



European
Global Navigation
Satellite Systems
Agency



Appendix 4: EGNOS Working Arrangements & Liabilities' Scheme



Iss. 01-00

Date: 03/12/2018

Function	Name	Signature	Date
Written by	José Manuel Álvarez		03/12/2018
Function	María Mota Jaime Álvarez EMRF SPWG members		

Document Life Cycle				
Release	Author	Date	Reason for Change	Sections impacted
00-01	José Manuel Álvarez María Mota EMRF SPWG	11/07/2018	New structure	All
00-02	José Manuel Álvarez María Mota EMRF SPWG	15/10/2018	Updated with comments from the group	All
01-00	José Manuel Álvarez María Mota Jaime Álvarez EMRF SPWG	03/12/2018	Consolidated version of the document. Service Provision Scheme and main roles and responsibilities of the parties involved agreed with the support of the EMRF members at the 2018 EMRF-SPWG workshop [RD-14]	All

Document Dissemination	
Internal to ESSP-SAS	External
ESSP	GSA
	EMRF

Table of Content

1	INTRODUCTION.....	4
1.1	PURPOSE AND SCOPE OF THE DOCUMENT.....	4
1.1.1.	<i>Background.....</i>	6
1.2	REFERENCE DOCUMENTS	7
1.3	ACRONYMS.....	7
2	REQUIREMENTS AND BEST PRACTICES FOR EGNOS SERVICE PROVISION IN MARITIME AND INLAND WATERWAYS	9
2.1	OPERATION AND MAINTENANCE	9
2.2	PERFORMANCE VERIFICATION	10
2.3	PUBLICATION OF INFORMATION	11
2.4	COMMITMENT AND WORKING ARRANGEMENTS:	13
3	PROPOSED APPROACH FOR ESP OPERATIONAL/LIABILITY SCHEME.....	17
3.1	EGNOS SERVICE DEFINITION DOCUMENT (SDD)	17
3.2	MARITIME EGNOS WORKING AGREEMENT (MEWA)	18
3.2.1	<i>EWA main document:</i>	19
3.2.2	<i>EWA ANNEX 1</i>	20
3.2.3	<i>EWA ANNEX 2</i>	20
4	EGNOS SDD CONSIDERATIONS.....	22

Table of Figures

FIGURE 1: SPWG TECHNICAL DOCUMENT NEW STRUCTURE.....	4
--	---

Table of Tables

TABLE 1: REFERENCE DOCUMENTS	7
TABLE 2: ACRONYMS.....	8

1 INTRODUCTION

1.1 Purpose and Scope of the Document

On the basis of the work done in this field along the past years within the Service Provision Working Group and including also the main conclusions of the EMRF/NMSP Workshops (held on October 5th and 6th 2017 in Athens [RD-8] and on October 30th and 31st 2018 in Madrid [RD-14]), the purpose of this document is to define the **appropriate liabilities schemes** for the provision of EGNOS Service for Maritime and IWW navigation.

This document is one of the appendixes generated in the frame of the EMRF Service Provision Working Group, as depicted in the figure below, gathering the information shared and addressed by the group members for the definition of the EGNOS Service Provision aspects:

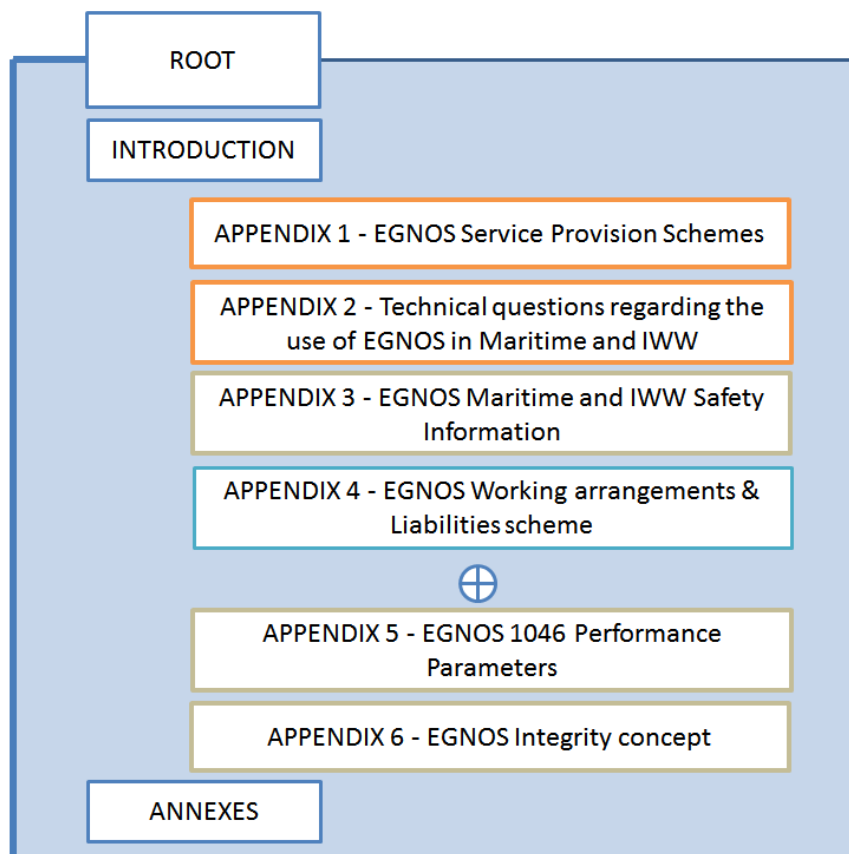


Figure 1: SPWG Technical document new structure

The objective is to define the liability scheme, including actors, roles and responsibilities, (EGNOS Service Provider and counterpart(s)) to be considered behind the EGNOS service provision in Maritime and Inland Waterways (IWW) domains.

It is proposed an approach for the EGNOS Working agreements within the EGNOS Service Provision Scenario 2 (L1 SiS received onboard the vessels with type approved receivers) and Scenario 3

(EGNOS information to be retransmitted over IALA Beacons or AIS stations) even it has to be noted that significant differences may appear when entering to the details.

On the basis of the applicable regulatory requirements, the intention is to propose an approach suitable for those Scenarios which consider the establishment of a Working agreement with the EGNOS Service provider laying down the terms and conditions of the service offered as well as the liabilities scheme of the parties involved.

This document, based on the existing requirements in the domain, and considering as well the particularities of the EGNOS Service for these Scenarios, describes the high level structure of the proposed approach (common to both scenarios). Then, the low level differences applicable to either Scenario 2 or Scenario 3 (see DEL-M Appendix 1 [RD-2]) will need to be addressed independently.

This Appendix 4 is structured in the following sections:

1. Introduction (this section):

Introduction to the document, including the scope and how this appendix is integrated in the frame of the SPWG documents structure.

2. Requirements and Best Practices for EGNOS Service Provision in Maritime and Inland Waterways.

This section identifies the main reference requirements and best practices already in place in the maritime and IWW domains for the definition of roles and responsibilities and liabilities schemes.

The intention of the analysis developed is to identify the requirements and best practices which seem suitable to be applied as well to the provision of the EGNOS Service. However, EGNOS particularities and additional requirements are also considered and proposed within this approach (e.g. data recording).

3. Proposed approach for ESP operational/liability scheme

This section presents the proposed approach for the organization of the service covering the needs and regulatory requirements identified and gathered in previous section.

4. EGNOS SDD considerations

This Section describes some considerations regarding the definition of a Service Definition Document for the EGNOS L1 Maritime Service.

This document has been distributed among the maritime and inland waterways authorities involved in the SPWG for their consideration.

The text provided in this document has been consolidated according to the agreements and main conclusions reached in the frame of the SPWG and supported by the Maritime Authorities attending the 2018 EMRF – SPWG Workshop [RD-14].

1.1.1. Background

The definition of the EGNOS Service Provision aspects is key for the implementation of an EGNOS Service for Maritime and IWW navigation. This definition is being addressed by the Service Provision Working Group (SPWG), established within the framework of the European Maritime Radio Navigation Forum (EMRF) and participated by different Authorities and representatives from the maritime and GNSS industry.

This group has analysed the main elements to be considered for defining the appropriate scheme for the EGNOS Services Provision in the Maritime and IWW domains, based on actual regulatory framework and community needs and considering the system capabilities available today (EGNOS v2). These elements include the following points:

- **Identification of Regulatory Framework and key stakeholders**

The group identified the existing regulations, standards and technical references related to the provision of Maritime/IWW navigation services (Aids to Navigation), which may also apply to the provision of the EGNOS service for maritime/IWW.

- **Definition of the Service Provision Scheme(s).**

Based on the previously identified framework and considering the existing system capabilities and potential EGNOS transmission options, the group defined different Service Provision scenarios. These scenarios present **the high-level schemes** for the provision of EGNOS Service in Maritime and IWW, identifying the main actors involved together with their main interfaces/responsibilities APPENDIX 1 [RD-2] within the SPWG documents.

These scenarios were validated by maritime authorities attending the 2017 joint EMRF/NMSP Workshop held in Athens the 5th and 6th October 2017 [RD-8] and those Authorities attending the 2018 EMRF-SPWG workshop held in Madrid the 30th and 31st of October 2018 [RD-14].

- **Liabilities for the EGNOS Service Provision in Maritime and Working arrangements**

Once the high-level Service Provision Schemes have been identified, the next step was to further develop the roles and responsibilities for each scheme together with the very scope of their required interfaces. Moreover, it was critical to define the low-level details to be considered within the working arrangements and in particular the liability scheme to be established between the parties involved in each Service Provision Scheme.

This analysis has been addressed in coordination with the authorities within the SPWG and gathered in this document (the particular proposal is included in section 3 in this document).

It is very relevant to note that the (free of charge) EGNOS service provision will be established under a fair and equitable treatment principle among all the EU member states and notably the liability points to be addressed will ensure this fact. However, in some cases, due to differences in national regulations and processes, some tweaks may be needed to be considered so as to reflect certain national particularities. Furthermore, although the EGNOS L1 Maritime service (SiS use in Scenario 2) will be tailored to the European Maritime community needs for maritime navigation in accordance with the harmonized implementation of the maritime community requirements, the approval/authorization on a national basis will not be required as this service will be offered by the EC to all European Community under the SDD conditions (see §3 and §4).

Moreover, it should be mentioned that the liability scheme proposed and gathered in this document does not define any additional responsibilities/liabilities to be allocated to the National Competent Authorities, beyond their current existing ones.

1.2 Reference Documents

RD	Document Title
[RD-1]	EMRF-SPWG-Root_v1.0, March 2018
[RD-2]	EMRF-SPWG-APPENDIX 1 - EGNOS Service Provision Schemes
[RD-3]	EMRF-SPWG-APPENDIX 2 - Technical questions regarding the use of EGNOS in Maritime and IWW
[RD-4]	EMRF-SPWG-APPENDIX 3 – EGNOS Maritime and IWW Safety Information
[RD-5]	EMRF-SPWG-APPENDIX 5 - EGNOS 1046 performance parameters_v7
[RD-6]	EMRF-SPWG-APPENDIX 6 - EGNOS V2 Integrity for maritime operations_v1.3
[RD-7]	IMO International Convention for the Safety of Life at Sea (SOLAS), 1974
[RD-8]	Minutes of the meeting of the 5th EMRF workshop on the maritime use of EGNOS, Athens October 2017
[RD-9]	IALA Recommendation R-121 on Performance and Monitoring of DGNSS Services in the Frequency Band 283.5-325kHz - Edition 2 - 29 May 2015.
[RD-10]	IALA Guideline No.1112 on Performance and Monitoring of DGNSS Services in the Frequency Band 283.5-325kHz - Edition 1 - 29 May 2015.
[RD-11]	IMO Resolution A.1046(27) on Worldwide Radionavigation Systems - 30 November 2011
[RD-12]	IALA Guideline No.1005 on Contracting out Aids to Navigation Services – Edition 2 -.07 December 2005
[RD-13]	IALA Recommendation R-135 On The Future of DGNSS - Edition 2 - December 2008
[RD-14]	EMRF-SPWG 2018 Workshop Report_v1.1 (30-31 October 2018)

Table 1: Reference documents

1.3 Acronyms

The list of acronyms is provided is included hereafter.

Acronym	Definition
AtoN	Aids to Navigation

Acronym	Definition
CEREMA	Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement
EGNOS	European Geostationary Navigation Overlay Service
ESP	EGNOS Service Provider
EMRF	European Maritime RadioNavigation Forum
ESSP	European Satellite Services Provider
EWA	EGNOS Working Agreement
GLA	General Lighthouse Authorities of the UK and Ireland
GSA	European GNSS Agency
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IMO	International Maritime Organization
IWW	Inland Waterways
MSI	Maritime Safety Information
MoU	Memorandum of Understanding
OS	Open Service
SBAS	Satellite-Based Augmentation System
SDD	Service Definition Document
SI	Safety Information
SPWG	EGNOS Service Provision Working Group
(M)EWA	(Maritime) EGNOS Working Agreement
WWRNS	World-Wide Radionavigation System

Table 2: Acronyms

2 REQUIREMENTS AND BEST PRACTICES FOR EGNOS SERVICE PROVISION IN MARITIME AND INLAND WATERWAYS

The intention of this section is to set out the liabilities, requirements and best practices already in place in the maritime and IWW domains to be used as the reference for the definition of the of roles, responsibilities and interfaces for each EGNOS SP scheme (included in Appendix 1 [RD-2]), so as to assure consistency with existing practices for similar operational concepts.

The points presented below summarise the analysis performed within the SPWG that identified the main references and existing requirements to be applied to the provision of AtoN Services in maritime and inland waterways, which seem suitable to be also applied to the provision of EGNOS Services in the maritime and inland Waterways domains. It also takes into consideration further analysis developed by the ESP and presented during the 2017 EMRF-NMSP workshop held in Athens the 5th and 6th of October 2017 [RD-8].

The references identified have been grouped into four blocks of requirements as follows:

1. **Operation and Maintenance**
2. **Performance Verification**
3. **Publication of information**
4. **Commitment and working arrangements**

The following subsections detail the requirements identified within each of these blocks.

It should be noted that the **maritime and IWW experts attending the 2017 EMRF- NMSP workshop [RD-8] validated the requirements identified** and confirmed that the information presented was complete and that there were no missing requirements applicable to the (EGNOS) Service Provision in both domains.

Moreover, the **Maritime Authorities attending the 2018 EMRF-SPWG workshop [RD-14] confirmed these operational elements/modalities** identified in the required interface with the EGNOS Service provider in support to the corresponding operational chain and service provision scheme. These elements are further described in the subsections below.

2.1 Operation and Maintenance

The following reference documentation has been considered to extract the requirements listed below:

- ✓ IALA Recommendation R-121 on Performance and Monitoring of DGNSS Services in the Frequency Band 283.5-325kHz [RD-9].

According to this Recommendation the provision of differential GNSS (DGNSS) services should be operated in accordance with certain minimum standards that should include the signal format, reference datum, availability, continuity, integrity, accuracy, signal monitoring, range and coverage, status reporting, validation, and the publication of information about the system.

This IALA document recommends to Members and other Authorities providing DGNSS services in the MF band to adopt the design and implementation principles set out in the relevant IALA Guideline(s).

- ✓ IALA Guideline No.1112 on Performance and Monitoring of DGNSS Services in the Frequency Band 283.5-325kHz - Edition 1 - 29 May 2015 [RD-10].

According to this Guideline, *the operation of the service is considered as the set of tasks performed by the DGNSS service provider. With respect to **Operation and Maintenance**, the DGNSS service provider should continuously monitor the DGNSS transmissions to detect service disruptions and anomalies.* To monitor the quality of the service, the Service provider should provide means to:

- *to monitor the service using local or remote integrity monitors to detect service disruptions and anomalies;*
- *inform users using navigational warnings regarding service disruptions or scheduled interruptions;*
- *manage any service disruptions;*
- *manage maintenance work or changes to the service in such a way that service disruption is minimized and the users are provided with advance warning.*

Consequently, derived from the requirements above, the EGNOS service provider (ESP) should **continuously monitor the service** to detect service disruptions or anomalies and inform users accordingly. The ESP should cover the following aspects:

- To monitor the service;
- To detect service disruptions and anomalies with respect to the committed performance;
- To inform users using the corresponding warnings and communication channels (Maritime and IWW Safety Information) regarding service disruptions or scheduled interruptions;
- To manage any service disruptions;
- To manage maintenance work or changes to the service in order to minimize the service disruption and providing the users with warning in advance to the event.

2.2 Performance Verification

The following existing references have been considered:

- ✓ IALA Recommendation R-121 on Performance and Monitoring of DGNSS Services in the Frequency Band 283.5-325kHz [RD-9].

This document recommends to Members and other Authorities providing DGNSS services in the MF band to:

- Provide integrity information for GNSS;
- Provide the service with a level of redundancy to achieve performance requirements IMO A.1046 (27);
- Provide means of verifying the performance of the service;
- Adopt the design and implementation principles set out in the relevant IALA Guideline(s)

- ✓ IALA Guideline No.1112 on Performance and Monitoring of DGNSS Services in the Frequency Band 283.5-325kHz - Edition 1 - 29 May 2015 [RD-10].

According to this Guideline, *with respect to **Performance Verification**, the DGNSS service provider should verify that the service is performing according to specifications. The DGNSS service provider should verify that accuracy and integrity requirements are achieved (measured with appropriate monitoring facilities).*

- ✓ IMO Resolution A.1046(27) on Worldwide Radionavigation Systems [RD-11].

In terms of committed performance and performance verification, this IMO Resolution requires the following points to be guaranteed:

- The continued provision of the service is assured.
- The system is able to provide position information within the declared coverage area with a performance not less than that established in the present resolution.

Thus, derived from these references, the EGNOS Service Provider will verify that the service is performing according to the specifications committed (detailed in the corresponding Service Definition Document.), providing the means of this continuous verification.

Not only accuracy and integrity will be verified, but all the different parameters characterising the EGNOS 1046 Service (see EMRF-SPWG-APPENDIX 5 - EGNOS 1046 performance parameters_v7 [RD-5] for a complete description of these parameters).

2.3 Publication of information

The existing references considered regarding the publication of information are listed below:

- ✓ IALA Recommendation R-121 on Performance and Monitoring of DGNSS Services in the Frequency Band 283.5-325kHz [RD-9].

According to this Recommendation, the Members and other Authorities providing DGNSS services in the MF should provide mariners with information about the service, for example

- description of the service
- achieved service performance
- service disruptions
- geographical service area

- ✓ IALA Guideline No.1112 on Performance and Monitoring of DGNSS Services in the Frequency Band 283.5-325kHz - Edition 1 - 29 May 2015 [RD-10].

According to this Guideline, *with respect to the **Publication of information**, the DGPS service provider should provide a description of the DGNSS service and provide up to date information of scheduled maintenance activities.* The service provider should publish sufficient information about the service to enable users to use the service safely at all times.

This IALA Guideline proposes to employ the existing information channels, appropriate to the intended users and to the nature of the information (e.g. Notices-to-Mariners or broadcasting of maritime safety information (MSI) in the GMDSS).

The relevant information to be published should include:

- description of the service [for example which GNSS is supported], and its intended purpose, identification of the service provider, identification of where information relating to the service can be found and references to the relevant standards and specifications the service comply to.
 - advice for safe use of the service and cautionary notes taking into account user receiving equipment;
 - technical parameters for each DGNSS beacon;
 - achieved service performance;
 - the geographical service area where the performance criteria apply;
 - contact information for the service provider;
 - navigational warnings regarding service disruptions or scheduled interruptions.
- ✓ IMO Resolution A.1046(27) on Worldwide Radionavigation Systems [RD-11].

This IMO Resolution also requires the publication of the characteristics and parameters of the system and of its status:

- *The government or organization providing and operating the system has stated formally that the system is operational and available for use by merchant shipping.*
 - *Adequate arrangements have been made for publication of the characteristics and parameters of the system and of its status.*
 - *An integrity warning of system malfunction, non-availability or discontinuity should be provided to users as soon as practicable by Maritime Safety Information (MSI) systems.*
- ✓ IMO International Convention for the Safety of Life at Sea (SOLAS), 1974 [RD-7].

SOLAS Chapter V Regulation 13.3 states that “*Changes in the transmissions of position-fixing systems which could adversely affect the performance of receivers fitted in ships shall be avoided as far as possible and only be effected **after timely and adequate notice has been promulgated.***”

Based on the references above, in terms of publication of information, the EGNOS Service Provider will:

- Provide a description of the (EGNOS 1046) service and provide up to date information of scheduled maintenance activities. This relevant information should, as a minimum, include the points listed below:
 - Description of the service: publication of its characteristics, parameters of the system and its status and its intended purpose, identification of the service provider, identification of where information relating to the service can be found and references to the relevant standards and specifications the service comply with.
 - Coverage predictions and system performance statistics

- Information of scheduled maintenance activities and planned unavailabilities/degraded performance (provided to users through the appropriate Maritime/IWW Safety Information).
- Advice for safe use of the service and cautionary notes taking into account user receiving equipment;
- Achieved service performances (performance statistics)
- Contact information for the service provider
- Information/Support to users: Website, Helpdesk

2.4 Commitment and working arrangements:

The reference documentation analysed regarding service providers commitment and the establishment of working arrangements are listed below:

- ✓ IMO International Convention for the Safety of Life at Sea (SOLAS), 1974 [RD-7].

SOLAS Chapter V **Regulation 13** gives high level requirements on how to establish and operate aids to navigation but directs Contracting Governments to follow other relevant international recommendations and guidelines (e.g. published by IALA) when establishing the aids. This Regulation 13 regarding *Establishment and operation of aids to navigation* states:

1. *“Each Contracting Government undertakes to provide, as it deems practical and necessary either individually or in co-operation with other Contracting Governments, such aids to navigation as the volume of traffic justifies and the degree of risk requires.*
2. *In order to obtain the greatest possible uniformity in aids to navigation, Contracting Governments undertake to take into account the international recommendations and guidelines when establishing such aids.*
3. *Contracting Governments undertake to arrange for information relating to aids to navigation to be made available to all concerned. Changes in the transmissions of position-fixing systems which could adversely affect the performance of receivers fitted in ships shall be avoided as far as possible and only be effected after timely and adequate notice has been promulgated.”*

- ✓ IMO Resolution A.1046(27) on Worldwide Radionavigation Systems [RD-5].

This Resolution establishes the points to be fulfilled by the *organizations providing and operating the system*:

- The government or organization providing and operating the system has stated formally that the system is operational and available for use by merchant shipping.
- The system is able to provide position information within the declared coverage area with a performance not less than that established in the present resolution.
- Adequate arrangements have been made for publication of the characteristics and parameters of the system and of its status.
- Adequate arrangements have been made to protect the safety of navigation should it be necessary to introduce changes in the characteristics or parameters of the system that could adversely affect the performance of shipborne receiving equipment.

- ✓ IALA Guideline No.1005 on Contracting out Aids to Navigation Services [RD-12]

The majority of AtoN services are provided by national authorities that are governmental bodies. However in some cases AtoN services may be contracted out to external companies. This IALA guideline identifies the characteristics, proposed steps and types of contracting out AtoN. Some of the factors to be considered by the Maritime Authority when contracting Aids to Navigation Services are:

- Quality of the service
- Service offered to mariners
- Reliability and continuity of the service
- Response to outages
- Aids in place at the right time
- Physical proximity of service providers to clients
- Flexibility and innovation from the service provider
- Implementation of new technologies
- Risk Management
- Costs of the service:
 - Reduction of costs
 - Cost-effectiveness
 - Financial risk
 - Availability of cost recovery exercise

Other considerations included in this guideline are included below:

- The responsibility towards the international community always remains with the contracting Government as signatory of the SOLAS Convention. Any contract between the AtoN Authority and the private sector for doing tasks on aids to navigation remains under the responsibility of the authority.
- National Authorities should pay particular attention to the legislation within their countries. Being the owner of the aids to navigation service or the official organization responsible to provide an aid to navigation service under legislations, the National Authorities could be held liable to any third party injured as a result of negligence attributable to the service provider in the execution of the maintenance contract. Most often, the liability and the responsibility attributed to the National Authorities cannot be passed to the service provider, even using a very detailed and solid contract.
- National Authority should define the appropriate insurance coverage to be maintained by the service provider. The National Authority could be held liable to any third party injured as a result of negligence attributable to the service provider in the execution of the contract. The subject is very much dependent on local geographical conditions, applicable laws and regulations and general political strategy.
- National Authorities should implement action items for the inspection, monitoring and the auditing of the delivery of the service by the service provider.

- The contract should specify in details the performance of the aids to navigation service to be delivered to the mariners under the responsibility of the service provider.
- The contract should specify that the service provider must use this process to inform mariners of any outages of the aids to navigation under its contractual agreement.

It needs to be highlighted that this guideline is applicable to the provision of DGNSS when such services are subcontracted by the national authorities to external companies.

Although the EGNOS L1 maritime service will not be contracted out by the European Maritime Authorities, this is a very good reference regarding the principles and best practices included and to be considered in the development of the liability scheme and notably in the operational working arrangements and specific commitments.

✓ IALA Recommendation R-135 On The Future of DGNSS [RD-13].

This recommendation outlines an updated strategy for the recapitalisation of DGNSS. It sets out the requirements and available options, and identifies areas that need to be further studied. The baseline requirements and principles for the re-capitalisation of the IALA DGNSS service are stated as follows:

- Maintenance of legacy signals (backward compatibility).
- Flexibility to support future service requirements e.g. multiple GNSS, ranging and communications functions.
- Internationally applicable solution.
- Life-time of at least 10 years.

A set of four strategies for re-capitalisation of DGNSS are briefly described in the document, including SBAS integration. Additionally, the recommendation highlights the necessity of setting service level agreements between the service providers and the AtoN provider for establishing requirements and contractual obligations: *“The service would then be dependent on the SBAS provider so that a Service Level Agreement would be needed”*.

According to this supporting documentation, in particular IALA Guideline No.1005, the majority of AtoN services are provided by national Authorities that are governmental bodies and in some cases these AtoN services may be contracted out to external companies/bodies. It should be remarked that in these cases the responsibility towards the international community always remains with the contracting Government as signatory of the SOLAS Convention. Any contract between the AtoN Authority and a third party for doing tasks on aids to navigation (AtoN) remains under the responsibility of the Authority. It has to be noted that in line with outcomes of the 2018 EMRF-SPWG workshop [RD-14] in the case of the EGNOS L1 maritime service no additional responsibilities has to be addressed by the Maritime National Competent Authorities beyond the current existing ones.

The same implications could be considered if the maritime/IWW Authorities depend on the EGNOS Service Provider for the provision of the EGNOS maritime service. In these cases a Working Arrangement (WA)/Service Level Agreement (SLA) between the ESP and National Authorities would be needed to cover the authorities responsibilities and regulatory aspects in case that they were not included in the Service Definition Document in force (See section 3 for further details).

According to the reference documentation, these working arrangements should at least cover the following points:

- Service offered:

The performance of the AtoN service to be delivered to the mariners under the responsibility of the service provider should be detailed in the contract.

- Reliability and continuity of the service
 - Quality of the service
 - etc.
- Response to outages. The contract should specify the process to be followed by the service provider to inform mariners of any outages of the aids to navigation under its contractual agreement.
 - Insurance requirements for the service provider. The National Authority should define the appropriate insurance coverage to be maintained by the service provider. Depending on the national legislations, authorities could be held liable in case of accidents as a result of negligence by the subcontracted company. For this reason the agreement may determine the appropriate insurance coverage that the ESP should maintain.
 - Risk Management
 - Costs of the service (FREE for EGNOS services)
 - Financial risk
 - Legal data recording (to archive the operational data/the service data for a period sufficient to meet local litigation requirements).
 - Inspection and monitoring: National Authorities could implement action items for the inspection, monitoring and the auditing of the delivery of the service by the ESP.
 - Implementation of new technologies
 - Others

It should be remarked that the different elements listed in this section, applicable to the (EGNOS) Service Provider and to be reflected in the corresponding working arrangements, were **validated by the maritime and inland waterway authorities attending the 2017 EMRF-NMSP workshop held in Athens the 5th and 6th October 2017[RD-8]**.

Once these applicable requirements and best practices have been identified, the next step was to formalize the responsibilities between the parties involved in the Service Provision schemes (see Appendix 1 [RD-2]). The associated roles and liabilities should be tailored to each scenario/scheme.

Regarding the best way to formalize these responsibilities, the authorities attending the 2017 EMRF-NMSP EGNOS workshop confirmed **[RD-8]** that the best approach would be to **use a specific document agreed by the involved parties describing their roles, responsibilities and the specific working arrangements among them**. The attendees of the 2018 EMRF-SPWG workshop [RD-14] identified two options to materialize this document, which are further addressed in section 3 below.

3 PROPOSED APPROACH FOR ESP OPERATIONAL/LIABILITY SCHEME

In line with the main outcomes of the EMRF/NMSP workshop held in Athens in 2017 [RD-8] and with the conclusions of the 2018 EMRF-SPWG Workshop [RD-14] 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

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

- Declaration of EGNOS/SBAS in the safety of navigation domain as a national AtoN or not.
- 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).
- The Competent Authority empowered to formalize the required EGNOS operational modalities as EGNOS Service Provider counterpart.

This section of the document further develops Option B, presenting the potential approach for the organization of the service covering the identified needs and regulatory requirements identified and gathered in previous section. This proposal, as introduced above, is based in two main elements/documents: the Service Definition Document and the Working Agreement.

1. EGNOS Service Definition Document (SDD)
2. EGNOS Working Agreement

3.1 EGNOS Service Definition Document (SDD)

For the provision of a maritime navigation service it is essential to detail the characteristics of the service in question, which is done through a Service Definition Document (SDD).

This EGNOS SDD is intended to provide a complete description of the EGNOS service, including, at least:

- The characteristics of the service offered to users and the mechanism to access the service.
- The conditions and minimum level of performances available to suitably equipped users.
- How to access the EGNOS Services.

As depicted before different regulations highlight the need for the publication of the EGNOS Service description (§2.3). The bullets below provide a high level preliminary list of the essential information which should be included in an EGNOS 1046 SDD:

- Description of the EGNOS System and EGNOS Service Provision Environment
- EGNOS Signal In Space characteristics and performance in the range domain.

- Terms and conditions of EGNOS Service use, including liability, and its intended lifetime.
- EGNOS Receivers - type approval context/standards (advice for safe use of the service and cautionary notes taking into account user receiving equipment)
- Performance: the positioning Service offered to users by this EGNOS Service and the minimum performance in the positioning domain.
- The usable coverage region.
- Other factors such as an undertaking to provide the service for a set amount of time and the amount of notification provide before any significant change to the service offered.
- Safety warnings regarding service disruptions or scheduled interruptions
- Contact information for the service provider
- Other points (TBD)

The EGNOS SDD will be updated when required in order to reflect any changes and improvements to the EGNOS Service addressed.

Whenever there is any complementary information to be provided to users that could affect any SDD content, the information is given to users through Service Notices as an amendment to the SDD till the next SDD update. The Service Notices are also public documents which can be found at EGNOS User Support Website.

The definition of the parameters characterising a potential future EGNOS (v2) Maritime Service compliant with IMO Resolution A.1046, including a preliminary assessment of the performance, has been gathered in a separate document: EMRF-SPWG-APPENDIX 5 - EGNOS 1046 performance parameters_v7[RD-5] according to the proposed documental layout .

It should be noted that this analysis was shared with the EMRF members and updated with their feedback. It was agreed during the 2017 EMRF- NMSP workshop that the list of parameters described in this document [RD-5] characterize the EGNOS maritime Service [RD-8]. These service parameters were also presented and validated at the 2018 EMRF-SPWG workshop [RD-14].

Moreover, **the EGNOS v2 integrity for maritime domain operations (EMRF-SPWG-APPENDIX 6 - EGNOS V2 Integrity for maritime operations_v1.3 [RD-6]) was also validated by the 2017 EMRF- NMSP workshop attendees [RD-8] and in the 2018 EMRF-SPWG workshop attendees [RD-14].**

3.2 Maritime EGNOS Working Agreement (MEWA)

As a tool to foster the EGNOS based maritime navigation implementation, the objective of this document (the MEWA) is to formalize these working arrangements, between ESP and a specific Maritime/IWW Authority or AtoN provider, so as to support the operational introduction and use of EGNOS in the waters under a specific administration responsibility, in case that they were not covered by the Service Definition Document in force (See option B in section3).

It has to be noted that in case of the option B above will be each National Competent Authority who has the competence to require the MEWA for the EGNOS L1 maritime service operational implementation. Always under the umbrella of a harmonized, fair and equitable treatment for the EU 28 member states, the low-level details to be included in this document need to be defined with the support of the interested maritime/IWW authorities. Taking into account the existing requirements and

best practices already identified (§2), a proposal for the structure of these arrangements is described below:

The MEWA would be composed of three parts, as follows:

1. EWA main document: The main contractual part of the arrangement containing contractual liability.
2. ANNEX 1: Including the Service Commitment regarding the EGNOS Service and the provision of Safety Information
3. ANNEX 2: Including the specific “Service Arrangements” and particular procedures defined between the ESP and its counterpart.

These three parts are further developed in the subsections below. However there are still low-level details to be assessed and discussed with the Authorities within the SPWG.

3.2.1 EWA main document:

This is the main part of the document containing contractual liability, including the following information:

- Identification of the organisations involved/reflected in the agreement:
 - o EC/GSA
 - o Oversight (TBC)
 - o Identification of the PARTIES:
 - EGNOS Service Provider (ESP)
 - Counterpart (Maritime/IWW Authority or AtoN provider)
- Overall objective of the Agreement: To formalize the operational and technical modalities between **ESP** and its **Counterpart**, in order to support the corresponding EGNOS based service provision.
- Roles and Responsibilities of the Parties.
 - o **EGNOS Service Provider:** To provide the Service with the performances described in EWA Annex 1. To comply with the Service Arrangements’ technical and safety information provisions specified in EWA Annex 2.
 - o **Counterpart:** To comply with the Service Arrangements’ technical provisions specified in Annex 2.

It should be remarked that the EWA 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.
- Scope of the Service: the Service shall be restricted to:
 - o the performances defined and described in EWA Annex 1 (§3.2.2).
 - o the Service Areas defined and described in EWA Annex 1 (§3.2.2).

- Charges (FREE at the point of use).
- EGNOS Contractual Liability
- Other legal clauses/aspects (TBD)

3.2.2 EWA ANNEX 1

The Annex 1 to the MEWA describes the EGNOS Service with the committed performance and also the way EGNOS Safety Information is to be provided to the mariners/skippers.

- The ESP Service Commitment as stated in the referenced document **EGNOS Service Definition Document (SDD)**.

As detailed before the EGNOS SDD addresses the terms and conditions of access to the Service and will contain any maritime specific requirement and/or performance / operational aspect as designed for EGNOS based operations.

It should be noted that in case of any discrepancy between SDD and EWA the SDD will prevail.

- Establishing the process for the provision of **EGNOS Safety Information (MSI, IWW SI)**.

The ESP should provide EGNOS Safety information to the corresponding Hydrographic entity/RIS Provider.

The EGNOS MSI service will follow the already existing processes and the ESP will be the originator of the appropriate EGNOS related MSI.

The particular applicable requirements and the process for the generation and distribution of EGNOS related Safety Information is addressed in EMRF-SPWG-APPENDIX 3 – EGNOS Maritime and IWW Safety Information [RD-4].

3.2.3 EWA ANNEX 2

Once the Service characteristics and the liabilities between the parties (ESP and counterpart) are established, this Annex to the MEWA defines the specific “Service Arrangements” and procedures to be put in place between the ESP and its counterpart, namely:

- “Contingency” Management process/coordination

A validated procedure will be put in place between the ESP and the Maritime/IWW Authority to inform its MEWA counterpart of system or service events which are expected to lead to a significant deviation from the service commitments and to impact maritime/inland EGNOS based operations.

- Information Sharing/Coordination Scheme: a formal communication channel to be used by ESP to:
 - o Share relevant operational information with the counterparts that could lead to an impact on the Service provided
 - o Identify any specific support that could be required from ESP to feed the counterpart decision making processes
 - o Support operational implementation issues/ planning

- Communicate about the SDD updates (regular ESP activity, to reflect changes in the service provision):
- Provide Performance Reports
- EGNOS/GNSS (Legal) Data Recording
 - ESP to record and store the EGNOS/GNSS data providing the necessary GNSS data for purpose of accident/incident investigation or occurrence reporting related to the provision by AtoN provider/Authority based on the EGNOS signal
 - ESP to provide support in the assessment of EGNOS/GNSS data in case of accident/incident investigation process.
 - ESP to archive EGNOS/GNSS data for a period sufficient to meet local litigation requirements (**at least 5 years**).
 - The data to be recorded should include, at least, the EGNOS messages used for the provision of the EGNOS 1046 Service.

Depending on the specific Service provision Scheme implanted some specificities should be put in place as depicted in the following section.

It is relevant to note that in case of the EGNOS use through the Ground infrastructure (e.g. DGNSS or AIS) the main conclusions on this field coming from the SC 24 pilot project: “Support to Maritime Service Providers for the transmission of EGNOS corrections via IALA beacons” will need to be considered.

4 EGNOS SDD CONSIDERATIONS

For the provision of a maritime navigation service and also for the establishment of a service level agreement/working arrangements with any Maritime authority on a particular service offered it is essential to detail the characteristics of the service in question, which is done through a Service Definition Document (SDD).

There are currently three EGNOS Service Definition Documents (SDDs), one per each of the EGNOS services (SoL, OS and EDAS SDDs). They are a programmatic document generated jointly by GSA (European GNSS Agency) and ESSP (European Satellite Services Provider) and finally issued by the European Commission (EC). The SDDs are the EGNOS key users and services oriented documents. The EGNOS SDDs are public documents which can be found at EGNOS User Support Website: <http://egnos-user-support.essp-sas.eu/>

In the case of the Scenarios (Maritime Scenario 1 and IWW Scenario IL1A in APPENDIX 1 - EGNOS Service Provision Schemes [RD-2]) where the maritime use of EGNOS is provided entirely through the use of the EGNOS Open Service (OS), with no responsibility on the EGNOS Service provider, irrespective of whether or not a SBAS type-approved receiver is used, then the existing OS SDD applies.

In the case of Scenario2 and IWW Scenario IL1B, in which the EGNOS SIS is used directly by vessels equipped with a SBAS type-approved receiver, with responsibility on the EGNOS Service Provider, including the provision of Safety Information (SI), a specific maritime ‘EGNOS L1 Maritime service’ needs to be defined through a new SDD.

In the case of Scenario 2 or Scenario IL1B, when the vessel is not equipped with a SBAS type-approved receiver, the existing OS SDD applies.

In the case of Scenario 3 or Scenario IL2 , in which the AtoN service provider retransmits EGNOS information provided either by the EGNOS SIS or EDAS, the EGNOS OS or EDAS SDD apply to the point where the information is passed to the National Maritime Service provider for retransmission.

The case of Scenario 4 (EGNOS EDAS information used directly by the vessel in APPENDIX 1 - EGNOS Service Provision Schemes [RD-2]) is not considered further within this document (due to issues with data latency and integrity application through third party communications). For the use of EGNOS Data Access Service (EDAS) received directly by the vessel, the existing EDAS SDD applies. Other considerations (as the use of EDAS for maritime safety related applications) and their impact in the existing EDAS SDD need to be further studied. However, it should be noted that the use of EDAS directly on the vessel is not recommended. The EWA addressed within this document will not cover this situation (Scenario 4) and such use of EDAS by the vessel is at its own risk, with no service guarantees or liability attributed to the Maritime Authorities.



European
Global Navigation
Satellite Systems
Agency



END OF DOCUMENT