



Annual Work Programme 2011

1 April 2011

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1.1 Purpose of the document

The purpose of the Annual Work Programme is to outline the activities that will be performed by the SESAR Joint Undertaking (hereinafter the SJU or Joint Undertaking) in 2011 and its expected achievements contributing to the 2012 mid-term strategic objectives. It describes how the resources made available by the European Union, Eurocontrol and the Members will be geared towards the 2011 achievements by detailing the operational and administrative actions that will be performed during the year.

1.2 Mission

The SJU is established by Council Regulation (EC) 219/2007, as last modified by Council Regulation (EC) 1361/2008. The aim of the SJU is to ensure the modernisation of the European air traffic management system by coordinating and concentrating all relevant research and development efforts in the European Union. It shall be responsible for the execution of the ATM Master Plan and in particular for carrying out the following tasks:

- organising and coordinating the activities of the development phase of the SESAR project in accordance with the ATM Master Plan, by combining and managing under a single structure public and private sector funding,
- ensuring the necessary funding for the activities of the Development phase of the SESAR Programme in accordance with the ATM Master Plan,
- ensuring the involvement of the stakeholders of the air traffic management sector in Europe, in particular: air navigation service providers, airspace users, professional staff associations, airports, and manufacturing industry; as well as the relevant scientific institutions or the relevant scientific community,
- organising the technical work of research and development, validation and study, to be carried out under its authority while avoiding fragmentation of such activities,
- ensuring the supervision of activities related to the development of common products duly identified in the ATM Master Plan and if necessary, to organise specific invitations to tender.

Based on the above, the management of the SJU has established a mid-term “vision” to ensure that the results reached and progress made towards the achievement of the SJU mission are concretely measurable and monitored during the overall duration of the Programme, so that:

By 2012 we have created the change in the European ATM that demonstrates our ability to deliver benefits to the community

The strategic objectives set for the end of 2012 are:

- initial 4D trajectory is validated in an operational environment supported by satellite-based technology,
- 10,000 flights, including 500 military, are SESAR labelled,
- 80% of SESAR projects have tested their output in a real life environment,
- first SWIM pilots are in place to exchange data across at least 5 domains,
- the first remote tower is ready for operations,

- SESAR benefits are demonstrated on city pairs connecting 8 European airports,
- airspace users have signed up to the SESAR business case for time-based operations.

1.3 2010 achievements

Following the launch of the SESAR Programme activities in June 2009, the following key achievements, which have an impact on the planned 2011 activities, need to be mentioned:

- a. at the end of October 2010, 275 projects were initiated and 217 entered the execution phase; the integration of activities awarded as part of IBAFO II is well on its way and around 1800 persons are currently involved in the different projects of the SESAR Programme. The Programme activities are developing as planned and constitute a solid basis to be further progressed to contribute to the 2012 strategic objectives' achievement.
- b. in June 2010, the first Engineering Review Session, i.e. the assessment of the progress of the different Work Packages/Projects towards the SJU Targets, was performed. In particular, the review highlighted how the critical dependencies have been established and contribute to the coherent progressing of the projects towards the Targets as well as the need for some corrective actions to align schedules, content, and engineering methodology (see 2.1);
- c. with regard to the Programme reporting, the SJU has introduced a structured quarterly reporting based on effort consumption that shall be submitted by the Members, starting with quarter III 2010. This report will provide the SJU with an additional monitoring of the alignment of the Members' efforts with the programme objectives, and of the risk incurred;
- d. with regard to Validation, SESAR partners found an agreement on a V&V¹ roadmap, which in particular stresses the importance of being as close as possible to the real operational environment in all validation activities;
- e. WPE (Long Term Research, see also 3.2) and WP11 (Flight Operations Centre Systems) have been launched and activities are expected to start fully respectively by year end and by the first quarter 2011;
- f. in order to ensure the involvement of all stakeholders in the Programme, the SJU has assured their participation through the award of contracts as a result of procurement procedures, directly or through Eurocontrol:
 - during the first months of 2010 a contract was signed to add "low cost airspace users" expertise. The amount committed during 2010 is of EUR 1.5 million;
 - with regard to the involvement of the Military, more and more contacts are developed with the different National Defence administrations and through Eurocontrol DCMAC. The recruitment of a Senior Military Advisor in May 2010 has

¹ Validation & Verification

- substantially accelerated the awareness process of SESAR within the Military community (see 3.5);
- the involvement of the Professional Staff Associations has been assured through the signature by Eurocontrol on behalf of the SJU of 5 contracts with each of the associations (see 3.6). The amount committed for the period 2010 - 2012 is of EUR 1 million as cash contribution of Eurocontrol. The administration and payments are managed by Eurocontrol, once the deliverables are approved by the SJU;
- g. the second phase of AIRE (Atlantic Interoperability Initiative to Reduce Emissions) procurement procedure was launched and completed, resulting in the award of 18 contracts with different consortia in charge of the performance of the activities (see 3.1). The total amount committed is EUR 2.7 million;
- h. a study on wireless communication was launched by the SJU in May 2010 and 2 contracts for the amount of EUR 0.5 million were signed;
- i. following the initialling of a MoC between the EU and the FAA, the SJU in cooperation with the EC and Eurocontrol will establish the most appropriate framework to implement this memorandum in concrete activities (see 4.1). In this respect, it is the intention of the SJU to ensure that its Members involved operationally at Project level are focal points with their USA correspondents in the different relevant domains. Furthermore, external relation in co-operation with the EC and Eurocontrol were established with different strategic areas around the world, in particular Brazil, China, India and the Middle East countries (see 4.7);
- j. the communication plan has been implemented in accordance with the Budget approved by the Administrative Board (see 5). Within the effective activities performed by the Communication team, the annual Amsterdam Global ATC conference in March constitutes an example of efficient and effective results within contained resources;
- k. almost all 2010 administrative and financial objectives were achieved by the end of August 2010. In particular, the successful implementation of ABAC and SAP was completed in May 2010, while “ABAC Contract Module” will be implemented by year end. On the contrary, following a discussion with DG BUDG, “ABAC Assets Module” will not be implemented and instead SAM (SAP Assets Management) will be implemented during 2011 as soon as available;
- l. with regard to Project Audit, two project auditors were recruited and started respectively on August 1st and September 1st 2010. The Audit strategy has been defined and implementation is ongoing with the first batch of audits to be performed starting at year end, beginning of 2011. A framework contract for audit services was signed, after an open procurement procedure, with Ernst and Young in May 2010 (see 6.4);
- m. the overall SJU recruitment process is almost completed, having only two vacant positions for which recruitments are ongoing;

- n. during the first 10 months of 2010, the SJU has disbursed EUR 29.5 million in terms of pre-financing. In the last two months pre-financings totalling EUR 43 million are planned, bringing the total amount of pre-financing paid by the SJU up to EUR 126.6 million;
- o. requests of co-financing related to the eligible costs incurred by Members during 2009 have been received totalling EUR 2.4 million². Internal assessment is completed and disbursements are ongoing within the provisions of the MFA;
- p. the Eurocontrol contribution to the SJU for 2009 is EUR 9 million cash, EUR 8.0 million activities realized by Eurocontrol on behalf of the SJU (early projects, ISA, secondments) and EUR 11.5 million in-kind, in the final stage of the validation process.
- q. the EU contribution in 2010 amounted to EUR 41 million cash of which EUR 22 million from the FP7 and EUR 19 million from the TEN-T funds.

The draft Annual Activity Report for 2010, which an extensive description of all the results achieved will be submitted to the Administrative Board by the end of January 2011, while the final version is due by the end of March 2011.

2. The Programme

2.1 Programme planning, execution and release delivery

During the Initiation phase of the SESAR Programme it became evident that the activities in Work Packages, Sub Work Packages and Projects had different levels of maturity when applying the agreed maturity assessment criteria according to E-OCVM V-phases and the chosen System Engineering methodology. The concept of SESAR releases in the SESAR Programme is a direct consequence of this analysis together with the V&V Roadmap developments in 2010.

One of the intentions of the V&V Roadmap work was to clearly identify and agree when in time maturity of a specific project or projects would reach the level of being ready for validation to prove industrialisation readiness. We found then that activities related to Step 1 was occurring in a time window of 2011 - 2014 and Step 2 in a time window starting from 2012.

As the SESAR Concept storyboard is the storyboard of the ATM Master Plan Service Levels, alignment with the current structure of the Master Plan with Operational Improvements is

² It should be noted that the costs eligible for co-financing during 2009 were limited to those related to the completed deliverables - in this case the PIRs and RCAs for the Projects for which the SJU decided the launch of the execution phase. This excluded all the costs related to the Work in Progress related to the remaining Projects. As a result, the amount of the co-financing for 2009 does not represent the complete work done by the Members during the year. In order to ensure a more appropriate alignment of the co-financing with the work realized, the MFA has been amended to include in the eligible cost of each financial year the Work in Progress too.

a given and therefore reflected in the work of the Service level and OI related project(s). The releases shall be seen as the definition of annual activities being ready to prove industrialisation and deployment readiness. The activities found in the first release have as a consequence of this approach embedded the earlier identified quick-wins.

This does not mean that all other activities are postponed or given less priority. On the contrary, it is of the utmost importance that the less mature activities continue their work according to plan in order to achieve the same level of maturity for validations to prove industrialisation and deployment readiness and thereby placed in the next releases. Consequently the work to be performed in 2011 includes not only Release 1 validation activities but also many research and development activities necessary to move SESAR closer to deployment.

The mapping between the content of Release 1 to the current structure of the ATM Master Plan has been done to the extent needed and possible in the light of project(s) validation planning. The validation reports of the projects in Release 1 will therefore by nature give substance to the next update of the ATM Master Plan and so will the projects of consecutive releases.

In this context and for alignment purposes, WP C has, as an early task, conducted a successful and complete mapping of the “IP1” Operational Improvements in the light of the next ESSIP campaign scheduled for Q2 2011.

As a consequence a comprehensive review of the SESAR Programme implementation approach was conducted during 2010 which included the V&V roadmap as well as the lessons learnt from the System Engineering process. The conclusions of the review highlighted the need to breakdown the Programme high level objectives into a more technical and operational level defining in detail what has to be done, by whom and when, and thus to clearly identify the SESAR validated deliverables which will contribute to the SESAR Development Phase objectives as well as to the specific 2012 Strategic Objectives.

The Programme review identified critical project dependencies as well as the first common deliveries to be completed in 2011 and 2012. Furthermore, the lessons learnt from the first application of the System Engineering processes suggested that a more efficient approach was required.

As a result of this comprehensive exercise, the SJU and the Members agreed that the most appropriate way to deliver consisted in articulating the Programme Plan through SESAR Releases contributing to the development of the SESAR Storyboard Steps. The first SESAR Release is due by year end 2011 and it will be followed by Releases with annual frequency or every two years, the content of which will be defined based on the level of maturity of the different Projects.

A SESAR Release embeds groups of projects delivering, in a determined timeframe, R&D results that can support decision to move related activities to the industrialisation stage (end of V3).

Each Release is developed through 3 phases (see fig.1):

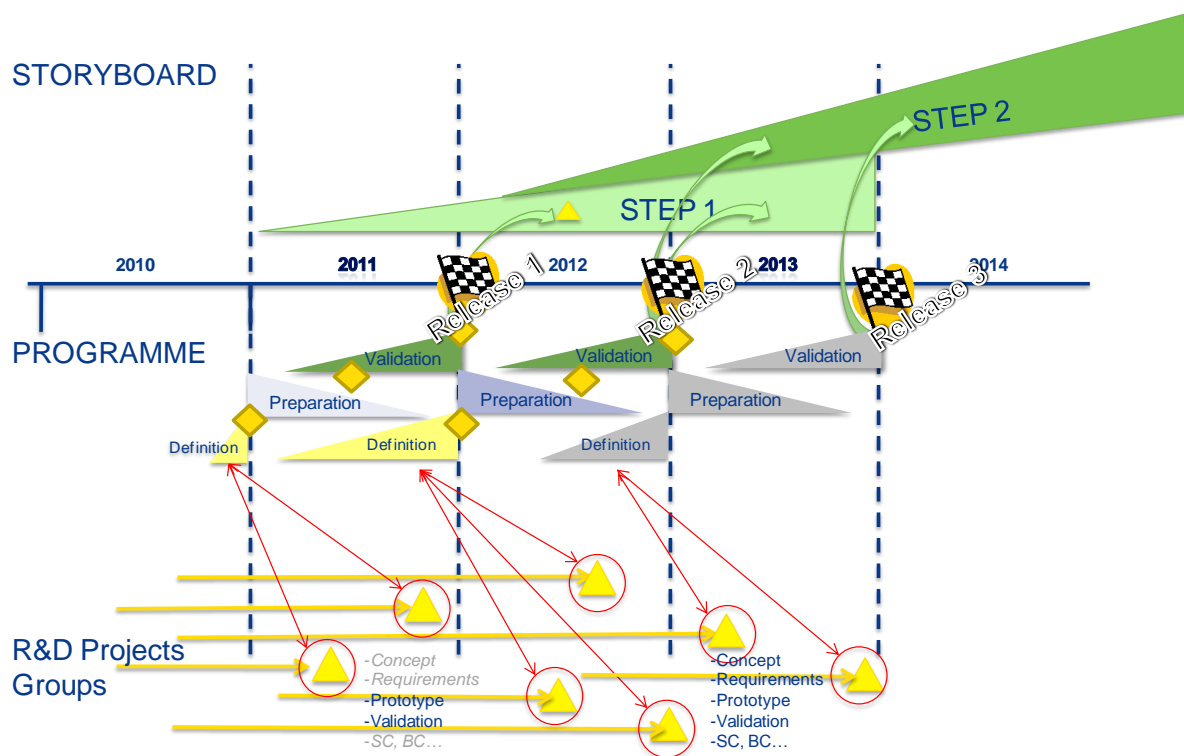


Figure 1: SESAR Programme Plan

- **Definition:** this phase aims at defining the Release scope and at getting the commitment of all the involved SESAR members to the Release plan. Defining a Release is a continuous process assessing the project ability to deliver for the considered deadline. This assessment is based upon the projects plans and projects inputs and, later, on the validation reports from previous Releases. At the end of this phase:
 - projects included in the release have clarified their objectives and demonstrated through a realistic & achievable plan their ability to deliver within the following period,
 - assessment of the Release coherence has been performed with regards to project dependencies and high level operational and technical objectives,
 - all projects participating to the Release have committed upon the Release plan.
- **Preparation:** this phase aims at preparing the V&V Exercise execution, i.e. developing the pieces of concept description and solution (system and/or procedures) that are due for the on-going release. At the end of this phase:
 - requirements have been captured,
 - prototypes have been developed and verified by the project in charge of their development,
 - prototypes are integrated to the IBPs (Industry Based Platforms) on the validation site,
 - integration platforms have been qualified for the execution of integrated validation activities,
 - V&V exercises are defined and planned.
- **Validation:** this phase aims at validating the pieces of solution developed for the Release and assessing their maturity in order to determine whether it is possible to

move to the following phases of the European Operational Concept Validation Methodology (E-OCVM) (V4). During this phase:

- V&V Exercises are executed,
- Operational concept and technical solutions are documented.

The progress towards the delivery of the SESAR Release is controlled at Programme level through System Engineering (SE) Reviews. These SE Reviews take place:

- at the end of the Release Definition Phase,
- at the end of the Release Preparation Phase,
- at the end of the Release Validation Phase.

Even though it is acknowledged that not all activities progress at the same pace, for efficiency reasons, SE Reviews are organised at a fixed time of the year.

In parallel to the current Release execution activities, Primary projects which are not considered for the current Release:

- follow their project plan aligned with the E-OCVM methodology and are controlled through the project gates,
- contribute to the definition of further releases.

Progressively, projects will be making the necessary steps towards the validation of the SESAR concept of operation: establishment of the operational requirements, development and verification of the prototypes and ultimately the conduct of validation activities.

The Release delivery process has been structured around a set of 6 Operational Packages and associated Sub-Packages clustering projects and activities based on their outputs and ensuring an operational and performance focus.

Two technical packages have been defined to structure technology that has a wide operational coverage; CNS and SWIM (see fig.2).

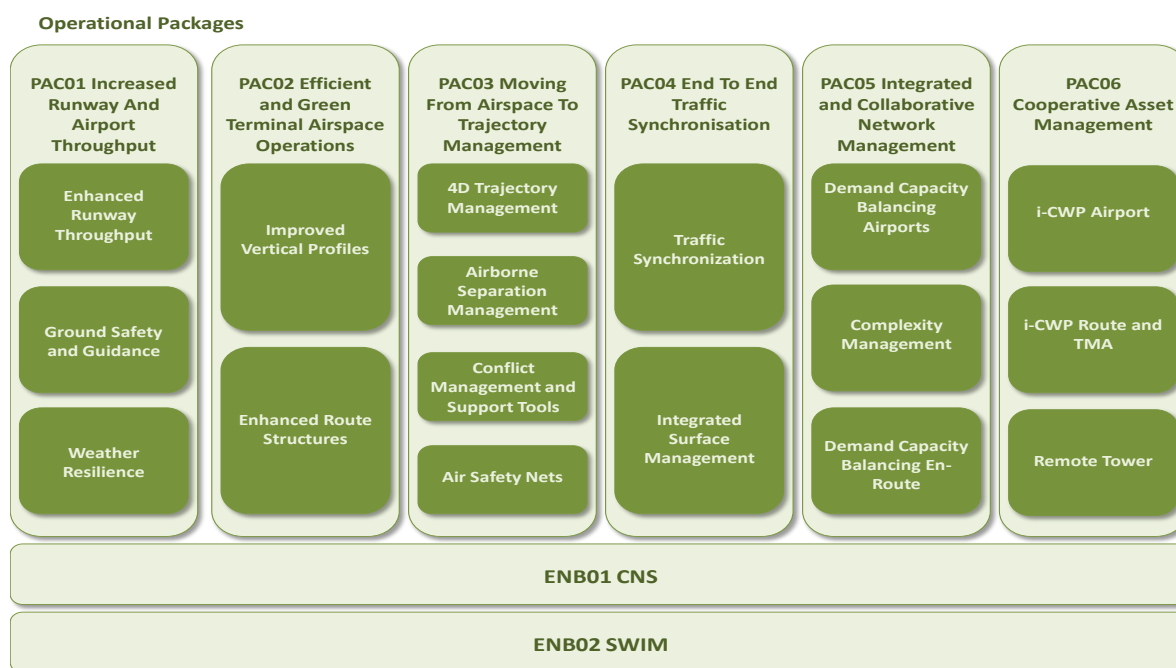


Figure 2

An **Operational Package** is a deployment focused grouping of operational changes and associated technical and procedural enablers.

An **Operational Sub-Package** is a sub-grouping of connected operational and technical improvements related to the Operational Package and comprising a sub-set of Operational Improvements (OIs) with closely related operational focus, designed to meet performance expectations of the ATM Master Plan.

To ensure that both Operational and Technical projects are structured in a way that dependencies are respected and that common work areas lead to coherent and integrated set of validation results, a third grouping based on common focus and linked to the Operational Sub-Packages was defined as Operational Focus Area

In this respect, an **Operational Focus Area** is a limited set of dependent operational and technical improvements sitting within an Operational Sub-Package, comprising specific interrelated OIs designed to meet specific performance expectations of the ATM Performance Partnership.

2.2 The SESAR Programme Release 1

In 2011, close to 260 projects will be in full execution mode delivering the first R&D results as well as the necessary guidance material to the Programme, in particular for the establishment of the various cases (safety, business, security, environment, human factors). In addition, after having been involved in the initiation phase, Airspace Users experts have been allocated to the various projects with clear contributions identified for 2011. Their output as well as their feedback on the progress of the Programme will be assessed by the SJU on a quarterly basis. Equally all Staff Associations experts have been allocated to various projects as well as to validation exercises by establishing an International Validation Team of operational experts across the ATM domains, e.g. controllers, engineers and pilots.

The programme governance is aligned with the provision of the MFA and in particular relies on the Programme Committee (PC), the Programme Control Group (PCG) and at the highest level on the Administrative Board. During the year, regular meetings took place at the level of PC, in particular to prepare Release 1 and to steer the Programme developments. Some of these meetings were preceded by PCG meetings at more technical level, where the participation of the Work Package Leaders and Contribution Managers ensured a strong link with the work in the Projects. With regard to the Initiation Phase, where the PC provided advice to the Executive Director on a weekly basis, adequate mechanisms were put in place to make the process efficient and effective. The decision making process was on a consensus basis.

Furthermore, it should be noted that Release 1, as well as the following Releases and the specific activities planned by the SJU, embed the mitigating actions identified in the 2010 Risk Management exercise. The mitigating actions listed in Annexe 3 will be implemented starting in 2011 and their impact will be assessed during the 2011 Risk Management exercise. The results of the implementation of the mitigating actions together with the new Risk Management assessment will be reported to the ADB at year end.

The figure here below, Figure 3, identifies through the aforementioned three layers, the Operational Focus Areas within which projects will provide validated deliverables (see the following sections 2.2.1 to 2.2.6 for details).

Operational Package	Operational Sub-package	Operational Focus Area	Delivery
PAC01 Increased Runway and Airport Throughput	Weather Resilience	LVPs using GBAS	
	Ground Safety and Guidance	Ground safety nets Enhanced situational awareness	
	Enhanced Runway Throughput	Time Based Separation Dynamic Vortex Spacing Brake to Vacate	
PAC02 Efficient and Green Terminal Airspace Operations	Enhanced Route Structures	Optimised RNP Structures Point Merge in Complex TMA	2011 2011
	Improved Vertical Profiles	CDA CCD Approach Procedure with Vertical Guidance	2011
PAC03 Moving from Airspace to Trajectory Management	4D Trajectory Management	Free Routing Trajectory Management Framework Business and Mission Trajectory Authorisation & revision using data link Cruise climb System interoperability and data sharing	2011 2011
		ASPA S&M ATSA-ITP ASEP	
	Conflict Management and Support Tools	Conflict Detection, Resolution and Monitoring Enhanced Decision Support Tools and Performance Based Navigation Sector team operations Generic controller validations)	2011
	Air Safety Nets	Enhanced STCA ACAS Monitoring	2011 2011
PAC04 End to End Traffic Synchronisation	Traffic Synchronization	Integrated AMAN DMAN AMAN Extended AMAN horizon AMAN + Point Merge DMAN Multiple Airports i4D + CTA	2011 2011 2011 2011

Operational Package	Operational Sub-package	Operational Focus Area	Delivery
	Integrated Surface Management	Surface Planning and Routing Surface management Integrated with Arrival & Departure Management Pilot enhanced vision Guidance assistance to aircraft and vehicles	
PAC05 Integrated and Collaborative Network Management	Demand Capacity Balancing Airports	Airport Operations Plan (AOP) and CDM	
	Complexity Management	Complexity Assessment Resolution	2011
	Demand Capacity Balancing En-Route	Airspace Management and AFUA Dynamic sectorisation and Constraint management Enhanced ATFCM processes UDPP NOP Environmental sustainability	2011
PAC06 Cooperative Asset Management	iCWP Airport	iCWP Airport	2011
	iCWP Route and TMA	iCWP Route and TMA	2011
	Remote Tower	Remote Tower	2011
ENB01 CNS	CNS	CNS	
ENB02 Information Management	SWIM	SWIM	

Figure 3

A clear representation of the link between the 2011 activities and expected achievements and the 2012 strategic objective is provided below.

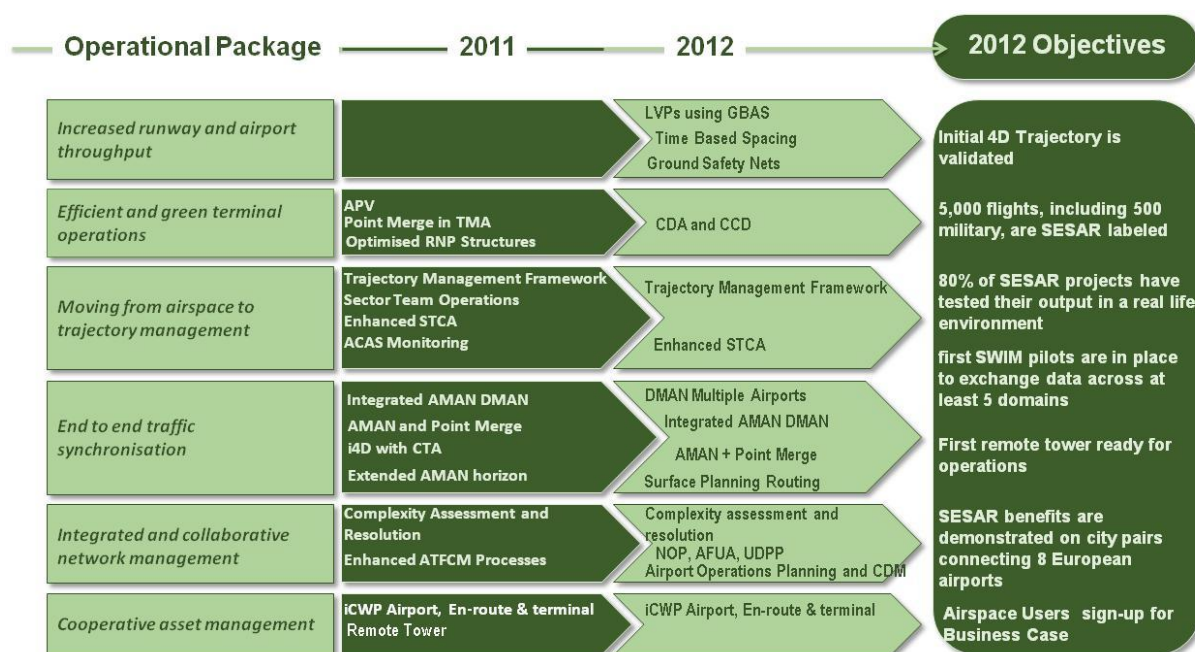


Figure 4: Contribution to the 2012 Objectives

It can be seen there are no direct 'validation' contributions to SWIM scheduled in 2011, while in 2012 there is an objective to have SWIM pilots in place across at least 5 domains. For 2011 the validation activities have not assumed the use of SWIM, especially as many of them are local to one domain. It is expected that validations during 2012 will include applications exchanging information across domains and specific action is being taken during 2011 to mitigate any risk to achievement of this objective.

At the PC in December 2010 the SJU and the Members involved in the Programme agreed on 29 exercises within 16 Operational Focus Areas to be performed and completed as described hereafter (see sections 2.2.1 to 2.2.6). This set of Operational Focus Areas and associated validation exercises represent the scope of the Release 1, which consists of a total effort estimated at 3 000 Men*months or around EUR 37.3 million³.

Release 1 consists of the package of work having completed the V3 and on which a decision for industrialisation and subsequent deployment can be made. The locations of the Release 1 validation activities are illustrated on Figure 5.

³ Estimated at EUR 12.418 Men*months as per IBAFO.

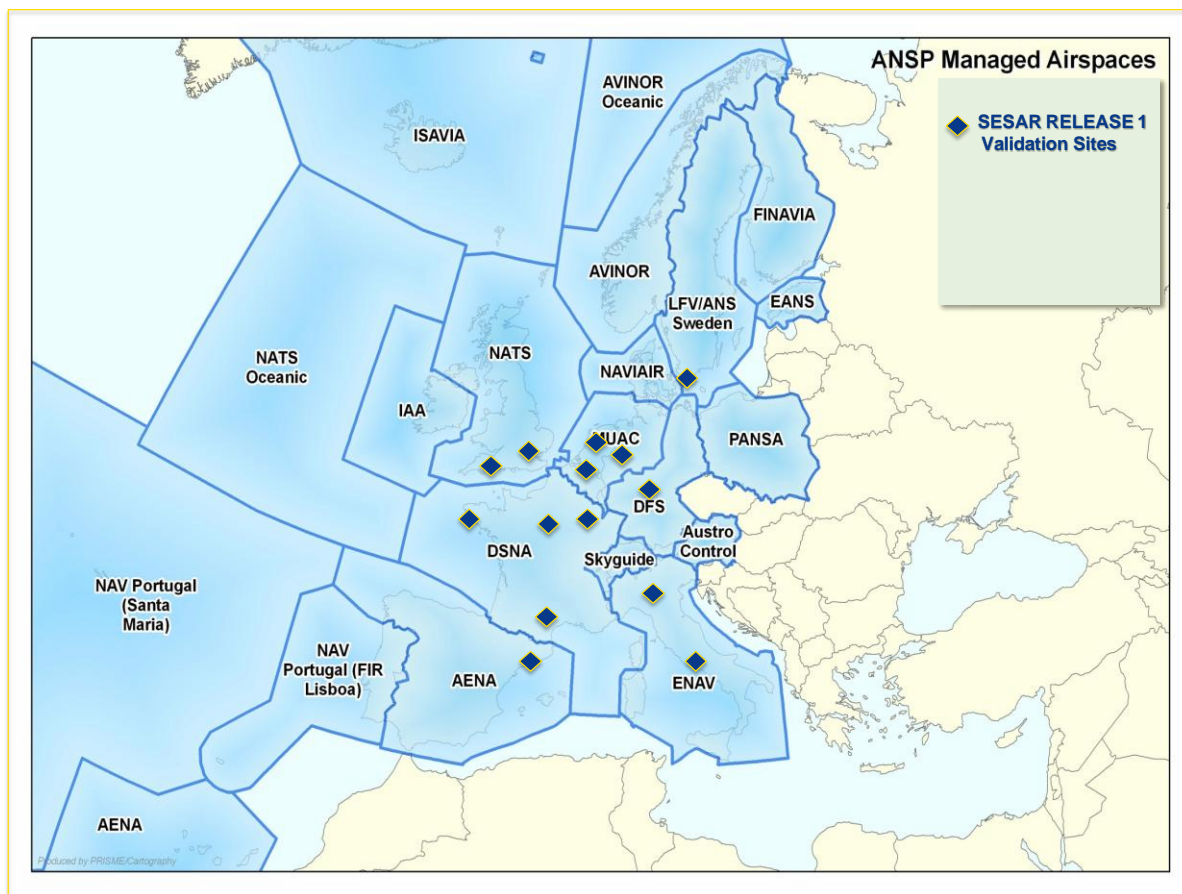


Figure 5: Main locations of the Release 1 Validation activities

The projects activities identified as part of Release 1 are described in the Release Plan. The execution of this plan will be closely monitored by the SJU and regular reports will be provided to the governance of the Programme. During the definition, preparation and validation phases of the Release, projects are subject to System Engineering reviews organised by the Industrial Support. Together with the System Engineering methodology applied in 2011, this work will deliver periodical assessment of the level of maturity achieved in the Programme. It will ensure as well technical consistency of the various activities and outputs, together with the formalisation and traceability of the requirements. This approach is particularly important for the identification and establishment of the future standards

The following sections provide for each of the Operational Packages the achievements and indicators which are linked to the validation exercises to be conducted in 2011.

2.2.1 Operational Package 1 Achievements

PAC01 Increased Runway and Airport Throughput

No Exercise in Release 1 is identified for PAC01.

2.2.2 Operational Package 2 Achievements

PAC02 Efficient and Green Terminal Airspace operations

Optimised RNP Structures			
Achievement	Validated procedures, requirements, cases and updated operational Guidelines on P-RNAV Guidelines- on PRNAV in complex TMA leading to an increased deployment in Europe		V3
Deliverables	OSED ⁴ , SPR ⁵ INTEROP, Technical Specifications, Validation Report		
Contributing Project	5.7.4		
Estimated Efforts	45 Men*months		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-05.07.04-VP-142	RTS ⁶	AENA IBP Barcelona TMA	December 2011

⁴ OSED = Operational Service Environment Description is a document detailing Concept description for each Operational Focus Area. It develops the addressed Operational Service by allocating Operational Requirements to Operators, Application Services and Information Services.

⁵ SPR = Safety and Performance Requirements is a document detailing the OSED for each Operational Focus Area in allocating Operational, Safety and Performance requirements to Systems.

⁶ RTS: Real Time simulation, using an operational platform.

Point Merge in Complex TMA			
Achievement	Validated Point Merge - procedures based on and exploiting the Flight Management System (FMS) without radar vectoring, constrained by controller instructions on speed and level. It will Facilitate the application of Continuous Descent Arrival and provide a baseline for Trajectory Based operations in the TMA		V3
Deliverables	OSED, SPR, INTEROP ⁷ , Validation Report		
Contributing Projects	5.7.4		
Estimated Efforts	45 Men*months		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-05.07.04-VP-228	RTS	ENAV IBP Milan TMA	December 2011
EXE-05.07.04-VP-229	RTS	NATS TC London TMA	December 2011

Approach Procedure with Vertical Guidance			
Achievement	Validated Approach Procedures with Vertical (APV) guidance using Satellite Based Augmentation System (SBAS) leading to the ability to fly Instrument Landing System (ILS) type approaches to airport independently of ground based infrastructure.		V3
Deliverables	OSED, SPR, Technical Specifications, Validation report		
Contributing Projects	5.6.3		
Estimated Efforts	87 Men*months		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-05.06.03-VP-224	RTS	NATS TC Southampton APT	October 2011

⁷ INTEROP = Interoperability is a document providing interoperability requirements which are the minimum technical and functional requirements that provide the basis for ensuring compatibility among the various elements of the technical systems supporting defined services and using specific technology

2.2.3 Operational Package 3 Achievements

PAC03 Moving from airspace to trajectory Management

Trajectory Management Framework			
Achievement	Initial procedures and requirements for initial 4 Dimensions (i4D) concept for supporting the management of a single Controlled Time Arrival (CTA) constraint in the En-Route and TMA phase of flight. (VP 041 & 212) Validated procedures, and system requirements, for Trajectory Management revision considering : <ul style="list-style-type: none"> - Flow rerouting scenario and, - unexpected closure of airspace (VP 043) 		V3
Deliverables	OSD, SPR, Technical Specifications & Validation Plan		
Contributing Projects	4.5; 5.5.1		
Estimated Efforts	86 Men*months		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-04.05-VP-041	RTS En-route	ENAV Rome	October 2011
EXE-05.05.01-VP-212	RTS En-route	ENAV Rome	October 2011
EXE-04.05-VP-043	RTS	DSNA Coflight Toulouse	December 2011

Sector team operations			
Achievement	Validated procedures to improve sector team organisation and coordination (roles & responsibilities) and initial requirements on tools support and information sharing.		V3
Deliverables	OSD, SPR, INTEROP, Validation report		
Contributing Projects	4.3 4.7.8		
Estimated Efforts	237 Men*months		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-04.03-VP-032	Shadow mode	Brest ATCC	December 2011
EXE-04.03-VP-237	Live Trials	Brest ATCC	December 2011
EXE-04.07.08-VP-304	RTS	NATS London ACC Ops room platform	October 2011

Enhanced STCA			
Achievement	Validated procedures, requirements, prototype and cases for enhanced Short Term Conflict Alert (STCA). This enhanced STCA will support controllers in identifying conflict between flights inside TMA wherein difficult operations are conducted (e.g. IFF/VFR traffic, complex interface with arrival/departure sectors, etc) and avoiding false alarms.		V3
Deliverables	OSED, SPR, INTEROP, Technical Specifications, Validation report		
Contributing Projects	4.8.1; 10.4.3		
Estimated Efforts	97 Men*months		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-04.08.01-VP-140	RTS	THALES STCA prototype	November 2011

Airborne Collision Avoidance System Monitoring			
Achievement	Validated specifications and cases for : <ul style="list-style-type: none"> • new altitude capture laws to avoid false alarm in high vertical rate encounter, • link Airborne Collision Avoiding System to autopilot, and • quantified overall safety gain. 		V3
Deliverables	SPR, Technical Specifications, Validation report		
Contributing Projects	4.8.2		
Estimated Efforts	77 Men*months		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-04.08.02-VP-054	Encounter Model Based Simulation Platform	DSNA Toulouse	February 2011
EXE-04.08.02-VP-480	Encounter Model Based Simulation Platform	DSNA Toulouse	February 2011

2.2.4 Operational Package 4 Achievements

PAC04 End to End Traffic Synchronisation

Integrated AMAN/DMAN			
Achievement	Validated procedures, requirements, for basic Departure Manager (DMAN) capabilities at a single airport. Validation of procedures for establishing the departure sequence with sufficient quality taking into account surface and departure management processes.		V3
Deliverables	OSED, Validation report		
Contributing Projects	6.8.4		
Estimated Efforts	69 MEN.MONTHS		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-06.08.04-VP-470	Life Trial	DSNA CDG	September 2011

AMAN & Extended AMAN horizon			
Achievement	Validated procedures on extending the arrival tasks to the En-route controllers within Arrival Manager (AMAN) horizon of a related airport.		V3
Deliverables	OSED, SPR, Validation report		
Contributing Projects	4.5; 5.5; 5.5.1; 5.6.1; 5.6.4; 12.4.1		
Estimated Efforts	266 Men*months		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-05.06.04-VP-187	RTS	ENAV IBP Rome	June 2011
EXE-05.06.04-VP-187bis	RTS	LVNL Schipol	August 2011
EXE-05.06.04-VP-188	RTS	NATS London TC	October 2011
EXE-05.06.04-VP-189	RTS	NORACON Malmö	December 2011

Arrival Manager & Point Merge				
Achievement	Validated procedures, requirements, and cases for using Point Merge in TMA-Extended concept (PMS-TE) for achieving Continuous Descent Approach from High level altitude in high level traffic load.			V3
Deliverables	OSED, SPR, INTEROP, Validation report			
Contributing Projects	5.6.7			
Exercise	Validation Technique	Validation Platform		Exercise Completed
EXE-05.06.07-VP-427	Live Trial	DSNA Athis-Mons		December 2011

i4D + Controlled Time of Arrival				
Achievement	Validated procedures, requirements, prototype and technical specifications for both En-route and TMA environments covering: <ul style="list-style-type: none"> • Computed and predicted Controlled Time of Arrival features exchanged between aircraft and ground using initial 4Dimension capability in traffic synchronisation; • - Impacts on cockpit integration and human factors. 			V3
Deliverables	OSED, SPR, Technical Specifications, Validation report			
Contributing Projects	4.3; 5.6.1; 9.1 ; 10.2.1; 10.7.1; 10.9.4			
Estimated Efforts	780 Men*months			
Exercise	Validation Technique	Platform		Exercise Completed
EXE-04.03-VP-323	Flight Trial	ECTRL MUAC IBP & AIRBUS Flight Test Aircraft		December 2011
EXE-05.06.01-VP-203	Flight Trial	ECTRL MUAC NORACON Malmo IBPs & AIRBUS flight test Aircraft		December 2011
EXE-05.06.01-VP-205	Flight Trial	NORACON Malmo IBP		June 2011

2.2.5 Operational Package 5 Achievement

PAC05 Integrated and Collaborative Network Management

Complexity Assessment and Resolution			
Achievement	Validated procedures, requirements, prototypes and cases for a complexity prediction tool based on: <ul style="list-style-type: none"> controller capabilities to solve different complex situations in the airspace, but also possible controller resolutions in the traffic prediction through continuous simulations; breaking down the predicted complexity/workload in its constituent components, i.e. workload caused by coordination, workload caused by predicted conflicts etc. 		V3
Deliverables	OSED, SPR, INTEROP, Technical Specifications, Validation report		
Contributing Projects	4.7.1; 10.8.1		
Estimated Efforts	154 Men*months		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-04.07.01-VP-001	Shadow Mode	Eurocontrol MUAC	December 2011

Enhanced ATFCM Processes			
Achievement	Validated Operational procedures, requirements, cases and CFMU Human Machine Interface (HMI) and Network Operational Plan Portal (NOP) enhancement for Short Term Air Traffic flow & Capacity Management Measures (STAM). STAMs are pre-defined scenarios aimed at improving the traffic flow between ATC sectors in coordination with the CFMU for optimising the related sectors capacities.		V3
Deliverables	OSED, SPR, INTEROP, Technical Specifications, Validation report		
Contributing Projects	7.6.5; 13.1.1; 13.2.3		
Estimated Efforts	271 Men*months		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-07.06.05-VP-314 (Remark : The actual list of ATSU is still to be confirmed)	Live Trial	Eurocontrol CFMU	November 2011
		ATSU unit of Reims	
		ATSU unit of London	
		ATSU unit of Frankfurt or Karlsruhe	
		ATSU unit of Maastricht	

2.2.6 Operational Package 6 Achievements

PAC06 Cooperative Asset Management

Integrated Controller Working Position Airport			
Achievement	Validated procedures for: -low cost and simple departure data entry panel to be deployed at airfields enabling them to be in electronic communication with CFMU concerning the departure status of aircraft under their control.		V3
Deliverables	Technical Specifications, Validation report		
Contributing Projects	12.4.1		
Estimated Efforts	33 Men*months		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-12.04.01-VP-391	Shadow Mode	NATS Southampton IBP	February 2011
EXE-12.04.01-VP-404	Shadow Mode	NATS Southampton IBP	November 2011

Integrated Controller Working Position Route and TMA			
Achievement	Validated specifications and prototypes for a new Human Machine Interface for TMA Controller Working Position (CWP) with improved design, addressing Human Factors related issues.		V3
Deliverables	OSED, SPR, INTEROP, Technical Specifications, Validation report		
Contributing Projects	5.9; 10.10.3; 10.10.2		
Estimated Efforts	403 Men*months		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-05.09-VP-356	RTS	ENAV IBP	December 2011
EXE-05.09-VP-148	RTS	DSNA IBP	December 2011

Remote Tower			
Achievement	Validated procedures, requirements and prototype for-provision of ATC Services on a single airport from a remote site		V3
Deliverables	OSED, SPR, INTEROP, Validation report.		
Contributing Projects	6.9.3 12.4.6; 12.4.7; 12.4.8		
Estimated Efforts	87 Men*months		
Exercise	Validation Technique	Platform	Exercise Completed
EXE-06.09.03-VP-056	Live Trial	NORACON Ängelholm Airport	November 2011

2.3 Work Package(s) and Projects activities with horizon beyond 2011

SESAR Release 1 is mainly bottom-up driven. Subsequent SESAR Releases will have to incorporate progressively additional top-down guidance as elaborated by SESAR Transverse projects, and in particular performance assessment guidance. The top-down approach will be strengthened through the amount of evidence gathered at future various reviews and taking into account how the projects develop and the level of maturity reached by the operational and technical solutions. Once a Release is defined, the contributing projects will be synchronised and monitored accordingly.

The R&D results of a SESAR Release will be integrated to become input to WP C Master Plan Maintenance (i.e. the basis for future deployment planning).

During 2011, around 230 projects which are planned to deliver validated results in following Releases will:

- follow their project plan aligned with the E-OCVM methodology and be controlled through the project Gates,
- contribute to the definition of further releases.

In addition, following a procurement procedure initiated in 2010, it is expected that the R&D activities covering the scope of Flight and Wing Operations Centres / Meteorological Services (WP11) will be awarded and executed as an integrate part of the Programme starting in 2011.

All these projects are expected to submit the deliverables listed in their project Initiation Reports (PIRs), with different levels of maturity, including V1 and V2. The SJU will monitor through the Control Gate mechanism the advancement of the projects, the timing and quality of the deliverables to ensure that these projects will be included in their expected

Releases, according to the V&V roadmap. A list of the deliverables expected during 2011 is attached as Annexe I⁸.

The effort committed by the Members for these projects during 2011 is estimated at 12.000 Men*months.

The current version of the V&V roadmap provides initial information related to the delivery of the 2012 and 2013 results. The roadmap will be further refined in 2011 to cover as far as possible Step⁹ 2 and Step 3 as well as to contain more precise information for 2012 and 2013; together with R&D results of Release 1, it will then be used as the primary input for the next Releases.

The definition of Release 2 will start early 2011 based on the Validation and Verification Roadmap for Step 1. The scope and schedule will be defined using the same approach as for the first one. The scope of Release 2 will be more ambitious than Release 1 and should address among others, the following topics:

- GBAS
- Time Based Spacing
- Surface Safety Nets
- Full PRNAV
- Advanced Continuous Descent Approach & Continuous Climb Departure
- Initial 4D and Flight Object
- En-route Arrival Management
- Multi-airport arrival Management
- Surface Routing
- Complexity Management
- Integrated Network Operations Plan
- Advanced FUA
- Airport AOP

The locations of the expected validation sites for Release 2 and onwards are illustrated on the Figure below.

⁸ The list of the deliverables is based on the projects entered in Execution Phase before 18 November 2010.

⁹ The Step concept is defined in the Concept Storyboard document submitted to the ADB and derived from the Service Level 2 of the ATM Master Plan.

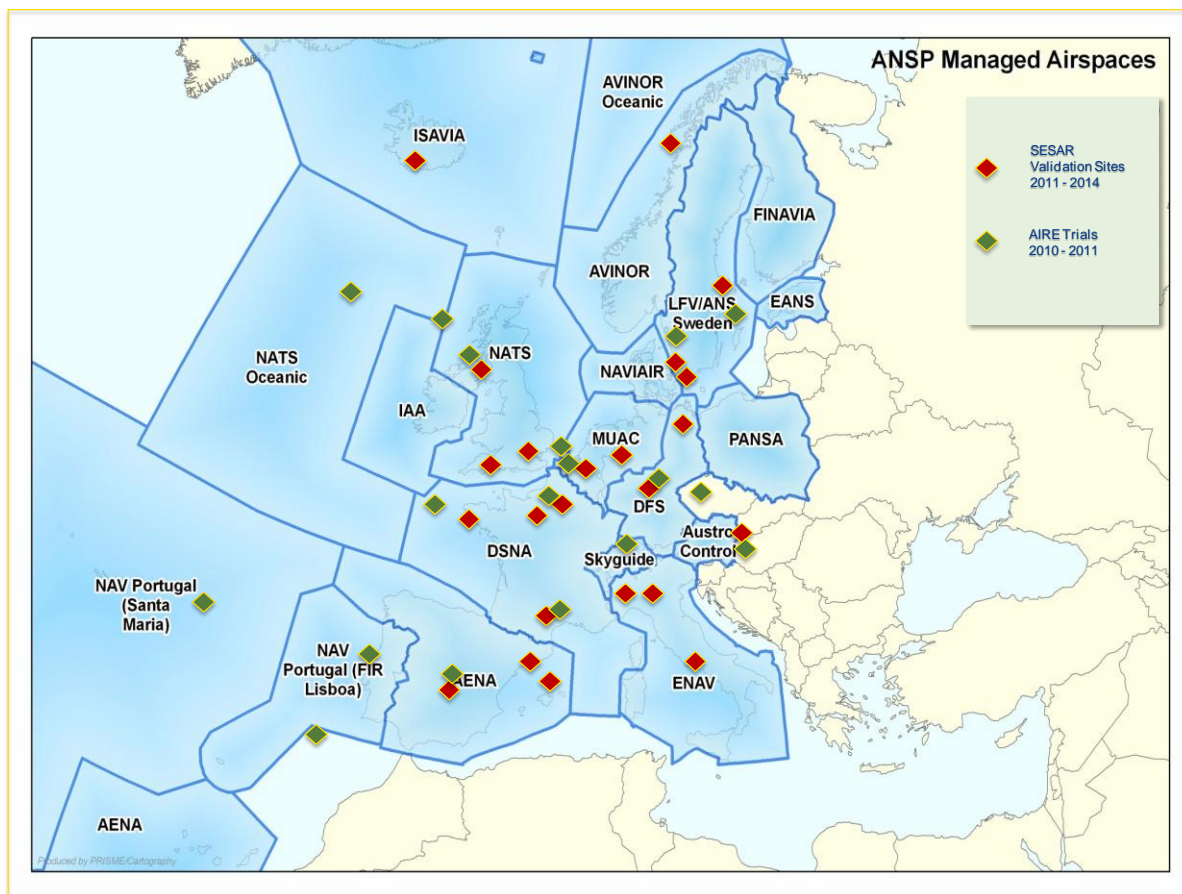


Figure 6: Main locations validation activities for Release 2 and onwards.

2.4 Associate Partners of the SJU

In application of Article 1 (5) of the SJU Regulation and successive decisions of the Administrative Board, and in order to involve the stakeholders of the Air Traffic Management in Europe, the SJU has developed the necessary legal framework to associate interested entities to the Programme activities.

On 15 January 2010², the Administrative Board approved the principles establishing the legal framework for the Associate Partners of the SJU. In January 2011, once the gap analysis and the process for the Associate Partners of the SJU Members have been completed, the SJU will launch an invitation to submit proposals for becoming “Associate Partners of the SJU”.

The creation of this new category of stakeholders in the SESAR Programme answers the need to complement the expertise brought by the SJU Members to the SESAR Programme in specific fields.

Only eligible entities which are selected following the defined procedure may become Associate Partners of the SJU. They will not become members of the SJU but direct contractors under a Framework Partnership Agreement to the SJU. Their specific contribution will be further refined under mutually agreed Specific Agreements.

This invitation will be addressed exclusively to the following entities:

- Small and Medium-sized Enterprises (SMEs), meaning micro, small and medium-sized enterprises within the meaning of the European Commission Recommendation of 6 May 2003 ref. 2003/361/EC (for the SME definition, please refer to Annex III attached hereto: Extract of Recommendation 2003/361/EC),
- Research Organisations, meaning, in line with the principles governing the Seventh Framework Programme, a legal entity established as a non-profit organisation which carries out research or technological development as one of its main objectives^[1],
- Universities, and
- Institutes of higher education.

The call for proposals will be divided into 6 lots as follows:

- Lot 1: Information Management;
- Lot 2: Network & Airport Collaboration;
- Lot 3: Technical Service Management;
- Lot 4: Airborne & CNS Systems;
- Lot 5: Modelling Support to Validation;
- Lot 6: UAV/UAS integration in SESAR.

The assessment of the received proposals will be performed in spring and the results will be submitted to the Administrative Board for decision.

The amount of co-financing made available for this call amounts to EUR 10 million as already identified in the SJU Budget 2011.

2.5 IBAFO III

With the completion of the Initiation Phase, during the second quarter 2011 the SJU Members will be required to re-assess the level of their contributions based on the first years of work and the possible gaps/excess resources detected. This important exercise will allow to ensure the best use of the existing resources and will permit the SJU to consider possible areas of activity where there would be a need for additional resources

The launching the IBAFO III is planned for the second half of 2011 and will follow the same procedures as for the IBAFO I and II. The Programme Committee and the Administrative Board will be kept timely informed of the procedure. The amount allocated to IBAFO III has yet to be determined and will be part of the overall commitment available in the current budget allocation.

3. SESAR Programme Specific Activities in 2011

3.1 Atlantic Interoperability to Reduce Emission (AIRE)

AIRE was established by the European Commission and the US Federal Aviation Administration (FAA) in 2007. The SJU is responsible for its management on the European side since 2008. In 2009 and 2010, having performed 1.152 trials with 18 partners, the AIRE programme was successful in demonstrating that significant environmental savings as

CO2 emission reduction can be achieved at present using existing technology through efficient partnership. Several of the trialled procedures are being applied on the daily basis e.g. CDA procedures in Stockholm or Cruise Climb procedures in Santa Maria (Portugal).

AIRE constitutes a core element of the SESAR Programme. In AIRE national and regional partnerships on tangible, interoperable, “win-win” operational efficiency topics are fostered. Partners, jointly validate solutions that reduce CO2 emissions in the short term and capitalize on present aircraft capabilities.

In 2010, the SJU issued a call for tender and received a large number of project proposals. Eighteen were selected according to the established criteria - in particular projects entailing significant environmental benefits and strongly focusing on implementation - resulting in a significant enlargement of the programme’s geographical coverage and partners. Two projects cover surface operations; five will be carried out on the Terminal Area; four projects for oceanic/en-route procedures; and seven will conduct gate to gate trials involving more than 40 partners.

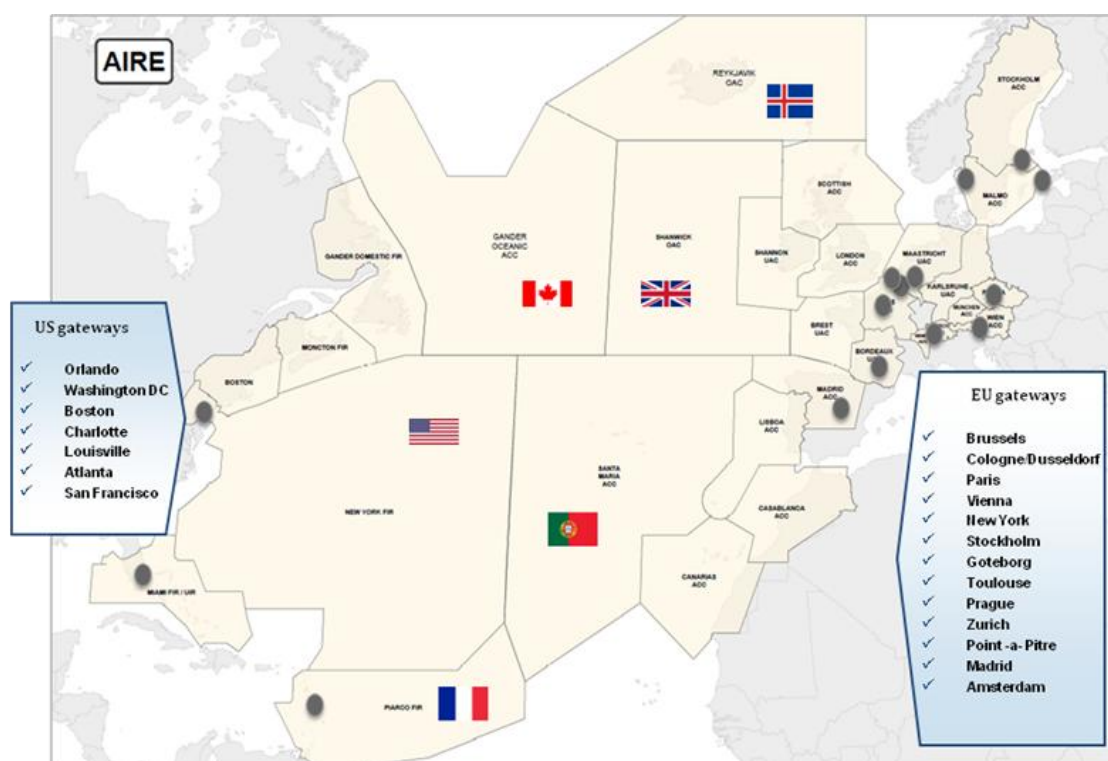


Figure 7: AIRE locations for airports and/or ANSPs

The SJU will closely monitor and evaluate the project plans during the end of 2010/ first quarter of 2011 with the majority of the trials taking place during 2011. More than 2000 flight trials are expected.

Every project has two mandatory deliverables, a Phase1 report describing in details the solution that will be subject to the proof-of-concept, and a final report detailing the

findings that can be derived from the validation exercise and possible deployment scenarios.

Insights developed on the basis of the 2009/10 AIRE activities and trials provided a fundamental input to the other Work Packages of the SESAR Programme allowing an earlier deployment of green procedures. Work will continue to further promote the implementation of tested procedures locally, regionally and at international level. In 2010 a closure technical workshop was organised showing the importance of the synergies between the AIRE activities and those of many of the remaining Programme's Work Packages. These synergies will be further developed in 2011 capitalising on the testing opportunities of AIRE to validate some of industrialisation ready technical solutions being developed in the SESAR Programme. Efforts in 2011 will also be concentrated in considerably expanding the programme in order to impact more locations, stakeholders and further accelerate the pace of change.

Budget 2011	Commitment	Payment
Chapter 3.1 - EUR Mio		
AIRE Phase 2	<i>committed in 2010 for 2.7</i>	1.8
AIRE Expansion	4.8	0.6

3.2 Work Package E

The ATM community recognises the need to stimulate long-term research, creativity and innovation to develop the scientific knowledge aimed at extending the SESAR vision and also to complement SESAR activities. Consequently long term/innovative research addressing knowledge and breakthrough technologies/concept elements beyond the current SESAR vision or not in the main stream of SESAR work programme has been launched in the framework of WP E to accompany advanced research in aeronautics. This would assure the continuity in implementations beyond the existing horizons (both in time and scope).

The objectives of WPE consist of exploring several topics (concept element and/or technology) extending the SESAR vision without any predefined time frame.

SESAR Long Term and Innovative research themes have been defined with the advice of the Scientific Committee. These research themes are felt to be relevant for ensuring the incubation of ideas towards the evolution of the ATM Target Concept and beyond. Research themes include:

- Legal and institutional framework;
- Automation;
- Complexity and safety;
- Economics and performance.

These long term/innovative researches are contributing to progressing knowledge over time, potentially identifying innovative technologies/concepts elements improving the efficiency of the ATM system. It is establishing the foundation upon which Europe's Industries will remain competitive and efficient in the global market.

The first WP-E call for proposals for ATM Research Networks WP-E first was issued in February 2010. All four research themes were open. The evaluations were made in April by independent experts and led to the launch of two Networks, one in the Automation theme and one in the Complexity theme. A second call was subsequently open in July for the Economic theme only but no proposal passed the selection criteria.

Both selected Networks (ComplexWorld and Hala!) became operational in July and September respectively and have already taken actions to organise the think tank process in their domain. They produced deliverables like the communication and animation tools and published their first Domain Strategy papers. In addition, they both completed the selection of their first set of PhD subjects (half a dozen PhDs each) as the result of Calls for Proposals.

The first WP-E call for proposals for ATM Research projects was opened in July and closed in October covering the two themes relating to the two networks and additionally the theme “Legal and Institutional Framework” for which projects were felt more appropriate than a network. Seventeen projects have been recommended by independent experts for SESAR funding with a reserve list of four projects. They will start early 2011 and will be linked to the relevant network and also to the relevant SESAR projects to ensure beneficial exchange of results for SESAR.

During 2011, both Research Networks on ‘*Managing Complexity Safely*’ and ‘*Towards Full Automation in ATM*’ will announce their first tranche of funded PhD subjects and the respective host institutions. The main objectives are:

- White papers for strategic Research directions in their domain;
- Annual Joint Workshop (dissemination event);
- Summer Schools;
- Growing participation and review of the activities.

The third Research Network, ‘*Economics & Performance*’, will be launched in 2011, assuming a suitable network proposal is received and selected in November 2010.

With three Research Networks launched this will conclude the first phase for research networks as they move into establishing themselves and preparing for performance assessment in 2012.

A Research Networks combined event will be held during the year, bringing together over 100 different Research organisations spread across the three thematic areas already defined.

2011 will see the launch of the WPE Research Projects (co-funded activities that fall outside of the mainstream development Programme) selected as part of the first call that closed in October 2010. These projects will be committed, initiated and then moved into execution during the year. A further call for Research Projects is planned for 2011 against an updated set of Research Themes; the thematic document will be prepared in collaboration with the SJU Scientific Committee in preparation for the call.

Budget 2011	Commitment	Payment
Chapter 3.1 - EUR Mio	3.5	3.5

3.3 OPTIMI and SAT OPTIMI

In February 2010, after an open call for tender, the SJU launched the OPTIMI (Oceanic Position Tracking Improvement and Monitoring) project, a European initiative for flight tracking in oceanic and remote areas. 13 ANSPs, Airlines, Engineering and manufacturing companies and an Air Transport Communications provider (SITA) have been involved. OPTIMI delivers a set of recommendations which could result in concrete benefits for a number of actors, including Search and Rescue services, accident and incident investigation services, Air Navigation Service Providers and airspace users.

To complement the results achieved so far, the SJU signed a contract on SAT-OPTIMI, after an open call for tenders. SAT-OPTIMI is a study that uses the output from OPTIMI to present the feasibility and options for the best use of satellite infrastructure and technology to ensure full deployment of oceanic and remote tracking services. The study will report by April 2011 and include, among other things, the timing, investment and operations cost estimates, as well as a business and service model for tracking services, giving a clear direction on a path for deployment of aircraft tracking services over oceanic, continental and polar regions

In the light of results from OPTIMI and SAT-OPTIMI, the SJU may propose to conduct complementary work, in particular in the development of specific operational procedures.

Budget 2011	Commitment	Payment
Chapter 3.1 - EUR Mio	<i>committed in 2010 for 0.1</i>	0.1

3.4 ATM Master Plan update

In 2009, the Council of European Union adopted a resolution on the endorsement of the European ATM Master Plan, requesting, inter alia, the European Commission to report annually to the Council on the execution of the ATM Master Plan. The first update of this master Plan was issued and endorsed in March 2010.

The ATM Master Plan contains all the necessary elements to develop and deploy all the SESAR technologies and procedures. The SJU has the competencies, under the Council Regulation (EC) 219/2007, for the execution of the ATM Master Plan. Work package C is the instrument foreseen within the Programme to ensure the maintenance of the European ATM Master Plan and the monitoring of the progress related to the development and the deployment of SESAR.

WP C is organised in 3 pillars: C1 - Master Plan Maintenance, C2 - Performance Deployment Planning, Financial incentives and Reporting, and C3 - Maintenance of Standardisation and Regulatory roadmap. Following the launch of C2 and C3 activities in the execution phase

in early December 2010, the work for the continuous maintenance of the Master Plan will begin.

C2 project kicked-off in October 2010 and will deliver by the end of February 2011 its first milestone: an alignment of the three levels of the European ATM Master Plan to ensure full coverage of the Master Plan in the ESSIP (Eurocontrol Single Sky Implementation). This analysis will result in recommendations for mitigating any misalignment. Between March and June 2011, C2 will initiate its deployment reporting and monitoring functions, in order to build short-medium term Deployment Scenarios. The Deployment Scenarios will contain the Deployment Packages. These elements consist of groupings of deployment sequences of SESAR technologies and procedures, defined by a positive business case. Each Deployment Package must demonstrate benefits to the involved stakeholders when deployed. It will also allow the identification of specific measures for those stakeholders which might require particular actions to ensure an overall positive business case for the Package.

The Deployment Scenarios will be the tool to manage SESAR deployment at several geographical levels (pan-European, Regional and National) and per stakeholder group. Any gaps identified (current versus planned situations) will allow the SJU to adopt recommendations in view of updating the EU ATM Master Plan.

C3 projects will also start delivering at high pace and is expected to develop by the end of February 2011 a first Standardisation Roadmap. This Standardisation Roadmap is expected to feed, as regards the SESAR programme, the discussions in different standardisation fora, including the ICAO standardisation roundtable.

C2 and C3 first deliverables will constitute major inputs to the Master Plan update campaign to be launched by C1 after summer 2011. The objective of the Campaign is to prepare a proposal for a comprehensive update of the European ATM Master Plan. It is expected that this update will take in consideration the introduction of the Deployment Packages. Wide expert consultation in various domains, including Airspace Users, National Authorities, the Military, and stakeholders from non European States will ensure the necessary inputs and support. During the campaign the Risk Management Plan will be updated based on inputs from the projects.

In a meeting between the EC, Eurocontrol and the SJU, it was concluded that WP C shall be the most appropriate process for the development of tools for planning and monitoring of implementation. In this respect, it will be ensured adequate interaction between WP C and IP 1.

Budget 2011	Commitment	Payment
Chapter 3.3 - EUR Mio	see WP C	see WP C

3.5 Military

In 2011, the Military Engagement Plan for SESAR (MEPS), drafted by Eurocontrol, is expected to be put in place and become fully operational. The MEPS will enable the full participation of national military authorities in all relevant aspects of the work

programme, via a structured organisation including the formation of specific panels to collate all military input in specific technical or operational domains.

It is expected that the SJU launches a call for tender in order to make an inventory of existing and future military state of the art technologies, in particular for airborne equipment, and their respective performance capabilities. This study will in particular highlight how to ensure interoperability between military and civil technologies, in order to reduce implementation cost for SESAR.

Budget 2011	Commitment	Payment
Chapter 3.1 - EUR Mio	1.0	0.8

3.6 Professional Staff Association

The Professional Staff Associations: ECA, IFATCA, ETF, ATCEUC and IFATSEA have all been contracted by Eurocontrol on behalf of the SJU through a Framework Contract with Annual Work Orders. They participate in the SESAR Programme depending on their professional skills and interest in most of the work packages and projects. The framework contract and the work orders are followed up in quarterly meetings with the SJU and Eurocontrol.

The SJU has agreed with Professional Staff Associations to create an International Validation Team of operational experts, from different nationalities, across all the exercise domains. The team will be fully operational in time for the first validation exercise during 2011.

Budget 2011	Commitment	Payment
Chapter 3.1 - EUR Mio	0.4	0.4

3.7 National Supervisory Authorities

NSAs, Civil and Military, are involved on a regular basis to provide advice on the progress of the SESAR Programme to facilitate the future implementation of the results and anticipate possible issues stemming from it. A Memorandum of Understanding for the provision of expertise has been signed by seven Authorities, covering a comprehensive pan-European geographical scope. During 2010 experts received a detailed picture of the SESAR Programme and agreed on a set of joint activities to be developed in 2011. Work will focus in particular on the regulatory assessment of Release 1 activities, including "Remote & Virtual ATC towers". A significant involvement of NSAs is also foreseen in the review of WP16 deliverables (in particular safety, environment and security assessment methodologies).

The SJU will organize quarterly meetings in 2010 to review the status of the tasks supported by the experts of the Authorities.

Budget 2011	Commitment	Payment
Chapter 3.1 - EUR Mio	<i>committed in 2010 for 0.7</i>	0.2

4. Coordination with other Programmes and Organisations

4.1 FAA/NextGen

The EU/USA Memorandum of Cooperation (MoC) in civil aviation research and development and its Annexe on SESAR-NextGEN cooperation are provisionally applied since 3 March 2011 and are expected to formally enter into force in the course of 2011. They provide a political and legal framework allowing to initiate cooperative activities on the SESAR/NextGen interoperability. The MoC identifies 5 headline areas of cooperation:

- Transversal Activities,
- Information Management,
- Trajectory Management
- CNS & Airborne Interoperability,
- Collaborative Projects.

The specific cooperative activities covering the above mentioned areas will be defined in Appendices to the SESAR-NextGEN Annex. These Appendices shall be signed by the SJU and the FAA in 2011. Working Groups will be established for each of these cooperation areas and their activity will focus on the definition of actions and outputs to ensure that appropriate coordination is achieved.

A set of priority subjects for cooperation with the FAA has been identified; these high priority subjects required for harmonisation and interoperability include the definition and exchange of 4D trajectory, Aeromacs/Wimax profile definition, ADS-B applications, GNSS configurations and convergence of the overall concept of operations where it impacts on interoperability.

The modus operandi of each Working Group is to engage the SJU Members in the work where practicable and have this work included within projects already in the SESAR Programme. Hence there will be no need for a parallel programme of activity on interoperability issues with the US due to this inclusive and integrated approach.

The key principles underlying the interoperability cooperation work are:

- SESAR/NextGen technical cooperation is integrated within the Programme and that coordination activities are mainly allocated to SESAR contributing partners;
- All coordination activities must show demonstrable value, clear deliverables and alignment with a committed timescale;
- SESAR partner activities will be managed and reported via existing project and programme management arrangements with both Working Group Leaders and a Coordination Committee ensuring compliance with the Annexe.

Additional areas of technical and operational coordination will also be established in future. Strong and effective cooperation is expected to produce concrete results for input into the work programme.

Budget 2011	Commitment	Payment
Chapter 3.3 - EUR Mio	<i>in principle, part of the Programme costs</i>	<i>in principle, part of the Programme costs</i>

4.2 Clean Sky

Clean Sky includes within its scope two aspects of key interest for SESAR: the airborne flight management and trajectory aspects as well as environmental modelling to demonstrate what improvement is expected from the Clean Sky technology developments. SESAR has a complementary environmental programme of work in AIRE and environmental modelling for the programme in Work Package 16 as well as development of Airborne FMS/Avionics and communications improvements in Work Packages 9 and 15.

Consequently, the SJU has already established direct links between the Work Package 9 and Clean Sky and during 2011 this is expected to realise an exchange of information ensuring that SESAR developments are aligned with and encompass the forthcoming changes in aircraft performance and operations.

During 2011 the SJU intends to ensure alignment of modelling assumptions and methods between the SJU WP 16 and the Clean Sky Technology Demonstrator in order that claims for environmental improvements are expressed consistently.

Budget 2011	Commitment	Payment
Chapter 3.3 - EUR Mio	<i>part of the Programme costs</i>	<i>part of the Programme costs</i>

4.3 Framework Programme (FP) Projects

During 2010 the SJU have established regular coordination meetings with both DG MOVE and DG RTD and have collated a list of active and new framework projects. During 2011 coordination between relevant projects in SESAR and the Framework Projects identified as relevant to the Programme will be activated to ensure the SJU is '*coordinating and concentrating all European Union's relevant research and development efforts in ATM*'.

During 2011, for the new Framework Projects not already selected, the SJU will, offer to directly support DG RTD in the selection activities to ensure that proposals do not duplicate what is already scoped and funded in the SESAR work programme.

4.4 ICAO

The SJU has participated already in 2010 in the Standardization Roundtable that coordinates the standardization needs of NextGen and SESAR under the umbrella of ICAO.

At least two other meetings of this group are foreseen during 2011 identifying near term standardisation needs. ICAO has for best preparation for the ANC 2012 set up a new structure around constructing what ICAO would call blocks or upgrades needed for global implementation based on the SESAR and NextGen modernisation programmes. This means that this new ICAO structure of global Technical Teams and Challenge Teams are taking over, from the Standardisation Roundtable, the preparation work for ANC 2012.

Later it is envisaged that this forum will evolve into a more strategic monitoring group. There is a strong connection between the work in this scenario and the development and maintenance of the Standardization Roadmap under WP C.

The ICAO near-term standardisation needs will be directly mapped into the SESAR Programme activities in order to ensure that there is appropriate provision for the standards required by the concepts and technologies being developed in the programme. Gaps and overlaps will be identified in order to provide updates to the ICAO planning.

Besides the Standardization field, ICAO has been and will continue to be involved in OPTIMI through their participation in the OPTIMI Supervisory Committee. The technical and operational involvement of stakeholders from non-European States in this type of SESAR initiatives will be ensured through ad hoc and limited participation in regional groups. In particular, a Working Paper will be presented by the SJU in the GREPECAS plenary meeting in March 2011.

Finally, there is a great interest from the global aviation community to count on a strong presence of SESAR and NextGen in the ICAO Air Navigation Conference that will take place in 2012. Preparation of the ANC12 is a key target in terms of supporting a globally harmonised planning which is consistent with the work of SESAR. The EC has therefore set up and chairs a coordination group with members of the SJU, Eurocontrol, EASA, EUROCAE in order for the best European preparation possible for the ANC 2012 and for a complete alignment of the work between SESAR and NextGen under the EU - US Memorandum of Cooperation with the ICAO work on blocks or upgrades for global implementation.

4.5 EASA

EASA and the SJU have agreed on how to ensure effective involvement of EASA, with the support of Eurocontrol as deemed necessary, in the Programme in respect of ATM safety issues. Before the beginning of each year, EASA will receive from the SJU and approve the plan with the deliverables scheduled for the following year.

4.6 ESA

The SJU and ESA, through the IRIS programme, have already established a productive working arrangement where ESA staff actively participates in SJU projects relevant to them, and SJU staff and project participants meet to exchange relevant information. The SJU also participate directly to the Joint Iris Advisory Committee. These activities will continue in 2011 and become focussed on developing a recommendation to be presented to the SJU Administrative Board on the further deployment of Iris as a means of satisfying the satellite component in SESAR's communication needs.

In particular during 2011 the SJU will support activities described in an exchange of letters between the EC and ESA where the role of the SJU in matters such as the EU/US Memorandum Of Cooperation on interoperability is referenced amongst other aspects

including the need for ESA to fully consider all technical options for the chosen satellite segment for SESAR.

4.7 External relations

The SJU pursues international relations in the context of the European Commission external relations framework. This has included support to the Commission in extending SESAR to the Latin American States. In this context, in 2011 SESAR aims at consolidating technical cooperation with Brazil and at providing support to the EC for the initialling of a Memorandum of Understanding with Mexico. Using Optimi-Aire-like initiatives, exploration of possible bilateral relations with the East African States (Atlantic States) is also being considered. Apart from that, follow-up on SESAR workshops held in Turkey and the Ukraine as well as further developments and maintenance of relations with Southern Mediterranean States is also foreseen. Work will continue with China, India and Middle East Countries.

Overall, the SJU maintains an opportunistic approach to external relations, ensuring the highest benefit for the future Programme deployment and its Members.

5. Communication plan

The success of the SJU and the achievement of the SESAR Programme results depend from a proper communication of the correct messages to the staff involved in the Programme, to the SJU stakeholders and to the Air Transport community at large and the general public as well.

In this respect the “*Communication Plan SESAR JU*” has been established and approved by the ADB in 2009. Based on the lessons learnt from 2010, the Communication activities for the 2011 will strengthen the first results of awareness and proactive information attitude achieved so far. In 2011, different actions detailed in the Communication Plan will be performed:

- Joint communication activities with the SESAR Members & Associate Partners;
- Intense internal communication to the 2.000 SESAR dedicated staff;
- Strong presence at ATC Global Amsterdam for the second time with several conferences and workshops to inform the audiences on the SESAR WP progresses;
- Regular on-line communication + internal & external newsletters;
- Enriching databases to reach new air transport stakeholders;
- -Selective participation at major conferences on ATM & Air Transport;
- Updated communication tools such as website, brochures, videos, etc
- Second communication action towards passengers at airports;
- Communication activities about the programme AIRE.

Budget 2011	Commitment	Payment
Chapter 2.3 - EUR Mio	0.3	0.3

6. Administration & Finance

6.1 Ensure efficient support to the Programme implementation

With the finalisation of the BAFO II, the assignment of work to the Members is almost completed; in 2010 the SJU has assigned the work concerning the WP11 and WPE. In 2011 almost all the Programme's projects will be in the execution phase. The Directorate of Administration & Finance will continue its efforts to support the Programme implementation by ensuring the timely availability of the necessary resources, human and financial, and by providing the necessary internal control aiming at the respect of the principle of sound financial management and the legality of the underlying transactions.

Between the critical activities, the Directorate will organize the expected IBAFO III, will follow up the completion of the "*Associate Partners of the SJU*" call and will ensure the amendment of the MFA to incorporate the results of the initiation phase.

6.2 On time assessment of Contractual Deliverables and Project's Interim Report

By the end of 2011 the SJU will have pre-financed almost all the Programme projects with an overall disbursement of about EUR 143.6 million since 2009. Eligible costs referring to projects having completed the initiation phase are co-financed according to the provisions of the MFA.

Interim report will be provided in June 2011 including eligible cost incurred by the Members during 2010; internal procedures ensure that the operational and financial requirements are satisfied in respect of the acceptance of contractual deliverables.

According to the provision of the MFA, the projects co-financing is granted to the Member on the basis of the Certified Interim Financial Statement referring to the incurred costs related to accepted deliverables and work in progress. In this respect and on the basis of the Certified Interim Financial Statement, the SJU plans to disburse EUR 70 million to the Members as co-financing.

The deliverables acceptance and the payment authorisation processes are defined in the Financial Circuits ensuring full compliance with the terms of the Financial Rules necessary to receive financing from the European Union budget.

Financial Initiation and Verification functions are performed respecting the four eyes principle with a clear separation of responsibility; the process is supported by the use of the ABAC system. The delegation of authority for budget implementation and the assignment of Initiating and Verifying functions to staff ensure the necessary resources to implement the processes providing adequate segregation of functions and accountability of the actors involved.

6.3 Ensure effective implementation of ICS and risk management

The Programme implementation and the increasing disbursement of funds call for a further strengthening of the internal control. The Administrative Board has approved in 2010 the SJU's Internal Control Standards for effective management derived from the communication of the European Commission "*Revision of the Internal Control Standards and Underlying Framework Strengthening Control Effectiveness*" SEC (2007) 1341. This provides the SJU's management and staff with a clear set of standards to comply with in performing their activity.

Furthermore within the SJU Risk policy a corporate approach is implemented with the objective of providing the SJU with a Risk Management system which addresses the uncertainty related to the achievement of its objectives. The adoption of a common model builds on three basic concepts:

- Risk management is a continuous process which develops at different level of responsibilities within the SJU;
- Risk management is linked to the SJU's strategy which includes a clear risk policy to determine its risk appetite;
- Risk management is a process that identifying potential events affecting the ability of the SJU to reach its objectives, allows the management to take actions and define mitigating measures giving them reasonable assurance on the achievement of the objectives.

Building on the first results achieved and on the findings of the 2010 Risk Report, the SJU will further develop in 2011 the Risk management system. This is in line with the requirements of the European Commission concerning risk management contained in the Communication SEC (2005) 1327.

6.4 Set up Programme's financial audit structure

The Project Audit Sector, will support the Members to achieve the overarching result of maximising the benefit of the resources available for the Programme by raising awareness of best practice, guiding in the better implementation of the SJU Rules, MA, MFA and contributing to the proper, economic, efficient use of the resources.

The administrative support to the Programme implementation, reinforced in 2010 through the recruitment of two Projects Auditors in charge of ex post project audit, will be fully deployed in 2011 adding further assurance on the use of funds. In strict cooperation with operational functions, the Projects Auditors are responsible for checking the compliance with the principle of sound financial management and in particular to assess deliverables' value for money. The Ex-Post Project Audit Strategy, expected to be approved by the ADB in December 2010 will be implemented with the support of a provider of audit services to whom a contract has been awarded.

At the beginning of 2011, the Project Audit Annual Plan will be established and submitted for approval to the Executive Director.

The Plan will contain the project audits to be performed

- At least 5 Members and 2 Service Contracts determined either through a statistical approach or on a risk based approach;
- Additional audits as required by the SJU management taking into consideration different relevant elements.

7. Internal Audit

7.1 Internal Audit Work Programme 2011

The Administrative Board will be invited to approve the Internal Audit work program for 2011. It will be established on the basis of an updated analysis of risks faced by the SJU in its research and development program operations and the risks inherent to its specific nature as a European Union Body charged with the execution of a public private partnership.

7.2 Changes to the SJU internal audit arrangements in 2011

In 2010 the European Court of Auditors considered that there are strong arguments in favour of allowing the same powers for the Commission's Internal Auditor as exercised in respect of other EU bodies¹⁰. In response the Internal Auditor of the European Commission wrote to the SJU Administrative Board Chairman and Executive Director informing of his intention to undertake the responsibility of being the SJU Internal Auditor. The Administrative Board will be invited to approve measures to realign the SJU Internal Audit function to establish an Internal Audit Capability and to recognize formally the role of the Internal Auditor of the European Commission as the SJU Internal Auditor.

7.3 Assurance work

Emphasis will be placed on assurance work designed to enable the Executive Director to report on the SJU system of internal control in the context of the execution of the SJU work program and its associated budget following the successful ramp-up phase in 2010. Assurance work will be largely undertaken by the newly established SJU Internal Audit Capability in 2011.

7.4 Consulting and other work

In 2011 internal audit consulting effort will include realignment of the internal audit structure and putting in place new working arrangements to support it. Providing

¹⁰ European Court of Auditors, Opinion No. 2/2010 on the SESAR Joint Undertaking Financial Rules.

consulting advice on conflict of interest management; the operation of the financial circuit; and other aspects of the internal control system will continue to represent around a third of available resources.

7.5 Co-ordination and oversight of public audit functions

The SJU Permanent Audit Panel co-ordinates the activities of the audit and control functions of the SJU's Founding Members and advises the Administrative Board on audit related matters. In 2011 the Panel's rules of procedure will be adapted to reflect the new internal audit structure.

7.6 Resources

The SJU Internal Audit Capability will retain one full-time internal auditor seconded from Eurocontrol. Additional specialist expertise may be purchased externally in 2011 where this is deemed necessary or appropriate. In 2011 further efficiency gains from the use of audit tools and guidance on audit methodology provided by the Commission Internal Audit Service are expected to offset the effort of establishing the new internal audit structure. Therefore resource requirements in 2011 are expected to be maintained at the level of 2010.

8. Glossary

4 D	4 Dimensions
ABAC	Accrual Based Accounting
ACAS	Airborne Collision Avoidance System
A-CCD	Advanced Continuous Climb Departure
A-CDA	Advanced Continuous Descend Approach
ADS-B	Automatic Dependence Surveillance-Broadcast
ADS-C	Automatic Dependence Surveillance-Contract
AeroMacs	Aeronautical Mobile Airport Communications System
AFUA/ASM	Advanced Flexible Use Airspace/Airspace Management
AMAN	Arrival Manager
ASPA	Airborne Spacing
ATM	Air Traffic Management
ATSA ITP	Air Traffic Situation Awareness- In-Trail Procedure
CCD	Continuous Climb Departure
CDA	Continuous Descend Arrival
CDM	Collaborative Decision Making
CNS	Communication, Navigation, Surveillance
CTA	Controlled Time Arrival
DCB	Demand and Capacity Balancing
DCMAC Euroc.	Directorate Civil Military ATM Coordination
DMAN	Departure Manager
GBAS	Ground Based Augmentation System
GNSS	Global Navigation Satellite System
I 4D	Initial 4 Dimensions
I CWP	Integrated Controller Working Position
IOP	Inter Operability
LVP	Low Visibility Procedure
MSP	Multi Sector Planning
NOP	Network Operation Plan
OAT	Operational Air Traffic
P-RNAV	Precision Area Navigation
RNP	Required Navigation Performance
RTS	Real Time Simulation
S&M	Sequencing & Merging
SBT/RBT	Shared Business Trajectory/Reference Business Trajectory
STCA	Short Term Conflict Alert
SWIM	System Wide Information Management
TMA	Terminal Area
UDPP	User Driven Prioritisation Process

9. Annexe I - Projects (excluding Release 1) in Execution Phase - 2011 Planned delivery

10. Annexe II - Programme Financials

11. Annexe III - 2010 Risk Management