# PRR 2008

An Assessment of Air Traffic Management in Europe during the Calendar Year 2008

# Performance Review



May 2009
Performance Review
Commission



### **Background**

This report has been produced by the Performance Review Commission (PRC). The PRC was established by the Permanent Commission of EUROCONTROL in accordance with the ECAC Institutional Strategy 1997. One objective of this strategy is "to introduce a strong, transparent and independent performance review and target setting system to facilitate more effective management of the European ATM system, encourage mutual accountability for system performance..."

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The PRU's e-mail address is PRU@eurocontrol.int

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## Foreword by the PRC Chairman



Dear ATM Stakeholder,

The **Performance Review Commission (PRC)** was established in 1998 under the revised EURO-CONTROL Convention as an independent body to contribute to the improvement of the European air traffic management system through a strong, transparent and independent performance review and target setting system.

This Executive Summary of the PRC's Performance Review Report 2008 is designed to be a "stand-alone" document, containing the salient points of the full report.

The purpose of Performance Review Reports is neither to praise nor to criticise but to provide all air traffic system stakeholders with carefully validated data and in-depth analysis of the most critical elements of the system. The intention is that all involved parties will be able to recognise through benchmarking how they could improve their behaviour to contribute to the global performance.

The Single European Sky Framework regulation implements a performance scheme for air navigation services and network functions. Performance review and target-setting will have a significantly increased importance and the PRC is ready to play fully its role in this major new challenge.

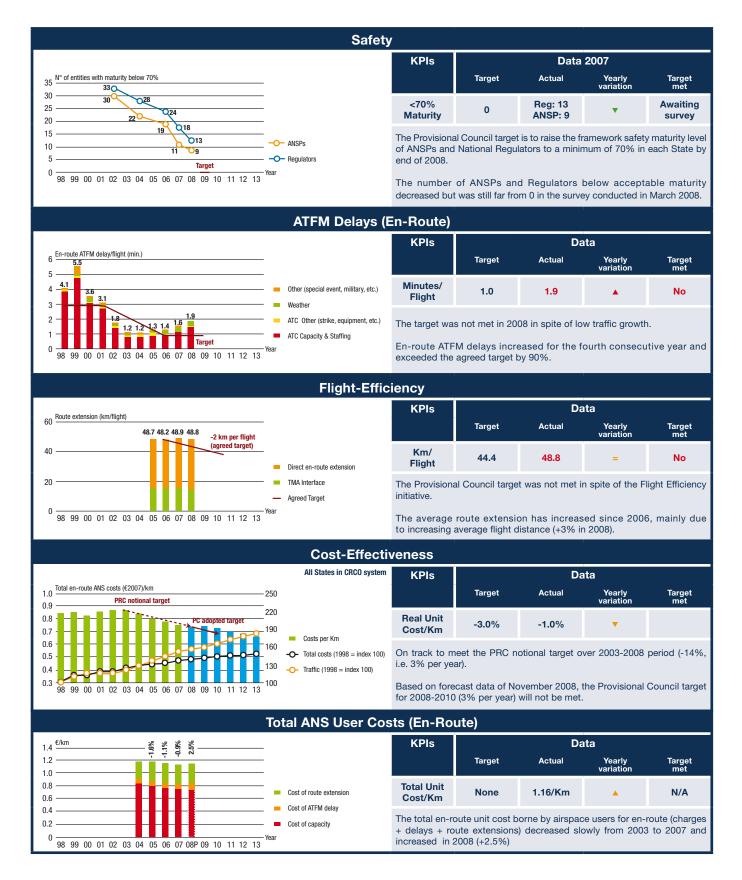
The PRC welcomes constructive comments and feedback on its work. These should be addressed to EUROCONTROL, Performance Review Unit, 96 rue de la Fusée, B 1130 Brussels, Belgium. *PRU@eurocontrol.int*.

You can consult/download a copy of the complete report from the PRC Webpage: http://www.eurocontrol.int/prc

Jean-François VIVIER

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## **European level - ANS Perspective**



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## **European level - Aviation Perspective**



Figure 1: Key Performance Indicators in 2008

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### Introduction

PRR 2008 presents the performance of European Air Navigation Services (ANS) in 2008 in a more general aviation perspective and reviews it under the Key Performance Areas of Safety, Punctuality and Predictability, Capacity/delays, Flight-Efficiency, Cost-Effectiveness and Environmental impact.

Key Performance Indicators corresponding to both Aviation and ANS perspectives are shown in Figure 1, together with approved targets for the latter.

### Traffic demand

Traffic growth became negative from August 2008 onwards and was limited to 0.4% in 2008 (5% in 2007). Traffic forecasts for 2009 have been revised downwards, around -5% as a consequence of the global financial crisis and economic downturn.

Traffic demand is becoming more volatile. Improved ANS flexibility, i.e. responsiveness to unforeseen changes, should be addressed in DMEAN, FABs, and SESAR.

### Safety

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There were no ATM-induced accidents in Europe in 2008.

In 2007, the number of reported high-risk separation minima infringements and runway incursions decreased, against a general rise of traffic and total incident reports. Notwithstanding a significant amount of reports still under investigation and therefore not classified, this appears to be a positive trend reversal from the previous three years.

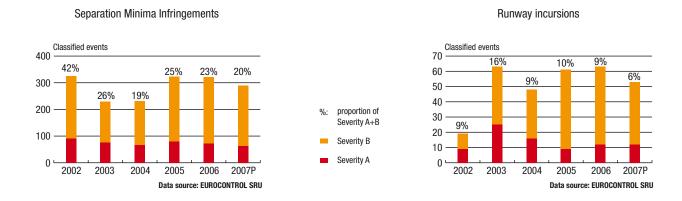


Figure 2: Reported high-risk occurrences

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A majority of States have not yet fully implemented EUROCONTROL Safety Regulatory Requirements (ESARR). Compliance with regulations is an obligation of each State. A combination of enforcement measures (e.g. EU infringement procedures, where applicable) and/or support programmes must ensure that such regulations are fully transposed and implemented without delay.

The PRC supports confidentiality of individual incident reports as well as protection of individuals in a just culture environment. However, the PRC maintains that information about safety performance of ANS providers, whose prime duty is to ensure safety and who provide a public service, should be more transparent.

In the latest maturity survey (March 2008), thirteen States and nine ANSPs did not reach the minimum acceptable maturity level of 70% (see Figure 1). The target that all regulators and ANSPs should reach this minimum level by end 2008 remains a challenge. More efforts are needed by those concerned to reach at least this minimum level.

The EU rule-making mechanism, safety oversight and the safety performance monitoring process are closely inter-linked. There is a continuous loop whereby the legislative process is followed by target-setting, compliance and performance monitoring, enforcement, incentives and feed-back.

The USOAP and ESIMS safety audit programmes will terminate in 2011 and no follow-up has yet been decided for the latter. The PRC considers that a structured ANS safety oversight scheme tailored to the European environment is needed, which could be based on a combination of surveys, peer reviews (as provided for in the SES legislation) and audits.

### Air transport Punctuality/predictability

After a continuous deterioration between 2003 and 2007, air transport on time performance improved slightly in Europe in 2008, in a context of lower traffic growth (as can be seen in Figure 7 on page vii).

Late arrivals are mainly driven by late departures at origin airports, with relatively small variations in the gate to gate phase. Figure 3 shows that departure delays originate principally from turnaround processes. ATFM-related departure delays caused by en-route or airport constraints account for 27% (24% without weather-related ATFM delays), and show an increasing trend in 2008.

The predictability of operations several months in advance affects airline scheduling and the extent to which the use of available resources (aircraft, crew, etc.) can be maximised. After a continuous deterioration between 2003 and 2007, operational variability improved slightly in 2008.

Today's air transport system operates with wide time margins. Because of this high level of built-

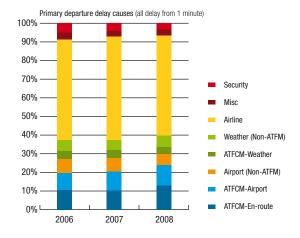


Figure 3: Drivers of departure punctuality

in variability, flexibility is needed in the way the current system is operated. Improvements in on-time performance and a reduction in variability require a simultaneous tightening of airline, airport and ATM processes, and imply a better coupling between them in the aviation network.

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### En-route performance

#### **EN-ROUTE ATFM DELAYS**

The en-route delay target was not achieved in 2008. Summer en-route ATFM delays increased for the fourth consecutive year and overshot the agreed target by 90% (1.9 min/flight, Target: 1 min/flight; see Figure 1). 4.3% of flights were delayed more than 15 minutes due to en-route ATFM delays (3.3% in 2007).

While the majority of ACCs met or exceeded their capacity plans, the failure to deliver capacity as planned or inadequate plans in a few ACCs (notably Warsaw, Copenhagen, Nicosia, Zagreb, Vienna, Rhein and Zurich) negatively impacted the whole European network performance. The re-negotiation of some employment conditions with short notice effect was a significant contributor. Higher focus needs to be given to the respect of capacity plans and to adequate management of human resources.

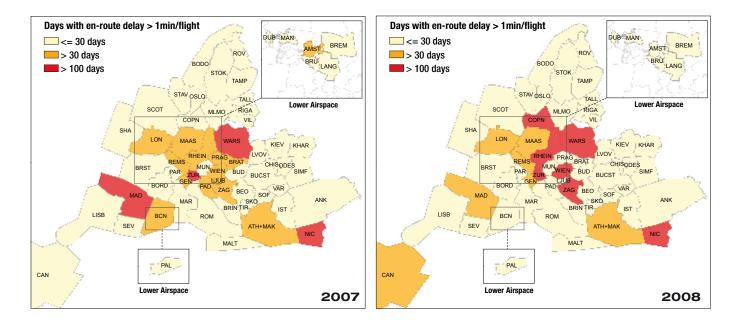


Figure 4: Most delay-generating ACCs

There is typically a three-year time lag in raising ATM capacity through traditional methods (airspace design, recruitment, training, investment). There are at least two implications:

- 1. It is important that the development of future ANS capacity is not jeopardised during the current global financial crisis and economic downturn. The positive effect on costs would materialise relatively late, and the negative impact on capacity would appear when traffic growth resumes. Rather, lower traffic growth is an opportunity to catch up on the capacity shortfall that has built up over the last 3 years.
- 2. Capacity plans need to take account of collective agreements and those agreements need to be valid for the duration of the plans. Any revision should not jeopardise the capacity plans (e.g. compensating lower working hours by higher productivity).

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### **EN-ROUTE FLIGHT EFFICIENCY**

Flight-efficiency has significant economic and environmental impacts.

The flight efficiency target was not achieved in 2008 (see figure 1). Improvements in relative route extension (-0.2%) were masked by increasing average flight distance (+3%).

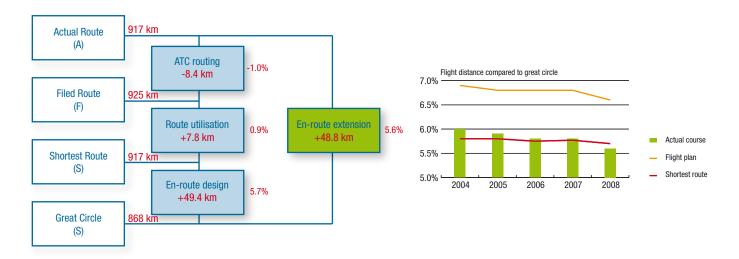


Figure 5: Components of en-route flight efficiency

Short term benefits can be achieved by raising user awareness of shortest available routes. Network management through the CFMU can play a role here. But the main issue, as far as en-route flight-efficiency is concerned, is airspace design (as shown in Figure 5).

Approximately 63% of route extension is due to domestic airspace design issues, but 26% is linked with cross-FAB airspace design, which illustrates the need for a network approach to airspace design.

### ACCESS TO, AND USE OF, SHARED AIRSPACE

There was progress in 2008, with Military Key Peformance Indicators becoming available. Implementation by States should be encouraged. Progress still needs to be made both in developing and offering routes through shared airspace and ensuring that these routes are effectively used by civil users, especially during weekends when military activity is minimal.

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### Performance at main airports

Airports are key nodes of the aviation network. Performance of the airport system depends on the actions of many key players, such as airport operators, airlines and ANS.

Managing performance at airports requires reliable performance indicators. Operational performance indicators related to the arrival and taxi phases are being developed in cooperation with airports, ANSPs and users.

The analysis of operational performance at airports reveals a contrasted picture across Europe. London Heathrow (LHR) shows by far the highest level of excess times in the Arrival, Sequencing and Metering Area (ASMA).

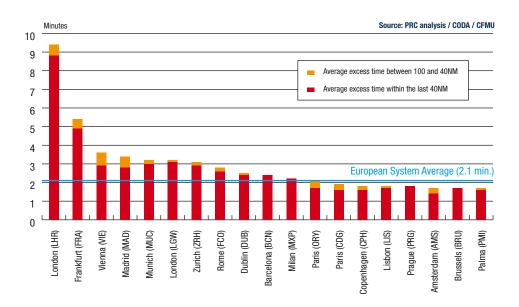


Figure 6: Average excess time within the last 100 NM (ASMA)

Operational performance is affected by a number of factors, including airport infrastructure, airport capacity and demand management (including scheduling), traffic variability, weather conditions, sustainability of airport capacity in adverse conditions and environmental/political restrictions, all of which need to be considered in a balanced assessment of performance.

Local performance can also have an impact on the overall performance of the European network. Delays resulting from local decisions may propagate throughout the European network, creating reactionary delays and introducing variability in daily operations at other airports.

While there may be a variety of causes for delay, the way the traffic is managed has an impact on the distribution of the delay between air and ground and thus on overall costs to airspace users.

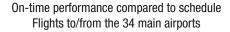
Cancellations are also an important service quality indicator and need to be measured consistently throughout Europe.

Airport capacity being a main challenge to future air traffic growth, an increased focus needs to be put on the integration of airports in the ATM network and the optimisation of operations at and around airports.

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# Comparison of operational performance in the USA and Europe

The FAA/ATO and the PRC have cooperated to identify and measure comparable indicators of operational ANS performance on both sides of the Atlantic, using consistent data sources and methodologies.



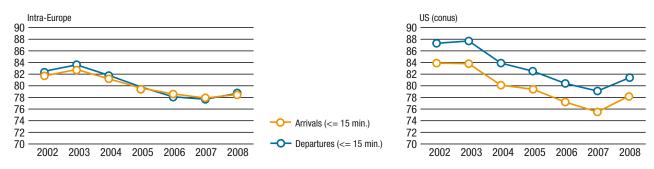


Figure 7: Air Transport Punctuality (On-time performance)

One observes similar arrival punctuality levels in the US and Europe (as shown in Figure 7), albeit with higher delay variability in the US.

# Evolution of Scheduled Block Times Flights to/from the 34 main airports

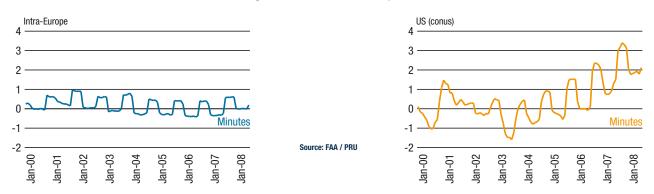


Figure 8: Scheduling of Alr Transport Operations

A breakdown by flight phases reveals strong and weak points on both sides:

- a schedule upwards-creep and lower average seating capacity are observed in the US;
- in the US, departure punctuality is better than in Europe but taxi-out delays are longer;
- "Direct route extension" is approximately 1% lower in the US, with corresponding fuel burn benefits;
- while there is no superior performance in terms of arrival transit time in the TMA, London Heathrow is a clear outlier.

These differences possibly originate from different policies in allocation of airport slots and flow management, as well as different weather conditions. The impact on environment, predictability and flexibility in accommodating unforeseen changes may be different. A better understanding of trade-offs would be needed to identify best practices and policies.

Identification and application of today's best practices, with existing technology and operational concepts, could possibly help in raising the level of performance on both sides of the Atlantic in the relatively short term, and may have wider applicability.

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### Cost-Effectiveness

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At European system level, the real en-route unit cost decreased from 0.87 €/km to 0.76 €/km between 2003 and 2007, i.e. a reduction of -3.4% per annum, as shown in Figure 1.

- the combination of favourable traffic increase (+26%) and tighter cost management allowed a majority of States to improve their cost-effectiveness performance;
- this improvement is in line with the PRC's notional target (-3% per annum over 2003-2008). Had there not been significant cost increases in some States/ANSPs (e.g. Spain) during the period, the improvement at European system level would have been even better.

2008 marks the end of a positive business cycle which started in 2003. Traffic growth will be significantly lower in 2009 and possibly some time beyond. The economic downturn requires ANSPs to review their plans to ensure that they are consistent with more straitened economic circumstances. ANSPs cannot stand aside and it will be important that they continue, and enhance, the quest for efficiency.

In contrast, in a majority of ANSPs/States, projections indicate that the en-route cost-base is planned to significantly increase in 2009 despite a slowdown in traffic. This implies that the PC objective (-6% over 2008-2010) will not be met notwithstanding States/ANSPs commitment in Nov 2007. Latest Member States' projections indicate that en-route real unit costs are expected to decrease by -2.2% between 2008 and 2010, or even increase if traffic is lower than forecasted in 2009 and 2010 as shown in Figure 9.

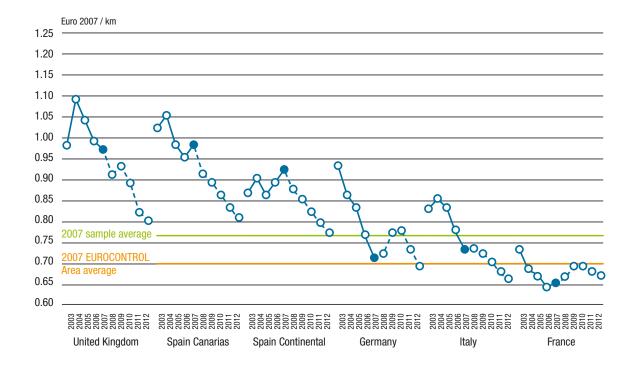


Figure 9: Trend in en-route ANS real unit costs for the five largest States (2003-2012)

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It will also be important that the breathing space provided by weaker demand is used to build a stronger platform for the eventual resumption of traffic growth, so that there is a better match between capacity and demand and a better ongoing cost-effectiveness performance. There is still room for cost-effectiveness and productivity improvement based on benchmarking analysis. Initiatives like FABs and SESAR should contribute to rationalising investments and optimising the use of resources.

ANSPs management together with staff unions have a collective responsibility to address this challenge and to work together to implement measures that allow short and medium term flexibility in controlling costs.

En-route MET costs (5% of total en-route ANS costs) decreased by -9% in real terms between 2003 and 2007. This is a significant contribution to the en-route ANS cost-effectiveness improvement.

In 2007, the total cost-base for the EUROCONTROL Agency (8% of total en-route ANS costs) decreased by -1% in real terms. This is the first time on record that the EUROCONTROL cost-base has decreased. Further decreases are expected as part of the EUROCONTROL Agency cost-effectiveness objective until 2012. Given the increasingly straitened economic situation, it is important that the EUROCONTROL Agency commits to the planned cost-base decrease.

Setting of binding Community performance targets (SES II) would represent a significant step towards driving further performance improvements in ANS. These targets should be combined with the setting of unit rates in advance for a period of three to five years so as to provide an effective incentive to meet local objectives and improve cost predictability.

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### **Environmental** impact

Aviation's total contribution to  $CO_2$  emissions in the EU, including international aviation, is 3.4%, as shown in Figure 10. The ultimate improvement that could ideally be achieved in the absence of any ATM constraint (such as safety, capacity etc.) is a reduction of 0.2% of all  $CO_2$  emissions in the EU (6.6% of 3.4%).

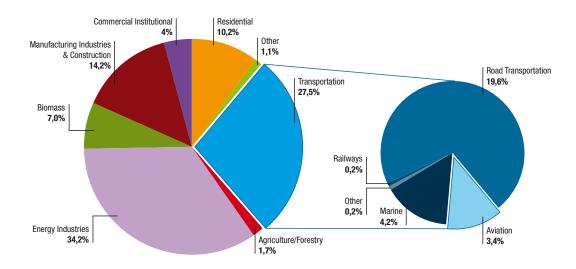


Figure 10: Contribution of CO<sub>2</sub> emissions by sector (EU27 area) 2006 base year

Directive 2008/101/EC regarding the EU emissions trading scheme has been adopted. It includes international aviation as of 2012. All flights arriving and/or departing from an EU/EEA airport will be covered for their entire length. The emissions covered by this Directive represent circa 240Mt  $CO_2$  a year.

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If the EUROCONTROL flight efficiency target were met, there would be clear environmental benefits related to en-route emissions. Thus far, this target has not been met.

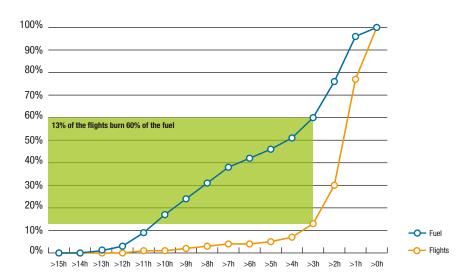


Figure 11: Distribution of flights and fuel burn by duration of the flight

Long-haul flights (>3 hours) account for 13% of flights, but 60% of fuel burn, as shown in Figure 11.

It would appear that at least half of the airports covered by the Noise Directive see their capacity affected by environmental (noise) restrictions. Furthermore, environmental restrictions may influence each other, i.e. affecting the flight path to minimise noise exposure on the ground would likely lead to reduced flight efficiency and thus increased emissions. Therefore, care must be taken and priorities clearly set before imposing such restrictions.

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### Economic assessment

Costs borne by users for en-route capacity (charges), ATFM delays and flight-inefficiencies in 2008 are estimated at €6.5 Billion, €0.9 Billion and €2.6 Billion respectively. There are trade-offs between them. It is the total economic cost borne by users (cost of capacity + delays + route extension) that should be minimised.

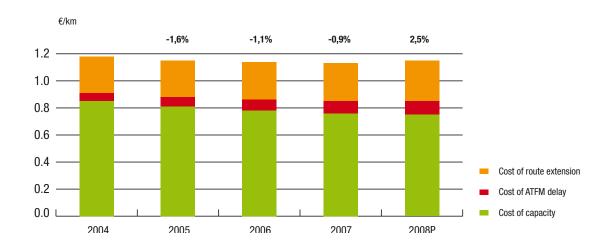


Figure 12: Real unit economic cost (en route)

The significant improvements in en-route cost-effectiveness since 2004 have been almost cancelled-out by increases in delays and route extension. The real unit economic cost went down at a slow rate of approximately -1% per annum until 2007, but increased by nearly 2.5% in 2008, as shown in Figure 12.

An objective to progressively reduce the real unit economic cost was agreed by Ministers in 2000 and should be actively pursued, even more so in the current straitened economic circumstances. Reduction of the unit cost of capacity will be more challenging with lower traffic growth, which could be alleviated by more efforts on flight-efficiency and delays.

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### Further steps

With slower traffic growth and more volatile traffic demand ahead, it is even more important to balance the different areas of performance, and to improve the terms of trade-offs, so as to contain costs and improve quality of service while improving safety.

This can be done in the short term through higher efficiency and flexibility in the use of scarce resources (human, financial, airspace, airport capacity, R/F spectrum), and in the longer term through appropriate regulation (in particular the SES II proposed performance scheme), governance and deployment of technology, as illustrated here.

The proposed SES II performance scheme is designed to be a powerful driver of ANS performance improvements. The PRC is prepared to contribute to these improvements.

The SES II package also includes a technological pillar, i.e. SESAR. It will be important to ensure the consistency of the SES II Performance Scheme and the SESAR performance framework.

Finally, a significant element appears to be missing to drive ANS performance, i.e. minimum requirements and common guidelines or rules for governance of ANSPs or FABs, wherever performance accountability lies.



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### Recommendations

The Provisional Council is invited:

a. to note the PRC's Performance Review Report (PRR 2008) and to submit it to the Permanent Commission;

### SAFETY

- **b. to request** States to provide greater transparency of safety data, and particularly the public availability of States' ESIMS and USOAP audit reports concerning ANS safety, including Corrective Action Plans;
- **c. to request** the Director General to present a plan to ensure the continuity of safety oversight, taking due account of any future EASA responsibilities;
- **d. to require** the use by States/ANSPs of automated detection and reporting tools to complement manual reporting of incidents;

### FLIGHT EFFICIENCY-ENVIRONMENT

- **e. to confirm** the already agreed target for flight efficiency of an average reduction of the average route extension per flight of 2 km and related environmental impact (May 2007);
- **f. to request** that the CFMU and airspace users co-operate to increase the use of shorter alternative routes at the flight planning stage, including conditional routes;
- **g. to request** further development of route structures coordinated by EUROCONTROL, and that conditional routes are open as often as possible, particularly at week-ends;

### **COST-EFFECTIVENESS**

**h. to agree** that there should be no mid-term upward revision by States of the 2009 unit rates and that States/ANSPs implement necessary measures to deal with any revenue shortfall in 2009;

### **CAPACITY**

i. to urge States and Air Navigation Service Providers not to jeopardise future capacity provision during the current economic situation;

### **NETWORK MANAGEMENT**

- **j. to request** the Director General to propose the role of, and propose performance indicators for, the network management function:
- k. to request the States to promote the use of airport collaborative decision-making.

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### About the Performance Review Commission

The Performance Review Commission (PRC) provides independent advice on European Air Traffic Management (ATM) Performance to the EUROCONTROL Commission through the Provisional Council.

The PRC was established in 1998, following the adoption of the European Civil Aviation Conference (ECAC) Institutional Strategy the previous year. A key feature of this Strategy is that "an independent Performance Review System covering all aspects of ATM in the ECAC area will be established to put greater emphasis on performance and improved cost-effectiveness, in response to objectives set at a political level".

The PRC reviews the performance of the European ATM System under various Key Performance Areas. It proposes performance targets, assesses to what extent agreed targets and high-level objectives are met and seeks to ensure that they are achieved. The PRC/PRU analyses and benchmarks the cost-effectiveness and productivity of Air Navigation Service Providers in its annual ATM cost-effectiveness (ACE) Benchmarking reports. It also produces ad hoc reports on specific subjects.

Through its reports, the PRC seeks to assist stakeholders in understanding from a global perspective why, where, when, and possibly how, ATM performance should be improved, in knowing which areas deserve special attention, and in learning from past successes and mistakes. The spirit of these reports is neither to praise nor to criticise, but to help everyone involved in effectively improving performance in the future.

The PRC meets typically 15 days a year. It consists of 12 Members, including the Chairman and Vice-Chairman:

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Mr. Ralf Berghof
Mr. Juan Revuelta Lapique
Mr. Carlo Bernasconi
Mr. Jaime Rodriques Valadares

Dr. Harry Bush Mr. Lauri Vänskä

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Mr. Helmut Erkinger Mrs. Aysin Zeren

PRC Members must have professional experience of air traffic management (planning, technical, operational or economic aspects) and/or safety or economic regulation in one or more of the following areas: government regulatory bodies, air navigation services, airports, aircraft operations, military, research and development.

Once appointed, PRC Members must act completely independently of States, national and international organisations.

The Performance Review Unit (PRU) supports the PRC and operates administratively under, but independently of, the EUROCONTROL Agency. The PRU's e-mail address is *PRU@eurocontrol.int*.

The PRC can be contacted via the PRU or through its website <a href="http://www.eurocontrol.int/prc">http://www.eurocontrol.int/prc</a>.

### PRC PROCESSES

The PRC reviews ATM performance issues on its own initiative, at the request of the deliberating bodies of EUROCONTROL or of third parties. As already stated, it produces annual Performance Review Reports, ACE reports and ad hoc reports.

The PRC gathers relevant information, consults concerned parties, draws conclusions, and submits its reports and recommendations for decision to the Permanent Commission, through the Provisional Council. PRC publications can be found at <a href="https://www.eurocontrol.int/prc">www.eurocontrol.int/prc</a> where copies can also be ordered.



For any further information please contact:

Performance Review Unit, 96 Rue de la Fusée, B-1130 Brussels, Belgium

Tel: +32 2 729 3956 Fax: +32 2 729 9108

pru@eurocontrol.int http://www.eurocontrol.int/prc