European ATM Service Description for the AirportMETAlert Service

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Abstract

This document is the result of the "Service Design" step of the B.4.3 Working Method on Services for the AirportMETAlert Service, covering the dissemination of alerts and warnings to airport stakeholders when MET parameters exceed a certain threshold.

Authoring & Approval

Prepared By - *Authors of the document.*		
Name & Company	Position & Title	Date
[redacted] FINMECCANICA	[redacted]	27/04/2016

Reviewed By - *Reviewers internal to the project.*		
Name & Company	Position & Title	Date
[redacted] NORACON	[redacted]	27/05/2016

Reviewed By - *Other SESAR projects, Airspace Users, staff association, military, Industrial Support, other organisations.*		
Name & Company	Position & Title	Date
[redacted] FINMECCANICA	[redacted]	18/11/2015
[redacted] FINMECCANICA		16/11/2015
[redacted] FINMECCANICA		10/11/2015
[redacted] Austrocontrol		18/11/2015
[redacted] Thales		18/11/2015

Approved for submission to the SJU By - *Representatives of the company involved in the project.*		
Name & Company	Position & Title	Date
[redacted] FINMECCANICA	[redacted]	19/11/2015
[redacted] FINMECCANICA		19/11/2015
[redacted] NORACON		31/05/2016
[redacted] NORACON		31/05/2016

Rejected By - *Representatives of the company involved in the project.*		
Name & Company	Position & Title	Date
Name / Company	*<Position / Title>*	*DD/MM/YYYY*

Rational for rejection
None.

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00.02.01	20/07/2016	Final update		Updated according to 08.03.10-D65_SJU_Assessment_report_reponse

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This deliverable consists of SJU foreground.

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Executive summary

The AirportMETAlert service covers the dissemination of alerts and warnings to airport stakeholders when MET parameters exceed a certain threshold. This service is essential in achieving situational awareness about dangers related to the current or upcoming degradation of meteorological conditions which could turn into the safe delivery of ATM services. Service design has been performed in the context of SESAR Service Activity SVA012.

1 Introduction

1.1 Purpose of the document

The purpose of this Service Design Document (SDD) is to provide a complete logical description of the AirportMETAlert Service, its operational context, its basic architectural features, its dynamical aspects, its operations and the data provided. All these aspects are presented as model views according to the ISRM UML EATMA Profile, which organize knowledge about a service into views inspired to the NAF Framework.

This SDD services as a complement to a model based description and supports the configuration management process by providing well-defined baselines.

The service presented will be a part of the Service Portfolio. The Service portfolio presents all services that are available or is planned to become available at a high level.

1.2 Intended readership

SESAR Deployment Manager, SCG, the OPS and SYS projects participating in the SVA Team, Service Architects, Information Architects, System Engineers and Developers in pursuing architecting, design and development activities.

1.3 Inputs from other projects

N/A

1.4 Glossary of terms

N/A

1.5 Acronyms and Terminology

1.5.1 Acronyms

Term	Definition
ADD	Architecture Description Document
AOP	Airport Operations Plan
ATM	Air Traffic Management
CC	Capability Configuration
DCB	Demand and Capacity Balancing
EATMA	European Air Traffic Management Architecture
E-ATMS	European Air Traffic Management System
FAA	Federal Aviation Administration

Term	Definition
IER	Information Exchange Requirement
ISRM	Information Service Reference Model
MET	Meteorology or meteorological
NAF	NATO Architecture Framework
NSOV	NATO Service Oriented View
NOV	NATO Operational View
OASIS	Organization for the Advancement of Structured Information Standards
OSED	Operational Service and Environment Definition
QoS	Quality of Service
SAR	Service Allocation Report
SCG	Service Coordination Group
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.
SWIM	System Wide Information Management
UML	Unified Modelling Language
V&V	Validation and Verification
WSDL	Web Services Definition Language
XSD	XML Schema Definition

1.5.2 Terminology

Term	Definition	Source
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 [10]

Term	Definition	Source
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 [10]
Node	A logical entity that performs Activities. Note: nodes are specified independently of any physical realisation.	EATMA Guidance Material [10]
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 [10]
Service function	A type of activity describing the functionality of a Service.	EATMA Guidance Material [10]
Service interface	The mechanism by which a service communicates	EATMA Guidance Material [10]

2 Service identification

Name	AirportMETAlert
ID	{F936A2E4-1769-46f0-8181-D13ACD85A9E3}
Version	2.0
Keywords	Meteorological alert and warning, airport meteorological observation, meteorological parameter
Architect(s)	[redacted] FINMECCANICA

Lifecycle status	Date	References
Identified	11/11/2015	See reference [13]
Allocated	04/12/2015	See reference [14]
Designed	31/05/2016	This document
Validated	03/03/2016	See reference [12]
IOC	Date for Initial Operational Capability	[Reference to technical enabler hosting the service in the ATM master plan]
FOC	Date for Full Operational Capability	[Reference to technical enabler hosting the service in the ATM master plan]

3 Operational and Business context

The operational requirements for the Alerts/Warnings are mainly gathered around the "6.2 Monitor Airport Performance Service" in the OFA 05.01.01 OSED [1] documentation:

> *"In the Medium/Short term planning phase the Monitor Airport Performance service mainly focuses on Airport-DCB issues. It will detect the evolution of resources availability and demand, highlighting the situations where the plan will be incompatible with matching the performance target values (Airport Performance Baseline). At the end of medium term planning and during short term planning phase (i.e. up to a few days ahead), as weather data will be more and more reliable, weather forecasts will be provided, as well as MET warnings and alerts with probabilistic parameters. During Medium/Short term planning phase, the Monitor Airport Performance service does not necessarily require the active participation of each stakeholder, but has to be configured to allow the provision of alerts/warnings to the appropriate actor and the APOC (if implemented) in the event of potential deviation from the plan."*

Therefore the service is supposed to be provided by the local MET provider and consumed by the AOP, among the other airport partners who are concerned. The service supports this operational service by providing MET alerts over SWIM to subscribed partners. The service was also validated in EXE-06.03.01-VP-669 (SESAR Release 5).

3.1 Information Exchange Requirements

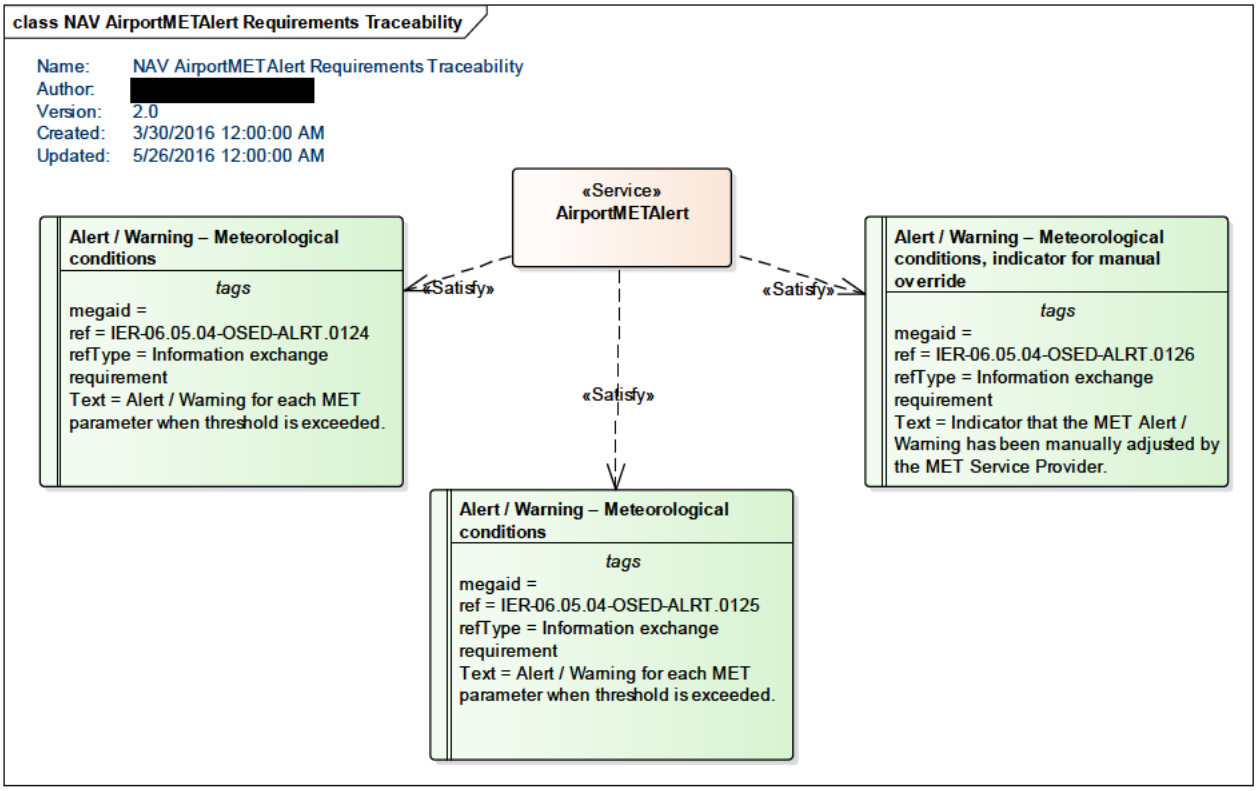

Figure 1: NAV AirportMETAlert Service Requirements Traceability IER Diagram

3.2 Other Requirements

3.2.1 Non-Functional Requirements

NA.

3.2.2 Relevant Industrial Standards

NA.

3.2.3 Nodes

The EATMA nodes specified in the service are shown in the NOV-2 AirportMETAlert Service to Nodes Mapping diagram below:

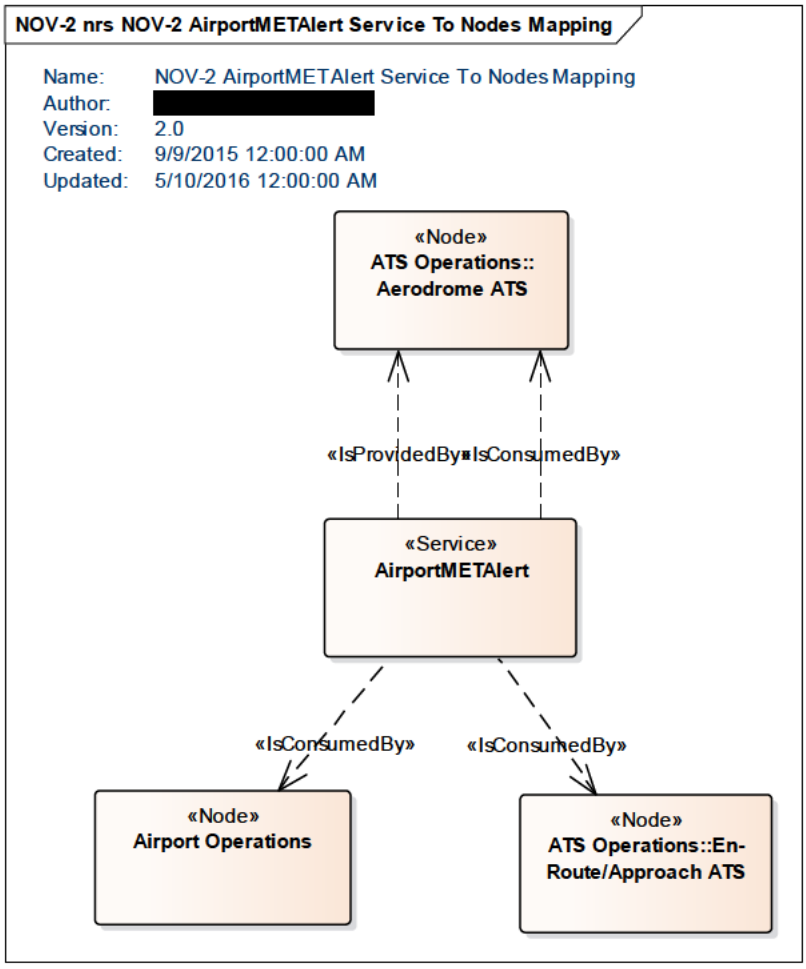

Figure 2: NOV-2 AirportMETAlert Service to Nodes Mapping diagram

4 Service overview

4.1 Service Taxonomy

The service taxonomy is described in the ISRM Service Portfolio document [3].

4.2 Service Levels (NfRs)

NA.

4.3 Service Functions and Capabilities

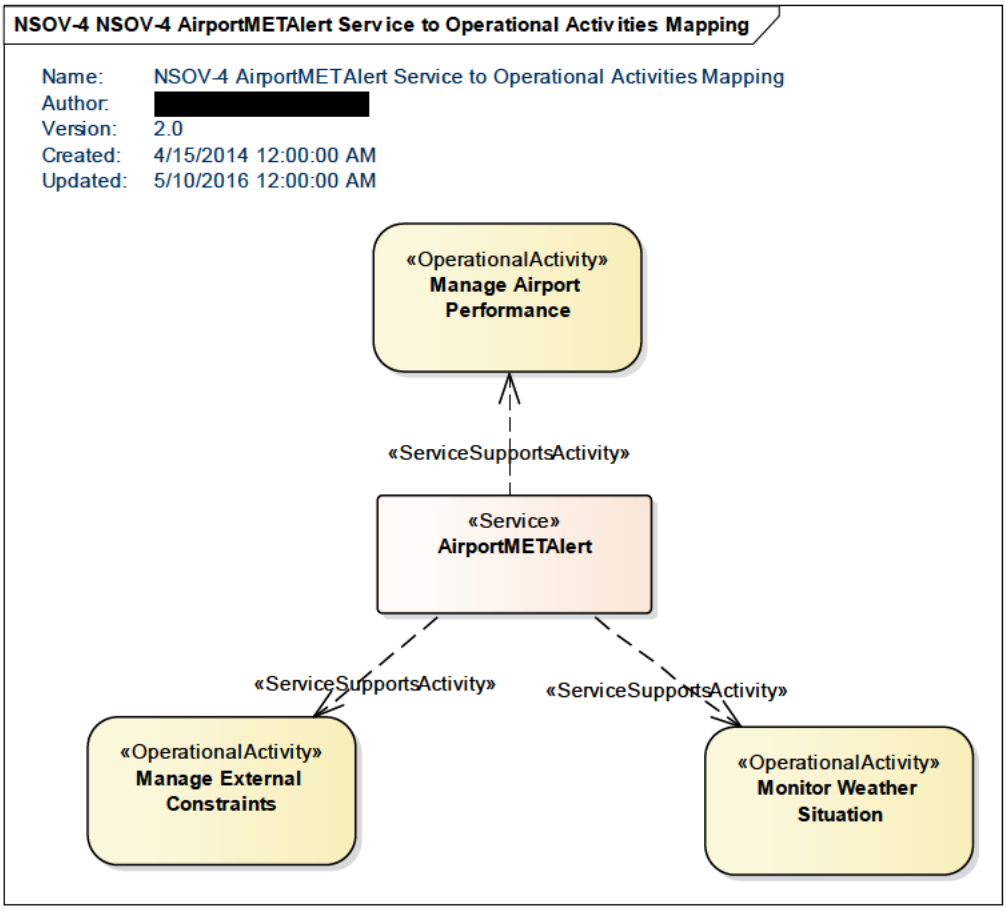

Figure 3: NSOV-4 AirportMETAlert Service to Operational Activities Mapping diagram

For the service to capabilities mapping, see the NSOV-2 Service Interface Definition diagram in Section 4.4.

4.4 Service Interfaces

The service is based on a single pub/sub interface. The AirportMETAlertPublisher service interface definition allows the consumer to subscribe or unsubscribe to the data, while the AirportMETAlertSubscriber service interface definition allows the service provider to publish the message containing the data. The messages for subscription and unsubscription are only logical

abstract wrappers, since the actual management of the publication mechanism is done at the level of the SWIM Technical Infrastructure.

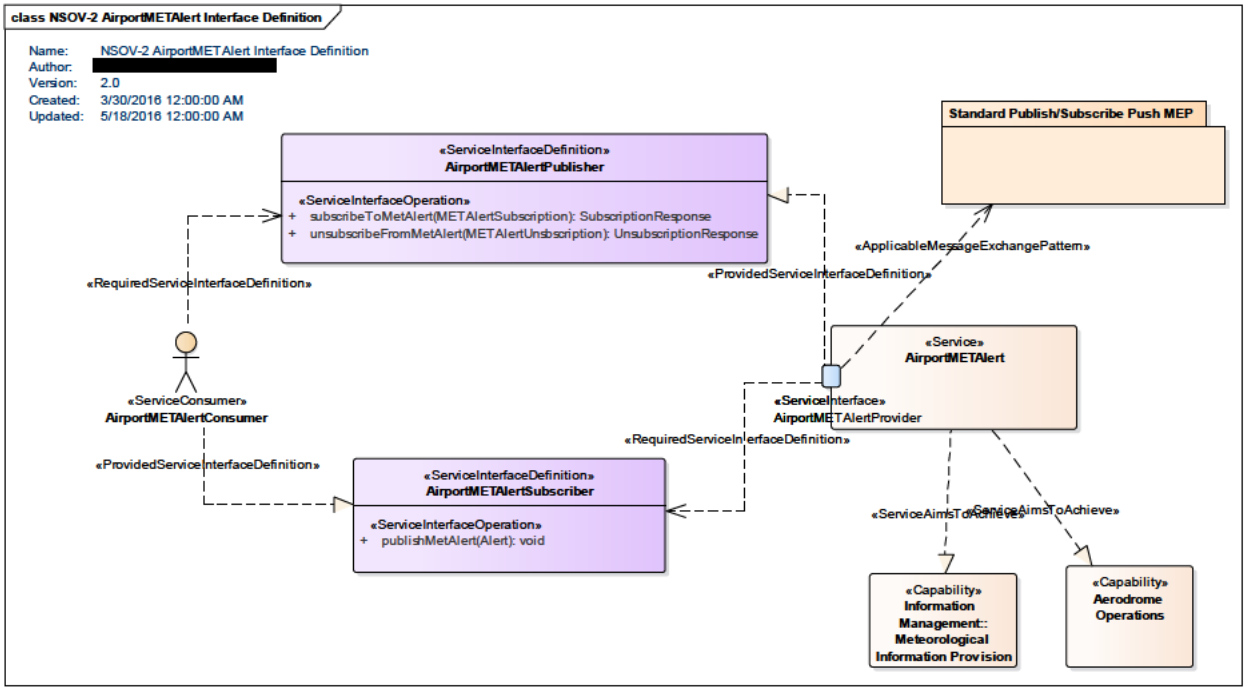

Figure 4: NSOV-2 AirportMETAlert Service Interface Definition diagram

ServiceInterface	ServiceInterfaceDefinition	ServiceInterfaceOperation	Role
AirportMETAlertProvider	AirportMETAlertPublisher	subscribeToAirportMETAlert	provided
AirportMETAlertProvider	AirportMETAlertPublisher	unsubscribeFromAirportMETAlert	provided
AirportMETAlertConsumer	AirportMETAlertSubscriber	publishAirportMETAlert	required

Table 1: Service Interfaces

5 Service interface specifications

5.1 Service Interface AirportMETAlertProvider

This is the only interface for this service. It implements the Standard Publish/Subscribe Push message exchange pattern, and exposes two service interface definitions, one for the provider and one for the consumer side.

5.1.1 Service Interface Definition AirportMETAlertPublisher

This interface definition enables a consumer to subscribe or unsubscribe from the provisioning of the service message.

5.1.1.1 Operation subscribeToAirportMETAlert

The service operation enables the service consumer to subscribe to a particular airport meteorological alert.

5.1.1.1.1 Operation Functionality

The service operation enables the consumer to select the desired airport for which he wants an airport meteorological alert.

5.1.1.1.2 Operation Parameters

The operation is modelled with a return type representing the generic outcome for a subscription.

Element Name	Author	Notes
METAlertSubscription	[redacted]	Message for the Subscription
SubscriptionResponse		Reply to the subscription operation.

Table 2: Payload elements for the subscribeToAirportMETAlert operation

5.1.1.2 Operation unsubscribeFromAirportMETAlert

The service operation enables the service consumer to unsubscribe from the service.

5.1.1.2.1 Operation Functionality

The service operation enables the consumer to select the desired airport for which he does not want airport meteorological alert anymore.

5.1.1.2.2 Operation Parameters

The operation is modelled with a return type representing the generic outcome for an unsubscription.

Element Name	Author	Notes
METAlertUnsbscription	[redacted]	Message for the Unsubscription
UnsubscriptionResponse		Reply to the unsubscription operation.

Table 3: Payload elements for the unsubscribeFromAirportMETAlert operation

5.1.2 Service Interface Definition AirportMETAlertSubscriber

This interface definition enables the provider to publish the AirportMETAlert.

5.1.2.1 Operation unsubscribeFromAirportMETAlert

The service operation enables the service consumer to receive a notification for a new AirportMETAlert which he has subscribed to.

5.1.2.1.1 Operation Functionality

The service operation simply enables the consumer to access a pre-subscribed new AirportMETAlert available from the MET provider.

5.1.2.1.2 Operation Parameters

The operation is modelled without a return type. The operation has a single input parameter which represents the full service payload as represented above.

The relevant EntityItems are described in the table below, each attribute and relationship is described. The tagged values show the linked AIRM class.

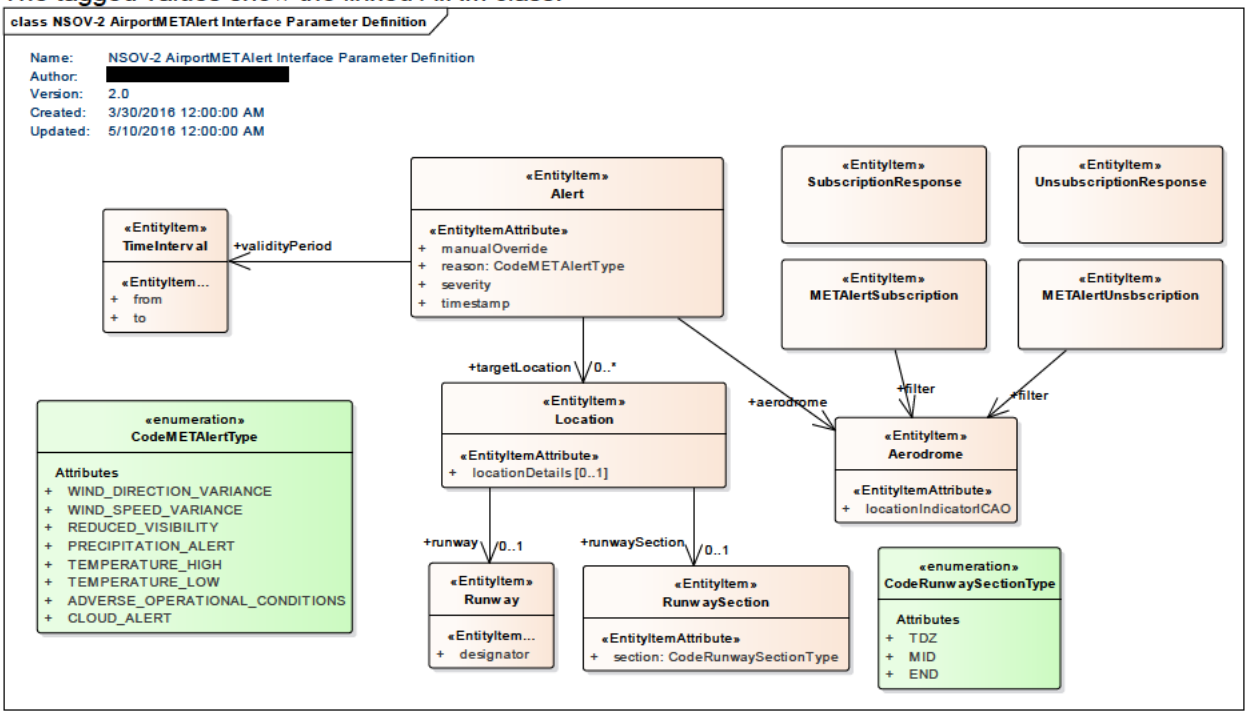

Figure 5: NSOV-2 AirportMETAlert Service Interface Parameter Definition diagram

Element Name		Author	Notes
SubscriptionResponse		[redacted]	Reply to the subscription operation.
	Element Tagged Value Name	Value	
	CLDMSemanticTrace	CLDM_out_of_scope	
Element Name		Author	Notes
UnsubscriptionResponse		[redacted]	Reply to the unsubscription operation.
	Element Tagged Value Name	Value	
	CLDMSemanticTrace	CLDM_out_of_scope	
Element Name		Author	Notes
METAlertSubscription		[redacted]	Message for the Subscription
	Element Tagged Value Name	Value	
	CLDMSemanticTrace	CLDM_out_of_scope	

Element Name	Author	Notes
METAlertUnsbscription	[redacted]	Message for the Unsubscription

Element Tagged Value Name	Value
CLDMSemanticTrace	CLDM_out_of_scope

Element Name	Author	Notes
Alert	[redacted]	Indication of an actual or potential hazardous situation that requires particular attention or action.

Element Tagged Value Name	Value
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:Stakeholders:BusinessService:Alert

Attribute Name	Type	Notes
manualOverride		Indicator that the MET Alert / Warning has been manually adjusted by the MET Service Provider. The MET Service Provider shall have the ability to manually override the MET alerts and warnings generated by the rules engine. These overrides have to be marked/labelled as such.

Tagged Value Name	Value
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:Stakeholders:BusinessService:Alert@trigger

Attribute Name	Type	Notes
reason	CodeMETAlertType	The identification code of alert/warning.

Tagged Value Name	Value
CLDMSemanticTrace	CLDM_out_of_scope

Attribute Name	Type	Notes
severity		The severity level of the notice: ALERT or WARNING.

Tagged Value Name	Value
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:Stakeholders:BusinessService:Alert@severityLevel

Attribute Name	Type	Notes
timestamp		Day and actual time of the message in UTC.

Tagged Value Name	Value
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:Stakeholders:BusinessService:Alert@startEntityLifetime

Element Name	Author	Notes
Location	[redacted]	Location which a service message (or a portion of) applies to. May be an aerodrome or a runway, or sections of a runway, or a specific location relative to the runway.

Element Tagged Value Name	Value
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:Stakeholders:BusinessService:Alert@annotation

Attribute Name	Type	Notes
locationDetails		Additional explanation about the location to

Element Name	Author	Notes
SubscriptionResponse	[redacted]	Reply to the subscription operation.
Element Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	
Element Name	Author	Notes
UnsubscriptionResponse	[redacted]	Reply to the unsubscription operation.
Element Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	
Element Name	Author	Notes
METAlertSubscription	[redacted]	Message for the Subscription
Element Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	
Element Name	Author	Notes
METAlertUnsbscription	[redacted]	Message for the Unsubscription
Element Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	
Element Name	Author	Notes
Alert	[redacted]	Indication of an actual or potential hazardous situation that requires particular attention or action.
Element Tagged Value Name	Value	
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:Stakeholders:BusinessService:Alert	
Attribute Name	Type	Notes
		which the alert is applicable. E.g. a distance in miles in the approach or climb out from a runway to which a wind shear alert is raised. E.g. 02R TDZ, 15L APPROACH 1 Mile
Tagged Value Name	Value	
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:Stakeholders:BusinessService:Alert@annotation	
Element Name	Author	Notes
CodeMETAlertType	[redacted]	List of Warnings / Alerts message codes
Element Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	
Attribute Name	Type	Notes
WIND_DIRECTION_VARIANCE		The prevailing or forecast wind direction is significantly different to nominal conditions and may require a runway change to ensure safety.
Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	
Attribute Name	Type	Notes
WIND_SPEED_VARIANCE		The prevailing or forecast wind speed is significantly different to nominal conditions a likely to be impacting runway utilisation.
Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	
Attribute Name	Type	Notes
REDUCED_VISIBILITY		The prevailing or forecast visibility is reduced and may be impacting operations.
Tagged Value Name	Value	

Element Name	Author	Notes
SubscriptionResponse	[redacted]	Reply to the subscription operation.
Element Tagged Value Name		Value
CLDMSemanticTrace		CLDM_out_of_scope
Element Name	**Author**	**Notes**
UnsubscriptionResponse	[redacted]	Reply to the unsubscription operation.
Element Tagged Value Name		Value
CLDMSemanticTrace		CLDM_out_of_scope
Element Name	**Author**	**Notes**
METAlertSubscription	[redacted]	Message for the Subscription
Element Tagged Value Name		Value
CLDMSemanticTrace		CLDM_out_of_scope
Element Name	**Author**	**Notes**
METAlertUnsbscription	[redacted]	Message for the Unsubscription
Element Tagged Value Name		Value
CLDMSemanticTrace		CLDM_out_of_scope
Element Name	**Author**	**Notes**
Alert	[redacted]	Indication of an actual or potential hazardous situation that requires particular attention or action.
Element Tagged Value Name		Value
CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:Stakeholders:BusinessService:Alert

Attribute Name	Type	Notes
CLDMSemanticTrace	CLDM_out_of_scope	
Attribute Name	**Type**	**Notes**
PRECIPITATION_ALERT		Precipitation Alert (Rain, Showers, Freezing Rain, Snow). The prevailing conditions or forecast reflects precipitation that may impact operations.
Tagged Value Name	**Value**	
CLDMSemanticTrace	CLDM_out_of_scope	
Attribute Name	**Type**	**Notes**
TEMPERATURE_HIGH		The prevailing conditions or forecast reflects temperatures which may impact aircraft take-off performance.
Tagged Value Name	**Value**	
CLDMSemanticTrace	CLDM_out_of_scope	
Attribute Name	**Type**	**Notes**
TEMPERATURE_LOW		The prevailing conditions or forecast reflects temperatures which may require anti-icing or de-icing of aircraft and airfield surfaces.
Tagged Value Name	**Value**	
CLDMSemanticTrace	CLDM_out_of_scope	
Attribute Name	**Type**	**Notes**
ADVERSE_OPERATIONAL_CONDITIONS		Adverse operational conditions (Thunderstorms /CB/Lightening, Turbulence, Wind shear, Low Level Temperature Inversions). The prevailing or forecast weather conditions indicate adverse operational conditions. Conditions may result in diversions, holding or go-arounds; non-standard routing; evacuation of personnel from the Ramp area.
Tagged Value Name	**Value**	

Element Name	Author	Notes
SubscriptionResponse	[redacted]	Reply to the subscription operation.
Element Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	

Element Name	Author	Notes
UnsubscriptionResponse	[redacted]	Reply to the unsubscription operation.
Element Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	

Element Name	Author	Notes
METAlertSubscription	[redacted]	Message for the Subscription
Element Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	

Element Name	Author	Notes
METAlertUnsbscription	[redacted]	Message for the Unsubscription
Element Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	

Element Name	Author	Notes
Alert	[redacted]	Indication of an actual or potential hazardous situation that requires particular attention or action.
Element Tagged Value Name	Value	
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:Stakeholders:BusinessService:Alert	

Attribute Name	Type	Notes
CLDMSemanticTrace	CLDM_out_of_scope	

Attribute Name	Type	Notes
CLOUD_ALERT		The prevailing or forecast weather conditions indicate a cloud height and amount (coverage) that may impact VFR or Cat I operations.
Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	

Element Name	Author	Notes
TimeInterval	[redacted]	Time interval which a piece of information applies to.
Element Tagged Value Name	Value	
CLDMSemanticTrace	CLDM_out_of_scope	

Attribute Name	Type	Notes
from		Planned beginning time of the validity period for a piece of information.
Tagged Value Name	Value	
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:Abstract:TemporalEnabledEntity@startValidity	

Attribute Name	Type	Notes
to		Planned ending time of the validity period for a piece of information.
Tagged Value Name	Value	
CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:Abstract:TemporalEnabledEntity@endValidity	

Element Name			Author	Notes
Runway			[redacted]	A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.
	Element Tagged Value Name		Value	
	CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:BaseInfrastructure:AerodromeInfrastructure:Runway	
	Attribute Name	Type		Notes
	designator			The full textual designator of the runway, used to uniquely identify it at an aerodrome/heliport which has more than one. E.g. 09/27, 02R/20L, RWY 1.
	Tagged Value Name	Value		
	CLDMSemanticTrace	urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:BaseInfrastructure:AerodromeInfrastructure:Runway@designator		

Element Name			Author	Notes
RunwaySection			[redacted]	Section of the runway: TDZ, MID, END.
	Attribute Name	Type		Notes
	section	CodeRunwaySectionType		Section of the runway: TDZ, MID, END.
	Tagged Value Name	Value		
	CLDMSemanticTrace	CLDM_out_of_scope		

Element Name			Author	Notes
Aerodrome			[redacted]	A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.
	Element Tagged Value Name		Value	
	CLDMSemanticTrace		urn:x-ses:sesarju:airm:v410:ConsolidatedLogicalDataModel:SubjectFields:BaseInfrastructure:AerodromeInfrastructure:Aerodrome	
	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@designator		

Table 4: Payload tracing to AIRM

6 Service dynamic behaviour

The interface offers three operations, namely to subscribe/unsubscribe from the publication of the data, and to notify the consumer on the data being available. The service dynamic behaviour is shown using the NSOV-5c Service-Event diagram created for the purpose. The following diagram shows that the interaction envisaged between provider and consumer is an asynchronous publish/subscribe "push" type MEP.

6.1 Service Interface AirportMETAlertService

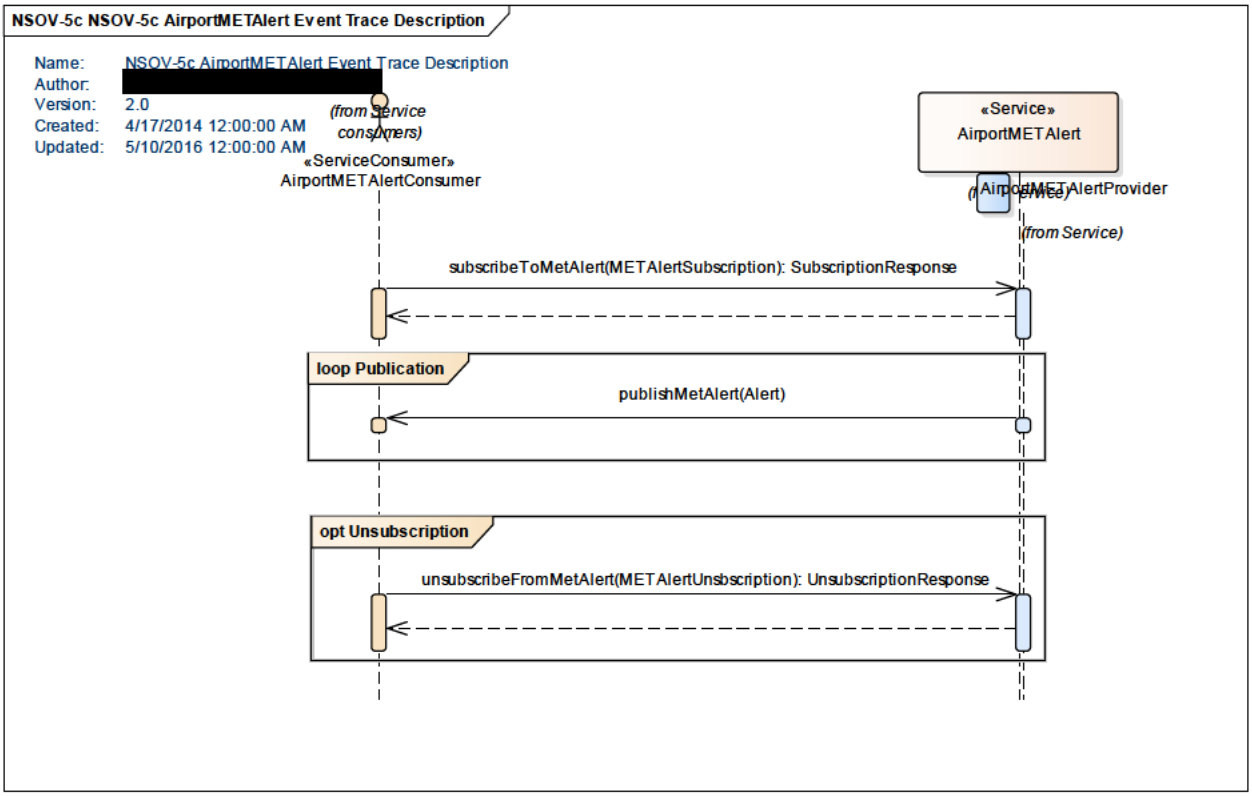

Figure 6: NSOV-5c AirportMETAlert Service Event Trace Description

7 Service provisioning (optional)

Service prototyping was performed in the context of MET-related validation exercise EXE-06.03.01-VP-669 in SESAR. The technology so far identified for the technical interface is the OASIS standard Web Service Notification and belongs to the SWIM Yellow Profile. The detailed description of the technical service contract and service implementation for these exercises is part of technical deliverables by project 12.7.5.

8 Validation and Verification

8.1 Verification

Verification was performed according to the ISRM Rulebook [8] and the ISRM Verification Guidance [9].

8.1.1 Verification Results

Verification was performed via manual inspection and assisted by a script developed in 8.3.10. The verification outcome is completely free of errors.

Verification reports are in these files “Designed_Services_-_AirportMETAlertService.xls” and “Designed_Services_-_AirportMETAlertService_Common.xls” available in [11].

8.2 Validation

Validation for this service was be performed as part of the SESAR validation exercise EXE-06.03.01-VP-669 in Q1 2016. The outcome is recorded in the Validation report VALR [12].

9 References

Name	Version	Document ID / Location
[1] 06.05.04-D16-OFA 05.01.01 Consolidated OSED (Part1)	03.00.00	06.05.04 D16
[2] 06.05.04-D16-OFA 05.01.01 Consolidated OSED (Part2)	03.00.00	06.05.04 D16
[3] ISRM Service Portfolio	00.08.01	08.03.10 D65
[4] SESAR Operational Service and Environment Definition	03.00.00	SJU templates & guidelines package, OSED template
[5] SESAR Safety and Performance Requirements	03.00.00	SJU templates & guidelines package, SPR template
[6] ISRM Tooling Guidelines	00.07.00	08.03.10 D44
[7] ISRM Modelling Guidelines	00.07.00	08.03.10 D44
[8] ISRM Foundation Rule Book	00.07.00	08.03.10 D44
[9] ISRM Verification Guidelines	00.07.00	08.03.10 D44
[10] EATMA Guidance Material	00.04.02	B04.01 D66
[11] Verification reports for the service	N/A	08.03.10 D65 Verification reports
[12] EXE-06.03.01-VP-669 Validation Report (VALR)	1.0	06.03.01 D140
[13] Service Activity Initiation Aerodrome MET Alerts and Warnings services	00.01.00	08.03.10 SVA012 Initiation Report
[14] SessionH_service_allocation_matrix_EATMA_6.1_V.0.6	00.00.08	B04.03 SCG Service Allocation Matrix

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