



P14.02.03 Final Project Report

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Task contributors

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Abstract

SWIM Supervision aims at defining the needed measures to be able to properly manage the SWIM TI. This document reports P14.02.03 progress and contribution to the roadmap for deployment activities as defined in the ATM Master Plan, P14.02.03 achievements in terms of deliverables. Due to its suspension, it's recommended to use the material further refined produced by P14.01.03 and P14.01.04 in order to allow deployment of the SWIM Supervision.

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None.

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Edition	Date	Status	Author	Justification
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00.01.00	26/05/2014	Final	██████████	1 st edition to be discussed in the Closure GATE
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00.02.00	21/07/2014	Final	██████████	Material ready to be handed over.

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This deliverable consists of SJU foreground.

Publishable summary

SWIM, System Wide Information Management, was identified in SESAR as one of the four main changes in the ATM Target Concept that impact the European ATM System architecture for the long-term. SWIM aimed at ensuring the inter-operability of ATM Systems by **standardizing and implementing external interfaces with common message formats**. SWIM would enhance the availability of the information to the end-user applications and would allow finding the most appropriate source of information when needed.

SWIM was further decomposed in its **Operational (SWIM)** aspect and in its **Technical Aspect (SWIM-TI, Technical Infrastructure)**. Both Operational and Technical aspects of SWIM aimed at enabling a net-centric architecture following a SOA approach in order to inter-connect the different ATM systems and exchange value added services amongst them.

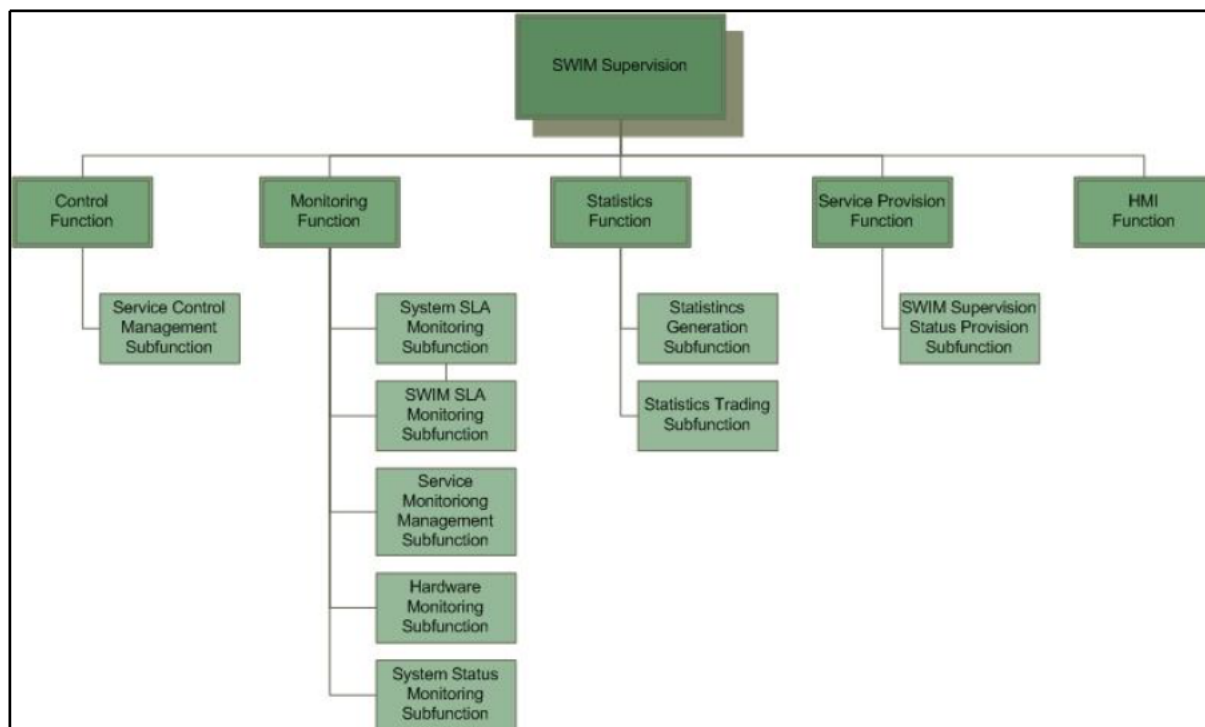
SWIM Supervision was proposed as one of the means for being able to achieve the success of the overall SWIM concept. SWIM Supervision aimed to **allow control and monitor the large SWIM environment** relying in a **strong governance structure**. Hence, a Concept of Operations would be designed for the SWIM Supervision and a set of technical entities would be specified and prototyped to validate such Operational Concept.

Among the expected benefits that would be achieved via the definition of the SWIM Supervision concept, the following ones were identified as key ones:

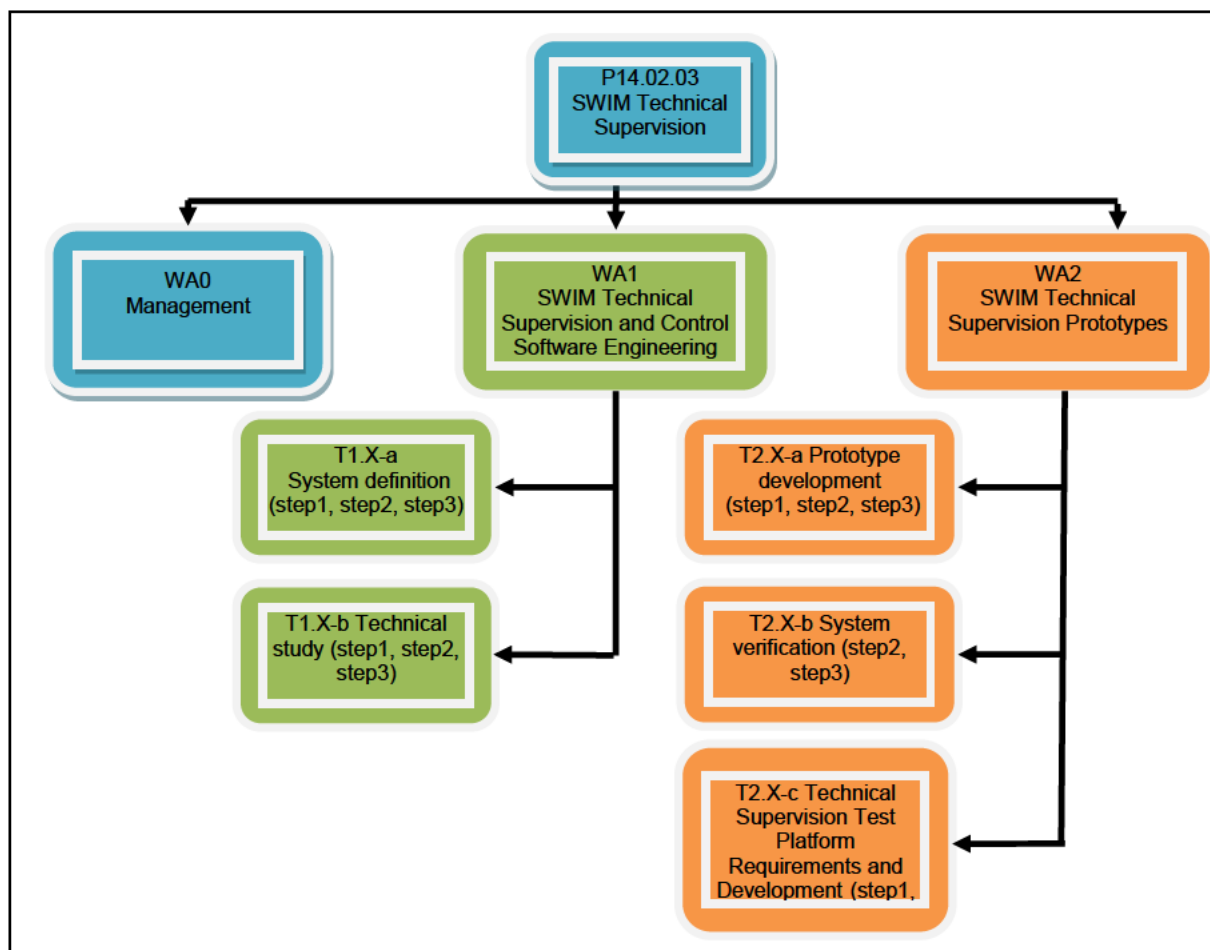
- Situational awareness as a major feature to ease analysis and decision making
- Status information sharing as a security driver for operational procedures (degraded modes and fallback measures).
- Enhanced ED-133 Interoperable Systems operation via sharing status/supervision information.
- Enabled Secure Infrastructure (allowing audit accesses).
- Enabled Safety Infrastructure (detects failures and trigger counter measures).
- Reliable Infrastructure (It supervises the status of offered/needed functions and taking in consideration redundancy).

Among the identified **challenges** to achieve the goal of **SWIM Supervision**, the **organizational aspect** (establishing and governing a non-local SWIM Supervision) was the most constraining one. Transitioning from an ATM organized at a local level (Airports, AOCs, etc.) and at a national level (ATCs, Militaries) towards a European ATM implies sovereignty and transfer of responsibility issues that need to be addressed.

SWIM-TI Supervision was aimed at **specifying** and **prototyping** the technical requirements derived from the SWIM Supervision Operational Concept. The main objectives were to specify, prototype and verify a SWIM-TI Supervision to be used at the different deployment levels (local, non-local, sub-regional and regional) that would provide the functionalities described in the following picture:



To achieve this, P14.02.03 tasks were structured as follows:



Where the objectives to be achieved by each of them were:

- **WA0 – Management**

Dealt with managing the planning and the resources in order to achieve the objectives in time and with the expected quality. It also included coordination and reporting to the different stakeholders.

- **WA1 – SWIM Technical Supervision Software Engineering**

Dealt with the definition of the SWIM-TI Supervision. It was planned to take place during the whole set of SESAR Steps, contributing to each of them as follows:

- **Step1 Contribution:** P14.2.3 aimed at providing early foundation for prototypes, based on the previous ICOG and SWIM-SUIT works, for which technologies were already chosen.
 - **T1.1- b - Technical Study:** A trade study on COTS solutions for Supervision was intended to take place to assess the State of the Art for the different Supervision COTS.
 - **T1.1- a - System definition:** A definition of the architecture and associated requirements of the SWIM Technical Supervision.
- **Step2 Contribution:** P14.2.3 aimed at introducing the sub-regional and regional level for the SWIM Technical Supervision and at refining local level to be aligned with P08.03.01SWIM Supervision Concept of Operations.
 - **T1.2- b - Technical Study:** Advanced study to incorporate COTS that would support the extended scope
 - **T1.2- a - System definition:** Update to include the extended scope.
- **Step3 Contribution:** P14.2.3 aimed at maintaining and refining the SWIM Supervision definition.
 - **T1.3- b - Technical Study:** Analysis of the new COTS that may have arisen.
 - **T1.3- a - System definition:** Maintain and update.

- **WA2 – SWIM Technical Supervision Prototypes**

Dealt with the implementation and verification of the requirements specified in WA1 and the setup of the verification platform.

Step 1 took place according to plan and both Technical Study and System Definition allowed, even without SESAR Programme inputs, the development and verification of SWIM-TI Supervision Prototypes to achieve the local definition of the concept.

For **Step 2**, the fact that SWIM-TI Supervision was aiming at designing and prototyping SWIM-TI Supervision for the sub-regional and regional levels, implied the need to have a SWIM Supervision ConOps well defined by project P08.03.01 that would be used as input for the project. During the **Project Gate of 2012**, SJU informed that P08.03.01 proposed its suspension as that no positive feedback towards the concept was received from the Operational Stakeholders. Besides there were no identified scenarios in which SWIM Supervision would be needed. According to this, SJU recommended the **Suspension of P14.02.03** and this decision was supported by the PCG.

A group of different transversal projects were assigned the responsibility to analyse and identify the need for Supervision in a European ATM, tackling the different points of view (Operational, Systems and Infrastructure). The group provided recommendations to further analyse this need in forthcoming Programmes (SESAR 2020) as there were hints that this could be needed, but no formal evidences.

Aligned with the latest, **P14.02.03 was proposed to be closed**, having as main **achievements** the definition and verification of the SWIM-TI local Supervision, that was incorporated into both SWIM-TI Architectural Document and SWIM-TI Technical Specification documents.

Acronyms

Term	Definition
ATC	Air Traffic Controller
ATM	Air Traffic Management
AOC	Airport Operations Centre
ConOps	Concept of Operations
COTS	Commercial Off The Shelf
EUROCAE	European Organisation for Civil Aviation Equipment
HMI	Human Machine Interface
HW	Hardware
ICAO	International Civil Aviation Organization
ICOG	Interoperability Consultancy Group for the IOP Interface Specification
MET	Meteorological Information Provider
PC	Personal Computer
PCG	Programme Control Group
RTCA	Radio Technical Commission for Aeronautics
SESAR	Single European Sky ATM Research Programme
SJU	SESAR Joint Undertaking
SLA	Service Level Agreement
SOA	Services Oriented Architecture
SPV	Supervision
SW	Software
SWIM	System Wide Information Management
SWIM-SUIT	SWIM Supported by Innovative Technologies
SWIM-TI	SWIM Technical Infrastructure
TAD	Technical Architecture Document
TS	Technical Specification
WA	Working Activity

1 Final Project Report

1.1 Project progress and contribution

According to the European ATM Master Plan (ref. [2]), SWIM, (Operational Improvements IS-0901-A, IS-0901-B and IS-0901-C) was set to introduce a complete change in how information is managed throughout its lifecycle across the whole European ATM system. SWIM consists of standards, infrastructure and governance, enabling the management of ATM information and its exchange between qualified parties via interoperable services.

P14.02.03 SWIM Supervision aimed at contributing to the achievement of the above mentioned operational improvement via the specification and verification of the following enablers¹:

EN Code	EN Title	P14.02.03 activities /contributions	Maturity ² before project	Maturity after project
SWIM-INFR-01a	High Criticality SWIM Services infrastructure Support and Connectivity.	Blue Profile Enabler. P14.02.03 SWIM TI Supervision provides technical Information Sharing to support the concept.	V2	V3
SWIM-INFR-05a	General SWIM Services infrastructure Support and Connectivity.	Yellow Profile Enabler. P14.02.03 SWIM TI Supervision provides technical Information Sharing to support the concept.	V2	V3
SWIM-SUPT-01a	SWIM Supporting Registry Provisions	SWIM Registry. P14.02.03 SWIM TI Supervision provides technical Information Sharing to support the concept.	V2	V3
SWIM-SUPT-03a	SWIM Supporting Security Provisions	Federated Security. SWIM Registry. P14.02.03 SWIM TI Supervision provides technical Information Sharing to support the concept.	V2	V3
SWIM-SUPT-05a	SWIM Supporting IP Network Bridging Provisions	Communication Bridge. SWIM Registry. P14.02.03 SWIM TI Supervision provides technical Information Sharing to support the concept.	V2	V3
GGSWIM-26a	Provision and use of Ground-ground data services for Network Operations Planning	Yellow Profile Enabler. P14.02.03 SWIM TI Supervision provides technical Information Sharing to support the concept.	V2	V3

¹ ATM Master Plan Data Set 11

² The E-OCVM cycle is applicable to the validation of operational concepts and the assessment of its maturity. However, the E-OCVM cycle can be extended to technology verification activities, by making some analogy with Technological Readiness Level. The last two columns of **Error! Reference source not found.** provide an indicative estimation of the project contributions towards the maturity of enablers considered in the project, supported by performance evidences provided in the P.14.02.03 project deliverables.

EN Code	EN Title	P14.02.03 activities /contributions	Maturity ² before project	Maturity after project
GGSWIM-49	Ground-ground data communications services for airspace reservation/availability	Yellow Profile Enabler. P14.02.03 SWIM TI Supervision provides technical Information Sharing to support the concept.	V2	V3
GGSWIM-52	Provision and use of ground-ground data communications services for aeronautical information- EAD	Yellow Profile Enabler. P14.02.03 SWIM TI Supervision provides technical Information Sharing to support the concept.	V2	V3
AGSWIM-34-	New System AGDLGMS ³	Due to the Suspension of the Project, no contribution to the enabler was achieved.	V2	V2
GGSWIM-10b	SWIM Supervision for Step2	Due to the Suspension of the Project, no contribution to the enabler was achieved.	V2	V2
GGSWIM-10c	SWIM Supervision for Step3	Due to the Suspension of the Project, no contribution to the enabler was achieved.	V2	V2
GGSWIM-26b	Provision of Ground-ground data SWIM services for Network Operations Planning	Due to the Suspension of the Project, no contribution to the enabler was achieved.	V2	V2
GGSWIM-51b	SWIM Ground-ground messaging services	Due to the Suspension of the Project, no contribution to the enabler was achieved.	V2	V2
GGSWIM-51c	SWIM Ground-ground messaging services	Due to the Suspension of the Project, no contribution to the enabler was achieved.	V2	V2
GGSWIM-52a	Provisioning of ground-ground SWIM services for aeronautical information distribution - EAD	Due to the Suspension of the Project, no contribution to the enabler was achieved.	V2	V2
GGSWIM-52b	Provisioning of ground-ground SWIM services for aeronautical information distribution - EAD	Due to the Suspension of the Project, no contribution to the enabler was achieved.	V2	V2
GGSWIM-55b	Improvement of the Step 1 SWIM profiles to be more integrated	Due to the Suspension of the Project, no contribution to the enabler was achieved.	V2	V2

³ To be noted that the notion of AGDLGMS was discarded and SWIM-TI A/G communications are expected to be handed by SWIM-TI Purple Profile.

EN Code	EN Title	P14.02.03 activities /contributions	Maturity ² before project	Maturity after project
MIL-0501	Develop specifications on Interoperability between SWIM and military systems	Communication Bridge. SWIM Registry. P14.02.03 SWIM TI Supervision provides technical Information Sharing to support the concept.	V2	V3

SWIM Supervision was specified and prototypes developed⁴ in order to verify such specifications. The SWIM Supervision Specifications are already refined and included in SWIM-TI material (SWIM TAD (ref [12], SWIM TS (ref [14])).

Several validation exercises (ref [15]) have been designed to support the validation of SWIM Operational Improvements (in which the prototypes from P14.02.03 (integrated into P14.02.09 demonstrator) would have been included). However, at the time of completion of this Final Project Report, only EXE-04.03-VP-022 was completed.

1.2 Project achievements

1.2.1 Results of the Project

The project defines (and reports the verification of) the means for being able to perform:

– Configuration Management

Establishing and maintaining consistency of a system's performance and its functional and physical attributes with its requirements, design, and operational information throughout its life.

SWIM-TI Configuration Management function is limited to the SWIM-TI, in terms of SWIM-TI Node hardware/software and applications for the provision of SWIM Services.

– Fault Management

Fault management is the set of functions that detect, isolate, and correct malfunctions in a SWIM-TI Node.

Fault management is the functional area that provides **control** towards the different entities that are part of the SWIM-TI Node. **Control** function allows the supervisor to perform command and actions on the supervised object which is part of the SWIM node.

In order to detect the malfunctions, a **lifecycle** is needed to be associated to the different entities that are part of the SWIM-TI Node. A concrete status will identify whether the entities are working appropriately or, on the contrary, they are in a degraded/error **status**.

In case of error, and also as a part of the Fault Management, an **Alarming** sub function is foreseen.

Also in case of error, **Recovery procedures** and **safety measures** should be analysed and provided by SWIM Supervision.

The following generic lifecycle is applied for the Fault Management of the supervised entities:

⁴ See Project Achievements and Project Deliverables chapters.

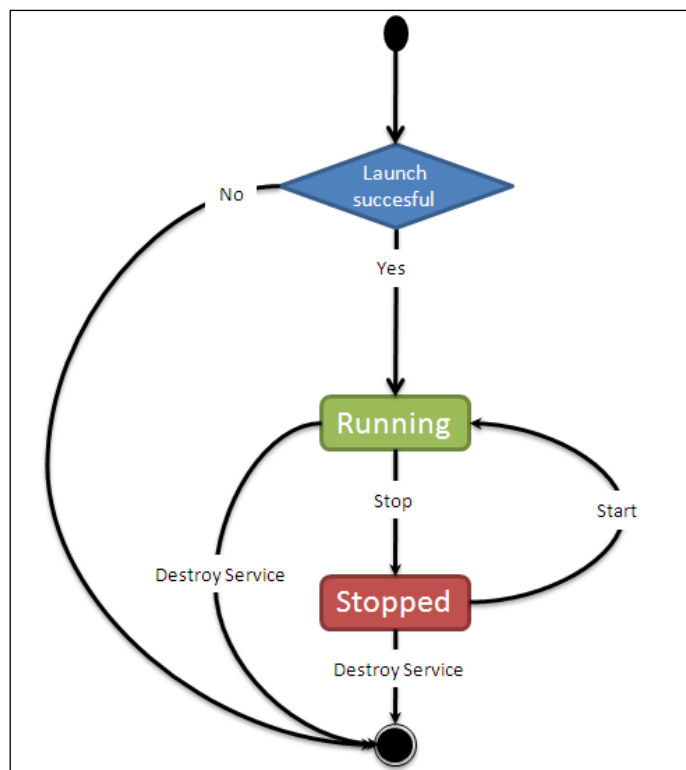


Figure 1 – SWIM-TI Supervised Entity Lifecycle

Where the Supervised Entity will report its status⁵ as:

- **Running.** The Supervised Entity is available and ready to be used.
- **Stopped.** The Supervised Entity stopped its execution

– Performance Management

Performance management focuses on monitoring and managing the performance and service availability of the supervised entities.

It can be defined as the process to detect, and report application's performance regarding the end-users' expectations (often formalized as Service Level Agreements, SLA).

It usually deals with the monitoring of the performance and the provision of statistics associated to it.

– Security

Security Management at SWIM-TI Supervision Level relates to the ability of enabling (or denying) the access to the SWIM-TI Node elements to an external actor.

– Legal Recording

Legal recording refers to the recording of all data exchanged in the context of the supervision function (e.g. events), commands issued and their results, etc.

The above indicated set of functionalities is applied to:

– SWIM-TI Node Hardware

⁵ Note that a more complex lifecycle can exist within each node, but not necessarily to be standardized

The SWIM-TI Node Hardware is composed of those physical elements that somehow are involved in enabling the functionality of the SWIM-Node (e.g. a PC, a router, etc).

Not in all the deployments this hardware needs to be monitored by SWIM-TI Supervision (e.g. those nodes that are embedded in a System that already has a function that deals with the management of all the hardware elements).

– **SWIM-TI Node Processes**

The SWIM-TI Node Processes are those software elements that somehow are involved in enabling the functionality of the SWIM-Node (e.g. the Security COTS, the messaging COTS, etc).

– **SWIM-TI Enabling Services Status**

The SWIM-TI Enabling Services are those infrastructure services provided by SWIM-TI (not to be mistake with the SWIM Functional Blocks) acting as a System to another System (e.g. the provision of the information regarding the status of the supervised entities from a SWIM-TI Supervision towards another SWIM-TI Supervision)

– **SWIM-TI ATM Services Status**

The SWIM-TI ATM Services are those services offered by an ATM System via the SWIM-TI (via the SWIM-TI) (e.g. the provision of the Weather info from a MET System towards an aircraft).

– **SWIM-TI Node**

As described, a SWIM Node is a logical aggregation of certain capabilities. The supervision of the SWIM Node means the report of all those elements (SW/HW/services/etc.) that are described as a part of such SWIM-TI Node.

1.2.2 R&D Questions addressed

The project has evaluated and challenged the needs for having Supervision at different SWIM levels, from local to sub-regional and regional. Local level has been specified and verified. The feasibility of a series of COTS products for being used in SWIM local SPV has been evaluated; the result indicated that none of them fully covers of the functionality needed (even though they are providing promising result in several aspects).

1.2.3 Agreements achieved

In terms of Technical Solution, SWIM Supervision has been described and specified at local level, according to the mentioned functionalities:

- **Configuration Management**
- **Fault Management**
 - **Control**
 - **Alarming**
 - **Recovery procedures**
 - **Safety measures**
- **Performance Management**
- **Security**
- **Legal Recording**

In terms of Technical Solution, it has been agreed to not progress in the description of the SWIM Supervision at Sub-regional and Regional levels.

Further analyses on the Operational Needs for such hierarchy were identified prior to being allowed to continue with a technical functional description and specification for those levels.

1.2.4 Contribution towards ATM Performance Targets

N/A

Not directly traceable, but through IS-0901-A.

1.2.5 Difference between initial and final scope

The main difference between the initial scope and the final scope for P14.02.03 relies in the fact that the project was stopped after Step 1 activities, not being able to reach the whole set of initially fixed objectives.

Step 2 and Step 3 activities aimed at providing a technical functional description and specification for SWIM Supervision at Sub-regional and Regional levels. The strong dependency with P08.03.01 and the fact that P08.03.01 proposed its suspension (as the project didn't receive positive feedback towards the initial SWIM Supervision Operational Concept was received from the Operational Stakeholders) implied that such objectives were not achieved.

A group of different transversal projects were assigned the responsibility to analyse and identify the need for Supervision in a European ATM, tackling the different points of view (Operational, Systems and Infrastructure). The group provided recommendations to further analyse this need in forthcoming Programmes (SESAR 2020) as there were hints that this could be needed, but no formal evidences.

1.3 Project deliverables

A summary of the project deliverables is presented in the table below:

Del. code	Del. Name	Description	Assessment Decision
D001	Final Progress status report	The deliverable (this document) comprises the P14.02.03 Final Project Report.	Not yet delivered
D002	SWIM Technical Supervision Requirements Architecture Report	Includes functional description and technical specification of SWIM Supervision (ref. [5]).	No reservation (P)
D003	Results on the Technical Study Step1	Includes an assessment of several Supervision COTS in order to evaluate their feasibility of being used for verifying SWIM Supervision Requirements (ref. [6]).	No reservation (P)
D004	SWIM Technical Supervision Prototype (step 1) [Frequentis]	Frequentis' Supervision Prototype Delivery Note (ref. [7]).	No reservation (P)

Del. code	Del. Name	Description	Assessment Decision
D025	SWIM Technical Supervision Prototype (step 1) [THALES]	THALES' Supervision Prototype Delivery Note (ref. [8]).	No reservation (P)
D026	SWIM Technical Supervision Prototype (step 1) [Indra]	Indra's Supervision Prototype Delivery Note (ref. [9]).	No reservation (P)
D005	Technical Supervision Test Platform Requirements and Development for the V.1.0.0	Includes the description of the TestBed and of the Verification Procedures for verifying SWIM Supervision Prototypes (ref. [10]).	No reservation (P)
D006	SWIM Technical Supervision Verification Report	Includes the report on the verification of the defined requirements (D002) performed in the Testbed (D005) with the use of the different prototypes (D004, D025, D026) (ref. [11]).	No reservation

Deliverables D002, D004, D025, D026, D005 and D006 represent the regular set of deliverables for a Systems and Software Engineering approach (from the scope definition to the verification and report), whereas D003 consists of a State-of-the-art analysis. In general, it can be said that the achievements of the project are contained in the D006 (SWIM Technical Supervision Verification Report) that comprises the conclusions regarding the feasibility for the defined concepts for being deployed and being able to support the concept of SWIM Supervision.

1.4 Contribution to standardization

The contribution of P14.02.03 to the development of new Standards and Norms should be understood as being contained in the contribution of the overall SWIM Systems Engineering material (SWIM-TI Technical Architecture Document (ref. [12]), SWIM-TI Technical Specifications Catalogue (ref. [14]) and SWIM Profiles Instantiations (ref. [13]).

The project has not contributed to standardisation activities (EUROCAE/RTCA, ICAO, EUROCONTROL, OGC...) (nor has its members on behalf of the project).

1.5 Project Conclusions and Recommendations

The material provided by the project has been further refined by projects P14.01.03 "SWIM Design" and P14.01.04 "Interface specifications and Services Technical requirements" with updated (and not evolving) versions included in:

- SWIM-TI Technical Architecture Document 2.1, March 2014 (ref. [12]).
- SWIM-TI Technical Specifications Catalogue 2.1, February 2014 (ref. [14]).

These functional and architectural definition and associated requirements are considered the most up to date SWIM Supervision material available and agreed in the Programme, and it's derived from D002 (ref. [5]).

The set of specifications included in the mentioned references are further traced to the Iteration 2.1 SWIM Profiles that are the root for the deployment of the SWIM-TI. The SWIM Profiles are described in:

- SWIM-TI Technical Specifications Catalogue 2.1, February 2014 (ref. [14]) (including references to current Profiles TSs).
- SWIM Profiles Instantiations 2.1, March 2014 (ref. [13]).

According to that, it's recommended to use the above mentioned deliverables when dealing with SWIM-TI Supervision.

In what regards to the content and scope, the recommendations coming from this project are aligned with the recommendations/observations provided in the Supervision Task Force Final report (ref. [16]), that can be summarized as:

There is an identified need for achieving/providing Supervision in:

- Local Technical Supervision (to detect the technical cause of operational disruption).
- Local CDM (to assess the operational impact of the technical failure).
- Network Management Function CDM (to share the local operational impact).
- Supervision for:
 - SWIM – NM_B2B profile status.
 - SWIM – ATC_ATC_Coordination profile status (already defined in ED133).
 - Satellite signal (e.g. GPS, EGNOS, etc) at local and regional levels.

In addition, current regulations (e.g. EASA 1034/1035) imply the use of supervision as a means to meet the safety goals.

It needs to be studied the need for Supervision at the following ATM operation businesses:

- a) **As is (local?) situation:** each stakeholder remains individual and sole responsibility for its own resources and service provision with the responsibility to provide local contingency only;
- b) **Extension of the Area of Responsibility (sub-regional? FAB?):** adjacent stakeholder may be able to ensure resources and service provision on behalf stakeholder facing difficulties to provide its own resources and service provision.
- c) **Fully integrated ATM European organization** with resources shared among B.4.4 & B.4.5): stakeholder will provide to and consume service from other European stakeholders.

In which the following considerations are to be handled:

For each of these potential European ATM organizations, nominal and non-nominal scenarios shall be defined and might lead to new supervision requirements. Fundamental questions will rise such as:

1. Which operational capability (resource, service provision) needs to be supervised in order to identify the operational impact?
2. Which information to disseminate? Cause of the failure apart for legal matter? Impact of the failure?
3. Shall this be a full automated process or will it rely on a support of human for the decision making (e.g. NOTAM)?
4. Does this change imply new roles/responsibilities or a change/extension of the existing ones (institutional issue)?

Moving from ATM operational business expectation a) to b) and c), there will be a growing need for security mechanisms and strategies which could lead to some supervision needs.

But, the key issue will be where responsibilities will lie in the future, and if/how technical capabilities and service provision will meet the need for stakeholder internal and external 'situational awareness' and the retention or devolution of their specific responsibilities. Especially, if these are to be conducted on more collaborative ('committee') based processes, and if/where final intervention can be implemented.

There is a need to continue identifying and analysing the Operational Needs for Supervision at all architectural levels in the European ATM and to prototype and verify the technical means to support such needs, if identified.

2 References

- [1] [SESAR Programme Management Plan, Edition 03.00.00](#)
- [2] [European ATM Master Plan, Edition 2](#)
- [3] Multilateral Framework Agreement (“MFA”) signed between the SJU, EUROCONTROL and its 15 selected members on August 11, 2009, amended on 14 June 2010, 19 October 2010 and 2 July 2012
- [4] [Latest Project baseline](#)
- [5] P14.02.03, SWIM Technical Supervision Requirements Architecture Report, D002, 00.02.06 , 08/03/2011
- [6] P14.02.03, Results on the Technical Study Step1, D003, 00.01.00, 19/01/2011
- [7] P14.02.03, SWIM Technical Supervision Prototype (step 1) [FREQUENTIS], D004 , 00.00.01, 15/07/2011
- [8] P14.02.03, SWIM Technical Supervision Prototype (step 1) [THALES], D025, 00.00.01, 20/01/2012
- [9] P14.02.03, SWIM Technical Supervision Prototype (step 1) [Indra] , D026, 00.00.03, 15/07/2011
- [10] P14.02.03, Technical Supervision Test Platform Requirements and Development for the V.1.0.0, D005, 00.00.01, 07/07/2011
- [11] P14.02.03, SWIM Technical Supervision Verification Report, D006, 00.01.02, 02/12/2011
- [12] P14.01.03, SWIM-TI Technical Architecture Document 2.1, D033, 00.02.00, March 2014
- [13] P14.01.03, SWIM Profiles Instantiations 2.1, D034, 00.02.00, March 2014
- [14] P14.01.04, SWIM-TI Technical Specifications Catalogue 2.1, D41-001, 00.00.02, February 2014
- [15] WP03, V&V Roadmap - full view, [10/05/2014](#)
- [16] SJU&WPB Supervision Task Force, Supervision Task Force Report, 01.00.00, June 2014

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