PRB
Annual Monitoring Report 2016

Volume 1:
European Overview

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1 FOREWORD

1.1.1 The Performance Review Body (PRB) of the single European sky set up according to Commission Implementing Decision (EU) 2016/2296[1] is tasked to assist the Commission in the implementation of the performance scheme, in particular as regards the monitoring, benchmarking and review of the performance and network functions and in the monitoring of the overall performance of the European ATM network, including the preparation of annual reports to the Single Sky Committee.

1.1.2 This Annual Monitoring Report 2016 has been prepared by Eurocontrol and the European Aviation Safety Agency (EASA) for the attention of and adoption by the Performance Review Body. It is based on the data supplied by the Member States and on those collected by Eurocontrol and EASA respectively in their field of activity.

1.1.3 According to Article 18 of Commission Implementing Regulation (EU) No 390/2013 laying down a performance scheme for air navigation services and network functions[2] the national supervisory authorities and the Commission shall monitor the implementation of the performance plans. The Commission shall report to the Single Sky Committee on the achievement of performance targets at least once a year. In this task, the Commission is assisted by the Performance Review Body. This Annual Monitoring Report 2016 will be presented to the Single Sky Committee on 24/25 October 2017 to fulfil this objective. Following its presentation to the Single Sky Committee, this Report will be published by the Commission via the website https://webgate.ec.europa.eu/eusinglesky according to Article 8 of the Commission Implementing Decision (EU) 2016/2296.

1.1.4 The work of the Performance Review Body makes a positive contribution towards improving the European air traffic management (ATM) network, in particular by providing the Commission with impartial, evidence-based recommendations on the performance of air navigation services at Union and local levels as well as of network functions. In accomplishing the tasks attributed to it, the Performance Review Body issues recommendations to the Commission.

1.1.5 The Performance Review Body took note of this Annual Monitoring Report 2016 on its meeting in September 2017. Due to the fact that the mandate of the previous Performance Review Body ended on 31 December 2016 pursuant to Commission Implementing Decision 2014/672/EU[3] and the Commission designated a new Performance Review Body, for which the members were appointed on 1 June 2017, the current Performance Review Body is still working on finalising its recommendations to the Commission stemming from this Annual Monitoring Report 2016. Once finalised and adopted, those recommendations will also be shared with the Single Sky Committee and published by the Commission via the above mentioned website.

[1] Commission Implementing Decision (EU) 2016/2296 of 16 December 2016 setting up the independent group of experts designated as Performance Review Body of the single European sky (OJ L 344, 17.12.2016, p. 92).
[2] Commission Implementing Regulation (EU) No 390/2013 of 3 May 2013 laying down a performance scheme for air navigation services and network functions (OJ L 128, 9.5.2013, p. 1).
[3] Commission Implementing Decision 2014/672/EU of 24 September 2014 on the extension of the designation of the Performance Review Body of the single European sky (OJ L 281, 25.9.2014, p. 5).

2 INTRODUCTION & CONTEXT

2.1 About This Document

2.1.1 This Annual Monitoring Report 2016 of the Performance Review Body (PRB) of the Single European Sky (SES) covers the second year of the second Reference Period (RP2) which runs for five years from 2015 to 2019.

2.1.2 The PRB Annual Monitoring Report consists of three Volumes:

- Volume 1 is a summary overview of the monitoring of 2016.
- Volume 2 presents main reports for all actors of the SES reporting process.
- Volume 3 contains a detailed Safety Review of 2016, produced by EASA.

2.1.3 This Volume 1 provides a summary of European Air Navigation Services (ANS) performance achieved for 2016 in the four Key Performance Areas (KPA); namely safety, environment, capacity and cost-efficiency.

2.1.4 This report refers to, and uses data from, the Member States subject to the provisions of the SES Performance Scheme and data supplied by Eurocontrol.

2.1.5 The data used in this report are published on the ESSKY website or via the Performance Dashboard, which is hosted by Eurocontrol. The Dashboard provides reports and ANS performance data for all participants subject to the SES Performance Scheme, and can be accessed by clicking on this link[i].

2.2 The SES Performance Scheme

2.2.1 RP2 is regulated by Article 11 of EC Regulation 549/2004 of the European Parliament and of the Council[ii], and its supporting Implementing Rule, EC Regulation 390/2013, laying down a performance scheme for ANS and network functions[iii]. In addition for the purposes of financial review, the States are regulated by Articles 12, 14, 15 and 16 of EC Regulation 550/2004 of 10 March 2004 on the provision of ANS in the single European sky[iv] and its supporting Implementing Rule, EC Regulation 391/2013 of 3 May 2013 laying down a common charging scheme for ANS[v].

2.2.2 ANS performance targets are set under the SES Performance Scheme at Union-wide and/or at local (national or FAB) levels. The Commission sets targets for all KPAs during RP2. They are given in Commission Implementing Decision (EU) 132/2014[vi] of 11 March 2014 setting the Union-wide performance targets for the air traffic management network and alert thresholds for the second reference period 2015-19.

2.2.3 The National Supervisory Authorities (NSA) report on their monitoring of Performance Plans accepted by the Commission. The Commission issues decisions on consistency and inconsistency of the performance targets of the plans submitted through various legal instruments which are used for the assessment of the NSAs monitoring reports. The list is given in Annex I.

2.3 RP2 Key Performance Areas

Table 1 presents the Key Performance Areas (KPAs) and Performance Indicators (PIs) applicable for RP2 (2015-2019) as set out in Regulation (EU) No 390/2013. The PIs with Union-wide and/or local targets in RP2 are referred to as the Key Performance Indicators (KPIs).(= Target = Reporting)	RP1		RP2		
	Union-wide	Local	Union-wide	FAB	National
Safety KPIs (bold) & PIs					
Effectiveness of Safety Management (EoSM)	R	R	T	T	R
Application of severity classification scheme (RAT methodology)	R	R	T	T	R
Just Culture (JC)		R		T	R
Application of automatic data recording				R	R
Level of occurrence reporting				R	R
Separation Minima Infringements (SMI)	R	R		R	R
Runway Incursions (RI)	R	R		R	R
ATM-Specific Occurrences (ATM-S)	R	R		R	R
Airspace Infringements (AI)				R	R
Environment KPIs (bold) & PIs					
Average horizontal en-route flight efficiency (actual trajectory)			T	T	
Average horizontal en-route flight efficiency (last filed flight plan trajectory)	T		T		
Effectiveness of booking procedures for FUA			R		R
Rate of planning of conditional routes (CDRs)			R		R
Effective use of conditional routes (CDRs)	R		R		R
The additional time in taxi-out phase – *previously under Capacity KPA*					R
The additional time in terminal airspace (ASMA) – *previously under Capacity KPA*					R
Capacity KPIs (bold) & PIs					
Average minutes of en-route ATFM delay attributable to ANS	T	T	T	T	
Average minutes of arrival ATFM delay attributable to terminal ANS	R	R	R		T
The adherence to ATFM slots					R
The average minutes of ATC pre-departure delay.					R
The additional time in taxi-out phase – *now under Environment KPA*	R	R			
The additional time in terminal airspace (ASMA) – *now under Environment KPA*	R	R			
Cost Efficiency KPIs (bold) & PIs					
Average Determined Unit Cost (DUC) for en-route ANS	T	T	T		T
Average Determined Unit Cost (DUC) for terminal ANS	R				T
Costs of EUROCONTROL			R		

Table 1: RP2 Performance indicators

2.3.1 The PRB Annual Monitoring Report for 2016 refers to performance in the airspace shown in Figure 1, which is the geographical scope of the Union-wide targets for RP2.

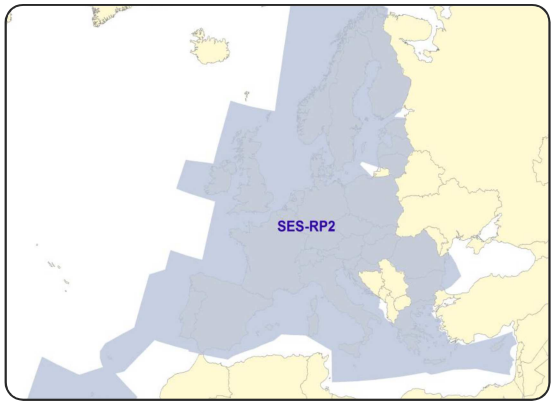


Figure 1: RP2 Geographical scope

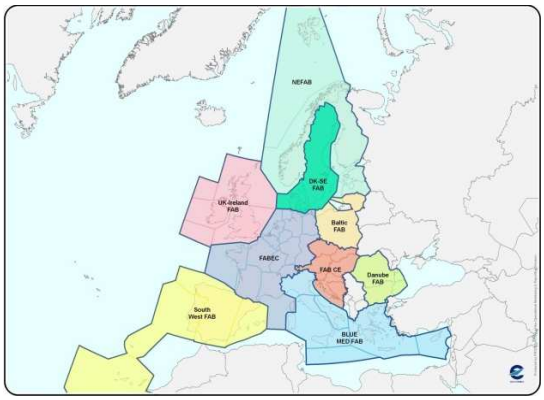


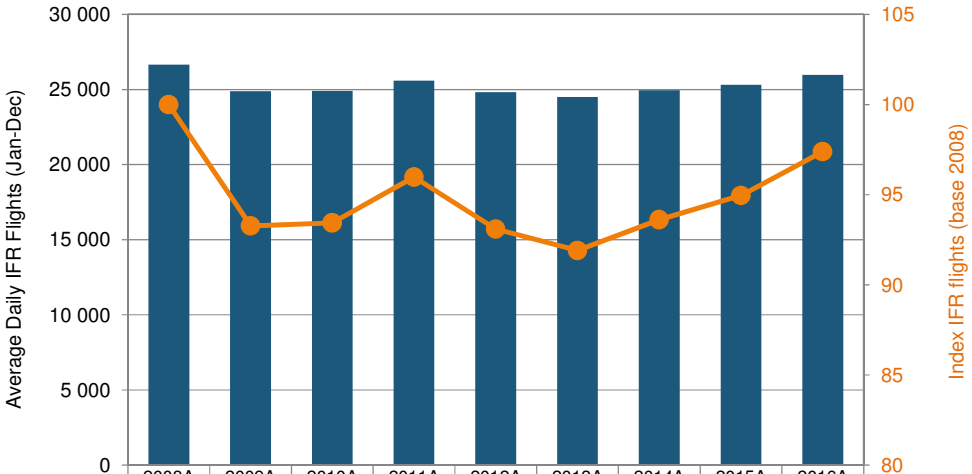
Figure 2: Functional Airspace Blocks

2.3.2 The geographical scope covers the airspace controlled by the RP2 SES States in the ICAO EUR and AFI regions at the start of the reference period. Therefore, it includes the airspace of 9 FABs controlled by the 28 EU Member States, the airspace controlled by Norway and Switzerland in the ICAO EUR region, as well as the Canaries FIR (Spain), Bodø FIR (Norway) and NOTA/SOTA (UK/IRL).

2.4 Air Traffic in 2016

IFR flights

2.4.1 IFR traffic (Average daily IFR flights in the SES RP2 area) increased for the third year in a row in 2016 (+2.6% vs. 2015), but remained below the record pre-economic crisis level reached in 2008 (-2.6% vs. 2008), as shown in Figure 3. The quarterly IFR flight record was broken in the third quarter of 2016.



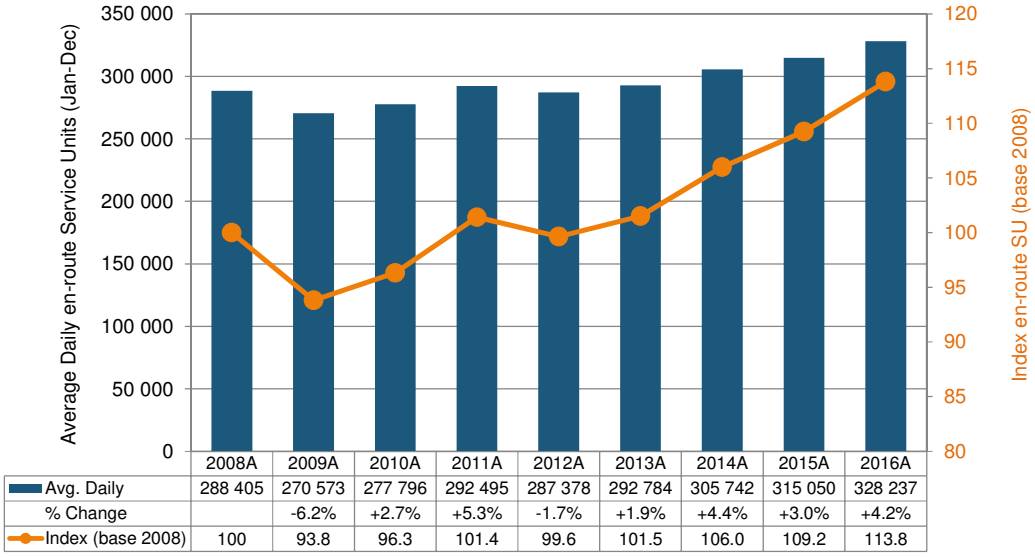
	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2016A
Average Daily IFR Flights	26 668	24 874	24 918	25 595	24 827	24 508	24 966	25 321	25 972
% Change		-6.7%	+0.2%	+2.7%	-3.0%	-1.3%	+1.9%	+1.4%	+2.6%
Index (base 2008)	100	93.3	93.4	96.0	93.1	91.9	93.6	95.0	97.4

Figure 3: Traffic 2008-2016 (SES RP2 area)

2.4.2 The Union-wide average masks variations in terms of traffic growth between FABs. The highest growth was observed for SW FAB (+8.0% vs 2015), followed by Baltic FAB (+6.3%),

UK-IRL FAB (+5.2%). The only FAB for which a negative growth was observed was NEFAB (-1.2% vs. 2015).

2.4.3 Average daily en-route Service Units (TSUs) in the RP2 area continued to grow faster than flights in 2016 (+4.2% vs. 2015, +13.8% vs. 2008), as shown in Figure 4. Service units grow faster than IFR flights due to longer and heavier flights on average.



	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2016A
Avg. Daily	288 405	270 573	277 796	292 495	287 378	292 784	305 742	315 050	328 237
% Change		-6.2%	+2.7%	+5.3%	-1.7%	+1.9%	+4.4%	+3.0%	+4.2%
Index (base 2008)	100	93.8	96.3	101.4	99.6	101.5	106.0	109.2	113.8

Figure 4: En-route service units 2008-2016 (SES RP2 area)

2.5 Union-wide Performance in 2016.

2.5.1 Table 2 shows the Union-wide targets for RP2 which were set by Commission Implementing Decision 132/2014[vii] for the Key Performance Indicators (KPI).

2.5.2 Table 3 shows the performance achieved at Union-level against these targets in 2016 for Environment, Capacity and Cost Efficiency KPA.

KPI			2015	2016	2017	2018	2019
SAFETY							
Level of Effectiveness of Safety Management (EoSM)	**State Level**						C
	Safety Culture MO						C
	all other MOs						D
Application of the RAT methodology	**SMIs**	**Ground**			≥ 80%		100%
		Overall			≥ 80%	≥ 80%	≥ 80%
	RIs	**Ground**			≥ 80%		100%
		Overall			≥ 80%	≥ 80%	≥ 80%
	ATM-S	**Ground**			≥ 80%		100%
		Overall			≥ 80%		100%

KPI	2015	2016	2017	2018	2019
ENVIRONMENT[4]					
KEP (horizontal en-route flight efficiency for last filed flight plan)	*4.78%*	*4.61%*	*4.44%*	*4.27%*	4.10%
KEA (horizontal en-route flight efficiency for actual trajectory)	*2.96%*	*2.87%*	*2.78%*	*2.69%*	2.60%
CAPACITY					
Average en-route air traffic flow management (ATFM) delay per flight (Minutes)	0.5	0.5	0.5	0.5	0.5
COST EFFICIENCY					
Average Union-wide determined unit cost for en-route air navigation services (Real terms EUR 2009)	56.64	54.95	52.98	51.00	49.10

Table 2: Union-wide Targets for RP2

KPI	2016		
	EU TARGET	ENTITY	PERFORMANCE
KEP	4.61%	Union-wide	4.91%
KEA	2.87%	Union-wide	2.96%
Average en-route air traffic flow management (ATFM) delay per flight (Minutes)	0.5	Union-wide	0.91
Average Union-wide determined unit cost for en-route air navigation services (Real terms EUR 2009)	54.95	Union-wide	50.57

Table 3: Performance at Union-level

2.5.3 **Safety:** The Safety targets for RP2 are to be met in 2017, 2018 and 2019 respectively. There are no Safety targets defined for 2016.

2.5.4 **Environment:** The Union-wide targets for KEP and KEA were not met. The deterioration in performance in 2016 with respect to 2015 has been 0.07 percentage points (pp) for KEP (from 4.84% to 4.91%) and 0.016 pp for KEA (from 2.80% to 2.96%).

2.5.5 **Capacity:** The Union-wide target for en-route ATFM delay (0.5 minutes per flight) was not met in 2015 or 2016. Average en-route ATFM delay in 2016 was 0.91 minutes per flight, an increase of almost 20% on 2015 results, for a corresponding traffic increase of 2.6%.

2.5.6 **Cost Efficiency:** At Union-wide level, actual en-route unit cost (50.57€$_{2009}$) was -8.0% lower than the en-route Union-wide target and -6.1% lower than the aggregated Performance Plans Determined Unit Cost (53.86 €$_{2009}$). Actual en-route costs were -1.9% (-120.6 M€$_{2009}$) lower than the Determined Costs (6 195.9 M€$_{2009}$), while the Total Service Units (TSUs) were +4.4% higher than planned. As far as terminal cost-efficiency is concerned, the Union-wide

[4] Targets for KEA and KEP are for 2019 only. Nevertheless indicative target values have been provided for the intermediate years (shown in grey/white).

actual terminal unit cost (165.92 €$_{2009}$) was -4.8% lower than planned in the RP2 PPs. This results from the combination of higher-than-planned TNSUs (+4.7%) and lower-than-planned terminal costs (-0.4%, or -4.1 M€$_{2009}$).

2.5.7 It must be noted that these conclusions refer to both the en-route and the terminal cost-efficiency KPIs of the Performance Regulation and that the conclusions related to the true costs paid by airspace users in 2016 is different. More details can be found in paragraph 2.6.9 as well as Sections 6.8 and 6.12.

2.6 Local- level Performance in 2016

2.6.1 The summary information shown below relates to ANNEX 1 Section two of Regulation 390/2013, i.e. local target setting and performance monitoring at local level.

2.6.2 **Safety:** The Safety targets for RP2 are to be met in 2019. No targets are defined for 2016.

2.6.3 **Environment:** Targets for 2016 have been met by two of the nine FABs, namely DK-SE FAB and SW FAB, which already met their target back in 2015. All nine FABs have registered a decrease in performance with respect to 2015.

2.6.4 **Capacity:** Five of the nine FABs achieved or surpassed their FAB targets, the remaining four did not.

2.6.5 Table 4 provides a summary of the performance in 2016 at FAB-level (local) with respect to the Environment and Capacity targets indicated in their Performance Plans.

2.6.6 Further detail of the performance at local-level is provided in Table 5 which shows the performance at State-level within each FAB for the Environment and Capacity targets indicated in their Performance Plans.

2.6.7 **Cost Efficiency:** The performance and charging schemes have been designed to ensure that the Cost-Efficiency targets are directly used in the calculation of en-route and terminal unit rates together with adjustments related to the various features of the scheme (such as inflation, traffic risk, cost risk, incentives, etc.).

2.6.8 Table 6 (for en-route) and Table 7 (for terminal) identify whether the actual unit cost is lower or higher than the determined unit cost (DUC) set in the Performance Plan, as well as the drivers for this evolution in terms of cost and traffic.

2.6.9 Due to the design of the scheme, NSAs have not reported any corrective measures *per se* in respect of cost-efficiency but actions to improve cost-efficiency that are planned to be applied at local level. Details on these can be found in Volume 2 for each SES State.

2.6.10 A particular attention is given to States which have significantly increased their costs compared to their determined costs: Romania, Sweden and Bulgaria for en-route; Romania, Sweden, Slovenia and Spain for terminal. See more details in Paragraphs 6.5.5 (for en-route) and 6.10.13 (for terminal).

2.6.11 In addition to this analysis which covers the regulated Cost-efficiency KPIs of the Performance Regulation, this report also examines the Actual Unit Cost for airspace Users (also referred to as the "true cost for users") presented in section 6.8 (for en-route) and in 6.12 (for terminal), which are a better reflection of the cost-efficiency performance from an airspace user's point of view, since it reflects the adjustments relating to 2016 activities which will be charged or reimbursed to users in future years. Note that the "true cost" for users is different from the cost charged during the year due to the adjustments foreseen in the performance scheme and SES charging Regulation.

KPI		2016		
	ENTITY	REFERENCE VALUE	PP TARGET	PERFORMANCE
KEA	Baltic	1.47%		1.68%
	BlueMed	2.70%		3.17%
	Danube	1.50%		1.60%
	DK-SE	1.20%		1.20%
	FABCE	1.94%		1.97%
	FABEC	3.22%		3.40%
	NEFAB	1.32%		1.72%
	SW FAB	3.71%		3.49%
	UK-IRE	3.27%		3.85%
Average en-route air traffic flow management (ATFM) delay per flight (Minutes)	Baltic	0.21		0.35
	BlueMed	0.18	0.36	0.13
	Danube	0.04	0.03	0.00
	DK-SE	0.10		0.05
	FABCE	0.29		0.08
	FABEC	0.42	0.49	1.07
	NEFAB	0.12		0.07
	SW FAB	0.31		0.42
	UK-IRE	0.26	0.26	0.30

Table 4: FAB-level view of Environment and Capacity KPAs

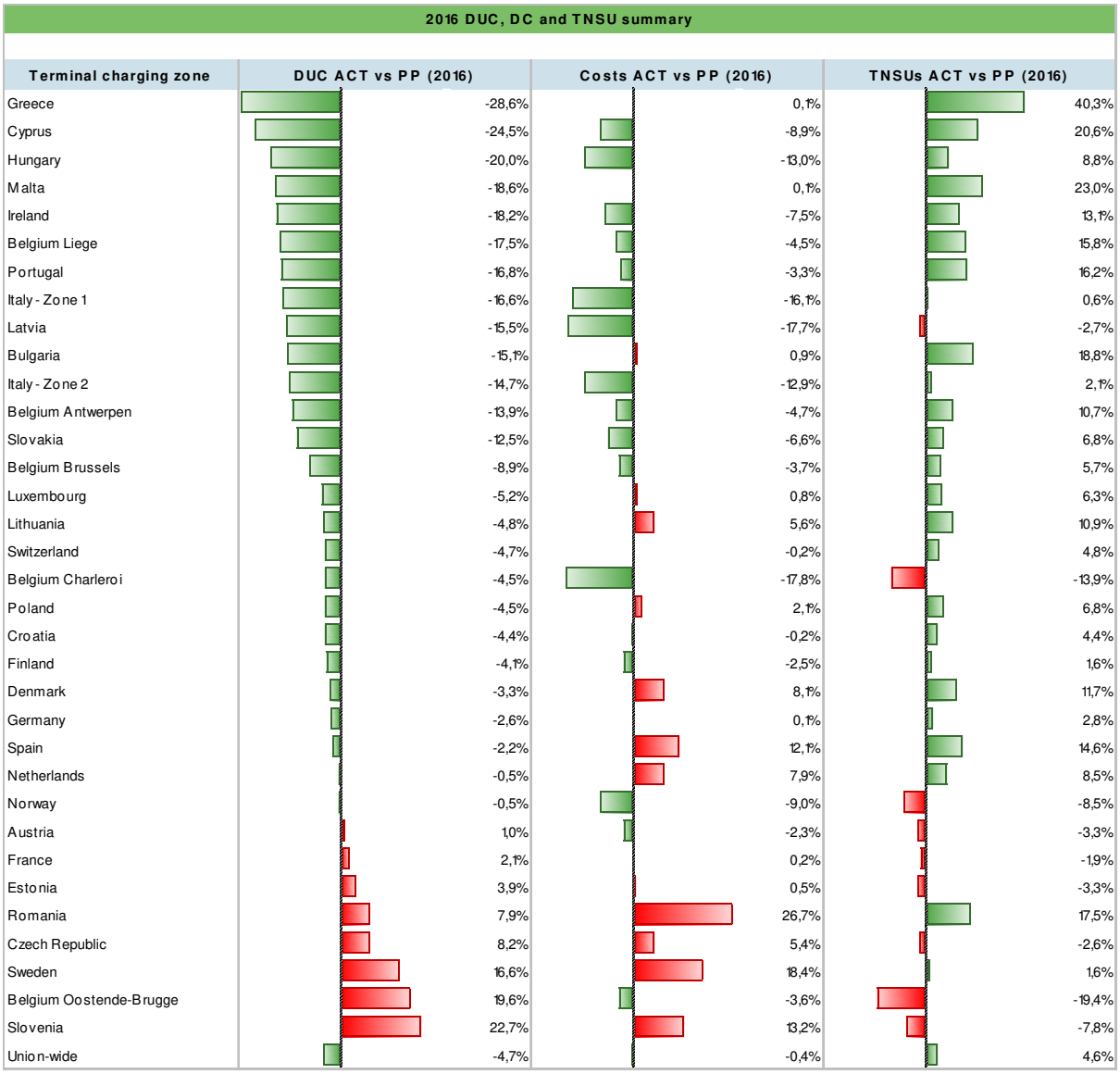
FAB	State	KPI	PP Target	Performance
Baltic	Lithuania	KEA	n/a	1.66%
		E-R Delay	0.02	0.00
		Arrival Delay	0.00	0.00
	Poland	KEA	n/a	1.68%
		E-R Delay	0.23	0.39
		Arrival Delay	0.04	0.21
BlueMed	Cyprus	KEA	n/a	4.26%
		E-R Delay	1.5	0.63
		Arrival Delay	None	0.51
	Greece	KEA	n/a	2.15%
		E-R Delay	1.4	0.14
		Arrival Delay	0.10	0.26
	Italy	KEA	n/a	3.65%
		E-R Delay	0.1	0.00
		Arrival Delay	0.41	0.13
	Malta	KEA	n/a	1.11%
		E-R Delay	0.02	0.00

FAB	State	KPI	PP Target	Performance
		Arrival Delay	0.10	0.01
Danube	Bulgaria	KEA	n/a	1.70%
		E-R Delay	0.05	0.01
		Arrival Delay	0.00	0.00
	Romania	KEA	n/a	1.52%
		E-R Delay	0.00	0.00
		Arrival Delay	0.00	0.34
DK-SE	Denmark	KEA	n/a	1.15%
		E-R Delay	0.1	0.00
		Arrival Delay	0.11	0.03
	Sweden	KEA	n/a	1.21%
		E-R Delay	0.1	0.07
		Arrival Delay	0.35	0.22
FABCE	Austria	KEA	n/a	2.24%
		E-R Delay	0.21	0.05
		Arrival Delay	1.29	0.72
	Croatia	KEA	n/a	1.48%
		E-R Delay	0.22	0.04
		Arrival Delay	0.05	0.00
	Czech Rep.	KEA	n/a	2.35%
		E-R Delay	0.1	0.01
		Arrival Delay	0.30	0.00
	Hungary	KEA	n/a	1.50%
		E-R Delay	0.05	0.07
		Arrival Delay	0.05	0.00
	Slovakia	KEA	n/a	2.29%
		E-R Delay	0.1	0.03
		Arrival Delay	0.00	0.00
	Slovenia	KEA	n/a	1.81%
		E-R Delay	0.21	0.01
		Arrival Delay	0.00	0.00
FABEC	Belgium	KEA	n/a	4.03%
		E-R Delay	n/a	0.72
		Arrival Delay	none	0.73
	France	KEA	n/a	3.62%
		E-R Delay	0.4	1.18
		Arrival Delay	0.60	0.59
	Germany	KEA	n/a	2.81%
		E-R Delay	n/a	0.40
		Arrival Delay	0.65	0.45
	Luxembourg	KEA	n/a	n/a
		E-R Delay	n/a	n/a
		Arrival Delay	0.49	0.08
	Netherlands	KEA	n/a	3.05%
		E-R Delay	n/a	0.29
		Arrival Delay	2.00	2.00
	Switzerland	KEA	n/a	5.12%
		E-R Delay	0.22	0.10
		Arrival Delay	2.35	1.78
NEFAB	Estonia	KEA	n/a	1.26%
		E-R Delay	0.12	0.02
		Arrival Delay	0.00	0.00
	Finland	KEA	n/a	0.89%
		E-R Delay	0.08	0.00
		Arrival Delay	0.13	0.27
	Latvia	KEA	n/a	1.21%

FAB	State	KPI	PP Target	Performance
		E-R Delay	0.04	0.00
		Arrival Delay	0.04	0.01
	Norway	KEA	n/a	2.24%
		E-R Delay	0.08	0.11
		Arrival Delay	0.60	0.44
SW FAB	Portugal	KEA	n/a	1.62%
		E-R Delay	0.15	0.21
		Arrival Delay	0.60	0.63
	Spain	KEA	n/a	4.03%
		E-R Delay	0.29	0.37
		Arrival Delay	0.80	0.89
UK-IRL	Ireland	KEA	n/a	1.39%
		E-R Delay	0.13	0.00
		Arrival Delay	0.18	0.15
	UK	KEA	n/a	4.35%
		E-R Delay	0.23	0.31
		Arrival Delay	0.78	1.19

Table 5: State-level view of Environment and Capacity KPA

Table 6: Actual vs. Determined en-route Unit Costs in 2016



Terminal charging zone	DUC ACT vs PP (2016)	Costs ACT vs PP (2016)	TNSUs ACT vs PP (2016)
Greece	-28,6%	0,1%	40,3%
Cyprus	-24,5%	-8,9%	20,6%
Hungary	-20,0%	-13,0%	8,8%
Malta	-18,6%	0,1%	23,0%
Ireland	-18,2%	-7,5%	13,1%
Belgium Liege	-17,5%	-4,5%	15,8%
Portugal	-16,8%	-3,3%	16,2%
Italy - Zone 1	-16,6%	-16,1%	0,6%
Latvia	-15,5%	-17,7%	-2,7%
Bulgaria	-15,1%	0,9%	18,8%
Italy - Zone 2	-14,7%	-12,9%	2,1%
Belgium Antwerpen	-13,9%	-4,7%	10,7%
Slovakia	-12,5%	-6,6%	6,8%
Belgium Brussels	-8,9%	-3,7%	5,7%
Luxembourg	-5,2%	0,8%	6,3%
Lithuania	-4,8%	5,6%	10,9%
Switzerland	-4,7%	-0,2%	4,8%
Belgium Charleroi	-4,5%	-17,8%	-13,9%
Poland	-4,5%	2,1%	6,8%
Croatia	-4,4%	-0,2%	4,4%
Finland	-4,1%	-2,5%	1,6%
Denmark	-3,3%	8,1%	11,7%
Germany	-2,6%	0,1%	2,8%
Spain	-2,2%	12,1%	14,6%
Netherlands	-0,5%	7,9%	8,5%
Norway	-0,5%	-9,0%	-8,5%
Austria	1,0%	-2,3%	-3,3%
France	2,1%	0,2%	-1,9%
Estonia	3,9%	0,5%	-3,3%
Romania	7,9%	26,7%	17,5%
Czech Republic	8,2%	5,4%	-2,6%
Sweden	16,6%	18,4%	1,6%
Belgium Oostende-Brugge	19,6%	-3,6%	-19,4%
Slovenia	22,7%	13,2%	-7,8%
Union-wide	-4,7%	-0,4%	4,6%

Table 7: Actual vs. Determined terminal Unit Costs in 2016

3 SAFETY

3.1 Presentation of the Safety PIs and KPIs

3.1.1 In RP2, there are Union-wide targets for the following Safety KPIs (SKPIs):

- SKPI1: the Effectiveness of Safety Management (EoSM);
- SKPI2: the application of the severity classification based on the Risk Analysis Tool (RAT) methodology.

3.1.2 The EoSM SKPI shows, at a State level, the capability of authorities to manage the State Safety Programme (SSP) whenever it is in place and, at a service provision level, the service provider's capability to manage an effective Safety Management System (SMS). The application of the severity classification based on the RAT methodology SKPI aims at measuring to what extent the RAT methodology has been applied to assign severity levels to reported ATM incidents by the ANSPs and the Member States. The level of Just Culture SPI aims at measuring the level of presence and corresponding level of absence of just culture at State and at ANSP level. The main objective of the indicator is to identify possible obstacles and impediments to the application of just culture at State and ANSP level.

3.1.3 In addition, the regulation introduces three additional Safety Performance Indicators (SPIs) without targets and for monitoring purposes. These are as follows:

- SPI1: The application by the air navigation service providers of automated safety data recording systems where available, which shall include, as a minimum monitoring of separation minima infringements and runway incursions. (This PI aims at measuring if ANSPs use these tools in a just culture environment to improve the information and analysis by the organisations' SMS).
- SPI2: The reporting by the Member States and air navigation service providers on the level of occurrence reporting, on an annual basis, aiming at measuring the level of reporting and addressing the issue of improvement of reporting culture; and
- SPI3: The number of, as a minimum, separation minima infringements, runway incursions, airspace infringements, and ATM-specific occurrences at all air traffic services units.

3.1.4 The overview of all S(K)PIs used in RP2 are presented in Table 1. Their associated targets are shown in Table 2 above.

3.2 Accidents and Serious Incidents with ANS contribution

3.2.1 The data presented in this section relates to accidents and serious incidents.

3.2.2 Figure 5 shows the number of accidents and serious incidents between 2009 and 2016, (defined by ICAO Annex 13 and assigned to an occurrence by a European Accident Investigation Authority) that are related to the provision of ANS, alongside a rate calculated using the number of flight hours performed within the EU. In the eight year period analysed, there were two fatal accidents that were ANS-related, both in 2012; however in none of them ANS was contributory factor to the accident, which makes them rare (definition of ANS-related and ANS-contribution and detailed scope of analysis are available in Volume 3 of this report).

3.2.3 The figure also shows an overall decreasing trend in the number of serious incidents since 2010 with fluctuations within the period analysed.

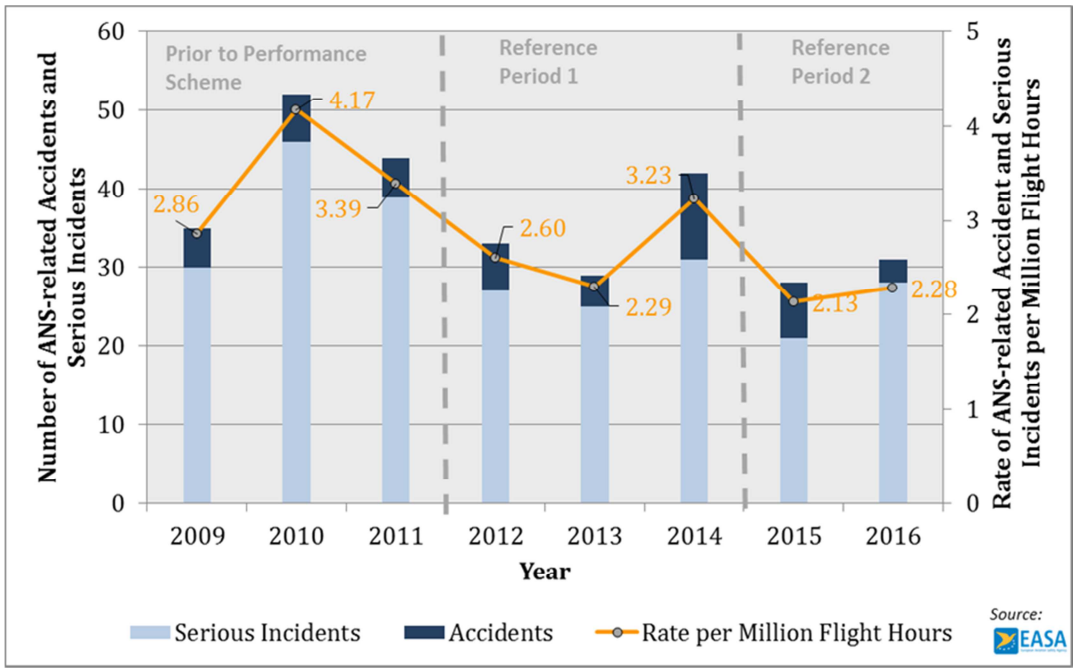


Figure 5: ANS related accidents and serious incidents (2009-2015)

3.2.4 Figure 6 shows accidents and serious incidents with ANS contribution identified in their investigation. These preliminary figures for 2016 suggest a similar level of ANS safety performance compared with previous year.

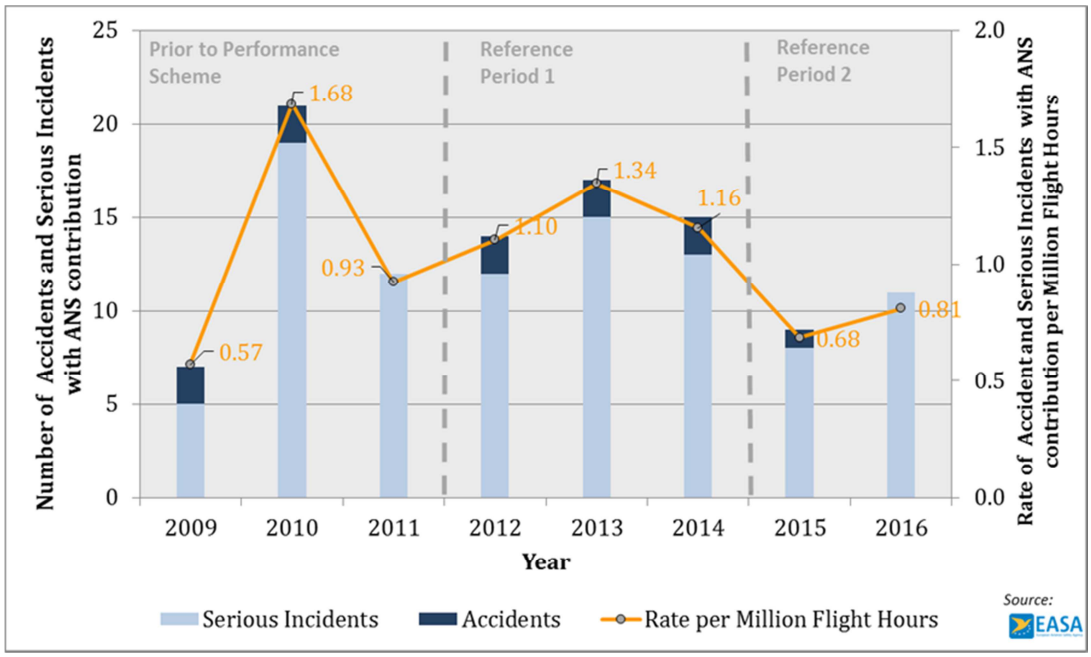


Figure 6: ANS contribution accidents and serious incidents (2009-2015)

3.2.5 Overall the safety reporting environment is changing in Europe, due to introduction of the new Occurrence Reporting Scheme in November 2015 and it has to be accepted that the next few years will be a transition phase. During this time, in order to maintain and improve European reporting, it is important that actors responsible for the collection of safety data work together in order to create an optimum solution.

3.2.6 During this transition phase, availability, completeness and quality of safety data may change if there are no appropriate arrangements in place between all parties involved in the process. Therefore, the quality and completeness of the used databases will closely be monitored and the choice of databases might change in the future.

3.2.7 Note that more detailed analysis of ANS accidents and serious incidents are available in Volume 3 of this report.

3.3 Effectiveness of Safety Management

3.3.1 All 30 States and 31 ANSPs, including MUAC, filled in the questionnaires used for the measurement of the EoSM SKPI in accordance with AMC/GM for the Implementation and Measurement of Safety Key Performance Indicators (EASA Decision 2011/017R, amended by ED Decision 2014/035/R and ED Decision 2015/028/R). In accordance with the AMC, the responses of all States have been verified by EASA standardisation team while the responses of the ANSPs have been verified by the State Competent Authorities.

3.3.2 The following paragraphs summarise the analysis of the EoSM results provided by the States and ANSPs. Note that the EoSM scores provided by States were subject to EASA review using the data from the audits and the follow up of the corrective measures. Results of this verification exercise on State level can be found in the PRB Annual Monitoring Report - Volume 2.

3.3.3 Figure 7 and Figure 8 show the EoSM results of States and ANSP respectively in 2016.

3.3.4 The lowest EoSM Score provided by the individual States in 2016 is 40 with six (6) of the States scoring below 50, as opposed to 9 in 2015, and the highest EoSM score at State level in 2016 is 86. The average EoSM score has increased from 56 in 2015 to 60 in 2016. These values are not directly comparable with RP1 values as there was no verification of the self-assessed score in RP1. From the start of RP2 EASA has verified all self-assessed scores including levels D and E with the exception of the questions Q3.8 (Safety Assurance), Q5.1 and Q5.2 (Safety Culture), all of them related to the existence and measurement of a safety culture. This means that State responses were adjusted (if necessary) after EASA verification.

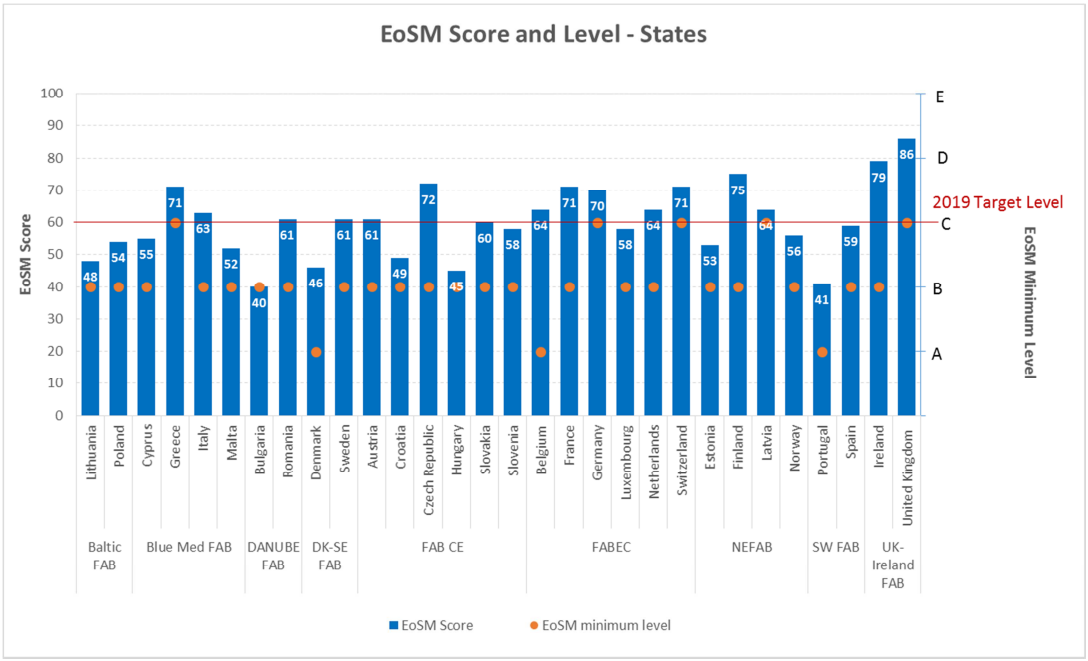


Figure 7: 2016 Effectiveness of Safety Management for States

3.3.5 As it is important to look at the results of EoSM both in terms of EoSM overall Maturity Score and in terms of Maturity Level, and as the RP2 has introduced targets to be achieved by 2019 on EoSM Level, Figure 7 on the second axis shows EoSM Minimum Level achieved by each State (EoSM scores (blue bars) vs. EoSM minimum Maturity Level achieved (on the second axis – black dots)).

3.3.6 Despite the improvement on the EoSM overall score in 2016, **Figure 7** supports the observation that some core elements of the safety oversight system are still missing in many States. These elements are closely monitored by EASA as part of its obligations.

3.3.7 Analysis of the overall EoSM Minimum Maturity Level Achieved further shows that five (5) States out of 30 are already at Level C (**Figure 7**), as opposed to last year when only one State had reached that level. Three States have a Level A. When excluding Component 5 – *Safety Culture*, which was not verified, there are still 19 States out of 30, approximately 63%, below 2019 RP2 target level C.

3.3.8 **Figure 8** shows that the minimum effectiveness score by individual ANSPs in 2016 is 29 with only one (1) ANSP scoring below 50. The maximum effectiveness score at ANSP level in 2016 is 92, with five (5) ANSPs above 90. The average score value achieved by all ANSPs increased from 79 in 2015 to 80 in 2016.

3.3.9 The analysis of the overall EoSM Minimum Maturity Level Achieved by ANSPs shows that all ANSPs except one (1) are already at Level C or above for Safety Culture, which is the 2019 target Level, and that 17 ANSPs out of 31, approximately 55%, have already achieved the 2019 EoSM target, i.e. level D, for all other MOs (the four EoSM Components other than Safety Culture). When looking at the evolution of performance from 2015 to 2016, it is worth noting that the number of ANSPs that have achieved the target for all other MOs increased from 10 to 17.

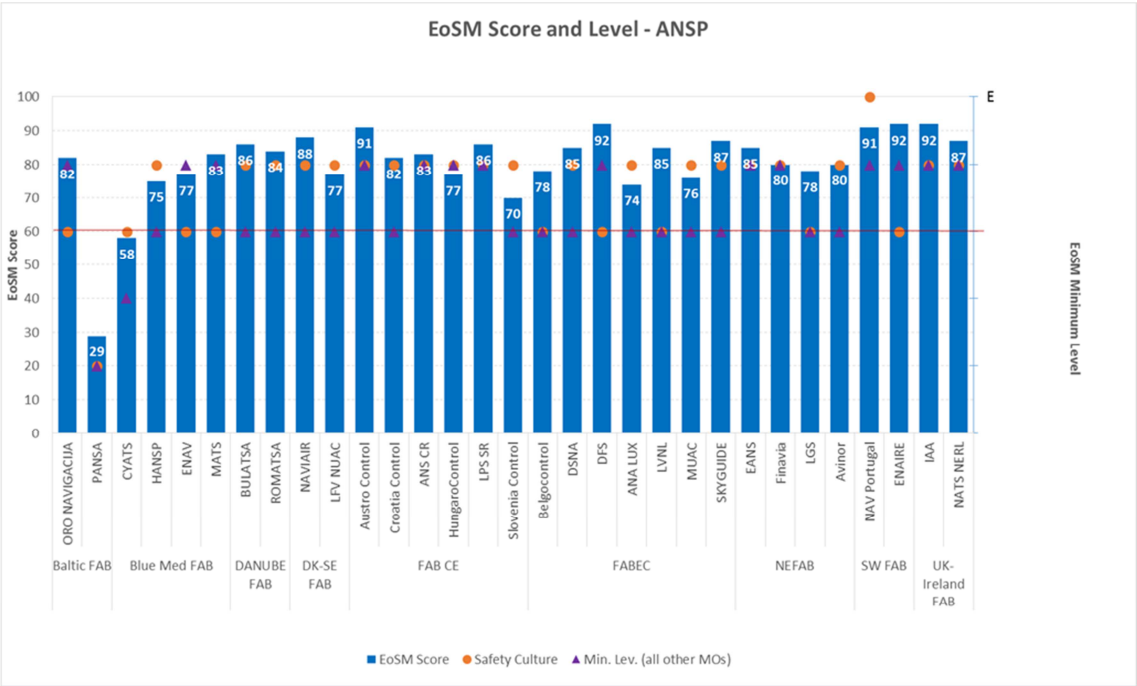


Figure 8: 2016 Effectiveness of Safety Management for ANSPs

3.3.10 Note that more detailed results of EASA EoSM review for each State are available in Volume 2 and Volume 3 of this report.

3.4 Application of RAT Methodology

3.4.1 In accordance with Commission Regulation (EU) No 390/2013, States are required to report the proportion of SMIs, RIs and ATM-S for which the severity classification was assessed using the RAT methodology.

3.4.2 In the first year of RP2 monitoring, the AST reporting mechanism is still used as the main vehicle for reporting the application of severity classification using the RAT methodology.

3.4.3 In RP2 several changes have been introduced to the monitoring of the application of the RAT methodology for deriving the severity for the reported occurrences: the RAT methodology is only mandatory for deriving the severity of A, B and C reported SMIs and RIs, and AA, A, B and C severity for ATM-S and Regulation (EU) No. 390/2013 (hence, including the use of the RAT Methodology) may not be applicable at airports and traffic units with less than 70,000 IFR movements per year.

3.4.4 From the Union-wide perspective and taken all occurrences reported collectively into account, targets for 2017, as per Commission Implementing Decision (EU) 2015/19, are already achieved for its application to the SMI occurrences and RI Ground component (see Figure 9). For RI Overall, and ATM-specific occurrences the percentages do not achieve the targets of 2017. The situation in 2016 has deteriorated in comparison with 2015. The RAT application to RI Overall and ATM-s overall are again the categories below the targets but the percent of RAT application dropped in those components and RI-ground too.

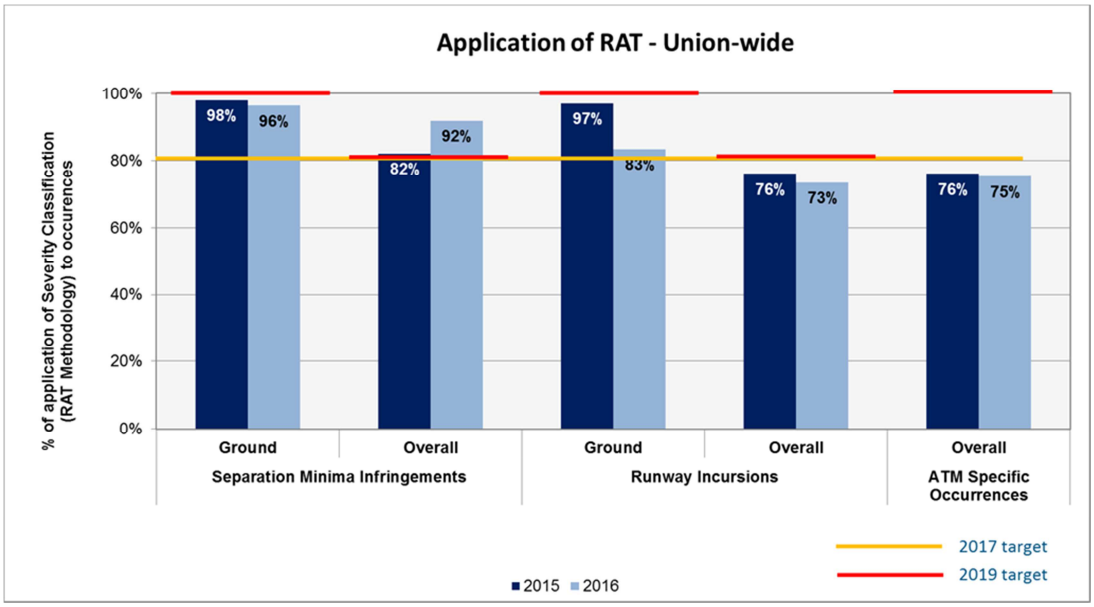


Figure 9: 2016 severity assessment using RAT methodology (Union-wide)

3.4.5 It is observed that, at the Union level, the number of SMI, RI and ATM-s occurrences that required the application of RAT have increased in both elements where RAT is applied, ground and overall.

3.4.6 Note that more detailed results of the RAT methodology application are available in Volume 3 of this report.

3.5 Other safety performance indicators

3.5.1 Other safety indicators are monitored, among which is highlighted the number of occurrences reported. The most informative information that can be derived from this safety

PI is linked to the evolution of the metrics across years. However, any trend should be read carefully and not correlate immediately with greater or lower levels of safety of the services as there are additional factors that may influence its evolution, e.g., the level of traffic, improvement/deterioration in the reporting culture, or change of interpretation of occurrence definitions or applicability within the Performance Scheme.

3.5.2 **Table 8** lists the evolution of the total number of occurrences at union-wide level. While the number of Separation Minima Infringements (SMIs) and ATM-specific (ATM-s) occurrences have decreased by 3% and 7%, respectively, the reported number of Runway Incursion (RI) and Airspace Infringements (AI) occurrences have both increased by 7% and 20%, respectively in 2016 with respect to 2015.

TYPE OF OCCURRENCE		2015	2016	VARIATION
Reported occurrences Union-wide	SMI	2,290	2,231	↓ -3 %
	RI	1,024	1,099	↑ 7%
	AI	4,041	4,838	↑ 20%
	ATM-S	15,111	14,089	↓ -7%

Table 8: Union-wide number of high and low severity reported occurrences

3.5.3 Note that additional indicators and analysis are available in Volume 3 of this report.

4 ENVIRONMENT

4.1 Presentation of the Environment PIs and KPIs

4.1.1 The Performance Regulation 390/2013 defines two KPIs for horizontal en-route flight efficiency at Union-wide level:

- **KEA**: The average horizontal en-route flight efficiency of the **actual** trajectory, and;
- **KEP**: The average horizontal en-route flight efficiency of the **last filed flight plan** trajectory.

4.1.2 For local target setting and performance monitoring, only the KEA is defined as a KPI for horizontal flight efficiency at FAB level.

4.1.3 The Performance Regulation further defines a number of performance indicators (PI) related to the operational performance at and around airports, to be monitored at both European and local levels (i.e. national level with a breakdown at airport level). Details of the European Level monitoring can be found in Table 1. The following PIs are monitored at local level:

- additional time in the taxi-out phase, and
- additional time in the terminal airspace.

4.1.4 With RP2, the average additional time in terminal airspace and taxi-out phase are associated to the Environment KPA. This reflects the recognition that inefficiencies in terms of additional times are directly linked with engine fuel burn and hence have an influence on the Environment.
Next to the obvious emissions, inefficiencies in terms of higher additional times can additionally contribute to the noise exposure during the departure phase (i.e. taxi-out) and arrival phase (i.e. terminal airspace).

4.1.5 The overview of all (K)PIs used in RP2 are presented in Table 1. Their associated targets are shown in Table 2.

4.2 Horizontal En-route Flight Efficiency

4.2.1 Table 9 provides the performance achieved by the different FABs and Network Manager (SES Area) as measured by the KEA indicator.

FAB	2012	IMPROVEMENT 2012-2019		2015	2016	2017	2018	2019
Baltic	1.61%	0.25%	Target	1.50%	1.47%	1.44%	1.40%	1.36%
			Actual	1.60%	1.68%	---	---	---
BlueMed	3.02%	0.57%	Target	2.78%	2.70%	2.62%	2.54%	2.45%
			Actual	2.80%	3.17%	---	---	---
Danube	1.69%	0.32%	Target	1.55%	1.50%	1.46%	1.41%	1.37%
			Actual	1.26%	1.60%	---	---	---
DK-SE	1.20%	0.01%	Target	1.20%	1.20%	1.20%	1.20%	1.19%
			Actual	1.18%	1.20%	---	---	---
FAB CE	2.13%	0.32%	Target	1.99%	1.94%	1.90%	1.85%	1.81%
			Actual	1.91%	1.97%	---	---	---

FAB	2012	IMPROVEMENT 2012-2019		2015	2016	2017	2018	2019
FABEC	3.56%	0.60%	Target	3.30%	3.22%	3.14%	3.05%	2.96%
			Actual	3.34%	3.40%	---	---	---
NEFAB	1.44%	0.22%	Target	1.35%	1.32%	1.29%	1.26%	1.22%
			Actual	1.40%	1.72%	---	---	---
SW-FAB	4.27%	0.99%	Target	3.85%	3.71%	3.57%	3.43%	3.28%
			Actual	3.39%	3.49%	---	---	---
UK-IRL	3.64%	0.65%	Target	3.36%	3.27%	3.18%	3.09%	2.99%
			Actual	3.47%	3.85%	---	---	---
SES area			Target	2.96%	2.87%	2.78%	2.69%	2.60%
			Actual	2.80%	2.96%	---	---	---

Table 9: KEA Performance by FAB

4.2.2 Targets for 2016 were met by two of the nine FABs, namely DK-SE FAB and SW FAB, which already met their target back in 2015. All nine FABs have registered a decrease in performance with respect to 2015. As a result the Network Manager has also not met the target value for the SES area.

4.2.3 In addition to the KEA indicator, the Network Manager has also a target on the KEP indicator, which is based on flight plans. Table 10 lists the KEP and KEA indicator for the Network Manager. Neither for KEP nor KEA have the indicative target values been met. Similarly to KEA performance, KEP has deteriorated with respect to 2015.

AREA	INDICATOR		2015	2016	2017	2018	2019
SES	KEP	Target	4.78%	4.61%	4.44%	4.27%	4.10%
		Actual	4.84%	4.91%	---	---	---
	KEA	Target	2.96%	2.87%	2.78%	2.69%	2.60%
		Actual	2.80%	2.96%	---	---	---

Table 10: KEP & KEA Performance at Union-wide level

4.2.4 Figure 10 shows the evolution of KEP and KEA (i.e., when excluding the ten worst and ten best days) for the SES area, together with the monthly values for HFE. It can be noticed how, in particular for KEA, the summer months have been the most difficult.

4.2.5 It should be noted that for the SES area, for which KEP and KEA are both available, the gap between the two values has reduced but this is due to KEP performance deteriorating at a lower rate than that of KEA performance (rather than, as envisaged, an improvement in KEP at an higher rate than the improvement of KEA).

4.2.6 The measurement of KEP and KEA includes the interface component which is the additional distance due to entry and exit points. As highlighted by NM in the European Route Network Improvement Plan (ERNIP), it requires and will require particular attention. Details per FAB are provided in the remarks in Volume 2.

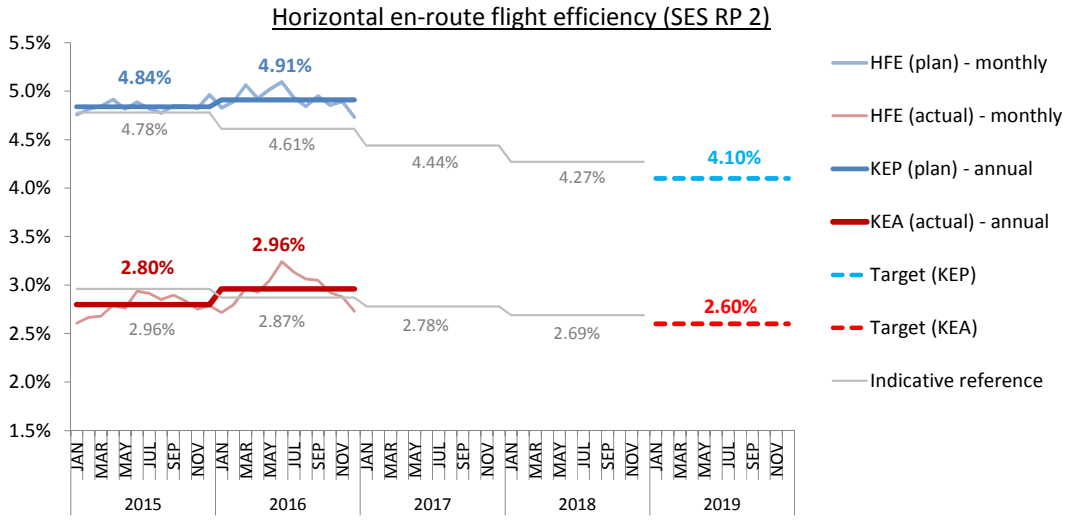


Figure 10: Evolution of Horizontal En-Route Flight Efficiency indicators

4.3 Effective Use of Conditional Routes

4.3.1 The Network Manager, in the Airspace Management Performance Report 2016 to NETOPS, reports the proportion of flights planning to use conditional routes (CDRs) as the Rate of Aircraft Interested (RAI) below.

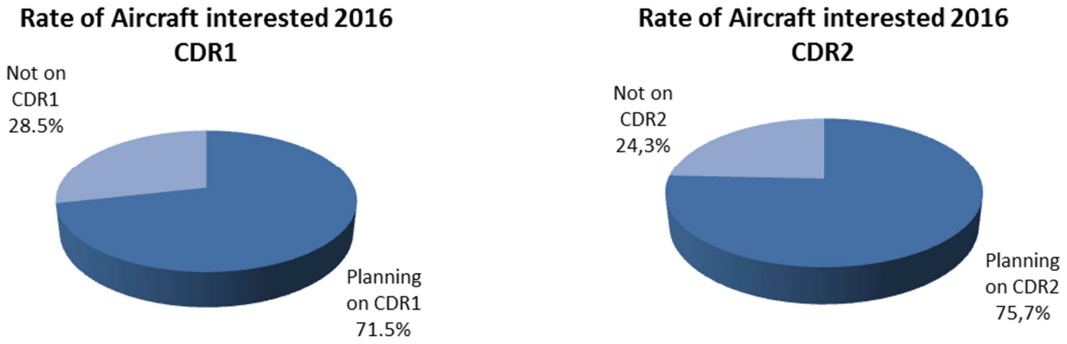


Figure 11: Ratio of flights planned via Conditional Routes (RAI)

4.3.2 The Network Manager, in the same publication, reports the proportion of flights that actually used conditional routes (CDRs) as the Rate of Actual Use (RAU) below.

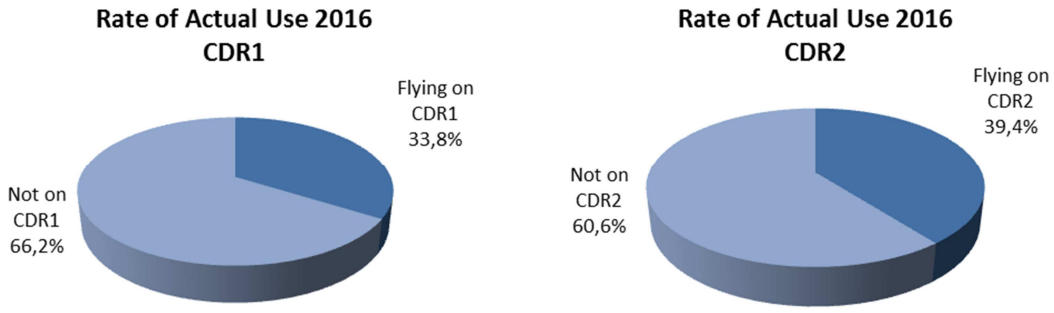


Figure 12: Ratio of flights actually using Conditional Routes (RAU)

4.3.3 The above figures are consistent with previous years (2012-2015) in the SES Performance Scheme where the PRB has used the figures provided to the NETOPS forum. The NETOPS report differs from the RP2 Performance Monitoring report. In the RP2 Performance Reporting Template 2016 completed by the Network Manager the figures for CDR-RAI are reported as 25.8% and CDR-RAU is reported as 12%, no distinction is made between CDR1 and CDR2.

4.3.4 In the Annual Network Operations Report 2016, the Network Manager reports on the deterioration of the Rate of Aircraft actually using CDRs: "This is the result of ATC intervention for various reasons (expedite traffic, weather, etc.) as well as due to the expansion of FRA implementation in ECAC, making many CDRs no longer a better solution for flying".

4.3.5 Information was available, and provided, at local level from only 1 of the 28 States.

4.3.6 With the on-going further implementation of Free Route Airspace throughout the Network, the concept of CDRs is no longer relevant. In the PRB Annual Monitoring Report 2014 (and again in 2015) the PRB recommended that this indicator should be reviewed in terms of effectiveness in reporting on ANS performance.

4.4 Effective Booking Procedures

4.4.1 Effective booking procedures are presented for each State in Volume 2 of this Monitoring Report. The vast majority of States (20/30) only reported partial information relating to this PI, and 7 States did not provide any information.

4.5 Civil Military Dimension of the Plan

4.5.1 Article 11.3.(f) of the Performance Regulation 390/2013 mandates performance plans to include a description of the civil-military dimension of the plan describing the performance of flexible use of airspace (FUA) application in order to increase capacity with due regard to military mission effectiveness.

4.5.2 The FAB monitoring templates requested FABs and States to provide information on how capacity has been increased through cooperation and coordination between civil and military stakeholders.

4.5.3 The PRB notes that, although several FABs and States reported on existing civil-military arrangements, providing information on how civil-military cooperation and coordination has actually increased capacity is the exception rather than the rule.

4.6 Application of FUA

4.6.1 Annex V paragraph 1.1(j) of the Performance Regulation requires National Supervisory Authorities to provide information on how the FUA concept is applied by the national/FAB authorities to provide the optimum benefit for both civil and military airspace users.

4.6.2 Paragraph 1.2 of the same Regulation requires NSAs to submit their yearly survey on the application of the FUA concept.

4.6.3 The FAB monitoring template requested FABs and States to provide information on how the States review their application of FUA to ensure they are providing the optimum benefit for airspace users.

4.6.4 The PRB notes the inconsistent and varied reporting by the States on this subject and the general absence of annual review processes on the application of FUA by the States.

4.7 Additional Time in Taxi-Out Phase and Terminal Airspace (ASMA)

Airport Operator Data Flow

4.7.1 As mentioned above, with RP2, the average additional time in terminal airspace and taxi-out phase are associated to the Environment KPA. This reflects the recognition that additional times are directly linked with engine fuel burn and related emissions. In order to ensure the robust monitoring of the environmental impacts, appropriate data collection across the European airports is required. The transition from RP1 to RP2 resulted in the number of airports subject to the Performance Regulation 390/2013 to increase from 77 to 173 in 2015 and then 174 in 2016, including the alignment of airports subject to the performance and charging regulations. This poses a data quality assurance problem: 1.) there has been a number of airports subject to RP1 that have not established full compliance with the reporting requirements under RP1, and 2.) the integration of additional airports subject to RP2. In consequence the operational data flow for performance monitoring at airports is not yet fully implemented.

4.7.2 To cope with the number of airports and ensure quality of the reporting, technical processes and organisational measures have been established and are maintained by the PRU. The PRU is in contact with the identified reporting entities to establish the data flow and ensure compliance with the associated data specification. In case of major non-compliance or non-responsiveness by the identified reporting entity, the PRU liaises with the respective authorities. While the reporting situation is steadily improving, it must be noted that for some of the airports included with RP2 performance plans, the level of knowledge about the allocation and the resulting reporting requirements is low. Work is on-going to iteratively establish and implement the regular data reporting for these airports.

4.7.3 The status of the implementation of the airport operator data flow can be derived from Table 11 and Table 12. Table 11 summarizes the reporting situation at the end of 2016. At the time being only a third of the airports subject to RP2 provide the required data for the monitoring of the environmental indicators.

Total # airports subject to RP2	# Airports with valid data: **Both** ASMA and ATXOT	# Airports with valid data: Only ASMA	# Airports with valid data: Only ATXOT	# Airports without any ASMA or ATXOT valid data	% airports with complete data flow
174	57	8	1	108	32.8%

Table 11: Airport Operator Data Flow Status – ASMA and Additional TXOT

4.7.4 Throughout 2016, various airport operators completed the data technical preparatory phase and validation of the data flow. Respective monitoring results will be available in the following years[5]. Details on the implementation level can be found in Volume 2 for each SES State.

Monitoring at National or EU-wide level

4.7.5 Given the widely unchanged status of validated data collection, the indicator for the average additional time in the taxi-out phase and terminal airspace cannot be readily determined for all air navigation services at airports subject to RP2. In particular, the aggregation of the indicators at FAB or Union-wide level is of little value at this stage due to the high number of

[5] Operational ANS performance data at airport level will be published (i.e. airports with valid data) if the data provider successfully established the compliance with the airport operator data flow and not more than 2 months of data are missing per year. Aggregated national results will only be published, if all airports subject to RP2 are considered valid.

airports with missing data.

4.7.6 The monitoring of local indicators at national or EU-wide level poses a further difficulty. Variations in traffic and the locally achieved performance might be masked by the associated national or EU-wide level. Conceptually, the national average will be strongly driven by the achieved performance at the major airport(s) in a specific State. This is amplified by aggregating the indicators on regional (i.e. FAB) level. This masking effect can be seen when comparing Table 12 and Table 13. The skewing of the national average of additional taxi-out time and time in the terminal airspace (ASMA) can be observed in the case of States with services subject to RP2 at several airports.

State	# airports	Avg. add. taxi-out time (min. per dept.)	Airports with valid data	% airports with valid data	Avg. add. ASMA time (min. per arrival)	Airports with valid data	% airports with valid data
Austria	6		1	16.7%		1	16.7%
Belgium	5		2	40.0%		2	40.0%
Bulgaria	1	**1.41**	1	100.0%	**0.45**	1	100.0%
Croatia	1			0.0%			0.0%
Cyprus	2			0.0%			0.0%
Czech Republic	4		1	25.0%		1	25.0%
Denmark	1	**2.32**	1	100.0%	**1.56**	1	100.0%
Estonia	2		1	50.0%		1	50.0%
Finland	1	**2.80**	1	100.0%	**0.98**	1	100.0%
France	60		4	6.7%		5	8.3%
Germany	16		14	87.5%		14	87.5%
Greece	1	**1.31**	1	100.0%	**1.10**	1	100.0%
Hungary	1	**1.39**	1	100.0%	**0.94**	1	100.0%
Ireland	3		2	66.7%		2	66.7%
Italy	5	**4.11**	5	100.0%	**1.10**	5	100.0%
Latvia	3		1	33.3%		1	33.3%
Lithuania	4			0.0%			0.0%
Luxembourg	1			0.0%	**0.61**	1	100.0%
Malta	1			0.0%	**0.67**	1	100.0%
Netherlands	4		1	25.0%		1	25.0%
Norway	4			0.0%		3	75.0%
Poland	15		1	6.7%		1	6.7%
Portugal	10		2	20.0%		2	20.0%
Romania	2			0.0%		1	50.0%
Slovakia	1			0.0%	**0.31**	1	100.0%
Slovenia	3		1	33.3%		1	33.3%
Spain	5	**3.72**	5	100.0%	**1.67**	5	100.0%
Sweden	1	**2.08**	1	100.0%	**1.18**	1	100.0%
Switzerland	2	**3.11**	2	100.0%	**2.58**	2	100.0%
United Kingdom	9	**5.54**	9	100.0%		8	88.9%

Table 12: Additional Taxi-Out time & Additional ASMA time - (2016) National Level

Monitoring At Local Level

4.7.7 Air traffic varies across airports in Europe. Table 13 lists the subset of airports with more than 200 000 movements per year clustered in three groups of traffic and mapped to operational bounds per indicator. Table 13 shows the locally achieved performance in 2016 for each cluster with a view to flagging higher levels of additional time that have an impact on environmental performance.

		IFR Movements (thousands per year (2016))					
		above 400		300 – 400		200 – 300	
Additional Taxi-Out Time	> 4 min/dep.	LFPG EGLL	4.23 8.44	LEMD LIRF LEBL	4.01 6.58 5.18	EGKK EIDW	7.96 5.03
	3 to 4 min/dep.	EDDF	3.23	EDDM	3.10		
Additional Time in Terminal	> 3 min/arr.	EGLL	8.43			EGKK	4.20
	2 to 3 min/arr.			EDDM LEBL	2.00 2.25	LSZH EIDW	2.81 2.67

Table 13: Additional Taxi-Out time & Additional ASMA time - (2016) Local Level

4.7.8 Insofar as the additional taxi-out time is concerned, London Heathrow (EGLL), Rome Fiumicino (LIRF), and London Gatwick (EGKK) accrued a significant share of additional time of around 7 minutes or more. At these airports a similar level of additional time was already accrued in 2015. Amsterdam Schiphol (EHAM), for example, the busiest airport in 2016, accrued an additional taxi-out time below the operational bound established in Table 13. EHAM accrued an additional taxi-out time of 2.2 min/dep. Services at Frankfurt (EDDF) and Munich (EDDM) range slightly above the threshold of 3 minutes per departure.

4.7.9 London Heathrow (EGLL) with 8.43 min/arr. and London Gatwick (EGKK) with 4.20 min/arr. also reach the higher values regarding the additional time in the terminal airspace. The operational concept in combination with the high level of capacity utilisation at EGLL results in this high level of accrued additional time in the terminal airspace.

5 CAPACITY

5.1 Presentation of the Capacity PIs and KPIs

5.1.1 The KPI used for Union-wide en-route capacity is the average minutes of en-route ATFM delay per flight attributable to ANS.

5.1.2 As far as local target setting is concerned, the Performance Regulation 390/2013 defines two KPIs, namely:

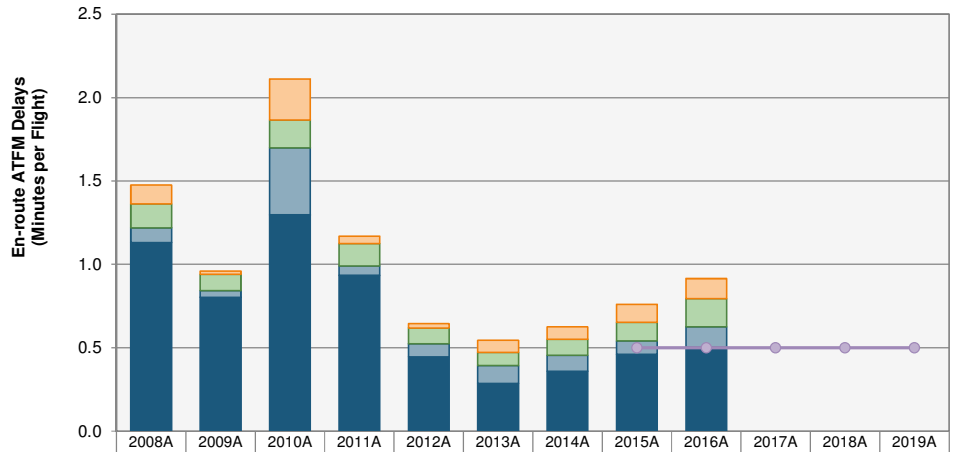
- average minutes of en-route ATFM delay per flight at FAB level, with a breakdown monitored for reasons of transparency at the most appropriate level, and;
- average minutes of arrival ATFM delay per flight attributable to terminal and airport ANS and caused by landing restrictions at the destination airport. In this case, it is at national level, with a breakdown at airport level for monitoring purposes.

5.1.3 The Performance Regulation 390/2013 also defines a number of Performance Indicators (PI) related to the operational performance of air navigation services at and around airports, monitored at both European and local levels (i.e. national level with a breakdown at airport level).

- the arrival ATFM delay is monitored at Union-wide level;
- the adherence to ATFM slots;
- the average minutes of ATC pre-departure delay.

5.1.4 The Commission did not accept, by end-2016, the capacity targets for two FABs: BlueMed FAB and FABEC, as in both cases the targets were not consistent with the Union-wide targets for en-route capacity.,

5.1.5 The Commission subsequently accepted revised capacity performance targets for FABEC in Commission Decisions (EU) 2017/552 (Switzerland) & 2017/553 (Belgium, Germany, France, Luxembourg and the Netherlands) of 22nd March 2017.



	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015A	2016A	2017A	2018A	2019A
Other	0.11	0.02	0.25	0.04	0.03	0.07	0.07	0.11	0.12			
Weather	0.14	0.10	0.17	0.14	0.10	0.08	0.10	0.11	0.17			
ATC Other	0.09	0.04	0.40	0.06	0.08	0.11	0.10	0.08	0.12			
Capacity/Staffing	1.13	0.80	1.30	0.93	0.45	0.29	0.36	0.46	0.50			
NPP Total ER ATFM Delay								0.50	0.50	0.50	0.50	0.50
Total	1.48	0.96	2.11	1.17	0.65	0.55	0.63	0.76	0.91			

Figure 13: Average en-route ATFM Delay in RP1 and RP2

5.2 En-Route ATFM Delays: Union-wide

5.2.1 **Error! Reference source not found.** shows the average en-route ATFM delay by cause for the RP2 area between 2008 and 2016, as provided by the Network Manager.

5.2.2 The Union-wide en-route capacity target for RP2 is 0.5 min. per flight (RP2 area, all delay reasons, all years during RP2).

5.2.3 The Union-wide target was not achieved in 2015 and 2016 as shown in Table 14. For 2016, the actual delay KPI was 0.91 min. per flight.

5.2.4 The cost to airspace users of this **additional** delay (0.41 min. per flight) is estimated at 390M€ (0.41 x 25,972 flights/day x 366 x €100[viii]).

5.2.5 The Network Manager's Annual Reporting 2016 on NM Performance RP2 (NPP)[ix] highlights the major contributors to the delay as being capacity and staffing constraints during the summer period and weekends; industrial action in the first half of 2016, and an increase in weather related delays. Further details of major capacity constraints are provided in the relevant sections of Volume 2 of this PRB Monitoring Report.

	2015	2016	2017	2018	2019
Union-wide target	0.5	0.5	0.5	0.5	0.5
Actual performance	0.76	0.91			
Difference	**+0.26**	**+0.41**			

Table 14: ATFM Delay Performance at Union-wide level

5.2.6 In reporting against the strategic objective to plan optimum capacity the Network Manager states[x]:

*"Although the network **capacity** target could not be met in 2016, the **NOP planning process** is fully mature and proved its relevance. The analysis of 2016 results showed that among the 6 ANSPs where capacity issues were anticipated, the 3 who implemented the measures proposed by NM through the collaborative decision making processes and agreed by ANSPs, eventually made an important contribution to network performance. If the 3 other ANSPs had progressed the implementation of their measures, the Network would have met the 0.5 min/flight target (all other assumptions being equal)."*

5.2.7 As the PRB has previously highlighted[xi], the States with capacity problems, must ensure that their ANSPs implement the remedial actions proposed by the NM and provide the much needed capacity.

5.2.8 The Network Operations Plan (NOP) covering the period 2017-2021[xii], contains capacity plans that are inconsistent with the required performance to meet the Union-wide target for en-route capacity for the remainder of RP2, considering all causes of delay.

5.2.9 The prediction of the Network Manager, contained within NOP 2017-2021, is that unless current capacity plans are improved, the Union-wide target for en-route ATFM delay will not be achieved in any year of RP2.

5.3 En-Route ATFM Delays: Local level (Functional Airspace Block (FAB))

5.3.1 The local (FAB) targets for en-route capacity are as adopted in the relevant FAB performance plans. Each FAB was provided with a reference value (that would ensure consistency with the Union-wide target), for each year of RP2, as published in the NOP.

5.3.2 Five of the nine FABs achieved their en-route capacity targets. Indeed all five of these FABs provided a positive contribution to network performance by achieving a more stringent capacity performance than their respective reference values.

2016 / FAB	Reference Value	FAB Target	Actual Performance
Baltic	0.21	0.21	0.35
BlueMed	0.18	0.36	0.13
Danube	0.04	0.03	0.00
DK-SE	0.10	0.10	0.05
FAB-CE	0.29	0.29	0.08
FABEC	0.42	0.49	1.07
NEFAB	0.12	0.12	0.07
SW FAB	0.31	0.31	0.42
UK-IRL	0.26	0.26	0.30

Table 15: ATFM Delay Performance by FAB

5.3.3 Four FABs achieved neither their FAB targets nor their respective reference values: Baltic FAB, FABEC, South West FAB and UK IRL FAB.

5.3.4 Analysis of individual FAB performance and further analysis of capacity performance at State level can be found in Volume 2 of this Report.

5.4 Change to the method of ATFM Delay Calculation

5.4.1 On 4th April 2016, following a decision of the Network Management Board, the Network Manager implemented a system change to eliminate errors in the quantification of ATFM delays brought about through usage by ATC units of the aircraft 'ready message' (REA). The REA message is used, at the discretion of ATC, to seek improvements in Calculated Take-Off Time (CTOT) for specific aircraft that report ready to depart with minimum delay if an improvement is available.

5.4.2 The REA message does not increase the delay experienced by the aircraft, even if no slot improvement was possible. The previous methodology for the calculation of ATFM delay was erroneously considering the ATC update of an aircraft's ability to depart as being an update of the last filed flight plan, and thus was increasing the period between Estimated Take-Off Time (ETOT) and CTOT. Such errors could result in ATFM delay figures being inflated even though no aircraft faced increased penalisation. This, in turn, could lead to the situation where ATC no longer try and improve the CTOT for aircraft, because doing so would result in being 'penalised' in terms of performance calculations.

5.4.3 Based on the implementation date of the system change / calculation method and with a view to overcoming issues in terms of retrospective corrections for the first quarter of 2016, the Commission approved the implementation of the improved ATFM delay calculation methodology from its implementation date of April 4th 2016. The data used for performance monitoring purposes (i.e. SES RP2 Performance Dashboard, pre-filled RP2 Monitoring Templates) reflect this decision accordingly.

5.5 En-route capacity incentive schemes

5.5.1 The PRB provided SSC 63 (December 2016) with a review of the incentive schemes presented in the FAB performance plans, as part of the performance plan review process and provided the States with its opinion on the compliance of the individual incentive schemes with the published legislation. (WP SSC 63 Flimsy 5 PRB recommendations refers)

5.5.2 The main concerns of the PRB related to motivating the ANSPs to improve performance; documentation of the incentive schemes; inducement of a high-level of service – better than currently provided and contributing to the Union-wide target; effective monitoring by NSAs;

bonuses being paid for sub-optimal performance; appropriate consultation with airspace users; consideration of FAB performance; consistency of targets with Union-wide target and reconciliation of allocation of delay with actual delay causes through a rigorous and independent process.

5.5.3 The PRB provided comments on what it saw as issues that should be addressed in regards to the incentive schemes established by the various FABs / States in the PRB Annual Monitoring Report 2015.

5.5.4 The annual monitoring reports received from each FAB contained information on the results of the relevant incentive schemes applied during 2016. With the exception of Cyprus, which has introduced a financial incentive scheme without providing any details, there is no change to any incentive scheme from 2015. [In 2015, when DCAC failed to achieve the national target, Cyprus applied a non-financial incentive scheme without providing details.]

5.5.5 States report that, during 2016, 11 ANSPs achieved performance levels which resulted in an aggregated additional payment equivalent of more than €8 million [ANS CR; Austrocontrol; Bulatsa; CroatiaControl, DCAC, EANS; ENAV; Finavia; LGS; LPS SR & Slovenia Control].

5.5.6 States report that five ANSPs achieved performance levels that result in aggregated financial penalties equivalent to €5.1 million [Belgocontrol, DSNA, EUROCONTROL (MUAC), NATS & PANSA]. Two ANSPs were not subject to an incentive scheme [MATS, HANSA].

5.5.7 States report that twelve ANSPs achieved capacity performance within a dead-band of neither penalty nor bonus [Avinor; DFS; ENAIRE; Hungarocontrol; IAA; LFV; LVNL; Naviair; Nav Portugal; Oro Navigacia; Romatsa and Skyguide]. The remaining two ANSPs were not subject to an incentive scheme [MATS, HANSA].

5.5.8 Further information and analysis for each en-route capacity incentive scheme applied during 2016 can be found in Volume 2 of this Annual Monitoring Report.

5.6 Incorporation of Post Operations Performance Adjustment Process

5.6.1 For the 2016 monitoring, the Commission decided to incorporate the results of the Post Operations Performance Adjustment Process (operated by the Network Manager on behalf of the National Supervisory Authorities, and approved by the Network Management Board), into the pre-filled monitoring templates for the SES States. NM describes the process in the following link: http://www.eurocontrol.int/publications/post-operations-performance-adjustment-process. The output of the process, in the case of an approved change, is a revised classification or attribution of ATFM delay.

5.6.2 Whilst there is no doubt that the Network Manager has performed the process in an impartial and professional manner, the following issues should be noted:

- The transfer of delays to a third party may not be consistent with the performance legislation, in regards to performance monitoring at local level; and in particular the requirement that “the indicator covers all IFR flights traversing the local airspace”. If the delayed flight did not traverse the local airspace (of the third party) then there is a question if the delay can be assigned correctly;
- Incorporating the Post Operations Performance Adjustment Process into the performance data at source (instead of attaching it as an addendum) risks presenting a misleading picture of capacity performance. Fundamentally, ATFM delays occur because local ATC capacity is unable to accommodate specific traffic demand (irrespective of the underlying reason). Similarly, ATFM delays can be resolved or mitigated by safely increasing local ATC capacity to meet particular demand. Breaking,

or reducing, the link between local capacity and local demand means that solvable capacity constraints may remain unaddressed.

5.7 Positive contribution to Network Performance

5.7.1 As reported in Table 15, five of the nine FABs surpassed the en-route capacity targets provided in their respective RP2 FAB performance plan for 2016: BlueMed FAB; Danube FAB; Denmark-Sweden FAB; FAB CE and NEFAB. [The four FABS that did not perform better than their performance plan target are: FABEC, SW FAB, Baltic FAB and UK-IRL FAB.]

5.7.2 The positive contribution made by these FABs has provided a significant impact to the Union-wide en-route capacity performance and to airspace users in general.

5.7.3 Table 16 below shows what the (hypothetical) Union-wide capacity performance would have looked like in 2016, if the five FABs surpassing the targets had simply met their respective targets. The values for the delay benefit comparison are:

- for FABs that did not achieve their target, the actual delay; or
- for FABs that did provide sufficient capacity, the target from the respective performance plan.

FAB	Daily traffic	Value for delay (min/flight)	Calculated Delay (000 min)	Union-wide delay
Baltic	2300	0.35 (actual)	805.00	
BlueMed	6479	0.36 (target)	2332.44	
Danube	2472	0.03 (target)	74.16	
DK-SE	2828	0.10 (target)	282.80	
FAB CE	5614	0.29 (target)	1628.06	
FABEC	15977	1.07 (actual)	17095.39	
NEFAB	2742	0.12 (target)	329.04	
SW FAB	5272	0.42 (actual)	2214.24	
UK-Ire FAB	6790	0.30 (actual)	2037.00	
SES Area	25972		26798.13	1.03

Table 16: Quantification of the positive contribution of certain FABs

5.7.4 The positive contribution by the FABs surpassing their target equates to the difference between the hypothetical result presented in Table 16 and the actual achieved en-route ATFM delay on Union-wide level (c.f. Table 14): 1.03 – 0.91 = 0.12 minutes per flight at Union-wide level. This positive contribution saved additional costs to airspace users of approximately €114 million (0.12 * 366 * €100 * 25972) on Union-wide level.

5.8 Arrival ATFM Delay – National Target Setting and Actual Performance

5.8.1 With the RP2 performance plans, the majority of States established a national target on

arrival ATFM delay. There still exists confusion about the requirement to establish a national target and/or an associated incentive scheme for ANS Capacity at and around airports. This section focusses on the national target on arrival ATFM delay.

5.8.2 On average, the established national targets on arrival ATFM delay are consistent with the historic performance at national level considering a movement-related weighting for the respective airports. Table 17 shows the performance observed during 2016, in terms of achieving the national targets and associated breakdowns. Cases for which no national target (all causes) has been established or where the actual observed performance exceeds the established target are highlighted.

5.8.3 Table 17 reports arrival ATFM delay (all causes). A number of SES States have augmented the national target on arrival ATFM delay with a respective 'CRSTMP target'[6]. The latter is an instrument for the application of the incentive scheme and regulated under the Charging regulation 391/2013.

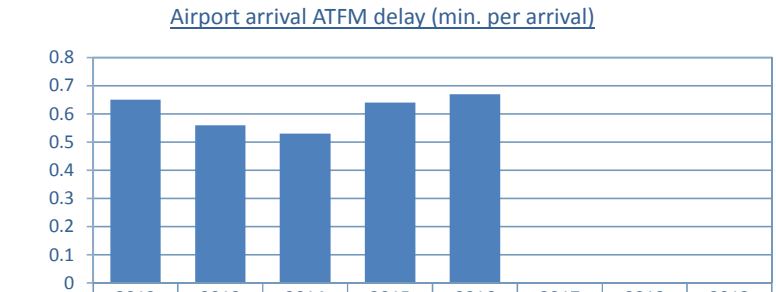
5.8.4 The calculation of the arrival ATFM delay, just like the en-route ATFM delay, is affected by the change in methodology described in sections 5.4 and 5.6. Though the overall impact is negligible, this leads in a few cases to variations in the reporting by national authorities (e.g. non-application of post-ops adjustment/REA correction or the application the application of the REA correction for all of 2016).

FAB	State	National Target [min/arrival]		Airport Level
		Target	Actual (all causes)	
Baltic	Lithuania	0.00	0.00	Commensurate with traffic / level of congestion at airport level
	Poland	0.04	0.21	Warsaw exceeding local breakdown significantly with an important increase in arrival ATFM delay with respect to 2015. Other two airports lightly exceeding the local breakdown.
BlueMed	Cyprus	none	0.51	Both airports (Paphos and Larnaca) exceeding local breakdown significantly, with a significant increase of delay in Paphos with respect to 2015 (0.26 vs 1.22 min/arr)
	Greece	0.10	0.26	Athens exceeding the target significantly, with an important increase with respect to 2015.
	Italy	0.41	0.13	All airports meeting their local breakdown values. Very significant reduction of delays at Fiumicino.
	Malta	0.10	0.01	LMML accrues a negligible share of arrival ATFM delay
Danube	Bulgaria	0.00	0.00	Sofia shows 0 delays, commensurate with traffic / level of congestion at the airport
	Romania	0.00	0.34	Important increase of arrival ATFM delay at Bucharest with respect to 2015, exceeding now its local breakdown value.
DK-SE	Denmark	0.11	0.03	Commensurate with traffic / level of congestion at the only airport (EKCH)
	Sweden	0.35	0.22	Arrival ATFM delay increase at the only airport (ESSA) vs 2015, but still meeting the target.
FABCE	Austria	1.29	0.72	Negligible contribution by other Austrian airports, LOWW outperforms national target value

[6] ATFM delay to which a flight is subjected is defined to have as cause the most penalizing ATFM regulation. Causes related to air traffic service provision and/or special activities comprise: C – ATC Capacity, R – ATC Routing, S – ATC Staffing, T – Equipment (ATC), M – military activity, and P – special event. Under the charging regulation, IR391/2013, States may exclude specific delay causes for the application of the respective incentive scheme.

FAB	State	National Target [min/arrival]		Airport Level
		Target	Actual (all causes)	
	Croatia	0.05	0.00	Commensurate with traffic / level of congestion at the only airport (LDZA)
	Czech Republic	0.30	0.00	Negligible arrival ATFM delay at all Czech airports, including LKPR
	Hungary	0.05	0.00	Commensurate with traffic / level of congestion at the only airport (LHBP)
	Slovakia	0.00	0.00	Commensurate with traffic / level of congestion at the only airport (LZIB)
	Slovenia	0.00	0.00	Commensurate with traffic / level of congestion at the Slovenian airports (LJLJ, LJMB, LJPZ)
FABEC	Belgium	none	0.73	No national target specified (all causes); CRTSMP value specified for EBBR and EBLG; EBBR accounts for major share; EBLG commensurate with level of traffic; EBCI shows important increase vs 2015.
	France	0.60	0.59	10 of the 60 French airports in the RP2 monitoring exceed their local breakdown, including Orly, Toulouse and Marseille.
	Germany	0.65	0.45	9 of the 16 German airports in the RP2 monitoring slightly exceed their local breakdown; levels are commensurate with traffic / level of congestion at German airports
	Luxembourg	0.49	0.08	Commensurate with traffic / level of congestion at the only airport (ELLX)
	Netherlands	2.00	2.00	No breakdown specified; CRSTMP value for EHAM; national target is met and CRTSMP value met for EHAM
	Switzerland	2.35	1.78	No breakdown specified; Switzerland established a traffic-dependent national target for all causes and CRSTMP; both are met.
NEFAB	Estonia	0.00	0.00	Commensurate with traffic / level of congestion at the Estonian airports (EETN, EETU)
	Finland	0.13	0.27	EFHK exceeding the local value and national target
	Latvia	0.04	0.01	Local breakdown only available for Riga, which is met; level commensurate with traffic / level of congestion
	Norway	0.60	0.44	Negligible contribution by ENVA and ENZV, discernible contribution by ENBR and ENGM
SW FAB	Portugal	0.60	0.63	Overall national target exceeded with LPPR and LPPT exceeding the local value significantly.
	Spain	0.80	0.89	LEBL exceeding the national target and the local value significantly; LEPA still very high but meeting its local value; performance at other airports (i.e. GCLP, LEMD, LEMG) significantly better, although GCLP also exceeds its local value
UK-IRL	Ireland	0.18	0.15	Negligible contribution by EICK and EINN, where no local value is available; performance at EIDW exceeding the local value
	United Kingdom	0.78	1.19	5 of the 9 British airports in RP2 Monitoring exceed their local value: EGGW, EGKK, EGLC and EGSS exceeding the local value significantly; EGBB marginal exceeding the value; performance at other airports (i.e. EGCC, EGPF, EGPH) significantly better; performance at EGLL commensurate with level of congestion

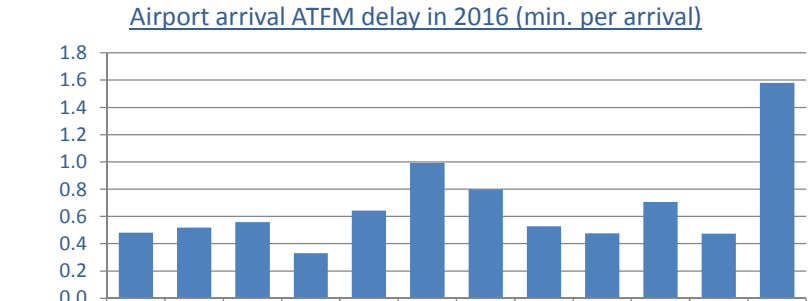
Table 17: Arrival ATFM Delay - Targets and Observed Performance



	2012	2013	2014	2015	2016	2017	2018	2019
All causes	0.65	0.56	0.53	0.64	0.67			
# airports	173	173	173	173	174			

Source: EUROCONTROL/PRU

Figure 14: Arrival ATFM delay (2012-2016) at Union-wide level



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
All causes	0.48	0.52	0.56	0.33	0.64	0.99	0.8	0.53	0.48	0.71	0.47	1.58

Source: EUROCONTROL/PRU

Figure 15: Arrival ATFM delay per month (2016) at Union-wide level

5.8.5 Following a steady decrease throughout 2012 to 2014 (see Figure 14) the European average for arrival ATFM delay (all delay causes) started increasing again in 2015 and 2016 to the current 0.67 min / arrival, the highest in RP1 or RP2 so far. This reflects the level of arrival ATFM delay at the beginning of RP1 (calibrated to the list of RP2 airports). Furthermore, the increase of arrival ATFM delay correlates with the increased level of en-route delay across Europe.

5.8.6 Figure 15 shows seasonality in the arrival ATFM delay for 2016. The yearly union-wide average is strongly influenced by the significant increase of average arrival ATFM delay in December (i.e. 1.58 min/arrival). This is closely linked to winter weather operations.

5.9 Incentive schemes on national target on arrival ATFM delay

5.9.1 As part of the RP2 Performance Plan assessment, compliance issues with respect to the establishment of a national target on arrival ATFM delay and a respective incentive scheme were identified. As concerns the performance monitoring, States commented on the identified issues with no final decision by the European Commission.

5.9.2 This results in a mix of the application of the national target (e.g. some States not having established a target, or the target is based on a subset of airports, an alternate of complimentary target on a subset of delay causes is established, no / limited breakdown to local airport level) and the associated incentive scheme.

5.9.3 Volume 2 of the Monitoring Report identifies for each SES Member State whether a national

target has been established with the associated break-down to the respective airport, and to what extent an incentive scheme has been established and applied.

5.10 Adherence to ATFM Slots and Pre-Departure Delay – Actual Performance

State	# airports	ATFM slot adh. (%)	ATC pre-departure delay (mins. per departure)	Airports with valid data	% airports with valid data
Austria	6	93.2%		1	16.7%
Belgium	5	93.5%		2	40.0%
Bulgaria	1	98.8%	0.03	1	100.0%
Croatia	1	89.9%		0	0.0%
Cyprus	2	81.0%		0	0.0%
Czech Republic	4	94.9%		1	25.0%
Denmark	1	97.9%	0.07	1	100.0%
Estonia	2	91.3%		1	50.0%
Finland	1	88.3%	0.18	1	100.0%
France	60	85.3%		2	3.3%
Germany	16	93.3%		7	43.8%
Greece	1	91.3%	0.75	1	100.0%
Hungary	1	93.8%	0.11	1	100.0%
Ireland	3	95.7%		1	33.3%
Italy	5	93.4%	1.39	5	100.0%
Latvia	3	94.5%		1	33.3%
Lithuania	4	91.2%		0	0.0%
Luxembourg	1	82.9%	0.01	1	100.0%
Malta	1	96.3%	0.16	1	100.0%
Netherlands	4	89.8%		0	0.0%
Norway	4	98.1%	0.05	4	100.0%
Poland	15	94.6%		1	6.7%
Portugal	10	90.0%		0	0.0%
Romania	2	91.8%		0	0.0%
Slovakia	1	97.2%		0	0.0%
Slovenia	3	96.3%		1	33.3%
Spain	5	93.9%	0.49	5	100.0%
Sweden	1	95.4%	0.09	1	100.0%
Switzerland	2	92.2%	0.80	2	100.0%
United Kingdom	9	91.8%		5	55.6%

Table 18: ATFM Slot Adherence & ATC Pre-Departure Delay (2016) National Level

5.10.1 Across SES States the adherence to ATFM slots ranges widely above 85%. Notable exemptions are Luxembourg (i.e. ELLX) with 82.9% and Cyprus (i.e. LCLK and LCPH) with 81%. Some very low levels of adherence to the ATFM slots (below 80% and down to 42.2% in the case of LFGJ: Dôle-Tavaux) are observed at small airports.

5.10.2 On a national level, the current reporting of average ATC pre-departure delay is limited and suffers from the pending transition of RP1 airports and the implementation of the airport data flow for new entrant airports under RP2 (c.f. 5.8.1). The pre-departure delay indicator is dependent on the delay reporting by the airport. Compliance with the data specification will ensure the consistent reporting of delay enabling the determination of the pre-departure delay indicator.

5.10.3 On average, there is no substantial ATC related pre-departure delay across Europe. Nevertheless, the current level of reporting also shows a high number of non-specified delays. This is driven by the local activities to assess and validate the airspace user reported delay before submitting the operational data. It can be observed that airports have strengthened their involvement in this validation process. However, this is strongly dependent on local resources and capabilities, and varies from airport to airport.

6 COST-EFFICIENCY

En-Route ANS Cost-Efficiency

6.1 Summary of the en-route cost-efficiency targets and data for RP1

6.1.1 The key finalised data for RP1 (2012-2014) are shown in Table 19. It summarizes data related to the Union-wide targets for RP1 as set in Commission Decision 2011/121/EU of 21 February 2011[xiii], data from adopted National Performance Plans, and actual data taken from the annual NSA Monitoring Reports and the June 2015 Reporting Tables. This information covers the 29 States that were part of the SES Performance Scheme in RP1 (i.e. it excludes Croatia which is now included in RP2).

6.1.2 Using the KPI defined in the performance Regulation, Table 19 shows that in RP1:

(i) Compared to the adopted Performance Plans, actual performance at Union-wide level was better than the DUR target in 2014 (54.15 €$_{2009}$ compared to 54.84 €$_{2009}$) and was also better than the intermediate value in 2013, though was worse in 2012.

(ii) Compared to the Union-wide target, actual performance was worse than the 2014 target (54.15 €$_{2009}$ compared to the target of 53.92 €$_{2009}$) and also worse than the intermediate values in 2013 and 2012.

(iii) In terms of traffic, SUs increased over RP1 (+1.5% p.a. between 2011 and 2014) but were below the levels planned in each year.

	SES States - Data as per EC Decision on Union-wide targets for RP1	2012P	2013P	2014P
En-route	Real en-route costs (determined costs 2012-2014) - (in EUR2009)	6 296 297 788	6 234 893 556	6 179 610 754
	Total en-route Service Units	108 776 000	111 605 000	114 610 000
	Real en-route unit costs per Service Units - (in EUR2009)	**57.88**	**55.87**	**53.92**
	SES States - Data from RP1 national performance plans	**2012P**	**2013P**	**2014P**
	Real en-route costs (determined costs 2012-2014) - (in EUR2009)	6 258 122 341	6 318 609 442	6 304 761 101
	Total en-route Service Units	108 359 738	111 461 030	114 964 695
	Real en-route unit costs per Service Units - (in EUR2009)	**57.75**	**56.69**	**54.84**
	SES States - Actual data from June 2015 Reporting Tables	**2012A**	**2013A**	**2014A**
	Real en-route costs - (in EUR2009)	6 047 812 097	5 947 919 729	5 947 263 158
	Total en-route Service Units	103 501 763	105 171 670	109 836 771
	Real en-route unit costs per Service Units - (in EUR2009)	**58.43**	**56.55**	**54.15**

Table 19: Summary of RP1 en-route cost-efficiency targets (2012-2014)

6.2 Presentation of the RP2 en-route cost-efficiency KPI and targets

6.2.1 Commission Decision 2014/132[xiv] of 11 March 2014 set Union-wide targets for the cost-efficiency Key Performance Area covering RP2 (i.e. the period 2015-2019). These targets, as shown in Table 20, are expressed in average Determined Unit Cost (DUC) for en-route ANS and correspond to an average DUC decrease of -3.3% p.a. between 2014 (starting point based on the RP1 Determined Costs (DCs) for 2014 i.e. 58.09 €$_{2009}$) and 2019.

COST-EFFICIENCY UNION-WIDE TARGETS	2015	2016	2017	2018	2019
Real en-route Determined Unit Costs (in EUR$_{2009}$)	56.64	54.95	52.98	51.00	49.10

Table 20: En-route cost-efficiency targets for RP2 (EC Decision)

6.2.2 The aggregation of the individual national cost-efficiency targets for the 30 SES States that corresponds to 30 en-route Charging Zones (CZ) (Belgium and Luxembourg share one CZ and Spain has two CZs) is shown in Table 21. It results in an average DUC decrease of -3.4% p.a. between 2014 (starting point based on the RP1 Determined Costs (DCs) for 2014 i.e. 58.09 €$_{2009}$) (starting point based on the RP1 Determined Costs (DCs) for 2014) and 2019.

6.2.3 Table 21 also shows that the aggregation of the local cost-efficiency targets reported in the RP2 Performance Plans (PPs) are lower than the Union-wide targets in 2015 (-2.3%), 2016 (-2.0%), 2017 (-1.0%), 2018 (-0.7%) and 2019 (-0.3%).

COST-EFFICIENCY DATA FROM PERFORMANCE PLANS	2015P	2016P	2017P	2018P	2019P
Real en-route Determined Unit Costs (in EUR$_{2009}$)	55.33	53.86	52.47	50.65	48.94
Difference between Determined Unit Costs and EC Decision on Union-wide targets	-2.3%	-2.0%	-1.0%	-0.7%	-0.3%

Table 21: En-route cost-efficiency targets for RP2 as per aggregation of adopted national targets (SES level)

6.2.4 Important note: In 2016, Malta, Poland and Bulgaria requested the Commission to revise their RP2 en-route cost-efficiency targets for the years 2017 to 2019. The figures for these three States shown in this report reflect: i) the adopted Performance Plans (Commission Implementing Decision (EU) 2015/348 of 2 March 2015) for the years 2015 and 2016; and ii) the revised Performance Plans (submitted by these States but still pending approval by the Commission (SSC/17/64 Agenda item 3.1 refers)) for the years 2017 to 2019.

6.3 Actual 2016 unit cost vs. DUC in adopted Performance Plans

6.3.1 In order to ensure consistency with Commission Implementing Decision 2014/132/EU setting Union-wide targets for RP2, with the DCs provided in the adopted PPs and to allow consolidation at Union-wide level, actual costs are expressed in real terms (€$_{2009}$ prices).

6.3.2 Figure 16 summarizes the situation in 2016. It shows that the Union-wide actual en-route unit cost (50.57 €$_{2009}$) was -6.1% lower than planned in the RP2 PPs (53.86 €$_{2009}$). This is because in 2016 actual en-route costs were -1.9% (-120.6 M€$_{2009}$) lower than the DCs reported in the PPs (6 195.9 M€$_{2009}$), while the actual number of Total Service Units (TSUs) was +4.4% higher than planned. In addition, the Union-wide actual en-route unit cost (50.57 €$_{2009}$) was -8.0% lower than the Union-wide target for 2016 (€54.95 €$_{2009}$) which was adopted by the Commission in 2014.

Actual unit cost vs. DUC in adopted Performance Plans						
SES States - Data from RP2 Performance Plans		**2015D**	**2016D**	**2017D**	**2018D**	**2019D**
En-route costs (EUR2009)		6 235 113 277	6 195 878 072	6 164 525 008	6 110 343 143	6 018 185 578
Total en-route Service Units		112 687 532	115 027 116	117 494 197	120 642 948	122 962 099
Real en-route unit costs per Service Unit (EUR2009)		**55,33**	**53,86**	**52,47**	**50,65**	**48,94**
SES States - Actual data from Reporting Tables		**2015A**	**2016A**	**2017A**	**2018A**	**2019A**
En-route costs (EUR2009)		6 079 182 146	6 075 304 465			
Total en-route Service Units		114 994 014	120 135 471			
Real en-route unit costs per Service Unit (EUR2009)		**52,87**	**50,57**			
Difference between Actuals and Planned (Actuals vs. PP)		**2015**	**2016**	**2017**	**2018**	**2019**
Real en-route costs (EUR2009)	in value	-155 931 130	-120 573 607			
	in %	-2,5%	-1,9%			
Total en-route Service Units	in value	2 306 482	5 108 355			
	in %	2,0%	4,4%			
Real en-route unit costs per Service Unit (EUR2009)	**in value**	**-2,47**	**-3,29**			
	in %	**-4,5%**	**-6,1%**			

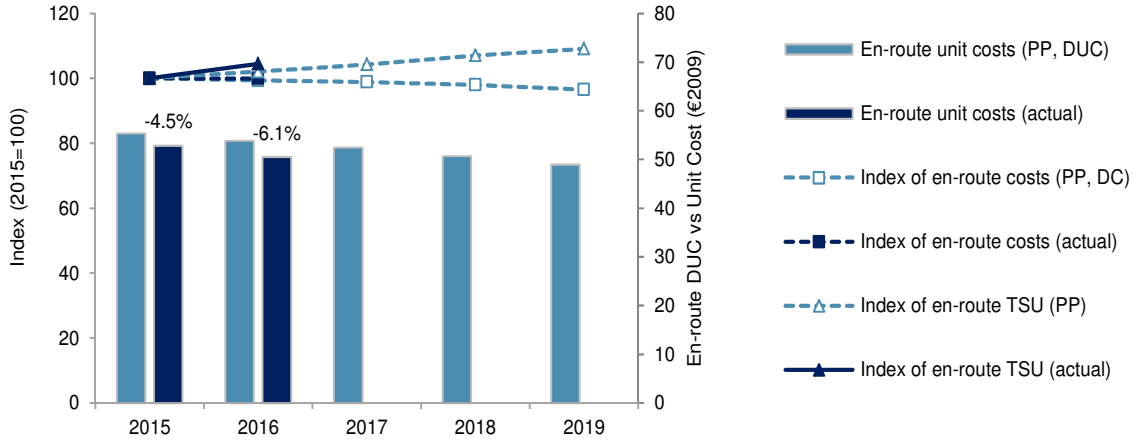


Figure 16: En-route unit cost (actual vs. Performance Plans)

6.3.3 The overall average variation of en-route unit cost observed at Union-wide level (-6.1%) masks different situations across the 30 en-route CZs as shown in Figure 17.

6.3.4 In 2016, actual en-route unit cost was lower than planned for 21 CZs. For 12 of these CZs, this reflects the combination of lower actual costs with higher traffic volumes than expected.

6.3.5 In contrast, the 2016 actual en-route unit cost was higher than the DUC provided in the RP2 PPs for nine CZs. For one, the deviation was larger than +10% (Poland, +10.5%). For Poland, this deviation reflects the combination of higher en-route costs than planned (+1.6%) with significantly lower actual traffic than expected (-8.1%). Poland (as well as Malta and Bulgaria) submitted a proposal to the Commission for revising their en-route RP2 performance targets (see note at 6.2.4 above).

6.3.6 Details on the potential corrective measures that have been reported, for those CZs not reaching the 2016 actual en-route unit cost targets, are available for each CZ in Volume 2 of this report.

En-route charging zone	DUC ACT vs PP (2016)	Costs ACT vs PP (2016)	TSUs ACT vs PP (2016)
Malta	-31.3%	0.2%	45.8%
Ireland	-16.7%	-8.1%	10.3%
Hungary	-16.1%	-1.0%	18.0%
Norway	-16.1%	-11.6%	5.4%
Bulgaria	-13.8%	10.3%	28.0%
Portugal	-12.8%	-1.4%	13.0%
Greece	-11.1%	-3.7%	8.3%
Spain Continental	-10.5%	-2.3%	9.2%
Switzerland	-9.3%	-7.9%	1.6%
Germany	-8.3%	-5.3%	3.3%
Estonia	-8.1%	-4.3%	4.1%
Cyprus	-7.1%	0.4%	8.0%
France	-5.5%	-2.0%	3.7%
Netherlands	-5.4%	3.8%	9.7%
Croatia	-4.9%	-4.7%	0.3%
United Kingdom	-3.5%	0.6%	4.2%
Belgium & Luxembourg	-3.4%	-3.8%	-0.4%
Slovakia	-3.3%	-2.2%	1.1%
Austria	-2.5%	-3.4%	-1.0%
Denmark	-2.3%	0.8%	3.2%
Czech Republic	-1.0%	2.8%	3.8%
Latvia	0.2%	-4.1%	-4.2%
Italy	0.3%	-6.1%	-6.4%
Lithuania	2.4%	2.2%	-0.2%
Spain Canarias	2.8%	-0.1%	-2.8%
Slovenia	3.0%	3.4%	0.4%
Romania	4.6%	12.9%	7.9%
Sweden	5.9%	9.1%	3.0%
Finland	9.5%	3.0%	-5.9%
Poland	10.5%	1.6%	-8.1%
Union-wide	-6.1%	-1.9%	4.4%

Figure 17: 2016 actual unit cost vs. PP by charging zone

6.3.7 Figure 17 shows also that actual traffic was higher than planned for 22 CZs. With the exception of Sweden, Romania and Slovenia, the 2016 actual en-route unit cost were lower than the DUC reported in the PPs for all these 22 CZs. 12 of these CZs achieved lower costs than planned and seven were able to contain any increases in costs to less than the increase in revenue due to higher traffic. For example, although the actual traffic in Bulgaria was +28.0% higher than planned, actual costs were +10.3% above planned, leading to an actual unit cost 13.8% lower than planned.

6.3.8 For eight CZs, actual traffic was lower than planned. Significant deviations are observed for Poland (-8.1%), Finland (-5.9%) and Italy (-6.4%). Only two CZs (Austria and Belgium & Luxemburg) managed to reduce their costs by more than the fall in planned revenue related to traffic, so that the actual unit costs were lower than planned.

6.3.9 More details on the deviation between the DUC and actual en-route unit cost for 2016 at CZ level are available in Volume 2 of the PRB 2016 Monitoring Report.

6.4 Actual 2016 traffic vs TSUs in adopted Performance Plans (PPs)

6.4.1 In 2016, Union-wide actual Total Service Units (TSUs) were +4.4% higher than planned in the adopted PPs (i.e. still within the ±10% alert threshold at system level).

6.4.2 At State level, as shown in Figure 17, all States remained above the -10% threshold, while five States experienced a traffic increase above the +10% threshold: Malta (+45.8%), Bulgaria (+28.0%), Hungary (+18.0%), Portugal (+13.0%) and Ireland (+10.3%). Two of these states

(Bulgaria, Malta) and the already mentioned Poland submitted in 2016 a request to the European Commission to revise their RP2 en-route cost-efficiency targets for the years 2017 to 2019 (see note at 6.2.4 above).

6.4.3 For years 2017 to 2019, as shown in Figure 18 below, the STATFOR February 2017 traffic outlook for the rest of RP2 remains significantly above the forecasts of the PPs. It must be noted that if any of the three scenarios of STATFOR February 2017 forecasts materialise, the traffic will be substantially higher than planned for the rest of RP2. The traffic is expected to exceed the ±2% dead band foreseen in the traffic risk-sharing mechanism and in the high case would exceed the 10% threshold in the year 2019.

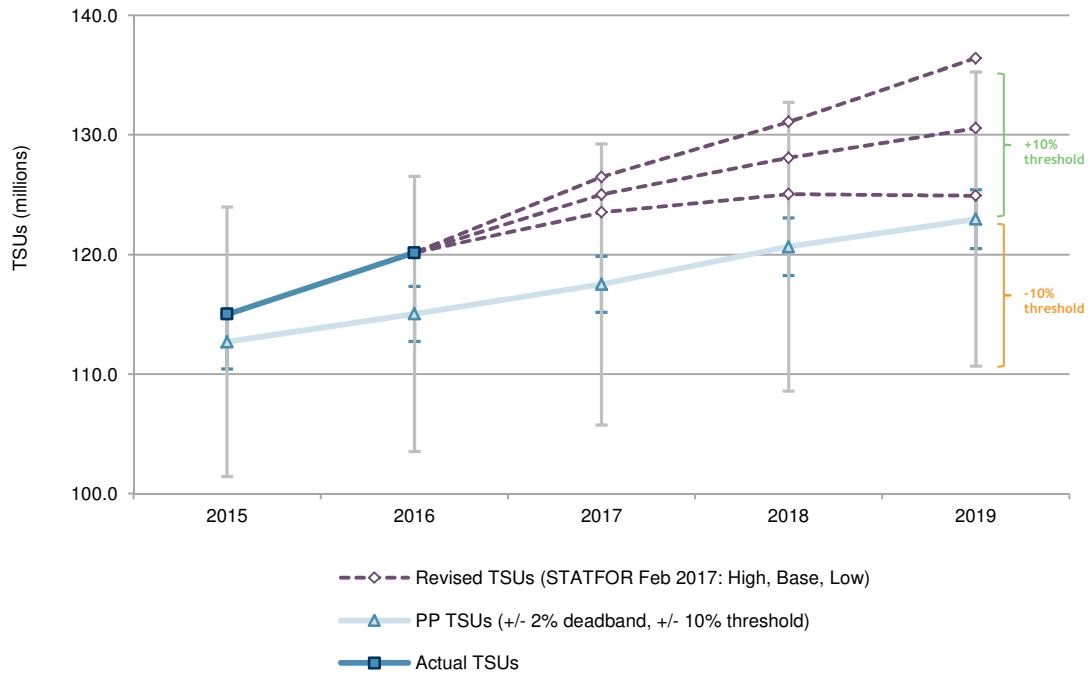


Figure 18: En-route traffic monitoring (Actual 2016 TSUs compared to PPs, SES level)

6.4.4 The traffic risk-sharing arrangements provided in the Charging Regulation[xv] foresee that ATSPs' additional (or lost) revenue (in respect of DCs) due to the difference between the actual and the planned TSUs are shared with airspace users (see illustration in Figure 19) as follows:

(i) For a difference in TSUs falling within the dead band of ± 2%, the additional (or lost) revenue in respect of ATSP DCs is fully retained (or borne) by the ATSP concerned;

(ii) For a difference in TSUs falling outside the threshold of ± 10%, the additional (or lost) revenue in respect of ATSP DCs is fully reimbursed (or charged) to the airspace users;

(iii) For a difference in TSUs falling between the dead band of ± 2% and the threshold of ±10%, the additional (or lost) revenue in respect of ATSP DCs is shared between the ATSPs (30%) and the airspace users (70%).

6.4.5 The DCs of the other entities such as States, NSAs/EUROCONTROL and MET Service Providers (which represent some 10% of the total DCs at Union-wide level) are not subject to traffic risk-sharing and are fully reimbursed (or charged) to the airspace users, irrespective of traffic evolution.

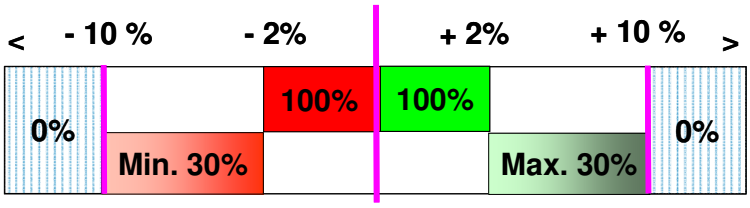


Figure 19: Traffic risk-sharing mechanism for the ATSPs

6.4.6 As a result, the additional revenues (234.2 M€$_{2009}$) arising from the deviation between actual and planned traffic in 2016 are shared between States/ANSPs and airspace users.

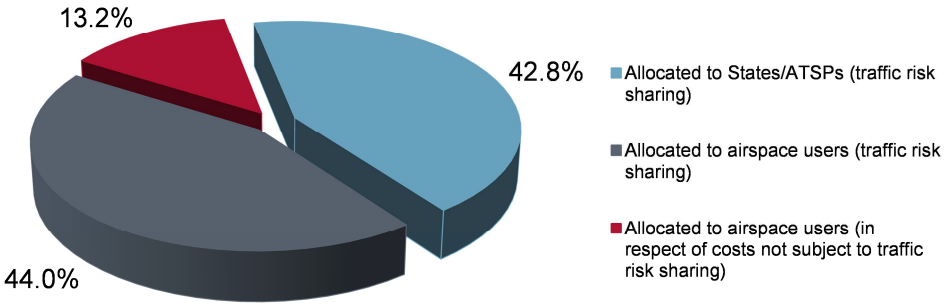


Figure 20: Outcome of the 2016 traffic risk-sharing mechanism

6.4.7 In accordance with the traffic risk-sharing mechanism, Figure 20 shows that 42.8% of the additional revenues is retained by States/ATSPs (100.3 M€$_{2009}$, comprising 97.6 M€$_{2009}$ for the main ATSPs and 2.8 M€$_{2009}$ for the other ATSPs).

6.4.8 Figure 20 also shows that 57.2% of the additional revenues are distributed to airspace users, i.e. 44.0% relating to costs subject to traffic risk-sharing (103.1 M€$_{2009}$) and 13.2% relating to costs not subject to traffic risk-sharing (30.9 M€$_{2009}$) as described in paragraph 6.4.5.

6.4.9 It must be noted that this situation is significantly different from the situation in RP1 when actual traffic was always lower than planned in the PPs.

6.5 Actual 2016 en-route costs vs. costs in adopted PPs

6.5.1 At Union-wide level, actual 2016 en-route costs were -120.6 M€$_{2009}$ (i.e. -1.9%) lower than the DCs provided in the RP2 PPs.

6.5.2 Figure 21 provides a breakdown of this variation for each entity considered in the en-route CZs (main ATSPs[xvi], other ANSPs, the MET service providers and the NSAs/EUROCONTROL).

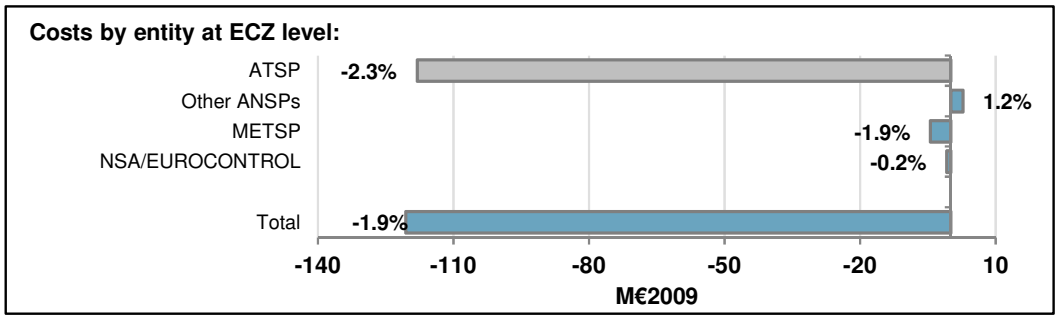


Figure 21: 2016 actual en-route costs compared to PPs by entity (SES level)

6.5.3 As shown in Figure 21, actual en-route costs in 2016 were lower than planned for the main

ATSPs (-2.3% or -118.0 M€$_{2009}$), the MET service providers (-1.9% or -4.4 M€$_{2009}$) and the NSA/EUROCONTROL (-0.2% or -0.9 M€$_{2009}$). On the other side, 2016 actual en-route costs were higher than planned for the other ANSPs (+1.2% or +2.8 M€$_{2009}$). Due to their relative size in the CZs, most of the deviation observed for the total en-route ANS costs (-1.9% or -120.6 M€$_{2009}$) is due to the main ATSPs (i.e. the main designated ATSP subject to traffic risk-sharing arrangements).

6.5.4 The variation of the "other ANSPs" category is mainly due to MUAC which provides ATC services in the upper airspace of Belgium, Germany, Luxembourg and the Netherlands. MUAC actual costs (136.5€$_{2009}$) are +2.3% higher than planned in the FABEC RP2 PP (133.5 M€$_{2009}$), that represent 2.2% of total SES determined en-route costs. This deviation can be explained by the decision of MUAC States to already report in 2016 some Eurocontrol corporate costs related to MUAC staff pensions and operating costs (Part IV of Eurocontrol budget) into MUAC costs. This transfer does not change the total costs of Eurocontrol (including MUAC) when considering all Parts of the budget. It must be noted that States have decided to already implement this transfer, pending the final approval of a new Maastricht agreement now under discussion.

6.5.5 Figure 22 presents for each en-route charging zone the variation between actual costs and determined costs.

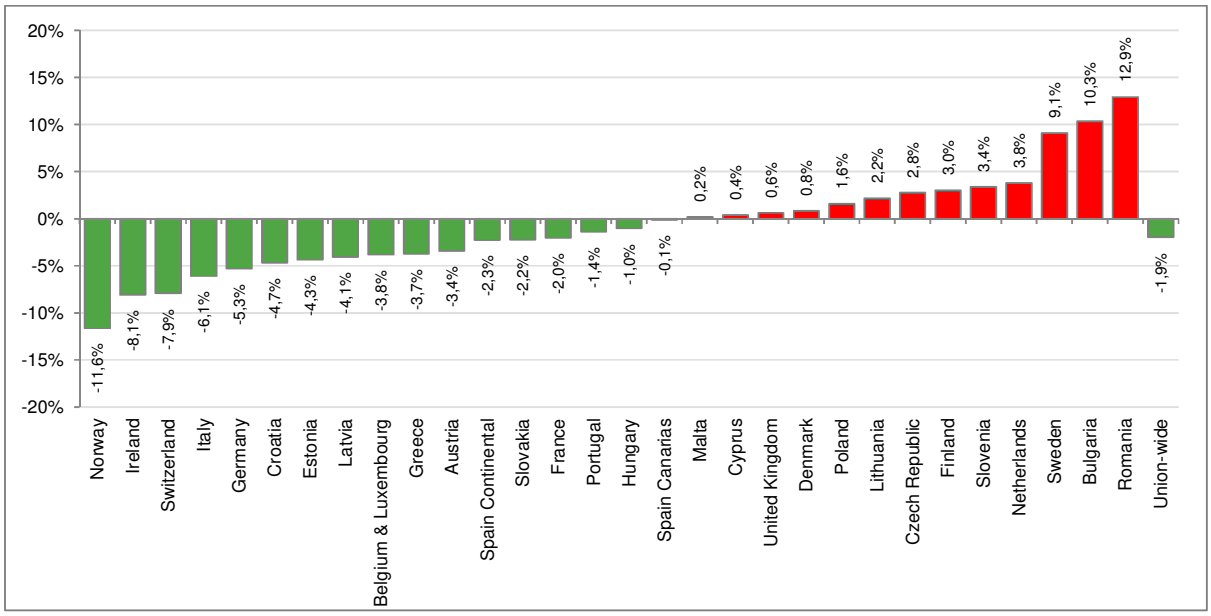


Figure 22: 2016 actual en-route costs compared to PPs by CZs (SES level)

6.5.6 As shown on Figure 22, actual costs were higher than planned for 13 CZs. Three of these states had an observed deviation above 9.0%:

- Romania with +12.9% or +16.5 M€$_{2009}$, being the ATSP ROMATSA (+13.1% or +15.6 M€$_{2009}$) the major contributor to the observed difference. The higher than planned en-route costs in real terms were mainly driven by an extraordinary higher actual staff cost (+12.0%, or +10.0 M€$_{2009}$) and higher exceptional costs of (+ 8.7 M€$_{2009}$), when none exceptional costs were planned. No drivers underlying the deviation of actual costs for 2016 outlined above are provided in the additional information to June 2017 en-route reporting tables or the DANUBE FAB 2016 Monitoring Report.
- Bulgaria with +10.3%, or +8.2 M€$_{2009}$, due to the higher than planned, en-route costs in real terms, for the ATSP BULATSA (+11.4%, or +8.4 M€$_{2009}$). The main driver to the observed difference was significantly higher actual staff costs for BULATSA (+16.5%, or

+8.0 M€$_{2009}$) related to i) "*an increase of the salaries of ATM staff and in particular of the ACC ATCOs, as well as due to the payments related to ATCO-bonus scheme in response to both, significantly increased traffic levels and ATCO-hour productivity", and ii) "salaries for the supporting operational staff, including CNS, MET, AIS, etc. have also accounted for a moderate increase*". Bulgaria submitted a request to the European Commission to revise their RP2 en-route cost-efficiency targets for the years 2017 to 2019 targets (see note at 6.2.4); and

- Sweden with +9.1% or +15.6 M€$_{2009}$. The higher than planned en-route costs in real terms were mainly driven by higher actual costs for the main ATSP-LFV (+8.2%, or +11.5 M€$_{2009}$) and for the other ANSPs (+44.8%, or +3.5 M€$_{2009}$). The main driver for the higher actual costs for LFV were the higher than planned staff costs (+22.9%, or +20.7 M€$_{2009}$), mainly due to higher pension costs driven by a lower discount rate than assumed in the PP. The difference between the actual and planned pension costs is reported as costs exempt from cost/sharing.

6.5.7 Figure 22 shows that actual costs were lower than planned for 17 CZs. Three of these states had an observed deviation close to -8.0% or above:

- Norway with -11.6% or -12.3 M€$_{2009}$, being the ATSP AVINOR (-12.9% or -12.4 M€$_{2009}$) the major contributor to the observed difference. The lower than planned en-route costs in real terms were mainly driven by an extraordinary lower actual staff cost (-13.8%, or -9.2 M€$_{2009}$) due to "*the continuous focus and thorough follow-up on cost efficiency initiatives both in operations and in administration. Furthermore, pension cost in 2016A is lower than planned due to changes in external factors such as interest rates and life expectancy*" and lower depreciation costs of (-34.4% or -3.0 M€$_{2009}$) due to "*a capex underspending and a later date of capitalisation than previously expected*";
- Ireland with -8.1%, or -9.3 M€$_{2009}$. The lower than planned en-route costs in real terms are mainly driven by reductions for the ATSP IAA (-9.5% or -9.3 M€$_{2009}$) due to the lower staff costs (-5.7% or -3.2 M€$_{2009}$), mainly due to higher than expected number of departures, retirements and delays in the recruitment plan; and lower other operating costs (-23.4% or -6.1 M€$_{2009}$), mainly due to savings across a range of technical and administrative expenses. and
- Switzerland with -7.9% or -8.3 M€$_{2009}$. The lower than planned en-route costs in real terms were mainly driven by lower actual costs for the ATSP Skyguide (-9.3%, or -8.2 M€$_{2009}$) due to lower staff costs (-12.6% or -8.9 M€$_{2009}$), mostly explained by the postponement of recruitments, other costs containment measures and less FTEs "due to facility management restructuration".

6.5.8 Figure 23 shows that the main drivers for the ATSPs lower actual en-route costs in 2016 (-118.0 M€$_{2009}$) are lower other operating costs (-8.8% or -79.1 M€$_{2009}$), lower staff costs (-0.5% or -15.5 M€$_{2009}$) and lower depreciation costs (-5.6% or -40.7€$_{2009}$).

6.5.9 A large proportion of the -79.1 M€$_{2009}$ deviation observed for the lower other operating costs than planned is due to three States:

- DFS (Germany) with -34.2%, or -28.9 M€$_{2009}$, mainly due to an extraordinary lower actual inflation in 2016 than the foreseen in the PP and the related impact on lower operating costs in electricity, heating and maintenance costs of the buildings and technical systems;
- ENAV (Italy) with -14.2%, or -12.0 M€$_{2009}$, mainly due to renegotiated suppliers' contracts in particular related to "costs for electricity, insurances and operational telecommunications" and "substantial reduction of the consultancy activities assigned to external companies"; and

- NERL (United Kingdom) with -11.7% or -12.6 M€$_{2009}$, mainly due to cost containment measures and reclassification of some cost items to staff costs.

6.5.10 Depreciation costs are also significantly lower than planned (-5.6% or -40.7€$_{2009}$). This is mainly due to (1) the postponement or delays in capital expenditures (CAPEX), (2) delays in entry into service of the purchased equipment, and (3) in some cases the non-realisation of planned CAPEX. The postponement of capital expenditures (CAPEX) that was observed during the RP1 period could have been triggered to adjust to lower than expected traffic volumes (-4.9% TSUs for the RP1 period), but this should not be the case in RP2 where traffic is higher than planned.

6.5.11 More details of the main drivers underlying the deviation between actual and Determined Costs for each of these costs categories are available at CZ level in Volume 2 of this report.

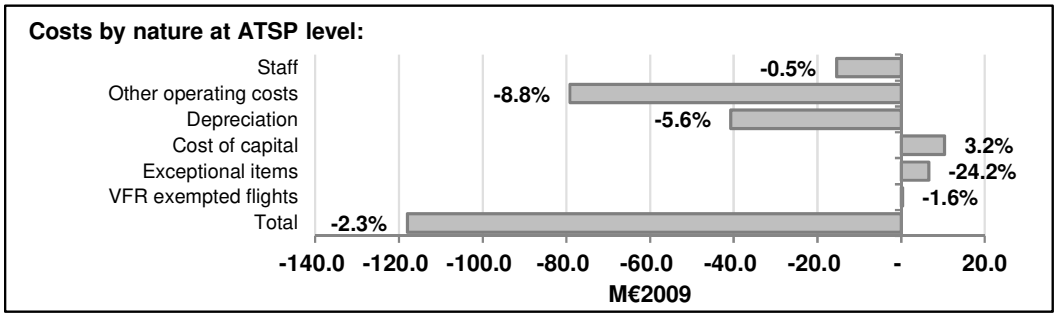


Figure 23: 2016 actual en-route costs compared to PPs by nature (SES level)

6.5.12 The cost-sharing mechanism in the SES Regulations provides that the difference between the DCs set in the adopted PPs and the actual costs for the year shall be borne by the States/ATSPs, except for the costs exempt from this mechanism (see Figure 24),

6.5.13 The costs exempt from cost-sharing are taken into account in the calculation of the ATSP net gain for the 2016 en-route activity which is presented in Section 6.6.1. This monitoring report takes into account the States submissions on costs exempt from cost-sharing as reported in the June 2017 Reporting Tables for the purposes of en-route charges. These amounts, to be recovered from (+) or reimbursed to (-) users, will be eligible for carry-over to the following reference period(s), if deemed allowed by the Commission.

En-route costs exempted from cost sharing		
Estimates ('000 €2009)		**2016**
[redacted]	Pension	21552
	Interest rates on loans	-3 860
	Taxation law	-10 914
	New cost item required by law	313
	International agreements	-4 273
[redacted]	ATSP	6 475
	Other ANSP	3 378
	METSP	-24
	NSA/EUROCONTROL	-7 010
Total costs exempted from cost sharing		**2 818**

Figure 24: 2016 en-route costs exempted from cost sharing (SES level)

6.5.14 Figure 24 shows that overall, the net amount of costs exempt from cost sharing in 2016 is small (2.8 M€$_{2009}$). The costs exempt from cost sharing reported by main ATSPs amount to 6.5 M€$_{2009}$. This figure is significantly impacted by the following combined effects: Sweden main ATSP cost exempt from cost sharing (+19.6 M€$_{2009}$) which are relating to pension costs,

Spanish ATSP (-9.0 M€$_{2009}$) corresponding to the difference between the actual and planned operating costs as a result of unforeseen changes in the national taxation law (VAT) and French ATSP (-10.6 M€$_{2009}$) related to pensions and interest rates on loans. Figure 24 also indicates that, cost exempt from cost sharing are negative for the MET service providers (-0.02 M€$_{2009}$) and the NSA/EUROCONTROL (-7.0 M€$_{2009}$).

EUROCONTROL Costs

6.5.15 Figure 25 compares the 2015 and 2016 Eurocontrol costs included in RP2 Performance Plans of the SES States (excluding the Santa Maria Charging Zone) with the actual figures reported by States in their 2015 and 2016 monitoring reports. For the purpose of this analysis, the Eurocontrol costs include the Agency costs for the SES States (Part I, IV and IX), excluding the MUAC costs (Part III only) which are part of the other ATSPs costs as explained in point 6.5.4 above.

6.5.16 It must be noted that when the MUAC agreement referred to in paragraph 6.5.4 will enter into force, Eurocontrol costs (excluding MUAC) will be lower since they will not include Part IV anymore.

6.5.17 The total actual Eurocontrol cost for the **SES states** in 2016 is 426.9 M€$_{2009.}$ This cost represents 92% of the total actual Eurocontrol cost in 2016, when considering all Eurocontrol Members States.

6.5.18 As shown in Figure 25 at SES level, actual 2016 Eurocontrol costs were some -1.9% or 8.4 M€$_{2009}$ lower than planned by States in the RP2 PPs. Under the scenario indicated in paragraph 6.5.16, the actual 2016 Eurocontrol costs would be -3.4% or -14.8 M€2009.

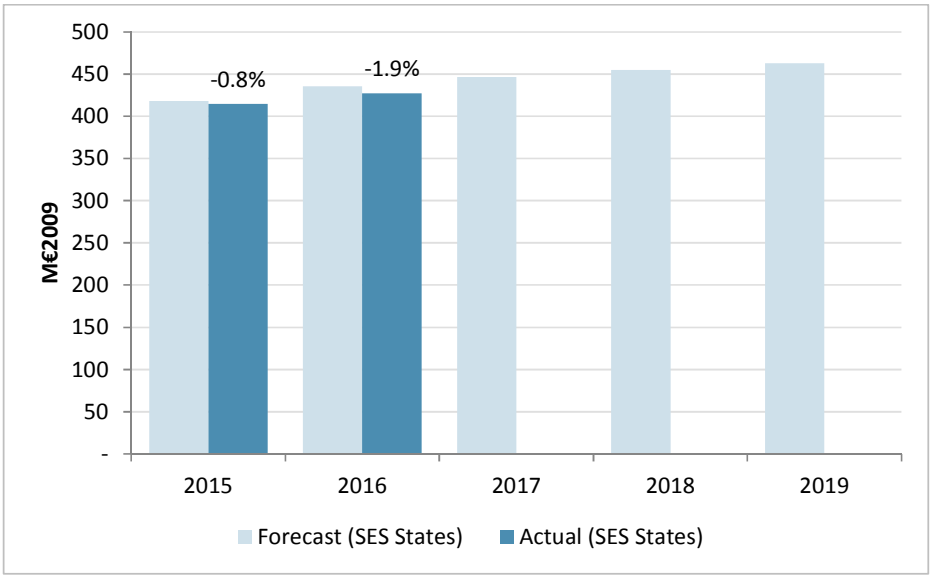


Figure 25: Actual Eurocontrol costs vs. Planned (SES level)

6.5.19 Figure 26 shows that the Eurocontrol unit cost (3.55 €$_{2009}$) at SES level was -6.1% lower than planned (3.78 €$_{2009}$) in 2016. This is due to the fact that actual Eurocontrol costs (at SES level) are -1.9% lower than planned in the DCs of the SES States' PPs, and that actual Total Service Units (TSUs) are +4.4% higher than planned in the SES States' PPs.

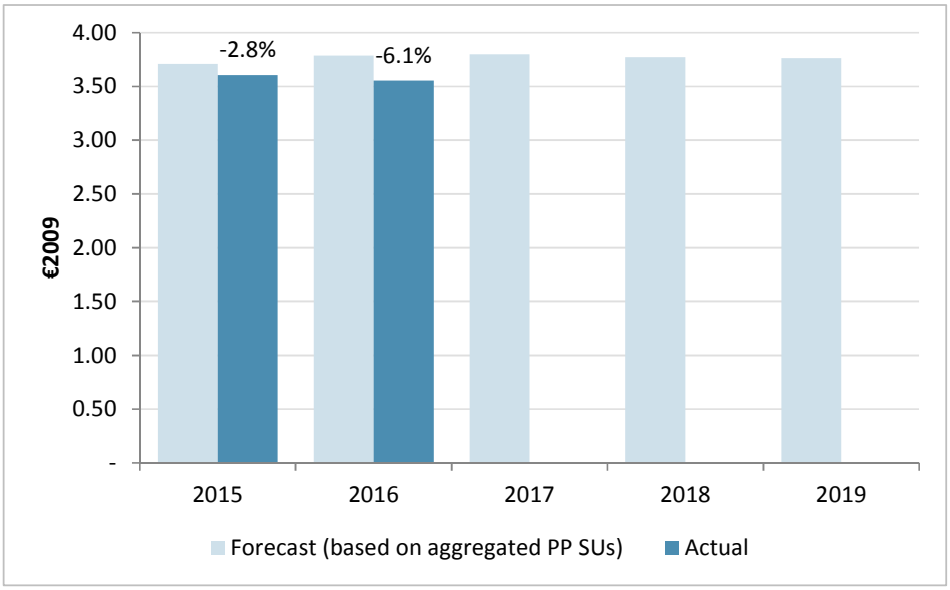


Figure 26: Actual Eurocontrol unit cost vs. Planned (SES level)

6.6 ATSP net gain for the 2016 en-route activity

6.6.1 The analysis of the overall economic surplus generated from the en-route activity by an ATSP can be broken down in two main elements:

(i) the net ATSP gain/loss on en-route activity;

(ii) the estimated surplus (return on equity) already embedded in the cost of capital charged to airspace users through the DCs.

6.6.2 This section focuses on the first element, the net ATSP gain/loss on en-route activity, which results from the combination of the traffic risk sharing, the cost sharing and the incentives on capacity and environment performance during the year. An analysis of the overall economic surplus, including the estimated surplus embedded in the cost of capital is provided in Section 6.7.

6.6.3 The (main) en-route ATSP is the most significant contributor to a State's en-route costs (around 84% of the total actual cost base) and is the main entity subject to the costs and traffic risk-sharing mechanisms. The analysis of the net ATSP gain/loss focuses on the ATSP en-route activity for 2016. It does not consider the cash flow position and liquidity balance at the end of the year as those are impacted by the charging mechanism whereby the eligible under-recoveries (for traffic, etc.) are to be recovered in year N+2 or later.

6.6.4 The analysis of the main ATSPs' results in 2016 shows that, at Union-wide level, a net gain of 225.3 M€$_{2009}$ was generated on the en-route activity (see Figure 27).

6.6.5 The net gain referred to in the above paragraph results from the combination of three distinct elements:

- a gain resulting from the cost-sharing mechanism of +124.5 M€$_{2009}$, corresponding to the difference between actual 2016 costs and the determined costs from the adopted PPs for the (main) ATSPs, and claimed costs exempt from cost-sharing;
- a net gain resulting from the traffic risk-sharing mechanism of +97.6 M€$_{2009}$ for the (main) ATSPs. It is important to note that this is a completely different situation compared to RP1 when actual traffic was always lower than planned in the PPs and a net loss was generated. Additionally in 2016 the net gain resulting from the traffic risk-sharing mechanism (+97.6 M€$_{2009}$) was 208% higher than in 2015 (+31.7 M€$_{2009}$); and,

- a net gain resulting from the financial incentive mechanism relating to capacity and environment performance, amounting to +3.2 M€$_{2009}$ (see more details in paragraph 6.6.6 below).

Focus on the main ATSPs: Net ATSP gain/loss on en-route activity		
Cost sharing ('000 €2009)	**2015**	**2016**
Determined costs for the main ATSPs (PP) - based on planned inflation	5 289 228	5 225 457
Actual costs for the main ATSPs	5 147 242	5 107 425
Difference in costs: gain (+)/Loss (-) retained/borne by the main ATSPs	141 986	118 032
Amounts excluded from cost sharing to be recovered from (+) or reimbursed to (-) users	23 200	6 475
Gain (+)/Loss (-) to be retained by the main ATSPs in respect of cost sharing	**165 186**	**124 507**
Traffic risk sharing ('000 €2009)	**2015**	**2016**
Difference in total service units (actual vs PP) %	2.0%	4.4%
Determined costs for the main ATSPs (PP) - based on actual inflation	5 319 561	5 314 633
Gain (+)/Loss (-) to be retained by the main ATSPs in respect of traffic risk sharing	**31 689**	**97 558**
Incentives ('000 €2009)	**2015**	**2016**
Gain (+)/Loss (-) to be retained by the main ATSPs in respect of incentives (bonus/penalty)	**9 686**	**3 215**
Net ATSP gain(+)/loss(-) on en-route activity ('000 €2009)	**206 561**	**225 279**

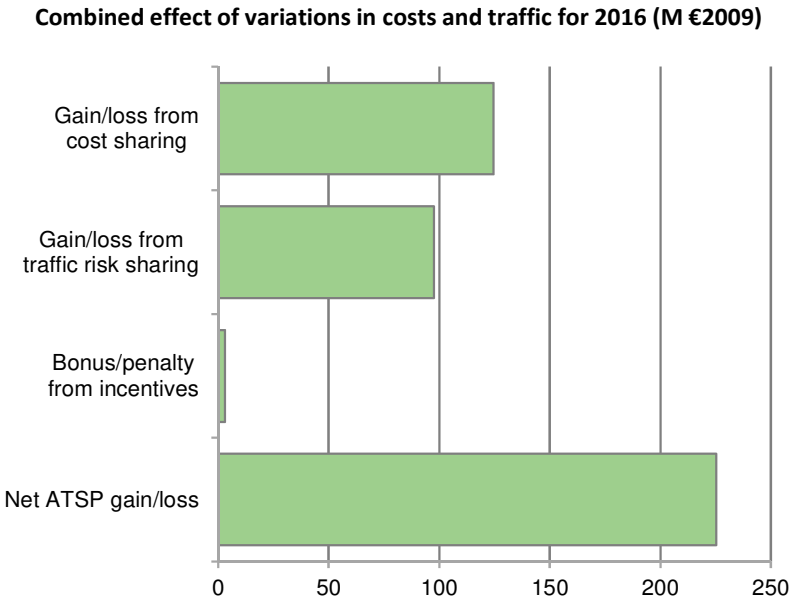


Figure 27: Net gain/loss on 2016 en-route activity for the (main) ATSPs (SES level)

6.6.6 The bonus, in respect of capacity and environment incentives (+3.2 M€$_{2009}$ shown in Figure 27), reflects the fact that:

- For 14 en-route main ATSPs, the actual capacity performance in 2016 remains within the dead band of the incentive mechanism, there are therefore no bonuses or penalties for these CZs;
- In a majority of cases, the amount of bonus or penalty in respect of capacity and environment incentives is significantly lower than 1% of en-route revenues;
- 11 en-route main ATSPs were in a position to generate bonuses, for a total amount of 7.3 M€$_{2009}$; and,

- Four en-route main ATSPs (DSNA, Belgocontrol, NATS and PANSA) reported penalties (-4.1 M€$_{2009}$).

6.6.7 Figure 28 shows the situation for each main ATSP. It also shows that the amount of bonus is above or equal to 1% of the en-route revenues (based on the ATSP chargeable unit rate in 2016 times the actual TSUs) for four ANSPs: EANS 1.3%, ENAV 1.1%, DCAC Cyprus 1.0%, LGS 1.0% and Finavia 1.0%.

6.6.8 The inclusion of these bonuses in the chargeable cost bases is being assessed by the European Commission.

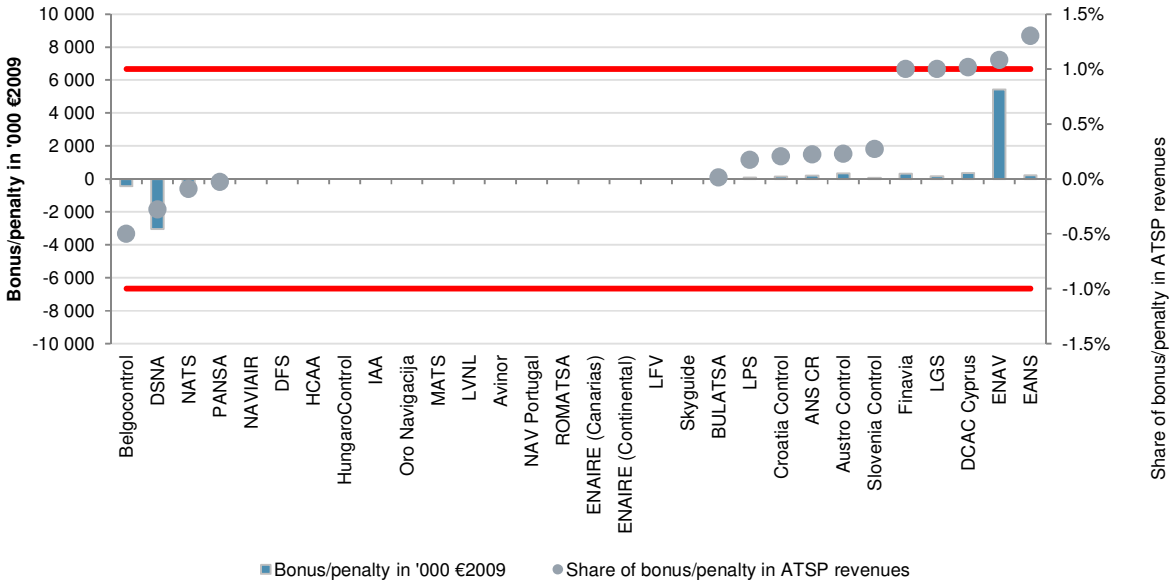


Figure 28: En-route gain(+)/loss(-) to be retained by the main ATSPs in respect of incentives

6.7 ATSPs 2016 overall en-route economic surplus vs. Performance Plans

6.7.1 This analysis estimates the "overall economic surplus", comprising the net ATSP gain/loss on en-route activity (see section 6.6), and the surplus embedded in the cost of capital (return on equity (RoE). The estimated economic surplus is a useful tool to monitor the financial strength of the ATSPs. Detailed information on the methodology used to compute the estimated economic surplus is available in the Reader's Guide included in the accompanying Volume 2 to this report.

6.7.2 The concept of estimated economic surplus is different from the net accounting profit disclosed by the ATSPs in their financial statements. The latter includes revenues and costs relating to the provision of terminal ANS and other activities (e.g. consultancy services) which are not financed through user charges, as well as revenues and costs pertaining to other years of activity, and is therefore not comparable with the notion of economic surplus.

6.7.3 As a consequence, it is important to stress that the overall economic surplus expressed as a percentage of the en-route revenues[xvii] is not directly comparable to the profit margin that would be calculated from ATSPs' financial statements.

6.7.4 Based on the information reported by the States, the en-route surplus embedded in the determined cost of capital is estimated at 246.8 M€$_{2009}$ for the 29 main ATSPs (see column 2016D in Figure 29). This figure is based on a planned asset base amounting to some 6 209 M€$_{2009}$, of which 57.2% is financed through equity at an average (pre-tax) RoE rate of 6.9%.

6.7.5 The actual estimated surplus for the en-route activity in 2016 amounts to 500.8 M€$_{2009}$ (see

column 2016A in Figure 29). This figure comprises the surplus embedded in the actual cost of capital (275.5 M€$_{2009}$) and the net gain/loss generated in respect of the en-route activity in 2016 (225.3 M€$_{2009}$, see Figure 27).

6.7.6 The estimated surplus at Union-wide level represents 9.4% of 2016 en-route revenues, which is higher than planned in the PPs (4.7%). This corresponds to a (weighted average) ex-post actual RoE of 12.9%, which is also higher than that planned in the PPs (6.9%).

6.7.7 The actual estimated surplus includes the reported exemptions from cost-sharing (i.e. 6.5 M€$_{2009}$) in 2016. These amounts to be recovered from (+) or reimbursed to (-) users will be eligible for carry-over to the following reference period(s), if deemed allowed by the EC. If these exemptions are not allowed by the EC, the actual estimated surplus in 2016 would be slightly lower (i.e. 494.3 M€$_{2009}$ of the en-route revenues, compared to 500.8 M€$_{2009}$).

Focus on the main ATSPs: En-route estimated surplus *

* This calculation of the economic surplus retained by the main ATSPs is based on the determined RoE and on the information provided in the Reporting Tables. This is different from the accounting profit/loss reported in the P&L accounts of the ATSP.

Estimated surplus ('000 €2009)	2016D	2016A
Total asset base	6 208 733	6 338 934
Estimated proportion of financing through equity (in %)	57.2%	61.6%
Estimated proportion of financing through equity (in value)	3 551321	3 903 807
Estimated proportion of financing through debt (in %)	42.8%	38.4%
Estimated proportion of financing through debt (in value)	2 657 412	2 435 127
Cost of capital pre-tax (in value)	328 002	338 390
Average interest on debt (in %)	3.1%	2.6%
Interest on debt (in value)	81236	62 860
Determined RoE pre-tax rate (in %)	6.9%	7.1%
Estimated surplus embedded in the cost of capital for en-route (in value)	246 767	275 531
Net ATSP gain(+)/loss(-) on en-route activity	-	225 279
Overall estimated surplus (+/-) for the en-route activity	**246 767**	**500 809**
Revenue/costs for the en-route activity	**5 225 457**	**5 332 704**
Estimated surplus (+/-) in percent of en-route revenues	**4.7%**	**9.4%**
Estimated ex-post RoE pre-tax rate (in %)	**6.9%**	**12.8%**

Figure 29: Estimated surplus for en-route activity for the (main) ATSPs at Union-wide level (SES level)

6.7.8 The overall estimated surplus at Union-wide level (500.8M€$_{2009}$ or 9.4% of en-route revenues) masks different situations amongst the 29 main en-route ATSPs. Figure 30 shows that in 2016, 22 ATSPs have increased their estimated surplus (as a proportion of revenues) compared to the amounts embedded in the determined cost of capital.

6.7.9 Figure 30 also shows that three main ATSPS (LVNL, ROMATSA and Finavia) have incurred losses and show a negative actual estimated surplus on their en-route activity in 2016.

- For LVNL (Netherlands, -0.2% compared to 0% as planned in the PP). LVNL has no return on equity and no ex-ante estimated surplus was embedded in the cost of capital provided the PP for RP2. Therefore the actual estimated surplus of -0.3 M€$_{2009}$ is due to a loss arising from the cost sharing mechanism (-5.3 M€$_{2009}$) partially compensated with the gain arising from the traffic risk sharing mechanisms (+5.1 M€$_{2009}$);
- For ROMATSA (Romania, -1.6% compared to +7.8% as planned in the PP), this is mainly due to a loss of -15.1 M€$_{2009}$ arising from the cost-sharing mechanism since ROMATSA had substantially higher costs than planned (+13.1%); and,

- For Finavia (Finland, -1.6% compared to +3.2% as planned in the PP), this mainly reflects the combination of losses arising from the cost sharing (-1.2 M€$_{2009}$) and traffic risk sharing mechanisms (-1.1 M€$_{2009}$).

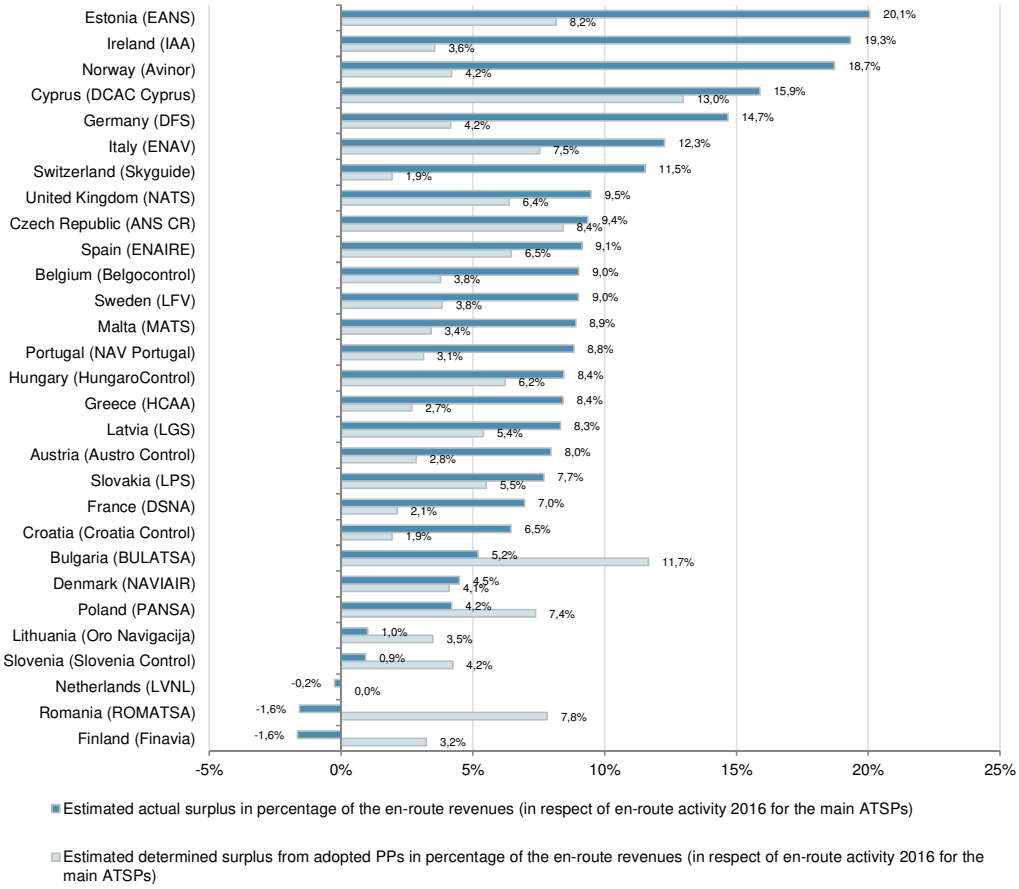


Figure 30: Estimated surplus for the 2016 en-route activity for the main ATSPs

6.7.10 Figure 30 shows that for seven ATSPs, the estimated surplus in 2016 represented more than 10% of their en-route revenues:

- For EANS (Estonia, 20.1% compared to 8.2% as planned in the PP), the actual estimated surplus is mainly due to a gain arising from the cost sharing mechanism (+1.0 M€$_{2009}$) and a higher actual estimated surplus embedded in the cost of capital (+1.5 M€$_{2009}$) than planned due to the reporting of higher net current assets;
- For IAA (Ireland, 19.3% compared to 3.6% as planned in the PP), this is mainly due to a gain of +9.3 M€$_{2009}$ arising from the cost-sharing mechanism since IAA achieved substantially lower cost than planned (-9.5%);
- For Avinor (Norway, 18.7% compared to 4.2% as planned in the PP), this is mainly due to a gain of +12.4 M€$_{2009}$ arising from the cost-sharing mechanism since Avinor achieved substantially lower cost than planned (-12.9%);
- For DCAC Cyprus (15.9% compared to 13.0% as planned in the PP), is a combination of three elements:
  - a gain of +0.6 M€$_{2009}$ arising from the cost sharing mechanism;
  - a gain of +1.4 M€$_{2009}$ arising from the traffic risk sharing mechanism; and,

- a gain of +0.4 M€$_{2009}$, corresponding to a bonus for DCAC as part of the en-route capacity target incentive mechanism reported in the 2016 BLUE MED FAB monitoring report.

- For DFS (Germany, 14.7% compared to 4.2% as planned in the PP), the actual estimated surplus is mainly due to the combination of a net gain of +52.2 M€$_{2009}$ arising from the cost-sharing mechanism since DFS achieved substantially lower cost than planned (-6.9%) and the gain of 18.5 M€$_{2009}$ arising from the traffic risk sharing mechanism;
- For ENAV (Italy, 12.3% compared to 7.5% as planned in the PP), this is mainly due to a gain of +33.9 M€$_{2009}$ arising from the cost-sharing mechanism since ENAV achieved substantially lower cost than planned (-6.6%), partially diminished by the loss of -17.1 M€$_{2009}$ arising from the traffic risk sharing mechanism; and,
- For Skyguide (Switzerland, 11.5% compared to 1.9% as planned in the PP), this is mainly due to a gain of +7.3 M€$_{2009}$ arising from the cost-sharing mechanism since Skyguide achieved substantially lower cost than planned (-9.3%).

6.7.11 More details on the main ATSPs economic surplus are available in Volume 2.

6.8 Union-wide 2016 actual costs and cost for users

6.8.1 This Section presents the actual en-route cost for airspace users in respect of ANS activities in 2016 (also referred to as the "true cost for users"). Note that the "true cost" for users is different from the cost **charged** during the year due to the adjustments foreseen in the performance scheme and SES charging Regulation.

6.8.2 In this context, the "true costs" are a better reflection of the cost-efficiency performance from an airspace user's point of view. This section attempts to quantify the "true costs" in respect of ANS activities carried out in 2016 which comprise:

- the amounts that have already been charged to the users through the 2016 unit rates, and;
- the different adjustments relating to 2016 activities which will be charged or reimbursed to users in future years.

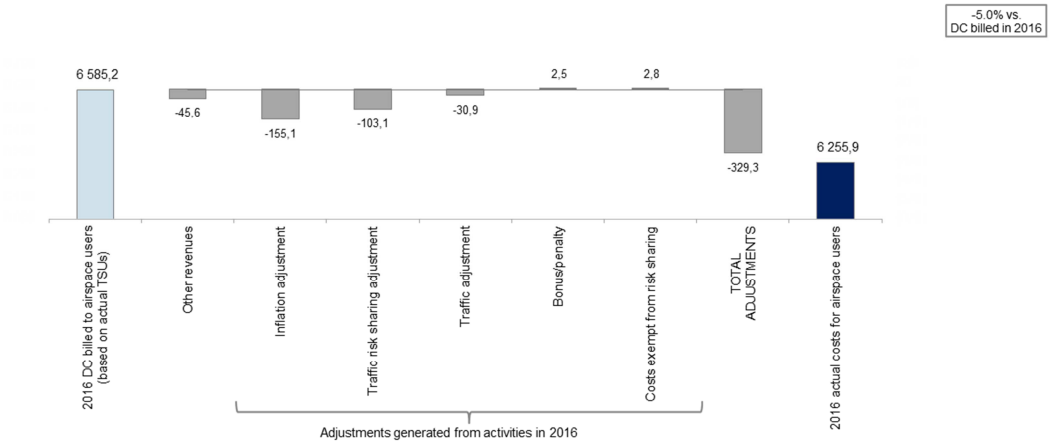


Figure 31: Actual costs for users in respect of the 2016 en-route activity (in M€$_{2009}$)

6.8.3 It should be noted that the calculation of the "true costs" for users does not include the impact of the risk associated with exchange rates linked to the billing of the chargeable unit rate. The unit rate charged to airspace users is established in national currency but billed in Euros using the current exchange rate. In case of exchange rate fluctuations, the actual costs

paid by airspace users will be higher or lower than planned.

6.8.4 Figure 31 shows that the actual costs incurred by airspace users in respect of activities performed in 2016 (6 255.9 M€$_{2009}$) are -5.0% (-329.3 M€$_{2009}$) lower than the DCs billed based on actual TSUs (6 585.2 M€$_{2009}$).

6.8.5 The first factor contributing to the observed difference is the deduction of -45.6 M€$_{2009}$ of other revenues. In a majority of en-route CZs, there are either no or only small amounts of other revenues deducted from the determined costs. However, a few CZs have material levels of other revenues providing an impact at Union-wide level. This is especially the case for:

(i) Spain Continental and Spain Canarias (-17.8 M€$_{2009}$) mainly due to national public funding and commercial revenues;

(ii) France (-11.1 M€$_{2009}$) reflecting reimbursements from the SESAR Joint Undertaking, revenues from commercial activities, the co-financing of Coflight by ENAV and Skyguide and reimbursements of EC grants; and,

(iii) Croatia (-7.5 M€$_{2009}$) corresponding to the revenues from service provision in the airspace of Bosnia and Herzegovina.

6.8.6 For almost all CZs (Belgium-Luxembourg and Norway being the only exceptions), the actual inflation index in 2016 is lower than planned in the PPs. The overall net effect of inflation adjustments at State level is a forthcoming reimbursement (-155.1 M€$_{2009}$) to airspace users.

6.8.7 At Union-wide level, TSUs are +4.4% higher than planned. For 23 CZs, the difference between actual and planned TSUs falls outside the ±2% dead band of the traffic risk sharing mechanism. The net effect of these deviations between actual and planned TSUs is a forthcoming reimbursement (-103.1 M€$_{2009}$) to airspace users.

6.8.8 Since Union-wide traffic is higher than planned , the traffic adjustments relating to costs not subject to traffic risk sharing is again a forthcoming reimbursement (-30.9 M€$_{2009}$) to airspace users.

6.8.9 Eleven CZs reported bonuses in respect of capacity and environment incentives, while United Kingdom, Poland, Germany, France, Netherlands and Belgium/Luxembourg are the only CZs that reported penalties (Germany and Netherland related to MUAC). At system level, the overall result of these incentive mechanisms amounts to a bonus of +2.5 M€$_{2009}$ to be charged to airspace users, if deemed eligible after assessment by the Commission. This amount differs from the +3.2 M€$_{2009}$ of Figure 27 as it is calculated at State level and not only for the main ATSPs as it is done in the Figure 27.

6.8.10 Finally, a net amount of +2.8 M€$_{2009}$ has been reported as costs exempt from cost sharing at Union-wide level. It is important to note that at CZ level, costs exempt from cost sharing are amounts to be reimbursed to airspace users in the majority of cases. However, Sweden reported an exceptionally high amount to be charged to airspace users (+19.6 M€$_{2009}$) for its main ATSP which outweighs the negative amounts reported by the majority of CZs. These costs will be eligible for carry-over (charged/reimbursed to airspace users) to the following reference period(s), if deemed allowed by the EC. The +2.8 M€$_{2009}$ amount differs from the +6.5 M€$_{2009}$ of Figure 27 as in this case is calculated at State level and not only for the main ATSPs as is done in Figure 27.

Terminal ANS Cost-Efficiency

6.9 Presentation of the terminal cost-efficiency KPI

6.9.1 Although there are no Union-wide cost-efficiency targets for terminal ANS, 2016 is the second year where terminal ANS cost-efficiency performance is monitored according to the requirements of Article 18 of the performance Regulation.

6.9.2 The terminal cost-efficiency KPI is the result of the ratio between the determined costs and the forecast terminal service units (TNSUs) contained in the PPs. Each State has adopted local cost-efficiency targets at Terminal Charging Zone (TCZ) level for RP2 with the same risk sharing arrangements than for en-route except that traffic risk sharing exemptions can apply for TCZs including airports with less than 225 000 movements.

6.9.3 A total of 36 TCZs have been reported (generally one per State, but two for Italy, two for UK and five for Belgium) covering a total of 174 airports.

6.9.4 The two TCZs reported by UK have been excluded from this analysis for the following reasons:

(iv) information relating to UK TCZ B (nine airports) has been reported to the EC on a confidential basis in accordance with the requirements related to market conditions and;

(v) UK TCZ C (London Approach) is not directly comparable with other TCZs since the service provided is of a hybrid nature, making the transition between en-route and terminal services for the five London Airports (which are also part of TCZ B).

6.9.5 It should be noted that the 2016 cost-efficiency monitoring analysis for UK TCZ C is available in the accompanying Volume 2 of this report.

6.9.6 Table 22 presents the aggregation of the terminal DUCs reported by the States (excluding UK) for all years of RP2.

COST-EFFICIENCY DATA FROM PERFORMANCE PLANS	2015P	2016P	2017P	2018P	2019P
Real terminal Determined Unit Costs (in EUR_{2009})	180.83	174.35	165.78	161.29	157.33

Table 22: Terminal DUCs for RP2 as per aggregation of PPs (SES level)

6.9.7 Important note: in 2016, Malta has submitted a request to the European Commission to revise their RP2 Terminal cost-efficiency DUC for the years 2017 to 2019. The figures shown in this report reflect: i) the adopted Performance Plan (Commission Implementing Decision (EU) 2015/348 of 2 March 2015) for the years 2015 and 2016; and ii) the revised Performance Plan (submitted by Malta but still pending approval by the EC) for the years 2017 to 2019 (see note at 6.2.4 above).

6.10 Actual 2016 unit cost vs. DUC in adopted Performance Plans

6.10.1 In order to ensure consistency with the DCs provided in the adopted PPs and to allow consolidation at Union-wide level, actual costs are expressed in real terms ($€_{2009}$ prices).

6.10.2 Figure 32 shows that, in 2016, the Union-wide actual terminal unit cost (166.10 $€_{2009}$) was some -4.7% lower than planned in the RP2 PPs. This variation results from the combination of higher than planned TNSUs (+4.6%) and lower than planned terminal costs (-0.4% or -4.1 $M€_{2009}$).

Actual unit cost vs. DUC in adopted Performance Plans						
SES States - Data from RP2 Performance Plans		**2015D**	**2016D**	**2017D**	**2018D**	**2019D**
Terminal costs (EUR2009)		1.117.713.492	1.103.962.617	1.066.100.758	1.058.073.714	1.052.864.252
Total terminal Service Units		6.181.013	6.331.707	6.430.770	6.559.914	6.692.224
Real terminal unit costs per Service Unit (EUR2009)		**180,83**	**174,35**	**165,78**	**161,29**	**157,33**
SES States - Actual data from Reporting Tables		**2015A**	**2016A**	**2017A**	**2018A**	**2019A**
Terminal costs (EUR2009)		1.084.292.134	1.099.832.992			
Total terminal Service Units		6.318.950	6.621.679			
Real terminal unit costs per Service Unit (EUR2009)		**171,59**	**166,10**			
Difference between Actuals and Planned (Actuals vs. PP)		**2015**	**2016**	**2017**	**2018**	**2019**
Real terminal costs (EUR2009)	in value	-33.421.358	-4.129.624			
	in %	-3,0%	-0,4%			
Total terminal Service Units	in value	137.937	289.972			
	in %	2,2%	4,6%			
Real terminal unit costs per Service Unit (EUR2009)	**in value**	**-9,24**	**-8,26**			
	in %	**-5,1%**	**-4,7%**			

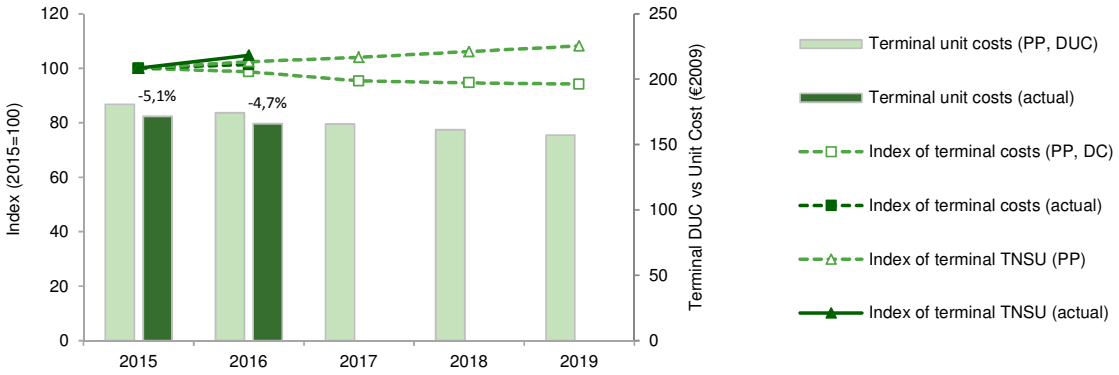


Figure 32: Terminal costs, traffic and unit costs (actual vs. Performance Plans, SES level)

6.10.3 The overall deviation of terminal unit costs observed at Union-wide level (-4.7%) masks different situations across the 34 TCZs as shown in Figure 33.

6.10.4 Actual terminal unit costs are lower than planned in 26 TCZs out of 34, with in most cases a combination of lower actual costs and higher traffic compared to RP2 PPs. Among these 26 TCZs, three managed to achieve reductions in the terminal DUC of more than -20.0%: Greece (-28.6%), Cyprus (-24.5%) and Hungary (-20.0%). In the case of Greece the actual unit costs is lower mainly to significantly higher traffic compared to the forecast used in the PPs (+40.3%).

6.10.5 For five TCZs, actual unit costs are higher than planned by more than +5.0%: Slovenia (+22.7%), Belgium Oostende-Brugge (+19.6%), Sweden (+16.6%), Czech Republic (+8.2%) and Romania (+7.9%).

- For Slovenia, the higher unit cost is due to the combined effect of lower traffic compared to the forecast used in the PPs (-7.8%) and actual cost higher than planned (+13.2%), mainly driven by higher staff costs for the ATSP (+15.5%).
- For Belgium Oostende-Brugge, the higher unit cost is due to lower traffic compared to the forecast used in the PPs (-19.4%).
- For Sweden, the higher unit cost is due to higher actual costs (+18.4%) mainly driven by a large increase of the LFV pension costs resulting from a significantly lower actual discount rate set by the Swedish Pension Authority.

- For Czech Republic, the higher unit cost is due to the combined effect of lower traffic compared to the forecast used in the PPs (-2.6%) and higher than planned actual costs (+5.4%)
- For Romania, the higher unit cost is due to higher actual costs (+26.7%) mainly driven by higher staff costs for the ATSP (+26.5%).

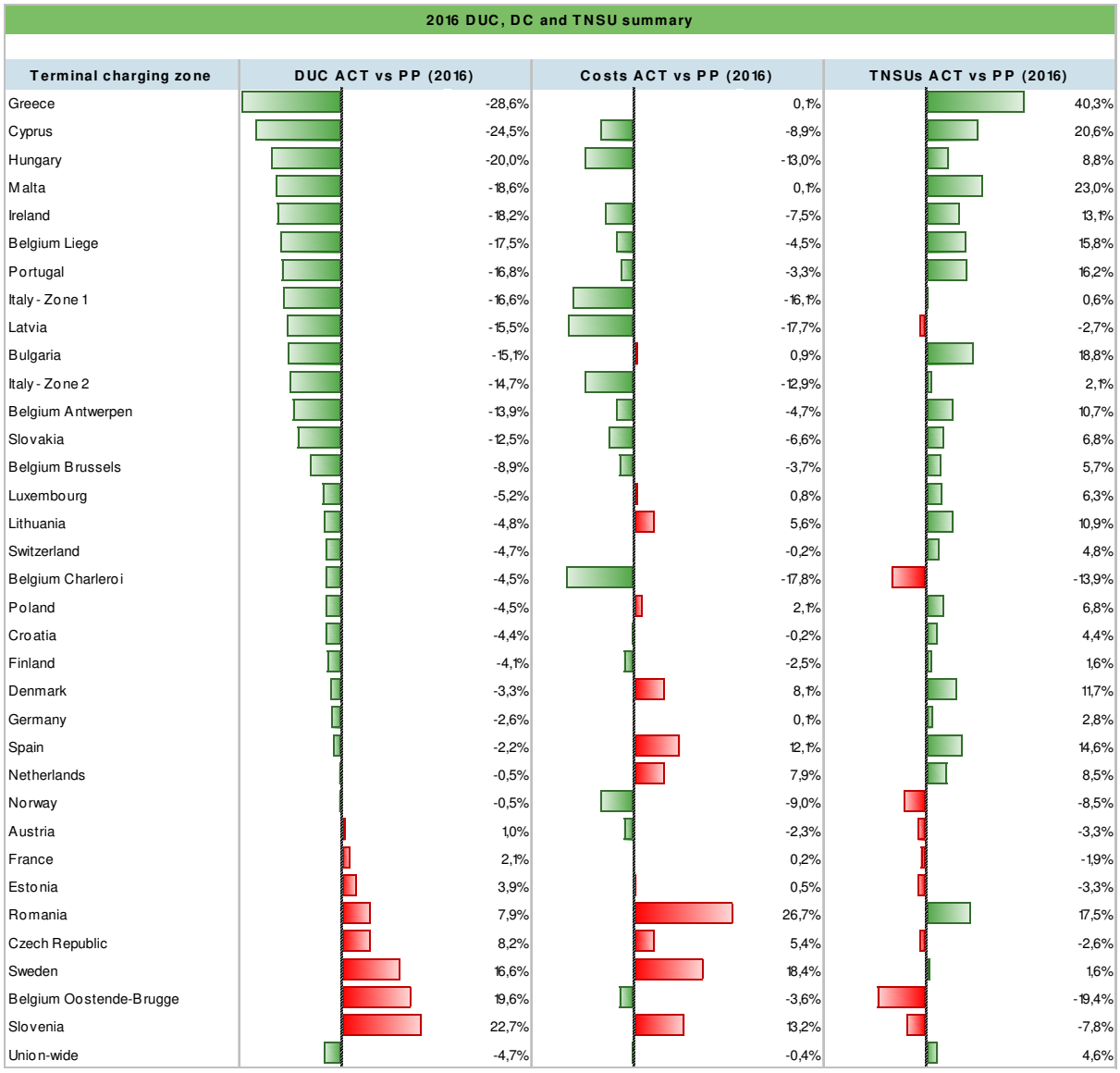


Figure 33: 2016 TANS actual costs vs. PP at State level

6.10.6 For nine TCZs, the actual number of TNSUs is lower than planned in the RP2 PPs, and two of them had traffic levels that fall below the -10% alert threshold, Belgium Charleroi (-13.9%) and Belgium Oostende-Brugge (-19.4%). It worth noting that these TCZ were not subject to Terminal Navigation Charges (TNC) since terminal ANS costs were 100% subsidised by the State or regional authorities in 2016.

6.10.7 For 12 TCZs, the actual numbers of TNSUs compared to the planned in the RP2 PPs are higher than +10%, exceeding the alert threshold. Significant deviations above +20% are observed for Greece (+40.3%), Malta (+23.0%), and Cyprus (+20.6%). Among the 30 States that have reported at least one TCZ, in 2016 only Malta has submitted a request to the

European Commission to revise their RP2 Terminal cost-efficiency DUC for the years 2017 to 2019.

6.10.8 Figure 34 shows that the TNSU forecasts used in the PPs are consistently below than the low scenario of the STATFOR forecast (February 2017) for all years until the end of RP2. Indeed, if any of three STATFOR February 2017 scenarios materialize, the traffic is expected to exceed the ±2% dead band foreseen in the traffic risk-sharing mechanism and in the high case would exceed the +10% threshold in the year 2019. It must be noted that that only 18 out of the 36 original TCZ are applying traffic risk-sharing.

6.10.9 As for en-route, based on current projections at a Union-wide level the actual terminal traffic over RP2 will be higher than the forecasts provided in the PPs. This implies additional revenues for the States/ATSPs but also amounts to be reimbursed to airspace users according to the traffic risk sharing adjustments.

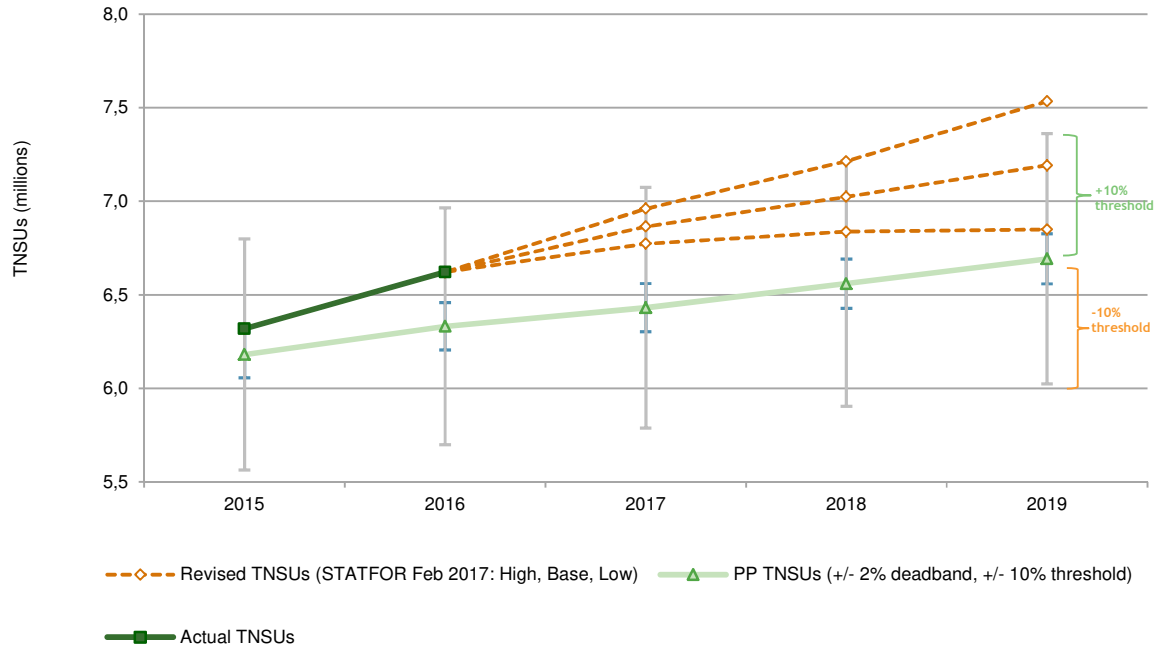


Figure 34: Terminal traffic monitoring (SES level)

6.10.10 Figure 35 shows that at SES level actual terminal costs were lower than planned for the MET service providers (-5.8% or -2.8 M€$_{2009}$) and the NSAs (-12.0% or -1.4 M€$_{2009}$). Most of the deviation observed for the total terminal costs (-0.4% or -4.1 M€$_{2009}$) is due to these two entities. The main ATSPs has a limited effect since the actual costs compared to the planned were very similar (+0.06 M€$_{2009}$).

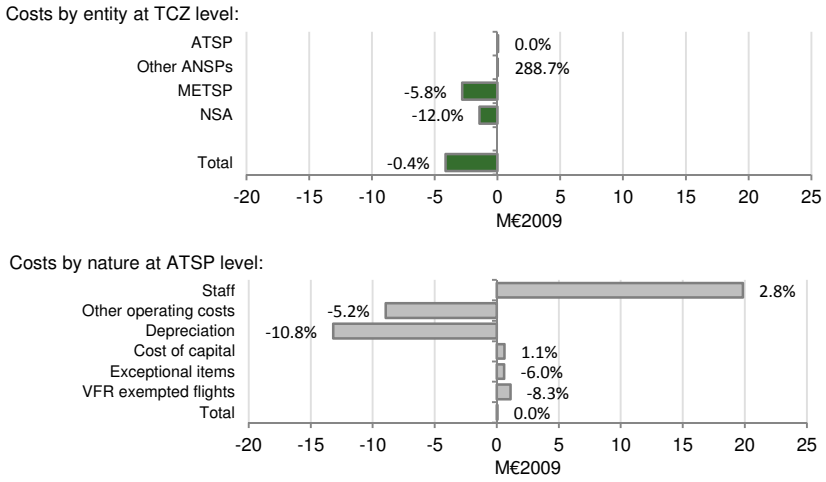


Figure 35: 2016 actual terminal costs compared to PPs (SES level)

6.10.11 Figure 35 also shows that the similar value, observed in actual costs compared to the DCs for the main ATSPs masks different situations across the different costs categories in 2016: higher staff costs (+2.8% or 19.9 M€$_{2009}$); lower other operating costs (-5.2% or -8.9 M€$_{2009}$); lower depreciation costs (-10.8% or -13.2 M€$_{2009}$); higher cost of capital (+1.1% or +0.6 M€$_{2009}$); lower exceptional items that at aggregated level results in lower revenues than planned (-6.0% or +0.6 M€$_{2009}$), therefore higher total costs; and finally the VFR exempted flights costs were lower than the forecasts provided in the RP2 Performance Plans (-8.3% or +1.1 M€$_{2009}$).

6.10.12 Details on the main drivers underlying the deviation between actual and determined costs for each of these costs categories are available at TCZ level in Volume 2 of the PRB 2016 monitoring report.

6.10.13 Figure 36 presents for each Terminal charging zone the variation between actual costs and determined costs.

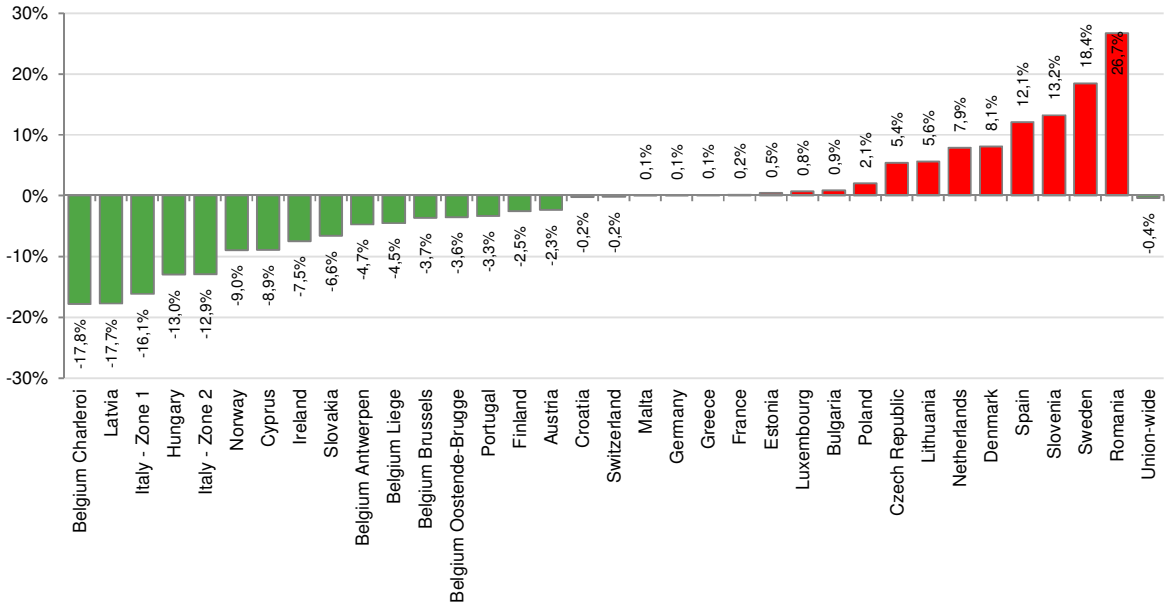


Figure 36: 2016 actual terminal costs compared to PPs (SES level)

6.10.14 As shown on Figure 36, actual costs were higher than planned for 16 CZs. Four of these states had an observed deviation above 10%:

- Romania with +26.7% or +3.0 M€$_{2009}$, being the ATSP ROMATSA (+26.9%, or +3.0 M€$_{2009}$) the major contributor to the observed difference. The higher than planned terminal costs in real terms were mainly driven by an extraordinary higher actual staff cost (+26.5%, or +2.0 M€$_{2009}$) and higher exceptional costs of (+ 0.8 M€$_{2009}$), when none exceptional costs were planned. No drivers underlying the deviation of actual costs for 2016 outlined above are provided in the additional information to June 2017 en-route reporting tables or the DANUBE FAB 2016 Monitoring Report;
- Sweden with +18.4% or +2.7 M€$_{2009}$. The higher than planned terminal costs in real terms were mainly driven by higher actual costs for the ATSPs (LFV and Swedavia) (+18.7%, or +2.7 M€$_{2009}$). The main driver was the higher than planned staff costs (+28.5%, or +2.6 M€$_{2009}$). As for en-route, this difference is mainly due to significantly higher than planned pension costs for LFV;
- Slovenia with +13.2%, or +0.4 M€$_{2009}$, due to the higher than planned terminal costs in real terms for the ATSP Slovenia Control's (+15.6%, or +0.5 M€$_{2009}$). The main driver to the observed difference was significantly higher actual staff costs for Slovenia Control's (+15.5%, or +0.4 M€$_{2009}$); and
- Spain with +12.1%, or +10.8 M€$_{2009}$, due to the higher than planned terminal costs in real term, for the ATSP ENAIRE (+14.3%, or +12.1 M€$_{2009}$). The main driver to the observed difference was significantly higher actual staff costs for ENAIRE (+11.8%, or +8.3 M€$_{2009}$) mainly due to the redistribution of ATCOs staff considering the traffic increase at airports in the TCZ and higher capital related costs, including depreciation (+35.8%, or +2.3 M€2009) and cost of capital (+30.2%, or +0.8 M€2009) reflecting a significantly higher than planned actual asset base for the terminal activity (+39.4%).

6.10.15 Figure 36 shows that actual costs were lower than planned for 18 CZs. Five of these CZs had an observed deviation above -10%:

- Belgium Charleroi -17.8% or -1.3 M€$_{2009}$. The lower than planned terminal actual costs in real terms were mainly driven by reductions for the ATSP Belgocontrol (-17.7% or -1.3 M€$_{2009}$) due to the lower actual depreciation costs (-70.8% or -0.7 M€$_{2009}$) and lower actual other operating costs (-26.4% or -0.3 M€$_{2009}$);
- Latvia -17.7% or -1.1 M€$_{2009}$. The lower than planned terminal actual costs in real terms were mainly driven by reductions for the ATSP LGS (-17.3% or -1.0 M€$_{2009}$) due to the lower actual depreciation costs (-26.9% or -0.5 M€$_{2009}$) and lower actual other operating costs (-42.9% or -0.3 M€$_{2009}$);
- Italy zone 1 with -16.1% or -6.3 M€$_{2009}$. The lower than planned terminal actual costs in real terms were driven by lower actual costs for the ATSP ENAV (-16.2%, or -6.3 M€$_{2009}$) due to lower actual staff costs (-19.4% or -3.7 M€$_{2009}$) and lower actual other operating costs (-29.6% or -2.1 M€$_{2009}$);
- Hungary with -13.0% or -2.2 M€$_{2009}$. The lower than planned terminal actual costs in real terms were driven by lower actual costs for the ATSP HungaroControl (-13.1%, or -2.2 M€$_{2009}$) due to lower actual staff costs than planned (-8.8% or -0.9 M€$_{2009}$) and lower depreciation costs than foreseen in the plan (-39.9% or -1.2 M€$_{2009}$); and
- Italy zone 2 with -12.9% or -7.3 M€$_{2009}$. The lower than planned terminal actual costs in real terms were driven by lower actual costs for the ATSP ENAV (-13.0%, or -7.3 M€$_{2009}$) due to lower actual staff costs (-14.0% or -4.0 M€$_{2009}$) and lower actual other operating costs (-24.7% or -2.6 M€$_{2009}$).

6.11 ATSPs 2016 overall terminal economic surplus vs. Performance Plans

6.11.1 Although 30 main ATSPs reported information relating to terminal ANS in 2016, the analysis

presented hereafter focuses on 28 ATSPs in order to take into account the specificities of some TCZs:

(i) Actual data for the ATSPs operating in UK TCZ B (mainly NERL) are not publicly available (provided to the Commission on a confidential basis as terminal ANS are provided on a contractual basis – see paragraph 6.9.4).

(ii) In Cyprus and at four Belgian regional TCZs, terminal ANS is 100% subsidised by the States/Regions.

(iii) In Sweden, no capital related costs (depreciation and cost of capital) are reported for the main ATSP (LFV) in the terminal Reporting Tables since these costs are fully borne by the airport operator (Swedavia) that owns the CNS infrastructure used by LFV to provide terminal ANS services. For monitoring purposes, the overall estimated terminal surplus for ATSPs (LFV and Swedavia) is considered.

(iv) Greece reported zero actual costs for depreciation, cost of capital and ATSP's asset base (HCAA) in the June 2017 submission of terminal reporting tables, under the statement that "*all fixed assets in operation which are used for the provision of ATS in the terminal navigation charging zone have been fully depreciated".* For monitoring purposes, the overall estimated terminal surplus is therefore just the outcome of the net gain retained by the main ATSPs (HCAA) as a result of the variations in costs, since traffic risk sharing does not apply in this TCZ and no bonus or penalty from capacity incentives has been reported.

6.11.2 In these cases, the notion of economic surplus is either not appropriate, or to be interpreted with caution. NERL, DCAC and Belgocontrol (with the exception of its activity in Brussels TCZ) have therefore been excluded from the analysis presented below.

6.11.3 Figure 37 presents: i) the net gain retained by the main ATSPs in 2016 as a result of the variations in costs and traffic, as well as the bonus from capacity incentives (see left-hand side); and ii) the overall estimated surplus when adding to this net gain the return on equity embedded in the cost of capital (see right-hand side).

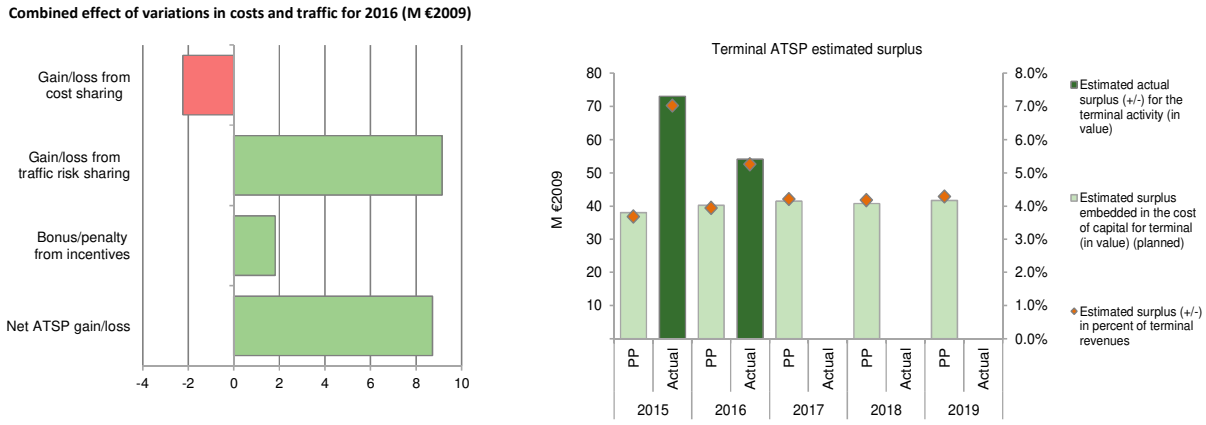


Figure 37: Estimated surplus for the 2016 terminal ANS activity at Union-wide level (SES level)

6.11.4 In 2016, the main ATSPs collectively generated a net gain of +8.7 M€$_{2009}$ on the terminal activity. This is a combination of three elements:

- a loss of -2.2 M€2009 arising from the cost-sharing mechanism;

- a gain of +9.1 M€2009 arising from the traffic risk-sharing mechanism (applied in 17 out of 34 TCZs included in this analysis); and,
- a gain of +1.8 M€2009, corresponding to a bonus from the capacity incentive mechanism.

6.11.5 Five ATSPs (DFS, ENAV, Skyguide, LVNL and Oro Navigacija) reported a bonus for their operational performance in 2016 (for an overall amount of 2.0 M€$_{2009}$) and two (Finavia, and PANSA) reported a penalty (for an overall amount of 0.2 M€$_{2009}$). The inclusion of these bonuses in the chargeable cost base is still being assessed by the Commission.

6.11.6 Ex-post, the overall estimated surplus taking into account the net gain from the terminal activity mentioned above (8.7 M€$_{2009}$) and the surplus embedded in the actual cost of capital (45.4 M€$_{2009}$) amounts to 54.1 M€$_{2009}$ (5.3% of the 2016 terminal revenues, see right-hand side of Figure 37). At Union-wide level, the resulting ex-post rate of return on equity (RoE) is 7.8%, which is higher than the 6.2% planned in the PPs. Many TCZs are very small (123 out of 174 airports are below 70 000 air transport movement per year) and in many cases the asset base reported for the TCZ is also very small. The RoE expressed in terms of percentage should therefore be interpreted with caution since relatively high/low values do not necessarily reflect very large gains/losses in absolute values.

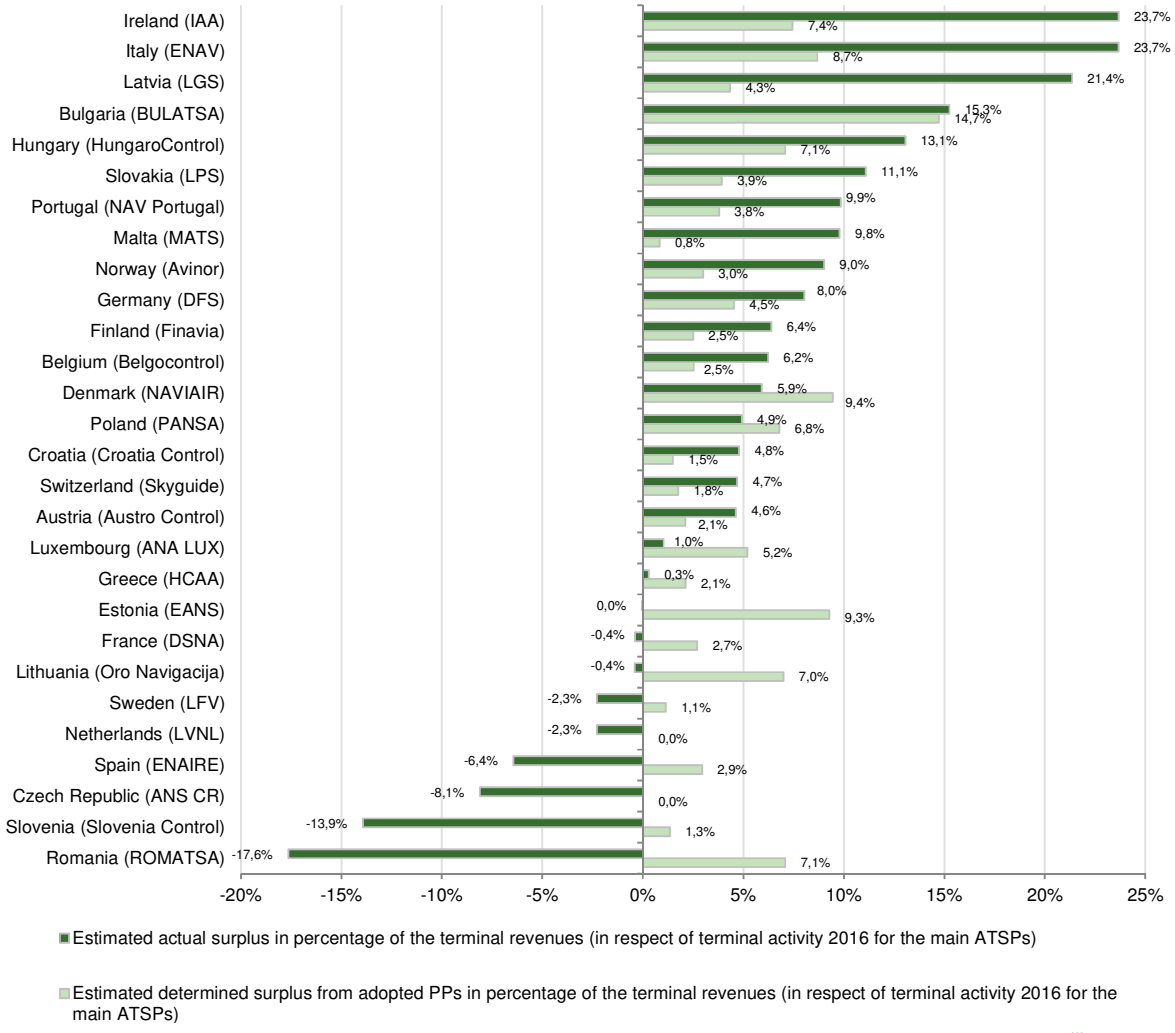


Figure 38: Estimated surplus for the 2016 terminal activity at (main) ATSPs level[xviii]

6.11.7 Figure 38 shows that a majority of ATSPs did achieve a higher actual estimated surplus than planned. This is particularly the case of the three ATSPs operating in Ireland, Italy and Latvia

where the overall estimated surplus exceeds 20% of ATSPs revenues. All these ATSPs achieved lower costs than planned (from -8.0% for IAA (Ireland) to -17.3% for LGS (Latvia)). Where traffic risk sharing applies (Ireland and Italy - Roma/Fiumicino), actual traffic was higher than planned.

6.11.8 On the other hand, Figure 38 also shows that 8 out of 28 ATSPs incurred an estimated economic loss in respect of the 2016 terminal activity:

- For Romania, Slovenia, Sweden, and Lithuania, where traffic risk sharing does not apply, the observed losses are entirely due to higher actual costs compared to the planned values.
- In the case of Czech Republic, where traffic risk sharing applies, the observed loss is mainly due to lower than planned traffic (-2.6%) which could not be absorbed by the Return on Equity (RoE) since no cost of capital is charged by ANS CR to terminal ANS airspace users.
- In the case of Spain, the estimated surplus embedded in the cost of capital and the positive outcome of the traffic risk sharing were not sufficient to outweigh the significant increase in costs (+14.3%).
- In the case of the Netherlands, LVNL has no return on equity and therefore no ex-ante estimated surplus was embedded in the cost of capital provided the NPP for RP2. As a result, the observed loss is mainly due higher cost than planned costs (+8.0%) partially compensated with the positive outcome of the traffic risk sharing.
- In the case of France, DSNA the observed loss is due to the combination of higher than planned costs (+1.4%) and to lower than planned traffic (-1.9%), which was mostly absorbed by the Return on Equity (RoE).

6.11.9 More details on the main ATSPs economic surplus are available in the PRB Monitoring Reports at State level (Volume 2).

6.12 Union-wide 2016 actual costs and cost for users

6.12.1 This section analyses the actual terminal costs for airspace users in respect of ANS activities in 2016 (also referred to as the “true cost for users”) in the same way as it is done for en-route ANS (see p. 50).

6.12.2 In Cyprus and at four Belgian regional TCZs, terminal ANS is 100% subsidised by the States/Regions. TANS activities are therefore fully financed though "income from other sources". Consequently the calculation shown below excludes the adjustments generated for these TCZs and takes into account only the “other revenues”.

6.12.3 Figure 39 shows that the actual costs incurred by airspace users in respect of activities performed in 2016 (971.2M€$_{2009}$) are -17.3% (-202.6M€$_{2009}$) lower than the DCs billed based on actual TNSUs (1 173.8 M€$_{2009}$).

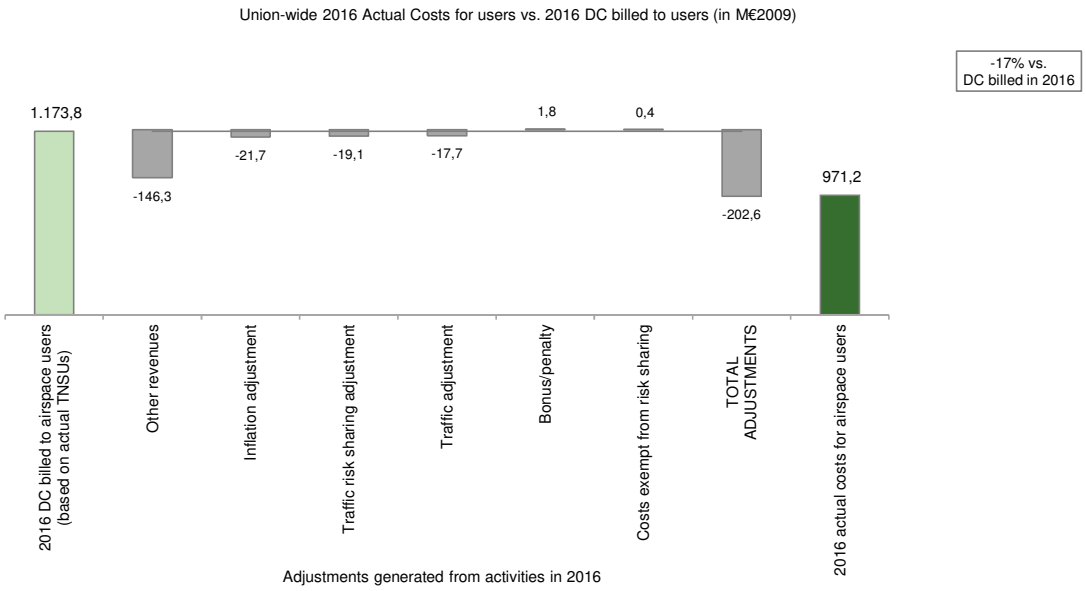


Figure 39: Union-wide 2016 actual costs for users vs. 2016 DCs billed to users (in M€$_{2009}$) (SES level)

6.12.4 The most important factor contributing to the observed difference is the deduction of some -146.3 M€$_{2009}$ of other revenues. In a large majority of TCZs, there are either no, or only small, amounts of other revenues deducted from the determined costs. However, particular circumstances in a few TCZs have a large impact at Union-wide level. This is especially the case for:

- Spain (-80.4 M€2009) reflecting the fact that terminal ANS costs are partially financed by two elements: 1) revenues from agreements with the airport manager regarding aerodromes service provisions for all airports in the charging zone and 2) ENAIRE commercial income (publications, and minor consulting activities).
- Belgium (-28.5 M€2009 in total for the five TCZs) where the financing of TANS in 2016 is partly (Brussels airport) or fully (regional airports) subsidised by the State or regional authorities; and,
- Cyprus (-7.7 M€2009) where terminal ANS was free of charge for the airspace users in 2016 since TANS costs were 100% subsidised by the State.

6.12.5 For almost all States (Belgium and Norway being the only exceptions), the actual inflation index in 2016 is lower than planned in the PPs. The overall net effect of inflation adjustments at State level is a forthcoming reimbursement (-21.7 M€$_{2009}$) to airspace users.

6.12.6 Traffic risk sharing applies to 18 TCZs out of the 34 included in this monitoring report. In these TCZs, the net effect of differences between actual and planned TNSUs is a forthcoming reimbursement (-19.1 M€$_{2009}$) to airspace users. Since traffic was in general higher than planned, the traffic adjustments relating to costs not subject to traffic risk sharing is again a forthcoming reimbursement (-17.7 M€$_{2009}$) to airspace users.

6.12.7 Five ATSPs (DFS, ENAV, Skyguide, LVNL and Oro Navigacija) reported a bonus for their operational performance in 2016 (for an overall amount of 2.0 M€$_{2009}$) and two (Finavia and PANSA) reported a penalty (for an overall amount of 0.2 M€$_{2009}$). The overall result is a bonus of 1.8 M€$_{2009}$ (Belgocontrol's reported penalty is excluded from this calculation since terminal ANS is 100% subsidised by the States/Regions). The inclusion of these bonuses in the chargeable cost bases is still being assessed by the European Commission.

6.12.8 Finally, 15 TCZs reported costs exempt from cost sharing, representing a total amount of -0.4 M€$_{2009}$. These costs will be eligible for carry-over (reimbursed to airspace users) to the

following reference period(s), if deemed allowed by the European Commission.

Gate-to-Gate ANS Cost-Efficiency

6.13 Gate-to-Gate ANS DCs monitoring

6.13.1 As shown in Table 23, actual gate-to-gate ANS costs[xix] at Union-wide level are in 2016 some -1.7% lower than planned in the adopted PPs (7 175 M€$_{2009}$ compared to 7 300 M€$_{2009}$) due to a combination of lower en-route costs and lower terminal costs.

2016 Gate-to-gate ANS actual costs vs. PP						
SES States - Data from RP2 Performance Plans		**2015D**	**2016D**	**2017D**	**2018D**	**2019D**
Real en-route costs (determined costs 2015-2019) - (in EUR2009)		6.235.113.277	6.195.878.072	6.164.525.008	6.110.343.143	6.018.185.578
Real terminal ANS costs - (in EUR2009)		1.117.713.492	1.103.962.617	1.066.100.758	1.058.073.714	1.052.864.252
Real gate-to-gate ANS costs - (in EUR2009)		7.352.826.769	7.299.840.689	7.230.625.766	7.168.416.856	7.071.049.830
Share of en-route costs in gate-to-gate ANS costs		**84,8%**	**84,9%**	**85,3%**	**85,2%**	**85,1%**
SES States - Actual data from Reporting Tables		**2015A**	**2016A**	**2017A**	**2018A**	**2019A**
Real en-route costs - (in EUR2009)		6.079.182.146	6.075.304.465			
Real terminal ANS costs - (in EUR2009)		1.084.292.134	1.099.832.992			
Real gate-to-gate ANS costs - (in EUR2009)		7.163.474.280	7.175.137.457			
Share of en-route costs in gate-to-gate ANS costs		**84,9%**	**84,7%**			
Difference between Actuals and Planned (Actuals vs. PP)		**2015**	**2016**	**2017**	**2018**	**2019**
Real gate-to-gate costs (EUR2009)	in value	-189.352.488	-124.703.232			
	in %	-2,6%	-1,7%			
En-route share	in p.p.	0,1%	-0,2%			

Table 23: 2016 gate-to-gate ANS actual costs vs. PPs (SES level)

6.13.2 The actual proportion of en-route in total ANS costs (84.7%) is in line with the proportion planned in the PPs (84.9%). This indicates that, at system level, there is no noticeable reallocation of costs from en-route to terminal ANS.

7 NETWORK PERFORMANCE PLAN

7.1 Safety

7.1.1 Two SKPIs are monitored for the NM: EOSM and application of RAT to the ATM-s occurrences reported by the NM.

7.1.2 NM EoSM score achieved is 57 based on the verified responses to the questionnaire, which increased from the figure (50) from last year.

7.1.3 Analysis of the questionnaire responses per each EoSM management objective shows that some elements of NM safety management system are still to be fully consolidated. Table 24 shows the level of maturity achieved for the different Management Objectives (MOs). While significant progress have been recorded in many areas, the continuous oversight carried out by EASA during 2016 still showed that NMD management system has room for improvement, especially in terms of documents/records management and compliance monitoring. This situation is mainly reflected in a few of the questions linked to the areas of *Safety Policy & Objectives and Safety Promotion* being rated as effectiveness level B. None of the Management Components achieved the target level 'D'.

EoSM Component	2016
Safety Culture	***C***
Minimum level achieved for all other MOs	***B***
Safety Policy & Objectives	*B*
Safety Risk Management	*C*
Safety Assurance	*C*
Safety Promotion	*B*

Table 24: NM level of EoSM

7.1.4 With regards to the component of Safety Culture, the NM had already achieved the target level 'C' for 2019, last year, and it is maintained in 2016.

7.1.5 In the scope of the network functions, those technical events affecting the tactical and real time function that provides traffic prediction, flow monitoring and warnings are the ones to be RAT assessed.

7.1.6 The NM reports that it applied severity classification using the RAT methodology to 100% of AA/A, B or C occurrences, thus achieving the 2019 target. These figures have not been verified by either EASA or EUROCONTROL/DPS).

RAT application	2015	2016	2017	2018	2019
NM ATM-S target	*N/A*	*80%*	*90%*	*100%*	*100%*
Actual Value	*N/A*	*100%*			

Table 25: NM results of application of the severity classification (based on RAT)

7.2 Environment

7.2.1 In addition to the KEP and KEA indicators, which are KPIs, NM has four PIs: the KEP and KEA indicators for the entire NM area (as opposed to the SES area), the NM added value in

achieving the flight planning target, and the route extension due to en-route design.

7.2.2 The two PIs on the entire NM area are highly correlated to the two corresponding KPIs, and the two objectives were not achieved. The value for KEP was missed by 0.47 percentage points (4.81% instead of 4.34%) for KEP and by 0.6 percentage points for KEA (2.93% instead of 2.87%).

7.2.3 The NM added value in achieving the flight planning target was also not met, with an actual value of -1.3% (the objective was -10%).

7.2.4 The route extension due to en-route design has been met, by 0.11 percentage points (2.47% compared to an objective of 2.58%).

7.3 Capacity

7.3.1 Average en-route ATFM delay in the SES RP2 area in 2016 was 0.91 minutes per flight which means that the Union-wide capacity target of 0.5 minutes was not achieved.

7.3.2 The Network Manager provided the following explanation as to why the target had been missed:

- Capacity and staffing constraints in summer, industrial action in the first half of the year (+50% on 2015), an increase of weather delays with 50% over 2015 contributed to missing the target.
- Most ACCs faced traffic growth (except in Southeast Europe) but the levels were within the high forecast range. ATC capacity/staffing delays accounted for 0.47 minutes per flight in the NM area (6% increase).
- One of the main reasons for high en-route ATFM delays was the inability of some ANSPs to open the maximum number of sectors at peak periods (NOP commitment) during summer.
- In addition, it is difficult for NM to monitor capacity evolution as some ANSPs do not provide full details on sector configurations and activations. Several ACCs also recorded relatively high staffing delays/flight for more than one summer month, particularly Brussels, Warsaw, Karlsruhe, Nicosia and Lisbon.
- There was additional ATFM delay due to en-route weather equivalent to 0.16 min/flt (50% more than 2015). June was particularly bad for en-route weather. Many ANSPs do not cooperate proactively to mitigate weather impact and react too late leading to a higher delay impact.
- Several strikes in 2016 caused over 1.2 million minutes of delay and over 13,000 flight cancellations - equivalent of 0.12 min/flt (NM area). NM undertook specific actions to manage disruptions including: disabling RAD restrictions and coordinating with military AMCs in neighbouring states to make off-load routes available; arranging special routes with North African states; including Algeria/Tunisia in IFPS FPL distribution area to help ANSPs and AOs. NM believes the strike management process is mature given the agreements in place and further improvement will be marginal.

7.3.3 The Network Manager reported on corrective measures agreed with Cyprus and Greece that resulted in a 70% reduction in delays during the summer, albeit with lower traffic levels. The Network Manager also reported on agreed measures with Portugal and Spain that "managed delays despite very high traffic increase."

7.3.4 Additional risk areas were identified during the capacity planning process: corrective measures were agreed at NDOP and NMB and are described in the Network Operations Plan 2017-2019/21.

7.4 Cost-Efficiency

7.4.1 The approved NPP cost-efficiency target is the "total NM Costs in nominal terms".

7.4.2 The 2016 total actual NM costs in nominal terms is reported to amount to 206 600 K€ which is -4.8% lower than planned in the approved NPP (217 045 K€).

7.4.3 The NPP cost efficiency target has therefore been met in 2016.

7.4.4 It is reported that "staff remuneration" was slightly higher than planned whereas operating expenditure was lower than planned as well as depreciation and cost of capital.

7.4.5 Costs are reported to be managed through quarterly budget checkpoints and the implementation of a robust scrutiny process for all operating expenditure.

7.4.6 It is understood that the INEA Funding will be booked as a receipt when the cost statements of the projects have been accepted.

7.4.7 It is also understood that all financial information is managed through the "NMB budget task force" and approved by the Network Management Board.

	NPP FORECASTS RP2				
NM Cost (nominal, '000€)	2015 F	2016 F	2017 F	2018 F	2019 F
Grand Total	216 810	217 045	218 126	220 360	223 561

	Monitoring RP2 Actual costs				
NM Cost (nominal, 000€)	2015 A	2016 A	2017 A	2018 A	2019 A
Grand Total	213 908	206 600			
% deviation Actual vs. Forecast	-1.3%	-4.8%			

Table 26: Total NM costs forecast profile and 2015-2016 actual NM costs

	RP2 PLANNED COSTS PROFILE from NPP				
NM Costs (nominal, 000€)	2015 F	2016 F	2017 F	2018 F	2019 F
1 1a Staff Remuneration	91 883	93 189	94 725	96 360	98 927
1 2 Operating	45 609	44 693	43 656	43 873	43 366
1 3 Depreciation	3 587	3 521	3 996	4 773	5 158
1 4 Cost of capital	252	381	441	473	487
1 1a Staff Receipts	-974	-1 005	-1 025	-1 046	-1 087
1 2 Other Receipts	-1 140	-1 393	-1 643	-1 643	-1 643
1 2 Sales of services UPP	-913	-839	-842	-848	-848
1 2 Sales of services UPP Overhead	-273	-252	-252	-254	-254
Indirect Costs	41 767	41 323	41 045	40 338	41 064
Future (net) Costs Total	179 798	179 618	180 101	182 026	185 170
Costs of the Past	37 012	37 427	38 025	38 334	38 391
Grand Total	216 810	217 045	218 126	220 360	223 561

	Monitoring RP2 Actual costs				
NM Costs (nominal, 000€)	2015 A	2016 A	2017 A	2018 A	2019 A
Staff Remuneration	94 449	95 012			
Operating	42 068	43 214			
Depreciation	2 556	1 525			
Cost of capital	84	32			
Staff Receipts	-1 048	-1 117			
Other Receipts	0	-1 111			
Sales of services UPP	-1 240	-1 659			
Sales of services UPP Overhead	0	0			
Indirect Costs	41 037	34 508			
Future (net) Costs Total	177 906	170 404			
Costs of the Past	36 002	36 196			
NM Costs (nominal, 000€					
Grand Total	213 908	206 600			

	NPP FORECASTS RP2				
NM Cost (nominal, '000€)	2015 F	2016 F	2017 F	2018 F	2019 F
Grand Total	216 810	217 045	218 126	220 360	223 561

	Monitoring RP2 Actual costs				
NM Cost (nominal, 000€)	2015 A	2016 A	2017 A	2018 A	2019 A
Grand Total	213 908	206 600			
% deviation Actual vs. Forecast	-1.3%	-4.8%			

Table 27: Breakdown of total NM costs and receipt forecasts and 2015-2016 actual

8 ALERT THRESHOLDS

8.1 Presentation of the Alert Thresholds

8.1.1 Article 19 of the Performance Regulation 390/2013 defines specific mechanisms to handle exceptional situations occurring in Reference Periods. These "alert mechanisms" can be triggered in Reference Periods at both Union-wide level and local level when unforeseeable circumstances occur that are both insurmountable and beyond the control of the States, ANSPs and Network Manager or when alert threshold(s) are reached at EU level.

8.1.2 Two traffic alert thresholds, one at Union-wide level and one at local level, were defined in Commission Decision 2014/132/EU of 11 March 2014[vi] setting the Union-wide performance targets and alert thresholds for the provision of ANS for the second reference period 2015-2019:

- a deviation over a calendar year by at least 10% of actual traffic expressed in en-route service units compared to Union-wide planned figure (110 196 000 in 2016) defined in the Annex of the Commission Implementing Decision of 11 March 2014 (2014/132/EU);
- a deviation over a calendar year by at least 10% of actual traffic expressed in service units compared with forecasts set out in the respective Performance plans at local level.

8.2 Union-wide level

8.2.1 From the 2016 traffic data it can be seen that the traffic alert threshold of ±10% was not reached at Union-wide level. As shown on Figure 40, actual en-route Service Units in 2016 were +9.0% higher than the planned 2016 value in Annex 1 of Commission Implementing Decision (2014/132/EU). It must be noted that this situation is due to the fact that Union-wide targets for RP2 have been based on the STATFOR low case scenario (September 2013).

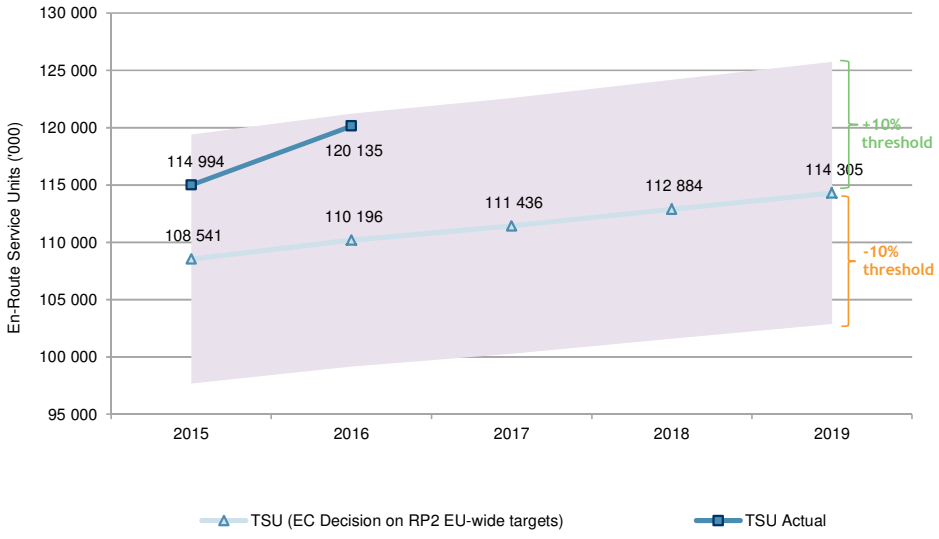


Figure 40: En-route service units at Union-wide level

8.3 Local Level

8.3.1 According to Article 19(3) of the Performance Regulation, States may decide to apply different alert thresholds than the Union-wide at local level. In this case, they shall describe and justify them in their Performance Plan. So far, no States decided to use a different alert threshold. Therefore the same threshold (±10% compared to the traffic forecasts contained in each Performance Plan) applies to all the en-route charging zones.

8.3.2 Figure 41 presents the proportional difference between actual and planned en-route Service Units for charging zone in 2016.

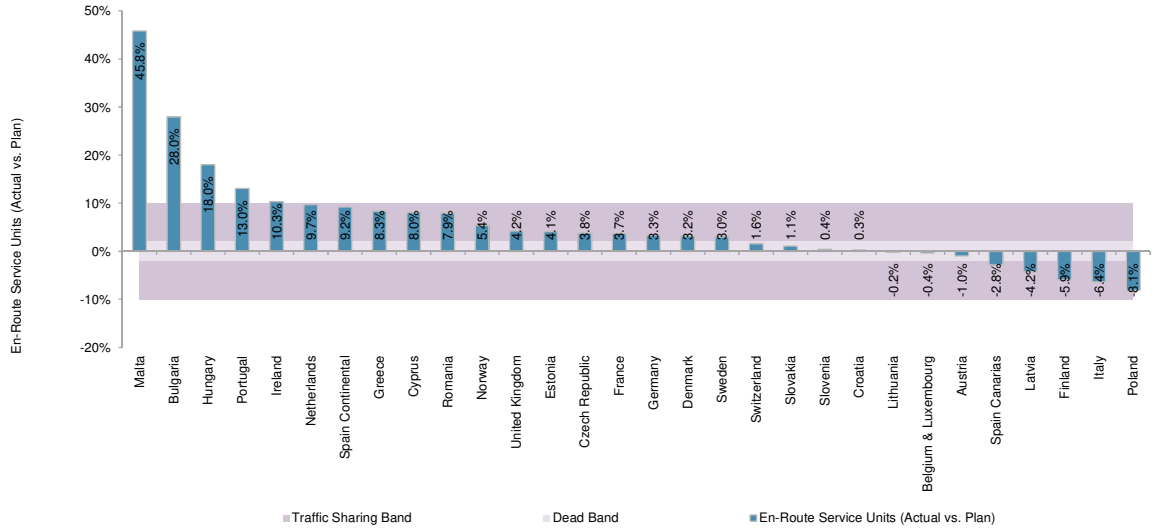


Figure 41: 2016 En-route actual service units versus PP by charging zone

8.3.3 At State level, Figure 41 shows that Malta (+45.8%), Bulgaria (+28.0%), Hungary (+18.0%), Portugal (+13.0%) and Ireland (+10.3%) experienced a traffic in 2016 above the +10% threshold. On the other side, no States were below the -10% threshold.

8.3.4 In 2016, Malta, Bulgaria and Poland submitted a request to the European Commission to revise their RP2 en-route cost-efficiency targets for the years 2017 to 2019 targets (see note at 6.2.4 above). These states already exceeded the +/- 10% threshold in 2015. Malta (+35.2%), Bulgaria (+22.7%) experienced a traffic in 2015 above the +10% threshold. On the other side, Poland (-11.1%) exceeded the -10% threshold.

8.3.5 It is noteworthy that, based on the traffic risk-sharing mechanism defined in the charging Regulation 391/2013[xv], if traffic is below -10% (or respectively above +10%), all losses exceeding -10% (or respectively all gains exceeding +10%) may be recovered from (or shall be returned to) airspace users through an adjustment of the chargeable unit rate in N+2.

9 SUMMARY OF OBSERVATIONS

9.1 Safety

9.1.1 The following section lists the key observations and conclusions made after the review of the 2016 safety Performance and verified results of monitoring of S(K)PIs for the second year of the second Reference Period of the Performance Scheme.

9.1.2 The safety reporting environment in Europe has recently changed with the introduction of the new Occurrence Reporting Scheme in November 2015 and it has to be accepted that the next few years will be a transition phase.

9.1.3 In 2016 there was no accident registered with ANS-contribution at all in fix wing commercial air transport operation airplanes above 2,250 kg MTOW. No ANS-related fatal accident has been observed since 2012, and no fatal accident with ANS contribution has been registered in the last 8 year period, which makes them rare. The analysis of the ANS-related accidents and serious incidents shows an overall decreasing trend in the number of serious incidents since 2010, whilst the number of accidents has remained approximately static with small fluctuations within the analysed period.

9.1.4 The analysis of the overall EoSM Minimum Maturity Level Achieved by States shows that five (5) States out of 30 have already achieved the 2019 target Level C as opposed to last year when only one State had reached that level. There are three (3) States with level A. When excluding Component 5 – Safety Culture, which was not verified, there are still 19 States out of 30, approximately 63%, below 2019 target level C. Overall, the EoSM Management Objectives that need the most improvement at State level are Safety Policy and Objectives, Safety Assurance, and Safety Culture. On the contrary, the most effective component is Safety Risk Management.

9.1.5 The analysis of the overall EoSM Minimum Maturity Level Achieved by ANSPs shows that all ANSPs except one (1) are already at Level C or above for Safety Culture, which is the 2019 target Level, and that 17 ANSPs out of 31, approximately 55%, have already achieved the 2019 EoSM target level D for all other MOs (the four EoSM Components other than Safety Culture). When looking at the evolution of performance from 2015 to 2016, it is worth noting that the number of ANSPs that have achieved the target for all other MOs increased from 10 to 17.

9.1.6 Overall, the components that require more attention at ANSP level are Safety Promotion, Safety policy and Objectives, and Safety Assurance. At the same time, the major improvements during 2016 have been achieved in Safety Promotion and Safety Assurance. Interestingly, Safety Culture target has been achieved by all ANSPs but one, contrary to the State level, where this component was the one that needs more attention and improvement.

9.1.7 PANSA still has a low score and level for the EoSM safety indicator despite the Polish CAA oversight, which may compromise the achievement of the safety target in 2019. This level was already observed in the 2015 Monitoring Report. To change this trend, PANSA will need to ensure that measures are put in place that will improve the EoSM indicator, as recommended last year. It is advisable that Commission, EASA and the Polish NSA closely monitor safety management implementation levels by PANSA in the next years of RP2 as to ensure that the measures are effective in reaching the targets in 2019. This can be done by way of NSA to track progress towards achieving the target set for EoSM, i.e., level D, or even by focused inspections and audits, if necessary.

9.1.8 The current definition of the indicator that measures the application of the RAT

methodology has led to a situation where the application of the RAT methodology could be mandatory for the ATM Ground and not for the ATM Overall, or vice-versa. Such an approach has the potential to negatively affect the harmonisation of the severity assessment using the RAT methodology, thus reversing an improvement achieved during RP1.

9.1.9 From the Union-wide perspective and taking all occurrences reported collectively into account, targets for 2017 are already achieved for RAT application to the SMI occurrences. For RI, both Ground (73%) and Overall (66%), and ATM-specific (75%) occurrences the percentages do not achieve the target (i.e. 80%). The situation in 2016 has deteriorated in comparison of 2015 where only RI Overall and ATM-s overall were below the targets and for narrower margins.

9.1.10 In addition, Union-wide targets for 2017 and 2019 have already been achieved in full by four (4) FABs: Danube FAB, FAB CE, NEFAB and UK-Ireland FAB.

9.2 Environment

9.2.1 The EU-wide indicative targets for KEP and KEA were both not met in 2016.

9.2.2 The EU-wide KEP indicator, based on flight plans, worsened from 4.84% in 2015 to 4.91% in 2016 which is 0.3 percentage points above the target for 2016 (4.61%).

9.2.3 The EU-wide KEA indicator measuring actual trajectories also deteriorated from 2.80% in 2015 to 2.96% in 2016 which is also above the target of 2.87% for 2016.

9.2.4 Local KEA targets for 2016 have been met by two of the nine FABs, namely DK-SE FAB and SW FAB, which already met their targets back in 2015. All nine FABs have registered a decrease in performance with respect to 2015.

9.2.5 The NM has highlighted the need to focus on FRA implementation, including cross-border to improve the interface component of KEP and KEA. Details per FAB are provided in the remarks in volume 2.

9.2.6 With the on-going further implementation of Free Route Airspace throughout the Network, the concept of CDRs is losing its relevance. In the PRB Annual Monitoring Report 2014 (and again in 2015) the PRB recommended that this indicator should be reviewed in terms of effectiveness in reporting on ANS performance

9.2.7 As regards Effective Booking Procedures: out of the 30 States in the performance scheme, 20 States provided only partial information and 3 States provided no information.

9.2.8 To assess the impact of air navigation services at and around airports, the additional time in the terminal airspace and during the taxi-out phase are monitored linking temporal inefficiencies to higher level of fuel burn (and potentially noise). Across Europe the monitoring for airports subject to RP2 is dependent on the implementation of the required operational data flow.

9.2.9 The airport operator data flow has been fully implemented for about a third of the airports. The indicator for the average additional time in the taxi-out phase and terminal airspace cannot be readily determined for all air navigation services at airports subject to RP2. In particular, the aggregation of the indicators at FAB or Union-wide level is of little value at this stage due to the high number of airports with missing data.

9.3 Civil Military Dimension of the Plan

9.3.1 Although several FABs and States reported on existing civil military arrangements, providing information on how civil military cooperation and coordination has actually increased capacity is the exception rather than the rule.

9.4 Application of FUA

9.4.1 The inconsistent and varied reporting by the States on this subject and the general absence of annual review processes on the application of FUA by the States is to be noted.

9.5 En Route Capacity

9.5.1 The Union-wide target for en-route ATFM delay (0.5 minutes per flight) was not met. Average en-route ATFM delay in 2016 was 0.91 minutes per flight, an increase of almost 20% on 2015 results, for a corresponding traffic increase of 2.6%. Five of the nine FABs achieved or surpassed their FAB targets, the remaining four did not.

9.5.2 Given that the Union wide target was 0.5 minutes per flight means the **additional** delay of 0.41 minutes per flight equates to an **additional** cost to airspace users of approximately 390M€ (0.41 x 25,972 flights/day x 366 x €100[xx]).

9.5.3 Four FABs achieved neither their FAB targets nor their respective reference values: Baltic FAB, FABEC, South West FAB and UK IRL FAB.

9.5.4 Five of the nine FABs surpassed the en-route capacity targets provided in their respective RP2 FAB performance plan for 2016: BlueMed FAB; Danube FAB; Denmark-Sweden FAB; FAB CE and NEFAB. The positive contribution by these FABs surpassing their target equates to the difference between the hypothetical result presented in Table 16 and the actual achieved en-route ATFM delay on Union-wide level (c.f. Table 14): 1.03 – 0.91 = 0.12 minutes per flight at Union-wide level. This positive contribution saved additional costs to airspace users of approximately €114 million (0.12 * 366 * €100 * 25972) on Union-wide level.

9.5.5 The European Commission instructed the Performance Review Unit, to implement the improved methodology of delay calculation (elimination of errors in using 'ready message' (REA)) from its implementation date of April 4th 2016, and to calculate capacity performance accordingly.

9.5.6 The PRB provided comments on what it saw as issues that should be addressed in regards to the incentive schemes established by the various FABs / States in the PRB Annual Monitoring Report 2015. The annual monitoring reports received from each FAB contained information on the results of the relevant incentive schemes applied during 2016. With the exception of Cyprus, which has introduced a financial incentive scheme without providing any details, there is no change to any incentive scheme from 2015.

9.5.7 The Network Operations Plan (NOP) covering the period 2017-2021[xxi], contains capacity plans that are inconsistent with the required performance to meet the Union-wide target for en-route capacity for the remainder of RP2, considering all causes of delay.

9.5.8 The prediction of the Network Manager, contained within NOP 2017-2021, is that unless current capacity plans are improved, the Union-wide target for en-route ATFM delay will not be achieved in any year of RP2.

9.5.9 The Commission requested that the results of the Post Operations Performance Adjustment Process be incorporated into the pre-filled monitoring templates for the States. The transfer of delays to a third party may not be consistent with the performance legislation, in regards to performance monitoring at local level; and in particular the requirement that "the indicator covers all IFR flights traversing the local airspace". If the delayed flight did not traverse the local airspace (of the third party) then there is a question if the delay can be assigned correctly;

9.5.10 Incorporating the Post Operations Performance Adjustment Process into the performance

data at source (instead of attaching it as an addendum) risks presenting a misleading picture of capacity performance. Fundamentally, ATFM delays occur because local ATC capacity is unable to accommodate specific traffic demand (for whatever reason). Similarly, ATFM delays can be resolved or mitigated by (safely) increasing local ATC capacity to meet particular demand. Breaking, or reducing, the link between local capacity and local demand means that solvable capacity constraints may remain unaddressed.

9.6 Airport Capacity

9.6.1 With the RP2 performance plans, the majority of States established a national target on arrival ATFM delay. There still exists confusion about the requirement of establishing a national target (complemented by a breakdown to the local airport level) and/or an associated incentive scheme for ANS Capacity at and around airports. Across Europe, there is a mix of the implementation of national targets and associated incentive schemes.

9.6.2 Services at and around airports in a total of 6 SES States did not meet their national target: Greece, Romania, Finland, Portugal, Spain, and United Kingdom. The aggregated Union-wide average arrival ATFM delay increased to 0.67 minutes per arrival in 2016 (2015: 0.64 minutes/arrival). This represents an increase for a second year in a row reaching a pre-RP2 level as observed in 2012.

9.6.3 For the majority of air navigation services adherence to ATFM slots is generally high (above 90%). This can also be seen in the aggregated national values. However, there is a number of airports ranging well below a threshold of 80%. In terms of impact on the predictability of traffic on the network level, the lower performance cannot be explained by traffic levels.

9.6.4 The monitoring of pre-departure delay is also dependent on the establishment of the airport operator data flow (c.f. 9.2.9, implementation at about a third of the airports subject to RP2). Furthermore, the robustness of the monitoring requires a consistent reporting of delay causes. For the majority of airports, this is not possible today. Compliance with the data specification will ensure the consistent reporting of delay enabling the determination of the pre-departure delay indicator.

9.7 Cost-Efficiency

9.7.1 Different economic and operational contexts are observed in the first two years of RP2 (2015-16) compared to RP1. This is particularly the case for actual inflation which is for most of the SES States lower than planned in the PPs, and for actual traffic volumes which are on average higher than expected.

9.7.2 In 2016, the Union-wide actual en-route unit cost (50.57 €$_{2009}$) was -6.1% lower than planned in the RP2 PPs (53.86 €$_{2009}$). This is because in 2016 actual en-route costs were -1.9% (-120.6 M€$_{2009}$) lower than the DCs reported in the PPs (6 195.9 M€$_{2009}$), while the actual number of Total Service Units (TSUs) was +4.4% higher than planned. In addition, the Union-wide actual en-route unit cost (50.57 €$_{2009}$) was -8.0% lower than the Union-wide target for 2016 (€54.95 €$_{2009}$) which was adopted by the Commission in 2014.

9.7.3 In 2016, Union-wide actual Total Service Units (TSUs) were +4.4% higher than planned in the adopted PPs (i.e. still within the ±10% alert threshold at system level). At State level, all States remained above the -10% threshold, while five States experienced a traffic increase above the +10% threshold: Malta (+45.8%), Bulgaria (+28.0%), Hungary (+18.0%), Portugal (+13.0%) and Ireland (+10.3%). Two of these States (Bulgaria, Malta) and Poland submitted, based on the results of the 2015 monitoring, requests in 2016 to the European Commission to revise their RP2 en-route cost-efficiency targets for the years 2017 to 2019.

9.7.4 For years 2017 to 2019, the STATFOR February 2017 traffic outlook for the rest of RP2

remains significantly above the forecasts of the PPs. It must be noted that should any of the three scenarios of STATFOR February 2017 forecasts materialise, then the traffic will be substantially higher than planned for the rest of RP2. The traffic is expected to exceed the ±2% dead band foreseen in the traffic risk-sharing mechanism and in the high case would exceed the 10% threshold in the year 2019.

9.7.5 Most of the deviation observed for the total en-route ANS costs (-1.9% or -120.6 M€$_{2009}$) is due to the main ATSPs (i.e. the main designated ATSP subject to traffic risk-sharing arrangements). Actual en-route costs in 2016 were lower than planned for the main ATSPs (-2.3% or -118.0 M€$_{2009}$), the MET service providers (-1.9% or -4.4 M€$_{2009}$) and the NSA/EUROCONTROL (-0.2% or -0.9 M€$_{2009}$). On the other side, 2016 actual en-route costs were higher than planned for the other ANSPs (+1.2% or +2.8 M€$_{2009}$).

9.7.6 The total actual Eurocontrol cost for the **SES states** in 2016 is 426.9 M€$_{2009.}$ This cost represents 92% of the total actual Eurocontrol cost in 2016, when considering all Eurocontrol Member States. At SES level, actual 2016 Eurocontrol costs were some -1.9% or 8.4 M€$_{2009}$ lower than planned by States in the RP2 PPs. Under the scenario indicated in paragraph 6.5.16 the actual 2016 Eurocontrol costs would be -3.4% or -14.8 M€$_{2009}$.

9.7.7 The actual estimated surplus for the en-route activity amounts to 500.8 M€$_{2009}$ or some 9.4 % of en-route revenues. This amount comprises the surplus embedded in the actual cost of capital (275.5 M€$_{2009}$) and the net gain/loss generated in respect of the en-route activity in 2016 (225.3 M€$_{2009}$). It is noteworthy that in 2016, three main ATSPs (LVNL, ROMATSA and Finavia) have incurred losses and show a negative actual estimated surplus on their en-route activity in 2016.

9.7.8 In the context of its cost-efficiency monitoring analysis, this report also examines the actual en-route costs for airspace users (also referred as “true costs”). The actual en-route costs for airspace users reflect the adjustments relating to 2016 activities which will be charged or reimbursed to users in future years. The actual costs incurred by airspace users in respect of the en-route activity in 2016 (6 255.9 M€$_{2009}$) are -5.0% (-329.3 M€$_{2009}$) lower than the DCs billed based on actual TSUs (6 585.2 M€$_{2009}$). A significant part of this difference is due to the inflation adjustment (-155.1 M€$_{2009}$). Indeed, for most of the States, actual inflation for 2016 is much lower than planned in the PPs. Additionally at Union-wide level, TSUs are +4.4% higher than planned, the additional revenues arising from the deviation between actual and planned traffic in 2016 are shared between States/ANSPs. The net effect of these deviations between actual and planned TSUs is a forthcoming reimbursement of -103.1 M€$_{2009}$ to airspace users relating to costs subject to traffic risk-sharing and of -30.9 M€2009 relating to costs not subject to traffic risk-sharing. This means that the inflation adjustment and the traffic risk sharing, which are part of the charging scheme, will lead to a reduction of the unit rates that will be charged to airspace users in 2018. This scenario is different from that observed during RP1, and is not expected to change in the coming years.

9.7.9 In 2016, the Union-wide actual terminal unit cost (166.10 €$_{2009}$) was some -4.7% lower than planned in the RP2 PPs. This variation results from the combination of higher than planned TNSUs (+4.6%) and lower than planned terminal costs (-0.4% or -4.1 M€$_{2009}$).

9.7.10 The overall estimated surplus generated on the terminal activity in 2016 by the main ATSPs amounts to +54.1 M$_{€2009}$. This figure comprises the net gains (+8.7 M$_{€2009}$) arising from the costs, traffic risk sharing and the capacity incentive mechanisms and the surplus embedded in the actual cost of capital (+45.4M$_{€2009}$). Detailed analysis shows that a majority of ATSPs were in a position to achieve in 2016 a higher actual estimated surplus than planned on the terminal activity. Still 8 out of 28 ATSPs incurred an estimated economic loss in respect of the 2016 terminal activity.

9.7.11 The monitoring of gate-to-gate DCs shows that in 2016 actual proportion of en-route in total ANS costs (84.7%) is in line with the proportion planned in the PPs (84.9%). This indicates that, at system level, there is no noticeable reallocation of costs from en-route to terminal ANS.

Annex I. Commission Decisions

Commission Decision: RP2 Targets

Commission Implementing Decision (EU) 132/2014[xxii] of 11 March 2014 setting the Union-wide performance targets for the air traffic management network and alert thresholds for the second reference period 2015-19.

Commission Decisions on consistency/inconsistency of the performance targets

Commission Implementing Decision (EU) 2015/348 of 2 March 2015 concerning the consistency of certain targets included in the national or functional airspace block plans submitted pursuant to Regulation (EC) No 549/2004 of the European Parliament and of the Council with the Union-wide performance targets for the second reference period;

Commission Implementing Decision (EU) 2015/347 of 2 March 2015 concerning the inconsistency of certain targets included in the national or functional airspace block plans submitted pursuant to Regulation (EC) No 549/2004 of the European Parliament and of the Council with the Union-wide performance targets for the second reference period and setting out recommendations for the revision of those targets;

Commission Implementing Decision (EU) 2015/670 of 27 April 2015 on the compliance of unit rates for charging zones for 2015 under Article 17 of Implementing Regulation (EU) No 391/2013;

Note that in 2015 the plans of FABEC and Blue Med for capacity, and France, Germany, Netherlands, and Switzerland were not accepted. Where this is the case the details of their contribution to the EC is assessed using; where possible, indicative or reference values;

EFTA Surveillance Authority Decision No 83/15/COL of 18 March 2015 concerning the consistency of certain targets included in the national or functional airspace block plans submitted pursuant to Regulation (EC) No 549/2004 of the European Parliament and of the Council with the Union-wide performance targets for the second reference period [2016/1418]

EFTA Surveillance Authority Decision No 221/15/COL of 3 June 2015 amending EFTA Surveillance Authority Decision No 83/15/COL concerning the consistency of certain targets included in the national or functional airspace block plans submitted pursuant to Regulation (EC) No 549/2004 of the European Parliament and of the Council with the Union-wide performance targets for the second reference period [2016/1420

Commission Implementing Decision (EU) 2015/1055 of 30 June 2015 concerning the consistency of certain targets included in the national or functional airspace block plans submitted by Switzerland pursuant to Regulation (EC) No 549/2004 of the European Parliament and of the Council with the Union-wide performance targets for the second reference period.

Commission Implementing Decision (EU) 2015/1056 of 30 June 2015 concerning the inconsistency of certain targets included in the national or functional airspace block plan submitted by Switzerland pursuant to Regulation (EC) No 549/2004 of the European Parliament and of the Council with the Union-wide performance targets for the second reference period and setting out recommendations for the revision of those targets.

Commission Implementing Decision (EU) 2016/422 of 18 March 2016 on the compliance of unit rates for charging zones for 2015 under Article 17 of Implementing Regulation (EU) No 391/2013. OJ L 75, 22.3.2016, p. 68-69.

Commission Implementing Decision (EU) 2016/418 of 18 March 2016 on the compliance of unit rates for charging zones for 2016 under Article 17 of Implementing Regulation (EU) No 391/2013. OJ L 75, 22.3.2016, p. 57-59.

Commission Implementing Decision (EU) 2016/419 of 18 March 2016 on the non-compliance of unit rates for charging zones for 2016 under Article 17 of Implementing Regulation (EU) No 391/2013. OJ L 75, 22.3.2016, p. 60–62.

Commission Implementing Decision (EU) 2016/420 of 18 March 2016 on the non-compliance of unit rates for charging zones for 2015 under Article 17 of Implementing Regulation (EU) No 391/2013 (notified under document C(2016) 1592) (Text with EEA relevance). OJ L 75, 22.3.2016, p. 63-65.

Commission Implementing Decision (EU) 2016/421 of 18 March 2016 on the non-compliance of unit rates for the charging zone of Switzerland for 2015 and 2016 under Article 17 of Implementing Regulation (EU) No 391/2013. OJ L 75, 22.3.2016, p. 66-67.

Commission Implementing Decision (EU) 2016/599 of 15 April 2016 concerning the consistency of certain targets included in the revised national or functional airspace block plans submitted pursuant to Regulation (EC) No 549/2004 of the European Parliament and of the Council with the Union-wide performance targets for the second reference period. OJ L 103, 19.4.2016, p. 37-40.

Commission Implementing Decision (EU) 2016/1373 of 11 August 2016 approving the Network Performance Plan for the second reference period of the Single European Sky performance scheme (2015-2019. OJ L 217, 12.8.2016, p. 51-52.

Commission Implementing Decision (EU) 2016/1940 of 6 October 2016 on the establishment of market conditions for terminal air navigation services in the United Kingdom under Article 3 of Implementing Regulation (EU) No 391/2013.

Commission Implementing Decision (EU) 2017/258 of 13 February 2017 concerning revised performance targets and appropriate measures included in the national or functional airspace block plan submitted by Switzerland pursuant to Regulation (EC) No 549/2004 of the European Parliament and of the Council that are not adequate in respect to the Union-wide performance targets for the second reference period and setting out obligations for corrective measures (notified under document C(2017) 728) (Text with EEA relevance) OJ L 38, 15.2.2017, p. 71–75.

Commission Implementing Decision (EU) 2017/259 of 13 February 2017 concerning certain revised performance targets and appropriate measures included in the national or functional airspace block plans submitted pursuant to Regulation (EC) No 549/2004 of the European Parliament and of the Council that are not adequate in respect to the Union-wide performance targets for the second reference period and setting out obligations for corrective measures (notified under document C(2017) 729) (Text with EEA relevance.) OJ L 38, 15.2.2017, p. 76–85

Commission Implementing Decision (EU) 2017/552 of 22 March 2017 concerning the consistency of the targets in the key performance areas of capacity and cost-efficiency included in the revised functional airspace block plan submitted by Switzerland pursuant to Regulation (EC) No 549/2004 with the Union-wide performance targets for the second reference period (Text with EEA relevance.) OJ L 79, 24.3.2017, p. 8–10.

Commission Implementing Decision (EU) 2017/553 of 22 March 2017 concerning the consistency of the targets in the key performance areas of capacity and cost-efficiency included in the revised functional airspace block plan submitted pursuant to Regulation (EC) No 549/2004 by Belgium, Germany, France, Luxembourg and the Netherlands with the Union-wide performance targets for the second reference period (notified under document C(2017) 1798) (Text with EEA relevance.) OJ L 79, 24.3.2017, p. 11–14

Annex II. **References**

[i] http://www.eurocontrol.int/prudata/dashboard/rp2_2016.html

[ii] Regulation (EC) No 549/2004 of the European Parliament and of the Council laying down the framework for the creation of the Single European Sky. OJ L 96, 31.3.2004, p. 1., as amended by Regulation (EC) No 1070/2009 of the European Parliament and of the Council of 21 October 2009. OJ L 300, 14.11.2009, p.34.

[iii] Commission Implementing Regulation (EU) No 390/2013 of 3 May 2013 laying down a performance scheme for air navigation services and network functions. OJ L 128, 9.5.2013, p.1.

[iv] Regulation (EC) No 550/2004 of the European Parliament and of the Council of 10 March 2004 on the provision of air navigation services in the single European sky OJ L 96, 31.3.2004, p. 10–19, as amended by Regulation (EC) No 1070/2009 of the European Parliament and of the Council of 21 October 2009. OJ L 300, 14.11.2009, p.34.

[v] Commission Implementing Regulation (EU) No 391/2013 of 3 May 2013 laying down a common charging scheme for air navigation services. OJ L 128, 9.5.2013, p31.

[vi] Commission Implementing Decision of 11 March 2014 setting the Union-wide performance targets for the air traffic management network and alert thresholds for the second reference period 2015-19. OJ L 71, 12.3.2014, p.20.

[vii] Commission Implementing Decision of 11 March 2014 setting the Union-wide performance targets for the air traffic management network and alert thresholds for the second reference period 2015-19 (2014/132/EU)

[viii] University of Westminster calculations for "Network average cost of ATFM delay per minute" http://www.eurocontrol.int/sites/default/files/publication/files/european-airline-delay-cost-reference-values-final-report-4-1.pdf

[ix] Network Manager's Annual Reporting on NM Performance RP2 (NPP), July 2016

[x] Report on the Implementation of the NPP and NSP in 2016, Network Manager, Annex 2, II.4.SO4 (Published in April 2017)

[xi] PRB Annual Monitoring Report 2015 Volume 1: European Overview and PRB Recommendations, Section 4.2.5 (Dated 20 December 2016)

[xii] European Network Operations Plan 2017-2021 edition 2.2, published in July 2017. http://www.eurocontrol.int/sites/default/files/publication/files/european-network-operations-plan-2017-2021-2.2.pdf

[xiii] Commission Decision 2011/121/EU of 21 February 2011 setting the Union-wide performance targets and alert thresholds for the provision of air navigation services for the years 2012 to 2014. OJ L 48, 23.2.2011, p.16.

[xiv] Commission Implementing Decision (EU) 2014/132 of 11 March 2014 setting the Union-wide performance targets for the air traffic management network and alert thresholds for the second reference period 2015-9. OJ L 71, 12.3.2014, p.20.

[xv] Commission Implementing Regulation (EU) No 391/2013 of 3 May 2013 laying down a common charging scheme for air navigation services. OJ L 128, 9.5.2013, p31.

[xvi] For the purposes of this analysis, the main ATSPs' actual costs are aggregated from the monitoring reports produced at CZ level. For a few ATSPs, the analysis at State level is adjusted to take into account reporting issues or special circumstances. These adjustments are systematically explained in Volume 2 of the PRB monitoring report.

[xvii] In the context of this analysis the calculation of the revenues is the sum of the net ATSP gain/loss on en-route activity and the actual costs of the ATSP, as reflected in Figure 27.

[xviii] Figure 38 reflects a mix of different situations with some TCZs applying the traffic risk sharing arrangements while others do not. In addition, it should be noted that five TCZs (Cyprus and the four Belgian regional airports) are not included in Figure 38 since the provision of ANS in these TCZs is 100% financed by State funds.

[xix] UK TCZs were excluded from this analysis in order to ensure consistency with Section 6.10.

[xx] University of Westminster calculations for "Network average cost of ATFM delay per minute" http://www.eurocontrol.int/sites/default/files/publication/files/european-airline-delay-cost-reference-values-final-report-4-1.pdf

[xxi] European Network Operations Plan 2017-2021 edition 2.2, published in July 2017. http://www.eurocontrol.int/sites/default/files/publication/files/european-network-operations-plan-2017-2021-2.2.pdf

[xxii] Commission Implementing Decision of 11 March 2014 setting the Union-wide performance targets for the air traffic management network and alert thresholds for the second reference period 2015-19. OJ L 71, 12.3.2014, p.20.