



European ATM Service Description for the ArrivalSeparationIndicator Service

Document information

Project Title	Information Service Modelling deliverables
Project Number	08.03.10
Project Manager	NORACON
Deliverable Name	European ATM Service Description for the ArrivalSeparationIndicator Service
Deliverable ID	D65
Edition	00.02.01
Template Version	02.00.02

Task contributors

DFS, EUROCONTROL, NORACON, NATMIG, FINMECCANICA, FREQUENTIS, THALES, ENAIRE, DSN, INDRA, SEAC and ENAV

Abstract

This document contains the service description for the ArrivalSeparationIndicator service produced by Project 08.03.10 for ISRM iteration 2.0 based on the input from P06.08.01 "Flexible and Dynamic Use of Wake Vortex Separations".

The designed service allocated on the APP ATC system supports operations of Air Traffic Controllers and Supervisors managing the Air Traffic on Final Approach based on Time Based Separation concept.

The ArrivalSeparationIndicator Service enables:

- the APP ATC system to publish separation advices, safety mitigation advices and alerts to the ATC Controllers and Supervisors involved in Monitoring and separating Air Traffic on Final Approach;
- the APP ATC Supervisor to request the switch of the system computation mode from TBS rules to DBS rules (or vice-versa) for all the arrival pairs being processed by the TBS system;
- the ATC Controller to request the setting of a specific computation mode (TBS or DBS) for a single pair of aircrafts.

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N/A	N/A	N/A
Rational for rejection		
N/A		

Document History

Edition	Date	Status	Author	Justification
00.00.01	27/10/2015	Draft	██████████ ENAV(IDS)	Draft Document produced to report the model views related to the ArrivalSeparationIndicator Service

				following the Foundation for ISRM 1.4.
00.00.02	30/11/2015	Draft	(NORACON)	Updated based on comments from initial review
00.00.03	30/11/2015	Draft	ENAV(IDS)	First set of format improvements and correction of minor errors based on feedback received from SYS and OPS
00.01.00	30/11/2015	Final	ENAV(IDS)	Final version for the ISRM 1.4 delivery.
00.01.01	22/12/2015	Update	ENAV(IDS)	Update based upon SJU comments from December 2015 related to the ISRM 1.4 document marked with version 00.01.00.
00.01.02	28/04/2016	Draft		SDD initial draft for ISRM 2.0 delivery
00.01.03	16/05/2016	Draft		SDD draft after internal review
00.01.04	17/05/2016	Draft		SDD draft for external review
00.02.00	27/05/2016	Final		Final version for the ISRM 2.0 delivery
00.02.01	20/07/2016	Final update		Updated according to 08.03.10-D65_SJU_Assessment_report_response

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Table of Contents

EXECUTIVE SUMMARY	7
1 INTRODUCTION.....	8
1.1 PURPOSE OF THE DOCUMENT	8
1.2 INTENDED READERSHIP	8
1.3 INPUTS FROM OTHER PROJECTS	8
1.4 GLOSSARY OF TERMS	8
1.5 ACRONYMS AND TERMINOLOGY	8
1.5.1 Acronyms.....	8
1.5.2 Terminology.....	10
2 SERVICE IDENTIFICATION.....	13
3 OPERATIONAL AND BUSINESS CONTEXT	14
3.1 INFORMATION EXCHANGE REQUIREMENTS	14
3.2 OTHER REQUIREMENTS	18
3.2.1 Non-Functional Requirements.....	18
3.2.2 Relevant Industrial Standards	18
3.2.3 Nodes	19
4 SERVICE OVERVIEW	20
4.1 SERVICE TAXONOMY.....	20
4.2 SERVICE LEVELS (NFRs).....	20
4.3 SERVICE FUNCTIONS AND CAPABILITIES.....	21
4.4 SERVICE INTERFACES	22
5 SERVICE INTERFACE SPECIFICATIONS	24
5.1 SERVICE INTERFACE INFORMATIONPROVIDERINTERFACE	24
5.1.1 Service Interface Definition ArrivalSeparationInformationProvider.....	24
5.1.2 Service Interface Definition ArrivalSeparationInformationSubmitter.....	27
5.2 SERVICE INTERFACE SEPARATIONMODEMANAGERINTERFACE	40
5.2.1 Service Interface Definition ArrivalSeparationModeManager.....	40
6 SERVICE DYNAMIC BEHAVIOUR	44
6.1 SERVICE INTERFACE SEPARATIONMODEMANAGERINTERFACE	45
6.2 SERVICE INTERFACE INFORMATIONPROVIDERINTERFACE	45
7 SERVICE PROVISIONING (OPTIONAL)	46
8 VALIDATION AND VERIFICATION	47
8.1 VERIFICATION.....	47
8.1.1 Verification Results.....	47
8.2 VALIDATION	47
9 REFERENCES.....	48

List of tables

Table 1: Requirements tracing	18
Table 2: Service Interfaces	23
Table 3: Payload tracing to AIRM	26
Table 4: Payload tracing to AIRM	38
Table 5: Payload tracing to AIRM	42
Table 6: Summary of the Verification Results	47

List of figures

Figure 1: NAV ArrivalSeparationIndicator Requirements Traceability IER diagram	15
Figure 2: NOV-2 ArrivalSeparationIndicator Service To Nodes Mapping diagram	19
Figure 3: NSOV-4 ArrivalSeparationIndicator Service to Operational Activities Mapping diagram	21
Figure 4: NSOV-2 ArrivalSeparationIndicator Interface Definition diagram	22
Figure 5: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram	25
Figure 6: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram	28
Figure 7: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram	28
Figure 8: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram	29
Figure 9: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram	29
Figure 10: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram	30
Figure 11: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram	30
Figure 12: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram	41
Figure 13: NSOV-5c ArrivalSeparationIndicator Event Trace Description	44

Executive summary

This document contains the service description for the ArrivalSeparationIndicator service produced by Project 08.03.10 for ISRM 2.0, based on the input from P06.08.01 "Flexible and Dynamic Use of Wake Vortex Separations".

The designed service allocated on the APP ATC system supports operations of Air Traffic Controllers and Supervisors managing the Air Traffic on final approach based on Time Based Separation concept in addition to the traditional Distance Based Separation concept. The service enables the system to provide Approach Controllers and Tower Runway Controllers with Separation Information on each arrival pair of aircrafts established on the final approach, where this information is provided graphically on the controller's display.

The service includes the functionalities to monitor the separation values, to receive alerts in case of service failures (such as: service availability, switch in computation mode) and to receive safety mitigation advices.

The ArrivalSeparationIndicator Service enables the service provider (APP ATC system) to:

- send separation advices, safety mitigation advices and automatically alerts to Supervisors and ATC Controllers concerned by the flights established on Final Approach.

Furthermore the ArrivalSeparationIndicator Service enables the Supervisor to:

- set the separation computation mode of the TBS system (Time Based Separation or Distance Based Separation) in order to explicitly accommodate the service operational needs to local-in-time conditions

and the ATC Controller to:

- set a specific computation mode (TBS or DBS) for a single pair of aircrafts (and to receive as reply either the confirmation that the requested mode is used for that pair or an error message).

This document includes:

- The description of the context of the service from a business and operational perspective;
- The mapping from Service to Information Exchange Requirements;
- The description of how the service supports the interaction between EATMA Operational Nodes;
- The Service Overview;
- The Service Interface overview, including the EATMA capabilities mapping;
- The mapping from Service to EATMA Operational Activities;
- A detailed description of the Service Interfaces;
- The payload design;
- The dynamic behaviour of the Service Interfaces.

1 Introduction

1.1 Purpose of the document

The purpose of this Service description is to provide a holistic overview of the ArrivalSeparationIndicator Service and its building blocks. It serves as a complement to a model based description and supports the configuration management process by providing well-defined baselines.

1.2 Intended readership

This service description is intended to be read by Enterprise Architects, Service Architects, Information Architects, System Engineers and Developers in pursuing architecting, design and development activities.

1.3 Inputs from other projects

- Operational Service and Environment Definition (OSED) for Time Based Separation (TBS) for Arrivals (Ref. [9])
- B.4.3 ArrivalSeparationIndicator Service Allocation (SVA002) (Ref. [11]).

1.4 Glossary of terms

N/A

1.5 Acronyms and Terminology

1.5.1 Acronyms

Term	Definition
ADD	Architecture Description Document
AIRM	ATM Information Reference Model
APP	Approach
ATC	Air Traffic Control
ATM	Air Traffic Management
CC	Capability Configuration
DBS	Distance Based Separation
EATMA	European Air Traffic Management Architecture
E-ATMS	European Air Traffic Management System
FAA	Federal Aviation Administration
IER	Information Exchange Requirement

Term	Definition
IM	Information Model
ISRM	Information Service Reference Model
MEP	Message Exchange Pattern
MRS	Minimum Radar Separation
NAF	NATO Architecture Framework
NSOV	NATO Service Oriented View
NOV	NATO Operational View
NSV	NATO System View
PWS	Pire Wise Separation
ORD	Optimised Runway Delivery
OSD	Operational Service and Environment Definition
S-PWS	Statis Pire Wise Separation
SDD	Service Description Document
SESAR	Single European Sky ATM Research Programme
SESAR Programme	The programme which defines the Research and Development activities and Projects for the SJU.
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SJU Work Programme	The programme which addresses all activities of the SESAR Joint Undertaking Agency.
SoaML	Service Oriented Architecture Modelling Language
SWIM	System Wide Information Management
SWIM TI	System Wide Information Management Technical Infrastructure
TBS	Time Based Separation
UML	Unified Modelling Language
V&V	Validation and Verification
WDS	Weather Dependent Separation
WSDL	Web Services Definition Language

Term	Definition
XSD	XML Schema Definition

1.5.2 Terminology

Term	Definition	Source
Additional Spacing	The extra spacing above the required separation or spacing required to accommodate the distance spacing changes and the time spacing changes that will occur between both lead and follower aircraft establishing on the final approach localiser, until the lead aircraft crosses the runway landing threshold to touchdown.	See ref. [9]
Capability	Capability is the ability of one or more of the enterprise's resources to deliver a specified type of effect or a specified course of action to the enterprise stakeholders.	EATMA Guidance Material [8]
Capability Configuration	A Capability Configuration is a combination of Roles and Systems configured to provide a Capability derived from operational and/or business need(s) of a stakeholder type.	EATMA Guidance Material [8]
Final Approach	The approach path commencing at the interception of the localiser and glideslope path and ending at the runway landing threshold or a missed approach.	See ref. [9]
Final Approach Arrivals Sequence	The order intent of arrival aircraft on final approach.	See ref. [9]
Final Approach Threshold	The location on final approach to which separations for arrival aircraft are applied, e.g. the landing runway threshold for ICAO separation rules or start of landing speed stabilisation (4DME for London Heathrow).	See ref. [9]
Forecast Wind Conditions Aloft Profile	The wind conditions forecast at a specified time in the future in the form of an evolution of the wind speed and the wind direction over a defined path segment aloft. In the context of TBS over a defined path segment on final approach.	See ref. [9]
Glideslope Wind Conditions	The wind conditions profile on the final approach glideslope.	See ref. [9]
Ground Speed Profile	The evolution of the ground speed values over a defined path segment. In the context of TBS over a defined path segment on the final approach glideslope.	See ref. [9]
Node	A logical entity that performs Activities. Note: nodes are specified independently of any physical realisation.	EATMA Guidance Material [8]

Term	Definition	Source
Separation Constraint	The separation to keep aircraft operating safely on final approach. Examples are minimum radar separation to keep risk of collision to an acceptable safe level and wake turbulence radar separation to keep the risk of an adverse wake turbulence encounter to an acceptable safe level.	See ref. [9]
Service	The contractual provision of something (a non-physical object), by one, for the use of one or more others. Services involve interactions between providers and consumers, which may be performed in a digital form (data exchanges) or through voice communication or written processes and procedures.	EATMA Guidance Material [8]
Service attribute	A Service Attribute defines a property of a service. Examples: Response time, Frequency of invocation, Message Exchange Pattern.	B43 T5 study
Service function	A type of activity describing the functionality of a Service.	EATMA Guidance Material [8]
Service interface	The mechanism by which a service communicates	EATMA Guidance Material [8]
TBS Distance	<p>The TBS distance is the distance separation equivalent of the TBS rules in the prevailing wind conditions on final approach for displaying to the final approach controller and the tower runway controller.</p> <p>The TBS rules are converted to the TBS distance by applying the reference airspeed profile to the final approach threshold that was used to derive the TBS rules. The reference airspeed profile is to be applied in the context of the final approach wind conditions on the glideslope that the lead aircraft is forecast to experience over the distance separation to the final approach threshold.</p>	See ref. [9]
TBS Rules	<p>The time based wake turbulence radar separation rules on final approach derived from the distance based wake turbulence separation rules.</p> <p>The TBS rules are based on a ground speed profile conversion from applying the DBS rules in low headwind conditions. The ground speed profile conversion is based on a reference airspeed profile over the distance based separation to the final approach threshold. The TBS rules are the reference time separations that apply for the reference airspeed profile</p> <p>For example for the ICAO DBS rules where the final approach threshold is the runway landing threshold; the reference airspeed profile is aligned to a 150kt IAS standard reference landing stabilisation speed profile to the runway landing threshold and is aligned to a 170kt IAS standard procedural airspeed profile to 6Nm from the runway landing threshold prior to landing speed stabilisation.</p>	See ref. [9]

Term	Definition	Source
Wind Conditions Profile	The evolution of the wind speed and wind direction over a defined path segment. In the context of TBS over defined path segments of the final approach glideslope.	See ref. [9]

2 Service identification

Name	ArrivalSeparationIndicator
ID	{0A5F9FBD-AD80-400a-9D17-C94AD9BAC559}
Version	2.0
Keywords	TBS, DBS, Wake Vortex Separation, Headwind, Arrival Separation Indicator, Computation Mode, Alert, Risk, Mitigation, Safety, Advice, Failure, Final Approach, Arrival Pair, Lead Aircraft, Follower Aircraft, Safety Nets
Architect(s)	XXXXXXXXXX ENAV(IDS)

Lifecycle status	Date	References
Identified	28/11/2014	European ATM Service Identification for ArrivalSeparationIndicator Service (See reference [10])
Allocated	23/03/2015	B.4.3 ArrivalSeparationIndicator Service Allocation (SVA002) (See reference [11])
Designed	30/05/2016	This document
Validated	<i>Date when validated. Filled by WP3</i>	<i>Name of protocol documenting the decision</i>
IOC	<i>Date for Initial Operational Capability</i>	<i>Reference to technical enabler hosting the service in the ATM master plan</i>
FOC	<i>Date for Full Operational Capability</i>	<i>Reference to technical enabler hosting the service in the ATM master plan</i>

3 Operational and Business context

The operational context for the ArrivalSeparationIndicator service derives from the P06.08.01 OSED (see [9]).

This ArrivalSeparationIndicator service enables the APP ATC system to:

- provide Supervisors and ATC Controllers with the Separation information for Arrival Pairs established on Final Approach, based on current computation mode of the TBS tool, including separation advices, safety mitigation advices, alerts and notifications in case of service failures;
- provide Supervisors with the functionality to manage the current computation mode of the TBS system by enabling the Supervisor to request the automatic switch from one computation mode to another and to receive a confirmation from the system about the outcomes of the above request;
- provide ATC Controllers with the functionality to set a specific computation mode (TBS or DBS) for a single pair of aircrafts and to receive as reply either the confirmation that the requested mode is used for that pair (or an error message).

3.1 Information Exchange Requirements

IERs are not available in the OSED 06.08.01-D05 00.01.02 (see [9]). As a consequence, a list of operational requirements taken from the OSED is shown in the following figure:

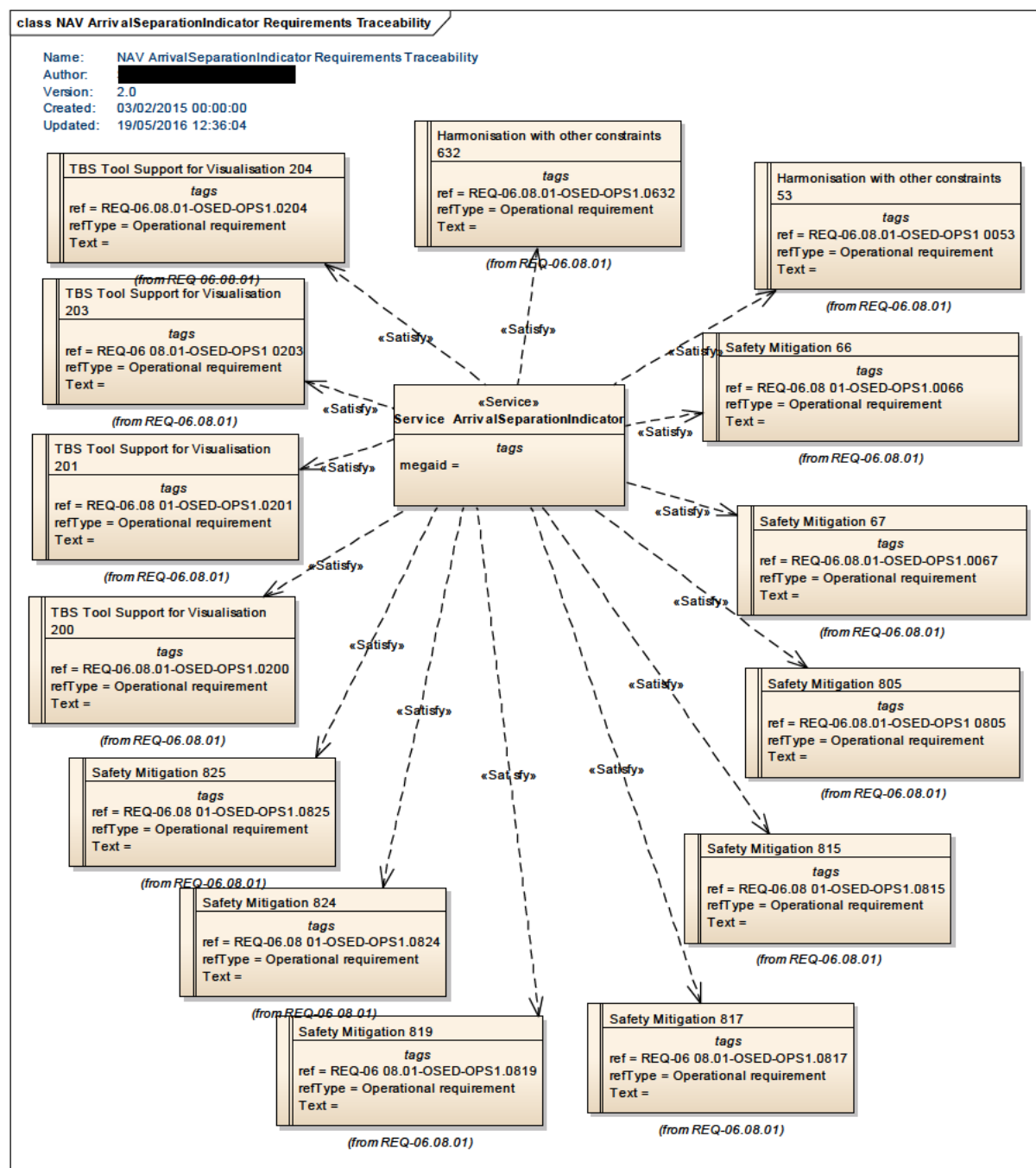


Figure 1: NAV ArrivalSeparationIndicator Requirements Traceability IER diagram

Element Name	Author	Notes
Harmonisation with other constraints 632	[REDACTED]	The Tower Runway Controller in coordination with the Final Approach Controller may change the final approach separation and runway spacing constraints that are to be applied at any time.
Element Tagged Value Name	Value	

	ref	REQ-06.08.01-OSED-OPS1.0632
	refType	Operational requirement
	Text	
Element Name	Author	Notes
Harmonisation with other constraints 53		The Tower Supervisor in coordination with the Approach Supervisor shall determine the final approach separation and runway spacing constraints that are to be applied at any time.
	Element Tagged Value Name	Value
	ref	REQ-06.08.01-OSED-OPS1.0053
	refType	Operational requirement
	Text	
Element Name	Author	Notes
Safety Mitigation 66		The system shall provide a Wrong Aircraft Turned on to Separation Indicator Monitor to check that the correct aircraft is turned on to each separation indicator and to alert when the wrong aircraft is turned on to a separation indicator.
	Element Tagged Value Name	Value
	ref	REQ-06.08.01-OSED-OPS1.0066
	refType	Operational requirement
	Text	
Element Name	Author	Notes
Safety Mitigation 67		The system shall provide an Aircraft Turned on to Wrong Localiser Monitor to check and alert for an aircraft not being turned on to the intended final approach localiser, i.e. different than the Approach Arrival Sequence intended landing runway.
	Element Tagged Value Name	Value
	ref	REQ-06.08.01-OSED-OPS1.0067
	refType	Operational requirement
	Text	
Element Name	Author	Notes
Safety Mitigation 805		The Approach Arrivals Sequence Display shall support the alerting of when a separation distance could not be calculated for an arrival pair.
	Element Tagged Value Name	Value
	ref	REQ-06.08.01-OSED-OPS1.0805
	refType	Operational requirement
	Text	
Element Name	Author	Notes
Safety Mitigation 815		The TBS System Monitor shall provide an alert of a TBS System failure to the TMA System Operating Authority, the Approach Supervisor and the Tower Supervisor.

Element Tagged Value Name		Value
ref		REQ-06.08.01-OSED-OPS1.0815
refType		Operational requirement
Text		
Element Name	Author	Notes
Safety Mitigation 817		The Arrival Sequence Service Monitor shall provide an alert of an Arrival Sequence Service failure to the TMA System Operating Authority, the Approach Supervisor and the Tower Supervisor.
Element Tagged Value Name		Value
ref		REQ-06.08.01-OSED-OPS1.0817
refType		Operational requirement
Text		
Element Name	Author	Notes
Safety Mitigation 819		The Glideslope Wind Conditions Service Monitor shall provide an alert of a Glideslope Wind Conditions Service failure to the TMA System Operating Authority, the Approach Supervisor and the Tower Supervisor.
Element Tagged Value Name		Value
ref		REQ-06.08.01-OSED-OPS1.0819
refType		Operational requirement
Text		
Element Name	Author	Notes
Safety Mitigation 824		The Approach Radar Display shall support an Abnormal Indicated Airspeed Monitor alert to the Approach Controllers.
Element Tagged Value Name		Value
ref		REQ-06.08.01-OSED-OPS1.0824
refType		Operational requirement
Text		
Element Name	Author	Notes
Safety Mitigation 825		The Approach Radar Display shall support a Distance Compression Monitor alert to the Approach Controllers.
Element Tagged Value Name		Value
ref		REQ-06.08.01-OSED-OPS1.0825
refType		Information exchange requirement
Text		
Element Name	Author	Notes
TBS Tool Support for Visualisation 200		The system shall provide visualisation of the TBS distance separation to the final approach controller to at least a distance separation step resolution of 0.1Nm.
Element Tagged Value Name		Value
ref		REQ-06.08.01-OSED-OPS1.0200
refType		Operational requirement

	Text	
Element Name	Author	Notes
TBS Tool Support for Visualisation 201		The system shall provide visualisation of the TBS distance separation to the tower runway controller to at least a distance separation step resolution of 0.1Nm.
Element Tagged Value Name	Value	
ref	REQ-06.08.01-OSED-OPS1.0201	
refType	Operational requirement	
Text		
Element Name	Author	Notes
TBS Tool Support for Visualisation 203		The final approach controller shall be provided with a visual reference of the required separation or spacing constraint as the aircraft descend on the final approach glideslope to the runway landing threshold.
Element Tagged Value Name	Value	
ref	REQ-06.08.01-OSED-OPS1.0203	
refType	Operational requirement	
Text		
Element Name	Author	Notes
TBS Tool Support for Visualisation 204		The tower runway controller shall be provided with a visual reference of the required separation or spacing constraint as the aircraft descend on the final approach glideslope to the runway landing threshold.
Element Tagged Value Name	Value	
ref	REQ-06.08.01-OSED-OPS1.0204	
refType	Operational requirement	
Text		

Table 1: Requirements tracing

3.2 Other Requirements

3.2.1 Non-Functional Requirements

N/A

3.2.2 Relevant Industrial Standards

N/A

3.2.3 Nodes

The Service to EATMA Nodes Mapping diagram is shown in the figure below.

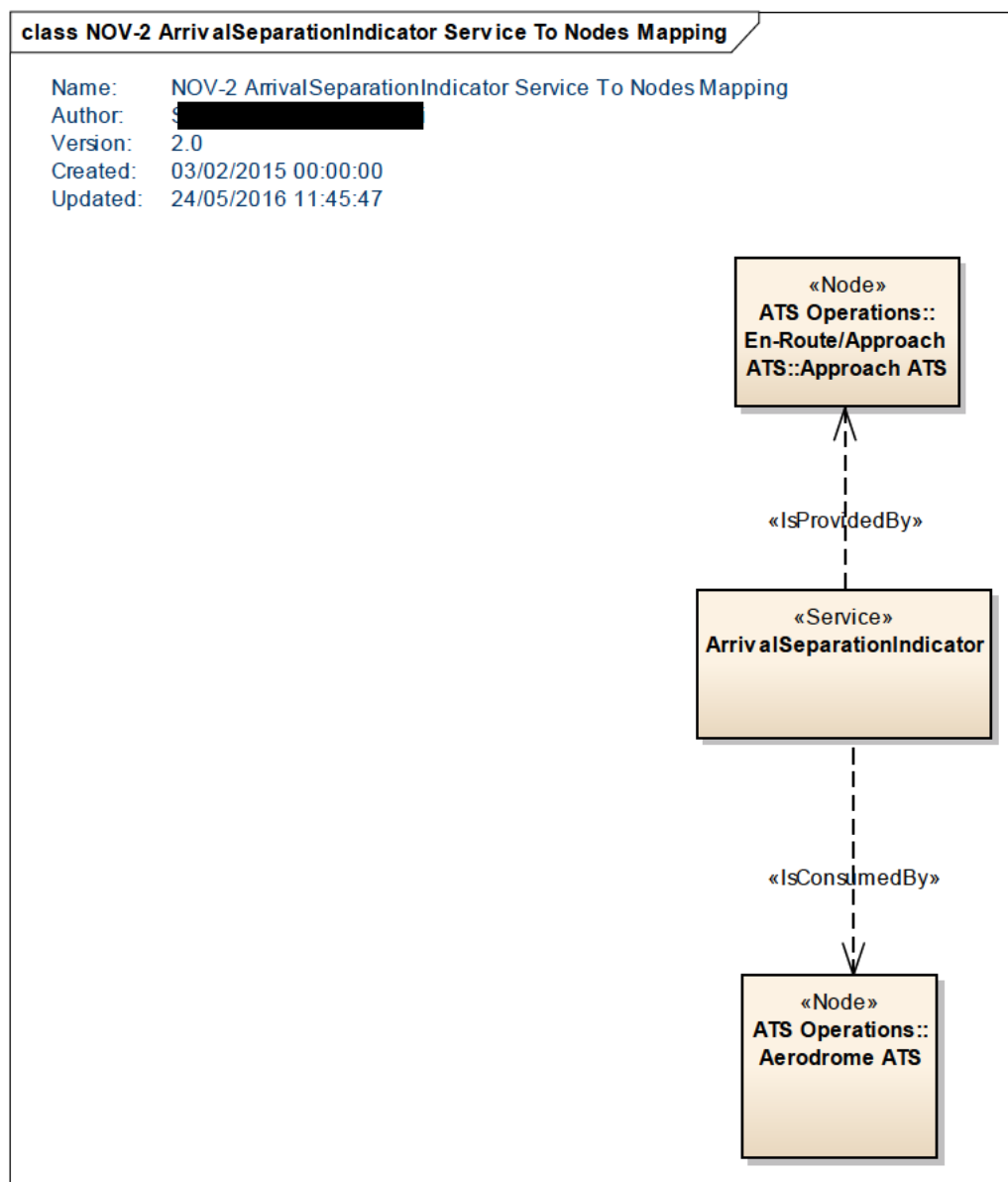


Figure 2: NOV-2 ArrivalSeparationIndicator Service To Nodes Mapping diagram

4 Service overview

The ArrivalSeparationIndicator Service enables the APP ATC system to:

- publish separation advice messages to the ATC Controllers and Supervisors involved in Monitoring and separating Air Traffic on Final Approach that need to monitor the separation of the Arrival Pairs;
- publish safety mitigation advice messages to the ATC Controllers and Supervisors involved in Monitoring and separating Air Traffic on Final Approach that need to take decisions about the desired distance separation of each Arrival Pair established on Final Approach;
- publish alert messages to the ATC Controllers and Supervisors involved in Monitoring and separating Air Traffic on Final Approach that need to be aware about the current status of the TBS system (failures in computation due to input, failures in output, unavailability of services providing input to the TBS system);

The ArrivalSeparationIndicator Service enables the APP ATC Supervisor to:

- request the switch of the system computation mode from TBS rules to DBS rules (or vice-versa) for all the arrival pairs being processed by the TBS system;
- receive a confirmation from the system about the outcomes of the above request

and the ATC Controller to:

- set a specific computation mode (TBS or DBS) for a single pair of aircrafts and
- receive as reply either the confirmation that the requested mode is used for that pair or an error message.

4.1 Service Taxonomy

The service taxonomy is described in the ISRM Service Portfolio document [13].

4.2 Service Levels (NfRs)

N/A

4.3 Service Functions and Capabilities

The mapping from ArrivalSeparationIndicator Service to EATMA Operational Activities is shown in the figure below:

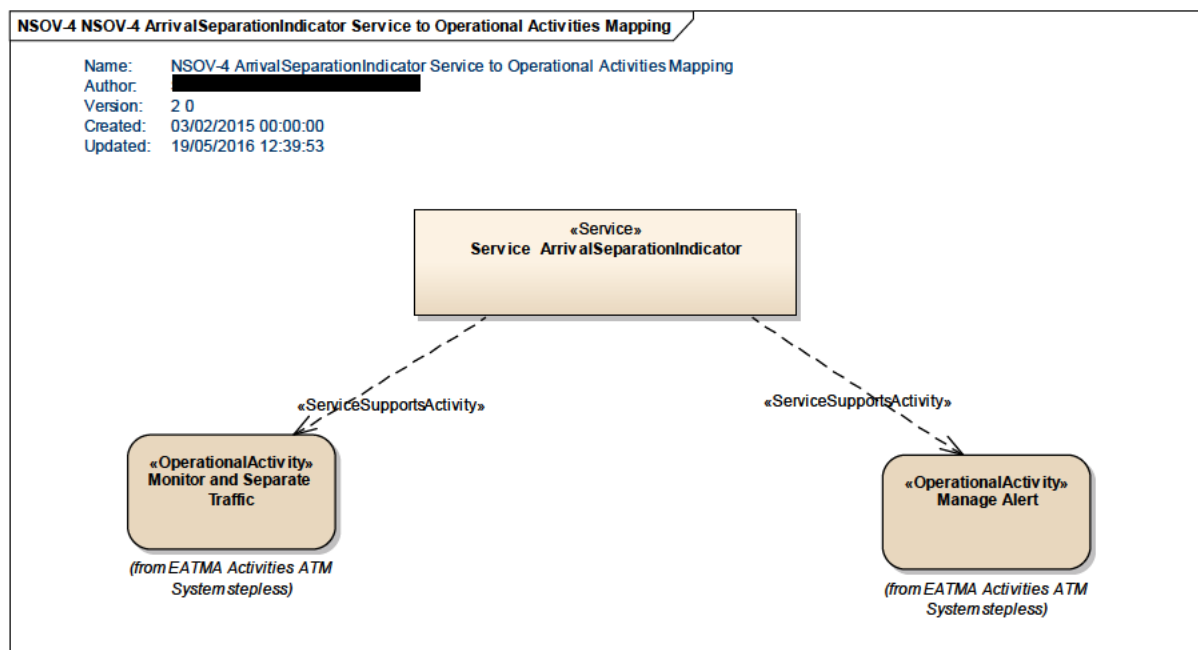


Figure 3: NSOV-4 ArrivalSeparationIndicator Service to Operational Activities Mapping diagram

4.4 Service Interfaces

The ArrivalSeparationIndicator Service has two service interfaces (ports):

- **InformationProviderInterface** which includes the definition and operations enabling the Service Consumers to subscribe/unsubscribe to/from the Service, and the Service Provider to send to the subscribed Service Consumers the information about separation advices, safety mitigation advices and alerts.
- **SeparationModeManagerInterface** which includes the definition and operations enabling:
 - the Service Consumer (Supervisor) to set the separation computation mode of the TBS system (TBS or DBS) in order to explicitly accommodate the service operational needs to local-in-time conditions;
 - the Service Consumer (ATC Controller) to request a specific TBS computation mode to be set for the separation computation of a pair of aircraft.

Chapter 5 is dedicated to the description of the Service interface specifications which are thus here not detailed.

The NSOV-2 ArrivalSeparationIndicator Interface Definition diagram is shown in Figure 4.

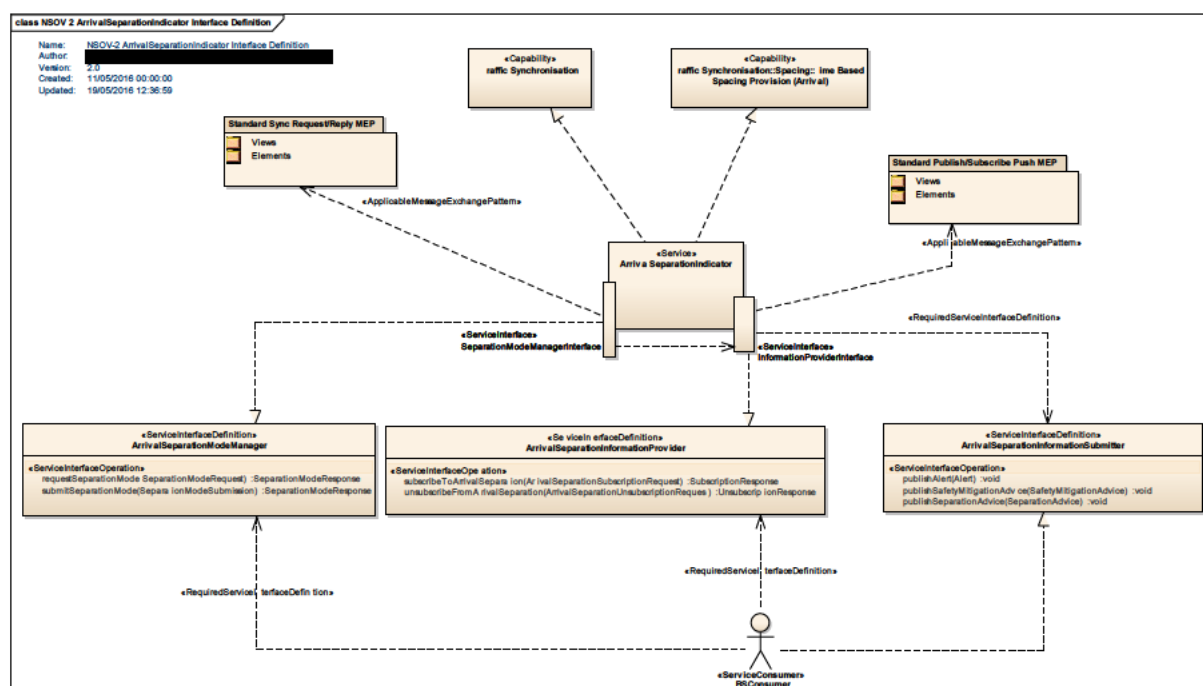


Figure 4: NSOV-2 ArrivalSeparationIndicator Interface Definition diagram

The related service interface definitions are listed in Table 2 which is reported below.

ServiceInterface	ServiceInterfaceDefinition	ServiceInterfaceOperation	Role
InformationProviderInterface	ArrivalSeparation InformationProvider	subscribeToArrivalSeparation	provided
InformationProviderInterface	ArrivalSeparation InformationProvider	unsubscribeFromArrivalSeparation	provided
InformationProviderInterface	ArrivalSeparation InformationSubmitter	publishAlert	required
InformationProviderInterface	ArrivalSeparation InformationSubmitter	publishSafetyMitigationAdvice	required
InformationProviderInterface	ArrivalSeparation InformationSubmitter	publishSeparationAdvice	required
SeparationModeManagerInterface	ArrivalSeparationModeManager	requestSeparationMode	provided
SeparationModeManagerInterface	ArrivalSeparationModeManager	submitSeparationMode	provided

Table 2: Service Interfaces

5 Service interface specifications

The interfaces of the ArrivalSeparationIndicator service are shown in Figure 4 and are described in the sections below with their service interfaces definitions and operations.

5.1 Service Interface InformationProviderInterface

The purpose of the Service Interface **InformationProviderInterface** is to foresee the service interface definitions with necessary operations to allow the Service Consumers to subscribe/unsubscribe to/from ArrivalSeparationIndicator service and to receive information such as separation advices, safety mitigation advices and alerts.

The message exchange pattern foreseen for the InformationProviderInterface is the Standard Publish/Subscribe Push MEP.

The Service Interface InformationProviderInterface implements two Service Interface definitions:

- the **ArrivalSeparationInformationProvider** service interface definition
- the **ArrivalSeparationInformationSubmitter** service interface definition

which are described in the following subparagraphs.

5.1.1 Service	Interface	Definition
	ArrivalSeparationInformationProvider	

The purpose of the **ArrivalSeparationInformationProvider** service interface definition is to implement the service operations to subscribe/unsubscribe to/from ArrivalSeparationIndicator service in order to enable/disable the delivery of separation advices, the safety mitigation advices and the alerts from the TBS system. The architecture of the ArrivalSeparationInformationProvider service interface includes the following operations:

- **subscribeToArrivalSeparation(ArrivalSeparationSubscriptionRequest):SubscriptionResponse** – this operation allows to subscribe to the reception of ArrivalSeparation messages.
- **unsubscribeFromArrivalSeparation(ArrivalSeparationUnsubscriptionRequest):UnsubscriptionResponse** - this operation allows to unsubscribe from the reception of ArrivalSeparation messages.

The related payload diagrams and tables were defined in the release of ISRM (1.4) upon discussion within WP8 and are hereby reported.

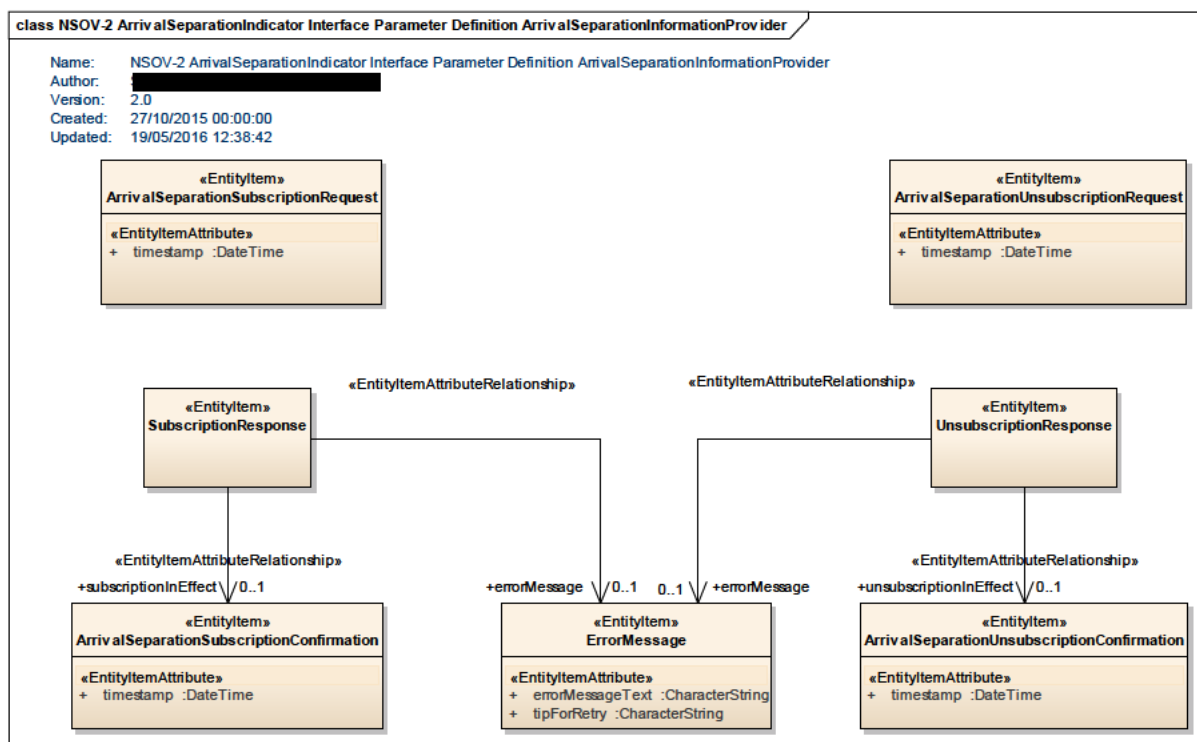


Figure 5: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram

Element Name		Author	Notes
ArrivalSeparationSubscriptionRequest			The Subscription Request to the ArrivalSeparationIndicator Service
	Attribute Name	Type	Notes
	timestamp	DateTime	Timestamp for when the request was issued.
	Tagged Value Name		Value
	CLDMSemanticTrace		CLDM out of scope

Element Name		Author	Notes
ArrivalSeparationSubscriptionConfirmation			The confirmation of a subscription to arrival separation information.
	Attribute Name	Type	Notes
	timestamp	DateTime	Timestamp for when the subscription is effective.
	Tagged Value Name	Value	
	CLDMSemanticTrace	CLDM out of scope	

Element Name		Author	Notes
ArrivalSeparationUnsubscriptionRequest			The Unsubscription Request to the ArrivalSeparationIndicator Service
	Attribute Name	Type	Notes
	timestamp	DateTime	Timestamp for when the request was issued.
	Tagged Value Name		Value
	CLDMSemanticTrace		CLDM out of scope

Element Name	Author	Notes
ArrivalSeparationUnsubscriptionConfirmation		The confirmation of a unsubscription to arrival separation information.
Attribute Name	Type	Notes
timestamp	DateTime	The timestamp for when the unsubscription is effective
Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	

Element Name	Author	Notes
ErrorMessage		The error message sent when the operation did not succeed.
Attribute Name	Type	Notes
errorMessageText	CharacterString	The text of the error message.
Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	
Attribute Name	Type	Notes
tipForRetry	CharacterString	A tip for retry of the failed operation.
Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	

Element Name	Author	Notes
SubscriptionResponse		Response to subscription request.

Element Name	Author	Notes
UnsubscriptionResponse		Response to unsubscription request.

Table 3: Payload tracing to AIRM

5.1.1.1 Operation subscribeToArrivalSeparation

The **subscribeToArrivalSeparation** operation enables requesting the subscription to the Service and receiving either a confirmation in case of successful subscription or, in case of unsuccessful subscription, an error message with a tip for retry.

5.1.1.1.1 Operation Functionality

The operation functionality foresees:

- to pass to the Service Interface the parameter named **ArrivalSeparationSubscriptionRequest** including a timestamp (the time the request is sent)
- to receive from the Service Interface a reply with the parameter **SubscriptionResponse** including a timestamp (the time the response is sent); the response can be either an error message or a confirmation of successful subscription.

5.1.1.1.2 Operation Parameters

The operation parameters are detailed in Figure 5 and in Table 3 and are thus not reported here.

5.1.1.2 Operation unsubscribeArrivalSeparation

The operation **unsubscribeArrivalSeparation** exposed by the Service Interface definition “ArrivalSeparationInformationProvider” enables unsubscription from the reception of ArrivalSeparation messages.

5.1.1.2.1 Operation Functionality

The operation functionality foresees:

- To pass to the Service Interface the parameter named ArrivalSeparationUnsubscriptionRequest including a timestamp (the time the request is sent)
- to receive from the Service Interface a reply with the parameter UnsubscriptionResponse including a timestamp (the time the response is sent).

5.1.1.2.2 Operation Parameters

The operation parameters are detailed in Figure 5 and in Table 3 and are thus not reported here.

5.1.2 Service Interface Definition ArrivalSeparationInformationSubmitter

The purpose of the service interface ArrivalSeparationInformationSubmitter is to deliver the Arrival Separation Information to subscribed Service Consumers.

The architecture of the ArrivalSeparationInformationSubmitter service interface definition includes the following operations:

- **publishSeparationAdvice(SeparationAdvice):void** – it enables the Service Provider to send separation advices to the ATC controllers concerned by the flights on arrival. The input parameter of the operation is the SeparationAdvice;
- **publishSafetyMitigationAdvice(SafetyMitigationAdvice):void** – it enables the Service Provider to send Safety Mitigation Advices to the service consumers. The input parameters of the operation are the SafetyMitigationAdvice;
- **publishAlert(Alert):void** – it enables the Service Provider to send Alerts to the service consumers which need to be aware of the system status for primary safety reasons. The input parameters of the operation is the Alert.

The related payload diagrams and tables have been defined in the release of ISRM (1.4) upon discussion within WP8 and are hereby reported.

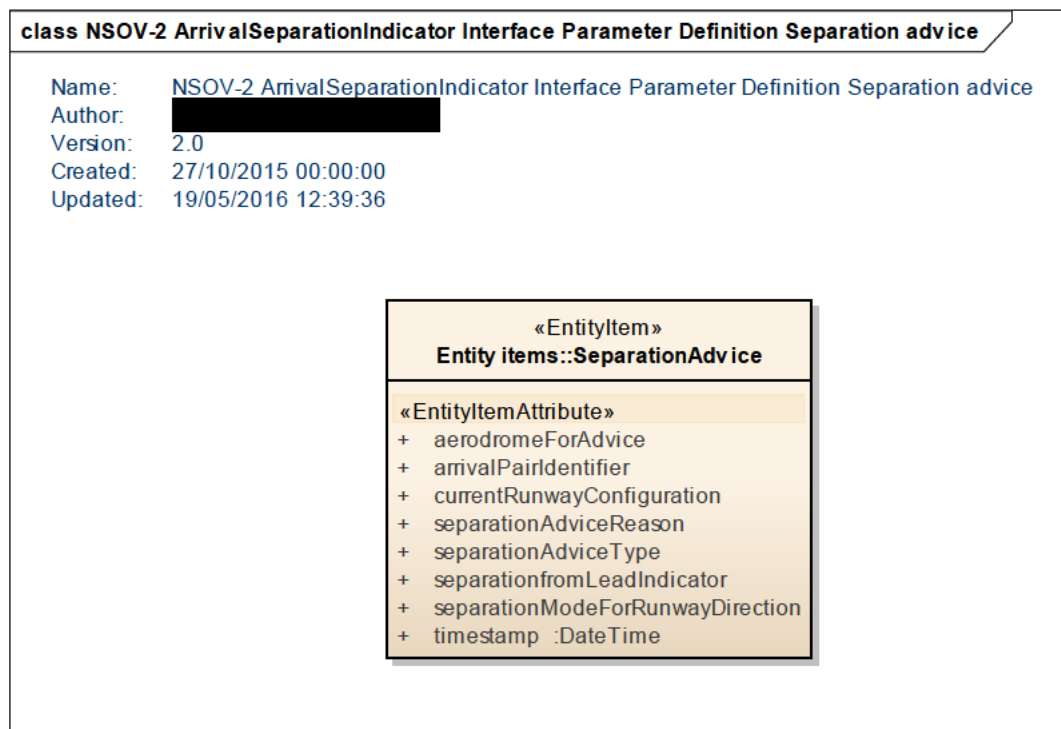


Figure 6: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram

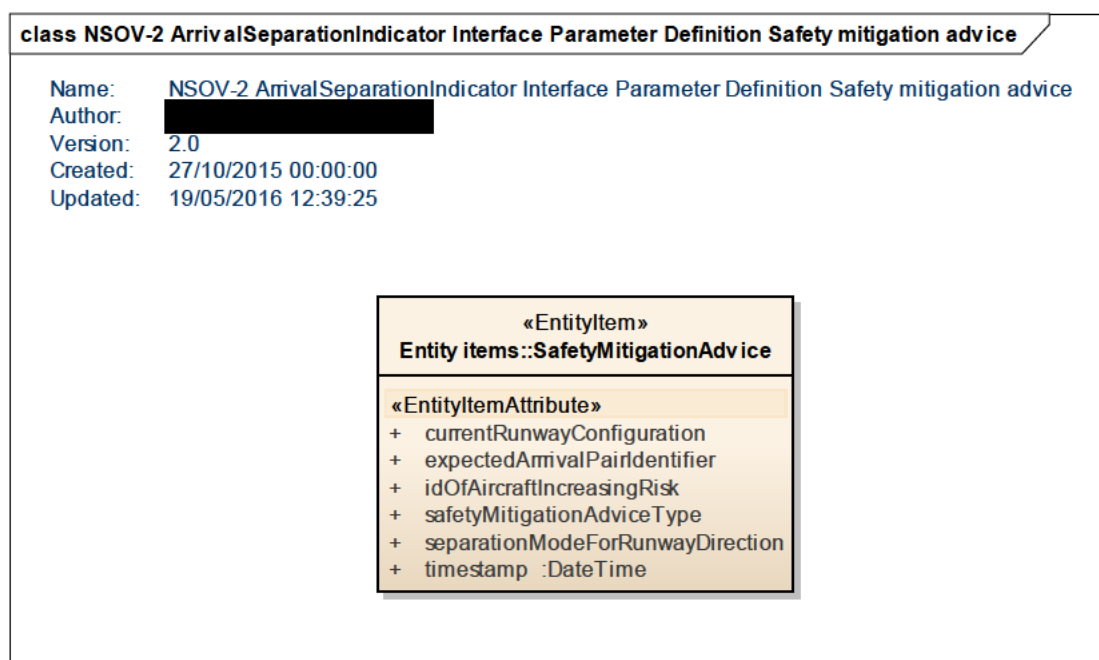


Figure 7: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram

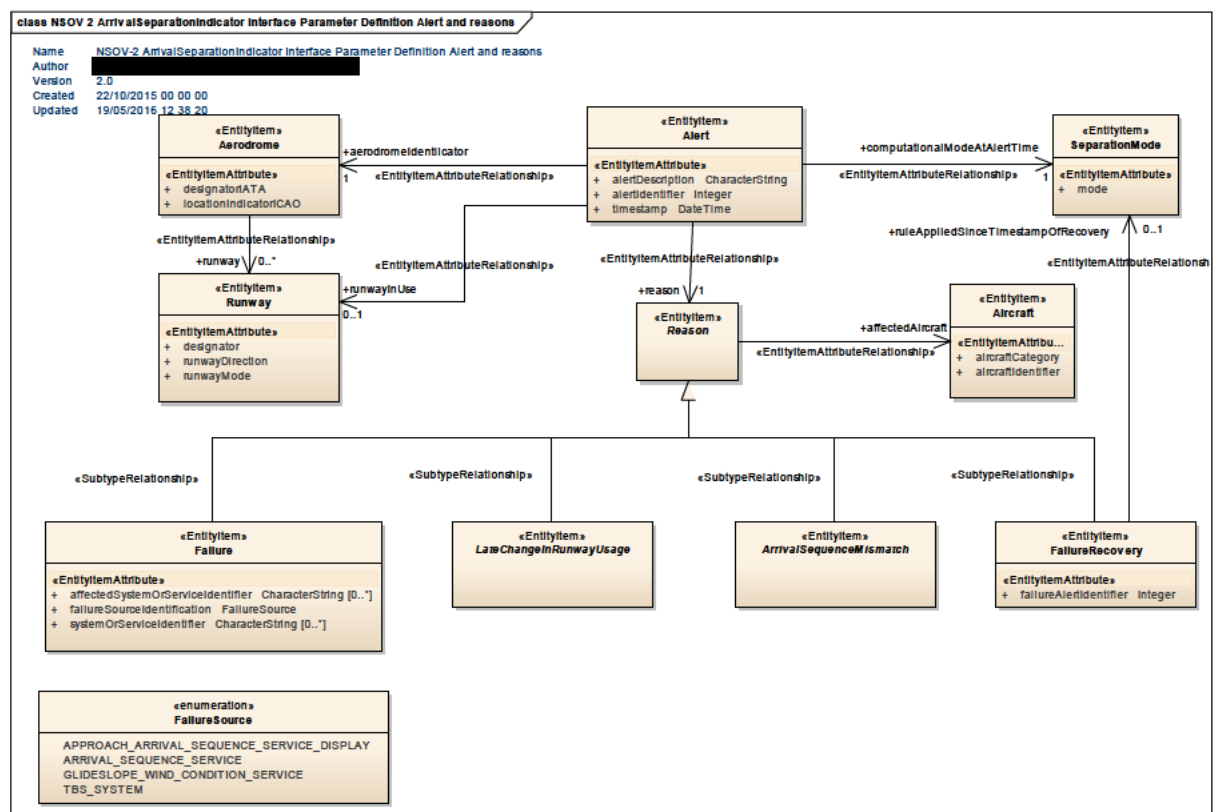


Figure 8: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram

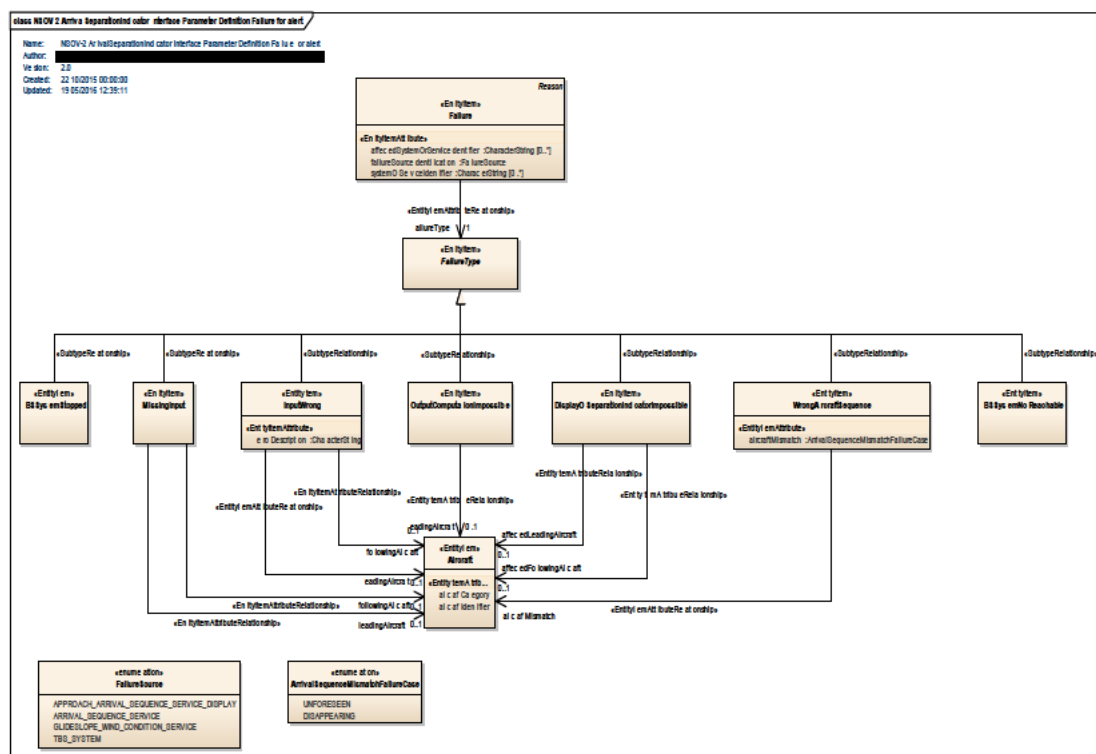


Figure 9: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram

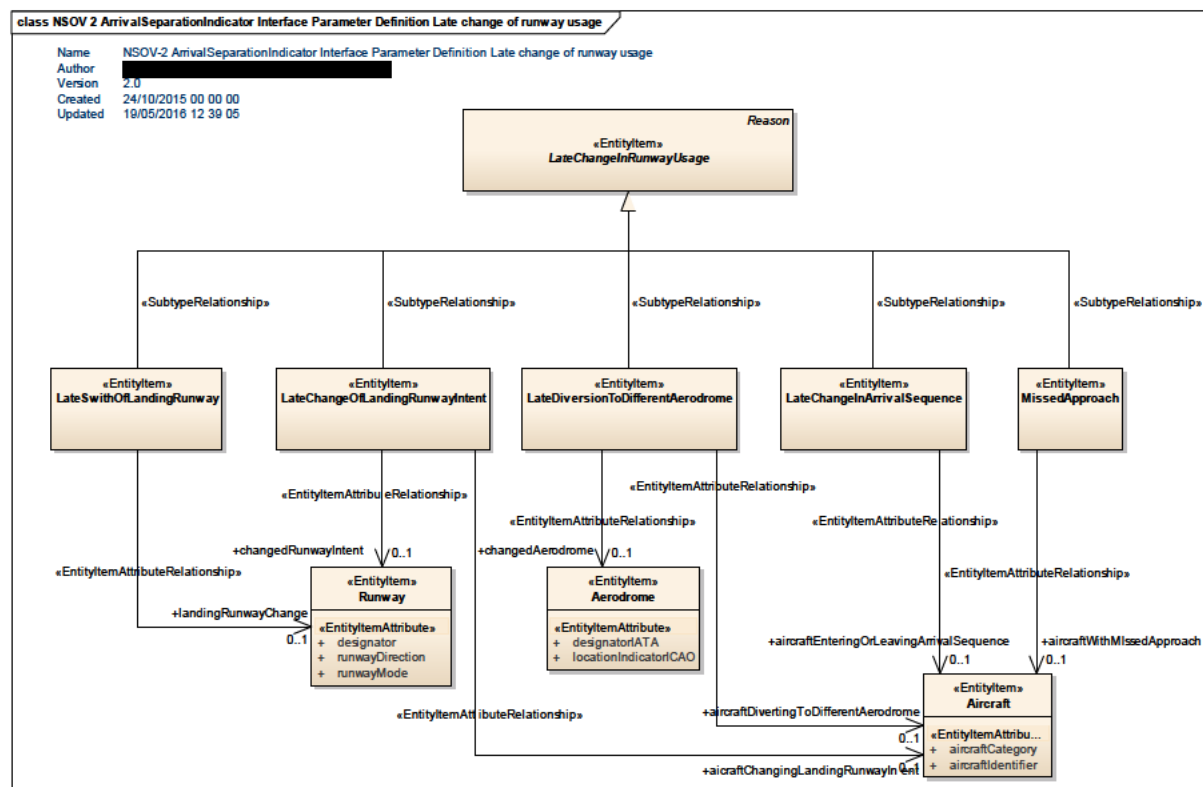


Figure 10: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram

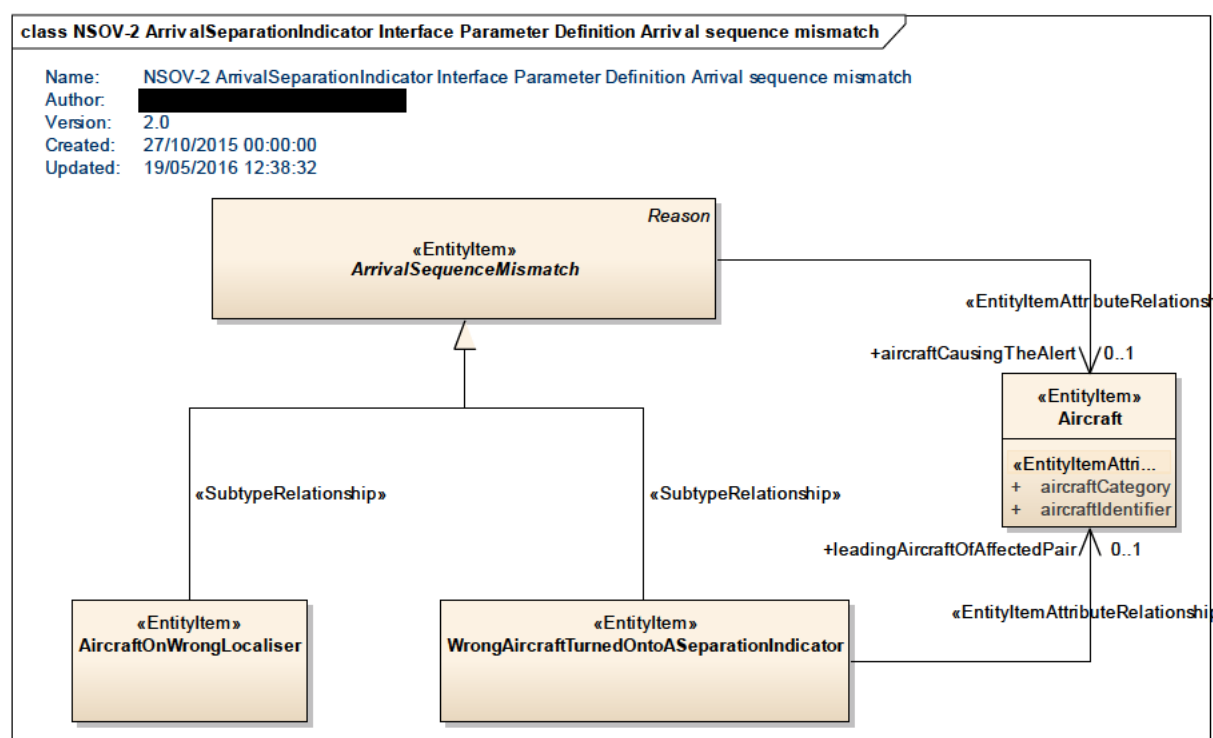


Figure 11: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram

Element Name		Author	Notes
SeparationAdvice			Entity Item containing the information related to the Separation Advice.
Attribute Name	Type	Notes	
aerodromeForAdvice		Aerodrome for which the separation advice is issued.	
Tagged Value Name		Value	
CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:ConflictManagement:FinalArrivalSeparationAdvice@aerodromeForAdvice	
Attribute Name	Type	Notes	
arrivalPairIdentifier		Identifier of the lead and the following aircraft for a certain pair in the arrival sequence.	
Tagged Value Name		Value	
CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:ConflictManagement:FinalArrivalSeparationAdvice@arrivalPair	
Attribute Name	Type	Notes	
currentRunwayConfiguration		The current runway configuration	
Tagged Value Name		Value	
CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:ConflictManagement:FinalArrivalSeparationAdvice@runwayConfiguration	
Attribute Name	Type	Notes	
separationAdviceReason		The reason for separation advice reasons could be one of the following (in decreasing severity): - Distance decreasing - Separation infringement risk increasing - Separation infringement imminent - Separation infringement occurred	
Tagged Value Name		Value	
CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:ConflictManagement:FinalArrivalSeparationAdvice@separationAdviceReason	
Attribute Name	Type	Notes	
separationAdviceType		The types for the separation advice could be one of the following: - Increased arrival pair distance / set additional spacing for arrival pair. - Deviation from procedural airspeed profile.	
Tagged Value Name		Value	
CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:ConflictManagement:FinalArrivalSeparationAdvice@separationAdviceType	
Attribute Name	Type	Notes	
separationfromLeadIndicator		The status of the current separation from lead indicator type: - In trail - Not in trail	
Tagged Value Name		Value	

	CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:ConflictManagement:FinalArrivalSeparationAdvice@separationFromLeadIndicator
Attribute Name	Type	Notes
separationModeForRunwayDirection		The separation rule applied for the runway direction.
Tagged Value Name	Value	
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:ConflictManagement:SeparationMode@arrivalSeparationMode	
Attribute Name	Type	Notes
timestamp	DateTime	The timestamp for when the advice was issued.
Tagged Value Name	Value	
CLDMSemanticTrace	CLDM out of scope	

Element Name	Author	Notes
SafetyMitigationAdvice		<p>Safety Mitigation Advices related to:</p> <ul style="list-style-type: none"> Aircraft not being turned on the intended final approach center-line; the arrival sequence order delivered on intermediate approach mismatches the arrival sequence order in the Arrival Sequence Display used to calculate the separation indicator distances (wrong aircraft sequence); there is an abnormal final approach airspeed behaviour that significantly increases the risk of separation infringement (deviations from the procedural airspeed profiles employed on final approach); there is an imminent separation infringement or it is already happened; the wrong aircraft is turned on to a separation indicator; an aircraft is merged on to the wrong final approach localiser.
Attribute Name	Type	Notes
currentRunwayConfiguration		Current runway configuration
Tagged Value Name	Value	
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:ConflictManagement:FinalArrivalSafetyMitigationAdvice@runwayConfiguration	
Attribute Name	Type	Notes
expectedArrivalPairIdentifier		Identifier of the lead and the following aircraft for a the expected pair in the arrival sequence.
Tagged Value Name	Value	
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:Subje	

		ctFields:AirTrafficOperations:ConflictManagement:FinalArrivalSafetyMitigationAdvice@expectedArrivalPair	
	Attribute Name	Type	Notes
	idOfAircraftIncreasingRisk		Id of aircraft causing safety mitigation.
	Tagged Value Name		Value
	CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:ConflictManagement:FinalArrivalSafetyMitigationAdvice@aircraftIncreasingRisk
	Attribute Name	Type	Notes
	safetyMitigationAdviceType		The types of the safety mitigation advice could be one of the following: - Lead aircraft not being turned on intended final approach centre line - Follower aircraft not being turned on intended final approach centre line. - Wrong aircraft turned on the final approach centre line - Aircraft being turned on intended final approach centre line. For each type, the id of the aircraft in question shall be provided.
	Tagged Value Name		Value
	CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:ConflictManagement:FinalArrivalSafetyMitigationAdvice@safetyMitigationAdviceType
	Attribute Name	Type	Notes
	separationModeForRunwayDirection		The separation rule applied for the runway direction.
	Tagged Value Name		Value
	CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:ConflictManagement:SeparationMode@arrivalSeparationMode
	Attribute Name	Type	Notes
	timestamp	DateTime	The timestamp for when the advice was issued.
	Tagged Value Name		Value
	CLDMSemanticTrace		CLDM out of scope

Element Name	Author	Notes
Alert		Alerts related to: <ul style="list-style-type: none"> • TBS System failure; • Glideslope Wind Conditions Service failure; • Arrivals Sequence Service Failure; • Approach Arrivals Sequence Display failure (a separation distance could not be calculated for an arrival pair).
Attribute Name	Type	Notes
alertDescription	CharacterString	
Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	
Attribute Name	Type	Notes
alertIdentifier	Integer	System generated identifier of the alert.
Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	
Attribute Name	Type	Notes
timestamp	DateTime	The timestamp for when the alert is issued.
Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	

Element Name	Author	Notes
Aerodrome		Indicators for an aerodrome.
Attribute Name	Type	Notes
designatorIATA		The identifier that is assigned to a location in accordance with rules (resolution 767) governed by the International Air Transport Association (IATA).
Tagged Value Name	Value	
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:BaseInfrastructure:AerodromeInfrastructure:Aerodrome@designatorIATA	
IMDefinitionTrace	urn:x-ses:sesarju:airm:v410:InformationModel:SubjectFields:BaseInfrastructure:AerodromeInfrastructure:AerodromeIATADesignator	
Attribute Name	Type	Notes
locationIndicatorICAO		The four letter ICAO location indicator of the aerodrome/heliport, as listed in ICAO DOC 7910.
Tagged Value Name	Value	
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:BaseInfrastructure:AerodromeInfrastructure:Aerodrome@locationIndicatorICAO	
IMDefinitionTrace	urn:x-ses:sesarju:airm:v410:InformationModel:SubjectFields:BaseInfrastructure:CommunicationInfrastructure:AerodromeLocationIndicator	

Element Name		Author	Notes
Runway			Information about runway for an aerodrome.
Attribute Name	Type	Notes	
designator		The designator of a runway	
Tagged Value Name		Value	
CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:BaseInfrastructure:AerodromeInfrastructure:Runway@designator	
Attribute Name	Type	Notes	
runwayDirection		Designator of runway direction	
Tagged Value Name		Value	
CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:BaseInfrastructure:AerodromeInfrastructure:RunwayDirection@designator	
IMDefinitionTrace		urn:x-ses:sesarju:airm:v410:InformationModel:SubjectFields:BaseInfrastructure:AerodromeInfrastructure:RunwayDirectionDesignator	
Attribute Name	Type	Notes	
runwayMode		The mode of runway usage: Departure only, Arrival only, Mix mode, Closed	
Tagged Value Name		Value	
CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:AerodromeOperations:RunwayMode@configuredMode	
IMDefinitionTrace		urn:x-ses:sesarju:airm:v410:InformationModel:SubjectFields:BaseInfrastructure:AerodromeInfrastructure:RunwayMode	

Element Name	Author	Notes
Reason		The reason for the alert to be issued.

Element Name		Author	Notes
Failure			In the case when the alert is due to a failure.
Attribute Name	Type	Notes	
affectedSystemOrServiceIdentifier	CharacterString	The identifier of the system or the component affected by the failure.	
Tagged Value Name		Value	
CLDMSemanticTrace		CLDM_out_of_scope	
Attribute Name	Type	Notes	
failureSourceIdentification	FailureSource	Identification of the source of the failure	
Tagged Value Name		Value	
CLDMSemanticTrace		CLDM_out_of_scope	
Attribute Name	Type	Notes	
systemOrServiceIdentifier	CharacterString	The identifier of the system or the component causing the failure.	
Tagged Value Name		Value	
CLDMSemanticTrace		CLDM_out_of_scope	

Element Name	Author	Notes
FailureType		The type of failure resulting in an alert.

Element Name	Author	Notes
TBSSystemStopped		The case when the TBS system has stopped.
Element Name	Author	Notes
InputWrong		The case where the input for the computation of the separation indicator is wrong. Such as when the Wake Vortex category of the aircraft type in arrival pair in the input does not match the wake vortex category of the aircraft type.
Attribute Name	Type	Notes
errorDescription	CharacterString	Description of the error in the input.
Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out of scope	
Element Name	Author	Notes
WrongAircraftSequence		The case where there is a mismatch between the arrival sequence order delivered at intermediate approach and the arrival sequence at the final approach display. A mismatch could be the case when an unforeseen aircraft has entered the arrival sequence, or when an aircraft has unforeseen left the arrival sequence.
Attribute Name	Type	Notes
aircraftMismatch	ArrivalSequenceMismatchFailureCase	
Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out of scope	
Element Name	Author	Notes
MissingInput		The case of missing input for computation of the separation indicator for a specific pair of aircrafts in the arrival sequence.
Element Name	Author	Notes
OutputComputationImpossible		The case where it is impossible to produce an output of the computation of the separation indicator due to a computation error. The error could be caused by error in the input.
Element Name	Author	Notes
DisplayOfSeparationIndicatorImpossible		The case where display of the computed separation indicator is not possible.
Element Name	Author	Notes
TBSSystemNotReachable		The case when the TBS system is not reachable.

Element Name	Author	Notes
FailureSource		The sources for failure alerts related to time based separation for arrival sequence.
Attribute Name	Type	Notes
APPROACH_ARRIVAL_SEQUENCE_SERVICE_DISPLAY		
Tagged Value Name	Value	

Attribute Name	Type	Notes
ARRIVAL_SEQUENCE_SERVICE		
Tagged Value Name	Value	
Attribute Name	Type	Notes
GLIDESLOPE_WIND_CONDITION_SERVICE		
Tagged Value Name	Value	
Attribute Name	Type	Notes
TBS_SYSTEM		
Tagged Value Name	Value	

Element Name	Author	Notes
FailureRecovery		In the case the alert is issued as a notification of recovery after a failure.
Attribute Name	Type	Notes
failureAlertIdentifier	Integer	The identifier of the alert for the failure which lead to the recovery.
Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	

Element Name	Author	Notes
SeparationMode		Is also denoted as computation mode. Is the mode for which the TBS system calculates the distance between aircraft pairs in the arrival sequence. The calculated distance used for projection of indicators in the TBS system's displays. Values are either: DBS - Distance Based Separation TBS - Time Based Separation
Attribute Name	Type	Notes
mode		Abbreviations DBS or TBS.
Tagged Value Name	Value	
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:ConflictManagement:SeparationMode@arrivalSeparationMode	
IMDefinitionTrace	urn:x-ses:sesarju:airm:v410:InformationModel:SubjectFields:AirTrafficOperations:ConflictManagement:SeparationMode	

Element Name	Author	Notes
LateChangeInRunwayUsage		The reason for the alert is late change in runway usage. A late change is after the lead aircraft has turned on to intercept to merge on to final approach. The details for this case are described in the subclasses.
Element Name	Author	Notes

LateSwitchofLandingRunway		The case when the controllers performs a late change of landing runway. A late change is after the lead aircraft has turned on to intercept to merge on to final approach.
Element Name	Author	Notes
LateChangeOfLandingRunwayIntent		The case where the pilot performs a late change of landing runway intent. A late change is after the lead aircraft has turned on to intercept to merge on to final approach.
Element Name	Author	Notes
LateDiversionToDifferentAerodrome		The case when an aircraft have performed a late diversion to different aerodrome. A late change is after the lead aircraft has turned on to intercept to merge on to final approach.
Element Name	Author	Notes
LateChangeInArrivalSequence		The case where a late change in the arrival sequence have occurred. A late change is after the lead aircraft has turned on to intercept to merge on to final approach.
Element Name	Author	Notes
MissedApproach		The case when an aircraft has performed a missed approach.

Element Name	Author	Notes
ArrivalSequenceMismatch		The reason for the alert is mismatch of the arrival sequence
Element Name	Author	Notes
AircraftOnWrongLocaliser		The case when an aircraft is turned on to the wrong approach localiser.
Element Name	Author	Notes
WrongAircraftTurnedOntoASeparationIndicator		The case when wrong aircraft has turned into a separation indicator for a certain arrival pair

Element Name	Author	Notes
ArrivalSequenceMismatchFailureCase		The cases for arrival sequence mismatch failure: - An unforeseen aircraft has entered the arrival sequence - An aircraft has disappeared from the arrival sequence
Attribute Name	Type	Notes
UNFORESEEN		
Tagged Value Name	Value	
Attribute Name	Type	Notes
DISAPPEARING		
Tagged Value Name	Value	

Table 4: Payload tracing to AIRM

The explanation concerning the purpose and architecture of the Interface are described in the following subparagraphs.

5.1.2.1 Operation publishSeparationAdvice

The operation **publishSeparationAdvice** exposed by the Service Interface definition “ArrivalSeparationInformationSubmitter” enables subscribed Service Consumers to receive Separation Advice information related to Arrival Separation Information.

5.1.2.1.1 Operation Functionality

The operation functionality foresees:

- to pass an input parameter named SeparationAdvice to be distributed to the Service Consumers already subscribed to the Service;
- not to receive any message in reply.

5.1.2.1.2 Operation Parameters

The operation parameters are detailed in Figure 6 and in Table 4 and are thus not reported here.

5.1.2.2 Operation publishSafetyMitigationAdvice

The operation **publishSafetyMitigationAdvice** exposed by the Service Interface definition “ArrivalSeparationInformationSubmitter” allows subscribed Service Consumers to receive Safety Mitigation Advice information related to Arrival Separation Information.

5.1.2.2.1 Operation Functionality

The operation functionality foresees:

- to pass to the Service Interface the parameter named SafetyMitigationAdvice to be distributed to the Service Consumers already subscribed to the Service;
- not to receive any message in reply.

5.1.2.2.2 Operation Parameters

The operation parameters are detailed in Figure 7 and in Table 4 and are thus not reported here.

5.1.2.3 Operation publishAlert

The operation **publishAlert** exposed by the Service Interface definition “ArrivalSeparationInformationSubmitter” allows subscribed Service Consumers to receive Alert information related to Arrival Separation Information.

5.1.2.3.1 Operation Functionality

The operation functionality foresees:

- to pass an input parameter named Alert to be distributed to the Service Consumers already subscribed to the Service;
- not to receive any message in reply.

5.1.2.3.2 Operation Parameters

The operation parameters are detailed in Figure 8, Figure 9, Figure 10, Figure 11 and in Table 4 and are thus not reported here.

5.2 Service Interface SeparationModeManagerInterface

The purpose of the Service Interface **SeparationModeManagerInterface** is to foresee the service interface definitions with necessary operations to allow:

- the Service Consumer (Supervisor) to set the separation computation mode of the TBS system (TBS or DBS)
- and the Service Consumer (ATC Controller) to request a specific TBS computation mode to be set for the separation computation of a pair of aircraft.

The message exchange pattern foreseen for the service interface SeparationModeManagerInterface is the Standard Sync Request/Reply MEP.

The Service Interface SeparationMode implements one single Service Interface definition:

- the **ArrivalSeparationModeManager** service interface definition

which is described in the following subparagraphs.

5.2.1 Service Interface Definition ArrivalSeparationModeManager

The purpose of the service interface ArrivalSeparationModeManager is to enable the Supervisor to set the separation computation mode of the TBS system and the ATC Controller to request a specific TBS computation mode for the separation computation of a pair of aircraft. The architecture of the ArrivalSeparationModeManager service interface definition includes the following operations:

- **submitSeparationMode** – which supports the Supervisor to set the computation mode currently used by the TBS tool to calculate all the Separations (TBS or DBS);
- **requestSeparationMode** – which supports the ATC Controller to set a specific computation mode (TBS or DBS) for a single Pair of aircraft and to receive as reply either the confirmation that the requested mode is used for that pair or an error message.

The related payload diagrams and tables were defined in the release of ISRM (1.4) upon discussion within WP8 and are hereby reported.

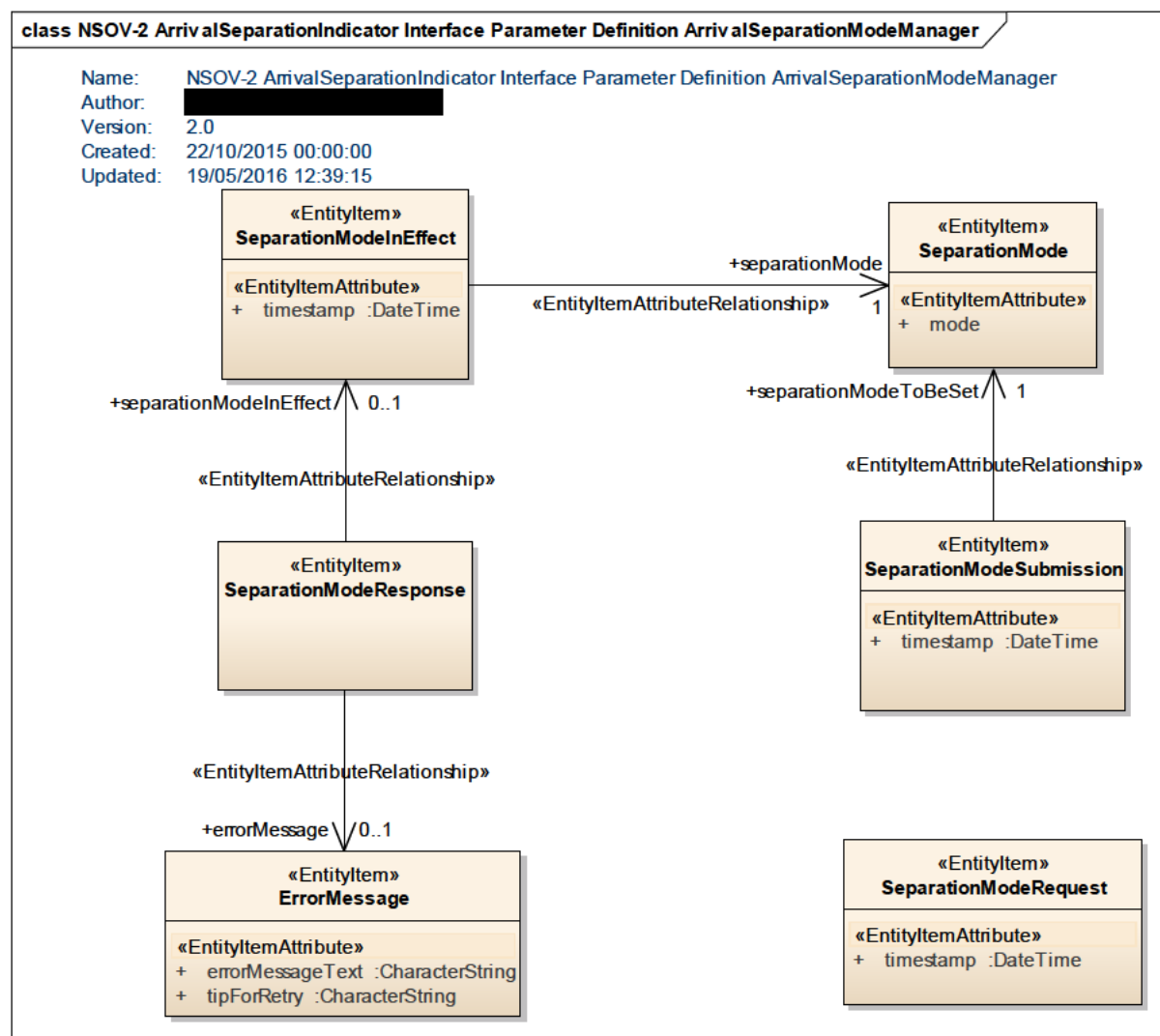


Figure 12: NSOV-2 ArrivalSeparationIndicator Interface Parameter Definition diagram

Element Name	Author	Notes
SeparationMode	[REDACTED]	Is also denoted as computation mode. Is the mode for which the TBS system calculates the distance between aircraft pairs in the arrival sequence. The calculated distance used for projection of indicators in the TBS system's displays. Values are either: DBS - Distance Based Separation TBS - Time Based Separation
Attribute Name	Type	Notes
mode		Abbreviations DBS or TBS.
Tagged Value Name	Value	
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:AirTrafficOperations:ConflictManagement:SeparationMode@arrivalSeparationMode	

	IMDefinitionTrace	urn:x-ses:sesarju:airm:v410:InformationModel:SubjectFields:AirTrafficOperations:ConflictManagement:SeparationMode	
Element Name		Author	Notes
SeparationModeInEffect			Separation mode in effect with additional information.
Attribute Name	Type	Notes	
timestamp	DateTime	The timestamp for when the separation mode was in effect.	
Tagged Value Name		Value	
CLDMSemanticTrace		CLDM_out_of_scope	
Element Name		Author	Notes
SeparationModeRequest			Entity Item to be used to require the separation mode in use.
Attribute Name	Type	Notes	
timestamp	DateTime	Timestamp for when the separation mode was requested.	
Tagged Value Name		Value	
CLDMSemanticTrace		CLDM_out_of_scope	
Element Name		Author	Notes
SeparationModeResponse			Entity Item used as reply (a confirmation) when the supervisor submits (i.e. sets) the separation mode and also as the reply when the consumers are requesting the current separation mode. The content could either be: - SeparationMode (for a successful operation) or - ErrorMessage (when the operation has failed)
Element Name		Author	Notes
SeparationModeSubmission			Separation mode to be set with additional information.
Attribute Name	Type	Notes	
timestamp	DateTime	The timestamp for when the change to separation mode was requested.	
Tagged Value Name		Value	
CLDMSemanticTrace		CLDM_out_of_scope	

Element Name		Author	Notes
ErrorMessage			The error message sent when the operation did not succeed.
Attribute Name	Type	Notes	
errorMessageText	CharacterString	The text of the error message.	
Tagged Value Name		Value	
CLDMSemanticTrace		CLDM_out_of_scope	
Attribute Name	Type	Notes	
tipForRetry	CharacterString	A tip for retry of the failed operation.	
Tagged Value Name		Value	
CLDMSemanticTrace		CLDM_out_of_scope	

Table 5: Payload tracing to AIRM

5.2.1.1 Operation submitSeparationMode

The operation **submitSeparationMode** exposed by the Service Interface definition “ArrivalSeparationModeManager” allows subscribed Service Consumers (Supervisors) to set the current mode of computation of the Separation used by the TBS tool.

5.2.1.1.1 Operation Functionality

The operation functionality foresees:

- to pass to the Service Interface the parameter named SeparationModeSubmission;
- to receive from the Service Provider the parameter SeparationModeResponse with a confirmation that the Separation is computed as requested from a certain timestamp onwards.

5.2.1.1.2 Operation Parameters

The operation parameters are detailed in Figure 12 and in

Element Name		Author	Notes
ErrorMessage			The error message sent when the operation did not succeed.
Attribute Name	Type	Notes	
errorMessageText	CharacterString	The text of the error message.	
Tagged Value Name		Value	
CLDMSemanticTrace		CLDM_out_of_scope	
Attribute Name	Type	Notes	
tipForRetry	CharacterString	A tip for retry of the failed operation.	
Tagged Value Name		Value	
CLDMSemanticTrace		CLDM_out_of_scope	

Table 5 and are thus not reported here.

5.2.1.2 Operation requestSeparationMode

The operation **requestSeparationMode** exposed by the Service Interface definition “ArrivalSeparationModeManager” allows subscribed Service Consumers to request a certain mode of computation of the Separation to be used by the TBS system and obtain in reply a confirmation or an error with a tip to retry.

5.2.1.2.1 Operation Functionality

The operation functionality foresees:

- to pass to the Service Interface the parameter named SeparationModeRequest (sent by a subscribed Consumer to the Service Provider);
- to receive in reply from the Service Provider the parameter SeparationModeResponse as confirmation that the requested Separation Mode has been correctly set for the TBS tool.

5.2.1.2.2 Operation Parameters

The operation parameters are detailed in Figure 12 and in and are thus not reported here.

6 Service dynamic behaviour

The ArrivalSeparationIndicator Service implements two Service Interfaces:

- **SeparationModeManagerInterface**
- **InformationProviderInterface**

The dynamic behaviour of such service interface is described in the present chapter in Figure 13.

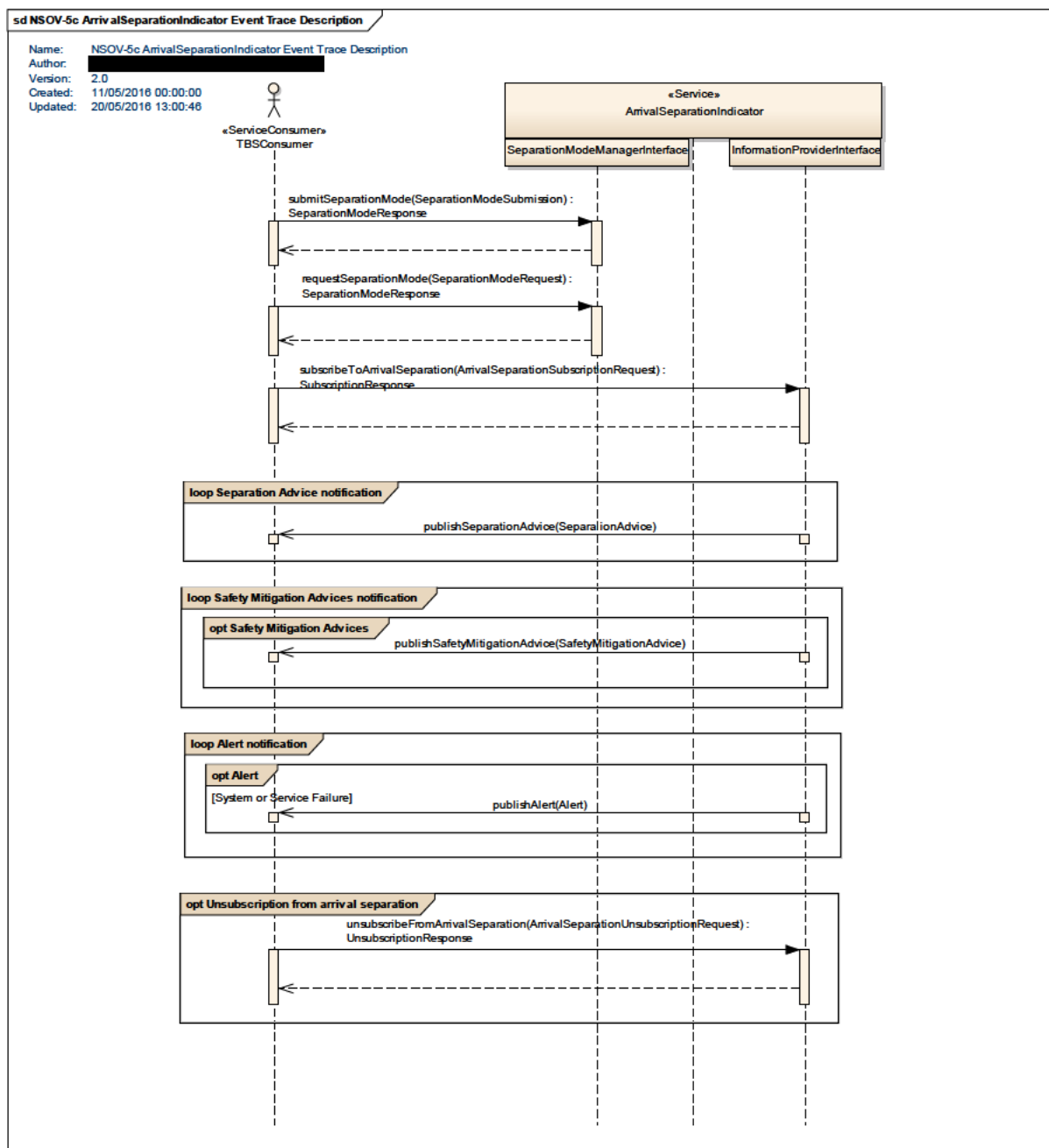


Figure 13: NSOV-5c ArrivalSeparationIndicator Event Trace Description

6.1 Service Interface SeparationModeManagerInterface

The dynamic behaviour of this service interface is described in this chapter in Figure 13.

6.2 Service Interface InformationProviderInterface

The dynamic behaviour of this service interface is described in this chapter in Figure 13.

7 Service provisioning (optional)

N/A

8 Validation and Verification

8.1 Verification

The verification of the service model is compliant to ISRM Foundation Rulebook (Ref. [6]).

Verification was performed using the WP 8.3.10 verification tools integrated on Sparx Enterprise Architect framework:

- Autoverify script version 28927 (Tortoise SVN review 28927).
- MDG Technologies ISRM Verification Rules version 29993 (Tortoise SVN review 29325)
- MDG Technologies ISRM Library Functions version 29915 (Tortoise SVN review 29325)

8.1.1 Verification Results

The detailed findings, coming from execution of the verification script, are recorded in Verification_report_ArrivalSeparationIndicator_Service file, located in the D65 delivery package.

A summary of those results is reported below:

Service name:	Designed Services - ArrivalSeparationIndicatorService	Date of Service Creation:	20140710-09:33:31
Service version:	2.0	Version of Verification Rules:	00.07.00
Phase:	2.0	Date of Verification:	20160503-04:39:01
Owner of service:		Passes:	409
Name of verifier:		Failures:	
Overall comments:	N/A	Manual:	152
MDG Library Functions version:	29915	MDG ISRM Verification version:	29993

Table 6: Summary of the Verification Results

8.2 Validation

Currently there are no validation exercises covering the exchange of information for the ArrivalSeparationIndicator Service.

9 References

Name	Version	Document ID / Location
[1] Project deliverables template	03.00.00	SJU templates & guidelines package, Project deliverables template
[2] SESAR Operational Service and Environment Definition	03.00.00	SJU templates & guidelines package, OSED template
[3] SESAR Safety and Performance Requirements	03.00.00	SJU templates & guidelines package, SPR template
[4] ISRM Tooling Guidelines	00.07.00	08.03.10 D44
[5] ISRM Modelling Guidelines	00.07.00	08.03.10 D44
[6] ISRM Rulebook	00.07.00	08.03.10 D44
[7] ISRM Verification Guidelines	00.07.00	08.03.10 D44
[8] European ATM Architecture (EATMA) Guidance Material v4	00.04.02	B.04.01 D66
[9] Operational Service and Environment Definition (OSED) for Time Based Separation for Arrivals (TBS)	00.01.02	06.08.01 D05
[10] European ATM Service Identification for ArrivalSeparationIndicator Service	00.01.00	08.03.10 D62
[11] B.4.3 ArrivalSeparationIndicator Service Allocation (SVA002)	00.00.06	B.4.3
[12] System Requirements finalized	00.01.01	10.04.04 D18
[13] ISRM Service Portfolio	00.08.01	08.03.10 D65
[14] ATM Information Reference Model	4.1.0	08.01.03 D47
[15] Verification reports for the service	N/A	08.03.10 D65 Verification reports

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