SESAR
JOINT UNDERTAKING

ANNUAL REPORT 2013

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SESAR JOINT UNDERTAKING

2013 Annual Report

Why **SESAR**

Air Traffic Management (ATM) is an essential component in the air transport system, which is worth €8.4 billion/year* and involves:

58.000 Employees*

17.200 Air Traffic Controllers*

11.5 million Km² of airspace*

63 En route centres*

Today's complex infrastructure means that Europe's ATM is not running as efficiently as it could:

In 2010 en-route flights were delayed by an estimated **19.4 million minutes.****

On average, each flight was **49km longer** than direct flights.**

Estimated costs of airspace fragmentation up to **€4 billion a year.****

With traffic expected to grow, Europe needs to take advantage of technological developments in order to keep the aviation industry sustainable.

2012	2030
9.5 million flights*	**16.6** million flights*
1.6 billion passengers***	**2.7** billion passengers***

* Source: EUROCONTROL — **Source: European Commission — *** Source: Airports Council International Europe

with **SESAR**

SESAR is researching and developing innovative ATM solutions that **benefit Europe's society and wider economy.**

A **positive impact** on the EU's GDP.*

Creation of **additional jobs** in air transport industries.*

More direct flights will shorten flight times by approximately 10 %, **9 minutes per flight** on average.*

A reduction in the environmental impact of flights by **10 %**, through shorter waiting and taxi times, more direct trajectories and smoother landing approaches.**

Fewer cancellations and delays and increased predictability and punctuality on arrivals and departures.*

* Source: SESAR Macroeconomic Study, 2011 — ** High-level goals for the Single European Sky

TIMELINE

2007

27/02
SESAR JU created under European Union Law

12/10
Appointment of the Executive Director

2008

21/02
Start of negotiations with 15 pre-selected members

06/05
Public release of SESAR Master Plan

17/11
First AIRE contracts signed

16/12
Adoption of the amended Council regulation recognising SESAR JU as a Union body

2009

30/03
Signature of administrative agreement between the SESAR JU and the Kingdom of Belgium

Endorsement of the European ATM Master Plan by the Council

03/06
SESAR programme technical kick-off

12/06
SESAR JU signs working agreements with 16 partners totaling €1.9 billion

15/09
Major airlines, business & general aviation, associations participate in SESAR

14/12
First four SESAR projects start research and development

2010

04/01
1,000th contributor working on SESAR

08/04
AIRE: first complete (gate-to-gate) transatlantic flights

31/05
First 100 SESAR projects in execution

19/07
Associate partners join SESAR family

17/09
AIRE 2010/11: Successful start of new green aviation trials

08/11
Memorandum of Understanding with Mexico signed

10/11
EASA and SESAR seal cooperation agreements

2011

28/01
OPTIMI presents recommendations for better aircraft tracking

03/03
EU/US Memorandum of Cooperation in aviation research signed

08/03
SESAR Release 2011 officially presented

11/04
Memorandum of Understanding with State Aviation Administration of Ukraine signed

09/06
Airspace users engaged in WP11

01/07
Macro-economic study shows positive economic impact of SESAR in EU Member States and beyond

03/08
Eight consortia join SESAR as new Associate Partners

05/10
ATM Master Plan Update officially kicked-off

29/11
First SESAR Innovation day

2012

02/12
The world's first 4D Flight successfully validates the capability of the aircraft system to comply with time constraints

05/12
SESAR top-down Programme prioritisation

06/12
First SWIM Masterclass launched

10/12
European ATM Master Plan 2012 adopted

11/12
Demonstration activities, including second phase of AIRE, are launched

11/12
Memorandum of Cooperation with Civil Aviation Authority of Singapore signed

11/12
First live SWIM demonstration

12/12
Second SESAR Innovation Day

2013

13/02
The European ATM Master Plan 2010 wins prestigious IHS Jane's air traffic control (ATC) award

14/02
Successful live demonstration of SWIM at the World ATM Congress in Madrid

26/06
Nine demonstration projects are launched on the safe integration of civil remotely piloted aircraft systems (RPAS) in the European ATM System

10/07
European Commission invests 600 million EUR in new research to unblock congestion in Europe's airspace

1/09
Patrick Ky moves on to new heights at European Aviation Safety Agency (EASA) and Claude Chêne takes up duties as SJU Executive Director

10/10
European Union (EU) transport Ministers agree on SJU extension

26-28/11
Third SESAR Innovation Days

Contents

Message from Chairman of the SJU Administrative Board

Matthias Ruete, Director-General for Mobility and Transport, European Commission

2013 was a visionary year for SESAR, with the SESAR Joint Undertaking (SJU) not only building on the results of 2012 but also defining a vision to be achieved by 2014: 'The SJU partnership has successfully introduced innovations, bringing measurable performance benefits to the worldwide aviation community'. This vision is one which is shared by many and the pursuit of it led to many achievements for the SJU in 2013, most notably the following:

Actively contributing to the Pilot Common Project (PCP) by outlining a proposal with the main steps and drivers required, ensuring that SESAR solutions will unleash their full potential to the ATM community.

Publishing the first SESAR Solutions Packs ensuring that wider audiences, such as policy decision-makers and regulators, understand the societal, economic and safety benefits of SESAR solutions.

Widening the scope of SESAR demonstration activities through the launch of a new call for proposals, paving the way for the deployment of the PCP by showcasing the benefits of specific solutions for small and medium-sized airports, as well as global interoperability.

Launching 9 demonstration projects on civil RPAS integration in European airspace, representing 38 different partners from 8 different countries: Czech Republic, Germany, Spain, France, Italy, Malta, the Netherlands and the United Kingdom.

Welcoming the participation of over 64 teams worldwide to the SESAR SWIM Master Class 2013, ensuring that it has truly become an international ATM event.

This 2013 annual report describes the results achieved over the past year by the SJU in delivering the SESAR vision. The report highlights that SESAR is clearly already meeting its mandate — as the technological pillar of the single European sky (SES) initiative — to modernise Europe's ATM system, which is now recognised as a core element in the value chain for a more efficient and competitive European aviation industry.

SESAR has created the change in European ATM that demonstrates its ability to deliver benefits and deployable solutions. I am confident that 2014 will see SESAR bring even more solutions to Europe's aviation sector. It will create new possibilities and new business, bringing benefits to European society and the economy at large. It is for this reason that I believe that SESAR solutions are not only fundamental for the SES to achieve its high-level goals but are also instrumental towards Europe's 2020 strategy for achieving a smart, sustainable and inclusive economy.

2013 was my last full year as Chairman of the Administrative Board and I am extremely proud to hand over such a successful programme to my successor João Aguiar Machado, who takes over this responsibility as of the 1 May 2014. I am certain that he will be just as committed to SESAR as I was and will ensure that we maintain this significant momentum in the years ahead.

Foreword

Claude Chene, Executive Director, SESAR Joint Undertaking

During my time at the SJU, I witnessed plenty of convincing evidence that SESAR is already having a transformative and positive impact on the ATM industry. In visits to validation and demonstration exercises, and in speaking to operations experts, I observed the commitment, energy and determination of SESAR members to develop solutions that are relevant for use and that have a real potential to boost Europe's ATM performance, both now and in the future.

2013 is testament to this commitment. Building on the numerous achievements of 2012, the SESAR programme brought an additional 13 projects to the validation phase. In addition, the programme further enhanced its commitment to bridging research and development (R & D) towards deployment, with a growing portfolio of SESAR demonstrations which will be further strengthened through a new call for proposals launched at the end of 2013. The SESAR innovation pipeline was also enhanced through the new ideas emerging from its long-term research networks and PhD programmes, an area of the programme which I am happy to see will be further championed in SESAR 2020.

Over the last 6 years, the partnership has increased in its maturity, building a strong relationship between stakeholders and a rationalised R & D landscape that now has real synergy with the SES and the European Commission.

My advice going forward is to continue to forge this spirit of partnership so that the silos that blight Europe's R & D landscape become a thing of the past. The SESAR 2020 programme gives us ample space for such collaborative engagement through: long-term research, large scale demonstrations and the continuation of the European ATM Master Plan, with more focus on results and outcomes. With the establishment of the Deployment Manager, the SJU and SESAR members will have a pathway towards transforming their R & D efforts into real changes in the ATM system.

CHAPTER 1

Meeting our objectives

At the end of 2012, the SJU published its second mid-term vision covering the period of 2013–14. The aim of this vision was to ensure that the SESAR programme remains focused not only on the achievement of its mission but also on concrete research and innovation progress.

In this context, the SJU vision for the period 2013–14 was defined as follows:

The SJU partnership has successfully introduced innovations, bringing measurable performance benefits to the worldwide aviation community.

To achieve this, the individual strategic objectives, together with an assessment of the achievements at year-end 2013, are:

OBJECTIVE ONE

SESAR procedures, technology/tools and airspace design solutions enabled by the initial 4D capability have demonstrated performance benefits in terms of efficiency, safety, capacity and predictability.

In 2013, validation activities focused on the evolution of the 4D trajectory coupled with controlled time of arrival (CTA) in mixed traffic environments. The exercises highlighted that, contrary to initial expectations, ATC procedures using 4D capability need further refining for traffic separation and sequencing and in order to measure efficiency in different operating environments.

Subsequently, additional work will be required to enrich the ground conflict detection systems with the trajectory downlinked from the aircraft. For this reason, further initial 4D (i4D) procedures in mixed traffic environment will be validated in 2014.

Taking into account that more validation exercises are expected to take place in 2014, **30 % of this objective has been completed.**

OBJECTIVE TWO

Technological and operational innovations in the airport domain are ready for deployment and SESAR airport operations plan (AOP)/air operations centre (AOC)/network operations plan (NOP) integration has demonstrated positive network performance.

A validation exercise, launched as part of Release 3, aimed at improved arrival predictability and its propagation to departure predictability, as well as reducing an arrival traffic bunching effect. This activity addressed related topics, such as the connection between the AOP and the network NOP.

In addition, 2013 successfully delivered the time-based separation SESAR solution, which aims to provide a consistent time spacing between arriving aircraft in order to maintain runway approach capacity, no matter the headwind conditions.

By the end of year, **30 % of this objective was complete**, meaning that the SJU met its 2013 target.

OBJECTIVE THREE

SESAR partners commit to the SESAR programme's innovative technological/ operational results in their medium-term investment plans.

In 2013, the SJU worked on the delivery of 'Solution Packs' which signal the end of the planned R & D activities on a given operational procedure or technology. These solutions are derived from Releases 1 and 2 and have been made widely available. For more information, see chapter 3.

In 2013, the manufacturing industry, air navigation service providers (ANSPs) and airports — accounting for 6 out of the 15 SESAR members — shared their plans which showed convergence of investments and deployment intentions towards technology and procedures reflecting SESAR solutions.

The mid-term investment plans are expected to be part of the deployment activities, outside the remit of the SJU; however the SJU communication on benefits linked to innovations will provide strong incentives for inclusion in mid-term investment plans.

At the end of year, **40 % of this objective was complete**, which was also the achievement target for the SJU for 2013.

OBJECTIVE FOUR

SWIM-based applications contribute to efficient implementation of airspace users' preferred flight routes and profiles.

SWIM validation activities are being progressively integrated in the release delivery process and therefore featured significantly in Release 3 over 2013. In particular, one exercise partially demonstrated that the on-line data interchange mechanism (OLDI) can be replaced with flight object to pass information between area control centres (ACC) and support SESAR's concept of operations for trajectory management. In addition, exercises focusing on the interoperability of flight planning systems, which support free routing operations, were validated using SWIM profiles.

In addition, 2013 saw an unprecedented number of stakeholders from across the globe become engaged in building a critical mass of knowledge on SWIM and setting in motion a change process in how information is exchanged between ATM stakeholders, not just in Europe but worldwide. For more information, see chapter 5.

By the end of 2013, the SJU **achieved its target of 30 % completion towards this objective.**

OBJECTIVE FIVE

The SESAR controller working position (CWP) prototype demonstrates performance gains through its adaptability to efficiently integrate new functionalities.

In 2013, validation activities focused on the integration of new functionalities and decision-making tools in the human–machine interface of the CWP.

In particular, a Release 3 exercise validated the use of enhanced short-term conflict alerts (STCAs) using downlinked aircraft parameters (DAPs). Initial results in accordance with feedback from air traffic controllers (ATCOs) confirm that the use of both selected flight level (SFL) and track angle rate (TAR) DAPs provide improvements in the STCA tool. This ultimately leads to a reduction of nuisance alerts and ATCO workload, increased ATCO trust in STCAs and increased ability to manage traffic.

At the end of 2013, **the SJU met its achievement target of 60 % for this objective.**

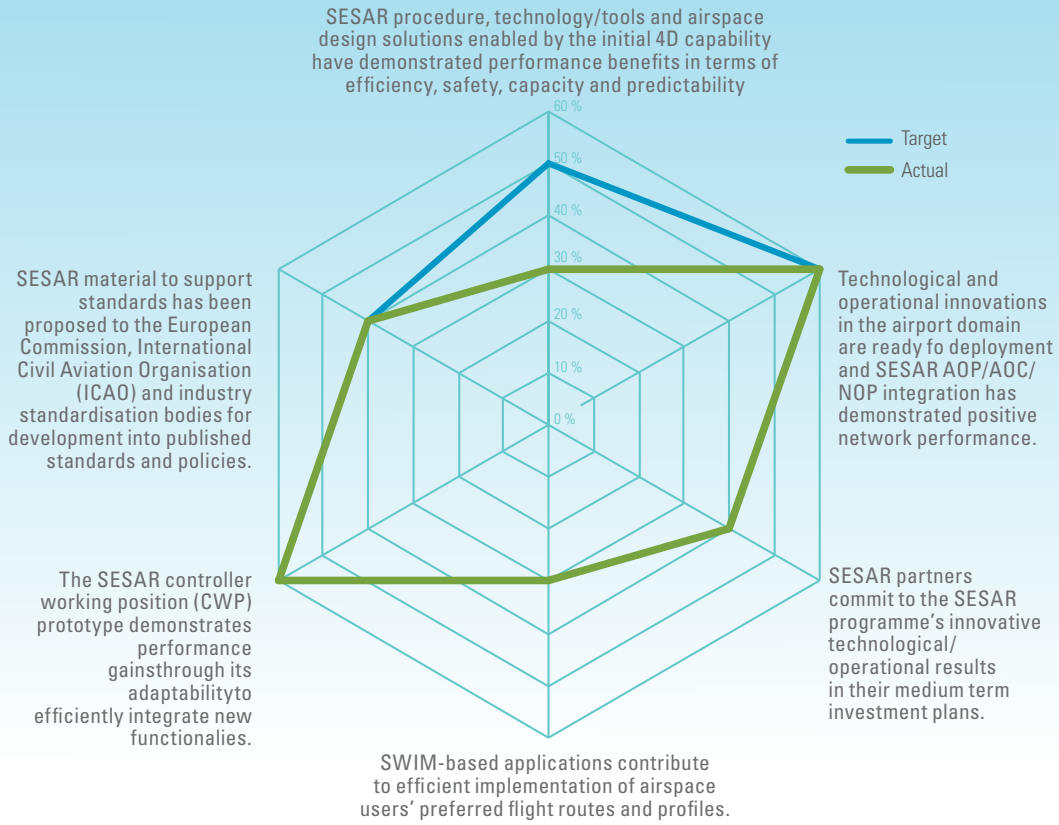
OBJECTIVE SIX

SESAR material to support standards has been proposed to the European Commission (EC), the International Civil Aviation Organisation (ICAO) and industry standardisation bodies for development into published standards and policies.

SESAR material to support standards has been proposed to the EC, ICAO and industry standardisation bodies for development into published standards and policies.

Three standards are well advanced in their development, while a further ten standards are currently in the process of being approved.

Figure 1: **SJU progress on achieving SESAR programme objectives**



OBJECTIVE SEVEN

Through the SJU public-private partnership (PPP), SESAR staff have become world leaders in creating a culture of innovation, cooperation and accountability to deliver.

Over the course of 2013, the SJU participated in a number of high-level international events in order to raise awareness about SESAR, its latest results, and to increase global stakeholder engagement in the programme. Examples of such events include participation in the 2013 World ATM Congress (WAC), the 2013 SESAR SWIM Master Class, an EU–United States (US) conference focusing on the interoperability of SESAR Solutions and other global events and workshops. Please see chapter 5 for more details of SESAR's global outreach activities.

Given the success of these global outreach activities and events, SESAR **considers this objective to be 100 % achieved.**

OBJECTIVE EIGHT

Results from SESAR long-term research activities are embedded into the rest of the SESAR programme and prove the effective link between innovation and R & D.

In 2013, to ensure the link between innovation and R & D, the SJU coordinated and participated in the following.

- Advisory Council for Aeronautics Research in Europe (ACARE)
- Exploratory research activities
- Engagement with the scientific committee
- Coordination with the EU framework programme

For more details on these activities, please see chapter 2.

This work is still ongoing and will be continued during 2014, especially in view of the preparation for long-term research activities within the SESAR 2020 programme.

CHAPTER 2

Long-term and innovative research

Long-term and innovative research is pivotal to the SESAR programme. It addresses novel and/or unconventional concepts, ideas and new technologies in order to stimulate new thinking and creativity in the ATM research domain.

The work undertaken within this pillar of the programme aims to be complementary to existing SESAR activities, thereby ensuring seamless continuity within the research and innovation pipeline beyond the SESAR programme.

2.1. Exploratory research objectives

The objective of long-term research is to be a catalyst for the creation of a healthy body of European ATM research, and related communications, navigation and surveillance (CNS) research capability and knowledge that will exist beyond the lifetime of the current SESAR development programme. The SJU, through funding open calls for proposals, enables universities, research centres and small to medium-sized enterprises (SMEs) to undertake research activities that go beyond the main SESAR industrial programme and thus concentrate on lower research maturity levels.

Long-term research addresses areas that analyse long-term research concept/technology gaps as well as European ATM challenges towards the evolution of a safe, competitive and sustainable future ATM system.

Over the course of 2013, the long-term research themes were further refined, taking into account feedback on work performed to date, the evolving research goals in the advisory council for ACARE and based on guidance from the scientific committee, who provide scientific advice and support to the SJU including the transition of the SJUs research activities under Horizon 2020.

To date, **the programme has three research networks, 19 PhDs and 40 research projects** (details of these projects can be found on the SJU website).

These research themes are the following:

- Towards higher levels of automation in ATM
- Mastering complex systems safely
- System architecture and system design
- Information management, uncertainty and optimisation
- Enabling change in ATM.

Through the involvement of a wide range of universities, research centres and industries, these research projects offer a structured way to build competence and capability, which will serve the needs of the ATM sector in the long-term.

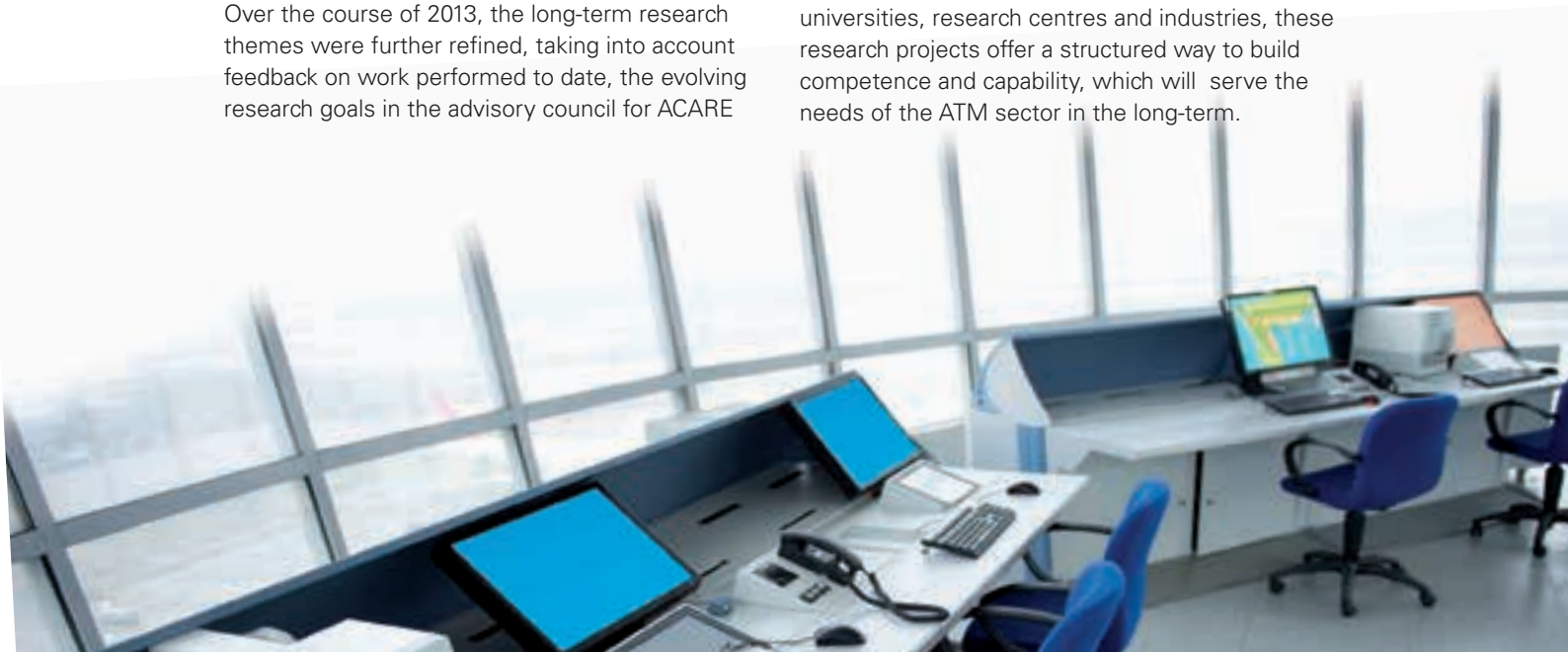
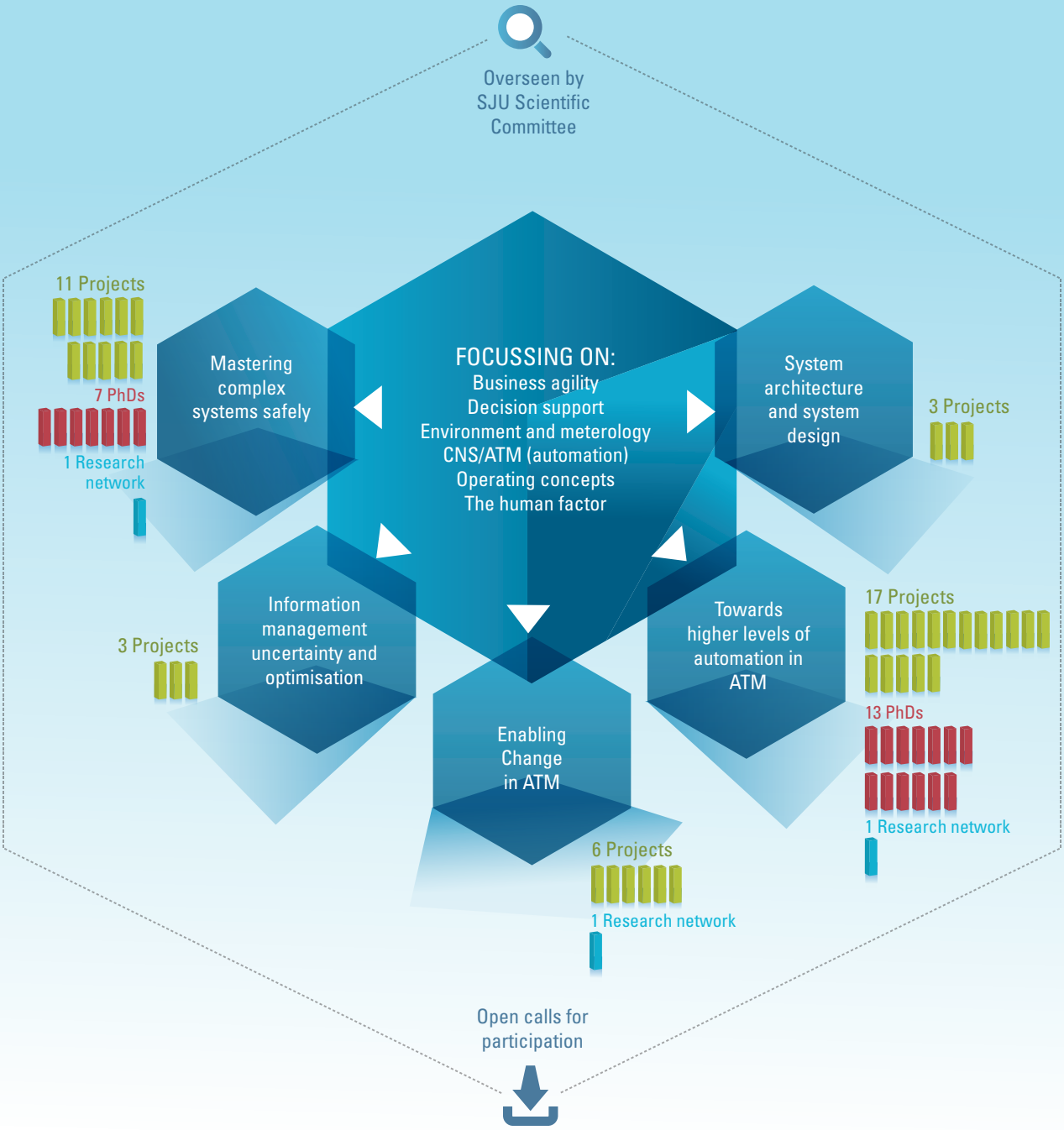


Figure 2: **Exploratory research: a thematic approach**



'SESAR exploratory research drives the development and evolution of the next generation of innovative and unconventional ideas, concepts and technologies that define the performance of the future European ATM system, and contribute to its successful evolution.'

SESAR Scientific Committee, 2013

◂ The SJU Science Committee

2.2. Research networks

SESAR research networks are responsible for building research knowledge, competencies and capabilities that should serve the ATM industry in the long-term. They coordinate research, develop knowledge, ensure that the network evolves, and select and manage PhD research activities. Each network comprises partners from academia, research establishments, industry, and others: stakeholders who share a common expertise or interest in a relevant ATM or transport domain.

In order to provide a sound repository of ATM knowledge, since 2011 three research networks **(Higher Automation Levels in ATM (HALA!), Complex World and Addressing the liability impact of automated systems (ALIAS))** have been active in the automation and complexity fields, organising specific targeted activities, such as annual conferences, summer schools and other dissemination events. Other activities include the development a state-of-the-art position paper on each network's respective themes, monitoring a PhD research portfolio and providing support to related projects.

In 2013, the research networks performed the following research activities.

ComplexWorld: transformed its position paper into a wiki, organised five thematic workshops on uncertainty, resilience, network modelling, data science and non-classical metrics in ATM, two scientific publications and prepared one book proposal.

HALA! updated its position paper, organised a summer school and submitted a number of scientific papers.

2.3. PhDs

Over the course of the year, **20 PhD students** continued their research with the funding of the SESAR programme, and the support and guidance of the two Research Networks.

HALA! oversaw the work of 13 PhDs, ComplexWorld supported 6 PhDs and launched a call for a new PhD student to join its network.

2.4. Projects

During 2013**, 17 of the 18 projects from the first (2010) call were closed** following a full assessment of their research results([1]). A **further 22 new projects arising from the second (2012) call successfully kicked off**. These projects undergo a thorough technical review gate, which is followed by a final meeting to capture the work and identify next steps. All results are owned by the SJU in order to selectively trigger further work in later phases of R & D, or to add to the body of knowledge on the subject for future research activities.

([1]) http://www.sesarju.eu/innovation-solution/exploratory-research/research-themes-and-projects

2.5. SESAR Innovation Days

The SESAR Innovation Days are the main forum for dissemination of exploratory research results and for interaction with the wider ATM research community and industry representatives. Unlike any other scientific event in ATM research, the SESAR Innovation Days focus explicitly on long-term and innovative research.

From the 26–28 of November 2013, the SESAR Innovation Days took place at the Kungliga Tekniska Högskolan (KTH) Royal Institute of Technology in Stockholm, Sweden. A **total of 175 participants** attended the 3-day event, which celebrated scientific excellence through a series of workshops and research exhibitions and provided the backdrop for the award ceremony of the 2013 SESAR Young Scientist Award.

2.6. Young Scientist Award

In September 2013, the SJU launched the second SESAR Young Scientist Award, inviting candidates with scientific achievements within a bachelor's or master's thesis or on-going PhD work to apply for the call. This annual award recognises the potential of up-and-coming scientists and their contribution to any SESAR research within the ATM and enabling technologies domain.

To be eligible, candidates have to demonstrate that their research was carried out within the scope of SESAR and covered research within one of the following themes:

- Automation
- Complex systems
- System architecture and system design
- Information management, uncertainty and optimisation
- Enabling change.

2013 SESAR YOUNG SCIENTIST

The 2013 SESAR Young Scientist was awarded to Manuel Soler for his work on "Commercial Aircraft Trajectory Optimization based on Multiphase Mixed Integer Optimal Control". His work was recognised for its innovative modelling and interdisciplinary solution approach to the traj ectory modelling problem, as well as strong engagement with research centres both in Europe and the United States.

◂ SESAR's 2013 Young Scientist Award Winner, Manuel Soler, receiving his prize from SJU Executive Director, Claude Chêne.

CHAPTER 3

Moving from research to innovation: validating SESAR

As a performance-based R & D programme, SESAR systematically validates the work of its technological and operational projects. The mechanism used to validate these solutions is known as the Release process. This process involves solutions undergoing thorough pre-industrial development and integration testing within a given timeframe in order to establish their readiness for industrialisation and subsequent deployment.

2013 was a milestone year in terms of solutions. This was because, for the first time ever, the SJU was able to publically share its innovative solutions. This information was packaged into 'Solution Packs', which aim to demonstrate to wider audiences, such as policy decision-makers and regulators, the societal, economic and safety benefits of SESAR solutions. Thanks to this work done in 2013, these Solutions Packs were packaged onto the SESAR website in early 2014, providing a public space whereby audiences, both technical and non-technical, can now access the information they need. The solution packs are displayed in three steps:

1. **At a glance:** gives a brief description of the solution and the benefits it will bring to ATM.
2. **In context:** provides a summary of the validation process, performance achievements, benefits to ATM operations, and activities to be conducted before or as part of deployment.
3. **Getting technical:** provides a pack of documentation, including validation reports, technical and interoperability specifications, and regulatory recommendations. Additional material may include safety and security assessments, and human and environmental performance reports.

At the end of 2013, **SESAR published 15 solutions**. Further solutions will be developed, validated and packaged for dissemination between now and 2016.

Figure 3: **Releases in a nutshell**

Release 1 included 25 operational validation exercises throughout Europe. The exercises centred on the development of efficient and green terminal airspace operations, the i4D trajectory, end-to-end traffic synchronisation and integrated and collaborative network management.

Release 2 built on the experience gained during Release 1, widening the scope of the work and comprised 30 exercises, which took place across 18 European locations. The main results of these exercises focused on: refining the time-based separation minima between arrival aircraft, optimising the ATC sectorisation to better cope with traffic demand, providing new direct routing for airlines and increasing ATC efficiency.

Release 3 included 13 exercises, the results of which will be published in the second quarter of 2014. Read more in section 3.1.

3.1. Release 3 in depth

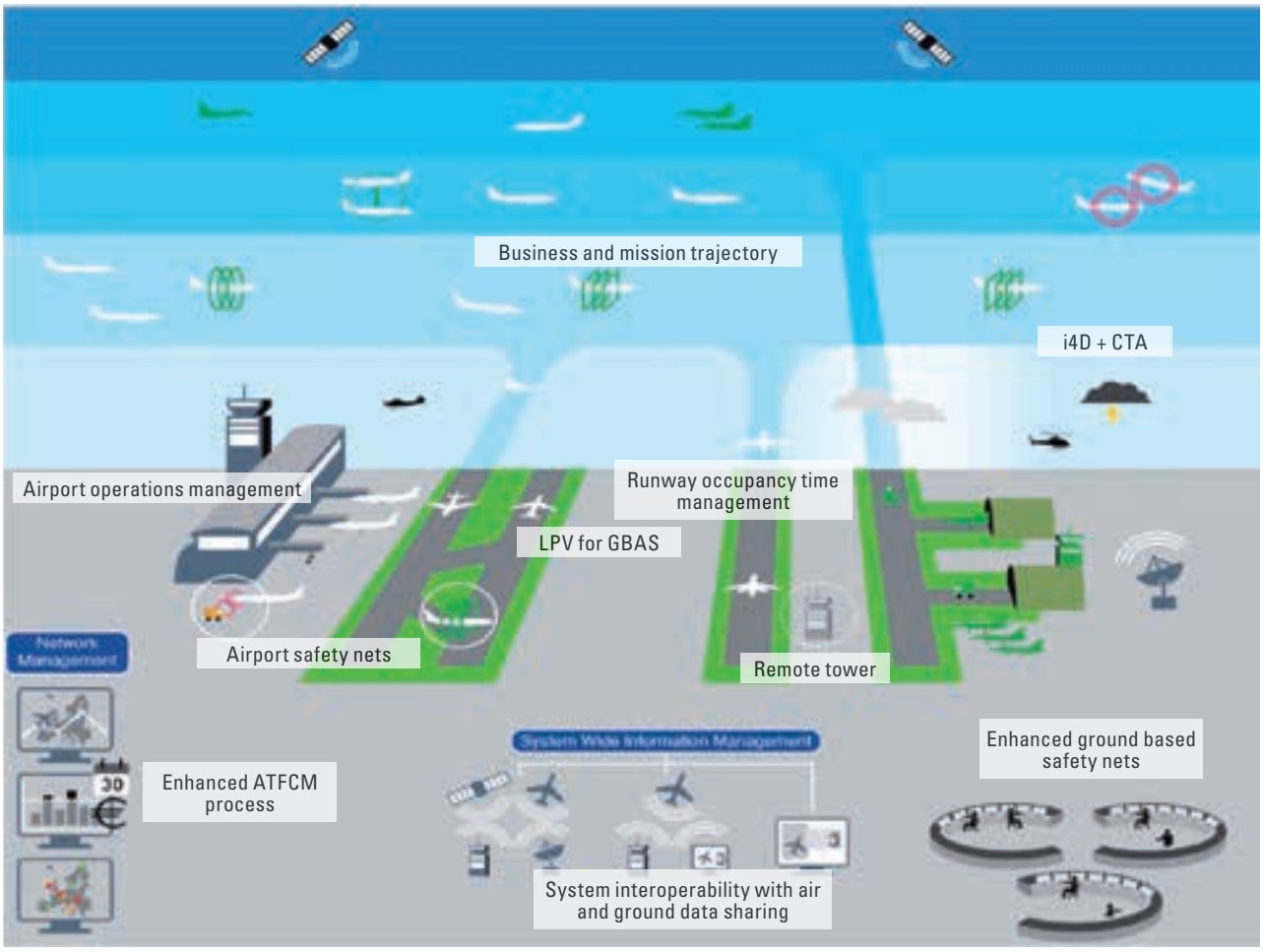
In 2013 the Release 3 activities got underway, expanding the scope of Releases 1 and 2 with 13 exercises (see Fig 4). In addition, one further exercise was carried over from Release 2 (Enhanced arrival and departure management in terminal manoeuvring area and en route).

Overall, the exercises focused on traffic synchronisation in complex environments, arrival management solutions, time-based operations, enhanced flight data exchange. Results deriving from Release 3 will be published in the second quarter of 2014.

Figure 4: **List of Release 3 validation exercises**

Operational Focus Area	Exercise name	Location
Airport safety nets	Operational validation of airport safety nets in an integrated controller working position (iCWP)	Madrid (Spain)
Airport safety nets	Integration of airport safety support tools and enhanced automatic dependent surveillance-broadcast (ADS-B) with the air traffic control (ATC) system supervision	Milan (Italy)
Runway occupancy time management	Break-to-vacate-early trials	London (United Kingdom)
Low visibility procedures (LVPs) using GBAS	Validation of Required Navigation Performance (RNP) to global based augmentation system (GLS) – flight simulator	Toulouse (France)
System interoperability with air and ground data sharing	Procedure for coordination between air traffic service units through the use of flight object information validation	Toulouse (France)
Airborne spacing (ASPA) sequencing & merging (SM)	Airborne spacing (ASPA) SM.	Rome (Italy)
Enhanced ground based safety nets	Operational (and integrated) validation of enhanced short-term conflict alert (STCA) using down link parameters	Rome (Italy)
Initial 4D (i4D) and controlled time of arrival (CTA)	i4D simulations with mainline aircraft integration simulator and connected with Maastricht Upper Area Control Centre (MUAC) and North European and Austrian consortium (Noracon) ATC Centre	Maastricht (Netherlands)
i4D + CTA	i4D simulations with mainline aircraft integration simulator and connected with MUAC and Noracon ATC Centre	Maastricht (Netherlands)
Airport operations management	Dynamically update the network operations plan/ airport operations plan (NOP/AOP) using the target time of arrival (TTA) procedure	Palma de Mallorca (Spain)
Enhanced air traffic flow and capacity management systems (ATFCM) processes	Dynamically update the NOP/AOP using TTA procedure	Brussels (Belgium)
Remote tower	Single remote aerodrome flight information service (AFIS) live trial	Bodø (Sweden)
Business and mission trajectory	Enhance current flight planning processes	Brussels (Belgium)

Figure 5: **Release 3 operational focus areas**



3. 2. Release 3 highlights

While the official results of Release 3 are still to be published, the following are two exercises already worth highlighting:

Airport safety net concept successfully validated at Milan Malpensa Airport

In November 2013, Milan Malpensa Airport was the location for the successful validation of the airport safety net concept. The exercise focused on the early detection of conflicting vehicle trajectories on the airport surface and runways, and the provision of related alerts to ATCOs

The exercise was conducted by SESAR member Ente Nazionale per l'Assistenza al Volo (ENAV), with the support of its validation partners — Selex ES, Sistemi Innovativi per il Controllo del Traffico Aereo (SICTA), Techno Sky — and saw the participation of five controllers, three pseudo pilots and an integrated team of validation experts made up of engineers and ATM specialists. Using a sophisticated pre-industrial validation platform at Malpensa tower backup operational room, the exercise consisted of two techniques:

1. A real-time simulation analysed **innovative alarms for controllers**, such as non-compliance to ATC clearances and instructions; conflicting ATC clearances; surface conflict prediction and detection; and runway incursion detection and area intrusion. Three CWPs were used during the simulation dealing with delivery, ground and tower control functions. These positions were fed with traffic handled by three pseudo pilot positions.

   This technique aimed at assessing the operational benefits of these concepts in terms of safety and human performance (acceptability, usability and controller workload). This validation

The SJU visit to the operational control tower room. From left to right: Cristiano Baldoni, ENAV Contribution Manager, Claude Chêne, Executive Director of the SESAR Joint Undertaking, Stefano Porfiri , Selex ES — Head of the SESAR Programme, Benoit Fonck, SJU Chief Development and Delivery.

demonstrated the added value of having a customised platform for displaying conflict identification and alerting messages on the CWP.

2. A shadow mode trial investigated the **accuracy/reliability of automatic dependent surveillance-broadcast (ADS-B) through an advanced comparative algorithm**, with the aim of enhancing ground system for airport surveillance.

Overall, the validation exercise identified significant improvements leading to higher safety levels for the airport.

Ground based augmentation system installation and interoperability tests pave the way for precision approach and landing

In September 2013, the SESAR programme validated the use of augmentation systems (Satellite based-SBAS as well as ground based augmentation system (GBAS) — for precision approach) in order to increase accessibility in airports.

GBAS augments global satellite navigation systems (GNSS) for use in precision approach and landing guidance and for managing complex simultaneous approaches across multiple runways — all of which have significant benefits, such as cost savings, reduced delays, increased airport capacity, greater ATC flexibility and improved safety.

Under the umbrella of the SESAR programme, two ground manufacturers — Thales and Indra-Navia — and two airborne manufacturers — Thales Avionics and Honeywell — are developing GBAS category (CAT) II/III ground and airborne equipment. Against this background, the ground equipment was installed at two airports — Toulouse and Frankfurt — for flight testing and system validation to CAT II/III, which was supported by a number of SESAR members (Honywell, Indra-Navia, Airbus, Thales, Deutsche Flugsicherung GmbH (DFS), Direction des Services de la Navigation Aérienne (DSNA) and the Eurocontrol.

The key objective of these validation exercises was to test the interoperability between CAT III avionics receiver prototypes and prototypes for ground stations, and airport ATC infrastructure. A range of different conditions and scenarios were tested during the trials, including multipath evaluations, full scale deviations and CAT III to II regression testing and back, in order prove the validity of GBAS.

The results of these initial flight tests have proved that GBAS can bring additional benefits, including lower maintenance costs, easier installation paths, reduced tarmac and approach congestion and a greater range of complex approaches to European airports. Further testing of the current trial systems at Toulouse and Frankfurt airports is scheduled for 2014. SESAR is also exploring the potential for a future extension of the project for multi-constellation, multi-frequency GBAS, which would lead to an even more robust system suitable for use virtually anywhere in the world. It is also expected to extend activities to validate enhanced functions supporting curved approaches and displaced runway threshold capabilities.

CHAPTER 4

Preparing for SESAR deployment

The European ATM Master Plan is the common roadmap for the development and deployment of SESAR technologies and procedures, linking them to the SES performance objectives. The plan defines the essential operational changes that need to occur in order to achieve the SES performance objectives and also identifies the related functionalities and the key actions that stakeholders will have to implement at a given time.

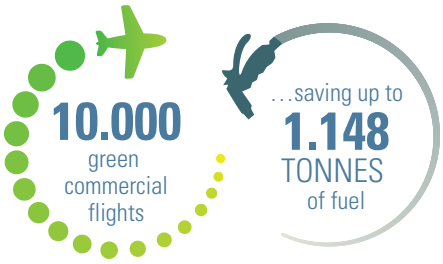
It has been demonstrated that only the timely, synchronised and coordinated deployment of SESAR in accordance with the Master Plan will contribute to achieving the SES performance objectives and the overall economic benefits expected from ATM modernisation. This has required setting up appropriate instruments and mechanisms within the SJU working arrangements that bridge R & D with deployment activities, effectively preparing for SESAR deployment beyond the maintenance of the European ATM Master Plan. This section gives a summary of these deployment preparatory activities.

6.1. Demonstrating SESAR

A range of stakeholders from airspace users, ANSPs, the manufacturing industry and airports work together on collaborative demonstration projects for a period of typically 24 months in order to demonstrate the benefits of SESAR solutions in real operations.

At the end of 2013, SESAR was **co-financing 27 demonstration projects,** consisting of live trials, running across Europe and both the North and South Atlantic.

- Nine projects have an environmental focus, aiming to show that aircraft emissions can be reduced through better flight management. These are part of the third round of projects funded within the **Atlantic interoperability initiative to reduce emissions (AIRE)** programme, a joint initiative of SESAR and the US Federal Aviation Administration (FAA). Bringing together **31 airports, ANSPs and airline partners** in **14 geographical locations**, this latest set of projects builds on the successes and insights gained through the previous series of AIRE demonstration flights and aims to raise the performance bar further. To date, AIRE has run more than **10 000 green commercial flights** using new procedures, resulting in **fuel savings of up to 1 148 tonnes** of fuel. These collaborative efforts are concrete proof that it is possible to fly more environmentally-friendly trajectories today with commercial flights, using current technologies.



SESAR Solution Demonstrations:

15
AIRLINES

5
AIRPORTS

18
AVIATION PARTNERS

25
GEOGRAPHICAL LOCATIONS

- Nine further projects aim to showcase the benefits of first **SESAR Solutions** in day-to-day operations on a larger scale. The purpose of these projects is to increase the operational exposure of the benefits of SESAR Solutions, stemming from the **SESAR Release process**, and accelerate their acceptance by the wider ATM community in order to promote their merit for industrialisation. These projects therefore focus on the introduction of several new technologies and improvements in one or several operational focus areas, and **involve 15 airlines, 5 airports and 18 other aviation partners** in **25 geographical locations**.

  The final results of these on-going projects will be gradually published from 2014, but their preliminary results already indicate that on more than **5 000 commercial flights**, involving over **20 air operators**, significant performance gains can be achieved on flights within Europe, as well as flights between Europe and North America, Latin America or Africa. These performance gains cover a wide range of key performance areas, including customer satisfaction (through smoother flights and punctuality), environmental efficiency, air navigation service provision productivity, safety and capacity. Furthermore, some of the projects are also taking advantage of and complementing results achieved by other European initiatives, such as Clean Sky.

- The remaining 9 projects focus on the integration of **civil RPAS** into European ATM. With **38 different partners from 8 different countries**, these projects aim to demonstrate how to integrate RPAS into non-segregated airspace in a multi-aircraft flight environment. The projects focus on concrete results filling the operational and technical gaps and demonstrate the links with SESAR. Both optionally-piloted and completely remotely-piloted systems will be participating in these projects, using various types and sizes of civil RPAS, such as rotary wing, motor gliders, and light observation aircraft, both for civil and military purposes. The demonstrations started in the last quarter of 2013 and are expected to run until the end of 2015.

SESAR prides itself on the strong momentum for change that it has developed over the years, in which ATM stakeholders are keen to share their experiences and knowledge. Proof of this willingness to learn from one another was seen at workshop held in Lisbon at the end of November 2013. **Over 40 experts, representing more than 60 organisations, working together on demonstration activities in Europe and the North Atlantic,** participated in the workshop where they shared and reviewed preliminary results and discussed how to further improve the approach to demonstrations.

Figure 6: **Spread of demonstration projects by location**

4.2. Sharing best practices and scaling up demonstrations

Large Scale SESAR Demonstrations will be a major focus of the SESAR programme as it moves forward towards the deployment phase, since these activities are seen as vehicles with which to accelerate the operational acceptance and the subsequent industrialisation of the SESAR solutions. With this in mind and to further build confidence in SESAR solutions, a Call for Proposals covering SESAR Demonstration Activities for the period 2014–16 was launched at the end of 2013 ([2]). The call focused on larger projects that can pave the way for the deployment of the PCP (see Section 4.3), and specific solutions targeting small and medium-sized airports, as well as global interoperability.

4.3. Support to the Commission in developing a proposal for the Pilot Common Project

In 2012, shortly after the update of the European ATM Master Plan, the SJU was mandated by the European Commission to draft a **Pilot Common Project (PCP)** outlining the main changes required to **deploy the first SESAR solutions and associated cost benefit analysis**. This SJU proposal was handed to the Commission in 2013.

([2]) http://www.sesarju.eu/about/procurement

The PCP proposal consists of an initial set of six' 'ATM Functionalities' (AFs), as per the Commission's draft implementing Regulation on common projects, which are logically grouped by essential operational changes defined in Step 1 of the European ATM Master Plan.

The functionalities outlined in the PCP were selected for their technological, operational and economical maturity for implementation, their significant contribution to performance, and the added value of their synchronised deployment within the 2014–20 timeframe. It is considered that together they will bring substantial and measurable performance improvements and also pave the way towards building the ATM infrastructure of the future.

Given that such improvements will require a synchronised implementation among key investors, the SJU liaised with a wide range of stakeholders in order to collect constructive recommendations, ensure credibility and minimise risks. Key operational stakeholders included: the Network Manager, civil airspace users, ANSPs, airports, staff associations, ground and airborne industry and the military.

The PCP proposal is the first articulation of the common project concept described in Article 15a paragraph 1 of the amended service provision Regulation adopted by the European Parliament and the Council on 21 October 2009 ([3]). It is therefore expected to lead an incremental approach of future of common projects, which sends a positive message that SESAR deployment is sustainable, performance-driven, and fully in line with the European ATM Master Plan.

4.4. Supporting regulators and authorities

Air travel is a highly regulated industry, in terms of its environmental, security, safety or competition aspects. This is why the SJU works closely with EC and national regulatory authorities, to ensure that SESAR solutions are developed taking into account the regulatory and standardisation context in which they will be deployed. Refer to section 4.4.1, 4.4.2 and 4.4.3 for more information.

4.4.1. Collaboration with European Aviation Safety Agency

Over the course of 2013, the SJU scaled up its collaboration with the European Aviation Safety Agency (EASA) in order to ensure that the programme can benefit from their regulatory advice and expertise — not only in order to support the day-to-day activities of the programme but also to ready SESAR Solutions for deployment.

Over the course of the year, EASA and the SJU actively collaborated on three priority areas:

1. GBAS CAT II/III
2. PCP
3. Data communications.

In addition, the EASA rulemaking plan was adapted to include SESAR regulatory needs, such as a SWIM regulatory framework and some elements of the remote tower operations.

4.4.2. Collaboration with national authorities

National supervisory authorities (NSAs) play an important role in creating the bridge between development and deployment. Over 2013, the results of the reviews performed by the authorities and of their participation in validation exercises have been integrated into the assessment of the SESAR deliverables.

As a result of a call for proposals for civil and military national authorities published in June 2012, a new memorandum of understanding (MoU) started in January 2013. On the grounds of this MoU, **16 national authorities, from 13 European countrires** ([4]), committed to provide more than 80 experts to support the SJU until the end of 2016.

([3]) Regulation (EC) No 1070/2009 of 21 October 2009, published on 14 November 2009, OJEU L300/34

([3]) The states represented through this call are Belgium, France, Germany, Ireland, Italy, Malta, the Netherlands, Poland, Portugal, Romania, Spain, Turkey and the UK. During 2013 Ukraine also joined the group of national authorities cooperating with SESAR, through an expert working arrangement.

Among the selected Authorities are several NSAs, civil aviation authorities, two military authorities and one aviation security authority.

More specifically over the course of 2013, the SJU continued to be active in the relevant fora in which national authorities coordinate and take decisions, such as:

- The Single Sky Committee
- The EASA ATM Thematic Advisory Group

Furthermore, the SJU maintained close relations with NSAs through the NSA Coordination Platform, which falls under the umbrella of the Single Sky Committee. In December 2013, the platform created a specific Working Group on SESAR in order to coordinate the comments of the NSAs regarding the PCP proposal.

4.4.3. Collaboration with the European Organisation for Civil Aviation Equipment

For several years, the SJU has actively been working with the European Organisation for Civil Aviation Equipment (EUROCAE), towards systematising and streamlining the processes for the production of standardisation material. In 2013, this collaboration became stronger with the signature of an MoU between EUROCAE and the SJU. The objective of this MoU is to support the standardisation work of EUROCAE in activities which are relevant for the SESAR work programme. As a consequence, EUROCAE's technical work program gradually included several standardisation needs stemming from the SESAR programme with a particular attention to supporting PCP-related standardisation needs.

See chapter six for details of relations with other European partners.

Figure 7: **Involvement of Authorities 2013-2016**

CHAPTER 5

Going global

Given that aviation is a global industry, the SJU has been committed to and focussed on ensuring harmonisation and global interoperability since the very start of the SESAR programme. Recognising these as vital prerequisites for a smooth and seamless transition towards a modernised global ATM system, as a PPP the SJU actively engages with global aviation partners in order to ensure interoperability. This section provides a summary of these global outreach activities and explores collaboration with two major aviation players — the FAA through the US ATM programme, NextGen and ICAO. The SJU also raises the profile of the SESAR programme through a number of global outreach activities, in particular in relation to demonstrating SWIM.

5.1. Collaboration beyond Europe

The SJU pursues international relations in the context of the European Commission external relations framework. In this regard, the SJU actively liaises with Commission's Directorate-General for Mobility and Transport to find the best practical means of technical cooperation in relation to ATM and SESAR.

In order to strengthen global cooperation, several bilateral memoranda of cooperation (MoC) have been drawn up between the European Commission and non-EU countries.

- EU–US MoC on civil aviation R & D, which entered into force in July 2010.
- MoC with the Japanese Civil Aviation Bureau (JCAB), signed in July 2011.
- MoC with Mexico, in order to explore cooperation in ATM R & D, signed in September 2011.
- MoC with the Civil Aviation Authority Singapore (CAAS), which entered into force in November 2012.

In addition to the above, the SJU organises SESAR workshops in non-EU countries, mostly as awareness-raising exercises. A workshop in Kiev in 2010 resulted in the establishment of a SESAR–Ukraine steering group, which met during 2013 to discuss how to involve Ukrainian authorities and industries in the SESAR work programme. Two workshops were organised in Turkey — the most recent took place in March 2013 at Istanbul Technical University, attracting more than 100 participants representing universities and both the aviation and ATM sectors across Turkey. In doing so, the workshop contributed to the goal of increasing Turkish authorities' and industry engagement in the SESAR programme. Over the course of 2013, the SJU continued to develop good relations with stakeholders in Australia (secondment of expert 2012/13), China, Israel, Turkey, Ukraine, the states in the Common Market for Eastern and Southern Africa (COMESA) and the Gulf States.

5.1.1. FAA/NextGen

In March 2011 the US and the European Union signed an MoC on civil aviation R & D. Annex I of this MoC establishes a framework for cooperation to ensure global interoperability between their respective ATM modernisation programmes, NextGen and SESAR, taking into account the interests of both civil and military airspace users. The SJU therefore closely cooperates with the FAA/NextGen within this framework in order to formalise harmonisation efforts in several key ATM areas:

- Transversal matters, such as operational concepts and architecture alignment and planning matters

related to the European ATM Master Plan/ standardisation roadmap and the ICAO work programme:

- 4D trajectory management alignment.
- SWIM, CNS, and avionics.
- Common projects/activities such as demonstration activities.

In particular, the above areas of active collaboration include: wake turbulence separation criteria and tools, flight and flow information exchange, global interoperability demonstration activities for the period 2014/15, airborne collision avoidance systems, development of a common avionics roadmap, data link technology and services, performance based navigation (PBN) capabilities, GNSS and automatic dependent surveillance services and technology.

Over the course of 2013, a more issue-based approach was taken for the collaboration with the US, meaning that priority was given to issues related to harmonisation or interoperable global standards. This has led the collaboration towards a stronger content focus and a better understanding of key harmonisation or interoperability issues that need to be addressed in order to achieve a synchronised planning of development and delivery towards deployment by both the SESAR and the NextGen programmes.

Collaboration with the FAA will be further strengthened in 2014 through collaborative demonstrations on 4D trajectory arrival flows and on global demonstration activities on SWIM. Going global in these areas, not the least on SWIM, will be key for the future of ATM, which is why the SJU has included specific demonstration activities on global SWIM interoperability in the recent call for very large scale demonstrations, which aims to take SWIM to the next level of global ambition.

5.1.2. International Civil Aviation Organisation

During 2013, the SJU continued to play a key role in the EC-led European coordination between the EC, Eurocontrol, EASA, European Civil Aviation Conference (ECAC) and EUROCAE for the International Civil Aviation Organisation (ICAO) 38th General Assembly, at which the ICAO Global Air Navigation Plan (GANP) was endorsed, in preparation for the 38th Assembly. The SJU contributed to the European working papers, addressing the need for alignment between the European ATM Master Plan under the SES legislative framework and the ICAO GANP/ Aviation System Block Upgrades (ASBUs) work programme priorities. These are key to the SESAR

programme's ability to support and be supported by ICAO work on developments towards global interoperability.

Given that the priorities of ICAO are directly linked with SESAR and NextGen, the EU–US MoC coordination planning has played a very important and successful role in developing common positions to ICAO. Thanks to the input provided by both sides of the Atlantic, ICAO established a programmatic framework to develop a set of solutions to meet the global needs for an interoperable airspace — the framework takes into account SESAR and NextGen and the current ATM capabilities, and establishes a transition plan to deliver key performance improvements.

With the endorsement of the GANP/ASBUs, the overall alignment between ICAO ASBUs and the European ATM Master Plan has been achieved, however, this is just the start of the process and further collective work is needed in order to reach the necessary level of detail.

5.2. Showcasing SESAR at international events

The SJU participates in a number of high-level international events in order to raise awareness about SESAR, its latest results, and to increase global stakeholder engagement in the programme.

5.2.1. World ATM Congress, February 2013, Madrid

In April 2013, the SJU organised a series of events, as well as an exhibition stand, at the world air traffic management congress (WAC) in Madrid — the largest air traffic management (ATM) exhibition worldwide. The theme of the SJU's participation 'From Innovation to Solution', provided the backdrop for the SJU, SESAR members and guests to present the progress achieved by the programme so far. During the course of the three-day congress, the SJU hosted a forum and three workshops, whereby 650 attendees were presented with concrete results and future activities. While the SESAR Forum provided a platform for high-level debate on the programme, a live demonstration of the SESAR SWIM Concept provided participants with a tangible example of the changes and benefits that the programme is delivering (See section 5.3 for more information about the live demonstration).

5.2.2. EU–US event on SESAR, June 2014, Washington

Given that international cooperation and the interoperability of SESAR solutions are paramount for the programme's development and future deployment, in June 2013 the SJU, in partnership with the EU delegation to the US, held a successful 1-day conference in Washington DC. The event attracted a high-level audience of nearly 100 people, including representatives of the US and EU Member State governments, ICAO, and industry from both sides of the Atlantic. The conference was the flagship event in the *Rendez-Vous* series organised by the EU delegation to the US, which aims to strengthen the enduring relationship between the US, the EU, and the EU Member States through lively debates about the critical issues facing the transatlantic relationship today.

EU Ambassador to the EU, João Vale de Almeida, speaking at SESAR event in Washington.

Wim Post, SESAR JU and Dirk Janssens, Eurocontrol, accept the prestigious IHS Jane's Award on behalf of the SESAR programme.

5.3. Global SWIM Outreach

2013 saw an unprecedented number of stakeholders from across the globe become engaged in building a critical mass of knowledge on SWIM and setting in motion a change process in how information is exchanged between ATM stakeholders, not just in Europe but worldwide. The SJU and SESAR members invested significantly to ensure a global understanding of SESAR's SWIM-related R & D activities.

- SESAR's SWIM outreach kicked off at the **2013 WAC** where SESAR members demonstrated for the first time in front of a live, global audience the agility and flexibility that SWIM can bring, and how it can be instrumental in supporting new ATM collaborative decision-making processes. The three demonstration sessions that took place involved 10 ATM organisations interconnecting 31 prototypes for exchanging information on airspace, flights, airports and weather. They tested SWIM's promise of information sharing, service orientation, federation, open standards and information and service lifecycle management.
- The second outreach initiative was the **SWIM Master Class (June–November 2013)**, which welcomed 64 teams worldwide, ranging from software development companies to universities, actively demonstrating their SWIM-enabled applications. The 2013 edition attracted an increased number of ATM service providers, which offered development teams a wider scope of data and services to exploit in their SWIM-enabled applications or web services.

In recognition of SESAR's success in raising awareness and involving a growing community of ATM stakeholders in the implementation of SWIM, **SESAR was awarded the 2014 prestigious IHS Jane's Award**.

The success of SESAR's SWIM outreach is testament to the commitment shown by the SESAR members and those who participated in last year's live SWIM demonstration and SESAR SWIM Master Class. Together they showed how the SWIM principles can be applied to deliver operationally useful information to global ATM stakeholders.

CHAPTER 6

Engagement with European aviation stakeholders

The basic principle of the SJU 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 needs of Europe's entire aviation community.

With this in mind, over the course of 2013, the SJU fostered cooperation with a number of key stakeholder groups, namely State (including military) partners, professional staff associations, airports and civil airspace users.

6.1. SESAR and state aviation

In Europe, state aviation, including mainly the military, represents hundreds of segregated airspace areas and dozens of state airfields. It is estimated that around 30 % of military flights fly Military general aircraft traffic (GAT), while the rest belong to operational air traffic (OAT). Despite the fact that military aviation activity represents less than 2 % of global flights generated in Europe, for sovereignty purposes there is nonetheless a strong need for airspace to accommodate a large variety of training missions, homeland security missions, as well as cross-border crisis management operations. For such missions, access to airspace is vital, however, given that these missions are often launched at short notice, military and state aviation use of airspace is more complex and varied than its use by civilian airspace users. For this reason, the wide involvement of state aviation is paramount to enable the SESAR programme to understand and take into account the various ways in which this particular stakeholder makes use of airspace across Europe.

In 2013, 69 military experts (10 % pilots, 35 % air defence experts, 35 % ATM experts, 20 % engineers) from ten countries (Belgium, Germany, Spain, France, Italy, the Netherlands, Portugal, Finland, Sweden and the United Kingdom) were involved in the Military Engagement Plan for SESAR (MEPS). The aim of MEPS is to enable the participation of national military experts in all relevant aspects of the SESAR programme in a structured way, such as through the creation of specific panels to gather a large number of inputs from state aviation in specific technical and operational domains.

6.1.1. The European Defence Agency

EUROPEAN DEFENCE AGENCY

The SJU and the European Defence Agency (EDA) have been engaged in close dialogue since 2011 and a framework arrangement was formally established in April 2012. In 2013, this relationship continued to provide input on military matters and opinions to the programme, especially with regards to the PCP and the European ATM Master Plan update.

In particular, the collaboration focuses on:

- Defense investment and procurement
- Planning for the evolution of relevant military technologies

- Risk mitigation actions related to military implementation of SESAR
- Provision of expertise or organisation of forums to gather the required results in key areas.

The EDA facilitates the coordination of the military views on SESAR with a view that military interests are taken fully into account. The EDA sponsors the SES/SESAR Military Implementation Forum that brings together, in addition to its Member States, the North Atlantic Treaty Organisation (NATO), Eurocontrol and the European Commission, as well as on a volunteer basis non-member states (including the US and Canada)..

6.1.2. NATO

The SJU has been collaborating with the NATO through a roadmap defining the need for technical interaction between the SJU, NATO and the EDA. This roadmap aims to obtain a common understanding of how the SESAR programme affects NATO interests and, through substantial information sharing, to identify possible matches between NATO expertise and SJU activities. Over the past months, the main focus areas of common interest were defined as: business trajectory versus mission trajectory, NATO interoperability with SWIM and NATO network-enabled capabilities.

6.2. Professional staff associations

Human performance is at the heart of air navigation systems, which is why professionals from the air transport sector are actively involved in the programme to ensure that future systems are built to their needs and specifications. Professional staff associations participate in the programme through five framework contracts, one for each of the following associations: International Federation of Air Traffic Controllers' Associations (IFATCA), European Cockpit Association (ECA), International Federation of Air Traffic Safety Electronics Associations (IFATSEA), European Transport Workers' Federation (ETF), and Air Traffic Controllers European Unions Coordination (ATCEUC). In 2013, these framework contracts were extended until the end of programme (end of 2016).

The full integration of staff associations' representatives into the different levels of the programme is in place and **a pool of 90 cross-nationality licensed and operational ATCOs, pilots and air traffic safety electronics personnel (ATSEP) have formed an international validation team (IVT)**. During 2013, the IVT participated in several validation activities bringing sound operational experience and value to the performance and exercise outcomes.

The IVT has an agreed staff association focal point for the planning and reporting of the IVT to the SJU and respective follow-up. To further strengthen their work, in 2013, the SJU contracted a second IVT expert.

6.3. SESAR Performance Partnership (SPP)

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

During 2013, the primary focus of the SPP was on supporting the SJU Executive Director in his decision-making with regard to the European ATM Master Plan Business View follow-up activities and the SJU's PCP mandate. During the period when the PCP was being elaborated upon, the number of SPP meetings was doubled and complemented by monthly briefing sessions to provide the maximum level of transparency to the broader stakeholder community on these critical areas of work. In the second half of 2013, the SPP resumed normal operations and focused its attention on cross-checking R & D developments with PCP objectives, as well as the level of ambition of the Step 2 Concept of Operations.

Figure 8: **Stakeholder interests represented in the SESAR Performance Partnership**

6.4. Airports Council International, Europe

SESAR is developing ATM technologies that will inevitably have a direct impact on airports. Therefore, in order to secure the involvement of airports within the programme, in 2013, the SJU extended its **framework agreement** with **Airports Council International (ACI)** for another two years. The objective of this contract is to raise awareness and boost relations between SESAR and its airport partners — beyond the six hub operators reached through SESAR European Airports Consortium — to smaller and medium-sized airports in the Europe.

Over the last two years, ACI and SJU have been working closely together to spread news on SESAR developments, carrying out joint communication activities and consulting on technical issues such as safety, environment and the European ATM Master Plan, with tailored workshops taking place in France, Croatia, Poland and Portugal in 2013.

6.5. Civil airspace users

Civilian airspace users (AUs) include scheduled airlines, charter companies, cargo and air freight service providers, the business and leisure aviation sectors and all forms of non-military air travel, from hot air balloons through to police helicopters. AUs have an important role to play in steering the SESAR programme. AUs provide not only valuable expertise, but in-depth knowledge and insight gained through their wide area of expertise: the projects and the programme rely on this and also benefit directly from it.

In 2013, **2 500 person-days of pilots/engineers' expertise were used in the context of the programme in over 100 different projects,** ensuring an extensive involvement of 11 AU organisations at technical and content levels.

Due to their strength of **involvement and knowledge across the programme** an AU Liaison Officer was engaged this year.

See section 4.4 for information on SJU's collaboration with other European stakeholders, such as EASA and national authorities.

Figure 9: **List of Airspace Users involved in the SESAR Programme until 2016 (excluding Demonstration Activities)**

CHAPTER 7

Annual accounts for 2013

During 2013, the SJU paid the amount of 91.6 million EUR to the members for their operational activities, 0.2 million EUR of which was allocated to pre-financing activities. Considering that the programme is now steady, the SJU expects these expenses to remain similar for the coming years.

Overall, the acquisition of goods and services went through the procurement process according to the SJU Financial Rules, ensuring fair competition among potential suppliers and the efficient use of funds. In 2013, staff expenditure amounted to 5.6 million EUR, an increase of 0.4 million EUR, due to the fact that SJU reached almost full capacity as per the Staff Establishment Plan.

In accordance with Article 15 of the SJU Financial Rules, and in order to ensure the most adequate cash management in view of 2014 expenditure, the SJU received a cash contribution from the EU for an amount of 77.5 million EUR. The cash contribution from Eurocontrol amounted to 7.7 million EUR. The resources received were fully employed to provide the co-financing to the members, the total amount of payments exceeded the total revenues so that total cash balance at the end of the year was reduced from 15.9 million EUR to 5.5 million EUR, out of which 2.3 million EUR will be absorbed by commitments still to be paid.

The resources made available by the SJU members, the budget provided by FP7 ([5]) and TEN-T ([6]), 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.

SJU expects these figures to remain stable for the coming years.

([5]) The European Union Seventh Framework Programme for Research and Technological Development

([6]) The Trans-European Transport Network Executive Agency (TEN-T EA) — http://tentea.ec.europa.eu/

BALANCE SHEET

all figures in EUR	31/12 2013	31/12 2012
I. NON-CURRENT ASSETS	**71 534 867**	**94 849 973**
Intangible fixed assets	571 332	699 268
Tangible fixed assets	360 786	400 154
Furniture and Vehicles	99 690	92 865
Computer Hardware	25 535	19 345
Other tangible assets	235 561	287 944
Long-term Pre-Financing	70 602 749	93 750 551
II. CURRENT ASSETS	**32 741 672**	**31 104 235**
Short-term Pre-Financing	26 707 196	15 307 277
Short-term receivables	818 214	83 660
Current receivables	78 293	26 853
Sundry receivables	272	11 506
Accrued income	29 380	39 631
Deferred charges	710 269	5 670
Cash & cash equivalents	5 216 262	15 713 298
TOTAL ASSETS	**104 276 539**	**125 954 208**
III. CURRENT LIABILITIES	**337 184 209**	**244 846 106**
Accounts payable	5 112 573	4 378 856
Current payables	356 227	59 612
Accrued charges	4 629 826	4 239 833
Other accounts payable	126 520	79 411
Co-Financing to be paid to the Members	88 086 300	80 176 707
Contribution from Members to be validated	243 985 336	160 290 543
Cash Contributions from Members to be accepted	0	0
TOTAL LIABILITIES	**337 184 209**	**244 846 106**
NET ASSETS (Total Assets less Total Liabilities)	**(232 907 670)**	**(118 891 898)**
IV. NET ASSETS	**(232 907 670)**	**(118 891 898)**
Contribution from Members	745 291.300	579 442 694
European Union	344 800 515	267 265.000
Eurocontrol	185 286 408	177 605 351
Other Members	215 204 377	134 572 343
Accumulated contribution from Members used previous years	(698 334 592)	(427 368 372)
Contribution from Members used during the year (EOA)	(279 864 378)	(270 966 220)
TOTAL NET ASSETS	**(232 907 670)**	**(118 891 898)**

PROFIT AND LOSS ACCOUNT

all figures in EUR	**2012**	**2011**
OPERATING REVENUE		
Contributions from members	0	0
Other Revenues	0	0
TOTAL OPERATING REVENUE	**0**	**0**
OPERATING EXPENSES		
Administrative expenses	(7 852 086)	(7 587 681)
Staff expenses	*(4 487 255)*	*(4 373 765)*
Fixed assets related expenses	*(539 706)*	*(298 149)*
Other administrative expenses	*(2 825 125)*	*(2 915 767)*
Operational expenses	(272 051 373)	(263 643 221)
Other operational expenses	*(272 051 373)*	*(263 643 221)*
TOTAL OPERATING EXPENSES	**(279 903 459)**	**(271 230 902)**
NON-OPERATING ACTIVITIES		
Financial operations revenues	*33 495*	*268 778*
Financial operations expenses	*(3 282)*	*(4 261)*
Other non-operational income	*8 868*	*165*
TOTAL NON-OPERATING ACTIVITIES	**337 184 209**	**244 846 106**
CONTRIBUTIONS FROM MEMBERS USED DURING THE YEAR	**(279 864 378)**	**(270 966 220)**

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 SJU Administrative Board (in accordance with Article 5 (i) of the Statutes of the SJU 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 1

Composition of the SJU Administrative Board on 31 December 2013

SJU founding members	Member	Alternate member
EU represented by the European Commission	Mr Matthias Ruete *(Chairman)*	Mr Matthew Baldwin
Eurocontrol	Mr Bo Redeborn *(Deputy Chairman)*	Mr Bernard Miaillier

SJU members	Member	Alternate member
AENA	Mr Ignacio González Sánchez	Ms Mariluz De Mateo
Airbus	Mr Bernard Rontani	Mr Pierre Bachelier
ALENIA Aeronautica	Mr Maurizio Fornaiolo	Mr Fabio Ruta
DFS	Mr Robert Schickling	Mr Ralf Bertsch
DSNA	Mr Maurice Georges	Mr Philippe Merlo
ENAV	Mr Iacopo Prissinotti	Mr Cristiano Baldoni
Frequentis	Mr Rolf Unterberger	Mr Christian Pegritz
Honeywell	Mr Jean-Luc Derouineau	Mr Alexandre Laybros
INDRA	Mr Rafael Gallego Carbonell	Mr Ramon Tarrech
NATMIG	Mr Aage Thunem	Mr Magnus Lindegren
NATS	Mr Martin Rolfe	Mr Simon Hocquard
Noracon	(vacant)	Mr Niclas Gustavsson
SEAC	Mr Giovanni Russo	Mr Roland Krieg
SELEX ES	Mr Mario Richard	Mr Stefano Porfiri
Thales Group	Mr Jean-Marc Alias	Mr Luc Lallouette

Stakeholder representatives	Member	Alternate
Military	Group Captain Richard Connelly	Mr Per Coulet
EDA	Mrs Claude-France Arnould	Mr Giampaolo Lillo
Civil users of airspace	Mr Vincent de Vroey	Mr Pedro Vicente Azua
Air navigation service providers	Mr Guenter Martis	(vacant)
Equipment manufacturers	Mr Jan Pie	(vacant)
Airports	Mr Olivier Jankovec	Mr Andreas Eichinger
Staff in the ATM sector	Mr Loïc Michel	Mr Theodore Kiritsis
Scientific community	Mr Peter Hecker	Mr J.A. Mulder

ANNEX 2

Composition of the SJU management team on 31 December 2013

Claude Chêne, Executive Director of the SJU, managed the SESAR programme following the guidelines established by the Administrative Board, to whom he reported. To achieve this, he had the full commitment of the SJU team.

Executive Director's Office

Chief Strategies and International Relations: Michael Standar

Senior Advisor Military Affairs: Denis Koehl

Liaison Officer at the Delegation of the European Union to the United States: David Batchelor

Advisor: Fiona McFadden

Chief Communications Officer: Triona Keaveney

Internal Audit: Véronique Haarsma

Directorate Programme and Operations

Deputy Executive Director, Operations and Programme: Florian Guillermet

Deputy Director Operations and Programme, Chief Technology and Innovation: Peter Hotham

Directorate Finance and Administration

Deputy Executive Director Finance and Administration: Carlo Borghini

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www.sesarju.eu

founding members

EUROPEAN UNION

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Members

Associate Partners

Associate Partners to the SESAR Joint Understaking

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