PRB | Performance review body of the single european sky

PRB Advice to the Commission in the setting of Union-wide performance targets for RP3

Final report

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PRB Performance review body of the single european sky

Note from the chair: The priorities of the PRB for RP3

1 2018 is a challenging year for the performance of European Air Traffic Management. In the fully liberalised European aviation market, airlines are responding to an increasing demand for air travel and continue to cut cost in a highly competitive market. They increase their fleets, replace small aircraft by bigger models and offer more flights. These developments are putting pressure on the Air Traffic Management system. In terms of safety, the system continues to have a stellar performance and is able to cope with record traffic numbers. In terms of economic performance, the results are sobering. The current economic regulation has not rendered the envisaged results and not all Air Navigation Service Providers (ANSPs) are meeting all of their targets. This has led to a damaging capacity shortage in crucial areas of the Single Sky Member States, resulting in unacceptable delays with high costs for airlines and their passengers. In addition, the past years show that some ANSPs have not invested as planned, although they had the necessary money.

2 Experience gained over the performance scheme to date define, to a great extent, the target setting for the upcoming reporting period (2020 – 2024). The economic regulation for air traffic management must continue to substitute for the lack of competition among ANSPs.

3 Economic regulation has faced similar situations in the past. Demand for aviation has always been volatile and linked to the wider economic environment. The aviation industry has adapted to such volatility for many years.

4 In 2001, the terrorist attacks on 11th September and the wider impact on the world economy led to a significant reduction in demand for air travel. Delays decreased. Traffic recovered and reached unprecedented levels in 2007 and 2008, with delays also increasing substantially. The financial crisis of 2008 reduced the demand for air transport. Traffic demand took nine years to recover to the traffic numbers seen in 2008. The past months have seen new record levels of traffic, including days with new peaks (over 37,000 flights within the European ATM network in one day[1]).

5 The PRB recognises that such shocks are unpredictable and that it is difficult for the Air Navigation Service Providers to adapt to largescale changes in demand. However, the PRB believes that ANSPs must develop greater flexibility over the coming years to ensure a sustainable European ATM system for the future.

6 Under the current and proposed legal framework for economic regulation, the PRB is responsible for advising the Commission on targets for four Key Performance Areas. Safety, Environment, Capacity and Cost Efficiency.

7 The PRB sees the following priorities for the upcoming Reporting Period:

8 **Safety:** The overall safety level of European air traffic management has reached an impressive level. The performance scheme only defines targets for the effectiveness of safety management of Member States/National Supervisory Authorities and of air navigation service providers. In this respect, the current performance is high, but can still be improved.

[1] On 7th September 2018, the Network Manager reported that the European ATM network handled 37,101 flights

9 For the Safety KPA, the targets will need to be reviewed and adjusted once the new regulation is adopted.

10 Environmental performance: The PRB recognises that the planned trajectories are significantly more inefficient than the actual trajectory flown. Progress should be made to reduce the gap to increase the predictability of operations, however the PRB also recognises that the flight efficiency of the route planned by airlines can be largely outside of an ANSP's control.

11 Capacity/delays: Traffic and delay are now at record levels. Millions of passengers did not reach their destination on time. Nevertheless, in 2017 the Single European Sky (SES) area handled less than 1% more flights than in 2008[2].

12 The current situation produced an average delay of over two minutes per flight (up to August 2018), four times the target for RP2[3]. The latest version of the Network Operations Plan of the Network Manager[4] (NM) projects an even poorer delay performance than the previous edition, emphasising the gravity of the situation. However, this is not a failure of European Air Traffic Management as a whole. Many States in Europe are performing well and are reaching their delay targets despite challenging traffic growth, demonstrating that there is sufficient capacity throughout the majority of the European ATM network.

13 For example, Slovakia and Bulgaria have handled traffic growth above the STATFOR baseline forecast, whilst achieving their delay targets.

14 A few (large) Member States in the centre of Europe (in particular, France and Germany) are failing to provide sufficient capacity, despite growing traffic. As these ANSPs are in the core area of Europe where demand continues to increase, their insufficient performance has the greatest impact on network performance. Seven Area Control Centres (ACCs) (six in the centre of Europe) are forecasted to generate excessive delays and must increase capacity provision urgently to meet the needs of the airspace users.

15 For those ANSPs that fail to provide sufficient capacity, analysis shows much of the delay is caused by capacity and staffing causes. Such reasons are considered to be largely within the control of the ANSPs and the poor performance is at least partly the consequence of management decisions taken by ANSPs in the past five years.

[2] Information from EUROCONTROL shows that there were 9,760,443 flights in 2008 compared with 9,847,620 in 2017 in the SES RP2 area.
[3] The PRB expects the average delay per flight in 2018 to be between 1.6 and 1.7 minutes per flight by the end of the year.
[4] European Network Operations Plan 2018-2019/22, EUROCONTROL. 3rd July 2018

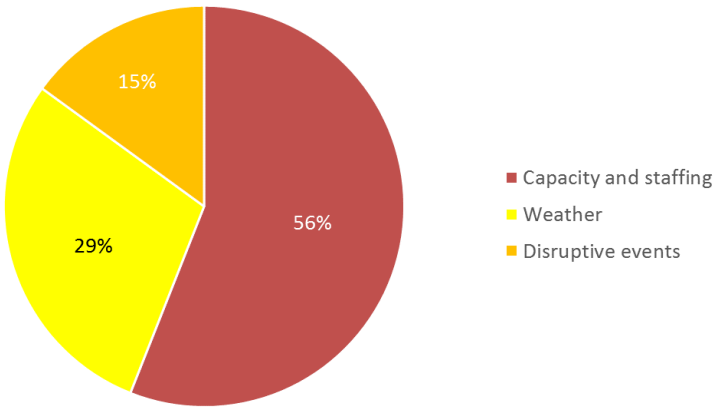

Figure 1: Delay causes in 2018 (January to August)

16 A number of ANSPs have not provided sufficient capacity, have delayed investments and did not take corrective measures soon enough to adapt their priorities. At the same time these ANSPs have recovered additional revenue through the traffic risk sharing mechanism and generated surpluses significantly above those planned.

17 The PRB will ask the respective National Supervisory Authorities (NSAs) to immediately initiate the Corrective Measures based on the PRB's recommendations within the Monitoring Report for 2017.

18 Cost: Cost of ATM service remains an important element of performance for airspace users, whilst the travelling public focus more on the impact of delays. For the PRB, the following aspects are decisive for RP3:

- Overall for cost for the provision of the service have largely remained flat during RP2. This means that ANSPs were able to handle the (slightly) increased traffic of the past years at the similar cost. However, this statement needs to be put into context: At the same time, ANSPs had substantially increased revenues, because through the current charging scheme, the charges don't only depend on the number of flights they handle, but also on the weight of the aircraft. As airlines are using larger aircraft and are increasing the load factor, revenue for ANSPs has increased. As the PRB has pointed out in the Target Ranges Report, many ANSPs have accumulated surpluses which they should be using to improve the quality of service.
- Cost of delays have risen substantially in summer 2018, at the expense of airlines and, ultimately, passengers. Under one of strictest protection of passenger rights, airlines have to re-book passengers or reimburse the ticket price if passengers miss a connection or if airlines have to cancel a flight, even if they have not caused the cancellation. If needed, airlines also have to provide accommodation, in some cases even pay compensation when Air Traffic Management has caused the delay. Passengers often suffer economic damages which they cannot recover from any third party, not to mention the frustration of being late, missing connections or losing booked accommodation.

Improving performance for RP3

19 After ensuring the safety of air navigation services (ANS), solving the capacity issue is the highest priority to improve overall performance, keeping in mind that the other KPIs are equally important to ensure a fully-functioning network.

20 According to forecasts, air traffic will continue to grow. All stakeholders within the European ATM network must work closely together to build a system that can support significant and continuous traffic growth, whilst also being able to adapt to downturns.

21 The PRB faces the difficult question whether the target setting for the coming years should be adjusted to the insufficient performance of a few or whether the few underperformers must live up to the standards others are able to provide. Underperformers must take necessary measures to perform at acceptable levels. These measures are available and will cost money, but there are sufficient means in the system to finance them.

22 A two-stage process is required to help drive performance of the European ATM system towards the economic optimum and to enable the ATM system to be more flexible to variation in traffic.

23 During the first stage, ANSPs must recover from the current capacity shortfall. The PRB welcomes that the European Commission (EC) and Member States are in the process of revising the regulatory framework. Such a revision must encourage and incentivise the provision of air navigation services from any location and implement the technology required to make this happen. It is only then that the recurrent cycle of traffic growth and delay will be resolved and that the system will be able to adapt flexibly to meet fluctuating demand.

24 The second stage is to prepare for RP4 allowing the industry to transform to demand-driven services using available technology.

Recommendations for performance targets for RP3

25 The targets proposed are based on the current regulations governing RP2. The PRB also includes a first indication of the targets based on the latest version of the revised regulation prior to discussions at the Single Sky Committee (SSC) meeting on 3rd October 2018.

26 The PRB is proposing targets to reduce the capacity shortfall, maintain cost efficient operations, improve environmental performance whilst maintaining the impressive safety record.

27 The targets proposed are credible, realistic and achievable. In terms of cost efficiency, the PRB recommends continuing to reduce the unit costs from the beginning of RP3, balanced by a starting point that provides sufficient revenue for ANSPs to accommodate the forecasted growth in air traffic demand.

28 The European Commission and Member States must monitor this closely to ensure that existing capacity issues are resolved and performance levels are then maintained across the network.

29 The PRB believes that a three-year reference period would allow to implement both the short-term and the long-term goals of the European air traffic management system. Fundamental reform of the performance scheme, to include enforcement mechanisms, will require a revision of the basic SES legislation and the performance and charging scheme Regulations prior to RP4.

30 The PRB recommends the following targets for RP3 of the performance and charging schemes.

Safety

Effectiveness of Safety Management (for States)	
Current status	Progress is required. Overall, only a few States have reached the RP2 target (Level C) for reporting the Management Objectives. No states have exceeded this minimum level.
PRB proposal for consultation of June 2018	States to achieve Level C in all Management Objectives
PRB proposal for union-wide targets for RP3	States to achieve Level C in all Management Objectives
PRB proposal for union wide-targets under the revised performance and charging regulation (target ranges)	Not included in the current draft of the revised regulation

Effectiveness of Safety Management (for ANSPs)	
Current status	Expect ANSPs to achieve the RP2 targets (Level C in Safety Culture and Level D in all other Management Objectives) by the end of 2019.
PRB proposal for consultation of June 2018	ANSPs to achieve Level E in Safety Risk Management and Level D in all other Management Objectives, including Safety Culture.
PRB proposal for union-wide targets for RP3 (based on current RP2 EoSM metric)	ANSPs to achieve Level E in Safety Risk Management and Level D in all other Management Objectives, including Safety Culture.
PRB proposal for union wide-targets under the revised performance and charging regulation (based on new EoSM metric)	Subject to final review of the Accepted Means of Compliance supporting the revised regulation, the indication is that Level E target will be changed to Level D in the Safety Risk Management component and Level D to Level C in all other Management Objectives, including Safety Culture.

Application of Risk Analysis Tool (RAT) Methodology (by States)	
Current Status	The PRB considers it feasible to reach the target defined at the end of RP2 even though improvements in the application of the Risk Analysis Tool for Overall ATM Specific Occurrences is still required.
PRB proposal for consultation value presented in June 2018	At least 80% application of the Risk Analysis Tool for Overall Separation Minima Infringements and Runway Incursions. 100% for Overall ATM Specific Occurrences.
PRB proposal for union-wide targets for RP3	At least 80% application of the Risk Analysis Tool for Overall Separation Minima Infringements and Runway Incursions. 100% for Overall ATM Specific Occurrences.
PRB proposal for union wide-targets under the revised performance and charging regulation	Not included in the current draft of the revised regulation

Application of Risk Analysis Tool (RAT) Methodology (by ANSPs)	
Current Status	The PRB considers it feasible to reach the target defined at the end of RP2 even though improvements in the application of the Risk Analysis Tool for Overall ATM Specific Occurrences is still required.
PRB proposal for consultation presented in June 2018	100% application of the Risk Analysis Toll for Ground Separation Minima Infringements, Runway Incursions and ATM Specific Occurrences.
PRB proposal for union-wide targets for RP3	100% application of the RAT for Ground Separation Minima Infringements, Runway Incursions and ATM Specific Occurrences.
PRB proposal for union wide-targets under the revised performance and charging regulation	Not included in the current draft of the revised regulation

31 A three-year Reference Period would make it more challenging for ANSPs to reach the more ambitious targets proposed for RP3 regarding the Effectiveness of Safety Management. Nevertheless, the impact of, for example, technology change and the implementation of SESAR will need to be controlled, ensuring that developments within other KPAs do not affect safety. The PRB, therefore, would recommend retaining the targets proposed above in the event of a three-year Reference Period.

Environment

The average horizontal en route flight efficiency of the last filed flight plan (KEP)	
Current status	Actual performance in 2017: Flight planned trajectory is on average 4.73% longer than the great-circle distance RP2 Target in 2019: 4.10%
Consultation value presented in June 2018	3.70% to 3.90%
PRB proposal for union-wide targets for RP3	3.90% Both for a five-year and three-year reference period
PRB proposal for union wide-targets under the revised performance and charging regulation	Not applicable

The average horizontal en route flight efficiency of the actual trajectory (KEA)	
Current status:	Actual performance in 2017: Actual trajectory is on average 2.81% longer than the great-circle distance RP2 Target in 2019: 2.60%
Consultation value presented in June 2018	2.20% to 2.40%
PRB proposal for union-wide targets for RP3	2.40% Both for a five-year and three-year reference period
PRB proposal for union wide-targets under the revised performance and charging regulation	2.40% Both for a five-year and three-year reference period

Capacity

Average en route ATFM delay	
Current status	Actual performance in 2017: 0.94 minutes per flight RP2 Target in 2019: 0.50 minutes per flight
Consultation value presented in June 2018	0.24 to 0.50 minutes per flight[5]
PRB proposal for union-wide targets for RP3	**0.50 minutes per flight in 2024** EU-wide annual targets: 2020: 0.8 minutes per flight 2021: 0.7 minutes per flight 2022: 0.6 minutes per flight (Target for a three-year RP) 2023: 0.5 minutes per flight
PRB proposal for union wide-targets under the revised performance and charging regulation	**0.50 minutes per flight in 2024** EU-wide annual targets: 2020: 0.8 minutes per flight 2021: 0.7 minutes per flight 2022: 0.6 minutes per flight (Target for a three-year RP) 2023: 0.5 minutes per flight

Cost efficiency

Average determined unit cost (DUC) for en-route					
Starting point for target setting for RP3, proposed by the PRB in June 2018	Determined Unit Cost: €46.38 in 2019 (in $€_{2009}$ prices) Determined Cost: 6,325M$€_{2009}$				
Consultation value for the DUC presented in June 2018:	Proposed range for 2019 DUC: €42.25 to €37.77 ($€_{2009}$ prices) (i.e. -2.3% to -4.2% per annum over RP3)				
PRB final proposal for Union-wide targets for RP3					
	2020	**2021**	**2022**	**2023**	**2024**
Determined costs (DC) [M€2009]	6,272	6,219	6,166	5,968	5,770
Annual change in DC [%]	-0.8%	-0.8%	-0.9%	-3.2%	-3.3%
Service units [,000]	140,515	143,786	147,155	150,264	153,616
Determined unit cost (DUC) [€2009]	44.64	43.25	41.90	39.72	37.56
Determined unit cost trend (%)	-3.3%			-5.3%	
	-4.1%				

32 In addition, the current performance scheme Regulation requires the PRB to propose a **traffic alert threshold**.

[5] The PRB also requested feedback from stakeholders on an option to increase intermediates values for the capacity KPI for the first few years of RP3

33 For RP3, the PRB proposes to retain the threshold from RP2 (10%). During RP2 there have been a number of instances where the traffic alert threshold has been exceeded. The proposal for performance plans to related to the STATFOR base case should minimise such cases for RP3.

34 The proposed revision of the regulation bases the alert threshold on the percentage change in traffic movements (Instrument Flight Rules, IFR) rather than service units. The PRB supports this change.

Regula Dettling-Ott

PRB Chair

This report has been prepared by the Performance Review Body (PRB) of the Single European Sky. The PRB would like to thank the European Aviation Safety Agency (EASA), EUROCONTROL's Performance Review Unit and Network Manager, the SESAR Joint Undertaking and SESAR Deployment Manager for their contributions in preparing this report.

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1. Target setting for RP3

1.1 Structure of the Report

35 The current Single European Sky (SES) legislation requires the European Commission (EC) to adopt Union-wide (EU) performance targets for the third reference (RP3 2020-2024) by the end of 2018.

36 In parallel, the EC has proposed a revised Regulation to replace the existing performance and charging schemes. The PRB understands that this revised regulation will not be voted on within the Single Sky Committee (SSC) until the meeting in November 2018. Until the new regulation enters into force, the PRB will comply with the current regulatory framework when proposing the targets and will set out the target levels for the 2020-2024 period using the RP2 KPIs. When new RP3 KPIs are formally agreed, the targets will be reconsidered and adapted to the finally adopted KPIs, as necessary.

37 The PRB has also analysed the major differences between the proposed and the current regulation and the key impacts for the proposed targets for RP3 in Annex A.

38 The PRB's proposals for the Union-wide targets are structured as follows:

- Chapter 1: Target setting for RP3
- Chapter 2: Level of ambition
- Chapter 3: Scope of the stakeholder consultation
- Chapter 4: Additional evidence used by the PRB since the publication of the Target Ranges Report[6] on 20th June 2018
- Chapters 5 to 6: Individual key performance areas
    - The PRB's initial proposals, complemented by additional information the PRB has considered
    - A summary of stakeholder consultation/comments
    - The PRB's assessment of these comments
    - The PRB's recommendations for the Union-wide targets
- Chapter 9: Next steps towards adopting targets for RP3
- Chapter 10: Summary of performance targets proposed for RP3
- Chapter 11: PRB observations not relating to target setting

39 The PRB has included the following documents as annexes to this report:

- Annex A: Impact of the proposed revision to the Regulation
- Annex B: Reference values for capacity targets prepared by the Network Manager
- Annex C: The reports from a study by Steer commissioned by the EC to investigate the interdependency between cost effectiveness and capacity

[6] EU-wide target ranges for RP3 – For stakeholder consultation – June 2018.

1.2 Union-wide performance indicators for RP3

40 Table 1 summarises the key performance indicators (KPIs) within the current performance scheme Regulation[7] and presents the KPIs within the proposed revised regulation.

KPA	KPIs in existing regulation	KPIs in proposed revision
Safety	- Effectiveness of Safety Management: • ANSPs • States - Application of severity classification scheme based on the Risk Analysis Tool (RAT) methodology	- Effectiveness of Safety Management • ANSPs
Environment	- Horizontal flight efficiency - Using radar data for the actual trajectory - Using the last-filed flight plan	- Horizontal flight efficiency - Using radar data for the actual trajectory
Capacity	- En route Air Traffic Flow Management delay per flight	- En route Air Traffic Flow Management delay per flight
Cost Efficiency	- Determined unit cost (DUC) for en route ANS	- Determined unit cost (DUC) for en route ANS

Table 1: Union-wide KPIs for RP3 based on the existing and proposed revised Regulation

1.3 Geographical scope

41 The proposed Union-wide targets for RP3 refer to ANS performance in airspace controlled by the EU28 plus Norway and Switzerland within the ICAO EUR region.

42 On 29th March 2019, the United Kingdom is expected to leave the European Union. At the time of writing, it is unclear whether the UK will remain part of the SES framework under (transitional) arrangements that would last until December 2020 or whether it will be a third country which remains in the EUROCONTROL area but outside the scope of the Single European Sky framework.

43 The calculations for the targets in this report include the United Kingdom. However, if it becomes evident that the UK will become a third country as of April 2019 outside the scope of the SES framework, the PRB will adapt its targets to refer to EU27 plus Norway and Switzerland and will publish them in the in the first quarter of 2019.

44 The calculation for the targets in this report does not include third countries which under the European Common Aviation Area (ECAA) are Associate Countries (for example, Albania).

[7] Commission Implementing Regulation (EU) No 390/2013 of 3 May 2013 laying down a performance scheme for air navigation services and network functions

1.4 Traffic outlook

45 The volume of traffic and how this traffic is distributed is a key factor influencing the performance of ANSPs.

46 The situation for setting targets for RP3 is different than for RP2. Traffic growth was weak during the preparation for RP2 and it was uncertain how quickly traffic levels may recover from the economic downturn. Many Member States and the EC adopted the STATFOR low forecast for RP2, which presented the least traffic risk to ANSPs. The economy and air traffic picked up more quickly than many had anticipated and a number of ANSPs had not planned how to deal with traffic growth predicted in the high traffic forecast. Many Member States thus exceeded the threshold of ±10% for RP2.

47 Adopting the low forecast caused considerable difficulties for many ANSPs. The PRB welcomes that under the proposed new regulation, Member States would be required to choose the STATFOR base scenario. The PRB expects that the performance plans proposed by Members States should be robust enough to accommodate different traffic developments.

48 The PRB uses the STATFOR February 2018 forecast as the September 2018 forecast was not available for the preparation of this report.

En route traffic forecast ('000 SUs)	2014A	2015A	2016A	2017A	2018P	2019P	2020P	2021P	2022P	2023P	2024P	% 2024/ 2019
Baseline scenario	111,670	115,063	120,208	126,928	131,945	136,378	140,515	143,786	147,155	150,264	153,616	12.6%
% annual changes		3.0%	4.5%	5.6%	4.0%	3.4%	3.0%	2.3%	2.3%	2.1%	2.2%	
High scenario	111,670	115,063	120,208	126,928	133,626	139,584	147,021	152,667	158,506	164,365	170,096	21.9%
% annual changes		3.0%	4.5%	5.6%	5.3%	4.5%	5.3%	3.8%	3.8%	3.7%	3.5%	
Low scenario	111,670	115,063	120,208	126,928	130,261	133,180	134,529	135,541	136,911	137,966	139,268	4.6%
% annual changes		3.0%	4.5%	5.6%	2.6%	2.2%	1.0%	0.8%	1.0%	0.8%	0.9%	
A = Actual, P = projection												
Source: STATFOR Seven-Year Forecast February 2018												

Table 2: En route service unit forecast (STATFOR February 2018)

49 The STATFOR baseline scenario projects an annual average growth rate during 2020-2024 of 2.4%, which is lower than the baseline forecast for 2014-2019 (4.0%) for RP2.

1.5 Consultation process

50 The PRB has consulted with stakeholders to develop targets for RP3. The PRB met with several representatives during the preparation of the report on target ranges.

51 On 4th July 2018, the PRB held a workshop to discuss proposed ranges for the Union-wide targets to RP3, attended by approximately 100 participants (in person or by web streaming).

52 On 21st August 2018, the PRB held a second workshop with the authors of the academic study to discuss their approach and to clarify stakeholder concerns.

53 Between 20th June 2018 and 4th September 2018 stakeholders were invited to provide feedback on the proposed target ranges.

54 A summary of the comments received from Member States and stakeholders is included in each chapter on the KPAs. In addition to the aforementioned input, the PRB has considered the following input:

- Observed performance until summer 2018.
- New data received, including updates to the safety KPI values for RP2 to date.
- States' annual monitoring reports for 2017.
- States' reporting tables with forecast cost-efficiency figures covering RP2 and final cost data for 2017.
- Input from the SESAR Joint Undertaking and SESAR Deployment Manager regarding the implementation of the SESAR Common Project.

2. Level of ambition

2.1 The PRB's approach

55 The proposed Union-wide performance targets are ambitious and achievable, taking into account current operational performance. A few underperforming ANSPs should not define the level of ambition. The targets would:

- Enable underperforming service providers to improve their performance and then contribute adequately to achieving the goals of SES.
- Promote and reward those that continue to achieve their targets in a demanding traffic environment.

2.2 Opportunities for performance improvements in RP3

56 Significant improvements in operational performance are required in RP3. The following sections provide an overview of opportunities to improve performance in RP3.

a) Ensuring sufficient air traffic controllers

57 Significant increases in traffic during RP2 to-date have created challenges for some ANSPs. Some capacity constraints can and must be relieved by increasing the number of air traffic controller hours at the right time and place.

58 Since 2008, ANSPs have increased ATCO productivity by 10.1%[8], which is a significant efficiency gain. However, IFR traffic in 2017 was less than one percent higher than in 2008. This highlights a shortage in ATCO staff.

59 The PRB expects that there is further room for improvement through implementation of technology such as Virtual Centres enabling ANS to provide more capacity where it is needed. The use of dynamic cross border services can improve efficiency particularly during quieter periods and night operations when a service is still required but traffic

[8] PRR 2017 - Performance Review Report. An Assessment of Air Traffic Management in Europe during the Calendar Year 2017. May 2018

levels can be low. Such flexibility is crucial to deliver a safe, effective and cost-efficient service to airspace users during RP3.

b) Efficiency gains in individual ANSPs

60 The PRB recognises the strong cost control by ANSPs during RP1 and RP2. In some cases this has led to under investment and capacity shortages. ANSPs should be encouraged to continue to control cost, whilst investing to manage the increasing traffic demand to close the capacity gap where one exists. Investment alone will not enhance cost-efficiency. ANSPs and NSAs must ensure that investments contribute towards improved performance.

c) New technology to cope with variability and better match capacity to demand.

61 The performance of European ATM is linked with technology. With the uptake of network focussed technologies being a key contributor to the step-increase in performance that is required to cope with the significant forecasted increase in traffic. Many of these technologies have been developed in co-ordination with the SJU and are outlined in the ATM Masterplan. In the short term – ie RP3 – the PRB fully endorses the swift implementation of the Pilot Common Project (PCP) and other SESAR technologies as preparation for long term capacity issues.

62 It should be noted that regarding the targets recommended by the PRB, the impact of the PCP and SESAR projects have been considered through the analysis by the PRU and NM on an EU-wide level. Determining the individual impact of the PCP and SESAR is complex since the benefits and costs go beyond the scope of the performance scheme and are not harmonised with the KPIs. It should be noted that the SESAR Deployment Manager is reanalysing the costs and benefits of the PCP projects to better understand their contribution to European ATM performance. For example, the PCP was expected to increase terminal and en-route airspace capacity by nearly 9% to during RP2, however the PRB understands that this is not expected to be realised[9].

63 The PRB is working closely with the SESAR Joint Undertaking, SESAR Deployment Manager and the Network Manager to co-ordinate methods and processes, and to develop recommendations to the European Commission regarding possible regulatory changes to incentivise the implementation of specific SESAR technologies. These will be focused on those that improve network performance.

64 The PRB recommends managing this process through a two-stream parallel approach, coordinating the different timelines of technology and performance.

65 For RP3 the following actions are needed:

- Identify the key impacts of SESAR projects on the Performance and Charging scheme and the KPIs encouraging the implementation of the PCP within RP2 and RP3.
- Harmonise cost-benefit analysis methodologies.
- Check that CAPEX investments within RP3 Performance Plans are compatible with the SESAR programme.

[9] Based on discussions and email exchange between the PRB, SJU and SDM.

- Monitor the uptake of SESAR technologies as part of the annual monitoring process without expanding the reporting requirements of Member States.

66 For the second stream, the PRB will recommend to the Commission to substantially adapt the performance regulation for RP4, strengthening the link between performance and technology. This is likely to require changes to the basic regulation. The new regulation must be consistent with the SESAR vision to provide ATC services from any geographical location to any other, with a high degree of automation in a cyber-secure connected environment which achieves higher safety standards and full scalability. The European ATM systems behave as one while remaining constituted of several interoperable components and services. The underpinning communications, navigation and surveillance (CNS) and flight data services are based on a digital infrastructure. These structural changes are required to cope with the expected increase in air traffic and the use of airspace by UAVs.

67 For the long term, the following actions are needed:

- Define the methods to reward and incentivise the implementation of industry transforming technologies and business models.
- Develop ATM digitalisation and change management indicators.
- Determine how to provide adequate flexibility to support new entrants and adapt to the changing environment.

d) Collaboration to reduce fragmentation

68 The fragmentation of the European ANS is a well-documented weakness, which limits the operational and cost-efficiency improvements that are required to move towards a truly single European sky. States and ANSPs can achieve such improvements by working collaboratively rather than in isolation.

69 The implementation of Functional Airspace Blocks had limited success in tackling fragmentation, with ANSPs still tending to operate in silos, independently of others. Cooperation between oversight authorities also remains limited.

70 Further improvements must be achieved by:

- Using common support services between ANSPs and/or external service providers. Such services could include administration, common procurement, safety management, meteorology, infrastructure, procurement and training.
- Consolidation of area control centres within one State or across national boundaries. Where physical consolidation is not possible, Virtual Centres should be implemented to offer capacity sharing and improved redundancy.
- Unbundling and liberalisation of CNS provision.

71 Initiatives developed at a local/regional level are required to support defragmentation and increase operational and cost efficiency. The Borealis Alliance and COOPANS are examples where ANSPs work together on a commercial basis. COOPANS partners benefit from common procurement, operation and maintenance of ATM systems improving interoperability between ATM systems.

2.3 Interdependencies

72 The targets for RP3 must consider the interdependencies between the four KPAs within the performance scheme.

a) Safety and other KPAs

73 Safety is the highest priority KPA within the scheme. It is linked to all other performance areas. The value of safety is not monetised as part of Total Economic Cost.

74 During RP2, eight ANSPs have achieved the proposed targets for the Effectiveness of Safety Management (Level E) with 20 ANSPs at Level D two years before RP2 ends. Level E requires ANSPs to implement a predictive view on addressing risks in line with the predictive approach required by Regulation (EU) No 373/2017 (Common Requirements)[10]. Consequently, the PRB believes that the step from Level D to Level E, whilst challenging, is consistent with the cost efficiency targets and the starting point proposed for RP3.

b) Capacity and cost effectiveness

75 The PRB recognises that within an efficient system increasing capacity is likely to cause additional cost, either through increased staffing levels, investment in technology or new procedures to optimise current operations.

76 Under the current performance scheme, additional traffic also means higher revenues for ANSPs. Through traffic risk sharing, ANSPs participate in the growth and obtain additional income, allowing them to cover the marginal costs of increasing capacity and to match demand.

77 In theory, the optimal balance between cost efficiency and capacity is well understood and is simulated by the Network Manager. The optimum capacity is the point at which the additional cost of increasing capacity equals the cost of additional delays incurred by airspace users.

78 The optimum capacity is a crucial piece of evidence used by the PRB when setting targets, as it identities the level of cost and delay which minimises the overall costs to airspace users. However, in the history of the performance scheme at no point has the industry achieved this economic optimum. Further investment in staffing and technology will be required to reach and sustain the required performance.

c) Capacity and environment (flight efficiency)

79 There is an interdependency between en-route capacity and flight efficiency. A structured route network can offer more operational capacity, but can also add distance and time to a flight.

80 The cost of fuel is one incentive for airspace users to plan and fly the most direct route[11]. However, during periods of delay airspace users may look for alternative routes, even if they are longer or at a less optimal flight level.

[10] Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight

[11] PRB recognises that other factors such as unit rates and weather conditions also influence an airspace user's decision on routing.

81 Performance of the Environmental KPA for the actual route flown remains similar in 2017 to the value in 2014 and 2015, despite the significant increases in delay, suggesting that the interdependency between capacity and the environment is being managed and does not currently create a hard constraint on flight efficiency.

82 The PRB has considered these interdependencies when proposing the targets on the Environment KPA. Actions being implemented by ANSPs and the Network Manager over the coming years to support more direct routes and the investment in capacity to improve delay performance make an ambitious target achievable.

83 The interdependency between capacity and the environment in terminal areas is more complex, particularly with aircraft noise as an additional consideration. The performance scheme does not require Union-wide targets for performance within the terminal areas, but should be considered in future revisions of the performance scheme.

d) Cost efficiency and environment (flight efficiency)

84 There is an interdependency between cost efficiency and environment. Airspace users often plan routes to minimise their costs, which can trade-off additional distance for lower cost routes.

e) Dependencies with other external factors

85 Complexity and traffic variability are external factors influencing performance. The PRB recommends that complexity should be monitored as the implementation of Free Route Airspace progresses to ensure that potential increases in complexity do not impact the KPIs.

f) Role of the military

86 European air forces require significant volumes of airspace to meet their operational and training requirements. This impacts on the ability of the European ATM to maximise efficient routing.

87 The military users have for many years worked with civil service providers to optimise airspace management. This cooperation has improved significantly. However, there is room for further improvement in some Member States.

88 The military users are constrained by limited resources and their efforts should focus on measures improving performance where it is most needed, including the effective coordination between Flexible Use of Airspace (FUA) and the introduction of Free Route Airspace (FRA) in core areas and where military airspace use has the greatest impact on performance.

g) PRB conclusions on interdependencies regarding Union-wide targets for RP3

89 The PRB concludes that the interdependencies identified don't create insurmountable barriers to the setting of ambitious Union-wide targets, balanced by a realistic starting point for cost-efficiency and capacity targets that reflect current performance and the challenges in RP3.

90 Interdependencies have a greater impact at local level and the PRB encourages ANSPs/FABs to provide clarity on these issues within the local performance plans for RP3.

2.4 Total economic cost

91 In RP2, the PRB used the concept of Total Economic Cost (TEC) to calculate the total ANS-related costs borne by airspace users. The figure includes:

- En route and terminal charges.
- Indirect costs caused by ATM-related delay and flight inefficiency.

92 The concept is a good methodology for observing the impact of interdependencies, particularly between capacity and cost efficiency.

93 The objective is to propose targets for RP3 that minimise the total costs, whilst maintaining safety levels and safeguarding the requirements of all airspace users, including the military.

94 Calculating the total economic cost is complicated. For this report, the PRB has focused on the determined cost of en-route service provision and the cost of delay. This will allow the PRB to observe the costs borne by airspace users.

95 Figure 2 presents the projected determined costs of en-route services and the additional costs of en route ATFM delay for RP3, based on the proposed targets and the STATFOR baseline traffic scenario. This indicates that in 2018, airspace users will have had to bear unprecedentedly high costs.

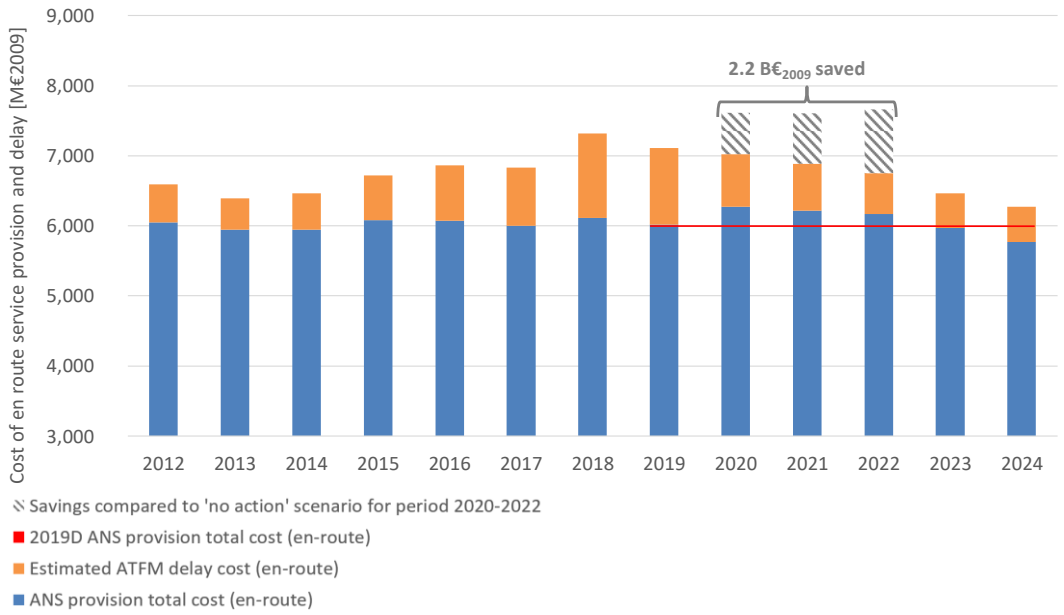

Figure 2: Projected cost of en-route services and en-route ATFM delay

96 It will take ambitious targets to ensure that 2018 remains the peak of these costs and that at the end of RP3 the cost of service provision and delay will be significantly lower. Without such ambitious targets costs and delay are forecasted to increase amounting to an additional cost of 2.2 B€$_{2009}$ between 2020 and 2022 (based on the 'no action' scenario in the Target Ranges Report and the latest version of the Network Operations Plan[12]).

[12] The Network Operations Plan projects delay up until the end of 2022, hence it is not possible to estimate the delay cost savings for RP3 in 2023 and 2024.

3. Scope of consultation

3.1 Overview of consultation

97 The report on the proposed target ranges for RP3 was published on 20th June 2018. Following the release, a stakeholder consultation workshop was held on 4th July in Brussels, providing stakeholders with a platform to express early views and concerns. Subsequently, the PRB received written comments up to and including 4th September 2018 from stakeholders.

98 The PRB will publish a report in October 2018 on the feedback received during the consultation process ("Union-wide target proposals for RP3 - Consultation response document").

3.2 Comments received

99 The PRB received over 870 comments from 40 organisations and individuals representing a broad range of stakeholders within the air transport industry. A full list of respondents is presented below in Table 3.

100 The responses cover 22 States as well as European or multinational organisations.

Stakeholder	Total	Names of respondents
Airline and airline association	3	[IATA, A4E, AIRE], LOT Polish Airlines, Tuifly Germany
Air Navigation Service Provider (ASNP) and ANSP associations	20	ANS Finland, Austro Control GmbH, Belgocontrol, BULATSA, CANSO, Croatia Control Ltd, DFS Deutsche Flugsicherung GmbH, DSNA, ENAIRE, ENAV International Strategies, IAA, LFV, MUAC, NATS, NAV Portugal, PANSA, SE Oro Navigacija, Skyguide, Slovenia Control
Staff Association	2	Aerocontrol Switzerland, SINCTA
Functional Airspace Block (FAB)	1	FABEC
Members States and National Supervisory Authorities	14	Belgian CAA + Belgian NSA, Bundesaufsichtsamt für Flugsicherung (German NSA), CAA Poland, CAA Slovenia, Croatian CAA, Czech Republic CAA + ANS CR, Danish NSA, ENAC, Finnish Transport Safety Agency, DGAC (French NSA), Ministry of Infrastructure and Water Management, Slovak Republic NSA, Switzerland (FOCA), Transportstyrelsen (Swedish NSA), UK CAA

Table 3: Summary of respondents by stakeholder type

3.3 Statistical analysis and clustering comments

101 The PRB has categorised the responses based on the type of comment and grouped similar comments. As in RP2, clusters of questions are identified by a reference number, for instance "CEF01".

4. Additional evidence

4.1 Overview of additional evidence

102 This section provides a summary of the additional evidence used to propose the targets that was not available for the report proposing target ranges, including:

- The updated Network Operations Plan, providing updated delay forecasts.
- Updated safety monitoring results from 2017.
- The results of a study commissioned by the EC on the interdependency between cost efficiency and capacity[13].

4.2 Update edition of the Network Operations Plan

103 The PRB takes into account recent updates in the Network Operations Plan and Network Operations Reporting.

104 There were significant differences in the en route Air Traffic Flow Management (ATFM) delay forecast values between the April 2018 edition – on which the target ranges were based – and the June 2018 edition. Between 2018 and 2022 forecasted delays will increase over 0.25 minutes per flight on average per year. The PRB has considered this projected degradation in its target for the Capacity KPA to ensure that it remains realistic and achievable.

4.3 Updated safety monitoring results from 2017

105 The safety monitoring covers three KPAs: The Effectiveness of Safety Management (EoSM) for ANSPs and States, respectively and the level of application of the Risk Analysis Tool (RAT) Methodology for the severity classification. Targets reflect the Minimum Maturity Level of the EoSM and the percentage of application of the RAT for separation infringements, runway incursions and ATM specific occurrences.

106 Updated information was made available to the PRB after the publication of the target ranges report and this has been included in the analysis for advising the EC on targets for RP3.

4.4 Interdependency between cost efficiency and capacity

107 In September, the PRB received the results of a study by Steer, contracted by the Commission, investigating the relationship between the cost-efficiency and capacity KPAs. The study estimated that the incremental costs for reaching the capacity target in 2019 extends from a higher estimate of 281 M€$_{2009}$ to a lower estimate of 48 M€$_{2009}$ (based on the NM forecast of 1.01 mins/flight in 2019 and a target of 0.5 min/flight)[13].

108 The study confirms the proposal of the PRB to allow additional revenue within the starting point for RP3 to overcome the shortage in capacity.

[13] See Annex C. A study by Steer (formerly Steer Davies Gleave - SDG), commissioned by the EC to assess the interdependency between cost efficiency and capacity.

5. Safety KPA

5.1 Initial proposal

109 Table 4 and Table 5 below presents the PRB's initial proposed ranges for the Safety KPI targets, as contained in the target ranges report issued for consultation, based on the RP2 KPIs.

Effectiveness of Safety Management		
EoSM Component (Management Objectives)	ANSP	State (NSA)
	EU-target (2024)	EU-target (2024)
Safety Policy and Objectives	D	C
Safety Risk Management	**E**	C
Safety Assurance	D	C
Safety Promotion	D	C
Safety Culture	**D**	C

Table 4: Proposed targets for EoSM for RP3 (E represents the highest level of performance)

Application of the Risk Analysis Tool		
Categories		Proposed EU-target (2024)
Reporting on Separation Minima Infringements	Ground	100%
	Overall	80%
Reporting on Runway Incursion	Ground	100%
	Overall	80%
Reporting on ATM Specific Occurrences	Overall	100%

Table 5: Proposed targets for application of the Risk Analysis Tool for RP3

5.2 New evidence available since June 2018 for the Safety KPA

110 Since the publication of the proposal for the EU-wide target ranges for RP3, EASA has continued to validate data on the Safety KPA for RP2 and has updated the performance data.

111 Regarding States, analysis of the overall EoSM Minimum Maturity Level shows that only five (5) States out of 30 have reached the RP2 target (Level C maturity), the same number of States that achieved the target level in 2016. There have been improvements in the level achieved on all components, except *Safety Policy and Objectives*. The EoSM Management Objectives (MOs) that need the most improvement are *Safety Policy and Objectives*, *Safety Culture* and *Safety Promotion*. The most effective component at State level is *Safety Risk Management*. This has not changed significantly since 2016. When excluding *Safety Culture*, which was not verified by EASA, there are 21 States out of 30 below the 2019 RP2 target level C. This shows that some core elements of the safety management system require further progress to reach the RP2 targets.

112 The analysis of the overall EoSM Minimum Maturity Level achieved by ANSPs in 2017 shows that all ANSPs are already at Level C or above for Safety Culture, which is the 2019 RP2 target level, and that 19 ANSPs out of 31, approximately 61%, have already achieved the 2019 EoSM target, i.e. level D, for all other MOs (the four EoSM Components other than Safety Culture). Between 2016 and 2017, the number of ANSPs that have achieved the target for all other Management Objectives increased from 24 to 29.

113 From the Union-wide perspective and taking all occurrences reported collectively into account, targets for 2017 were achieved for their application to all required occurrences,

i.e. Separation Minima Infringements, Runway Incursions, and ATM-Specific. The RAT applicability to the Runway Incursion - Ground and ATM-Specific Overall applied by ANSPs need the most improvement. More ANSPs/States have achieved the 2017 target.

114 EASA presented the updated data at the Stakeholder Consultation in July 2018. The expected status at the end of 2019 (projected value at the end of RP2) is shown in Table 6 together with the proposed targets for RP2.

Effectiveness of Safety Management of States during RP2	
Target 2019	**Projected value (2019)**
All NSAs have achieved at least EoSM Level C in all Management Objectives.	With the rate of improvements seen in 2015, 2016 and 2017, combined with the number of States below the target in one or more Management Objective, improved progress is required to ensure all States will achieve the target for RP2. Overall, only a few States have reached the RP2 target (Level C) for the Management Objectives and no States have exceeded this minimum level.
Effectiveness of Safety Management of ANSPs	
Target 2019	**Projected value (2019)**
All ANSPs have achieved at least EoSM Level C in Safety Culture and Level D in all other Management Objectives.	The PRB continues to expect ANSPs will achieve the RP2 targets by the end of 2019, if the current progress continues. Those ANSPs currently not meeting the target will need to focus on further strengthening their efforts to achieve the RP2 target.
Application of Risk Analysis Tool (RAT) Methodology by States	
Target 2019	**Projected value (2019)**
By the end of RP2, all NSAs/States should be reporting ATM Overall for almost all reported occurrence (i.e. 99%)	The PRB considers it feasible to reach the target defined at the end of RP2 even though improvements in the application of the RAT for Overall ATM Specific Occurrences is still required.
Application of Risk Analysis Tool (RAT) Methodology by States	
Target 2019	**Projected value (2019)**
By the end of RP2, all ANSPs should be reporting ATM Ground for all reported occurrences (i.e. 100%)	The PRB considers it feasible to reach the targets defined at the end of RP2 even though improvements in the application of the RAT for Ground Runway Incursions are still required.

Table 6: Update of projected values at the end of 2019 (RP2)

5.3 Viewpoints on ambition of the targets from stakeholders

115 Comments on the proposed Safety KPIs received during the Stakeholder consultation were grouped in to the following areas are addressed in the following section:

- SAF01: Target setting process - Stakeholders support that safety targets are set before other KPAs, however consider that an adequate process describing such a staged approach is not part of the proposal.
- SAF02: RP3 KPI and associated guidance - Stakeholders argue that once the RP3 KPI and associated guidance based on the CANSO Standard of Excellence has been agreed, the target setting process based on the RP3 KPI should be reconsidered.

- SAF03: Target for EoSM - Stakeholders expressed concern that Level E will generate disproportionate cost for EoSM on Safety Risk Management and that the target was set because a majority of ANSPs have already achieved Level D. Stakeholders argued that requiring all ANSPs to have SMS processes at international best practice level, focusing on innovation and improvement is excessive and unrealistic as a universal regulatory target.
- SAF04: Compliance versus continuous improvements - Stakeholders noted that Regulation (EU) No 2013/373 is a compliance-based Regulation and therefore cannot be used as a basis for targeting continuous improvements under the performance scheme.
- SAF05: Cost of implementing safety targets and constraint on capacity - Stakeholders have argued that target setting in other KPAs needs to take into account the costs of implementation to achieve safety targets and the possible constraints on capacity that might be required to deliver them.
- SAF06: Safety acting as counterbalance for other KPAs - Stakeholders supports the expressed need to monitor that no unintended effects are introduced in safety by the targets set in other KPAs. Stakeholders however consider it unclear how the PRB intends to ensure that safety will act as a control mechanism counterbalancing the other KPAs.

5.4 PRB opinions on key comments

a) SAF01: Target setting process

116 In the proposed targets for the EU-wide target ranges for RP3 within Safety, the PRB considered that the targets for the Safety KPA have to be set considering the proposed targets for other KPAs and how achieving such targets could affect safety. The PRB also takes account of other developments expected during RP3 such as traffic growth and the introduction of new technologies.

117 EASA and the PRB considered the necessary actions required by stakeholders to achieve the targets for other KPAs, i.e. the PRB proposed higher targets for the EoSM for ANSPs within Safety Risk Management and Safety Culture.

118 For other KPAs, the PRB recommends a staged approach to performance improvements for RP3, however this would not apply to safety. Considering that the extent of the changes expected during RP3 remains the same, the purpose of the Safety KPA target setting remains to retain or improve levels of safety.

b) SAF02: RP3 KPI and associated guidance

119 The proposed Safety KPIs for RP3 apply a similar methodology as that used for RP2, i.e. defining maturity levels to be achieved in different parts of the Safety Management performed by the ANSPs.

120 If the revised Regulation and guidance material are adopted they will define new maturity levels. It would be necessary to map these to the existing levels to ensure the proposed target is correctly reflected within the new KPI and the target updated.

121 To give an indication of the maturity levels under the new guidance material, EASA currently identifies that a Level E in e.g. Safety Risk Management under the current methodology would correspond to a Level D under the CANSO Standard of Excellence, which is being used as the basis to develop the RP3 metric to measure Effectiveness of Safety Management for ANSPs.

c) SAF03: Level E will cause disproportionate cost for EoSM on Safety Risk Management for ANSPs

122 The PRB does not recommend increasing the target solely because Level D has been achieved. The current performance is used to assess whether improvements required to reach Level E are realistic. In fact, in the monitoring report of 2017, eight ANSPs have already reached Level E, 20 ANSPs are at Level D, and only three are at Level C and this is two years before RP2 ends. This supports the conclusion that Level E is feasible.

123 Level E requires ANSPs to implement a predictive view on addressing risks in line with the predictive approach[14] required by Regulation (EU) No 2017/373 (Common Requirements)[15]. Consequently, the step from Level D to Level E, whilst challenging, is consistent with the cost efficiency targets and the starting point proposed for RP3.

124 Level E for Safety Risk Management requires respondents to address one specific question in the EoSM questionnaire (SA6.116). To reach Level E compared with Level D three improvements are required:

a. Methods are in place to predict future safety risks and to mitigate these risks. Regulation (EU) No 2017/373 already calls for providers to have "*A process to identify hazards associated to its services which shall be based on a combination of reactive, proactive and predictive methods of safety data collection*[17]." The Level E of the EoSM is considered by the PRB as being consistent with this requirement.

b. The risk management processes are reviewed and improved on a periodic basis (periodic risk management process review by management, including agendas, minutes, actions and their status). The need for periodic review of management processes will be required by Regulation (EU) No 2017/373 in general for the ANSP Management System of which safety management is part and further required for providers as part of their Safety Management System. Consequently, the additional cost for the ANSP fulfilling this sub-requirement as part of the performance scheme should be limited.

c. The organisation develops best practice guidelines that it shares with other ANSPs (risk management process). Guidance to the processes applied would be expected as part of a Management System, and it would be expected that service providers would seek and adopt best practices and where relevant share the experience of using such practices with fellow providers. It is not expected, as implied by

[14] ATS.OR.200 Safety management system, (2)(i): A process to identify hazards associated to its services which shall be based on a combination of reactive, proactive and predictive methods of safety data collection
[15] Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, (EU) No 1035/2011 and (EU) 2016/1377 and amending Regulation (EU) No 677/2011
[16] SA6.1: A continuing risk management process that identifies, assesses, classifies, and controls all identified safety risks within the organisation, including potential future risks.
[17] ATS.OR.200 Safety management system, (2)(i), as above.

stakeholders' comments, that all Safety Management System (SMS) processes will be at international best practice level. The guidelines for some processes in this area reflect best practices.

125 The PRB does not consider that placing the target for the ANSP will bring significant additional workload or cost on the NSA. Their task would remain the same based on the regulation.

d) SAF04: Compliance versus continuous improvements

126 Ensuring regulatory compliance is the minimum level to be achieved by an ANSP. This does not imply that the ANSP cannot exceed the regulator requirements. The PRB does not consider that regulation is in contradiction to the requirements for Level E, rather supportive thereof as explained under SAF03.

127 ANSPs already reaching Level E under the current regulatory framework demonstrates that an approach of continuous improvements is possible in addition to ensuring compliance and that NSAs are able to determine that the safety management system at the ANSP seeks continuous improvements.

e) SAF05: Cost of implementing Safety targets and constraint on capacity

128 As explained under SAF03, the additional cost of reaching Level E is considered marginal for the overall cost of service provision. The PRB does not consider achieving Level E will place any constraints on capacity as the services provided irrespective of the level of Safety Risk Management need to be acceptably safe, i.e. safety considerations may place constraints on capacity, not the methodology applied to ensure safety risks are controlled.

f) SAF06: Safety acting as counterbalance for other KPAs

129 It must be ensured that no unintended effects are introduced in safety by the targets set in other KPAs. Achieving the targets in other KPAs, during a situation of significantly increasing traffic, may require quite substantial changes to be introduced in the ATM Functional System. Increasing the maturity of Safety Risk Management to Level E will ensure a more pro-active and forward-looking management of safety risks.

5.5 Recommendations for targets

130 The PRB does not consider the comments from the Stakeholders to provide substantial arguments for changing the proposed targets. It is recognised that the increase of EoSM maturity level for Safety Risk Management and Safety Culture may give additional, but minor cost in addition to additional cost as a consequence of the need to ensure compliance with Regulation (EU) No 2017/373.

131 The initial proposal for targets as defined in Section 5.1 apply for the advice to the EC.

5.6 Proposed new Regulation for RP3

132 The proposed regulation for RP3 only retains the Safety KPA for the Effectiveness of Safety Management within ANSPs, and consequently under this regulation no targets would be proposed for the Effectiveness of Safety Management for States (NSAs) or for the application of the Risk Analysis Tool.

133 For the Target Setting Report, EASA provided a proposal for targets under the proposed RP3 regulation and explained the use of the CANSO SoE and the "calibration" hereof with the current EoSM scheme. Therefore, the proposed set of targets would need to be adapted to ensure consistency with the new RP3 SKPIs and to reach the same level of ambition as the currently proposed targets imply.

6. Environment KPA

6.1 Initial proposal

134 Table 7 below presents the PRB's initial proposed ranges for the Environment KPI target, as contained in the target ranges report for consultation.

Average horizontal flight efficiency of actually flown trajectory		
Actual performance (2017)	RP2 Target (2019)	Range (2020 – 2024)
2.81%	2.60%	2.20% – 2.40%

Average horizontal flight efficiency of the last filed flight plan		
Actual performance (2017)	RP2 Target (2019)	Range (2020 – 2024)
4.73%	4.10%	3.70% – 3.90%

Table 7: PRB proposal for consultation – environment

6.2 New evidence available since June 2018 for the Environment KPA

a) European Route Network Improvement Plan (ERNIP) ATS Route Network (ARN) Version 2018 – 2019/22

135 In September 2018, the Network Manager published a final version of the European Route Network Improvement Plan (ERNIP) ARN Version 2018 – 2019/22. The final version allows the PRB to confirm that the assumptions behind the initial targets remain valid.

b) High-level analysis of impact of contributory factors on changes in horizontal flight efficiency of the actual trajectory

136 Following the consultation workshop on the proposed RP3 target ranges the PRB investigated the potential causes for changes in horizontal flight efficiency.

137 The PRB isolated the impact of a lack of capacity, staffing issues, ATC disruptions and weather on average horizontal route extension of the actual trajectory (KEA) using the following methodology: Average KEA was calculated for days where the average en-route delay per flight was more than or equal to one minute and at the same time, the contribution of the evaluated factor (capacity, staffing issues, ATC disruptions and weather) was more than 50%. This sample represented days where bad performance was caused primarily by the factor being investigated. The KEA calculated for these days was then compared against the average KEA calculated over the full analysis period 1 January 2014 to 31 July 2018. Average KEA calculated for this period was 2.85%.

138 Flight efficiency of the actual trajectory KEA was 2.86% on days where ATC capacity caused more than 50% of all en-route delays and the average delay per flight was more than 1 minute.

139 On days when ATC staffing caused most of the delays, the average KEA increased by 0.12%.

140 Network disruptions cause airlines to fly around areas affected by the strikes, triggering the biggest change in KEA performance. Although in line with expectation, this result must be viewed with caution due to a relatively small data sample[18].

141 Weather also contributes to decreasing horizontal flight efficiency, resulting in average KEA on days with severe weather being by 0.31% worse than average KEA in the monitored period.

142 The Table 8 below summarises the estimate contribution of each factor to KEA performance.

Contributory factor	Average KEA on days when the selected factor was most contributing to all delays	Average KEA in the measured period	Difference
Capacity	2.86%	2.85%	0.01%
Staffing	2.98%		0.12%
Network Disruptions	3.52%		0.67%
Weather	3.17%		0.31%

Table 8: Factors contributing to KEA performance

6.3 Comments from stakeholders on ambition of the target from stakeholders

143 Comments on the proposed Environment KPI ranges received during the stakeholder consultation and the following stakeholder review period were grouped in to the following areas:

- ENV01: Trade-off between flight efficiency and capacity - Stakeholders commented that the target ranges report does not indicate whether or not a link between flight efficiency and capacity was taken into account and if so, how was this trade-off addressed.
- ENV02: Flight efficiency improvements in cases where 24-hour (H24) Free Route Airspace is available - Member States who have implemented H24 FRA raised concerns about operational measures to further improve their flight efficiency performance.
- ENV03: Level of ambition - Stakeholders expressed varying opinions with regards to the level of ambition of the proposed flight efficiency targets.
- ENV04: Link between FRA and capacity - Stakeholders commented that in case of airspace with capacity constraints the use of FRA may be limited which will have an impact on flight efficiency.
- ENV05 Factors outside of an ANSP's control - Stakeholders commented that certain factors impacting flight efficiency performance are outside of an ANSP's control,

[18] The PRB analysed 25 days with delay over one minute per flight for which network disruptions caused 50% of the delay

namely airspace users' flight planning practices, route choices or cost-optimisation of routes.

6.4 PRB opinion on key points

a) ENV01: Trade-off between flight efficiency and capacity

144 The methodology used by the PRB to derive the proposed target ranges is based on the assessment by Network Manager taking into account known route and airspace projects as defined in ERNIP and anticipated traffic growth published in STATFOR February 2018 forecast, Base scenario. This information was the basis for simulations quantifying potential capacity and flight efficiency improvements. Thus, the tradeoff between flight efficiency and capacity was taken into account.

b) ENV02: Flight efficiency improvements in cases where H24 FRA is operational

145 Some states have implemented H24 FRA. Those states can still improve their horizontal flight efficiency performance through improved civil/military coordination, advanced ATCO training or airspace re-sectorisation. However, the PRB recognises that improvement in such cases is likely to be marginal. The degree of FRA implementation will be reflected in local reference values derived by the Network Manager, i.e. more ambitious reference values will apply where there remains greatest scope for improvement.

c) ENV03: Level of ambition

146 Under the new ERNIP Part 2 ARN Version 2018 – 2019/22, Section 2, the route extension due to airspace design[19] is expected to decrease to approximately 1.90% by the end of 2022[20]. Assuming the impact of all contributory factors will be comparable to the impact observed during RP2, the optimal KEA (1.90%) combined with the impact of weather (+0.31%), impact of staffing (+0.12%) and impact of capacity restrictions (+0.01%) identified in Table 8 would lead to a value of 2.34% for KEA at the end of 2022. This value is within the originally proposed range of 2.20% to 2.40% and the range can, therefore, be considered ambitious, but achievable. KEA performance may affected further by disruptive events. However, these are low in numbers and therefore unlikely to significantly influence KEA at the end of RP3. The impact of unavailability of Conditional Routes (CDRs) remains unquantified (due to lack of data). Therefore, the PRB recommends setting the KEA target at the upper bound of the proposed range at 2.40%.

d) ENV04: Link between FRA and capacity

147 The PRB notes that implementation of H24 FRA brings significant benefits to airspace users in terms of distance savings - fuel consumption reduction, less of CO_2 emissions, and shorter flight hours. The real benefit for the ANSPs is dependent on the level of operational, technological and staff readiness to implement FRA operations in already complex airspace and traffic environments. Among other roles, the Network Manager's

[19] If all flights would have used the route network without any route restrictions, without weather with all CDRs permanently available and with traffic growing according to STATFOR February 2018 Base scenario forecast.
[20] As specified in the European ATM Master Plan and supported by Commission implementing regulation (EU) No 716/2014, Free Route Airspace on a H24 basis should be implemented throughout the entire EUROCONTROL area by 2022

involvement and support to the ANSPs in the implementation of H24 FRA on the local level is to ensure that the benefits of the local H24 FRA implementation are translated to the network level ensuring greater performance on a wider scale. Proper implementation of H24 FRA will benefit operations and not degrade the current local performance. Appropriate implementation of H24 FRA must ensure that the adequate systems and procedures are in place (i.e. improved traffic predictability due to the identification of more stable trajectories while at the same time enhancing the usage of conflict detection tools) to provide adequate support for ATCOs to cope with the growing demand in the new H24 FRA environment.

e) ENV05: Factors outside of ANSP control

148 ANSPs do not have ultimate control over the environmental indicators within the performance scheme. Moreover, the existing RP2 framework does not require airspace users to report data on their route selection algorithms or overall flight planning practices.

149 Work is ongoing to better understand and quantify the individual factors affecting horizontal flight efficiency (for example, flight planning, awareness of route availability and civil/military coordination) in order to identify and formulate strategies for future improvements. An important next step for a better understanding of the constraints imposed on airspace users is the collection of better data on the activation of special use airspace and on route availability when the flight plan was submitted by airspace users (shortest available route).

150 Without relevant data, the PRB is currently unable to analyse the potential impact of factors outside of ANSP control on environmental performance. However, the PRB notes that ANSPs can influence the performance in environmental metrics through advancements in the route structure design, route availability, improved civil/military coordination and advanced ATCO training or airspace resectorisation.

6.5 Recommendations for targets

151 ANSPs which have already implemented H24 FRA will have limited scope for additional significant improvement of their horizontal flight efficiency. This fact will be taken into account when deriving the local reference values for the RP3 ENV indicators.

152 The union-wide targets, and how they are broken down to local level, will depend on the regulation in place for RP3. The PRB recommends for the Network Manager to break down the finally agreed target to a local level, either FAB or national level depending on the regulatory requirement. This should be done in consultation with the PRB and FABs/NSAs to ensure that the breakdown reflects the most up-to-date FRA implementation plans.

153 Finally, when FRA is operational across Europe, additional focus is required on other metrics in order to examine scope for exploiting further environmental benefits.

154 Additionally, for ANSPs that have implemented H24 FRA, there are still measures that such ANSPs could take to further improve their flight efficiency. As most of the observed flight inefficiencies (62%) originate from the network component[21], participation in cross-border FRA initiatives may lead to improvements in flight efficiencies of all involved

[21] PRR 2017 - Performance Review Report. An Assessment of Air Traffic Management in Europe during the Calendar Year 2017. May 2018

ANSPs. The PRB encourages ANSPs to follow the example of SECSI FRA[22] cross-border initiative which notes potential savings per day of up to 1,940 NM in flight distance, 285 minutes in flight time, a reduction in fuel consumption of 8,000 kg and a reduction in CO_2 emissions of 25,500kg[23].

155 It is expected that the full implementation of all the route and airspace improvement plans as currently known to the NM, when compared to the start of RP2, could bring (by 2022) benefits represented by savings of approximately 120 million NMs, i.e. the equivalent of 720 000 tons of fuel saved, or reduced CO_2 emissions of 2 400 000 tons, or 600 million Euros[24].

156 PRB considers H24 FRA to be the greatest contributor and there will be less scope for improvements of flight efficiency once it is implemented across Europe. Therefore, the PRB does not propose further improvements after 2022 for KEP or KEA. As such, the targets proposed below assume that Free Route Airspace on a H24 basis will be implemented throughout the entire EUROCONTROL area by 2022, as specified in the European ATM Master Plan and supported by Commission Implementing Regulation (EU) No 716/2014[25].

157 With regards to KEP performance, PRB expects that the improvement will be associated not only with FRA implementation, but also with technical advancements in airspace users' flight planning systems.

158 Following this review, the PRB proposes the targets presented in Table 9 which the PRB considers challenging but achievable.

KPI	2020	2021	2022	2023	2024
Average horizontal flight efficiency of the actual trajectory	2.53%	2.47%	2.40%	2.40%	2.40%
Average horizontal flight efficiency of the last filed flight plan	4.03%	3.97%	3.90%	3.90%	3.90%

Table 9: PRB proposal for Union-wide environment targets for RP3

7. Capacity KPA

7.1 The PRB's Initial proposal for capacity

159 Table 10 presents the PRB's initial proposed range for the Capacity KPI target, as contained in the target ranges report for consultation.

Minute of en route ATFM delay per flight		
Actual performance (2017)	RP2 Target (2019)	Range (2020-2024)
0.94	0.50	0.24 – 0.50

Table 10: PRB proposal for consultation – capacity

[22] Created by merging SAXFRA and SEAFRA airspaces
[23] https://www.austrocontrol.at/en/company/media/press__news/detail/__49
[24] European Route Network Improvement Plan - PART 2 - European ATS Route Network - Version 2018-2019/22
[25] Commission Implementing Regulation (EU) No 716/2014 of 27 June 2014 on the establishment of the Pilot Common Project supporting the implementation of the European Air Traffic Management Master Plan

7.2 New evidence available since June 2018 for the Capacity KPA

a) Network Operations Plan 2018-2022

160 On 3rd July 2018, the Network Management Board approved a new version of the Network Operations Plan (NOP) for the years 2018-2022[24]. This version of the NOP published a revised forecast for en route ATFM delay for the European network.

161 The delay forecasted within the NOP has increased significantly between the April 2018 edition – on which the target ranges were based – and the edition approved in July.

162 The delay forecasts show an expected degradation in performance between 2018 and 2022, by an average per year of over 0.25 minutes per flight. The scale of the degradation alone is over 50% of the current target and optimal level of delay. This demonstrates the magnitude of the capacity issues faced by the European network and that action must be taken immediately to close the capacity gap.

Delay Forecast Full Year (min/flight)[26]			
Year	NOP forecast April 2018 Edition	NOP forecast June 2018 Edition	Difference June – April forecast
2018	1.05	1.35	+0.30
2019	1.01	1.19	+0.18
2020	0.97	1.23	+0.26
2021	0.82	1.09	+0.27
2022	0.74	1.01	+0.27

Table 11: Comparison of NOP delay forecast between June 2018 and April 2018 editions

b) Recent delay performance

163 The following graph shows the degradation of delay performance despite modest traffic growth between 2017 and 2018 (on a monthly basis).

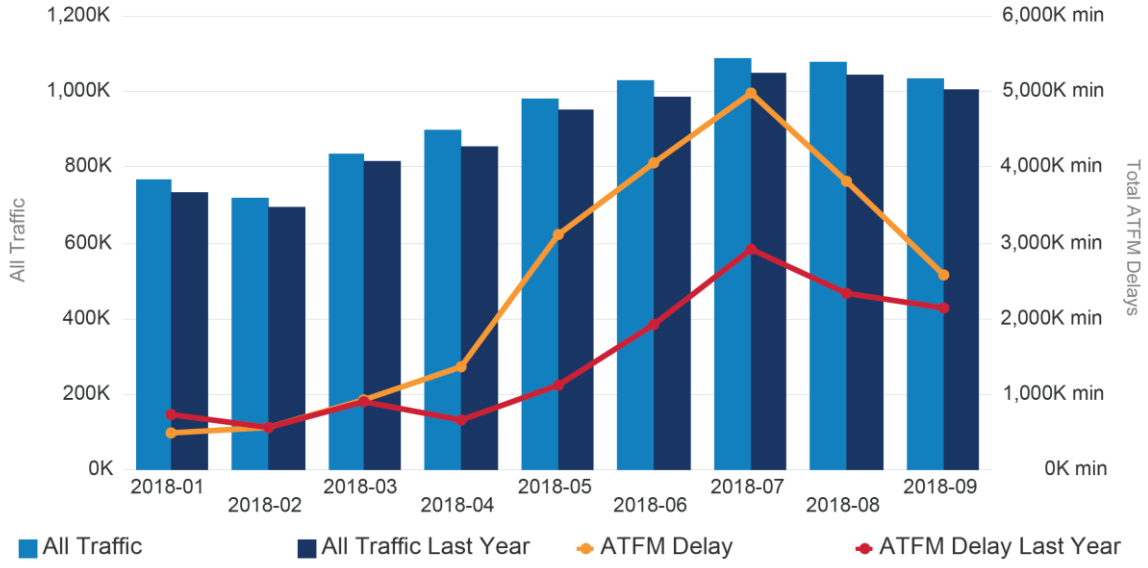

Figure 3: Traffic and delay performance comparison 2018 vs 2017 (monthly YTD up to August 2018)
Source: EUROCONTROL – Network Manager Dashboard

[26] Includes estimations of industrial actions and technical failures included at a statistical level of 0.1 minutes per flight (min/flight)

164 The highest levels of delays are generated during weekend days. The main reasons ANSPs allocate for increasing delays are a substantial increase of weather delay and capacity and staffing.

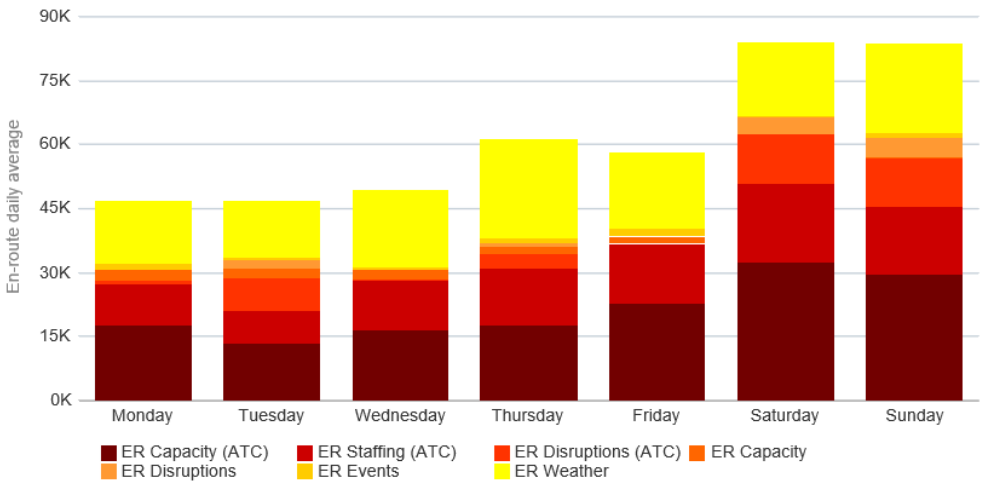

Figure 4: Daily average delay (YTD up to August 2018)
Source: EUROCONTROL – Network Manager Dashboard

7.3 Comments from stakeholders

165 Stakeholders' comments were grouped in to the following areas:

- CAP01: Ambition level - Stakeholders comments revealed differences regarding the level of ambition of the proposed target ranges for the Capacity KPI.
- CAP02: Allowances for weather and network disruptions - Stakeholders raised a concern that the allowances for weather and network disruptions were based on historical analysis rather than future projections.
- CAP03: Delay code allocation - Stakeholders voiced differing opinions with regards to the allocation of delay causes, particularly relating to weather and staffing.
- CAP04: Interdependency with cost efficiency - stakeholders highlighted the importance of setting the capacity targets considering the cost efficiency targets.
- CAP05: PRB proposal for increased intermediate targets - Stakeholders showed some support for this proposal in the light of the evidence emerging from the latest version of the NOP.

7.4 PRB opinions

a) CAP01: Ambition Level

166 The PRB proposed target ranges of 0.24-0.50 minutes of delay per flight for the target value for RP3, minimising the overall costs borne by airspace users and passengers. The considerable under-investment in the industry during RP2 has increased the impact of high traffic growth. At the same time, many ANSPs have continued to increase their economic surplus.

167 The current levels of performance are inadequate, and action must be taken immediately to close the capacity gap. However, increasing capacity takes time and money. Therefore, the PRB proposes to take a phased approach to achieving the economic optimum of 0.5 minutes per flight in 2023 and 2024.

168 This approach is further supported by choosing a starting point for the cost efficiency target that, as a temporary and one-off measure, allows for investments with a proven impact on capacity during the remainder of RP2 and for RP3.

b) CAP02: Allowances for weather and network disruptions

169 The PRB undertook historic analysis to propose the contribution to delay relating weather and network disruptions. Weather phenomena and network disruptions, such as the impact of strikes, are difficult to predict. When a centre is operating close to full capacity, weather or other disruptive events are likely to have a greater impact.

170 A report by EUROCONTROL[27] noted that the cost for weather attributed en-route ATFM delay in Europe is estimated to be around €215 million in 2017, an increase of €56 million compared to 2016 and that the allocation of such delay should be considered to ensure that it reflects the primary cause of the delay. Only then can the root cause of capacity constraints be properly addressed.

171 With respect to the impact of network disruptions, the issue of industrial action and its impact needs to be recognised. Although this is not a factor within the PRB's remit, its effect on the performance scheme and the ability to meet the agreed targets has to be taken into account so as to ensure a full understanding of the context and reality of the operational environment.

c) CAP03: Delay code allocation -

172 Following discussions at the stakeholder consultation meeting on 4th July 2018 and the analysis presented in the aforementioned EUROCONTROL study[27], the PRB agrees that the issue relating to delay code allocation warrants further investigation.

173 In their report, EUROCONTROL noted that, "*a considerable amount (more than 60%) of weather attributed ATFM en-route delays was attributed to ATC sectors that were already applying capacity constraints by being collapsed.*" The PRB also notes the complexities relating to sector structure within an ACC and that collapsed sectors do not necessarily mean that there are existing capacity constraints.

174 The PRB would like to engage with NSAs to audit the allocation of delay codes to ensure that the practice of allocation is fully transparent and identifies the primary cause of delays.

d) CAP04: Interdependency with cost efficiency

175 The capacity targets must consider the interdependency with the cost efficiency targets. In the Target Ranges Report, the PRB defined a range of starting points for RP3 and the

[27] PRR 2017 Performance Review Report. An Assessment of Air Traffic Management in Europe during the Calendar Year 2017

ranges for cost efficiency targets taking account of the investment required to return the system to optimal performance during RP3.

176 The PRB has also considered the revised NOP published in June 2018 to ensure that the targets set for capacity are realistic and achievable for the duration of RP3.

e) CAP05: PRB proposal for increased intermediate targets

177 The PRB took note of the following key pieces of evidence when proposing the capacity targets:

- the request from stakeholders for the targets to be realistic and achievable
- the forecasted delay within the latest Network Operations Plan
- the optimum delay to provide a cost-efficient service to airspace users
- the cost to airspace users of not achieving the 'cost optimum' value of 0.5 minutes per flight

178 The PRB has proposed a compromise that will challenge ANSPs to improve beyond what is forecasted in the NOP for the first three years of RP3. The targets, however, are reasonable and achievable and higher than the 0.5 minutes of delay per flight would be if applied for each year of RP3.

179 To avoid the potential for further degradation of network performance, targets should require those States already achieving their reference values to continue to do so. The additional delay buffer created by the increase of intermediate values should be allocated to States with proven capacity-related difficulties.

7.5 Recommendations for targets

180 The latest delay performance and future delay forecast do not meet the optimal performance levels targeted within the current performance scheme targets.

181 Capacity improvements take time to be delivered. However, capacity constraints have been an issue for too long. Action must be taken immediately to address capacity shortfall. ANSPs and the Network Manager must give the priority to providing additional capacity to balance demand and capacity.

182 The PRB proposes the targets presented in Table 12.

KPI	2020	2021	2022	2023	2024
Minutes of en route ATFM delay per flight	0.80	0.70	0.60	0.50	0.50

Table 12: PRB proposal for Union-wide capacity targets for RP3

183 The Capacity KPI consists of three elements: System wide cost optimum capacity, Severe weather and Network disruptions that sum together to provide the target value. The increase of the target from 0.5 minutes per flight to 0.8 minutes per flight implies an increase for each of these three elements.

8. Cost Efficiency KPA

8.1 Initial proposal

184 The PRB advice to the EC is regarding the cost efficiency of en-route ANS.

185 The PRB proposed a Union-wide starting point[28] determined unit cost equal to 47.79€2009 within the Target Ranges Report.

186 Table 13 shows the proposed ranges for the Cost Efficiency KPA target. The PRB identified the potential cost reduction (efficiency gap) for en-route ANS based on benchmarking of European ANSPs. The scenarios in the table below are based on the percentage of the gap closed during RP3.

	Scenario 1: 40% efficiency gap closing	Scenario 2: 60% efficiency gap closing*	Scenario 3: 75% efficiency gap closing
En-route determined total cost % p.a.	-0.1%	-1.4%	-2.2%
En-route SU growth p.a. (STATFOR February 2018 base forecast)	+2.4%		
En-route DUC % p.a.	-2.3%	-3.5%	-4.2%
En-route DUC end point in 2024 (€2009)	42.25	39.47	37.77

Table 13: Summary of the proposed RP3 target range (as presented in the Target Ranges Report, Table 6).
**Scenario 2 corresponds to the return to 2016 determined total cost.*

8.2 New evidence available since June 2018 for the Cost Efficiency KPA

187 The proposed starting point for RP3 has been updated with new information and evidence received by the PRB. Consequently, the cost evolution scenarios and DUC end points for RP3 have also been updated. The new evidence consists of:

i. Actual en-route cost figures for 2017 as reported in the Reporting Tables[29].
ii. Actual traffic for 2017 in terms of en-route service units.
iii. Actual and forecast total en-route staff costs per ANSP.
iv. Breakdown of planned and actual capital expenditure and en-route depreciation costs per ANSP over RP2.
v. Actual inflation rates for 2016 and 2017 per Member State from EUROSTAT.
vi. Breakdown of actual and planned overall economic surplus per ANSP, including 2017 actual data.

[28] According to the latest draft proposal for the RP3 Regulation, the starting point in terms of determined unit costs is identified at Art. 9.5(a) as "baseline value for determined unit costs". To ease readability and for consistency with the PRB Report "EU-wide target ranges for RP3", the terminology "starting point" is kept in this report, when referring to the determined unit costs starting point.
[29] For the purpose of its target setting, the PRB has considered the 2017 actual cost values as reported by Eurocontrol. These numbers are yet validated as part of the 2017 Monitoring Report for RP2. Based on past experience, the PRB considered the 2017 data as acceptable. If variations would result from the validation, they would impact on the proposed Union-wide targets only minimally and not modifying the targets.

a) Update of the initial proposal

188 The values of determined total cost and determined unit cost for RP2 for the year 2019 remain valid and binding as they are outlined in the Performance Plans and Commission Decision.

189 A study commissioned by the PRB (the Academic Study) forecasted the total cost based on historical data (2006-2016 actual total costs and traffic). Using the cost forecasts and the service units sourced by STATFOR estimated the 2019 Union-wide starting point.

190 The PRB has updated the initially-proposed starting and end points taking into account the actual costs and traffic in 2017.

i. **Update of the RP3 DUC starting point value**: The 2016 en-route costs have been updated with the 2017 actual en-route costs (6,003M€2009). The RP3 starting point for DUC decreases from 47.79€2009 (proposed in the Target Ranges Report) to **46.38€2009**. In terms of total cost, this results in a total cost base of 6,325M€2009, which is higher than the 2019 determined total cost for RP2 [6,018M€2009 as aggregation of Member State Performance Plans].

ii. **Update of the RP3 cost evolution scenarios**: Table 14 presents an update of the target ranges based on the new starting point. The original values proposed in the Target Ranges Report are presented in brackets.

	Scenario 1: 40% gap closing	Scenario 2: 60% gap closing*	Scenario 3: 75% gap closing
En-route determined total cost (p.a. % change)	+0.4% *(-0.1%)*	-0.9% *(-1.4%)*	-1.8% *(-2.2%)*
En-route SU (p.a. % change). (STATFOR February 2018 base forecast)	+2.4% *(+2.4%)*		
En-route DUC (p.a. % change)	-2.0% *(-2.3%)*	-3.2% *(-3.5%)*	-4.1% *(-4.2%)*
En-route DUC end point in 2024 (€2009)	42.01 *(42.25)*	39.45 *(39.47)*	37.56 *(37.77)*

Table 14: Updated summary of the proposed RP3 target range
**Scenario 2 corresponds to the return to 2016 determined total cost.*

191 The updated end points are marginally different due to a correction in the methodology. The new methodology ensures consistency in the computation of starting and ending points.

192 The PRB has considered the following aspects regarding the updates of the cost evolution scenarios:

i. The updated year-on-year determined total cost reduction efforts are lower when using 2017 actual total cost.

ii. The updated year-on-year determined unit cost reduction efforts of all three scenarios are lower when using 2017 actual total cost.

iii. In cost evolution scenario 1, total costs are now increasing yearly, whilst in the Target Ranges Report a decreasing trend was shown. This is because the projected cost for 2019, based on 2016 data, was higher than the end point projected for 2024. This led to a decreasing trend over RP3. The updated total cost projection for 2019, based on 2017 data, is lower than the proposed end point of Scenario 1. In terms of DUC, the decreasing trend continues in all three scenarios due to traffic growth projections throughout RP3.

b) Planned versus spent CAPEX to-date

193 Since the publication of the Target Ranges Report, the PRB has analysed the historical trend of capital expenditure to-date as reported by the Member States during the yearly monitoring activity. There are important differences between Member States in terms of the implementation of planned investments in RP2, as highlighted in Figure 5. The PRB has identified four clusters of ANSPs when comparing the actual capital expenditure compared with the planned investments:

a. EANS, LFV, Hungarocontrol, NATS, ANS CR, Oro Navigacija and DSNA have invested more than planned since the start of RP2.

b. ENAIRE, Skyguide, NAVIAIR, PANSA, Slovenia Control, Austro Control, LGS, NAV Portugal, BULATSA, Croatia Control and Avinor have invested over 80% of their planned CAPEX. The PRB considers these ANSPs behind planning. However, these ANSPs are still on track to meet their planned investment level by 2019.

c. ENAV, DFS, LVNL, Belgocontrol, ANA LUX and ROMATSA have invested between 50%-80% of their planned CAPEX. These ANSPs are not on track to meet their planned CAPEX levels.

d. MUAC, ANS Finland, LPS, IAA, DCAC Cyprus and MATS have CAPEX spending rates below 50%, showing a clear lack of investment compared to the plans. The PRB recognises that the original planned CAPEX level is generally low within this cluster.

194 ANSPs currently underspending must take action and review their CAPEX plans and current performance to identify where investment supports the provision of capacity to improve operational and cost efficiency performance. This is also needed to cope with operational challenges foreseen in RP3. The ANSPs highlighted in c. and d. above have to act.

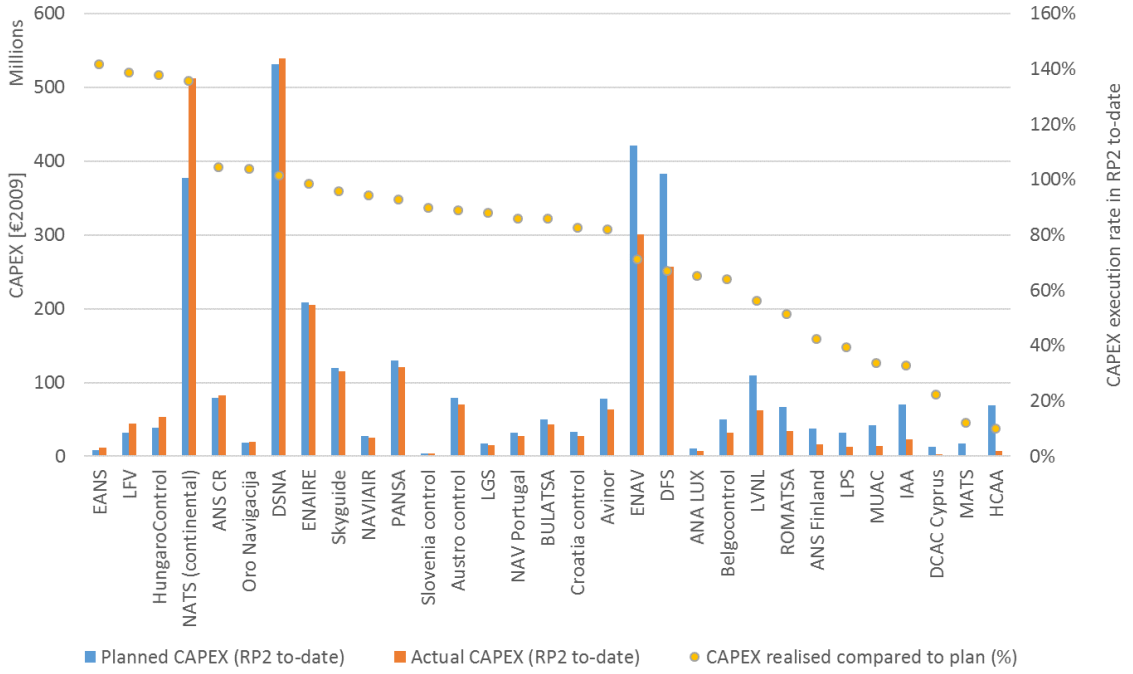

Figure 5: Planned vs. actual CAPEX throughout RP2 in absolute values and percentages (to-date, 2017 data included). Source: PRB elaboration on EUROCONTROL data

195 In some instances, ANSPs have spent their planned CAPEX, yet are unable to hit their delay targets. This suggests a shortage of ATCOs, or other operational reasons are causing the delay. Other ANSPs have underspent CAPEX. For these, not all ANSPs generate high delay, but some do. This highlights that, whilst CAPEX and the implementation of new technology is important to provide sufficient capacity, it is only a part of the overall picture and this requires further investigation.

c) The cost of improving capacity

196 ANSPs causing the majority of delays should be able to achieve their RP2 capacity targets with limited investment. The PRB has used the following evidence to estimate the cost of this additional capacity:

- Report from EUROCONTROL: The PRB requested the PRU at EUROCONTROL to estimate the cost of closing the capacity gap. The PRU estimated, based on the cost of employing additional ATCOs, that the cost would be between 40M€ - 100M€ per year.
- Study commissioned by the European Commission on the interdependency between cost and capacity: The EC contracted Steer to investigate the relationship between cost and capacity. Based on historical data Steer estimated that the cost for resolving the capacity gap is between 48M€ and 268M€.

197 The studies did not take account of potential barriers to the implementation of new technology or services, such as cross-border service provision, that may be needed to deliver the required capacity increases. The values do, however, support the PRB's view that it is possible to resolve the current capacity shortage with a relatively limited increase in the overall cost of service provision by properly managing the investments.

8.3 Viewpoints on ambition of the target from stakeholders

198 The section provides a summary of the most frequently occurring comments during the consultation process.

a) CEF01: Academic Study

199 Stakeholders considered the Academic Study in general a positive step towards a more objective and evidence-based target setting process for the Cost Efficiency KPA.

200 Stakeholders asked for a detailed discussion on how the study has been conducted. In particular, there was a concern that the study was too theoretical, and that it would be used for the individual performance plans.

201 A common concern was that individual circumstances have not been considered when determining local cost inefficiencies of ANSPs. A number of questions were raised by stakeholders on Tables 5-9, 5-10 and 5-11 within the Academic Study, namely about the currency used, the application of the purchase power parity, on how the Academic Study should be interpreted and to what extent these tables have been used in the target setting process by the PRB.

202 Stakeholders also raised questions with respect to the variability of cost efficiency results amongst the different ANSPs.

b) CEF02: Link between the Capacity and Cost Efficiency KPA

203 A common concern by the stakeholders referred to what extent the PRB considered the need to increase capacity (and perform the corresponding investments) and how this links to the ambition of the Cost Efficiency KPA targets.

c) CEF03: PRB's calculations for RP3 Cost Efficiency KPA target setting

204 A common question by many was how the PRB computed the projected total cost for 2019 [6,515M€$_{2009}$] and 2024 [7,272M€$_{2009}$]. In particular, the stakeholders noted that this represents a 20% increase of total cost between 2016 [6,060M€$_{2009}$] and 2024, within the 'no action' cost evolution scenario.

205 Stakeholders were also interested to know how cost evolution scenarios 1 and 3 (i.e. respectively closing 40% and 75% of the total cost inefficiency gap) were decided upon. Stakeholders pointed out that historical DUC trends have not exceeded -2.1%.

206 In addition, stakeholders wonder to what extent the ANSPs' forward looking report has been used in the drafting of the Target Ranges Report.

8.4 PRB opinion

a) CEF01: Academic Study

207 The objective of the study was to benchmark the ANSPs belonging to the SES area, considering the complexity of operations. The benchmarking identified the potential for reducing ANS costs at a union-wide level when setting union-wide targets.

208 The Academic Study's values are in €2016 and adjusted for Purchasing Power Parity (PPP). They are estimated per ANSP and subsequently aggregated. For each country/year, the Academic Study selected the highest costs, comparing the results obtained by well recognised methodologies (i.e. Stochastic Frontier Analysis and Data Envelopment Analysis).

209 The Academic Study recommends estimating specific local cost efficiency targets for RP3. This focus on the local level is consistent with the concerns Member State expressed during the consultation period.

b) CEF02: Link between Capacity and Cost Efficiency KPA

210 The PRB believes that the delay issues should be addressed urgently and with a high priority. At the same time the Academic Group quantified the potential for cost reduction that exists for each ANSP. Improving capacity and cost simultaneously is achievable over the time horizon of RP3.

211 In the past, studies have unsuccessfully attempted to quantify the interdependency between the Capacity and Cost Efficiency KPAs. In a recent draft of the study by Steer for the Commission it is highlighted that it remains challenging to evaluate the interdependency between cost and capacity. However, in the view of the PRB, both the Academic Study and the report from Steer, confirm that the target ranges for Cost Efficiency and Capacity KPA are broadly consistent to achieve both the determined unit cost and the capacity targets.

c) CEF03: PRB's calculations for RP3 Cost Efficiency KPA target setting

212 The calculation of total costs in 2019 and 2024 were based on the actual costs in 2016, which were increased to account for increases in traffic projected in the February 2018 STATFOR base forecast. This 'no action' scenario assumed that there would be no improvements in cost efficiency between 2016 -2024 and resulted in a total cost projection of 6,515M€2009 in 2019 and 7,272M€2009 in 2024.

213 The starting point was updated (as described in Section 8.2(a)) to include the actual costs for 2017 that were made available after the publication of the Target Ranges Report. This reduced the 2019 starting value to 6,325M€2009. The end point value has been recalculated to be 7,235M €2009 as explained in paragraph 191[30].

214 The Academic Study calculated the potential to reduce en-route ANS costs using a combination of two different methods (DEA and SFA). The results estimated that costs could be reduced between 25-30% at union-wide level.

8.5 Recommendations for targets

215 The Cost Efficiency KPA targets for RP3 take into account the latest STATFOR February 2018 base forecast covering the period 2018-2024.

216 The PRB has considered the cost projections submitted by Member States. The PRB has based the targets on the STATFOR base scenario, which is consistent with the proposed revised regulation. Under the current regulation Member States can choose a forecast

[30] The updated end points are marginally different due to a correction in the methodology. The new methodology ensures consistency in the computation of starting and ending points.

other than the STATFOR base scenario for their cost projections, and several Member States based their projections on such other forecasts.

217 The level of ambition for the RP3 Cost Efficiency KPA target is reflected by the three cost evolution scenarios. These three scenarios have been presented as options in the Target Ranges Report and are shown in Figure 6 and Figure 7. In addition, the yellow line represents the scenario considering the cost projections submitted by Member States.

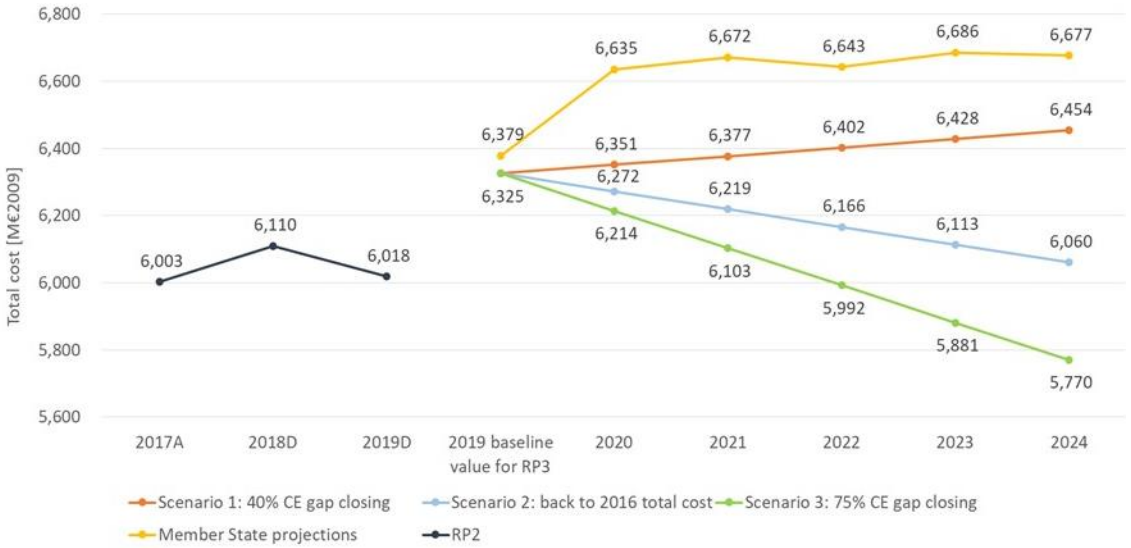

Figure 6: Scenarios for cost evolution over RP3 in terms of total cost

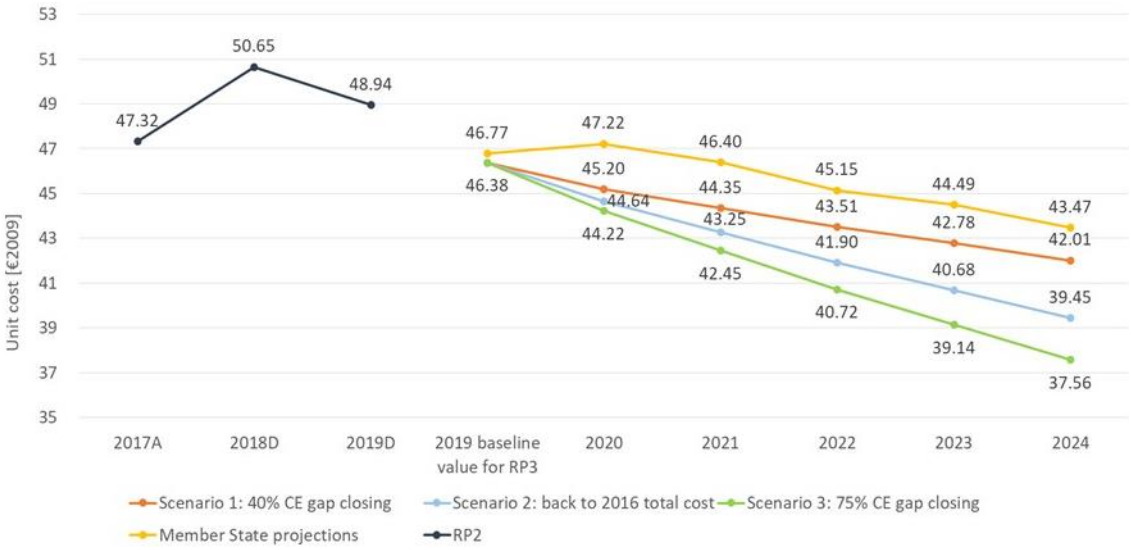

Figure 7: Scenarios for cost evolution over RP3 in terms of unit cost

218 Member States projections estimate a Union-wide increase in total costs which is not consistent with the PRB's vision and has not been retained. Similarly, Scenario 1 projects an increase in costs and has not been retained.

219 In Scenario 2, where total cost throughout RP3 evolves to the actual total cost level of 2016, the yearly DUC reduction (-3.2%), is similar to the trend in the RP2 target (-3.3%). Evidence has indicated that ANSPs have managed to keep their total cost base fairly constant over RP2 despite an increase in traffic and therefore becoming more cost efficient.

220 In Scenario 3, where 75% of the identified cost inefficiency gap would be closed by 2024, the effort of DUC reduction per annum is more challenging than in RP2 (i.e. -4.1%).

221 The PRB concluded that a balance must be struck between increasing the costs compared to RP2 and retaining the pressure to improve cost effectiveness. Therefore, the PRB proposes **a combination of the two cost evolution scenarios (Scenarios 2 and 3 above)** based on the following considerations:

a. During the **first three years of RP3 (2020, 2021, 2022)**, the cost efficiency reduction shall be less ambitious (cost evolution Scenario 2) in order to provide more capacity in line with the proposed delay targets. In combination with the proposed RP3 starting point for DUC, this proposal allows for the necessary investments to maintain strong performance in the majority of the airspace and target areas with poor performance.

b. In the **last two years of RP3 (2023, 2024),** the higher ambition is in line with the spirit of the SES high-level goals of achieving significant cost efficiency improvements. The cost efficiency gains by the end of RP3 should reach the targets set out in Scenario 3.

222 Figure 8 and Figure 9 show the combination of these two scenarios in terms of total cost and determined unit cost. Table 15 summaries the proposed combined scenario.

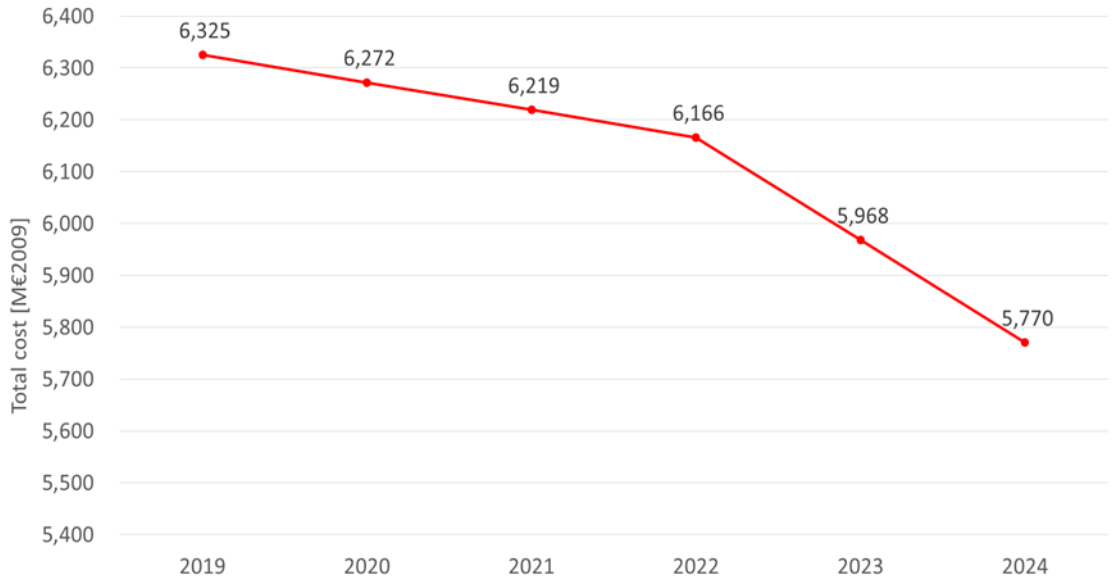

Figure 8: Combination of scenario 2 and 3 evolution scenario in terms of total cost

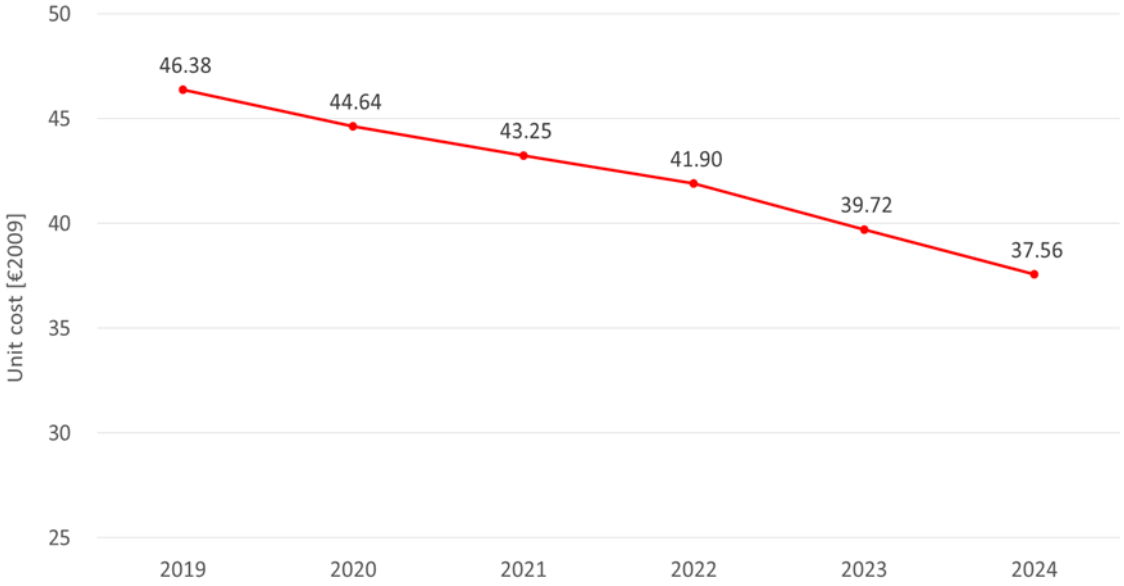

Figure 9: Combination of scenario 2 and 3 evolution scenario in terms of total cost

223 The **starting point** defined by the PRB demonstrates a balance between two diverging objectives. Firstly, efficiency gains should be passed on to airspace users through lower unit rates, which requires a low starting point. However, the starting point should not be so low to disincentivise ANSPs from reducing costs to become more cost efficient during the reference period. Therefore, the PRB believes the starting point should be set above the observed actual costs, balanced by a challenging end point.

224 This starting point implies a responsibility for ANSPs to provide sufficient capacity to meet the forecasted growth in air traffic demand. The PRB will not micromanage this process, but intends to monitor investments and operational expenditure to confirm that the additional funding is invested to reduce delays and then maintain them at optimal levels.

225 Setting the starting point as described above (paragraph 220) implies a DUC reduction equal to -3.3% per annum for the first three years of RP3 and equal to -5.3% per annum for the last two years of RP3. These trends allow for the achievement of a credible cost efficiency target at the end of RP3.

8.6 Conclusion

226 The PRB recommends the following Cost Efficiency KPA targets for RP3:

i. **A determined unit cost trend of -3.3% p.a. in 2020, 2021 and 2022.**

ii. **A determined unit cost trend of -5.3% p.a. in 2023 and 2024.**

iii. Starting from an EU-wide **starting point value for DUC for RP3 of 46.38€2009**.

iv. Ending with a EU-wide DUC of 37.56€2009 by the end of 2024.

Average determined unit cost (DUC) for en-route					
Starting point for target setting for RP3, proposed by the PRB	Determined Unit Cost: €46.38 in 2019 (in €2009 prices) Determined Cost: 6,325M€2009				
Consultation value presented in June 2018:	Proposed range for 2019 DUC: €42.25 to €37.77 (€2009 prices) (i.e. -2.3% to -4.2% per annum over RP3)				
PRB final proposal for Union-wide targets for RP3					
	2020	**2021**	**2022**	**2023**	**2024**
Determined costs (DC) [M€2009]	6,272	6,219	6,166	5,968	5,770
Annual change in DC [%]	-0.8%	-0.8%	-0.9%	-3.2%	-3.3%
Service units [,000]	140,515	143,786	147,155	150,264	153,616
Determined unit cost (DUC) [€2009]	44.64	43.25	41.90	39.72	37.56
Determined unit cost trend (%)	-3.3%			-5.3%	
	-4.1%				

Table 15: summary of RP3 Cost Efficiency KPA target proposal

9. Additional elements of target setting

9.1 Overview of additional elements

227 This section provides the PRB's response to the obligations for the provision of ANSP comparator groups within Article 10(5) of Regulation (EU) No 390/2013 and for setting traffic alert thresholds for the alert mechanisms that could lead to the revision of Union-wide targets (Article 10(4)).

9.2 ANSP comparator groups

228 Steer provided the clustering analysis under contract to the EC[31]. The clustering analysis was undertaken using a similar approach as in RP2, using latest data on traffic complexity, traffic volume, cost of living indices, traffic variability and unit ATCO employment costs. Each Member State was grouped to maximise the similarities within each group and minimise the similarities between groups.

[31] Annex 4 to the Target Ranges Report. Results of the clustering analysis prepared by Steer (Steer Davies Gleave)

Cluster	Members
Cluster 1	Austria
	Switzerland
	Germany
	United Kingdom
	France
	Spain
	Italy
Cluster 2	Norway
	Sweden
	Denmark
	Finland
	Ireland

Cluster	Members
Cluster 3	Czech Republic
	Hungary
	Slovakia
	Croatia
	Slovenia
	Bulgaria
	Poland
	Romania
Cluster 4	Cyprus
	Greece
	Estonia
	Latvia
	Lithuania
	Malta
Cluster 5	Belgium/Luxembourg
	Netherlands

Table 16: Comparator groups

229 Five comparator groups have been identified; four less than for RP2. Maastricht Upper Area Control Centre (MUAC) was not included in the clustering analysis because it only controls upper airspace. Belgium and Netherlands were included as an individual cluster because of their responsibility relating to lower airspace only.

9.3 Alert thresholds

230 The current performance scheme Regulation contains provisions for establishing an alert threshold, based on which targets and the risk sharing mechanisms apply, and beyond which performance targets may be revised in accordance with the Regulation.

231 Alert thresholds are linked to the variability between actual and forecasted level of traffic and for RP2 the PRB invited States to, "*make sure that performance plans are robust enough to accommodate a range of traffic outcomes within the alert threshold.*" The alert thresholds have been exceeded in several instances in RP2 largely because traffic growth aligned with the STATFOR High scenario whilst in many cases Performance Plans were based on the STATFOR Low scenario.

232 Under the current Regulations, the PRB considers that alert thresholds currently set at ±10% by the EC for RP2 should remain for RP3.

233 The PRB reiterates the message from RP2 for States to ensure that performance plans are robust to both higher and lower traffic than planned.

9.4 Next steps

a) The regulatory process

234 Upon receiving the recommendations of the PRB for the targets, the process of defining Union-wide targets for RP3 is in the hands of the EC. The PRB will continue to support the EC and Member States to get targets adopted which will improve the current SES performance.

235 Additionally, the EC has proposed a revision of the performance and charging Regulation. The PRB will support the EC and Member States to implement the new regulation, making sure that current deficiencies are eliminated and that the new regulation allows at least for some changes necessary for an efficient European air traffic management service. However, the PRB firmly believes that the Single Sky framework needs more fundamental change, including a revision of the basic SES Regulation.

b) Local performance planning

236 The PRB will support NSAs throughout the performance planning process. The PRB will attend and present to the Performance Working Group of the NSA Coordination Platform. The PRB also welcomes ad-hoc meetings with NSAs to discuss particular concerns or requests for clarifications from NSAs regarding the preparation of their performance plans.

237 The performance planning process remains uncertain until the regulatory text for RP3 is confirmed. However, until such point that a revised version is adopted the PRB will continue to work with the process and timings defined in the existing regulation.

10. Summary of recommendations

238 Table 17 presents a summary of the PRB's final proposal for performance targets for RP3.

Summary of PRB's final proposals for targets for RP3		
Safety	EoSM (States)	Level C for all Management Objectives
	EoSM (ANSPs)	Level E for Safety Risk Management Level D for all other Management Objectives
	RAT application (States)	80% for Overall SMIs and Runway Incursions. 100% for Overall ATM Specific Occurrences.
	RAT application (ANSPs)	100% application of the RAT for Ground SMIs, Runway Incursions and ATM Specific Occurrences.
Environment	Horizontal flight efficiency of planned trajectory (KEP)	3.90%
	Horizontal flight efficiency of actual trajectory (KEA)	2.40%
Capacity	Average ATFM en route delay	0.50 minutes per flight in 2024 Annual target values: 2020: 0.80 mins per flight 2021: 0.70 mins per flight 2022: 0.60 mins per flight (target for a three-year RP) 2023: 0.50 mins per flight
Cost efficiency	Determined Unit Cost (in €$_{2009}$ prices)	€46.38/SU in 2019 2020-2022: -3.3 % reduction per year 2023-2024: -5.3% reduction per year Interim point in 2022: €41.90 End point in 2024: €37.56

Table 17: Summary of PRB's final proposal for performance targets for RP3

11. PRB observations not related to the target setting

239 The European Commission and Member States should take this opportunity to eliminate current shortcomings of the regulation which are outside the scope of the target setting but could make a big difference and integrate the learnings from RP2.

240 In many respects, the proposal improves the regulatory framework, but it will not bring the fundamental changes that are required to achieve the progress for the future. The PRB also notes that the text of the revised regulation is still under discussion and the content may change prior to adoption.

11.1 Changes possible by means of adapting the Implementing Regulation

241 The PRB considers the following priorities for future revisions to the current Implementing Regulations:

- Ensure ANSPs use more uniform reporting and allocation of delay codes, especially in case of weather delays.
- Allow CAPEX only if there is evidence that it increases capacity and cost efficiency.
- Oblige ANSPs to return unspent CAPEX to airspace users.
- Incentivise technology which allows ANSPs to provide services to other ANSPs irrespective of location.
- Integrate pension cost in the normal cost base (treating ANSPs the same way as other companies).

11.2 Changes requiring a change in the basic SES regulation (RP4)

242 The PRB considers the following priorities for changes that will require a revision of the basic SES legislation for RP4:

- Simplify the economic regulation for Air Traffic Management to a light-handed regulation with penalties.
- Complement penalties with an element of damages to compensate airspace users for damages they suffer from underperformance.
- Introduce strong incentives enabling the provision of services where they are needed irrespective of current sectoral or national borders.
- Strengthen oversight at European level over ANSPs economic performance with competence to audit and to implement penalties.