

SES II: Is Europe ready for the deployment phase of SESAR?

2010 is an important year for Europe's modernisation programme SESAR. The development phase of the programme is gathering pace with more than 300 projects underway, and the European Commission (EC) is now turning its attention to implementation. A task force is due to report back to the EC by the end of the year with a proposal that will outline how the deployment phase will be managed from 2013. SESAR implementation is timed to match the maturity of research projects underway, supported by cost benefit and safety cases, and in line with the European ATM Master Plan agreed in the SESAR definition phase.

On a practical level, the programme is on track. Europe's research activities are working towards a common goal, and are developing the technical answers to SESAR targets. These include trajectory-based operations with better flight profiles and lower fuel consumption for airspace users; a rolling network operation plan that takes account of events including weather and traffic demand; an air traffic management intranet to share information in real-time; integration of airport and airspace activities in the management process; and safer operations.

Some programmes are already delivering results, as shown by hundreds of flight trials in 2009 which made use of existing technology and introduced new operational procedures. For example, arrivals into Stockholm saved on average 100-150 kg of fuel per flight as a result of optimised descent profiles, while oceanic flights flown as close as possible to their preferred trajectory over the North Atlantic achieved two per cent fuel savings under the Atlantic Initiative to Reduce Emissions (AIRE). A new concept called Point Merge is due to begin operating in Oslo from 2011, followed by Dublin and Rome, that applies controlled time of arrival in the context of SESAR. Simulations carried out by Eurocontrol Experimental Centre and DSN of France

revealed safety and capacity benefits alongside reductions in workload and voice communications.

SESAR targets also support the appointment by Eurocontrol of SITA as its network provider for the Pan European Network Service (PENS). This IP-based regional communications backbone service will enable navigation service providers in 38 countries to exchange operational voice and data communications across a common network for the first time. Eurocontrol Director General David McMillan said: "PENS will be the physical communications layer of the future. It is the culmination of 15 years of discussion and reflects the vision of a pan-European network" It forms the basis of the SESAR system wide information management (SWIM). In addition to information exchange between air navigation service providers (ANSPs), PENS will replace the individual services that feed centralised applications such as the Central Flow Management Unit (CFMU) and European Aeronautical Information Service Database (EAD) to deliver further economies of scale.

So SESAR can deliver the technical solutions, but the political and institutional framework to support them is still taking shape. There is a real need to reduce fragmentation of Europe's airspace, which IATA says costs the airline industry USD1 billion a year – almost 10 per cent of navigation fees. European airspace is managed by 58 separate area control centres, compared with only 21 in the US for a similar volume of traffic. The EC's Single European Sky programme includes in-depth reform of ATM organisation and performance in Europe, while SESAR represents the technical contribution.

SESAR development projects fall under the management of the SESAR Joint Undertaking (SJU). The SJU is a public-private partnership created in 2007 by the EC and Eurocontrol to



Guenter Martis: ANSP ground infrastructure has to become standardised.

coordinate Europe's research efforts. Both organisations pledged E700 million, with a further E700 million contribution-in-kind from stakeholder partners who joined in 2009. SJU Executive Director Patrick Ky told the European Parliament transport committee in January 2010: "Already today, some 1,200 highly skilled experts work on SESAR across Europe. This figure is expected to grow to 3,000 amongst the partner organisations by 2011. In this partnership, all the production work is performed by the members. Airbus leads the work on aircraft development, Indra leads the work on airport systems, NATS leads the work on approach control."

The SESAR process has brought about the acceptance and buy-in of all parties concerned. "So far, innovation in this field happened on an ad-hoc basis. To overcome capacity issues, efforts have been rather put into airspace management and the recruitment of additional human actors instead of renewing the system as such. It does not make sense any more to modernise air traffic control systems on a local or national basis," explains Ky. The results of the SESAR technical programme will be supported by EU legislation, through the mandating of common standards in European airspace and airports.

CANSO Director of European Affairs Guenter Martis agrees: "This is the big plus of SESAR. We could probably

achieve research and development results in a shorter time frame, and less cost. But the issue is: we would not have the understanding and participation for all parties." Martis believes in the long term SESAR will reduce operating costs. "Aircraft equipment is already very standardised. ANSP ground infrastructure has to become standardised. We are just at the beginning of this process and EC implementing rules and community specifications are the way to get there." In mid-2009 the SJU launched 16 work packages covering all operational activities for en route, terminal and airports; system development including aircraft systems and ATM network design; SWIM; and transversal activities. The work packages represent E1.9 billion investment between 2009 and 2016 and cover the operational and technical elements (including specifications, procedures, prototypes and validation reports) needed to progressively deploy Europe's new ATM system. The 16 partners in the SJU head up consortiums that involve more than 70 companies in work programmes.

Thales is leading three work packages and secured projects worth almost E240 million in June 2009 – double the next closest industry partner, Indra. The biggest programme is the E13 million platform development of the SWIM network, followed by the CNS Work Package 15, led jointly by Thales and SELEX, which examines the application of satellite-based navigation systems and new surveillance technology. The third Work Package 10 includes trajectory management and gate-to-gate operations, and is led jointly by Thales and Indra. SESAR work accounts for most of the company's current research activity, with a strong interest in also serving markets outside Europe.

Thales Programme Director for the research & development phase of SESAR Luc Lallouette explains: "Thales has been a key player from the instigation of the programme. Even before the definition phase, Thales was active in promoting the concept. We are the biggest industrial investor and the second biggest overall after Eurocontrol, so for us, synergies are a must. SWIM and trajectory management have the highest priority for us and we want to make sure that SESAR investments

are in line with what we believe the market is expecting worldwide."

Thales draws on its own development work for some projects. In the case of the network operations package WP7, Thales has proposed a prototype regional flow management system that is based on its integrated flow management system installed and operating in South Africa since November 2009. The system integrates all airspace and airport users in one process to optimise the flight efficiency, taking account of traffic demand, airport capacity and adverse weather.

Lalouette says a pathway and timeframe for the deployment phase of SESAR is key to the programme, and identifies shortcomings in a process that involves so many participants and actors. "Maintaining tight coordination between all projects and all actors is a real challenge and insufficient coordination is one of the main risks."

Martis shares these concerns, and believes coordination between the various work packages is not optimum. "With so many work packages, there needs to be overall coordination so they all work in the same direction to achieve a common goal, which is the future ATM system. There needs to be a connection from one work package to another. Some should work together, yet they seem to develop somehow in isolation."

In order to ensure the SJU work stays aligned with the goals and objectives

of the whole programme, a further Work Package B has been created. The aim is to integrate the results of individual programmes such as SWIM, operational and network systems into a consistent architecture on a high level. Work Package B provides a refined and consistent target concept, and ensures the architecture meets the SESAR performance objectives.

The EC is also putting in place a regulatory framework to ensure stakeholders comply with SESAR targets. The remit of the European Aviation Safety Agency (EASA) has been extended to ATM and airports, and the checks and balances applied at national level are being driven by a wider European perspective. Binding targets, including performance and charging regulations, are being drawn up for release at the end 2010 that will ensure Single Sky legislation is an effective means to implement change.

The Single Sky second package which came into force at end of 2009 is driving this change. It introduces a performance improvement scheme in the four key areas of cost efficiency, flight efficiency, safety and capacity. With the introduction of targets at European level, the focus has to move from national to regional goals. However, as Martis warns, "You cannot wipe away in a few years what has been a principle over decades. In some people, fragmentation is in the genes. Across the industry, including manufacturers, you have to rethink processes and how to do business." ➔

Lead partners in SESAR projects launched in June 2009

Project leader	Number of projects	Value (Emillion)
Airbus	51	79.4
Alenia	30	32.1
Frequentis	30	26.3
Honeywell	24	39.7
Indra	99	119.3
NATMIG	29	35.3
SELEX	64	77.3
Thales	128	237.3