SESAR came to life on the recognition of serious inadequacies with the current air traffic management system. Today, the shortcomings of the European ATM system are estimated to cost some €4 billion annually. Without a radical change in the way air transport is managed, flying in Europe will reach its limits, leading to more delays for passengers, greater safety concerns, increased costs for airlines and higher CO2 emissions.

The aim of 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 industrial implementation.

In this context, almost 3,000 experts in Europe and beyond are working to bring ATM technology up to 21st century standards.

Partnership, sustainability and user orientation are the founding principles of the SESAR Joint Undertaking’s approach to delivering tangible, deployable solutions to the ATM world.
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**WHY SESAR?**

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

The mission of SESAR is to modernise Europe's ATM system. As the technological pillar of Europe's ambitious Single European Sky initiative, the programme has set ambitious performance targets by 2020:

- A 27% increase in Europe's capacity
- A 40% reduction in accident rate per flight hour – corresponding to the safety need associated with the anticipated traffic growth;
- A 2.8% reduction per flight in environmental impact; and
- A 6% reduction in CO2 emissions per flight.

SESAR is not just another European Research and Development project. The outcomes of the innovative work are expected to have considerable impact on both the aviation industry and society as a whole:

- A combined positive impact on the EU's GDP of €400 billion over next 20 years.
- Creation of approximately 35,000 additional jobs in air transport industries. And €40 billion additional impact, the figure rises to €308 billion.
- Flights are shortened by approximately 15%, Franchise flights by an average.
- A 5% improvement in on time performance and delays and increased predictability and punctuality on arrivals / departures.

**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: Charles Kmit
- Liaison Officer at the Delegation of the European Union to the United States: David Batchelor
- Chief Corporate Communications: Nathalie Oghlian
- Internal Audit: Markus Hamann

Directorate Programme and Operations
- Deputy Executive Director Operations and Programme: Florian Guillermet
- Deputy Director Operations & Programme (Chief Technology and Innovation): Peter Hotham

Directorate Finance and Administration
- Deputy Director Finance and Administration: Carlo Borghese
2012 HIGHLIGHTS

In 2012, the SJU and its members endorsed the new European roadmap for ATM Modernisation: the European ATM Master Plan 2012. This Master Plan is the flagship for all SJU activities and research, steering the programme towards realising its mission of creating the change in European ATM.

1,500 full time employees

2,221,102.16 man hours were spent to make SESAR solutions a reality.

2,767 experts

SESAR is delivering: by the end of 2012, 82% of the Vision and Objectives 2012 were completed.

Programme progress 2011-2012
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Message from Chairman of the Administrative Board, Matthias Ruete, Director-General for Mobility and Transport (DG Move), European Commission

CHANGING EUROPEAN ATM

In 2010 the SESAR Joint Undertaking established its mid-term vision to “create by 2012 the change in the European ATM that demonstrates our ability to deliver benefits to the community”. This vision is shared by many. There is considerable reflection and debate on the need for creating change and delivering benefits in ATM. The pursuit of this common vision has led to some significant initiatives in 2012. For example, the adoption of the second edition of the ATM Master Plan, which becomes the key tool for SESAR deployment outlining the essential operational and technological changes necessary to achieve the European Single Sky performance objectives; and:

- the revision of the Implementing Regulations on performance and charging with binding performance targets in all four key performance areas of safety, environment, capacity and cost-efficiency;
- the launching of the second revision of the Single European Sky regulatory framework, aiming at improving efficiency of service provision and modernising the Institutional landscape;
- the initiation of the SESAR deployment process through common projects and governance and incentive mechanisms; and
- On the international scene, the endorsement of the Aviation System Block Upgrades and agreement on a draft Global Air Navigation Plan at the 12th ICAO Air Navigation Conference in November 2012.

This 2012 annual report describes the results achieved over the past year by the Joint Undertaking in delivering the SESAR vision. These successes reflect its continuous efforts to improve its effectiveness by reassessing priorities, optimising the use of public and private resources and by enhancing its management processes, to respond to the ever-evolving needs for a better performing ATM system.

SESAR definition, development and deployment processes are more and more strongly interrelated and inseparable components of a continuous and evolving cycle. Having initiated SESAR deployment, through the Commission’s implementing Regulation on common projects, we have grasped the ends of this cycle and recognised the SESAR Joint Undertaking as a pivotal contributor.

How to continue ATM research and innovation under the upcoming Horizon 2020 Research and Innovation Programme? I believe that we can proudly say that the SESAR Joint Undertaking is one of the Union’s most ambitious and successful initiatives. It has proven its ability to create the change envisioned in European ATM. For this reason, the Commission, strongly supported by ATM stakeholders, is proposing the extension of the SESAR Joint Undertaking beyond its current mandate.

The benefits of a better performing European ATM are more than ever within reach thanks to the many achievements of SESAR and of the Single European Sky framework. But to exploit these benefits we need to maintain the momentum and intensify common effort, to demonstrate the will and ability to implement the necessary changes.

Foreword from Patrick Ky, Executive Director, SESAR Joint Undertaking

SCALING UP COLLABORATION FOR PROGRESS IN SUSTAINABLE AVIATION

SESAR was set-up to make a difference by developing solutions that will fundamentally change the way air traffic management is being handled in Europe. Recognising that this mission is too large for one organisation to accomplish alone, SESAR is a unique public-private partnership whose real success depends on a broad partnership of many stakeholders.

In 2012, more than 2500 people, from 80 entities, 16 members and 13 associate partners were working on over 300 projects. Among them were Europe’s biggest airports, some 21 air navigation service providers and the world’s leading manufacturers. In addition, we are working with airspace users, the scientific and military communities, and we have stretched SESAR’s boundaries across Europe.

It is thanks to this broad and diverse partnership that SESAR has been able to deliver the impressive results contained in this report. We need the expertise of all stakeholders and the assurance that the technologies developed will meet their needs.

SESAR’s members have proven that by working together real changes in the ATM domain are achievable. Not only will the aviation industry benefit from optimised flights, but society will profit as a whole. The programme still has a long way to go but we are moving forward and we have the right partnership to face the challenges together. Our results indicate that we are clearly already delivering tangible, deployable solutions to the ATM world.

We are delivering. We are modernising the European sky. It’s our mission and together with our members and partners we are achieving it!

2012 was the last full year of my tenure as Executive Director of SESAR JU as I will move on to new challenges as the Executive Director of the European Aviation Safety Agency (EASA) in September 2013. I would like to take this opportunity to thank both the Board and staff members for their support and active contribution during the last 6 years. I am extraordinarily proud of what we have accomplished together and I am confident that my departure will not jeopardize the future of SESAR. The team is ready, prepared and skilled to face future challenges and build on the good work that has already been achieved. I look forward to continuing to collaborate with SESAR in my new position – which, after all shares a common objective.
At the end of 2009, SESAR published a first mid-term “vision” covering the period 2010–2012 to ensure that the SESAR Programme was focused not only on the achievement of its mission but also on concrete research and innovation progress, including quick wins. In this context, SESAR’s vision for the period 2010–2012 was defined as follows: “By 2012 we have created the change in the European ATM that demonstrates our ability to deliver benefits to the community.”

The strategic objectives together with an assessment of the achievement at year-end 2012 are:

**OBJECTIVE ONE**

**INITIAL 4D TRAJECTORY IS VALIDATED IN AN OPERATIONAL ENVIRONMENT SUPPORTED BY SATELLITE BASED TECHNOLOGY**

The SESAR 4D trajectory concept adds time to the classical three-dimensional flight trajectory. It aims at enabling more direct flights with benefits for passengers, airlines and the environment. The 4D trajectory concept requires that airspace users are able to agree on the detailed 4D Business/Mission trajectory directly with the service providers involved in facilitating the flight path in the specific airspaces concerned.

“Initial 4D trajectory” based operations were tested in an operational environment as part of Releases 1 and 2. February 2012 marked the world premiere 4D trajectory flight trials, which were carried out in the traffic environment of the Maastricht Upper Area Control Centre (MUAC), Nordic Upper Area Control Centre (NUAC) Copenhagen and Stockholm Approach. In addition, in the context of Release 2, exercises were performed in order to further work on the operational procedures to be implemented for 4D.

The first European CATII/III GBAS (Ground-Based Augmentation System) station was installed at Toulouse Airport and technical verification activities were performed in 2012, enabling “flight readiness”. Test Flights will take place in 2013 in real operational conditions.

Despite the complexity related to 4D, SESAR achieved around 85% of this objective.

**OBJECTIVE TWO**

**10,000 FLIGHTS, INCLUDING 500 MILITARY, ARE SESAR LABELLED**

By the end of 2012, 10,568 commercial flights demonstrated early SESAR benefits.

These flights took place in the context of Demonstration Activities, initially launched in the framework of AIRE (Atlantic Interoperability Initiative to Reduce Emissions) and OPTIMI (Oceanic position tracking improvement and monitoring) and complemented the Large Scale Demonstration Activities launched in 2012.

In particular, “2012 Demonstration Activities” showcased the benefits of SESAR solutions, in a commercial flight environment, to the wider aviation community.

As no Military flights took part in these demonstration activities, this objective is considered to be 95% completed.

**OBJECTIVE THREE**

**80% OF SESAR PROJECTS HAVE TESTED THEIR OUTPUTS IN A REAL LIFE ENVIRONMENT**

Already in 2011, SESAR established and implemented a Validation Strategy through the Release delivery approach. In this respect, Release 1 and 2 deliverables were achieved through exercises performed in real-life operational environments or on pre-operational platforms.

It can be concluded that, by end 2012, 70% of SESAR validation took place through live trials, operational shadow mode or even flight trials. It is therefore considered that the objective is 90% completed.

**OBJECTIVE FOUR**

**FIRST SWIM PILOTS ARE IN PLACE TO EXCHANGE DATA ACROSS AT LEAST 5 DOMAINS**

Concrete and tangible progress was achieved with the Live SWIM Demonstration Event of November 2012. This event brought together participants across the Programme, linking together 27 different systems and demonstrated realistic scenarios across Airport, Air Traffic Control and Automated Fixed Telecommunications Network domains.

SWIM validation activities are progressively being integrated into Release delivery process and will heavily feature and contribute to those Release 3 exercises, planned for 2013.

At the end of 2012, the objective was therefore considered to be 50% completed.

**OBJECTIVE FIVE**

**THE FIRST REMOTE TOWER IS READY FOR OPERATION**

Successful Remote Tower validation exercises, conducted in 2011 and 2012, positively confirmed:

- The feasibility of providing Air Traffic Service to Ängelholm airport from the Malmö ATCC R&D Remote Tower Centre;
- The feasibility of conducting remotely nominal and non-nominal operations;
- The technical feasibility of capturing the “out of window” traffic situation and operational environment from a single airport and to display this picture in the remote site.

In order to ensure the assessment of regulatory aspects, SESAR ensured the participation of the Dutch Regulatory Authorities to these trials.

The objective is therefore considered to be 100% achieved.

Despite this significant achievement, further enhancement of the capability of the Remote Tower system is necessary (e.g. in bad weather operations using enhanced vision...). As a result, Remote Tower R&D activities will be pursued beyond 2012 within the next SESAR Releases.

**OBJECTIVE SIX**

**SESAR BENEFITS ARE DEMONSTRATED IN CITY PAIRS CONNECTING 8 EUROPEAN AIRPORTS**

Since 2009, AIRE has continuously demonstrated significant benefits with regards to emission reduction, therefore, in 2012; the SESAR Joint Undertaking extended the green branch of the Programme through the connection with 8 major European airports (Paris, Vienna, Madrid, Cologne, Dusseldorf, Prague, Brussels and Toulouse) and the involvement of some 40 partners in Europe and beyond.

The results of AIRE, together with the results achieved in the demonstration activities launched and already performed in 2012, allowed SESAR to meet 100% of the objective.
OBJECTIVE SEVEN
AIRSPACE USERS HAVE SIGNED UP TO THE SESAR BUSINESS CASE FOR TIME BASED OPERATIONS

Substantial effort has been invested in developing business case methodologies for ANSPs, airspace users and airports.

Following the mandate for the SESAR JU to prepare a draft Pilot Common Project, to support the European Commission in setting up the deployment of SESAR, the SJU is now working on developing the necessary business cases and their relative models. Overall, this objective is considered to be 40% achieved and further progress will be achieved as the Pilot Common Project develops.

Figure 1: SESAR JU progress on achieving SESAR Programme objectives

PART TWO
DELIVERING SESAR SOLUTIONS

2.1. TOWARDS A BUSINESS NEED DRIVEN RELEASE APPROACH

In 2010/11, a comprehensive review of the SESAR Programme’s implementation approach was conducted. The intention of this was to break down the Programme into Operational Packages and Sub-Packages and thereby cluster the Programme activities into Operational Focus Areas.

In early 2012, the SJU improved the effectiveness of the Release approach by identifying 5 priority business needs to meet the most pressing operational demands of ATM stakeholders. These priority business needs reflected the Key Features contained in the European ATM Master Plan and included:

- Traffic Synchronisation;
- Airport Integration and Throughput;
- Moving from Airspace to 4D Trajectory Management;
- Conflict Management and Automation;
- Network Collaborative Management and Dynamic/Capacity Balancing.

The outcomes of these validation activities have not yet been finalised, however, as of early January 2013, 2 exercises already produced substantial results: Point merge in complex Terminal Manoeuvring Area (TMA); and Trajectory Management Framework.

2.2. PROGRAMME ACHIEVEMENTS BY BUSINESS NEED

Against this background, in 2012, the SJU launched Release 2, which contained 30 exercises, taking place across 18 European destinations (Figure 4) and were focused on the priority business needs.

Release 2 built on the results from Release 1, widened the scope of the exercises and emphasised the need for coherence with the overall SESAR programme.

Priority was given to exercises demonstrating that future deployment is feasible in the short-medium term, assuming validation results confirm their suitability for delivery.

An Operational Focus Area is a limited set of operational improvements that are closely related and are designed to meet some defined performance expectations.
In 2012, the following activities were carried out to help meet the business need of Traffic Synchronization:

**Airborne Spacing, Sequencing and Merging**
This exercise examined airborne spacing manoeuvres to fine-tune the sequencing of the arrival traffic towards the airport. The exercise ran on aircraft and ATC simulators in Toulouse and Rome.

Observations indicate an increased automation for maintaining airborne spacing lead to a decreased workload per flight for controllers.

**Initial 4D Trajectory (i4D) and Controlled Time of Arrival**
Through simulator and flight trials, SESAR members and participating airlines performed an exercise to investigate operational procedures for flying to a time – in the en-route, as well as the TMA airspace.

These trials aimed to investigate procedures that make use of i4D capabilities to enhance queue management and minimise delays.

**Arrival Manager (AMAN) and Extended AMAN Horizon**
This exercise assessed a first integration of the arrival manager (AMAN) with Precision Navigation procedures in a complex TMA with more than one airport. The trial was carried out by AENA at Madrid airport.

The goal of this exercise was to achieve a reduction of controller workload through smoother arrival flows, creation of optimum 2D routes in the TMA and better situational awareness using new tools to monitor separation between aircraft.

**Point Merge in Complex TMA**
Validation in Milan of improved Point Merge Procedures in a complex TMA, building on Precision Area Navigation (P-RNAV) and Continuous Descent Approach (CDA).

The results of this exercise have already been captured and revealed that:
- Air Traffic Controller’s efficiency is improved: estimated 50% reduction in radio telecommunication (R/T) and 75% reduction in the need for vectoring, and airspace capacity increased by at least an average of 20%.
- Situational awareness is significantly better and handling of unusual situations is improved.
- Safety levels are maintained or even slightly improved.
- Runway throughput is improved by 4% on average.
- Potential fuel burn is reduced by 2% (resulting from reduction in radar vectoring and better vertical profile achieved by aircraft).

**AMAN and Point Merge**
DSNA implemented live trials procedures in order to test the requirements and cases for using point merge in an extended TMA with the aim of achieving Continuous Descent Approach (CDA) from high altitudes in high traffic environments.

The new procedures lead to smoother aircraft trajectory on approach, reducing fuel costs and environmental impact. They also support the 4D trajectory concept.
In 2012, the following activities were carried out to help meet business need of Airport Integration and Throughput:

**Airport Safety Nets**
This exercise developed and assessed a tool for the detection of conflicting ATC clearances for the runway controller. In particular, issues addressing the acceptance and safety (situation awareness and workload) of the final operational scenario and procedures were assessed.

It is anticipated that the upgraded systems improve safety at airports through better situational awareness and conflict alert systems, while at the same time increasing capacity.

**Remote Tower**
The overall aim of this trial was to assess the technical and operational capability of an initial prototype for the provision of Air Traffic Services (ATS) to a single aerodrome from a remote control site located at a distance of approximately 100 kilometres in an operational environment.

Initial results indicate that costs are able to be reduced by providing air traffic services at smaller airports from one single tower.

**Time-based Separation**
This exercise sought to validate the use of time-based separation minima by tower and approach controllers. In particular, new controller procedures and support tools should enable the use of refined time-based separation minima in typical operational circumstances, as well as challenging wind conditions and other critical situations.

It is foreseen that, through the enhancement of current distance-based approach separations with time-based separations, runway capacity is increased in critical conditions.

**Surface Planning and Routing**
In 2012, simulations and live trials were the basis for the validation of procedures and technical specifications for planning, assigning and modifying of a route to individual aircraft and vehicles using data link. The exercises aimed to ensure safe and efficient movement of aircraft and vehicles around the airport.

**Controller Working Position - Airport**
Operational simulations in France, Spain, Italy and Germany were designed to validate human/machine interface improvements including safety aspects, as well as operating procedures at airports. The aim is to provide the controllers with a clear picture of the actual traffic situation and with all the necessary traffic data to assist them in their control tasks. The data sets are presented either as text or graphics.

Initial observations already indicate that an improved air traffic controller working environment lead to more efficiency and a lower workload.

**Moving from Airspace to 4D Trajectory Management**
In 2012, the following activity was carried out to help meet the business need of Moving from Airspace to 4D Trajectory Management:

**Trajectory Management Framework**
This validation exercise was conducted by NATS and aimed at ensuring ATC Conflict Detection and Resolution tool performance, in high density area controlled airspace, improves when the underlying Trajectory Prediction is supported by data from an Airline Operational Control Centre.

The results of this exercise have already been captured and reveal that:

- 300 nuisance alerts avoided per day, which means a total of more than 100000 conflict resolution actions avoided per year;
- Reduction of controller workload;
- Level-off avoidance translates into a money saving of €1,270,000 per year;
- Significant Environmental/Fuel Efficiency benefits were achieved: approximately 2 million kg fuel economy a year and estimated reduction of 6,100 tonnes of CO2 a year.
In 2012, the following activities were carried out to help meet the business need of Conflict Management and Automation:

**Complexity Assessment and Resolution**
Release exercises in Barcelona and Maastricht evaluated the possibility to improve the match between traffic densities and spare capacity in the network. Supporting tools to balance demand and capacity are being developed.

The validated procedures and tools support decision making to solve complexity issues by continuously adapting the traffic load.

**Sector Team Operations**
NATS carried out an operational validation of a concept of a multi-sector planner operating environment, with emphasis on identifying roles and responsibilities. This exercise should deliver a support tool and information-sharing functions.

The procedures and software will allow more efficient management, task sharing and coordination amongst controllers.

**Traffic Synchronisation**

- Basic AMAN
- 4D + CTA
- Integrated AMAN
- DMAN & extended AMAN horizon
- Multiple CTOs/CTAs
- Mixed mode runway operations

**System Wide Information Management**

- Exchange models
- Initial SWIM services
- Full SWIM Services

**Airport Integration & Throughput**

- Airport CDM
- A-SMGCS L1 & L2
- Surface Management Integrated with arrival & departure
- Airport Safety Nets
- Further integration of surface & departure management
- A-SMGCS L3 & L4

**Conflict Management & Automation**

- Initial Controller Assistance Tools
- Enhanced DST & PIN
- Conflict Detection & Resolution
- Advanced Controller Tools to support SBT/REBT
- Enhanced trajectory prediction

**Deployment Baseline**

- Step 1: Time based
- Step 2: Trajectory based
- Step 3: Performance based

The validated procedures and tools support decision making to solve complexity issues by continuously adapting the traffic load.
Figure 4: How the SESAR Release process contributes to the Master Plan key features

<table>
<thead>
<tr>
<th>KEY FEATURE</th>
<th>RELEASE 1 (25 Exercises)</th>
<th>RELEASE 2 (30 Exercises)</th>
<th>RELEASE 3 (19 Exercises)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moving from Airspace to 4D Trajectory Management</td>
<td>• Approach procedures with vertical guidance (APV) &lt;br&gt; • Integrated controller working position</td>
<td>• Free Routing • Business and Mission Trajectory Flight Planning</td>
<td>• ATS coordination procedures for ATS Units including coordination &amp; transfer of flights</td>
</tr>
<tr>
<td>Traffic Synchronisation</td>
<td>• P-RNAV in a complex TMA (full implementation) &lt;br&gt; • Point Merge in a complex TMA &lt;br&gt; • Enhanced Airborne Collision Avoidance System (ACAS) &lt;br&gt; • AMAN &amp; Extended Horizon &lt;br&gt; • AMAN-DMAN Integration &lt;br&gt; • Controller working position enhancements &lt;br&gt; • Initial 4D (i4D) &amp; Controlled Time of Arrival – initial operations</td>
<td>• Airborne Spacing, Sequencing and Merging &lt;br&gt; • Initial 4D Trajectory (i4D) &amp; Controlled Time of Arrival – Time management &lt;br&gt; • Arrival Manager (AMAN) and Extended AMAN Horizon with precision navigation in complex TMA &lt;br&gt; • AMAN and Point Merge in extended TMA &lt;br&gt; • Point Merge in a complex TMA using P-RNAV for Continuous Descent Approaches (CDA)</td>
<td>• Airborne spacing (ASPA) Sequencing and Merging (SmM) for TMA &lt;br&gt; • Traffic sequencing assistance for Initial 4D Trajectory Management and Controlled Time of Arrival &lt;br&gt; • Arrival Manager (AMAN) and Extended AMAN Horizon for multiple airports</td>
</tr>
<tr>
<td>Network Collaborative Management &amp; Dynamic/Capacity Balancing</td>
<td>• Short-term Air Traffic Flow and Capacity Management (ATFCM) measures improvements</td>
<td>• Airspace Management and Advanced Flexible use of Airspace – sharing of real-time airspace usage</td>
<td>• Enhanced flight planning considering 4D profiles or 4D data&lt;br&gt; • Enhanced Air Traffic Flow and Capacity Management (ATFCM) processes</td>
</tr>
<tr>
<td>System Wide Information Management</td>
<td></td>
<td></td>
<td>• Air and Ground Data Sharing in support of ATS coordination procedures for coordination &amp; transfer of flights</td>
</tr>
<tr>
<td>Airport Integration &amp; Throughput</td>
<td>• Controller working position - Data entry to CFMU &lt;br&gt; • Remote Tower</td>
<td>• Situation awareness improvements at controller working position &lt;br&gt; • Airport Safety Net tool supporting clearances for the runway controller &lt;br&gt; • Use of Time-Based Separation Minima &lt;br&gt; • Surface Planning and Routing &lt;br&gt; • Remote Tower, single airport ATS</td>
<td>• Low Visibility Procedure using GBAS&lt;br&gt; • Airport Safety Nets for incursion detection&lt;br&gt; • Remote Tower, single airport, ATS &amp; FIS&lt;br&gt; • Enhanced Situation Awareness using runway status lights&lt;br&gt; • Runway Occupancy Time Management through Brake to Vacate performance&lt;br&gt; • Integrated Airport Operations Management by use of Airport Operations Plan (AOP) link to Network Operations Plan (NOP)</td>
</tr>
<tr>
<td>Conflict Management &amp; Automation</td>
<td>• Sector Team Organisation &amp; task sharing &lt;br&gt; • Enhanced Short Term Conflict Alert (STCA) &lt;br&gt; • Complexity Assessment &amp; Resolution &lt;br&gt; • Controller working position enhancements</td>
<td>• Enhanced Conflict Detection &amp; Resolution tools for high density operations &lt;br&gt; • Tooling for complexity and density assessment related to capacity&lt;br&gt; • Sector Team Operations – multi-sector planner</td>
<td>• Enhanced Ground Based Safety Nets using aircraft derived data in Short Term Conflict Alert (STCA)</td>
</tr>
</tbody>
</table>

7 Please note that the objectives mentioned under each Release may include more than one exercise

* www.atmmasterplan.eu
2.3. Results by Work Package (WP)

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" 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 (B, C, 3, 16). It is expected that the benefits provided by such transverse WPs will manifest themselves throughout many other operational and system WPs, and thus will contribute to maximising benefits of those WPs.

### WP3

**Validation infrastructure adaptation and integration**

The objective of WP3 is to support SESAR’s partners and the operational and technical threads to properly define and coordinate the timely evolution and set-up of Verification and Validation Platforms.

In 2012, WP3 continued to take an active role in the collection and completion of information for the Verification and Validation (V&V) roadmap. In this context, WP3 has supported dozens of Operational or Primary projects, from capturing the V&V needs to supporting the development with their measurement 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 the 4D/time-based operations are seen as a vital part of future TMA and en-route operations.

During 2012, WP4 focused on the finalisation of Release 1 exercises (Air Safety Nets, Complexity Assessment and Resolution, CDMS & Sector Team Operations, 4D+CTA and Ground Safety Nets), the preparation of Release 2 exercises through developing real time simulation activities for Sector Team Operations, 4D+CTA and Ground Safety Nets, as well as the definition of Release 3 exercises.

### 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 component of future TMA and en-route operations.

During 2012, WP5 successfully produced results in the domain of 4D+CTA, PANASA/Extended AMAN and Optimised RNP in complex TMA.

### WP6

**Airport Operations**

This Work Package addresses 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.

With all projects in their execution phases, 2012 saw WP6 move towards several validation activities e.g. integrated controller working positions, surface management and routing, safety net Remote tower for single airport prototypes and time based separation on approach. The initial results of these exercises have been encouraging with further exercises to take place in 2013.

### WP7

**Network Operations**

The scope of the Network Operations WP is to cover 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 delivered under WP7 in 2012 include:

- The launch of two Release exercises involving the ‘Advanced Flexible Use of Airspace’ project, which have addressed the integration of Airspace Management tools with Air Traffic Flow and Capacity Management (ATFCM) and ATC respectively.
- As part of Release 2, an exercise concerning ‘User Preferred Routing’ performed a real-time, fast-time simulation at MUAC and confirmed the feasibility of implementing User Preferred Routing, under certain conditions, in a high-density airspace.
- Another exercise on ‘Business Mission Trajectory’ performed validation exercises on the Enhanced Flight Plan, involving improvements to the sharing of trajectory, aircraft performance and ATM constraints between the Network Manager and Flight Operations.
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.

The general situation of WP8 improved significantly in 2012 thanks to the implementation of the SWIM Action Plan, which saw its completion at the end of 2012. In addition, the SWIM CONOPS document was published and widely distributed, assuring a common understanding of SIWM in the SESAR ATM Community and beyond.

The scope of WP10 includes all Research & Development activities to define, design, specify and validate the En-route & TMA ATM Systems evolutions for introducing and enhancing Trajectory Management functions, new Separation Modes, Controller Tools and Safety Nets, Airspace Management supporting functions, Management Complexity tools, Queue Management and Route optimisation features.

During 2012, WP10 focused on bringing 20 projects into execution, all of which passed their Gate review and showed good progress. In this context, technical requirements were developed and verified in support to Release 2, covering areas such as: Flight Objects, enhanced data link capabilities, complexity assessment and safety net.

The objective of WP9 is to cover 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 the progressive development of aircraft separation assurance and the aircraft component required for the improvement of surface movement operations, as well as the enhancement of communication, navigation and surveillance airborne systems.

In 2012, 28 out of the 30 projects included in WP9 were in their execution phase. The main achievements delivered under WP9 in 2012 include:

- Operational evaluations successfully demonstrated the technical feasibility of the i4D concept.
- Airborne-Spacing function, which makes an aircraft establish and maintain time spacing from a target aircraft designated by the Air Traffic Controller (allowing a controller workload reduction and potentially a capacity increase), have been implemented in the different avionics and successfully integrated in an aircraft integration simulator.

The scope of 11.01 is to cover Flight Operations Centres and Wing Operations Centres. The work covers concept development, validation, system development and verification stages since it is both an operational and a system work package.

During 2012, WP11.01 accelerated the pace, establishing coordination with the rest of SESAR and working in line with SESAR requirements. Of particular note, WP11.01 has established very effective working arrangements with airspace users and has been coordinating closely with WP7 on the exercises addressing Enhanced Flight Plan (e.g. consideration of 4D profiles).

The scope of WP12 addresses the requirements for meteorology within the SESAR Programme, particularly in relation to the impact that meteorology will have on 4D trajectory based systems of the future and in managing predictability in an efficient way.

In 2012, WP11.02 focused on establishing effective interactions with the rest of SESAR, particularly with regards to requirement gathering, increasing awareness on current and future meteorology capabilities and performing a Quick Win prototype in order to demonstrate the integration of improved weather data with Airport-Collaborative Decision Making.

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 is undertaking technical developments and verification and support to validation, providing the ground-based system support to the new concepts, procedures and practices described by WP6.

In 2012, coordination with WP6 continued to progress effectively, with application of the OFAs gaining momentum and bringing benefit to the overall planning of the programme. Technical requirements have been developed, mirroring the work within WP6 and covering such areas as:

- Wake vortex detection/prediction tools;
- Airport Operating Plan (AOP) decision support tools;
- Safety nets;
- Surface traffic planning, routing and guidance;
- Arrival and departure management;
- Ground Based Augmentation System (GBAS) CAT 1 implementation.
WP13

Network Information Management System

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).

In 2012, WP13 developed prototypes in support of Advanced Flexible Use of Airspace (AFUA) and Business/ Mission Trajectory Release exercises. Preparatory work has begun on Flight Object for Network Manager and ATFCM aspects.

WP14

SWIM Technical Architecture

The SWIM technical architecture Work Package is the follow-up in the context of SESAR of the SWIM-SUIT 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.

The year 2012 was a transition year from Step 1 to Step 2 related activities. At the end of 2011, the planning of all activities in WP14 was realigned to allow regular staggered iterations. Through an enhanced SWIM action plan, WP14 was able to better define SWIM Technical Infrastructure (TI) profiles and provide the foundational analysis of SWIM solutions for connection with ground and airborne systems. In parallel, WP14 also performed the first Security Risk Analysis (SRA) for the SWIM TI as input for the next phase of Step 2 developments.

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 2012, highlights for WP15 included:
- GBAS Cat IIIb based on GPS has installed a station at Toulouse airport - GPS-Li (GAST-D) with successful testing of signal in space.
- Good progress continues with the projects working together on Navigation Infrastructure definition and optimisation. In addition to the Navigation Performance requirements and Infrastructure Rationalisations work, progress is being made towards the SESAR navigation baseline.

WP16

R&D Transversal Areas

The scope of the R&D Transversal Areas (TA) Work Package is to concentrate on the improvements necessary 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 and newly developed TA-related practices to SESAR operational and system Work Packages.

In 2012, WP16 produced some examples of application of Transversal Area Reference Material. The reference material concerned safety, security, environment, as well as a cost benefit analysis and was reviewed by the National Authorities as well as EASA, the European Aviation Safety Agency. In addition, the projects of WP16 produced some mature deliverables:
- Security projects have produced an updated Security risk Assessment Methodology.
- Environment projects have developed a prototype for a web-based Environment Reference Material toolkit.
- Human Performance projects have produced an updated Human Performance assessment methodology and HP case argument that have been applied to Remote Tower and Time Based Separation.

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.

In 2012, WPB was strengthened through the development of the Integrated Roadmap, which was used to support Work Programme R&D activities (e.g. Release 3&4 definition), as well as the ATM-Master Plan update. As a consequence, 2 datasets will be produced per year (End of April and Early October) to support the V&V roadmap, the Standardisation and Regulatory roadmaps, the release definition and the update of the main transverse deliverables.

WPC

Master Plan Maintenance

The scope of the Master Plan Maintenance Work Package is to administer 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. In 2012, WPC contributed to the delivery of the European ATM Master Plan 2012.

WPE

Long Term Innovative Research Programme

The scope of WPE is to stimulate long-term research, creativity and innovation in order to develop the scientific knowledge aimed at extending the SESAR vision and to complement SESAR activities. SESAR Long Term and Innovation Research themes were defined with the advice of the Scientific Committee. These research themes include: (1) legal aspects of paradigm shift; (2) towards higher levels of automation in ATM; (3) mastering complex systems safely; (4) economics; and (5) performance.

In order to build a sound repository of knowledge, two Research Networks were active in 2012 in the Automation and Complexity fields through annual conferences, Summer School activities and by way of updates to their respective position papers. In addition, 20 PhD students continued to work under WPE funding and with the support and guidance of the Research Networks.

In addition to WPE, the SJU also co-led a working group on ‘Meeting Societal & Market Needs with Munich Airport’ and provided the leadership needed to achieve a coherent document meeting the Goals of Flightpath 2050, showing what research activities and targets will need to be performed and achieved in order to progress towards the ambitious targets set.
2.4. OTHER PROGRAMME RESULTS

Beyond the SESAR Work Packages, in 2012, the programme actively engaged in other initiatives with the intention of both strengthening and advancing the programme deliverables.

2.4.1. THE EUROPEAN ATM MASTER PLAN 2012

Following significant works initiated during the summer of 2011, taking into account the developments since the end of the definition phase, the European ATM Master Plan 2012 was adopted in principle by the Administrative Board in July and definitely in October 2012.

The European ATM Master Plan 2012 outlines the essential operational and technological changes that are required to contribute to achieving the SES performance objectives, making the Master Plan a key tool in the context of SESAR deployment and providing the basis for timely and coordinated deployment of efficient technologies and procedures.

The document includes various developments such as the updated Long Term Traffic Growth Forecast, as well as the results achieved and the indications emerged so far. Furthermore it rationalises and simplifies the previous Master Plan introducing comprehensive views of the European ATM Master Plan per category of stakeholders.

2.4.2. DEMONSTRATION ACTIVITIES AND AIRE

Building on positive experiences of former AIRE activities, the SJU launched a Call for Large Demonstration Activities in November 2011. The Call had a part specifically dedicated to the environmental aspects, AIRE III.

The Call resulted in 9 Demonstration Activities projects being awarded a total co-financing of EUR 8,424,399.79. These projects have now completed the initiation phase and are in the full execution phase. The specific results are expected towards mid-2014. Similarly, 9 AIRE III projects were awarded a co-financing of EUR 1,911,364.00 and are now in the execution phase. In addition, the AIRE initiative has seen an expansion in the South Atlantic.

In total, Demonstration Activities, including environmental exercises, involve more than 60 Partners in approximately 30 Locations. The results already achieved by the Programme will be further assessed in operational multi-context environments.

2.4.3. REMOTELY PILOTED AIRCRAFT SYSTEMS

The task of developing an initial roadmap for the integration of Remotely Piloted Aircraft Systems (RPAS) into non-segregated ATM environments from 2016 was decided by the European RPAS Steering Group (ERSG), chaired by the European Commission, in July 2012. The ERSG is consisted of three groups which cover regulatory activities, R&D activities and societal matters.

In December 2012, the group produced an initial roadmap, which will structure SESAR’s RPAS work in the coming 5 years.

The ERSG also benefited from work deriving from the SJU Associate Partners who completed a study on the RPAS concept of operations in September 2012, which resulted in the following:

- A Context Baseline and Assumptions Plan which develops the relevant operational and technical requirements for remotely piloted aircraft in line with current SESAR Target Concept.
- A Concept of Operations (CONOPS), for effective civil and public remotely piloted vehicle operations in controlled airspace from 2012 onwards[9].
- Operational and technical requirements for remotely piloted aircraft to be integrated in SESAR, capable of operating within the 4D Business / Mission Trajectory structures.

3.1. SESAR PERFORMANCE PARTNERSHIP

The SESAR Operational Performance Partnership (SPP) is a single forum for consensus-driven coordination with the operations community. In this group, senior representatives for “users of SESAR Solutions” discuss and agree on specific topics of common interest.

During 2012, the SPP mostly concentrated on supporting the decision making process related to the ATM Master Plan update campaign. SPP members supported the proposed ATM Master Plan update proposal, with an understanding that further work was required on the Business View.

Figure 5: Stakeholder interests represented in the SESAR Performance Partnership

The basic principle of the SESAR JU is to broaden and deepen collaboration with a range of different stakeholders in order to benefit from their expertise and gain their assurance that the technologies being developed meet the business needs of Europe’s entire ATM community.

In this context, over 2012, the SJU fostered cooperation with professional staff associations, military partners and various national aviation authorities. Similarly, SESAR also strengthened its relationships with international partners and sister ATM modernisation programmes from across the globe.
3.2. PROFESSIONAL STAFF ASSOCIATIONS

The involvement of the Professional Staff Associations in the SESAR Programme is secured through the realisation of 5 framework contracts. These contracts aim at enabling staff representatives to participate in all technical activities of the programme. Moreover, the SJU formed an “International Validation Team (IVT)” which is a group of staff representatives who participate in Release activities. During 2012, the IVT consisted of 65 cross-nationality licensed and operational Air Traffic Controllers, Pilots and Air Traffic Services Engineering Personnel (ATSEP).

3.3. CIVIL AIRSPACE USERS

Airspace users have an important role to play in steering the SESAR Programme. In 2012, 2,415 man-days of pilots/engineers’ expertise were used in the context of the Programme, ensuring an extensive involvement of eleven Airspace User Organisations at technical and content level.

In order to ensure the contribution of the Airspace Users to the Programme activities until 2016, a new Call was launched which resulted in 14 contracts being signed and experts of more than 16 airlines involved.

Figure 6: List of Airspace Users involved in the SESAR Programme until 2016 (excluding Demonstration Activities)

<table>
<thead>
<tr>
<th>SCHEDULED &amp; CHARTER AIRLINES</th>
<th>CARGO OPERATORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIRFRANCE</td>
<td>DHL</td>
</tr>
<tr>
<td>American Airlines</td>
<td>Lufthansa Cargo</td>
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<td>BRITISH Airways</td>
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</tr>
<tr>
<td>IBERIA</td>
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<tr>
<td>Lufthansa</td>
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<tr>
<td>Transavia</td>
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<tr>
<td>Novair</td>
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<td>Turkish Airlines</td>
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<td>ELAL</td>
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<tr>
<td>TUIfly.com</td>
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<table>
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<th>LOW FARE AIRLINES</th>
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<td>flybe.com</td>
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<tr>
<td>Bmi</td>
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<tr>
<td>Ryanair</td>
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</tr>
<tr>
<td>Lufthansa Cargo</td>
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<table>
<thead>
<tr>
<th>BUSINESS AVIATION &amp; GENERAL AVIATION (INCL. HELICOPTERS)</th>
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</thead>
<tbody>
<tr>
<td>EasyJet</td>
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<tr>
<td>B E A M</td>
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<tr>
<td>I A T A</td>
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<tr>
<td>Dassault Aviation</td>
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<tr>
<td>ECAC</td>
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<tr>
<td>EASA</td>
<td></td>
</tr>
<tr>
<td>NETJETS</td>
<td></td>
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</tbody>
</table>

3.4. EASA AND NATIONAL AUTHORITIES

The SJU has continued to be active in the relevant forums whereby Regulatory Authorities coordinate and take decisions. The SJU interacts with the National Supervisory Authorities through the National Supervisory Authorities Coordination Platform, under the umbrella of the Single Sky Committee.

The results of the reviews, performed by the Authorities, and participation in validation exercises are integrated in the assessment of the SESAR deliverables as much as possible. They are also taken into account as inputs for the future deployment of SESAR solutions.

In June 2012, a new Call for Proposals aimed at Civil and Military National Authorities was published in order to secure the continuity of their support until December 2016. The Call was completed in December 2012, resulting in the acceptance of 17 National Authorities12 from 13 States13, which will provide support to the SJU from more than 80 experts.

3.5. MILITARY

In 2012, 96 military experts (10% pilots, 20% air defence experts, 30% ATM experts, 40% engineers) from 8 countries (DE, UK, FR, ES, BE, PT, SW and NL) were involved in the Military Engagement Plan for SESAR (MEPS). The aim of MEPS is to enable the participation of national military in all relevant aspects of the SESAR Programme, via a structured organisation including the creation of specific panels to gather a large number of military inputs in specific technical and operational domains.

Also in 2012, the SJU published the “SESAR Military Avionics Study”, which highlighted how to ensure interoperability between military and civil technologies in order to reduce and optimise implementation costs for SESAR.

3.6. EUROPEAN DEFENCE AGENCY (EDA)

While the SJU and European Defence Agency (EDA) have been engaged in a close dialogue and informal talks since the beginning of 2011, the SJU established a more formal arrangement with the EDA in 2012 to ensure adequate military input on relevant aspects of the SESAR Programme. According to this arrangement, the EDA offers a consolidated input from its participating Member States and the Military international organisations, in particular NATO, as well as relevant political support to “buy in” for the Programme. In particular, the collaboration focuses on a number of specific areas related to SESAR, such as:

- Defence Investment and procurement.
- Planning for relevant Military technologies evolution.
- Risk mitigation actions on the military implementation of SESAR.
- Providing expertise or organising the necessary fora to gather the required results on specific areas, in coordination with the SJU.

12 Among the selected Authorities there are several National Supervisory Authorities, Civil Aviation Authorities, two Military Authorities and one Aviation Security Authority.
13 The States represented through this Call are Belgium, France, Germany, Ireland, Italy, Malta, The Netherlands, Poland, Portugal, Romania, Spain, Turkey and The UK.
During 2012, the majority of SESAR projects were in their actual execution phase. This led to a considerable increase in the co-financing rate of projects by the SESAR JU. In this regard, 2012 saw the SJU pay out EUR 98.9 million against a comparable amount of EUR 67.9 million in 2011 to realise its operational activities. On the other hand, given that almost all projects are already in their execution phase and some projects are even near to closure, pre-financing of projects decreased from 6 million in 2011 to 3.1 million in 2012. The SESAR JU expects these figures to remain stable for the coming years.

PART FOUR
FINANCIAL INFORMATION

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Overall, the acquisition of goods and services went through the procurement process according to the SESAR JU Financial Rules, ensuring fair competition among potential suppliers and the efficient use of funds. Staff expenditure amounted to EUR 5.2 million, an increase of EUR 0.5 million, due to the fact that SESAR JU reached almost full capacity as per the Staff Establishment Plan.

In accordance with Article 15 of the SESAR JU Financial Rules, and in order to ensure the most adequate cash management in view of 2013 expenditure, the SJU introduced its cash request to the European Union for an amount of EUR 69.7 million. The cash contribution from EUROCONTROL amounted to EUR 33.2, compared to an initial budget of 14.5 million. The resources received were almost fully awarded to the co-financing of Members. The budget surplus at the end of the year amounted to EUR 16.1 million, which is in line with the previous year and sufficient to ensure the continuity of operations during the first few months of 2013.

The resources made available by the SJU Members, the budget provided by FP7 and TEN-T, as well as the cash contribution from EUROCONTROL, were used in accordance with the SJU Financial Rules and 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 the SJU Financial Rules, derived from FP7 and TEN-T funding systems, were applied.

3.7. NATO

During 2012, a technical roadmap defined effective modalities of interaction between the SJU, NATO and EDA to achieve a common understanding of shared challenges and identify possible matches between NATO expertise and the on-going activities of the SJU. The roadmap highlighted several areas of common interest such as Business Trajectory versus Mission Trajectory, NATO interoperability with SWIM and NATO network enabled capabilities.

3.8. COLLABORATION BEYOND EUROPE

The SJU pursues international relations in the context of the European Commission external relations framework.

Concrete cooperation has taken the form of bilateral Memorandum of Cooperation (MoC) between the Commission and non-EU countries to which have been three so far:

- The implementation of the EU-US MoC on civil aviation R&D.
- MoC with the Japanese Civil Aviation Bureau (JCAB) signed in July 2011.
- MoC with Mexico, to explore ATM cooperation.

In November 2012, an MoC between the SESAR JU and Civil Aviation Authority Singapore (CAAS) was signed in November 2012, which contains a number of technical collaboration areas so as to support each other in modernising ATM through knowledge sharing and validation activities. In addition, the SJU hosted an expert from the Australian ANSP.

3.8.1. ICAO

The SJU invested a significant amount of resources and played a key role in the European coordination for the 2012 Air Navigation Conference. The main topic of the conference was the endorsement of the ‘Aviation System Block Upgrades (ASBU)’, which form the backbone of the next ICAO Global Air navigation Plan and the ICAO work programme for the coming ten years.

Moreover, the SJU strongly contributed to the definition of ICAO ASBUs, in particular to guarantee the full alignment with the SESAR programme. In addition, the SJU identified key areas where the SESAR Development Phase needs the support of ICAO standards. These areas have been coordinated with the FAA under the EU-US MoC Coordination Plans and will be further worked on to ensure SESAR/NextGen coordinated positions in support to the development of standards and ICAO provisions.

3.8.2. FAA/ NEXTGEN

The EU-US MoC enabled the SJU and the US/FAA to discuss and coordinate their positions towards ICAO in the context of the 2012 Air Navigation Conference. Furthermore, specific activities were successfully undertaken, particularly to define a common avionics roadmap between NextGen and SESAR, which is the key requirement for interoperability of the two systems.

1 The European Union Seventh Framework Programme for Research and Technological Development

2 The Trans-European Transport Network Executive Agency (TEN-T EA) - http://tentea.ec.europa.eu/
### BALANCE SHEET

<table>
<thead>
<tr>
<th>All figures in EUR</th>
<th>31/12/2012</th>
<th>31/12/2011</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. NON-CURRENT ASSETS</strong></td>
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</tr>
<tr>
<td>Intangible fixed assets</td>
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<td>67,319</td>
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<tr>
<td>Tangible fixed assets</td>
<td>400,154</td>
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<td>Furniture and Vehicles</td>
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<td>Computer Hardware</td>
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<tr>
<td>Long-term Pre-Financing</td>
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<td><strong>II. CURRENT ASSETS</strong></td>
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<td>Short-term receivables</td>
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<td>Deferred charges</td>
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<td>Cash &amp; cash equivalents</td>
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<td>15,303,453</td>
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<td>Short-term Pre-Financing</td>
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<td><strong>TOTAL ASSETS</strong></td>
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<td><strong>III. CURRENT LIABILITIES</strong></td>
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<td>Accounts payable</td>
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<td>Co-Financing to be paid to the Members</td>
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<tr>
<td>Contribution from Members to be validated</td>
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<td>Cash Contributions from Members to be accepted</td>
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<td><strong>TOTAL LIABILITIES</strong></td>
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<td>224,457,367</td>
</tr>
<tr>
<td><strong>NET ASSETS (Total Assets less Total Liabilities)</strong></td>
<td>(118,089,217)</td>
<td>(94,618,272)</td>
</tr>
</tbody>
</table>

**IV. NET ASSETS**

| Contribution from Members | 579,442,694 | 322,750,100 |
| European Union | 267,265,000 | 197,552,000 |
| Eurocontrol | 177,650,351 | 80,753,978 |
| Other Members | 134,572,343 | 54,404,122 |
| Accumulated contribution from Members used previous years | (427,368,372) | (206,385,641) |
| Contribution from Members used during the year (EOA) | (270,163,539) | (220,982,731) |
| **TOTAL NET ASSETS** | (118,089,217) | (94,618,272) |

### PROFIT & LOSS ACCOUNT

<table>
<thead>
<tr>
<th>All figures in EUR</th>
<th>2012</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPERATING REVENUE</strong></td>
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<tr>
<td>Contributions from Members</td>
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<tr>
<td>Other Revenues</td>
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<td>0</td>
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<tr>
<td><strong>Total operating revenue</strong></td>
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<td>0</td>
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<tr>
<td><strong>OPERATING EXPENSES</strong></td>
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<tr>
<td>Administrative expenses</td>
<td>(758,768,1)</td>
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<td>Staff expenses</td>
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<td>(4,527,126)</td>
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<td>Fixed assets related expenses</td>
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<td>Other administrative expenses</td>
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<td>Operational expenses</td>
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<td>Other operational expenses</td>
<td>(262,840,540)</td>
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<td><strong>Total operating expenses</strong></td>
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<td>(221,188,091)</td>
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<td>Deficit from operating activities</td>
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<td>(221,188,091)</td>
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<td><strong>NON-OPERATING ACTIVITIES</strong></td>
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<tr>
<td>Financial operations revenues</td>
<td>268,778</td>
<td>211,166</td>
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<tr>
<td>Financial operations expenses</td>
<td>(4,261)</td>
<td>(5,806)</td>
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<tr>
<td>Other non operating income</td>
<td>165</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total non-operating activities</strong></td>
<td>264,682</td>
<td>205,360</td>
</tr>
<tr>
<td><strong>CONTRIBUTIONS FROM MEMBERS USED DURING THE YEAR</strong></td>
<td>(270,163,539)</td>
<td>(220,982,731)</td>
</tr>
</tbody>
</table>

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 SESAR JU ADMINISTRATIVE BOARD ON 31 DECEMBER 2012

<table>
<thead>
<tr>
<th>SJU Founding Members</th>
<th>Member</th>
<th>Alternate Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Union represented by the European Commission</td>
<td>Mr Matthias Ruete (Chairman)</td>
<td>Mr Matthew Baldwin</td>
</tr>
<tr>
<td>EUROCONTROL</td>
<td>Mr Bo Redeborn</td>
<td>Mr Bernard Miaillier (Deputy Chairman)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SJU Members</th>
<th>Member</th>
<th>Alternate Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>AENA</td>
<td>Mr Ignacio González Sánchez</td>
<td>Ms Mariluz De Mateo</td>
</tr>
<tr>
<td>Airbus</td>
<td>Mr Bernard Rontani</td>
<td>Mr Pierre Bachelier</td>
</tr>
<tr>
<td>ALENIA Aeronautica</td>
<td>Mr Maurizio Fornaiolo</td>
<td>Mr Fabio Ruta</td>
</tr>
<tr>
<td>DFS</td>
<td>Mr Dieter Kaden</td>
<td>Mr Ralf Bertsch</td>
</tr>
<tr>
<td>DSNA</td>
<td>Mr Maurice Georges</td>
<td>Mr Philippe Merlo</td>
</tr>
<tr>
<td>ENAV</td>
<td>Mr Iacopo Prissinotti</td>
<td>Mr Cristiano Baldoni</td>
</tr>
<tr>
<td>Frequentis</td>
<td>Mr Rolf Unterberger</td>
<td>Mr Christian Pegritz</td>
</tr>
<tr>
<td>Honeywell</td>
<td>Mr Jean-Luc Derouineau</td>
<td>Mr Alexandre Laybros</td>
</tr>
<tr>
<td>INDRA</td>
<td>Mr Rafael Gallego Carbonell</td>
<td>Mr Ramon Tarrech</td>
</tr>
<tr>
<td>NATMIG</td>
<td>Mr Aage Thunem</td>
<td>Mr Magnus Lindegren</td>
</tr>
<tr>
<td>NATS</td>
<td>Mr Martin Rolfe</td>
<td>Mr Alastair Muir</td>
</tr>
<tr>
<td>NORACON</td>
<td>Mr Thomas Allard</td>
<td>Mr Niclas Gustavsson</td>
</tr>
<tr>
<td>SEAC</td>
<td>Mr Giovanni Russo</td>
<td>Mr Roland Krieg</td>
</tr>
<tr>
<td>SELEX S.I.</td>
<td>Mr Mario Richard</td>
<td>Mr Stefano Porfiri</td>
</tr>
<tr>
<td>Thales Group</td>
<td>Mr Rémi Gilie</td>
<td>Mr Luc Lallouette</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stakeholder Representatives</th>
<th>Member</th>
<th>Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Military</td>
<td>Air Commodore Chris J Lorraine</td>
<td>Mr Per Coulet</td>
</tr>
<tr>
<td>European Defence Agency</td>
<td>Mrs Claude-France Arnould</td>
<td>Mr Giampaolo Lillo</td>
</tr>
<tr>
<td>Civil users of airspace</td>
<td>Mr Vincent de Vroey</td>
<td>Mr Pedro Vicente Azua</td>
</tr>
<tr>
<td>Air Navigation Service Providers</td>
<td>Mr Guenter Martis</td>
<td>Mr Bernard Martens</td>
</tr>
<tr>
<td>Equipment manufacturers</td>
<td>Mr Michael Von Gizycki</td>
<td>Mr Patrick de Préaux</td>
</tr>
<tr>
<td>Airports</td>
<td>Mr Olivier Jankovec</td>
<td>Mr José Thomás Baganha</td>
</tr>
<tr>
<td>Staff in the ATM sector</td>
<td>Mr Loïc Michel</td>
<td>Mr Joël Cariou</td>
</tr>
<tr>
<td>Scientific community</td>
<td>Mr Peter Hecker</td>
<td>Mr J.A. Mulder</td>
</tr>
</tbody>
</table>
WHY SESAR?

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

The mission of SESAR is to modernise Europe’s ATM system. As the technological pillar of Europe’s ambitious Single European Sky initiative, the programme has set ambitious performance targets by 2030:

- 27% increase in Europe’s airspace capacity;
- 40% reduction in accidents per flight - corresponding to this risk not associated with the anticipated traffic growth;
- 2.8% reduction in environmental impact; and
- 6% reduction in cost per flight.

SESAR is not just another European Research and Development project. The outcomes of the innovative work are expected to have considerable impact on both the aviation industry and society as a whole:

- A combined positive impact on the EU’s GDP of €850 billion over next 20 years.
- Creation of approximately 5,000 additional jobs in air transport industries. And 10% additional impact, the figure rises to 30,000.
- Flight times shortened on average.
- A 6% reduction in cost per flight.
- 2.8% reduction in environmental impact; and
- 40% reduction in accidents per flight - corresponding to this risk not associated with the anticipated traffic growth.

Composition of the management team of the SESAR JU

Liaison Officer at the Delegation of the European Union to the United States: David Batchelor
Chief Corporate Communication: Nathalie Oghlian
Internal Audit: Véronique Haarsma
Advisor: Fiona McFadden
Chief Strategies and International Relations: Michael Standar
Senior Advisor Military Affairs: Orfei Micali
Executive Director’s Office
Deputy Executive Director Operations and Programme: Fabrice Guillet
Deputy Director Operations & Programme (Chief Technology and Innovation): Peter Hendriksen

Directorate Programme and Operations
Deputy Executive Director Operations and Programme: Fabrice Guillet
Deputy Director Operations & Programme (Chief Technology and Innovation): Peter Hendriksen

Directorate Finance and Administration
Deputy Executive Director Finance and Administration: Carlo Bonghi

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.
SESAR came to life on the recognition of serious inadequacies with the current air traffic management system. Today, the shortcomings of the European ATM system are estimated to cost some €4 billion annually. Without a radical change in the way air transport is managed, flying in Europe will reach its limits, leading to more delays for passengers, greater safety concerns, increased costs for airlines and higher CO₂ emissions.

The aim of 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 industrial implementation.

In this context, almost 3,000 experts in Europe and beyond are working to bring ATM technology up to 21st century standards.

Partnership, sustainability and user orientation are the founding principles of the SESAR Joint Undertaking’s approach to delivering tangible, deployable solutions to the ATM world.