

IALA Recommendation A-124

APPENDIX 1

Basic AIS Services, AIS Data Model and AIS Service specific MDEF sentences

Edition 1

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10, rue des Gaudines
78100 Saint Germain en Laye, France
Telephone: +33 1 34 51 70 01 Fax: +33 1 34 51 82 05
e-mail: contact@iala-aism.org Internet: www.iala-aism.org

Document Revisions

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

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Appendix 1 to IALA Recommendation A-124

1 INTRODUCTION

1.1 Index of Appendices to IALA Recommendation A-124 on the AIS Service

General:

Appendix 0 References, Glossary of terms and Abbreviations – to be developed

Deliverables of the AIS Service to the shore-based clients:

Appendix 1 Basic AIS Services, Data model & AIS Service specific MDEF sentences

Appendix 2 Intentionally blank

Architecture of the AIS Service:

Appendix 3 Distribution model – to be developed

Appendix 4 Interaction and data flow model

Appendix 5 Interfacing model

Appendix 6 Internal Time Latency model – to be developed

Appendix 7 Internal Reliability model – to be developed

Appendix 8 Test model – to be developed

Functional components of AIS Service:

Appendix 9 Functional description of the AIS Logical Shore Station – to be developed

Appendix 10 Functional description of the AIS PSS Controlling Unit – to be developed

Appendix 11 Functional description of the AIS Service Management – to be developed

Installation and life-cycle management issues of the AIS Service:

Appendix 12 Co-location issues at Physical Shore Stations (PSS) and on-site infrastructure considerations – to be developed

Appendix 13 Recommendation regarding efficient operation and maintenance – to be developed

Runtime configuration management of the VDL:

Appendix 14 FATDMA planning and operation

Appendix 15 Assigned mode operation – to be developed

Appendix 16 DGNSs broadcast via the AIS Service

Appendix 17 Channel management

Appendix 18 VDL loading management

Appendix 19 Satellite AIS considerations

1.2 Purpose of the Appendix

This Appendix expands on the description of the Basic AIS Services.

The justification for this Appendix is:

- to describe the functional interface of the AIS Service to the shore based system (compare Main Body of this Recommendation), i.e. the External BAS of the AIS Service;
- to describe the internal BAS of the AIS Service;
- to tie the data exchange aspects to the IALA Harmonized Data Model (IHDM), thereby to the overarching IMO Common Maritime Data Structure, and to the IALA Maritime Data Exchange Format (MDEF).

1.3 Overview of Basic AIS Services (BAS)

A Basic AIS Service (BAS) is a discrete service of the AIS Service that can be represented as a mnemonic which in turn represents the functional delivery of a defined set of data items. Basic implies that it is one consistent fundamental functionality (or lowest level component) of the AIS Service. Each BAS supports an interaction between the AIS and other shore-based technical services of the shore-based system, as defined by the IALA Common Shore-Based System Architecture (CSSA).

The BAS are categorized into external and internal. The external BAS are those BAS which deliver AIS data to and from the shore based system. Hence, the external BAS also comprise the data flow from ship to shore and from shore to ship (and other traffic objects). External BAS are the functional interface of the AIS Service to other shore-based technical services.

The External BAS are arranged in Basic AIS Service Categories in accordance with the net data flow behaviour of the BAS.

The External BAS Categories are as follows (compare Figure 1 overleaf):

- 1 Category E-1: initiated by an external AIS (mobile) station and delivers data from the external AIS (mobile) station to the requesting shore-based technical service.
- 2 Category E-2: initiated by the requesting shore-based technical service and delivers data from the requesting shore-based technical service to the external AIS (mobile) stations.
- 3 Category E-3: initiated by the requesting shore-based technical service. They provide data to external AIS (mobile) stations for a defined period of time or configure the external AIS (mobile) stations' behaviour on the VDL.
- 4 Category E-4: initiated by the requesting shore-based technical service. They provide data already available at the AIS service about the AIS VDL and the profile of individual external AIS (mobile) stations.

Note: The term 'external AIS (mobile) station' indicates an AIS station which is not part of the 'own' AIS Service, and which is a 'mobile' station in most cases (following ITU M.1371 terminology). There may situations, where this station may be a 'fixed' station (again following ITU M.1371 terminology).

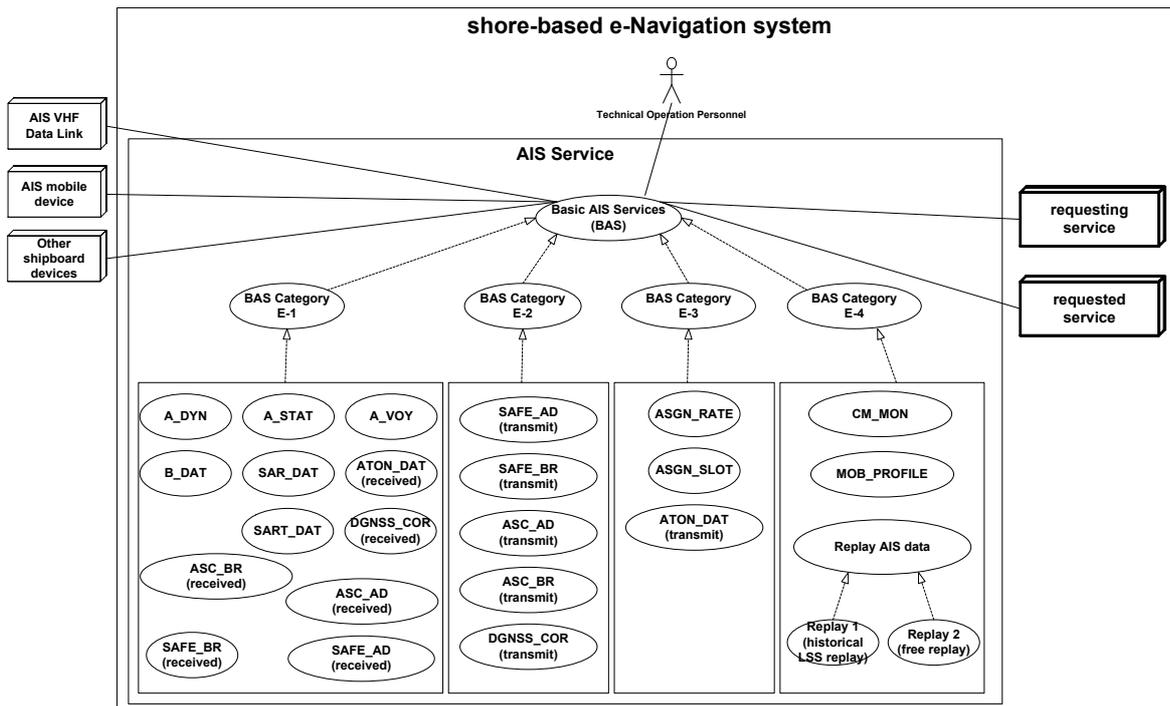


Figure 1 Overview of External Basic AIS Services

The specific External BAS Categories are further explained under the appropriate section in chapter 4 of this document.

The Internal BAS are those which are needed to manage the AIS VHF Data Link or gather information on the AIS VDL and/or external AIS (mobile) stations needed for the technical operation of the AIS Service. They are not visible to the remainder of the shore based system, i.e. can not be accessed by other technical services.

The internal BAS are arranged in *Basic AIS Service Categories* in accordance with the data flow behaviour of the BAS.

The internal BAS Categories are as follows (compare Figure 2 overleaf):

- 1 *Category I-1*: initiated by the requesting shore-based technical service. They provide data already available at the AIS Service about the AIS VDL and the profile of individual external AIS (mobile) stations.
- 2 *Category I-2*: initiated by the technical operation personnel and delivers data continuously from the AIS Service to a requested shore-based technical service as well as to external AIS (mobile) stations.
- 3 *Category I-3*: initiated by the technical operation personnel and delivers data from the AIS VDL to the technical operation personnel.
- 4 *Category I-4*: initiated by the technical operation personnel. They provide data already available at the AIS Service about the AIS VDL and the profile of individual external AIS (mobile) stations.
- 5 *Category I-5*: This Internal Basic AIS Service Category contains all internal BAS, which log data internal to the AIS Service, should that feature be desired by a competent authority.
- 6 *Category I-6*: This Internal Basic AIS Service Category contains all internal BAS, which deal with initialization and/or termination of the AIS Service as a whole.
- 7 *Category I-7*: This internal Basic AIS Service Category contains all Internal BAS, which deal with the initialization, configuration or termination of individual functional components of the AIS Service.

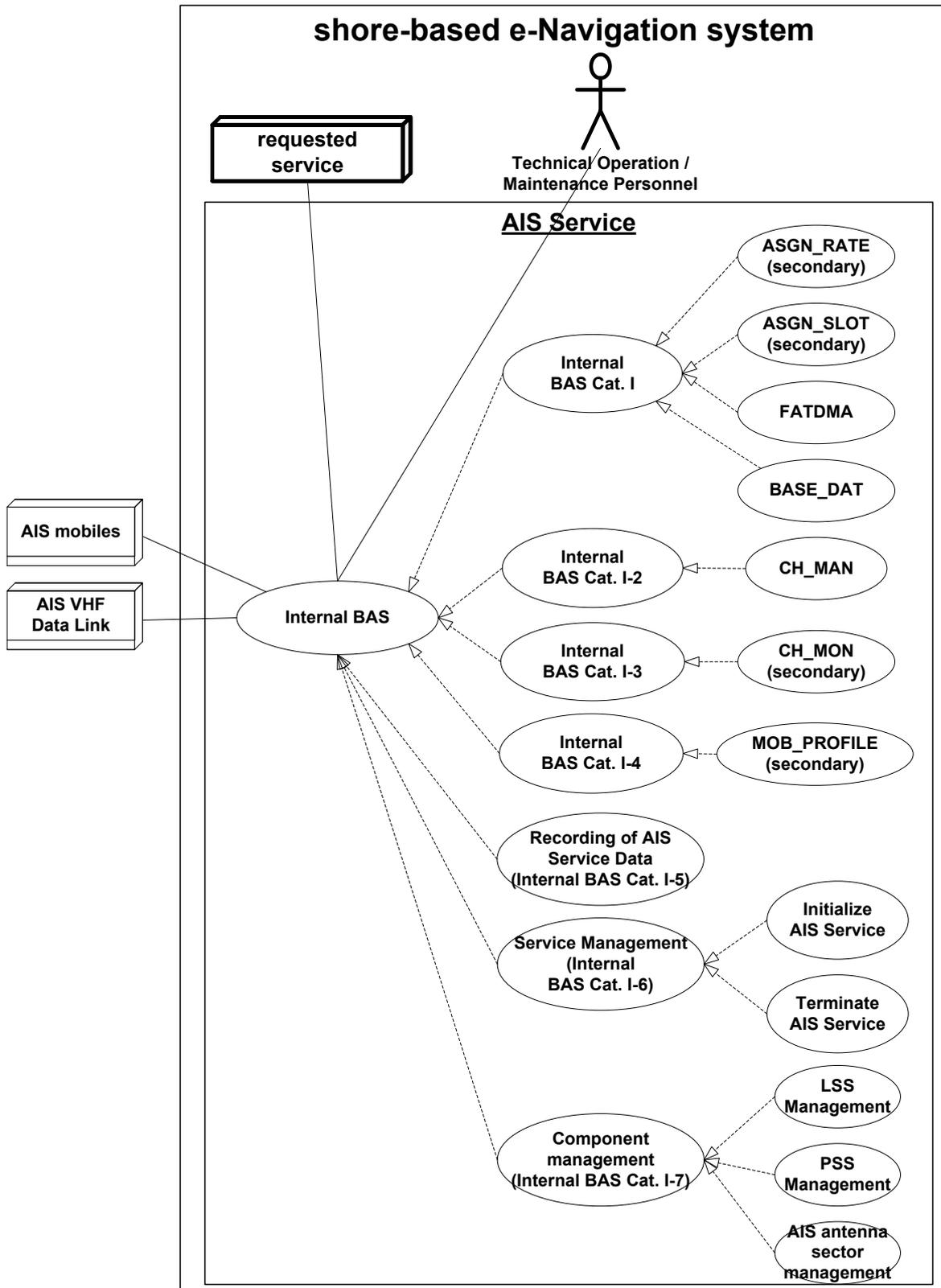


Figure 2 Complete overview of internal Basic AIS Services

The specific internal BAS Categories are further explained under the appropriate section in chapter 5 of this document.

The context within and the interfacing of the AIS Service to the shore based system and the encoding format of the data items is detailed in Appendix 5 (Interfacing Model).

1.4 Overview of the Data Model of the AIS Service

The Data Model of the AIS Service indicates what data objects are used at the functional interface of the AIS Service to the shore-based system, i.e. within by the External Basic AIS Services. Thereby, the AIS Data Model identifies the data, which the AIS Service can provide to the shore-based system on the AIS equipped traffic objects (in particular ships) and what data objects the shore-based system may send to the AIS stations carried by these traffic objects.

The data exchange via the functional interfaces of the AIS Service by both the external as well as the internal BAS is done by ‘sentences’, which are sets of data objects arranged in a meaningful order (‘semantics’). These ‘sentences’ are encoding-free at this stage, and they are part of the IALA Maritime Data Exchange Format (MDEF), which in turn uses the IALA Harmonized Data Model (IHDM) and its data objects.

The IHDM is the IALA contribution to IMO’s Common Maritime Data Structure (CMDS) and will be created by a co-operation with IHO, using IHO’s Registry (based on their S-100 standard). Also the MDEF will be implemented by using IHO’s Registry (based on their S-100 standard). The precise AIS Service specific data object and their properties definitions will be contained in the IHDM. Figure 3 illustrates this notion.

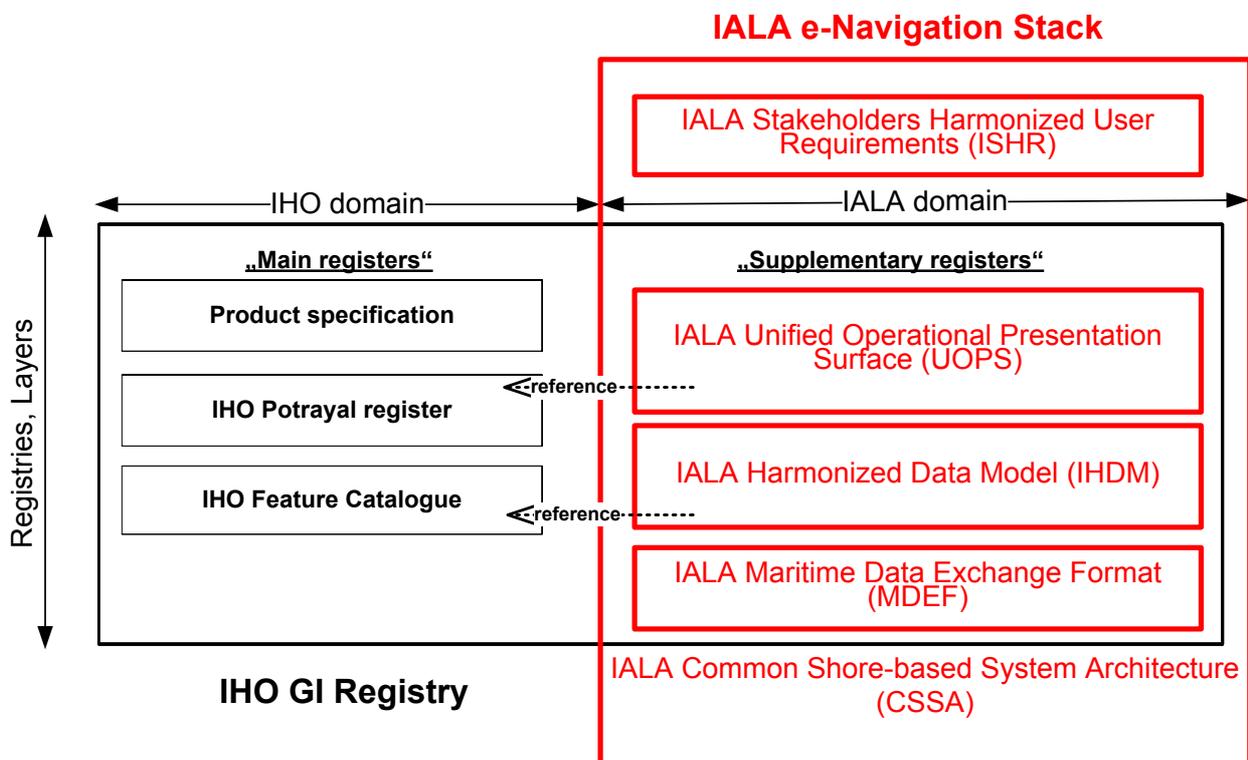


Figure 3 The relationship between the IHO GI Registry and the IALA e-Navigation stack

By using the IHDM contained definitions, the AIS Service provides data objects, in the orderly arranged format of MDEF sentences, which are essentially defined by the IALA IHDM. The usage of the IALA IHDM defined data objects may be superimposed by AIS specific restrictions regarding value range.

The Data Model of the AIS Service is a *subset* of the IALA Harmonized Maritime Data Model (IHDM):

- 1 The data objects (and their properties) are defined in the IALA IHDM. The Data Model of the AIS Service does not define additional data objects independent of the IALA IHDM.¹

¹ The IALA IHDM also contains several branches for „proprietary data‘, the definition of which is subject to proprietary definition and may not be published.

- 2 The AIS Service references these data objects by their unique identifier, namely the unique data object identifier (UDOI).
- 3 The UDOI also includes a version number of the definition of the data object referenced. Hence, rigid version control is imposed by definition. This has very important consequences:
 - a The references to the definitions of the data objects of the IALA IHDM, which are referenced by the UDOI, are dated.
 - b That would allow the IALA IHDM to be further progressed independent of the AIS Service, even if definitions of data objects used by the AIS Service are changed and their version number increased in the process, while the stability of the data model of the AIS Service is guaranteed since it references to the then 'older' definitions of the data objects referenced.
 - c On the other hand, the AIS Service may introduce an updated version of a data object definition into the IALA IHDM, thus referencing the newer version instead.
- 4 The Data Model of the AIS Service 'inherits' the features of the IALA IHDM. Also, the data objects referenced 'inherit' the features of the referenced data objects of the IALA IHDM.
- 5 On the other hand, concurrent with that notion of 'inheritance', the data model of the AIS Service introduces AIS-specific restrictions regarding *permissible value range* of the data objects which have been defined in the IALA IHDM. For example the AIS Service uses a restricted text character set ('6-bit-ASCII' character set) for composing text strings.

A generic and more elaborate description of the concept of the Basic Services, of the IALA IHDM, of the IALA MDEF and of the IALA CSSA is given in the appropriate system architecture related IALA documentation.

1.5 Overview on the relationship of AIS Service with MDEF

The External and Internal BAS constitute sentences of the IALA MDEF. They indicate what data objects are used in what order at the functional interface of the AIS Service to the shore-based system, i.e. by the External Basic AIS Services, or internally of the AIS Service, i.e. by the Internal Basic AIS Services. This provides the semantics which is used when exchanging data either to the shore-based system at large or internally.

The AIS Service specific IALA MDEF sentences will be identified by a unique identifier, which is called Maritime Sentence Identifier (MSID). The MSID will be assigned by the IALA MDEF at large.

The MDID will also include a version number of the definition of the sentence. Hence, rigid version control is imposed by definition. This has important consequences:

- Any references to the definitions of the BAS as being IALA MDEF sentences, which are referenced by the MSID, are dated;
- That would allow the IALA MDEF to be further progressed independent of the AIS Service, even if definitions of MDEF sentences used by the AIS Service are changed and their version number increased in the process, while the stability of older versions of BAS of the AIS Service is guaranteed since it references to the then 'older' definitions;
- On the other hand, this international AIS Service may introduce an updated version of a data object definition into the IALA MDEF, while national AIS Service implementations of the AIS Service may still use the older definitions.

For any implementation of an AIS Service as part of a larger shore-based system, it should be noted, however, that correct interaction between the AIS Service and the larger shore-based system depends upon the usage of the same version of the respective IALA MDEF sentences both by requesting and by requested technical service at any time, i.e. both sides of the functional interface supported by the IALA MDEF sentences need to use 'same language' at any time.

1.6 How to read this Appendix

This Appendix is organized in accordance with the following rules:

- 1 For each *BAS Category* a general introduction which comprises the data flow, the context of that BAS within the shore-based system and the resulting functional component description for the AIS PSS Controlling Unit (AIS-PCU), AIS Logical Shore Station (AIS-LSS) and AIS Service Management (ASM) is given.
- 2 Secondly for each *individual BAS* belonging to that category the following descriptions are given which build upon the BAS Category description and adapt it to the specifics of the individual BAS:
 - a Introduction of individual BAS
 - b List of data objects delivered or required
 - i The list of data objects delivered or required for an individual BAS is given as a AIS Service specific MDEF sentence.
 - ii The MDEF sentence description in turn incorporates by reference – i.e. using a unique maritime data object identifier (UDOI) – the definition of the data objects used within the BAS as part of the IALA IHDM.
 - iii resembles the recommended order of appearance in the data portion of an interface sentence which contains the data objects encoded. Thus, this data object list has a direct bearing on the technical interfacing at the LSS interface to the shore based e-Navigation system (**Appendix 5** refers).
 - c *Time dynamics of the BAS* indicate the data delivery and associated timing features and/or timing requirements of the data flow of that individual BAS.

Cautionary notes regarding the e-Navigation context indicate specific caution to be taken when using the BAS for applications and for the AIS data delivered. Specific attention is given to the role of the actors/entities involved in this BAS.

2 EXTERNAL BASIC AIS SERVICES

2.1 BAS Category E-1

BAS Category E-1 is initiated by an external AIS (mobile) station and delivers data from that external AIS (mobile) station to the requesting technical service.

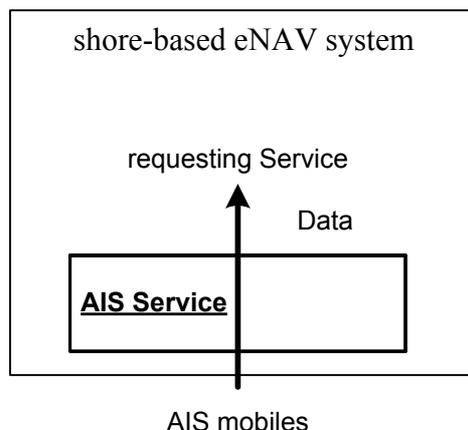


Figure 4 Data flow of BAS Category E-1

2.1.1 Context of the BAS Category E-1

The following figure describes the context of BAS Category E-1, i.e. the relevant actors/entities of the shore-based system involved.

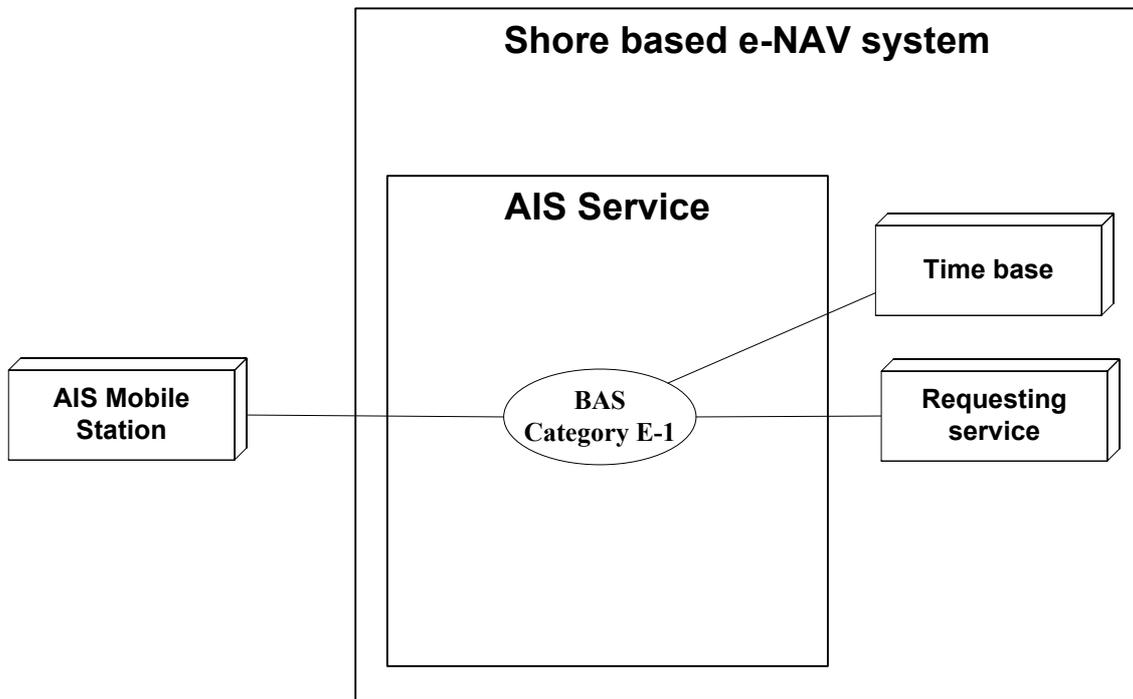


Figure 5 Context of the BAS Category E-1

2.1.2 Mapping of external BAS to functional component description for BAS Category E-1

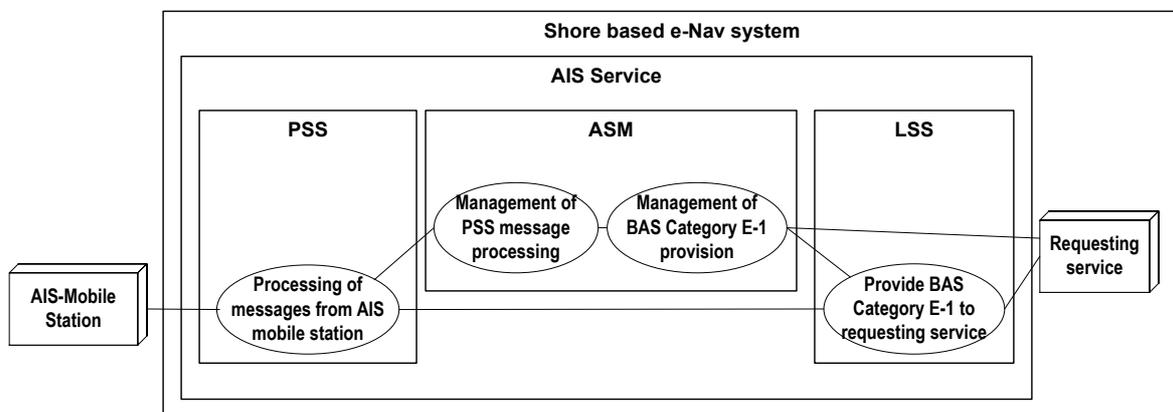


Figure 6 Resulting functional component description for BAS Category E-1

Note: For the sake of simplicity the time base is not shown.

2.1.3 BAS A_STAT

Static ship data from Class A shipborne mobile AIS stations

2.1.3.1 Introduction of A_STAT

The BAS Category E-1 A_STAT provides *static data about the vessel* to the requesting technical service. This data is derived from the *AIS Class A mobile station* broadcasts.

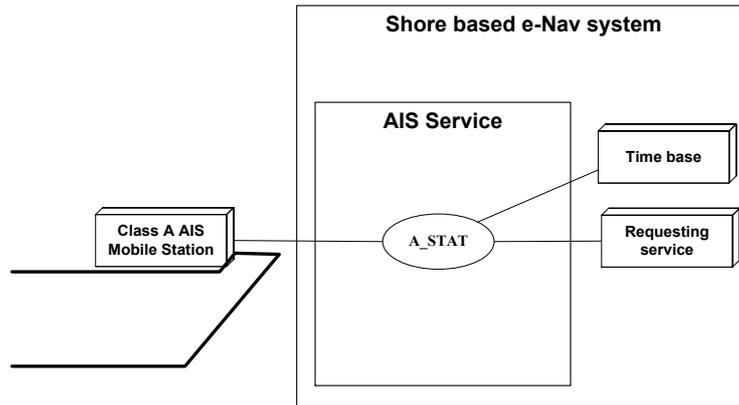


Figure 7 BAS Category E-1 A_STAT

2.1.3.2 IALA MDEF sentence of BAS A_STAT

Table 1 The IALA MDEF sentence of BAS A_STAT

MMSI of Class A AIS mobile station	[U.DOI tbd]
IMO Number of vessel	[U.DOI tbd]
Call Sign of vessel	[U.DOI tbd]
Name of vessel	[U.DOI tbd]
Type of vessel	[U.DOI tbd]
Length of vessel	[U.DOI tbd]
Beam of vessel	[U.DOI tbd]
Time/date of reception at receiving site	[U.DOI tbd]

2.1.3.3 Time dynamics of A_STAT

The above data objects will be delivered to the requesting technical service without further polling (push) when one of the following conditions is fulfilled:

- Immediately after initialization of this BAS when available;
- [Every [N] minutes; N to be configured by the requesting technical service; default setting of N = 6];
- When a shipboard change of any of the above individual data element is received;
- Upon request of the requesting technical service.

2.1.3.4 Cautionary notes regarding the e-Navigation context

The static data is entered manually on the ship board side during installation and is password protected however it is possible that this data may be faulty.

The limited precision of the ship's dimensions have to be taken into consideration when evaluating this data.

2.1.4 BAS A_DYN

Dynamic ship data from Class A shipborne mobile AIS stations.

2.1.4.1 Introduction of A_DYN

The BAS Category E-1 A_DYN provides dynamic data about the vessel to the requesting technical service. This data is derived from the AIS Class A mobile station broadcasts.

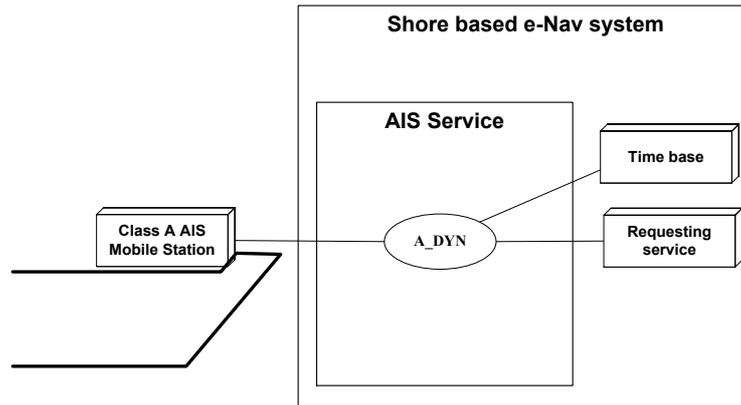


Figure 8 BAS Category E-1 A_DYN

2.1.4.2 IALA MDEF sentence of BAS A_DYN

Table 2 The IALA MDEF sentence of BAS A_DYN

MMSI of Class A AIS mobile station	[U.DOI tbd]
Geographic position of the vessel	[U.DOI tbd]
Type of position sensor in use	[U.DOI tbd]
Reference location of position sensor in use	[U.DOI tbd]
SOG of the vessel	[U.DOI tbd]
COG of the vessel	
ROT of the vessel	[U.DOI tbd]
Heading of the vessel	[U.DOI tbd]
Navigational status of the vessel	[U.DOI tbd]
Time/date of reception at receiving site	[U.DOI tbd]

2.1.4.3 Time dynamics of A_DYN

The above data objects will be delivered to the requesting technical service without further polling (push) when one of the following conditions is fulfilled:

- 1 Immediately after initialization of this BAS when available.
- 2 At a variable rate based on the navigational status, the manoeuvring and the speed of the vessel between 2 s and 3 minutes. The reporting interval can be increased by commanding the mobile station into assigned mode.
- 3 [Every [N] minutes; N to be configured by the requesting technical service; default setting of N]
- 4 Upon request of the requesting technical service

2.1.4.4 Cautionary notes regarding the e-Navigation context

The dynamic data is only as accurate as the sensor data provided autonomously and automatically to the AIS-station from shipboard sensors.

2.1.5 BAS A_VOY

Voyage related ship data from Class A shipborne mobile AIS stations.

2.1.5.1 Introduction of A_VOY

The BAS Category E-1 A_VOY provides voyage related data about the vessel to the requesting technical service. This data is derived from the AIS Class A mobile station broadcasts.

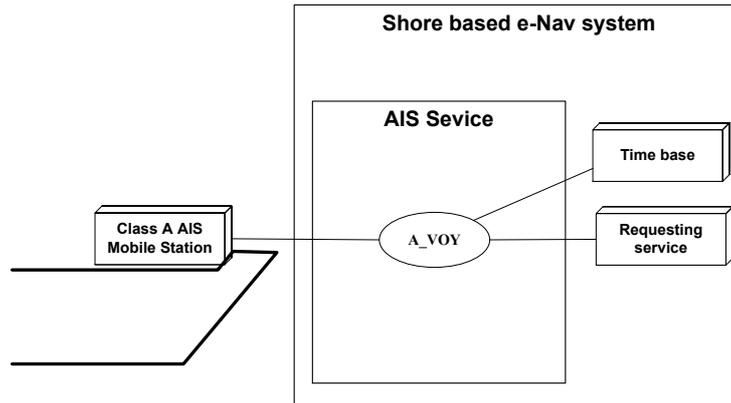


Figure 9 BAS Category E-1 A_VOY

2.1.5.2 IALA MDEF sentence of BAS A_VOY

Table 3 The IALA MDEF sentence of BAS A_VOY

MMSI of Class A AIS mobile station	[U.DOI tbd]
AIS derived maximum present static draught of the vessel (AIS draught)	[U.DOI tbd]
AIS derived destination of the vessel (AIS destination)	[U.DOI tbd]
AIS derived ETA at destination (AIS ETA)	[U.DOI tbd]
AIS derived Type of Cargo of the vessel (AIS cargo type)	[U.DOI tbd]
Time/date of reception at receiving site	[U.DOI tbd]

2.1.5.3 Time dynamics of A_VOY

The above data objects will be delivered to the requesting technical service without further polling (push) when one of the following conditions is fulfilled:

- Immediately after initialization of this BAS when available;
- [Every [N] minutes; N to be configured by the requesting technical service; default setting of N = 6];
- When a shipboard change of any of the above individual data element is received;
- Upon request of the requesting technical service.

2.1.5.4 Cautionary notes regarding the e-Navigation context

The voyage related data is entered manually on the ship board side before and might be adapted during the voyage and is sometimes subject to the discretion of the ship's personnel. It is possible that this data may be faulty.

Information on the type of cargo provides only the classification of dangerous goods (Carrying DG, HS, or MP, IMO hazard or pollutant category A, B, C, D)

2.1.6 BAS B_DAT

Ship data from Class B shipborne mobile AIS stations.

2.1.6.1 Introduction of B_DAT

The BAS Category E-1 B_DAT provides *static and dynamic data about the vessel* to the requesting technical service. This data is derived from the *AIS Class B mobile station* broadcasts.

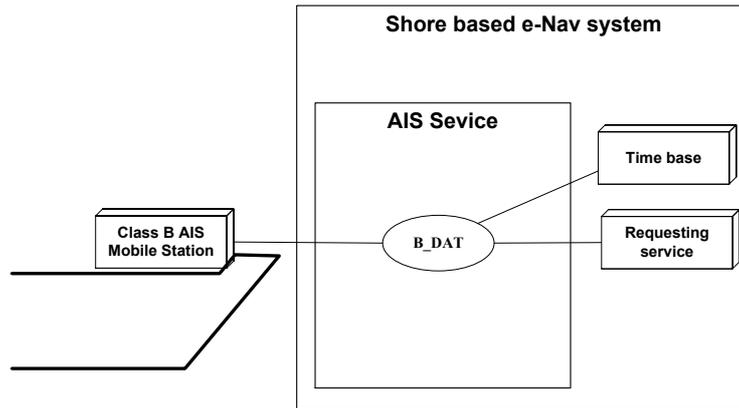


Figure 10 BAS Category E-1 B_DAT

2.1.6.2 IALA MDEF sentence of BAS B_DAT

Table 4 The IALA MDEF sentence of BAS B_DAT

MMSI of Class B AIS mobile station	[U.DOI tbd]
Call Sign of the vessel	[U.DOI tbd]
Name of the vessel	[U.DOI tbd]
Type of the vessel	[U.DOI tbd]
Length of the vessel	[U.DOI tbd]
Beam of the vessel	[U.DOI tbd]
Unregistered daughter vessel instead length and beam (B CS only)	[U.DOI tbd]
Geographic position of the vessel	[U.DOI tbd]
Type of position sensor in use	[U.DOI tbd]
Reference location of position sensor in use	[U.DOI tbd]
SOG of the vessel	[U.DOI tbd]
COG of the vessel	
Heading of the vessel	[U.DOI tbd]
Time/date of reception at receiving site	[U.DOI tbd]

2.1.6.3 Time dynamics of B_DAT

The above data objects will be delivered to the requesting technical service without further polling (push) when one of the following conditions is fulfilled:

- Immediately after initialization of this BAS when available;
- At a variable rate based on the navigational status, the manoeuvring and the speed of the vessel between 5 s and 3 minutes. The reporting interval can be increased, decreased or assigned into a quiet time by commanding the mobile station into assigned mode;
- [Every [N] minutes; N to be configured by the requesting technical service; default setting of N];
- When a shipboard change of any of the above individual data element is received;
- Upon request of the requesting technical service.

2.1.6.4 Cautionary notes regarding the e-Navigation context

The dynamic data is only as accurate as the sensor data provided autonomously and automatically to the AIS-station from shipboard sensors.

The static data is entered manually on the ship board side during installation and is password protected however it is possible that this data may be faulty.
The limited precision of the ship's dimensions have to be taken into consideration when evaluating this data.

2.1.7 BAS SAR_DAT

Data from SAR airborne AIS stations

2.1.7.1 Introduction of SAR_DAT

The BAS Category E-1 SAR_DAT provides *static and dynamic data about the aircraft involved in SAR operations* to the requesting technical service. This data is derived from the *AIS SAR aircraft equipment broadcasts*.

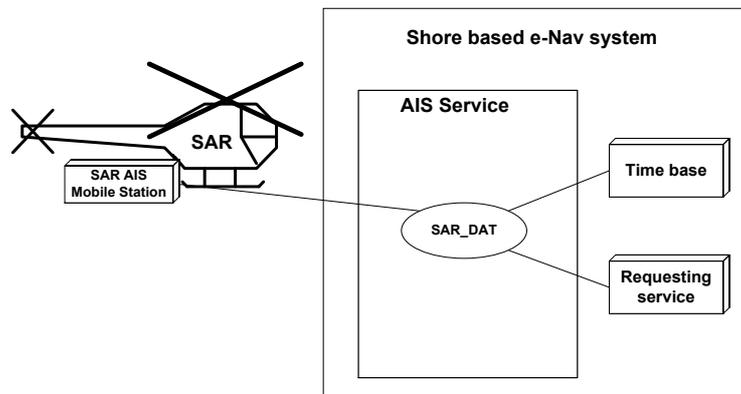


Figure 11 BAS Category E-1 SAR_DAT

2.1.7.2 List of data objects delivered the requesting technical service

The BAS SAR_DAT delivers the following data objects:

- MMSI of AIS SAR aircraft equipment;
- Geographic position of the aircraft;
 - Latitude; Longitude ([U.DOI]);
 - Time tag of position determination ([U.DOI]);
 - Integrity of position ([U.DOI]);
 - Accuracy of the position ([U.D.
- Altitude of the aircraft ([U.DOI]);
- Altitude sensor used ([U.DOI]);
- SOG of the aircraft ([U.DOI]);
- COG of the aircraft ([U.DOI]);
- Name of the aircraft ([U.DOI]);
- Time/date of reception at receiving site ([U.DOI]).

2.1.7.3 Time dynamics of SAR_DAT

The above data objects will be delivered to the requesting technical service without further polling (push) when one of the following conditions is fulfilled:

- Immediately after initialization of this BAS when available;

- Every 10 seconds; [The reporting interval can be increased by commanding the mobile station into assigned mode];
- [Every [N] minutes; N to be configured by the requesting technical service; default setting of N];
- Upon request of the requesting technical service.

2.1.7.4 Cautionary notes regarding the e-Navigation context

The dynamic data is only as accurate as the sensor data provided autonomously and automatically to the AIS-station from shipboard sensors.

The static data is entered manually on the ship board side during installation and is password protected however it is possible that this data may be faulty.

2.1.8 Service Name: ATON_DAT (received): Data from AtoN AIS stations

2.1.8.1 Introduction of ATON_DAT

The BAS Category E-1 ATON_DAT provides *data about the ATON* to the requesting technical service. This data is derived from the *ATON AIS station* broadcasts.

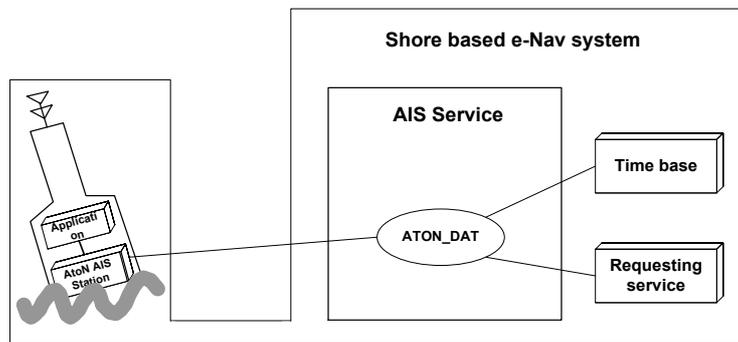


Figure 12 BAS Category E-1 ATON_DAT

2.1.8.2 List of data objects delivered the requesting technical service

The BAS ATON_DAT delivers the following data objects:

- MMSI of AtoN AIS station ([U.DOI]);
- Type of Aids-to-Navigation ([U.DOI]);
- Name of Aids-to-Navigation ([U.DOI]);
- Geographic position of the AtoN:
 - Latitude, Longitude ([U.DOI]);
 - Time tag of position determination ([U.DOI]);
 - Integrity of position ([U.DOI]);
 - Accuracy of the position ([U.DOI]);
- Type of electronic position fixing device in use ([U.DOI]);
- Reference location of position sensor in use ([U.DOI]);
- Dimension of the AtoN ([U.DOI]);
- Off-position indicator of the AtoN ([U.DOI]);
- AtoN status ([U.DOI]);

- Virtual AtoN flag ([U.DOI]);
- Time/date of reception at receiving site ([U.DOI]).

2.1.8.3 Time dynamics of ATON_DAT

The above data objects will be delivered to the requesting technical service without further polling (push) when one of the following conditions is fulfilled:

- Immediately after initialization of this BAS when available.
- [Every [N] minutes; N to be configured by the requesting technical service; default setting of N = 3]
- When a change of some of the above individual data element is received
- Upon request of the requesting technical service

2.1.8.4 Cautionary notes regarding the e-Navigation context

The dynamic data is only as accurate as the sensor data provided autonomously and automatically to the AIS-station from shipboard sensors.

2.1.9 BAS SAFE_AD (received)

Safety related addressed message

2.1.9.1 Introduction of SAFE_AD (received)

The BAS Category E-1 SAFE_AD provides addressed safety related text messages from a specific vessel addressed to the requesting technical service. This data is derived from an *AIS station* broadcasts.

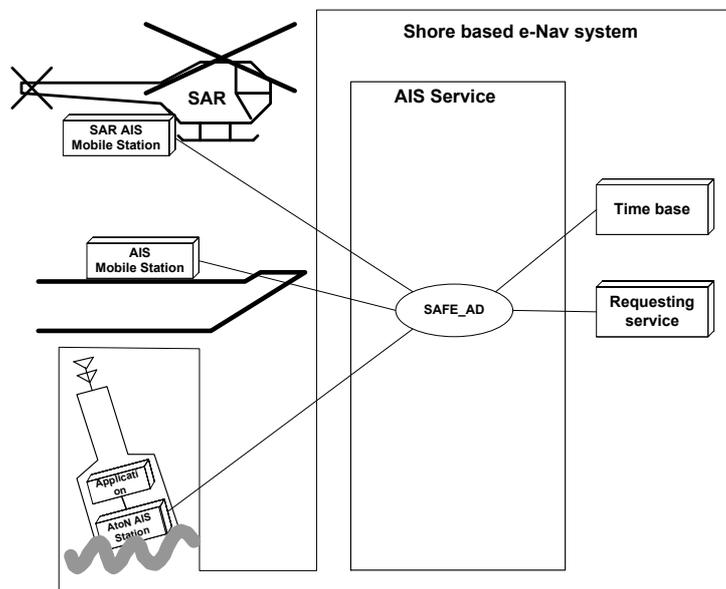


Figure 13 BAS Category E-1 SAFE_AD

2.1.9.2 List of data objects delivered to the requesting technical service

The BAS SAFE_AD delivers the following data objects:

- Source ID: ([U.DOI])
MMSI of source of the safety related text message

- Destination ID: ([U.DOI])
MMSI of addressed AIS station or if service MMSI used: service MMSI
- text container with safety related text ([U.DOI])
- Time/date of reception at receiving site ([U.DOI])

List of objects requires from the requesting technical service

- Acknowledgement required ([U.DOI])

2.1.9.3 Time dynamics of SAFE_AD (received)

The above data objects will be delivered to the addressed technical service without further polling (push) when one of the following conditions is fulfilled:

- Immediately after reception of the addressed data;
- Upon request of the requesting technical service.

2.1.9.4 Cautionary notes regarding the e-Navigation context

Due to the number of occupied slots the safety related messages should be as short as possible. The message is variable in length and contents. The maximum number of characters is limited to [156] (or 5 VDL slots).

2.1.10 BAS SAFE_BR (received)

Safety related broadcast message.

2.1.10.1 Introduction of SAFE_BR (received)

The BAS Category E-1 SAFE_BR provides safety related broadcast text messages from a specific vessel to the requesting technical service. This data is derived from an AIS station broadcasts.

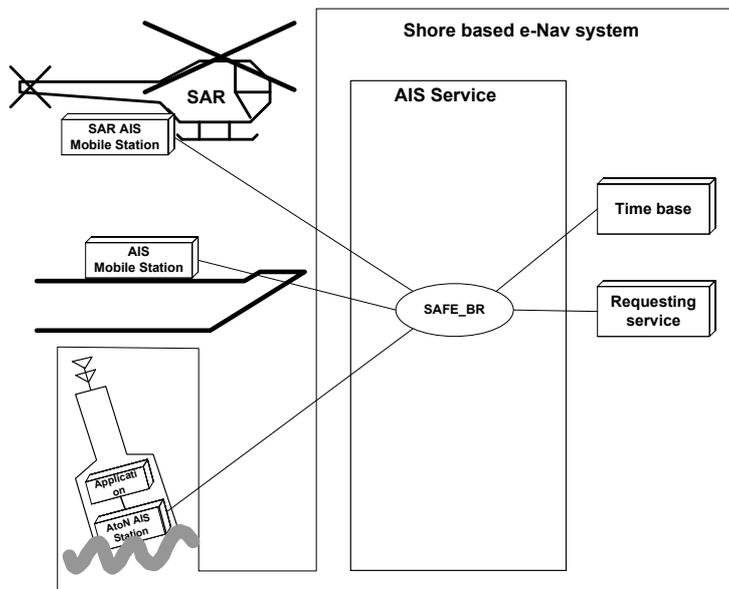


Figure 14 FBAS Category E-1 SAFE_BR

2.1.10.2 List of data objects delivered to the requesting technical service

The BAS SAFE_BR delivers the following data objects:

- Source ID: ([U.DOI])
MMSI of transmitting AIS station or if service MMSI used: service MMSI
- Destination ID: ([U.DOI])
- MMSI of the receiving AIS station or ID of AIS service area in which the message was received
- Text container with safety related data ([U.DOI])
- Time/date of reception at receiving site ([U.DOI])

List of objects requires from the requesting technical service

- Acknowledgement required ([U.DOI])

2.1.10.3 Time dynamics of SAFE_BR (received)

The above data objects will be delivered to the technical service without further polling (push) when one of the following conditions is fulfilled:

- Immediately after reception of the data;
- Upon request of the requesting technical service.

2.1.10.4 Cautionary notes regarding the e-Navigation context

Due to the number of occupied slots the safety related messages should be as short as possible. The message is variable in length and contents. The maximum number of characters is limited to [156] (or 5 VDL slots).

2.1.11 BAS ASC_AD (received)

Addressed Application Specific data Container

2.1.11.1 Introduction of ASC_AD (received)

The BAS Category E-1 ASC_AD provides an addressed container for application specific data from a specific vessel to the requesting technical service. This data is derived from an *AIS station* broadcasts. Regional application specific messages are collected by IALA.

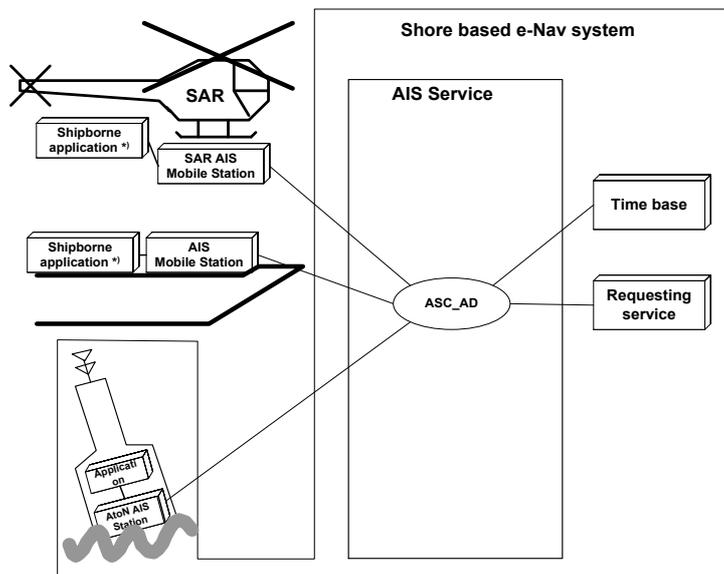


Figure 15 BAS Category E-1 ASC_AD

2.1.11.2 List of data objects delivered to the requesting technical service

The BAS ASC_AD delivers the following data objects:

- Source ID: ([U.DOI])
MMSI of source of the application specific data container
- Destination ID: ([U.DOI])
MMSI of addressed AIS station or if service MMSI used: service MMSI
- application specific data container ([U.DOI])
including DAC/FI combo
- Time/date of reception at receiving site ([U.DOI])

List of objects requires from the requesting technical service

- Acknowledgement required ([U.DOI])

2.1.11.3 Time dynamics of ASC_AD (received)

The above data objects will be delivered to the technical service without further polling (push) when one of the following conditions is fulfilled:

- Immediately after reception of the data;
- Upon request of the requesting technical service.

2.1.11.4 Cautionary notes regarding the e-Navigation context

The receiving technical service may not be able to process the received application specific message.

2.1.12 BAS ASC_BR (received)

Broadcast Application Specific data Container

2.1.12.1 Introduction of ASC_BR (received)

The BAS Category E-1 ASC_BR provides a container for application specific data broadcast from a specific vessel to the requesting technical service. This data is derived from an *AIS station* broadcasts. Regional application specific messages are collected by IALA.

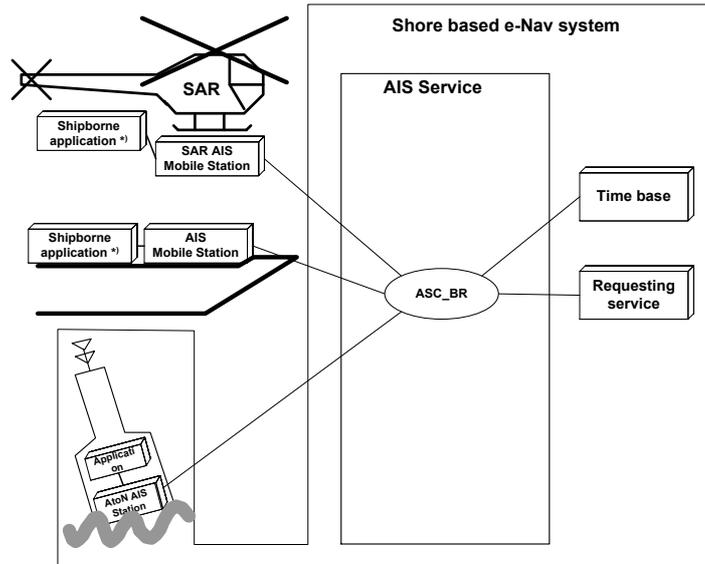


Figure 16 BAS Category E-1 ASC_BR

2.1.12.2 List of data objects delivered to the requesting technical service

The BAS ASC_AD delivers the following data objects:

- Source ID: ([U.DOI])
MMSI of source of the application specific data container
- Destination ID: ([U.DOI])
MMSI of addressed AIS station or if service MMSI used: service MMSI
- application specific data container ([U.DOI])
including DAC/FI combo
- Time/date of reception at receiving site ([U.DOI])

List of objects requires from the requesting technical service

- Acknowledgement required ([U.DOI])

2.1.12.3 Time dynamics of ASC_BR (received)

The above data objects will be delivered to the technical service without further polling (push) when one of the following conditions is fulfilled:

- Immediately after reception of the data;
- Upon request of the requesting technical service.

2.1.12.4 Cautionary notes regarding the e-Navigation context

The receiving AIS station may not be able to process the received application specific message.

2.1.13 BAS DGNSS_COR (received)

DGNSS corrections as received from AIS Service.

2.1.13.1 Introduction of DGNSS_COR (received)

The BAS Category E-1 DGNSS_COR provides DGNSS corrections as received from an AIS Shore Stations to the requesting technical service. This data is derived from an *AIS station* broadcasts.

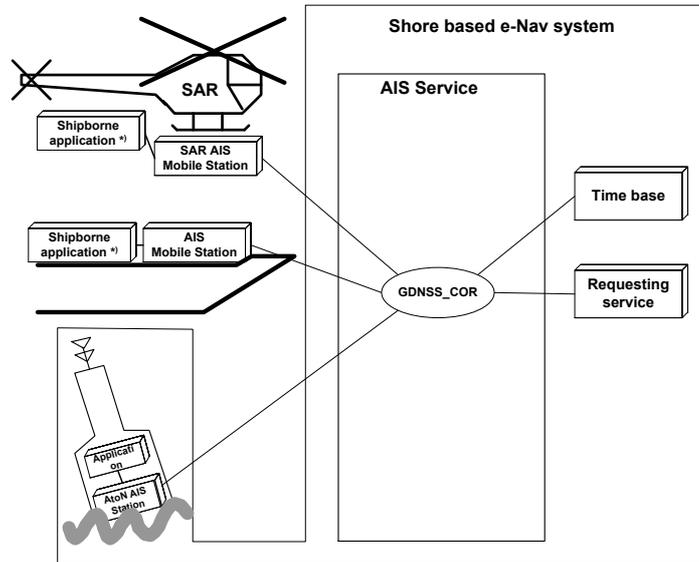


Figure 17 BAS Category E-1 DGNSS_COR

2.1.13.2 List of data objects delivered to the requesting technical service

The BAS DGNSS_COR delivers the following data objects:

- Source ID: ([U.DOI])
MMSI of transmitting AIS station or if service MMSI used: service MMSI
- RTCM container with correction data ([U.DOI])
- Time/date of reception at receiving site ([U.DOI])

2.1.13.3 Time dynamics of DGNSS_COR (received)

The above data objects will be delivered to the technical service without further polling (push) immediately after reception of the data.

2.1.13.4 Cautionary notes regarding the e-Navigation context

2.2 BAS Category E-2

BAS Category E-2 is initiated by the requesting technical service and delivers data from the requesting technical service to the AIS mobile stations.

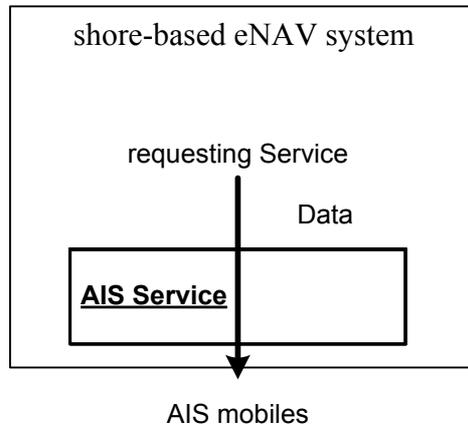


Figure 18 Data flow BAS Category E-2

2.2.1 Context of the BAS Category E-2

The following figure describes the context of BAS Category E-2, i.e. the relevant actors/entities of the shore-based system involved.

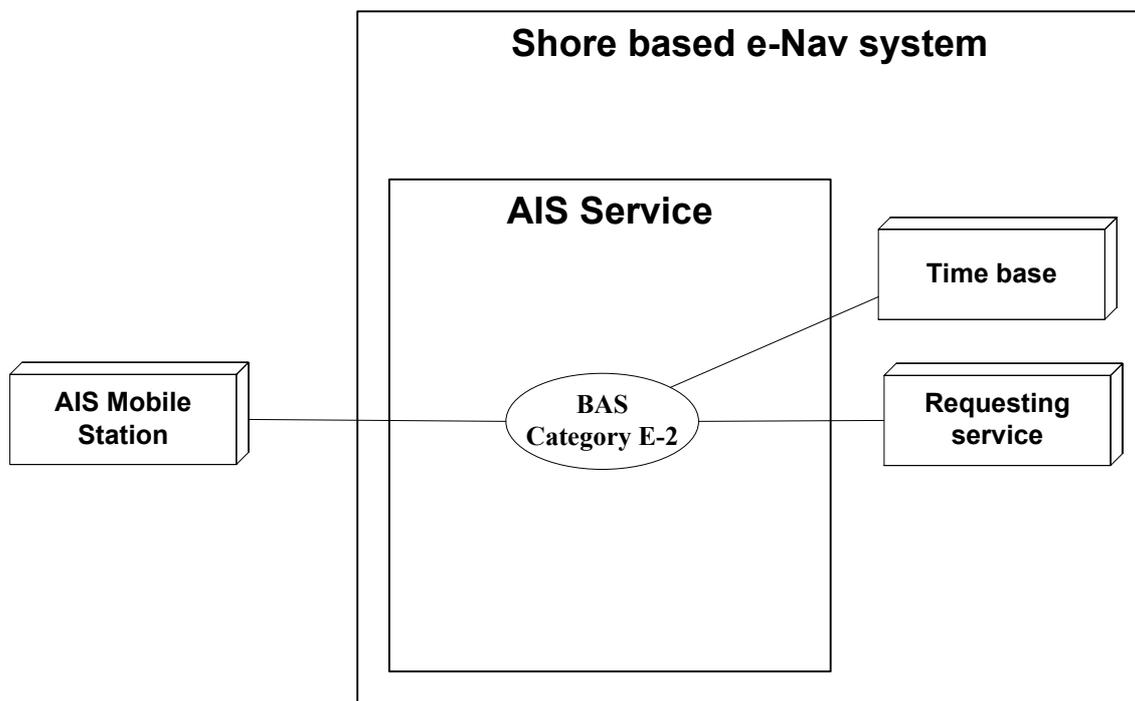


Figure 19 Context of the BAS Category E-2

2.2.2 Mapping of BAS Category E-2 to functional component description

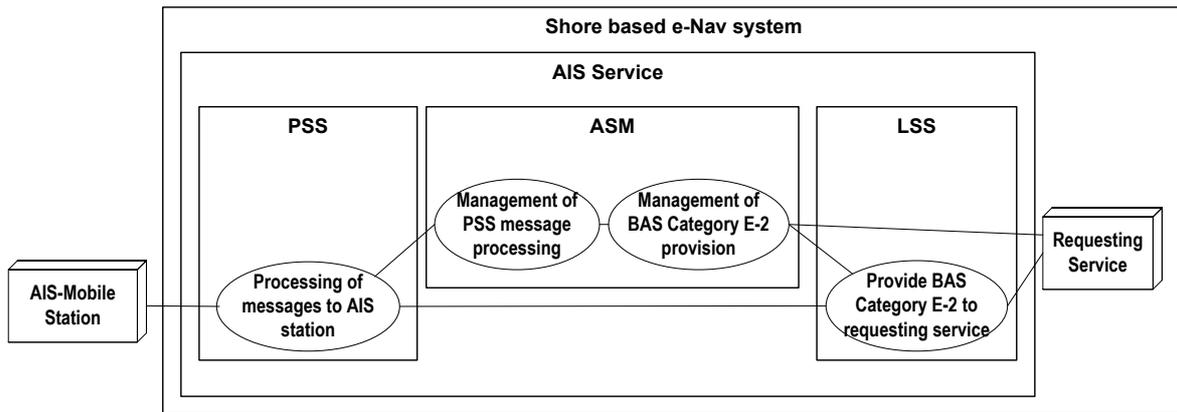


Figure 20 Resulting functional component description for BAS Category E-2

Note: For the sake of simplicity the time base is not shown.

2.2.3 BAS SAFE_AD (transmitted) - Safety related addressed message

2.2.3.1 Introduction of SAFE_AD (transmitted)

The BAS Category E-2 SAFE_AD transfers safety related text messages from the requesting technical service addressed to a specific vessel. The successful transfer will be acknowledged.

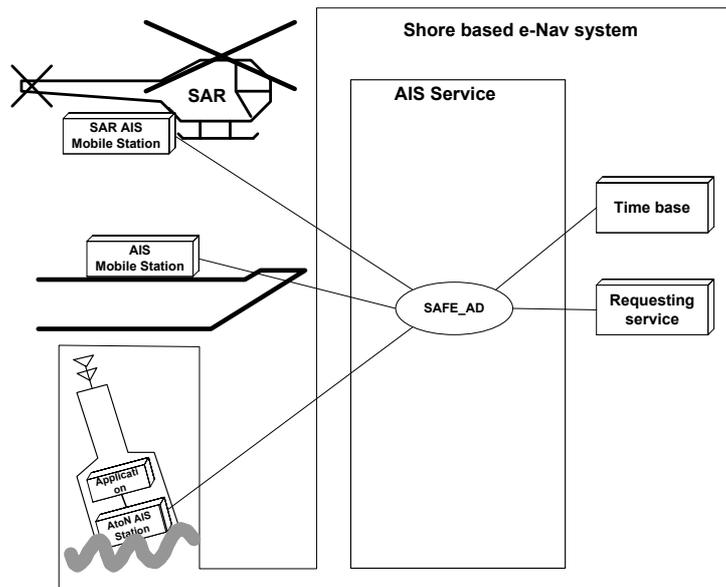


Figure 21 BAS Category E-2 SAFE_AD

2.2.3.2 List of data objects delivered from the requesting technical service

The BAS SAFE_AD expects the following data objects from the requesting technical service:

- Source ID: ([U.DOI])
MMSI of transmitting AIS shore station or if service MMSI used: service MMSI
- Destination ID: ([U.DOI])
MMSI of addressed AIS station
- text container with safety related text ([U.DOI])
- text container priority ([U.DOI])

- [Process ID (for ACK to the technical service) ([U.DOI])

List of objects delivered to the requesting technical service

- Acknowledgement ([U.DOI])
- [Process ID (for ACK to the technical service) ([U.DOI])

2.2.3.3 Time dynamics of SAFE_AD (transmitted)

The above data objects will be broadcast to the addressed AIS mobile station immediately after reception of the addressed data from the requesting technical service. The reception of the broadcast by the addressed AIS mobile station will be acknowledged to the technical service.

2.2.3.4 Cautionary notes regarding the e-Navigation context

The BAS SAFE_AD checks the size of the provided safety related text against the before negotiated size for addressed safety related text.

A Class B AIS mobile station may not be able to display a received safety text message.

2.2.4 BAS SAFE_BR (transmitted)

Safety related broadcast message.

2.2.4.1 Introduction of SAFE_BR (transmitted)

The BAS Category E-2 SAFE_BR transfers safety related broadcast text messages from the requesting technical service to all AIS stations in a given AIS service area. The broadcast will be acknowledged.

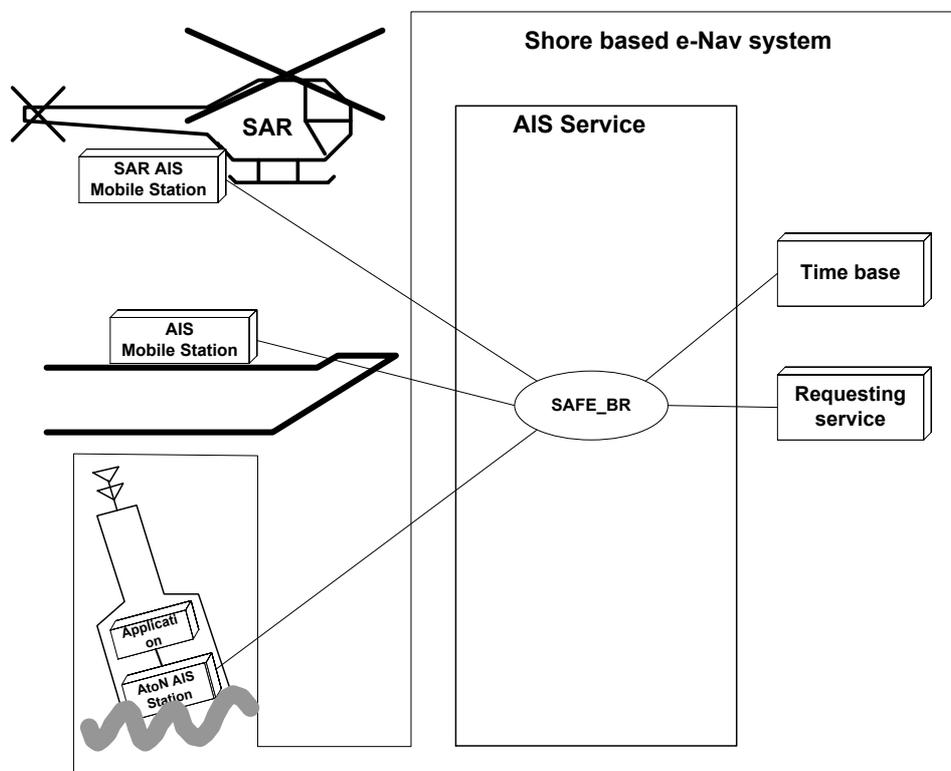


Figure 22 BAS Category E-2 SAFE_BR

2.2.4.2 List of data objects delivered from the requesting technical service

The BAS SAFE_BR expects the following data objects from the requesting technical service:

- Source ID: ([U.DOI])
MMSI of transmitting AIS shore station or if service MMSI used: service MMSI
- Destination ID: ([U.DOI])
ID of service areas where the message will be broadcast
- text container with safety related text ([U.DOI])
- text container priority ([U.DOI])
- [Process ID (for ACK to the technical service) ([U.DOI])

List of objects delivered to the requesting technical service

- Acknowledgement ([U.DOI])
- [Process ID (for ACK to the technical service) ([U.DOI])

2.2.4.3 Time dynamics of SAFE_BR (transmitted)

The above data objects will be broadcasted into the identified service area immediately after reception of the data and the broadcast area definition from the technical service. The broadcast of the message will be acknowledged to the technical service.

2.2.4.4 Cautionary notes regarding the e-Navigation context

The BAS SAFE_BR checks the size of the provided safety related text against the before negotiated size for safety related broadcast text.

A Class B AIS mobile station may not be able to display a received safety text message.

2.2.5 BAS ASC_AD (transmitted)

Addressed Application Specific data Container.

2.2.5.1 Introduction of ASC_AD (received)

The BAS Category E-2 ASC_AD transfers an addressed container for application specific data from a requesting technical service to a specific vessel. The successful transfer will be acknowledged. Regional application specific messages are collected by IALA.

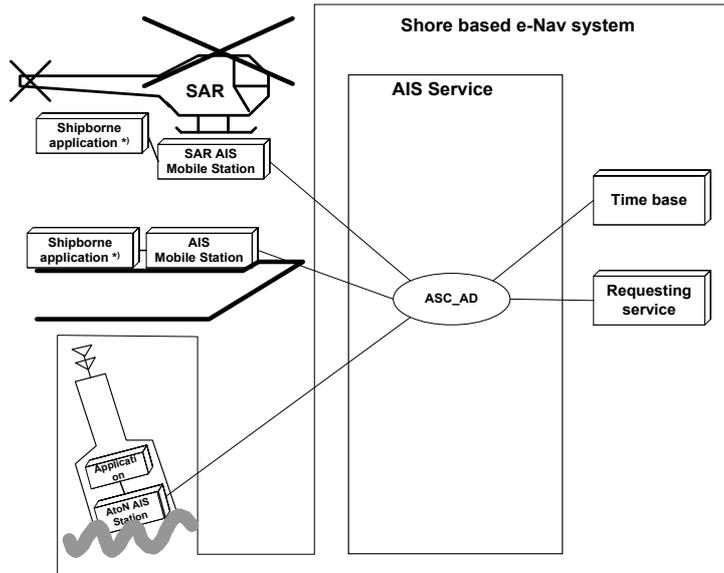


Figure 23 BAS Category E-2 ASC_AD

2.2.5.2 List of data objects delivered from the requesting technical service

The BAS ASC_AD expects the following data objects from the requesting technical service:

- Source ID: ([U.DOI])
MMSI of transmitting AIS shore station or if service MMSI used: service MMSI
- Destination ID: ([U.DOI])
MMSI of addressed AIS station if service MMSI used: service MMSI

- application specific data container ([U.DOI])
including DAC/FI combo
- application specific data container priority ([U.DOI])
- [Process ID (for ACK to the technical service)] ([U.DOI])

List of objects delivered to the requesting technical service

- Acknowledgement ([U.DOI])
- [Process ID (for ACK to the technical service)] ([U.DOI])

2.2.5.3 Time dynamics of ASC_AD (transmitted)

The above data objects will be broadcasted to the addressed AIS mobile station immediately after reception of the data from the requesting technical service. The reception of the broadcast by the addressed AIS mobile station will be acknowledged to the technical service.

2.2.5.4 Cautionary notes regarding the e-Navigation context

The BAS ASC_AD checks the size of the provided application specific data container against the before negotiated container size for addressed application specific data container.

The receiving AIS station may not be able to process the received application specific message.

2.2.6 BAS ASC_BR (transmitted)

Broadcast Application Specific data Container

2.2.6.1 Introduction of ASC_BR (transmitted)

The BAS Category E-2 ASC_BR transfers a container for broadcast application specific data received from a requesting technical service to all AIS stations in a given AIS service area. The broadcast of the data will be acknowledged. Regional application specific messages are collected by IALA.

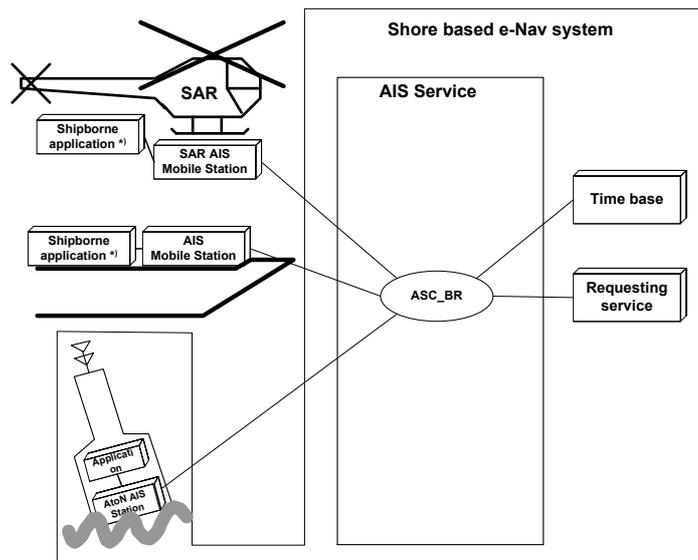


Figure 24 BAS Category E-2 ASC_BR

List of data objects delivered from the requesting technical service.

The BAS ASC_BR expects the following data objects from the requesting technical service:

- Source ID: ([U.DOI])

MMSI of transmitting AIS shore station or if service MMSI used: service MMSI

- Destination ID: ([U.DOI])
service area where the message will be broadcast
- application specific data container ([U.DOI])
including DAC/FI combo
- application specific data container priority ([U.DOI])
- [Process ID (for ACK to the technical service)] ([U.DOI])

List of objects delivered to the requesting technical service

- Acknowledgement ([U.DOI])
- [Process ID (for ACK to the technical service)] ([U.DOI])

2.2.6.2 Time dynamics of BAS ASC_BR (transmitted)

The above data objects will be broadcasted into the identified area immediately after reception of the data from the technical service. The broadcast of the message will be acknowledged to the technical service.

2.2.6.3 Cautionary notes regarding the e-Navigation context

The BAS ASC_AD checks the size of the provided application specific data container against the before negotiated container size for addressed application specific data container.

The receiving AIS station may not be able to process the received application specific message

2.2.7 BAS DGNSS_COR (transmitted)

Broadcast of DGNSS corrections via AIS VDL

2.2.7.1 Introduction of DGNSS_COR (transmitted)

The BAS Category E-2 DGNSS_COR transfers DGNSS corrections as received from a requesting technical service to all AIS stations in a given AIS service area. The broadcast of the data will be acknowledged.

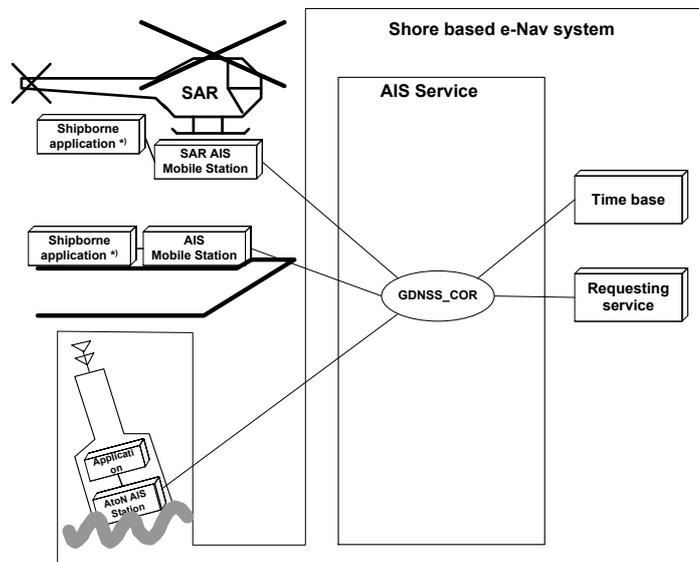


Figure 25 BAS Category E-2 DGNSS_COR

2.2.7.2 List of data objects delivered from the requesting technical service

The BAS ASC_BR expects the following data objects from the requesting technical service:

- Source ID: ([U.DOI])
MMSI of transmitting AIS station or if service MMSI used: service MMSI
- Destination ID: ([U.DOI])
service area where the message will be broadcast
- RTCM container priority ([U.DOI])
- [Process ID (for ACK to the technical service) ([U.DOI])

List of objects delivered to the requesting technical service

- Acknowledgement ([U.DOI])
- [Process ID (for ACK to the technical service) ([U.DOI])

2.2.7.3 Time dynamics of DGNSS_COR (transmitted)

The above data objects will be broadcasted into the identified area immediately after reception of the data from the technical service. The broadcast of the message will be acknowledged to the technical service.

2.2.7.4 Cautionary notes regarding the e-Navigation context

2.3 BAS Category E-3

BAS Category E-3 is initiated by the requesting technical service. They provide data to AIS mobile stations for a defined period of time or configure the AIS mobile stations' behaviour on the VDL.

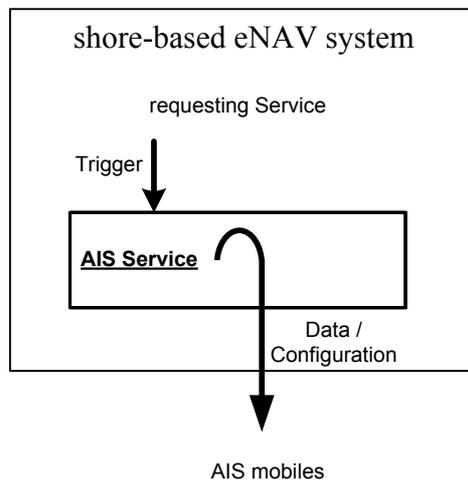


Figure 26 Data flow BAS Category E-3

2.3.1 Context of the BAS Category E-3

The following figure describes the context of BAS Category E-3, i.e. the relevant actors/entities of the shore-based system involved.

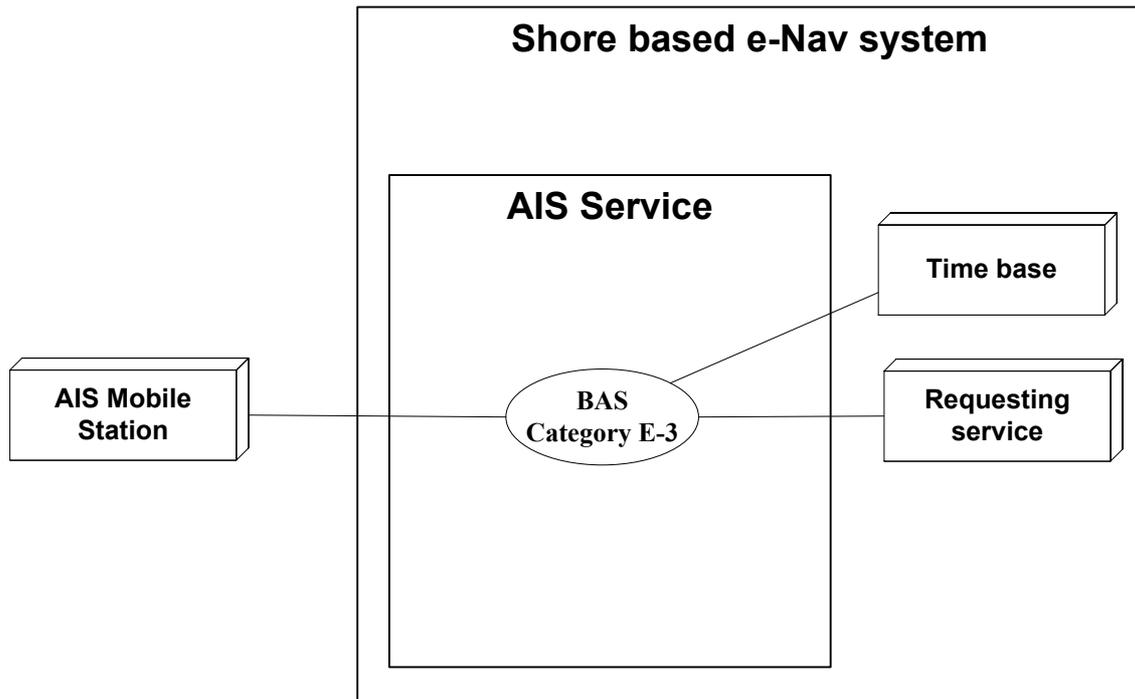


Figure 27 BAS Category E-3

2.3.2 Mapping of external BAS to functional component description for BAS Category E-3

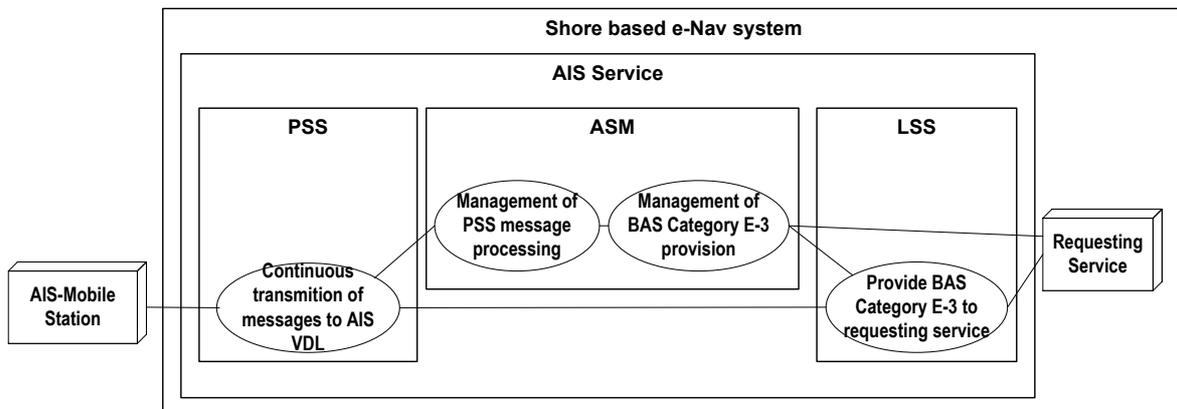


Figure 28 Resulting functional component description for BAS Category E-3

Note: time base not shown for sake of simplicity

2.3.3 BAS ASGN_RATE

Reporting rate assignment of AIS mobile station.

2.3.3.1 Introduction of ASGN_RATE

The BAS Category E-3 ASGN_RATE provides a means to the requesting technical service to increase or decrease the reporting interval of AIS mobile stations' position report.

This assignment may be addressed to a single AIS mobile station or to a group of AIS mobile stations within a defined region.

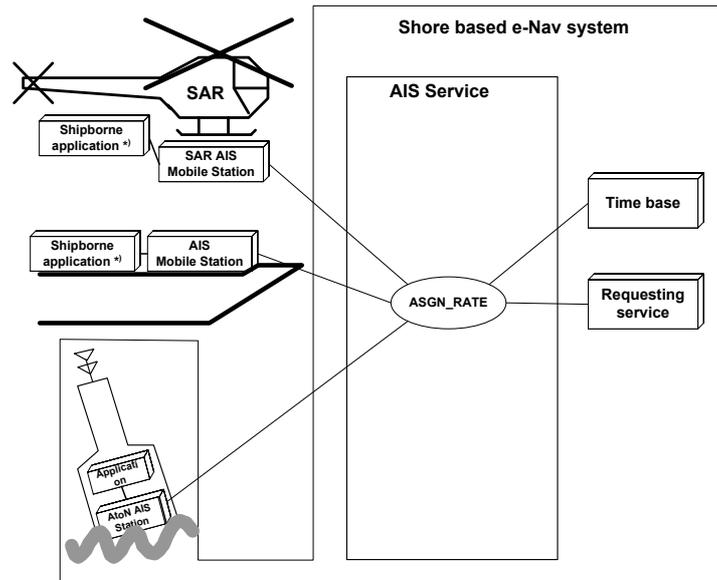


Figure 29 BAS Category E-3 ASGN_RATE

2.3.3.2 List of data objects delivered from the requesting technical service

The BAS ASGN_RATE expects the following data objects from the requesting technical service:

- Source ID: ([U.DOI])
MMSI of transmitting AIS shore station or if service MMSI used: service MMSI

Destination ID:

- specific AIS mobile stations ([U.DOI])
- MMSI of addressed AIS station(s)

Group of AIS mobile stations

- Geographical area (lat, long) ([U.DOI])
- AIS station type ([U.DOI])
- Type of ship ([U.DOI])
- Cargo type ([U.DOI])

Assigned behaviour:

- New Reporting rate ([U.DOI])
- Duration of quiet time ([U.DOI])
- Transmit mod: Channel to transmit on (A, B, both) ([U.DOI])

Effective life of assignment ([U.DOI])

- [Process ID (for ACK to the technical service)] ([U.DOI])

List of objects delivered to the requesting technical service

- Assignment status ([U.DOI])
- [Process ID (for ACK to the technical service)] ([U.DOI])

2.3.3.3 Time dynamics of ASGN_RATE

The BAS ASGN_RATE automatically broadcast an assignment command to the addressed AIS mobile stations or into the identified area immediately after reception of the data from the

requesting technical service. The addressed AIS mobile stations will enter the assigned mode and will revert after the provided effective life of assignment is elapsed until it is reinitiated by the requesting technical service. The requesting technical service may monitor the effective live time of the assignment in order to reinitiate the assignment.

2.3.3.4 Cautionary notes regarding the e-Navigation context

Class A AIS mobile station can only be assigned to decreased reporting intervals.

Older Class A AIS mobile stations will not observe assignments to Group of Class A AIS mobile stations.

2.3.4 BAS ASGN_SLOT

Assignment of AIS mobile station into protected area (protected time slots).

2.3.4.1 Introduction of ASGN_SLOT

The BAS Category E-3 ASGN_SLOT provides a mean to the requesting technical service to assign a specific AIS mobile stations' position reports to a protected area (protected time slots).

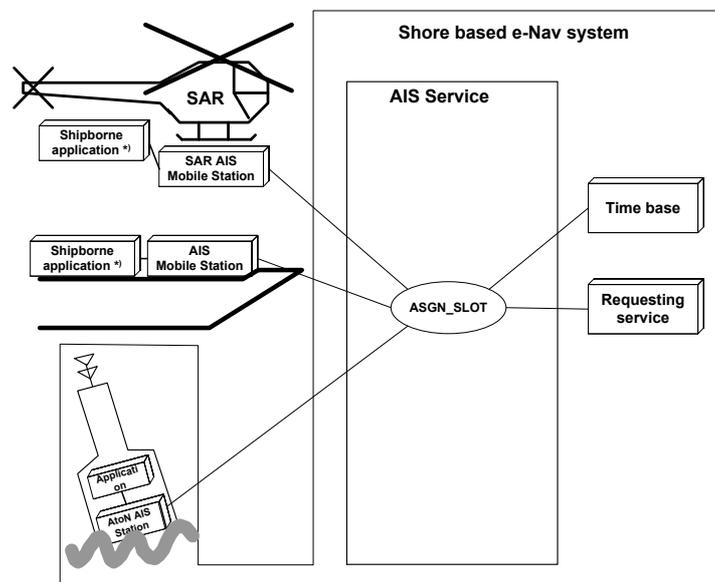


Figure 30 BAS Category E-3 ASGN_SLOT

2.3.4.2 List of data objects delivered from the requesting technical service

The BAS ASGN_RATE expects the following data objects from the requesting technical service:

- Source ID: ([U.DOI])
MMSI of transmitting AIS shore station or if service MMSI used: service MMSI
- Destination ID:
- MMSI of addressed AIS station ([U.DOI])
- New Reporting rate ([U.DOI])
- Effective life of assignment ([U.DOI])
- [Process ID (for ACK to the technical service) ([U.DOI])

List of objects delivered to the requesting technical service

- Assignment status ([U.DOI])

- [Process ID (for ACK to the technical service) ([U.DOI])

2.3.4.3 Time dynamics of ASGN_SLOT

The BAS ASGN_SLOT automatically broadcast an assignment command to the addressed AIS mobile station immediately after reception of the data from the technical service. The addressed AIS mobile station will enter the assigned mode and will revert after the provided effective life of assignment is elapsed until it is reinitiated by the requesting technical service. The requesting technical service may monitor the effective live time of the assignment in order to reinitiate the assignment.

2.3.4.4 Cautionary notes regarding the e-Navigation context

The Basic AIS Service ASGN_SLOT should be used only when a protected area (protected time slots) are provided.

2.3.5 BAS ATON_DAT (transmitted)

Delivers synthetic and/or virtual AtoN data to mobile AIS stations

2.3.5.1 Introduction of ATON_DAT (transmitted)

The BAS Category E-3 ATON_DAT broadcast synthetic and/or virtual AtoN data as stipulated by the Technical services.

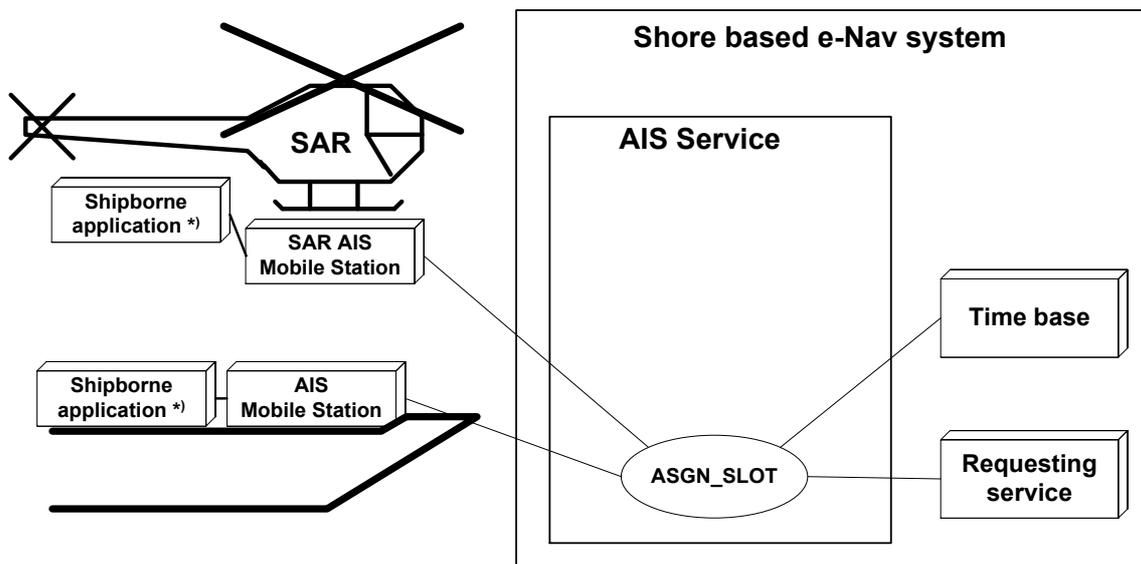


Figure 31 BAS Category E-3 ATON-DAT

2.3.5.2 List of data objects delivered from the requesting technical service

The BAS ATON_DAT expects the following data objects from the requesting technical service:

- MMSI Number of AtoN AIS station ([U.DOI])
- Type of Aids-to-Navigation ([U.DOI])
- Name of Aids-to-Navigation ([U.DOI])
- Geographic position of the AtoN
 - Latitude, Longitude ([U.DOI])
 - Time tag of position determination ([U.DOI])

- Integrity of position ([U.DOI])
- Accuracy of the position ([U.DOI])
- Type of electronic position fixing device in use ([U.DOI])
- Reference location of position sensor in use ([U.DOI])
- Dimension of the AtoN ([U.DOI])
- Off-position indicator of the AtoN ([U.DOI])
- AtoN status ([U.DOI])
- Virtual AtoN flag ([U.DOI])
- Effective life of assignment ([U.DOI])
- Reporting rate ([U.DOI])
- [Process ID (for ACK to the technical service) ([U.DOI])

List of objects delivered to the requesting technical service

- AtoN broadcast status ([U.DOI])
- [Process ID (for ACK to the technical service) ([U.DOI])

2.3.5.3 Time dynamics of ATON_DAT (transmitted)

The provided synthetic and/or virtual AtoN data will be broadcast every 3 minutes or as configured by the requesting technical service. The broadcast will be terminated after the provided effective life of assignment is elapsed unless it is reinitiated by the requesting technical service.

2.3.5.4 Cautionary notes regarding the e-Navigation context

AIS mobile station may not be able to display a received synthetic and / or virtual AtoN data.

Names of more than 20 characters may not be displayed on the MKD of some Class A AIS units.

2.4 BAS Category E-4

BAS Category E-4 is initiated by the requesting technical service. They provide data to the requesting technical service already available at the AIS service about the AIS VDL and the profile of individual AIS mobile stations.

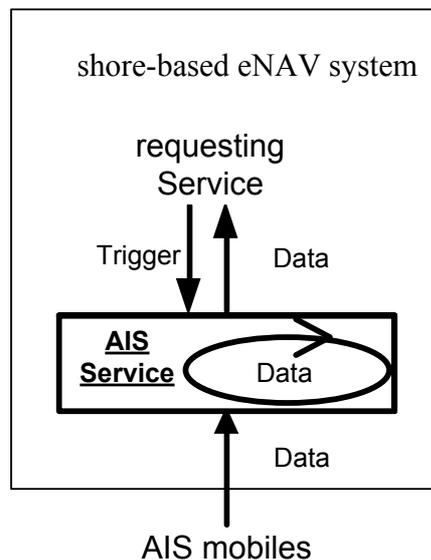


Figure 32 Data flow External BAS Category E-4

2.4.1 Context of the BAS Category E-4

The following figure describes the context of external BAS Category IV, i.e. the relevant actors/entities of the shore-based system involved.

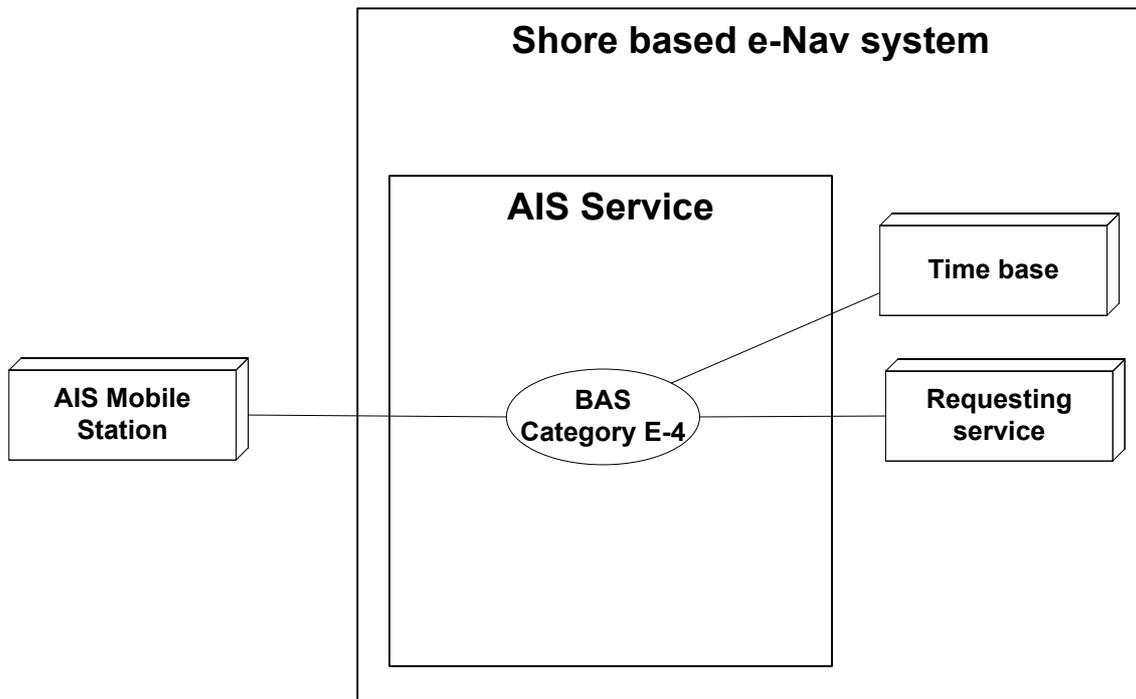


Figure 33 BAS Category E-4

2.4.2 Mapping of external BAS to functional component description for BAS Category E-4

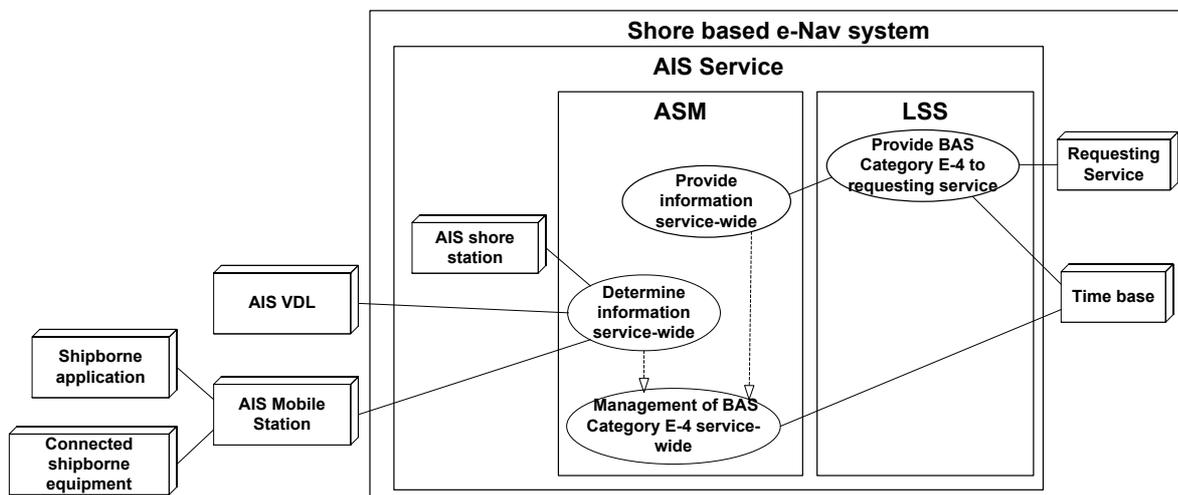


Figure 34 Resulting functional component description for BAS Category E-4

2.4.3 BAS CH_MON

Monitors the AIS VDL and provides relevant data to requesting service.

2.4.3.1 Introduction of CH_MON

The BAS Category E-4 CH_MON monitors the status of the AIS VDL and provides relevant data to the requesting technical service. This data is derived from message reception and VDL measurements by the AIS shore station.

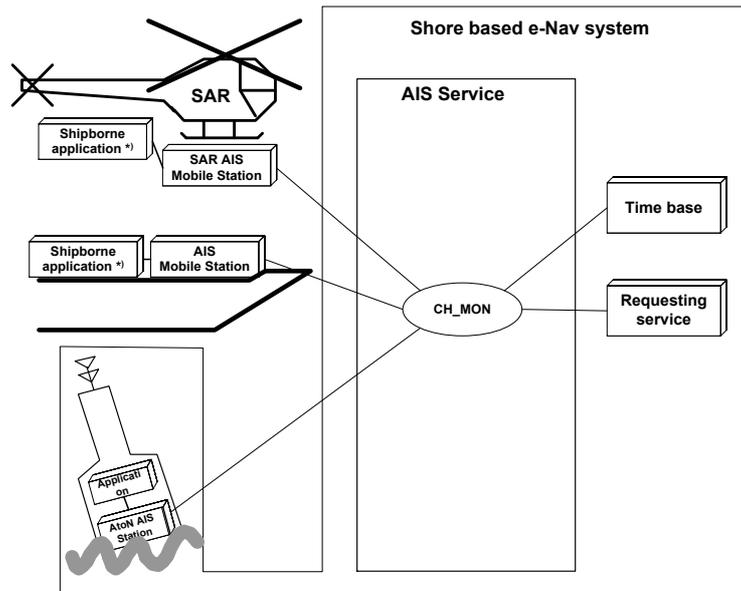


Figure 35 BAS Category E-4 CH_MON

2.4.3.2 List of data objects delivered to the requesting technical service

The BAS CH_MON delivers the following data objects:

- Availability of AIS-PCU service area within the AIS-LSS service area
 - ID of AIS-PCU service area ([U.DOI])
 - availability of AIS-PCU service area (coverage, interference) ([U.DOI])
- AIS VDL load per AIS-PCU service area within the AIS-LSS service area
 - ID of AIS-PCU service area ([U.DOI])
 - total VDL load of AIS-PCU service area ([U.DOI])
 - VDL load caused by Class A mobile station ([U.DOI])
 - VDL load caused by Class B mobile station ([U.DOI])

2.4.3.3 Time dynamics of CH_MON

The above data objects will be delivered to the requesting technical service:

- Upon request of the requesting technical service
- every [N] minutes; N to be configured by the requesting technical service; default setting of N = 6

2.4.3.4 Cautionary notes regarding the e-Navigation context

The BAS CH_MON delivers statistic data about the AIS VDL in the respective AIS-PCU service area. Those data may be different at different location within the AIS-PCU service area.

2.4.4 BAS MOB_PROFILE

Profile of individual mobile AIS station.

2.4.4.1 Introduction of MOB_PROFILE

The BAS Category E-4 MOB_PROFILE BAS provides data about the features of individual mobile AIS stations, their performance on the AIS VDL and the connected on-board equipment and applications to the requesting technical service.

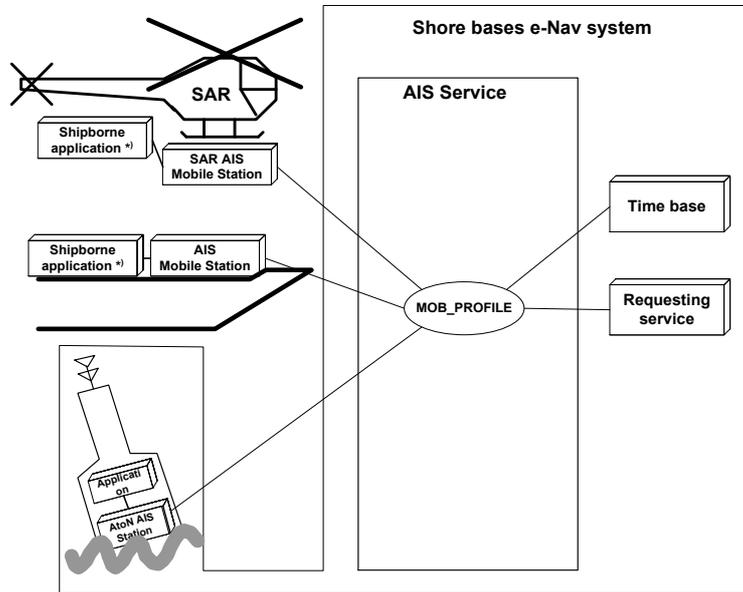


Figure 36 BAS Category E-4 MOB_PROFILE

2.4.4.2 List of data objects delivered to the requesting technical service

The BAS MOB_PROFILE delivers the following data objects:

- MMSI of mobile AIS station ([U.DOI])
- Type of mobile AIS station ([U.DOI])
- Reporting interval of the Mobile AIS station
 - Nominal reporting interval ([U.DOI])
 - Violation of nominal reporting interval ([U.DOI])
(violation of lost target interval)
- Onboard AIS display available (DTE) ([U.DOI])
- Supported onboard applications using application specific messages ([U.DOI])

2.4.4.3 Time dynamics of MOB_PROFILE

The above data objects will be delivered to the requesting technical service:

- Upon request of the requesting technical service
- every [N] minutes; N to be configured by the requesting technical service; default setting of N = 6
- When a change of specific of the above data element occurs, e.g. violation of nominal reporting interval

2.4.4.4 Cautionary notes regarding the e-Navigation context

3 INTERNAL BASIC AIS SERVICES

3.1 BAS Category I-1

BAS Category I-1 are initiated by the technical operation personnel and delivers data from the AIS service to mobile AIS stations.

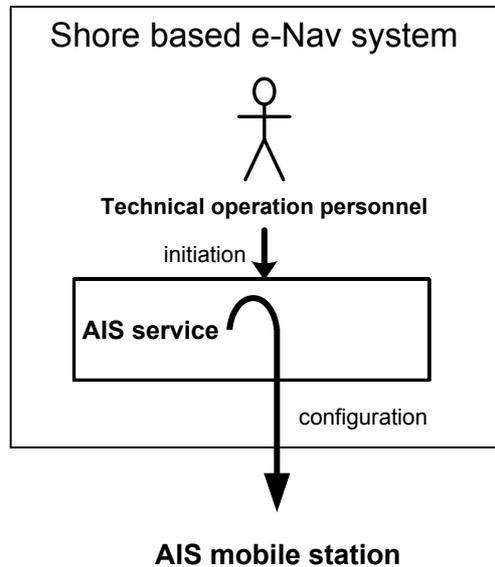


Figure 37 Data flow BAS Category I-1

3.1.1 Context of the BAS Category I-1

The following figure describes the context of internal BAS Category I-1, i.e. the relevant actors/entities of the shore-based system involved.

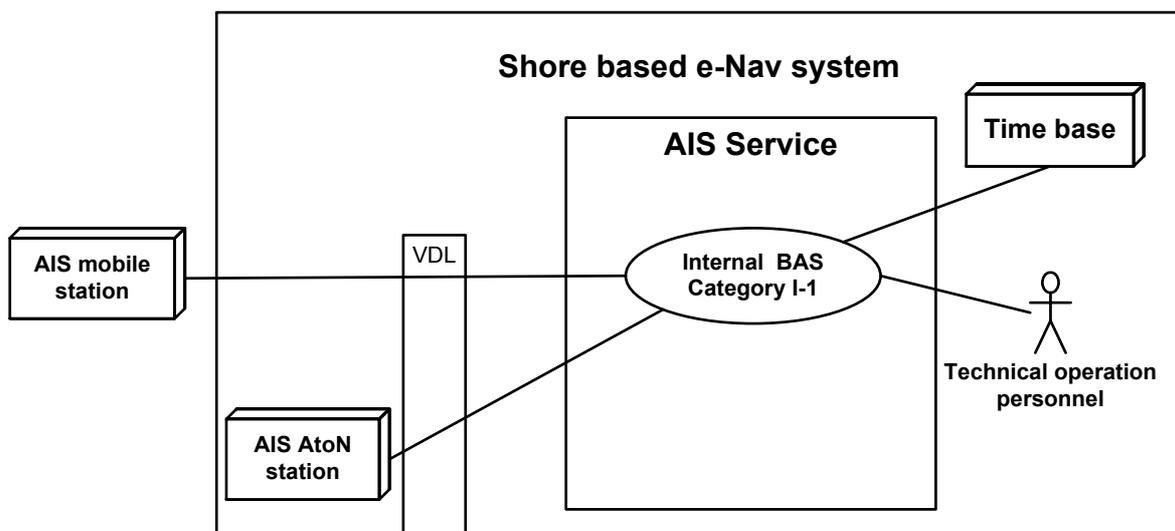


Figure 38 BAS Category I-1

3.1.2 Mapping of internal BAS to functional component description for BAS Category I-1

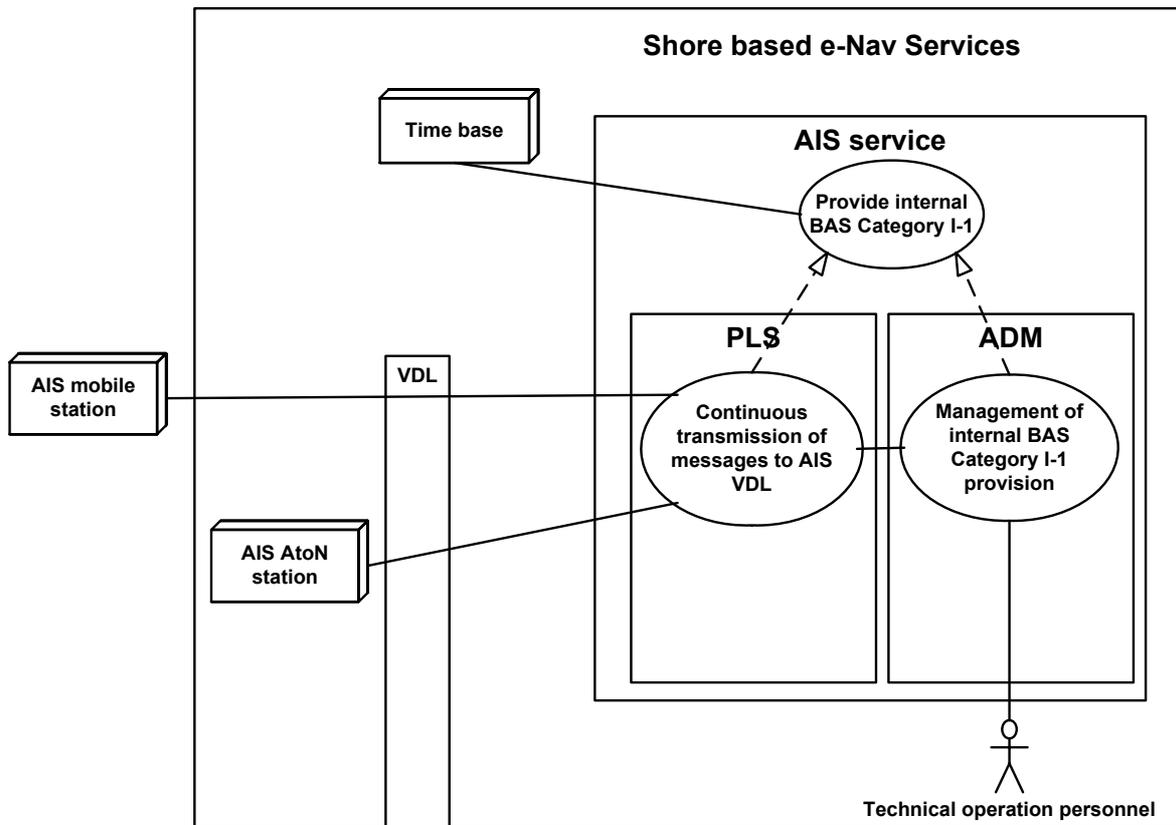


Figure 39 Resulting functional component description for BAS Category I-1

3.1.3 BAS BASE_DAT

Base station time and position data

3.1.3.1 Introduction of BASE_DAT

The BAS Category I-1 BASE_DAT initiated by the technical operation personnel and provides time and position data of the transmitting AIS shore station to mobile AIS station. This data is used by the receiving AIS station for secondary synchronization and system management purposes.

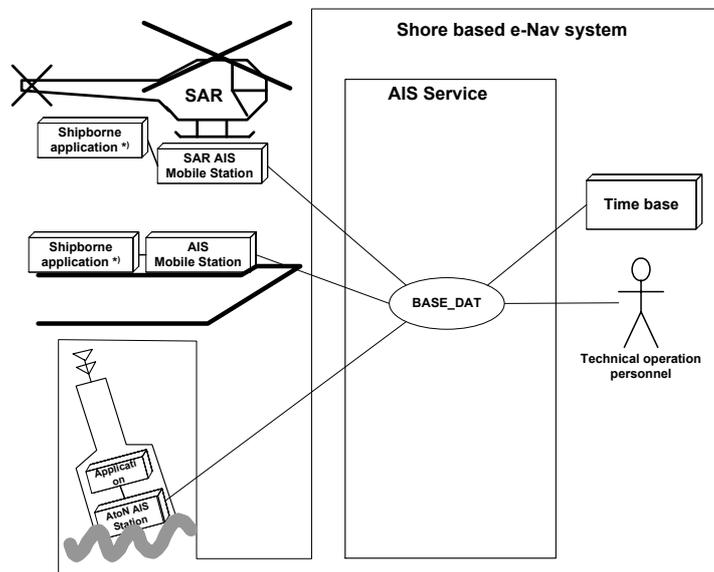


Figure 40 BAS Category I-1 BASE_DAT

3.1.3.2 List of data expected from the technical operation personnel

The BAS ASGN_RATE expects the following data objects from the technical operation personnel:

- Source ID: ([U.DOI])
- MMSI of transmitting AIS shore station
- UTC Date (year, month, day) ([U.DOI])
- UTC Time (hour, minute, second) ([U.DOI])
- Geographic position of the AIS shore station
 - Latitude, Longitude ([U.DOI])
 - Time tag of position determination ([U.DOI])
 - Integrity of position ([U.DOI])
 - Accuracy of the position ([U.DOI])
- Type of position sensor in use ([U.DOI])

List of data objects delivered to the technical operation personnel

- BASE_DAT status ([U.DOI])

3.1.3.3 Time dynamics of BASE_DAT

The above data objects will be broadcast by the AIS shore station every 10 seconds unless providing synchronization data for other AIS stations. Then it is broadcast every 3 1/3 seconds.

The BAS BASE_DAT operates continuously until switched off.

3.1.3.4 Cautionary notes regarding the e-Navigation context

Older mobile AIS stations may not observe the 120 nm limitation for acceptance of FATDMA reservations

3.1.4 BAS ASGN_RATE (internal)

Reporting rate assignment of AIS mobile station

3.1.4.1 Introduction of ASGN_RATE

The BAS Category I-1 ASGN_RATE provides a means to the technical operation personnel to influence the VDL load by increasing or decreasing the reporting interval of AIS mobile stations' position report.

This assignment may be addressed to a single AIS mobile station or to a group of AIS mobile stations within a defined region.

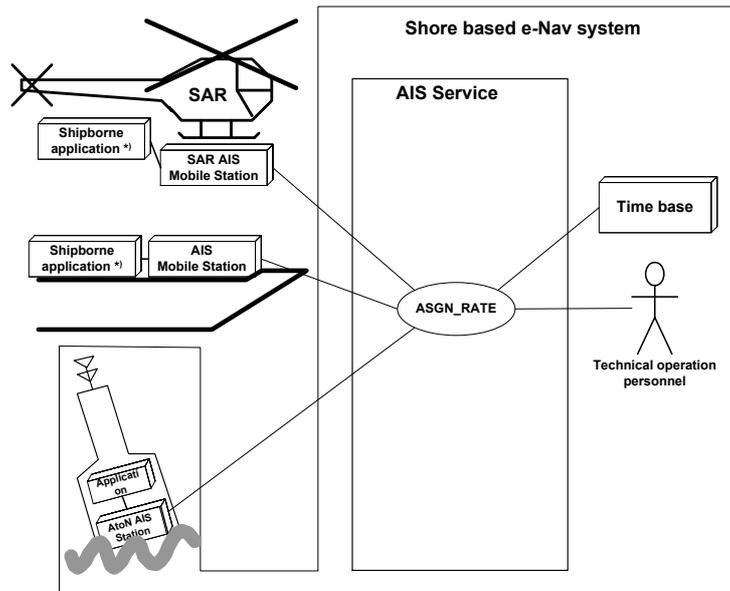


Figure 41 BAS Category I-1 ASGN_RATE

3.1.4.2 List of data objects expected from the technical operation personnel

The BAS ASGN_RATE expects the following data objects from the technical operation personnel:

- Source ID: ([U.DOI])
MMSI of transmitting AIS shore station
- Destination ID:
 - specific AIS mobile stations ([U.DOI])
 - ✓ MMSI of addressed AIS station(s)
 - Group of AIS mobile stations
 - ✓ Geographical area (lat, long) ([U.DOI])
 - ✓ AIS station type ([U.DOI])
 - ✓ Type of ship ([U.DOI])
 - ✓ Cargo type ([U.DOI])
- Assigned behaviour:
 - New Reporting rate ([U.DOI])
 - Duration of quiet time ([U.DOI])
 - Transmit mod: Channel to transmit on (A, B, both) ([U.DOI])
- Effective life of assignment ([U.DOI])

List of data objects delivered to the technical operation personnel

- Assignment status ([U.DOI])

3.1.4.3 Time dynamics of ASGN_RATE

The BAS ASGN_RATE automatically broadcast an assignment command to the addressed AIS mobile stations or into the identified area immediately after reception of the data from the technical operation personnel. The addressed AIS mobile stations will enter the assigned mode and will revert after the provided effective life of assignment is elapsed until it is reinitiated by the technical operation personnel. The technical operation personnel may monitor the effective live time of the assignment in order to reinitiate the assignment.

3.1.4.4 Cautionary notes regarding the e-Navigation context

Class A AIS mobile station can only be assigned to decreased reporting intervals.

Older Class A AIS mobile stations will not observe assignments to Group of Class A AIS mobile stations.

3.1.5 BAS ASGN_SLOT (internal) - Assignment of AIS mobile station into protected area (protected time slots)

3.1.5.1 Introduction of ASGN_SLOT

The BAS Category I-1 ASGN_SLOT provides a mean to the technical operation personnel to assign a specific AIS mobile stations' position reports to a protected area (protected time slots).

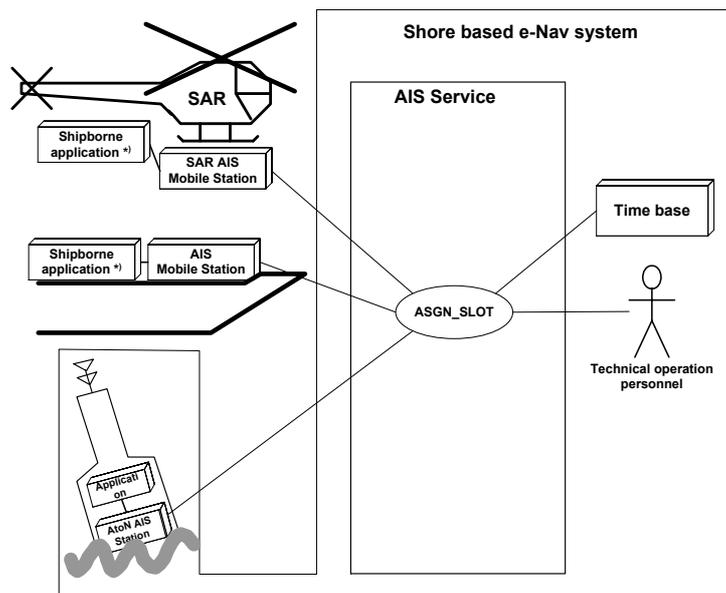


Figure 42 BAS Category I-1 ASGN_SLOT

3.1.5.2 List of data objects delivered from the technical operation personnel

The BAS ASGN_RATE expects the following data objects from the technical operation personnel:

- Source ID: ([U.DOI])
MMSI of transmitting AIS shore station
- Destination ID:
- MMSI of addressed AIS station ([U.DOI])
- New Reporting rate ([U.DOI])
- Effective life of assignment ([U.DOI])

List of data objects delivered to the technical operation personnel

- Assignment status ([U.DOI])

3.1.5.3 Time dynamics of ASGN_SLOT

The BAS ASGN_RATE automatically broadcast an assignment command to the addressed AIS mobile station immediately after reception of the data from the technical operation personnel. The addressed AIS mobile station will enter the assigned mode and will revert after the provided effective life of assignment is elapsed until it is reinitiated by the technical operation personnel. The

technical operation personnel may monitor the effective live time of the assignment in order to reinitiate the assignment.

3.1.5.4 Cautionary notes regarding the e-Navigation context

The Basic AIS Service ASGN_SLOT should be used only when a protected area (protected time slots) are provided.

3.1.6 BAS FATDMA

FATDMA slot reservations by base station(s).

3.1.6.1 Introduction of FATDMA

The BAS Category I-1 FATDMA provides a means to the technical operation personnel to reserve time slots from the autonomous use by other AIS stations.

Those time slots are available for specific use as determined by the technical operation personnel, e.g. for AIS base station or AIS AtoN station transmissions.

IALA recommendation on FATDMA planning and operation can be found in A-124, Appendix 14.

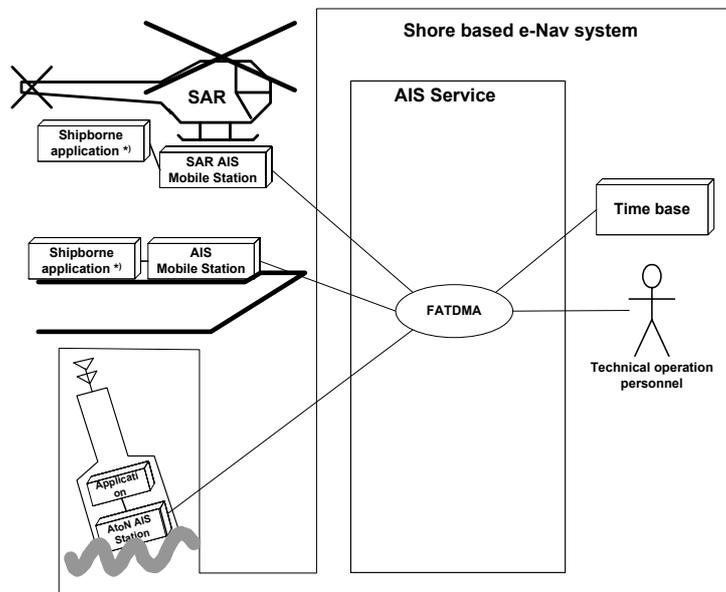


Figure 43 BAS Category I-1 FATDMA

3.1.6.2 List of data objects delivered from the technical operation personnel

The BAS ASGN_RATE expects the following data objects from the technical operation personnel:

- Source ID: ([U.DOI])
MMSI of transmitting AIS shore station
- FATDMA reservation scheme (needs further consideration)
 - FATDMA start slot ([U.DOI])
 - FATDMA block size ([U.DOI])
 - FATDMA increment ([U.DOI])
 - FATDMA reservation time out ([U.DOI])

List of data objects delivered to the technical operation personnel

- FATDMA status ([U.DOI])

3.1.6.3 Time dynamics of FATDMA

The BAS FATDMA automatically broadcast a FATDMA reservation command into the identified area immediately after reception of the data from the technical operation personnel. The mobile AIS stations will exclude the reserved time slots from autonomous use. The BAS FATDMA operates continuously until switched off.

3.1.6.4 Cautionary notes regarding the e-Navigation context

Older mobile AIS stations may not observe the 120 NM limitation for acceptance of FATDMA reservations

3.2 BAS Category I-2

BAS Category I-2 are initiated by the technical operation personnel and delivers data continuously from the AIS service to a requested technical service as well as to mobile AIS stations.

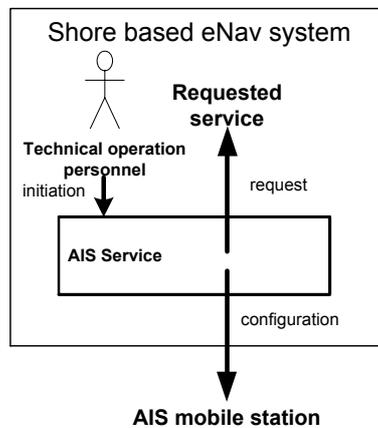


Figure 44 Data flow BAS Category I-2

3.2.1 Context of the BAS Category I-2

The following figure describes the context of BAS Category I-2, i.e. the relevant actors/entities of the shore-based system involved.

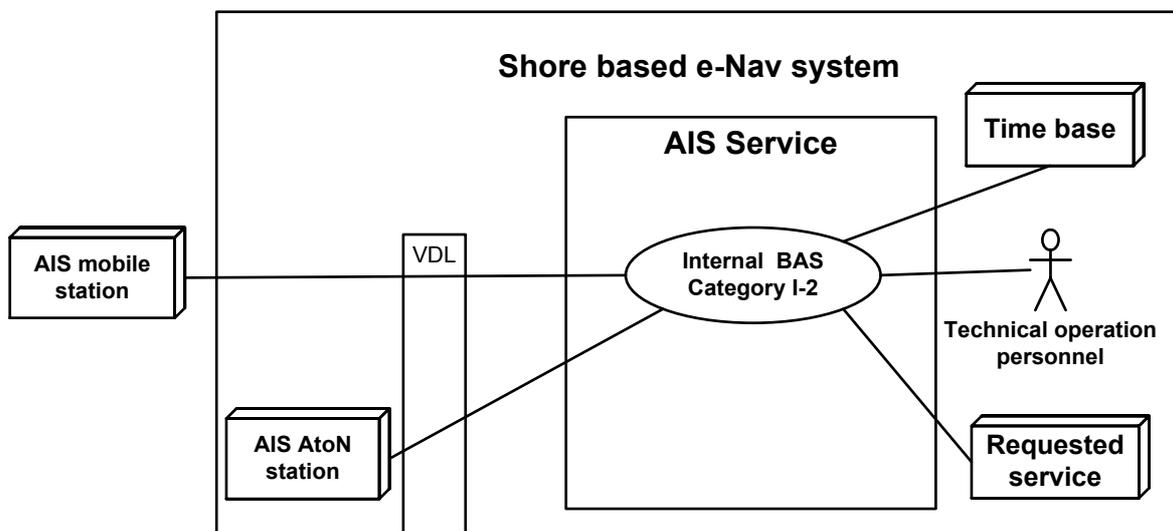


Figure 45 BAS Category I-2

3.2.2 Mapping of internal BAS to functional component description for BAS Category I-2

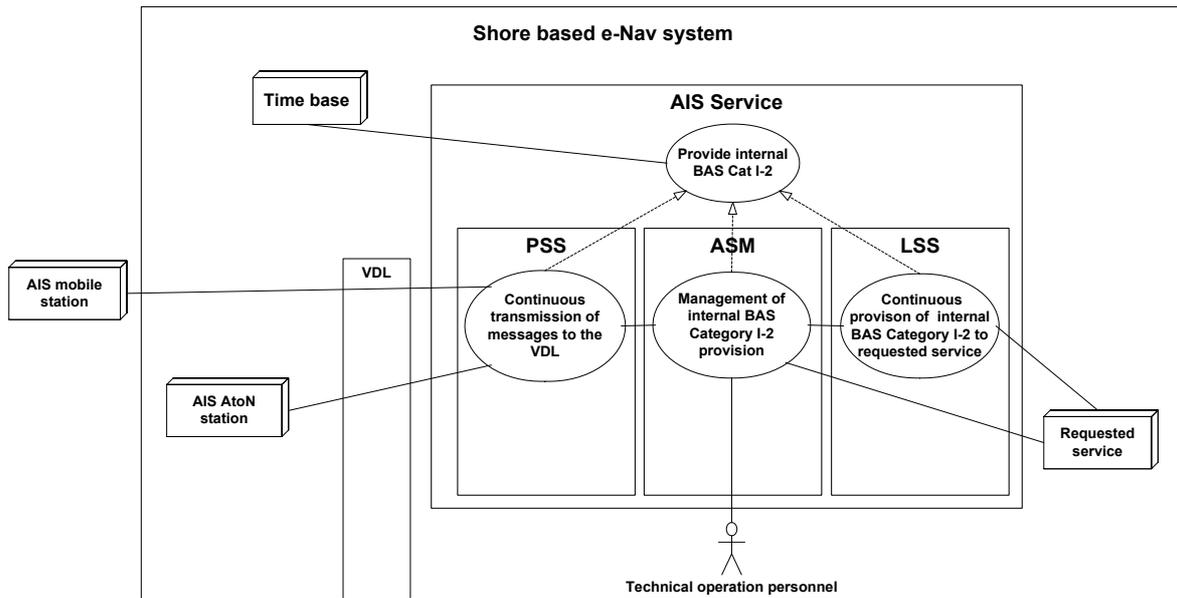


Figure 46 Resulting functional component description for BAS Category I-2

3.2.3 BAS CH_MAN

Channel management

3.2.3.1 Introduction of CH_MAN

The BAS Category I-2 CH_MAN provides a means to the technical operation personnel for AIS channels management in a defined geographic region. It allows for:

- transmission of channel management commands to the mobile AIS station via the AIS VDL
- interaction with the DSC Service as requested service. On behalf of the AIS Service the DSC Service transfers channel management command to the mobile AIS stations via DSC channel 70.

Mobile AIS stations which receive the channel management command and operate in the defined geographic region will change the radio parameter accordingly, e.g. AIS channels, Tx power or Tx/Rx mode.

IALA recommendation on channel management can be found in IALA Recommendation A-124, Appendix 17.

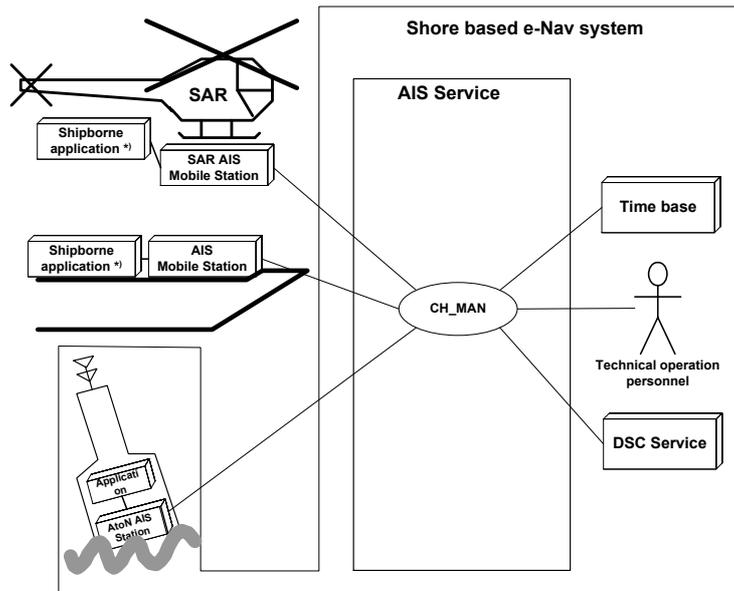


Figure 47 Figure 1: BAS Category I-2 CH_MAN

3.2.3.2 List of data objects delivered from the technical operation personnel

The BAS CH_MAN expects the following data objects from the technical operation personnel. Those data objects will be delivered to the DSC Service as well when acting as requested service by the AIS Service.

- Source ID:
 - VHF channel no. of AIS Channel A ([U.DOI])
 - VHF channel no. of AIS Channel B ([U.DOI])
 - Tx/Rx mode setting of mobile AIS station ([U.DOI])
 - Tx power setting (high/low) of mobile AIS station ([U.DOI])
 - Definition of the geographic region for channel management:
 - Latitude, Longitude ([U.DOI])
 - Transitional zone size ([U.DOI])
- If destination ID is used:
- MMSI of addressed AIS station ([U.DOI])

3.2.3.3 Time dynamics of CH_MAN

The BAS CH_MAN automatically broadcast a channel management command into the identified area and when initiated to the DSC Service immediately after reception of the data from the technical operation personnel.

The mobile AIS stations operating in the defined region will change the radio parameter accordingly. The BAS CH_MAN operates continuously until switched off.

3.2.3.4 Cautionary notes regarding the e-Navigation context

Some Class B mobile AIS stations may not be able to execute the channel management command.

3.3 BAS Category I-3

BAS Category I-3 is initiated by the technical operation personnel and delivers data from the AIS VDL to the technical operation personnel.

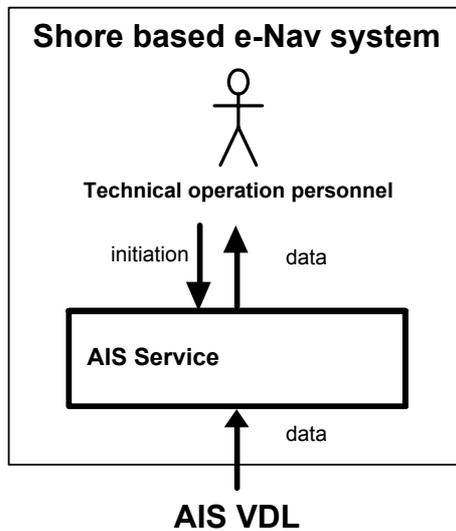


Figure 48 Data flow BAS Category I-3

3.3.1 Context of the BAS Category I-3

The following figure describes the context of BAS Category I-3, i.e. the relevant actors/entities of the shore-based system involved.

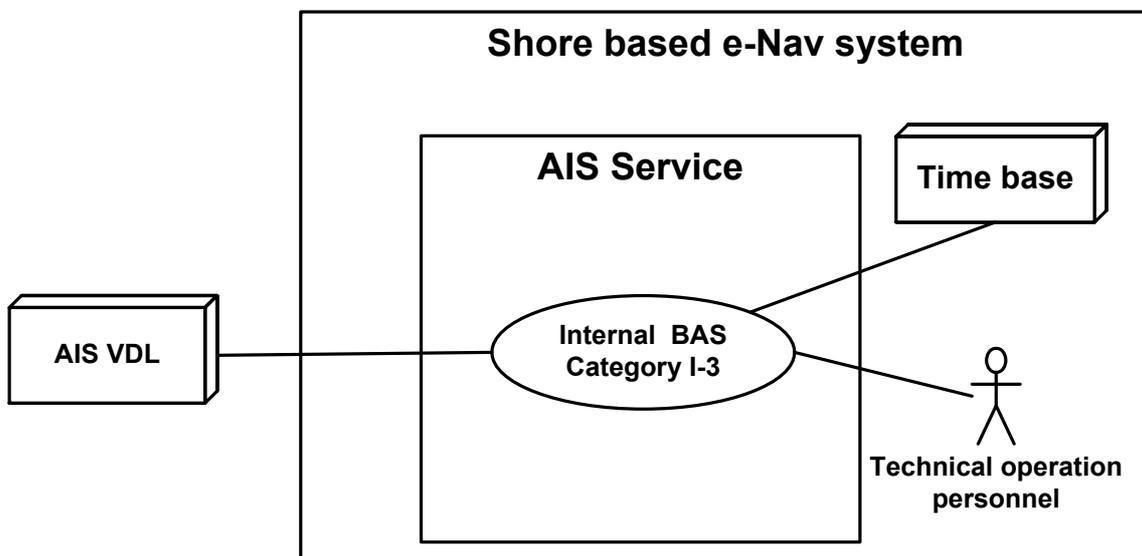


Figure 49 BAS Category I-3

3.3.2 Mapping of internal BAS to functional component description for BAS Category I-3

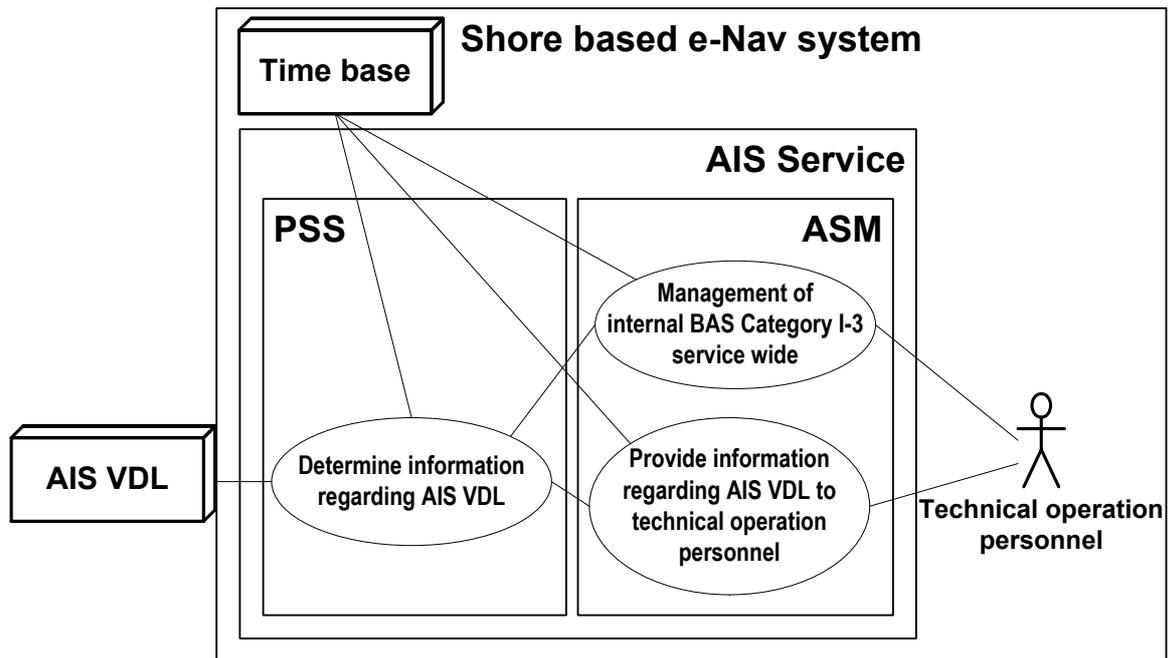


Figure 50 Resulting functional component description for BAS Category I-3

3.3.3 BAS CH_MON (internal)

Monitors the AIS VDL and provides relevant data to the technical operation personnel.

3.3.3.1 Introduction of CH_MON (internal)

The BAS Category I-3 CH_MON monitors the status of the AIS VDL and provides relevant data to the technical operation personnel. This data is derived from message reception and VDL measurements by the AIS shore station.

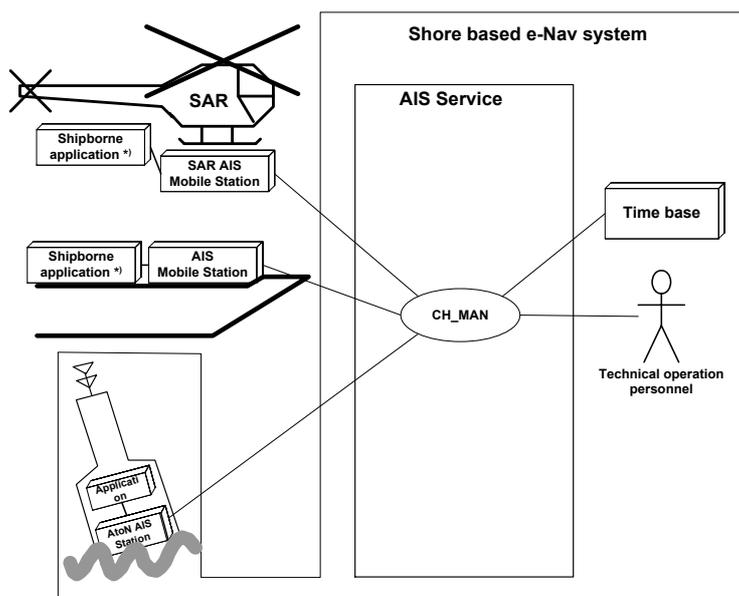


Figure 51 BAS Category I-3 CH_MON

3.3.3.2 List of data objects delivered to the technical maintenance personnel

The BAS CH_MON delivers the following data objects to the technical maintenance personnel.

- Availability of AIS-PCU service area within the AIS-LSS service area
ID of AIS-PCU service area ([U.DOI])
- availability of AIS-PCU service area (coverage, interference) ([U.DOI])
- AIS VDL load per AIS-PCU service area within the AIS-LSS service area
- ID of AIS-PCU service area ([U.DOI])
- total VDL load of AIS-PCU service area ([U.DOI])
- VDL load caused by Class A mobile station ([U.DOI])
- VDL load caused by Class B mobile station ([U.DOI])

3.3.3.3 Time dynamics of CH_MON

The above data objects will be delivered to the requesting technical service:

- Upon request of the requesting technical service
- [Every [N] minutes; N to be configured by the requesting technical service; default setting of N = 6]

3.3.3.4 Cautionary notes regarding the e-Navigation context

The BAS CH_MON delivers statistic data about the AIS VDL in the respective AIS-PCU service area. Those data may be different at different location within the AIS-PCU service area.

3.4 BAS Category I-4

BAS Category I-4 is initiated by the technical operation personnel. They provide data already available at the AIS service about the AIS VDL and the profile of individual AIS mobile stations.

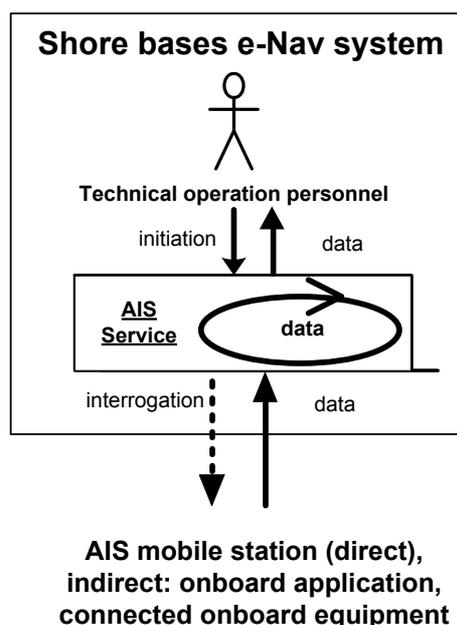


Figure 52 Data flow BAS Category I-4

3.4.1 Context of the BAS Category I-4

The following figure describes the context of BAS Category I-4, i.e. the relevant actors/entities of the shore-based system involved.

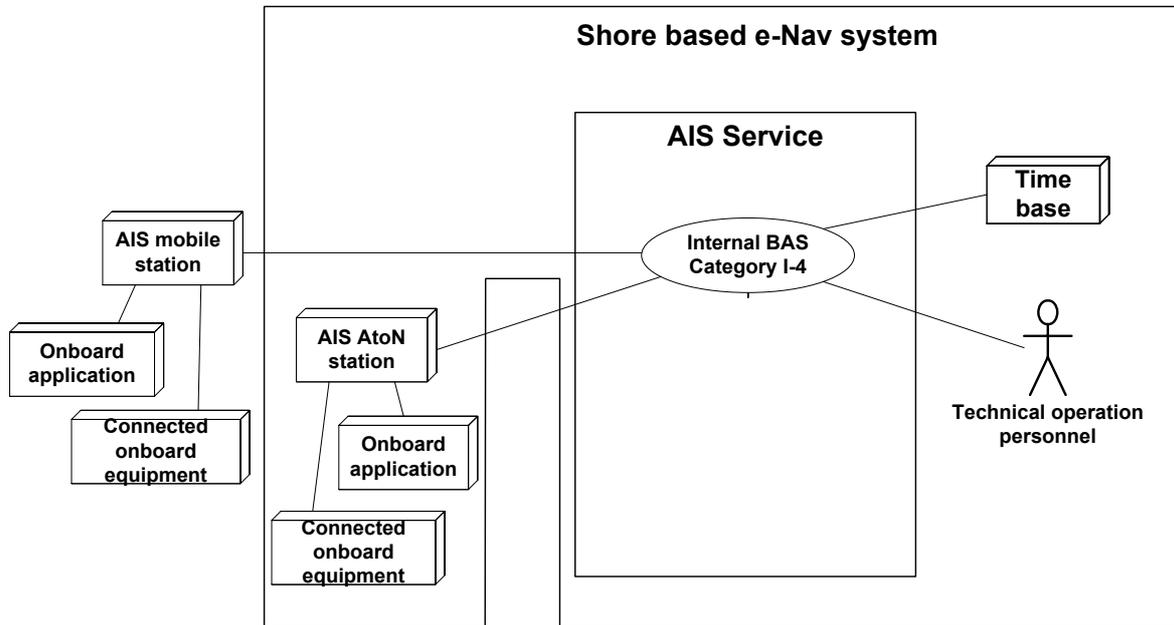


Figure 53 BAS Category I-4

3.4.2 Mapping of internal BAS to functional component description for BAS Category I-4

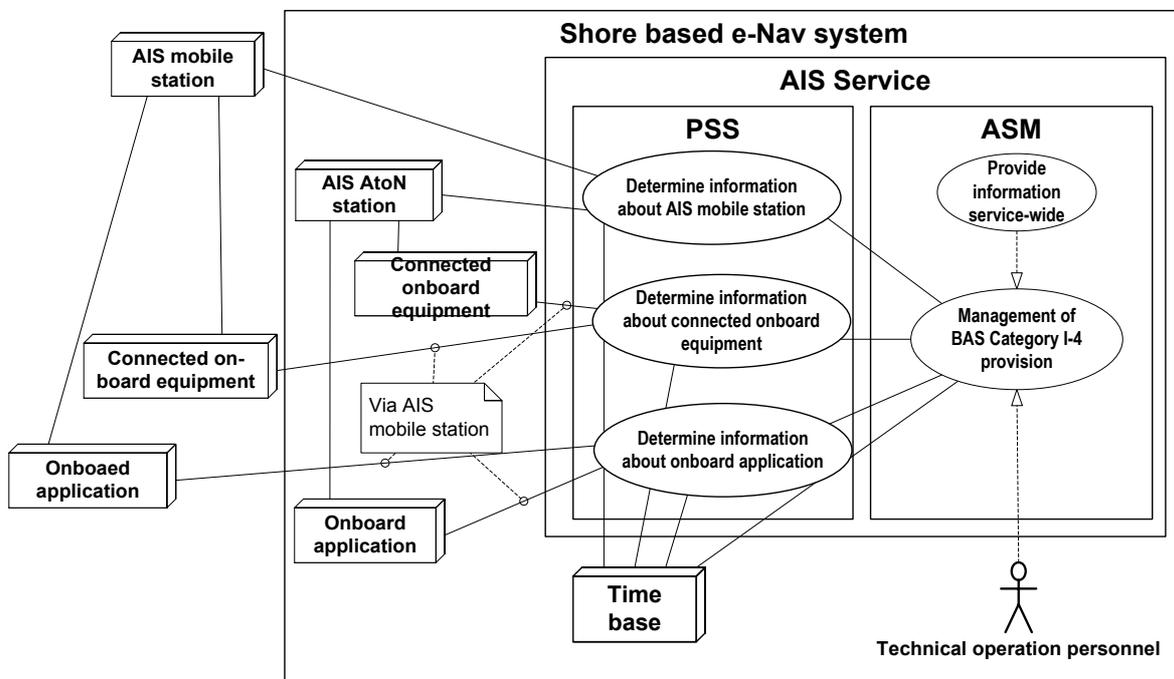


Figure 54 Resulting functional component description for BAS Category I-4

3.4.3 BAS MOB_PROFILE

Profile of individual mobile AIS station and their performance on the VDL.

3.4.3.1 Introduction of MOB_PROFILE

The BAS Category I-4 MOB_PROFILE BAS provides data about the features of individual mobile AIS stations, their performance on the AIS VDL and the connected on-board equipment and applications to the technical operation personnel.

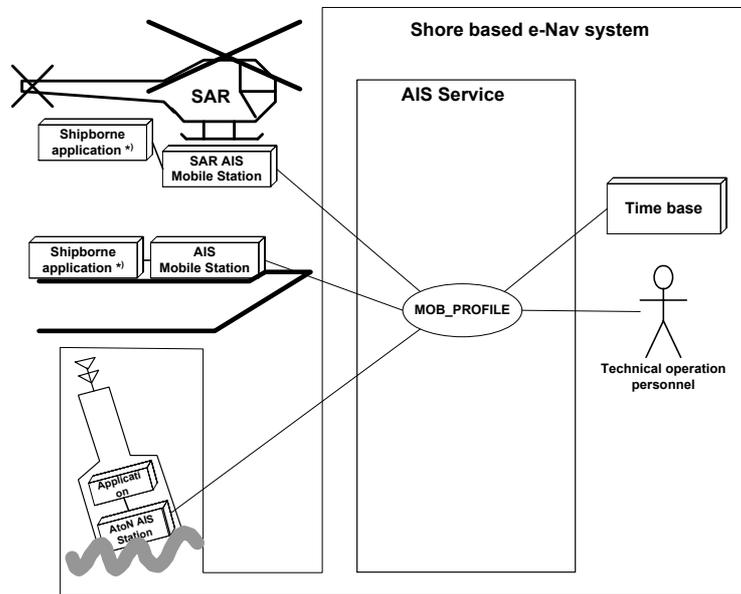


Figure 55 BAS Category I-4 MOB_PROFILE

3.4.3.2 List of data objects delivered to the technical operation personnel

The BAS MOB_PROFILE delivers the following data objects:

- MMSI of mobile AIS station ([U.DOI])
- Type of Mobile AIS station ([U.DOI])
- Reporting interval of the Mobile AIS station
 - Nominal reporting interval ([U.DOI])
 - Violation of nominal reporting interval ([U.DOI])
(violation of lost target interval)
- Onboard AIS display available (DTE) ([U.DOI])
- Supported onboard applications using application specific messages ([U.DOI])
- Vendor ID (Class CS only) ([U.DOI])
- Class B unit flag ([U.DOI])
- Class B DSC flag ([U.DOI])
- Class B band flag ([U.DOI])
- Class B Message 22 flag ([U.DOI])
- Assigned mode flag ([U.DOI])
- Violation of FATDMA reservations ([U.DOI])
- Violation of slot boundaries ([U.DOI])
- Violation of SOTDMA algorithm ([U.DOI])

3.4.3.3 Time dynamics of MOB_PROFILE

The above data objects will be delivered to the technical operation personnel:

- Upon request of the requesting technical service;
- [Every [N] minutes; N to be configured by the requesting technical service; default setting of N = 6];
- When a change of specific of the above data element occurs, e.g. violation of nominal reporting interval.

4 SIZE NEGOTIATION BETWEEN AIS SERVICE AND REQUESTING TECHNICAL SERVICE FOR DATA OBJECT CONTAINER SIZE

Due to the number of occupied slots the safety related text should be as short as possible. The text is variable in length and contents. The maximum size of data object container accepted by the respective BAS is negotiation between AIS service and requesting technical service. Different data object container might have different maximum sizes.

In the example below the maximum size of the data object container is derived from the maximum length of an AIS VDL message (5 VDL slots).

Example of size negotiation for maximum size of the data object container:

- Addressed safety related text container - maximum number of ASCII characters: [156];
- Safety related broadcast text container - maximum number of ASCII characters: [161];
- Addressed application specific data container - maximum number of binary data bytes: [117];
- Broadcast application specific data container - maximum number of binary data bytes: [121].