**Report of intersessional meeting of the AIS + COMMUNICATION WORKING GROUP of the IALA eNAV Committée**,  
Intersessional meeting held March 31 – April 4, 2014, at IALA HQ,   
Saint Germain en Laye

1. **Introduction**

The AIS + COMMUNICATION Working Group (WG 3+ 4) of the IALA e-NAV Committee held an intersessional at the IALA HQ, Saint Germain en Laye, France

The meeting was chaired by Rolf Zetterberg, Chair WG3+4.

The main objective of the meeting was to develop draft inputto the May meeting of ITU-R WP5B , supporting the allocation of VHF frequencies for VDES. The level of interest for the subject was reflected in the record number of participants to the WG meeting.

1. **Progress made**

### **2.1 Presentations and reports**

### 2.1.1 IMO-ITU Joint Expert Group

### Christian Rissone reported from the Joint IMO-ITU expert group, that there is a general support from IMO for the allocation of the requested frequencies for VDES.

### 2.1.2 Tokyo Workshop on VDES

### Cdr Hideki NOGUCHI, Japan Coast Guard made the presentation of the result of 2nd Tokyo Workshop on VDES held in January 2014 co-hosted by the Ocean Policy Research Foundation and Japan Coast Guard. He reported that many experts discussed various matters on VDES. He concluded that now many studies and testbeds were conducted or planned and it was very encouraging for the development of VDES. The Workshop also agreed that more studies and testbeds are needed. The Workshop was very successful and fruitful for the development of VDES. The details of the result were shown in the input paper 04.

### 2.1.3 GLA Sounding test

### Jan Safar, GLA, and David Haley, ITR, presented a report summarising the results of a VDES channel sounding campaign, conducted by the General Lighthouse Authorities of the United Kingdom and Ireland (GLA) and the Institute for Telecommunications Research (ITR) at the University of South Australia. The channel sounding campaign examined radio propagation conditions for all channels intended for use in ship-to-shore and shore-to-ship VDES and ASM communications. System components and deployment were consistent with real world maritime use in the context of the IMO Maritime Service Portfolio area categories.

### Most areas provided a line-of-sight component and the channel typically exhibited mild frequency selective fading. The harshest frequency selective fading was observed in non line-of-sight conditions, where fades spanned a significant proportion of the channel. Several channel characteristics were identified that are specific to maritime use.

### The results provide valuable input into waveform and receiver design. Based on the observed channel conditions, a multicarrier waveform design may be considered. An alternative is to consider a single carrier system using low complexity time domain channel equalisation. A complexity/performance trade-off study would ensure signaling and receiver methods that are appropriate for the channel.

### The channel sounding campaign has demonstrated that spectrum currently being considered for VDES and ASM use is well suited to the purpose. Building upon the spectrum using a considered design approach will provide an optimal performance/complexity balance and deliver the maximum benefit for future maritime communications.

### 2.1.4 Swedish VDES Testbed

### Johan Lindborg, Saab, presented a report detailing the latest results from the Swedish VDES research.

### The research has focused on terrestrial use of the proposed additional 25kHz channels, called ASM1 and ASM2.

### A testbed has been developed using their existing software defined AIS radio design, giving an additional 25 kHz ASM channel working in parallel with AIS1 and AIS2. The additional ASM channel can in runtime be changed between use of GMSK, DQPSK and D8PSK, giving a potential data bandwidth up to three times that of AIS.

### The project shows the addition of ASM1 and ASM2 channels with higher data bandwidth could be done at a relatively low additional cost in relation to current Class A AIS systems.

### The platform is ready for field testing and further performance studies.

### 2.1.5 JRC VDES study

### Yoshio Miyadera, JRC, introduced their proposal and investigation of VDES. It includes the proposal of dedicated satellite uplink channels, proposed regional channel plan, proposal of two methods for sharing between satellite and maritime mobile, and the introduction of multi-path investigation.

### 2.1.6 VDES research status in Korea

### Jaemyoung KIM, ETRI, presented the status of the VDES research in Korea. ETRI has developed the prototype of VDE station and receiver based on the TETRA method.

### We had field tests and verified the throughput performances in the annex 1, 3 and 4 of ITU-R M.1842-1.

### KRISO is developing VDE modems in the "Maritime RF-based Ship Ad-hoc Network development task in the Cutting-edge Port Logistics System Implementation Plan funded by MOF (Ministry of Ocean and Fisheries). They developed a 1st generation modem to confirm the 28.8kbps/25kHz, ACPR(-70dBc) technical spec. in Annex-1 and will test the modem this year. Also they are developing the broadband VHF digital modem which supports 300 kbps and implementing a VHF MAC and routing protocol for SANET.

### Korea will have the clear global VDE channels if voice call channels move to unused channels in the 2Q this year. Three organizations are related to VHF communication. The MOF is in charge of maritime affairs and needs to have the overall application plan to utilize the valuable VHF channel resources.

### They issued whether data channel bonding need or not and how about delaying adoption time until 2019. Also they commented that CHs 2026 & 2086 in Satellite VDE are reserved in future use to avoid dubious interference and need to reserve AIS channels for AIS Class B in the region 1&3.

### See Saint Germain Input 12.

### 2.1.7 JCG study of Data Volumes for VDES

### LCDR Takeuchi of Japan Coast Guard provided a presentation on an assessment of data volume for various operations of the JCG. According to the assessment, less than 50 ASM slots per minute are required for communications relating to the JCG operations. In his presentation, he also pointed out that more studies on data volume in different cases would be welcomed for the development of VDES and a common methodology to measure data volume was required.

### 2.1.8 The role of VDES and the Maritime Cloud

### Jens K. Jensen (DMA) gave a presentation (input 10) on the background of the Maritime Cloud as the realization of a “communication infrastructure providing authorized seamless information transfer on board ships, between ships, between ship and shore and between shore authorities and other parties”, as requested in the original IMO strategy for e-navigation, in IMO MSC85 85-26-Add.1. The concept is further described in input 09. Based on this, input 08 elaborates on the role of VDES as having the potential to provide a universally available capacity for e-navigation, however requiring a lager, global infrastructure behind each shore station or satellite station, to achieve seamless communication between all parties. It was also pointed out, that while MMSI numbers may be useful in AIS and even VDES, another identity concept is needed to enable the inclusion of shorebased actors in the information transfer capabilities, who do not have their own VDES station. Furthermore, the need for authentication and encryption of confidential data can be handled by higher logical layers than the VDES physical data link layer.

### 2.1.9 Furuno VDES study

### Mr. Nakagawa (Furuno electric co.,ltd.) made a presentation on his input paper to the meeting. He noted that performance of multi-carrier modulation methods which are assumed as candidates for VDES, are neither appropriate nor effective for VDES.

### Furthermore, Dr. Kashiwa (Furuno electric co.,ltd) introduced a challenge related to power amplifier design for the intended modulation methods. He noted that when utilizing multicarrier modulation methods, due to a requirement for linearity, the efficiency will be rather low and thus power dissipation at the power amplifier would be significant. This design would require a huge heat sink in the power amplifier, which would increase the total dimensions of the unit by considerable amount.

## 2.2 Technical discussions

Christian Rissone explained the work ahead in ITU regarding the frequency allocation for VDES and pointed out that a consolidated opinion from IALA members regarding the preferred channel plan, would facilitate the decision process.

The working group agreed after discussions and the development of a number of use cases for ASM and VDE, where the characteristics of the 3 proposed channel plans were assessed, that Channel Plan A would be the best alternative for the anticipated global usage.

The co-existence of the terrestrial and the satellite components of VDES was discussed and the merits of time sharing and frequency separation was considered. It was concluded that it is premature to make any detailed design decisions now and that the main objective now is to secure the frequency allocations.

2.3 Draft liaison statement to ITU-R WP5B

The WG was informed of a possibility to send a Liaison statement to the next ITU-R WP5B meeting (May 2014) via an unconventional procedure. The SG Gary Prosser and the Chair of the eNAV Committee Bill Cairns, have agreed to seek approval of an input to ITU-R WP5B, from the eNAV Committee by correspondence. If approved the document shall be sent to Council for approval by correspondence and if approved by Council, to ITU-R WP5B. The importance of bringing the IALA opinion to ITU-R WP5B is the motivation for the use of this procedure.

A draft Liaison Statement to ITU-R WP5B was developed, indicating the IALA support for Channel Plan A. The rationale is given in two annexes. Annex 1 is answering a number of evaluation criteria from ITU. Annex 2 is a comparison of the characteristics of the 3 proposed channel plans in 6 specified use cases. The annexes clearly demonstrate the advantages of Channel Plan A.

Japan Coast Guard has reservations for this document due to the unusual procedure. See Annex C

***Action items***

*The* ***Chair of the IALA WG3/WG4 intersessional meeting*** *was asked to forward Saint Germain Output 02 “Liaison statement to ITU WP5B”to the Chair of the eNAV Committee and to the secretariat with a request to initiate the process described above.*

## 2.4 Template for Draft CPM text

A template for possible national submissions to ITU-R WP5B proposing a draft CPM text for Agenda Item 1.16 was developed. The proposed text supports the IALA position regarding frequency allocations for VDES. The WG encourages its members to study the possibility that their national frequency administration submit inputs based on the template, to the next ITU-R WP5B meeting.

The WG also encourages its members to study the possibility that their national frequency administration support Channel Plan A at the ITU-R WP5B meeting.

*The* ***Chair of the IALA WG3/WG4 intersessional meeting*** *was asked to forward the Document Saint Germain Output 03”* *WD towards a Draft CPM text for Agenda Item 1.16” to all members on the WG3+4 email distribution list .*

## 2.5 Demonstration objectives for VDES

Since there is still a strong need for further studies, tests and demonstrations on different aspects of VDES, it was decided to update the document eNAV14-17-1-3-6 “Demonstration objectives for VDES” according to the progress made. It was also decided to include an Annex. The Annex lists relevant reports published so far, and ongoing and planned work regarding VDES.

*The* ***Chair of the IALA WG3/WG4 intersessional meeting*** *was asked to forward the document Saint Germain Working Document 03 “Demonstration Objectives for VDES – updated” to next meeting.*

## 2.7 Draft input to IMO NCSR – comment on NCSR1/9

The need for work on the logical communication links for eNavigation has been observed by the Danish Maritime Administration, who have developed the concept of the “Maritime Cloud”. This concept is mentioned in the report to NCSR1 from the IMO eNavigation Correspondence Group (NCSR1/9). The concept of the “Maritime Cloud” is within the scope of the planned work for IALA and it was therefore decided to submit a comment on NCSR1/9 to NCSR1, indicating the willingness of IALA to participate in the development of the “Maritime Cloud” concept.

Since the normal way for approval of outputs can´t meet the deadline for inputs to NCSR1, it is proposed to use the procedure explained under 2.3 above.

Japan Coast Guard has reservations for this document due to the unusual procedure. See Annex C.

*The* ***Chair of the IALA WG3/WG4 intersessional meeting*** *was asked to forward Saint Germain Output 04 “Draft Input to IMO NCSR1 – comment on NCSR1/9” to the Chair of the eNAV Committee and to the secretariat with a request to initiate the process described above.*

## 2.8 Design Considerations for VDES

During a brain-storming session there were a number of design considerations captured and compiled in Working Document Saint Germain WD02.

*The Chair of the IALA WG3/WG4 intersessional meeting was asked to keep the document Saint Germain Working Document 02 as a Working Document within the WG and distribute it within the WG*

## The Final Plenary

This report was considered, amended and accepted, noting the reservation from the Japan Coast Guard, as representing the actual progress made and the results of the meeting at the IALA HQ in Saint Germain en Laye.

The chair thanked IALA for hosting the meeting. The chair also thanked all participants for their attendance, hard work and contributions to the discussions and wished everybody a safe journey home.

**Rolf Zetterberg**

Chair AIS+ COMMUNICATION Working Group (WG3+ WG4) of IALA e-NAV Committee**.**

**Annex A:**

**Participants.**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Name** | **Org** | **Country** |
| 1 | Hideki Nagouchi | JCG | Japan |
| 2 | Antti Kukkonen | Furuno | Finland |
| 3 | Bill Kautz | USCG | USA |
| 4 | Christian Rissone | ITU | France/ITU |
| 5 | Michael Card | IALA | France/IALA |
| 6 | Michel Imart | CEREMA | France |
| 7 | Hiroyasu Nakagawa | Furuno | Japan |
| 8 | Jan Safar | GLA | UK |
| 9 | Jeffrey van Gils | Rijkswaterstaat, NL | Netherlands |
| 10 | Jens Kristian Jensen | Söfartsstyrelsen, DK | Denmark |
| 11 | Peggy Browning | Exactearth | USA |
| 12 | Peter Andersen | Cobham | Denmark/CIRM |
| 13 | Steve Burrows | CIL | Ireland |
| 14 | Yauchi Takamasa | OKI Consulting Solutions | Japan |
| 15 | Tony Haugen | Kongsberg | Norway |
| 16 | Torbjörn Grape | SMA | Sweden |
| 17 | Yoshio Miyadera | JRC | Japan |
| 18 | Johan Lindborg | SAAB Transpondertech | Sweden |
| 19 | Yann Guichoux | CEREMA | France |
| 20 | Kinji TAKEUCHI | JCG | Japan |
| 21 | David Haley | Institute for Telecom Res, AU | Australia |
| 22 | Bill Cairns | USCG | USA |
| 23 | Takuo Kashiwa | Furuno | Japan |
| 24 | Jaemyoung, KIM | ETRI, Korea | Korea |
| 25 | Paul Smith | FRS, USCG | USA |
| 26 | Johnny Schultz | L3 | USA |
| 27 | Haruko Takeshita | JCG | Japan |
| 28 | Stephen Jones | AMS | Australia |
| 29 | Henrik Kalstrup | Cobham | Denmark |
| 30 | Gaetan Fabritius | CLS | France |
| 31 | Frank Zeppenfeldt | ESA | ESA |
| 32 | Kaisu Heikonen | FTA | Finland |
| 33 | Harald Åsheim | Kystverket, N | Norway |
| 34 | Alagha, Nader | ESA | ESA |
| 35 | Pierre Debusschere | CLS | France |
| 36 | Marcos Lopez | GMV | Spain |
| 37 | Jean Jacques, Valette | CLS | France |
| 38 | Jean Charles Cornillou | CEREMA | France |
| 39 | Rolf Zetterberg Chair WG 3+4 | SMA | Sweden |
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**Appologies**

|  |  |  |
| --- | --- | --- |
| **Name** | **Organization** | **Country** |
| Arroyo, Jorge | USCG | USA |
| Bober, Stefan | Federal Waterways and Shipping Adm | Germany |
| Tetrault, Brian | US Corps of Eng | USA |
| Jaewoo, Lim | RRA | Korea |
| Carson-Jackson, Jillian | AMSA | Australia |
| Cotu, Jean Francois | CCG | Canada |
| Tremlett, Robert | Maritime Consultant | UK |
| Wotton, Richard | MCGA | UK |
|  |  |  |

**Annex B.**

**Input Documents**

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| **INPUT DOCUMENTS** |  |
| 01 | Draft Agenda |
| 02 | List of documents |
| 03 | eNAV14-17-3-4 Working Towards a Draft Rec on VDES |
| 04 | Report of Tokyo Workshop |
| 05 | Presentation “Technical Details and Guidelines for VDES Implementation“ |
| 06 | Swedish VDES Test Bed Report |
| 07 | GLA\_ITR VDES Channel Sounding Trial Report 1v0 |
| 08 | A vision for the role of VDES |
| 09 | An overview of the Maritime Cloud – input to IMO eNAV CG |
| 10 | Maritime Cloud overview |
| 11 | Investigation on VDES by JRC |
| 12 | VDES Research status in Korea |
| 13 | Examples of Data Volume of JCG operations |
| 14 | WP5B WD towards Draft CPM Text |
| 15 | WP5B WD Draft channel plan VDES |
| 16 | Example of AI 1.16 CPM Template |
| 17 | Satellite –terrestrial sharing IALA WG3+4 VDES CLS |
| 18 | Contribution France ESA for AI 1.16 |
| 19 | A study on modulation methods for VDES |
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**Output documents**

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| --- | --- |
| 1 | Report of the WG3+4 meeting |
| 2 | Draft Liaison Statement to ITU-R WP5B |
| 3 | WD towards a Draft CPM text for Agenda Item 1.16 |
| 4 | Draft input to IMO NCSR – comment on NCSR1/9 |
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**Working Documents** (for next WG meeting)

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| **Working Document** | **Title** |
| 01 | User requirements |
| 02 | Design considerations on VDES |
| 03 | Demonstration Objectives for VDES - updated |