SESAR 3 Joint Undertaking Project Handbook

Programme Execution Framework

Edition date:	**11 April 2022**
Edition:	**01.00**
Status:	**Approved**

Abstract

This document is the guidance to project managers (i.e. coordinators) of SESAR 3 Joint Undertaking (SESAR 3 JU) projects and their teams about how to conduct their project and comply with needs defined by the SESAR 3 JU for its programme execution. **This guidance is applicable to all projects unless otherwise specified**.

The application of this project handbook is mandatory with the aim to execute the European ATM Master Plan.

EUROPEAN PARTNERSHIP

Co-funded by the European Union

EUROPEAN PARTNERSHIP

**Co-funded by
the European Union**

Table of Contents

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

List of Figures

List of Tables

Co-funded by the European Union

EUROPEAN PARTNERSHIP

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

1   Introduction

1.1   About the SESAR 3 Joint Undertaking

The SESAR 3 Joint Undertaking[1] is an institutionalised European partnership between private and public sector partners set up to accelerate through research and innovation the delivery of the Digital European Sky. To do so, it is harnessing, developing and accelerating the take-up of the most cutting-edge technological solutions to manage conventional aircraft, drones, air taxis and vehicles flying at higher altitudes. The SESAR 3 JU partnership brings together the EU, Eurocontrol, and more than 50 organisations covering the entire aviation value chain, from airports, airspace users of all categories, air navigation service providers, drone operators and service providers, the manufacturing industry and scientific community. The partnership also works closely with the regulatory and standardisation bodies, notably EASA and Eurocae, as well as key stakeholders, such professional staff organisations, the space and military communities and global partners.

1.2   About the SESAR 3 JU Project Handbook

This project handbook provides an overview of the management of the SESAR 3 JU research and innovation (R&I) programme (also referred to as the SESAR 3 JU Digital European Sky (DES) programme) and provides guidance on how SESAR 3 JU projects shall be managed to support project delivery according to SESAR 3 JU expectations and European ATM master plan (ATM MP) ambitions.

While the SESAR 3 JU multi-annual work programme (MAWP) provides a high-level overview of the management approach of the DES programme, the project handbook outlines the objectives, principles and steps to be taken for each applicable SESAR 3 JU process.

The aim is to ensure an agreed and common approach across all projects to deliver the vision of the European ATM MP, allowing a uniform way of monitoring project execution as part of the DES programme, as well as supporting programme-level decision making and facilitating SESAR 3 JU innovation pipeline[2].

The main objective of the handbook is to provide a single entry point into the SESAR 3 JU programme framework for any SESAR 3 JU project. In doing so this handbook aims **to give an overview of <u>what is expected from project managers and their teams</u>** when defining, validating and reporting upon the development of SESAR 3 JU deliverables in relation to exploratory research, solutions/single sky demonstrators or transversal projects.

---

[1] www.sesarju.eu

[2] The SESAR 3 JU research and innovation programme is designed as an innovation pipeline, made up of exploratory research, industrial research and validation, fast track to innovation and uptake, and digital sky demonstrators (DSD), where ideas are matured into tangible SESAR Solutions for market uptake.

To achieve these objectives the document is structured as follows:

- It gives an overview and provides details of the SESAR 3 JU solution life cycle and the practices to validate SESAR Solutions in relation to pre-defined and standardised maturity levels.
- It describes practices that projects should apply to ensure compliance with the SESAR 3 JU programme management requirements[3], including the practices such as:
    - contributing to the performance assessment of SESAR Solutions, cost-benefit analysis and business cases (see section 3.3),
    - contributing to the SESAR architecture (e.g. integrating project outputs) and preparing information for deployment (see section 3.4),
    - ensuring consistency with and allowing monitoring of the ATM Master Planning (see section 3.5).
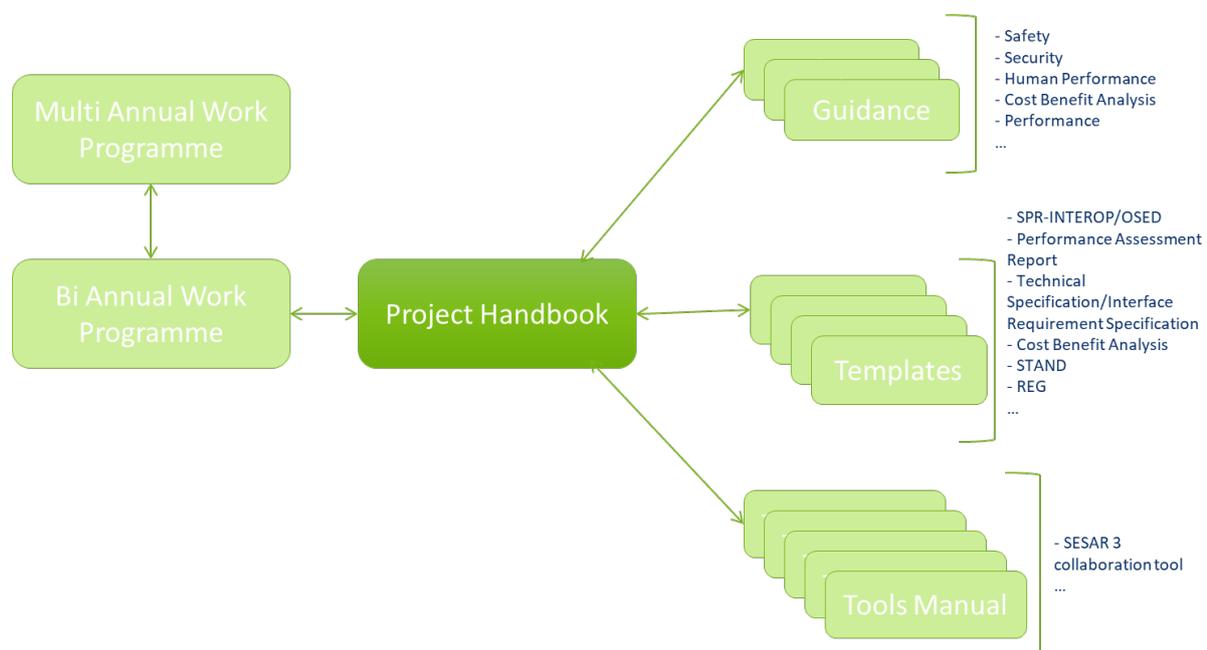
Figure 1: Overview of the SESAR 3 JU programme execution framework

The handbook is therefore the main reference for the programme execution framework. Templates, guidance manuals and tools are provided to complement the project handbook detailing the methodologies to apply; the latest applicable version of these materials are accessible on the SESAR 3 JU's collaboration platform (see "programme library") to be presented to projects upon their kick-off meeting.

---

[3] It should be noted that this Handbook complements the eGrants Online Manual, which explains the basic principles and obligations for executing projects funded under Horizon Europe - the Framework Programme for Research and Innovation.

EUROPEAN PARTNERSHIP

Co-funded by the European Union

1.3 Applicability

The practices outlined in this document are applicable to all SESAR 3 JU projects (i.e. solution projects and transversal projects). Any foreseen deviation of those practices must be documented in the project management plan (PMP), which is one of the first deliverables requested following the project kick-off. Any deviations to the application of practices must be agreed by the SESAR 3 JU.

In addition, solution projects shall comply with the practices as defined by the so-called transversal projects and published in SESAR 3 JU's collaboration platform. By the same token, the transversal projects shall comply with the processes and life cycle as outlined in this handbook.

1.4 Change and configuration management of reference material

All documents (guidance, templates, etc.) listed in the SESAR 3 JU programme library are subject to SESAR 3 JU change management under configuration control by the SESAR 3 JU. The aim is to create a stable working environment, while amendments and improvements are possible but in a controlled and agreed manner.

1.5 Concepts, terms and definitions

Appendix A contains the list of abbreviations used in this document.

The following is a list of the concepts, terms and definitions most commonly referred to in this document:

ATM Master Plan [ATM MP]: Within the framework of the EU aviation strategy and Single European Sky (SES), the European Air Traffic Management (ATM) Master Plan is the main planning tool for ATM modernisation across Europe. It defines the development and deployment priorities needed to deliver the Single European Sky ATM Research (SESAR) vision. The Master Plan is regularly updated, through strong collaboration between all ATM stakeholders, in order to respond to the evolving aviation landscape.

Bi-annual Work Programme [BAWP[4]]: The bi-annual work programme of the SESAR 3 JU outlines the scope of the research and innovation (R&I) activities that will be performed in the current and following years, implemented through open call(s) for proposals and call(s) for tenders. It also details the resources of the SESAR 3 JU for this period according to the staff establishment plan and budget.

CDE Plan [CDE]: The communication, dissemination and exploitation plan documents all planned activities. The plan should cover the communication objectives, high-level messages, short publishable descriptions and a schedule of actions to be implemented across a range of channels with a view to reaching a broader, non-ATM audience. The plan should also include a strategy to disseminate the project's results as well as make best use of the project results (exploitation of project results). The beneficiaries must provide a detailed communication and dissemination plan, setting the objectives,

---

[4] https://www.sesarju.eu/node/4115

key messaging, target audiences, communication channels, social media plan, planned budget and relevant indicators for monitoring and evaluation (see AMGA).

Deployment: 'SESAR deployment phase' refers to successive phases of industrialisation and implementation, during which the following activities are conducted: standardisation, production and certification of ground and airborne equipment and processes necessary to implement SESAR Solutions (industrialisation); and procurement, installation and putting into service of equipment and systems based on SESAR Solutions, including associated operational procedures (implementation).

Digital Sky Demonstrators [DSD]: Digital Sky Demonstrators aim at bringing SESAR Solution(s) to scale in the market, offering a viable means to build confidence and buy-in from the supervisory authorities and operational staff, bridging the gap from research through to industrialisation and implementation. As such, the demonstrators will be closely connected to the standardisation and regulatory activities (with the involvement of National Supervisory Authorities and/or EASA), and will provide a platform for a critical mass of 'early movers' to accelerate market uptake. DSD run demonstration activities that take place in live operational environments and put under test the concepts, services, technologies and standards necessary to deliver the Digital European Sky, providing tangible evidence of the performance benefits in terms of environment, capacity, safety, security and affordability. Typically, these activities address maturity from technical readiness level (TRL) TRL6 up to TRL8.

Essential Operational Change [EOC]: The EOCs are the nine essential game changers triggering structural evolutions of the European ATM. They will be required to deliver the SESAR vision up to and including its Phase C (as described in ATM MP 2020), the defragmentation of European skies through virtualisation, and will enable the delivery of the SES objective of implementing 'more sustainable and better performing aviation'.

Exploratory Research [ER]: Exploratory research refers to the development and evaluation of innovative or unconventional ideas, concepts, methods and technologies that can define and deliver the performance required for the next generation of European ATM systems. Activities cover low TRL research and are divided into two distinct maturity sub-phases. The first sub-phase is 'excellent science' and is primarily oriented at universities and research organisations to create a coordinated body of ideas, using a knowledge transfer network, and consists of early research, which leads to the second sub-phase, called 'application-oriented research', which takes the most promising ideas and applies them to an area of ATM where there is potential to exploit the idea(s) to deliver future operational benefit.

Extended Release Strategy [ERS]: The extended release strategy provides an overview of the planned deliverables of the SESAR 3 R&I programme across the four strands of activities making up the innovation pipeline. By setting the target maturity levels for the content under development by the SESAR 3 JU projects e.g. SESAR Solutions and their associated target exit TRL, the ERS drives a top-down approach connecting the strategic level of the ATM MP and MAWP to the working level of the Programme. The ERS supports the monitoring of the progress in the R&I pipeline, and supports the impact analysis of any gap, deviation or inconsistency between the strategic view and the programme view in terms of timescales/maturity, performance and investments. The Extended Release Strategy is updated on a yearly basis (see section 2.1).

Fast-track innovation and uptake [FTIU]: This refers to industrial research projects designed to accelerate the development of high-risk / high-gain SESAR Solutions with a view to shortening their time to market. These projects may start at very low TRLs (from TRL2), but should target delivering, as

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

rapidly as possibly, new products and services to the market at TRL7. Fast-track projects should demonstrate the application of development methods, including an iterative approach with fast prototyping to rapidly test the desirability, feasibility and viability of new services and technologies with end users.

Funding and tender opportunities portal[5]: This refers to the entry point for the electronic administration of EU-funded research and innovation projects, managed by the European Commission. The portal facilitates the publication of calls, the submission of proposals, their evaluation, the preparation of grant agreements and the execution of grants.

Grant Agreement [GA]: it is a written document memorializing the terms and conditions of an Award granted pursuant to the Plan and shall incorporate the terms of the Plan.

Horizon Europe [HE] call for proposals: An invitation to submit proposals for one or more topics covered by the SESAR 3 JU Digital European Sky programme. The programme is implemented through a number of different HE calls, published at regular intervals, each covering a different part of the programme.

Horizon Europe process: A process that is defined by the European Commission services and that applies to grants funded by the Horizon Europe research and innovation programme.

Industrial Research and Validation [IR]: R&I activities that aim at developing, assessing and validating technical and operational concepts in simulated and real operational environments according to a set of key performance areas. These activities typically start at TRL3 and are progressively mature up to TRL6 / TRL7 (see Fast-Track Innovation and Uptake).

Integrated validation: An integrated validation aims to go beyond the boundaries of individual SESAR Solution(s) (so far addressed independently) and validate them together, to facilitate and de-risk the transition into industrialisation and implementation phases.

Key Performance Area [KPA]: Refers to the categorisation of performance subjects related to high level ambitions and expectations. ICAO Global ATM concept sets out these expectations in general terms for each of the 11 ICAO defined KPAs.

Key Performance Indicator [KPI]: Current/past performance, expected future performance (estimated as part of forecasting and performance modelling), as well as actual progress in achieving performance objectives is quantitatively expressed by means of indicators called Key Performance Indicators (KPIs). To be relevant, indicators need to correctly express the intention of the associated performance objective. Since indicators support objectives, they should not be defined without having a specific performance objective in mind. Indicators are not often directly measured. They are calculated from supporting metrics according to clearly defined formulas, e.g. cost-per-flight-indicator = Sum (cost)/Sum (flights). Performance measurement is therefore carried out through the collection of data for the supporting metrics".

---

[5] https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/home

Maturity level: Refers to the level of maturity achieved by a SESAR Solution, which is defined in accordance with the Technology Readiness Level scheme (TRL).

Milestone: Control points in the project that help to chart progress. Milestones may correspond to the achievement of a key result, allowing the next phase of the work to begin. They may also be needed at intermediary points so that, if problems have arisen, corrective measures can be taken. A milestone may be a critical decision point in the project where, for example, the consortium must decide which of several technologies to adopt for further development. The achievement of a milestone should be verifiable. An illustration is provided in section 3.1 Figure 4).

Multi-annual Work Programme [MAWP]: The Multiannual Work Programme establishes the framework under which the operations of the Single European Sky Air Traffic Management Research (SESAR) 3 Joint Undertaking will be defined, planned and executed from 2021 to 2031. It defines the overall life cycle of the SESAR 3 JU's research and innovation (R & I) programme (Digital European Sky Programme), which seeks to deliver the technological solutions needed to achieve the modernisation and digitalisation of air traffic management (ATM) in Europe, in line with the European ATM MP. It also defines the activities of the SESAR 3 JU other than research and innovation (R & I), both operational and administrative.

Performance ambitions: The performance ambitions supported by SESAR are aspirational and refer to the performance capability that may be achieved if SESAR Solutions are made available through R&I activities, deployed in a timely and, when needed, synchronised way and exploited to their full potential.

Performance assessment: The assessment of solutions' performance based on validation results obtained during the solution development life cycle, according to the SESAR 3 JU performance framework.

Programme snapshot: An integrated overview of the programme schedule available in the SESAR 3 JU's collaboration platform (continuously updated by projects in particular when changes occur), which presents the status of the progress of all projects at programme level. It is used to analyse the status of the programme and propose steering to the governance bodies.

Project Management Plan: Formal, approved document, provided by each SESAR 3 JU project, defining how the project is executed, monitored and controlled and closed (see section 3.1.2).

Release process: The release process is a management process that secures the programme delivery by setting-up the programme priorities for a yearly cycle. The release process, based on the latest applicable ERS baseline, provides a yearly planning and delivery of key outputs from SESAR 3 JU projects, e.g. SESAR Solutions addressing a maturity gate, key demonstrator results, etc. The process also enables the monitoring of the progress made on related SESAR Solutions against the ERS, and the reporting to the SESAR 3 JU governance about any issues allowing to take corrective actions when required (see section 2.3).

R&I flagship: The programme flagship activities that structured the content of the MAWP to support the delivery of the DES programme. They correspond to the 'destinations' as per HE definition.

SESAR Solution: Typical programme output that could be one of the two following nature:

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

a) SESAR ATM Solution: deployable output of the SESAR 3 JU R&I development activities, which consists of new improved standardised and interoperable operational concepts and procedures (and required underlying technologies) and that has proven its potential to deliver performance improvements to European ATM if deployed in the target operating environment.

b) SESAR Technological Solution: output of the SESAR 3 JU R&I development activities, which consists of a new technology, verified as feasible, safe and able to support future SESAR ATM Solutions in delivering their expected ATM Performance Improvements.

SESAR Architecture: specific SESAR framework, which supports the development and Integration of content produced by the SESAR 3 JU Projects within the SESAR 1/SESAR 2020 & Digital European Sky programmes.

SESAR Architectural model view: a diagram, based upon SESAR architecture standards, which aims to illustrate a specific set of elements and/or characteristics of the European ATM and UTM Systems and used as a complement to the Digital European Sky Programme deliverables.

SESAR Programme Library: SESAR 3 JU library containing guidance, templates and programme reference material (e.g. ATM Master Plan reference…) accessible from SESAR 3 JU's collaboration platform.

SESAR Solution data pack: is a bundle of deliverables produced by SESAR 3 JU that contains the key output deliverables of solution project activities per individual SESAR solution. Solution data packs are used as an input for the next maturity phases (e.g. deployment) in case of TRL6.

a) In case of ER projects, there is no SESAR solution data pack as such, but the following deliverables could be considered as an equivalent:

i) In case of excellence science research projects:

(1) Concept outline.

ii) In case of application-oriented research projects:

(1) Operational Service and Environment Definition (OSED);

(2) Functional Requirements Document (FRD);

(3) Economical Evaluation (EVAL).

b) In the case of IR / FTIU projects, the SESAR solution data pack is composed of:

i) In case of **SESAR ATM Solution**:

(1) Contextual Note (CN);

(2) Safety and Performance Requirements - INTEROPerability requirements (SPR-INTEROP)/ Operational Service and Environment Definition (OSED);

(3) Technical specification (TS)/Interface requirements specification (IRS) (when relevant, this includes documentation (SDD) of the services which are enabled by the SESAR Solution or common services);

(4) Cost benefit analysis (CBA);

(5) Standardisation deliverable (STAND);

(6) Regulatory deliverable (REG).

ii) In the case of **SESAR Technological Solutions**:

(1) Contextual Note (CN);

(2) Technical specification (TS)/Interface requirements specification (IRS) (when relevant, this includes documentation (SDD) of the services which are enabled by the SESAR Solution or common services);

(3) Cost-benefit analysis (CBAT);

(4) Standardisation deliverable (STAND);

(5) Regulatory deliverable (REG).

c) In the case of Digital Sky Demonstrators, there is no SESAR Solution data pack as such, but the following deliverables could be considered as an equivalent:

(1) Demonstration Report (DEMOR);

(2) Standardisation deliverable (STAND);

(3) Regulatory deliverable (REG).

SESAR 3 JU programme execution framework: consists of defined life cycle, processes, responsibilities (people) supported by SESAR 3 JU's collaboration platform (composed of a series of tools) with the aim to institutionalise the approach and general way of working.

Single European Sky [SES] high-level goals: These are the political targets set by the European Commission. Their scope covers the full ATM performance outcomes resulting from the combined implementation of the SES pillars and instruments, as well as industry developments not driven directly by the EU.

SESAR 3 JU's collaboration platform: A platform to steer and manage the entire programme according to the processes described in this document; the platform provides general collaboration capabilities for individual and across project teams.

SESAR 3 JU process: Processes defined by the SESAR 3 JU to support the management of the programme for areas not covered by Horizon Europe (eGrants) processes, and enabled by SESAR 3 JU's collaboration platform.

SESAR Research Innovation Agenda [SRIA][6]**:** It details the R & I roadmaps to achieving the Digital European Sky.

Solution projects: any R&I project maturing a SESAR Solution and delivering the corresponding SESAR Solution data-pack.

Transversal activity: a series of activities executed by dedicated projects (called **transversal projects**) that support the SESAR 3 JU via a series of defined tasks and processes with a threefold objective:

a) <u>Integration</u>: to support SESAR Solution development in accordance with a commonly used SESAR 3 JU Information Reference Model (taxonomy) and SESAR 3 JU architecture model principles;

b) <u>Performance</u>: to support the performance assessment of SESAR Solutions through the definition and management of their performance expectations in respect of ATM MP performance ambitions with a series of guidance and associated trainings;

c) <u>Master planning monitoring</u>: to connect and report in function of the ATM MP, which is the main strategic planning tool to modernise ATM across Europe and link R&I activities with deployment to achieve SES performance objectives, as well as any other policy objectives of the EU.

Technical Readiness Level [TRL][7]**:** TRLs are a method for estimating the maturity of technologies during the acquisition phase of a program, developed at NASA during the 1970s. They are adopted in EU Framework Programmes since Horizon 2020.

---

[6] https://www.sesarju.eu/node/3697

[7] Horizon Europe Glossary

Co-funded by
the European Union

EUROPEAN PARTNERSHIP

2 SESAR Solution development life cycle

The objective of this chapter is to introduce the **SESAR Solution development life cycle**, which consists of a standard sequence of activities to develop, validate and release a SESAR Solution (the main output of SESAR 3 JU's R&I work produced by solution projects).

Through the SESAR Solution development life cycle, and thanks to the planning and execution of the exploratory research, industrial research and demonstrations activities performed by SESAR 3 JU projects, the maturity of a SESAR Solution increases progressively and in a controlled manner, from an innovative idea at low TRL to readiness for deployment.

2.1 Extended Release Strategy

The Extended Release Strategy (ERS) provides at any time an overview planned deliveries of the SESAR 3 JU R&I programme across the innovation pipeline. By setting the target maturity levels for the content under development by SESAR 3 JU projects e.g. SESAR Solutions and their associated target exit TRL, the ERS drives the top-down approach connecting the strategic level (top down) of the ATM Master Plan and MAWP to the working level of the Programme (bottom-up). The ERS supports the monitoring of the progress in the R&I pipeline, and supports the impact analysis of any gap, deviation or inconsistency between the strategic view and the programme view.

The ERS is the reference for the elaboration of the yearly Release Plan (see section 2.3.1).

The ERS aims at:

- Steering the SESAR R&I work to achieve the ATM MP (e.g. vision phase D and also remaining work to complete from phase C) and performance ambitions by planning the target maturity levels that each SESAR 3 JU project shall aim to achieve according to the scope of their work (i.e. SESAR Solutions). These maturity targets are documented via the ERS.
- Monitoring the progress of SESAR Solutions towards the maturity targets and reflecting the output from the yearly project reviews. Deviations from the ERS shall be reported as "ERS risks" by each SESAR project (see section 3.2), assessed through an impact analysis against the ambitions set out in the ATM MP, and documented in a yearly update of the ERS.
- Ensuring the yearly planning and reporting of the output of SESAR projects (e.g. from Exploratory Research to Digital Sky Demonstrators results), via the annual Release Plan and Report, and update of the ERS.

The ERS is managed by SESAR 3 JU and updated on a yearly basis. This update represents an opportunity to re-align the strategic view with the development and validation layer e.g. baselining the changes issued during project reviews (supported by SESAR Solution maturity assessment), SESAR Solution maturity gates, and identify potential significant impacts on the MAWP/BAWP.

2.2 SESAR Solution development and validation process

The SESAR Solution development and validation process defines and executes appropriate validation and demonstration activities and assessments (e.g. safety assessment- see section 3.3.2) to prove that a **SESAR Solution is operationally/technically feasible, deployable in the relevant operating environments, capable of delivering valuable/tangible performance benefits** in line with the ambitions set out in the ATM MP and at an acceptable cost for the ATM stakeholders.

2.2.1 Approach to develop and validate/demonstrate SESAR Solution

SESAR 3 JU projects are responsible for planning and executing the required and sufficient number of validation/demonstration exercises and assessments to ensure a given SESAR Solution can progress from initial maturity level towards their target maturity level (as defined in corresponding project grant agreement (GA)) in compliance with the corresponding SESAR maturity criteria (see Annex E of the MAWP). The planning for each TRL phase is captured in the SESAR Solution validation plan (VALP) (or TVALP) (or respectively in the DSD project demonstration plan (DEMOP)), while at the end of the activities of each TRL phase, SESAR Solution shall provide a validation report (VALR) (or TVALR) (respectively DSD project shall provide a demonstration report (DEMOR)) where results are consolidated, capturing the relevant conclusions and recommendations.
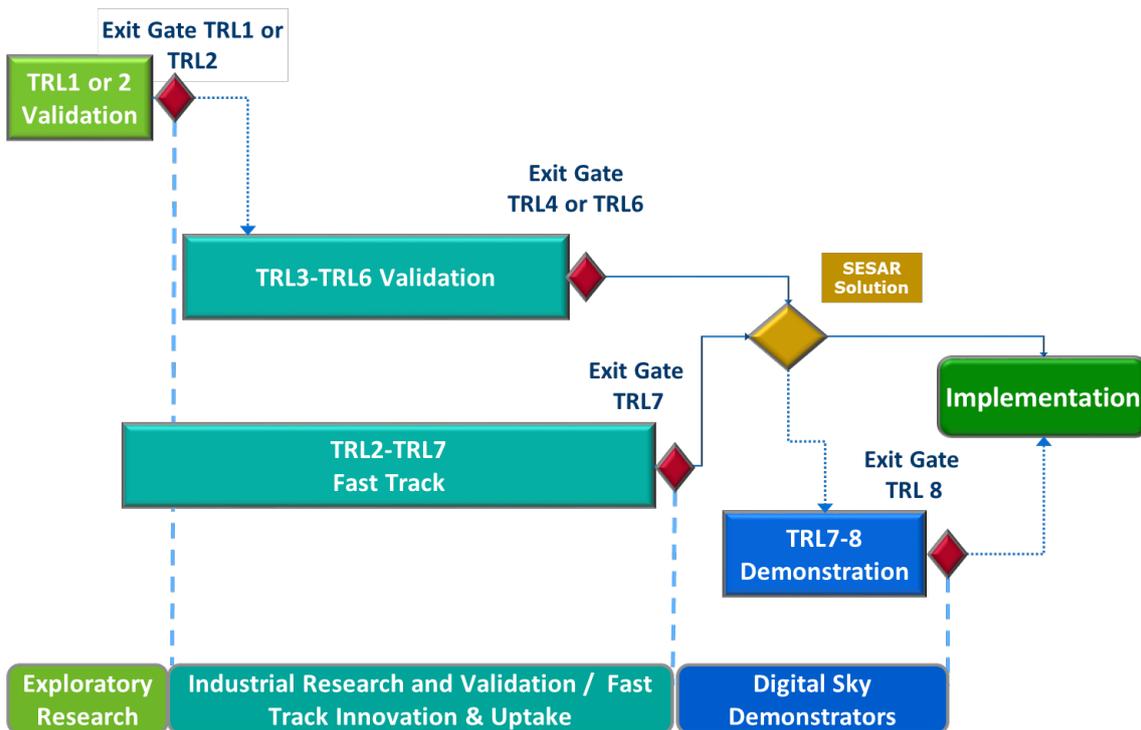
Figure 2: SESAR Solution development overview

After each TRL phase, the solution projects shall update SESAR Solution technical deliverables they are working on (e.g. SPR-INTEROP/OSED and TS/IRS for an industrial research project) considering the

Co-funded by
the European Union

EUROPEAN PARTNERSHIP

Page I 11
© −2022− SESAR 3 JU
Approved

validation and/or demonstration[8] results. Transversal assessment results e.g. safety, human performance, etc. shall also support the consolidation of the SESAR Solution CBA at the end of each TRL phase.

Integrated validation activities address several SESAR Solutions. They may be required to ensure that the joint deployment of these SESAR Solutions that have completed TRL6 individually as part of previous SESAR programmes is still feasible. The results of the integrated validation activities may imply updates on the relevant SESAR Solutions data packs e.g. requirements.

In addition, the SESAR 3 JU R&I programme is composed of fast-track innovation and uptake activities that aim at accelerating when possible this process and rapidly bring innovative ideas from low TRL as close as possible to deployment, i.e. TRL7.

Digital Sky Demonstrators contribute to bridge bridging the gap between pre-industrial development and validation and deployment, ensuring the required regulatory framework e.g. standards and regulations is ready for proceeding to the SESAR Solution(s) deployment. When demonstration activities take place, their objective is to complete TRL8 and for that they shall focus on already validated SESAR Solution(s) on previous SESAR programmes and/or calls, and build on the related deliverables, such as the Solution data packs. In case a DSD project addresses a SESAR Solution that has not been previously validated in SESAR, the project shall provide the required material (e.g. requirements in appropriate SESAR Solution technical deliverable(s)) for supporting its deployment.

The development of the validation/demonstration infrastructure required to validate/demonstrate the SESAR Solutions is under the responsibility of the corresponding solution project. The execution of these activities and the elaboration of the supporting detailed documentation remain internal to projects and is not handed over to the SESAR 3 JU. The verification results of prototypes and validation/demonstration infrastructure, their integration to build the validation/demonstration platforms and their potential impacts on the validation/demonstration objectives, while must be carefully taken into consideration, remain as well under the responsibility of the projects and are not required by the SESAR 3 JU.

To guarantee the delivery of robust SESAR Solutions, the maturity achieved during the development life cycle will be assessed during the applicable exit maturity gates (see section 3.7.4). Project maturity self-assessment will also be required as input to the yearly project review to allow SESAR 3 JU to monitor the progress of a solution's development (see section 3.8). A set of maturity criteria, compliant with the Horizon Europe TRL definition (see Annex E of MAWP), will be used to confirm the maturity level reached by the SESAR Solution.

Along the development and validation of the SESAR Solutions, care shall be taken on the need to engage with the National Authorities and EASA (when required), to address the regulatory issues and to consider the need for developing standards.

---

[8] Demonstration results may either confirm the SESAR Solution data pack(s) content of the SESAR Solution(s) that has(ve) been demonstrated or identify area for clarification/update(s) that shall be documented in updated SESAR Solution data pack.

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

2.2.2 Approach to consider performance in the development and validation process

As the technological pillar of the 'Single European Sky' (SES), SESAR is one of the key contributors to achieve high-level goals (HLGs) relative to 2005 performance and expressed as:

- Improving the safety performance by a factor of 10.
- Three-fold increase in ATM capacity that will also reduce delays both on the ground and in the air.
- Enabling a 10% reduction in the effects flights have on the environment.
- Providing ATM services to airspace users at a cost of at least 50% less.

Not only does SESAR support these SES HLGs but SESAR also aims at enabling additional performance ambitions, as stated in the European ATM MP, through the full implementation of the SESAR vision. The ATM MP is the agreed roadmap that connects ATM research and development (R&I) activities with deployment scenarios in support of the SES performance goals.

ATM MP performance ambitions should be considered as aspirational rather than fixed and binding, since the SESAR Programme has to take into account the lengthy lead times inherent to infrastructure-based sectors such as ATM and the need to spur sustained R&I activities for the future. The SESAR 3 JU has designed a performance management process which makes use of a SESAR Performance Framework (SPF) to support individual SESAR Solution performance development and quantification against these ambitions; the Performance management process can be found in section 3.3.

2.2.3 Approach to maintain a SESAR Architecture in the development and validation process

In support to the SESAR Solution development and validation approach (see 2.2.1) and in complement to the Performance approach (see 2.2.2), there is a need to consolidate SESAR Architecture at programme level with the aim to monitor completeness, consistency and coherence from a holistic perspective for both ATM and U-space of work by all SESAR 3 JU IR and DSD projects.

SESAR Architecture is maintained through a set of content integration activities organised and run in a continuous manner throughout the SESAR 3 JU programme management (see section 3.5), and Solution development and validation process working hand in hand with the programme management activities that support the SESAR 3 JU's decision-making. The objective is threefold:

- To consolidate quality of the content of the SESAR Solution deliverables in a structured way thanks to consistency, coherence and coverage analysis at programme level.
- To contribute to consolidated views to support the ATM MP monitoring.
- To support the management of requirements, allowing system engineering data to be traced to the SESAR Architecture (e.g. validation objectives against requirements and/or demonstration results against objectives).

The content integration processes are aligned with the planning and feed the delivery life cycle via the solution maturity assessment as further described in this handbook. The level of detailed activities varies depending on the level of targeted SESAR Solution exit maturity.

The content integration processes play a pivotable supporting role to prepare and transfer specific content output from the R&I towards deployment (industrialisation and implementation) and this is enabled via ATM MP level 3 planning processes and allow the SESAR 3 JU governing board to monitor the progress of the research activity towards deployment with regard to the ATM MP Level 1.

2.2.4 Approach to align R&I to ATM Master Plan

The European Air Traffic Management Master Plan (MP) is the cornerstone of the Single European Sky Air Traffic Management (ATM) and SESAR 3 JU is responsible for its execution and maintenance. The plan evolves following the results of development activities, coordinated by the SESAR 3 JU, and the deployment plans, implemented by the stakeholders of the SESAR project. Those SESAR developments and deployment activities are covering both industrialisation and implementation activities and remain strongly connected to EU policy priorities.

The connection to the ATM MP is enabled and embedded in the development and validation processes while the contextual note delivered when a SESAR Solution is at TRL6 level contains recommendations regarding additional activities to be conducted during the industrialization phase or as part of deployment.

While the responsibility to develop information aligned with the ATM MP lays with each solution project, one transversal project will support the activity by providing guidance and ensure that the quality of information is complete and usable in terms of monitoring and in terms of alignment of the ATM MP scope and ambitions.

So process compliancy as described in chapter 4 and awareness and understanding of the strategic plan are needed to be and remain aligned to this Master Plan which is monitored at a yearly basis and reported to up to the level of the SESAR 3 JU Governing Board.

2.2.5 Approach to documenting SESAR Solutions

The expected outcomes of solution projects are documented using a set of concrete deliverables that a project must submit to the SESAR 3 JU. These deliverables aim at capturing the required elements to be further validated across the R&I pipeline, and when full maturity (i.e. TRL6 for IR SESAR Solution or TRL7 for FTIU SESAR Solution) is achieved at guaranteeing the delivery of SESAR Solutions as outputs supporting deployment. These deliverables will therefore mainly address the operational requirements and supporting technical requirements, the performance assessment, cost–benefit analysis, contribution to standardisation and support to regulatory activities; they shall be developed and consolidated as described in the SESAR Solution development and validation process (see 2.2.1).

The following table lists and defines all the SESAR 3 JU Digital European Sky programme technical deliverables.

Deliverable	Definition
Cost-benefit analysis (CBA)	*The cost-benefit analysis (CBA) documents the potential benefits, when deployed in the applicable environment(s), of a SESAR ATM Solution or a SESAR Technological Solution (CBAT), and whether or not they are expected to exceed the costs over a given time horizon.*
Concept outline	*High level description of the concept with identification of potential benefits and associated risks.*
Contextual note	*The contextual note 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, etc. When a SESAR Solution is at TRL6 level it contains as well recommendations regarding additional activities to be conducted during the industrialization phase or as part of deployment. It introduces the technical data pack comprising the SESAR 3 JU deliverables.*
Demonstration plan (DEMOP)	*The demonstration plan describes the way in which one or more demonstration exercises or activities is/are to be prepared and executed in order to achieve the demonstration objectives. It includes those demonstration exercises that are required and sufficient to ensure that the SESAR Solution(s) under the scope of the project will progress from the initial maturity level to the target one. As appendix, it includes the required transversal and performance assessment plans (e.g. safety, Human Performance).*
Demonstration report (DEMOR)	*The demonstration report consolidates the results obtained by demonstration exercises. As appendix, it includes the transversal assessments (Safety, security, human performance and environment impact assessments) and any update on the requirements (SPR-INTEROP/OSED, TS/IRS) for SESAR Solutions under the scope of a demonstration project.*
Economic evaluation (ECO-EVAL)	*The economic evaluation assesses the potential benefits that an innovative idea or application under analysis by an exploratory research project could provide against an initial high level estimation of the costs that it may imply.*
Exploratory research plan (ERP)	*The exploratory research plan describes the way in which one or more validation exercises or activities are to be prepared and executed in order to achieve the validation objectives of an Exploratory Research project.*
Exploratory research report (ERR)	*The exploratory research report consolidates the results obtained by an exploratory research project once the validation activities, experiments, etc, have been completed.*

Functional requirements (FRD)	*The functional requirements document represents a formal statement of SESAR technological solution related functional requirements. The content describes "what" the SESAR technological solution has to do but not the "how".*
Operational service and environment description (OSED)	*The operational service and environment description aims at describing the specific activities and interactions of various stakeholders related to a new concept of operations or to a new piece of existing concept.*
Project management plan (PMP)	*The project management plan aims at capturing the project organisation and way of working internally and with the SESAR 3 JU, including the consolidation and maintenance of a project schedule (to be integrated and managed in the SESAR 3 JU's collaboration platform).*
REG	*Proposed SESAR acceptable means of compliance to EASA to illustrate means to establish compliance with the SES basic regulation and its implementing rules.*
Safety and performance requirements/ interoperability requirements - SPR-(INTEROP/OSED)	*The SPR-INTEROP/OSED contains the safety and performance requirements and interoperability requirements related to a SESAR Solution that has been defined and validated in the context of the OSED, which describes the applicable environment, assumptions, etc. As appendix, it includes the transversal assessments and the performance assessment report that justify the SPR-INTEROP requirements (e.g. safety, human performance, etc).*
Standardisation (STAND)	*Proposed SESAR input to standardisation activities (e.g. EUROCAE).*
Technical specifications/interface requirements (TS/IRS)	*The TS/IRS document provides the functional, non-functional and interface requirements related to a SESAR Solution. The technical specifications address the "what" and not the "how", they aim at specifying the functional description and the necessary logical interfaces between the SESAR Solution and other parts of the ATM system.*
(Technological) validation plan ((T)VALP)	*The validation plan describes the way in which one or more validation exercises or activities are to be prepared and executed in order to achieve the validation objectives. It includes those validation exercises that are required and sufficient to ensure that the SESAR ATM Solution or the SESAR Technological Solution (TVALP- Technological Validation Plan) will progress from the initial maturity level to the target one. As appendix, it includes the required transversal and performance assessment plans (e.g. safety, Human Performance).*
(Technological) validation report ((T)VALR)	*The validation report consolidates the validation results for a SESAR ATM Solution or the SESAR Technological Solution once the validation activities for a given maturity level have been completed.*

Table 1: Digital European Sky programme deliverables

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

The following table allocates the deliverables per phase of the innovation pipeline. These deliverables will be reviewed and assessed from a quality and a maturity perspective by the SESAR 3 JU.

Deliverables	Fundamental research	Applied oriented research	Industrial research	Fast track to innovation & uptake	Digital Sky Demonstrators
Concept Outline	■				
ERP	■	■			
ERR	■	■			
FRD		■			
OSED		■			
ECO-EVAL		■			
Contextual Note			■	■	
SPR-INTEROP/OSED			■	■	
TS/IRS			■	■	
(T)VALP			■	■	
(T)VALR			■	■	
CBA			■	■	
DEMOP					■
DEMOR					■
STAND			■	■	■
REG			■	■	■

Table 2: **Digital European Sky deliverables (Solution data pack) mapped by pillar of the innovation pipeline**

The projects are strongly encouraged to schedule the submission of draft technical deliverables along the lifecycle of the R&I activities[9]. This approach de-risks any possible rejection of deliverables should the quality of the documents not be met.

---

[9] In preparation for each Project review, for each SESAR Solution a clear set of draft/intermediate deliverable shall be identified to support the SESAR Solution self-assessment to be presented during Project review

2.3 SESAR Solution delivery - Release process

The release process is the SESAR 3 JU delivery management process that secures the programme deliveries by setting up the programme priorities according to a yearly cycle. The release process, based on the latest applicable Extended Release Strategy baseline, ensures the yearly planning and delivery of key output of SESAR 3 JU projects e.g. SESAR Solutions addressing a maturity gate, key demonstration results, etc. It also ensures the monitoring of the progress made by the related Solutions against the plan defined in the ERS, and the reporting to the SESAR 3 JU governance about any issues allowing to take corrective actions when required. The output of the Release process is used to generate the next version of the Extended Release Strategy, updating the applicable baseline for the programme.

The release process consists of three phases: definition, execution and delivery.

Release milestones do not impose deadlines to projects. The planning of validation / demonstration activities and maturity gates are based on each solution's lifecycle. The Release process also offers the opportunity for the projects to provide further visibility to the output of their work.

Figure 3 provides an overview of the phases of the Release process, which are detailed in the following sections.
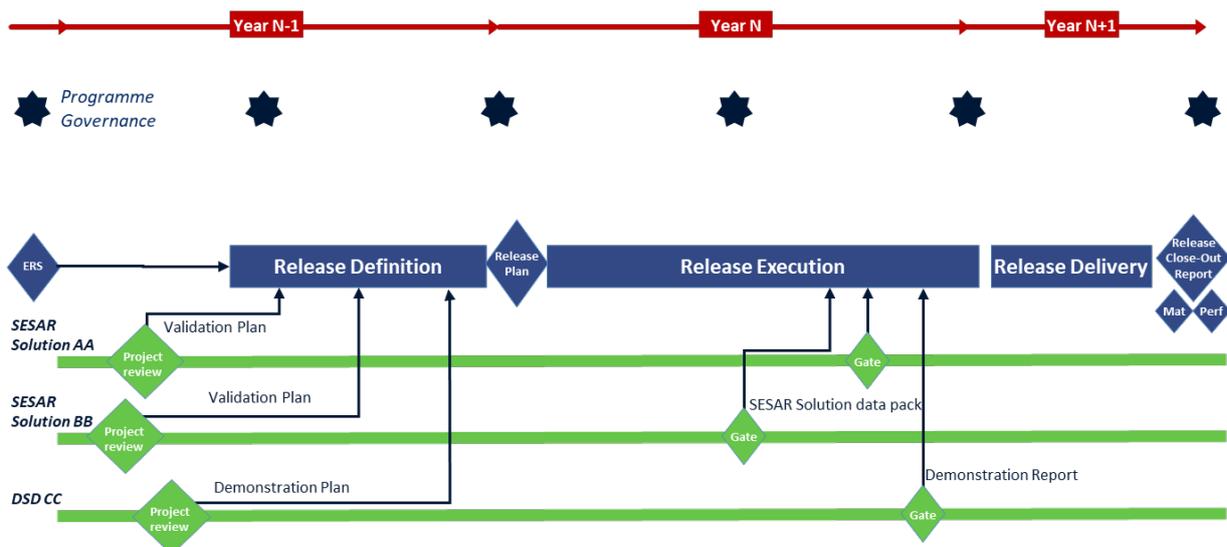
Figure 3: Overview of the Release process phases

2.3.1 Release definition

The objective of this phase, lasting from May to December of Year N-1, is to define, based on the latest applicable version of the Extended Release Strategy, a yearly Release Plan.

The Release N plan defines what the programme will deliver during a yearly cycle (across all R&I pillars) in particular (but not limited to) the list of SESAR ATM and Technological Solutions which, according to project planned activities (from Exploratory Research to Digital Sky Demonstrators) have planned a

maturity gate during year N. The definition of the Release Plan, followed by its approval at the SESAR 3 JU governance Level, will set the high level yearly targets that the Programme is committed to achieve in the yearly Release cycle.

An initial list of maturity gate dates are already available in the projects' proposals, which documented via the ERS baseline, are the reference for the elaboration of an initial draft of the Release Plan. These dates can be changed during the projects execution: the iterative update of validation and demonstration plans will be taken into consideration for iteratively updating the Release Plan during this definition phase. At the end of the Release definition phase, the Release Plan will be baselined based upon the latest available information from the projects and it will be monitored by the SESAR 3 JU programme for monitoring and reporting at the SESAR 3 JU governance bodies.

The Release Plan includes the list of validation and demonstration activities / assessments planned per SESAR Solution to achieve a given maturity level. These activities are extracted from the projects schedule (as managed in the SESAR 3 JU's collaboration platform) and are key input to define the content of the Release Plan.

Once delivered, the Release Plan is endorsed by the relevant SESAR 3 JU governance body and provides the reference for the following phase: the Release execution.

2.3.2 Release execution

During the Release execution phase, projects complete the validation / demonstration activities / maturity assessments leading to the maturity gate of the SESAR Solutions identified in the Release Plan. This typically includes:

- Running the scheduled validation and demonstration exercises.
- Analysing and consolidating results, producing validation reports, updating SESAR Solutions' documents accordingly (e.g. SPR-INTEROP/OSED and TS/IRS) with the expected quality (section 3.6).
- Producing the required material to support the maturity gate process e.g. maturity assessment (section 3.7).
- Keeping up to date the risk / issue / opportunities registers in particular those impacting the ERS and the release plan objectives (section 3.2).

2.3.3 Release monitoring

The SESAR 3 JU monitors and steers the release activities during the execution phase and reports on a regular basis to SESAR 3 JU governance regarding the progress of the release activities and intermediate obtained results. Special attention is paid to the overview of the risks, issues and opportunities that may impact the expected output of the yearly Release as identified in the Release Plan, and to ensure mitigation actions are in place.

The SESAR 3 JU recognises the uncertainties inherent within research, especially when performed at low maturity levels, where the proposed exit maturity level may not be reached or even where the proposed ATM application is found unsuitable.

To monitor the situation on a regular basis and to create visibility at management and governance levels, the SESAR 3 JU will when executing the programme put some coordination and reporting

measures in place and this by appointing SESAR 3 JU programme managers as first line focal points for programme management and programme expertise. This requires project managers to take into account the need to regularly coordinate with the SESAR 3 JU to maintain visibility for managing expectations and documenting/exploiting unexpected outcomes.

The monitoring of the release activities will on its turn cover the monitoring of the MAWP ambitions that includes the yearly obligatory and highly visible annual activity reporting of the SESAR 3 JU as well as ATM MP coverage reporting.

2.3.4 Release delivery

Once the release results are available e.g. SESAR Solution maturity has been confirmed through the exit maturity gate (see 3.7.4) and the (updated if needed) technical deliverables are ready, the SESAR 3 JU starts the consolidation of the release output into the release N close-out report.

By March of Year N+1, the Release N close-out report is delivered by the SESAR 3 JU. The Release close-out report provides a summary of the key results from all the activities performed in Release N e.g. successfully validated or demonstrated SESAR Solutions as confirmed during the relevant maturity gates, relevant validation and demonstration results, etc.

The release results e.g. maturity gate decisions, performance results, etc. are also an input for the update of the ERS building the new reference to be applicable for the next yearly cycle. The deviations documented in the release close-out report are compared to the expectations set in the ERS and the BAWP to assess their impact on the programme objectives and raise the required mitigation / corrective actions.

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

3 Project management in relation to programme management

The objective of this section is to present all programme management processes that projects have to comply with to ensure delivering SESAR Solutions at the required quality and maturity levels, answering to the ATM Master Plan and MAWP/BAWP objectives, and fulfilling SESAR 3 JU reporting obligation towards its governance.

The SESAR 3 JU sets up a strong programme management based on technical milestones and checkpoints supporting a series of SESAR 3 JU processes that have been designed from a time line perspective to complement applicable rules defined in the Horizon Europe (HE) grant management processes.

SESAR 3 JU is permanently maintaining and monitoring integrated views of all project activities (e.g. scope, time…), ensuring consistency and quality of SESAR 3 JU programme. The integrated programme planning relies upon strong R&I and transversal projects' cooperative set of practices and activities as described in following sections.
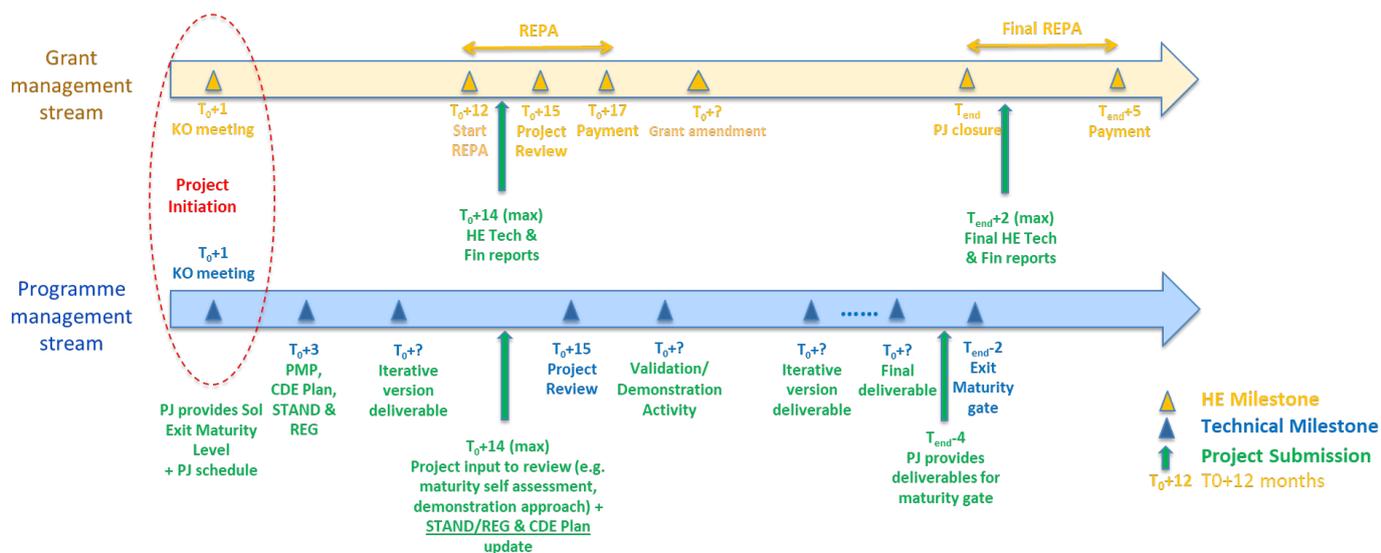
Figure 4: Complementarity between grant management and programme management processes[10]

The Programme management processes will be mainly run outside the eGrants tools and will be enabled by SESAR3 JU's collaboration platform that will be introduced at Project Kick Off. A close coordination between the Project and the SESAR 3 JU Programme Managers will be required along the execution of all following programme management processes; it will be facilitated through the SESAR 3 JU's collaboration platform.

---

[10] Note that for Exploratory Project (ER), the reporting period will be 15 months while for Industrial Research (IR) and Digital Sky Demonstrator (DSD), the reporting period will be 12 months as presented in the Figure 4; exact dates will be consolidated during the GAP in the GA.

3.1 Project management

The project planning is expected to support the common visibility between project and SESAR 3 JU on all project activities and deliverables necessary to achieve agreed project objectives; hence it supports the SESAR 3 JU in its obligation of reporting to its governance. The following key milestones shall be defined and maintained in the project schedule throughout the lifecycle of the project:

1) Kick-off meeting[11] (T_{0+1});
2) Project management plan (PMP) (T_{0+3}), including initial maturity level and performance expectation of each SESAR Solution(s)
3) Validation activity (when required);
4) Iterative versions (when required) and final version of the deliverables;
5) Horizon Europe technical report and financial report (2 months after the end of each reporting period defined in the GA);
6) Project review (between 2 and 4 months after each reporting period defined in the GA);
7) Solution data pack (T_{end}-4);
8) Exit maturity gate (T_{end}-2).

The project may in addition define any specific milestone that may be appropriate to secure correct visibility on the critical phase of the project (e.g. key maturity steps), especially each Work Package shall have at least one milestone per semester (every 6 months).

A PMP shall be delivered at T_{0+3} as a first consolidation of the project management principles described in the proposal and baselined in the GA, demonstrating project compliance to the project handbook - providing in particular a detailed project schedule (to be fully managed in the SESAR 3 JU's collaboration tool).

The PMP shall be kept up to date on a continuous basis and an updated version shall be delivered for each project Review.

3.1.1 Programme Initiation

If required, the SESAR 3 JU may organise a programme kick-off meeting with all projects to present the overall framework of work, based upon the content of this handbook.

The main purpose of the meeting would be to secure a common understanding and alignment to SESAR 3 JU programmatic objectives, expectations towards the projects in terms of the way of working together.

---

[11] Project shall be able to present their project management principles (e.g. Work Breakdown Structure, Product Breakdown Structure, Roles and responsibilities, IPR management…) that will be consolidated in the PMP to be delivered at T_{0+3}.

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

3.1.2 Project Initiation

The project kick-off meeting (KOM) is called by the project manager within the first month after the contract signature. The meeting is be an opportunity for the SESAR 3 JU and the project to present the teams in charge of the activities.

The KOM aims at informing the beneficiary(/ies) about the contractual and applicable financial provisions in more detail, including discussing the project and SESAR Solutions scope, objectives, organisation, deliverables, resources, planning, communications, dissemination and exploitation activities and other relevant information, as outlined in the description of the action in the GA. In addition, the project will be required to consolidate additional detailed schedule information captured during the GA preparation phase (e.g. milestones, dependencies, etc.).

The KOM is also the opportunity to discuss any practicalities related to the launch of the project and consolidating the initial maturity level (see section 3.7.2) of the SESAR Solution(s) under the project's scope, documenting evidence such as references to a previous SESAR activity or an initial maturity self-assessment of each solution. This initial self-assessment represents a critical step to start the work at SESAR Solution level. The initial maturity assessment shall either confirm or amend the initial maturity level of the SESAR Solution(s) (e.g. with reference to the maturity assessments available from previous SESAR activity, or any external activity providing adequate evidence) and document any potential gap/issue derived from this analysis. Finally for each SESAR Solution, projects must confirm the qualitative performance expectations (at level of KPAs and KPIs).

During this meeting, the SESAR 3 JU will also introduce in more detail its programme management practices, the SESAR 3 JU's collaboration platform and the applicable SESAR 3 JU templates and guidelines. Particular attention will be drawn to the need to ensure robust coordination with National Authorities and EASA when required.

Following the KOM the project may update its schedule with all well-defined milestones and dependencies and submit it to the SESAR 3 JU no later than T_{0+3}, with the overall PMP.

3.1.3 Management of changes in the project's R&I work

3.1.3.1 Objective

R&I work as performed by each individual project is described in the action part of the GA and along the life cycle of the R&I work it is further detailed and worked on from a content, performance and programmatic information viewpoint.

The evolution of the research, innovation, development and validation activities, in particular for those activities where a higher level of R&I maturity is targeted, may generate an impact to any of the three levels of the ATM MP. For this reason such changes must be monitored, be subject to an impact analysis, and therefore require therefore approval by SESAR 3 JU.

In addition, considering potential dependencies between SESAR Solutions, it is important that any change is visible to the different beneficiaries working at the level of the project, as well as to the different SESAR 3 JU members and partners working on the overall programme, to ensure their alignment to the vision and strategy, as outlined in the ATM MP.

3.1.3.2   Approach

Each project is responsible to manage (i.e. maintain and report) a set of pre-defined configuration data characterised within the GA action, and further detailed from a project/programme management viewpoint (e.g. scope, work breakdown and timeline), from a performance viewpoint as from a content viewpoint (e.g. architectural content and requirements).

When changes arise, the project manager is responsible to make those visible and obtain approval from SESAR 3 JU. This approval is necessary to detect in a timely manner any significant impact that these changes may generate in relation to the ATM MP and to ensure and maintain a good spirit of collaboration at the level of the programme. When assessing the change the SESAR 3 JU will also analyse whether it could trigger a contractual change to the GA leading to initiating a HE grant amendment process. The SESAR 3 JU is also responsible for ensuring the impact of any requested changes are coordinated with transversal and other projects.

3.1.3.3   Principal roles and responsibilities

Role	Responsibility
Solution project manager	Responsible for identifying and reporting project evolution and initiation change proposal(s) with due rationale.
SESAR 3 JU	Supervises the change proposals and performs impact assessment to assess acceptability of implementation according to the SESAR JU 3 programme and the ATM MP.
Transversal projects	Support SESAR 3 JU in the assessment of change proposals impacting ATM MP (e.g. performance, content integration…)

Table 3: Management of changes roles and responsibilities

3.1.3.4   Supporting tools

The evolution of project changes are instigated by the Project Manager who will use the SESAR 3 JU's collaboration platform. Depending on the nature of change (e.g. programme, schedule, performance, content integration…), an impact analysis may be triggered by SESAR 3 JU with support of transversal project.

3.2   Risk management

3.2.1   Objective

A per the GA, each project is responsible for identifying risks. However, it is not specified in any detail how such risks/issue & opportunities (RIOs) should be managed since the programme covers a very wide range of disciplines, which makes it challenging to specify a unique method for defining and assessing the RIOs. The SESAR 3 JU has therefore elaborated its own process and criteria for managing RIOs. This section describes how the project shall contribute to this approach.

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

3.2.2 Approach

Within the SESAR 3 JU, the management of RIOs at project level is performed according to the following principles: every project manager shall identify and manage RIOs affecting the project's objectives by:

- Identifying and classifying RIO.
- Identifying appropriate mitigation actions.
- Monitoring and tracking the status of action implementation.
- Updating regularly the list of RIOs.
- Escalating RIOs as necessary (e.g. External RIOs, RIOs impacting the programme delivery, interdependencies with other projects).
- Communicating about RIOs status and actions undertaken within and outside the project as necessary.

3.2.3 Principal roles and responsibilities

Role	Responsibility
Project manager	Responsible for identifying and reporting RIOs; defining appropriate mitigation actions; monitoring and tracking the status of their implementation; communicating about RIO status and actions undertaken.
SESAR 3 JU	Supervises the RIOs; supports the project manager in reporting and undertaking of corrective actions; supports the identification of RIOs to be escalated; ensures proper coordination for RIOs escalated at programme level.

Table 4: RIO management: roles and responsibilities

3.2.4 Supporting tools

The project manager will use the SESAR 3 JU's collaboration platform to continuously provide more details and visibility on mitigation actions.

In addition, in order to ensure an efficient risk management at programme level, it is requested from the project manager to update the list of risks and the associated actions continuously in the SESAR 3 JU's collaboration platform.

This is in line with the SESAR JU risk management policy and allows the SESAR 3 JU programme manager to identify risks that require escalation.

Co-funded by
the European Union

EUROPEAN PARTNERSHIP

Page I   25
© –2022– SESAR 3 JU
Approved

3.3   Performance management

3.3.1   SESAR 3 JU performance management

The SESAR 3 JU performance management process can be summarised in a few steps as described in the figure below:
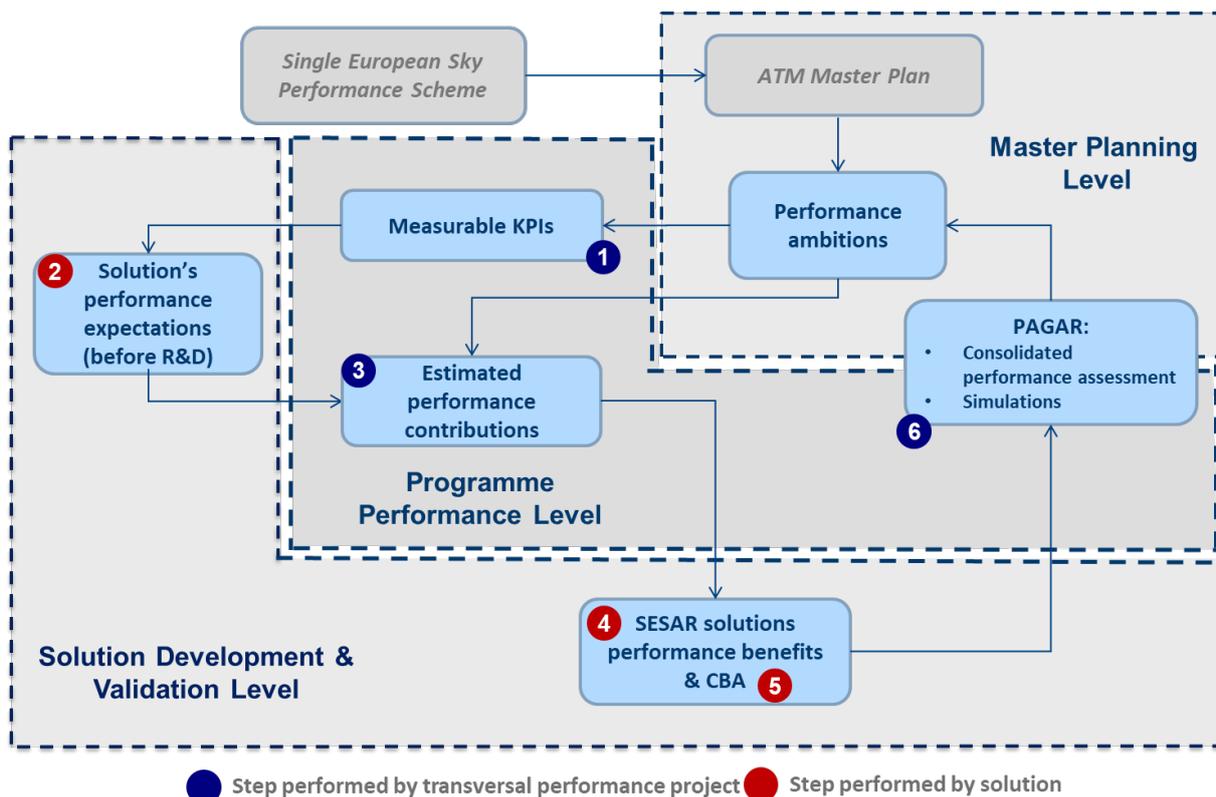
Figure 5: SESAR 3 JU performance management process

STEP 1: the ATM MP supports and enables SES high-level goals but also aims at enabling additional performance ambitions. It is the agreed roadmap that connects ATM research and development activities with deployment scenarios to achieve the performance objectives of the Single European Sky. Performance transversal project translates ATM MP and SESAR performance ambitions into measurable indicators - KPIs.

STEP 2: Solution projects explicitly describe the performance areas that are expected to be impacted by each SESAR Solution under development and how this impact may be measured. Such a qualitative performance expectation shall be provided as part of the tender process and grant consolidation.
SESAR Solutions may contribute to additional performance areas, which projects can detail in their proposal so long as they can demonstrate a direct or indirect link to the ambitions set in the MAWP, and ATM MP indirectly.

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

STEP 3: The SESAR performance ambitions must be aligned with the operational improvements expected by individual solutions; the performance transversal project shall estimate and allocate specific performance contributions for each SESAR Solution. These estimated performance contributions will be of a qualitative nature (e.g. high, medium and low contribution).

STEP 4: The solution projects then evaluate the performance benefits of each solution at European Civil Aviation Conference (ECAC) level through operational validation exercises and technical verification exercises along with dedicated analyses conducted using analytical models, fast-time models, real-time simulations and live trials. If no results are available, the analyses can be based on expert judgment and/or past study studies can in TRL1-2.

> Nota bene: Experts in the *transversal performance project* shall provide guidance, coaching and mentoring in the application and execution of sound extrapolation methodologies. However, *solution projects* shall bear full responsibility to deliver an ECAC level performance impact.

STEP 5: Performance benefits are then monetised and analysed by solution projects in the form of a cost-benefit analysis (CBA), providing key measures on expected costs and benefits for key stakeholders should they invest in a specific SESAR Solution. Not only shall CBAs be used to show the economic value of each SESAR Solution alone, but also as input to develop ad-hoc consolidated CBAs and business cases to support decisions on new implementation objectives and the master planning (see step 6).

> Nota bene: Solution projects bear full accountability in the organisation, preparation and successful progress of SESAR Solution CBA related activities such as estimation of benefits and costs, elaboration of risk and sensitivity analyses and overall conclusions. For this reason, solution projects are expected to pro-actively plan and allocate relevant and adequate resources (human resources and financial) for the completion of this deliverable.

STEP 6: The transversal performance project collects and aggregates the estimated performance data (at ECAC level) related to available solutions (as published in the PAR) and the aggregated CBA information, by taking into account the relationship between solutions (identified and managed as dependencies at overall programme level). Furthermore, it takes an active role in the preparation and running of multi solution simulations when applicable. The final objective is to obtain a consolidated view of the expected combined performance. The outcome of this process is the delivery of a yearly **Performance Assessment and Gap Analysis Report (PAGAR)** which displays and analyses the progresses achieved by the overall SESAR programme (as general assessment of individual but integrated solution projects performance estimates at ECAC level) vis-á-vis the Master Plan ambitions.

> Nota bene: the performance assessment as introduced in this chapter is applicable **to both SESAR ATM solutions as well as Technological solutions, either in industrial research, exploratory research,** f**ast-track innovation and uptake or Digital Sky Demonstrators.** Technological solutions are therefore covered by this approach. The application of the performance methodology itself may vary and is outlined in more details in the specific guidance for each KPA and with support of the transversal performance activities. For areas such as CBA, safety, security, human performance and environment, specific guidance material and assessment methodologies shall be followed by solution projects. The purpose for introducing these assessment practices is to support solution projects to identify and remove

or mitigate any potential obstacles which might limit their capability to produce the required documentation.

The SESAR 3 JU encourages *solution projects* to make use of coaching and training sessions provided by the *transversal performance activity* in the application of recommended methodologies for each KPA. *Solution projects* shall also have access to **community of practices** in which experts working on same matters share experience and good practices amongst each other. The set-up of the community of practices is to be facilitated in the SESAR 3 JU's collaboration platform.

3.3.2 CBA related methodology and assessment approach

A CBA is required to assess the affordability of a SESAR Solution with respect to its expected benefits and it is mandatory for each SESAR Solution under the responsibility of solution projects. A specific, and if needed, tailored CBA should be delivered for SESAR technological solutions, given their links with the SESAR ATM solution(s) they are expected to enable.

Appendix C.2.1 provides an introduction to the CBA assessment that solution project shall apply.

3.3.3 Safety related methodology and assessment approach

This section provides high-level guidance on safety tasks undertaken by solution projects for each of the TRL2-TRL8 maturity phases and for which a specific KPA methodology and assessment is foreseen. It is aimed at project managers and experts involved in:

- SESAR safety assessments.
- Derivation of safety drivers, safety specification and safety requirements.
- Development of SPR-INTEROP/OSED, TS/IRS, VALP and VALRs.
- Documenting safety assessment for demonstration in an operational environment (at TRL7 for fast track Innovation and uptake, and at TRL8 for DSD).

The purpose of safety assessment in SESAR 3 JU is to ensure that explicit consideration can be given from early definition and through the design stages to maximising the delivery of safety benefits and identifying /mitigating safety problems that could occur.

Appendix C.2.3 provides an introduction to the safety methodology and assessment that solution project shall apply.

3.3.4 Security methodology and assessment approach

The objective of the security work in SESAR is to deliver secure and cyber-resilient SESAR Solution(s).

A SESAR Solution is "security critical" if it connects multiple stakeholder systems and a successful cyber-attack could lead to any of the following:

- An accident or serious incident (safety).
- A high economic impact throughout Europe (economy).

All SESAR solution should perform a security risk assessment (SRA).

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

If a SESAR solution is considered "security critical", it shall perform a security risk assessment (SRA); it is recommended that all SESAR solution should perform a SRA.

Appendix C.2.4 provides an introduction to the security methodology and assessment that solution project shall apply.

3.3.5   Human performance methodology and assessment approach

Achieving the vision of the ATM MP relies on a detailed understanding of the impact that the human actors have on the successful operation of the system. The human element of the overall ATM system remains the most critical source of its performance, safety and resilience.

The purpose of the human performance (HP) assessment process is to ensure that HP aspects related to SESAR Solution technical and operational developments are systematically identified and managed. This is done by incorporating the knowledge and understanding of how human and system actors work together, and by explicitly incorporating the requirements that enable all functions to work collaboratively in managing performance in the SESAR 3 JU programme.

Appendix C.2.5 provides an introduction to the human performance methodology and assessment that solution project shall apply.

3.3.6   Environmental methodology and assessment practices

The purpose of an environmental impact assessment (EIA) is to provide evidence (e.g. to regulators) to demonstrate that environmental impacts have been identified and, where possible, mitigation measures implemented, if a SESAR Solution, or group of SESAR Solutions, is to proceed to deployment.

On the basis of this assessment, the best trade-off between environmental impacts and other performance areas should be selected to ensure the sustainability of aviation. However, no trade-offs should be made with regards to safety and security.

Appendix C.2.6 provides an introduction to the environmental methodology and assessment that solution project shall apply.

3.3.7   Digitalisation/automation

Digitalisation and automation are both considered as a pillar of a functional aviation ecosystem and will play a central role to enable a dynamic ATM system capable of becoming more scalable and resilient, and of ensuring that all air traffic is handled safely and efficiently, even under highest traffic growth forecast or during stagnation or unexpected downturn.

In particular, the introduction of an ATM digitalisation index will serve to indicate the achieved level of digitalisation by the European ATM industry. The expectation is that higher scores on this index will indicate an improvement in ATM performance and an increase in the economic potential generated by the European ATM industry.

A set of performance indicators shall be made available and adopted by SESAR Solutions to measure their contribution and impact on digitalisation.

3.3.8 Supporting tools

SESAR 3 JU's collaboration platform will:

- Enables performance management workflow.
- Holds an information storage and workflow related to maturity gate.
- Enables the community of practices for each performance dimension.

The interface between SESAR 3 JU, transversal performance project and solution projects will be realised using pre-defined deliverable templates that contain guidelines and criteria to help define and understand what is to be delivered; these templates will be provided upon project's kick off.

3.4 Master plan maintenance

3.4.1 Objective

The ATM MP is composed of three levels and the objective of the process within the scope of the execution of the SESAR R&I framework is to ensure that:

- The evolution of the MP strategy planning (L1) can be translated into input to feed the BAWP and consequently call for tenders.

- Progress of the work provided in terms of timescale, investment/cost, performance, standardisation and regulation and risks/issues and opportunities are monitored (L2).

- Deviations of progress are captured and the impact on strategic planning are reported upon.

- Output of work done is prepared in function of deployment activities (L3).

3.4.2 Approach

The monitoring of the master planning at all three levels is done by the SESAR 3 JU with support of a transversal master planning and monitoring project and uses information from the projects to feed the development monitoring while the deployment is fed by monitoring done through the master plan level 3 planning and reporting processes.

From an R&I execution framework viewpoint (i.e. scope of this handbook), for any solution under development (in particular for any that is targeting TRL6) the aim is to ensure that a comprehensive data pack is provided to allow for the controlled transition to the next maturity level (i.e. deployment). In this respect, the solution data pack shall include a contextual note containing any further recommendations regarding additional activities to be conducted during the next phase (i.e. deployment phase). This will be achieved by projects complying with processes described in this chapter.

3.4.3 Principal Roles and Responsibilities

Role	Responsibility
Transversal master planning and monitoring project manager	Responsible for making available information on master plan progress in a timely manner through deliverables defined in the GA
Solution project content integrator	Within each solution project team, one or more people involved in the development of the SESAR Solution(s) who are in charge of ensuring that the content of the deliverables agreed in the GA, allow monitoring the project's progress towards ATM master plan.
Transversal project master plan manager content integrator	This is the counterpart of the solution project content integrator who works as point of contact within the transversal team in order to support the delivery of SESAR Solution quality information to enable master plan monitoring and reporting, in particular related to the upstream deployment activity.
SESAR 3 JU	Is responsible by regulation for monitoring and reporting on all three levels of the ATM MP.

Table 5: Maintaining the ATM MP: roles and responsibilities

3.5 Content integration

3.5.1 Objective

The content integration process provides a means to ensure the quality, consistency and coherency of the content developed across the programme.

3.5.2 Approach

The process is executed on a continuous basis, supporting, integrating and consolidating SESAR Solution development. The level of detail varies depending on the targeted maturity level of the R&I work. See also Appendix C.1 and summarised in short:

- Before TRL4, development work shall be aligned with the taxonomy information set-up and applicable to all solution projects.

- At TRL4, SESAR Solution development shall be initiated within SESAR Architecture (at least one modelling shall justify it); this is applicable to IR projects and support SPR-INTEROP and TS/IRS deliverables.

- At TRL6, SESAR Solution development shall be finalised within SESAR Architecture (modelling shall be fully integrated in SESAR Architecture); this is applicable to IR projects and support final version of SPR-INTEROP and TS/IRS deliverables.

- At TRL7 / 8, SESAR Solution demonstration shall be maintained within SESAR Architecture; if need identified, TRL6 model shall be updated and fully documented (in TRL 6 supporting material).

The information to be integrated can be summarised as follows:

- System engineering (SE) structured information (e.g. Validation objectives, SPR-INTEROP/OSED requirements, TS/IRS requirements).

- Information supporting the development of the SPR-INTEROP/OSED and the TS/IRS. The TS/IRS aims to provide a functional description and necessary logical interfaces with other systems and identify the changes at the level of their functions that need to be developed and validated in order to support the realisation of the operational needs expressed in the SPR-INTEROP/OSED. As such, the functional description and the interfaces are done based on a set of pre-defined architectural elements.

When information is developed by solution project(s), coordinated work between the solution project and transversal project ensures:

- Assessing the consistency and coherency of information in support of the SESAR Architecture.

- Validating that the information is aligned with the vision of the ATM MP.

Providing input to the SESAR Solution maturity gates to confirm that the content, once integrated and consolidated in the SESAR architecture, is aligned with the master plan and with the inputs delivered by other solutions.

3.5.3   Principal roles and responsibilities

Role	Responsibility
Solution project manager	Responsible for making available content integration information timely and quality wise aligned with the submitted deliverables agreed in the GA.
Solution project content integrator	Within project team, one or more people involved in the development of the SESAR Solution(s) who is/are in charge of ensuring that the SESAR Solution(s) content information is consistent and complete, and aligned with information of dependent solutions.
Transversal project content integrator	Is the counterpart of the solution project Content Integrator and works as point of contact within the transversal team so to support the process of integration of SESAR Solution information.
SESAR 3 JU	Manages the quality assessment of information both of deliverables and the complementary content integration. To do this SESAR 3 JU relies on subject matter experts either within or outside the SESAR 3 JU and on the involvement of experts from transversal projects.

Table 6: Content Integration: roles and responsibilities

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

3.5.4 Supporting tools

The SESAR Architecture framework supports the R&I activities for developing and integrating a set of pre-defined information in a harmonised, consistent, coherent digitalised model-based format.

3.6 Quality assessment of deliverables

3.6.1 Objective

In order to secure a common programmatic approach to the quality of the output from each project, the SESAR 3 JU has elaborated its own process and criteria for assessing deliverables as defined in this section.

3.6.2 Approach

The SESAR 3 JU assumes that projects correctly apply internal quality controls prior to the submission of a deliverable to the SESAR 3 JU as prescribed in GA (see AMGA Article 7).
It is recommended that projects ensure the close involvement of the SESAR 3 JU throughout the development of a deliverable so that the submitted deliverable meets the required quality level; this may be assured through the provision of intermediate versions of deliverables.

Several types of deliverables are subject to a quality assessment by the SESAR 3 JU:

- Deliverables necessary for the scoping and development of SESAR Solutions (e.g. VALP, VALR, Demo Plan, Demo Report, SPR-INTEROP/OSED, TS/IRS, CBA…).

- Standalone deliverables that, while being part of the GA, are not part of any solution data pack (e.g. Communication dissemination & exploitation plan – CDE).

In the 'quality assessment of deliverables' process, the initial task of the project manager is the submission of the deliverable.

Before receiving the outcome of the quality assessment, the project manager may receive a request for clarification from the SESAR 3 JU; responses to these clarifications are necessary for the SESAR 3 JU to finalise the deliverable quality assessment.

Upon completion of the quality assessment, SESAR 3 JU will inform the project manager of the outcome. The project manager may need to integrate the necessary changes into the deliverable in case comments are received from the SESAR 3 JU as the deliverable is re-opened for submission. Best practice recommends to resubmit in SESAR 3 JU's collaboration platform the deliverable with track changes in addition to a clean version. No more than two assessments of the same deliverable will be performed by the SESAR 3 JU. Then either the deliverable is initial or intermediate and it will be expected that realignment of open points will be addressed in the following version; or the deliverable is a final version and then consequence on the performance of the project will be assessed at the next project review.

3.6.3   Principal roles and responsibilities

Role	Responsibility
Project manager (Coordinator)	Responsible for submitting the deliverables baselined in the GA in line with the baseline schedule and the applicable quality requirements. Care must be taken to ensure that all contributors have reviewed and agreed with the deliverable submission (internal to the project quality insurance). Any quality/review issue must be reported by the project manager to the SESAR 3 JU. Is also responsible to follow up on the quality assessment outcome in case corrections are required.
SESAR 3 JU	Manages the quality assessment of deliverables. To do so, the SESAR 3 JU relies on subject matter experts either within or outside the organisation.

Table 7: Quality assessment of deliverable: roles and responsibilities

3.6.4   Supporting tools

The project manager can use the SESAR 3 JU's collaboration platform for preparing the deliverable but the project must always use the Funding & Tenders Opportunities Portal for their formal submission to the SESAR 3 JU. Note that the assessment process is done with the support of the SESAR 3 JU's collaboration platform.

3.7   Maturity assessment

3.7.1   Objective

To guarantee the delivery of robust SESAR Solutions, their maturity will be assessed during the lifecycle of their development through:

- An initial maturity assessment (at the launch of the project, when applicable).
- A self-maturity assessment to be tabled by the project at the project review meeting.
- Exit maturity gate.

These assessments are based on a set of maturity criteria and are supported by the related evidences. Further guidance on the maturity criteria and on how to perform maturity assessments and prepare a maturity gate is provided in the maturity assessment guidance documentation available in the programme library accessible in the SESAR 3 JU's collaboration platform.

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

The maturity assessment is a process that helps determining the current state of maturity of a SESAR Solution in terms of technical readiness level (TRL), which corresponds to specific categories of research activities.

The maturity assessment is based on a structured set of maturity criteria per TRL (that can be found in Annex E of MAWP) supported by the evidences provided by the solution projects (e.g. technical work, data, validation results, etc.) as means of compliance.

3.7.2   Approach for initial maturity assessment

During the preparation and finalisation of the GA, each project shall have documented an initial maturity level of each of its SESAR Solutions[12] with convincing arguments, such as references to a previous SESAR activity or by performing an initial maturity self-assessment of each SESAR Solution it plan to mature/develop. This initial self-assessment represents a critical step to start the work at SESAR Solution level; consequently SESAR Solution development work shall be structured and planned according to the key principles of the SESAR Solution development life cycle introduced in section 2.1. In particular, the inputs required from SESAR activities (e.g. SESAR 1, SESAR 2020 or outside SESAR) that reflect the applicable baseline material to start working shall be identified as well as the expected performance that each SESAR Solution may produce.

By T_{0+3} months within PMP, each solution project shall consolidate the initial maturity level of the SESAR Solution(s) within their scope with convincing arguments, such as reference to a previous SESAR activity or by performing an initial self-maturity assessment of each SESAR Solution. The initial maturity assessment shall either confirm or amend the initial maturity level of the SESAR Solution(s) (e.g. with reference to the maturity assessments available from previous SESAR R&I programme or outside SESAR, etc.) and document any potential gap / issue derived from this analysis.

An update of the ERS and the project / solution schedule may result from this activity.

3.7.3   Approach for maturity self-assessment

As a preparatory activity for the yearly project review (see section 3.8), solution project shall perform a maturity self-assessment of each of its SESAR Solution in order to:

- Evaluate, based on available material (i.e. set of intermediate deliverables, intermediate validation results, etc.), progress towards the final maturity gate of the concerned maturity phase.
- Identify potential gaps and issues.
- Define corrective actions to de-risk the final successful outcome of the final maturity gate.

The maturity self-assessment, together with a draft contextual note (when applicable) and a presentation (summarising elements such as the description of the scope, activities performed, activities planned for the next period, etc.) constitute the key necessary content-related inputs for the project review. The project can also provide, as supporting documentation, the latest available

---

[12] For ER project, SESAR Solution corresponds to the core of their work.

intermediate versions of the deliverables (as evidence or means of compliance of the maturity self-assessment).

Beyond the preparation for the annual project review, solution project can take the opportunity to perform maturity self-assessments as appropriate and applicable.

3.7.4   Approach for exit maturity gate

As required by HE and established in the GA, the targeted TRL of each topic will be identified together with the preferable starting TRL in the GA. The targeted TRL will represent the minimum expected maturity to be achieved by the project activities. Should the development of the SESAR Solution be faster than initially planned, a higher maturity level could be targeted by the project leading to applying the required maturity criteria accordingly. Should the expected maturity level not be achieved, the delivered maturity level must be duly justified and confirmed through an applicable exit maturity gate. For example, SESAR Solutions reaching TRL4 at the exit maturity gate would require further work in order to reach TRL6, the level of maturity required to become a candidate solution for deployment.

The Maturity Gate overview is shown in the simplified diagram below.

Inputs:

- SESAR Solution's Maturity Self-Assessment

- Contextual Note and any relevant supporting material

- Maturity Gate session presentation
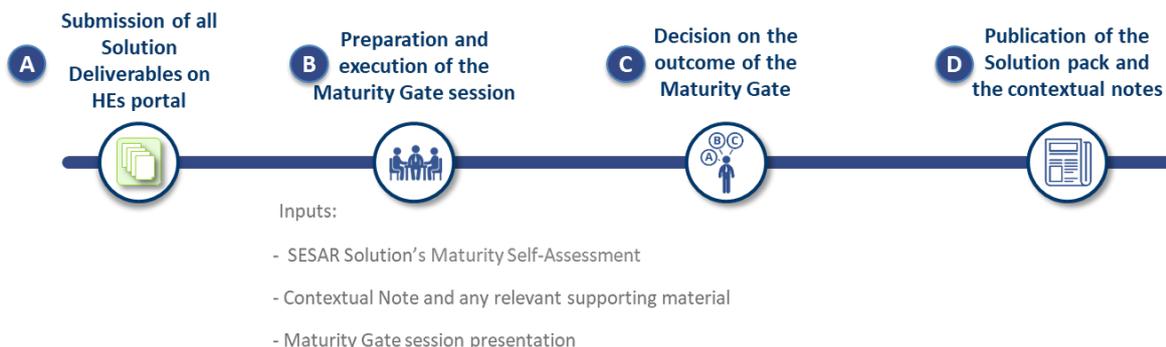
Figure 6: Maturity Gate overview

The maturity gate results in a maturity gate report containing the conclusions following the assessment of the maturity criteria (see annex E of MAWP) and the evidence offered. Conclusions may include recommendations that indicate additional research or development activities are needed at a later stage in the R&I programme. These recommendations will be of a level of detail allowing an easy check in future maturity gate, e.g. making reference to the appropriate assessment thread of the SESAR maturity criteria.

The information related to individual SESAR Solution maturity assessments is collected, baselined and stored by the SESAR 3 JU in the ERS (as introduced in section 2.1). A consolidated maturity report is generated by the SESAR 3 JU on an annual basis.

Further guidance on the maturity criteria and on how to perform maturity assessments and prepare a maturity gate is provided in the SESAR maturity assessment guidance documentation available in the Programme Library accessible in the SESAR 3 JU's collaboration platform.

3.7.5 Principal roles and responsibilities

Role	Responsibility
Solution project manager	Responsible for producing the required material to support the maturity gate process.
SESAR 3 JU	Organises and chairs the execution of a maturity gate and records decisions in terms of solution maturity.

Table 8: Maturity assessment: roles and responsibilities

3.7.6 Supporting tools

A maturity assessment is based on a set of maturity criteria (see annex E of MAWP). It shall be noted that each maturity criterion evidence is based upon a SESAR Solution deliverable (or a section of a SESAR Solution deliverable); consequently, it is clear that maturity assessment and quality assessments of deliverables are closely linked.

3.8 Project review

3.8.1 Objective

The project review is a grant related process whose tentative schedule has already been agreed when signing the GA. The two main linked objectives of the project review are:

- to assess the project execution relative to the description of action in the GA and thereby to support the SESAR 3 JU in processing the payment request from the project.

- to monitor the progress done in the development of SESAR Solution(s) with the analysis of the Maturity achieved by each SESAR Solution; in some cases it could even support the formal Maturity Gate of a specific SESAR Solution.

In addition, and as mentioned in each GA, the SESAR 3 JU has the right to review a project at any time. Such an 'ad-hoc' review could be organised when projects are facing difficulties to comply with the project plan or when the project is not performing as expected.

In both cases, the SESAR 3 JU applies the established process. A comprehensive evaluation of the project status at an agreed moment in time compared to the planning foreseen in the GA and complemented by the PMP/Demo plan will be established.

3.8.2 Approach

Project reviews apply to all type of projects.

Within the project reviews, the SESAR 3 JU assesses the project status versus management[13] and content criteria (in particular SESAR Solution maturity criteria). Projects are evaluated looking both backward (how has the project performed up to now?) and forward (is the plan for the future adequate?).

When linked to a reporting period, the preparation of the project review starts in parallel with the drafting of the HE periodic technical report and financial report. Project review meetings are taking place after the submission of technical report and financial report.

The project manager shall ensure the submission of the HE technical report and financial report as foreseen in the reporting and payment process ahead of the review meeting, unless the Project Review is scheduled between reporting obligations, in which case the SESAR 3 JU programme snapshot serves as main input for the Review meeting.

The project manager shall also make available to the SESAR 3 JU the most up to date Project PMP/Demo plan and CDE plan that provides sufficient details on how the next reporting period will be managed.

Finally, the project manager shall prepare and submit the review meeting presentation, based on the template available in the SESAR 3 JU's collaboration platform (including an up to date SESAR Solution slide per SESAR Solution). On the day scheduled, the SESAR 3 JU chairs the review meeting, in which at least the project manager participates.

---

[13] Projects shall describe the progress against the project scope and individual objectives, including indicative % complete in each Work Package and against deliverables. The schedule updates should indicate the status against the project baseline. It should clearly identify gaps or deviations from the planned work.
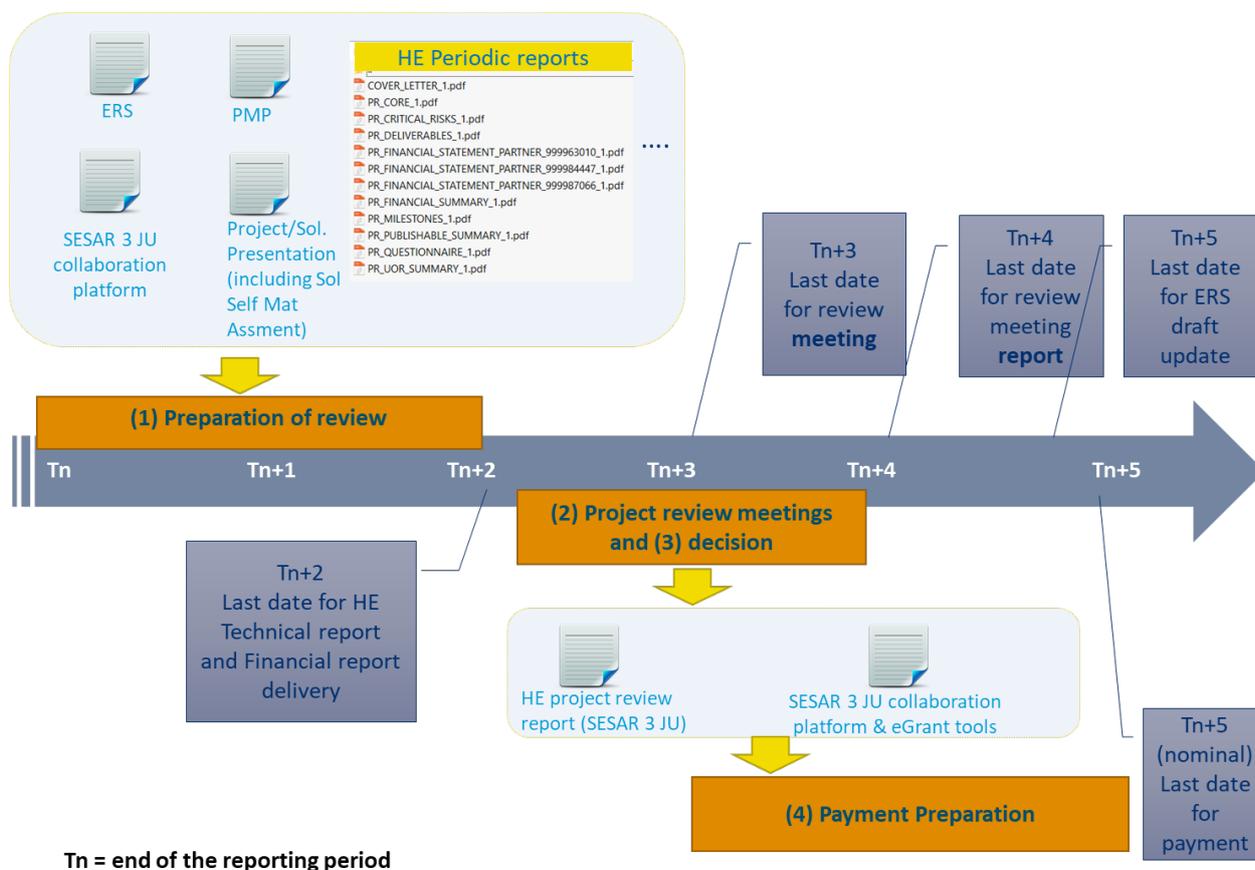
Figure 7: Overview of Project review

In addition to the project review outcomes as defined by HE, the conclusions of the review can lead to an update of the ERS.

3.8.3 Principal roles and responsibilities

Role	Responsibility
Project manager	Organises project contribution and input to the project review.
SESAR 3 JU	Organises the review on SESAR 3 JU side and involves required actors.

Table 9: Project review: roles and responsibilities

3.8.4 Supporting tools

For this process the project manager needs access to both the SESAR 3 JU's collaboration platform (for planning and executing the project review) and the HE Funding & Tenders Opportunities portal (to submit technical report and financial reports).

3.9 Communication, dissemination and exploitation

3.9.1 Introduction

Before getting started on communication, dissemination and exploitation (CDE) activities, it is important to note the difference between these three concepts. In the case of communications, it should be also noted that this refers to external communications and not communications internal to project between consortia members or with the SESAR 3 JU.

Figure 8: Definitions of communication, dissemination and exploitation – source EU Commission

3.9.2 Preparation for good CDE plan

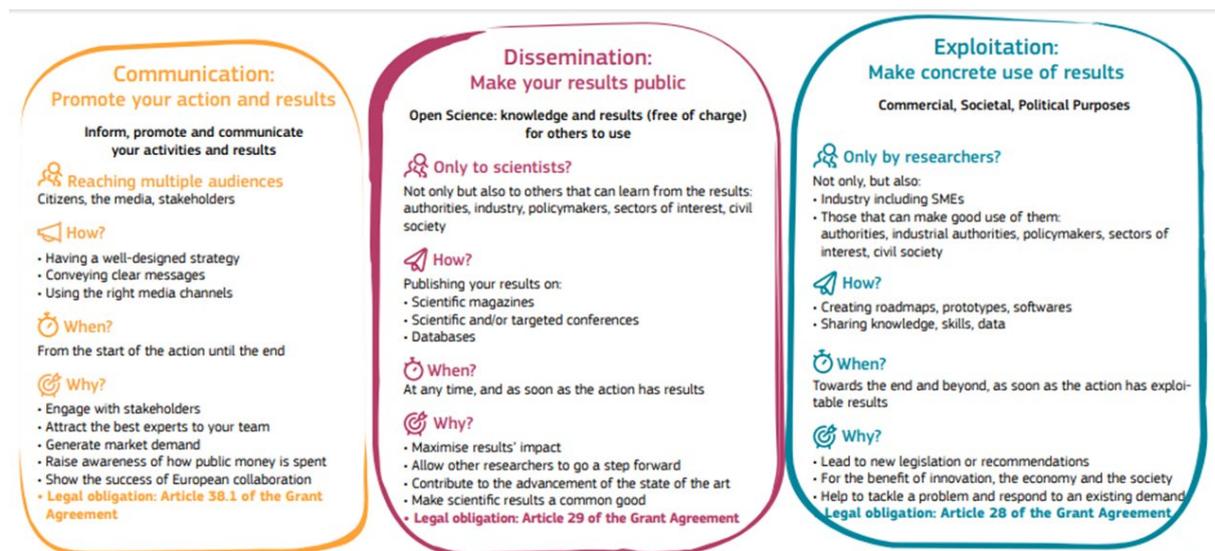Projects shall already produce in their proposal an initial draft of the CDE plan, demonstrating their ability to address all three areas of activities. According to the applicable HE rules, this is an admissibility criterion for proposals.

Following the project kick-off, at T_{0+3}, the project shall submit to the SESAR 3 JU a fully mature CDE plan as a key project deliverable. The CDE plan must be updated and submitted to the SESAR 3 JU at the end of each reporting period, up to a final version that shall be submitted during the final reporting period. The final CDE plan shall report on all communication and dissemination activities performed during the course of the project, but also to consolidate all exploitation activities to be completed after the closure of the project.

3.9.2.1 Resources

It is critical that projects allocate sufficient resources (both human and financial) to their CDE work taking into account the costs in terms of time, professional expertise and budget to develop quality CDE material (e.g. digital content, social media, etc…).

It is also strongly recommended that projects use experienced professionals in order to plan and implement an effective CDE strategy and action plan with clearly defined goals, audiences, messages and channels.

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

3.9.2.2   Coordination with the SESAR JU for communication

To ensure that communication activities are consistent with the SESAR 3 JU brand, project consortia are requested to coordinate with the SESAR 3 JU when preparing external communication activities (as listed in the CDE plan), in order to:

- Ensure that project communications and outreach milestones are integrated into broader SESAR 3 JU communications scheduling and planning.
- Allow the SESAR 3 JU to review strategies, key messages, targeted audiences and communications material on SESAR Solutions to ensure consistency with the SESAR JU's core objectives.
- Develop joint outreach activities taking into account established cooperative arrangements by the SESAR 3 JU or with the European Commission within the context of SESAR.
- Benefit from support of the SESAR JU for various events and conferences.
- Maximise outreach by using SESAR 3 JU communications channels and cooperative arrangements to further cascade relevant content.

Note that for that purpose, the SESAR 3 JU will make available a project space in the SESAR 3 JU public website to host project CDE content (releasing the obligation for project to develop their own website). The SESAR 3 JU will also provide projects with a pre-designed logo and instructions on its use as well as further rules for branding and acknowledgments (e.g. EU emblem, use of logos) at the kick-off meeting.

All communication guidelines material is available in the SESAR 3 JU's collaboration platform and dissemination and exploitation guidelines material is available in the EU Funding & Tenders opportunities portal.

3.9.3   Principal roles and responsibilities

Role	Responsibility
Project manager	Plan, document and produce CDE activities Assign a CDE lead contact with relevant skills in the field; Participate in communication coordination activities organised by the SESAR 3 JU, such as of the SESAR 3 JU communications coordination group meetings, inter-project coordination meetings, external events, etc. Comply with the Horizon Europe rules on Dissemination & exploitation of project results.
SESAR 3 JU	Monitor and assess CDE activities

Table 10: Communications, dissemination, exploitation: roles and responsibilities

3.9.4   Supporting tools

For this process the project manager needs access to both the SESAR 3 JU's collaboration platform (for CDE activities planning and reporting) and the HE Portal &Funding & Tenders Opportunities portal (for continuous reporting and for detailed guidance).

3.10 External stakeholder management

3.10.1 Objective

In order to secure the largest possible visibility and buy-in of the ATM MP, the SESAR 3 JU establishes cooperation/contractual agreements with experts representing a variety of external stakeholders; from airspace users, airport operators, professional staff organisations, to national supervisory authority, EASA, or even independent experts (contracted within the Funding & Tenders Portal Expert database).

3.10.2 Approach

During the steering and monitoring of programme execution, the SESAR 3 JU may invite external stakeholders to contribute to support the SESAR 3 JU.

Depending on the scope of each project and its importance with regards to the ATM MP objectives, the SESAR 3 JU and the external stakeholders may agree to participate in the quality assessment of deliverables (as assessor), maturity gate (as expert) or CDE monitoring (as observer).

In addition, as per HE, involvement of independent experts is a formal process that may be activated to support the SESAR 3 JU in the project review linked to the reporting and payment, including assessment of deliverables, maturity gates and participation in workshops.

3.10.3 Principal roles and responsibilities

Role	Responsibility
Project manager	Support external stakeholders' involvement in project activities.
SESAR 3 JU	Responsible for identification of external stakeholder experts and definition of their contribution to project management activities.

Table 11: External Stakeholders' management: roles and responsibilities

3.10.4 Supporting tools

External stakeholder experts will be configured in the SESAR 3 JU's collaboration platform as contributor to the programme management processes identified for their contribution, e.g. Quality assessment of deliverables (they could appear as an additional assessor), maturity gates (they could appear as reviewer) and CDE (they could appear as participant).

Independent experts will also have access to the EU Funding & Tenders Opportunities database.

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

4   References

For each of the specific domains introduced in Chapter 3, detailed reference and guideline materials are made available at project start.

All latest editions of reference documents are stored in the programme library of the SESAR 3 JU's collaboration platform. Templates and guidelines are under change control which means that amendments and evolutions are to be approved by the SESAR 3 JU prior to becoming effective.

Appendix A List of abbreviations

Abbreviation	Definition
AMGA	annoted model grant agreement
ANS	air navigation service
ANSP	air navigation service provider
ATM	air traffic management
ATS	air traffic service
BAWP	biannual work programme
CBA	cost-benefit analysis
CDE	communication dissemination exploitation
CEF	connecting Europe facility
CINEA	European climate, infrastructure and environment executive agency
CNS	communications, navigation and surveillance
DEMOP	demonstration plan
DEMOR	demonstration report
DES	digital European sky
DSD	digital sky demonstrator
EASA	European union aviation safety agency
EC	European commission
ECAC	European civil aviation conference
EIA	environmental impact assessment
EOC	essential operational change
ER	exploratory research
ERS	extended release strategy
ESM	external stakeholder management
EU	European Union
EUROCAE	European organisation for civil aviation equipment

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

GA	grant agreement
GAP	grant agreement preparation
GPDR	general data protection regulation
HE	horizon Europe
HLG	high level goal
HP	human performance
HPRM	human performance reference manual
ICAO	international civil aviation organization
INTEROP	interoperability requirements
IPR	intellectual property rights
IR	industrial research and validation
IRS	interface requirement specification
KOM	kick off meeting
KPA	key performance area
KPI	key performance indicator
MAWP	multiannual work programme
MP	master plan
NSA	national supervisory authority
OSED	operational services and environment description
PA	primary asset
PAGAR	performance analysis and gap assessment report
PAR	performance assessment report
QAD	quality assessment of deliverable
R&D	research and development
R&I	research and innovation
REG	regulation
SA	supporting asset
SAC	safety criteria

SDM	SESAR deployment manager
SecRA	security report assessment
SeCRAM	security risk assessment methodology
SES	single European sky
SESAR	single European sky ATM research
SESAR 2020	SESAR 2020 innovation R&I programme, also referred to as the 'SESAR 2020 Programme' or 'SESAR 2020 R&I Programme'. It is the coordinated set of activities described in this document, being undertaken by the SESAR JU Members and managed by the SESAR JU
SESAR JU	single European sky ATM research Joint Undertaking, established as a joint undertaking within the meaning of Article 187 of the Treaty on the Functioning of the European Union, established under the SESAR JU basic act
SESAR JU basic act	Council Regulation (EC) No219/2007 of 27 February 2007 (OJ L 64, 2.3.2007, p.1) on the establishment of a joint undertaking to develop the new generation European air traffic management system (SESAR), as amended by Council Regulation (EC) No1361/2008 of 16 December 2008 (OJ L352, 31.12.2008, p.12) and by Council Regulation (EU) No721/2014 of 16 June 2014 (OJ L192, 1.7.2014, p.1)
SESAR 3 JU	single European sky ATM research 3 joint undertaking
Single Basic Act	Council Regulation (EU) 2021/2085 of 19 November 2021 establishing the Joint Undertakings under Horizon Europe and repealing Regulations (EC) No 219/2007, (EU) No 557/2014, (EU) No 558/2014, (EU) No 559/2014, (EU) No 560/2014, (EU) No 561/2014 and (EU) No 642/2014
SMS	safety management system
SPF	SESAR performance framework
SPR	safety and performance requirements
SRIA	strategic research and innovation agenda
SRM	safety reference manual
STAND	standard
TRL	technology readiness level
TS	technical specifications
TVALP	technological validation plan
U-space	a set of new services relying on a high level of digitalisation and automation of functions, and specific procedures designed to support safe, efficient and secure access to airspace for a large numbers of drones, with an initial look at very low-level operations
VALP	validation plan

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

VLD	very-large-scale demonstration

Table12: List of acronyms and definitions

Approved

EUROPEAN PARTNERSHIP

Appendix B   Key performance areas & indicators

The table below provides an example of applicable KPAs and (K)PIs for operational, technological and U-space related solutions.

Each applicant to SESAR 3 JU calls shall identify in the proposal a list of KPAs which are expected to be impacted by their solution projects. Furthermore, a qualitative description of the expected impact shall also be duly provided (e.g. Solution project 'alpha' is expected to impact on capacity and cost-efficiency KPA with a high and low impact, respectively).

Solution projects can make reference to the table below when they complete their application but are also encouraged to propose additional performance areas or indicators, in particular for the Digitalisation and the U-space domain which currently are being developed.

KPA	(K)PI definition for ATM and technological solution projects	(K)PI definition for U-space solution projects
Capacity	TMA throughput, in challenging airspace, per unit time	List of (K)PIs currently under development
	En-route throughput, in challenging airspace, per unit time	
	Peak Runway Throughput (Mixed Mode)	
Cost-Efficiency	Flights per ATCO-hour on duty	
	Technology Cost per flight	
Operational Efficiency	Actual average fuel burn per flight	
	Average of difference in actual & flight plan or RBT durations	
	G2G flight time	
	Average departure delay per flight	
Safety	Total number of estimated accidents with ATM contribution per year	
Security*	A security risk assessment has been carried out	

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

KPA	(K)PI definition for ATM and technological solution projects	(K)PI definition for U-space solution projects
Human Performance*	Suitability of technical system in supporting the tasks of human actors	
Flexibility*	G2G ATFCM Delay Regulation Time Reduction	
Access and Equity*	Net Difference in AU's Delay or Cost Compared with other AUs	
Civil-Military cooperation and coordination*	Allocated vs. Requested ARES time	
Digitalisation	Digitalisation index under development	
*Path Efficiency**		
*Interoperability**		

* This KPA may only refer to mandatory or non-mandatory (K)PIs as there is no direct link to quantitative performance ambitions as expressed in the ATM Master Plan 2020.

** This KPA exclusively refer to the U-space domain and is currently under development.

Appendix C   Guidance for Transversal Activities

C.1 Architectural modelling as per level of maturity

The following table provides an overview of the level of detail of architectural modelling depending on the targeted maturity level of the solution project development and validation work and to be integrated via the content integration process as outlined in this handbook:

	Model/view #1 in support to the SPR/INTEROP-OSED deliverable	Model/View # 2 in support to the TS/IRS deliverable	Model/View # 3 in support to the TS/IRS deliverable
	Business View Model	**Technical systems and Human roles interaction view**	**System functions and Human tasks performed by Technical system(s) and Human roles view**
Before TRL 4	Until start of TRL 4, **Re-use** of existing relevant elements from the SESAR Architecture		
TRL4	**Initiate** business view model with identified existing elements	**Initialise** technical systems and human role interaction model	**Initialise** model for system functions and human tasks performed by technical systems and human roles
TRL6	**Consolidate** business view models	**Consolidate** technical systems and human role interaction model	**Consolidate** model for system functions and human tasks performed by technical systems and human roles
TRL7/8	**Maintain** business view models	**Maintain** technical systems and human role interaction model	**Maintain** models for system functions and human tasks performed by technical systems and human roles

C.2 Performance Guidance introduction

C.2.1 Performance assessment methodology

The solution projects shall analyse their exercise data to provide performance assessments at least in two scenarios, REFERENCE and SOLUTION. In doing so they identify and record the limitations of the exercise scope, assumptions, applicability, representativeness, validation techniques, confidence degree and other experimental parameters as recorded in the validation Report (VALR) or demonstration report (DEMOR).

SESAR Solutions set-up, prepare and carry out performance assessments evolving from an initial qualitative view to a quantitative manner as the solution progresses in its maturity level as per the following lifecycle TRL-phase:

- TRL0: identification of potential benefits and risks.
- TRL2: potential benefit and impact mechanisms and influencing factors with an initial assessment on the relevant KPIs as described in the SPR-INTEROP/OSED.
- TRL4: quantitative intermediate assessment on all relevant KPIs as described in the SPR-INTEROP/OSED.
- TRL6: complete assessment including final quantitative results on all relevant KPIs as described in the SPR-INTEROP/OSED.
- TRL7 / TRL8: quantitative measurement on all relevant KPIs to confirm performance impact of assessed SESAR Solution.

The confidence in the performance results should also be reported for each measured KPI or PI.

Finally, each SESAR Solution has to be considered from an ECAC-wide perspective, extrapolating the expected performance at ECAC level in their performance assessment reports (PARs) which is contained in a dedicated section of the SPR-INTEROP/OSED.

More details are available in the **guidance material** as stored in the programme library of the SESAR 3 JU's collaboration platform. Furthermore, **a team of CBA experts within the transversal performance team is also made available for training, coaching and mentoring purposes.**

C.2.2 Cost Benefit Assessment

A CBA is structured around the two following activities:

1. **Assessment of costs**: refers to the monetary value of the investment that is used to produce or acquire the benefit. For example, the training of controllers to use a new automated support tool.

2. **Assessment of benefits**: refers to the positive value of the return on investment to stakeholders. Examples of benefits are additional revenues or cost savings to stakeholders. Note that some impacts can be negative (e.g. increase in noise level) and should be identified and assessed to the possible extent.

The assessment of the CBA is refined as the SESAR Solution evolves in its maturity level as per the following lifecycle TRL-phase:

-   In **TRL2**, an economic evaluation (ECO EVAL) will take place. This is a form of simplified CBA which focuses more on scoping the solution, identifying its interdependencies with other solutions and implementation options, the stakeholders impacted, describing in qualitative terms the Benefit Impact Mechanisms (BIMs) in the SPR-INTEROP/OSED, including the most impacted KPAs and KPIs. Cost drivers are also identified. In TRL2, the output is in principle a qualitative description of the costs and benefits of the solution to the different impacted stakeholders with the aim to ensure understanding what the solution will bring – order of magnitude.

-   In **TRL4**, the feasibility phase, a classic CBA assesses the economic feasibility of the solution and can help to compare different alternatives e.g. a system is deployed everywhere or only in most complex environments. In TRL4, the output should already include a first order of

magnitude of benefits, costs and net present value (NPV) of the different options being compared (quantitative assessment).

- In **TRL6**, the final R&D CBA will include all the evidence gathered in terms of impacts, costs and benefits of a solution. By TRL6, the CBA should provide the NPV overall and per stakeholder group, a sensitivity analysis identifying the most critical variables to the value of the project, a risk analysis, the CBA model, report and recommendations (refinement of quantitative assessment).

- In **TRL7** and **TRL8**, solution projects will also provide quantitative assessments to confirm the performance impact of the assessed activities.

More details are available in the **guidance material** as stored in the programme library of the SESAR 3 JU's collaboration platform. Furthermore, **a team of CBA experts within the transversal performance team is also made available for training, coaching and mentoring purposes**.

C.2.3 Safety Methodology and Assessment

The SESAR 3 JU safety assessment methodological framework is provided by the SESAR safety reference material (SRM) and companion guidance material complemented by the more recent relevant guidance available in the programme library of the SESAR3 JU's collaboration platform (safety part). It is consistent with applicable ATM/ANS common requirements as laid down in (EU) No 2017/373 [ref 8] and the U-space airspace regulation as laid down in (EU) No 2021/664.

It provides evidence (e.g. to regulators) to demonstrate that safety assessment has been conducted in a systematic way so as to be able to argue that a solution, or group of solutions, is sufficiently safe to proceed to deployment.

In addition, at programme level, the purpose is to provide evidence that strategic safety targets are achievable. Eventually, it is to bring into a solution safety assessment report (SAR) all the findings of the safety assessment to show, in a clear unambiguous way, that a tolerable level of safety has been achieved in design and that the solution could, as a result, further proceed to deployment i.e. industrialisation and implementation.

The SRM-based SESAR 3 JU safety methodology continues to require that safety assessments examine internal functional system failures (termed 'failure based approach') but additionally requires the consideration of the 'success based approach'. The 'success based approach' determines the functionality and performance needed to be incorporated into the design to ensure that when the system is working as intended it is able to provide, at the very least, a tolerable level of safety but also ensures that the potential safety benefit of the design is maximised.

All safety assessments are undertaken at the SESAR Solution level. The applicable type of safety assessment for the SESAR Solution should be defined by the project amongst the three types of solution from a safety assessment perspective:

- **ATS/U-space operational** *solutions* - one or more ATS services are affected by the SESAR Solution or one or more U-space services are affected by the SESAR Solution.

- **"Other than ATS/U-space"** operational *solutions* – one or more "other than ATS/U-space" services are affected by the SESAR Solution. Note that these services are then consumed by an ATS/U-space operational (SESAR or non SESAR) solution.
- **Technological** *solutions* – new technology/equipment (not covered by the safety assessment of an operational solution) having the capability for supporting services.

The SRM adopts a generic 'safety-requirement' hierarchy which is initiated from the beginning of the project by setting design safety drivers (e.g. Safety Criteria (SAC) for ATS/U-space operational solutions) and further deriving Safety specification(s) at service level and Safety Requirements at Design level along the functional system life cycle phases up to TRL6.

With regards to the safety assessment in the operational environment for Fast Track (TRL7) and DSD (TRL7-TRL 8), the SESAR 3 JU SRM will only provide guidance addressing the principles and generic safety assessment process (e.g. show that the design intended for the system demonstration in operational environment meets the SESAR-expected design safety requirements and that the system demonstration as implemented will not negatively affect the safety of on-going operations). In any case, the safety assessment methodology to be applied in TRL7 and TRL8 shall follow the Safety Management System (SMS) of the participating ANSPs and prototype manufacturers approved by previously agreed by them with the relevant NSA, their competent authorities. The SRM guidance will also specify the type of safety assessment-related content expected in the SESAR deliverables due for the system demonstration in operational environment (such as to enable SJU to review the deliverables maturity and to disseminate relevant information to any candidate for the deployment of the demonstrated solution).

Figure 9 describes the safety assurance process applicable to solution projects up to and including TRL6, highlighting the active involvement of the SPR-INTEROP/OSED team, TS/IRS team and VAL team together with the SAFETY team (applicable to ATS/U-space operational solutions; specific adaptation to the process are needed for the other types of solution).
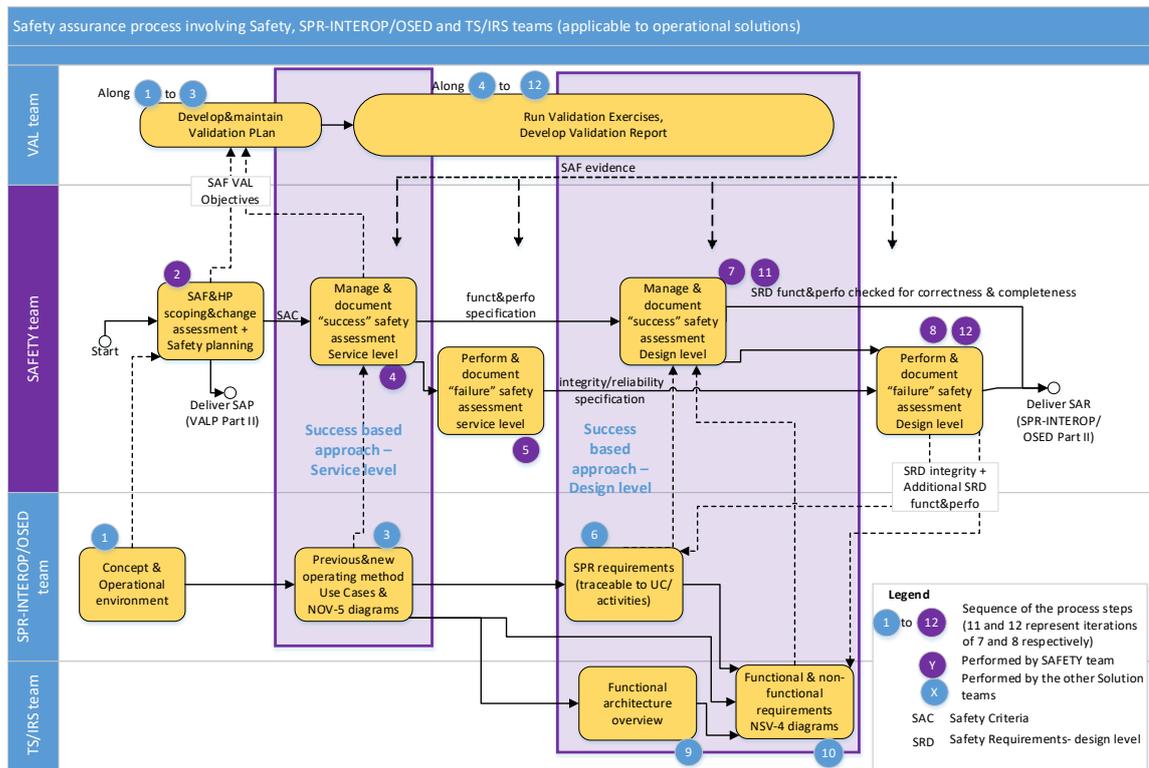
Figure 9: Safety assurance process involving Safety, SPR-INTEROP/OSED and TS/IRS teams (applicable to ATS/U-space operational solutions in Industrial Research & Validation up to and including TRL6)

C.2.4 Security methodology and assessment

To demonstrate SESAR Solutions are secure and cyber-resilient (up to maturity level TRL8), it is strongly recommended to perform a security risk assessment (SecRA) that could be locally developed based on the SESAR security risk assessment methodology (SecRAM 2.0). Security risks are identified, analysed and mitigated at SESAR Solution level by identifying security requirements that are documented in the SPR-INTEROP/OSED and/or TS/IRS and/or DEMOR as appropriate. The SESAR Solution project shall provide only two formal deliverables to be provided from the SESAR Solutions: the Security Assessment Plan (SecAP) and Security requirements (documented in SPR-Interop/OSED and/or TS-IRS as applicable).

Parts of the material produced during the security risk assessment (such as the SESAR TS/IRS - Part IIIA/B/C referred to as low, medium and high risk material) will contain sensitive information. From a legal perspective, management of such material shall comply with the national regulations of all involved members and/or international law. Therefore, solution projects shall not distribute sensitive material outside the remits of the project, neither via email nor via the SESAR 3 JU's collaboration platform. Potential non-compliance with the above mentioned rules and regulations may make the beneficiaries and the SESAR 3 JU or its employees liable in case of a security breach.

Note that the security requirements, which are derived from the security risk assessment, are in most cases not considered sensitive material.

Co-funded by
the European Union

In summary:

- The security risk assessment methodology (SecRAM) continues to be applied by SESAR Solutions and contributing members.
- The security maturity criteria remain unchanged.
- SESAR Solutions are recommended to run a complete a security assessment plan (SecAP) as an appendix in their VALP.
- The material produced in the security assessment result shall be stored on the member's own systems, and secured in accordance with applicable national regulations. The information shall not be stored on the SESAR 3 JU's collaboration platform.
- SESAR Solutions may present their SecRA material to transversal performance team members (for support) and to the SESAR 3 JU (for assessment) in face to face meetings only.
- The resulting security requirements shall be captured in the SPR-INTEROP/OSED and TS/IRS (i.e. eventually becoming publicly available without the supporting SecRA).

The diagram below indicates the areas where the transversal performance team can support solutions and describes a high level process, including deliverables and actors involved in the security work. The transversal performance projetc supports and guides the solutions to complete the Security Assessment Plan (SecAP) and the Security Risk Assessment based on SecRAM (2.0). An online training course on the SecRAM is also available in the SESAR 3 JU's collaboration platform for all SESAR Solutions to facilitate their understanding of the method when carrying out a SecRA. The supporting materials to assist SESAR Solutions in completing the security work are listed below, and are also shown in the diagram in Figure 10:

- SecRAM 2.0 is the recommended methodology to be applied to carry out the security risk assessment.
- The Security assessment plan (SecAP) describes the security approach and activities required to obtain the security requirements.
- The minimum set of security controls (MSSC) developed in SESAR 1 (accessible in the SESAR 3 JU's collaboration platform) can be used to derive some of the security requirements, adapting them to the specifics of a SESAR Solution.
- SecRAM catalogues contain information on identifying primary and supporting assets (PA & SA), Threats, Vulnerabilities and Controls for your solution.
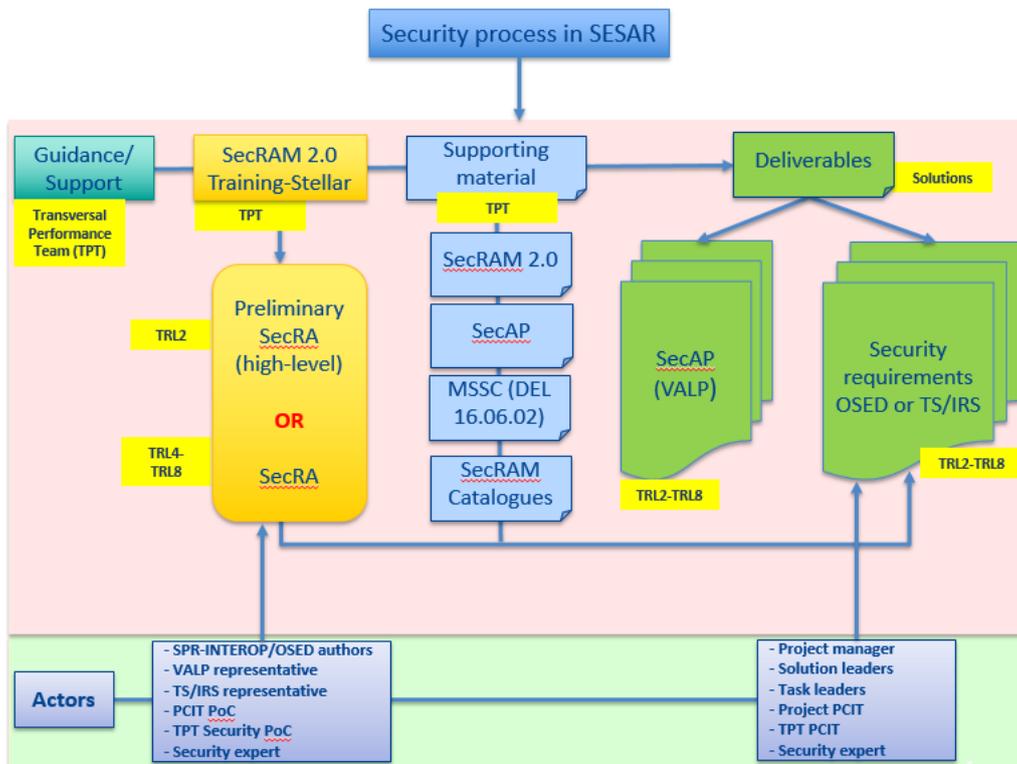
Figure 10: High level diagram indicating activities and actors involved in Security work

C.2.5 Human performance methodology and assessment

Human performance (HP) is incorporated into the SESAR 3 JU programme to ensure that sufficient account is taken of integrating the needs of the human-centred design within the project environment from the very beginning of a project, starting with exploratory research. This is supported by a systematic analysis and management of human factor aspects of the design and validation of future operations, in line with the TRL description as described in the HP reference material (HPRM).

1) **Exploratory research (TRL 0-2):**

   a) **Scope:** The HP assessment process aims at this stage to allow for an incipient identification of potential impacts on HP in order to ensure an adequate integration of the HP domain in the exploratory process, as early as possible. As soon as a potential impact on the human actors is identified, the HP assessment should accompany the exploratory process, while conducting the feasibility studies and exploring the transition from scientific to applied research.

EUROPEAN PARTNERSHIP

b) **Assessment Methodology proposed:** The "scoping and change" Assessment exercise should be conducted at this stage, in line with the HPRM. Preferably, it should be performed in collaboration with safety actors, if they are already an active part of the research.[14]

c) **HP expertise required:** It is highly recommended that the "scoping and change assessment" is performed even at this early stage by an HP expert, whom is familiar with the SESAR 3 JU methodology and can already use HF knowledge in making the adequate connections with the 4 HP argument levels.

2) **Industrial research and validation (TRL 3-6)**:

a) **Scope:** The HP focus is on determining the initial operational / technical concept from an HP point of view, resulting in the definition of a concept that is mature enough to be prototyped and tested as of TRL4 level. The process at this stage necessarily includes the identification of HP needs to be covered, as well as the identification of both potential benefits and aspects that may become impediments for the transition to a later stage (issues). Additionally, at the same time the HP focus is on the exploration of different alternatives and the identification of show-stoppers.
The HP assessment process is therefore, as of TRL4, focusing on improving and validating the operational concept through an iterative process of design-evaluation redesign. As of TRL 6 the validation activities will be carried out in a more realistic environment and the HP focus shifts towards

   1. the pre-industrial validation, with further developing and validating of the operational concept and supporting enablers and
   2. integration: ensuring that related concepts and supporting enablers can be applied together.

b) **Assessment methodology proposed:** In order for the industrial research and validation activities to be thoroughly covered from an HP perspective, the complete HP Assessment Process, as described in the HPRM should be applied.

c) **HP expertise required:** The HP assessment process is guided by the HP expert, involves all stakeholders and requires as a pre-requisite strong cooperation with other actors of the process in particular, operational experts, concept and systems designers.

3) **Digital Sky Demonstrators (TRL 7-8):**

a) **Scope**: As of TRL7, all relevant scenarios have to be exposed to the operational environment whereby all relevant HP aspects identified pre-TRL7, have to be tested and deemed feasible in order for the concept authorisation/ certification to happen. In TRL 8, the validation process will be finalised, capitalizing on all HP findings.

b) **Assessment methodology proposed:** Given that the only certification process available from an HP perspective is currently CS25/1302, for all other instances there is no formal HP process to be followed for certification and authorisation. As a result, it is proposed that as of TRL 7 onwards, the HP experts accompanying the demonstration activities, should ensure all findings from the latest HP Assessment Report (pre-demonstration) are adequately integrated and

---

[14] Note: Even though at this stage HP might be evaluated as N/A, once the concept becomes more mature (e.g. Industrial Research and Validation) it is recommended to re-evaluate the need to perform an HP Assessment.

tested in demonstration activities. Following the demonstration activities, it is recommended that the HP experts draft a final HP Assessment Report [ref HPRM], encompassing all the activities performed to date that would conclude the V&V process.

c) **HP expertise required:** TRL 7 and TRL 8 activities should be overseen by an HP Expert.

4) Fast track innovation and uptake (TRL 2-7):

a) **Scope:** Even though the scope of the fast track projects is to target a rapid delivery of new products and services towards TRL7, the HP assessment process is recommended to follow the equivalent processes as described above for the corresponding TRL they are in. The identification of issues, benefits, mitigations, show-stoppers and the planning of the HP activities should be followed in line with the high-level arguments.

b) **Assessment methodology proposed:** The HP assessment methodology is recommended, in order to ensure the completeness of the assessment and the adequate traceability of HP activities and findings.

HP expertise required: Fast track projects should be accompanied by an HP expert whom performs the HP assessment, as soon as an impact on the human has been identified.

The HPRM provides the means, the method and process by which HP can be integrated into the concept and technical system design and the outcomes assessed. The HPRM also provides a set of process based indicators that allow the maturity of the project to be assessed at the same time as supporting concept development and gathering data to support the project and validation activities.

To achieve this, the HP assessment process describes the following four HP arguments to show that airborne and ground ATM actors will contribute to the SESAR expected performance benefits, without a negative impact on HP. More details on HP arguments and necessary evidence are available in the specific HP guidance methodology.
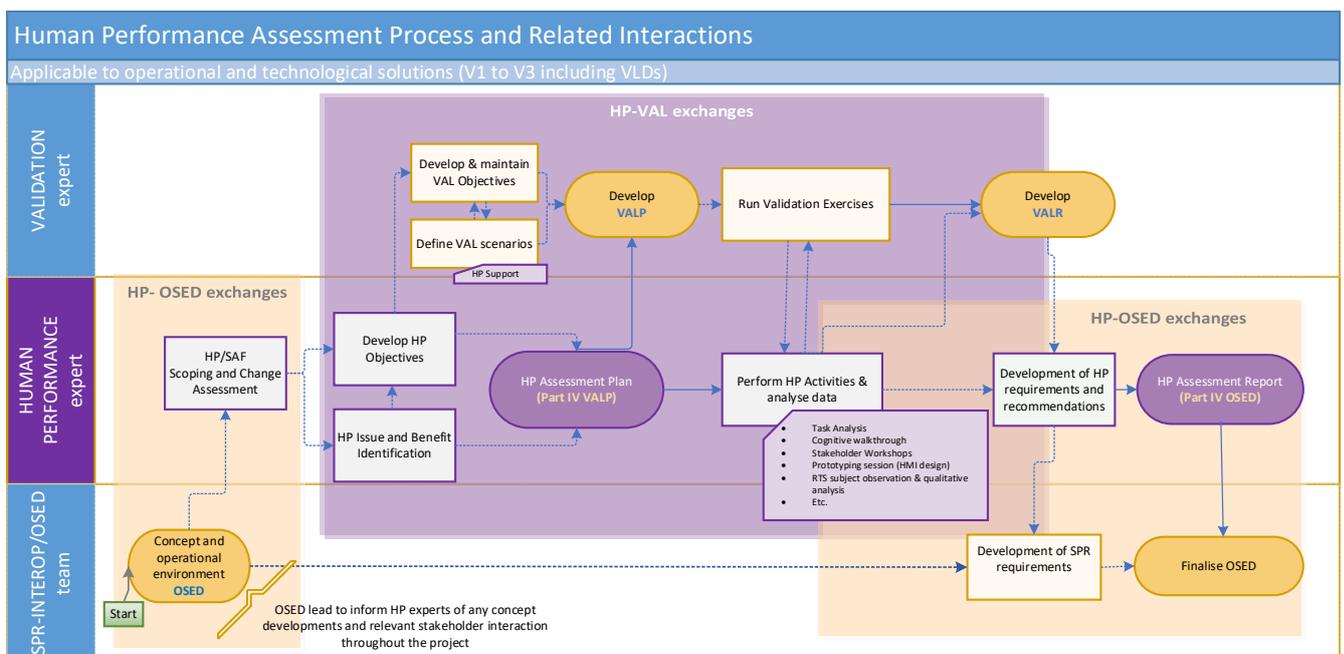

Figure 11: Human performance assessment process and related SESAR Solution members` interactions

C.2.6 Environmental methodology and assessment

Any SESAR Solution that would affect the 4D flight path (travel time and route) or the aircraft operating mode (engine, configuration), must be subject to an environmental impact assessment (EIA).

Carrying out an EIA requires a good knowledge of certain impact assessment applications and expertise in the field, including knowledge of ICAO (Doc 10031, Doc 9889 and Doc 9911) and ECAC (Doc 29) guidance documents. In the absence of such expertise in the projects, it is highly recommended to follow training provided regularly by SESAR 3 JU with the support of transversal activities.

The EIA process follows a classical "Plan-Do-Check-Act" validation approach. It allows the environmental benefits of a proposed ATM change (i.e. a SESAR Solution) to be assessed at each stage of its maturation.

The EIA process consists of five main steps:

- EIA Step 1: Identify ATM change and the scope of potential impacts on the environment.

- EIA Step 2: Define environmental validation requirements.

- EIA Step 3: Plan environmental impact assessment activities.

- EIA Step 4: Conduct the environmental impact assessment exercise.

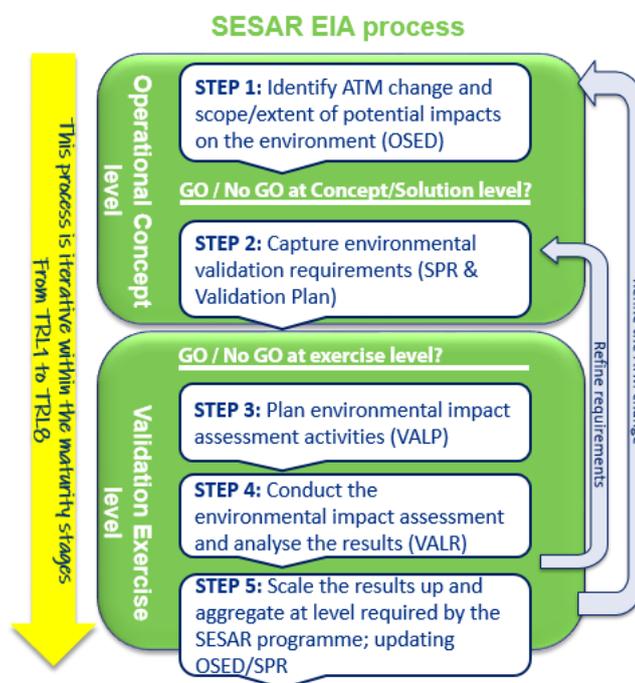- EIA Step 5: Scale the results up and aggregate.

Figure 12: the SESAR EIA process

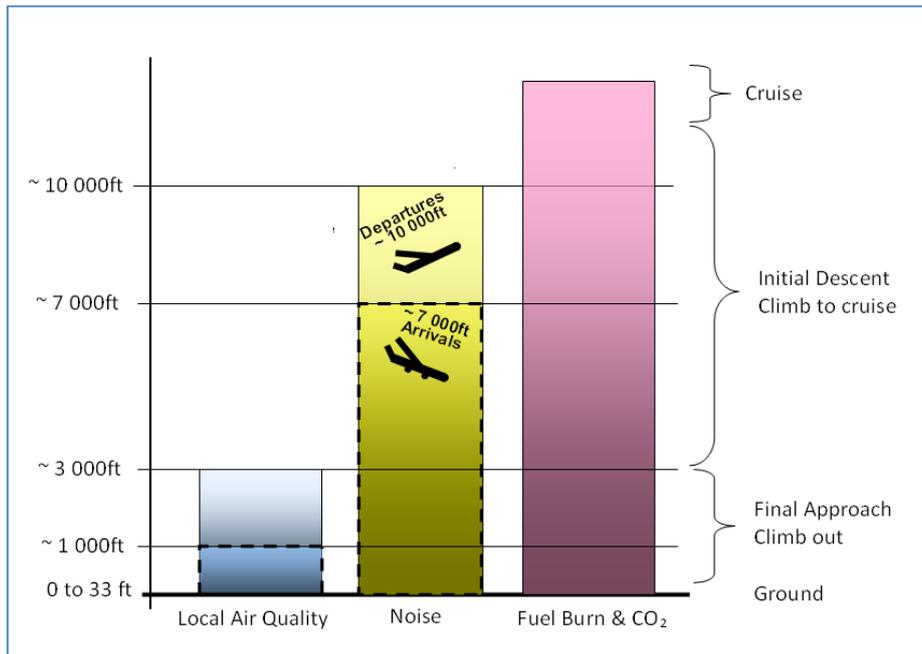The following schematic helps identifying the environmental focus areas that should be part of this EIA.

Figure 13: Relevant environmental impacts as a function of altitude and phase of flight

More details are available in the guidance material as stored in the programme library of the SESAR 3 JU's collaboration platform and made available at project kick off meeting.

EUROPEAN PARTNERSHIP

Co-funded by
the European Union

End of the document

Co-funded by
the European Union

EUROPEAN PARTNERSHIP