



The European Organisation for Civil Aviation Equipment
L'Organisation Européenne pour l'Équipement de l'Aviation Civile

SWIM SERVICE STANDARDISATION PACKAGE

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FOREWORD

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EXECUTIVE SUMMARY

Within the SESAR programme, activities on SWIM (System-wide Information Management) have reached a maturity level so that the first SWIM services are ready for standardisation.

In the area of extending the horizon of Arrival management (AMAN) a relevant SWIM service has been identified, designed and validated according to a published and applied “SESAR Method on Services”.

The results of this particular SESAR activity was be used as a candidate to standardise the first SWIM service by a EUROCAE Working Group.

The task given to WG-104 was to transfer the results obtained in SESAR on an “Arrival Management Information Service” in a standardised service description. This first SWIM service description should be such that it can be re-used for standardisation of other SWIM services in the future.

As this is the first time EUROCAE has initiated the standardisation of a SWIM service, the group was also tasked to provide a report capturing the lessons learned from their work and provide recommendation regarding the methodology for further SWIM service standardisation. This report also contains a proposal for potential future activities regarding the standardisation of ATM SWIM services.

The present EUROCAE report encompasses the comprehensive analysis performed by WG-104 in the SWIM area, for ease of reference and possible application by interested stakeholders.

The following parts provide an overview about the deliverables WG-104 has produced as individual reports, and how they can be used for standardisation of further services. These reports have been grouped under ER-018 and published as one comprehensive EUROCAE report.

For future standardisation activities in the SWIM area, any stakeholder may initiate a new task. For this, any interested party is invited to contact the EUROCAE Secretariat at eurocae@eurocae.net.

PART

REPORT

1. REPORT ON PROPOSED WORK PROGRAMME AND A PRIORITISED LIST OF SWIM SERVICES FOR FUTURE STANDARDISATION

This document contains a prioritised list of potential services, recommended by WG-104 based on the services which were available in 2016, for possible standardisation similar to the Arrival Sequence Service. This recommendation can serve as input for EUROCAE to initiate further calls for standardisation of SWIM services.

2. REPORT ON LESSONS LEARNED FROM THE STANDARDISATION OF THE AMAN SERVICE

This document aims at helping future groups to perform service standardisation and describes the findings WG-104 has gained during the standardising of the extended AMAN service. It gives recommendations about the composition of groups for standardisation of future SWIM services within the context of EUROCAE. This report also provides recommendations how standardisation of services can be improved in the future.

3. REPORT ON SWIM SERVICE STANDARDIZATION TEMPLATE

This Template can be used for the description and standardisation of SWIM services within EUROCAE working groups. Its structure follows the structure, which has been applied in the ED-254 Arrival Sequence Service Performance Standard to develop the first standardised service. It contains explanations and help text how to fill the different chapters which are needed to reach a standardised service.



REPORT ON PROPOSED WORK PROGRAMME AND A PRIORITISED LIST OF SWIM SERVICES FOR FUTURE STANDARDISATION

(Part 1)

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EXECUTIVE SUMMARY

System-Wide Information Management (SWIM) consists of standards, infrastructure and governance enabling the management of ATM related information and its exchange between qualified parties via interoperable services.

In 2016 Working Group 104 was founded with the aim to elaborate a concept for standardising SWIM services using the AMAN Extended Horizon Service as a first example for a standardised service.

One of the deliverables of WG-104 is to elaborate a Work Programme containing a list of potential services for standardisation.

This list was provided to the EUROCAE TAC for approval and will serve as a basis for EUROCAE to initiate further calls for standardisation of SWIM services. The current document contains the aforementioned Work Programme.

CHAPTER 1

PURPOSE AND SCOPE

1.1 INTRODUCTION AND PURPOSE OF THE DOCUMENT

Within the SESAR programme, activities on SWIM (System-wide Information Management) have reached a maturity level so that the first SWIM services are ready for standardisation.

In the area of extending the horizon of Arrival management (AMAN), a relevant SWIM service has been identified as the candidate to be standardised as the first SWIM service by a EUROCAE Working Group (WG-104).

The experience gained with the AMAN SWIM service description can be re-used for standardisation of other SWIM services in the future. This report, provided by the group, contains a proposal for potential future activities regarding the standardisation of ATM SWIM services and it proposes a work programme.

The purpose of this document is to provide recommendations to the official bodies, including EUROCAE TAC, with SWIM services candidates for potential standardisation. Furthermore, it summarises the debates within the EUROCAE Working Group WG-104 on the proposed SWIM services candidates for potential standardisation.

1.2 RELATIONSHIP TO OTHER DOCUMENTS

- SESAR Deployment Plan – <http://www.sesardeploymentmanager.eu/deployment-programme-2016-highlights/>
- SESAR JU Resources - <http://www.sesarju.eu/swim/resources>
- SESAR Solution - <http://www.sesarju.eu/sesar-solutions/enabling-aviation-infrastructure/initial-system-wide-information-management-swim>
- EUROCAE WG76 – list of MET services
- European Commission Implementing Regulation (EU) No 716/2014 on the establishment of the Pilot Common Project supporting the implementation of the European Air Traffic Management Master Plan Text with EEA relevance

CHAPTER 2

CRITERIA USED TO PRIORITISE THE SERVICES

2.1 INTRODUCTION

When prioritising the potential candidates within the list of services that could be standardised, one of the challenges is to decide on a method for selecting among different ideas. For the decision-making process, the WG elaborated a set of criteria to be used by the experts of the WG-104 to judge the priority of an information service for future service standardisation. Expert judgement from the specific domains has been used, which led to the list of services that are proposed for future standardisation.

The following chapter describes the criteria which were used to elaborate the proposed list.

2.2 INITIAL LIST OF SERVICES

During SESAR1, the Information Service Reference Model (ISRM) was used to define services that were needed by ATM operational processes to fulfil their information needs.

The ISRM consists of Service Design Models, providing a logical (i.e. technology independent) representation of the ATM-related information services, expressed formally in the Unified Modelling Language (UML).

A service in ISRM is designed on a logical level, which means that it can be technically designed and implemented using different technologies.

Additionally, a document-based description of the service designs was produced, in order to complement the Service Design Models in the ISRM. This document, the Service Description Document (SDD), is the outcome of the Service Design activity. The purpose of each SDD is to provide a holistic overview of a particular service and its building blocks. It supports the configuration management process by providing well-defined baselines.

Foundation material for the standardisation process can be taken from those SDD documents.

As such, the starting point for the list of services to be prioritised is the ISRM.

The list of available SDD documents from SESAR is provided in Appendix B.

2.3 CRITERIA

The following sections describe the criteria that were used to prioritise the list of services to be possibly standardised by EUROCAE. Each of the criteria is equally scored on a range between 0-10 (lowest to highest).

Along with the criteria, a weight is given to the criterion. The weight of the criterion is explained in the next chapter.

2.3.1 Available service design

One of the criteria for the start of standardisation is the availability of a service design. The ISRM, which is the starting point for our analysis, has been completed with services that have a Service Description Document (SDD). As there was also the possibility in SESAR1, to provide only a SDD without a Model, the scoring for those services that are part of the ISRM is considered higher than the services that are only provided with an SDD.

The rationale for taking this criterion into account is twofold:

- A community of stakeholder has already decided to design such a service using information exchange requirements provided by SESAR 1. This decision is an indicator, that there is a business need for this service.
- A service design is a good information basis to judge if a service is mature and fit for purpose.

2.3.2 Maturity / Compliance Result

An important aspect for selecting the future services for standardisation is the maturity of the supported ATM concept and the service design. A mature ATM concept and associated designs for the services used in the concept, will provide confidence that the standardisation process for the SWIM specific services will be successful.

It is important to assess the *level* of maturity. In SESAR this was demonstrated through a set of verification and validation (V&V) exercises which were using a set of SWIM compliance criteria. It can be said, that at the same time, the maturity of the service design of these services was assessed as well. The fact that designs were used to implement service instances, which were validated during a SESAR V&V exercise, is an important indication on the maturity of the Service. The SWIM Compliance Report provides an indication on the maturity of the service for possible standardisation.

Therefore, an important criterion for selecting the future services for standardisation is the validation of the service during SESAR, taking into account the results of the related SWIM Compliance report.

2.3.3 Services included in DP2016 / PCP

Following the adoption by European Commission of the Implementation Regulation (EU) No.716/2014, known as the Pilot Common Project (PCP), the European ATM Community needed a unique, agreed and supported implementation plan by and for industry, illustrating how to get organised to ensure synchronised, coordinated and timely deployment. This plan is the Deployment Programme (DP), as issued by the SESAR Deployment Manager (SDM).

The DP represents the blueprint for the ATM investment plans of all operational stakeholders impacted by the PCP regulation.

Edition 2016 of the DP links the information exchanges listed in the regulation to the services developed in the context of SESAR or to the services deployed or planned by NM, where applicable. The list is based on an interpretation of the PCP and is compiled as guidance for stakeholders.

These services are considered a starting point for PCP coverage for SWIM. The list provided in the DP2016 is an important input to be taken into account for selecting the services to be standardised.

2.3.4 Cardinality (number of providers)

The cardinality means the "number of providers who would implement the service". In the case that the SWIM service has to be implemented by different providers, it is more important that this service is standardised. The different service providers can then use the standardised service as a reference.

2.3.5 Cardinality (number of consumers)

The cardinality means the "number of consumers (i.e. stakeholder types) who would use the service". Consumers take the main benefit of standardised services on the semantical and conceptual level as well as on the technical level.

2.3.6 Priority for the customers

This criterion is about the recognition and indication by a user community that standardisation of a SWIM service is needed. The voice of the customer, asking for standardisation is an important factor for the prioritisation.

The criterion takes into account the services that serve content, which is described in a legally binding way, i.e. service in the context of legal obligations.

The criterion also takes into account the services that have a direct impact on ATM operations. This includes for example Flight Object services or AMAN.

2.4 WEIGHTING FACTOR

Not all the criteria have the same value, as some are more important than others are. Therefore, we added an importance indication through an 'importance percentage', which is the percentage given to each of the criteria, in relation to the overall weight (total weight of all the criteria is 100%). The overall score for each criterion is the score of the criterion multiplied with the 'importance percentage'.

The weighting factors are provided below:

Criteria	Importance percentages
Available service description	5%
Maturity / Compliance Result	5%
Services included in DP2016	20%
Cardinality (number of providers)	20%
Cardinality (number of consumers)	20%
Priority for the customers	30%

2.5 EXPERT REVIEW

The criteria were used to build a shortlist of services with an associated priority. A review of the list was done, to assess the usefulness, applicability and support by the community for standardisation. Domain experts were requested to provide their view and recommendation on the services to be standardised.

CHAPTER 3

PROPOSED SERVICES FOR STANDARDISATION

3.1 INTRODUCTION

WG-104 proposes to group the list of services in the following areas:

- MET Services
- A-CDM Services
- AIM Services
- AMAN Services
- 'Other' Services

The reason behind that grouping is that standardisation work on services for each of the proposed areas can be done in parallel, as different domain expertise is required for each of these areas. A further assumption is that different resources will work on the standardisation of services within the proposed areas.

3.2 WORK PROGRAMME: LIST OF PROPOSED SERVICES FOR STANDARDISATION

The criteria explained in Chapter 2 were used to build a list of services that are proposed for potential future standardisation. Find below the list, organised by the areas.

3.2.1 MET Services

METHazardEnRouteObservation

- The METHazardEnrouteObservation service addresses the delivery of information on observed significant weather phenomena for air traffic. Consumers, who subscribe to the service, can use filters to receive a subset of the information, e.g. filtering on airspace or on weather condition.

METHazardEnRouteForecast

- The METHazardEnrouteForecast service defines an information service for exchanging Forecasts and Nowcasts of significant weather phenomena. The service subscription is similar to the above service.

METAR

- The METAR service covers the dissemination of standard ICAO METAR bulletins over SWIM to a wide range of subscribing ATM users. This service aims therefore at bringing the benefits of increased interoperability via SWIM to the MET Community of Interest.

METREPORT

- The METREPORT service covers the dissemination of standard ICAO METREPORT/SPECIAL bulletins over SWIM. The local routine (METREPORT) and special (SPECIAL) reports are routine observations made at an aerodrome throughout the day. Local routine reports shall be transmitted to local air traffic services units and shall be made available to the operators and to other users at the aerodrome. The scope and usage of METREPORT/SPECIAL is the aerodrome.

TAF

- The TAF service covers the dissemination of standard ICAO TAF bulletins over SWIM. The TAF (Terminal Aerodrome Forecast) is a pre-defined ICAO format for reporting weather forecast information with particular reference to aerodromes. TAFs are issued every six hours for major civil airfields and generally apply to a 24 or 30-hour period, and an area within approximately five miles from the centre of an airport runway complex. TAFs are issued every 3 hours for military airfields and some civil airfields and cover a period ranging from 3 hours to 24 hours.

EUMETNET were contacted and confirmed their interest to the standardisation activity. The services "METHazardEnRouteObservation" and "METHazardEnRouteForecast" are related to the deployment projects EUMETNET are leading for INEA CEF2015.

EUMETNET recommends that services related to deployment are prioritised over the other MET services.

3.2.2

A-CDM Services

AirportFlightInformationPublication

- The AirportFlightInformationPublication service supports the Airport CDM concept and its implementation by providing the A-CDM partners with Common Situation Awareness about flights at a CDM airport through the publication of flight information to the A-CDM Partners that subscribe to it.

CalculatedPreDepartureSequenceDelivery

- The CalculatedPreDepartureSequenceDelivery service supports the Airport CDM concept and its implementation by providing the Pre-Departure sequencer the capability to deliver the calculated TSAT and TTOT time values.

PreDepartureSequenceSetting

- The PreDepartureSequenceSetting service supports the Airport CDM concept and its implementation by providing the relevant authority with the capability to set the TSAT and TTOT time values of a given flight at a CDM airport.

TargetOffBlockTimeSetting

- The TargetOffBlockTimeSetting service supports the Airport CDM concept and its implementation by allowing an A-CDM Partner to set the Target Off-Block Time (TOBT) that indicates the target time for the aircraft to be ready for Off-Block.

3.2.3

AIM Services

AerodromeMapInformation

- The Service aims to publish Aerodrome Map Features and the Maps themselves as described by EUROCAE in standard AMXM, ED99D and ED119C.

AeronauticalInformationFeature

- The AeronauticalInformationFeature service enables the exchange of aeronautical information and describes its abilities for potential consumers in terms of:
 - feature provided,
 - full feature description (name, attributes, ...),
 - geographical coverage,
 - filtering capabilities (spatial, temporal and on attribute values)

AeronauticalInformationMap

- The purpose of the service is the provision of digital aeronautical information maps resembling the current aeronautical AIP charts, improving its functionalities and usability.

3.2.4

AMAN Services

The service standardised by WG-104 is the ArrivalSequence Service, which sends information to the upstream ATSUs as shown in the picture below and indicated as Phase1.

The services proposed for further standardisation are the ArrivalPlanning Service, sent to the downstream ATSUs indicated as Phase 2, and the service consumed by the AMAN for the calculation of the Arrival Sequence indicated as Phase 3.

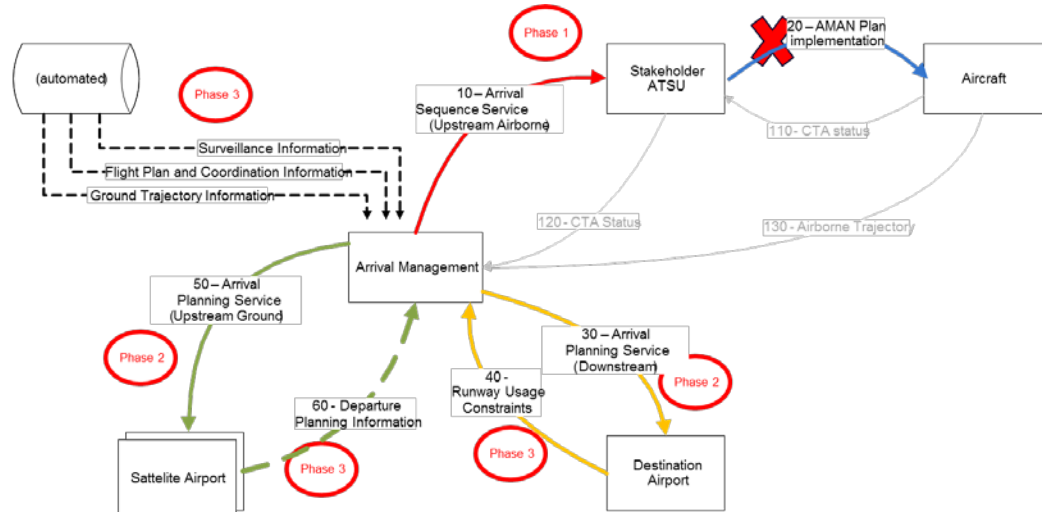


FIGURE 1: ARRIVALSEQUENCE SERVICE / UPSTREAM ATSUS INFORMATION

ArrivalPlanning Service

- This service is focused on the AMAN information provided to the down-stream ATSUs (Phase 2)

ArrivalManagement Input Services

- The services needed for the calculation of the Arrival Sequence (Phase 3).
- Many of the services needed for phase 3 are currently within the research phase. Standardisation should be considered after the results of the R&D phase.

3.2.5

'Other' Services

Within the ISRM there have been services created using the ED133 specification. We propose that the EUROCAE WG 59, working on the ED133 standard, describes these Flight Object services:

SharedFlightObject

- The "SharedFlightObject" service allows the providers and consumers to share information regarding Flight Objects.

ATCFlightObjectControl

- The ATCFlightObjectControl service allows consumers to request a number of changes to a Flight Object, which is being managed by the service provider.

This could be taken as baseline or just as an example for future activities of WG-59 on making their descriptions SWIM compliant.

3.3

FURTHER RECOMMENDATIONS

3.3.1

Coaching of future standardisation activities

Based on their experience, WG-104 recommends the future SWIM standardisation activities to be supported by an expert knowledgeable on developing a SWIM Specific Service Description. This would help the future standardisation teams getting familiar with the approach chosen to standardise a service.

3.3.2 Further work for WG-104 and proposal on the organisation of SWIM Service standardisation at EUROCAE

WG-104 was tasked to deliver a "Proposed Work Programme and a prioritised list of SWIM services for future standardisation".

During the development of this deliverable WG-104 concluded that the proposed Work Programme should be accompanied by a proposal for the future organisational structure of EUROCAE service standardisation activities.

The proposal for the organisational structure can be summarised as follows:

- Different working groups, either existing or new, could aim to work at the same time side by side on the standardisation of services in different areas like MET, A-CDM, AIM, AMAN and maybe others.
- The working groups shall consist of team members with expertise in the domain area as well as with SWIM experts.
- The working groups might act as sub-working groups of WG-104 having the advantage of getting direct information on specific topics from WG-104 members.