ATM Performance

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for European ATM

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Dear readers,

Over the last few years, the overall performance of Europe’s air traffic management (ATM) system has improved considerably, thanks to the efforts made both by the aviation community at large and EUROCONTROL. Notable progress has been achieved in the areas of safety, capacity, efficiency and the environment.

In Europe, there has not been a single fatal accident attributable to ATM in the last five years, and the rate of serious incidents is falling. The safety maturity of European service providers and regulators rose by 27% and 25% respectively in the last two years.

Air traffic flow management delays have been reduced in spite of an annual 4% increase in traffic.

Route charge unit rates fell by 13% from 2003 to 2006, and unit costs are forecast to drop by another 15% in the next five years.

In Europe today, environmental measures in air traffic management have already reduced CO₂ emissions by 2 million tonnes (equivalent to 1% of the total aviation emissions in Europe) per annum.

However, performance must continue to improve, especially with traffic set to continue to rise in the short, medium and long term, at an average of 4% per annum, and in double figures in the Eastern part of Europe. As further proof traffic increased by 5.3% between January and May 2007.

The aviation community’s focus on performance represents a major development in the last ten years, resulting from the growing complexity of the ATM system. The EUROCONTROL Performance Review Commission, created in 1997, has played a crucial role in this respect, advising on the setting of performance indicators, proposing performance targets and working on a performance review of Europe’s ATM performance. This action has helped raise the performance of the air navigation system across the entire European continent.

The global dimension of air transport calls, however, for a globally enhanced air navigation system.

This was the main theme of a worldwide Symposium on the Performance of the Air Navigation System held by ICAO in March this year. The Symposium created awareness amongst all stakeholders of the need to build a performance-oriented approach to ATM, enhancing safety, capacity, efficiency, security and the environment, under the umbrella of ICAO’s Global ATM Plan.

Europe’s ATM system has benefited from a systematic continent-wide performance measurement and review system, and this experience can usefully be developed at global level.

A performance-based approach is currently being used in the SESAR Programme. This will include the delivery of the European ATM Master Plan by March 2008, a roadmap of improvements designed to improve the equation between stakeholder needs and system solutions towards the definition and application of new concepts and processes.

Chers lecteurs,

Au cours des dernières années, la performance globale du système européen de gestion du trafic aérien (ATM) s’est considérablement améliorée, grâce aux efforts consentis à la fois par la communauté aéronautique dans son ensemble et par EUROCONTROL. Des progrès notables ont été accomplis dans les domaines de la sécurité, de la capacité, de l’efficience et du respect de l’environnement.

En Europe, pas un seul des accidents mortels survenus au cours des cinq dernières années n’était imputable à l’ATM, et le nombre d’incidents graves est en baisse. Le degré de maturité de la sécurité chez les prestataires de services et les instances de réglementation européens a augmenté, respectivement, de 27 % et 25 % ces deux dernières années. Les retards imputables à la gestion des courants de trafic aérien ont été réduits, en dépit d’une augmentation annuelle du trafic de 4 %.

Les taux unitaires des redevances de route ont diminué de 13 % entre 2003 et 2006 et devraient encore baisser de 15 % au cours des cinq prochaines années.

À l’heure actuelle, en Europe, les mesures environnementales prises dans le cadre de la gestion du trafic aérien ont déjà permis de réduire de 2 millions de tonnes les émissions annuelles de CO₂ (soit l’équivalent d’1 % des émissions totales produites par l’aviation en Europe).

Avec un trafic qui continuera d’augmenter, à court, moyen et long termes, à un taux moyen de 4 % par an et selon un taux à deux chiffres dans la partie est de l’Europe, il faut toutefois que l’amélioration des performances se poursuive. Pour preuve, entre janvier et mai 2007, une croissance du trafic de 5.3 % a été enregistrée.

La priorité accordée à la performance par la communauté aéronautique, évolution majeure de ces dix dernières années, est une conséquence directe de la complexité croissante du système ATM. La Commission d’examen des performances d’EUROCONTROL, créée en 1997, a joué un rôle essentiel à cet égard, en rendant des avis sur la fixation d’indicateurs de performance, en proposant des objectifs de performance et en procédant à un examen des performances de l’ATM en Europe. Ce faisant, elle a contribué à l’amélioration des performances du système de navigation aérienne dans l’ensemble du continent européen.

La dimension planétaire du transport aérien appelle toutefois une amélioration du système de navigation aérienne à l’échelle mondiale.

Tel était le fil conducteur du symposium de l’OACI sur les performances du système de navigation aérienne, tenu en mars de cette année. Il a permis à l’ensemble des partenaires de prendre conscience de la nécessité d’une approche de l’ATM axée sur les performances, propre à renforcer la sécurité, la capacité, l’efficience, la sûreté et le respect de l’environnement, sous l’égide du Plan mondial ATM de l’OACI.

Le système ATM européen a bénéficié d’un système de mesure et d’examen systématiques des performances à l’échelle du continent, et cette expérience peut être utilement reproduite à l’échelle planétaire.


Victor M. Aguado
Directeur général
**Focus**

## Setting performance targets for European air traffic management

**by Xavier Fron, Head of the Performance Review Unit**

### Introduction

Many readers will be aware of the Performance Review Commission’s (PRC) role in reviewing the past performance of the European ATM system. This has constituted the bulk of its annual Performance Review Reports (PRRs).

However, the target-setting element is less well known. The PRC’s terms of reference also require it “to propose targets to be set for ATM system improvements”. In PRR 2006, which is the PRC’s latest performance review report, strong emphasis was placed on performance targets.

Some might consider that adoption of performance targets is long overdue. The ECAC Institutional Strategy adopted by Transport Ministers in 1997 included an objective to adopt performance targets by 1998! Experience, however, has shown that it is a complex subject, and that solid foundations must be laid before a robust house can be built.

The foundations in this case are reliable data. A lot of reliable data are available from the EUROCONTROL Central Flow Management Unit (traffic, ATFM delays) and Central Route Charges Office (distance, route charges), with the distinct advantage that it is comprehensive and homogeneous across Europe. Going further, significant progress was made through the adoption of economic information disclosure requirements in 2001, after two years of detailed work by the PRU and the ATM Cost-Effectiveness (ACE) Working Group. However, much more remains to be done, especially insofar as safety data are concerned. The forthcoming adoption of SES Implementing Rules for Performance Review is expected to reinforce the information flow.

Although, this progress may seem unimpressive at first sight, more tortoise than hare, it was clear at the first Worldwide Symposium on ANS performance organised by the International Civil Aviation Organization in March this year, that Europe is in fact at the forefront of ANS performance measurement. After nearly ten years, the PRC is now in a position to submit a set of performance targets addressing key performance areas, namely safety, capacity/delays, flight efficiency and the environment, and cost-effectiveness.

### PRC recommendations

In its latest recommendations, the PRC invited the EUROCONTROL Provisional Council:

**Safety**

a. to confirm that all national regulators and air navigation service providers providing en-route services should reach the agreed minimum level of safety management and regulation maturity (70%) by end-2008 and to formally adopt this as an interim European safety performance target …;

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a. to confirm that all national regulators and air navigation service providers providing en-route services should reach the agreed minimum level of safety management and regulation maturity (70%) by end-2008 and to formally adopt this as an interim European safety performance target …;
b. to request the Director General to undertake a review of EUROCONTROL’s publication and confidentiality policy, to ensure the appropriate balance between confidentiality and transparency of safety information;

Capacity/delays

c. to agree that 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;

d. to adopt as a flight-efficiency target a reduction in the European average route extension per flight of two kilometres per annum until 2010;

e. to note that achieving the flight-efficiency target would reduce carbon dioxide emissions in proportion;

Cost-effectiveness

f. to adopt the cost-effectiveness target of reducing the European average real unit cost by 3% per annum until 2010.

Basis for the PRC’s targets

The PRC did not pluck these targets out of thin air. A lot of research, detailed analysis and consultation went into their development.

Safety

Let’s take a look at the safety target first. Safety being the principal objective of ATM, and aviation requiring extremely high levels of safety, one would expect a high level of maturity in measuring safety performance. In fact, even basic safety data are not yet uniformly available across Europe, although some information exists in a number of States. In many cases, the foundations are not yet there, let alone the house. This is why the target is about building the foundations, i.e. sufficiently mature safety processes at air navigation service providers and ATM regulators, and these include incident-data collection.

The PRC is aware that the aim of the European Safety Programme (ESP), adopted in 2004, is to get all “State ATM regulations and service providers to a 70% minimum maturity level”. This is why the PRC proposed that this already agreed objective be formally adopted as an interim safety target. In May 2007, the Provisional Council "confirmed that all national regulators and air navigation service providers providing en-route services should strive to reach the agreed minimum level of safety management and regulation maturity (70%) by end-2008 and adopted its use as an interim European safety performance target".

The other safety recommendation highlights the difficulty that the PRC encounters in getting meaningful and useful safety data for performance review purposes. As a general principle, the PRC believes that there should be a duty of accountability and transparency vis-à-vis airspace users and the public concerning safety of air navigation services. There is a need to ensure an appropriate balance between maintaining confidentiality of safety data and ensuring transparency of safety information for the general public. Hopefully, the confidentiality policy will be relaxed, after the Director General has conducted his review.

Capacity and delays

Turning now to ATC capacity and delays, a European target for en-route ATFM delays was adopted in 2001 on the PRC’s recommendation. The planning objective was to progressively reduce delay to the optimum (1 min/flight) by 2006. When it was set, this target was considered to be very challenging. However, experience has shown that the adoption of a target has focused efforts towards increased capacity, which, combined with a tem-
porary reduction in traffic in 2001-2002, led to remarkable improvements in ATFM delays, even faster than originally anticipated.

The current target is generally accepted and widely considered as a satisfactory performance level. The PRC therefore proposed that the current European target of 1 minute per flight be maintained for the coming years, which was agreed by the Provisional Council.

Actual and target en-route delays are shown together with traffic growth in the figure 1.

**Flight efficiency and its environmental impact**

Flight efficiency has recently been identified as a major ATM performance issue. The financial impact of horizontal route extensions is in the order of €2 billion per annum, to which sub-optimal vertical profiles and terminal area procedures would have to be added. Moreover, flight inefficiencies have direct environmental implications, which are increasingly a major concern in today’s society.

The first step was to assemble accurate data and develop a relevant performance framework with specific flight-efficiency indicators. The current average route extension is measured at 48.6 km per flight, which corresponds to 441 million kilometres per annum over and above the shortest distance between terminal areas.

The second step was to identify a target that is both realistic and challenging, taking into account trade-offs with capacity, and respecting required levels of safety. The target proposed by the PRC, a reduction in the average route extension per flight by 2 km per annum, was adopted by the Provisional Council. It is consistent with EUROCONTROL’s plans (ARN V5, V6, AAS).

The current and target values for route extension are shown below and in figure 2.

### Route extension (km)

<table>
<thead>
<tr>
<th>Year</th>
<th>Route extension per flight</th>
<th>Total</th>
<th>Estimated cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>49.2 km</td>
<td>435 m km</td>
<td>€2,130 m</td>
</tr>
<tr>
<td>2006</td>
<td>48.6 km</td>
<td>441 m km</td>
<td>€2,230 m</td>
</tr>
</tbody>
</table>

The adoption of a European flight-efficiency target is a major step forward, with consequent financial and environmental benefits.

**Cost-effectiveness**

PRR 2006 shows that the cost-effectiveness of European ATM has been improving since 2003. A break in the unit cost trend is clearly visible (see figure 3).

Nevertheless, cost-effectiveness remains a major ATM performance issue. In 2006, en-route and terminal air navigation service costs amounted to some €7.800 million. High-level comparisons indicate that there is room for significant improvements in cost-effectiveness, which could be achieved by increasing productivity, reducing fragmentation and support costs, and effectively managing employment costs.
It is therefore important to progressively improve cost-effectiveness. It is very good news that States/ANSPs’ cumulative projections show such improvement, nearly meeting the PRC’s notional target for 2008 (-14% with respect to 2003). The cumulative savings from 2003 to 2008 would then amount to more than €2 billion.

This indicates that a European cost-effectiveness target of reducing the real unit cost by 3% per annum is both reasonable and achievable. Moreover, this target is in line with the strategic design objectives of the ATM industry until 2010, as stated in SESAR Deliverable 2 on performance targets (a 3% yearly reduction of real unit costs until 2010, followed by a 5% yearly reduction until 2020).

For these reasons, the PRC proposed the formal adoption of a European cost-effectiveness target of reducing the European average real unit cost by 3% per annum until 2010. A firm decision is currently pending.

What happens next?

The adoption of European performance targets is a significant step forward. Although not legally binding, European targets effectively contribute to focusing minds and improving ATM performance as shown by recent experience.

The PRC will continue to perform its duty with a view to producing increasingly improved performance reviews and target-setting. It will also seek to persuade, encourage and explain the basis for its recommendations to policy- and decision-makers at all levels concerned.

For further information, please consult the PRC’s website at http://www.eurocontrol.int/prc.
Focus

EUROCONTROL: a performance-driven approach in SESAR

Unsurprisingly, the performance-driven approach directly emanates from the vision of the group which drafted the EUROCONTROL revised Convention and established the Performance Review Commission some ten years ago, and which found an echo in initiatives taken by the European Commission (EC) such as the Vision 2020 for European Aeronautics. Performance orientation was a novel approach in air traffic management (ATM), designed to improve the equation between stakeholder needs and system solutions, requiring the definition and application of new concepts and processes.

Not only has it helped to formulate strategic documents for European ATM, but the performance-driven approach has also progressively translated into concrete actions for short/medium-term planning, in particular the European Convergence and Implementation Plan (ECIP) and the Capacity Enhancement Function (CEF). Various stakeholders have supported the idea since its inception and have directly contributed to improving the level of performance of the European ATM system, as well as facilitated the dissemination of the approach beyond Europe.

It has therefore been from the outset a quite natural feature of the approach taken in SESAR.

What does performance-driven mean?

In essence it represents a fundamental change compared to the traditional technology-driven approach, which has led to adding technologies one by one as they become available. The purpose is now to prepare and take decisions on the basis of...
the identified and foreseen needs of society, air transport and airspace users, and of the expected outcome of the proposed changes to ATM services. Both the needs and the outcome are expressed in terms of performance, and can therefore be included in a comprehensive business case.

**Main actions**

The ATM2000+ Strategy pioneered in 2000 a strategic planning approach, setting performance goals, though not specifically quantified, as the means to define the strategic direction of change.

The EUROCONTROL Provisional Council agreed in 2001 on a capacity target for the medium term of 1 minute average en-route ATFM delay per flight in the summer period, and it has recently added targets for flight efficiency and safety.

The ECIP has been designed to provide for a coherent approach that ensures a continued performance-driven development at network and local level. The ECIP Implementation Objectives refer to change steps in the strategic road map, and describe the performance improvements expected from their achievement. The ECIP objectives are in turn used in the Local CIPs to establish the national plans and propagate common actions. This process is continuously improved and adapted in order to respond to new challenges. The role of the ECIP process in fostering progress and harmonisation within a set of States has been recognised in ICAO and is the subject of a recommendation from the 11th ICAO Air Navigation Conference that it should be used as a model for other regions.

Since 2001 a specific function, the Capacity Enhancement Function, has been created within the EUROCONTROL Agency in order to determine more precisely the capacity requirements of the different Area Control Centres in the next three to five years and the effects of the plans. Discrepancies are analysed in order to determine and, where possible, implement additional measures to provide more capacity. The capacity analysis has been extended to cost-effectiveness.

In the research area, the recommendations of Vision 2020 and its quantified targets for aeronautics have been used by the Advisory Council for Aeronautical Research in Europe (ACARE) to establish a Strategic Research Agenda. These same references have provided the overall political design goals for SESAR.

These different initiatives have converged towards the notion of a European ATM Master Plan, an essential instrument for an ambitious programme: SESAR.

**Key performance areas**

In SESAR, the participation of the airspace users in the Definition Phase has been instrumental in going one step further in the definition of the performance planning approach. The Definition Phase work on this subject is not yet completed, but it has already provided results on at least three aspects:

- performance targets;
- the elaboration of predictive influence diagrams to discuss the expected performance from new concepts;
- the recognition of a notion of performance partnership.

An initial set of indicators targets has been proposed with the second main deliverable (D2) of the Definition Phase, most of which have been quantified. They are based on the expectations of society and airspace users. The SESAR work started from the 11 key performance areas (KPAs) being discussed in ICAO and made a specific effort to identify specific indicators and targets. They are illustrated in Figure 1.

**Figure 1: Key performance areas**
The KPAs have become the reference point for discussing the merits of the future concept of operations for SESAR and technical solutions.

While the assessment of the actual performance of a new system would require substantial validation and extensive simulations or pre-operational trials, it is essential to be able to formulate initial assessments at an early stage of development, based on documented rationale articulated by experts and supported by available data and results from R&D. This is the purpose of the performance influence diagrams which are being defined in SESAR and which support the discussion and assessment of the concept of operations. This will allow a first traceable assessment of the effects of the new features on performance.

**Performance management**

The European ATM Master Plan will consolidate the different perspectives into a comprehensive chain of information, from requirements to solutions, providing the rationale to ensure commitment to the implementation of proposed changes.

The recommendations coming from the SESAR work also stress the notion of performance partnership. Although how it would work remains to be described in more detail, it rightly stresses that the planning and real-time decisions of the main stakeholders (aircraft operators, airport operators and air navigation service providers) are closely interdependent and that overall and individual performance in the ATM network is the result of the actions and behaviour of all, since all address and have effects on a common object: the flight trajectory.

This immediately points to the need for information to be shared so that every stakeholder fully understands the situation and can either make more informed and better decisions or offer alternatives. This is the principle of collaborative decision-making, and an indication that partnership is needed.

Conversely partnership needs to be built on mechanisms that allow this virtuous circle to function. In particular, the means of measuring the effectiveness of the system is to measure its actual performance and compare it to the set targets.

**Performance planning process**

The contribution of European experts has made it possible to reach a high level of consistency within the ICAO and SESAR groups working concurrently. Three main steps, aligned with ICAO, have been identified:

- capturing and understanding requirements;
- analysis of future system performance to determine gaps in the current systems and plans;
- adapting the current plans to eliminate the gaps or mitigate their effects.

Performance orientation provides tools to make more informed decisions in due time, rather than freezing the choice of a technology at too early a stage.

It may also be necessary to apply trade-offs where not all requirements can be simultaneously satisfied. The SESAR Definition Phase will also soon contribute to the understanding of the trade-off mechanisms that would be needed.

Ultimately, the European ATM Master Plan will be the product of the performance-oriented planning in the SESAR Programme.

Early achievements in the application of the approach have been observed. Overall, the benefits of the approach are obvious, but they must be accompanied by rigour in its application to make sound judgments, provide effective advice to decision-makers, and prevent the risk of disillusion that could be the result of haste and misuse.

**EUROCONTROL in the process**

The exact role and contribution of EUROCONTROL will be adapted to the evolving situation and the particular requirements of SESAR. Nevertheless, it is expected that the Agency will continue to play an active role consistent with its overall mission of ATM planning at the European network level by facilitating, coordinating and supporting the efforts of stakeholders in achieving higher levels of ATM performance.

**The way ahead**

The SESAR Definition Phase is proceeding with its main deliverables, applying the approach previously described. The work will then continue in the SESAR Joint Undertaking to ensure that the actions and work can be related to the agreed framework and targets. In parallel, the short-term implementation actions needed to bring performance gains before new developments can deliver will be given a new impetus, being better justified in performance terms, better fitting in the overall transition path and being better supported and therefore progressed more steadily by stakeholders.
Enhancing airport efficiency
EUROCONTROL and Munich Airport celebrate Airport CDM success

On 7 June 2007, Munich Airport became the first European airport to have fully implemented Airport Collaborative Decision-Making (CDM). This was an important event for all the key players involved in this project, namely the EUROCONTROL Central Flow Management Unit (CFMU), the Airport CDM Project Team and the Airport Operations and Environment Division (AOE) as well as Munich Airport.

At 0800 UTC, departure planning information (DPI) messages started to be processed in the CFMU operational system for flights departing from Munich Airport.

The DPI messages are used to provide the CFMU with highly accurate off-block-time and take-off-time predictions based on collaborative procedures established by the airport operator, aircraft operator and ATC. The CFMU updates its operational flight profile data and makes them available to all CFMU users, particularly at downstream and arrival units.

Extensive operational trials with Munich were carried out both in October 2006 and more recently in May 2007. The results demonstrated the added benefit of having this updated accurate information sent to the CFMU. For Munich, the benefits are clear. The accurate data they are supplying allows the CFMU to issue slot times directly linked to the time the aircraft will be ready to depart, so minimising any delays. For the CFMU, the data also allow more accurate traffic prediction and therefore more efficient management of the ATM network.

Although Munich is the first airport to become operational with the CFMU, it is expected that Zurich and Brussels will also reach this status later this year while other CDM airports will follow next year.

Airport CDM is seen as the mechanism to increasingly integrate airports into the air traffic management network, and the exchanging of DPI messages is essential for this integration to be successful.

The EUROCONTROL Airport CDM Programme is already improving the operational efficiency of a number of European airports, delivering benefits such as greater predictability and reduced taxi times by 10% on average. The fuel saving at Munich alone is €2.65 million per annum (18,700 tonnes of CO2). This is achieved by encouraging all the main airport partners to share operational data in a transparent way, often requiring cultural change, which in turn leads to enhanced decision-making processes and operational efficiency coupled with improved use of airport resources and infrastructure.
A performance-driven approach to air traffic management

For many years industries have been adopting performance-driven approaches in the management of their business. They have had to do so in order to avoid going out of business. This does not strictly apply to air traffic management (ATM). However, managing the performance of ATM is of crucial importance for the business of stakeholders making use of ATM, and not least for the benefit of the millions of passengers using air transport.

The EUROCONTROL Agency has for some years now been developing and promoting a performance-based approach in ATM. The Agency also contributes to the development of guidance material at the global ICAO level. A global approach is essential. Aviation is a global business and performance areas such as safety, security and the environment require a global approach. At the same time, it is crucial to ensure a consistent and globally interoperable performance-based transition to the Global ATM Operational Concept.

The Global ATM Operational Concept describes how the global ATM system should look, for example in terms of design and operations. One of the main objectives of the concept is to respond to performance needs, such as the need for more capacity and the need for higher flight efficiency, which has also an important environmental benefit. The most difficult part of any target concept is the transition to that concept. This is because it requires many types of coordinated changes and good stakeholder cooperation. Changes often go hand in hand with required investments, for example new/updated avionics, for which there should be ample compensation in terms of benefits. This is one of the reasons why the transition to the Operational Concept also needs to be performance-driven.

The ICAO 11th Air Navigation Conference held in 2003 endorsed the Global Concept, which has since been the official reference for the ICAO Regions for their performance-based ATM evolution plans. The ICAO Global Concept is also the reference for Europe and in particular for the SESAR Programme. However, this reference requires further Region-specific details in order to be of use for regional transition programmes such as SESAR. The SESAR Operational Concept adds that level of detail and was developed as part of the third milestone deliverable.

But how do we move from today’s ATM system to an ATM system compliant with the Concept? In other words, how does performance-based transition work?
It all starts with a good understanding of the performance of the ATM system. This understanding includes knowledge of the past and current performance but also of the principles of how to measure, analyse and report on performance. Ideally one should be able to answer questions such as “what is the current safety level?” and “what is the current capacity?” before planning transition to the target concept. Understanding also includes knowing how to set achievable performance targets and how to select the best improvements in order to meet these targets.

Performance-based transition is the strategic part of performance management. It generally has a planning horizon of 20 years. Such a long planning horizon is necessary because of the long lead and implementation times required for new performance improvements. For example, the development and validation of new standards and also agreement on new regulation take many years. The short- and medium-term part of performance management is focused on optimising the performance of the existing system and the deployment planning of existing performance improvements.

The EUROCONTROL Agency has contributed to the Performance Based Transition Guidelines published by ICAO. This document explains step by step how to develop (for the first time) or update a performance-driven roadmap of operational improvements (performance improvements). The figure below illustrates the main steps.

This approach consists of three main steps and results in a new or updated roadmap of improvement steps (changes) towards the future ATM system.

The objective of the first step is to agree and set the performance targets. Performance-based transition planning is a collaborative effort, which relies on proactive stakeholder participation and involvement. However, because of the sometimes different performance requirements, it is not always possible to achieve a result which is satisfactory to everyone.

Setting performance targets starts with a good appreciation of the ATM community expectations. These are high-level and not quantified statements such as “aviation should be safer” or “ATM should be cost-effective”. It is difficult to plan a system on such a basis. It is therefore necessary to get into more detail. This is provided by the performance objectives. An example of an environmental performance objective is “Noise emissions and their impacts are minimised as far as possible for each
A performance-driven approach to air traffic management

Flight. There is still no quantitative information which is required for transition planning, but it zooms in on a specific area.

Targets are by definition quantitative, timed and should be realistic, i.e. achievable. Before setting targets, it is necessary to understand and define how the achievement should be measured. This may sound obvious and simple, but it is the often overlooked “engine room” which is required for performance management. This engine room consists of processes and systems for information and data capture, statistical analysis and reporting. It provides the necessary understanding of the past and current performance of the ATM system. Without such a basis, performance management becomes a façade rather than the very useful tool which it should be.

A target can for example be a noise level around an airport that should not be exceeded, or a reduction in route charges by a certain year, or a reduction in safety incidents by a certain year.

The second main step in the performance-based approach is to identify any performance gaps. This requires a good understanding of the performance of the ATM system and how that performance is expected to evolve on the basis of the current improvement plans. The figure below illustrates an example of a performance gap (the expected performance exceeds the set target which could for example be a maximum noise level).

The timing of the performance gap defines when a new improvement needs to be available and needs to deliver performance benefit. It is even more important to understand what the improvement should be.

The analysis of the performance gap and identification of the reasons for it is the bridge to the next and third main step in the performance-based transition approach. Not only should the reasons be understood, this understanding should also be shared among stakeholders.

The third step is about finding the right solution and updating the roadmap. The starting point is the Operational Concept, since the improvements need to be on the path towards the concept. The ICAO Global ATM Concept is used as the global reference but is too general for regional and local transition planning. Consequently, regional transition programmes, such as SESAR, have developed a more detailed Operational Concept. This Concept represents the target for the foreseeable future.
The changes to the ATM system delivering performance improvements are called the operational improvements. They are at the same time the transition steps towards the target operational concept. Examples of operational improvements are the reduction in vertical separation (RVSM) and the introduction of continuous descent approaches (flight efficiency/environment).

In many cases, bringing about an operational improvement requires new systems to be implemented or existing ones to be updated, regulations, standards and procedures to be developed/validated, and training to be developed and given. These are called enablers. By identifying and analysing the enablers and assessing how long it takes to introduce them, an assessment can be made of when the operational improvement can be implemented. It is also necessary to make an assessment of the cost of the improvement and to assess whether the estimated costs are justified given the anticipated benefit.

Proof needs to be provided that the improvement is a response to the performance gap (identified in step 2) and that it provides the expected performance. This proof is usually provided by validation/research activities. However, increasingly for long-term improvements, there will be uncertainties for example as regards the performance benefits of the improvement. This is normal. Identifying the critical areas of uncertainty is important and should be used to steer and focus research (the objective of research is to reduce uncertainties).

There are 11 key performance areas (KPAs). The key ones are safety, capacity, cost-effectiveness, security and the environment. For each of these KPAs, performance objectives and targets have to be set and improvements have to be identified and developed to meet the targets. The roadmap should include a complete set of operational improvements satisfying the requirement set in all selected key performance areas.

This sounds complex. On the other hand it is important to make a start and to keep things simple, for example by using a limited set of objectives and targets (those for which there is performance information available) and to learn. In fact, performance-based transition is a continuous learning process.

Reaching agreement on operational improvements and the roadmap is challenging, because different stakeholder groups value performance in different ways. Transparency, good communication and stakeholder participation as well as good performance understanding are key to bringing parties together behind the same strategic plan.

Developing or updating the strategic roadmap is an intensive task requiring broad and frequent involvement of stakeholders and therefore cannot be carried out on a regular basis. Moreover, stability is required, since the roadmap is used to steer and drive research and development work but also activities such as standardisation, legislation, etc.

The typical period between roadmap updates is about five years. However, this does not mean that in between updates there is no need to maintain the information. On the contrary, maintaining the information (such as that derived from performance review, validation, etc) is important in order to build on the previous roadmap.

The Performance-Based Transition Guideline document has been developed with substantial Agency input and is based on the experience the Agency has gained over the years, for example with the development of the Strategic Performance Framework. The same experience is currently being used in the SESAR Programme which will deliver the European ATM Master Plan by March 2008. This will include a roadmap of improvements from today’s European ATM system to a European ATM system compliant with the SESAR concept.
It has however become increasingly clear that the military ATM performance framework needs to be much broader and cover all the key performance areas (KPAs) and indicators (KPIs) identified in current ATM developments, more specifically the Single European Sky (SES), Single European Sky ATM Research (SESAR) and the Dynamic Management of European Airspace Network (DMEAN).

Furthermore, it is not only military performance but civil-military interface performance that should be further developed.

The recently created EUROCONTROL Civil-Military ATM Coordination Directorate has taken as a priority task the development of a coherent military and civil-military ATM performance framework, covering all the performance areas in line with the SES, SESAR and DMEAN performance framework.

**Current status**

Performance will be a major driver in ATM. Within the scope of current programmes the definition of KPAs and KPIs is particularly important as they will tailor the future ATM system.

The figures 1 and 2 illustrate the different clusters of KPAs and corresponding KPIs in the SES and SESAR.

**Example of civil-military KPI**

In the short and medium term, the performance of the FUA implementation will be one of the main objectives for airspace-related civil-military KPIs.

In the framework of DMEAN, the use of airspace (Conditional Routes – CDR usage) released by the military has been identified as a key civil-military performance indicator.

This is an important KPI to actually assess the performance of FUA, and should be coupled with the military KPI ‘Release of airspace before schedule’.

‘Release of airspace before schedule’ will give an indication of the ability of the military units to release airspace which was booked but not used for whatever reason, e.g. mission cancellation due to weather. However, this information per se does not mean too much if it is not accompanied by the corresponding civil-military KPI ‘Use of airspace released by military’. It is the combination of this pair that will provide the necessary information for an appropriate assessment of FUA performance.

In a similar way in other areas such as interoperability, safety, security, etc., we can identify pairs of civil-military KPIs, which combined together will give us a valuable indication of civil-military interface performance.

**The vision**

EUROCONTROL is a civil-military organisation. The development and implementation of a coherent set of civil-military KPIs will greatly facilitate the achievement of EUROCONTROL’s strategic objectives and SESAR developments.

ICAO and EUROCONTROL Strategic Objectives should be seen as the main background for KPA and KPI development. These objectives include inter alia national security, national and international defence requirements, airspace security and ATM security. Notwithstanding the fact that in all these areas the military play a key role, the main aspect to highlight is the strong need for robust civil-military cooperation and coordination to be able to fulfil the strategic objectives.

The EUROCONTROL Agency is fully committed to supporting military organisations and States to enhance the civil-military interface through the development of a coherent civil-military ATM performance framework.
Military organisations have shown themselves to be cooperative and transparent when providing data to measure KPIs. The EUROCONTROL Performance Review Report 2006 has dedicated a chapter to the civil-military use of airspace, where the provision of data by military organisations was a fundamental step. The EUROCONTROL Directorate of Civil-Military ATM Coordination (DCMAC) is encouraging military organisations to be fully transparent and open with regard to provision of performance data, as the best way to overcome former concerns and enhance confidence and partnership.

DCMAC in close cooperation with military organisations and other EUROCONTROL units will progress a civil-military ATM performance framework. A first draft document has been developed and the consultation process is under way. The initial broad support received so far suggests we should be optimistic regarding the way forward for this initiative.

The objective of the document is to enhance civil-military cooperation and coordination through the development of the civil-military and military performance framework addressing all areas and indicators where civil-military cooperation can be improved.

Another initiative in close cooperation with the EUROCONTROL Performance Review Unit (PRU) is the provision of an annual report on civil-military ATM performance. This is considered to be a fundamental item of information for ATM managers and planners, since it will constitute a very valuable benchmark for further improvements.

**Conclusion**

Future ATM will be performance-driven. Successful implementation of well-defined civil-military and military KPAs/KPIs will significantly facilitate enhanced levels of civil-military cooperation and therefore support the implementation of the SES.

The military community is in the process of aligning its performance framework to ongoing pan-European ATM initiatives. Appropriate KPAs, KPIs, performance targets and measurements are being defined in line with developments in SES, SESAR and DMEAN and user needs.

Transparency and openness in the provision of data for performance measurement will not only result in reliable KPIs but even more importantly will also enhance mutual confidence and trust among all the ATM actors.
Passengers, the ultimate consumers of the ATM product, have a right to information about the service they are getting, and a right to be assured that its quality is measurable against defined safety parameters they can trust. The independent Performance Review Commission (PRC) has been providing this kind of information annually since its first report on calendar year 1998, but although it is valued within the industry for identifying benchmarks and raising standards, its work – and remains – "to ensure the effective management of the European ATM system through a strong, transparent, and independent performance review and target-setting system".

In 1999, one year after it was set up, the PRC produced its first report about European ATM performance in the previous calendar year. It covered three key performance areas (KPA): safety, delays and cost-effectiveness. In May this year, the PRC published its 10th report, covering ATM performance across Europe in 2006 (PRR 2006), with a new key performance area (KPA) called "flight efficiency". Put simply, this involves a comparison of how far an aircraft flies and how long its journey takes compared to the minimum distance and time between the point of origin and destination. One vignette of relevant information from the report: the PRR 2006 reports that the average intra-European flight travels 5.9% further than the distance between terminal areas. This indicates a potential area for improving the industry’s environmental effectiveness, points out Williams.

Back up the 12 members of the PRC are the ten permanent employees of the Performance Review Unit (PRU). The PRU gathers data and, in addition to the annual PRRs, helps the PRC produce specialist reports like the annual benchmarking reports on air navigation service providers’ cost-effectiveness, and on other subjects like the effect of the Single European Sky (SES) initiative on ATM performance.

So after ten PRC reports, why is ATM in Europe still little understood outside the industry? The reports are there – in plain language – on the web. The data has been publicly available for nine years.

Sheer system complexity, rather than lack of transparency, appears to be the reason. Despite years of work by EUROCONTROL and ECAC, and despite the Single European Sky initiative, European ATM is not an entity. It is a gradually converging cooperative of national organisations which may be operating in a far more harmonised way than they used to not long ago, but it is still a long way from its declared, fully integrated destination. Revealingly, one of the recent PRC reports is entitled: “Report on the impact of fragmentation in European ATM/CNS” (communication, navigation and surveillance).

Consequently the total system is less efficient than it could be, and national standards still vary considerably, as PRR 2006 confirms. Williams points out that there are still 24 national aviation authorities (NAAs) and 19 air navigation service providers (ANSPs) performing below the KPA minimum target.
levels for safety management and regulatory maturity, and the deadline for achieving the set objectives is the end of 2008. Fortunately for most European travellers, Williams emphasises, the ANSPs that have reached the expected standards are those that handle the majority of Europe’s passenger traffic: about 75% of it, in fact.

Efficiency and cost-effectiveness may not be perfect, Williams admits, but it is getting measurably better. He also points out that it is difficult to prove the PRC’s work has been the motivating cause for improvement, but European ATM cost-effectiveness measured in euros per kilometre flown began to improve in 2003 having previously been almost level for more than fifteen years. Since then it has not only continued to improve annually, but the projections forecast further efficiency gains nearly meeting the target rate of 3% a year. He adds: “We do believe that we are having a fair amount of influence.”

Williams explains some of the changes: “Many of the ANSPs are seriously interested in benchmarking. That’s a very powerful thing. I have seen a change in my four years at the PRC. I think what we are seeing is that many of the ANSPs now have chief executives that have come from outside industries – plus those like me that have come up from the grass roots – who understand what running a business is about. They understand the importance of a relationship with their customers.” He points out that the airlines, through their user associations, are able to use the information provided by the PRC. “That is good,” he remarks. He also expresses confidence that the European Commission will use PRC data to apply pressure on national agencies to ensure targets are met.

On safety concerns – given that the system is not starting from a state that could remotely have been described as dangerous – Williams remarks: “Some progress has been made, but not enough.” He explains: “One of the things that surprised me when I took this job four years ago was a lack in many of the ANSPs of safety management system (SMS) processes. Many States just didn’t have an incident reporting process at all. A fair amount of progress has been made, but it’s still an area that concerns me.” He points out that it is not a problem that always originates with individual ANSPs or their managements, explaining: “There are still some States that have legislation which actually discourages air traffic controllers from filling in incident reports. This just does not make any sense at all.”

The report on 2006 says: “Incident reporting has improved considerably since 2001, which gives better visibility on ATM safety issues and more opportunity to prevent accidents. However, incident reporting is inadequate in a number of States.” But contrast that with an extract from the PRR 1998: in that year, 14 States said they had a reporting system, one declared it did not, and ten gave no response to the PRC’s enquiry. In the same report, the PRC observed: “Reviews of European ATM performance in terms of safety are presently severely constrained by the unavailability of data, the absence of harmonised definitions for categories of incidents beyond those defined by ICAO, and the inconsistencies in the application of those definitions that are available. Levels of reporting also differ widely, preventing the ECAC-wide aggregation of figures, and the entire process is made more complex by confidentiality issues.”

The improvement is evident, even if there is still a long way to go. Meanwhile Williams is adamant about the PRC’s independence. “We don’t go representing States. We take with us the experience of our life in ATM and interpret the data provided by our ten full-time colleagues in the PRU.” Okay, but do people in the business put pressure on you? “Inevitably organisations put pressure on you, but I think we have maintained our independence. I am pretty confident of that. To be fair to Victor Aguado [the Director General of EUROCONTROL] he will express a point of view, but he has never tried to tell me what to say. I respect him for that.”
Social partners point the way on functional airspace blocks

Report by the Social Dialogue ATM Work Group on the implications of FABs

by Laurence King, Deputy President of the Joint Air Traffic Management Working Group (JATMWG) of the European Transport Workers Federation (ETF)

In September 2004 CANSO and the European Transport Workers Federation (ETF) hosted a joint conference on Functional Airspace Blocks (FABs). This conference brought together 150 participants representing air navigation service providers, the trade unions and professional organisations. Since then, FABs have become the keystone of the Single European Sky (SES) initiative. They sometimes seem to be the only element of the initiative. The European Commission and the airlines, however, complain of a lack of progress. Yet one glance at the Joint Report on FABs published by the social partners will perhaps tell you why progress has been slower than some may have expected.

Air traffic management is a sector of aviation in which employers and employees are committed to the success of the SES and in which social dialogue has a powerful influence on any structural changes that the industry will undergo. Following on from the successful Palermo Conference in 2004, the social partners carried out a joint study to explore the issues of FABs. That study was presented to the European Commission and Parliament in February 2007.

One size does not fit all

The study concluded that one FAB model does not fit all the circumstances that exist across Europe. This fits in with the initial work done by a number of States, trade unions and service providers. So far, no one has come up with a definitive blueprint for an FAB. What does an FAB mean? FABs are of course much more than airspace design projects. The creation of FABs will clearly involve complex processes, requiring a phased and step-by-step approach, with associated outputs identified, and added-value to be assessed and confirmed throughout.

The joint study also identified that all stakeholders had to be included in the process. It is vital that airlines, the military and States are involved. Early consultation between the social partners and involvement in the decision-making process is central to the development of FABs. The “bottom-up approach” implies that service providers have the right and obligation of initiative with the appropriate involvement of staff and users (civil and military) from the beginning of the process. Air navigation service providers and their respective employee representatives should agree consultative arrangements that provide for involvement at such a stage that influence over the decision-making process is ensured.

If States are taking the initiative, then it is equally important that they develop proper consultation arrangements. It is unacceptable for Member States simply to come along and tell the service providers and their employees that they are launching an FAB. If FABs are to bring the additional capacity that is required, then staff and all other stakeholders must actively support the process.

The report recognised that FABs could lead to changes in conditions of employment. Where the implementation of an FAB could in principle lead to a significant change in the roles and/or locations of workers in more than one country, the social partners will consider how to handle the resulting social impact. If major change is going to impact on staff, then the appropriate negotiating machinery has to be put in place to deal with these changes. This includes the creation of cross-border negotiating forums involving all unions.

The joint report has identified five different phases of development: initiation, feasibility, planning, decision and implementation. Each of these phases requires a different approach to consultation. In many cases, this will involve various partners and therefore different consultation arrangements. Each of these phases will take time. It is vitally important that all the stakeholders buy into the change if we are to develop capacity.

The report also recognised that there is no legal requirement in the Single Sky regulations for FABs to address consolidation of service provision.

Furthermore, it is widely recognised that an FAB does not require the concentration of all air navigation services functions at one site. Several area control centres (ACCs) of several service providers can contribute to one FAB. If staff are to continue to support the SES, then we need some acceptance that they simply cannot be treated as commodities that can be shipped around Europe at the whim of an employer.
Skyway 45 - Summer 2007

FABs are much more than airspace design concepts and may encompass enhanced cross-border cooperation which would have to deal with a number of issues, safety and performance management, air traffic flow capacity management (ATFCM), flexible use of airspace (FUA) and functional integration to name but a few. In creating FABs, we must have plans in place on these issues:

- civil/military cooperation and joint planning;
- common planning and design criteria for airspace and sectorisation;
- human resources management and training;
- legal liability.

**Social dialogue will be the key to success**

Social dialogue will be the key to success. The service providers are addressing FAB implementation with their staff representatives. The challenge is to encourage a cost-conscious culture and to optimise resources. Air navigation service providers know best how to find the most appropriate way to lead their staff through change and to keep them motivated in order to cope with traffic growth.

The social partners also accepted that accelerated implementation can be obtained with public funding and incentives. The ATM social partners certainly agree that public funding can be necessary to accelerate implementation. Also, the idea of incentives could be considered in order to positively influence cooperation, but we in the trade unions remain unconvinced that incentives are the best measure for service providers.

**The complexity of the transition process and related costs is generally underestimated**

The ATM social partners feel that airline representatives and political decision-makers do not fully appreciate the complexity and timeframe of FAB projects, for example in terms of the international agreements and sovereignty/liability issues that are necessary for the implementation of FABs.

Forced consolidation models for FAB implementation are not supported by the ATM social partners. The “top-down approach” of 4-5 FABs for Europe based on theoretical studies is not supported by the ATM social partners. We believe that resistance to this type of approach should not be underestimated.

The idea of a single service provider for Europe, as suggested in some discussions, is not supported either. Analysis of such a solution provides no serious evidence that it would enhance safety and/or cost-effectiveness. In addition, there is no legal requirement in the Single Sky regulations demanding consolidation of service provision.

Performance measurements are supported by the ATM social partners on cost-effectiveness and safety. The ATM social partners support the work of the PRC/PRU on the measurement of cost-effectiveness. The ATM social partners will also support performance measurement on safety data, once that process and methodology have been agreed.

**Improvements in safety are a must**

FABs will also need to see a new approach to a "just culture" in the European Single Sky. Ensuring safety has to be our top priority and improving reporting systems is key to improving safety as traffic grows. The report identified four main barriers to creating a better reporting culture in ATM. Firstly, national laws in some Member States prohibit adequate legal protection for occurrence reporting. Secondly, there is no EU requirement on Member States to set up voluntary reporting systems which protect the reporter. Thirdly, there is a lack of understanding of what we mean by a just culture on the part of judicial authorities and the wider public. Finally, there is a lack of trust between staff and management at some service providers. All of these barriers must be overcome if we are to bring about the improvement in safety that is required.

This report is not a blueprint for FABs. What it does do is examine some of the problems associated with the creation of FABs and also come up with some solutions. It is the best attempt so far at establishing the key processes for developing successful FABs. Its main conclusion, however, is that it is only through dialogue and consultation, particularly with staff, that FABs can successfully be created. This is a conclusion which should not be ignored by Europe’s rule-makers.

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**Laurence King** is an air traffic controller based at the Manchester Area Control Centre in the UK. He also spent 12 years at the Scottish and Oceanic Area Control Centre in Prestwick. He has been active as a lay trade union representative in the UK and participated in particular in the debates on the privatisation of air traffic control. He is currently the Deputy President of the Joint Air Traffic Management Working Group (JATMWG) of the European Transport Workers Federation (ETF), and will succeed Jean-Pierre Etienne as President during the summer. He co-chaired the Sub-Group Consultation on FABs between the social partners.
Air traffic management performance: AEA’s point of view

The inefficiencies of the current European air traffic management (ATM) system are well documented in the Performance Review Commission reports: low productivity, cost-inefficiencies and fragmented services are the causes of the performance shortfall of the European system.

by Vincent De Vroey, General Manager, Technical and Operations, Association of European Airlines (AEA)

The total economic cost to airspace users (including charges, delays and flight inefficiencies) in 2005 was around €9.4 billion per annum, but this could be reduced by €3.4 billion if the system operated more efficiently.

As stated by the EUROCONTROL Performance Review Commission (PRC) in its last report (PRR 2006) cost-effectiveness of the European ATM system is a major performance issue: there is evidence that cost-effectiveness could be greatly improved by increasing productivity, reducing fragmentation and support costs, and effectively managing employment costs.

The direct costs of inefficiencies as a result of low productivity and high support costs were approx. €2 billion in 2005, and en-route inefficiencies result in an estimated additional cost of €1.4 billion per year. These inefficiencies also have a direct negative impact on the environment1, given the increased level of emissions produced. (according to PRR 2006, 4.7 million tons of CO₂ per annum).

For European operators it is essential to rebalance the aviation value chain by improving the efficiency of the ATM infrastructure, and this is also an important pillar of the industry’s emissions containment policy. AEA is the voice of 31 European airlines. In 2004, AEA published an action plan to pursue such objectives; one of the most important elements of this action plan is improving the efficiency of the European ATM system.

Days of change

This need for change is not only recognised by the airspace users – the European institutions too are actively tackling the need for a structural reform. The European Commission is developing a new ATM regulatory framework through the Single European Sky (SES) legislation and SESAR development, which have created the momentum for a major change in the current ATM system towards achieving a Single European ATM system from an operational and technological point of view.

SESAR was launched to develop the technical/operational complement to Single European Sky and constitutes a new approach to reforming the ATM infrastructure in Europe, deriving many performance and operational benefits. However, SESAR alone is not sufficient; airlines cannot wait until 2020 to realise the full benefits of a Single European Sky. In addition, the transitional costs of moving to the new, more beneficial end-system are expected to be very high. This could jeopardise the implementation of SESAR, and therefore, there will be a need for substantial EU public funding for it. In this context, airlines, as customers of the system, should pay only for services received, and should not be prefinancing investments and technology development.

1- On the subject of aviation’s environmental performance, readers are invited to visit www.enviro.aero, a global cross-industry initiative providing information on the steps taken by the commercial aviation industry to limit its impact on the environment.
**AEA’s vision**

The airlines want a single European sky, with less fragmentation, more flexibility and overall efficiency. It should consist of a minimum number of Functional Airspace Blocks (FABs) based not on national borders but on traffic flow requirements, capacity and cost-efficiency, each managed by one authority. FABs need to be developed according to operational needs but also take account of safety, airspace capacity, cost-reduction objectives and environmental improvements through increased flight efficiency. Achievement of this objective requires political commitment and monitoring at the highest level.

**In conclusion**

The current European ATM system is highly inefficient, costing the airspace users around €3.4 billion per year. Therefore a major restructuring of the system must be undertaken in order to rebalance the whole aviation value chain. SES and SESAR are the main drivers for this change, but the benefits will materialise in the long term and the costs of the implementation are expected to be very high.

For this reason, some quick-wins should be pursued in the short term, such as the hiving off of the ancillary services, economic regulation of air navigation service provision, and a fundamental reform of the ATM governance structures. All these initiatives should support the successful (fully operational) implementation of the FABs.

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**The CASIMO Programme**

The Danish air navigation services provider Naviair is soon to implement its new ATM system.

Denmark will have a new ATM system including a new control tower at Copenhagen airport by the end of 2007. This development is the result of the implementation of the modernisation programme known as CASIMO, consisting of more than 50 different integrated projects.

In view of the certification of the Danish air navigation service provider Naviair by the National Supervisory Authority this year, the safety case for CASIMO will be based on the latest guidance material produced by EUROCONTROL.

In this context, EUROCONTROL and Naviair have recently concluded an agreement whereby the EUROCONTROL Agency will support the development of the safety case and take part in the related quality assurance. This project is managed by the Stakeholder Implementation Services Division and will be carried out by experts (Mr Patrick Mana and Mr Jean-Michel de Rede) from the Safety, Security and Human Factors Division.

The future developments of the CASIMO ATM system will take place within the frame of the “COOPANS cooperation” between the northern European air navigation service providers LFV Group, IAA and Naviair, and the supplier of the main ATC system Thales ATM.
Network Operations Plan
2007 edition: preparing for major changes in 2008

On 13 April 2007, the EUROCONTROL Central Flow Management Unit issued the third release of the Network Operations Plan (NOP) document, representing the consolidated view of all ATM partners’ plans across Europe for the following season.

This is an improvement initiated within the Dynamic Management of the European Airspace Network Programme, known as DMEAN. It covers technical integration issues as well as enhanced processes for improved information-sharing between all partners.

Born under the DMEAN umbrella

The concept of the NOP, proposed in the DMEAN Master Plan, is a response to ATM long-standing issues, such as the fragmentation of information, the lack of a clear and user-friendly display of the airspace and air traffic flow and management situation, the lack of a common view on ATM partners decisions, and the poor use of short-notice updates, leading to a lack of reactivity and flexibility.

Against this background, the NOP represents a consolidated set of airspace, flow and capacity plans, including the outcome of demand and capacity balancing in advance of the day of operations, and reflects the updated pan-European network situation. It is progressively refined from the strategic phase up to the real-time operations.

2007 edition: web enhancements and regular updates

The NOP 2007 edition now benefits from a web edition with improved navigation by topic and search facility, and the possibility of retrieving area control centres via a map. Furthermore, all updates are posted immediately on the homepage of the NOP website. The document style has also been improved for better readability.

In advance of each AIRAC date, updates are published as news items displayed on the NOP website homepage for:

- special events
- significant military exercises
- short-term airspace improvement synopsis of the Route Network Development Sub-Group;
- area control centre updates.

Some sections have received extended contributions, such as the military exercises.

The General ATFM measures and tools section has been updated, and now features new web-training packages, ASM/ATFCM trials evolutions and operational improvements.

Preparing for the 2008 NOP portal

CFMU has initiated three concurrent sub-projects to prepare for a major change for the 2008 NOP summer edition: the implementation of a network operations portal accessible to the whole ATFM community.

Extended collaboration with the NOP contributors

The intention is to strengthen and improve the cooperation arrangements currently in place with NOP contributors. Flow Management Positions (FMPs) and
air navigation service providers’ ATCFM managers will be provided with the initial input elements of the NOP (previous ATFCM reports, ATM Network Capacity Plan, STATFOR forecasts, etc.) at an early stage in the planning process. All updates to these documents will also be provided as soon as they are available. A shared space for downloading previous information and uploading draft contributions will also be provided.

The role of the FMP regional meetings as a critical input and validation of the NOP content will be strengthened, as will the role of the Meeting of Directors of Operations preceding publication. A similar process will gradually be developed for the airport and military exercise domains with the appropriate partners.

**NOP portal mock-up for stakeholder consultation**
The NOP portal will be the main vehicle of ATM operations planning, complementing the current operational systems. It is therefore essential that all stakeholders’ needs be taken into account in its development.

The Operational Coordination Sub-Group, in charge of operations and development (ODSG), has nominated a group of experts to participate in this consultation process which is to take place in summer and autumn 2007. The CFMU will provide a mock-up of the future portal layout, to assist the collection of requirements.

For the NOP portal first edition (spring 2008), the components will mostly be extracted from the current CFMU operations website, the CIA application and the NOP document.

**Portal integration with the CFMU systems**
The objective is to close the gap between the network operations planning and the tactical operations through technical integration. The technical project supporting the development of the NOP portal is quite complex owing to the multiplicity of the components to be integrated. In addition to the implementation of a new portal infrastructure (so called “portal access layer”) and the integration of existing contents, the CFMU access management will also be reviewed, and gradually the back-end applications will be adapted in order to provide components for timely integration into the NOP.

**More ambitions for the future**

In the years to come, through incremental evolutions, the portal is expected to provide tangible support for the implementation of the future collaboration workflows which will be designed to address future ATFCM challenges. In that sense, it can be considered as one of the essential building blocks that will pave the way for the future SESAR implementation.

www.cfmu.eurocontrol.int/cfmu/nop

The summer 2008 edition of the NOP portal will optimise the daily efficiency of all the ATFCM players involved in planning and monitoring activities.
The ICAO Worldwide Symposium on Performance of the Air Navigation System

An epoch-making Symposium on Performance was held at ICAO’s Headquarters in Montreal from 26 to 30 March 2007. Its key objective was “to create awareness among government policy makers and regulators, air navigation service providers, airport operators and airspace users of the need to create a performance network for the purpose of enhancing safety and efficiency in the air navigation system.”

Roberto Kobeh González, President of the Council of ICAO:
Ensuring the viability of the air navigation system of the future.

The Worldwide Symposium on Performance of the Air Navigation System (SPANS) attracted more than 250 regulators, air navigation service providers, airport operators, airspace users and other interested parties for a focused discussion on the performance of the world’s air navigation system.

The meeting was an opportunity for the world aviation community to update itself on the migration from a technology-driven to a performance-based air navigation system. It also set the stage for further discussions on the overall topic of air navigation at the 36th Session of the ICAO Assembly, from 18 to 28 September in Montreal.

Mr Roberto Kobeh González, President of the Council of ICAO, set the tone for the five-day event by suggesting in his opening remarks that the emphasis now placed on performance was a direct result of the growing reality of privatised air navigation services and the ensuing pressure for greater accountability. He emphasised that the aviation community should respond accordingly when designing, planning, implementing and operating the global air navigation system.

“The answer lies in the Global Air Traffic Management Operational Concept endorsed by the Eleventh Air Navigation Conference (AN-Conf/11) of 2003. For the first time and under the auspices of ICAO, stakeholders of the world aviation community jointly formulated at the Conference a vision for an integrated and globally harmonised air traffic management (ATM) system, with a planning horizon up to and beyond the year 2025,” said Mr Kobeh González.

He added that “an interoperable global ATM system would apply to all users during all phases of flight and meet agreed levels of safety (…), provide for optimum economic operations, be environmentally sustainable and meet national security requirements. In short, the Operational Concept outlines a total system performance framework to achieve defined requirements.”

Along those lines, the Symposium was considered to be one of the most substantive air navigation gatherings in many years.

The need to meet the expectations of the ATM community when designing, implementing and operating the ATM system, was strongly endorsed. These expectations included safety, efficiency, access and equity, capacity, global interoperability, cost-effectiveness, security and protection of the environment.
SPANS was an event that was designed to differ in structure and intent from traditional ICAO meetings in that it was not asked to produce conclusions and recommendations. Rather, it was thought of as a natural follow-up to the benchmarking results of AN-Conf/11, while taking into account significant and more recent developments such as the revision to the Global Air Navigation Plan accepted by the Council of ICAO in November 2006.

Originally entitled Global Air Navigation Plan for CNS/ATM Systems, the revised Plan is based on the recommendations of AN-Conf/11 and two related industry roadmaps created following the Conference. In essence, it is part of an integrated set of tools and guidance material, which includes the Global ATM Operational Concept, ATM

Performance was addressed from several perspectives: safety, economic and management, operational/infrastructure and technical.

The European input, through work done in ICAO Panels, briefings and presentations, stood out from the rest. Prior coordination and preparation done at a well-attended meeting on 5 February 2007, organised jointly by EUROCONTROL and the European Commission, strengthened this contribution, avoided duplication and ensured consistency.

The topics of the Symposium covered important aspects of work programmes of the EUROCONTROL Agency, notably those relating to European Air Traffic Management, the Performance Review Commission and the Safety Regulation Commission. Besides this, the Agency – in close collaboration with stakeholders – also made contributions on ICAO working arrangements, such as the ATM Requirements and Performance Panel (ATMRPP) and the Air Navigation Services Economics Panel (ANSEP).

Recognising the importance of this event, EUROCONTROL dedicated considerable resources to it – delivering one keynote speech, giving five technical presentations and providing the Symposium with two moderators. Keith Williams, Chair of the Performance Review Commission, made his presentation, which had been fully coordinated with the Agency.

Victor Aguado, Director General of EUROCONTROL, pointed out in his opening keynote speech that the European air traffic management system has benefited from a systematic continent-wide performance measurement and review system. He noted that such an experience could usefully be developed on a global level. Performance management, he observed, has meant evolving from a national level to a more regional level. While the system used in Europe was designed to deal with that continent’s own complex circumstances, some of its features could well be of interest to other parts of the world. By exchanging information on their experiences, all regions could have the opportunity to raise their performance levels, he concluded.

Bo Redeborn, EUROCONTROL’s Director of ATM Strategies, gave a com-
The ICAO Worldwide Symposium
on Performance of the Air Navigation System

Datelines

Systems Requirements and Performance-Based Transition Guidelines that will guide the implementation of CNS/ATM systems and usher in the global ATM system envisioned in the operational concept.

ICAO has integrated this work into its new Business Plan, which stresses the implementation of harmonised air traffic management systems and performance-based efficiency improvements, as well as increased functional integration between ICAO Headquarters and Regional Offices. Through innovative methods, the Global Plan will facilitate the planning and implementation of important operational developments that have taken place in recent years, particularly with regard to aircraft capabilities. It will also ensure that opportunities that have emerged as technologies have matured, as research and trials have been successfully concluded, and as procedures and specifications have been finalised, are fully exploited.

Associated guidance and interactive planning tools for States, regional planning groups and air navigation services providers will be used to establish performance objectives and implementation time lines. The Global Plan will thus become the baseline for measurable achievements as the global ATM system continues to evolve from systems-based to performance-based. States and regions will be able to select initiatives tailored to their particular needs in order to meet agreed performance objectives.

Against this backdrop, SPANS participants were able to enhance their knowledge and comprehension of technical, organisational, economic and safety issues related to the implementation of a performance-based air navigation system. High-level presentations by numerous experts from civil aviation administrations, the industry and the ICAO Secretariat provided a broad range of views on key performance implications, such as capacity, cost-effectiveness, efficiency, environmental impact, flexibility, global interoperability, access and equity, participation, predictability, safety and security.

Several objectives relating to the performance of the world’s air navigation system were identified during the Symposium, with a special focus on the leadership of ICAO in the implementation process. There was recognition of the essential role of the Organisation in advancing work in the operational, technical, safety and economic areas, as well as securing global interoperability between major air navigation initiatives.

Another dimension of the role of ICAO will be to develop and promote minimum performance reporting requirements for air navigation service providers, develop a methodology for measuring performance expectations, and develop guidance material on facilitating collaborative decision-making. This will also entail accelerating work on performance-based navigation (PBN). PBN provides for more direct and precise flight paths, increased safety, reduced fuel burn, more efficient traffic flows and reduced ATC communications. In this respect, ICAO has cooperated with EUROCONTROL and the Federal Aviation Administration in the United States on joint PBN familiarisation seminars to be conducted in all parts of the world.

Looking ahead, SPANS charted a way forward for the aviation community and, more specifically, the symposium participants. This includes the implementation of area navigation (RNAV) and required navigation performance (RNP) in accordance with the PBN concept, integration of the ICAO Global Air Navigation Plan in performance-based transition planning, cooperation on establishing performance indicators, use of ICAO-defined key performance areas for performance
The participants were invited to:

- implement RNAV (area navigation) and RNP (required navigation performance) in accordance with the PBN concepts;
- use the Global Air Navigation Plan in performance-based transition planning;
- collaborate on establishing performance indicators;
- measure and report on performance – this was specifically aimed at ANSPs;
- use ICAO KPAs for performance management;
- implement Safety programmes and establish acceptable levels of safety – this was aimed at States;
- use the global Aviation Safety Plan to meet safety performance objectives.

ICAO indicated that economic aspects would be further addressed at an ICAO Conference on the Economics of Airports and Air Navigation Services to be held in the third quarter of 2008; it would be preceded by a Symposium.

It is anticipated that the ICAO Secretariat will use the outcome of the Symposium to provide important messages on ANS performance and its future work programme at the 36th ICAO Assembly, which will take place in Montreal on 18-28 September 2007.

In summary, EUROCONTROL’s coordination and input at the ICAO Performance Symposium was greatly appreciated and our expertise and work in progress universally recognised. In particular the prior coordination meeting, organised jointly by EUROCONTROL and the European Commission, served to strengthen Europe’s input. The result was that Europe’s overall credibility was heightened and the region’s standing in civil aviation was enhanced.
Inauguration of the new Central Flow Management Unit’s Operations Room: a cornerstone for the Single European Sky

The new Operations Room of the EUROCONTROL Central Flow Management Unit (CFMU) was inaugurated on 3 July 2007 at a ceremony in Brussels by Mr Victor M. Aguado, Director General of EUROCONTROL, Mr Jacques Barrot, Vice-President of the European Commission and Commissioner for Transport and Mr Fernando Palao, Secretary of State for Transport of Spain.

The CFMU first became operational in 1995, essentially allocating take-off slots to flights across the whole of Europe, and imposing restrictions when traffic exceeded safe limits. However, over recent years it has evolved and today the CFMU has a key role to play in bringing about a genuine Single European Sky.

Working closely with its stakeholders, the CFMU is responsible for optimising the capacity available for air traffic control across Europe in order to balance the demand for flights from airlines. Where demand exceeds capacity, the CFMU reroutes flights or calculates ground delays in order to ensure that air traffic controllers never have more aircraft than they can safely handle, and to minimise airborne holdings. By dynamically monitoring and responding to changes in capacity, the CFMU has helped to ensure that now, some ten years on, approximately an additional 10,000 flights can be handled in European airspace each day. Without the CFMU, estimates suggest that delays would more than triple with a cost to airlines of €1.5 billion a year.

Thanks to the availability of its Initial Flight Plan System (IFPS), the CFMU provides a Europe-wide alerting service in case an aircraft or airline which has been banned for safety reasons tries to enter European airspace.

The CFMU also provides environmental benefits. Better capacity management and flight routing have reduced fuel consumption by 300,000 tonnes annually. This comes on top of the 310,000 tonnes of fuel saved annually through Reduced Vertical Separation Minima and the 120,000 tonnes of fuel saved every year thanks to the increased application of the Flexible Use of Airspace concept between civil and military users. In total some 2,300,000 tonnes of CO₂ emissions are thus avoided annually.

“The CFMU provides safety, capacity, security and environmental benefits while at the same time being a public service,” said Victor M. Aguado, Director General of EUROCONTROL. “Its central position and flexibility enables Europe to handle major planned and unplanned events while ensuring that our delays due to air traffic management remain low and safety remains high. With this extensive range of benefits, the CFMU is an operational cornerstone of the Single Sky in Europe.”
1- Jacques Barrot, Vice-President of the European Commission, Commissioner for Transport

2- Fernando Palao, Secretary of State for Transport of Spain, representing the Presidency of the EUROCONTROL Permanent Commission

3- Charles-Louis d’Arenberg, Chairman of the Board of Belgocontrol

4- Fernando Conte, Chairman of the Association of European Airlines

5- Jean-Yves Valin, Director of Strategy and Quality, representing Pierre Graff, President and CEO of Aéroports de Paris
The second deliverable, D2 “Air Transport Framework – The Performance Target”, was accepted by EUROCONTROL and a Stakeholder Forum took place in Geneva in January 2007 with around 230 attendees representing the air transport community. After a plenary session during which the SESAR Consortium presented the major conclusions and recommendations of D2, the floor was opened to stakeholders to discuss and challenge the content. The forum generally agreed that D2 represents the foundation of the future Concept of Operations.

D2 recommends designing a performance-based European ATM system built in partnership with clear targets and delivering to the airspace users the best outcome for their flights within the constraint of the available infrastructure, based on a shared set of values and priorities.

D2 has built on the 11 ICAO Key Performance Areas and developed respective targets which are being used to drive the design of the Concept of Operations (Deliverable 3) and which will be instrumental in measuring achievements.

D3 is the development of the Concept of Operations, the ATM architecture and the supporting technologies. It is currently progressing and will be delivered to EUROCONTROL in July 2007. The preliminary versions of the Concept are centred on a collaborative involvement of the major stakeholders in the definition and management of trajectories, on networking of information where aircraft are nodes of the network and supporting an efficient collaborative decision-making process, on a balancing of demand and capacity based on airspace users priorities, and on the utilisation of appropriate technologies, modes of operations to meet the targets.

The results of D3 will be the subject of a Stakeholder Forum to be held in September.

The SESAR Joint Undertaking (S-JU) regulation was adopted by the European Council at the end of February 2007 and a Transport Council Meeting on 8 June made the S-JU operational. On 8 February an ad hoc session of the EUROCONTROL Provisional Council agreed to the principle of the Organisation's becoming a founding member of the S-JU, and invited the Agency to begin negotiations for a detailed Founding Member Agreement that will spell out in detail EUROCONTROL’s contributions to the SESAR Joint Undertaking. The meeting also confirmed that the Agency will make a total contribution of €700 million over the duration of the S-JU.
Yiannis Paraschis elected to lead Europe’s airports  

Brussels, 14 June 2007 – Dr Yiannis Paraschis, CEO of Athens International Airport, was unanimously elected President of the European Region of the Airports Council International (ACI EUROPE) at the 17th ACI EUROPE Annual Assembly held in Zurich today. After the two terms served by Prof. Manfred Schölch (Executive Vice President of Fraport), Dr Paraschis will take over on 16 June for one year until June 2008. (source ACI EUROPE press release)

Daniel Weder appointed as new CEO of skyguide

Geneva, 18 June 2007 – The Board of Directors of skyguide has chosen Daniel Weder, 50, as the new Chairman of the air navigation service provider. Daniel Weder is currently Managing Director at Swiss International Air Lines and is responsible for Airport Services & Operation Steering. He will begin his new position at the headquarters in Geneva on 1 October 2007. The interim CEO, Francis Schubert, will take up a new position as deputy CEO at the same time. (Source: skyguide)

Opening ceremony for new Heathrow tower

13 June 2007 – Heathrow’s latest landmark reaches another milestone today– the £50m airport’s new air traffic control tower is officially opened.

Controllers have already been operating there for the past seven weeks after successfully completing the switch-over from the old building to the new, 87-metre-high centre at 2a.m. on Saturday 21 April. (Source: NATS press release)

Belgocontrol obtains European certification

11 June 2007 – Mr Jean-Claude Tintin, Chief Executive Officer of Belgocontrol, today received from the Director-General of the Belgian Civil Aviation Authority, Mr Jules Kneepkens, the official document confirming the European certification by the Belgian Supervisory Authority of all of the company’s activities. The certification is issued within the framework of the future Single European Sky and is destined to improve the efficiency and safety of air traffic. (Source: Belgocontrol press release)
Visits & Agreements

On 29 March, the Director General, Victor M. Aguado, welcomed the Board of Directors of Avinor, the air navigation service provider of Norway. The Board was briefed on the main activities of EUROCONTROL, including the Agency’s relations with the European Community, development of ATM programmes and strategies, including SESAR, and was given a tour of the CFMU operations room.

On 8 May, EUROCONTROL officials welcomed a delegation from Avinor, Norway. Discussions were held on SESAR, airports, regulatory issues and the environment. The visit was concluded with a tour of the CFMU operations room.

On 23 May, the Director of the General Secretariat, Gerhard Stadler, welcomed a large delegation of Chief Executive Officers from various industries in Belgium. Presentations included an overview of EUROCONTROL, the Central Route Charges Office and a virtual tour of the CFMU.

On 12 June, the Director General received the Supervisory and Executive Boards of the Dutch air navigation service provider LVNL. They were given an overview of EUROCONTROL and was presented with the findings on LVNL performance, based on the ATM cost-effectiveness (ACE) 2005 Benchmarking Report, and given a tour of the CFMU operations room.

On the same day, a delegation from the Civil Aviation Bureau of Japan visited EUROCONTROL to be briefed on the main activities of the Agency, including SESAR and the Central Route Charges Office, concluding with a visit to the CFMU operations room. On 13 June, the delegation visited the Maastricht Upper Area Control Centre.

On 15 June, the Director of the General Secretariat received the Dutch Ambassador for International Relations, Mr Ron Muyzert. Bilateral discussions were held on host State matters and ongoing legal issues. The visit was concluded with an explanation of the CFMU operations given by John Byrom, Head of the CFMU Operations Division (right).

On 22 June, the Director General received Mr Budhi M. Suyitno, Director General for Air Transportation of the Republic of Indonesia.
14-16 September 2007
ICAO/McGill University Worldwide Conference
Montreal, Canada

19-20 September 2007
CFMU User Forum
EUROCONTROL Brussels’ Headquarters, Belgium

26-28 October 2007
IFATCA European Regional Meeting
Prague, Czech Republic

28-31 October 2007
52nd Annual Conference and Exposition
Marriott Wardman Park Hotel, Washington DC

11-13 March 2008
ATC Global 2008
Rai International Exhibition and Congress Centre, Amsterdam, the Netherlands

The Autumn 2007 issue of Skyway will focus on EUROCONTROL’s achievements in the last decade

EUROCONTROL website: www.eurocontrol.int