

Proposed regulatory approach for a revision of the SES Performance Scheme addressing RP2 and beyond

Version 1.0

**Prepared by the Performance Review
Body (PRB)
of the Single European Sky**

01/03/2012



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EXECUTIVE SUMMARY

Purpose of this Document

The performance scheme is a central element of the Single European Sky (SES), which aims at ensuring “more sustainable and better performing aviation”.

This Regulatory Approach document, prepared at the Commission’s request, contains the Performance Review Body (PRB)’s advice on the development of the SES Performance Scheme in terms of substance, for application from the second Reference Period onwards (RP2, starting 1 January 2015).

The Commission is consulting on this Regulatory Approach through an on-line questionnaire which will be open to the public for comments from 9 March to 1 June 2012 (http://ec.europa.eu/transport/consultations/index_en.htm).

Main thrust of the proposed revisions

Implementation of the performance scheme¹ started on 1 January 2012. Acknowledged as being a transitional period of three years only (2012-2014), the first reference period (RP1) addresses mainly the en route part of ANS provision and focuses target setting on en route capacity, environment and cost-efficiency. It aims to bring early benefits to the industry, focussing on en route air navigation services and facilitates lessons to be learnt on the operation of the scheme before full coverage is achieved in RP2.

The proposed revision of the performance scheme in RP2 is driven by two main needs:

- First, to improve and reinforce the performance scheme.

Proposals to improve and reinforce the performance scheme are set out in Chapter 1. Many of them build on lessons learnt and/or result from stakeholders’ feedback collected through an informal consultation phase carried out between June and November 2011. Interdependencies between KPAs are also considered.

The proposals also seek to ensure greater consistency and convergence between the performance scheme and other SES tools, such as the Functional Airspace Blocks and the deployment of SESAR technology, as well as with other EU policies, such as the “Better Airports” package.

The general principles applied by the PRB are to 1) build on existing provisions and maintain the continuity of the performance scheme wherever possible; 2) complement target setting as necessary based on tested indicators; 3) identify new indicators as required to assist in consistency assessments and prepare the ground for future evolutions; and 4) define related reporting requirements.

- Second, as foreseen in the performance Regulation, to extend the performance scheme to cover the full gate-to-gate scope, with target-setting in all four Key Performance Areas. This extension is addressed in a methodical way: For each

1 The legal basis for the Performance Regulation can be found in Article 11 of the SES’s framework Regulation (EC) No 549/2004 of 10 March 2004 amended by Regulation (EU) No 1070/2009 of 14 November 2009. The performance scheme is set up by Commission Regulation (EU) No 691/2010 of 29 July 2010 “*laying down a performance scheme for air navigation services and network functions*” (the performance Regulation), completed for its cost-efficiency dimension by Regulation (EU) No 1794/2006 “*laying down a common charging scheme for air navigation services*” amended by Regulation (EU) No 1191/2010 of 16 December 2010 (the charging Regulation).

KPA, various options are identified, their impact is assessed, and a preferred option is presented.

A system of target setting and performance monitoring for the safety KPA is proposed in Chapter 4. It was developed in close liaison with EASA.

Proposals for the environment and capacity KPAs are presented in Chapters 5 and 6 respectively. They are designed to reinforce the existing target setting system for en-route, complement it with incentives as appropriate, extend it to terminal areas and ground movements, build on new provisions from the Network Manager Regulation, and prepare the ground for future evolutions, such as vertical flight and/or fuel efficiency interventions planned during the period.

Finally, Chapter 7 recommends to retain the existing target setting and incentive system for the Cost-Efficiency KPA as far as route charges are concerned, and to complement it with a system of local target setting for terminal air navigation services charges.

An overview of the PRB proposals in the various KPAs is provided in Table 1.

Next Steps

The consultation on the options and recommendations contained in this document will support the Commission's work on amendment to the Regulations setting up the performance scheme and the Charging regime. Based on feedback received to this consultation, the PRB will submit proposed changes to the relevant implementing rules to the Commission in July. Any changes to the Regulations will be adopted by the Commission through the examination procedure.

The aim is to secure the amendment of the performance scheme by end 2012 to allow EU-wide performance targets for RP2 to be set for all Key Performance Areas and adopted before end 2013. The year 2014 will then be devoted to the establishment, assessment and adoption of Performance Plans for RP2.

Table 1: Overview of the PRB proposals

KPA	ANS performance indicators	RP1	RP2	Comments
Safety	Effectiveness of safety management ('maturity')	Monitoring	EU target Perf. plan target	Possible update of elements of the SPI
	Application of severity classification scheme	Monitoring	EU target Perf. plan targets	Possible update of elements of the SPI
	Separation infringements	Monitoring	Monitoring	
	Runway incursions	Monitoring	Monitoring	
	ATM special technical events	Monitoring	Monitoring	
	Application of Just Culture	Monitoring	EU target Perf. plan target	Possible update of elements of the SPI
	Level of reporting		Monitoring	Quality check possible in RP1
	Quality of reports and analysis		Monitoring	Quality check possible in RP1
	Effectiveness of mitigation measures		Monitoring	
	Independent safety performance monitoring via use of TCAS-RA dataflow		EU monitoring	Feasibility study + indicator development
	Automatic runway incursion dataflow		EU monitoring	Feasibility study + indicator development
	Effectiveness of Runway Safety Programmes		Monitoring	Feasibility study + indicator development

KPA	ANS performance indicators	RP1	RP2	Comments
Environment	Horizontal flight efficiency	EU target		EU target based on Flight plan; NM accountable
			EU target FAB target NM target	EU & FAB targets based on actual trajectory NM target based on Flight plan
	Effective use of civil/military airspace structures	Monitoring		Based on annual reporting
			Monitoring	based on detailed on-line data
	Additional time in taxi-out phase		EU target	For coordinated airports
			Monitoring	For the remaining non-coordinated Performance Scheme airports
Additional time in arrival sequencing and metering area (ASMA)		EU target	For coordinated airports	
		Monitoring	For the remaining non-coordinated Performance Scheme airports	
Horizontal and vertical terminal performance indicator		Monitoring	Based on 30 second interval position report data for all Performance Scheme airports	
Capacity	En-route ATFM delay	EU target Nat/FAB targets		
			EU target Perf. plan target	With a weather delay allowance managed at network level plus incentives set on NM and FABs
	Airport ATFM delays	Monitoring	EU target Perf. plan target	
	ATFM slot adherence		EU target Perf. plan target	
	ANS related local delay at the gate		Monitoring	Based on A-CDM data
	Airport resilience		Monitoring	e.g. number of days with more than 10% cancellations
	Additional time in taxi-out phase	Monitoring		Moved to Environment KPA in RP2
Additional time in arrival sequencing and metering area (ASMA)	Monitoring		Moved to Environment KPA in RP2	
Cost-efficiency	Determined Unit Rate for en-route-ANS	EU target Nat/FAB targets	EU target Perf. plan target	With incentives
	Terminal unit rate	Monitoring		
	Terminal determined unit rate		EU monitoring	
			Perf. plan target	With incentives
	Terminal costs	Monitoring		
	Terminal ANS Determined Costs		EU monitoring	
Gate to gate ANS costs per composite TSU		EU monitoring Monitoring		

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1 PURPOSE OF THE REGULATORY APPROACH

The purpose of this regulatory approach is to provide a basis for formal consultation for the revision of the performance scheme of the second Single European Sky package consisting in Regulation (EU) No 691/2010 (the performance Regulation).

The Commission has asked EUROCONTROL through the Performance Review Body (PRB) to assist it in the revision of the performance scheme (Single Sky Committee 41, 6-7 April 2011). The PRB has started work on this issue in June 2011.

This Regulatory Approach builds on the informal consultation carried out by the PRB between June and November 2011, materialised by a stakeholder consultation through a questionnaire, a compilation and analysis of contributions collected, bilateral meetings with stakeholders and a stakeholder Workshop held on 10 November 2011.

2 APPROACH OF THE PROPOSAL

2.1 The Single European Sky context

The SES II package, adopted in 2009, included a performance scheme with target-setting, implemented through the Performance Regulation No 691/2010, adopted on 29 July 2010.

The performance scheme started on schedule. Acknowledged as being a transitional period of three years only, the first reference period does not address the full gate-to-gate scope envisaged in the Regulation and does not contain all the key performance indicators (KPIs). Rather it aims to bring early benefits to the industry, focussing on en route ANS, while enabling lessons to be learnt on the operation of the scheme before full coverage is achieved in the second reference period (RP2.)

2.2 Main objectives of the revision of the performance scheme

The aim of the revision of the Single European Sky's performance scheme is to ensure that, from RP2 onwards, this performance scheme is fully developed and implemented, with a gate-to-gate ANS scope, setting performance targets in all four Key Performance Areas (KPAs) of Safety, Capacity, Environment and Cost-efficiency; complemented with adequate incentives. It also aims at improving the processes of the performance scheme in the light of experience gained.

2.2.1 The safety context

In the safety context, the objectives of the performance scheme are different from those of compliance monitoring. The performance scheme is output-based, addressing the level of effectiveness, maturity and tangible outcome of different safety processes. It complements the compliance monitoring which checks the existence and level of adherence of these processes against the requirements set out in applicable legislation.

In a recent Communication to the Council and the European Parliament², the Commission provides the view that continuous improvement in safety can be achieved if the European Union (EU) addresses the risks to aviation safety in a systematic fashion through a proactive, risk- and performance-based management of aviation safety.

To allow for this, the three main elements of the aviation Safety Management System (SMS) at European level – namely its strategy, a Safety Programme and a Safety Plan – propagate the need for monitoring and measurement of safety performance in Europe by application of

2 Communication from the Commission to the Council and the European Parliament: "Setting up an Aviation Safety Management System for Europe", 25.10.2011

a set of different safety performance indicators (SPIs) that work on different levels. These are SPIs for (i) the general public (to inform EU citizens on accident/incident trends), (ii) about principal risks (to monitor key risk areas) and (iii) making the implementation link to the mitigation/action plan (to report on the effectiveness of mitigation measures).

The Performance Regulation establishes a new mechanism to improve safety performance of NSAs, ANSPs and network functions through target setting and continuous monitoring at national/FAB and EU-wide level. It defines safety Performance Indicators that should be monitored at European through State levels and used for the safety performance assessment during the first reference period (RP1). These are:

- the Effectiveness of Safety Management (EoSM),
- the application of the severity classification based on the Risk Analysis Tool (RAT) methodology to the reporting of occurrences, and
- the reporting of Just Culture (JC).

In addition, the current Regulation is asking States to report certain data listed in Annex IV of the 691/2010.

One of the main purposes of the present proposal to review the performance scheme is to put in place performance target setting in safety to ensure a balance with the other KPAs.

2.2.2 Building on and consolidating achievements in RP1

EU-wide targets for 2012-2014 are setting a challenging but acceptable level of ambition. A significant change in performance needs can be expected as a result.

The cost-efficiency target coupled with the charging regime seeks to ensure that en route charges remain nearly constant in real terms between 2009 and 2014, while traffic is expected to grow some 16.7% (see Figure 1). If the target is met, the cumulated savings vs. unit rates prevailing in 2009 are estimated at some 2.3 Billion Euros over RP1.

The environment target, if achieved, will result in nearly constant ANS-related emissions over 2009-2014, as shown in Figure 1. Its achievement will therefore decouple emissions from traffic growth and ensure a carbon-neutral growth of aviation as far as ANS is concerned.

Finally, the capacity target, if achieved, will reduce delays below the lowest levels ever achieved, bring them closer to the economic optimum and make capacity more responsive to unexpected traffic growth.

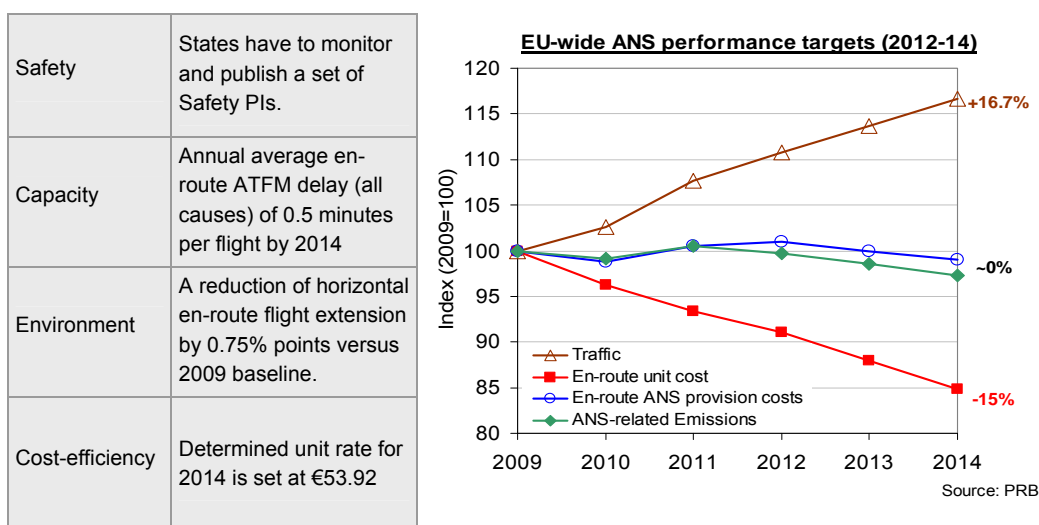


Figure 1: EU-wide ANS performance targets [2012-2014]

Regulations and safety performance metrics ensure that any such performance gains are not made at the expense of Safety.

RP2 should now build on and consolidate this progress. A key driver for the changes proposed for RP2 and beyond is to establish and strengthen the robustness, stability and continuity of the performance scheme. As a consequence, this Regulatory Approach builds on the existing four Key Performance Area. It is also based on the key principles, shared by stakeholders during the informal consultation phase, that new Key Performance Indicators should be proposed only when their robustness, relevance and stability are demonstrated, and that existing Key Performance Indicators should be maintained unless demonstration can be made that they should be changed or modified.

2.2.3 Taking a balanced approach, delivering added value

A key theme that emerged from the informal consultation phase is the need for a balanced approach taking into account the local context and its evolution as well as interdependencies and trade-offs between Key Performance Areas, whilst securing safety improvement through appropriate target-setting. This echoes the Recitals 10 and 11 of Commission Decision 2011/121/EU of 21 February 2011 setting the EU-wide performance targets for the first reference period 2012-2014,

This need for a balanced approach recognises that each State, depending on its specific situation, may have to apply different priorities when establishing its performance plan, with a view to contributing to the best of its ability to reaching the EU-wide performance targets. This should be explicitly taken into account during the Performance plan assessment. The PRB considers it important to ensure that, in using this flexibility, Performance plans continue to make a full contribution to delivering the EU targets

Without including the financial value of safety, the performance scheme has a bearing on some €14 billion per annum, i.e. some €70 billion over a 5-year reference period.

Figure 2 shows orders of magnitude of direct and indirect ANS-related costs, all of which are borne by airspace users in Europe. The direct costs are incurred through ANS charges (en route and terminal) and the indirect costs consist in the cost of ATFM delays and flight inefficiencies. Putting too much pressure on one area may well generate losses in other areas, which could exceed the expected gains. A key success factor for the performance scheme shall be to minimise the total ANS-related costs while ensuring safety improvement.

This highlights the need for a solid approach to interdependencies and trade-offs, e.g. between risks and opportunities, between different KPAs, existing levels of safety being maintained or enhanced. This should be duly taken into account when setting EU-wide targets and during the Performance plan assessment phases. In this context, the concept of “economic value”, developed further in section 3.2.2, is a potential tool to assess the trade-offs and the overall contribution of the Performance plan to reaching the EU-wide targets.

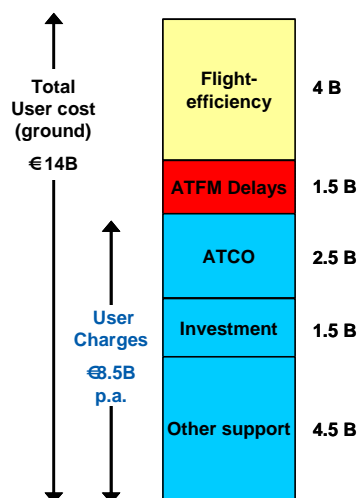


Figure 2: Breakdown of total user cost (EUROCONTROL area)

2.2.4 Ensuring convergence of the SES five pillars towards aviation performance

The second Single European Sky package (SES II) adopts a total system, gate-to-gate approach for ANS. It is based on five closely interrelated pillars all converging towards the keystones of aviation performance and sustainability:

- The **legislative pillar** includes the performance scheme, a strengthening of Functional Airspace Blocks (FAB), as well as a central network management function fostering an increased efficiency of the network.
- The **safety pillar** extends the competence of the European Aviation Safety Agency (EASA) to ATM and airports, which puts aviation safety under the authority of a single entity at EU level.
- The **technological pillar**, SESAR, aims to develop state of the art technology supporting Member States in their efforts to improve performance, safety and sustainability.

The expected setting up of a governance structure and financing tools for the deployment of SESAR technology will allow the performance scheme to get information on the deployment of technology expected for the next years which will be taken into account for setting adequate performance targets. Conversely, performance needs shall be used to set priorities for the deployment of technology.

- The **airport pillar**, comprising the creation of the Airport Capacity Observatory is to be complemented by terminal ANS performance indicators in the performance scheme, with a view to ensuring a fully gate-to-gate dimension to the performance scheme. In addition the Commission has presented a “Better airports” package on 1 December 2011, which includes links with the SES and its performance scheme. In the medium term, depending on the timing and outcome of Co-Decision process, this may pave the way for an extension of the performance scheme from ANS performance to a global aviation performance.

Furthermore, the Airport slots part of the package has an influence on the setting and ability to reach the terminal ANS capacity and environment targets. States should be aware of the need to adopt a balanced approach to reach the optimal airport capacity whilst taking into account the ANS dimension.

- The **human factor** pillar, materialised initially by consultation of staff representatives at all stages of the performance scheme implementation and the introduction of a safety key performance indicator addressing “just culture”.

The contribution of all SES pillars and entities towards global SES performance is illustrated in the graph below:

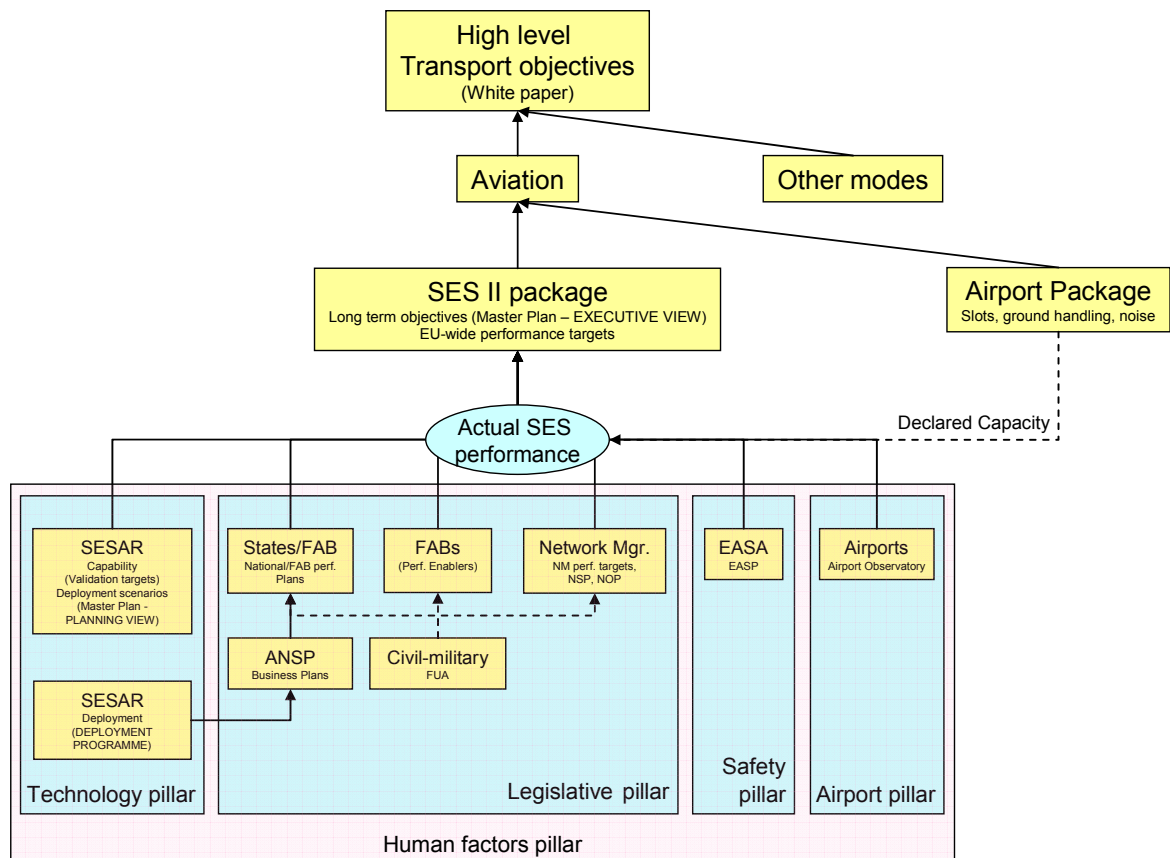


Figure 3 Contributions to the high level transport objectives

2.3 Initial informal consultation of stakeholders and interested parties

The PRB started the engagement with stakeholders and interested parties on RP2 preparation via a five month informal consultation phase (July-November 2011). The objective was to collect a wide range of initial views from the stakeholder community prior to making any proposals.

First, an open invitation was sent to stakeholders to provide initial views in written form to the PRB chairman, or to request a bilateral meeting with the PRB for an initial exchange of thoughts. A number of stakeholders (primarily associations) used this opportunity.

In July, a structured questionnaire was sent to a large number of stakeholders, asking for feedback on lessons learned during RP1 preparation; views regarding the link between Master Plan and RP2 of the Performance Scheme; the scope of RP2 in general; data provision; and questions regarding main priorities, indicator selection and target setting in each of the Key Performance Areas covered by the performance scheme, namely: Safety, Environment, Capacity and Cost efficiency.

Forty-four replies were received, several of which represented consolidated responses from groups of stakeholders.

The informal phase was concluded with a public workshop held at EUROCONTROL's Headquarters in Brussels on Thursday 10 November 2011. The workshop attracted a lot of interest: approximately 170 people attended the event. As a follow-up, approximately a dozen stakeholders provided additional comments in the weeks after the workshop.

The informal phase was a fruitful experience for both the stakeholders and the PRB, which has gained valuable understanding of the stakeholders' (sometimes diverging) initial views regarding RP2. This information has been duly considered by the PRB in the development of this regulatory approach proposal.

Documentation regarding the questionnaire and the workshop can be consulted at the following address: <http://www.eurocontrol.int/articles/performance-targets>, under the heading “RP2”.

2.4 Consistency with other policies and objectives of the European Union

The performance scheme of the Single European Sky and the proposal to extend it to cover all air navigation services in a gate-to-gate approach is fully in line with the main objectives of the White Paper 2011 of the Commission “*Roadmap to a Single European Transport Area – Towards a competitive and sustainable and resource efficient transport system*”³.

It also supports:

- the “*Europe 2020 strategy*”⁴, proposed by the Commission on 3 March 2010 for reviving the economy of the European Union and aiming at “smart, sustainable, inclusive growth” with greater coordination of national and European policy.
- The Commission work programme for 2012⁵ to bring EU back to growth, through finalising the Single market and strengthening economic governance.

2.5 General impact of the proposal

The proposal is based on the requirements contained in the performance Regulation (EU) No 691/2010, requesting that missing key performance indicators be developed (Annex I of the performance Regulation) and that the process be reviewed and where necessary amended and improved (Article 24 of the performance Regulation).

Moreover, there is a strong and widely-shared demand from stakeholders of the aviation community as well as from the political level (Council, European Parliament, National Authorities) to put in place an ambitious and gate-to-gate ANS performance scheme, with target-setting covering all Key Performance Areas.

The impact of each scenario/option of the proposal are assessed in the chapters below, KPA per KPA and KPI per KPI.

In chapters 4 to 7 below, addressing each proposed option in each KPA, the following approach is followed:

1. Identification of the problems to be addressed and objectives pursued
2. Identification of the potential options/alternatives
3. Assessment of the impact of the options proposed

3 COM(2011) 144 final <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0144:FIN:FR:PDF>

4 http://ec.europa.eu/news/economy/100303_en.htm

5 http://ec.europa.eu/atwork/programmes/index_en.htm

The guiding principles for the assessment of the various options presented are as follows:

Table 2 Guiding principles for assessment of options

Relevance	Does the proposal address the problem(s) identified in an achievable and adequate way? Does it drive the right behaviour and target the appropriate accountable entities? Is the risk of undesired behaviour or side-effects identified and mitigated?
Proportionality	Are the implementation costs in proportion to potential benefits/added value? (In particular is the data flow in place or not too costly to establish?) Does the proposal take into account the administrative burden on all stakeholders (including the Commission's)
Subsidiarity	Is the demonstration made that EU action is more effective than action taken at FAB, national or local level? (e.g. in particular for terminal performance indicators)
Maturity	Is the proposal based on sufficient evidence and robust analysis? Has the indicator been tested and does it rely on sufficient and validated historical data?
Acceptability	Does the proposal benefit from a reasonable buy-in from stakeholders?

In application of Recital (14) of the performance Regulation (EU) No 691/2010, the KPIs proposed are “selected for being specific and measurable and allowing the allocation of responsibility for achieving the performance targets”.

3 LESSONS LEARNED FROM RP1, REVIEW OF THE PROCESS AND HORIZONTAL ISSUES

3.1 Improving the quality of the legislation on the basis of experience gained

Processes for the preparation of the first reference period 2012-2014 (in particular setting the EU-wide targets, preparing the FAB or national performance plans, assessing the plans and advising the Commission), experience gained by the various entities involved in the process (e.g. NSAs through the NSA Coordination platform) and the informal stakeholder consultation carried out in 2011 allowed gaining experience and collecting States, national authorities and stakeholders feedback on a number of issues deserving review and if possible improvement. The main issues identified cover:

3.1.1 Timing, synchronisation and coordination of processes

RP1 experience has shown that the timing foreseen in the performance Regulation for e.g. the preparation of plans and targets and their assessment is demanding and complex. An amendment was already made to Article 14 of the performance Regulation to give the Commission and PRB four months rather than only two months for the assessment of the revised plans and targets (Article 1(1) of Regulation (EU) No 1216/2011 of 24 November 2011). This applies already to RP1.

It is difficult to move the key dates of the process because they were carefully set trying to take into consideration other processes such as the ANSP Business Plan cycles and the EUROCONTROL Multilateral route charges system as well as the need to have access to reliable and robust data.

It is however necessary to take a fresh look at the general performance scheme timing from RP2 onwards and consider how to:

- Possibly adapt a number of milestones to create as much room as possible in the timetable for the Performance plan establishment, consultation and assessment;
- avoid as much as possible heavy workload for Member States, ANSPs and the PRB during difficult periods.

The PRB has reviewed these issues and proposes the following recommendations:

1. Consultation of the PRB on its draft proposals for EU-wide targets: For RP1, this took place during the month of August 2010. There is no specific requirement in the regulation for the timing of such consultation, but this challenging timing was largely due to the fact that data necessary for setting the EU-wide en route cost-efficiency target was not made available before end June–early July 2010, after the EUROCONTROL enlarged Committee and substantial adjustment work, due to the fact that it was the first time that this new process was applied, using new reporting tables. This is unlikely to happen again and the timing to obtain cost-efficiency related information could be improved through a minor change in the charging Regulation: If in the fifth indent of Annex II of this Regulation, the data was requested nineteen months before the start of the reference period rather than eighteen (i.e. concretely for RP2 by 1 June 2013 rather than by 1 July, fully in line with the requirements of the EUROCONTROL route charges system), the PRB could work in June on the basis of this data, which would include the final figures from 2012 and disclose its proposal by end June 2013 rather than early in August 2013. Stakeholder consultation could take place over more than two months in July, August and first week of September 2013. These timings mean that the summer period can not be avoided but providing the much longer time for feed back on the proposals would respond to the concerns expressed by stakeholders. Furthermore, the initial EU-wide performance targets proposals would be known one month earlier (end June rather than end July), thus giving more time to Member States and FABs to start work on their own performance plan, as requested by several NSAs during the informal consultation process.

2. Assessment of initial performance plans: For RP1, this assessment had to take place during the months of July and August 2010, generating understandable difficulties. Obtaining the Performance plans one month earlier (i.e. by 1 June rather than 1 July) would allow the Commission and PRB to do the assessment work by mid-July. To this effect, the PRB envisages proposing a change in Article 12: to establish that the Performance plans and targets have to be adopted and communicated seven months before start of the reference period.

Such amendment would be an improvement on the current arrangements. For RP1, States/FABs were asked, and accepted, to deliver their plans by end June 2011, i.e. roughly 6 months after the positive vote in the SSC (3 December 2010), whilst the formal Commission Decision was published on 21 February 2011.

With the proposed timing modifications, States/FABs would still have the same 11 months' period than at present to prepare their plans as they would benefit from information on EU targets earlier than for RP1 (end June rather than end July as proposed in 1. above) and the legal deadline for the delivery of the plan would be clear as it would not rely anymore on the publication of the Commission Decision which depends on the completion of internal Commission processes.

The two PRB proposals are illustrated in the graph below, where the red arrows indicate where the changes proposed are:

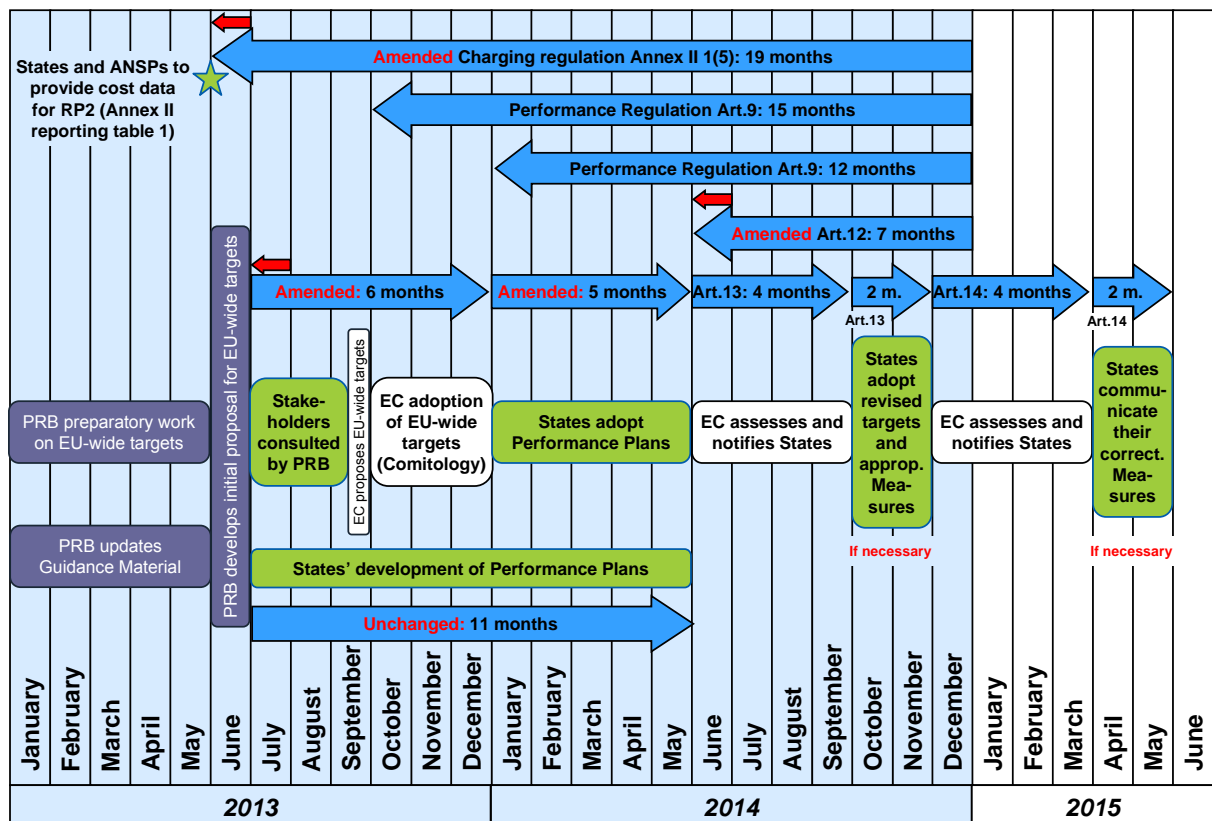


Figure 4: Proposed RP2 preparation schedule

3.1.2 Duration of the reference periods

After discussion in 2010 between the Commission and Member States in the Single Sky Committee, Article 7 of the performance Regulation set a first, transitional, reference period (RP) of 3 years, to be followed by default by RPs of 5 years, it being understood that this could be revised if necessary in the light of experience gained.

Work for RP1 clearly highlighted that RPs of three years are too short as work towards RP2 target-setting will need to start in 2013, one year only after the beginning of RP1, therefore with little experience from this first reference period. The overlap of work for RP1

(assessment of plans, revision of targets, a possible second revision loop) whilst having to work almost in parallel on RP2 preparation, generates a very heavy and complex workload.

On the other hand, the informal consultation phase allowed some stakeholders to express the view that five years might be too long, introducing risks in forecasting.

The PRB has considered this issue and came to the following conclusions:

- Five-year periods are widely-used business cycles in the aviation industry, applying e.g. to economic regulation, many airport contracts, EUROCONTROL planning or ANSP business planning.
- Five-year periods tie in with the timelines of EASA standardisation inspections, the ensuing establishment of corrective action plans and ANSP (re)certification.
- In five-year cycles, the third year allows a mid-term review if deemed necessary, enabling concrete action to be taken for the last two years of the period, which would be impossible if the period was of four years only as work on the following reference period would have already started.
- Longer periods (in the present case five years instead of three or four) give more room for manoeuvre to the ANSPs to adapt to temporary events affecting the business environment and reach their objectives at the end of the period. It also gives them enough time to undertake and achieve the structural changes that they need.
- Longer periods give airspace users a better predictability of ANS costs and quality of service, allowing them to better plan and organise their business for the overall benefit of European aviation. To change parameters and/or targets too frequently is a factor of instability for the industry.

The PRB therefore recommends *status quo*, i.e. that the future reference periods will be of five years, as stipulated in the performance Regulation.

3.1.3 Clarity and stability of assessment criteria

The process for the assessment of the plans and stakeholders' feedback allowed highlighting the need for clearer "rules of the game". In the light of the lessons learned during the first assessment cycle, the assessment criteria that will be used by the PRB must be clearly known and precisely communicated before the start of the preparation of Performance Plans. Revisiting Annex III of the performance Regulation seems to be desirable in order to incorporate some missing details and if necessary removing any ambiguities.

The PRB will make proposals to the Commission on the basis of its own experience and comments collected from stakeholders. The main areas of improvement identified so far are as follows:

- To explicitly indicate that the targets contained in a Performance plan shall be assessed taking into account the targets set for the previous reference period and their contribution to the EU-wide targets, this with a view to ensuring that efforts made for the previous reference period and the local context are duly taken into account when assessing the targets set for the following reference period. This is an extension of the principles⁶ underlying the setting of the EU-wide performance targets and assessment of performance plans for RP1, which stressed the importance of taking due account of the pre-performance scheme context, local specificities and efforts already made by Member States and FABs;
- To explicitly indicate that the ANSP capacity plan(s) is/are taken as a criterion(a) for the assessment of the capacity targets;
- To formalise comparator groups before NSAs prepare their Performance Plans with a view to making it part of the Commission Decision on EU -wide targets;

6 Recital 18 of the performance Regulation and Recital 11 of Commission Decision (2011/121/EU) of 21 February 2011

- To review / extend the Return on Equity criterion (to cover the cost of capital);
- To provide more precise reference to some assessment criteria (IMF, STATFOR...), and to clarify the date of the forecast to be used during the assessment;
- To clarify which traffic forecasts are to be used for stakeholder consultation and for the establishment of performance plans;

3.1.4 Thresholds for airports / scope for the application of the scheme:

In principle, the performance and charging Regulations apply to airports with more than 50 000 commercial movements per year (Article 1.3 of the performance Regulation), but the performance and charging Regulations contain several other thresholds:

For cost-efficiency, States may decide to include airports with less than 50 000 commercial air transport movements in their terminal charging zones under the charging regulation. In doing so, currently, these automatically fall under the performance scheme for terminal ANS cost-efficiency target setting and performance monitoring.

For capacity, in the current texts, the indicator “additional time for ASMA” applies to airports above 100 000 commercial movements. As far as data provision is concerned, data is expected from airports with more than 150 000 movements and all coordinated and facilitated airports with more than 50 000 movements.

As a consequence, there is a difference between the list of airports where ANS operational performance indicators apply (approximately 80 airports) and those where terminal ANS cost-efficiency indicators apply (228 airports in 2012). The aggregated capacity/environment performance indicators for ANS at airports do not fully match the terminal ANS cost-efficiency performance indicators.

Chapters 5, 6 and 7 of this document address this issue with the aim of streamlining, explaining the purpose of each threshold, its relevance, and how to make use of it in an efficient and performance-oriented way. This issue is also important to bear in mind for future discussions on interdependencies.

3.1.5 Case of “market conditions” for the provision of ANS at and around airports

Under the Charging Regulation, States have the possibility to demonstrate that ANS provision at and around airports is subject to market conditions. As a consequence, States may decide not to subject such services to cost-efficiency targets. They make their own assessment of the market conditions but this assessment is subject to a right of scrutiny by the Commission (Article 1.6 of the charging Regulation). The Commission can question, but not reject, such assessment.

To date, this possibility has been used only by the UK and Luxembourg. However as other States move towards liberalisation of all or part of such services, it is possible that more States will claim that their terminal ANS services are subject to market conditions.

The PRB considers it important that both the assessment of market conditions be robust and in full compliance with the conditions of the Regulation and also that such regime should demonstrate benefits to airspace users in terms of quality of service.

To ensure robustness of the assessment of such market conditions, the PRB recommends that the conditions set out in Annex 1 of the charging Regulation be reviewed with a view to strengthening the Commission’s ability to carry out its right of scrutiny and ask relevant questions as necessary.

Should this be done, States which make use of this provision will still be required to provide information on overall costs, and airports in market conditions shall, in principle, also be subject to the performance scheme in respect of all other KPAs. The PRB will thereby be able to monitor ANS performance at these airports in a satisfactory manner.

3.1.6 Data quality, provision and dissemination

The rules for the use and dissemination of the data provided under Annex IV should be defined in a clearer manner than in the present text, which does not address issues such as the independent handling of data received by the PRB as well as the confidentiality, in particular of safety-related data, intellectual property rights and dissemination aspects.

The PRB recommends amending Article 21 of the performance Regulation to create a legal basis for a Commission Decision aiming at setting up a “data policy” determining the extent and limit of disclosure of the data collected and held under the performance scheme and sorting out as necessary the issues of confidentiality, intellectual property rights and data protection.

3.1.7 Improving quality and accuracy of the texts

Work on RP1 has highlighted a number of ambiguities or imprecise drafting in both the performance and the charging Regulations. The PRB will make amendment proposals in particular in the following areas:

Performance Regulation

- Data requirements: To consider collecting and aggregating all ANSP staff plans at EU-wide level.
- Stakeholder consultation: To consider giving EC/PRB an explicit role in the facilitation / synchronisation of NSA consultation meetings on their performance plan.
- KPIs/PIs, e.g.:
 - Annex I or new article: To consider the possibility to introduce new performance indicators for monitoring (not target-setting) during reference periods through comitology;
 - Annex I, section 1, 3.1: To better define what is (and what is not) included in the capacity indicator (delays caused by exceptional events such as strikes or eruptions).

Charging Regulation

- Determined costs: To indicate explicitly in Article 2 (h) of the charging Regulation that determined costs are established in a given charging zone for the duration of the reference period⁷ and are not changed during this period, unless a change in the perimeter of the charging zone or the airports composing it would so justify, subject to the conditions highlighted below.
- Charging zones, Article 4: States should have the flexibility to adapt dynamically to the evolution of the conditions of terminal ANS provision during a reference period of five years, i.e. a change in the number of airports of the zone or application of market conditions regime. This flexibility should be allowed under the conditions that :
 - Full transparency is provided to allow rebuilding consistent cost-efficiency time series (before/after the change occurs);
 - Airspace users are consulted and their comments are reported;
 - The State provides an assessment of the impact of the changes on their terminal ANS cost-efficiency targets and performance monitoring and how they intend to carry out the performance monitoring during the remainder of the reference period.
 - Furthermore, if the change relates to the liberalisation of terminal ANS (becoming subject to "market conditions"), it is essential that the procedure set out under article 1.6 is carried out during the reference period (i.e. all necessary data and assessment are provided 18 months prior to the date of implementation of the change).and that the conditions under Annex I of the charging regulation are fully respected.

7 unless an alert mechanism is activated in application of Article 18 of the performance Regulation.

- Traffic forecast: Article 6.1: To ensure that traffic forecasts used in the charging scheme and in the Performance plan are identical. Currently, only costs are requested to be identical.

3.2 Horizontal issues

3.2.1 Encouraging the elaboration of performance plans at FAB level

For RP1, most FABs were not yet established. FABEC delivered a partial FAB plan, cost-efficiency remaining in national plans and only Denmark and Sweden produced a single plan adopted at their FAB level.

The situation will be different for RP2 as all FABs are expected to be established and delivering benefits as from 4 December 2012.

Some FABs have already indicated their intention to elaborate FAB plans as from RP2.

In this context, the PRB is of the opinion that a strengthened “FAB approach” to performance, is likely to foster synergies and economies of scale and to stimulate performance improvements coming from FABs and the defragmentation of ATM.

The PRB believes that these synergies should become visible already during RP2. One way of achieving this would be to adopt a more business to business approach focused on delivery of total economic value.

The PRB considers that performance plans (including targets) should be established at FAB level and cover all four KPAs, it being understood that:

- In the cost-efficiency KPA, different charging zones with different determined unit rates might still co-exist if justification is brought that determined unit rates are too heterogeneous between the States concerned and that single en route and terminal determined unit rates would be detrimental to the overall performance. Regional charging zones (e.g. two en route charging zones in a FAB of four or five States) could be possible and should be encouraged when adequate.
- When different charging zones continue existing in a FAB, the FAB plan should demonstrate how the FAB dimension has been taken on board to set the different cost-efficiency targets in the different charging zones (e.g. synergies, common procurement, common training, etc.) and should allow assessing the interdependencies between the cost-efficiency targets and the other KPAs.

However, FAB plans should be subject to specific pre-conditions, including clear accountability for reaching the targets and a common incentive scheme where applicable.

The PRB therefore proposes to review Article 5 of the performance Regulation, aiming at reinforcing a FAB approach to performance and establishing that:

- performance plans are adopted at FAB level, with obligations aiming at ensuring and strengthening a clear allocation of responsibilities and accountability;
- the plans shall be transmitted by the FAB governing body with a clear demonstration of the way the FAB dimension has been taken into account and is reflected into measurable performance gains in all Key Performance Areas, and in particular cost-efficiency if different charging zones still exist in the FAB.
- all investment projects are assessed on the basis of the benefits they will bring to the infrastructure at FAB level.

Additional Guidance Material shall also be considered to help States / FABs to assist in the FAB approach in the preparation of their plans for RP2.

3.2.2 Introducing the concept of total economic value and addressing interdependencies between targets

There is a need for a robust approach to interdependencies and trade-offs between different KPAs, e.g. between risks and opportunities, safety being protected.

For given safety levels, a balance should be found between operational, environmental and financial efficiency. Performance in all three KPAs can be translated in monetary terms and added up in a total economic cost, as illustrated in Figure 2. In Europe, airspace users bear a total economic cost of some 14 Billion Euros per annum for ANS on the ground, which should be minimised under the performance scheme.⁸

In the informal consultation phase on the lessons learned from RP1, some States have stressed the interdependencies between the different KPAs and insisted on the flexibility to set targets in a balanced way with a view to improving the total economic value. They also claimed that the contribution of States / FABs to the performance scheme could be adequately assessed through the use of a "total economic value" parameter.

The flexibility claimed by these States is already inherent to the principles underlying the performance scheme. The fact that the plans do not have to comply exactly with the EU-wide targets but "*be consistent with, and adequately contribute*" to them, is the materialisation of the principle of trade-offs and adequate consideration of local context and specificities, which are furthermore stressed in several Recitals of the Regulation.

The concept of total economic value is relevant to ascertain whether globally, the performance of ATM improves or not. It is already used in Eurocontrol PRC's annual reports (PRR) and was also used by the PRB as a parameter in the assessment of the National or FAB performance plans for RP1.

In principle, the PRB sees some attraction in using the concept of "total economic value" for balancing the EU-wide targets and as a criterion for the assessment of the trade-offs between targets in a Performance plan and their overall consistency with the EU-wide targets. Accordingly, it will be important to ensure that the value of any "trade-off" between different KPAs is assessed using commonly agreed methodology and that any change to the economic value targeted in one KPA is matched by (at least) the equivalent value in another.

For this approach to work, there must be a balance between incentives applying to the different KPAs. Otherwise, there would be a risk in balancing a target associated with a "hard" incentive (cost-efficiency) against a target with a weak incentive scheme.

It is also important to emphasize that the current structure of four KPAs with their relevant KPIs will be maintained. The total economic value should not be used as a single KPI replacing the others, because its value is subject to significant change from exogenous parameters that may vary a lot outside of ANS control, e.g. the price of fuel. The concept of total economic value should rather be used to assess consistency *a priori* and total economic value achieved *a posteriori*.

The PRB recommends appropriate amendment of Annex III of the performance Regulation (and Annex II if necessary) to integrate the concept of total economic value as a criterion allowing to check the interdependencies between the targets and ensure that overall an adequate level of performance is attained.

Additional Guidance Material should also be considered to help States / FABs to use this economic value concept in the preparation of their plans for RP2.

In line with the principle that there should be no financial incentive for safety performance (Article 11.2 of the performance Regulation), the PRB does not consider it appropriate to assign economic value to safety.

The PRB considers it important that in RP2 performance plans provide a full description and evaluation of interdependencies, including the interaction with safety. Plans should also

⁸ The airborne costs of ANS are outside the scope of the SES performance scheme.

describe how these interdependencies are to be monitored, including any impact on safety. In addition, the PRB recommends in Chapter 4 (section 4.8) that Performance Plans should include a safety assessment.

3.2.3 Ensuring convergence with the ATM Master Plan and SESAR deployment

The SESAR baseline is being deployed, paving the way for the deployment of SESAR validated technologies and procedures. The European ATM Master Plan is being substantially updated with notably a focus on deployment and the ambition of becoming a document providing an executive view on the key deployment priorities (concept of about 10 “essential operational changes”). Furthermore, the high-level SESAR societal goals it contained are being re-formulated as long-term SES performance objectives to which all SES pillars, including the performance scheme, should contribute, as illustrated in Figure 3 on page 5.

In parallel, the Commission works on the “*governance and incentive mechanisms for the deployment of SESAR, the Single European Sky’s technological pillar*”. In its Communication COM (2011) 923 of 22 December 2011 it stresses that “*SESAR deployment must be performance driven*”, i.e. deployment must be decided where and when it can demonstrate measurable performance gains that contribute to reaching the performance targets of the SES performance scheme. Even if no precise proposal can be made at present, the PRB is conscious that this Commission work may imply further amendment of the performance Regulation. Such amendment proposals, if they were to be considered, would be made in due time, under Commission authority and through appropriate stakeholder consultation mechanisms.

The revision of the performance scheme should enable convergence between the performance scheme, the ATM Master plan and SESAR deployment, so as to reach the long-term SES performance objectives.

- At present, there is a need to ensure the consistency of RP2 targets with longer term plans (Master plan, Network Strategy Plan). This does not require a change in the performance Regulation as it will be achieved through adequate coordination with the Commission, the SESAR JU, the Network Manager, and if relevant and timely, the entities that will be involved in the governance of SESAR deployment.
- In order to reflect performance improvements expected from SESAR deployment in its proposals for EU-wide targets for RP2, the PRB will need from the SESAR JU, by end 2012, information about validated capabilities that will have a bearing on performance achievable in RP2 and about ground investments to be depreciated during RP2, both of which should be part of the Master plan. This does not necessitate amending the performance Regulation.
- For the assessment of the performance plans for RP2, the PRB will seek information to understand the decision-making processes behind the main investments for the period (e.g. existence of a cost-benefit analysis, how interdependencies have been considered, whether the FAB dimension has been taken into consideration, whether the investment relates to an “essential operational change” bringing benefits to the network). As far as the current performance Regulation is concerned, Paragraph 2.1(d) of Annex II already gives to the Commission the possibility to check in an embryonic way to what extent the main investments are Master Plan-related. This is however limited to the cost-efficiency part of the plan, which is insufficient.
- Capacity planning and delivery is an important factor towards ANS performance. The implementation of capacity developments (new operational procedures, airspace design, systems, hiring and training) typically takes five years, which corresponds to the duration of SES Reference periods. Moreover, capacity must be deployed in response to demand. A balance must be found between too little capacity that generates delays and too high capacity resulting in low cost-efficiency. There is a loss of economic value in both cases. Traffic forecasts are too uncertain for accurate capacity planning over the SESAR longer term view. The PRB is therefore of the opinion that capacity planning should be

addressed through target setting under the SES performance scheme. However, it remains important that SESAR develops the capability for ANSPs to grow capacity in a flexible and efficient way, when and where needed. This does not necessitate amending the performance Regulation, but should be taken into account in the Master plan update.

The PRB therefore recommends reviewing the relevant parts of the performance Regulation to, as appropriate:

- strengthen the link between investment plans and performance targets through, in Annex II of the performance Regulation, making it broader than simply the cost-efficiency KPA and redrafting it to reflect the needs expressed above (e.g. existence of a cost-benefit analysis, how interdependencies have been considered, whether the FAB dimension has been taken into consideration, whether the investment relates to an “essential operational change” bringing benefits to the network), and consider inserting a commensurate assessment criterion;
- more generally, check and align the terminology in the Regulation with the latest developments of the work carried out on the “interim deployment” (formerly IP1) and SESAR deployment (e.g. insertion of the “essential operational change” concept).

3.3 The Network Manager and the performance scheme

Commission Regulation (EU) No 677/2011 of 7 July 2011⁹ lays down the rules for the implementation of ATM Network Management functions. This Regulation also amended the performance Regulation to establish the Network Manager’s (NM) interactions with, and contributions to the performance scheme. This was achieved through the creation of a new Article 5a “Network Manager” in the performance Regulation, giving to the NM the responsibility to elaborate a Performance plan before the beginning of each reference period (Article 5a 1 (d)), containing

- an environment performance target consistent with the European Union-wide performance target for the period,
- performance targets for other relevant key performance areas, consistent with the European Union-wide performance targets for the period;
- a description of the actions planned to meet the targets;
- where necessary or decided by the Commission, additional key performance indicators and targets.

The NM also received the tasks to

- Support the Commission (and by delegation, the PRB) for the preparation of EU-wide targets before the period and monitoring during the period (Article 5a 1(a))
- Support Member States and ANSPs in reaching their performance targets (Article 5a 1(c))

Logically, the PRB received in return the additional responsibility to assist the Commission in the assessment of the Performance plan of the Network Manager, including its consistency with the EU wide performance targets (New Art 3.3 m.)

The PRB’s view is that the changes to the performance scheme introduced by Regulation (EU) No 677/2011 are adequate, sufficient in the current context focusing on RP2 preparation, and do not necessitate a further amendment of the performance Regulation.

9 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:185:0001:0029:EN:PDF>

4 SAFETY KEY PERFORMANCE AREA

4.1 Context and problem to address

Article 1 of the Framework regulation (EC) No 549/2004 defines the SES objectives for safety performance in qualitative terms: “*The objective of the single European sky initiative is to enhance current air traffic safety standards*”. Article 13a of the same regulation establishes that Member States and the Commission, in accordance with their respective roles “*shall coordinate as appropriate with the European Aviation Safety Agency (EASA) to ensure that all safety aspects are properly addressed*”.

In order to further improve the already good safety record of the civil aviation industry, ICAO has promoted the principles of safety management. These principles revolve around the implementation of a Safety Management System (SMS) in industry organisations and a State Safety Programme (SSP) in Member States. In addition, EASA, the Member States, the Commission, and Eurocontrol have taken a more proactive approach and worked collaboratively to develop the European Aviation Safety Programme (EASP) that should aid Member States in meeting their legal obligations and further improving safety.

The sharing of roles between the EU and the Member States, as described in the EASA Basic Regulation, makes it necessary for the Member States to work together with EASA to fully implement the SSP. Production of an EU equivalent of an SSP (i.e. the EASP) is a more efficient mean of discharging this obligation and should support the Member States in developing their own SSPs.

ICAO Annex 11 (para 2.27) and Annex 14 (para 1.5.1) prescribe that States shall establish a SSP at State level in order to achieve Acceptable Level of Safety (ALoS)¹⁰. ICAO standards also explicitly require States to establish an ALoS to be achieved, as a means to verify satisfactory performance of the SSP and service providers’ SMS. In the EU context, ALoS will be based on a combination of three tier level Safety Performance Indicators (SPIs):

- Safety measurements as information relative to events with high consequences: 1st tier SPIs providing a general assessment of safety and informing the public and stakeholders;
- Safety performance measurement of events: 2nd tier SPIs focusing on key risk areas (principal risks) which require measures; and
- Safety requirements: 3rd tier SPIs providing information on the effectiveness of the measures.

The EC in a recent Communication to the Council¹¹ and the European Parliament provides the view that, in order to continue to make progress on safety, the European Union (EU) addresses the risks to aviation safety in a systematic fashion. The move from a primarily reactive system is needed, where regulations are changed as a result of experience, towards a system which is pro-active and attempts to anticipate potential safety risks in order to further reduce the likelihood of an accident. The text of the Communication clearly outlines that performance indicators and targets have a primary role in moving EU towards a performance-based regulation in the context of compliance regulation.

The Communication sets the strategy for aviation safety in Europe for the coming years. It is accompanied by a Commission Staff Working Paper¹² describing the current aviation safety framework at European level (the EASP). The Communication, the Commission Staff

10 ICAO’s SSP requirements place responsibility for the establishment of an ALoS on the State. This is accomplished through the use of data and other resources that contribute to the development of SPIs that are used to measure whether the SSP is achieving an acceptable level of safety.

11 COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT: “Setting up an Aviation Safety Management System for Europe”. Brussels, 25.10.2011

12 EC SEC(2011) 1261 final European Aviation Safety Programme.

Working Paper and the European Aviation Safety Plan (EASp) are the main elements of the SMS at European level: a strategy, a Safety Programme and a Safety Plan.

Lastly, to ensure that safety is the ultimate priority of the Single Sky Initiatives, it is of utmost importance to ensure that improving performance has no adverse effect on safety. Therefore, it is necessary to guarantee that safety will be duly taken into account during the RP2.

4.2 Objectives of safety performance

Considering all regulatory requirements and high level objectives, the strategic direction for safety during the second reference period (RP2) of the performance scheme should be considered two fold:

- Maintaining and improving safety levels while improving overall efficiency of the air navigation services across the key performance areas environment, capacity and cost-efficiency.
- Contribute in moving Europe towards a pro-active, risk- and performance-based management of aviation safety (risk-based approach and approach based on safety performance).

4.3 Roadmap towards safety performance

4.3.1 RP1: setting the baseline

The performance Regulation (EU) No 691/2010 establishes a new mechanism to improve safety performance of NSAs, ANSPs and network functions through target setting and continuous monitoring at national/FAB and EU-wide level. Currently the Regulation and its amendment (EU) No 1216/2011 define a number of SPIs, which shall be monitored at both European and national/FAB levels and used for the safety performance assessment during the first reference period (RP1).

Based on the current regulatory proposal in place and its SPIs, it is expected, that by the end of RP1, Europe will benefit from an improved level of reporting of incidents in ANS/ATM, and from an improved quality and harmonisation of reporting and its subsequent analysis. Moreover, it is expected that States will advance with the implementation of their SSPs, which shall provide a fundamental basis for further safety improvements. For the first time an initial safety picture (with regards to safety performance) at the EU-level will be available.

It would be expected that a number of improvements will already be realised during RP1 or will be in process:

- States should have clearly designated ATS providers for the whole airspace and these ATS providers should have formally defined safety interfaces with other entities. This should provide clear lines of safety accountabilities and well organised Safety data management.
- The interface between SMSs of ANSPs and airport operators will be under development following the introduction of EU Rules for Aerodrome operators by December 2013.
- Safety reporting, lagging and leading indicators should be consistently monitored and measured across Europe. Reporting will be mandated by authorities and encouraged by Just Culture.

4.3.2 RP2: from monitoring to target setting

The RP1 safety data collection and verification process for 2012 will start as soon as possible and be concluded by Q1 2013 to allow the Commission, States, EASA and the PRB to gain experience in SPIs, with a view to target setting for RP2. While the current legislation requires a target to be set for RP2 for safety, concerns have been raised by some users that this may be counter productive and premature. However, to guarantee that safety continues to be the overall priority in the ANS/ATM service provision, the PRB is in favour of setting ambitious targets for safety in RP2.

The PRB proposal, taking into account stakeholder feedback during the informal consultation phase, is that **target-setting for safety performance is necessary in RP2. The safety targets will be, however, set only for the three PIs** (EoSM, JC, and application of RAT methodology) **that were monitored in RP1**. They must be solid and measurable to maintain credibility of the SES performance framework.

At Which Aggregation Level Should Targets Be Set?

Safety is a global issue and should be addressed by setting clear performance targets. To respect the importance of safety and the other SES objectives, it is proposed that EU-wide targets would be set on the three indicators which are monitored during RP1 (EoSM, JC, and application of RAT methodology).

As a top-down approach is not feasible for apportioning safety performance targets, targets on national level would be equivalent to the EU-wide target.

4.4 Performance Indicators for RP2

4.4.1 Development framework

If the main safety performance objective of RP1 was to improve and harmonise reporting across Europe (through regular monitoring of leading and lagging indicators) the logical step in RP2 is the improvement of risk management. Therefore, a framework for the development of performance indicators and targets for RP2 needs to foster continuous improvement of safety of the ANS/ATM system in Europe.

In order to achieve this specific objective, it is necessary to improve not just the risk management but also the system of safety assurance. This should ultimately allow that safety performance monitoring and measurements (including verification of safety performance and of effectiveness of controls which are in place) as well as management of change are working properly. In addition, continuous improvement of safety requires continuous safety performance monitoring.

Figure 5 describes the safety framework that will be used as a basis for the development of performance indicators and subsequent safety performance targets for RP2. A high-level safety objective / strategic safety direction for RP2 at the top signifies an aim to increase overall safety levels in Europe.

Note: Development of Safety indicators for RP2 should take into account both the European safety initiatives, such as the three tier level approach described in EASP and EASp, as well as the relevant ICAO context, principles and initiatives, including safety indicators described in the ICAO Global Aviation Safety Plan (GASP).

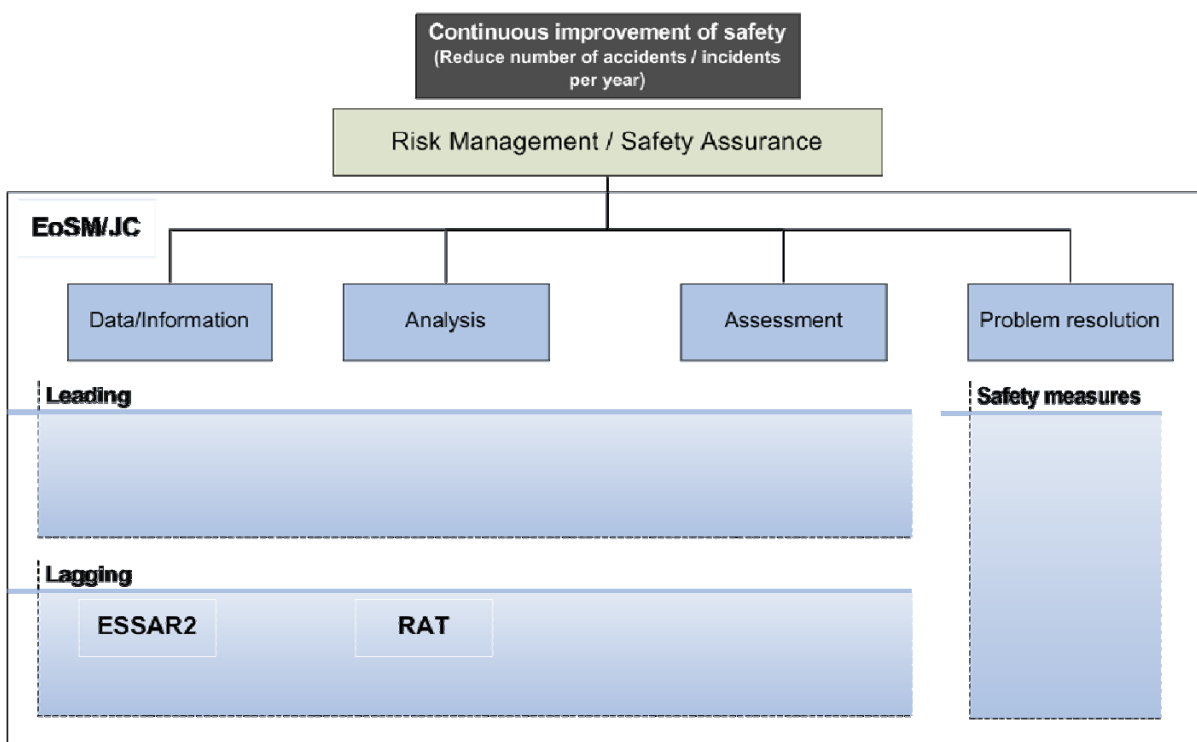


Figure 5: Development framework for RP2 Safety PIs (Safety framework)

4.4.2 Options for RP2

Two options have been analysed:

- **Option 1:** RP1 SPIs and their targets, with no new safety indicators introduced in RP2.
- **Option 2:** RP1 SPIs and their targets (Option 1) plus potential RP1 SPIs updates, and introduction of new safety indicators to be monitored during RP2. This altogether driving the risk-based approach.

These options are elaborated in the following sections.

4.4.3 Option 1

RP1 SPIs and their targets, with no new safety indicators introduced in RP2

The three leading RP1 SPIs that will be monitored from 2012 onwards, at both European and national/FAB levels, are expected – inter alia – to improve and harmonise reporting across Europe. They provide the basis for target setting in RP2. Nevertheless, the metrics for the RP1 SPIs should be reviewed during and at the end of RP2 and, if required, be updated to address issues that potentially might arise regarding their practical application.

Summary of approach

- Develop and where possible set up appropriate targets (either qualitative or quantitative) for the three RP1 SPIs (EoSM, JC, and application of RAT methodology) to be applied as of 2015.
- Review RP1 SPIs and their metrics for issues of practical application and, where necessary, implement appropriate updates.

Initial assessment

Relevance	-	Ensures continuity with the current RP1 indicators, but does not allow strengthening of behaviour towards the risk-based approach.
Proportionality	+	Simply continuing with RP1 indicators is a low cost solution but will not address the challenges the Performance Scheme will be facing during RP2 with respect to safety and the interdependencies with the other KPAs.
Subsidiarity	++	The review of the National Performance Plans for RP1 demonstrated the diversity in how safety is addressed on national level. An EU-wide approach is the only option to address the requirements of the performance scheme. Setting targets for SPIs is only feasible on EU-level in order to drive consistent and comparable behaviours across Europe.
Maturity	+++	Already used in RP1 so it can be considered mature.
Acceptability	++	Already accepted by stakeholders for RP1.

4.4.4 Option 2

RP1 SPIs and their targets (Option 1), plus introduction of new safety indicators

The intentions and purpose of the SPIs in RP1 were appropriate for implementation in the context of the EU-wide ANS/ATM environment prevailing before and in RP1. However they are not able to express risk-based measures or to deliver outcome oriented attributes. Hence, essential work to refine current and develop new SPIs for RP2 must ensure that 'real outcomes' which are derived from input and action taken by NSAs, ANSPs, and rules and regulations in respect of safety performance, capability and culture can be detected and measured. It is fundamental that SPIs in RP2 ensure that the real risks in ANS/ATM are identified comprehensively and fully addressed.

To successfully close the risk management loop, it is very important that the process, from the time the safety issue is identified and reported through to its closure, including corresponding actions taken and the results, is documented and that feedback is provided. An effective method and measurement is necessary in RP2, which will provide evidence that the areas being reviewed have been addressed and safety issues have been resolved.

Using the safety framework (Figure 6) and the requirement for a continuous improvement in safety, three risk management/safety assurance areas/levels, with a high potential for improvement in RP2 were identified. These are:

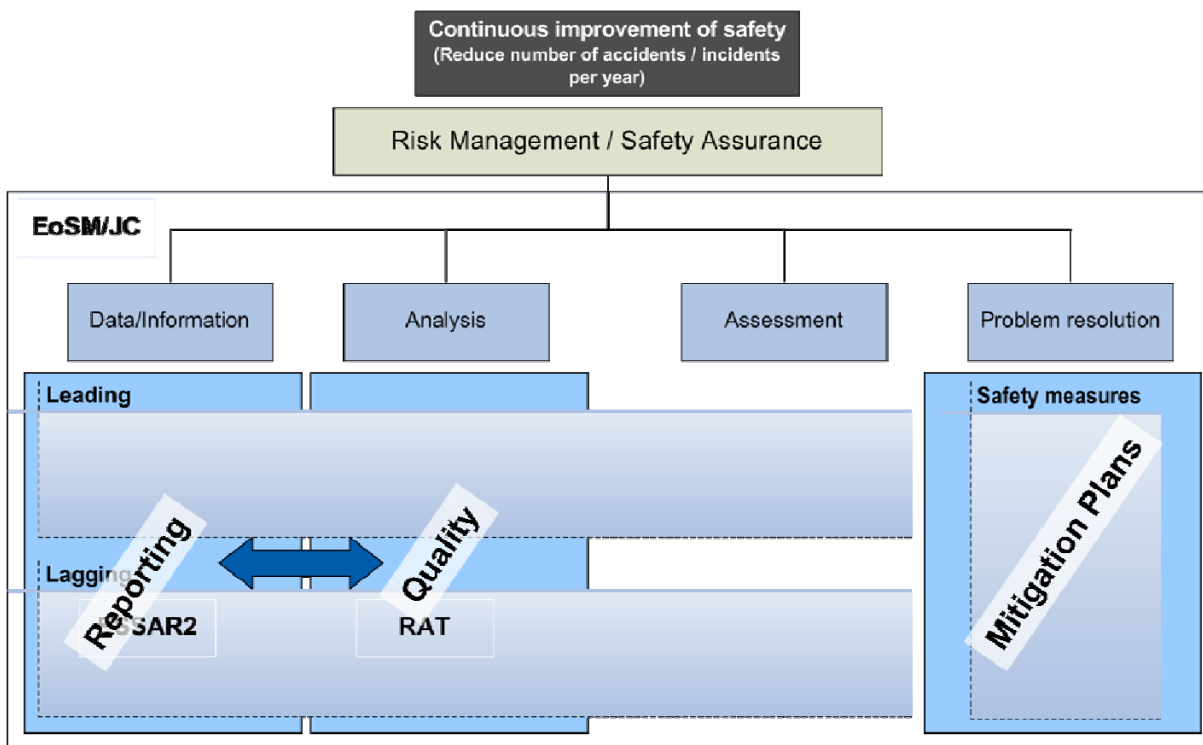


Figure 6: Areas for improvement in RP2

- Reporting: Improvement of level of reporting (addressing the issue of improvement of reporting culture),
- Quality of reports and quality of analysis: (addressing issues of common taxonomy, identification of causal factors during report analysis, etc), and
- Mitigation measures: Development, implementation and effectiveness of mitigation measures (addressing effective application of corrective and preventive measures and controls to address key risk areas and measures to address management of change).

Improved level of reporting

The level of reporting is linked to many factors: e.g. existence and level of just culture, maturity of the ANSP, quality of the surveillance by the NSA, effectiveness of the SSP management. Nevertheless, PRB believes that improvement of reporting can be further achieved by application of a method that would indicate the level of reporting.

One possible way to accomplish this could be by utilisation of automatic equipment for safety data collection. The Commission at SSC/35 in 2010 highlighted the importance of use of automated equipment and invited the Member States to record, whenever possible, the number of separation infringements identified through the use of automated equipment.

At present there is no requirement for automatic reporting. With introduction of a regulatory requirement, a safety indicator based on the use of automatic equipment can be used to monitor reporting culture (e.g. by measuring the delta between automatically detected and manually reported occurrences). However, automated reporting tools can only help solving the 'under-reporting', if the implementation of such tools and their usage are intelligently established by the ANSP and is supported by the NSA (i.e. just culture environment should exist).

In addition, automatic data is useful in the analysis of the efficiency of Safety Nets as well as to monitor "hot spots" in the ANSP's area of responsibility. Use of automatic tools can give early indication of the deterioration of the performance of the ATM system. Nevertheless, for whatever purpose automatic equipment is installed, investigation of all gathered events cannot be expected.

The PRB proposal for RP2 is to introduce a new indicator that will indicate the plan to improve the level of reporting by using means of automatic data collection or other equivalent methods (e.g. by using Heinrich pyramid principle to assess distribution of different types of occurrences).

Quality of reports and analysis

In general, the extensive and consistent use of standardised taxonomy, methodologies (e.g. RAT), should significantly contribute to the quality, consistency and harmonisation of safety reports and analysis on EU-level.

The PRB proposal for RP2 is therefore two-fold: it is building on the update of the RP1 RAT application indicator with a further push to standardise taxonomy. The PRB proposal is therefore:

- Extension of RAT methodology application:
 - Extension to cover additional types of occurrences in the ATM area.
 - The introduction of the use of the repeatability part of the RAT methodology.
- The use of a common list of causal / contributing factors for the occurrence analysis.

Mitigation measures

Reporting on European level:

The development and implementation of effective safety mitigation/action plans requires a layered approach. ANSPs - based on reactive and pro-active processes - are developing corrective and preventive measures and controls to address (i) identified risk and (ii) management of change. The implementation of these plans should be monitored by the State. Lastly, the global and EU-wide key risk areas are addressed on the State/FAB level by implementation of EU-wide Safety Action Plans and initiatives.

While some safety issues will stay at national level and will be addressed by the national SSP, there will be other instances where common issues of pan-European scope will require a collective action. For example, EASA's European Aviation Safety Plan (EASp) contains actions to increase aviation safety and to comply with ICAO Standards and Recommended Practices (SARPs) through appropriate EASA rulemaking initiatives. In addition, the LSSIP and ESSIP¹³ already monitor implementation of five European Safety Action Plans (e.g. for the prevention of runway incursions and level bust) and progress of implementation of four different Safety Nets. Information from LSSIP plans can already give an indication of State's compliance rate, i.e. implementation level. The PRB proposes to monitor effectiveness of these EU-wide ATM related plans. EASA will provide regular progress reports of the EASp to the PRB to facilitate such monitoring necessary for PRB.

Reporting on national level - Implementation of SSPs:

ICAO requires contracting States to establish and implement SSPs which are defined as an integrated set of regulations and activities aimed at improving safety. While SMSs have been implemented in all ANSPs accountable to deliver performance in RP1, the SSP implementation is still at its early stage and SSPs are not consistently available in Europe. Many Member States have just developed a draft SSP document and only a few have fully implemented or advanced in their SSP implementation.

While the existence of an SSP (i.e. development and implementation) does not immediately imply that proposed mitigation measures are effective, it is a first step to safety performance improvement. Therefore, the PRB proposes the new indicator to monitor the development and effective implementation of SSPs and plans particularly in the context of ATM. This new indicator should be built on the basis of RP1 SPI, the EoSM indicator, since the EoSM consists of a Management Objectives (MOs) that have been derived for each of the elements

13 European Single Sky Implementation Plan (ESSIP) 2011.

of the ICAO SSP. It will reinforce the specific MO related to national safety plans¹⁴. The metric for this PI will be developed together with EASA, based on its system in place to ensure consistency of the State Safety Plans with the EASp and taking into consideration future developments of the EASA framework that will be fully consistent with ICAO Annex 19. The monitoring of the PI will be done by EASA which will provide regular reports to the PRB.

Reporting on national level - Trend analysis of lagging indicators:

Based on the set of indicators and the identified key risk areas, actions required to mitigate identified risks should be defined. However, development of the Mitigation Plan (plan of proposed mitigations and controls for keeping the system safe or making improvements) itself does not assure improvement of safety levels without proper and effective implementation. Therefore, monitoring of implementation of the plan as well as monitoring of the effectiveness of corrective/mitigation measures is needed to ensure that key risk areas are addressed.

For this reason, the PRB proposes:

- Monitoring and trend analysis¹⁵ of lagging indicators at national level (differentiated by RAT severity A, B, C & repeatability in relation to their risk areas and causal factors).
- Reporting on evolving trends in different risk areas on a periodic basis (e.g. yearly, quarterly).

Summary of the approach

- Develop and set up appropriate targets for the three RP1 SPIs (EoS, JC, and application of RAT methodology) to be applied as of 2015.
- Review RP1 SPIs and their metrics for issues of practical application and, where necessary, implement appropriate updates.
- Further develop RP1 SPIs, where appropriate, and monitor the new elements during RP2.
- Use the safety framework (Figure 6) to identify SPIs that can steer the safety behaviour (within three identified areas) in the desired direction. Developed indicators shall be used in RP2 for monitoring purposes only.

Initial assessment

Relevance	+++	Ensures continuity with the current RP1 measures, responds to regulatory and stakeholders needs concerning continuous safety improvement and strengthens the behaviour towards the risk-based approach.
Proportionality	++	Cost-effective solution due to continuity with RP1 indicators. New data flows to be established, as well as new metrics to address the challenges the Performance Scheme will be facing during RP2 with respect to safety.
Subsidiarity	+++	The review of the National Performance Plans for RP1 demonstrated the diversity in addressing safety on national level. A EU-wide approach is the only option to address the requirements of the performance scheme. Setting targets for SPIs is only feasible on EU-level in order to drive consistent and comparable behaviours

14 Currently MO does not provide direct reference to development and implementation of the SSP, but merely assesses the development of safety policy.

15 The request for increased safety monitoring and trend analysis is supported by the recent ICAO European Regional Aviation Safety Group (RASG-EUR) at the meeting held in the ICAO EUR/NAT Office in Paris in January 2012.

		across Europe. This argument is equally applicable to the implementation of additional SPIs, which are aiming at fostering behaviour towards a risk-based approach on EU-level.
Maturity	++	High level of maturity is given for the continuation of using the RP1 indicators. Additional indicators will only be monitored and once mature, targets might be set for RP3.
Acceptability	+++	The proposal for update of RP1 indicators is already accepted by stakeholders for RP1 whilst the development of the new indicators for RP2 responds to stakeholders' expectations whilst minimising impact on them so should be widely acceptable. The proposal is based on stakeholder consultations and a safety expert workshop. The proposal responds to stakeholder requirements with regards to better harmonisation.

4.5 EU-wide safety performance monitoring

Taking into account the expectations of the Performance Scheme, PRB is of the view that independent monitoring of ANS/ATM safety performance on the EU level is needed. At the moment, safety performance monitoring is available either through the use of safety indicators that are based on self-assessment¹⁶ or on indicators that are reported through the State (such as number of incidents¹⁷). An independent and neutral indicator at the moment does not exist on the EU level. The introduction of an independent safety performance monitoring indicator would provide indications of safety performance trends that are not influenced by manual reporting or by self-assessment. One currently possible solution for independent EU-wide monitoring of safety performance, in PRB's opinion, is the use of Traffic Collision Avoidance System (TCAS) Resolution Advisories (RA).

In Europe, as of 1 January 2005 all civil fixed-wing turbine-engine aircraft with a maximum take-off mass over 5,700 kg, or capable of carrying more than 19 passengers, are required to be equipped with TCAS II version 7.0. Additionally, on 20 December 2011, the Commission published an Implementing Rule¹⁸ mandating the carriage of TCAS II version 7.1 within EU airspace earlier than the dates stipulated in ICAO Annex 10 (1 January 2017¹⁹). TCAS version 7.1 will become mandatory in EU as of 1 December 2015.

ICAO recognises that the Airborne Collision Avoidance System (ACAS) can have a significant effect on ATC, and suggests that the performance of TCAS in the ATC environment should be monitored²⁰. In addition, one of the SESAR objectives²¹ is that service providers should establish a monitoring of the performance of ACAS in the ATC environment. This monitoring system should be in place by end of March 2012. Therefore, the PRB suggests the development and introduction of a new SPI based on monitoring of TCAS events, more specifically, TCAS-RA.

The PRB proposal is two-fold:

- Initiate the TCAS-RA dataflow in RP2:

16 Even though verification mechanism of the verification of RP1 SPIs is defined in 691/2010.

17 Analysis of the number of incidents and their trends currently provide more indication on the change in the reporting culture than on the evolution of the safety risk. Moreover this type of data is only available with one or two years of delay.

18 (EU) No 1332/2011. Common airspace usage requirements and operating procedures for airborne collision avoidance.

19 ICAO Annex 6 states that as of 1 January 2005, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5700 kg or authorized to carry more than 19 passengers shall be equipped with an ACAS II. Amendment 85 to ICAO Annex 10 volume IV (published in 2010) introduced a provision stating that: all new ACAS installations after 1 January 2014 shall be compliant with version 7.1; and all ACAS units shall be compliant with version 7.1 after 1 January 2017.

20 PANS-ATM. Procedures for Air Navigation Services - ICAO Doc. 4444 Fifteenth Edition 2007-ATM/501

21 SLoA ATC16-ASP02, European Single Sky Implementation Plan (ESSIP) 2011.

- Collect data through airlines and ANSPs,
- Investigate possibilities for introduction of safety indicator and perform feasibility study;
- If feasible, introduce a suitable SPI based on TCAS-RA before the end of RP2 and start its monitoring:
 - States to provide evidence of safety resolutions in identified hot-spot areas.

TCAS-RA Dataflow

The next table shows dataflow requirements necessary to initiate development of independent safety performance monitoring on the European level.

Table 3 Dataflow requirements for independent safety performance monitoring (TCAS example)

Reporting Requirement	Notes
Mandatory – used for safety monitoring	<ul style="list-style-type: none"> - Reporting criteria: <ul style="list-style-type: none"> - A pilot is required to notify the ATC concerned and submit an ACAS report to the Authority whenever an aircraft in flight has manoeuvred in response to an TCAS-RA (EU-OPS 1.420). - Following a significant ACAS event, pilots and controllers should complete an air traffic incident report (PANS-ATM). - Data availability: <ul style="list-style-type: none"> - Legal requirements to record warning alerts - The EASA Acceptable Mean of Compliance (AMC), AMC1-CAT.IDE.A.190 on Flight data recorder defines the parameter to be recorded. The parameters to be recorded should meet the performance specifications as defined in the relevant tables of the EUROCAE Document ED-112. The list depends on the date of the certificate of airworthiness of the aircraft. AMC list TCAS as a parameter to be recorded. - Service providers should establish a monitoring of the performance of ACAS in the ATC environment, as described in PANS-ATM. SES objective: A monitoring system of the performance of ACAS in the ATC environment should be in place by end of March 2012. - Data preservation: <ul style="list-style-type: none"> - Following an incident that is subject to mandatory reporting, the operator of an aeroplane on which a flight recorder is carried shall, to the extent possible, preserve the original recorded data pertaining to that incident, as retained by the recorder for a period of 60 days unless otherwise directed by the investigating authority (EU-OPS 1.160). - Similar requirements apply to the ATS environment with regards to the voice recording and radar data preservation. For example automatic recordings of surveillance data shall be retained for a period of at least 30 days. When the recordings are pertinent to accident and incident investigations, they shall be retained for longer periods until it is evident that they will no longer be required (ICAO Annex 11).
Voluntary – used for system development and performance monitoring (protected).	<ul style="list-style-type: none"> - Reporting: Pilot and Controller reports on voluntary basis submitted through: <ul style="list-style-type: none"> - The requirements of Annex IV of 691/2010 - EUROCONTROL Voluntary ATM Incident Reporting (EVAIR) - Shared safety reporting systems

4.6 Airports

The PRB is of the view that the current development of EU rules for Aerodrome Operators where the implementation of SMSs at airports and the establishment of an appropriate interface with the ANSP SMS, as well as with the other organisations operating at the

aerodrome, if mandated, will increase the level of reporting and the quality of safety data (including runway incursions data) by:

- Encouraging staff having access to the manoeuvring area to report safety occurrences through the application of Aerodrome Operator's Safety Management principles (and especially through Just Culture environment).
- Aligning the investigation process between airport operators and ANSPs, which operate at the same airport, also by using the same taxonomy and sharing safety data.
- Measuring and regularly assessing the effectiveness of local Runway Safety Programmes.

It is the PRB's opinion that these efforts should be enforced by introduction of the measure for the effectiveness of Runway Safety Programmes (similar to the Effectiveness of Safety Management indicator).

Runway incursions dataflow

According to ICAO and EASA runway incursions are one of the primary risks in aviation. It is expected that the gathering of runway incursion data will allow a proper evaluation and mitigation of runway incursion risks. In addition, the PRB is of the opinion that some automatic detection tools for runway incursions will be extensively deployed before RP2 (based on the analysis of the A-SMGCS Level 2 implementation status²²).

There are two types of automatic detection tools for runway incursions:

- The first is a component of the aircraft avionics - Runway Awareness and Advisory System (RAAS),
- The second is a component of the Advanced Surface Movement Guidance & Control System (A-SMGCS) which is an airport-ATC system to safely expedite traffic in the movement area at airports.

RAAS is designed to provide flight crews with information concerning their aircraft's position relative to an airport's runway while operating at an airport. RAAS is a software upgrade to the later model Enhanced Ground Proximity Warning Systems (EGPWS). The installation and the data recordings of GPWS are made mandatory by Commission Regulation (EC) No 859/2008. Although there is no obligation to install RAAS software, many European airlines have started to include RAAS in the EGPWS of all new aircraft delivered from 2010 onwards. However, there is not yet a clear decision by airlines whether to retrofit older aircraft.

The A-SMGCS Level 2 includes Safety Nets which protect runways and designated areas and associated procedures. Appropriate alerts are generated for the controllers in case of conflicts between all vehicles on runways and the incursion of aircraft into designated restricted areas. The A-SMGCS is a technical application which is included in the European ATM Master Plan²³. In addition, a European norm on A-SMGCS Level 2 as a means of compliance to the Regulation on Interoperability (EC) No 552/2004 is adopted as Community Specification (ETSI EN 303 213-2).

It is the PRB's view that both the implementation of RAAS for commercial aviation and A-SMGCS Level 2 for those airports indicated in Section 3 Annex IV of 691/2010²⁴ should be made mandatory from January 2015. It should be noted that according to the Table 8 of Annex B of the ESSIP Plan 2011, some 18 airports will have implemented A-SMGCS Level 2

22 Table 8, Annex B, European Single Sky Implementation Plan (ESSIP) 2011 and LSSIP reports from <http://www.eurocontrol.int/articles/lssip>.

23 Article 3.1.2 of 552/2004 prescribes that "Flight data processing systems shall accommodate the progressive implementation of advanced, agreed and validated concepts of operation for all phases of flight, in particular as envisaged in the ATM Master Plan."

24 Airport operators providing services at Community airports with more than 150 000 commercial air transport movements per year and to all coordinated and facilitated airports with more than 50 000 commercial air transport movements per year.

by the end of 2012. In addition, data collected through RAAS software and A-SMGCS Level 2 should be made available to the EC on mandatory basis from 2016 onwards.

Furthermore, it is the PRB's opinion that operators, that are already using any type of runway incursion automatic detection tools, should be invited to share this data with the EC as of 2013, in order to develop detailed data requirements applicable at European level for RP2.

4.7 Improvements to the performance Regulation

Safety assessment of the performance plans:

When States develop their National Performance Plans the interdependencies between KPAs need to be considered especially in relation to the Safety KPA. Evaluation of interdependencies is an important issue and a specific effort was made when reviewing (revised) performance plans. Therefore, the amended IR should require a safety assessment of the plan (e.g. a Performance plan safety case). The safety assessment should identify risks, based on which, risk mitigation measures should be defined. Implementation of these measures should be monitored by the State and regular updates provided to EC as these measures are essential to the correct implementation of the plan.

Therefore, the PRB proposes a modification to the IR to address issues of interdependencies; however no performance indicator defined for RP2. Based on the experience of RP2 an indicator could be set-up for RP3.

4.8 Conclusions

Taking into account the expectations for the Performance Scheme, informal consultation with stakeholders, and the discussion above, it is **proposed to retain Option 2** for RP2 (K)PIs and therefore to improve risk management / safety assessment processes by introducing:

- European Union-wide targets set for RP1 SPIs,
- Possible update to elements of RP1 SPIs,
- Development and introduction of new RP2 safety indicators, for monitoring purposes only.

Table 4: Safety options: summary of initial assessment

Option	1	2
Relevance	-	+++
Proportionality	+	++
Subsidiarity	++	+++
Maturity	+++	++
Acceptability	++	+++

In addition, the PRB firmly believes in the importance of the development and implementation of:

- Independent safety monitoring via use of TCAS-RA dataflow (develop safety indicator and start its monitoring by the end of RP2),
- Automatic runway incursion dataflow (develop data requirements applicable at European level in RP2 and start mandatory collection of data as of 2016).
- Measure for the effectiveness of Runway Safety Programmes (similar to the EoSM indicator).

The PRB suggests that the indicators for RP2 are described on an appropriate high level in the IR and that further detail and the relevant metrics are developed through e.g. Acceptable Means of Compliance (AMC) and Guidance Material (GM) following EASA's the Rulemaking Procedure process.

Finally, when States develop their National Performance Plans the interdependencies between KPAs need to be considered especially in relation to the Safety KPA. Therefore, the amended IR should require a safety assessment of the plan (e.g. a Performance plan safety case) from which some identified risks should be highlighted. Based on identified risks, risk mitigation action plans should be defined. Implementation of these plans should be monitored by the State.

5 ENVIRONMENT KEY PERFORMANCE AREA

This chapter addresses the environmental impact of ANS which can be divided into the impact on global climate, local air quality (LAQ) and noise at airports.

While the importance of environmental friendly facility management and staff travel of ANS is acknowledged, the focus is on environmental impact of aircraft operations managed by ANS.

The scope covers en-route and airport/terminal flight phases and the focus is ATFM and ANS related Flight Efficiency (CO₂) as required by Regulation 691/2010 “the Performance Scheme.”

5.1 Environment Problem Definition

The environmental impact of aviation on climate is primarily related to CO₂ emissions (closely related to fuel efficiency). Other climate relevant emissions include carbon dioxide (CO₂) contrails and cirrus clouds (H₂O), oxides of nitrogen (NO_x) oxides of sulphur (SO_x) and soot.

Emissions from aviation contribute to 3.5% of total CO₂ emissions in Europe. In this context, Air Navigation Services (ANS) are estimated to have an impact on only 6% of the 3.5% aviation part of the total European CO₂ emissions. ANS-related inefficiency in en-route is considered to be the main component followed by inefficiencies in the terminal area (ASMA additional time) and in the taxi phase.

Local Air Quality (LAQ) is an increasingly important issue at European airports. The ANS contribution towards improving LAQ is mainly related to arrival and departure procedure design, operational performance and associated flight efficiency and emissions during take-off, landing and taxiing.

Another major challenge at airports is the need to balance traffic growth with the need to manage aircraft noise and associated negative effects on the population in the vicinity of the airport. It is estimated that some 2.5 million people are exposed to noise from 71 major European airports.

Noise and local air quality are delicate subjects which are also subject to trade off between CO₂, cost and capacity whilst ensuring safety.

The Commission’s proposed Airport package²⁵ specifically targets airport noise issues and is probably best placed to provide an approach to effective noise management in Europe (noise will be addressed further in 5.6).

5.2 What are the Environment objectives?

Based on current legislation requirements and the capability of Air Navigation Services to influence environmental issues, the main objective for RP2 is to reduce ANS related CO₂ emissions and LAQ through flight efficiency improvements, both in the air and on the ground, taking a gate to gate approach.

In doing so it should be recognised that the performance of the ATM system is the results of many interdependencies. All these interdependencies are illustrated conceptually in Figure 7 from CANSO.

25 COM(2011) 823

http://ec.europa.eu/transport/air/airports/doc/2011-airport-package-communication_en.pdf

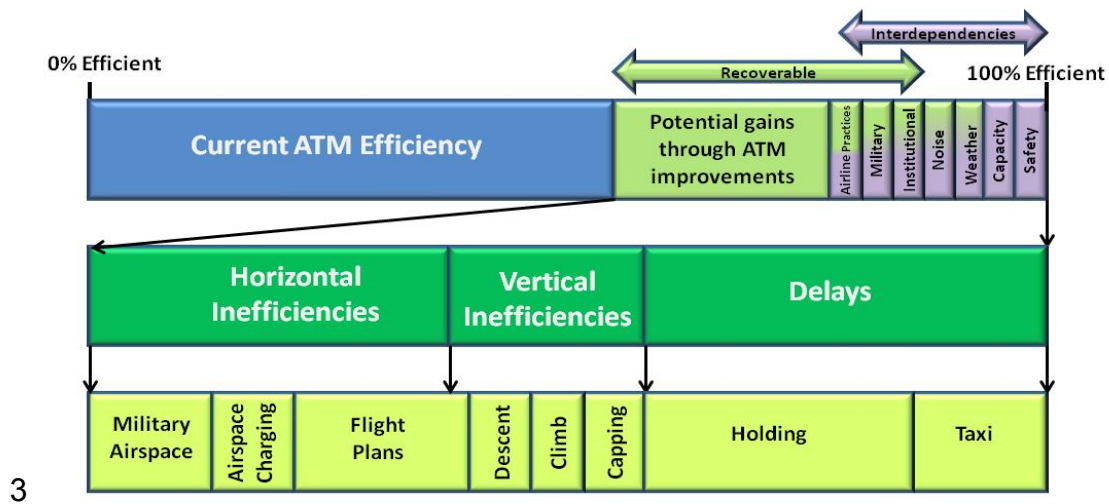


Figure 7 ATM Inefficiency Categories (notional scales) – source CANSO

While ANSPs can directly influence some of the interdependencies listed above, the largest gains will come from ANSPs working closely with other industry stakeholders – Regulators, Airlines, Airports, Airplane Manufacturers, Avionics and Ground System Suppliers, and local Communities.

In accordance with the estimation published in PRR 2011 (Figure 8), the priority should be to reduce horizontal en-route flight inefficiencies (already covered in RP1) and improve flight efficiency at and around airports (Taxi-out and airborne delays). More work would also be needed to better understand the impact of vertical inefficiencies (most of which are related to the airborne delays in the terminal area).

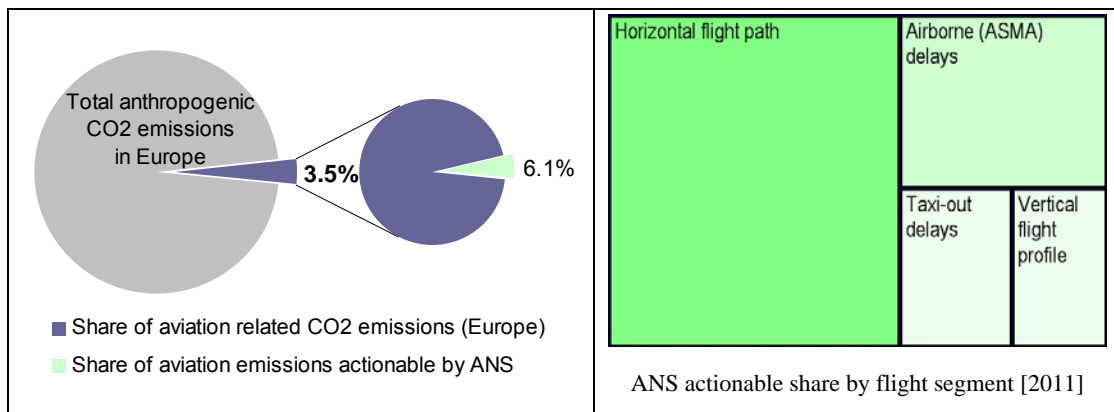


Figure 8: Estimated ANS-related impact on European CO2 emissions [2011]

5.3 What does the current legislation provide?

The current Performance Legislation already introduces regulation for en-route through flight efficiency measures that target horizontal aspects of the aircraft in-flight profile.

Annex I of the Performance Regulation specifies three EU-wide KPIs for Environment:

- average horizontal en-route flight efficiency (average between the length of the en-route part of the actual trajectory and the optimum trajectory which, in average, is the great circle;
- effective use of civil/military airspace structures (not subject to target-setting in RP1), and
- a third KPI to be defined and applied from RP2 onwards, addressing specific Terminal and Airport ANS-related environment issues.

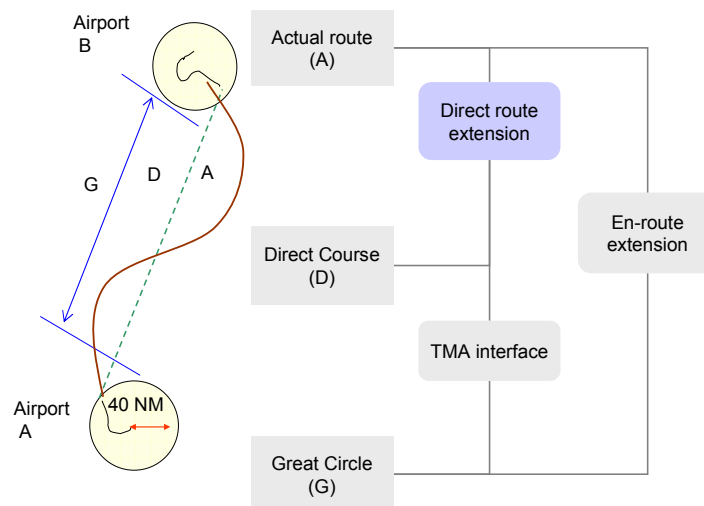


Figure 9: Current framework for EU-wide average horizontal en-route flight efficiency

The current framework for horizontal flight efficiency is represented by Figure 9.

An opportunity to further improve RP1 horizontal flight efficiency rests with the Network Manager, who will address this in collaboration with States/ANSPs as part of the Network Manager Performance Plan, expected to be delivered by end of March 2012.

To respond to the above mentioned requirement for measuring the effective use of civil/military airspace structures, two indicators are proposed to be monitored during RP1:

- the extent to which reserved airspace is actually used when booked;
- the extent to which CDRs (Conditional Routes) are used by flights that could have used them.

It should be noted that two capacity indicators are to be monitored from RP1 onwards at specified airports, which are considered also relevant for Environment because of their relationship with flight efficiency and associated emissions (additional time in flight and fuel burn):

- Additional time in the taxi out phase, and
- Additional time for ASMA (Arrival Sequencing and Metering Area).

The Performance Regulation currently does not address noise or LAQ although noise is expected to be addressed by the proposed Airport Package.

5.4 Reducing en-route CO₂ emissions

The environment problem being addressed is primarily additional en-route distance flown leading to increased fuel consumption and associated CO₂ emissions.

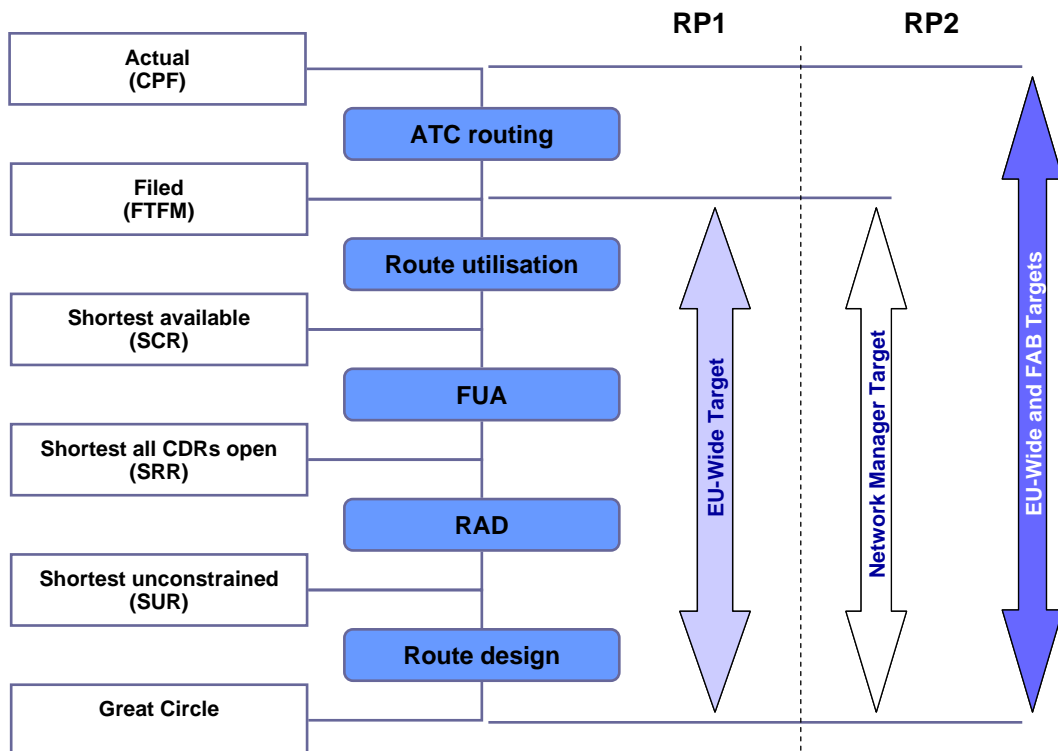


Figure 10: Future framework for EU-wide average horizontal en-route flight efficiency

Flight efficiency improvements are the results of the interactions between many stakeholders:

- Route network design (Network Manager/FAB/States);
- Route availability (Flexible Use of Airspace (FUA)/Route Availability Document (RAD));
- Route utilisation in flight plans (airspace users), and
- Tactical routing optimisation (ANSPs)

The Environmental target for RP1 only addresses the first 3 points listed above.

5.4.1 Considerations related to the selection of indicators and target setting

Actual Trajectory Based?

Using the actual trajectory as a performance indicator would be closer to measuring actual fuel burn and will capture tactical actions taken by ANSPs to optimise a flight plan in real time through options such as direct routes when available.

The challenge is to ensure that the Network Manager and FABs / ANSPs continue to optimise the route structure and associated procedures at a European level rather than at a local one thus reducing the need for real time tactical interventions that may impact predictability.

Since both the flight plan and the actual trajectory are complementary measures that can drive efficiency if harnessed appropriately, there is a case to consider a European-wide and FAB target using actual trajectory whilst retaining a flight plan approach as a European-wide Network Manager measure.

Flight Plan Based?

The current RP1 EU wide environment KPI measures horizontal route efficiency based on flight plans which dictate the airspace users' flight efficiency related to aircraft fuel uptake and take-off weight.

Retaining a flight plan based KPI will continue to highlight route inefficiencies and drive improvements in route design that should be acceptable to users, bringing benefits through

reduction in fuel loads and greater predictability as the difference between planned and actual route flown decreases.

Furthermore a flight plan based metric is considered as more relevant at the Network Manager level as the latter has little influence on the actual routing of the flight.

Enhancing Measures?

A number of adaptations have been suggested to enhance the current European-wide KPI such as measuring against wind optimum route, assessing improvements in the vertical profile and the use of Free Route.

Wind Optimum Routes

It is recognised that the shortest route is not always the most fuel efficient and there were suggestions to use the notion of wind-optimum route in the performance scheme. However, the main purpose of the en-route horizontal flight efficiency indicator is to use statistics to drive Stakeholder behaviour to improve route design.

Given that the typical European en-route distance flown is less than 1000km, the statistical difference between the current KPI (deviation from direct route) and an alternative (deviation from wind-optimum route) is limited.

Given that a large part of horizontal inefficiency is related to route design, for which distance is the relevant measure, the current indicator (measured versus the great circle) can be computed very precisely, checked and understood by everyone.

Also, if the indicator was to be measured against the wind optimum trajectory, we would need an extremely precise model of such trajectories, which does not currently exist.

As both alternatives drive the same behaviour (improved en-route flight efficiency), and for continuity and proportionality reasons, it is proposed not to adapt the current measure to account for wind optimum routes.

Time Based Measure

The current measure is distance based and consideration could be given to evolving this to being time based as this is more directly related to fuel consumption.

Time spent in the air is however strongly influenced by wind and the use of such measure is closely related to the notion of wind optimum routes addressed above.

Furthermore time in the air can also be influenced by aircraft operator priority regarding the respective importance of time versus fuel.

Vertical Flight Efficiency

Some States have developed a particular understanding of the vertical inefficiencies of flight and whilst this has significance in terminal airspace it is considered to be of a second order in the en-route flight phase.

En-route vertical efficiency is difficult to measure as the optimum cruise level depends on many parameters (aircraft weight, meteorological conditions, aircraft operator priorities, etc).

The difference between the actual flight level and the requested flight level has been suggested has a possible measure. However, this measure might be incomplete as in many cases the operator may not be able to request an optimum flight level for a number of reasons (level capping, letter of agreement, etc.) at the time the flight plan is accepted.

Considering the limited impact of vertical flight efficiency in the en-route phase and the difficulty to measure it, it is considered preferable to focus efforts on vertical aspects in terminal airspace.

Free Route Concept

Much focus has been put on improving en-route airspace design over the past years. The implementation of "Free route airspace (FRA) initiatives" aimed at enhancing en-route flight

efficiency started as early as 2009 and clear benefits can be seen in those areas where it has been implemented. Airspace users should gain further benefit through a coherent Europe-wide free route deployment.

As indicated in PRR 2010, the highest potential for improving horizontal flight efficiency is within States (64.6% if flights could fly a direct route within each State), and a further 12.5% could be achieved by improving the interface between States within a FAB. However, a significant part (22.9%) can only be addressed at European level.

Accordingly, the implementation of Free Route is encouraged by the PRB as it is an important enabler to achieve further flight efficiency improvements if implemented at FAB level and coordinated Europe-wide.

Civil Military

Monitor civil/military use of airspace and routes

The Flexible Use of Airspace is an enabler for horizontal flight efficiency improvements. To assess such improvements, two performance indicators will be monitored in RP1²⁶, namely:

- the extent to which reserved airspace is actually used when booked, and
- the extent to which CDRs are used by flights that could have used them.

A number of different factors drive efficiencies in airspace design and use.

In line with Commission Regulation (EC No 2150/2005)²⁷ the goal is to achieve benefit through improved use of SUA (Special Use Airspace) and greater use of available conditional routes (CDRs). To measure this, performance indicators will be used based on the provision of annual data, as required in the implementing rule.

However, use of a CDR does not necessarily represent use of available airspace since any real time tactical interventions such as provision of short cuts (FUA level 3) cannot be measured as data on actual airspace status is not readily available.

The data situation is changing and some States are starting to provide detailed airspace use data to a centralised data repository such as PRISMIL and the number of States doing so is expected to increase during RP1.

To assess how efficiently airspace released by the military service providers is used by airspace users, detailed on-line data would be required to further enhance the measurement of actual use of airspace, going beyond the current data deliveries provided as part of the Airspace Use Plans (AUP) and Updated AUP (UUP). It can be expected that monitoring of actual use of civil / military airspace structures would promote enhanced collaboration between all parties and would increase Network Manager and adjacent civil and military ANSPs situational awareness through use of a real time data feed.

Provision of a real time data feed should be an aspiration of RP2.

Shall a target be set?

While the current legislation requires a target to be set for RP2, concerns have been raised by some stakeholders that this may be counter productive and detrimental to an effective collaboration. Moreover, use of airspace is one factor influencing flight efficiency. Furthermore, the political challenge to achieve acceptance of a target might prove too strong.

However, considering the need to limit the number of KPIs used for regulation, the PRB recommends not setting a Europe-wide target. The target for en-route horizontal flight

26 Letter from the EC to the To THE Members of the SSC - Subject: Performance scheme / Environment performance indicator / effective use of civil-military airspace structures (Ref. Ares(2012)69968 - 20/01/2012)

27 COMMISSION REGULATION (EC) No 2150/2005 of 23 December 2005 laying down common rules for the flexible use of airspace

efficiency already covers the effect of improved use of civil-military airspace structures. Two targets should not overlap.

Nevertheless, this does not restrain States from setting targets in their performance plans.

At which Aggregation Level Should Targets Be Set?

It is essential that target setting encourages a coherent approach to airspace design, whilst considering European airspace as a continuum. This would require the Network Manager, FABs / ANSPs and airspace users to work together to deliver benefits.

The first and standard option is to retain a Europe-wide target on horizontal flight efficiency based on flight plans.

Targets could also be set on the basis of actual trajectories at FAB level. That will encourage ANSPs to optimise the flight plan in real time through appropriate tactical intervention although this could have a limited impact if the filed flight plan is already close to the optimum that can be achieved

It is important to ensure that such an option does not result in counter productive behaviour where local optimisation is to the detriment of overall European airspace and route optimisation.

The dual target approach (EU-wide target on flight plans, national/FAB targets on actual trajectories) will reinforce accountability and drive efficiency measures at different planning/operational levels.

What about incentives?

The issue of incentives has provoked significant debate during informal consultation and there is no stakeholder consensus on the subject.

Whilst States may decide to set incentives that may drive local improvement, concern has been expressed that such incentives set at a local level may lead to inappropriate behaviour that is detrimental to the network.

Another consideration is a potential side effect of a possible en-route capacity incentive where ANSPs might be tempted to manage performance dependencies in a way that protects their capacity performance by forcing aircraft to re-route around congested areas.

Whilst the PRB is not proposing incentives for environment, in the event that incentives are considered, care should be taken that their application ensures a balanced approach towards reaching both State and European Union-wide targets.

In the event that incentives are proposed by States, then the PRB suggests that a part of the incentive should be used to ensure overall achievement of European Union-wide targets.

Options

Based on the discussion above four options have been analysed:

- Option 1: Continue with RP1 target setting (Flight Plan based KPI) plus monitor use of civil military airspace structure;
- Option 2: EU wide and FAB targets on Actual Trajectory plus monitor military
- Option 3: EU wide and FAB targets on Actual Trajectory plus monitor use of civil military airspace structure with detailed on-line data
- Option 4: EU wide and FAB targets on Actual Trajectory plus target on use of civil military airspace structure

5.4.2 En-route CO₂ Option 1

Summary of approach

Continue with RP1 target setting (Flight Plan based KPI) plus monitor use of civil military airspace structure:

- An EU wide target on horizontal flight efficiency based on the flight plan (where the Network Manager is accountable).
- Monitor civil / military performance indicators (no target).

Initial assessment

Relevance	+	Ensures continuity with the current RP1 measures and directly addresses the problem of users being able to plan optimum flights.
Proportionality	+++	No additional cost involved as data flow already exists.
Subsidiarity	++	The route network has to be managed at a European level to ensure an optimum performance for airspace users.
Maturity	+++	The measures and data flow will already be in place.
Acceptability	+++	This option should be acceptable to stakeholders since it reflects agreements in RP1.

5.4.3 En-route CO₂ Option 2

Summary of approach

EU wide target and FAB targets on Actual Trajectory plus monitor military.

This option includes:

- An EU wide and FAB target on horizontal flight efficiency based on the actual trajectory
- An EU wide target on horizontal flight efficiency based on the flight plan (where the Network Manager is accountable)
- Monitor civil / military performance indicators (no target).

Initial assessment

Relevance	++	Addresses the ability of the ANSP to optimise a flight profile and better reflects fuel usage.
Proportionality	+++	No additional cost involved as the data flow already exists.
Subsidiarity	+++	This reflects the ANSP ability to optimise the trajectory.
Maturity	++	Although the data flow will already be in place, this will require development of methodology and measures to ensure that FAB targets reflect European Union-wide whilst avoiding unintended local behaviour.
Acceptability	++	The use of actual trajectories addresses stakeholder expectations although viewed with concern from a Network Management perspective due to potential unintended local behaviour.

5.4.4 En-route CO₂ Option 3

Summary of approach

EU wide and FAB targets on Actual Trajectory plus monitor use of civil military airspace structure with detailed on-line data.

This option includes option 2 extended by:

- Civil / military performance indicators (no target) based on detailed on-line data for monitoring performance.

Initial assessment

Relevance	+++	Provides proper assessment of the effective use of civil military airspace structure by taking account of the actual times that airspace was booked and released.
Proportionality	++	Additional cost is involved due to the need for States to provide the necessary detailed civil military on-line data although States can use existing tools.
Subsidiarity	+++	Whilst management of civil military airspace structures is a State issue, some coordination and monitoring is required at the European level to optimise network operations and ensure equity and access for all airspace users.
Maturity	++	It will be necessary for States to complete the development and implementation of detailed civil military on-line data flows.
Acceptability	+++	A number of States have already planned to provide data during RP1.

5.4.5 En-route CO₂ Option 4

Summary of approach

EU wide and FAB targets on Actual Trajectory plus target on use of civil military airspace structure.

This option includes option 3 extended by:

- Civil / military performance targets.

Initial assessment

Relevance	+	A specific target on use of civil military airspace structures might not be required as its impact is already covered under the horizontal flight efficiency target.
Proportionality	++	No additional cost involved.
Subsidiarity	+	Whilst the Performance Scheme requires targets to be set at the European level, it would appear preferable to set the target on civil military airspace structures at a State level.
Maturity	+	There is limited European experience; indicators should be monitored for some time to ensure acceptable maturity before targets are implemented.
Acceptability	+	Setting a target on use of civil military airspace structures should be

considered carefully as the military are not explicitly part of SES, it is essential to maintain an important level of collaboration between all stakeholders at the European level.

5.4.6 En-route CO₂ Options: Conclusion

Taking into account the expectations of the Performance Scheme, informal consultation with stakeholders and the discussion above, **Option 3 is considered the preferred option**:

- An EU wide and FAB target on horizontal flight efficiency based on the actual trajectory
- A European Union-wide target on horizontal flight efficiency based on the flight plan (where the Network Manager is accountable)
- Civil / military performance indicators (no target) based on detailed on-line data for monitoring performance.

Table 5: En-route CO₂ options: summary of initial assessment

Option	1	2	3	4
Relevance	+	++	+++	+
Proportionality	+++	+++	++	++
Subsidiarity	++	+++	+++	+
Maturity	+++	++	++	+
Acceptability	+++	++	+++	+

5.4.7 Application of Incentives

In the event that incentives are proposed for en-route flight efficiency, they should be applied to drive States performance at the local level and provide motivation to a collective contribution by States to the achievement of European Union-wide targets.

5.5 Reducing airport and terminal CO₂ emissions

The airport / terminal environment problems being addressed are additional time flown on arrival and departure and additional taxi time; both lead to increase fuel consumption and associated CO₂ emissions.

The current best estimates indicate that in Europe some 6% of total CO₂ emissions from aviation can be influenced by ANS of which some 20% are related to airborne holdings and around 12% to the taxi-out phase [PRR 2010].

Two indicators are proposed which involve additional time either flown or when taxiing, developed from indicators measured in RP1. In addition a new measure concerning vertical efficiency is introduced to cover approach and departure profile inefficiencies.

The approach considers the challenges to target setting given the specific environments and operating configurations of individual airports as well as discussing the airports that should be included.

There are interdependencies and trade offs to be considered such as capacity versus environment where additional routing implemented as a noise measure results in more emissions.

5.5.1 Considerations related to the selection of indicators and target setting

Monitor RP1 Indicators

The Performance Scheme states that “a third European Union-wide environment KPI shall be developed to address the specific airport air navigation services (ANS) related environment issues”.

While in RP1 no specific environment performance indicators were defined for terminal / airport two indicators proposed under capacity for monitoring are also relevant for environment:

- Additional time in the taxi out phase, and
- Additional time for ASMA (Arrival Sequencing and Metering Area).

Additional surface manoeuvring time related to taxi and holding with engines on at the apron or runway holding point is an important contributor to CO₂ emissions and LAQ. Similarly, additional time in terminal airspace also contributes to CO₂ emissions.

As a minimum, the simple option should be to monitor these two indicators.

Set Environment Efficiency targets on taxi out and ASMA additional time

It is clear that the two indicators described above provide feedback on flight efficiency impacting environment and so they should be considered as environment performance indicators.

Target setting to reduce surface additional time could bring environmental benefits through use of planned pushback and taxi procedures related to departure slots and optimised taxi routings with a reduction in engines-on holding time at the runway.

Further benefits could be realised by reducing flight time in terminal airspace through improved airspace and procedures design better adapted to modern aircraft navigation performance. En-route cross boundary arrival management and speed control techniques that absorb delay earlier and more efficiently could also be considered.

The applicability parameters for measuring additional time in terminal airspace could be reconsidered, by extending the measurement area to 100nm from the airport in which case the en-route flight efficiency would need to be adjusted to be 40nm after departure to 100nm from arrival, as is already the case in the US Europe benchmark report.

Address vertical efficiency

Aircraft that are sequenced into terminal airspace are often subject to inefficient procedures as the need to absorb additional time generally results in one or more level-off segments interrupting descent. Departing traffic might also be subject to interrupted climb when forced to stay below arrival traffic. Such procedures can result in additional fuel burn as less fuel would have been used if the flight would have been unconstrained.

Although such inefficiencies are partly addressed by the time based ASMA indicator, a more comprehensive measure of fuel efficiency could be achieved by looking at Vertical and Horizontal dimensions rather than ASMA.

This raises an issue of the data quality necessary to ensure that a “step climb or descent” is captured in the data flow; the current 1 to 3 minutes interval provided today is insufficient to ensure this. To be able to do so would require an improvement in existing quality of data i.e. a position report interval of 30 seconds as well as the development of new indicators.

Since ASMA additional time drives most of ANS related horizontal and vertical inefficiencies in the terminal area the option to further integrate vertical inefficiencies together with the improved data flow should be assessed.

The PRB also intends to study the effects of Cross Border Arrival Management Concepts (XMAN) that sequence the traffic with optimum speed calculations well before the Top of Descent.

Which Airports should be considered?

Globally, the performance Regulations apply to airports with more than 50 000 commercial movements per year and in addition, the capacity indicator contained in Annex I, Section 2, paragraph 3.1 of the performance Regulation (additional time for ASMA) applies to airports above 100 000 commercial movements.

As far as data provision is concerned (Annex IV, paragraph 3), data is expected from airports with more than 150 000 movements and all coordinated and facilitated airports with more than 50 000 movements.

Under the Performance Scheme, NSAs have proposed a total of 77 airports for inclusion in the scheme for monitoring and or target setting.

Of the 77 airports proposed for inclusion, 48 are “coordinated” airports (level 3).

Coordinated airports are those airports where the number of airport slots are controlled to preserve quality of service and limit Environmental impact. Scope for traffic growth at these airports is generally limited which provides for greater control.

However, many of the non-coordinated airports have significant opportunity for growth possibly leading to saturation and a need for coordination as well as potential for a greater contribution to environmental inefficiency; monitoring them would be prudent.

The level of inefficiency is linked to capacity utilisation and the level of variability of operations. To ensure that further environment inefficiencies can be detected it is proposed to set Environment KPA targets on coordinated European airports whilst monitoring the non-coordinated Performance Scheme airports.

States will need to ensure consistency with the National Performance plan at these airports when approving their coordination parameters.

In this respect it is proposed that states have to ensure that all airports which cause a negative effect on the network or have capacity constraints are coordinated.

At Which Aggregation Level Should Targets Be Set?

Climate change is a global issue and should be underlined by setting a clear performance objective. Furthermore, the Performance Scheme requests that “*a second European Union-wide environment KPI shall be developed to address the specific airport air navigation services (ANS) related environment issues*”.

At the same time the specific local configuration and geographical position of each airport needs to be recognised in terms of their contribution to environmental inefficiency and this can only be handled by State involvement in target setting or allocation.

To respect the importance of climate change and the SES objectives it is proposed that the EU-wide targets would be set on the two indicators which will be monitored in RP1 (taxi-out and ASMA) to foster a bottom up approach by the States who will be required to set targets on the airports under their responsibility.

5.5.2 Options

Based on the discussion above three options have been analysed.

- Option 1: Monitor Taxi out additional time and ASMA additional time
- Option 2: Set targets on Taxi out additional time and ASMA additional time, and monitor horizontal and vertical performance
- Option 3: Set target on Taxi out additional time and a target on horizontal and vertical efficiency in terminal airspace

5.5.3 Airport and Terminal CO₂ Option 1

Summary of approach

Monitor Taxi out additional time and ASMA additional time.

- Monitoring Taxi out additional time and additional time in terminal airspace (ASMA) for all Performance Scheme airports

Initial assessment

Relevance	++	Taxi out and ASMA measures proposed for the capacity KPA seem perfectly suited to environment.
Proportionality	+	Although taxi out and ASMA measures are already proposed in RP1 and data flow will already be established, the measure does not drive change through target setting.
Subsidiarity	+++	This applies to the local level of operations without any target so reflects EU principles on subsidiarity.
Maturity	++	The taxi out and ASMA measures are already proposed in RP1 so will already be in place.
Acceptability	+++	The taxi out and ASMA measures are already monitored in RP1.

5.5.4 Airport and Terminal CO₂ Option 2

Summary of approach

Set targets on Taxi out additional time and ASMA additional time, and monitor horizontal and vertical performance:

- European Union-wide targets set on Taxi out additional time and additional time in terminal airspace (ASMA) for coordinated airports and monitoring only for the remaining non-coordinated Performance Scheme airports.
- To develop and monitor a horizontal and vertical performance indicator based on 30 second interval position report data for all Performance Scheme airports

Initial assessment

Relevance	++	Taxi out and ASMA are important contributors to CO ₂ emissions generated by aviation
Proportionality	+++	Taxi out and ASMA measures are already proposed in RP1 so data flow will already be established and setting targets will drive change in this key EU action area whilst monitoring a horizontal and vertical performance indicator will improve maturity.
Subsidiarity	++	CO ₂ emissions have a global impact on climate change and EU target setting is fully aligned with EU policy on environmental issues.
Maturity	++	Taxi out and ASMA measures are already proposed in RP1 so will already be in place, however, work is still required to develop the approach to support target setting at European and State level.
Acceptability	+++	Taxi out and ASMA target setting appears to be accepted based on informal stakeholder consultation.

5.5.5 Airport and Terminal CO₂ Option 3

Summary of approach

Set target on Taxi out additional time and a target on horizontal and vertical efficiency in terminal airspace.

This option adapts option 2 by replacing ASMA additional time by:

- A European Union-wide target set on terminal airspace horizontal and vertical performance based on 30 second interval report data for coordinated airports and monitoring only for the remaining non-coordinated Performance Scheme airports.

Initial assessment

Relevance	+++	This indicator covers additional vertical inefficiencies in addition to those related to ASMA additional time.
Proportionality	++	This will require more precise data of at least a 30 second interval report. Increasing the reporting rate should be technically feasible and the financial impact is limited.
Subsidiarity	++	CO ₂ emissions have a global impact on climate change and EU target setting is fully aligned with EU policy on environmental issues.
Maturity	+	This indicator is based on limited experience. Prior to implementation it will require a more precise dataflow with at least a 30 second interval report and some experience in monitoring these indicators is necessary before envisaging using it for target setting
Acceptability	+++	Extending the performance indicator to include vertical aspects appears to be accepted based on informal stakeholder consultation.

5.5.6 Airport and Terminal CO₂ Options: Conclusion

Taking into account the current Performance Scheme, informal consultation with stakeholders and the discussion above, it is **proposed to retain Option 2** and to improve data quality to support a horizontal and vertical performance indicator during RP2:

- A European Union-wide target set on Taxi out additional time and additional time in terminal airspace (ASMA) for coordinated airports and monitoring only for the remaining non-coordinated Performance Scheme airports.
- To develop and monitor a horizontal and vertical performance indicator based on 30 second interval position report data for all Performance Scheme airports.

Table 6: Terminal CO₂ options: summary of initial assessment

Option	1	2	3
Relevance	++	++	+++
Proportionality	+	+++	++
Subsidiarity	+++	++	++
Maturity	++	++	+
Acceptability	+++	+++	+++

5.6 Aircraft related Airport Noise

It is clear that noise at and around airports is an important and primarily local issue which needs to be addressed locally (after considering and balancing input from all parties).

It is difficult to see how the SES Performance Scheme addressing ANS improvements can adequately contribute to driving change with regard to noise due to local specific factors involved such as culture, population distribution, geography and individual airport configurations and traffic flows.

The ANS role with regard to noise is specifically focused on operational noise abatement procedures and compliance monitoring so there is limited opportunity to influence the issue. There is also a significant trade-off with flight efficiency and local capacity agreements beyond the influence of an ANSP and in relation to that, Collaborative Environmental Management (CEM) is a key initiative to address the Environmental challenges at and around airport and prioritise actions.

Noise at airports is currently addressed by two existing EC directives which provide Member States guidance on the harmonised assessment and management of noise issues.

Furthermore, the proposed airport package includes a revision of the noise abatement directive which aims at the implementation of a collaborative approach to noise management, ensuring proper consultation and analysis is undertaken before any new constraints are put in place.

Although it is acknowledged that noise at airports is an important issue, it is proposed not to address noise in RP2 as the SES Performance Scheme is not a suitable tool to drive improvements which is primarily a local issue and which is currently addressed by part of the proposed airport package through the update of the noise abatement directive.

5.7 Airport Local Air Quality (LAQ)

As with noise, local air quality is an important and primarily local issue which needs to be addressed locally (after considering and balancing input from all parties).

Local initiatives at airports aimed at improving local air quality usually consist of a mix of measures including low emission airside vehicles, NO_x related landing charges, use of fixed ground power instead of Auxiliary Power Units and improved efficiency of operations. In addition to the positive impact on local air quality, these initiatives contribute to a small extent towards reducing the impact of aviation on climate (CO₂).

As with noise, the ANS influencing role with regard to LAQ is highly connected with flight efficiency and local capacity agreements beyond the influence of an ANSP.

ANS contributions towards improving LAQ are mainly related to operational performance and associated fuel burn during take-off and landing and in the taxi phase which is already addressed in the flight efficiency indicators.

It is difficult to see how the Performance Scheme can contribute directly to driving improvements in LAQ and although it is acknowledged to be an important issue, it is proposed not to specifically address LAQ in RP2 as it is already covered implicitly through flight efficiency improvements discussed above.

6 CAPACITY KEY PERFORMANCE AREA

This chapter addresses the KPA “Capacity.” The scope covers en-route and airport/terminal flight phases and the focus is ATFM and ANS related delay as required for the second reference period by Regulation 691/2010 “the Performance Scheme.”

6.1 Capacity Problem Definition

According to PRR 2011, en-route ATFM delay and congestion at main airports are key factors to be addressed in order to improve the overall aviation network performance (Figure 11).

This is valid notwithstanding the capping of demand through the airport co-ordination process.

It is difficult to measure capacity directly which is the reason why the measure of ATFM delay was chosen as a proxy for the unavailability of capacity.

En-route delays are driven almost entirely by ATC capacity and staffing-related constraints which are primarily planning issues.

Average annual ATFM delay per flight [2011]

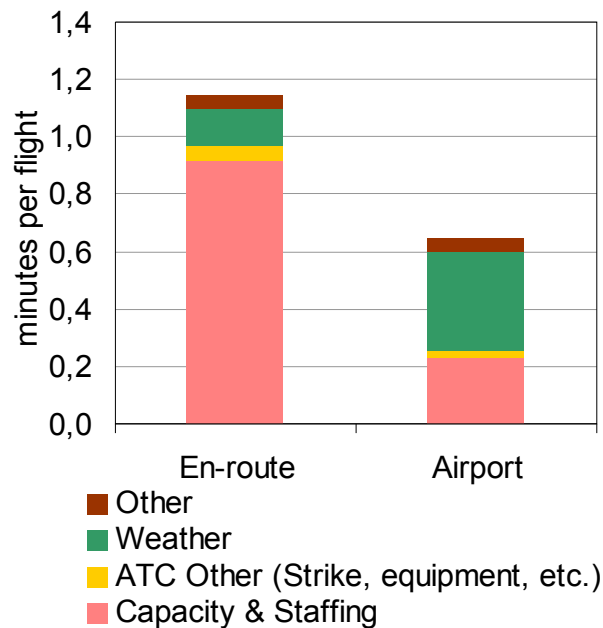


Figure 11: Average Annual ATFM delay per flight: En-route / Airport

Closing the en route capacity gap is one of the objective of RP1 and the adopted EU-wide capacity target for RP1 is to reduce the en route ATFM delay per flight to 0.5 minute by 2014.

The establishment of financial incentives to drive delivery of capacity is one option to consider for RP2.

A move to incentives poses questions of unexpected behaviour such as protecting individual stakeholder’s interests through gaming or exclusion of causes as well as a potential reluctance to collaborate in delivering performance. If incentives are considered, such behaviours need to be anticipated and safeguards put in place through NSA governance procedures and monitoring.

The level at which incentives should be set needs to be determined to ensure best application. A European wide approach to incentives for en-route capacity translated at the FAB level would seem appropriate due to the mature nature of the en-route capacity KPI.

Airport Operations performance is the result of complex interactions between many actors (Airport operator, Slot coordinator, local ATC provider, CFMU, Airlines, Ground handlers, and other service providers at the airport). Therefore identifying clear ANS accountability in overall air transport performance is difficult.

It is acknowledged that airport capacity is limited by infrastructure and environmental factors.

At congested airports where there is a permanent imbalance of capacity and demand, demand is usually coordinated, meaning schedules are constrained to preserve safety and a level of quality of service. This quality of service is rarely explicit (although in the UK²⁸ it is quantified in terms of minutes of delay) and is a trade off between scheduling intensity and delay (all causes).

6.2 What are the Capacity objectives?

The en-route capacity goal is for the Network Manager and ANSPs to collaboratively develop en-route capacity that delivers an optimum quality of service (cost of capacity versus cost of delay).

RP1 provides an opportunity for the Network Manager and ANSPs to stabilise en-route capacity delivery whilst developing robust airspace design and staffing plans to be able to provide the necessary capacity in RP2.

The opportunity to incentivise delivery of en-route capacity will be considered.

For airport capacity, the goal is to maximise airport value and optimise airport throughput, given the available infrastructure, weather conditions and traffic mix to achieve an acceptable level of quality of service.

6.3 What does the current legislation provide?

The current Performance Scheme already specifies that the European Union-wide capacity indicator for en-route capacity shall be the minutes of en route ATFM (Air Traffic Flow Management) delay per flight.

No capacity targets are defined for airport or terminal in RP1 although the Performance Scheme specifically refers to the preparation of the development of a second European Union-wide capacity KPI for RP2.

This states that “the Commission shall collect, consolidate and monitor as from the first reference period:

- a. the total of ATFM delays attributable to terminal and airport air navigation services;
- b. the additional time in the taxi out phase;
- c. for airports with more than 100 000 commercial movements per year the additional time for ASMA (Arrival Sequencing and Metering Area).”

Whilst the Performance Scheme states that “as from the second reference period, a second European Union-wide capacity indicator shall be developed to address the specific airport ANS-related capacity issues” on the basis of the additional time in taxi out and ASMA it is considered that these two metrics are better suited to flight efficiency which is addressed under the Environment KPA.

28 At three London airports (Heathrow, Gatwick and Stansted), this trade-off is made explicit in that the scheduling rate set by the airport co-ordinator, in consultation with the airlines and NATS, builds in an average holding period 10 minutes for all arrivals and departures over each normal day (with a maximum holding period of 25 minutes during peak periods).

6.4 Improving en-route capacity

The en-route capacity problem being addressed is primarily driven almost entirely by ATC capacity, airspace design and staffing-related constraints which are primarily planning issues and the current Performance Scheme measure is the minutes of en-route Air Traffic Flow Management delay per flight (average per annum).

This measure is considered mature although stakeholder consultation has highlighted variants as well as issues related to severe weather and exceptional event handling.

The approach to target setting should ensure that the Network Manager and States/FABs continue to work in a collaborative manner to drive en-route capacity improvements.

6.4.1 Considerations related to the selection of indicators and target setting

Retain en-route ATFM delay per flight

A simple approach would retain the current measure which is the average annual en-route Air Traffic Flow Management delay per flight (all causes), described in the Performance Scheme.

This is considered to be an acceptable performance mechanism by most stakeholders and the general opinion is to ensure stability by leaving the key performance indicator unchanged in this case.

Adapt the current measure

During the stakeholder consultation some proposals to adapt the current measure were put forward. These included:

- Delay per flight hours
- Delay at peak hours
- Delay > 15 minutes

The initial proposal for RP1 was to use delay per flight hours instead of delay per flight. Delay per flight hours has the advantage to be “additive”. Furthermore delay per flight hours relates closer to ANS output (i.e. considers distance) and therefore allows for more meaningful comparison when analysing difference of performance over week and week-end or when comparing performance across areas of different size. However there is a high correlation between all the indicators proposed and there is merit in keeping some regulatory continuity by retaining the current measure.

How to address weather delay, severe weather and exceptional events?

Current Situation

In the current Performance Scheme, capacity targets at national or FAB level are set without provision, or allowance, for any exceptional and unforeseeable factor(s) which may adversely affect performance.

The consideration of weather delay and exceptional events was raised frequently by stakeholders although reaching common agreement on what constitutes severe weather and exceptional events and how they should be treated is not straight forward.

Exceptional events

Exceptional events such as severe weather, natural disasters and industrial action cannot be planned and therefore cannot be included in capacity planning figures. Nevertheless, although such events are rare, they can have significant impact with considerable cost (recent experience of volcanic ash cloud) and stakeholders have put forward the need to identify and exclude such events from any performance considerations.

For RP1, exclusion of such events is already accepted.

Weather delay

Weather delays are better understood and although not considered to be a significant element of en-route delay, a weather delay provision was included in the calculation of the RP1 European Union-wide reference values.

Similarly, weather related delay is included in the FAB/State capacity target which needs to be managed by an individual ANSP. This is not necessarily effective at an overall network level as ANSPs naturally focus on their own issues and have no incentive to work towards an optimized network solution.

Since the Network Manager has a clear role for coordinating solutions to weather and exceptional events (e.g. rerouting scenario), an alternative approach could be for the Network Manager to manage a weather delay allowance to ensure an optimised network approach. However, a risk remains that ANSPs might not actively contribute to the mitigation of weather delay as this is excluded from the ANSP performance measurement.

Concerns about local versus network optimization and inappropriate behaviour could be addressed through an appropriate incentive scheme to entice ANSPs to contribute to the achievement of a European Union-wide target.

What about incentives?

Whilst the en-route capacity performance mechanism is considered to be stable and therefore potentially suited to the introduction of incentives there is a divergence of views amongst stakeholders on the issue.

Those stakeholders that are already mature in the performance domain consider that the en-route capacity KPI is an opportunity to introduce incentives whilst other stakeholders considered that financial incentives could be counter-productive and prevent effective collaboration amongst stakeholders.

As discussed in the Environment KPA, States may set incentives that can drive local improvement yet at the same time may lead to inappropriate behaviour that is detrimental to the network. So, a common en-route incentive if agreed would be European Union-wide and should ensure that collaborative behaviour is included to avoid any notion of protection at a State / FAB level where ANSPs might be tempted to manage performance dependencies in a way that protects both their capacity and flight efficiency performance.

In the event that incentives are proposed for capacity, then

- to be feasible there would need a broad acceptance by States;
- incentives should be preferably set at FAB level;
- a part of the incentive should be used to motivate States to collectively contribute to overall achievement of European Union-wide targets.

Such an incentive would have the benefit of providing valuable experience in the use of incentives on a KPI that is generally well understood and accepted.

6.4.2 Options

Based on the discussion above three options have been analysed:

- Option 1: ATFM delay per flight with a European Union wide target broken down by FAB
- Option 2: Option 1 + incentive set on FABs for the achievement of the target on capacity related delay
- Option 3: EU-Wide target on ATFM delay per flight with a weather delay allowance managed at network level plus capacity target set on FABs
- Option 4: Option 3 with incentives set on NM and FABs

6.4.3 En-route Capacity Option 1

Summary of approach

Continue with EU-Wide target on ATFM delay per flight: however on a FAB level

- A European Union-wide target on ATFM delay per flight broken down by FAB

Initial assessment

Relevance	+++	Ensures continuity with the current RP1 measure.
Proportionality	+++	Provides value for money due to continuity with RP1.
Subsidiarity	++	Responds to the performance scheme requirements for a European Union-Wide target.
Maturity	+++	Already used in RP1 so it can be considered mature.
Acceptability	++	Already accepted by stakeholders for RP1 although some stakeholders expressed reservations concerning the impact of severe weather and exceptional events.

6.4.4 En-route Capacity Option 2

Summary of approach

ATFM delay per flight with a European Union wide target broken down by FAB complemented with an incentive set on FABs for the achievement of the capacity target.

This option includes option 1 plus:

- An incentive set on FABs for the achievement of the capacity target

Initial assessment

Relevance	+++	Ensures continuity with the current RP1 measure.
Proportionality	++	Provides motivation to the FAB to achieve the capacity target.
Subsidiarity	++	Responds to the performance scheme requirements for European Union-Wide target and places the responsibility for achievement on the FAB.
Maturity	++	Whilst the ATFM delay measure is mature, the new element is the incentive set on FABs for the achievement of the capacity target. Process and procedure development will be necessary .
Acceptability	++	Wide divergence of views have been expressed by the stakeholders. While some consider financial incentives as a necessity in a mature performance regime, other are concerned by the potential negative behaviours that may be prejudicial to an effective collaboration.

6.4.5 En-route Capacity Option 3

Summary of approach

ATFM delay per flight with a weather delay allowance managed at network level:

- This option comprises a European Union-wide target set on ATFM delay per flight split in

two parts :

- A target on weather delay and exceptional events managed at network level
- A target on capacity related delay distributed by FAB

Initial assessment

Relevance	+++	Ensures continuity with the current RP1 measure and responds to stakeholders concerns regarding the impact of weather.
Proportionality	++	Provides value for money due to continuity with RP1 although process and procedure development will be necessary albeit primarily limited to the Network Manager.
Subsidiarity	+++	Responds to the performance scheme requirements for European Union-Wide target and weather handling is clearly within the remit of the Network Manager and responds to stakeholders expectations whilst minimising impact on them.
Maturity	++	The ATFM delay measure is mature and the Network Manager has current experience of managing weather although process and procedure development will be necessary.
Acceptability	++	The ATFM delay measure is already accepted by stakeholders for RP1 whilst the weather event handling responds to stakeholders' expectations whilst minimising impact on them so should be widely acceptable.

6.4.6 En-route Capacity Option 4

Summary of approach

EU-Wide target on ATFM delay per flight with a weather delay allowance managed at network level plus incentives set on NM and FABs

This option builds on option 3 plus incentives set on the Network Manager and FABs for:

- The collective achievement by FABs and the Network Manager of the European Union-wide target set on ATFM delay per flight and including a weather delay allowance managed at network level
- The achievement of the FAB target on capacity related delay

Initial assessment

Relevance	+++	Reflects those stakeholders views that incentives are an efficient way of ensuring that targets and brings focus to collective achievement of network targets.
Proportionality	+++	The incentives are set equally on both Network Manager and FABs.
Subsidiarity	++	All stakeholders are provided with motivation to collectively achieve targets.
Maturity	++	Experience gained by some stakeholders in the use of incentives can be exploited.
Acceptability	+++	By setting incentives on both network and FABs to achieve targets provides a balanced approach to incentives.

6.4.7 En-route Capacity Options: Conclusion

Taking into account the expectations of the Performance Scheme, informal consultation with stakeholders and the discussion above, it is **proposed to retain Option 4**:

EU-Wide target on ATFM delay per flight with a weather delay allowance managed at network level plus with incentives set on the Network Manager and FABs for:

- The collective achievement by FABs and the Network Manager of the European Union-wide target set on ATFM delay per flight and including a weather delay allowance managed at network level
- The achievement of the FAB target on capacity related delay

Table 7: En-route capacity options: summary of initial assessment

Option	1	2	3	4
Relevance	+++	+++	+++	+++
Proportionality	+++	++	++	+++
Subsidiarity	++	++	+++	++
Maturity	+++	++	++	++
Acceptability	++	++	++	+++

6.5 Improving airport capacity

Figure 12 shows the current conceptual framework for the analysis of ANS-related performance at airports.

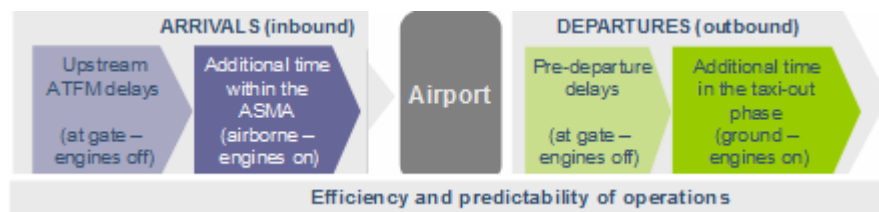


Figure 12: Conceptual framework of ANS-related performance at airports

For arrival traffic airport capacity shortages lead additional time in the terminal area (airborne holding, path stretching, ...) and/or upstream ATFM delays taken at the airport of departure. For departing traffic airport capacity shortages mainly results in additional taxi-out and/or pre-departure delays taken at the gate.

Airport capacity focuses on total ATFM delay attributable to terminal and airport air navigation services. During informal consultations, stakeholders introduced a number of different capacity measurement options including ANS related delay at the gate and slot ATFM compliance.

The approach to target setting needs to identify which airports will be subject to targets and whether targets should be European Union-wide and/or State oriented.

The complexity of the airport in terms of interaction of stakeholders plus the significant impact of weather need to be considered in the assessment of performance needs and target setting.

6.5.1 Considerations related to the selection of indicators and target setting

Indicators monitored in RP1

Currently the Performance Scheme proposes three indicators for monitoring in RP1, these are:

- the total of ATFM delays attributable to terminal and airport air navigation services;
- the additional time in the taxi out phase;
- for airports with more that 100 000 commercial movements per year the additional time for ASMA (Arrival Sequencing and Metering Area).

During stakeholder consultations and when assessing the goals set for flight efficiency it has become clear that taxi out and ASMA are also relevant to measure environmental performance. To avoid duplication, it is proposed to focus the airport capacity discussion on the total of ATFM delays attributable to terminal and airport air navigation services.

Although Taxi out and ASMA additional time have been addressed in the Environment chapter; those two indicators should also be considered as relevant to assess capacity.

Consider ATFM slot adherence monitoring (taking account of appropriate EC Regulation)

If departure management frequently fails to deliver aircraft to the departure runway as required by ATFM, a large number of flights may take off outside their assigned ATFM slot. Poor ATFM slot adherence reduces flow predictability and may lead to en-route and destination airport over deliveries.

Monitoring ATFM slot adherence is based on counting the number of flights for which the difference between calculated (CTOT) and actual takeoff time (ATOT) is larger than the Slot Tolerance Window (STW).

There are no new data requirements to monitor ATFM slot adherence.

Consider CDM indicator (deployment of CDM)

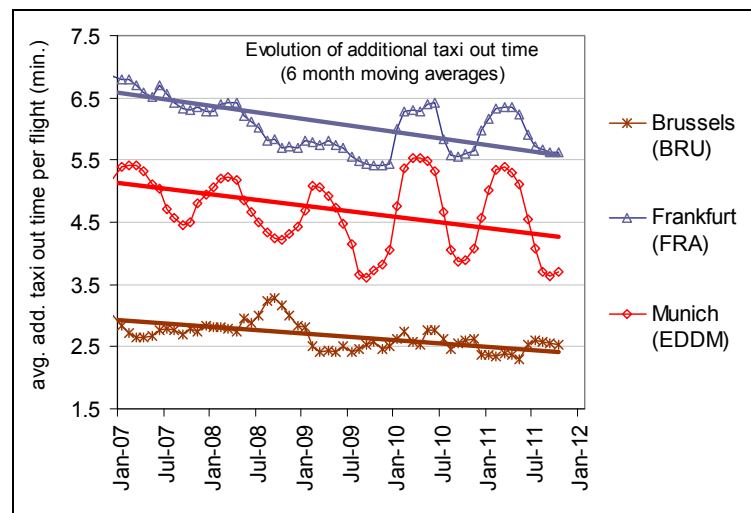


Figure 13: Evolution of additional taxi-out time

Early experience with CDM deployment in Europe shows performance benefits in predictability and taxi out times plus improved ground and en-route planning.

Munich Airport has demonstrated local benefits of Airport CDM; average taxi times have decreased and airport partners now use the TSAT (Target Start-up Approval Time) to allocate ground resources. Similar benefits have been seen at other A-CDM airports (Figure 13).

Furthermore, the Departure Planning Information (DPI) messages exchanged with the CFMU shows that A-CDM already provides greater predictability and delivers significant network benefits.

A recent study²⁹ (Airport CDM Network Impact Assessment) suggests that wider implementation of Airport CDM could result in substantial network benefits:

- It could be possible to increase sector capacity within the core area by up to 4% which equates to between 1-2 aircraft per sector
- A room for improvement for an en-route delays of between 33%-50%.
- The potential benefits in terms of ATFM delays if 42 airports implement A-CDM has been estimated as a reduction of minutes delay between 18% and 23% referred to the current situation.

The harmonized implementation of A-CDM throughout Europe following the ETSI specification [ETSI EN 303 212 V1.1.1³⁰] is of high interest to the Aircraft Operators.

It is beyond the Performance Scheme to monitor deployment of technology although by presenting performance improvement through such documents as the PRR annual report it is possible to highlight best practice and provide encouragement to other stakeholders to deploy. It is the PRB's opinion that at least all coordinated airports should implement A-CDM.

Consider ATC local pre-departure delay

Some stakeholders have proposed to monitor ANS related local departure delay using IATA delay code 89. Whilst providing useful information, this performance indicator is manually captured and subject to varied interpretation which could result in a lack of accuracy and consistency, as such it is not reliable enough to be used in a regulated environment.

ANS-related pre-departure delays due to departure airport constraints could be monitored in RP2 if they can be provided through a reliable source (preferably automated) .

At A-CDM airports a measure based on the difference between the Target Start-up Approval Time (TSAT) which represents an ANSP clearance after integration of runway saturation and weather impacts, and the Target Off Block Time (TOBT) provided by airline will improve accuracy and consistency of data.

What about weather delay and exceptional events?

Unlike en-route, weather delay represents a significant part of total Airport ATFM delay and is discussed in terms of the number of "bad" weather days in a season.

Managing poor weather (poor visibility, freezing conditions, strong winds and convective weather, see Figure 14) is one of the main tasks of an ANSP at an airport and poor weather can be characterised according to different levels of severity and in most situations mitigation requires a collaborative response from different airport stakeholders. Furthermore, weather delay at major European airports can have a significant network effect.

29 Airport CDM Network Impact Assessment – EEC Note No.10-009

30 http://www.etsi.org/deliver/etsi_en/303200_303299/303212/01.01.01_60/en_303212v010101p.pdf

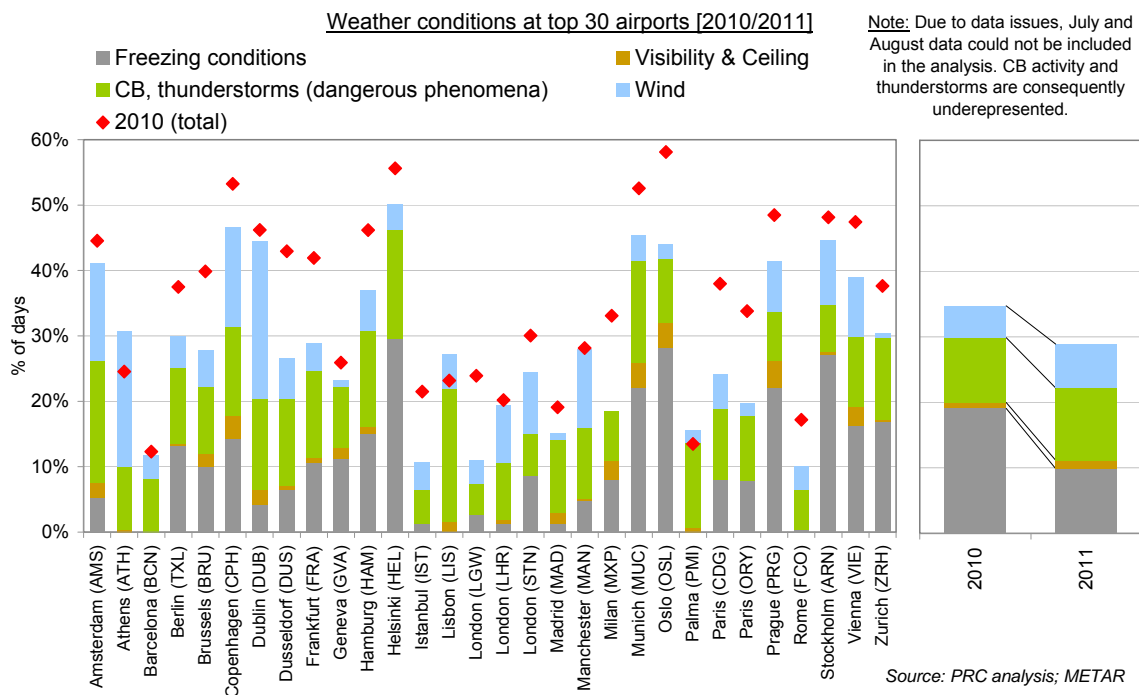


Figure 14: Weather conditions at the top 30 airports

As with en-route, exceptional events such as exceptional weather, natural disasters and industrial action cannot be planned and should be subject of a separate analysis.

As weather delay represents an important part of airport ATFM delay, it would not be unreasonable for RP2 to include weather related events within overall Airport ATFM delay.

Need for Airport Resilience

When there is a significant shortage of capacity, arrival flights are subject to regulation or diverted towards other airports whilst departures accumulate on the ground with critical impact on recovery and ability to manage subsequent traffic demand or new peak waves at hub airports.

The management of this scenario requires collaboration by all airport stakeholders (Airport Operator, ANSP, carriers and their Ground Handlers) preferably supported by A-CDM ensuring a common view of the situation and implementation of collaboratively agreed recovery plans.

The “system” has to be sufficiently resilient in order to avoid such situations and although such a crisis is generally not attributable to ANS, ANS have an important role to play in the management of the recovery together with other stakeholders.

A first possible measure of Airport resilience could be a performance indicator representing the number of days per year when the total number of flights cancelled (in comparison with the may-flight list on the eve of that day) is more than 10%.

Which Airports should be considered?

As discussed in chapter 5 (Environment KPA), staying with the different Performance Scheme airport criteria would cover approximately 80 European airports.

Whilst under nominal conditions, coordinated airports (around 45 airports under the Performance Scheme) should not have any significant ATFM delay; at non coordinated airports, an increase of ATFM delay is a sign that the airport might need to be coordinated (level 3 airports currently account for more than 90% of all airport delay).

Furthermore, it is interesting from a performance point of view to ensure that the coordination criteria are explicit and can be used as a measure of performance.

Nevertheless, caution needs to be exercised to avoid missing out on those airports that pose issues to the network and are not coordinated since it is the main non-coordinated airports that have significant potential for growth and therefore a potentially greater contribution to network inefficiency.

As information on ATFM delay is available for all airports and in order to avoid missing out on those non-coordinated airports that have potential for growth with eventual network impact it is proposed to set all European airports be considered in the computation of the EU-Wide targets.

While States should remain accountable for all Airports under their responsibility and take corrective actions in case any of those generate significant ATFM delays, it would seem appropriate to require State to only set individual target on co-ordinated airports.

In this respect it is proposed that states have to ensure that all airports which cause a negative effect on the network or have capacity constraints are coordinated.

States will need to ensure consistency with the Performance plans at these airports when approving their coordination parameters.

What approach to target setting?

The Airport slot regulation sets the responsibility and process for managing the capacity at airports and accordingly Airport capacity should be managed at local level.

However, airport ATFM delay is a mature measure which has been measured for more than 10 years, staying rather stable year after year at system level. As such, target setting at a State level would respect rules of subsidiarity and be appropriate.

Despite it being appropriate to manage Airport capacity at a local level, Airports are part of a network and performance of one airport can impact other airports and it is this dependency that merits consideration of a European Union-wide ATFM Delay target that drives collaborative behaviour.

One approach could be to have targets at both European Union-wide and State to drive performance and ensure that Airports are fully part of the ATM network.

6.5.2 Options

All options assume that additional time in taxi out plus ASMA measures will be reallocated to the environment KPA.

Based on the discussion above, two options are proposed:

- Option 1: Monitoring total ATFM delay attributable to airport / terminal air navigation services, monitoring ANS gate delay and ATFM slot adherence
- Option 2: Targets set on total ATFM delay attributable to airport / terminal air navigation services and ATFM slot adherence, plus monitoring ANS gate delay and Airport resilience.

6.5.3 Airport Capacity Option 1

Summary of approach

Monitoring total ATFM delay attributable to airport / terminal air navigation services, monitoring ANS gate delay and ATFM slot adherence:

- Monitor the total ATFM delay attributable to airport / terminal air navigation services at all Performance Scheme airports.
- Monitor ANS-related delay at the gate using A-CDM data at all Performance Scheme airports. (A-CDM data to be obligatory for coordinated airports by 2015, RP2?)
- Monitor ATFM slot adherence at all Performance Scheme airports

Initial assessment

Relevance	++	Whilst not fully respecting the Performance Scheme requirements on airport capacity by only proposing to monitor total ATFM delay, it responds to stakeholder input on additional airport capacity issues
Proportionality	++	<p>ATFM delay data are already available and furthermore there are synergies with the deployment of CDM that should make available enhanced and more reliable data flows that cover any additional needs.</p> <p>Nevertheless, the measure does not drive change through target setting.</p>
Subsidiarity	+++	There are no subsidiarity issues with this option.
Maturity	++	<p>Monitoring of total ATFM delay attributable to airport / terminal air navigation services has been in place for 10 years.</p> <p>Data required for ANS related delay at the gate and has been implemented for RP1.</p>
Acceptability	+++	This option would be acceptable to stakeholders since it reflects agreements in RP1 and it responds to stakeholder input on additional airport capacity issues.

6.5.4 Airport Capacity Option 2

Summary of approach

Target set on total ATFM delay attributable to airport / terminal air navigation services and ATFM slot adherence, plus monitoring ANS gate delay and Airport resilience:

- European Union-wide and State targets set on all Performance Scheme airports for total ATFM delay attributable to airport / terminal air navigation services that incorporates severe weather and exceptional events.
- European Union-wide and State targets on ATFM slot adherence
- Monitor ANS-related delay at the gate using A-CDM data at all CDM airports.
- Monitor Airport resilience (e.g. number of days with more than 10% cancellations)

Initial assessment

Relevance	+++	Airport ATFM delay represents 30 to 50% of the overall ATFM delay and this option respects the Performance Scheme requirements by proposing to monitor total ATFM delay. It also responds to stakeholder input on additional airport capacity issues.
Proportionality	+++	Setting targets will drive change in this key EU action area.
Subsidiarity	+++	This respects EU principles by targeting both European Union-wide and State targets providing an effective balanced approach.
Maturity	++	<p>Much of the data flow has been implemented in the context of RP1 as has the monitoring of total ATFM delay attributable to airport / terminal air navigation services.</p> <p>However, work is still required to develop the approach to support target setting at European and State level.</p>

Acceptability +++ This option should be acceptable to stakeholders as it provides a balanced approach and responds to stakeholder input on additional airport capacity issues. Under European legislation, Airports already have to report to the EU in the event that the target of 80% ATFM slot adherence is not met.

6.5.5 Airport Capacity Options: Conclusion

Taking into account the expectations of the Performance Scheme, informal consultation with stakeholders and the discussion above, it is **proposed to retain Option 2**:

- European Union-wide and State targets set on all Performance Scheme airports for total ATFM delay attributable to airport / terminal air navigation services that incorporates severe weather and exceptional events.
- European Union-wide and State targets set on ATFM slot adherence at all Performance Scheme airports.
- Monitor ANS-related delay at the gate using A-CDM data at all Performance Scheme airports.
- Monitor Airport resilience (e.g. number of days with more than 10% cancellations)

Table 8 Terminal/airport capacity options: summary of initial assessment

Option	1	2
Relevance	++	+++
Proportionality	++	+++
Subsidiarity	+++	+++
Maturity	++	++
Acceptability	+++	+++

7 COST-EFFICIENCY KEY PERFORMANCE AREA

The purpose of this chapter is to present the PRB input for the cost-efficiency KPA to the proposed regulatory approach for RP2. It is based on the PRB previous discussions and views, taking into consideration stakeholders' feedback (through survey and direct feedback as well as an informal stakeholders' workshop held on 10 November 2011).

7.1 Description of the problem

7.1.1 Political context of the regulatory proposal

The cost-efficiency key performance area (KPA) is distinctive from other KPAs in the SES Performance Scheme in particular because the regulatory requirements of the performance regulation³¹ and those of the charging regulation³² are very much interwoven. This has a number of implications that adds complexity for the cost-efficiency KPA as compared to the other KPAs of the performance scheme. For instance in the establishment, collection and monitoring of cost-efficiency performance indicators (PI/KPI) the underlying data flows and related reporting requirements are highly dependent on the regulatory provisions in the charging regulation. In addition, there are two pieces of related primary legislation³³, providing in general wider potential for legal and regulatory discrepancies (some of which are specifically identified in this paper).

Regulation (EU) No 691/2010 envisages the extension of the ANS performance scheme to airport ANS to ensure a genuine gate-to-gate³⁴ ANS performance review system. Given that the en-route cost-efficiency KPI is now effectively implemented, the focus of this chapter is mainly on how to extend the performance scheme to terminal ANS so as to ensure a genuine gate-to-gate ANS cost-efficiency improvement.

Operations at and around airports are more and more attracting the attention of policy makers at national and EU levels. This reflects a genuine concern that future demand growth might not be accommodated due to scarcity of ground (airport) infrastructure, which in turn requires more effective use of existing capacity. This is one of the reasons why the Commission has recently launched the "Better Airports Package"³⁵.

Given potential misunderstanding it is important to distinguish between Terminal Navigation Charges ("TNC") and "Airport charges". Airport charges typically include landing charges, passenger charges, cargo charges, parking and hangar charges, security charges, noise charges, and are covered by Directive 2009/12/EC³⁶. Airport charges represent some €15 billion/year compared to some €1.5 billion/year for TNC.

31 Commission Regulation (EU) No 691/2010, laying down a performance scheme for air navigation services and network functions.

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:201:0001:0022:EN:PDF>

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

<http://www.eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:341:0003:0016:EN:PDF>

33 "Framework Regulation" (Regulation (EC) N° 549/2004), and "Service Provision Regulation" (Regulation (EC) N° 550/2004) as amended by Regulation (EC) N° 1070/2009.

34 In the context of the cost-efficiency KPA, "gate-to-gate ANS costs/cost-efficiency" means "En-route ANS costs/cost-efficiency" + "Terminal ANS costs/cost-efficiency".

35 Legislative proposals for Airport capacity assessment and inventory; Revision of the ground handling directive, Revision of the slot regulation and a Communication (01/12/2011): http://ec.europa.eu/transport/air/airports/doc/2011-airport-package-communication_en.pdf

36 Directive 2009/12/EC of the European Parliament and of the Council of 11 March 2009, must be translated by Member States into national legislation by 15 March 2011.

Terminal ANS costs represent almost 20% of total gate-to-gate ANS costs, covering the cost of services provided to traffic taking off and landing at some 228 airports in the EU 27 States plus Norway and Switzerland. This is illustrated in Figure 15 below.

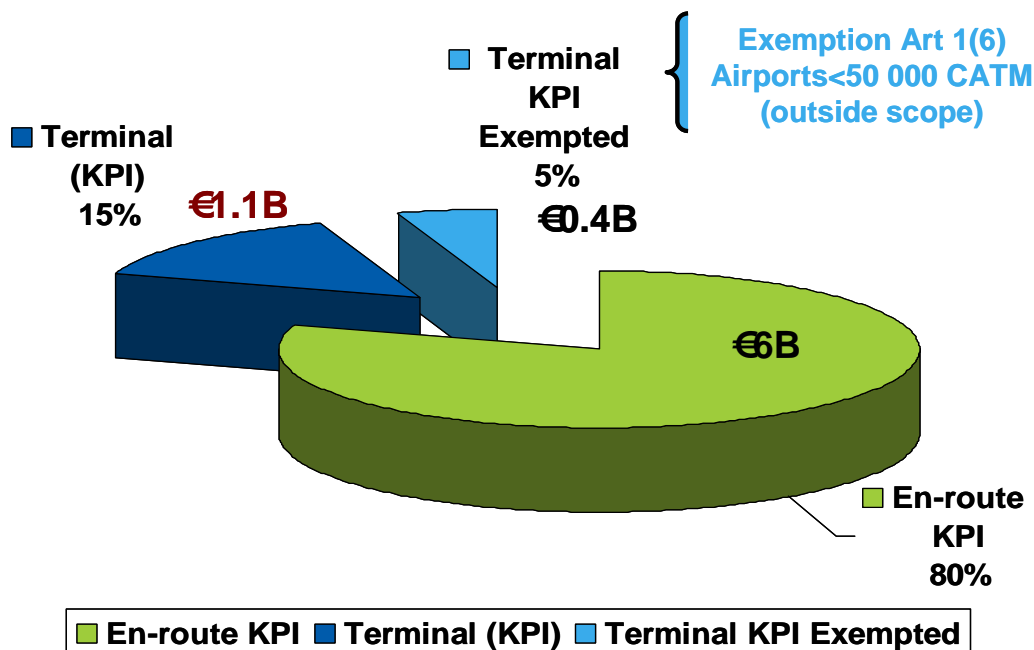


Figure 15: Total gate-to-gate ANS costs and charges, EU-27+Norway and Switzerland

At present, an estimated 5% of all gate-to-gate ANS costs (or some 25% of terminal ANS costs) fall outside the scope of the terminal ANS cost-efficiency target setting. The related airports are exempted either because they do not reach the 50 000 commercial air transport movements threshold or because the respective States consider they satisfy a “contestability assessment” and meet specific conditions³⁷ (some 14 UK airports have been so assessed in 2008).

Indeed, under regulation EU No 1794/2006 (charging regulation), Member States can file for exemption (reduced reporting requirements under Annex III of said regulation) for terminal ANS costs assessed to be subject to “market conditions”. As a consequence, those States may decide not to set determined costs or any cost-efficiency targets for terminal ANS (i.e. no risk sharing mechanism and no necessity to be consistent with and contribute to EU-wide targets for those States). Potentially it is possible that in the short to medium term more States claim that their terminal ANS services are submitted to market conditions, therefore subject to reduced reporting requirements under the charging scheme and exempted from terminal ANS cost-efficiency target setting.

The charging regulation currently foresees that a new so-called “contestability assessment” must be carried out at least 12 months before the start of RP2. Incidentally, for the purpose of target setting, currently, States should provide forward looking data at least 18 months before the start of RP2. To ensure regulatory consistency, the charging regulation provisions will be aligned with the performance scheme requirements and this will be addressed as part of the next phase (implementing rule drafting, see section 3.1.7 above).

³⁷ Art. 1(6) and Annex I of Regulation (EC) No 1794/2006 (as amended by Regulation (EU) No 1191/2010) as well as Art 1(4) of Regulation (EU) No 691/2010)

Table 9: Comparison of En-route and Terminal ANS costs and charges features

En-route ANS costs and unit rates	Terminal ANS costs and unit rates
80% costs (EU average)	20% costs (EU average) – <i>of which 15% fall under the scope of target setting</i>
Common formula for 40 years Harmonised principles / comparable data	No common formula (due by 2015) Data comparability is weak
EU-wide average is computed	No EU-wide average can be directly computed
Full geographical coverage	Partial geographical coverage Not all EU-wide and partial data reporting
Long time data series, collected, validated, analysed	Data collection just started (data quality issue)
12 years of benchmarking experience and direct control of data flows for en-route ATM/CNS	Monitoring/Benchmarking is about to start
All SES States	29 States; 31 Terminal Charging Zones and close to 230 airports

As discussed earlier, Regulation (EU) No 691/2010 envisages the extension of the ANS performance scheme to airport ANS to ensure a genuine gate-to-gate ANS performance review system.

In considering ANS cost-efficiency performance in RP2, the following factors need to be considered:

- There is a growing trend towards opening terminal ANS provision to competition for the market (provision of ATC services at specific airports through concessions/contracts). This is already the case in the UK (and Germany for smaller airports) and underway in Sweden (smaller airports) and Spain. In this instance, ANS related costs are not necessarily recovered through TNC (i.e. no unit rate for TNC) paid by airlines to the State/ANSP but through a contract. In such case, ANS related costs are usually embedded into the airport charges and/or financed by revenues from other commercial sources.
- In a number of cases TNC paid by airspace users are lower than actual terminal ANS costs because of explicit State intervention and/or cross-subsidies;
- The terminal ANS represent around 20% of total gate-to-gate ANS costs, 25%³⁸ of which may be exempted from target setting
- There is a wide heterogeneity of apparent terminal ANS cost-efficiency performance across EU states. As shown in Section 7.3, recent preliminary analysis of terminal ANS costs data (see also Chapter 7 of PRR 2011) suggests that there is a range of potential drivers for differences in terminal ANS cost-efficiency (beyond genuine cost-inefficiencies) and several operational, organisational and economic factors affect performance, such as differences in:
 - cost allocation between en-route and terminal;
 - traffic levels;
 - number and size of airports covered by terminal charging zones;
 - scope of the services provided at airports by the ANSP, including, responsibility, use and ownership of airport-related assets;
 - level of State/local subsidies to cover terminal ANS costs;

³⁸ Or an equivalent of some 5% of gate-to-gate costs.

- market organisation (e.g. existence or not of genuine “competition for the market” / “contestable markets”, where ANS charges/prices are set at or close to the long term marginal costs).

No doubt that further studies on factors affecting terminal ANS cost-efficiency performance across the European States are required in the future in order to gain a better understanding of differences observed and be able to set meaningful terminal ANS cost-efficiency targets.

7.1.2 Problem analysis: main policy issues and problems identified

The SES performance scheme identified as a main issue that total gate-to-gate ANS cost-efficiency in Europe needs to improve; mainly because:

- Factual comparison with US indicates scope for significant improvement (lower productivity and higher support costs in Europe, high level of fragmentation of air navigation service provision);
- European ANSP benchmarking indicates room for efficiency improvements using best practices;
- (Until now) full cost recovery system for monopoly ANSPs (including for Terminal ANS in most cases) with so far perceived lack of incentive to improve performance.

The bulk of ANS costs are recovered through en-route charges (on average 80% in the EU). Therefore 80% of the problem is likely to be captured by en-route ANS cost-efficiency targets already. In addition, where the en-route and terminal ANS provider is the same organisation (i.e. almost all EU States), as many costs are common costs (i.e. serving both en-route and terminal ANS and therefore allocated between en-route and terminal costs), a major part of the terminal ANS costs are already regulated through those common costs. Arguably, in line with the “better and smarter regulation” initiatives of the Commission, there is less need for regulating terminal ANS for those States.

7.1.3 Stakeholders affected by the regulatory proposal

- States, CAAs / local regulators
- National Supervisory Authorities (NSAs);
- Air Navigation Service Providers (ANSPs);
- Airspace users;
- Airports;
- The Commission and the PRB.

7.2 Desired outcome: objectives for the ANS cost-efficiency KPA

The main objectives for the ANS cost-efficiency KPA are to contribute to a regulatory framework that:

- Ensures gate-to-gate ANS costs are effectively managed;
- Ensures that performance indicators contribute to cost-efficiency improvements;
- Avoids over-regulation/undue administrative burden;
- Does not prevent genuine move towards competition (for the market);
- Ensures transparency for any potentially opportunistic behaviour (e.g. reallocation of costs);
- Ensures a balanced approach between all KPAs (global objective for all KPAs)

7.3 PRB current understanding and preliminary analysis of terminal ANS cost-efficiency performance

The SES performance scheme specifies the ANS cost-efficiency indicators for the RP1 timeframe (2012 to 2014):

- The first key performance indicator (KPI) is the determined unit rate for en-route ANS (hereinafter 'DUR') for which targets are set for EU-wide³⁹ and national/FAB levels (and consistency assessment carried out by the Commission through the submission of performance plans);
- Two performance indicators (PI) (the Terminal ANS costs and Terminal unit rates)⁴⁰ are to be used by the Commission/States for monitoring.

PI versus KPI

According to article 2 of the performance Regulation an important distinction is to be made between "performance indicators (PI)" and "key performance indicators (KPI)":

- PI means the indicators used for the purpose of performance monitoring, benchmarking and reviewing;
- KPI means the performance indicators used for the purpose of performance target setting.

Table 10: Cost-efficiency indicators during RP1

	RP1 (2012-2014)	
	EU-Wide	Nat/FAB
80% costs	Average En-route ANS DUR KPI	En-route ANS DUR KPI
20% costs	Terminal ANS Costs PI +Average Terminal unit rate ⁴¹ PI	Terminal ANS Costs PI +Terminal unit rate

39 Regulation EU No 691/2010: Annex I – Section 1: For EU-wide target setting (...)

4. COST-EFFICIENCY INDICATOR

4.1. For the first reference period:

The European Union-wide cost-efficiency KPI shall be the average European Union-wide determined unit rate for en route air navigation services, defined as follows:

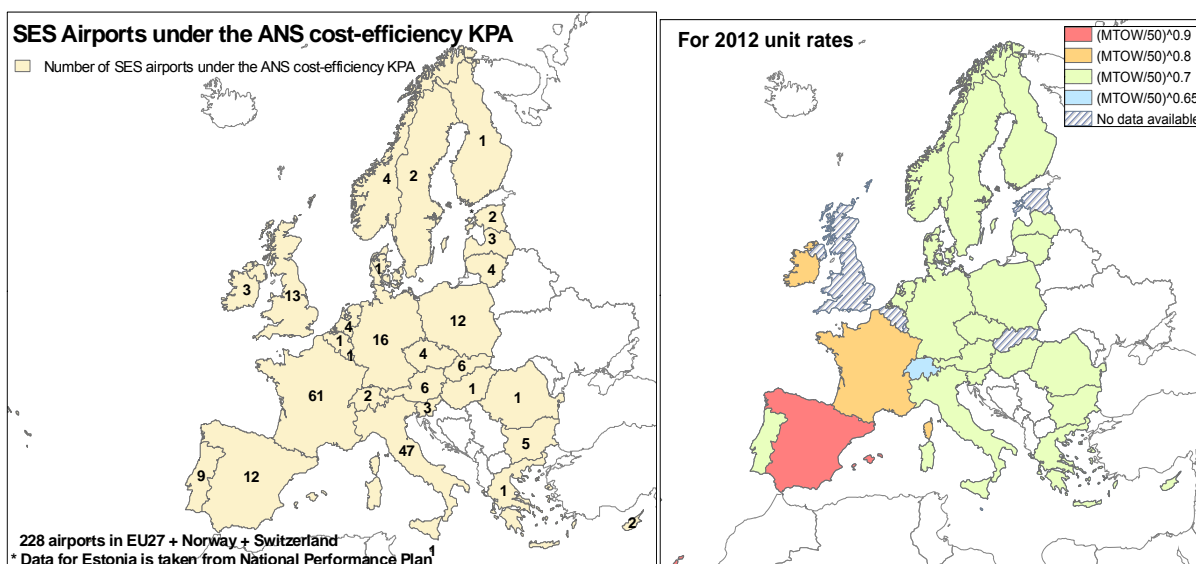
(a) the indicator is the result of the ratio between the determined costs and the forecast traffic, expressed in service units, expected for the period at European Union level, as contained in the Commission's assumptions for establishing the European Union-wide targets in application of Article 9(4);

(b) the indicator is expressed in Euros and in real terms;

(c) the indicator is provided for each year of the reference period.

40 For the first reference period, terminal air navigation services costs and unit rates shall be collected, consolidated and monitored by the Commission in accordance with Regulation (EC) No 1794/2006.

41 No average EU-wide terminal unit rate can be computed before 2015 (dependency on the charging regulation).



Sources: Commission Hearing on Terminal ANS costs and charges, 25 Nov. 2011; Estonia Performance plan (July 2011)

Figure 16: Terminal ANS Costs and charges

Figure 16 shows the terminal ANS Costs and charges: variability of airports (map on the left) and Terminal service units/charging formula (map on the right) for EU27 States +Norway and Switzerland.

In 2010, two countries have more than one charging zone: Sweden (1 for Landvetter and 1 for Arlanda airports) and the United Kingdom (a charging zone A for a group of 10 airports with between 50 000 and 150 000 commercial air transport movements, and a charging zone B with 4 aerodromes with more than 150 000 commercial air transport movements). If Terminal ANS are assessed by the Commission as falling under the requirements of Article 1 (6) and annex I of Regulation EU No 1794/2006 – “contestability assessment”, then States may decide not to set determined costs and any potential terminal cost-efficiency targets/KPI.

Although the performance monitoring formally starts only in 2012, the PRB already started to analyse available data from the Consultation Hearing on Terminal ANS costs and charges in November 2011.

Despite transparency improvements on terminal ANS costs and unit rates information, there is still a great deal of diversity across EU States, as illustrated in Figure 16. The number of aerodromes for which terminal ANS costs and unit rates are reported vary widely from one State to another, ranging from one single aerodrome (e.g. Belgium, Finland, Greece, Hungary, Luxembourg, and Romania) up to more than 60 aerodromes (France).

The RP1 (2012-2014) SES performance monitoring has formally started. For the 2012 terminal ANS costs and unit rates reported in November 2011 there has been a better coverage than in previous years, although data remain incomplete. Indeed, there is a need for a genuine data validation and verification process to ensure consistent and timely reporting in order to perform a genuine monitoring of terminal ANS costs and unit rates in RP1, as well as prepare any potential target setting for RP2.

Terminal ANS costs in the EU represent roughly €1.5 billion. In 2010 terminal ANS unit costs (at constant prices, in €2009 decreased in a similar magnitude as en-route ANS unit costs (-7.0% for terminal and -6.4% for en-route).

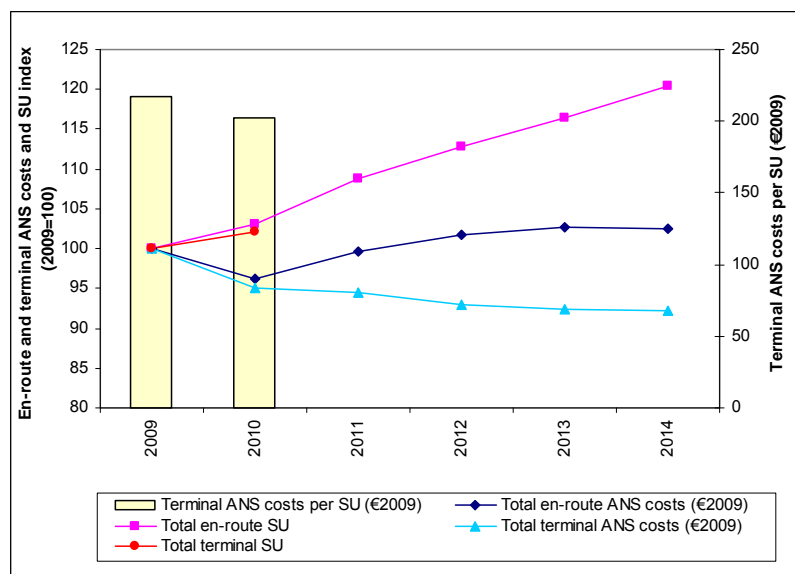
Table 11 provides a summary of terminal ANS costs and terminal service units for 2010 and a comparison with 2009.

Table 11: Terminal ANS cost-efficiency highlights (PRR2011, Chapter 7)

TERMINAL ANS	Terminal ANS cost-efficiency for SES reporting States		
<ul style="list-style-type: none"> • For the first time, the PRB computed terminal ANS unit costs (terminal ANS costs per terminal SUs) for all SES reporting States using a common formula to calculate terminal SUs. • High level analysis indicates that: <ul style="list-style-type: none"> ○ Terminal ANS costs decreased in 2010 compared to 2009 (-5.0%); ○ Terminal ANS unit costs decreased in 2010 compared to 2009 (-7.0%); ○ Terminal ANS costs are planned to further decrease over RP1 (-2.9% in 2014 vs. 2010 or -0.7% p.a. on average) • There are significant variations in the terminal ANS costs per SU across States which would deserve a more detailed analysis. 	Total terminal ANS costs (M€)	1 438	-5.0%
	Recomputed terminal service units (MTOW ^{0.7}) (M TSU)	7.1	+2.1%
	Terminal ANS costs per terminal SU (€2009)	201.9	-7.0%
	Planned average annual growth rate of terminal ANS costs over 2010-14 (Nov. 2011 plans)		-0.7%/year

Historically there have been strong incentives to reallocate costs towards en-route, due to the influencing power of local carrier(s) to keep down terminal charges. As binding targets are now set for en-route ANS cost-efficiency, there are perceptions of potential incentives to reallocate costs towards terminal ANS. Thus, there is a perceived risk that efficiency improvements in en-route ANS cost-efficiency would come at the expense of terminal ANS cost-efficiency.

However this perception does not seem to match existing “facts and figures” reported⁴² by EU States. Indeed as illustrated in Figure 17, whereas en-route ANS costs are planned to increase by +0.7% p.a. on average between 2010 and 2014, terminal ANS costs are planned to decrease by -0.7% p.a. on average over the same period. This is an interesting result as it indicates that if some States may have reallocated costs from terminal to en-route in the past, at system level the opposite does not seem to be true for RP1. This would also confirm that the terminal ANS cost-efficiency features follow different dynamics than en-route and in particular the market conditions / negotiation power at local level could have sufficient influence to keep charges/prices under tight control. This could be an indication that terminal ANS cost-efficiency does not need the same “regulatory treatment” as en-route ANS cost-efficiency.

**Figure 17: Evolution of en-route and terminal ANS cost (€2009) and TSU (2009A-2014P)**

42 note: the PRB/Commission could not validate the underlying data provided under the charging scheme requirements.

7.4 Proposed options and impact assessment for the cost-efficiency KPA

7.4.1 Considerations related to the assessment of options and target setting

Unlike typical (regulatory) impact assessments by the Commission, the alternatives/options assessed here are not whether regulatory intervention is necessary or if there are alternatives to regulation: regulatory action has already been decided by the legislator. Rather the focus is on if, where, and what alternative performance indicators and regulatory instrument are deemed most appropriate at this point in time for the Commission and States/NSAs to address the identified problems for the cost-efficiency KPA. Beyond the selection of indicators, the presented options mainly differ on the choice of regulatory instrument for terminal ANS cost-efficiency, falling in three basic categories:

- Performance review and benchmarking;
- “Bottom-up” target setting (local KPIs only); and
- “Top-down” target setting (EU-wide KPI with which local KPIs need to be “consistent with and adequately contribute to”).

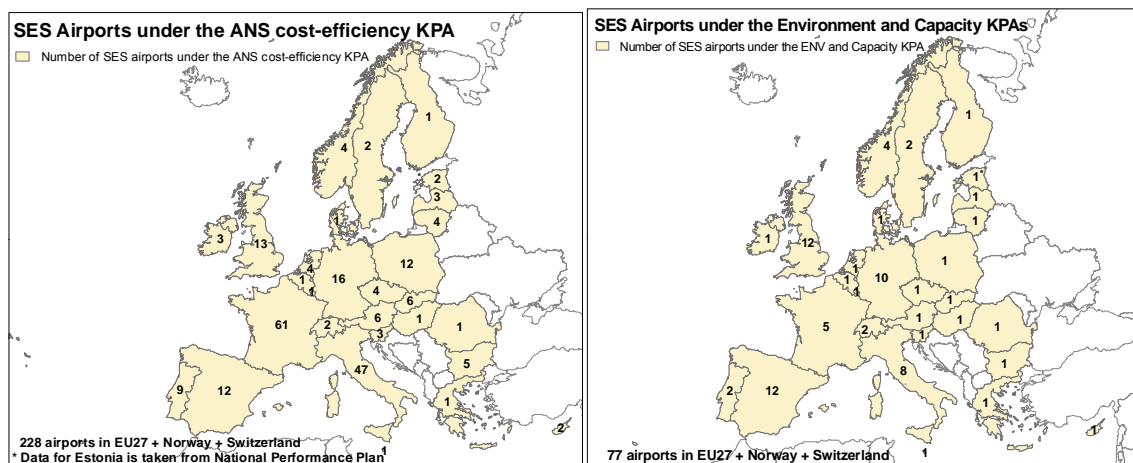
The PRB is minded to ensure a degree of legal certainty and regulatory stability in the SES Performance Scheme from RP1 to RP2. The PRB understands that legal certainty and regulatory stability is also a general stakeholders’ expectation. Therefore the PRB recommends to keep the same key performance indicator (en-route ANS determined unit rate), as well as the same regulatory approach for en-route ANS cost-efficiency (i.e. top-down target setting with explicit financial incentives as foreseen in the Charging Regulation). The PRB notes that for RP1 amongst the four current SES performance scheme KPAs (Safety, Capacity, Environment and Cost-Efficiency), the cost-efficiency KPA is the one with the highest level of regulatory requirements (top down target setting with genuine incentives) and covering the widest part of the problem to be addressed (80%+ of total ANS cost-efficiency).

In addition, the PRB is minded to ensure a working and effective performance scheme before adding a new KPI, as also requested by stakeholders. The PRB considers that the whole SES performance scheme is indeed about implementing and delivering improved performance. RP1 is only just starting (2012-2014) and the full impact of the incentives mechanisms (risk sharing) will only be known by 2015, well after the PRB will propose targets for RP2 (around mid 2013).

The PRB only considered the different alternatives/options for terminal ANS that are deemed necessary to ensure genuine gate-to-gate ANS cost-efficiency improvements.

In doing so, the PRB has performed a preliminary Impact Assessment (IA) which has included a qualitative assessment of the pros and cons of the different options as well as a scoring of different criteria in a common assessment grid.

As shown in Figure 18 below, another important element to bear in mind is that there is a significant difference between airports where ANS operational performance indicators apply (approximately 77 airports) and where terminal ANS cost-efficiency indicators apply (228 airports in 2012, of which some major airports are excluded from target setting). Therefore, the capacity/quality of service performance indicators for ANS at airports do not match the terminal ANS cost-efficiency performance indicators. This is also important for future discussions on interdependencies.



Sources: Cost-Efficiency KPA: Commission Consultation Hearing, 25 Nov. 2011 and Estonia Performance plan (July 2011); Environment/Capacity KPAs: National sources

Figure 18: SES airports' scope for the CEF, ENV and CAP KPAs

Figure 18 shows the difference in SES airports scope between the cost-efficiency KPA (map on the left) and the Environment and Capacity KPAs (map on the right) for EU-27 States +Norway and Switzerland.

As discussed in the Capacity and Environment KPA chapters, there are different thresholds for the number of airports covered by the SES performance scheme and there is a shared willingness to focus the scope of airports covered by the SES performance scheme. As far as the cost-efficiency KPA is concerned, it is directly dependent on the data flow from the charging regulation, where on the one hand all UK airports and Luxembourg are submitted to reduced reporting requirements and exempted from target setting and where States have decided to include a number of airports below the mandatory threshold of 50 000 CATM, on a voluntary basis, resulting into a total of close to 230 airports to be monitored (3 times more than for the terminal Capacity and Environment KPIs).

One way to focus the number of airports covered by the SES performance scheme targets could be for the Commission to update the charging regulation and require States to isolate airports with more than 150 000 Commercial Air Transport Movements (or to “coordinated airports” – some 45 airports EU-wide – to align with the operational KPAs) into dedicated terminal charging zone. In total, EU-wide, there are some 28 airports above 150 000 commercial air transport movements, representing 2/3 of total service units. Setting targets on charging zones with 228 airports would imply investing resources at national and European levels in monitoring and benchmarking 228 airports, while the 28 biggest airports represent 2/3 of the total service units traffic in Europe. This would seem difficult to justify on the grounds of the EU “proportionality principle”.

Another possibility would be to set up a dedicated data flow for the terminal ANS cost-efficiency performance indicators, and additional reporting to specifically address performance monitoring and target setting in addition to the reporting requirements of the charging regulation, although that might be perceived as adding administrative burden on States and stakeholders by duplicating some reporting requirements difficult to justify on the grounds of the EU “proportionality principle” as well.

Both alternatives of new reporting requirements are submitted to stakeholders' feedback. These are not considered further in the impact assessment below as they would equally impact the three options.

7.4.2 Options

The PRB has developed three options to address the two main identified problems:

- the scope for improvement in gate-to-gate ANS cost-efficiency; and

- avoiding the perceived risk that efficiency improvement in en-route ANS cost-efficiency comes at the expense of terminal ANS cost-efficiency.

As binding targets are now set for en-route ANS, there was a perceived risk that en-route cost-efficiency performance will improve at the expense of terminal ANS. This has therefore to be addressed by the cost-efficiency KPA during RP2, notwithstanding that this is a perceived risk not universally recognised by stakeholders. In fact, PRB preliminary analysis shows (see Figure 17 above) that whereas total en-route ANS costs are planned to increase by +0.7% p.a. on average between 2010 and 2014, terminal ANS costs are planned to decrease by -0.7% p.a. on average over the same period.

These three options are:

- **Option 1:** “Top-down” target setting for en-route, and performance review and benchmarking for terminal ANS;
- **Option 2:** “Top-down” target setting for en-route, with “Bottom-up” target setting for Terminal ANS;
- **Option 3:** “Top-down” target setting for en-route and terminal ANS.

The PRB considers that the three selected options are *a priori* relevant to address the identified cost-efficiency objectives. Option 3 corresponds to the indicators set out in the initial performance regulation (EU) No 691/2010. This “initial intent of the regulation” has been complemented with two genuine options/alternatives that would meet the SES performance scheme requirements and objectives to genuinely improve the ANS cost-efficiency performance.

7.4.3 Cost Efficiency Option 1: “Top-down” target setting for en-route and performance review and benchmarking for terminal ANS

The PRB first option is to build on RP1 (top-down target setting with incentives for en-route ANS – more than 80% of the costs – and performance benchmarking for terminal ANS cost-efficiency). This is in line with the strategic direction of RP2, which is “extending the scope of the SES performance scheme to a genuine gate-to-gate performance view”. To this end, for both EU-wide and national/FAB level, a genuine gate-to-gate view is introduced and proposed for performance review, monitoring and benchmarking purposes (this performance indicator is proposed to be explicitly included in all three options⁴³).

In this option there is an explicit recognition of the desired differentiation between en-route ANS provision (80% of the costs – already submitted to strong target setting with financial incentives) and the more dynamic terminal ANS provision segment (representing 20% to be regulated) which can be subject to greater competition (e.g. franchise bidding for close to 25% of the terminal ANS business market).

While this option is less intrusive than Option 2 and Option 3 discussed below, it maintains target setting for the bulk of gate-to-gate costs (80% covered through en-route ANS cost-efficiency target setting), and covers under performance review/benchmarking 100% of the gate-to-gate ANS costs. In this context, this option also recognises that terminal ANS costs are somehow already “regulated” through the en-route DUR target setting and that terminal navigation charges (TNC) are already subject to effective pressure by local carriers, as indicated by recent facts and figures reported in Figure 17 above (for EU27+Norway and Switzerland, terminal ANS costs are planned to decrease over the period 2010).

43 Essentially, this indicator would be the sum of terminal and en-route costs divided by a suitable output metric comprising terminal and en-route service units.

Summary of Option 1 approach

	EU-wide	National/FAB
En-route ANS (80% costs)	En-route Determined Unit Rate KPI ⁴⁴	En-route Determined Unit Rate KPI
Terminal ANS (20% costs)	Terminal Unit Rate PI ⁴⁵ Terminal ANS Costs PI	Terminal Unit Rate PI Terminal ANS Costs PI

Consistency assessment criteria:

- 5 existing criteria for en-route (“Return on Equity” criteria upgraded to “Cost of Capital” criteria – see RP1 lessons learned).
- Plus 6th criterion to check for potential re-allocation.

In practice, for en-route KPI the process already in place for RP1 (top-down target setting with incentives) would remain, while the PRB would benchmark terminal ANS cost-efficiency and the Commission would be able to request formally States to revise en-route targets if en-route ANS cost-efficiency would improve at the expense of terminal ANS cost-efficiency. In addition, the PRB would monitor trends of the gate-to-gate ANS unit costs.

Initial assessment

Relevance	++	<p>With en-route KPI (80% costs under target setting) and terminal and gate-to-gate PI, i.e. under performance review/benchmarking by the Commission/PRB, with the potential to challenge also all terminal ANS costs (20%) including challenging any potential re-allocation through a specific consistency criteria when assessing Performance plan s: this option addresses the problems identified in section 7.4.1.</p> <p>It also provides a direct gate-to-gate view (re. main problem) and an indicator of overall cost-efficiency performance.</p>
Proportionality	++	<p>While this option is less intrusive than the other two options, it maintains target setting for the bulk of gate-to-gate costs (80% covered through en-route ANS cost-efficiency target setting), and covers performance review/benchmarking for 100% of the gate-to-gate costs provided through the SES regulations. This option recognises that terminal ANS costs are somehow already “regulated” through the en-route DUR target setting.</p> <p>Balanced approach / better respects “proportionality” principle (80% costs already under strong target setting with incentives); 20% to be monitored with specific check on allocation.</p> <p>Fully in line with the Commission targets of avoiding over-regulation while still meeting the key objective for RP2 to establish and strengthen the robustness, stability and continuity of the performance scheme; minimal change vs. RP1 while considering gate to gate cost-efficiency and more direct/transparent indication of whether gate-to-gate unit costs are reducing.</p>
Subsidiarity	+++	<p>Fully in line with the EU subsidiarity principle and does not prevent States to set target at local level for terminal ANS which is recognised as more of a local issue than en-route; it also recognises the current limitations of setting target “top-down” for Terminal ANS cost-efficiency</p>

44 Key Performance Indicator as defined in Art.2 (d) of Regulation (EU) No 691/2010

45 Performance Indicator as defined in Art.2 (c) of Regulation (EU) No 691/2010

Maturity	++	<p>The performance review and benchmarking for terminal ANS cost-efficiency is only formally starting with RP1 (in 2012).</p> <p>This option will provide some time for NSA/national regulators to gain experience on the impact of risk sharing mechanisms on ANSPs for en-route ANS before setting targets for terminal ANS.</p>
Acceptability	++	<p>All else equal, the PRB/Commission expects a lower return on equity and cost of capital with postponed risk sharing arrangements than without.</p> <p>PRC has monitored ANSP gate-to-gate performance indicators (e.g. “gate-to-gate cost per composite flight-hours”), an indicator fully recognised by stakeholders. At EU level there are no technical difficulties to aggregate en-route and terminal ANS costs per total composite service units.</p>

Overall this option is deemed to address the two fundamental problems identified for the cost-efficiency KPA (see section 7.4.1) while meeting the proportionality principle (balance of costs and expected benefits), as well as EU subsidiarity principle (nothing prevents individual States to set additional specific terminal ANS cost-efficiency targets if they so wish).

It should be noted that Option 1 would still offer the opportunity for States who so wish to:

- apply the new requirements of the amended charging regulation for terminal ANS (regulation (EC) No 1794/2006 as amended by regulation (EU) No 1191/2010). In this cases States would still have the possibility to set determined costs with risk-sharing arrangements for terminal ANS and set national targets on terminal ANS cost-efficiency;
- or alternatively,
- postpone such new requirements until Reference Period 3. However since the Regulations currently mandate application of these provisions (setting of determined costs, risk-sharing) in RP2, an amendment to postpone such requirements for terminal ANS would be necessary.

7.4.4 Cost Efficiency Option 2: “Top-down” target setting for en-route with “Bottom-up” target setting for Terminal ANS

This option is mid-way between RP1 performance indicators (Option 1) and Option 3 (top-down target setting as discussed below), while taking account of the limitations of Option 3. It is considered to be less intrusive than Option 3 and to better respect the subsidiarity principle as it is a “bottom-up” target setting process for terminal ANS cost-efficiency, thus enabling local issues to be addressed by national authorities/regulators.

Summary of Option 2 approach

	EU-wide	National/FAB
En-route ANS (80% costs)	En-route Determined Unit Rate KPI	En-route Determined Unit Rate KPI
Terminal ANS (15%costs)⁴⁶	Terminal Determined Unit Rate PI Terminal ANS Determined Costs PI	Terminal Determined Unit Rate KPI

In this option, as for each option, the process for the en-route KPIs would be as in RP1. States would be required to set determined costs and targets for terminal determined unit rates (one for each charging zone), but there would be no EU-wide DUR target for terminal

⁴⁶ Around 25% of Terminal ANS (5% of gate to gate ANS costs) are exempted from target setting but not from performance monitoring (mainly Luxembourg and 14 airports in the UK that have filed for exemptions within the charging scheme on the ground of Art 1(6) and Annex I conditions)

ANS. Terminal charges would come within the scope of the risk-sharing provided in Regulation (EC) No 1794/2006. The PRB would benchmark and monitor at EU level the terminal ANS determined costs and the different terminal DUR targets set by States. In addition, for both EU-wide and national/FAB level, a genuine gate-to-gate cost-efficiency performance indicator is introduced and proposed for performance review, monitoring and benchmarking purposes.

One should bear in mind that setting terminal DUR targets with limited experience and benchmarking, including for terminal Service Unit forecasting by STATFOR, is likely to increase the risk premium (cost of capital) that would be required by ANSPs, as experience has recently shown with the en-route part. Indeed, building on what is done for en-route, a rough estimate of the additional premium that is likely to be requested for setting terminal DUR targets (terminal determined costs, terminal service units with risk sharing mechanisms) would, all else equal, be approximately 1.5% of the terminal cost-bases (see Table 12 below). This would amount to an additional €22.5 M/year over RP2 (in total €110 M for 5 years).

Table 12: Average cost of capital used for en-route and terminal ANS

	EU-wide annual average cost of capital over RP1 (2012-2014)	% of cost base
En-route ANS	~ €350 M/year	5.5%
Terminal ANS ⁴⁷	~ €60 M/year	4.0%

From an economic point of view, for Option 2 to outperform Option 1 would require, all else equal, that the setting of national terminal DUR targets across EU-wide induces genuine cost-efficiency improvements (savings) exceeding any likely increase in return on equity/cost of capital for RP2 (i.e. in the above assumptions and calculations, exceeding 1.5% or €22.5 million/year on average over 5 years equivalent to €110 million in total over RP2).

Furthermore, setting effective terminal DUR targets at national level would require a certain level of regulatory maturity and experience on establishing ex-ante the level of terminal ANS determined costs and terminal service units forecast over 5 years amongst the relevant stakeholders. This is likely to be an important challenge for the NSAs/national regulators. This would need to be built up relatively soon as targets are to be set by 2014, while States have already decided to postpone the implementation of the revised charging regulation for terminal ANS to 2015.

However this needs to be balanced by the fact that with Option 2 national terminal ANS cost-efficiency targets would be set, automatic full cost recovery would end, thus creating the grounds for financial incentives to improve cost-efficiency performance in the medium to long run.

In order to mitigate the likely increase in the cost of capital (i.e. States requesting higher risk premium due to the uncertainty related to terminal Sus traffic forecasting) of Option 2 described above, an adjustment of the traffic risk sharing scheme could be also considered. This would require a modification to the provisions of the Charging regulation for terminal ANS. Should such a modification be suitable, the details of the traffic risk sharing scheme for terminal ANS would have to be carefully established in due course. However the PRB does not intend to re-visit traffic risk sharing provisions for en route for which forecasting are well established.

⁴⁷ The calculations for en-route are based on States performance plans and the calculations for terminal ANS are based on available information from the “2012 Terminal ANS costs and charges, Consultation Hearing” (November 2011, European Commission)

Consistency assessment criteria:

- 5 existing criteria for en-route (“Return on Equity” criteria upgraded to “Cost of Capital” criteria – see RP1 lessons learned).
- Plus 6th criterion to check for potential re-allocation.

In practice the PRB would not assess consistency of national/FAB terminal DUR targets with the EU target as there would be no EU-wide target for comparison. Therefore, the formal process in Article 13 of Regulation 691/2010 would not apply strictly speaking. Instead the PRB would assess the reasonableness of the national terminal DUR target, taking into account costs trends, and if the target would be considered as not justified, could raise its concerns. This analysis could also be supported by the monitoring and benchmarking of trends in gate-to-gate ANS costs per service unit.

Initial assessment

Relevance	++	Relevant to effectively address the two main identified problems in section 7.4.1. For the terminal ANS part, might be seen as better than Option 1 (see above) in that it reinforces the move away from (short term) full cost-recovery.
Proportionality	++	If indeed terminal ANS issues are better known by local regulators, the option is less costly than Option 3 (see below) but possibly more costly than option 1 (see above).
Subsidiarity	+++	Respect subsidiarity: cost-efficiency target setting for Terminal Charging Zones (composed of one or a group of airports) is arguably a local issue highly dependent on local circumstances.
Maturity	+	Low maturity, as no terminal DUR benchmarking exists, nor comparable terminal unit rates across Europe before 2015. Lack of knowledge and experience for terminal TSU forecasting (including by STATFOR for which this will be a new service/product). However it is balanced by a generally better knowledge of local circumstances by national regulators.
Acceptability	+++	In line with the initial intent which foresees to establish terminal determined costs and terminal determined service units for the next Reference Period. Risk sharing arrangements with application of determined costs and TSU to en-route ANS has shown that it pushes up the required return on equity and hence the cost of capital – therefore terminal target setting (for 15% of costs) could increase costs in the short run (RP2). Lack of knowledge and experience in terminal TSU forecasting, which means more risk and uncertainty for pricing in terminal traffic risk sharing as part of the cost of capital calculation. This might lead to higher risk premiums – and therefore higher costs. However this could be mitigated by a modification of the Charging Regulation to allow a different risk sharing scheme for terminal ANS.

7.4.5 Cost Efficiency Option 3: “Top-down” target setting for en-route and terminal ANS

This regulatory option is considered to be the most intrusive intervention as it foresees top-down target setting for both en-route and terminal ANS cost-efficiency. In this option determined unit rates (DUR) targets are set over RP2 for both EU-wide and national/FAB levels and for both en-route and terminal ANS cost-efficiency.

Summary of Option 3 approach

	EU-wide	National/FAB
En-route ANS (80% costs)	En-route Determined Unit Rate KPI	En-route Determined Unit Rate KPI
Terminal ANS (15%costs)⁴⁸	Terminal Determined Unit Rate KPI	Terminal Determined Unit Rate KPI

However, the PRB has identified a number of “regulatory discrepancies” between the charging regulation and the performance regulation:

Table 13: Identified need for alignment between charging and performance regulations

Terminal ANS cost-efficiency	Performance scheme (EU N° 691/2010)	Charging Scheme (EU N°1794/2006 as amended by 1191/2010)
Scope “mismatch”	Mandatory for airports >50 000 CATM + <u>at least main airport</u> for States where no airports >50 000 CATM	Not mandatory for all Member States (4 EU States have no airports with >50 000 CATM)
Time “mismatch”	Adopt target (EU-wide) by 2013	Harmonised SU/ TNC formula by 2015

The PRB has identified a ‘scope mismatch’: currently some States which have no airports with more than 50 000 commercial air transport movements (CATM) are not consistently reporting for the purpose of the charging scheme requirements. At the same time, States have to report, for the purpose of the performance scheme, at least the terminal ANS costs and charges in relation to the main airport. Art 1(5) of EU 1794/2006 (as amended by 1191/2010) aims to realign the scope of these regulations but the transitional provisions may at States’ discretion postpone such realignment until end-2014. However they would still need to report the full data set for the purpose of the Performance Scheme monitoring requirements starting in 2012 and the PRB/Commission wishes to avoid duplication and unnecessary burden.

In addition, there is a ‘timing mismatch’: there will be no harmonised terminal service unit formula and therefore no harmonised terminal unit rates before 2015.

As a result, in the current regulation terms EU-wide targets are expected to be set in 2013, i.e. before consistent and comprehensive EU-wide data series are recorded. Given the time needed to build a robust system and the scarce regulatory resources across Europe, setting EU-wide terminal DUR target in 2013 without the necessary data and experience (e.g. understanding the impact of risk sharing on ANSPs for the en-route part), and for 15% of the costs, does not seem a commendable approach at this stage.

One should also bear in mind that setting terminal DUR targets with limited experience and benchmarking, including for terminal Service Unit forecasting, is likely to increase the risk premium (cost of capital) that would be required by ANSPs as experience has recently shown with the en-route part (see also the rationale presented in section 7.4.4 and Table 12 for Option 2 above).

48 Around 25% of Terminal ANS (5% of gate to gate ANS costs) are exempted from target setting but not from performance monitoring (mainly Luxembourg and 14 airports in the UK that have filed for exemptions within the charging scheme on the ground of Art 1(6) and Annex I conditions)

In addition, as described above there are several different models for terminal ANS provision which means that the service is far from homogenous across the EU. There are differences in the scope of service, the market structure (whether services are provided by a single ANSP or several), and the extent of cross-subsidies, as well as cost allocation between en-route and terminal.

As a result, through informal consultation, most stakeholders have recognised that no robust and meaningful EU-wide terminal ANS cost-efficiency target could be set for RP2. Presently, this consideration is also shared by the PRB.

Consistency assessment criteria:

- 5 existing criteria for en-route (“Return on Equity” criteria potentially upgraded to “Cost of Capital” criteria – see RP1 lessons learned).
- For this Option, it is likely that specific additional criteria would be required for terminal consistency assessment (how to assess adequate contribution to and consistency with EU-wide targets).

Initial assessment

Relevance	++	<p>A priori relevant with high feasibility risk and credibility risks.</p> <p>Whereas the KPI is already known by stakeholders and reflects the initial intention in EU Regulation No 691/2010, there are high feasibility risks:</p> <ul style="list-style-type: none"> • low maturity/understanding of data for terminal ANS (no data validated; short history of data analysis for costs and traffic); • no detailed benchmarking evidence such as comparators (as for en-route); • no credible and robust EU-wide terminal DUR KPI target can be set.
Proportionality	+	<p>Clearly the most “expensive” option. 80% of the problem is already under target setting (en-route DUR). Specifically addressing 15% of the costs with a top-down terminal DUR target is likely to require a significantly larger amount of resources. In many cases the major part of the costs are indirectly regulated through en-route or exempted from terminal ANS cost-efficiency target setting on the ground of “contestability assessment” of the charging regulation, but formally full cost recovery survives.</p>
Subsidiarity	+	<p>There is a general recognition that EU does not seem to be the best level nor top-down target setting for terminal ANS, given the variety of service models, differences in scope etc, across the EU.</p>
Maturity	+	<p>Low maturity, no terminal unit rate will be available before 2015, while target would have to be set by 2013 and monitoring starts in 2012.</p> <p>With 220+ airports, huge heterogeneity across States and Terminal Charging Zones (TCZ):</p> <ul style="list-style-type: none"> • from 61 airports in France and 47 in Italy to 1 airport in most other States covered by target setting; • for TCZ with multiple airports, very large differences across airports (size, scope of services provided, etc) • no comparators/peer groups exist <p>Non negligible difficulties for the NSA to set consistent local targets with the EU-wide target and for Commission/PRB to carry out an effective and fair “consistency assessment”.</p>
Acceptability	+	<p>With limited experience in terminal ANS benchmarking, and no EU-wide DUR formally computed before 2015, PRB/EC likely to be challenged for setting EU-wide target in 2013 and States/NSAs likely to have difficulties to set local targets consistent with the EU-wide and the PRB for the assessment. Lack of knowledge and experience in terminal TSU</p>

forecasting (including by STATFOR for which this will be a new service/product), which means more risk and uncertainty for pricing in terminal traffic risk sharing as part of cost of capital calculation. This might lead to higher risk premiums – and therefore higher costs.

7.4.6 Cost Efficiency Options: Conclusion

Table 14 provides a high-level summary of the three options that have been more specifically considered.

Table 14: Three identified options for the cost-efficiency KPA

Option 1		Option 2		Option 3	
“Top-down” target setting for en-route and performance review and benchmarking for terminal ANS		“Top-down” target setting for en-route and “Bottom-up” target setting for terminal ANS		“Top-down” target setting across gate-to-gate ANS	
EU-wide	Nat/FAB	EU-wide	Nat/FAB	EU-wide	Nat/FAB
En-route DUR KPI	En-route DUR KPI	En-route DUR KPI	En-route DUR KPI	En-route DUR KPI	En-route DUR KPI
Terminal unit rate PI and Terminal ANS costs PI	Terminal unit rate PI and Terminal ANS costs PI	Terminal Determined Unit Rate PI and Terminal ANS Determined Costs PI	Terminal DUR KPI	Terminal DUR KPI	Terminal DUR KPI
G2G costs per total SU PI ⁴⁹	G2G costs per total SU PI	G2G costs per total SU PI	G2G costs per total SU PI	G2G costs per total SU PI	G2G costs per total SU PI

Responding to stakeholders expectations, in RP2 the PRB is minded to focus on consolidating the efforts initiated during RP1 while progressing towards a gate-to-gate approach to cost-efficiency performance, in line with the SES objectives. The Performance Scheme should remain focussed on a limited number of KPIs at European level. States should however be encouraged to add additional elements, including additional targets, in their performance plans for improving ANS performance at they see fit given their specific circumstances.

As the bulk of ANS costs are allocated to en-route (80% on average in the EU), RP2 should still focus on delivering en-route ANS cost-efficiency improvements. For these reasons, and for the purpose of regulatory continuity and legal consistency, it is proposed that the EU-wide and national/FAB en-route ANS cost-efficiency KPI (en-route determined unit rate – DUR) set for RP1 should remain stable for RP2.

⁴⁹ Gate-to-gate ANS costs (en-route + terminal ANS) per composite total service units (an indicator representing total en-route and terminal service units)

As regards terminal ANS cost-efficiency, the diversity of scope, the variety of service models, business dynamics and added complexity of performance at terminal ANS present clearly a greater challenge than in the en-route environment.

The aim of the PRB is to ensure that gate-to-gate ANS costs are effectively managed, that the cost-efficiency performance indicators proposed drive genuine cost-efficiency improvements, while avoiding over-regulation/undue administrative burden and opportunistic behaviour for all stakeholders. Simultaneously the PRB does not wish to prevent genuine move towards competition (for terminal ANS service provision). Last but not least, the PRB seeks a balanced approach which respects the subsidiarity and proportionality principles amongst other “Better/Smarter Regulation” principles.

In this Chapter the PRB has considered 3 options for the cost-efficiency KPA, differentiated by the regulatory proposals for terminal ANS cost-efficiency, and has carried out a preliminary impact assessment weighting the advantages and disadvantages of each. In the light of this analysis the PRB’s preliminary conclusions are:

1. The PRB does not favour **Option 3** (“Top-down” target setting for both en-route and terminal ANS) for RP2. **Option 3** corresponds to the indicators set out in the initial performance regulation (EU) No 691/2010. However, in view of the lack of consistent data on terminal ANS costs and service units, the variety of service models and the high variance of terminal ANS scope and lack of effective benchmarking evidence, **Option 3** is not deemed feasible nor meaningful for RP2;
2. The PRB considers that both **Option 1** (“Top-down” target setting for en-route ANS, and performance review and benchmarking for terminal ANS) and **Option 2** (Top-down” target setting for en-route ANS, and “bottom-up” target setting for terminal ANS) have their advantages and disadvantages.
3. **Option 1** maintains target setting for the bulk of gate-to-gate costs (80% covered through en-route ANS cost-efficiency target setting with a direct bearing on common costs borne by the ANSP and therefore terminal ANS costs, as indicated by current plans), and covers under performance review/benchmarking 100% of the gate-to-gate ANS costs provided through the SES regulations. **Option 1** recognises that terminal ANS costs are already “regulated” through the en-route cost-efficiency target (at least for the common costs) and that terminal ANS charges are already subject to effective pressure by local carriers. **Option 1** leaves it up to national regulators to decide on the opportunity (or otherwise depending on their level of maturity for economic regulation), to implement in full or to postpone the determined costs method, risk sharing arrangements and financial incentives for terminal ANS, in which case, everything else equal, comparatively lower cost of capital and less risk for opportunistic behaviour are expected.
4. **Option 2** requires NSAs to set national terminal ANS DUR targets for RP2. In order to do so a certain level of awareness and experience in the terminal ANS charging scheme new provisions are required amongst the relevant stakeholders. These would need to be built up relatively soon as national terminal DUR targets would have to be set by 2014, while States have decided to postpone the implementation of the revised charging regulation for terminal ANS to 2015. From an economic point of view, for **Option 2** to outperform **Option 1** would require, all else equal, that the setting of national terminal DUR targets across EU-wide induces additional genuine cost-efficiency improvements (savings) exceeding any likely increase in return on equity/cost of capital for RP2. However this needs to be balanced by the fact that with **Option 2** national targets would be set, automatic full cost recovery would end, thus creating the grounds for financial incentives to bring sustainable cost-efficiency performance improvements.
5. On balance, at this stage, the PRB favours **Option 2**, on the grounds of likely acceptability by the main stakeholders, and because the implementation of the terminal provisions of the charging regulation from 2015 onwards, by ending the cost recovery, are expected to induce greater terminal ANS cost-efficiency improvements

across the EU than **Option 1**. **Option 2** is also deemed to better respect proportionality and subsidiarity principles than **Option 3** (undeliverable) in that it allows flexibility to national regulators for what is a recognised local issue.

The PRB looks forward to stakeholders' feedback on these conclusions.

Table 15: Cost-efficiency options: summary of initial assessment

Option	1	2	3
Relevance	++	++	++
Proportionality	++	++	+
Subsidiarity	+++	+++	+
Maturity	++	+	+
Acceptability	++	+++	+

8 ABBREVIATIONS

ACAS	Airborne Collision Avoidance System
A-CDM	Airport Collaborative Decision Making
AoS	Acceptable Level of Safety
AMC	Acceptable Means of Compliance
ANS	Air Navigation Services
ANSP	Air Navigation Service Provider
ASMA	Arrival Sequencing and Metering Area
A-SMGCS	Advanced Surface Movement Guidance and Control System
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATOT	Actual Take-Off Time
ATS	Air Traffic Services
AUP	Airspace Use Plan
CAA	Civil Aviation Authority
CANSO	Civil Air Navigation Services Organisation
CAT	Commercial Air Transport
CATM	Commercial Air Transport Movement(s)
CDM	Collaborative Decision-Making
CDR	Conditional Route
CEM	Collaborative Environmental Management
CO2	Carbon Dioxide
CPF	Correlated Position Reports for a Flight
CTOT	Calculated Take-Off Time
DPI	Departure Planning Information (message)
DUR	Determined Unit Rate
EASA	European Aviation Safety Agency
EASP	European Aviation Safety Programme
EASp	European Aviation Safety Plan
EC	European Communities
EC	European Commission
EGPWS	Enhanced Ground Proximity Warning System
EoS	Effectiveness of Safety Management
ESSIP	European Single Sky ImPlementation (mechanism / documents)
ETSI	European Telecommunications Standards Institute
EU	European Union
EUROCAE	European Organisation for Civil Aviation Equipment
EVAIR	EUROCONTROL Voluntary ATM Incident Reporting

FAB	Functional Airspace Block
FABEC	FAB Europe Central
FRA	Free Route Airspace
FTFM	Filed Tactical Flight Model
FUA	Flexible Use of Airspace
G2G	Gate to Gate
GASP	ICAO Global Aviation Safety Plan
GM	Guidance Material
IA	Impact Assessment
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IMF	International Monetary Fund
IP1	Implementation Package 1 (SESAR)
JC	Just Culture
JU	Joint Undertaking
KPA	Key Performance Area
KPI	Key Performance Indicator (indicator with target setting)
LAQ	Local Air Quality
LSSIP	Local Single Sky Implementation (mechanism / documents)
MO	Management Objective
MTOW	Maximum Take-Off Weight
NM	Network Manager
nm	Nautical mile
NOP	Network Operations Plan
NPP	National Performance Plan
NSA	National Supervisory Authority
NSP	Network Strategy Plan
PANS-ATM	Procedures for Air Navigation Services – Air Traffic Management (ICAO Doc 4444)
PI	Performance Indicator (monitoring only, i.e. indicator without target setting)
PRB	Performance Review Body
PRC	Performance Review Commission
PRISMIL	Pan-European Repository of Information Supporting Military Key Performance Indicators
PRR	Performance Review Report
PRU	Performance Review Unit
RA	Regulatory Approach
RA	TCAS Resolution Advisory
RAAS	Runway Awareness and Advisory System
RAD	Route Availability Document
RAT	Risk Analysis Tool
RP	Reference Period

RP1	Reference Period 1 (2012-2014)
RP2	Reference Period 2 (2015-2019)
RP3	Reference Period 3 (2020-2024)
SARPs	ICAO Standards and Recommended Practices
SES	Single European Sky
SESAR	Single European Sky ATM Research Programme
SloA	Stakeholders Line of Action
SMS	Safety Management System
SPI	Safety Performance Indicator
SSC	Singe Sky Committee
SSP	State Safety Programme
STATFOR	Air Traffic Statistics and Forecasts Service
STW	Slot Tolerance Window
SU	Service Units
SUA	Special Use Airspace
TCAS	Traffic Collision Avoidance System
TCAS-RA	TCAS Resolution Advisory
TNC	Terminal Navigation Charges
TSAT	Target Start-up Approval Time
TSU	Total Service Units
UK	United Kingdom
US	United States (of America)
UUP	Updated (Airspace) Use Plan
XMAN	Cross Border Arrival Management