Capacity, flight efficiency and emissions
The eternal triangle

Partnership for Performance
The Flight Efficiency Plan

Interview with FABEC Project Manager
“FABEC is all about believing that together, we can make it”
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Dear readers,

Global aviation is passing through an area of severe turbulence. Traffic and load factors are decreasing, while costs are going up and the outlook for the immediate term is not positive. The forecast for this year is a 5% decline in traffic across Europe affecting all sectors, including the low-cost and business aviation markets.

As a result, our industry is under increasing pressure to deliver safe and cost-efficient operations while taking proper account of aviation’s impact on the environment.

As the ATM scene has changed globally, at EUROCONTROL we have taken action on both the internal and external fronts to reflect the changes.

Internally, we are changing our own Organisation’s structure. While EUROCONTROL continues to be an intergovernmental Organisation, the governance on all matters relating to, or supporting service provision will increasingly come from industry, including air navigation service providers and airspace users. At the same time, we are playing our part in delivering efficiencies and reducing costs.

On the external front, we are fully committed to working with our partners in order to secure a long-term future for our industry and this cooperation is bringing tangible results and is very extensive.

The Flight Efficiency Plan we developed with IATA and CANSO last year, which is extensively covered in this edition of Skyway, is a very good example of this – and one that has already achieved estimated savings of some €5 million. Responding to the financial and economic crises which have cut the revenue needed to deliver the solutions being called for by the airspace users, the Plan addresses the capacity issue and flight efficiency in a more purposive way.

Another good example of this kind of cooperation is our joint working plan with ACI EUROPE. Within this framework, the two organisations will work on implementing collaborative ground processes, such as collaborative decision-making (CDM). This will allow for a more efficient and fully optimised use of existing airport facilities, which in turn will reduce fuel burn and emissions from aircraft both on the ground and in the air.

The prospect for the short term is not good for anyone, and it will not be easy for ATM. However, we have a unique opportunity to seize and to prepare ourselves for when traffic returns to normal growth patterns. I hope that you will see in EUROCONTROL a partnership organisation where we can come together to address some of the most pressing issues.

David McMillan,
Director General

Chers lecteurs,


Conséquence de cette conjoncture, nous subissons des pressions de plus en plus fortes afin que nous conduisions nos opérations de manière sûre et économiquement efficace, tout en tenant dûment compte des incidences du transport aérien sur l’environnement.

Consciente de l’évolution de la scène ATM au niveau mondial, l’Organisation EUROCONTROL a entrepris de répercuter ces changements sur les fronts intérieur et extérieur.

Sur le plan interne, nous procédons actuellement à une refonte de notre structure organisationnelle. EUROCONTROL restera certes une organisation intergouvernementele, mais la gouvernance sur toutes les questions liées à la fourniture des services, ou sous-tendant cette dernière, sera de plus en plus exercée par l’industrie, et notamment les prestataires de services de navigation aérienne et les usagers de l’espace aérien. Dans le même temps, nous veillons à faire notre part d’efforts en termes d’économies et de réductions de coûts.

Sur le plan externe, nous sommes résolument décidés à bâtir avec nos partenaires un avenir à long terme pour notre secteur d’activité. Cette coopération produit des résultats concrets et revêt une dimension considérable.

Le Plan d’efficacité des vols que nous avons mis au point l’an dernier en collaboration avec l’IATA et la CANSO, et dont il sera largement question dans le présent numéro de Skyway, constitue un bon exemple de cette coopération. Il a déjà permis de réaliser des économies estimées à quelque 5 millions d’euros. Adopté en réponse à la crise économique et financière qui a vu fondre les recettes nécessaires pour livrer les solutions attendues par les usagers de l’espace aérien, le Plan aborde la problématique de la capacité et de l’efficacité des vols selon une approche plus ciblée.

Un autre exemple de coopération est notre plan de travail commun avec l’ACI EUROPE. Dans ce contexte, les deux organisations vont œuvrer conjointement à la mise en place de processus coopératifs au sol, comme la prise de décision en collaboration ou CDM. Ces nouveaux processus permettront une exploitation plus efficace et entièrement optimisée des installations aéroportuaires existantes, qui se traduira par une diminution de la consommation de carburant et des émissions des aéronefs au sol et dans les airs.

Les perspectives à court terme ne sont pas bonnes pour personne, et l’ATM va être confrontée à une situation difficile. Toutefois, une occasion unique se présente, que nous devons saisir pour nous préparer au retour à la croissance normale du trafic. J’espère que vous saurez voir en l’Organisation EUROCONTROL un lieu de partenariat où nous pouvons, ensemble, nous attaquer à certaines des questions les plus urgentes.

David McMillan,
Directeur général
Capacity, flight efficiency and emissions
– the eternal triangle

The need to strike the right balance between performance in flight efficiency, emissions and capacity will remain a key challenge in the foreseeable future. European air traffic management has taken up the challenge.

Joe Sultana, Deputy Director Central Flow Management Unit, explains how.
Background

From the start, the primary task of air traffic control (ATC) has been safety, i.e. preventing collisions between aircraft in the air and on the ground. Eventually the phrase ‘expeditious flow of air traffic’ became part of the bible for all controllers (ICAO PANS DOC 4444).

In truth ATC training never really focused on what “expeditious” meant and controllers were left to devise their own tactical procedures, such as to clear aircraft direct to the furthest possible point in their sector or FIR.

As traffic levels grew and the first delays started to hit European ATM in the late 70s and early 80s, holding patterns were designed and aircraft holding inside the major TMAs became a common occurrence. Eventually flow control was introduced both for safety and to absorb delays at the departure airport.

With the traffic build-up in the 1990s and the increase in delays, flow control had to be combined with capacity-increasing measures. Capacity became the buzzword and all efforts of national and Agency experts were dedicated to increasing capacity and reducing delay. Some concepts such as Reduced Vertical Separation Minima (RVSM) had the benefit of increasing capacity and improving flight efficiency. Airspace redesign, making use of area navigation capabilities and flight level capping, had a significant positive impact on European capacity and delay reduction. Having the freedom to put routes anywhere has resulted in the design of routes which spread out the traffic for capacity reasons, with a somewhat negative effect on flight efficiency, increasing the overall route length and preventing aircraft from flying their preferred vertical flight profiles.

With the price of fuel below $40, the capacity side of the triangle dominated ATM operational improvement efforts. The network was optimised for increased capacity, delays went down to below the Provisional Council’s target, whilst ATC was mitigating for flight inefficiencies at a tactical level.

Aircraft operators reverted to looking at how to make profit for a change and started to ask for capacity without flight inefficiencies, i.e. they resisted the introduction of routes which were longer than the ones they replaced and complained about the capping of flights at uneconomical flight levels. Environmental concerns became something more than airport noise issues. EUROCONTROL activities to measure flight inefficiencies, emission mitigation projects such as Continuous Descent Approach (CDA) projects and a more collaborative approach with aircraft operators on flow measures, which substituted delays for longer routes, were a first response to meeting the airlines’ requests.
In reality, however, delays were still the principal performance indicator. The political and top management will to make it happen was not there. The triangle was heavily tilted towards the capacity vertex. The airlines’ operating cost equation was still dominated by the cost of delay. It took the growing green agenda in Europe in the early part of this decade to move emissions more into the political frame, with the European Commission becoming more vocal on emissions and ATM starting to take the issue more seriously. Airline associations recognised this change, reviewed their own operating procedures and asked ATM to do likewise. It was politically correct (fuel-efficient) to introduce CDAs on a trial basis, but still not at the expense of capacity.

Flight Efficiency Plan

Then, the price of fuel shot up, first closer and closer to $80-90, then past $100 and then way beyond to nearly $150. Airlines faced what they called the perfect storm – unaffordable operating costs and plunging markets. Suddenly carrying and burning the minimum amount of fuel became paramount. The parameters which influenced the fuel flight plan were updated every week and pilots were given strict instructions to stick to the optimised fuel flight plan. When asked “What is the priority: capacity or flight efficiency?” the answer was “survival”. Flight efficiency became the concern of airline CEOs and their associations. A global Flight Efficiency Plan was launched. EUROCONTROL worked with IATA and CANSO to develop the Flight Efficiency Plan for the European region.

This Plan has tipped the balance from awareness and acknowledgement of the problem to a concrete resolve to do something about it and has resulted in substantive changes to operational procedures at air navigation service provider and Agency level. Other articles in this edition of Skyway provide practical examples.

EUROCONTROL worked with IATA and CANSO to develop the Flight Efficiency Plan for the European region.

However, implementation of any change on any of the capacity, flight efficiency and mission mitigation measures will not be any easier in the coming months. Although the price of fuel is way below the highs of summer 2008, the general economic crisis has moved the damage from high fuel cost to lower revenue income. Falls in service providers’ reve nues due to declining traffic are starting to extend some of the deployment phases of a number of projects.

For aircraft operators the overriding objective will remain – operating costs need to be as low as possible for the foreseeable future. Environmental societal priorities are here to stay and may even become stronger. The low price of fuel reduces the financial incentives and cost element driver to address fuel. The phenomenon of aircraft operators choosing long routes with more emissions in order to avoid the more expensive overflying charges is clear to see. CO₂ trading will reverse this as it will have a significant impact on airline operations in the very near future.

The dilemma of the complex triangle will not go away whatever the economic situation. However, the fuel crisis has been a catalyst for lasting change – increasing ATM’s contribution to the industry’s financial and environmental sustainability, without impacting safety, will be on the agenda of ATM developments in the short term and SESAR.

The way forward

There is a way forward – a dynamic ATM system for Europe which can deliver a balanced performance improvement in capacity, flight efficiency and emissions according to the network, functional airspace blocks (FABs) and local performance targets derived from the Single European Sky.

In more practical terms, we will require:

- Dynamic airspace structures and ATFCM processes which can be adapted to favour any of the three drivers in turn;
- Clear political network-wide performance targets;
- Locally agreed performance priorities;
- A robust CDM process which defines the operational priorities for each day or parts thereof for different ATM service providers in the European airspace network;
- Processes to change airspace organisation and ATM procedures from one operational scenario to another in a safe and orderly manner;
- Performance monitoring and reporting mechanisms.

It will remain difficult to meet any one of the performance objectives without impacting the other two but there will be no alternative. It is a closed triangle, and will not be split open any time soon. The need to balance the performance triangle will stay with us for the foreseeable future. European ATM has taken up the challenge.
Air traffic management performance in Europe

Xavier Fron, Head of the Performance Review Unit, presents the performance of air traffic management in Europe and sheds light on the prospects for the future.

A performance-oriented approach

A performance-oriented approach in air traffic management, focusing on outcomes rather than means, was an important part of the ECAC Institutional Strategy adopted by Transport Ministers in 1997.

Such a performance-oriented approach is now firmly embedded in ICAO policies, and has been reinforced through the adoption of the second package of Single European Sky legislation (SES II).

A performance-oriented approach for a large and critical system brings improvements

...for a large and critical system

The European ATM system, consisting of 38 en-route air navigation service providers (ANSPs) ensures the safety of some 10 million IFR flights each year, with some 56,000 employees. En-route and terminal ATM services cost some €8,300 million in 2007.

Traffic growth slowed quite markedly in 2008 (0.1%, compared to 5.0% in 2007) and is expected to be in negative figures in 2009 (-5%). This downturn is caused, primarily, by the straitened economic circumstances being experienced worldwide.

...brings improvements

Acting on PRC recommendations, the Provisional Council of EUROCONTROL adopted the following targets in 2007:

- **Safety**: all national regulators and ANSPs providing en-route services should strive to reach the agreed minimum level of safety management and regulation maturity (70%) by end 2008.

- **Delay**: the European performance target for en-route ATFM delays remains set at 1 minute per flight for each summer period (May to October inclusive) until 2010.

- **Flight efficiency**: a reduction in the European average route extension per flight of two kilometres per year until 2010.

- **Environment**: achieving the flight-efficiency target would reduce carbon dioxide emissions in proportion.

- **Cost-effectiveness**: in principle, a reduction in the European average real unit cost of 3% per annum until 2010.

The aforementioned targets and observed performance are illustrated in the table on the following page.
The total en-route unit cost borne by airspace users for en-route (charges + delays + route extensions) decreased slowly from 2003 to 2007 and increased in 2008 (+1.9%).
Concerning safety, reported high-risk separation minima infringements and runway incursions have decreased, against a general rise in traffic and total incident reports. This appears to indicate a positive trend in ATM safety. However, the latest safety maturity survey (March 2008) showed that 13 States and 9 ANSPs did not reach the minimum acceptable maturity level of 70%. The target that all regulators and ANSPs should reach this minimum level by end 2008 remains a challenge.

The agreed target for en-route capacity and delays has not been met since 2006. Summer 2008 en-route ATFM delays increased for the fourth consecutive year and exceeded the agreed target by 90% (1.9 min./flight versus a target of 1 min./flight). 4.3% of flights were delayed more than 15 minutes due to en-route ATFM delays (3.3% in 2007).

While the majority of ACCs met or exceeded their ATC capacity plans, inadequate plans or the failure to deliver capacity as planned because of inadequate plans in a few ACCs (notably Warsaw, Copenhagen, Nicosia, Zagreb, Vienna, Rhein and Zurich) had a negative impact on the performance of the overall European network. This illustrates the need for a collective approach to performance management.

**Summer 2008 en-route ATFM delays increased for the fourth consecutive year and exceeded the agreed target by 90%.**

Although traffic is currently declining, it would be a short-sighted decision to cut back investment in future ATC capacity. Instead, States and ANSPs should continue to work to close existing capacity gaps where possible, in order to improve system flexibility, to optimise use of resources, and to prepare for traffic recovery.

Turning to flight efficiency, the target agreed in 2007 has not yet been met. Improvements in relative route extension (-0.2%) were masked by increasing average flight distance (+3% per year.). It is important for future initiatives to improve flight efficiency, while preserving safety and capacity, and to provide economic and environmental benefits.

As for cost-effectiveness, the real en-route unit cost decreased from 0.87 €/km to 0.76 €/km between 2003 and 2007, i.e. a reduction of -3.4% per year, which is in line with the PRC’s notional target (-3% per year. over the 2003-2008 period). This positive achievement is the result of a combination of robust traffic growth (+26%) and tighter cost management in the majority of States.

**...but relatively slowly**

Apart from safety, which must meet minimum agreed levels, performance in other key performance areas (KPAs) can be translated into monetary terms. The total ANS economic cost consists of direct costs in respect of ATC capacity provision (recovered through route and terminal charges) and indirect costs (delays, additional flight time and fuel burn due to non-optimum flight profiles), all of which are borne by airspace users in Europe.

The total ANS economic cost reflects trade-offs among the various KPAs, excluding safety. Transport Ministers agreed in 2000 that the economic objective should be to minimise the total economic cost of ANS.

As shown in the bottom part of the table, the significant improvements in cost-effectiveness have almost been cancelled out by increases in ATFM delays and route extension since 2004. The real unit economic cost went down at a slow rate of approximately -1% per annum until 2007, but increased by nearly 2% in 2008. This indicates the importance of managing the entire system performance and understanding trade-offs between KPAs.
Air traffic management performance in Europe

In the current straitened economic circumstances, this will require additional efforts by all stakeholders. Undoubtedly, reducing the unit cost for ATC capacity will be more challenging with lower traffic growth. This could be alleviated by greater efforts to improve flight efficiency and reduce ATFM delays.

...and must be reinforced

Both internal and external benchmarking analyses indicate that there is room for improvement in all performance indicators in the current system. Moreover, initiatives such as FABs and SESAR must contribute to further improvements in order to justify investment.

The current EUROCONTROL performance review and target-setting system has contributed to significant progress in ANS performance, but needs to be reinforced. SES II builds on the performance scheme contained in the SES I regulations adopted in 2004, and in addition:

- adds Community target-setting mechanisms at both European and local levels;
- defines a common framework for corrective measures, including alert mechanisms, incentives and compliance, to be applied by States when targets are not met;
- applies not only to ANS, but importantly to network functions;
- establishes an independent Performance Review Body (PRB) to assist the European Commission in implementing the performance scheme.

The provisions of SES II, when implemented, will undoubtedly further drive ATM performance in the European Union and associated States, with the potential to extend to all EUROCONTROL States by decision of its governing bodies.

The PRC is ready to play a full part in further development of the European ATM system.

In conclusion

Safety has to remain the number one priority in order to allow for future traffic growth and secure the confidence of travellers.

Given the network effects on the one hand and the principle of subsidiarity on the other hand, the performance regulation of ANS requires an effective mix of European and local initiatives.

The future challenge will be to apply SES regulations in such a way that behaviours of all parties are aligned to common performance objectives, so that ATM performance improves for the benefit of users, staff, ANSPs, States and the travelling public.

More information at www.eurocontrol.int/prc
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Delivering a Dynamic Management of the European Airspace Network (DMEAN) and the Flight Efficiency Plan
Improved design of airspace and TMA – key in delivering capacity

Ravzan Bucuroiu, Airspace Design Manager, reports on the ongoing and future work to address both capacity and flight-efficiency challenges at European ATM network level.

Introduction

Between 1999 and 2008, air navigation service providers, civil and military aviation authorities, airlines, airports and EUROCONTROL worked closely together to improve the performance of the European air traffic management (ATM) network. Between 1999 and 2008, while traffic grew 27%, the capacity of the network increased by 47% reducing total en-route ATFM delays by 66%. In parallel, routes flown were shortened by an average of approximately 5 km. Together these improvements generated 3.5 million tonnes of CO₂ savings per year. Currently, the European ATS route network is only 3.5% longer than the great-circle distances (for intra-European flights).

Major challenges ahead

The European Community’s Single European Sky (SES) legislation identifies, in Article 6.1 of the SES Airspace Regulation, the need for “route and sector design to ensure the safe, economically efficient and environmentally friendly use of airspace”.

To ensure a continuously improving performance, the EUROCONTROL Provisional Council adopted two important operational performance targets for the European ATM network:

- a flight efficiency target that requires a reduction in the European average route extension per flight of two kilometres per annum until 2010 with subsequent emissions reductions;
- a network average en-route delay target of 1 minute per flight for the summer season (May-October) till at least 2013.

Future challenges in terms of capacity, flight efficiency and environment are high. The current financial crisis, the traffic downturn, the evolution of oil prices and environmental pressure require accelerated action in the improvement of European airspace. The existing plans have the potential to respond to these challenges.

A consolidated work programme

In 1997, the EUROCONTROL Provisional Council approved the Airspace Action Plan and the Airspace Management Improvement Initiative that set concrete actions for the improvement of European airspace design and utilisation. In addition, EUROCONTROL developed a Terminal Airspace Improvement Initiative comprising a comprehensive toolbox of operational improvements.

During summer 2008, IATA, CANSO and EUROCONTROL agreed to work in an even closer partnership along with airlines, airports and air navigation service providers (ANSPs) to identify solutions and launch operational actions that will lead to fuel and emissions savings in the short term. This resulted in the development of a common Flight Efficiency Plan that was built on the solid foundations of current work undertaken by the air navigation...
service providers, States, airports and EUROCONTROL to improve European airspace design and network management and was in line with the common objective of a Single European Sky.

**A partnership approach**

At European ATM network level, all airspace design actions are consolidated through the work of the EUROCONTROL Airspace and Navigation Team (ANT) and its specialised Route Network Development Sub-Group (RNDSG). The RNDSG is the coordination forum for European rolling airspace design and development, planning and implementation of the improved European ATS route network, optimised civil and military airspace structures and ATC sectors. The RNDSG is a group through which civil and military experts representing 43 States and their ANSPs, eight international organisations, including airspace user organisations and EUROCONTROL work in partnership to constantly improve European airspace design and utilisation.

The ANT’s RNDSG develops agreed pan-European solutions demonstrating the commitment of the aviation industry to work together to address significant operational, economic and environmental challenges. The Director Operations of the European ANSPs are directly involved in monitoring the implementation of these European ATM network operational improvements through the EUROCONTROL Operations Coordination Group.

**A long-term vision**

The RNDSG developed a long-term vision of the European airspace structure called the Advanced Airspace Scheme (AAS) Route Network. The AAS Route Network is based on the AAS operational concept and the DMEAN operational concept and integrates airspace design, advanced airspace management/FUA and ATFCM.

The AAS Route Network constitutes a living roadmap for the European ATS Route Network (ARN) from which successive ARN versions and annual improvements will be derived, in close cooperation with States’ civil and military authorities, ANSPs and airspace users. The AAS Route Network takes a long-term view of the ECAC airspace structure (including updates coming from functional airspace block developments or from other local or sub-regional plans) incorporating elements that are expected to be gradually in place between 2010-2012/15 providing the foundation for future airspace concept developments within the context of SESAR.

The feasibility of creating an efficient pan-European ATS Route Network aligned with major flows and independent of national boundaries, as requested in the PRR 2006, was proven through the development of the AAS route network. The further development and gradual implementation of the AAS route network will represent a major step towards enhanced ATM capacity and improved flight efficiency.
A rolling process

The partnership approach put in place for the development and utilisation of the European airspace structure results in an annual set of airspace improvements that are consolidated in a three-year European ATS Route Network.

At this stage, the work devoted to the improvement of the European airspace structure and utilisation focuses on the following actions:

The gradual implementation of Version 6 of the European ATS Route Network, through a consistent set of annual airspace improvement packages, between 2008 and 2010:

- A consolidated set of more than 400 improvement packages representing more than 2,000 routes and 60 resectorisation projects will be implemented for the summer seasons in 2008-2010.
- As a result of these improvements, the European ATS route network will become only 3.35% longer than the great-circle distances (from TMA entry to TMA exit points).
- The map number 1 indicates the ATS route network expected to be in place at the end of the implementation of ARN Version 6 (Autumn 2010) together with the traffic load based on current traffic.

Improving flight efficiency for the most penalised city pairs in Europe:

As a priority objective, the current actions aimed at improving the top 50 city pairs with the total highest route extension (i.e. volume of traffic and route extension) will be accelerated. Solutions will be explored with the ANSPs to improve flight efficiency to the largest possible extent, without impacting safety and capacity. These solutions will be introduced between 2008 and 2010 and deployed through the annual set of improvements.

The map number 2 indicates the additional routes expected to be in place as a result of the flight efficiency improvements expected for the most penalised city pairs in terms of flight efficiency.
Implementation of additional CDRs\textsuperscript{2} for the main traffic flows:

Distinct action will be taken to ensure the implementation of additional CDRs through major military areas that will serve important traffic flows. This action will also take into consideration the findings related to the most penalised city pairs.

Ensuring support to the initial implementation of free route airspace in different parts of Europe:

Several States and ANSPs plan to introduce free route airspace in the short to medium term. From a European network airspace design perspective, this approach will be encouraged and the required support will be provided to accelerate implementation and to encourage other States to implement similar actions. These actions are already underway.

Efficient TMA design and utilisation:

The TMA Improvements Initiative, comprising a comprehensive toolbox of operational improvements, as requested by the airspace users and put forward by EUROCONTROL, will be used to ensure enhanced flight efficiency in TMAs. The toolbox is designed to improve flight efficiency, capacity and environmental performance through:

- new concepts for TMA design and support to individual TMA redesign projects;
- widespread application of Precision Area Navigation (P-RNAV);
- accelerated deployment of Continuous Descent Approach (CDA), without affecting capacity;
- ATC system support for advanced arrival management support (AMAN) tools;
- implementation of RNAV approaches in a commonly agreed manner and of common standards;
- harmonised implementation of alternatives to ILS precision approach and maintenance or improvement of runway throughput even in low-visibility conditions.

Significant capacity and flight-efficiency benefits

Improved airspace design and sectorisation solutions will be required in the coming years to address both capacity and flight-efficiency challenges. The work that is currently underway is a major contributor to future capacity increase. As a result of the combination between traffic growth and delay targets, the European ATM network will need a capacity increase of approximately 30% over the next five years. Airspace design is one of the major contributors to this capacity increase as its contributions to capacity growth over the next five years is estimated to be about 15%.

In terms of flight efficiency, on an yearly basis and as from the full implementation of ARN Version 6 in 2010, the results previously mentioned indicate that, between 2008 and 2010, flying distances will be reduced by approximately 12 million NM, representing the equivalent of 72,000 tonnes of fuel saved, or reduced emissions of 240,000 tonnes, or €60 million. This does not take into account the saving that could come from addressing the top 50 most penalising city pairs.

As for TMA design, EUROCONTROL figures show that if CDAs were to be implemented, at least 20% of European airports, annual savings to airlines would be approximately 120,000 tonnes of fuel, i.e. 400,000 tonnes CO\textsubscript{2} per year which equates to €100 million. Additional savings could be generated through the implementation of TMA airspace redesign projects. The resulting benefits cannot be estimated as they depend on local situations.

The existing plans have the potential to further improve the performance of the European ATM network, if fully implemented. In order to achieve this, there is a clear need for commitment from all partners to a cooperative approach to European network airspace design, implementation and management.

2. Conditional Routes
A balanced ATM performance: the civil-military view

Rob Peters, Head of the Civil-Military Central Management Functions Unit, takes a civil-military perspective to examine how various elements impact the performance of air traffic management (ATM).

As the title suggests, there are several elements which contribute to ATM performance; and all these need to be balanced, i.e. dovetailed in such a way that performance is enhanced and counterproductive effects minimised.

One of these ‘elements’ is the military. It is worthwhile remembering here that military operations are conducted in line with a national parliamentary decision. The military is one of the tools with which States can honour their national and international commitments.

At the same time, military aviation comprises the largest number and types of aircraft. Just like any airline, military airspace users therefore view ‘balanced performance’ from a network perspective, as a balance between all parties involved. The performance of the network is determined through collective performance output by all parties.

Military airspace users need to accomplish their mission most of the time within an integrated environment. In fact there is no such thing as civil or military aviation, civil or military airspace, civil or military performance. This integrated environment requires civil/military coordination and cooperation everywhere and at any given time.

Such coordination and cooperation takes place on three different levels (political, strategic and tactical/operational).

At political level, Ministers of Transport and Defence, as part of their national parliamentary aviation responsibilities, need to ensure that the national follow-up to international, mostly EU agreements, is coordinated in such a way as to enable operations of both civil and military airspace users.

At strategic level, the CEOs of both civil and military airspace user organisations need to ensure that consistent procedures for civil-military coordination, including the use of cross-border airspace, are in place, supported by appropriate infrastructure and staff training for these procedures to be applied safely and seamlessly. Collaborative decision-making is the buzzword here. Some air navigation service providers are co-located, i.e. military controllers work side by side with civil controllers, which eases the required cooperation and coordination.

A major challenge at political and strategic level is the establishment of functional airspace blocks (FABs). While they reduce fragmentation, their establishment is linked to a number of organisational, legal and financial issues that need to be agreed at the highest level. As might have been expected, the “2008 Evaluation of FAB Initiatives” made by the Performance Review Commission (PRC) has shown that “most significant progress has taken place where there was a strong involve-
Some air navigation service providers are co-located, i.e. military controllers work side by side with civil controllers, which eases the required cooperation and coordination.

At tactical level, real-time coordination between civil and military units should contribute to economic use of the shared resource. Another report commissioned by the PRC in 2007 on the evaluation of civil/military airspace use resulted in one key finding on real-time coordination: “Civil/military coordination for tactical ATC and ASM needs to be raised to best-practice levels, especially in European core area. Best practices include co-location/integration of civil and military ATC units, use of identical/highly interoperable civil and military systems.”

This PRC-commissioned report also recommended the definition of performance indicators, e.g. to measure airspace booking versus actual airspace use and, consequently, civil use of released airspace. The Directorate of Civil/Military ATM Coordination is in the process of drawing up a roadmap for key performance indicators and is, together with other EUROCONTROL units, developing a tool called PRISoMIL, which will quantify performance data and share them network-wide. This goes hand-in-hand with the development of another project, known as LARA (Local and Regional ASM Support Tool), which is intended to optimise airspace planning between civil and military users.

Inefficiencies in airspace organisation, airspace management and actual use of airspace will inevitably downgrade flight efficiency and thus the capacity of the network – with economic and ecological side effects: unnecessary fuel burn and unnecessary emissions. The optimisation of flight efficiency should therefore be seen as a collective effort. Airspace design, airspace planning, airspace management and airspace use are separate, but interlinked, ATM functions addressed by the flexible use of airspace (FUA) concept. The early days of FUA date back to 1992, when Europe was facing a mismatch between demand and capacity, much as it is now.

While FUA continues to be applied every day, its conceptual foundations have been reinforced by the airspace regulation of the Single European Sky initiative, which calls for a more integrated management of airspace, complemented by the development of new ATM concepts and procedures. Development issues will be addressed as part of SESAR, where EUROCONTROL is responsible for civil-military coordination on R&D aspects and, with the support of some high-level national military participation in the Administrative Board of the SESAR Joint Undertaking, tries to ensure that the SESAR work programme properly reflects the needs for civil-military interoperability plus the integration of the military mission trajectory in the overall SESAR concept of operations.

There is a saying: A mile of road takes you nowhere. A mile of runway takes you everywhere. Today’s aviation is characterised by an excess of demand for that mile of runway. This situation calls for a transparent approach, involving all partners.
Airport capacity enhancement in action

Gregory De Clercq, Airport ATS Expert and Manager of the Airport Capacity Enhancement Project, describes how this EUROCONTROL project is helping to reduce congestion at airports in the short and long term.

Although the financial turbulence in 2008/2009 had a drastic downgrading effect on European traffic demand, economic growth is forecast to resume in 2011, which will necessitate more flights in the medium term. The 2008 Challenges to Growth study confirmed that Europe continues to face an airport capacity crunch. The European aviation industry will have to resolve major challenges, one of the most important of which will be the availability of airport capacity.

The Challenges to Growth study forecasts that in the most likely scenario, by 2030 airport capacity will lag behind traffic demand by some 2.3 million IFR flights, equivalent to 11% of European traffic. Put differently, 170 million passengers will be affected and 19 airports will process 50% of all flights and will have to operate at full capacity eight hours a day, every day of the year. This would mean that the disruption of operations at these airports for any reason (weather, unforeseen events) will severely affect the functioning of the European air traffic network as a whole.

Although there have been significant improvements in airport capacity compared to four years ago (previous Challenges to Growth report), the capacity challenge is still an important issue, not least due to the uncertainty as to whether the planned capacity improvements will actually be delivered. In order for EUROCONTROL to work with stakeholders in managing airport capacity on a network-wide basis, the following elements need to be in place:
Dedicated database allowing airports to submit information on capacity issues via a secure connection (Community Observatory on Airport Capacity).

- Reduction in network delays.
- Greater flexibility allowing account to be taken of the nature of airport operations.

**Community Observatory on Airport Capacity**

The Community Observatory on Airport Capacity was established on 4 November 2008. This consultative body addresses airport capacity issues from a European perspective, looking in particular at ways of aligning airport capacity with ATM capacity so as to avoid delays and congestion. The Observatory will also advise on the implementation of the action plans for airport capacity, efficiency and safety in Europe.

Three working groups have been defined: Airport Capacity, Gate-to-Gate and Intermodality. EUROCONTROL will play an important role in this initiative by leading the Airport Capacity working group and by contributing to the two others.

In support of the Observatory’s mission, EUROCONTROL will bring its experience within a number of systematic and effective processes for air traffic management capacity planning at European level. The European Commission may wish to extend this exercise to produce a comprehensive inventory of European airport capacity.

Experience, exchange of data and best practice will be enhanced, and the Observatory is a key forum for establishing a pan-European vantage point and assisting in developing the measures to make optimum use of European airport capacity.

Providing additional runway capacity is a key determinant in any airport delay reduction process.

**Reduction in network delays**

The need to analyse, calculate and subsequently enhance airport/airside capacity in Europe is clear. Increased demand for airport slots will not be met and delays will continue to increase. Therefore a prime objective is to reduce the network level of delay. Nevertheless, reduction of airport delays should not be considered in isolation nor disassociated from airside capacity issues in general or the runway capacity enhancement process in particular. Providing additional runway capacity is a key determinant in any airport delay reduction process.

However, there is little point in enhancing capacity or efficiency without analysing the real reasons for the delays. In order to meet this requirement a structured initiative has been established including major activities such as the analysis of the reasons for delays, delay reduction action plans and Airside Capacity Enhancement and Capacity Planning (ACE) action plans.

**Airside Capacity Enhancement (ACE) methodology**

Existing airport infrastructure is often under-utilised as a result of the use of sub-optimum practices and procedures. The EUROCONTROL Airport Capacity Enhancement (ACE) project provides the means to release latent capacity through:

- accurate measurement of the performance of the airport operation;
- assessment of the capacity of the airport;
- enhancement of air traffic control, pilot and airport operator performance via the implementation of best practice techniques.

The underlying basis for the ACE methodology is the collection and analysis of operational data and information. Data is collected for arrivals and departures and includes runway occupancy times, pilot reaction times and measurement of actual separations. This observation data is merged with air traffic controller, airport and Central Flow Management Unit (CFMU) data to provide a complete profile of the airport. This process allows the potential capacity to be identified and released as part of the enhancement plans.
Airport capacity enhancement in action

EUROCONTROL’s analysis and modelling tool (PIATA+) is then used to validate the data and put it into a form that facilitates understanding of the results. As well as general results, specific analysis of detailed groups provides real insight. For example, runway occupancy time for arrivals can be shown as an average for all aircraft at the airport, but can also be shown for each airline and aircraft type for each runway and exit point.

The data is presented to air traffic controllers and pilots at individual “forums”. These forums provide the opportunity for participants to review each element of the airside operation and, in addition to enhancing an understanding of the airport operation, the review of data provides the opportunity to develop ideas for improving airport throughput.

After the individual forums, air traffic controllers and pilots come together at a joint forum where all issues are discussed and a set of recommendations is developed. Subsequent modelling can also provide an assessment of the potential benefits of the various recommendations.

The simple presentation of the airport operation in each of its various phases allows an objective assessment of performance and removes any barriers or perceptions that air traffic controllers and pilots may have prior to the forums. Many recommendations come from the improved communication between controllers (both tower and approach), pilots and the airport company, facilitated by a very strong culture of cooperation.

An awareness campaign is normally launched to highlight key issues and recommendations and to inform all airport users of the importance of airport capacity and efficient operations. About six months later, a second data collection is then carried out to review the benefits of any improvements and enhance the action plan if appropriate.

The ACE team consists of former airport air traffic controllers, pilots and airport operators together with capacity analysis experts with experience in evaluating and enhancing capacity at many airports. By working closely with some of Europe’s busiest and fastest growing airports, the ACE project has identified a number of best practices that are applicable for all airport stakeholders. These best practices underwent rigorous evaluation at trial airports and have subsequently been implemented at many others.

Capacity enablers under development

Airport capacity, which is a function of both runway and ground infrastructure, refers to the ability of an airport to handle a given volume of traffic demand within a specified time period. Another problem facing airports today is that of capacity reduction during periods of strong headwinds or crosswinds on the approach. It is also clear that the current ICAO wake turbulence categories are outdated, which means that in many cases aircraft are being overseparated, resulting in a loss of capacity with more separation than they actually need. To help address these issues EUROCONTROL is working to update the existing vortex separation criteria and in some cases to develop new procedures. The broad areas of work are:

- Closely-spaced parallel runways
- Crosswind procedures
- Time-based separation
- Re-categorisation of the ICAO wake turbulence categories

The aim of these activities is to increase runway throughput, while maintaining or improving levels of safety. This will be achieved primarily through three mechanisms: the temporary suspension of the application of wake turbulence separations under favourable weather conditions, the optimisation of aircraft wake turbulence categories and the use of time-based spacing on final approach.

In order to avoid any duplication of effort and to facilitate the approach to ICAO for rule changes, EUROCONTROL is cooperating very closely with the FAA. Together, the two organisations have established a common Wake Vortex Coordination Group to oversee the development of these concepts. However, representatives of all sectors of the aviation community are participating in this work.
Introducing the next generation of air traffic control

The new flight data processing system (FDPS), implemented last December at EUROCONTROL’s Maastricht Upper Area Control Centre, provides a set of leading-edge tools to handle future traffic growth in a safer, more expeditious and environmentally efficient manner in one of Europe’s busiest and most complex airspaces. Developed in line with European Flight Data Processing (eFDP) specifications, it is a fundamental step towards the Single European Sky’s objective of reducing the fragmentation of ATC systems, still prevailing in today’s Europe, by increasing interoperability between these systems.

New technologies for a performance-driven air traffic management system

In line with the ambitious targets of the SESAR programme for enhanced safety, network capacity, effectiveness and emission reductions, the new flight data processing system at Maastricht will contribute to the development of a performance-driven air traffic management system in Europe.

Each year the number of aircraft wanting to fly through Europe’s airspace grows. There are increasing demands for shorter and more flexible routes to allow aircraft to fly the most fuel-efficient and environmentally-responsible routes possible and to respond to dynamic weather and traffic conditions. Europe’s air traffic management (ATM) community will be able to cope with the new challenges facing air travel only if new ways can be found to increase the performance of the ATM system – and that means handling more flights, but with higher levels of safety, environmental responsibility and efficiency.

The objectives of Europe’s infrastructure modernisation programme – SESAR – are to transform the European ATM system by synchronising the plans and actions of the various partners and federating resources. In the long term, the SESAR programme aims to triple capacity, while improving safety by a factor of 10, with 10% fewer emissions per flight, at half the cost of today’s system.

To meet these targets a range of new technologies are needed. Humans and machines will have to work in innovative ways to process the growing amount of data required to compute the safest and most efficient routes through Europe’s skies.
Focus

Introducing the next generation of air traffic control

Greater flight efficiency

A trajectory-based system increases the potential for offering more direct routes, optimal flight profiles and the best alternative routes, ultimately helping to ensure greater flight efficiency, reduce fuel-burn and emissions.

Maastricht UAC manages 260,000 square kilometres of upper airspace above the Benelux countries and north-west Germany – one of the busiest airspaces in the world – handling in excess of 1.5 million flights a year, and over 5,000 flights a day in summer. In the past decade air traffic has increased by 55% and in spite of the economic turbulence that is currently affecting the air transport industry, further growth is expected in the future. At the same time flight efficiency has grown into a key concern for the aviation industry.

A key component of ATC technology is the flight data processing system which, in essence, electronically processes flight plans and updates, correlating them to the radar tracks on the controller’s display and ensuring that information on the flight’s progress is sent automatically to other controllers in other sectors or in adjacent centres.

The new flight data processing system at Maastricht is not just smarter and more efficient than the former system – it is based on a different operating philosophy. It is trajectory-based, rather than route-based. In the past, flight plans had to follow the rigid pattern of airways that criss-cross the skies above the continent.

If a flight changed course to shorten its route or change destination an entirely new flight plan had to be created. With a trajectory-based system the initial trajectory requested by the aircraft is continuously updated with radar data and inputs from the controller, reflecting in real time the clearances provided to the aircraft and the planned sector sequence. This helps controllers get a clearer and safer picture of the air traffic situation and plan the most efficient flight profile on
the basis of real-time information. This feature increases the potential for offering more direct routes, optimal flight profiles and the best alternative routes, ultimately helping to ensure greater flight efficiency.

A range of next-generation technologies such as medium-term conflict detection (MTCD), controller-pilot data link communications (CPDLC), a traffic and controller workload analysis function, operational configuration management and greater electronic coordination are embedded in the new system.

Pre-operational validation platform

Developed to manage a continuum of airspace extending over several countries of the Functional Airspace Block Europe Central (FABEC) area, the new system provides the technology base for seamless air navigation services – a key element in the Single European Sky programme.

On top of providing next-generation technologies aimed at increasing efficiency performance in the short term, the new system will allow future improvements to be introduced in a modular way, meeting the upcoming technical and operational requirements of the Single European Sky. Furthermore in a bid to actively contribute to the development of the future European ATM system, the advanced features now available will also offer a unique platform capable of supporting the pre-operational evaluation and validation of future concepts in support of the SESAR development phase in a cross-border operational environment.

New Flight Data Processing System Features at a glance

- The new FDPS was developed in line with European Flight Data Processing (eFDP) specifications, developed by EUROCONTROL and other major air navigation service providers. It complies with the Single European Sky Regulation on the Interoperability of the European ATM Network, (EC) No. 552/2004, and the relevant implementing rules. It is therefore in line with European interoperability standards, and is the first implementation of an eFDP-compliant system in Europe.

- It is a trajectory-based system, as opposed to the classical route-based systems used hitherto. A trajectory is now continuously updated by the flight behaviour (indicated by radar data and inputs from the controller) whereas in a route-based system the flight plan route remains fairly static in the system. This means that since all route changes are updated automatically, controllers have the most accurate information at all times. The trajectory can also be updated by external sources (e.g. adjacent centres through on-line data interchange or OLDI). This feature facilitates better management of the airspace.

- Real-time trajectory data is exchanged with military ATC in Belgium, the Netherlands and Germany (German military ATC is co-located at Maastricht). This ensures that all partners alike – civil and military – share the most accurate, real-time flight information at all times.

- Medium-term conflict detection (MTCD), which alerts controllers to potential conflicts up to some 20 minutes ahead, is an integral part of the new FDPS. Conflict prediction technologies enable controllers to rapidly assess trajectory changes and issue timely responses. This feature offers efficiency gains.

- Automatic monitoring of aircraft clearances, providing a warning to controllers if the aircraft departs from its cleared flight level or route.

- Coordination of flights requires less verbal action as most of the coordination processes are assisted through electronic coordination (via OLDI or on-line data interchange). This is done for internal coordination and for external coordination with the adjacent ATC centres supporting this capability.

- Increased controller-pilot data link communications (CPDLC) functionalities – CPDLC functions are now “label-based”, which means that they are fully integrated into the controller’s tools. They are therefore more user-friendly. This feature enables the handling of large numbers of simultaneous CPDLC operations in each sector, exchanging messages with a single click of the mouse. This further reduces controller workload and the risk of verbal miscommunications.

- More flexible management of controlled airspace – sectors can be easily reshaped to reflect changing traffic patterns, specific weather conditions or areas temporarily reserved for military operations. Operational configuration management can support more complex and dynamic concepts, ranging from variable division flight levels between Low and High sectors to sectors with variable geographical boundaries. Increased system flexibility will improve performance by keeping flight delays at a low level.

- Traffic and controller workload analysis function (traffic management system), planned for deployment in the course of 2009, to ensure that controller workload in particularly complex sectors is taken into account in the capacity planning process. The traffic management system will support the optimal use of the operational configuration management.
At the end of 2008, at the European Aviation Summit on sustainability, the SESAR Joint Undertaking formally announced the commitment of 17 industry partners to testing novel, ‘green’ flight procedures under real conditions. The low-noise and CO₂-emission flight trials are being organised in the framework of AIRE, an agreement between the European Commission and the US Federal Aviation Administration, which aims to develop environmentally-friendly air transport operations on transatlantic routes. More than 100 trials will be performed this year.

Alain Siebert, in charge of the AIRE Programme at the SESAR Joint Undertaking, reports.

**EU-US ‘green’ flight cooperation**

The Atlantic Interoperability Initiative to Reduce Emissions (AIRE) Agreement between the European Commission and the United States is a programme which aims to reduce CO₂ emissions. By taking advantage of air traffic management best practices and new technologies, it expects to accelerate the implementation of environmentally-friendly procedures for all phases of flight, and to validate the benefits of these improvements. The SESAR Joint Undertaking is responsible for the management of AIRE from a European perspective.

**AIRE is moving forward: more than 100 trials and 17 partners**

Under this initiative, airlines, air navigation service providers (ANSPs), the manufacturing industry and airports are invited to capitalise on present avionics technology and work collaboratively in order to perform integrated flight trials and demonstrations validating solutions for the reduction of CO₂ emissions.

The SESAR Joint Undertaking will directly support more than 100 trials scheduled to take place in 2009 with 17 partners: Airbus, Air France, the French ANSP DSNA, Aéroports de Paris, Thales, ADACEL, AVTECH, Egis Avia, Nav Portugal, TAP Portugal, Isavia, Icelandair, AENA, INECO, Iberia, LFV and Novair.

Greener flight procedures have the potential to reduce the environmental impact of each flight by 10%. To make this happen, we need to accelerate the pace of change by testing new procedures in live conditions. Each integrated project will aim to demonstrate the environmental, operational and economic benefits that modern, environmentally-friendly solutions will bring to air traffic management. These trials will complement the findings of a number of earlier AIRE activities conducted since 2007, some of them already putting Europeans and Americans side by side. In addition, and in close dialogue with our founding members the European Commission and EUROCONTROL, we have initiated a consolidation process of other relevant activities in Europe under AIRE to capture synergies. We are also inten-
Green ground movement trials with Air France at Paris CDG (in cooperation with the DSNA and Aéroports de Paris) will seek to demonstrate the effectiveness of a new collaborative decision support system which will minimise taxi time and allow for single engine taxi operation, thanks to enhanced time predictability.

Terminal

Airports are one of the bottlenecks of the present air traffic management system. Air traffic flows are managed on a first-come, first-served basis leading to unnecessary fuel burn, as air traffic control often requires aircraft to level off and hold at intermediate altitudes during descent. “Green” approach (Continuous Descent Approaches) and green climb trials at Madrid, Paris CDG and Stockholm airports involving DSNA, Thales, AVTECH, LFV, Novair, Egis Avia, AENA, INECO, Iberia and Air France are planned. The first ‘Required Navigation Performance’ CDA approach ever to be performed in Europe is now planned at Stockholm’s Arlanda airport in cooperation with Airbus.

Oceanic

In the present system, ever-increasing traffic flows between Europe and North America are leading to inefficient fuel consumption, fewer accepted pilot requests and airline schedule disruptions. Trials for “green” Oceanic procedures and techniques (speed, horizontal and lateral flight profile optimisation) with Nav Portugal, Isavia involving TAP Portugal, Air France, ADACEL and Icelandair on selected routes between Europe and North/Latin America will be carried out in 2009.

Kick-off meetings have already taken place to start the six projects. At the end of the year, reports will be distributed to share the outcomes of these 100 trials.
The FRAL project
Free Route Airspace Lisboa FIR
The beginning of a new era...

NAV Portugal Airspace and Procedures Department introduces the FRAL project, which on 7 May 2009 will see the implementation of a full free route airspace within the Lisbon FIR above flight level (FL) 245.

Background

After nearly 30 years of international coordination and development, the introduction of basic area navigation (B-RNAV) on 23 April 1998 marked the achievement of one of the most significant and challenging initiatives to improve the efficiency of the air traffic services (ATS) route network of the entire European Civil Aviation Conference (ECAC) area.

However, the advantages expected from RNAV, with the design and implementation of the new ATS route network relying on a complete RNAV environment in the ECAC en-route airspace, have yet to be accomplished. This is due to the fact that European airspace is still confined to a fixed ground-based navaid structure resulting in a fixed ATS route network.

The significant traffic growth experienced during the last decade, coupled with the large increase in the en-route delay, forced air navigation service providers (ANSPs) to increase their airspace capacity by restructuring the airspace with the creation of smaller sectors. This trade-off between operational management and flight efficiency has resulted in the current airspace sector design, which does not facilitate the point-to-point alignment of the ATS route network.

Airspace initiatives

As a result, the ATS route network is still not capable of managing the potential airspace capacity and of satisfying aircraft operators’ expectations in terms of greater operational flexibility, punctuality and financial benefits.

In a bid to address this situation, IATA, CANSO and EUROCONTROL have recently launched the Flight Efficiency Plan (FEP), which aims to enhance European airspace design and network management. The FEP comes at a crucial time, when a global economic crisis is seriously affecting airlines and other stakeholders.

Due recognition should be given to the EUROCONTROL Agency, which since 1994 has been coordinating the necessary planning and implementation activities to improve the European ATS route network. It has done so on a dedicated step-by-step basis through the Route Network Development Sub-Group (RNDSG). The year 2008 saw a significant step forward, with some States presenting several promising initiatives regarding free-route-like operations, as a starting point towards a full free route airspace concept.

Consequently and independently of the routes inserted in flight plans, it has become common practice at the Lisbon Area Control Centre to offer aircraft operators the shortest route between an entry point and an exit point, without reference to the ATS route network. In this airspace, flights remain subject to air traffic control.

Recognising the challenges which lie ahead in terms of traffic growth and flight efficiency, NAV Portugal has welcomed the FEP initiative and has decided to implement, on 7 May 2009, a full free route airspace within the Lisbon FIR above FL245. This development is part of a project known as FRAL (Free Route Airspace Lisboa FIR).

Since the introduction of B-RNAV, the Lisbon FIR has experienced a traffic growth of approximately 52%. To address this challenge, the NAV Portugal Airspace Department has redesigned the en-route airspace, thereby delivering a 60% increase in capacity and a reduction in the ATFM en-route delay of 0.2 minutes per flight. The redesign of the airspace within Lisbon FIR has taken into consideration the main traffic flows and has optimised the management of the operations room.

Free route airspace is a specific airspace within which users can freely plan their routes between an entry point and an exit point.
The five action points of the Flight Efficiency Plan are:

1. Enhancing European en-route airspace design through annual improvement of European ATS routes network, high priority being given to:
   a. Implementation of a coherent package of annual improvements and of shorter routes.
   b. Improving efficiency for the most penalised city pairs.
   c. Implementation of additional Conditional Routes for main traffic flows.
   d. Supporting initial implementation of free route airspace.

2. Improving airspace utilisation and route network availability through:
   a. Actively supporting and involving aircraft operators and the computer flight plan service providers in flight plan quality improvements.
   b. Gradually applying route availability restrictions only where and when required.
   c. Improving the utilisation of civil/military airspace structures.

3. Efficient Terminal Airspace design and utilisation, through:
   a. Implementing advanced navigation capabilities
   b. Implementing Continuous Descent Approaches (CDAs), improved arrival/departure routes, optimised departure profiles, etc.

4. Optimising airport operations, through:

5. Improving performance awareness.

Next steps

NAV Portugal, under the umbrella of reference organisations such as EUROCONTROL, CANSO and ICAO, actively participates in various national and international programmes in order to find technical and operational solutions to improve the performance of the air transport system for the benefit of all users.

It is hoped that the FRAL project will encourage other States and air navigation service providers to plan the introduction of full free route airspace projects in the short and medium term. Other States would benefit from the implementation of similar actions. Some of these actions are already ongoing.

In response to the Flight Efficiency Plan, NAV Portugal has taken a first step forward opening up a new era for change, to enhance the design of Europe’s en-route airspace.
Sweden implements free route airspace above FL 285 in a phased process from 2009 to 2010

FRAS, Free Route Airspace Sweden, is an initiative of the Swedish LFV Group. It falls within a project known as Green Flight, part of a wider programme called RAM, the Regional ATM Migration Programme. Peder Albèr, Project Manager FRAS, LFV Group, explains.

Fully in line with the EUROCONTROL DMEAN Framework Programme (fore-runner of SESAR), the FRAS concept responds to the expectations of the IATA/EUROCONTROL/CANSO Flight Efficiency Plan by addressing the dual need to reduce aviation’s environmental impact and increase flight efficiency.

Following the approval of the Swedish Transport Agency, the concept of free route airspace will be launched initially on a trial basis, on 9 April this year, in Sweden. As a result, all overflights above FL 285 will be able to flight plan from an entry point direct to an exit point north of the 61st parallel and fly this preferred route. The military authorities have also accepted the operational concept.

Following recently performed real-time simulations, it is planned to allow overflights to flight plan direct in the rest of the Sweden UIR.

As the next step, it is also planned to offer flights departing from/arriving in Sweden and airports in the vicinity the opportunity to flight plan and utilise the optimum route selection for the flight phase above FL 285, initially north of the 61st parallel and then for the rest of Sweden. It is hoped that this will become a reality first in April and then in December 2010, pending approval from the relevant authorities.

This stepwise implementation of various operational concepts, initially in an area where traffic density is low, creates an experience platform before introduction in a denser traffic environment.

Fast-time simulations performed by both EUROCONTROL and LFV in the area concerned have indicated that the distance flown using optimum route selection is 1-2% shorter than within the fixed route network. For every 1,500 flights, the implementation of FRAS is expected to bring a daily reduction in fuel burn of more than 20 tonnes, reducing CO₂ emissions by more than 60 tonnes.

Another piece of good news is that for airlines the FRAS concept does not require any additional equipment.

Furthermore, the implementation of FRAS increases consistency between the flight plan and the trajectory flown. This is an essential part of the improvement of the gate-to-gate process and the development of future ATM tools to facilitate it.

A representative of the operational division of the Swedish Air Force has been involved in the FRAS project since it started at the end of 2007. This has ensured that the operational concept which has been developed provides improved flight efficiency for both OAT and GAT.

As part of the Flexible Use of Airspace concept, TRAs (Temporary Reserved Areas) are also being established in Sweden. These areas will be active during specific military exercises, giving limited access to non-participating traffic. In these cases, the traffic will be routed tactically outside active TRAs.

The implementation of free route airspace is enabled by the adequate system support provided at the two Swedish ACCs (Stockholm and Malmö), in the form of MTCD (Medium-Term Conflict Detection) and APW (Area Proximity Warning). These augment conflict detection and track monitoring capabilities. Close cooperation with military counterparts at both planning and operational levels is already well established.

The larger the area encompassed by a portion of free route airspace, the larger the benefits in terms of the environment and flight efficiency for the airspace users. Ongoing discussions with neighbouring States indicate that this concept will expand within the region in the very near future.
DMEAN and the Flight Efficiency Plan

Flight Plan and ATFCM adherence, for the safe and optimum flow of air traffic

www.eurocontrol.int/dmean
Following the recommendations of the wide-ranging feasibility study on the creation of the Functional Airspace Block Europe Central (FABEC), and the signature, last November, by Belgium, France, Germany, Luxembourg, the Netherlands and Switzerland of a joint Declaration of Intent for the creation of FABEC, the implementation phase was officially launched in November 2008 among the civil and military air navigation service providers and the State authorities of the six States. The FABEC Project Manager, Peter Naets, reveals the issues at stake.

Since the very beginning, the FABEC project has had the ambition to federate all the actors of the air navigation sector in the area – whether they represent civil or military State authorities or civil and military air navigation service providers. What kind of structure did the parties put in place to drive the implementation phase and facilitate the integration process?

The FABEC project has been considered as a single project from the outset. It therefore rests on a three-pillar governance structure, where all partners are closely interrelated – the States Organisation, the Project Organisation and the Air Navigation Service Providers (ANSPs) Organisation. We opted for this structure to ensure a clear and consistent allocation of responsibilities and accountabilities for all the improvements to be put in place by the different partners. Because all activities should converge and are as complementary as are the many parts of a vast jigsaw, there is a single integrated work plan for ANSPs and the States alike, the objective being to eventually build a coherent whole. We wanted to put in place an organisation flexible enough to be able to respond dynamically to the need to deliver substantial performance improvements in the area.

Several expert task forces have already been set up with a view to delivering inputs – whether big or small – in the course of 2009. In which areas are they active?

I will not be exhaustive here and list all the task forces that have been created, but what the reader should gather is that the task forces range from purely technical areas (e.g. the voice communication systems task force or the Enhanced On-line Data Interchange – Enhanced OLDI task force), to the further development of leading-edge technologies (e.g. the Air Ground Data Link Services or Centralised ARTAS Track Services task forces), airspace re-design or cross-border flow and airspace management projects (the hot spots task force or the ATFCM/ASM task force), to areas in which what has been hitherto managed separately by each ANSP will be streamlined with a view to achieving greater efficiencies, consistency and economies of scale (e.g. training). In parallel, a number of other task forces or bodies will facilitate the implementation of performance improvements by concentrating on key enablers such as a States agreement, charging regime, common performance management, liability issues, regulatory or oversight issues. But this is just a beginning. As we progress, new areas for cooperation will be identified or initiated and resources will be deployed to exploit these new opportunities.
What are the key critical success factors which will allow the FABEC project to provide tangible benefits and added value for customers?

We all share the opinion that FABEC should be performance-driven. Already in the feasibility study phase, the ANSPs agreed on quantified performance targets in the areas of safety, environment, capacity, flight efficiency, cost-effectiveness and military mission effectiveness. These targets have driven the work so far. In parallel, by signing the Declaration of Intent at the last Aviation Summit in Bordeaux, the States agreed on a number of aspirational goals per performance area. These goals are all in line with the objectives of SESAR and the Single European Sky. The States and the ANSPs will closely monitor and review the processes to achieve the agreed performance targets and are therefore laying the groundwork for the creation of a strong performance monitoring function.

Secondly, without the support of the staff and the customers there would be no FABEC! Social dialogue and stakeholder consultation are therefore two major pillars on which the project must rest. An efficient and structured social dialogue is a key contributor to the de-fragmentation
“FABEC is all about believing that together, we can make it”

process and this regardless of the cooperation model that will eventually be chosen – whether contractual cooperation, integration or consolidation. And of course, a robust stakeholder consultation will give us further guidance as to what is really needed in the business.

Thirdly, appropriate civil/military cooperation and agreement on airspace design and use will be a critical element of the future air traffic management system.

Appropriate civil/military cooperation and agreement on airspace design and use will be a critical element of the future air traffic management system.

Next, we all realise that the project is ambitious and involves very complex issues. I am convinced however that breaking down complex and intricate issues into simple ones will be one of the keys to success. We should aim for an evolutionary – rather than revolutionary – approach and implement the improvements that can be put in place as soon as practicable. What we need now are concrete steps forward, while avoiding to try and fix what’s not broken.

But the first and foremost ingredient for success is in my opinion cohesion between all the partners. The feasibility study contains some very ambitious ideas, yet implementing them will require the fundamental commitment of all the partners. FABEC is, in fact, all about believing that all together we can make it – just as the forefathers of European integration believed back in 1957.

The FABEC area at a glance

The Functional Airspace Block Europe Central – FABEC – covers the airspace of six States (Belgium, France, Germany, Luxembourg, the Netherlands and Switzerland) located in the core of the European continent. This airspace is one of the busiest and most complex in the world. Most of the large European airports and major civil and military airways are located in this area. Owing to its size and central position in Europe, FABEC is a cornerstone of the Single European Sky.

- a complex and dense ATS route network;
- a dimension of 1.7 million km², equating to 9% of the surface area of the European continent;
- 6 million flights per year, equating to 55% of all European air traffic;
- a forecast traffic growth of 50% between 2006 and 2018, resulting in close to 8 million flights by 2018;
- about 410 military/special areas;
- some 370 control sectors;
- 14 air traffic control centres (Brussels, Bordeaux, Brest, Marseille, Paris, Reims, Bremen, Munich, Karlsruhe, Langen, Maastricht, Amsterdam, Geneva and Zürich);
- some 240 airports operating instrument flight rules (IFR);
- 3 major intercontinental hub airports (Paris, Amsterdam, Frankfurt) and proximity to the London airports;
- total revenues of about €3,000 million.
Aviation journalist Jenny Beechener talks to CANSO, EUROCONTROL and IATA to find out more about the Flight Efficiency Plan the three organisations signed last September.

The economic downturn has brought a new dynamic to the ATM business. No longer can service providers, suppliers and regulators rely on traffic growth to sustain revenue levels. If the industry is to remain profitable, it has to address the pressing issues of high cost and inefficient operations, while maintaining safety levels. Moreover, the industry faces a growing weight of public opinion to the effect that emissions are too high and not enough is being done to counter them.

The result is a surprising coming together of the key players to find solutions. Whether by choice or necessity, the organisations that depend on aviation for a living agree that working together is the way to secure a long-term future for the industry. The most visible manifestation of this is the signing by IATA Director General Giovanni Bisignani, EUROCONTROL Director General David McMillan, and CANSO Secretary General Alexander ter Kuile of the Flight Efficiency Plan (FEP) in September 2008.

Rocketing oil prices in 2008 prompted the FEP initiative which aims to reduce fuel burn and emissions. The financial crisis put a new slant on the problem, by cutting the revenue needed to deliver the solutions that airspace users are calling for. “The FEP is a way of addressing the capacity issue – which has not gone away – and flight efficiency, in a more pointed way,” explains David McMillan. “It is urgent. There is a focus within the next two years to realise plans more quickly than might otherwise have happened.”

The aim is to engage 40 airports in A-CDM by the end of 2009, in order to achieve reductions in CO2 emissions of 400,000 tonnes a year.

McMillan believes organisational pride has got in the way in the past. “Actually, what we need to be about is recognising that our agendas, although they may have differences, are very much the same agenda.” EUROCONTROL signed a cooperation agreement with ACI EUROPE in October 2008, and the two bodies launched a joint action plan on Airport-Collaborative Decision Making (A-CDM). The aim is to engage 40 airports in A-CDM by the end of 2009, in order to achieve reductions in CO2 emissions of 400,000 tonnes a year. This is based on the experience of Munich Airport, where A-CDM has seen taxi times fall by 10%, saving users €3.6 million a year.
CANSO also supports stronger collaboration. “Aviation is a system and needs to be project managed that way,” says Alexander ter Kuile. He says the Single European Sky II regulation is a strong driver. “SESAR is a very collaborative project, so both day-to-day operations, as well as longer-term airspace management and systems design, are moving to an integrated environment.”

European Parliament approval of the SES II package at the end of March endorses this pan-European approach through convergence in regulation, performance targets and network design. It also introduces a mandatory requirement to make progress on CO₂ reductions.

There are more signs that the European aviation scene is changing. In February EUROCONTROL convened the first meeting of its Air Navigation Services Board (ANSB) which is comprised of senior people from the ANSP community, airlines and airports. Formed to help set the strategic direction of EUROCONTROL, the ANSB is also about finding ways in which we can all work together for the strategic direction of ATM in Europe.

The first meeting of the EU Observatory on Airport Capacity at the end of 2008 brings together representatives from EUROCONTROL, ACI EUROPE, national authorities, and industry in an advisory role. In addition to drafting an action plan, the Observatory aims to align capacity on the ground with ATM capacity.

**Tough targets**

Within the next two years the FEP aims to reduce annual fuel consumption by 470,000 tonnes, and cut CO₂ emissions by 1.5 Mt. It lists five action points, all of which come from various existing programmes, but need to be accelerated. One area to receive special focus is the terminal manoeuvring area (TMA). “We know a lot of flight inefficiencies are in the TMA,” explains Joe Sultana, EUROCONTROL CFMU Deputy Director. “We are trying to get each ANSP to look at what is possible. This includes RNAV approaches, airspace design, and continuous descent approach (CDA). We are telling airlines to be vocal about their requirements.”

IATA is pushing for wider application of CDAs and calculates that if 100 airports implement CDA, airlines could save €50-150 million a year across Europe. About 20 airports offer the procedure, which requires no additional equipment, but allows trained controllers to give clearance to aircraft descending to the threshold with engines at near idle. Successfully introduced at airports like Stockholm Arlanda and Amsterdam Schiphol during off-peak periods, savings range from 50-150kg of fuel per arrival. At London Heathrow, CDAs result in a smaller noise footprint. “IATA would like to see CDAs introduced where it does not impact capacity,” says spokesperson Lorne Riley. “By starting at secondary airports we can improve our use of CDAs.” Secondary airports account for 30% of Europe’s total traffic, and offer a large potential emissions gain.

Since the FEP was signed, IATA has reported new CDAs at four airports in Norway, Italy’s three Rome airports, plus Cologne and Munich in Germany. Furthermore, by introducing the procedure at remote waypoints, for example combined with RNAV approach paths, the savings are even greater. CANSO reports new RNAV-STARS arrivals into Arlanda that takes advantage of advanced navigation performance onboard SAS B737NG aircraft to shorten the approach path and cut emissions.

Another area where the FEP throws the spotlight on inefficiency is en-route airspace. Between the end of 2008 and the start of the 2009 summer season, 100 new airspace projects are scheduled to begin, comprising mainly new and shorter routes. The 11,000 nm saved exceeds the FEP target this year, and equates to 24,000 tonnes of fuel and 80,000 tonnes of CO₂ according to IATA. “We’ve looked at the most constrained city pairs and examined the traffic volume versus the route extension to find the worst city pairs,” says Sultana.
Sometimes there are valid reasons, such as one-way routes introduced in response to high demand adding to route length. In some cases conditional routes can be created in military areas. EUROCONTROL is working with each Member State to look at where routes can be made more efficient. “With the drive from IATA and CANSO we are taking a closer look.”

Route extensions in Europe are estimated by the Performance Review Commission to be 48.8 km or 5.6% of route length in 2008. While a third occurs in the TMA, the majority is en route and is attributed to domestic airspace design, prompting calls for faster introduction of functional airspace blocks. Furthermore, where there is shared civil/military use of airspace, the take-up was disappointing in 2008, despite an increase in available military airspace.

“There is a weak link,” says Sultana. “New routes that become available during the day as a result of flexible use of airspace are not being flight planned. The aircraft operator with limited resources tends to work to the old flight plan, and wait for ATC to offer a new route. This is no incentive to the military and you still have to carry the fuel for the original route.”

One of the most high-profile FEP action points concerns A-CDM. EUROCONTROL has published a manual which guides airports and stakeholders through the process, and airports like Zurich and Brussels have already joined Munich in reporting savings as a result of A-CDM. London Heathrow, Paris CDG, Amsterdam, Prague and Milan Malpensa are following in their footsteps. It requires collaboration between airlines, ANSPs, airports and ground handlers at the operational level, and as such is a real test of industry partnership.

“You have to sit around the table, and have commitment from the top down, to change the way you do business at the airport,” explains IATA’s Riley. “People working on airports have to understand they are part of a network of airports.” IATA estimates that the cost-benefit ratio of implementing A-CDM is 1:8, a clear reason for more widespread implementation. The CFMU expects at least six airports to operate A-CDM by the end of 2009.

Flight data has become more important to the overall solution. “It is at the heart of the problem we have,” says Sultana. “We plan on the basis of what we expect, and once we get the flight plan, we can update the plans. Then we find the aircraft does not stick to the flight plan.” This leads to peaks and troughs in the system, and ANSPs are obliged to keep some capacity in reserve. Airlines need to re-file revised flight plans, and airports need to advise when departure times change. “Many of these processes are in place, we simply need to adhere to them,” he adds.

This last point requires a change in mindset. For this reason the FEP calls for ‘performance awareness’, whereby all the players need to be aware of the cost of a flight. For the airspace user, low navigation charges may reduce operating costs, but a longer route will waste fuel and emissions. Alexander ter Kuile says that while ATM has delivered a 4% increase in airspace fuel efficiency over the last 10 years, CANSO data shows that a further 4% increase in airspace efficiency will never be delivered as a result of conflicting interests. “100% airspace efficiency does not exist due to the inter-dependencies between classic ATM functions: safety, noise, capacity, military airspace. Based on the IPCC’s 1998 statement that there is 12% airspace inefficiency, that leaves just a final 4% airspace fuel efficiency that ATM can deliver.”

The FEP represents a new approach to this target, and in getting commitment from all the stakeholders, has a real chance of success.
EUROCONTROL was created in the early 1960s as an international intergovernmental organisation, reporting to its ‘owners’, the Member States. Accountability, to the equivalent of what is today the Provisional Council and Permanent Commission, reflected the mood of the times, and was appropriate for several decades. However, as the corporatisation of air navigation service provision became the norm in Europe, along with growing involvement of airspace users in the decision-making chains of air traffic management (ATM), this arrangement began to come under pressure.

Patrick Bernard, Senior Policy Advisor to the Director General, explains.

After extensive reflection about how best to adapt EUROCONTROL to this changing world, in November 2008, the Provisional Council unanimously approved new governance arrangements for EUROCONTROL.

The key principle behind the changes is that while EUROCONTROL continues to be an intergovernmental Organisation, the governance on all matters relating to, or supporting service provision will increasingly come from industry, including air navigation service providers and airspace users. So exactly what do these governance arrangements consist of? They are essentially composed of three different levels.

First, at project and programme level, consultative groups (Stakeholders Consultation Group, Operations Coordination Group) and the Military ATM Board are confirmed in their role of providing advice to the Director General.

Second, at the level of organisational units within the Agency, Supervisory Boards are created, with three foreseen from the beginning: one for the Central Flow Management Unit, one for the Cooperative Network Design Directorate, one for the Central Route Charges Office. One is also planned at a later stage for the Directorate of Resources. Supervisory Boards will be relatively small groups, with typically some five or six members mostly external to the Agency, and will be chaired by one of these non-executive Directors (i.e. non-Agency staff). Their role will be to provide advice and recommendations to the Director General, like consultative groups, but this time at the aggregate business level of large organisational entities within the Agency. The business plans of these units will be the main tool for the functioning of these Supervisory Boards.

Third, at the corporate level of the Agency, a new Air Navigation Services Board has been created, with 15 members: 8 from air navigation service providers, 5 from airspace users, 1 from airports, and 1 from the military. The essential new feature here, which forms the core part of the new governance, is that the new Air Navigation Services Board is formally given a mandate by the Provisional Council to approve the Agency’s Business Plan, including the endorsement of financial elements.

This use of the mandate goes far beyond the advisory role of the previous Air Navigation Services Board and former Chief Executive Standing Conference. The mandate will be exercised within a specific remit formally given to the Air Navigation Services Board by the Provisional Council, which includes a large part of the Agency’s activities, only excluding regulatory and military activities, as well as the Maastricht Upper Area Control Centre.
In parallel with this, the role of the Standing Committee on Finance is unchanged, as is the Provisional Council as the validating authority for the Agency Business Plan, and the Permanent Commission as the approving authority for the Agency’s budget. This means that conceivably diverging positions could develop between the Air Navigation Services Board and the Standing Committee on Finance, since the Air Navigation Services Board has a role in endorsing financial elements, and for this reason the arrangements foresee in that case a role for the Director General to seek to broker a common position between these two bodies. Success on that will require a new business planning process ensuring alignment with the budgetary process, and work has started on this new business planning process with the new Air Navigation Services Board.

By approving the new governance and in particular the mandate given to the Air Navigation Services Board, the Provisional Council has put in place measures which should go a great way towards meeting the ATM industry’s needs, making advanced use of the current early implementation of the revised Convention, and setting a fundamental precedent in EUROCONTROL’s history. The new governance is an ambitious reform package that will see the Organisation modernised so that it can respond fully to the objectives of the Single European Sky with the European Community and non-EU States.

With the reforms agreed, a series of challenges remain for 2009: putting in place the new bodies, aligning the business planning process, enabling the Air Navigation Services Board to deliver on the mandate given to it by the Provisional Council, which will require commitment from all involved stakeholders. The Agency will be doing all it can to support these objectives and the new Air Navigation Services Board.
Safety oversight is defined as a function by means of which ICAO Contracting States ensure effective implementation of the safety-related Standards and Recommended Practices (SARPs) and associated procedures contained in the Annexes to the Convention on International Civil Aviation and related ICAO documents. Safety oversight also ensures that the national aviation industry provides a safety level equal to, or better than, that defined by the SARPs. As such, an individual State’s responsibility for safety oversight is the foundation upon which safe global aircraft operations are built. Lack of appropriate safety oversight in one Contracting State therefore threatens the health of international civil aircraft operation. Marc Deboeck, Safety Regulation Unit, and Milen Dentchev, Performance Review Unit, report.

In 1992, during the 29th Session of the ICAO Assembly, a concern was raised on the apparent inability of some Contracting States to conduct their safety oversight functions. Major reasons cited for this included lack of a regulatory framework and lack of technical and financial resources to carry out the minimum requirements of the Chicago Convention.

As a result, the Assembly adopted Resolution A29-13: Improvement of Safety Oversight, reaffirming individual States’ responsibilities for safety oversight as one of the tenets of the Convention and calling on Contracting States to reaffirm their safety oversight obligations under the Chicago Convention.

Based on Assembly Resolution A29-13, ICAO established in 1995, and expanded in 2005, a Universal Safety Oversight Audit Programme (USOAP) using a comprehensive systems approach, comprising regular and mandatory safety oversight audits conducted by a team of ICAO auditors specialised in all the 16 safety-related ICAO Annexes. These audits cover eight areas of expertise – legislation (LEG), civil aviation organisation (ORG), personnel licensing (PEL), aircraft operations (OPS), airworthiness (AIR), air navigation services (ANS), air routes and ground aids (AGA) and accident and incident investigation (AIG).

According to this safety oversight audit programme, by 2011 the USOAP teams will have audited all 170 ICAO Contracting States, 44 of which are ECAC Member States.

Following a USOAP audit, the Final Safety Oversight Audit Report provides an assessment of the safety oversight capability of the State based on the eight critical elements (CEs) defined in ICAO Doc 9734 Part A. This report contains the audit findings and recommendations, as well as the Corrective Action Plan (CAP) developed by the State and approved by ICAO. Subsequently, the State must comply and act on the safety oversight audit findings and recommendations through the completion of its CAP.
USOAP audit results

The graph below shows the level of implementation of the eight critical elements of the ICAO safety oversight system for the 23 ECAC Member States audited by USOAP between 2005 and 2008. It also compares the capability for safety oversight of these States with the average level in the world.

EUROCONTROL participation in USOAP

The Memorandum of Cooperation (MoC) signed on 17 March 2005 between ICAO and EUROCONTROL regarding safety oversight auditing ensures that coordination takes place between both organisations at working and programme management levels. The EUROCONTROL

ECAC States versus Global Safety Oversight Capability – 2008 situation

safety audits derive from the ESARR Implementation Monitoring and Support (ESIMS) Programme operated by the Safety Regulation Commission (SRC). They monitor the timely, uniform and effective implementation of ESARRs within the States’ legislative and regulatory framework, giving full consideration to their commitments under EC legislation and the EUROCONTROL Convention. Pursuant to Article 28 of the Chicago Convention and the ESARRs, States have the responsibility to ensure the safe provision of ANS and to exercise due diligence with regard to the safety oversight of ANS provision.

Both ICAO and EUROCONTROL carry out safety oversight audits in the 44 ECAC States. Under the MoC, ESIMS and USOAP audit schedules are coordinated to avoid overlaps and take full advantage of the synergies between the two programmes. It also makes it possible to limit the impact on States of oversight intervention in ATM and to capitalise on the use of scarce auditing resources. Currently, five EUROCONTROL ESIMS auditors are certified ICAO safety oversight auditors in the area of ANS.

Russia – the last State audited in the ICAO EUR Region in 2008

The Russian Federation was subject to a USOAP audit from 15 September to 1 October 2008. The ten members of the audit team, working in eight areas linked to 16 Annexes, faced a most challenging experience in this immense nation with its wide-ranging aviation activities and traditions.

Russia, at 17,075,400 km², is the largest country in the world, covering more than an eighth of the Earth’s land area; with 142 million people, it is the ninth largest by population. It extends across
the whole of northern Asia and 40% of Europe, spanning 11 time zones and incorporating a dazzling range of environments and landforms.

Russian airspace encompasses 26 million km², a third of which is high seas airspace. Within it, 1208 operators utilise 564,000 km of airways, the majority of which are international transit routes for, among others, trans-Siberian, transpolar and cross-polar flights. The State annually issues over 7,000 ATC licences and some 17,000 ATC ratings. In 2007 air traffic increased by 13% compared to 2006 – international flights account for the largest increase in traffic volumes since 2002.

Given the vastness of the country and the complexity of its civil aviation system, it will not come as a surprise that the audit activities were by necessity limited to the European part of Russia. Most of the work was done in Moscow at the Interstate Aviation Committee (IAC, which has comparable working arrangements to EASA) and at the Headquarters of the Civil Aviation Administration with its three entities responsible for the safety of civil aviation, i.e. Rosaviatsia (the Federal Air Transport Agency, FATA), Rosavianadzor (the Federal Air Transport Oversight organisation, FATO) and Rosaeronavigatsia (the Federal Air Navigation Authority, FANA). Other entities visited included Goskorporatzia OrVĐ – the State ATM Corporation (the ANS provider of the Russian Federation), Sherementievo and Domodedovo international airports, the Regional Offices at St. Petersburg and Kazan, plus a variety of regional airplane and helicopter plants, aircraft manufacturers, maintenance organisations and research institutes.

The Chicago Convention and its SARPs serve as a basis for the legal regulations of the Russian Federation. Each of the Annexes to the Convention, as well as the ICAO Procedures for Air Navigation Services (PANS), are published in the Russian language via mandatory provisions contained in various legal acts and rules of application.

Russia’s awareness of its responsibility vis-à-vis international aircraft operation and global aviation safety has yielded a keen interest in aligning the national ATM system with Europe’s long-term civil aviation improvement processes, e.g., through the IAC with its long-standing experience in rule-making, certification and accident and incident investigation. Also, FANA uses ESARRs No. 2 – Reporting and Assessment of Safety Occurrences in ATM, and No. 3 – Use of Safety Management Systems by ATM Service Providers, as driving documents in the drafting of relevant State regulations.

Russia increasingly uses contemporary international standards on flight crew training to help reduce the impact of human factors on flight safety. To ensure the quality of training, state-of-the-art integrated simulators are used to instruct both flight crew and air traffic controllers on how to react to emergencies and monitor in-flight behaviour.

In May 2008 the Russian Government transferred FANA to the authority of the Ministry of Transport. Henceforth, the development of the Russian ANS Concept effectively saw the merger of the civil and military ANS systems. The air navigation service providers which currently come under FANA authority are State enterprises and Federal Government agencies as follows:

- **State ATM Corporation**, which includes the provision of ATS, airspace organisation, CNS and airway facility maintenance and inspections. It employs 8,450 controllers, 9,440 engineers and operates 120 ACCs plus 94 joint civil/military ATS units throughout the Federation;

- **Aerospace Search and Rescue (SAR) Joint System Service**, controlling the activities regarding SAR services for aircraft and spacecraft in seven SAR regional areas, consisting of 39 regional SAR operational units. The SAR fleet comprises 31 aircraft and 96 helicopters, plus three MoD¹ aircraft dedicated to the ISS² SAR;
State Scientific Research Institute of Air Navigation, which conducts research, carries out studies and developments, and participates in training. It is also responsible for developing visual and instrument flight procedures (flight checks are contracted out to specialist private companies). It cooperates closely with, notably, ICAO and the EUROCONTROL Experimental Centre; Centre of Aeronautical Information Management of Civil Aviation; Hydrometeorology Service of the Russian Federation.

Safety management systems (SMSs) are established within all service providers in implementation of the State Safety Policy and Plan, and a QMS is implemented for the organisation and operation of ATM, CNS, aerodrome support, aviation security and SAR services in all branches of the State ATM Corporation, which obtained ISO 9001:2000 certification.

Not unlike the hurdles European States need to overcome in instituting harmonised regulations regarding the Single European Sky, the Russian Federation – although it established a comprehensive safety regulatory framework via national rules – is still confronted with significant differences between these regulations and the ICAO SARPs, particularly in the area of ANS. That is precisely why it has embarked upon an ambitious ATM system modernisation programme.

The Russian system approach to flight safety

To meet its international obligations, the Russian Government on 6 May 2008 approved the State Flight Safety Programme for Civil Aircraft, the main goal of which is to ensure the implementation and unified application of the safety requirements provided for in the ICAO SARPs. The Programme allows for the renewal of the Russian aircraft fleet and the harmonisation of liability of the State and operators, airports, aircraft and equipment manufacturers, maintenance organisations and ATC units. It also includes extensive R&D, enabling an overall increase of standards for aircraft operations, aviation personnel training and licensing.

Long-term arrangements are steadily being put into effect to endorse the Programme. Between 2008 and 2015 flight safety rules and regulations will be fully renewed, federal and industry programmes set up to meet the obligations, and provisions made for inter-agency actions to enhance flight safety. This coordinated approach will be based on, among other things, the implementation of a civil aviation safety control system, monitoring progress in technology and industry best practices and creating an all-embracing database to include aircraft airworthiness, certification of aviation enterprises, accidents and incidents, violations of the Russian air law, and personnel licensing.

The Programme also provides for the technical renewal of ground infrastructure and the conditions to increase the efficiency of aircraft operations. With an 82 billion RUR budget drawn from service provision charges and federal funds, a dedicated ATM modernisation plan aims to upgrade the joint ATM system, its facilities and interfacing systems by establishing and developing the Russian air navigation system on the basis of advanced technologies and facilities. In the medium term Russian ANS will be integrated into EUR ANS, to become part of the global structure in the longer term. Airspace-use improvements will include the large-scale application of RVSM airspace and the “free flight” concept. In tandem with the automation of the meteorological and AIS services, the establishment of consolidated ACCs with integrated ATC systems and a common ASM/ATFM system, the Russian aviation authorities plan to save an estimated 17.35 million tonnes of fuel by 2015.

The Russian aviation authorities plan to save an estimated 17.35 million tonnes of fuel by 2015

The aforementioned measures will apply to all parts of Russian ANS, as well as to supporting organisations. To ensure further improvement, the Programme also calls for the elaboration of scientific methods to enhance flight safety for air navigation purposes based on a flight safety-related risk model, and the development of interdependent flight safety indices for all flight stages and different segments of the air navigation system. The Interagency Civil Aviation Flight Safety Commission is responsible for the Programme’s evaluation process, taking into account the critical elements of the State safety oversight system as stipulated by ICAO. It is envisaged that the Programme’s execution, within the next three to five years, will result in the stabilisation of safety levels and serve as a prerequisite for enhanced flight safety and increased air traffic throughout the Russian Federation.
On 17-19 March 2009, EUROCONTROL took part in ATC Global 2009 in Amsterdam. This event has established itself over the years as Europe’s largest ATM/ATC exhibition with close to 200 exhibitors, including a two-day world-class conference, five half-day workshops and 35 seminar sessions.

The event organiser, CMP, reports that the number of visitors attracted in 2008 was maintained this year, whilst the quality of visitor was improved. ATC Global also received their highest press attendance to date as well as seeing visitors increase their length of stay during the three-day show. There was also a record growth in attendance from non-European countries such as USA, Brazil, South Africa, Cambodia, Taiwan, China, Japan and Malaysia.

Exhibition

The EUROCONTROL Agency was once again one of the key exhibitors with a 180 m² stand which featured a wide array of projects under the slogan “Delivering the future ATM system today and tomorrow in partnership”.

The main focus of the EUROCONTROL stand was on performance-driven solutions in the field of airspace design and planning, air traffic flow and capacity management, environment, airports and civil-military cooperation, to address the balance between capacity, flight efficiency and emissions. The stand also featured demonstrations of TMA2010+ (integration of air and ground trajectory management) and the new Flight Data Processing System operational at the Maastricht Upper Area Control Centre. The future ATM system SESAR was also prominent, through a presentation of the European ATM Master Plan, the SESAR E-learning module and the Integrated Tower Working Position project.
Conference

Running alongside the exhibition on 17-18 March, the two-day conference focused on ATM’s responses to the turbulent times facing world aviation. ATC Global Conference is uniquely placed to answer the questions facing the ATM industry, through its combination of attracting the leading ATM thought leaders, for the quality of its debates, and most importantly, its truly global scope.

EUROCONTROL Director General, David McMillan, the Director of Cooperative Network Design (CND), Bo Redeborn, and the CND Deputy Director for Network Development, Lex Hendriks, all took part in the conference and contributed to the analysis and discussion of the nature of the crisis facing the aviation industry, and possible solutions.

Workshops and Seminars

EUROCONTROL’s presence at ATC Global was unprecedented this year, with the Agency’s organisation of two workshops with the SESAR JU, respectively on Information Management – the road to Swim and one on Mobile Communications – the art of the possible, and a third workshop on ADS-B, sponsored by ITT. All workshops were very well attended.

The ATC Global programme showcased around 35 presentations from key industry suppliers and experts, offering insight into the latest technology and product developments affecting the air transport industry. In this context, EUROCONTROL presented its work on just culture and its voluntary ATM incident reporting function (EVAIR). Together with the FAA, EUROCONTROL also presented a comparison of operational performance in the USA and Europe.

The new Flight Data Processing System (FDPS) implemented at EUROCONTROL’s Maastricht Upper Area Control Centre received an award in the category “Future Systems”.

Jane’s ATC Global Awards

On 17 March, during the ATC Global Event in Amsterdam, Jane’s held its annual ATC awards ceremony. Now in their tenth year, the awards recognise endeavour and achievement in air traffic management and help to raise awareness of contributions made across the industry.

The award categories this year (Service provision, Industry, Contribution to European ATM, Enabling technology, Innovation, Future Systems and Thales Emerging Technologies) were designed to reward new developments as well as collaborative ventures.

The new Flight Data Processing System (FDPS) implemented at EUROCONTROL’s Maastricht Upper Area Control Centre (MUAC) in December 2008 received an award in the category “Future Systems”.

Herman Baret, New FDPS Programme Manager at EUROCONTROL’s MUAC, and José Luis González Paz, New FDPS Programme Manager at Indra, jointly collected the Jane’s Future System Award for the next-generation interoperable FDPS. Delivered by the Spanish systems provider Indra, FDPS supports both civil and military operations and provides a set of leading-edge tools to handle future traffic growth in a safer, more expeditious and environmentally efficient manner.
Emissions Trading Scheme Workshop: minimising aviation’s compliance overheads

By now, most of us in the aviation world are aware of the European Union Emissions Trading Scheme (EU ETS) and have heard that our industry will be included in it from 2012, but how many of us know what this really means? The implications for the sector are considerable, touching on matters as diverse as administrative processes and data confidentiality, as well as financial concerns. What, however, is the real significance for those in the industry and what steps do the various parties need to take to become compliant whilst keeping costs to a minimum?

19 February 2009,
EUROCONTROL Headquarters, Brussels

Identifying the industry’s need to work together and share information on how best to approach implementation, and appreciating the key role EUROCONTROL could play as a provider of data to the various actors within the scheme, the Agency took the initiative of organising an information-sharing seminar focusing on cutting the costs of compliance. The workshop ‘Emissions Trading Scheme: minimising aviation’s compliance overheads’, was held on 19 February and attended by 130 delegates, representing the aircraft operators, the competent authorities which will be entrusted with regulation at Member State level, the European Commission, verifying organisations and various industry value-added service providers.

In his opening address, the Director General, Mr David McMillan, stressed the growing importance of the environment within the aviation industry, as demonstrated by its inclusion in the EU ETS. He went on to emphasise that “the early establishment of lean mechanisms in support of the whole process is essential to achieve the most efficient and effective scheme possible, minimising as far as possible the burden of compliance costs,” adding that in a dynamic pan-European industry, EUROCONTROL data would have a key role to play in achieving this. This drive to implement an efficient and effective system whilst minimising the costs of compliance formed the main focus of the day.

The ETS will require the majority of aircraft operators to provide a flight-by-flight account of CO₂ emissions on a yearly basis, which will then be measured against a baseline year for the allocation of emissions permits. With no existing process in place for the collection and verification of this data, it is possible that many airlines will need to find extra resources and implement new procedures, creating an additional burden in difficult financial times. One potential way for aircraft operators affected by the scheme to cut costs is through the provision of data from EUROCONTROL, which could streamline the reporting and verification processes.

As EUROCONTROL already collects pan-European data through its Central Flow
Management Unit and Central Route Charges Office, it presents a time and cost-efficient way of meeting industry data requirements. This idea was welcomed by Brian Humphries, President of the European Business Aviation Association, who expressed the concerns of smaller operators. He proposed a simplified monitoring, reporting and verification (MRV) process based on data provided by EUROCONTROL facilities, which could help to achieve compliance more efficiently. The need for a simple and universal administrative process was also identified by Andreas Herdemen, Assistant Director of Environment Policy at IATA, who proposed that existing industry practices be used where possible. He stated that aircraft operators were keen to work with EUROCONTROL, though stressed the need for transparency and confidentiality whilst any unnecessary administrative burden should be avoided.

However, it is not just the aircraft operators who will benefit from the Agency’s data. Olaf Hoelzer-Schoophil, representing the German competent authority responsible for verifying emissions at State level, stressed the importance of accurate data which could confirm that one tonne of CO₂ really is one tonne of CO₂. This is essential to guarantee a level playing field for all operators, as well as to ensure that the scheme is credible, ecologically reliable and economically efficient. The Agency is currently in the process of developing guidance on a process to allocate aircraft operators to administering States. Philip Good of the European Commission’s DG Environment, the official body which proposed the legislation now in force, emphasised EUROCONTROL’s important role for the Commission in the administration of the ETS. He set out the input which the Commission would require from the Agency, specifically the data requirements for the allocation process and calculation of historic emissions to establish baselines, as well as ongoing support for the verification process.

The number of requests to EUROCONTROL for support in this area was a crucial factor in influencing the Agency to take the initiative of organising this meeting. A key aim was to provide a forum for participants to exchange views and better understand the needs of all stakeholders with roles to play in the ETS, as well as to gather their ideas as to what their data requirements might be. Although operators expressed a wish to gain access to Agency emissions data, some concerns were expressed over confidentiality and the accuracy of that data. The Agency uses the ANCAT 3 system of emissions calculation and its PAGODA emissions modelling tool has been verified for accuracy against other methods. Mr Stefano Mancini of the EUROCONTROL Environment Unit, who has been involved with the development and implementation of PAGODA since its conception, stressed that the tool was there to support airline operators during the verification process, and that a secure online portal is being developed which will give confidential access to user-specific data for verified users only.

Whilst the emphasis of the day was on cutting the costs of compliance and the support that EUROCONTROL can provide in this, there was also agreement that information exchange is vital for the achievement of an efficient and harmonised approach to implementation. A need for further workshops, and similar events, as a practical forum for informing interested parties of mutual concerns and requirements was identified.

There was a general consensus that EUROCONTROL would be a possible source of much information to support stakeholders in their roles in the ETS. Whilst all agreed that the path towards implementation was challenging, it was acknowledged that States, aircraft operators and the Agency working in partnership was the most efficient way of harnessing existing resources and capabilities to keep the cost of compliance to a minimum.

“The early establishment of lean mechanisms in support of the whole process is essential to achieve the most efficient and effective scheme possible, minimising as far as possible the burden of compliance costs”
Ms Sylvette Chollet, EASA Representative in China, accompanied by Ms Sadel and Mr Arroyo from DG/TREN at the European Commission, visited Headquarters on 19 March. They were provided with an overview of EUROCONTROL, the Agency’s role in the implementation of the Single European Sky and an explanation of CFMU operations.

On 13 February, 16 programme managers from Henley Management College in the UK were welcomed at Headquarters to learn about the work done by EUROCONTROL, with a specific focus on the challenges facing the Agency and air traffic management up to 2010.

On 12 February, a delegation comprising representatives from the US army and navy were received at Headquarters. Presentations on the role of EUROCONTROL and civil-military ATM cooperation were all part of the programme, together with a tour of the CFMU operations room.

On 9 February, a delegation representing the Japanese Civil Aviation Bureau visited EUROCONTROL’s Headquarters. The briefing focused on EUROCONTROL’s role in air traffic management, the LINK2000+ Programme and the work carried out in the CFMU operations room.

On 31 March, a delegation from the Spanish Aviation Safety Agency (AESA), headed by its Director, Ms Isabel Maestre Moreno, was received at headquarters by the Director General and briefed on the role of EUROCONTROL, ANS performance measurement in Europe, ATM safety and safety regulation. The visit included a tour of the CFMU operations room.
12 May 2009
Workshop – International Local Runway Safety Team
EUROCONTROL Headquarters, Brussels

29 June – 2 July 2009
8th USA/Europe ATM R&D Seminar
Napa, California, USA

9-10 September 2009
xNOTAM Workshop #5
EUROCONTROL Headquarters, Brussels

6-7 October
Wide Area Multilateration – Ready for Use
EUROCONTROL Headquarters, Brussels

More events at www.eurocontrol.int
in the “Events & Meetings” section

The Summer Edition of Skyway will focus on the Single European Sky