



Introduction to the SESAR 2020 Programme Execution

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The purpose of this paper is to provide an introduction summary of the SESAR 2020 Programme Execution Framework. It outlines how projects have to integrate in the overall execution of the SESAR 2020 programme. The paper serves as guidance in function of the application by members to the SESAR 2020 call for tender.

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1 Introduction to this document

The purpose of this document is to provide an executive summary of the SESAR 2020 Programme Execution Framework, covering Project management interfaces with the Programme Management as a top-to-bottom process outlining how SESAR Solutions or ATM technological enablers are developed and validated.

The documents target audience are those people or companies participating in the SESAR 2020 call for proposal (also referred to as the Best and Final Offer process).

More details about the modus operandi between participants, in particular at the project level, (between projects, and between projects and the SJU) are described in the document entitled "[SESAR 2020 Programme Guidance edition 1.0](#)". This document however has been prepared in function of the SESAR 2020 ramp-up as an intermediate step in function of the SESAR 2020 call for proposal and will be used as basis to further refine way of working. As such it will evolve to become the SESAR 2020 Programme Management Plan (PMP) and become the formal document explaining the way for projects and actors do the operational R&I work.

2 Terminology, concepts referred to, acronyms

ATM Master Plan [ATM MP]: provides the main direction and principles for the SESAR Programme. The ATM Master Plan has regular updates, amendments are submitted to the SJU Administrative Board for adoption. The ATM Master Plan establishes key elements for R&I such as performance objectives and needs, regulatory and standardisation roadmap, business case and risk management plan.

Concept of Operation [ConOps]: The document's content is limited to those solutions being worked on within the SESAR 2020 programme and will be light in nature, incorporating elements of the old ConOps at a Glance as well as the SESAR1 Step1&2 ConOps and DODs. The document is Step agnostic (although referring to steps). Scenario's and operational descriptions are likely to be organised around IOC dates, these may evolve however, in line with programme needs, taking the VALS as an input.

Performance Ambitions: The SESAR performance ambitions represent the broad expectations of performance contributions from the deployment resulting from the SESAR Technology Pillar. At Network level overall performance ambition sets a direction for progress towards the SES High-Level Goals. These are set using expert judgement, representing a realistic view of what could be enabled by the SESAR Technology pillar.

Programme Reference: The Programme Reference consists of a collection of approved material providing a common and agreed view on the Programme technical content (operational and system). The Programme Reference is periodically updated.

Performance Assessment: The assessment of past, current and/or planned performance. The process of assessing past and current performance is called performance review. Planned performance is assessed during the research and development phases of the life cycle, using validation techniques. (ICAO Doc 9883)

Project Management Plan: Formal, approved document, provided by each SESAR 2020 Project, used to manage its execution. It defines how the project is executed, monitored, controlled, and closed. All Project management Plans follow a common template.

SESAR Programme Management Plan [SESAR PMP]: the Programme management plan which explains how the Programme is conducted from an operational viewpoint (different from the individual Project Management Plans).

SESAR Programme Execution Framework: a Programme wide Business Management System consisting of defined life cycle, processes, responsibilities (people) supported by a series of tools with the aim to institutionalise the approach and general way of working.

SESAR Solution: Programme output is defined and packed in the form of “SESAR Solutions”. SESAR Solutions contain outputs from R&I activities which relate to either an Operational Improvement (OI) step or group of OI steps and associated enablers which have been designed, developed and validated in response to validation targets that when implemented, will deliver performance improvements to European ATM.

SESAR Technological Solution: Technology that enables future SESAR Solutions, verified as feasible, safe and to provide Performance Improvements is considered to be a “Technological Solution”.

SESAR Solution project: A project that delivers SESAR Solutions.

SESAR Enabling project: A project delivering SESAR Technological Solutions is known as an “Enabling project”.

Single European Sky High Level Goals: The SES High Level goals are political targets set by the European Commission. Their scope is the full ATM performance outcome resulting from the combined implementation of the SES pillars and instruments as well as industry developments not driven directly by the EU.

Programme Content Integration: programme level activities will aim to coordinate, consolidate and integrate operational and technical solutions, and as such to support and guide the processes to ensure their completeness, consistency and coherency from a holistic perspective as expressed in the SESAR CONOPS. The content Integration activities will also cover the maintenance and support of the performance framework and ensuring its applicability by the projects. These activities will provide support for SESAR programme monitoring (dependencies management across solutions, issues identification), releasing and adaptation; and for any further decision making necessary at governance structure level.

Transversal project: Projects steering the work and consolidating the results of SESAR Solution and Enabling projects, with the aim to strengthen the top-down view and ensure coherence and consistency of the results.

Validation Target: Validation targets are the goals that focus the development of enhanced capabilities by the SJU Projects. They aim to get the required performance capability from R&I to contribute towards the achievement of a Performance Ambitions as highlighted in the Master Plan.

Integrated validation: validation having objectives that go beyond the boundaries of one project and integrate solutions delivered by different projects

SESAR Solution Package: is provided at the end of the v3 activities and contains:

- VALR.
- OSED/SPR/INTEROP.
- TS/IRS.
- Cost Benefit Analysis.
- Service documentation of the services enabled which are used by the SESAR solution or common services.

This Solution Package will be used as an input for the next maturity phases (e.g. Standardisation, etc.) and may include needs for standardisation identified during the Solution development.

Acronym used in the document	Meaning
ATM	Air Traffic Management
CBA	Cost Benefit Analysis
CDV	Content Development and Validation
CI	Content Integration
DOW	Description of Work
DMT	Definition Maturity Target
DP	Deployment Program
EASA	European Aviation Safety Agency

EATMA	European ATM Architecture
EC	European Commission
E-OCVM	European Operational Concept Validation Methodology
ER	Exploratory Research
EU	European Union
EUROCAE	European Organisation for Civil Aviation Equipment
EXE	Exercise
FAB	Functional Airspace Block
FRD	Functional Requirement Document
HP	Human Performance
IBP	Industrial Based Platform
ICAO	International Civil Aviation Organization
IER	Information Exchange Requirements
INTEROP	Interoperability Document (Requirements)
IOC	Initial Operational Capability
IOP	Interoperability
IR	Industrial Research
IR	Implementing Rules
IRS	Interface Requirements Specification
IT	Information Technology
JU	Joint Undertaking
KPA	Key Performance Area
KPI	Key Performance Indicator
L2	Level 2
LSD	LSE Support Document
LSSIP	Local Single Sky Implementation
NCV	NATO Capability View
NOV	NATO Operational View
NPV	NATO Programme View
NSOV	NATO Service Oriented View
NSV	NATO Systems View
MP	Master Planning
OCVM	Operational Concept Validation Methodology
OI	Operational Improvement
OPS	Operations
OSD	Operational Services & Environment Description
PDP	Preliminary Deployment Program
R&I	Research and Development
RIO	Risks, Issues and Opportunities
RM	Requirement Management
RPAS	Remotely Piloted Aircraft System
RTCA	Radio Technical Commission for Aeronautics
SDD	Service Description Document
SE	System Engineering

SES	Single European Sky
SESAR	Single European Sky ATM Research
SGA	Specific Grant Agreement
SJU	SESAR Joint Undertaking
SoS	System of Systems
SPR	Safety and Performance Requirements
SPV	Separation Performance Visualiser
STAR	Safety Target Achievement Roadmap
STG	System Thread Guidance
SUT	System Under Test
SWIM	System-Wide Information Management
SWIM-TI	SWIM Technical Infrastructure
SYS	System (System Thread)
TRL	Technology Readiness Level
TS	Technical Specification
UML	Unified Modelling Language
VALP	Validation Plan
VALR	Validation Report
VALS	Validation Strategy
VLD	Very Large Demonstration
VP	Verification Plan
VR	Verification Report

3 Life Cycle

The work done in the programme is steered according the following interwoven life cycles:

1. **Programme and Release Delivery Life Cycle** aiming to:

- Enable the coordination of content integration output on a continuously iterative basis, using defined milestones on work performed at SESAR Solution, enabling development and validation levels
- Enable a release delivery mechanism, including validation roadmap maintenance processes, aimed at ensuring delivery of SESAR Solutions.

2. **SESAR Solution Life Cycle** aiming to structure and perform work at project level and progressively increase SESAR Solution maturity, with the final objective of delivering a SESAR Solution packages for industrialisation and deployment.

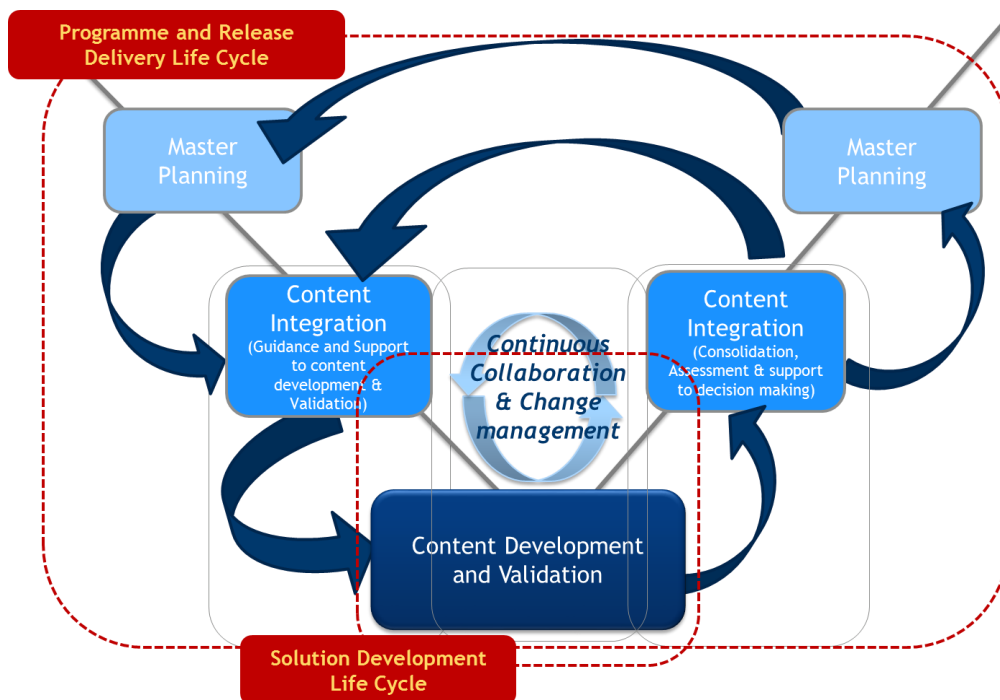


Figure 1 SESAR 2020 interwoven life cycles

SESAR 2020 ensures a flow of promising ideas through the SESAR innovation pipeline and this from exploratory research through industrial research and demonstrations. After this they can be proposed for industrialization and deployment. This is achieved through:

- Activities performed by SESAR Solution and Enabling projects: Developing and maturing SESAR Solutions in line with the Programme’s key features;
- Activities performed by Transversal projects: Steer and consolidate (including performing coherency checks) the work related to individual SESAR Solutions

Effective coordination between the Solution/Enabling and Transversal layers is essential in contributing to the overall success of SESAR 2020. In order to facilitate this coordination, transversal activities repeatedly follow the same annual cycle and have the same annual deliverables. The Programme & Release Delivery lifecycle is an annual sequence of Programme Milestones, associated to key outputs of Transversal activities which have an impact on the work of Solution and Enabling projects.

The Solution Development life cycle is a continuous process, meaning that when planning internal activities Solution and Enabling projects have to be aware of and able therefore to accommodate, the Programmes required milestones and associated Release Delivery life cycle.

3.1 Programme and Release Delivery Life cycle

The release and Programme life cycle has been defined to give SESAR Solution and enabling projects proper visibility on all key events related to transversal activities. The life cycle will create formal and visible Programme wide reference on a yearly basis and this to enable and improve change and configuration management and decision making and reporting.

The Programme Life cycle includes milestones from the following transversal activities:

- Guidance and Support to Content Development Activities
- Content and Validation Consolidation ;
- Release Management;

3.1.1 From Master Plan to Integrated Content: the overall story in a nutshell

The development of content in the SESAR 2020 Programme is structured and executed by three high level business processes and practices executed in 6 activities. The following pictures summarises these steps:

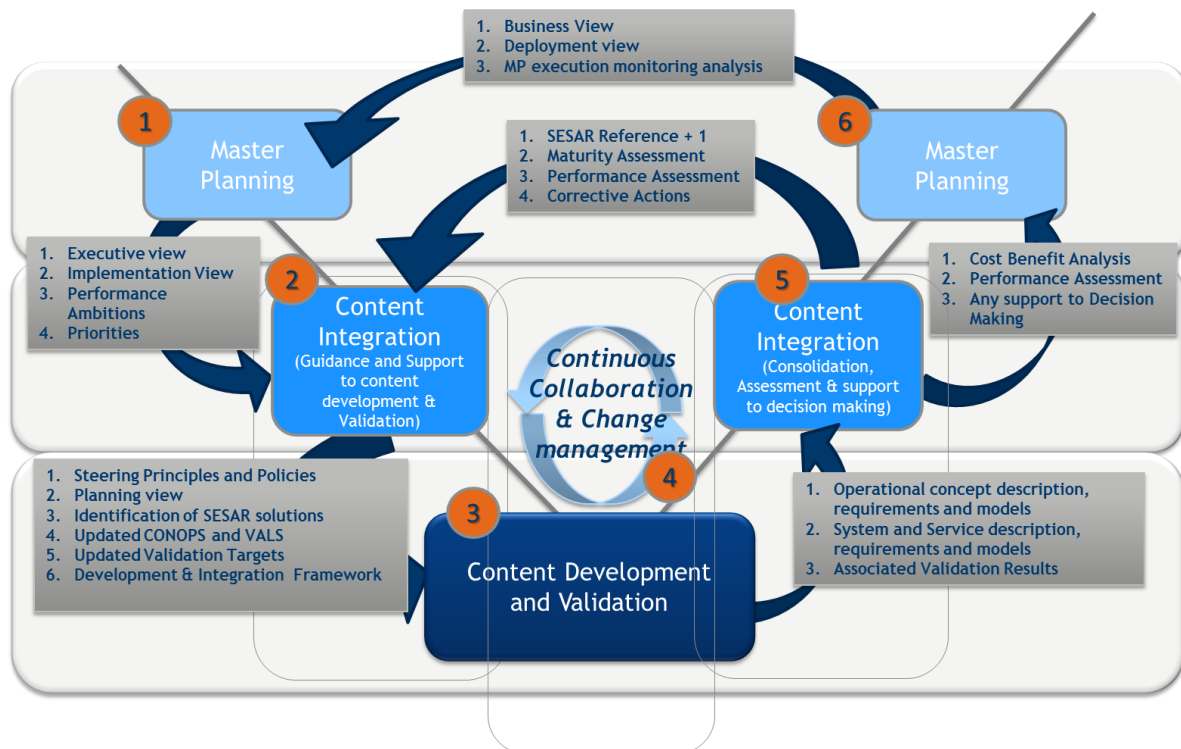


Figure 2 SESAR 2020 Developing Content in SESAR 2020 - 3 processes in 6 steps

The current status of Single European Sky ATM Research is captured in the “SESAR Reference” (mastered in EATMA). This includes a view of the operational concept under development, supported by technical architecture and associated performance related information.

[1] The Reference is the starting point for the Master Planning (MP) process to review and define a **strategic view** for Single European Sky ATM Research, driving the modernisation of ATM and governing the transition from research to deployment. This strategic view is composed of:

- An Executive view (Level 1) comprising an integrated set of information constituting the high-level synthesis;
- A Planning View (Level 2) providing the detailed planning and architecture information;
- An Implementation view (Level 3) providing the short to medium term deployment view.

[2] Starting from this strategic view, **Content Integration (CI)** organises and enables **tactical steering** by providing a **development framework** to support and integrate the work done by projects developing and validating SESAR Solutions, in order to ensure that the Programme as a whole delivers in time and scope the expectations outlined in the ATM Master Plan. This work comprises:

- The base-lining and possible further evolution and refinement of SESAR Solutions;
- The creation of a Concept of Operations and a Validation Strategy;
- The development of Validation Targets specifically linked to SESAR Solutions;
- The maintenance of the Extended Release Strategy;
- Providing and structuring steering principles and guidance as set by authorities and governance bodies;
- Putting development framework and guidance at the disposal of SESAR Solution projects;

[3] In line with the steering and framework provided, **Solution and Enabling Projects** (actors of the Content Development and Validation (CDV) process) develop, verify and validate SESAR Solutions and Technological Solutions in function of potential future deployment. The expected outputs from these activities consist of a set of standard deliverables (further outlined in this paper), including:

- Descriptions, requirements and models defining the Solutions
- Associated validation and performance results.

Work done in this phase also provides contributions to standardisation, regulation, industrialisation and deployment aspects of the SESAR Solutions developed.

Any request for a change to Solution and Enabling projects agreed objectives is analysed at the Content Integration level and assessed in terms of impact and applied via a formal change management process.

Once validation activities at a given maturity level are completed, Solution and Enabling projects go through a gate process to assess achieved maturity of the relevant SESAR Solution. Several criteria are checked at these gates, including compliance with guidance and recommendation as provided by content integration and as enabled by the development framework.

[4] Coherence of the work conducted within different Solution and Enabling projects is ensured through a continuous collaboration process put in place at the content integration layer. The contributions from different projects are integrated, possible inconsistencies identified, communicated to projects and resolution actions taken.

[5] Annually, as part of the Content Integration and Master Planning processes, integrated content is used to update respectively the SESAR Reference and the Consolidated Business Case.

[6] At the end of this cycle, all materials are used to feed a possible next iteration or Master Planning update and to launch an update of the Programme cycle using the output (maturity, performance) and execute identified corrective actions.

3.1.2 Life cycle Milestones

SESAR 2020 ensures a flow of promising ideas through the SESAR innovation pipeline and this from exploratory research through industrial research and demonstrations. After this they can be proposed for industrialization and deployment.

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The Programme & Release Delivery lifecycle is an annual sequence of Programme Milestones, associated to key outputs of Transversal activities which have an impact on the work of Solution and Enabling projects.

When planning internal activities, Solution & Enabling projects are to be aware of and have to accommodate with the Programme lifecycle milestones. The Programme & Release Delivery cycle is described hereafter.

The following figure represents a graphical view of the Programme & Release Delivery Life cycle

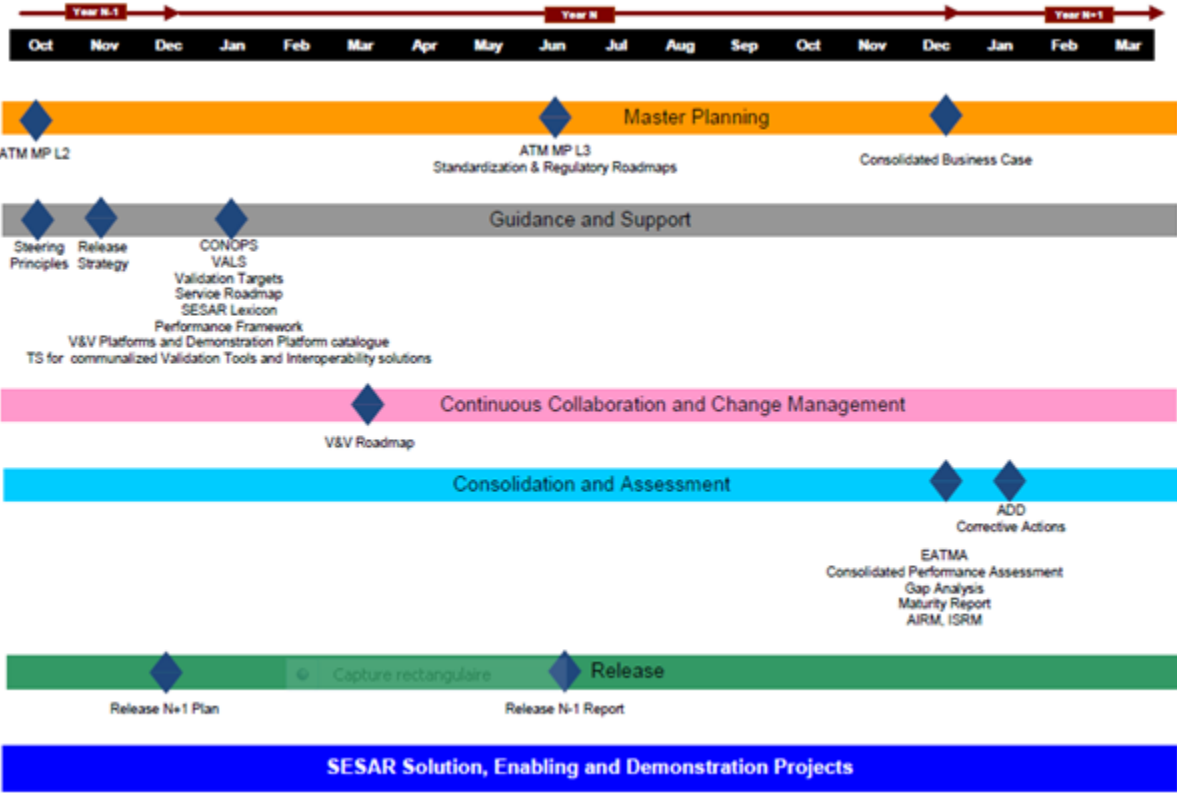


Figure 3 Programme Lifecycle Milestones

The milestones can be further divided into the following:

3.1.2.1 Master Planning Milestones

- October: ATM Master Plan Level 2
- June: ATM Master Plan Level 3
- June: Standardisation Roadmap and Regulatory Roadmap
- December: Consolidated Business Case

In addition an update of the ATM Master Plan Level 1 is expected before 2020, synchronizing all levels.

3.1.2.2 Content Integration Milestones

The following Milestones are listed in a logical sequence following the ATM Master Plan Level 2 issued in October.

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Guidance and Support

- October: Steering Principles
- November: Release Strategy
- January: CONOPS
- January: VALS
- January: Validation Targets
- January: Service Roadmap
- January: SESAR Lexicon
- January: Performance Framework
- January: V&V Platforms and Demonstration Platform catalogue
- January: TS for communalized Validation Tools and Interoperability solutions

Continuous Collaboration and Change Management

- V&V Roadmap

Consolidation and Assessment

- December: EATMA
- December: Consolidated Performance Assessment
- December: Gap Analysis
- December: Maturity Report
- December: AIRM
- December: ISRM
- January: ADD
- January: Corrective Actions

3.1.2.3 Release Milestones

- April : Capture of Release Results (latest date for the provision of V3 assessed and consolidated Solution data pack)
- June: Release Report
- October : Capture of the Solution description/material (latest date for inclusion into the Release Plan)
- December: Release Plan

3.1.3 Content Integration: Guidance and Support to Development and Validation

Annually in December, the following deliverables are provided by processes in the domain of Guidance and Support to Content Development and Validation, to give top-down guidance to SESAR Solution and Enabling projects:

- An updated “Concept of Operations (CONOPS) document” is published. This update introduces a succinct description of the evolutions of the ATM operational concepts to be developed and validated for deployment in the next years, including new SESAR Solutions.
- An updated version of the Dataset, introducing the new reference of Operational Improvements (OI) steps and Enablers.
- A new version of the Release Strategy, assigning target release dates to the OI steps.

3.1.4 Continuous Collaboration and Change Management

Change Management and Continuous Collaboration correspond to a set of ongoing processes running in the background of Content Development and Validation activities to ensure the overall coherence of Programme content and proper change management. Where inconsistencies are detected, these processes will produce feedback to the Solution and Enabling projects.

These processes operate from a reference baseline defined in and steered by the Programme Life Cycle.

3.1.5 Release process

The Release process ensures the yearly delivery of V3 mature SESAR Solutions and of successful VLDs results. It consists of three phases, Definition, Execution, Delivery, which are individually detailed hereafter. A new Release process is started every year. The entire execution of the Release process lasts about two and a half years. The following description deals with the generic Release of Year N, which begins in Year N-1 and finishes in Year N+1.

Next figure provides an overview of the phases of the Release process, which are detailed in the following sections.

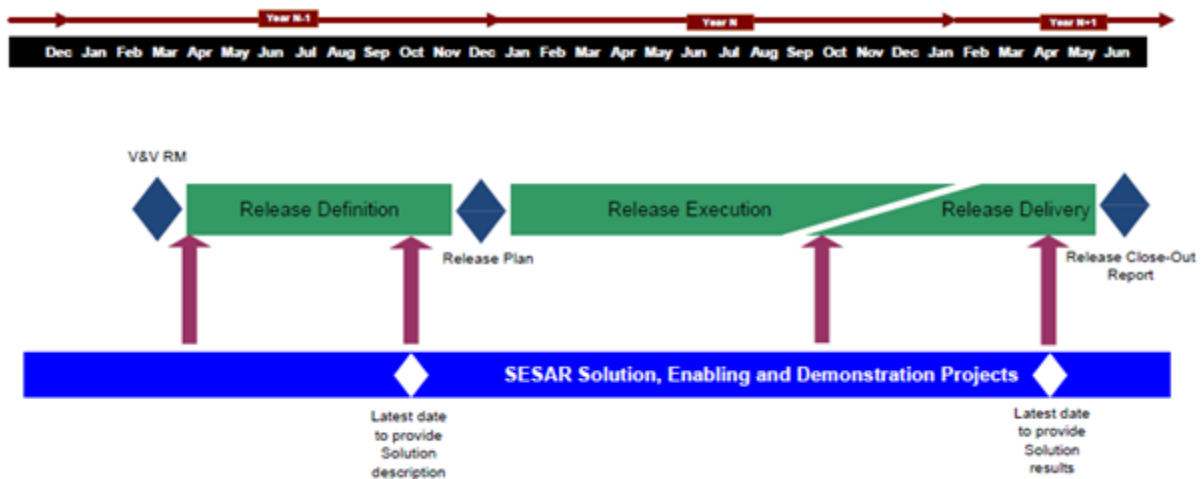


Figure 4 Overview of the Release process phases

3.1.5.1 Release Definition

The objective of this phase, lasting from March to December of Year N-1, is to identify the list of SESAR ATM and Technological Solutions which, according to project planned activities, are expected to successfully pass their Gate V3 or Gate Demo in Year N and therefore to be ready for industrialisation.

Mindful of this, during the Release Definition phase, the most relevant updated validation, verification and demonstration plans, and more generally all documentation on SESAR Solutions made available by SESAR projects, are collected and analysed in order to identify the SESAR Solutions that should be fully validated during the Year N.

V3 Validation and Verification plans are made available in their first version as part of the data packs provided by SESAR projects at Gate V2.

These plans are then updated during the V3 validation phase and should be available in final version during the Release Definition phase and in October by the latest in order to consolidate all of them in the Release Plan. Relevant demonstration activities will be considered in a similar way.

The V&V Roadmap, which presents a synthetic overview of Programme validation, verification and demonstration activities, is also an essential input to define the future Release.

Once delivered, the Release Plan is endorsed by the related Governance Body (equivalent to the SESAR 1 Programme Committee) and provides the reference for the following phase: the Release Execution.

The following figure shows how V2 Gate results (as well as updated project documents, together with the V&V Roadmap) are expected to contribute to the definition of the Release Plan.

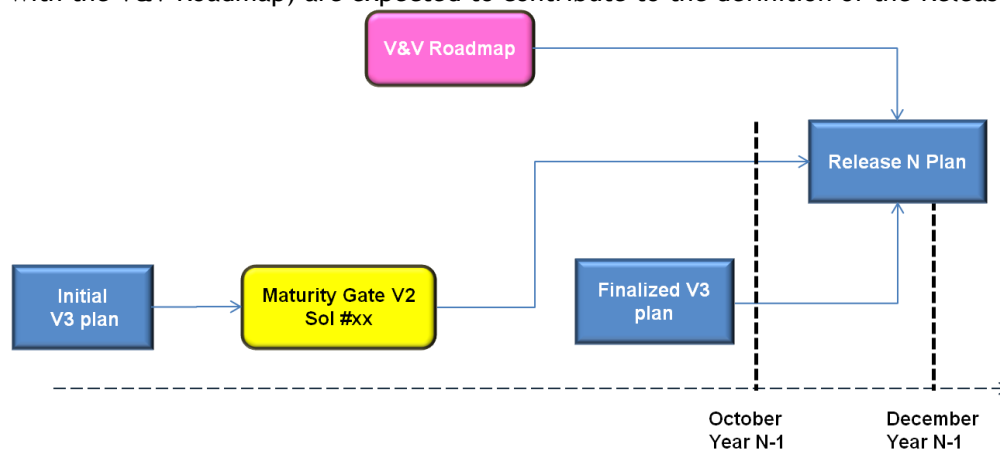


Figure 5 : Inputs contributing to the Release Plan

3.1.5.2 Release Execution

From January of Year N to February of Year N+1, SESAR projects complete the activities leading to the full V3 validation of the SESAR Solutions identified in the Release Plan. This typically includes:

- Running the scheduled validation and verification exercises and demonstrations;
- Analysing and consolidating results, producing validation reports and updating projects' documents accordingly (e.g. OSED/SPR/INTEROP);
- Organising and participating in SESAR Solution Maturity Gates V3 or Demo.
- Contributing to the review of the Maturity Gate data packs (e.g. Content Integration Project).

3.1.5.3 Release Delivery

As soon as possible, but by April of Year N+1 at the latest, ATM solution V3 maturity will have been confirmed through the V3 Maturity Gate and the Solution Data Pack will be ready for consideration in the Release Close-Out Report. Similarly, Demo results will have been confirmed through the Demo gate and results made available.

In June of Year N+1, the Release N Close-Out Report is delivered presenting the SESAR Solutions validated or demonstrated through the Release execution and confirmed through the relevant Gates. The Close-Out Report also provides a summary of results from all the activities identified in the Release N Plan.

The Release N Close-Out Report comes at the end of the Release Delivery phase, which runs from January to June of Year N+1. During this phase:

- Validation reports and demonstration reports resulting from SESAR Solution Maturity Gates V3 and Demo are analysed and consolidated into the Release Close-Out Report.
- Data packs from successful SESAR Solutions Maturity Gates are checked for completeness, and made available as Programme outputs. The data packs contain the deliverables produced by projects in the context of their Gates V3 and Demo, finalised as needed according to the Gate recommendations (please also refer to SESAR Solution approach documented in a next section) and shall be aligned to the Programme methodologies and templates. That includes for instance final OSED/SPR/INTEROP, TS/IRS, Validation and Demonstration Reports, CBAs.

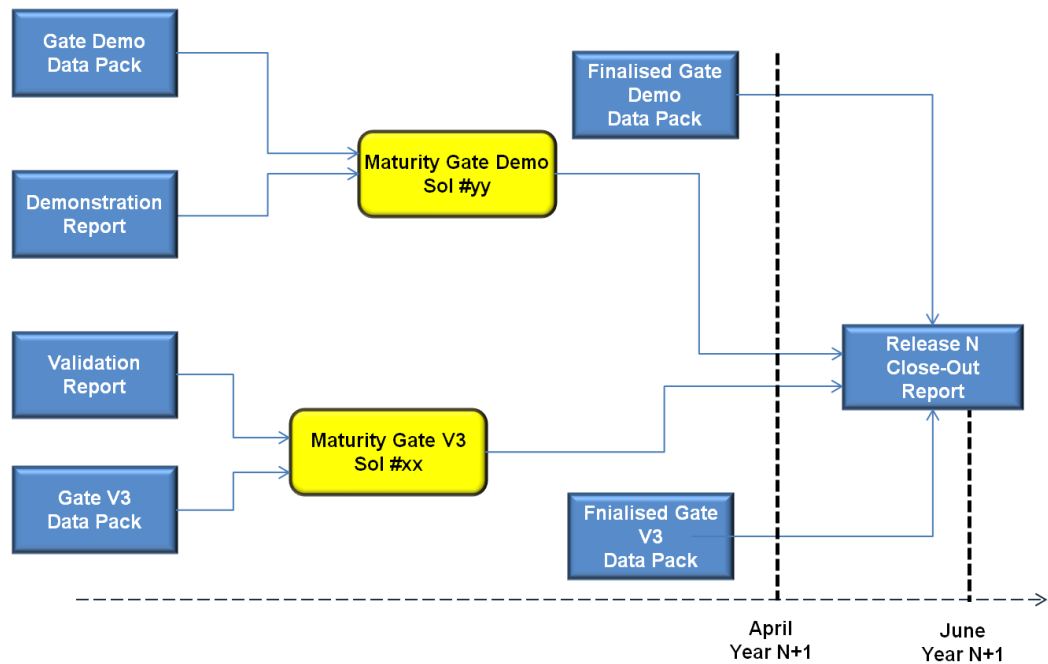


Figure 6 : Inputs contributing to the Release Close-Out Report

At the same time Release results are used at Content Integration level to assess Programme performance and maturity, updating the relevant Performance and Maturity Reports.

A gap analysis against the original performance and maturity targets is executed, updating the Performance and Maturity baselines.

3.1.6 Content Integration: Delivery Consolidation

Content integration is an ongoing activity ensuring the coherence of content produced by SESAR Solution and Enabling projects. Annually an update of the SESAR Reference Baseline is made available within the Programme and includes:

- A Baseline of the concept of operations;
- A Baseline of the technical architecture (EATMA);
- Consolidated Performance Results (considering performance results delivered by ATM solution projects through their validation activities);
- The ATM Master Plan L2 Dataset;

The aim of this activity is to bring together the work undertaken within SESAR Solution and enabling projects when developing and validating Solutions. The SESAR reference Baseline is used as an input for the next iteration of the Master Plan.

Maturity and performance results may result in further work to further address identified gaps.

3.2 Solution Development Life cycle

A standard end-to-end approach is made applicable to the three phases of the SESAR 2020 R&I Programme: (i) Exploratory Research; (ii) Applied Research, Pre-Industrial Development and Validation, referred to as “Industrial Research and Validation”; (iii) Very Large Scale Demonstrations (VLD).

Output of the SESAR Programme is defined in the form of SESAR Solutions and SESAR Technological Solutions. **SESAR Solutions** are the entities that ensure connection and continuity of research activities along the three Programme phases.

SESAR Solutions relate to either an Operational Improvement (OI) step or a group of OI steps with associated Enablers (technical system, procedure or human), which have been designed, developed

and validated in response to specific Validation Targets and that are expected deliver operational and/or performance improvements to European ATM, when translated into their effective realisation.

SESAR Technological Solutions relate to verified technologies proven to be feasible and profitable, which may therefore be considered to enable future SESAR Solutions.

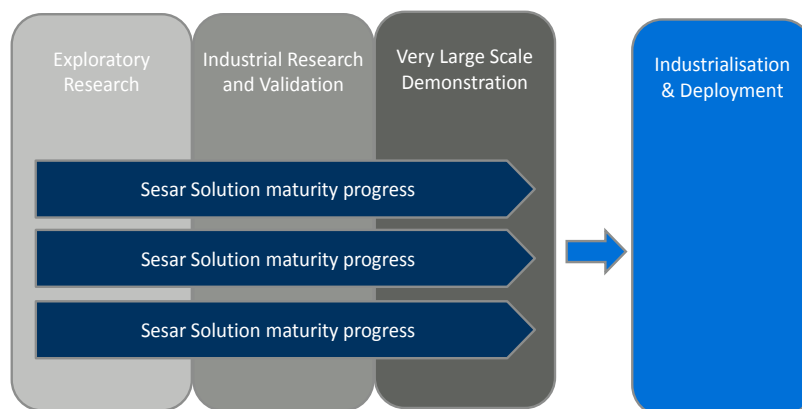


Figure 7 A common maturity progress cycle

The **SESAR Solution lifecycle** is a process executed at Project level which includes a standard sequence of activities to develop, validate and progressively increase SESAR Solution maturity. The final objective of which is to deliver a SESAR Solution package for Industrialisation and Deployment. The SESAR Solution lifecycle consists of four phases:

- V0-V1 validation;
- V2 validation;
- V3 validation and
- Demonstration.

The first three phases develop and validate the SESAR Solution up to, respectively, the E-OCVM maturity levels V1, V2 and V3. These levels correspond to the Technology Readiness Levels TRL2, TRL4 and TRL6.

Activities related to the V0-V1 validation phase are executed by Projects in the domain of Exploratory Research. Some V1 activities may need to be completed by Projects in the Industrial Research and Validation domain.

Activities related to the V2 validation and V3 validation phases are executed by Projects in the Industrial Research and Validation domain.

Demonstration activities, executed by Projects in the VLD domain, are in some cases justified in order to bridge the gap between Pre-Industrial Development & Validation and Industrialisation & Deployment. When they take place, these activities ensure a step beyond V3 maturity, up to TRL7. The notion of TRL7 is related to the “actual system prototype in an operational environment”. In the frame of the SESAR Programme, TRL7 corresponds to validation using early versions of end-user systems, to confirm deployment readiness of the targeted solution at a larger scale.

The SESAR Solution lifecycle includes five Maturity **Gates**, these are decision points assessing achieved results and authorising continuation of development and validation activities along the lifecycle. Each Gate is based on a set of success criteria. The Gates are:

- Gate ER/IR - This Gate verifies the achievement of V1 maturity as a condition required for transition from Exploratory Research to Industrial Research and Validation. The Gate may authorise the transition to phase V2 or to a complement/extension of V1 validation taking place in the Industrial Research and Validation domain.

- Gate V1 - This Gate verifies the achievement of full V1 maturity and authorises transition to phase V2. In case the Gate ER/IR has concluded to a full V1 maturity, this Gate V1 can be skipped.
- Gate V2 - This Gate has two objectives: (i) verifying the achievement of full V2 maturity and (ii) accepting the plan for future V3 validation activities. The Gate may authorise transition to phase V3. (Similar to the SESAR 1 SE1 review, but it does not identify SESAR Solution candidates to a Release).
- Gate V3 - This Gate verifies the achievement of full V3 maturity. The Gate may authorise transition to the Industrialisation and Deployment phase (similar to the SESAR 1 SE3 review)
- Gate DEMO - This Gate, based on a set of criteria confirming readiness for wide scale Deployment, verifies successful achievement of Demonstration objectives. The Gate may confirm transition to the Industrialisation and Deployment phase.

Projects will plan SESAR Solution Gates in accordance with the project progress. When planning their activities, Solution projects will be aware of constraints related to the Programme milestone calendar such as, the latest date for a V3 Gate allowing a SESAR Solution to be part of a given Release.

The following figure provides an overview of the SESAR Solution lifecycle, its phases and Gates.

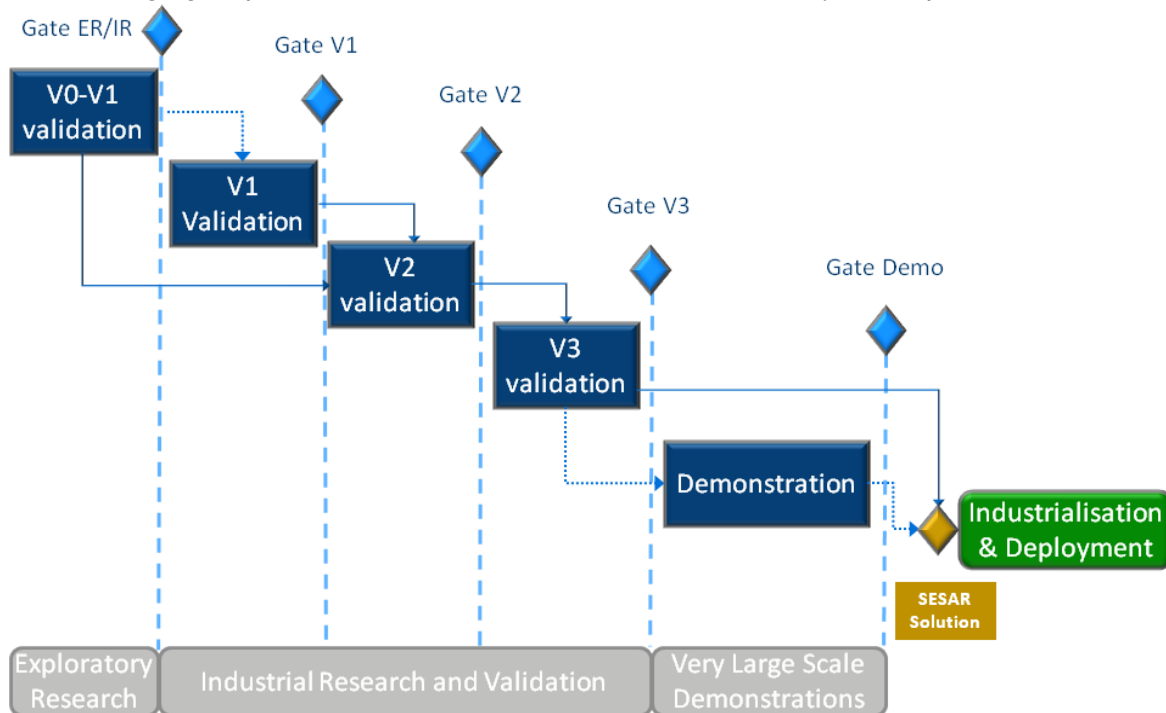


Figure 8 Gates and phases of SESAR Solution life cycle

3.2.1 Validation tailored in function of maturity level

This section describes the phases of the lifecycle of SESAR Solutions and SESAR Technological Solutions.¹

Each phase of the lifecycle is decomposed into a standard sequence of activities associated to formal deliverables. Key points in the activity sequence are identified by Milestones. When a phase of a SESAR Solution lifecycle is planned, its Milestones are assigned specific planning dates,

¹ Please refer to §1,

providing visibility at Programme level on the expected evolution of development and validation tasks.

As a general principle, deliverables produced at the end of a maturity phase are the main inputs for the following one. In particular the VALP presented at a Maturity Gate describes the approach to the validation of the next maturity level. Operational deliverables finalised at a Maturity Gate are the initial baseline to start development activities in the next maturity phase.

Relying on past validation activities, projects may start working in the SESAR 2020 Programme on SESAR Solutions having already previously achieved V1 or V2 maturity status. In such case, the results and deliverables from these previous validation activities are expected to be available as an input to the maturity cycle of the SESAR 2020 Solution.

Project “internal deliverables” are not considered and not represented in the following sections. Internal deliverables will be produced as needed in the frame of project activities but will not be formally handed over and will not go through the deliverable quality assessment process. Therefore they will not be considered at Programme level to monitor the progress of the SESAR Solution maturity phase. This is the case, for instance, for technical documents related to the development and verification of V&V infrastructures and platforms. The essential elements of their content, is expected to be found in the associated platform availability note.

It is important to note that, depending on the validation results, several iterations may be needed to validate a SESAR Solution over a given maturity phase. Back-loops are therefore possible within a single maturity-phase.

Moreover, the development process is not sequential. In general the work on performance, operational, services and technical aspects take place at the same time, recognising that the main focus will shift from top (performance) to bottom (technology) as the solution is matured.

V2 phase will also have considerable concept development work in this part of the lifecycle. This work will include HMI-design, role-design and procedure-design and will not be limited to the development of the prototype. V3 phase will include exercise preparation, training, and will not be limited to the development of the IBP.

Not all these activities are represented in the following sections: tables and figures rather focus on Milestones, Gates, and formal deliverables for each phase of the SESAR Solution lifecycle.

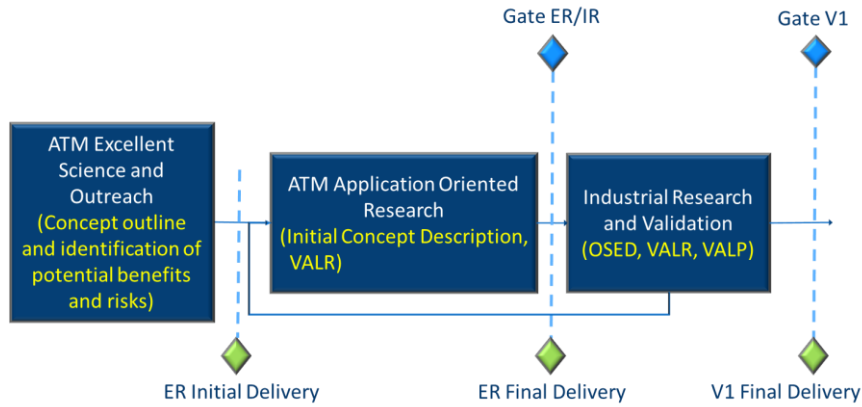
Relying on possible past validation activities, projects might start working in the SESAR 2020 Programme on SESAR Solutions having already previously achieved V1 or V2 maturity status. In such case, the results and deliverables from these previous validation activities are expected to be available as an input to the SESAR 2020 Solution maturity cycle.

When planning their activities, Solution projects will have to consider the Programme milestones calendar such as delivering in due time the required data packs and scheduling in due time the V3 maturity Gate in order to have the resulting SESAR Solutions available for the related Release Close out.

Please note that the following sections describe “reference” situations, but there may be exceptions which require adapting these patterns to specific needs.

3.2.1.1 V1 phase for SESAR Solution

A development and validation phase related to SESAR Solutions conducted up to V1 maturity can be broken down in the following activities and is completed via a successful assessment of the following deliverables at Gate ER/IR and Gate V1 level:

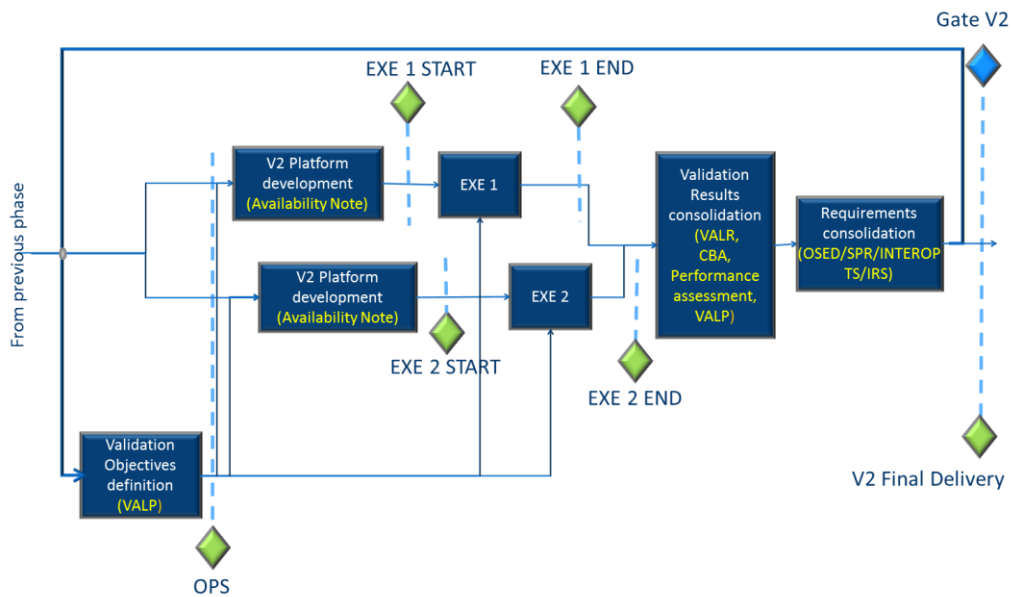


Activity	Deliverable	Milestone
ATM Excellent Science and Outreach	Concept outline and identification of potential benefits and risks	ER Initial Delivery
ATM Application Oriented Research	Initial Concept Description	ER Final Delivery
	Validation Report (VALR)	
Gate ER/IR		
Industrial Research and Validation	Operational Services and Environment Definition (OSED) V1	V1 Final Delivery
	Validation Report (VALR) V1	
	Validation Plan (VALP) V2 defining the validation roadmap for phase V2	
Gate V1		

Figure 9 V1 validation phase for SESAR Solution

3.2.1.2 V2 phase for SESAR Solution

A development and validation phase related to SESAR Solutions conducted up to V2 maturity can be broken down in the following activities and is completed via a successful assessment of the following deliverables at Gate V2-SE1:

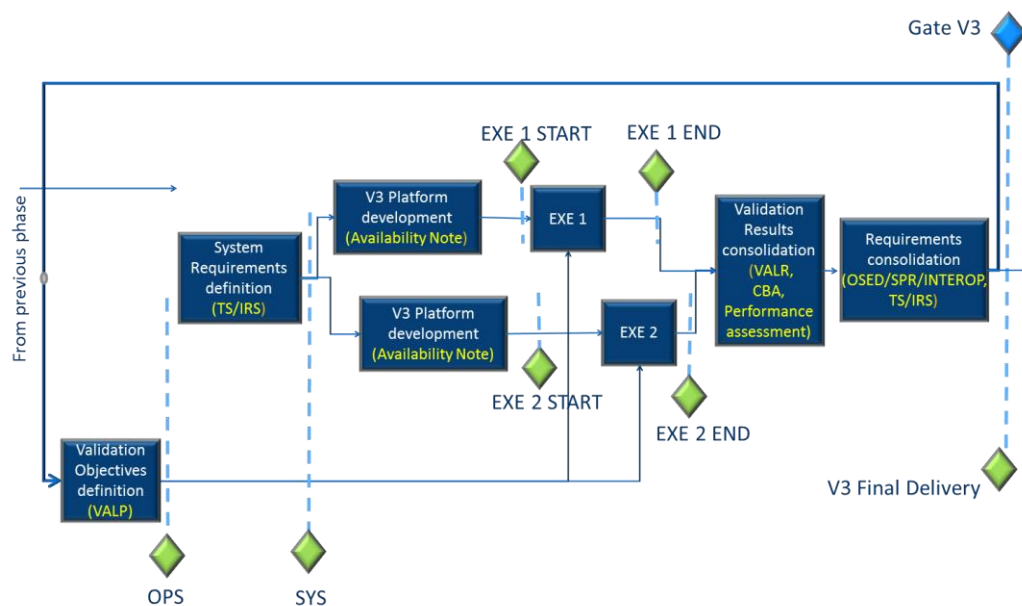


Activity	Deliverable	Milestone
Validation Objectives definition	Validation Plan (VALP) V2	OPS
V2 Platform development	Availability Note	EXE START
Exercise		EXE END
Validation Results consolidation	Validation Report (VALR) V2	V2 Final Delivery
	Performance assessment and CBA V2	
	Validation Plan (VALP) V3 defining the validation roadmap for phase V3	
Requirements consolidation	Operational Requirements (OSED/SPR/INTEROP) V2	
	Technical Specification (TS) V2 not always relevant in V2 phase	
Gate V2		

Figure 10 V2 validation phase for SESAR Solution

3.2.1.3 V3 phase for SESAR Solution

A development and validation phase related to SESAR Solutions conducted up to V3 maturity can be broken down in the following activities and is completed via a successful assessment of the following deliverables at Gate V3-SE3:

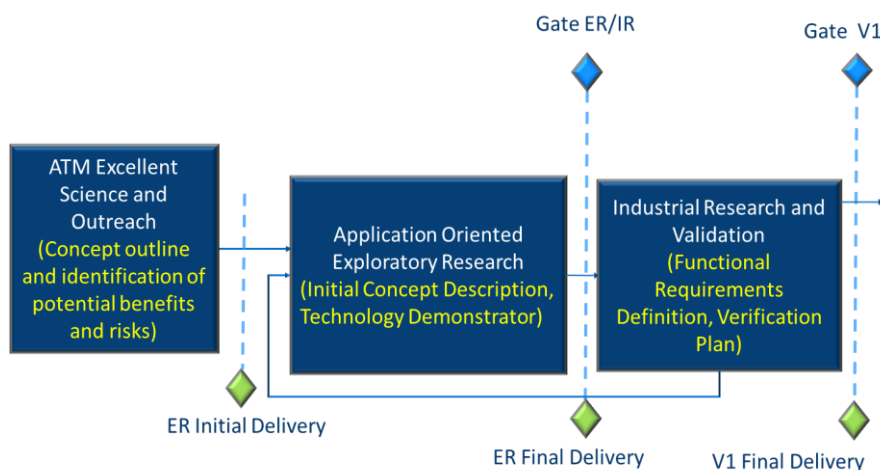


Activity	Deliverable	Milestone
Validation Objectives definition	Validation Plan (VALP) V3	OPS
System Requirements definition	Initial Technical Requirements (TS/IRS) V3 Different documents may be produced for different systems	SYS
V3 Platform development	Availability Note	EXE START
Exercise		EXE END
Validation Results consolidation	Validation Report (VALR) V3 Performance assessment and CBA V3	V3 Final Delivery
Requirements consolidation	Operational Requirements (OSED/SPR/INTEROP) V3	
	Technical Requirements (TS/IRS) V3	
Gate V3		

Figure 11 V3 validation phase for SESAR Solution

3.2.1.4 V1 phase for Technological Solution

The development and verification phase related to Technological Solutions conducted up to V1 maturity can be broken down in the following activities and is completed via a successful assessment of the following deliverables at Gate ER/IR and Gate V1 level:

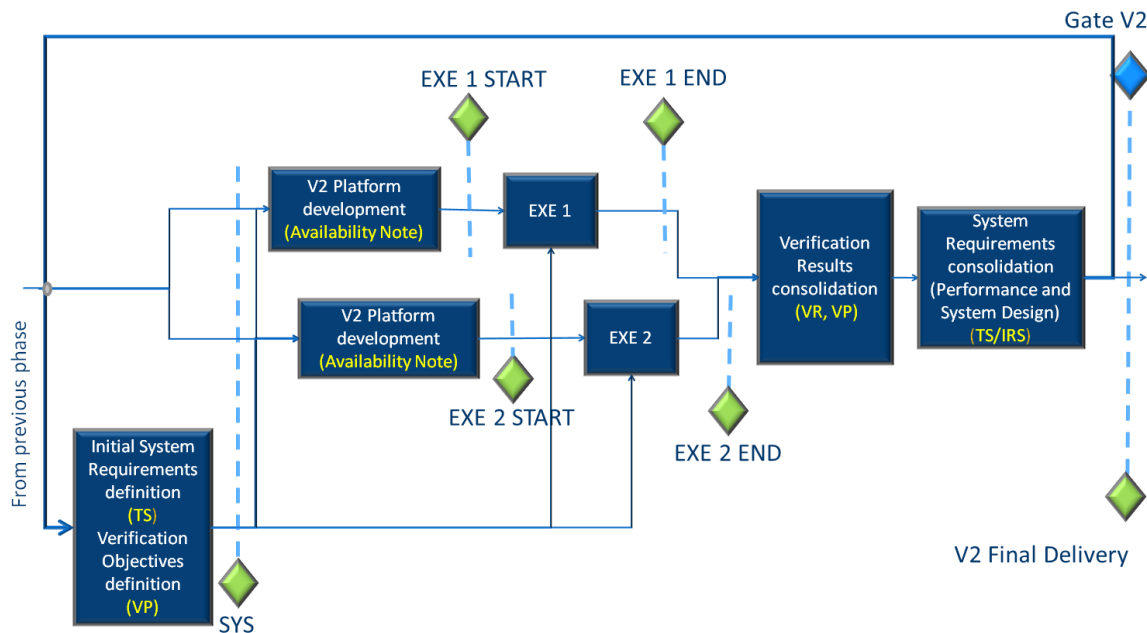


Activity	Deliverable	Milestone
ATM Excellent Science and Outreach	Concept outline and identification of potential benefits and risks	ER Initial Delivery
ATM Application Oriented Research	Initial Concept Description	ER Final Delivery
	Technology Demonstrator	
Gate ER/IR		
Industrial Research and Validation	Functional Requirements Definition (FRD)	V1 Final Delivery
	Verification Plan (VP) V2 defining the verification roadmap for phase V2	
Gate V1		

Figure 12 V1 verification phase for Technological Solutions

3.2.1.5 V2 phase for Technological Solution

A development and verification phase related to Technological Solutions conducted up to V2/TRL4 maturity can be broken down in the following activities and is completed via a successful assessment of the following deliverables at Gate V2:

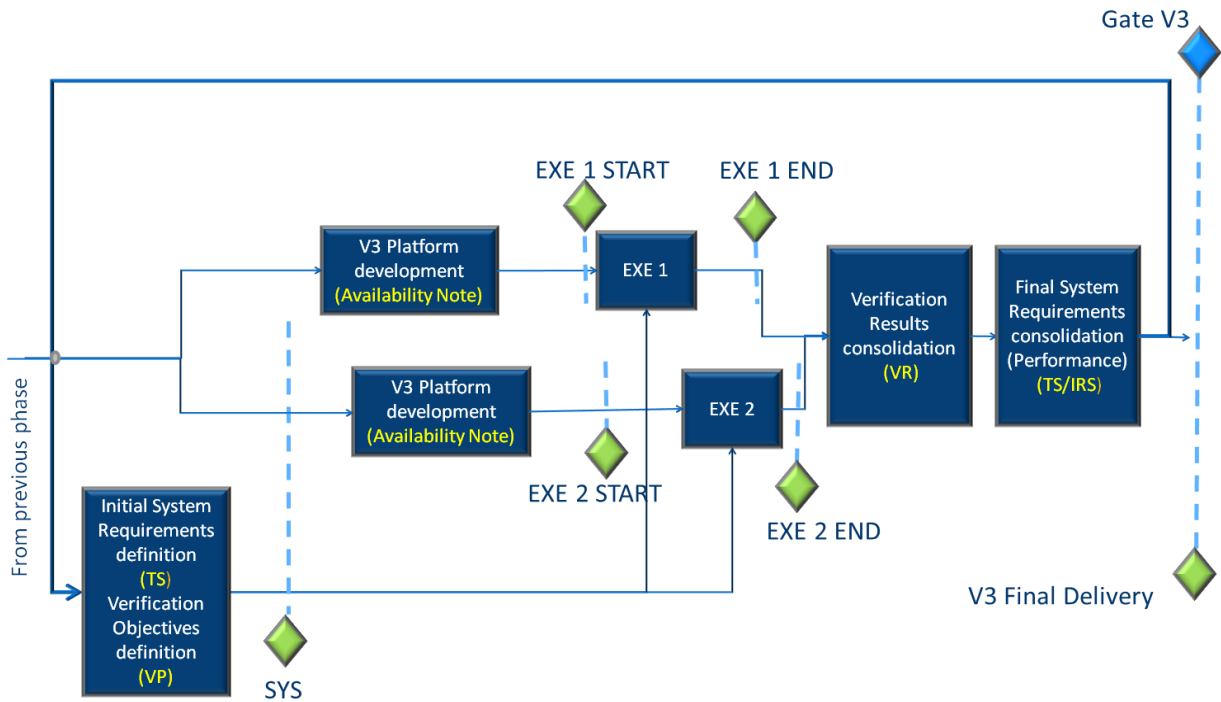


Activity	Deliverable	Milestone
Initial System Requirements definition	Initial Technical Specification (TS)	SYS
Verification Objectives definition	Verification Plan (VP)	
V2 Platform development	Availability Note	EXE START
Exercise		EXE END
Verification Results consolidation	Verification Report (VR)	V2 Final Delivery
	Verification Plan (VP) defining the verification roadmap for phase V3	
Systems Requirements consolidation	Technical Requirements (TS/IRS) not always relevant in V2 phase	
Gate V2		

Figure 13 V2 verification phase for Technological Solution

3.2.1.6 V3 phase for Technological Solution

A development and verification phase related to ATM Technological Solutions conducted up to V3 maturity can be broken down in the following activities and is completed via a successful assessment of the following deliverables at Gate V3 (TRL6-SE3):

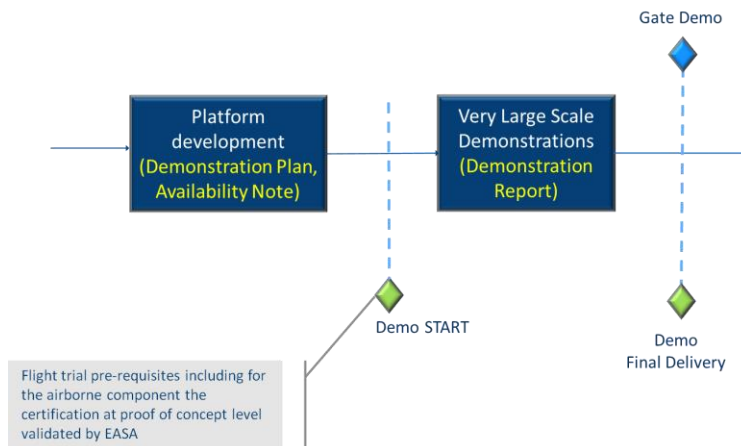


Activity	Deliverable	Milestone
Initial System Requirements definition	Technical Specification (TS)	SYS
Verification Objectives definition	Verification Plan (VP)	
V3 Platform development	Availability Note	EXE START
Exercise		EXE END
Verification Results consolidation	Verification Report (VR)	V3 Final Delivery
Systems Requirements consolidation	Final Technical Requirements (TS/IRS)	
Gate V3		

Figure 14 V3 verification phase for Technological Solution

3.2.1.7 Demonstration phase for SESAR and Technological Solution

A demonstration project can be broken down in the following activities and is completed via a successful assessment of the following deliverables at Demo's final Gate:



Activity	Deliverable	Milestone
Platform development	Demonstration Plan	Demo START
	Availability Note	
Very Large Scale Demonstrations	Demonstration Report	Demo Final Delivery
Gate Demo		

Figure 15 Demonstration phase for SESAR and Technological Solution

3.2.2 Projects and SESAR Solutions

Each SESAR Project develops and validates several SESAR ATM & Technological Solutions, which may have different maturity and therefore be at different phases of their own lifecycle. A SESAR ATM & Technological Solution is developed and validated by only one SESAR Project.

The figure below shows how an Industrial Research and Validation Project may address within its scope several SESAR Solutions, each of which may be at a different point of its own maturity phase.

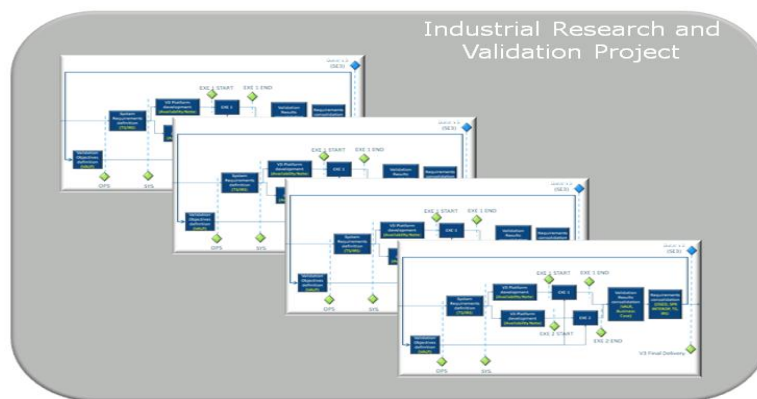


Figure 16 SESAR projects and SESAR Solutions

In order to optimise time and resources, Project Managers will have the opportunity to combine gates of different SESAR Solutions. This will be done in coordination with the SJU, who will identify the best option.

A validation exercise executed by a project in the Industrial Research and Validation domain may also address several SESAR Solutions, potentially including some which are the responsibility of other projects. This is known as “integrated validations”, in which the validation activities led by one project contribute to finalising the validation work of other projects.

It should be also noted that one Demonstration executed by a VLD Project can, in general, address several SESAR Solutions simultaneously.

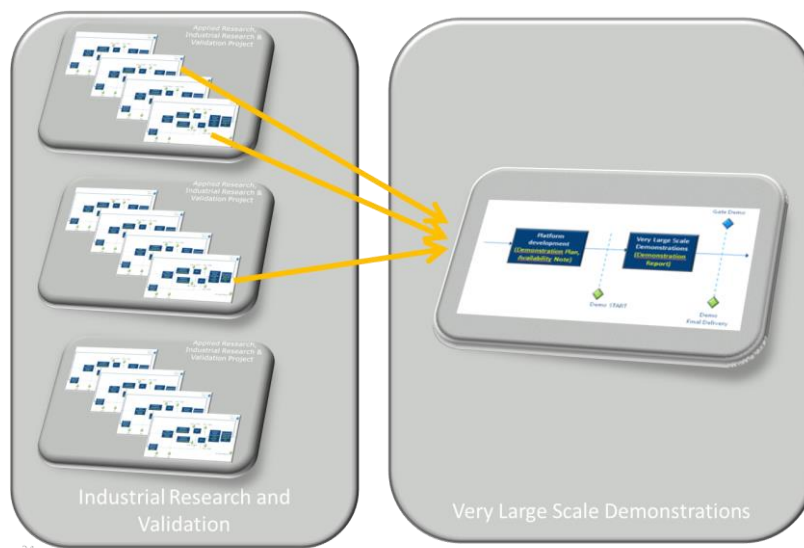


Figure 17 VLD projects shall address several solutions at the same time

3.2.3 Activities in the scope SESAR Solution Development & Validation

In line with the steering and framework provided, Solution and Enabling Projects define an operational concept to achieve the relevant Validation Target. Based on this, they develop, verify and validate SESAR Solutions and Technological Solutions in function of potential future deployment. The results of the validation are used for performance assessment and to update the operational and systems and service definition.

Work done in this phase also provides contributions to standardisation, regulation, industrialisation and deployment aspects of the SESAR Solutions developed.

This set of activities consolidates and integrates the deliveries and the validation results from Solution and Enabling projects, to build and to baseline the global Programme views with respect to Performance, Maturity, Operations, Systems and Services.

The set of activities can be sub-divided into the following four sub domains:

3.2.3.1 Operational concept definition

Based on the SESAR Reference, CONOPS and Validation Targets, the objective of the Operational Concept definition process is to define a consistent and coherent set of operational requirements and architecture describing the operational concept associated with a SESAR Solution along with the benefit impact mechanisms to address the associated validation target. It also includes the Initial Concept descriptions in the case of Exploratory Research Projects.

3.2.3.2 System and Service Development and Verification

The objectives of System and Service Development and Verification process are to define a consistent and coherent set of functional and non-functional, interface and service requirements and architecture fulfilling the operational needs and relevant steering principles; to develop and verify system prototypes and V&V infrastructures (V&VIs) complying with these requirements and architecture and to integrate them into the V&V Platforms to be ready for validation.

3.2.3.3 Production and analysis of Validation and Demonstration results

The objectives of the Validation and Demonstration process are to:

- Follow the Validation Strategy and Validation Targets allocated to each SESAR Solution, define and execute appropriate validation activities proving that the operational concept is feasible,

applicable to different operational contexts and will bring the expected performance benefits. Furthermore, integrated validation activities can be defined addressing several SESAR solutions simultaneously.

- In the case of VLD projects, define the Demonstration Plan to execute the Very large Scale Demonstration and elaborate the corresponding Demonstration Report after executing the demonstration.

3.2.3.4 Performance Results Capturing

Using information provided in the Validation Reports from Solution Projects and the Demonstration Reports from VLD Projects, the objective of this process is to produce an assessment of SESAR Solution performance, compliant with the Performance Framework and Guidance material as developed by the Content Integration process.

Performance assessments will take place as a single or group of validation exercises as appropriate to obtain sufficiently complete results. Performance results from the different validation exercises are documented and analysed by project experts and aggregated per SESAR Solution, with explicit reference to the operating environment they were conducted in. Conclusions for each KPA and KPI are derived according to the process and methodologies detailed in the Guidance material and a performance assessment is built, which describes the expected performance enhancements as well as the side effects, issues requiring resolution and opportunities to be exploited.

Performance impact is monetised and analysed in the form of a Cost Benefit Analysis (CBA), providing key measures on expected costs and benefits for key stakeholders implied by investing in the SESAR Solution, together with optimum deployment options to best maximise solution benefits.

Development of a performance assessment occurs in a progressive way: It is refined as solutions evolve along consecutive maturity levels, in compliance with the Guidance material as developed by the Content Integration process, but approximately in accordance with the following scope

- V0: identification of potential benefits and risks,
- V1: conceptual benefits, benefit mechanisms and influence factors, initial assessment on the primarily affected KPAs&KPIs
- V2: quantitative intermediate assessment on all KPAs & KPIs (including Safety, Security, HP and costs assessment)
- V3: complete assessment including final quantitative results on all KPAs & KPIs

This activity interacts with the Content Integration process on one hand by using the Performance Framework as guidance material and on the other by providing an input for the Consolidated Performance Assessment and the development of the Consolidated Business Case at MP level as highlighted in the following diagram.

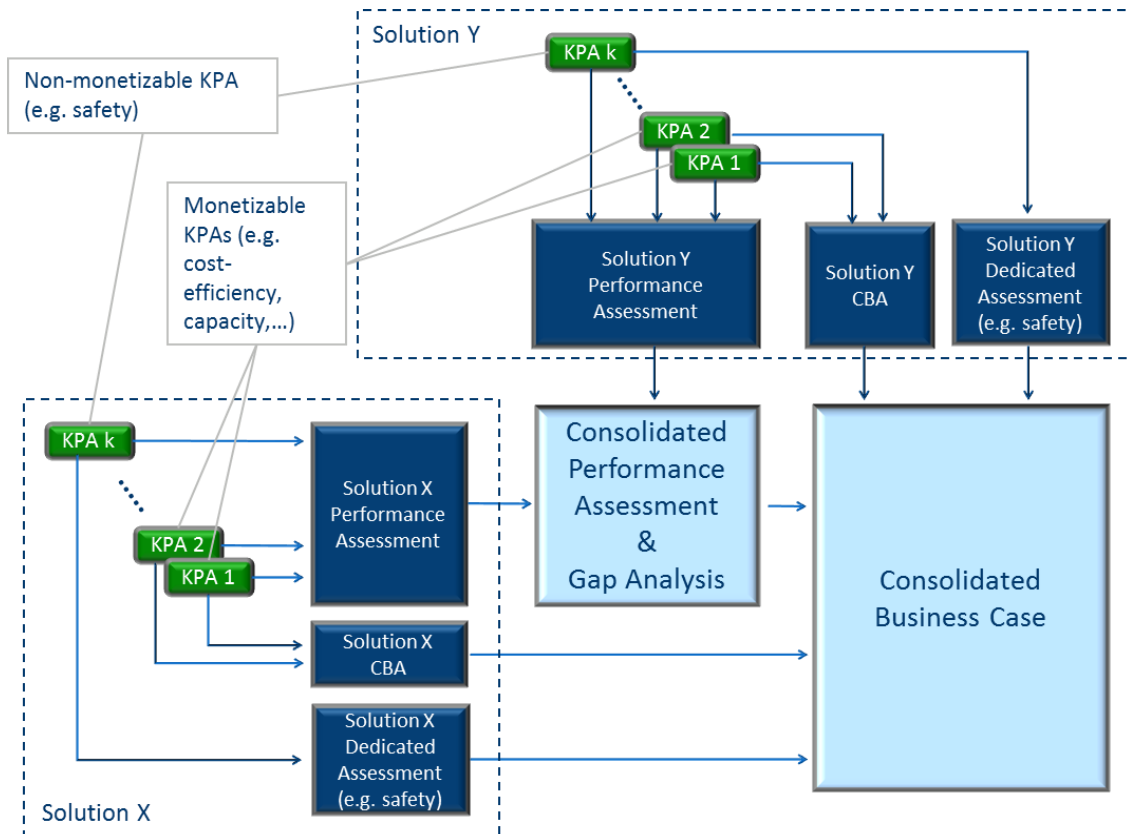


Figure 18 Main Relationships between performance assessment results at different levels

The principal output and deliverables of this domain of activities are:

- Performance Assessment, integrating all performance results as identified in the VALR into EATMA. This is provided in close coordination with Architecture Coherence, as part of the Continuous Collaboration and Change management process.
- Cost Benefit Analysis, covering SESAR Solutions in v2 (first view) and v3.
- Dedicated Assessment on specific KPAs (e.g. safety, security), to provide complementary information to the CBA for the use of the Consolidated Business Case. For certain KPAs such as safety and security in fact the Performance Assessment might need to be complemented by a wider collection of evidences which are more structured than the architectural links available in EATMA. The Solutions subject to such dedicated assessment and the methodology to be followed will be identified and detailed in the Guidance Material as developed by the Content Integration process.

Performance Assessment (as part of the VALR and in EATMA) and CBA are provided by each Solution project after performing v2 and v3 validation activities and by VLD projects. For the CBA sometimes the best level of granularity could be a group of Solutions rather than one individual Solution. Appropriate Guidance will be provided by the CI process, tailored to the specific nature and needs of the projects.

3.3 Involvement of transversal activity projects in the development and validation life cycle

3.3.1 Content Integration

Content Integration aims at coordinating and integrating the operational and technical solutions, and as such at supporting and guiding the processes to ensure their completeness, consistency and coherency from a holistic perspective as expressed in the SESAR CONOPS. The content Integration activities also cover the maintenance and support of the performance framework and ensure its applicability by the projects. These activities provide support to the activities that monitor the programme and that support the SJU decision making.

3.3.2 Master Plan Maintenance

The main objective of the Master Plan Maintenance is to support the maintenance of the ATM MP and the alignment of its three levels. This includes ensuring that the ATM performance ambition levels are correctly established at the highest level and can flow into the programme to drive R&I and deployment prioritisation.

3.3.3 Validation and Demonstration Engineering

This activity aims at developing and maintaining the processes, methods, tools and training for System Engineering (SE) Data Management (based on a Data Centric Approach) allowing to capture SE data in a structured way and ensuring consistency, coherence and coverage analysis at Programme level. It also ensures maintaining the Verification and Validation Demonstration Platform Development Methodology, providing support and monitoring of its correct application across the programme. Finally, it investigates the development of the technical specifications, interoperability requirements and conformance criteria supporting the communalization of validation tools and interoperability solutions that are applicable for the different simulators, tools and V&V Demonstration Infrastructure.

4 Project interfaces in function of Programme Management

The project management activities are broken down into a dedicated set of practices and are based on industry best practices. They aim to ensure an institutionalised approach whereby interfaces between the SJU Programme management and the members' project management methods are made common. This allows the SJU to roll up management information captured and as such ensure consistent monitoring and control at Programme level and to share the information with any stakeholder. Project management activities can be clustered into a number of dedicated practices, many of these practices are interrelated. The following picture provides an overview (green boxes):

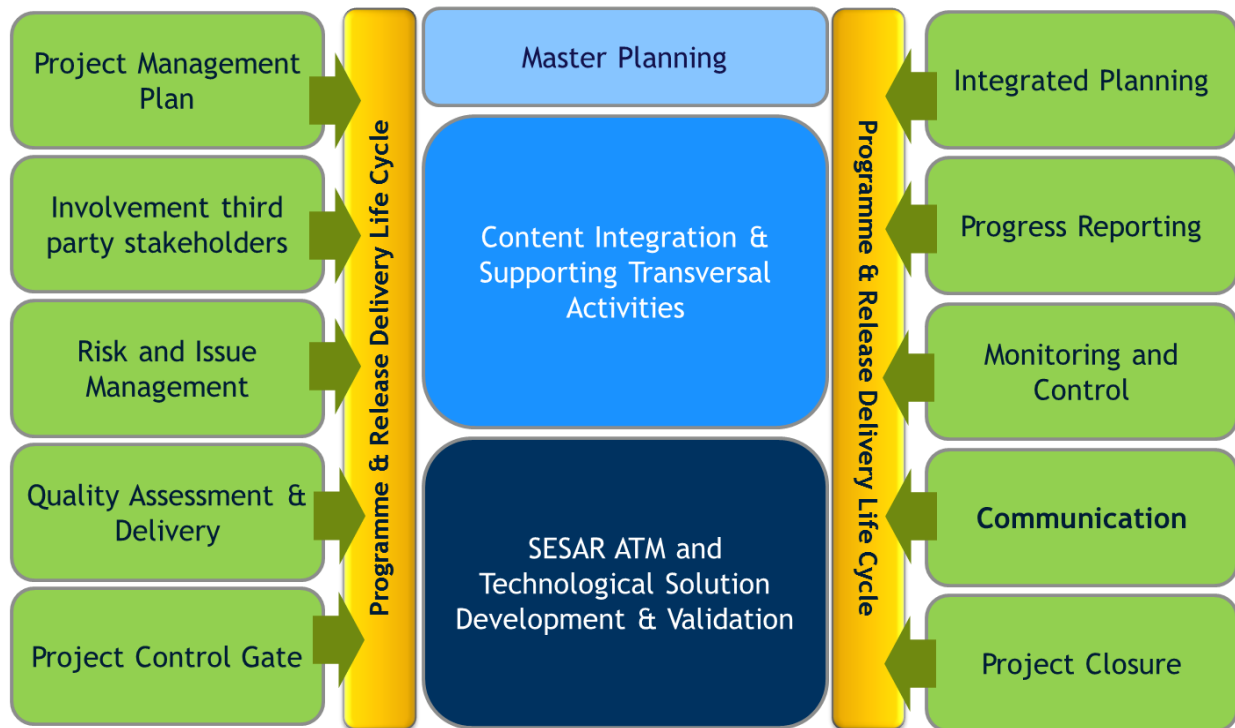


Figure 19 Clusters of Project Management Activities

The next sections provide a short introduction to each Projects purpose and principles, per Management domain.

Titles of next sections shall be aligned with the picture + 10 green boxes in the picture while only 9 sections here below

4.1.1 Project Management Planning

All Projects will deliver a Project Management Plan and this to ensure that each project, depending on the nature of its activities (i.e. research or demonstration) and the type of the project (SESAR solution, Technological Solution, Content Integration, Transversal Support) complies with the policies concerning:

- Programme and release life cycle
- Content Integration and other transversal activities;
- the way a SESAR Solution or a SESAR Technological Project conducts the work to be done and is aligned with maturity targets;

Compliance visibility will be derived from information such as milestones, identified dependencies and deliverables.

Post approval of the Project Management Plan, any structured information contained within it will be stored and maintained by the project manager in the dedicated registers as made available to each project in the SJU Extranet project site.

4.1.2 Integrated planning

The purpose of the integrated planning process:

- Is to bring together and consolidate any relevant information that contributes to a viable plan in order to ensure a clear definition of the work to be done by each project. Generate and baseline clear expectations, that will form the basis of an agreed work-plan between the SJU and the project and members;
- is to detail the dependencies between the various contributors within the Programme and the SJU and as such to organise any work within the Programme;
- is to use planning information to monitor scope, progress and quality, with the aim of forecasting progress against the plan and when/where needed identify and execute corrective actions;

4.1.3 Involvement of 3rd party stakeholders

The objective is to involve in the Programme activities resources which represent various groups of stakeholders such that their expertise and knowledge can be utilised in the most effective and efficient manner possible. The relationship with 3rd party stakeholders is special since 3rd parties are requested for their expertise contributing to project task like development or revision of specs, participation to validation exercises, etc. while the SJU monitors, reviews and approves the project deliverables. The involvement of 3rd Party stakeholders within the project should be applied to those activities that contribute to the development of SESAR Solutions as a priority

Contracts with the following stakeholders, in the frame of SESAR 2020, who can be included in the 3rd party management, are to be put in place:

- Airspace Users;
- Staff Associations;
- Military;
- International Validation Teams;
- National Authorities.

4.1.4 Progress Reporting

The objective of Progress Reporting process is to monitor in a qualitative and quantitative manner the progress and the forecast of the Projects including the status of their risks and issues.

The reporting on the progress shall be done quarterly. A report is to be submitted at the end of the second week following each quarter i.e.

- 2nd week in January
- 2nd week in April
- 2nd week in July
- 2nd week in October

To ensure proper monitoring and control, the Programme collects and consolidates information from Projects on their progress. The SJU validates the progress of the overall Programme and initiates corrective actions on time, effort and/or quality where necessary.

The content of the reporting can be summarised as follows:

- A summary status which gives an executive statement on the progress made and key issues;
- Achievements made in the last reporting period, i.e. milestones, control gates, and key data on tasks;
- % completion at the task level;
- Top 5 risks in order of criticality and/or priority;
- Red and amber issues, with their status and corrective actions;

- Main targets and events over the next reporting period.

In order to establish the report, the Project Manager shall agree with the Members involved in the Project the most appropriate way to collect the data necessary to elaborate the report, e.g. through the Task Leaders.

A Progress report does not trigger a new baseline plan. A baseline plan change (i.e. the formal agreed plan between the SJU & Project, which constitutes the current project reference plan) can only be decided via the change management process (see next).

4.1.5 Risk and Issue Management

The objective of the Risk and Issue Management process is to enable and ensure that risks, issues and opportunities are identified and managed at all levels within the Programme.

Projects identify, own and are responsible for managing the RIs (risks and issues), or escalating them towards the SJU for management at the Programme level; this identification and management responsibility also includes, for the Projects, the identification and management of RIs pertaining to the development of SESAR Solutions or Technology Solutions.

Managing risks, issues and opportunities is a continuous process which focuses on:

1. Identifying, describing and assessing risks, issues and opportunities;
2. Maintaining risk, issue and opportunity information regularly, i.e. checking on a regular basis if it is up-to-date, exhaustive and accurate enough;
3. Defining actions to mitigate the risks and issues, or to promote the opportunities; an expected level of effectiveness of these actions should be assessed;
4. Implementing these actions;
5. Controlling their effectiveness.

Risks are potential events that may affect a Project or the Programme negatively, while issues are actual events. Thus, risks must be managed in order to avoid that they become issues (prevention) or that their initially expected effect becomes actual (protection). Issues must be treated as soon as possible and, where necessary, escalated to the appropriate level in the shortest timeframe. A risk may remain open, while an issue must be solved.

Information on top risks and main issues (with high or very high severity) is included in the Project Progress Report. All Project risks and issues are reviewed during the Project Control Gates, with a particular focus on their evolution.

4.1.6 Monitoring and Control

The objective of the monitoring and control processes is to ensure that quality and progress is being tracked at project level, and where needed to allow corrective actions to be taken and make available this information to the Programme management level.

The following monitoring and control processes are being made available and need to be applied in mandatory manner by and under the responsibility of the project manager:

- Dependency management : this sub-process provides an instrument to project managers to define, track, and control dependencies between the project and
 - o Other project activities, deliverables, or milestones
 - o V2 and V3 validation exercises as recorded and base-lined in the V&V roadmap. These dependencies were called in the SESAR 1 Programme OFA dependencies.
 - o The overall Programme life cycle and its deliverables
- Milestones tracking: this sub-process allows project managers to get an overview of all their milestones and record achievement including evidence. Additional to being a usual project manager tool, it provides essential information when collated at programme level for progress monitoring.

- Deliverable assessment tracking: the sub-process gives visibility to project manager and any project stakeholder about the status of deliverables in function of hand over, quality assessment as performed by SJU and any other information linked to the financial handling of the work performed.
- Integrated scheduling is a mechanism provided to project manager and any other stakeholder to aggregate schedule information and as such capture an overview of planned worked against actual progress.

4.1.7 Quality Assessment and Delivery

The objective of the quality assessment process is to assess and monitor the quality of all relevant deliverables by the SJU. Within the SESAR Programme, the quality of the deliverables is managed according to the following principles:

- Quality assessment of deliverables is an integral part of the organisation and processes of the Projects: submission of a deliverable to the SJU involves all Project members and implies that the deliverable meets relevant standards and Programme expectations;
- The SJU assumes that Projects correctly apply internal quality controls prior to the submission of a deliverable to the SJU. The SJU may ask for evidence from the project to assess that internal quality controls are correctly planned and performed;
- Quality of deliverables is a major input for the acceptance at the Project Control Gate;

4.1.8 Communication

The objective of the communication process is threefold:

- To create awareness and outreach about SESAR 2020 and its projects;
- To showcase the research outcomes and benefits that SESAR solutions can bring to real day-to-day Air Traffic Management (ATM) operations;
- To accelerate the operational acceptance and subsequent deployment of SESAR solutions.

To ensure that communications are consistent with the SESAR brand, project consortia are requested to contact SJU Communications Sector when preparing external communication activities, in order to:

- Validate SESAR-related content;
- Develop possible joint outreach activities through various communications channels;
- Benefit from SJU messaging support;
- Secure SJU speakers, if needed;
- Allow the SJU to further cascade relevant content through its own existing channels.

4.1.9 Project Control Gate

The Project Control Gate is a Gate process with the objective to establish a comprehensive evaluation of the Project status at an agreed moment in time. The main consequence of the Control Gate is an agreement (or not) to the Project to proceed, possibly under certain conditions and with possible changes to the plan (those would have to be formally processed via a change request (see previous section)).

Project Control Gates apply to all type of projects. From an administrative viewpoint they have to be conducted at least once per year. Gates will also be called in function of progress made in the way SESAR Solutions and Technological Solutions are developed, validated or demonstrated

Within the Project Control Gates, the SJU assesses the Project against management and content factors or criteria. During the Project Control Gates, Projects are evaluated looking both backward (how has the project performed up to now?) and forward (is the plan for the future adequate?).

The evaluation aims to answer the two following questions:

1. CONTENT view: “Is the Project delivering the defined and specified result and contributing to the right Programme outputs?”

This factor encompasses evaluation criteria related to the content produced: the submission of project deliverables on time and at the expected level of quality (as per the deliverables assessment status, see previous section). The maturity Gates of the SESAR Solution lifecycle inform this Content view.

2. MANAGEMENT view: “Is the Project properly managed and under control?”

This encompasses evaluation criteria related to the quality of the project management i.e.:

- the alignment of the Project plan (scope, content, schedule) with the needs of the Programme (in particular with the Validation Strategy and the V&V Roadmap, and contribution to the Business Priority Needs)
- adherence to the plan and dependencies (in particular in relation with the Programme and Release life cycle and with the way SESAR Solutions or Technological Solutions) are to be developed, validated and demonstrated
- Effectiveness in following-up previous project control gates actions, as well as mitigation actions for risks, issues and opportunities (with particular regard to the actions related to Release issues), and the effort consumed in relation with the actual delivery of the project;

To assess the above, the SJU uses measurements produced within each of the project management activities presented in this chapter (i.e. the overall SJU management framework) related to as well content development and delivery as Programme planning-monitoring-control.

The Project Gate is chaired by the SJU Programme Manager in charge of the specific project.

4.1.10 Project Closure

The objective of the Project Closure process is to determine if a Project has achieved its objectives, if the resources have been used in accordance with the plans and economically; overall to determine the sound financial management of the Project in accordance with the SJU Financial Rules.

The Project Closure determines through the Project Closure Gate meeting the end of the obligations of the concerned Members in relation to the activities to be performed for a given Project. Unless specified in this document or in other implementation documents (e.g. the Execution Guidelines), this process is applicable in the same manner to all project closures.

Closure is done at the project level and applies to all type of projects within the SESAR 2020 Programme. All projects that have entered execution must be closed formally via the Project Closure process, unless a specific Administrative Board decision was taken.

A project is considered as a candidate for closure when

- The project has completed its work plan; or
- Under certain conditions to be assessed on a case by case, the SESAR JU has decided to cancel the project.

5 Programme Organisation and Co-ordinating roles

5.1 Overview

Hereafter is an overview of the 2020 Programme organisational structure applicable for SESAR 2020. The matrix structure aims to enable coordination from a programme viewpoint and from an ATM content viewpoint. It also shows the relationship between multiple Solution Projects and the transversal projects i.e. Master Plan, Content Integration and V&V projects.

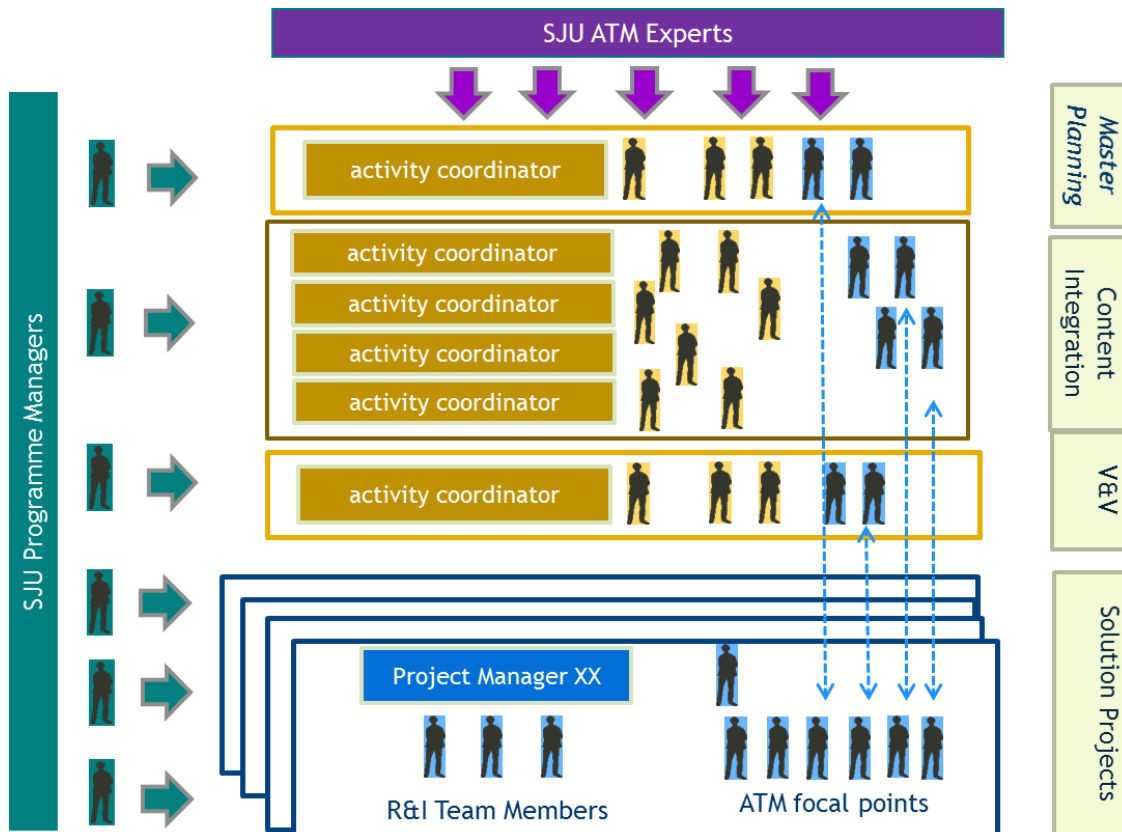


Figure 20 Co-ordination related organisational roles and responsibilities

In the sections hereafter we introduce roles and responsibilities of some key actors in this organisational matrix structure.

5.2 Project SGA Coordinator

The SGA coordinator acts as SGA primary contact point with the SJU and is responsible for:

- Checking the quality of the deliverables and verifying their completeness and correctness
- Submitting the deliverables and reports on behalf of the SGA beneficiaries
- Participating to the Escalation and Remedial procedures
- Preparing and contributing to the formal contractual closure of the activity

In complement to the SGA Co-ordinator as described above, specific roles and responsibilities are allocated in function of the following type of projects:

- Solutions and Enabling Projects, and
- Transversal Activities

5.3 Solution and Enabling Project

5.3.1 Project Manager Solution and Enabling Project

In addition to its role of SGA co-ordinator, the Project Manager of a Solutions and Enabling Project shall lead and coordinate activities with the aim of delivering SESAR Solutions. This role consists more particularly in ensuring:

- the timely delivery of the SESAR Solutions or Technological Solutions and Enablers;
- the timely execution of SESAR Solution validation activities;
- the preparation, execution and maintenance of a Project Management plan;
- the application of common methods, as defined within the Programme Management Plan (e.g. progress reporting, corrective action implementation, project control gates);
- the provision of a comprehensive oversight of the Project and manage the operational relationship between the Members involved at the Project level;
- the engagement of 3rd parties (such as but not limited to airspace users, staff associations, etc.), where applicable;
- proper and timely communication of information, within the Project and to the upper levels; and
- an appropriate preparation and contribution to the operational closure of the Project

5.3.2 Project Team

Every project will be led by a project manager and is composed of R&I solution experts and a number of defined ATM Focal Points. Project Teams are to be set-up such that they become multi-disciplinary teams, with clear defined roles and individual people appointed to these roles. Part time allocation of those resources and the usage of standard tooling aim to secure collaborative work between solution and transversal projects on one hand and between solution projects and enabling projects on the other hand.

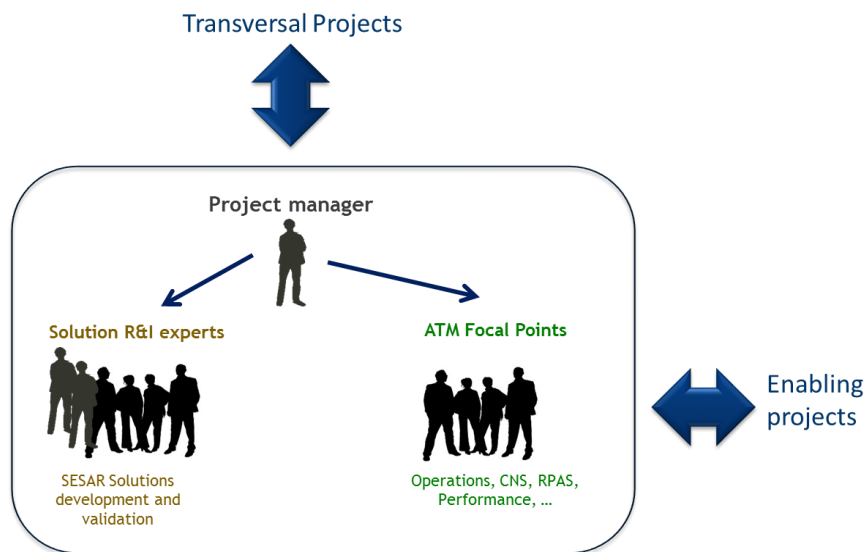


Figure 21 Inter-Project collaboration

5.3.2.1 R&I Solution Team and Team members

The R&I Solution Team consists in experts and engineers responsible for developing the required validation platforms, planning, organising, executing the validation activities and analysing and consolidating the results leading to the delivery of the associated SESAR Solution.

5.3.2.2 ATM Focal Points

ATM Focal Points are experts in different areas who will:

- Contribute to the development of deliverables submitted by their project (e.g. OSED, Safety assessment, Common Services);

- Contribute to the development of Technological Solutions (e.g. CNS enablers) required to support the validation of their project's ATM solutions
- Contribute to the development of the deliverables to be produced by the Transversal Activities (e.g. CONOPS, functional Architecture).
- Act as subject matter expert for one or more areas vis-à-vis the Transversal projects or Technological Solution Project and contribute to develop deliverables at those transversal level.

Various ATM Focal points are to be appointed. Hereafter a non-exhaustive list:

- ATM related:
 - o Operations
 - o Technical Architecture
 - o Services
 - o Safety
 - o Security & Cyber security
 - o Human Factors, ...
 - o Standardisation & Regularisation
 - o Operational Performance impact ...
 - o CNS, RPAS, METEO, ...
- Project Support related:
 - o Requirements Identification
 - o Project Planner
 - o Quality People
 - o Architecture Modelling
- Communication related:

5.4 Transversal Project

5.4.1 Transversal Activity Coordinator

In addition to the role of the Project SGA co-ordinator, one or more Transversal Activity Coordinators are appointed and has a facilitator role in support of the SJU and its Programme Governance with the aim of delivering the transversal Deliverables.

6 Programme Tooling at Programme Level

Capitalising on the work done in SESAR 1 where a series of applications were developed and deployed to support the different activities and frameworks at Programme level, it is the purpose in SESAR 2020 to mature and further institutionalise their usage.

The figure below gives a high level view of Tooling & Frameworks applicable:

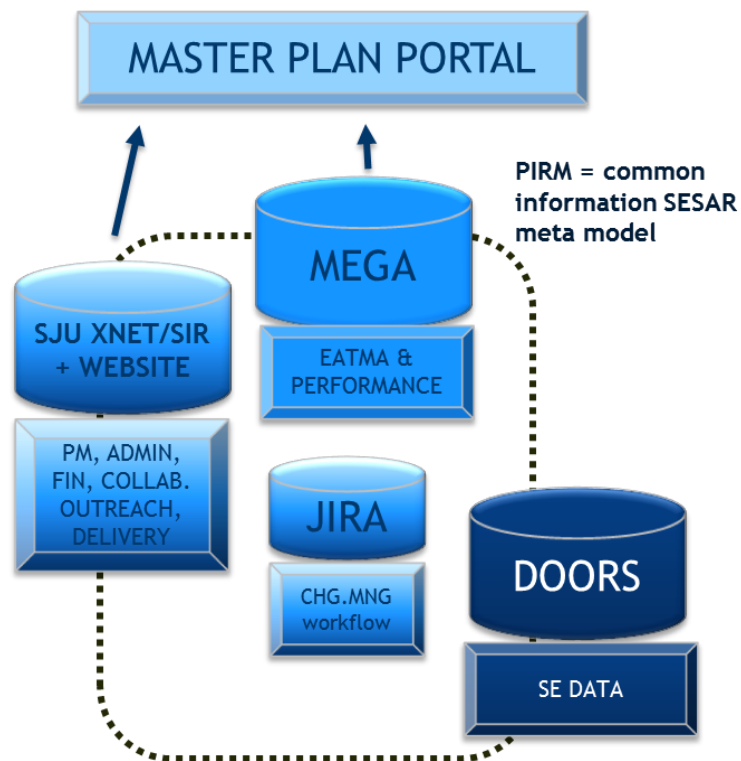


Figure 22 Tooling at Programme Level

The overall set-up can be broken down into the following applications each covering an area of responsibility:

- **ATM Master Plan Portal:** a portal providing a view on the information as contained in the ATM Master Plan
- **Programme Management Framework ((tools Extranet, back-end SIR repository) and SJU Public Web**
 - o Collaboration tool for all Programme participants
 - o Central repository for any (approved) guidance materials
 - o Enabling Programme versus project management interfaces and workflow
 - o Integrated Programme planning tool
 - o V&V roadmap repository
 - o Repository containing any Programme management related information
 - o Repository containing all assessed and approved deliverables
 - o Gate-away for financial processes linked to the EC financial system.

- **EATMA - European ATM Architecture Framework tool MEGA)** is a central repository that includes detailed and consistent content related information covering business, operational, service and system models. In addition it will become the centralised repository to host any information in the context of the performance management framework. It is linked to DOORS.
- **SE Requirements and Validation Information tool (tool DOORS):** a tool to capture requirements and used in order to validate consistency and completeness of validation work done. It is linked to EATMA.
- **Change Management tool (tool JIRA):** a tool to create and track change tickets and enable content development change management related workflow. The programme/project management related change management remains (currently) embedded in the extranet.

While there are different frameworks and tools to enable the overall execution framework, there is a set of information that is commonly to be understood and used between all implementations. To ensure common understanding and to enable exchange of this meta-info a logical model has been defined and agreed. The **Programme Information Reference Model (PIRM)** acts as such as single reference for the definition of information entities and relationships which have a structuring role in SESAR operational and technical processes. It integrates information models and corresponding datasets made available by several Programme processes:

- Performance Definition and Validation,
- SE data management,
- Programme Management,
- ATM Master Plan L2 definition,
- Deployment planning,
- Integrated planning,
- V&V Roadmap definition.

7 Guidance Documentation

At the start of the SESAR 2020 programme Guidance Documentation will be made available according to the following principles:

- All guidance documentation must be aligned with the structure and principles as introduced in this document.
- Guidance will be bundled to a limited set of docs grouped as per functions like project manager, transversal activity manager, ATM Focal Point, etc.

Appendix A Output produced per type of project in the overall life cycle and process to develop content

The following table summarises what each project and programme produce. The list is not exhaustive including only the most relevant deliverables for internal and external stakeholders.

For each deliverable the main content to be used (content), by whom (potential consumers) and for what reason (rationale) is explained. The tables is sorted as per Provider and as per SESAR Deliverable

SESAR Deliverable	Provider	Content	Potential Consumers	Rationale
CNS Infrastructure specifications and guidance	Pj14	<ul style="list-style-type: none"> Solutions for integrated CNS domain Solutions for Communications Solutions for Navigation Solutions for Surveillance 	ANSPs Avionics manufacturers Standardization & Certification bodies Deployment Governance Pj19 Airports	To understand the needs in terms of infrastructure and its possible rationalisation. To support standardisation. To prepare v4 and v5 To de risk industrialisation phase.
Services documentation	PJ15, Pj16, Solution and Enabling projects	Service Definition documentation including: <ul style="list-style-type: none"> Service Specification including interface definition, quality of service, behaviour Service Description Document (SDD) which is the non-formal description of a logical service, its interfaces and operations. (These can be provided as part of the TS/IRS deliverable) Service Architecture and modelling integrated in EATMA. Description of High Level Architectures for provider and consumer systems. Business Model and Cost Benefit Analysis Service provider and consumer roles and responsibilities Safety assessment and requirements Security assessment and requirements Proposed actions concerning rulemaking 	ANSPs Airports AUs Manufacturers Standardization & Certification bodies Deployment Governance Solution and Enabling Projects Pj19	To understand the performance impact, benefits and risks for changes in the business model. To get the necessary information to deploy a common service architecture. To understand the functionality of the services available and which operational activities they could support. To understand the logical service model from which develop the final physical model for deployment.

SESAR Deliverable	Provider	Content	Potential Consumers	Rationale
		<p>and standardisation.</p> <ul style="list-style-type: none"> NOTE: a particular case is the Virtual Centre Model developed by Pj16 		
SWIM -TI TS	Pj17	<p>TS/IRS for the different SWIM TI profiles. The SWIM profiles define the different characteristics of the infrastructure(s) that the service instance uses to communicate</p>	<p>Manufacturers ANSPs Authorities (national, European and global) Airspace Users Airports Standardization & Certification bodies</p>	<p>To understand the system and interface requirements to be implemented when deployment a SWIM profile system in order to ensure interoperability and performance. To establish governance on frameworks for information management, services developments and technology architecture. To support standardisation. To prepare v4 and v5 To de risk industrialisation phase.</p>
SESAR Lexicon	Pj19	<p>Update and maintain the inventory of SESAR terms (SESAR Lexicon), with the corresponding definition, to harmonize their use in the Work Programme</p>	<p>Any people who needs to understand and become familiar with terminology used in SESAR</p>	<p>Enhance communication and understanding</p>
Steering Principles	Pj19	<ul style="list-style-type: none"> Programme Strategic direction from authorities and governance bodies. Design Principles stemming from the ATM MP, CONOPS, Performance Report and Gap Analysis and Maturity Report. Corrective Actions: Issues pending from previous iteration (yearly in December), e.g. identified inconsistencies etc. 	<p>SESAR Solution and Enabling Projects</p>	<p>General Communication and feedback amongst governance</p>
Validation Targets	Pj19	<ul style="list-style-type: none"> Validation Targets per SESAR Solution 	<p>SESAR Solution Projects</p>	<p>To drive validation activities To provide the reference against which Solutions will be assessed</p>
ADD	Pj19 with	<ul style="list-style-type: none"> Visibility on Solution functional 	<p>ANSPs</p>	<p>To understand the changes on the system</p>

SESAR Deliverable	Provider	Content	Potential Consumers	Rationale
	contributions from SESAR Solution and Enabling projects	<p>architecture (consolidation of results from Solution and Enabling projects).</p> <ul style="list-style-type: none"> • Identification of Interfaces/services between Solutions • View on High Level Architecture evolution options. • Implementation/Deployment options <ul style="list-style-type: none"> ○ Grouping Solutions ○ Linked to Operating Environment 	<p>Airports AUs Manufacturers Standardization & Certification bodies Deployment Governance ATM MP SESAR Solution and Enabling Projects</p>	<p>architecture concept to be build and deployed and their impact in the production, operations, regulations etc. To build Deployment Packages and Scenarios. To build PCPs.</p>
AIRM	PJ19 with contributions from SESAR Solution and Enabling projects	<ul style="list-style-type: none"> • Information Model for the information used in the SESAR Programme. • Logical data model for the information used in the SESAR Programme. 	SESAR Solution and Enabling Projects	<p>Common reference for the different information and logical data models that will be developed as part of SESAR. To ensure that exchanged information shares the same meaning at its origin and its destination. This will enable systems to easily combine and process information from multiple sources. To ensure semantic interoperability of the solutions developed.</p>
CONOPS	Pj19 with contributions from SESAR Solution and Enabling projects	<ul style="list-style-type: none"> • Extended Executive Summary • Major principles and characteristics (Performance expectations) • The content limits (limited to the solutions planned to be part of the 2020 Programme) • Provide a temporal operational view of the changes in line with anticipated IOC dates • How it responds to challenges • Significant Operational Changes per Key Feature and Solutions with Perfo Info (contribution to which KPA) • Previous Operating Method 	<p>Actors external to the programme (incl. Deployment Governance, ICAO and the Commission)</p> <p>ATM MP</p> <p>SESAR Solution</p>	<p>To understand what we do. To understand the changes on the operational concept to be build and deployed and their impact in the production, operations, regulations etc. It will feedback into the ICAO-GNP</p> <p>To understand SESAR contribution to the global concept</p> <p>To understand how at a high level the solution will work together with other SESAR solutions and where necessary manage concept alignment between SESAR Solutions</p>

SESAR Deliverable	Provider	Content	Potential Consumers	Rationale
		<ul style="list-style-type: none"> • New Operating Method • Operational environment • Operational characteristics • Operational Scenario (potentially with reference to a number of different deployment options) • Performance expectations • Visible Key feature/Solution/OI relationship • Output from the Issue Management Process • Modelling of the ConOps will take place directly into EATMA and not form part of the published document 	Projects	
Consolidated Performance Assessment	Pj19 with contributions from SESAR Solution and Enabling projects	<ul style="list-style-type: none"> • Aggregation of performance results according to different levels • Extension of results in scope and geography • Overall performance assessment and gap analysis 	ANSPs Airports Manufacturers Authorities (national, European and global) Airspace Users Deployment Governance	To understand the potential performance impacts stemming from deployment of the new operational concept and system architecture in the production, operations, regulations, etc.
ISRM	Pj19 with contributions from SESAR Solution and Enabling projects	For services developed in SESAR, collection of SDD produced by the SESAR Solution and Enabling projects. NOTE: ISRM is a view from EATMA.	SESAR Solution and Enabling Projects	To achieve interoperability and to reduce number of interfaces between different ATM systems across multiple organizations. To better support ATM services in an appropriate way.
Service Roadmap	Pj19 with contributions	List of identified and designed services with associated dates to each development and	SESAR Solution and Enabling Projects	To understand if services already exist or are being developed meeting their needs.

SESAR Deliverable	Provider	Content	Potential Consumers	Rationale
	from SESAR Solution and Enabling projects	implementation phase.		
SESAR Reference (EATMA)	Pj19 with contributions from SESAR Solution and Enabling projects	<p>Includes (not limited to):</p> <ul style="list-style-type: none"> • IR DS • ADD • CONOPS • VALS • Validation Targets (4.4.5) • Information architecture • Service architecture • Views on Capabilities, Key feature and Solutions. • Consolidated Performance assessment and Gap Analysis • AIRM • ISRM 	<p>SESAR Solution and Enabler projects</p> <p>NOTE: Also same consumer as each of its components</p>	<p>To ensure consistency and coherence of the development.</p> <p>To enable performance assessment and aggregation.</p> <p>To support decision making.</p> <p>NOTE: Also same rationale as for each of its components</p>
Validation Strategy (VALS)	Pj19 with support from SESAR Solution and Enabling Projects	<ul style="list-style-type: none"> • Initially created at Content Integration level (P19). Updated upon contribution from Solution Projects. • Stakeholder's identification, needs and expectations • Current and Target Maturity Levels (RS/Maturity Report) • High Level Validation Objectives in Key Performance Areas • Validation Techniques and Tools • Validation Scenarios • Linked to Deployment scenarios in order to ensure deployment oriented R&I • Ensuring impacted stakeholders are 	<p>SJU</p> <p>SESAR Solution and Enabling Projects</p>	<p>To generate a coordinated validated output which is also responsive to external demands, such as common projects</p>

SESAR Deliverable	Provider	Content	Potential Consumers	Rationale
		involved <ul style="list-style-type: none"> Integrated Validation Needs (across projects) 		
ATM MP Level 1 and Level 3	Pj20	Level 1 is made up of three roadmaps: Stakeholder, CNS and Standardisation & Regulatory Roadmaps and overall concept captured within the Master Plan document Level 3 takes the form of implementation objectives to be achieved within coordinated time scales.	Standardization & Certification bodies ANSPs Manufacturers Airspace Users Airports	To understand the timelines for the development and deployment of the new operational concept and their impact in the production, operations, regulations etc. To plan the investments. To support standardisation and certification activities. To create the right order of those changes that are interdependent.
ATM MP Level 1: Regulatory Roadmap	Pj20	The Regulatory Roadmap presents the regulatory activities foreseen in support of the modernisation efforts for the future ATM system. It consists of the identification of both mandatory and voluntary material. On the mandatory part, it shows candidates for potential regulation in support of Step 1 Essential Operational Changes. On the voluntary part it shows an initial list of certification material that will be necessary to support Step 1 Aircraft Functions.	Standardization & Certification bodies ANSPs Manufacturers Airspace Users Airports	To support standardisation and certification activities.
ATM MP: Standardisation Roadmap	Pj20	List of standardisation Enablers, their link with the OI Steps and the publication date, which is the date by which the standard is required to be published.	Standardization & Certification bodies ANSPs Manufacturers Airspace Users; Airports	To support standardisation and certification activities.
Consolidated Business Case	Pj20	<ul style="list-style-type: none"> Aggregation of Consolidated Performance Assessment, CBAs and other dedicated assessment to different levels 	ANSPs Airports Manufacturers	Presenting to Decision Makers an analysis of the impact of deploying a certain set of SESAR Solutions in a certain timeframe (e.g. per

SESAR Deliverable	Provider	Content	Potential Consumers	Rationale
		<ul style="list-style-type: none"> Financial analysis including incentives 	Authorities (national, European and global) Airspace Users Deployment Governance	deployment package/scenario).
Data Set (ATM MP level 2)	Pj20 in collaboration with Pj19	<ul style="list-style-type: none"> OI steps Enablers Deployment Packages and Scenarios 	Standardization & Certification bodies ANSPs Manufacturers Airspace Users SESAR Solution and Enabler projects Airports	To get a view on the different changes to be developed in the SESAR programme in terms of operations, systems, human roles, procedures and institutional, and their timeline. To get a view of the possible deployment packages and scenarios stemming from SESAR work.
Technical specifications for communalized Validation Tools and Interoperability solutions	Pj22	<ul style="list-style-type: none"> List of strategic validation tools and interoperability solutions supporting several partners and/or several projects validation needs and thus improving cost-efficiency; Technical specifications, interoperability requirements and conformance criteria applicable for the different simulators, tools and V&Vs; 	SESAR Solution Projects VLDs Projects Standardisation & Certification bodies (e.g. WG-81)	To support standardisation. To improve cost-efficiency by allowing different partners/projects to use the same tools.
V&V platforms and Demonstration Platform catalogue	Pj22	<ul style="list-style-type: none"> List existing V&V and Demonstration Platforms. Associated documentation describing their current capabilities and their planned evolution. 	SESAR Solution Projects VLDs Projects	As a reference to identify the gap between the current capabilities of the V&V and demonstration platforms and the needs for supporting the required validation / demonstration activities.
Availability Note for the V&VP	SESAR Solution and Enabling Projects	It includes the verification of system prototypes and V&Vs and their integration, for v2, v3 and Demonstration Platform. This includes the main conclusions of the following	SJU SESAR Solution and Enabling Projects	To understand the readiness of a platform for a validation exercise. To understand what went wrong during the prototype and platform development and

SESAR Deliverable	Provider	Content	Potential Consumers	Rationale
	and VLDs	<p>deliverables (that are internal to the projects):</p> <ul style="list-style-type: none"> • Verification Plan (VP) and Report (VR) and per Technological solution or V&VI for v2 and v3. • Integration Plan and Report for the integration of the system prototype into the V&VIs to build the V&VP. 		verification (if applicable).
Validation Report (VALR)	SESAR Solution and Enabling Projects	<ul style="list-style-type: none"> • Context of the validation activity I.e. Summary of Objectives, scenarios & Assumptions • How the Validations were carried out • Exercise results, including reference to performance targets, analysis and confidence in the outcome • Conclusions & Recommendations 	SJU SESAR Solution and Enabling Projects	The report provides the official agreed output of a SESAR Solutions validation activity. Enabling the Solution to progress through the maturity Gates and finally contribute V3 validated content for the annual release
VALP	SESAR Solution and Enabling Projects	<ul style="list-style-type: none"> • Validation Scope, including any integrated validation activity • Validation Objectives, stakeholder identification & expectations • Validation Scenarios & exercise list 	SJU SESAR Solution and Enabling Projects	To provide accurate visibility of the intended validation activity intended to take place. Enabling assurance that activity is appropriately targeted
TS/IRS per SESAR Solution, Technological Solution or Technology Demonstrator	SESAR Solution Project/ Enabling Project/VLDs	<ul style="list-style-type: none"> • Description of the Solution, purpose, context, interfaces with other Solutions and services needed. • Functional and non-functional requirements for the final system (not prototype related). • Interface / Service requirements for the final system (not prototype related). • They may also include the Service Description Document (SDD) (when relevant), which is the non-formal description of a logical service, its interfaces and operations. 	ANSPs Airports AUs Manufacturers Standardization & Certification bodies Deployment Governance Pj19	<p>To understand the system and interface requirements to be implemented when deployment a system in order to ensure interoperability and performance.</p> <p>To support standardisation.</p> <p>To prepare v4 and v5.</p> <p>To de risk industrialisation phase.</p> <p>To create the consolidated reference architecture (Pj19).</p>

SESAR Deliverable	Provider	Content	Potential Consumers	Rationale
		<ul style="list-style-type: none"> System & Service Architecture and modelling for an ATM or Technological Solution integrated in EATMA. 		
Cost Benefit Analysis	SESAR Solution Projects	<ul style="list-style-type: none"> Monetisation of benefits from performance assessment Analysis of Costs Differentiation per affected stakeholder 	SJU Pj19 Pj20	To understand the potential economic and financial impact stemming from the implementation of the SESAR solution
OSD/SPR/INTER OP (consolidated)	SESAR Solution Projects	<ul style="list-style-type: none"> Performance requirements Detailed concept description Definition of Operational services Operational requirements Interoperability requirements identified from the analysis of results coming from existing material to the identification of new requirements Operational Architecture and modelling per SESAR Solution integrated into the EATMA. 	Standardization & Certification bodies ANSPs Manufacturers Deployment Governance	To understand the operational, safety, performance and interoperability requirements that will be required to deploy the new operational concept. To support standardisation and certification activities. To prepare v4 and v5. To de risk industrialisation phase.
Maturity Assessment Report	SJU	Consolidation of maturity assessment results, it integrates the results of all maturity assessments taken place at SESAR Solution Maturity Gates since the previous Report	SJU P19 P20 Deployment Governance	The report presents the maturity status of Programme content, providing a feedback to all the actors in charge of planning future validation, demonstration and deployment activities.
Release Plan	SJU	It includes the description of the set of SESAR solutions that will be validated up to V3 during the Year N, for further V3 assessment at a V3 Gate during year N+1. It provides with details regarding the set of Validation exercises (milestones, dependencies, platform, location of the exercises, specific validation objectives for each contributing exercise)	SJU SESAR Solution and Enabling Projects	The decision to deliver a set of V3 SESAR solutions at year N+1 has to be taken at the end of year N-1, based on sufficiently detailed plans. It assumes that V2 gates have been previously passed.
Release Close out Report	SJU	<ul style="list-style-type: none"> Summary of results from all the activities identified in the Release Plan 	SJU P19	The report collects the annual Programme Validation and Demonstration results providing

SESAR Deliverable	Provider	Content	Potential Consumers	Rationale
			P20 Deployment Governance	a feedback to all the actors in charge of planning future validation and demonstration activities.
Release Strategy	SJU	Planning view indicating the target Release for V3 maturity of SESAR Solutions. It also describes the maturity currently achieved and the maturity expected to be reached by a specific point in time.	SJU P19 P20 SESAR Solution and Enabling Projects Deployment Governance	The Release Strategy is a direct input for the Programme validation Strategy, generating a top down view with which to assess (and potentially influence) SESAR Solution validation timing and priorities.
V&V Roadmap	SJU with contribution of Projects	Set of synthetic Programme views, which present the essential information elements of planned validation exercises and demonstrations.	SJU P19 P20	The V&V Roadmap materialises the link between SESAR Solutions and the Work Programme (Project activities and schedule). It also ensures that the V&V roadmap is sufficiently deployment oriented and aligned with Master Planning assumptions.
Demonstration Plan	VLDs	Context of the Demonstration Demonstration approach Demonstration activities Implementation considerations Communication Plan	SJU	To provide visibility of the demonstration activity intended to take place. Enabling assurance that activity is appropriately targeted
Demonstration Report	VLDs	Context of the Demonstration Execution of Demonstration Exercises Exercises Results Demonstration Exercises reports Summary of the Communication Activities Next Steps	SJU	The report provides the official agreed output of a Demonstration activity. Enabling the Solution to progress through the maturity Gate Demo