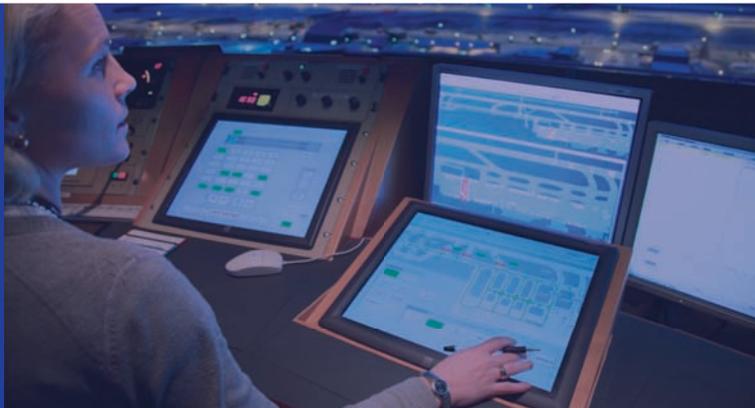




ANNUAL REPORT  
2011



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EUROPEAN UNION

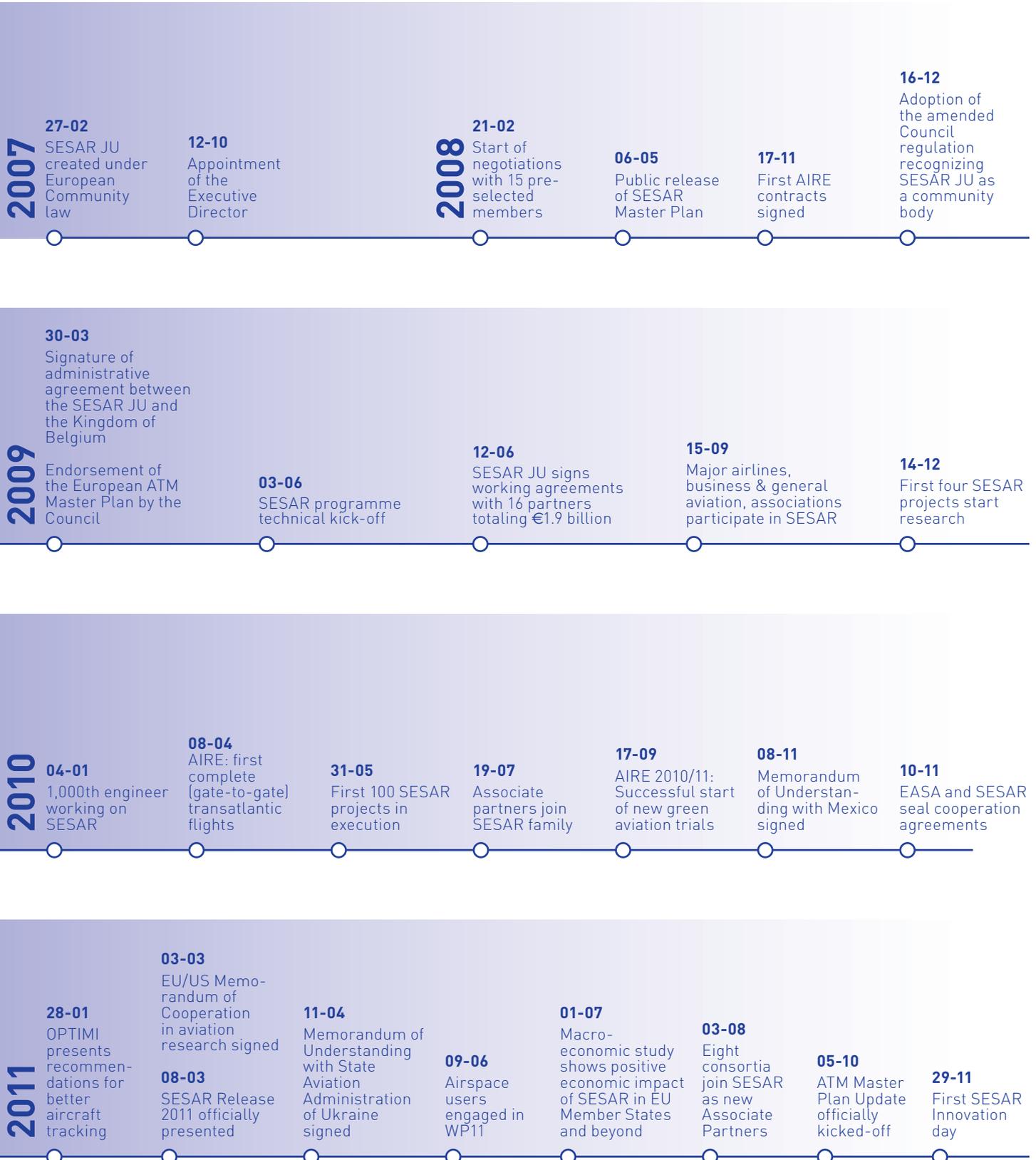


EUROCONTROL

# Single European Sky ATM Research (SESAR)

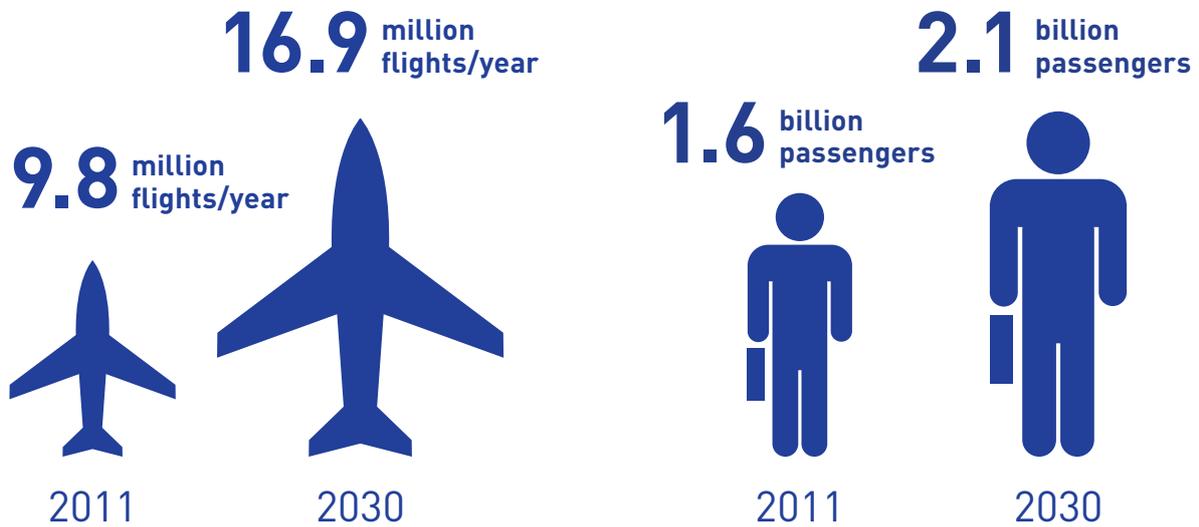
The **SESAR programme** is the operational and technological answer to Europe's main air traffic management challenges. The aim of the SESAR Joint Undertaking is to ensure the **modernisation** of the **European air traffic management system** by coordinating and concentrating all relevant research and development efforts with a view to harmonising implementation. **Partnership, sustainability** and **user orientation** are the founding principles of the SESAR Joint Undertaking's work approach.

# Timeline



# Why SESAR?

Aviation in Europe is expected to grow. The current ATM infrastructure will not be able to handle this growth:\*



SESAR is set out to modernise Europe's ATM system. It's key performance targets for 2020 are to:



SESAR technology will not only ensure fluidity of traffic. SESAR also makes good business sense:



\* Valid in 2013-2030 period. Source: SESAR Macroeconomic study 2011

# SESAR in 2011

SESAR opted for a R&D approach close to operations. Consequently, in 2011 the programme achieved tangible results through AIRE and the new Release strategy.

SESAR validation locations in Europe and worldwide



**Release 1**  
 The first SESAR Release is delivered. 25 validation exercises all over Europe to scrutinize new SESAR prototypes, procedures and technologies. The highlight of 2011: the world's first initial 4D flight.



**Release 2**  
 Release 2 is launched with a more ambitious programme of 35 validation trials.

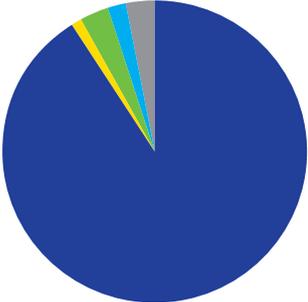


**AIRE**  
 The second AIRE cycle included more than 9,000 green operational flights.



**SESAR project status**

- Projects initiated
- Projects cancelled
- Projects suspended
- Projects still under initiation
- Projects to be initiated



**A growing workforce**  
 2,306 experts working on the programme\*  
 1,953,229.75 man-hours spent by experts\*\*



\* By 31 December 2011 \*\* In 2011

## Members



## Associate Partners



## Associate Partners to the SESAR Joint Undertaking





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Message from the Chairman of the Administrative Board  
**Matthias Ruete**, Director-General for Mobility  
and Transport, European Commission

## Preparing deployment



The European Commission's White Paper on transport policy, issued in March 2011, establishes a roadmap to a Single European Transport Area defining a long-term strategy to achieve a sustainable EU transport system by 2050. Achieving a truly seamless Single European Sky and deploying results developed by SESAR in the agreed time frame are key initiatives for achieving a Single European Transport area.

In this context, reducing fragmentation of research and development efforts in Europe and joint European efforts will bring the greatest European added value. The SESAR Joint Undertaking is therefore not only an implementation instrument of the Single European Sky, but is also proving to be an effective model for rationalising and coordinating research, development and validation in ATM. Furthermore, the development and validation of new technologies and procedures through the SESAR Joint Undertaking's partnership framework driven by the Single Sky performance objectives, contribute to stimulating investments in new technologies aiming to modernise Europe's ATM infrastructure.

The achievements described in this annual activity report confirm that 2011 has been a key year for the progression of the Joint Undertaking and of the SESAR development phase. A few of the main results I would like to highlight are: the demonstration, in a real life environment, of SESAR early benefits; the launching of the first substantial update of the European ATM Master plan and the further affirmation of the SESAR Joint Undertaking's position on the international scene, in particular by playing a key role in the European coordination for ICAO's Air Navigation Conference in 2012. There is no doubt that these results are the fruit of the commitment and excellent work of all the men and women involved in the work of the Joint Undertaking. This commitment and the regulatory framework of the Single European Sky are the main success factors of SESAR.

2011 has also witnessed the further expansion of the Joint Undertaking's partnership to a number of new associates. This confirms the success and attractiveness of our collaborative approach and contributing to expanding and enriching the experience and expertise that the Joint Undertaking has built up over the past years in managing and coordinating a complex research and innovation programme. Moreover, in 2011, through the conclusion of a series of agreements, the European Commission has opened new opportunities for the SESAR Joint Undertaking to further expand its cooperation with non-EU countries such as the United States, Mexico, Japan and Singapore, thus promoting the deployment of SESAR technologies in the world.

The Administrative Board, which I have the honour to chair on behalf of the European Commission since March 2011, plays a major role not only in assuring the fulfilment of the Joint Undertaking's mandate, but also in driving the high level of commitment and motivation of its members and staff that have allowed achieving today's results. It is our commitment to maintain the momentum generated by SESAR and its partnership also in view of preparing the future steps of the programme.

Matthias Ruete

Foreword from the Executive Director

**Patrick Ky**, Executive Director, SESAR Joint Undertaking

## SESAR makes good business sense



2011 has been a good year for SESAR. We have welcomed new Associate Partners, launched the last of our work packages and secured the organisational involvement of main airspace users. We have kicked-off the update of the European ATM Master Plan and delivered the first concrete results through the Release framework.

But most importantly for me, we have confirmed that SESAR is simply good for business. The timely, effective and efficient implementation of the SESAR Programme will make a sizeable contribution to the European economy, as air transport is a potent growth enabler. A study<sup>1</sup> calculated that the benefits of SESAR extend far beyond the air transport industry: the programme results, once implemented, are expected to generate a combined posi-

tive impact on the European Union's GDP of EUR 419 billion over the 2013-2030 period and lead to the creation of a total of 328,000 direct and indirect jobs.

But even though SESAR creates huge returns on a European level, individual actors need to base their investment decisions on business assessments. For this reason, SESAR partners have decided to evaluate the performance impact of all SESAR products in an operational environment. Through this SESAR Release approach, business decisions can be made on grounds of real life experience. The results of the first SESAR Release 2011 are detailed in this report.

Our aim at the SESAR JU is to move air traffic management from the age of VHF radio into the Internet era. This is a quantum leap in technology and it comes at a cost. But the cost will be a fraction of the actual benefits from the new system. Every single day of delay means concrete economic losses for the industry and passengers alike.

Patrick Ky

1. Assessing the Macroeconomic Impact of SESAR – McKinsey & Company

# Part 1: Meeting our objectives



In 2010, the SESAR JU together with its members agreed on working towards a common vision and seven strategic objectives by 2012. By the end of 2011 their achievement in the set timeframe came within tangible reach.

## Vision

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

## Strategic objectives by 2012

- 1** Initial **4D trajectory** is validated in an operational environment supported by satellite-based technology
- 2** **10,000 SESAR flights**, including **500 military**, are performed
- 3** 80% of SESAR projects have tested their output in a **real life environment**
- 4** First **SWIM pilots** are in place to exchange data across at least five domains
- 5** The first **remote tower** is ready for operations
- 6** SESAR benefits are demonstrated on **city pairs** connecting eight European airports
- 7** **Airspace users** have signed up to the SESAR business case for time-based operations



**Objective 1 - Initial 4D trajectory is validated in an operational environment supported by satellite based technology**

The 'Initial 4D trajectory based operations' were validated during a first operational trial in February 2012. The second iteration, part of Release 2, is planned for late 2012 and the third for 2013. The aim will be to validate operational procedures for flying according to a Controlled Time of Arrival (CTA) in the en-route and TMA airspace.

**Objective 2 - 10,000 SESAR flights, including 500 military, are performed**

In 2011, 9,366 commercial flights demonstrated early SESAR benefits (including AIRE and OPTIMI flights). Unfortunately, the number of military flights in the SESAR Programme remains limited for the time being.

**Objective 3 - 80% of SESAR projects have tested their outputs in a real life environment**

In order to achieve this objective, a research validation strategy has been established. In particular, the results of Release 1 and those planned for Release 2 will connect SESAR projects to existing systems or technical environments.

**Objective 4 - First SWIM pilots are in place to exchange data across at least five domains**

In 2011, a SWIM Action Plan was introduced to counteract delays and unresolved issues. Despite the progress made by year-end 2011 and the implementation of the action plan with the contribution of ongoing validation exercises, the full achievement of the objective by 2012 is not yet ensured.

**Objective 5 - The first remote tower is ready for operation**

The first validation exercises for remote tower operations, with the participation of experts from National Supervisory Authorities, have been successfully performed as planned in Release 1. Further trials will take place in 2012.

**Objective 6 - SESAR benefits are demonstrated in city pairs connecting eight European airports**

The latest cycle of AIRE projects included no less than seven gate-to-gate optimisation projects. City pairs included Paris - Point-a-Pitre, New York - Paris, Paris - Toulouse, several destinations departing and arriving from/at Gothenburg, and several destinations arriving in Amsterdam and Stockholm.

**Objective 7 - Airspace users have signed up to the SESAR business case for time based operations**

The SESAR JU has heavily invested in developing business case methodologies for ANSPs, airspace users and airports. To a certain extent and in some areas the business case will be endorsed to the level of industrialisation readiness, whereby additional work will be needed with stakeholders on its deployment. Preliminary business case information will be made available to prepare the transition to deployment for first SESAR solutions from 2013.

# Part 2: Delivering SESAR solutions

SESAR is a performance and delivery oriented R&D programme. In 2011, the freshly introduced Release strategy produced the first tangible results. Additionally, the second cycle of AIRE projects was successfully closed, allowing the SESAR JU to present encouraging results from almost 10,000 green and more efficient flights. Over and above the Releases, the Work Packages continued to deliver progress and the SESAR JU kicked-off the European ATM Master Plan update campaign.

## 2.1 The SESAR Release strategy

### Launch and execution of Release 1

The SESAR Joint Undertaking together with its members introduced the SESAR Release approach to feed the aviation community with an incremental flow of new or improved air traffic management solutions at a pre-industrialisation stage. Results delivered through the Release process will gradually contribute to the SESAR development phase objectives as well as to the specific 2012 mid-term objectives.

The Release process has been structured around a set of six operational packages (see below) clustering projects and activities to ensure an operational and performance focus. Two technical packages have been defined to structure technology that has a wider operational coverage: CNS and SWIM.

Release 1 featured 25 operational validation exercises which took place throughout Europe in 2011, with some final tasks completed in the first months of 2012.

### Operational package 1: Increased runway and airport throughput

The objective of this first package is to achieve optimal runway and airport utilisation in all traffic and weather conditions. In 2011 no validation exercise contributing to the completion of this package was performed.



## Operational package 2: Efficient and green airspace terminal operations

One aim of the SESAR Programme is to safely increase the capacity of the Terminal Area whilst optimising vertical flight profiles and safely providing capacity, predictability, efficiency and environmental benefits.

In 2011 three Release exercises contributed to the achievement of this operational package:

1. **Optimised RNP structures:** real-time simulation on a platform looking at validating the implementation of Precision Area Navigation (P-RNAV) in Madrid.

The trials firstly demonstrated the feasibility of Continuous Descent Approaches (CDAs) and Continuous Climb Departures (CCD) through P-RNAV. The exercise also showed an increase in capacity by integrating P-RNAV and conventional routes in high traffic density Terminal Manoeuvring Area (TMA). At the same time, the workload of pilots and controllers could be reduced. The exercises successfully demonstrated the maturity of the concept and the results support a decision for industrialisation.

2. **Point merge in complex TMA:** On the basis of real-time simulations, the exercise validated the improvement of point merge procedures through a better exploitation of Flight Management Systems in London's TMA.

The exercises demonstrated that point merge procedures work more effectively when used with an effective arrival manager. The controller workload could be reduced by 16% while increasing runway throughput by 4% and a 2% decrease in fuel burn. The exercises successfully demonstrated the maturity of the concept. Further activities are planned as part of Release 2.

3. **Approach procedure with vertical guidance:** This exercise aimed at validating approach procedures with vertical guidance using a satellite based augmentations system.

While keeping the controller workload within acceptable limits, the trials showed mostly improved airport landing rates with reduced airline diversions. The exercises successfully demonstrated the maturity of the concept and the results support a decision for industrialisation.



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### Operational package 3: Moving from airspace to trajectory management

The objective of package 3 is to introduce the use of business and mission trajectories. This final goal of the SESAR Programme will provide the ATM system with greater capacity, predictability and efficiency benefits. The exchange of air and ground data will lead to common situation awareness both for systems as well as pilots and controllers.

In 2011 eight Release exercises contributed to the achievement of this operational package:

1. **Trajectory Management Framework:** Three different validation trials were conducted – including a first flight trial – to assess procedures and requirements for the initial 4 Dimensions concept. The focus lay on supporting the management of a single Controlled Time Arrival (CTA) constraint in the en-route and TMA phases of flight.

The qualitative assessment of the exercises confirms that the CTA procedures do not impact safety; and that the concept allows improvements of vertical efficiency which should generate fuel savings. However, the exercise showed a deterioration of horizontal performance, which will be further investigated in Release 2 and Release 3.

2. **Sector team operations:** Through two shadow mode and live trials, procedures to improve sector team organisation and coordination (roles & responsibilities) were validated. Requirements for improved information and task sharing tools were delivered.

The exercises demonstrated the ability of air traffic controllers to perform their control tasks effectively using new support tools and defined working methods. The results therefore sufficiently support a decision for industrialisation.

3. **Enhanced short term conflict alert (STCA):** This validation exercise looked at supporting controllers in identifying possible conflicts for steady and manoeuvring aircraft in the TMA. The aim was to generate useful alerts with an adequate warning time.

The enhanced STCA allowed a reduction of false alarms while the genuine alert rate and warning times were maintained or even slightly increased. The exercises successfully demonstrated the maturity of the concept and the results support a decision for industrialisation.

4. **Airborne collision avoidance system monitoring:** Two exercises validated avoiding false alarms in the event of high vertical climb and descent rate encounters based on a new altitude capture law. The new altitude capture laws lead to a significant reduction (factor of 30) of the false alarm rates reducing workload for controllers and increasing safety. Due to the positive results, Airbus is already in the process of implementing the technology.

## Operational package 4: End to end traffic synchronisation

The objective of package 4 is to synchronise traffic flows for all phases of flight. This will lead to efficiency gains due to early planning and coordination of sequences and target times.

In 2011 eight Release exercises contributed to the achievement of this operational package:

1. **Integrated AMAN/DMAN:** On the basis of live trials, validation of enhanced Departure Manager (DMAN) procedures implemented to establish a pre-departure sequence at Paris CDG.

The results of this exercise are very promising with performance improvements in terms of target start-up time, predictability and stability of departure sequence. The average taxi time decreased by 9%. During the trials, adherence to Central Flow Management Unit (CFMU) slots improved as well, with 81% of all departing flights managing to match the slot that was attributed to them. The results thus support a decision for industrialisation.

2. **AMAN & Extended AMAN horizon:** On different platforms in Rome, Schiphol, London and Malmö, SESAR members validated procedures on extending the arrival tasks to the en-route controllers within Arrival Manager (AMAN) horizon of a related airport.

The trials showed significant benefits, including substantial environmental ones. For example in the London exercise, aircraft fuel burnt in the 500 nautical miles extended AMAN horizon was reduced by 9% or 942 kg per flight. Aircraft stack holding time (i.e. airborne waiting) was reduced by between 78% and 87%, with matching positive consequences on the flight's environmental impact. Follow-up activities are planned for Release 2.

3. **I4D and Controlled Time of Arrival:** The main objective of this exercise, which included the world's first four-dimensional flight on 10 February 2012, was to validate the operational concept of flying to a time constraint in the en-route as well as in the TMA area. The flight on an A320 test aircraft aimed at verifying the Flight Management System (FMS) and ground automation systems implemented the I4D solution through data link interoperability. The flight trial proved that useful data supporting the concept can be exchanged by air-ground systems. Additionally, the level of precision reached automatically by the airborne FMS was more than satisfactory. The results will contribute to further exercises planned in Release 2 and Release 3.



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## Operational package 5: Integrated and collaborative network management

The objective of package 5 is efficient and predictable collaborative management of European traffic flows and airspace and airport resources. In the future SESAR system, all ATM partners will have a shared awareness of the current and future predicted status of the traffic situation. It will thus be easier to for example redress capacity and weather constraints to facilitate the business needs of the users.

In 2011 six Release exercises contributed to the achievement of this operational package:

- 1. Complexity Assessment and Resolution:** The exercise successfully validated the ability of complexity prediction and assessment tools to detect traffic congestions and to reduce ATC controller workload. However, further activities are planned in Release 2 as the applicability of the concept in non-nominal cases and other ACCs have yet to be demonstrated.
- 2. Enhanced ATFCM Processes:** Through live trials in five different locations, SESAR members showed that STAM can provide an immediate and safe method of mitigating delays caused by excess demand and subsequent regulation of the network. In Reims for example, whilst traffic grew year on year by almost 2%, the comparable delay was reduced by almost 65%. Benefits in terms of punctuality and predictability were clearly illustrated during the trial observing a hotspot with 59 flights. Applying STAM measures, the initial total delay generated by network regulation was reduced by 799 minutes, reducing average delay of 13 minutes per flight to 2 minutes per flight. Further exercises are planned in Release 3, mainly to assess the applicability of the concept in non-nominal cases, higher traffic loads and in other ACCs

## Operational package 6: Co-operative asset management

The objective of package 6 is a coordinated planning between all ATM stakeholders to ensure a coherent and consistent transition to future service and capability levels.

In 2011 five Release exercises contributed to the achievement of this operational package:

1. **Controller Working Position Airport:** Through shadow-mode trials procedures were validated for a low cost and simple departure data entry panel improving the availability and accuracy of departure information. A significant improvement of traffic predictability at small airports was demonstrated. Only 6% of flights were outside a 10-minute margin of error, compared with 43% without the new SESAR tool. The exercises successfully demonstrated the maturity of the concept and support a decision for industrialisation.
2. **Controller Working Position En-Route and TMA:** Two validations looked at validating a new Human Machine Interface for the Controller Working Position with positive feedback from the controllers. However, some operational requirements have not been addressed yet and further exercises will be conducted in Release 2.
3. **Remote Tower:** Remote Tower technology allows the provision of Air Traffic Services to a single aerodrome from a remote control site. In this exercise, the remote control site successfully managed a smaller airport some 100 kilometres away. Further exercises are planned as part of Release 2 to provide more information on the security, safety and human performance.

**The Release 1 results will be thoroughly analysed in order to build business cases and recommendations for implementation. The full Release 1 report is available as of summer 2012.**

## Launch of Release 2

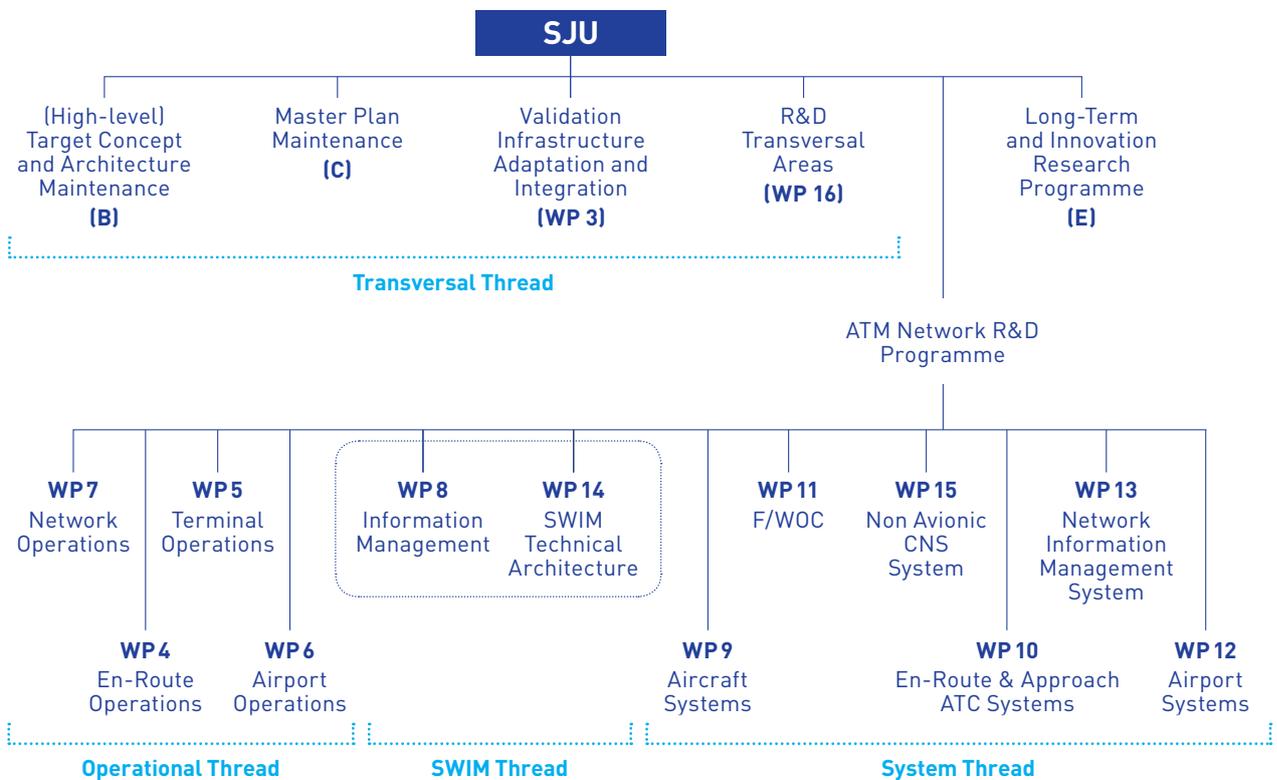
Release 2 will build on the results from Release 1 but will be wider in scope and will emphasise on coherence with the overall SESAR Programme. The main operational improvements aimed for in Release 2 are in the areas of **airport platform safety, airborne operations, ATC operations and network management**. Priority has been given to exercises demonstrating that future deployment is feasible in the short-medium term, assuming validation results confirm their suitability for delivery.

In its effort to answer to the needs of all **airspace users** and to validate the proposed technical and operational improvements in a real life environment, airspace users are involved in the Release 2 trials.

The programme contains 35 exercises, clustered into 18 themes (Operational Focus Areas). Four exercises have been carried over from Release 1.

## 2.2 Results by SESAR Work Package (WP)

Besides the activity performed within the first SESAR Release, SESAR progressed in all its Work Packages. The programme is divided into WPs addressing each step of the flight, themselves organised into sub-WPs and projects dealing with specific issues.



The programme is split into four different threads:

- Operational considerations are addressed under WPs 4, 5, 6 and 7;
- System considerations are addressed under WPs 9, 10, 11, 12, 13 and 15;
- System Wide Information Management considerations are addressed under WPs 8 and 14;
- “Transverse” activities”, such as validation infrastructure, development of safety, security, environment and human performance cases, European ATM Master Plan, Target concept and architecture maintenance, are dealt by a number of additional WPs (i.e. B, C, 3, 16).

## WP3 - VALIDATION INFRASTRUCTURE ADAPTATION AND INTEGRATION



The objective of WP3 is to support the SESAR partners as well as the operational and technical threads to properly define and coordinate the timely evolution and setting up of Verification and Validation Platforms.

WP3 played an active part in the definition of the Validation and Verification Roadmap for Releases 2 and 3. This work allowed for a more coherent top-down approach of SESAR validation exercises in 2011. Additionally, WP3 successfully led the first System Engineering Review of Release 1.

WP3 has established a recognised methodology which is gradually used by all validation actors based on a set of common tools.



## WP4 - EN-ROUTE OPERATIONS

The scope of WP4 is to provide the operational concept description for the en-route operations and to perform its validation. The applications of 4D/time-based operations are seen as a vital part of future TMA and en-route operations.

During 2011, the main achievement of WP4 was the preparation and execution of six Release 1 exercises involving CDM & Sector Team Operations, Complexity Assessment and Resolutions, etc.

## WP5 - TMA OPERATIONS



WP5 manages and performs all research, development and validation activities required to define the TMA ATM Target Concept. This covers all phases of planning and execution of flights/trajectories and the identification of supporting technical systems necessary for TMA Operations. The applications of 4D/time-based operations are seen as a vital part of the future TMA and en-route operations.

An important part of WP5's work in 2011 was linked to the first Release. Six of its projects were involved in several exercises and the main results achieved are in the domains of i4D and Controlled Time of Arrival as well as Arrival Manager (AMAN)/ Extended AMAN. WP5 also supported the definition of the second Release plan and seven WP5 projects will be involved in validation exercises in 2012.

## WP6 - AIRPORT OPERATIONS



The Airport Operations WP is addressing developments associated with the airside elements of airport operations. However, to ensure effective planning and management, landside elements (such as passenger and baggage handling) are also being taken into consideration, but with any associated developments being undertaken outside SESAR.

WP6 has contributed to the successful execution of the Release 1 Remote Tower validation. The initial results of these exercises have been encouraging, with further exercises to take place in 2012.

Progress has been made with requirements definition and validation in a number of other areas, in particular safety nets, surface planning, routing and guidance, wake vortex, etc.



## WP7 - NETWORK OPERATIONS

The scope of the Network Operations WP covers the evolution of services taking place in the business development and planning phases to prepare and support trajectory-based operations including airspace management, collaborative flight planning and Network Operations Plan (NOP).

The main achievements in 2011 include:

- The STAM (Short Term ATFCM Measures) or Dynamic DCB live trial for Release 1 (see above);
- The completion of the Step 1 Detailed Operational Definition (DOD) and Integrated Validation Plan. This provides a framework for the execution of all subsequent concept development and validation activities in WP7 for Step 1;
- Progress on concept development and validation planning leading to the approval of six exercises for Release 2.

## WP8 - INFORMATION MANAGEMENT



In order to realise the concept of SWIM (System Wide Information Management) for ATM, which is needed to achieve interoperability and inter-system seamless operations, WP8 primarily defines the ATM Information Reference Model (AIRM) and the Information Service Model (ISRM) to be used by the various ATM services and necessary to develop the SWIM specifications and test platforms.

Over 2011 a SWIM Action Plan has been put in place to respond to the issue raised at the Programme Control Group (PCG) level in February 2011 about the risk that without adequate project developments the programme would not achieve its SWIM objectives. The plan includes a set of 16 actions that were implemented immediately. By year end it was noted that the general situation of WP8 had gradually improved.

## WP9 - AIRCRAFT SYSTEMS



The scope of the Aircraft Systems WP covers the required evolutions of the aircraft platform, in particular to progressively introduce 4D trajectory management functions in mainline, regional and business aircraft. The work will address as well the progressive development of aircraft separation assurance and the aircraft components required for the improvement of surface movement operations as well as enhancements of communication, navigation and surveillance airborne systems.

In 2011, WP9 projects made considerable progress in the framework of the first SESAR Release. For example, the Initial 4D trajectory project has developed and implemented the elements which are necessary to manage the 4D trajectory on board. First technical flights have taken place to validate the on board functions under real conditions. The ASAS spacing function, which makes an aircraft establish and maintain a time spacing from a target aircraft designated by the air traffic controller (allowing a controller workload reduction and potentially a capacity increase), has been implemented in different avionics and integrated in an aircraft integration simulator.

Airspace users supported the projects and the added value was recognised both by project team and by airspace users.

## WP10 - EN-ROUTE & APPROACH ATC SYSTEMS



WP10 designs, specifies and validates the en-route & TMA ATC Systems evolutions for enhancing trajectory management, separation modes, controller tools, safety nets, airspace management supporting functions and tools, etc.

During 2011, the first sets of technical requirements have been developed and verified in support to mainly the Release 1 exercises, covering areas such as trajectory management and flight objects, enhanced data link capabilities, complexity assessment and safety net. The corresponding prototypes have been used in Release 1 exercises.

## WP11 - FLIGHT OPERATIONS CENTRE SYSTEM

The scope of the Flight and Wing Operations Centres / Meteorological Services Work Package covers the definition of the airspace users operations and the development of the systems required to support the implementation of the various SESAR components (e.g. adaptation to the 4D trajectory). The WP addresses the meteorological service component in increasing ATM performance. WP11 projects will contribute to Release 2.

The scope has been separated into two stand-alone sub-Work Packages (SWP), the first SWP (11.01) addressing Flight and Wing Operations Centres and the second SWP 11.02 addressing Meteorological Services.

### FLIGHT AND WING OPERATIONS CENTRES



On 9 June 2011, the Fly4D consortium – led by Airbus with Cassidian, Honeywell, Lufthansa Systems and Sabre Airline Solutions – was awarded a contract to perform SESAR sub-Work Package 11.01. The work addresses the definition, the development and the validation of airspace user's future flight planning and control systems and procedures in support of the SESAR ATM Target Concept.

### METEOROLOGICAL SERVICES



On 16 January 2012, the EUMETNET Consortium – led by EUMETNET EIG with seven National Meteorological Services (Meteo France, UK Met Office, DWD, FMI, met.no, KNMI and SMHI) and three industry partners (Belgocontrol, NLR and Thales Air Systems) – has been awarded a contract to perform SESAR sub-Work Package 11.02 (Meteorological Information Services). 11.02 will provide the SJU and its partners with the opportunity to properly integrate weather into the SESAR Programme.

## WP12 - AIRPORT SYSTEMS



The scope of the Airport Systems Work Package encompasses all Research & Development activities to define, design, specify and validate the airport systems needed to support the SESAR ATM target concept. WP12 will undertake technical developments and validation/verification, providing the ground-based system support to the new concepts, procedures and practices described by WP6.

In 2011 WP12 has among others contributed to Release 1 through project 'Baseline for Airport Controller Tools', a stand-alone project that has successfully developed, verified and validated a low cost tool to improve the connection between small/medium airports and the CFMU. Furthermore, the incorporation of SWIM into the activities of WP12 is being addressed with effective coordination between WPs 8 and 14.

## WP13 - NETWORK INFORMATION MANAGEMENT SYSTEM (NIMS)



The scope of the Network Information Management System Work Package covers the system and technical R&D tasks related to the Network Information Management System (NIMS), the Advanced Airspace Management System (AAMS) and the Aeronautical Information Management System (AIMS).

The main achievements in 2011 included the implementation of the Network Manager Validation Platform (NMVP) at the Eurocontrol CFMU as well as progress on system requirements and architecture aspects.



## WP14 - SWIM TECHNICAL ARCHITECTURE

The SWIM technical architecture Work Package is the follow-up of SWIM-SUIT, an European Commission FP6 project. It uses as an input the SWIM-SUIT deliverables and adapts them and/or further develops them to cope with the SESAR work programme components.

WP14 is actively contributing to the SWIM Action Plan. A SWIM Demonstration Event took place in November with good participation from the overall programme WPs. During this event, participants received an in-depth view of the SWIM Technical Infrastructure designed and developed for SESAR Step 1. Live demonstrations of SWIM building blocks in various ATM operational contexts were scheduled.



## WP15 - NON AVIONIC CNS SYSTEM

The Non Avionic CNS System Work Package addresses CNS technologies development and validation also considering their compatibility with the Military and General Aviation user needs.

In 2011, good progress has been made in a number of areas. For example, the project in charge of airport communication system has delivered propagation analysis results and has produced user profile deliverable which has been fed into the international standardisation forum in charge of the WiMAX standard. The same project has also significantly contributed to EUROCAE and has been successful in starting ICAO SARPS. Satellite Communication coordination has been ensured with the European Space Agency (ESA). A first version of the definition deliverable (Mission Requirements) has been produced and transferred to ESA which is in charge of defining the system to be tested by SESAR. Three projects are working together on navigation infrastructure definition and optimisation. Most of the projects in WP15 contributed significantly to standardisation activities. Airspace users supported the projects and the added value was recognised both by project team and by airspace users.



## WP16 - R&D TRANSVERSAL AREAS

The scope of the R&D Transversal Areas (TAs) Work Package covers the improvements needed to adapt safety, security, environment, contingency (service continuity) and human performance management system practices to SESAR as well as towards an integrated management system. WP16 also provides support and coordination for the consistent and coherent application of the already existing as well as newly developed TA-related practices to SESAR operational and system Work Packages.

In 2011, the main activity of WP16 has been to set-up the Reference Material for Transversal Areas defining the methods to be applied by WP 4-15 to perform their safety, security, environment, human performance and cost-benefit assessments.

WP16 has supported the initiation of working methods with EASA and National Supervisory Authorities for cases acceptability. The WP provided valuable support to the European Commission (EC) for the update of Directive 2002/30/EC on the establishment of rules and procedures with regard to the introduction of noise related operating restrictions at Community airports.



## WPE - LONG TERM AND INNOVATIVE RESEARCH PROGRAMME

The scope of WPE is 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. SESAR Long Term and Innovative Research themes were defined with the advice of the Scientific Committee. These research themes include legal aspects of paradigm shift; towards higher levels of automation in ATM; mastering complex systems safely; economics and performance.

During 2011, the research themes have been used to establish the work in WPE to date, consisting of two Research Networks, some PhDs and the selection as well as launch of 18 research projects. During 2011 further PhDs were awarded by the Automation Research Network area. In total 20 PhDs students are currently working in ATM research. 2011 represented the majority of the first year of operation of the Research Networks and their annual reviews.

The Scientific Committee has met on three occasions and provided valuable advice to the SESAR JU on the best strategy to adopt research themes. It also took an active part in the PhDs selection during 2011.



DFS Deutsche Flugsicherung

## WPB - TARGET CONCEPT AND ARCHITECTURE MAINTENANCE

The scope of the Target Concept and Architecture Maintenance Work Package covers the maintenance and refinement of the high-level ATM Performance Target and Architecture including the Concept of Operations (CONOPS). It defines and ensures the consistency of the ATM architecture for all SESAR WPs. WPB will also conduct a performance analysis of the ATM Target Concept throughout SESAR development phase.

During 2011, WPB has supported the SESAR Releases by preparing and chairing Release review sessions. WPB has delivered initial material supporting the definition of Step1 CONOPS such as the Initial Trajectory Operations, high-level scenarios. WPB has also produced initial Step1 validation targets (fuel efficiency, cost effectiveness, safety, capacity [airspace and airport runway]) which set the performance goals for the R&D activities of the work programme.



## WPC - MASTER PLAN MAINTENANCE

The scope of the Master Plan Maintenance Work Package is to administrate the up-to-date maintenance of the European ATM Master Plan to monitor the progress of development and of implementation. It also maintains the standard and regulatory roadmaps as well as the SESAR business cases.

On 5 October 2011, the European ATM Master Plan update campaign was officially launched. A group has been created to support the update work: the Master Planning Group (MPG) composed of key projects, the European Commission, EASA, the Performance Review Unit, and representative of different stakeholders such as ANSPs, airspace users, air and ground manufacturers, staff associations, Military, etc. MPG members have finalised their first, important technical review of Operational Improvement Steps, Enablers, Deployment Scenarios and Deployment Packages. With this, the update campaign moved to the following step, the broad consultation with ECAC experts on 19 December 2011. A portal dedicated to the ATM-MP update consultation and review has been made available to the ATM community.

WPC has also supported the ICAO standardisation process with the initial SESAR needs, and has defined the processes to develop and maintain the standardisation and the regulatory roadmaps. The project in charge has developed an initial regulatory and standardisation baseline as well as an initial version of the two roadmaps.

## 2.3 Other programme results

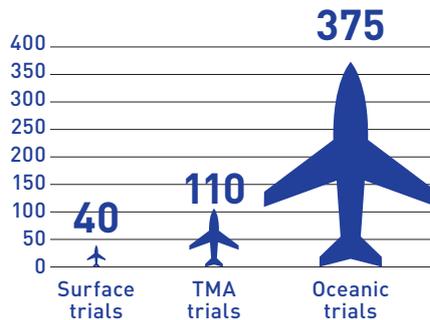
### AIRE

The SESAR JU collaborates with the US Federal Aviation Administration (FAA) and a number of European and North American partners in an international programme for the reduction of aircraft emissions (AIRE - Atlantic Interoperability Initiative to Reduce Emissions).

On the European side alone, this project has since 2009 realised close to 10,000 trials under operational conditions. Most of the solutions validated through AIRE have now been implemented in daily operations or will be shortly.

In 2010/11 eighteen AIRE projects carried out more than 9,000 live trials on commercial flights. Average fuel savings<sup>1</sup> per flight were in the order of 40 kg for surface trials, 110 kg for projects covering TMA operations, and 375 kg of fuel for oceanic for an A330 aircraft. 41 partners from 13 different countries (including Morocco and Canada) formed the projects' consortia. This cycle of AIRE projects has so far been the most ambitious one, not only in terms of numbers of partners and flights, but also in terms of set-up. Projects tackled improvements for surface, terminal and oceanic areas; seven of them successfully covered more than one flight domain, aiming at a green gate-to-gate approach.

Figure 1:  
Average kg of  
fuel saved on  
A330 aircraft



The initiative received a lot of media attention with increased interest and information requests from airlines and ANSPs not officially part of consortia. On the technical side, a large range of areas were covered with an immediate implementation in Paris CDG, Zurich, Toulouse, Brussels and Vienna airports; the oceanic FIRs of St Maria, Casablanca, New York, Shanwick and Gander.

### OPTIMI and SAT-OPTIMI

Following the tragic loss of Air France flight 477 over the Atlantic in June 2009, the European Commission asked the SESAR JU to find solutions to better track aircraft in oceanic and remote low density airspace. In response to this, the Oceanic Position Tracking Movement and Monitoring project (OPTIMI) was launched.

To complement the results of OPTIMI, the SESAR JU launched the SAT-OPTIMI study, using the output from OPTIMI to present the feasibility and options for the best use

1. Averaged figures based on 14 projects



of satellite infrastructure and technology to ensure full deployment of oceanic and remote tracking services.

The study report included, 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 deployment path for aircraft tracking services over oceanic, remote continental and Polar Regions.

The main recommendations from the study were to:

- Initiate Iridium based flight data triggered transmission system demonstrations for the quick adoption of emergency triggered service.
- Sponsor the development of INMARSAT SB200 Oceanic Safety as a key driver for an optimised FANS 1/A regulated service.

## European ATM Master Plan Update

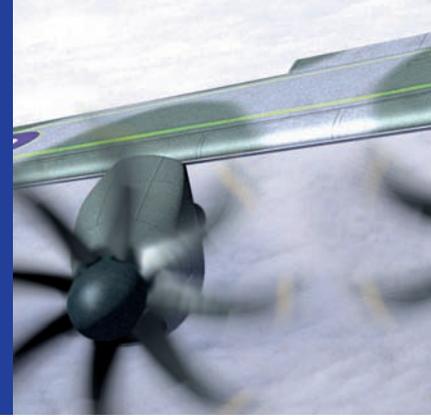
The European ATM Master Plan identifies the performance needs of the future ATM system and provides the operational, technological, standardisation and regulatory sequence that will contribute to the achievement of these needs. The update supported by a Master Planning Group (MPG) takes into account the developments since the end of the SESAR definition phase. It will result in a significant change in comparison with the current Master Plan.

During the kick-off of the European ATM Master Plan update campaign on 5 October, it was agreed that the new Master Plan should respect the following principles:

- Prepare for the deployment phase, including the connection between the research and development activities, deployment scenarios and performance needs;
- Ensure global interoperability.

The updated European ATM Master Plan will be fully aligned with the SESAR Programme and the timely deployment of enablers (technology, procedures, regulations, standards etc.) in accordance with the performance targets. It will take into account various developments like the updated Long Term Traffic Growth Forecast, the results achieved in the R&D programme as well as in implementation activities (IP1) and the indications emerged so far. It will also rationalise and simplify the first edition and introduce comprehensive views of the European ATM Master Plan per category of stakeholders.

# Part 3: Cooperation with partners & programmes



The SESAR JU constantly aims at broadening and deepening the participation of different stakeholders in the programme. Consequently, eight new 'Associate partners of the SESAR JU' were taken onboard. But the SESAR JU also further fostered cooperation with professional staff associations, military partners or national aviation authorities. At the same time, its management was very active in strengthening ties with international partners and sister ATM modernisation programmes.

## New Associate Partners

In January 2011 the SESAR JU launched an invitation to submit proposals for becoming "Associate partners of the SJU". The invitation was specifically addressed to entities belonging to four categories: SMEs, Research Organisations, Universities and Institutes of higher education. Eight new consortia were endorsed by the SESAR JU on 1 July 2011. This new category of partners was created to answer the need to complement and complete the expertise brought by the SESAR JU members to the SESAR Programme in specific ATM fields:

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

Lot 3 was not awarded as no proposals were received.

## Military

86 military experts from six countries are engaged in the SESAR Programme through the Military Engagement Plan for SESAR (MEPS). The MEPS which was initiated in mid-2011 will facilitate the participation of national military in all relevant aspects of the work programme.

Also in 2011, the SESAR JU awarded the "SESAR Military Avionics Study", to a consortium composed of ISDEFE (Ingeniería de Sistemas para la Defensa de España, S.A.) and AIRBUS Military to make an inventory of existing and future military state of the art technologies, in particular for airborne equipage, and their respective performance capabilities. The study will highlight how to ensure interoperability between military and civil technologies, in order to reduce implementation cost for SESAR.



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## Professional Staff Associations

The continuous involvement of five professional staff associations in the SESAR Programme has been secured through new two-year framework contracts. The full participation of their experts into the programme is in place; additionally, a pool of 65 cross-nationality licensed and operational ATCO's, pilots and ATSEP's have formed an International Validation Team. The team is ready to participate in the different validation activities depending on the type of exercise and need. The interest and motivation of the Staff Associations to participate in SESAR has increased during 2011.

☪ In January 2010, Eurocontrol on behalf of the SESAR Joint Undertaking awarded five major staff associations (ATCEUC, ECA, ETF, IFATSEA, IFATCA) with framework contracts to secure the involvement of their representatives in the programme. ☪

## National Supervisory Authorities

The SESAR JU organised the involvement of National Supervisory Authorities (NSA) experts in different parts of the programme with a focus on the review of safety deliverables and on participation in Release 1 validation exercises. This approach has proven to be very successful, as it made programme partners aware of possible regulatory constraints and certification issues. On the other hand, it enables the authorities to better understand the development of systems and procedures that they will later have to certify.

## Civil Airspace Users

Airspace Users have been actively involved across the programme, contributing towards projects tasks and deliverables across 92 projects. Contributions equivalent to 1,750 man-days have been received from Air France, EBAA, ELFAA, IAOPA, IATA, KLM, LAG, Novair, SAS and TAP. Apart from airline experts, the SESAR JU is pleased to now also have rotorcraft representatives involved.



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## Federal Aviation Administration (FAA)/ NextGen

Cooperation with the FAA and especially its ATM modernisation programme NextGen progressed well in 2011. In the framework of the newly signed Memorandum of Cooperation providing a dedicated annex on NextGen/SESAR cooperation, a number of coordination activities were launched.

- Coordination of technical efforts in support of global and ICAO standardisation activities;
- Road-mapping including standardisation and regulation with a view to facilitate implementation synchronisation;
- Avionics technology and applications roadmap;
- Data-link technology;
- Atlantic Interoperability Initiative to Reduce Emissions (AIRE).

## Other European Union initiatives

During 2011, the SESAR JU and the Clean Sky JU continued discussions and alignments for the improvement of the environmental footprint of aviation through gate-to-gate and SESAR trajectory operations. In addition, to avoid duplication of research activities, the SESAR JU was in regular exchange with European Commission Directorate-Generals Research and MOVE for all their sector related activities performed through the 7th Framework Programme.

## ICAO

The SESAR JU takes on a key role in the European coordination for ICAO's 12th Air Navigation Conference (ANC/12) in November 2012 together with the European Commis-

sion, Eurocontrol, the European Aviation Safety Agency (EASA), European Civil Aviation Conference (ECAC) and European Organization for Civil Aviation Equipment (EUROCAE). At ANC/12 the international aviation community will agree on the work plan for the next ten years based on the needs of the different ATM modernisation programmes and, specifically, those of NextGen and SESAR.

The SESAR JU has identified key areas where the SESAR development phase needs the support of standards and ICAO provisions. These areas have been coordinated with the FAA under the EU-US MoC Coordination Plans and will be further worked on with the aim of having SESAR and NextGen coordinated working papers on ICAO provisions and standards for presentation and agreement at the ANC/12.

## EASA

A letter of agreement between the SESAR JU and EASA took effect in January 2011 meaning that the safety agency could take up its work of reviewing SESAR project deliverables. The initial list of actions included for example assessments on the remote and virtual tower and the evolution of ground based safety nets projects as well as OPTIMI. In September, EASA was also asked to review the guidance material to execute proof of concept as a high priority. The work is ongoing and results expected in 2012.

## European Space Agency (ESA)

The SESAR JU and ESA work together in a number of activities: most prominently the IRIS programme which aims to develop a new air-ground communication system for air traffic management (see box). Furthermore the two agencies interact for the OPTIMI and SAT-OPTIMI projects, the business case analysis of SatCom development and on GNSS navigation aspects.

“The SESAR JU and ESA have established a productive working relationship through the IRIS programme. ESA staff actively participates in SESAR projects relevant to them. The SESAR JU also participates directly in the Joint Iris Advisory Committee. These activities continue in 2012.”

## Cooperation with other regions

The SESAR JU pursues international relations in the context of the European Commission external relations framework. Concrete technical cooperation on the basis of bilateral Memoranda of Cooperation signed between the European Commission and the US, Japan and Mexico allowed the SESAR JU to cooperate closely with those countries.

# Part 4: Financial information

In 2011 the vast majority of SESAR projects were in their actual execution phase (meaning the project plans had been approved by the SESAR JU already). This could be felt in a considerable increase of co-financing of projects by the SESAR JU. Where the SESAR JU in 2010 paid EUR 25 million to realise its operational activities, this amount increased to EUR 62 million in 2011. At the same time, pre-financing of projects decreased from EUR 53 million in 2010 to EUR 6 million in 2011.

In accordance with Article 15 of the SESAR JU Financial Rules and in order to ensure the most adequate cash management in view of 2012 expenditure, the SESAR JU limited its cash request to the EU to EUR 18 million, received in December 2011. The resources made available by the SESAR JU members, the budget provided by FP7 and TEN-T, the cash contribution from Eurocontrol, were used in accordance with the SESAR JU Financial Rules and, consequently, in line with the principles of the European Union Programmes providing the funds. With particular regard to the estimated eligible costs of the SESAR Programme, the provisions of Title 9 of the SESAR JU Financial Rules were applied, considering that these provisions are derived from the principles of FP7 and TEN-T funding systems.

## Balance Sheet

| ALL FIGURES IN EUR              | 31/12/2011                                 | 31/12/2010         |           |
|---------------------------------|--|--------------------|-----------|
| <b>1. NON-CURRENT ASSETS</b>    | <b>106.628.418</b>                         | <b>108.575.803</b> |           |
| Intangible fixed assets         | 677.199                                    | 865.999            |           |
| Tangible fixed assets           | 425.161                                    | 479.400            |           |
|                                 | <i>Furniture and Vehicles</i>              | 53.499             | 34.522    |
|                                 | <i>Computer Hardware</i>                   | 49.270             | 62.752    |
|                                 | <i>Other tangible assets</i>               | 322.392            | 382.126   |
| Long-term Pre-Financing         | 105.526.058                                | 107.230.404        |           |
| <b>II. CURRENT ASSETS</b>       | <b>23.210.677</b>                          | <b>57.387.142</b>  |           |
| Short-term receivables          | 631.325                                    | 230.513            |           |
|                                 | <i>Current receivables</i>                 | 471.361            | 69.327    |
|                                 | <i>Sundry receivables</i>                  | 1.101              | 310       |
|                                 | <i>Accrued income</i>                      | 45.420             | 160.876   |
|                                 | <i>Deferred charges</i>                    | 113.443            | -         |
| Cash & cash equivalents         | 15.303.453                                 | 57.156.629         |           |
| Short-term Pre-Financing        | 7.275.899                                  | -                  |           |
| <b>TOTAL ASSETS</b>             | <b>129.839.095</b>                         | <b>165.962.945</b> |           |
| <b>III. CURRENT LIABILITIES</b> | <b>224.457.367</b>                         | <b>144.519.752</b> |           |
| Accounts payable                | 8.799.321                                  | 8.069.279          |           |
|                                 | <i>Current payables</i>                    | 105.370            | 257.588   |
|                                 | <i>Accrued charges</i>                     | 8.374.644          | 7.381.334 |
|                                 | <i>Taxes, salaries and social security</i> | -                  | -         |
|                                 | <i>Other accounts payable</i>              | 319.307            | 430.357   |

|   |                     |                    |
|---|---------------------|--------------------|
| Co-Financing to be paid to the Members                    | 78.394.873          | 55.100.098         |
| Contribution from Members to be validated                 | 137.001.592         | 81.331.743         |
| Cash Contributions from Members to be accepted            | 261.581             | 18.632             |
| <b>TOTAL LIABILITIES</b>                                  | <b>224.457.367</b>  | <b>144.519.752</b> |
| <b>NET ASSETS (Total Assets less Total Liabilities)</b>   | <b>(94.618.272)</b> | <b>21.443.193</b>  |
| <b>IV. NET ASSETS</b>                                     | <b>(94.618.272)</b> | <b>21.443.193</b>  |
| Contribution from Members                                 | 332.750.100         | 227.828.834        |
| <i>European Union</i>                                     | <i>197.552.000</i>  | <i>179.552.000</i> |
| <i>Eurocontrol</i>  | <i>80.793.978</i>   | <i>42.200.336</i>  |
| <i>Other Members</i>                                      | <i>54.404.122</i>   | <i>6.076.498</i>   |
| Accumulated contribution from Members used previous years | (206.385.641)       | (66.395.588)       |
| Contribution from Members used during the year (EOA)      | (220.982.731)       | (139.990.053)      |
| <b>TOTAL NET ASSETS</b>                                   | <b>(94.618.272)</b> | <b>21.443.193</b>  |

## Economic Outturn Account

| ALL FIGURES IN EUR                                     | 2011                 | 2010                 |
|--|----------------------|----------------------|
| <b>OPERATING REVENUE</b>                               |                      |                      |
| Contributions from Members                             | 0                    | 0                    |
| Other Revenues   | 0                    | 0                    |
| Total operating revenue                                | 0                    | 0                    |
| <b>OPERATING EXPENSES</b>                              |                      |                      |
| Administrative expenses                                | (8.167.569)          | (6.970.399)          |
| <i>Staff expenses</i>                                  | <i>(4.527.126)</i>   | <i>(4.037.695)</i>   |
| <i>Fixed assets related expenses</i>                   | <i>(574.859)</i>     | <i>(488.883)</i>     |
| <i>Other administrative expenses</i>                   | <i>(3.065.584)</i>   | <i>(2.443.821)</i>   |
| Operational expenses                                   | (213.020.522)        | (133.239.266)        |
| <i>Other operational expenses</i>                      | <i>(213.020.522)</i> | <i>(133.239.266)</i> |
| Total operating expenses                               | (221.188.091)        | (140.209.665)        |
| <b>DEFICIT FROM OPERATING ACTIVITIES</b>               | <b>(221.188.091)</b> | <b>(140.209.665)</b> |
| <b>NON-OPERATING ACTIVITIES</b>                        |                      |                      |
| <i>Financial operations revenues</i>                   | <i>211.166</i>       | <i>198.073</i>       |
| <i>Financial operations expenses</i>                   | <i>(5.806)</i>       | <i>(4.172)</i>       |
| <i>Other non-operational income</i>                    | <i>0</i>             | <i>25.711</i>        |
| Total non-operating activities                         | 205.360              | 219.612              |
| <b>CONTRIBUTIONS FROM MEMBERS USED DURING THE YEAR</b> | <b>(220.982.731)</b> | <b>(139.990.053)</b> |

Disclaimer: All financial figures contained in this report are subject to the final observations of the European Court of Auditors and the final approval by the SESAR JU Administrative Board (in accordance with Article 5 (i) of the Statutes of the SESAR JU annexed to Council Regulation (EC) No 219/2007 of 27 February 2007 and as amended by Council Regulation (EC) No 1361/2008 of 16 December 2008).

# Annex

## Composition of the SJU Administrative Board on 31 December 2011

| <b>SJU FOUNDING MEMBERS</b>        | <b>MEMBER</b>                    | <b>ALTERNATE MEMBER</b> |
|------------------------------------|----------------------------------|-------------------------|
| European Commission                | Mr Matthias Ruete (Chairman)     | Mr Matthew Baldwin      |
| EUROCONTROL                        | Mr Bo Redeborn (Deputy Chairman) | Mr Bernard Miaillier    |
| <b>SJU MEMBERS</b>                 | <b>MEMBER</b>                    | <b>ALTERNATE MEMBER</b> |
| AENA                               | Mr Reinaldo Rodríguez            | Ms Mariluz De Mateo     |
| Airbus                             | Mr Bernard Rontani               | Mr Pierre Bachelier     |
| ALENIA Aeronautica                 | Mr Nazario Cauceglia             | Mr Maurizio Fornaiolo   |
| DFS                                | Mr Dieter Kaden                  | Mr Georg Dickhaut       |
| DSNA                               | Mr Maurice Georges               | Mr Philippe Merlo       |
| ENAV                               | Mr Iacopo Prissinotti            | Mr Cristiano Baldoni    |
| Frequentis                         | Mr Johannes Bardach              | Mr Johannes Prinz       |
| Honeywell                          | Mr Jean-Luc Derouineau           | Mr Alexander Laybros    |
| INDRA                              | Mr Rafael Gallego Carbonell      | Mr Ramon Tarrech        |
| NATMIG                             | Mr Aage Thunem                   | Mr Magnus Lindegren     |
| NATS                               | Mr Ian Mills                     | Mr Richard Deakin       |
| NORACON                            | Mr Thomas Allard                 | Mr Niclas Gustavsson    |
| SEAC                               | Mr Giovanni Russo                | Mr Roland Krieg         |
| SELEX S.I.                         | Mr Antonio Mattogno              | Mr Stefano Porfiri      |
| Thales Group                       | Mr Rémi Gille                    | Mr Luc Lallouette       |
| <b>STAKEHOLDER REPRESENTATIVES</b> | <b>MEMBER</b>                    | <b>ALTERNATE MEMBER</b> |
| Military                           | Gp Capt John Clark               | (vacant)                |
| Civil users of airspace            | Mr Vincent de Vroey              | Mr Pedro Vicente Azua   |
| Air Navigation Service Providers   | Mr Guenter Martis                | Mr Bernard Martens      |
| Equipment manufacturers            | Mr Michael Von Gizycki           | Mr Patrick de Prévaux   |
| Airports                           | Mr Philippe Ahrens               | Mr José Thomás Baganha  |
| Staff in the ATM sector            | Mr Loïc Michel                   | Mr Joël Cariou          |
| Scientific community               | Mr Peter Hecker                  | (vacant)                |



## Composition of the management team of the SESAR JU

Patrick Ky, Executive Director of the SESAR JU, manages the SESAR Programme following the guidelines established by the Administrative Board to which he reports. To achieve this, he has the full commitment of the SESAR JU team.

### Executive Director's Office

Chief Strategies and International Relations: Michael Standar

Senior Advisor Military Affairs: Denis Koehl

Advisor: Fiona McFadden

Chief Corporate Communication: vacant

Internal audit: Véronique Haarsma

### Directorate Programme and Operations

Deputy Executive Director Operations and Programme: Florian Guillermet

Deputy Director Operations & Programme (Chief Technology and Innovation): Peter Hotham

Chief Regulatory Affairs: José Antonio Calvo Fresno

Chief Economics and Environment: Alain Siebert

Chief ATM: Benoit Fonck (acting)

### Directorate Finance and Administration

Deputy Executive Director Finance and Administration: Carlo Borghini



For the latest information, please consult our website:

[www.sesarju.eu](http://www.sesarju.eu)

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