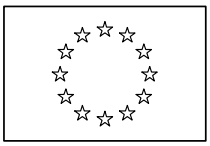

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COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Single European Sky II: towards more sustainable and better performing aviation

{SEC(2008) 2082}

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1. INTRODUCTION

The massive increase in demand for air transport is **straining the capacity** of infrastructure: 28 000 daily flights by 4 700 commercial aircraft are pushing airports and air traffic management (ATM) to their limits. The **fragmentation** of air traffic management hinders optimal capacity use and imposes an unnecessary financial burden on aviation. **Safety** requirements have to be improved in parallel with the increase in traffic. Increasing environmental awareness is also putting pressure on aviation to demonstrate its **environmental performance**.

To tackle these issues, the Commission has come up with a package of proposals.

Firstly, the existing **Single Sky legislation** needs to be sharpened to deal with performance and environmental challenges. Secondly, the **SESAR** (Single European Sky ATM Research) programme is to provide the future technology. Thirdly, the competence of the **European Aviation Safety Agency** (EASA) is to be extended to aerodromes, air traffic management and air navigation services. Fourthly, the '**action plan for airport capacity, efficiency and safety**' needs to be implemented.

2. SINGLE EUROPEAN SKY I: A BASIS FOR CHANGE[1]

The adoption of the Single European Sky legislation in 2004 (SES I) brought air traffic management under the common transport policy. However, a truly 'single' sky was not yet achieved.

2.1. SES achievements

The 'Community method' (the standard EU decision-making procedure) has already delivered its first results. An institutional framework, embracing the Single Sky Committee, the Industry Consultation Body, social dialogue[2] and Eurocontrol[3], has been set up and has been instrumental in establishing rules.

The Single Sky has strengthened safety. Member States have begun separating oversight from service provision. The safety know-how embodied in the Eurocontrol Safety Regulatory Requirements has become Community law. Since 20 June 2007, air navigation service provision has been subject to certification. Competence standards for air traffic controllers were set to ensure safe services and to allow a more flexible management of resources, also across national borders.

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1 COM(2007) 845, 20.12.2007.

2 The Sectoral Social Dialogue Committee on Civil Aviation, established on basis of Commission Decision 98/500/EC of 20 May 1998, extended to ATM.

3 The European Community became a member of the Eurocontrol Organisation under Council Decision 11053/2 Aviation 121 of 17.7.2002.

Sound accounting standards and the adoption of the charging regulation represent the first steps towards economic efficiency[4].

Meanwhile, measures have been taken to speed up technological innovation. Going beyond interoperability rules, the SESAR project was launched as the technological and industrial component of the Single European Sky. The project is organised in three phases. The definition phase (2004-2008 — € 60m) has delivered the 'SESAR Master Plan' for introducing the future air traffic management system. The next phase is the research and development of the system, managed by the SESAR Joint Undertaking (2008-2016 — € 2100m). Deployment will follow from 2013.

2.2. Yet another leap to take

The Single European Sky has not delivered the expected results in important areas. The process of integration within functional airspace blocks, regardless of national borders, has encountered numerous hurdles, in particular political and economic obstacles. Air traffic control, mistakenly, is identified with sovereignty: the Member States' responsibility (and associated liability) for their airspaces and the involvement of the military. Though the complexity of this argument is recognised, instead of prompting innovative solutions for exercising sovereignty, it has been used to block cross-border integration.

Member States have not taken steps to **improve cost-efficiency**. Hardly any progress is evident in the overall efficiency of the design and use of the European air **network**.

3. CHALLENGES FOR AVIATION

A lot has happened since the launch of Single Sky in 2000. Enlargement policy, together with an active neighbourhood policy, has extended the European aviation market to 37 countries with more than 500 million citizens[5]. The expanding single aviation market is turning the EU into a global player. Since July 2002, the European Aviation Safety Agency (EASA) has been in charge of ensuring a high and uniform level of safety. Additionally, global warming is raising environmental concerns.

3.1. Sustainability of aviation

Present science points to human activity as the main source of climate change. Aircraft have a noise and emission impact. Aviation currently accounts for about 3% of all CO_2 emissions in Europe, but it grows very quickly.

To complement the Community Emissions Trading Scheme and research efforts[6], air traffic management must also contribute to sustainable aviation. Aircraft should be able to follow the shortest routes with optimised flight profiles[7].

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4 Commission Regulation (EC) No 1794/2006 of 6 December 2006 laying down a common charging scheme for air navigation services (OJ L 341, 7.12.2006).

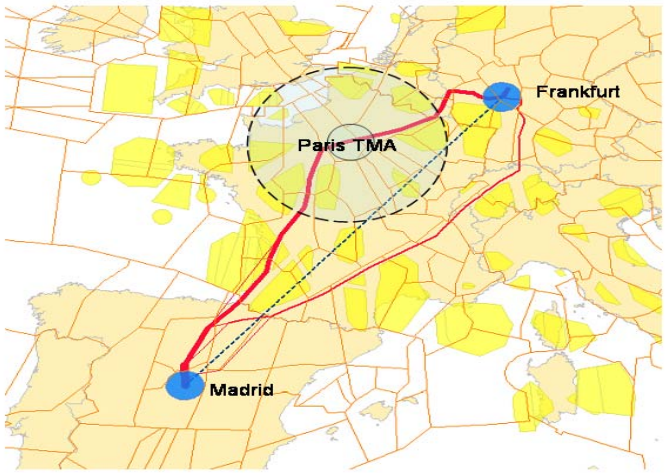
5 Several neighbouring states have decided to enter the European Common Aviation Area to gain a stimulus for growth and employment.

6 Including the Clean Sky Joint Technology Initiative

7 At high altitudes engines perform better and airframes have less air resistance (drag).

Graph 1: The need for shorter routes

A patchwork of national routes: Aircraft do not fly 'as the crow flies'.



Shorter routes will save nearly 5 million tonnes of CO_2 per year. On average, aircraft fly 49 km longer than strictly necessary due to airspace fragmentation. 63% of route inefficiencies can be resolved within country boundaries. However, Member States are reluctant to tackle airspace fragmentation. Routes determine income flows for air navigation service providers[8]. Member States have to allocate exercise areas to the military, but historically remote areas have evolved into areas with the densest traffic. The current process is not robust enough to improve network design.

Traffic management in the vicinity of airports suffers from the 'first come, first served' rule and the inconsistency between airport and air traffic management operations. Airport slots[9] are allocated independently from flight plans[10]. The lack of a holistic network approach leads to unnecessary noise and emissions.

All in all, improving both air traffic management and airport operations could reduce emissions by some 7 to 12% for the average flight, or 16m tonnes of CO_2 per year.

Table 1: Savings in time (minutes) and fuel (kg) from improved flight operations

	Time	Fuel	Fuel as % of average flight
Shorter routes	4 min	150 kg	3.7%
Improved flight profile	0.0min	23 kg	0.6%
Better approach procedures	2 – 5 min	100-250 kg	2.5 – 6%
Improved aerodrome operations	1 – 3 min	13 – 40 kg	0.3 – 0.9%
Total savings on a flight	8 – 14 min	300 – 500 kg[11]	**7 – 11%**
Average intra-EU flight	96 min	3 000 kg	100%

Source: Performance Review Report, 2007, p. 58.

8 Aircraft operators are charged on the basis of the distance flown through national airspace (multiplied by a factor for weight) according to the last filed flight plan.

9 A slot is the time that an aircraft is allowed to use a runway or the airspace.

10 Each pilot has to file a 'flight plan' before taking off. The number of flight plans indicates the demand for air navigation services.

11 One litre of fuel translates into 3.15 kg CO_2 emissions.

3.2. Performance of air navigation service provision

The current self-regulatory regime leads to a performance patchwork. In general, the good performance of some actors is outweighed by the poor performance of others.

3.2.1. Safety

Safety can never be taken for granted. Europe can boast an excellent safety record, but safety processes vary widely among Member States and safe management of traffic and of services to air navigation must improve and find a common set of rules developed by a single authority and uniformly implemented obligatorily by all. For aerodromes, ICAO rules exist, but do not yield the required level playing field. In general, the aviation sector lacks a consistent safety approach. This also impairs effective safety oversight. All in all, despite the good safety record, there is a need to increase safety levels in parallel with increasing traffic.

3.2.2. Flight efficiency

The current European route network still is an amalgamation of national routes. The design of routes is in many cases the product of historical national considerations. Routes for intra-European flights are some 15% less efficient than domestic flight routes. In addition, the route network is not always well aligned with European traffic. The shortest available routes are underused due to the lack of precise, real-time information[12].

Airspace is a scarce resource, which has to satisfy the requirements of both civil and military airspace users. Its efficient use depends on how all flight phases, including appropriate planning and preparation, are integrated within seamless air and ground operations and on how new users such as unmanned aerial vehicles or very light jets are served.

Aircraft should thus use shorter and better routes to improve the sustainability of aviation.

3.2.3. Capacity/delays

The dramatic delays in 1999 were the direct occasion for launching the Single Sky. The situation has since recovered following the traffic downturns caused by September 11 and SARS, but delays have been steadily mounting again in recent years: capacity is not keeping pace with increasing demand. Delays carry a heavy cost for operators, the flying public and the economy as a whole[13].

Delays signal a lack of capacity or its inefficient use. The provision of capacity requires a long-term strategy with effective planning and commitment to timely and complete implementation. Such a strategy should consider all causes of delays, including flow management, control capacity or airport scheduling. In addition, there should be a capacity to intervene to resolve choke points causing ripple effects throughout the network.

3.2.4. Cost-efficiency

Air traffic control is a service of general interest provided by a **natural monopoly**. While competition in aviation has reduced costs and led to more affordable ticket prices, the relative cost of air traffic control has been growing. Air traffic control currently accounts for 8 to 12%

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[12] Performance Review Commission, 2007, An Assessment of Air Traffic Management in Europe during the Calendar Year 2006, Eurocontrol, Brussels, p. 51 *et seq*.

[13] Longer delays have particularly disruptive effects: the two percent of cancelled flights account for 2/3 of total delays. In 2007, delays amounted to 21.5m minutes at a cost of € 1 300m.

of the ticket price. While Community law allows Member States to use incentives to improve cost-efficiency, none has done so since 2004[14].

While some service providers are becoming more oriented towards cost-efficiency, there is much scope for improvement. Fixed costs, mostly support costs, should benefit from economies of scale. Above all, the productivity of air traffic controllers should improve[15].

Indeed, despite its technical nature, air traffic control remains craftsmanship. Controllers and pilots still use voice communication by radio. While cockpits have become automated, controllers have not fundamentally altered their working methods. Increases in traffic are met by a proportional increase in equipment and staffing and hence cost: capacity is mainly increased by opening new 'sectors' managed by two controllers.

Within the constraints under which ATM has operated until now, there have been also performance improvements thanks in particular to the contribution of air traffic controllers and staff.

3.3. Fragmentation

The American air traffic control system manages double the number of flights for a similar budget from some 20 control centres. Fragmentation in the European system is the result of a **history** where air traffic control has been closely associated with sovereignty and hence confined within national borders.

Fragmentation has several consequences: many of the 60 or so area control centres in Europe are below the optimal economic size; duplication of systems persists through unsynchronised adoption of technological change and piecemeal procurement, leading to high maintenance and contingency costs for equipment that is not interoperable; the costs of research, training and administration are disproportionately high. Fragmentation costs **€ 1bn** every year.

4. CALL FOR ACTION: EUROPE MUST DELIVER A SEAMLESS SKY

Airspace users and passengers pay **an unnecessary cost** for inefficiencies in the aviation chain, in time, fuel burn and money. SES I prompted the industry into action, but Member States have not sufficiently used the instruments provided to improve performance: designation of service providers, use of economic incentives, opening up to the market, changes in route structure, establishment of functional airspace blocks, etc.[16]. That is why the Performance Review Commission calls for **quantified targets**.

The High Level Group on the future aviation regulatory framework[17] calls for consistent use of the '**Community method**', with decisions taken at European level by qualified majority voting, while leaving implementation to a strong partnership between the Member States and the Community.

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[14] UK has a price cap system on en-route services and operates air traffic control in airports on a market basis. Germany has recently introduced competition in air traffic control at some regional airports. Some other states intend to take similar measures.

[15] The Performance Review Commission calculated a productivity of 0.71 composite flight hours per air traffic controller hour in 2005. This means that a controller has only 0.7 planes to monitor at any given moment in time, with the best performing at 1.65 and the least performing at 0.35.

[16] Performance Review Commission, Eurocontrol, 2006, *Evaluation of the Impact of the Single European Sky initiative on air traffic management performance*, Brussels, p. iii. – independent evaluation at the request of the European Commission.

[17] High Level Group on the Future Aviation Regulatory Framework, 2007, '*A framework for driving performance improvement*', Brussels, 47 p.

In order to make the European sky safer and more sustainable, the Commission has put forward a package of proposals. The four SES regulations need to be amended to introduce a **performance framework** with quantified target setting. The extension of EASA competences to cover all links in the aviation safety chain will improve **safety**. The endorsement of the ATM Master Plan will speed up **technological** innovation. The airport action plan will tackle **capacity** in the air and on the ground.

The success of these proposals depends to great extent on the intense **involvement** of stakeholders, in particular the military and staff. A common transport policy for air traffic management is based on a civil system, in which Member States have to integrate the interests of defence. This requires close involvement of the **military** in the institutional framework. The Single Sky Committee with adequate military participation will assume a strategic role here.

The quality of air navigation services depends on the **competence** of personnel. A 'just culture' is the basis for safety policy. All stakeholders in the reporting chain need to contribute to this just culture. In more general terms, the air traffic industry will undergo structural change. This evolution must be adequately managed. That is why the **social dimension** should be further promoted to ensure staff involvement.

5. FIRST PILLAR: REGULATING PERFORMANCE

Building upon SES I, the proposals here strengthen existing instruments and provide a regulatory framework. The first measure introduces a system of **performance regulation** through the setting of targets. The second accelerates initiatives to integrate service provision within **functional airspace blocks** as a way of reaching performance targets. Thirdly, strengthening **the network management function** will directly contribute to improving the overall performance of the network.

5.1. Driving the performance of the ATM system

An independent **performance review body** monitors and assesses the performance of the system. It develops indicators for the various performance areas and proposes Community-wide targets (delay, cost reduction, shortening of routes). Stakeholders will be able to provide input on the framing and selection of indicators to increase general acceptance. The National Supervisory authorities are also encouraged to comment, possibly forming a common representative meeting to exchange views.

The **Commission approves** the performance targets and passes them on to the national supervisory authorities. These organise wide consultations, notably with airspace users, to agree on proposals for national/regional targets consistent with the network-wide targets.

The agreed targets are **binding**. Route charges paid to air navigation service providers[18] will be used as incentives to ensure the credibility of performance regulation.

5.2. Facilitating the integration of service provision

The challenge is to turn the wide range of current initiatives for functional airspace blocks into genuine **instruments of regional integration** to achieve performance targets. For the

[18] Commission Regulation (EC) No 1794/2006 of 6 December 2006 on laying down a common charging scheme for air navigation services.

time being, the Commission is sticking to the 'bottom-up' approach to establish functional airspace blocks[19].

The Commission will support current initiatives to set up functional airspace blocks by:

- Setting firm deadlines for implementation (at latest by end 2012);
- Extending the scope to lower airspace up to the airport;
- Clearing national legal and institutional obstacles.

5.3. Strengthening the network management function

Network management function helps service providers and users find optimal gate-to-gate solutions from a European network perspective complementing performance regulation. It comprises a range of tasks exercised by different actors including:

- European Route Network Design: Ensure that local design solutions are consistent with European network efficiency requirements within a multi-modal policy and that airspace users can fly optimal trajectories;
- Management of Scarce Resources: Optimise the use of scarce resources through a centralised inventory of these resources, with a view to overcoming sometimes conflicting local solutions;
- Traffic Flow Management, slot coordination and allocation: slots are allocated as a function of the 'required time of arrival' to ensure predictability;
- Management of the deployment of SESAR technologies and the procurement of European-wide infrastructure elements: ensuring consistent and synchronised availability of suitable equipment and management of information networks[20].

The modalities for executing these functions will be developed in implementing rules, guaranteeing public interest impartiality and ensuring appropriate industry involvement. Network management should also provide for global interoperability and cooperation with neighbouring countries.

6. SECOND PILLAR: A SINGLE SAFETY FRAMEWORK

Continuous growth of air traffic in Europe, induced capacity limitations, congestions of air space and of aerodromes, as well as the progressive use of new technologies all call for a common European approach for a harmonised development of safety regulations and their effective implementation to maintain or even improve the safety level of this industrial activity.

However, differences in application of and compliance with non-binding aviation safety rules throughout the Member States lead to diverging processes and different level of safety standards.

Europe has already decided in 2002 that the adequate answer to those safety challenges had to rest in the establishment of one single European safety entity, known as the European Aviation Safety Agency (EASA).

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[19] Article 5(4) of Regulation (EC) No 551/2004 on the organisation and use of the airspace in the Single European Sky of 10 March 2004 (OJ L 96, 31.3.2004, p. 20).

[20] In line with System Wide Information Management.

Its competences have progressively developed since then to cover the fields of airworthiness of aircraft, aircraft operation and air crew licensing. Responsibilities for related inspection mechanisms to check compliance by Member States and their undertakings enhance this scope of competence.

Following this approach the Commission proposes to extend the competence of the Agency to the remaining key safety fields of aerodromes and Air Traffic Management / Air Navigation Services. This pillar therefore provides the safety element of the Single European Sky endeavour.

7. THIRD PILLAR: OPENING THE DOOR TO NEW TECHNOLOGIES

The present air traffic control system is being pushed to its limits, working with obsolescent technologies and suffering from fragmentation. Europe must accelerate the development of its system to respond to the challenges and synchronise both airborne and ground deployments. SESAR is to increase safety levels by a factor of ten, capable of handling a threefold increase in traffic at half of today's cost per flight. The future operational concept represents a paradigm change, creating a form of collaborative information system for aviation operations. The **SESAR Master Plan**, part of this package, is based on the results of the definition phase (2004-2008) and triggers the development phase (2008-2013). On the basis of this Master Plan the Commission will prepare a proposal for a **European ATM Master plan**, to be endorsed by the Council as provided for in Article 1(2) of Council Regulation (EC) No 219/2007 establishing the SESAR Joint Undertaking.

7.1. A look to the future

Aviation operations are the end result of a complex series of interactions between aircraft operators (civil and military), airports, air navigation service providers, and regional and central flow management. The degree to which these actors are able to integrate information on their operations to increase predictability determines the performance of the network.

Predictability requires system-wide integration and the exchange of information on planned and real-time operations covering all phases of flights, from the moment that the engines are turned on until they are switched off again. The starting point for the organisation of flight operations is the required time of arrival.

The system calculates the optimal route to fly ('business trajectory') as a function of the required time of arrival at the airport. The trajectories are conceived as a continuum, covering all phases of flight, from flight planning, until unloading the plane at destination. The management of air operations and ground operations is hence integrated to avoid any waiting time. Operators will have an incentive to stick to planned operations: on-time operations get priority in order to reduce the sensitivity of the system to secondary delays.

Dynamic air traffic flow management adapts airspace structures to the density of traffic flows. It is embedded in a broader range of network management functions: ensuring an optimal design of route network; enabling the necessary flow of information between all links of the operational aviation chain; deciding on the use of relevant equipment and systems and organising procurement; and allocating scarce resources, such as airspace, runway slots, transponder codes and frequencies.

7.2. Towards the successful implementation of SESAR

The successful implementation of SESAR is a collective responsibility and demands the commitment of the whole aviation community. The development phase lays the foundation for the more advanced tools and technologies. The Joint Undertaking coordinates and

structures development, overcoming fragmentation in research efforts, also by screening ongoing projects for their SESAR relevance. Third countries may contribute to its activities.

The real added value of SESAR will come with implementation, when SESAR products, once validated at European level with support of some sort of co-ordination structure of supervisory authorities, are deployed in a coordinated and synchronised way through the Community legal framework. This will overcome fragmentation in equipment for both air navigation service providers and airspace users and speed up the pace of technological progress.

The deployment process will require solid governance structures, reflecting the nature of activities and balancing the interests of the aviation community. The Commission will come forward with a proposal for such a structure.

8. FOURTH PILLAR: MANAGING CAPACITY ON THE GROUND

The European Parliament[21] and the Council[22] have endorsed the **'action plan for airport capacity, efficiency and safety in Europe'**[23].

The necessary investments in airport capacity need to be made. To accommodate growing demand for air traffic, airport capacity needs to remain aligned with ATM capacity to preserve the overall efficiency of the network. The action plan therefore contains several measures to increase the output and optimise the planning of airport infrastructures, while at the same time raising safety and environmental standards.

8.1. Better use of existing infrastructures

New technologies, derived from SESAR, will increase the safety and efficiency of airport operations. In addition, the Commission will propose measures to ensure consistency between airport slots and flight plans.

8.2. Improved infrastructure planning

Economic and environmental constraints, together with long lead-times for new infrastructure, mean that priority should be given to optimising the use of existing capacities.

These measures will mean that land planning and long-term airport planning will be conducted simultaneously to take better account of **environmental** constraints. To this end, the Commission will propose separately strengthening the rules on noise in EU airports[24].

8.3. Promoting intermodality and improving access to airports

Congestion at airports and tighter security controls make high-speed trains increasingly competitive. However, airports could benefit from the rapidly developing high-speed railway network. Close coordination with planning for rail and road networks will ensure the design and construction of truly **complementary transport networks** at minimum cost.

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21 EP Resolution of 11.10.2007.

22 Council Conclusions of 2.10.2007.

23 COM(2006) 819, 24.1.2007.

24 Directive 2002/30/EC of 26 March 2002 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Community airports.

8.4. The Community Observatory on airports capacity

The Commission will set up an Observatory, composed of Member States, relevant authorities and stakeholders, to exchange and monitor data and information on airport capacity as a whole. This Observatory, which should start working by mid-2008, will be the appropriate forum for qualified parties to present and discuss their views. It will be in a position to arrive at balanced and consolidated opinions to **advise the Commission** on the development and implementation of Community airport capacity. The Observatory will also assist in network management tasks.

9. CONSEQUENCES FOR EUROCONTROL

The regulatory structure and the provision of some central network tasks for air traffic management remain subject to intergovernmental arrangements. However, an intergovernmental framework cannot produce a level playing field where aviation can thrive as rules cannot be enforced.

Eurocontrol currently contributes to some network management tasks. The internal reform of the organisation should align governance structures with the Single European Sky with a view to (i) complying with the requirements for network tasks; and (ii) reinforcing industry involvement in line with the common transport policy.

Assuming the reform is implemented, the Commission intends to enhance cooperation with Eurocontrol to implement its policies. A first step towards achieving this would be a framework agreement. This will take into account the pan-European nature of the organisation.

10. CONCLUSIONS: TOWARDS A TRULY SINGLE SKY BY 2012

European citizens are entitled to the best performing air transport system. A **Community framework** needs to replace the overlapping regulatory structures inherited from the past to cover all flight phases in the air transport **network**. It is time to prepare for the future.