

# sesar magazine



## Moving forward

With the positive outcome of the second invitation for best and final offers (BAFO 2), the programme is moving forward. We need to concentrate now on the actual R&D and start to deliver. First quick wins are being demonstrated in the framework of the Atlantic

Interoperability Initiative to Reduce Emissions (AIRE). More than 100 trials in 2009 have shown that through the efficient use of today's technology and improved procedures, the environment, industry and society at large can already today benefit from the SESAR programme.

The partnership approach that defines SESAR is becoming more and more impressive. In 2010, we will have 1,500 engineers and experts working on the programme and all the 300 projects launched by the end of the year. But the decisive factor of the programme is that we use our partners' expertise: Airbus for example leads work package 9 which deals with aircraft systems; staff and professional associations are involved when it comes to human factor issues; and regulatory authorities advise us on certification questions.

The SESAR Joint Undertaking is doing its utmost to inform and involve all relevant parties as SESAR is the future for all actors of the European Sky. Stay tuned and subscribe to our newsletters. Much will happen this year and our commitment is to start to deliver first project results in 2011.

**Patrick Ky, SESAR Executive Director**

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## SESAR at ATC Global

Come and visit us at ATC Global in Amsterdam from 9-11 March 2010. You'll find us in hall 9, stand number R402. Our SESAR experts are happy to get in touch with you!

Join the AIRE announcement on 9 March (morning) with first results from European and US green flight trials. The meeting is organised jointly by the SESAR Joint Undertaking and the Federal Aviation Administration. Don't miss the SESAR Forum on 9 March (afternoon) where you get an outlook on what will happen at Europe's ATM innovation programme in 2010. Register now through the ATC Global website ([www.atcevents.com](http://www.atcevents.com)).

SESAR at ATC Global – we're expecting you.

## Immerse in the world of SESAR

Want to know more about SESAR? Visit our website regularly and discover what is hot at the European ATM innovation programme. Watch the video interviews with SESAR pilots. Get the latest news and subscribe to our e-newsletters. Read background information and download the SESAR screensavers and wallpapers. Finally, get introduced to the programme by SJU Executive Director, Patrick Ky, via an e-learning module. You can easily access the module from the SESAR homepage (click on teaser on the right hand side). [www.sesarju.eu](http://www.sesarju.eu) – your portal to the world of SESAR



interview

# Military needs and roles are unique in SESAR

**An interview with** Group Captain John Clark, Royal Air Force - Assistant Director, Airspace Policy 2



**Group Captain John Clark** currently represents the Military ATM Board of Eurocontrol. As Group Captain for Air Traffic Control (ATC) at the UK's Headquarters Air, he was responsible for military ATC policy and all aspects of service delivery with a particular focus on expeditionary ATC.

Group Capt Clark joined the Royal Air Force in 1976 and was subsequently commissioned into the Air Traffic Control Branch. He has served with the RAF in a variety of posts in the UK, Belize, Germany and Saudi Arabia, where he was directly responsible for all UK air operations over Afghanistan. He has also held a Desk Officer appointment within the UK's Counter Proliferation and Arms Control Secretariat, acting as the Ministry of Defence's focal point in providing support to firstly UNMOVIC and, post-hostilities, the Iraq Survey Group.

**Group Captain Clark, you are representing the military stakeholders in the SESAR Joint Undertaking's (SJU) Administrative Board. What are the expectations of the military sector with regard to the programme?**

Like all SESAR stakeholders, the military sees the need for a new European ATM system to meet the challenges facing the sector – we have no doubt about it. We are working to play our part in ensuring that SESAR meets these challenges.

However, SESAR will need to accommodate the diverse needs of airspace users. The military has very specific needs tailored to the nature of its missions. SESAR will need to accommodate these needs because they won't go away.

We need operational freedom but are aware that this cannot be achieved unilaterally. SESAR has to develop a new generation of civil-military 'performance based' standards. This should lead to a new approach to certification, recognising military capabilities that prove to be equivalent to the required performance level.

**Who are included as 'military stakeholders' and what are the main reasons for their involvement in SESAR?**

The military is unique, in that we are stakeholders in several different roles and sectors - as airspace users, regulators and service providers. In establishing the Single European Sky (SES) initiative the EU Member States committed to ensure that 'the interests of Member States military users of airspace

are represented in the whole development, decision-making process and implementation of SES.'

Military use of airspace includes anything from training exercises (using only small areas) to air policing for national security reasons. Missions often launch with very short notice. Access to airspace is therefore vital and our use of airspace is perhaps more complex and varied than other users.

We therefore believe that wide military involvement is important in order to collect comprehensive information on the varied ways in which militaries use airspace across Europe and so that the SESAR concept, as it develops, takes these needs into account.

**Military stakeholders clearly have an interest in the programme as airspace users – are there any other aspects that are seen as having potential impact or benefits for European armed forces?**

Safety is of course paramount – and should not be degraded – but new systems must take military needs into account. The successful application of the business trajectory concept across Europe under SESAR will create an environment of greater certainty. The implementation of such a common model and standard will have a positive impact on safety, which of course will be a benefit to all users including military ones, but it must not be at a cost to operational capability.

New systems will also be a challenge for the military, as



AIRBUS MILITARY 2009 - A400M First Flight  
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although we have to maintain flexibility for missions associated with national security, the business- or mission-trajectory concept relies on the military declaring its airspace requirements as early and with as much precision as possible.

The United Kingdom has developed the 'Joint and Integrated' approach, which brings together civil and military ATM and ensures that we work together closely in partnership. We see that SESAR will also ensure that Civil and Military airspace users and Air Navigation Service Providers (ANSPs) work together in partnership.

Our role in SESAR's Administrative Board is similar to this. We are not a voting member but provide military judgement and input, including the requirements of Eurocontrol's Military ATM Board (MAB), which represents the pan-European national military directors of ATM.

#### Where do you see the biggest challenges in the programme?

For the overall programme I don't think enough has been done yet to consider the implementation of SESAR or the overall programme management of all aspects of the delivery of SES. In particular, we need to consider how to handle the costs of deploying any additional or new equipment.

Also, more work is needed on the Cost Benefit Analysis and whether we need to find innovative funding for some airspace users, and this is recognised within the SJU. Funding is a challenge for many stakeholders, but particularly the military, whose first financial priority must always be national security.

We also need to recognise that different military authorities use different national standards. Making them all compliant with new SESAR requirements may need significant investment.

There are opportunities in SESAR too, however. In particular, it should be possible to re-use existing military avionics in meeting performance-based standards, while security requirements should be addressed through participation in the System-Wide Information Management (SWIM) - rapid access to information should lead to rapid decision making.

Military missions often have to transit international airspace

and the 4D trajectory concept should help. Another example is the roll-out of Mode-S surveillance radar, where the military platform will not be exempt. We will have to equip to maintain interoperability.

#### Do you exchange information on the SESAR programme with armed forces of other countries?

We look at civil-military issues within the Civil Military Interface Standing Committee (CMIC) so obviously this remit includes SESAR. We brief them on SESAR developments several times per year, as we do with Eurocontrol's Military ATM Board. On the whole Eurocontrol provides the forum for discussions at the technical level. A third body that allows for less formal discussions between military and civil stakeholders is EURAMID.

The Civil Aviation Authorities of several countries are also involved in the Regulatory Information Coordination Board Area Northwest RICBAN, which is also an informal group of civil and military authorities that coordinates on SESAR.

So far there have been positive reactions with regard to SESAR from all members of these bodies but underlying funding concerns remain.

#### Which are the work packages you are most keenly interested in?

From the military perspective all work packages dealing with performance, master planning, concept development, security and developing interoperability are of interest. In particular, however, I am following Work Package 4 on en-route operations, which will cover the planning of business and military trajectories, as well as Work Package 7 on network operations, which covers the infrastructure needed to support trajectory-based operations.

Work Package 9 on aircraft systems is also of special interest, as is Work Package 15 on 'Communication, navigation and surveillance' (CNS) systems, which should deal with the equipment that may be needed to support the SESAR concept.

We also follow with interest the continuing Cost Benefit Analyses carried out as part of the work on business cases within Work Package C.

#### What do you see as the added value of a European-level programme and does this create challenges that are specific to military stakeholders?

All the stakeholders in the European ATM system have common challenges and it is vital that we come together to meet them collectively. In doing this we can't take a 'stovepipe' approach, ignoring interoperability and working in isolation. SESAR will share expertise and resources, create an environment of openness and transparency, and deliver economies of scale.

For the military, it is vital we play our part, but we must not underestimate the challenges we face due to the unique nature of our requirements on airspace, the need to maintain flexibility for varied and complex missions and, as mentioned before, the funding challenges.

## SESAR in-depth

# Take-off for the 4D trajectory



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With a decision made by the Executive Director, and after consultation with the SESAR partners, the first four projects of the SESAR programme were given the green light to start their execution phase in December 2009. Project 9.1 "Airborne Initial 4D Trajectory Management" led by SESAR member Airbus was amongst the four projects. 4D trajectory is at the core of SESAR and will enable more direct flights with benefits for passengers, airlines and the environment.

The 4D trajectory concept requires that airspace users are able to agree directly with the air navigation service providers on the detailed trajectory for the flight in four dimensions (three spatial dimensions, plus time). Before and throughout the flight, the aircraft's trajectory information containing current and predicted positions will be exchanged with all concerned Air Navigation Service Providers, and possible time constraints will be agreed at specific waypoints in the vicinity of congested areas. Air Traffic Management (ATM) operations will be automated to a greater extent than they are today, with data exchanged directly between the airborne and ground systems. More precise information about the current and future positions of every aircraft at any given moment will improve safety as well as flight predictability. This system will allow a significantly more efficient resource planning which will in turn enable airports and the European sky to cater for more flights than they can today.

## Project background

"Initial 4D" is the first step towards "full 4D" operations which are planned in the SESAR target concept. Initial 4D operations work by defining a time constraint for each aircraft at certain crossroads in the sky, in order to sequence the traffic. Typical crossroads for these time constraints could be in the vicinity of congested airports. Initial 4D requires only a light avionics upgrade and could be in operation from 2015 on all current generation aircraft. The objective of Project 9.1 is to progress on the airborne part of the technical definition and the system design of the initial 4D function, so that a cost effective and robust industrial development of aircraft systems can be launched. The project is led by Airbus with support from SESAR members, Thales, Honeywell, Alenia Aeronautica and Eurocontrol.

## Scope & approach

The first part of the project deals with the functional definition of the airborne segment and will provide information on the capabilities to be implemented onboard, independently of the aircraft architecture. The second part of the activities addresses the Verification and Validation (V&V) of the airborne system. For that purpose, airborne system mock-ups and prototypes will be built for mainline and regional aircraft. Initial V&V will be conducted using mock-ups in a simulated aircraft environment, possibly coupled with a simulated ATM environment. Final V&V will be carried out using prototypes fitted in a flight test aircraft (real architecture and real interfaces) flying in real ATM environments provided in the framework of SESAR Work Packages (WP) 4 – En-Route Operations and 5 – Terminal Operations.

## Benefits

As the trajectory of each aircraft is defined in detail in advance, with local conditions and other airspace users taken into account, the overall predictability and efficiency of the air traffic will be enhanced. The 4D trajectory will also improve safety as it decreases the work load for pilots and air traffic controllers who will have more time for monitoring safety aspects. Knowing the exact trajectory and timing for each flight means that aircraft can optimise their routing and fuel usage which will lower costs but also reduce the CO<sub>2</sub> emissions per flight.. In addition, 4D trajectories can take into account local needs in terms of noise and other pollution and avoid unnecessary over-flights.



Jean-Louis de Menorval and Olivier de la Burgade  
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### **“Airbus contribution to SESAR is essential”**

A short interview with Olivier de La Burgade (Airbus), Work Package 9 leader and Jean-Louis de Menorval (Airbus), project manager of project 9.1 “Airborne Initial 4D Trajectory Management”.

#### **What are your expectations in the SESAR programme?**

ATM is a key factor for the growth of air transport. Airbus recognises that SESAR is the initiative needed to avoid crippling of the European skies. Ultimately, Airbus customers need a smooth and efficient air traffic system to operate in good conditions and to develop in the future.

It is therefore essential that Airbus takes part in the definition of this next generation ATM system which will require more interactions and cooperation between the aircraft and the ground. Airbus has notably to ensure that future aircraft capabilities will match the future operational concept, that the future operational concept is defined to make the best use of future aircraft capabilities and that air and ground development and deployment are synchronised.

#### **Project 9.1 was one of the first projects within the SESAR programme to start the execution phase. Where do you see it in the overall programme?**

SESAR is built upon several pillars, and one of them is the

management of the reference business trajectory. The 4D trajectory capability of the aircraft is the airborne function contributing to this pillar. Project 9.1 targets to deliver a cost-effective aircraft capability to put into operation in a limited timeframe; basically we are speaking about an initial version of the business trajectory.

Thanks to the active support of 9.1 partners Honeywell, Thales, Eurocontrol and Alenia Aeronautica, we have put a lot of effort to launch this project as early as possible, as we believe it is essential to deliver the benefits expected from SESAR.

#### **How big is the Airbus team working on the SESAR Programme and to which other WPs are you contributing?**

At cruise level, more than 100 Airbus staff will work on SESAR, covering a wide range of domains: navigation, communication, surveillance, human factors, safety, business aspects, environment, onboard operations (including pilots), etc. About half of the Airbus contribution will be provided within WP9, but Airbus has also planned significant contributions in operational work packages (WPs 4, 5, 6) as well as in WP16, notably on safety, human factor, environment and security aspects.

## SESAR in-depth

# FREQUENTIS: Quality, safety, innovation – and a complete commitment to SESAR

By Hannes Bardach, CEO Frequentis AG



Hannes Bardach, Frequentis AG

With around 800 people and a turnover of some EUR 140 million, the Frequentis Group is smaller than other players in the field. Yet this passionate and growing team continues to have a significant influence on ATM performance, just as it has for the past 30 years. Frequentis introduced many of the game-changing innovations in ATM.

One example is fully-digital voice communication, which brought unprecedented stability and availability to the most sensitive information exchange in ATC: the link between the pilot and the controller. So much so, in fact, that it is now a non-topic, with this exchange fully integrated within a single communication system. Controller-machine interactions based on touch screen technology are another example, and these have become a standard feature.

### Long-standing expertise and know-how in ATM

The Frequentis-managed European Aeronautical Information Services Database (EAD) exploits the huge benefits of

information management and service provision, particularly those gained from standardised, coherent, ECAC-wide implementation: EAD has changed AIS operation in Europe dramatically. These innovations, many of which are now reflected in community standards, together with our mature partnerships with leading ANSPs from around the world, gave us the confidence to believe we could make a substantial contribution to an endeavour the size of SESAR.

Frequentis stands for quality, safety, innovation and a complete commitment to ATM. The Single European Sky provides an environment for unprecedented change in the organisation of air traffic management. New technologies that both reflect and integrate into the state-of-the-art architecture of the overall system will enable the operational improvements required to meet the 2020 targets.

### Favouring an open SES ATM framework

Frequentis supports the service-oriented systems of systems approach described in the European ATM Master Plan and therefore favours an open SES ATM interface framework.

**Open interfaces** play a central role for us. Open interfaces unleash the power of flexibility without compromising quality, stability or safety. They allow best-in-breed experts to contribute on a small-scale services basis while still operating the overall system through the same architecture, without the need to change everything. Open interfaces thus reduce costs.

Frequentis sees the SESAR **overall architecture** as a stable set of open service interfaces that allow all services to collaborate on a loosely coupled basis. Our involvement in B.4.3. should help strengthening this idea. Services themselves, however, may undergo continuous changes in different implementations. A subset of these interfaces is important to Frequentis and thus addressed with vigour

within the company. These are also the main areas of activity within SESAR.

The very nature of **communications** makes it an obvious interface problem. Both ground-based and air-ground communications face major changes. Communications issues on the ground basically focus around the convergence of all services, including voice, through a common transport platform based on IP technology. The digital radio link is, however, fundamental to all SESAR operational concepts and also requires close attention. Frequentis is contributing to these two areas through the vast know-how and expertise we have gained over many years via three projects out of WP15.2.

The interface between **SWIM** and those services collaborating on SWIM is critical for successful information management. This will clearly be the topic attracting the highest priority in the future. In order to manage the airspace, it is essential to manage the information that represents this airspace and all its users so comprehensively. SWIM is still in the early stages and will deploy its full capabilities on a step-by-step basis. Stable interface specs are required to allow both the continuous development of the SWIM core and the adaptation of services to the SWIM environment. Information modelling and the shaping of SWIM are important pillars of the Frequentis contribution to SESAR which is carried by 15 projects out of WP8 and WP14 and three projects out of WP13.

The interfaces within a facility, such as a **fully-integrated ATC tower**, are just as important as the interfaces on SES regional bases provided by SWIM. A set of interfaces allowing many different suppliers to hook up their components will produce a feature-rich and flexible set of applications. The Frequentis contribution here comes through the experience gained from our TAPtools® framework and is brought in five projects out of WP12.

The Frequentis user-centric approach manifests itself most exquisitely in the SESAR **integrated Controller Working Position** (iCWP) initiative. The interface between the controller and his supporting technical environment requires special



Frequentis: Design for security – workflow based sector suite

attention in the light of increases in performance, safety and flexibility, and allows controllers to rapidly resume work in any sector of the SES. Within SESAR, Frequentis is aiming for a configurable interaction platform that serves as a single front-end system supporting all back-end services, with a single common interaction scheme, look and feel (user interface style guide). Supporting this concept requires a broad footprint in SESAR projects as there is no single topic assigned. Consequently, the Frequentis contribution spreads from projects in WP5, WP6, WP10 and WP12.

All Frequentis solutions are based on the same fundamental Frequentis operating principles:

- Open and standardised interfaces play an important role - always place the human being, the user, at the centre of your considerations
- Design according to information models and information flows
- Clearly understand and build on rigid safety concepts
- Design for security

#### Safety as a basic requirement for Frequentis

Frequentis is active in a range of business fields relating to safety-critical operations, including the public transport, public security and maritime sectors. Involvement in public security, for example, forces us to develop and implement outstanding security concepts and solutions that go way beyond those currently being discussed in ATM. The rigid safety regime in the international rail business bears comparison with the avionics business and even exceeds current ATM practices. Frequentis fully understands and respects the unique business environment of ATM. Given this awareness, we pay the maximum possible attention to safety and security considerations. We also believe we bring substantial benefits to the SESAR programme and the ATM community by introducing expertise from other domains and applying it to ATM issues. This justifies our contribution to the respective projects in WP16.

#### SESAR in Frequentis

SESAR is an ambition that is carried from the whole Frequentis organisation. There is a core management team led by Michael Holzbauer (Acting SESAR Lead) and Melania Gagea (SESAR Programme Manager) that takes care of organisational issues, though. But SESAR project deliverables will be developed by the ATM production organisation in order to facilitate and accelerate deployment and re-use of new insights in everyday operations.

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## short news

### Hearing on SESAR at the European Parliament

The Transport Committee in its session of 27 January put on the agenda an exchange of views on SESAR. Patrick KY, Executive Director, took the floor and gave an update and outlook on the programme. "SESAR unites skills and innovation capabilities of the entire EU aerospace industry", Mr Ky emphasised during his speech.

Several Members of the European Parliament (MEP) raised questions about diverse topics. Belgian MEP Saïd el Khadraoui (S&D) for example was especially interested in questions of interoperability between the US NextGen and the SESAR programme to avoid

additional costs for airspace users. Dominique Riquet (EPP) from France on the other hand raised the question on the funding of the deployment of SESAR technologies and procedures. He stressed the importance of investing public money in the programme to support European competitiveness. The human factor was at the core of German MEP Gesine Meissner's (ALDE) question highlighting the importance of involving pilots and air traffic controllers in the development of SESAR technologies and procedures. Other questions from MEPs centred on the progress of the projects, automation of tasks, etc.

A constructive and enthusiastic exchange of views, stimulating for all parties concerned. The SJU will further



Belgian MEP Mathieu Grosch (EPP) reading the SESAR brochure. He also raised questions on financial, technical, administrative and political aspects of SESAR's deployment phase.

enhance its discussions with Members of the European Parliament.

### BAF02 - we have lift-off!



Launch workshop with all parties involved, 2 February 2010

The second call for Best and Final Offers (BAF02) was closed successfully in February 2010. Some 47 projects in Work Packages (WP) 7 – Network Operations, 13 – Network Information

Management System, 16 – Research & Development Transversal Areas and C – Master Plan Maintenance were allocated to members. Additionally, 46 projects and sub-work packages which were not awarded at the first invitation, were assigned as well. The four WPs will be led by Eurocontrol with contributions from all SJU members.

At a launch workshop with all the parties involved on 2 February, the SJU stressed the importance of the initiation phase in the project lifecycle. The purpose of the project initiation phase is to refine the definition of the projects, and to provide the necessary information to enable the SJU Executive Director to make a Go/No-Go decision on whether to proceed to project execution.

For each project, the phase begins with a formal kick-off meeting. The project then has up to 90 calendar days to submit a Project Initiation Report (PIR) to the SJU. The PIR is reviewed by the SJU and, further to consultation with the Programme Committee (PC), the SJU Executive Director makes a decision on project execution.

During February, the necessary contractual arrangements are being finalised, with the first kick-off meetings for the BAF02 Projects being foreseen as of late February. The SJU and the SESAR members are committed to making the programme a success. With the majority of all projects being awarded, we have lift-off!

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