A Blueprint for the Single European Sky

Delivering on safety, environment, capacity and cost-effectiveness

CONTENTS

1 – EXECUTIVE SUMMARY

The European aviation sector is a major driver of economic growth for the European Union (EU). More than 800 million passengers[1] were transported by air in Europe during 2011. It is estimated that the air transport sector provides 7.8 million jobs and contributes €475 billion in Gross Domestic Product (GDP) across the European Union[2]. With economic globalization and increasing travel demand, up to a two-fold increase in air traffic is projected within the next 20 years[3].

To support the expected growth in a safe and sustainable manner, a seamless and modern air transport system is required for Europe. This is the objective of the Single European Sky (SES) initiative which carries high-level goals to achieve by 2020 relative to 2005[4]:

- A three-fold increase in capacity where needed;
- Improve safety performance by a factor of 10;
- A 10% reduction in the effects flights have on the environment; and
- Reduce the cost of ATM services to airspace users by at least 50%.

However the current approach to the SES has not accelerated the evolution of a Single European Sky to the extent anticipated. Progress has been painfully slow and the inefficiencies of the European Air Traffic Management (ATM) system are still generating more than €5 billion of direct additional costs and 8.1 million tonnes of additional CO_2 emission every year[5].

The slow progress continues to cause passenger flight delays of more than 100 million hours annually[6]. The incentives of a competitive market are absent, and the coordination required across borders makes national oversight inadequate.

The current ATM structure and performance is a genuine threat to on-going growth and viability of the European air transport sector and unless appropriately addressed will impair European competitiveness and restrict economic growth and job creation.

This report integrates many of the existing "silo approach" analyses such as the ATM Master Plan to provide an overall vision of the Single European Sky and the necessary reforms to realize the anticipated benefits.

SES Blueprint

When fully realized, the Single European Sky will handle more than 20 million flights per year with the highest level of safety in the world. Aircraft will arrive within one minute of the planned arrival time regardless of weather conditions. Travel will be reduced by 10 minutes on average. A total cost reduction across European ATM of €9 billion per annum will be achieved through structural and operational improvements. The institutional and technical reforms will reduce the additional costs caused by fragmentation and inadequate service quality across Europe by over €3 billion per annum. Better procedures and flight profiles will provide €6 billion of fuel savings and 18 million tonnes of CO_2 emissions savings every year. Additional capacity, more efficient routes, fewer delays, less cancelled flights, and lower fuel burn will considerably increase the efficiency and economy of air transport while reducing costs and generating €419 billion additional GDP for the European economy and 320,000 jobs[7].

With fewer air traffic controllers the United States FAA is able to deliver 70% more controlled flight hours than Europe.

A new approach is required to increase the performance and efficiency of the air transport system while decreasing environmental impact and overall cost.

[1] From European Commission statistics (Eurostat): http://epp.eurostat.ec.europa.eu/portal/page/portal/transport/data/main_tables
[2] From ATAG: www.aviationbenefitsbeyondborders.org/around-the-world/eu27-nations
[3] From EUROCONTROL Long-Term Forecast - Flight movements 2010-2030
[4] From European ATM Master Plan Edition 1 2009
[5] Performance Review Report (PRR) 2011
[6] 800 million passengers have suffered from an average 10 minutes delay (PRR report 2011)
[7] From SESAR JU "Assessing the macroeconomic impact of SESAR" 2011

Key Reforms

To achieve the future European air transport environment and realize these economic gains, three key reforms are necessary:

- The creation of a mature performance system;
- The rationalization of air traffic management institutional structures; and
- The modernization of the ATM system.

Performance

The establishment of an independent European economic regulator for air navigation charges to define the targets to be achieved, oversee progress and determine binding financial corrective action is fundamental to the success of SES. Consideration should be given to evolving the role of the Performance Review Body into such a body given it present function and capability.

The targets and financial incentives set must cascade through the entire ATM supply chain with binding mechanisms between the states and their various air navigation services providers issued on a limited and regularly reviewed term with binding performance obligations.

The approach to operational performance improvement must enhance service quality on a gate-to-gate basis.

To support these activities, the European Commission needs to develop a clear, integrated roadmap for the 5 Pillars (Technology, Safety, Legislative, Airport and Human Factor) of SES including the expected performance contribution from each pillar to achieve the high-level goals.

Rationalization

The rationalization of ATM institutional structures includes a range of reforms to better clarify and streamline both regulatory and service provision across European skies.

The expansion of EASA scope is not supported as this time. Instead the focus on addressing potential overlaps between the EASA and SES frameworks should be addressed through coordination mechanisms. The activities of National Supervisory Authorities (NSAs) relating to FAB level activities should be centralized in regional offices under the supervision of EASA.

The grouping of en route air navigation services provision at Functional Airspace Block (FAB) levels with no more than 40 Air Traffic Control Centers (ATCC) across Europe and the centralization of operational management, training, procurement and support functions would be a primary driver for cost-effective services and reducing the cost of fragmentation by €3 billion per annum (improved service through reduced delay in all phases of flight and reduced number of support professionals). The rationalization process also enhances safety and environmental outcomes through reduced interface and transfer points, improved information sharing and better matching of resource to demand.

A reorganization of supporting ATM infrastructure at a European or FAB-level, provided by the best value operator and subject to a periodic tendering process, will deliver better value services and reduce the waste from infrastructure duplication designed along national borders rather than European air transport network need.

A Network Manager taking accountability for the central functions of flight information, demand and capacity management, as well as implementation of new ATM infrastructures to ensure common standards and interoperable rules will ensure that European airspace is managed as a community resource.

Modernization

The modernization of airborne systems and ground infrastructure and procedures will ensure that the forecast of increased traffic can be safely managed through better situational awareness for both pilots and air traffic controllers. Simultaneously, the deployment of advanced decision support tools will enable the rationalization process through increased system efficiency allowing the same number of air traffic controllers to safely handle a doubling of traffic.

The new generation of systems will use open architecture allowing much greater flexibility, innovation and interoperability ultimately leading to significant efficiencies and further supporting rationalization activities.

These systems also facilitate the efficient routes and flight profiles that result in 300kg[8] of fuel savings per flight; €6 billion of fuel cost savings and 18 million tonnes of CO_2 emissions savings per annum.

These new sophisticated tools necessitate an upgrade of skills for the traditional role of air traffic controllers as they become air traffic managers. This evolution, much like the transition pilots experienced with modern airliners, will support a system requiring no increase in ATC staffing levels beyond today. The new technologies also offer a broadening of skills for the technical workforce as they will have to manage new and more automated systems in larger air traffic control facilities.

The modernization and rationalization of the ATM supply chain ultimately results in a need for fewer support professionals in air navigation services but will generate more than 300,000 additional jobs across the European aviation sector.

[8] 2010 US/Europe comparison of ATM related Operational Performance commissioned by Eurocontrol and the FAA

Key Benefits

Traffic

20 million

flights per year

Punctuality

Aircraft will arrive within

min 1

of the planned arrival time

Flight Duration

Travel has been reduced

min 10

of the planned arrival time

Cost Efficiency

Inefficiency costs reduced by

€3 billion

per annum

Flight Efficiency

Better procedures and flight profiles

€6 billion

Savings per annum

CO_2 Savings

Corresponding to

t 18 million

of CO_2 savings per annum

Gross Domestic Product

€419 billion

of additional GDP for Europe from 2013 to 2030

2 – PRESENT STATUS OF THE SINGLE EUROPEAN SKY

The EU launched the SES initiative more than ten years ago. The objective was to reduce the fragmentation of air navigation services in Europe and to improve the performance of the ATM system.

This initiative was largely based on a white paper[9] issued by the Commission in 1996, which warned that lack of capacity of the existing system was a risk to the future growth of air transport in Europe. The inefficiencies of air navigation services were responsible for approximately €4 billion per annum of extra costs for the airlines in delays (€2 billion), extensions of route (€1.2 billion) and additional air navigation charges (€0.6 billion).

The EU adopted two SES packages in 2004 and in 2009 in order to reduce this fragmentation, to better define the responsibilities of regulators and operators, enhance the performance of air navigation services and reduce the cost of these services. The second package was intended to accelerate the realization of the SES and its benefits with high-level goals to achieve by 2020 relative to 2005.

Enabling EU skies to handle 3 times more traffic

Improving safety by a factor of 10

Reducing the environmental impact per flight by 10%

Cutting ATM Unit costs by 50%

To achieve these goals the European Parliament established a framework of five pillars based on technology, safety, performance, airports and human factors.

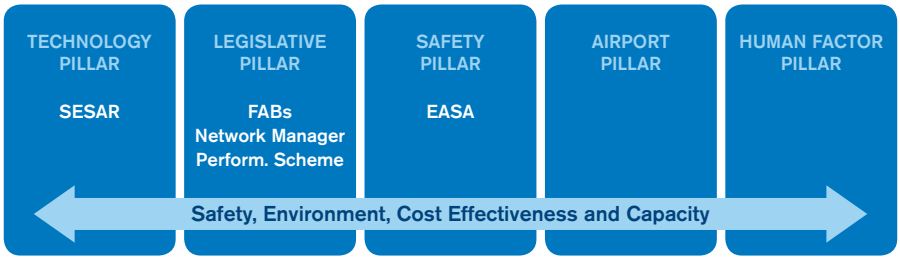
The EU has played an important leadership role in the establishment and implementation of the SES pillars; however, various initiatives are in differing stages of development and have not been brought together into a comprehensive, integrated and action-orientated roadmap.

Technology

The Single European Sky ATM Research (SESAR) program has been a strong focus for many stakeholders across the industry. More than €2 billion has been committed to the development phase and is estimated that around 3,000 people are currently engaged in this unprecedented research and development effort to improve ATM efficiency. The encouraging results of this development phase have demonstrated that new concepts are feasible however the benefits will be much delayed and at a reduced level than originally planned. Importantly, SESAR deployment will only deliver a portion of the SES high-level goals. If the technology component is not deployed in synchronization with the other pillars, it will lead to further waste and non-delivery of benefits.

The SESAR Joint Undertaking (JU) has been tasked to manage the update of the European ATM Master Plan, but if the document defines a clear technology roadmap for SESAR deployment, it still lacks the broader and ambitious targets which the SES promised and air transport stakeholders had anticipated. This is an opportune time to consider the next steps as the governance structure for SESAR deployment is still under discussion, the longevity of the SESAR JU is currently being considered, and most important, the business case for SESAR deployment has yet to be consolidated. The level of EU funding to mobilize and support SESAR deployment is also uncertain, as the €3 billion budget proposed by the European Commission (EC) for the period 2014 to 2020 is not approved. Issues also remain unanswered regarding the harmonization of SESAR and Next Generation Air Transportation System (NextGen) programs. Specifically, concerns exist in relation to standardization, certification and aligned regulation.

Figure 1: SES implementation five pillars



[9] ATM White Paper: COM(96)57 final

Safety

To date the SES I and II packages focused on making progress in areas of safety and clarified the respective roles of regulators, supervision authorities and service providers. The evolution of the European Aviation Safety Agency (EASA) to cover ATM and airports is also an important step towards the supervision of safety across the entire air transport supply chain.

However, at this point, it is considered that EASA must improve its cost-efficiency. Importantly, it is lacking some of the necessary resource capability in order to effectively perform new responsibilities, especially with respect to appropriately experienced and skilled professionals.

Reporting and transparency are also insufficient. It is concerning that in the PRR for the 2011 calendar year, that 12 European Civil Aviation Conference states did not submit safety template data to the Eurocontrol Safety Regulation Commission.

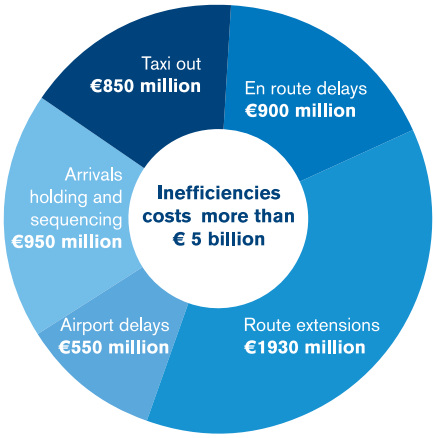
Legislative

The legislative pillar consists of three components which have close interrelationships; the Performance Scheme, the FABs and the Network Manager.

Performance Scheme

The performance scheme has been operational since January 2012, and monitoring and reporting is new for this first performance review period (termed RP1) from 2012-2014. However, the development of performance plans by states and FABs has been unacceptably slow and passive. The last report of the Performance Review Body (Performance Review Report (PRR) 2011) shows that the inefficiencies of air navigation services were still generating more than € 5 billion per annum of extra cost for airspace users:

- En route delays (€900 million),
- Route extensions (€1930 million),
- Airports delays (€550 million),
- Arrivals holding and sequencing (€950 million), and
- Taxi out (€850 million).



In addition, the cost of air navigation services provision is more than €8 billion per annum (en route and terminal air navigation services). This means that the total cost of air navigation services provision in 2011, including current system inefficiencies was €13 billion per annum.

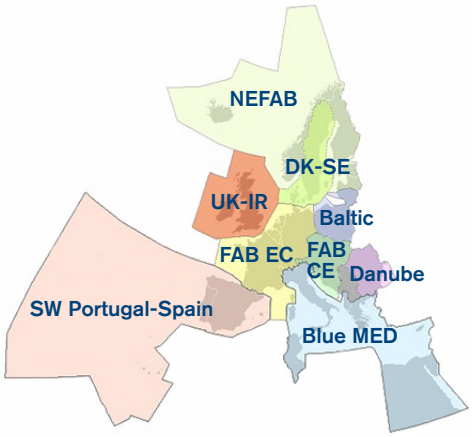
€13 billion in 2011

Air navigation services provision (€8 billion)

System inefficiencies (€5 billion)

Between 2005 and 2011 an improvement in the en route air navigation costs has occurred. However, this is still far from the objective of the SES implementation, which requires a 50% reduction by 2020. Most states have presented plans that are not fully compliant with the objectives contained in the performance scheme.

Functional Airspace Blocks



The FABs are a vital foundation element of the SES, designed to rationalize European ATM. There are currently 9 FABs either established or under construction: two of these (UK-Ireland and Denmark-Sweden) are established. The others were required to be established by 4 December 2012. Despite considerable expectation, progress has been minimal and the substantive requirements of the regulation are not considered to have been met. Against any reasonable assessment of progress, it cannot be said that FABs have optimized airspace along air traffic flows, or optimized human and technical resources and the European Commission is expected to announce infringements procedures against non-compliant states.

Route design has seen an increase in operational efficiency, however, major technical, cultural and industrials challenges still need to be addressed. Most EU ANSPs continue to develop their own ATM systems and their own training capability, which leads to difficulty in standardizing EU-wide service delivery, inhibits staff mobility and adds significantly to overall costs. More needs to be done to rationalize the ATC supply chain by reducing the numbers of ANSPs, AIM, CNS and MET providers. This has to be one of the priorities of the SES implementation.

The 2010 U.S./Europe Comparison of ATM related Operational Performance, commissioned by EUROCONTROL and the Federal Aviation Administration (FAA)[10], indicates the potential results which rationalization of these services can generate. With similar sized airspace (11.5 million km² for Europe, 10.4 million km² for the U.S.), a comparable number of airports (450 in Europe, 509 in the U.S.) and with very similar service levels, the U.S. ATM system is able to manage 67% more flights (15.9 million flights in the U.S., compared to 9.5 million flights in Europe) with less air traffic controllers (14, 600 in the U.S., 16, 700 in Europe) and 38% less staff (35,200 in the U.S., 57,000 in Europe).

The report from Eurocontrol and FAA[11] identifies the fragmentation of the European ATM system as the main driver behind such difference with 38 ANSPs in Europe (only one in the U.S.) and 63 en route centers in Europe (20 in the U.S.).

This analysis indicates that the SES objective of reducing the unit cost of air navigation provisions by 50% is clearly achievable and this should be a key objective of each FAB.

The comparison also demonstrates that both systems have inefficiencies, which generate extra cost in terms of delays and fuel burn, and that a global enhancement of performance has to be delivered by a global modernization of the ATM system.

Network Manager

The Network Manager function was established at the beginning of 2012. The function has a governance structure supportive of airspace user needs and will be a useful tool to drive the implementation of SES operations towards increased performance. However, there are also some unresolved matters that relate to the on-going EUROCONTROL network technology research and development and not the SESAR JU. This should be consolidated to the SJU program.

To ensure the effectiveness of this role, the SES regulation must explicitly state that the Network Manger has the authority to enforce coordinated actions by ANSPs. Additionally, the Network Manager role needs to be strengthened to ensure that it can rationalize the network and identify opportunities for service quality improvement by FABs.

Airports

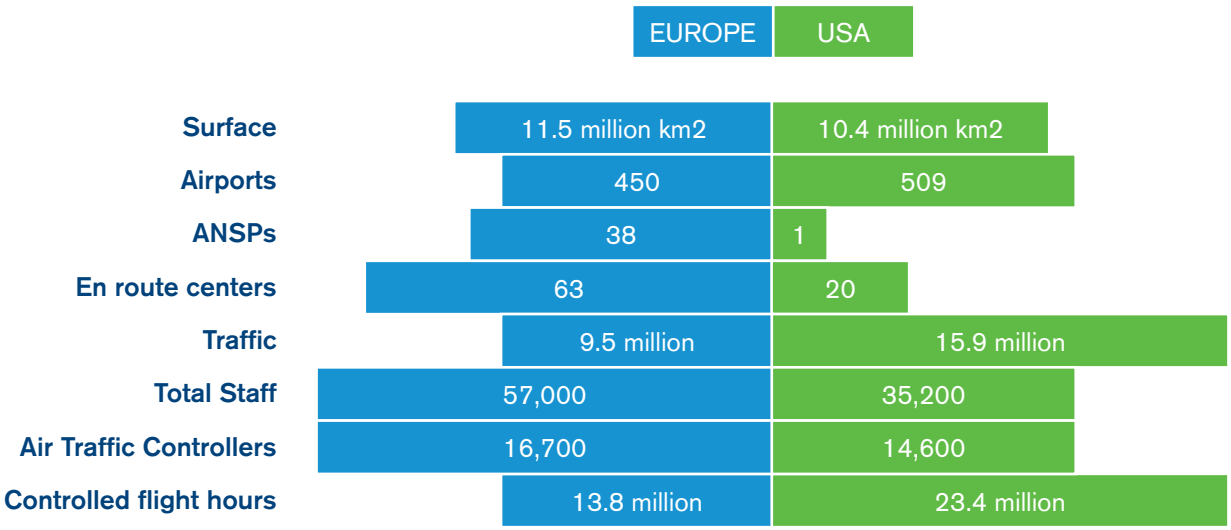
The release of the EU airports package in late 2011 focused on matters associated with slots, ground handling and noise. It remains an issue that this package addresses only allocation and utilization issues and not capacity issues.

The need to better integrate airport processes with airspace management using a standardized approach is evident if the capacity goals of the SES are to be realized and we are not to continue wasting €2.35 billion in additional costs attributable to the airport and associated terminal airspace.

Human factors

Of all of the pillars, the least tangible progress has occurred with respect to the human factors and social issues involved in SES implementation. It is well recognized that this is a challenging area and will take commitment and diligence by ANSP management and staff to work through this transition.

Without a successful human factors element to this transition, the SES will result in the deployment of new technology that will not be fully utilized and not deliver the anticipated benefits. A clear focus on better planning the engagement with ANSP staff is needed.



[10,11] 2010 U.S./Europe Comparison of ATM-Related Operational Performance

3. KEY CONSIDERATIONS TO DELIVER SES

The Single European Sky is a flagship transport initiative for the European Union, delivering significant European-wide economic, social and environmental improvements as well as aviation sector specific benefits.

To deliver a truly Single European Sky and realize these opportunities, the European Union, member states and institutions must be prepared to make the necessary and challenging reforms.

Economic and Social Opportunity

The modernization and rationalization of many European industries including energy, communications and transport has been marked by the successful transformation of European national leaders into global champions, delivering innovation, better service and lower prices to domestic and international markets.

In air transport, this transformation has supported the tremendous growth in demand to date and facilitated the emergence of major European carriers that are now among the world's largest airlines. Additionally, rationalization has occurred in the manufacturing industry, allowing European manufacturers to become world leaders in many aspects of the aviation sector.

Today the air transport sector in Europe supports 7.8 million jobs and €475 billion in economic impact. In fact, if European aviation were a member state, it would rank 7th in size by GDP.

The study led by ATAG on the benefits of aviation beyond borders[12] indicates that should growth in passenger and cargo traffic be one percentage point lower during the period 2010-2030, then in 2030:

- There would be nearly half a million fewer direct jobs in the air transport sector.
- Taking into account the indirect and induced impacts, the total number of jobs supported by the air transport sector would be over 1.9 million fewer than the base forecasts.
- The direct, indirect and induced contribution of the air transport sector to European GDP would be €127 billion (2010 prices) lower, with an additional €64 billion lost through lower tourism activity.

For the SES directly, the SESAR Joint Undertaking Macroeconomic Impact Assessment demonstrated that implementation could deliver 320,000 additional jobs and €419 billion of additional GDP in the period 2013-2030[13].

Disturbingly, Europe's status as a leading hub of world trade, a position held for centuries due to its relative development and geographic position, is increasingly under threat from rapidly developing competitive nations and regions.

A key factor in the EU's ability to remain competitive in the future will be the seamless connectivity with the emerging economies of Latin America, Africa, the Middle East and Asia.

This connectivity will not be possible without a new ATM system capable of managing the anticipated growth. The SES is designed to deliver this connectivity.

Environmental Opportunity

The aviation industry agreed in 2008 to the world's first set of sector-specific climate change targets. The industry is already delivering on the first target – to improve fleet fuel efficiency by 1.5% per year until 2020. From 2020, aviation will stabilize its net CO_2 emissions while continuing to grow to meet the needs of passengers and economies.

By 2050, the industry intends to reduce its net CO_2 footprint to 50% below what it was in 2005.

Companies across the sector are collaborating to reduce emissions using a four-pillar strategy of new technology, efficient operations, improved infrastructure and economic measures to fill the remaining emissions gap.

There are three key European programs which bring together European Commission institutions and industry to deliver these ambitious objectives: SESAR, the Clean Sky technology program and European Biofuel Flightpath.

Europe's Single Sky program alone is supposed to deliver a 10% reduction in environmental impact and so is considered as one of the key drivers of a sustainable development of the air transport in Europe.

[12,13] From SESAR JU "Assessing the macroeconomic impact of SESAR" 2011

Key Reforms

This opportunity for the European economy to create millions of new jobs, many billions of additional GDP in the coming years and to reinforce the position of Europe in the evolving global market must not be allowed to fail.

A new round of stronger and targeted SES legislative reforms is urgently required so that the benefits of SES can be achieved. To achieve stronger regulation it will be vital that the European Commission is supported by a Single Sky Committee free from conflicting interests with member state ANSPs, a strong consultation mechanism with airspace users and greater transparency and account-ability of decision making.

Member states and FABs will have to be fully engaged in the implementation of all SES pillars with a clear commitment to structural changes, which will have binding targets and financial incentive mechanisms.

In order to reach the SES goals, the key stakeholders, but particularly service providers will need to form different relationships and reach a greater level of collaboration.

This new ATM environment will have to be efficient, dynamic, highly-integrated and innovative.

Stakeholders will have to be willing and able to integrate developing technologies and capabilities both on the ground and on board.

European airspace will need to be operated collaboratively as a network if the safety, environment, capacity and cost-effectiveness goals are to be achieved.

We see three key reform measures to achieve these goals:

1. The creation of a mature performance system
2. The rationalization of air traffic management institutional structures
3. The modernization of the ATM system

4. A BINDING PERFORMANCE SYSTEM

Performance: Key Challenges

There remains considerable scope to improve performance through a stronger more targeted performance framework where states and service providers are held strictly accountable.

The bottom-up approach, whereby decision making is devolved to state and ANSP level and consultation with local stakeholders, has failed to deliver the targets. States have not fully reached the targets they had previously agreed. The incentives of a competitive market are absent, and the coordination required across borders makes national oversight inadequate.

Between 2004 and 2011, air navigation unit costs for en route services have decreased by 15%, however this is mainly due to the increase in traffic as the service units have increased in the same period by more than 30%. Some progress has also been made in flight efficiency but delays have significantly increased and were in 2011 more than 30% higher than in 2004 (60% higher that the targeted objective with 1.6 min per flight as an average)[14].

Performance: Key Reforms

A fundamental issue in the approach to date for SES is the lack of an overall roadmap identifying the process to deliver the high-level goals. The European Commission needs to establish such a plan and clearly identify the interrelationships between the 5 SES Pillars and their individual contribution towards the trajectory for safety, environment, capacity and cost-effectiveness by 2020. Such a roadmap would set the necessary policy guidance to drive the consequent performance framework, regulation and measures.

A new package of regulation establishing an independent EU economic regulator is essential. Evolution of the PRB into such an entity given its current function and capability is a logical step to take. To this end, the PRB should be detached from Eurocontrol and transformed into a full EU body overseen by the Commission. The members of the PRB shall be appointed directly by the Commission. To guarantee that these members exercise their functions in an independent manner and without any conflict of interest effective safeguards should be introduced through regulation.

The independent economic regulator should establish milestone EU targets to be achieved by each State or FAB, control the conformity of the performance plans with these targets and require appropriate corrective measures when necessary.

These targets and financial incentives will take into account the necessary investments required for the modernization and rationalization of the ATM services and be cascaded at a national or FAB level within the various ANSPs through binding mechanisms. This means that the performance plans will have to be based on the European Commission established roadmap.

To ensure this process is transparent, providers will report regularly to their customers on a series of Key Performance indicators (KPIs), which will be incorporated into binding service charters between customers and FABs.

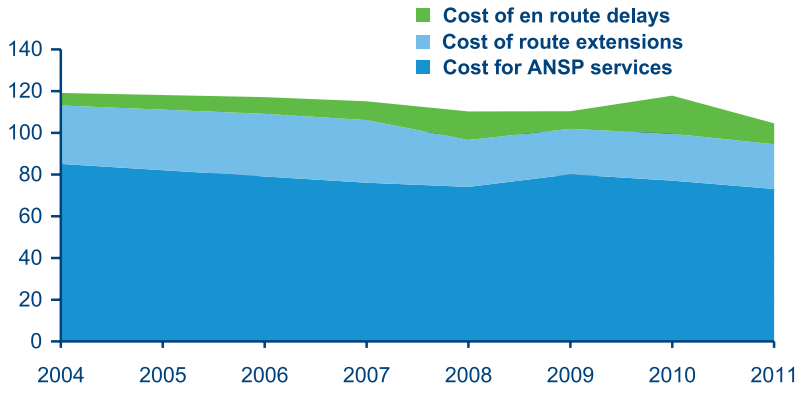
Future funding through charging will be dependent upon achievement of those KPIs. Pricing caps will also be overseen by the economic regulator which will consider progress against KPIs in determining the efficiency of each provider.

There are a number of examples in Europe, such as the telecommunications sector, where economic regulation has successfully supported the establishment of a cost efficient and fair market for consumers.

Three instruments have been used to positive effect:

- Progressive liberalization of former monopolies,
- Accompanying harmonization measures, and
- Competition rules.

Total cost of ATM in € for 100 km of en route flight



VERY SLOW IMPROVEMENT OF THE PERFORMANCE BEWTEEN 2004 and 2011

Future funding will be dependent upon achievement of KPIs, overseen by an independent EU-wide economic regulator

[14] Performance Review Report (PRR) 2011

As indicated by ongoing regulations for other sectors, amongst the most important characteristics of a regulatory system are:

- *Transparency should apply to the regulatory process:* The targets, which are established, should be based on a set of KPIs, which are easily measured. The KPIs must be independent and airspace users must be involved in the process.

- *Cost-effectively deliver an adequate level of investment:* The new regulation package should ensure that the future framework provides the right mechanisms in the context of the challenges facing the FABs, with increased emphasis for behavioral change and for investments in rationalization and modernization of the ATM supply chain.

- *The profitability or return on investments is a key driver:* This can be achieved by a change in the air navigation charges regulation, linking the rate of return on the investments made by the ANSP and equity of their shareholders to the achievements of the performance scheme.

- *Penalties:* To ensure the compliance of states and FAB operators, the performance scheme will be binding, with the regulator having the ability to require reasonable and automatic sanctions when divergence from the performance scheme is observed for a state or a FAB. Vigilance is required to guard against the potential for costs associated with any penalties being included in charges. The framework for penalties must be designed at an EU level to ensure inappropriate "trade-offs" cannot occur.

- *Pricing:* A key role of the economic regulator would be to manage and monitor the approval process for the unit rates of the air navigation charges according to the objectives of the performance scheme, but also considering the situation of each individual ANSP and the level of efforts made to engage in the structural reforms and investments requested to deliver SES benefits. A robust airspace users' consultation mechanism must be implemented in this process.

- *Binding performance obligations:* Where monopoly ATM services are maintained at local, national or FAB level, because rationalization of these services is considered to provide better cost efficiency, the new regulation will have to clearly state that providers of these services have to be designated from member states as service providers for a limited and regularly reviewed term and with a service level agreement containing binding performance obligations aligned to the performance scheme.

- *Performance plans:* The National Supervision Authorities (NSAs) will still be responsible for the elaboration of the performance plan. However those plans will have to be submitted to the economic regulator for endorsement before adoption by individual states.

Performance: Key Benefits

A binding performance system designed to drive the right behaviors is essential to realize the benefits of SES. To date the approach has been fragmented, inconsistent and lacking accountability. This critical reform must be approached with the benefits to Europe and its citizens as the prime consideration and must not be obscured by vested interest or historical institutional practices.

An overall SES roadmap is a foundation tool that will set the policy guidance necessary for member states and institutions to ensure each of the 5 Pillars interrelate and contribute appropriately to the SES high-level goals. This will serve to mitigate concerns regarding roles, responsibilities and accountability as well as setting the overall trajectory for stakeholders to deliver the SES.

The establishment of a European-wide independent economic regulator for air navigation charges will ensure that a consistent, fair and accountable performance system is established to facilitate the realization of SES. This essential reform will make best use of scarce resources and ensure best practice economic regulation is applied.

Price caps would be set to provide financial incentives for improved performance.

This process will considerably reduce the timeframe required to finalize the Performance Plan process and thereby increase the quality through traffic forecasts determined nearer to the commencement of the Performance Period.

5. RATIONALIZATION

Rationalization: Key Challenges

Rationalization of European ATM is the foundation of SES implementation. In the future ATM environment, a reduced number of FABs will have to deliver efficient Air Traffic Services (ATS). This will be achieved through a limited number of air traffic control centers and rationalized ATM infrastructure that operates with open architecture, fully-standardized systems and procedures. This evolution will necessitate meaningful social dialogue to ensure the ATM workforce is engaged with these important changes.

The cost of services for the airspace users will be reduced, while flight efficiency steadily improves. Communication, Navigation and Surveillance (CNS) services will be provided at lower cost and with higher efficiency. CNS, Aeronautical Information Management (AIM) and Meteorological (MET) services will be re-organized with successful providers offering the most efficient and cost effective service.

These ancillary services should be liberalized through separating them from the core bundled ANSPs and opening the market for competition.

SES implementation needs strong centralized functions to tightly coordinate the programs contained in the five pillars. The European Commission will need the regulatory powers and resources to ensure this is achieved.

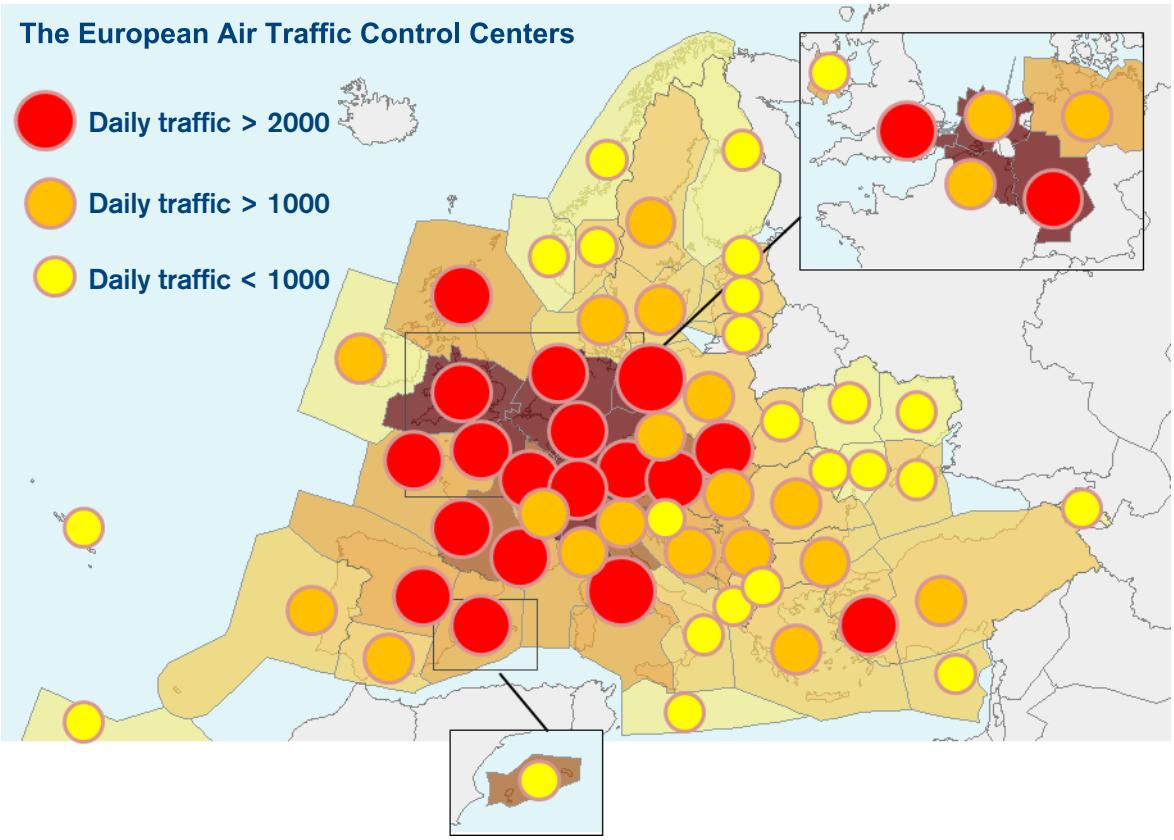
Rationalization: Key Reforms

Reducing support costs of Air Navigation Services

Comparison with the U.S.[15] indicates that the ratio of Air Traffic Control Officers (ATCOs) to additional staff in the U.S. is 1 to 1.4 whereas in Europe it is 1 to 2.4.

The Performance Review Report (PRR) for 2011 also indicates that today's support costs in Europe represents more than 70% of ATM/CNS costs which are estimated to be approximately €300 out of a total cost of €400 per flight hour.

For some smaller European ANSPs the support cost is more than 80% of their total unit cost. It is recognized that nine European FABs will not provide the same unified system that applies in U.S., however a reasonable objective should be to reduce the ratio of European ATCOs to additional staff from the present ratio of 2.4 to 1.6. A slightly higher ratio is considered reasonable based upon the additional interface and requirements associated with multiple FABs. This would in fact result in more than 3000 additional professional staff providing support functions across Europe if the 1.4 US ratio was applied.



[15] 2010 US/Europe Comparison of ATM Related Operational Performance commissioned by Eurocontrol and the FAA.

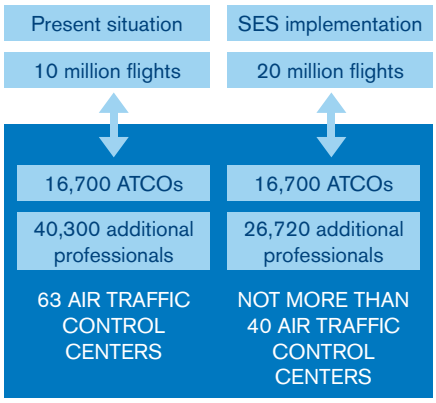
Reducing the number of Air Traffic Control Centers

The comparison with the U.S.[16] also indicates that the U.S. ATM system is able to manage 67% more flights with 38% less staff. A major reason for this disparity is that the number of air traffic control centers in the U.S. is 20, whereas in Europe there are 63 centers.

This fragmentation is a major driver in the relatively poorer performance of the European ATM network. The US-Europe comparison suggests that we need to be able to manage up to 20 million flights safely with the existing number of ATCOs (16 700) and with a reduced proportion of additional professionals 26 720 (1.6 x 16 700).

To reduce the number of Air Traffic Control Centers (ATCC) in Europe from 63 to 20 would require high capital investment in new facilities and additional costs for organizing the mobility of the staff.

However, a reasonable program of rationalization of ATCCs will be necessary if Europe is to regain competitiveness and achieve the SES. It is therefore necessary to identify opportunities where rationalization is appropriate from a performance, investment and human factor perspective. In this regard, it will be necessary to merge or integrate the smaller ATCCs, with the larger or those that have been recently modernized to leverage the existing investment. Analysis indicates that no more than 40 ATCCs should be required to operate European airspace with the current number of ATCOs.



It is considered that this could be achieved without major capital investments and would ensure the capacity to manage future growth of air traffic.

In addition to this rationalization, innovative approaches should also be considered. This includes concepts such as the "Virtual Center" where standardization of ATM equipment could drive ANSP efficiency, facilitate load sharing and reduce investment costs via shared services models.

Regrouping en route air navigation services at FAB level

Whilst the number and design of FABs will be rationalized and evolved, they will remain the major organizations for the state to deliver ATM performance services. The objectives of reducing the number of air traffic control centers and support costs should be fulfilled at FAB level.

FAB initiatives should therefore be reviewed against the following objectives:

- The provision of en route air traffic control services is regrouped at FAB level with centralization of operational management, training, procurement and support functions.
- A clear program of rationalizing and regrouping air traffic control centers and other facilities at FAB level is developed in each national performance plan to reduce the total number of centers in Europe from 63 to not more than 40.
- A wide-ranging and robust change management program is established in each FAB to ensure staff are directly and continuously engaged in the transition. This also includes a review of current work practices (to make the optimal use of new technology), the development of career path options for ATCOs, and other professionals, appropriate training of front line management to enable their active involvement in the transformation program and the development of common standards to address a range of workforce issues related to rationalization.

Synergies within FABs should not prevent other types of partnership between ANSPs drawn from different FABs. The deployment of new infrastructure should be able to be transferred to all FABs. All forms of collaboration between providers from different FABs should be encouraged to reduce service fragmentation. This fragmentation occurs at multiple levels within the existing European ATM system and it contributes to the current inadequate levels of overall efficiency.

It is necessary that each FAB be required by regulation to develop a roadmap for rationalization of ATCC's including key steps necessary for social dialogue, cost-benefit and safety analysis.

With the objective of limiting investments in new facilities and being able to control the anticipated 20 million flights per annum with the existing number of ATCOs and a reduced number of additional support professionals, not more than 40 air traffic control centers should be required in Europe

[16] 2010 US/Europe Comparison of ATM Related Operational Performance commissioned by Eurocontrol and the FAA.

Rationalizing the ATM infrastructure

In parallel, European ATM infrastructure has to be rationalized. Currently ANSPs operate separate ATM platform which multiplies costs and makes a coordinated deployment at EU level much more difficult. There is a need for shared and more effective coordination of procurements at FAB level which could also occur between FABs and at EU level under the supervision of the Network Manager. Globally, there are countries including the U.S., Canada and Australia that have successfully deployed new ATM infrastructure such as ADS-B and data-communication systems through a large-scale infrastructure and services tender process. Indeed, it can be the case that the "unbundling" of traditional functions can enable technology deployment using alternative investment and service models.

This is an approach that should be applied in Europe, where all the new infrastructures for ATM should be based on fully standardized and interoperable systems defined at EU level.

Standardization of ATM equipment is an effective means of increasing the efficiency of ANSPs. A common standardized ATC interface leads to improved FAB performance, by introducing effective load sharing processes. It also contributes to functional convergence of equipment by automatically solving the uneven spread of performance arising from different levels of sophistication in the operational concepts and technical support.

Individual ANSPs will no longer be compelled to purchase a fully-fledged system of their own, but will be able to acquire a service from a competitive supplier or share equipment with another provider, such as within the framework of a FAB project. This will reduce not only the investment costs but also the overall costs of providing the services concerned. Legislation is needed to provide an appropriate regulatory framework to steer the implementation of standardization and consolidation measures in a consistent and coherent manner. Within the FABs a common steering body should be established in order to ensure consistent and coordinated deployment.

As standardization measures are realistic and effective means to achieve the EU-wide performance targets, respective roadmaps for standardization and infrastructure consolidation shall be developed and endorsed.

Procurement would then be implemented through tenders issued at EU level or FAB level, providing suppliers with the opportunities to achieve economies of scale and to reflect this in pricing. These economies of scale will reduce the initial investments required for the new infrastructures and result in a decrease of the global level of investments of the ANSPs.

Unbundling the CNS, AIM and MET services

The provision of Communication, Navigation and Surveillance (CNS), AIM, and Meteorological (MET) services will also have to be reorganized to reduce fragmentation and duplication and to drive increased efficiency. This can be achieved through consolidation at FAB level using a tender process that encourages all European providers to compete and to extend their services beyond the national borders.

Regardless if these services are centralized at EU level or fully rationalized at FAB level, the providers should be designated through processes that allow all European licensed service providers to compete.

Where these services are rationalized at FAB level because rationalization is considered as providing better cost efficiency, the new regulation will have to clearly state that providers have to be designated for a limited and regularly-reviewed term and with a service level agreement containing binding performance obligations aligned to the performance scheme.

Where states have opened markets to competition for services, such as control tower services, it is important that the same rules that govern this type of competitive service provision should apply throughout Europe.

Clarifying the role of EASA

The Commission intent to expand the scope of the EASA to deal with all technical regulation and oversight, including issues not related to safety is noted. However, overloading EASA with new tasks might create more problems than benefits and could distract EASA from its core safety mission. The expansion of EASA's scope should not be a priority at this point in time. Instead, potential overlaps between EASA and SES frameworks could be solved through proper coordination mechanisms between EASA, Eurocontrol and the Commission without changing the institutional framework.

Regarding rulemaking, a more transparent governance is needed to ensure that the needs of those that finance the system have appropriate input to decision making processes. Certification of new components of the ATM system should be the exclusive role of EASA.

The fostering of rationalized providers and industries able to deliver air navigation services beyond borders must occur.

The activities of National Supervisory Authorities (NSAs) concerning services that are rationalized at FAB level, or delivered by one service provider for several countries, should be centralized in regional offices located in each FAB under the supervision of EASA. This will ensure a more efficient use of the existing resources and avoid duplication of checks or lack of coherence in compliance regimes between states. Importantly, EASA has also to be more efficient with less complex regulation, rule making processes easy to understand and to implement by operators.

This means a more operational regulator, driven by a relationship with the operators governed by two main principles: responsibility and transparency. A new governance and stronger consultation process will have to be established to better integrate operators concerns in the setting up of the regulation. At present, the move towards a more comprehensive technical "European Aviation Agency" should not be considered, as the slow progress on the establishment of a SES is not due to the lack of streamlined and balanced application of aviation legislation in the EU.

Expanding the role of the Network Manager

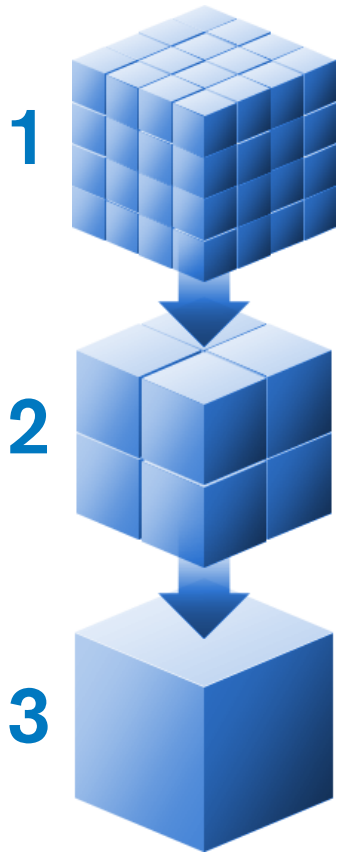
The Network Manager has a critical role to play in the rationalization of the European ATM system and this role has to be empowered to be the architect of the ATM network in Europe, working in collaboration with all aviation stakeholders.

Moreover, the ability of the Network Manager to effectively cover all of Europe, to reach all operators and to facilitate military coordination will make it the primary custodian of delivering network benefits, which is an essential element for the success of SES implementation.

The Network Manager therefore should be empowered with new responsibilities and functions allowing this role to develop a clear strategic view of the network improvements to be coordinated between the different stakeholders. The role should be specifically mandated to define and supervise all the centralized functions of the SES implementation including the introduction of technology that will increasingly drive the European aviation network, such the System Wide Information Management (SWIM) and Air Traffic Flow Management initiatives. It is also critical that the Network Manager ensures that these systems effectively interface with Airport Collaborative Decision Making.

Additionally, the Network Manager should be given the competence to propose and to carry out specific projects for the optimization of FAB governance, airspace as well as technical and human resources. Realistic but ambitious time lines should be set by the Network Manager for the implementation of these projects, and penalties should apply in the event that the FAB Member States do not comply with the proposed measures and deadlines.

The new regulation of SES should clearly state the functions to be fully centralized at EU level as part of the responsibilities of the Network Manager; which services are to be delivered at FAB level; and which services are to be submitted to competition in accordance with the rules of the EU open market. With potential for significant rationalization these functions will be evaluated through cost benefit analysis, which will analyze the benefits of full centralization at EU level of some existing ATM services such as ATFM, and SWIM but also a next generation flight plan management system.



The Network Manager

- **Focuses across many** European airspace blocks to manage overall network performance through optimized trajectory and SWIM
- Manages demand and capacity across the network through techniques such as advising flights to delay on the ground where necessary
- Re-designs airspace, air-routes to be more efficient and maximize capacity across Europe

Functional Airspace Blocks

- **Focuses on a small number** of European airspace blocks to optimize airspace, human and technical resources
- A new state and institutional structure to organize air navigation services
- Will rationalize European airspace from 27 blocks to only 9

Air Traffic Control Centers

- **Focuses on one** European airspace
- Provides air traffic services to flights
- Currently 63 individual centers across Europe with potential for significant rationalization

Reform of Eurocontrol

The evolution of EASA combined with the Network Manager developing a greater role in rationalizing European ATM architecture, further necessitates the reform of Eurocontrol.

R&D activities will need to be well aligned with Horizon 2020 and SJU programs and the Maastricht ACC should be fully integrated in the FABEC structure.

Eurocontrol will focus on activities related to its enhanced role as the EC appointed Network Manager, the new governance should be based around industry leadership on these activities. However, this should not limit the role and use of expertise of Eurocontrol to continue support of SES and SESAR.

Eurocontrol will have to achieve the performance targets set by the independent economic regulator. The cost base reform of Eurocontrol must continue to decrease regardless of traffic growth.

Civil-Military Alignment

Military operations must be given appropriate regard in the rationalization process. Importantly, as rationalization leads to reduced fragmentation and using airspace as a single, flexible resource, it is anticipated that both existing and emerging military mission need will be better accommodated and integrated with growing civil air transport sector demand.

Human Factor

The necessary process of rationalization must be done with the full participation and transparency of staff and their representatives; the risk of not having an engaged workforce for such a change is significant.

To address this risk, the European Commission needs to establish a planning framework across all FABs to identify and track the progress of human factor engagement.

Rationalization: Key Benefits

Rationalization will contribute significantly to the reduction in unit cost and to the absorption of the €5 billion of current inefficiencies.

The immediate regrouping of en route air traffic control services at FAB level with centralization of operational management, training, procurement and support functions should allow a 10% cost saving (€700 million per annum). In the interim term, the other benefits of reducing the number of air traffic control centers, and a better cost efficiency for CNS, AIM, MET services, should deliver an additional 10% reduction in unit cost and inefficiencies. It should reduce the unit cost of ANS provision by 20% in the interim term.

In the end state, with the US ratios applied to the European context, 16 700 ATCOs and a total number of less than 45 000 professionals should be able to manage twice the amount of traffic.

With the achievement of that, the objective of a 50% reduction of the unit ATM costs would be realized.

The regrouping of en route air navigation services at FAB level will also allow more direct routes and free routing in the upper airspace, with a 50% reduction of the route extensions in the interim term. It should result in an annual €1 billion cost saving and a 3 million tonnes reduction in CO_2 emissions.

A better organization of the airspace at FAB level, and an enhanced air traffic flow management system developed by the network manager at EU level should eliminate most of the en route delays representing a €1 billion annual cost saving.

Rationalization alone will mean the unit cost of ANS provision is reduced by 20% in the interim term

More direct routes and free routing whenever and wherever possible, elimination of most of the en route delays, should result in a €2 billion cost saving and a 3 million tonnes reduction in CO_2 emissions.

Immediate Term

- 10% unit cost reduction
- €700 million cost savings per annum
- Enroute Services grouped at FAB-level
- Centralization of operational management, training, procurement and support functions

Interim Term

- 20% reduction in unit cost
- €1 billion of cost savings per annum
- Reduced number of ATCC and better cost efficiency for CNS,AIM & MET services.
- More direct routes and lower delays

End-State

- 50% reduction in unit cost
- €2 billion of additional cost savings per annum
- 16,700 ATCOs
- Total number of less than 45,000 professionals
- 40 ATCC able to manage twice the traffic with direct routes and no delays

Total savings

€3.7 billion per annum

- CO_2 emissions savings: 3 million tonnes per annum for 10 million flights
- 6 million tonnes for 20 million flights

6. MODERNIZING THE ATM SYSTEM

Modernizing: Key Challenges

The expected increase in productivity of the European ATM system will not be possible without the successful deployment of new technologies and operational concepts that support the ATM transformation process, including the better integration of airborne and ground systems. This has to be supported by a robust validation and implementation process but also by funding, financing and incentive mechanisms.

This requires a clear commitment of the states and ANSP to implement the requested infrastructure and systems in synchronization with the the evolution required for airborne equipage. Mandates have to also apply to ground based equipment. Penalties against states not fulfilling their obligations on time must be enforced.

The "Best Equipped Best Served" (BEBS) principle must be broadened to a "Most Capable Best Served" (MCBS) to encompass aircraft equipage, crew training, operational certification, flight planning capability and the ability to efficiently and seamlessly convey the pertinent capability to ATM. The discussion on applying this principle for encouraging investment needs to progress. It should be applied as a progressive tool to facilitate and accelerate the transition towards a more effective airspace use concept. The €3 billion support for SESAR deployment, which was forecasted by EC in the next TEN-T program for the period 2014 to 2020, needs to be adopted by the states and European Parliament.

Without this funding, airspace users will have difficulties funding investment both directly and indirectly in the new technologies required for SESAR. A powerful funding and incentives mechanism is required to support the efforts required for the modernization of the European ATM system.

ATM modernization cannot be successful if human factors are not fully integrated into the development and validation of new concepts and procedures supporting SESAR deployment. All the professionals concerned by the structural changes required to deliver the high-level goals of the SES implementation must be involved in the decision-making process.

Modernizing: Key reforms

SESAR governance

Considerable scope exists to improve system performance through the introduction of new technology and new operational concepts. This is the objective of a successful SESAR deployment. To realize this ambition, the institutional framework must avoid duplication and ensure cost efficiency.

Airspace users will have the exclusive responsibility to endorse business cases for Common Projects before European Commission adoption. Following such endorsement the delivery of improved performance outcomes will be binding upon ANSPs and airports.

Common Projects will define, in total transparency, which capabilities and technologies are to be deployed and where, within an associated timeframe on which ANSP, airports and airspace users can commit. Whilst the manufacturing industry cannot be involved in the governance of SESAR deployment, they do have a role to support end users through information exchange. This will assist decision making to ensure global interoperability as well as to ensure that the most effective solutions are evaluated, independent of any vested interest.

The lack of coordination in the implementation of a data link infrastructure at EU level is one of the major failures of SES implementation today.

To successfully deploy SESAR, the regulations and implementation rules established by the EU will have to ensure that the governance mechanisms are driven by the SES high-level goals.

Harmonization between SESAR and NextGen will have to be guaranteed through fully interoperable systems. Airspace users and industry suppliers will have to be fully engaged in this harmonization process through constant exchanges between the key stakeholders of the two programs.

Proposed Common Projects will have to demonstrate early benefits and the process will have to be fully transparent and driven by airspace users' expectations. The review of the deployment program should include geographical and technical analysis of the present European ATM performance deficiencies and the options for improvement.

The consultation processes for the deployment of SESAR will also have to be reinforced. A high-level body similar to the NextGen Advisory Committee (NAC) will have to be established.

Funding and incentives mechanisms

It is absolutely necessary that the proposed budget for the period 2014 to 2020 is confirmed so that a funding mechanism can be built that is able to provide efficient support and incentives to the SES implementation. Governance rules must ensure that the use of this fund provides a real incentive to SES implementation. The requested €3 billion community funding is the minimum contribution acknowledging the estimated €30 billion total investment cost.

The airspace user community is the seminal investor in funding the ATM supply chain. It is therefore necessary to direct community funding specifically to support these stakeholders in their role as the principal investor of SESAR deployment in an efficient manner.

In order that community funding support is managed in a transparent, efficient and fair manner whilst driving a timely and synchronized SESAR deployment, it is considered that a mechanism to off-set user charges is essential.

This approach will support the airspace users to fund directly and indirectly the estimated €23 billion they will contribute to deliver SESAR (estimated €30 billion total cost less the estimate €7 billion military costs).

It will be important that transparency of planned service provider capital expenditure is adequate to ensure that there is no duplication or reallocation of cost.

The timing of allocation of community funding will be important. The community funding needs to be aligned with the critical period of SESAR deployment from 2014-2019 to ensure that Europe has in place the essential capabilities on which subsequent conceptual changes to ATM are anticipated and on which substantial benefits are expected.

This will also align with the performance scheme second reference period and thus ensure distribution of funds can be clearly linked to not only technology/infrastructure investment, but performance outcomes. Additionally, European Union financing mechanisms must de-risk the investments required by airspace users through repayment terms linked to benefit realization.

Human factors

The new, sophisticated tools necessitate an upgrade of skills for the traditional role of air traffic controllers as they become air traffic managers. This evolution, much like the transition pilots experienced with modern airliners, supports a system requiring no increase in ATC staffing levels beyond today. The new technologies require a broadening of skills from the technical workforce as they will have to manage new and more automated systems in larger air traffic control centers.

An effective on-going social dialogue must be developed to assist the transition process. If staff are not fully engaged in this transition, the risk to a successful outcome will be significantly increased.

Modernizing: Key Benefits

Modernization will facilitate the safe growth of air transport in Europe, whilst also improving flight efficiency, reducing emissions with the best possible use of aircraft capabilities.

The 2010 U.S./Europe comparison of ATM related operational performance[17] has shown that the estimated total benefit pool actionable by a better air navigation service provision is a reduction of approximately 300kg of fuel burn per flight. This translates into a potential fuel saving of 3 million tonnes per annum for 10 million flights with an average reduction in flight time of 10 minutes per flight.

The deployment of technologies that offer improved trajectory options and better manage demand and capacity so that arrival holding and sequencing is eliminated are anticipated with a yearly cost saving of €1 billion when fully implemented and a 3 million tonnes reduction in CO_2 emissions.

Improved and more integrated management of operations at airports will also be delivered and should eliminate most of the taxi out costs representing today a €0.8 billion annual cost saving, and most of the airports delays, representing today a €0.5 billion annual cost saving.

Whilst implementation of the full 4D trajectory, continuous descent and climb procedures, use of efficient taxi technologies and procedures, better flight profiles and more optimized speed adjustments allowed by business trajectory management should also result in a yearly cost saving of €1 billion and a 3 million tonnes reduction in CO_2 emissions.

The modernization of the European ATM systems will deliver a 300kg fuel saving per flight, resulting in €6 billion of cost savings, and 12 million tonnes reduction in CO_2 emissions when air traffic is forecasted to grow to 20 million flights annually, with an average reduction of flight time of 10 minutes.

Immediate Term

Taxi out reduction: €0.8 billion cost savings per annum

Airports delay reduction: €0.5 billion cost savings per annum

- Surface Management systems
- CDM processes on airports

Interim Term

€1 billion cost savings per annum

3 million tonnes CO_2 savings per annum

- Extended AMAN
- PBN
- Merging procedures
- i4D trajectory

End-State

€1 billion cost savings per annum

3 million tonnes CO_2 savings per annum

- Full 4D trajectory
- Continuous descent and climb procedures
- Efficient taxi technologies and procedures
- Better flight profiles
- Optimized speed adjustments

Total Savings

Total annual cost savings €3.3 billion, and 6 million tonnes of CO_2 savings for 10 million flights

€5.3 billion of cost savings, 10min reduction of flight time, and 12 million tonnes of CO_2 savings for 20 million flights

[17] 2010 US/Europe comparison of ATM related Operational Performance commissioned by Eurocontrol and the FAA

7. CONCLUSION

The Single European Sky initiative is expected to make significant contribution to the European economy and community. Through managing the increased demand for air transport in a safe, efficient and sustainable manner, the SES will prove a vital enabler to the competitive advantage of European commerce as well as connecting the citizens of Europe with the world.

To realize this contribution, the SES has established goals for safety, environment, capacity and cost-effectiveness to be achieved by 2020.

The realization of these goals requires commitment by the European Parliament, European Commission, member states and institutions to make material change to the way in which Air Traffic Management is organized and operated.

A new ATM environment can be implemented; improving quality of service whilst accommodating growing demand, enabling fuel and time savings, resulting in better environmental outcomes, fewer delays, fewer cancelled flights, and overall increased European air transport efficiency.

Three key reforms are required to implement the new ATM environment:

- The creation of a binding performance system,
- The rationalization of air traffic institutional structures and
- The modernization of ATM systems.

The benefits of a strong, independent European-wide performance framework are clearly evidenced from other industry sectors. Evolution to an environment where behaviors to deliver on ambitious but realistic targets are fostered and with reasonable and meaningful financial penalties for non-compliance enforced is essential for the SES. The establishment of an independent economic regulator will be necessary to achieve this.

The comparison with the US shows that the objective of safely managing a doubling of air traffic with the same number of air traffic controllers and a reduced number of support professionals can be achieved through the rationalization and modernization of the European ATM supply chain, including the opening up of support services.

Such rationalization, includes the rationalization of ACCs from 63 to not more than 40 and a reduction in the ratio of support staff from 2.4 to 1.6.

Modernization of European ATM infrastructure must not be undertaken in isolation, but rather will need to be aligned with both the rationalization process and the binding performance system in order to realize the needed performance improvements.

These reforms will ensure the competitiveness, adaptability and mobility of air transport professionals and this, in turn, will improve productivity and drive job creation and sustainable growth in real wages.

To achieve this, a strong social dialogue is needed to find the right settings between the varying interests and to understand that a safe, modern and efficient European air transport industry is a unified single sky.

The Single European Sky is too important to the European economy and its citizens to be allowed to fail. The benefits are clear. The opportunities there to be taken. The reforms are understood. The political commitment to see these challenges though to realization is now the critical element needed to assure success.

SUMMARY OF THE KEY REFORM MEASURES REQUIRED

Reform Measure	Reform Detail
Performance	Implementation of an independent European economic regulator: ▪ Setting EU targets to be achieved by each state or FAB. ▪ Controlling the conformity of the performance plans with these targets. ▪ Requiring appropriate corrective measures or penalties when necessary. ▪ Linking the rate of return on the investments made by the ANSP and equity of their shareholders, to the achievements of the Performance Scheme. ▪ Taking into account airspace users concerns through consultation mechanisms.
	Implementation of binding mechanisms betweens states or FABs and the air navigation services providers allowing the targets set to be cascaded through the whole ATM supply chain with contracts issued on a limited and regularly-reviewed term according to the performance objectives.
	Clarification of the role of EASA: ▪ Safety accountability across the entire air transport supply chain ▪ Supervising all licensing and certification activities
Rationalization	A Network Manager empowered with new responsibilities and functions: ▪ As architect of the ATM network in Europe ▪ To develop a clear strategic view of the network improvements ▪ To define and supervise all the centralized functions
	A regrouping of en route air navigation service provision at FAB level: ▪ Base on a centralisation of operational management, training, procurement and ”backroom” support functions ▪ Ensuring a reduction of the number of ATC centers from 63 to not more than 40 ▪ Ensuring a reduction of the ratio of ATCOs to other professionals from 1 to 2.4 to 1 to 1.6 ▪ Supported by a development of career path options for ATCOs and technical workforce, an active involvement in the transformation program and the development of common standards to address redundancy, relocation and staff performance
	A new ATM infrastructure based on fully standardized and interoperable systems ▪ Defined at EU level ▪ Implemented through tenders issued at EU level or FAB level A rationalization at FAB level using periodic tender process for the CNS, MET, AIS services fostering providers delivering services beyond borders with a better cost efficiency and the support of highly qualified industries.
Modernization	Implementation of a governance and consultation mechanisms for SESAR deployment allowing airspace users to have a key role in the modernization process.
	Deployment packages based on a consolidated business case endorsed by airspace users aligned with both rationalization and performance needs.
	Priority given to changes that can be implemented in the immediate term with quick benefits for the airspace users.
	A €3 billion funding from EU for the period 2014 to 2020 to provide efficient support and incentives to the SES implementation.
	Implementation of MCBS principle to accelerate changes and allow a appropriate return on investment for airspace users

SUMMARY OF THE NEW ATM ENVIRONMENT BENEFITS

	Safety	Capacity	Cost-Effectiveness	Environment
	x10	**X2 or 3 where needed***	**50% reduction**	**10% reduction**
ATM supply chain rationalization	Safety improvement is the first objective of SES implementation. This will be delivered by the continuous effort of the ATM supply chain to improve the reliability of systems, to maintain a high standard of qualification of staff, to fully integrate human factors in the development and implementation of new technologies. Reinforcement of regulation and controls through EASA will also contribute to this safety enhancement. The new technologies will increase the reliability of data exchange, facilitate situational awareness of pilots and controllers and thereby enhance safety related decision making. Better predictability of traffic combined with enhanced conflict detection and resolution systems will allow the safe management of 20 million flights per year across European airspace.	Rationalization of the airspace design and regrouping of en route air navigation services at FAB level will allow a progressive 20% increase of capacity in the immediate/interim term. Most of the en route delays will be absorbed representing a €1 billion annual cost saving in the immediate/ interim term.	Regrouping of En route air navigation services will allow a 10% cost saving (€0.7 billion annually) in the immediate term. Reduction of the number of ATCC and better organization of CNS, AIM, MET services should deliver additional cost savings resulting in a 20% reduction of unit costs in interim term.	Generalisation of free routing in upper airspace allowing more direct routes will allow a 50% reduction of the route extensions in the immediate/interim term. It will result in an annual €1 billion cost saving and a 3 million tonnes reduction in CO_2 emissions.
		Annual cost savings Immediate/Interim term: €1 billion End State: €1 billion	**Annual cost savings Immediate/Interim term: €0.7 billion End State: €0.7 billion**	**Annual cost savings Immediate/Interim term:€1 billion End State: €2 billion**
ATM supply chain modernization		Development of new technologies and operational concepts ensuring a true gate-to-gate approach will allow an 80% increase of capacity of the ATM system where and when required through data link communication systems, enhanced conflict detection and resolution systems, etc. Implementation of surface management systems associated to other CDM processes on airports will absorb most of the taxi out costs in the immediate and interim term representing a €0.8 billion annual cost saving, and most of the airports delays, representing a €0.5 billion annual cost saving.	New technologies, such as data link system for communications, better predictability of the traffic with time based operations, enhanced conflict detection and resolution systems with trajectory based management, etc. will allow a 30% additional reduction in unit cost of the ATM system at the end state as the same number of Air Traffic Controllers will be able to handle safely a doubling of traffic.	Extended AMAN combined with PBN, merging procedures and trajectory management will progressively eliminate arrival holding and sequencing costs with a yearly cost saving of €1 billion and a 3 million tonnes reduction in CO_2 emissions for 10 million flights. Implementation of the full 4D trajectory, continuous descent and climb procedures, use of efficient taxi technologies and procedures, better flight profiles and speed adjustments allowed by business trajectory management will allow additional yearly cost saving of €1 billion and a 3 million tonnes reduction in CO_2 emissions for 10 millions flights.
		Annual cost savings Immediate/Interim term: €1.3 billion End State: €1.3 billion	**Reduction of the unit cost by 30%**	**Annual cost savings Immediate/Interim term: €2 billion End State: €4 billion**


IATA


AEA
Association of
European Airlines


era
european regions airline association