

Appendix 3

to Tender Specifications

Interface Control Document



S-AIS-DPC Block2

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SAT-AIS DPC Block2 - Software Interface Control Document [D3 / DSA]

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1. Introduction

This document is the Software Interface Control Document of the S-AIS DPC Block2 System.

It is aimed at defining and specifying the Interfaces covering the interfaces external to the S-AIS DPC Block2 System, as well as the internal interfaces that are published by the components of the system as specified in [Error! Reference source not found.].

2. Software overview

Please refer to Error! Reference source not found..

3. Requirements and design

3.1. Interface design

3.1.1. Interface definition

In this document, an interface is considered as the mean for components (or actors) to communicate with each other. In that sense, an interface is specified by the following elements:

- The information that is exchanged, expressed through a Data Model. The Data Model describes, in a quasi-formal way, the structure of the data.
- The protocol, i.e. the set of rules that determine how this information is exchanged.

3.1.2. Relationship between components and interfaces

The interface establishes a relationship with the components (or sub-system) of the DPB Block2 System that can be the kinds hereafter.

Implement relationship: the component acts as a server with the interface. It guarantees that the contract defined by the interface is observed by the component.

The following UML diagram shows how such a relationship is depicted. The component “A” implements the interface “I_INTERFACE_1”.

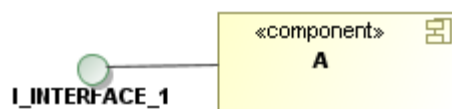


Figure 1 - UML representation for interface implementation

Use relationship: the component acts as a client with the interface. In order to interoperate, the client must meet the published interface.

The following UML diagram shows how such a relationship is depicted. The component “B” uses the interface “I_INTERFACE_2”.

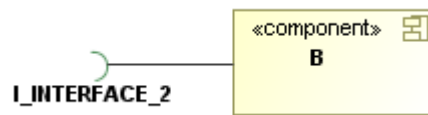


Figure 2 - UML representation for interface usage

The two graphical notations can be combined. In the following UML diagram, the component “C” uses the interface “I_INTERFACE_3” published by the component “D”.



Figure 3 - UML representation for interface implementation and usage

Own relationship: the owner is the component that specifies the interface. By convention, the owner is the component that delivers the information, i.e. it acts as a producer.

The distinction between client and server is not significant here because the role can be inverted whether the protocol used is “push” or “pull” oriented.

For instance, the Data Retrieval is responsible to feed the system with data (AIS messages, Auxiliary data, EO Data). This behaviour is typically that of a producer. So the interface through which data is retrieved is owned by this component, even if, in a “push” oriented protocol, the interface is implemented by the consumers, like the L1 Processing.

The following UML diagram shows how such a relationship is depicted. The component “E” uses and owns the interface “I_INTERFACE_4”.

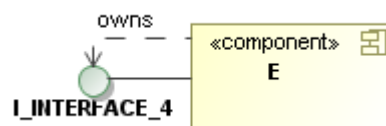


Figure 4 - UML representation for interface ownership

3.1.3. Relationship between interfaces

Interfaces can be “merged” into one according to an inheritance relationship.

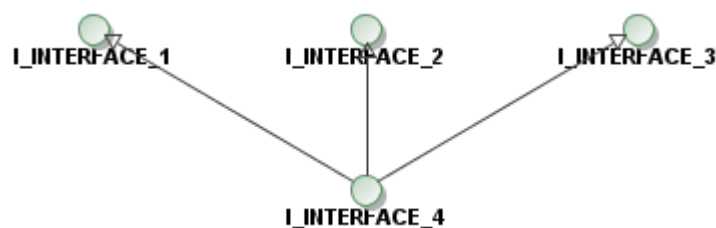


Figure 5 - UML representation for interface inheritance



3.1.4. Relationship between interfaces and Use Cases

In [Error! Reference source not found.] the functional behaviour of the DPC Block2 components are described through Use Cases. A Use case describes the interactions between an actor of a component and the component itself. The point of contact between the two gives rise to the implementation of interfaces.

In classic usages, the relationship is 1:1 between a UC and the interface, but in asynchronous implementations, the relationship can lead to implement several interfaces for a single UC.

3.1.5. Relationship between interfaces and Services

The DPC Block2 System is designed so that services are mapped to UCs in a 1:1 relationship. Thus a service can lead to the implementation of several interfaces, in the same way that with Use Cases.

3.1.6. Interface overview

The following paragraph enumerates all the actors, subsystem or components with the interfaces unveiled when there is a relationship (implement, use or own), according to [Error! Reference source not found.].

The interfaces are uniquely identified and follow a naming convention.

IFR-ALL-0002/I

The Interfaces in the DPC Block2 System boundary must follow a naming convention.

Trace from: SR-DPC-DES-2000

The Interfaces in the DPC Block2 System can be implemented by several components, and several components can use an interface, in strict accordance with SOA philosophy. This ensures that services are defined as reusable units of processing.

IFR-ALL-0004/I

The Interfaces in the DPC Block2 System boundary shall be modeled in preparation for reuse.

Trace from: SR-DPC-DES-2020

To get a general idea of how the pieces fit together in the system, two views of the system are shown:

- The Figure 6 gives a high-level view of the components and actors with a relationship link when there is an interface between them.
- The Figure 7 gives a concrete view on the components and actors with their respective interfaces. Focus is on services, so the interfaces related to configuration, control and supervision are not shown here to avoid overloading the diagram.

The ESB is not represented since it plays the role of a mediator. It can then be seamlessly used whenever an internal interface is used.

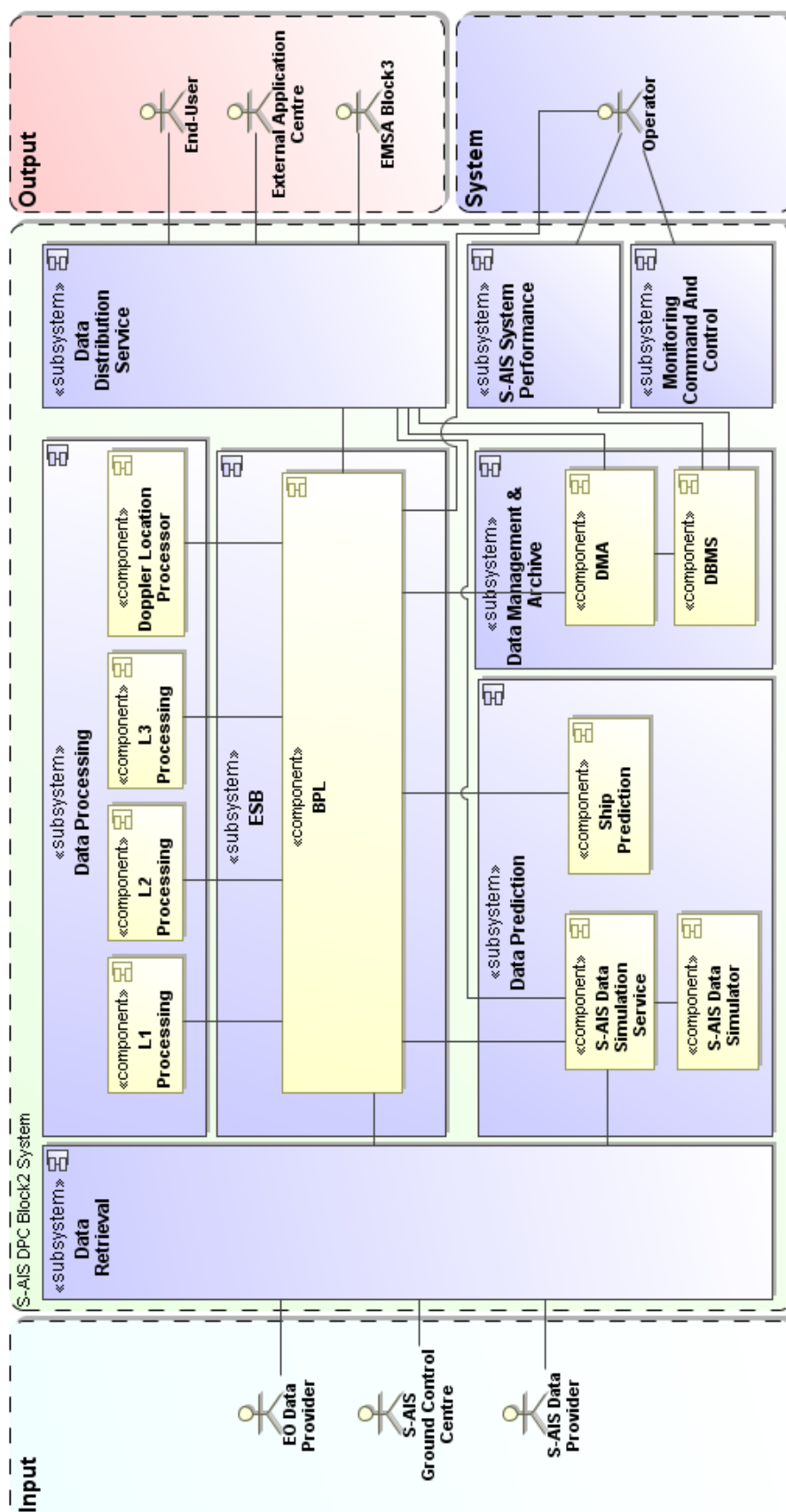


Figure 6 - Overview of components relationship

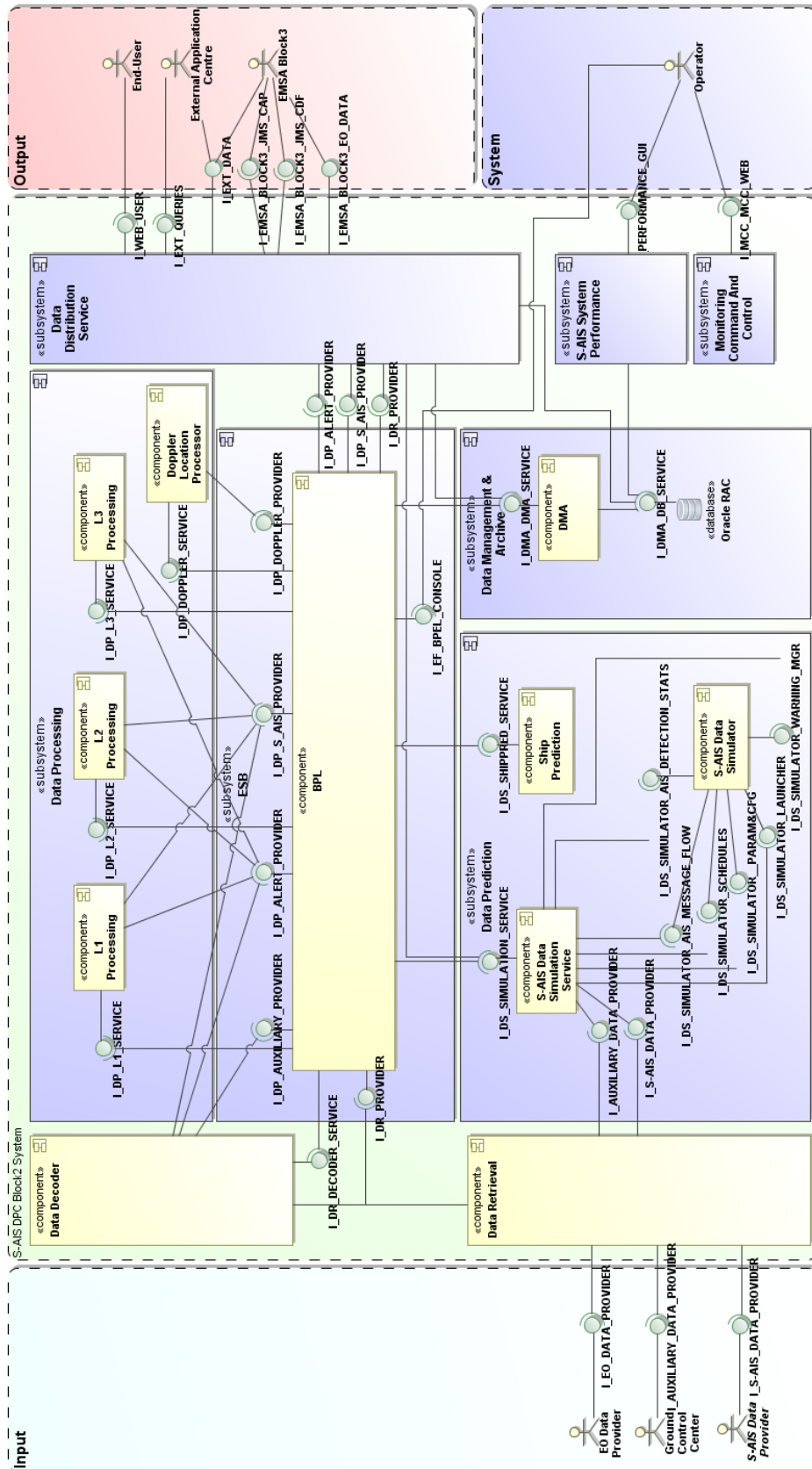


Figure 7 - Overview of component interfaces



3.1.6.1. Actors

3.1.6.1.1. "Input" actors

The "input" actors are actors publishing an interface that allows the DPC Block2 to be fed with data.

The following actor diagram details the hierarchy of "input" actors identified for the DPC Block2, depending on the quality, function and responsibility that they assume.

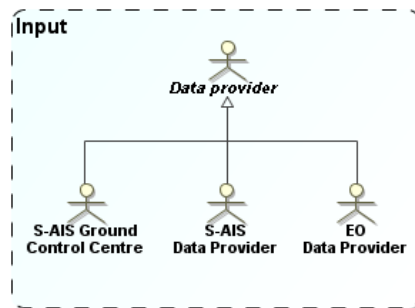


Figure 8 - "Input" actors of the DPC Block2 System

3.1.6.1.1.1. Data Provider

The Data Provider Actor represents an abstraction of all the input data sources that are considered for the DPC Block2. A data provider is an agent that is able to deliver a content used by the system, like an AIS Message for instance.

3.1.6.1.1.2. EO Data Provider

The EO Data Provider Actor, that processes EO data that overlaps with SAT-AIS orbits, supplies DPC Block2 with Vessel Detection Reports (VDRs) that can be correlated with SAT-AIS position reports. The EO provider may also deliver the Level 1 images used as input of their vessel detection algorithms.

The following diagram details the interfaces used or implemented by the actor.



Figure 9 - Interfaces for the EO Data Provider actor

3.1.6.1.1.3. S-AIS Data Provider

The S-AIS Data Provider Actor supplies DPC Block2 with AIS messages received by a SAT-AIS satellites constellation together with ancillary data such as the satellite reception timestamp or a Doppler shift measurement.

The following diagram details the interfaces used or implemented by the actor.



Figure 10 - Interfaces for the S-AIS Data Provider actor

3.1.6.1.1.4. S-AIS Ground Control Centre

The S-AIS Ground Control Centre Actor supplies DPC Block2 with SAT-AIS orbits and events files – called Auxiliary Data.

The following diagram details the interfaces used or implemented by the actor.



Figure 11 - Interfaces for the S-AIS Ground Control Centre actor

3.1.6.1.2. “Output” actors

The “output” actors are actors consuming data delivered by the DPC Block2.

The following actor diagram details the hierarchy of “output” actors identified for the DPC Block2, depending on the quality, function and responsibility that they assume.

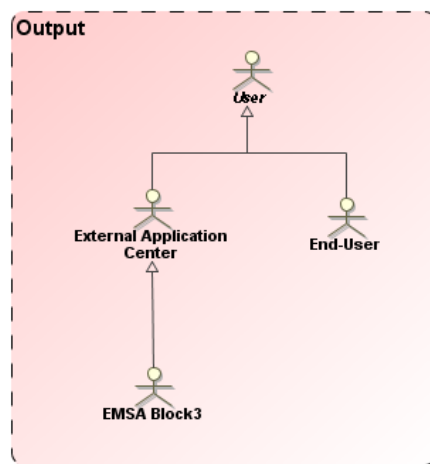


Figure 12 - “Output” actors of the DPC Block2 System

3.1.6.1.2.1. EMSA Block3

The EMSA Block3 Actor represents the DPC Block3 that ingests AIS data received from terrestrial and satellite sources. It is a recipient system for post-processed SAT-AIS and EO data, warnings and SAT-AIS information. As the inheritor of the Actor “External Application Center”, it also uses the



provided DPC Block2 Web Services to fetch data. The following diagram details the interfaces used or implemented by the actor.

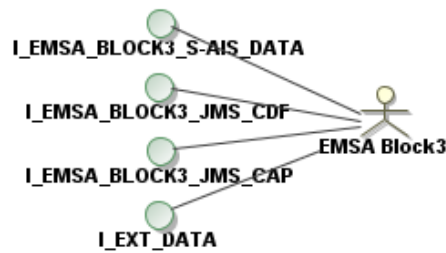


Figure 13 - Interfaces for the EMSA Block3 actor

EMSA Block3

implements

I_EMSA_BLOCK3_EO_DATA

I_EMSA_BLOCK3_JMS_CDF

I_EMSA_BLOCK3_JMS_CAP

I_EXT_DATA

3.1.6.1.2.2. End-User

The End-User represents a human client needing to have access (visualization and extraction) to the information provided by DPC Block2 via a dedicated Web User Interface.

The following diagram details the interfaces used or implemented by the actor.

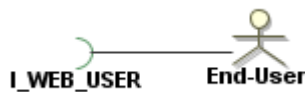


Figure 14 - Interfaces for the End-User actor

End-User

uses

I_WEB_USER

3.1.6.1.2.3. External Application Centre

The External Application Center Actor represents all clients needing to have access to SAT-AIS data through the Web Services supplied by the DPC Block3. The provided interface is exclusively via dedicated Web Services.

The following diagram details the interfaces used or implemented by the actor.

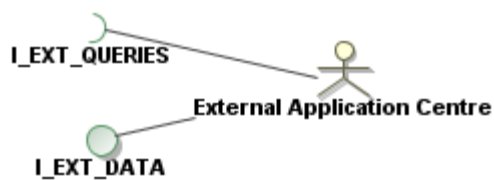


Figure 15 - Interfaces for the External Application Centre actor

External Application Centre

implements

I_EXT_DATA

uses

I_EXT_QUERIES

3.1.6.1.3. "System" actors

The "System" actors are internal actors assuming the role of administration of the DPC Block2 system.

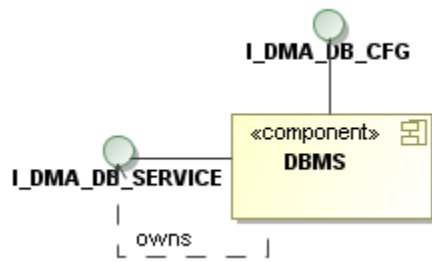


Figure 17 - Interfaces for the DBMS component

DBMS

implements

I_DMA_DB_CFG

I_DMA_DB_SERVICE

3.1.6.2.1.2. DMA component

The DMA is the component in charge of providing the long term archive of all DPC Block2 system data. It supplies the DPC Block2 system all the necessary advanced services to store, retrieve, delete and query for data.

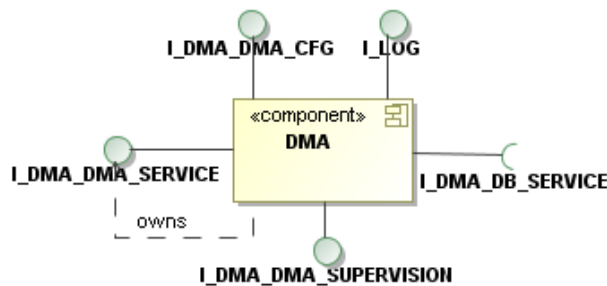


Figure 18 - Interfaces for the DMA component

DMA

implements

I_DMA_DMA_CFG

I_DMA_DMA_SERVICE

I_DMA_DMA_SUPERVISION

I_LOG

uses

I_DMA_DB_SERVICE

3.1.6.2.2. Data Prediction

3.1.6.2.2.1. S-AIS Data Simulation Service component

The S-AIS Data Simulation Service is the component in charge of providing several simulation services within the DPC Block2 System in a SOA flavour compatible with the backbone framework of the system.

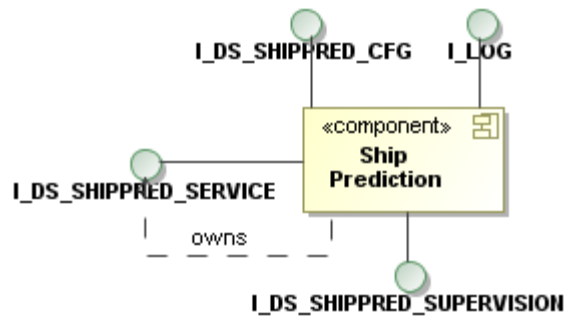


Figure 21 - Interfaces for the Ship Prediction component

Ship Prediction

implements

I_DS_SHIPPRED_CFG
I_DS_SHIPPRED_SERVICE
I_DS_SHIPPRED_SUPERVISION
I_LOG

4.1.1.1.2. Data Processing

4.1.1.1.2.1. Doppler Location processor component

The Doppler Location Processor is the component in charge of computing the terminal locations and to provide an associated error estimate.

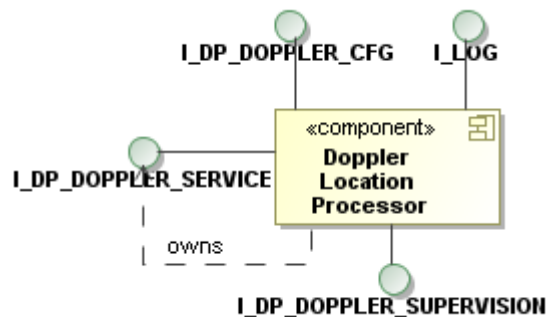


Figure 22 - Interfaces for the Doppler Location Processor component

Doppler

implements

I_DP_DOPPLER_CFG
I_DP_DOPPLER_SERVICE
I_DP_DOPPLER_SUPERVISION
I_LOG

4.1.1.1.2.2. L1 Processing component

The L1 Processing is the component in charge of decoding raw AIS Messages with syntax and semantic control, without any further enhancement processing.

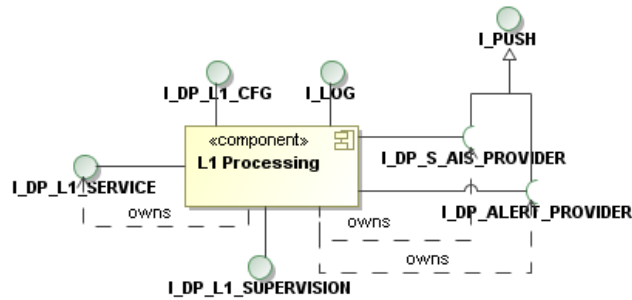


Figure 23 - Interfaces for the L1 Processing component

L1 Processing

implements

I_DP_L1_CFG
I_DP_L1_SERVICE
I_DP_L1_SUPERVISION
I_PUSH

uses

I_DP_ALERT_PROVIDER
I_DP_S_AIS_PROVIDER

4.1.1.1.2.3. L2 Processing component

The L2 Processing is the component in charge of qualifying level 1 AIS messages that match the computed Doppler location with the reported position, and recovering position of invalid level 1 AIS messages.

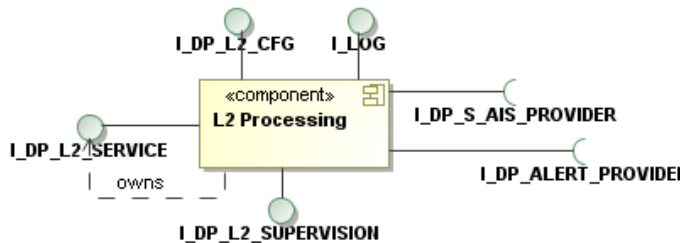


Figure 24 - Interfaces for the L2 Processing component

L2 Processing

implements

I_DP_L2_CFG
I_DP_L2_SERVICE
I_DP_L2_SUPERVISION
I_DP_S_AIS_PROVIDER

uses

I_DP_ALERT_PROVIDER
I_DP_S_AIS_PROVIDER

4.1.1.1.2.4. L3 Processing component

The L3 Processing is the component in charge of validating positions of Ship by Vessels detection derived from EO images.

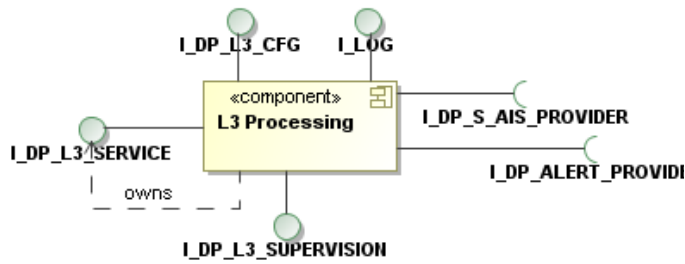


Figure 25 - Interfaces for the L3 Processing component

L3 Processing

implements

I_DP_L3_CFG
I_DP_L3_SERVICE
I_DP_L3_SUPERVISION
I_LOG

uses

I_DP_ALERT_PROVIDER
I_DP_S_AIS_PROVIDER

4.1.1.1.3. ESB Framework

4.1.1.1.3.1. BPEL Engine component

The BPEL engine is the component in charge of the orchestration of the different services provided by the components and subsystem of the DPC Block2 System.

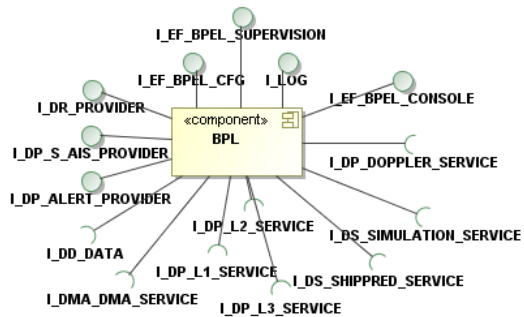


Figure 26 - Interfaces for the BPEL Engine component

BPEL Engine

implements

I_DP_ALERT_PROVIDER
I_DP_S_AIS_PROVIDER
I_DR_PROVIDER
I_EF_BPEL_CFG
I_EF_BPEL_CONSOLE
I_EF_BPEL_SUPERVISION
I_LOG

uses

I_DD_DATA
I_DMA_DMA_SERVICE
I_DP_DOPPLER_SERVICE
I_DP_L1_SERVICE
I_DP_L2_SERVICE
I_DP_L3_SERVICE
I_DS_SHIPPRED_SERVICE
I_DS_SIMULATION_SERVICE

4.1.1.2. Subsystems

4.1.1.2.1. Data Distribution subsystem

The Data Distribution is the subsystem in charge of transferring data products from the SAT-AIS DPC to EMSA Block 3 and external users.

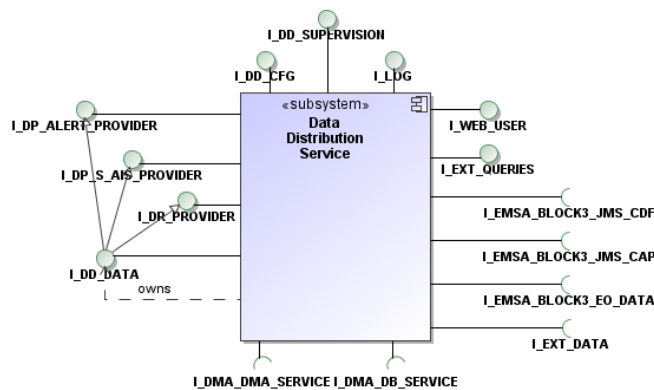


Figure 27 - Interfaces for the Data Distribution Service

Data Distribution

implements

I_DD_CFG
I_DD_DATA
I_DD_SUPERVISION
I_DP_ALERT_PROVIDER
I_DP_S_AIS_PROVIDER
I_DR_PROVIDER
I_EXT_QUERIES
I_LOG
I_WEB_USER

uses

I_DMA_DB_SERVICE
I_DMA_DMA_SERVICE
I_DS_SIMULATION_SERVICE
I_EMSA_BLOCK3_EO_DATA
I_EMSA_BLOCK3_JMS_CDF
I_EMSA_BLOCK3_JMS_CAP
I_EXT_DATA

4.1.1.2.2. Data Retrieval subsystem

The Data Retrieval is the subsystem in charge of the acquisition of all input data for the DPC Block2 System.

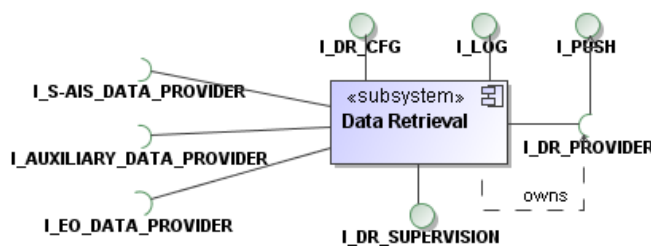


Figure 28 - Interfaces for the Data Retrieval subsystem

Data Retrieval

implements

I_DR_CFG
I_DR_SUPERVISION
I_LOG

uses

I_AUXILIARY_DATA_PROVIDER
I_DR_PROVIDER
I_EO_DATA_PROVIDER
I_S-AIS_DATA_PROVIDER

4.1.1.2.3. Monitoring Command and Control subsystem

The Monitoring Command and Control is the subsystem in charge of several activities related to the supervision and control of the DPC Block2 System.

- “U” for interfaces used by the element,
- “I” for interfaces implemented by the element.



Elements

Actor		Component										Subsystem								
EMSA Block3	End-User	EO Data Provider	External Application Centre	S-AIS Data Provider	S-AIS Ground Control Centre	Operator	L1 Processing	L2 Processing	L3 Processing	Doppler	DMA	DBMS	Ship Prediction	S-AIS Data Simulation Srv	S-AIS Data Simulator	BPEL Engine	Data Distribution	Data Retrieval	System Performance	MCC

Interfaces

External																				
I_AUXILIARY_DATA_PROVIDER					I													U		
I_EMSA_BLOCK3_EO_DATA	I																U			
I_EMSA_BLOCK3_JMS_CDF	I																U			
I_EMSA_BLOCK3_JMS_CAP	I																U			
I_EO_DATA_PROVIDER		I																U		
I_EXT_DATA	I		I														U			
I_EXT_QUERIES			U																	
I_S-AIS_DATA_PROVIDER				I														U		
I_WEB_USER		U															I			
Internal																				
I_AUXILIARY_DATA_PROVIDER														I						
I_DD_CFG						U											I			
I_DD_DATA															U		I			
I_DD_SUPERVISION																	I			U
I_DMA_DB_CFG						U						I								
I_DMA_DB_SERVICE											U	I					U		U	
I_DMA_DMA_CFG						U					I									
I_DMA_DMA_SERVICE											I					U	U			
I_DMA_DMA_SUPERVISION											I									U
I_DP_ALERT_PROVIDER							U	U	U							I	I			
I_DP_DOPPLER_CFG						U				I										
I_DP_DOPPLER_SERVICE										I						U				
I_DP_DOPPLER_SUPERVISION										I										U
I_DP_L1_CFG						U	I													
I_DP_L1_SERVICE							I									U				
I_DP_L1_SUPERVISION							I													U
I_DP_L2_CFG						U		I												
I_DP_L2_SERVICE								I								U				
I_DP_L2_SUPERVISION								I												U
I_DP_L3_CFG						U			I											
I_DP_L3_SERVICE									I							U				
I_DP_L3_SUPERVISION									I											U
I_DP_S-AIS_PROVIDER							U	U	U							I	I			
I_DR_CFG						U												I		
I_DR_PROVIDER																I	I	U		
I_DR_SUPERVISION																		I		U
I_DS_SHIPPRED_CFG						U							I							
I_DS_SHIPPRED_SERVICE													I			U				
I_DS_SHIPPRED_SUPERVISION													I							U
I_DS_SIMULATION_CFG						U								I						
I_DS_SIMULATION_SERVICE														I		U	U			
I_DS_SIMULATION_SUPERVISIO														I						U

The following table determines the category of each interface of the DPC BLock2 System.

**Communication services**

I_AUXILIARY_DATA_PROVIDER
I_DD_DATA
I_DR_PROVIDER
I_EMSA_BLOCK3_EO_DATA
I_EMSA_BLOCK3_JMS_CDF
I_EMSA_BLOCK3_JMS_CAP
I_EO_DATA_PROVIDER
I_EXT_DATA
I_EXT_QUERIES
I_S-AIS_DATA_PROVIDER

Human interaction services

I_MCC_MCC_WEB
I_SP_PERFORMANCE_GUI
I_WEB_USER

Model/Information management services

I_DMA_DB_SERVICE
I_DMA_DMA_SERVICE

Processing services

I_DP_ALERT_PROVIDER
I_DP_DOPPLER_SERVICE
I_DP_L1_SERVICE
I_DP_L2_SERVICE
I_DP_L3_SERVICE
I_DP_S_AIS_PROVIDER
I_DS_SHIPPRED_SERVICE
I_DS_SIMULATION_SERVICE
I_DS_SIMULATOR_AIS_DETECTION_STATS
I_DS_SIMULATOR_AIS_MESSAGE_FLOW
I_DS_SIMULATOR_SCHEDULES
I_DS_SIMULATOR_WARNING_MGR

System management services

I_DD_CFG
I_DD_SUPERVISION
I_DMA_DB_CFG
I_DMA_DMA_CFG
I_DMA_DMA_SUPERVISION
I_DP_DOPPLER_CFG
I_DP_DOPPLER_SUPERVISION
I_DP_L1_CFG
I_DP_L1_SUPERVISION
I_DP_L2_CFG
I_DP_L2_SUPERVISION
I_DP_L3_CFG
I_DP_L3_SUPERVISION



I_DR_CFG
 I_DR_SUPERVISION
 I_DS_SHIPPRED_CFG
 I_DS_SHIPPRED_SUPERVISION
 I_DS_SIMULATION_CFG
 I_DS_SIMULATION_SUPERVISION
 I_DS_SIMULATOR_LAUNCHER
 I_DS_SIMULATOR_PARAM&CFG
 I_EF_BPEL_CFG
 I_EF_BPEL_CONSOLE
 I_EF_BPEL_SUPERVISION
 I_LOG
 I_MCC_MCC_CFG
 I_SP_PERFORMANCE_CFG

Table 2 - Interfaces categorization

4.2. Interface specification

4.2.1. General considerations

The Interfaces of the DPC Block2 System follows an SOA approach that promotes composition and reuse of services. It imports that each interface is well described, not only in terms of protocol but also in terms of capabilities.

In the S-AIS DPC Block2 frame, capabilities of services are expressed using a OWL-based Web Service Ontology (OWL-S) that specifies what a service requires and what it provides, in unambiguous and computer-intepretable form.

IFR-ALL-0008/I

The Interfaces in the DPC Block2 System boundary must be described with the OWL-S language.
Trace from: SR-DPC-DES-1980

The content of a service description is specified in the following table. Note that some elements may not be applicable to some services (mandatory).

Element	Mandatory	Description
Service name	yes	Refers to the name of the service that is being offered.
Service Identifier	yes	
Text description	yes	Provides a brief description of the service. It summarizes what the service offers, it describes what the service requires to work, and it indicates any additional information that the compiler of the profile wants to share with the receivers.
Contact Information	no	provides a mechanism of referring to humans or individuals responsible for the service (or some aspect of the service)



inputs	yes (but empty if no inputs)	What the service requires.
outputs	yes (but empty if no outputs)	What the service provides.

For most interfaces of the system, Web Services are used as the method of communication, and then are described with WSDL according to [Error! Reference source not found.]. In that case, the extensibility elements of WSDL allow for use OWL-S declarations inside the WSDL service description.

4.2.2. I_PUSH

4.2.2.1. Introduction

The interface defines a “sink” into which a set of data are sent.

The protocol is a push oriented protocol where the information travels from the publisher to the recipient in a one way, without the need for the recipient to explicitly ask for.

It's important to notice that the roles are inversed here:

- The publisher plays the role of the client in the protocol, it uses the published interface.
- The recipient plays the role of the server; it implements and publishes the interface.

The following diagram illustrates this concept:

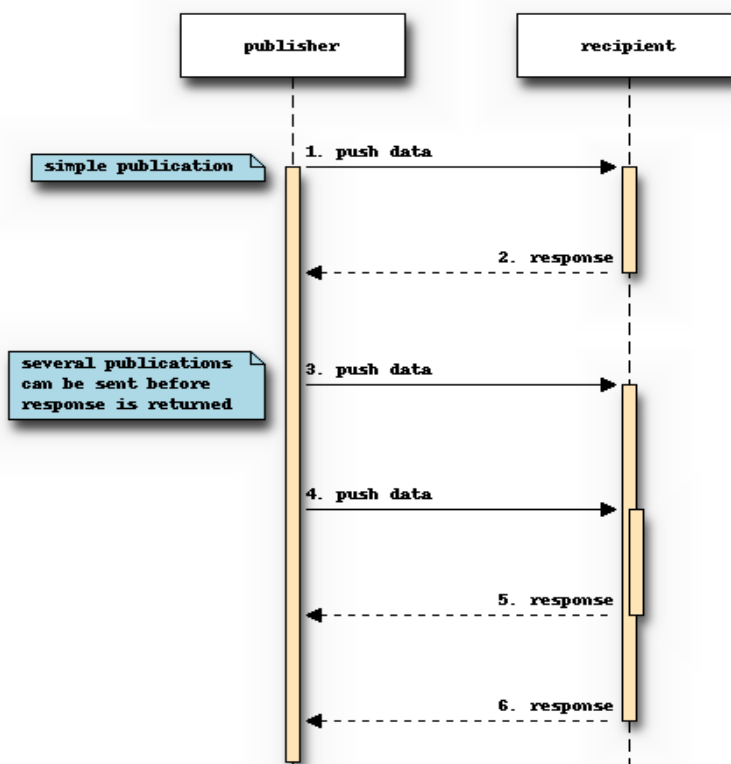


Figure 31 - Exchanges through the I_PUSH interface



This interface is generic, and specifies only the mechanisms involved during the exchange, but not the data themselves. This interface is specialized by each component that uses (or implement) it like the Data Retrieval or the Data Processing subsystems.

4.2.2.2. Relationship to other protocols

This protocol uses industry standard protocols.

IFR-I_PUSH-0010/T

The I_PUSH interface must establish a conversation between a client and a server performed over HTTP version 1.1 as described in [RD 3].

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

IFR-I_PUSH-0020/T

The I_PUSH interface must use the SOAP messaging protocol v1.1 and v1.2 for formatting requests and responses as specified in [RD 4] and [RD 5] ;

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

IFR-I_PUSH-0030/T

The I_PUSH interface must use the Document style binding.

Trace from: SR-DPC-DES-1970

The following diagram shows the underlying messaging and transport stack used by the protocol.

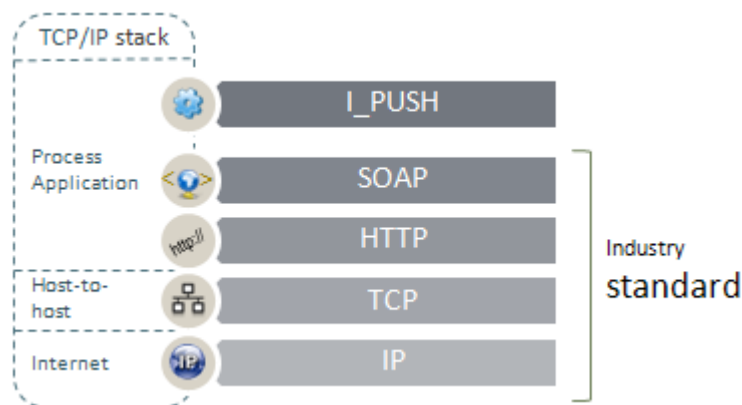


Figure 32 - Protocol stack of the I_PUSH interface

4.2.2.3. Operations

The interface specifies a single operation that can be invoked by a client.

IFR-I_PUSH-0040/T

The I_PUSH must use the literal style for all the published operations.

Trace from: SR-DPC-DES-1970

4.2.2.3.1. “push” operation

The push operation allows for a client to “push” new data to the server.



Note that the name of the operation can be changed by the inherited interfaces.

4.2.2.3.1.1. Messages

The following table describes the message exchanged through this operation.

name	way	message type	Multiplicity
push	input argument	dpc:responseType	One (required)
	List of items that are pushed.		
	output		
	No result is expected.		

The push message contains the list of all the items being pushed. The message structure is a `dpc:responseType` instance container, that accepts any kind of items. Each sub-system publishing a pushed oriented protocol has to specify the concrete data exchanged.

4.2.2.3.1.2. Example

The following example shows the pushing of a two data bulk. The scenario is initiated by the server itself.

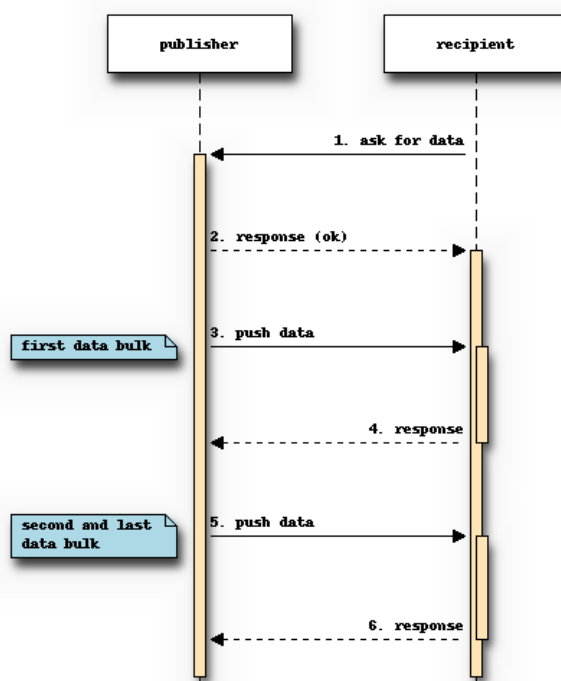


Figure 33 - Exchange example for the I_PUSH interface

The SOAP messages send by the client at sequence (3) and sequence (5) are detailed here after.

In the following message, the `lastResponse` attribute of the push operation is set to false, indicating that others messages are expected to come.

```
1 <soapenv:Envelope
```



```

2  xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
3  xmlns:srv="http://iap.esa.int/services/sat-ais/abstract"
4  xmlns:core="http://iap.esa.int/schemas/sat-ais/core"
5  xmlns:dpc="http://iap.esa.int/schemas/sat-ais/dpc">
6
7  <soapenv:Header/>
8  <srv:push core:uuid="1777ec60-4042-22e1-b86c-0800200c9a66"
9          core:processId="1777ec60-4042-44e1-b86c-0800200c9a66"
10         core:timestamp="2001-10-26T21:32:52+02:00"
11         core:sequenceNumber="0"
12         core:lastResponse="false">
13
14     <foo/>
15     <bar/>
16 </srv:push>
17 </soapenv:Envelope>

```

In the following message, the `lastResponse` attribute of the push operation is set to true, indicating the received message is the last of the sequence. The `sequenceNumber` attribute is set to 1 indicating this message is the second of the sequence.

```

1 <soapenv:Envelope
2   xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
3   xmlns:srv="http://iap.esa.int/services/sat-ais/abstract"
4   xmlns:core="http://iap.esa.int/schemas/sat-ais/core"
5   xmlns:dpc="http://iap.esa.int/schemas/sat-ais/dpc">
6
7   <soapenv:Header/>
8   <srv:push core:uuid="1777ec60-4042-22e1-b86c-0800200c9a66"
9           core:processId="1777ec60-4043-44e1-b86c-0800200c9a66"
10          core:timestamp="2001-10-26T21:41:12+02:00"
11          core:indexNumber="1"
12          core:lastResponse="true">
13
14       <foo/>
15       <bar/>
16 </srv:push>
17 </soapenv:Envelope>

```

4.2.3. I_AUXILIARY_DATA_PROVIDER

4.2.3.1. Introduction

I_AUXILIARY_DATA_PROVIDER		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		External	Synchronous	HTTP, HTTPS, FTP, SFTP, TCP
implemented by	S-AIS Data Simulation Service S-AIS Ground Control Centre	used by	Data Retrieval	
The interface defines the contract that SAT-AIS data providers - either existing, simulated or future ones - shall respect to provide auxiliary data (orbit parameters, orbit and ground station event files, etc.) to the DPC Block2 system.				

4.2.3.2. Protocol

The protocol used for the provision of auxiliary data shall be based on standard TCP communication protocols.

**IFR-I_AUXILIARY_DATA_PROVIDER-0050/T**

The interface with SAT-AIS data providers shall use standard TCP communication protocols (http/https, socket, FTP/SFTP) for the provision of auxiliary data.

Trace from:

SR-DPC-IFR-0080

SR-DIS-FUN-1800

SR-DIS-FUN-1810

The protocol actually implemented depends on the SAT-AIS data provider. The following sections describe the interface provided by the SAT-AIS data providers already identified for the DPC Block2 system

4.2.3.2.1. KSAT protocol

SAT-AIS messages are written to files on a secure FTP (SFTP) server that is hosted by KSAT. The server is accessed by the DPC Block2 as required.

Protocol	SFTP
Host	ftp3.ksat.no
Directory	DPC_delivery/aux/
Authentication	User/password. Details will be provided by KSAT

Once downloaded successfully, the Data Retrieval shall delete the files from the-server.

IFR-I_AUXILIARY_DATA_PROVIDER-0060/T

After the successful download of an auxiliary data file from KSAT SFTP server, the Data Retrieval shall delete the files from the server

Trace from:

IFR-I_AUXILIARY_DATA_PROVIDER-0070/T

After the successful download of auxiliary data file from KSAT SFTP server, the session shall be closed by the client

Trace from:

If a download is stopped, or failed it must be reinitiated, as it is not possible to restart from the last retrieved point.

IFR-I_AUXILIARY_DATA_PROVIDER-0080/T

If a download from KSAT SFTP server is stopped , or fails, it must be reinitiated

Trace from:

Auxiliary data files delivered by KSAT will use following naming convention:

AUX-<Source>_<Type>_<Generation_Time>.<extension>

where:

Field	Description	Format
Source	Satellite to which the data apply	One of the following values: <ul style="list-style-type: none"> • AISSAT-1 • NORAI



Type	Indicate the type of auxiliary data which is contained in the data file	One of the following values: <ul style="list-style-type: none"> • TLE: two lines elements • SCHEDULE: scheduled data downlinks • GENERAL: general information about satellite and associated ground stations • EVENT: satellite event
Generation_Time	Date of generation of the auxiliary data	YYYYDoYhhmmss Ex: 2011241094530 (= 29-AUG-2011 09:45:30)
extension	Extension of auxiliary data file, depending on the data type	One of the following values: <ul style="list-style-type: none"> • tle: for TLE type • xml: for SCHEDULE type • txt: for GENERAL and EVENT types

TLE and (Antenna) SCHEDULE files will be uploaded on a regular basis, typically once a week.

GENERAL file will be uploaded at the beginning of the project, and whenever there are changes to the information within.

EVENT files will only be uploaded if an event occurs or is planned.

4.2.3.2.2. exactEarth protocol

Auxiliary data are written to files on a secure FTP (SFTP) server that is hosted within the exactEarth Data Processing Centre. The server is accessed by the DPC Block2 as required.

Protocol	SFTP
Host	clients.exactearth.com
Directory	DPC/SAISData/
Authentication	User/password. Details will be provided by KSAT

IFR-I_AUXILIARY_DATA_PROVIDER-0090/T

After the successful download of a SAT-AIS messages data file from exactEarth SFTP server, the session shall be closed by the client

Trace from:

IFR-I_AUXILIARY_DATA_PROVIDER-0100/T

If a download from exactEarth SFTP server is stopped , or fails, it must be reinitiated

Trace from:

TLE and acquisition schedules files will be uploaded on a regular basis, typically once a week.

General information files will be uploaded at the beginning of the project, and whenever there are changes to the information within.

Events (satellites, ground stations) files will only be uploaded if an event occurs or is planned.



4.2.3.2.3. SAT-AIS Simulator protocol

The SAT-AIS simulator does not provide auxiliary data.

4.2.3.3. Data model

The data model for auxiliary data (both in terms of format and content) is dependent on the data provider, and it seems there is no international standardized format.

The following sections describe:

- A proposal for an XML format that could be used by future SAT-AIS providers for the delivery of the different identified types of auxiliary data (SAT-AIS provider information and events, satellites information and events, ground stations information and events, network links information and events; ground station acquisition schedule).
- The proprietary format and content of SAT-AIS data providers identified for the DPC Block2 project, if they do not use the proposed XML format.

Ideally, auxiliary data delivered by SAT-AIS data providers shall answer to the following requirements to fully cover the DPC Block2 general requirements defined by ESA. In practice, existing SAT-AIS can only provide partial information. These discrepancies are identified in the sections dedicated to each provider.

IFR-I_AUXILIARY_DATA_PROVIDER-0110/I

SAT-AIS providers shall provide satellite orbits with the best accuracy available. As a minimum, SAT-AIS providers shall deliver the orbit parameters as Two-Line Elements (TLE).

Trace from: SR-DRT-IFR-0180, SR-DRT-IFR-0200

IFR-I_AUXILIARY_DATA_PROVIDER-0120/I

SAT-AIS providers shall update auxiliary data periodically, on a weekly or daily basis, or in near real-time for unscheduled events

Trace from: SR-DRT-IFR-0190

IFR-I_AUXILIARY_DATA_PROVIDER-0130/I

SAT-AIS providers shall provide in the auxiliary data the status of the satellites within their constellation, and, if unavailable, the reason and duration (start and end dates) of unavailability in a satellite events file.

Trace from: SR-DRT-IFR-0210, SR-DRT-IFR-0220, SR-DRT-FUN-0330

IFR-I_AUXILIARY_DATA_PROVIDER-0140/I

SAT-AIS providers shall provide in the auxiliary data the list of ground stations they use for data downlink (including ground station 3D coordinates, antenna gain, minimum elevation angle).

Trace from: SR-DRT-IFR-0230, SR-DRT-IFR-0240

IFR-I_AUXILIARY_DATA_PROVIDER-0150/I

Shall a ground station be unavailable, the reason and duration (start and end dates) of unavailability shall be provided in a ground station events file.

Trace from: SR-DRT-IFR-0250

IFR-I_AUXILIARY_DATA_PROVIDER-0160/I

SAT-AIS providers shall provide in the auxiliary data the planned acquisition schedule for each satellite and ground station they operate, with the beginning and end time of acquisition.

Trace from: SR-DRT-IFR-0260

**IFR-I_AUXILIARY_DATA_PROVIDER-0170/I**

SAT-AIS providers shall provide in the auxiliary data the average processing time of SAT-AIS data by each ground station, and the additional processing time by the provider itself (if any), before data made available to DPC Block2.

Trace from: SR-DRT-IFR-0270

IFR-I_AUXILIARY_DATA_PROVIDER-0180/I

SAT-AIS providers shall provide in the auxiliary data the status of network links within their system (including link between ground stations to provider, or provider to DPC Block2). In case of scheduled maintenance, SAT-AIS providers shall indicate the reason and start/end dates.

Trace from: SR-DRT-IFR-0280

4.2.3.3.1. KSAT data model

KSAT uses a proprietary format for the provision of auxiliary data.

SCHEDULE data file:

For AISSat-1 information on ground station acquisition and conflicts will be given in a weekly xml-file. This is not applicable for the NORAIS as this information is not applicable for the ISS.

The example below shows an example of a SCHEDULE auxiliary data file content, with:

- one normal pass,
- one rejected pass (no contact due to conflict),
- one partial pass (contact only for a limited time)

```

1 <schedule_reply>
2   <start_time>2011-11-29T14:43:22Z</start_time>
3   <end_time>2011-11-29T14:55:34Z</end_time>
4   <satellite_name>AISSAT-1</satellite_name>
5   <antenna>SG40</antenna>
6   <status>ACCEPTED</status>
7   <partial_pass>NO</partial_pass>
8 </schedule_reply>
9 <schedule_reply>
10  <start_time>2011-11-29T16:19:11Z</start_time>
11  <end_time>2011-11-29T16:31:33Z</end_time>
12  <satellite_name>AISSAT-1</satellite_name>
13  <antenna>SG40</antenna>
14  <status>REJECTED</status>
15  <partial_pass>NO</partial_pass>
16 </schedule_reply>
17 ...
18 <schedule_reply>
19  <start_time>2011-11-29T22:46:30Z</start_time>
20  <end_time>2011-11-29T22:50:36Z</end_time>
21  <satellite_name>AISSAT-1</satellite_name>
22  <antenna>SG40</antenna>
23  <status>ACCEPTED</status>
24  <partial_pass>YES</partial_pass>
25 </schedule_reply>

```

TLE data file

The AISSat-1 satellite cannot do any orbital maneuvers and the operations are based on available 2-line elements.

TLE information can be downloaded from. <http://www.celestrak.com/NORAD/elements/> where the format is:

```

AISSAT 1
1 36797U 10035C 11333.53283880 .00001943 00000-0 25660-3 0 4689
2 36797 98.0852 43.5277 0013578 106.3283 253.9418 14.81135497 74782

```



As NORAIS is hosted on the ISS the TLEs for ISS can be used and also be downloaded from <http://www.celestrak.com/NORAD/elements/>.

TLE format is described in **Error! Reference source not found..**

GENERAL data file

General auxiliary data (not applicable for NORAIS) will be combined in a file whose format is:

```
File Generated: <date>
File Version: <version>
Satellite: AISSAT-1
NORAD ID: 36797
Ground Station 01 ID: SG40
Ground Station 01 Coordinates: <lat>, <long>, <altitude>
Average Ground Processing Time Real-Time Data: <real_time_delay>
Average Ground Processing Time Stored Data: <stored_delay>
```

where:

Field	Description	Format
date	Date and time of generation of the Auxiliary data file	YYYYDoYhhmmss Ex: 2011241094530 (= 29-AUG-2011 09:45:30)
version	Number of times this files has been updated last year. A new update shall always be sent at the beginning of a new calendar year.	YYYY-XXX Ex: 2012-001
lat, long	Ground station latitude and longitude, in decimal degrees	Decimal,]-90,90] /]-180,180]
altitude	Ground station altitude, in meters	Integer
real_time_delay	Average processing delay for real-time data, in minutes	Integer
stored_delay	Average processing delay for stored data, in minutes	Integer

The average Ground processing time is based on actual performance and is an estimate of the average time when messages are received by the Ground Station until they are made available to the DPC Block2. As AISSat-1 operates in both “live”-mode and stored data mode, these two modes have been separated.

EVENT data file

In case of an event which makes the SAT-AIS data unavailable (other than what is given in the ground station availability file), an event file will be generated. An event file can be generated before a known situation (satellite maintenance), during an event that will last for some time or after an event that has been corrected.

The format is:

```
File Generated: <date>
File Version: <version>
```



Satellite: AISSAT-1
 NORAD ID: 36797
 Start Time of Event: <start_date>
 End Time of Event: <end_date>
 Event Reason: <reason>
 Optional Event Description: <description>

Field	Description	Format
date	Date and time of generation of the Auxiliary data file	YYYYDoYhhmmss Ex: 2011241094530 (= 29-AUG-2011 09:45:30)
version	Event number in current year	YYYY-XXX Ex: 2012-001
start_date	Start date and time of the event	YYYYDoYhhmmss
end_date	End date and time of the event	YYYYDoYhhmmss
reason	Reason for the event	Any of the following values: <ul style="list-style-type: none"> • Satellite exception • Satellite maintenance • Ground station exception • Ground Station maintenance • Network exception • Network maintenance • Other
description	If "Other" is used as the event reason, description of the event	String

4.2.3.3.2. exactEarth data model

exactEarth uses the data model described in sections §6.2.15 for the provision of auxiliary data.

However, the information provided will be limited to the following items:

- Provider information, excluding provider anomaly periods.
- Satellites information, including satellite availability, but excluding maneuvers and payload information and events
- Ground station information, excluding ground station maintenance or events
- Network link information, limited to provide to DPC Block2 link

No scheduled acquisition information will be delivered by exactEarth.

4.2.3.3.3. SAT-AIS Simulator protocol

The SAT-AIS simulator does not provide auxiliary data.

4.2.3.3.4. Future SAT-AIS providers data model

The data model proposed for future SAT-AIS provider is described in section §6.1.18.3.1.4 of the present ICD.



4.2.4.

4.2.5. I_DD_CFG

4.2.5.1. Introduction

I_DD_CFG		Scope	Mode:	Protocol:
		Internal	Synchronous	File system, XML files
implemented by	Data Distribution	used by	Operator	
The interface defines the entry point of the Data Distribution component through which the Operator can perform the configuration.				

4.2.5.2. Protocol

The protocol describes the point of contact through which an Operator can configure the component. It is a very basic interface that equates to the File System with files as information carrier.

IFR-I_DD_CFG-0190/I

The I_DD_CFG interface must use files living on the local file system to carry configuration information.

Trace from:

4.2.5.3. Data Model

The information, that describes configuration items, is structured into an XML file compliant with an XSD Schema according to [Error! Reference source not found.] and [Error! Reference source not found.].

IFR-I_DD_CFG-0200/I

The I_DD_CFG interface must rely on an XML dialect validated by a XSD Schema.

Trace from:

SR-DPC-DES-2030

SR-DPC-DES-1960

The data model have separated tags for each group of parameters, assembled by type or component, which will have specific tags dedicated to configure global or specific working behaviour.

The example presented below show how the configuration tags shall be organized on the configuration file.



```

<dds_config>
  <!-- General configuration parameters -->
  <general>
    <config_parameter>XXXXXXX</config_parameter>
    ....
  </general>

  <!-- Specific configuration parameters -->
  <data_handler>
    <config_parameter>XXXXXXX</config_parameter>
    ....
  </data_handler>

  <data_provider>
    <config_parameter>XXXXXXX</config_parameter>
    ....
  </data_provider>

  <user_manager>
    <config_parameter>XXXXXXX</config_parameter>
    ....
  </user_manager>

  <web_display>
    <config_parameter>XXXXXXX</config_parameter>
    ....
  </web_display>
</dds_config>

```

Figure 34 - Data Distribution Configuration File Example

4.2.6. I_DD_DATA

4.2.6.1. Introduction

I_DD_DATA		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		Internal, ESB	Synchronous	HTTP, SOAP, XML
implemented by	Data Distribution	used by	BPEL Engine	
The interface defines the mean used to deliver real time data to the external users:				
<ul style="list-style-type: none">SAT-AIS data (human readable and raw)Warnings and AlertsSAT-AIS InformationEO Data				

4.2.6.2. Protocol

The interface is the inheritance of the following interfaces:

- I_DP_ALERT_PROVIDER for warnings and alerts,
- I_DP_S_AIS_PROVIDER for SAT-AIS data (human readable, after processing)
- I_DR_PROVIDER for SAT-AIS data (raw), SAT-AIS Information and EO Data.

This protocol uses industry standard protocols.

IFR-I_DD_DATA-0210/T

The I_DD_DATA interface must establish a conversation between a client and a server performed over HTTP version 1.1 as described in [RD 3].

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

**IFR-I_DD_DATA-0220/T**

The I_DD_DATA interface must use the SOAP messaging protocol v1.1 and v1.2 for formatting requests and responses as specified in [RD 4] and [RD 5] ;

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

IFR-I_DD_DATA-0230/T

The I_DD_DATA interface must use the Document style binding.

Trace from:

SR-DPC-DES-1970

4.2.7. I_DD_SUPERVISION**4.2.7.1. Introduction**

I_DD_SUPERVISION		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		Internal	Synchronous	JMX
implemented by	Data Distribution	used by	MCC	
The interface defines the mean used to manage and monitor the component.				

4.2.7.2. Protocol

The protocol describes the point of contact through which a Supervision tool (actually the MCC instance) can monitor and administrate the component.

The protocol is a widely spread Java technology called JMX - Java Management eXtensions. The underlying protocol used is also a Java technology called RMI - Remote Method Invocation.

IFR-I_DD_SUPERVISION-0240/I

The I_DD_SUPERVISION interface must use the JMX protocol v1.4 as specified in [RD 21].

Trace from:

The following diagram shows the underlying messaging and transport stack used by the protocol.

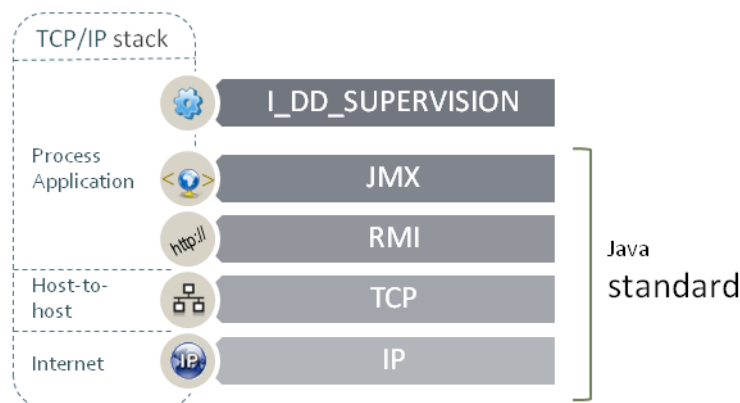


Figure 35 - Protocol stack of the I_DD_SUPERVISION interface



4.2.7.3. Operations

Through the JMX protocol, a set of operations are exposed to allow the control of the sub-system, as well as the retrieval of information about the service operations, such as deliveries failures, unauthorized queries or other relevant information that allow the correct monitoring of the service behavior.

4.2.7.3.1. “startRealTimeDataDistributionService” operation

The operation allows for a client to start the real-time data distribution service.

4.2.7.3.1.1. *Request message*

No arguments are expected.

4.2.7.3.1.2. *Response message*

The response contains the status of the start operation.

4.2.7.3.2. “stopRealTimeDataDistributionService” operation

The operation allows for a client to stop the real-time data distribution service.

4.2.7.3.2.1. *Request message*

No arguments are expected.

4.2.7.3.2.2. *Response message*

The response contains the status of the stop operation.

4.2.7.3.3. “startArchiveDataProviderService” operation

The operation allows for a client to start the archive data provider service.

4.2.7.3.3.1. *Request message*

No arguments are expected.

4.2.7.3.3.2. *Response message*

The response contains the status of the start operation.

4.2.7.3.4. “stopArchiveDataProviderService” operation

The operation allows for a client to stop the archive data provider service.



4.2.7.3.4.1. *Request message*

No arguments are expected.

4.2.7.3.4.2. *Response message*

The response contains the status of the stop operation.

4.2.7.3.5. “getRealTimeDataDistributionStatus” operation

The operation allows for a client to query for the status of the Real-time Data Distribution Service.

4.2.7.3.5.1. *Request message*

No arguments are expected.

4.2.7.3.5.2. *Response message*

The response contains the requested status.

4.2.7.3.6. “getArchiveDataProviderStatus” operation

The operation allows for a client to query for the status of the Archive Data Provider.

4.2.7.3.6.1. *Request message*

No arguments are expected.

4.2.7.3.6.2. *Response message*

The response contains the requested status.

4.2.7.3.7. “getArchiveDataProviderStatus” operation

The operation allows for a client to query for the status of the Archive Data Provider.

4.2.7.3.7.1. *Request message*

No arguments are expected.

4.2.7.3.7.2. *Response message*

The response contains the requested status.



4.2.8. I_DMA_DB_CFG

4.2.8.1. Introduction

I_DMA_DB_CFG		Scope	Mode:	Protocol:
		Internal	Synchronous	Proprietary
implemented by	DBMS	used by	Operator	
The interface defines the entry point of the DBMS component through which the Operator can perform the configuration.				

4.2.8.2. Protocol

The protocol describes the point of contact through which an Operator can configure the component. It is a very basic interface that equates to the File System with files as information carrier.

IFR-I_DMA_DB_CFG-0250/I

The I_DMA_DB_CFG interface must use files living on the local file system to carry configuration information.

Trace from:

4.2.8.3. Data Model

The information, that describes configuration items, is structured into an XML file compliant with an XSD Schema according to [Error! Reference source not found.] and [Error! Reference source not found.].

IFR-I_DMA_DB_CFG-0260/I

The I_DMA_DB_CFG interface must rely on an XML dialect validated by a XSD Schema.

Trace from:

SR-DPC-DES-2030

SR-DPC-DES-1960

4.2.9. I_DMA_DB_SERVICE

4.2.9.1. Introduction

I_DMA_DB_SERVICE		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		Internal	Synchronous	TPC, SQL
implemented by	DBMS	used by	Data Distribution DMA System Performance	
The interface defines the mean used to access the database of the DPC Block2 System.				



4.2.10. I_DMA_DMA_CFG

4.2.10.1. Introduction

I_DMA_DMA_CFG		Scope	Mode:	Protocol:
		Internal	Synchronous	File system, XML files
implemented by	DMA	used by	Operator	
The interface defines the entry point of the DMA component through which the Operator can perform the configuration.				

4.2.10.2. Protocol

The protocol describes the point of contact through which an Operator can configure the component. It is a very basic interface that equates to the File System with files as information carrier.

IFR-I_DMA_DMA_CFG-0270/I

The I_DMA_DMA_CFG interface must use files living on the local file system to carry configuration information.

Trace from:

4.2.10.3. Data Model

The information, that describes configuration items, is structured into an XML file compliant with an XSD Schema according to [Error! Reference source not found.] and [Error! Reference source not found.].

IFR-I_DMA_DMA_CFG-0280/I

The I_DMA_DMA_CFG interface must rely on an XML dialect validated by a XSD Schema.

Trace from:

SR-DPC-DES-2030

SR-DPC-DES-1960

4.2.11. I_DMA_DMA_SERVICE

4.2.11.1. Introduction

I_DMA_DMA_SERVICE		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		Internal, ESB	Asynchronous	HTTP, SOAP, XML
implemented by	DMA	used by	BPEL Engine Data Distribution	
The interface defines the mean (oriented service) used to access the information stored in the database of the DPC Block2 System.				



4.2.12. I_DMA_DMA_SUPERVISION

4.2.12.1. Introduction

I_DMA_DMA_SUPERVISION		Scope	Mode:	Protocol:
		Internal	Synchronous	JMX
implemented by	DMA	used by MCC		
The interface defines the mean used to manage and monitor the component.				

4.2.12.2. Protocol

The protocol describes the point of contact through which a Supervision tool (actually the MCC instance) can monitor and administrate the component.

The protocol is a widely spread Java technology called JMX - Java Management eXtensions. The underlying protocol used is also a Java technology called RMI - Remote Method Invocation.

IFR-I_DMA_DMA_SUPERVISION-0290/I

The I_DMA_DMA_SUPERVISION interface must use the JMX protocol v1.4 as specified in [RD 21].

Trace from:

The following diagram shows the underlying messaging and transport stack used by the protocol.

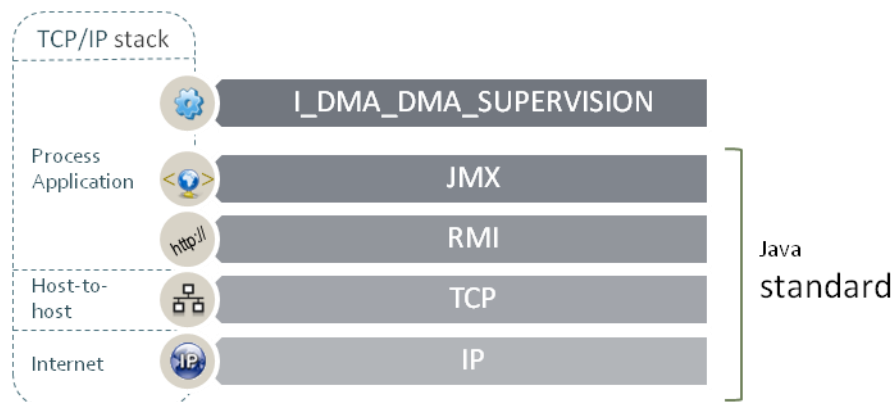


Figure 36 - Protocol stack of the I_DMA_DMA_SUPERVISION interface

4.2.12.3. Data Model

4.2.13. I_DP_ALERT_PROVIDER

4.2.13.1. Introduction

I_DP_ALERT_PROVIDER		Scope	Mode:	Protocol:
		Internal, ESB	Asynchronous	HTTP, SOAP, CAP
implemented by	BPEL Engine Data Distribution	used by L1 Processing L2 Processing		



L3 Processing

The interface defines the contract a component shall respect to be able to receive warnings and alerts.

4.2.14. I_DP_DOPPLER_CFG

4.2.14.1. Introduction

I_DP_DOPPLER_CFG	<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
	Internal	Synchronous	File System, XML files
implemented by	used by		
Doppler			
Operator			
The interface defines the entry point of the Doppler component through which the Operator can perform the configuration.			

4.2.14.2. Protocol

The protocol describes the point of contact through which an Operator can configure the component. It is a very basic interface that equates to the File System with files as information carrier.

IFR-I_DP_DOPPLER_CFG-0300/I

The I_DP_DOPPLER_CFG interface must use files living on the local file system to carry configuration information.

Trace from:

4.2.14.3. Data Model

The information, that describes configuration items, is structured into an XML file compliant with an XSD Schema according to [Error! Reference source not found.] and [Error! Reference source not found.].

IFR-I_DP_DOPPLER_CFG-0310/I

The I_DP_DOPPLER_CFG interface must rely on an XML dialect validated by a XSD Schema.

Trace from:

SR-DPC-DES-2030

SR-DPC-DES-1960



4.2.15. I_DP_DOPPLER_SERVICE

4.2.15.1. Introduction

I_DP_DOPPLER_SERVICE	<u>Scope</u> Internal, ESB	<u>Mode:</u> Synchronous	<u>Protocol:</u> HTTP, SOAP, XML
implemented by	Doppler	used by	BPEL Engine
The interface defines the contract the Doppler component shall respect to provide the Doppler computation capability to the System.			

4.2.15.2. Relationship to other protocols

This protocol uses industry standard protocols.

IFR-I_DP_DOPPLER_SERVICE -0320/T

The I_DP_DOPPLER_SERVICE interface must establish a conversation between a client and a server performed over HTTP version 1.1 as described in [RD 3].

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

IFR-I_DP_DOPPLER_SERVICE -0330/T

The I_DP_DOPPLER_SERVICE interface must use the SOAP messaging protocol v1.1 and v1.2 for formatting requests and responses as specified in [RD 4] and [RD 5] ;

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

IFR-I_DP_DOPPLER_SERVICE -0340/T

The I_DP_DOPPLER_SERVICE interface must use the Document style binding.

Trace from: SR-DPC-DES-1970

The following diagram shows the underlying messaging and transport stack used by the protocol.

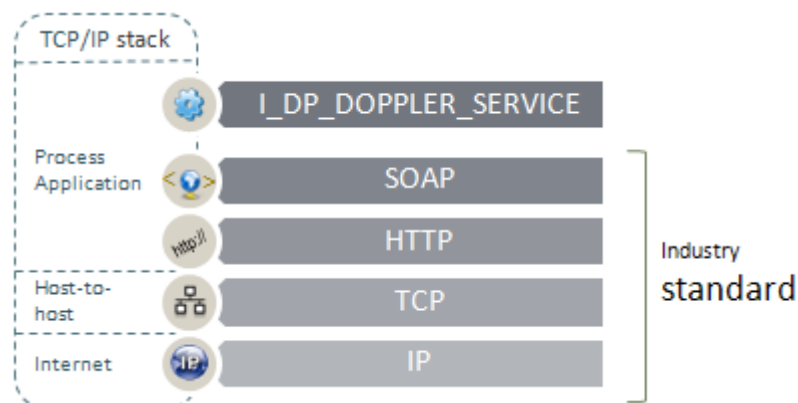


Figure 37 - Protocol stack of the I_DP_DOPPLER_SERVICE interface



4.2.15.3. Operations

The interface specifies one operation that can be invoked by a client.

IFR-I_DP_DOPPLER_SERVICE-0350/T

The I_DP_DOPPLER_SERVICE must use the literal style for all the published operations.

Trace from: SR-DPC-DES-1970

4.2.15.3.1. “computeDopplerLocations” operation

The operation allows for a client to provide inputs for the Doppler Location computation.

4.2.15.3.1.1. Request message

The following table describes the message exchanged through this operation.

Element	Description	Type
decodedMessages	A reference on a file containing a set of L1 AIS decoded messages. (msg:SatAISMessageBulkType)	core:reference
dopplerLocationHistories	A reference on a file containing a set of Doppler Location Histories (returned by previous Doppler location computations). (doppler:shipLocationHistorieBulkType)	core:reference

According to the general principle of the separation between the control and the data, all the information (payload) is transmitted through files. Those files are referenced in the arguments of the request and shall be resolvable.

4.2.15.3.1.2. Response message

The following table describes the message exchanged through this operation.

Element	Description	Type
dopplerResults	A reference on a file containing the Doppler locations computed. (doppler:dopplerPassResultBulkType)	core:reference
dopplerLocationHistories	A reference on a file containing a set of Doppler Location Histories. (doppler:shipLocationHistorieBulkType)	core:reference

According to the general principle of the separation between the control and the data, all the information (payload) is transmitted through files. Those files are referenced in the arguments of the request and shall be resolvable.



4.2.15.3.1.3. Fault message

4.2.15.3.1.4. Example

The following example shows the submission of decoded AIS messages for which the Doppler locations must be computed.

```

1 <soapenv:Envelope
2     xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
3     xmlns:srv="http://iap.esa.int/services/sat-ais/data-processing"
4     xmlns:core="http://iap.esa.int/schemas/sat-ais/core"
5     xmlns:xlink="http://www.w3.org/1999/xlink">
6     <soapenv:Header/>
7     <soapenv:Body>
8         <srv:computeDopplerLocations>
9             <srv:decodedMessages xlink:href="/s-ais-dpc-block2/shared/decoded-
10                 messages-1777ec60-4042-22e1-b86c-
11                 065778952136"/>
12             <srv:dopplerLocationHistories xlink:href="/s-ais-dpc-
13                 block2/shared/doppler histories-
14                 1777ec60-4042-22e1-b86c-
15                 984523136745"/>
16         </srv:computeDopplerLocations>
17     </soapenv:Body>
18 </soapenv:Envelope>

```

The following example shows the obtained response for the Doppler location results.

```

1 <soapenv:Envelope
2     xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
3     xmlns:srv="http://iap.esa.int/services/sat-ais/data-processing"
4     xmlns:core="http://iap.esa.int/schemas/sat-ais/core"
5     xmlns:xlink="http://www.w3.org/1999/xlink"
6     xmlns:ais="http://esa.int/XML/SADPC/ctypes">
7     <soapenv:Header/>
8     <soapenv:Body>
9         <srv:computeDopplerLocationsResponse>
10             <srv:dopplerResults xlink:href="/s-ais-dpc-
11                 block2/shared/doppler locations-1777ec60-
12                 4042-22e1-b86c-984523136745"/>
13             <srv:dopplerLocationHistories xlink:href="/s-ais-dpc-
14                 block2/shared/doppler histories-
15                 1777ec60-4042-22e1-b86c-
16                 654789963124"/>
17         </srv:computeDopplerLocationsResponse>
18     </soapenv:Body>
19 </soapenv:Envelope>

```

4.2.16. I_DP_DOPPLER_SUPERVISION

4.2.16.1. Introduction

I_DP_DOPPLER_SUPERVISION	<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
	Internal	Synchronous	JMX
implemented by Doppler	used by MCC		
The interface defines the mean used to manage and monitor the component.			



4.2.16.2. Protocol

The protocol describes the point of contact through which a Supervision tool (actually the MCC instance) can monitor and administrate the component.

The protocol is a widely spread Java technology called JMX - Java Management eXtensions. The underlying protocol used is also a Java technology called RMI - Remote Method Invocation.

IFR-I_DP_DOPPLER_SUPERVISION-0360/I

The I_DP_DOPPLER_SUPERVISION interface must use the JMX protocol v1.4 as specified in [RD 21].
Trace from:

The following diagram shows the underlying messaging and transport stack used by the protocol.

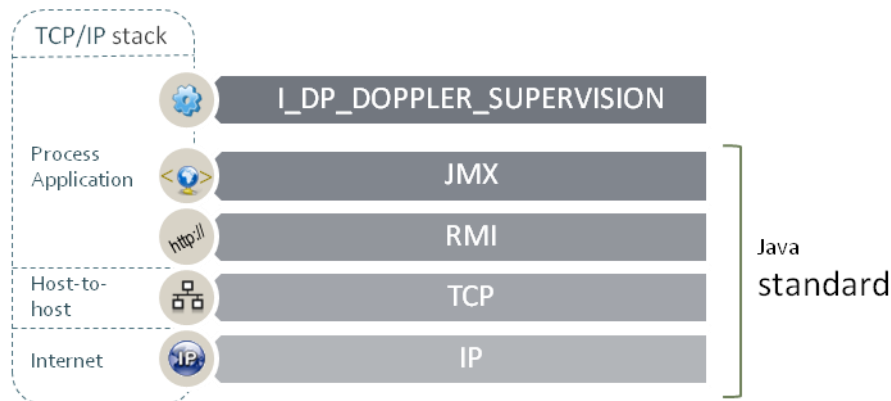


Figure 38 - Protocol stack of the I_DP_DOPPLER_SUPERVISION interface

4.2.16.3. Data Model

4.2.17. I_DP_L1_CFG

4.2.17.1. Introduction

I_DP_L1_CFG		Scope	Mode:	Protocol:
		Internal	Synchronous	File System, XML files
implemented by	L1 Processing	used by	Operator	
The interface defines the entry point of the L1 Processing component through which the Operator can perform the configuration.				

4.2.17.2. Protocol

The protocol describes the point of contact through which an Operator can configure the component. It is a very basic interface that equates to the File System with files as information carrier.

IFR-I_DP_L1_CFG-0370/I

The I_DP_L1_CFG interface must use files living on the local file system to carry configuration information.



Trace from:

4.2.17.3. Data Model

The information, that describes configuration items, is structured into an XML file compliant with an XSD Schema according to [Error! Reference source not found.] and [Error! Reference source not found.].

IFR-I_DP_L1_CFG-0380/I

The I_DP_L1_CFG interface must rely on an XML dialect validated by a XSD Schema.

Trace from:

SR-DPC-DES-2030

SR-DPC-DES-1960

4.2.18. I_DP_L1_SERVICE

4.2.18.1. Introduction

I_DP_L1_SERVICE		Scope	Mode:	Protocol:
		Internal, ESB	Asynchronous	HTTP, SOAP, XML
implemented by	L1 Processing		used by	BPEL Engine
<p>The interface defines the contract the L1 Data Processing shall respect to be able to process incoming data from the Data Retrieval subsystem. The protocol is a one-way protocol where the information travels only from the client to the server.</p> <p>The response is delivered through two others interfaces (asynchronous mechanism) I_DP_S_AIS_PROVIDER for decoded AIS messages and I_DP_ALERT_PROVIDER for Alerts.</p>				

4.2.18.2. Relationship to other protocols

This protocol uses industry standard protocols.

IFR-I_DP_L1_SERVICE-0390/T

The I_DP_L1_SERVICE interface must establish a conversation between a client and a server performed over HTTP version 1.1 as described in [RD 3].

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

IFR-I_DP_L1_SERVICE-0400/T

The I_DP_L1_SERVICE interface must use the SOAP messaging protocol v1.1 and v1.2 for formatting requests and responses as specified in [RD 4] and [RD 5] ;

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

**IFR-I_DP_L1_SERVICE-0410/T**

The I_DP_L1_SERVICE interface must use the Document style binding.

Trace from:

SR-DPC-DES-1970

The following diagram shows the underlying messaging and transport stack used by the protocol.

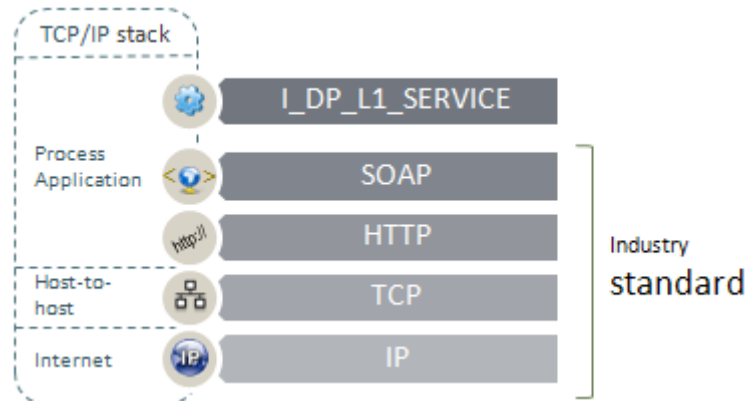


Figure 39 - Protocol stack of the I_DP_L1_SERVICE interface

4.2.18.3. Operations

The interface specifies two operations that can be invoked by a client.

IFR-I_DP_L1_SERVICE-0420/T

The I_DP_L1_SERVICE must use the literal style for all the published operations.

Trace from:

4.2.18.3.1. "L1ProcessingDecode" operation

The operation allows for a client to provide inputs to the L1 Processing component in order to decode raw AIS messages.

4.2.18.3.1.1. Request message

The following table describes the message exchanged through this operation.

Element	Description	Type
rawMessages	A list of resources pointing to resources (files) containing raw AIS Messages.	dpc:resourceBulkType

The request contains the list of S-AIS messages resources (dpc:resourceBulkType) that are coming from the Data Retrieval subsystem. The media-type for all the resource must be "application/x-ais-message".

4.2.18.3.1.2. Response message

A minimal response is returned containing the process of the id related to the submitted job.



4.2.18.3.1.3. Fault message

4.2.18.3.1.4. Example

The following example shows the submission of raw AIS messages.

```

1 <soapenv:Envelope
2     xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
3     xmlns:srv="http://iap.esa.int/services/sat-ais/data-processing"
4     xmlns:core="http://iap.esa.int/schemas/sat-ais/core"
5     xmlns:xlink="http://www.w3.org/1999/xlink"
6     xmlns:ais="http://esa.int/XML/SADPC/ctypes">
7   <soapenv:Header/>
8   <soapenv:Body>
9     <srv:L1ProcessingDecode>
10      <srv:rawMessages>
11        <dpc:resource
12          core:uuid="1777ec60-4042-11e1-b86c-0800200c9a66"
13          xlink:href="http://s-ais-dpc.eu/incoming/ais/eee-ftp-
14            20010731010010.nm4">
15          <dpc:publisher>exactEarth</dpc:publisher>
16          <dpc:source>ftp://exact-earth.com/data/ais/200107310100110.nm4<
17            /dpc:source>
18          <dpc:creationDate>2011-07-31T01:00:10-05:00</dpc:creationDate>
19          <dpc:format>application/x-ais</dpc:format>
20          <dpc:size >14612645</dpc:size>
21        </dpc:resource>
22        <dpc:resource
23          core:uuid="1777ec60-4042-11e1-b86c-065428799634"
24          xlink:href="http://s-ais-dpc.eu/incoming/ais/eee-ftp-
25            20010731011576.nm4">
26          <dpc:publisher>exactEarth</dpc:publisher>
27          <dpc:source>ftp://exact-earth.com/data/ais/20010731011576.nm4</dpc:
28            source>
29          <dpc:creationDate>2011-07-31T04:08:04-18:25</dpc:creationDate>
30          <dpc:format>application/x-ais</dpc:format>
31          <dpc:size >1549654</dpc:size>
32        </dpc:resource>
33      </srv:rawMessages>
34    </soapenv:Body>
35  </soapenv:Envelope>

```

4.2.18.3.2. “L1ProcessingAdvancedCheck” operation

The operation allows for a client to provide inputs to the L1 Processing component in order to perform advanced coherency checks on decoded L1 AIS Messages, which are:

- Satellite footprint Check
- Ship Velocity Check

4.2.18.3.2.1. Request message

The following table describes the message exchanged through this operation.

Element	Description	Type
decodedMessages	A reference on a file containing a set of L1 AIS decoded messages (msg:SatAISMessageBulkType)	core:reference
lastPositions	A reference on a file containing the last positions of all the vessels of the decoded messages (itypes:mobilePositionBulkType)	core:reference



ephemerids	A reference on a file containing the ephemerids for the satellite (itypes:ephemeridType)	core:reference
-------------------	--	----------------

According to the general principle of the separation between the control and the data, all the information (payload) is transmitted through files. Those files are referenced in the arguments of the request and shall be resolvable.

4.2.18.3.2.2. Response message

A minimal response is returned containing the process of the id related to the submitted job.

4.2.18.3.2.3. Fault message

4.2.18.3.2.4. Example

The following example shows the submission of L1 decoded AIS messages along with vessels last positions and satellite ephemerids.

```

1 <soapenv:Envelope
2     xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
3     xmlns:srv="http://iap.esa.int/services/sat-ais/data-processing"
4     xmlns:core="http://iap.esa.int/schemas/sat-ais/core"
5     xmlns:xlink="http://www.w3.org/1999/xlink"
6     xmlns:ais="http://esa.int/XML/SADPC/ctypes">
7   <soapenv:Header/>
8   <soapenv:Body>
9     <srv:L1ProcessingAdvancedCheck>
10      <srv:decodedMessages xlink:href="./s-ais-dpc-block2/shared/decoded-
11        messages-1777ec60-4042-22e1-b86c-
12        065778952136"/>
13      <srv:lastpositions xlink:href="./s-ais-dpc-block2/shared/positions-
14        1777ec60-4042-22e1-b86c-984523136745"/>
15      <srv:ephemerids xlink:href="./s-ais-dpc-block2/shared/ephemerids-1777ec60-
16        4042-22e1-b86c-879876546542"/>
17    </srv:L1ProcessingAdvancedCheck>
18  </soapenv:Body>
19 </soapenv:Envelope>

```

4.2.19. I_DP_L1_SUPERVISION

4.2.19.1. Introduction

I_DP_L1_SUPERVISION		Scope	Mode:	Protocol:
		Internal	Synchronous	JMX
implemented by	L1 Processing	used by	MCC	
The interface defines the mean used to manage and monitor the component.				

4.2.19.2. Protocol

The protocol describes the point of contact through which a Supervision tool (actually the MCC instance) can monitor and administrate the component.



The protocol is a widely spread Java technology called JMX - Java Management eXtensions. The underlying protocol used is also a Java technology called RMI - Remote Method Invocation.

IFR-I_DP_L1_SUPERVISION-0430/I

The I_DP_L1_SUPERVISION interface must use the JMX protocol v1.4 as specified in [RD 21].

Trace from:

The following diagram shows the underlying messaging and transport stack used by the protocol.

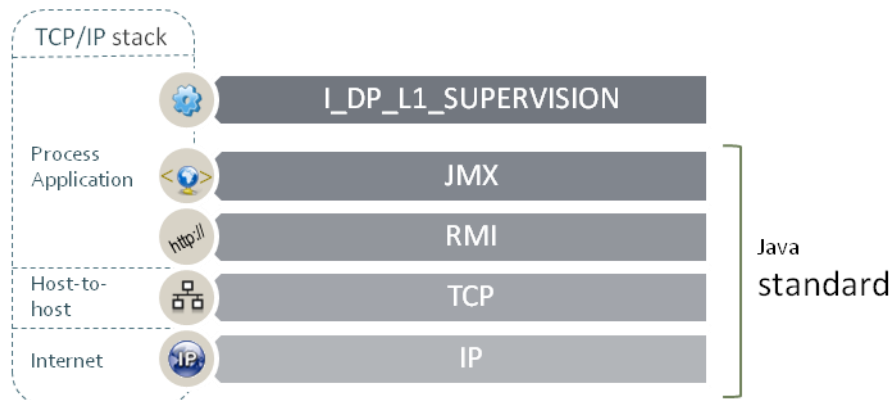


Figure 40 - Protocol stack of the I_DP_L1_SUPERVISION interface

4.2.19.3. Data Model

4.2.20. I_DP_L2_CFG

4.2.20.1. Introduction

I_DP_L2_CFG		Scope	Mode:	Protocol:
		Internal	Synchronous	File System, XML files
implemented by	L2 Processing	used by Operator		
The interface defines the entry point of the L2 Processing component through which the Operator can perform the configuration.				

4.2.20.2. Protocol

The protocol describes the point of contact through which an Operator can configure the component. It is a very basic interface that equates to the File System with files as information carrier.

IFR-I_DP_L2_CFG-0440/I

The I_DP_L2_CFG interface must use files living on the local file system to carry configuration information.

Trace from:



4.2.20.3. Data Model

The information, that describes configuration items, is structured into an XML file compliant with an XSD Schema according to [Error! Reference source not found.] and [Error! Reference source not found.].

IFR-I_DP_L2_CFG-0450/I

The I_DP_L2_CFG interface must rely on an XML dialect validated by a XSD Schema.

Trace from:

SR-DPC-DES-2030

SR-DPC-DES-1960

4.2.21. I_DP_L2_SERVICE

4.2.21.1. Introduction

I_DP_L2_SERVICE	Scope	Mode:	Protocol:
	Internal, ESB	Asynchronous	HTTP, SOAP, XML
implemented by	L2 Processing	used by	BPEL Engine
<p>The interface defines the contract the L2 Data Processing shall respect to be able to qualify incoming decoded AIS messages with enhancement or recovery. The protocol is a one-way protocol where the information travels only from the client to the server.</p> <p>The response is delivered through two others interfaces (asynchronous mechanism) I_DP_S_AIS_PROVIDER for decoded AIS messages and I_DP_ALERT_PROVIDER for Alerts.</p>			

4.2.21.2. Relationship to other protocols

This protocol uses industry standard protocols.

IFR-I_DP_L2_SERVICE-0460/T

The I_DP_L2_SERVICE interface must establish a conversation between a client and a server performed over HTTP version 1.1 as described in [RD 3].

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

IFR-I_DP_L2_SERVICE-0470/T

The I_DP_L2_SERVICE interface must use the SOAP messaging protocol v1.1 and v1.2 for formatting requests and responses as specified in [RD 4] and [RD 5] ;

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

IFR-I_DP_L2_SERVICE-0480/T

The I_DP_L2_SERVICE interface must use the Document style binding.

Trace from: SR-DPC-DES-1970



The following diagram shows the underlying messaging and transport stack used by the protocol.

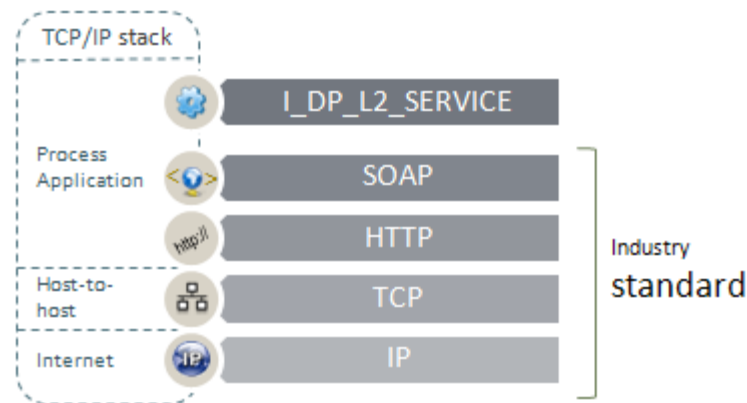


Figure 41 - Protocol stack of the I_DP_L2_SERVICE interface

4.2.21.3. Operations

The interface specifies a single operation that can be invoked by a client.

IFR-I_DP_L2_SERVICE-0490/T

The I_DP_L2_SERVICE must use the literal style for all the published operations.

Trace from:

4.2.21.3.1. “L2Processing” operation

The operation allows for a client to provide inputs to the L2 Processing component in order to enhance AIS messages by performing the following tasks:

- Correlation task between positions reported in AIS messages and the Doppler location that have been calculated with a sufficient reliability. For this task, in addition to the AIS messages, the computed Doppler locations are given to the operation.
- Recovering task for AIS positions reports that have been considered as invalid according to the L1 Process.

4.2.21.3.1.1. Request message

The following table describes the message exchanged through this operation.

Element	Description	Type
decodedMessages	A reference on a file containing a set of L1 AIS decoded messages. (msg:SatAISMessageBulkType)	core:reference
dopplerResults	A reference on a file containing a set of Doppler computations for all the ships contained in the given AIS decoded messages. (doppler:dopplerPassResultBulkType). The Doppler computation contains the following minimal information: <ul style="list-style-type: none"> • Ship identifier • Satellite identifier • Location date 	core:reference



- Doppler location
- Uncertainty

According to the general principle of the separation between the control and the data, all the information (payload) is transmitted through files. Those files are referenced in the arguments of the request and shall be resolvable.

4.2.21.3.1.2. Response message

A minimal response is returned containing the process of the id related to the submitted job.

4.2.21.3.1.3. Fault message

4.2.21.3.1.4. Example

The following example shows the submission of decoded AIS messages along with Doppler computations.

```

1 <soapenv:Envelope
2     xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
3     xmlns:srv="http://iap.esa.int/services/sat-ais/data-processing"
4     xmlns:core="http://iap.esa.int/schemas/sat-ais/core"
5     xmlns:xlink="http://www.w3.org/1999/xlink"
6     xmlns:ais="http://esa.int/XML/SADPC/ctypes">
7   <soapenv:Header/>
8   <soapenv:Body>
9     <srv:L2Processing>
10       <srv:decodedMessages xlink:href="/s-ais-dpc-block2/shared/decoded-
11         messages-1777ec60-4042-22e1-b86c-
12         065778952136"/>
13       <srv:dopplerResults xlink:href="/s-ais-dpc-
14         block2/shared/doppler locations-1777ec60-
15         4042-22e1-b86c-984523136745"/>
16     </srv:L2Processing>
17   </soapenv:Body>
18 </soapenv:Envelope>

```

4.2.22. I_DP_L2_SUPERVISION

4.2.22.1. Introduction

I_DP_L2_SUPERVISION		Scope	Mode:	Protocol:
		Internal	Synchronous	JMX
implemented by	L2 Processing		used by	MCC
The interface defines the mean used to manage and monitor the component.				

4.2.22.2. Protocol

The protocol describes the point of contact through which a Supervision tool (actually the MCC instance) can monitor and administrate the component.

The protocol is a widely spread Java technology called JMX - Java Management eXtensions. The underlying protocol used is also a Java technology called RMI - Remote Method Invocation.

**IFR-I_DP_L2_SUPERVISION-0500/I**

The I_DP_L2_SUPERVISION interface must use the JMX protocol v1.4 as specified in [RD 21].

Trace from:

The following diagram shows the underlying messaging and transport stack used by the protocol.

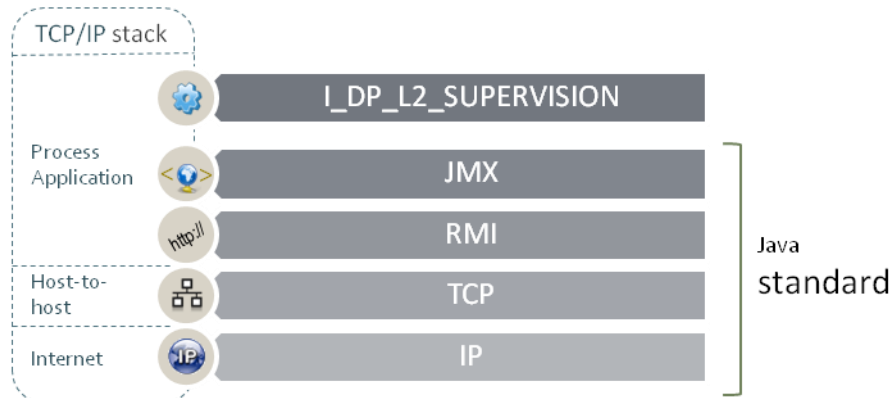


Figure 42 - Protocol stack of the I_DP_L2_SUPERVISION interface

4.2.22.3. Data Model

4.2.23. I_DP_L3_CFG

4.2.23.1. Introduction

I_DP_L3_CFG		Scope	Mode:	Protocol:
		Internal	Synchronous	File System, XML files
implemented by	L3 Processing	used by	Operator	
The interface defines the entry point of the L3 Processing component through which the Operator can perform the configuration.				

4.2.23.2. Protocol

The protocol describes the point of contact through which an Operator can configure the component. It is a very basic interface that equates to the File System with files as information carrier.

IFR-I_DP_L3_CFG-0510/I

The I_DP_L3_CFG interface must use files living on the local file system to carry configuration information.

Trace from:

4.2.23.3. Data Model

The information, that describes configuration items, is structured into an XML file compliant with an XSD Schema according to [Error! Reference source not found.] and [Error! Reference source not found.].

**IFR-I_DP_L3_CFG-0520/I**

The I_DP_L3_CFG interface must rely on an XML dialect validated by a XSD Schema.

Trace from:

SR-DPC-DES-2030

SR-DPC-DES-1960

4.2.24. I_DP_L3_SERVICE**4.2.24.1. Introduction**

I_DP_L3_SERVICE		Scope	Mode:	Protocol:
		Internal, ESB	Asynchronous	HTTP, SOAP, XML
implemented by	L3 Processing	used by	BPEL Engine	
<p>The interface defines the contract the L3 Data Processing shall respect to be able to qualify incoming decoded AIS messages. The protocol is a one-way protocol where the information travels only from the client to the server.</p> <p>The response is delivered through two others interfaces (asynchronous mechanism) I_DP_S_AIS_PROVIDER for decoded AIS messages and I_DP_ALERT_PROVIDER for Alerts.</p>				

4.2.24.2. Relationship to other protocols

This protocol uses industry standard protocols.

IFR-I_DP_L3_SERVICE-0530/T

The I_DP_L3_SERVICE interface must establish a conversation between a client and a server performed over HTTP version 1.1 as described in [RD 3].

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

IFR-I_DP_L3_SERVICE-0540/T

The I_DP_L3_SERVICE interface must use the SOAP messaging protocol v1.1 and v1.2 for formatting requests and responses as specified in [RD 4] and [RD 5] ;

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

IFR-I_DP_L3_SERVICE-0550/T

The I_DP_L3_SERVICE interface must use the Document style binding.

Trace from: SR-DPC-DES-1970

The following diagram shows the underlying messaging and transport stack used by the protocol.

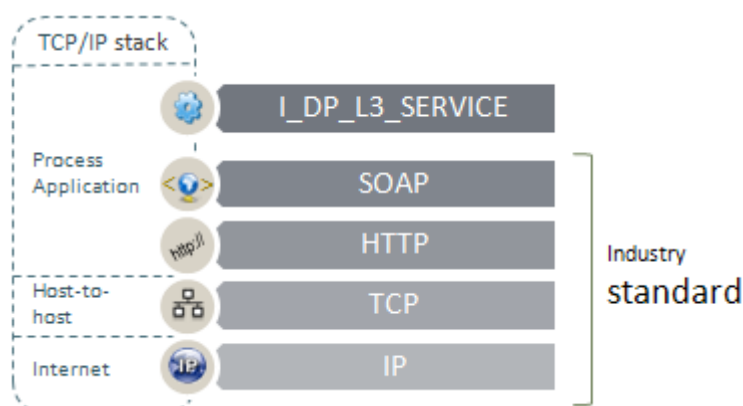


Figure 43 - Protocol stack of the I_DP_L3_SERVICE interface

4.2.24.3. Operations

The interface specifies a single operation that can be invoked by a client.

IFR-I_DP_L3_SERVICE-0560/T

The I_DP_L3_SERVICE must use the literal style for all the published operations.

Trace from: SR-DPC-DES-1970

4.2.24.3.1. “L3Processing” operation

4.2.24.3.1.1. Request message

The operation allows for a client to provide inputs to the L3 Processing component in order to enhance AIS messages by performing an EO correlation activity between positions reported in AIS messages and the VDRs that have been provided.

The following table describes the message exchanged through this operation.

Element	Description	Type
decodedMessages	A reference on a file containing a set of AIS decoded report positions. The type does not constraint the type of the message and the protocol supports AIS messages that are not AIS report positions. They are simply ignored. (msg:SatAISMessageBulkType)	core:reference
vesselsDetectionReports	A reference on a file containing the list of Vessel Detection Reports.	core:reference

According to the general principle of the separation between the control and the data, all the information (payload) is transmitted through files. Those files are referenced in the arguments of the request and shall be resolvable.

4.2.24.3.1.2. Response message

A minimal response is returned containing the process of the id related to the submitted job.



4.2.24.3.1.3. Fault message

4.2.24.3.1.4. Example

The following example shows the submission of decoded AIS messages along with VDRs.

```

1 <soapenv:Envelope
2     xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
3     xmlns:srv="http://iap.esa.int/services/sat-ais/data-processing"
4     xmlns:core="http://iap.esa.int/schemas/sat-ais/core"
5     xmlns:xlink="http://www.w3.org/1999/xlink"
6     xmlns:ais="http://esa.int/XML/SADPC/ctypes">
7   <soapenv:Header/>
8   <soapenv:Body>
9     <srv:L2Processing>
10      <srv:decodedMessages xlink:href="/s-ais-dpc-block2/shared/decoded-
11                                messages-1777ec60-4042-22e1-b86c-
12                                065778952136"/>
13      <srv:vesselsDetectionReport xlink:href="/s-ais-dpc-block2/shared/vdrs-
14                                1777ec60-4042-22e1-b86c-
15                                984523136745"/>
16    </srv:L2Processing>
17  </soapenv:Body>
18 </soapenv:Envelope>

```

4.2.25. I_DP_L3_SUPERVISION

4.2.25.1. Introduction

I_DP_L3_SUPERVISION		Scope	Mode:	Protocol:
		Internal	Synchronous	JMX
implemented by	L3 Processing	used by	MCC	
The interface defines the mean used to manage and monitor the component.				

4.2.25.2. Protocol

The protocol describes the point of contact through which a Supervision tool (actually the MCC instance) can monitor and administrate the component.

The protocol is a widely spread Java technology called JMX - Java Management eXtensions. The underlying protocol used is also a Java technology called RMI - Remote Method Invocation.

IFR-I_DP_L3_SUPERVISION-0570/I

The I_DP_L3_SUPERVISION interface must use the JMX protocol v1.4 as specified in [RD 21].

Trace from:

The following diagram shows the underlying messaging and transport stack used by the protocol.

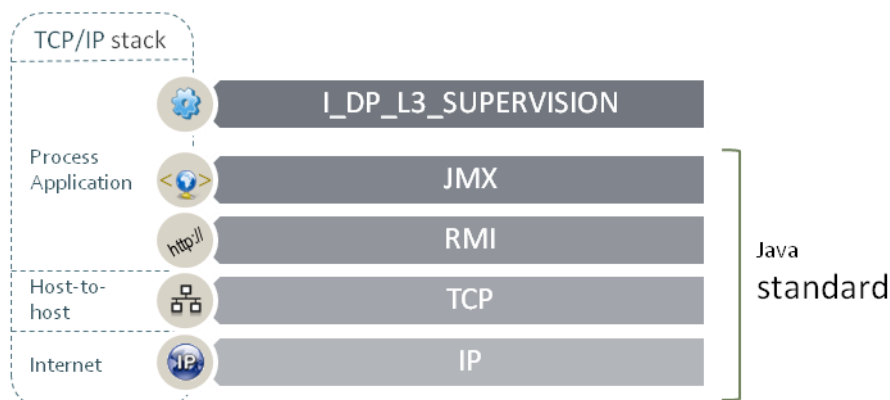


Figure 44 - Protocol stack of the I_DP_L3_SUPERVISION interface

4.2.25.3. Data Model

4.2.26. I_DP_S_AIS_PROVIDER

4.2.26.1. Introduction

5. I_DP_S_AIS_PROVIDER		Scope	Mode:	Protocol:
		Internal, ESB	Asynchronous	HTTP, SOAP, XML
implemented by	BPEL Engine Data Distribution		used by	L1 Processing L2 Processing L3 Processing
The interface defines the contract a component shall respect to be able to receive S-AIS decoded messages coming from the L1, L2, L3 Processing.				

5.1.1. I_DR_CFG

5.1.1.1. Introduction

I_DR_CFG		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		Internal	Synchronous	File System, XML files
implemented by	Data Retrieval	used by	Operator	
The interface defines the entry point of the Data Retrieval sub-system through which the Operator can perform the configuration.				

5.1.1.2. Protocol

The protocol describes the point of contact through which an Operator can configure the component. It is a very basic interface that equates to the File System with files as information carrier.

**IFR-I_DR_CFG-0580/I**

The I_DR_CFG interface must use files living on the local file system to carry configuration information.

Trace from:

5.1.1.3. Data Model

The information, that describes configuration items, is structured into an XML file compliant with an XSD Schema according to [Error! Reference source not found.] and [Error! Reference source not found.].

IFR-I_DR_CFG-0590/I

The I_DR_CFG interface must rely on an XML dialect validated by a XSD Schema.

Trace from:

SR-DPC-DES-2030

SR-DPC-DES-1960

5.1.2. I_DR_PROVIDER**5.1.2.1. Introduction**

I_DR_PROVIDER		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		Internal, ESB	Asynchronous	HTTP, SOAP, XML
implemented by	BPEL Engine Data Distribution	used by	Data Retrieval	
The interface defines the contract a data consumer shall respect to be able to receive data from the Data Retrieval subsystem.				
The protocol is a push oriented protocol where the information travels from the publisher to the recipient in a one way, without the need for the recipient to explicitly ask for.				

5.1.2.2. Relationship to other protocols

This protocol uses industry standard protocols.

IFR-I_DR_PROVIDER-0600/T

The I_DR_PROVIDER interface must establish a conversation between a client and a server performed over HTTP version 1.1 as described in [RD 3].

Trace from:

SR-DPC-IFR-0080

SR-DPC-DES-1970

IFR-I_DR_PROVIDER-0610/T

The I_DR_PROVIDER interface must use the SOAP messaging protocol v1.1 and v1.2 for formatting requests and responses as specified in [RD 4] and [RD 5] ;

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

**IFR-I_DR_PROVIDER -0620/T**

The I_DR_PROVIDER interface must use the Document style binding.

Trace from: SR-DPC-DES-1970

The following diagram shows the underlying messaging and transport stack used by the protocol.

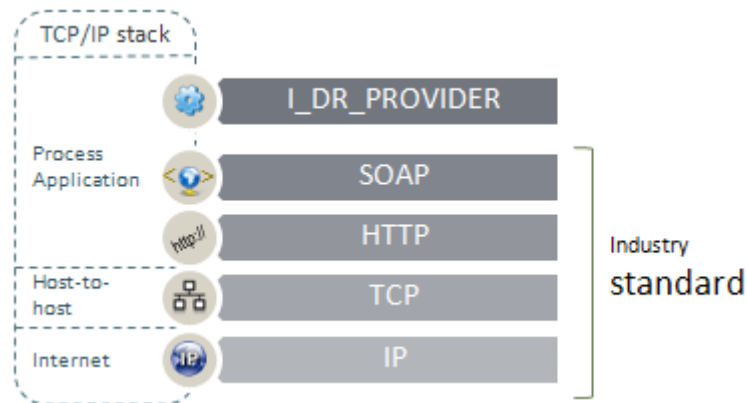


Figure 45 - Protocol stack of the I_DR_PROVIDER interface

5.1.2.3. Operations

The interface specifies a single operation that can be invoked by a client.

IFR-I_DR_PROVIDER-0630/T

The I_DR_PROVIDER must use the literal style for all the published operations.

Trace from: SR-DPC-DES-1970

5.1.2.3.1. “push” operation

5.1.2.3.1.1. Messages

The push operation allows for a client to “push” new data to the server.

The following table describes the message exchanged through this operation.

name	way	message type	Multiplicity
push	input argument	dpc:responseType	One (required)
	A response containing the list of resources (dpc:resourceBulkType) that have been retrieved.		
	output		
	No result is expected.		

The push message contains the list of resources being pushed. The message structure is a `dpc:resourceBulk` container that contains the set of `dpc:resource` describing the resources being pushed.

For each resource, the following information is carried:

- A UUID attribute uniquely identifying the resource;
- A reference attribute holding the resource location in the DPC Block2 System;
- A traceability element describing the process that produces the resource;



- The name of the publisher;
- The identifier of the source with the protocol;
- The creation date of the resource;
- The mime-type of the resource;
- The size of the resource.

The client must not expect to have resources of the same mime-type in a response.

5.1.2.3.1.2. Example

The following example shows the pushing of a bulk of resources. The scenario is initiated by the server itself.

The response contains two resources:

- A file containing S-AIS messages coming from the Exact Earth provider through the provided FTP server.
- A file containing EO data published by CLS retrieved from the HTTP protocol.

```

1 <soapenv:Envelope
2   xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
3   xmlns:srv="http://iap.esa.int/services/sat-ais/data-retrieval"
4   xmlns:core="http://iap.esa.int/schemas/sat-ais/core"
5   xmlns:dpc="http://iap.esa.int/schemas/sat-ais/dpc"
6   xmlns:xlink="http://www.w3.org/1999/xlink">
7   <soapenv:Header/>
8   <soapenv:Body>
9     <srv:push
10      core:uuid="alafdac0-40f4-11e1-b86c-0800200c9a66"
11      core:processId="0d9bd790-615f-11e1-b86c-0800200c9a66"
12      core:timestamp="2011-10-26T21:32:52+02:00"
13      core:sequenceNumber="0"
14      core:lastResponse="true">
15     <dpc:resourceBulk>
16       <dpc:resource
17         core:uuid="uuid:1777ec60-4042-11e1-b86c-0800200c9a66"
18         xlink:href="http://s-ais-dpc.eu/incoming/ais/eee-ftp-20010731010010.
19           nm4">
20         <core:traceability>
21           <core:processId>0d9bd790-615f-11e1-b86c-0800200c9a66</core:processId>
22           <core:timestamp>2011-10-26T21:32:52+02:00</core:timestamp>
23           <core:upstream/>
24         </core:traceability>
25         <dpc:publisher>exactEarth</dpc:publisher>
26         <dpc:source>ftp://exact-earth.com/data/ais/200107310100110.nm4</dpc:source>
27         <dpc:creationDate>2011-07-31T01:00:10-05:00</dpc:creationDate>
28         <dpc:format>application/x-ais</dpc:format>
29         <dpc:size>14612645</dpc:size>
30       </dpc:resource>
31     </dpc:resourceBulk>
32     <dpc:resource
33       core:uuid="uuid:1777ec60-4042-11e1-b86c-0800201c9a67"
34       xlink:href="http://s-ais-dpc.
35         eu/incoming/eo/17761_ASA_WSM_1PXCLS20120126_103733_00000177X0
36         00_00000_51818_5512_EOP.tgz">
37       <core:traceability>
38         <core:processId>0d9bd790-615f-11e1-b86c-0800200c9a66</core:processId>
39         <core:timestamp>2011-10-26T21:32:52+02:00</core:timestamp>
40         <core:upstream/>
41       </core:traceability>
42       <dpc:publisher>CLS</dpc:publisher>
43       <dpc:source>ftp://xxxx</dpc:source>
44       <dpc:creationDate>2011-09-17T10:44:48.363598Z</dpc:creationDate>
45       <dpc:format>application/x-gzip</dpc:format>
46       <dpc:size>1466545672645</dpc:size>
47     </dpc:resource>
48   </dpc:resourceBulk>
49   </srv:receive>
50 </soapenv:Body>
51 </soapenv:Envelope>

```



5.1.3. I_DR_SUPERVISION

5.1.3.1. Introduction

I_DR_SUPERVISION		Scope	Mode:	Protocol:
		Internal	Synchronous	JMX
implemented by	Data Retrieval		used by	MCC
The interface defines the mean used to manage and monitor the component.				

5.1.3.2. Protocol

The protocol describes the point of contact through which a Supervision tool (actually the MCC instance) can monitor and administrate the component.

The protocol is a widely spread Java technology called JMX - Java Management eXtensions. The underlying protocol used is also a Java technology called RMI - Remote Method Invocation.

IFR-I_DR_SUPERVISION-0640/I

The I_DR_SUPERVISION interface must use the JMX protocol v1.4 as specified in [RD 21].

Trace from:

The following diagram shows the underlying messaging and transport stack used by the protocol.

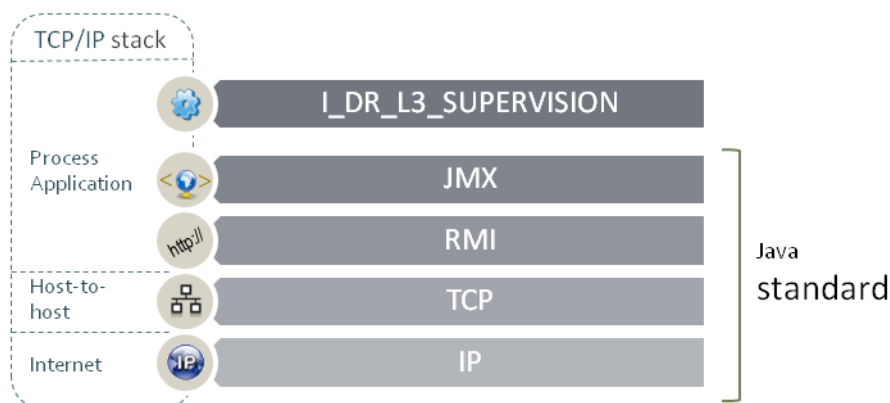


Figure 46 - Protocol stack of the I_DR_SUPERVISION interface

5.1.3.3. Data Model

5.1.4. I_DS_SHIPPRED_CFG

5.1.4.1. Introduction

I_DS_SHIPPRED_CFG		Scope	Mode:	Protocol:
		Internal	Synchronous	File System, XML files
implemented by	Ship Prediction		used by	Operator



The interface defines the entry point of the Ship Prediction component through which the Operator can perform the configuration.

5.1.4.2. Protocol

The protocol describes the point of contact through which an Operator can configure the component. It is a very basic interface that equates to the File System with files as information carrier.

IFR-I_DS_SHIPPRED_CFG-0650/I

The I_DS_SHIPPRED_CFG interface must use files living on the local file system to carry configuration information.

Trace from:

5.1.4.3. Data Model

The information, that describes configuration items, is structured into an XML file compliant with an XSD Schema according to [Error! Reference source not found.] and [Error! Reference source not found.].

IFR-I_DS_SHIPPRED_CFG-0660/I

The I_DS_SHIPPRED_CFG interface must rely on an XML dialect validated by a XSD Schema.

Trace from:

SR-DPC-DES-2030

SR-DPC-DES-1960

5.1.5. I_DS_SHIPPRED_SERVICE

5.1.5.1. Introduction

I_DS_SHIPPRED_SERVICE	<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
	Internal, ESB	Synchronous	HTTP, SOAP, XML
implemented by	Ship Prediction	used by	BPEL Engine
The interface defines the contract the Ship Prediction component shall respect to provide the Ship Prediction computation capability to the System.			

5.1.5.2. Relationship to other protocols

This protocol uses industry standard protocols.

IFR-I_DS_SHIPPRED_SERVICE-0670/T

The I_DS_SHIPPRED_SERVICE interface must establish a conversation between a client and a server performed over HTTP version 1.1 as described in [RD 3].

Trace from:

SR-DPC-DES-2040



SR-DPC-IFR-0080
SR-DPC-DES-1970

IFR-I_DS_SHIPPRED_SERVICE-0680/T

The I_DS_SHIPPRED_SERVICE interface must use the SOAP messaging protocol v1.1 and v1.2 for formatting requests and responses as specified in [RD 4] and [RD 5] ;

Trace from:

SR-DPC-DES-2040
SR-DPC-DES-1970

IFR-I_DS_SHIPPRED_SERVICE-0690/T

The I_DS_SHIPPRED_SERVICE interface must use the Document style binding.

Trace from:

SR-DPC-DES-1970

The following diagram shows the underlying messaging and transport stack used by the protocol.



Figure 47 - Protocol stack of the I_DS_SHIPPRED_SERVICE interface

5.1.5.3. Operations

The interface specifies one operation that can be invoked by a client.

IFR-I_DS_SHIPPRED_SERVICE-0700/T

The I_DP_DOPPLER_SERVICE must use the literal style for all the published operations.

Trace from: SR-DPC-DES-1970

5.1.5.3.1. “computeShipRoutes” operation

The operation allows for a client to provide inputs for the computation of the ship routes. The operation follows the request/response paradigm, as shown in the following sequence diagram.

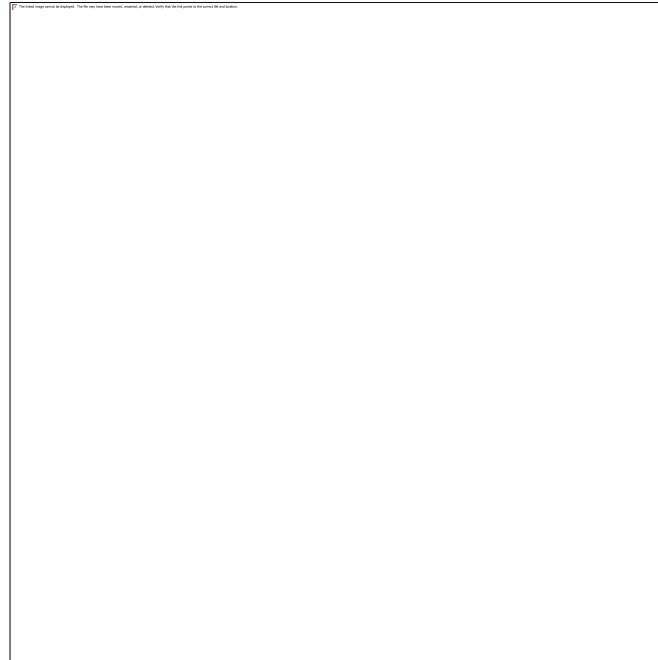


Figure 48 - Sequence diagram for the ship routes computation

5.1.5.3.1.1. Request message

The following table describes the message exchanged through this operation.

Element	Description	Type
shipPositions	A reference on a file containing the position, time, speed, heading and port of call of a set of ships. (dpc:mobilePositionBulkType)	core:reference
duration	The duration time limiting the time horizon of each computed route.	xsd:duration

According to the general principle of the separation between the control and the data, all the information (payload) is transmitted through files. Those files are referenced in the arguments of the request and shall be resolvable.

5.1.5.3.1.2. Response message

The following table describes the message exchanged through this operation.

Element	Description	Type
routes	A reference on a file containing the computed route for each ship. The route contains the list of predicted positions along with timestamp, speed, and heading. (dpc:mobileRouteBulkType)	core:reference



According to the general principle of the separation between the control and the data, all the information (payload) is transmitted through files. Those files are referenced in the arguments of the request and shall be resolvable.

5.1.5.3.1.3. Fault message

5.1.5.3.1.4. Example

The following example shows the submission of ship positions for which the route must be computed for an horizon of 15 hours.

```

1 <soapenv:Envelope
2     xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
3     xmlns:srv="http://iap.esa.int/services/sat-ais/data-processing"
4     xmlns:core="http://iap.esa.int/schemas/sat-ais/core"
5     xmlns:xlink="http://www.w3.org/1999/xlink">
6   <soapenv:Header/>
7   <soapenv:Body>
8     <srv:computeShipRoutes>
9       <srv:routes xlink:href="/s-ais-dpc-block2/shared/ship-positions-1777ec60-
10         4042-22e1-b86c-987456321459"/>
11       <srv:duration>PT15H</srv:duration>
12     </srv:computeShipRoutes>
13   </soapenv:Body>
14 </soapenv:Envelope>

```

The following example shows the obtained routes.

```

1 <soapenv:Envelope
2     xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
3     xmlns:srv="http://iap.esa.int/services/sat-ais/data-processing"
4     xmlns:core="http://iap.esa.int/schemas/sat-ais/core"
5     xmlns:xlink="http://www.w3.org/1999/xlink">
6   <soapenv:Header/>
7   <soapenv:Body>
8     <srv:computeShipRoutes>
9       <srv:routes xlink:href="/s-ais-dpc-block2/shared/ship-routes-1777ec60-
10         4042-22e1-b86c-987456145368"/>
11     </srv:computeShipRoutes>
12   </soapenv:Body>
13 </soapenv:Envelope>

```

5.1.6. I_DS_SHIPPRED_SUPERVISION

5.1.6.1. Introduction

I_DS_SHIPPRED_SUPERVISION		Scope	Mode:	Protocol:
		Internal	Synchronous	JMX
implemented by	Ship Prediction		used by	MCC
The interface defines the mean used to manage and monitor the component.				

5.1.6.2. Protocol

The protocol describes the point of contact through which a Supervision tool (actually the MCC instance) can monitor and administrate the component.



The protocol is a widely spread Java technology called JMX - Java Management eXtensions. The underlying protocol used is also a Java technology called RMI - Remote Method Invocation.

IFR-I_DS_SHIPPRED_SUPERVISION-0710/I

The I_DS_SHIPPRED_SUPERVISION interface must use the JMX protocol v1.4 as specified in [RD 21].
Trace from:

The following diagram shows the underlying messaging and transport stack used by the protocol.

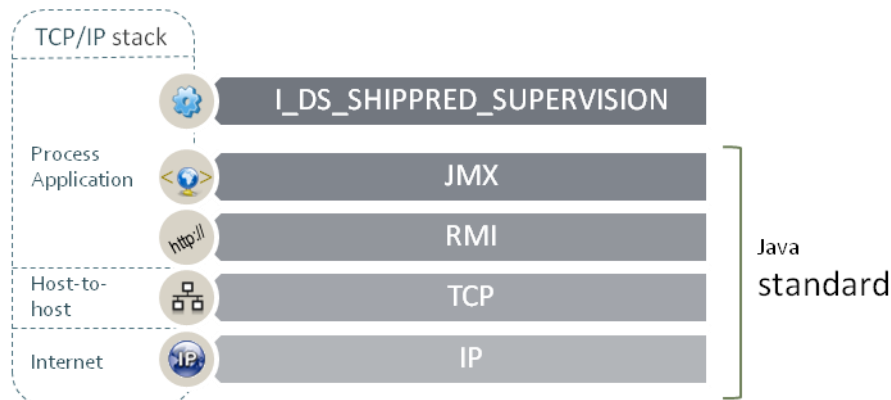


Figure 49 - Protocol stack of the I_DS_SHIPPRED_SUPERVISION interface

5.1.6.3. Data Model

5.1.7. I_DS_SIMULATION_CFG

5.1.7.1. Introduction

I_DS_SIMULATION_CFG		Scope	Mode:	Protocol:
		Internal	Synchronous	File System, XML files
implemented by	S-AIS Data Simulation Service		used by	Operator
The interface defines the entry point of the S-AIS Data Simulation Service component through which the Operator can perform the configuration.				

5.1.7.2. Protocol

The protocol describes the point of contact through which an Operator can configure the component. It is a very basic interface that equates to the File System with files as information carrier.

IFR-I_DS_SIMULATION_CFG-0720/I

The I_DS_SIMULATION_CFG interface must use files living on the local file system to carry configuration information.

Trace from:



5.1.7.3. Data Model

The information, that describes configuration items, is structured into an XML file compliant with an XSD Schema according to [Error! Reference source not found.] and [Error! Reference source not found.].

IFR-I_DS_SIMULATION_CFG-0730/I

The I_DS_SIMULATION_CFG interface must rely on an XML dialect validated by a XSD Schema.

Trace from:

SR-DPC-DES-2030

SR-DPC-DES-1960

5.1.8. I_DS_SIMULATION_SERVICE

5.1.8.1. Introduction

I_DS_SIMULATION_SERVICE		Scope	Mode:	Protocol:
		Internal, ESB	Asynchronous Synchronous	HTTP, SOAP, XML
implemented by	S-AIS Data Simulation Service		used by	BPEL Engine Data Distribution
The interface defines the contract the S-AIS Data Simulation Service component shall respect to provide the simulation capability to the System.				

5.1.9. I_DS_SIMULATION_SUPERVISION

5.1.9.1. Introduction

I_DS_SIMULATION_SUPERVISION		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		Internal	Synchronous	JMX
implemented by	S-AIS Data Simulation Service		used by	MCC
The interface defines the mean used to manage and monitor the component.				

5.1.9.2. Protocol

The protocol describes the point of contact through which a Supervision tool (actually the MCC instance) can monitor and administrate the component.

The protocol is a widely spread Java technology called JMX - Java Management eXtensions. The underlying protocol used is also a Java technology called RMI - Remote Method Invocation.

IFR-I_DS_SIMULATION_SUPERVISION-0740/I

The I_DS_SIMULATION_SUPERVISION interface must use the JMX protocol v1.4 as specified in [RD 21].

Trace from:



The following diagram shows the underlying messaging and transport stack used by the protocol.

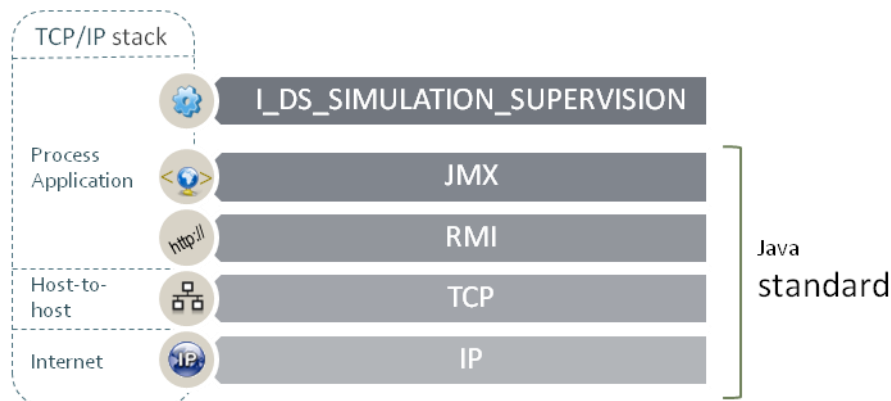


Figure 50 - Protocol stack of the I_DS_SIMULATION_SUPERVISION interface

5.1.9.3. Data Model

5.1.10. I_DS_SIMULATOR_PARAM&CFG

5.1.10.1. Introduction

6. I_DS_SIMULATOR_PARAM&CFG		Scope	Mode:	Protocol:
		Internal	Synchronous	File system, XML files
implemented by	S-AIS Data Simulator			used by S-AIS Data Simulation Service
The interface defines the entry point of the S-AIS Data Simulator component through which the configuration of the Simulator instances can be achieved.				

The Simulator shall simulate a Satellite-AIS environment easily modifiable by several parameters files centralized in one Main parameter file.

The Main Parameter file is a XML file.

The XML main parameters file is completed by data files:

- Antenna gain files (several per simulation)
- TLE file (several per simulation)
- IERS file (one per simulation)
- Auxiliary file (one per simulation)
- Geoids file (one per simulation)
- Atmospheric activity file (one per simulation)
- Detection table (one per simulation)
- Detection map (one per simulation)
- Virtual fleet map (one per simulation)
- Real fleet (one per simulation)
- Downlink schedules files (one per satellite)



6.1.1.1. Configuration parameters

The XML file contains the following elements:

1. Header
2. Simulation management parameters
3. Monitoring parameters
4. Common parameters
5. Fleets parameters
6. Link budget parameters
7. Signal detection parameters
8. Provider parameters

These sections are described in the following paragraphs.

6.1.1.1.1. Header

The header contains:

- The 'name' of the simulation, that will be re-used in the name of all outputs
- The UTC beginning date of the simulation, in Year/Month/Day/Hour/Minute/Second format
- The 'author' of the parameter file, only for save and archive (not used in the simulation)
- The 'reference' of the parameter file, only for save and archive (not used in the simulation)

6.1.1.1.2. Simulation management parameters

The Simulation management parameters contain:

- The number of successive fixed period processing : 0 to N, with 0 meaning infinite
- The processing speed: Choice between 3 options with their own characteristics:
 - Full-speed (no option)
 - Accelerated-speed, with in parameter:
 - the acceleration factor (between 1 and 30)
 - the "break when late" parameter to decide if the Simulator shall break when it is late
 - Real-time speed, with in parameter:
 - the "break when late" parameter to decide if the Simulator shall break when it is late
- Outputs configuration
 - The path of the directory in which the AIS messages files will be generated
 - The path of the directory in which the statistics files will be generated
 - The path of the directory in which the satellites positions files will be generated
 - The path of the directory in which the satellites downlink schedules files will be generated
 - The path of the directory in which the ground stations downlink schedules files will be generated



- The path of the directory in which the ships downlink schedules files will be generated

6.1.1.1.3. Monitoring

The monitoring parameters are made up of :

- alarms parameters :
 - path of the CAP output file which will contain CAP alarms (Warning manager, Interface 3)

6.1.1.1.4. Common

The common parameters are :

- Geoids input file path :
 - The geoids table shall be a CSV text file containing $180 \times 360 = 64800$ lines which provide :
 - The latitude in degree, from -89° to 90°
 - The longitude in degree, from -179° to 180°
 - The sea altitude at the given position
 - The lines are sorted by ascending latitude, and inside that sort by ascending longitude.

Here is small part of the content of the geoids file :

```
-89,-179,8788.22
-89,-178,8789.22
-89,-177,8790.22
-89,-176,8791.22
```

- Auxiliary data input file path :
 - The Simulator shall use the Auxiliary file to get the unavailability events of the satellites and ground stations of a provider. This file has a CSV (Comma Separated VALUES file) format. Each unavailability is characterized by type of the element ('SAT' for Satellite or 'GS' for Ground Station), the ID of the element, the beginning UTC timestamp in unix epoch time (number of seconds since 01/01/1970 00h00m00s) and the duration in seconds. No other element that a full availability or a full unavailability is taken into account. The auxiliary file may cover several days (maximum: 7 days).

Here is an example of an auxiliary data file containing two entries :

```
SAT,SAT1,1332856123,600
GS,GS6,1332254665,86400
```

- IERS input file path :
 - The Simulator shall use the IERS Bulletin A file to get the Earth rotation parameters necessary for conversion to J2000. The format is described in introduction of the Bulletin A (<http://data.iers.org/products/6/14885/orig/bulletina-xxiv-052.txt>). The Simulator is not be in charge of the retrieval of the IERS Bulletin A, but shall read it, parse it, and use it for J2000 orbit conversion.
 - The SAT-AIS simulator uses a COTS named Orekit. The IERS file path shall be a directory path. The given directory shall contain :



- The "UTC-TAI.history" file containing the leap second information. It can be update if necessary and can be found at <http://hpiers.obspm.fr/eoppc/bul/bulc/UTC-TAI.history>
- The "DE-406-ephemerides" directory which shall contain :
 - The "unxp1962.406" file (which doesn't need any update)
- The "Potential" directory which shall contain :
 - The "eigen-5c.gfc" file (which doesn't need any update)
- The "Earth-Orientation-Parameters" directory which shall contain :
 - The "IAU-2000" directory which shall contain :
 - The "finals2000A.all.xml" file containing the earth rotation parameters. It has to be updated if necessary and can be found at http://www.iers.org/nn_11252/SharedDocs/MetaDaten/1379__FINALS__ALL__IAU2000.html

6.1.1.1.5. Fleets configuration

The fleets configuration is made up of the real fleet configuration and the virtual fleet configuration. This configuration also contains the following parameters common to the real and the virtual vessels:

- Amplitude of the day/night transmission frequency variation (in Hz): amplitude of the transmitted frequency variation according to the day/night periods.
- SOTDMA model activation: flag used in order to disable the SOTDMA model simulation which can be very time consuming.

6.1.1.1.5.1. Real fleet configuration

The real fleet configuration is made up of :

- The real fleet input file path :
 - In CSV format
 - Each line provides the following information :
 - The MMSI of the vessel
 - The vessel transmitting flag on AIS1 and AIS2 : true or false
 - The vessel transmitting flag on AIS3 and AIS4 : true or false
 - The frequency error (in Hz) : the emission frequency error of the vessel (relative to the main emission frequency)
 - The delay error : in milliseconds
 - The transmission class : class A or B
 - The transmission period, in slots :
 - 75, 125, 225, 375 or 6750 for class A
 - 188, 562, 1125 or 6750 for class B
 - The proportion of static reports (message 5) in the transmission flow : between 0 and 1 (for class A only)
 - The longitude bias in degrees
 - The longitude error in degrees



- The latitude bias in degrees
- The latitude error in degrees
- For each point describing the route of the vessel :
 - The longitude (between -180° and +180°)
 - The latitude (between -90° and +90°)
 - The heading : angle between North and 0° azimuth of the antenna pattern, in degrees (only for message filling)
 - The speed (in knots) : used to propagate the positions of the vessels
 - The UTC timestamp of the point in unix epoch time (number of seconds since 01/01/1970 00h00h00s)
 - **NOTE : the route shall be at least made up of one point**
- The DETECTION delimiter : DET : appears only if there is following detection data
- For each satellite which has detected the vessel :
 - The satellite id
 - The UTC detection timestamp in unix epoch time (number of seconds since 01/01/1970 00h00h00s)

Here is small part of the content of the virtual fleet file :

```
226000000,true,true,500,1,A,75,0.25,,0.1,0.2,0.3,0.4,-
123.54,45.67,32.23,5.33,1332856123,DET,SAT1,1332822321,SAT12,1332823521

226000001,true,false,225,0,B,188,0,0.1,0.2,0.3,0.4,-90.32,73.18,12.3,4.13,1332842132,-
91.32,74.18,12.3,4.13,1332845012,DET,SAT3,1332822321

226000002,true,false,112,0,A,125,0,1,0.1,0.2,0.3,0.4,-75.32,-13.12,23.13,6.23,1332861231,-74.32,-13.12,12.3,4.13,1332848645
```

6.1.1.1.5.2. Virtual fleet configuration

The virtual fleet configuration is made up of :

- The proportion of static reports (message 5) for class A vessels (between 0.0 and 1.0). The proportion for real vessels is given in the real fleet configuration file for each real vessel
- The proportion of class A vessels which emit on AIS3 and AIS4 frequencies
- The virtual fleet input file path :
 - The virtual fleet map shall be a text file containing 180 x 360 = 64800 lines which provide :
 - The latitude in degree, from -89° to 90°
 - The longitude in degree, from -179° to 180°
 - The number of class A ships with 2s transmission period at this position
 - The number of class A ships with 3.33s transmission period at this position
 - The number of class A ships with 6s transmission period at this position
 - The number of class A ships with 10s transmission period at this position
 - The number of class A ships with 3min transmission period at this position
 - The number of class B ships with 5s transmission period at this position
 - The number of class B ships with 15s transmission period at this position
 - The number of class B ships with 30s transmission period at this position



- The number of class B ships with 3min transmission period at this position
- Note : The lines are sorted by ascending latitude, and inside that sort by ascending longitude.

Here is small part of the content of the virtual fleet file:

```
-89,-179,1,1,0,0,0,1,0,0,0
-89,-178,1,1,0,0,0,1,3,0,0
-89,-177,1,1,0,0,0,1,0,0,0
-89,-176,1,1,0,0,0,1,0,22,0
-89,-175,1,1,0,0,0,1,0,0,0
-89,-174,1,1,0,0,0,1,0,0,0
-89,-173,1,1,0,12,0,1,0,0,0
-89,-172,1,1,0,0,3,1,0,0,0
```

6.1.1.1.5.3. Attitude of the vessels

The fleets configuration also contains the attitude parameters which are applied to all the vessels. These parameters are:

- roll amplitude : maximum roll amplitude of the ships, in degrees
- roll period : maximum roll pulse of the ships, in rad/s
- pitch amplitude : maximum pitch amplitude of the ships, in degrees

pitch period : maximum pitch pulse of the ships, in rad/s

6.1.1.1.6. Link budget parameters

The link budget parameters contain the following information :

- antenna gain files paths, each file has the following characteristics :
 - text file in CSV format
 - one Antenna gain file per antenna
 - a unique identifier (number) is given for each file. This identifier is then used in the configuration file to associate an antenna with its antenna gain file
 - An antenna gain file shall contain $90 \times 360 = 32400$ lines which provide :
 - The aperture in degree, from 1° to 90° (nadir/zenith is at 0°)
 - The azimuth in degree, from 1° to 360°
 - The gain in dBi
 - Note : The lines are sorted by ascending aperture, and inside that sort by ascending azimuth.

Here is small part of the content of an antenna gain file :

```
10,100,12.35
10,101,11.35
```

- atmospheric activity input file path, this file has the following characteristics :
 - text file in CSV format
 - The atmospheric activity table shall contain $180 \times 360 = 64800$ lines which provide :
 - The latitude in degree, from -89° to 90°
 - The longitude in degree, from -179° to 180°
 - The noise increase over the noise floor, in dB



- The density of electrons at the given position, in electrons/m³
- The S4 for ionosphere scintillation parameter (between 0.3 and 1 by 0.1 steps)
- Note : the lines are sorted by ascending latitude, and inside that sort by ascending longitude.

Here is small part of the content of an atmospheric table configuration file :

```
-12,85,1.12,2.32,2.66
-12,86,1.24,5.45,12.22
```

- link budget parameters for the AIS1 and AIS2 frequencies :
 - The “Various” losses, value in dB
 - The Ionosphere losses model : constant losses (in dB) or scintillation model
 - Ionosphere losses, value in dB, only useful in ionosphere constant losses model
 - Faraday effect activation : Boolean to (de)activate the faraday effect
 - The noise floor : in dBm/Hz
 - The receiver noise : in dB
 - The amplitude of link budget random dispersion, in dB. Shall be greater than or equal to 0.0. The noise/gain will be randomly drawn in the range [-amplitude, +amplitude]
- link budget parameters for AIS3 and AIS4 frequencies :
 - the same configuration parameters as for the AIS1 and AIS2 frequencies

6.1.1.1.7. Signal detection parameters

This parameters allow to configure the computations which will be done during signal processing.

This configuration is made up of :

- Detection probabilities reset threshold : a detection probability will be reset only if the detection timestamp doesn't exceed this threshold (in minute)
- Detection probability alarm threshold : a CAP alarm message if a detection probability exceeds this threshold
- Type 2 collisions parameters :
 - Type 2 collisions time threshold from previous slot : in milliseconds
 - Type 2 collisions time threshold from next slot with CRC overlap : in milliseconds
 - Type 2 collisions time threshold from next slot without CRC overlap : in milliseconds
- Virtual vessels detection flag: indicates whether the virtual vessels signals have to be detected. If not, the AIS messages of these vessels are not generated. In all cases these signals are generated (except if this flag is set to false and the position-based model has been selected).
- Minimum power threshold : in dBm which allows to detect only signals which power is greater than this threshold
- Processing model :
 - trivial detection model, position-based detection model, extrapolation model or signal processing detection model



- Parameters of trivial detection model:
 - Maximum number of simultaneously received signals
 - Detection probability
 - SigmaF : standard deviation of Doppler measurement
- Parameters of signal processing model:
 - The detection table configuration file path. The detection table is a CSV text file with 171 lines providing :
 - The Eb/N0, in dB, from -2 dB to 15 dB by 0.1 dB steps
 - The BER for AIS messages which length is 96 bits
 - The BER for AIS messages which length is 168 bits
 - The BER for AIS messages which length is 424 bits
 - The PER for AIS messages which length is 96 bits
 - The PER for AIS messages which length is 168 bits
 - The PER for AIS messages which length is 424 bits
 - The PER for the CRC

Here is small part of the content of a detection table configuration file:

```
-2.0,1.31E-01,1.31E-01,4.29E-01,6.10E-11,1.46E-06,7.56E-104,1.06E-01
-1.9,1.28E-01,1.28E-01,4.22E-01,1.03E-10,1.97E-06,1.58E-101,1.12E-01
-1.8,1.25E-01,1.25E-01,4.14E-01,1.75E-10,2.66E-06,3.17E-99,1.18E-01
-1.7,1.22E-01,1.22E-01,4.07E-01,2.95E-10,3.58E-06,6.15E-97,1.24E-01
-1.6,1.20E-01,1.20E-01,4.00E-01,4.95E-10,4.82E-06,1.15E-94,1.30E-01
-1.5,1.17E-01,1.17E-01,3.92E-01,8.28E-10,6.46E-06,2.07E-92,1.36E-01
```

- Signal processing model: single channel processing or beamforming processing
- Single channel processing configuration parameters :
 - Polygonal parameters for spectral filtering capacity : two values
 - Useful noise bandwidth : in dB
 - kF : performance factor of Doppler measurement
 - Minimum deviation of the Doppler measurement in Hz
- beamforming processing parameters :
 - Useful noise bandwidth : in dB
 - kF : performance factor of Doppler measurement
 - Minimum deviation of the Doppler measurement in Hz
- Parameters of the position-based detection model:
 - The detection map configuration file path. The detection table is a CSV text file with $180 \times 360 = 64800$ lines which provide :
 - The latitude in degree, from -89° to 90°
 - The longitude in degree, from -179° to 180°
 - The detection probability of class A ships with 2s transmission period at this position



- The detection probability of class A ships with 3.33s transmission period at this position
- The detection probability of class A ships with 6s transmission period at this position
- The detection probability of class A ships with 10s transmission period at this position
- The detection probability of class A ships with 3min transmission period at this position
- The detection probability of class B ships with 5s transmission period at this position
- The detection probability of class B ships with 15s transmission period at this position
- The detection probability of class B ships with 30s transmission period at this position
- The detection probability of class B ships with 3min transmission period at this position
- Note: The lines are sorted by ascending latitude, and inside that sort by ascending longitude.

Here is small part of the content of a detection map configuration file:

```
-90,-
177,0.15765645645,0.25763645645,0.35765645645,0.45765645645,0.55765645645,0.65765645645,0.75765645645,0.85765
645645,0.95765645645
-90,-
174,0.15765645645,0.25763645645,0.35765645645,0.45765645645,0.55765645645,0.65765645645,0.75765645645,0.85765
645645,0.95765645645
-90,-
171,0.15765645645,0.25763645645,0.35765645645,0.45765645645,0.55765645645,0.65765645645,0.75765645645,0.85765
645645,0.95765645645
...
-
90,177,0.15765645645,0.25763645645,0.35765645645,0.45765645645,0.55765645645,0.65765645645,0.75765645645,0.85
765645645,0.95765645645
-
90,180,0.15765645645,0.25763645645,0.35765645645,0.45765645645,0.55765645645,0.65765645645,0.75765645645,0.85
765645645,0.95765645645
-
87,180,0.15765645645,0.25763645645,0.35765645645,0.45765645645,0.55765645645,0.65765645645,0.75765645645,0.85
765645645,0.95765645645
```

- **SigmaF:** standard deviation of Doppler measurement
- **Parameters of the extrapolation detection model (ESA model) :**
 - **Maximum number of simultaneously received signals**
 - **SigmaF:** standard deviation of Doppler measurement
 - **The extrapolation detection model configuration file path.** This file contains the following information :
 - The latitude in degree, from -90° to 90° with a 3 degrees step
 - The longitude in degree, from -177° to 180° with a 3 degrees step
 - From column 2 to column NumberMaxInterfering + 2 : detection probability according to the number of simultaneously received signals
 - Note: The lines are sorted by ascending latitude, and inside that sort by ascending longitude. An example is given below.

Here is small part of the content of a detection map configuration file:



```
-89,-
179,0.15765645645,0.25763645645,0.35765645645,0.45765645645,0.55765645645,0.65765645645,0.75765645645,0.85765
645645,0.95765645645
-89,-
178,0.15765645645,0.25763645645,0.35765645645,0.45765645645,0.55765645645,0.65765645645,0.75765645645,0.85765
645645,0.95765645645
```

6.1.1.1.8. Provider configuration

The provider configuration is made up of a constellation configuration and a ground network configuration.

6.1.1.1.8.1. Constellation configuration

The constellation describes the satellites (maximum 24) configuration. Each satellite is configurable according the following parameters :

- The satellite ID (unique string identifier)
- The TLE (two-lines elements) file path associated with the satellite. The Simulator shall use the TLE file to get the orbital parameters of the satellite necessary for its position prediction. The format may be for instance found at http://spaceflight.nasa.gov/realdata/sightings/SSapplications/Post/JavaSSOP/SSOP_Help/tle_def.html. The Simulator is not be in charge of the retrieval of the TLE, but shall read it, parse it, and use it for orbit propagation.
- The downlink schedule option :
 - Generated : the SAT-AIS simulator generates the downlink schedule of this satellite
 - ReadFromFile : the SAT-AIS simulator reads the downlink schedule of this satellite from the given input file.
- The geographic filters (maximum : 16) :
 - Each geographic filter can be described as a polygon representing at most 10 corners. Each corner are configured with:
 - Latitude in degrees
 - Longitude in degrees
 - IMPORTANT : The first corner SHALL be equal to the last corner
- The antennas (maximum: 20) configuration parameters
 - Antenna gain ID, referenced among the antenna gain portfolio
 - Antenna position, referenced in the local (X, Y, Z) satellite reference frame
 - Polarization :
 - circular or linear
 - if linear, with the axial ratio and the direction in azimuth/elevation
 - Processed channels: a boolean value for each AIS frequency
- The attitude parameters of the satellite :
 - yaw phase : yaw phase at t = 0 = 1/1/1970 00h00, in degrees
 - yaw drift : yaw drift, in rad/s
 - roll amplitude : roll amplitude of the satellite, in degrees



- roll period : roll pulse of the satellite, in rad/s
- roll phase : roll phase at $t = 0 = 1/1/1970\ 00h00$, in degrees
- pitch amplitude : pitch amplitude of the satellite, in degrees
- pitch period : pitch pulse of the satellite, in rad/s
- pitch phase: pitch phase at $t = 0 = 1/1/1970\ 00h00$, in degrees
- Ground stations visibility parameters :
 - A satellite can be visible either by all the ground stations or by a subset of ground stations (1 at minimum)

6.1.1.1.8.2. *Ground network configuration*

The Ground-network parameters contain:

- The characteristics of each ground station (maximum : 60)
 - The ground-station ID (unique string identifier)
 - The position of the ground station : longitude (in degrees), latitude (in degrees), altitude (in meters)
 - The antenna gain ID, referenced among the antenna gain portfolio
 - The minimum masking angle (in degrees)
 - The minimum visibility duration : minimum duration to consider the downlink as feasible (in seconds). Used only if the SAT-AIS simulator has to generate a downlink schedule.

The time delivery delay : delay in minutes to transfer the data to the Data Processing Centre

6.1.1.2. configuration reading schedule

- All the input files can configured to be read once at the beginning of the simulation or periodically at each fixed period.
- All the output files can enabled or disabled. Here is the detail of the output generation :
 - AIS message flow : If active, produced every fixed period
 - AIS detection statistics : If active, produced every fixed period
 - ETRF satellite orbit : If active, produced every 12 hours for the next 24 hours
 - J2000 satellite orbit : If active, produced every 12 hours for the next 24 hours
 - Satellite downlink schedule : If active, produced every 12 hours for the next 24 hours
 - Ground stations downlink schedule : If active, produced every 12 hours for the next 24 hours
 - Ship downlink schedule : If active, produced every fixed period

6.1.2. I_DS_SIMULATOR_AIS_DETECTION_STATS

6.1.2.1. Introduction

I_DS_SIMULATOR_AIS_DETECTION_STATS

Scope

Mode:

Protocol:



		Internal	Synchronous	File system, XML files
implemented by	S-AIS Data Simulator		used by	S-AIS Data Simulation Service
The interface defines the entry point of the S-AIS Data Simulator component through which the AIS detection statistics and detection warnings are delivered to the DPC Block2 System.				

One file is produced per fixed period, with title:

[currentDate]_[simulationName].stt

The [currentDate] is the fixed period end date in UTC unix epoch time (number of milliseconds since 01/01/1970 00h00m00s)

The [simulationName] is the 'name' given in the Main parameter file header.

This file is a CSV. Each line of this file is made up of :

- The MMSI of the ship
- A preliminary alert index :
 - '0' if no problem (according to threshold and constellation geographic coverage)
 - '1' if detection probability of the ship by one particular satellite is high (according to threshold)
 - '2' if detection probability of the ship by all satellites is high (according to threshold)
- The cumulated detection probability for all satellites
- For each satellite :
 - The satellite id
 - The cumulated detection probability of the satellite

Here is small part of the content of a statistics output file :

```
100450457,0,0.01,SAT2,0.01
100450459,0,0.20,SAT2,0.20
100451459,2,1.24,SAT2,0.10,SAT3,0.20,SAT4,0.94
100452459,0,0.41,SAT3,0.20,SAT4,0.05,SAT5,0.16
100551450,1,0.92,SAT4,0.80,SAT5,0.12
100451457,0,0.31,SAT1,0.31
```

6.1.3. I_DS_SIMULATOR_AIS_MESSAGE_FLOW

6.1.3.1. Introduction

I_DS_SIMULATOR_AIS_MESSAGE_FLOW	<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
	Internal	Synchronous	File system, XML files
implemented by	S-AIS Data Simulator		
used by	S-AIS Data Simulation Service		
The interface defines the entry point of the S-AIS Data Simulator component through which the			



simulated AIS messages are delivered to the DPC Block2 System.

The message flow format shall follow the following formats :

- ITU-R M.1371 for the message content specified by [Error! Reference source not found.]
- IEC 61162-1 for the information coding specified by [Error! Reference source not found.]
- IEC 62320-1 for the header definition specified by [Error! Reference source not found.]

6.1.3.2. File structure

One file is produced per downlink, with title:

[deliveryDate]_[simulationName]_[satelliteID]_[stationID].mes

The [deliveryDate] is the deliveryDate in UTC unix epoch time (number of milliseconds since 01/01/1970 00h00m00s)

The [simulationName] is the 'name' given in the Main parameter file header.

The [satelliteID] is the ID of the downlink satellite.

The [stationID] is the ID of the downlink station.

The file corresponding to a downlink is updated every fixed period.

As only one downlink is associated to a satellite at a given date, only one file per satellite may be updated per fixed period. Once the delivery date is passed, the file will never be updated again.

6.1.3.3. Message content

Five messages among the ones presented in annex 8, section 3 of [RD1] shall be produced by the Simulator :

- Class A dynamic messages for moving ships (emission period < 6750 slots) : message 1
- Class A dynamic messages for moored ships (emission period = 6750 slots) : message 3
- Class B dynamic messages : message 18
- Voyage-related messages : message 5
- AIS 3&4 specific message : message 27

6.1.3.3.1. User ID

The User ID shall be defined by the conversion of the 9 digits MMSI to 30 bits.

For the real ships read from the fleet table, the MMSI shall be kept identical.

For the virtual ships issued from the virtual fleet, the MMSI shall be constructed as 200XXXXXX, with XXXXXX being the ID of the ship in the virtual fleet.

Remark : The value 200 in first digits of the MMSI corresponds to a MID (Maritime Identification Digit) from Europe (meaning of the '2') as the Data Processing Centre is European but the X00 MID are not assigned to any particular country.

6.1.3.3.2. Messages 1 and 3 content : Class A dynamic report

The message 1 and 3 content is given in annex 8, § 3.1 of [RD1]. It represents 168 bits.

The elements shall be filled has follows :



- 6 bits : Message ID = 1 if moving ship, 3 if moored ship
- 2 bits : Repeat ID = 0
- 30 bits : User ID : see above
- 4 bits : Navigational Status = 0 if moving ship, 1 else
- 8 bits : Rate of turn = 0
- 10 bits : SOG = value in the ship parameter field (in 1/10th knots)
- 1 bit : Position accuracy = 0
- 28 bits : Longitude = value in the ship parameter field (in 1/10000th minute)
- 27 bits : Latitude = value in the ship parameter field (in 1/10000th minute)
- 12 bits : COG = heading given in the ship parameter field (in 1/10th degree)
- 9 bits : Heading = value in the ship parameter field (in degree)
- 6 bits : Time stamp = emission second (between 0 and 59)
- 2 bits : Special maneuver indicator = 0
- 3 bits : Spare = 0
- 1 bit : RAIM flag = 0
- 19 bits : Communication state = 0

Example for moving ship MMSI 200000000, longitude 1 degree, latitude 2 degrees, speed 1 knot, heading 10 degrees, transmission second 3:

```
000001 00 001011111010111100001000000000 0000 00000000 0000001010 0 ...
...      0000000010010010011111000000      00000010010010011111000000      000001100100
000001010 ...
... 000011 00 000 0 00000000000000000000
```

6.1.3.3.3. Messages 5 content : Class A static report

The message 5 content is given in annex 8, § 3.3 of [RD1]. It represents 424 bits.

The elements shall be filled has follows :

- 6 bits : Message ID = 5
- 2 bits : Repeat ID = 0
- 30 bits : User ID : see above
- 206 bits : The following (2 + 30 + 42 + 120 + 8 + 30 + 4) = 236 bits are set to 0 (default value)
- 20 bits : ETA = 0b 00000000011000111100
- 129 bits : The following (8 + 120 + 1) = 129 bits are set to 0 (default value)
- 1 bit : Spare = 0

6.1.3.3.4. Messages 18 content : Class B position report

The message 18 content is given in annex 8, § 3.16 of [RD1]. It represents 168 bits.

The elements shall be filled has follows :

- 6 bits : Message ID = 18



2 bits : Repeat ID = 0

30 bits : User ID : see above

8 bits : Spare = 0

10 bits : SOG = value in the ship parameter field (in 1/10th knots)

1 bit : Position accuracy = 0

28 bits : Longitude = value in the ship parameter field (in 1/10000th minute)

27 bits : Latitude = value in the ship parameter field (in 1/10000th minute)

12 bits : COG = heading given in the ship parameter field (in 1/10th degree)

9 bits : Heading = value in the ship parameter field (in degree)

6 bits : Time stamp = emission second

2 bits : Spare = 0

8 bits : Flags = 0b 10000001

19 bits : Communication state = 0b 1100000000000000110

Example for ship MMSI 200000000, longitude 1 degree, latitude 2 degrees, speed 1 knot, heading 10 degrees, transmission second 3:

010010 00 001011111010111100001000000000 00000000 0000001010 0 ...

... 0000000010010010011111000000 00000010010010011111000000 000001100100
000001010 ...

... 000011 00 10000001 1100000000000000110

6.1.3.3.5. Messages 27 content : Position report on AIS 3&4

The message 27 content is given in annex 8, § 3.25 of [RD1]. It represents 96 bits.

The elements shall be filled has follows :

6 bits : Message ID = 27

2 bits : Repeat ID = 3

30 bits User ID : see above

1 bit : Position accuracy = 0

1 bit : RAIM flag = 0

4 bits : Navigational Status = 1 if the ship transmission period is 6750 slots, 0 else

18 bits : Longitude = value in the ship parameter field (in 1/10th minute)

17 bits : Latitude = value in the ship parameter field (in 1/10th minute)

6 bits : SOG = value in the ship parameter field (in knots)

9 bits : COG = heading given in the ship parameter field (in degrees)

1 bit : GNSS Status = 0

1 bit : Spare = 0

Example for moving ship MMSI 200000000, longitude 1 degree, latitude 2 degrees, speed 1 knot, heading 10 degrees:

011011 11 001011111010111100001000000000 0 0 0000 ...

... 000000001001011000 00000010010110000 000001 000001010 0 0



6.1.3.4. Data coding

The messages delivered to the data processing centre shall be written in ASCII and structured as follows :

If it is a message 1, 18 or 27, it is presented on one line as follows :

```
\[header]*[ck1]\\!AIVDM,1,1,,[channel],[data],0*[ck2]
```

If it is a message 5, it is presented on 2 successive lines as follows :

```
\[headerA]*[ck1A]\\!AIVDM,2,1,1,[channel],[dataA],0*[ck2A]
```

```
\[headerB]*[ck1B]\\!AIVDM,2,2,1,[channel],[dataB],2*[ck2B]
```

In the case of message 5, the data are divided in two subsets : one with 360 bits and a second with 64 bits.

The different fields ([data], [checksum], [channel] and [header]) are specified in the following requirements.

6.1.3.4.1. [Data] coding

The data shall be coded by a conversion from binary to ASCII according to the following rules :

Binary data are divided in blocks of 6 bits

If the last block is uncomplete, it is completed by zeros (only for message 5 in the 2nd data block)

Each 6 bits block is converted to ASCII according to table C-1 page 103 of IEC 61162-1 ([RD2])

Remark : The coding stated in [RD2] is not obvious (from 0 to 9, several special characters (but not all), letters from A to W, apostrophe and letters from a to w) and shall then be considered carefully.

6.1.3.4.2. [Checksum] coding

Two checksums shall be calculated per line :

- one for the header on the [header] part
- one for the data field covering all elements between the “!” and the “*” (excluding them)

The checksum is calculated according to the following rules :

Characters are converted to 8 bits by their ASCII code

A XOR is executed between all concerned characters

The 4 MSB and the 4 LSB are separated and converted in hexadecimal

The hexadecimal value are used as characters

6.1.3.4.3. [Channel] coding

The channel shall be:

A if the message has been transmitted on AIS 1 or AIS 3

B if the message has been transmitted on AIS 2 or AIS 4



6.1.3.4.4. [Header] coding

The header shall be divided into several sections beginning all with a letter and a colon, and ended with a comma. The following content shall be defined :

s:[source] : 'name' of the simulation given in the parameters

a:[satellite] : ID of the satellite that has performed the detection

c:[detection date] : detection date in seconds since midnight the 1/1/1970

h:[ground-station] : ID of the ground-station used to downlink the message

d:[downlink date] : date of downlink to the ground station (in seconds since the 1/1/1970)

r:[reception date] : date of delivery to the data processing centre (in seconds since the 1/1/1970)

n:[number of simultaneous processed signals] : the total number of signals (this one included) processed during this message production. This number gives the total number of interfering signals.

i:[information] : information field, in which data are separated by a double underscore __:

 'TOA_' : precise time of arrival within the detection second given after c:, in μ s

 'FOA_' : frequency or arrival with relation to the centre of the channel, in mHz, including the Doppler shift.

 'POA_' : estimated received power in dBm

 'TSPC_' : time of satellite position computation in seconds since the 1/1/1970

q:[quality index] : 1 hexadecimal character to code 4 bits :

 1st bit : '0' if it is a real vessel, '1' if it is a virtual vessel

 2nd bit : '0' if the CRC was correct, '1' if the CRC was false

 following bits : spare

If the message is a message 5 and then divided in 2 lines, the complete header is given on the first line, and only the fields s, a and c are repeated in the header of the second line.

6.1.3.4.5. Example

For this example, we consider a shortened message :

[data] = 111111 000000 111111 000000 111000 111000 000111 000111 000000 111111

and the header :

[header] = s:HELLO

The data are converted to characters by division in 6 bits blocks and using the IEC table C-1 [RD1] :

[dataC] = w0w0pp770w

The data characters are completed by the nominal elements (except for [channel] kept to 'null') :

[dataT] = AIVDM,1,1,,,w0w0pp770w,0

Each of the 24 characters of the data are converted by their 8-bits ASCII code :

[dataB] =

A = 01000001

I = 01001001

V = 01010110

D = 01000100

M = 01001101

, = 00101100

1 = 00110001



```
, = 00101100
1 = 00110001
, = 00101100
, = 00101100
, = 00101100
w = 01110111
0 = 00110000
w = 01110111
0 = 00110000
p = 01110000
p = 01110000
7 = 00110111
7 = 00110111
0 = 00110000
w = 01110111
, = 00101100
0 = 00110000
```

The XOR is calculated on the 24 lignes (may be also seen as the modulo 2 of the sum per column) :

[dataX] = 00100000

This result is converted to hexadecimal :

[dataK] = 20

Each of the 7 characters of the header are converted by their 8-bits ASCII code :

[headerB] =

```
s = 01110011
: = 00111010
H = 01001000
E = 01000101
L = 01001100
L = 01001100
O = 01001111
```

The XOR is calculated on the 7 lignes (may be also seen as the modulo 2 of the sum per column) :

[headerX] = 00001011

This result is converted to hexadecimal :

[dataK] = 0B

The complete delivered message is then :

```
\s:HELLO*0B\!AIVDM,1,1,,,w0w0pp770w,0*20
```

6.1.4. I_DS_SIMULATOR_LAUNCHER

6.1.4.1. Introduction

I_DS_SIMULATOR_LAUNCHER		Scope	Mode:	Protocol:
		Internal	Synchronous	Command line
implemented by	S-AIS Data Simulator		used by	S-AIS Data Simulation Service
The interface defines the entry point of the S-AIS Data Simulator component through which the start/stop commands and progress measures are exchanged with the Shell Launcher.				

The Simulator launcher is not part of the Simulator.



It is recommended to use a Shell command.

An example of Simulator launcher window for a previous version of the Simulator is given here below as an example (for Windows OS) :

```

C:\WINNT\system32\cmd.exe
Microsoft Windows XP [version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

D:\Documents and Settings\calmett>cd ../..
D:\>cd AISMAR-simulator-v2.6
D:\AISMAR-simulator-v2.6>AISnap26.exe scenarios\testEquator0.xml
Thales Alenia Space Navigation & Communication Btl
Simulateur AIS Maritime par satellite v.2.4.6.1
Copyright Thales Alenia Space 2009 read 0 Scenario from scenarios\testEquator0.xml
Un sous-répertoire ou un fichier res\testEquator0\total\ existe déjà.
### Simulations on 100 Frames : result in res\testEquator0\
Frame 0: 63066 emit, 49890 transmit, 16806 possible, 13526 detect, 10930 seen, 0 removed
Frame 1: 63082 emit, 50065 transmit, 16504 possible, 13322 detect, 13185 seen, 0 removed
Frame 2: 63154 emit, 49825 transmit, 16191 possible, 13140 detect, 14686 seen, 0 removed
Frame 3: 63145 emit, 49371 transmit, 16863 possible, 13650 detect, 15812 seen, 0 removed
Frame 4: 63126 emit, 49315 transmit, 17428 possible, 14099 detect, 16755 seen, 0 removed
Frame 5: 63070 emit, 49504 transmit, 16286 possible, 13125 detect, 17411 seen, 0 removed
Frame 6: 63190 emit, 49854 transmit, 16645 possible, 13278 detect, 17931 seen, 0 removed
Frame 7: 63213 emit, 49980 transmit, 16526 possible, 13187 detect, 18395 seen, 0 removed
Frame 8: 63117 emit, 50035 transmit, 16674 possible, 13497 detect, 18720 seen, 0 removed
Frame 9: 63194 emit, 50186 transmit, 16240 possible, 13024 detect, 18970 seen, 0 removed
Frame 10: 63110 emit, 50053 transmit, 16225 possible, 13164 detect, 19187 seen, 0 removed
Frame 11: 63145 emit, 49790 transmit, 16150 possible, 13151 detect, 19332 seen, 0 removed
Frame 12: 63145 emit, 49969 transmit, 16572 possible, 13345 detect, 19437 seen, 0 removed
Frame 13: 63137 emit, 49945 transmit, 15828 possible, 12855 detect, 19514 seen, 0 removed
Frame 14: 63216 emit, 50061 transmit, 16006 possible, 12872 detect, 19563 seen, 0 removed
Frame 15: 63119 emit, 49870 transmit, 16258 possible, 13075 detect, 19598 seen, 0 removed
Frame 16: 63156 emit, 50093 transmit, 15703 possible, 12614 detect, 19615 seen, 0 removed
Frame 17: 63062 emit, 49871 transmit, 16513 possible, 13227 detect, 19627 seen, 0 removed
^C
D:\AISMAR-simulator-v2.6>_

```

Figure 51 : Example of simulator launcher for Windows

The use of a Shell window is also recommended as:

- It is easy to open several Shell windows in parallel and launch one Simulator instance per window
- The choice between screen writing and file saving of progress messages is easily accessible with '>' and '>>' commands

6.1.4.2. Start/Stop interface

The Simulator launcher shall launch the simulation by launching the executable associated with the Main parameter XML file.

The Simulator launcher shall stop the simulation by breaking the executable.

As all simulations, and in particular all outputs writing, are based on a fixed period of 3 minutes, breaking the executable will only give a loss of the current fixed period.

To rerun a simulation, it may only be launched again with the same parameters and configuration files, knowing that the UTC date is one of the parameters.

6.1.4.3. Progress messages

During the simulation, the Simulator shall provide access to the progression of the simulation through messages displayed or stored (choice of the Simulator launcher).

The messages are, for each fixed period:

- UTC date of the beginning of the fixed period
- "parameters reading... done"
- "preparation phase... done" (corresponding to schedules elaboration)
- "processing slot 0/6750 250/6750 500/6750 750/6750..."
- "processing ended, waiting for real-time trigger"



6.1.4.4. Logs

All the logs will be generated as configured in the log4j.xml file.

This log4j.xml shall be located in the same directory than the simulator executable file.

6.1.5. I_DS_SIMULATOR_SCHEDULES

6.1.5.1. Introduction

I_DS_SIMULATOR_SCHEDULES		Scope	Mode:	Protocol:
		Internal	Synchronous	Command line
implemented by	S-AIS Data Simulator		used by	S-AIS Data Simulation Service
The interface defines the entry point of the S-AIS Data Simulator component through which the long-term predicted orbits and schedules are delivered to the DPC Block2 System.				

The Simulator shall be able to produce the following schedule files:

- Satellite position in terrestrial reference frame
- Satellite position in J2000 reference frame
- Satellite downlink schedule
- Ground station downlink schedule
- Ship downlink schedule

Each of them is described below.

In all these files, the dates are given in UTC unix epoch time (number of milliseconds since 01/01/1970 00h00m00s).

6.1.5.2. Satellite position in terrestrial reference frame

There is one file per satellite, named accordingly with the satellite ID (parameter) as:

SatellitePositionTerrestrial_ID.sch

This file is a CSV text file which content is:

- A first line containing the beginning date of the file in UTC unix epoch time (number of milliseconds since 01/01/1970 00h00m00s).
- 2880 lines containing the (x,y,z) position of the satellite in terrestrial reference frame every 30s for the 24 hours following the UTC beginning date

Here is small part of the content of a satellite position output file :

```
1332922796123
4505000.0,4505000.0,0.0
4505010.0,4504990.0,0.0
```




6.1.5.3. Satellite position in J2000 reference frame

There is one file per satellite, named accordingly with the satellite ID (parameter) as:

SatellitePositionJ2000_ID.sch

This file is a CSV text file which content is:

- A first line containing the beginning date of the file in UTC unix epoch time (number of milliseconds since 01/01/1970 00h00m00s).
- 2880 lines containing the (x,y,z) position of the satellite in J2000 reference frame every 30s for the 24 hours following the UTC beginning date

Here is small part of the content of a satellite position output file :

```
1332922796123
4505000.0,4505000.0,0.0
4505010.0,4504990.0,0.0
```

6.1.5.4. Satellite downlink schedule

There is one file per satellite, named accordingly with the satellite ID (parameter) as:

SatelliteDownlink_ID.sch

This file is a CSV text file which content is:

- all the downlinks over the next 24 hours, each downlink being represented on a single line with the ID of the ground station, the beginning date in UTC unix epoch time (number of milliseconds since 01/01/1970 00h00m00s) and the duration in seconds

Here is small part of the content of a satellite downlink schedules output file :

```
GS1,1332922796123,4
GS2,1332922806123,600
GS4,1332922906123,360
GS5,1332923006123,300
GS1,1332923106123,420
```

6.1.5.5. Ground-station downlink schedule

There is one file per ground-station, named accordingly with the ground-station ID (parameter) as:

GroundDownlink_ID.sch

This file is a CSV text file which content is:

- all the downlinks on this station over the next 24 hours, each downlink being represented on a single line with the ID of the satellite, the beginning date in UTC unix epoch time (number of milliseconds since 01/01/1970 00h00m00s) and the duration in seconds.

Here is small part of the content of a ground station downlink schedules output file :

```
SAT1,1332922796123,4
SAT2,1332922806123,600
SAT4,1332922906123,360
SAT5,1332923006123,300
SAT1,1332923106123,420
```

6.1.5.6. Ship downlink schedule

There is one file for the whole simulation, named:



ShipDownlink.sch

This file is a CSV text file which content is:

1. for each downlink of a ship:
 - the MMSI of the ship
 - the satellite ID which handles the signal
 - the date in UTC unix epoch time (number of milliseconds since 01/01/1970 00h00m00s) of visibility of the ship by the satellite
 - the ID of the ground station which will downlink the data
 - the delivery date in UTC unix epoch time (number of milliseconds since 01/01/1970 00h00m00s) to the Data Processing Centre

Here is small part of the content of a ships downlink schedules output file :

```
201201748,SAT1,1332922906123,GS5,1332926901234
201201748,SAT2,1332922906123,GS4,1332926901234
201201612,SAT3,1332546521321,GS1,1332549412523
201201622,SAT3,1332325246562,GS1,1332360123252
```

6.1.6. I_DS_SIMULATOR_WARNING_MGR

6.1.6.1. Introduction

I_DS_SIMULATOR_WARNING_MGR		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		Internal	Synchronous	Command line
implemented by	S-AIS Data Simulator		used by	S-AIS Data Simulation Service
The interface defines the entry point of the S-AIS Data Simulator component through which the Warning and Errors are reported to the DPC Block2 System.				

The Warning manager is not part of the Simulator.

The recommended approach is to have at the Warning manager level a unique Warning file for the Simulator and to parse regularly this file to identify if there is new information.

6.1.6.2. Content of the Simulator Warning file

The Warning file shall follow the CAP format specified by [Error! Reference source not found.].

The file is then a XML file.

Every time a new issue is identified, an <alert> field and an <info> field are completed following the previous elements written in the document.

The message is elaborated as follows:

<cap:alert> field is completed as follows:

- <identifier> : Message ID : Integer giving the type of error :
 - between 1 and 99 for critical errors (Simulation broken with impacts on Input/Outputs)
 - between 100 and 199 for major errors (Simulation broken without impacts on Input/Outputs)



- between 200 and 1000 for warnings (Simulation continued)
- Values defined during development
- <sender> : Sender ID given in the Simulation instance parameters
- <date> : Time and date (hardware date) according to [Error! Reference source not found.]
- <status> : “Actual” in nominal mode, may be set as “Test” for draft versions of the Simulator
- <msgType> : “Alert”
- <source> : ‘Name’ of the Simulator instance given in the parameters
- <cap:info> field completed with the following fields:
 - <headline> : Name of the alert (maximum 160 characters)
 - <description> : Text description of the problem, with traces, values, ...
- </cap:info>

</cap:alert>

6.1.7. I_EF_BPEL_CFG

6.1.7.1. Introduction

I_EF_BPEL_CFG		Scope	Mode:	Protocol:
		Internal	Synchronous	File System, XML files
implemented by	BPEL Engine	used by	Operator	
The interface defines the entry point of the BPEL Engine component through which the Operator can perform the configuration.				

6.1.7.2. Protocol

The protocol describes the point of contact through which an Operator can configure the component. It is a very basic interface that equates to the File System with files as information carrier.

IFR-I_EF_BPEL_CFG-0750/I

The I_EF_BPEL_CFG interface must use files living on the local file system to carry configuration information.

Trace from:

6.1.7.3. Data Model

The information, that describes configuration items, is structured into an XML file compliant with an XSD Schema according to [Error! Reference source not found.] and [Error! Reference source not found.].

IFR-I_EF_BPEL_CFG-0760/I

The I_EF_BPEL_CFG interface must rely on an XML dialect validated by a XSD Schema.



Trace from:
SR-DPC-DES-2030
SR-DPC-DES-1960

6.1.8. I_EF_BPEL_CONSOLE

6.1.8.1. Introduction

I_EF_BPEL_CONSOLE		Scope	Mode:	Protocol:
		Internal	Synchrnous	HTTP, HTML
implemented by	BPEL Engine		used by	Operator
The interface defines the mean from which the Operator can monitor and administrate the BPEL component.				

6.1.9. I_EF_BPEL_SUPERVISION

6.1.9.1. Introduction

I_EF_BPEL_SUPERVISION		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		Internal	Synchronous	JMX
implemented by	BPEL Engine	used by	MCC	
The interface defines the mean used to manage and monitor the component.				

6.1.9.2. Protocol

The protocol describes the point of contact through which a Supervision tool (actually the MCC instance) can monitor and administrate the component.

The protocol is a widely spread Java technology called JMX - Java Management eXtensions. The underlying protocol used is also a Java technology called RMI - Remote Method Invocation.

IFR-I_EF_BPEL_SUPERVISION-0770/I

The I_EF_BPEL_SUPERVISION interface must use the JMX protocol v1.4 as specified in [RD 21].

Trace from:

The following diagram shows the underlying messaging and transport stack used by the protocol.

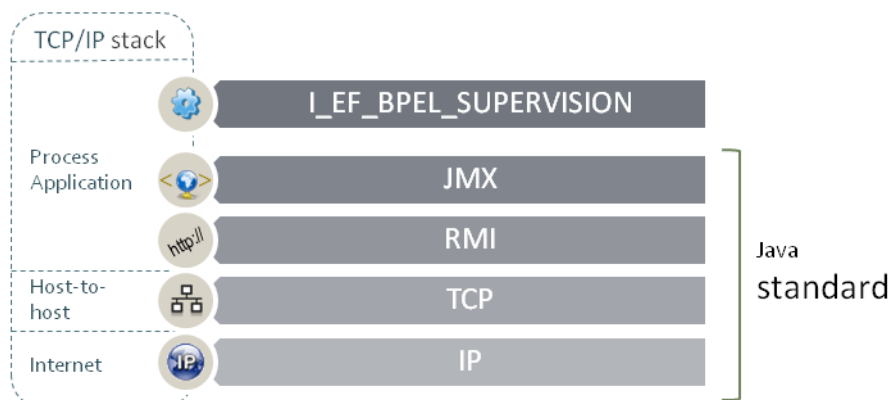


Figure 52 - Protocol stack of the I_EF_BPEL_SUPERVISION interface

6.1.9.3. Data Model

6.1.10. I_EMSA_BLOCK3_EO_DATA

6.1.10.1. Introduction

I_EMSA_BLOCK3_EO_DATA		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		External	One Way	SFTP, XML
implemented by	EMSA Block3	used by	Data Distribution	
The interface defines the contract the EMSA Block3 shall implement to be able to receive EO Data from the DPC Block2 System, using the EMSA CleanSeaNet interface.				

6.1.11. I_EMSA_BLOCK3_JMS_CDF

6.1.11.1. Introduction

I_EMSA_BLOCK3_JMS_CDF		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		External	One Way	JMS, EMSA CDF
implemented by	EMSA Block3	used by	Data Distribution	
The interface defines the contract the EMSA Block3 shall implement to be able to receive AIS messages (with or without enhancements) from the DPC Block2 System, using the EMSA JMS interface.				

6.1.11.2. Protocol

The protocol describes the point of contact between S-AIS DPC Block2 and EMSA Block3 for the supply of AIS messages processed by the DPC.

The protocol is a widely spread Java technology called JMS - Java Message Service.



I_EMSA_BLOCK3_JMS_CDF-0771/I

The I_EMSA_BLOCK3_JMS_CDF interface must use the JMS protocol v1.1 as specified in [RD 22].
Trace from:

I_EMSA_BLOCK3_JMS_CDF -0771/I

The I_EMSA_BLOCK3_JMS_CDF interface must organize JMS dialog according to the following terms: in a single way, from the S-AIS DPC Block2 (Sender) to the EMSA Block3 (Receiver), following the point-to-point model, through a single message queue, using a Text message (as message body).
Trace from:

Regarding this protocol:

- The EMSA Block3 acts as the receiving system. The sequence of steps performed could be like this:
 1. Lookup of the JMS message queue
 2. Creation of the connection and session
 3. Creation of a receiver queue
 4. Message reception from the queue as a text message
 5. Go to step 4 until end condition
 6. Close connection and session
- The DPC Block2 acts as the sending system. The sequence of steps performed could be like this:
 1. Lookup of the JMS message queue
 2. Creation of the connection and session
 3. Creation of a sender queue
 4. Creation of a text message (containing the textual S-AIS message in EMSA CDF format)
 5. Message sending to the queue
 6. Go to step 5 until end condition
 7. Close connection and session

6.1.11.3. Data model

6.1.11.3.1. General points

The data model used by the interface is the EMSA Canonical Data Format (CDF) described in [RD 25].

EMSA CDF data model can hold various information. As a general principle, a set of S-AIS messages comes in the following form:

- A root which expresses common information about source, identification and timestamp;
 - Access rights, if relevant
 - A set of position messages gathered per ships:
 - Access rights, if relevant
 - Ship particulars (i.e. ship static information)
 - A Set of position reports for the considered ship
 - Common attributes (location, sog, cog...)
 - AIS specific information (ship type, raw message)
 - S-AIS specific information (satellite identifier, Doppler shift frequency...)

6.1.11.3.2. S-AIS DPC specific usage

The DPC Block2 system makes a specific usage of the CDF which is suitable for its needs. The following chapters describe the specific parts of the model that both producer and consumer must know to correctly handle the exchange.



6.1.11.3.2.1. Organisation of positions in CDF

The EMSA CDF format gives a lot of freedom in the way of organizing the ais positions.

By convention, the Data Distribution subsystem produces data as following:

- 1 position message, for a single ship in a single JMS message.

This is always true even if incoming messages through the JMS queue have multiple positions or ships in it. They are splitted and singled out.

6.1.11.3.2.2. Dataflow identifier

The CDF delivered by S-AIS DPC Block2 contains an identifier which allows to gather all ais messages belonging to the same dataflow. The attribute `dataflowID` is used for that purpose.

6.1.11.3.2.3. Processing: validation

DPC Block2 validation involves the S0 and S1 processing. We plan to proceed this way:

- Checks on the AIS message itself. If relevant, the following validations are performed by DPC Block2: CRC, message type, message length, consistency of values.
 - If all the checks succeed, the attribute “consistencyCheck” of the considered PositionReport element is set to “valid”, provided that the attribute does not already exist or its value is “valid”.
 - If one of the checks fails, the attribute “consistencyCheck” of the considered PositionReport element is set to “rejected”.
 - If no check is performed, the attribute is not valuated (does not appear in the element).
- Checks on the Position of the message. If relevant, the following validations are performed by DPC Block2: Velocity check, Satellite footprint check.
 - If all the checks succeed, the attribute “positionConsistencyCheck” of the considered PositionReport element is set to “valid” , provided that the attribute does not already exist or its value is “valid”.
 - If one of the check fails, the attribute “positionConsistencyCheck” of the considered PositionReport element is set to “invalid”.
 - If no check is performed, the attribute is not valuated (does not appear in the element).

6.1.11.3.2.4. Processing: Correlation

The correlation processing is performed by DPC Block2 at S3 and S5 stage for position messages which are consistent.

If the position is validated or invalidated by correlation (Doppler or EO), the element “correlation” of the SatAisSpecific element is added and information about correlation result is provided.

```
<ais:correlation result="valid" method="doppler" distanceToDetection="12.">
  <ais:position>
    <cdf:Latitude error="1.0" errorRotation="0.">10.8</cdf:Latitude>
    <cdf:Longitude error="2.1" errorRotation="15.">25.3</cdf:Longitude>
  </ais:position>
</ais:correlation>
```



6.1.11.3.2.5. Processing: Position correction

For cases where message position is inconsistent (i.e. positionConsistencyCheck attribute is set to "invalid"), a correction of the position is performed by DPC Block2 using several strategies: Doppler, interpolation or extrapolation.

For this case, we propose to correct the position (element latitude, longitude and altitude of the PositionReport element) and to valuate the attribute dataProcessing.

```
<pos:PositionReport
  timestamp="2006-05-04T18:13:51.0Z"
  source="Sat-AIS"
  dataProcessing="PositionCorrected"
  consistencyCheck="valid">
  <cdf:Latitude error="2.5" errorRotation="0.">12.5</cdf:Latitude>
  <cdf:Longitude error="1.43" errorRotation="0.">-42.09</cdf:Longitude>
</pos:PositionReport>
```

6.1.12. I_EO_DATA_PROVIDER

6.1.12.1. Introduction

I_EO_DATA_PROVIDER	Scope	Mode:	Protocol:
	External	Synchronous	HTTP, HTTPS, FTP, SFTP, TCP
implemented by	EO Data Provider		
	used by	Data Retrieval	
The interface defines the contract that EO data providers shall respect to provide EO data (Level 1 images and VDRs) to the DPC Block2 system.			

6.1.12.2. Protocol

The protocol used for the provision of EO shall be based on standard TCP communication protocols.

IFR-I_EO_DATA_PROVIDER-0780/T

The interface with SAT-AIS data providers shall use standard TCP communication protocols (http/https, FTP/SFTP) for the provision of EO data.

Trace from:

SR-DPC-IFR-0080

SR-DIS-FUN-1800

SR-DIS-FUN-1810

The protocol actually implemented depends on the EO data provider. The following sections describe the interface provided by the EO data providers already identified for the DPC Block2 system (CLS and KSAT).

6.1.12.2.1. CLS protocol

EO data packages are written to files on a secure FTP (SFTP) server that is hosted by CLS. The server is accessed by the DPC Block2 as required.

Protocol	SFTP
----------	------



Host	TBD
Directory	TBD
Authentication	User/password. Details will be provided by CLS

There are two types of data packages:

- EOP: EO package containing the EO Level 1 product itself (image) and a standardised description of this product,
- DER: a EO Derived package containing information on the vessel detected on the EO Level 1 product. This package corresponds to the VDR itself.

The SFTP transfer of a data package (file) must be performed as a two step mechanism:

- 1- Transmission of the data package in a spool/tmp directory (which name has to be defined)
- 2- Move of the data package from the spool/tmp directory to the root directory of the ftp server

The last move ensure an “atomic” availability of the data package in the root directory

Once downloaded successfully, files shall be deleted from the-server.

IFR-I_EO_DATA_PROVIDER-0790/T

After the successful download of EO data packages (EOP and DER packages) from CLS SFTP server, files shall be deleted from the server

Trace from:

IFR-I_EO_DATA_PROVIDER-0800/T

After the successful download of a EO data file from CLS SFTP server, the session shall be closed by the client

Trace from:

If a download is stopped, or failed it must be reinitiated, as it is not possible to restart from the last retrieved point.

IFR-I_EO_DATA_PROVIDER-0810/T

If a download from CLS SFTP server is stopped , or fails, it must be reinitiated

Trace from:

EO data packages are using naming rules bases on the name of the image.

EO image identifier

A unique identifier for the image is built with the following rule:

<image_id> = <order_id>_<image_name>

where:

Field	Description	Format
order_id	Unique identifier of the order assigned at the time of the image ordering process	Integer
image_name	Product name assigned to the scene by the Satellite Operator	String

Note:



- The image identifier is used in the naming convention of any package AND in the GML files itself
- The *<image_name>* is defined outside the S-AIS-DPC Block2 context and is not unique in itself; it could also include underscores (_) and dots (.).

Example of image identifier (ENVISAT ASA image):

123_ASA_WSM_1PNACS20100603_203524_000000592090_00043_43183_0001.N1.00114_EMSA

Package file name

The package file name shall match the following rule:

<image_id>_<package_type>.<extension>

where:

Field	Description	Format
image_id	Unique identifier of the image, defined in the above section	String
package_type	code for package type	Any of the following codes: <ul style="list-style-type: none"> • EOP for EO Product package type • DER for EOderived package type including VDR
extension	Valid file format extension for the package	Example: .tgz

All other package type codes are invalid in the context of the S-AIS-DPC Block2.

Package information XML file name

All EO packages (EOP and DER) contain a package description file in XML format, following the naming rule:

<image_id>_PCK.xml

where **image_id** is the unique identifier of the image, defined in the above section.

Example of package information file name:

123_ASA_WSM_1PNACS20100603_203524_000000592090_00043_43183_0001.N1.00114_EMSA_PCK.xml

EOP GML file name

EOP packages contain a description of the EO product file in GML format, following the naming rule:

<image_id>_EOP.xml

where **image_id** is the unique identifier of the image, defined in the above section.

Example of EOP description file name:



123_ASA_WSM_1PNACS20100603_203524_000000592090_00043_43183_0001.N1.00114_EMSA_EOP.xml

VDR GML file name

DER packages contain a VDR file in GML format, following the naming rule:

<image_id>_DS_<ds_id>.xml

where:

- **image_id** is the unique identifier of the image, defined in the above section.
- **ds_id** is the sequence identifier of the ship detection processing (integer).

Example of VDR GML file name:

123_ASA_WSM_1PNACS20100603_203524_000000592090_00043_43183_0001.N1.00114_EMSA_DS_32.xml

EO native image file name

The filename is "free" but the extension must be the original extension of the filetype as provided by the Satellite Operator otherwise the image processor cannot "understand" the filetype and process the file accordingly.

IFR-I_EO_DATA_PROVIDER-0820/T

To be valid, a EOP Package must contain : a package description file, a EOP description of the EO product as an XML/GML file, the EO product itself (native or zipped).

Trace from:

Examples:

Envisat EOP packages should contain:

7854_ASA_WSM_1PNSMA20101012_104055_000001792093_00409_45052_1616.N1_EOP.xml

7854_ASA_WSM_1PNSMA20101012_104055_000001792093_00409_45052_1616.N1_PCK.xml

ASA_WSM_1PNSMA20101012_104055_000001792093_00409_45052_1616.N1

Note that the Envisat SAR Native 1 must keep the original extension of the filetype (.N1) as provided by the satellite operator.

- ASA_WSM_1PNSMA20101012_104055_000001792093_00409_45052_1616.N1 is correct
- ASA_WSM_1PNSMA20101012_104055_000001792093_00409_45052_1616.N1.00001 is not correct

The N1 file should be referenced in the EOP.xml

<eop:fileName> ASA_WSM_1PNSMA20101012_104055_000001792093_00409_45052_1616.N1

</eop:fileName>

RS2 packages should contain:

7900_RS2_20090917_163129_0048_SCNA_HH_SCN_52578_0000_2347505_PCK.xml

7900_RS2_20090917_163129_0048_SCNA_HH_SCN_52578_0000_2347505_EOP.xml

RS2_20090917_163129_0048_SCNA_HH_SCN_52578_0000_2347505.zip



The zip file should have the same name as the SAR Native 1 product.

The zip file should be referenced in the EOP.xml

```
<eop:fileName>RS2_20090917_163129_0048_SCNA_HH_SCN_52578_0000_2347505.zip
```

```
</eop:fileName>
```

IFR-I_EO_DATA_PROVIDER-0830/T

To be valid, a DER Package must contain: a package description file, a VDR file as an XML/GML file, and optionally a set of imagerettes (full resolution images of the detections) referenced in the main VDR file.

Trace from:

6.1.12.2.2. KSAT protocol

EO data files are written to files on a secure FTP (SFTP) server that is hosted by KSAT. The server is accessed by the DPC Block2 as required.

Protocol	SFTP
Host	ftp3.ksat.no
Directory	DPC_delivery/EO/ for EO level1 data DPC_delivery/VDR/ for VDR data
Authentication	User/password. Details will be provided by KSAT

There are two types of files provided:

- EO Level 1 data: file containing the EO Level 1 product itself (image),
- VDR data: a file containing information on the vessel detections from the EO Level 1 product.

Once downloaded successfully, files shall be deleted from the-server.

IFR-I_EO_DATA_PROVIDER-0840/T

After the successful download of EO data files (EO image or VDR files) from KSAT SFTP server, files shall be deleted from the server

Trace from:

IFR-I_EO_DATA_PROVIDER-0850/T

After the successful download of a EO data file from KSAT SFTP server, the session shall be closed by the client

Trace from:

If a download is stopped, or failed it must be reinitiated, as it is not possible to restart from the last retrieved point.

IFR-I_EO_DATA_PROVIDER-0860/T

If a download from KSAT SFTP server is stopped , or fails, it must be reinitiated

Trace from:

EO data files are using naming rules based on the name of the image.

**EO Level1 data:**

The following naming convention will be used.

ENVISAT ASA images

ASA_<mode>_1<orig><date>_<time>_<len><p><cyc>_<relOrbit>_<orbit>_<count>.N1

where:

Field	Description	Format
mode	Image mode	String, 3 characters Ex: WSM
orig	Processing originator	String, 5 characters Ex: PNPDE
date	Processing date	YYYYMMDD
time	Processing time	hhmmss
len	Product length	Integer, 8 digits
p	Phase	Integer, 1 digit
cyc	Cycle	Integer, 3 digits
relOrbit	Relative orbit	Integer, 5 digits
orbit	Absolute orbit	Integer, 5 digits
count	Counter	Integer, 4 digits

Example of ENVISAT ASA image name:

ASA_WSM_1PNPDE20120206_122902_000005323111_00239_51977_8062.N1

RADARSAT 2 images

RS2_<date>_<time>_<len>_<mode>_<pol>_<lev>_<nnnnnn>_<nnnn>_<nnnnnnnn>.zip

where:

Field	Description	Format
date	Image date	YYYYMMDD
time	Image time	hhmmss
len	Product length	Integer, 4 digits
mode	Image mode	String, 4 characters Ex: SCWA
pola	Polarisation	String, 4 characters Ex: HHHV
lev	Processing level	String, 3 characters Ex: SGF



nnnnnn	Various counters	Integer
nnnn		
nnnnnnnn		

Example of RADARSAT 2 image name:

RS2_20120330_070002_0076_SCWA_HHHV_SGF_188403_4219_7226476.zip

VDR data

VDR data files will be names using the name of the EO data used for the detection, with the following rule:

<eo_data_name>_SATAIS_DPC_svd.gml

where **eo_data_name** is the name of the EO Level 1 image defined in the above section.

Example of VDR file name:

RS2_20120330_070002_0076_SCWA_HHHV_SGF_188403_4219_7226476_SATAIS-DPC_svd.gml

6.1.12.3. Data model

The data model used for EO Level 1 data (image) is related to the satellite operator (ESA for ENVISAT, MDA for RADARSAT 2), and is not dependent of the data provider (CLS or KSAT).

Description of EO Level 1 data format is outside the scope of the DPC Block2 system, as vessels detection processing is done directly by the EO data providers. Information about EO Level 1 data formats can be found:

- For ENVISAT ASAR N1 format:
<http://envisat.esa.int/handbooks/asar/CNTR6-2.htm#eph.asar.asardf.1p>
- For RADARSAT 2 zipped package format:
http://gs.mdacorporation.com/includes/documents/RN-RP-51-2713%20RS-2%20Product%20Format%20Definition_1_10.pdf
<http://gs.mdacorporation.com/includes/documents/RS2ProductSchemas.zip>

On the contrary, the data model for EO derived data (EO description in GML format, VDR in GML formats) varies with the EO data provider.

6.1.12.4. CLS data model

The data model for CLS EO data is described in the general data model section of this document.

- Package description file: see section §6.2.10
- EOP description of EO product: see section §6.2.14
- VDR file: see section §6.2.7



6.1.12.5. KSAT data model

The data model for KSAT VDR data is described in the general data model section §6.2.22 and §6.2.23.

6.1.13. I_EXT_DATA

6.1.13.1. Introduction

I_EXT_DATA		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		External	One Way	HTTP, SOAP, XML
implemented by	EMSA Block3 External Application Centre	used by	Data Distribution	
The interface defines the contract that EMSA Block3 and External Application Centre shall implement to receive data from the S-AIS DPC Block2 System. The information provided are:				
<ul style="list-style-type: none">SAT-AIS data: Group of <i>Ship Messages</i> to be distributed to the external users. The <i>Ship Message</i> already include SAT-AIS Information data.Warnings and Alerts: Group of Warnings and Alerts to be distributed to the external users in CAP format.EO data: Group of Vessel Detection Reports				

6.1.13.2. Operations

The interface specifies several operations that can be invoked by a client.

IFR-I_EXT_DATA -0870/T

The I_EXT_DATA must use the literal style for all the published operations.

Trace from:

6.1.13.2.1. “AlertPush” operation

The operation allows for the DPC Block2 system to deliver real time Alerts and Warnings to the external authorized users.

6.1.13.2.1.1. Request message

The following table describes the message exchanged through this operation.

Element	Description	Type
SADPC_AlertPush	a message containing sequence of alert (in CAP format)	sat-dpc:SADPC_AlertPush



6.1.13.2.1.2. *Response message*

A minimal response is returned containing the acknowledgement of the server about the submission.

6.1.13.2.1.3. *Fault message*

6.1.13.2.1.4. *Example*

6.1.13.2.2. “SatAISMessagePush” operation

The operation allows for the DPC Block2 system to deliver real time S-AIS Messages to the external authorized users.

6.1.13.2.2.1. *Request message*

The following table describes the message exchanged through this operation.

Element	Description	Type
SADPC_ SatAISMessagePush	a message containing a sequence of decoded AIS messages.	sat-dpc: SADPC_SatAISMessagePush

6.1.13.2.2.2. *Response message*

A minimal response is returned containing the acknowledgement of the server about the submission.

6.1.13.2.2.3. *Fault message*

6.1.13.2.2.4. *Example*

6.1.13.2.3. “InformationPush” operation

The operation allows for the DPC Block2 system to deliver real time information about providers to the external authorized users.

6.1.13.2.3.1. *Request message*

The following table describes the message exchanged through this operation.

Element	Description	Type
SADPC_ InformationPush	a message containing a sequence of information.	sat-dpc: SADPC_InformationResponse

6.1.13.2.3.2. *Response message*

A minimal response is returned containing the acknowledgement of the server about the submission.



6.1.13.2.4. "RawSatAISMessagePush" operation

The operation allows for the DPC Block2 system to deliver real time S-AIS Messages to the external authorized users.

6.1.13.2.4.1. Request message

The following table describes the message exchanged through this operation.

Element	Description	Type
SADPC_ InformationPush	a message containing a sequence of information.	sat-dpc: SADPC_SatAISMessagePush

6.1.13.2.4.2. Response message

A minimal response is returned containing the acknowledgement of the server about the submission.

6.1.13.2.4.3. Fault message

6.1.13.2.4.4. Example

6.1.14. I_EXT_QUERIES

6.1.14.1. Introduction

I_EXT_QUERIES		Scope	Mode:	Protocol:
		External	Asynchronous	HTTPS, SOAP, XML
implemented by	Data Distribution	used by	External Application Centre	
The interface defines the mean through which External Application Centres can perform queries for the following Block2 data products:				
<ul style="list-style-type: none">• Predicted ship positions• Warnings and Alerts• AIS Data (well received, enhanced or EO Correlated)• SAT-AIS information data• EO Data				

6.1.14.2. Relationship to other protocols

This protocol uses industry standard protocols.

IFR-I_EXT_QUERIES-0880/T

The I_EXT_QUERIES interface must establish a conversation between a client and a server performed over HTTPS version 1.1 as described in [RD 3].



Trace from:

SR-DPC-DES-2040

SR-DPC-IFR-0080

SR-DPC-DES-1970

SR-DIS-FUN-1800

SR-DIS-FUN-1810

IFR-I_EXT_QUERIES-0890/T

The I_EXT_QUERIES interface must use the SOAP messaging protocol v1.1 and v1.2 for formatting requests and responses as specified in [RD 4] and [RD 5] ;

Trace from:

SR-DPC-DES-2040

SR-DPC-DES-1970

IFR-EXT_QUERIES-0900/T

The I_EXT_QUERIES interface must use the Document style binding.

Trace from:

SR-DPC-DES-1970

The following diagram shows the underlying messaging and transport stack used by the protocol.

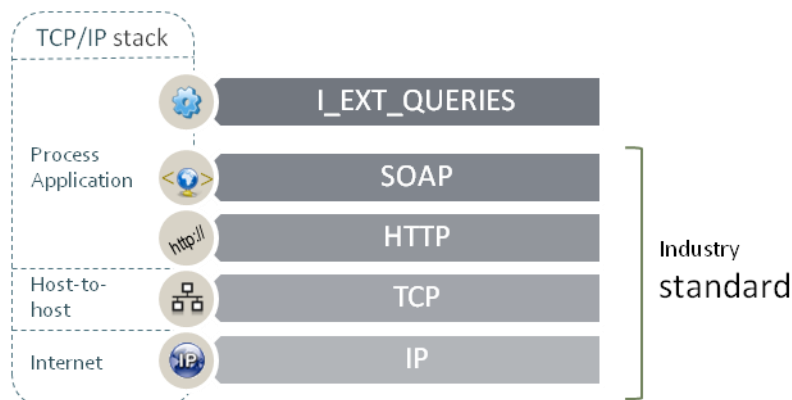


Figure 53 - Protocol stack of the I_EXT_QUERIES interface

6.1.14.3. Operations

The following set of operations is available through the interface:

- Operation to query Predicted AIS Messages (S4)
- Operation to query Missing AIS Messages (S2)
- Operations to query Well Received AIS Messages (S1), Enhanced AIS Messages (S3), EO Correlated AIS Messages (S5)
- Operation to query SAT-AIS Information (S6)

The arguments of these operations will be then used by the Data Distribution to request data from the Block-2 Data Management & Archive using exactly the inputs as the ones received.

6.1.14.3.1. Missing AIS Messages Query Inputs

With these queries the external users shall be able to retrieve missing messages warnings and alerts from Block-2.



The following inputs parameters shall be provided as arguments to the service operation by the corresponding SOAP request. If approved, the same SOAP request will be performed to Block-2 Data Management & Archive Service.

The reply shall be a list of warnings and alerts delivered through the corresponding SOAP Response.

Table 1: Missing Messages Alert Query Inputs

Name	Type
From	dateTime
To	dateTime
MMSINumberList	MMSINumberListType
MaxMsgPerShip	positiveInteger
RectangularArea	RectangularAreaType
SatelliteIdList	SatelliteIDListType
AIStypeList	AIStypeListType

6.1.14.3.2. AIS Data Query Inputs

These queries allow the external user to get Well Received AIS Messages (S1), Enhanced AIS Messages (S3), Predicted AIS Messages (S4) or EO Correlated AIS Messages (S5) from Block-2.

The following inputs parameters shall be provided as arguments to the service operation by the corresponding SOAP request. If approved, the same SOAP request will be performed to Block-2 Data Management & Archive Service.

It shall be noted that in this case it will be published an operation per type of AIS data.

The reply shall be a list of SataISMessages delivered through the corresponding SOAP Response.

Table 2: AIS Messages Query Inputs

Name	Type
From	dateTime
To	dateTime
MMSINumberList	MMSINumberListType
MaxMsgPerShip	positiveInteger
RectangularArea	RectangularAreaType
SatelliteIdList	SatelliteIDListType
AIStypeList	AIStypeListType
ProcessingLevelList	ProcessingLevelListType
OriginList	OriginListType
RetrieveRawMessage	boolean
RetrieveDecodedAISMessage	boolean
RetrieveMessageMetaData	boolean
RetrieveMessageAncillaryData	boolean



6.1.14.3.3. SAT-AIS Information Query Inputs

These queries allow the external user to get SAT-AIS Information data from Block-2.

The following inputs parameters shall be provided as arguments to the service operation by the corresponding SOAP request. If approved, the same SOAP request will be performed to Block-2 Data Management & Archive Service.

The reply shall be a list of SAT_AIS Information delivered through the corresponding SOAP Response.

Table 3: SAT-AIS Information Query Inputs

Name	Type
SatelliteId	SatelliteIDType
GroundStationId	GroundStationIDType
Delay	positiveInteger

6.1.15. I_LOG

6.1.15.1. Introduction

I_LOG		Scope	Mode:	Protocol:
		Internal	Synchronous	File System, file, ASCII
implemented by	BPEL Engine Data Distribution Data Retrieval DMA Doppler L1 Processing L2 Processing L3 Processing S-AIS Data Simulation Service Ship Prediction System Performance		used by	MCC Operator
The interface defines the contract that several components shall respect to provide information about their activities in a log file.				

6.1.15.2. Protocol

The information delivered through this interface is operated through a file living on the files-system.

IFR-I_LOG-0910/T

The I_LOG interface must delivers the information in a file living on the files-system.

Trace from:

6.1.15.3. Data model

The information is written in pure text using the ASCII character encoding and the single Line Feed character (LF, 0x0A) for line separation.

Each log message has the following format:



timestamp [thread] severity context message

where:

Field	Description	Format
timestamp	Timestamp of the log message	ISO 8601
thread	The identifier of the thread	String
severity	A value from the severity scale which expresses the significance of the event	One of the following values: <ul style="list-style-type: none"> • INFORMATION • WARNING • ERROR
context	A content referring to a context, like the name of the class or module	A sequence of characters without spaces
message	Explicit and detailed description of the event	Free text, including spaces and newlines.

6.1.16. I_MCC_MCC_CFG

6.1.16.1. Introduction

I_MCC_MCC_CFG		Scope	Mode:	Protocol:
		Internal	Synchronous	Proprietary
implemented by	MCC	used by	Operator	
The interface defines the entry point of the MCC sub-system through which the Operator can perform the configuration.				

6.1.16.2. Protocol

The protocol describes the point of contact through which an Operator can configure the component. It is a very basic interface that equates to the File System with files as information carrier.

IFR-I_MCC_MCC_CFG-0920/I

The I_MCC_MCC_CFG interface must use files living on the local file system to carry configuration information.

Trace from:

6.1.16.3. Data Model

The information, that describes configuration items, is structured into an XML file compliant with an XSD Schema according to [Error! Reference source not found.] and [Error! Reference source not found.].

IFR-I_MCC_MCC_CFG-0930/I

The I_MCC_MCC_CFG interface must rely on an XML dialect validated by a XSD Schema.



Trace from:
SR-DPC-DES-2030
SR-DPC-DES-1960

6.1.17. I_MCC_MCC_WEB

6.1.17.1. Introduction

I_MCC_MCC_WEB		Scope	Mode:	Protocol:
		Internal	Synchronous	HTTP, HTML
implemented by	MCC	used by	Operator	
The interface defines the Web User Interface through which the Operator can monitor the system activity.				

6.1.18. I_S-AIS_DATA_PROVIDER

6.1.18.1. Introduction

I_S-AIS_DATA_PROVIDER		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		External	Synchronous	HTTP, HTTPS, FTP, SFTP, TCP, JMS
implemented by	S-AIS Data Provider S-AIS Data Simulation Service	used by	Data Retrieval	
The interface defines the contract that SAT-AIS data providers - either existing, simulated or future ones - shall respect to provide SAT-AIS messages to the DPC Block2 system.				

6.1.18.2. Protocol

The protocol used for the provision of SAT-AIS messages shall be based on standard TCP communication protocols.

IFR-I_S-AIS_DATA_PROVIDER-0940/T

The interface with SAT-AIS data providers shall use standard TCP communication protocols (http/https, socket, FTP/SFTP) for the provision of SAT-AIS messages.

Trace from:
SR-DPC-IFR-0080
SR-DIS-FUN-1800
SR-DIS-FUN-1810

The protocol actually implemented depends on the SAT-AIS data provider. The following sections describe the interface provided by the SAT-AIS data providers already identified for the DPC Block2 system



6.1.18.2.1. KSAT protocol

SAT-AIS messages are written to files on a secure FTP (SFTP) server that is hosted by KSAT. The server is accessed by the DPC Block2 as required.

Protocol	SFTP
Host	ftp3.ksat.no
Directory	DPC_delivery/data/
Authentication	User/password. Details will be provided by KSAT

Once downloaded successfully, the Data Retrieval shall delete the files from the-server.

IFR-I_S-AIS_DATA_PROVIDER-0950/T

After the successful download of a SAT-AIS messages data file from KSAT SFTP server, the Data Retrieval shall delete the files from the server

Trace from:

IFR-I_S-AIS_DATA_PROVIDER-0960/T

After the successful download of a SAT-AIS messages data file from KSAT SFTP server, the session shall be closed by the client

Trace from:

If a download is stopped, or failed it must be reinitiated, as it is not possible to restart from the last retrieved point.

IFR-I_S-AIS_DATA_PROVIDER-0970/T

If a download from KSAT SFTP server is stopped , or fails, it must be reinitiated

Trace from:

SAT-AIS messages data files delivered by KSAT will use following naming convention:

AIS-<Start time>_<Stop time>_<Source>_<Type>.nmea

where:

Field	Description	Format
Start time	Date indicating the start of data reception by KSAT from the ground station	YYYYDoYhhmmss Ex: 2011241094530 (= 29-AUG-2011 09:45:30)
Stop time	Date indicating the end of data reception by KSAT from the ground station	YYYYDoYhhmmss
Source	Satellite from which the data are received. KSAT currently provides data for two SAT-AIS space assets: AISSAT-1 and NORAIS (payload onboard the ISS)	One of the following values: <ul style="list-style-type: none"> • AISSAT-1 • NORAIS
Type	Indicate whether Doppler frequency shifts (FSI) are included in the data or not	One of the following values: <ul style="list-style-type: none"> • DPC



- DPCFSI

Note:

- For AISSAT-1: KSAT accesses the AISSat-1 data from the Norwegian Coastal Administration as an NMEA stream. The data is stored and forwarded for processing as soon as there is a 30 seconds gap with no new data received at KSAT. The data content will be from start of receiving data after the previous gap until the end of receiving data for the current gap. Typically there will be one file for the realtime data received while in contact with the Svalbard groundstation and one file for the onboard dump data received just after a pass finishes. For AOIs covered in the frame of the DPC Block2 demonstration (see **Error! Reference source not found.**), no realtime data shall be received (as both AOIs are too far from the real-time coverage area).
- For NORAIS: data are made available as files on the N-USOC server. KSAT is checking for new files every 15 minutes. Nominal files for NORAIS are containing a full hour of data that is 3-4 hours old, i.e. a file created at T will have data from the time period T-4h until T-3h. Realtime files for NORAIS are containing 15 minutes of data that are up to 30 minutes old, i.e. a file created at T will contain files from T-15m until T.

6.1.18.2.2. exactEarth protocol

exactEarth distributes AIS messages through its exactAIS service. The exactAIS system collects AIS data from Class A AIS transponders (and some Class B in certain cases) on a global basis.

It is provided through exactEarth's exactView satellite constellation. This constellation of satellites started with a minimum configuration of three LEO satellites in a polar orbit. By the end of 2012 the full constellation will be comprised of seven LEO satellites in orbits ranging from polar to equatorial. The revisit time is dependent on location but ranges from seven to fourteen revisits in every twenty four hour period for every location on the earth.

exactEarth supports two delivery options: a secured streaming interface, or SFTP distribution.

Secured data feed

AIS messages are streamed directly from the exactEarth Data Processing Centre over an encrypted link using a TCP/IP socket based connection. ExactEarth provides software (called the exactAIS Subscriber Proxy) which is installed at the DPC Block2 site and maintains a persistent connection to the exactEarth server. This Proxy receives filtered AIS data according to DPC Block2 Area Of Interest and then routes it to another TCP/IP socket for ingestion into the Block2 operational systems.

Protocol	TCP/IP socket
Host / Port	exactAIS Client Proxy software installed on DPC Block2 system automatically connects to 174.90.122.80 or 174.90.122.81 / port 25742
Operating System for the exactAIS Client Proxy	Windows XP or Windows 7
Authentication	User/password. Details will be provided by exactEarth Operations
Data Retrieval Method	Automatic polling and retrieval by exactAIS Client Proxy

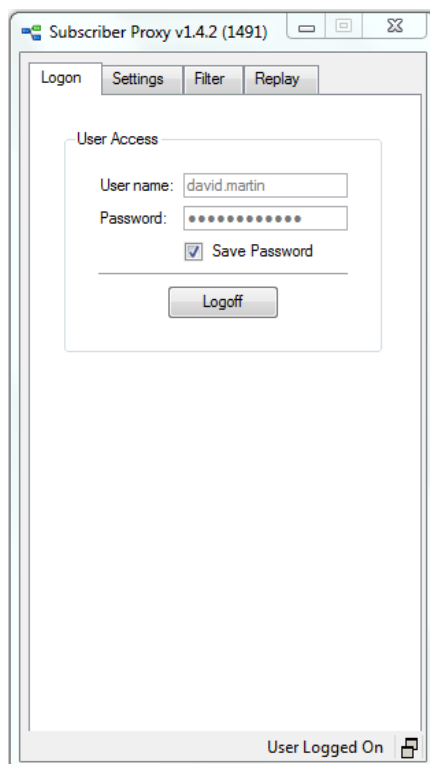


Figure 54: Example of exactAIS Subscriber Proxy i

Connection to exactEarth Processing Centre via the proxy should remain open at all times. If the connection is lost, it should be re-established immediately. The status of the link can be determined by checking the Subscriber Proxy window status bar at the bottom of the client GUI. If there is a problem with the connection, errors will be presented by the client software to help troubleshoot. Assistance is available 24/7 by contacting the exactEarth Service Desk.

IFR-I_S-AIS_DATA_PROVIDER-0980/T

Connection to exactEarth Processing Centre via the proxy should remain open at all times. If the connection is lost, it should be re-established immediately.

Trace from:

Secured FTP

AIS messages are written to files on a secure FTP (SFTP) server on a time limited basis that is hosted within the exactEarth Data Processing Centre. The server is accessed by the DPC Block2 as required.

Protocol	SFTP
Host	clients.exactearth.com
Directory	DPC/SAISData/
Authentication	User/password. Details will be provided by KSAT

The files may be written on either a 24 hour aggregated basis, or when the DPC Block2 AOI is updated with new position reports. The files utilize a naming convention as follows:

- 24 Hour Aggregate: <Date>_all.nmea



Field	Description	Format
Date	Date of the aggregate day of AIS messages	YYYYMMDD Ex: 20112410 (= 24-OCT-2011)

- AOI Update: <Date_Time>_<SeqNo>.nmea

Field	Description	Format
Date_Time	Date and time of the AIS messages stored in the file	YYYYMMDD_hhmmss Ex: 20112410_145000 (= 24-OCT-2011 14:50:00)
SeqNo	Sequence number automatically incremented at each daily data delivery (every time new data are available for the AOI)	NNNN

Although there is no time limit for the duration of a session, exactEarth requires that the session be closed after all available files are downloaded.

IFR-I_S-AIS_DATA_PROVIDER-0990/T

After the successful download of a SAT-AIS messages data file from exactEarth SFTP server, the session shall be closed by the client

Trace from:

IFR-I_S-AIS_DATA_PROVIDER-1000/T

If a download from exactEarth SFTP server is stopped , or fails, it must be reinitiated

Trace from:

Up to 50 parallel connections are supported, but it is usually recommended to use an automated process to download files that requires a reduced number of connections (typically one or two). Typically a session is opened every n minutes, available files are downloaded and the session is closed.

6.1.18.2.3. SAT-AIS Simulator protocol

The SAT-AIS simulator, developed in the frame of the DPC Block2 project, can provide AIS messages for a simulated fleet of vessels, and for a simulated satellite constellation and set of ground stations.

SAT-AIS messages generated by the SAT-AIS Simulator are directly written in files living on the file-system.

IFR-I_S-AIS_DATA_PROVIDER-1010/T

Delivery of SAT-AIS messages by the SAT-AIS Simulator is via files living on the file-system.

Trace from: -

The SAT-AIS Simulator provides one file per simulated downlink to a ground station, with the following naming rule:

<deliveryDate>_<simulationName>_<satelliteID>_<stationID>.mes



Field	Description	Format
deliveryDate	Delivery date of data to the DPC Block2k, in Unix Epoch time (number of seconds since 01/01/1970 00:00:00 UTC)	Integer
simulationName	Name of the simulation (configured when starting the simulation)	String
satelliteID	Identifier of the satellite from which the data are received	String
stationID	Identifier of the ground station on which the downlink is performed	String

The file corresponding to a given downlink is updated at each simulation step.

As only one downlink is associated to a satellite at a given date, only one file per satellite may be updated per simulation step. Once the delivery date is passed, the file is never updated again.

6.1.18.2.4. EMSA protocol

EMSA protocols is based on the widely spread Java technology called JMS - Java Message Service.

IFR-I_S-AIS_DATA_PROVIDER-1001/T

The IFR-I_S-AIS_DATA_PROVIDER-1001/T interface for the EMSA provider must use the JMS protocol v1.1 as specified in [RD 22].

Trace from:

IFR-I_S-AIS_DATA_PROVIDER-1002/T

The IFR-I_S-AIS_DATA_PROVIDER-1001/T interface for the EMSA provider must organize JMS dialog according to the following terms: in a single way, from the EMSA system (Sender) to the S-AIS DPC Block2 (Receiver), following the point-to-point model, through a single message queue, using a Text message.

Trace from:

Regarding this protocol:

- The DPC Block2 acts as the receiving system. The sequence of steps performed could be like this:
 7. Lookup of the JMS message queue
 8. Creation of the connection and session
 9. Creation of a receiver queue
 10. Message reception from the queue as a text message
 11. Go to step 4 until end condition
 12. Close connection and session
- The EMSA acts as the sending system. The sequence of steps performed could be like this:
 8. Lookup of the JMS message queue
 9. Creation of the connection and session
 10. Creation of a sender queue
 11. Creation of a text message (containing the textual S-AIS message in EMSA CDF format)
 12. Message sending to the queue
 13. Go to step 5 until end condition
 14. Close connection and session



6.1.18.3. Data model

Two kind of data model are considered depending on the data provider.

6.1.18.3.1. NMEA v4 format

For all data providers except EMSA, SAT-AIS messages shall be delivered in ASCII using the <comment block>+<VDM sentence> standard format. An example of <comment block>+<VDM sentence> message is given below:

```
\s:AISsat_1,c:1282736221*45\!AIVDM,1,1,,A,344e1U0r008r5EBU@dSo4US>0PvQ,0*75
```

where:

- \s:AISsat_1,c:1282736221*45\ is the comment block
- !AIVDM,1,1,,A,344e1U0r008r5EBU@dSo4US>0PvQ,0*75 is the VDM sentence

The Carrier Return Line Feed character (CRLF, 0x0D 0x0A) is used for line separation.

NMEA sentences for radio-communication equipment and system (including AIS) are described in **Error! Reference source not found.** (IEC 61162-1). Only the VDM sentence shall be used.

AIS message types and content are documented in **Error! Reference source not found.** (ITU-R M.1371). There shall be no limitation on the type of AIS messages delivered by SAT-AIS data providers (for Class A and Class B AIS devices)

The comment block syntax is defined in **Error! Reference source not found.** (IEC 62320-1).

IFR-I_S-AIS_DATA_PROVIDER-1020/T

The interface with SAT-AIS data providers shall be based on the standard distribution format <comment block>+<VDM sentence>, according to IEC 61162-1, ITU-RM 1371, IEC 62320-1

Trace from: SR-DRT-IFR-0110

IFR-I_S-AIS_DATA_PROVIDER-1030/T

Only the VDM sentence shall be used. If other sentences are provided, they shall be ignored by the DPC Block2

Trace from: -

IFR-I_S-AIS_DATA_PROVIDER-1040/T

The interface with SAT-AIS data providers shall provide all received AIS messages, without any restriction on the AIS message type (position and non-position messages, for both class A and class B ships).

Trace from: SR-DRT-IFR-0090

IFR-I_S-AIS_DATA_PROVIDER-1050/T

The interface with SAT-AIS data providers may provide all received AIS messages, without any restriction on their integrity (that is even messages with wrong CRC).

Trace from: SR-DRT-IFR-0100

VDM sentence

The VDM sentence has the following syntax:

```
!xxVDM,<totalSentences>,<nbSentence>,<seq>,<channel>,<data>,<bits>*<hh>
```

Field	Description	Format
xxVDM	VDM sentence header	Any of the following values:



		<ul style="list-style-type: none"> • AIVDM • BSVDM
totalSentences	Total number of sentences needed to transfer the message	Integer, [1-9]
nbSentence	Sentence number	Integer, [1-9]
seq	Sequential message identifier	Integer, [0-9] Null for message that fit in one sentence
channel	AIS channel	Any of the following values: <ul style="list-style-type: none"> • A • B
data	Encapsulated ITU-R M.1371 radio message	String. Maximum of 62 valid characters for messages transferred using multiple sentences, and 63 valid characters for messages using a single sentence
bits	Number of fill-bits	Integer, [0-5]
hh	Checksum. XOR of binary converted 8-bits ASCII characters for the data field covering all elements between the “!” and the “*” (excluding them).	Hexadecimal (2 digits)

Comment block

The Comment block is associated to each AIS message expressed as a VDM sentence, to provide ancillary information (date, source, etc.). It is compounded of 1 or more (tag-code,value) pairs, separated by a comma (“,”).

IFR-I_S-AIS_DATA_PROVIDER-1060/T

The interface with SAT-AIS data providers shall provide ancillary data associated to each detected AIS message. Ancillary data shall be contained in the comment block.

Trace from: SR-DRT-IFR-0120

A comment block has the following syntax:

```
\<tag-code_1>:<value_1>,...<tag-code_n>:<value_n>*<hh>\
```

Field	Description	Format
tag-code_i	Comment block tag	String (usually 1 character).
value_i	Value associated to the tag	String
hh	Comment block checksum. XOR of binary converted 8-bits ASCII characters for the data field covering all elements between the “\” and the “*” (excluding them).	Hexadecimal (2 digits)

Standardized comment block tags that are used by SAT-AIS data providers are:



- c (mandatory): detection date of the AIS message, expressed in Unix Epoch time (number of seconds since 01/01/1970 00:00:00 UTC)
- s (mandatory): source of data (typically, the identifier of the satellite that received the AIS message)
- i (optional): information. This is free form text using valid characters. In the case of DPC Block2 system, the tag-code can be used to provide information such as Doppler shift measurements, signal level, etc.

The maximum number of characters in a comment block is 80 characters including the beginning and closing “\” comment block delimiters.

Two or more lines can be associated to form a group, each line containing a comment block. This can be used to represent multi-sentences AIS messages, as detailed in **Error! Reference source not found.** (§ A.3).

IFR-I_S-AIS_DATA_PROVIDER-1070/T

The comment block shall contain a time stamp indicating the date and time of detection of the AIS message by the satellite, with a resolution of at least 1 sec. The “c” tag-code shall be used for this time stamp.

Trace from: SR-DRT-IFR-0130

IFR-I_S-AIS_DATA_PROVIDER-1080/T

The comment block shall contain an identifier of the source of the the AIS message. The “s” tag-code shall be used.

Trace from: SR-DRT-IFR-0140

IFR-I_S-AIS_DATA_PROVIDER-1090/T

When available, the comment block shall contain the Doppler shift measured by the satellite at the time of detection of the AIS message, the received signal power, or other “signal” information. The “i” tag-code shall be used.

Trace from: SR-DRT-IFR-0150, SR-DRT-IFR-0160

6.1.18.3.1.1. KSAT data model

The data model used by KSAT for the provision of SAT-AIS messages follows the general one described in § 6.1.18.3.

The comment block tags are the following:

Field	Description	Format
c:<date>	Detection date of the AIS message, expressed in Unix Epoch time (number of seconds since 01/01/1970 00:00:00 UTC)	Integer
s:<sat>	identifier of the satellite that received the AIS message	Any of the following values: <ul style="list-style-type: none"> • AISat-1 • NORAIS
i:FSI=<value> (optional)	Frequency Shift Indicator (FSI), that is the frequency deviation measured by the satellite when receiving the AIS message, w.r.t. the AIS channel on which the message was received. FSI value is a positive or negative integer with a resolution is 1 Hz (FSI=(+/-)NNNN).	Integer



Example of SAT-AIS messages provided by KSAT:

- Without FSI information

```
\s:AISsat_1,c:1282736221*45\!AIVDM,1,1,,A,344e1U0r008r5EBU@dSo4US>0PvQ,0*75
\s:AISsat_1,c:1282736221*45\!AIVDM,1,1,,B,344SPK7P@g30QT`WhdFR22m800nQ,0*5D
\s:AISsat_1,c:1282736222*46\!AIVDM,1,1,,A,402M57Aub<cTW2>GE0`APt700L06,0*13
```

- With FSI information

```
\s:AISsat_1,c:1293019988,i:FSI=+4500*XX\!AIVDM,1,1,,B,15REn100j<MoK:6=:NPaS
Gf<05Pl,0*77
```

Note: the current KSAT implementation for comment block of multi-sentences AIS messages (e.g. AIS message type 5) does not follow the standard described in **Error! Reference source not found.** The Norwegian Coastal Administration currently removes the comment block for the 2nd line.

For instance, while a message 5 should look like:

```
\s:AISsat_1,c:1302267506*4F\!AIVDM,2,1,2,B,544j0N0256r5D5Tt001<u84e<4p00000
00000016;0V=554U0?Ti@H3i`3jj,0*4E
\s:AISsat_1*3A\!AIVDM,2,2,2,B,3m4jh000000,2*7D
```

it currently looks like the following for AISsat-1:

```
\s:AISsat_1*3A\!AIVDM,2,1,2,B,544j0N0256r5D5Tt001<u84e<4p00000000000016;0V=5
54U0?Ti@H3i`3jj,0*4E
!AIVDM,2,2,2,B,3m4jh000000,2*7D
```

This discrepancy has been reported to the NCA and shall be corrected during the duration of the DPC Block2 project.

6.1.18.3.1.2. exactEarth data model

The data model used by exactEarth for the provision of SAT-AIS messages follows the general one described in § 6.1.18.3.

The comment block tags are the following:

Field	Description	Format
c:<detec ^{tion} _date>	Detection date of the AIS message, expressed in Unix Epoch time (number of seconds since 01/01/1970 00:00:00 UTC)	Integer
s:<sat>	identifier of the satellite that received the AIS message	String (rEVnn where nn is the satellite number)
i:<information>	information field, in which data are separated by a double underscore __	String
TOA_	precise time of arrival within the detection second given after c:, in µs (optional)	Integer
FOA_	frequency shift of arrival with respect to the centre of the AIS channel, in mHz	Integer



If a message is a multi-slot message requiring multiple VDM sentences, the grouping parameter of the comment block structure is used (see **Error! Reference source not found.**, § A.3).

Example of SAT-AIS messages provided by exactEarth:

```
: \s:rEV01d,c:1422969058,i:FOA_+2625000*46\!AIVDM,1,1,,B,15N7NDPP0<CwogJP?`;
uMwwj28RI,0*5F
```

6.1.18.3.1.3. SAT-AIS Simulator data model

The data model used by the SAT-AIS Simulator for the provision of SAT-AIS messages follows the general one described in § 6.1.18.3.

The comment block tags are the following:

Field	Description	Format
c:<detec	Detection date of the AIS message, expressed in Unix Epoch time (number of seconds since 01/01/1970 00:00:00 UTC)	Integer
s:<source>	Name of the simulation (configured when starting the instance of the SAT-AIS simulator)	String
a:<sat>	Identifier of the satellite that has performed the detection	String
h:<ground_station>	Identifier of the ground-station used to downlink the message	String
d:<downlink_date>	Date of downlink to the ground station, expressed in Unix Epoch time (number of seconds since 01/01/1970 00:00:00 UTC)	Integer
r:<reception_date>	Date of delivery to the data processing centre, expressed in Unix Epoch time (number of seconds since 01/01/1970 00:00:00 UTC)	Integer
i:<information>	information field, in which data are separated by a double underscore __	String
TOA_	precise time of arrival within the detection second given after c:, in µs	Integer
FOA_	frequency shift of arrival with respect to the centre of the AIS channel, in mHz	Integer
POA_	estimated received power in dBm	Integer
TSPC_	date of satellite position computation, expressed in Unix Epoch time (number of seconds since 01/01/1970 00:00:00 UTC)	Integer
q:<quality_index>	Hexadecimal character representing a quality index coded on 4 bits <ul style="list-style-type: none"> Bit 1: '0' if it is a real vessel, '1' if it is a virtual vessel Bit 2: '0' if the CRC is correct, '1' if the CRC is false Bit 3-4: spare 	Hexadecimal (1 character)



6.1.18.3.1.4. Future SAT-AIS providers data model

The data model used by the future SAT-AIS data providers for the provision of AIS messages follows the general one described in § 6.1.18.3.

The proposed comment block tags are the following:

Field	Description	Format
c:<detection_date>	Detection date of the AIS message, expressed in Unix Epoch time (number of seconds since 01/01/1970 00:00:00 UTC)	Integer
s:<sat>	Identifier of the satellite that has performed the detection	String
h:<ground_station>	Identifier of the ground-station used to downlink the message	String
d:<downlink_date>	Date of downlink to the ground station, expressed in Unix Epoch time (number of seconds since 01/01/1970 00:00:00 UTC)	Integer
o:<orbit>	Identifier of the satellite orbit during which the AIS message was received	Integer
i:<information>	information field, in which data are separated by a double underscore __	String
TOA_	(optional) precise time of arrival within the detection second given after c:, in μ s	Integer
FOA_	(optional) frequency shift of arrival with respect to the centre of the AIS channel, in mHz	Integer
POA_	(optional) estimated received power in dBm	Integer

6.1.18.3.2. EMSA CDF format

6.1.18.3.2.1. General points

For the EMSA S-AIS provider, the data model used is the EMSA Canonical Data Format (CDF) described in [RD 25].

EMSA CDF data model can hold various information. As a general principle, a set of S-AIS messages comes in the following form:

- A root which expresses common information about source, identification and timestamp;
 - Access rights, if relevant
 - A set of position messages gathered per ships:
 - Access rights, if relevant
 - Ship particulars (i.e. ship static information)
 - A Set of position reports for the considered ship
 - Common attributes (location, sog, cog...)
 - AIS specific information (ship type, raw message)
 - S-AIS specific information (satellite identifier, Doppler shift frequency...)



6.1.18.3.2.2. S-AIS DPC specific usage

The DPC Block2 system makes a specific usage of the CDF which is suitable for its needs. The following chapters describe the specific parts of the model that both producer and consumer must know to correctly handle the exchange.

6.1.18.3.2.3. Organisation of positions in CDF

The EMSA CDF format gives a lot of freedom in the way of organizing the ais positions.

In the absence of a specific agreement in the organization of positions in CDF and since the “receiver” role is taken on by DPC Block2 (through the Data Retrieval component), the organization is let to the producer.

The only restrictions made to the schema concerns the limit in terms of quantity and space, so that:

- The total weight of a JMS message (TextMessage) can not exceed 100 MiB

6.1.18.3.2.4. Specific information

S-AIS DPC Block2 can make use of specific information coming from providers if they are available in the CDF. Those are:

Satellite identifier:

The identifier of the satellite. Optional but necessary for the success of services S1 to S5.

Frequency of Arrival

The frequency of arrival is the frequency expressed in Hertz (Hz) of the received data. Optional but necessary for the success of services S3 and S4.

Doppler signal level

The Doppler signal level is the level, expressed in decibel meter (Dbm) of the Doppler signal when receiving data.

Doppler Signal Noise Ratio

The Doppler signal noise ratio is the signal/noise ratio, expressed in decibel (Db) of the signal when receiving data.

Doppler channel identifier

The Doppler channel identifier is the identifier of the channel used when receiving data.

Orbit identifier

The orbit identifier is the identifier of the orbit the received data belongs to.

Data flow identifier

The data flow identifier is the identifier of the flow the received data belongs to. It is not used but overridden by the DPC Block2 processings.



6.1.19. I_SP_PERFORMANCE_CFG

6.1.19.1. Introduction

I_SP_PERFORMANCE_CFG		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		Internal	Synchronous	File System, XML files
implemented by	System Performance	used by	Operator	
The interface defines the entry point of the System Performance sub-system through which the Operator can perform the configuration.				

6.1.19.2. Protocol

The protocol describes the point of contact through which an Operator can configure the component. It is a very basic interface that equates to the File System with files as information carrier.

IFR-I_SP_PERFORMANCE_CFG-1100/I

The I_SP_PERFORMANCE_CFG interface must use files living on the local file system to carry configuration information.

Trace from:

6.1.19.3. Data Model

The information, that describes configuration items, is structured into an XML file compliant with an XSD Schema according to [Error! Reference source not found.] and [Error! Reference source not found.].

IFR-I_SP_PERFORMANCE_CFG-1110/I

The I_SP_PERFORMANCE_CFG interface must rely on an XML dialect validated by a XSD Schema.

Trace from:

SR-DPC-DES-2030

SR-DPC-DES-1960

6.1.20. I_SP_PERFORMANCE_GUI

6.1.20.1. Introduction

I_SP_PERFORMANCE_GUI		<u>Scope</u>	<u>Mode:</u>	<u>Protocol:</u>
		Internal	Synchronous	GUI
implemented by	System Performance	used by	Operator	
The interface defines the mean through which the Operator can access to the System Performance GUI.				



6.1.21. I_WEB_USER

6.1.21.1. Introduction

I_WEB_USER		Scope	Mode:	Protocol:
		External	Synchronous	HTTPS, HTML
implemented by	Data Distribution	used by	End-User	
<p>The interface defines the mean through which the End-User can graphically access to data provided by the S-AIS DPC Block2, such as:</p> <ul style="list-style-type: none">• SAT-AIS data processed,• products generated,• warnings and message logs.				

6.1.21.2. Protocol

The protocol describes the point of contact through which a user can graphically display the S-AIS data processed, products generated, warnings and message logs. The interface equates to an HTTP endpoint delivering content in HTML (and some related W3C technologies) that can be displayed by a Web Browser.

IFR-I_WEB_USER-1120/I

The I_WEB_USER interface must establish a conversation between a client and a server performed over HTTP version 1.1 as described in [RD 3].

Trace from:

SR-DPC-IFR-0070

SR-DPC-IFR-0080

SR-DIS-FUN-1800

SR-DIS-FUN-1810

6.1.21.3. Information exchanged

The interface can exchange several resources depending on the nature of the information to display:

- HTML resources,
- style resources (css),
- graphical resources (png),
- data resources (xml, json,...)
- code resource (js)
- ...

The following screen capture shows a representation of the information displayed in a Web Browser.

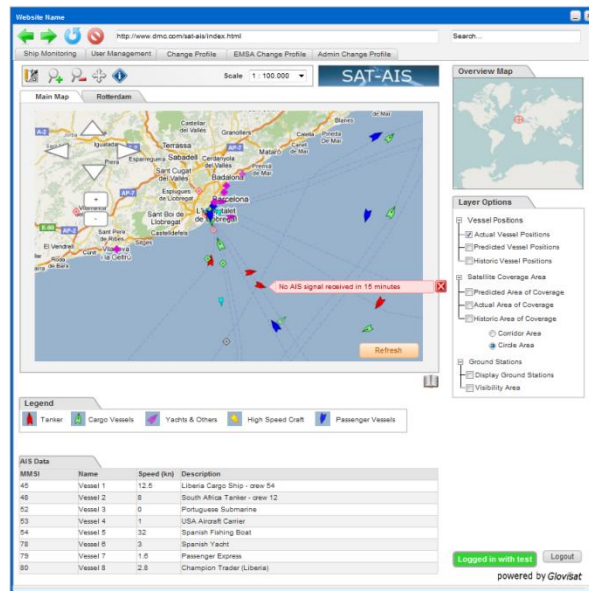


Figure 55 - Web User interface

6.2. Data models

This section contains common definitions used by the specified interfaces.

In this document, a data model refers to the types and the structure of the information that is exchanged through interfaces.

Each data model is described using a formal grammar appropriate for the specification of the data, for instance [Error! Reference source not found.] and [Error! Reference source not found.] for XML formats.

IFR-DATAMODEL-ALG-0001/T

The information exchanged through the interfaces in the boundary of the DPC Block2 System must be described by a formal grammar appropriate for the specification of the data.

Trace from: SR-DPC-DES-1960

6.2.1. “XSD” data model

The XSD data model provides several primitive and derived data types from which all others can be declared.

This data model specification is part of [Error! Reference source not found.] and [Error! Reference source not found.]. It declares types and elements in the following namespace:

xsd: <http://www.w3.org/2001/XMLSchema>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.2. “XLink” data model

The XLink data model describes several mechanisms for establishing links between resources.

This data model specification is part of [Error! Reference source not found.] from W3C. It declares types and elements in the following namespace:



xlink: <http://www.w3.org/1999/xlink>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.3. “GML” data model

The Geography Markup Language (GML) data model is defines types and elements used to express geographical features. GML serves as a modeling language for geographic systems as well as an open interchange format for geographic transactions on the Internet.

This data model is an XML encoding in compliance with [Error! Reference source not found.] from the Geospatial Consortium (OGC). It is normalized through [Error! Reference source not found.].

All components of the GML schema are defined in the following namespace using the mechanisms specified in [Error! Reference source not found.].

gml: <http://www.opengis.net/gml/3.2>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.4. “CAP” data model

6.2.4.1. Introduction

The Common Alerting Protocol (CAP) is an XML-based data format for exchanging public warnings and emergencies between alerting technologies. CAP allows a warning message to be consistently disseminated simultaneously over many warning systems to many applications. CAP increases warning effectiveness and simplifies the task of activating a warning for responsible officials.

This data model is an XML schema, as defined with [Error! Reference source not found.] and [Error! Reference source not found.], standardized by Oasis through [Error! Reference source not found.] that declares components in the following namespace using the mechanisms specified in [Error! Reference source not found.].

cap: urn:oasis:names:tc:emergency:cap:1.2

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.4.2. Data types

The data types declared within the CAP schema are versatile in order to cover almost all types of alerts and notifications, far beyond what is necessary in the frame of the DPC Block2 project.

From this perspective, a dedicated application profile is made which restricts uses and domains without losing the compliance with the standard.

6.2.5. "alert" Data Model

6.2.5.1. Introduction

The alert data model describes alert in Common Alerting Protocol xml based format.

This data model specification is part of [RD 8] and [RD 9]. All components of the alert Data Model are specified hereafter using the mechanisms specified in [RD 7].



`http://esa.int/XML/SADPC/alert`

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.5.2. Data types

6.2.5.2.1. `alert:AlertType`

Alert encapsulating a cap alert.

The following paragraph describes the structure of the complex type.

/...

`/cap:alert`

- Type: *anonymous*

CAP Alert Message (version 1.2)

6.2.5.2.2. `alert:AlertBulkType`

Bulk of alerts.

The following paragraph describes the structure of the complex type.

/...

`/alert:Alert[1:∞]`

- Type: `alert:AlertType`

6.2.6. "alert-criteria" Data Model

6.2.6.1. Introduction

The `alrtreqc` data model describes criteria for alert request.

This data model specification is part of [RD 8] and [RD 9]. All components of the `alert-criteria` Data Model are specified hereafter using the mechanisms specified in [RD 7].

`http://esa.int/XML/SADPC/alrtreqc`

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.6.2. Data types

6.2.6.2.1. `alert-criteria:AlertRequestCriteriaType`

No documentation.

The following paragraph describes the structure of the complex type.

/...

`/alert-criteria:From`

- Type: `xsd:dateTime`

Time interval from.

`/alert-criteria:To`

- Type: `xsd:dateTime`

Time interval to.

`/alert-criteria:MMSINumberList`



- Type: common:MMSINumberListType

Ship selection.

/alert-criteria:MaxMsgPerShip[0:1]

- Type: xsd:positiveInteger

Message max per ship.

/alert-criteria:RectangularArea[0:1]

- Type: common:RectangularAreaType

Area restriction.

/alert-criteria:SatelliteIdList[0:1]

- Type: common:SatelliteIDListType

Satellite restriction.

/alert-criteria:AISMessageTypeList[0:1]

- Type: common:AISMessageTypeListType

AIS message type restriction.

6.2.7. "cls" Data Model

6.2.7.1. Introduction

The cls data model defines the common types and elements used in VDR, an XML document providing information on the vessels detected on an Earth Observation product.

This data model specification is part of [RD 8] and [RD 9]. All components of the cls Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://www.cls.fr/cls>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.7.2. Data types

6.2.7.2.1. cls:ImagetteType

The data type expresses the type for an imagette.

The following paragraph describes the structure of the complex type.

@cls:width

- Constraint: optional - Type: xsd:positiveInteger

No documentation.

@cls:height

- Constraint: optional - Type: xsd:positiveInteger

No documentation.

@cls:srsName

- Constraint: required - Type: xsd:anyURI

No documentation.

/...

/cls:sarBbox[0:1]



- Type: gml:BoundingShapeType

Bouding Box of the imagette in SAR image reference following PathOriented. 0,0 stands for bottom left. For the srsName orientation, the following urn can be used:

- urn:cls:SAR:RawOriented- : l'orientation native des donnees dans les produits. Cette orientation est uniquement relative au format de stockage des produits. Cette notion ne concerne que les fichiers de produits. Aucune donnee raw oriented n'est disponible dans SARTool (sauf equivalence directe).
- urn:cls:SAR:SensorOriented- : l'orientation des donnees telles que vues par le capteur. C'est a dire X croissant avec la distance oblique et Y croissant avec le temps / l'azimut. C'est l'orientation native des donnees mises a disposition par les lecteurs de donnees bas niveau de la bibliotheque SARTool. Aucune sortie graphique n'est prevue sous cette orientation.
- urn:cls:SAR:PathOriented- : l'orientation des donnees telles que vues par un humain sur le satellite. C'est a dire X croissant de gauche a droite (vue de dessus) et Y croissant avec le temps. C'est l'orientation par default des donnees mises a disposition par les classes produits gerees par SARTool.
- urn:cls:SAR:NorthOriented- : l'orientation des donnees au plus proche d'une orientation geographique X croissant d'Ouest en Est et Y croissant du Sud vers le Nord. C'est une orientation optionnelle des donnees mises a disposition par les classes produits gerees par SARTool.

/cls:geoFootprint[0:1]

- Type: gml:PolygonPropertyType

Footprint of the imagette described by a long/lat pair.

/cls:imgGeometry[0:1]

- Type: gml:GeometryPropertyType

Optional Geometry inside the imagette. Same geometric type (point, line, polyline,...). (0,0) coord is the point to the left bottom of the imagette.

/cls:imageURI

- Type: xsd:anyURI

Complete file path to the imagette.

/...[0:1]

/cls:imageResolution

- Type: anonymous

Imagette resolution (in metters)

@cls:uom

- Constraint: optional - Default: m - Type: xsd:anyURI

No documentation.

@cls:axisLabel

- Constraint: optional - Default: x y - Type: xsd:string

No documentation.

/cls:imageSubSamplingFactor

- Type: xsd:double

Scale factor between the resolution of a full Resolution and the resolution of the imagette.



6.2.7.2.2. cls:MobilSourceType

The data type represents the type of the data source where a mobile position has been retrieved.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- enumeration: SARShip. Mobile is extracted from a SAR L1 file.
- enumeration: LRIT. Mobile is extracted from a database containing LRIT beacon positions.
- enumeration: AIS. Mobile is extracted from a database containing AIS positions.
- enumeration: Other. Any other data source for mobile positions not already referenced.

6.2.7.2.3. cls:MobilType

The data type represents the type of the data source where a mobile position has been retrieved.

The following paragraph describes the structure of the complex type.

/...

/cls:ID

- Type: `xsd:anyURI`

The unique identifier of the mobile.

/cls:date

- Type: `xsd:dateTime`

Date and time in ISO 8601 format.

/cls:geoPosition

- Type: `gml:PointPropertyType`

Mobile position expressed in longitude and latitude in the EPSG 4326 System Projection.

/cls:size[0:1]

- Type: `gml:LengthType`

Size of the mobile if possible, in meters (m). In every cases, it is encouraged to use the concrete unit using the `uom` attribute.

/cls:speed[0:1]

- Type: `gml:SpeedType`

Mobile speed if possible, in meters per seconds (m/s). In every cases, it is encouraged to use the concrete unit using the `uom` attribute.

/cls:route[0:1]

- Type: `gml:AngleType`

Route in degrees in relation to geographic north. Positive values to the est (compass between 0 and 360 degrees). In every cases, it is encouraged to use the concrete unit using the `uom` attribute.

/cls:source[0:1]

- Type: `cls:MobilSourceType`

Data source from which the position information has been retrieved, if known.

The following example shows the instantiation of a ship.

```
1 <ship xmlns:cls="http://www.cls.fr/cls"
2   xmlns:gml="http://www.opengis.net/gml">
```



```

3
<cls:ID>urn:cls:SAR:L2:Ship:ASA_WSM_1PXPDE20021117_104431_000000672011_00180_03741_0009
:20101124155858:0</cls:ID>
4   <cls:date>2002-11-17T10:45:07.914729Z</cls:date>
5   <cls:geoPosition>
6     <gml:Point srsName="EPSG:4326">
7       <gml:pos axisLabels="longitude latitude"
8         srsDimension="2"
9         uomLabels="deg deg">-9.78774 43.1479</gml:pos>
10    </gml:Point>
11  </cls:geoPosition>
12  <cls:size uom="m">448.845</cls:size>
13  <cls:route uom="deg">280.274</cls:route>
14  <cls:source>SARShip</cls:source>
15 </ship>

```

6.2.8. "common" Data Model

6.2.8.1. Introduction

The common types data model defines the common types and elements that are shared between all the components of the DPC Block2. Several other data models may refer this data model.

This data model specification is part of [RD 8] and [RD 9]. All components of the common Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://esa.int/XML/SADPC/ctypes>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.8.2. Data types

6.2.8.2.1. common:ErrorType

Error type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 30.

6.2.8.2.2. common:SpeedInKilometersPerSecondType

A speed defined as a double and expressed in kilometers per second.

The data type is a restriction of `xsd:double`. Facets of the restriction are following:

- minInclusive: 0.

6.2.8.2.3. common:MMSINumberType

MMSI number type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- pattern: [0-9]{9}.

6.2.8.2.4. common:StatusType

Status, possible values :

- OK
- NOK
- PARTIAL



The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- enumeration: OK.
- enumeration: NOK.
- enumeration: PARTIAL.

6.2.8.2.5. `common:OriginType`

Origin of message type :

- 1 : AIS message only
- 2 : Reconstructed message
- 3 : Predicted message

The data type is a restriction of `xsd:integer`. Facets of the restriction are following:

- enumeration: 1.
- enumeration: 2.
- enumeration: 3.

6.2.8.2.6. `common:KnotsType`

Knots type.

The data type is a restriction of `xsd:decimal`. Facets of the restriction are following:

- fractionDigits: 2.
- minInclusive: 0.00.

6.2.8.2.7. `common:ShipNameType`

Ship name type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- minLength: 0.
- maxLength: 50.

6.2.8.2.8. `common:PeriodType`

Period duration.

The following paragraph describes the structure of the complex type.

/...

```
/common:From
- Type: xsd:dateTime
/common:To
- Type: xsd:dateTime
```

6.2.8.2.9. `common:CheckResultType`

Result code of a check :

- 0 : not process
- 1 : not possible (value to do the check not available)
- 2 : check OK
- 3 : check KO



The data type is a restriction of `xsd:integer`. Facets of the restriction are following:

- enumeration: 0.
- enumeration: 1.
- enumeration: 2.
- enumeration: 3.

6.2.8.2.10. `common:satelliteTimePositionType`

Position of the satellite with timestamp information.

The following paragraph describes the structure of the complex type.

/...

/ `common:timeStamp`

- Type: `xsd:dateTime`

6.2.8.2.11. `common:AltitudeType`

Altitude express in meter.

The data type is a restriction of `xsd:double`. Facets of the restriction are following:

- minInclusive: 0.

6.2.8.2.12. `common:DescriptionType`

Generic description.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 100.

6.2.8.2.13. `common:SADPC_PushType`

Message of the SAT-AIS DPC used for a push in the push communication .

The following paragraph describes the structure of the complex type.

/...

6.2.8.2.14. `common:MMSINumberListType`

MMSI number list type.

6.2.8.2.15. `common:DelayInSecondType`

Delay expressed in second.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.

6.2.8.2.16. `common:SADPC_RequestType`

Message of the SAT-AIS DPC used for a request in a request/response paradigm.

The following paragraph describes the structure of the complex type.

/...

/ `common:MaxMsgPerResponseMsg[0:1]`

- Type: `xsd:positiveInteger`

6.2.8.2.17. `common:RectangularAreaType`

Rectangular area type.



The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- `maxLength`: 30.

6.2.8.2.18. `common:MsgIDType`

Message identifier under the form of an UUID.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- `pattern`: `[a-f0-9]{8}-[a-f0-9]{4}-[a-f0-9]{4}-[a-f0-9]{4}-[a-f0-9]{12}`.

6.2.8.2.19. `common:LongitudeType`

Longitude in decimal degree from -180 to 360.

The data type is a restriction of `common:AngleInDecimalDegreeType`. Facets of the restriction are following:

- `minInclusive`: -180.
- `maxInclusive`: 360.

6.2.8.2.20. `common:shipTypeType`

Ship type description type.

The data type is a restriction of `xsd:integer`. Facets of the restriction are following:

- `minInclusive`: 0.
- `maxInclusive`: 100.

6.2.8.2.21. `common:HeadingType`

Heading type.

The data type is a restriction of `xsd:nonNegativeInteger`. Facets of the restriction are following:

- `minInclusive`: 0.
- `maxInclusive`: 359.

6.2.8.2.22. `common:SatellitePassIDType`

Satellite pass type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- `maxLength`: 30.

6.2.8.2.23. `common:SADPC_ResponseType`

Message of the SAT-AIS DPC used for a response in a request/response paradigm.

The following paragraph describes the structure of the complex type.

/...

/ `common:ReferenceId`

- `Type`: `common:MsgIDType`

/ `common:SeqNum`

- `Type`: `common:SeqNumType`

/ `common:Terminate`

- `Type`: `xsd:boolean`



6.2.8.2.24. `common:OriginatorRecipientType`

The data type holds the Originator or Recipient. The content can be any free text.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- `maxLength`: 30.

6.2.8.2.25. `common:AIMessageTypeListType`

AIM message type list type.

6.2.8.2.26. `common:ProcessingLevelListType`

Processing level list type.

6.2.8.2.27. `common:SADPC_MessageType`

Message of the SAT-AIS DPC.

The following paragraph describes the structure of the complex type.

/...

/ `common:MessageId`

- `Type`: `common:MsgIDType`

/ `common:Timestamp`

- `Type`: `xsd:dateTime`

6.2.8.2.28. `common:AngleInDecimalDegreeType`

The data type denotes an Angle expresses in decimal degree.

The data type is a restriction of `xsd:decimal`. Facets of the restriction are following:

- `fractionDigits`: 5.

6.2.8.2.29. `common:DistanceInDegreeType`

Distance in degree type.

The data type is a restriction of `xsd:double`. Facets of the restriction are following:

6.2.8.2.30. `common:OriginListType`

Origin list type.

6.2.8.2.31. `common:signalLevelType`

Signal level description type.

The data type is a restriction of `xsd:double`. Facets of the restriction are following:

6.2.8.2.32. `common:ProcessingLevelType`

Processing level type :

- 1 : L0
- 2 : L1
- 3 : L2
- 4 : L3

The data type is a restriction of `xsd:integer`. Facets of the restriction are following:

- `enumeration`: 0.
- `enumeration`: 1.



- enumeration: 2.

- enumeration: 3.

6.2.8.2.33. `common:SADPC_PollType`

Message of the SAT-AIS DPC used for a poll in a request/poll response paradigm.

The following paragraph describes the structure of the complex type.

/...

`/common:ReferenceId`

- Type: `common:MsgIDType`

6.2.8.2.34. `common:orbitQualityType`

Orbit quality description type.

The data type is a restriction of `xsd:integer`. Facets of the restriction are following:

- `minInclusive`: 0.

- `maxInclusive`: 20000.

6.2.8.2.35. `common:decibelType`

Decibel description type.

The data type is a restriction of `xsd:double`. Facets of the restriction are following:

6.2.8.2.36. `common:ElevationType`

Elevation in decimal degree from 0 to 90.

The data type is a restriction of `common:AngleInDecimalDegreeType`. Facets of the restriction are following:

- `minInclusive`: 0.

- `maxInclusive`: 90.

6.2.8.2.37. `common:IMONumberType`

IMO number type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- `pattern`: `[0-9]{7}`.

6.2.8.2.38. `common:SeqNumType`

Sequence number used in multi messages response.

The data type is a restriction of `xsd:nonNegativeInteger`. Facets of the restriction are following:

6.2.8.2.39. `common:CallSignType`

Call sign type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- `pattern`: `[A-Z0-9]{1,7}`.

6.2.8.2.40. `common:SatelliteIDType`

The data type holds the identifier of a satellite. No assumption is made on the format, and the data type can contain any free text.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:



- maxLength: 30.

6.2.8.2.41. common:SatelliteIDListType

List of satellite identifiers.

6.2.8.2.42. common:FrequencyType

Frequency type.

The data type is a restriction of `xsd:double`. Facets of the restriction are following:

6.2.8.2.43. common:positionType

Position description type, geographic type with time stamp information.

The following paragraph describes the structure of the complex type.

/...

/common:timeStamp

- Type: `xsd:dateTime`

6.2.8.2.44. common:MessageOriginType

Message origin type :

- 1 : collected
- 2 : predicted
- 3 : simulated
- 4 : recovered

The data type is a restriction of `xsd:integer`. Facets of the restriction are following:

- enumeration: 1.
- enumeration: 2.
- enumeration: 3.
- enumeration: 4.

6.2.8.2.45. common:GroundStationIDType

The data type holds the identifier of a ground station. No assumption is made on the format, and the data type can contain any free text.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 30.

6.2.8.2.46. common:satellitePositionType

Position of the satellite.

The following paragraph describes the structure of the complex type.

/...

/common:SatelliteID

- Type: `common:SatelliteIDType`

/common:PosX

- Type: `common:LengthInKilometersType`

/common:PosY

- Type: `common:LengthInKilometersType`



```

/common:PosZ
- Type: common:LengthInKilometersType
/common:SpeedU[0:1]
- Type: common:SpeedInKilometersPerSecondType
/common:SpeedV[0:1]
- Type: common:SpeedInKilometersPerSecondType
/common:SpeedW[0:1]
- Type: common:SpeedInKilometersPerSecondType

```

6.2.8.2.47. common:LengthInMetersType

A length (or a distance) defined as a double and expressed in meters.

The data type is a restriction of `xsd:double`. Facets of the restriction are following:

- minInclusive: 0.

6.2.8.2.48. common:ErrorEllipseType

Error ellipse parameters, defined by :

- Smi-major axis
- Semi-minor axis
- Orientation (angle with the North, going towards to the East)

The following paragraph describes the structure of the complex type.

/...

```

/common:semiMajorAxis
- Type: xsd:double
Semi-major axis.
/common:semiMinorAxis
- Type: xsd:double
Semi-minor axis.
/common:orientation
- Type: common:AngleInDecimalDegreeType
Orientation.

```

6.2.8.2.49. common:LengthInKilometersType

A length (or a distance) defined as a double and expressed in kilometers.

The data type is a restriction of `xsd:double`. Facets of the restriction are following:

- minInclusive: 0.

6.2.8.2.50. common:AISMessageTypeType

AIS message (number) type.

The data type is a restriction of `xsd:integer`. Facets of the restriction are following:

- minInclusive: 1.
- maxInclusive: 27.



6.2.8.2.51. `common:RotationType`

Rotation (degree/min) type.

The data type is a restriction of `xsd:decimal`. Facets of the restriction are following:

- `fractionDigits`: 2.

6.2.8.2.52. `common:satelliteVelocityType`

Satellite velocity (Vx,Vy,Vz) WGS84, unit=km/s [-10,10], resolution=10E-6.

The following paragraph describes the structure of the complex type.

6.2.8.2.53. `common:MeterByHertzType`

Meter by Hertz type.

The data type is a restriction of `xsd:double`. Facets of the restriction are following:

6.2.8.2.54. `common:CheckType`

Check containing the result and a description.

The following paragraph describes the structure of the complex type.

/...

/`common:Result`

- `Type`: `common:CheckResultType`

/`common:Description`[0:1]

- `Type`: `common:DescriptionType`

6.2.8.2.55. `common:LatitudeType`

Latitude in decimal degree from -90 to 90.

The data type is a restriction of `common:AngleInDecimalDegreeType`. Facets of the restriction are following:

- `minInclusive`: -90.
- `maxInclusive`: 90.

6.2.9. "core" Data Model

6.2.9.1. Introduction

The core data model defines the common types and elements that serve as a "foundation" for others data models.

This data model specification is part of [RD 8] and [RD 9]. All components of the `core` Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://iap.esa.int/schemas/sat-ais/core>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.9.2. Data types

6.2.9.2.1. `core:SequenceNumberType`

The sequence number is a positive number that represents an index in a sequence of elements. It is used for instance to re-order several responses from a same request during an asynchronous call.



The data type is a restriction of `xsd:nonNegativeInteger`. Facets of the restriction are following:

6.2.9.2.2. `core:mediaTypeType`

The media-type type represents an identifier compliant with [RD 15] and [RD 16] for referencing formats. The media-type is a two-part identifier separated by a slash:

`type / subtype`

IANA manages a registry of media types, some of them are used by the S-AIS Block2 System but some others not. For all these non standard data types, new entries are added to the type "x" as shown here after.

- `application/x-tle` : TLE content, a data format used to convey set of orbital elements that describe the orbit of an earth satellite.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- pattern: `[a-z-]+/[a-z-]+`. Two string parts separated with a slash.
- maxLength: 30. Limit the string length of the media-type.
- minLength: 8. Minimal string length for a media-type.

6.2.9.2.3. `core:responseType`

The response data type represents a response holding the necessary information to contextualize the processing. The response is a container that doesn't detail the content so that the carried information can be anything. No assumption is made about this, and it's up to each service to extend this type to enforce the content type. The data type is a structure (XSD Complex Type) that carries some information in attributes about the whole data set where the fragment is originated.

The following paragraph describes the structure of the complex type.

`@core:uuid`

- Constraint: required - Type: `core:UUIDType`

The UUID attribute carries a universally unique identifier. This attribute is used in several elements to introduce a strong and uniform identification principle.

`@core:processId`

- Constraint: required - Type: `core:UUIDType`

Unique identifier of the processing. If several responses are produced by a same asynchronous processing, the `processId` remains the same. This allows for a consumer to understand the relationship between several responses.

`@core:timestamp`

- Constraint: required - Type: `xsd:dateTime`

Date and time in ISO 8601 format when the response was generated

`@core:sequenceNumber`

- Constraint: required - Type: `core:SequenceNumberType`

The sequence number, starting from 0 for the first and incremented one by one. This index allows a client to reorder the received response.

`@core:lastResponse`

- Constraint: required - Type: `xsd:boolean`

Flag that indicates whether this response is the last or not. Even if this flag is set, other responses with the same `responseId` can be sent, since there is no order relation. The consumer must check that the `indexNumber` of each received response forms a continuous sequence.



/...

/any[1:∞]

The content of the response data type is left un-described and can be anything. The concrete structure is refined by each service depending on the needs. For instance, the Data Retrieval subsystem use this structure to carry and publish the retrieved data from Providers.

The following example shows what a response could be.

```

1 <core:responseInstance xmlns:core="http://iap.esa.int/schemas/sat-ais/core"
2   xmlns:dpc="http://iap.esa.int/schemas/sat-ais/dpc"
3   xmlns:xlink="http://www.w3.org/1999/xlink"
4   core:uuid="1777ec60-4042-44e1-b86c-0800200c9a66"
5   core:processId="1777ec60-4042-22e1-b86c-0800200c9a66"
6   core:timestamp="2001-10-26T21:32:52+02:00"
7   core:sequenceNumber="0"
8   core:lastResponse="true">
9   <foo>
10  </foo>
11 </core:responseInstance>

```

6.2.9.2.4. core:traceabilityType

The traceability Data Type confers to the DPC Block2 System the capability for tracing data along the processing chain. As shown in the figure, this data type holds the information about the:

- "Who": the UUID of the data uniquely identifies the element covered by the traceability;
- "When": a date and time locates the time at which traceability is exercised;
- "Where": the process uuid identifies the process from which the data has been produced;
- "How": Every data that have been used to produce the element is inventoried here.

Notice that this information is not DPC Block2 specific. The data type is a structure (XSD Complex Type) that carries the information in elements, each characterizing one specific aspect of the traceability.

The following paragraph describes the structure of the complex type.

/...[0:1]

/core:processId

- Type: core:UUIDType

Unique identifier of the processing from which the data comes from (Where).

/core:timestamp

- Type: xsd:dateTime

Date and time in ISO 8601 format when the data was produced (When).

/core:upstream

- Type: anonymous

Contains the sequence (eventually empty) of upstream identifiers (How), no matters their natures. This allows an understanding of elements that were used to generate the data described.

/...

/core:from[0:∞]

- Type: core:UUIDType

Unique identifier of the data that was used, in upstream, to produce this data.



The following example shows a traceability element denoting the result of a process made of three materials.

```

1 <core:traceability>
2   <core:processId>b6626e50-62f1-11e1-b86c-0800200c9a66</core:processId>
3   <core:timestamp>2011-10-26T21:32:52+02:00</core:timestamp>
4   <core:upstream>
5     <core:from>28a84648-99af-464b-a7eb-8cbb46898e37</core:from>
6     <core:from>6431522c-cfff-406f-9510-b10e4fe4d479</core:from>
7     <core:from>5e7a6fd0-e657-4db6-96b1-d42a7406c539</core:from>
8   </core:upstream>
9 </core:traceability>

```

6.2.9.2.5. core:UUIDType

The UUID data type represents a universally unique identifier, an identifier used to uniquely identify information in a distributed system, without the need of a central coordination. A UUID is a 16 bytes (128 bits) number represented by 32 hexadecimal digits. The digits are grouped in 5 blocs separated by hyphens, the first bloc containing 8 digits, the following three containing 4 digits and the last bloc containing 12 digits.

d6399470-3d3e-11e1-b86c-0800200c9a66

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- pattern: `[a-f0-9]{8}-[a-f0-9]{4}-[a-f0-9]{4}-[a-f0-9]{4}-[a-f0-9]{12}`. 32 hexadecimal digits following the form: 8-4-4-4-12

6.2.10. "csndc" Data Model

6.2.10.1. Introduction

No documentation.

This data model specification is part of [RD 8] and [RD 9]. All components of the `csndc` Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://www.emsa.europa.eu/csndc>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.10.2. Data types

6.2.10.2.1. csndc:DataPackageType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/csndc:packageInfo

- Type: `csndc:PackageInfoType`

/csndc:eoProduct

- Type: `csndc:EOProductType`

/Choice

/csndc:oilSpills[0:1]

- Type: `csndc:OilSpillsType`

/...



```

/csndc:detectedShips[0:1]
  - Type: csndc:DetectedShipsType
/csndc:sarDerivedData
  - Type: csndc:SARDerivedDataType
/csndc:qualityNotification[0:1]
  - Type: csndc:QualityType
/csndc:qualityReport[0:1]
  - Type: csndc:QualityType
/csndc:processRequest[0:1]
  - Type: csndc:ProcessRequestType

```

6.2.10.2.2. csndc:DetectedShipReferenceType

GML files describing observed in the original satellite image

The following paragraph describes the structure of the complex type.

/...

```

/csndc:identifier
  - Type: anonymous
  Identifier for metadata item
  Simple type
/csndc:fileName[0:1]
  - Type: anonymous
  Reference to filename in the Package
  Simple type

```

6.2.10.2.3. csndc:QualityType

Specify the data package quality info file

The following paragraph describes the structure of the complex type.

/...

```

/csndc:identifier
  - Type: anonymous
  Identifier for metadata item
  Simple type
/csndc:fileName
  - Type: anonymous
  Reference to filename in the Package
  Simple type

```

6.2.10.2.4. csndc:ProcessRequestType

Specify the process request file

The following paragraph describes the structure of the complex type.

/...



/csndc:identifier

- Type: *anonymous*

Identifier for metadata item

Simple type

/csndc:fileName

- Type: *anonymous*

Reference to filename in the Package

Simple type

6.2.10.2.5. csndc:EOProductType

Specify the data package attributes

The following paragraph describes the structure of the complex type.

/...

/csndc:identifier

- Type: *anonymous*

Identifier for metadata item

Simple type

/csndc:fileName[0:1]

- Type: *anonymous*

Reference to filename in the Package

Simple type

6.2.10.2.6. csndc:SARDerivedFeatureType

NetCDF file describing a meteo feature (wind, wave) derived from the original satellite image

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- enumeration: WIND.
- enumeration: WAVE.

6.2.10.2.7. csndc:OilSpillReferenceType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/csndc:identifier

- Type: *anonymous*

Identifier for metadata item

Simple type

/csndc:fileName[0:1]

- Type: *anonymous*

Reference to filename in the Package

Simple type

6.2.10.2.8. csndc:OilSpillsType



Describes main results of the Oil Spill Analysis performed on the scene

The following paragraph describes the structure of the complex type.

@csndc:total

- Constraint: required - Type: xsd:integer

Total number of oil spills found/processed

/...

/csndc:oilSpillReference[1:∞]

- Type: csndc:OilSpillReferenceType

6.2.10.2.9. csndc:DetectedShipsType

GML files describing observed in the original satellite image

The following paragraph describes the structure of the complex type.

@csndc:total

- Constraint: required - Type: xsd:integer

Total number of detected ships found.

/...

/csndc:detectedShipReference[1:∞]

- Type: csndc:DetectedShipReferenceType

6.2.10.2.10. csndc:SARDerivedDataType

NetCDF files describing meteo features (wind, wave) derived from the original satellite image

The following paragraph describes the structure of the complex type.

/...

/csndc:sarDerivedDataReference[1:∞]

- Type: csndc:SARDerivedDataReferenceType

6.2.10.2.11. csndc:SARDerivedDataReferenceType

NetCDF file describing a meteo feature (wind, wave) derived from the original satellite image

The following paragraph describes the structure of the complex type.

/...

/csndc:sarDerivedFeature

- Type: csndc:SARDerivedFeatureType

Type of derived data

/csndc:fileName

- Type: *anonymous*

Reference to filename in the Package

Simple type

6.2.10.2.12. csndc:PackageInfoType

Specify the data package attributes

The following paragraph describes the structure of the complex type.

/...



/csndc:packageId

- Type: *xsd:string*

Specify a reference identifier for the data package

/csndc:packageType

- Type: *anonymous*

Specify type of data package (one of OS_WARNING, EO_PRODUCT, OS_NOTIFICATION, SAR_DERIVED, QUALITY_NOTIFICATION or QUALITY_REPORT, PROCESS_REQUEST, PROCESS_RESPONSE)

Simple type

/csndc:operationType

- Type: *anonymous*

Specify if the data package is part of a reference test data set or not (one of TEST or NOMINAL)

Simple type

/csndc:dataPackageDescription[0:1]

- Type: *xsd:string*

6.2.11. "decoded-msg" Data Model

6.2.11.1. Introduction

The daismsg data model describes decoded AIS message in NMEA standard encoding.

This data model specification is part of [RD 8] and [RD 9]. All components of the decoded-msg Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://esa.int/XML/SADPC/daismsg>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.11.2. Data types

6.2.11.2.1. decoded-msg:CommunicationStateType

Communication state description type.

The data type is a restriction of *xsd:int*. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 524287.

6.2.11.2.2. decoded-msg:DecodedAISMessageType

Decoded AIS message.

The following paragraph describes the structure of the complex type.

/Choice

/decoded-msg:AISMsg1Msg2Msg3

- Type: decoded-msg:AISMsg1Msg2Msg3Type

/decoded-msg:AISMsg4Msg11

- Type: decoded-msg:AISMsg4Msg11Type



```
/decoded-msg:AISMsg5
- Type: decoded-msg:AISMsg5Type
/decoded-msg:AISMsg6
- Type: decoded-msg:AISMsg6Type
/decoded-msg:AISMsg7Msg13
- Type: decoded-msg:AISMsg7Msg13Type
/decoded-msg:AISMsg8
- Type: decoded-msg:AISMsg8Type
/decoded-msg:AISMsg9
- Type: decoded-msg:AISMsg9Type
/decoded-msg:AISMsg10
- Type: decoded-msg:AISMsg10Type
/decoded-msg:AISMsg12
- Type: decoded-msg:AISMsg12Type
/decoded-msg:AISMsg14
- Type: decoded-msg:AISMsg14Type
/decoded-msg:AISMsg15
- Type: decoded-msg:AISMsg15Type
/decoded-msg:AISMsg16
- Type: decoded-msg:AISMsg16Type
/decoded-msg:AISMsg17
- Type: decoded-msg:AISMsg17Type
/decoded-msg:AISMsg18
- Type: decoded-msg:AISMsg18Type
/decoded-msg:AISMsg19
- Type: decoded-msg:AISMsg19Type
/decoded-msg:AISMsg20
- Type: decoded-msg:AISMsg20Type
/decoded-msg:AISMsg21
- Type: decoded-msg:AISMsg21Type
/decoded-msg:AISMsg22
- Type: decoded-msg:AISMsg22Type
/decoded-msg:AISMsg23
- Type: decoded-msg:AISMsg23Type
/decoded-msg:AISMsg24A
- Type: decoded-msg:AISMsg24AType
/decoded-msg:AISMsg24B
- Type: decoded-msg:AISMsg24BType
/decoded-msg:AISMsg25
```



- Type: decoded-msg: AISMsg25Type

/decoded-msg: AISMsg26

- Type: decoded-msg: AISMsg26Type

/decoded-msg: AISMsg27

- Type: decoded-msg: AISMsg27Type

6.2.11.2.3. decoded-msg: SequenceNumberType

Sequence number description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 3.

6.2.11.2.4. decoded-msg: QuietTimeType

Quiet time type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 15.

6.2.11.2.5. decoded-msg: PowerType

Power description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.6. decoded-msg: DestinationType

Destination description type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 20.

6.2.11.2.7. decoded-msg: AISMsg1Msg2Msg3Type

AIS messages 1, 2 and 3 (Position Report)

The following paragraph describes the structure of the complex type.

/...

/decoded-msg: RepeatIndicator

- Type: decoded-msg: RepeatIndicatorType

/decoded-msg: MMSINumber

- Type: common: MMSINumberType

/decoded-msg: NavStatus

- Type: decoded-msg: NavStatusType

/decoded-msg: Rot

- Type: common: RotationType

/decoded-msg: Sog

- Type: common: KnotsType



```
/decoded-msg:PositionAccuracy
- Type: decoded-msg:PositionAccuracyType
/decoded-msg:Longitude
- Type: common:LongitudeType
/decoded-msg:Latitude
- Type: common:LatitudeType
/decoded-msg:Cog
- Type: common:HeadingType
/decoded-msg:TrueHeading
- Type: common:HeadingType
/decoded-msg:TimeStampCounter
- Type: decoded-msg:TimeStampCounterType
/decoded-msg:ManeuverIndicator
- Type: decoded-msg:ManeuverIndicatorType
/decoded-msg:RAIMFlag
- Type: decoded-msg:RAIMFlagType
/decoded-msg:CommunicationState
- Type: decoded-msg:CommunicationStateType
```

6.2.11.2.8. decoded-msg:SlotIncrementType

Slot increment description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1023.

6.2.11.2.9. decoded-msg:ClassBDSCType

Class B Digital Selective Calling (DSC) description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.10. decoded-msg:ManeuverIndicatorType

Maneuver indicator description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 3.

6.2.11.2.11. decoded-msg:TimeoutInMinuteType

Timeout in minute description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 7.



6.2.11.2.12. decoded-msg:ClassBMsg22Type

Class B Message type 22 (Channel Management) description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.13. decoded-msg:CommunicationStateSelectorType

Communication state selector description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.14. decoded-msg:AISMsg20Type

AIS message 20 (Data Link Management).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
  - Type: decoded-msg:RepeatIndicatorType
/decoded-msg:SourceMMSINumber
  - Type: common:MMSINumberType
/decoded-msg:Offset1
  - Type: decoded-msg:SlotOffsetType
/decoded-msg:NumberOfSlot1
  - Type: decoded-msg:NumberOfSlotType
/decoded-msg:Timeout1
  - Type: decoded-msg:TimeoutInMinuteType
/decoded-msg:Increment1
  - Type: decoded-msg:IncrementType
/decoded-msg:Offset2
  - Type: decoded-msg:SlotOffsetType
/decoded-msg:NumberOfSlot2
  - Type: decoded-msg:NumberOfSlotType
/decoded-msg:Timeout2
  - Type: decoded-msg:TimeoutInMinuteType
/decoded-msg:Increment2
  - Type: decoded-msg:IncrementType
/decoded-msg:Offset3
  - Type: decoded-msg:SlotOffsetType
/decoded-msg:NumberOfSlot3
  - Type: decoded-msg:NumberOfSlotType
/decoded-msg:Timeout3

```



```

- Type: decoded-msg:TimeoutInMinuteType
/decoded-msg:Increment3
- Type: decoded-msg:IncrementType
/decoded-msg:Offset4
- Type: decoded-msg:SlotOffsetType
/decoded-msg:NumberOfSlot4
- Type: decoded-msg:NumberOfSlotType
/decoded-msg:Timeout4
- Type: decoded-msg:TimeoutInMinuteType
/decoded-msg:Increment4
- Type: decoded-msg:IncrementType

```

6.2.11.2.15. decoded-msg:StationTypeType

Station type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 15.

6.2.11.2.16. decoded-msg:ClassBDisplayType

Class B display description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.17. decoded-msg:VendorIDType

Vendor identifier description type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 7.

6.2.11.2.18. decoded-msg:AIMsg19Type

AIS message 19 (Extended Class B Equipment Position Report).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
- Type: decoded-msg:RepeatIndicatorType
/decoded-msg:MMSINumber
- Type: common:MMSINumberType
/decoded-msg:Sog
- Type: common:KnotsType
/decoded-msg:PositionAccuracy
- Type: decoded-msg:PositionAccuracyType
/decoded-msg:Longitude

```



```

- Type: common:LongitudeType
/decoded-msg:Latitude
- Type: common:LatitudeType
/decoded-msg:Cog
- Type: common:HeadingType
/decoded-msg:TrueHeading
- Type: common:HeadingType
/decoded-msg:TimeStampCounter
- Type: decoded-msg:TimeStampCounterType
/decoded-msg:Name
- Type: decoded-msg:NameType
/decoded-msg:TypeOfShip
- Type: decoded-msg:TypeOfShipType
/decoded-msg:ShipLength
- Type: common:LengthInMetersType
/decoded-msg:TypeOfElectronicPositionFixingDevice
- Type: decoded-msg:TypeOfElectronicPositionFixingDeviceType
/decoded-msg:RAIMFlag
- Type: decoded-msg:RAIMFlagType
/decoded-msg:DTEStatus
- Type: decoded-msg:DTEStatusType
/decoded-msg:AssignedMode
- Type: decoded-msg:ModeType

```

6.2.11.2.19. decoded-msg:ChannelBandwidthType

Channel bandwidth type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.20. decoded-msg:AISMsg12Type

AIS message 12 (Addressed safety related message).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
- Type: decoded-msg:RepeatIndicatorType
/decoded-msg:SourceMMSINumber
- Type: common:MMSINumberType
/decoded-msg:SequenceNumber
- Type: decoded-msg:SequenceNumberType
/decoded-msg:DestinationMMSINumber

```




- Type: common:MMSINumberType

/decoded-msg:RetransmitFlag

- Type: decoded-msg:RetransmitFlagType

/decoded-msg:SafetyRelatedText

- Type: decoded-msg:SafetyRelatedTextType

6.2.11.2.21. decoded-msg: AISMsg24BType

AIS message 24 part B (Class B CS Static Data Report).

The following paragraph describes the structure of the complex type.

/...

/decoded-msg:RepeatIndicator

- Type: decoded-msg:RepeatIndicatorType

/decoded-msg:MMSINumber

- Type: common:MMSINumberType

/decoded-msg:TypeOfShip

- Type: decoded-msg:TypeOfShipType

/decoded-msg:VendorID

- Type: decoded-msg:VendorIDType

/decoded-msg:CallSign

- Type: common:CallSignType

/decoded-msg:ShipLength

- Type: common:LengthInMetersType

6.2.11.2.22. decoded-msg: NavStatusType

Navigation status description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 15.

6.2.11.2.23. decoded-msg: IncrementType

Increment description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 2047.

6.2.11.2.24. decoded-msg: AISMsg5Type

AIS message 5 (Ship static and voyage related data).

The following paragraph describes the structure of the complex type.

/...

/decoded-msg:RepeatIndicator

- Type: decoded-msg:RepeatIndicatorType

/decoded-msg:MMSINumber



```

- Type: common:MMSINumberType
/decoded-msg:AISVersionIndicator
- Type: decoded-msg:AISVersionIndicatorType
/decoded-msg:IMONumber
- Type: common:IMONumberType
/decoded-msg:CallSign
- Type: common:CallSignType
/decoded-msg:ShipName
- Type: common:ShipNameType
/decoded-msg:TypeOfShip
- Type: decoded-msg:TypeOfShipType
/decoded-msg:ShipLength
- Type: common:LengthInMetersType
/decoded-msg:TypeOfElectronicPositionFixingDevice
- Type: decoded-msg:TypeOfElectronicPositionFixingDeviceType
/decoded-msg:ETA
- Type: xsd:date
/decoded-msg:ShipDraught[0:1]
- Type: common:LengthInMetersType
/decoded-msg:Destination
- Type: decoded-msg:DestinationType
/decoded-msg:DTEStatus
- Type: decoded-msg:DTEStatusType

```

6.2.11.2.25. decoded-msg:TxRxModeType

TX/RX mode description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 15.

6.2.11.2.26. decoded-msg:NameType

Name description type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 20.

6.2.11.2.27. decoded-msg:AISMsg7Msg13Type

AIS messages 7 and 13 (Binary Acknowledge, Safety related Acknowledge).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
- Type: decoded-msg:RepeatIndicatorType

```



```
/decoded-msg:SourceMMSINumber
- Type: common:MMSINumberType
/decoded-msg:DestinationMMSINumber1
- Type: common:MMSINumberType
/decoded-msg:SequenceNumber1
- Type: decoded-msg:SequenceNumberType
/decoded-msg:DestinationMMSINumber2
- Type: common:MMSINumberType
/decoded-msg:SequenceNumber2
- Type: decoded-msg:SequenceNumberType
/decoded-msg:DestinationMMSINumber3
- Type: common:MMSINumberType
/decoded-msg:SequenceNumber3
- Type: decoded-msg:SequenceNumberType
/decoded-msg:DestinationMMSINumber4
- Type: common:MMSINumberType
/decoded-msg:SequenceNumber4
- Type: decoded-msg:SequenceNumberType
```

6.2.11.2.28. decoded-msg:AISMessageChannelType

AIS message channel description type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- enumeration: A.
- enumeration: B.

6.2.11.2.29. decoded-msg:PositionAccuracyType

Position accuracy description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.30. decoded-msg:NameExtensionType

Name extension description type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 14.

6.2.11.2.31. decoded-msg:SafetyRelatedTextType

Safety related text description type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 156.

6.2.11.2.32. decoded-msg:TypeOfShipType

Type of ship description type.



The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- `minInclusive`: 0.
- `maxInclusive`: 255.

6.2.11.2.33. `decoded-msg:AISMsg9Type`

AIS message 9 (Standard SAR Aircraft position report).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
  - Type: decoded-msg:RepeatIndicatorType
/decoded-msg:MMSINumber
  - Type: common:MMSINumberType
/decoded-msg:Altitude
  - Type: common:AltitudeType
/decoded-msg:Sog
  - Type: common:KnotsType
/decoded-msg:PositionAccuracy
  - Type: decoded-msg:PositionAccuracyType
/decoded-msg:Longitude
  - Type: common:LongitudeType
/decoded-msg:Latitude
  - Type: common:LatitudeType
/decoded-msg:Cog
  - Type: common:HeadingType
/decoded-msg:TimeStampCounter
  - Type: decoded-msg:TimeStampCounterType
/decoded-msg:AltitudeSensor
  - Type: decoded-msg:AltitudeSensorType
/decoded-msg:DTEStatus
  - Type: decoded-msg:DTEStatusType
/decoded-msg:AssignedMode
  - Type: decoded-msg:ModeType
/decoded-msg:RAIMFlag
  - Type: decoded-msg:RAIMFlagType
/decoded-msg:CommunicationStateSelector
  - Type: decoded-msg:CommunicationStateSelectorType
/decoded-msg:CommunicationState
  - Type: decoded-msg:CommunicationStateType

```

6.2.11.2.34. `decoded-msg:NumberOfSlotType`

Number of slot description type.



The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- `minInclusive: 0`.
- `maxInclusive: 15`.

6.2.11.2.35. `decoded-msg:AISMsg18Type`

AIS message 18 (Standard Class B CS Position Report).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
  - Type: decoded-msg:RepeatIndicatorType
/decoded-msg:MMSINumber
  - Type: common:MMSINumberType
/decoded-msg:Sog
  - Type: common:KnotsType
/decoded-msg:PositionAccuracy
  - Type: decoded-msg:PositionAccuracyType
/decoded-msg:Longitude
  - Type: common:LongitudeType
/decoded-msg:Latitude
  - Type: common:LatitudeType
/decoded-msg:Cog
  - Type: common:HeadingType
/decoded-msg:TrueHeading
  - Type: common:HeadingType
/decoded-msg:TimeStampCounter
  - Type: decoded-msg:TimeStampCounterType
/decoded-msg:ClassBUnit
  - Type: decoded-msg:ClassBUnitType
/decoded-msg:ClassBDisplay
  - Type: decoded-msg:ClassBDisplayType
/decoded-msg:ClassBDSC
  - Type: decoded-msg:ClassBDSCType
/decoded-msg:ClassBBand
  - Type: decoded-msg:ClassBBandType
/decoded-msg:ClassBMsg22
  - Type: decoded-msg:ClassBMsg22Type
/decoded-msg:Mode
  - Type: decoded-msg:ModeType
/decoded-msg:RAIMFlag
  - Type: decoded-msg:RAIMFlagType

```



```
/decoded-msg:CommunicationStateSelector
```

```
- Type: decoded-msg:CommunicationStateSelectorType
```

```
/decoded-msg:CommunicationState
```

```
- Type: decoded-msg:CommunicationStateType
```

6.2.11.2.36. decoded-msg:AISMsgType

Base type for all decoded AIS messages.

The following paragraph describes the structure of the complex type.

/...

```
/decoded-msg:AISMessageChannel
```

```
- Type: decoded-msg:AISMessageChannelType
```

```
/decoded-msg:AISMessageType
```

```
- Type: common:AISMessageTypeType
```

6.2.11.2.37. decoded-msg:TypeOfElectronicPositionFixingDeviceType

Type of electronic position fixing device description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 15.

6.2.11.2.38. decoded-msg:ClassBBandType

Class B band description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.39. decoded-msg:AISMsg22Type

AIS message 22 (Channel Management).

The following paragraph describes the structure of the complex type.

/...

```
/decoded-msg:RepeatIndicator
```

```
- Type: decoded-msg:RepeatIndicatorType
```

```
/decoded-msg:StationMMSINumber
```

```
- Type: common:MMSINumberType
```

```
/decoded-msg:ChannelA
```

```
- Type: decoded-msg:ChannelType
```

```
/decoded-msg:ChannelB
```

```
- Type: decoded-msg:ChannelType
```

```
/decoded-msg:TxRxMode
```

```
- Type: decoded-msg:TxRxModeType
```

```
/decoded-msg:Power
```

```
- Type: decoded-msg:PowerType
```



```

/decoded-msg:Longitude1
- Type: common:LongitudeType
/decoded-msg:Latitude1
- Type: common:LatitudeType
/decoded-msg:Longitude2
- Type: common:LongitudeType
/decoded-msg:Latitude2
- Type: common:LatitudeType
/decoded-msg:AddressedBroadcastIndicator
- Type: decoded-msg:AddressedBroadcastIndicatorType
/decoded-msg:ChannelABandwidth
- Type: decoded-msg:ChannelBandwidthType
/decoded-msg:ChannelBBandwidth
- Type: decoded-msg:ChannelBandwidthType
/decoded-msg:TransitionalZoneSize
- Type: decoded-msg:TransitionalZoneSizeType

```

6.2.11.2.40. decoded-msg:AtoNStatusType

Aids to navigation description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 255.

6.2.11.2.41. decoded-msg:AddressedBroadcastIndicatorType

Addressed broadcast indicator description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.42. decoded-msg:AISMsg27Type

AIS message 27 (Long Range AIS Broadcast message).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
- Type: decoded-msg:RepeatIndicatorType
/decoded-msg:MMSINumber
- Type: common:MMSINumberType
/decoded-msg:PositionAccuracy
- Type: decoded-msg:PositionAccuracyType
/decoded-msg:RAIMFlag
- Type: decoded-msg:RAIMFlagType

```



```

/decoded-msg:NavStatus
  - Type: decoded-msg:NavStatusType
/decoded-msg:Longitude
  - Type: common:LongitudeType
/decoded-msg:Latitude
  - Type: common:LatitudeType
/decoded-msg:Sog
  - Type: common:KnotsType
/decoded-msg:Cog
  - Type: common:HeadingType
/decoded-msg:CurrentGNSSPositionStatus
  - Type: decoded-msg:GNSSPositionStatusType

```

6.2.11.2.43. decoded-msg:SlotOffsetType

Slot offset description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 4095.

6.2.11.2.44. decoded-msg:AISMsg6Type

AIS message 6 (Addressed Binary Message).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
  - Type: decoded-msg:RepeatIndicatorType
/decoded-msg:SourceMMSINumber
  - Type: common:MMSINumberType
/decoded-msg:SequenceNumber
  - Type: decoded-msg:SequenceNumberType
/decoded-msg:DestinationMMSINumber
  - Type: common:MMSINumberType
/decoded-msg:RetransmitFlag
  - Type: decoded-msg:RetransmitFlagType
/decoded-msg:BinaryData
  - Type: xsd:hexBinary

```

6.2.11.2.45. decoded-msg:GNSSPositionStatusType

Global navigation satellite position status type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.



6.2.11.2.46. decoded-msg: AISMsg10Type

AIS message 10 (UTC and Date inquiry).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
  - Type: decoded-msg:RepeatIndicatorType
/decoded-msg:SourceMMSINumber
  - Type: common:MMSINumberType
/decoded-msg:DestinationMMSINumber
  - Type: common:MMSINumberType

```

6.2.11.2.47. decoded-msg: TypeOfAidsToNavigationType

Type of aids to navigation description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 31.

6.2.11.2.48. decoded-msg: AltitudeSensorType

Altitude sensor description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.49. decoded-msg: AISMsg16Type

AIS message 16 (Assigned Mode Command).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
  - Type: decoded-msg:RepeatIndicatorType
/decoded-msg:SourceMMSINumber
  - Type: common:MMSINumberType
/decoded-msg:DestinationMMSINumberA
  - Type: common:MMSINumberType
/decoded-msg:SlotOffsetA
  - Type: decoded-msg:SlotOffsetType
/decoded-msg:SlotIncrementA
  - Type: decoded-msg:SlotIncrementType
/decoded-msg:DestinationMMSINumberB
  - Type: common:MMSINumberType
/decoded-msg:SlotOffsetB
  - Type: decoded-msg:SlotOffsetType

```



```
/decoded-msg:SlotIncrementB
- Type: decoded-msg:SlotIncrementType
```

6.2.11.2.50. decoded-msg: AISMsg4Msg11Type

AIS messages 4 and 11 (Base Station Report, UTC and Date response).

The following paragraph describes the structure of the complex type.

/...

```
/decoded-msg:RepeatIndicator
- Type: decoded-msg:RepeatIndicatorType

/decoded-msg:MMSINumber
- Type: common:MMSINumberType

/decoded-msg:UTC
- Type: decoded-msg:UTCType

/decoded-msg:PositionAccuracy
- Type: decoded-msg:PositionAccuracyType

/decoded-msg:Longitude
- Type: common:LongitudeType

/decoded-msg:Latitude
- Type: common:LatitudeType

/decoded-msg:TypeOfElectronicPositionFixingDevice
- Type: decoded-msg:TypeOfElectronicPositionFixingDeviceType

/decoded-msg:TransmissionControl
- Type: decoded-msg:TransmissionControlType

/decoded-msg:RAIMFlag
- Type: decoded-msg:RAIMFlagType

/decoded-msg:CommunicationState
- Type: decoded-msg:CommunicationStateType
```

6.2.11.2.51. decoded-msg:RetransmitFlagType

Retransmit flag description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.52. decoded-msg: AISMsg23Type

AIS message 23 (Group Assignment Command).

The following paragraph describes the structure of the complex type.

/...

```
/decoded-msg:RepeatIndicator
- Type: decoded-msg:RepeatIndicatorType

/decoded-msg:StationMMSINumber
```



```

- Type: common:MMSINumberType
/decoded-msg:Longitude1
- Type: common:LongitudeType
/decoded-msg:Latitude1
- Type: common:LatitudeType
/decoded-msg:Longitude2
- Type: common:LongitudeType
/decoded-msg:Latitude2
- Type: common:LatitudeType
/decoded-msg:StationType
- Type: decoded-msg:StationTypeType
/decoded-msg:TypeOfShip
- Type: decoded-msg:TypeOfShipType
/decoded-msg:TxRxMode
- Type: decoded-msg:TxRxModeType
/decoded-msg:ReportingInterval
- Type: decoded-msg:ReportingIntervalType
/decoded-msg:QuietTime
- Type: decoded-msg:QuietTimeType

```

6.2.11.2.53. decoded-msg: AISMsg21Type

AIS message 21 (Aids-to-navigation Report).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
- Type: decoded-msg:RepeatIndicatorType
/decoded-msg:MMSINumber
- Type: common:MMSINumberType
/decoded-msg:TypeOfAidsToNavigation
- Type: decoded-msg:TypeOfAidsToNavigationType
/decoded-msg:NameOfAidsToNavigation
- Type: decoded-msg:NameType
/decoded-msg:PositionAccuracy
- Type: decoded-msg:PositionAccuracyType
/decoded-msg:Longitude
- Type: common:LongitudeType
/decoded-msg:Latitude
- Type: common:LatitudeType
/decoded-msg:DimensionReferenceForPosition
- Type: common:LengthInMetersType

```



```

/decoded-msg:TypeOfElectronicPositionFixingDevice
- Type: decoded-msg:TypeOfElectronicPositionFixingDeviceType
/decoded-msg:TimeStampCounter
- Type: decoded-msg:TimeStampCounterType
/decoded-msg:OffPositionIndicator
- Type: decoded-msg:OffPositionIndicatorType
/decoded-msg:AtoNStatus
- Type: decoded-msg:AtoNStatusType
/decoded-msg:RAIMFlag
- Type: decoded-msg:RAIMFlagType
/decoded-msg:VirtualAtoN
- Type: decoded-msg:VirtualAtoNType
/decoded-msg:AssignedMode
- Type: decoded-msg:ModeType
/decoded-msg:NameOfAidsToNavigationExtension
- Type: decoded-msg:NameExtensionType

```

6.2.11.2.54. decoded-msg:TimeStampCounterType

Timestamp counter description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 63.

6.2.11.2.55. decoded-msg:AISMsg24AType

AIS message 24 part A (Class B CS Static Data Report).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
- Type: decoded-msg:RepeatIndicatorType
/decoded-msg:MMSINumber
- Type: common:MMSINumberType
/decoded-msg:Name
- Type: decoded-msg:NameType

```

6.2.11.2.56. decoded-msg:UTCType

UTC description type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- pattern: [0-9]{14}.

6.2.11.2.57. decoded-msg:AISMsg17Type

AIS message 17 (GNSS Binary Broadcast Message).

The following paragraph describes the structure of the complex type.



/...

```

/decoded-msg:RepeatIndicator
- Type: decoded-msg:RepeatIndicatorType
/decoded-msg:MMSINumber
- Type: common:MMSINumberType
/decoded-msg:Longitude
- Type: common:LongitudeType
/decoded-msg:Latitude
- Type: common:LatitudeType
/decoded-msg:Data
- Type: xsd:hexBinary

```

6.2.11.2.58. decoded-msg:AISMsg8Type

AIS message 8 (Binary Broadcast Message).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
- Type: decoded-msg:RepeatIndicatorType
/decoded-msg:SourceMMSINumber
- Type: common:MMSINumberType
/decoded-msg:BinaryData
- Type: xsd:hexBinary

```

6.2.11.2.59. decoded-msg:BinaryDataFlagType

Binary data flag type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.60. decoded-msg:AISMsg14Type

AIS message 14 (Safety related Broadcast Message).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
- Type: decoded-msg:RepeatIndicatorType
/decoded-msg:SourceMMSINumber
- Type: common:MMSINumberType
/decoded-msg:SafetyRelatedText
- Type: decoded-msg:SafetyRelatedTextType

```

6.2.11.2.61. decoded-msg:ClassBUnitType

Class B unit description type.



The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- `minInclusive`: 0.
- `maxInclusive`: 1.

6.2.11.2.62. `decoded-msg:AISMsg15Type`

AIS message 15 (Interrogation).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
  - Type: decoded-msg:RepeatIndicatorType
/decoded-msg:SourceMMSINumber
  - Type: common:MMSINumberType
/decoded-msg:DestinationMMSINumber1
  - Type: common:MMSINumberType
/decoded-msg:AISMessageType1
  - Type: common:AISMessageTypeType
/decoded-msg:SlotOffset1
  - Type: decoded-msg:SlotOffsetType
/decoded-msg:DestinationMMSINumber2
  - Type: common:MMSINumberType
/decoded-msg:AISMessageType2
  - Type: common:AISMessageTypeType
/decoded-msg:SlotOffset2
  - Type: decoded-msg:SlotOffsetType

```

6.2.11.2.63. `decoded-msg:AISVersionIndicatorType`

AIS version indicator description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- `minInclusive`: 0.
- `maxInclusive`: 3.

6.2.11.2.64. `decoded-msg:AISMsg25Type`

AIS message 25 (Single Slot Binary Message).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
  - Type: decoded-msg:RepeatIndicatorType
/decoded-msg:SourceMMSINumber
  - Type: common:MMSINumberType
/decoded-msg:AddressedBroadcastIndicator
  - Type: decoded-msg:AddressedBroadcastIndicatorType

```



```
/decoded-msg:BinaryDataFlag
- Type: decoded-msg:BinaryDataFlagType
/decoded-msg:DestinationMMSINumber[0:1]
- Type: common:MMSINumberType
/decoded-msg:BinaryData
- Type: xsd:hexBinary
```

6.2.11.2.65. decoded-msg:TransitionalZoneSizeType

Transitional zone size.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 7.

6.2.11.2.66. decoded-msg:RAIMFlagType

Receiver autonomous integrity monitoring flag description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.67. decoded-msg:DTEStatusType

Data Terminal Equipment (DTE) description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.68. decoded-msg:ModeType

Mode description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.69. decoded-msg:ChannelType

Channel description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 4095.

6.2.11.2.70. decoded-msg:ReportingIntervalType

Reporting interval type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 15.

6.2.11.2.71. decoded-msg:OffPositionIndicatorType



Off position indicator description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.72. `decoded-msg:VirtualAtoNType`

Virtual aids to navigation description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.73. `decoded-msg:RepeatIndicatorType`

Repeat indicator description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 3.

6.2.11.2.74. `decoded-msg:TransmissionControlType`

Transmission control description type.

The data type is a restriction of `xsd:int`. Facets of the restriction are following:

- minInclusive: 0.
- maxInclusive: 1.

6.2.11.2.75. `decoded-msg:AISMsg26Type`

AIS message 26 (Multiple Slot Binary Message).

The following paragraph describes the structure of the complex type.

/...

```

/decoded-msg:RepeatIndicator
  - Type: decoded-msg:RepeatIndicatorType
/decoded-msg:SourceMMSINumber
  - Type: common:MMSINumberType
/decoded-msg:AddressedBroadcastIndicator
  - Type: decoded-msg:AddressedBroadcastIndicatorType
/decoded-msg:BinaryDataFlag
  - Type: decoded-msg:BinaryDataFlagType
/decoded-msg:DestinationMMSINumber[0:1]
  - Type: common:MMSINumberType
/decoded-msg:BinaryData
  - Type: xsd:hexBinary
/decoded-msg:CommunicationStateSelector
  - Type: decoded-msg:CommunicationStateSelectorType
/decoded-msg:CommunicationState

```




- Type: decoded-msg:CommunicationStateType

6.2.12. "doppler" Data Model

6.2.12.1. Introduction

The dop data model defines the main types for "Doppler processing" related elements and types .

This data model specification is part of [RD 8] and [RD 9]. All components of the `doppler` Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://iap.esa.int/schemas/sat-ais/dop>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.12.2. Data types

6.2.12.2.1. `doppler:datationQualityType`

Datation quality description type.

The data type is a restriction of `xsd:decimal`. Facets of the restriction are following:

- fractionDigits: 6.
- minInclusive: 0.000000.
- maxInclusive: 10.000000.

6.2.12.2.2. `doppler:dopplerPassResultType`

Doppler location results per satellite pass.

The following paragraph describes the structure of the complex type.

/...

/doppler:satellitePassId

- Type: common:SatellitePassIDType

Satellite pass id.

/doppler:satelliteId

- Type: common:SatelliteIDType

Satellite id.

/doppler:shipId

- Type: common:MMSINumberType

Ship identification.

/doppler:assimilatedMeasurementNumber

- Type: xsd:integer

Assimilated measurement number.

/doppler:locationdate

- Type: xsd:dateTime

Location date.

/doppler:dopplerLocation[0:∞]

- Type: doppler:dopplerLocationType

Location.

**Example :**

```

1 <dop:dopplerPassResult>
2   <dop:shipId>1234</dop:shipId>
3   <dop:satellitePassId>222</dop:satellitePassId>
4   <dop:satelliteId>222</dop:satelliteId>
5   <dop:orbitQuality>10</dop:orbitQuality>
6   <dop:assimilatedMeasurementNumber>10</dop:assimilatedMeasurementNumber>
7   <dop:locationdate>2012-01-01T12:00:00.000000Z</dop:locationdate>
8   <gml:Point>
9     <gml:pos>45.12 120.98</gml:pos>
10  </gml:Point>
11  <dop:estimatedTransmissionFrequencyChannel
channel="1">10000</dop:estimatedTransmissionFrequencyChannel>
12  <dop:estimatedTransmissionFrequencyChannel
channel="2">10000</dop:estimatedTransmissionFrequencyChannel>
13  <dop:estimatedTransmissionFrequencyChannel
channel="3">10000</dop:estimatedTransmissionFrequencyChannel>
14  <dop:estimatedTransmissionFrequencyChannel
channel="4">10000</dop:estimatedTransmissionFrequencyChannel>
15  <dop:distanceToSubSatelliteTrack>5</dop:distanceToSubSatelliteTrack>
16  <dop:errorEllipseParameters>
17    <dop:semiMajorAxis>10</dop:semiMajorAxis>
18    <dop:semiMinorAxis>10</dop:semiMinorAxis>
19    <dop:orientation>120</dop:orientation>
20  </dop:errorEllipseParameters>
21  <dop:geometricDilutionOfPrecision>10</dop:geometricDilutionOfPrecision>
22  <dop:residualError>10</dop:residualError>
23  <dop:passedControlNumber>10</dop:passedControlNumber>
24  <dop:reinitFlag>0</dop:reinitFlag>
25  <dop:distributionFlag>0</dop:distributionFlag>
26 </dop:dopplerPassResult>

```

6.2.12.2.3. doppler:shipLocationHistorieBulkType

Set of last computed locations of each ship description type.

The following paragraph describes the structure of the complex type.

/...

/doppler:shipLocationHistory[1:∞]

- Type: doppler:shipLocationHistoryType

List containing the last computed location of each ship.

6.2.12.2.4. doppler:estimatedTransmissionFrequencyChannelBulkType

Set of estimatedTransmissionFrequencyChannelType.

The following paragraph describes the structure of the complex type.

/...

/doppler:estimatedTransmissionFrequencyChannel[1:∞]

- Type: doppler:estimatedTransmissionFrequencyChannelType

6.2.12.2.5. doppler:dopplerPassResultBulkType

Set of Doppler location results per satellite pass.

The following paragraph describes the structure of the complex type.

/...



/doppler:dopplerPassResult[1:∞]

- Type: doppler:dopplerPassResultType

Doppler location results per satellite pass.

6.2.12.2.6. doppler:dopplerInfoType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/doppler:date

- Type: xsd:dateTime

Doppler measure date.

/doppler:receivedFrequency

- Type: common:FrequencyType

Doppler received frequency.

/doppler:channelId

- Type: xsd:integer

Doppler channel id.

/doppler:signalLevel

- Type: common:signalLevelType

Doppler signal level.

/doppler:SNR

- Type: common:decibelType

Doppler signal/noise ratio.

6.2.12.2.7. doppler:lastComputedLocationType

Last computed doppler location description type.

The following paragraph describes the structure of the complex type.

/...

/doppler:locationDate

- Type: xsd:dateTime

Location date.

/doppler:channelLocationDateBulk

- Type: doppler:channelLocationDateBulkType

Location dates per channel.

/doppler:model[1:∞]

- Type: anonymous

Results for the model.

@doppler:type

- Constraint: optional - Type: doppler:modelNameType

No documentation.

/...



/doppler:location

- Type: gml:PointType

Location.

/doppler:estimatedTransmissionFrequencyChannelBulk

- Type: doppler:estimatedTransmissionFrequencyChannelBulkType

Estimated transmission frequenciesper channel.

/doppler:longitudeVelocity

- Type: xsd:double

Longitude velocity.

/doppler:latitudeVelocity

- Type: xsd:double

Latitude velocity.

/doppler:covarianceMatrix

- Type: gml:CovarianceMatrixType

Covariance matrix.

/doppler:probability

- Type: xsd:double

Probability.

6.2.12.2.8. doppler:shipLocationHistoryType

Doppler shift measurement history description type.

The following paragraph describes the structure of the complex type.

/...[0:1]

/doppler:shipId

- Type: common:MMSINumberType

Ship identification.

/doppler:reinitFlag[0:1]

- Type: doppler:reinitFlagType

Reinit flag.

/doppler:invalidedLocationNumber

- Type: xsd:integer

Invalided location number.

/doppler:lastComputedLocation

- Type: doppler:lastComputedLocationType

Last computed location of the ship.

Example :

```

1 <dop:shipLocationHistory>
2   <dop:shipId>1234</dop:shipId>
3   <dop:reinitFlag>0</dop:reinitFlag>
4   <dop:invalidLocationNumber>10</dop:invalidLocationNumber>
5   <dop:lastComputedLocation>
6     <dop:locationDate>2012-01-01T12:00:00.00000Z</dop:locationDate>

```



```

7      <dop:channelLocationDates>
8      <dop:channelLocationDate channel="1">2012-01-
01T12:00:00.00000Z</dop:channelLocationDate>
9      <dop:channelLocationDate channel="2">2012-01-
01T12:00:00.00000Z</dop:channelLocationDate>
10     <dop:channelLocationDate channel="3">2012-01-
01T12:00:00.00000Z</dop:channelLocationDate>
11     <dop:channelLocationDate channel="4">2012-01-
01T12:00:00.00000Z</dop:channelLocationDate>
12     </dop:channelLocationDates>
13     <dop:model type="abc">
14         <gml:Point>
15             <gml:pos>45.12 120.98</gml:pos>
16         </gml:Point>
17         <dop:estimatedTransmissionFrequencyChannels>
18             <dop:estimatedTransmissionFrequencyChannel
channel="1">10000</dop:estimatedTransmissionFrequencyChannel>
19             <dop:estimatedTransmissionFrequencyChannel
channel="2">10000</dop:estimatedTransmissionFrequencyChannel>
20             <dop:estimatedTransmissionFrequencyChannel
channel="3">10000</dop:estimatedTransmissionFrequencyChannel>
21             <dop:estimatedTransmissionFrequencyChannel
channel="4">10000</dop:estimatedTransmissionFrequencyChannel>
22         </dop:estimatedTransmissionFrequencyChannels>
23         <dop:longitudeVelocity>10</dop:longitudeVelocity>
24         <dop:latitudeVelocity>10</dop:latitudeVelocity>
25         <dop:covarianceMatrix>
26         </dop:covarianceMatrix>
27         <dop:probability>10</dop:probability>
28     </dop:model>
29 </dop:lastComputedLocation>
30 </dop:shipLocationHistory>

```

6.2.12.2.9. doppler:dopplerMeasurementType

No documentation.

The following paragraph describes the structure of the complex type.

@doppler:id

- Constraint: optional - Type: xsd:integer

No documentation.

/...

/doppler:doppler

- Type: doppler:dopplerInfoType

Doppler recorded measure.

/doppler:satellitePosition

- Type: common:satellitePositionType

Satellite position.

/doppler:satelliteVelocity

- Type: common:satelliteVelocityType

Satellite velocity.

6.2.12.2.10. doppler:dopplerMeasureType



No documentation.

The following paragraph describes the structure of the complex type.

/...

/doppler:shipId

- Type: common:MMSINumberType

Ship identification.

/doppler:satelliteId

- Type: common:SatelliteIDType

Satellite id.

/doppler:satellitePassId

- Type: common:SatellitePassIDType

satellite pass id.

/doppler:orbitQuality

- Type: common:orbitQualityType

Orbit quality.

/doppler:datationQuality

- Type: doppler:datationQualityType

Datation quality.

/doppler:averageGpsLocation

- Type: common:positionType

Average GPS location.

/doppler:maxVelocity

- Type: common:KnotsType

max velocity.

/doppler:shipType

- Type: common:shipTypeType

Ship type.

/doppler:shipName

- Type: common:ShipNameType

Ship name.

/doppler:averageMeasurementsDate

- Type: xsd:dateTime

Average Measurement date.

6.2.12.2.11. doppler:channelLocationDateType

Date of doppler location per channel description type.

The following paragraph describes the structure of the complex type.

@doppler:channel

- Constraint: required - Type: xsd:integer

No documentation.



6.2.12.2.12. doppler:matrixType

Covariance matrix description type.

The following paragraph describes the structure of the complex type.

@doppler:size

- Constraint: required - Type: xsd:integer

No documentation.

6.2.12.2.13. doppler:estimatedTransmissionFrequencyChannelType

Estimated transmission frequency per channel description type.

The following paragraph describes the structure of the complex type.

@doppler:channel

- Constraint: required - Type: xsd:integer

No documentation.

6.2.12.2.14. doppler:dopplerMeasureBulkType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/doppler:measure[1:∞]

- Type: doppler:dopplerMeasureType

6.2.12.2.15. doppler:modelNameType

Model name of doppler location precessing description type.

The data type is a restriction of xsd:string. Facets of the restriction are following:

- maxLength: 30.

6.2.12.2.16. doppler:dopplerLocationType

Doppler location description type.

The following paragraph describes the structure of the complex type.

/...

/doppler:location

- Type: common:positionType

Location.

/doppler:estimatedTransmissionFrequencyChannelBulk

- Type: doppler:estimatedTransmissionFrequencyChannelBulkType

Estimated transmission frequencies per channel.

/doppler:distanceToSubSatelliteTrack

- Type: common:ElevationType

Distance to sub satellite track.

/doppler:errorEllipseParameters

- Type: common>ErrorEllipseType

Error ellipse parameters.



/doppler:geometricDilutionOfPrecision

- Type: xsd:integer

Geometric Dilution of Precision.

/doppler:residualError

- Type: common:FrequencyType

Residual error.

/doppler:passedControlNumber

- Type: xsd:integer

Passed control number.

/doppler:reinitFlag

- Type: doppler:reinitFlagType

Reinit flag.

/doppler:distributionFlag

- Type: xsd:boolean

Distribution flag.

6.2.12.2.17. doppler:channelLocationDateBulkType

Set of channelLocationDateType.

The following paragraph describes the structure of the complex type.

/...

/doppler:channelLocationDate[1:∞]

- Type: doppler:channelLocationDateType

6.2.12.2.18. doppler:reinitFlagType

Reinit flag.

The data type is a restriction of xsd:boolean. Facets of the restriction are following:

6.2.13. "dpc" Data Model

6.2.13.1. Introduction

The dpc data model defines the main types and elements involved in SAT-AIS DPC Block2 Software System.

This data model specification is part of [RD 8] and [RD 9]. All components of the dpc Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://esa.int/XML/SADPC/dpc>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.13.2. Data types

6.2.13.2.1. dpc:mobilePositionType

Mobile Position description type, used to manage the ship position and data such speed, heading, destination port.

The following paragraph describes the structure of the complex type.



/...

/dpc:shipId

- Type: common:MMSINumberType

Ship identification.

/dpc:speed

- Type: common:SpeedInKilometersPerSecondType

Mobile speed.

/dpc:heading

- Type: common:HeadingType

Mobile heading.

/dpc:portLocode

- Type: dpc:portLocodeType

Destination port code.

Example :

```

1 <dpc:mobilePosition>
2   <shipId>23456</shipId>
3   <gml:Point srsDimension="2"
4     srsName="http://www.opengis.net/def/crs/EPSG/0/4326">
5     <gml:pos>46.42 123.98</gml:pos>
6   </gml:Point>
7   <dpc:timestamp>2012-01-12T13:00:00Z</dpc:timestamp>
8   <dpc:speed>14</dpc:speed>
9   <dpc:heading>80</dpc:heading>
10 </dpc:mobilePosition>

```

6.2.13.2.2. dpc:mobileRouteBulkType

Set of mobile route positions description type.

The following paragraph describes the structure of the complex type.

6.2.13.2.3. dpc:ephemeridType

List of satellite positions (ephemerid) description type.

The following paragraph describes the structure of the complex type.

/...

/dpc:ephemerids[1:∞]

- Type: common:satelliteTimePositionType

Example :

```

1 <dpc:ephemerids>
2   <dpc:satellitePosition>
3     <xs:timestamp>2012-01-12T13:00:00Z</xs:timestamp>
4     <ctyp:SatelliteID>
5     </ctyp:SatelliteID>
6     <ctyp:PosX>10</ctyp:PosX>
7     <ctyp:PosY>20</ctyp:PosY>
8     <ctyp:PosZ>10</ctyp:PosZ>
9     <ctyp:SpeedU>2</ctyp:SpeedU>
10    <ctyp:SpeedV>3</ctyp:SpeedV>
11    <ctyp:SpeedW>4</ctyp:SpeedW>

```



```

12 </dpc:satellitePosition>
13 <dpc:satellitePosition>
14 </dpc:satellitePosition>
15 </dpc:ephemerids>

```

6.2.13.2.4. dpc:mobileRouteType

Mobile route positions description type.

The following paragraph describes the structure of the complex type.

Example :

```

1 <dpc:mobileRoute>
2   <dpc:mobilePosition>
3     <shipId>23456</shipId>
4     <gml:Point srsDimension="2"
5       srsName="http://www.opengis.net/def/crs/EPSSG/0/4326">
6       <gml:pos>46.42 123.98</gml:pos>
7     </gml:Point>
8     <dpc:timestamp>2012-01-12T13:00:00Z</dpc:timestamp>
9     <dpc:speed>14</dpc:speed>
10    <dpc:heading>80</dpc:heading>
11  </dpc:mobilePosition>
12  <dpc:mobilePosition>
13    <shipId>23456</shipId>
14    <gml:Point srsDimension="2"
15      srsName="http://www.opengis.net/def/crs/EPSSG/0/4326">
16      <gml:pos>46.42 123.98</gml:pos>
17    </gml:Point>
18    <dpc:timestamp>2012-01-12T13:00:00Z</dpc:timestamp>
19    <dpc:speed>14</dpc:speed>
20    <dpc:heading>80</dpc:heading>
21  </dpc:mobilePosition>
22 </dpc:mobileRoute>

```

6.2.13.2.5. dpc:predictedMobilePositionType

Predicted mobile Position description type.

The following paragraph describes the structure of the complex type.

/...

/dpc:uncertainty

- Type: dpc:positionErrorType

Predicted position uncertainty generated by predicted service.

6.2.13.2.6. dpc:shippredGlobalParametersType

Global parameters for ship prediction service description type.

The following paragraph describes the structure of the complex type.

/...

/dpc:maxTimeDifferenceInSeconds

- Type: xsd:integer

Maximum value of a time interval, used to compute the speed and acceleration of the positions.

/dpc:maxDistanceInMeters

- Type: common:LengthInMetersType

Maximum distance threshold, used to reject positions located too far from the target position.



/dpc:smootherUsed

- Type: xsd:boolean

Indicates that the interpolation/extrapolation must be processed using the Kalman filter and the backward pass of the Rauch-Tung-Striebel filter to interpolate and smooth the positions.

/dpc:diffusionCoefficientForRandomWalk

- Type: xsd:double

Diffusion coefficient D for the random walk model. Mandatory if the smoother is used (see smootherUsed parameter).

/dpc:randomWalkFlag

- Type: dpc:RandomWalkFlagType

No documentation.

Example :

```

1 <dpc:shippedGlobalParametersPayload>
2   <dpc:maxTimeDifferenceInSeconds>10</dpc:maxTimeDifferenceInSeconds>
3   <dpc:maxDistanceInMeters>100</dpc:maxDistanceInMeters>
4   <dpc:smootherUsed>true</dpc:smootherUsed>
5
6   <dpc:diffusionCoefficientForRandomWalk>12.21</dpc:diffusionCoefficientForRandomWalk>
7   <dpc:diffusionCoefficientForCorrelatedRandomWalk>10.00</dpc:diffusionCoefficientForCorrelatedRandomWalk>
8   <dpc:randomWalkFlag>RANDOM_WALK</dpc:randomWalkFlag>
9 </dpc:shippedGlobalParametersPayload>

```

6.2.13.2.7. dpc:resourceBulkType

Set of resources description type.

The following paragraph describes the structure of the complex type.

/...

/dpc:resource[1:∞]

- Type: dpc:resourceType

6.2.13.2.8. dpc:resourceType

The resource data type represents a piece of information along with metadata, uniquely identified and resolvable through the network. It is for instance the reference of a file reachable through HTTP. The data type is a structure (complex type) that carries the metadata information related to the referenced resource.

The following paragraph describes the structure of the complex type.

@dpc:uuid

- Constraint: optional - Type: core:UUIDType

Unique identifier of the resource in the system.

@dpc:href

- Constraint: optional - Type: xsd:anyURI

Express a link to the concrete resource . The link can be any URI as long as it is resolvable, like an URL to an HTTP or FTP server.

/...

/dpc:publisher



- Type: `xsd:string`

The name of the entity where the resource is originated.

/dpc:source

- Type: `xsd:anyURI`

A resolvable location from which the resource has been retrieved. This is the location where the data published by the providers can be retrieved.

/dpc:format

- Type: `core:mediaTypeType`

Media-type of the resource.

/dpc:size

- Type: `xsd:long`

Size of the resource in bytes.

/dpc:creationDate

- Type: `xsd:dateTime`

Creation date and time of the resource.

6.2.13.2.9. dpc:mobilePositionBulkType

Set of mobile Position description type.

The following paragraph describes the structure of the complex type.

/...

/dpc:mobilePosition[1:∞]

- Type: `dpc:mobilePositionType`

List of mobile positions.

6.2.13.2.10. dpc:RandomWalkFlagType

Random walk model description type, possible values :

- CORRELATED_RANDOM_WALK
- RANDOM_WALK

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- enumeration: CORRELATED_RANDOM_WALK.
- enumeration: RANDOM_WALK.

6.2.13.2.11. dpc:portLocodeType

Destination port description type.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 5.

6.2.13.2.12. dpc:positionErrorType

Position error description type.

The following paragraph describes the structure of the complex type.

/...

/dpc:errorLonLon



- Type: xsd:double

Error variance of the longitude.

/dpc:errorLatLat

- Type: xsd:double

Error variance of the latitude.

/dpc:errorUU

- Type: xsd:double

Error variance of u.

/dpc:errorVV

- Type: xsd:double

Error variance of v.

/dpc:errorLonLat

- Type: xsd:double

Error covariance between the longitude and the latitude.

/dpc:errorLonU

- Type: xsd:double

Error covariance between the longitude and u.

/dpc:errorLonV

- Type: xsd:double

Error covariance between the longitude and v.

/dpc:errorLatU

- Type: xsd:double

Error covariance between the latitude and u.

/dpc:errorLatV

- Type: xsd:double

Error covariance between the latitude and v.

/dpc:errorUV

- Type: xsd:double

Error covariance between u and v.

/dpc:errorEllipse

- Type: common:ErrorEllipseType

Error ellipse.

6.2.14. "eop" Data Model

6.2.14.1. Introduction

No documentation.

This data model specification is part of [RD 8] and [RD 9]. All components of the `eop` Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://earth.esa.int/eop>



Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.14.2. Data types

6.2.14.2.1. eop:EarthObservationEquipmentType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:platform[0:1]

- Type: eop:PlatformPropertyType

/eop:instrument[0:1]

- Type: eop:InstrumentPropertyType

/eop:sensor[0:1]

- Type: eop:SensorPropertyType

/eop:acquisitionParameters[0:1]

- Type: eop:AcquisitionPropertyType

6.2.14.2.2. eop:EarthObservationPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:EarthObservation[0:1]

- Type: eop:EarthObservationType

eop root element for generic Earth Observation Product description

6.2.14.2.3. eop:ProductInformationType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:referenceSystemIdentifier[0:1]

- Type: eop:CodeWithAuthorityType

Indicates if product is geo-referenced, (in which case should point to a code space for the CRS), when not supplied it is assumed that the browse is provided in "raw" satellite frame of reference

/eop:fileName

- Type: xsd:string

Path to the actual product data if available online (could be any kind of URL : direct link to the image or WMS/WCS interface), it is assumed that if a client is prepared to "manage" a product delivered by e.g. WCS they would parse the URL to identify that it contains the OGC standard SERVICE=WCS

/eop:version[0:1]

- Type: xsd:string

Product version



/eop:size[0:1]

- Type: gml:MeasureListType

Product size (bytes) allowing the user to realise how long a download is likely to take

6.2.14.2.4. eop:SensorType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:sensorType[0:1]

- Type: eop:SensorTypePropertyType

/eop:operationalMode[0:1]

- Type: gml:CodeListType

Sensor mode. Possible values are mission specific and should be retrieved using codespace. (eg. PHR : PA, XS or PX).

/eop:resolution[0:1]

- Type: gml:MeasureType

Image resolution

/eop:swathIdentifier[0:1]

- Type: gml:CodeListType

Swath identifier (e.g. Envisat ASAR has 7 distinct swaths (I1,I2,I3...I7) that correspond to precise incidence angles for the sensor). Value list can be retrieved with codeSpace.

6.2.14.2.5. eop:DownlinkInformationType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:acquisitionStation

- Type: gml:CodeListType

Acquisition / receiving station code. Possible values are mission specific and should be retrieved using codespace.

/eop:acquisitionDate[0:1]

- Type: xsd:dateTime

Acquisition date time

6.2.14.2.6. eop:ProcessingInformationPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:ProcessingInformation

- Type: eop:ProcessingInformationType

6.2.14.2.7. eop:CodeWithAuthorityType

From GML 3.2 draft



The following paragraph describes the structure of the complex type.

@eop:codeSpace

- Constraint: required - Type: xsd:anyURI

No documentation.

6.2.14.2.8. eop:BrowseInformationArrayPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:BrowseInformation[1:∞]

- Type: eop:BrowseInformationType

6.2.14.2.9. eop:InstrumentType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:shortName

- Type: xsd:string

Instrument short name EOLI : instShNm

6.2.14.2.10. eop:EarthObservationEquipmentPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:EarthObservationEquipment

- Type: eop:EarthObservationEquipmentType

6.2.14.2.11. eop:MaskType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:maskMembers

- Type: eop:MaskMembersPropertyType

6.2.14.2.12. eop:PlatformType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:shortName

- Type: xsd:string

Platform short name (eg. PHR)

/eop:serialIdentifier[0:1]

- Type: xsd:string



Platform serial identifier (eg. for PHR : 1A)

/eop:orbitType[0:1]

- Type: *anonymous*

High level characterisation of main mission types (GEO/LEO)

Simple type

6.2.14.2.13. eop:AcquisitionType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:orbitNumber[0:1]

- Type: *xsd:int*

EOLI : orbit (F B b s)

/eop:lastOrbitNumber[0:1]

- Type: *xsd:int*

EOLI : lastOrbit (F)

/eop:orbitDirection[0:1]

- Type: *anonymous*

EOLI : orbitDir (F B b s)

Simple type

/eop:ascendingNodeDate[0:1]

- Type: *xsd:dateTime*

UTC date and time at ascending node of orbit

/eop:ascendingNodeLongitude[0:1]

- Type: *gml:MeasureType*

Longitude at ascending node of orbit. should be expressed in degrees

/eop:startTimeFromAscendingNode[0:1]

- Type: *gml:MeasureType*

Start time of acquisition in milliseconds from Ascending node date

/eop:completionTimeFromAscendingNode[0:1]

- Type: *gml:MeasureType*

Completion time of acquisition in milliseconds from Ascending node date

/eop:orbitDuration[0:1]

- Type: *gml:MeasureType*

Actual orbit duration in milliseconds

/eop:acrossTrackIncidenceAngle[0:1]

- Type: *gml:AngleType*

Across Track Incidence angle given in degrees.

/eop:alongTrackIncidenceAngle[0:1]

- Type: *gml:AngleType*



Along Track Incidence angle given in degrees.

```
/eop:incidenceAngle[0:1]
```

- Type: gml:AngleType

Global Incidence angle given in degrees.

```
/eop:pitch[0:1]
```

- Type: gml:AngleType

Pitch angle given in degrees.

```
/eop:roll[0:1]
```

- Type: gml:AngleType

Roll angle given in degrees.

```
/eop:yaw[0:1]
```

- Type: gml:AngleType

Yaw angle given in degrees.

6.2.14.2.14. eop:SensorTypePropertyType

No documentation.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- enumeration: ALTIMETRIC.
- enumeration: ATMOSPHERIC.
- enumeration: OPTICAL.
- enumeration: RADAR.

6.2.14.2.15. eop:FootprintType

No documentation.

The following paragraph describes the structure of the complex type.

/...

```
/gml:multiExtentOf
```

- Type: gml:MultiSurfacePropertyType

```
/gml:centerOf[0:1]
```

- Type: gml:PointPropertyType

6.2.14.2.16. eop:DownlinkInformationArrayPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

```
/eop:DownlinkInformation[1:∞]
```

- Type: eop:DownlinkInformationType

6.2.14.2.17. eop:ArchivingInformationType

No documentation.

The following paragraph describes the structure of the complex type.

/...



/eop:archivingCenter

- Type: gml:CodeListType

Archiving centre code. Possible values are mission specific and should be retrieved using codespace. PHR : value is a valid station code eop/EOLI : N/A

/eop:archivingDate

- Type: xsd:dateTime

Archiving date time

/eop:archivingIdentifier[0:1]

- Type: eop:CodeWithAuthorityType

Local archiving id as created by the mission ground segment that may required to allow subsequent order processing

6.2.14.2.18. eop:MaskInformationArrayTypePropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:MaskInformation[1:∞]

- Type: eop:MaskInformationType

6.2.14.2.19. eop:AcquisitionPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:Acquisition

- Type: eop:AcquisitionType

6.2.14.2.20. eop:HistogramType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:bandId[0:1]

- Type: xsd:string

/eop:min

- Type: xsd:int

/eop:max

- Type: xsd:int

/eop:mean[0:1]

- Type: xsd:double

/eop:stdDeviation[0:1]

- Type: xsd:double

6.2.14.2.21. eop:ProcessingInformationType

No documentation.



The following paragraph describes the structure of the complex type.

/...

/eop:compositeType[0:1]

- Type: *anonymous*

Composite type of product, if available

Simple type

/eop:method[0:1]

- Type: *xsd:string*

Method used to compute datalayer. (e.g. Kalman filtering, ROSE)

/eop:methodVersion[0:1]

- Type: *xsd:string*

Method version (e.g. 1.0)

/eop:processorName[0:1]

- Type: *xsd:string*

Processor software name (e.g. FastROSE)

/eop:processorVersion[0:1]

- Type: *xsd:string*

Processor software version (e.g. 1.0)

/eop:processingLevel[0:1]

- Type: *anonymous*

Processing level applied to the product

Simple type

/eop:nativeProductFormat[0:1]

- Type: *xsd:string*

Native product format

6.2.14.2.22. eop:MaskFeatureType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:maskType

- Type: *eop:CodeWithAuthorityType*

Mask type. Value list can be retrieved with codeSpace

/gml:extentOf

- Type: *gml:SurfacePropertyType*

6.2.14.2.23. eop:ProductInformationArrayPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...



```
/eop:ProductInformation[1:∞]
```

```
- Type: eop:ProductInformationType
```

6.2.14.2.24. eop:EarthObservationResultPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

```
/eop:EarthObservationResult
```

```
- Type: eop:EarthObservationResultType
```

Defines the observation result, i.e. the Earth Observation Product

6.2.14.2.25. eop:InstrumentPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

```
/eop:Instrument
```

```
- Type: eop:InstrumentType
```

6.2.14.2.26. eop:MaskInformationType

No documentation.

The following paragraph describes the structure of the complex type.

/...

```
/eop:type
```

```
- Type: anonymous
```

Mask type. Possible values are : SNOW, CLOUD and QUALITY

Simple type

```
/eop:format
```

```
- Type: anonymous
```

Mask format. Possible values are : RASTER or VECTOR

Simple type

```
/eop:referenceSystemIdentifier[0:1]
```

```
- Type: eop:CodeWithAuthorityType
```

Indicates if mask is geo-referenced, and thus can be assumed to be displayed directly on a map (in which case should point to a code space for the CRS), when not supplied it is assumed that the mask is provided in "raw" satellite frame of reference

```
/eop:fileName
```

```
- Type: xsd:string
```

Path to the mask (could be any kind of URL : direct link to the image or WMS/WCS interface in case of RASTER mask; direct link to the file or WFS interface in case of VECTOR file), it is assumed that if a client is prepared to "manage" a mask delivered by e.g. WMS they would parse the URL to identify that it contains the OGC standard SERVICE=WMS

6.2.14.2.27. eop:MaskMembersPropertyType

No documentation.



The following paragraph describes the structure of the complex type.

/...

/eop:MaskFeature[0:∞]

- Type: eop:MaskFeatureType

Mask member : . Mandates the following optional gml properties inherited from gml:_Feature : - gml:id attribute - gml:name - gml:boundedBy Note : the upcoming gml:identifier will replace eop:identifier in GML 3.2

6.2.14.2.28. eop:EarthObservationMetaDataType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:identifier

- Type: *anonymous*

Identifier for metadata item, includes ground segment codespace to guarantee uniqueness within eop : urn:eop:GS:CollectionId:ProductId

Simple type

/eop:doi[0:1]

- Type: *anonymous*

Digital Object Identifier identifying the product

Simple type

/eop:parentIdentifier[0:1]

- Type: *anonymous*

Collection identifier

Simple type

/eop:acquisitionType

- Type: *anonymous*

Used to distinguish at a high level the appropriateness of the acquisition for "general" use, whether the product is a nominal acquisition, special calibration product or other. Values: - NOMINAL - CALIBRATION - OTHER More specific information (i.e. platform and sensor specific values) are expressed within the imageSubType tag.

Simple type

/eop:acquisitionSubType[0:1]

- Type: gml:CodeListType

The mission specific type definition should refer to mission/ground segment dedicated codeSpace. PHR values are : "CALIBRATION - UNNORMALIZED" "CALIBRATION - DARKNESS SEQUENCE" "CALIBRATION - ASTRAL" "CALIBRATION - AMETHIST" "CALIBRATION - REFOCUSING SEQUENCE" "MTSR MODE" "DAS FILE" "SPECIFIC-1" "SPECIFIC-2" "SPECIFIC-3" "SPECIFIC-4"

/eop:productType

- Type: xsd:string

Describes product type in case that mixed types are available within a single collection. This is ground segment specific definition

/eop:status



- Type: *anonymous*

Refers to product status. PHR : always "ACQUIRED"

Simple type

/eop:downlinkedTo[0:1]

- Type: eop:DownlinkInformationArrayPropertyType

/eop:archivedIn[0:1]

- Type: eop:ArchivingInformationArrayPropertyType

/eop:imageQualityDegradation[0:1]

- Type: gml:MeasureType

Must be expressed in percents. EOLI N/A (attTypes/attName ?)

/eop:imageQualityDegradationQuotationMode[0:1]

- Type: *anonymous*

Indicator to know how the quality quotation has been calculated.

Simple type

/eop:histograms[0:1]

- Type: eop:HistogramArrayPropertyType

/eop:composedOf[0:∞]

- Type: eop:EarthObservationPropertyType

/eop:subsetOf[0:∞]

- Type: eop:EarthObservationPropertyType

/eop:linkedWith[0:∞]

- Type: eop:EarthObservationPropertyType

/eop:processing[0:1]

- Type: eop:ProcessingInformationPropertyType

/eop:vendorSpecific[0:1]

- Type: eop:SpecificInformationArrayPropertyType

6.2.14.2.29. eop:SpecificInformationArrayPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:SpecificInformation[1:∞]

- Type: eop:SpecificInformationType

6.2.14.2.30. eop:HistogramArrayPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:Histogram[1:∞]

- Type: eop:HistogramType



6.2.14.2.31. eop:EarthObservationType

Earth Observation Product description

The following paragraph describes the structure of the complex type.

6.2.14.2.32. eop:EarthObservationResultType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:browse[0:1]

- Type: eop:BrowseInformationArrayPropertyType

/eop:product[0:1]

- Type: eop:ProductInformationArrayPropertyType

/eop:mask[0:1]

- Type: eop:MaskInformationArrayPropertyType

6.2.14.2.33. eop:PlatformPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:Platform

- Type: eop:PlatformType

6.2.14.2.34. eop:BrowseInformationType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:type

- Type: *anonymous*

Browse type. Possible values are : THUMBNAIL, QUICKLOOK and ALBUM.

Simple type

/eop:subType[0:1]

- Type: gml:CodeListType

Value is mission specific. Value list can be retrieved with codeSpace. Not used by PHR. For MODIS : OPTICAL, THERMAL

/eop:referenceSystemIdentifier

- Type: eop:CodeWithAuthorityType

Indicates if browse is geo-referenced, and thus can be assumed to be displayed directly on a map (in which case should point to a code space for the CRS), when not supplied it is assumed that the browse is provided in "raw" satellite frame of reference

/eop:fileName

- Type: xsd:string



Path to the browse image (could be any kind of URL : direct link to the image or WMS/WCS interface), it is assumed that if a client is prepared to "manage" a browse delivered by e.g. WMS they would parse the URL to identify that it contains the OGC standard SERVICE=WMS

6.2.14.2.35. eop:SensorPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:Sensor

- Type: eop:SensorType

6.2.14.2.36. eop:ArchivingInformationArrayPropertyType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:ArchivingInformation[1:~]

- Type: eop:ArchivingInformationType

6.2.14.2.37. eop:SpecificInformationType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/eop:localAttribute

- Type: xsd:string

Container for ad-hoc metadata that does not merit a mission specific schema or extension, the localAttribute describes the name of the attribute

/eop:localValue

- Type: xsd:string

Container for ad-hoc metadata that does not merit a mission specific schema or extension, the localAttribute describes the value of the attribute

6.2.15. "info" Data Model

6.2.15.1. Introduction

The info data model provided information for :

- provider
- satellite
- ground station (information + acquisition)
- network

This data model specification is part of [RD 8] and [RD 9]. All components of the info Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://esa.int/XML/SADPC/info>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.



6.2.15.2. Data types

6.2.15.2.1. info:SatelliteScheduledAcquisitionType

Scheduled satellite acquisition.

The following paragraph describes the structure of the complex type.

/...

```
/info:SatelliteID
- Type: common:SatelliteIDType
/info:ScheduledAcquisitionPeriod
- Type: common:PeriodType
```

6.2.15.2.2. info:SatelliteManeuverTypeType

Type of a satellite maneuver.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- `maxLength`: 20.

6.2.15.2.3. info:GroundStationAcquisitionInformationType

Ground station acquisition information.

The following paragraph describes the structure of the complex type.

/...

```
/info:GroundStationId
- Type: common:GroundStationIDType
/info:SatelliteScheduledAcquisition[0:∞]
- Type: info:SatelliteScheduledAcquisitionType
```

6.2.15.2.4. info:NetworkLinkProviderToDpcType

Network link between the provider and the DPC.

The following paragraph describes the structure of the complex type.

/...

```
/info:Provider
- Type: info:ProviderType
/info:Status
- Type: common:StatusType
```

6.2.15.2.5. info:SatelliteInformationType

Satellite information.

The following paragraph describes the structure of the complex type.

/...

```
/info:SatelliteID
- Type: common:SatelliteIDType
/info:SatelliteStatusTimeStamp
- Type: xsd:dateTime
/info:SatelliteStatus
```



```

    - Type: common:StatusType
/info:TwoLine
    - Type: info:TwoLineType
/info:SatelliteAnomaly[0:∞]
    - Type: info:SatelliteAnomalyType
/info:PlannedSatelliteManeuver[0:∞]
    - Type: info:PlannedSatelliteManeuverType
/info:Payload[0:∞]
    - Type: info:PayloadType

```

6.2.15.2.6. info:GroundStationAnomalyMaintenanceType

Ground station anomaly or maintenance.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 20.

6.2.15.2.7. info:NetworkLinkSatelliteToGroundStationType

Network link between the satellite and the ground station.

The following paragraph describes the structure of the complex type.

/...

```

/info:SatelliteID
    - Type: common:SatelliteIDType
/info:GroundStationId
    - Type: common:GroundStationIDType
/info:Status
    - Type: common:StatusType

```

6.2.15.2.8. info:InformationType

Information.

The following paragraph describes the structure of the complex type.

/...

```

/info:Header
    - Type: info:InformationHeaderType
/info:ProviderInformation[0:∞]
    - Type: info:ProviderInformationType
/info:SatelliteInformation[0:∞]
    - Type: info:SatelliteInformationType
/info:GroundStationInformation[0:∞]
    - Type: info:GroundStationInformationType
/info:GroundStationAcquisitionInformation[0:∞]
    - Type: info:GroundStationAcquisitionInformationType
/info:NetworkLinkInformation[0:∞]
    - Type: info:NetworkLinkInformationType

```



6.2.15.2.9. info:GroundStationAnomalyMaintenancePeriodType

Ground station anomaly or maintenance period defined by the period duration and the anomaly or maintenance.

The following paragraph describes the structure of the complex type.

/...

/info:AnomalyMaintenance

- Type: info:GroundStationAnomalyMaintenanceType

6.2.15.2.10. info:TwoLineElementSetLineType

Line of a two-line element set.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 69.

6.2.15.2.11. info:PayloadAnomalyType

Payload anomaly.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 20.

6.2.15.2.12. info:PayloadType

Payload defined by a name, a status, an acquisition mode and anomaly period.

The following paragraph describes the structure of the complex type.

/...

/info:Name

- Type: xsd:string

/info:Status

- Type: info:PayloadStatusType

/info:PayloadAcquisitionMode

- Type: info:PayloadAcquisitionModeType

/info:PayloadAnomalyPeriod

- Type: info:PayloadAnomalyPeriodType

6.2.15.2.13. info:GroundStationInformationType

Ground station information.

The following paragraph describes the structure of the complex type.

/...

/info:GroundStationId

- Type: common:GroundStationIDType

/info:Latitude

- Type: common:LatitudeType

/info:Longitude

- Type: common:LongitudeType

/info:Altitude



```

- Type: common:AltitudeType
/info:MinTrackingElevation[0:1]
- Type: common:ElevationType
/info:AntennaDiameter[0:1]
- Type: common:LengthInMetersType
/info:AntennaRadome[0:1]
- Type: xsd:boolean
/info:Status[0:1]
- Type: common:StatusType
/info:GroundStationAnomalyMaintenancePeriod[0:∞]
- Type: info:GroundStationAnomalyMaintenancePeriodType
/info:TrackedSatelliteIDList
- Type: common:SatelliteIDListType
/info:DataDeliveryDelay[0:1]
- Type: common:DelayInSecondType

```

6.2.15.2.14. info:SatelliteAnomalyType

Satellite anomaly defined by the period duration and the reason of the anomaly.

The following paragraph describes the structure of the complex type.

```

/...
/info:Reason
- Type: info:SatelliteAnomalyReasonType

```

6.2.15.2.15. info:PayloadStatusType

Payload status.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- enumeration: OK.
- enumeration: NOK.
- enumeration: STAND_BY.

6.2.15.2.16. info:InformationHeaderType

Information header.

The following paragraph describes the structure of the complex type.

```

/...
/info:Originator
- Type: common:OriginatorRecipientType
/info:Recipient
- Type: common:OriginatorRecipientType
/info:GenerationTimeStamp
- Type: xsd:date

```

6.2.15.2.17. info:PayloadAcquisitionModeType



Acquisition mode of the payload.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- `maxLength`: 20.

6.2.15.2.18. `info:PayloadAnomalyPeriodType`

Payload anomaly period defined by the period duration and the anomaly.

The following paragraph describes the structure of the complex type.

/...

/info:Anomaly

- `Type`: `info:PayloadAnomalyType`

6.2.15.2.19. `info:ProviderAnomalyType`

Provider anomaly.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- `maxLength`: 20.

6.2.15.2.20. `info:PlannedSatelliteManeuverType`

Satellite maneuver defined by the period duration and the type of the maneuver.

The following paragraph describes the structure of the complex type.

/...

/info:Type

- `Type`: `info:SatelliteManeuverTypeType`

6.2.15.2.21. `info:TwoLineType`

Two-line element including the generation time stamp and the two-line element set.

The following paragraph describes the structure of the complex type.

/...

/info:GenerationTimeStamp

- `Type`: `xsd:dateTime`

/info:TwoLineElementSet

- `Type`: `info:TwoLineElementSetType`

6.2.15.2.22. `info:NetworkLinkInformationType`

Network link information.

The following paragraph describes the structure of the complex type.

/Choice

/info:NetworkLinkSatelliteToGroundStation

- `Type`: `info:NetworkLinkSatelliteToGroundStationType`

/info:NetworkLinkGroundStationToProvider

- `Type`: `info:NetworkLinkGroundStationToProviderType`

/info:NetworkLinkProviderToDpc

- `Type`: `info:NetworkLinkProviderToDpcType`



6.2.15.2.23. info:ProviderAnomalyPeriodType

Provider anomaly period defined by the period and the anomaly.

The following paragraph describes the structure of the complex type.

/...

/info:Anomaly

- Type: info:ProviderAnomalyType

6.2.15.2.24. info:TwoLineElementSetType

Two-line element set.

The following paragraph describes the structure of the complex type.

/...

/info:Line1

- Type: info:TwoLineElementSetLineType

/info:Line2

- Type: info:TwoLineElementSetLineType

6.2.15.2.25. info:SatelliteAnomalyReasonType

Reason of a satellite anomaly.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 20.

6.2.15.2.26. info:ProviderType

Provider.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 20.

6.2.15.2.27. info:NetworkLinkGroundStationToProviderType

Network link between the ground station and the provider.

The following paragraph describes the structure of the complex type.

/...

/info:GroundStationId

- Type: common:GroundStationIDType

/info:Provider

- Type: info:ProviderType

/info:Status

- Type: common:StatusType

6.2.15.2.28. info:ProviderInformationType

Provider information.

The following paragraph describes the structure of the complex type.

/...

/info:Provider

- Type: info:ProviderType



```

/info:Status[0:1]
  - Type: common:StatusType
/info:ProviderAnomalyPeriod[0:~]
  - Type: info:ProviderAnomalyPeriodType
/info:OperatedSatelliteIDList
  - Type: common:SatelliteIDListType
/info:DataDeliveryDelay[0:1]
  - Type: common:DelayInSecondsType

```

6.2.16. "info-criteria" Data Model

6.2.16.1. Introduction

The inforeqc data model describes criteria types for AIS message requesting.

This data model specification is part of [RD 8] and [RD 9]. All components of the `info-criteria` Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://esa.int/XML/SADPC/inforeqc>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.16.2. Data types

6.2.16.2.1. `info-criteria:InformationRequestCriteriaType`

No documentation.

The following paragraph describes the structure of the complex type.

```

/...
/info-criteria:SatelliteId
  - Type: common:SatelliteIDType
/info-criteria:GroundStationId
  - Type: common:GroundStationIDType
/info-criteria:Delay[0:1]
  - Type: xsd:positiveInteger

```

6.2.17. "itypes" Data Model

6.2.17.1. Introduction

The `itypes` data model defines the message types involved in internal services of DPC Block 2 software system.

This data model specification is part of [RD 8] and [RD 9]. All components of the `itypes` Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://esa.int/XML/SADPC/itypes>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.



6.2.17.2. Data types

6.2.17.2.1. `itypes:SADPC_InternalPushMessageType`

Internal push message description type.

The following paragraph describes the structure of the complex type.

/...

6.2.17.2.2. `itypes:SADPC_InternalMessageType`

Internal message description type.

The following paragraph describes the structure of the complex type.

/...

`/itypes:MessageId`

- Type: `common:MsgIDType`

Message identifier.

`/itypes:Timestamp`

- Type: `xsd:dateTime`

Timestamp of message.

6.2.17.2.3. `itypes:SADPC_InternalRequestMessageType`

Internal request message description type.

The following paragraph describes the structure of the complex type.

/...

`/itypes:MaxMsgPerResponseMsg[0:1]`

- Type: `xsd:positiveInteger`

Maximum count of response messages per request.

6.2.17.2.4. `itypes:SADPC_InternalResponseMessageType`

Internal response message description type.

The following paragraph describes the structure of the complex type.

/...

`/itypes:ReferenceId`

- Type: `common:MsgIDType`

Request message reference id.

`/itypes:SeqNum`

- Type: `common:SeqNumType`

Sequence number.

`/itypes:Terminate`

- Type: `xsd:boolean`

Flag of exchange termination.



6.2.18. "msg" Data Model

6.2.18.1. Introduction

The msg data model describes XML data model of AIS decoded messages, contains description for :

- L1, L2 and L3 checks Types
- Raw message Types
- Meta data Types
- Ancillary data Types
- SAT-AIS messages

This data model specification is part of [RD 8] and [RD 9]. All components of the msg Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://esa.int/XML/SADPC/msg>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.18.2. Data types

6.2.18.2.1. msg:RecoveryMethodType

No documentation.

The data type is a restriction of `xsd:integer`. Facets of the restriction are following:

- enumeration: 0. Prediction.
- enumeration: 1. Doppler.

6.2.18.2.2. msg:CommentBlockLineType

Line of a comment block.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- maxLength: 80.

6.2.18.2.3. msg:SatAISMessageBulkType

Bulk of SAT-AIS messages.

The following paragraph describes the structure of the complex type.

/...

/msg:SatAISMessage[1:∞]

- Type: msg:SatAISMessageType

SAT-AIS messages.

6.2.18.2.4. msg:CommentBlockType

Comment block.

The following paragraph describes the structure of the complex type.

/...

/msg:CommentBlockLine[1:10]

- Type: msg:CommentBlockLineType

Comment block.



6.2.18.2.5. msg:NmeaLineType

Line of nmea data.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- `maxLength`: 256.

6.2.18.2.6. msg:SatAISMessageType

SAT-AIS message.

The following paragraph describes the structure of the complex type.

/...

/msg:MessageOrigin

- Type: `common:MessageOriginType`

Message origin.

/msg:AISMessageType[0:1]

- Type: `common:AISMessageTypeType`

Message type.

/msg:MessageId

- Type: `common:MsgIDType`

Message information.

/msg:SatelliteId

- Type: `common:SatelliteIDType`

Satellite information.

/msg:ComputedMessageTimeStamp[0:1]

- Type: `xsd:dateTime`

Computed timestamp.

/msg:SatelliteReceptionTimeStamp

- Type: `xsd:dateTime`

Satellite reception timestamp.

/msg:DPCReceptionTimeStamp

- Type: `xsd:dateTime`

DPC reception timestamp.

/msg:DPCL1ProcessingTimeStamp[0:1]

- Type: `xsd:dateTime`

L1 processing timestamp.

/msg:DPCL2ProcessingTimeStamp[0:1]

- Type: `xsd:dateTime`

L2 processing timestamp.

/msg:DPCL3ProcessingTimeStamp[0:1]

- Type: `xsd:dateTime`

L3 processing timestamp.

/msg:MMSINumber[0:1]



- Type: common:MMSINumberType

Ship identification.

/msg:L1Check[0:1]

- Type: msg:L1CheckType

L1 processing indicator.

/msg:L2Check[0:1]

- Type: msg:L2CheckType

L2 processing indicator.

/msg:L3Check[0:1]

- Type: msg:L3CheckType

L3 processing indicator.

/msg:RawMessage[0:1]

- Type: msg:RawMessageType

Raw message.

/msg:DecodedAISMessage[0:1]

- Type: decoded-msg:DecodedAISMessageType

Raw message.

/msg:MessageMetaData[0:1]

- Type: msg:MessageMetaDataType

Meta data.

/msg:MessageAncillaryData[0:1]

- Type: msg:MessageAncillaryDataType

Ancillary data.

6.2.18.2.7. msg:RawMessageType

AIS raw message.

The following paragraph describes the structure of the complex type.

/...

/msg:CommentBlock

- Type: msg:CommentBlockType

Comment block

/msg:Nmea

- Type: msg:NmeaType

Nmea type.

6.2.18.2.8. msg:NmeaType

Nmea data.

The following paragraph describes the structure of the complex type.

/...

/msg:NmeaLine[1:10]

- Type: msg:NmeaLineType



6.2.18.2.9. msg:MessageAncillaryDataType

Ancillary data of the SAT-AIS message.

The following paragraph describes the structure of the complex type.

/...

/msg:DopplerMeasurement[0:1]

- Type: doppler:dopplerMeasurementType

Doppler measurement.

/msg:ReceivedPower[0:1]

- Type: msg:ReceivedPowerType

Received power.

6.2.18.2.10. msg:MessageMetaDataType

Meta data of the SAT-AIS message.

The following paragraph describes the structure of the complex type.

/...

/msg:satellitePosition

- Type: common:satellitePositionType

Satellite position.

/msg:satelliteVelocity[0:1]

- Type: common:satelliteVelocityType

Satellite velocity.

6.2.18.2.11. msg:EOCorrelationCheckType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/msg:Check

- Type: common:CheckType

Check result and description.

/msg:EOCorrelationError[0:1]

- Type: common:ErrorType

EO correlation error.

6.2.18.2.12. msg:L3CheckType

L3 checks of the SAT-AIS message.

The following paragraph describes the structure of the complex type.

/...

/msg:EOCorrelationCheck[0:1]

- Type: msg:EOCorrelationCheckType

EO correlation indicator.

6.2.18.2.13. msg:L2CheckType



L2 checks of the SAT-AIS message. \reqref SR-PRO-FUN-0400/T

The following paragraph describes the structure of the complex type.

/Choice

/msg:DopplerCheck

- Type: msg:DopplerCheckCheckType

Doppler check information.

/msg:RecoveryProcessing

- Type: msg:RecoveryProcessingType

6.2.18.2.14. msg:L1CheckType

L1 checks of the SAT-AIS message. \reqref SR-PRO-FUN-0400/T,SR-PRO-FUN-0410/T

The following paragraph describes the structure of the complex type.

/...

/msg:CrcCheck

- Type: common:CheckType

Crc check.

/msg:AISMessageTypeCheck

- Type: common:CheckType

AISMessageType check.

/msg:LengthCheck[0:1]

- Type: common:CheckType

Length check.

/msg:ConsistencyCheck[0:1]

- Type: common:CheckType

Consistency check.

/msg:SatFootPrintCheck[0:1]

- Type: common:CheckType

Satellite footPrint check.

/msg:VelocityCheck[0:1]

- Type: common:CheckType

Velocity check.

6.2.18.2.15. msg:ReceivedPowerType

Received power.

The data type is a restriction of xsd:double. Facets of the restriction are following:

6.2.18.2.16. msg:RecoveryProcessingType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/msg:RecoveryMethod



- Type: msg:RecoveryMethodType

Recovery method.

/msg:OrigMessageId

- Type: common:MsgIDType

Message origin.

/msg:RecoveryError

- Type: common:ErrorType

Processing error.

6.2.18.2.17. msg:DopplerCheckCheckType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/msg:Check

- Type: common:CheckType

Check result and description.

/msg:DopplerError[0:1]

- Type: common:ErrorEllipseType

Ellipse error.

/msg:DopplerMsgId[0:∞]

- Type: common:MsgIDType

Doppler messages ids.

6.2.19. "msg-criteria" Data Model

6.2.19.1. Introduction

No documentation.

This data model specification is part of [RD 8] and [RD 9]. All components of the msg-criteria Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://esa.int/XML/SADPC/msgreqc>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.19.2. Data types

6.2.19.2.1. msg-criteria:SatAISMessageRequestCriteriaType

SAT-AIS message request criteria.

The following paragraph describes the structure of the complex type.

/...

/msg-criteria:From

- Type: xsd:dateTime

/msg-criteria:To

- Type: xsd:dateTime



```

/msg-criteria:MMSINumberList
  - Type: common:MMSINumberListType
/msg-criteria:MaxMsgPerShip[0:1]
  - Type: xsd:positiveInteger
/msg-criteria:RectangularArea[0:1]
  - Type: common:RectangularAreaType
/msg-criteria:SatelliteIdList[0:1]
  - Type: common:SatelliteIDListType
/msg-criteria:AISMessageTypeList[0:1]
  - Type: common:AISMessageTypeListType
/msg-criteria:ProcessingLevelList[0:1]
  - Type: common:ProcessingLevelListType
/msg-criteria:OriginList[0:1]
  - Type: common:OriginListType
/msg-criteria:RetrieveRawMessage[0:1]
  - Default: true - Type: xsd:boolean
/msg-criteria:RetrieveDecodedAISMessage[0:1]
  - Default: false - Type: xsd:boolean
/msg-criteria:RetrieveMessageMetaData[0:1]
  - Default: false - Type: xsd:boolean
/msg-criteria:RetrieveMessageAncillaryData[0:1]
  - Default: false - Type: xsd:boolean

```

6.2.20. "sat-dpc" Data Model

6.2.20.1. Introduction

No documentation.

This data model specification is part of [RD 8] and [RD 9]. All components of the `sat-dpc` Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://esa.int/XML/SADPC>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.20.2. Data types

6.2.20.2.1. `sat-dpc:OutCodeType`

Unique code returned in all operations used in asynchronous request/response and push mechanisms. This code can be considered has a well reception of the SOAP in message of the operation by the server side.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- enumeration: Success.



6.2.20.3. Elements

6.2.20.3.1. SADPC_InformationResponse

SAT-AIS DPC Information response.

The following paragraph describes the structure of the complex type.

/...

```
/sat-dpc:Information
  -Type: info:InformationType
```

6.2.20.3.2. SADPC_InformationRequest

SAT-AIS DPC Information request.

The following paragraph describes the structure of the complex type.

/...

```
/sat-dpc:InformationRequestCriteria
  -Type: info-criteria:InformationRequestCriteriaType
```

6.2.20.3.3. SADPC_SatAISMessageResponse

Response of a request for retrieving SAT-AIS messages.

The following paragraph describes the structure of the complex type.

/...

```
/sat-dpc:SatAISMessageBulk
  -Type: msg:SatAISMessageBulkType
```

6.2.20.3.4. SADPC_Out

Out message used in all operations used in asynchronous request/response and push mechanisms.

The following paragraph describes the structure of the complex type.

/...

```
/sat-dpc:OutCode
  -Type: sat-dpc:OutCodeType
```

6.2.20.3.5. SADPC_AlertRequest

Request for retrieving alerts.

The following paragraph describes the structure of the complex type.

/...

```
/sat-dpc:AlertRequestCriteria
  -Type: alert-criteria:AlertRequestCriteriaType
```

6.2.20.3.6. SADPC_AlertResponse

Response of a request for retrieving alerts.

The following paragraph describes the structure of the complex type.

/...

```
/sat-dpc:AlertBulk
  -Type: alert:AlertBulkType
```



6.2.20.3.7. SADPC_SatAISMessagePoll

Poll for retrieving SatAISMessages.

The following paragraph describes the structure of the complex type.

6.2.20.3.8. SADPC_SatAISMessageRequest

Request for retrieving SAT-AIS messages.

The following paragraph describes the structure of the complex type.

```
/...
/sat-dpc:SatAISMessageRequestCriteria
- Type: msg-criteria:SatAISMessageRequestCriteriaType
```

6.2.20.3.9. SADPC_AlertPoll

Poll for retrieving alerts.

The following paragraph describes the structure of the complex type.

6.2.20.3.10. SADPC_SatAISMessagePush

Pushed data containing SAT-AIS messages.

The following paragraph describes the structure of the complex type.

```
/...
/sat-dpc:SatAISMessageBulk
- Type: msg:SatAISMessageBulkType
```

6.2.20.3.11. SADPC_InformationPoll

Poll for retrieving Informations.

The following paragraph describes the structure of the complex type.

6.2.20.3.12. SADPC_AlertPush

Pushed data containing alerts.

The following paragraph describes the structure of the complex type.

```
/...
/sat-dpc:AlertBulk
- Type: alert:AlertBulkType
```

6.2.21. "simulator" Data Model

6.2.21.1. Introduction

No documentation.

This data model specification is part of [RD 8] and [RD 9]. All components of the `simulator` Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://esa.int/XML/SADPC/simulator>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.21.2. Elements

6.2.21.2.1. satAisSimulatorConfiguration



The S-AIS Simulator Configuration data model defines the elements used to configure the Simulation instances.

The following paragraph describes the structure of the complex type.

/...

/simulator:header

- Type: *anonymous*

/...

/simulator:name

- Type: *xsd:string*

/simulator:beginningDate

- Type: *anonymous*

Simple type

/simulator:author

- Type: *xsd:string*

/simulator:reference

- Type: *xsd:string*

/simulator:simulationManagement

- Type: *anonymous*

/...

/simulator:numberOfFixedPeriod

- Type: *xsd:int*

/simulator:processingMode

- Type: *anonymous*

/Choice

/simulator:realTimeMode

- Type: *anonymous*

@simulator:breakWhenLate

- Constraint: required - Type: *xsd:boolean*

No documentation.

/simulator:acceleratedTimeMode

- Type: *anonymous*

@simulator:breakWhenLate

- Constraint: required - Type: *xsd:boolean*

No documentation.

@simulator:accelerationRate

- Constraint: required - Type: *anonymous*

No documentation.

/simulator:fullSpeed

- Type: *xsd:anyType*



```

/simulator:output
- Type: anonymous
/...
/simulator:AISMessages
- Type: anonymous
/simulator:outputFileInformation
/simulator:statistics
- Type: anonymous
/simulator:outputFileInformation
/simulator:satellitesPositions
- Type: anonymous
/simulator:outputFileInformation
/simulator:satellitesDownlinkSchedules
- Type: anonymous
/simulator:outputFileInformation
/simulator:groundStationsDownlinkSchedules
- Type: anonymous
/simulator:outputFileInformation
/simulator:shipsDownlinkSchedules
- Type: anonymous
/simulator:outputFileInformation
/simulator:monitoring
- Type: anonymous
/...
/simulator:alarms
- Type: anonymous
@simulator:simulatorId
- Constraint: required - Type: xsd:int
No documentation.
/...
/simulator:alarmsFilePath
- Type: anonymous
/simulator:outputFileInformation
/simulator:common
- Type: anonymous
/...
/simulator:geoidsFilePath
- Type: anonymous
/simulator:inputFileInformation

```



```

/simulator:auxiliaryDataFilePath
- Type: anonymous

/simulator:inputFileInformation

/simulator:IERSFilePath
- Type: anonymous

/simulator:inputFileInformation

/simulator:fleet
- Type: anonymous

/...

/simulator:realFleet
- Type: anonymous

/...

/simulator:fleetFilePath
- Type: anonymous

/simulator:inputFileInformation

/simulator:virtualFleet
- Type: anonymous

@simulator:ais3And4EmittingVesselsProportion
- Constraint: required - Type: anonymous

No documentation.

@simulator:staticReportProportion
- Constraint: required - Type: anonymous

No documentation.

/...

/simulator:virtualFleetFilePath
- Type: anonymous

/simulator:inputFileInformation

/simulator:linkBudget
- Type: anonymous

/...

/simulator:antennaGainFiles
- Type: anonymous

/...

/simulator:antennaGainFilePath[1:24]
- Type: anonymous

@simulator:id
- Constraint: required - Type: anonymous

No documentation.

/simulator:inputFileInformation

```



```
/simulator:atmosphericActivityFilePath
- Type: anonymous

/simulator:inputFileInformation

/simulator:AIS12LinkBudget
- Type: anonymous

/simulator:linkBudgetParameters

/simulator:AIS34LinkBudget
- Type: anonymous

/simulator:linkBudgetParameters

/simulator:signalDetection
- Type: anonymous

@simulator:detectionProbabilitiesResetThreshold
- Constraint: required - Type: xsd:int
No documentation.

@simulator:detectionProbabilityAlarmThreshold
- Constraint: required - Type: xsd:double
No documentation.

/...

/simulator:staticReport
- Type: anonymous

@simulator:detectionLossFactor
- Constraint: required - Type: xsd:double
No documentation.

/simulator:type2CollisionsTimeThresholds
- Type: anonymous

@simulator:previousSlot
- Constraint: required - Type: xsd:double
No documentation.

@simulator:nextSlotWithoutCRC
- Constraint: required - Type: xsd:double
No documentation.

@simulator:nextSlotWithCRC
- Constraint: required - Type: xsd:double
No documentation.

/simulator:detectionModel
- Type: anonymous

/Choice

/simulator:trivialModel
- Type: anonymous
```



@simulator:sigmaF

- Constraint: required - Type: xsd:double

No documentation.

@simulator:minPowerLevel

- Constraint: required - Type: xsd:double

No documentation.

@simulator:maxSimultaneousSignals

- Constraint: required - Type: xsd:int

No documentation.

@simulator:detectionProbability

- Constraint: required - Type: xsd:double

No documentation.

/simulator:positionBasedModel

- Type: *anonymous*

@simulator:sigmaF

- Constraint: required - Type: xsd:double

No documentation.

/...

/simulator:detectionMapFilePath

- Type: *anonymous*

/simulator:inputFileInformation

/simulator:BERBasedModel

- Type: *anonymous*

/...

/simulator:BERFilePath

- Type: *anonymous*

/simulator:inputFileInformation

/simulator:signalProcessing

- Type: *anonymous*

/Choice

/simulator:singleChannel

- Type: *anonymous*

@simulator:usefulNoiseBandwidth

- Constraint: required - Type: xsd:double

No documentation.

@simulator:kF

- Constraint: required - Type: xsd:double

No documentation.

/simulator:beamforming



- Type: *anonymous*

@simulator:usefulNoiseBandwidth

- Constraint: required - Type: xsd:double

No documentation.

@simulator:kF

- Constraint: required - Type: xsd:double

No documentation.

/...

/simulator:polygonalParameters

- Type: *anonymous*

@simulator:a

- Constraint: required - Type: xsd:double

No documentation.

@simulator:b

- Constraint: required - Type: xsd:double

No documentation.

/simulator:provider

- Type: *anonymous*

@simulator:id

- Constraint: required - Type: xsd:string

No documentation.

/...

/simulator:constellation

- Type: *anonymous*

/...

/simulator:satellites

- Type: *anonymous*

/...

/simulator:satellite[1:24]

- Type: *anonymous*

@simulator:id

- Constraint: required - Type: xsd:string

No documentation.

/...

/simulator:TLEFilePath

- Type: *anonymous*

/simulator:inputFileInformation

/simulator:antenna[1:10]

- Type: *anonymous*



@simulator:gainRefId

- Constraint: required - Type: *anonymous*

No documentation.

/...

/simulator:position

- Type: *anonymous*

@simulator:X

- Constraint: required - Type: xsd:double

No documentation.

@simulator:Y

- Constraint: required - Type: xsd:double

No documentation.

@simulator:Z

- Constraint: required - Type: xsd:double

No documentation.

/simulator:polarization

- Type: *anonymous*

/Choice

/simulator:circular

- Type: xsd:anyType

/simulator:linear

- Type: *anonymous*

@simulator:axialRatio

- Constraint: required - Type: xsd:double

No documentation.

@simulator:azimuth

- Constraint: required - Type: xsd:double

No documentation.

@simulator:elevation

- Constraint: required - Type: xsd:double

No documentation.

/simulator:AISChannels

- Type: *anonymous*

@simulator:AIS1

- Constraint: required - Type: xsd:boolean

No documentation.

@simulator:AIS2

- Constraint: required - Type: xsd:boolean

No documentation.



@simulator:AIS3

- Constraint: required - Type: xsd:boolean

No documentation.

@simulator:AIS4

- Constraint: required - Type: xsd:boolean

No documentation.

/simulator:geographicFilters[0:1]

- Type: *anonymous*

/...

/simulator:geographicFilter[1:16]

- Type: *anonymous*

/...

/simulator:corner[4:10]

- Type: *anonymous*

@simulator:latitude

- Constraint: required - Type: xsd:double

No documentation.

@simulator:longitude

- Constraint: required - Type: xsd:double

No documentation.

/simulator:groundStationVisibility

- Type: *anonymous*

/Choice

/simulator:seenOnlyBy

- Type: *anonymous*

/...

/simulator:groundStation[1:60]

- Type: *anonymous*

@simulator:id

- Constraint: required - Type: xsd:string

No documentation.

/simulator:seenByAll

- Type: xsd:anyType

/simulator:groundNetwork

- Type: *anonymous*

/...

/simulator:groundStation[1:60]

- Type: *anonymous*

@simulator:id



- Constraint: required - Type: `xsd:string`

No documentation.

/...

/simulator:position

- Type: *anonymous*

@simulator:longitude

- Constraint: required - Type: `xsd:double`

No documentation.

@simulator:latitude

- Constraint: required - Type: `xsd:double`

No documentation.

@simulator:altitude

- Constraint: required - Type: `xsd:double`

No documentation.

/simulator:antenna

- Type: *anonymous*

@simulator:gainRefId

- Constraint: required - Type: *anonymous*

No documentation.

/simulator:minimumMaskingAngle

- Type: `xsd:double`

/simulator:minimumVisibilityDuration

- Type: `xsd:int`

/simulator:deliveryDelay

- Type: `xsd:int`

6.2.22. "svd" Data Model

6.2.22.1. Introduction

List of doppler centroide values.

This data model specification is part of [RD 8] and [RD 9]. All components of the `svd` Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://cweb.ksat.no/cweb/schema/geoweb/vessel/sarVesselDetection>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.22.2. Data types

6.2.22.2.1. `svd:ProductMetadataType`

Adds SAR specific attributes about the SAR level1 product.

The following paragraph describes the structure of the complex type.

/...



/svd:polarisationChannels[0:1]

- Type: svd:PolarisationChannelsPropertyType

The polarisation channel(s) used for vessel detection.

/svd:polarisationMode[0:1]

- Type: svd:PolarisationModePropertyType

single S, dual D, twin T, quad Q, UNDEFINED.

/svd:antennaLookDirection[0:1]

- Type: *anonymous*

Polarisation channel transmit/receive configuration: horizontal, vertical.

Simple type

/svd:ENL[0:1]

- Type: xsd:double

Equivalent Number of Looks.

/svd:minIncidenceAngle[0:1]

- Type: gml:AngleType

Minimum Incidence angle.

/svd:maxIncidenceAngle[0:1]

- Type: gml:AngleType

Maximum Incidence angle.

/svd:incidenceAngleVariation[0:1]

- Type: gml:AngleType

Incidence angle variation

/svd:dopplerCentroid[0:1]

- Type: svd:DopplerCentroidListType

/svd:dopplerFrequency[0:1]

- Type: gml:MeasureType

Doppler Frequency of acquisition. Deprecated, use dopplerCentroid.

/svd:pulseRepetitionFrequency[0:∞]

- Type: svd:PulseRepetitionFrequencyType

Pulse repetition frequency, for each swath number.

/svd:azimuthAmbiguityList[0:∞]

- Type: svd:AzimuthAmbiguityListType

List of Azimuth Ambiguity values, with one value pr. pixel position. Values in the "valueList" are assumed to be indexed respective to their order, with index base at "startPixel" and increment by "stepPixel". The "valueList" is a list of double values separated by a single space character (derived from type gml:doubleList), and must contain at least two values. One azimuthAmbiguityList element should be provided for each swath number, which is given in the swathNumber attribute.

/svd:startTime[0:1]

- Type: xsd:dateTime

Start time of product scene (SAR Level1 product).



/svd:stopTime[0:1]

- Type: xsd:dateTime

Stop time of product scene (SAR Level1 product).

6.2.22.2.2. svd:AzimuthAmbiguityValueListType

Restriction of gml:doubleList, which requires at least two values in the list.

The data type is a restriction of gml:doubleList. Facets of the restriction are following:

- minLength: 2.

6.2.22.2.3. svd:PolarisationChannelsPropertyType

No documentation.

The data type is a restriction of xsd:string. Facets of the restriction are following:

- enumeration: HH.
- enumeration: HV.
- enumeration: VH.
- enumeration: VV.
- enumeration: HH VV.
- enumeration: HH HV.
- enumeration: VV VH.
- enumeration: HH VV HV VH.
- enumeration: UNDEFINED.

6.2.22.2.4. svd:DopplerCentroidListType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/svd:dopplerCentroidTime

- Type: xsd:dateTime

doppler.

/svd:rangeTimeOrigin

- Type: xsd:decimal

In seconds.

/svd:valueList

- Type: svd:DopplerCentroidValueListType

List of decimal values, at least one.

6.2.22.2.5. svd:FeatureCollectionType

A restriction of the abstract feature collection contains zero or more svd:featureMembers.

The following paragraph describes the structure of the complex type.

@gml:id

- Constraint: optional - Type: xsd:ID



Database handle for the object. It is of XML type ID, so is constrained to be unique in the XML document within which it occurs. An external identifier for the object in the form of a URI may be constructed using standard XML and XPointer methods. This is done by concatenating the URI for the document, a fragment separator, and the value of the id attribute.

/...

/gml:StandardObjectProperties

/gml:boundedBy[0:1]

- Type: gml:BoundingShapeType

/Choice[0:~]

/svd:featureMember

- Type: svd:FeaturePropertyType

6.2.22.2.6. svd:PulseRepetitionFrequencyType

No documentation.

The following paragraph describes the structure of the complex type.

@svd:swathNumber

- Constraint: required - Type: xsd:integer

No documentation.

6.2.22.2.7. svd:FeatureType

No documentation.

The following paragraph describes the structure of the complex type.

/...

The actual detected vessel feature.

/vd:vesselPosition

- Type: gml:PointPropertyType

The primary feature geometry. The point position of a vessel, in geo coordinates

/vd:vesselLength[0:1]

- Type: xsd:double

In meters

/vd:vesselWidth[0:1]

- Type: xsd:double

Width of the vessel (as in AIS 'Beam' attribute), In meters

/vd:vesselShape[0:1]

- Type: gml:PolygonPropertyType

If available, the shape geometry of a vessel, in geo coordinates

/vd:vesselHeading[0:1]

- Type: xsd:double

In decimal deegrees of angle

/vd:vesselSpeedOverGround[0:1]

- Type: xsd:double

**In knots**

/vd:distanceToLand[0:1]

- Type: xsd:double

Shortest distance to the coast line, in meters.

/vd:classification[0:1]

- Type: vd:ClassificationType

/vd:detectionTime[0:1]

- Type: xsd:dateTime

When the vessel was in the given position, e.g. scan-line time of the detected feature.

/vd:guid[0:1]

- Nillable - Type: xsd:string

Globally unique Id for the feature. Primarily used to link features and events during analysis. This GUID will have no obvious meaning for the arbitrary user.

/svd:detectionMetadata[0:1]

- Type: svd:DetectionMetadataType

/svd:productMetadata[0:1]

- Type: svd:ProductMetadataType

/vd:provider[0:1]

- Type: xsd:string

Providing organization

/vd:access[0:1]

- Type: xsd:string

Data access conditions/rights

6.2.22.2.8. svd:AzimuthAmbiguityListType

No documentation.

The following paragraph describes the structure of the complex type.

@svd:swathNumber

- Constraint: required - Type: xsd:integer

No documentation.

/...

/svd:startPixel

- Type: xsd:integer

/svd:stepPixel

- Type: xsd:integer

/svd:valueList

- Type: svd:AzimuthAmbiguityValueListType

6.2.22.2.9. svd:DetectionMetadataType

Adds SAR specific attributes about the detection.

The following paragraph describes the structure of the complex type.



/...

/svd:azimuthAmbiguity[0:1]

- Type: xsd:boolean

true, if the observation is classified as azimuth ambiguity.

/svd:maxNRCS[0:1]

- Type: xsd:decimal

Calibrated maxPixelValue, in dB.

/svd:RCS[0:1]

- Type: xsd:decimal

RCS, sum of all sigma0 values within target outline times target surface, in dBm2.

/svd:backgroundNRCSAvg[0:1]

- Type: xsd:decimal

Average Background NRCS, in dB.

/svd:polarisationChannels[0:1]

- Type: svd:PolarisationChannelsPropertyType

The polarisation channel(s) used for vessel detection.

6.2.22.2.10. svd:DopplerCentroidValueListType

Restriction of gml:doubleList, which requires at least one values in the list.

The data type is a restriction of gml:doubleList. Facets of the restriction are following:

- minLength: 1.

6.2.22.2.11. svd:FeaturePropertyType

Restricted feature property Container for a svd:feature - follow gml:AssociationType pattern.

The following paragraph describes the structure of the complex type.

/...[0:1]

/svd:feature

- Type: svd:FeatureType

An SVD feature encloses a snapshot of a single detected vessel.

6.2.22.2.12. svd:PolarisationModePropertyType

No documentation.

The data type is a restriction of xsd:string. Facets of the restriction are following:

- enumeration: D.
- enumeration: Q.
- enumeration: S.
- enumeration: T.
- enumeration: UNDEFINED.

6.2.22.3. Elements

6.2.22.3.1. polarisationChannels

The polarisation channel(s) used for vessel detection.



Refer to `svd:polarisationChannels` for the description of the data type.

6.2.22.3.2. `featureCollection`

This is the concrete response element used by a service for SVD features.

Refer to `svd:featureCollection` for the description of the data type.

6.2.22.3.3. `antennaLookDirection`

Polarisation channel transmit/receive configuration: horizontal, vertical.

6.2.22.3.4. *anonymous*

No documentation.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- enumeration: LEFT.
- enumeration: RIGHT.

6.2.22.3.5. ENL

Equivalent Number of Looks.

Refer to `svd:ENL` for the description of the data type.

6.2.22.3.6. `featureMember`

No documentation.

Refer to `svd:featureMember` for the description of the data type.

6.2.22.3.7. `detectionMetadata`

No documentation.

Refer to `svd:detectionMetadata` for the description of the data type.

6.2.22.3.8. `incidenceAngleVariation`

Incidence angle variation

Refer to `svd:incidenceAngleVariation` for the description of the data type.

6.2.22.3.9. RCS

RCS, sum of all `sigma0` values within target outline times target surface, in dBm2.

Refer to `svd:RCS` for the description of the data type.

6.2.22.3.10. `stopTime`

Stop time of product scene (SAR Level1 product).

Refer to `svd:stopTime` for the description of the data type.

6.2.22.3.11. `startTime`

Start time of product scene (SAR Level1 product).

Refer to `svd:startTime` for the description of the data type.

6.2.22.3.12. `dopplerCentroid`

No documentation.

Refer to `svd:dopplerCentroid` for the description of the data type.

6.2.22.3.13. `minIncidenceAngle`



Minimum Incidence angle.

Refer to `svd:minIncidenceAngle` for the description of the data type.

6.2.22.3.14. backgroundNRCSAvg

Average Background NRCS, in dB.

Refer to `svd:backgroundNRCSAvg` for the description of the data type.

6.2.22.3.15. maxIncidenceAngle

Maximum Incidence angle.

Refer to `svd:maxIncidenceAngle` for the description of the data type.

6.2.22.3.16. azimuthAmbiguityList

List of Azimuth Ambiguity values, with one value pr. pixel position. Values in the "valueList" are asumed to be indexed respective to their order, with index base at "startPixel" and increment by "stepPixel". The "valueList" is a list of double values separated by a single space character (derived from type `gml:doubleList`), and must contain at least two values. One `azimuthAmbiguityList` element should be provided for each swath number, which is given in the `swathNumber` attribute.

Refer to `svd:azimuthAmbiguityList` for the description of the data type.

6.2.22.3.17. feature

An SVD feature encloses a snapshot of a single detected vessel.

Refer to `svd:feature` for the description of the data type.

6.2.22.3.18. polarisationMode

single S, dual D, twin T, quad Q, UNDEFINED.

Refer to `svd:polarisationMode` for the description of the data type.

6.2.22.3.19. maxNRCS

Calibrated `maxPixelValue`, in dB.

Refer to `svd:maxNRCS` for the description of the data type.

6.2.22.3.20. pulseRepetitionFrequency

Pulse repetition frequency, for each swath number.

Refer to `svd:pulseRepetitionFrequency` for the description of the data type.

6.2.22.3.21. productMetadata

No documentation.

Refer to `svd:productMetadata` for the description of the data type.

6.2.22.3.22. azimuthAmbiguity

true, if the observation is classified as azimuth ambiguity.

Refer to `svd:azimuthAmbiguity` for the description of the data type.

6.2.22.3.23. dopplerFrequency

Doppler Frequency of acquisition. Deprecated, use `dopplerCentroide`.

Refer to `svd:dopplerFrequency` for the description of the data type.



6.2.23. "vd" Data Model

6.2.23.1. Introduction

KSAT Data model for Satellite based Vessel Detection - GML Application schema.

This data model specification is part of [RD 8] and [RD 9]. All components of the `vd` Data Model are specified hereafter using the mechanisms specified in [RD 7].

<http://cweb.ksat.no/cweb/schema/geoweb/vessel/vesselDetection>

Although this specification associates a specific XML namespace prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

6.2.23.2. Data types

6.2.23.2.1. `vd:DirectionType`

No documentation.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- enumeration: ASCENDING.
- enumeration: DESCENDING.

6.2.23.2.2. `vd:OrbitStateVectorType`

No documentation.

The following paragraph describes the structure of the complex type.

/...

/vd:time

- Type: `xsd:dateTime`

The sample time, in UTC

/vd:position

- Type: *anonymous*

All position units of measure are meters

/...

/vd:x

- Type: `xsd:double`

/vd:y

- Type: `xsd:double`

/vd:z

- Type: `xsd:double`

/vd:velocity

- Type: *anonymous*

All velocity units of measure are m/s

/...

/vd:x

- Type: `xsd:double`

/vd:y



- Type: xsd:double

/vd:z

- Type: xsd:double

6.2.23.2.3. vd:ProductMetadataType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/vd:platform[0:1]

- Type: xsd:string

Platform name, e.g. ENVISAT, RADARSAT-2, TSX-1, etc.

/vd:swathIdentifier[0:1]

- Type: xsd:string

Swath identifier (e.g. Envisat ASAR has 7 distinct swaths (I1,I2,I3...I7) that correspond to precise incidence angles for the sensor). Value list can be retrieved with codeSpace.

/vd:operationalMode[0:1]

- Type: xsd:string

Sensor mode/BeamModeMnemonic/Beam Configuration. Possible values are mission specific and should be retrieved using codespace. (eg. PHR : PA, XS or PX).

/vd:productType[0:1]

- Type: xsd:string

Product type, e.g. IMS, APS, SGX, SGF, etc.

/vd:lineTimeDirection[0:1]

- Type: vd:TimeDirectionType

/vd:pixelTimeDirection[0:1]

- Type: vd:TimeDirectionType

/vd:orbitDirection[0:1]

- Type: vd:DirectionType

/vd:orbitStateVector[0:~]

- Type: vd:OrbitStateVectorType

/vd:footprint[0:1]

- Type: gml:LinearRingPropertyType

The geometric (geo-coordinates) footprint of the product. Preferrably a gml:LinearRing/gml:PosList form.

/vd:productId[0:1]

- Type: xsd:string

Unique reference to an image product (possibly derived from original Level1 product).

/vd:guid[0:1]

- Nillable - Type: xsd:string

Globally unique Id for the feature. Primarily used to link features and events during analysis. This GUID will have no obvious meaning for the arbitrary user.



6.2.23.2.4. vd:ClassificationType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/vd:class

- Type: vd:ClassificationValueType

One of the predefined valid classes: VESSEL, NOISE, AZ_AMBIGUITY, SURFACE_INSTALLATION.

/vd:vesselType[0:1]

- Type: xsd:string

If classification value is VESSEL, the type of vessel detected, e.g. "cargo", "bulk", etc..

/vd:installationType[0:1]

- Type: xsd:string

If classification value is SURFACE_INSTALLATION, this element may name the type of installation, e.g. "platform", "wind mill", "buoy", etc.

/vd:installationReference[0:1]

- Type: xsd:string

If classification value is SURFACE_INSTALLATION, this element may hold a reference GUID to the actual identified object.

6.2.23.2.5. vd:TimeDirectionType

No documentation.

The data type is a restriction of xsd:string. Facets of the restriction are following:

- enumeration: INCREASING.
- enumeration: DECREASING.

6.2.23.2.6. vd:FeaturePropertyType

Restricted feature property Container for a vd:feature - follow gml:AssociationType pattern.

The following paragraph describes the structure of the complex type.

/...[0:1]

/vd:feature

- Type: vd:FeatureType

A VD feature encloses a snapshot of a single detected vessel

6.2.23.2.7. vd:FeatureCollectionType

A restriction of the abstract feature collection contains zero or more vd:featureMembers.

The following paragraph describes the structure of the complex type.

@gml:id

- Constraint: optional - Type: xsd:ID

Database handle for the object. It is of XML type ID, so is constrained to be unique in the XML document within which it occurs. An external identifier for the object in the form of a URI may be constructed using standard XML and XPointer methods. This is done by concatenating the URI for the document, a fragment separator, and the value of the id attribute.

/...



```

/gml:StandardObjectProperties
/gml:boundedBy[0:1]
  - Type: gml:BoundingShapeType
/Choice[0:∞]
  /vd:featureMember
    - Type: vd:FeaturePropertyType

```

6.2.23.2.8. vd:ClassificationValueType

No documentation.

The data type is a restriction of `xsd:string`. Facets of the restriction are following:

- enumeration: VESSEL.
- enumeration: NOISE.
- enumeration: AMBIGUITY.
- enumeration: SURFACE_INSTALLATION.

6.2.23.2.9. vd:ConfidenceType

No documentation.

The data type is a restriction of `xsd:double`. Facets of the restriction are following:

- minInclusive: 0.0.
- maxInclusive: 1.0.

6.2.23.2.10. vd:FeatureType

No documentation.

The following paragraph describes the structure of the complex type.

/...

The detected vessel feature

```

/vd:vesselPosition
  - Type: gml:PointPropertyType
  The primary feature geometry. The point position of a vessel, in geo coordinates.
/vd:vesselLength[0:1]
  - Type: xsd:double
  Length of the vessel expressed in meters.
/vd:vesselWidth[0:1]
  - Type: xsd:double
  Width of the vessel (as in AIS 'Beam' attribute), in meters.
/vd:vesselShape[0:1]
  - Type: gml:PolygonPropertyType
  If available, the shape geometry of a vessel, in geo coordinates.
/vd:vesselHeading[0:1]
  - Type: xsd:double
  Heading of the vessel, in decimal degrees of angle/

```



/vd:vesselSpeedOverGround[0:1]

- Type: xsd:double

Speed of the vessel, in knots

/vd:distanceToLand[0:1]

- Type: xsd:double

Shortest distance to the coast line, in meters.

/vd:classification[0:1]

- Type: vd:ClassificationType

/vd:detectionTime[0:1]

- Type: xsd:dateTime

When the vessel was in the given position, e.g. scan-line time of the detected feature.

/vd:guid[0:1]

- Nillable - Type: xsd:string

Globally unique Id for the feature. Primarily used to link features and events during analysis. This GUID will have no obvious meaning for the arbitrary user.

/vd:detectionMetadata[0:1]

- Type: vd:DetectionMetadataType

/vd:productMetadata[0:1]

- Type: vd:ProductMetadataType

/vd:provider[0:1]

- Type: xsd:string

Providing organization

/vd:access[0:1]

- Type: xsd:string

Data access conditions/rights

6.2.23.2.11. vd:DetectionMetadataType

No documentation.

The following paragraph describes the structure of the complex type.

/...

/vd:confidence[0:1]

- Type: vd:ConfidenceType

Confidence of correctness of observation, decimal in the range: [0, 1]

/vd:headingAndLengthConfidence[0:1]

- Type: vd:ConfidenceType

Confidence in heading and length of the vessel, decimal in the range: [0, 1].

/vd:imageCoordinates[0:1]

- Type: gml:PointPropertyType

Coordinate of the detected feature within the product - i.e. pixel coordinates in the image/product coordinate system (pixel, line). NB! the coordinate system is to be specified in the srsName attribute as srsName="image" or URN: urn:ogc:def:derivedCRSType:OGC:1.0:image .



/vd:maxPixelValue[0:1]

- Type: xsd:double

Maximum pixel value within the target.

/vd:backgroundPixelValueAvg[0:1]

- Type: xsd:double

Average background pixel value.

/vd:backgroundPixelValueStd[0:1]

- Type: xsd:double

Standard deviation background pixel value.

/vd:incidenceAngle[0:1]

- Type: gml:AngleType

Incidence angle from vertical, in decimal degrees.

/vd:pixelWidth[0:1]

- Type: xsd:double

Width of a single pixel along the scan-line axis. In meters.

/vd:pixelHeight[0:1]

- Type: xsd:double

Height of a single pixel, i.e. same as height of the scan-line of pixels. In meters.

/vd:pixelRepresentation[0:1]

- Type: xsd:string

For example: Complex Integer, Complex Float, Integer, Float, etc.

/vd:detectionSoftware[0:1]

- Type: xsd:string

Info on the software used to perform the vessel detection.

/vd:productId[0:1]

- Type: xsd:string

Unique reference to an image product (possibly derived from original Level1 product).

/vd:guid[0:1]

- Nillable - Type: xsd:string

Globally unique Id for the feature. Primarily used to link features and events during analysis.
This GUID will have no obvious meaning for the arbitrary user.

6.2.23.3. Elements

6.2.23.3.1. featureCollection

This is the concrete response element used by a service for VD features

Refer to `vd:featureCollection` for the description of the data type.

6.2.23.3.2. vesselLength

Length of the vessel expressed in meters.

Refer to `vd:vesselLength` for the description of the data type.



6.2.23.3.3. footprint

The geometric (geo-coordinates) footprint of the product. Preferably a gml:LinearRing/gml:PosList form.

Refer to `vd:footprint` for the description of the data type.

6.2.23.3.4. detectionMetadata

No documentation.

Refer to `vd:detectionMetadata` for the description of the data type.

6.2.23.3.5. pixelWidth

Width of a single pixel along the scan-line axis. In meters.

Refer to `vd:pixelWidth` for the description of the data type.

6.2.23.3.6. vesselPosition

The primary feature geometry. The point position of a vessel, in geo coordinates.

Refer to `vd:vesselPosition` for the description of the data type.

6.2.23.3.7. detectionSoftware

Info on the software used to perform the vessel detection.

Refer to `vd:detectionSoftware` for the description of the data type.

6.2.23.3.8. productType

Product type, e.g. IMS, APS, SGX, SGF, etc.

Refer to `vd:productType` for the description of the data type.

6.2.23.3.9. headingAndLengthConfidence

Confidence in heading and length of the vessel, decimal in the range: [0, 1].

Refer to `vd:headingAndLengthConfidence` for the description of the data type.

6.2.23.3.10. imageCoordinates

Coordinate of the detected feature within the product - i.e. pixel coordinates in the image/product coordinate system (pixel, line). NB! the coordinate system is to be specified in the `srsName` attribute as `srsName="image"` or URN: `urn:ogc:def:derivedCRSType:OGC:1.0:image`.

Refer to `vd:imageCoordinates` for the description of the data type.

6.2.23.3.11. pixelHeight

Height of a single pixel, i.e. same as height of the scan-line of pixels. In meters.

Refer to `vd:pixelHeight` for the description of the data type.

6.2.23.3.12. vesselHeading

Heading of the vessel, in decimal degrees of angle/

Refer to `vd:vesselHeading` for the description of the data type.

6.2.23.3.13. vesselSpeedOverGround

Speed of the vessel, in knots

Refer to `vd:vesselSpeedOverGround` for the description of the data type.

6.2.23.3.14. orbitStateVector



No documentation.

Refer to `vd:orbitStateVector` for the description of the data type.

6.2.23.3.15. feature

A VD feature encloses a snapshot of a single detected vessel

Refer to `vd:feature` for the description of the data type.

6.2.23.3.16. backgroundPixelValueAvg

Average background pixel value.

Refer to `vd:backgroundPixelValueAvg` for the description of the data type.

6.2.23.3.17. detectionTime

When the vessel was in the given position, e.g. scan-line time of the detected feature.

Refer to `vd:detectionTime` for the description of the data type.

6.2.23.3.18. productMetadata

No documentation.

Refer to `vd:productMetadata` for the description of the data type.

6.2.23.3.19. orbitDirection

No documentation.

Refer to `vd:orbitDirection` for the description of the data type.

6.2.23.3.20. platform

Platform name, e.g. ENVISAT, RADARSAT-2, TSX-1, etc.

Refer to `vd:platform` for the description of the data type.

6.2.23.3.21. maxPixelValue

Maximum pixel value within the target.

Refer to `vd:maxPixelValue` for the description of the data type.

6.2.23.3.22. distanceToLand

Shortest distance to the coast line, in meters.

Refer to `vd:distanceToLand` for the description of the data type.

6.2.23.3.23. vesselShape

If available, the shape geometry of a vessel, in geo coordinates.

Refer to `vd:vesselShape` for the description of the data type.

6.2.23.3.24. vesselWidth

Width of the vessel (as in AIS 'Beam' attribute), in meters.

Refer to `vd:vesselWidth` for the description of the data type.

6.2.23.3.25. featureMember

No documentation.

Refer to `vd:featureMember` for the description of the data type.

6.2.23.3.26. provider



Providing organization

Refer to `vd:provider` for the description of the data type.

6.2.23.3.27. pixelRepresentation

For example: Complex Integer, Complex Float, Integer, Float, etc.

Refer to `vd:pixelRepresentation` for the description of the data type.

6.2.23.3.28. confidence

Confidence of correctness of observation, decimal in the range: [0, 1]

Refer to `vd:confidence` for the description of the data type.

6.2.23.3.29. swathIdentifier

Swath identifier (e.g. Envisat ASAR has 7 distinct swaths (I1,I2,I3...I7) that correspond to precise incidence angles for the sensor). Value list can be retrieved with `codeSpace`.

Refer to `vd:swathIdentifier` for the description of the data type.

6.2.23.3.30. access

Data access conditions/rights

Refer to `vd:access` for the description of the data type.

6.2.23.3.31. productId

Unique reference to an image product (possibly derived from original Level1 product).

Refer to `vd:productId` for the description of the data type.

6.2.23.3.32. guid

Globally unique Id for the feature. Primarily used to link features and events during analysis. This GUID will have no obvious meaning for the arbitrary user.

Refer to `vd:guid` for the description of the data type.

6.2.23.3.33. lineTimeDirection

No documentation.

Refer to `vd:lineTimeDirection` for the description of the data type.

6.2.23.3.34. classification

No documentation.

Refer to `vd:classification` for the description of the data type.

6.2.23.3.35. backgroundPixelValueStd

Standard deviation background pixel value.

Refer to `vd:backgroundPixelValueStd` for the description of the data type.

6.2.23.3.36. operationalMode

Sensor mode/BeamModeMnemonic/Beam Configuration. Possible values are mission specific and should be retrieved using `codespace`. (eg. PHR : PA, XS or PX).

Refer to `vd:operationalMode` for the description of the data type.

6.2.23.3.37. pixelTimeDirection

No documentation.



Refer to `vd:pixelTimeDirection` for the description of the data type.

6.2.23.3.38. incidenceAngle

Incidence angle from vertical, in decimal degrees.

Refer to `vd:incidenceAngle` for the description of the data type.

7. Validation requirements

The validation approach of the interfaces defined in the present ICD will be detailed in each subsystem SVP and SVS documents.

8. Traceability

See traceability matrices in Appendix B and C.



Appendix A - List of acronyms

AD	Applicable Document
AIS	Automatic Identification System
ASCII	American Standard Code for Information Interchange
BPEL	Business Process Execution Language
CRC	Cyclic Redundancy Check
COTS	Commercially Available Off-The-Shelf
DLP	Doppler Location Processing
DPC	Data Processing Centre
EO	Earth Observation (radar or optical images)
ESB	Enterprise Serial Bus
FTP	File Transfer Protocol
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ISS	International Space Station
ITDMA	Incremental Time Division Multiple Access
JMX	Java Management Extensions, a Java technology that supplies tools for managing and monitoring applications.
KML	Keyhole Markup Language
KPI	Key Performance Indicator
LEO	Low Earth Orbit
MMSI	Maritime Mobile Service Identity
NAS	Network Attached Storage
NASA	National Aeronautics and Space Administration
NCA	Norwegian Coastal Administration
NMEA	National Maritime Electronics Association, which defines communication standards for maritime equipments (including GPS)
N-USOC	Norwegian User Support and Operations Centre
OGC	Open Geospatial Consortium
RD	Reference Document
RMI	Remote Method Invocation



S-AIS	Satellite AIS (data collection of AIS messages by satellites)
TBC	To be confirmed
TBD	To be defined
TLE	Two-Line Elements
TLS	Transport Layer Security
UC	Use Case
UML	Unified Modeling Language, a standardized general-purpose modeling language in the field of object-oriented software engineering.
XML	eXtensible Markup Language
XSLT	Extensible Stylesheet Language Transformations
WS-*	Web Services (W3C)
TBC	To be confirmed
TBD	To be defined
TBW	To be written



Appendix B - Traceability matrix - ICD vs SSS requirements

RequirementName (ICD)	TracedFROM (SSS)
IFR-ALL-0002/I	SR-DPC-DES-2000/I
IFR-ALL-0004/I	SR-DPC-DES-2020/I
IFR-ALL-0005/I	SR-DPC-DES-1990/I
IFR-ALL-0008/I	SR-DPC-DES-1980/I
IFR-DATAMODEL-ALG-0001/T	SR-DPC-DES-1960/I
IFR-EXT_QUERIES-0900/T	SR-DPC-DES-1970/I
IFR-I_AUXILIARY_DATA_PROVIDER-0050/T	SR-DIS-FUN-1800/I
	SR-DIS-FUN-1810/I
	SR-DPC-IFR-0080/T
IFR-I_AUXILIARY_DATA_PROVIDER-0060/T	
IFR-I_AUXILIARY_DATA_PROVIDER-0070/T	
IFR-I_AUXILIARY_DATA_PROVIDER-0080/T	
IFR-I_AUXILIARY_DATA_PROVIDER-0090/T	
IFR-I_AUXILIARY_DATA_PROVIDER-0100/T	
IFR-I_AUXILIARY_DATA_PROVIDER-0110/I	SR-DRT-IFR-0180/T
	SR-DRT-IFR-0200/T
IFR-I_AUXILIARY_DATA_PROVIDER-0120/I	SR-DRT-IFR-0190/T
IFR-I_AUXILIARY_DATA_PROVIDER-0130/I	SR-DRT-FUN-0330/T
	SR-DRT-IFR-0210/T
	SR-DRT-IFR-0220/T
IFR-I_AUXILIARY_DATA_PROVIDER-0140/I	SR-DRT-IFR-0230/T
	SR-DRT-IFR-0240/T
IFR-I_AUXILIARY_DATA_PROVIDER-0150/I	SR-DRT-IFR-0250/T
IFR-I_AUXILIARY_DATA_PROVIDER-0160/I	SR-DRT-IFR-0260/T
IFR-I_AUXILIARY_DATA_PROVIDER-0170/I	SR-DRT-IFR-0270/T
IFR-I_AUXILIARY_DATA_PROVIDER-0180/I	SR-DRT-IFR-0280/T
IFR-I_DD_CFG-0190/I	
IFR-I_DD_CFG-0200/I	SR-DPC-DES-1960/I
	SR-DPC-DES-2030/I
IFR-I_DD_DATA-0210/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_DD_DATA-0220/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_DD_DATA-0230/T	SR-DPC-DES-1970/I
IFR-I_DD_SUPERVISION-0240/I	
IFR-I_DMA_DB_CFG-0250/I	
IFR-I_DMA_DB_CFG-0260/I	SR-DPC-DES-1960/I
	SR-DPC-DES-2030/I
IFR-I_DMA_DMA_CFG-0270/I	
IFR-I_DMA_DMA_CFG-0280/I	SR-DPC-DES-1960/I



RequirementName (ICD)	TracedFROM (SSS)
	SR-DPC-DES-2030/I
IFR-I_DMA_DMA_SUPERVISION-0290/I	
IFR-I_DP_DOPPLER_CFG-0300/I	
IFR-I_DP_DOPPLER_CFG-0310/I	SR-DPC-DES-1960/I
	SR-DPC-DES-2030/I
IFR-I_DP_DOPPLER_SERVICE -0320/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_DP_DOPPLER_SERVICE -0330/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_DP_DOPPLER_SERVICE -0340/T	SR-DPC-DES-1970/I
IFR-I_DP_DOPPLER_SERVICE-0350/T	SR-DPC-DES-1970/I
IFR-I_DP_DOPPLER_SUPERVISION-0360/I	
IFR-I_DP_L1_CFG-0370/I	
IFR-I_DP_L1_CFG-0380/I	SR-DPC-DES-1960/I
	SR-DPC-DES-2030/I
IFR-I_DP_L1_SERVICE-0390/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_DP_L1_SERVICE-0400/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_DP_L1_SERVICE-0410/T	SR-DPC-DES-1970/I
IFR-I_DP_L1_SERVICE-0420/T	
IFR-I_DP_L1_SUPERVISION-0430/I	
IFR-I_DP_L2_CFG-0440/I	
IFR-I_DP_L2_CFG-0450/I	SR-DPC-DES-1960/I
	SR-DPC-DES-2030/I
IFR-I_DP_L2_SERVICE-0460/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_DP_L2_SERVICE-0470/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_DP_L2_SERVICE-0480/T	SR-DPC-DES-1970/I
IFR-I_DP_L2_SERVICE-0490/T	
IFR-I_DP_L2_SUPERVISION-0500/I	
IFR-I_DP_L3_CFG-0510/I	
IFR-I_DP_L3_CFG-0520/I	SR-DPC-DES-1960/I
	SR-DPC-DES-2030/I
IFR-I_DP_L3_SERVICE-0530/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_DP_L3_SERVICE-0540/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_DP_L3_SERVICE-0550/T	SR-DPC-DES-1970/I
IFR-I_DP_L3_SERVICE-0560/T	SR-DPC-DES-1970/I
IFR-I_DP_L3_SUPERVISION-0570/I	



RequirementName (ICD)	TracedFROM (SSS)
IFR-I_DR_CFG-0580/I	
IFR-I_DR_CFG-0590/I	SR-DPC-DES-1960/I
	SR-DPC-DES-2030/I
IFR-I_DR_PROVIDER-0620/T	
IFR-I_DR_PROVIDER-0600/T	SR-DPC-DES-1970/I
	SR-DPC-IFR-0080/T
IFR-I_DR_PROVIDER-0610/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_DR_PROVIDER-0630/T	SR-DPC-DES-1970/I
IFR-I_DR_SUPERVISION-0640/I	
IFR-I_DS_SHIPPRED_CFG-0650/I	
IFR-I_DS_SHIPPRED_CFG-0660/I	SR-DPC-DES-1960/I
	SR-DPC-DES-2030/I
IFR-I_DS_SHIPPRED_SERVICE-0670/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
	SR-DPC-IFR-0080/T
IFR-I_DS_SHIPPRED_SERVICE-0680/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_DS_SHIPPRED_SERVICE-0690/T	SR-DPC-DES-1970/I
IFR-I_DS_SHIPPRED_SERVICE-0700/T	SR-DPC-DES-1970/I
IFR-I_DS_SHIPPRED_SUPERVISION-0710/I	
IFR-I_DS_SIMULATION_CFG-0720/I	
IFR-I_DS_SIMULATION_CFG-0730/I	SR-DPC-DES-1960/I
	SR-DPC-DES-2030/I
IFR-I_DS_SIMULATION_SUPERVISION-0740/I	
IFR-I_EF_BPEL_CFG-0750/I	
IFR-I_EF_BPEL_CFG-0760/I	SR-DPC-DES-1960/I
	SR-DPC-DES-2030/I
IFR-I_EF_BPEL_SUPERVISION-0770/I	
IFR-I_EO_DATA_PROVIDER-0780/T	SR-DIS-FUN-1800/I
	SR-DIS-FUN-1810/I
	SR-DPC-IFR-0080/T
IFR-I_EO_DATA_PROVIDER-0790/T	
IFR-I_EO_DATA_PROVIDER-0800/T	
IFR-I_EO_DATA_PROVIDER-0810/T	
IFR-I_EO_DATA_PROVIDER-0820/T	
IFR-I_EO_DATA_PROVIDER-0830/T	
IFR-I_EO_DATA_PROVIDER-0840/T	
IFR-I_EO_DATA_PROVIDER-0850/T	
IFR-I_EO_DATA_PROVIDER-0860/T	
IFR-I_EXT_DATA-0870/T	
IFR-I_EXT_QUERIES-0880/T	SR-DIS-FUN-1800/I



RequirementName (ICD)	TracedFROM (SSS)
	SR-DIS-FUN-1810/I
	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
	SR-DPC-IFR-0080/T
IFR-I_EXT_QUERIES-0890/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_LOG-0910/T	
IFR-I_MCC_MCC_CFG-0920/I	
IFR-I_MCC_MCC_CFG-0930/I	SR-DPC-DES-1960/I
	SR-DPC-DES-2030/I
IFR-I_PUSH-0010/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_PUSH-0020/T	SR-DPC-DES-1970/I
	SR-DPC-DES-2040/T
IFR-I_PUSH-0030/T	SR-DPC-DES-1970/I
IFR-I_PUSH-0040/T	SR-DPC-DES-1970/I
IFR-I_S-AIS_DATA_PROVIDER-0940/T	SR-DIS-FUN-1800/I
	SR-DIS-FUN-1810/I
	SR-DPC-IFR-0080/T
IFR-I_S-AIS_DATA_PROVIDER-0950/T	
IFR-I_S-AIS_DATA_PROVIDER-0960/T	
IFR-I_S-AIS_DATA_PROVIDER-0970/T	
IFR-I_S-AIS_DATA_PROVIDER-0980/T	
IFR-I_S-AIS_DATA_PROVIDER-0990/T	
IFR-I_S-AIS_DATA_PROVIDER-1000/T	
IFR-I_S-AIS_DATA_PROVIDER-1010/T	
IFR-I_S-AIS_DATA_PROVIDER-1020/T	SR-DRT-IFR-0110/T
IFR-I_S-AIS_DATA_PROVIDER-1030/T	
IFR-I_S-AIS_DATA_PROVIDER-1040/T	SR-DRT-IFR-0090/T
IFR-I_S-AIS_DATA_PROVIDER-1050/T	SR-DRT-IFR-0100/T
IFR-I_S-AIS_DATA_PROVIDER-1060/T	SR-DRT-IFR-0120/T
IFR-I_S-AIS_DATA_PROVIDER-1070/T	SR-DRT-IFR-0130/T
IFR-I_S-AIS_DATA_PROVIDER-1080/T	SR-DRT-IFR-0140/T
IFR-I_S-AIS_DATA_PROVIDER-1090/T	SR-DRT-IFR-0150/T
	SR-DRT-IFR-0160/T
IFR-I_SP_PERFORMANCE_CFG-1100/I	
IFR-I_SP_PERFORMANCE_CFG-1110/I	SR-DPC-DES-1960/I
	SR-DPC-DES-2030/I
IFR-I_WEB_USER-1120/I	SR-DIS-FUN-1800/I
	SR-DIS-FUN-1810/I
	SR-DPC-IFR-0070/T
	SR-DPC-IFR-0080/T



Appendix C - Traceability matrix - SSS vs ICD requirements

RequirementName (SSS)	TracedTo (ICD)
SR-DIS-IFR-0370/T	SRS
SR-DIS-FUN-0380/T	SRS
SR-DIS-FUN-0730/T	SRS
SR-DIS-FUN-0740/T	SRS
SR-DIS-FUN-0750/T	SRS
SR-DIS-FUN-0760/T	SRS
SR-DIS-FUN-0770/T	SRS
SR-DIS-FUN-0780/T	SRS
SR-DIS-FUN-0790/T	SRS
SR-DIS-FUN-0800/T	SRS
SR-DIS-FUN-0810/T	SRS
SR-DIS-FUN-0820/T	SRS
SR-DIS-FUN-0830/T	SRS
SR-DIS-FUN-0840/T	SRS
SR-DIS-FUN-0850/T	SRS
SR-DIS-FUN-0860/T	SRS
SR-DIS-FUN-0870/T	SRS
SR-DIS-FUN-0880/T	SRS
SR-DIS-FUN-0890/T	SRS
SR-DIS-FUN-0900/T	SRS
SR-DIS-FUN-0910/T	SRS
SR-DIS-FUN-0920/T	SRS
SR-DIS-FUN-0930/T	SRS
SR-DIS-FUN-0940/T	SRS
SR-DIS-FUN-0950/T	SRS
SR-DIS-FUN-0960/T	SRS
SR-DIS-FUN-0970/T	SRS
SR-DIS-FUN-0980/T	SRS
SR-DIS-FUN-1740/T	SRS
SR-DIS-FUN-1750/T	SRS
SR-DIS-FUN-1760/T	SRS
SR-DIS-FUN-1770/T	SRS
SR-DIS-FUN-1780/T	SRS
SR-DIS-FUN-1790/I	SRS
SR-DIS-FUN-1800/I	IFR-I_AUXILIARY_DATA_PROVIDER-0050/T
	IFR-I_EO_DATA_PROVIDER-0780/T
	IFR-I_EXT_QUERIES-0880/T
	IFR-I_S-AIS_DATA_PROVIDER-0940/T
	IFR-I_WEB_USER-1120/I
SR-DIS-FUN-1810/I	IFR-I_AUXILIARY_DATA_PROVIDER-0050/T



RequirementName (SSS)	TracedTo (ICD)
	IFR-I_EO_DATA_PROVIDER-0780/T
	IFR-I_EXT_QUERIES-0880/T
	IFR-I_S-AIS_DATA_PROVIDER-0940/T
	IFR-I_WEB_USER-1120/I
SR-DIS-FUN-1820/I	SRS
SR-DIS-IFR-0290/T	SRS
SR-DIS-IFR-0300/T	SRS
SR-DIS-IFR-0310/T	SRS
SR-DIS-IFR-0320/T	SRS
SR-DIS-IFR-0330/T	SRS
SR-DIS-IFR-0340/T	SRS
SR-DIS-IFR-0350/T	SRS
SR-DIS-IFR-0360/T	SRS
SR-DIS-IFR-0390/T	SRS
SR-DIS-IFR-0400/T	SRS
SR-DIS-IFR-0410/T	SRS
SR-DMA-FUN-0680/T	SRS
SR-DMA-FUN-0690/T	SRS
SR-DMA-FUN-0700/T	SRS
SR-DMA-FUN-0710/T	SRS
SR-DMA-FUN-0720/T	SRS
SR-DPC-DAT-0220/T	Data Procurement Plan
SR-DPC-DAT-0230/A	Data Procurement Plan
SR-DPC-DAT-0240/A	Data Procurement Plan
SR-DPC-DAT-0250/I	SRS
SR-DPC-DAT-0260/A	Data Procurement Plan
SR-DPC-DES-1910/A	SRS
SR-DPC-DES-1920/A	SRS
SR-DPC-DES-1930/T	SRS
SR-DPC-DES-1940/I	SRS
SR-DPC-DES-1950/I	SRS
SR-DPC-DES-1960/I	IFR-DATAMODEL-ALG-0001/T
	IFR-I_DD_CFG-0200/I
	IFR-I_DMA_DB_CFG-0260/I
	IFR-I_DMA_DMA_CFG-0280/I
	IFR-I_DP_DOPPLER_CFG-0310/I
	IFR-I_DP_L1_CFG-0380/I
	IFR-I_DP_L2_CFG-0450/I
	IFR-I_DP_L3_CFG-0520/I
	IFR-I_DR_CFG-0590/I
	IFR-I_DS_SHIPPRED_CFG-0660/I
	IFR-I_DS_SIMULATION_CFG-0730/I



RequirementName (SSS)	TracedTo (ICD)
	IFR-I_EF_BPEL_CFG-0760/I
	IFR-I_MCC_MCC_CFG-0930/I
	IFR-I_SP_PERFORMANCE_CFG-1110/I
SR-DPC-DES-1970/I	IFR-EXT_QUERIES-0900/T
	IFR-I_DD_DATA-0210/T
	IFR-I_DD_DATA-0220/T
	IFR-I_DD_DATA-0230/T
	IFR-I_DP_DOPPLER_SERVICE -0320/T
	IFR-I_DP_DOPPLER_SERVICE -0330/T
	IFR-I_DP_DOPPLER_SERVICE -0340/T
	IFR-I_DP_DOPPLER_SERVICE-0350/T
	IFR-I_DP_L1_SERVICE-0390/T
	IFR-I_DP_L1_SERVICE-0400/T
	IFR-I_DP_L1_SERVICE-0410/T
	IFR-I_DP_L2_SERVICE-0460/T
	IFR-I_DP_L2_SERVICE-0470/T
	IFR-I_DP_L2_SERVICE-0480/T
	IFR-I_DP_L3_SERVICE-0530/T
	IFR-I_DP_L3_SERVICE-0540/T
	IFR-I_DP_L3_SERVICE-0550/T
	IFR-I_DP_L3_SERVICE-0560/T
	IFR-I_DR_PROVIDER-0600/T
	IFR-I_DR_PROVIDER-0610/T
	IFR-I_DR_PROVIDER-0630/T
	IFR-I_DS_SHIPPRED_SERVICE-0670/T
	IFR-I_DS_SHIPPRED_SERVICE-0680/T
	IFR-I_DS_SHIPPRED_SERVICE-0690/T
	IFR-I_DS_SHIPPRED_SERVICE-0700/T
	IFR-I_EXT_QUERIES-0880/T
	IFR-I_EXT_QUERIES-0890/T
	IFR-I_PUSH-0010/T
	IFR-I_PUSH-0020/T
	IFR-I_PUSH-0030/T
	IFR-I_PUSH-0040/T
SR-DPC-DES-1980/I	IFR-ALL-0008/I
SR-DPC-DES-1990/I	IFR-ALL-0005/I
SR-DPC-DES-2000/I	IFR-ALL-0002/I
SR-DPC-DES-2010/I	SRS
SR-DPC-DES-2020/I	IFR-ALL-0004/I
SR-DPC-DES-2030/I	IFR-I_DD_CFG-0200/I
	IFR-I_DMA_DB_CFG-0260/I
	IFR-I_DMA_DMA_CFG-0280/I



RequirementName (SSS)	TracedTo (ICD)
	IFR-I_DP_DOPPLER_CFG-0310/I
	IFR-I_DP_L1_CFG-0380/I
	IFR-I_DP_L2_CFG-0450/I
	IFR-I_DP_L3_CFG-0520/I
	IFR-I_DR_CFG-0590/I
	IFR-I_DS_SHIPPRED_CFG-0660/I
	IFR-I_DS_SIMULATION_CFG-0730/I
	IFR-I_EF_BPEL_CFG-0760/I
	IFR-I_MCC_MCC_CFG-0930/I
	IFR-I_SP_PERFORMANCE_CFG-1110/I
SR-DPC-DES-2040/T	IFR-I_DD_DATA-0210/T
	IFR-I_DD_DATA-0220/T
	IFR-I_DP_DOPPLER_SERVICE -0320/T
	IFR-I_DP_DOPPLER_SERVICE -0330/T
	IFR-I_DP_L1_SERVICE-0390/T
	IFR-I_DP_L1_SERVICE-0400/T
	IFR-I_DP_L2_SERVICE-0460/T
	IFR-I_DP_L2_SERVICE-0470/T
	IFR-I_DP_L3_SERVICE-0530/T
	IFR-I_DP_L3_SERVICE-0540/T
	IFR-I_DR_PROVIDER-0610/T
	IFR-I_DS_SHIPPRED_SERVICE-0670/T
	IFR-I_DS_SHIPPRED_SERVICE-0680/T
	IFR-I_EXT_QUERIES-0880/T
	IFR-I_EXT_QUERIES-0890/T
	IFR-I_PUSH-0010/T
	IFR-I_PUSH-0020/T
SR-DPC-DES-2050/I	SRS
SR-DPC-DES-2060/I	SRS
SR-DPC-DES-2070/I	SRS
SR-DPC-FUN-0040/A	SRS
SR-DPC-FUN-0050/A	SRS
SR-DPC-FUN-0060/A	SRS
SR-DPC-FUN-0070/T	SRS
SR-DPC-FUN-0080/A	SRS
SR-DPC-FUN-0090/T	SRS
SR-DPC-FUN-0110/T	SRS
SR-DPC-FUN-0120/T	SRS
SR-DPC-FUN-0130/T	SRS
SR-DPC-FUN-0135/T	SRS
SR-DPC-FUN-0140/T	SRS
SR-DPC-FUN-0150/T	SRS



RequirementName (SSS)	TracedTo (ICD)
SR-DPC-FUN-0160/T	SRS
SR-DPC-FUN-0170/T	SRS
SR-DPC-FUN-0180/T	SRS
SR-DPC-FUN-0190/T	SRS
SR-DPC-FUN-0200/T	SRS
SR-DPC-HW-1630	See SRS § 4.4
SR-DPC-HW-1640	See SRS § 4.4
SR-DPC-HW-1650	See SRS § 4.4
SR-DPC-HW-1660	See SRS § 4.4
SR-DPC-HW-1670	See SRS § 4.4
SR-DPC-HW-1680/I	See SRS § 4.4
SR-DPC-HW-1690	See SRS § 4.4
SR-DPC-HW-1700	See SRS § 4.4
SR-DPC-HW-1710	See SRS § 4.4
SR-DPC-HW-1720	SRS
SR-DPC-HW-1730	See SRS § 4.4
SR-DPC-IFR-0010/T	SRS
SR-DPC-IFR-0020/T	SRS
SR-DPC-IFR-0030/T	SRS
SR-DPC-IFR-0040/T	SRS
SR-DPC-IFR-0050/T	SRS
SR-DPC-IFR-0060/T	SRS
SR-DPC-IFR-0070/T	IFR-I_WEB_USER-1120/I
SR-DPC-IFR-0080/T	IFR-I_AUXILIARY_DATA_PROVIDER-0050/T
	IFR-I_DR_PROVIDER-0600/T
	IFR-I_DS_SHIPPRED_SERVICE-0670/T
	IFR-I_EO_DATA_PROVIDER-0780/T
	IFR-I_EXT_QUERIES-0880/T
	IFR-I_S-AIS_DATA_PROVIDER-0940/T
	IFR-I_WEB_USER-1120/I
SR-DPC-OPE-2080/I	SRS
SR-DPC-PER-0100/A	SRS
SR-DPC-PER-0210/T	SRS
SR-DPC-PER-0270/A	SRS
SR-DPC-PER-0280/T	SRS
SR-DPC-REL-1880/A	SRS
SR-DPC-REL-1890/A	SRS
SR-DPC-SAF-1840/I	SRS
SR-DPC-SAF-1850/I	SRS
SR-DPC-SAF-1860/I	SRS
SR-DPC-SAF-1870/T	SRS
SR-DPC-SW-0010/I	SRS



RequirementName (SSS)	TracedTo (ICD)
SR-DPC-SW-0020	SRS
SR-DPC-SW-0030	PAP
SR-DPC-SWQ-1900/AI	SRS
SR-DPC-VVI-2090/I	SVD
SR-DPC-VVI-2100/TAI	SVD
SR-DPC-VVI-2110/TAI	SVD
SR-DPC-VVI-2120/I	SVD
SR-DPC-VVI-2130/I	SVD
SR-DPC-VVI-2140/T	SVD
SR-DPC-VVI-2150/T	SRS
SR-DPC-VVI-2160/I	SVD
SR-DPC-VVI-2170/I	SVD
SR-DPC-VVI-2180/A	SRS
SR-DPC-VVI-2190/I	SVD
SR-DPC-VVI-2200/A	SRS
SR-DPP-FUN-1580/T	SRS
SR-DPP-FUN-1590/T	SRS
SR-DPP-FUN-1600/T	SRS
SR-DPP-FUN-1610/T	SRS
SR-DPP-FUN-1620/T	SRS
SR-DPS-FUN-1360/T	SRS
SR-DPS-FUN-1370/T	SRS
SR-DPS-FUN-1380/T	SRS
SR-DPS-FUN-1390/T	SRS
SR-DPS-FUN-1400/T	SRS
SR-DPS-FUN-1410/T	SRS
SR-DPS-FUN-1420/T	SRS
SR-DPS-FUN-1430/T	SRS
SR-DPS-FUN-1440/T	SRS
SR-DPS-FUN-1450/T	SRS
SR-DPS-FUN-1460/T	SRS
SR-DPS-FUN-1470/T	SRS
SR-DPS-FUN-1480/T	SRS
SR-DPS-FUN-1490/T	SRS
SR-DPS-FUN-1500/T	SRS
SR-DPS-FUN-1510/T	SRS
SR-DPS-FUN-1520/T	SRS
SR-DPS-FUN-1530/T	SRS
SR-DPS-FUN-1540/T	SRS
SR-DPS-FUN-1550/T	SRS
SR-DPS-FUN-1560/T	SRS
SR-DPS-FUN-1570/T	SRS



RequirementName (SSS)	TracedTo (ICD)
SR-DRT-FUN-0290/T	SRS
SR-DRT-FUN-0300/T	SRS
SR-DRT-FUN-0310/T	SRS
SR-DRT-FUN-0320/T	SRS
SR-DRT-FUN-0330/T	IFR-I_AUXILIARY_DATA_PROVIDER-0130/I
SR-DRT-FUN-0340/T	SRS
SR-DRT-FUN-0350/T	SRS
SR-DRT-FUN-0360/T	SRS
SR-DRT-IFR-0090/T	IFR-I_S-AIS_DATA_PROVIDER-1040/T
SR-DRT-IFR-0100/T	IFR-I_S-AIS_DATA_PROVIDER-1050/T
SR-DRT-IFR-0110/T	IFR-I_S-AIS_DATA_PROVIDER-1020/T
SR-DRT-IFR-0120/T	IFR-I_S-AIS_DATA_PROVIDER-1060/T
SR-DRT-IFR-0130/T	IFR-I_S-AIS_DATA_PROVIDER-1070/T
SR-DRT-IFR-0140/T	IFR-I_S-AIS_DATA_PROVIDER-1080/T
SR-DRT-IFR-0150/T	IFR-I_S-AIS_DATA_PROVIDER-1090/T
SR-DRT-IFR-0160/T	IFR-I_S-AIS_DATA_PROVIDER-1090/T
SR-DRT-IFR-0170/T	SRS
SR-DRT-IFR-0180/T	IFR-I_AUXILIARY_DATA_PROVIDER-0110/I
SR-DRT-IFR-0190/T	IFR-I_AUXILIARY_DATA_PROVIDER-0120/I
SR-DRT-IFR-0200/T	IFR-I_AUXILIARY_DATA_PROVIDER-0110/I
SR-DRT-IFR-0210/T	IFR-I_AUXILIARY_DATA_PROVIDER-0130/I
SR-DRT-IFR-0220/T	IFR-I_AUXILIARY_DATA_PROVIDER-0130/I
SR-DRT-IFR-0230/T	IFR-I_AUXILIARY_DATA_PROVIDER-0140/I
SR-DRT-IFR-0240/T	IFR-I_AUXILIARY_DATA_PROVIDER-0140/I
SR-DRT-IFR-0250/T	IFR-I_AUXILIARY_DATA_PROVIDER-0150/I
SR-DRT-IFR-0260/T	IFR-I_AUXILIARY_DATA_PROVIDER-0160/I
SR-DRT-IFR-0270/T	IFR-I_AUXILIARY_DATA_PROVIDER-0170/I
SR-DRT-IFR-0280/T	IFR-I_AUXILIARY_DATA_PROVIDER-0180/I
SR-MCC-FUN-1050/I	SRS
SR-MCC-FUN-1060/I	SRS
SR-MCC-FUN-1070/T	SRS
SR-MCC-FUN-1080/T	SRS
SR-MCC-FUN-1090/I	SRS
SR-MCC-FUN-1100/T	SRS
SR-MCC-FUN-1110/T	SRS
SR-MCC-FUN-1120/T	SRS
SR-MCC-FUN-1130/T	SRS
SR-MCC-FUN-1140/T	SRS
SR-MCC-FUN-1150/T	SRS
SR-MCC-FUN-1160/T	SRS
SR-MCC-FUN-1170/T	SRS
SR-MCC-FUN-1180/T	SRS



RequirementName (SSS)	TracedTo (ICD)
SR-MCC-FUN-1190/T	SRS
SR-MCC-FUN-1200/T	SRS
SR-MCC-FUN-1210/T	SRS
SR-MCC-FUN-1220/T	SRS
SR-MCC-FUN-1230/T	Not covered
SR-MCC-FUN-1240/T	SRS
SR-MCC-FUN-1250/T	SRS
SR-MCC-FUN-1260/T	SRS
SR-MCC-FUN-1270/T	SRS
SR-MCC-FUN-1280/T	SRS
SR-MCC-FUN-1290/T	SRS
SR-MCC-FUN-1300/T	SRS
SR-MCC-FUN-1310/T	SRS
SR-MCC-FUN-1320/T	SRS
SR-MCC-FUN-1330/T	SRS
SR-MCC-FUN-1340/T	SRS
SR-MCC-FUN-1350/T	SRS
SR-PRO-FUN-0370/T	SRS
SR-PRO-FUN-0380/T	SRS
SR-PRO-FUN-0390/T	SRS
SR-PRO-FUN-0400/T	SRS
SR-PRO-FUN-0410/T	TBC at CDR
SR-PRO-FUN-0420/T	TBC at CDR
SR-PRO-FUN-0430/T	SRS
SR-PRO-FUN-0440/T	SRS
SR-PRO-FUN-0450/T	SRS
SR-PRO-FUN-0460/T	SRS
SR-PRO-FUN-0470/T	SRS
SR-PRO-FUN-0480/T	SRS
SR-PRO-FUN-0490/T	SRS
SR-PRO-FUN-0500/T	SRS
SR-PRO-FUN-0510/T	SRS
SR-PRO-FUN-0520/T	SRS
SR-PRO-FUN-0530/T	SRS
SR-PRO-FUN-0540/T	SRS
SR-PRO-FUN-0550/T	SRS
SR-PRO-FUN-0560/T	SRS
SR-PRO-FUN-0570/T	SRS
SR-PRO-FUN-0580/T	SRS
SR-PRO-FUN-0590/T	SRS
SR-PRO-FUN-0600/T	SRS
SR-PRO-FUN-0610/T	SRS



RequirementName (SSS)	TracedTo (ICD)
SR-PRO-FUN-0620/T	SRS
SR-PRO-FUN-0630/T	SRS
SR-PRO-FUN-0640/T	SRS
SR-PRO-FUN-0650/T	SRS
SR-PRO-FUN-0660/T	SRS
SR-PRO-FUN-0670/T	SRS
SR-SSP-FUN-0990/T	SRS
SR-SSP-FUN-1000/T	SRS
SR-SSP-FUN-1010/T	SRS
SR-SSP-FUN-1020/T	SRS
SR-SSP-FUN-1030/T	SRS
SR-SSP-FUN-1040/T	SRS