

sesar magazine

editorial

SESAR's head start on the 'Innovation Union'

Europe has declared an 'innovation emergency'. Innovation is the key to growth, jobs and Europe's competitiveness. Innovation in products, services, business and social processes and models will for example help tackle the future societal challenges of climate, energy, demography and health. Consequently, Europe's new 'Innovation Union' initiative is at the heart of Europe's 2020 economic strategy.

I am happy to say that in this respect, SESAR has a head start. Research and development creates jobs. It builds sustainable growth and strengthens Europe's position in the world by speeding up and improving the way new products or processes are developed, produced and accessed. (Continued on page 2)

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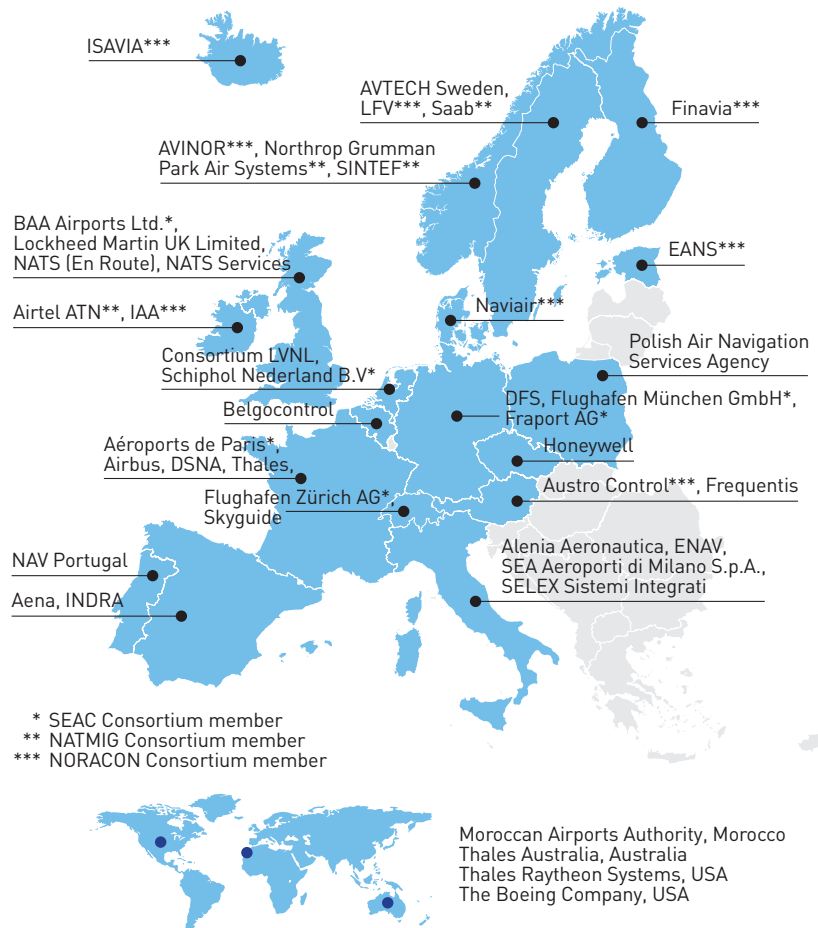
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Welcome to the new Associate Partners

The SESAR Joint Undertaking enlarged once more the number of contributors to the SESAR work programme. Since summer, it can now benefit from the additional input of 13 associate partners. Especially the endorsement of non-European members such as Boeing, Thales Australia, or the Moroccan Airports Authority is seen

as asset. With AVTECH Sweden a new SME also joined the SESAR family. The remaining new SESAR Associate Partners are: Consortium LVNL, Lockheed Martin UK Limited, NATS Services, NAV Portugal, Polish Air Navigation Services Agency, SEA Aeroporti di Milano S.p.A., Skyguide, THALES Raytheon Systems.

SESAR members and associate partners in Europe and worldwide



(Continued from page 1)

SESAR will definitely contribute to achieving these new priorities: currently 2,000 highly skilled experts are working on developing high tech solutions for a greener, more efficient, more cost-effective and above all safe air traffic management system. This new system will allow the participating industry to secure their position on international markets. It will enhance EU leadership in aerospace and will reduce the flight-related climate change impact.

SESAR has so far clearly shown that the partnership between public and private players can be a real success story. Combining the strategic vision of institutions with the reactivity and pragmatic approach of industry is a model that should be kept in mind for the future.

Patrick Ky, Executive Director of the SESAR Joint Undertaking

interview

“We will succeed”

With the endorsement of the new 13 Associate Partners, 21 air navigation service providers (ANSP) are currently contributing to the SESAR work programme. As air navigation service and airport service provider at the same time, Aena has a special role amongst them. In the interview below, Mariluz de Mateo, Head of the Strategy and Planning Unit in Aena's Air Navigation Directorate, details the expectations and needs ANSPs have towards the SESAR work programme, the controller of the future and the technological innovation brought by the programme.



Mariluz de Mateo is the Head of the Strategy and Planning Unit in Aena's Air Navigation Directorate. Her main areas of responsibility cover: the development and management of the Air Navigation Business Plan, the management and coordination of the international activities in the Air Navigation Directorate, and the coordination and management of Aena's participation to the SESAR Programme. She is member of the Air Navigation Management Committee. © Aena, 2010

Mrs De Mateo Garcia, Aena is a heavily involved member of the SESAR programme; as air navigation and airport service provider at the same time you are leading for example work package 6 on airport operations. Why did your organisation decide to join the programme and how far does your commitment go?

The SESAR programme paves the way to the future European Air Navigation System. It implies the alignment and commitment of whole Europe towards a common set of objectives, and an organisation like Aena, one of the main ANSPs in Europe and the major airport operator worldwide, couldn't be indifferent to this important initiative.

Aena, fully focused on improving the performances of the services provided to its customers, has been working intensely during the past years to enhance its CNS/ATM systems, participating actively both to European R&D projects and also to initiatives like iTEC, continuously evolving its ATC system (SACTA). With its involvement in SESAR, Aena aims to accelerate the entry into service of the agreed solutions after validation of their operational benefits. These solutions will encompass both airspace and airport environments, from a complete gate-to-gate perspective.

Regarding Aena's commitment, its Air Navigation, Airport and Environment Directorates, all of them directly involved in SESAR, have deployed an important number of technical and highly specialised human resources, being aware of the importance of SESAR's success. Furthermore, Aena counts on the support provided by its affiliates CRIDA and INECO for this important challenge. The recent incorporation of NAV Portugal as Associate Partner to Aena in the SJU, provides an important added value to the programme and our contribution to it, and furthermore proves the FAB South West partner's commitment to jointly delivering results.

“The size and level of complexity handled in the work programme of the SJU is not comparable to past ATM European R&D initiatives or projects.”

The work programme was kicked-off almost 18 months ago. What is your experience so far?

These 18 months have been indeed quite demanding and at the same time rewarding because of the important steps forward all of us have taken. The size and level of complexity handled in the work programme of the SJU is not comparable to past

ATM European R&D initiatives or projects.

On 3rd of June 2009 the first projects were kicked off; now around 200 projects, out of a total of 300, are already in their execution. This high number of interdependent projects dealing with the different aspects of the ATM system makes the accomplishment of the overall programme consistency a really big challenge. In this context, the recent development of the Validation & Verification Roadmap for Step 1 has implied an important common achievement.

There is still work to be done before the SJU machinery runs at full speed and first operational validation results are provided, but I am quite confident that with the great cooperative spirit shown up to the moment we will succeed.

How do you think will the work of ANSPs change in future through SESAR?

One of the main objectives of SESAR's concept is the fulfillment, in as much as possible, of airspace users expectations and plans; this in turn means that ANSPs have to focus on facilitating airspace users' performance improvements.

A realistic initial planning and the continuous sharing of the capabilities and assets available to update this planning in a consistent manner is one of the major paradigmatic changes of the SESAR concept. It will need the mutual confidence and conviction of all users, air navigation service providers and airport operators that the pursued objectives are the same: improving the performances of the network users.

Furthermore, involvement of all ATM actors in SESAR provides a clear opportunity to reduce the period between R&D work and deployment of solutions. In this last respect, it is important to stress that the SESAR programme follows a three phase lifecycle supporting the definition, development, validation and verification of the ATM Operational Concept and associated technical enablers to a level of maturity when decisions on industrialisation and deployment can be made. To ensure that SESAR products are ready for implementation, operational shadow mode and live trials on Industry Based Platforms (IBP) will be performed, bringing validation and verification activities as close to the target deployment environment as possible.

In which direction do you think will the role of controllers evolve?

The role of controllers will evolve from the actual tactical job to one which will basically have strategic functions. This new role will be performed using the advanced tools that SESAR will develop. Information exchange with all stakeholders will introduce new concepts of operations such as trajectories management instead of fixed routes separations, delegation to the pilots (in some conditions) in order to maintain their own separation

“The controller of the future will be a manager with lots of information available that will permit a better airspace use.”

with other aircraft. The change of the actual philosophy – first come first served – to one which will have as main goal the global capacity will require a big change of mentality.

When SESAR is implemented the controller will become a manager with lots of information available that will permit a better airspace use, and will therefore grant that the system capacity will cope with the future demand.

SESAR has been criticised in the past to be too ANSP-friendly and to neglect the airspace users. What is your view on that?

Airspace users had, have and will have a role of the utmost importance in SESAR, and this couldn't be expected to be different.

They were heavily involved and played a key role during the Definition Phase when the SESAR Concept and the ATM Master Plan were developed. At present, users contribute to the projects of the SJU work programme through framework contracts, and they are one of the major stakeholders in the Administrative Board. Furthermore, their participation in the SESAR Performance Partnership (SPP) ensures that users positions and priorities are considered not only in what refers to the SJU work programme, but to all SESAR implications: performance planning, ATM Master Plan updates... In the future, users will have to remain involved if we all want to succeed in achieving the strategic objectives of SESAR.



Controllers of the future will have advanced SESAR tools at their disposal. © DFS.

From your perspective as air navigation and airport service provider, if there was one thing you could wish from SESAR, what would that be?

There is more than one item in my wish list for SESAR, but the first and foremost would be the fulfillment of a seamless and interoperable European ATM system – from an airport operator viewpoint, this necessarily means the total integration of airports as part of the ATM network – which is deployed in a coordinated and

steady way, making sure that full interoperability with the neighbouring systems – i.e. Next Gen – is achieved.

What is for you the biggest technological innovation we can expect with SESAR?

The nature of the SESAR programme, where the added value comes from the close collaboration of all the stakeholders involved in the ATM system, is characterised by its performance driven spirit in opposition to the technology driven one. The programme comprises a mixture of projects from which important technical innovations are expected and those that address the improvement of the system via an optimal exploitation of technologies and procedures that, though already available, are not deployed extensively all over Europe.

If I should choose one technological element, that would be SWIM. It is definitely the key to enable the sharing of real time and updated information between all stakeholders, which in the end will prove to be the baseline for the paradigm changes in operations SESAR will provide.

Focus on: Safety

Safety is not an accident

Safety surely is the highest priority for all aviation actors. Consequently, one of the key performance targets of the SESAR work programme is to improve the safety performance by a factor of ten while air traffic is expected to triple. Within SESAR, safety is tackled from an operational point of view, Safety Cases are built and improvements of safety methods are being elaborated. In all this, SESAR takes a holistic approach towards safety: involving equipment, procedures and humans.

The European sky today is already crowded. Keeping Europe's highest safety standards albeit an expected tripling of flights by 2020 is one of the main tasks of SESAR.

While all projects within the SESAR work programme have to perform safety assessments, the task of improving safety by a factor of ten calls for a thorough safety management plan. The key fundamental safety questions that the SESAR programme has to address are:

- Will the proposed SESAR concept of operations and architecture meet the safety target? If not, what additional safety defences or arrangements need to be in place?
- Given that SESAR aims to improve safety, where will this additional safety come from?
- What will be the flexibility in terms of different ANSPs being able to 'pick and mix' changes to the ATM/ANS functional system and yet still achieve the required safety levels?
- Which safety performance indicators are practicable, insightful, sensitive to safety fluctuations, and accurate over short-term and medium-, long-term timescales?

Answers to those questions will be taken care of by Project P16.06.01 – the so-called Safety Support and Coordination Function – drawing on information/evidence reported by safety assessment activities within all work packages and, more generically, SESAR's validation and verification activities.

The key part of the work programme for P16.06.01 is to develop Safety Cases for the gate-to-gate air navigation services provided by SESAR-compliant ATM/ANS functional systems. Safety Cases will be developed for each of the three steps of the con-



“SESAR's safety strategy is based on three pillars:

- Operational Safety: WP4-15 R&D projects develop operational improvements aiming at increasing the safety of future ATM operations (e.g. safety nets)

- Safety case: P16.6.1

consolidates various safety assessments developed by WP4-15 R&D projects into safety cases and ensures their consistency and compliance with regulatory requirements

- Safety assessment methods: P16.1.X develop new/improved safety methods to manage the SESAR challenges.”

Patrick Mana, SJU Work Programme Manager

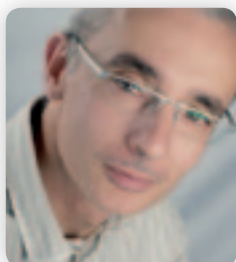
cept story board and the safety arguments will be established addressing the system engineering lifecycle up to and including the pre-industrialisation phase.

To adequately address the change of scope, functions and boundaries of the SESAR concept of operations from a safety standpoint, a tailored safety management system is being organised, implemented, run and maintained:

- A SESAR Safety Policy to ensure that the SESAR programme contributes to aviation's efforts to continually improve its high safety standards;
- Assurance that the Safety Policy statements are being discharged through the SESAR organisation and work programme;
- Safety Reference Material providing a detailed practical guide to safety assessment and assurance. It will be regularly updated with fast-tracked safety research on required safety assessment tools and techniques to overcome current

“Partners in P16.06.01 are ready to take up the challenges of what looks to be one of the most wide-ranging ATM safety assessments ever undertaken.”

Eric Perrin (Eurocontrol),
SESAR Project Manager,
project 16.06.01



limitations in contemporary safety assessments;

- The coordination with EASA on the development of the Safety Reference Material within the scope of ongoing activities amending the existing ATM/ANS regulatory framework on safety assessment of changes;
- A Safety Management Plan specifying the safety assurance activities that are to be carried out by all relevant SESAR projects in order to create necessary and sufficient evidence for the production of the Safety Cases mentioned above;
- The direct support to projects through training and coaching and the provision of assurance that complex relationships between projects are dealt with to address adequately the "compound/aggregate risk";
- The development and maintenance of the Safety Cases;
- The regular and tight interface with those authorities having legal obligations with regard to SES implementation, i.e. EASA

and National Authorities (NSAs, NAAs). Their early involvement is deemed essential to anticipate regulatory issues and pave the ground to positive regulatory positions on SESAR products.

On the basis of the safety management elements described above and building on the safety culture within the programme ensuring the proper levels of commitment to safety, competency and resourcing, answers to fundamental safety questions will be provided, thereby maximising the "deployability" of the SESAR improvements.

“SESAR's safety strategy aims at ensuring that the safety of future ATM operations can be improved in compliance with regulatory requirements.”

Patrick Mana, SJU Work Programme Manager

Europe's aviation safety body on board

In November the Executive Directors of the SESAR Joint Undertaking and the European Aviation Safety Agency (EASA), Patrick Ky and Patrick Goudou, as well as the Director-General of Eurocontrol, David McMillan, signed cooperation and working arrangements to secure EASA's support regarding the implementation of the SESAR work programme.

EASA's expertise is sought in different domains, including impact analysis of new concepts on the rulemaking, oversight and certification activities of EASA; advice on methodologies for the acceptable elaboration of safety deliverables; review of these safety deliverables and issue of opinions; or the assessment of the 'certifiability' of future systems/services derived from SESAR concepts. Additionally, the Agency will provide input in different work packages and will participate in updating the ATM Master Plan as well as the regulatory and standardisation roadmaps.

Read here below a short interview with Dr Norbert Lohl, Certification Director of EASA, on this future cooperation.



Dr Norbert Lohl, EASA Certification Director

Dr Lohl, EASA, the SESAR Joint Undertaking (SJU) and Eurocontrol have just signed a working arrangement. What are your expectations?

Our expectations are that this working arrangement will provide a lot of assistance to EASA, in particular for the safety assessment of the new technology, systems and modes of



Patrick Ky and Patrick Goudou after signing the working arrangement on 10 November 2010.

operation designed by SESAR. This assistance is expected both in terms of technical excellence, but also in additional manpower, for the benefit of the SESAR programme.

An important area of cooperation will be the certifiability of future SESAR systems. How will the cooperation between EASA and the SJU look like exactly in this area?

EASA intends to build on the best available industrial practices and experience available in the field. EASA will be eager to build on the activities already conducted in this field, in particular by Eurocontrol.

Safety is paramount in aviation and it is a common denominator of EASA and SESAR. EASA will also perform 'safety advice' on SESAR deliverables. Along which parameters will this advice be elaborated?

These advices will be elaborated in strict compliance with the existing regulations. EASA will also propose to SESAR to comply in advance with the coming regulations. In all cases, these advices will focus on practicality, without any compromise being made in the field of safety.

In general, what is your view on the new technical developments coming from SESAR?

EASA is looking forward to those technical developments, in particular to the total system approach fully integrating the ground, space and airborne segments for seamless, safe and efficient aviation operations.

SESAR in depth

Discussing the future of SESAR

It is estimated that the disruptions caused by the Icelandic volcanic ash cloud cost the aeronautical sector up to €2.5bn. Additionally, passengers around the world suffered from canceled and delayed flights. The European answer to that crisis was very clear: acceleration of the Single European Sky (SES) initiative to enable better cooperation. This also means that the crucial importance of SESAR, the Single European Sky's technical pillar, is on the Brussels' political agenda ever since.

The Sky and Space Intergroup of the European Parliament organised on 11 November a hearing on SESAR. Patrick Ky, Executive Director of the SESAR Joint Undertaking, explained that a successful deployment phase of SESAR would ensure that European industry remained a world leader in the global air traffic management market. He also underlined that SESAR was a model for EU's 2020 priorities by improving aviation,

for an efficient and sustainable air transport system in Europe". In this context, SESAR was presented as a major strategic tool for European industry leadership and competitiveness. The Bruges Declaration, adopted as a conclusion to the summit, specifically stresses the need to put in place innovative financing mechanisms, pooling all possible resources for the synchronised deployment of SESAR technologies. It also underlines the need to invest in aerospace research and technology, in order to develop the solutions which will reduce aviation's environmental impact. This Declaration will be presented for endorsement to the next Transport Council in December 2010.

Often forgotten and yet another very important actor for any major decision regarding the SESAR programme, the Single Sky Committee is systematically informed in its meetings on the progress of the programme and activities of the SJU. It is also consulted for opinion or decision by the European Commission every time the position of the Community has to be determined



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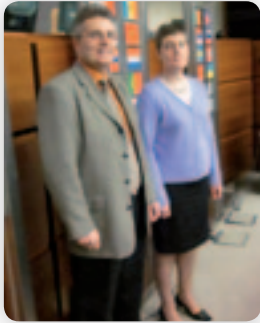
preventing Europe's skies from becoming deadlocked, keeping its passengers flying safely and lessening the environmental impact of flight in the future. The parliamentarians indicated their full support to the programme and emphasised the need to find efficient and innovative ways to finance the deployment of SESAR in particular in the context of limited EU resources. During the European Aviation Summit organised by the Belgian EU presidency in Bruges on 26-27 October 2010 an important and productive debate took place with regard to the implementation of the SES. European Commission Vice-President Kallas recalled in his welcoming address that it was "an essential requirement

on important issues such as the accession of new members or significant modifications of the ATM Master Plan.

The Single Sky Committee supports the European Commission in the elaboration and adoption of all regulations aiming at the implementation of the SES. Thanks to its wider perspective, the Single Sky Committee ensures an overall consistency among the various pillars of the SES. Thus recently, in the Commission regulation laying down a performance scheme for air navigation services and network functions, the Single Sky Committee established a clear link with the Performance Framework of the ATM Master Plan.

SESAR in depth

Sharing the airspace: Advanced Flexible Use of Airspace (AFUA)



Franck Ballerini (Deputy Work Package 7 Leader) and Viviane Davy (Project Manager 7.5.2)

Project 7.5.2 (AFUA) – along with a number of projects in WP7 (Network Operations) – received SJU approval at the end of the summer and is now entering its Project Execution Phase.

What is Advanced Flexible Use of Airspace?

The objectives and business models of airspace requirements are different for the civil and military airspace users. Whereas the civil aviation develops a trajectory with the most cost-efficient routing, the military have a mission objective including

the most mission effective routing and usage of the airspace. The Flexible Use of Airspace (FUA) is defined by the European Commission (EC) Regulation N°2150/2005 of 23 December 2005. However, this concept has been interpreted differently by different national organisations and consequently, the procedures applied by these countries vary considerably, resulting in inconsistencies and discrepancies, affecting the efficiency of the civil/military coordination.

The concept of Advanced Flexible Use of Airspace embedded in the Mission Trajectory is expected to provide more flexibility based on dynamic airspace management in all phases of the flight, from the initial planning to the execution phase.

SESAR Project 7.5.2

Project 7.5.2 is led by Eurocontrol, with participation from Aena, DFS, NATS, NORACON and Thales. The aim of this project is to optimise the trade-off between civil and military requirements by defining new types of airspace structures and the reservation processes that will facilitate better sharing of airspace between the two communities of users.

The project will develop procedures to harmonise AFUA structures and implementation procedures across Europe. This improved commonality of procedures should ensure an easier AFUA techniques integration into pan-European route structures, systems and operations. It will also focus on sharing AFUA airspace structures, not only between civil and military, but also between military and other military. This includes cross-border flights, and cross-border areas.

The project scope intends to define the future airspace structures and harmonise their design at European level. These structures will have to be dynamic as much as possible taking into account aircraft and weapon system performances. Current fixed structures (Temporary Restricted Area (TRA), Temporary Segregated Area (TSA), Cross Border Area (CBA)) should in future be an exception and for a limited timeframe only.

This evolution will be developed in line with the three SESAR

Concept Storyboard Steps, starting with more flexible airspace structures like Military Variable Profile Area (MVPA) and Variable Geometric Area (VGA), and evolving to Dynamic Mobile Area (DMA) in 2020 and beyond.

Validation

The project covers the three phases of the European Operational Concept Validation Methodology (EOCVM). Gaming, simulation and live trials will be performed, supported by prototypes, and validation platforms at the CFMU and MUAC.

Benefits for all airspace users

The Advanced Flexible Use of Airspace concept will contribute to the SESAR performance targets:

- By providing the adequate segregated airspace at right place and at right time while providing the accurate information.
- The evolution from fixed to dynamic structures shall decrease the transit between airbases and training areas, help to save fuel and allow more flexibility.
- By facilitating the collaboration and the coordination between armed forces, the capacity shall be increased for a common shared benefit.

The project aims to deliver validation results – that could be used to support deployment decisions – in 2012 in particular with modular areas and information sharing.

Incorporating the military perspective

In June this year, the SJU set-up a working group with military experts to integrate the specific operational and training requirements of military and state aircraft flights to the SESAR Concept of Operations (ConOps). Concentrating on its “at a glance summary”, the group in its final report stated that the ConOps could be considered applicable as a whole with some necessary adaptations and enhancements. With a view to harmonising civil and military rules and procedures to the maximum extent possible, the group identified the need for the SESAR ConOps to incorporate a number of mission requirements and military planning specificities. A similar working group will soon be created with representatives from the General Aviation and Rotorcraft community.



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- **SESAR Forum** on progress made so far and priorities for the coming year (8 March 2011, afternoon);
- Debate on **Global Interoperability** (9 March 2011, morning);
- Four **technical workshops** (9 March 2011) on SWIM, Avionics, Data Communications or Green ATM.



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