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| From: ARM Committee | ARM11-13.3.1 |
| To: ENAV Committee | 13 March 2020 |

LIAISON NOTE

Draft guideline on producing an e-Navigation Operational Service Description and Annex

# Introduction

At ARM10 it became clear that Guidance was required on e-Navigation operational service descriptions.

From the start of the development of e-Navigation, it was recognised that e-Navigation Maritime services consist of operational services and technical services, where technical services can make use of product specification as building blocks. The Maritime Services describe the service on a high level and link them to the IMO objectives etc. However, in order to develop a MS into an actual operational service it is necessary that more information is provided for the development. Therefore, the need for an operational services description was identified.

# Details

At ARM11 a draft guideline on producing an e-Navigation Operational Service Description was developed and as an Annex to the Guideline a Operational Service Description template was developed.

# Related Papers

* Draft Guidline on producing an e-Navigation Operational Service Description.
* Annex A, Operational Service Description Template

# Action requested

The ENAV Committee is requested to:

1. Review the draft guideline and Annex and provide ARM with feedback for ARM12.

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| * **I****ALA Guideline** |

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Producing an e-Navigation Operational Service Description

1. **Edition 1.0**

**March 2020**

Revisions to this IALA Document are to be noted in the table prior to the issue of a revised document.

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| **Date** | **Page / Section Revised** | **Requirement for Revision** |
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1. **INTRODUCTION**

This guideline is aimed to assist members and/or other international organisations in the development of an Operational Service Description (OSD) for the provision of IMO defined Maritime Services (MS). The MS are described in an IALA Guideline. An OSD is the interconnection between the high level description of the Maritime Services and the Technical Services to be developed.

* 1. **The Overarching e-Navigation Architecture**

G-1113 ed. 1 described the overarching e-Navigation Architecture. There the foundation is described regarding the notion of Maritime Service Portfolio’s (MSP), which later evolved to Maritime Services (MS), and it envisaged that it would consist of Operational and Technical Services. Most MS depend on the exchange of data and for that purpose it is essential that a common understanding of the data is described in standardized data models and stored in a central location. This is what is done by an S-200 based product specification. There are already a number of product specifications available either in the S-200 and S-100 domain.

As stated in recommendation E-NAV 140 and in G-1113 the development of e-Navigation related services should be based on user (information) needs. This means that the objective of the MS, the user need, the information need, user requirements, etc are described in a way that can later be translated in a Technical Service Specification and a technical design by engineers. This is the purpose of an Operation Service Description.

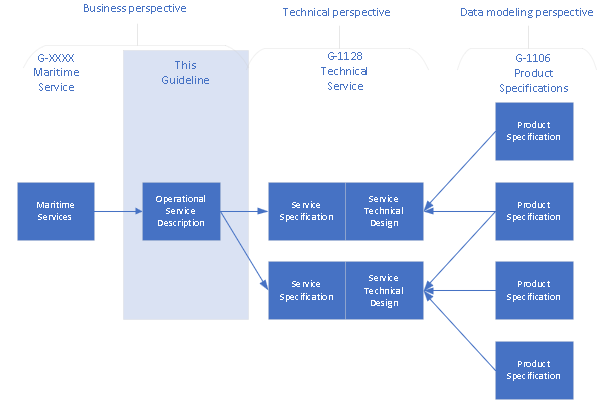
1. **SCOPE**

This Guideline is intended for business consultants in the maritime domain, information managers, domain architects, etc. This Guideline is intended to assist them in challenging the providers of Operational Services to specify their needs and intended goals so that they can be realised by Technical Services.

The scope is limited to the production of an OSD.

1. **E-navigation service Development process**

For the development of IT based services, an Agile approach is commonly used. In an Agile organization business and IT are working together on the development of the service. They interactively discuss information and user needs etc. and develop the software solution in an iterative way where the usability is frequently demonstrated to the end user. Information exchange between business and IT is done in an informal setting where teams work together on a daily basis. In the case of the development of e-Navigation Maritime Services this is not possible since the information transfer regarding the MS is a pan committee and even a pan organization activity. Therefore it is necessary to follow a more structured way of working where information about an MS is well documented and a defined process is followed. The relationship between the different required documents is critical for the development process. The relationship between the documents is represented in figure 1.



***Relationship between Maritime Services, Operational Service Description, Technical Services and Product Specifications.***

* 1. **Requirement traceability**

For the development of MS information is transferred between different stakeholders. In the case of information transfer there is a risk that information gets lost, resulting in loss of functionality at the end of the development process. To mitigate this it is necessary that requirement traceability is a part of the development process. IALA G-1133 gives guidance on this topic and should be used for this purpose. Information needs, user needs and requirements should be made explicit and in every step in the development process it should be made clear how the requirement is fulfilled.

1. **Operational Service description**

The Operational Service Description should provide all the information needed to make a G-1128 based Service Specification and technical service design. The OSD should i.e. describe a full information need analysis and the derived data needs. The OSD should consist the following main components:

* Context and goal of the operational service
* Relation with MS
* User needs, Information needs, high level Functional and non-Functional requirements
* Requirements traceability matrix
  1. **Context and goal of the operational service**

An OSD should give a clear view what is to be achieved by the service. It should give the reader a clear description what the goal is of the operational service. It provides information about what this service must provide from the different users’ perspectives, i.e. users at the shore side (authorities, service providers, etc.) and the users of the service at the ships side.

* 1. **Relation to Maritime Services**

An OSD is directly related to MS. It’s possible that MS are provided by one or more Operational Services. It should be made clear what part of the MS is covered by the OSD.

* 1. **Describing the service**

e-Navigation is about the sharing of information between ship and shore. Therefore it is essential that the information needs which have to be fulfilled by the service are unambiguous. An information needs analysis can be helpful in case this is not yet clear. The analysis makes the information need explicit and provides context for the quality of the information and is a reference for the data needed to provide the information. The OSD does not have to contain information about the data. The data needed for the provision if the information is a part of the technical design of the service.

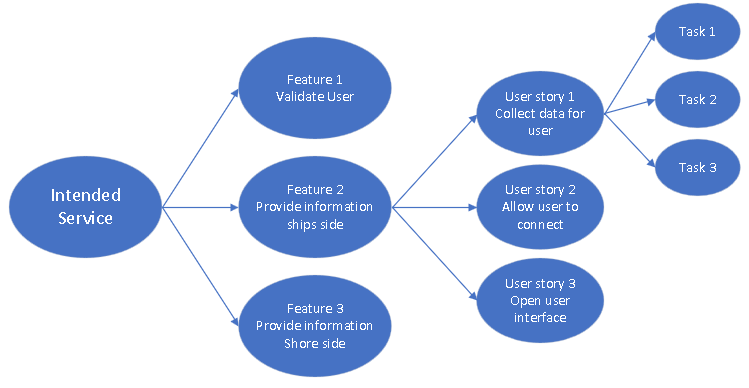
After the information analysis is complete, the OSD should provide information about the intended usage of the service and fulfilment of the information needs. It can be difficult for people at the business side of the service to explain their intended business need. To aid in this process there are different proven methodologies that can be used. The most common methodology is to make use of Epics and User Stories, as used in Agile Development. Epics are the description of a (collection of) features of a part of the service. For consistency and simplicity sake, the document will use Feature Descriptions and will not make a distinction between Epics and Features.

User Stories are detailed descriptions of parts of the service described from the users perspective. Feature descriptions lead to User Stories that can be further designed and programmed by software engineers.

In figure 2 a small example of the relationship between an Intended Service, and associated Epics and User Stories are represented.

As shown the service is divided into main features. The desired functionality of the feature will be transformed into a feature description and these can be broken down into User Stories. The User Story describes the desired part of the feature from the point of view of the user.

In the OSD the desired features are translated into feature descriptions. It does so by providing a statement such as “As a user ... I want to ... So that… “, and it provides criteria to determine if the feature is fulfilled.



***Example of the relationship between an Intended Service, and associated Feature and User Stories.***

For an OSD it is sufficient to describe the operational service at a Feature level.

A Feature consists mainly of the following items:

* A feature description. **Example:** As a shore side authorities I want to send weather warning to all ships in a given area so that the ships can make a decision accordingly.
* Architectural parameters.
* Functional and non- functional requirements.

Annex A; The Operational Service Description Template can assist members with the creation of an OSD. This template is based on the items described in section 4.

When the template is complete it will contain sufficient information to be translated to a service specification and technical design document.

1. **DEFINITIONS**

The definition of terms used in this Guideline can be found in the International Dictionary of Marine Aids to Navigation (IALA Dictionary) at <http://www.iala-aism.org/wiki/dictionary>.

1. **ACRONYMS**

IMO – International Maritime Organization

IT – Information Technology

MS – Maritime Services

OSD – Operational Service Description

1. **REFERENCES**

IALA Guideline G-112O

IALA Guideline G-1113

IALA Guideline G-1133

IALA Rec E-NAV 140

Agilereference.org

**oPERATIONAL SERVICE DESCRIPTION TEMPLATE**

**Operational Service Description for the *xxx* Service**

**INTRODUCTION**

The *blue italic text* is meant to be replaced by those producing the Operational Service Description (OSD). The non-italic text is not necessarily meant to be replaced but may be used as example text.

**Purpose of the Document**

*This template shall support the service architects in creating a description of the services (put down in writing) at a high level of abstraction. This template provides descriptive instructions for the intended content for each section. Formally, such instructions are written in blue italic font – they shall be deleted when writing the actual service specification document. In addition, some parts of this template provide suggested text fragments that may be directly re-used in the service specification document. Such proposed text fragments are given in black normal font.*

*The purpose of this OSD is to provide information needed to develop the service specification(s) and the technical service(s).*

**Context of the operational service**

This section provides information about the context of the Operational Service.

*The context of the Operational Service gives the service specification developer information about the rationale of the service. Furthermore it must provide information about the relationship between the Operational Service and Maritime Services (MS), such as specifying the MS or part of MS covered by this Operational Service. If there are parts of the MS that are realized by other Operational Services this should be stated here.*

**objective of the service**

This section provides information about the objective(s) of the Operational Service.

*The Operational Service should have very clear objectives. These objectives should be described in Specific, Measureable, Achievable, Realistic, and Timely (SMART) terms. The section should give a clear description of what the Operational Service is intended to do.*

**Intended users of the service**

This section provides information about the intended users of the service.

*Give a clear description about the users or groups of users intended to make use of the Operational Service. This can be ship board users and/or shore side users, such as maritime authorities, pilots, port authorities, etc.*

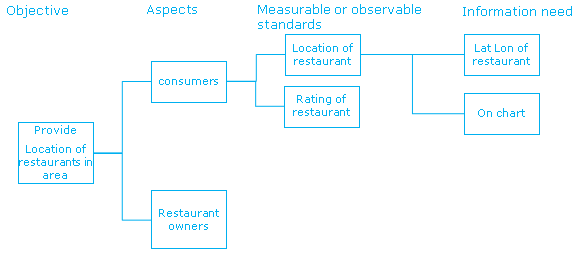
**Information needs**

This section provides the information needs that are to be fulfilled by the Operational Service.

*This section should state very clearly the information needs the Operational Service covers. Information needs may be different for the different users of the operational service.*

*There are numerous techniques that can be used to obtain the information needs. There is no prescribed method to do this as long as the information needs are described in a clear way.*

*For example: Use the objective of the service as the starting point for the analysis. Based on the objective identify the most important aspects of the (sub)objective. From the aspects you can derive measurable or observable standards. This then will lead to the specific information needed. Figure 1 shows a practical schematic example of this method of information analysis.*

**

***Schematic example of information analysis***

*The results of the information analysis need to be captured in a matrix. This is necessary for requirement traceability and ensures that the objectives are being realized.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Provide location of restaurants in area* information need matrix | | | | |
| Aspects | Measurable/observable standards | Information need ID | Information need | Necessary operations |
| *Consumers* | *Location of restaurant* | *C.IN.1* | *Lan Lon of restaurant* | *Convert from X,Y* |
| *Consumers* | *Location of restaurant* | *C.IN.2* | *Rating of restaurant* | *None* |
| *Consumers* | *Rating of restaurant* |  |  |  |
| *Restaurant owners* |  |  |  |  |

***By the service provided information needs***

**Features**

This section describes the main features. Table 2 lists the main features and the descriptions of the Operational Service.

*Description of the features of a service will provide the developer of the service specification the input for the development. For the description of the features it is helpful to use the following guidance:*

*The feature should be described as a statement: “As a <type of user> I want to <do something> so that <some reason>.”*

*As a check the INVEST[[1]](#footnote-1) method can be used to assess the quality of the feature description.*

*A good feature description should be:*

* *Independent (of all others)*
* *Negotiable (not a specific contract for features)*
* *Valuable (or*[*vertical*](http://guide.agilealliance.org/guide/incremental.html)*)*
* *Estimable (to a good approximation of the development effort)*
* *Small (This applies more for the underlying user stories)*
* *Testable (in principle, even if there isn’t a test for it yet)*

*The feature descriptions need to be documented. This necessary for traceability and ensures that the features are being realized.*

|  |  |
| --- | --- |
| Feature identifier | **Feature description** |
| *F.001* | *Example: As a mariner I want to be able to retrieve the weather forecast for my location at any time so that I can display it on my electronic chart* |
| *F.002* |  |
|  |  |

***Feature description table***

**Guiding Principles**

**Architectural parameters**

This section describes the architectural parameters for the operational service.

*List the architectural parameters for the operational service. Architectural parameters should specify the scope and rationale for the service specification developers. Example: “Maritime Safety Information must be provided within the S-100 data framework.” Rationale: “Harmonization between services must be achieved.”*

**Functional and Non-functional Requirements**

*Functional requirements are mainly derived from the user needs in the development of the service specification process. The OSD is input for the service specification process. Therefore the functional requirements that can be stated at this stage will be limited.*

*In this stage non-functional requirements can be drafted. A non-functional requirement is a specification that describes the system’s operation capabilities and constraints that enhance its functionality but do not affect the functionality itself. Non-functional requirements could be e.g. speed, security, reliability, maintainability, scalability, etc.*

Table 3 lists applicable Requirements for the *XYZ* service.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Requirement type | **Requirement Id** | **Requirement Name** | **Requirement Text** | **Feature identifier** |
| *Functional* |  |  |  |  |
| *Non-Functional* |  |  |  |  |
|  |  |  |  |  |

***Requirements for the operational service***

1. The acronym [INVEST](http://xp123.com/articles/invest-in-good-stories-and-smart-tasks/) helps to remember a widely accepted set of criteria, or checklist, to assess the quality of a [user story](https://www.agilealliance.org/glossary/user-stories/). If the story fails to meet one of these criteria, the team may want to reword it, or even consider a rewrite [↑](#footnote-ref-1)