

# MINUTES OF MEETING

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## 2018 EMRF and SPWG Workshop Report

**Chairman:** Jacques Manchard (EMRF)

**Co- Chairs:** José Manuel Álvarez, María Mota (ESSP)

**Workshop Date:** 30<sup>th</sup>-31<sup>st</sup> October 2018

**Workshop Place:** Madrid, Spain

**Distribution list:** EMRF-.SPWG workshop distribution list.

# 1 INTRODUCTION

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This document aims to summarize the relevant topics addressed at the 2018 EMRF and EGNOS Service Provision Working Group Workshop held on October 30<sup>th</sup> and 31<sup>st</sup> in Madrid.

This workshop has been co-organised by the European Maritime Radionavigation Forum (EMRF), the European GNSS Agency (GSA) and the European Space Agency (ESA) and was kindly hosted by Puertos del Estado.

The meeting was very successful, with the presence of different Maritime Authorities (Commissioners of Irish Lights, Finnish Transport Agency, GLA, Maritime Office Gdynia, CEREMA, WSV, Puertos del Estado, Trinity House) as well as GNSS experts and several representatives of the Industry. The workshop was attended by 33 participants, of which 7 were able to follow the discussions remotely through a dedicated connection enabled for the meeting.

Very interesting EMRF topics were presented to the audience and very fruitful discussions were held, in particular regarding the implementation of EGNOS L1 Maritime Service. In this sense, the EMRF members noticed the hard work and the good progress of the activities developed these previous years in the frame of the SPWG and EMRF. All these points and the main outcomes of the meeting are presented hereafter.

## 1.1 Agenda

The final agenda followed during this workshop is included below:

### **DAY 1 – (Tuesday 30<sup>th</sup> October 2018)**

- 9h30-9h45 – Welcome and Introduction
- 9h45-12h45 – EMRF Points for information
  - Likely evolution of the IALA DGNSS system
  - Developments in e-Navigation and the Maritime Connectivity Platform (MCP)
  - Update on AIS and VDES
  - Update on the ERNP (EC/JRC)
  - Update on R-Mode
  - Kongsberg ongoing projects
    - SBAS4MAR – Maritime SBAS User Algorithms (ESA)

- MAREC – SBAS in Maritime Receivers (GSA)
- AMNAS – Provision of SBAS and ARAIM through VDES satellites (ESA)
- GSA - SEASOLAS Project.
- 12h45-13h15 – European approach towards the EGNOS L1 Maritime Service Declaration
  - Service Concept Review
  - EMRF support letter to EC/GSA.

*13h15-14h30 – Lunch*

- 14h30 – 17h30 – EGNOS Service Provision Working Group
  - EGNOS L1 maritime service roadmap status/update
  - EGNOS L1 maritime Service Definition
    - Performance parameters (already finalised within EMRF)
    - Integrity at system level concept (already finalised within EMRF)
    - Static Performance study (update)
    - Validation studies and Field test campaigns (new)
  - EGNOS maritime Service points for discussion/decision and support:
    - Service provision Scheme
    - Maritime Safety information

**DAY 2 – (Wednesday 31<sup>st</sup> October 2018)**

- 9h30h-13h00 – EGNOS Service Provision Working Group
  - EGNOS maritime Service points for discussion/decision and support:
    - Service provision Scheme (summary)
    - Maritime Safety information (summary)
    - Liability scheme
  - Validation of evidences for the EGNOS L1 Maritime Service Concept Review (SCR)

- EMRF support letter to EC/GSA.

*13h00-14h30 – Lunch*

- 14h30-16h00 - Conclusions and way forward

The discussions held under each point of the agenda are described in the sections below.

## 2 DAY 1 - TUESDAY 30<sup>TH</sup> OCTOBER 2018

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### 2.1 Welcome and Introduction

Juan Francisco Rebollo (Puertos del Estado) started by welcoming the attendees to the workshop.

Jacques Manchard (EMRF) made a brief introduction to the meeting, thanking the organisers and the attendees, and in particular the speakers giving presentations under the different points of the agenda. Jacques also recalled the work done and the progress of the activities developed and shared in the frame of the EMRF fora.

### 2.2 EMRF Points for information

The first part of the meeting started with presentations on different EMRF topics:

#### 2.2.1 Likely evolution of the IALA DGNSS system

George Shaw (GRAD) gave an update on the status and evolution of the IALA DGNSS system.

There are many different factors that should be considered when evaluating the potential evolution of the IALA DGNSS systems in Europe.

- The users and their needs. There is a wide diversity of users, both maritime and multimodal. Not only the current needs but future uses should also be considered (linked with safety of e-Navigation services).
- The costs and benefits: the cost of the maintenance of current services and the cost and benefits of replacing obsolete components. George also remarked that the existing equipment may also enable the operation of alternative systems, such as R-mode.
- The timeframe for the availability of alternative augmentation systems should also be considered, and also the potential complementary nature of EGNOS and IALA beacons:

The proposed timescale of 2021 for the provision of an EGNOS V2 maritime ‘1046 service’ is seen as very positive; however the availability of SBAS within a MSR is still the big question. Moreover, there is also an estimated vessel equipage rate of approximately 10 years. Furthermore, it was also highlighted the importance of a wider acceptance of SBAS internationally, trying to involve other SBAS providers in this process.

- It should be considered to follow IALA Guidance on these aspects.

There is still research to be developed to try to answer some open points, in particular regarding the benefits of beacons providing protection to mariners in very difficult (ionospheric) conditions, and its complementary use with other alternative augmentation systems.

In this line the MarRINav project, proposed in the frame of the ESA NAVISP Programmes, aims to analyse the complementary use of EGNOS and IALA beacons. This project, that is expected to start in November 2018, responds to UK Blackett Report, which addressed GNSS vulnerabilities and recommended to investigate potential backup systems. The planned technical research within the project includes the following activities:

- identify UK Critical National Infrastructure for Resilient PNT

- explore complementary nature of Beacon/EGNOS V2
- research M-RAIM (including potential with maritime EGNOS V3)

### 2.2.2 e-Navigation and the Maritime Connectivity Platform (MCP)

George Shaw (GRAD) continued giving an update on the MCP. He described the MCP, which is communication framework for efficient, secure, reliable and seamless electronic information exchange between stakeholders, and its three main components:

1. The Maritime Identity Registry (MIR) - deals with managing users and the access to resources in the MCP.
2. The Maritime Service Registry (MSR) - enables service providers to register their services in the MCP to be offered to the end-users.
3. The Maritime Messaging Service (MMS) - enables seamless transfer of information across different communication links.

It was highlighted that collaboration is necessary to enable collaborative and well connected instances of the MCP. However, it is still not clear how the different instances and systems are going to work together.

The GLA are interested in investigating a MCP instance for UK and Ireland and wish to gauge interest in collaboration with others in Europe, considering compatible systems and devices and to understand how other governments are approaching the MCP. The GLA asked for EMRF support to coordinate this collaboration.

**Action 1 – EMRF to play a part in helping to coordinate MCP collaborative effort in Europe.**

### 2.2.3 Update on AIS and VDES

George Shaw (GRAD) presented the VHF Data Exchange System (VDES) development status. The VDES concept (developed at IALA and ITU and supported by IMO) aims at solving the AIS channel overload problems, providing additional data exchange capability which will enable e-Navigation applications.

The different VDES subsystems were introduced:

- AIS - the core subsystem is still there. The main objective is to assure that the AIS is not affected/ overloaded.
- Application-Specific Messages (ASM). Existing and new messages
- Terrestrial VHF Data Exchange (VDE-TER) – coverage limited by VHF horizon
- Satellite VHF Data Exchange (VDE-SAT) – extends the coverage beyond VHF

The different standardisation concerns with respect to VDES-Sat were remarked. The existing open points include VDES-Sat interferences and spectrum allocation, which are planned to be discussed at ITU WRC-19 Conference. The VDES standardisation roadmap was also presented to the meeting attendees.

Next, George also detailed the GLA VDES activities:

- VDES Channel Sounding Test Campaign.

The system architecture (transmitting and receiving equipment either onshore or onboard the vessels) was presented. A ship-shore channel sounding campaign has been conducted. The results of the test campaign have been already published (Rep. ITU-R M.2317) and give information to understand the signal propagation behaviour.

- VDES channel model development

A model reproducing channel conditions at sea has been implemented. This model allows realistic VDES channel conditions to be reproduced in simulation and testing scenarios, providing a basis for VDES coverage prediction.

- Hardware-in-the-Loop demonstration

- The Hardware-in-the-Loop System components (architecture) were presented.
- Selected applications have been demonstrated using a hardware-in-the-loop radio system, including cryptographic message authentication

- VDES security – prototype authentication

The prototype architecture was explained, including the protection measures: signature and timestamp.

- A future VDES activity is being prepared by the GLA in collaboration with industry: a VDES Prototype Terrestrial and Satellite to perform over-the-air tests.

## 2.2.4 Update on the ERNP (EC/JRC)

Carlos Armien (JRC/EC) presented the European Radio Navigation Plan and the strategy, which aims at facilitating the uptake of Galileo and EGNOS in the different sectors/domains.

The last ERNP issue was published in March 2018 and will be updated every three years.

The ERNP is a very complex document which covers more than 15 radio navigation and timing Systems and more than 10 users sectors.

- Chapter 3 describes the radio navigation landscape in Europe.

Carlos remarked that GNSS, SBAS and GBAS are all evolving to provide more accurate and robust services and that they may allow the rationalization/decommissioning of ground based radio navigation systems.

GNSS is the best performing radio based PNT system available with respect to accuracy, availability, continuity, integrity and coverage. Thus, reliance on GNSS is expected to increase in the coming years in the different domains.

However, GNSS vulnerabilities are still there, and it is recognised that GNSS cannot be the sole means of providing PNT services, in particular for critical applications.

- Chapter 6 describes the factors that are limiting the use of EGNSS. The challenges in maritime domain were commented:
  - There are no standards for the implementation of SBAS in shipborne receivers.
  - The environment in inland waterways is complex for GNSS signal propagation.
  - There is no full European EGNOS coverage.

Regarding the next steps, the EC is now preparing an Implementation Plan to analyse the challenges reported in the ERNP. Additionally, a stakeholders' consultation will be conducted next year (Q1-2019), and EC requested the EMRF support to this process.

## **Action 2 – EMRF to support the ERNP consultation process.**

### **2.2.5 Update on R-Mode**

Marek Dziewicki (MOG) presented the R-Mode concept and the status of the R-Mode Baltic project.

The technical principles of R-Mode were explained. Given that GNSS are vulnerable to interference, from natural or man-made sources, an alternative backup system is needed to ensure continuity of maritime operations and safe navigation. R-mode is a potential solution, which adds ranging capability to existing maritime infrastructure: DGPS radio beacons MF (300 kHz) and AIS VHF (162 MHz).

The ongoing activities of the R-Mode Baltic project were also presented. This project objective is to build a testbed for R-Mode System, using R-Mode enabled (modified) IALA beacons and R-Mode enabled (modified) AIS base stations, to demonstrate that R-Mode is able to meet maritime user requirements for a positioning and timing backup system.

The first tests have already been conducted and the preliminary results show that both MF and VHF signals are needed for adequate coverage. The project team is building up a first testbed that can utilise both signals-of-opportunity. The testbed implementation is being prepared and will be available from 2020.

Marek remarked the supporting role of IALA, that can provide coordination for activities and system promotion, acting as a repository of previous and current testbeds and preparing a roadmap for R-Mode standardisation. It was highlighted the R-Mode workshop scheduled to be held in IALA HQ in 2019.

Some attendees asked about the systems costs, and Marek clarified that the most expensive part is the clock and remarked that the time synchronisation and time stability are critical for this system. Marek also added that the R-Mode Baltic project will also address the economic aspects in order to know what is affordable.

Regarding the receiver side, it was also recognised that it will take time to have the receivers installed onboard the vessels, as it will not be compulsory to be equipped and there will not be an IMO carriage requirement in this sense.

### **2.2.6 Kongsberg ongoing projects**

Stig Erik Christiansen (Kongsberg Seatex) gave an update on three different projects:

#### **1. SBAS4MAR – Maritime SBAS User Algorithms (ESA)**

This project developed in the frame of ESA NAVISP Programmes aims at implementing an SBAS Receiver prototype with the focus on the receiver algorithms, with the following objectives:

- Development of Maritime SBAS user receiver algorithms and guideline documentation
- Development and testing of a Maritime SBAS receiver prototype
- Derivation of future maritime PNT needs with a focus on northern areas

## 2. MAREC – SBAS in Maritime Receivers (GSA)

This is a GSA Fundamental Elements project, focused on implementing the SBAS Receiver guidelines in on-board equipment. The objective of this project is to contribute to the ongoing SBAS standardization activities, by finalising the guidelines for the implementation of SBAS in the maritime and contributing to the work on test specifications. The algorithms will be implemented in Kongsberg commercial receivers (Seapos 320 and DPS 132) and tested in a laboratory and in a real environment.

Stig Erik commented that both SBAS4MAR and MAREC projects will test the equipment in a real environment in the Fjord of Trondheim.

## 3. AMNAS – Provision of SBAS and ARAIM through VDES satellites (ESA)

AMNAS is an ESA project devoted to analyse the provision of augmentation data (SBAS and ARAIM) to mariners using VDES-Sat to improve availability and integrity for navigation in the Arctic area.

This is expected to be the first project in an on-going series. Later work is expected to verify the project assumptions and analyse whether VDES is the most appropriate method.

A comparison between the two options analysed was commented. The SBAS Extension service has stringent latency and update rate requirements, but a near real-time service could be provided with 20 to 25 LEO satellites operating in a digital bent pipe manner. In contrast, the ARAIM option is less demanding, requiring only 7 satellites operating in a store and forward approach.

The AMNAS project indicates that VDES-Sat is capable of supporting GNSS augmentation to users in the Arctic area. The results of this project will be shared with the international standards bodies which are developing VDES.

### 2.2.7 GSA - SEASOLAS Project.

Silvia Porfili (GSA) presented the main outcomes of the SEASOLAS project. SEASOLAS is an EC funded project aimed at analyse an EGNOS (v3) DFMC Maritime Safety Service, including integrity at user level (from 2025+).

The Service architecture considers the use of EGNOS v3 signal in space (SiS) and also the transmission of information on service outages through terrestrial channels.

Three demanding scenarios were considered with potential to get benefits from the use of this EGNOS Safety Service: Port Navigation, Inland Waterways navigation (IWW) and Traffic Separation Schemes (TSS).

The reference requirements used for the project analyses were the operational requirements established by IMO regulations already accepted by the maritime community and also the project identified a set of more demanding figures for the different scenarios (called target performance levels) which aimed to explore if the technology also allowed to fulfilling more stringent requirements than the regulated ones.

The user level integrity concept proposed by the project combines an adaptive safety margin around the vessel and an alert to the mariner when the service performance at the user level is not compliant with the operational requirements for the intended operation. The proposed integrity concept provides a way to measure how reliable the vessel's position is. The alert, based on protection levels, might be provided to the mariner through a display in the bridge or embedded in the ECDIS.

Silvia presented the different technical solutions considered within the project. A preliminary assessment of the achievable performance showed that the technical solutions can meet the selected case scenarios requirements at an affordable price for the maritime users; however, additional critical activities still need to be carried out to consolidate the maturity of the proposed concept and ensure the readiness of the EGNOS DFMC Maritime Safety service.

Silvia commented that the project final report will be published soon and that users' feedback would be very much appreciated and asked for EMRF support in this process.

### **Action 3 – EMRF to support the user consultation process regarding the SEASOLAS project results.**

## **2.3 European approach towards the EGNOS L1 Maritime Service Declaration**

Manuel López (GSA) presented the European (EC and GSA) programmatic approach for the declaration of an EGNOS L1 Maritime Service in 2021.

GSA has proposed EC to start the process for delivering a new EGNOS service for Maritime based on SBAS L1 signal. This process is split into 4 phases (Concept Review, Requirements Review, Design Review and Operational Readiness Review).

The GSA will prepare the evidences (documents) of fulfilment/completeness of each of these phases, which will be presented to the EC for a formal approval for the EGNOS L1 maritime service declaration.

### **2.3.1 Service Concept Review**

For the first phase (SCR), the GSA has drafted an organisation note, which has been shared with EC and ESSP for comments. Once approved, the GSA will request EC to approve the process.

The objectives of this SCR (planned to be held in January 2019) are to verify that the following pre-requisites are fulfilled:

1. Clear Service/Mission requirements are established.
2. A preliminary impact assessment at System and Operations level is performed.
3. Cost/Benefit Analysis (costs for the Programme and benefits for maritime authorities).
4. The approach to the user segment development is defined and justified.
5. A Service Provision organisation model (high level CONOPS) is established.
6. At least 2 credible receiver manufacturers declare intention to commercialise receivers supporting EGNOS Maritime services.
7. At least 2 Maritime authorities declare intention to implement this service.

GSA requests EMRF support in this process and a letter expressing this support is proposed to be elaborated and sent to the EC/GSA.

### **2.3.2 EMRF support letter to EC/GSA**

Words for the proposed EMRF letter in support of the proposal were developed by the meeting attendees. It expresses the requested EMRF support, clarifying that the EMRF is an informal and unofficial body that cannot provide formal endorsement, but encourages the competent authorities in the Member States to do so.

The EMRF members suggested waiting until the end of the meeting, once all the discussions have been held, to concrete the final text of the letter (see §3.1.3).

## 2.4 EGNOS Service Provision Working Group (ESPWG)

As chair of this EMRF-ESPWG, José Manuel (ESSP) introduced this point in the agenda. He first recalled that following the GSA's presentation (SCR) the focus of the following presentations and discussions would be on the implementation of an EGNOS SiS L1 Maritime Service (2nd step in the GSA high level roadmap for the adoption of EGNOS in the maritime domain).

The SPWG has been working in the past years to define a common and harmonized approach to the EGNOS Service Provision Aspects in Maritime Navigation Applications. The different discussions have been gathered in a technical document, which has been restructured for the easy of understanding in a root document and 6 Appendices. The Appendices under final consolidation were recently updated with new inputs and have been provided to the meeting attendees for their consideration.

José Manuel highlighted that the discussions to be held under the next points in the agenda aim at achieving three main objectives:

1. Consolidate the remaining open points in the Appendices under revision, so as to freeze at this stage these documents that serve as inputs to the SCR documents (evidences of fulfilment of the different pre-requirements)
2. Support the SCR process (and the prepared evidences) for the implementation of the EGNOS L1 Maritime Service
3. Agree on the EMRF support letter text to be sent to EC and GSA

### 2.4.1 EGNOS L1 maritime service roadmap status/update

Manuel López (GSA) presented an update on the roadmap for the implementation of EGNOS Services in the maritime domain.

- Step1: Transmission of EGNOS corrections over IALA beacons or AIS  
Manuel recalled that the IALA Guidelines G1129 were published in December 2017 and that the pilot projects are already running with 4 different implementations.  
Some questions were raised about informing the user if the corrections retransmitted are from EGNOS or not. This might require changes in the RTCM messages format to include this information. It was proposed to deal with this point at IALA level (ENG committee) so as to look for additional opinions and suggestions.
- Step 2: EGNOS L1 (SiS) Maritime Service  
IALA ENG Committee plans to provide guidance for authorities (target 2020) and the IEC standardisation work on SBAS L1 is expected to be started in mid-2019 (so as to have the SBAS L1 test specifications ready by 2021).  
Regarding the receivers it was clarified that the standardisation activities, including the MAREC project, are not considering the complementary use of DGNSS and SBAS. The MAREC project is expected to implement the SBAS Rx Guidelines in receivers and test them in real environment so as to provide feedback to complete the guidelines to be used as inputs at IEC.

It was also commented that it will take 1 year to have a receiver in the market once the test specifications are ready (although sometimes the receivers are developed at the same time and this 1 year period could be shorter).

- Regarding the Service Provision aspects, the progress achieved is very positive. The remaining open points, are expected to be closed in the short term.

#### 2.4.2 EGNOS L1 maritime Service Definition

Elisabet Lacarra (ESSP) presented an update on SBAS for Shipborne Receivers.

The “Draft Guidelines for manufacturers for the implementation of SBAS in Shipborne Receiver”, drafted and reviewed in the scope of RTCM SBAS, were presented. A survey to receiver manufacturers was launched to see the compliance status to these guidelines and the results were very positive: the identified changes needed to comply with the guidelines were small and easy to implement for the manufacturers.

Elisabet recalled the proposed integrity concept at system level in compliance with IMO Resolution A.1046, which considers system failures (including satellite, iono and system alerts) but not local sources.

Then, the results of a preliminary analysis of EGNOS L1 maritime service performance (26 months period from 1-May-2016 to 30-June-2018) were presented to the attendees. The results shown compliance with IMO performance requirements for the different parameters analysed:

The Service continuity is a very demanding requirement (99.97%), and it was commented that it could be relaxed to 99.95% if SBAS is used as backup system in combination with other systems (this assumption is taken from reference IALA beacons documentation). It was explained the continuity coverage area is expected to improve with a new SW release for the RIMS stations.

Moreover, the extension of coverage up to 72° expected for a coming system release may improve the figures resulting from the performance analysis.

Elisabet continued presenting the results of a maritime GNSS campaign performed in Norway. The obtained performance results demonstrate the feasibility of EGNOS for some maritime applications.

Finally, the way forward with respect to receivers and standardization activities was recalled:

- Consideration of inputs from MAREC project, in which Kongsberg is developing a receiver in line with these guidelines.
- Final version of the Guidelines for Manufacturers for the Implementation of SBAS in Shipborne Receivers to feed the IEC process
- Support the process the integration of SBAS in the standardization process for maritime navigation and radiocommunication equipment and systems IEC 61108.

It was noted as well that the information presented in this point of the agenda refers to Appendix 5 and 6 (SPWG documents). The information in these appendices was already stable and, with minor update in Appendix 5 to reflect the latest results, are considered as frozen.

#### 2.4.3 EGNOS maritime Service points for discussion/decision and support:

##### 2.4.3.1 Service provision Scheme (SPWG Appendix 1)

Jaime Álvarez (ESSP) presented the EGNOS L1 Maritime Service provision scheme. The high level scheme considers the different actors involved and the interfaces between them.

The Service Provision scheme is confirmed to be valid (Appendix 1 can be frozen) with two updates agreed with the meeting attendees, as follows:

- There is no need of an oversight entity for this service (a supervisory body providing an oversight of the EGNOS L1 Maritime Service and of the agreements to be established between the ESP and Maritime Authorities/Competent Authorities).
- Clarify the Maritime Authority's role in the EGNOS MSI delivery process

#### 2.4.3.2 *Maritime Safety information (SPWG Appendix 3)*

María Mota (ESSP) presented the proposed scheme for the generation and distribution of EGNOS Maritime Safety Information (MSI).

The proposal considers using the same scheme, procedures and format already in place and which the maritime community are familiar with. The ESP will continuously monitor and verify the EGNOS Maritime Service committed performances and in case of events/deviations will inform the NAVAREA coordinators (NAVAREA I, II, III and XIX). Depending on the specific characteristics of the EGNOS MSI, the NAVAREA coordinators will distribute the information as NAVAREA warning or will forward it to the National Authorities to be distributed as coastal or local warnings by the established mechanism.

Again the role of the Maritime Authority within this MSI process was emphasized.

The presented EGNOS MSI delivery scheme was supported by the group (Appendix 3 can be frozen).

### 3 DAY 2 - WEDNESDAY 31<sup>ST</sup> OCTOBER 2018

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#### 3.1 EGNOS Service Provision Working Group (cont)

##### 3.1.1 EGNOS maritime Service points for discussion/decision and support:

###### 3.1.1.1 *Liability Scheme*

José Manuel Álvarez (ESSP) presented the proposed liability scheme for the EGNOS L1 Maritime Service (included in SPWG Appendix 4 document).

The proposed approach aims to cover the different aspects (Technical, Operational and Regulatory) in the liabilities scheme supporting the operational introduction and use of EGNOS in the waters under a specific administration responsibility. The EMRF group confirmed:

- The operational roles and responsibilities' apportionment described in the proposed operational scheme
- The operational elements/modalities identified in the required interface with the EGNOS Service provider in support to the corresponding operational chain and service provision scheme.
  1. Operation and Maintenance
  2. Performance Verification
  3. Publication of information
  4. Service commitment and working arrangements
- EGNOS Maritime service approval/authorization on a national basis won't be required as this service offered by the EC to all European Community under the SDD conditions (still to be defined).
- There are two liability scheme options identified to formalize the proposed service provision scheme
  - **Option A:** Based on the information reflected in the corresponding Service Definition Document, as issued by the European Commission (i.e. no agreement between the entity actually providing the service, ESP, and the competent national authority)
  - **Option B:** The same as the previous plus a MoU/EWA (common to all states) formalized with the EGNOS Service Provider to reflect the required operational modalities

It is clarified that the EWA/MOU will not add any additional liability to the national authority (this may depend on whether EGNOS is declared an AtoN by the national/competent authority). Its main purpose is to reflect the additional information and the support the authorities will receive from a third party (the ESP) as well as to define the interfaces between the ESP and the corresponding national authority.

The selection on the required option, harmonized at EU level, will be made upon clarification on the following elements:

- Should EGNOS/SBAS in the safety of navigation domain be considered an AtoN or not. There is an IALA ENG (WG3) task to provide technical/operational guidance to maritime administrations on the use of SBAS that may help to address this question, involving as well the IALA Secretary General to address all the elements around this topic.
- Legal/contractual requirements and interpretation, as identified by each state, on the need for a working arrangement with the EGNOS Service provider (third party delivering a service in the corresponding waterways).
- Competent Authority empowered to formalize the required EGNOS operational modalities as EGNOS Service Provider counterpart.

### 3.1.2 Validation of evidences for the EGNOS L1 Maritime Service Concept Review (SCR)

The meeting continued with the assessment of the documents prepared in the frame of the programmatic approach, as evidences to be evaluated at the SCR (first phase in the process).

The following SCR documents, distributed to the meeting attendees, were revised by the group:

- SCR1 – Service Mission Requirements

Different attendees commented that it should be clarified in the document that EGNOS is an augmentation system and that it only augments GPS L1.

- SCR2 – System and Operations impact assessment

No comments were received.

- SCR4 – User segment approach

The receivers and standardisation activities, already presented to the meeting attendees and included in this document, did not receive additional comments.

- SCR5 – High Level Service Provision Model

The service provision scheme included in this document will be updated according to the comments already provided by the group to SPWG Appendix 1:

- There is no need of an oversight entity for this service (a supervisory body providing oversight of the EGNOS L1 Maritime Service and of the agreements to be established between the ESP and Maritime Authorities/Competent Authorities).
- Clarify the Maritime Authority's role in the EGNOS MSI delivery process

These SCR documents (SCR 1, 2, 4 and 5) are confirmed to be correct with minor comments (indicated above). ESSP noted that these documents are open for EMRF members' review until the 15th of November. The documents' final version (including the comments provided) will be distributed to the meeting's attendees plus Francis Zachariae, IALA Secretary General and Michael Card IALA Deputy Secretary General.

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**Action 4 – ESSP will send an e-mail with the documents, the actions requested to the EMRF members and the proposed schedule.**

Manuel Lopez (GSA) also requested to confirm the support to this process from the different Maritime Authorities attending the meeting, as it will be also required to cover a prerequisite for the SCR phase. Puertos del Estado, Trinity House and the Commissioners of Irish Lights confirmed that they support the process being developed by the GSA/EC and presented during the meeting. Other authorities' representatives noted that they were not in a position to express this support, but could crosscheck internally.

### 3.1.3 EMRF support letter to EC/GSA

Having in mind the discussions held during the meeting, the attendees reviewed and revised the draft EMRF support letter to be sent to the EC and GSA: The letter text was edited and a draft proposal was consolidated with the consensus of the group.

Jacques Manchard will finalize the letter contents and will send it to GSA Exec Director (Carlo Des Dorides) and EU SatNav Programmes Director DG GROWTH (Mathias Petschke) and in copy to IALA (Francis Zachariae), GSA (Gian Gherardo Calini) and ESSP (Thierry Racaud).

**Action 5 – EMRF chair will send to GSA Exec Director (Carlo Des Dorides) and EU SatNav Programmes Director DG GROWTH (Mathias Petschke) and in copy to IALA (Francis Zachariae), GSA (Gian Gherardo Calini) and ESSP (Thierry Racaud).**

## 3.2 Conclusions and way forward

The meeting concluded with a summary of the main points addressed and conclusions.

ESSP will freeze the SPWG Appendices with the comments and outcomes of the meeting and also will update the SCR documents with the attendees feedback expected by the 15<sup>th</sup> November.

The next step in this process is the SCR evaluation, expected to take place in January 2019. Based on the outcomes of this first milestone, the following steps will be defined.

GSA confirmed that EMRF will continue playing a key role in the development of the EGNOS Maritime Service but not possible to set up a tentative date for the next meeting.

Finally, it was confirmed that the meeting minutes and presentations will be uploaded to the EMRF website.

## 4 ACTION ITEMS

The table below gathers the different actions rose during the workshop, indicating the status of the actions and identifying the allocated responsible for each of them.

Action	Description	Responsible	Status
<b>Error! Reference source not found.</b>	EMRF to play a part in helping to coordinate MCP collaborative effort in Europe	EMRF	Open
<b>Error! Reference source not found.</b>	EMRF to support the EC ERNP consultation process	EMRF	Open
<b>Error! Reference source not found.</b>	EMRF to support the user consultation process regarding the SEASOLAS project results.	EMRF	Open
<b>Error! Reference source not found.</b>	ESSP will send an e-mail with the documents, the actions requested to the EMRF members and the proposed schedule.	ESSP	Closed (6/11/2018)
<b>Error! Reference source not found.</b>	EMRF chair will send to GSA Exec Director (Carlo Des Dorides) and EU SatNav Programmes Director DG GROWTH (Mathias Petschke) and in copy to IALA (Francis Zachariae), GSA (Gian Gherardo Calini) and ESSP (Thierry Racaud).	EMRF Chair	Closed (9/11/2018)

Table 1 List of action items

## 5 PARTICIPANTS

The detailed attendee list is included in the table below:

Name	Mail	Company	Country
Alan Grant	<a href="mailto:Alan.Grant@gla-rnav.org">Alan.Grant@gla-rnav.org</a>	GLA Research and Development Directorate	UK/Ireland
George Shaw	<a href="mailto:george.shaw@gla-rnav.org">george.shaw@gla-rnav.org</a>	GLA Research and Development Directorate	UK/Ireland
Etienne LEROY	<a href="mailto:etienne.leroy@cerema.fr">etienne.leroy@cerema.fr</a>	CEREMA	France
Kaisu Heikonen	<a href="mailto:kaisu.heikonen@fta.fi">kaisu.heikonen@fta.fi</a> <a href="mailto:Kaisu.Heikonen@liikennevirasto.fi">Kaisu.Heikonen@liikennevirasto.fi</a>	Finnish Transport Agency	Finland
Michael Hoppe	<a href="mailto:michael.hoppe@wsv.bund.de">michael.hoppe@wsv.bund.de</a>	WSV	Germany
Juan Francisco Rebollo	<a href="mailto:jfrebollo@PUERTOS.ES">jfrebollo@PUERTOS.ES</a>	Puertos del Estado	Spain
Marek Dziewicki	<a href="mailto:marekdz@umgdy.gov.pl">marekdz@umgdy.gov.pl</a> <a href="mailto:marek.dziewicki@umgdy.gov.pl">marek.dziewicki@umgdy.gov.pl</a>	Maritime Office Gdynia	Poland
Martin Bransby	<a href="mailto:Martin.Bransby@gla-rnav.org">Martin.Bransby@gla-rnav.org</a>	GLA Research and Development Directorate	UK/Ireland
Marek Ledochowski	<a href="mailto:marled@umgdy.gov.pl">marled@umgdy.gov.pl</a> <a href="mailto:marek.ledochowski@umgdy.gov.pl">marek.ledochowski@umgdy.gov.pl</a> <a href="mailto:marekjola@hotmail.com">marekjola@hotmail.com</a>	Administration/Maritime Office	Poland
María Mota	<a href="mailto:maria.mota@external.essp-sas.eu">maria.mota@external.essp-sas.eu</a>	ESSP	Spain
José Manuel Álvarez	<a href="mailto:Jose-Manuel.Alvarez@essp-sas.eu">Jose-Manuel.Alvarez@essp-sas.eu</a>	ESSP	Spain
Jaime Álvarez	<a href="mailto:Jaime.Alvarez@essp-sas.eu">Jaime.Alvarez@essp-sas.eu</a>	ESSP	Spain
Manuel López	<a href="mailto:manuel.LOPEZMARTINEZ@gsa.europa.eu">manuel.LOPEZMARTINEZ@gsa.europa.eu</a>	GSA	Czech Republic
Silvia Porfili	<a href="mailto:silvia.porfili@gsa.europa.eu">silvia.porfili@gsa.europa.eu</a>	GSA	Czech Republic
Carlos Armiens	<a href="mailto:Carlos.ARMENS@ec.europa.eu">Carlos.ARMENS@ec.europa.eu</a>	JRC/EC	Belgium
Jaques Manchard	<a href="mailto:jacques.manchard@iala-aism.org">jacques.manchard@iala-aism.org</a>	EMRF	France
Roger Barker	<a href="mailto:roger.barker@thls.org">roger.barker@thls.org</a>	Trinity House	UK
Robert McCabe	<a href="mailto:robert.mccabe@irishlights.ie">robert.mccabe@irishlights.ie</a>	Commissioners of Irish Lights	Ireland
Ray Donohoe	<a href="mailto:ray.donohoe@irishlights.ie">ray.donohoe@irishlights.ie</a>	Commissioners of Irish Lights	Ireland
Lourdes	<a href="mailto:ltavira@indra.es">ltavira@indra.es</a>	INDRA	Spain

Tavira Guillén			
Stig Erik Christiansen	<a href="mailto:stig.erik.christiansen@km.kongsberg.com">stig.erik.christiansen@km.kongsberg.com</a>	Kongsberg	Norway
David Jiménez	<a href="mailto:David.Jimenez.Banos@esa.int">David.Jimenez.Banos@esa.int</a>	ESA	Netherlands
Elisabeth Lacarra	<a href="mailto:Elisabet.Lacarra@essp-sas.eu">Elisabet.Lacarra@essp-sas.eu</a>	ESSP	Spain
Jorge Morán	<a href="mailto:Jorge.Moran@essp-sas.eu">Jorge.Moran@essp-sas.eu</a>	ESSP	Spain
Virginia Antón	<a href="mailto:Virginia.Anton@essp-sas.eu">Virginia.Anton@essp-sas.eu</a>	ESSP	Spain
Admir Salahovic	<a href="mailto:admir@indra.es">admir@indra.es</a>	INDRA	Spain
Gines Moreno	<a href="mailto:gimoreno@gmv.com">gimoreno@gmv.com</a>	GMV	Spain
Juan Jose Arias Picazo	<a href="mailto:jjarias@gmv.com">jjarias@gmv.com</a>	GMV	Spain
Ana Cezon Moro	<a href="mailto:acezon@gmv.com">acezon@gmv.com</a>	GMV	Spain
Javier Ostolaza	<a href="mailto:Javier.OSTOLAZA@gsa.europa.eu">Javier.OSTOLAZA@gsa.europa.eu</a>	GSA	Prague
Kjell-Arne Aarmo	<a href="mailto:kjell@spacecentre.no">kjell@spacecentre.no</a>	Norwegian Space Centre	Norway
Francisco Javier de Blas	<a href="mailto:Francisco-Javier.Deblas@essp-sas.eu">Francisco-Javier.Deblas@essp-sas.eu</a>	ESSP	Spain
Francisco-Javier Argul	<a href="mailto:fjargul@puertos.es">fjargul@puertos.es</a>	Puertos del Estado	Spain

Table 2 Workshop Attendees



Figure 1 Workshop Attendees

Apologies were received from:

- Mike Fairbanks (EMRF)
- Gilles LEQUEUX (JRC/EC)

- 
- Bjørnar Kleppe (Norwegian Coastal Administration)
  - Jesper Backstedt (Swedish Maritime Administration)
  - Isabelle Ryckbost (European Sea Ports Organisation)
  - Aron Frank Sørensen (BIMCO)
  - Lawrence Sciberras (EMSA)
  - Gergely Mező (RSOE)

## 6 ACRONYMS

Acronym	Definition
DFMC	Dual-Frequency Multi-Constellation
EC	European Commission
EMRF	European Maritime Radionavigation Forum
ERNP	European Radio Navigation Plan
ESA	European Space Agency
ESSP	European Satellite Services Provider
GLA	General Lighthouse Authorities of the United Kingdom and Ireland
GRAD	GLA Research and Development Directorate
GSA	The European GNSS Agency
IALA	International Association of Lighthouse Authorities
IMO	International Maritime Organisation
M-RAIM	Maritime RAIM
RAIM	Receiver Autonomous Integrity Monitoring
R-Mode	Ranging Mode
SiS	Signal in Space
SPWG	EGNOS Service Provision Working Group
WWRNS	World Wide RadioNavigation Systems