Airport operations plan (AOP) and its seamless integration with the network operations plan (NOP)

Contextual note – SESAR Solution description form for deployment planning

Purpose:

This contextual note introduces a SESAR Solution (for which maturity has been assessed as sufficient to support a decision for industrialization) with a summary of the results stemming from R&D activities contributing to deliver it. It provides to any interested reader (external and internal to the SESAR programme) an introduction to the SESAR Solution in terms of scope, main operational and performance benefits, relevant system impacts as well as additional activities to be conducted during the industrialization phase or as part of deployment. This contextual note complements the technical data pack comprising the SESAR deliverables required for further industrialization/deployment.

Improvements in Air Traffic Management (ATM)

The SESAR Solution '**Airport operations plan (AOP) and its seamless integration with the network operations plan (NOP)'** supports the European ATM Master Plan's key feature of 'Network Collaborative Management & Dynamic Capacity Balancing' by using the SESAR concept of High Performing Airport Operations to achieve a full integration of airports into the ATM network, ensuring a seamless process through Collaborative Decision Making (CDM). Airports will contribute to achieving SESAR performance goals at this level through an integrated airport management framework where all aircraft operators and airport, aerodrome ATC and ground handling processes are conducted using common data sources and agreed procedures within a collaborative environment.

The Solution supports airport operations with an increased scope and timescale of data shared between the Airport and the Network Manager, building upon the Pre-SESAR Airport Collaborative Decision Making (A-CDM) baseline. It consists of a set of airport performance services and a suite of enabling applications to maintain performance in normal operations, adverse conditions due to meteorological phenomena with a negative impact such as thunderstorms and low visibility; and exceptional conditions due to *ad hoc* disruptive events such as runway closure or a terminal evacuation.

Solution #21 is strongly linked with SESAR Solution #18 'CTOT to TTA for ATFCM' and with Solution #20 'Collaborative NOP' due to the concept integration needed with the Airport Operations Plan (AOP).

The Solution is grounded in two new services developed for dealing with normal, adverse and exceptional operating conditions:

- **Steer Airport Performance** – establish the performance goals and Key Performance Indicator (KPI) thresholds; and

- **Monitor Airport Performance** – monitor performance against the goals. The Monitor Airport Performance service analyses the current and forecast performance using the most recent data and compares it against the agreed performance metrics

and targets. The monitoring system automatically triggers a warning or alert to ATM stakeholders if predefined thresholds are exceeded. The AOP is linked to the NOP and provides the data to facilitate these goals.

These services are enabled by a suite of new applications and together they allow the airport operator to act as the Ground Coordinator within the European ATM Network providing a focal point at the airport to ensure coordination among airport stakeholders, including the Network Manager. The new enabling tools and applications to support airport performance are:

- **AOP** – the Airport Operations Plan. A single, common and collaboratively agreed rolling plan that will form the single source of airport operations information shared bi-directionally with all airport stakeholders including the Network Manager. The AOP introduces automation in support of network and airport performance monitoring. Through the use of an AOP, airports stakeholders both generate and receive enhanced information and have better control over their operations through the Airport Transit View (ATV), which links business trajectories between inbound and outbound flights and enhances common situational awareness. Furthermore the AOP assists airspace users and airport operators in becoming active participants in the airport arrival management process (TTA) building on the A-CDM baseline concept.

- **Landside Processes** – the Solution extends beyond the airside operating environment and addresses processes within the terminal infrastructure that have a performance impact on flight predictability and efficiency, in this case monitoring the progress of passengers through the airport from check-in to the gate. Monitoring data is stored in the AOP and allows stakeholders to increase their confidence around TOBT accuracy and stability.

- **Integration of MET data** – a single consistent MET data source according to a standardised and agreed set of MET data parameters is a required input and probabilistic forecasting is introduced as a new methodology to enhance information and increase prediction accuracy. This data source and forecasting technique is introduced separately by Solution #35. However, new systems are provided in the context of Solution #21 allowing it to integrate with MET in order to provide enhanced sharing and visualisation of meteorological information, designed to support decision making and increasing common situational awareness. The display of MET information with associated alerts and warnings contributes to better predictability and more efficient decision making within the APOC organisational structure.

The full Airport Operations Management concept developed in SESAR 1 envisages two additional new services that have not yet reached maturity and will be deployed complementary to Solution #21 in the future, namely the ability to **Manage Airport Performance** and to **Perform Post-Operations Analysis**. These are intended to further

enhance stakeholder situational awareness, decision making and to quicken recovery from deviations to planned activities.

What are the benefits?

Better planning and execution of airport and network operations results in an improvement in utilisation of resources, airspace and airport infrastructure and in a reduction in reactionary delays. Information sharing between airport operations and network operations will assure the best overall system outcome while addressing the needs of airport actors, the ATM network, individual aircraft operators and the passengers who depend on their services.

Under the SESAR concept the AOP will be richer in terms of information content and will cover an extended time horizon compared to Pre-SESAR A-CDM. Where A-CDM focuses on individual aircraft processes that are restricted to a few hours before the flight, the AOP's content will be strategically created typically six months ahead of the day of operations and will address the airport's overall performance. Information will be shared between the AOP and NOP building upon today's A-CDM message exchanges, enabled by SWIM-based services contained in SESAR Solution #46 (Initial SWIM).

As well as timely and accurate information, the AOP is supported by a robust performance monitoring capability which allows airport processes to be efficiently managed in real time. The Solution's elements are aimed at supporting cooperation between all ATM stakeholders at appropriate decision-making stages, whilst ensuring a seamless process over the entire planning spectrum through to execution. It should allow airport stakeholders to meaningfully participate in ATFM[1] processes overseen by the Network Manager in collaboration with local airspace actors.

The improvements building upon the A-CDM baseline that are new for deployment include:

- **Information sharing** has been enhanced through the introduction of the Airport Transit View (ATV) concept, the integration of passenger flow data, the airport impact assessment concept to prevent knock-on effects associated to reactionary delays; and AOP/NOP connection through SWIM;
- The **turn-round process** (milestone approach) has been improved by connecting the data update process to flight status instead of fixed times (event based), by increasing anticipation of the turn-round prior to flight execution (from three hours to one day or more); and including passenger flow-related milestones;
- The airport will **connect with the Network Manager** to share not only Departure Planning Information (DPI) but also Arrival Planning Information (API), in an event-based approach in place of pre-determined times;
- **The collaborative pre-departure sequence** is improved through the integration of passenger flow-elated milestones; and

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[1] ATFM = Air Traffic Flow Management

- **Adverse conditions** – improvements will be derived from the integration of MET data into A-CDM processes.

What are the applicable operating environments?

The Airport Detailed Operational Description (DOD) for Step 1 applicable to this Solution recognises that the SESAR airport concept will be deployed according to the operational needs at airports throughout Europe. However, each airport varies significantly according to its configuration, demand characteristics and local operational limitations according to geographical, environmental and political factors.

Validation activity during the research phase focused on large airports with complex operations that clearly require an AOP. Applicable concept elements may be appropriate for smaller airports. For the purpose of comparison and projecting validation results between them, a set of objective criteria has been defined that will allow airports to be categorised objectively to support a realistic generalisation of the results from one particular airport to another. The project concluded that the concept could not be adequately demonstrated at regional airports, recognising that they have specific needs in terms of simplified A-CDM processes whilst maintaining quality of connection to the Network.

> **In summary, the Solution aims to improve the European ATM system through the integrated planning and execution of air and ground based operations, supported by a robust collaborative management process.**

Solution Operational Improvement Steps & Enablers

Operational Improvement Steps

- **AO-0801-A**: Collaborative Airport Planning Interface – fully covered.

- **AO-0802-A**: A-CDM process enhanced through integration of landside (passenger only) process outputs – fully covered.

- **AO-0803**: Integration of airports into ATM through Monitoring of Airport Transit View (Extension of Performance Monitoring building on A-CDM) – fully covered.

- **DCB-0310**: Improved Consistency between Airport & ATFCM Planning – fully covered.

Enablers

Enablers provided by Solution technical systems:

- **AIRPORT-02**: [TTA Airport Impact Assessment tool](#) (TRL6)

- **AIRPORT-03**: [Airports Operation Plan (AOP) management tool](#) (TRL6)

- **AIRPORT-35a**: [Airport CDM (level 4 - CDM integrated with passenger process)](#) (TRL6)

- **AIRPORT-40**: [Airport Performance Monitoring System](#) (TRL6)

- **CTE-C06b:** [PENS - Phase 2](#)

- **HUM-007:** [New communication and interaction patterns between stakeholders of airport operations linked to collaborative rolling AOP/NOP management](#)

- **HUM-014:** [New interactions and communication patterns for the integration of landside process outputs into the A-CDM process](#)

- **HUM-015:** [New working methods for the integration of landside process outputs into the A-CDM process](#)

- **HUM-016:** [New working methods for the integration of the Airport Transit View (ATV) into the A-CDM process](#)

- **NIMS-41:** [NM interface capable to integrate Airport impact assessment](#)

- **REG-0510:** [Regulatory Provisions for the integration and use of meteorological information in ATM operations and systems in a harmonised manner](#)

Required Enablers provided by other Solution technical systems:

- **AIRPORT-31:** [Airport CDM (levels 1, 2 & 3)](#) This Enabler is pre-SESAR (a prerequisite Enabler for the CDM baseline)

- **AIRPORT-38**: [Airport/ATFCM Extended data interface](#) (TRL6) This Enabler is provided by Solution #20

- **AOC-ATM-13:** [Participating of the FOC/ WOC in the airport triggered CDM process](#) This Enabler is provided by Solution #18

- **PRO-028:** [Procedures to support AOP-NOP collaborative process](#) This Enabler is provided by Solution #20

- **METEO-03**: [Provision and monitoring of real-time airport weather information, Step 1](#) (TRL6) This Enabler is provided by Solution #35

- **METEO-04b**: [Generate and provide MET information services relevant for Airport and final approach related operations, Step 1](#) (TRL6) This Enabler is provided by Solution #35

- **PRO-028**: Procedures to support AOP-NOP collaborative process

- **SWIM-APS-03a:** Provision of ATFCM Information Services for Step 1 This Enabler is provided by Solution #31

- **SWIM-APS-04a:** Consumption of ATFCM Information Services for Step 1 This Enabler is provided by Solution #31

- **SWIM-INFR-05a:** General SWIM Services infrastructure Support and Connectivity This Enabler is provided by Solution #31

- **SWIM-NET-01a:** SWIM Network Point of Presence This Enabler is provided by Solution #31

The applicable Integrated Roadmap Dataset is DS16. Note that HUM-008, HUM-009, HUM-010, HUM-011 and HUM-012 became optional for AO-0801-A in DS16.

Background and Validation Process

Not all of the Operational Improvement Steps and Enablers assigned to the SESAR 1 Operational Focus Area reached full maturity at the end of the Programme and therefore are not included in the Solution. They are described by the OSED in the accompanying Solution data pack. Activities at the V1 level consisted of paper-based desktop gaming exercises and expert opinion in order to formulate an early set of operational concept requirement documents. Activities then became more sophisticated, allowing concept feasibility to be demonstrated (V2) and then to support pre-industrialisation (V3).

Validation Threads

- **Airport Operations Plan (Airport Performance Steering & Monitoring)**

  o The first exercise at **V2 level** took place in **July 2012** and used **Fast Time Simulation** in two CAST[2] modelling sessions on the premises of industry partner ARC in Aachen, Germany and on EUROCONTROL premises in Brétigny, France. It explored the notion of the AOP being a rolling plan which is updated both automatically following specific events and manually as a result of stakeholder input. The exercise also validated the Airport Transit View (ATV), an integral element of the AOP which represents the visit of an aircraft to an airport in the form of a managed trajectory with key time-based milestones.

  o A second exercise at **V2 level** to validate the content of the AOP took place in **May 2013** using **Shadow Mode** at Palma de Mallorca Airport (PMI/LEPA). This activity used industry partner prototypes to provide an early working AOP and airport performance management tools hosted on the legacy

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[2] CAST = Comprehensive Airport Simulation Tool

operations platform at the airport. The intention was to test the feasibility of the AOP acting as a vehicle through which airport stakeholders may share information, not only a data repository but a commonly agreed plan which continuously evolves with automatic and stakeholder inputs when it becomes available.

o A third, more advanced exercise also at **V2 level** took place in **June 2013** using **Real Time Simulation (gaming)** on the premises of industry partner EADS Astrium (now Airbus Safran Launchers) in Les Mureaux, France. CAST now featured an interactive HMI based on a platform provided by Astrium to allow the visualisation of AOP data for stakeholders. Participants acted at an operational level but were not responsible for managing the airport's overall performance.

o A further final exercise at **V2 level** was executed in two separate sessions: the first took place in **July 2014** using **Real Time Simulation (gaming)** on the premises of industry partner Indra Sistemas, in Torrejón de Ardoz, Spain. The second session took place in **October 2014** also using **Real Time Simulation (gaming)** on the premises of industry partner EADS Astrium (now Airbus Safran Launchers) in Les Mureaux, France. The focus was placed on using an APOC setting and examining the use of the AOP and a suite of performance management tools in order to further improve situational awareness for all airport stakeholders, to improve the detection and resolution of operational disruptions through a collaborative decision making process; and to show that the APOC generally leads to increased overall airport performance. The exercise was considered to be a key validation milestone as it was the first opportunity for independent operational experts to simultaneously assess AOP information integrated into the overall APOC decision-making process.

o The concept moved to the more advanced **V3 level** exercise which took place in **July 2015** using **Shadow Mode** at Palma de Mallorca Airport (PMI/LEPA), but in effect was partially executed in **Live Trial** conditions. This activity aimed to show that data relating to landside processes at the airport could be incorporated into the AOP and used to assess the impact on ATV management, i.e. airside processes. It also demonstrated an improvement in situational awareness for airport actors through visibility of landside information impacting on airside operations. Departure predictability and temporal efficiency was improved through the increased accuracy of each flight's Target Off-Block Time (TOBT).

o The final exercise for this thread at **V3 level** also used **Real Time Simulation (gaming)** and took place in **February 2016** on the premises of industry partner AT-One in Braunschweig, Germany. The activity took advantage of a sophisticated validation platform capable of integrating the required prototypes supplied by industry partners to support the APOC concept, as

well as providing a realistic simulation environment to allow stakeholders to role-play in the APOC.

- **AOP/NOP integration with Target Time Management (TTM) aspects**

  o The network must be able to receive information from airports and vice versa (AOP-NOP integration) while using new procedures to deliver traffic to airports in a smooth flow that can be efficiently handled in the ground node (ATV turn-round sector) resulting in stable departure predictability. Three validation exercises were designed to advance this concept and further validated information sharing between the AOP and NOP.

  o The first exercise was conducted at **V3 level** using a **Live Trial** in the form of flight trials in **June 2013**, for selected flights inbound to Palma de Mallorca Airport (PMI/LEPA). Its main objective was to assess the feasibility of the Target Time of Arrival (TTA) procedure implementation to manage arrivals at the destination airport and to determine the impact on airport Key Performance Areas, mainly predictability. Due to the complexity of the Target Time Management (TTM) concept, this first activity only aimed to demonstrate a limited inbound traffic flow to a single airport operational environment. The exercise concentrated on the early and accurate prediction of the impact made by ATFM regulations on the AOP in congested situations to see how these changes affected airport performance (with a knock-on impact to network performance). An early AOP prototype was used to present a continuously updated picture of the airport's operating situation by integrating airport, NMOC[3] and local ATC real time data. This version of the AOP prototype also featured an impact assessment tool which allowed users to evaluate how changes in arriving traffic impacted airport and airline operations and how much of that impact was propagated back to the network on departure. Additionally the Network Manager used a tool to keep the NMOC continuously updated on both the impact of ATFM regulations on the airport and on the priorities of expected actions expressed by airspace users participating in the trial (Air Berlin, Air Europa and easyJet).

  o A second exercise was run concurrently with the one above, also at **V3 level** using the same **Live Trial** conditions in **June 2013** at Palma de Mallorca Airport (PMI/LEPA). In fact, these two exercises were organised jointly by the separate OFAs to ensure that the benefits in both airport and network management were addressed simultaneously. This activity looked at the TTA procedure and data sharing from the network's point of view and focused on optimising capacity through flight predictability improvement (flight adherence), moving from the current departure management (focused on

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[3] NMOC = Network Manager Operations Centre

CTOT[4]) to arrival management (focused on TTA); and reducing delays (mainly reactionary) by enhancing the participation of airspace users and airports in the arrival management process.

- o The third exercise was conducted at **V3 level** using **Shadow Mode** in **May 2016**, based at Madrid Airport (MAD/LEMD) and included traffic flows operating from Barcelona (BCN/LEBL), Palma de Mallorca (PMI/LEPA) and Alicante (ALC/LEAL) airports; additionally involving the three associated ACCs governing their respective TMA traffic volumes. The full TTM concept in SESAR is designed for the multiple airport operational environment integrated with the network, encompassing the coordination of target times along the full length of the relevant trajectory including the origin airport. This exercise was performed on the NMVP[5] connected to four prototype AOP systems (one for each airport) and a local FMP tool, connected through existing B2B web services (SWIM candidate services).

- o In addition to these exercises, a number of live demonstrations were conducted by the SESAR iStream project to test aspects of the TTA concept at Zurich and Paris CDG airports. This initiative focused on the business objectives of ANSPs and airspace users to show what can be achieved in the current operational environment. This activity in combination with the exercise described above showed that Target Time dissemination, adherence and execution, revision and monitoring and local DCB preferences are now possible for all involved actors and together form the common building blocks of the Target Time concept.

- **Integration of MET information in airport processes**

  - o Although the Solution was not directly responsible for producing new meteorological applications (to be deployed as Solution #35), it did nonetheless address elements complementary to Airport Operations Management – particularly where increased situational awareness of meteorological conditions improves operational decisions and use of airport resources. This work was coordinated with the SESAR Work Packages responsible for MET provision and development.

  - o A validation exercise at **V2 level** using **Real Time Simulation (gaming)** took place in **July 2014** on the premises of industry partner Selex ES (now Leonardo) in Rome, Italy. The focus in this exercise was on the integration of MET information and alerting to facilitate the management of adverse weather conditions at the airport, acknowledging its impact on operational planning, execution and overall airport performance. The exercise was also SWIM-enabled.

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[4] CTOT = Calculated Take-Off Time
[5] NMVP = Network Manager Validation Platform

> o A further validation exercise at the **V3 level** using **Shadow Mode** took place in **March 2016** at Milan Malpensa Airport (MXP/LIMC). This activity was the planned evolution of two predecessor exercises, forming an advanced combination of airport performance monitoring, runway DCB management and the integration of meteorological information – in a near-to-live operational environment using Selex prototypes hosted on ENAV's proprietary legacy systems platform with data shared via SWIM. This environment and a wide ranging set of objectives made it the most sophisticated V3 exercise in the Solution's validation roadmap.

Results and Performance Achievements

The scope of Solution #21 is a subset of the full Airport Operations Management concept developed in SESAR 1 and therefore performance assessment was conducted at the level of the Operational Focus Area responsible for its research activities. Performance benefits are outlined at the global Key Performance Area (KPA) level due to the large number of validation exercises. The Solution describes results and performance achievements in terms of the quantifiable KPA agreed and developed within the performance framework in the SESAR Programme.

Through the validation of this Solution, the following primary performance improvements and potential benefits were identified:

- An increase in the **Predictability** and **Flexibility** of airport operations (by integrating airport operations within the network); and

- An increase in the **Efficiency** in airport operations (by integrating airport operations within the network).

Secondary performance improvements, driven by the primary goals above, were also achieved:

- Contribution to incremental flight **Efficiency**;

- Better use of existing airport **Capacity**;

  - o Proactive management of predicted impacts to normal operations;

  - o Increased **Resilience** through quicker and effective recovery to normal operations from predicted or unpredicted adverse operating conditions;

Recommendations and Additional Activities

Additional activities should be considered during the industrialisation phase. These include:

- Affected stakeholders should check that deployment activities align to obligations mandated by the PCP under Regulation (EU) No 716/2014, particularly S-AF4.2

'Collaborative NOP' which requires that operational stakeholder ground systems shall be adapted to interface with network management systems;

- Consideration of the SESAR Solutions providing functionality to Solution #21, in particular Solution #46, to ensure that the required enabling technologies are in place to successfully achieve consistency in implementation;

- An assessment of the impact on Environmental Sustainability, which should improve due to reduced emissions on the ground through more efficient airport operations;

The implementation of the AOP and the exchange of information with the NOP is used by the Network Manager to improve predictability of short-term traffic flows. The continuous update of information is a feature of the concept and airports are advised to provide any available information that increases in accuracy where possible closer to the execution timeframe.

Therefore the following recommendations are made prior to or as part of the deployment:

- Upgrade local A-CDM information sharing platforms;

- Incorporate local business rules in the AOP (e.g. connecting passenger flows);

- Integrate the AOP with proprietary airspace user applications to facilitate passenger monitoring and TTA data exchanges;

- Consider training requirements for airport stakeholders involved in the new concepts;

Assumptions that are relevant for future deployment and that apply to this SESAR Solution:

- NMOC, FMP and airport-related systems are upgraded where necessary to support the new ATM functionalities;

- The SWIM service provided by Solution #46 will support the exchange of information between the AOP and NOP.

- Roles and responsibilities are clear, but the division of roles and responsibilities between airports and FMPs is subject to local variations and this should be recognised.

Actors Impacted by the SESAR Solution

- **Airport Operators** expect safe, punctual and more efficient operations, with increased predictability in both normal and adverse operating conditions;

- **ANSPs**, including local ATC (TWR) and local airspace (TMA/ACC), expect a high degree of conformance between planned and actual operations to be able to handle planned traffic demand safely and efficiently;

- **Airspace Users** (airlines and flight crew) expect to perform safe, punctual and efficient operations;

- **Ground Handling Agents** expect increased optimisation of resources; and

- The **Network Manager** expects better efficiency in network operations and sub-regional traffic flows by improving situational awareness through AOP/NOP integration, as well as an improvement in the use of overall network capacity.

Impact on Aircraft Systems

Minimal impact is expected on aircraft systems as it is envisaged that current fleet equipage in terms of performance and functionality is adequate to cope with new operating procedures and enabling technologies arising from this Solution.

Impact on Ground Systems

Future airport operations, as envisaged by SESAR and integrated within the ATM network in Europe, require the introduction of new enabling technologies in the ground infrastructure to support the new concepts.

Within the scope of this Solution, the main impacts for ground systems and airports in particular will be the introduction and/or upgrade of the following elements:

- **SWIM** – the concept of System Wide Information Management covers all ATM information including aeronautical, flight, aerodrome, meteorological, air traffic flow, and surveillance data. Existing ground systems such as AFTN, CDM messaging and B2B services will need to ensure that data exchanges between actors in the ATM system are SWIM compliant and have the necessary systems in place to support the concept.

- **AOP** – the Airport Operations Plan is the next generation of A-CDM platform. As an extension of CDM, the AOP contains a greater scope and quality of data in an increased timescale (typically to D-1), particularly with reference to airport operational performance targets. Stakeholders wishing to deploy this Solution must already have CDM as a baseline. Airports without CDM may opt to deploy the full AOP concept with CDM embedded.

Regulatory Framework Considerations

The main legislative consideration relevant to this Solution is the current Commission Implementing Regulation (EU) No 716/2014 of 27 June 2014 on the establishment of the Pilot Common Project supporting the implementation of the European Air Traffic

Management Master Plan (Text with EEA relevance). This IR determines the scope of ATM functionalities derived from the SESAR Programme that are considered to be mature and ready for deployment. Solution #21 contributes to the Step 1 Essential Operational Change for the 'Network Collaborative Management & Dynamic Capacity Balancing' key feature as defined in the European ATM Master Plan.

The provisions for Network Collaborative Management are described within the scope of Solution #20. The IR lays down the geographical scope for deployment and states that the identified operational stakeholders and the Network Manager shall operate Network Collaborative Management as from 1 January 2022.

Standardisation Framework Considerations

In order to ensure the maximum possible harmonisation in the implementation of the Solution, standardisation of the operational procedures developed within the Solution should be promoted.

The existing A-CDM standard and Community Specifications based on EUROCONTROL and EUROCAE documents should be reviewed. The agreed new information elements to be exchanged by stakeholders will need to be adopted by the EUROCONTROL ATM lexicon to ensure a common understanding and use of the data; and to allow integration with the existing A-CDM baseline.

This process should result in the standardisation of AOP information (data format, data quality etc.) and documented in a manner that ensures commonality of deployment at airports. An AOP/NOP implementation manual should be developed in the same way as the existing A-CDM implementation manual.

Considerations of Regulatory Oversight and Certification Activities

Other than the Implementing Rule for the Pilot Common Project outlined above which sets out the scope and timescale for deployment of new ATM procedures and technologies in Europe, there is no specific topic within the regulatory framework to be considered in deployment beyond the applicable currently existing regulation.

In general any impact on regulatory activities will primarily be to update policy, regulation and other working methods to include provision for the exchange of a wider scope of data in a common format between airports and the network.

Solution Data Pack

The Data pack for this Solution includes the following documents, some of which cover a wider scope than that defined by the Solution due to the on-going development activities in the Operational Focus Area responsible for Airport Operations Management. Only those

system requirements defined in the Technical Specification documents that are allocated to the Enablers under the scope of the Solution are to be considered:

- Regulatory overview;

- **SPR** – 06.03.01-D147 Edition 00.03.02 (25.11.2016). The document contains the safety and performance requirements for the Airport Operations Management concept developed in SESAR 1 by the member projects in OFA05.01.01.

- **INTEROP** – 06.03.01-D146 Edition 00.03.02 (25.11.2016). The document contains the interoperability requirements for the Airport Operations Management concept developed in SESAR 1 by the member projects in OFA05.01.01.

- **OSED** – 06.03.01-D145 Edition 00.04.02 (25.11.2016). The document, produced in three volumes (Part 1a, Part 1b and Part 2), contains the operational requirements and a full contextual explanation of the Airport Operations Management concept developed in SESAR 1 by the member projects contained in OFA05.01.01.

- **TS**: 12.06.02-D60 Edition 00.01.01 (11.07.2016). This document provides the functional analysis for the final system requirements of the Airport Operations Plan (AOP) to support the Airport Operations Management concept;

- **TS**: 12.06.03-D14 Edition 00.01.02 (12.05.2016). This document provides the functional analysis for the final system requirements of the Weather Information System for Airport Decision Support (WISADS) tool to support enhanced meteorological systems within the Airport Operations Management concept;

- **TS**: 12.06.07-D15 Edition 00.01.00 (13/07/2015)[6]. This document refines the functional analysis for Phase 2 system requirements of the AMAN, SMAN[7] and DMAN Integrated (ASDI) tool to support airport performance monitoring within the Airport Operations Management[8] concept;

- **TS**: 12.06.09-D24 Edition 00.01.02 (18.07.2016). This document provides the functional analysis for the final system requirements of the Airport Operations Plan (AOP) into the Network by SWIM (AINS) tool to support the integration of airport collaborating planning information and CDM processes into the ATM network;

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[6] Note that this deliverable was finally assessed and accepted by the SJU with some reservations. In particular, the document did not clarify what the ASDI function is within the airport / ATC system environment. Moreover, the SWIM Services used by the ASDI are not specified.
[7] The term 'SMAN' used in this acronym is outdated and should correctly be referred to as A-SMGCS, Advanced Surface Movement and Guidance Control Systems.
[8] ASDI also supports the integration of ATC systems into A-CDM processes (outside the scope of this Solution).

- **TS**: 12.07.03-D25 Edition 00.01.01 (10.05.2016). This document provides the functional analysis for the final system requirements of the Airport Performance Assessment Management Support System (APAMS) tool to support airport performance management within the Airport Operations Management concept;

- **TS**: 12.07.05-D11 Edition 00.01.02 (15.07.2015)[9]. This document refines the functional analysis for Phase 3 system requirements of the Improved Weather Information System (IWIS) tool to support enhanced meteorological systems within the Airport Operations Management concept; and

- **TS**: 15.04.09.c-D17 Edition 00.01.06 (26.04.2016). This document presents the final technical specification of the Ground Weather Monitoring System including updates of validated requirements. It gives a full reference for the basis on which prototype development has been conducted, taking into account the MET architecture at the local aerodrome level. It lists the system requirements derived from consolidated operational MET requirements.

SWIM:

- ISRM: 08.03.10-D65 00.01.01 including the ISRM v2.0, the ISRM Service Portfolio and the SDDs of the NOP related services (METAR, TAF, SNOWTAM, AirportMETObservation, AirportMETForecast, ICAOMetLocalReport , AirportMETAlert, RunwayManagementInformation, METREPORT).
- TS: 14.01.04-D44-004 00.01.00. This document specifies the SWIM Yellow Profile including the requirements applicable to interface with the SWIM-TI.
- 08.01.01-D48 SWIM Compliance Report both Services listed above.

In addition to the above mentioned documents, the SWIM reference documents are included in the data packs of the SESAR Solutions SWIM Yellow Profile and SWIM Framework.

Intellectual Property Rights (foreground)

The foreground is owned by the SJU.

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[9] Note that this deliverable was finally assessed and accepted by the SJU with some reservations. In particular, requirements should have been more clearly expressed (e.g. source of information) and the functional analysis and decomposition requires improvements.