESS

No other business was identified.

15 CLOSING AND DATE OF NEXT MEETING

ENAV 24 will be held October 7th to 11th, 2019, at the IALA Headquarters.

The workgroup envisions an intersessional February 3rd 13:00 to 7th 12:00. The tentative location is IALA Headquarters, but proposals for alternative locations are invited for final decision in ENAV24.

16 OUTPUT AND WORKING PAPERS

Output papers ('O') will be provided to ENAV23. Working ('W') papers will be forwarded to the next meeting of the WG3.

Number	Title	Action
Output 01	Report	Forward to IALA Secretariat
Working 01	G1139 draft working towards rev. 4	Forward to WG3 at ENAV24
Working 02 Output 03	Proposed new document structure for AIS/VDES documents including shore infrastructure.	See Action 4 and 5
Working 03	G1139 work item changelog	Forward to WG3 at ENAV24
Working 04	20190822_2092_WG3_phases_ver1.pptx	Forward to WG3 at ENAV24
Working 05	Change Proposal for VDE-SAT channelization and transmission structure.docx	Forward to WG3 at ENAV24
Output 02	R15-WP5B-C-0712!N21!MSW-E liaison to IALA on maritime id for AMRD.docx	Review in ENAV24 plenary and forward to ARM afterwards.

17 ATTENDEES

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18 ACTION ITEMS

1. *Stefan P. to move all OUPUT & WORKING documents to the ENAV24/INPUT folder (DONE)*
2. *WG3 to formulate “news updates” that can be approved during ENAV24 for when WRC-19 is approving the VDE-SAT frequencies. These new updates will be distributed through all channels in the name of IALA*
3. *Hideki: to check if we can keep superseded documents on the IALA home page with a clear indication of the state; old documentation revisions shall be accessible because they might be referenced. Please check the existing processes.*
4. *Hideki: proposed shore infrastructure document architecture to ARM, PAP and VTS committee for informal review and feedback*
5. *Jeffrey: proposed shore infrastructure document architecture to ENG committee for informal review and feedback*
6. *Jean-François: present method for how to transport S-200 through VDES @ENAV24*
7. *Stefan Bober: to organize a discussion meeting with Christian Rissonne at WRC-19 to find the best strategy for introduction of G1139 to ITU WP5B and feed it back to WG3 at January Intersessional.*
8. *Everybody: check if you want to host intersessional in 3-7th of February, 2020, input directly to stefan@albatros-tech.eu, latest at ENAV24*
9. *Stefan Pielmeier: get the specification of QPSK used in SAT to be available on the IALA Web page to be referred to from G1139 and later ITU-R M.2092-1*
10. *Hideki: provide a draft interim guideline on MASS as input to ENAV24*
11. *All: come up with ideas for a VDES logo we can use to identify all documentation and promotion that is related to VDES.*
12. *Stefan Pielmeier: check with IALA Secretary for advice on the need to register the name of VDES as a trademark/symbol (SENT EMAIL 2019-08-23 to Minsu)*
13. *Stefan Pielmeier: draft a Wikipedia publication on the Change Proposal for VDE-SAT channelization and transmission structure.docx method to protect it from patents.*
14. *Social Media updates: text from the secretary on the process to follow:*

Social Media is very important and an integral part of IALAs communication strategy. All members are encouraged to upload news and promotion related to VDES technology on IALA's LinkedIn group

(<https://www.linkedin.com/groups/86242/>) with 2.200 followers. If the information is well structured and preferably with a picture it creates the necessary awareness in the maritime community and proves the progress we make.

If you have made results from a test bed you can upload this on a dedicated area on the web site (ENAV Test bed results). Please send your VDES Testbed “news updates” to audrey.guinault@iala-aism.org for processing/approval. She will then update the IALA homepage accordingly.