Critical Point

An Industry View

2015 promises to be a year of reckoning for the Single European Sky as some of the world's most advanced technologies are readied to be rolled out.

Air Traffic Management presents the European Survey 2015, an essential insight into the thinking of some of the region's key industrialists as Europe enters this critical phase.

All active in the modernisation of the European air traffic network, these experts offer their insight into what issues will challenge the delivery of Single European Sky benefits

To read the full version of this year's expert panel interviews, visit **www.airtrafficmanagement.net/ eurosurvey2015**

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Innovation What are the emerging technologies and procedures which have the potential to change the game?

Stejskal, ERA The key technology with the potential to change views on surveillance strategy are unmanned aerial vehicles or UAVs (drones). The prospect of autonomously flying mini UAVs through dense airspace without any onboard transponder is a threat.

The reason is the lack of regulation but even more, the current surveillance infrastructure consisting mainly of monostatic PSRs which is less than capable of controlling and tracking such targets.

To solve such issues with matured technologies would require huge investment. Solutions are emerging in distributed sensor networks, however. One promising technology capable of challenging this problem is Multistatic Primary Surveillance Radar (MSPSR).

A MSPSR network of continuous wave bistatic radars where the signal source can be represented by transmitters of opportunity (FM, DVB-T, DAB, WiMax) in the case of a passive system or by dedicated transmitters in the case of an active system.

Both variants have their different advantages. One can imagine the economic aspect of an easily deployed passive system sensor network without the need to transmit. On the other hand there is the flexibility in the deployment - and coverage - of an active system without the disadvantage of fixed signal sources.

MSPSR passive systems have already proved their capabilities and are awaiting acknowledgment as surveillance sensors. MSPSR active systems are under development.

Higueras, Ineco Those resulting from research and development projects fully oriented to deployment and operation such as the Single European Sky ATM Research (SESAR) programme aimed at developing the new-generation air traffic management system capable of ensuring the safety and fluidity of air transport over the next 30 years.

Among the outputs from SESAR, especial attention should be paid to the operational concepts and procedures, together with the associated systems and technology, involved in the different SESAR releases and in the Pilot Common Project (PCP). Those have proved to be the more mature concepts so their implementation will constitute the basis for the future ATM change. Last, those concepts and systems should be supported by a corresponding regulatory framework.

Puetz, Quintiq We expect virtual air traffic control centres and the European improvement projects (among which SESAR) to be the biggest game-changers in regard to innovation. The virtual consolidation of several sites into a single joint centre opens up a world of possibilities, but also will impose new challenges with regards to managing the ATC playing field as a whole.

With the possibility of air navigation service providers (ANSP) not only providing additional services to other ANSPs, but competing among each other on service levels, the ATC landscape could change entirely.

If a virtual control centre has the ability to occasionally take over the traffic and airspace of another centre, technical infrastructure, processes and organisations will have to be aligned to ensure operational continuity.

Currently virtual control centres only operate within a single country's borders, the moment this happens across borders, the underlying procedures and tools used will need to be able to incorporate the differences in rules across a larger airspace.

Government regulations regarding the number of controllers and the licensing necessary to man each sector are very strict. If you look at for example fatigue management and labour rules in different territories, the planning tool used to schedule air traffic controllers would need to be able to handle a variety of rules in a single platform.

Clinch, SITA ATM efficiency improvement can get a quick win by connecting air traffic flow management systems to airline flight planning systems as shown in the SESAR project 'AOC Data Increasing trajectory prediction accuracy' instead of requiring aircraft upgrades to send trajectory data (see http://ow.ly/HiKkL)

Ramu, NetJets Performance Based Navigation (PBN) and Satellite Based Augmentation System (SBAS) will enable flexible and accurate flight paths down to precision approach minimums everywhere.

Those navigation technologies supported by the additional situational awareness brought by pilot enhanced vision will facilitate many types of marginal operations. It will free weather or night restrictions into airports. However, regulators must now develop guidelines on how those technologies can translate into operational credits or diminish the need for specific authorisations.

Gammicchia, ECA Basically all the technologies that help accommodate larger amounts of traffic in a safer way closer to the airspace users' preferred trajectories. This is achieved through collaborative procedures that reduce the congestion before take-off, the use of spacing tools that allow the crews to fly more efficient routes into the airports maximising the runway throughput, and everything related to an efficient sharing of information that will help taking better decisions in real time based on actual conditions rather than forecasted ones.

This is all summarised into one ATM functionality - that is the 4D Trajectory - and everything behind this concept that implies user preferred option combined with tools that permit flying it very accurately.

Ravenhill, Helios Game-changing technologies offer greater integration whilst maintaining global interoperability. The shift to Flight Object and information integration through SWIM as proposed by SESAR is a powerful enabler for improvement in the planning phase, but we still need to solve the datalink debate to enable a step-change in gate-to-gate trajectory management – for example to full 4D.

Far too often we get excited by technologies that only offer a partial solution and then frustrated when the promise fails to deliver. Space based ADS-B could be the same – knowing where an aircraft is every 5 to 10 seconds is only useful in reducing separation if ATC can communicate with the aircraft effectively; replicating VHF style voice over the oceans may also be needed – but at what cost?

Oceanic ATC is traditionally 10 times cheaper than continental ATC due to the much simpler service; are the efficiency gains really worth the extra costs? We need careful planning, not bandwagon jumping. We should be looking back at the goal of the original Aviation Telecommunications Network (ATN) and implementing it using modern commercial technologies.

The ATN was designed to ensure that an aircraft could communicate using a variety of datalinks optimised by phase of flight seamlessly with ATC. The game-changing technology is whichever technology enables a secure high bandwidth link between the aircraft and the ground wherever it is in the world. Then 4D becomes real.

ployment How important is the need for a single, co-ordinated organisation to ?lement Single Sky technologies? How effective will the Deployment Manager ve to be? Will its remit make sense on a cost benefit analysis basis?

Gammicchia, ECA It is recognised that SESAR deployment will be a challenging and complex task given the multiplicity of the actors. Even important than having one single isation in charge of deployment is the real for coordination in order to reduce the tainties about timing the implementation v functionalities.

e deployment manager structure, with presentatives from the main operational olders within the industry playing a lead- le makes sense and seems a good setting imise inefficiencies related to non-syn- sed implementation of the enablers. governance and funding issues have been settled now but it is the conviction of the ommunity that change management may next major hurdle to a successful SESAR ment. This is why a consultation process ng the professional staff organisations is le to address this dimension, in line with called fifth pillar as defined in the declara- Madrid in February 2010.

Ravenhill, Helios SESAR was defined as a three-phase programme: definition, development, deployment. Definition and development are ablished and funded through the SJU; but only now at the beginning of deployment. is complex and requirements change affic patterns, so all three phases need in harmony for the whole to be suc- The definition phase continues in spirit n the regular updates to the European ister Plan – designed to ensure the ›ment phase remains valid.

levelopment phase itself has recently authorised by the EU to the tune of a €1.8bn – a sign of the commitment to all programme. But the real success at of 2014 was the selection of an indus-)eployment Manager (DM) – consisting ain ANSPs, airports and airlines. have a crucial role. The pull-through of)lutions into operational use requires)lanning and coordination to be cost - only the operational stakeholders collaboratively have the knowledge s. The DM needs to work hard; to ›nsensus across all industry players, to feedback to the SJU on what solutions

are needed; to be equitable when defining the future deployment programmes. It is not an easy job, but the right organisation and people are involved to ensure success.

Stejskal, ERA Co-ordinating joint implementation is a natural act of technological unification to achieve a common level of maturity across the Europe. It might also speed up this process.

On the other hand is we should validate if technologies developed under Single European Sky project are the ones required these days.

The key development stream was decided before the economic crisis and didn't reflect the impact of that crisis. There should be broader dis- cussion on what to implement today rather than to start implementing on the basis of previous plans. Another aspect is that not all technologies developed under Single European Sky (SES) project are fully matured which should be also considered.

Higueras, Ineco Implementa- tion of SESAR operational concepts should be done in a coordinated, seamless way if we want to ensure the success of the deployment. In that way, lessons learned may be recorded and used in future implementations.

If not coordinated, the ATM system will be operated under different concepts and using different technologies that may turn into inefficiencies and a dispersion of the provided services. In this sense, a role such as the Deploy- ment Manager will definitively help although its effectiveness will depend on how its govern- ance mechanisms and procedures are defined.

In this sense the project 'ANSPs Interim Deployment Programme' project, in which Ineco is involved supporting the overall project execution and management, has proved to be an initial successful attempt aimed at producing synchronised and coordinated implementation activities with the engagement of the major air navigation service providers (ANSP) in Europe.

Regarding the cost benefit analysis, such an assessment has been performed in the context of this project. It shows that an on-time and synchro- nised implementation of the Pilot Common Pro- ject would generate over the period 2014 to 2030 a net present value amounting to €2.4 billion, with a nine-year payback period. If those results are extrapolated to the whole deployment, positive results will be achieved in economic terms.

Puetz, Quintiq Co-ordination is crucial in the implementation of the SES and its associated technologies. The technological dimension will need effective governance and a commonality in the standards that are set.

The key to the effectiveness of a co-ordi- nated organisation implementing the SES initia- tive, will of course be the thought leadership it provides. Those spearheading the SES initiative elaborated on technological requirements, saying that there is a clear objective to find a system that supports not just regional needs but the needs of the aviation sector as a whole.

The frontrunners in the organisation are going to have to take a closer look at the current systems in place and find best practices.

Clinch, SITA The EU-wide nature of SESAR required the Deployment Manager role to be assigned to a consortium so it cannot really be called a 'single, co-ordinated organisation'.

The Deployment Manager consortium's challenge of obtaining ATM benefits by modify- ing the operational systems of all the region's ANSPs to use the technology produced by the SESAR Development JU is much harder than the SESAR Development JU's challenge of deciding how to allocate and split R&D expenditure.

It will hopefully not get caught up in administrative obstacles like government purchasing policies stopping ANSPs from buying the SESAR JU products without going through competitive bidding processes.

Lallouette, Thales Many new ATM functionalities require implementation at a regional or pan-European level and thus require coordination and synchronisation in order to reach the expected performance improvements.

A single organisation is therefore needed to achieve such coordination. From Thales' perspective, such an organisation will require a significant involvement of all the key stakehold- ers including the main system manufactur- ers covering both the airborne and ground segments to support deployment programme planning activities including industrialisation, standardisation, certification and cost benefit analysis activities.

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