



# Final Project Report

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# PJ19 CI

## PJ19 – CONTENT INTEGRATION

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### Abstract

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The Single European Sky ATM Research - SESAR - 2020 Programme aims to modernise and harmonise the European Air Traffic Management (ATM) System from operational and technological perspective. It develops and validates different ATM Concepts and Technologies (the SESAR Solutions) that contributes to achieving its high-level performance objectives. In this complex context, it is crucial to have a transversal activity that generates a consolidated big picture and ensure consistency & coherency of the future European ATM System. This shall ensure the delivery of a best in class, globally interoperable and high performing Air Transport system. These transversal activities are realised by the Content Integration project.

The Final Project Report describes the activities and the major achievements made during the last three years (from November 2016 to December 2019). Beyond some major deliverables such as the SESAR Concept of Operations, the SESAR ATM Architecture based on an Enterprise Architecture (EA) approach with the use of the European ATM Architecture (EATMA) framework, and the performance consolidation and aggregation of the SESAR Solutions, the Content Integration activities enabled the SESAR 2020 Partners and the SESAR Joint Undertaking (SJU) in:

- Structuring the work at SESAR Solutions and SESAR 2020 programme level;
- Increasing the overall data quality be it at SESAR Solution and at SESAR 2020 programme level;
- Ensuring consistency and coherency at programme level and
- Addressing the Cyber Security challenge in delivering 'securable and resilient' SESAR Solutions.

This report provides also the list of rooms for improvements to implement for the next three year of the SESAR 2020 programme starting from year 2020.

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## Executive Summary

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The Single European Sky ATM Research - SESAR 2020 - Programme aims to modernise and harmonise the European Air Traffic Management (ATM) System from operational and technological perspective. It develops and validates different ATM Concepts and Technologies (the SESAR Solutions) that contributes to achieving its high-level performance objectives. In this complex context, it is crucial to have a transversal activity that generates a consolidated big picture of the future European ATM System described by the SESAR2020 Concept of Operations, the Architecture Description Document, the many Services and the associated performance results. This shall ensure the delivery of a best in class, globally interoperable and high performing Air Transport system. These transversal activities are realised by the Content Integration project.

Due to its pivotal nature, the Content Integration project contributed to an overall increase of the SESAR 2020 Wave 1 programme execution, governance and delivery quality from November 2016 to December 2019. Content Integration project achievements are of different nature:

- Achievements at SESAR 2020 programme level **improving the way SESAR Solutions worked together** and described their content within the predefined frameworks (Performance and European ATM Architecture (EATMA)) and high investment in training, coaching and communities of practices;
- Achievements referring to the **improvement of the quality of the content provided by the SESAR Solutions**; and the **consistency and coherency** of the deliverables at programme level and the EATMA Framework continuous evolution allowing to capture more elements of different nature and their relationships to better describe the European ATM system.
- Achievements in **starting to address cyber security** within ATM with the objective of delivering ‘securable and resilient’ SESAR Solutions with the set-up of a dedicated group of experts working at transversal level providing a common risk security assessment method, and permanent support and coaching to the SESAR 2020 Solutions.
- Achievements referring to the improvement of the SESAR Solution **validation activities monitoring** with the development of several dashboards (performance, architecture, cyber security) used on a daily basis to anticipate as much as possible the issue and/or difficulties SESAR Solutions were facing to; and a **pro-active role**:
  - to train, coach and support SESAR Solutions **to validate ATM Concepts and Technologies**;
  - to support the SESAR Solutions **to prepare the Maturity Gates**;
  - to support SJU in the **SESAR 2020 Work Programme execution** and
  - to support the **European ATM Master Plan 2019** update campaign.

In addition, the EATMA framework enabled the link of any architecture element to existing standard and/or regulation; or to identify needs for new standard and/or regulations. The European ATM Master Plan project used this **information to produce the Standardisation Roadmap**.

For the next three years (from 2020 to 2022), the Content Integration project will continue to generate a consolidated big picture, and to ensure consistency and coherency of the future European ATM System. Nevertheless, Content Integration project proposes some improvements:

- in order to **better streamline the SESAR Solutions, the Content Integration and SJU lifecycles**:
  - integrate all operational and architecture activities in a single work package to avoid a ‘silo’ syndrome;
  - set a common list of milestones with the SESAR Solutions and SJU;
  - Set a rolling Change Management process linked with the SESAR Solution Maturity Gate process.
- In order to **improve the Service Orientated Architecture (SOA) approach** with the nomination of SOA champions in charge of promoting the SOA approach and of valorising any concrete SOA results.
- In order to **re-enforce the usage of the architecting activities as support to the SESAR 2020 programme** to:
  - Further **integrate the European ATM Master Plan** elements into EATMA framework;
  - Improve the **integration of Institutional Enablers** in EATMA;
  - Continue to **explore the potential of the Business Architecture** elements in the context of the European ATM Master planning activities. (e.g. Strategy, Tactic, Mission);
  - Improve the **integration of the SESAR 2020 Performance** framework.



# 1 Project Overview

SESAR 2020 Applied Research and Pre-Industrial Development activities are undertaken based on a structured work programme to help the development of key topics relevant for Air Transport evolution as described below in **Figure 1: SESAR 2020 Research Challenges and Key Features**



**Figure 1: SESAR 2020 Research Challenges and Key Features**

The SESAR 2020 Programme aims to modernise and harmonise the European ATM System from operational and technological perspective. It develops and validates different ATM Concepts and Technologies (SESAR Solutions) that contributes to achieving its high-level performance objectives. In this complex context, it is crucial to have a **transversal activity that generates a consolidated big picture and ensure consistency & coherency of the future European ATM System** described by the SESAR 2020 Concept of Operations, the Architecture Description Document, the many Services and the associated performance results. This shall ensure the delivery of a best in class, globally interoperable and high performing Air Transport system. These transversal activities are **realised by the Content Integration project**.

## 1.1 Operational/Technical Context

Using Concept of Operations (CONOPS) as a reference, the SESAR Solutions intend to provide a coherent, consistent and validated view on how ATM performance can improve. SESAR Solutions are often linked and dependent on each other, often using the same resources in their implementation. There is therefore a need to ensure that these SESAR Solutions, brought altogether are coherent, consistent from a holistic point of view, and as a whole still delivering the performance improvements to European ATM system.

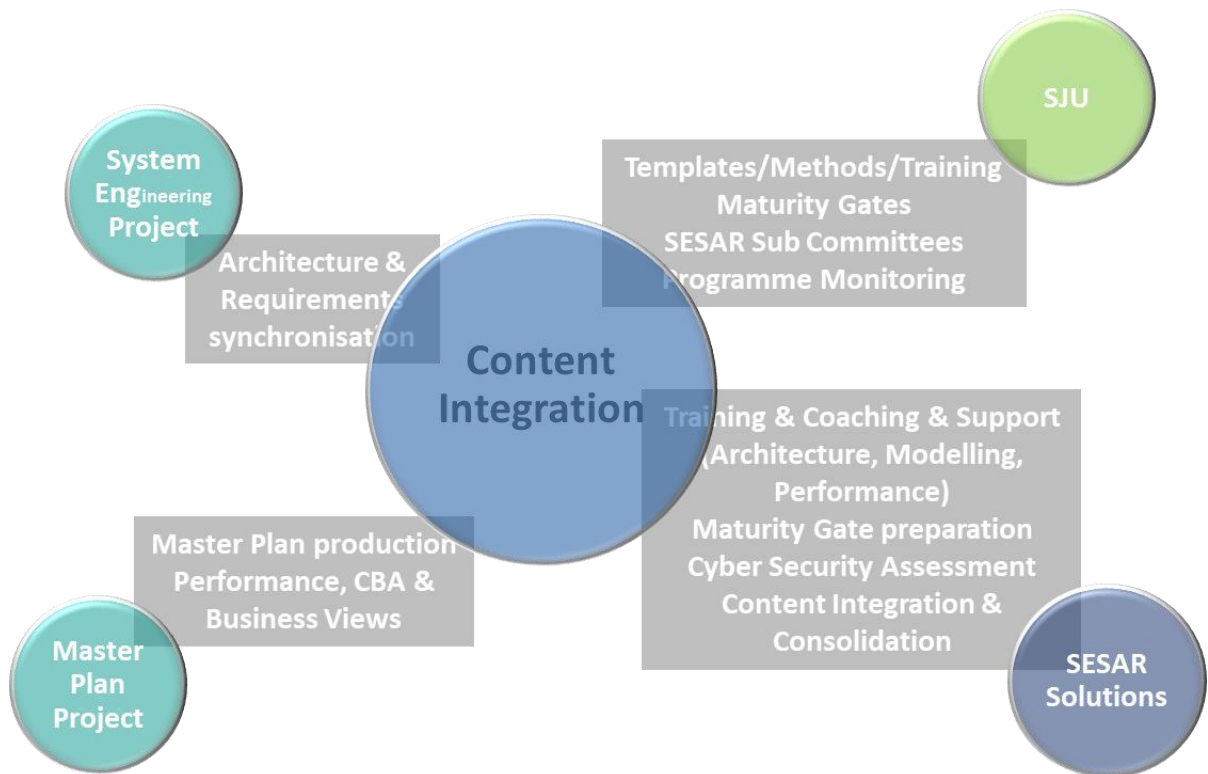


The Content Integration project **enables the assessment of the overall performance of the SESAR Solutions brought together** against the performance improvements expected for the European ATM system and set by the European ATM Master Plan.

The Content Integration project **provides the SESAR Solutions with guidance, training, coaching and support** to define and validate ATM Concept and Technologies. It also supports the process to **asses their maturity (completeness, consistency and coherency) from a holistic perspective** represented in the SESAR 2020 Concept of Operations and the SESAR Architecture Reference. The Content Integration project provides similar support to other SESAR Transversal activities such as the European ATM Master Plan (ATM Master Plan project) to support the European ATM Master Plan update campaign, and the System Engineering project to ensure synchronisation between SESAR Architecture information and the SESAR requirements.

In addition, the Content Integration project **provides support to the SESAR Joint Undertaking (SJU) to assess the maturity of the SESAR Solutions**, to monitor the SESAR 2020 Programme execution and to support the SJU/SESAR governance decision making.

The Content Integration project plays a pivotal role within the SESAR 2020 work programme. It needs to **connect to all SESAR Solutions**, but also to **the other Transversal projects** (ATM Master Plan and System Engineering projects) and **the SESAR Governance** (SJU and all SESAR 2020 governance bodies). This pivotal role is depicted in the Figure 2 below.



**Figure 2: The pivotal role of Content Integration within SESAR 2020 Work Programme**

To perform its role, a set of detailed objectives are defined for the Content Integration project. These objectives are summarised in chapter 4.

## 1.2 Key Project Results

### 1.2.1 Key Achievements

Due to its pivotal nature, the Content Integration project contributed to an overall increase of the SESAR 2020 Wave 1 programme execution, governance and delivery quality from November 2016 to December 2019. Content Integration project achievements are of different natures:

- Achievements at SESAR 2020 programme level **improving the way SESAR Solutions worked together** and validated their content within the predefined frameworks (Performance and EATMA) with high investment in training, coaching and communities of practices (EATMA and Performance Communities);
- Achievements referring to the **improvement of the quality of the content produced by the SESAR Solutions**; and its **consistency and coherency** at programme level;
- Achievements in **starting to address cyber security** within ATM, primarily to deliver 'securable and resilient' SESAR Solutions, with the set-up of a dedicated group of experts working at transversal level providing a common risk security assessment method, and permanent support and coaching to the SESAR Solutions.
- Achievements referring to the improvement of the SESAR Solution **validation activities monitoring** with the development of several dashboards (performance, architecture, cyber security) used on a daily basis to anticipate as much as possible the issue and/or difficulties SESAR Solutions were facing to; and to a **pro-active role**:
  - to support SESAR Solutions **to prepare the Maturity Gates**;
  - to support SJU in the **SESAR 2020 Work Programme execution** and
  - to support the European ATM Master Plan 2019 update campaign.

Ultimately, these achievements enabled SJU to **better assess the maturity of the SESAR Solutions**.

These quality improvements are specifically noticeable for what concerns:

- The performance assessment and consolidation,
- The system, service and information architecture,
- The Cyber Security development and
- The maturity of the European ATM Architecture (EATMA) framework.

#### 1.2.1.1 Working together - Frameworks and knowledge sharing

The maturity of the architecture (European ATM Architecture – EATMA) and performance frameworks increased considerably. Improvements made were not anymore in the building of the meta-model as in SESAR 1 programme, but in the better use of the meta-models to serve the SESAR Solutions and the SESAR 2020 Wave 1 programme. They went in the direction of a better integration between the different subjects (Operational, System, Service and performance and SESAR Solution dependencies) and of supporting the European ATM Master Plan. Adjustments to the EATMA and Performance framework were done in particular to better align the European ATM Master Plan level 2 (the architecture view) with the level 1 and 3.

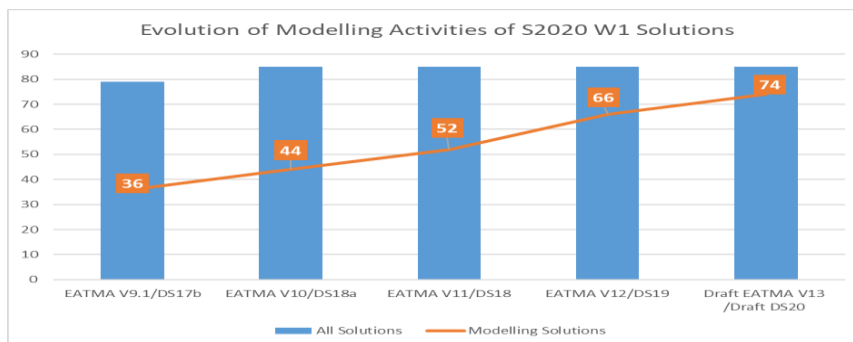


One of the achievements of the Content Integration project was **to reach a common agreement on a way of working together not imposed contractually**. This required a lot of persuasion, communication, flexibility, training/coaching and sharing of knowledge. The table below summarises all the events, which happened along the 3 years of the SESAR 2020 Wave 1 programme:

- **624 Coaching/guidance sessions** (EATMA Café, EATMA Digest, Architecture and Performance Communities of Practice, Cyber Security, CBA, Performance Assessment) with SESAR 2020 Solutions.
- **73 Training sessions** (SESAR Briefing sessions, EATMA training, modelling training, DataSet (DS) campaigns, performance training, change management).
- **45 Joint meetings** with SESAR Solutions to prepare the maturity gates. These joint meetings took place all in 2019 to support the SESAR 2020 Solution maturity assessment.

This does not include the meeting/coordination with the European ATM Master Plan and the System Engineering projects, nor meetings with SESAR Solution, which Content Integration project contributed to.

As shown in below, from 36% of SESAR Solutions applying the architecture framework (EATMA) at the beginning of SESAR Wave 1, we are now reaching 74% of the SESAR Solution applying an even enhanced architecture framework and common architecting methods. In addition, 100% of the SESAR Solutions are applying the Performance Framework and common performance assessments method.



**Figure 3 Evolution application of architecture (EATMA) framework by SESAR 2020 Solutions**

### 1.2.1.2 Improved quality

One of the main contributions of the Content Integration project is on the improvement in quality, accuracy, coherency and consistency of the content delivered by the SESAR Solutions.

This is mainly the result of an increasing number of SESAR Solutions complying with the common rules and methods set by Performance and EATMA frameworks guiding the description of the operational, technical, service, information and performance content. The Content Integration project produced the Steering Principles from the start of SESAR 2020 Wave 1. This promoted by the SJU and supported by the numerous tools and frameworks, improved the quality of the information produced at SESAR Solutions and content integration levels along SESAR 2020 Wave 1. This is also the result of an impressive training and coaching activities handled via face to face or WebEx® training, or via the user community of practice (such EATMA Forum, EATMA Café, EATMA wiki pages, performance community of practice, cyber security) as described in the previous section (1.2.1.1).

In addition, permanent activity monitoring and pro-active attitude towards the SESAR Solutions enabled the Content Integration project and the SJU to anticipate issue, concerns and difficulties SESAR Solutions were facing. Corrective measures were agreed in close collaboration with the SESAR Solutions and the SJU.

The Content Integration project developed dedicated and automated dashboards to support this permanent monitoring:

- Performance Dashboard,
- Cyber Security Dashboard,
- EATMA maturity reports,
- Ad-hoc reports made on request from SESAR Solutions and/or SJU.

### 1.2.1.3 Cyber Security

The Content Integration project with the support of SJU, ensured that all SESAR Solutions have taken appropriate approach in face of **cyber security challenge**. It provided steering guidance, principles and the Security Risk Assessment methodology, through SecRAM [2] to support and facilitate the production and the integration of the security requirements produced by SESAR Solutions. This task was challenging with many Partners/Organisations having to comply with a number of European, National or even corporate security requirements and regulations making the information sharing very difficult. A dedicated task force<sup>1</sup> examined the approach of cyber security challenge in SESAR 2020 and derived recommendations to be applied programme level.



The Content Integration project throughout pro-active continuous coaching and support helped the SESAR Solutions to follow the SecRAM process, to perform their risk assessment and to generate security requirements. The Content Integration project set-up a dedicated Community of Practice and organised several meetings with the SESAR Solutions. It developed a dedicated dashboard to monitor the Cyber Security activities. Starting from almost scratch at the start of SESAR 2020 Wave 1 programme, 41 of the SESAR Solutions (50% of the total number of SESAR Solutions) performed their risk assessments and generated risk requirements. The Content Integration reviewed and consolidated these risk requirements at the Maturity Gate level.

### 1.2.1.4 Support to SESAR Maturity Gate

The Content Integration provided lot of **support to the SESAR Solutions to reach the program quality criteria** in particular to pass the maturity gates. In 2018 and 2019, Content Integration project delivered a considerable amount of effort in the preparation of maturity gates. This was the purpose of many joint meeting (most of the time WebEx<sup>®</sup>) with the SESAR Solutions two to three months before the gate. A forefront activity, which should become regular in SESAR 2020 Wave 2.

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<sup>1</sup> SJU launched a Cyber Security taskforce early 2017. End of 2017, this taskforce provided Cyber Security requirements that could impact the performance framework, and a list of security-prioritized SESAR Solutions.

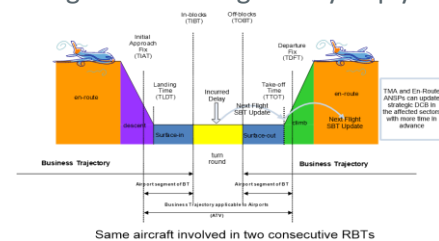
Similar support was provided to the SJU with Content Integration being included in the SESAR Maturity Gate process. Content Integration provided **SESAR Solution maturity assessment as input for the Maturity Gate**. At the end of the SESAR 2020 Wave 1 programme, the SESAR Maturity Gate process even changed with the SJU becoming involved in the joint meeting made with the SESAR Solutions well in advance of the maturity gate itself.

Due to the high amount of Maturity gates occurring at the end of SESAR 2020 Wave 1, Content Integration had to make priorities agreed with the SJU, to support a selected number of maturity gates preparation. Two framework and methodologies were used to assess the maturity of the SESAR Solutions: the European Operational Concept Validation Methodology (E-OCVM) to assess the maturity of the SESAR Concepts and the Technological Readiness Level (TRL) to assess the maturity of the SESAR technologies. The SESAR Solutions going to the E-OCVM V3/TRL6 maturity were the top priority. In total, the project supported 45 SESAR Solutions to prepare and run the maturity gates. Even if not all Solutions could be directly supported, Content Integration facilitated and provided the guidance to all solutions for the generation of quality reports (Coverage and Completeness Report, Compliance Report, Content Report) that are used during the Gate Support WebEx. These reports provided figures on the quality and spotted any issue in the architecture designed by the SESAR Solutions. This helped any SESAR Solution to do a self-assessment to be better prepared for the Maturity gates.

### 1.2.2 Key deliveries

Out of 58 contractual deliverables, 47 deliverables were produced and 11 were removed. Amongst the 47 deliverables, the major deliveries are:

- The **SESAR Concept of Operation - CONOPS**, especially, the light version (**Operational Concept Document – OCD**) delivered end of 2018. It describes the future Air Traffic Management (ATM) operations envisaged in Europe. The objective is to provide a high-level view of the operational characteristics of ATM in the future European airspace coming from the development of the SESAR Programme, and the main significant changes they imply in operating practices along with the capabilities they require. It is fully aligned with the ATM Vision defined for the 2019 edition of the European ATM Master Plan. It is an important reference for global interoperability and harmonization, as it has been adapted for Europe from the International Civil Aviation Organisation (ICAO) Global Air Traffic Management Operational Concept



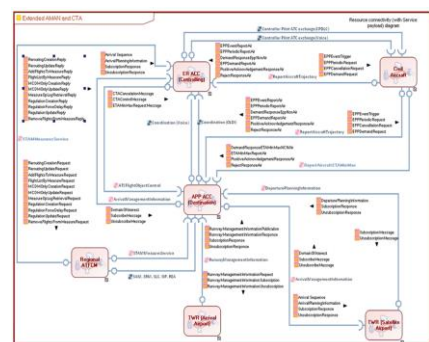
SESAR Concept of Operation (CONOPS) for each content integration cycle



- D2.1 - CONOPS (2017)
- D2.3 - OCD (2018)
- **D2.5 - CONOPS (2019) – reference material for SESAR 2020 Wave 2 work programme**

Documents available at [www.cordis.europa.eu](http://www.cordis.europa.eu)

- The SESAR reference architecture (**European ATM Architecture – EATMA**) and the associated description



(**Architecture Description Document – ADD**) delivered mid of 2019. The Architecture Description Document (ADD) provides a high-level blueprint of the European ATM System as a system of interoperable systems. It gives a consolidated overview based on evaluation and integration of SESAR solution architectures. It highlights the parts of the overall architecture, which will need to change to achieve the state expected at the end of SESAR2020 Wave 1 solutions deployment. It is also including the Integrated Roadmap/DataSet, the set of the Operational Improvement Steps (OI), the System and Standardisation Enablers (EN). The European ATM Master Plan uses this information to produce the Level 1 and Level 2 views, and for the Level 3 update.


SESAR reference architecture (European ATM Architecture) & associated description (Architecture Description Document – ADD) produced for each content integration cycle



- D3.4 - ADD (2017)
- D7.7 - ADD (2018)
- **D3.10 - ADD (2019) – reference material for SESAR 2020 Wave 2 work programme starting early 2020**

*Documents available at [www.cordis.europa.eu](http://www.cordis.europa.eu)*

The European ATM Architecture is also available in the **European ATM (eATM) Portal**. The eATM Portal provides architecture information linked with the Executive view of the European ATM Master Plan and with the European ATM Deployment monitoring tools. It provides a web based presentation of the key elements of the European ATM Architecture. The eATM portal is intended to be used primarily for internal SESAR 2020 purposes when developing the future ATM System and support the planning for its deployment with architecture information. The portal is intended to be used for disseminating the SESAR 2020 results and worldwide communication. Therefore, the portal is made of public and restricted areas. The working (restricted) website is accessible only to SESAR 2020 contributors and provides them with information to support achieving their project objectives; while the public website provides consultation possibilities world-wide. Both sites allow access information on Level 1, 2 and 3 of the European ATM Master Plan, described in reference to European ATM Architecture information. They also provide a mapping of the European ATM Master Plan with the Global Air Navigation Plan (GANP) produced by ICAO. However, the working site provides access to more performance, programmatic and Architecture information and enables visualisations of past and future information status.

- eATM Portal can be accessed at <https://www.eatmportal.eu/>

*There are two options, access to the public area (without restriction) or the working area (requires login with suitable credentials).*

- The performance consolidation and aggregation of the SESAR 2020 Wave 1 Solutions (**consolidated Performance Assessment And Gap Analysis Report – PAGAR**) delivered end of 2019. It provides an overview of the consolidation of the performance assessment from the SESAR Solutions. It

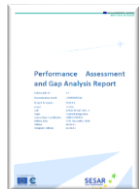


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covers the Safety, Environment, Predictability, Punctuality, Capacity, Civil-Military Cooperation and Coordination, Human Performance and ATM Security, and Cost Efficiency Key Performance Areas (KPA)s. It also contains important information related to the relationship between the SESAR Solution used for the construction and refinement of the deployment scenarios of the 2019 edition of the European ATM Master Plan.

Consolidated Performance Assessment and Gap Analysis Report (PAGAR) produced for each content integration cycle



- D4.3 - PAGAR (2017)
- D4.6 - PAGAR (2018)
- **D4.9 - PAGAR (2019) – reference material for SESAR 2020 Wave 2 work programme starting early 2020**

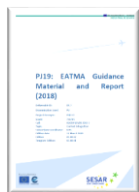
Documents available at [www.cordis.europa.eu](http://www.cordis.europa.eu) with restricted access rights

- The **Architecture and Performance Frameworks and Guidance** documents used to design and validate the SESAR solutions. Architecture and Performance framework and supporting guidance and methodologies are now part of the SESAR 2020 Programme library, meaning they are to be considered by all the SESAR Solution when defining and validating SESAR concept and technology.

European **ATM Architecture (EATMA)** framework is a **structure that encompasses different aspects and elements of the European ATM** and the involved in it stakeholders. Its main purposes are to structure the Research & Innovation activities, to allow an easy way of checking the overall coherency and consistency of developments and to provide an integrated reference and a common ground for issue detection and resolution. It could be used as a decision support instrument at SESAR 2020 Programme level or in the context of deployment investment decision making, as it captures the description of the evolution of the ATM system and provides the context of the changes. It is also a valuable tool for supporting ATM evolutions coordination with external partners at a global level, as they use similar frameworks (e.g. FAA Next Gen, ICAO).



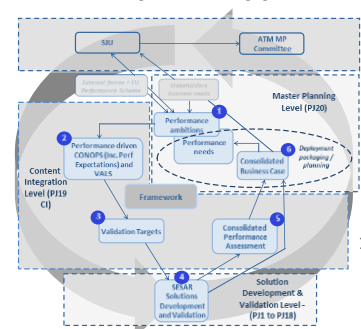
EATMA framework material produced at the start of each content integration cycle.



- D5.1 - EATMA guidance material and report (2016)
- D5.3 - EATMA guidance material and report (2017)
- D5.7 - EATMA guidance material (2018)
- **D5.11 - EATMA guidance material (2019) – reference material for SESAR 2020 Wave 2 work programme starting early 2020**

Documents available at [www.cordis.europa.eu](http://www.cordis.europa.eu)

The **Performance framework describes the performance-driven development approach** applied within the SESAR programme. It provides a framework ensuring that the programme develops the ATM concept and technologies needed to meet the Performance Master Ambitions described in the European ATM Master Plan. These Performance Ambitions and Expectations at ECAC-level are broken down into Validation Targets allocated to SESAR



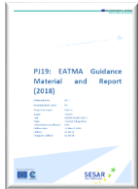
Founding Members





Solutions. The Performance framework provides also the SESAR Performance Driven Approach, the framework of metrics (Key Performance Areas (KPAs), Key Performance Indicators (KPIs), etc.) and how these elements contribute to the overall European performance assessment.

Performance framework material produced at the start of each content integration cycle.



- D4.1 PJ19: Performance Framework (2017)
- D4.2 PJ19: Validation Targets (2017)
- D4.4 PJ19: Performance Framework (2018)
- D4.5 PJ19: Validation Targets (2018)
- **D4.7 PJ19: Performance Framework (2019)**
- **D4.8 PJ19: Validation Targets (2019)**

Documents available at [www.cordis.europa.eu](http://www.cordis.europa.eu)

In parallel, few non-contractual deliverables have been produced:

- The **SESAR 2020 Steering Principles** providing a set of guidance and recommendations (relating to operational concept, performance assessment, system and service design and architecture development) to deliver the SESAR Solutions. It is a set of high-level guidance organised per context and created to ensure that the SESAR Solutions development and validation are consistent and coherent with the objectives set for SESAR 2020. The Steering principles are now part of the SESAR 2020 Programme library, meaning they are to be considered by each the SESAR Solutions when defining and validating SESAR concept and technology.

SESAR 2020 Steering Principles produced at the start of a given content integration cycle



- D2.0.010 - SESAR 2020 Steering Principles (2017)
- D2.0.020 - SESAR 2020 Steering Principles (2018)
- **D2.0.030 - SESAR 2020 Steering Principles (2019) – reference material for SESAR 2020 Wave 2 work programme starting early 2020**

Documents available at [www.cordis.europa.eu](http://www.cordis.europa.eu)

- The **Safety Reference Material (SRM)** details a broader approach to safety assessment in which ATM/ANS's positive contribution to aviation safety (a success approach), as well as ATM/ANS's negative effect on the risk of an accident (a failure approach), are both addressed. The former is required to show whether the concept is intrinsically safe, in the absence of failure i.e. when working as specified. It provides a detailed practical guidance to perform the safety assessment and assurance of the whole range of SESAR Solutions throughout the typical system development lifecycle being considered in the SESAR Development Phase (i.e. for each of the European Operational Concept Validation Methodology (E-OCVM) V1-V4). The SRM predetermines the safety assurance *objectives* and *activities* throughout the system development lifecycle required to address the *asked questions* concerning SESAR safety (up to and including a pre-industrialization



phase for the SESAR Programme 2020). The safety assurance objectives and activities have been developed to mainly address SESAR ATM Operational Solutions as the latter have direct operational consequences with safety implications (i.e. accidents and operational incidents perceived by the airspace users).

Safety Reference Material produced within for SESAR 2020 programme

- **D4.0.060 Safety Reference Material Ed 00.04.01**

Documents available at [www.cordis.europa.eu](http://www.cordis.europa.eu)

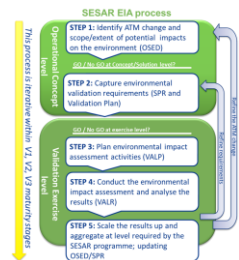
- The **Guidance to apply the SRM** provides practical guidance to support the safety assessment activities as defined in the SESAR Safety Reference Material (SRM). This guidance shall be used in conjunction with the SRM described above.

Guidance to apply the SRM produced within for SESAR 2020 programme

- **D4.0.050 Guidance to apply the SRM**

Documents available at [www.cordis.europa.eu](http://www.cordis.europa.eu)

- The **SESAR Environment Assessment Process** presents a common approach to performing Environmental Impact Assessments (EIAs) in SESAR. This common approach is vital to ensure the compatibility of different assessments to estimate the overall environmental impact of SESAR-related deployments. It may also be used to as a guideline to assess the performance change resulting from any airspace change proposal.



SESAR Environment Assessment Process produced within for SESAR 2020 programme

- **D4.0.080 SESAR Environment Assessment Process (2019)**

Documents available at [www.cordis.europa.eu](http://www.cordis.europa.eu)

## 2 Links to SESAR Programme

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### 2.1 Contribution to the European ATM Master Plan

The Content Integration project provided extensive support to the European ATM master Plan 2019 campaign:

- Content Integration project took the responsibility to initiate, run, monitor and release the various DataSet campaigns (DS17, DS17b, DS18a, DS18 and DS19). Dedicated change management process was defined and used with the provision of the supporting tools to run the campaign. Also, close coordination between SESAR Solutions, SJU and the European ATM Master Plan project was ensured via regular check points and ensuring all actions were completed in due time.
- Content Integration pushed for a more rigorous and systematic use the operational, system, service and information architecture to assess the various changes proposed by the SESAR Solutions. This enabled a significant increase of the quality of the information used by the European ATM Master Plan project (e.g. Operational Improvement steps, Enablers, Operational Environment, Stakeholders, ATM Capabilities).
- Content Integration project contributed to the ATM Vision, Drone integration, CNS Roadmap, Performances elements and the activity of Solution groupings for Deployment Scenarios of the revised European ATM Master Plan 2019.

### 2.2 Contribution to Standardisation and regulatory activities

Content Integration project was not mandated to contribute to standardisation and/or regulatory activities. Nevertheless, the EATMA framework enabled the link of any architecture element to existing standard and/or regulation; and to identify needs for new standard and/or regulations. Content Integration provided the means to maintain this information by the application of the Content Integration change management process and the use of Standardisation Enablers. The European ATM Master Plan project used the Standardisation Enablers to produce the Standardisation Roadmap.

## 3 Lessons Learned, Conclusion and Next Steps

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### 3.1 Lessons Learned

At the end of running the Content Integration for 3 years, the project made a lessons learned exercise. The main topics coming out are:

- The **working together** at programme level and how to improve it for SESAR 2020 Wave 2;
- From a content point of view, the **Service Orientation Architecture (SOA)** in SESAR;
- Considering that SESAR solutions are to be deployed, how to strengthen the link with what happens **beyond V3**.

#### 3.1.1 Working together

Not discussing how the SESAR 2020 programme ran, it was nevertheless needed to discuss how the Content Integration project collaborated with the SESAR Solutions and the SJU as this was a true challenge at the start of SESAR 2020 Wave 1. Overall, the feedback received by the SESAR Solution and the SJU was very positive. Content Integration activities demonstrated concrete benefits. Nevertheless, the lessons learned revealed several issues:

- **SESAR Solutions vs Content Integration lifecycle were not aligned**; and the yearly lifecycle of Content Integration delivery (PAGAR, ADD, CONOPS, EATMA, DataSet ...) was questionable as perceived to be too rigid sometime, and also putting too much pressure on work with information now always available or consolidated from the SESAR Solutions. Also, the Content Integration organisation with the distribution of operational and system activities into two work packages created difficulty in synchronisation and coordination with the SESAR Solutions. This became a real difficulty for the Maturity Gate (especially with gates taking place at the very end of SESAR 2020 Wave 1 programme) and the support for the European ATM Master Plan update campaign (the production of the DataSet).

Improvement suggested for SESAR 2020 Wave 2:

- no yearly Content Integration deliveries but intermediate version (at mid of SESAR 2020 Wave 2) and final version at end of SESAR 2020 Wave 2;
- integrate operational and system architecture activities into on single work package;
- Set a rolling process for the dataset production linked with the Maturity Gate and the next European ATM Master plan update campaign;
- Avoid to have maturity gates scheduled at the end of the SESAR 2020 Wave 2 programme;
- Agree on common milestones for SESAR solutions, Content Integration and SJU before summer 2020 and regular follow-up. This should include cut-off dates for some inputs needed by the Content Integration work (such as Solution performance assessment, architecture information);
- Identify and monitor risk at programme level for SESAR Solutions not able to meet the agreed Content Integration milestones.

- The **quality of the Content Integration relies on the quality of information** produced by the SESAR Solutions (be it for architecture or for performance). Some of these activities (architecture for example) were not part of the requirements set in the SESAR 2020 Wave 1 call. Also the distribution of some activities over the whole set of SESAR Solutions led to difficulties to have the whole set of expertise in all SESAR Solutions for task which were not full time.

Improvement suggested for SESAR 2020 Wave 2:

- have a pool of modellers at Partners level rather than one modeller per solution;
- make the Modelling café mandatory (currently voluntary);
- promote the use of the self-architecture assessment reports at SESAR Solution level;
- put priority on information which will be reused beyond SESAR (see section 3.1.3 below);
- reinforce the briefing sessions with all SESAR Solutions and SJU at the start of SESAR 2020 Wave 2 to provide/remind the reference material, the guidance information, the support available from the Content Integration and the common milestones (and impact not to meet it).

### 3.1.2 Service Orientation

Service Orientation was and remain one of the main steering principles for SESAR activity. This is mentioned in the recent European ATM Master Plan and the Airspace Architecture Study (AAS). However, as a matter of facts, from the Content Integration and the information provided by the SESAR Solutions, there were little progress in this service orientation in the context of SESAR 2020 Wave 1 programme. This is raising several issues:

- Issue is likely more at the level of **service mind set** before being a modelling and/or process issue. Service orientation was one of the major steering principles. This was also part of the Maturity criteria. The AAS and the European ATM Master Plan further recognised this major objective. In addition, Content Integration project reminded the SESAR Solutions several times. This seemed still not to be fully recognised, understood and applied at SESAR Solution level. There was a real need to better promote the SOA approach at SESAR 2020 programme level.

Improvement suggested for SESAR 2020 Wave 2:

- Promote the SOA approach;
- have one or several Service Mentor at Content Integration level “selling” SOA within the SESAR 2020 Wave 2 programme;
- make more pro-active the Content Integration SOA experts;
- provide a Service activity Dashboards to monitor and promote the SOA approach;
- communicate on concrete service success stories.
- **Content integration process to assess/coordinate the change requests on Service and ATM Information** seemed not to be in an efficient way, also not even always fully visible at SESAR Solutions level. This resulted in a little number of change requests for SESAR 2020 Wave 1 while some SESAR Solutions identified change at service and ATM information levels but not integrated at the Content Integration level.

Improvement suggested for SESAR 2020 Wave 2:

- make more pro-active the Content Integration SOA experts towards the SESAR Solutions;
- arrange some specific briefing sessions about SOA and the support Content Integration is ready to provide, at the start of SESAR 2020 Wave 2;
- make the content integration process used to assess/coordinate the change requests on Service and ATM Information agile and fully visible at SESAR Solution level;
- reinforce the link with the Service and AIRM change management bodies beyond SESAR to encourage reuse of services within SESAR 2020 Wave 2 programme.

### 3.1.3 Beyond V3 (or V4 gap)

Once reaching V3/TRL6 maturity level, SESAR solutions become candidates for industrialisation and deployment (be it local or at network level). Then, no stakeholder, no SESAR project is working on these matured SESAR Solutions. Therefore, we can consider this information to become some released information. However, the released information remains part of the SESAR as other SESAR Solutions can potentially reuse it. But other changes in SESAR might impact the released SESAR information also. This is raising several issues:

- What will happen if any **changes affect the SESAR information when no SESAR project/partner is working on this anymore.**

Improvement suggested for SESAR 2020 Wave 2:

- clarify who will be owning SESAR information when no SESAR activity is linked to this information;
- define a dedicated maintenance process for SESAR information beyond V3/TRL6.

- **Use of SESAR Solution information beyond V3/TRL6** - beyond SESAR a lot of Stakeholders are raising interest in SESAR Architecture with the concerns to be able to reuse, or at least, to better link deployment activity with SESAR R&D.

Improvement suggested for SESAR 2020 Wave 2:

- Re-assess with Stakeholders beyond SESAR which information is expected out of SESAR R&D.

## 3.2 Conclusions

In the context of SESAR 2020 Wave 1 programme, Content Integration activities demonstrated their full potential. This enabled the SESAR 2020 Partners and the SJU in:

- **Structuring the work** at SESAR Solutions and SESAR 2020 programme level by the use of common framework, tools and method to design and validate ATM Concepts and Technologies;
- **Increasing the overall data quality** be it at SESAR Solution or at SESAR 2020 programme level with direct positive impact on the SESAR Solution maturity gate process and the European ATM Master Plan information;
- **Ensuring consistency and coherency at programme level** by the use of reference and guiding information (such as CONOPS for ATM Concept, Steering Principles, Validation targets for ATM Solution and Technologies design, etc...);

- Providing monitoring tools to **support and help the SESAR Solutions** in ATM Solutions and Technologies design and validation; to **support the SJU in the SESAR 2020 programme execution and governance**; and to detect and resolve issues and concerns at the earliest time;
- **Addressing the Cyber Security** challenge in delivering ‘securable and resilient’ SESAR Solutions.

However, some improvements are requested:

- To reinforce the support provided to the SESAR Solution (especially for what concerns the Service Orientation);
- To better coordinate and align the Content Integration expectations with the SESAR Solution validation activities;
- To streamline the Maturity Gate process with the Content Integration change management especially for what concerns the DataSet maintenance.

### 3.3 Plan for next R&D phase (Next steps)

For the next three year of the SESAR 2020 programme starting from 1<sup>st</sup> of December 2019, the Content Integration project will:

- in order to **better streamline the SESAR Solutions, the Content Integration and SJU lifecycles**:

Fully integrate all operational and architecture activities in a single work package to avoid a ‘silo’ syndrome. This shall enable fully integrated and synchronised Content Integration activities vs the SESAR Solutions and the SJU.

To link further the Content Integration activities with the European ATM Master plan update campaign with several common activities.

Set a common list of milestones with and communicated to the SESAR Solutions and SJU. This shall enable to align the work of the SESAR Solutions with the SESAR programme lifecycle.

Set a rolling Change Management process. This change management process shall link with the SESAR Solution Maturity Gate process also.

- In order to **further improve the quality of the SESAR production**:

Re-inforce the “*pro-activeness*” of the Content Integration support provided to the SESAR Solutions (with the more extensive use of activity dashboards and additional briefing and induction sessions with the SESAR Solutions and the SJU at the start of the next SESAR 2020 programme phase.

- In order to **improve the SOA approach**:

To nominate SOA champions in charge of promoting the SOA approach and of valorising any concrete SOA results.

Make the Content Integration support for services more pro-active.

Also, EATMA framework at the end of SESAR 2020 Wave 1 is recognised as a cornerstone of the SESAR 2020 Programme. The level of maturity of the architecture content and practice has increased enormously in the context of SESAR 2020. The ambition for the usage of the architecture and

architecting activities as support to the Programme, Transversal and Master Planning processes has been clearly demonstrated in the past year resulting in the integration of the EATMA and ATM MP information into one common structure and framework. This work need to be further completed by defining the new process of data change management and clear roles, ownership and governance of the new structure at transversal and Programme levels. Following this first big step, new areas for evolution (candidate Architecture Issues) have been identified in order to be pursued in SESAR 2020 Wave 2:

- Further **integration of ATM MP L3** elements into EATMA framework;
- Improve the **integration of Institutional Enablers** in EATMA;
- Continue to **explore the potential of the Business Architecture** elements in the context of the ATM MP planning activities. (e.g. Strategy, Tactic, Mission);
- Improve the **integration of the SESAR 2020 Performance** framework
  - Integrate in EATMA KPAs and Influence factors;
  - Improve the description of the already captured in EATMA information about KPA/Focus Area/KPI/PI and Validation Target/Validation Result.

In addition to the list of candidate new AIs, Content Integration project identified several areas requiring the development of a specific detailed methodological guidance:

- **Identification of Stakeholders** based on Capability Configurations Identification of Solution dependencies based on Capabilities (top down) ;
- **Identification of Solution dependencies** based on the Capability Configurations, Services and Nodes (bottom-up).



## 4 Content Integration Project in detail

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### 4.1 Project objectives as defined in the Grant

To perform its role, a set of objectives<sup>2</sup> are defined for the Content Integration project. Content Integration project was tasked to:

1. **Execute the steering principles as provided and endorsed by SJU management and SESAR governance** [1]. Steering principles are a set of guidance and recommendations (relating to operational concept, system and service design, architecture development and performance assessment) to be used by the SESAR Solutions when defining and validating ATM Concept and Technologies.
2. **Create collaborative platform for solving operational and technical challenges** [1]. The European ATM Architecture (EATMA) framework is provided to the SESAR Solutions. This framework encompasses a tool (MEGA<sup>®</sup> HOPEX), a method and a change management process that support operational and technical experts in the development and description of the design of a SESAR Solution. Support, guidance and training to ensure the applicability of this architecture framework is provided to the SESAR Solutions. A dedicated Issue Management Process is applied to support the SESAR Solutions in case of diverging views, misunderstandings, inconsistency, incoherency or lack of alignment with the SESAR Concept of Operations, Operational, Functional, Service and Information Architecture.
3. **Ensure the coherence within and between the different SESAR 2020 projects** [1]. The SESAR 2020 Concept of Operations<sup>3</sup> (CONOPS) is driving the definition and validation of the SESAR ATM Concepts. It describes the future Air Traffic Management (ATM) operations envisaged in Europe. The objective is to provide a high-level view of the operational characteristics of ATM in the future European airspace. It is updated based on the contributions of SESAR Solution to ensure consistency, coherency and completeness from an operational perspective. In addition, SESAR Architecture Reference brings together the SESAR Operational, Functional, Information and Services Architectures developed by the SESAR Solutions. A dedicated Content Integration process<sup>4</sup> (including Change Management) is used to ensure the successful and seamless integration, the consistency and coherency check of SESAR Architecture produced by the SESAR Solutions. Its objective is to detect, understand and resolve any inconsistencies or lack of coherency in the defined ATM Concepts and Technologies.

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<sup>2</sup> The list of objectives set for the Content Integration project is defined in full detail in the SESAR 2020 Multi-annual Work Programme for the period 2016-2019 [1].

<sup>3</sup> Transition CONOPS published in 2016 forms the reference at the start of SESAR 2020 Wave 1 programme. It is revised and updated to reflect the intermediate results of the SESAR 2020 Wave 1 programme on a yearly basis.

<sup>4</sup> Content Integration process is reused from the first SESAR programme and was refined for the needs of SESAR 2020 Wave 1 programme.

At content integration level, specific focus is given on Cyber Security to ensure that security requirements specified are based upon operational need and risk, and are appropriate and lead to cost effective SESAR solutions.

4. Ensure alignment with the expectations outlined in the European ATM Master Plan concerning performance and transition to deployment [1]. A Performance Framework<sup>5</sup> is maintained to support the performance assessments made at SESAR Solution level. This Performance framework describes the performance-driven development approach that is applied within the SESAR 2020 Wave 1 programme. It includes the Validation Targets applicable at SESAR Solution level. It represents a framework to support the goal of ensuring that the programme develops ATM concepts technologies needed to meet the performance ambitions described in the European ATM Master Plan. Extensive support is provided to the SESAR Solutions by the means of Training Courses, coaching, Workshops and Communities of Practice.

A dedicated performance evaluation and consolidation process<sup>6</sup> is used to ensure alignment with expectations outlined in the SESAR 2020 Concept of Operations and the performance ambitions set in the European ATM Master Plan Edition. In addition, it ensures performance results can be exploited not only at local level but also at European level for decision making.

A high level Validation Strategy<sup>7</sup> (VALS) is redefined and provided to the SESAR 2020 Solutions to guide the validation activities.

5. **Ensure alignment of SESAR with other SES-related dependent activities and related research**, including Cyber Security, Remotely Piloted Aircraft System (RPAS), and Air Vehicle System developments in Clean Sky [1]. Content Integration ensures close coordination with the external SES organisations undertaking related research projects to provide the adequate support and required expertise for operations, systems & services, performance management, architecture and European ATM Master Plan updates. This will ensure/facilitate overall worldwide interoperability.
6. ***Provide support to the further decision making necessary by SJU management and SESAR governance*** [1]. Content Integration project provides SJU with support such as specific reports on ATM Operation topics, architecture topics, specific assessment focusing on given ATM concept element and/or SESAR Solution, dependencies management across Solutions, issues identification. It is provided to support SESAR 2020 Programme management (releasing and adaptation) and any further decision making necessary at SESAR 2020 governance level.
7. ***Support the Maturity Gates activities in terms of allocating experts for reviewing the material made available for confirming the maturity and performance levels achieved by the ATM***

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<sup>5</sup> SESAR 1 Performance Framework published in 2016 is used as a reference at the start of SESAR 2020 Wave 1 programme. This Performance Framework is revised and updated on a yearly basis.

<sup>6</sup> Performance evaluation and consolidation process is reused from the first SESAR programme and refined for the needs of SESAR 2020 Wave 1 programme.

<sup>7</sup> VALS published in 2016 forms the reference at the start of SESAR 2020 Wave 1 programme. It is revised and updated to reflect the intermediate results of the SESAR 2020 Wave 1 programme on a yearly basis.

*Solutions* [1]. Content Integration project provides the SESAR 2020 Solution with support to prepare for the maturity gates and supports the SJU to execute the maturity gates.

8. *Ensure close coordination with the European Master Plan Maintenance project to provide **the adequate support and required expertise for Master Plan updates*** [1]. The Integrated Roadmap and standardisation needs is produced to support the European ATM Master Plan update campaign.
9. **Act as repository manager** for the SESAR 2020 Member(s) contributing to the Architecture modelling (EATMA). All SESAR 2020 Partners and projects have access to the Central Architecture Repository held in MEGA<sup>®</sup> tool. This Architecture Repository implements the European ATM Architecture (EATMA) framework and stores the content produced by SESAR Solutions and other Transversal projects. Content Integration provides support, guidance and training to ensure the use of MEGA<sup>®</sup> tool and metadata by the SESAR Solutions and other Transversal projects follows the rules set for the EATMA Framework.

## 4.2 Work Performed

### 4.2.1 Content Integration project – work breakdown structure (WBS)

The Content Integration project organised its work into six different Work Packages (WP) as described in the Figure 4: Content Integration project – Work Breakdown Structure below.

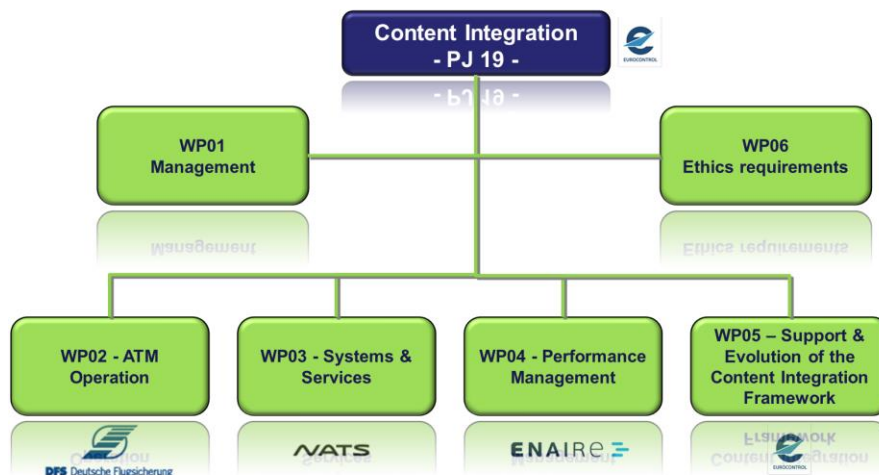


Figure 4: Content Integration project – Work Breakdown Structure

The Content Integration WPs were:

- **WP01 – Project Management** coordinated and monitored the project’s progress to accomplish the main objectives regarding time and resources. It ensured and coordinated the support provision to SESAR 2020 Programme/SJU and fulfilled the administrative requirements of the grant.
- **WP02 - ATM operation** prepared and provided the SESAR 2020 Validation Strategy. It integrated the SESAR Solutions into the SESAR 2020 Concept of Operations. It analysed proposed changes to the operations: i.e. Change Requests (concerning Operational

Improvement Steps and Procedural Enablers). In addition, WP02 prepared and maintained the Operational steering principles part of the SESAR 2020 Steering Principle Document.

- **WP03 - ATM Systems and Services** provided the System and Service Steering Principles whose part of it is included into the SESAR 2020 Steering principles document and performed the Content Integration process in order to produce the SESAR Functional, Information and Services Architecture – the SESAR Architecture Reference. It also coordinated the Cyber Security assessment and consolidation at programme level.
- **WP04 - Performance Management** provided and maintained the performance framework (including support, guidance, training and performance steering principles whose part of it constitutes the SESAR 2020 Steering principles document). It provided the validation targets to be considered by the different SESAR Solutions, defined and executed the dedicated performance evaluation and consolidation process in order to integrate and consolidate the performances assessments done at SESAR Solution level and support the European ATM Master Plan;
- **WP05 - Support & Evolution of the Content Integration Framework** provided and maintained the European ATM Architecture (EATMA) framework (including tooling (MEGA<sup>®</sup> HOPEX), support, guidance, training and European ATM portal), the Architecture Steering Principles whose part of it constituted the SESAR 2020 Steering principles document. It defined the Content Integration and Change Management process for the creation of the SESAR Architecture Reference.
- **WP06 – Ethics Requirements** ensured the definition and application of H2020 Ethics regulations applicable for the Content Integration project.

#### 4.2.2 Content Integration project – key numbers

The work performed by the Content Integration project could be compared to an iceberg. The Content Integration project produced several deliverables (such as CONOPS/OCD, ADD, PAGAR, Guidance and Release notes, reports) which in most of the case are the result of content integration and aggregation. Also, it performed a massive amount of work not always visible (framework and tools administration, training, coaching, communities of practice, helpdesk, support, monitoring, coordination, communication, content integration and aggregation, gate preparation, Cyber Security, SESAR governance support ...) in each Work Packages.



In addition to these deliverables, Content Integration project performed lot of coordination and communication with the SESAR Solutions and the SJU (all figures coming from STELLAR):

- **European architecture content** wise - EATMA releases (V10, V11 and V12) + V13 draft working version which will be the baseline for SESAR 2020 Wave 2 programme;
- **Communication at SESAR programme level** - Flash-Info including common flash-info (incl. 10 with the European ATM Master Plan campaign 2019, and 1 with the System Engineering);
- Providing **coaching and training** to SESAR Solutions and SJU - 3 SESAR Wave 1 briefing sessions, 9 EATMA & 19 Modelling & Service trainings (more than 300 trainees in total from ALL SESAR contributing organisations and SJU), 2 Change Management training sessions per

- DS campaign (via WebEx), 30 EATMA CAFÉ & 28 EATMA Digest and managing and animating EATMA Community (more than 750 users).
- Providing **support to SESAR Solutions** - 34 Maturity gate preparation meetings with SESAR Solutions leading to more than 100 actions recorded; almost 450 meetings with PCITs (plenary meeting, Data Sets, OPS & Architecture & Service & Cyber security & Performances, Data Set monitoring related meetings) resulting in more than 700 actions recorded. This does not include the first 10 months of PJ19 (STELLAR not available), nor the meetings and coordination with the European ATM Master Plan and the System Engineering projects, nor SESAR Solution meetings, which Content Integration project contributed to.

## 5 References

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### 5.1 General references

- [1] SESAR 2020 Multi-annual Work Programme for the period 2016-2019  
[http://www.sesarju.eu/sites/default/files/documents/adb/2015/151204\\_AWP2016\\_reformat\\_Final.pdf](http://www.sesarju.eu/sites/default/files/documents/adb/2015/151204_AWP2016_reformat_Final.pdf)
- [2] SecRAM version 02.00.00
- [3] Airspace Architecture Study, SESAR Joint Undertaking, 2019  
<https://www.sesarju.eu/node/3253>

### 5.2 Project Deliverables

Content Integration projects delivered some contractual deliverables and non-contractual deliverables.

#### 5.2.1 Contractual Deliverables

- [4] D1.1 Project Management Plan
- [5] D1.2 Final Project Report
- [6] D1.3 Q4 2016
- [7] D1.4 Q1 2017
- [8] D1.5 Q2 2017
- [9] D1.6 Q3 2017
- [10] D1.7 Q4 2017
- [11] D1.8 Q1 2018
- [12] D1.9 Q2 2018
- [13] D1.10 Q3 2018
- [14] D1.11 Q4 2018
- [15] D1.12 Q1 2019
- [16] D1.13 Q2 2019
- [17] D1.14 Q3 2019
- [18] D2.1 PJ19: CONOPS (2017)

- [19] D2.2 PJ19: VALS (2017)<sup>8</sup>
- [20] D2.3 PJ19: CONOPS (2018)
- [21] D2.4 PJ19: VALS (2018)
- [22] D2.5 PJ19: CONOPS (2019)
- [23] D2.6 PJ19: VALS (2019)
- [24] D3.1 PJ19: AIRM (2017)
- [25] D3.2 PJ19: AIRM (2018)<sup>9</sup>
- [26] D3.3 PJ19: AIRM (2019)<sup>10</sup>
- [27] D3.4 PJ19: ADD (2017)
- [28] D3.5 PJ19: ISRM (2017)
- [29] D3.6 PJ19: Update to SESAR Lexicon (2017)
- [30] D3.7 PJ19: ADD (2018)
- [31] D3.8 PJ19: ISRM (2018)<sup>11</sup>
- [32] D3.9 PJ19: Update to SESAR Lexicon (2018)<sup>12</sup>
- [33] D3.10 PJ19: ADD (2019)
- [34] D3.11 PJ19: ISRM (2019)<sup>13</sup>
- [35] D3.12 PJ19: Update to SESAR Lexicon (2019)<sup>14</sup>
- [36] D3.13 PJ19: RSIT (2018)
- [37] D3.14 PJ19: RSIT (2019)
- [38] D4.1 PJ19: Performance Framework (2017)
- [39] D4.2 PJ19: Validation Targets (2017)
- [40] D4.3 PJ19: Consolidated Performance Assessment and Gap Analysis (2017)
- [41] D4.4 PJ19: Performance Framework (2018)
- [42] D4.5 PJ19: Validation Targets (2018)
- [43] D4.6 PJ19: Consolidated Performance Assessment and Gap Analysis (2018)
- [44] D4.7 PJ19: Performance Framework (2019)
- [45] D4.8 PJ19: Validation Targets (2019)

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<sup>8</sup> Deliverable removed

<sup>9</sup> Deliverable removed -

<sup>10</sup> Deliverable removed -

<sup>11</sup> Deliverable removed -

<sup>12</sup> Deliverable removed -

<sup>13</sup>

<sup>14</sup> Deliverable removed -

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- [46] D4.9 PJ19: Consolidated Performance Assessment and Gap Analysis (2019)
- [47] D5.1 PJ19: EATMA guidance material and report (2016)
- [48] D5.2 PJ19: EATMA Portal and model release notes (2017)
- [49] D5.3 PJ19: EATMA guidance material and report (2017)
- [50] D5.4 PJ19: Yearly Lifecycle Reference Material (2017)
- [51] D5.5 PJ19: Integrated Roadmap Data Set (2017)
- [52] D5.6 PJ19: EATMA release note (2018)
- [53] D5.7 PJ19: EATMA guidance material (2018)
- [54] D5.8 PJ19: Yearly Lifecycle Reference Material (2018)<sup>15</sup>
- [55] D5.9 PJ19: Integrated Roadmap Data Set (2018)<sup>16</sup>
- [56] D5.10 PJ19: EATMA release note (2019)
- [57] D5.11 PJ19: EATMA guidance material (2019)
- [58] D5.12 PJ19: Yearly Lifecycle Reference Material (2019)<sup>17</sup>
- [59] D5.13 PJ19: Integrated Roadmap Data Set (2019)<sup>18</sup>
- [60] D6.1 POPD - Requirement No. 1
- [61] D6.2 POPD - Requirement No. 2

## 5.2.2 Non-Contractual Deliverables

- [62] D2.0.010 - PJ19 - Steering Principles 2017
- [63] D2.0.020 - PJ19 - Steering Principles 2018
- [64] D2.0.030 - PJ19 - Steering Principles 2019
- [65] D3.0.010 - PJ19 - Service Roadmap 2017
- [66] D3.0.040 - PJ19 - Service Roadmap 2018
- [67] D3.0.070 - PJ19 - Service Roadmap 2019
- [68] D3.0.020 - PJ19 - Service Portfolio 2017
- [69] D3.0.050 - PJ19 - Service Portfolio 2017
- [70] D3.0.080 - PJ19 - Service Portfolio 2017
- [71] D3.0.030 - PJ19 - Cyber Security Roadmap 2017
- [72] D3.0.060 - PJ19 - Cyber Security Roadmap 2017

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<sup>15</sup> Deliverable deleted -

<sup>16</sup> Deliverable deleted -

<sup>17</sup> Deliverable deleted -

<sup>18</sup> Deliverable deleted -

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- [73] D3.0.090 - PJ19 - Cyber Security Roadmap 2017
- [74] D4.0.010 - PJ19 - KPA Guidance Material (Common Assumptions) 2017
- [75] D4.0.020 - PJ19 - KPA Guidance Material (Common Assumptions) 2017
- [76] D4.0.030 - PJ19 - KPA Guidance Material (Common Assumptions) 2017
- [77] D4.0.040 - PJ19 - Performance Whitepaper (2018)
- [78] D.4.0.050 – PJ19 - Guidance to Apply the SESAR 2020 Safety Reference
- [79] D4.0.060 - PJ19 - Safety Reference Material Ed 00.04.01

### 5.3 Project Communication and Dissemination papers

- [80] SESAR Leaflet: European ATM Architecture (EATMA). 2018
- [81] SESAR Leaflet: SESAR Performance Framework. 2018
- [82] SESAR Slides: Avionics Conference Munich: Architecture Driven Approach for CNS planning integration. March 2019
- [83] SJU News Flash: Modernising ATM in Europe: the integrated way. April 2019
- [84] PJ19 Flash Info since January 2017:
  - <https://stellar.sesarju.eu> - PJ19 CI folder, shared document/ COM)
  - a. PJ19 Flash Info January 2017 (1.0)
  - b. PJ19 Flash Info February 2017 (1.0)
  - c. PJ19 Flash Info March 2017 (1.0)
  - d. PJ19 Flash Info May 2017 (1.0)
  - e. PJ19 Flash Info June-July 2017 (1.0)
  - f. September 2017 (1.0) PJ19 Flash info January 2018 (1.0)
  - h. PJ19 Flash info March 2018 (1.0)
  - i. PJ19 Flash Info April 2018 (1.0)
  - j. PJ19 Flash Info June 2018 (1.0)
  - k. DS18 Launch PJ19-PJ20 Special Flash Info July 2018 (1.0)
  - l. DS18 Launch PJ19-PJ20 Special Flash Info September 2018 (1.0)
  - m. PJ19 Flash Info September-October 2018 (1.0)
  - n. PJ19 Flash Info February 2019 (1.0)
  - o. DS19 Launch PJ19-PJ20 Special Flash Info (1.0)
  - p. PJ19 Flash Info March 2019 (1.0)
  - q. PJ19 Flash Info April 2019 (1.0)
  - r. PJ19 Flash Info May-June 2019 (1.0)
  - s. PJ19 Flash info November 2017 (1.0)
- [85] EATMA Digest (Internal) since January 2018:
  - EATMA Community - <https://ost.eurocontrol.int/sites/eatmac/Lists/Weekly%20Digest/AllItems.aspx>)
  - a. Weekly Digest #1: Start and End events in a NOV-5 Process Model
  - b. Weekly Weekly Weekly Weekly Digest #5: Diagrams and Elements on Diagrams look & feel
  - f. Weekly Digest #6: Deleting elements from Models

- g. Weekly Digest #7: Changing source and destination of an exchange in a Diagram
- h. Weekly Digest #8: Search shortcuts
- i. Weekly Weekly Weekly Weekly Weekly Weekly Weekly Weekly Weekly Weekly
- s. Weekly Weekly Weekly Weekly Digest #22: EATMA Architecture Issues
- w. Weekly Digest #23: Maturity reports - EATMA Gate support
- x. Weekly Digest #24: Naming Conventions and Description
- y. Weekly Digest #25: Enabler Guidance
- z. Weekly Digest #26: Coordination Analysis tab
- aa. Weekly Digest #27: Duplication, Creation, Use... Press Releases

## Appendix A Glossary of Terms, Acronyms and Terminology

### A.1 Glossary of terms

Term	Definition	Source of the definition
EATMA	EATMA Stands for European Air Traffic Management Architecture. It is the common architecture framework for SESAR 2020. It is the sole means of integrating the ATM operational and technical content developments produced by SESAR 2020 Solutions in a consistent and coherent way.	
European ATM Master Plan	The European ATM Master Plan is the agreed roadmap that connects ATM research and development activities with deployment scenarios to achieve the Single European Sky performance objectives. The initial version of the European ATM Master Plan, resulting from the first phase of the SESAR project's definition process, constitutes the basis for the development and deployment activities of the SESAR project.	
SESAR Performance Framework	Performance Driven development approach applied within the technical pillar of the European Commission's Single European Sky Air Traffic Management Research (SESAR) Programme. The performance framework ensures that the SESAR Programme develops the operational concept and technology needed to meet the performance ambitions described in the European ATM Master Plan	

**Table 1: Glossary**

### A.2 Acronyms and Terminology

Term	Definition
AAS	Airspace Architecture Study
ADD	Architecture Description Document
AI	Architecture Issue

AIRM	ATM Information reference Model
ATM	Air Traffic Management
CBA	Cost benefit Analysis
CONOPS	Concept of Operations
DMSC	Delivery Management Sub Committee
DS	DataSet
EA	Enterprise Architecture
EATMA	European ATM Architecture
ECAC	European Civil Aviation Conference
E-OCVM	European Operational Concept Validation Methodology
EN	Enabler
EPMB	Extended Project management Board meeting
FAA	Federal Aviation Authority
GANP	Global Air Navigation Plan
ICAO	International Civil Aviation Authority
IRS	Interface Requirement Specification document
KPA	Key Performance Area
KPI	Key Performance Indicator
OCD	Operation Concept Document
OI	Operation Improvement step
OSED	Operational Service and Environment Description
OTSC	Operational and Technical Sub Committee
PAGAR	Consolidated Performance Assessment And Gap Analysis Report
PI	Performance Indicator
PMB	Project management Board meeting
QPR	Quarterly Project Report
RSIT	Report of Service, Information and Terminology change
SDD	Service Description Document
SecRAM	Security Risk Assessment Methodology
SESAR	Single European Sky ATM Research Programme
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SOA	Service Oriented Architecture

SRM	Safety Reference Material
STELLAR	SESAR Tool Enabling coLLaborative ATM research
TRL	Technology Readiness Level
TS	Technical Specification document
VALS	Validation Strategy
WAC	World ATM Congress
WP	Work Package

**Table 2: Acronyms and technology**

