EUROCONTROL

REPORT COMMISSIONED BY THE PERFORMANCE REVIEW COMMISSION

ATM Cost-Effectiveness (ACE) 2013 Benchmarking Report with 2014-2018 outlook

Prepared by the Performance Review Unit (PRU)
with the ACE Working Group

May 2015

BACKGROUND

This report has been commissioned by the Performance Review Commission (PRC).

The PRC was established in 1998 by the Permanent Commission of EUROCONTROL, in accordance with the ECAC Institutional Strategy (1997).

One objective in this Strategy is «*to introduce strong, transparent and independent performance review and target setting to facilitate more effective management of the European ATM system, encourage mutual accountability for system performance and provide a better basis for investment analyses and, with reference to existing practice, provide guidelines to States on economic regulation to assist them in carrying out their responsibilities*.»

The PRC's website address is http://www.eurocontrol.int/prc

In September 2010, EUROCONTROL accepted the designation by the European Commission as the SES Performance Review Body (PRB) acting through its Performance Review Commission supported by the Performance Review Unit.

NOTICE

The Performance Review Unit (PRU) has made every effort to ensure that the information and analysis contained in this document are as accurate and complete as possible. Should you find any errors or inconsistencies we would be grateful if you could please bring them to the PRU's attention.

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

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DOCUMENT IDENTIFICATION SHEET

DOCUMENT DESCRIPTION

Document Title

ATM Cost-Effectiveness (ACE) 2013 Benchmarking Report with 2014-2018 outlook

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Abstract

This report is the thirteenth in a series of annual reports based on mandatory information disclosure provided by 37 Air Navigation Services Providers (ANSPs) to the EUROCONTROL Performance Review Commission (PRC). This report comprises factual data and analysis on cost-effectiveness and productivity for 37 ANSPs for the year 2013, including high level trend analysis for the years 2009-2013. The scope of the report is both en-route and terminal navigation services (i.e. gate-to-gate). The main focus is on the ATM/CNS provision costs as these costs are under the direct control and responsibility of the ANSP. Costs borne by airspace users for less than optimal quality of service are also considered. The report describes a performance framework for the analysis of cost-effectiveness. The framework highlights 3 key performance drivers contributing to cost-effectiveness (productivity, employment costs and support costs). The report also analyses forward-looking information for the years 2014-2018, inferring on future financial cost-effectiveness performance at system level, and displays information on future capital expenditures.

Keywords

EUROCONTROL Performance Review Commission - Economic information disclosure – Benchmarking – Target setting – Exogenous factors – Complexity metrics - ATM/CNS cost-effectiveness comparisons - European Air Navigation Services Providers (ANSPs) – Functional Airspace Blocks (FABs) - Gate-to-gate - En-route and Terminal ANS - Inputs and outputs metrics – Performance framework - Quality of service - 2013 data – Traffic downturn - Factual analysis – Historic trend analysis - Costs drivers - Productivity – Employment costs - Support costs – Area Control Centres (ACCs) productivity comparisons – Current and future capital expenditures – ATM systems – Five years forward-looking trend analysis (2014-2018).

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

CONTACT: **Tel: +32 2 729 3956, e-mail: pru@eurocontrol.int - http://www.eurocontrol.int/articles/performance-review-commission**

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This table indicates which chapters of the report are likely to be of most interest to particular readers and stakeholders.	
Executive summary	All stakeholders with an interest in ATM who want to know what this report is about, or want an overview of the main findings.
Chapter 1: Introduction	Those wanting a short overview of the structure of the report, the list of participating ANSPs, and the process to analyse the data comprised in this report.
Part I: - Pan-European system cost-effectiveness performance in 2013 and outlook for 2014-2018	
Chapter 2: Pan-European system cost-effectiveness performance in 2013 with 2014-2018 outlook	All those who are interested in a high level analysis of economic and financial cost-effectiveness performance in 2013 at Pan-European system and ANSP level. This chapter also includes a trend analysis of ATM/CNS cost-effectiveness performance over the 2009-2013 period, and an analysis focusing on its three main economic drivers (productivity, employment costs and support costs). Finally, this chapter comprises a forward-looking analysis of ATM/CNS performance over the 2014-2018 period, including capital investment projections. This chapter is particularly relevant to ANSPs' management, regulators and NSAs in order to identify best practices, areas for improvement, and to understand how cost-effectiveness performance has evolved over time.
Part II: - Cost-effectiveness performance focus at ANSP level	
Chapter 3: Focus on ANSPs individual cost-effectiveness performance	All those who are interested in obtaining an independent and comparable analysis of individual ANSP historic performance (2009-2013) in terms of economic and financial cost-effectiveness. This chapter is particularly relevant to ANSPs' management, airspace users, regulators and NSAs in order to identify how cost-effectiveness performance has evolved and which have been the sources of improvement. This chapter also includes information on ANSPs historic and planned capital investments, as well as a benchmarking analysis of financial cost-effectiveness with a set of comparators for each ANSP.
Annexes:	With a view to increase transparency, this report comprises several annexes including the data used in the report.

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EXECUTIVE SUMMARY

This ATM Cost-Effectiveness (ACE) 2013 Benchmarking Report, the thirteenth in the series, presents a review and comparison of ATM cost-effectiveness for 37 Air Navigation Service Providers (ANSPs) in Europe. The ACE benchmarking work is carried out by the Performance Review Commission (PRC) supported by the Performance Review Unit (PRU) and is based on information provided by ANSPs in compliance with Decision No. 88 of the Permanent Commission of EUROCONTROL on economic information disclosure and in the context of Annex IV 2.1(a) of EC Regulation N°691/2010 (Performance Scheme) amended by EC Regulation N°390/2013.

The data processing, analysis and reporting were conducted with the assistance of the ACE Working Group, which comprises representatives from participating ANSPs, airspace users, regulatory authorities and the Performance Review Unit (PRU). This enabled participants to share experiences and gain a common understanding of underlying assumptions and limitations of the data.

ACE 2013 presents information on performance indicators relating to cost-effectiveness and productivity for the year 2013, and how they changed over time (2009-2013). It examines both individual ANSPs and the Pan-European ATM/CNS system as a whole. In addition, ACE 2013 analyses forward-looking information covering the 2014-2018 period based on information provided by ANSPs in November 2014.

The ACE factual and independent benchmarking has set the foundation for a normative analysis to quantify the potential scope of cost-efficiency improvements for ANSPs. The ACE data analysis and the gathering of business "intelligence" on ANSPs cost-efficiency performance directly feed core processes of the Single European Sky (SES) performance scheme.

For ANSPs operating in SES States, 2013 is the second year of application of the "determined costs" method which comprises specific risk-sharing arrangements aiming at incentivising ANSPs economic performance. The PRB released in October 2014 a report on the monitoring of SES performance targets for the second year of RP1 (2013) based on information provided in June 2014. This ACE 2013 Benchmarking Report complements the PRB monitoring activity by providing a detailed benchmarking of cost-effectiveness performance at ANSP level including a trend analysis of three main economic drivers (productivity, employment costs and support costs) over the 2009-2013 period.

The PRC introduced in its ACE Benchmarking Reports the concept of economic cost-effectiveness indicator. This indicator is defined as gate-to-gate ATM/CNS provision costs plus the costs of ground ATFM delays for both en-route and airport, all expressed per composite flight-hour (a metric combining en-route flight-hours and airport movements). This economic performance indicator is meant to capture trade-offs between ATC capacity and costs.

In 2013, ATM/CNS provision costs fell by -2.0% while composite flight-hours remained fairly constant, resulting in a decrease in unit ATM/CNS provision costs (-1.9%) compared to 2012. In the meantime, for the third year in a row, the unit costs of ATFM delays significantly fell (-18.2%) contributing to the decrease in unit economic costs (-3.6%). As a result, unit economic costs amounted to €478 in 2013. This is -13% lower than the level achieved before the economic recession (i.e. €549 in 2008).

In 2009, composite flight-hours fell by -6.7% at Pan-European system level. The chart on the right-hand side of Figure 0.1 shows that after a rebound in 2010 (+2.1%) and 2011 (+3.9%), traffic fell in 2012 (-1.9%) and remained fairly constant in 2013 mainly reflecting the uncertainties affecting the European economies and the Eurozone in particular.

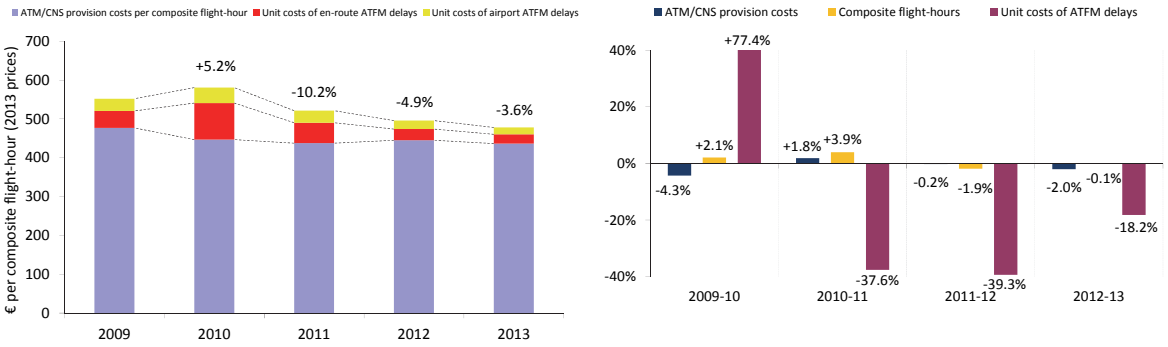

Figure 0.1: Changes in unit economic costs, 2009-2013 (real terms)

In 2013, 18 out of 37 ANSPs could reduce ATM/CNS provision costs compared to 2012 (bottom quadrants of Figure 0.2). For seven of these ANSPs, the lower ATM/CNS costs were associated with a reduction in traffic volumes. In most of the cases (five ANSPs out of seven), the reduction in ATM/CNS provision costs could compensate for the fall in traffic and therefore these ANSPs could avoid an increase in unit costs in 2013.

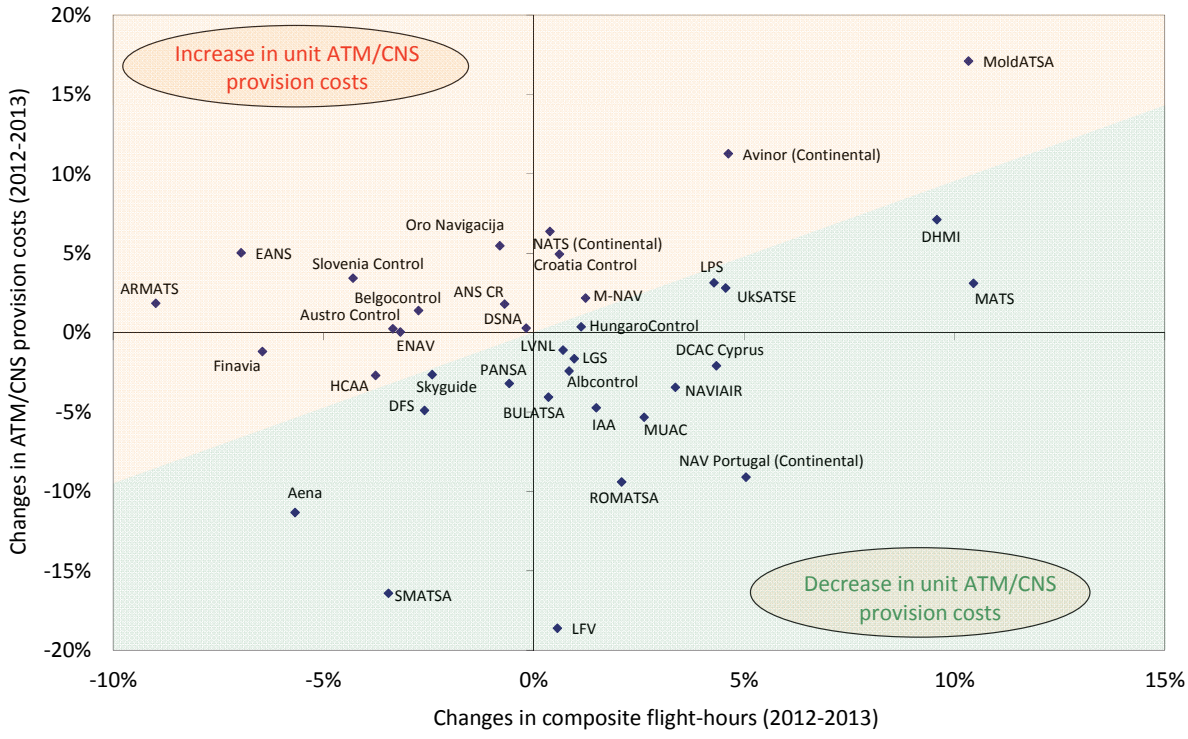

Figure 0.2: Changes in ATM/CNS provision costs and traffic volumes, 2012-2013 (real terms)

On the other hand, Figure 0.2 shows that between 2012 and 2013 ATM/CNS provision costs increased by more than +5.0% for six ANSPs including Avinor (+11.3%), DHMI (+7.1%), EANS (+5.0%), MoldATSA (+17.1%), NATS (+6.4%) and Oro Navigacija (+5.5%). The main drivers for these significant increases in ATM/CNS provision costs are provided in Part I of this report.

Figure 0.3 shows that the decrease in unit ATM/CNS provision costs observed at Pan-European system level in 2013 (-1.9%) is mainly due to the fact that support costs fell by -3.0% in a context of no traffic growth (-0.1%). In the meantime, ATCO employment costs per ATCO-hour (+1.4%) rose slightly faster than ATCO-hour productivity (+0.9%), leading to an increase in ATCO employment costs per composite flight-hour of +0.5% in 2013.

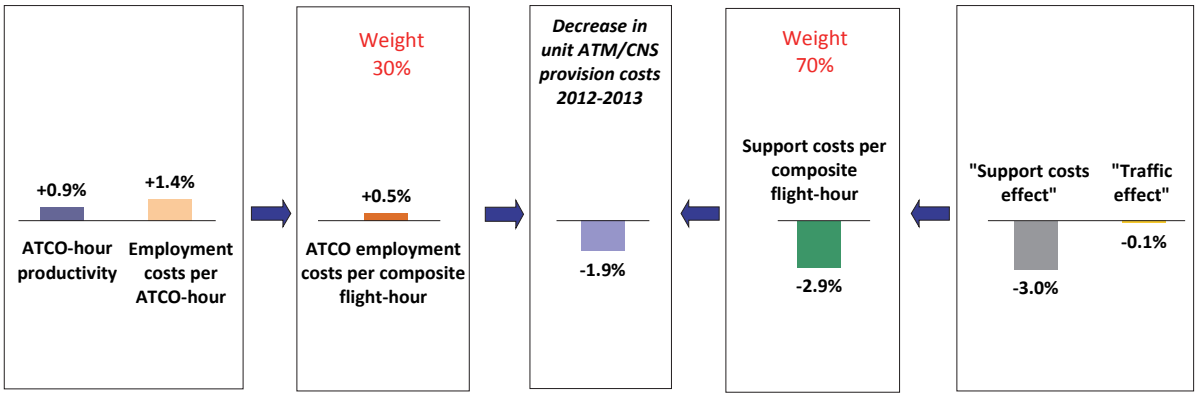

Figure 0.3: Changes in the financial cost-effectiveness indicator, 2012-2013 (real terms)

Figure 0.4 shows the changes in the different components of support costs (see the "support costs effect" bar on the right-hand side of Figure 0.3) between 2012 and 2013.

All support costs categories reduced in 2013: employment costs for support staff (-2.5% or -€68.8M), non-staff operating costs (-3.3% or -€44.8M), depreciation costs (-1.4% or -€12.6M), the cost of capital (-6.2% or -€33.2M) and exceptional costs (-10.4% or -€12.7M).

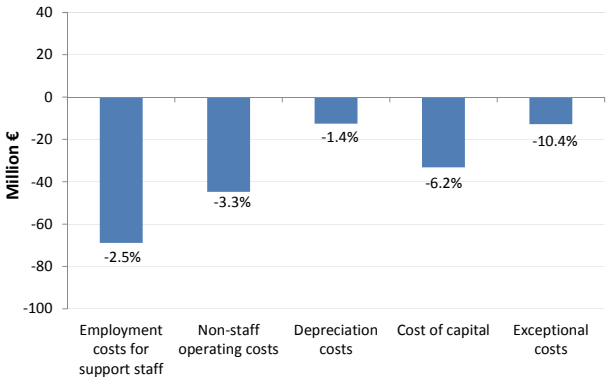

Figure 0.4: Changes in the components of support costs, 2012-2013 (real terms)

At Pan-European system level, after the -1.9% decrease in 2013, gate-to-gate unit ATM/CNS provision costs are planned to remain fairly constant in 2014 (-0.2%) and 2015 (-0.4%) and then to fall by -2.3% p.a. until 2018.

Overall, gate-to-gate unit ATM/CNS provision costs are expected to reduce by -1.5% p.a. between 2013 and 2018. This mainly reflects the fact that over this period traffic is planned to increase faster (+2.8% p.a.) than ATM/CNS provision costs (+1.2% p.a.).

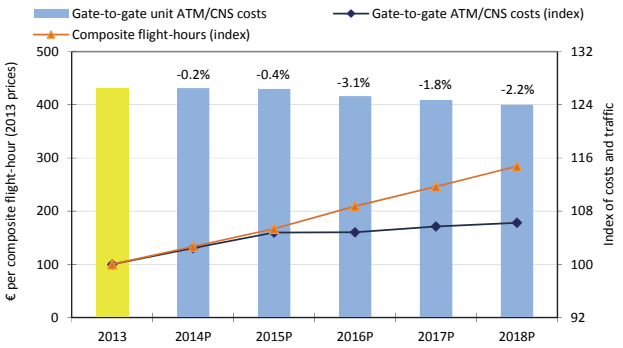

Figure 0.5: Forward-looking cost-effectiveness (2013-2018, real terms)

Overall, the cumulative capex planned for the period 2014-2018 amounts to some €4 995M. This is less than the cumulative capex spent between 2009 and 2013 (€5 658M). As a consequence, the average capex to depreciation ratio planned over 2014-2018 (1.15) is lower than that observed over the 2009-2013 period (1.22). This indicates that, overall, ANSPs assets bases are expected to grow at a lower rate than in the last five years.

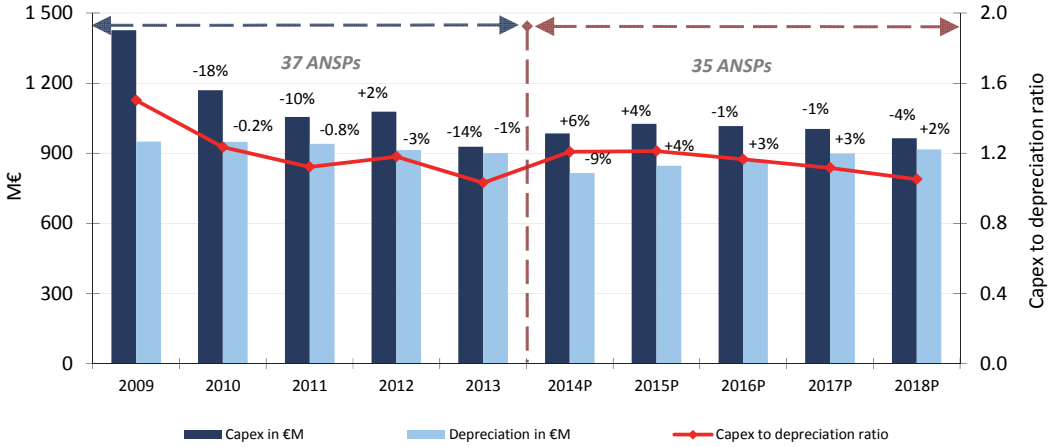

Figure 0.6: Capital expenditures and depreciation costs (2009-2018, real terms)

A more detailed analysis of ANSPs forward-looking plans indicates that a significant proportion of these investments relates to major upgrades or to the replacement of existing ATM systems.

1 INTRODUCTION

The Air Traffic Management Cost-Effectiveness (ACE) 2013 Benchmarking Report commissioned by EUROCONTROL's independent Performance Review Commission (PRC) is the thirteenth in a series of reports comparing the ATM cost-effectiveness of EUROCONTROL Member States' Air Navigation Service Providers (ANSPs)[1].

In September 2010, the PRC, supported by the EUROCONTROL Performance Review Unit (PRU), was designated Performance Review Body (PRB) of the European Commission (EC).

The ACE benchmarking work is carried out by the PRC in the context of Articles 3.3(i), 3.6(b)(c), and 3.8 of EC regulation N°691/2010 (Performance Scheme) amended by EC Regulation N°390/2013.

The report is based on information provided by ANSPs in compliance with Decision No. 88 of the Permanent Commission of EUROCONTROL, which makes annual disclosure of ANS information mandatory, according to the Specification for Economic Information Disclosure[2] (SEID), in all EUROCONTROL Member States.

Since these services are outside the PRC's terms of reference, this report does not address performance relating to:

- oceanic ANS;
- services provided to military operational air traffic (OAT); or,
- airport (landside) management operations.

The focus of this report is primarily on a cross-sectional analysis of ANSPs for the year 2013. However, the aviation community is also interested in measuring how cost-effectiveness and productivity at the European and ANSP levels varies over time, and in understanding the reasons why variations occur.

Hence, this report makes use of previous years' data from 2009 onwards to examine changes over time, where relevant and valid. It is particularly relevant to have a medium-term perspective given the characteristics of the ANS industry which requires a long lead time to develop ATC capacity and infrastructure. In 2009, the economic recession affected the aviation industry with an unprecedented -7% traffic decrease at system level, basically cancelling three years of traffic growth. It is therefore interesting to look at the changes in performance over the 2009-2013 period to understand how the ATM industry reacted to this sharp decrease in traffic demand.

1.1 Organisation of the report

The structure of the present ACE 2013 Benchmarking Report is made of two parts and three chapters:

Chapter 1 provides an overview of the participating ANSPs and outlines the processes involved in the production of this report.

[1] Previous reports in the series from ACE 2001 (Sept. 2003) to ACE 2012 (May 2014) can be found on the PRC web site at http://www.eurocontrol.int/articles/prc-and-prb-publications.

[2] PRC Specification for Economic Information Disclosure - Version 2.6, December 2008, can be found on the PRC web site.

Part I and Chapter 2 provide a high level analysis of economic and financial cost-effectiveness performance in 2013 at Pan-European system and ANSP level. This chapter also analyses changes in ATM/CNS cost-effectiveness performance between 2009 and 2013. A particular focus is put on the three main economic drivers of cost-effectiveness (productivity, employment costs and support costs). Finally, Chapter 2 comprises a forward-looking analysis of ATM/CNS performance over the 2014-2018 period, including capital investment projections.

Part II and Chapter 3 provide a two-page summary for each ANSP. This summary includes an individual trend analysis of ANSPs' cost-effectiveness performance between 2009 and 2013, and comprises a benchmarking analysis of each ANSP's financial cost-effectiveness with a set of comparators. It also examines the capital expenditure planned by each ANSP for the period 2014-2018.

Finally, this report also comprises several annexes which include statistical data used in the report, and individual ANSP Fact Sheets comprising a factual description of the governance and institutional arrangements in which the ANSP operates.

1.2 Overview of participating ANSPs

In total, 37 ANSPs reported 2013 data in compliance with the requirement from Decision No. 88 of the Permanent Commission of EUROCONTROL (see Table 1.1). In addition to the EUROCONTROL Member States, the en-route ANSP of Estonia[3] provided data in compliance with the Performance Scheme Regulation. All the reported information relates to the calendar year 2013.

Table 1.1 below shows the list of participating ANSPs, describing both their organisational and corporate arrangements, and the scope of ANS services provided. Table 1.1 also indicates (coloured yellow) which ANSPs were at 1 January 2013 part of the SES, and hence subject to relevant SES regulations and obligations[4]. In addition to SES members, a number of States (coloured blue) are committed, following the signing of an agreement relating to the establishment of a European Common Aviation Area (ECAA)[5], to cooperate in the field of ATM, with a view to extending the SES regulations[6] to the ECAA States. Hence, in principle all the en-route ANSPs of EUROCONTROL States[7] and other States disclosing information to the PRC are covered by the SES regulations, except Armenia, Moldova, Turkey and Ukraine.

[3] Estonia became a member of EUROCONTROL on the 1st of January 2015.

[4] Croatia joined the European Union in July 2013.

[5] Decision 2006/682/EC published on 16 October 2006 in the Official Journal of the European Union. States which have signed this Agreement but are not yet EU members comprise the Republic of Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, the Republic of Iceland, the Republic of Montenegro, the Kingdom of Norway, and the Republic of Serbia.

[6] This includes the second package of SES regulations (EC No 1070/2009), the amended Performance Scheme Regulation (EC No 390/2013) and amended Charging Scheme Regulation (EC No 391/2013).

[7] In 2013, en-route ANS in Bosnia and Herzegovina were provided by Croatia Control and SMATSA between FL290 and FL660 but the situation changed in November 2014 with the Bosnia and Herzegovina ANSP (BHANSA) providing ANS between FL100 and FL325 from Sarajevo ACC. BHANSA is therefore not included in the ACE 2013 analysis.

	ANSP	Code	Country	Organisational & Corporate Arrangements	OAT Services	Oceanic	MUAC	Delegated ATM	Internal MET	Ownership and management of airports
1	Aena	ES	Spain	State enterprise						x
2	Albcontrol	AL	Albania	Joint-stock company (State-owned)	x				x	
3	ANS CR	CZ	Czech Republic	State enterprise						
4	ARMATS	AM	Armenia	Joint-stock company (State-owned)						
5	Austro Control	AT	Austria	Joint-stock company (State-owned)					x	
6	Avinor	NO	Norway	Joint-stock company (State-owned)	x	x				x
7	Belgocontrol	BE	Belgium	State enterprise			x		x	
8	BULATSA	BG	Bulgaria	State enterprise					x	
9	Croatia Control	HR	Croatia	Joint-stock company (State-owned)	X			x	x	
10	DCAC Cyprus	CY	Cyprus	State body						
11	DFS	DE	Germany	Limited liability company (State-owned)	x		x			
12	DHMİ	TR	Turkey	State body (autonomous budget)						x
13	DSNA	FR	France	State body (autonomous budget)				x		
14	EANS	EE	Estonia	Joint-stock company (State-owned)						
15	ENAV	IT	Italy	Joint-stock company (State-owned)					x	
16	Finavia	FI	Finland	State enterprise	x			x	x	x
17	HCAA	GR	Greece	State body						x
18	HungaroControl	HU	Hungary	State enterprise					x	
19	IAA	IE	Ireland	Joint-stock company (State-owned)		x				
20	LFV	SE	Sweden	State enterprise	x			x	x	
21	LGS	LV	Latvia	Joint-stock company (State-owned)					x	
22	LPS	SK	Slovak Republic	State enterprise	x					
23	LVNL	NL	Netherlands	Independent administrative body			x			
24	MATS	MT	Malta	Joint-stock company (State-owned)						
25	M-NAV	MK	F.Y.R. Macedonia	Joint-stock company (State-owned)	x				x	
26	MoldATSA	MD	Moldova	State enterprise	x				x	
27	MUAC			International organisation						
28	NATS	UK	United Kingdom	Joint-stock company (part-private)		x				
29	NAV Portugal	PT	Portugal	State enterprise		x				
30	NAVIAIR	DK	Denmark	State enterprise				x		
31	Oro Navigacija	LT	Lithuania	State enterprise						
32	PANSA	PL	Poland	State body (acting as a legal entity with an autonomous budget)						
33	ROMATSA	RO	Romania	State enterprise					x	
34	Skyguide	CH	Switzerland	Joint-stock company (part-private)	x			x		
35	Slovenia Control	SI	Slovenia	State enterprise	x					
36	SMATSA	RS	Serbia	Limited liability company	x			x	x	
		ME	Montenegro							
37	UkSATSE	UA	Ukraine	State enterprise					x	

States covered by the SES Regulations
States part of the ECAA
States not covered by the SES Regulations

Table 1.1: States and ANSPs participating in ACE 2013

Table 1.1 also shows the extent to which the ANSPs incur costs relating to services that are not provided by all ANSPs. In order to enhance cost-effectiveness comparison across ANSPs, such costs, relating to oceanic ANS, military operational air traffic[8] (OAT), airport management operations and payment for delegation of ATM services[9] were excluded to the maximum possible extent.

1.3 Data submission

The SEID (see footnote 2) requires that participating ANSPs submit their information to the PRC/PRU by 15 July in the year following the year to which it relates. The SEID became also

[8] Note that since the 10 February 2014, LPS is not responsible to provide OAT services to military flights.

[9] The column 'Delegated ATM' in Table 1.1 relates to the delegation of ATM services to or from other ANSPs, based on financial agreements.

mandatory as part of the SES II legislation. The ACE 2013 data have been submitted in the SEID Version 2.6 which has been used since ACE 2008.

A Version 3.0 of this Specification has been finalised in December 2012 following the formal EUROCONTROL Regulatory and Advisory Framework (ERAF), after consultation and full involvement of the ad-hoc ACE Working Group using lessons learnt from the use of the SEID V2.6 over a trial period. The SEID V3.0 also reflects recent developments arising from the second package of the SES regulations in 2009, the Performance Scheme Regulation and the amended Charging Scheme Regulation. The SEID V3.0 shall be used to report 2014 data in July 2015.

Figure 1.1 indicates that 23 out of 37 ANSPs provided ACE 2013 data on time (compared to 28 for ACE 2012). It is important that this timely submission of ACE data is sustained and improved. The ACE benchmarking analysis must be seen as timely since several stakeholders, most notably ANSPs' management, regulatory authorities (e.g. NSAs) and airspace users, have a keen interest in receiving the information in the ACE reports as early as possible. Clearly, the timescale for the production of the ACE Benchmarking Report is inevitably delayed if data are not submitted on time.

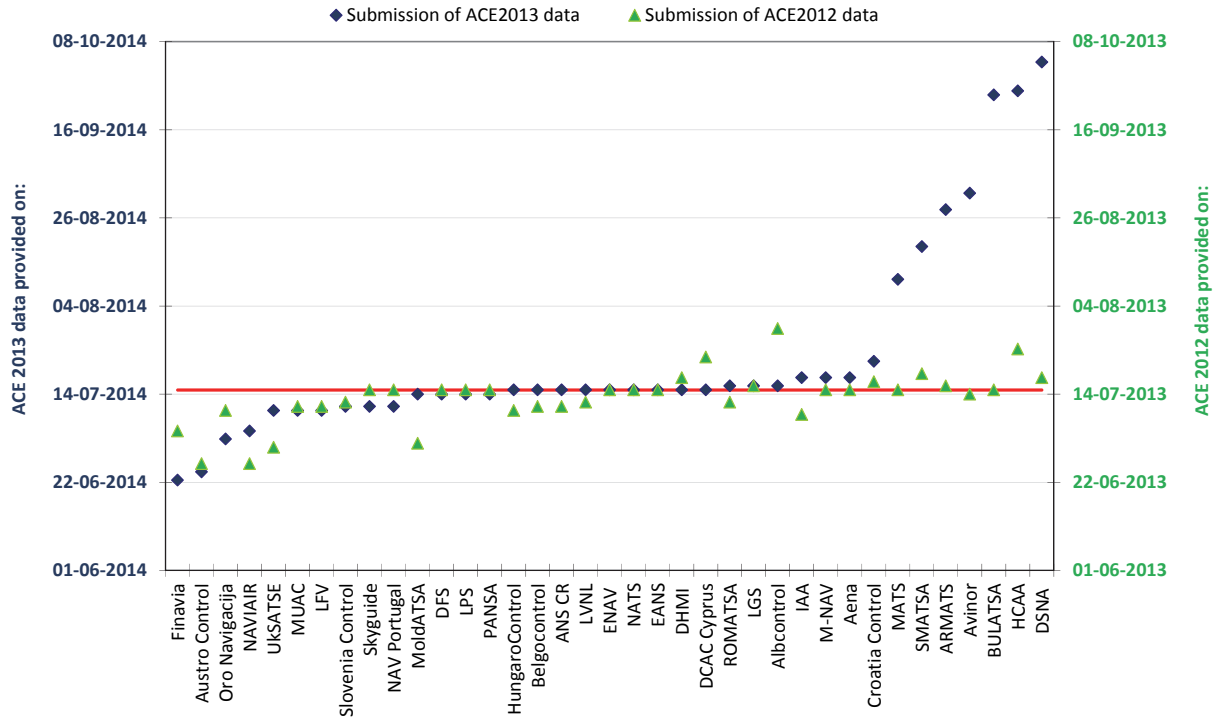

Figure 1.1: Progress with submission of 2013 data

The general and gradual improvement in the quality and the timing of the ACE data submission is marred by some problems relating to few individual ANSPs. For instance, DSNA and HCAA are still not in a position to provide complete balance-sheet data, although capital-related costs are charged to airspace users. Similarly, the quality of the operational data provided by HCAA (in particular staff numbers and working hours) is not satisfactory.

1.4 Data analysis, processing and reporting

The PRU is supported by an ACE Working Group (WG), including ANSPs, regulatory authorities and airspace users' representatives. The process leading to the production of the ACE report, which comprises data analysis and consultation, is summarised in Figure 1.2 below.

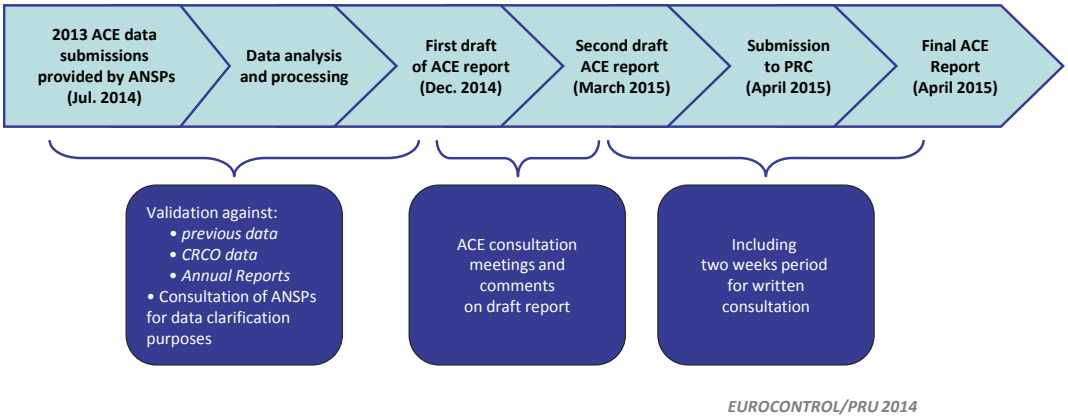

Figure 1.2: Data analysis, processing and reporting

In order to ensure comparability among ANSPs and the quality of the analysis, the information submitted by the ANSPs is subject to a thorough analysis and verification process which makes extensive use of ANSPs' Annual Reports and of their statutory financial accounts.

During this process a number of issues emerged:

- Annual Reports with disclosure of financial accounts are not available for some ANSPs (see Section 1.5 below). This removes one means of validating the financial data submitted.
- ANSPs which are involved in non-ANS activities (such as airport ownership and management, see Table 1.1) do not necessarily disclose separate accounts for their ANS and non-ANS activities. This means that the financial data submitted for the ANS activities cannot be validated with the information provided in the Annual Report.
- Except for a few ANSPs, Annual Reports do not disclose the separate costs for the various segments of ANS (such as en-route and terminal ANS) which means that the cost breakdown submitted cannot be reconciled.

As ANSPs progressively comply with the SES Regulation on Service Provision, which requires publication of Annual Reports including statutory accounts, and separation of ANS from non-ANS activity in ANSPs internal accounts, some of these shortcomings are expected to be gradually overcome (see also Section 1.5 below).

In most cases, data recorded in the Network Manager (NM) database have been used as the basis for the output metrics used in the ACE data analysis, and this practice has been generally accepted, including in cases where in previous years there had been discrepancies.

1.5 ANSPs' Annual Reports

ANSPs' Annual Reports provided a valuable means of validating the 2013 information disclosure data.

The SES Service Provision Regulation (SPR) (EC No 550/2004) came into force on 20 April 2004 and is applicable to 2013 Financial Accounts in all EU Member States (plus Switzerland and Norway) and to associated ANSPs. This Regulation is also applicable to States which have signed the ECAA Agreement (see Section 1.2), although the timing of its implementation is not yet decided for individual States. Among other provisions, the SPR requires that ANSPs meet certain standards of information disclosure (transparency) and reporting, and in particular that:

- ANSPs should draw up, submit to audit and publish their Financial Accounts (Art.12.1);
- in all cases, ANSPs should publish an Annual Report and regularly undergo an independent audit (Art 12.2); and,

- ANSPs should, in their internal accounting, identify the relevant costs and income for ANS broken down in accordance with EUROCONTROL's principles for establishing the cost-base for route facility charges and the calculation of unit rates and, where appropriate, shall keep consolidated accounts for other, non-air navigation services, as they would be required to do if the services in question were provided by separate undertakings (Art 12.3). The latter requirement is particularly relevant for the ANSPs which are part of an organisation which owns, manages and operates airports, such as Aena[10], Avinor, Finavia, HCAA, and DHMI[11].

Figure 1.3 displays the status of ANSPs 2013 Annual Reports and indicates that 30 out of 37 participating ANSPs have published an Annual Report for the year 2013.

It is generally considered that an Annual Report produced according to "best practice" should comprise three main components:

- a Management Report;
- annual Financial Accounts with relevant business segmentation and explanatory notes; and,
- an independent Audit Report.

At the time of writing this report, seven ANSPs[12] (including three which are subject to SES Regulations) have not published Annual Reports for 2013.

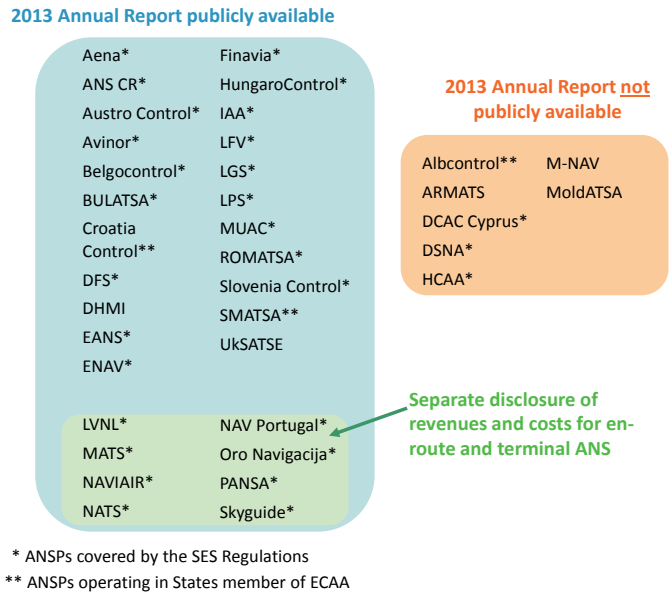

Figure 1.3: Status of 2013 Annual Reports

[10] In 2011, Aena went through a restructuration process relating to the separation of the airport division of Aena (creation of a new company Aena Aeropuertos S.A.) from the ANS department. In July 2014, Aena has been renamed ENAIRE and holds 100% of the capital of Aena S.A. (former Aena Aeropuertos S.A.).

[11] Although it should be noted that DHMI is not covered by the SES regulations.

[12] At the time of completing this report, DSNA which released Annual Reports in the previous years, has not yet published an Annual Report for the year 2013.

ANSPs' Annual Accounts are prepared in accordance with specific accounting principles. Often, (national) General Accepted Accounting Principles (GAAP) are used. In the context of the SES, Article 12 of the SPR prescribes that ANSPs Annual Accounts shall comply, to the maximum extent possible, with International Financial Reporting Standards (IFRS). Table 1.2 shows the 25 ANSPs whose 2013 Annual Accounts were partly or fully prepared according to IFRS[13].

ANSPs reporting according to IFRS in 2013	
Aena	LVNL
Albcontrol	MATS
ANS CR	MUAC
ARMATS	NATS
Austro Control	NAVIAIR
Avinor	NAV Portugal
BULATSA	Oro Navigacija
Croatia Control	PANSA
DFS	ROMATSA
EANS	Skyguide
LGS	Slovenia Control
LPS	SMATSA
	UkSATSE

Table 1.2: IFRS reporting status

It should be noted that in some cases, the implementation of IFRS may have a significant impact on an ANSPs' cost base[14, 15] (such as different treatment of costs related to the pension scheme, and changes in depreciation rules), hence it is very important to identify and understand the impact of changes in the accounting principles used to draw the financial accounts.

1.6 ANSP benchmarking and the SES Performance Scheme

The SES Performance Scheme includes EU-wide performance targets which are transposed into binding national/FAB targets for which clear accountabilities must be assigned within performance plans. Following the PRB recommendations, EU-wide targets for Cost-Efficiency, Capacity and Environment were adopted by the EC on the 3rd December 2010 for RP1 (2012-2014). It should be noted that the EU-wide Cost-Efficiency target is expressed in terms of en-route determined costs per service unit, and is computed at charging zone level (i.e. including ANSPs, MET, EUROCONTROL and NSAs costs).

The ACE factual and independent benchmarking has set the foundation for a normative analysis to quantify the potential scope of cost-efficiency improvements for ANSPs. Findings from the ACE Benchmarking analysis and the gathering of business "intelligence" on ANSPs cost-efficiency performance directly feed three core processes of the SES Performance Scheme:

1. EU-wide cost-efficiency target setting;
2. assessment of the cost-efficiency part of FABs/National Performance Plans; and,
3. monitoring of the cost-efficiency performance during a Reference Period.

[13] Skyguide Annual Accounts are prepared according to the Swiss GAAP which are close to IFRS.

[14] From 2007 onwards, this has been the case for the German ANSP, DFS, whose cost base includes costs recognised only since the conversion to IFRS. These costs, mainly due to the revaluation of DFS pension obligations, have been spread over a period of 15 years.

[15] Following the amendment of IAS 19 in 2013, any gains/losses arising from a change in actuarial assumptions have to be directly reflected in financial statements. This contrasts with the methodology that was used by some ANSPs until 2012 (i.e. corridor approach) according to which only a part of the actuarial gains/losses were recognised in the financial statements.

The ACE 2012 analysis also supported the PRB assessment of the contribution of the RP2 Performance Plans to the achievement of the Union-wide targets. The assessment took place in summer 2014 following the drawing up of the Performance Plans by the NSAs during the first half of 2014.

For ANSPs operating in SES States, the year 2012 marked the start of RP1 and the end of the "full cost-recovery" mechanism for en-route ANS. Over RP1, SES States/ANSPs operate under the "determined costs" method which comprises specific risk-sharing arrangements aiming at incentivising ANSPs economic performance. The first two years of RP1 provide meaningful insights on how the industry has reacted to the incentives provided as part of the performance scheme and charging scheme regulations. At Union-wide level actual traffic in terms of service units was significantly lower than planned in the Performance Plans (-4.5% for 2012 and -5.6% for 2013).

The 2013 PRB monitoring report on SES targets released in October 2014 showed that at Union-wide level, actual 2013 en-route costs were -5.4% than planned and therefore that SES States showed a certain degree of reactivity to adjust costs downwards in order to adapt to the lower traffic volumes.

This ACE 2013 Benchmarking Report complements the PRB monitoring activity by providing a detailed comparison of cost-effectiveness performance at ANSP level including a trend analysis of three main economic drivers (productivity, employment costs and support costs) over the 2009-2013 period. Performance indicators at FAB level are also presented in Annex 9.

Annex 3 provides explanations on the differences between ACE and SES economic indicators and illustrates how these can be reconciled.

PART I: PAN-EUROPEAN SYSTEM COST-EFFECTIVENESS PERFORMANCE IN 2013 AND OUTLOOK FOR 2014-2018

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2 PAN-EUROPEAN SYSTEM COST-EFFECTIVENESS PERFORMANCE IN 2013 WITH 2014-2018 OUTLOOK

2.1 Overview of European ANS system data for the year 2013

In 2013, the gate-to-gate ATM/CNS provision costs amounted to some €8.0 billion, and the 37 ANSPs employed a total of some 57 500 staff (30% of them being ATCOs working on operational duties).

The Pan-European ANS system analysed in this report comprises 37 participating ANSPs, excluding elements related to services provided to military operational air traffic (OAT), oceanic ANS, and landside airport management operations. The Pan-European ANS system also includes National Supervisory Authorities (NSAs) and other regulatory and governmental authorities, national MET providers and the EUROCONTROL Agency. In 2013, total ANS costs were around €9 047M (see Table 2.1 below), of which some €7 937M related directly to the provision of gate-to-gate ATM/CNS.

	2012	2013	13/12
	37 ANSPs	37 ANSPs	37 ANSPs
Gate-to-gate ANS revenues (not adjusted by over/under recoveries) (in € M):	**8 958**	**8 846**	**-1.3%**
En-route ANS revenues	7 063	6 997	-0.9%
Terminal ANS revenues	1 894	1 849	-2.4%
Gate-to-gate ANS costs (in € M):	**9 207**	**9 047**	**-1.7%**
ATM/CNS provision costs	8 101	7 937	-2.0%
MET costs	442	436	-1.4%
EUROCONTROL Agency costs	497	490	-1.6%
Payment to national authorities and irrecoverable VAT	167	184	10.3%
Gate-to-gate ATM/CNS costs (in € M):	**8 101**	**7 937**	**-2.0%**
En-route ATM/CNS costs	6 307	6 208	-1.6%
Terminal ATM/CNS costs	1 794	1 729	-3.6%
Gate-to-gate ANS staff:	**58 018**	**57 487**	**-0.9%**
ATCOs in OPS	17 377	17 532	0.9%
ACC ATCOs	9 724	9 874	1.5%
APPs + TWRs ATCOs	7 653	7 657	0.1%
NBV of gate-to-gate fixed assets (in € M)	**7 636**	**7 372**	**-3.5%**
Gate-to-gate capex (in € M)	**1 078**	**928**	**-13.9%**
Outputs (in M)			
Distance controlled (km)	9 899	9 969	0.7%
Total flight-hours controlled	14.2	14.3	0.4%
ACC flight-hours controlled	12.7	12.8	0.6%
IFR airport movements controlled	15.0	14.7	-2.2%
IFR flights controlled	9.5	9.4	-1.1%
Gate-to-gate ATFM delays ('000 min.)	**10 610**	**8 669**	**-18.3%**

Table 2.1: Key system data for 2012 and 2013, real terms

Gate-to-gate ANS revenues in 2013 amounted to some €8 846M. The European ANSPs employed some 57 487 staff. Some 17 532 staff (30%) were ATCOs working on operational duty, compared to some 13 400 in the United States[16]. On average, 2.3 additional staff are required for every ATCO in OPS in Europe.

[16] See Comparison of Air Traffic Management-Related Operational Performance: US/Europe (June 2014) available at http://www.eurocontrol.int/prb/publications.

ACE also analyses indicators derived from ANSP balance sheets and capital expenditures. The total Net Book Value (NBV) of fixed assets used by the Pan-European ANSPs to provide ATM/CNS services is valued at some €7 372M, which means that overall €0.83 of fixed assets are required to generate €1 of revenue, an indication of relative capital intensity (this ratio is about 2 for airlines and about 3 for main airports operators). Fixed assets mainly relate to ATM/CNS systems and equipment in operation or under construction. In 2013, the total ANSP capex at Pan-European system level amounted to some €928M.

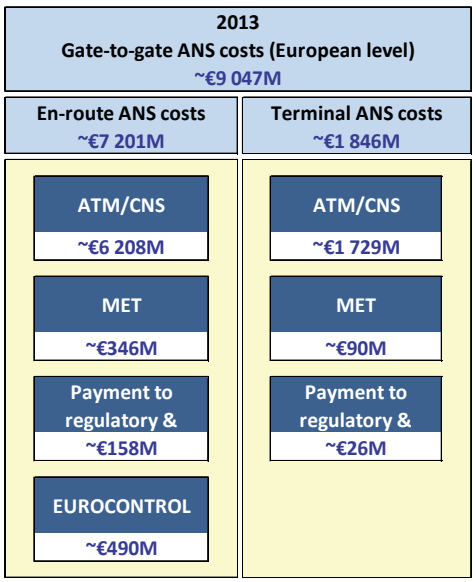


Figure 2.1: Breakdown of ATM/CNS provision costs, 2013

From a methodological point of view, ACE 2013 first considers the total costs at State level for providing ANS, however, since some elements of ANS provision are outside the control of individual ANSPs, it then focuses on the specific costs of providing gate-to-gate ATM/CNS (€7 937M). These represent 87.7% of total ANS costs. Other ANS costs include the costs of aeronautical meteorology services (4.8%), the costs of the EUROCONTROL Agency (5.4%) and the costs associated to regulatory and governmental authorities (2.0%).

Table 2.1 above indicates that, except the payment to national authorities and irrecoverable VAT (+10.3%), all components of ANS costs decreased in 2013. The larger decrease in 2013 is associated with ATM/CNS provision costs (-2.0% compared to 2012).

Despite the existence of common general principles, there are inevitably discrepancies in cost-allocation between en-route and terminal ANS across the European ANSPs. This lack of consistency might distort performance comparisons carried out separately for en-route and terminal ANS. For this reason, the focus of the cost-effectiveness benchmarking analysis in this report is "gate-to-gate" ANS.

ANSPs' ATM/CNS provision costs are then divided by an output metric to obtain a measure of performance – the **financial cost-effectiveness indicator**. The output metric is the composite flight-hour, a "gate-to-gate" measure which combines both en-route flight-hours controlled and IFR airport movements controlled. More information on the calculation of the output metric can be found in Annex 2.

2.2 Factors affecting performance

ANSPs in Europe operate in very diverse environments, both in terms of operational conditions (traffic complexity and variability) and socio-economic conditions (cost of living, labour laws).

There are also significant differences in terms of size across the ANSPs since the five largest bear 56% of the total Pan-European ATM/CNS provision costs while the five smallest represent less than 1% of the costs.

Many factors contribute to observed differences in unit costs between ANSPs. Some of these factors are measurable; others (such as regulatory constraints) are less obviously quantifiable.

Methods have been developed to measure a subset of exogenous factors. Currently, three relevant factors outside ANSPs control are consistently measured in the ACE Benchmarking Reports. As shown in Figure 2.2 below, these include the traffic complexity and the seasonal traffic variability. The third factor is the cost of living prevailing in the different countries where ANSPs operate.

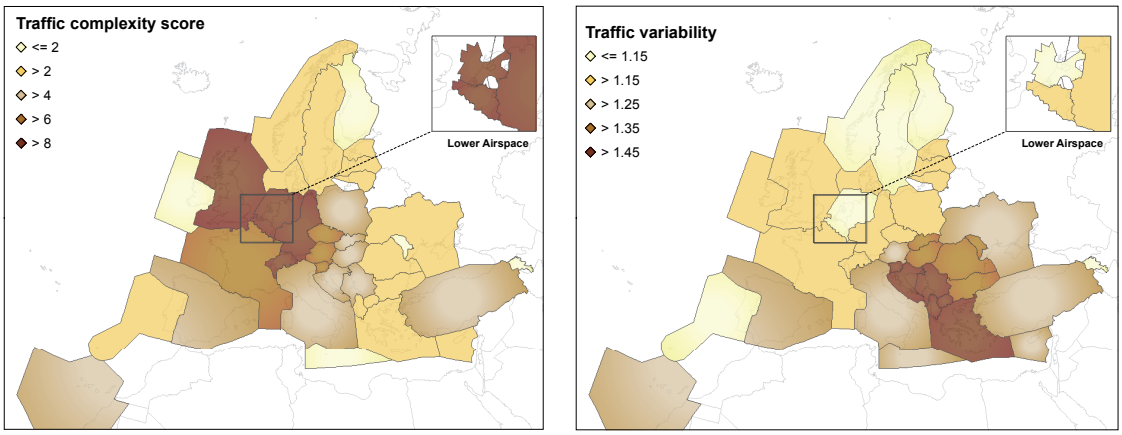


Figure 2.2: Exogenous factors measured by the PRU, 2013

Ideally, since the 37 ANSPs operate in very diverse environments across Europe, all the factors affecting performance should be taken into account in making fair performance comparisons, especially since many of these factors are outside the direct control of an ANSP. As in previous years, the analysis undertaken is a purely **factual** analysis of the cost-effectiveness indicators – measuring what the indicators **are**.

The impact of size on ANSPs performance is an important policy issue given the infrastructure characteristics of the ANS sector.

The five largest ANSPs (Aena, DFS, ENAV, NATS and DSNA) bear some 56% of total European gate-to-gate ATM/CNS provision costs, while their share of traffic is 50%. At first sight, this result contrasts with the expectation of some form of increasing returns to scale in the provision of ANS (the performance of larger ANSPs might benefit from their larger size).

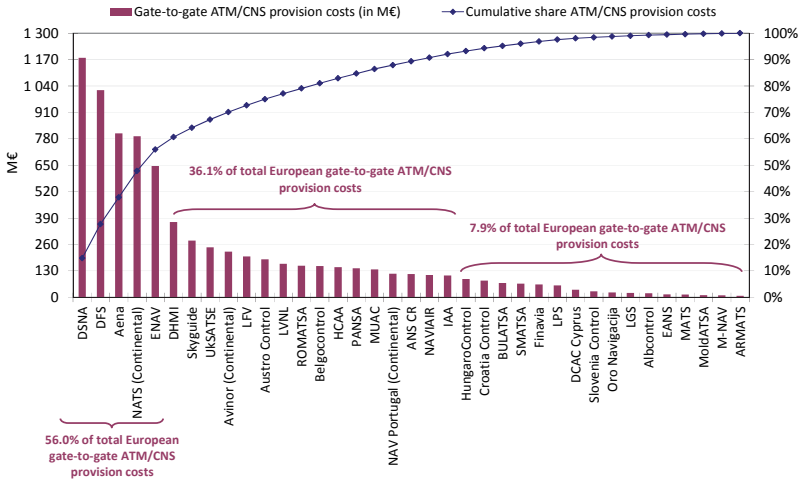


Figure 2.3: Distribution of ATM/CNS provision costs in 2013

It should be noted that:

- Under the full cost recovery regime that applied to most ANSPs until December 2011, there was little incentive to fully exploit scale effects;
- The five largest ANSPs were substantially affected by the decrease in traffic volumes resulting from the economic recession. On average, the number of composite flight-hours controlled by the five largest ANSPs reduced by -10.5% between 2008 and 2013 while it rose by +3.6% for the other ANSPs;
- Larger ANSPs tend to develop bespoke ATM systems internally which can be more costly than a commercial off-the-shelf (COTS) solution; and,
- Size is not the only factor that has an impact on ANSPs costs.

It is expected that with the regulatory regime introduced by the SES II Performance Scheme and the incentive scheme embedded in the Charging Scheme regulation, ANSPs will have stronger incentives to exploit scale effects in future years.

2.3 Pan-European economic cost-effectiveness performance in 2013

At Pan-European level, the unit economic cost amounted to €478 in 2013 which is -13% lower than the level achieved before the economic recession (€549 in 2008). At system level, the unit economic costs reached in 2013 their lowest level since the start of the ACE benchmarking analysis in 2001.

An assessment of ANS performance should take into account the direct costs (user charges) and indirect costs (delays, additional flight time and fuel burn) borne by airspace users, while checking that ANS safety standards are met. The PRC introduced in its ACE Benchmarking Reports the concept of economic cost-effectiveness. This indicator is defined as gate-to-gate ATM/CNS provision costs plus the costs of ground ATFM delays[17] for both en-route and airport, all expressed per composite flight-hour. This economic performance indicator is meant to capture trade-offs between ATC capacity and costs.

Figure 2.4 below shows the comparison of ANSPs gate-to-gate economic cost per composite flight-hour in 2013. The two dotted lines represent the bottom and the top quartiles and provide an indication of the dispersion across ANSPs (there is a difference of €180 between the bottom and the top quartile).

The economic cost-effectiveness indicator at Pan-European level is €478 per composite flight-hour, and, on average, ATFM delays represent 9% of the total economic costs (some €41 per composite flight-hour). According to the Network Operations Report[18], important factors contributing to en-route ATFM delays in 2013 were recurrent capacity problems in Nicosia ACC, industrial actions in France and some critical technical failures in London ACCs.

In 2013, ATFM delays contributed more than 15% to the economic unit costs for four ANSPs (DCAC Cyprus, LVNL, PANSA and Skyguide). For PANSA, the implementation of the new ATM system Pegasus in November 2013 generated exceptional ATFM delays in Warsaw ACC. On the

[17] The cost of ATFM delays (€87 per minute in 2013) is based on the findings of the study "European airline delay cost reference values" realised by the University of Westminster in March 2011. Further details on the computation of the economic costs per composite flight-hour at ANSP and Pan-European system level are available in Annex 2 of this report.

[18] The Network Operations Report 2013 is available on the Network Manager's website: http://www.eurocontrol.int/publications/network-operations-report-2013

other hand, DCAC Cyprus has had recurrent ATC capacity issues for several years. The implementation of capacity enhancement measures contributed to reduce ATFM delays in 2011-2012 compared to previous years, but the situation deteriorated in 2013. As a result, the share of ATFM delays in DCAC Cyprus 2013 unit economic costs (59%) is by far the highest in Europe.

Among the five largest ANSPs, the share of ATFM delays in the unit economic costs ranges from 2% for ENAV to 13% for DSNA, where industrial actions are the main cause of ATFM delays for Bordeaux, Brest and Marseille ACCs[19]. DFS has the highest unit economic costs amongst the five largest ANSPs, combining the highest ATM/CNS provision costs per composite flight-hour and relatively higher unit costs of ATFM delays.

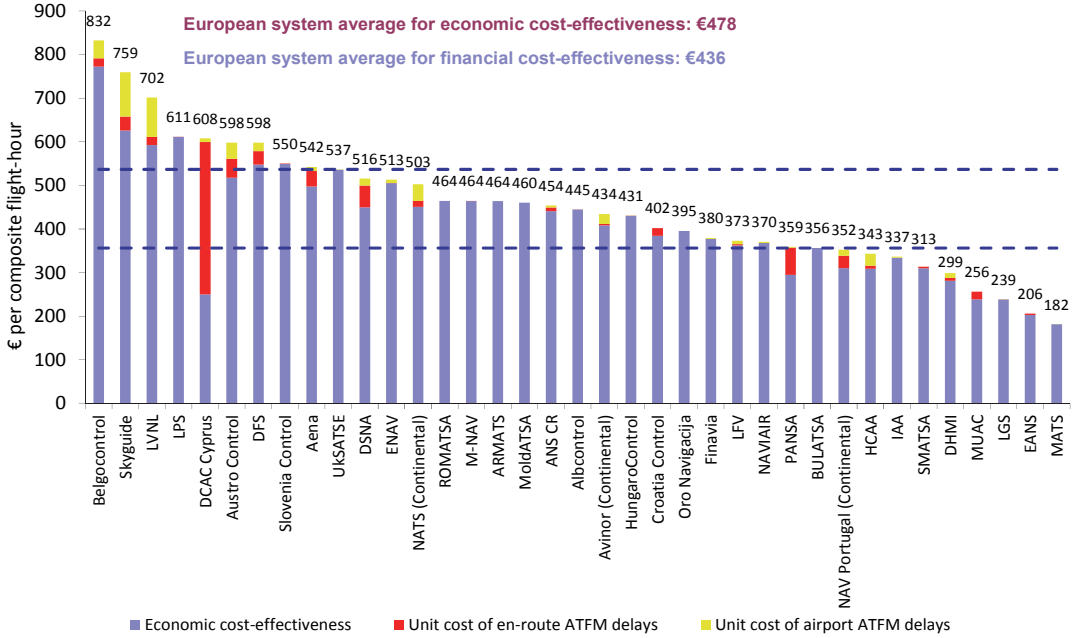


Figure 2.4: Economic gate-to-gate cost-effectiveness indicator, 2013

Figure 2.5 below analyses the changes in economic cost-effectiveness between 2009 and 2013 at Pan-European system level. The left-hand side of Figure 2.5 shows the changes in unit economic costs, while the right-hand side provides complementary information on the year-on-year changes in ATM/CNS provision costs, composite flight-hours and unit costs of ATFM delays.

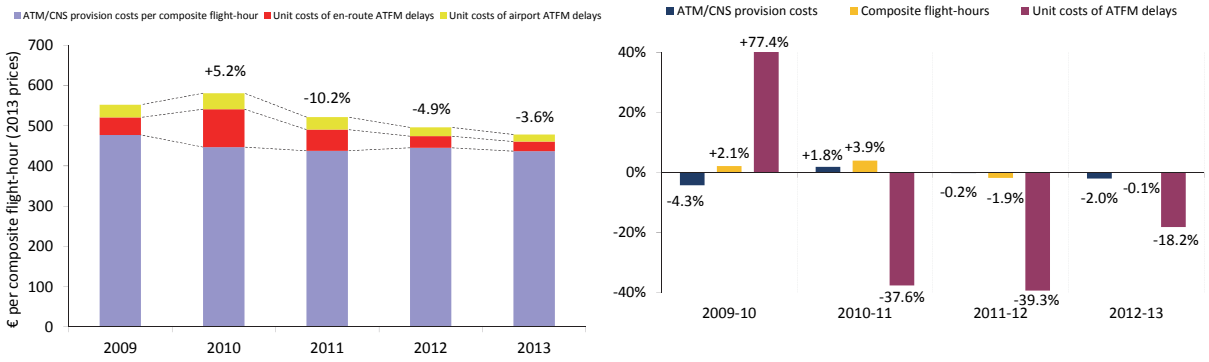


Figure 2.5: Changes in unit economic costs, 2009-2013 (real terms)

[19] See EUROCONTROL, Network Operations Report 2013, ANNEX II – ACC.

The level of the unit economic costs in 2009 reflects the substantial impact of the economic recession on the ATM industry, when composite flight-hours sharply reduced by -6.7% compared to 2008 and ATM/CNS provision costs rose by +1.3%.

In 2010, composite flight-hours rose by +2.1% while ATM/CNS provision costs fell by -4.3% in real terms. The reduction in ATM/CNS provision costs reflected the impact of cost-containment measures implemented by several European ANSPs. However, this performance improvement at system level was outweighed by a sharp increase in the unit costs of ATFM delays for a limited number of ANSPs and overall, unit economic costs rose by +5.2% in 2010.

Between 2010 and 2013, economic costs per composite flight-hour decreased by -6.3% p.a. in real terms, mainly due to the substantial decreases in unit ATFM delay costs (-32.3% p.a. between 2010 and 2013). Over this period, ATM/CNS provision costs remained at 2010 levels while the number of composite flight-hours slightly increased (+0.6% p.a.). This reflects the impact of the cost-containment measures implemented by a majority of ANSPs in a context of lower than forecast traffic growth.

In 2013, ATM/CNS provision costs fell by -2.0% in real terms while composite flight-hours remained fairly constant[20], resulting in a decrease in unit ATM/CNS provision costs (-1.9%). For the third year in a row, the unit costs of ATFM delays significantly fell (-18.2%) contributing to the -3.6% decrease in unit economic costs compared to 2012. As a result, in 2013 unit economic costs amount to €478 which is the lowest level achieved since the start of the ACE benchmarking analysis in 2001.

In Figure 2.6 below, ANSPs are classified in two groups. The upper bar chart shows ANSPs with a relatively higher aggregated complexity score (i.e. higher than 4) while ANSPs with a relatively lower aggregated complexity score (i.e. lower than 4) are shown in the bottom bar chart. Inside each group ANSPs are ranked by unit economic costs. More information about complexity indicators measured at ANSP level is available in Annex 6.

Figure 2.6 shows that between 2012 and 2013, economic gate-to-gate costs per composite flight-hour fell for 21 ANSPs. Some of these ANSPs could achieve a substantial reduction in the unit costs of ATFM delays in 2013 (see red portion of the bar). This is particularly the case for Croatia Control, DFS, DHMI and NAV Portugal.

For Croatia Control, the share of ATFM delays in economic costs reduced from 12% in 2012 to 4% in 2013, in a context of modest traffic growth (+0.6%). It is understood that the decrease in ATFM delays mainly results from the implementation of a series of optimisation measures in the domains of manpower planning, sector opening and ATS route network.

[20] It is noteworthy that the scope of airports included in the ACE analysis has changed in 2013 due to the on-going liberalisation of airports in Spain. By the end of 2013, the responsibility to provide aerodrome control services in 11 Spanish regional airports was transferred from Aena to SAERCO and FerroNATS. This issue does not significantly affect the results of this ACE 2013 Benchmarking Report. Indeed, correcting for the impact of this change in scope, composite flight-hours would have remained constant (0.002%) in 2013 (compared to a decrease of -0.1% when the scope of airports is not adjusted).

Figure 2.6: Changes in economic cost-effectiveness by ANSP, 2009-2013 (real terms)

For DFS, the unit costs of ATFM delays decreased for the third year in a row and the share of ATFM delays in economic costs fell from 15% in 2012 to 8% in 2013 in a context of decreasing traffic (-2.6%). This improvement mainly reflects (a) the impact of measures designed to address capacity shortage issues in Langen ACC, and (b) the implementation of a new ATC system (VAFORIT) in Karlsruhe ACC which enabled capacity improvements in the upper airspace.

The share of ATFM delays in DHMI economic costs reduced from 14% in 2012 to 6% in 2013, in a context of substantial traffic growth (+9.6%). The measures implemented by DHMI to reduce ATFM delays mainly focused on operational improvements at Istanbul Ataturk Airport, including the design of new SID/STAR procedures, application of new procedures for ground movements, the implementation of a new sectorisation and the introduction of a new preferential runway system.

For NAV Portugal, the share of ATFM delays in economic costs reduced from 21% to 12%, despite a +5.0% increase in traffic in 2013. The higher level of ATFM delays in 2012 was mainly due to an exceptional situation during the last month of 2012 linked to ATC staffing issues.

2.4 Pan-European financial cost-effectiveness performance in 2013

In 2013, unit ATM/CNS provision costs range from €772 (Belgocontrol) to €182 (MATS), a factor greater than four. Although the five largest ANSPs operate in relatively similar economic and operational environments, there is a substantial variation in unit ATM/CNS provision costs, ranging from DFS (€548) to NATS (€450).

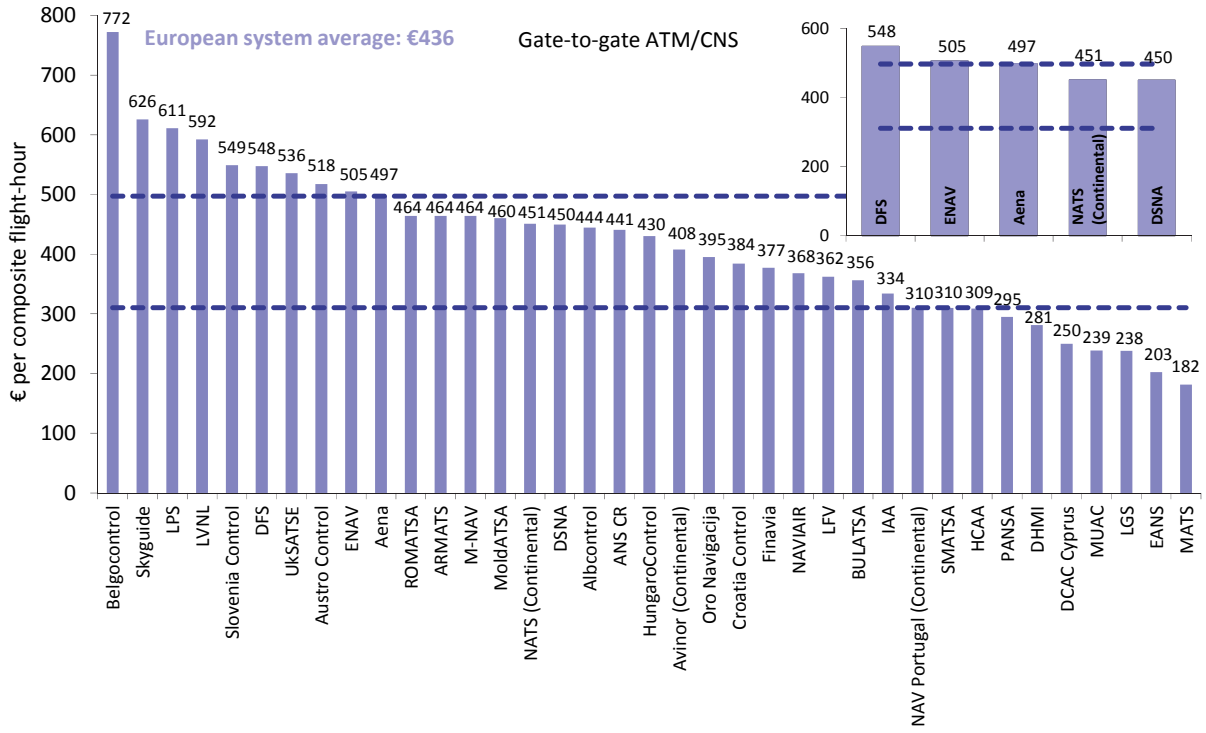


Figure 2.7: ATM/CNS provision costs per composite flight-hour, 2013

Because of their weight in the Pan-European system and their relatively similar operational and economic characteristics (size, scope of service provided, economic conditions, presence of major hubs), the ACE Benchmarking Reports place a particular focus on the results of the five largest ANSPs (Aena, DFS, DSNA, ENAV and NATS).

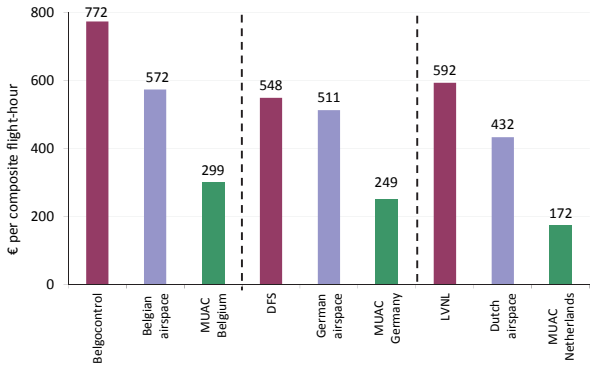
Figure 2.7 shows that although the five largest ANSPs operate in relatively similar economic and operational environments, there is a substantial variation in unit ATM/CNS provision costs, ranging from DFS (€548) to NATS (€450).

Belgocontrol and LVNL are amongst the ANSPs with the highest unit costs, ranking first and fourth in Figure 2.7 above. It is noteworthy that although these two ANSPs operate in relatively similar operational (both exclusively provide ATC services in lower airspace) and economic conditions, the unit ATM/CNS provision costs of Belgocontrol are in 2013 some +30% higher than that of LVNL. This substantial difference appears to be mainly driven by Belgocontrol relatively lower ATCO-hour productivity (see Figure 2.16 on p.26) and relatively higher unit support costs (see Figure 2.26 on p.36) compared to LVNL.

It should also be noted that these ANSPs own infrastructure which is made available to MUAC. To better assess the cost-effectiveness of ATM/CNS provided in each of the Four States (Belgium, Germany, the Netherlands, and Luxembourg) national airspaces, MUAC costs and outputs are consolidated with the costs and outputs of the national providers. This adjustment is presented in Figure 2.8 below.

The bottom of Figure 2.8 shows the figures which have been used for this "adjustment". The costs figures are based on the cost allocation keys used to establish the Four States cost-base, while the flight-hours are based on those controlled by MUAC in the three FIRs (Belgium, Netherlands and Germany).

The top of Figure 2.8 provides a view of this consolidated ATM/CNS provision costs per composite flight-hour in the airspace of Belgium, the Netherlands and Germany (see blue bars).



MUAC	Belgium	Germany	Netherlands
Flight-hours allocated to:	145 962	256 046	172 804
Costs allocated to:	€43.6M	€63.8M	€29.8M

Figure 2.8: Adjustment of the financial cost-effectiveness indicator for ANSPs operating in the Four States airspace, 2013

Figure 2.7 also indicates that in 2013 the unit ATM/CNS provision costs of various ANSPs operating in Central and Eastern European countries (LPS, Slovenia Control, UkSATSE, ROMATSA, ARMATS, M-NAV and MoldATSA) are higher than the Pan-European system average and in the same order of magnitude as the unit costs of ANSPs operating in Western European countries where the cost of living is much higher.

2.5 Changes in financial cost-effectiveness (2012-2013)

In 2013, 18 ANSPs could reduce ATM/CNS provision costs compared to 2012, for some of them in a context of traffic decrease or lower traffic growth than expected. This shows for these ANSPs a certain degree of reactivity in adjusting costs downwards in order to adapt to the lower traffic volumes.

Figure 2.9 provides a detailed analysis of the changes in cost-effectiveness at ANSP level between 2012 and 2013, identifying the cost and the traffic effects. Figure 2.9 shows that in 2013, 18 out of 37 ANSPs could reduce ATM/CNS provision costs compared to 2012. For seven of these ANSPs, the lower ATM/CNS costs were associated with a reduction in traffic volumes. For most of these ANSPs

(five out of seven), the reduction in ATM/CNS provision costs could compensate for the fall in traffic and therefore these ANSPs could avoid an increase in unit costs.

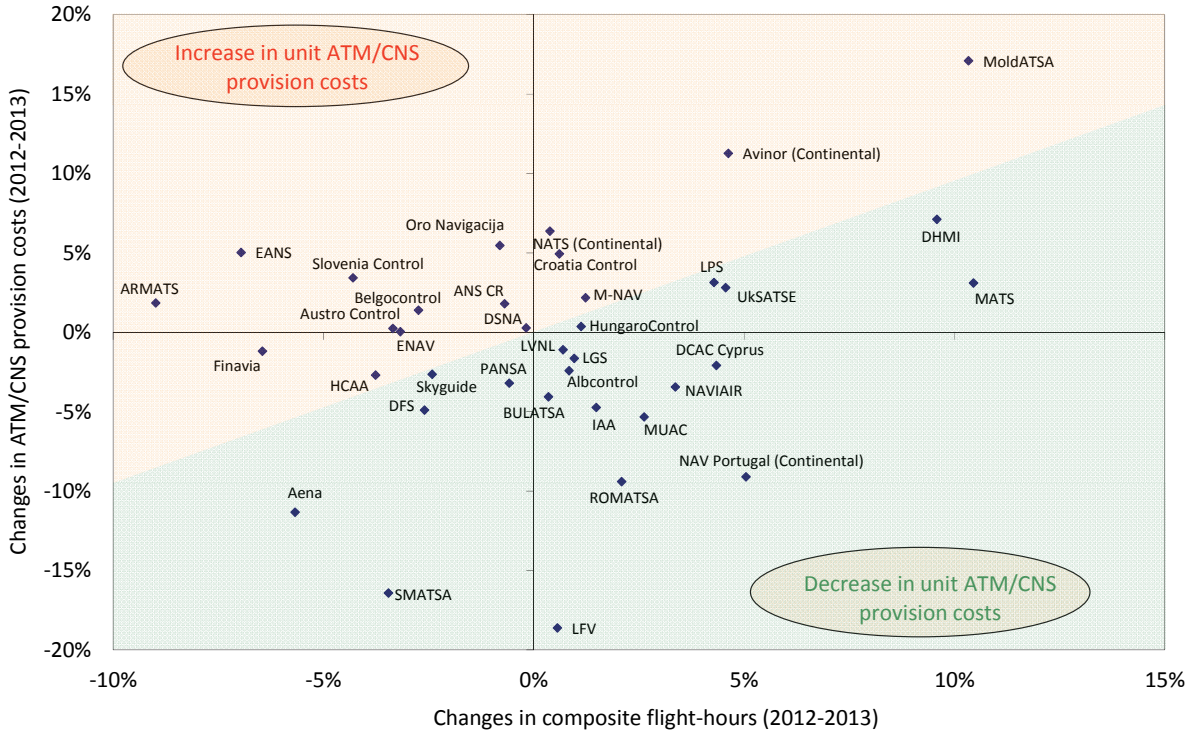


Figure 2.9: Changes in ATM/CNS provision costs and traffic volumes, 2012-2013 (real terms)

Figure 2.9 also shows that 11 ANSPs (Albcontrol, BULATSA, DCAC Cyprus, IAA, LFV, LGS, LVNL, MUAC, NAV Portugal, NAVIAIR and ROMATSA) could reduce ATM/CNS provision costs in a context of traffic increase in 2013. Among those ANSPs achieving the largest decreases in 2013, it is noteworthy that in 2012 LFV and ROMATSA had experienced exceptional increases in ATM/CNS provision costs mainly associated with the reporting of exceptional costs relating to pensions and employee benefits.

Among the five largest ANSPs, Aena (-11.3%) and DFS (-4.9%) could achieve a reduction in ATM/CNS provision costs in 2013 in a context of traffic decrease (-5.7% and -2.6%, respectively).

For Aena, it is understood that the observed decrease in ATM/CNS provision costs[21] in 2013 is mainly due to a) a reduction of 249 non-ATCO staff following the implementation of a social plan for voluntary lay-offs, and b) the fact that Aena ACE 2012 data submission included exceptional costs associated with this social plan (€32.1M).

For DFS, the largest cost reduction is observed for the staff costs category (-3.3% or -€24.4M). Non-staff operating costs and the cost of capital also substantially decreased compared to 2012 levels (-€15.7M and -€10.3M, respectively). It is noteworthy, however, that DFS 2012 staff costs were affected by a large increase in pension costs consecutive to a change in the discount rate used to compute the value of future pension obligations.

[21] It should be noted that Aena 2013 ATM/CNS provision costs comprise costs relating to ATM/CNS infrastructure shared with the military authority (€14.8M).

In 2013, unit ATM/CNS provision costs increased for NATS (+5.9%) and ENAV (+3.3%), and remained fairly constant for DSNA (+0.4%). For NATS, the increase in unit ATM/CNS provision costs mainly results from higher ATM/CNS provision costs (+6.4%), and in particular higher exceptional costs (+€44.2M) while traffic remained fairly constant (+0.4%). The higher exceptional costs observed for NATS in 2013 mainly reflect the reporting of a provision associated with a voluntary redundancy programme, applying to all employee groups across NATS regulated business, which will lead to the departure of some 240 employees.

For DSNA, the rise in staff costs (+1.9% or +€15.2M) was compensated by lower non-staff operating costs (-2.8% or -€6.3M), depreciation costs (-4.2% or -€4.7M) and cost of capital (-2.8% or -€1.0M) while traffic remained fairly constant (-0.2%).

For ENAV, the increase in unit ATM/CNS provision costs is mainly due to a significant decrease in traffic (-3.2%) while ATM/CNS costs remained fairly constant compared to 2012.

Figure 2.9 also shows that between 2012 and 2013 ATM/CNS provision costs increased by more than +5.0% for six ANSPs, including NATS (+6.4%):

- The increase in Avinor ATM/CNS provision costs (+11.3%) mainly reflects higher staff costs compared to 2012 (+12.6%), as the total number of staff rose by +7.9% and as pension costs increased with the implementation of IAS 19.
- For DHMI, ATM/CNS provision costs rose by +7.1% in 2013 while traffic increased by +9.6%. The increase in ATM/CNS provision costs is mainly due to an increase in all cost categories: staff costs (+4.8%), non-staff operating costs (+9.0%), depreciation costs (+8.3%) and cost of capital (+11.0%).
- The increase in EANS ATM/CNS provision costs (+5.0%) is associated with higher staff costs (+3.9%) and higher cost of capital (+51.4%) compared to 2012.
- For MoldATSA, the +17.1% increase in ATM/CNS provision costs is mainly due to higher staff costs (+11.4%), depreciation costs (+27.3%) and to a +51.7% rise in the cost of capital as the NBV of fixed asset increased following the commissioning of new ATM and voice communication systems in 2013.
- For Oro Navigacija, the +5.5% increase in ATM/CNS provision costs mainly reflects higher depreciation costs (+14.7%) following a major upgrade of the main ATM systems, increases in non-staff operating costs (+9.7%, mainly reflecting an increase in maintenance costs and expenses associated to bad debts), and higher staff costs (+3.0%).

More details on the changes in unit ATM/CNS provision costs for individual ANSPs are provided in Part II of this Report.

Another complementary analysis to assess the degree of ANSPs reactivity to adjust costs downwards in response to lower than expected traffic is to compare the actual 2013 ATM/CNS provision costs with the plans reported as part of the ACE 2012 data cycle [22,23].

[22] In ACE 2012, Avinor did not report the forecast number of IFR airport movements for the years 2013-2017. Avinor is therefore not included in this analysis.

[23] Note that the planned en-route costs provided by NATS in its ACE 2012 submission reflect the figures reported in the UK Performance Plan for RP1, which are based on regulatory accounting rules. This is different from the methodology used by NATS to report historic and actual ATM/CNS provision costs which are based on IFRS accounting. For this reason, NATS is not included in this analysis.

Table 2.2 indicates that in 2013, the actual number of composite flight-hours is -1.7% lower than planned in ACE 2012. Table 2.2 also shows that actual 2013 ATM/CNS provision costs are -€382M (or -5.2%) lower than planned, which is a noteworthy achievement for the ANS industry which is characterised by a relatively high rigidity of costs. As a result, actual unit ATM/CNS provision costs for the year 2013 were -3.6% lower than planned in ACE 2012.

European system level	2013
Planned composite flight-hours in ACE 2012 (M)	16.1
Actual composite flight-hours (M)	15.9
Difference between actual and planned composite flight-hours (%)	-1.7%
Planned ATM/CNS provision costs in ACE 2012 (M€2013)	7 301
Actual ATM/CNS provision costs (M€2013)	6 919
Difference between actual and planned costs (M€2013)	-382
Difference between actual and planned costs (%)	-5.2%

Table 2.2: Comparison of ATM/CNS provision costs and composite flight-hours at system level (figures provided in ACE 2012 versus actual data) (€2013)

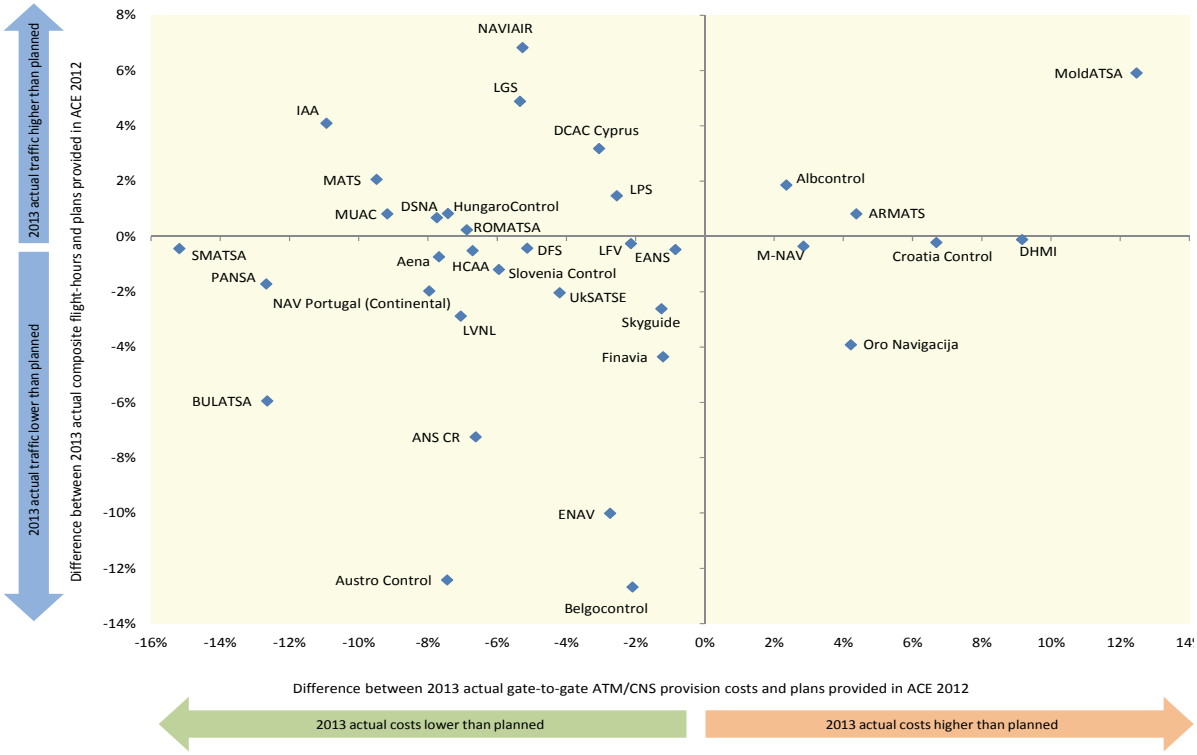


Figure 2.10: Comparison of 2013 actual ATM/CNS provision costs and traffic with ACE 2012 plans (real terms)

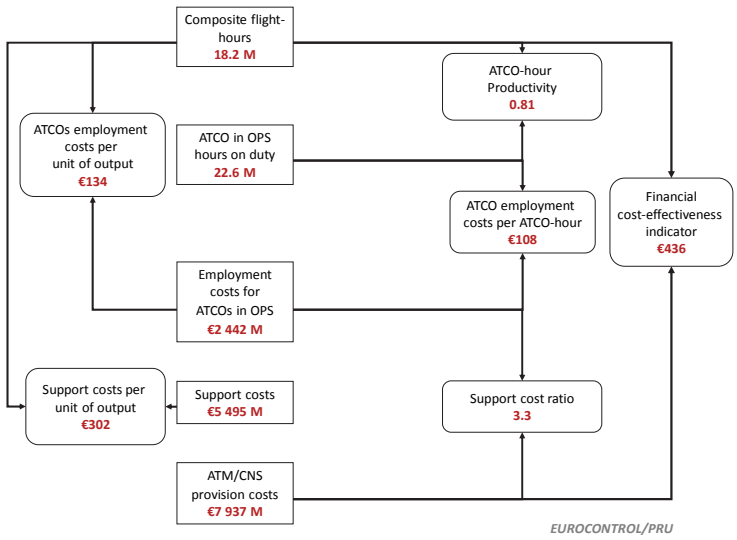
Figure 2.10 above shows that for 22 ANSPs, actual 2013 traffic was lower than planned in ACE 2012 data submissions. In particular, for three ANSPs (Austro Control, Belgocontrol and ENAV), actual 2013 traffic was at least -10% below ACE 2012 plans. It should be noted that in their ACE 2012 submission these ANSPs planned for a rather optimistic traffic growth (+11% for Belgocontrol, +10% for Austro Control and +8% for ENAV) which did not materialise in 2012 and 2013.

Among the five largest ANSPs, 2013 actual costs were lower than planned for Aena (-7.7%), DSNA (-7.7%), DFS (-5.1%) and ENAV (-2.7%). Given their weight in the European system, these ANSPs significantly contributed to reduce actual 2013 ATM/CNS provision costs by -5.2% compared to ACE 2012 plans.

For four ANSPs, 2013 actual costs were more than -10% lower than planned in ACE 2012 (i.e. BULATSA (-12.6%), IAA (-10.9%), PANSA (-12.7%) and SMATSA (-15.2%).

The right-hand side of Figure 2.10 shows that for seven ANSPs, actual 2013 costs were higher than planned in ACE 2012. For three of them, MoldATSA (+12.5%), DHMI (+9.2%) and Croatia Control (+6.7%) actual ATM/CNS provision costs were more than +5% higher than planned.

Figure 2.11 shows the analytical framework which is used in the ACE analysis to break down the financial cost-effectiveness indicator into basic economic drivers.



Key drivers for the financial cost-effectiveness performance include:

a) ATCO-hour productivity (0.81 composite flight-hours per ATCO-hour);
b) ATCO employment costs per ATCO-hour (€108); and,
c) support costs per unit output (€302).

Figure 2.11: ACE performance framework, 2013

Around 30% of ATM/CNS provision costs directly relates to ATCOs in OPS employment costs while 70% relate to "support" functions including non ATCOs in OPS employment costs, non-staff operating costs and capital related costs such as depreciation costs and the cost of capital.

At system level, unit ATM/CNS provision costs fell by -1.9% in real terms between 2012 and 2013. Figure 2.12 shows that in 2013, employment costs per ATCO-hour (+1.4%) rose slightly faster than ATCO-hour productivity (+0.9%). In the meantime, support costs reduced by -3.0% while the number of composite flight-hours remained at 2012 levels.

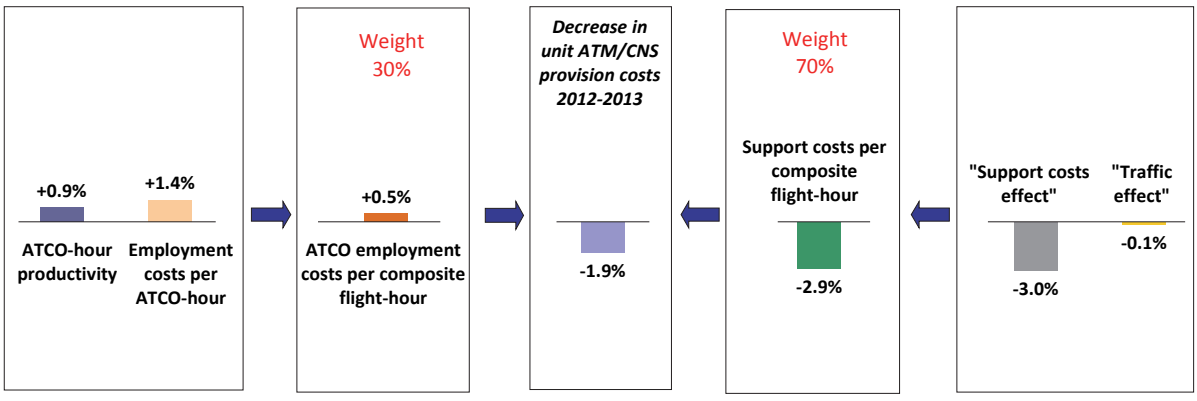


Figure 2.12: Changes in the financial cost-effectiveness indicator, 2012-2013 (real terms)

A detailed analysis of the changes in the key drivers of cost-effectiveness between 2009 and 2013 is provided hereafter (see sections 2.6, 2.7 and 2.8 below).

2.6 ATCO-hour productivity

At Pan-European level, an average of 0.81 composite flight-hours was controlled per ATCO-hour in 2013. ATCO-hour productivity rose by +10.8% between 2009 and 2013 since the increase in traffic (+4.0%) was absorbed with substantially fewer ATCO-hours on duty (-6.2%).

Figure 2.13 indicates that starting from a relatively low base in 2009 (reflecting the fall in traffic which resulted from the economic recession), ATCO-hour productivity substantially increased for two consecutive years (+6.7% in 2010 and +2.9% in 2011), remained fairly constant in 2012 (+0.1%) and slightly rose in 2013 (+0.9%).

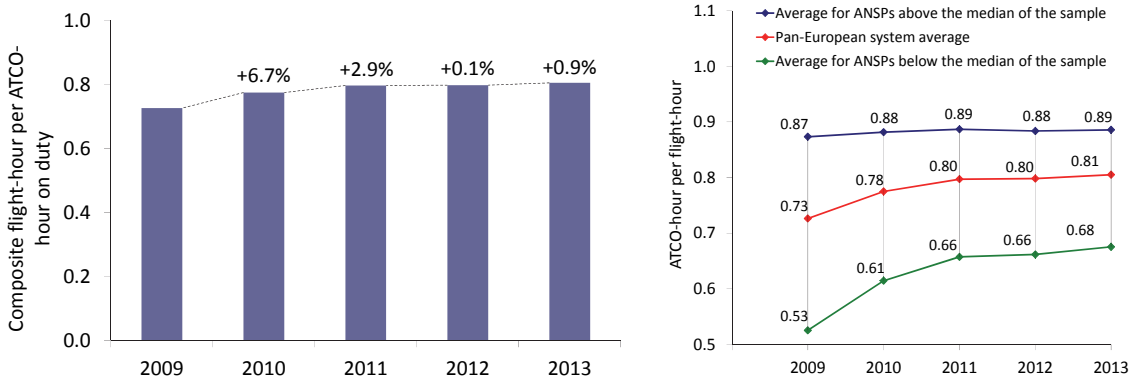


Figure 2.13: Changes in ATCO-hour productivity, 2009-2013

The increase in ATCO-hour productivity observed at Pan-European system level over the 2009-2013 period mainly reflects improvements in ANSPs with relatively lower ATCO-hour productivity levels (see green line in the right-hand chart of Figure 2.13), while the ATCO-hour productivity of ANSPs with higher productivity levels remained relatively constant.

Strong productivity increases were mainly achieved by Central and Eastern Europe ANSPs benefiting from higher traffic growth. However, significant improvements in productivity were also achieved by some ANSPs which started from a relatively higher base in 2009 (e.g. IAA).

At Pan-European system level, the increase in productivity achieved between 2009 and 2013 (+10.8%) is due to the fact that the overall traffic increase (+4.0%) was absorbed with substantially fewer ATCO-hours on duty (-6.2%).

Figure 2.14 shows that after a sharp reduction due to lower overtime hours between 2009 and 2010, average ATCO-hours on duty continued to fall by -1.8% p.a. between 2010 and 2013.

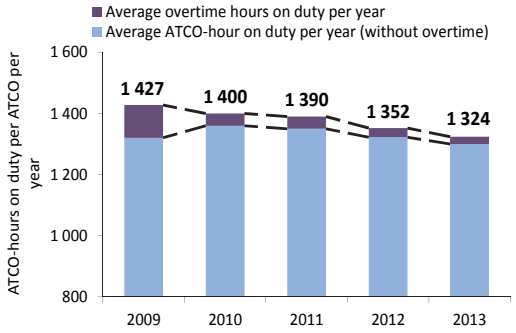


Figure 2.14: Changes in average ATCO-hours on duty, 2009-2013

These results are heavily influenced by the structural changes implemented in 2010-2011 by Aena following the introduction of Law 9/2010 which was adopted in Spain in 2010. This law introduced new working conditions for Spanish ATCOs, rising contractual working hours and significantly reducing the number of overtime hours, which was one of the main driver for high ATCO employment costs and relatively lower productivity for Aena in the past. Indeed, between 2009 and 2013, Aena ATCO-hour productivity substantially increased from 0.52 to 0.79 (+51.1%).

ANSPs	Country	(A) Changes in ATCO-hour productivity 2012-2013	(B) "Traffic effect"	(C) "ATCO-hour effect"
MATS	MT	29.5%	10.5%	-14.7%
LPS	SK	9.6%	4.3%	-4.9%
MoldATSA	MD	8.6%	10.3%	1.6%
DHMI	TR	8.1%	9.6%	1.4%
UkSATSE	UA	6.8%	4.6%	-2.1%
Croatia Control	HR	5.7%	0.6%	-4.8%
Albcontrol	AL	4.8%	0.8%	-3.8%
NAV Portugal (Continental)	PT	4.4%	5.0%	0.7%
Avinor (Continental)	NO	3.9%	4.6%	0.7%
NAVIAIR	DK	3.9%	3.4%	-0.5%
DCAC Cyprus	CY	3.6%	4.3%	0.8%
MUAC		2.5%	2.6%	0.1%
NATS (Continental)	UK	1.9%	0.4%	-1.5%
IAA	IE	1.5%	1.5%	0.0%
DFS	DE	1.4%	-2.6%	-3.9%
HungaroControl	HU	1.3%	1.1%	-0.2%
M-NAV	MK	1.2%	1.2%	0.0%
LGS	LV	1.2%	1.0%	-0.3%
ENAV	IT	0.6%	-3.2%	-3.8%
Aena	ES	0.5%	-5.7%	-6.2%
ROMATSA	RO	0.3%	2.1%	1.8%
LFV	SE	-0.4%	0.6%	0.9%
DSNA	FR	-1.0%	-0.2%	0.8%
Belgocontrol	BE	-1.1%	-2.7%	-1.7%
LVNL	NL	-1.5%	0.7%	2.2%
Oro Navigacija	LT	-1.9%	-0.8%	1.2%
ANS CR	CZ	-2.1%	-0.7%	1.4%
BULATSA	BG	-2.5%	0.4%	2.9%
Skyguide	CH	-2.9%	-2.4%	0.5%
PANSA	PL	-3.2%	-0.6%	2.8%
HCAA	GR	-3.8%	-3.8%	0.0%
SMATSA	SB	-4.7%	-3.5%	1.4%
Austro Control	AT	-6.3%	-3.3%	3.2%
Finavia	FI	-6.8%	-6.5%	0.4%
Slovenia Control	SI	-9.2%	-4.3%	5.4%
EANS	EE	-10.9%	-7.0%	4.5%
ARMATS	AM	-18.9%	-9.0%	12.2%
Total Pan-European System		0.9%	-0.1%	-1.0%

Positive values in column (A) mean that productivity improved between 2012 and 2013.

Positive values in column (B) mean that traffic volumes rose between 2012 and 2013.

Positive values in column (C) mean that the number of ATCO-hours rose between 2012 and 2013. All other things being equal, a positive value contributes to lower productivity (hence the red dot).

Productivity improves if traffic grows faster than the ATCO-hours on duty.

For example: LPS's 2013 productivity is +9.6% higher than in 2012 due a combination of a +4.3% increase in traffic and a -4.9% decrease in the number of ATCO-hours.

Note: By mathematical construction, the % variation in productivity (A) can be approximated as the difference between the "traffic effect" (B) and the "ATCO-hour effect" (C). The larger the % variations, the less accurate the approximation. This explains why in some cases (A) is not exactly equal to (B) - (C).

Figure 2.15: Annual changes in ATCO-hour productivity, composite flight-hours and ATCO-hours on duty, 2012-2013

In 2013, the ATCO-hour productivity of the Pan-European system as a whole amounted to 0.81 composite flight-hours per ATCO-hour. It is important to note that the metric of ATCO-hour productivity used in this report reflects the average productivity during a year for a given ANSP and does not give an indication of the productivity at peak times which can be substantially higher. The ATCO-hour productivity for each ANSP is shown in Figure 2.16 below.

There is a wide range of ATCO-hour productivity among ANSPs. The ANSP with the highest ATCO-hour productivity is MUAC (1.99), which only provides ATC services in upper airspace, while the ANSP with the lowest ATCO-hour productivity is ARMATS (0.16), i.e. one of the smallest ANSPs in terms of traffic volumes.

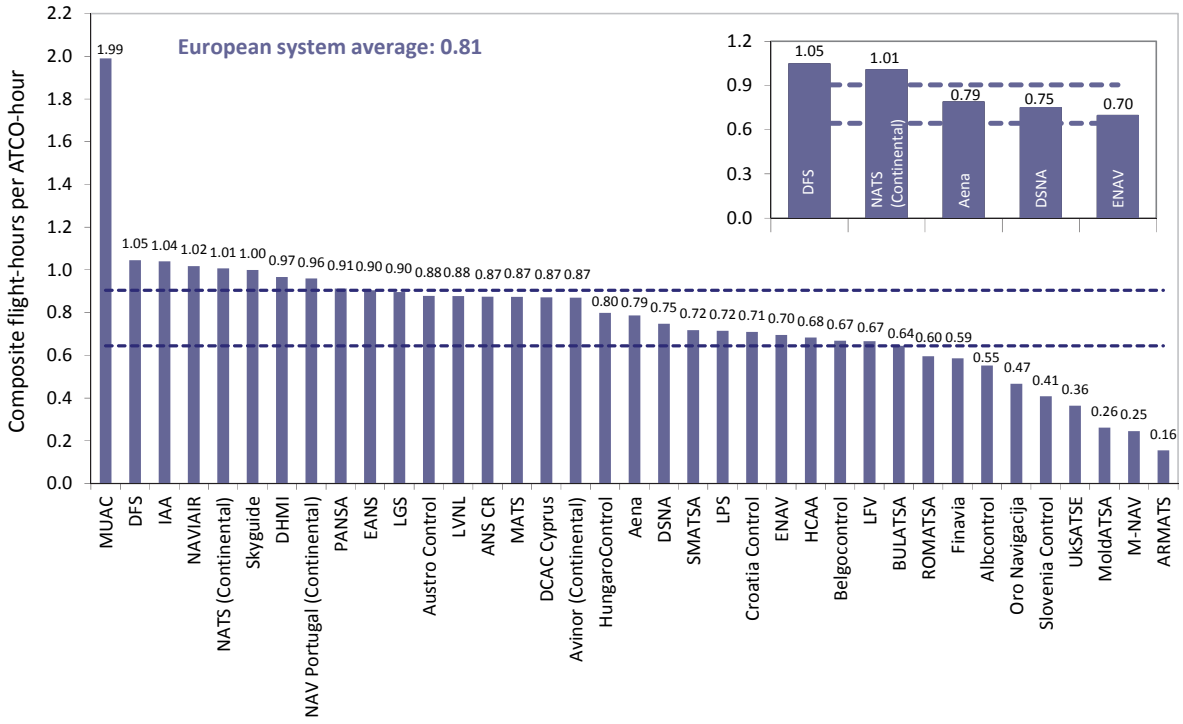


Figure 2.16: ATCO-hour productivity (gate-to-gate), 2013

Figure 2.16 also indicates that there are substantial differences in ATCO-hour productivity even among the five largest ANSPs. Indeed, DFS ATCO-hour productivity (1.05) is some +50% higher than that of ENAV (0.70).

It is important to mention that significant gains in cost-effectiveness could be achieved if the European average productivity (0.81) was raised to the level of the top quartile in Figure 2.16 (0.90). Most of the ANSPs that achieve or are close to top quartile ATCO-hour productivity (Austro Control, DFS, LVNL, MUAC, NATS and Skyguide) are among the ANSPs with the most complex traffic. On the other hand, ARMATS, M-NAV, MoldATSA and UkSATSE, which belong to the ANSPs with the least complex traffic (see Figure 2.2) show an ATCO-hour productivity which is lower than the bottom quartile. Low productivity in some of these ANSPs may be a consequence of their small size, and the difficulty in adapting their available ATC capacity and existing infrastructure to low traffic volumes and high seasonal variability.

It is noteworthy, however, that some of the ANSPs showing the lowest productivity levels do not seem to fully exploit favourable traffic increases to raise ATCO-hour productivity. This is for example the case for Albcontrol (-3.7% decrease in ATCO productivity despite a +16.8% increase in traffic over the 2009-2013 period).

Improvements in ATCO-hour productivity can result from more effective OPS room management and by making a better use of existing resources, for example through the adaptation of rosters (preferably individually based to enhance flexibility) and shift times, effective management of overtime, and through the adaptation of sector opening times to traffic demand patterns. Similarly, advanced ATM system functionalities and procedures are drivers for productivity improvements. It is also expected that SES tools such as FABs, the Network Manager, the performance scheme and the technological pillar (SESAR) contribute to increase ATCO productivity by a significant factor while ensuring safety standards.

Latest forecasts indicate that traffic volumes are not expected to be above 2008 levels before 2017. For this reason, there should be an opportunity to maintain the overall amount of ATCO-hours at Pan-European system level and, all else equal, increase ATCO-hour productivity without

significantly affecting the quality of service provided and without implementing massive investment programmes.

More details on the changes in ATCO-hour productivity for individual ANSPs are provided in Part II of this Report.

ATCO-hour productivity measured at ANSP level reflects an average performance, which can hide large differences among ACCs even for those operating in the same country/ANSP. It is therefore important to also analyse and compare productivity at ACC level.

In Figure 2.17, the 63 ACCs part of the ACE 2013 data analysis are grouped in clusters based on three operational characteristics: (1) their complexity scores, (2) the average used flight levels, and (3) their number of sectors. More information on the definition of these clusters can be found in previous ACE reports[24].

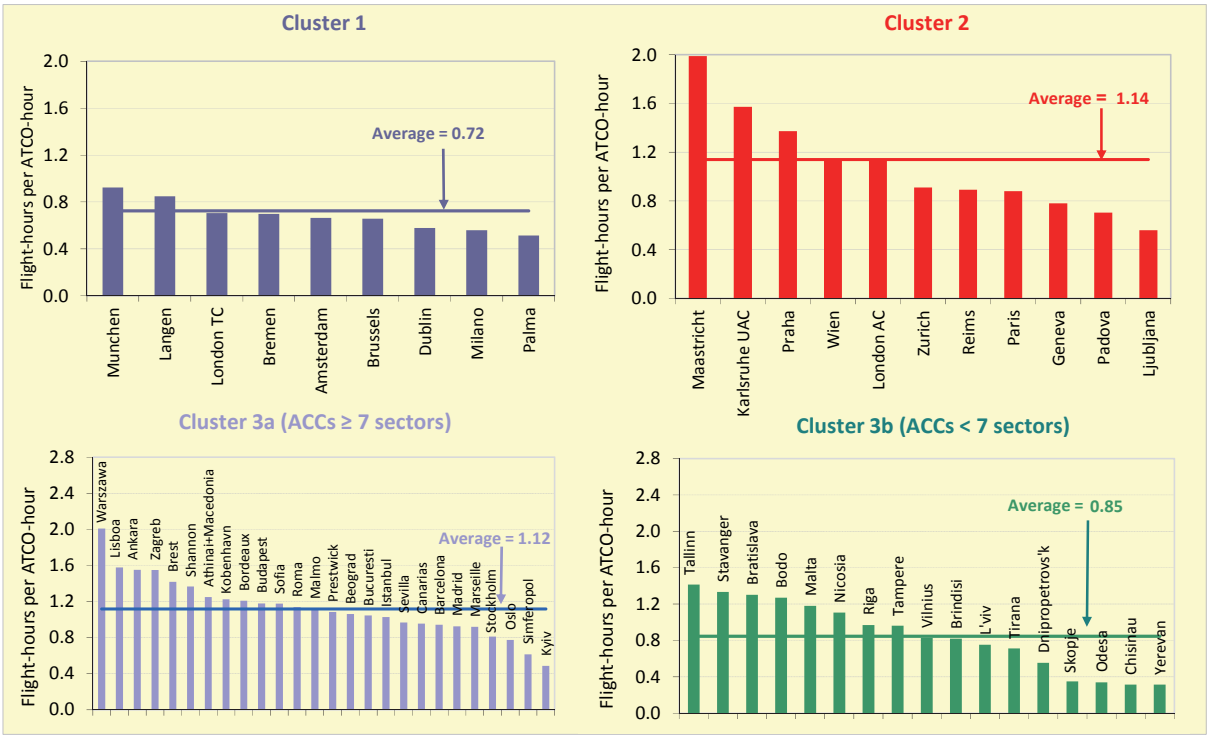


Figure 2.17: Summary of productivity results at ACC level, 2013

So far, no clear-cut statistical relationship between ATCO productivity, traffic complexity and traffic variability could be inferred because the relationships and potential trade-offs between all these metrics are not straightforward. Nevertheless, it is useful to compare the ATCO productivity of ACCs that share similar "operational" characteristics. Each cluster is briefly described below:

- **Cluster 1 (ACCs serving predominantly lower airspace with relatively high structural complexity)** has the lowest average productivity of any of the clusters (0.72 flight-hour per ATCO-hour). Palma, with the lowest productivity, has one of the highest seasonal traffic variability in Cluster 1. It should be noted that München ACC which, following a

[24] See for example the ACE 2008 Benchmarking Report on p.104. Report available on the PRC website: (http://www.eurocontrol.int/articles/prc-and-prb-publications).

reorganisation of the German airspace in 2013, exclusively provides ANS in lower airspace has been moved from Cluster 2 to Cluster 1.

- **Cluster 2 (ACCs serving dense upper airspace)** has an average productivity of 1.14 flight-hour per ATCO-hour. Within this cluster, Maastricht has significantly higher productivity (1.99 flight-hours per ATCO-hour, some +74% above the average in Cluster 2).
- **Cluster 3a (ACCs with 7 sectors or more and serving airspace with relatively low complexity)** has an average productivity of 1.12 flight-hour per ATCO-hour. Within this cluster, Warszawa has significantly higher productivity (2.01 flight-hours per ATCO-hour). It should also be noted that within this cluster Brest, Bordeaux and Marseille have the highest overall complexity, while Canarias and Shannon have the lowest.
- **Cluster 3b (ACCs with less than 7 sectors serving airspace with relatively low complexity)** has an average productivity of 0.85 flight-hour per ATCO-hour. While Yerevan shows the lowest productivity, it also has the lowest overall traffic complexity.

The analysis of ATCO-hour productivity at ACC level would seem to indicate that, whilst complexity measures are helpful in providing a way of clustering ACCs into broadly consistent groups, within these clusters there are still large differences in productivity performance across individual ACCs.

Other factors as yet unidentified (and not measured) such as the impact of different operational concepts and processes, the operational flexibility, could also affect ATCO productivity performance. There may also be cultural and managerial differences. These elements would deserve further analysis in order to provide some "explanation" of the differences in ATCO-productivity and identify best practice.

2.7 ATCO employment costs

In 2013, the average unit ATCO employment costs amounted to €108 per ATCO-hour (+1.4% compared to 2012). Between 2009 and 2013, unit ATCO employment costs remained fairly constant (-0.2%) as significant employment costs increases observed for ANSPs operating in Central and Eastern European countries were compensated by the impact of the structural reforms undertaken by Aena.

At Pan-European system level, ATCO employment costs per ATCO-hour remained almost constant between 2009 and 2013 (-0.2%).

Figure 2.18 shows that this is driven by:

- a significant decrease for the year 2010 (-5.1%); and,
- increases in 2011 (+2.6%), 2012 (+1.1%) and 2013 (+1.4%).

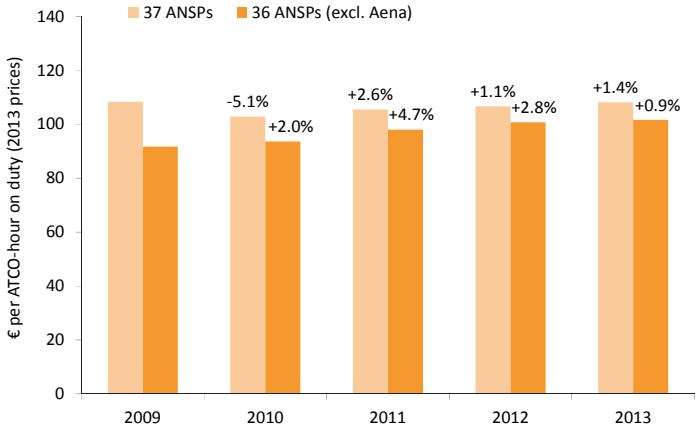


Figure 2.18: Changes in ATCO employment costs per ATCO-hour, 2009-2013 (real terms)

Figure 2.18 shows that this overall change is significantly affected by the decrease in Aena ATCO employment costs over the years 2009 and 2010. Indeed, excluding Aena, ATCO employment costs per ATCO-hour have increased in real terms by +10.8% between 2009 and 2013, including a moderate growth in 2013 (+0.9%).

In 2013, ATCO employment costs per ATCO-hour rose for 22 out of the 37 ANSPs. Increases larger than +10% were observed for six ANSPs: MoldATSA (+36.8%), MATS (+43.4%), Albcontrol (+19.2%), DHMI (+20.8%), LPS (+16.8%) and ROMATSA (+12.5%).

Among the five largest ANSPs, ATCO employment costs per ATCO-hour rose in 2013 for Aena (+6.6%), DFS (+3.0%) and ENAV (+1.6%). For DSNA and NATS, there were only small variations (i.e. -0.6% and +0.2%, respectively). As a result, the gap observed between DFS (€181) and DSNA (€98) slightly increased in 2013, reaching a factor of 1.85 (compared to 1.78 in 2012).

For Aena, this increase marks the end of a three-year declining trend and mainly reflects a -6.2% decrease in the number of ATCO-hours on duty, while the total employment costs for ATCOs in OPS remained at their 2012 level. For DFS, the observed increase in ATCO employment costs per ATCO-hour also reflects a decrease in the number of hours on duty (-3.9%) while ATCO employment costs reduced by -1.0%.

In 2013, the largest decreases in employment costs per ATCO-hour are observed for SMATSA (-15.4% from €55 to €47) and NAV Portugal (-15.3% from €152 in 2012 to €129 in 2013). For NAV Portugal, this is mainly due to the fact that exceptionally high pension related costs were reported in 2011 and 2012. These pension costs were reflecting a change in the actuarial assumptions used to compute defined benefits future obligations.

The unit ATCO employment costs at Pan-European system level amounted to €108 per ATCO-hour in 2013. Figure 2.19 shows the values for this indicator for all the ANSPs. There is a wide range of ATCO-hour employment costs across ANSPs, which is not surprising given the heterogeneity in the social and economic environments across Europe.

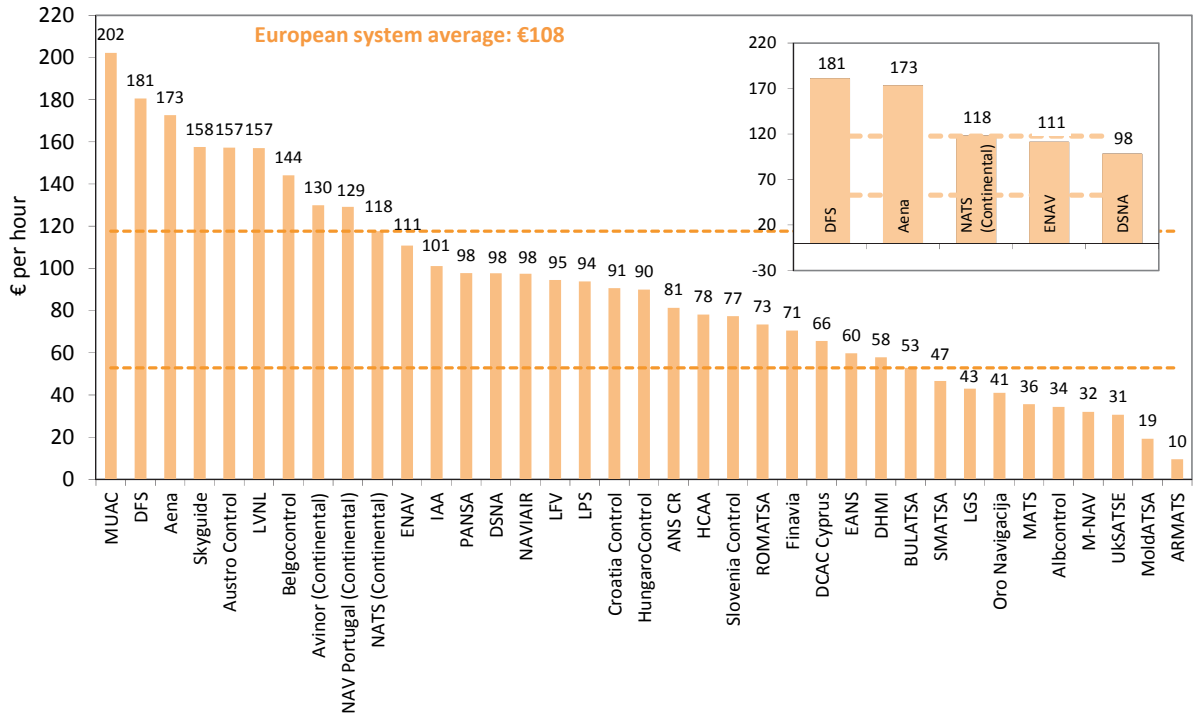


Figure 2.19: ATCO employment costs per ATCO-hour (gate-to-gate), 2013

In 2013, MUAC ATCO employment costs per ATCO-hour (€202) are the highest in Europe, above DFS (€181) and Aena (€173).

A major exogenous factor that underlies differences in unit employment costs is the difference in prevailing market wage rates in the national economies in general. This is also associated with differences in the cost of living. To assess the influence of these exogenous differences, employment costs per ATCO-hour have been examined in the context of Purchasing Power Parity (PPP). There are some limitations[25] inherent to the use of PPPs and for this reason the ACE data analysis does not put a significant weight on results obtained with PPPs adjustments. PPPs are nevertheless a useful analytical tool in the context of international benchmarking.

Figure 2.20 below shows the ATCO employment costs per ATCO-hour both **before** and **after** adjustment for PPP. The adjustment reduces the dispersion of this indicator. After PPP adjustment, the average unit employment costs per ATCO-hour amounts to €115 (compared to €108 without adjustment). For many Central and Eastern European ANSPs (ANS CR, BULATSA, Croatia Control, DHMI, HungaroControl, LPS, PANSA, ROMATSA, Slovenia Control and SMATSA) the PPP adjustment brings the unit employment costs close to those in Western Europe.

[25] For instance, it is possible that, for a given country, the cost of living in regions where the ANSP headquarter and other main buildings (e.g. ACCs) are located is higher than the average value computed at national level.

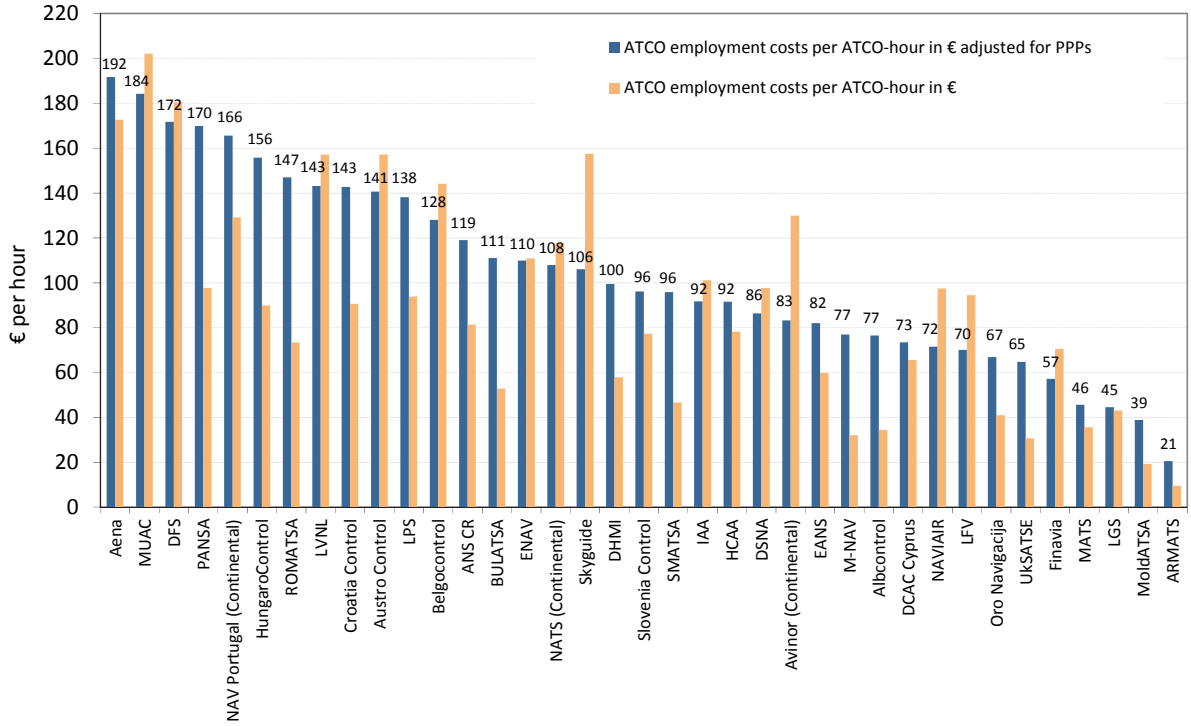


Figure 2.20: Employment costs per ATCO-hour with and without PPPs, 2013

Figure 2.21 shows the changes in ATCO employment costs per ATCO-hour for ANSPs operating in Central, Eastern and Western European countries[26].

Significant increases in ATCO employment costs per ATCO-hour are observed for ANSPs operating in Central and Eastern European countries and which started from a relatively low base in 2009.

This illustrates the gradual convergence of employment costs in Central and Eastern European economies following the strengthening of the economic integration and enhanced labour mobility.

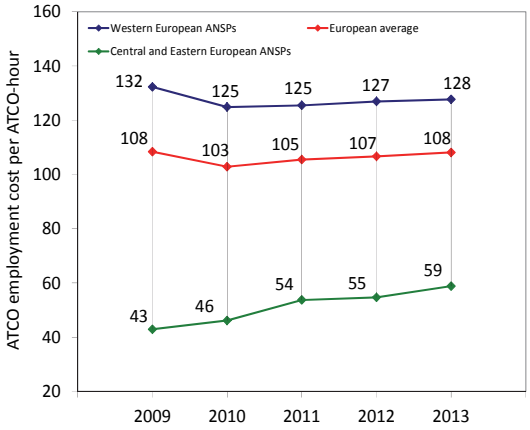


Figure 2.21: Convergence in ATCO employment costs for ANSPs operating in Eastern and Western European countries, 2009-2013 (real terms)

Employment costs are typically subject to complex bargaining agreements between ANSPs management and staff which usually are embedded into a collective agreement. The duration of the collective agreement, the terms and methods for renegotiation greatly vary across ANSPs. In some cases salary conditions are negotiated every year. High ATCO employment costs may be

[26] In Figure 2.21, the Central and Eastern European countries are those that joined the European Union from 2004 onwards plus Albania, Armenia, Croatia, F.Y.R Macedonia, Moldova, Turkey and Ukraine.

compensated for by high productivity (e.g. MUAC). Therefore, in the context of staff planning and contract renegotiation, it is important for ANSPs to manage ATCOs employment costs effectively and to set quantitative objectives for ATCO productivity.

More details on the changes in ATCO-hour employment costs for individual ANSPs are provided in Part II of this Report.

2.8 Support costs

In 2013, at Pan-European level, unit support costs reduced (-2.9%) in a context of no traffic growth. This mainly reflects the fact that 18 ANSPs could achieve a reduction in support costs. Particularly large decreases were observed for Aena and DFS (-18.6% and -6.6% respectively).

As indicated in Figure 2.22, support costs per composite flight-hours fell by -7.7% between 2009 and 2013 at Pan-European system level (or -2.0% p.a.).

This results from a combination of an increase in the number of composite flight-hours (+1.0% p.a.) and a decrease in support costs (-1.0% p.a.). The latter mainly reflects the impact of the cost containment measures implemented by the Pan-European ANSPs since 2009.

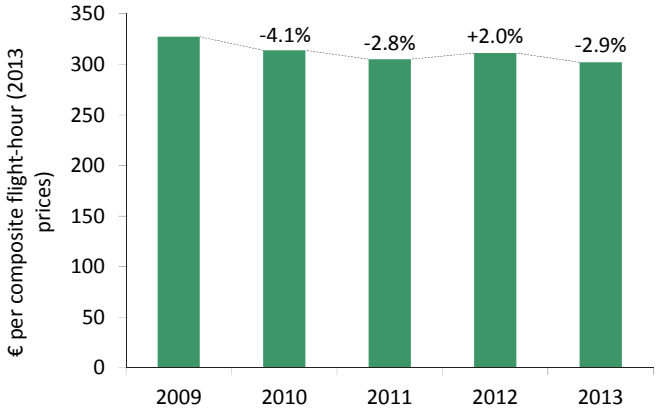


Figure 2.22: Changes in support costs per composite flight-hour, 2009-2013 (real terms)

In 2013, support costs reduced by -3.0% in a context of no traffic growth. As a result, unit support costs fell by -2.9%. This mainly reflects the fact that 18 ANSPs could achieve a reduction in support costs. Particularly large decreases were observed for Aena and DFS (-18.6% and -6.6% respectively) which due to their weight substantially affect the changes observed at Pan-European system level. The main drivers of the reduction in support costs are further discussed below (see Figure 2.23).

Contrary to ATCO employment costs, support costs encompass a variety of cost items which require specific analysis. There is a general acknowledgement that the Pan-European system has excessive support costs due to its high level of operational, organisational, technical and regulatory fragmentation.

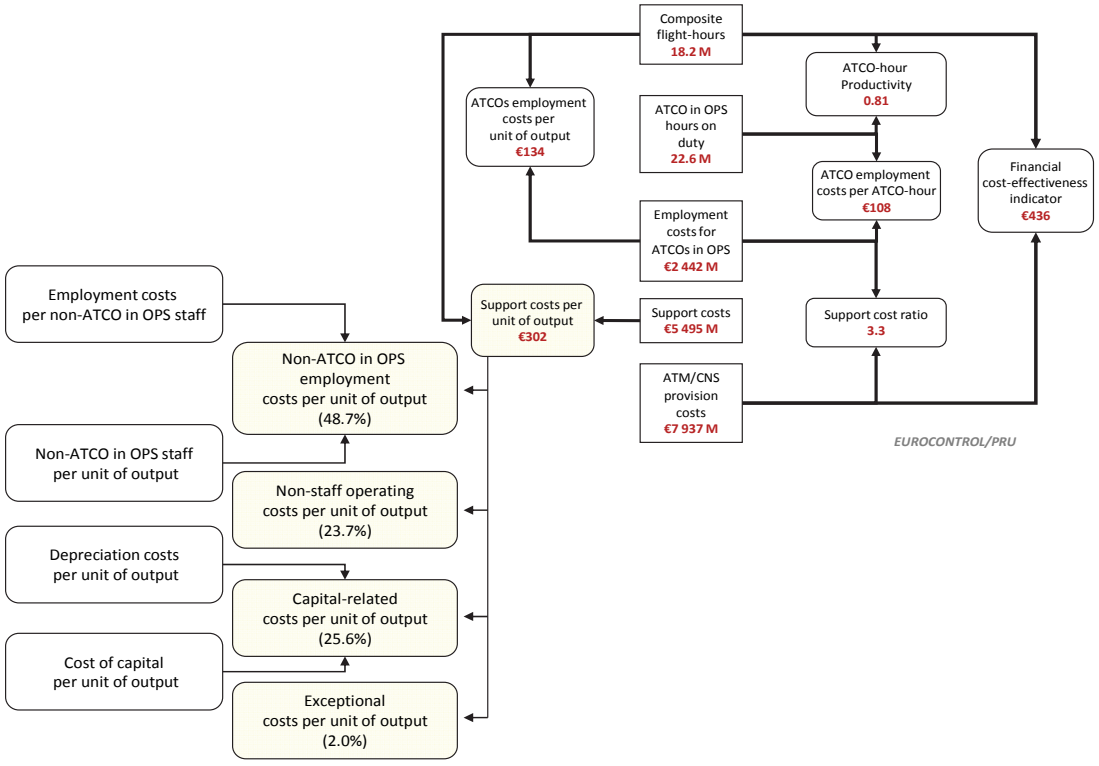


Figure 2.23: Framework for support costs analysis, 2013

As shown in Figure 2.23, support costs can be broken down into four separate components that provide further insight into the nature of support costs:

a) **Employment costs for non-ATCO in OPS staff** (48.7% of total support costs); these cover ATCOs on other duties, trainees, technical support and administrative staff. These costs can be affected by the following factors:
- Outsourcing of non-core activities (such as maintenance of technical equipment, and professional training) could transfer costs from this category to non-staff costs.
- Research & development policies may involve ATM systems either being developed in-house, or purchased off-the-shelf. In principle, either solution could lead to the most cost-effective outcome, depending on circumstances; this would depend on whether there were, for example, significant economies of scale, or major transaction costs.
- Arrangements relating to the collective agreement and the pension scheme for non-ATCOs in OPS.

b) **Non-staff operating costs** (23.7% of total support costs) mostly comprise expenses for energy, communications, contracted services, rentals, insurance, and taxes. These costs can be affected by the following factors:
- The terms and conditions of contracts for outsourced activities.
- Enhancement of the cooperation with other ANSPs to achieve synergies in the context of a FAB (sharing training of ATCOs, joint maintenance, and other matters).

c) **Capital-related costs** (25.6% of total support costs), comprising depreciation and financing costs for the capital employed. These costs can be affected by the following factors:
- The magnitude of the investment programme.
- The accounting life of the assets.
- The degree to which assets are owned or rented.

d) **Exceptional costs** which represent some 2.0% of total support costs.

Figure 2.24 shows the changes in the different components of support costs (see the "support costs effect" bar on the right-hand side of Figure 2.12) between 2012 and 2013.

All support costs categories reduced in 2013: employment costs for support staff (-2.5% or -€68.8M), non-staff operating costs (-3.3% or -€44.8M), depreciation costs (-1.4% or -€12.6M), the cost of capital (-6.2% or -€33.2M) and exceptional costs (-10.4% or -€12.7M).

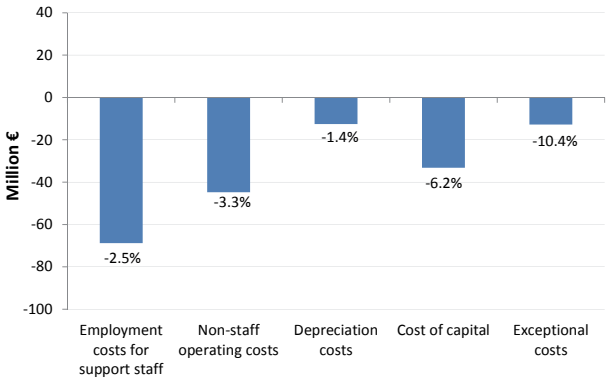


Figure 2.24: Changes in the components of support costs, 2012-2013 (real terms)

Overall, 23 out of 37 ANSPs managed to reduce support staff costs in 2013 but Aena (-€66.5M) and DFS (-€21.2M) are clearly the main contributors to the decrease observed at Pan-European system level (-€68.8M).

For Aena, the observed decrease in support staff costs is mainly due to a reduction in the number of non-ATCO staff in 2013 (-249 employees) following the implementation of a social plan for voluntary lay-offs. Exceptional staff costs associated to this social plan were reported in Aena 2012 data submission (€32.1M).

For DFS, the observed decrease in support staff costs for the year 2013 is mainly due to two factors. Firstly, there was a decrease in pension contributions for the civil servants being outside of the "imputed occupational pension model"[27], mainly reflecting the use of a higher discount rate to compute the value of future pension obligations. Secondly, there was a reduction in support staff overtime hours in 2013 following the implementation of cost containment measures by DFS.

Employment costs can be significantly affected by the type of pension arrangements, and particularly whether the pension scheme is based on "defined benefits" or "defined contributions". Some ANSPs have already taken decisive actions to deal with future pension obligations, notably changing the pension scheme for new recruits and moving away from "defined benefits" pension plans.

[27] From 2012 onwards, DFS applies a new model to compute the costs relating to pensions, the "imputed occupational pension model". The objective of this model is to ensure a more stable level of pension expenses over time. As part of this model, the interest rate is related to the prospective expected return on assets which is achievable in the long run.

Figure 2.25 breaks down ANSPs staff costs (€5 119M) into different categories. Gross wages and salaries are the main component of total staff costs (75.8%). The second largest category, employer contributions to staff pensions, accounts for 16.0%.

It should be noted that the proportion of pension contributions in total staff costs can significantly differ across the Pan-European ANSPs. These differences mainly reflect the variety of pension arrangements that are in place locally.

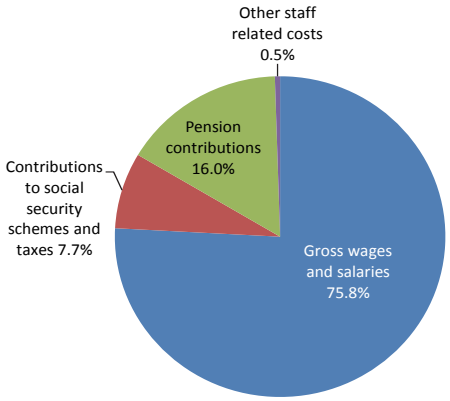


Figure 2.25: Breakdown of ANSPs staff costs, 2013

A revised version of IAS 19 (i.e. "employee benefits") was implemented in January 2013. One of the main revisions of IAS 19 relates to the departure from the "corridor approach". This implies that from 2013 onwards, for ANSPs operating under a "defined benefits" pension scheme, any actuarial gains and losses arising from a change in actuarial assumptions will have to be reported in the balance sheet. For those ANSPs, who in the past applied the "corridor approach" to reduce the impact of the changes in actuarial assumptions on ANS charges, the revision of IAS 19 affects 2013 pension costs. This issue requires the utmost attention given the long term consequences of pensions-related decisions and their magnitude in the cost bases and impact on chargeable unit rates.

More details on the changes in support costs for individual ANSPs are provided in Part II of this Report.

In 2013, the unit support costs of various ANSPs operating in Central and Eastern European countries are higher than the Pan-European system average and in the same order of magnitude as the unit support costs of ANSPs operating in Western European countries where the cost of living is much higher.

At Pan-European system level, support costs per composite flight-hour amounted to €302 in 2013. Figure 2.26 shows that the level of unit support costs varies significantly across ANSPs – a factor greater than four between Belgocontrol (€556) and MUAC (€137)[28].

[28] MUAC uses infrastructure owned by Belgocontrol, DFS and LVNL (see also p.21).

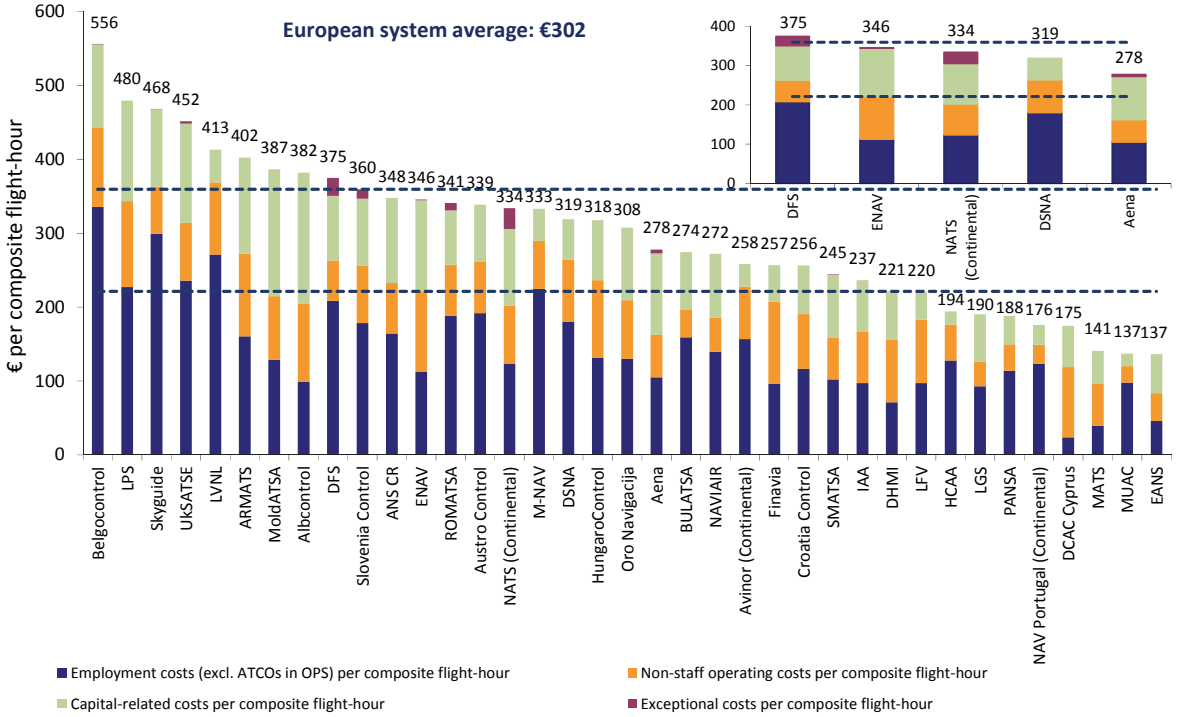


Figure 2.26: Support costs per composite flight-hour at ANSP level[29], 2013

Figure 2.26 indicates that there are significant differences in the composition of support costs amongst the 37 ANSPs, and in particular in the proportion of employment costs (blue bar) and non-staff operating costs (orange bar). The choice between providing some important operational support functions internally or externally has clearly an impact on the proportion of support costs that is classified as employment costs, non-staff operating costs, or capital-related costs. In some cases, the maintenance of ATM systems is outsourced and the corresponding costs are reported as non-staff operating costs. For other ANSPs, these activities are rather carried out by internal staff and the related costs appear as employment costs or as capital-related costs when, according to IFRS, the employment costs of staff working on R&D projects can be capitalised in the balance-sheet.

Figure 2.26 also indicates that in 2013 the unit support costs of various ANSPs operating in Central and Eastern European countries (e.g. LPS, UkSATSE, Albcontrol, ARMATS, MoldATSA and Slovenia Control) are higher than the Pan-European system average and in the same order of magnitude as the unit support costs of ANSPs operating in Western European countries where the cost of living is much higher.

Like ATCO in OPS employment costs, employment costs for the support staff are also affected by the cost of living. Using the same methodology as in Figure 2.20, Figure 2.27 shows the impact of adjusting the non-ATCO in OPS employment costs per composite flight-hour for PPPs. After PPP adjustment, the unit employment costs for support staff per composite flight-hour amounts to €162 (compared to €147 without adjustment). Figure 2.27 indicates that after PPP adjustment,

[29] It should be noted that the cost of capital reported by ANS CR in its ACE 2013 data submissions is higher than the costs charged to airspace users. Indeed, ANS CR did not charge any cost of capital to terminal ANS users.

the unit employment costs of many Central and Eastern European ANSPs are generally higher than those operating in Western Europe.

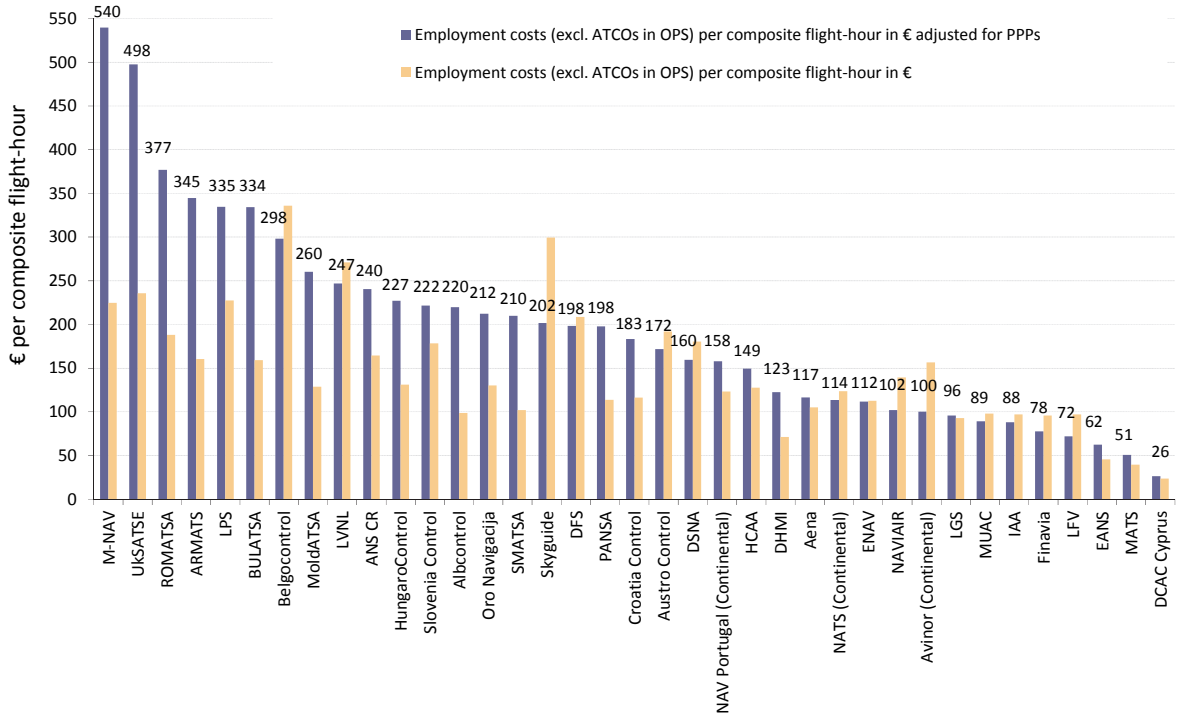


Figure 2.27: Employment costs (excl. ATCOs in OPS) with and without adjustment for PPPs, 2013

As both the cost of living and general wage levels are converging across Europe, there is an upward pressure on employment costs for these ANSPs. In order to sustain the current level of staffing and associated employment costs, it will be of great importance to effectively manage non-ATCO in OPS employment costs.

Non-ATCO in OPS employment costs per composite flight-hour (i.e. the blue portion of the bar in Figure 2.26) can be broken down into two indicators: (1) the employment costs per non-ATCO in OPS staff and (2) the number of non-ATCO in OPS staff required by unit of output.

Figure 2.28 below presents the ANSPs classified in four quadrants according to their level of employment costs per non-ATCO in OPS staff and the number of non-ATCO in OPS staff required per composite flight-hour. As explained in the introduction of this Chapter, MET costs are not included in the ACE data analysis. Therefore to ensure consistency, for those ANSPs where MET services are provided internally, MET staff are deducted from the total support staff reported in Figure 2.28. Note that the quadrants are determined by the European averages i.e. some 69 €'000 for the employment costs per non ATCO-staff, and 2.1 support staff for 1000 composite flight-hours.

An ANSP may have high unit employment costs for support staff but if a low number of support staff is required per composite flight-hour it will have lower support staff employment costs per composite flight-hour. This is the case for the ANSPs in the top left of Figure 2.28 such as MUAC and IAA (**Quadrant I**).

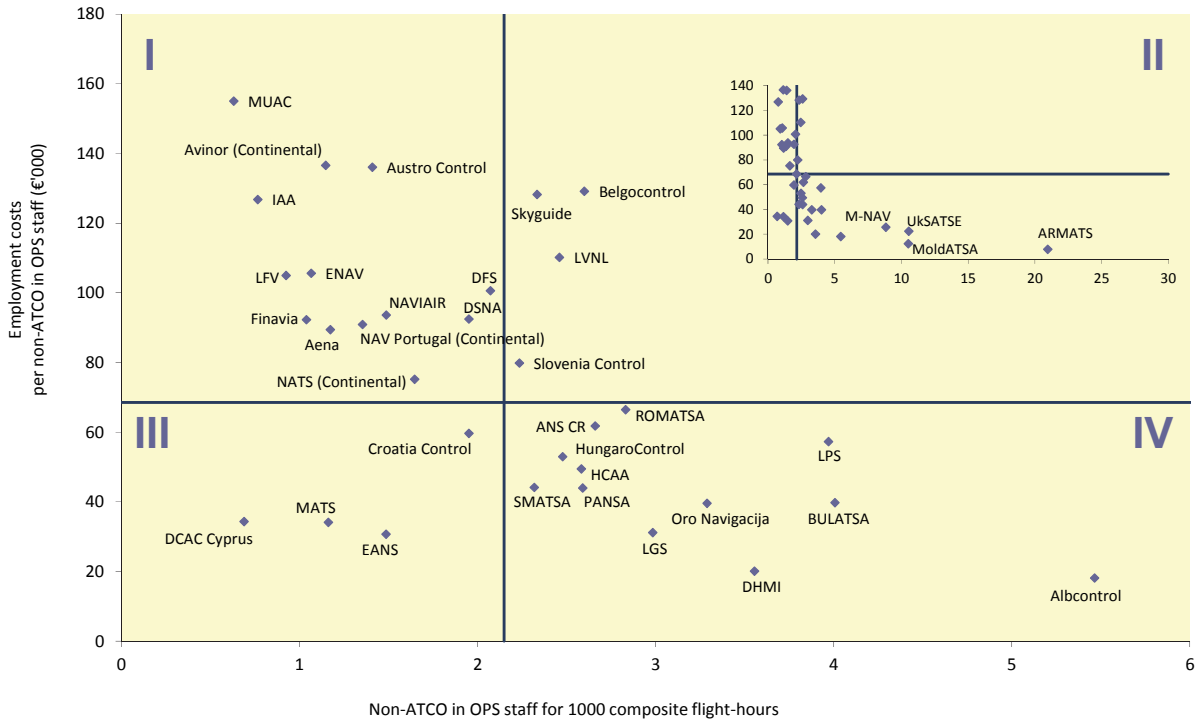


Figure 2.28: Unit employment costs for support staff and support staff per unit of output, 2013

ANSPs such as Belgocontrol, LVNL and Skyguide (**Quadrant II**) combine relatively high unit employment costs for support staff with a relatively high number of support staff per composite flight-hour, resulting in higher support staff costs per composite flight-hour (see also Figure 2.26 above).

Croatia Control, DCAC Cyprus, EANS and MATS (**Quadrant III**) combine relatively lower unit employment costs for support staff and lower number of support staff per composite flight-hour.

Finally, for ANSPs which are part of **Quadrant IV**, lower unit employment costs for support staff are combined with a higher number of support staff per composite flight-hour. This is particularly the case for ARMATS, M-NAV, MoldATSA and UkSATSE. These ANSPs are shown in the miniature replica which is inserted in Figure 2.28 (see top-right corner). The relatively large numbers of support staff per composite flight-hour substantially contribute to the relatively high unit support costs for these organisations (see Figure 2.26).

For ANSPs involved in airport management activities (e.g. Avinor, DHMI, Finavia and HCAA) the allocation of support staff between ANS and airport activities might be subject to numerous assumptions, especially for the staff working on transversal activities. In such cases, the decisions made on allocation keys for support staff will impact the support staff per composite flight-hour. A low number of support staff per composite flight-hour might therefore illustrate potential staff allocation issues. It can also reflect the fact that maintenance activities are outsourced (e.g. ENAV) or labour costs associated with the development of assets are capitalised (e.g. NATS). For this reason, support staff employment costs should not be treated separately but analysed along with the other components of support costs (i.e. non-staff operating costs and capital-related costs).

More details on the level of support costs for individual ANSPs are provided in Part II of this Report.

2.9 Forward-looking cost-effectiveness (2014-2018)

At Pan-European System level, the gate-to-gate unit ATM/CNS provision costs are planned to fall by -1.5% p.a. between 2013 and 2018. This mainly reflects the fact that over this period traffic is expected to increase faster (+2.8% p.a.) than ATM/CNS costs provision costs (+1.2% p.a.).

The objective of this section is to provide information on ANSPs planned gate-to-gate unit ATM/CNS provision costs and capex for the period 2014-2018. It is based on data reported by ANSPs in their ACE 2013 submissions[30]. It is important to note that NATS is excluded from this analysis since forward-looking data (based on regulatory accounting rules) and historical data (based on IFRS) are not directly comparable.

Figure 2.29 below shows that, at Pan-European System level, the gate-to-gate unit ATM/CNS provision costs are planned to fall by -1.5% p.a. between 2013 and 2018. This planned decrease is due to the fact that traffic is expected to increase faster (+2.8% p.a.) than ATM/CNS provision costs (+1.2% p.a.).

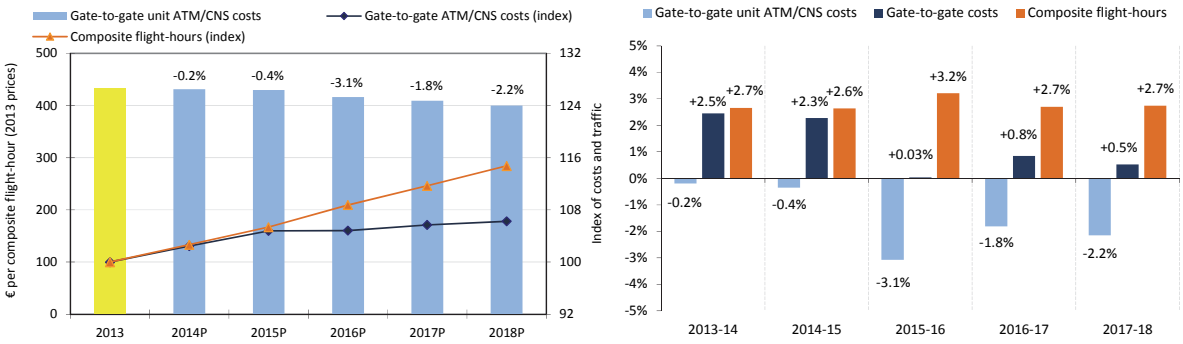


Figure 2.29: Forward-looking cost-effectiveness (2013-2018, real terms)

The decrease in unit costs planned at Pan-European system level masks contrasted situations among ANSPs. Table 2.3 below classifies ANSPs in four groups based on the traffic forecast used (i.e. whether it is lower or higher than the system average of +2.8% p.a.) and on the planned changes in total ATM/CNS provision costs between 2013 and 2018 (i.e. decrease or increase in ATM/CNS provision costs). For each ANSP, Table 2.3 also shows the resulting changes in unit ATM/CNS provision costs, ANSPs planning for an increase in unit costs larger than +0.5% p.a. are highlighted in orange, while those planning for a decrease larger than -0.5% p.a. are highlighted in blue.

Table 2.3 indicates that 24 ANSPs are planning for a decrease in unit ATM/CNS provision costs (larger than -0.5% p.a.) over the 2013-2018 period. This is particularly the case for Avinor (-8.0% p.a.), Albcontrol (-4.5% p.a.), Aena[31] (-4.4% p.a.) and MoldATSA (-4.4% p.a.) which planned for substantial decreases in unit costs (i.e. larger than -4.0% p.a.). For Aena, Albcontrol and Avinor,

[30] Because of the exceptional events affecting operations in Ukraine since 2014, UkSATSE is not in a position to provide forward-looking information for the ACE 2013 report.

[31] Aena planned ATM/CNS provision costs for 2014-2018 comprise costs relating to ATM/CNS infrastructure shared with the military, which are charged to civil airspace users. It should be noted that these costs are borne by the Spanish military authority and that from 2014 onwards they are not passing through Aena (ENAIRE) accounts.

this mainly reflects the combination of a reduction in ATM/CNS provision costs (-1.9% p.a., -1.8% p.a. and -5.3% p.a., respectively) while traffic volumes are expected to increase by +2.6% p.a., +2.8% p.a. and +3.0% p.a., respectively. For MoldATSA, the planned decrease in unit costs is mainly due to a substantial reduction in ATM/CNS provision costs (-6.1% p.a.) while traffic is forecast to decrease by -1.8% p.a. over the 2013-2018 period.

2013-2018 planned changes in unit costs (% p.a.)		Planned changes in composite flight-hours			
		Changes below system average (< 2.8% p.a.)		Changes above system average (> 2.8% p.a.)	
Planned changes in ATM/CNS provision costs	Decreases	Aena (-4.4% p.a.) Albcontrol (-4.5% p.a.) ARMATS (-2.9% p.a.) Belgocontrol (-2.1% p.a.) Croatia Control (-2.1% p.a.) DFS (-1.5% p.a.)	Finavia (-1.8% p.a.) LFV (2.3% p.a.) MoldATSA (-4.4% p.a.) NAVIAIR (-3.1% p.a.) ROMATSA (-2.9% p.a.)	Avinor (-8.0% p.a.) SMATSA (-3.8% p.a.)	
	Increases	Austro Control (0.2% p.a.) DCAC Cyprus (0.6% p.a.) DSNA (0.4% p.a.) IAA (1.2% p.a.) LVNL (0.3% p.a.) MATS (11.6% p.a.) MUAC (0.2% p.a.)	Oro Navigacija (-2.1% p.a.) Skyguide (0.7% p.a.)	ANS CR (-2.3% p.a.) BULATSA (-3.7% p.a.) DHMI (2.4% p.a.) EANS (3.5% p.a.) ENAV (-2.1% p.a.) HCAA (-3.3% p.a.) HungaroControl (-0.7% p.a.)	LGS (-0.6% p.a.) LPS (-0.8% p.a.) M-NAV (-3.5% p.a.) NAV Portugal (-2.9% p.a.) PANSA (-1.3% p.a.) Slovenia Control (-2.6% p.a.)

Table 2.3: Planned changes in unit costs over the 2013-2018 period (real terms)

On the other hand, unit ATM/CNS provision costs are expected to rise by more than +0.5% p.a. for 7 ANSPs between 2013 and 2018. This is particularly the case for MATS (+11.6% p.a.), EANS (+3.5% p.a.) and DHMI (+2.4% p.a.) which plan for substantial increases in ATM/CNS provision costs (+9.6% p.a., +6.6% p.a. and +12.0% p.a., respectively).

Figure 2.30 below shows the total actual capex and depreciation costs at Pan-European system level between 2009 and 2013 (including the 37 ANSPs contributing to the ACE report) as well as the planned capex and depreciation costs between 2014 and 2018 for the 35 ANSPs that reported a complete set of capex projections[32].

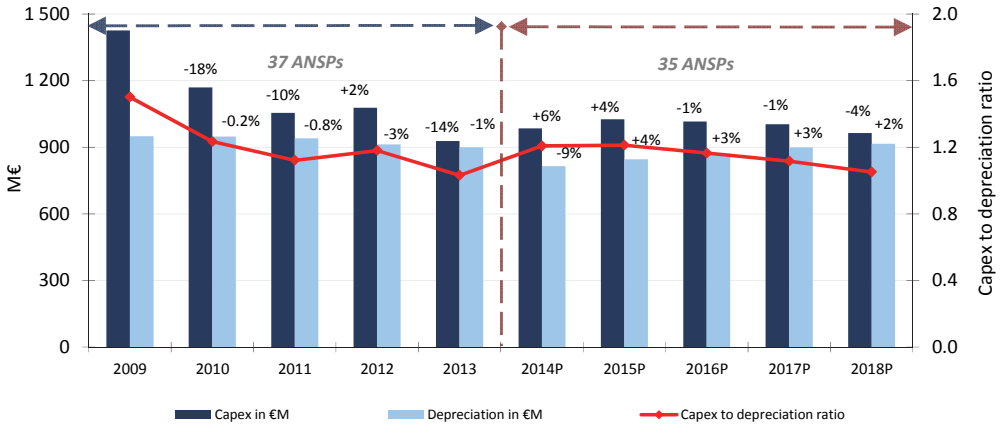


Figure 2.30: Capital expenditures and depreciation costs (2009-2018, real terms)

Overall, the cumulative capex planned for the period 2014-2018 amounts to some €4 995M. This is less than the cumulative capex spent between 2009 and 2013 (€5 658M). As a consequence, the

[32] UkSATSE did not provide a complete set of planned capex data for the 2014-2018 period in their ACE 2013 submissions. In addition, as explained in the introduction of Section 2.9, NATS is also excluded from the capex and depreciation costs analysis.

average capex to depreciation ratio planned over 2014-2018 (1.15) is lower than that observed over the 2009-2013 period (1.22). This indicates that, overall, ANSPs asset base are expected to grow at a lower rate than in the last five years.

Additional information on the nature and magnitude of the major investment projects for each ANSP is provided in Part II of this Report.

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PART II: COST-EFFECTIVENESS PERFORMANCE FOCUS AT ANSP LEVEL

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3 FOCUS ON ANSPs INDIVIDUAL COST-EFFECTIVENESS PERFORMANCE

3.1 Objective of this chapter

This chapter comprises two pagers for each ANSP participating to the ACE 2013 analysis. These two pagers include an analysis of the historical development of the financial cost-effectiveness indicator and its main components over the 2009-2013 period. Individual ANSP cost-effectiveness performance is also examined in the context of a group of ANSPs which operate in relatively similar operational and economic environments (comparator groups). Finally, these two pagers comprise historical information and projections about capital expenditures provided by each ANSP.

3.2 Historical development of cost-effectiveness performance, 2009-2013

The first page presents, for each ANSP, an assessment of its cost-effectiveness performance, and how it has developed over the five-year period 2009-2013. It examines the overall economic cost-effectiveness indicator and its two components (ATM/CNS costs per composite flight-hour, ATFM delay costs per composite flight-hour), and their evolution over the period (top left). It puts these in the context of the traffic growth observed in the ANSP's airspace (top right). In this page, financial data are all expressed in real terms (2013 prices).

Developments in the components of financial cost-effectiveness (ATCO-hour productivity, ATCO employment costs per ATCO-hour, and support costs per composite flight-hour) are also examined (middle left), to help understand the underlying causes of changes in overall cost-effectiveness.

The charts on the middle right provide additional information in order to better understand the drivers behind the changes in the three components of financial cost-effectiveness. First, the changes in ATCO-hour productivity are examined in the light of changes in composite flight-hours, number of FTE ATCOs in OPS and corresponding hours on duty. A second chart focuses on the changes in ATCO-hours on duty, and in particular on overtime hours. The third chart presents the changes in support costs are broken down into employment costs of staff other than ATCOs in OPS; non-staff operating costs; capital-related costs (depreciation and the cost of capital); and exceptional items, where present.

The bottom set of graphs examine how the changes in the components over the whole period contribute to the change in the overall financial cost-effectiveness indicator. The left-hand graphs relate to ATCOs in OPS; the right-hand graphs to other elements of cost ("support costs"). The left-hand graphs show how the change in ATCO productivity combines with the change in unit ATCO employment costs to make a change in ATCO employment costs per unit output. The right-hand graphs show how the change in support costs combines with traffic growth to make a change in support costs per composite flight-hour. The relative contribution of these two effects to the change in the financial cost-effectiveness indicator depends on the relative weight of ATCO employment costs, on the one hand, and support costs, on the other, in the overall ATM/CNS provision cost.

The presentation of financial time-series data

Presentation and comparison of historical series of financial data from different countries poses problems, especially when different currencies are involved, and inflation rates differ. There is a danger that time-series comparisons can be distorted by transient variations in exchange rates which happened to be particularly the case in 2009 in the wake of the financial crisis. In this chapter, the focus is on the historical development of financial performance indicators **in a given ANSP**.

For this reason, the following approach has been adopted for allowing for inflation and exchange rate variation. The financial elements of performance are assessed, for each year, in **national** currency. They are then converted to national currency in 2013 prices using national inflation rates. Finally, for comparison purposes in 2013, all national currencies are converted to euros using the 2013 exchange rate.

This approach has the virtue that an ANSP's performance time series is not distorted by transient changes in exchange rates over the period. It does mean, however, that the performance figures for any ANSP in a given year prior to 2013 are not the same as the figures in that year's ACE report, and cannot legitimately be compared with another ANSP's figures for the same year. Cross-sectional comparison using the figures in this report is only appropriate for 2013 data.

The historical inflation figures used in this analysis were obtained from EUROSTAT or from the International Monetary Fund. For the projections, the ANSPs' own assumptions concerning inflation rates were used. Details of the monetary parameters used for 2013 are given in Annex 7 to this report.

3.3 ANSP's cost-effectiveness within the comparator group, 2009-2013

The top charts of the second page present the financial cost-effectiveness indicator and its main components for individual ANSPs in comparison with their respective comparator group. The approach is to consider each ANSP in the context of a group of other ANSPs (comparators) which operate in relatively similar operational and economic environments.

The chart on the top-left shows the level and changes in unit ATM/CNS provision costs over the 2009-2013 period for each ANSP part of the comparator group. The chart on the top-right shows for each ANSP the deviations in unit ATM/CNS provision costs, ATCO-hour productivity, employment costs per ATCO-hour and unit support costs from the average of the comparator group at the start (2009) and at the end (2013) of the period considered.

The ANSP comparator groups used for the benchmarking analysis are presented in the table below. These comparator groups were determined for the purposes of the RP2 cost-efficiency target-setting process using a two-step approach combining the use of statistical tools (cluster analysis) with expert judgement. For a full description of the process, methodology and results see Annex I.C of the PRB report on RP2 EU-Wide Targets Ranges[33] released in May 2013.

Nine groups of comparators have been identified, some comprising a relatively large number of ANSPs and others only comprising two organisations. Due to the unique nature of its airspace (upper airspace only, across four States), it was determined that Maastricht (MUAC) should be considered separately and therefore this ANSP was not included in the comparator group benchmarking analysis. Finally, two groups have been designed for the ANSPs not operating in SES States. It should be noted that the names of these groups have been chosen for mnemonic purposes only.

[33] This document is available at: http://ec.europa.eu/transport/media/consultations/doc/2013-07-03-sesrp2/report.pdf

Comparator Groups	ANSPs
Five Largest	Aena
	DFS
	DSNA
	ENAV
	NATS (Continental)
Central Europe	ANS CR
	HungaroControl
	LPS
	Slovenia Control
	Croatia Control
	PANSA
South Eastern Europe	HCAA
	BULATSA
	ROMATSA
South Med	DCAC Cyprus
	MATS
Western Europe	Austro Control
	NAVIAIR
	Skyguide
Atlantic	NAV Portugal (Continental)
	IAA
Baltic States	EANS
	LGS
	Oro Navigacija
Nordic States	Avinor (Continental)
	LFV
	Finavia
BelNed	Belgocontrol
	LVNL
Non-SES 1	DHMI
	UkSATSE
Non-SES 2	Albcontrol
	ARMATS
	M-NAV
	MoldATSA
	SMATSA

Table 3.1: ANSPs comparator groups

3.4 Historical and forward-looking information on capital investment projects

The charts which are displayed in the middle and the bottom of the second page provide historical information and projections about capital expenditures provided by each ANSP.

The chart on the middle of the page shows the historical and planned evolution of capital expenditure and depreciation, highlighting the ANSP's investment cycles and their magnitude, across time. The ratio of these quantities (usually greater than one) is an indication of the rate at which the overall asset base is being expanded.

Finally, two tables present information on the nature of the main ANSP's capex projects between 2009 and 2019. The first table provides a high-level overview of the magnitude of capital expenditures by area (i.e. ATM, Communication, Surveillance, etc.) over the 2009-2019 period and of the upgrade/replacement cycles of the main ATM systems for each ACC. The capex allocation by area is not always straightforward, especially when ANSPs report under a large project several

smaller investments relating to different areas. The classification disclosed in this report therefore reflects the PRU understanding based on information provided by ANSPs during the validation process. In case of a project covering several areas, the rationale was to classify the whole project into the domain where the investment project was mostly contributing. The last table provides detailed information on the top 5 capex projects in monetary terms including the domain, the financial amount and the time period of the project. For ANSPs operating in SES States, this information is based on data provided in RP2 Performance Plans which is subject to change before the final adoption of the Performance Plans.

3.5 Cost-effectiveness performance focus at ANSP level

To facilitate the reading of this section, the table below displays the page number of the individual benchmarking analysis for each ANSP.

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Aena (Spain) – Cost-effectiveness KPIs (€2013)

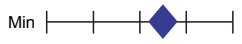
Contextual economic information

Exchange rate: Spain is within the EURO Zone

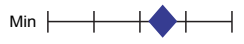
Aena represents 10.2% of European system gate-to-gate ATM/CNS provision costs

Operational conditions

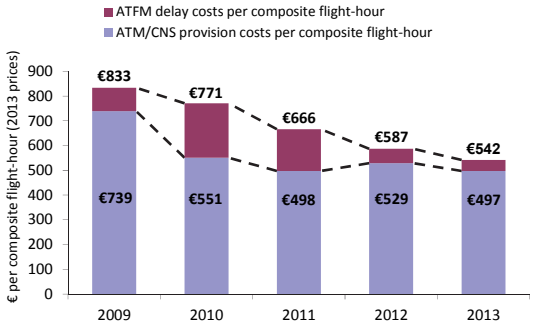
Aggregated complexity score:

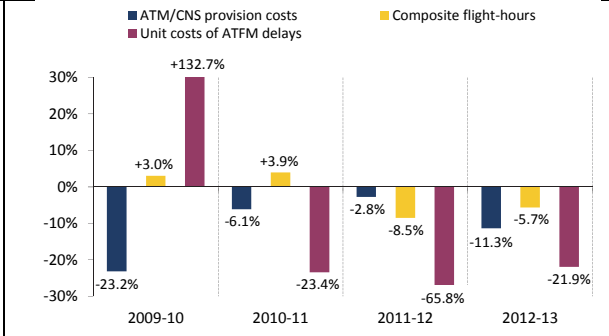


Seasonal traffic variability:

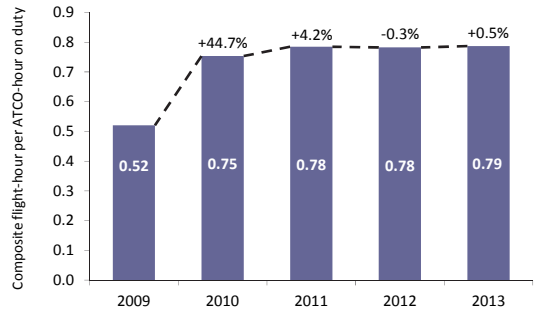


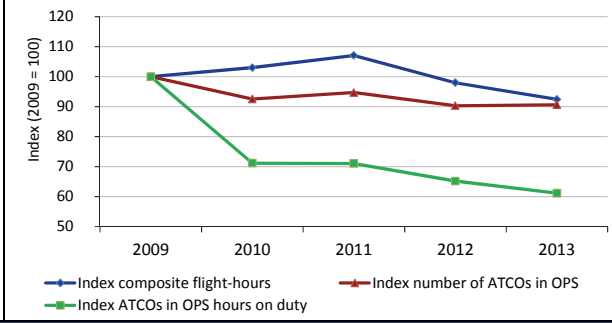
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



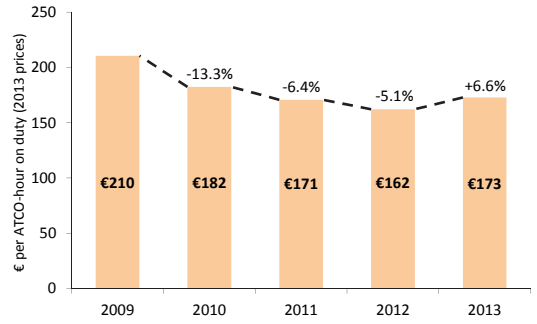


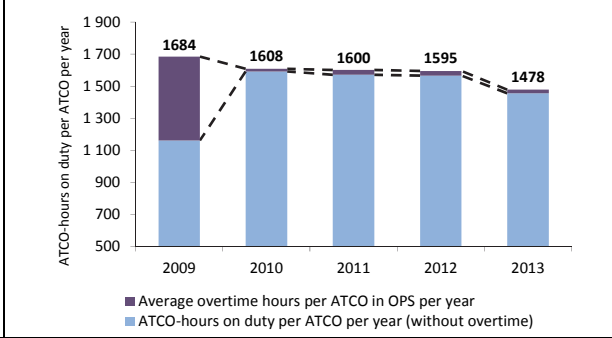
Trend in gate-to-gate ATCO-hour productivity



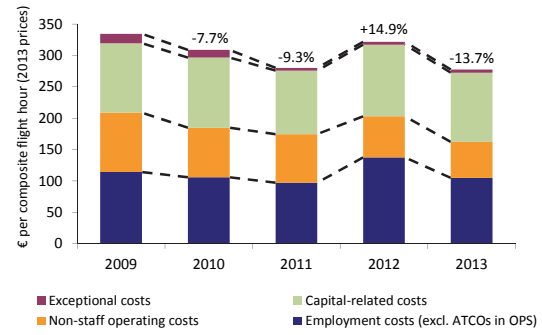


Trend in gate-to-gate employment costs per ATCO-hour

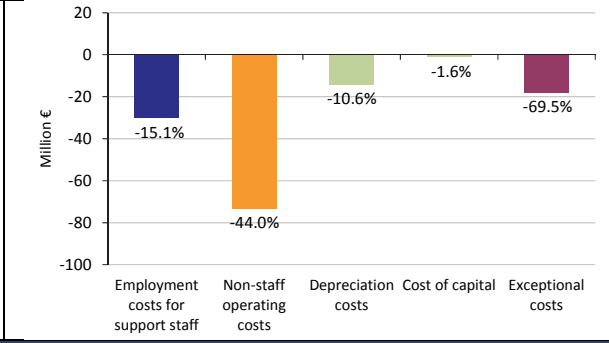




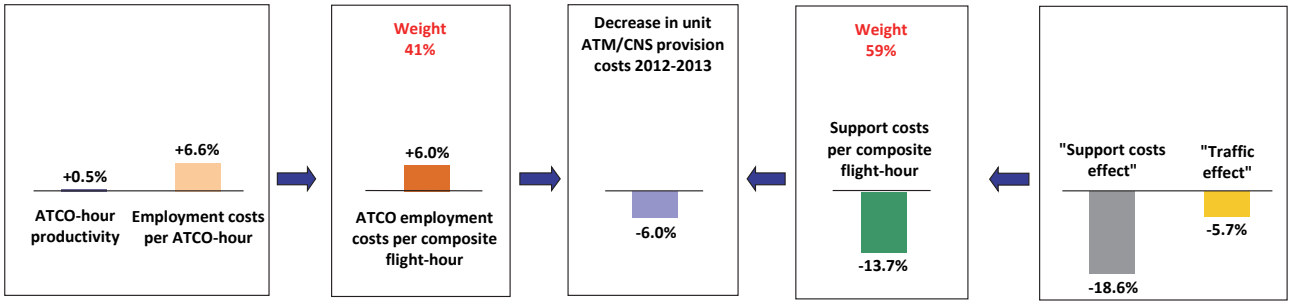
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

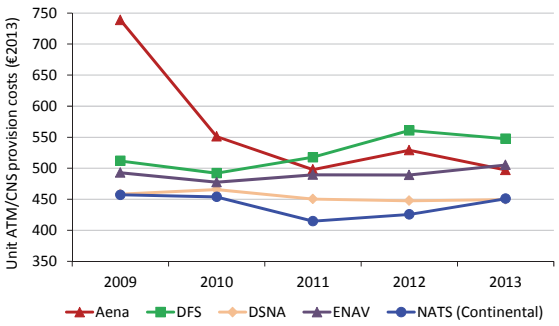


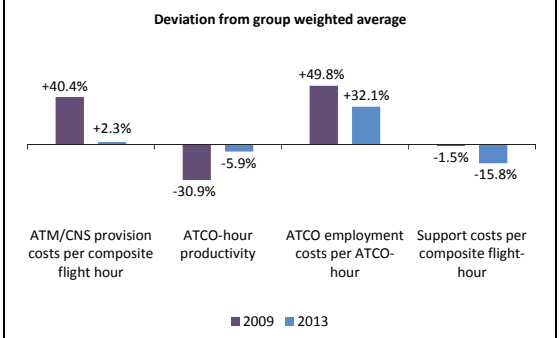
Changes in financial cost-effectiveness (2012-2013)



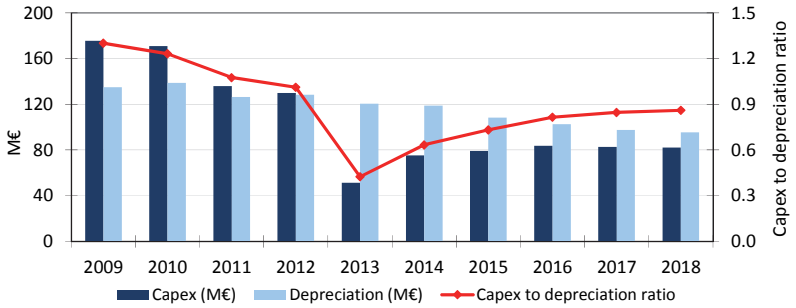
Aena (Spain) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS C: 2006 (all ACCs)*	RDPS C: 2006 (all ACCs)*	HMI C: 2006 (all ACCs)*	VCS C: 2000 (All ACCs-TMA) 2002 (All ACCs-En-route)*
						2009				Canarias, Palma
						2010	All ACCs	All ACCs	All ACCs	Barcelona
						2011				Madrid, Sevilla
						2012	All ACCs	All ACCs	All ACCs	
						2013				
						2014				Canarias
€65.2M	€70.3M	€4.3M	€17.8M		€219.1M	2015	Canarias	Canarias	Canarias	
						2016	Barcelona, Madrid, Palma, Sevilla	Barcelona, Madrid, Palma, Sevilla	Barcelona, Madrid, Palma, Sevilla	Madrid
						2017				Barcelona
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Project enablers contributing, inter alia, to ATM Master Plan, CNS and automation infrastructures	Other	91.6	2015	2019
2	Progressive implementation new SACTA version (iTEC FDP)	ATM	50.8	2015	2019
3	COMETA – Voice over Internet Protocol	COM	42.8	2015	2019
4	Progressive implementation of new Mode S radars, ADSB (surveillance evolution)	SUR	17.8	2015	2019
5	REDAN (data network)	COM	16.1	2015	2019

Albcontrol (Albania) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: 1 EUR = 139.907 ALL

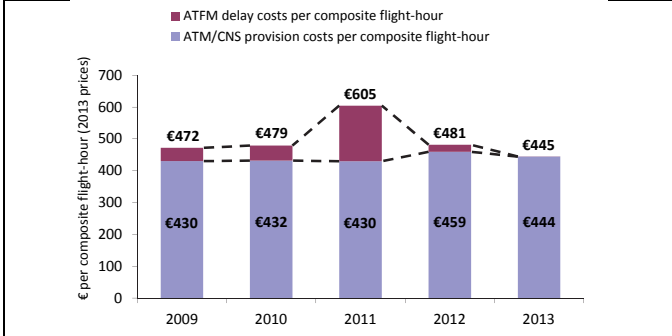
Albcontrol represents 0.3% of European system gate-to-gate ATM/CNS provision costs

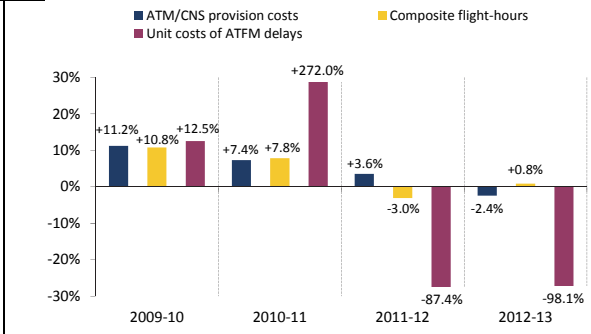
Operational conditions

Aggregated complexity score: Min — Max

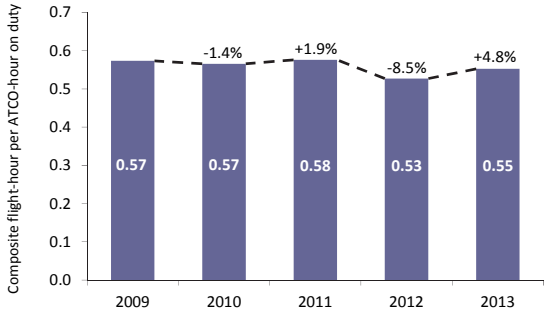
Seasonal traffic variability: Min — Max

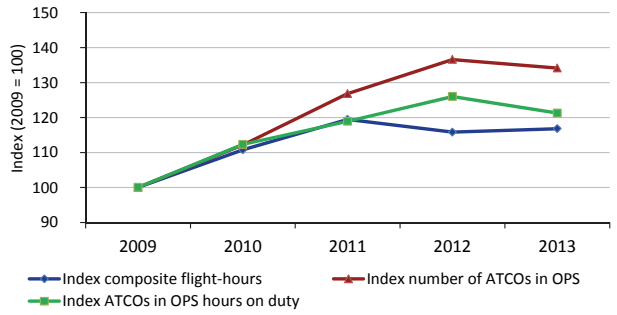
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



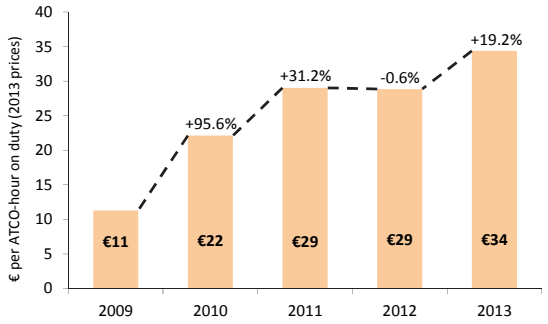


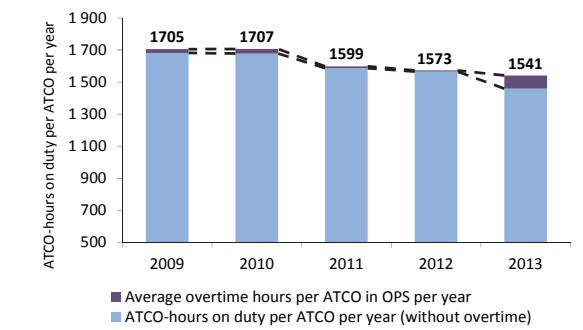
Trend in gate-to-gate ATCO-hour productivity



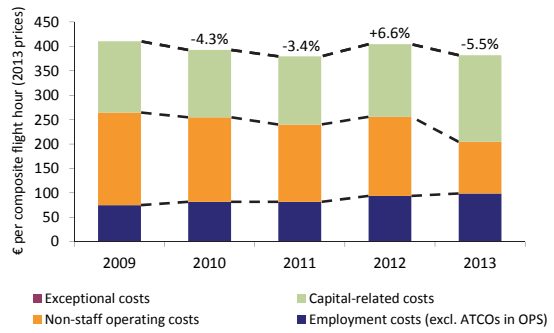


Trend in gate-to-gate employment costs per ATCO-hour

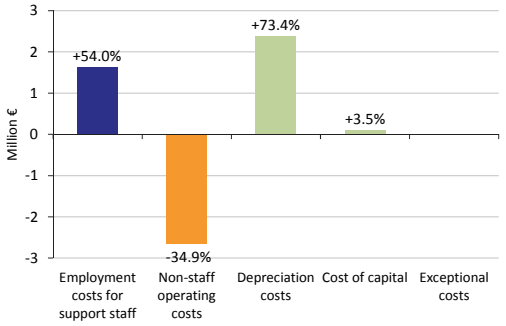




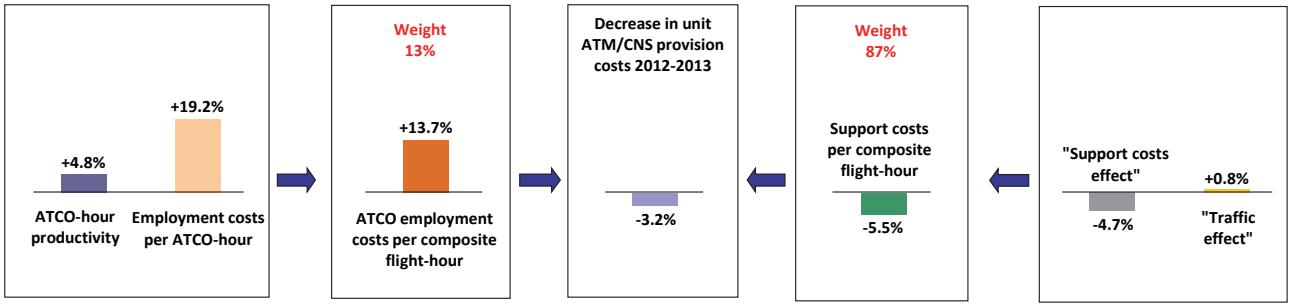
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

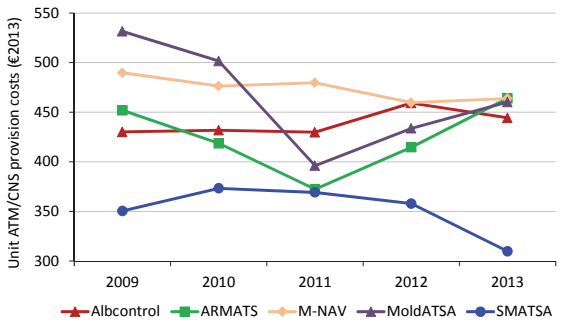


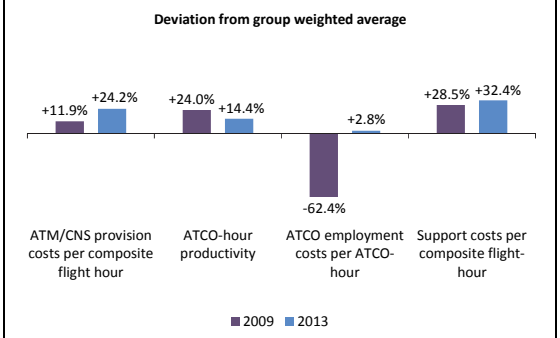
Changes in financial cost-effectiveness (2012-2013)



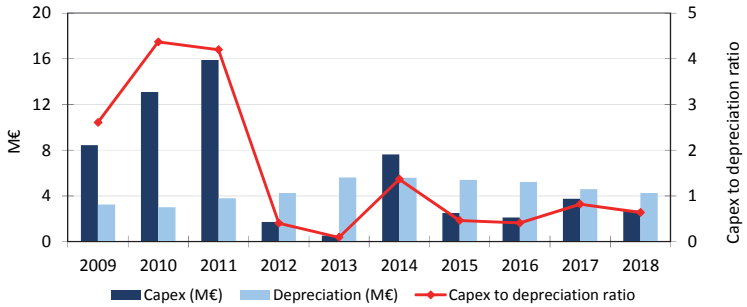
Albcontrol (Albania) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2004*	C: 2004*	C: 2004*	C: 2008*
€17.7M (2008-2012)	€2.0M (2008-2012)			€13.5M (2008-2011)		2009				
		€1.6M			€0.3M*	2010				
						2011				
				€0.3M		2012				
						2013				
						2014				
€3.4M		€1.3M				2015				
						2016				
						2017				
						2018				
						2019				

* The amount provided for under "Other" (i.e. €0.3M) related to MET

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Purchase of a new ATM system	ATM	14.5	2008	2012
2	New joint ACC/APP/TWR building located near Mother Teresa Airport	Buildings	13.5	2008	2011
3	Upgrade and maintenance of ATM systems	ATM	3.4	2015	2016
4	Remote radio facility (RXTX radio for VHF)	COM	2.0	2008	2012
5	Purchase of a Voice Communication System	ATM	1.8	2008	2011

ANS CR (Czech Republic) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: 1 EUR = 25.950 CZK

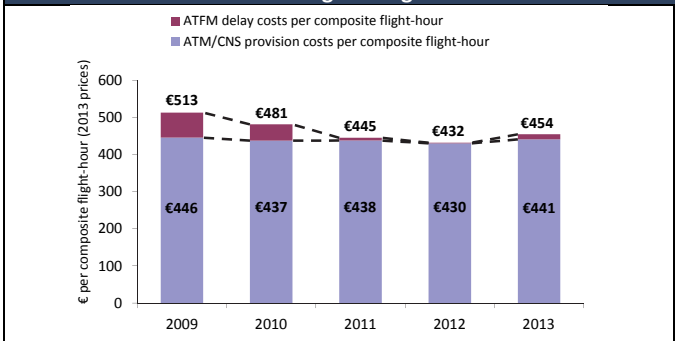
ANS CR represents 1.5% of European system gate-to-gate ATM/CNS provision costs

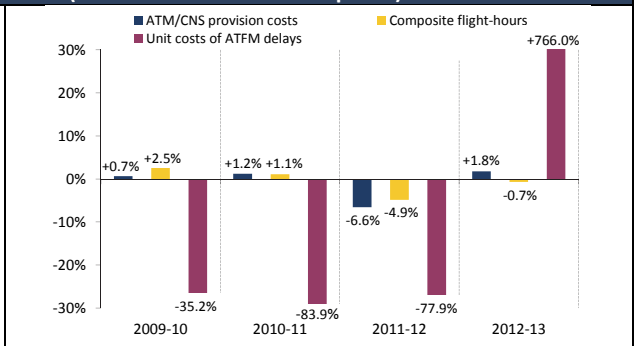
Operational conditions

Aggregated complexity score: Min — Max

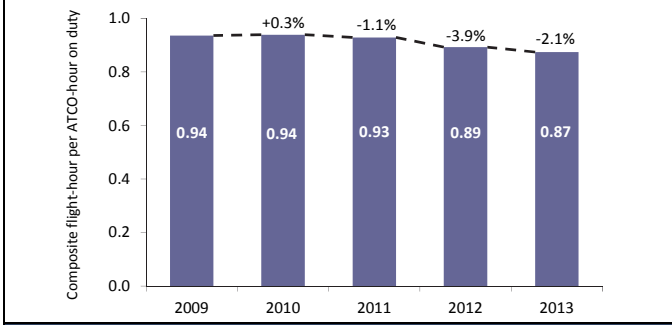
Seasonal traffic variability: Min — Max

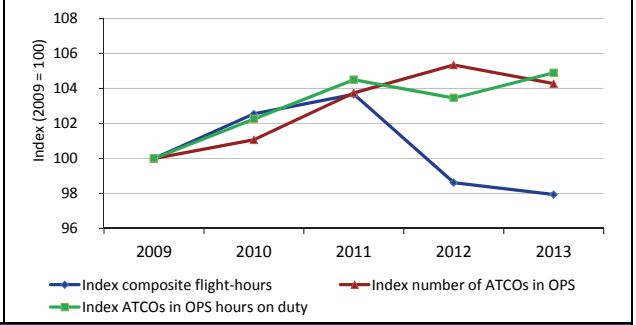
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



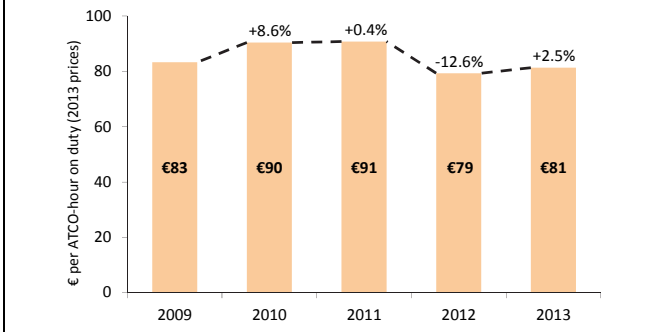


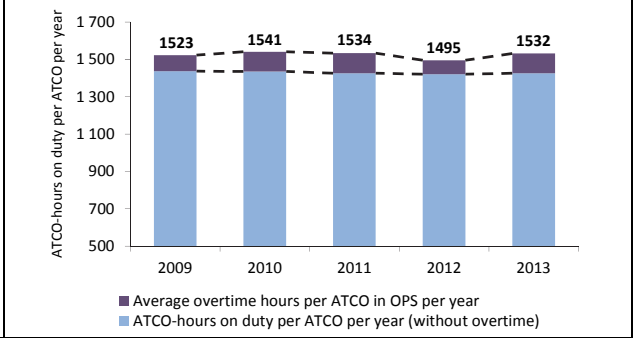
Trend in gate-to-gate ATCO-hour productivity



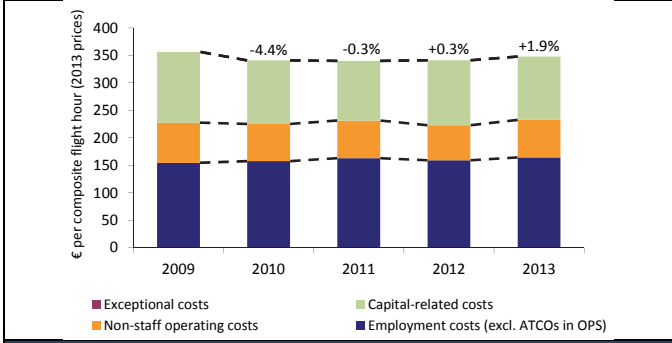


Trend in gate-to-gate employment costs per ATCO-hour

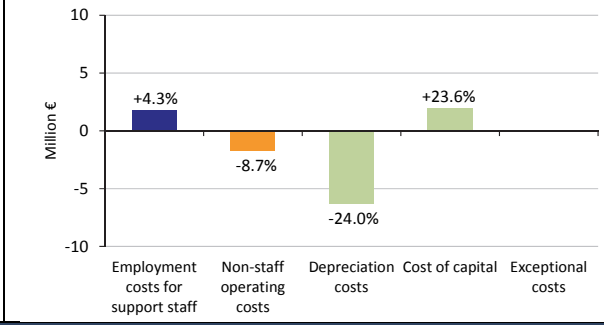




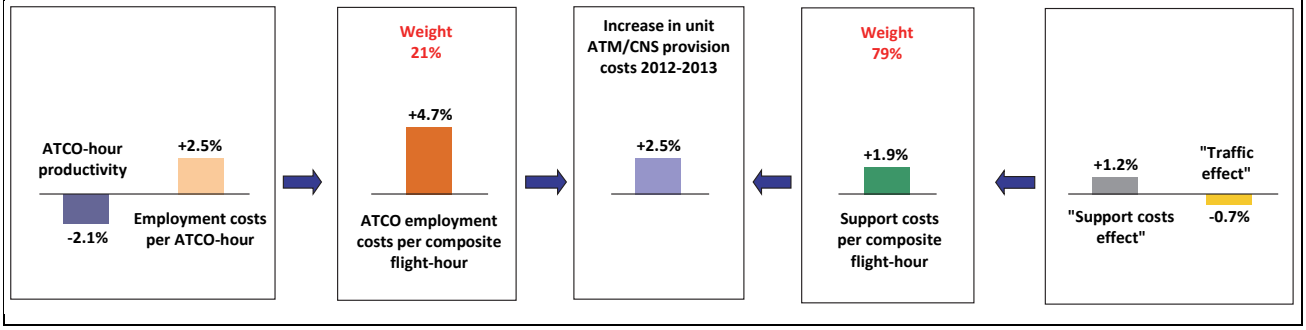
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

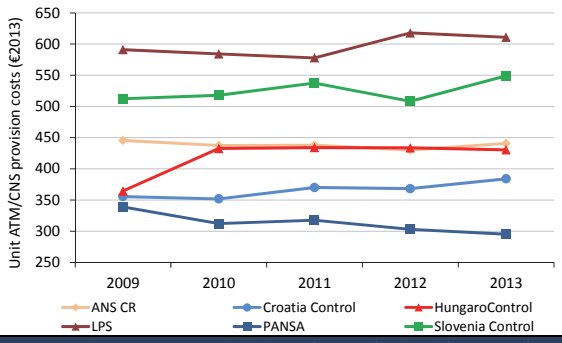


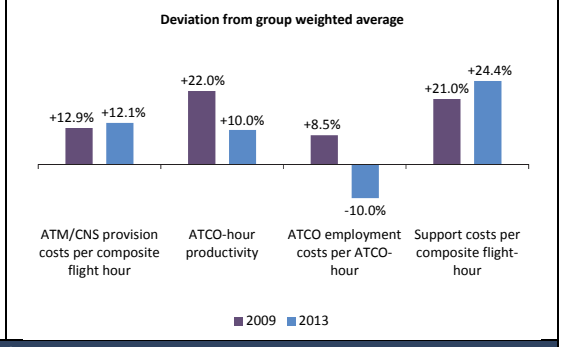
Changes in financial cost-effectiveness (2012-2013)



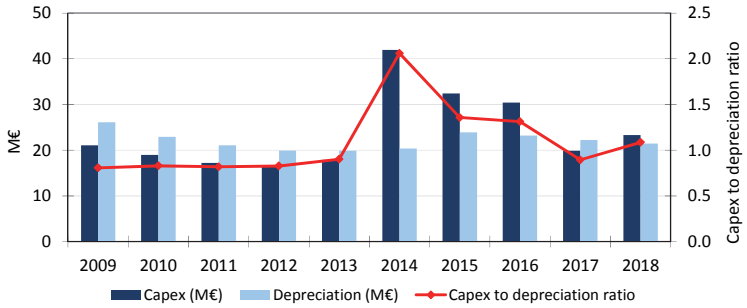
ANS CR (Czech Republic) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 1994*	C: 2000*	C: 2007*	C: 2007*
€78.2M (2008-2019)				€22.0M (2008-2016)		2009				
			€5.3M			2010				
	€10.1M					2011				
		€2.2M				2012				
						2013				
						2014				
						2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Replacement of RDP and FDP systems in Praha ACC (Neopteryx)	ATM	37.0	2011	2018
2	Upgrade of RDP and FDP secondary systems (approach to Neopteryx)	ATM	15.7	2015	2019
3	"TB 2007" Project involving the complete renovation of the "Technical Block Building" at Prague airport	Buildings	12.8	2008	2011
4	Replacement of radio communication equipments and replacement of VCS	COM	5.9	2012	2016
5	Building of the security centre in Ostrava airport	Buildings	5.9	2011	2016

ARMATS (Armenia) – Cost-effectiveness KPIs (€2013)

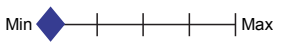
Contextual economic information

Exchange rate: 1 EUR = 538.083 AMD

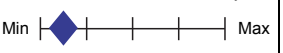
ARMATS represents 0.1% of European system gate-to-gate ATM/CNS provision costs

Operational conditions

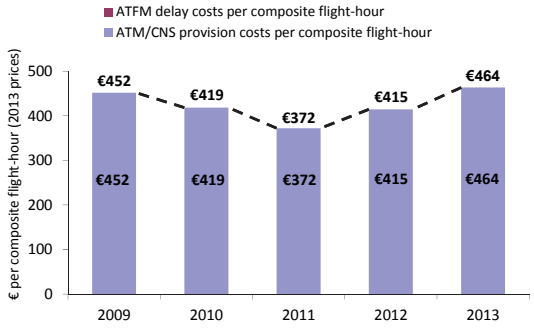
Aggregated complexity score:

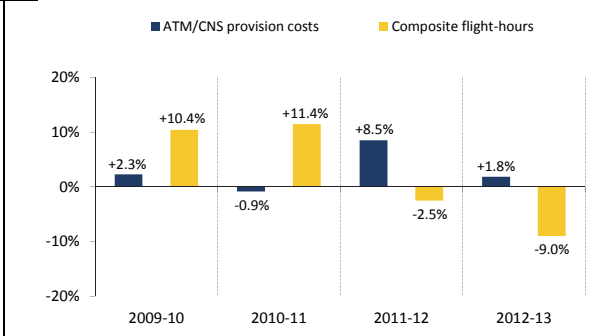


Seasonal traffic variability:

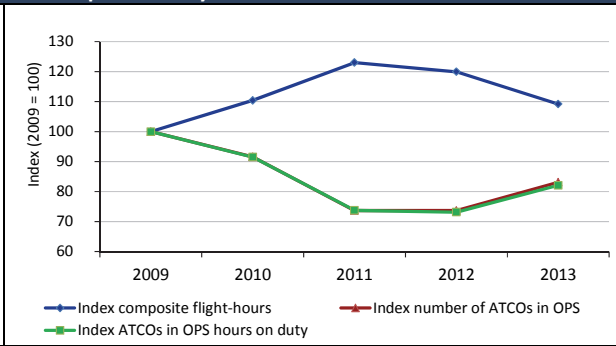


Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)

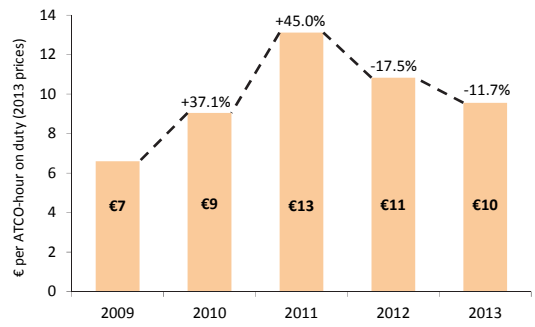


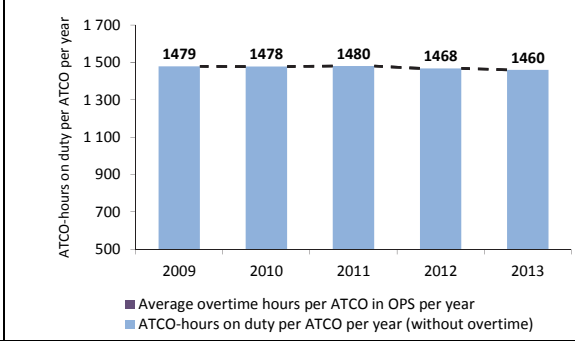


Trend in gate-to-gate ATCO-hour productivity

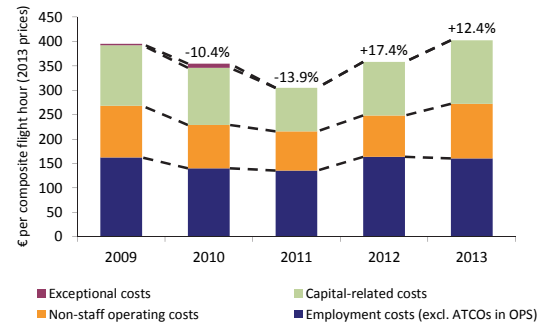


Trend in gate-to-gate employment costs per ATCO-hour

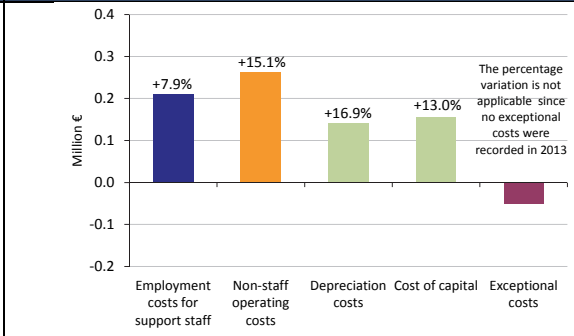




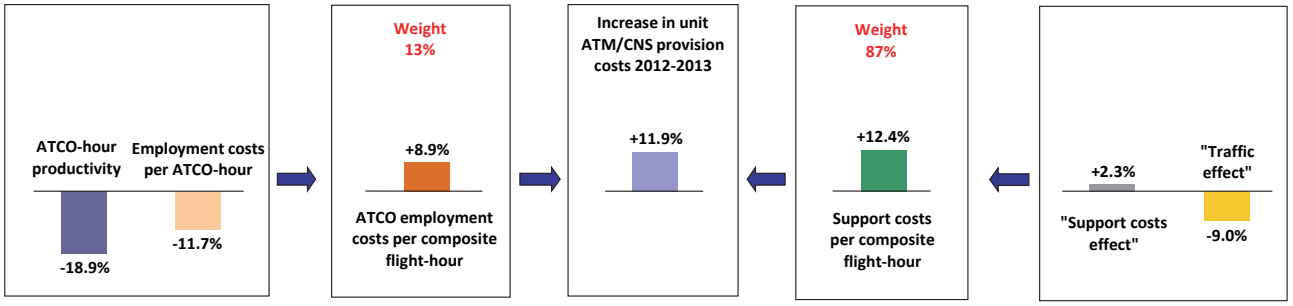
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

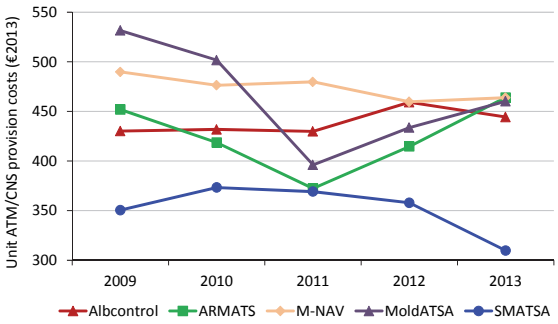


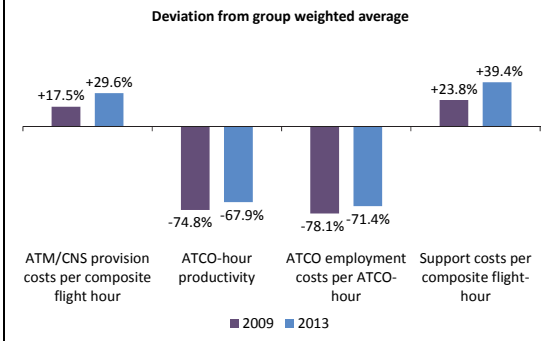
Changes in financial cost-effectiveness (2012-2013)



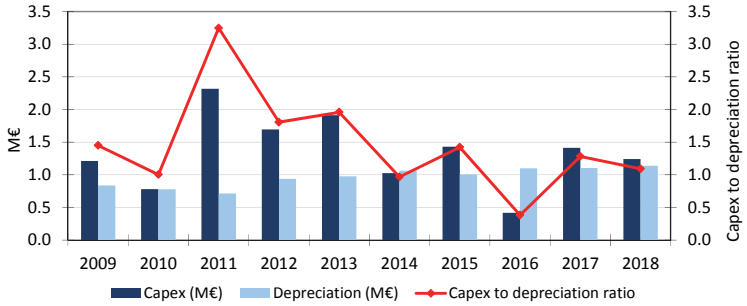
ARMATS (Armenia) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2000	C: 2000	C: 2000	C: 2000
						2009				
						2010				
						2011				
€3.5M	€0.7M					2012				
						2013				
					€0.1M	2014				
				€0.1M		2015				
		€1.3M	€3.0M			2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Modernisation of ATC centre (ATM automated system and VCSS)	ATM	2.4	2012	2013
2	Acquisition of MSSR	SUR	1.7	2017	2018
3	Modernisation of P3D MLAT system	SUR	1.2	2014	2016
4	Acquisition of a DVOR/DME system for Yerevan airport	NAV	0.8	2016	2017
5	Acquisition of "Galaxy" ATM system equipment /workplaces/ for Gyumri airport TWR	ATM	0.5	2015	2015

Austro Control (Austria) – Cost-effectiveness KPIs (€2013)

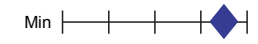
Contextual economic information

Exchange rate: Austria is within the EURO Zone

Austro Control represents 2.4% of European system gate-to-gate ATM/CNS provision costs

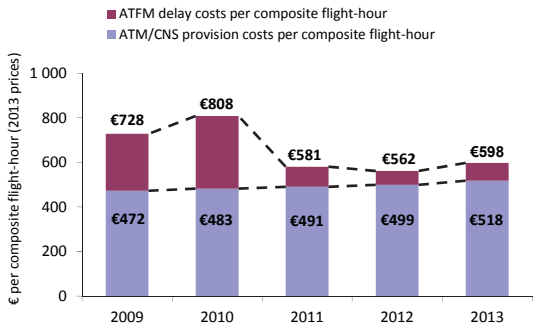
Operational conditions

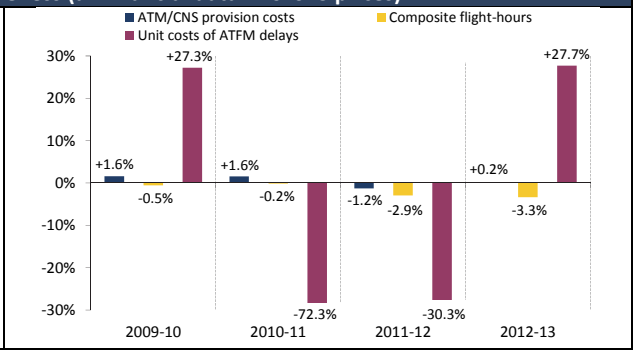
Aggregated complexity score:



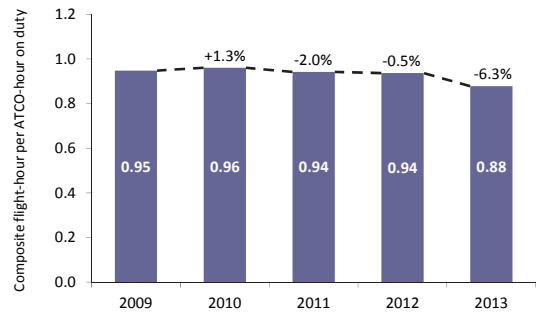
Seasonal traffic variability:

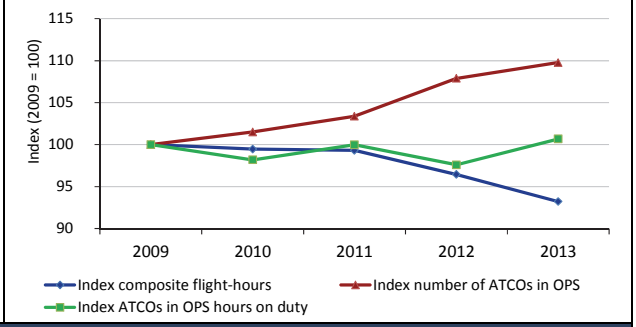
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



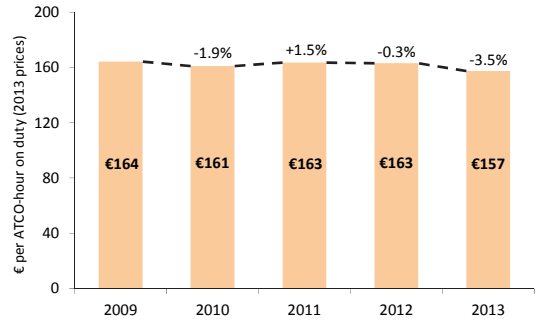


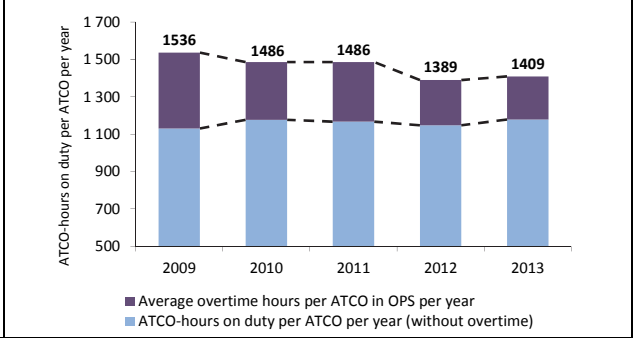
Trend in gate-to-gate ATCO-hour productivity



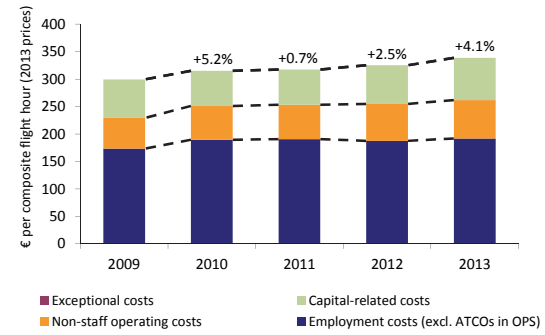


Trend in gate-to-gate employment costs per ATCO-hour

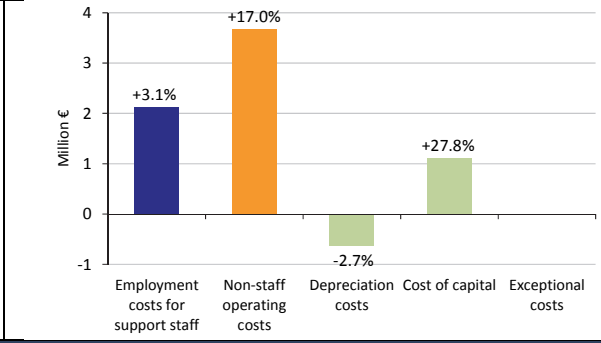




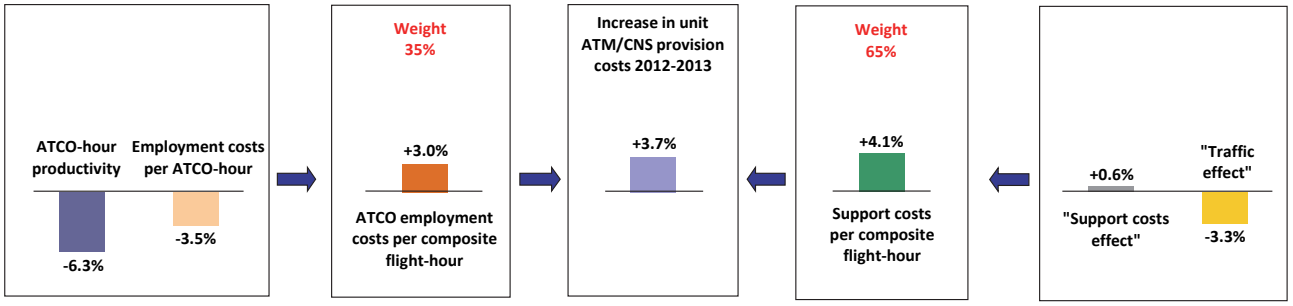
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

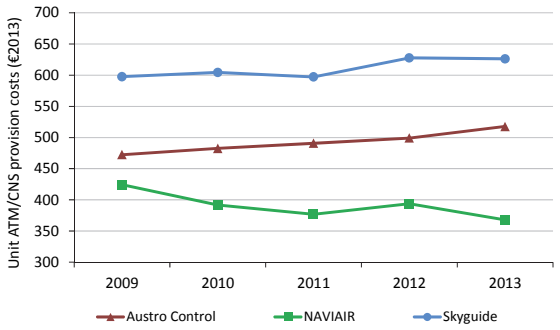


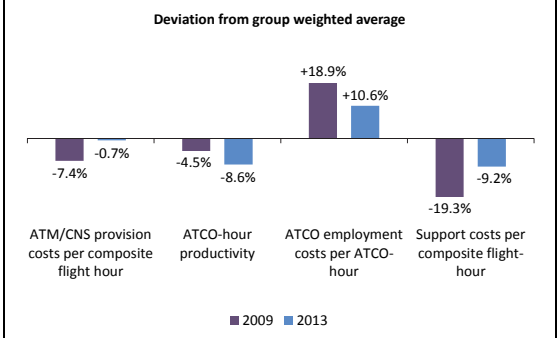
Changes in financial cost-effectiveness (2012-2013)



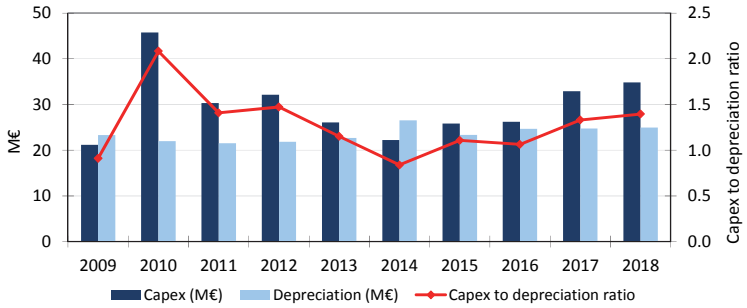
Austro Control (Austria) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS C: 2013*	RDPS C: 2013*	HMI C: 2013*	VCS C: 2013*
						2009				
						2010				
€33.6M		€4.3M	€10.3M	€13.6M	€81.6M	2011				
						2012				
	€4.2M					2013				
						2014				
€68.0M	€23.7M	€11.4M	€10.5M	€27.3M	€24.7M	2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Investment associated with ATM Systems (including COOPANS, training and simulator facilities, etc.)	ATM	101.6	2011	2019
2	Investment associated with communication (including introduction of CPDLC, VoIP technology, 8.33 khz channel separation, etc.)	COM	27.9	2013	2019
3	Investments associated to buildings and facility management (including Salzburg airport TWR)	Building	27.3	2015	2019
4	Investments associated to surveillance (including upgrade to Mode-S in various locations, implementation of wide-area multilateration, etc.)	SUR	16.6	2011	2019
5	Investments associated to navigation (including upgrade of NAV infrastructure, replacement of ILS, VOR, and DME equipment, etc.)	NAV	15.7	2011	2019

Avinor Continental (Norway) – Cost-effectiveness KPIs (€2013)

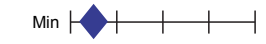
Contextual economic information

Exchange rate: 1 EUR = 7.808 NOK

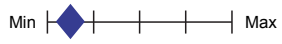
Avinor Continental represents 2.8% of European system gate-to-gate ATM/CNS provision costs

Operational conditions

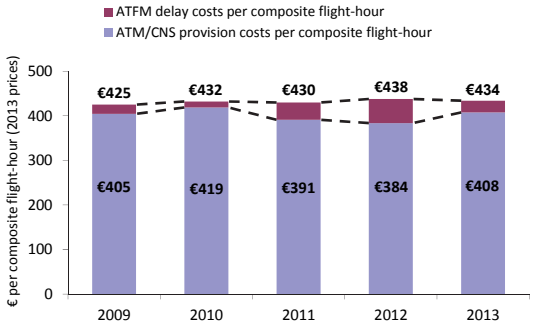
Aggregated complexity score:

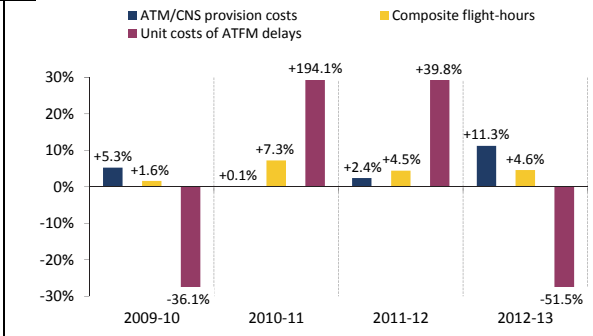


Seasonal traffic variability:

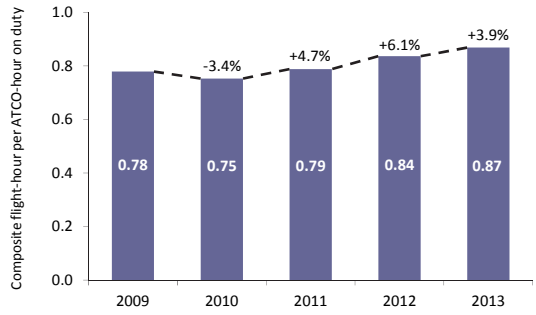


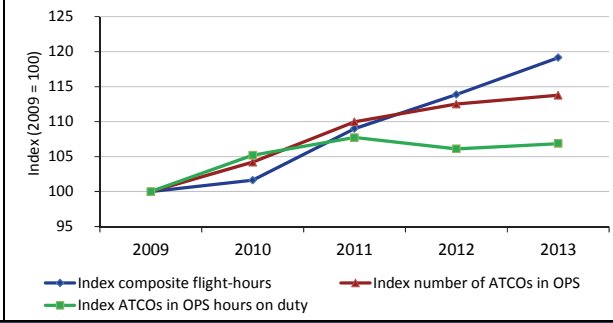
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



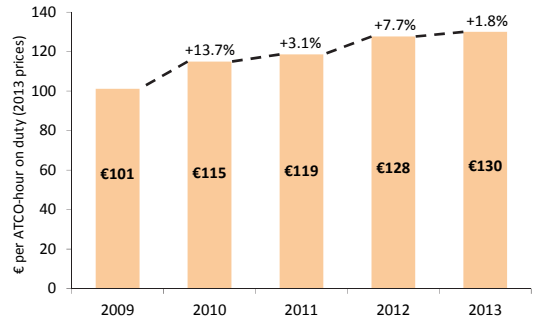


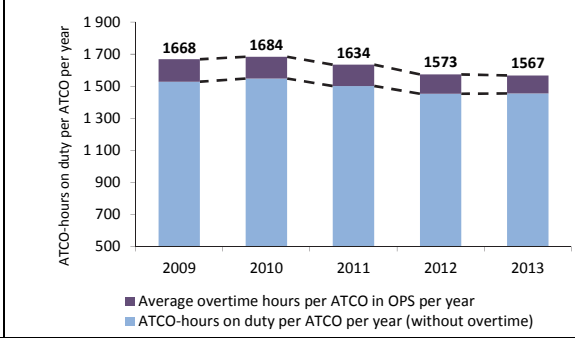
Trend in gate-to-gate ATCO-hour productivity



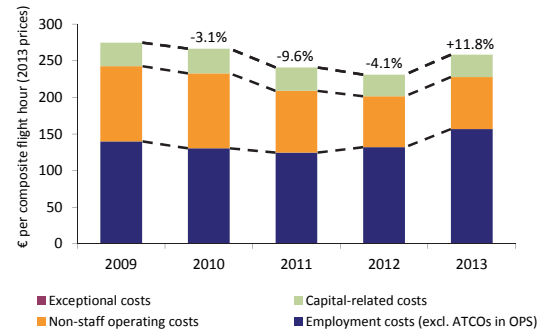


Trend in gate-to-gate employment costs per ATCO-hour

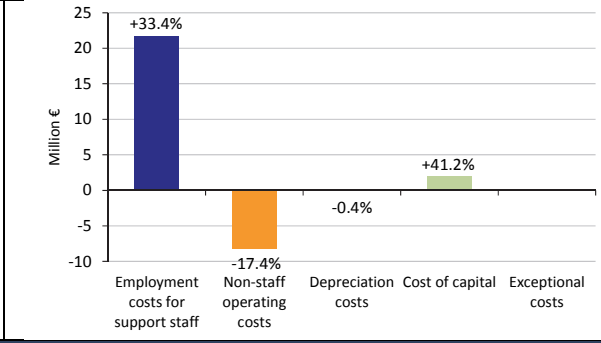




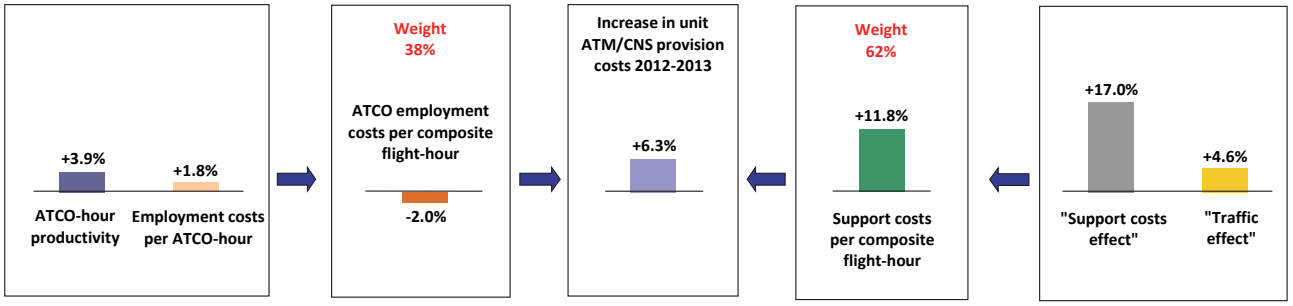
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

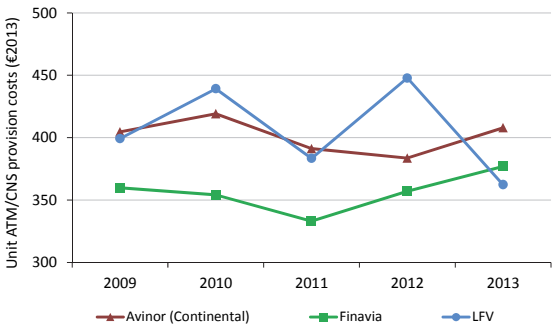


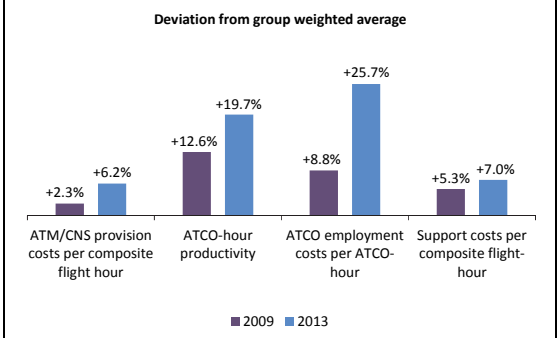
Changes in financial cost-effectiveness (2012-2013)



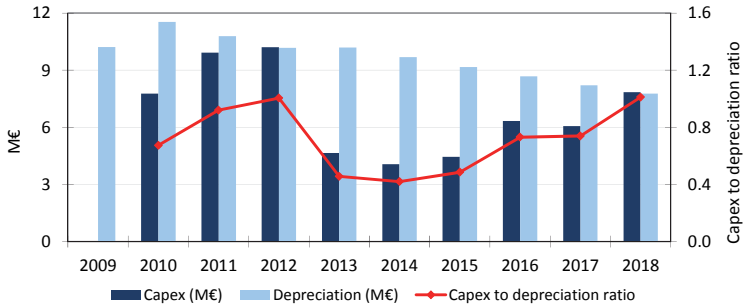
Avinor Continental (Norway) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 1996 (Oslo) 2004 (Stav.) 2008 (Bodø)	C: 1996 (Oslo) 2004 (Stav.) 2008 (Bodø)	C: 2004 (Stav.) 2008 (Bodø)	C: 2000 (Stav.) 2004 (Bodø) 2009 (Oslo)
€20.2M (2008-2014)						2009	Oslo	Oslo		Oslo
			€8.0M			2010				
	€2.9M					2011				
						2012				Oslo
						2013	Oslo	Oslo		
						2014				
€118.5M (2015-2024)	€13.1M	€2.3M	€30.8M	€2.2M	€2.1M	2015				
						2016				
						2017				
						2018	Oslo	Oslo		
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	New ATM infrastructure	ATM	70.6	2015	2019
2	RVT (Remote and Virtual Towers, will replace the traditional ATC/AFIS TWR with a remotely operated solution)	ATM	26.5	2015	2024
3	Norwegian Wide Area Multilateration (NORWAM)	SUR	22.8	2015	2018
4	SNAP (Southern Norway Airspace Project) project	ATM	14.8	2008	2014
5	Natcon Target concept implementation	ATM	14.2	2015	2016

Belgocontrol (Belgium) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: Belgium is within the EURO Zone

Belgocontrol represents 1.9% of European system gate-to-gate ATM/CNS provision costs

Operational conditions

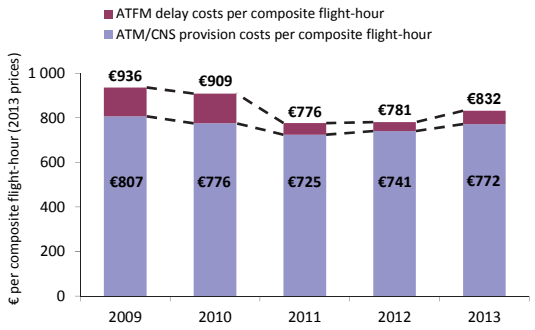
Aggregated complexity score:

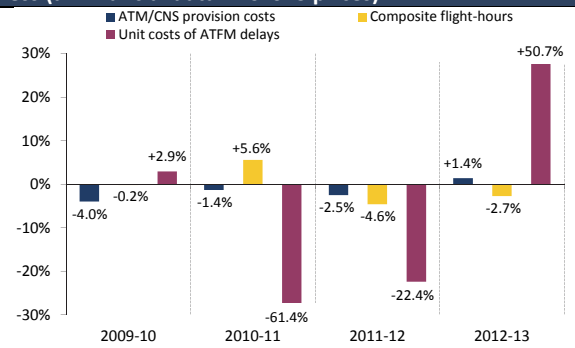
Min — Max

Seasonal traffic variability:

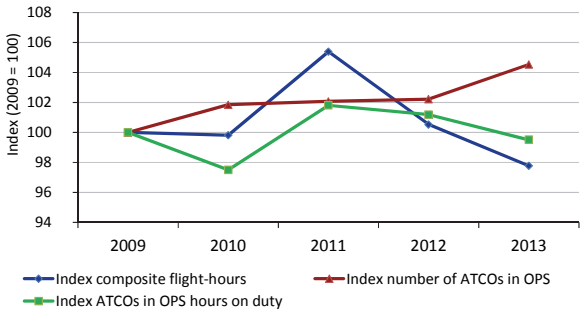
Min — Max

Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)

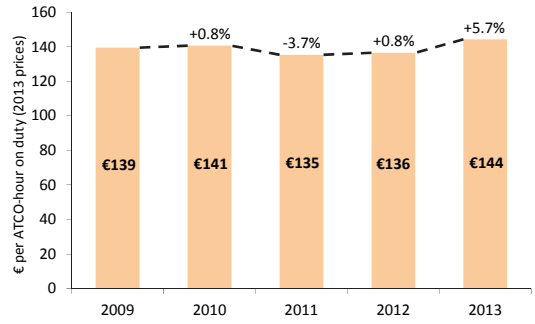


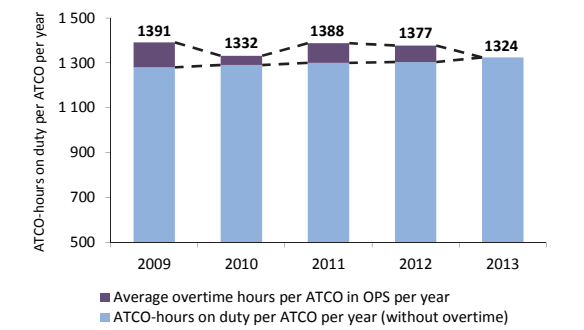


Trend in gate-to-gate ATCO-hour productivity

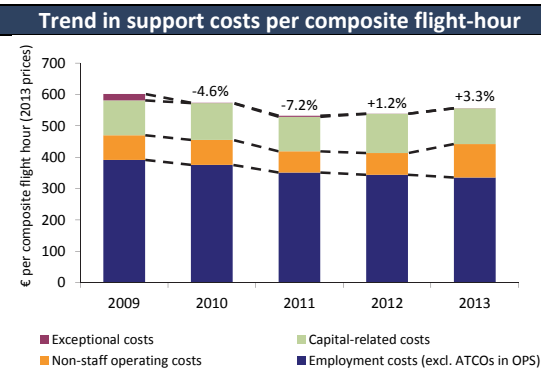


Trend in gate-to-gate employment costs per ATCO-hour

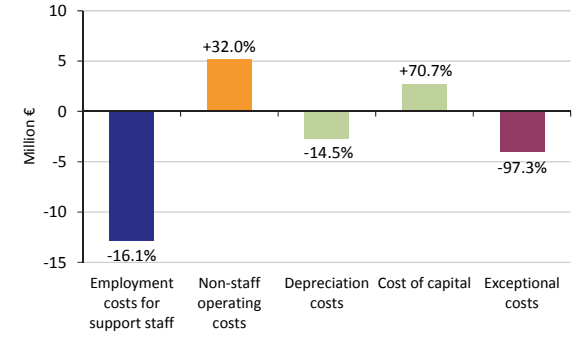




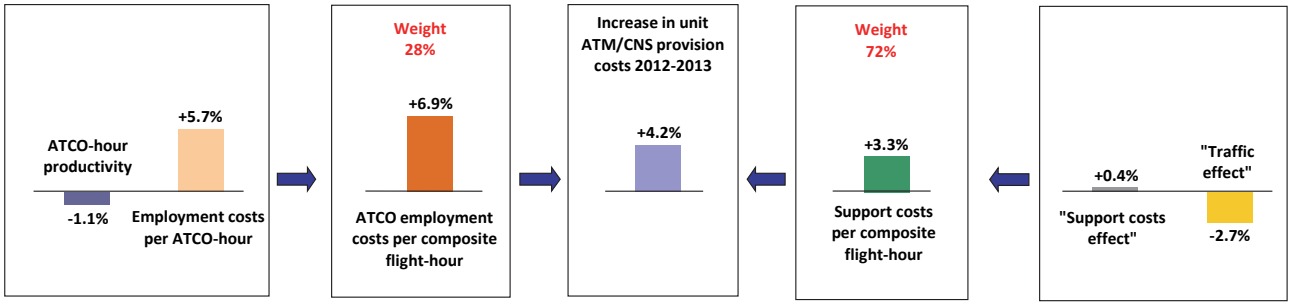
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

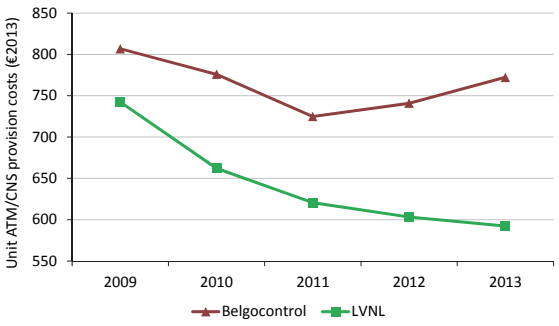


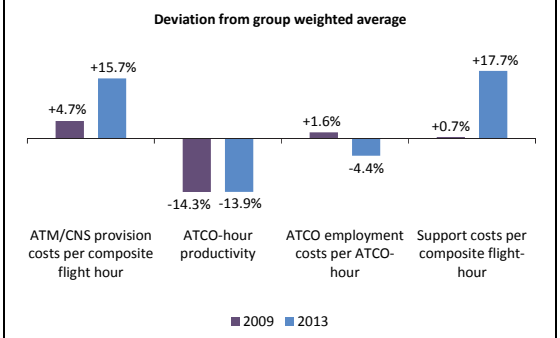
Changes in financial cost-effectiveness (2012-2013)



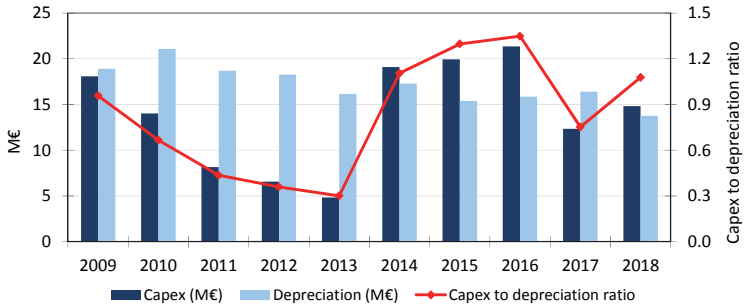
Belgocontrol (Belgium) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2009	C: 2003	C: 2009	C: 2008-2009
						2009				(2008-2009)
						2010				
						2011				
			€13.9M			2012				
						2013				
						2014				
						2015				
						2016				
€17.6M	€6.9M	€14.3M	€24.9M		€24.8M	2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Continuous evolution of the ATM system (Canac 2 A/S RFC)	ATM	16.6	2015	2019
2	A-SMGCS at Liège and Charleroi airports	SUR	10.4	2015	2019
3	Purchase of PSR/Mode S radars	SUR	6.5	2010	2013
4	Replacement and overhaul of VOR and DME equipment	NAV	6.2	2015	2019
5	A-SMGCS2 at Brussels airport	SUR	5.5	2015	2019

BULATSA (Bulgaria) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: 1 EUR = 1.956 BGN

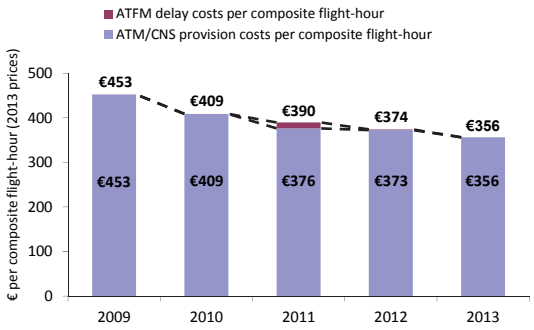
BULATSA represents 0.9% of European system gate-to-gate ATM/CNS provision costs

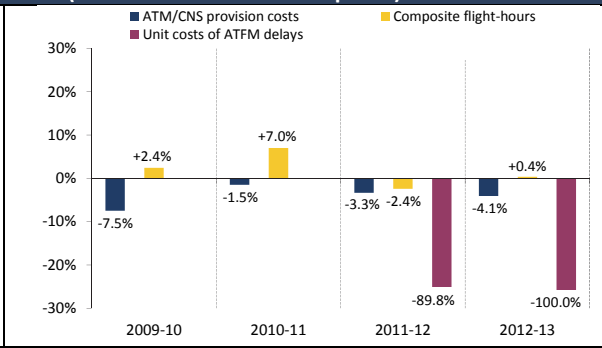
Operational conditions

Aggregated complexity score: Min — Max

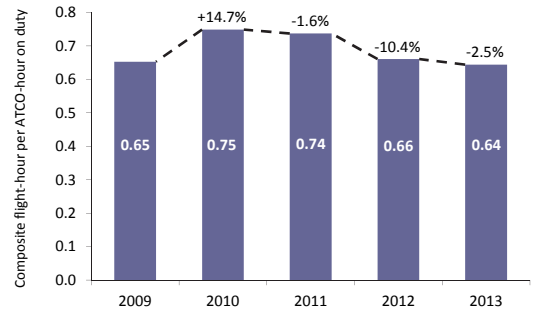
Seasonal traffic variability: Min — Max

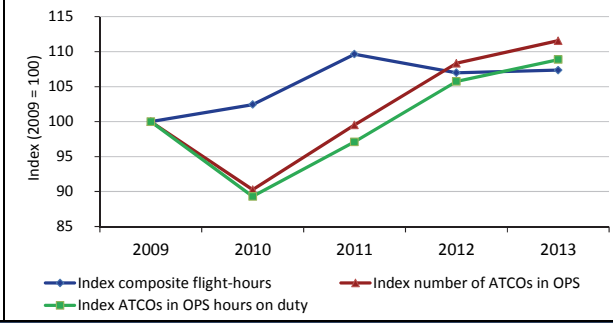
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



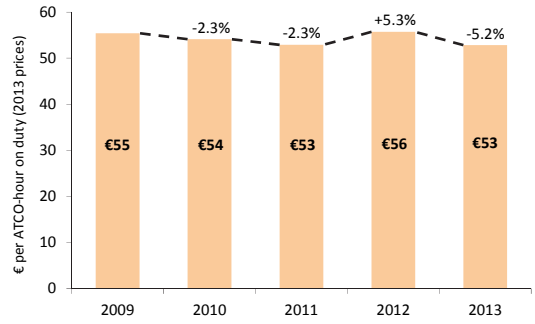


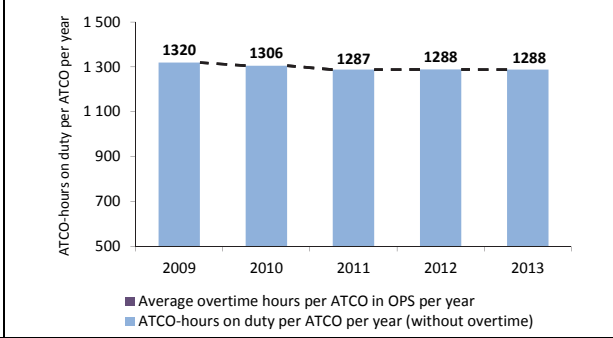
Trend in gate-to-gate ATCO-hour productivity



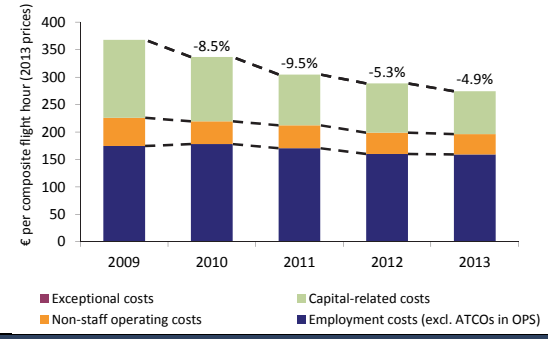


Trend in gate-to-gate employment costs per ATCO-hour

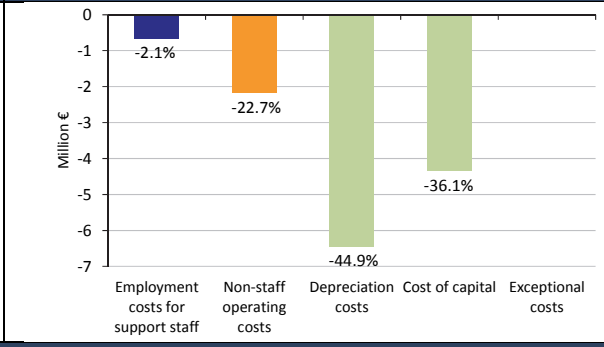




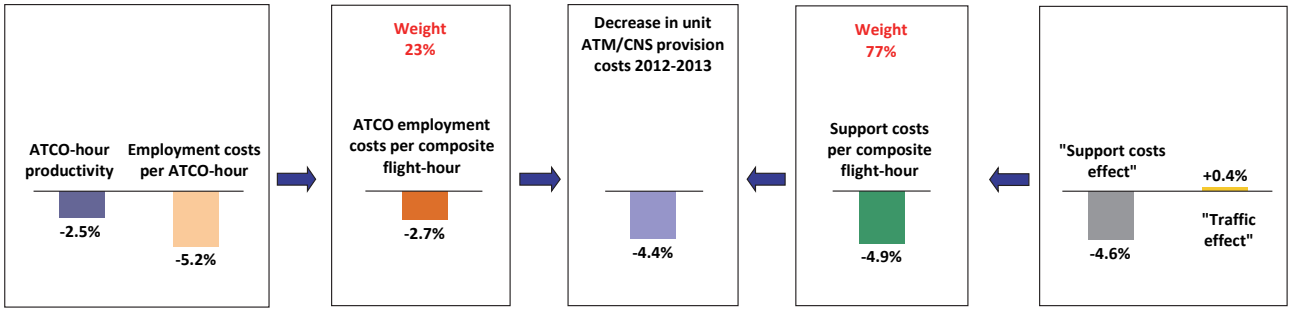
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

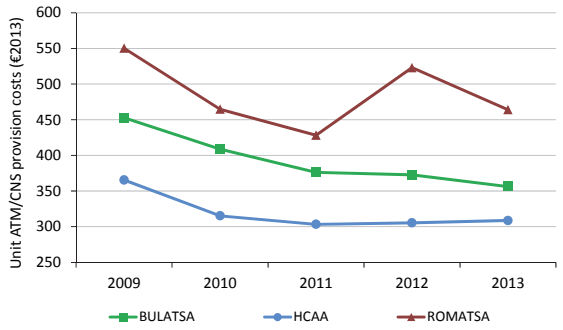


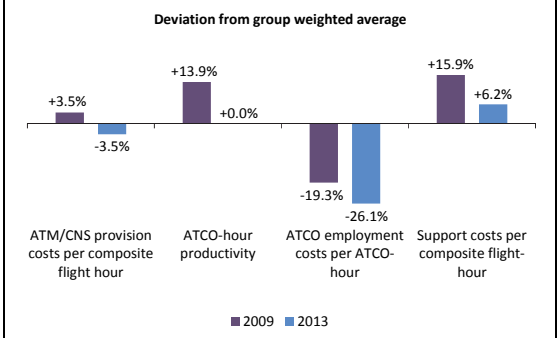
Changes in financial cost-effectiveness (2012-2013)



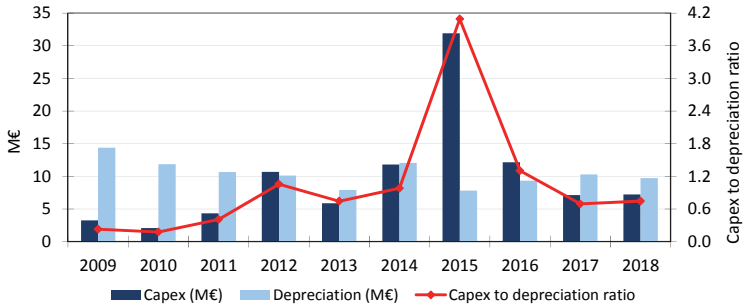
BULATSA (Bulgaria) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS C: 2005*	RDPS C: 2005*	HMI C: 2005*	VCS C: 2003*
						2009				
						2010				
€12.7M				€9.4M		2011				
	€17.0M	€4.0M	€23.9M		€1.2M	2012				
						2013				
						2014				
						2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	New en-route PSR and MSSRs	SUR	14.3	2011	2015
2	Extension and upgrade of the SATCAS system	ATM	8.7	2009	2015
3	New tower at Sofia airport and its adjacent structure	Building	8.1	2009	2013
4	Modernisation of the A/G radiocommunication equipment	COM	5.2	2013	2015
5	New UHF system	COM	4.2	2011	2014

Croatia Control (Croatia) – Cost-effectiveness KPIs (€2013)

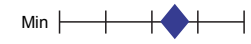
Contextual economic information

Exchange rate: 1 EUR = 7.576 HRK

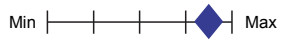
Croatia Control represents 1.0% of European system gate-to-gate ATM/CNS provision costs

Operational conditions

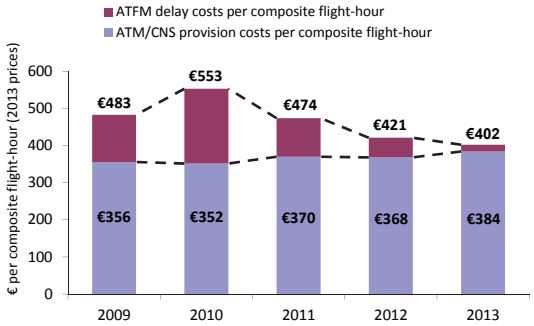
Aggregated complexity score:

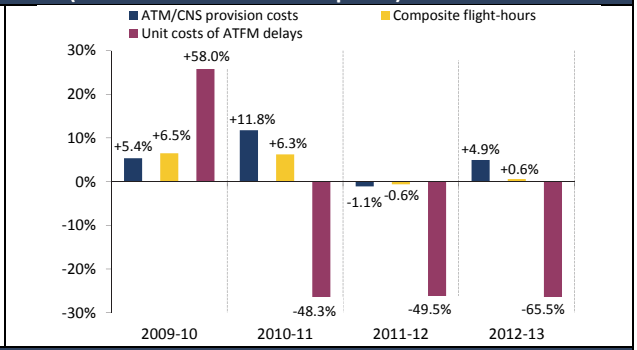


Seasonal traffic variability:

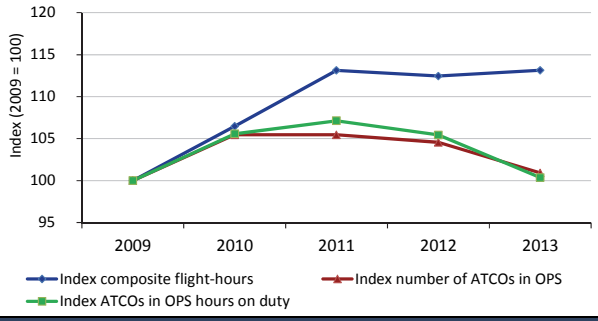


Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)

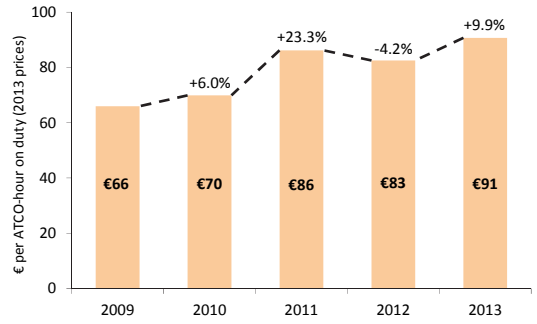


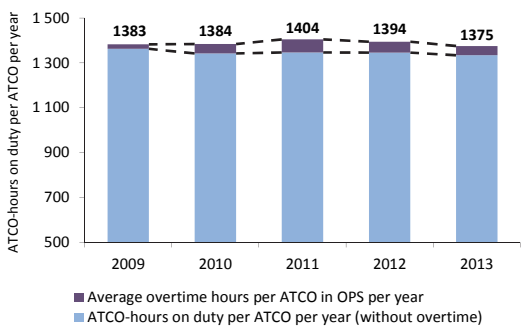


Trend in gate-to-gate ATCO-hour productivity

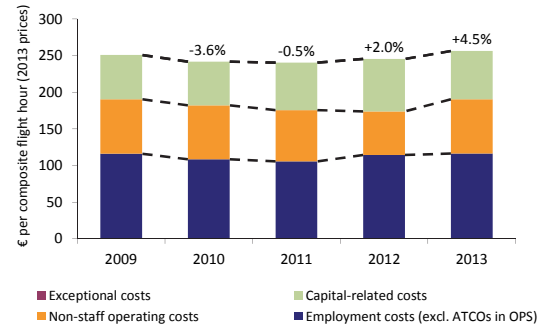


Trend in gate-to-gate employment costs per ATCO-hour

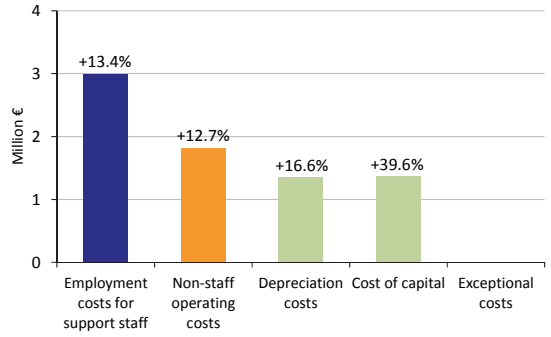




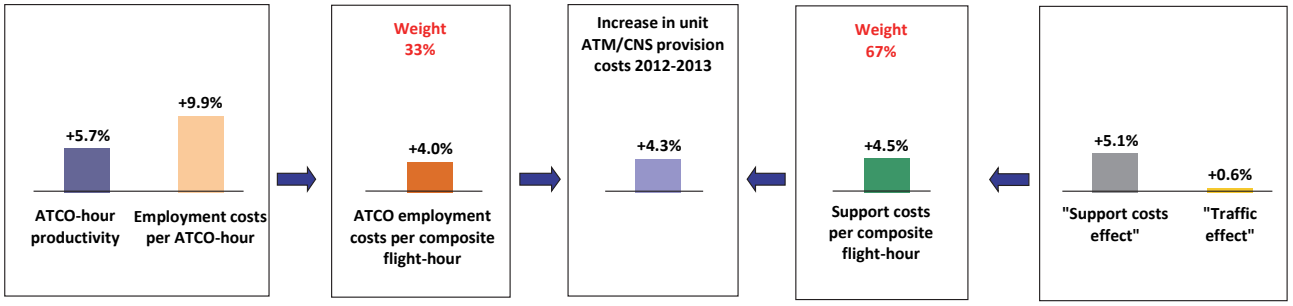
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

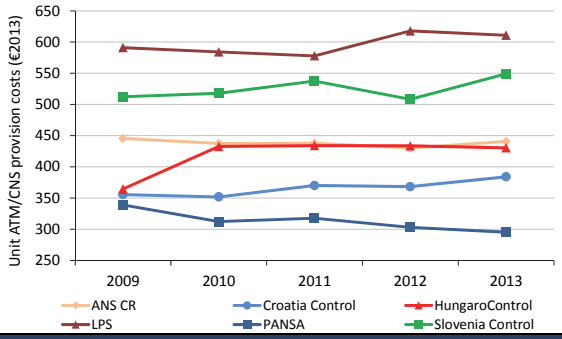


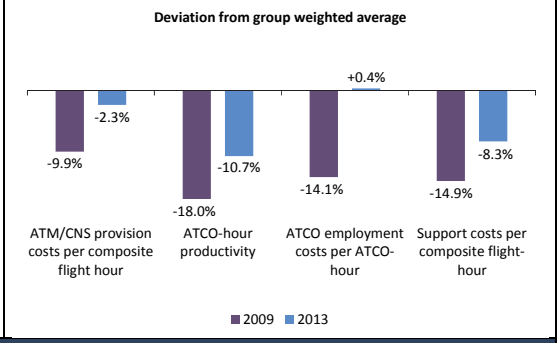
Changes in financial cost-effectiveness (2012-2013)



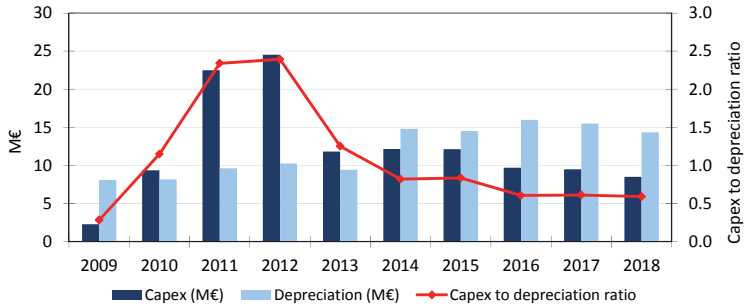
Croatia Control (Croatia) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS C: 2014*	RDPS C: 2014*	HMI C: 2014*	VCS C: 2005*
€46.6M	€14.8M (2004-2019)	€2.6M (2008-2013)	€3.9M	€1.5M	€2.3M	2009				
						2010				
						2011				
						2012				
						2013				
						2014				
€20.4M		€5.0M	€3.1M	€7.0M	€10.1M	2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	CroATMS/COOPANS Upgrade	ATM	38.5	2011	2014
2	ATM System Upgrade	ATM	17.9	2015	2019
3	CroATM (FMTP) Upgrade and Extension to Regional ATC Centres-Phase 1	ATM	8.1	2009	2011
4	Reconstruction of Old Buildings (RP2)	Buildings	7.0	2015	2019
5	VOICE-COM Systems Modernization and Replacement Project	COM	5.5	2015	2019

DCAC Cyprus (Cyprus) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: Cyprus is within the EURO Zone

DCAC Cyprus represents 0.5% of European system gate-to-gate ATM/CNS provision costs

Operational conditions

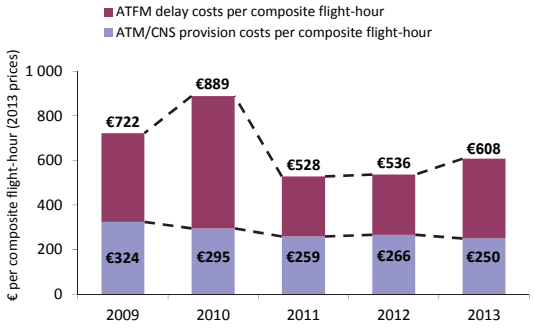
Aggregated complexity score:

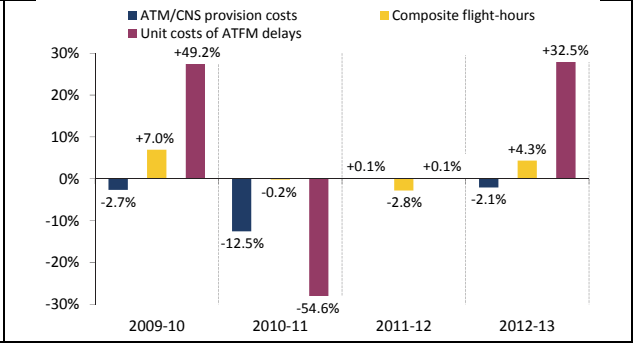
Min — Max

Seasonal traffic variability:

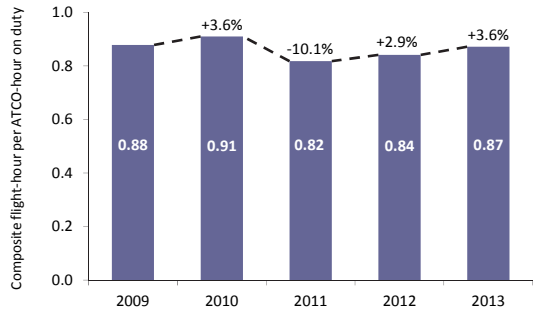
Min — Max

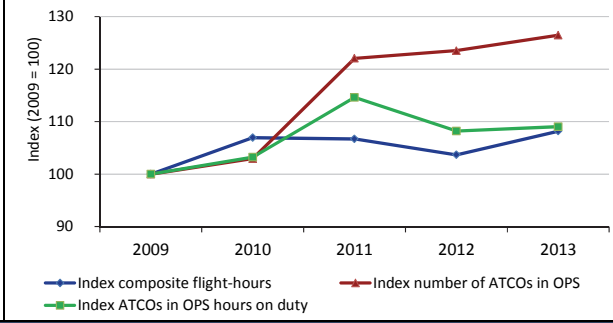
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



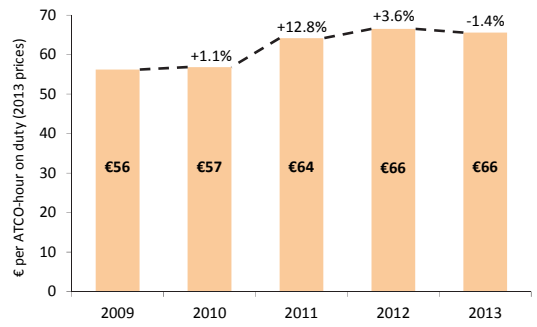


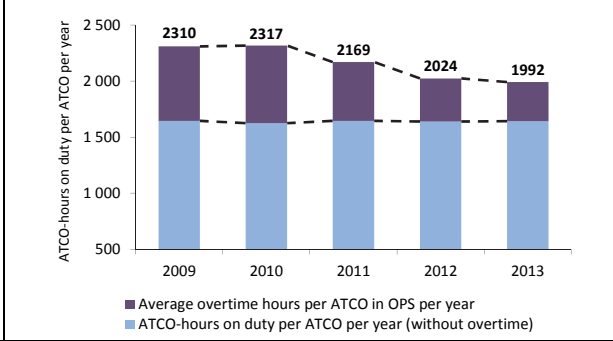
Trend in gate-to-gate ATCO-hour productivity



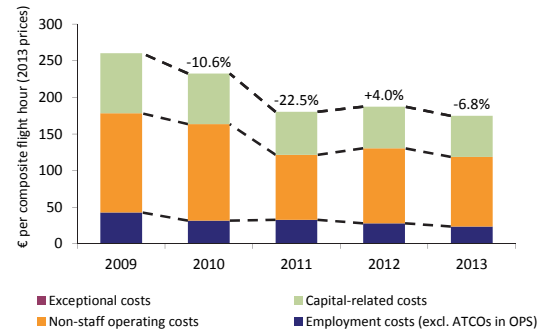


Trend in gate-to-gate employment costs per ATCO-hour

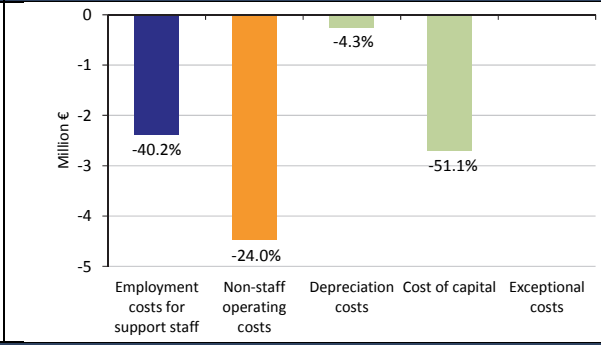




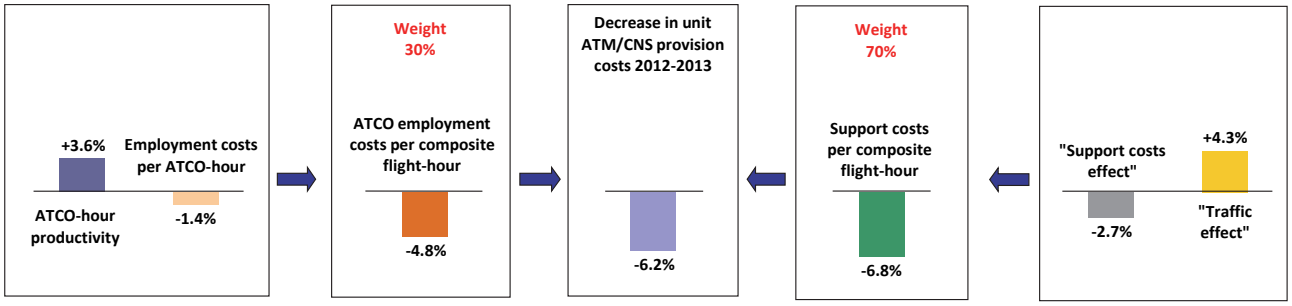
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

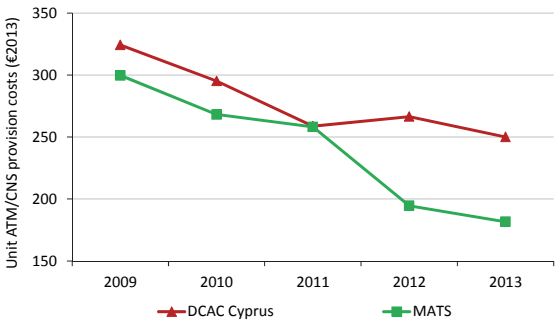


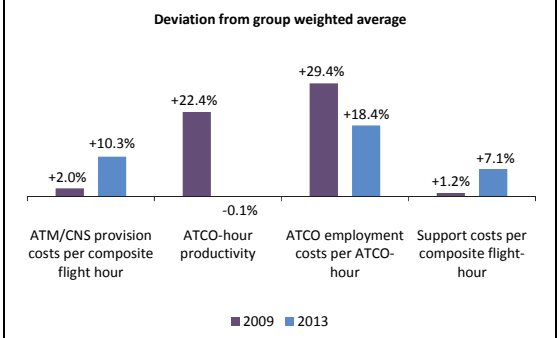
Changes in financial cost-effectiveness (2012-2013)



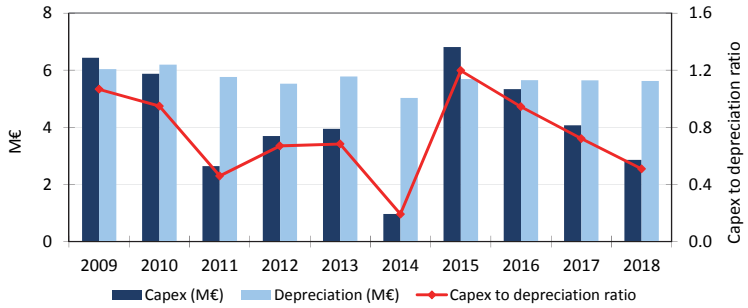
DCAC Cyprus (Cyprus) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2000*	C: 2000*		C: 1998*
€20.5M (2003-2010)				€8.9M (2006-2010)		2009				
						2010				
						2011				
€4.9M						2012				
	€11.3M	€1.3M	€12.5M (2006-2018)			2013				
						2014				
						2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Implementation of new ATM systems and purchase of new equipment in Nicosia ACC (LEFCO)	ATM	20.5	2003	2010
2	New Air Traffic Control Building in Nicosia	Building	8.9	2006	2010
3	Radar updates in Kiona	SUR	8.4	2006	2014
4	Data link services- EC29/2009, COMS & HMI	COM	4.8	2016	2018
5	Replacement of Lara SSR and installation of SSR at Paphos International airport	SUR	3.7	2015	2017

DFS (Germany) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: Germany is within the EURO Zone

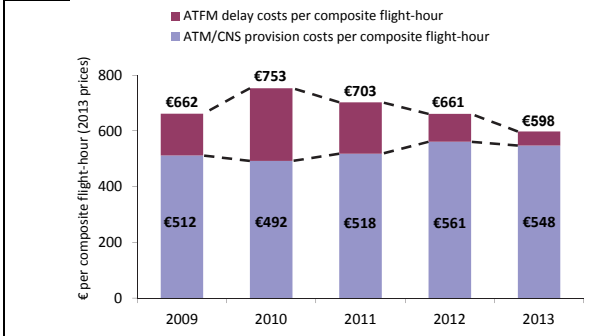
DFS represents 12.8% of European system gate-to-gate ATM/CNS provision costs

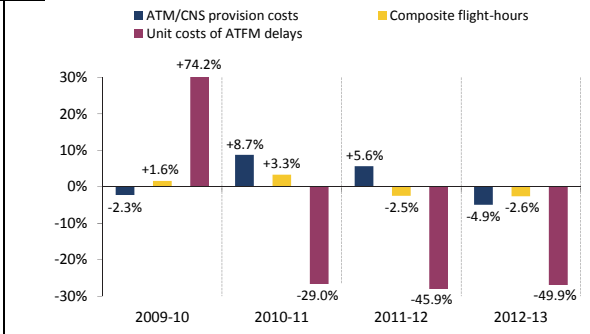
Operational conditions

Aggregated complexity score: Min — Max

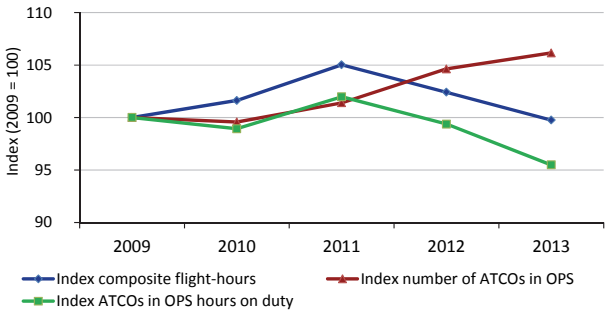
Seasonal traffic variability: Min — Max

Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)

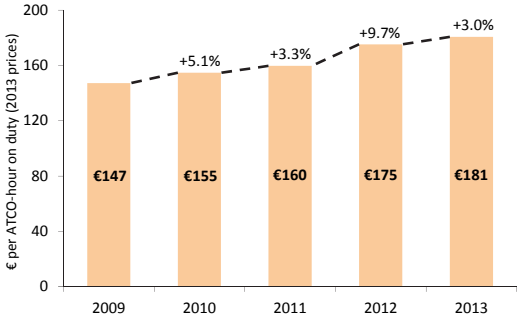


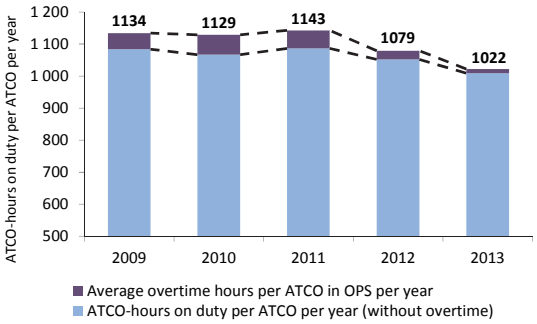


Trend in gate-to-gate ATCO-hour productivity

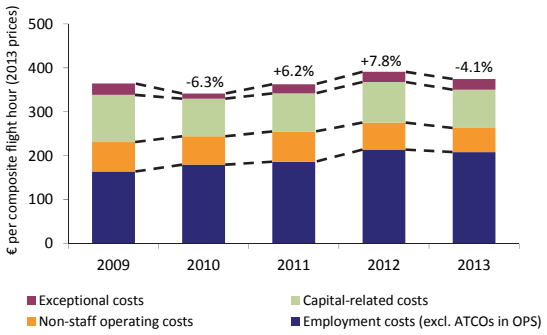


Trend in gate-to-gate employment costs per ATCO-hour

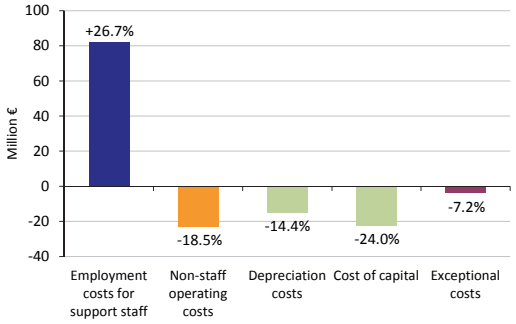




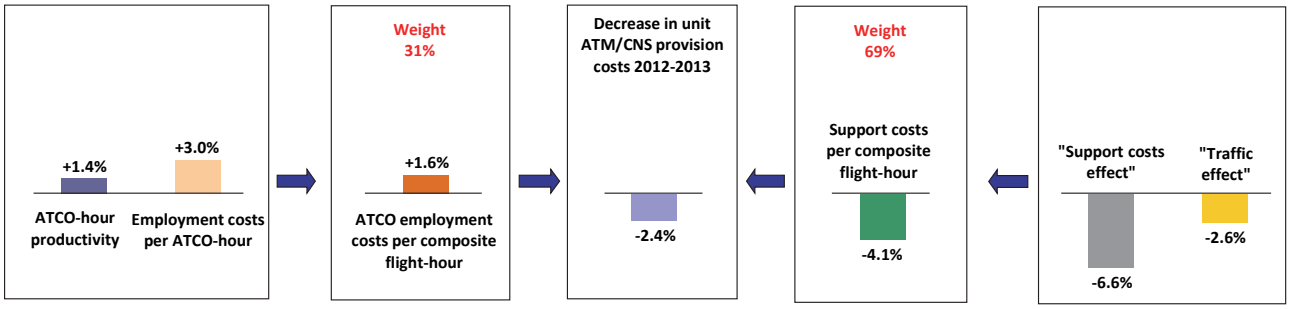
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

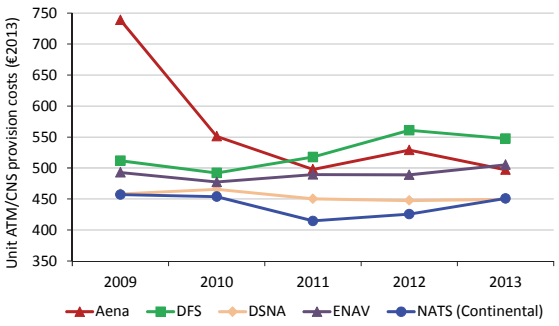


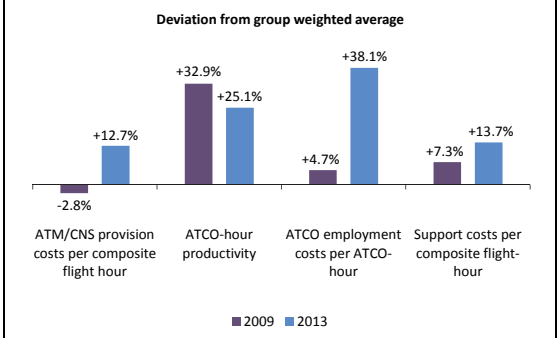
Changes in financial cost-effectiveness (2012-2013)



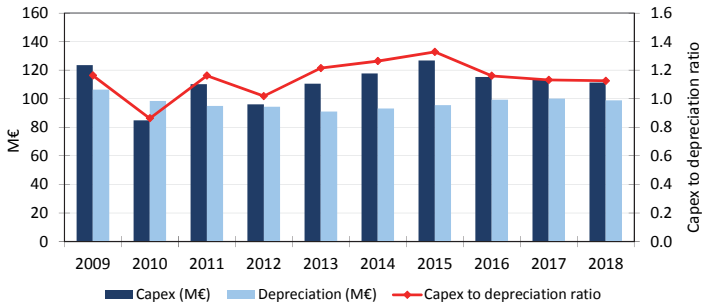
DFS (Germany) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2011 (Karl.) 2004 (Bremen) 1999 (Langen) 1999 (München)*	C: 2011 (Karl.) 2004 (Bremen) 1999 (Langen) 1999 (München)*	C: 2011 (Karl.) 2004 (Bremen) 2013 (Langen) 1999 (München)*	C: 2009 (Karl.) 2003 (Bremen) 2013 (Langen) 2002 (München)*
€467.7M (2004-2022)	€113.4M (2007-2020)	€51.8M (1999-2020)	€173.0M (2006-2027)	€155.8M (2002-2014)		2009				Karlsruhe
						2010			Bremen	
					€18.7M	2011	Karlsruhe	Karlsruhe	Karlsruhe	
						2012				
						2013			Langen, München	Langen
						2014				München
				€26.3M (2015-2017)		2015	Langen, München	Langen, München	Langen	
						2016			Langen, München	
						2017			München	
						2018	Bremen	Bremen	Bremen	
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Programme iCAS	ATM	314.6	2006	2022
2	MaRS - Modernisation and Replacement of Surveillance Infrastructure	SUR	139.7	2012	2027
3	Rasum 8.33 kHz	COM	68.7	2007	2020
4	Technical Centre Campus Langen	Buildings	59.0	2009	2016
5	P2 ATCAS Rehosting	ATM	51.8	2007	2019

DHMI (Turkey) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: 1 EUR = 2.531 TRY

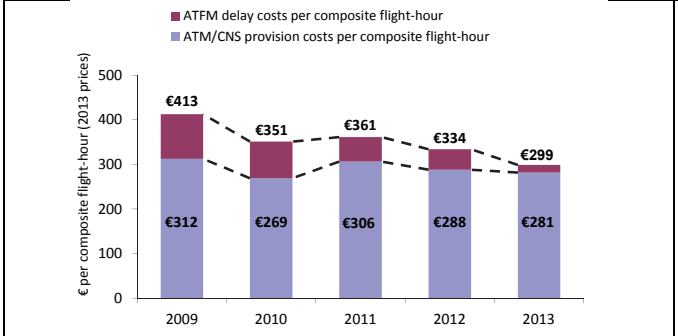
DHMI represents 4.7% of European system gate-to-gate ATM/CNS provision costs

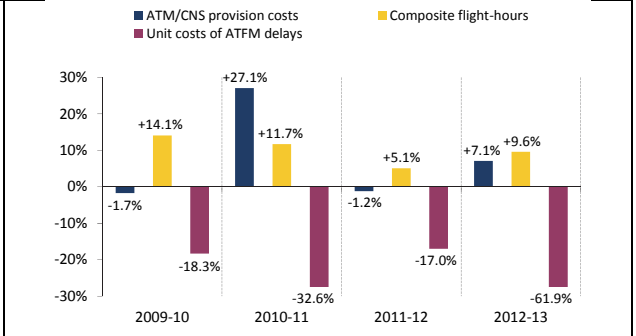
Operational conditions

Aggregated complexity score: Min — Max

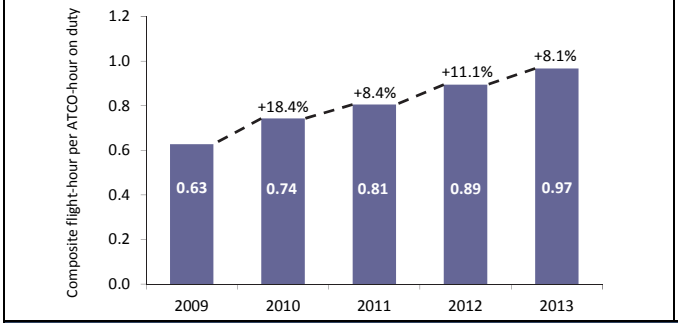
Seasonal traffic variability: Min — Max

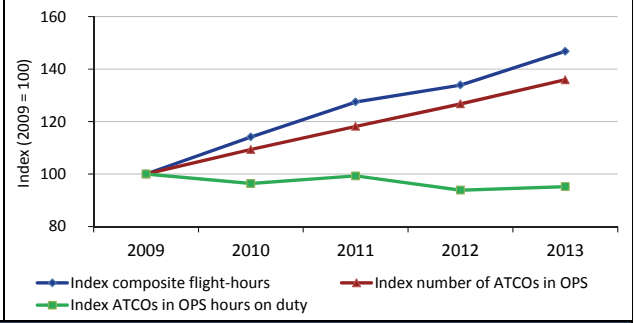
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



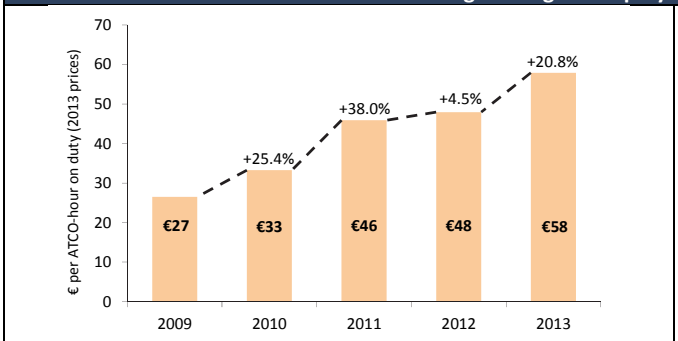


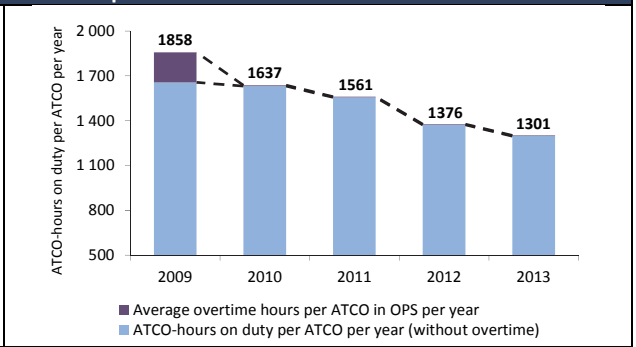
Trend in gate-to-gate ATCO-hour productivity



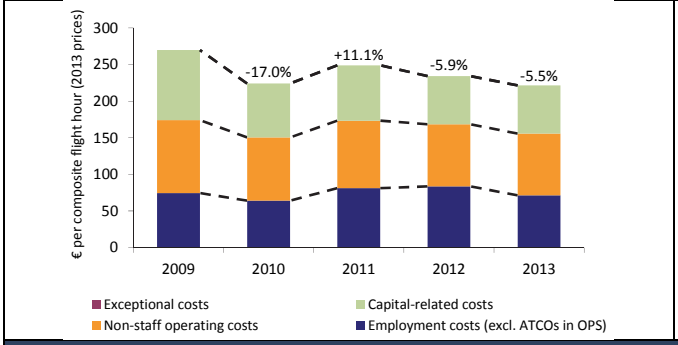


Trend in gate-to-gate employment costs per ATCO-hour

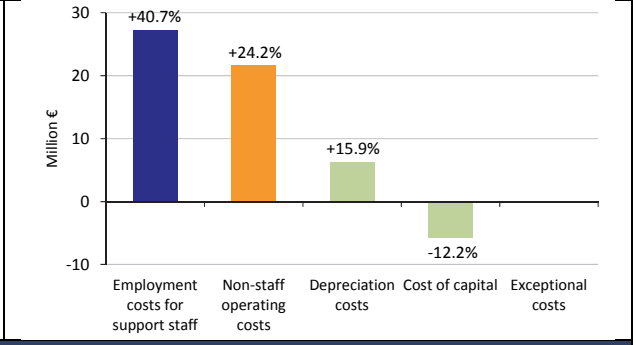




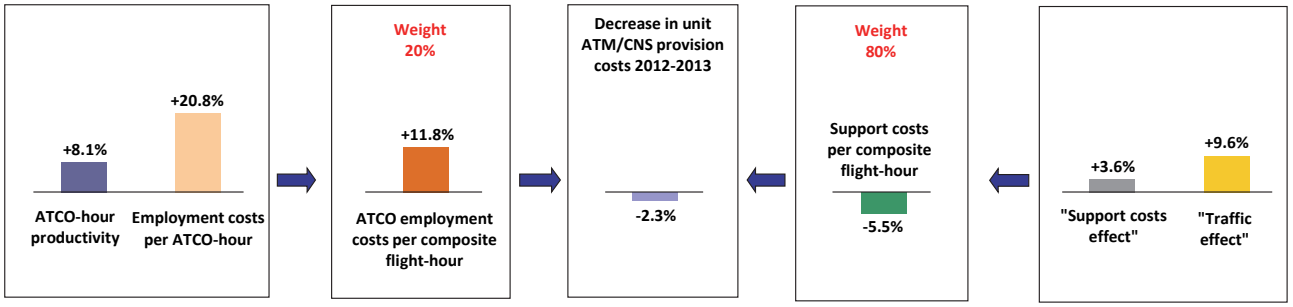
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

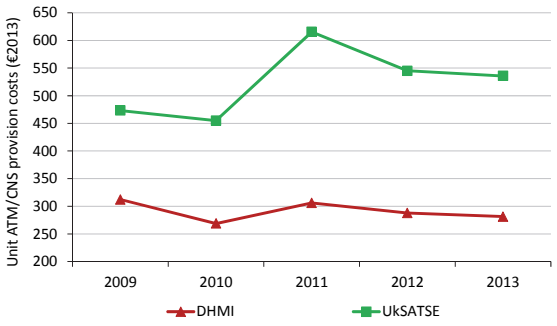


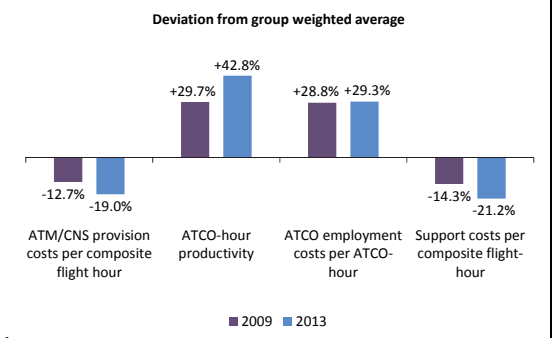
Changes in financial cost-effectiveness (2012-2013)



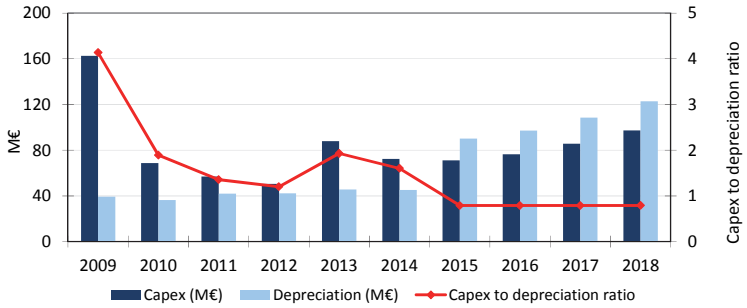
DHMI (Turkey) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2008 (All ACCs)*	C: 2008 (All ACCs)*	C: 2008 (All ACCs)*	C: 2004 (All ACCs)*
€94.7M (2008-2015)			€105.5M (2008-2016)	€93.3M (2008-2016)		2009				
	€40.6M	€32.2M				2010				
						2011				Ankara
					€13.0M	2012	All ACCs	All ACCs	All ACCs	Istanbul
						2013				
						2014				
						2015	All ACCs	All ACCs	All ACCs	All ACCs
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Replacement of existing radars and procurement of additional radars	SUR	44.3	2008	2014
2	ATC training complex	Building	43.2	2011	2016
3	Purchase of new Radar Data Processing and Flight Data Processing systems, new Human Machine Interface and Controller Working Positions	ATM	41.4	2009	2014
4	Air navigation communication and terminal systems periodic modernisation	COM	40.6	2010	2015
5	Central Ankara ACC and ATC Complexes	ATM	38.6	2008	2014

DSNA (France) – Cost-effectiveness KPIs (€2013)

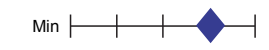
Contextual economic information

Exchange rate: France is within the EURO Zone

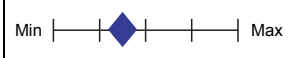
DSNA represents 14.9% of European system gate-to-gate ATM/CNS provision costs

Operational conditions

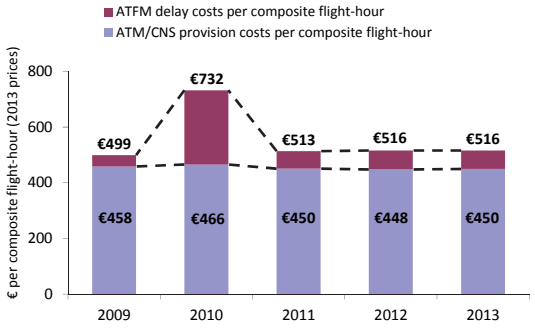
Aggregated complexity score:

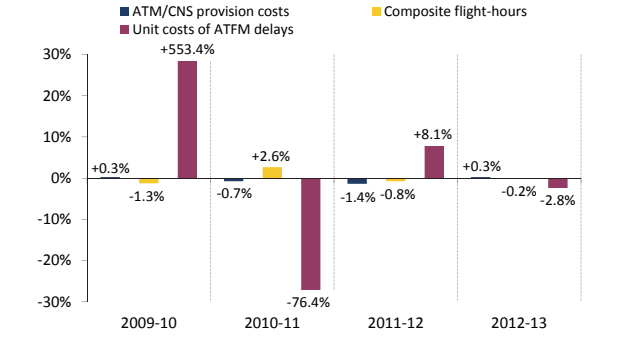


Seasonal traffic variability:

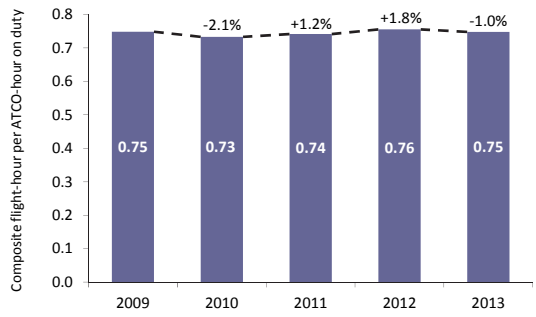


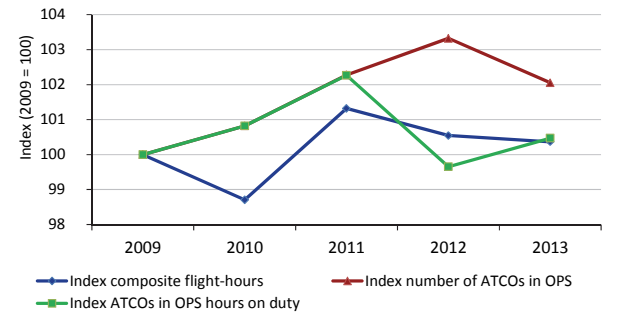
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



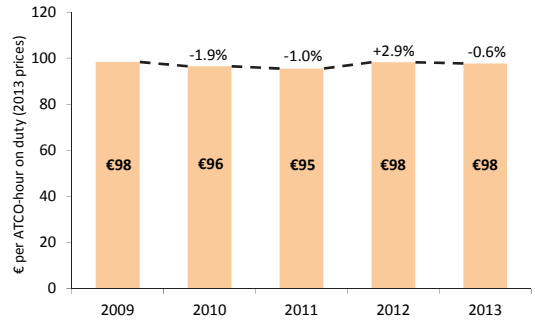


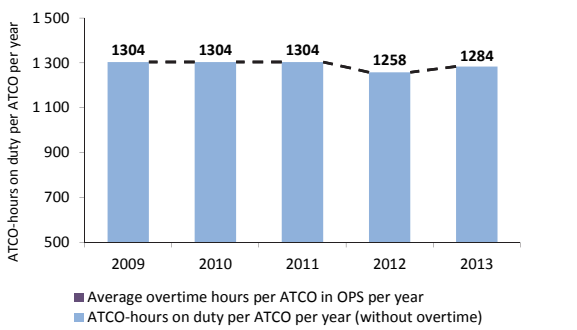
Trend in gate-to-gate ATCO-hour productivity



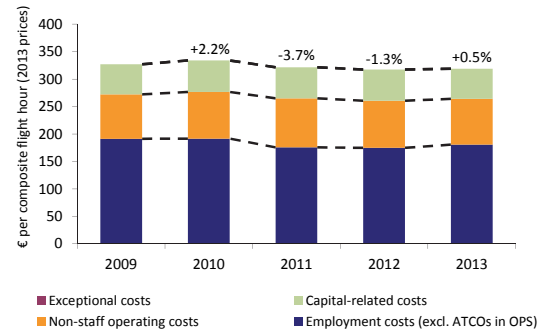


Trend in gate-to-gate employment costs per ATCO-hour

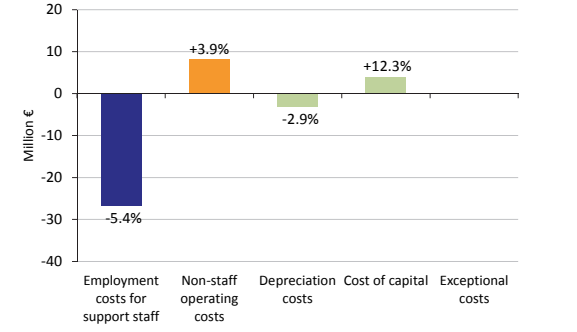




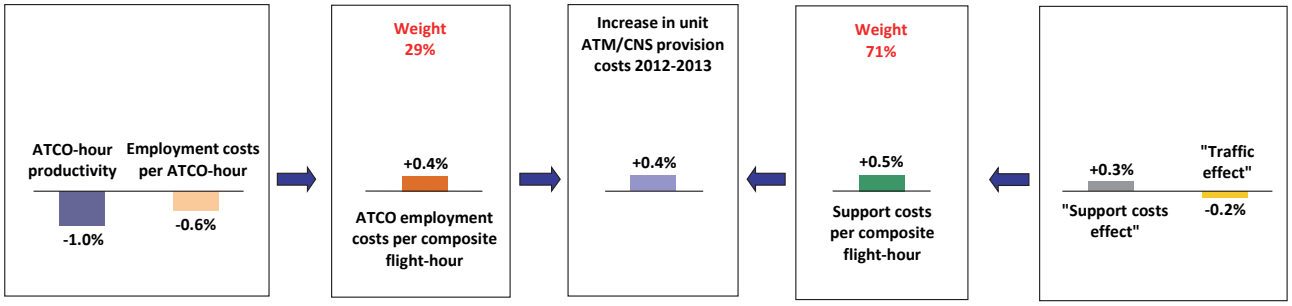
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

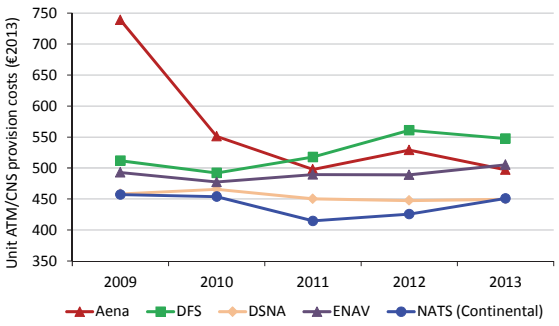


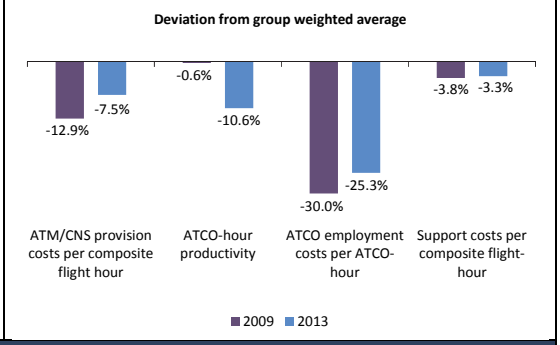
Changes in financial cost-effectiveness (2012-2013)



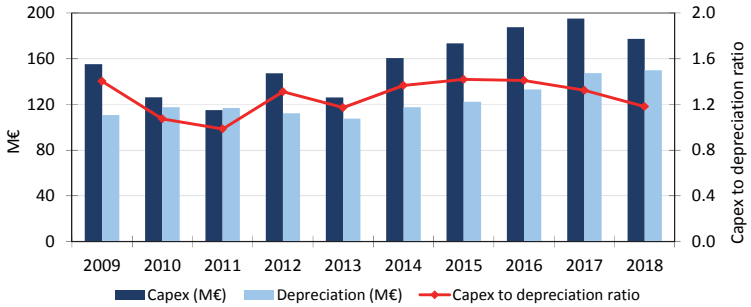
DSNA (France) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 1982*	C: 1982*	C: 2000*	C: 2000 (Marseille) 2000/2003 (Brest) 2002/2005 (Reims) 2002/2006 (Paris) 2003 (Bordeaux)*
€919.0M (2003-2021)	€419.0M (2005-2018)					2009			All ACCs	
						2010				
						2011				
		€54.0M	€27.5M			2012				
						2013				
						2014				
					€382.3M	2015				
						2016	Marseille, Reims	Marseille, Reims	Marseille, Reims	
						2017	Paris	Paris	Paris	
						2018	Bordeaux, Brest	Bordeaux, Brest	Bordeaux, Brest	
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	4-FLIGHT (New ATM system integrating COFLIGHT, Java HMI and advanced ATC tools in an electronic environment)	ATM	547.0	2003	2019
2	Evolution of CAUTRA DataLink	COM	266.0	2005	2018
3	COFLIGHT (Automatic flight plan processing system forming the core of 4-FLIGHT)	ATM	185.0	2003	2019
4	ERATO (stripless system designed in an all-electronic environment with innovative MTCD functionalities)	ATM	109.0	2003	2019
5	MCO and Evol NAV / COM / ATM (capex for operational maintenance of NAV, COM and ATM devices)	Other	99.0	2015	2019

EANS (Estonia) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: Estonia is within the EURO Zone

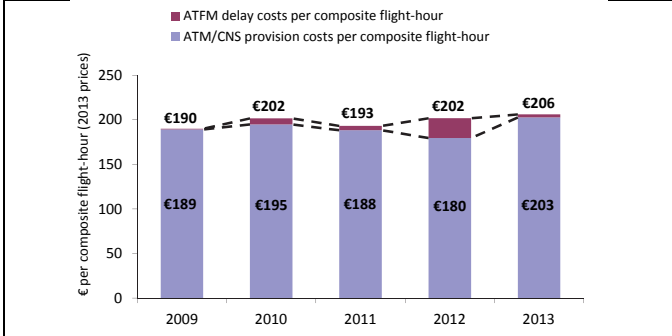
EANS represents 0.2% of European system gate-to-gate ATM/CNS provision costs

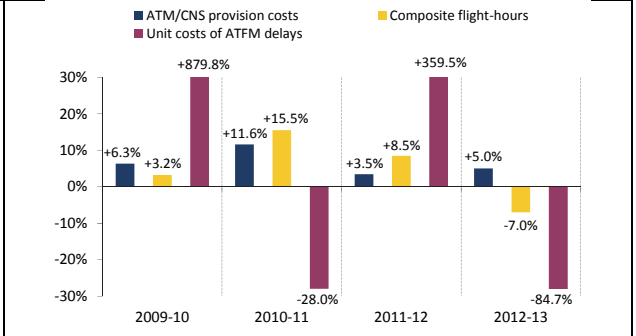
Operational conditions

Aggregated complexity score: Min — Max

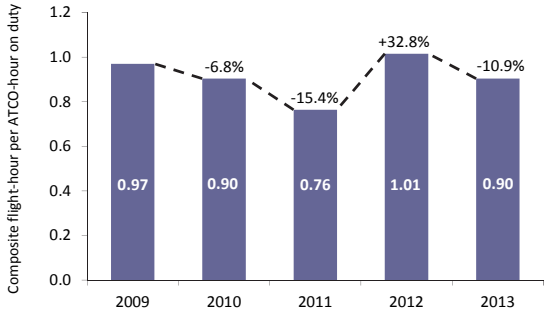
Seasonal traffic variability: Min — Max

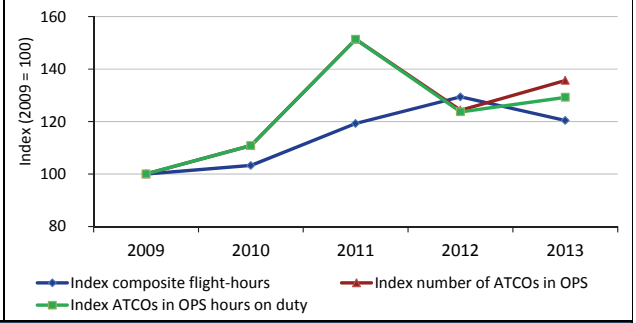
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



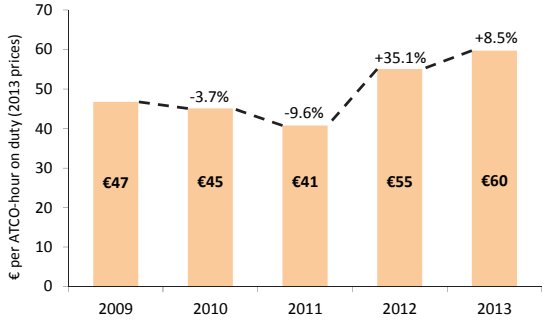


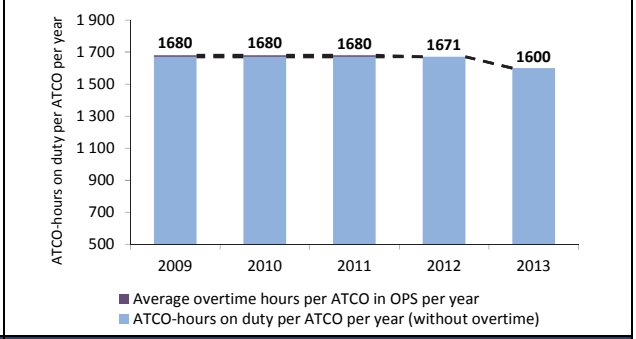
Trend in gate-to-gate ATCO-hour productivity



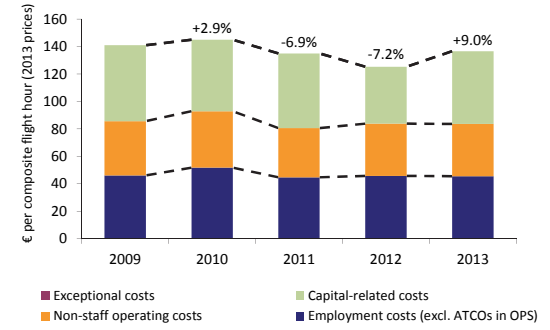


Trend in gate-to-gate employment costs per ATCO-hour

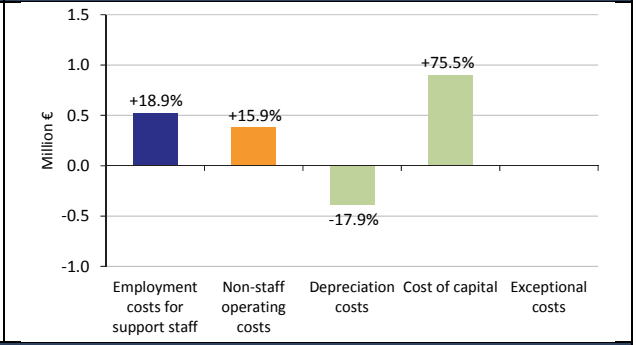




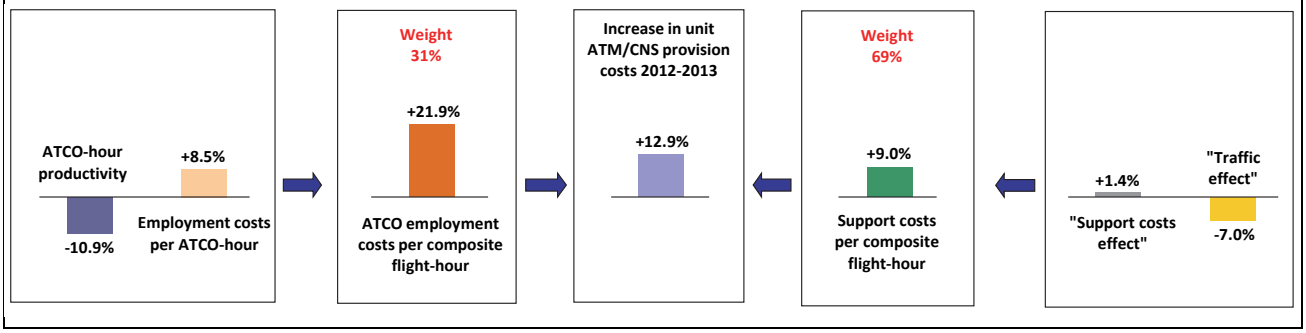
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

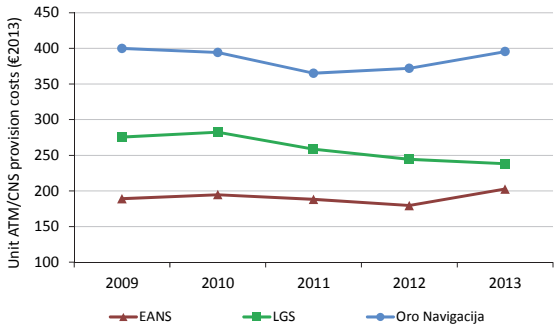


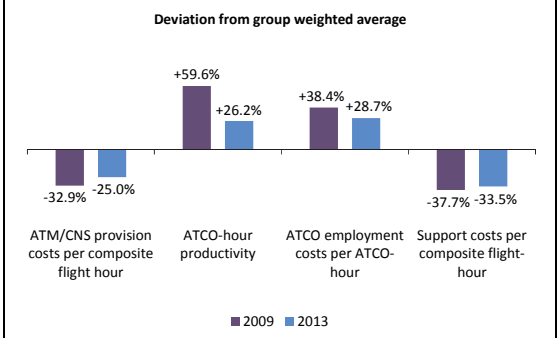
Changes in financial cost-effectiveness (2012-2013)



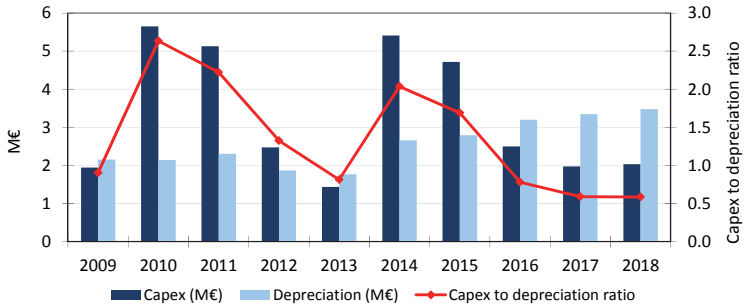
EANS (Estonia) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS C: 2012	RDPS C: 2002	HMI C: 2012	VCS C: 2012
€9.0M						2009				
						2010				
		€1.0M				2011				
				€0.2M		2012				
						2013				
						2014				
						2015				
€8.0M	€1.5M	€1.4M	€1.5M	€2.3M	€0.4M	2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Replacement of EUROCAT ATM system in Tallinn ACC (including new ATCO HMI)	ATM	8.0	2009	2012
2	Expenses in ATM system covering: Cross-border operations, FRA, FUA, data recording/storage, CPDLC, messages exchange with CFMU, Tallinn Airport operations, FASTI tools, software environment for management processes	ATM	8.0	2015	2019
3	Maintenance of buildings and installations (CNS-ATM equipment and ANS operations), technical upgrade of installations for meeting	Building	2.3	2015	2017
4	Expenses in surveillance, including: Expansion of Tallinn airport SMR-MLAT infrastructure, exchange of surveillance data, installation of Tallinn FIR WAM system	SUR	1.5	2015	2019
5	Communication, including: G-G voice upgrade with St-Petersburg ATCC, implementation of DTIS and DLC messages for Tallinn airport	COM	1.5	2015	2019

ENAV (Italy) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: Italy is within the EURO Zone

ENAV represents 8.2% of European system gate-to-gate ATM/CNS provision costs

Operational conditions

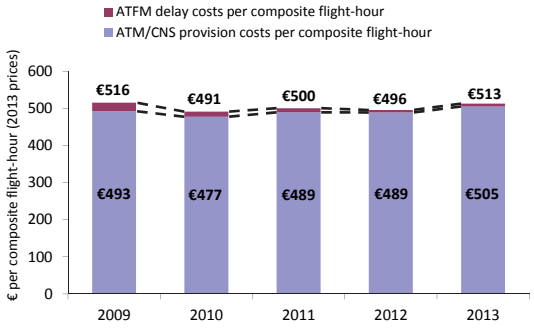
Aggregated complexity score:

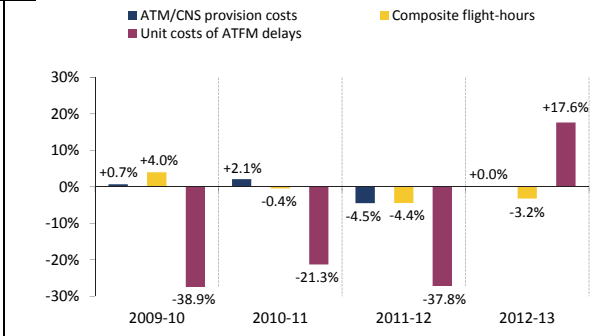
Min — Max

Seasonal traffic variability:

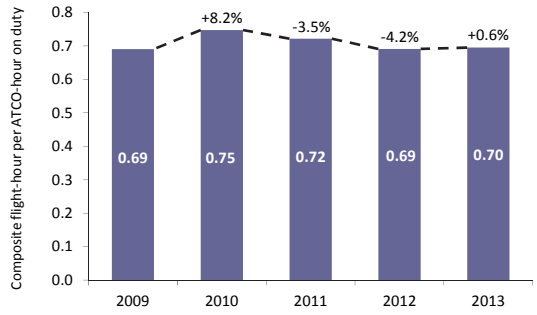
Min — Max

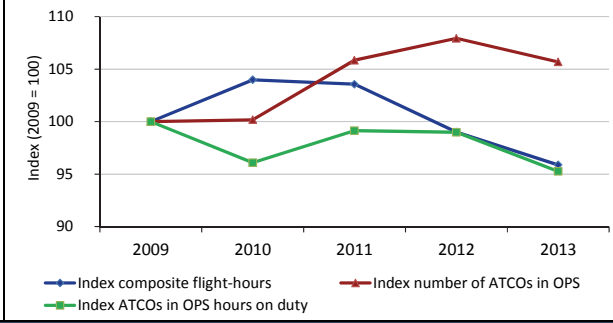
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



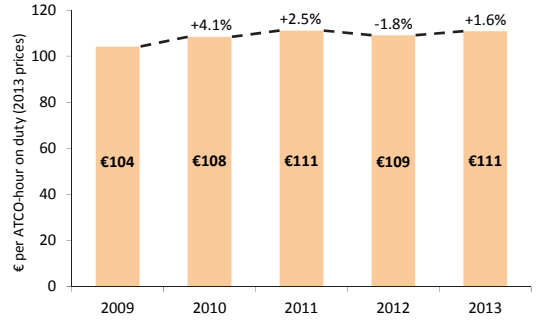


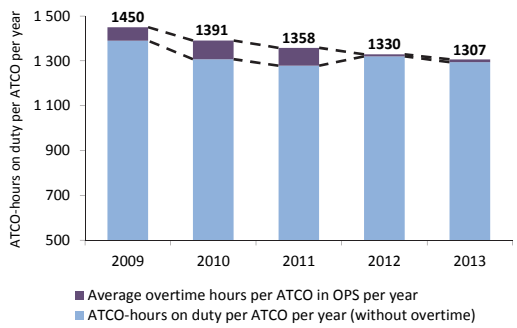
Trend in gate-to-gate ATCO-hour productivity



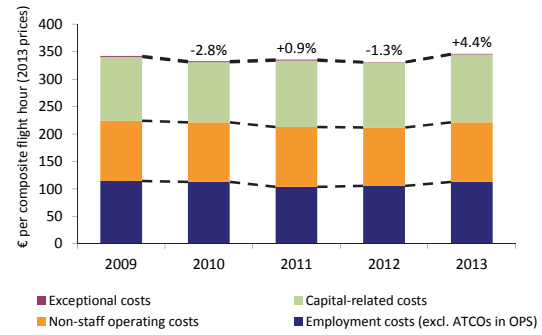


Trend in gate-to-gate employment costs per ATCO-hour

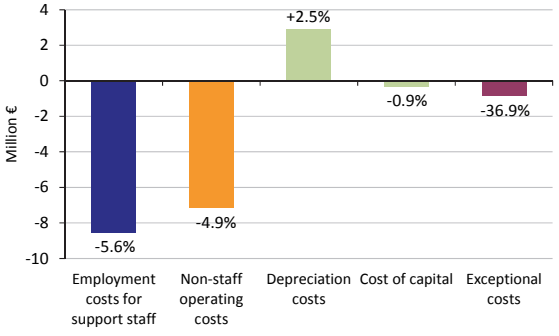




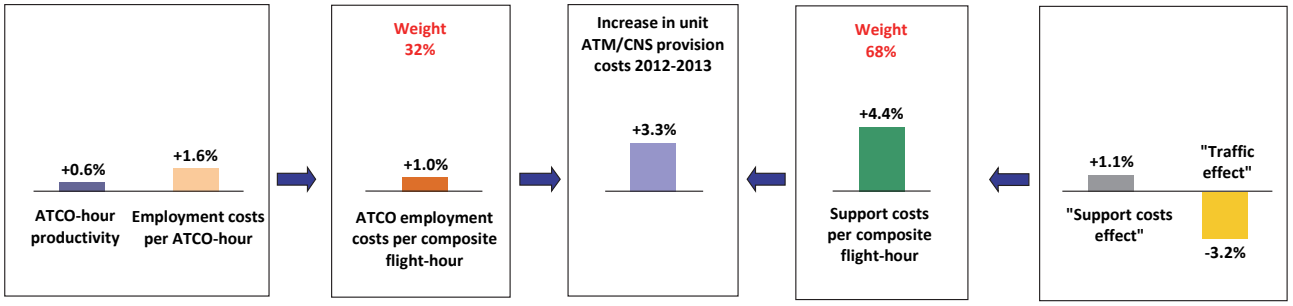
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

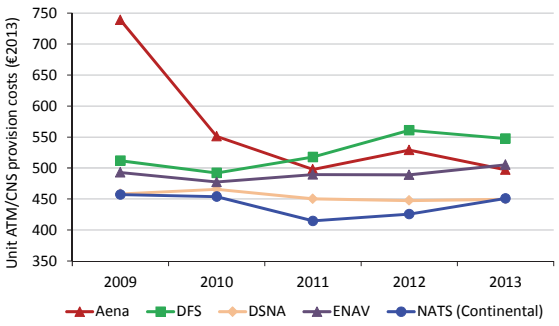


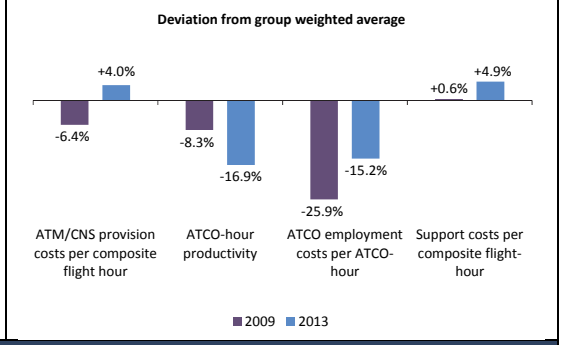
Changes in financial cost-effectiveness (2012-2013)



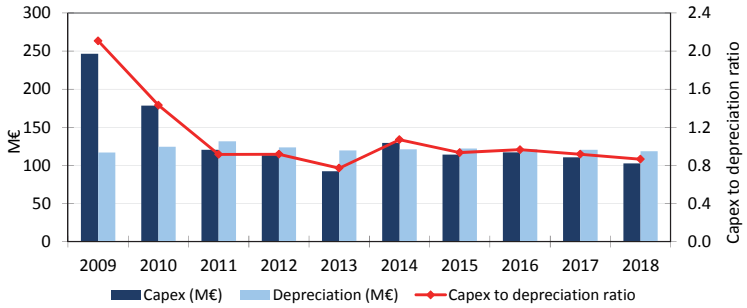
ENAV (Italy) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 1999 (All ACCs)*	C: 1999 (All ACCs)*	C: 1999 (All ACCs)*	C: 2000 (Roma) 2001 (Padova) 2005 (Brindisi, Mil.)*
						2009				Roma
						2010				
						2011				
						2012				
						2013				
						2014				
€209.8M	€45.5M	€1.3M	€32.3M		€434.3M	2015	All ACCs	All ACCs	All ACCs	
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Development of an integrated platform for the management of ATM procedures and aeronautical data (program 4-FLIGHT)	ATM	122.9	2015	2019
2	COFLIGHT (Automatic flight plan processing system forming the core of 4-FLIGHT)	ATM	30.7	2015	2019
3	Implementation of Datalink 2000+ system in all ACCs and major Italian airports	COM	28.9	2015	2017
4	ENET + ENET completion	ATM	25.7	2015	2019
5	Other	Other	430.1	2015	2019

Finavia (Finland) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: Finland is within the EURO Zone

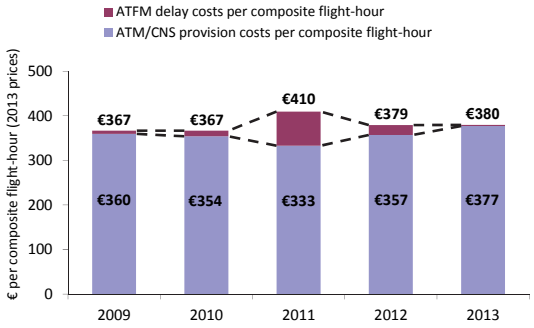
Finavia represents 0.8% of European system gate-to-gate ATM/CNS provision costs

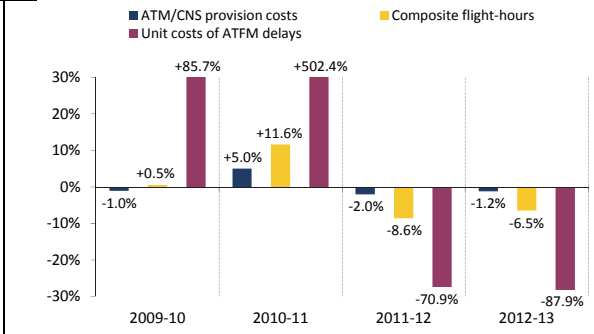
Operational conditions

Aggregated complexity score: Min – Max

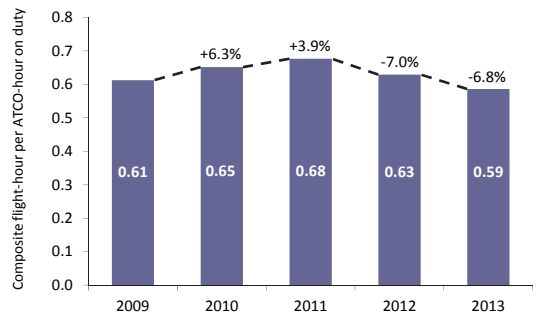
Seasonal traffic variability: Min – Max

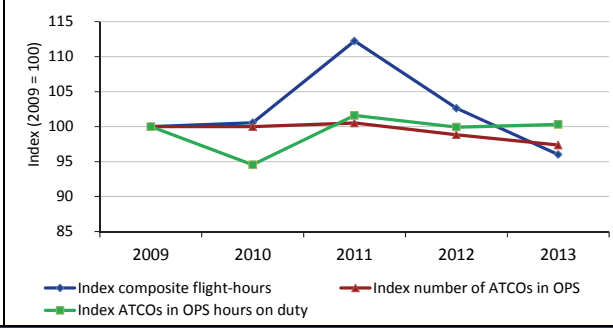
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



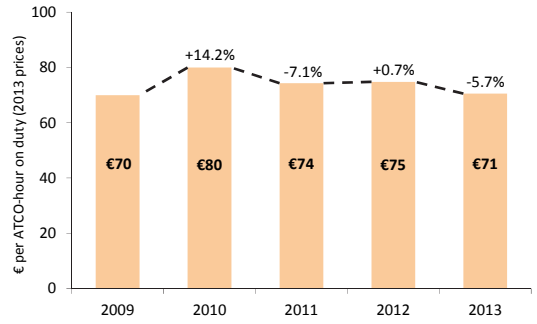


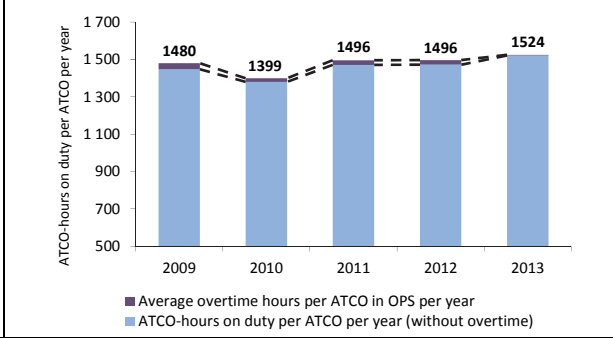
Trend in gate-to-gate ATCO-hour productivity



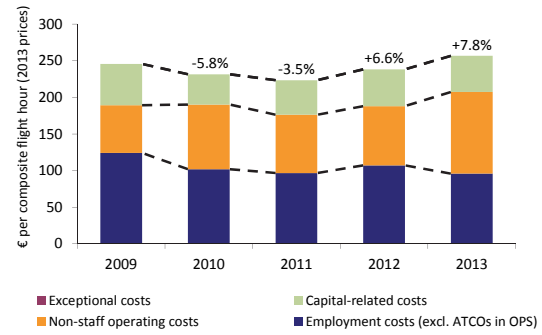


Trend in gate-to-gate employment costs per ATCO-hour

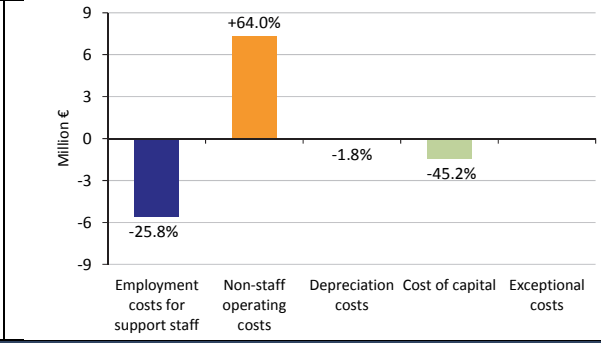




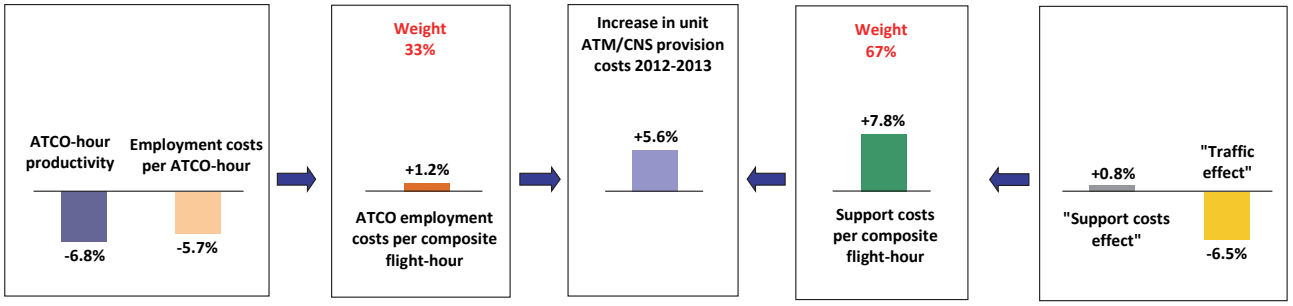
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

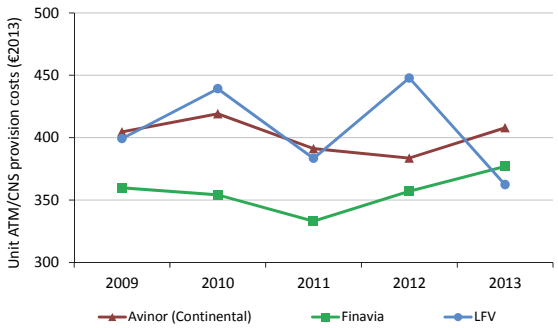


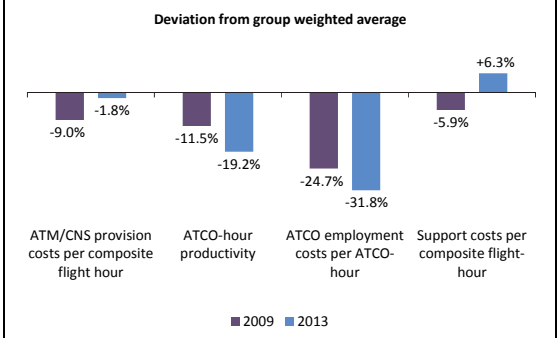
Changes in financial cost-effectiveness (2012-2013)



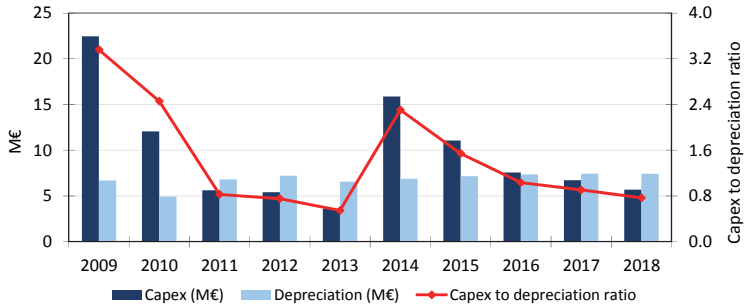
Finavia (Finland) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS C: 2012*	RDPS C: 2012*	HMI C: 2012*	VCS C: 2009*
€26.9M						2009				
						2010				
	€1.0M		€19.1M			2011				
						2012				
						2013				
		€10.4M				2014				
						2015				
	€8.5M					2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Replacement of ATM systems at Tampere and Helsinki Centres	ATM	13.8	2009	2013
2	ILS/DME renewal (all airports)	NAV	10.4	2014	2019
3	Investments in Wide area multilateration technology	SUR	7.5	2011	2016
4	Renewal of Secondary Surveillance Radars in various locations	SUR	6.8	2016	2019
5	VHF radiostations (8.33 kHz channel spacing > FL195)	COM	4.5	2016	2018

HCAA (Greece) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: Greece is within the EURO Zone

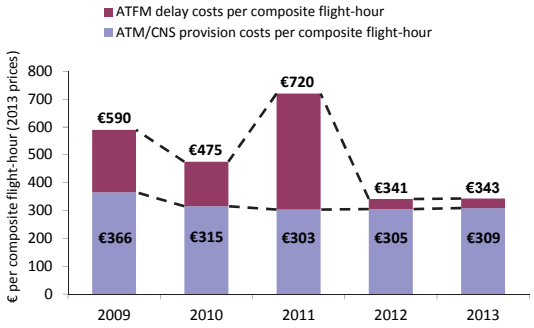
HCAA represents 1.9% of European system gate-to-gate ATM/CNS provision costs

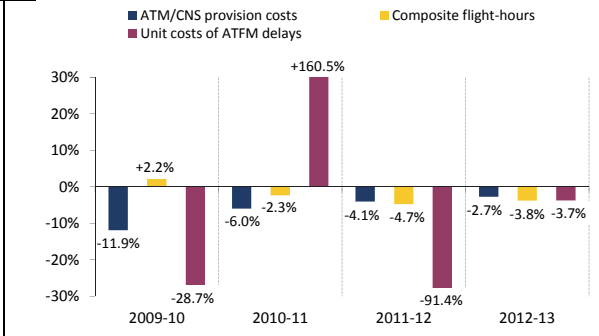
Operational conditions

Aggregated complexity score: Min — Max

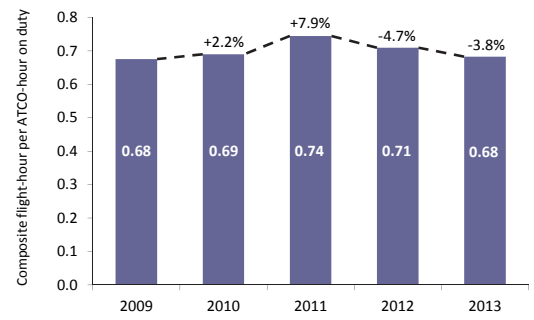
Seasonal traffic variability: Min — Max

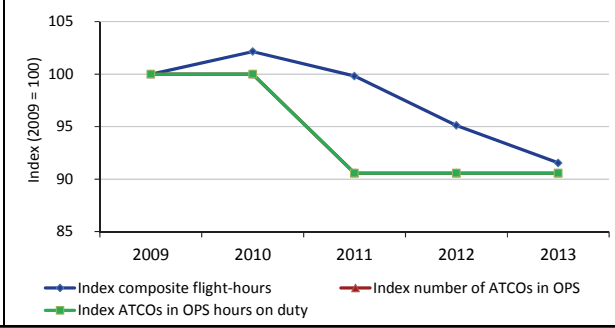
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



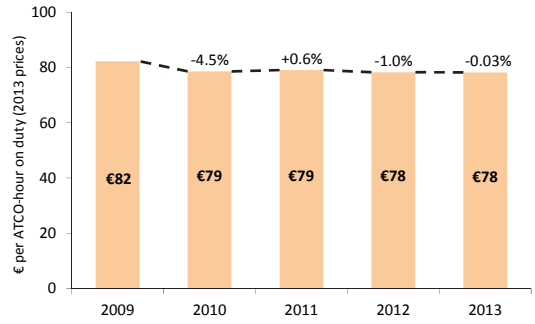


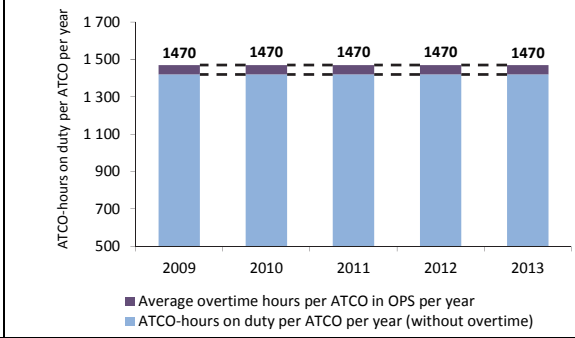
Trend in gate-to-gate ATCO-hour productivity



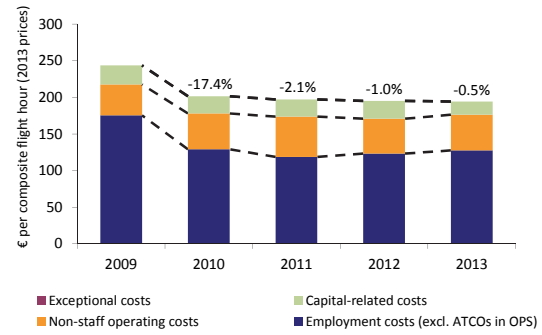


Trend in gate-to-gate employment costs per ATCO-hour

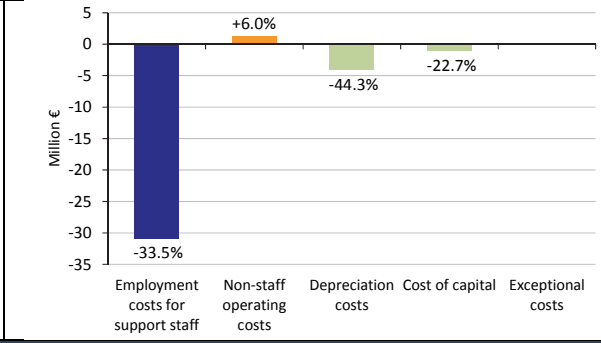




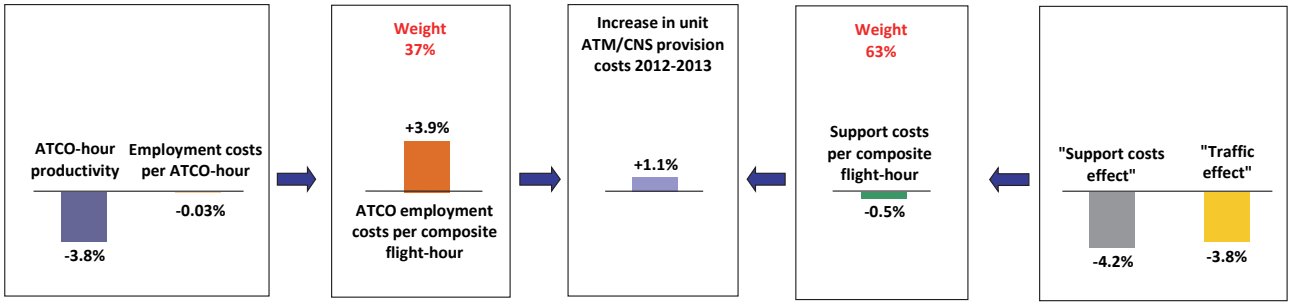
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

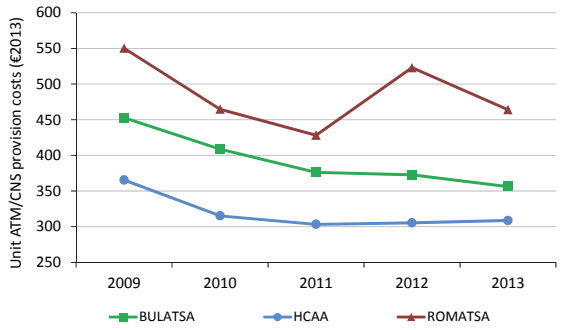


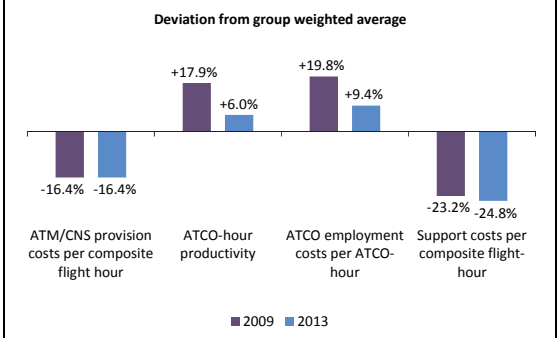
Changes in financial cost-effectiveness (2012-2013)



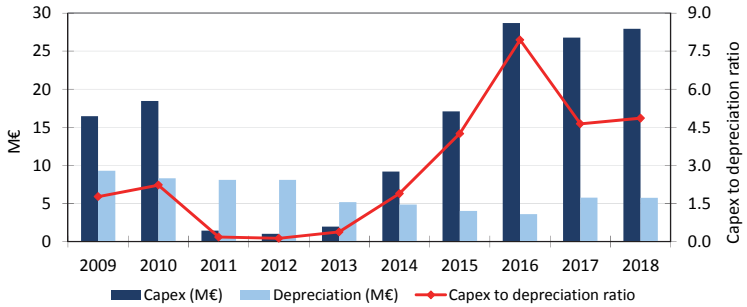
HCAA (Greece) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS C: 2000*	RDPS C: 2000*	HMI C: 2000*	VCS C: 1999*
€6.3M						2009				
						2010				
						2011				
						2012				
						2013				
						2014				
€78.1M (2015-2020)	€36.1M	€8.4M	€17.5M (2014-2020)			2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Procurement of new RDPS, FDPS & ODS system (PALLAS)	ATM	35.0	2016	2020
2	Replacement of 4 radars (Thessaloniki, Iraklion, Rodos and Kerrkira)	ATM	19.7	2016	2020
3	Partial replacement of CNS systems at Athinai (LGAV) Airport	COM	12.3	2015	2019
4	Replacement of 4 En-route Secondary Surveillance Radars	ATM	11.1	2016	2020
5	Purchase of VCS/RCS systems for Athinai/Makedonia ACC	COM	10.4	2015	2016

HungaroControl (Hungary) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: 1 EUR = 296.522 HUF

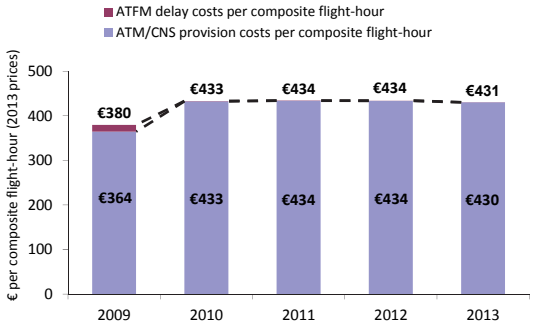
HungaroControl represents 1.1% of European system gate-to-gate ATM/CNS provision costs

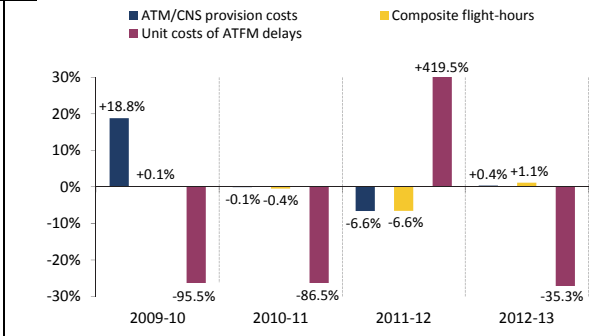
Operational conditions

Aggregated complexity score: Min — Max

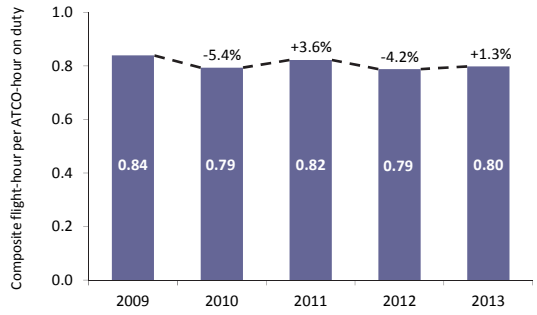
Seasonal traffic variability: Min — Max

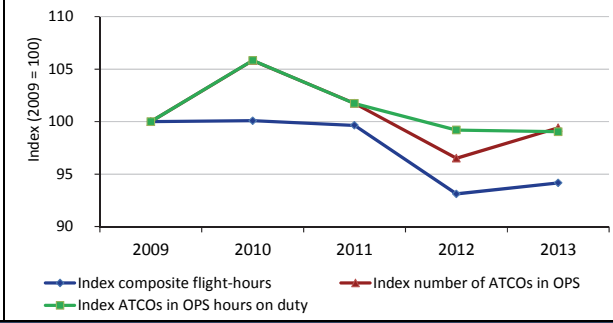
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



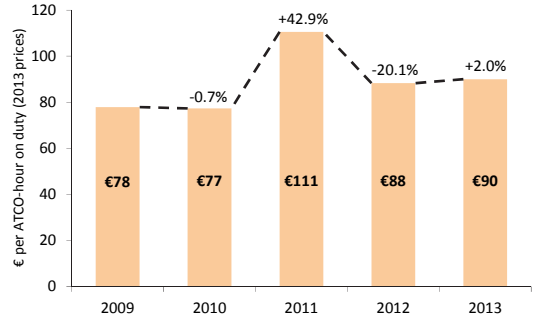


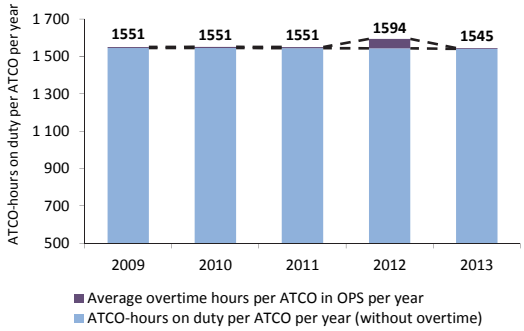
Trend in gate-to-gate ATCO-hour productivity



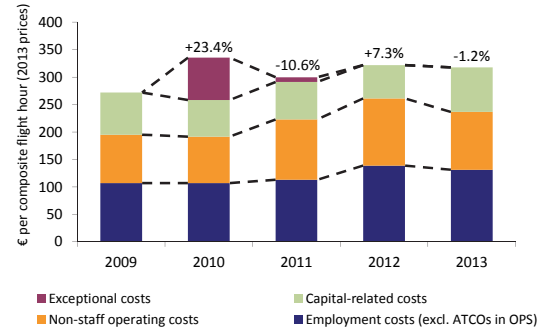


Trend in gate-to-gate employment costs per ATCO-hour

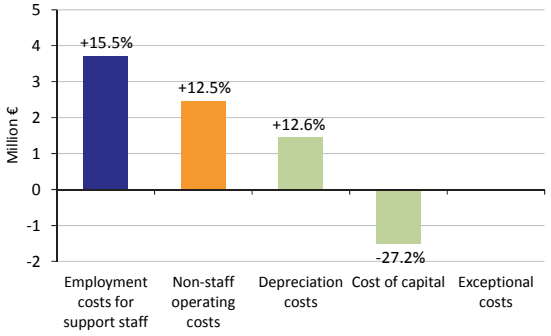




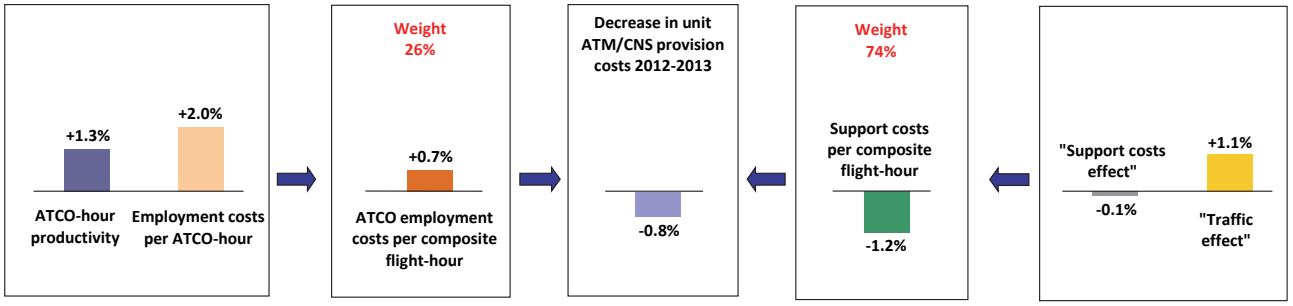
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

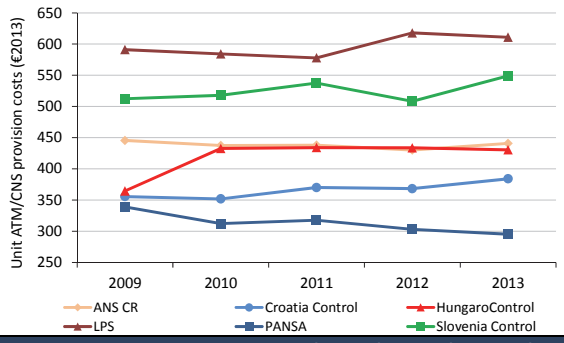


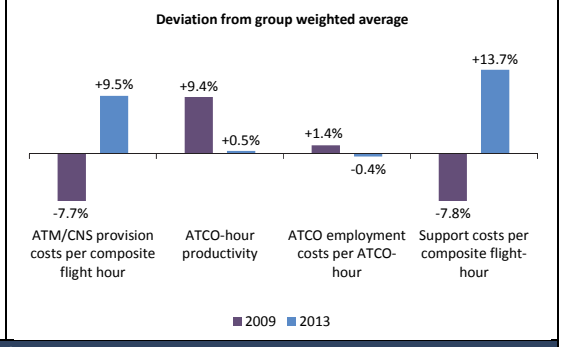
Changes in financial cost-effectiveness (2012-2013)



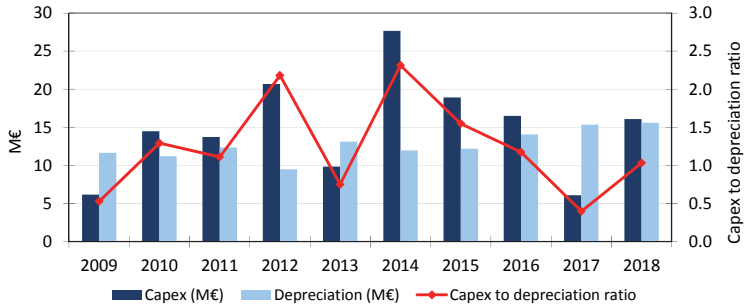
HungaroControl (Hungary) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS C: 2012*	RDPS C: 2012*	HMI C: 2012*	VCS C: 2012*
€81.9M (2008-2020)	€17.1M	€1.9M	€1.5M	€14.7M	€0.7M	2009				
						2010				
						2011				
						2012				
						2013				
				€4.1M		2014				
						2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	MATIAS SW/HW upgrade (ANS III project)	ATM	18.4	2009	2012
2	Matias build 12	ATM	18.0	2018	2020
3	ANS III Building (ANS III project)	Building	14.7	2010	2012
4	Matias build 11.1	ATM	11.0	2016	2016
5	Matias build 11.2	ATM	10.0	2017	2018

IAA (Ireland) – Cost-effectiveness KPIs (€2013)

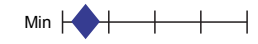
Contextual economic information

Exchange rate: Ireland is within the EURO Zone

IAA represents 1.4% of European system gate-to-gate ATM/CNS provision costs

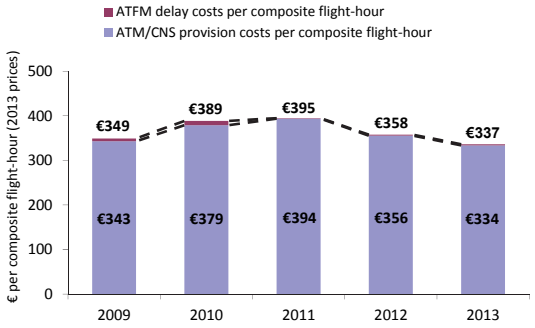
Operational conditions

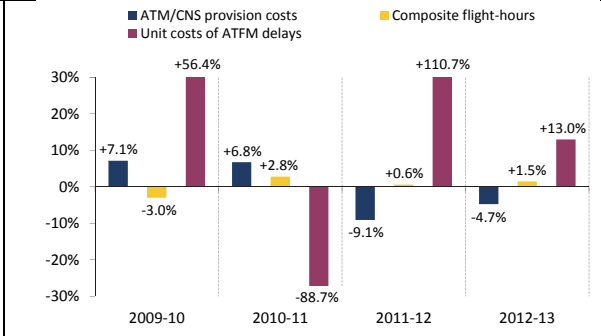
Aggregated complexity score:



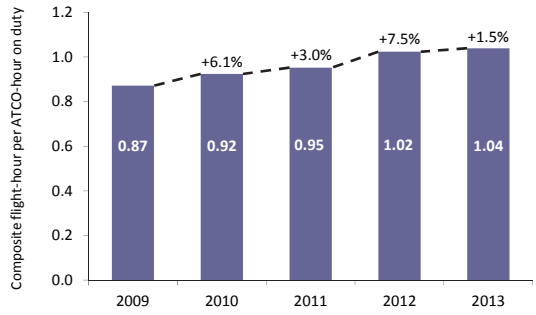
Seasonal traffic variability:

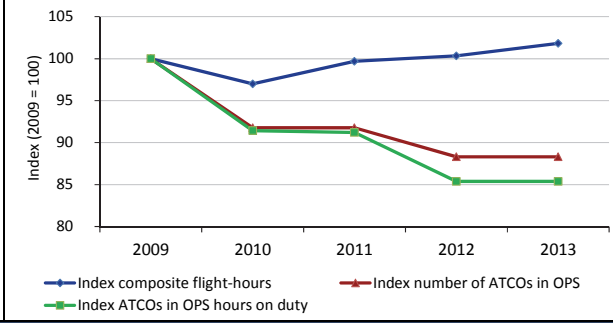
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



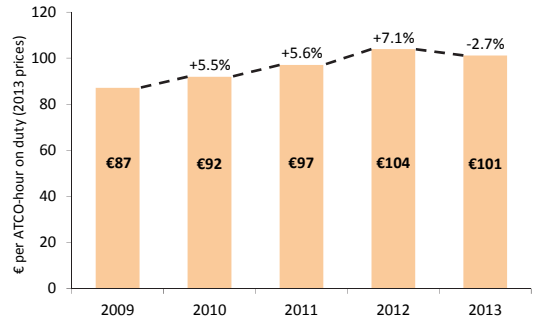


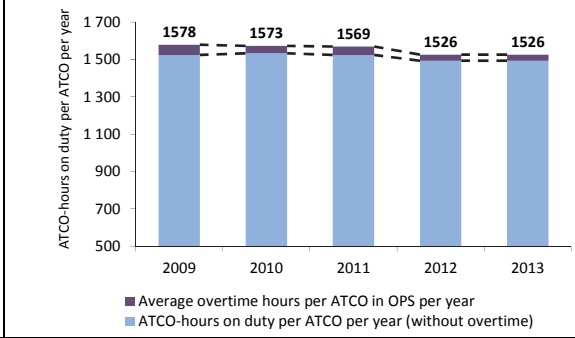
Trend in gate-to-gate ATCO-hour productivity



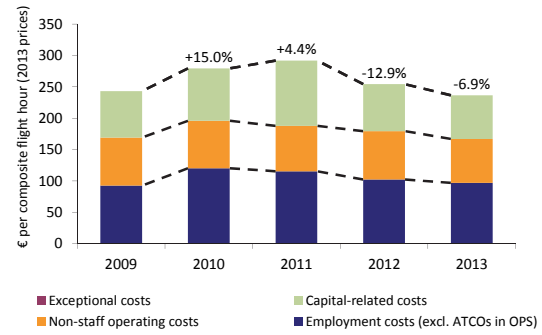


Trend in gate-to-gate employment costs per ATCO-hour

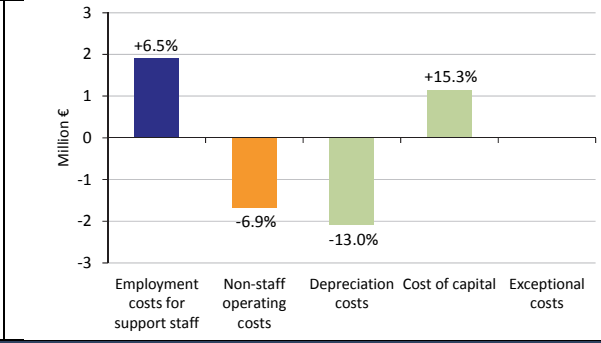




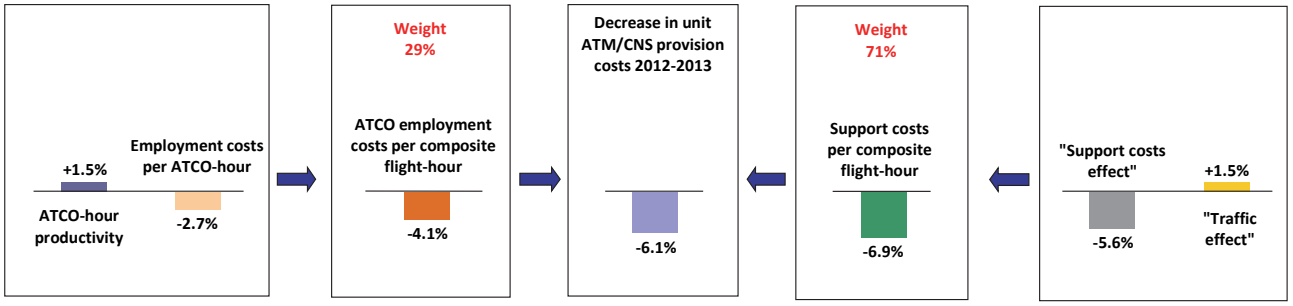
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

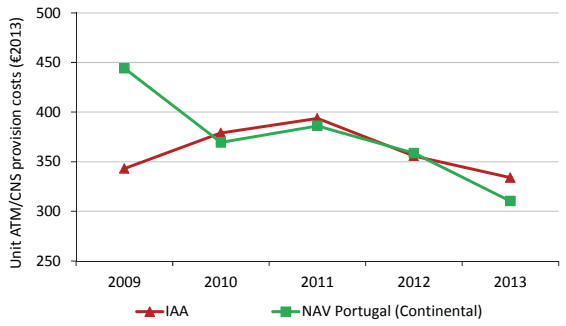


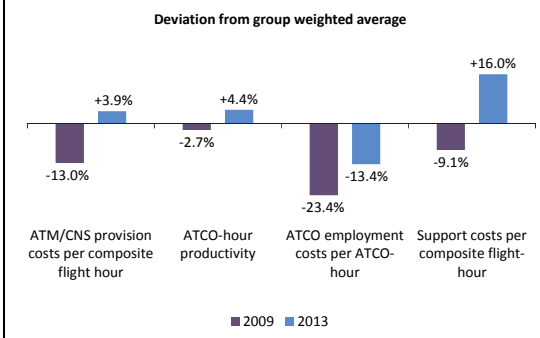
Changes in financial cost-effectiveness (2012-2013)



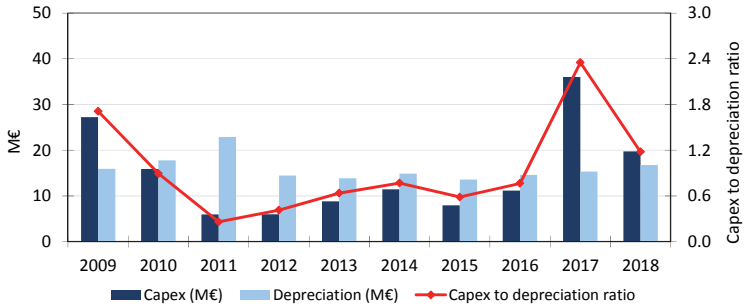
IAA (Ireland) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2011 (All ACCs)*	C: 2014 (All ACCs)*	C: 2011 (All ACCs)*	C: 2003 (All ACCs)*
						2009				
						2010				
€55.5M (2006-2014)						2011	All ACCs		All ACCs	
	€3.6M				€0.8M	2012				
		€53.7M (2006-2019)				2013				All ACCs
						2014	All ACCs	All ACCs	All ACCs	
€40.5M	€18.9M			€13.0M	€6.6M	2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	COOPANS (BUILD 1) initiative, including the replacement of the current FDP and RDP systems	ATM	49.0	2006	2012
2	Flight data processing (including COOPANS Build 3)	ATM	40.5	2015	2019
3	Surveillance and Navigation	SUR+NAV	27.7	2015	2019
4	Radar Replacement	SUR	20.0	2006	2011
5	Communications	COM	18.9	2015	2019

LFV (Sweden) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: 1 EUR = 8.647 SEK

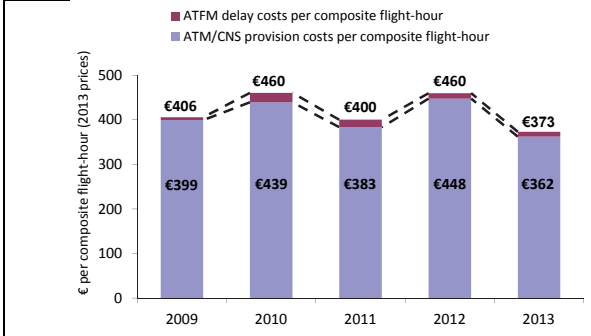
LFV represents 2.5% of European system gate-to-gate ATM/CNS provision costs

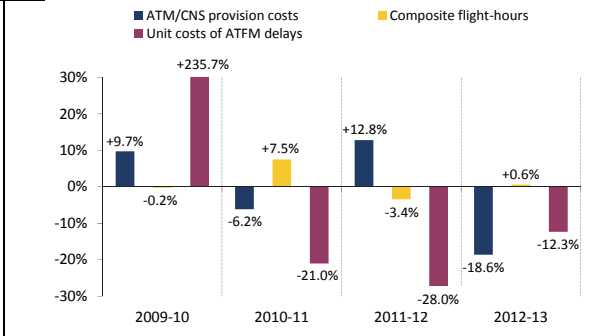
Operational conditions

Aggregated complexity score: Min – Max

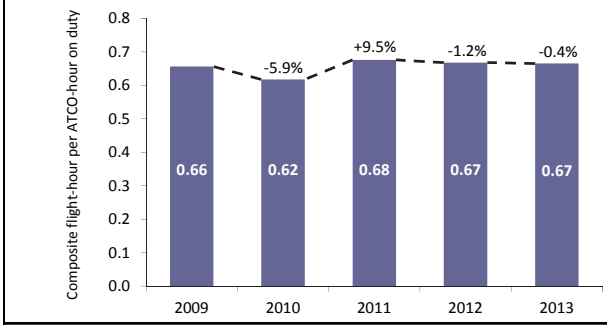
Seasonal traffic variability: Min – Max

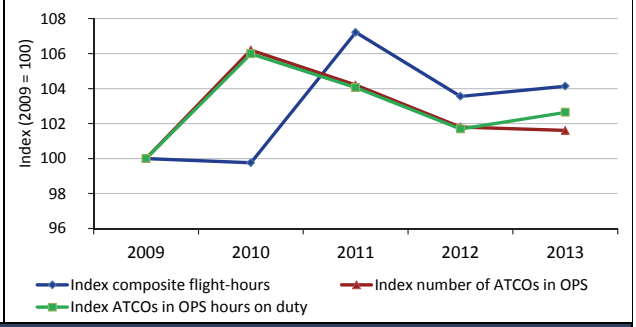
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



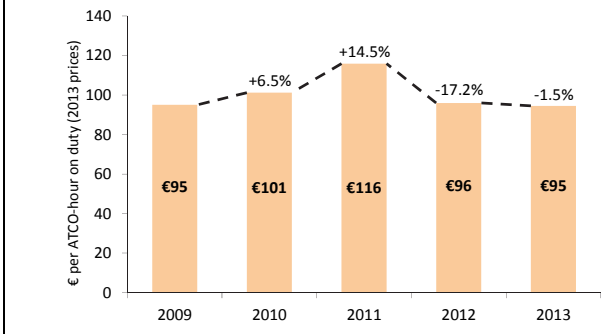


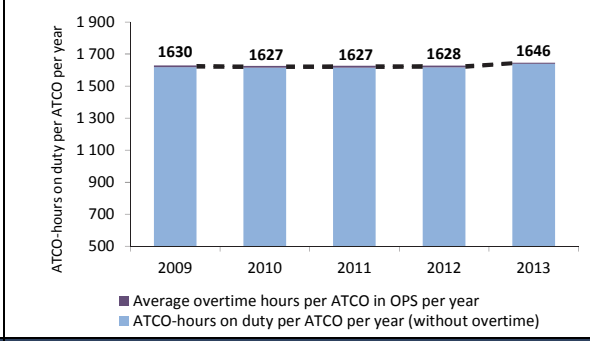
Trend in gate-to-gate ATCO-hour productivity



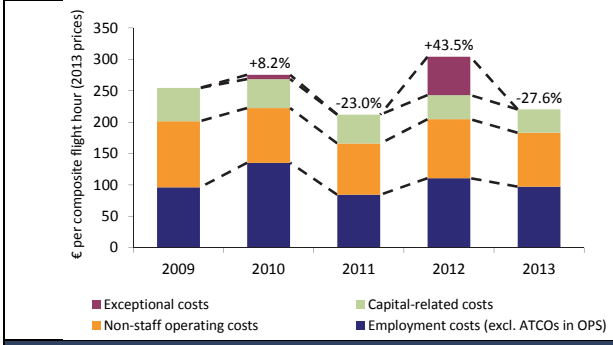


Trend in gate-to-gate employment costs per ATCO-hour

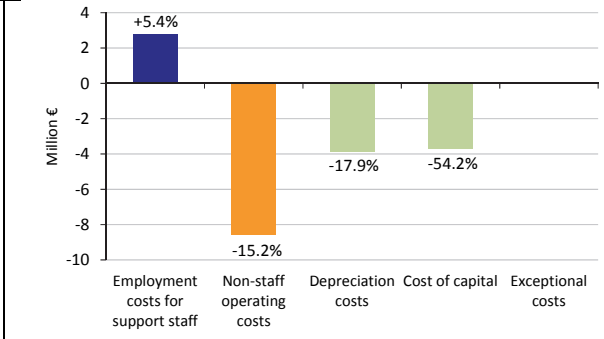




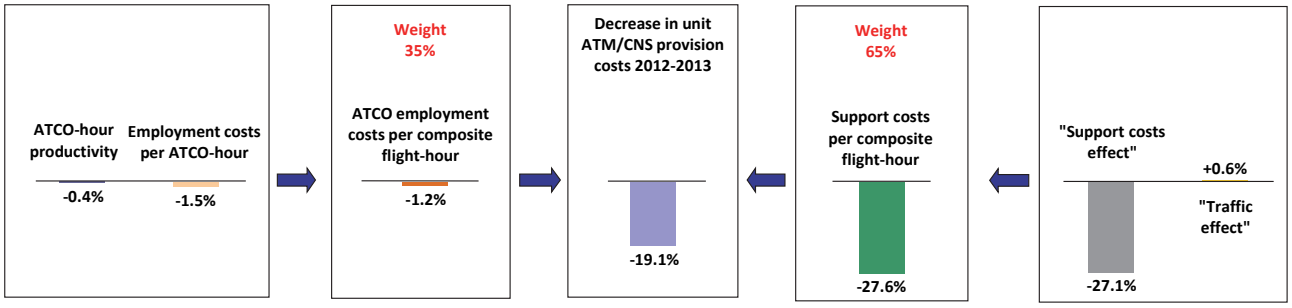
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

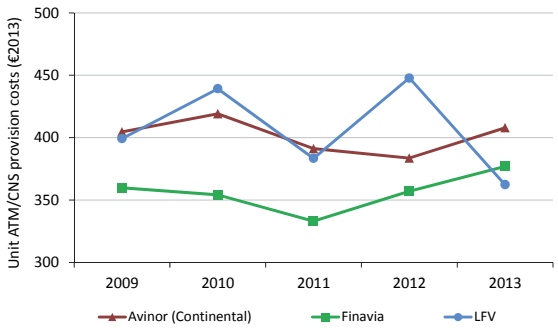


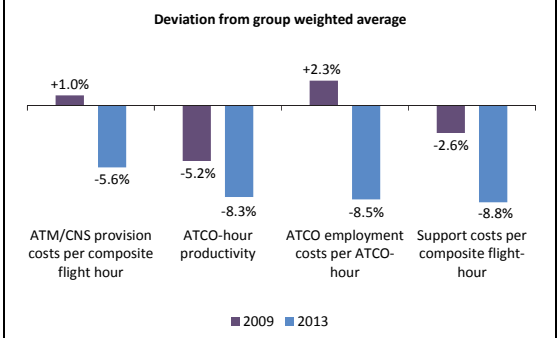
Changes in financial cost-effectiveness (2012-2013)



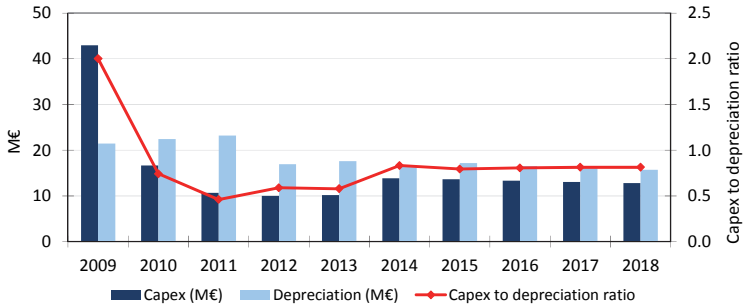
LFV (Sweden) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2012 (Malmo) 2013 (Stockholm)	C: 2012 (Malmo) 2013 (Stockholm)	C: 2012 (Malmo) 2013 (Stockholm)	C: 2010 (All ACCs)
€88.9M (2006-2014)	€9.7M (2007-2017)		€10.6M	€11.7M (2007-2011)		2009				
						2010				
						2011				
					€1.2M	2012		Stockholm		
						2013				
						2014	All ACCs		All ACCs	
€40.0M			€2.7M		€25.4M	2015				
						2016				
						2017				All ACCs
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	COOPANS	ATM	99.7	2006	2019
2	Remote Tower Centre (RTC)	ATM	15.0	2010	2016
3	Training and support building in Malmo	Buildings	11.7	2007	2011
4	Contigency system	ATM	11.6	2015	2019
5	Surveillance Upgrade Program (WAM)	SUR	8.7	2009	2017

LGS (Latvia) – Cost-effectiveness KPIs (€2013)

Contextual economic information

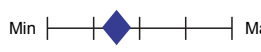
Exchange rate: 1 EUR = 0.703 LVL

LGS represents 0.3% of European system gate-to-gate ATM/CNS provision costs

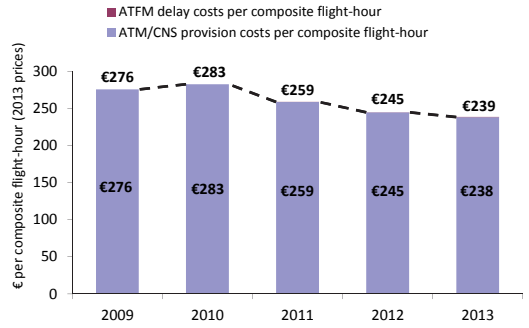
Operational conditions

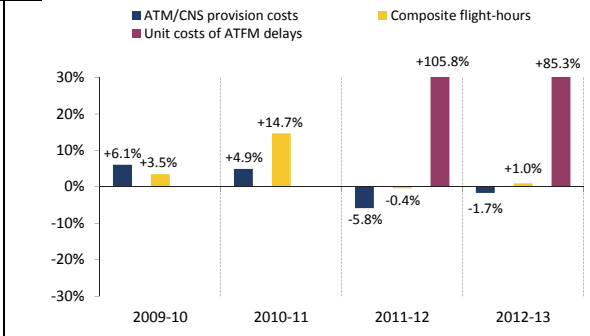
Aggregated complexity score:

Seasonal traffic variability:

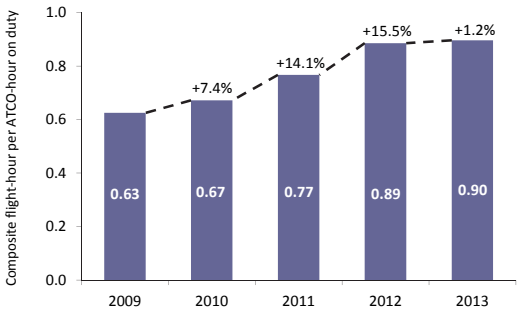


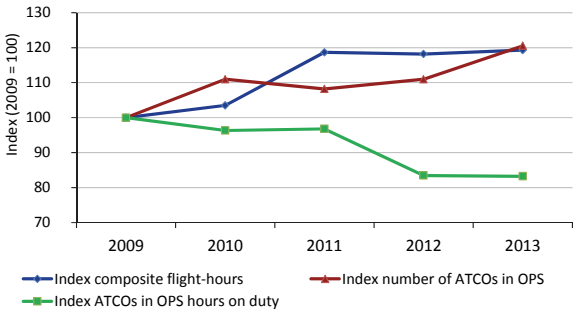
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



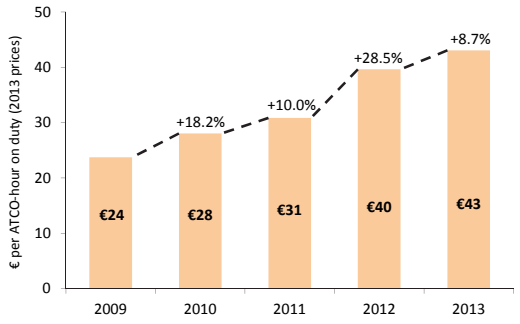


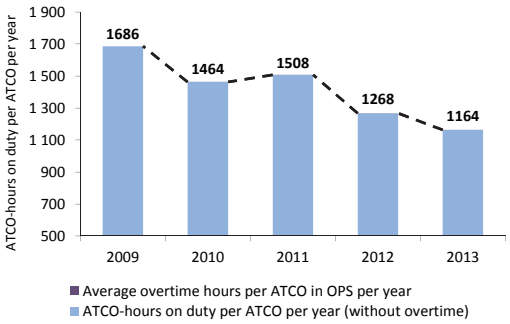
Trend in gate-to-gate ATCO-hour productivity



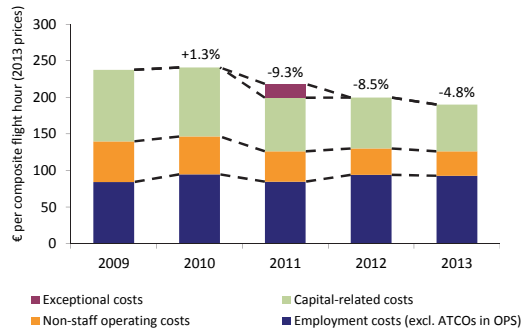


Trend in gate-to-gate employment costs per ATCO-hour

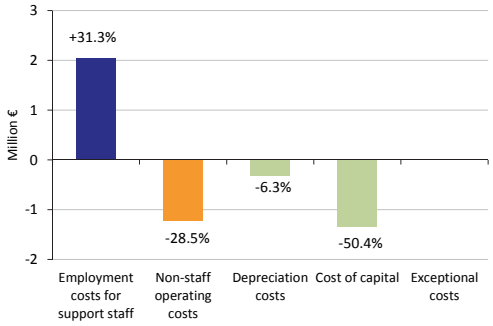




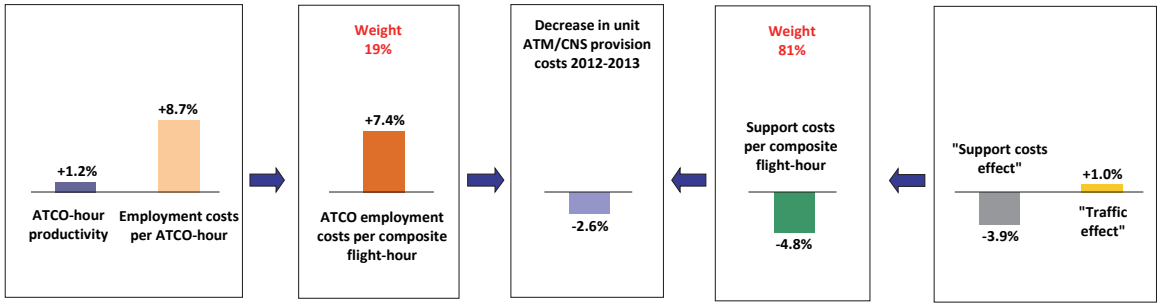
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

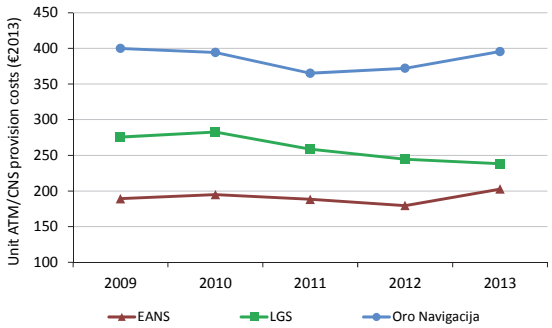


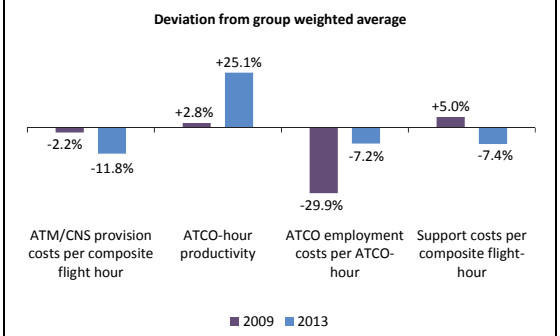
Changes in financial cost-effectiveness (2012-2013)



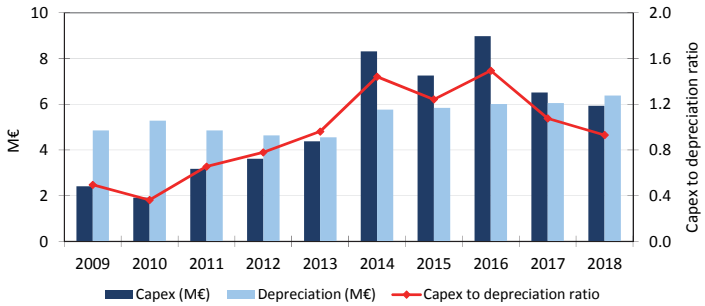
LGS (Latvia) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 1999*	C: 1999*	C: 1999*	C: 2004*
		€2.3M (2008-2009)				2009				
			€11.9M (2007-2014)			2010				
€9.5M (2007-2014)						2011				
	€3.0M				€2.1M	2012				
						2013				
			€8.8M			2014				
€22.6M	€2.6M					2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Collaborative Decision Making (CDM)	ATM	14.8	2015	2019
2	Modernization of surveillance system for provision of ATS in Latvia (MSSAL project) - 3 radars exchange	SUR	9.2	2007	2009
3	A-SMGCS modernisation	SUR	8.8	2015	2019
4	PBN Implementation project	ATM	6.8	2015	2019
5	Modernization of Automated ATC system (ATRACC)	ATM	3.9	2010	2013

LPS (Slovak Republic) – Cost-effectiveness KPIs (€2013)

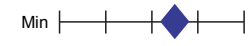
Contextual economic information

Exchange rate: Slovak Republic is within the EURO Zone

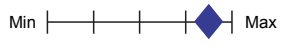
LPS represents 0.7% of European system gate-to-gate ATM/CNS provision costs

Operational conditions

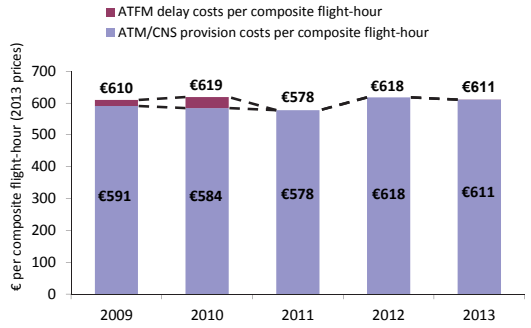
Aggregated complexity score:

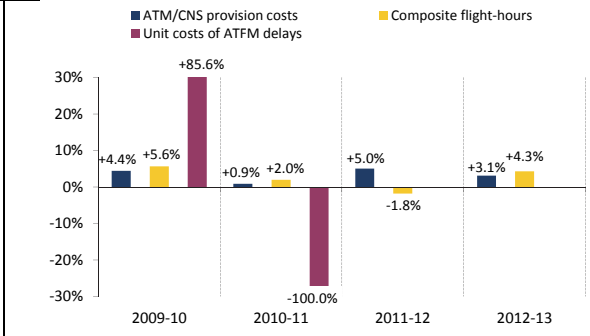


Seasonal traffic variability:

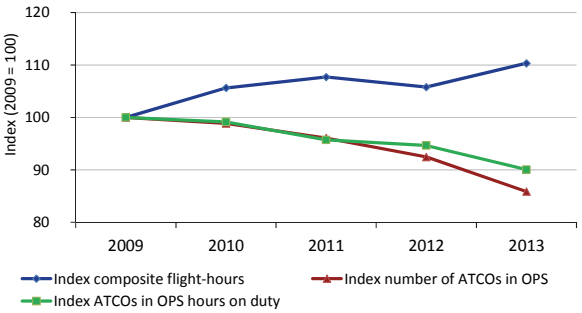


Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)

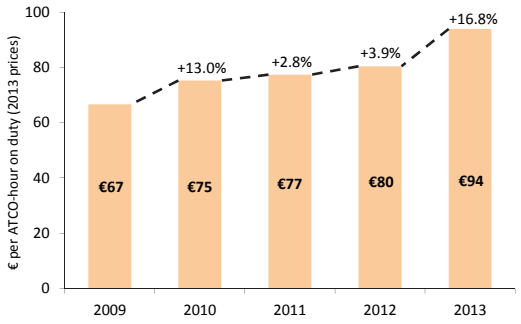


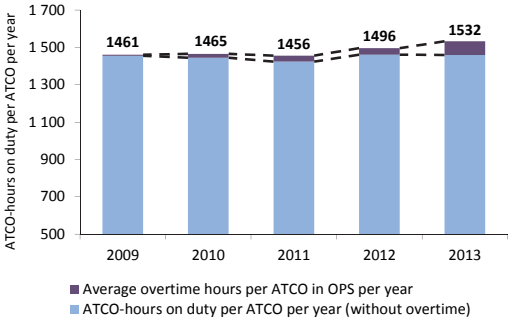


Trend in gate-to-gate ATCO-hour productivity

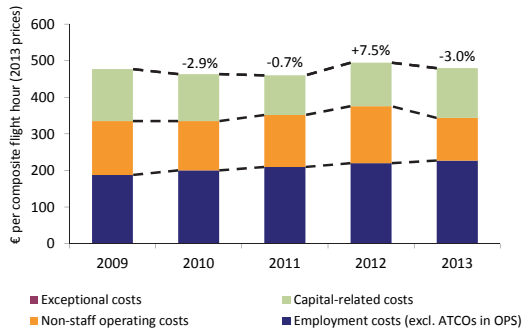


Trend in gate-to-gate employment costs per ATCO-hour

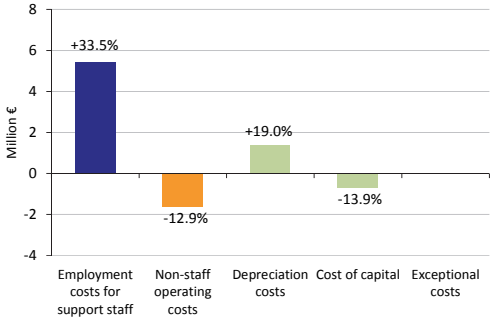




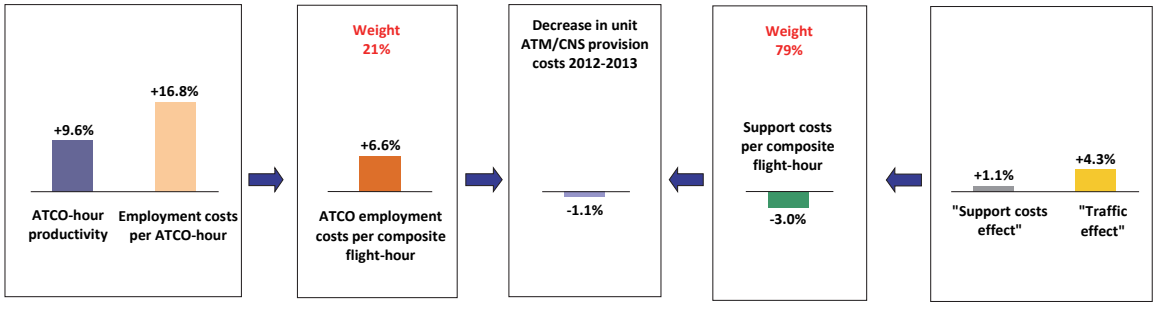
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

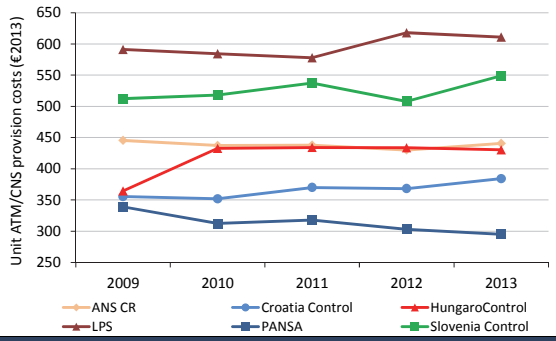


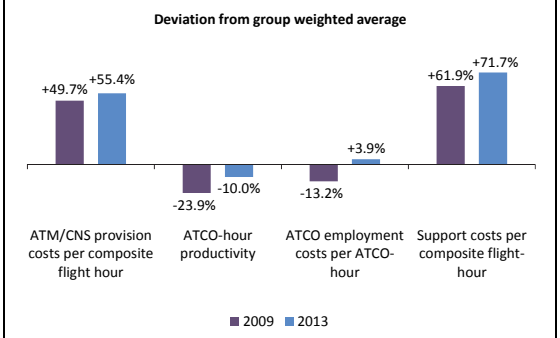
Changes in financial cost-effectiveness (2012-2013)



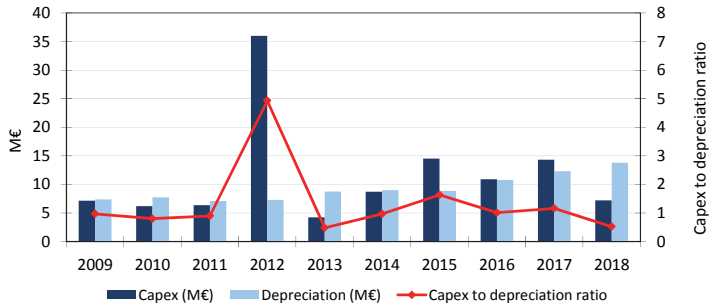
LPS (Slovak Republic) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS C: 1999	RDPS C: 2005	HMI C: 1999	VCS C: 2009
						2009				
						2010				
						2011				
€3.9M (2010-2015)	€1.2M		€5.1M	€33.5M (2007-2015)		2012				
						2013				
						2014				
						2015				
						2016				
€26.2M (2015-2019)	€12.5M	€6.2M			€14.9M	2017				
			€0.2M			2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Construction of the new ACC in Bratislava	Building	30.0	2007	2012
2	Upgrade of the main ATM System	ATM	20.4	2015	2019
3	Replacement of Navigation Systems	NAV	6.2	2015	2019
4	Replacement of SACON network	COM	5.0	2015	2019
5	Upgrade of Voice Communication System - Implementation of VoIP	COM	4.5	2015	2019

LVNL (Netherlands) – Cost-effectiveness KPIs (€2013)

Contextual economic information

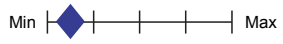
Exchange rate: Netherlands is within the EURO Zone

LVNL represents 2.1% of European system gate-to-gate ATM/CNS provision costs

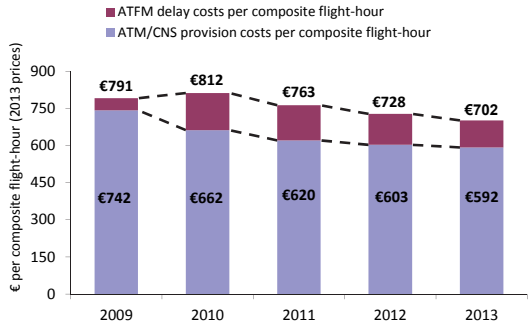
Operational conditions

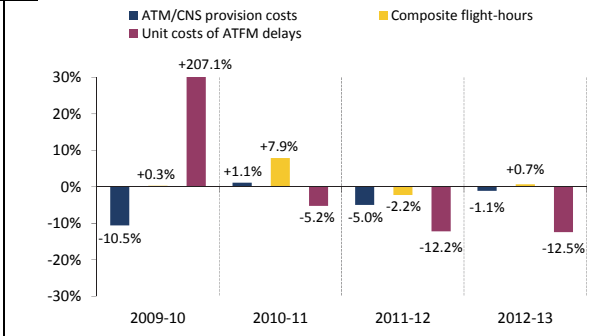
Aggregated complexity score:

Seasonal traffic variability:

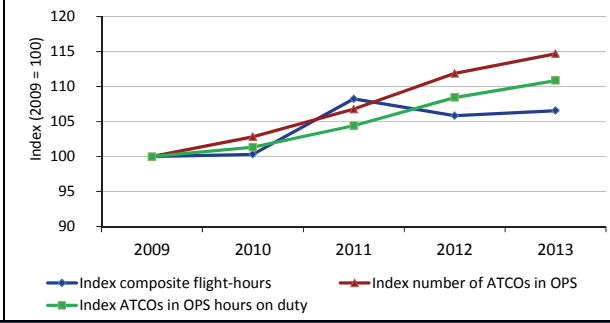


Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)

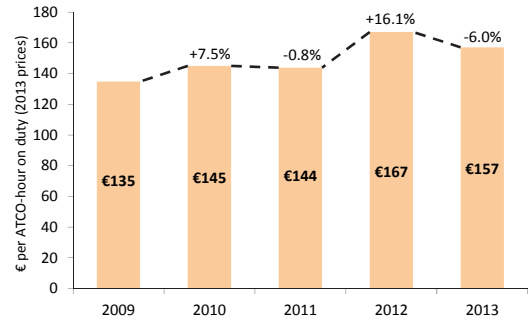


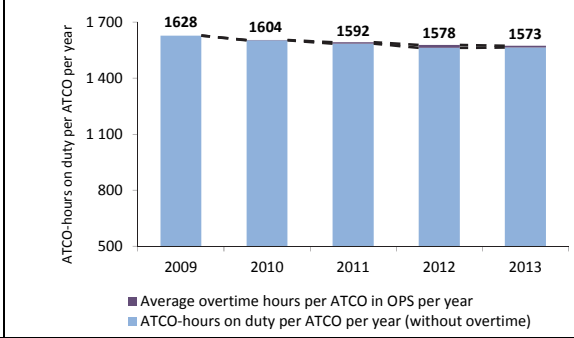


Trend in gate-to-gate ATCO-hour productivity

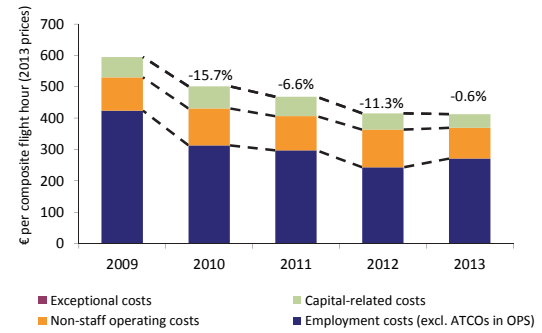


Trend in gate-to-gate employment costs per ATCO-hour

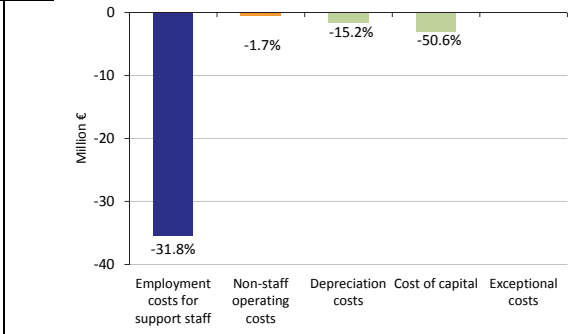




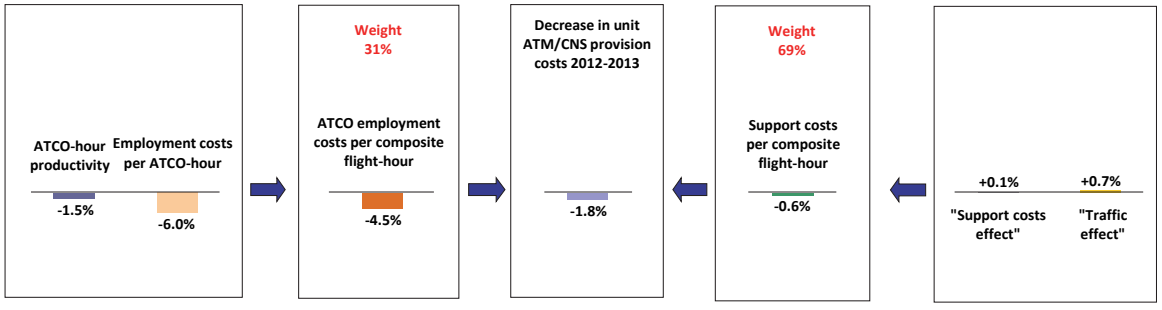
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

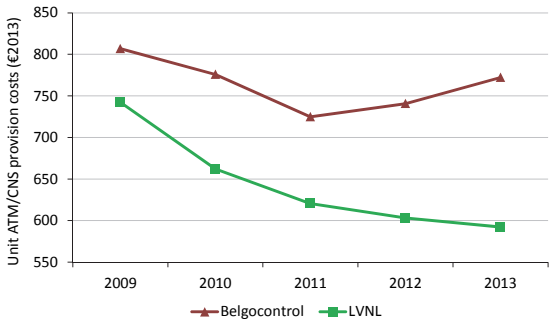


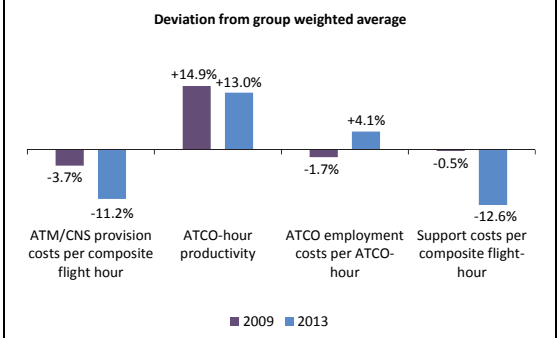
Changes in financial cost-effectiveness (2012-2013)



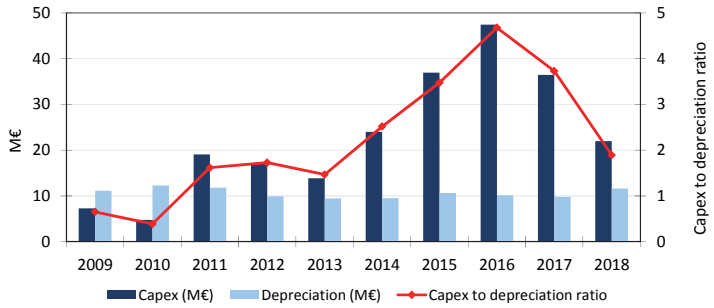
LVNL (Netherlands) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 1998*	C: 1998*	C: 1998*	C: 1988/upgraded in 1995*
						2009				
						2010				
€9.6M	€2.6M		€6.0M	€8.0M	€3.5M	2011				
						2012				
						2013				
						2014				
	€3.6M		€6.2M			2015				
				€21.5M		2016				
€89.9M					€33.6M	2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Detailed information relating to the top five capex project is currently not available for LVNL. This information will be published in the ACE 2014 Benchmarking Report.

MATS (Malta) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: Malta is within the EURO Zone

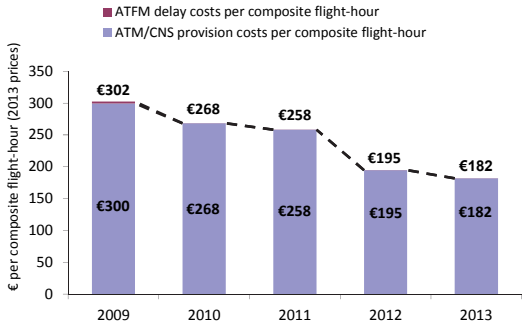
MATS represents 0.2% of European system gate-to-gate ATM/CNS provision costs

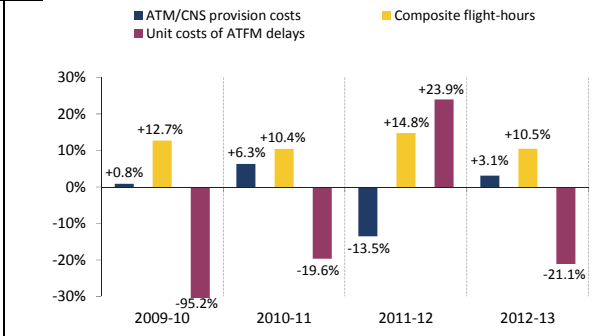
Operational conditions

Aggregated complexity score: Min — Max

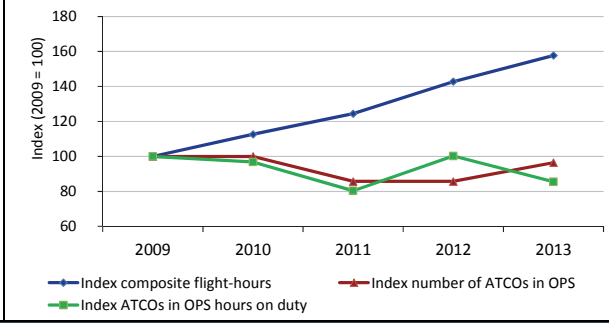
Seasonal traffic variability: Min — Max

Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)

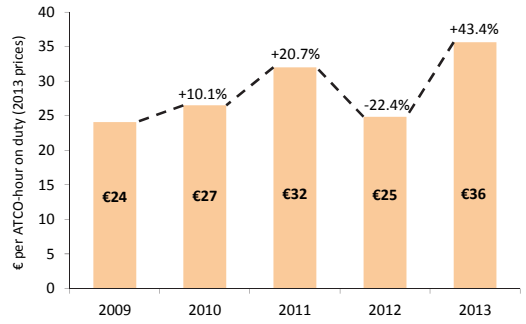


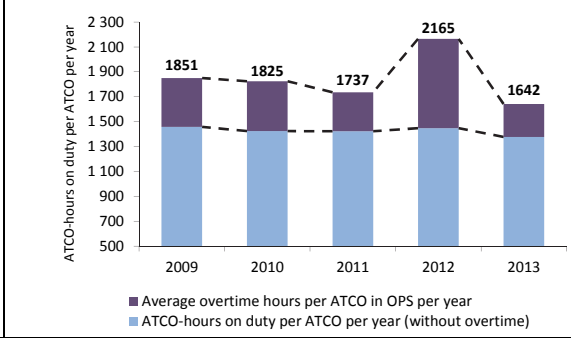


Trend in gate-to-gate ATCO-hour productivity

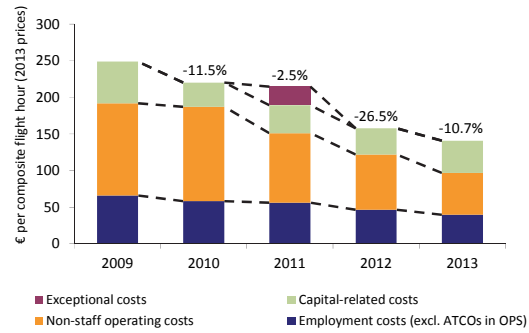


Trend in gate-to-gate employment costs per ATCO-hour

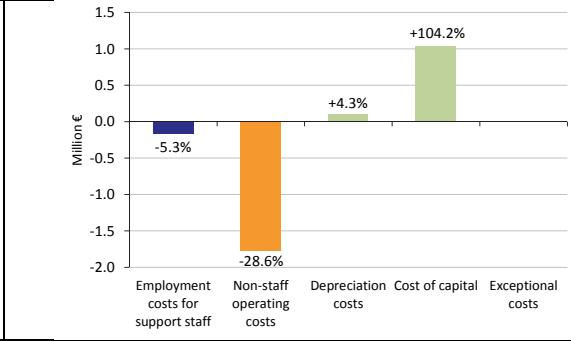




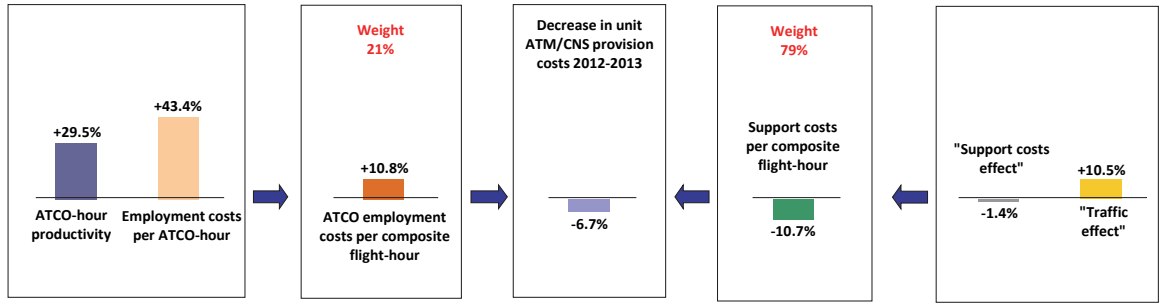
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

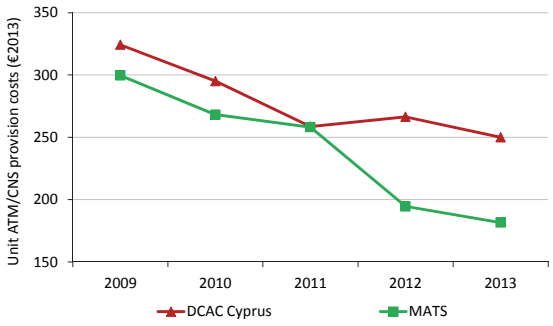


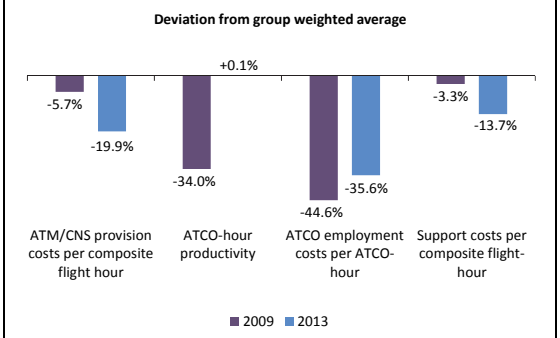
Changes in financial cost-effectiveness (2012-2013)



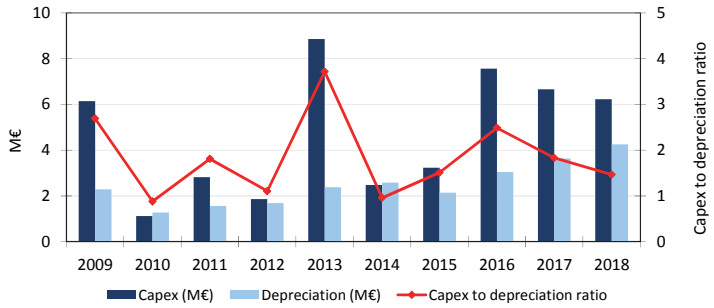
MATS (Malta) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 1996*	C: 1996*	C: 1996*	C: 1996*
						2009				
			€4.8M			2010				
				€1.8M		2011				
€7.5M						2012				
	€0.7M	€1.8M				2013				
						2014				
					€1.0M	2015				
				€18.0M		2016				
						2017				
						2018				
			€3.0M			2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	New Control Tower / ACC	Building	18.0	2015	2018
2	ATS system upgrade	ATM	7.5	2011	2015
3	Enroute PSR + WCL	SUR	3.0	2019	2019
4	Purchase and installation of MSSR (1)	SUR	2.4	2009	2013
5	Purchase and installation of MSSR (2)	SUR	2.4	2010	2014

M-NAV (F.Y.R. Macedonia) – Cost-effectiveness KPIs (€2013)

Contextual economic information

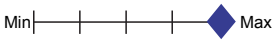
Exchange rate: 1 EUR = 61.481 MKD

M-NAV represents 0.1% of European system gate-to-gate ATM/CNS provision costs

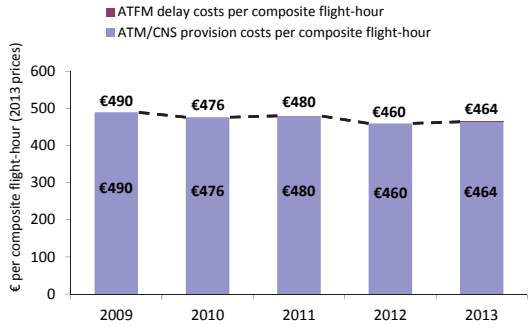
Operational conditions

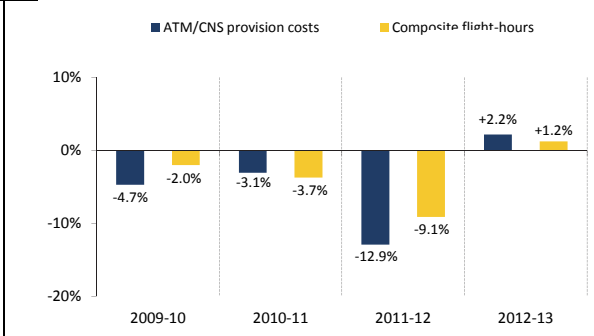
Aggregated complexity score:

Seasonal traffic variability:

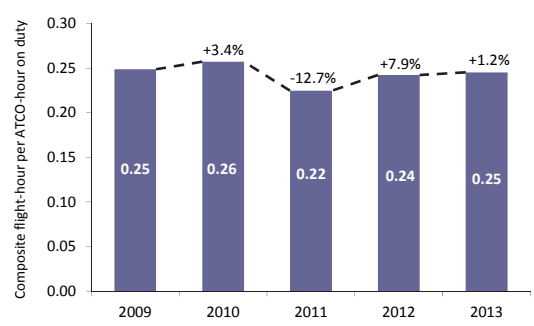


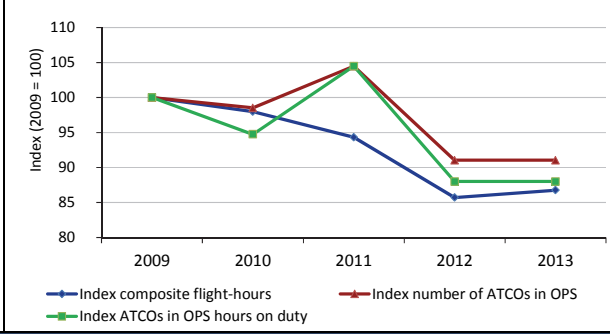
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



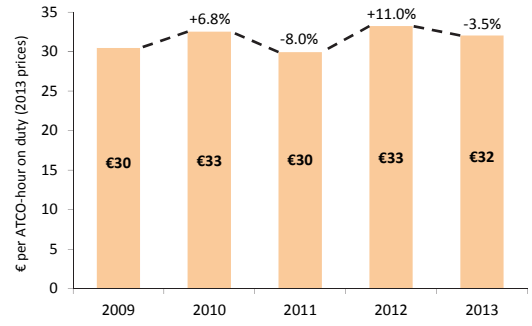


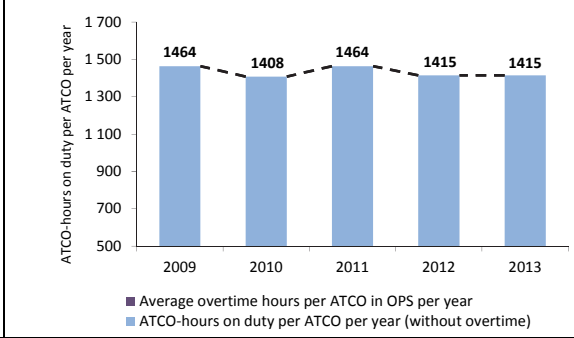
Trend in gate-to-gate ATCO-hour productivity



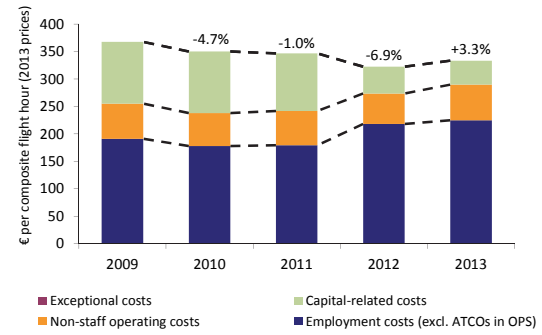


Trend in gate-to-gate employment costs per ATCO-hour

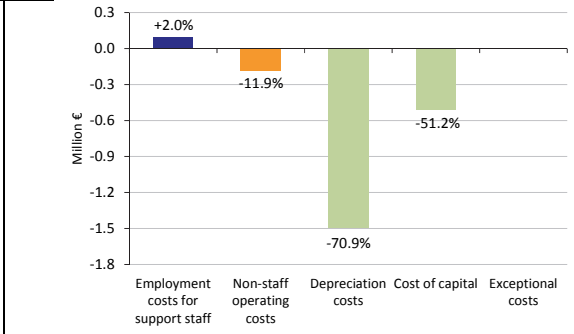




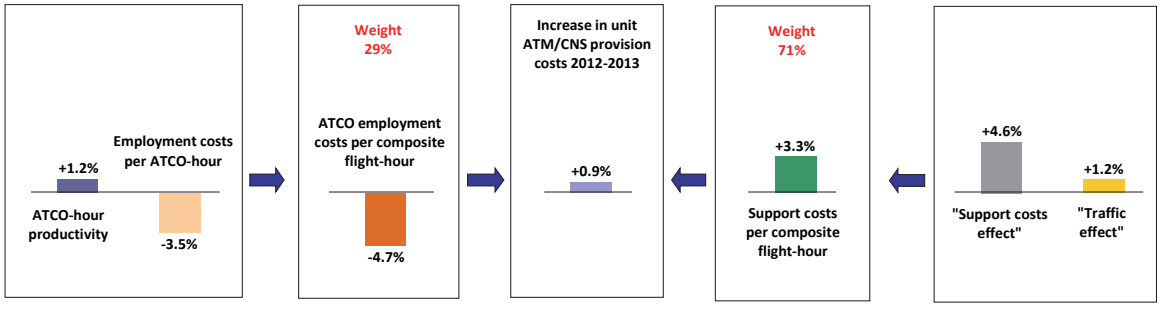
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

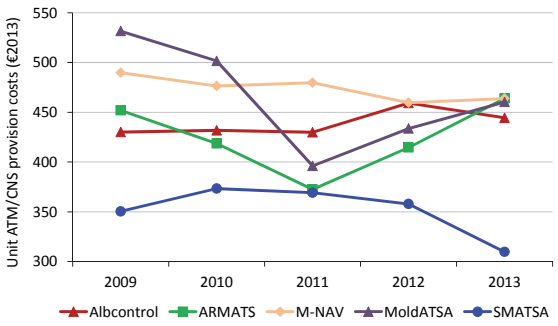


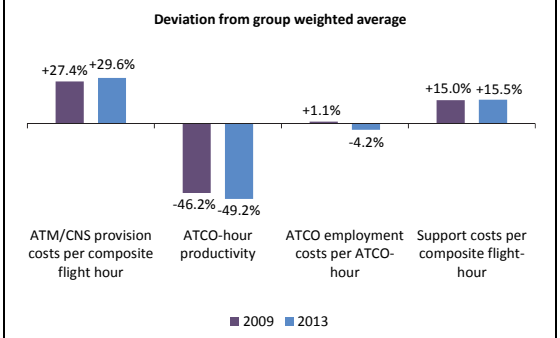
Changes in financial cost-effectiveness (2012-2013)



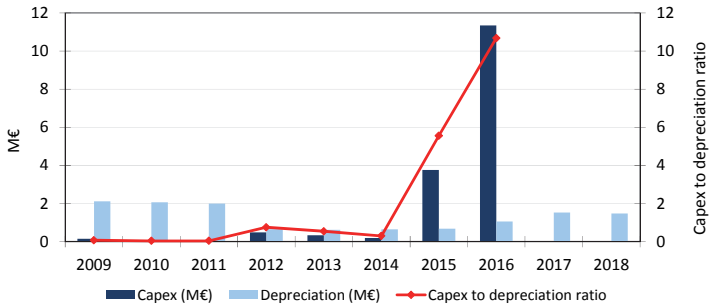
M-NAV (F.Y.R. Macedonia) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2002*	C: 2002*	C: 2002*	C: 2002*
						2009				
						2010				
						2011				
						2012				
€10.4M	€1.3M			€1.1M		2013				
			€3.8M			2014				
						2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Procurement of new ATM systems	ATM	8.1	2014	2016
2	Skopje Mode S radar	SUR	2.9	2014	2015
3	Construction of new building for ANSP headquarters	Building	1.1	2013	2015
4	Purchase of new VHF radio system and MW link	COM	1.0	2014	2015
5	Ohrid radar upgrade	SUR	0.9	2014	2015

MoldATSA (Moldova) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: 1 EUR = 16.548 MDL

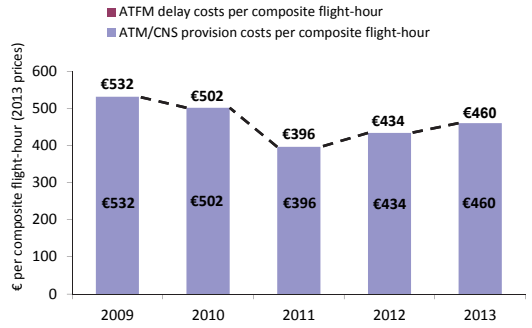
MoldATSA represents 0.1% of European system gate-to-gate ATM/CNS provision costs

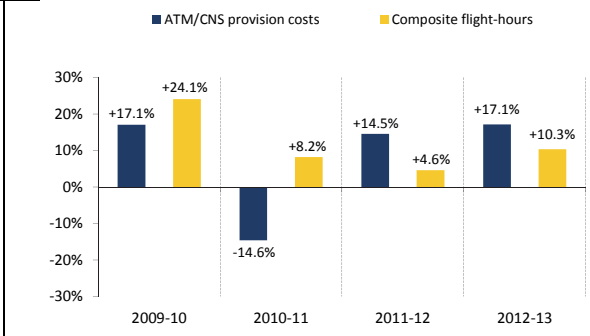
Operational conditions

Aggregated complexity score: Min — Max

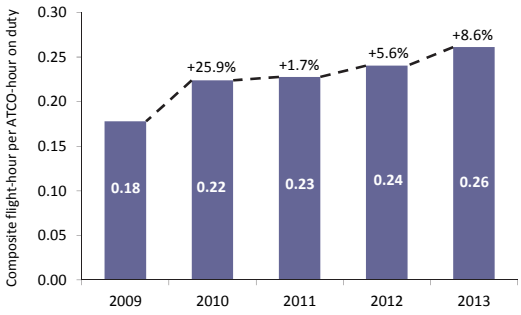
Seasonal traffic variability: Min — Max

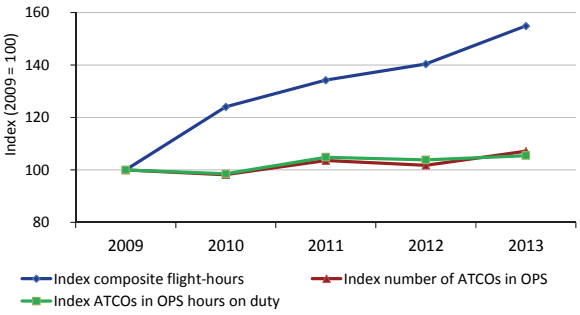
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



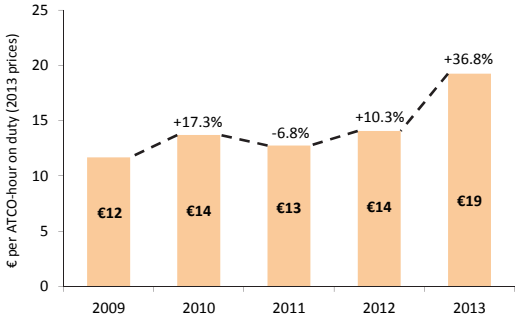


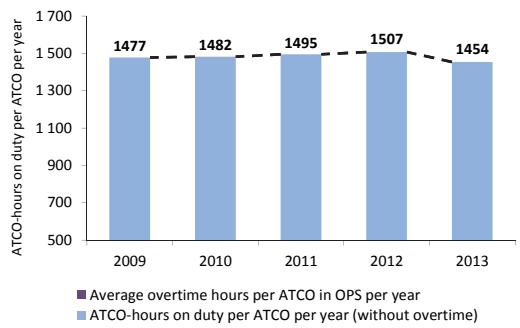
Trend in gate-to-gate ATCO-hour productivity



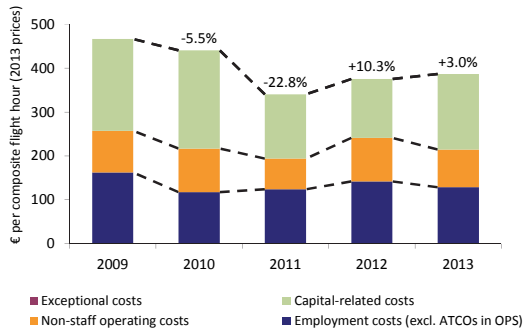


Trend in gate-to-gate employment costs per ATCO-hour

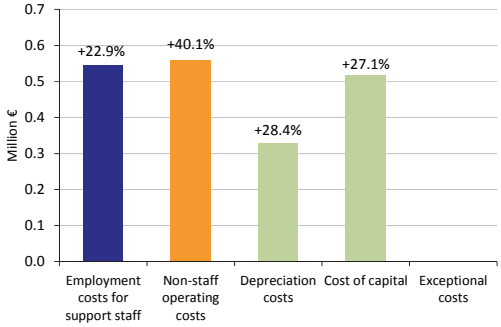




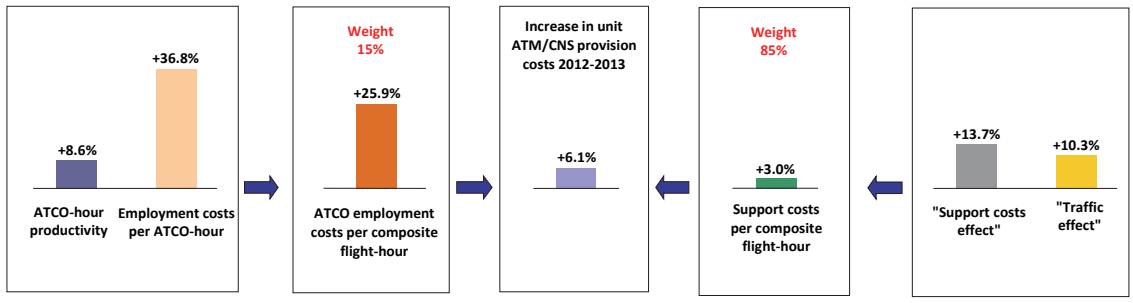
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

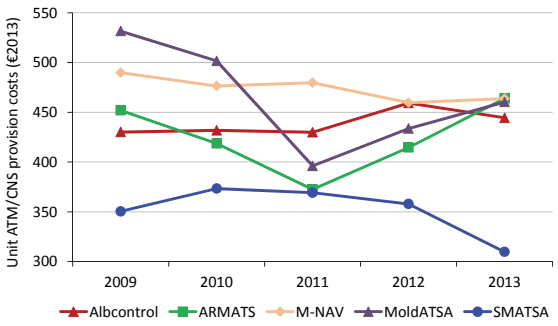


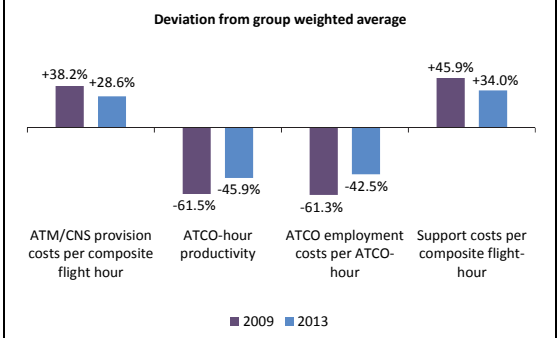
Changes in financial cost-effectiveness (2012-2013)



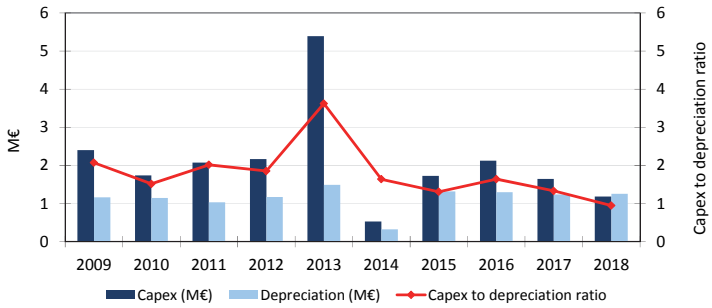
MoldATSA (Moldova) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS C: 2013*	RDPS C: 2013*	HMI C: 2013*	VCS C: 2013*
						2009				
	€1.1M				€0.9M**	2010				
€4.2M						2011				
			€1.5M			2012				
		€1.0M		€5.0M (2013-2020)		2013				
						2014				
						2015				
						2016				
						2017				
						2018				
						2019				

** Part of the amount provided under "Other" (i.e. €0.5M) relates to MET

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Construction and modernisation of the tower building in Chisinau	Buildings	5.0	2013	2020
2	Replacement of FDP, RDP and HMI systems (Si ATM Sweden)	ATM	2.9	2011	2013
3	Implementation of multilateration equipment	SUR	1.5	2012	2018
4	Commissioning of DVOR/DME units	NAV	0.6	2013	2014
5	Digital phone station PABX	COM	0.6	2012	2013

MUAC (Maastricht) – Cost-effectiveness KPIs (€2013)

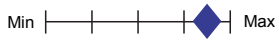
Contextual economic information

Exchange rate: Maastricht is within the EURO Zone

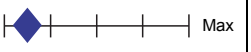
MUAC represents 1.7% of European system gate-to-gate ATM/CNS provision costs

Operational conditions

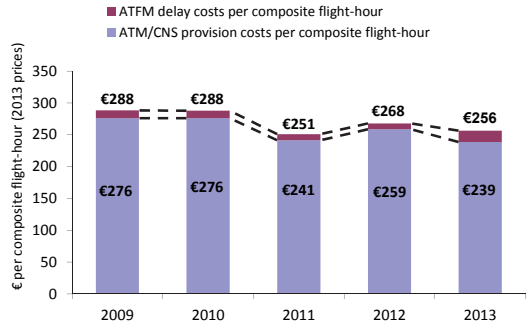
Aggregated complexity score:

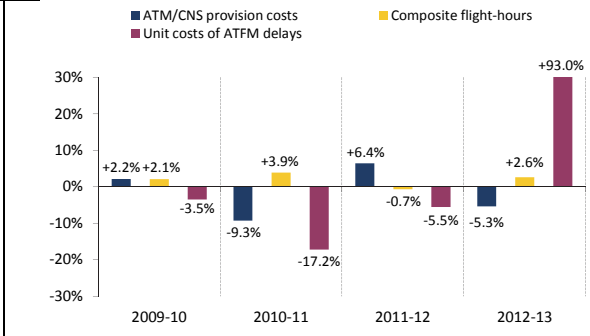


Seasonal traffic variability:

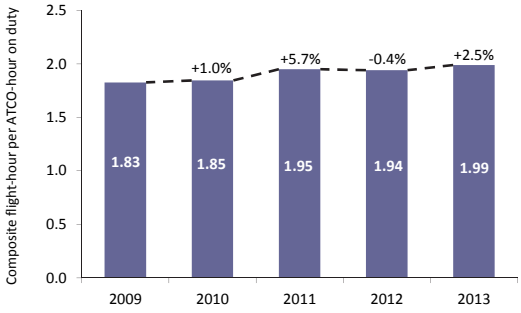


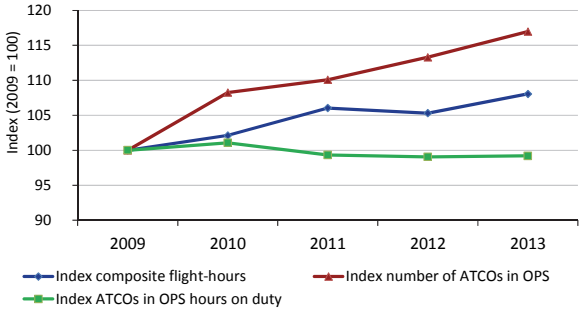
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



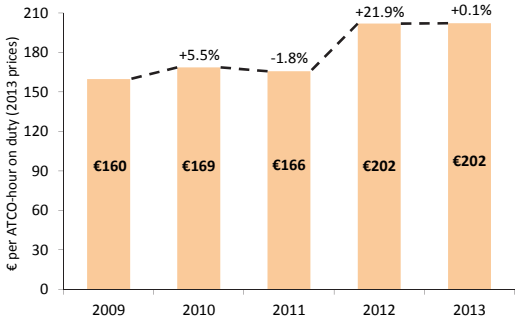


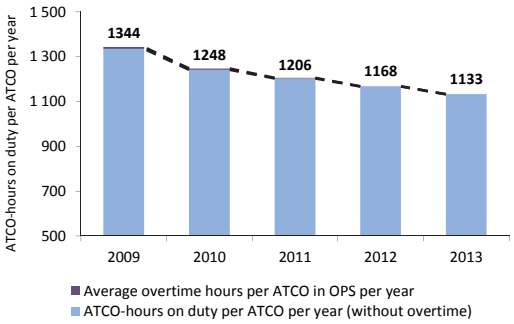
Trend in gate-to-gate ATCO-hour productivity



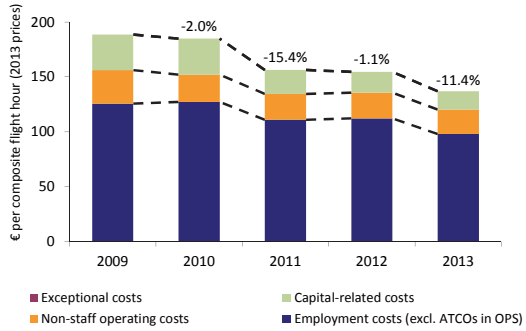


Trend in gate-to-gate employment costs per ATCO-hour

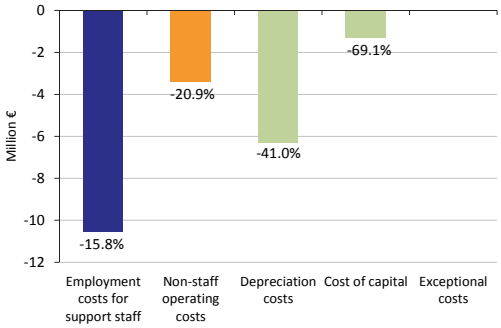




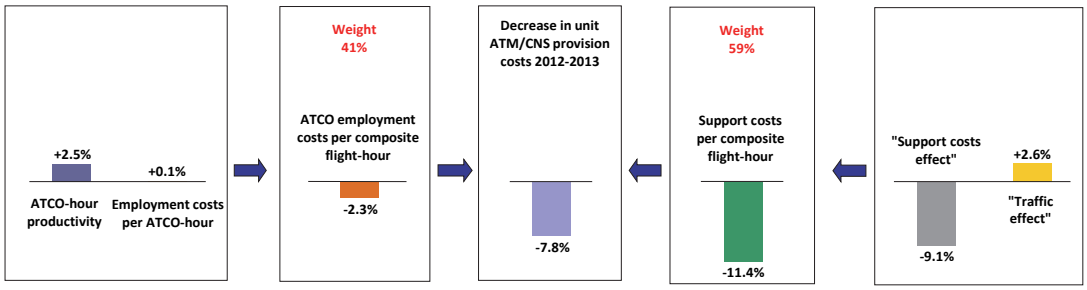
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)



Changes in financial cost-effectiveness (2012-2013)

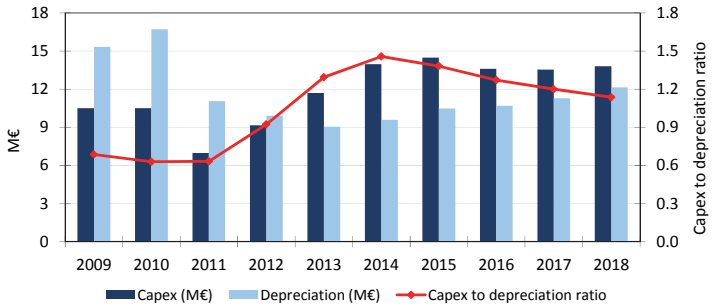


MUAC (Maastricht) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group

Due to the unique nature of its airspace (upper airspace only, across four States), it was decided that Maastricht (MUAC) should be considered separately and therefore this ANSP is not included in the comparator group benchmarking analysis

Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2008*	C: 2008*	C: 2002*	C: 1995* Upgr. 2005
€64.1M (2003-14)				€3.6M		2009				
						2010				
	€9.1M			€15.2M		2011				
					€4.1M	2012				
						2013				
						2014				
€58.8M	€6.0M			€7.7M	€5.0M	2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Procurement of new FDPS	ATM	50.0	2003	2011
2	New generation ATM	ATM	43.6	2015	2019
3	Renewal of infrastructure	Building	15.2	2011	2014
4	ATM SESAR Compliant (RP2)	ATM	13.1	2015	2019
5	Voice systems (RP1)	COM	9.1	2011	2014

NATS Continental (United Kingdom) – Cost-effectiveness KPIs (€2013)

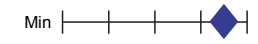
Contextual economic information

Exchange rate: 1 EUR = 0.849 GBP

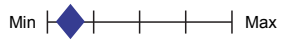
NATS Continental represents 10.0% of European system gate-to-gate ATM/CNS provision costs

Operational conditions

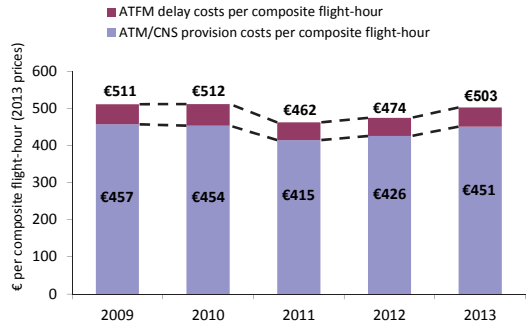
Aggregated complexity score:

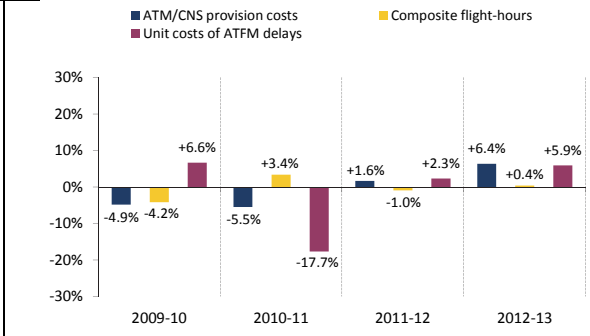


Seasonal traffic variability:

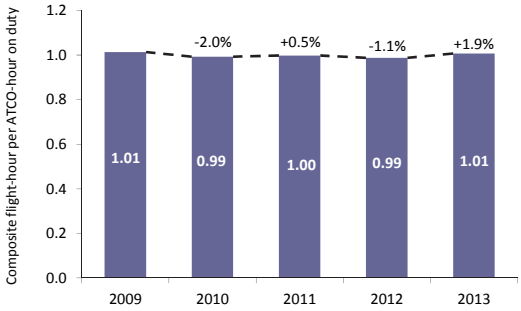


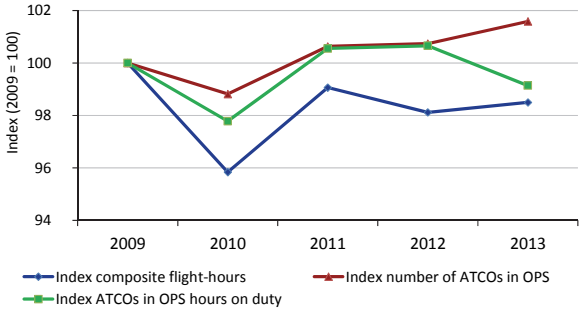
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



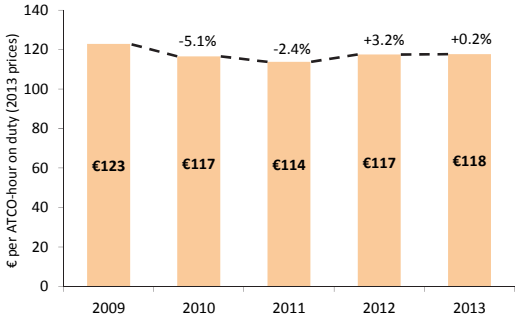


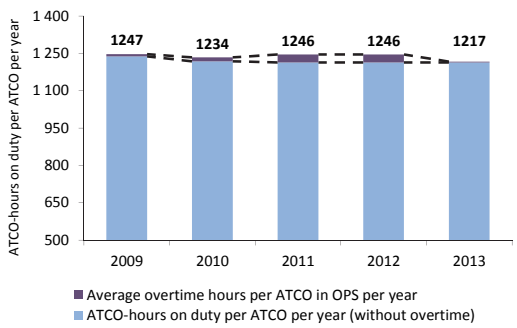
Trend in gate-to-gate ATCO-hour productivity



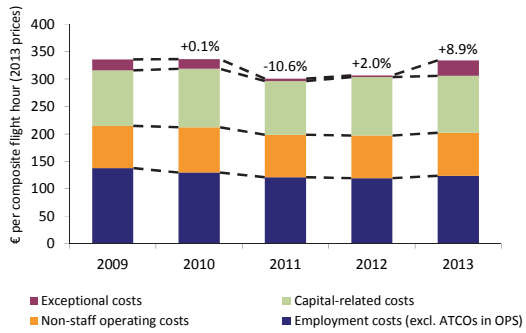


Trend in gate-to-gate employment costs per ATCO-hour

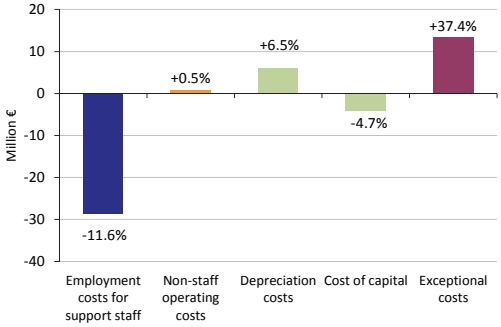




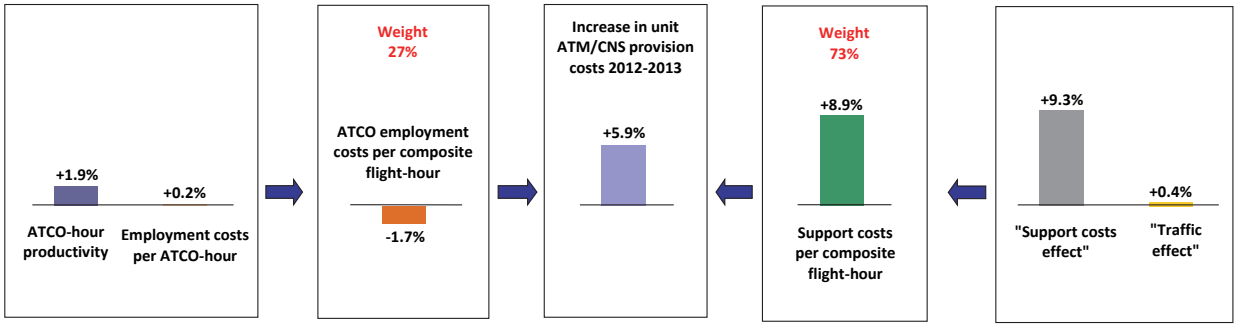
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

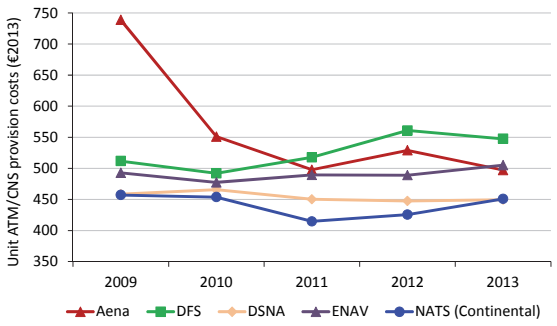


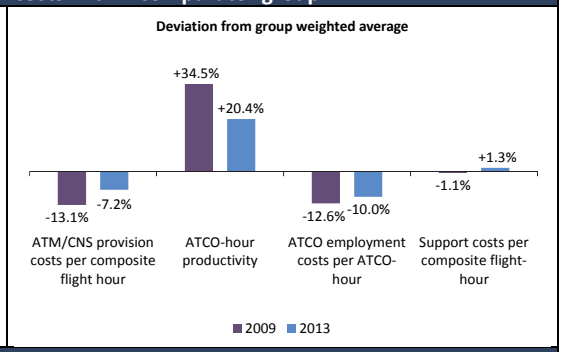
Changes in financial cost-effectiveness (2012-2013)



NATS Continental (United Kingdom) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs

Note that the planned data provided by NATS in its 2013 ACE submission reflect the figures reported in the Performance Plan for RP2, which are based on regulatory accounting rules. This is different from the methodology used by NATS to report historic and actual figures which are based on IFRS accounting.

Information on major capex projects and ATM systems upgrades/replacements

<table>
<tr><th>ATM</th><th>COM</th><th>NAV</th><th>SUR</th><th>Building</th><th>Other</th><th>Years</th><th>FDPS
C: 2001 (London AC , London TC and Prest.)*</th><th>RDPS
C: 1996 (Lon. AC) 2007 (Lon. TC) 2009 (Prest.)*</th><th>HMI
C: 2001 (Lon. AC) 2007 (Lon. TC) 2009 (Prest.)*</th><th>VCS
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</table>

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Centre system software development	ATM	211.1	2015	2019
2	iFACTS	ATM	191.0	2003	2011
3	iTEC	ATM	178.1	2015	2019
4	CNS infrastructure	CNS	109.1	2015	2019
5	Other capex	Other	64.4	2015	2019

NAV Portugal Continental (Portugal) – Cost-effectiveness KPIs (€2013)

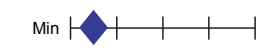
Contextual economic information

Exchange rate: Portugal is within the EURO Zone

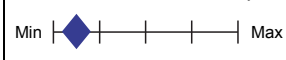
NAV Portugal Continental represents 1.5% of European system gate-to-gate ATM/CNS provision costs

Operational conditions

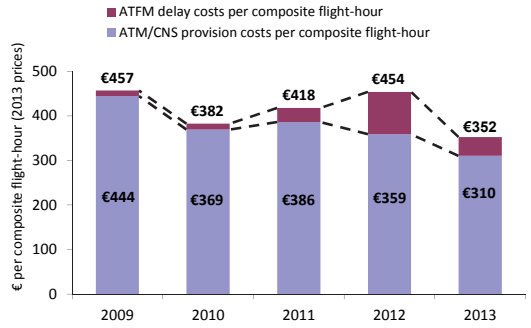
Aggregated complexity score:

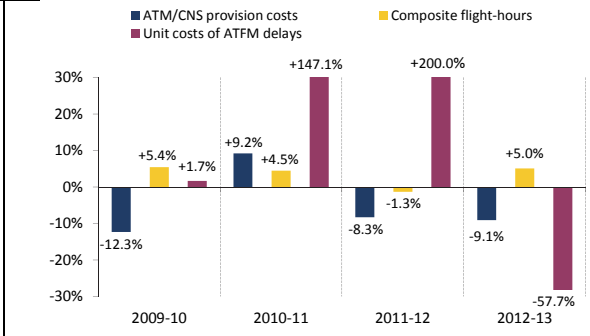


Seasonal traffic variability:

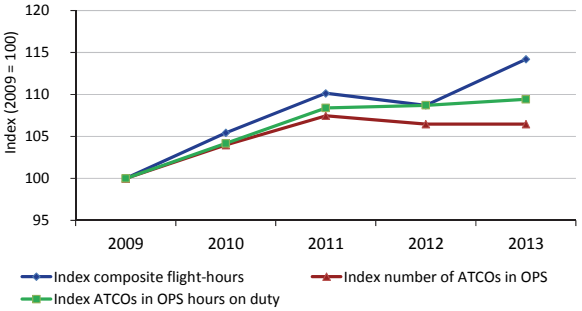


Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)

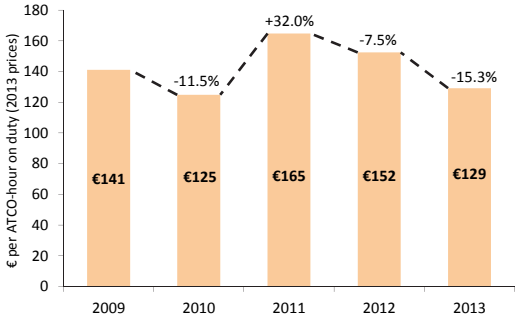


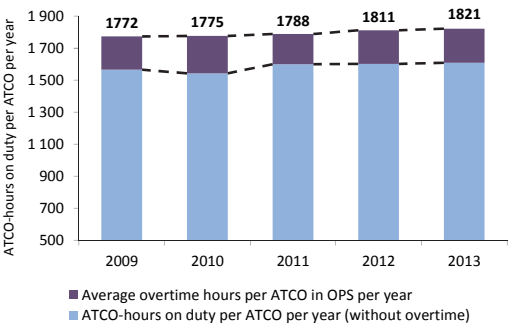


Trend in gate-to-gate ATCO-hour productivity

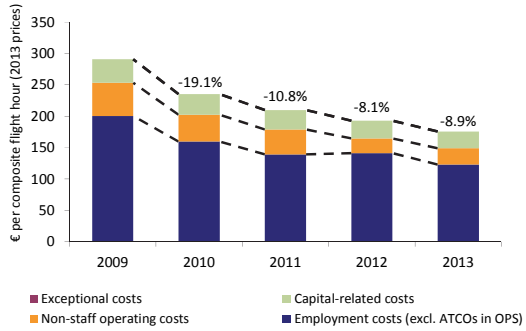


Trend in gate-to-gate employment costs per ATCO-hour

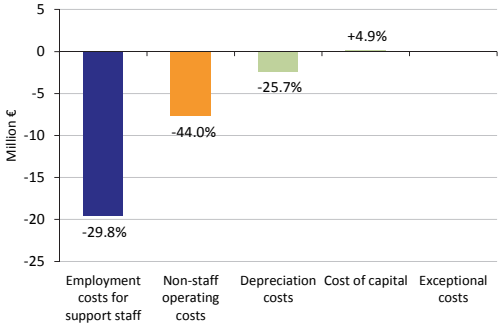




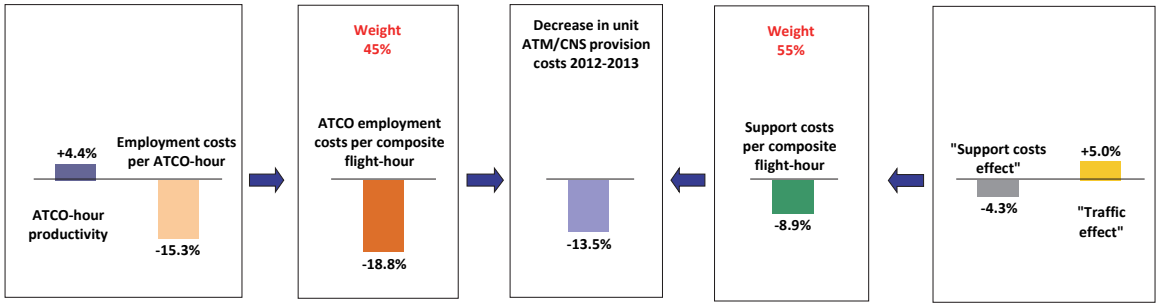
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

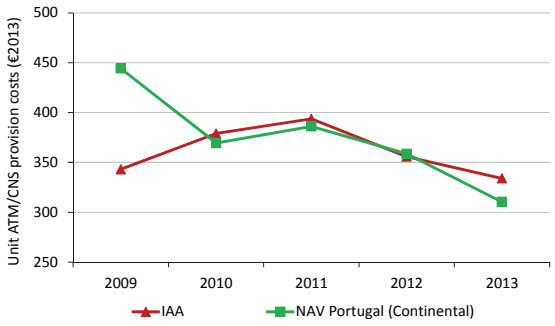


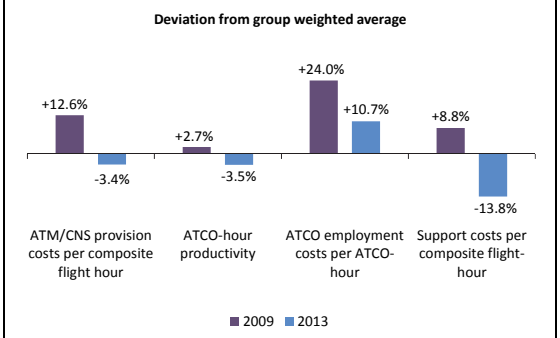
Changes in financial cost-effectiveness (2012-2013)



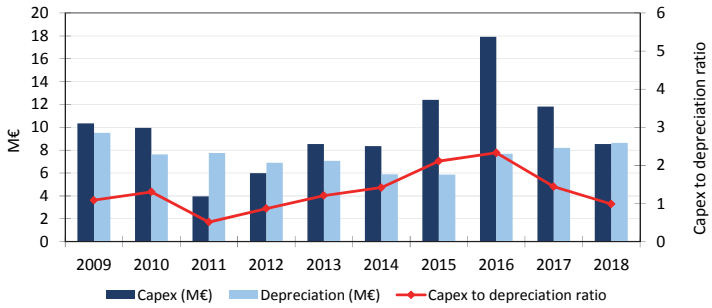
NAV Portugal Continental (Portugal) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2001*	C: 2001*	C: 2001*	C: 1999*
						2009				
						2010				
						2011				
€4.5M	€3.5M	€0.9M		€5.8M	€1.5M	2012				
			€1.1M			2013				
						2014				
€20.9M	€4.6M	€8.5M	€15.7M	€4.0M	€0.5M	2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	ATM systems program (mainly including the evolution of the LISATM system into LISATM-iTEC)	ATM	25.4	2012	2019
2	Surveillance program (mainly including new MLAT equipment for Lisboa FIR, Mode S radar sensors, replacement of Lisboa radar)	SUR	16.8	2013	2019
3	Building program (mainly including new Tower Centre in Horta and facilities maintenance in Lisbon)	Building	9.8	2012	2019
4	NAVAIDS program (mainly including new ILS systems at Oporto, Faro and Lisbon and the installation of navaids in the Porto TMA)	NAV	9.4	2012	2019
5	Communication program (mainly including new VCS system and purchase of tape recorders and communications systems in the Lisbon FIR)	COM	8.1	2012	2019

NAVIAIR (Denmark) – Cost-effectiveness KPIs (€2013)

Contextual economic information

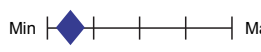
Exchange rate: 1 EUR = 7.456 DKK

NAVIAIR represents 1.4% of European system gate-to-gate ATM/CNS provision costs

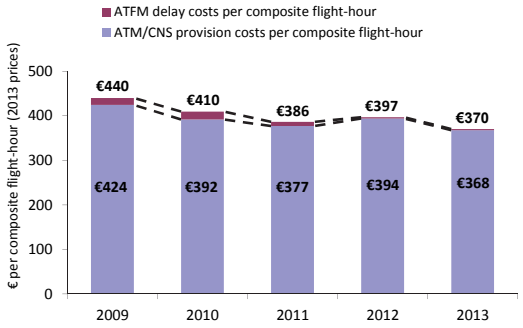
Operational conditions

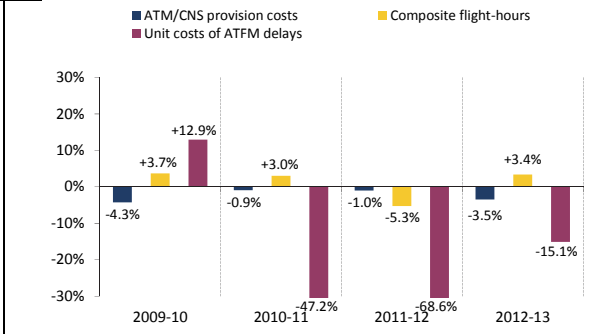
Aggregated complexity score:

Seasonal traffic variability:

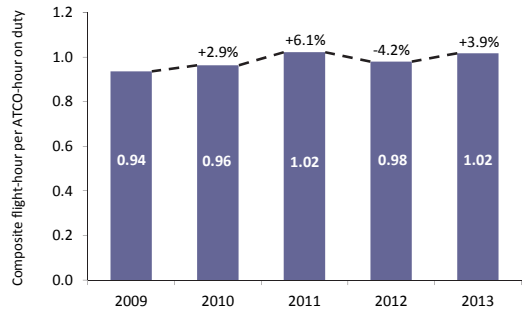


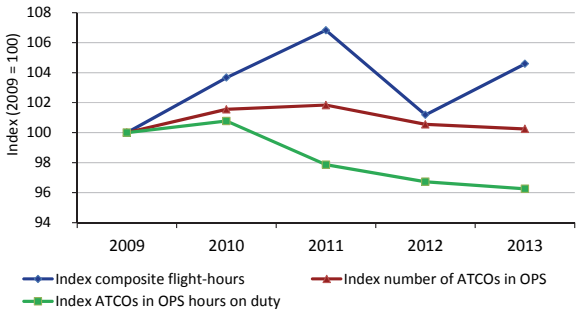
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



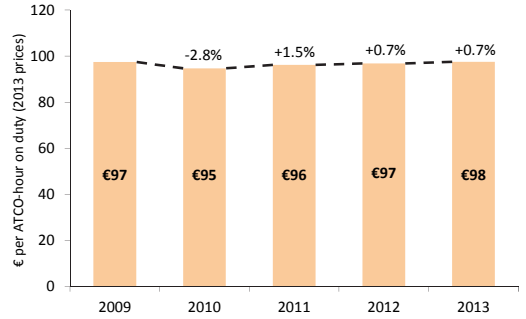


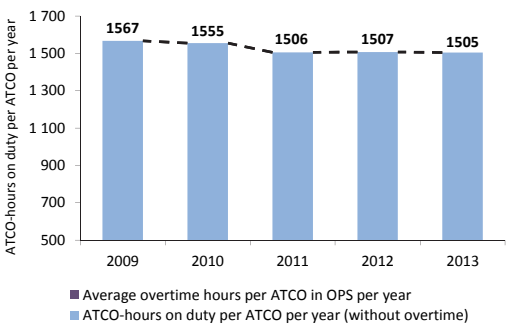
Trend in gate-to-gate ATCO-hour productivity



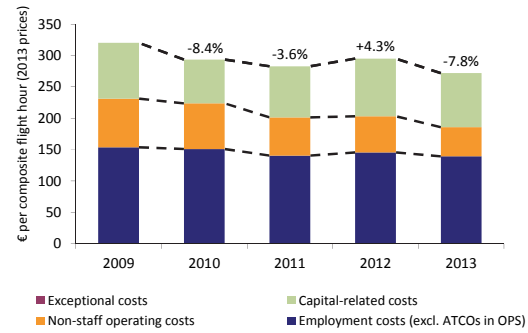


Trend in gate-to-gate employment costs per ATCO-hour

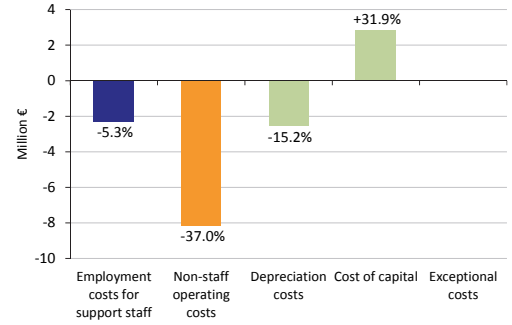




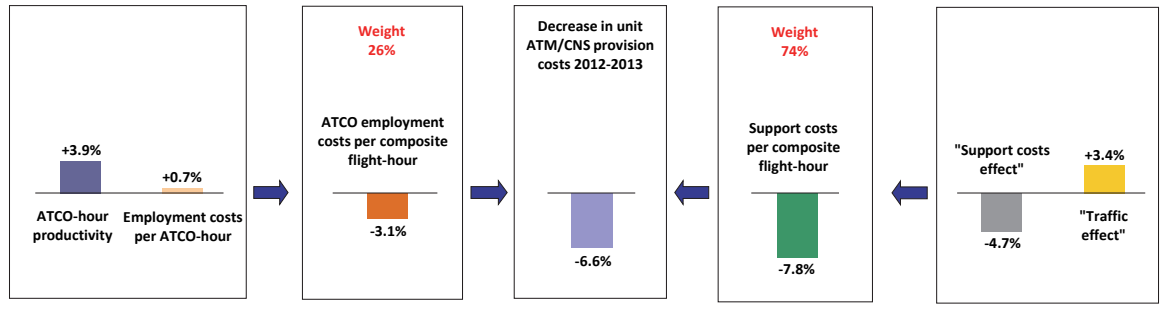
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

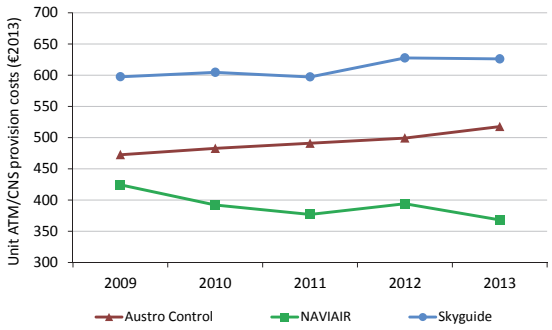


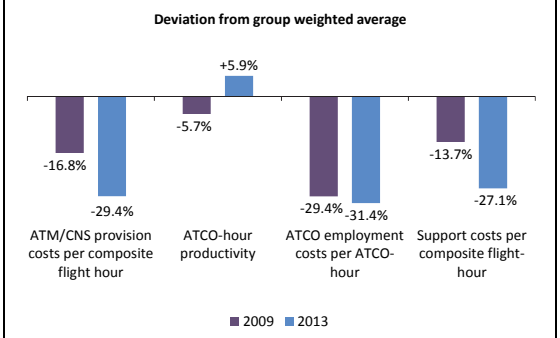
Changes in financial cost-effectiveness (2012-2013)



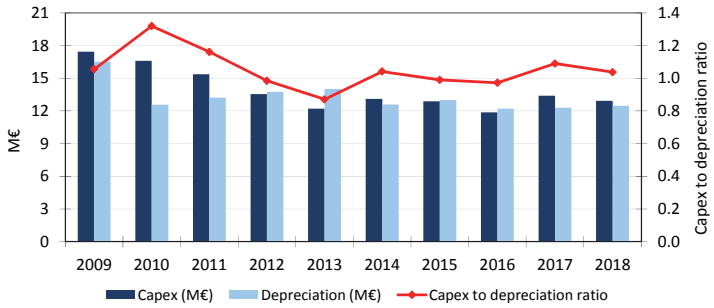
NAVIAIR (Denmark) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2008	C: 2008	C: 2008	C: 2008
						2009				
						2010				
						2011				
						2012				
						2013				
						2014				
€29.7M	€8.6M	€0.1M	€0.2M	€9.9M	€2.4M	2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Investments mainly relating to COOPANS and the upgrade of the FDP, RDP and HMI systems	ATM	29.7	2015	2019
2	Investments mainly relating to the implementation of Voice over Internet Protocol (VoIP) programme and related projects	CNS	8.9	2015	2019
3	Investments mainly related to buildings	Buildings	9.9	2015	2019
4	Other	Other	2.4	2015	2019

Oro Navigacija (Lithuania) – Cost-effectiveness KPIs (€2013)

Contextual economic information

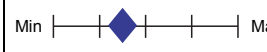
Exchange rate: 1 EUR = 3.453 LTL

Oro Navigacija represents 0.3% of European system gate-to-gate ATM/CNS provision costs

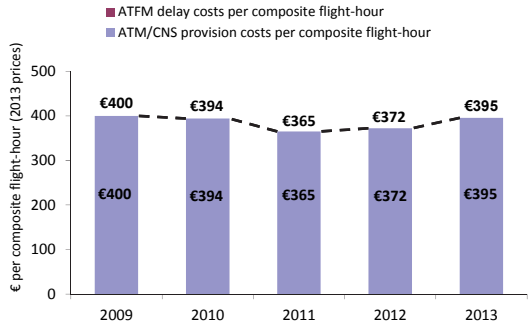
Operational conditions

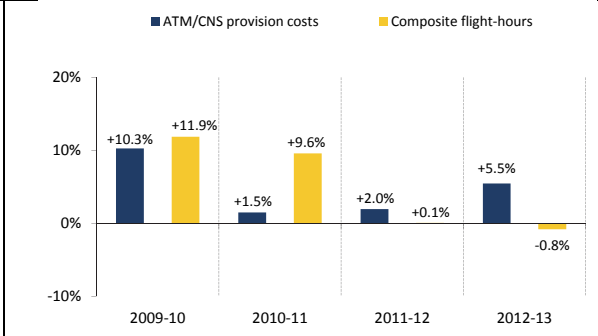
Aggregated complexity score:

Seasonal traffic variability:

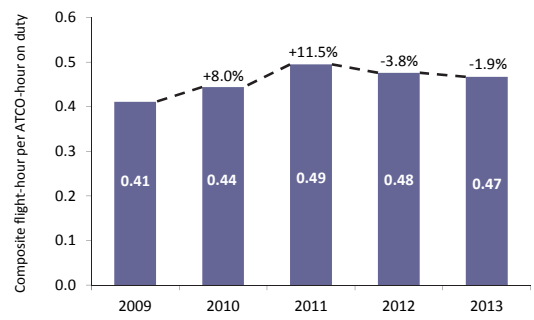


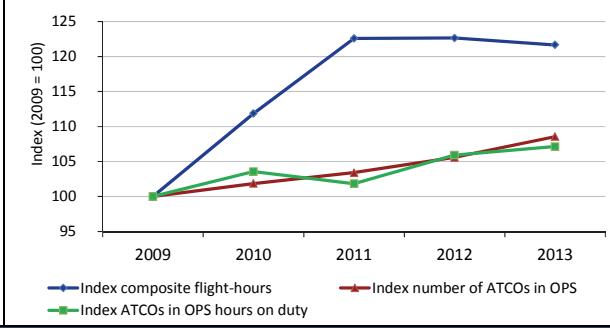
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



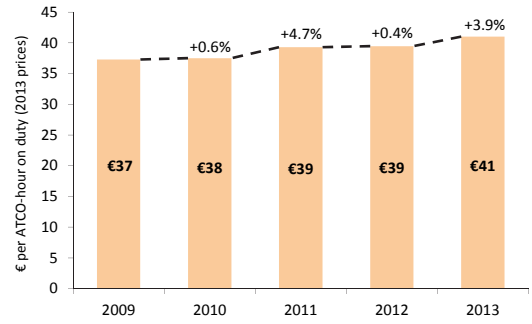


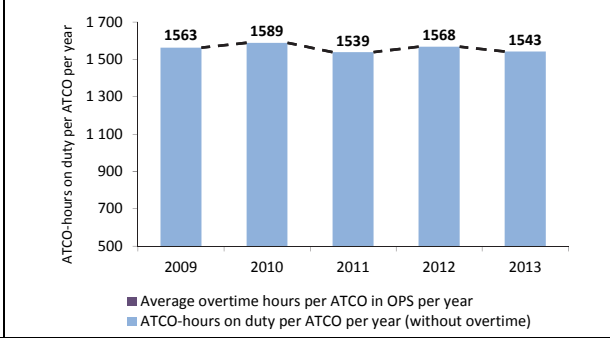
Trend in gate-to-gate ATCO-hour productivity



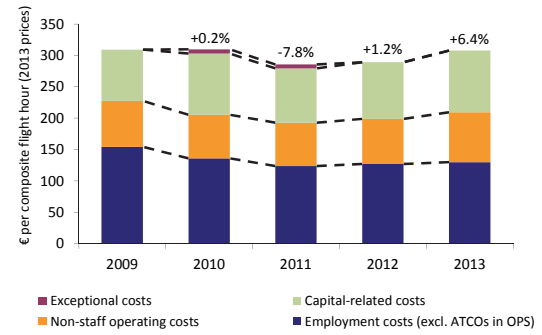


Trend in gate-to-gate employment costs per ATCO-hour

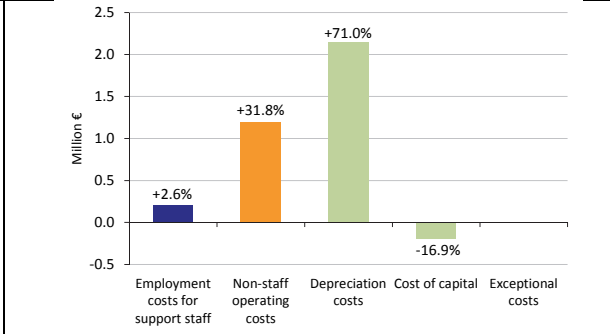




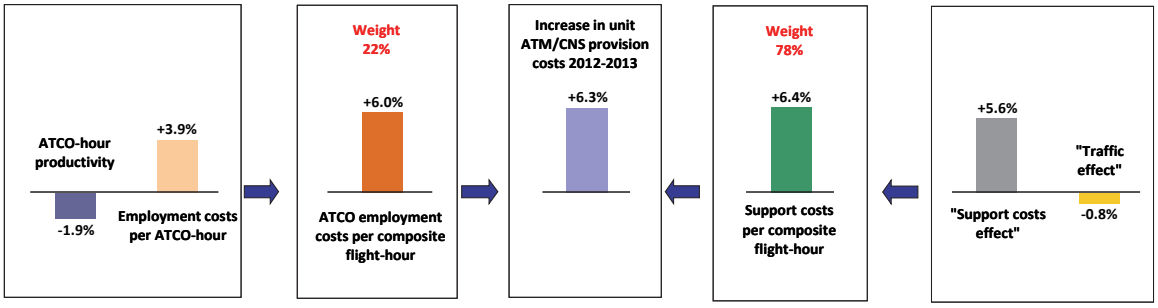
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

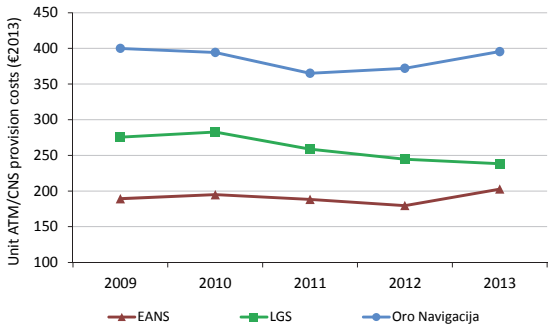


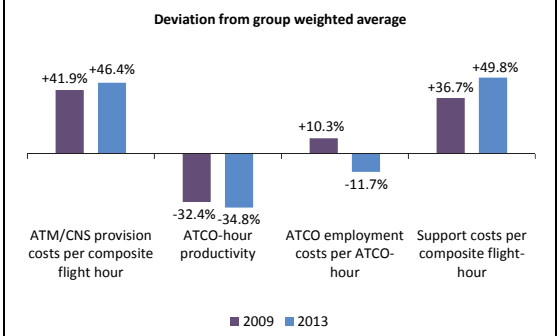
Changes in financial cost-effectiveness (2012-2013)



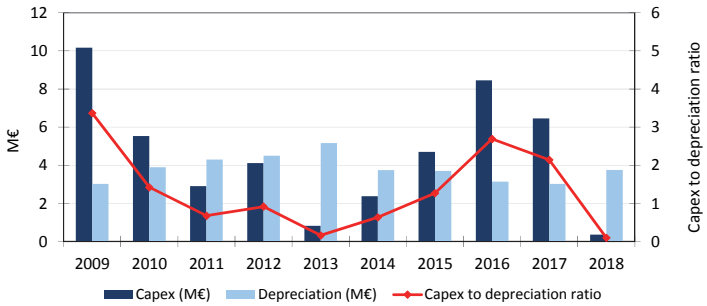
Oro Navigacija (Lithuania) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2005*	C: 2005*	C: 2005*	C: 2005*
						2009				
			€16.0M (2007-2012)			2010				
€5.1M (2008-2014)	€3.0M	€2.5M			€0.2M	2011				
						2012				
					€0.9M	2013				
	€0.2M					2014				
€6.2M		€1.0M	€1.1M	€10.7M	€1.9M	2015				
	€1.7M					2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	ACC and Administration building	Building	10.7	2015	2017
2	Installation of the new ATC system in new ACC	ATM	6.2	2015	2019
3	Replacement of radar (Kaunas)	SUR	4.8	2008	2010
4	Replacement of radar (Palanga)	SUR	4.8	2008	2010
5	Replacement of radar (Vilnius - 2007/2008)	SUR	3.7	2007	2008

PANSA (Poland) – Cost-effectiveness KPIs (€2013)

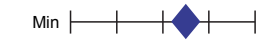
Contextual economic information

Exchange rate: 1 EURO = 4.193 PLN

PANSA represents 1.8% of European system gate-to-gate ATM/CNS provision costs

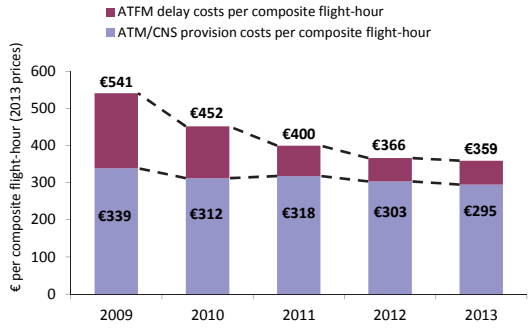
Operational conditions

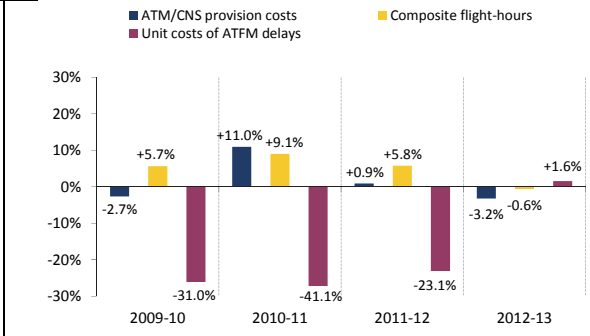
Aggregated complexity score:



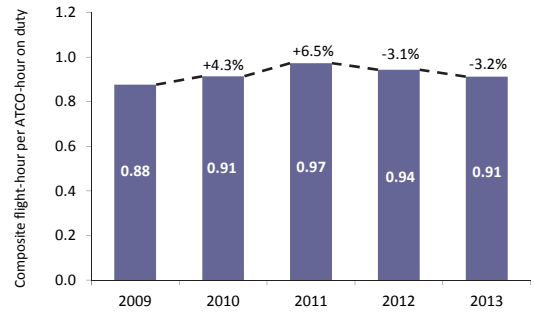
Seasonal traffic variability:

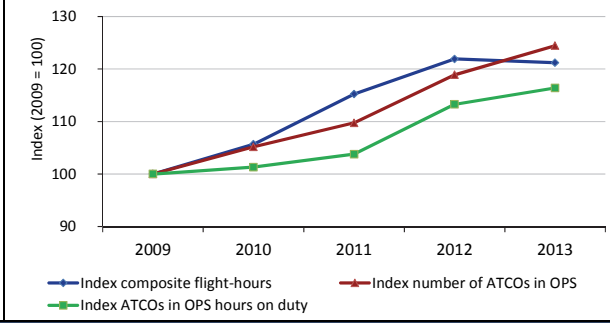
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



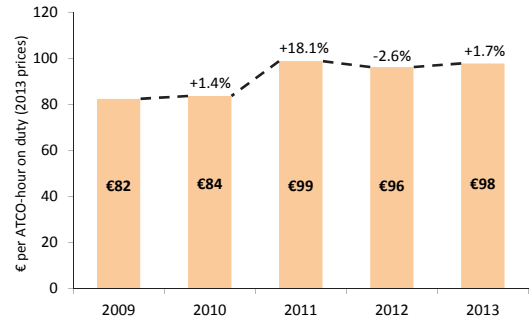


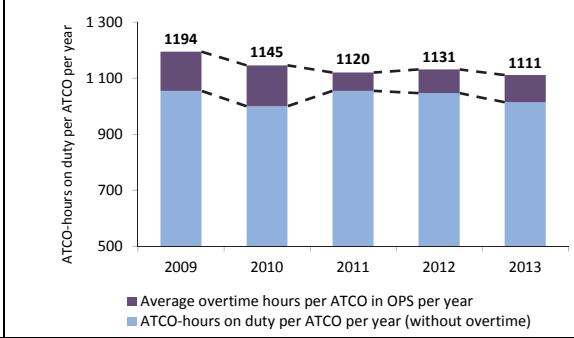
Trend in gate-to-gate ATCO-hour productivity



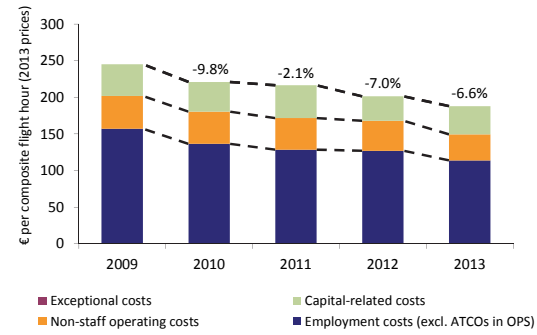


Trend in gate-to-gate employment costs per ATCO-hour

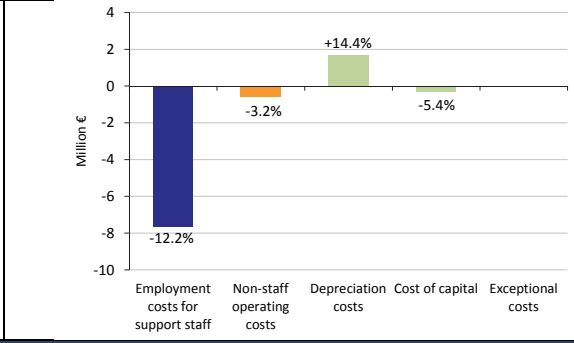




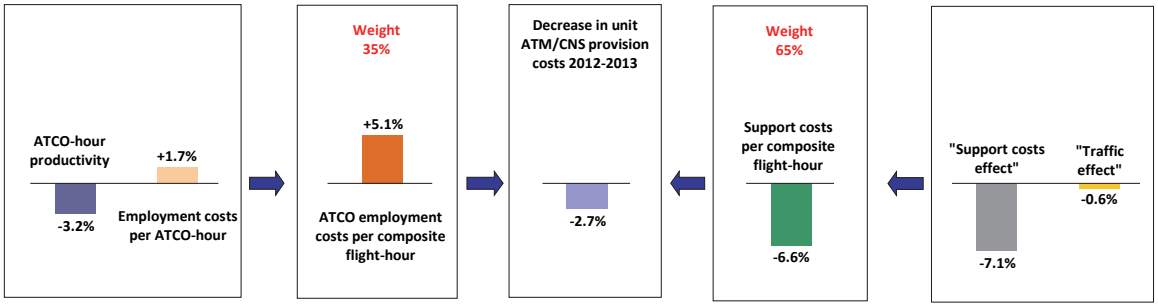
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

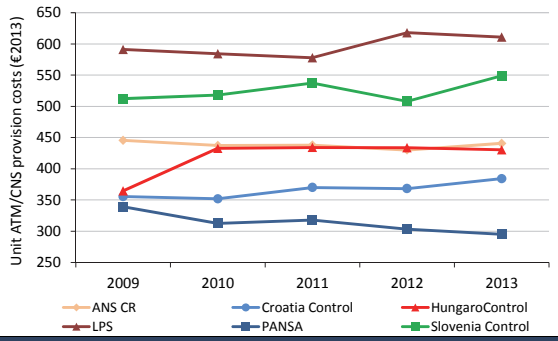


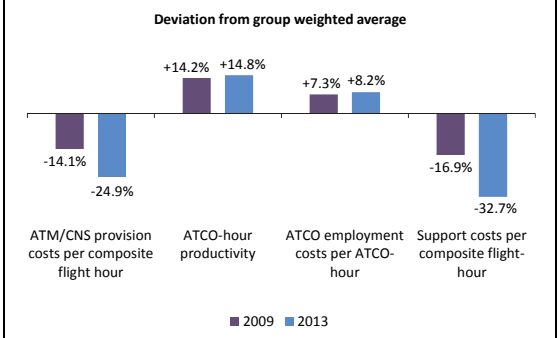
Changes in financial cost-effectiveness (2012-2013)



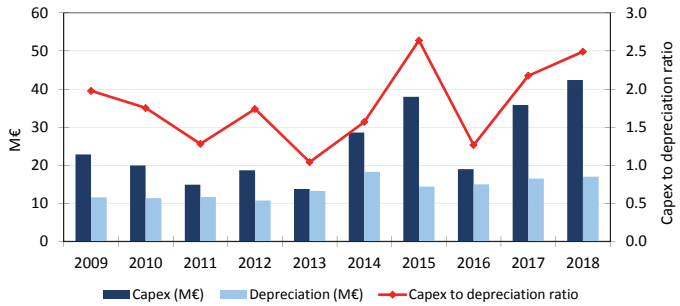
PANSA (Poland) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS C: 2013	RDPS C: 2013	HMI C: 2013	VCS C: 2013
€33.9M (2008-2013)	€11.9M				€4.6M	2009				
						2010				
						2011				
			€12.8M			2012				
						2013				
						2014				
€29.9M	€2.2M	€6.7M	€34.6M	€80.2M	€13.3M	2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	ATC training and contingency infrastructure	Building	47.9	2015	2019
2	Construction of TWR operational units	Building	26.7	2015	2018
3	Modernisation of radio systems and purchase of radars	SUR	25.8	2015	2019
4	Replacement of ATM system	ATM	23.0	2008	2013
5	Upgrade of Pegasus 21 ATM system	ATM	20.5	2015	2019

ROMATSA (Romania) – Cost-effectiveness KPIs (€2013)

Contextual economic information

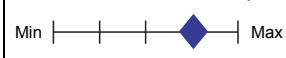
Exchange rate: 1 EUR = 4.416 RON

ROMATSA represents 2.0% of European system gate-to-gate ATM/CNS provision costs

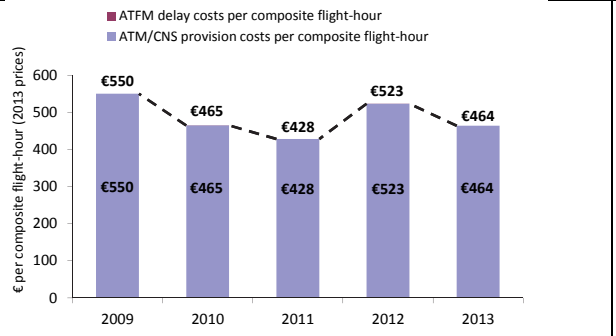
Operational conditions

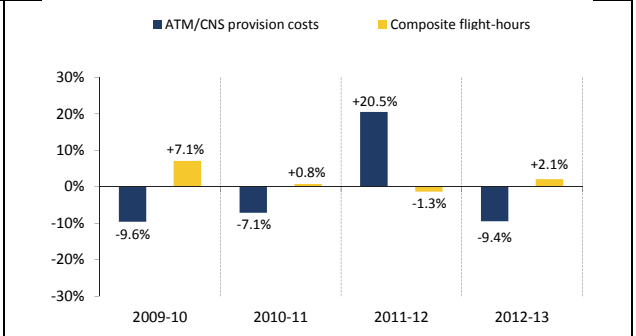
Aggregated complexity score:

Seasonal traffic variability:

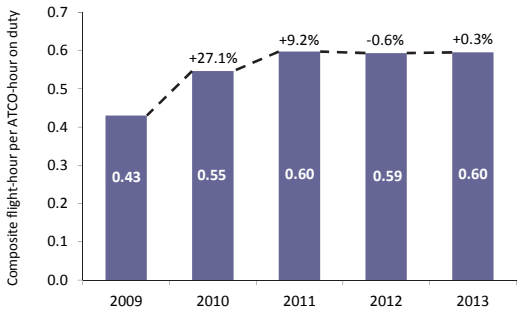


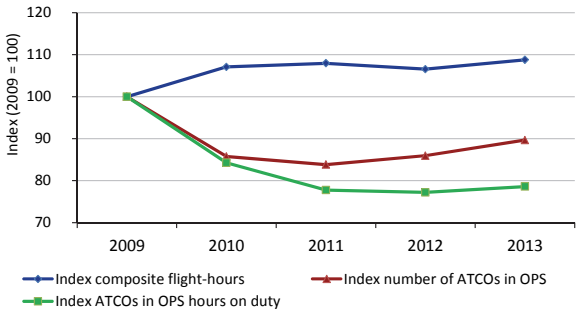
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



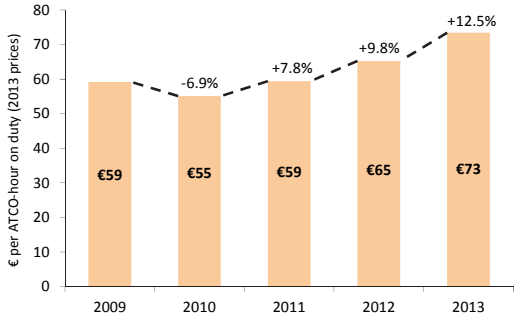


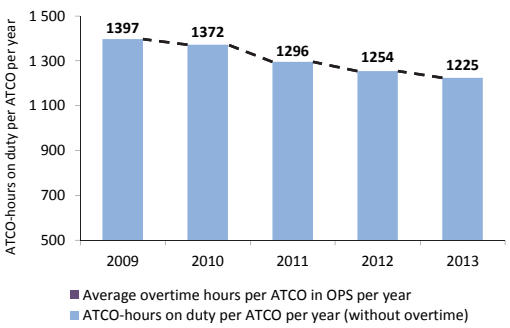
Trend in gate-to-gate ATCO-hour productivity



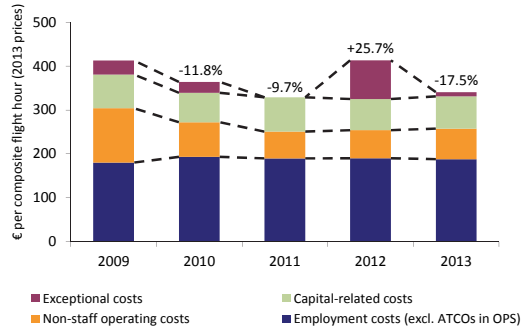


Trend in gate-to-gate employment costs per ATCO-hour

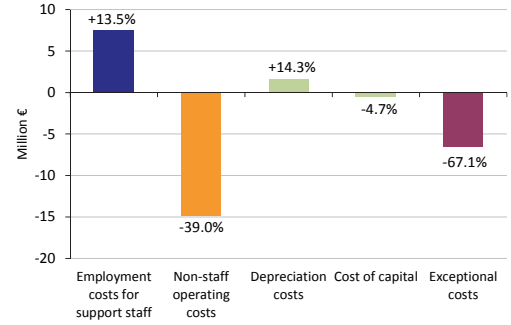




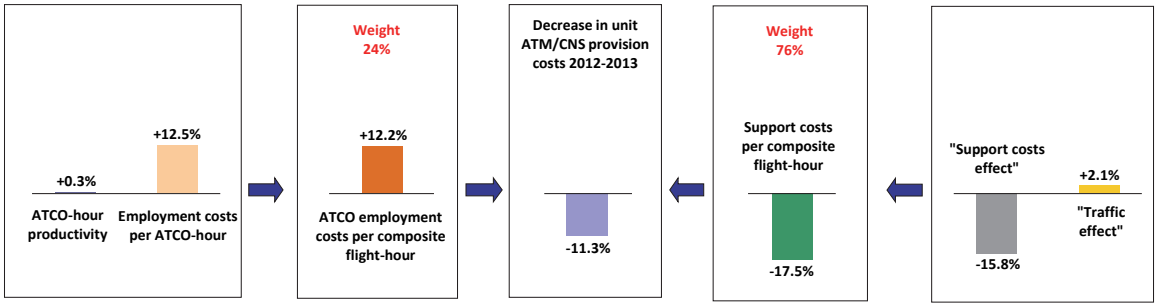
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

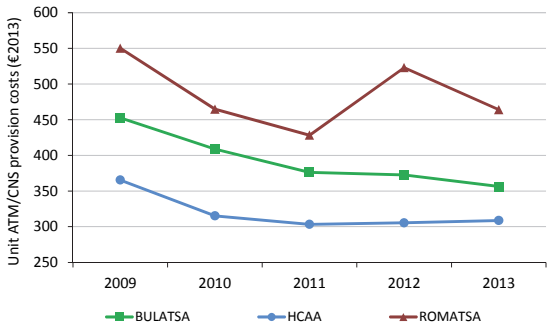


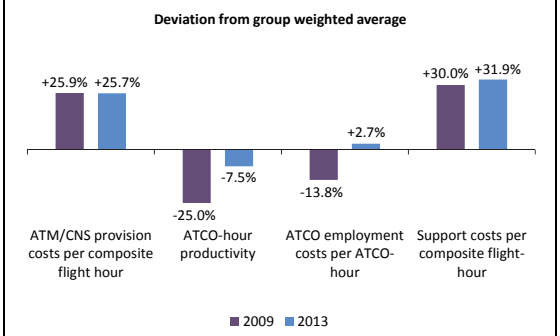
Changes in financial cost-effectiveness (2012-2013)



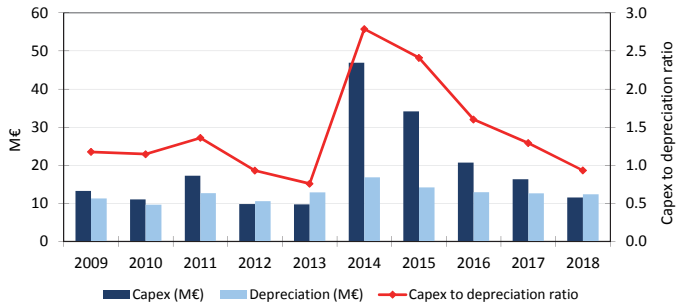
ROMATSA (Romania) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2003*	C: 2003*	C: 2003*	C: 2004*
						2009				
						2010				
		€1.2M		€0.4M		2011				
	€7.6M				€3.3M	2012				
€61.8M (2008-2021)			€16.6M			2013				
						2014				
				€8.6M		2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	ATM System ROMATSA 2015+ Phase I	ATM	34.3	2 011	2 015
2	ATM System ROMATSA 2015+ Phase II	ATM	15.1	2 015	2 018
3	ATM System ROMATSA 2015+ Phase III	ATM	10.1	2 017	2 021
4	Mode S radars installation	SUR	7.2	2 011	2 015
5	VCSS Replacement	COM	5.9	2 012	2 014

Skyguide (Switzerland) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: 1 EUR = 1.230 CHF

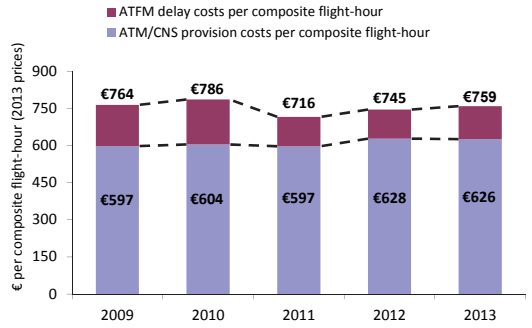
Skyguide represents 3.5% of European system gate-to-gate ATM/CNS provision costs

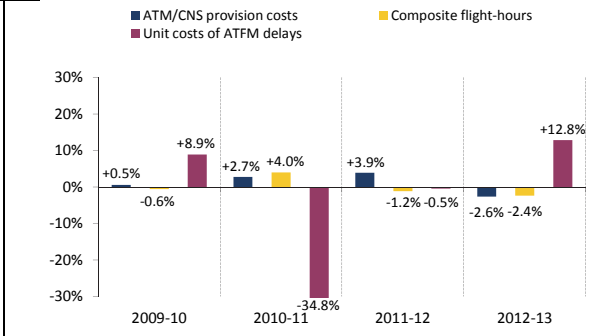
Operational conditions

Aggregated complexity score:

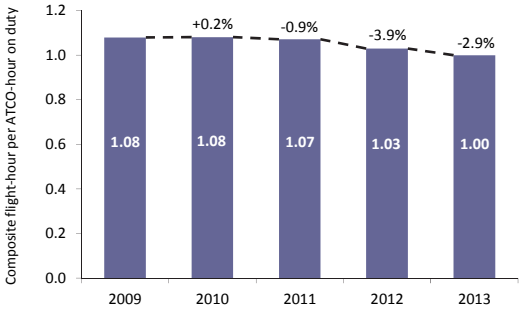
Seasonal traffic variability:

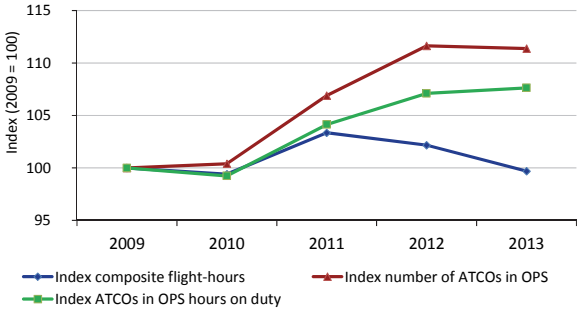
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



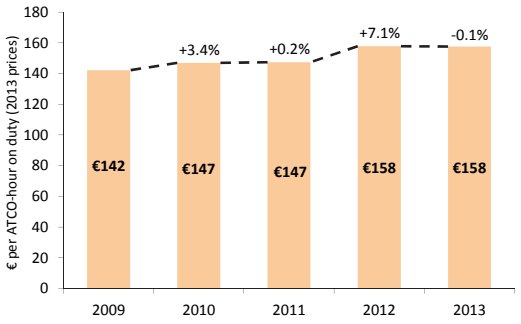


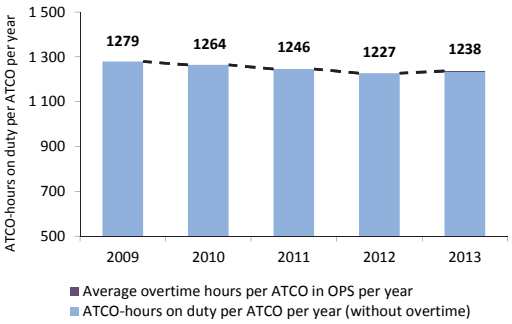
Trend in gate-to-gate ATCO-hour productivity



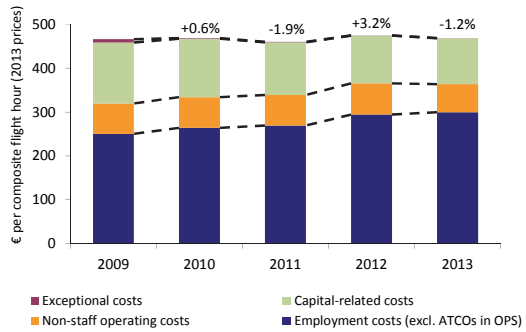


Trend in gate-to-gate employment costs per ATCO-hour

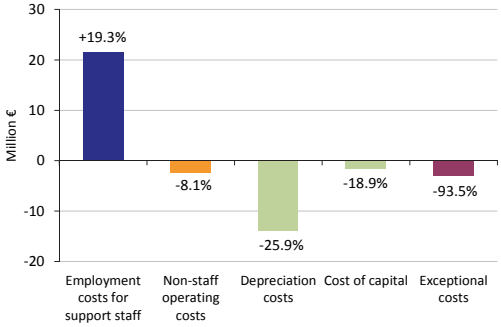




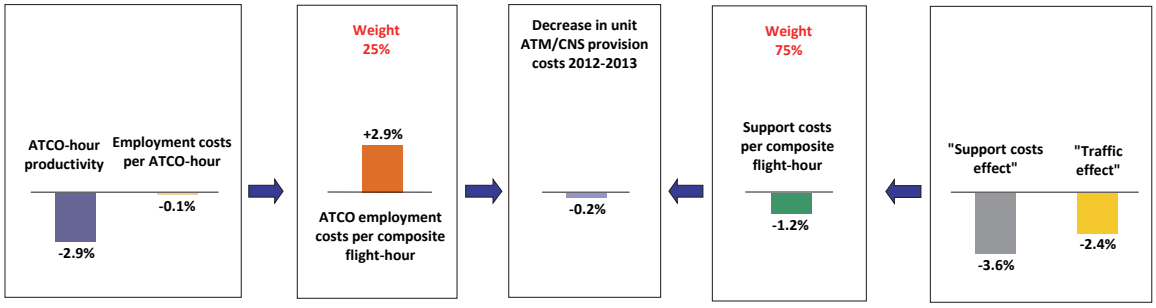
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

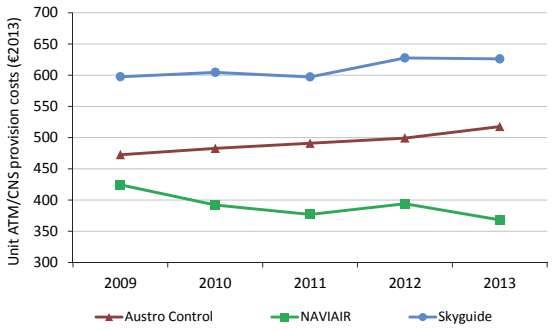


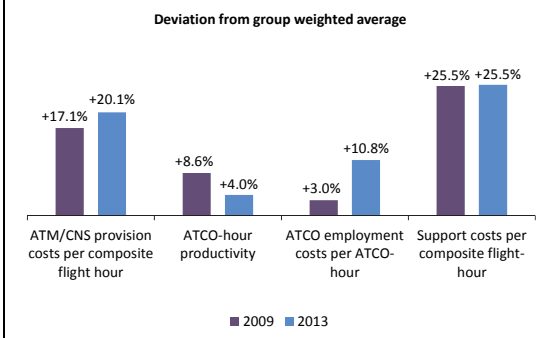
Changes in financial cost-effectiveness (2012-2013)



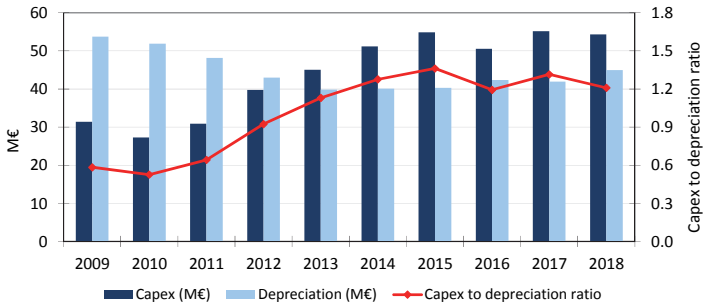
Skyguide (Switzerland) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 1999 (Geneva) 2007 (Zurich)*	C: 2004 (All ACCs)*	C: 2003/06 (All ACCs)*	C: 2004/05 (All ACCs)*
						2009				
						2010				
						2011				
						2012	Zurich	All ACCs	Zurich	Zurich
						2013	Geneva		Geneva	Geneva
						2014				
						2015				
						2016				
						2017				
						2018				
						2019				
€112.1M (2005-2019)	€23.3M		€12.5M	€3.6M	€6.5M**					

**Expenses relating to AIS

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Virtual Center 1	ATM	41.6	2011	2017
2	Network Evolutions	ATM	28.3	2005	2019
3	TACO (Tower – Approach – Communication) system integration into the new FDP in Zurich	ATM	18.4	2008	2015
4	Upgrade of the FDP system in Geneva	ATM	16.3	2015	2019
5	Smart Radio	COM	14.8	2012	2019

Slovenia Control (Slovenia) – Cost-effectiveness KPIs (€2013)

Contextual economic information

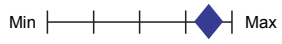
Exchange rate: Slovenia is within the EURO Zone

Slovenia Control represents 0.4% of European system gate-to-gate ATM/CNS provision costs

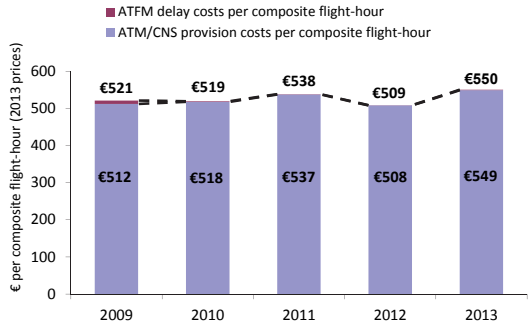
Operational conditions

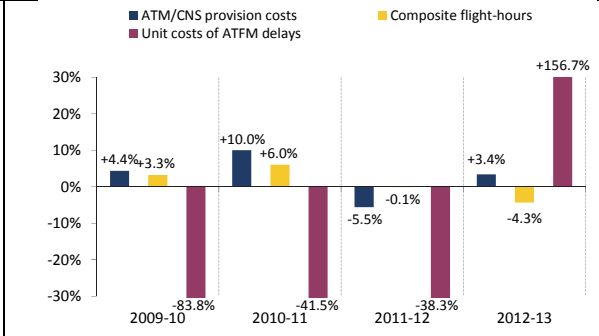
Aggregated complexity score:

Seasonal traffic variability:

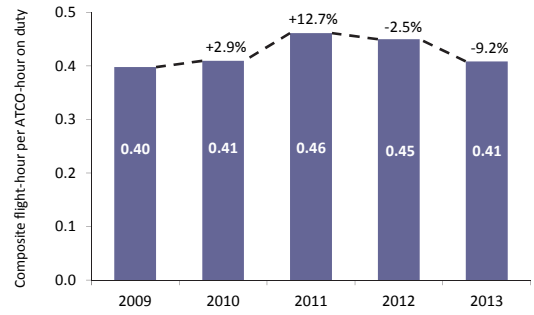


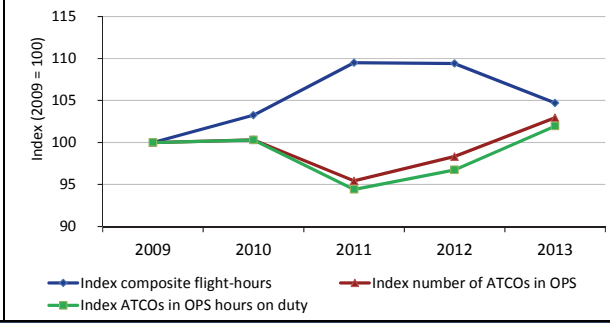
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



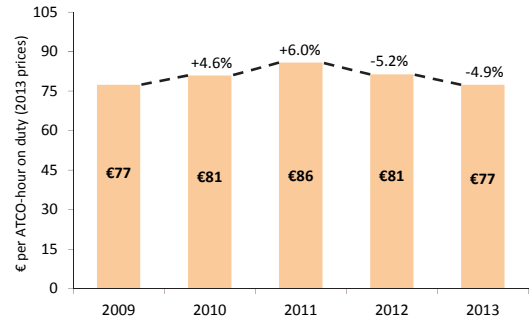


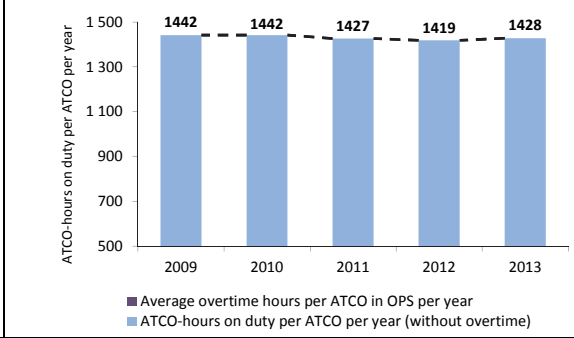
Trend in gate-to-gate ATCO-hour productivity



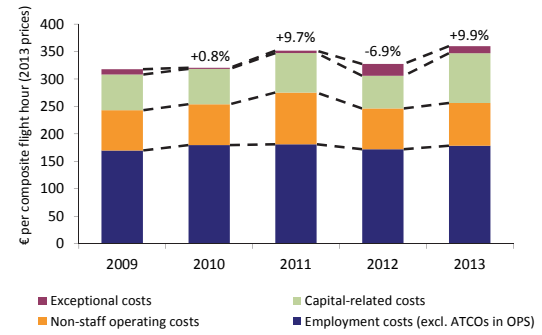


Trend in gate-to-gate employment costs per ATCO-hour

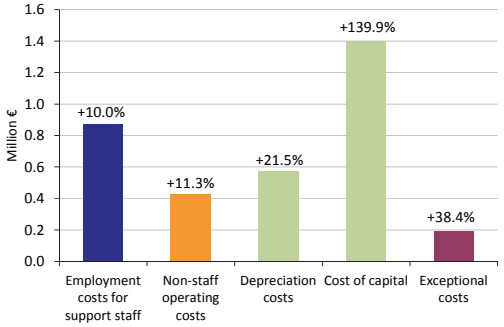




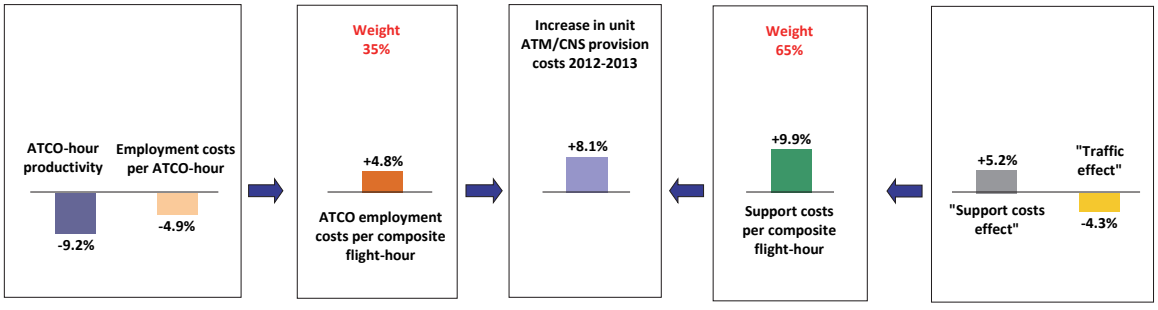
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

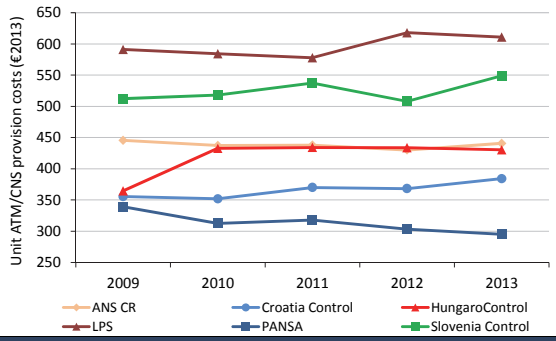


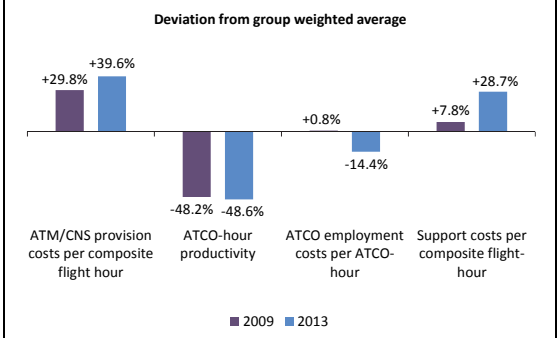
Changes in financial cost-effectiveness (2012-2013)



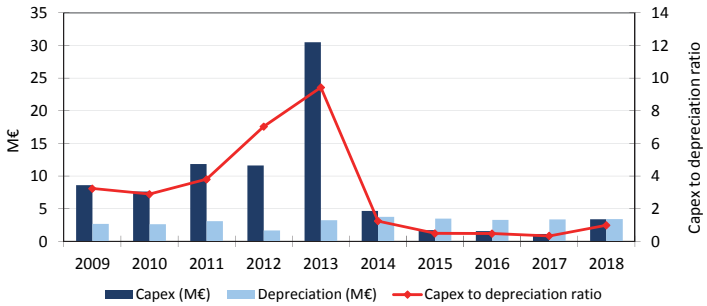
Slovenia Control (Slovenia) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2007*	C: 2000*	C: 2000*	C: 2013*
€6.9M (2006-2013)						2009				
		€1.8M		€22.7M (2006-2013)		2010				
	€3.1M		€1.0M			2011				
						2012				
						2013				
€8.1M						2014				
						2015				
					€2.9M	2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	New ATCC building in Ljubljana (including general equipment)	Buildings	22.7	2006	2013
2	New ATCC technical systems	ATM	6.9	2006	2013
3	ATM System upgrade	ATM	4.6	2018	2019
4	FDPS Upgrade	ATM	2.5	2014	2017
5	Other	Other	2.4	2015	2019

SMATSA (Serbia and Montenegro) – Cost-effectiveness KPIs (€2013)

Contextual economic information

Exchange rate: 1 EUR = 113.004 RSD

SMATSA represents 0.9% of European system gate-to-gate ATM/CNS provision costs

Operational conditions

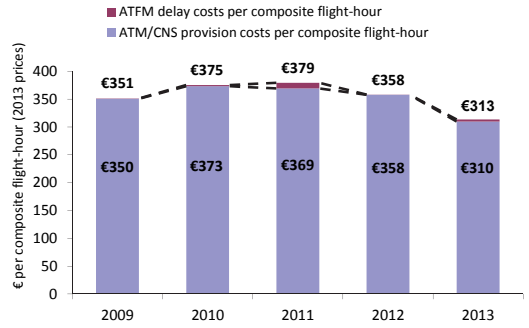
Aggregated complexity score:

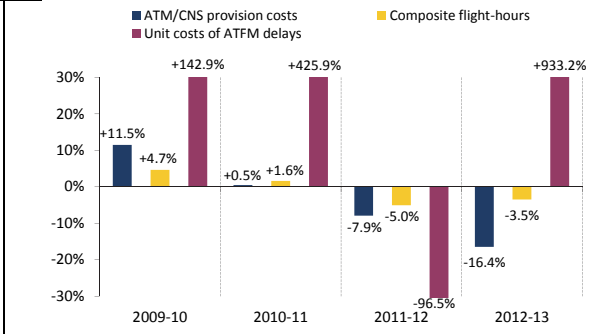
Min — Max

Seasonal traffic variability:

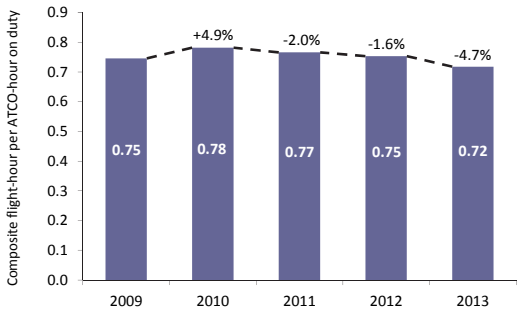
Min — Max

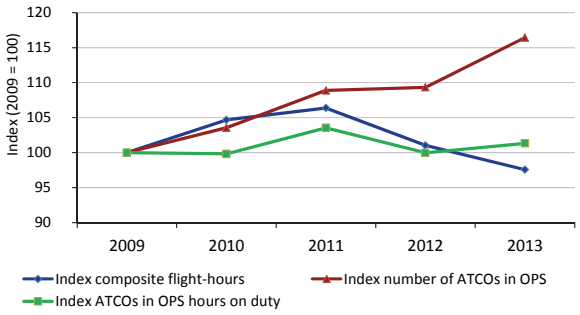
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



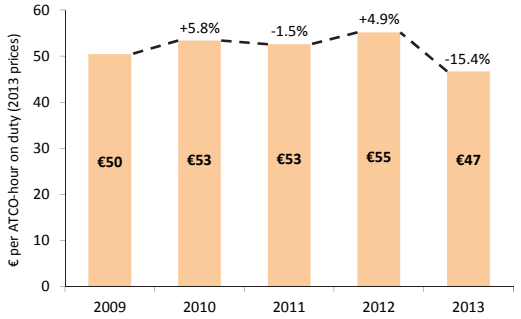


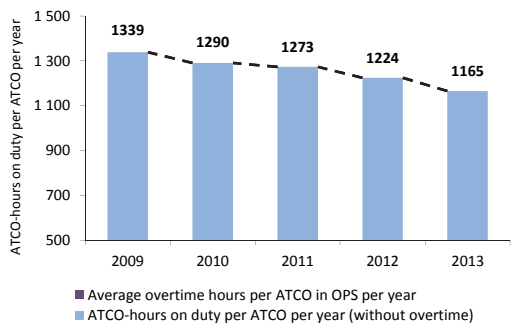
Trend in gate-to-gate ATCO-hour productivity



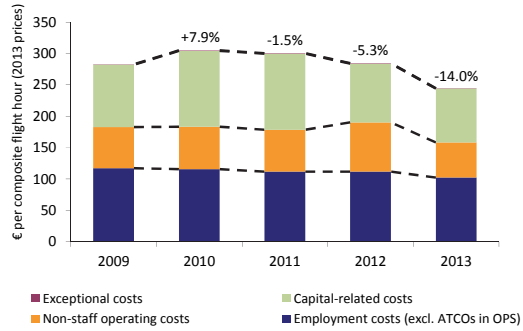


Trend in gate-to-gate employment costs per ATCO-hour

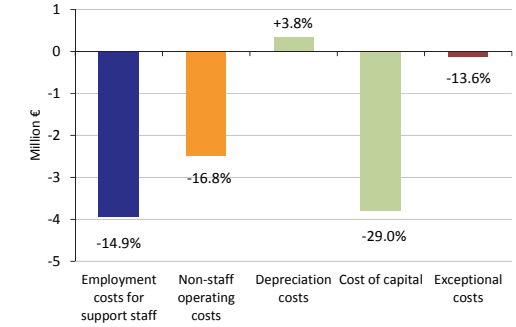




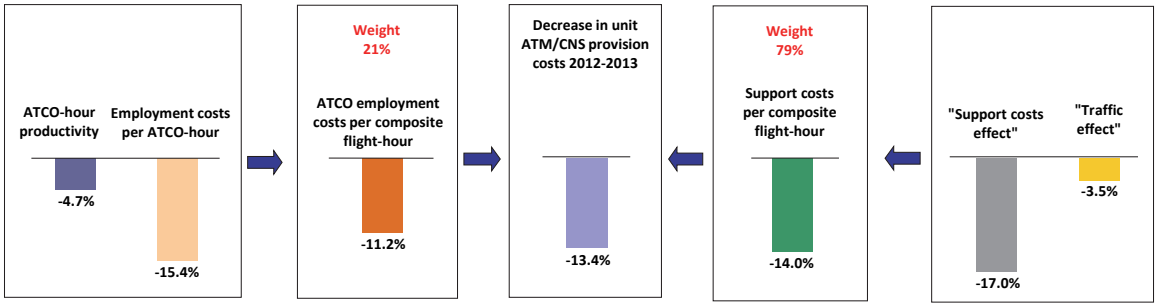
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

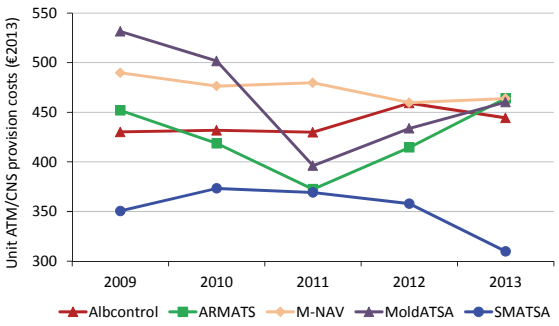


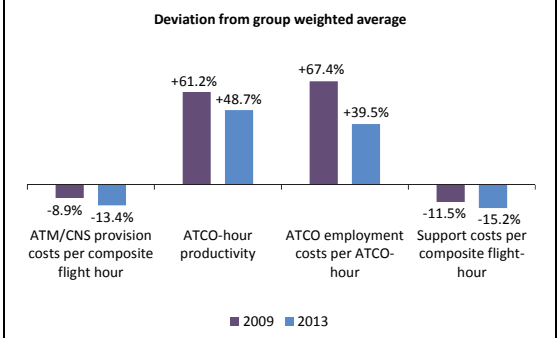
Changes in financial cost-effectiveness (2012-2013)



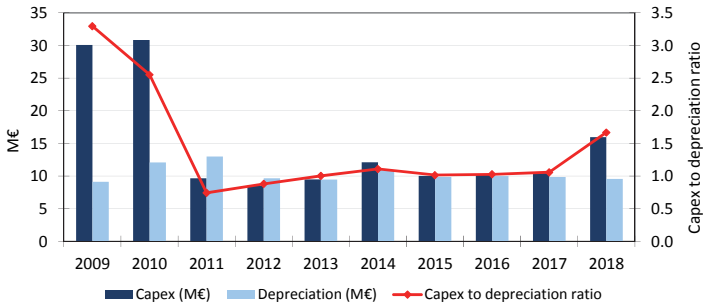
SMATSA (Serbia and Montenegro) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C: 2011*	C: 2011*	C: 2011*	C: 2011*
€52.8M (2008-2014)	€8.5M (2008-2015)			€19.8M		2009				
						2010				
			€3.8M		€0.5M	2011				
						2012				
						2013				
						2014				
						2015				
						2016				
						2017				
						2018				
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	New ATM System for Belgrade ACC and SMATSA communications network	ATM	30.9	2009	2011
2	New ATCC in Belgrade	Building	17.6	2009	2010
3	Aircraft equipped with Automatic Flight Inspection System	ATM	10.0	2008	2010
4	Procurement of a second aircraft for flight calibration of equipment	ATM	8.1	2013	2013
5	VHF and UHF radio system for air-ground communication	COM	4.9	2008	2010

UkSATSE (Ukraine) – Cost-effectiveness KPIs (€2013)

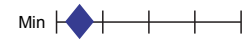
Contextual economic information

Exchange rate: 1 EUR = 10.612 UAH

UkSATSE represents 3.1% of European system gate-to-gate ATM/CNS provision costs

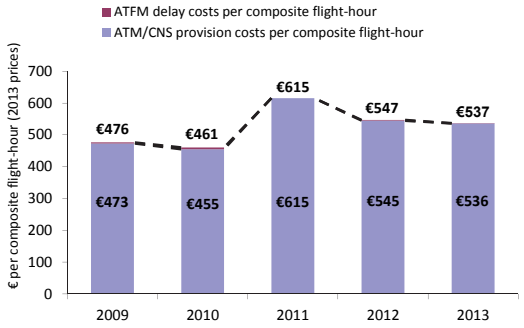
Operational conditions

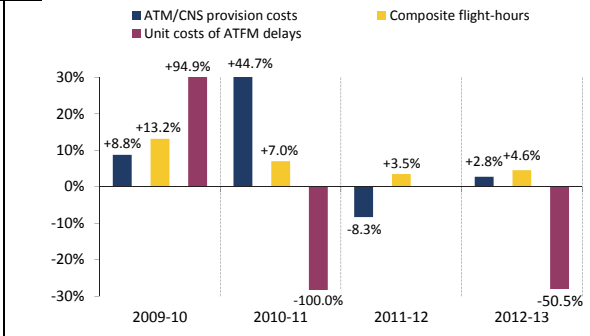
Aggregated complexity score:



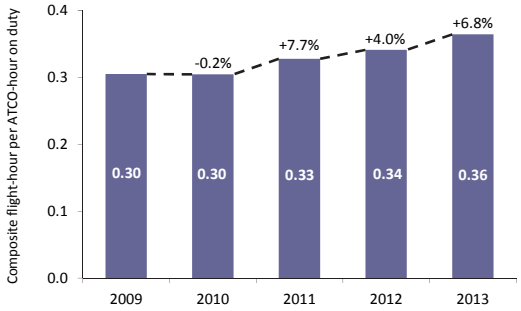
Seasonal traffic variability:

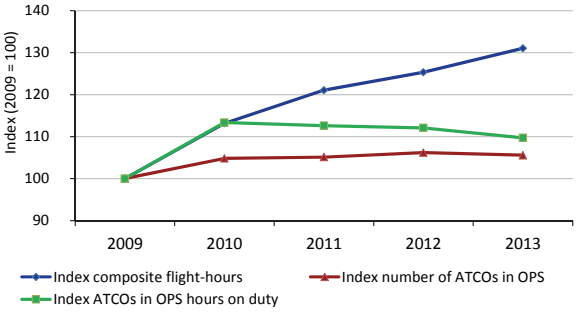
Trend in gate-to-gate economic cost-effectiveness (all financial data in €2013 prices)



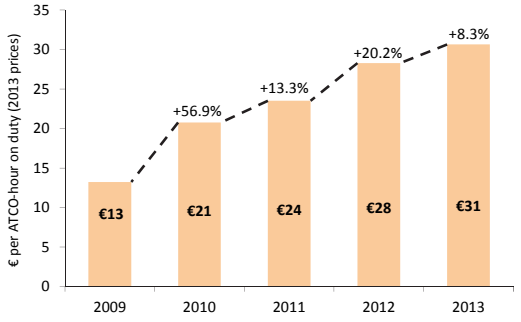


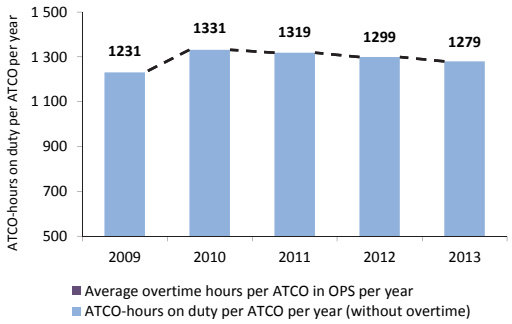
Trend in gate-to-gate ATCO-hour productivity



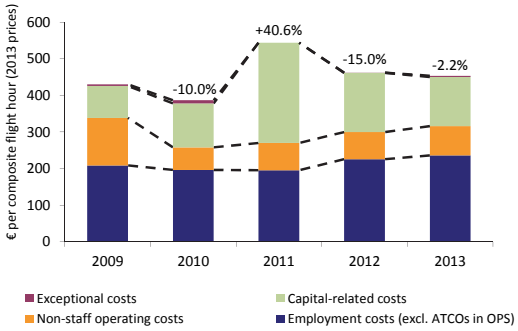


Trend in gate-to-gate employment costs per ATCO-hour

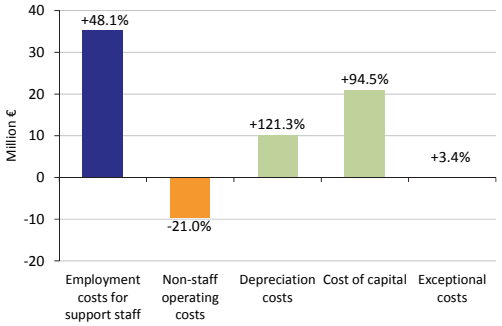




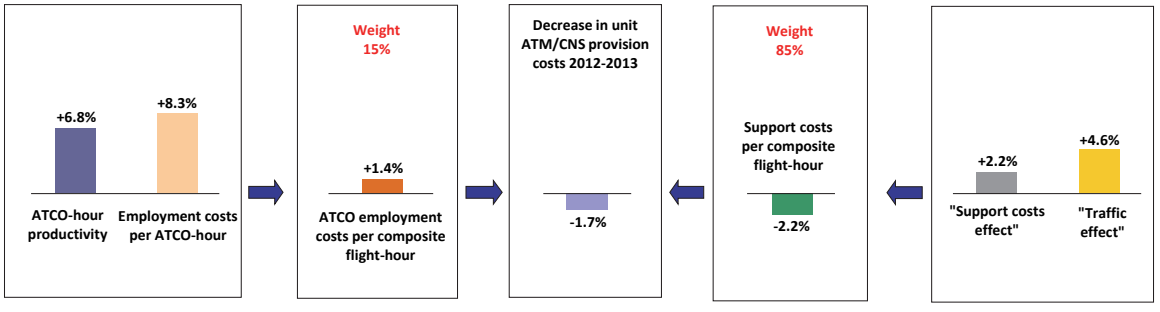
Trend in support costs per composite flight-hour



Changes in components of support costs (2009-2013)

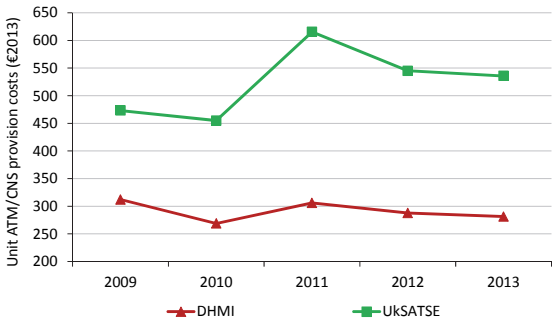


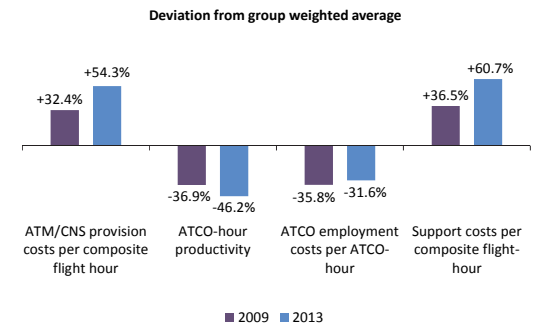
Changes in financial cost-effectiveness (2012-2013)



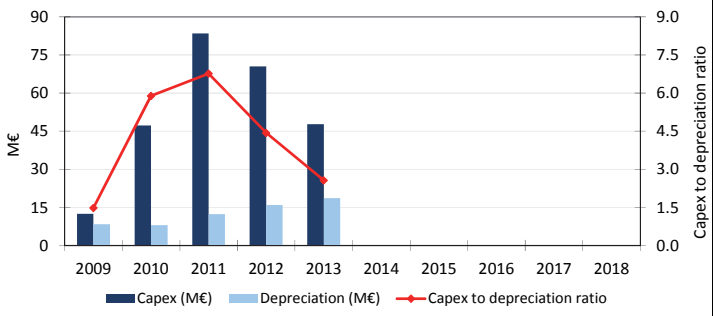
UkSATSE (Ukraine) – (€2013)

Changes in unit gate-to-gate ATM/CNS provision costs within comparator group





Planned capital expenditures and depreciation costs



Due to the exceptional events that affected UkSATSE operations in 2014, UkSATSE is not in a position to provide forward-looking information for the period 2014-2018.

Information on major capex projects and ATM systems upgrades/replacements

ATM	COM	NAV	SUR	Building	Other	Years	FDPS	RDPS	HMI	VCS
							C:1997 (L'viv) 2000 (Odesa, Kyiv) 2007 (Simf., Kyiv, Dnip.)*	C: 1997 (L'viv) 2000 (Odesa, Kyiv) 2007 (Simf., Kyiv, Dnip.)*	C: 1997 (L'viv) 2000 (Odesa, Kyiv) 2007 (Simf., Kyiv, Dnip.)*	C:2003 (Odesa, L'viv) 2006 (Simf., Dnip.) 2011 (Kyiv)*
€17.0M (2008-2014)				€42.6M (2008-2016)		2009				
	€10.4M		€9.5M		€2.8M	2010				
						2011				
						2012				
						2013	K, D	K, D	K, D	
						2014	S, L	S, L	S, L	L
						2015	O	O	O	O
						2016				
						2017				D
						2018				S
						2019				

* C = Commissioning Upgrade Replacement

Focus on the top five capex projects

Project number	Name of the project	Domain	Capex spent between start and end dates (€M)	Start date	End date
1	Building of new towers at Donets'k, Zhuliany (Kyiv), Kharkiv, Dnipropetrovs'k, Borispil airport and reconstructing of L'viv airport tower	Building	42.6	2008	2016
2	Upgrade of ATM systems for L'viv ACC/APP/TWR, Kyiv ACC/APP/TWR, Donets'k APP/TWR, Kharkiv APP/TWR and Dnipropetrovs'k TWR	ATM	17.0	2008	2014
3	Upgrade of radio equipment for Dnipropetrovs'k ACC, L'viv ACC, Kyiv ACC, Odesa ACC, Zhuliany (Kyiv) TWR and Donets'k APP/TWR	COM	10.4	2010	2016
4	Upgrade of surveillance systems in Borispil', L'viv, Kharkiv, Simferopol', Donets'k, Odesa and Dnipropetrovs'k	SUR	9.5	2010	2016
5	4 stand-alone Weather Radars (L'viv, Kharkiv and Simferopol', Donets'k)	Other	2.8	2010	2013

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ANNEX 1 – STATUS OF ANSPs YEAR 2013 ANNUAL REPORTS

	Availability of a public Annual Report (AR)	Availability of Management Report	Availability of Annual Accounts	Independent audited accounts	Separate disclosure of en-route and terminal ANS costs	Information provided in English	PRU comments
Aena	✔	✔	✔	✔	No	✔	Financial statements are published in English while the management report is available in Spanish
ANS CR	✔	✔	✔	✔	No	✔	
ARMATS	No	No	No	No	No	No	PRU received an extract of the financial statements comprising an Income and a Balance Sheet statement.
Austro Control	✔	✔	✔	✔	No	✔	
Avinor	✔	✔	✔	✔	No	✔	
Belgocontrol	✔	✔	✔	✔	No	✔	Audit performed by the "board of auditors". No cash flow statement.
BULATSA	✔	✔	✔	✔	No	✔	
Croatia Control	✔	✔	✔	✔	No	✔	
DCAC Cyprus	No	No	No	No	No	No	DCAC annually discloses a report which includes some financial information from Route Charges Document but not Financial Statements.
DFS	✔	✔	✔	✔	No	✔	Separate accounts are used for internal reporting purposes and charges calculation.
DHMİ	✔	✔	✔	✔	No	✔	Includes airport activities.
DSNA	No	No	No	No	No	No	At the time of writing this report, DSNA had not yet released its 2013 Annual Report comprising financial statements.
EANS	✔	✔	✔	✔	✔	✔	Separate disclosure of aggregated revenues and costs for en-route and terminal ANS.
ENAV	✔	✔	✔	✔	No	✔	
Finavia	✔	✔	✔	✔	No	✔	Detailed accounts only available for total Finavia.
HCAA	No	No	No	No	No	No	HCAA plans to produce an Annual Report for the year 2014.
HungaroControl	✔	✔	✔	✔	No	✔	
IAA	✔	✔	✔	✔	No	✔	
LFV	✔	✔	✔	✔	No	✔	
LGS	✔	✔	✔	✔	No	✔	
LPS	✔	✔	✔	✔	No	✔	
LVNL	✔	✔	✔	✔	✔	No	Separate Income Statement for en-route and terminal ANS
MATS	✔	✔	✔	✔	✔	✔	Separate Income Statement for en-route and terminal ANS.
M-NAV	No	No	No	No	No	No	
MoldATSA	No	No	No	No	No	No	PRU received an extract of the Financial Statements.
MUAC	✔	✔	✔	✔	n/appl	✔	
NATA Albania	No	No	✔	✔	No	✔	At the time of writing this report, NATA Albania had only released a document comprising its Financial Statements, but not a Management Report for the year 2013.
NATS	✔	✔	✔	✔	✔	✔	Several ARs for individual group companies.
NAV Portugal	✔	✔	✔	✔	✔	No	Separate disclosure of aggregated revenues and costs for en-route and terminal ANS.
NAVIAIR	✔	✔	✔	✔	✔	✔	
Oro Navigacija	✔	✔	✔	✔	✔	✔	Total revenues and costs provided for both en-route and terminal ANS.
PANSA	✔	✔	✔	✔	✔	✔	
ROMATSA	✔	✔	✔	✔	No	✔	
Skyguide	✔	✔	✔	✔	✔	✔	Separate accounts for en-route, terminal and military OAT services.
Slovenia Control	✔	✔	✔	✔	No	✔	
SMATSA	✔	✔	✔	✔	No	✔	
UkSATSE	✔	✔	✔	✔	No	✔	Annual Report does not include Financial Statements. UkSATSE provided a separate document with Financial Statements.

Annex 1 - Table 0.1: Status on ANSP's 2013 Annual Reports

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ANNEX 2 – PERFORMANCE INDICATORS USED FOR THE COMPARISON OF ANSPs

The output measures for ANS provision are, for en-route, the en-route flight-hours controlled[34] and, for terminal ANS, the number of IFR airport movements controlled. In addition to those output metrics, it is important to consider a "gate-to-gate" perspective, because the boundaries used to allocate costs between en-route and terminal ANS vary between ANSPs and might introduce a bias in the cost-effectiveness analysis[35].

For this reason, an indicator combining the two separate output measures for en-route and terminal ANS provision has been calculated. The "composite gate-to-gate flight-hours" are determined by weighting the output measures by their respective average cost of the service for the whole Pan-European system. This average weighting factor is based on the total monetary value of the outputs over the period 2002-2013 and amounts to 0.27.

The composite gate-to-gate flight-hours are consequently defined as:

Composite gate-to-gate flight-hours = En-route flight-hours + (0.27 x IFR airport movements)

In the ACE 2001-2006 Reports, two different weighting factors were used to compute ANSPs cost-effectiveness: one for the year under study and another to examine changes in performance across time. As the ACE data sample became larger in terms of years, the difference between these two weighting factors became insignificant. For the sake of simplicity, it was therefore proposed in the ACE 2007 Benchmarking Report to use only one weighting factor to analyse ANSPs performance for the year and to examine historical changes in cost-effectiveness.

Although the composite gate-to-gate output metric does not fully reflect all aspects of the complexity of the services provided, it is nevertheless the best metric currently available for the analysis of gate-to-gate cost-effectiveness[36].

The quality of service provided by ANSPs has an impact on the efficiency of aircraft operations, which carry with them additional costs that need to be taken into consideration for a full economic assessment of ANSP performance. In this ACE Benchmarking Report, an indicator of "economic" cost-effectiveness is computed at ANSP and Pan-European system levels by adding the ATM/CNS provision costs and the costs of ATFM ground delay, all expressed per composite flight-hour. This computation is shown in the Table below (see column 10).

The cost of ATFM delay is based on the findings of the study "European airline delay cost reference values" by the University of Westminster in March 2011 (i.e. €83 per minute of ATFM delay, expressed in 2011 prices, and applicable to all ATFM delays regardless of delay duration).

[34] Controlled flight-hours are calculated by the Network Manager (NM) as the difference between the exit time and entry time of any given flight in the controlled airspace of an operational unit. Three types of flight-hours are currently computed by the NM (filed model, regulated model and current model). The data used for the cost-effectiveness analysis is based on the current model (Model III or CFTM) and includes flight-hours controlled in the ACC, APP and FIS operational units which are described in the NM environment.

[35] See also working paper on "*Cost-effectiveness and Productivity Key Performance Indicators*", available on the PRC web site at www.eurocontrol.int/prc.

[36] Further details on the theoretical background to producing composite indicators can be found in a working paper on "Total Factor Productivity of European ANSPs: basic concepts and application" (Sept. 2005).

ANSPs	(1) Gate-to-gate ATM/CNS provision costs (in €'000)	(2) En-route ATFM delays ('000 minutes)	(3) Airport ATFM delays ('000 minutes)	(4)=(2)+(3) Total ATFM delays ('000 minutes)	(5) % share in European system ATFM delays	(6)=(4)x€87 Costs of ATFM delays (in €'000)	(7) Composite flight-hours (in '000)	(8)=(1)/(7) Financial gate-to-gate cost-effectiveness	(9)=(6)/(7) Costs of delay per composite flight-hour	(10)=(8)+(9) Economic costs per composite flight-hour
Aena	807 222	665	173	839	9.7%	72 962	1 624	497	45	542
Albcontrol	20 811	0	0	0	0.0%	19	47	444	0	445
ANS CR	115 113	26	15	41	0.5%	3 533	261	441	14	454
ARMATS	8 296	0	0	0	0.0%	0	18	464	0	464
Austro Control	187 033	179	154	333	3.8%	28 993	361	518	80	598
Avinor (Continental)	224 932	24	143	166	1.9%	14 484	551	408	26	434
Belgocontrol	154 399	44	94	138	1.6%	12 011	200	772	60	832
BULATSA	71 211	0	0	0	0.0%	0	200	356	0	356
Croatia Control	83 231	45	0	45	0.5%	3 919	217	384	18	402
DCAC Cyprus	37 334	600	14	614	7.1%	53 398	149	250	358	608
DFS	1 019 409	662	415	1 078	12.4%	93 772	1 862	548	50	598
DHMI	370 803	103	162	265	3.1%	23 051	1 318	281	17	299
DSNA	1 179 426	1 503	492	1 995	23.0%	173 524	2 624	450	66	516
EANS	14 710	3	0	3	0.0%	246	73	203	3	206
ENAV	646 880	4	114	118	1.4%	10 263	1 281	505	8	513
Finavia	63 663	0	5	5	0.1%	453	169	377	3	380
HCAA	148 772	39	152	191	2.2%	16 627	482	309	35	343
HungaroControl	90 809	1	0	1	0.0%	65	211	430	0	431
IAA	108 069	0	10	10	0.1%	830	324	334	3	337
LFV	201 742	19	49	68	0.8%	5 898	557	362	11	373
LGS	21 864	0	0	0	0.0%	40	92	238	0	239
LPS	58 341	0	0	0	0.0%	6	95	611	0	611
LVNL	165 843	60	292	352	4.1%	30 624	280	592	109	702
MATS	14 061	0	0	0	0.0%	8	77	182	0	182
M-NAV	9 820	0	0	0	0.0%	4	21	464	0	464
MoldATSA	10 489	0	0	0	0.0%	0	23	460	0	460
MUAC	137 159	117	n/appl	117	1.3%	10 168	575	239	18	256
NATS (Continental)	792 895	271	774	1 046	12.1%	90 978	1 759	451	52	503
NAV Portugal (Continental)	116 135	121	60	181	2.1%	15 738	374	310	42	352
NAVIAIR	109 536	0	9	9	0.1%	740	298	368	2	370
Oro Navigacija	24 763	0	0	0	0.0%	0	63	395	0	395
PANSA	143 161	345	13	358	4.1%	31 158	485	295	64	359
ROMATSA	155 661	0	0	0	0.0%	0	335	464	0	464
Skyguide	279 362	164	518	682	7.9%	59 346	446	626	133	759
Slovenia Control	29 684	1	0	1	0.0%	75	54	549	1	550
SMATSA	67 848	9	0	9	0.1%	802	219	310	4	313
UkSATSE	246 694	0	5	5	0.1%	436	460	536	1	537
Total European System	7 937 182	5 005	3 664	8 669	100%	754 173	18 184	436	41	478

Annex 2 - Table 0.1: Economic cost-effectiveness indicator, 2013

In each new ACE report, the PRU expresses the cost of one minute of ATFM delay in the price base of the year under review, using the average European Union inflation rate published by EUROSTAT[37]. When expressed in 2013 prices, the cost of ground ATFM delays amounts to €87 per minute.

The estimated costs of ATFM delays includes direct costs (crew, passenger compensation, etc.) the network effect (i.e. cost of reactionary delays) and the estimated costs to an airline to retain passenger loyalty. The cost of time lost by passengers is only partly reflected.

[37] As a result, the difference between the value for the cost of one minute of ground ATFM delays used in this ACE report (€87) and the figure reported in the ACE 2011 Benchmarking Report (€83) reflects the cumulative inflation for the European Union between 2011 and 2013 (i.e. around 4% over the period). Note that for the purposes of the ACE benchmarking analysis, the value of the cost of one minute of ATFM delay is rounded after being adjusted for inflation.

Finally, note that in order to ensure consistency, the cost of one minute of ATFM delay expressed in the price base of the year under review is also considered for the purposes of time series analysis. For example, the changes in unit economic costs between 2009 and 2013 which are expressed in Euro 2013 are computed using a value of €87 for the cost of one minute of ATFM delays.

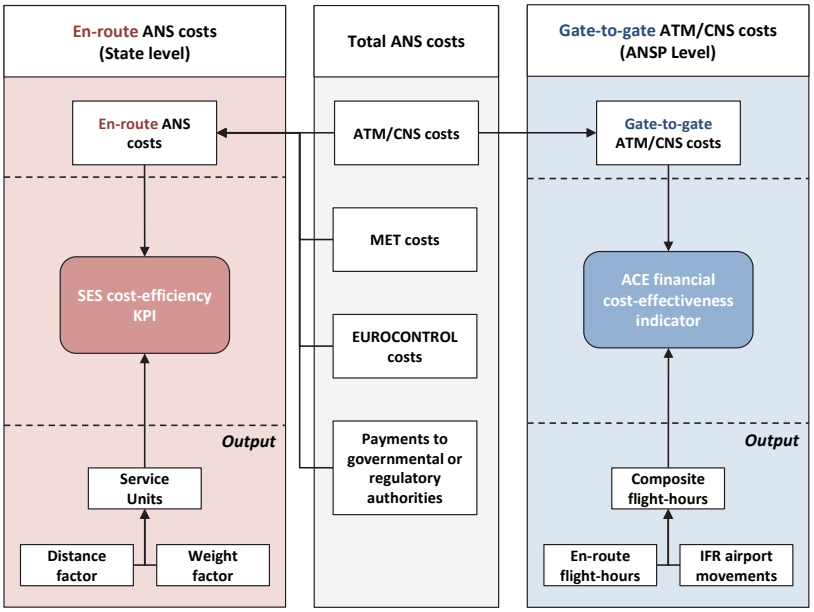
ANNEX 3 – ACE COST-EFFECTIVENESS INDICATOR AND SES COST-EFFICIENCY KPI

The objective of this Annex is to explain the main differences between the ACE financial cost-effectiveness indicator and the Single European Sky (SES) en-route cost-efficiency KPI (as defined in Regulation (EU) N°390/2013).

First of all, it should be noted that these two indicators have been specified in response to different needs:

- The purpose of ACE is to benchmark the cost-effectiveness performance of ANSPs in providing gate-to-gate ATM/CNS services (where en-route and terminal ATM/CNS are considered together). The ACE financial cost-effectiveness indicator is computed as the ratio of ATM/CNS provision costs to composite flight-hours and it can be broken down into three components (ATCO-hour productivity, ATCO employment costs per ATCO-hour and unit support costs). These components allow interpreting the differences in cost-effectiveness performance observed across Pan-European ANSPs. The ACE benchmarking analysis also informs ATM stakeholders on the level and trends of the Pan-European system cost-effectiveness performance.
- The en-route cost-efficiency KPI (the Determined Unit Cost or DUC), which is defined in the Performance Scheme regulation, is used as part of the SES cost-efficiency performance target-setting and monitoring processes. This KPI is computed as the ratio of en-route ANS costs (in real terms) to service units at charging zone level, and reflects the costs of several entities, not only the ANSP. The en-route ANS costs (in nominal terms) and service units also form the basis to calculate the unit rate that is billed to airspace users within a charging zone.

The methodology used to compute the two indicators is illustrated in the Figure below.



Annex 3 - Figure 0.1: ACE cost-effectiveness indicator and SES cost-efficiency KPI

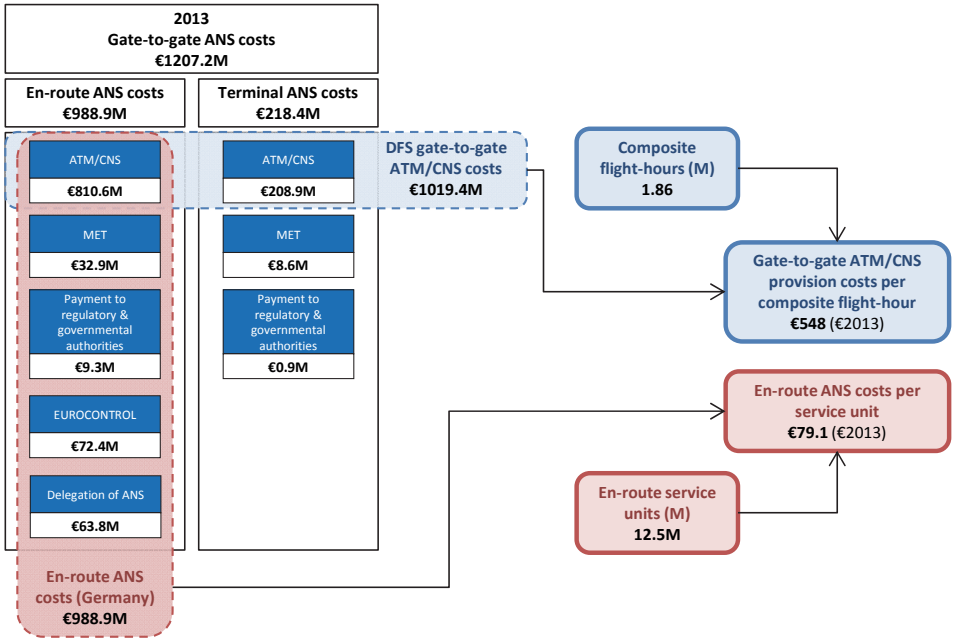
As shown in the Figure above, the main differences between the ACE financial cost-effectiveness indicator and the SES en-route cost-efficiency KPI are the following:

- **Operational scope**: En-route and terminal costs are considered together when benchmarking the economic performance of ANSPs in the ACE analysis. As explained in Annex 2 above, it is important to consider a "gate-to-gate" perspective, because the boundaries used to allocate costs between en-route and terminal ANS vary between

ANSPs and might introduce a bias in the cost-effectiveness analysis. On the other hand, the SES cost-efficiency KPI is computed for en-route and terminal ANS separately, for the purposes of the target-setting and/or monitoring processes.

- **Service scope**: Total ANS costs (including costs relating to the ANSPs, METSPs, EUROCONTROL, and NSAs) are used to compute the SES cost-efficiency KPI, while only the ANSPs ATM/CNS provision costs are included in the ACE benchmarking analysis.
- **Measure of the output**: The output metric used to compute the SES en-route cost-efficiency KPI is the number of en-route service units[38]. This metric is a function of the aircraft weight and of the distance flow within a given charging zone. This is the metric which has been historically used to compute the en-route unit rate charged to airspace users. On the other hand, the ACE financial cost-effectiveness indicator is computed using composite flight-hours[39], which combine both flight-hours and IFR airport movements as detailed in Annex 2 above. It should be noted that the geographical area controlled by ANSPs operational units can substantially differ from the charging zones in case of delegation of ANS. The composite flight-hours therefore better reflect the operational activity performed by ANSPs, while service units are more appropriate when charging zones are considered.

The Figure below provides a concrete example of reconciliation between the ACE financial cost-effectiveness indicator and the en-route costs per service unit[40]. It uses as an example the ACE 2013 data provided by DFS and the 2013 actual en-route costs and service units provided by Germany for the purposes of the Enlarged Committee for Route Charges in November 2014. In both cases, financial information is expressed in €2013.



Annex 3 - Figure 0.2: Example of reconciliation between ANSP unit gate-to-gate ATM/CNS provision costs and a charging zone unit en-route ANS costs (2013)

[38] $Service\ unit = distance\ flown \times \sqrt{\frac{MTOW}{50}}$.

[39] Further details on the calculation of the metric can be found in Annex 2 of this report.

[40] It should be noted that the costs reported in the UK Performance Plans and charged to en-route airspace users are based on regulatory accounting rules. This is different from the methodology used by NATS to report historic and actual ATM/CNS provision costs which are based on IFRS accounting.

ANNEX 4 – PERFORMANCE RATIOS

Annex 4 – Table summarises the relationship between the three multiplicative components of financial cost-effectiveness (ATCO-hour productivity, employment costs per ATCO-hour and support cost ratio) and the two complementary components (ATCO employment costs per composite flight-hour and the support cost per composite flight-hour), described in Chapter 2. To facilitate the interpretation of the results, the concept of the "performance ratio" has been introduced.

The **performance ratios** represent the relationship between the value for an ANSP of an indicator and the value of that indicator for the Pan-European system as a whole. Performance ratios are defined such that a value **greater than one** implies a performance **better** than the European average, in terms of the positive contribution it makes to cost effectiveness. An ANSP with the **same** performance as the Pan-European system will have a performance ratio of **one**.

ANSPs	Country	Financial cost-effectiveness KPI indexes*	Performance ratios			Performance ratios	
			ATCO-hour productivity	ATCO employment costs per ATCO-hour*	Support cost ratio*	ATCO employment costs per composite flight-hour*	Support costs per composite flight-hour*
Aena	ES	0.88	0.98	0.63	1.44	0.61	1.09
Albcontrol	AL	0.98	0.69	3.14	0.46	2.16	0.79
ANS CR	CZ	0.99	1.09	1.33	0.69	1.44	0.87
ARMATS	AM	0.94	0.19	11.32	0.43	2.18	0.75
Austro Control	AT	0.84	1.09	0.69	1.12	0.75	0.89
Avinor (Continental)	NO	1.07	1.08	0.83	1.19	0.90	1.17
Belgocontrol	BE	0.57	0.83	0.75	0.91	0.62	0.54
BULATSA	BG	1.23	0.80	2.05	0.75	1.64	1.10
Croatia Control	HR	1.14	0.88	1.19	1.08	1.05	1.18
DCAC Cyprus	CY	1.75	1.08	1.65	0.98	1.79	1.73
DFS	DE	0.80	1.30	0.60	1.02	0.78	0.81
DHMI	TR	1.55	1.20	1.87	0.69	2.24	1.36
DSNA	FR	0.97	0.93	1.11	0.94	1.03	0.95
EANS	EE	2.15	1.12	1.81	1.06	2.03	2.21
ENAV	IT	0.86	0.86	0.98	1.03	0.84	0.87
Finavia	FI	1.16	0.73	1.53	1.04	1.12	1.18
HCAA	GR	1.41	0.85	1.38	1.21	1.17	1.56
HungaroControl	HU	1.01	0.99	1.20	0.85	1.19	0.95
IAA	IE	1.31	1.29	1.07	0.95	1.38	1.28
LFV	SE	1.20	0.83	1.14	1.27	0.95	1.37
LGS	LV	1.83	1.11	2.51	0.66	2.79	1.59
LPS	SK	0.71	0.89	1.15	0.70	1.02	0.63
LVNL	NL	0.74	1.09	0.69	0.98	0.75	0.73
MATS	MT	2.40	1.08	3.03	0.73	3.29	2.15
M-NAV	MK	0.94	0.30	3.37	0.92	1.03	0.91
MoldATSA	MD	0.95	0.32	5.62	0.52	1.82	0.78
MUAC		1.83	2.47	0.53	1.38	1.32	2.21
NATS (Continental)	UK	0.97	1.25	0.92	0.84	1.15	0.90
NAV Portugal (Continental)	PT	1.41	1.19	0.84	1.41	1.00	1.72
NAVIAIR	DK	1.19	1.26	1.11	0.85	1.40	1.11
Oro Navigacija	LT	1.10	0.58	2.64	0.72	1.53	0.98
PANSA	PL	1.48	1.13	1.11	1.18	1.25	1.61
ROMATSA	RO	0.94	0.74	1.47	0.86	1.09	0.89
Skyguide	CH	0.70	1.24	0.69	0.82	0.85	0.65
Slovenia Control	SI	0.80	0.51	1.40	1.12	0.71	0.84
SMATSA	RS/ME	1.41	0.89	2.32	0.68	2.06	1.23
UkSATSE	UA	0.81	0.45	3.53	0.51	1.60	0.67
Total European System		1.00	1.00	1.00	1.00	1.00	1.00

Annex 4 – Table 0.1: The components of gate-to-gate cost-effectiveness, 2013[41]

ANSPs for which a given component makes a particularly positive contribution to its cost-effectiveness (more than 1.30) are highlighted in green – those where a given component makes a particularly low contribution (less than 1/1.30) are in orange.

Some ANSPs more than make up for a relatively low contribution from one component by a relatively high contribution from another and, as a result, are more cost-effective than the average (cost-effectiveness index greater than 1).

[41] For the ATCO employment costs per ATCO-hour, the support costs ratio, the ATCO employment costs per composite flight-hour and the support costs per composite flight-hour (asterisked in the Table above), the inverse ratio is used, since **higher** unit employment costs and **higher** support costs imply **lower** cost-effectiveness.

On the left-hand-side the three ratios are multiplicative; the product of the ratios for each of the components equals the performance ratio for overall financial cost-effectiveness (see financial cost-effectiveness index). The following example for Aena illustrates the interpretation of the performance ratios:

0.88	Aena's gate-to-gate **ATM/CNS costs per composite flight-hour** are **+14% higher** (1/0.88 - 1) than the European average.
= 0.98	**ATCO-hour productivity** is **-2% lower** than the European average.
x 0.63	The **ATCO employment costs per ATCO-hour** of Aena are **+60% higher** (1/0.63 - 1) than the European average.
x 1.44	**Support cost ratio** is **-30% lower** (1/1.44 - 1) than the European average.

On the right-hand-side, the two complementary performance ratios are normalised using the European average (note that these ratios are neither multiplicative nor additive):

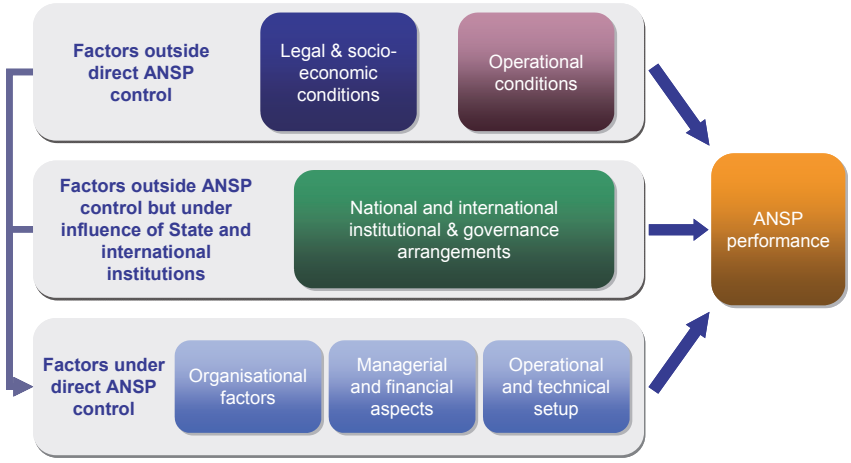
0.61	Aena's ATCOs in OPS employment costs per composite flight-hour are +63% higher (1/0.61 - 1) than the European average, while
1.09	the **support costs per composite flight-hour** are **-8% lower** (1/1.09 - 1) than the European average.

ANNEX 5 – FACTORS AFFECTING PERFORMANCE

The ACE benchmarking analysis has the objective of comparing ATM cost-effectiveness performance across a wide range of ANSPs. The major focus of this report is to examine and analyse the quantitative facts about the observed cost-effectiveness performance of the ANSPs. This factual analysis provides a comprehensive description and comparison of performance as viewed by the users of ATM/CNS services.

However, such a factual analysis cannot be either a complete explanation of performance differences between ANSPs, or an exhaustive guide on how performance can be improved, without some complementary consideration of how differences in performance arose.

The framework illustrated in the Figure below, which was first introduced in the ACE 2007 Benchmarking Report, shows **exogenous** and **endogenous** factors which influence ANSP performance.

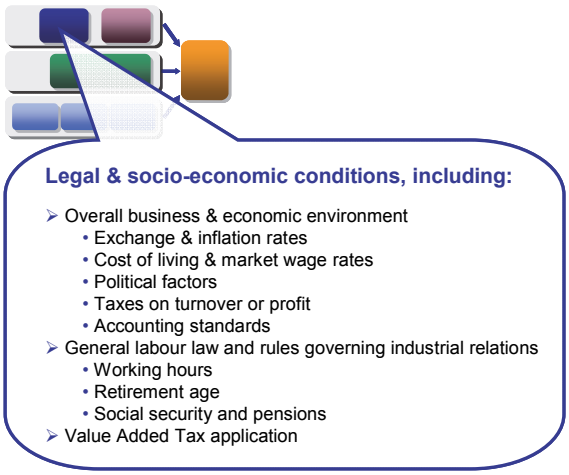


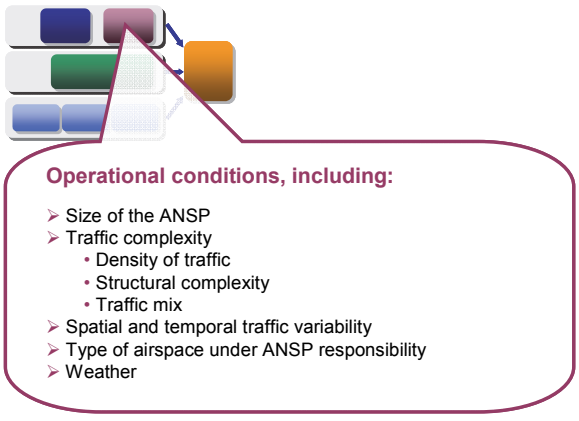
Annex 5 - Figure 0.1: Factors affecting cost-effectiveness performance

Exogenous factors are those outside the control of an ANSP whereas endogenous factors are those entirely under the ANSP's control.

Exogenous factors have been classified into two main areas according to which decision-makers have an influence over them. In particular, exogenous factors comprise:

- legal and socio-economic conditions (for example taxation policy), and operational conditions (for example traffic patterns the ANSP has to deal with) that are affected by decision makers and conditions outside aviation policy-making.

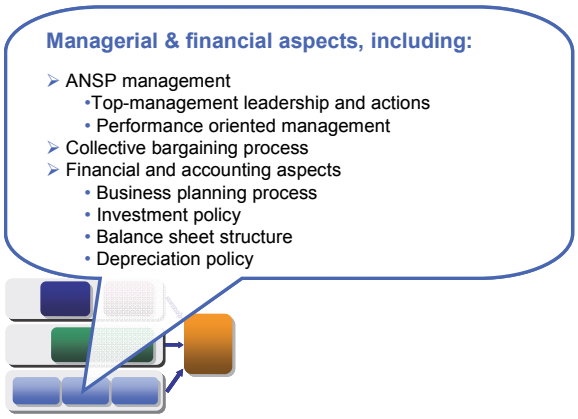


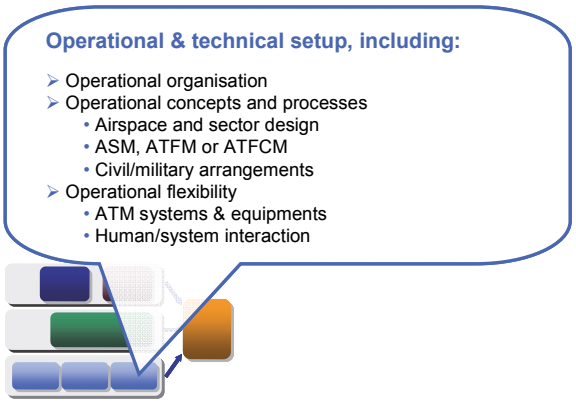


- institutional and governance arrangements such as international requirements imposed by the Single European Sky, that are influenced by aviation sector policy decisions.

The endogenous factors presented in Figure 0.1 above can be classified into three groups that should be taken into account in the scope of a comprehensive analysis of ANSPs' influence on performance:

- Organisational factors such as the internal organisation structure.
- Managerial and financial aspects such as the collective bargaining process.
- Operational and technical setup such as the operational structure.





A more comprehensive description and analysis of the performance framework illustrated in this Annex is available in Chapter 3 of the ACE 2009 Benchmarking Report[42].

[42] Document available on the PRC website (http://www.eurocontrol.int/publications/atm-cost-effectiveness-ace-2009).

ANNEX 6 – TRAFFIC COMPLEXITY AND TRAFFIC VARIABILITY INDICATORS

	[1]	[2]	[3]	[4]	[5] = [2]+[3]+[4]	[6] = [1]x[5]
ANSPs	Adjusted density	Vertical interactions	Horizontal interactions	Speed interactions	Structural complexity indicator	Aggregated complexity score
Skyguide	10.76	0.28	0.61	0.22	1.11	11.98
NATS (Continental)	9.95	0.37	0.43	0.30	1.11	11.03
DFS	10.18	0.27	0.57	0.24	1.08	11.03
Belgocontrol	7.19	0.39	0.55	0.45	1.40	10.08
MUAC	10.23	0.26	0.55	0.16	0.97	9.94
LVNL	9.91	0.19	0.43	0.38	1.00	9.91
ANS CR	9.15	0.14	0.53	0.17	0.83	7.63
Austro Control	8.31	0.18	0.53	0.19	0.90	7.51
Slovenia Control	9.29	0.12	0.55	0.10	0.77	7.13
DSNA	10.06	0.15	0.42	0.13	0.70	7.07
DHMI	8.55	0.16	0.35	0.16	0.67	5.77
LPS	7.79	0.09	0.48	0.15	0.73	5.67
ENAV	5.34	0.26	0.59	0.17	1.02	5.43
SMATSA	8.52	0.04	0.50	0.06	0.60	5.12
HungaroControl	7.72	0.06	0.46	0.13	0.65	5.02
Croatia Control	7.98	0.06	0.49	0.07	0.61	4.86
PANSA	4.79	0.14	0.54	0.22	0.89	4.26
Aena	6.46	0.15	0.37	0.13	0.64	4.13
ROMATSA	5.88	0.05	0.43	0.12	0.60	3.51
NAVIAIR	3.55	0.18	0.57	0.20	0.95	3.36
DCAC Cyprus	4.89	0.14	0.38	0.10	0.63	3.06
BULATSA	6.92	0.06	0.31	0.06	0.43	3.01
Albcontrol	6.61	0.05	0.35	0.04	0.45	2.95
LFV	3.00	0.22	0.50	0.23	0.95	2.84
EANS	3.77	0.14	0.30	0.21	0.66	2.48
M-NAV	4.17	0.09	0.44	0.06	0.59	2.48
HCAA	4.21	0.10	0.38	0.08	0.55	2.33
LGS	3.28	0.09	0.46	0.16	0.70	2.31
NAV Portugal (Continental)	3.77	0.15	0.37	0.08	0.60	2.27
UkSATSE	3.31	0.06	0.41	0.19	0.66	2.19
Avinor (Continental)	2.18	0.28	0.46	0.25	0.99	2.17
Oro Navigacija	2.86	0.08	0.49	0.15	0.72	2.06
IAA	4.06	0.07	0.24	0.13	0.45	1.81
MoldATSA	2.44	0.03	0.46	0.19	0.68	1.66
Finavia	1.70	0.26	0.33	0.36	0.94	1.60
MATS	1.66	0.07	0.37	0.19	0.63	1.05
ARMATS	1.33	0.08	0.39	0.16	0.63	0.84
Average	7.49	0.20	0.46	0.18	0.84	6.26

Annex 6 - Table 0.1: Traffic complexity indicators at ANSP level, 2013

ANSPs	ACC name	[1] Adjusted density	[2] Vertical interactions	[3] Horizontal interactions	[4] Speed interactions	[5] = [2]+[3]+[4] Structural complexity	[6] = [1]x[5] Aggregated complexity score	Average used flight level
NATS (Continental)	London TC	25.7	0.46	0.50	0.32	1.28	32.8	148
DFS	Langen	10.6	0.40	0.54	0.38	1.32	14.0	171
Skyguide	Zurich	9.5	0.31	0.60	0.26	1.17	11.1	284
DFS	Karlsruhe UAC	12.0	0.19	0.59	0.15	0.93	11.1	353
Skyguide	Geneva	11.2	0.21	0.61	0.16	0.98	11.0	313
DFS	Munchen	7.7	0.43	0.51	0.45	1.39	10.7	217
Belgocontrol	Brussels	7.2	0.39	0.55	0.45	1.40	10.1	178
MUAC	Maastricht	10.2	0.26	0.55	0.16	0.97	9.9	344
LVNL	Amsterdam	9.9	0.19	0.43	0.38	1.00	9.9	167
DSNA	Paris	10.0	0.27	0.36	0.30	0.93	9.3	224
DSNA	Reims	11.3	0.19	0.48	0.13	0.80	9.1	338
NATS (Continental)	London AC	8.8	0.30	0.37	0.24	0.92	8.0	310
ENAV	Padova	7.2	0.25	0.66	0.15	1.06	7.6	315
ANS CR	Praha	9.3	0.13	0.53	0.16	0.82	7.6	330
ENAV	Milano	5.0	0.45	0.63	0.39	1.47	7.4	213
Austro Control	Wien	8.6	0.16	0.53	0.16	0.85	7.4	329
Slovenia Control	Ljubljana	9.3	0.12	0.55	0.10	0.77	7.2	326
DSNA	Bordeaux	11.3	0.10	0.39	0.08	0.57	6.4	341
DSNA	Brest	10.3	0.08	0.46	0.07	0.61	6.3	352
IAA	Dublin	5.5	0.30	0.40	0.42	1.12	6.2	161
Aena	Palma	6.8	0.23	0.39	0.29	0.90	6.1	166
DSNA	Marseille	8.5	0.16	0.43	0.10	0.69	5.9	323
LPS	Bratislava	7.8	0.09	0.48	0.15	0.73	5.7	334
SMATSA	Beograd	8.7	0.04	0.50	0.06	0.60	5.2	349
NATS (Continental)	Prestwick	4.3	0.33	0.44	0.41	1.18	5.0	260
HungaroControl	Budapest	7.9	0.06	0.46	0.12	0.64	5.0	342
Croatia Control	Zagreb	8.2	0.05	0.49	0.07	0.60	5.0	347
DFS	Bremen	3.9	0.31	0.56	0.40	1.28	4.9	182
Aena	Barcelona	6.7	0.20	0.39	0.11	0.71	4.7	310
ENAV	Roma	5.2	0.23	0.55	0.13	0.90	4.7	315
DHMI	Ankara	7.2	0.10	0.36	0.15	0.61	4.4	347
PANSA	Warszawa	4.7	0.10	0.54	0.18	0.81	3.9	343
Aena	Madrid	7.7	0.08	0.35	0.07	0.50	3.9	342
ROMATSA	Bucuresti	5.9	0.04	0.43	0.12	0.59	3.5	345
NAVIAIR	Kobenhavn	3.4	0.17	0.57	0.18	0.92	3.2	322
DHMI	Istanbul	5.8	0.17	0.23	0.13	0.53	3.1	298
DCAC Cyprus	Nicosia	4.9	0.14	0.38	0.10	0.62	3.1	313
BULATSA	Sofia	7.1	0.06	0.31	0.06	0.43	3.0	348
NATA Albania	Tirana	6.6	0.05	0.35	0.04	0.45	2.9	343
LFV	Malmo	3.3	0.17	0.52	0.16	0.84	2.8	327
UkSATSE	L'viv	3.4	0.02	0.55	0.21	0.78	2.7	350
Aena	Sevilla	4.6	0.16	0.32	0.10	0.58	2.6	314
M-NAV	Skopje	4.3	0.09	0.44	0.06	0.59	2.5	331
EANS	Tallinn	3.8	0.14	0.30	0.21	0.66	2.5	314
UkSATSE	Simferopol	4.2	0.03	0.37	0.16	0.55	2.3	353
LGS	Riga	3.3	0.09	0.46	0.16	0.70	2.3	324
NAV Portugal (Continental)	Lisboa	3.8	0.15	0.37	0.07	0.60	2.3	326
ENAV	Brindisi	2.9	0.15	0.52	0.11	0.78	2.3	318
HCAA	Athinai+Macedonia	4.3	0.09	0.37	0.06	0.52	2.2	331
LFV	Stockholm	2.0	0.34	0.41	0.39	1.13	2.2	242
UkSATSE	Kyiv	2.9	0.11	0.38	0.22	0.71	2.1	333
Oro Navigacija	Vilnius	2.9	0.08	0.49	0.15	0.72	2.1	315
Avinor (Continental)	Oslo	2.2	0.27	0.42	0.20	0.89	1.9	277
UkSATSE	Dnipropetrovs'k	3.4	0.05	0.34	0.16	0.54	1.8	345
MoldATSA	Chisinau	2.4	0.03	0.46	0.19	0.68	1.7	334
UkSATSE	Odesa	2.3	0.07	0.46	0.12	0.65	1.5	340
Aena	Canarias	2.6	0.17	0.27	0.13	0.56	1.4	294
IAA	Shannon	3.9	0.04	0.22	0.09	0.35	1.4	346
Avinor (Continental)	Bodo	1.5	0.23	0.43	0.18	0.84	1.2	262
Finavia	Tampere	1.3	0.27	0.28	0.33	0.88	1.2	265
Avinor (Continental)	Stavanger	1.2	0.23	0.41	0.27	0.91	1.1	283
MATS	Malta	1.6	0.05	0.37	0.19	0.62	1.0	332
ARMATS	Yerevan	1.4	0.07	0.39	0.15	0.62	0.9	328
European system average		7.4	0.2	0.5	0.2	0.8	6.1	313

Annex 6 - Table 0.2: Traffic complexity indicators at ACC level, 2013

ANSPs	Traffic variability indicators		
	Variability based on three-months periods (2013)	Peak month / Average month (2013)	Peak week / Average week (2013)
Aena	1.22	1.25	1.26
Albcontrol	1.42	1.53	1.55
ANS CR	1.20	1.22	1.24
ARMATS	1.05	1.08	1.12
Austro Control	1.22	1.24	1.25
Avinor (Continental)	1.07	1.12	1.14
Belgocontrol	1.12	1.15	1.19
BULATSA	1.38	1.43	1.44
Croatia Control	1.43	1.52	1.52
DCAC Cyprus	1.15	1.20	1.25
DFS	1.13	1.15	1.16
DHMI	1.22	1.25	1.26
DSNA	1.19	1.22	1.23
EANS	1.12	1.15	1.16
ENAV	1.26	1.29	1.32
Finavia	1.05	1.08	1.10
HCAA	1.48	1.58	1.61
HungaroControl	1.30	1.34	1.36
IAA	1.12	1.18	1.19
LFV	1.06	1.13	1.14
LGS	1.14	1.17	1.19
LPS	1.30	1.37	1.38
LVNL	1.10	1.10	1.12
MATS	1.16	1.20	1.25
M-NAV	1.59	1.69	1.71
MoldATSA	1.31	1.33	1.42
MUAC	1.12	1.13	1.14
NATS (Continental)	1.14	1.15	1.16
NAV Portugal (Continental)	1.11	1.15	1.15
NAVIAIR	1.08	1.12	1.15
Oro Navigacija	1.15	1.17	1.19
PANSA	1.16	1.21	1.24
ROMATSA	1.30	1.34	1.36
Skyguide	1.15	1.17	1.18
Slovenia Control	1.37	1.43	1.46
SMATSA	1.41	1.48	1.49
UkSATSE	1.26	1.29	1.30

Annex 6 - Table 0.3: Traffic variability indicators at ANSP level, 2013

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ANNEX 7 – EXCHANGE RATES, INFLATION RATES AND PURCHASING POWER PARITIES (PPPS) 2013 DATA

ANSPs	Countries	2013 Exchange rate (1€ =)	2013 Inflation rate (%)	2013 PPPs	Comments
Aena	Spain	1	1.5	0.90	
Albcontrol	Albania	139.9	1.9	62.85	
ANS CR	Czech Republic	26.0	1.4	17.74	
ARMATS	Armenia	538.1	5.8	250.59	PPPs from IMF database
Austro Control	Austria	1	2.1	1.12	
Avinor (Continental)	Norway	7.8	2.0	12.19	
Belgocontrol	Belgium	1	1.2	1.13	
BULATSA	Bulgaria	2.0	0.4	0.93	
Croatia Control	Croatia	7.6	2.3	4.81	
DCAC Cyprus	Cyprus	1	0.4	0.89	
DFS	Germany	1	1.6	1.05	
DHMI	Turkey	2.5	7.5	1.47	
DSNA	France	1	1.0	1.13	
EANS	Estonia	1	3.2	0.73	
ENAV	Italy	1	1.3	1.01	
Finavia	Finland	1	2.2	1.23	
HCAA	Greece	1	-0.9	0.85	
HungaroControl	Hungary	296.5	1.7	171.21	
IAA	Ireland	1	0.5	1.10	
LFV	Sweden	8.6	0.4	11.66	
LGS	Latvia	0.7	0.0	0.68	
LPS	Slovak Republic	1	1.5	0.68	
LVNL	Netherlands	1	2.6	1.10	
MATS	Malta	1	1.0	0.78	
M-NAV	F.Y.R. Macedonia	61.5	2.8	25.60	
MoldATSA	Moldova	16.5	4.6	8.19	PPPs from IMF database
MUAC		1	2.6	1.10	Netherlands' PPPs and inflation rate used for MUAC
NATS (Continental)	United Kingdom	0.8	2.6	0.93	
NAV Portugal (Continental)	Portugal	1	0.4	0.78	
NAVIAIR	Denmark	7.5	0.5	10.16	
Oro Navigacija	Lithuania	3.5	1.2	2.12	
PANSA	Poland	4.2	0.8	2.41	
ROMATSA	Romania	4.4	3.2	2.20	
Skyguide	Switzerland	1.2	0.1	1.83	
Slovenia Control	Slovenia	1	1.9	0.81	
SMATSA	Serbia and Montenegro	113.0	7.7	55.04	Data for Serbia only since data is provided in Serbian Dinar
UkSATSE	Ukraine	10.6	-0.3	5.03	PPPs from IMF database

Annex 7 - Table 0.1: 2013 Exchange rates, inflation rates and PPPs data

Presentation and comparison of historical series of financial data from different countries poses problems, especially when different currencies are involved, and inflation rates differ. There is a danger that time-series comparisons can be distorted by transient variations in exchange rates.

For this reason, the following approach has been adopted in this Report for allowing for inflation and exchange rate variation. The financial elements of performance are assessed, for each year, in national currency. They are then converted to national currency in 2013 prices using national inflation rates. Finally, for comparison purposes in 2013, all national currencies are converted to Euros using the 2013 exchange rate.

This approach has the virtue that an ANSP's performance time series is not distorted by transient changes in exchange rates over the period. It does mean, however, that the performance figures for any ANSP in a given year prior to 2013 are not the same as the figures in that year's ACE report, and cannot legitimately be compared with another ANSP's figures for the same year. Cross-sectional comparison using the figures in this report is only appropriate for 2013 data.

The exchange rates used in this Report to convert the 2013 data in Euros are those provided by the ANSPs in their ACE data submission.

The historical inflation figures used in this analysis were obtained from EUROSTAT[43] or from the International Monetary Fund[44] when the information was not available in EUROSTAT website. For the projections (2014-2018), the ANSPs' own assumptions concerning inflation rates were used.

Purchasing Power Parities (PPPs) are currency conversion rates that are applied to convert economic indicators in national currency to an artificial common currency (Purchasing Power Standard (PPS) for EUROSTAT statistics). The PPPs data used to adjust most of the ANSPs employment costs in Chapter 2 of this report was extracted from EUROSTAT.

For three countries (Armenia, Moldova and Ukraine), PPP data was not available in the EUROSTAT database. In these cases, the IMF database was used. Since in the IMF database, the PPPs are expressed in local currency per **international Dollar** rather than **PPS**, an adjustment has been made so that the figures used for Armenia, MoldATSA and UkSATSE are as consistent as possible with the data used for the rest of the ANSPs. The assumption underlying this adjustment is that the difference in PPPs between two countries shall be the same in the EUROSTAT and in the IMF databases.

According to the IMF database, there is a factor of 4.44 between the PPPs for Ukraine (3.707 UAH per international dollar in 2013) and the PPPs for France (0.834 Euro per international Dollar). This factor is applied to the PPPs for France as disclosed in the EUROSTAT database (i.e. 1.13) to express the PPPs for Ukraine in PPS (5.03 = 1.13 × 4.44). A similar methodology is used to express Moldova and Armenia PPPs in PPS.

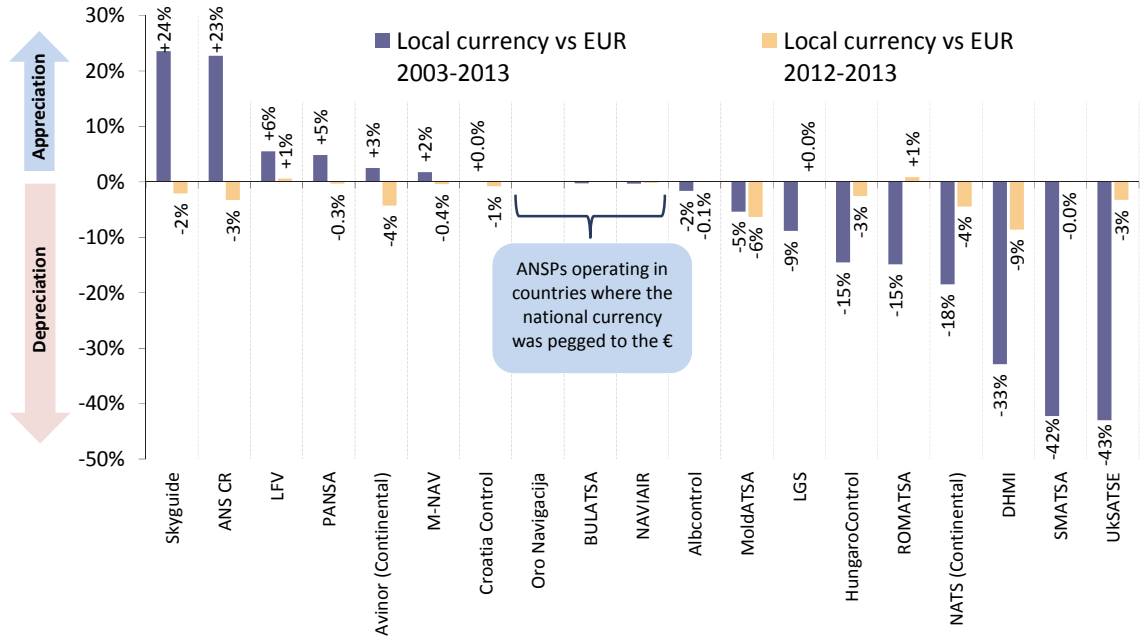
[43] Latest EUROSTAT database available at:

http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home

[44] IMF April 2014 database available at:
http://www.imf.org/external/pubs/ft/weo/2014/01/weodata/index.aspx.

It is important to note that, for ANSPs operating outside of the Euro zone, substantial changes of the national currency against the Euro may significantly affect the level of 2013 unit ATM/CNS provision costs when expressed in Euro (see Figure 2.7 on p.18). However, it should be noted that the changes in unit costs analysed in this Report (see for example Figure 2.9 on p.20) are not affected by changes in national currency against the Euro.

The Figure below shows the changes in exchange rates for ANSPs operating in countries which are not part of the Euro zone. The blue bar shows the long-term changes in exchange rate over the 2003-2013 period, while the orange bar displays the short-term changes (2012-2013).



Annex 7 - Figure 0.1: Cumulative variations in exchange rates against the Euro (2003-2013 and 2012-2013)

Significant changes are observed over the 2003-2013 period for several ANSPs part of the ACE analysis. For example, the Swiss Franc significantly appreciated (24%) while the British Pound substantially depreciated (18%). Other substantial variations in exchange rates compared to the Euro include the depreciation of the Ukrainian Hryvnia (43%), the Serbian Dinar (42%) and the Turkish Lira (33%) while the Czech Koruna appreciated by 23%.

For most of these ANSPs, this mainly reflects substantial variations in exchange rates compared to the Euro occurred during the 2008-2012 timeframe in the wake of the financial crisis and economic downturn.

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ANNEX 8 – KEY DATA

ANSPs	En-route ANS revenues (in €'000)										Terminal ANS revenues (in €'000)										Gate-to-gate ANS revenues (in €'000)									
	Income from charges	Income for airport operator	Income received from other States for delegation of ANS	Income from the military	Income in respect of exempted flights	Other income from domestic government	Financial income	Other income	Exceptional revenue item	**Total revenues**	Income from charges	Income for airport operator	Income received from other States for delegation of ANS	Income from the military	Income in respect of exempted flights	Other income from domestic government	Financial income	Other income	Exceptional revenue item	**Total revenues**	Income from charges	Income for airport operator	Income received from other States for delegation of ANS	Income from the military	Income in respect of exempted flights	Other income from domestic government	Financial income	Other income	Exceptional revenue item	**Total revenues**
Aena	687 674	0	0	0	9 223	6 568	2 716	11 801	77	718 059	17 508	176 563	0	0	0	0	778	6 266	24	201 138	705 181	176 563	0	0	9 223	6 568	3 494	18 067	101	919 197
Albcontrol	19 937	0	0	0	0	0	55	201	0	20 193	1 210	0	0	0	0	0	10	36	0	1 255	21 146	0	0	0	0	0	65	237	0	21 448
ANS CR	105 694	0	0	0	510	965	0	0	0	107 170	19 030	0	0	0	68	0	0	0	0	19 098	124 724	0	0	0	578	965	0	0	0	126 268
ARMATS	4 299	0	0	0	2	35	0	0	0	4 336	3 836	0	0	0	0	0	0	0	0	3 836	8 134	0	0	0	2	35	0	0	0	8 171
Austro Control	171 689	0	0	0	403	1 556	410	0	0	174 058	36 861	0	0	0	0	0	521	0	0	37 382	208 550	0	0	0	403	1 556	931	0	0	211 440
Avinor (Continental)	103 731	0	0	0	0	0	0	0	0	103 731	0	94 041	0	0	0	0	0	3 250	0	97 292	103 731	94 041	0	0	0	0	0	3 250	0	201 023
Belgocontrol	150 494	0	0	0	0	11 286	88	6 833	29	168 729	25 155	0	0	0	0	0	51	5 248	8	30 463	175 649	0	0	0	0	11 286	139	12 081	37	199 192
BULATSA	74 344	0	0	0	0	547	0	0	0	74 891	8 065	0	0	0	0	0	1 482	187	0	9 735	82 409	0	0	0	0	547	1 482	187	0	84 626
Croatia Control	64 404	0	9 178	0	0	0	0	0	0	73 583	8 219	0	0	0	0	0	0	0	0	8 219	72 624	0	9 178	0	0	0	0	0	0	81 802
DCAC Cyprus	48 269	0	0	0	0	0	0	0	0	48 269	0	0	0	0	0	7 485	0	0	0	7 485	48 269	0	0	0	0	7 485	0	0	0	55 754
DFS	796 206	0	0	0	0	0	42 407	0	0	838 613	227 282	0	0	0	0	0	12 105	0	0	239 387	1 023 488	0	0	0	0	0	54 512	0	0	1 078 000
DHMI	326 334	0	0	0	3 303	2 686	0	0	0	332 322	90 198	0	0	0	0	0	0	0	0	90 198	416 531	0	0	0	3 303	2 686	0	0	0	422 520
DSNA	1 146 084	0	0	0	18 163	0	0	8 000	0	1 172 246	236 015	0	0	0	44 311	0	0	2 000	0	282 326	1 382 098	0	0	0	62 474	0	0	10 000	0	1 454 572
EANS	17 001	0	0	0	0	0	0	0	0	17 001	1 129	0	0	0	0	0	0	0	0	1 129	18 130	0	0	0	0	0	0	0	0	18 130
ENAV	567 638	0	0	0	10 805	24 726	0	5 157	0	608 326	150 697	0	0	0	1 286	7 197	0	14 296	207	173 683	718 335	0	0	0	12 091	31 923	0	19 453	207	782 009
Finavia	37 715	0	0	258	0	440	0	0	0	38 413	16 817	0	0	0	0	215	0	1 071	0	18 103	54 532	0	0	258	0	655	0	1 071	0	56 516
HCAA	141 636	0	0	0	0	0	0	0	0	141 636	9 900	0	0	0	0	7 974	0	0	0	17 874	151 536	0	0	0	0	7 974	0	0	0	159 510
HungaroControl	85 768	0	0	0	1 429	768	2 058	2 081	391	92 495	18 582	0	0	0	77	0	446	357	64	19 525	104 351	0	0	0	1 506	768	2 503	2 438	455	112 021
IAA	106 010	0	0	0	1 552	0	130	0	0	107 692	21 040	0	0	0	0	0	138	0	0	21 178	127 050	0	0	0	1 552	0	268	0	0	128 870
LFV	185 197	0	1 202	0	789	0	5 152	0	0	192 340	14 862	14 285	0	0	0	0	329	0	0	29 476	200 059	14 285	1 202	0	789	0	5 481	0	0	221 816
LGS	21 118	0	0	0	0	0	1	54	0	21 174	2 870	0	0	0	0	0	4	256	0	3 130	23 988	0	0	0	0	0	6	310	0	24 304
LPS	59 061	0	0	705	1 012	434	83	867	0	62 162	3 559	0	0	0	108	0	13	131	0	3 811	62 620	0	0	705	1 120	434	96	998	0	65 973
LVNL	119 065	0	0	0	0	7 825	45	2 600	0	129 535	54 549	0	0	0	0	0	19	965	0	55 533	173 614	0	0	0	0	7 825	64	3 565	0	185 068
MATS	18 891	0	0	0	0	0	0	0	0	18 891	0	1 095	0	0	0	1 913	0	0	0	3 009	18 891	1 095	0	0	0	1 913	0	0	0	21 899
M-NAV	9 175	0	0	0	0	23	0	0	0	9 198	974	0	0	8	0	0	0	0	0	982	10 149	0	0	8	0	0	23	0	0	10 180
MoldATSA	10 039	0	0	0	0	49	16	0	578	10 683	2 103	0	0	0	0	0	0	0	121	2 224	12 142	0	0	0	0	49	16	0	699	12 907
MUAC											n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl										
NATS (Continental)	712 408	0	0	0	0	0	4 481	0	2 160	719 050	11 639	200 430	0	0	0	0	1 334	0	0	213 402	724 047	200 430	0	0	0	0	5 815	0	2 160	932 452
NAV Portugal (Continental)	98 658	0	0	0	0	1 168	0	796	0	100 621	24 068	0	0	0	0	0	0	980	0	25 048	122 726	0	0	0	0	1 168	0	1 775	0	125 669
NAVIAIR	94 205	0	0	0	1 643	0	137	915	0	96 900	29 558	3 077	0	0	110	0	5	24	0	32 774	123 763	3 077	0	0	1 753	0	142	939	0	129 674
Oro navigacija	20 782	0	0	169	72	0	96	161	0	21 279	4 282	0	0	36	194	0	20	34	0	4 567	25 064	0	0	206	265	0	116	195	0	25 846
PANSA	142 752	0	0	0	0	0	479	682	0	143 912	28 548	0	0	0	0	0	96	130	0	28 774	171 300	0	0	0	0	0	575	811	0	172 686
ROMATSA	144 768	0	0	0	2 600	1 058	288	212	3 826	152 752	13 602	0	0	0	0	0	5	2	0	13 608	158 371	0	0	0	2 600	1 058	293	214	3 826	166 360
Skyguide	136 414	0	42 527	0	0	33 658	788	2 993	0	216 380	80 485	0	0	0	0	15 966	308	5 002	0	101 761	216 899	0	42 527	0	0	49 624	1 097	7 995	0	318 141
Slovenia Control	27 545	0	0	0	96	0	1	70	1 507	29 220	2 860	101	0	249	43	0	0	304	0	3 558	30 405	101	0	249	139	0	1	374	1 507	32 778
SMATSA	67 788	0	6 074	0	0	0	1 229	0	0	75 091	5 317	0	0	0	0	0	283	0	240	5 840	73 105	0	6 074	0	0	0	1 512	0	240	80 931
UkSATSE	214 837	0	0	0	0	0	0	0	0	214 837	42 156	0	0	0	0	0	0	0	0	42 156	256 992	0	0	0	0	0	0	0	0	256 992

Annex 8 - Table 0.1: Breakdown of total ANS revenues (en-route, terminal and gate-to-gate), 2013

	En-route ANS costs (in €'000)								Terminal ANS costs (in €'000)								Gate-to-gate ANS costs (in €'000)							
ANSPs	ATM/CNS provision costs	MET costs	Payment for regulatory and supervisory services	Payment ot the State for provision of other services	Eurocontrol costs	Payments for delegation of ANS	Irrecoverable value added tax (VAT)	**Total costs**	ATM/CNS provision costs	MET costs	Payment for regulatory and supervisory services	Payment ot the State for provision of other services	Eurocontrol costs	Payments for delegation of ANS	Irrecoverable value added tax (VAT)	**Total costs**	ATM/CNS provision costs	MET costs	Payment for regulatory and supervisory services	Payment ot the State for provision of other services	Eurocontrol costs	Payments for delegation of ANS	Irrecoverable value added tax (VAT)	**Total costs**
Aena	618 936	35 127	7 399	17 232	48 847	0	0	727 542	188 285	0	0	0	0	0	0	188 285	807 222	35 127	7 399	17 232	48 847	0	0	915 827
Albcontrol	17 907	459	696	0	899	0	0	19 960	2 904	93	0	0	0	0	0	2 998	20 811	552	696	0	899	0	0	22 958
ANS CR	93 910	2 062	476	0	6 821	0	0	103 269	21 203	587	78	0	0	0	0	21 868	115 113	2 649	554	0	6 821	0	0	125 136
ARMATS	4 142	0	0	0	283	0	0	4 425	4 154	0	0	0	0	0	0	4 154	8 296	0	0	0	283	0	0	8 579
Austro Control	151 491	17 051	540	0	11 579	0	0	180 661	35 542	3 962	106	0	0	0	0	39 610	187 033	21 013	646	0	11 579	0	0	220 271
Avinor (Continental)	105 131	2 824	300	0	7 261	0	0	115 516	119 801	599	720	0	0	0	0	121 120	224 932	3 422	1 021	0	7 261	0	0	236 637
Belgocontrol	102 623	6 739	1 351	0	11 153	46 321	0	168 188	51 776	3 975	746	0	0	0	0	56 496	154 399	10 714	2 097	0	11 153	46 321	0	224 684
BULATSA	62 046	5 425	228	0	4 075	0	1	71 775	9 165	1 513	54	0	0	0	0	10 732	71 211	6 937	281	0	4 075	0	1	82 507
Croatia Control	74 589	4 506	0	0	0	0	0	79 095	8 642	677	0	0	0	0	0	9 319	83 231	5 183	0	0	0	0	0	88 414
DCAC Cyprus	32 813	3 952	7 880	0	2 368	0	0	47 013	4 521	988	1 976	0	0	0	0	7 485	37 334	4 940	9 855	0	2 368	0	0	54 498
DFS	810 555	32 854	0	0	0	0	0	843 408	208 855	8 629	878	0	0	0	0	218 362	1 019 409	41 483	878	0	0	0	0	1 061 770
DHMI	280 813	23 454	2 863	0	19 975	0	0	327 105	89 990	0	0	0	0	0	0	89 990	370 803	23 454	2 863	0	19 975	0	0	417 095
DSNA	934 267	66 449	10 700	0	78 428	43 285	35 997	1 169 126	245 159	20 098	2 600	0	0	0	9 646	277 503	1 179 426	86 547	13 300	0	78 428	43 285	45 643	1 446 629
EANS	12 995	107	0	0	0	0	0	13 103	1 714	85	0	0	0	0	0	1 799	14 710	192	0	0	0	0	0	14 902
ENAV	515 192	35 391	3 206	0	47 856	0	0	601 645	131 688	14 331	754	0	0	0	0	146 773	646 880	49 722	3 960	0	47 856	0	0	748 418
Finavia	36 708	3 380	110	0	0	332	0	40 530	26 955	3 018	279	0	0	0	0	30 252	63 663	6 398	389	0	0	332	0	70 782
HCAA	131 783	7 552	0	0	10 259	0	0	149 594	16 989	164	237	0	0	0	0	17 390	148 772	7 716	237	0	10 259	0	0	166 983
HungaroControl	76 098	2 652	1 449	0	5 218	0	0	85 417	14 712	224	237	0	0	0	0	15 173	90 809	2 876	1 686	0	5 218	0	0	100 590
IAA	88 237	6 541	1 454	2 249	7 510	0	0	105 991	19 832	1 635	291	314	0	0	0	22 072	108 069	8 176	1 745	2 563	7 510	0	0	128 063
LFV	176 662	3 564	472	0	0	0	0	180 698	25 080	0	186	0	0	0	0	25 266	201 742	3 564	658	0	0	0	0	205 964
LGS	16 892	693	861	0	1 074	0	0	19 520	4 972	424	287	0	0	0	0	5 683	21 864	1 117	1 148	0	1 074	0	0	25 203
LPS	51 749	1 835	1 167	0	3 226	0	0	57 977	6 592	733	48	0	0	0	0	7 373	58 341	2 568	1 215	0	3 226	0	0	65 350
LVNL	115 343	6 730	0	0	0	0	4 071	126 144	50 500	1 477	0	0	0	0	1 770	53 747	165 843	8 207	0	0	0	0	5 841	179 891
MATS	11 886	0	495	0	686	0	0	13 067	2 174	0	0	0	0	0	0	2 174	14 061	0	495	0	686	0	0	15 242
M-NAV	8 635	661	0	0	0	0	0	9 296	1 185	109	205	0	0	0	0	1 499	9 820	771	205	0	0	0	0	10 795
MoldATSA	8 604	955	0	0	391	0	0	9 951	1 885	210	8	0	0	0	0	2 103	10 489	1 165	8	0	391	0	0	12 054
MUAC	137 159	0	0	0	0	0	5	137 164	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	137 159	0	0	0	0	0	5	137 164
NATS (Continental)	619 707	0	5 618	0	0	937	0	626 262	173 188	8	3 321	0	0	0	0	176 517	792 895	8	8 939	0	0	937	0	802 779
NAV Portugal (Continental)	91 144	5 313	709	4 260	7 943	0	0	109 369	24 991	0	0	0	0	0	0	24 991	116 135	5 313	709	4 260	7 943	0	0	134 360
NAVIAIR	81 192	0	753	0	0	0	0	81 945	28 344	0	0	0	0	0	0	28 344	109 536	0	753	0	0	0	0	110 288
Oro navigacija	20 476	463	319	0	1 330	0	0	22 588	4 288	72	63	0	0	0	0	4 422	24 763	535	382	0	1 330	0	0	27 010
PANSA	122 554	4 216	1 745	0	8 687	866	0	138 069	20 607	3 458	990	0	0	0	0	25 055	143 161	7 674	2 735	0	8 687	866	0	163 124
ROMATSA	131 991	7 388	2 944	0	8 019	0	0	150 343	23 670	1 347	115	0	0	0	0	25 132	155 661	8 736	3 060	0	8 019	0	0	175 475
Skyguide	185 367	9 317	0	0	8 984	0	0	203 668	93 994	4 384	0	0	0	203	0	98 582	279 362	13 701	0	0	8 984	203	0	302 250
Slovenia Control	26 033	1 188	463	0	1 581	0	0	29 264	3 651	482	51	0	0	0	0	4 184	29 684	1 670	513	0	1 581	0	0	33 448
SMATSA	55 176	4 119	0	0	3 534	0	0	62 829	12 672	759	0	0	0	0	0	13 431	67 848	4 878	0	0	3 534	0	0	76 260
UkSATSE	197 302	2 816	2 194	0	9 334	0	0	211 645	49 392	0	476	0	0	0	0	49 868	246 694	2 816	2 670	0	9 334	0	0	261 514

Annex 8 - Table 0.2: Breakdown of total ANS costs (en-route, terminal and gate-to-gate), 2013

	En-route ATM/CNS costs (in €'000)						Terminal ATM/CNS costs (in €'000)						Gate-to-gate ATM/CNS costs (in €'000)					
ANSPs	Staff costs	Non-staff operating costs	Depreciation costs	Cost of capital	Exceptional items	ATM/CNS provision costs	Staff costs	Non-staff operating costs	Depreciation costs	Cost of capital	Exceptional items	ATM/CNS provision costs	Staff costs	Non-staff operating costs	Depreciation costs	Cost of capital	Exceptional items	ATM/CNS provision costs
Aena	388 429	76 175	99 074	49 123	6 135	618 936	138 451	16 991	21 448	9 598	1 798	188 285	526 880	93 166	120 522	58 721	7 933	807 222
Albcontrol	5 282	4 849	5 246	2 530	0	17 907	2 256	99	364	185	0	2 904	7 538	4 948	5 610	2 716	0	20 811
ANS CR	53 205	14 969	17 060	8 676	0	93 910	14 022	2 850	2 783	1 549	0	21 203	67 227	17 819	19 842	10 225	0	115 113
ARMATS	2 152	683	564	743	0	4 142	1 820	1 313	413	608	0	4 154	3 973	1 996	977	1 351	0	8 296
Austro Control	108 981	20 880	16 891	4 739	0	151 491	25 036	4 394	5 779	333	0	35 542	134 017	25 274	22 670	5 072	0	187 033
Avinor (Continental)	78 372	16 627	4 548	5 584	0	105 131	90 489	22 622	5 634	1 056	0	119 801	168 861	39 250	10 182	6 639	0	224 932
Belgocontrol	70 419	16 762	10 218	5 146	78	102 623	39 890	4 567	5 923	1 359	37	51 776	110 309	21 329	16 141	6 505	115	154 399
BULATSA	41 790	6 337	6 949	6 970	0	62 046	6 387	1 081	976	721	0	9 165	48 177	7 418	7 925	7 691	0	71 211
Croatia Control	47 190	15 218	8 368	3 813	0	74 589	5 705	834	1 072	1 032	0	8 642	52 895	16 052	9 440	4 844	0	83 231
DCAC Cyprus	12 692	12 813	5 073	2 235	0	32 813	2 071	1 393	701	357	0	4 521	14 763	14 206	5 774	2 592	0	37 334
DFS	561 853	80 973	74 902	57 862	34 964	810 555	147 717	20 804	16 110	14 055	10 169	208 855	709 570	101 778	91 012	71 917	45 134	1 019 409
DHMI	134 900	86 301	29 762	29 850	0	280 813	38 094	24 767	15 837	11 291	0	89 990	172 994	111 068	45 600	41 140	0	370 803
DSNA	646 150	174 752	83 963	29 402	0	934 267	169 972	44 885	23 606	6 696	0	245 159	816 122	219 637	107 569	36 097	0	1 179 426
EANS	7 733	2 118	1 425	1 719	0	12 995	374	638	340	362	0	1 714	8 107	2 756	1 765	2 081	0	14 710
ENAV	286 818	106 009	92 275	30 090	0	515 192	61 671	33 007	27 537	8 016	1 458	131 688	348 489	139 016	119 811	38 106	1 458	646 880
Finavia	20 469	11 207	3 973	1 059	0	36 708	16 025	7 633	2 592	705	0	26 955	36 494	18 840	6 565	1 764	0	63 663
HCAA	104 837	19 646	3 903	3 398	0	131 783	11 805	3 836	1 266	82	0	16 989	116 642	23 482	5 169	3 480	0	148 772
HungaroControl	41 753	19 287	11 438	3 621	0	76 098	9 685	2 930	1 688	409	0	14 712	51 438	22 217	13 125	4 030	0	90 809
IAA	53 662	18 872	9 636	6 067	0	88 237	9 253	3 787	4 219	2 573	0	19 832	62 915	22 659	13 855	8 640	0	108 069
LFV	112 412	43 511	17 613	3 126	0	176 662	20 720	4 360	0	0	0	25 080	133 132	47 870	17 613	3 126	0	201 742
LGS	10 263	2 553	3 149	927	0	16 892	2 669	508	1 403	392	0	4 972	12 932	3 061	4 552	1 319	0	21 864
LPS	29 925	10 138	8 004	3 682	0	51 749	4 316	962	757	557	0	6 592	34 241	11 100	8 761	4 239	0	58 341
LVNL	87 789	18 955	6 565	2 034	0	115 343	38 282	8 459	2 884	875	0	50 500	126 071	27 414	9 449	2 909	0	165 843
MATS	5 089	3 952	2 020	824	0	11 886	1 136	469	363	206	0	2 174	6 225	4 422	2 384	1 030	0	14 061
M-NAV	6 610	1 192	549	284	0	8 635	913	182	65	25	0	1 185	7 523	1 374	614	309	0	9 820
MoldATSA	4 019	1 336	1 241	2 008	0	8 604	595	620	248	422	0	1 885	4 615	1 956	1 489	2 430	0	10 489
MUAC	114 702	12 822	9 044	592	0	137 159	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	114 702	12 822	9 044	592	0	137 159
NATS (Continental)	302 328	93 845	94 147	80 255	49 132	619 707	120 705	44 388	5 159	2 442	494	173 188	423 033	138 233	99 306	82 697	49 626	792 895
NAV Portugal (Continental)	74 783	8 474	5 451	2 436	0	91 144	21 641	1 243	1 619	488	0	24 991	96 424	9 717	7 070	2 923	0	116 135
NAVIAIR	50 135	10 576	12 029	8 453	0	81 192	19 859	3 289	1 989	3 207	0	28 344	69 993	13 864	14 017	11 661	0	109 536
Oro navigacija	11 515	4 083	4 020	858	0	20 476	2 132	888	1 144	123	0	4 288	13 647	4 971	5 164	981	0	24 763
PANSA	91 759	14 512	11 584	4 698	0	122 554	15 400	2 773	1 641	793	0	20 607	107 159	17 285	13 226	5 491	0	143 161
ROMATSA	88 297	18 970	11 373	10 429	2 922	131 991	16 166	4 300	1 497	1 383	324	23 670	104 463	23 271	12 869	11 811	3 247	155 661
Skyguide	134 891	18 360	27 344	4 626	147	185 367	69 060	10 169	12 518	2 180	67	93 994	203 951	28 529	39 862	6 806	214	279 362
Slovenia Control	17 281	3 942	3 069	1 611	130	26 033	2 605	265	166	48	567	3 651	19 886	4 207	3 235	1 659	697	29 684
SMATSA	29 937	10 067	7 665	7 388	118	55 176	6 693	2 193	1 806	1 952	27	12 672	36 630	12 260	9 472	9 340	145	67 848
UkSATSE	116 470	29 322	15 061	35 239	1 210	197 302	30 796	6 755	3 565	7 957	319	49 392	147 266	36 077	18 627	43 195	1 529	246 694
Total	3 954 893	1 011 088	725 195	422 097	94 836	6 208 109	1 164 411	290 255	175 112	84 035	15 260	1 729 073	5 119 304	1 301 343	900 307	506 132	110 096	7 937 182

Annex 8 - Table 0.3: Breakdown of ATM/CNS provision costs (en-route, terminal and gate-to-gate), 2013

ANSPs	ANSP BALANCE SHEET in (€'000)								
	NBV fixed assets in operation	NBV fixed assets under construction	Long-term financial assets	Current assets	**Total assets**	Capital and reserves	Long-term liabilities	Current liabilities	**Total liabilities**
Aena	616 835	143 714	167 655	253 522	1 181 726	673 410	217 038	291 277	1 181 726
Albcontrol	35 587	2 299	66	23 707	61 660	42 055	18 058	1 547	61 660
ANS CR	113 732	17 798	11 562	70 729	213 822	194 178	8 839	10 804	213 822
ARMATS	10 663	0	34	2 048	12 745	10 408	1 648	689	12 745
Austro Control	230 399	13 141	36 936	95 419	375 895	65 544	245 004	65 347	375 895
Avinor (Continental)	77 193	29 492	0	0	106 685	106 685	0	0	106 685
Belgocontrol	124 125	9 568	28	76 243	209 964	137 466	21 682	50 817	209 964
BULATSA	85 165	4 513	469	78 063	168 210	142 573	5 429	20 208	168 210
Croatia Control	43 570	40 787	0	40 609	124 967	59 803	50 675	14 489	124 967
DCAC Cyprus	24 988	3 449	0	14 065	42 503	16 936	25 567	0	42 503
DFS	711 793	61 061	164 283	1 399 589	2 336 726	679 275	1 453 016	204 435	2 336 726
DHMI	502 565	110 033	1 079	90 199	703 876	640 105	19 106	44 666	703 876
DSNA	544 170	306 623	0	0	850 793	850 793	0	0	850 793
EANS	16 480	1 166	0	7 792	25 438	14 545	7 423	3 470	25 438
ENAV	840 920	412 885	114 826	659 876	2 028 507	1 298 818	203 104	526 585	2 028 507
Finavia	48 331	3 348	0	29 717	81 396	38 175	29 042	14 179	81 396
HCAA	105 455	0	0	0	105 455	105 455	0	0	105 455
HungaroControl	66 981	1 716	6 129	78 099	152 925	88 427	42 357	22 141	152 925
IAA	72 999	12 719	739	139 898	226 355	80 587	114 499	31 269	226 355
LFV	130 333	19 660	76 673	433 093	659 759	78 523	526 651	54 585	659 759
LGS	17 995	3 453	9	8 961	30 418	27 400	390	2 628	30 418
LPS	55 353	3 444	0	39 482	98 279	64 130	24 787	9 362	98 279
LVNL	81 129	27 329	0	37 171	145 629	7 987	105 190	32 452	145 629
MATS	13 129	50	0	10 916	24 095	11 683	7 646	4 766	24 095
M-NAV	6 866	163	0	6 459	13 488	12 198	73	1 217	13 488
MoldATSA	8 732	146	24	6 764	15 665	15 291	0	374	15 665
MUAC	65 387	12 481	0	55 672	133 540	0	77 868	55 672	133 540
NATS (Continental)	817 461	269 428	588 130	588 516	2 263 535	938 130	939 875	385 530	2 263 535
NAV Portugal (Continental)	53 636	13 314	88 274	120 789	276 013	87 753	139 714	48 546	276 013
NAVIAIR	150 574	7 429	11	72 258	230 271	113 146	83 594	33 531	230 271
Oro navigacija	27 677	821	1 448	18 353	48 299	44 719	271	3 310	48 299
PANSA	132 139	18 278	15 884	116 471	282 772	169 641	30 323	82 808	282 772
ROMATSA	104 746	16 007	951	132 148	253 853	180 189	60 147	13 516	253 853
Skyguide	237 119	65 613	46 489	163 800	513 021	273 520	164 365	75 136	513 021
Slovenia Control	33 973	558	211	4 005	38 747	12 636	14 320	11 792	38 747
SMATSA	114 403	6 442	0	30 669	151 515	89 341	43 450	18 724	151 515
UkSATSE	216 313	77 697	3 442	104 101	401 553	376 072	6 188	19 292	401 553
Total	6 538 919	1 716 626	1 325 351	5 009 205	14 590 100	7 747 599	4 687 337	2 155 164	14 590 100

Annex 8 - Table 0.4: Balance Sheet data at ANSP level, 2013

ANSPs	ATCOs in OPS	ATCOs on other duties	Ab-initio trainees	On-the-job trainees	ATC assistants	OPS support (non-ATCO)	Technical support staff for operational maintenance	Technical support staff for planning & development	Administration	Staff for ancillary services	Other	**Total staff**	ACC ATCOs in OPS	ACC ATCO-hours on duty	APPs+TWRs ATCOs in OPS	APPs+TWRs ATCO-hours on duty	Employment costs for ATCOs in OPS (€'000)
Aena	1 816	242	0	0	158	57	527	333	473	15	102	3 723	1 165	1 269 898	651	793 511	356 390
Albcontrol	55	9	0	24	7	0	82	0	71	36	43	327	38	58 330	17	26 452	2 915
ANS CR	195	17	15	9	96	64	133	24	234	31	72	890	94	144 967	101	153 722	24 296
ARMATS	79	0	0	9	20	14	152	0	56	28	96	454	23	33 580	56	81 760	1 102
Austro Control	292	20	24	23	44	73	110	101	83	100	0	870	119	171 241	173	240 124	64 689
Avinor (Continental)	405	109	28	27	133	0	210	39	35	34	18	1 038	179	279 177	226	355 380	82 457
Belgocontrol	226	29	0	11	0	51	177	26	146	92	50	808	87	109 426	139	189 901	43 152
BULATSA	241	37	0	6	43	44	371	8	162	107	88	1 107	112	143 136	129	167 184	16 390
Croatia Control	222	24	11	15	41	31	96	22	147	96	0	705	88	114 576	134	190 682	27 679
DCAC Cyprus	86	9	0	0	37	0	0	0	31	26	0	189	59	115 463	27	55 836	11 232
DFS	1 742	135	235	232	369	543	888	565	453	102	338	5 602	1 339	1 302 271	403	477 958	321 387
DHMI	1 048	39	47	55	36	279	1 358	28	1 305	469	1 071	5 735	513	742 824	535	620 600	78 951
DSNA	2 732	387	158	241	110	1 115	1 291	409	1 175	236	0	7 854	1 402	1 800 168	1 330	1 707 720	342 625
EANS	50	16	0	0	4	1	29	13	19	26	0	158	26	41 280	24	39 040	4 800
ENAV	1 409	176	19	71	21	19	103	114	564	379	134	3 009	865	1 098 236	545	743 721	204 183
Finavia	189	29	0	1	19	0	72	10	17	55	0	392	52	72 498	137	215 441	20 304
HCAA	480	105	0	0	0	48	464	88	90	0	450	1 725	215	316 050	265	389 550	55 170
HungaroControl	171	8	9	8	35	51	131	23	181	64	33	714	94	146 828	77	117 348	23 769
IAA	204	33	27	20	18	8	34	18	74	15	1	452	141	214 743	63	96 579	31 483
LFV	508	85	0	8	32	102	71	30	145	42	0	1 023	210	350 070	298	486 336	79 075
LGS	88	0	0	8	0	39	107	2	95	28	1	368	62	76 252	26	26 182	4 414
LPS	87	26	5	4	43	23	116	13	120	29	0	466	44	64 550	43	68 933	12 534
LVNL	203	31	28	29	60	171	115	84	157	15	0	892	70	109 941	133	209 477	50 180
MATS	54	0	0	0	0	0	38	0	23	18	11	144	30	49 980	24	38 688	3 159
M-NAV	61	24	0	5	9	8	45	0	43	48	24	267	33	46 695	28	39 620	2 766
MoldATSA	60	8	1	3	5	1	75	7	48	53	70	331	36	52 308	24	34 944	1 679
MUAC	255	33	13	4	48	74	126	0	54	0	11	618	255	288 932	n/appl	n/appl	58 416
NATS (Continental)	1 435	238	36	3	401	326	869	188	820	14	0	4 331	941	1 145 477	494	601 295	205 478
NAV Portugal (Continental)	214	40	0	3	26	59	97	62	167	43	10	721	91	163 800	123	225 951	50 338
NAVIAIR	194	81	0	4	96	33	98	30	88	14	0	637	85	128 250	109	164 364	28 532
Oro navigacija	87	10	0	1	0	24	67	8	68	28	0	293	34	54 251	53	79 904	5 502
PANSA	478	5	47	29	72	282	336	61	316	109	0	1 735	143	158 850	335	372 743	51 959
ROMATSA	460	93	17	11	0	0	364	0	392	196	0	1 533	220	266 640	240	296 640	41 354
Skyguide	361	65	24	48	103	207	138	148	206	72	31	1 403	220	281 949	141	164 589	70 344
Slovenia Control	93	11	0	0	11	4	26	10	35	24	0	214	55	79 190	37	53 155	10 240
SMATSA	262	66	0	26	32	30	100	105	91	156	0	868	150	174 720	112	130 458	14 245
UkSATSE	988	340	0	20	90	123	2 612	37	745	222	713	5 890	583	722 920	405	541 080	38 735
Total	17 532	2 579	744	957	2 219	3 903	11 628	2 607	8 929	3 022	3 367	57 487	9 874	12 389 466	7 657	10 196 868	2 441 925

Annex 8 - Table 0.5: Total staff and ATCOs in OPS data, 2013

ANSPs	Size of controlled airspace	Number of ACC operational units	Number of APP operational units	Number of TWR operational units	Number of AFIS	Total IFR flights controlled by the ANSP	Total IFR km controlled by the ANSP	Total flight-hours controlled by the ANSP	IFR Airport movements controlled by the ANSP	Composite flight-hours
Aena	2 190 000	5	17	23	0	1 617 907	856 217 657	1 230 086	1 480 234	1 623 657
Albcontrol	36 000	1	1	1	1	200 571	32 939 024	41 539	19 919	46 835
ANS CR	77 100	1	4	4	0	663 809	166 470 094	224 185	139 095	261 168
ARMATS	29 800	1	2	2	2	52 344	10 048 176	13 123	17 906	17 884
Austro Control	79 500	1	6	6	0	862 964	185 164 125	271 390	338 154	361 300
Avinor (Continental)	724 000	3	17	19	28	612 045	194 667 013	367 881	690 446	551 460
Belgocontrol	39 500	1	4	5	0	547 888	52 461 187	106 453	351 664	199 955
BULATSA	146 000	1	3	5	0	550 559	143 389 242	180 911	71 339	199 879
Croatia Control	158 000	1	7	10	0	493 771	150 731 163	194 577	83 190	216 696
DCAC Cyprus	174 000	1	2	2	0	277 397	104 105 063	134 793	54 719	149 342
DFS	388 000	4	0	16	0	2 743 604	869 824 588	1 347 911	1 932 889	1 861 835
DHMI	982 000	2	34	44	0	1 110 168	756 067 536	1 032 829	1 072 991	1 318 120
DSNA	1 010 000	5	12	81	0	2 789 930	1 507 255 250	2 121 262	1 889 756	2 623 718
EANS	77 300	1	2	2	0	182 255	46 893 151	63 141	35 567	72 598
ENAV	733 000	4	23	12	11	1 518 903	696 420 665	1 001 334	1 050 026	1 280 519
Finavia	411 000	1	7	19	6	225 403	64 229 064	106 960	232 810	168 860
HCAA	538 000	1	16	18	15	623 005	333 367 797	445 796	135 455	481 811
HungaroControl	92 900	1	1	1	8	600 163	145 341 450	188 556	84 302	210 971
IAA	457 000	2	3	3	0	522 570	205 448 775	266 629	214 356	323 623
LFV	626 000	2	25	31	1	695 146	279 244 177	419 476	516 500	556 805
LGS	95 600	1	2	1	1	234 569	53 921 604	73 916	67 242	91 795
LPS	48 700	1	2	5	0	396 879	69 180 649	88 438	26 527	95 491
LVNL	52 200	1	3	4	0	556 310	68 848 976	150 968	485 438	280 038
MATS	231 000	1	2	1	1	109 348	48 684 115	67 975	35 565	77 431
M-NAV	24 700	1	2	2	1	112 715	13 868 452	17 969	12 032	21 168
MoldATSA	34 100	1	1	4	0	74 210	14 136 033	18 228	17 160	22 791
MUAC	260 000	1	0	0	0	1 631 895	470 016 650	574 812	n/appl	574 812
NATS (Continental)	882 000	3	16	16	0	2 169 115	792 045 868	1 297 266	1 735 158	1 758 617
NAV Portugal (Continental)	671 000	1	4	6	0	448 370	225 709 522	301 200	274 736	374 248
NAVIAIR	158 000	1	7	6	1	630 973	138 799 385	210 182	329 173	297 704
Oro navigacija	74 700	1	3	4	0	211 611	35 680 284	51 095	43 327	62 615
PANSA	334 000	1	4	13	0	680 018	296 222 624	402 743	309 981	485 162
ROMATSA	254 000	1	3	16	0	512 876	233 034 482	298 797	137 761	335 425
Skyguide	69 700	2	4	7	0	1 150 572	205 674 753	319 353	477 196	446 232
Slovenia Control	20 400	1	3	3	0	259 303	34 150 400	46 133	29 841	54 068
SMATSA	145 566	1	8	8	0	516 274	157 118 167	199 944	71 785	219 030
UkSATSE	776 442	5	11	22	6	494 138	311 212 843	405 052	208 391	460 460
Total		63	261	422	82		9 968 590 003	14 282 905	14 672 631	18 184 125

Annex 8 - Table 0.6: Operational data (ANSP and State level), 2013

ANSPs	ACC Code	Flight-hours controlled	ATCO-hours on duty	ATCO-hour productivity	Average transit time in minutes	IFR ACC Movements	Size of the controlled area	ATCOs in OPS	Size of OPS room area (m²)	Number of sectors	Sum of sector-hours
Aena	Canarias	156 800	164 305	0.95	36	264 347	1 370 000	148	624	8	45 684
Aena	Barcelona	307 178	325 759	0.94	25	732 410	266 000	285	1 395	19	89 956
Aena	Madrid	474 939	512 763	0.93	33	874 149	435 000	467	1 013	25	146 837
Aena	Palma	62 832	122 315	0.51	15	245 968	51 400	131	783	7	34 382
Aena	Sevilla	139 987	144 756	0.97	26	320 687	179 000	134	574	7	39 137
ANS CR	Praha	199 027	144 967	1.37	18	658 542	77 100	94	950	9	30 571
ARMATS	Yerevan	10 538	33 580	0.31	12	50 713	29 800	23	168	1	8 760
Austro Control	Wien	195 251	171 241	1.14	17	699 319	79 500	119	900	12	39 834
Avinor (Continental)	Bodo	79 270	62 386	1.27	23	206 332	403 000	40	450	6	34 675
Avinor (Continental)	Oslo	120 763	155 965	0.77	21	346 470	115 000	100	605	15	63 232
Avinor (Continental)	Stavanger	81 129	60 826	1.33	20	242 030	205 000	39	250	3	21 800
Belgocontrol	Brussels	72 099	109 426	0.66	8	541 208	39 500	87	1 054	7	22 812
BULATSA	Sofia	168 345	143 136	1.18	19	532 909	145 000	112	1 183	12	24 887
Croatia Control	Zagreb	177 720	114 576	1.55	23	467 691	158 000	88	800	10	23 397
DCAC Cyprus	Nicosia	127 745	115 463	1.11	28	277 313	174 000	59	250	4	22 630
DFS	Karlsruhe UAC	564 056	358 732	1.57	21	1 642 811	261 000	383	1 850	38	134 390
DFS	Langen	354 412	417 670	0.85	18	1 211 069	108 000	434	1 689	35	133 611
DFS	Munchen	254 592	275 530	0.92	15	1 049 824	118 000	285	1 262	21	88 020
DFS	Bremen	174 851	250 313	0.70	18	594 363	174 000	236	1 050	21	88 457
DHMI	Ankara	631 834	406 888	1.55	51	743 529	779 000	281	295	11	83 220
DHMI	Istanbul	344 835	335 936	1.03	26	808 656	233 000	232	420	11	96 360
DSNA	Bordeaux	425 386	351 816	1.21	31	832 595	212 000	274	1 295	19	116 152
DSNA	Reims	239 311	268 356	0.89	18	809 757	117 000	209	1 040	17	70 176
DSNA	Paris	409 317	464 808	0.88	21	1 153 814	165 000	362	1 250	19	116 204
DSNA	Marseille	369 676	401 892	0.92	22	989 427	298 000	313	1 310	28	98 826
DSNA	Brest	444 028	313 296	1.42	30	881 735	400 000	244	850	17	83 143
EANS	Tallinn	58 450	41 280	1.42	20	177 076	77 300	26	269	3	12 045
ENAV	Brindisi	95 839	116 873	0.82	20	286 804	244 000	92	550	6	20 271
ENAV	Milano	160 650	286 583	0.56	17	571 827	73 300	221	593	17	56 771
ENAV	Padova	187 936	267 202	0.70	17	664 743	94 600	205	375	12	46 559
ENAV	Roma	486 761	427 579	1.14	31	935 992	503 000	347	1 600	26	92 763
Finavia	Tampere	69 696	72 498	0.96	25	164 691	411 000	52	550	5	24 820
HCAA	Athinai+Macedonia	394 728	316 050	1.25	39	599 685	538 000	215	1 000	12	59 400
HungaroControl	Budapest	173 249	146 828	1.18	18	571 574	92 900	94	720	7	20 237
IAA	Dublin	31 754	54 828	0.58	10	185 784	23 200	36	441	4	22 197
IAA	Shannon	218 601	159 915	1.37	33	392 076	449 000	105	576	8	39 956
LFV	Malmo	215 705	193 372	1.12	26	502 759	225 000	116	841	11	44 348
LFV	Stockholm	127 071	156 698	0.81	20	390 166	479 000	94	828	11	46 720
LGS	Riga	73 880	76 252	0.97	19	234 296	95 600	62	169	4	18 700
LPS	Bratislava	84 015	64 550	1.30	13	385 092	48 700	44	813	5	13 933
LVNL	Amsterdam	73 064	109 941	0.66	9	513 894	52 200	70	1 800	5	29 493
MATS	Malta	58 998	49 980	1.18	33	108 652	231 000	30	121	2	11 680
M-NAV	Skopje	16 362	46 695	0.35	9	109 720	24 700	33	202	3	10 144
MoldATSA	Chisinau	16 510	52 308	0.32	14	72 140	34 100	36	144	2	17 520
MUAC	Maastricht	574 812	288 932	1.99	21	1 631 895	260 000	255	1 050	20	67 268
Albcontrol	Tirana	41 539	58 330	0.71	12	200 571	36 000	38	36	4	13 889
NATS (Continental)	Prestwick	339 573	313 122	1.08	23	874 789	630 000	257	1 020	23	124 008
NATS (Continental)	London AC	507 636	446 590	1.14	17	1 798 282	287 000	367	2 000	19	79 391
NATS (Continental)	London TC	272 479	385 765	0.71	13	1 243 769	40 600	317	766	30	237 615
NAV Portugal (Continental)	Lisboa	258 710	163 800	1.58	36	432 973	671 000	91	663	8	54 155
NAVIAIR	Kobenhavn	157 069	128 250	1.22	18	532 440	158 000	85	600	7	31 208
Oro Navigacija	Vilnius	44 915	54 251	0.83	13	206 183	74 700	34	336	3	19 520
PANSA	Warszawa	319 186	158 850	2.01	30	639 997	331 000	143	1 300	8	34 000
ROMATSA	Bucuresti	278 794	266 640	1.05	33	504 794	254 000	220	1 391	11	59 220
Skyguide	Geneva	108 912	139 524	0.78	11	593 699	30 000	109	1 113	9	29 606
Skyguide	Zurich	129 877	142 425	0.91	11	720 951	39 800	111	960	10	38 320
Slovenia Control	Ljubljana	44 385	79 190	0.56	10	256 619	20 400	55	360	4	15 994
SMATSA	Beograd	185 726	174 720	1.06	22	508 534	145 566	150	744	9	38 500
UkSATSE	Kyiv	116 731	239 320	0.49	29	237 611	185 000	193	883	12	87 122
UkSATSE	Dnipropetrovs'k	65 915	119 040	0.55	24	163 123	167 000	96	415	5	39 202
UkSATSE	Simferopol	104 304	169 880	0.61	29	216 682	209 000	137	358	7	66 120
UkSATSE	L'viv	76 522	101 680	0.75	25	183 347	133 000	82	202	5	37 457
UkSATSE	Odesa	31 464	93 000	0.34	17	109 010	82 300	75	235	5	38 650
Total		12 787 738	12 389 439	1.03	22	35 099 908	14 043 266	9 874		724	3 455 954

Annex 8 - Table 0.7: Operational data at ACC level, 2013

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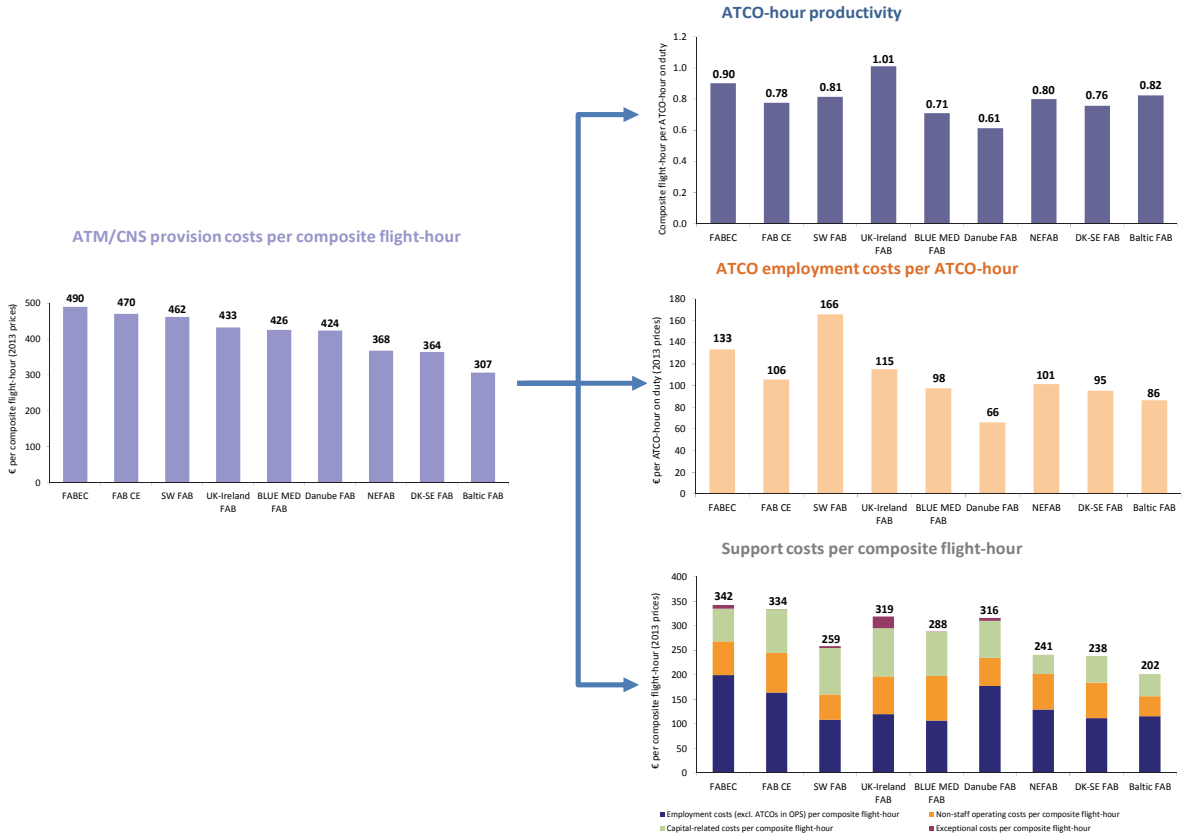
ANNEX 9 – PERFORMANCE INDICATORS AT FAB LEVEL

This Annex shows the financial cost-effectiveness indicator computed at FAB level for the year 2013 and broken down into its three main components: ATCO-hour productivity, ATCO employment costs per ATCO-hour and support costs per composite flight-hour.

The figures shown at FAB level in the Figure below have been computed taking into account the ANSPs participating to the ACE analysis in 2013 and which were formally part of a FAB initiative:

- FABEC: Belgocontrol, DFS, DSNA, LVNL, MUAC and Skyguide.
- FAB CE: ANS CR, Austro Control, Croatia Control, HungaroControl, LPS and Slovenia Control.
- SW FAB: Aena and NAV Portugal.
- UK-Ireland: IAA and NATS.
- BLUE MED: DCAC Cyprus, ENAV, HCAA and MATS.
- Danube: BULATSA and ROMATSA.
- NEFAB: Avinor, EANS, Finavia and LGS.
- DK-SE: LFV and NAVIAIR.
- Baltic: Oro Navigacija and PANSA.



Annex 9 - Figure 0.1: Breakdown of cost-effectiveness at FAB level, 2013

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ANNEX 10 – INDIVIDUAL ANSP FACT SHEETS

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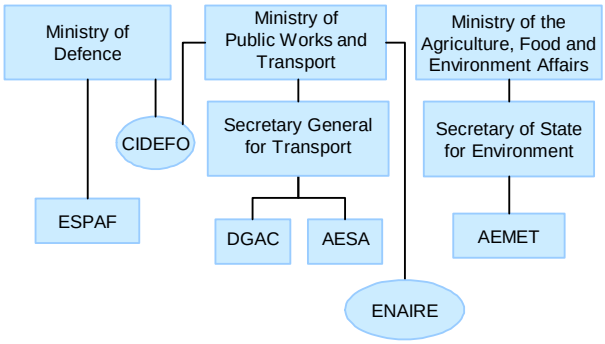
AENA (ENAIRE), Spain

ENAIRE

www.enaire.es

Institutional arrangements and links (2015)



Status (2015)

- Business Public Entity attached to Ministry of Development
- A company with specific status (governed by Private Law, except when acting in its administrative capacity)
- 100% State-owned

National Supervisory Authority (NSA):

- AESA (Spanish Aviation Safety State Agency) (for AENA)
- Spanish Air Force Staff (for MIL)
- Secretary of State for Environment (for MET)

Body responsible for:

Safety Regulation

Spanish Civil Aviation Authority - Government
AESA - Government

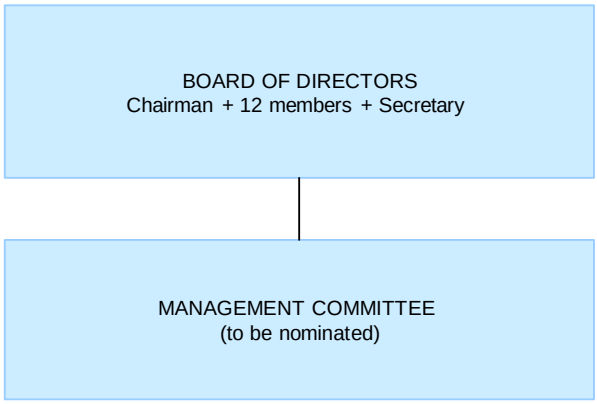
Airspace Regulation

Spanish Civil Aviation Authority - Government
AESA - Government

Economic Regulation

Government

Corporate governance structure (2015)



AENA (ENAIRE) (2015)

CHAIRMAN OF THE BOARD OF DIRECTORS:

Julio Gómez Pomar-Rodríguez

DIRECTOR OF AIR NAVIGATION:

Ignacio González Sánchez

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

Operational ATS units (2013)

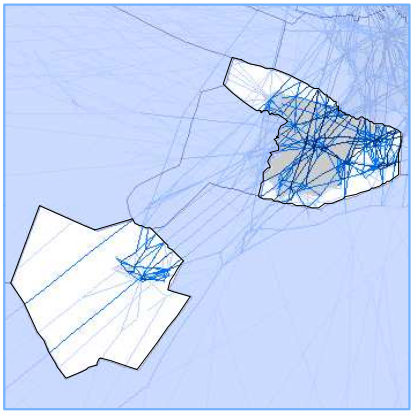
5 ACCs (Madrid, Barcelona, Canary Islands, Palma, Sevilla)
17 APPs (3 stand-alone APPs + 14 APPs co-located with TWR units)
23 TWRs

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	919
Gate-to-gate total costs (M€)	917
Gate-to-gate ATM/CNS provision costs (M€)	807
Gate-to-gate total ATM/CNS assets(M€)	737
Gate-to-gate ANS total capex (M€)	51
ATCOs in OPS	1 816
Gate-to-gate total staff	3 723
Total IFR flight-hours controlled by ANSP ('000)	1 230
IFR airport movements controlled by ANSP ('000)	1 480
En-route sectors	66
Minutes of ATFM delays ('000)	839

Size (2013)

Size of controlled airspace: 2 190 000 km²

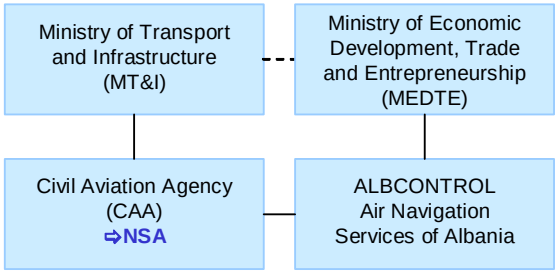


Albcontrol, Albania

National Air Traffic Agency

http://www.albcontrol.com.al/

Institutional arrangements and links (2015)



Status (2015)

- Since May 1999 NATA, now ALBCONTROL, is a joint-stock company
- 100% State owned

National Supervisory Authority (NSA):

Civil Aviation Agency (CAA)

Body responsible for:

Safety Regulation

MT&I and Civil Aviation Agency (CAA)

Airspace Regulation

MT&I and Civil Aviation Agency (CAA)

Economic Regulation

Ministry of Economic Development, Trade and Entrepreneurship (MEDTE)

Corporate governance structure (2015)

SUPERVISORY BOARD (6 members)
Chairman + 5 members

All 6 members are nominated by the MEDTE.
2 members are proposed by the MEDTE, 2 members by the MT&I and 2 members by the Ministry of Finance.

MANAGEMENT BOARD (6 members)
Director General + 5 Head of Divisions

Director General is appointed by MEDTE through the Supervisory Board of ALBCONTROL

Albcontrol (2015)

CHAIRMAN OF SUPERVISORY BOARD:

Genci Gjonçaj

DIRECTOR GENERAL (CEO) OF ALBCONTROL:

Belinda Balluku

HEAD OF THE ATS DEPARTMENT:

Sokol Ruçi

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☑ OAT	☑ Lower Airspace	☑ MET

Operational ATS units (2013)

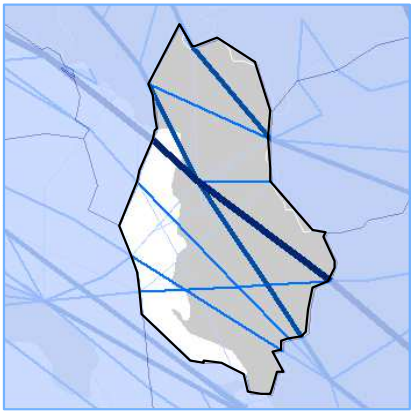
1 ACC (Tirana)
1 APP (Tirana)
1 TWR (Tirana)
1 AFIS (Tirana)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	21
Gate-to-gate total costs (M€)	23
Gate-to-gate ATM/CNS provision costs (M€)	21
Gate-to-gate total ATM/CNS assets(M€)	37
Gate-to-gate ANS total capex (M€)	1
ATCOs in OPS	55
Gate-to-gate total staff	327
Total IFR flight-hours controlled by ANSP ('000)	42
IFR airport movements controlled by ANSP ('000)	20
En-route sectors	4
Minutes of ATFM delays ('000)	0

Size (2013)

Size of controlled airspace: 36 000 km²

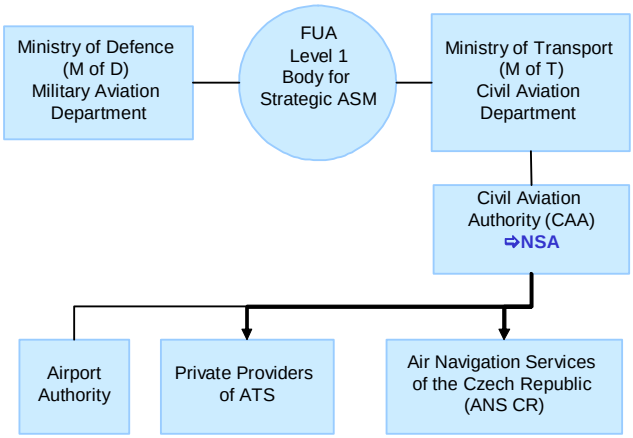


ANS CR, Czech Republic

Air Navigation Services of the Czech Republic

www.rlp.cz

Institutional arrangements and links (2015)



Status (2015)

- State-enterprise founded under the State Enterprise Act in 1995
- 100% State-owned

National Supervisory Authority (NSA):

Civil Aviation Authority (CAA)

Body responsible for:

Safety Regulation

Civil Aviation Authority

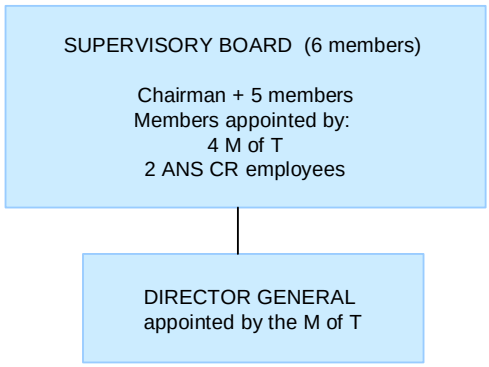
Airspace Regulation

Body for Strategic ASM

Economic Regulation

Ministry of Transport

Corporate governance structure (2015)



ANS CR (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Karel Dobeš

DIRECTOR GENERAL (CEO):

Jan Klas

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☑ OAT	☑ Lower Airspace	☐ MET

- OAT compatible only

Operational ATS units (2013)

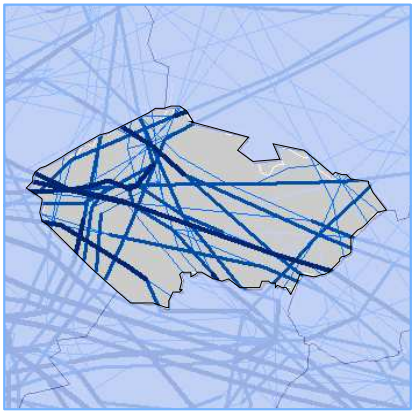
1 ACC (Praha)
4 APPs (Praha, Karlovy Vary, Brno, Ostrava)
4 TWRs (Praha, Karlovy Vary, Brno, Ostrava)
1 AFIS (located in Praha ACC)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	126
Gate-to-gate total costs (M€)	125
Gate-to-gate ATM/CNS provision costs (M€)	115
Gate-to-gate total ATM/CNS assets(M€)	125
Gate-to-gate ANS total capex (M€)	18
ATCOs in OPS	195
Gate-to-gate total staff	890
Total IFR flight-hours controlled by ANSP ('000)	224
IFR airport movements controlled by ANSP ('000)	139
En-route sectors	9
Minutes of ATFM delays ('000)	41

Size (2013)

Size of controlled airspace: 77 100 km²

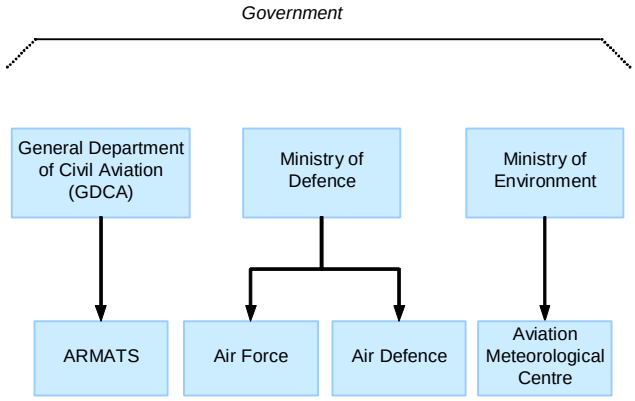


ARMATS, Armenia

Armenian Air Traffic Services

www.armats.com

Institutional arrangements and links (2015)



Status (2015)

- Joint-stock company as of 1997
- 100% State-owned

National Supervisory Authority (NSA):

General Department of Civil Aviation (GDCA)

Body responsible for:

Safety Regulation

General Department of Civil Aviation (GDCA)

Airspace Regulation

General Department of Civil Aviation (GDCA) and Ministry of Defence

Economic Regulation

Tax Authorities

Corporate governance structure (2015)

SUPERVISORY BOARD
Chairman is GDCA DG

EXECUTIVE BODY
Chairman + 5 members appointed by the stockholders
Chairman is ARMATS DG

ARMATS (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Artyom Movsesyan

CHAIRMAN OF THE EXECUTIVE BODY:

Artur Gasparyan

DIRECTOR OF AIR TRAFFIC SERVICES:

Artur Papoyan

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

Operational ATS units (2013)

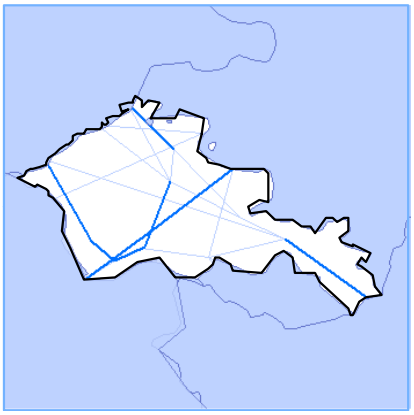
1 ACC (Yerevan)
2 APPs (Yerevan, Gyumri)
2 TWRs (Shirak, Zvartnots)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	8
Gate-to-gate total costs (M€)	9
Gate-to-gate ATM/CNS provision costs (M€)	8
Gate-to-gate total ATM/CNS assets(M€)	11
Gate-to-gate ANS total capex (M€)	2
ATCOs in OPS	79
Gate-to-gate total staff	454
Total IFR flight-hours controlled by ANSP ('000)	13
IFR airport movements controlled by ANSP ('000)	18
En-route sectors	1
Minutes of ATFM delays ('000)	0

Size (2013)

Size of controlled airspace: 29 800 km²

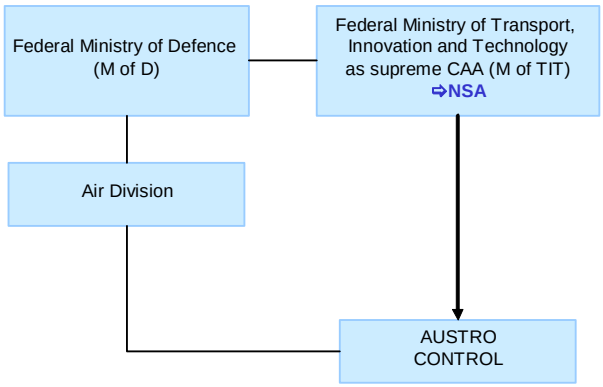


Austro Control, Austria

Österreichische Gesellschaft für Zivilluftfahrt mbH

www.austrocontrol.at

Institutional arrangements and links (2015)



Status (2015)

- Private limited company as of 1994
- 100% State-owned (Law makes provision for Austrian Airports to own up to 49 %)

National Supervisory Authority (NSA):

Federal Ministry of Transport, Innovation and Technology (M of TIT)

Body responsible for:

Safety Regulation

The power for regulatory decisions including safety oversight lies within the M of TIT

Airspace Regulation

M of TIT, normally on basis of proposals of Austro Control

Economic Regulation

Covered by the National Supervisory Authority

Corporate governance structure (2015)

GENERAL ASSEMBLY - M of TIT

SUPERVISORY BOARD (9 members)
Chairman + 8 members
6 members are appointed by M of TIT.
Members represent: 1 from M of Finance,1 from M of TIT, 1 from the field of aviation, 1 from the field of consulting, 1 from the field of transport, 3 from works council.

MANAGING BOARD
2 members
Members appointed by M of TIT.

Austro Control (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Mag. Karin Zipperer

MANAGING BOARD:

Dr. Heinz Sommerbauer
Thomas Hoffmann, MSc

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☑ MET

Operational ATS units (2013)

1 ACC (Wien)
6 APPs (Wien, Graz, Innsbruck, Klagenfurt, Linz, Salzburg)
6 TWRs

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	211
Gate-to-gate total costs (M€)	220
Gate-to-gate ATM/CNS provision costs (M€)	187
Gate-to-gate total ATM/CNS assets(M€)	185
Gate-to-gate ANS total capex (M€)	26
ATCOs in OPS	292
Gate-to-gate total staff	870
Total IFR flight-hours controlled by ANSP ('000)	271
IFR airport movements controlled by ANSP ('000)	338
En-route sectors	12
Minutes of ATFM delays ('000)	333

Size (2013)

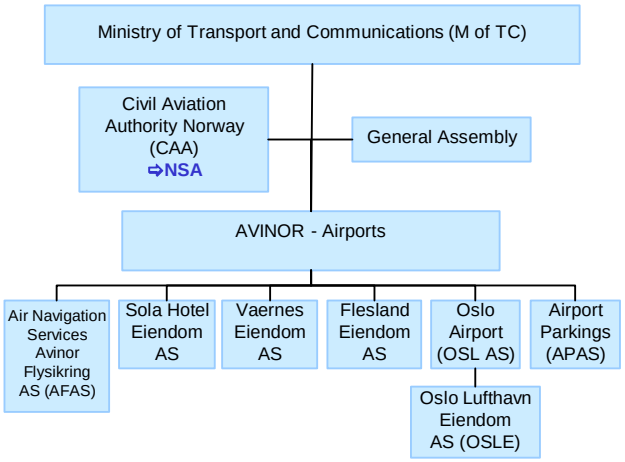
Size of controlled airspace: 79 500 km²

AVINOR, Norway

Avinor Flysikring AS

www.avinor.no

Institutional arrangements and links (2015)



Status (2015)

- State owned limited company.
- Civil ANSP and airport owner/ operator
- Independent of CAA

National Supervisory Authority (NSA):

Civil Aviation Authority Norway (CAA)

Body responsible for:

Safety Regulation

Civil Aviation Authority Norway

Airspace Regulation

Civil Aviation Authority Norway

Economic Regulation

Aeronautic charges are set annually by the Ministry of Transport and Communications

Corporate governance structure (2015)

SUPERVISORY BOARD (10 members)
Chairman + 9 members
Members represent: 6 M of TC, 4 staff

EXECUTIVE BOARD (10 members)
CEO + 9 members
CEO appointed by Supervisory Board

AVINOR (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Ola Mørkved Rinnan

CHIEF EXECUTIVE OFFICER:

Dag Falk-Petersen

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☑ Oceanic ANS
☑ OAT	☑ Lower Airspace	☐ MET

- AVINOR owns and operates 46 airports, 12 in association with Armed Forces

Operational ATS units (2013)

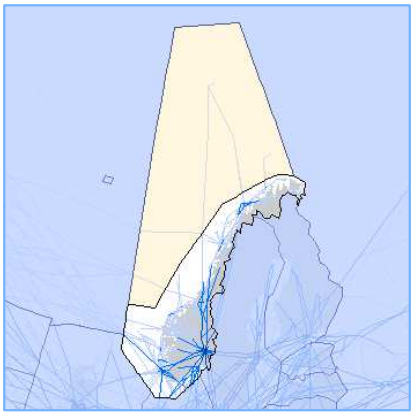
3 ACCs Oslo (ACC + APP), Stavanger (ACC), Bodo (ACC + APP + Oceanic)
17 APPs (1 APP combined with Oslo ACC + 16 TWRs/APPs)
17 TWRs
28 AFISs

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	201
Gate-to-gate total costs (M€)	236
Gate-to-gate ATM/CNS provision costs (M€)	225
Gate-to-gate total ATM/CNS assets(M€)	73
Gate-to-gate ANS total capex (M€)	5
ATCOs in OPS	405
Gate-to-gate total staff	1 038
Total IFR flight-hours controlled by ANSP ('000)	368
IFR airport movements controlled by ANSP ('000)	690
En-route sectors	24
Minutes of ATFM delays ('000)	166

Size (2013)

Size of controlled airspace: 2 174 000 km²



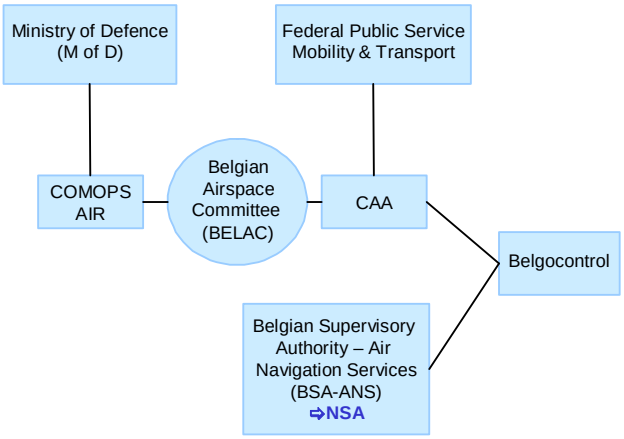
Continental: 724 000 km² - Oceanic:1 450 000 km²

Belgocontrol, Belgium

Belgocontrol

www.belgocontrol.be

Institutional arrangements and links (2015)



Status (2015)

- Public Autonomous Enterprise as of 1998 under a management contract
- 100% State-owned

National Supervisory Authority (NSA):

Belgian Supervisory Authority - Air Navigation Services (BSA-ANS)

Body responsible for:

Safety Regulation

Civil Aviation Authority

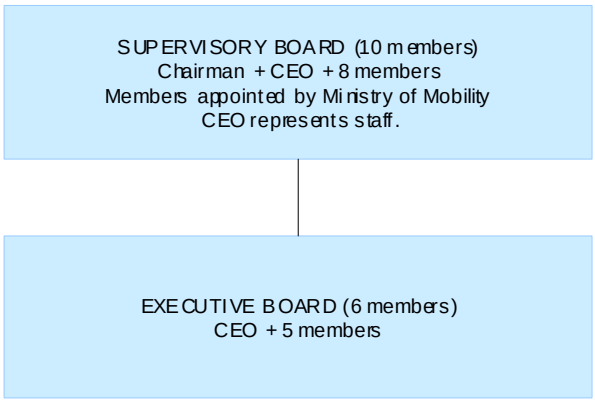
Airspace Regulation

Belgian Airspace Committee

Economic Regulation

Federal Public Service of Mobility and Transport

Corporate governance structure (2015)



Belgocontrol (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Renaud Lorand

DIRECTOR GENERAL (CEO):

Johan Decuyper

Scope of services (2013)

☑ GAT	☐ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☑ MET

- Belgocontrol controls lower airspace up to FL 245, including Luxembourg airspace above FL 145/165
- Upper airspace (> FL 245) is controlled by Maastricht UAC

Operational ATS units (2013)

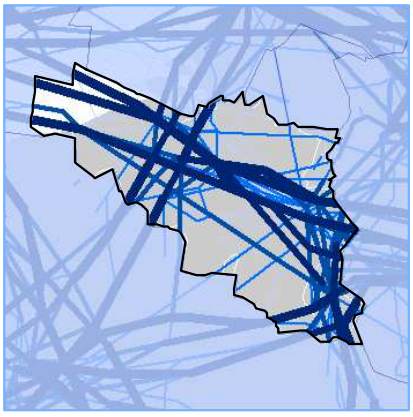
1 ACC (Brussels)
4 APPs (Brussels, Liege, Charleroi, Oostende)
5 TWRs (Brussels, Antwerp, Liege, Charleroi, Oostende)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	199
Gate-to-gate total costs (M€)	225
Gate-to-gate ATM/CNS provision costs (M€)	154
Gate-to-gate total ATM/CNS assets(M€)	126
Gate-to-gate ANS total capex (M€)	5
ATCOs in OPS	226
Gate-to-gate total staff	808
Total IFR flight-hours controlled by ANSP ('000)	106
IFR airport movements controlled by ANSP ('000)	352
En-route sectors	7
Minutes of ATFM delays ('000)	138

Size (2013)

Size of controlled airspace: 39 500 km²

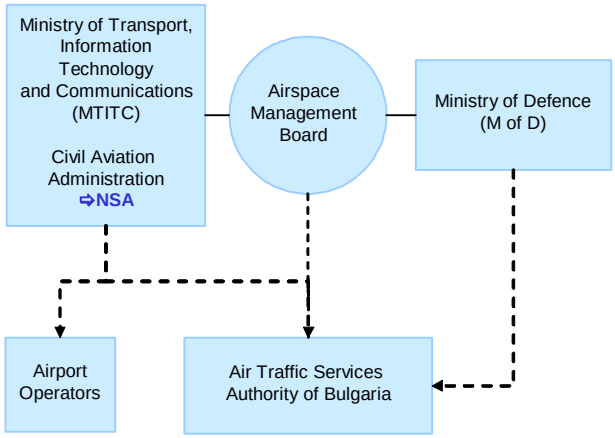


BULATSA, Bulgaria

Bulgarian Air Traffic Services Authority

www.atsa.bg

Institutional arrangements and links (2015)



Status (2015)

- State enterprise as of April 2001 (Art 53 §1 of the Civil Aviation Law)
- 100% State-owned

National Supervisory Authority (NSA):

Civil Aviation Administration

Body responsible for:

Safety Regulation

Civil Aviation Administration (Ministry of Transport, Information Technology and Communications (MTITC))

Airspace Regulation

Airspace Management Board

Economic Regulation

Ministry of Transport, Information Technology and Communications (MTITC)

Corporate governance structure (2015)

MANAGEMENT BOARD (3 members)
DG + 2 members

All members appointed by the MTITC.

BULATSA (2015)

CHAIRMAN OF THE MANAGEMENT BOARD:

Vaselina Karamileva

DIRECTOR GENERAL (CEO):

Georgi Peev

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☑ MET

- Training of ATCOs

Operational ATS units (2013)

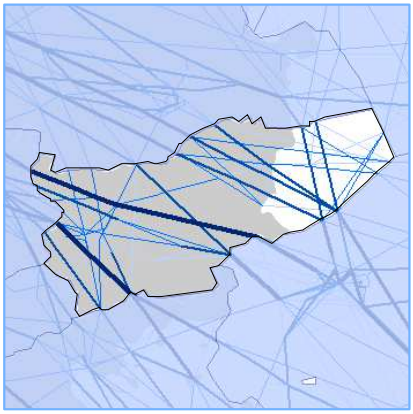
1 ACCs (Sofia)
3 APPs (Sofia, Varna, Burgas)
5 TWRs (Sofia, Varna, Burgas, Gorna Oriahovitza, Plovdiv)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	85
Gate-to-gate total costs (M€)	83
Gate-to-gate ATM/CNS provision costs (M€)	71
Gate-to-gate total ATM/CNS assets(M€)	88
Gate-to-gate ANS total capex (M€)	6
ATCOs in OPS	241
Gate-to-gate total staff	1 107
Total IFR flight-hours controlled by ANSP ('000)	181
IFR airport movements controlled by ANSP ('000)	71
En-route sectors	12
Minutes of ATFM delays ('000)	0

Size (2013)

Size of controlled airspace: 146 000 km²



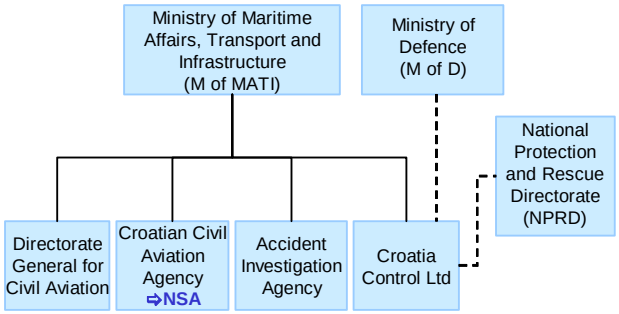
118 000 km² plus 28 000 km² over the Black Sea.

Croatia Control, Croatia

Croatia Control Ltd, Croatian Air Navigation Services

www.crocontrol.hr

Institutional arrangements and links (2015)



Status (2015)

- Limited liability company as of 1st January 2000
- 100% State-owned
- Integrated civil/military ANSP

National Supervisory Authority (NSA):

Croatian Civil Aviation Agency (CCAA)

Body responsible for:

Safety Regulation

Directorate General for Civil Aviation

Airspace Regulation

M of MATI

Economic Regulation

State Law and Croatia Control Ltd

Corporate governance structure (2015)

ASSEMBLY (3 members)
The President represents Ministry of MATI (Minister), the other Two members represent M of D (Minister) and M of F (Minister).

SUPERVISORY BOARD (5 members)
The Chairman + 4 members
The members represent the M of MATI, M of D, M of F, and employees. They are appointed for a 4-year period. The member representing the employees is elected and appointed pursuant to the Company Statute and Labour Relations Act.

MANAGEMENT
Director General
The DG is appointed by the Supervisory Board for a 5-year period, following an open competition and under the conditions stipulated by the Company Statute.

Croatia Control (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Darko Prebežac

DIRECTOR GENERAL:

Dragan Bilać

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☑ OAT	☑ Lower Airspace	☑ MET

- ATS provision within western part of Sarajevo FIR (west of the line: GUBOK-DER-BOSNA-VRANA-VELIT) from FL 325 to FL 660

Operational ATS units (2013)

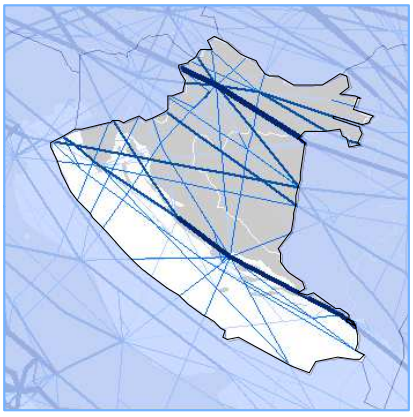
1 ACC (Zagreb)
1 APP (Zagreb)
8 APPs/TWRs (Osijek, Rijeka, Pula, Zadar, Split, Dubrovnik, Brač, Lošinj)
2 TWRs (Lučko, Zagreb)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	82
Gate-to-gate total costs (M€)	88
Gate-to-gate ATM/CNS provision costs (M€)	83
Gate-to-gate total ATM/CNS assets(M€)	83
Gate-to-gate ANS total capex (M€)	12
ATCOs in OPS	222
Gate-to-gate total staff	705
Total IFR flight-hours controlled by ANSP ('000)	195
IFR airport movements controlled by ANSP ('000)	83
En-route sectors	10
Minutes of ATFM delays ('000)	45

Size (2013)

Size of controlled airspace: 158 000 km²

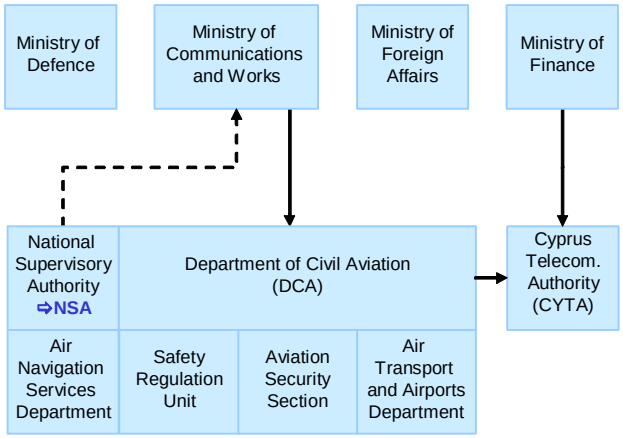


DCAC Cyprus, Cyprus

Department of Civil Aviation of Cyprus

www.mcw.gov.cy

Institutional arrangements and links (2015)



Status (2015)

- State body
- 100% State-owned

National Supervisory Authority (NSA):

Department of Civil Aviation

Body responsible for:

Safety Regulation

Department of Civil Aviation of Cyprus

Airspace Regulation

Department of Civil Aviation of Cyprus

Economic Regulation

Ministry of Finance

Corporate governance structure (2015)

Minister of Communications and Works

Director DCAC, Head of ANS Section, Head of T&A Section, Head of Aviation Security Section and Head of Safety Regulation Unit are nominated by the Civil Service. The Head of the NSA is nominated by the Council of Ministers.

DCAC Cyprus (2015)

DIRECTOR OF DCAC:

Nicos Nicolaou

HEAD OF NSA:

Panayiota Demetriou

HEAD OF SAFETY REGULATION UNIT:

Andreas Parpalides

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

- DCAC Cyprus owns and operates 2 airports

Operational ATS units (2013)

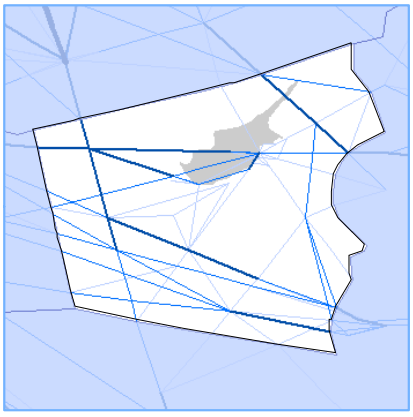
1 ACC (Nicosia)
2 APPs (Larnaca, Paphos)
2 TWRs (Larnaca, Paphos)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	56
Gate-to-gate total costs (M€)	54
Gate-to-gate ATM/CNS provision costs (M€)	37
Gate-to-gate total ATM/CNS assets(M€)	28
Gate-to-gate ANS total capex (M€)	4
ATCOs in OPS	86
Gate-to-gate total staff	189
Total IFR flight-hours controlled by ANSP ('000)	135
IFR airport movements controlled by ANSP ('000)	55
En-route sectors	4
Minutes of ATFM delays ('000)	614

Size (2013)

Size of controlled airspace: 174 000 km²

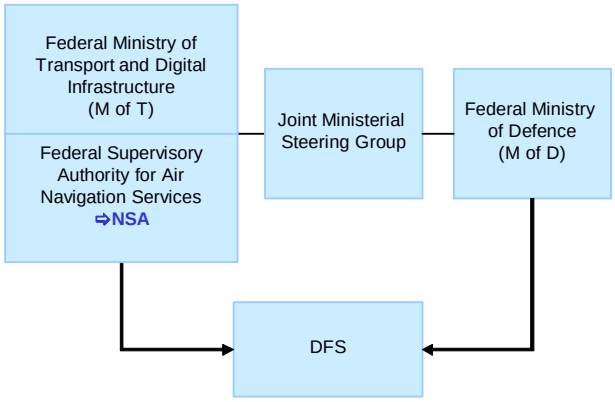


DFS, Germany

Deutsche Flugsicherung GmbH

www.dfs.de

Institutional arrangements and links (2015)



Status (2015)

- Limited liability company as of 1993, governed by Private Company Law
- 100% State-owned
- Integrated civil/military ANSP

National Supervisory Authority (NSA):

Federal Supervisory Authority for Air Navigation Services

Body responsible for:

Safety Regulation

Federal Supervisory Authority for Air Navigation Services (NSA)

Airspace Regulation

Federal Supervisory Authority for Air Navigation Services (NSA)

Economic Regulation

Federal Supervisory Authority for Air Navigation Services (NSA)

Corporate governance structure (2015)

SHAREHOLDER Meeting with M of T

Supervisory Board (12 Members)
Chairman + 11 Members
Chairman is recommended by the Government, elected by the Supervisory Board.
Members represent: 1 (Chairman) from M of T, 1 M of T, 2 M of D, 1 M of F, 1 KFW*, 6 staff reps.
Chairman has a double voting right.

EXECUTIVE BOARD (3 members)
CEO + 2 members
Executive Board is appointed by the Supervisory Board.

* KFW = KFW-Bankengruppe

DFS (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Sts. Michael Odenwald

CHAIRMAN OF THE EXECUTIVE BOARD:

Prof. Klaus-Dieter Scheurle

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☑ OAT	☑ Lower Airspace	☐ MET

- DFS controls both upper and lower airspace, except GAT for the upper airspace in North-Western Gerrmany
- Other ANS
- Consulting, training, engineering & maintenance services

Operational ATS units (2013)

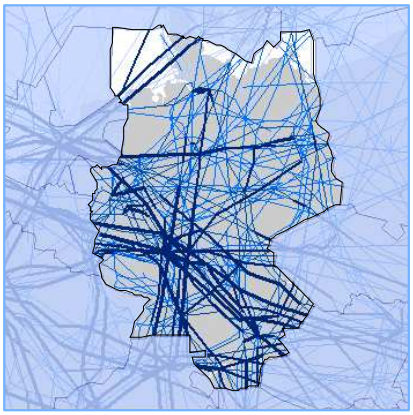
1 UAC (Karlsruhe)
3 ACCs/APPs (Bremen, Langen, München)
1 UAC (co-located with Maastricht UAC) for OAT in upper airspace in North-Western Germany
16 TWRs

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	1 078
Gate-to-gate total costs (M€)	1 020
Gate-to-gate ATM/CNS provision costs (M€)	1 019
Gate-to-gate total ATM/CNS assets(M€)	685
Gate-to-gate ANS total capex (M€)	111
ATCOs in OPS	1 742
Gate-to-gate total staff	5 602
Total IFR flight-hours controlled by ANSP ('000)	1 348
IFR airport movements controlled by ANSP ('000)	1 933
En-route sectors	115
Minutes of ATFM delays ('000)	1 078

Size (2013)

Size of controlled airspace: 388 000 km²

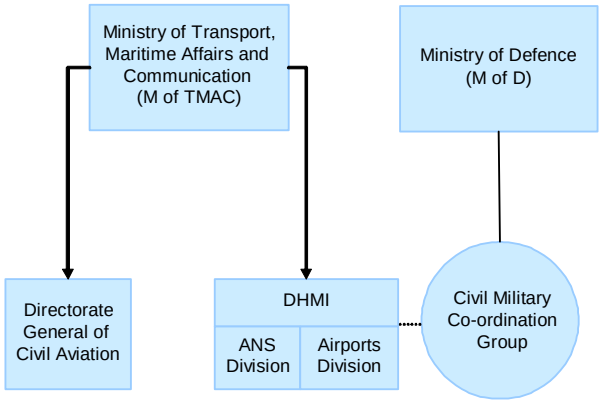


DHMI, Turkey

General Directorate of State Airports Authority

www.dhmi.gov.tr

Institutional arrangements and links (2015)



Status (2015)

- Autonomous State body
- 100% State-owned

National Supervisory Authority (NSA):

Not applicable since Turkey is not bound by SES Regulations

Body responsible for:

Safety Regulation

Directorate General of Civil Aviation

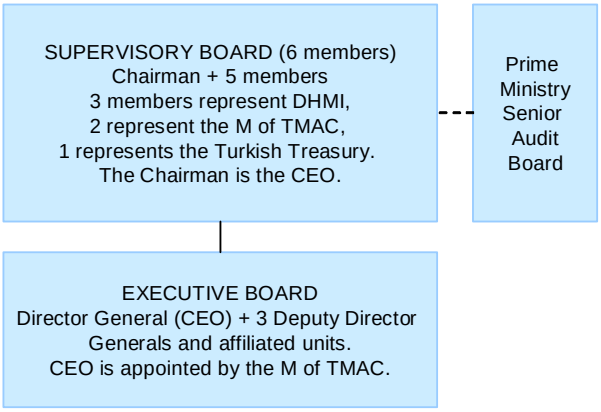
Airspace Regulation

General Directorate of DHMI

Economic Regulation

General Directorate of DHMI

Corporate governance structure (2015)



DHMI (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Mr. Serdar Hüseyin YILDIRIM

DIRECTOR GENERAL (CEO):

Mr. Serdar Hüseyin YILDIRIM

DIRECTOR ANS DIVISION:

Mr. Mustafa Kiliç

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

- DHMI is responsible for the administration of 47 State Airports. ATS services are provided by DHMI in 52 Airports

Operational ATS units (2013)

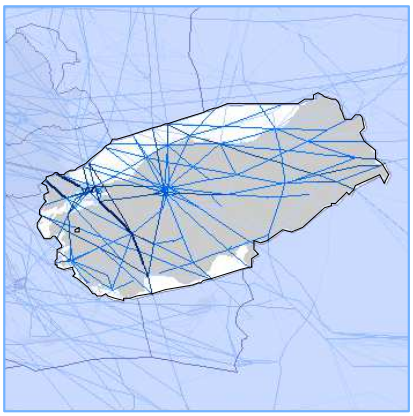
2 ACCs (Ankara, Istanbul)
34 APPs
44 TWRs
2 FICs/RCCs
45 AIS/ARO
43 SAR sub-center units

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	423
Gate-to-gate total costs (M€)	417
Gate-to-gate ATM/CNS provision costs (M€)	371
Gate-to-gate total ATM/CNS assets(M€)	613
Gate-to-gate ANS total capex (M€)	88
ATCOs in OPS	1 048
Gate-to-gate total staff	5 735
Total IFR flight-hours controlled by ANSP ('000)	1 033
IFR airport movements controlled by ANSP ('000)	1 073
En-route sectors	22
Minutes of ATFM delays ('000)	265

Size (2013)

Size of controlled airspace: 982 000 km²

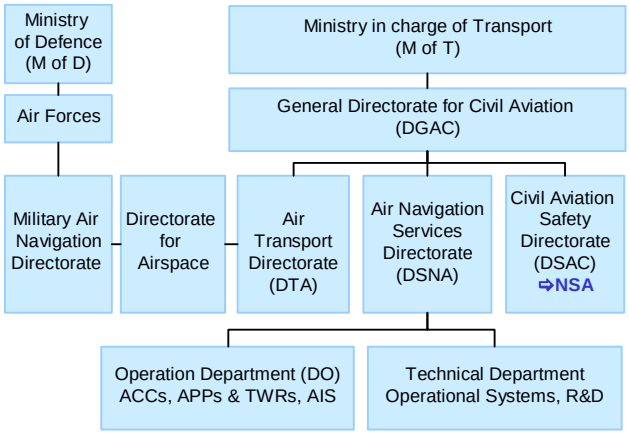


DSNA, France

Directorate of Air Navigation Services

www.aviation-civile.gouv.fr

Institutional arrangements and links (2015)



Status (2015)

- DSNA is a division of DGAC
- 100% State-owned

National Supervisory Authority (NSA):

Directorate for Civil Aviation Safety (DSAC)

Body responsible for:

Safety Regulation

Air Transport Directorate (DTA)

Airspace Regulation

Air Transport Directorate (DTA)
Direction de la circulation aérienne militaire (DIRCAM)

Economic Regulation

Air Transport Directorate (DTA)

Corporate governance structure (2015)

Minister in charge of Transport

Director General for Civil Aviation

EXECUTIVE BOARD (DSNA)
- Director of DSNA
- Deputy Director for Finance
- Deputy Director for Planning & Strategy
- Deputy Director for Human Resources
- Director of Operation Department (DO)
- Director of Technical Department (DTI)

DSNA (2015)

DIRECTOR OF DSNA:

M. Georges

DIRECTOR OF OPERATION DEPARTEMENT (DO):

M. Bruneau

DIRECTOR OF TECHNICAL DEPARTEMENT (DTI):

P. Planchon

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

- Delegation of airspace to Skyguide and Jersey

Operational ATS units (2013)

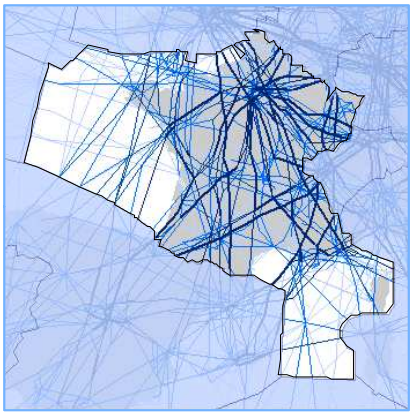
5 ACCs
12 APPs/TWRs (i.e. Paris Orly, Paris CDG, Marseille, Lyon, Nice, Bordeaux, Toulouse, Clermont Ferrand, Montpellier, Strasbourg, Bâle-Mulhouse, Nantes)
69 TWRs

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	1 455
Gate-to-gate total costs (M€)	1 447
Gate-to-gate ATM/CNS provision costs (M€)	1 179
Gate-to-gate total ATM/CNS assets(M€)	760
Gate-to-gate ANS total capex (M€)	126
ATCOs in OPS	2 732
Gate-to-gate total staff	7 854
Total IFR flight-hours controlled by ANSP ('000)	2 121
IFR airport movements controlled by ANSP ('000)	1 890
En-route sectors	100
Minutes of ATFM delays ('000)	1 995

Size (2013)

Size of controlled airspace: 1 010 000 km²



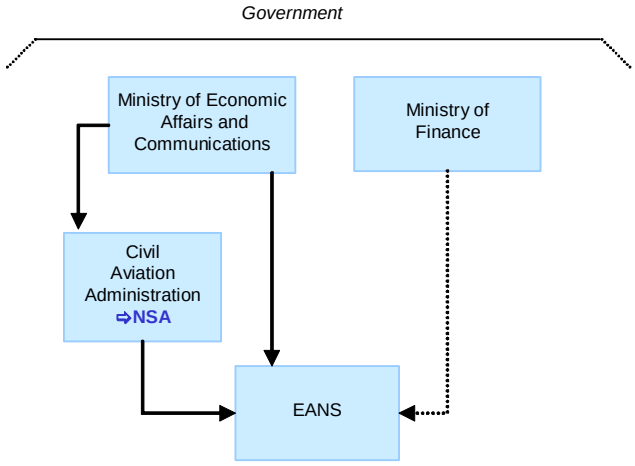
EANS, Estonia

Estonian Air Navigation Services

www.eans.ee

LENNULIIKLUSTEENINDUSE AS
ESTONIAN AIR NAVIGATION SERVICES

Institutional arrangements and links (2015)



Status (2015)

- Joint-stock company as of 1998
- 100% State-owned

National Supervisory Authority (NSA):

Civil Aviation Administration

Body responsible for:

Safety Regulation

Government of the Republic of Estonia
Safety Supervision is done by the Civil Aviation Administration (CAA)

Airspace Regulation

Government of the Republic of Estonia

Economic Regulation

Government of the Republic of Estonia
(Ministry of Economic Affairs and Communications & Ministry of Finance)

Corporate governance structure (2015)

SUPERVISORY BOARD (6 members)
Chairman + 5 members
Members: 3 appointed by M of EC of which 1 is elected Chairman by the members of the Supervisory Board;
3 appointed by M of F.

MANAGEMENT BOARD (3 members)
CEO + 2 members
CEO appointed by the Supervisory Board

EANS (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Andres Uusma

CHAIRMAN OF THE MANAGEMENT BOARD & CEO:

Tanel Rautits

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

- Tech. serv. (NAV/COMM/SUR), Aeronautical info serv.
- Consultancy services
- Control Tallinn Aerodrome
- Estonia is member of EUROCONTROL since 1st of January 2015

Operational ATS units (2013)

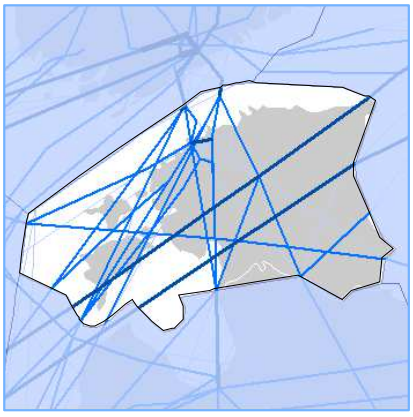
1 ACC (Tallinn)
2 APPs/TWRs (Tallinn, Tartu)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	18
Gate-to-gate total costs (M€)	15
Gate-to-gate ATM/CNS provision costs (M€)	15
Gate-to-gate total ATM/CNS assets(M€)	18
Gate-to-gate ANS total capex (M€)	1
ATCOs in OPS	50
Gate-to-gate total staff	158
Total IFR flight-hours controlled by ANSP ('000)	63
IFR airport movements controlled by ANSP ('000)	36
En-route sectors	3
Minutes of ATFM delays ('000)	3

Size (2013)

Size of controlled airspace: 77 300 km²

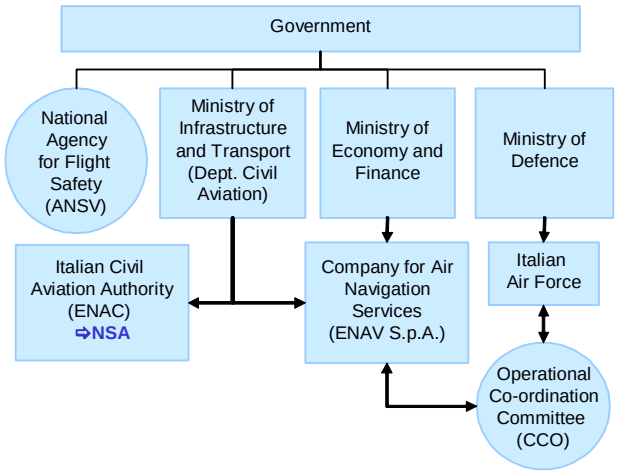


ENAV, Italy

Company for Air Navigation Services

www.enav.it

Institutional arrangements and links (2015)



Status (2015)

- Joint-Stock Company
- 100% State-owned by Ministry of Economy and Finance

National Supervisory Authority (NSA):

Italian Civil Aviation Authority (ENAC)

Body responsible for:

Safety Regulation

Italian Civil Aviation Authority (ENAC) and Ministry of Infrastructure and Transport (M of IT)

Airspace Regulation

Italian Civil Aviation Authority (ENAC)

Economic Regulation

Ministry of Infrastructure and Transport and ENAC review annually ANS charges in co-operation with Ministry of Economy and Finance and Ministry of Defence

Corporate governance structure (2015)

ADMINISTRATION BOARD:

Chairman + 2 members

The Administration Board has been appointed by the Ministry of Economy and Finance in consultation with the Ministry of Infrastructure and Transport.

Reciprocal obligations between the Ministry of Infrastructure and Transport and ENAV are Regulated through programme contract and service contract.

ENAV (2015)

CHAIRMAN:

Maria Teresa Di Matteo

MEMBERS OF THE ADMINISTRATION BOARD:

Nicola Maione
Alessandro Tonetti

DIRECTOR GENERAL:

Massimo Bellizzi

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☑ MET

- AIS, ATM and CNS
- Training and licensing of ATCO's
- R&D consultancy services
- Cartography and Airspace design
- Aerodrome weather services, Flight Calibration services

Operational ATS units (2013)

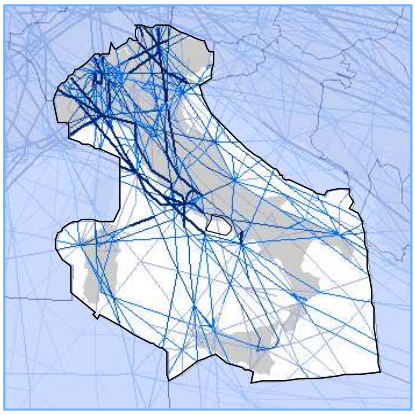
4 ACCs (Milan, Padua, Rome, Brindisi)
18 APPs co-located within TWR units + 1 APP stand-alone + 4 APPs co-located within ACC units
28 TWRs (including 16 low traffic airports which are not included in ACE data analysis)
11 AFIUs (low traffic airports not included in ACE data analysis)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	782
Gate-to-gate total costs (M€)	725
Gate-to-gate ATM/CNS provision costs (M€)	647
Gate-to-gate total ATM/CNS assets(M€)	969
Gate-to-gate ANS total capex (M€)	92
ATCOs in OPS	1 409
Gate-to-gate total staff	3 009
Total IFR flight-hours controlled by ANSP ('000)	1 001
IFR airport movements controlled by ANSP ('000)	1 050
En-route sectors	61
Minutes of ATFM delays ('000)	118

Size (2013)

Size of controlled airspace: 733 000 km²

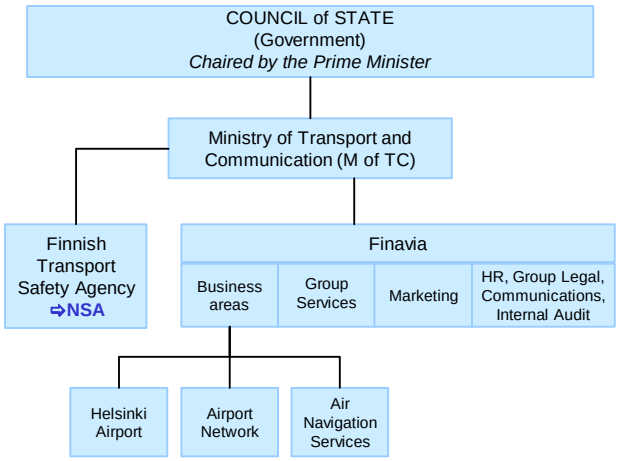


Finavia, Finland

Finavia

www.finavia.fi

Institutional arrangements and links (2015)



Status (2015)

- Public Limited Company
- Integrated civil/military ANSP
- 100% State-owned

National Supervisory Authority (NSA):

Finnish Transport Safety Agency

Body responsible for:

Safety Regulation

Finnish Transport Safety Agency

Airspace Regulation

Finnish Transport Safety Agency

Economic Regulation

Finnish Transport Safety Agency

Corporate governance structure (2015)

The BOARD (7 members)
Chairman + 6 members (1 member represents staff)
All members are appointed
by the General Meeting of Shareholders.
Chief Executive Officer of Finavia is not a member of the Board.

President and CEO

Finavia (2015)

CHAIRMAN OF THE FINAVIA BOARD:

Ritta Tiuraniemi (as of 14.01.2015)

PRESIDENT AND CEO:

Kari Savolainen

VICE PRESIDENT - AIR NAVIGATION SERVICES:

Raine Luojus

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☑ OAT	☑ Lower Airspace	☐ MET

- Finavia owns and operates 25 airports
- Delegation of ATS in certain areas to LFV and Avinor
- 189 ATCOs in OPS reported below do not include those providing services to military OAT flights

Operational ATS units (2013)

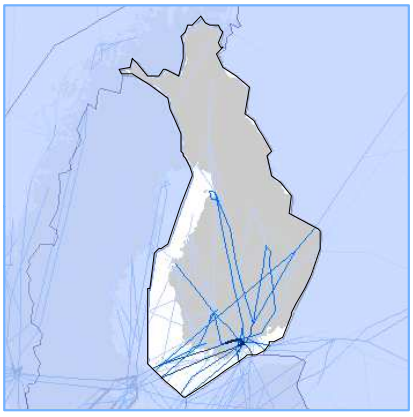
1 ACC (Tampere)
5 APPs/TWRs (Helsinki, Jyväskylä, Kuopio, Tampere-Pirkkala, Rovaniemi)
3 Mil-APPs/TWRs (Halli, Kauhava, Utti)
10 TWRs
1 General Aviation Airport (Malmi)
6 AFISs (Enontekiö, Kittilä, Kajaani, Savonlinna, Kuusamo, Varkaus)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	57
Gate-to-gate total costs (M€)	71
Gate-to-gate ATM/CNS provision costs (M€)	64
Gate-to-gate total ATM/CNS assets(M€)	40
Gate-to-gate ANS total capex (M€)	4
ATCOs in OPS	189
Gate-to-gate total staff	392
Total IFR flight-hours controlled by ANSP ('000)	107
IFR airport movements controlled by ANSP ('000)	233
En-route sectors	5
Minutes of ATFM delays ('000)	5

Size (2013)

Size of controlled airspace: 411 000 km²

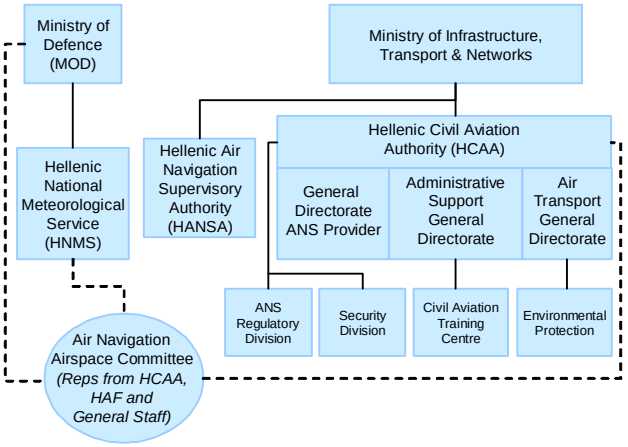


HCAA, Greece

Hellenic Civil Aviation Authority

www.hcaa.gr

Institutional arrangements and links (2015)



Status (2015)

- State body
- 100% State-owned

National Supervisory Authority (NSA):

Hellenic Air Navigation Supervisory Authority (HANSA)

Body responsible for:

Safety Regulation

Hellenic Civil Aviation Authority

Airspace Regulation

Air Navigation Airspace Committee

Economic Regulation

Ministry of Infrastructure, Transport & Networks and HCAA for charges

Ministry of Finance for HCAA Budget

Corporate governance structure (2015)

Minister of Infrastructure, Transport & Networks

HCAA Governor and two HCAA Deputy Governors appointed by the Minister

Three Directors General, one of which is responsible for central and regional HCAA/ANS units

HCAA (2015)

GOVERNOR:

D. Koukis

DEPUTY GOVERNORS:

G. Nanidis
V. Alevras

DIRECTOR GENERAL OF AIR NAVIGATION:

G. Kontogiannis

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

Operational ATS units (2013)

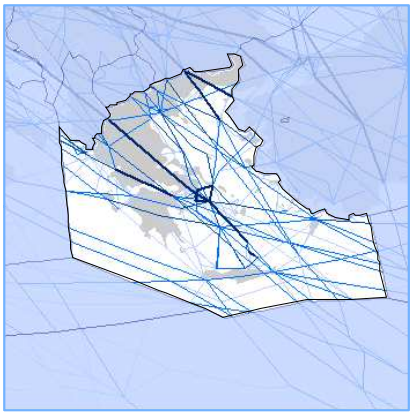
1 ACC
16 APPs
18 TWRs
15 AFISs

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	160
Gate-to-gate total costs (M€)	167
Gate-to-gate ATM/CNS provision costs (M€)	149
Gate-to-gate total ATM/CNS assets(M€)	105
Gate-to-gate ANS total capex (M€)	2
ATCOs in OPS	480
Gate-to-gate total staff	1 725
Total IFR flight-hours controlled by ANSP ('000)	446
IFR airport movements controlled by ANSP ('000)	135
En-route sectors	12
Minutes of ATFM delays ('000)	191

Size (2013)

Size of controlled airspace: 538 000 km²



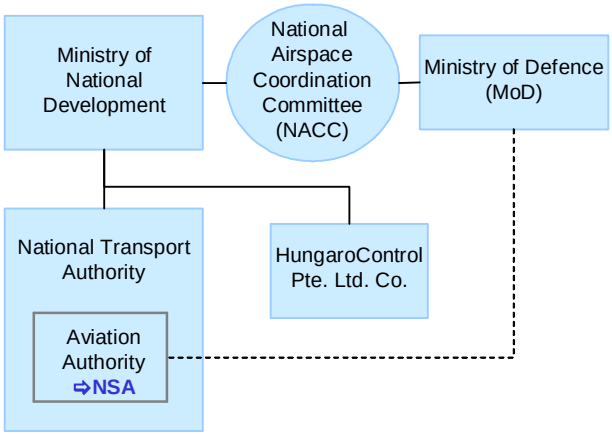
HungaroControl, Hungary

Hungarian Air Navigation Services

www.hungarocontrol.hu

HungaroControl
Hungarian Air Navigation Services Pte. Ltd. Co.

Institutional arrangements and links (2015)



Status (2015)

- HungaroControl was set up on January 1st 2002
- Registered as Private Limited Company as of 22 November 2006
- Operates as a Private Limited Company as of 1st January 2007
- 100% State-owned

Note: This Fact Sheet reflects the situation as of 24.02.2015

National Supervisory Authority (NSA):

Aviation Authority

Body responsible for:

Safety Regulation

Ministry of National Development

Airspace Regulation

Govt., Ministry of National Development

Economic Regulation

Govt., Ministry of National Development

Corporate governance structure (2015)

SHAREHOLDER
The Minister responsible for transport exercises the rights of the shareholder on behalf of the State

SUPERVISORY BOARD
President + 5 members
The President and all members are appointed by the Minister responsible for transport
2 members are representatives of the employees

BOARD OF DIRECTORS
5 members including CEO
All members appointed by the Minister responsible for transport

CHIEF EXECUTIVE OFFICER
The CEO is appointed by the Minister responsible for transport

HungaroControl (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

dr. Alex Bozóky

CHAIRMAN OF THE BOARD OF DIRECTORS:

Attila Márton

CHIEF EXECUTIVE OFFICER (CEO):

Kornél Szepessy

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☑ MET

- Entry Point Central Ltd. (49% HungaroControl owned company) provides training activities.
- HungaroControl provides ATM unit training.
- From 3rd of April 2014 HungaroControl provides air traffic services in the KFOR sector.

Operational ATS units (2013)

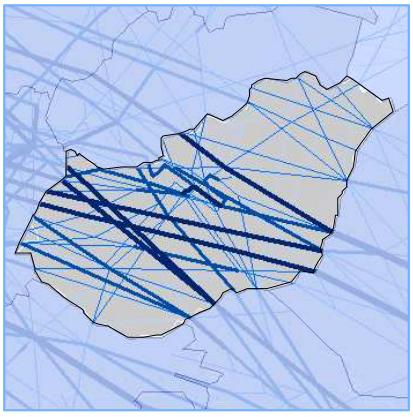
1 ACC (Budapest)
1 APP (Budapest)
1 TWR (Budapest)
8 AFISs

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	112
Gate-to-gate total costs (M€)	101
Gate-to-gate ATM/CNS provision costs (M€)	91
Gate-to-gate total ATM/CNS assets(M€)	68
Gate-to-gate ANS total capex (M€)	10
ATCOs in OPS	171
Gate-to-gate total staff	714
Total IFR flight-hours controlled by ANSP ('000)	189
IFR airport movements controlled by ANSP ('000)	84
En-route sectors	7
Minutes of ATFM delays ('000)	1

Size (2013)

Size of controlled airspace: 92 900 km²

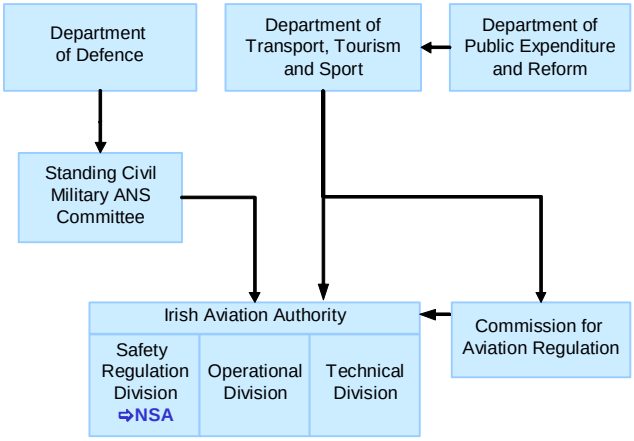


IAA, Ireland

Irish Aviation Authority

www.iaa.ie

Institutional arrangements and links (2015)



Status (2015)

- Commercial company as of 1994 governed by Companies Acts, 1963 to 2009
- 100% State-owned (Department of Public Expenditure and Reform) - IAA receives no funding or loans from the exchequer

National Supervisory Authority (NSA):

Safety Regulation Division

Body responsible for:

Safety Regulation

IAA Safety Regulation Division

Airspace Regulation

IAA Safety Regulation Division

Economic Regulation

NSA responsible for Economic Regulation in the context of en-route charges

Commission for Aviation Regulation (established under the Aviation Regulation Act in 2001)

The Act requires the Commission to make a determination specifying the maximum levels of terminal navigation charges

Corporate governance structure (2015)

BOARD OF THE AUTHORITY (9 members)
Chairman + CEO + 7 members

EXECUTIVE BOARD (Senior Management Board)
(8 members)
CEO + 7 senior executives

IAA (2015)

CHAIRMAN OF THE BOARD OF AUTHORITY:

Anne Nolan

CHIEF EXECUTIVE OFFICER:

Eamonn Brennan

DIRECTOR OF OPERATIONS DIVISION:

Peter Kearney

DIRECTOR OF TECHNICAL DIVISION:

Philip Hughes

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☑ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

Operational ATS units (2013)

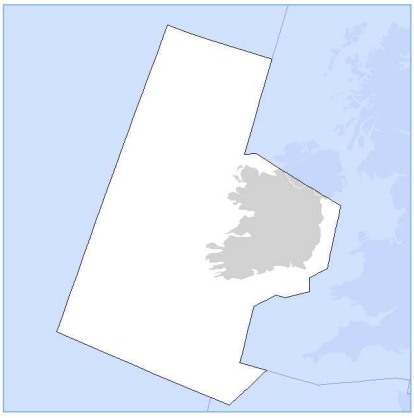
2 ACCs (Dublin, Shannon)
3 APPs (Dublin, Shannon, Cork)
3 TWRs (Dublin, Shannon, Cork)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	129
Gate-to-gate total costs (M€)	128
Gate-to-gate ATM/CNS provision costs (M€)	108
Gate-to-gate total ATM/CNS assets(M€)	83
Gate-to-gate ANS total capex (M€)	9
ATCOs in OPS	204
Gate-to-gate total staff	452
Total IFR flight-hours controlled by ANSP ('000)	267
IFR airport movements controlled by ANSP ('000)	214
En-route sectors	12
Minutes of ATFM delays ('000)	10

Size (2013)

Size of controlled airspace: 457 000 km²

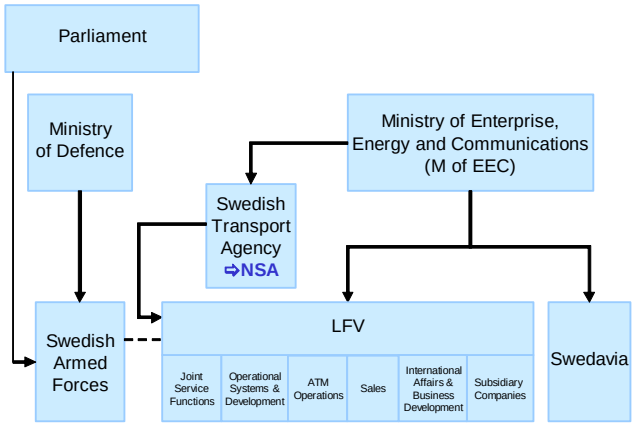


LFV, Sweden

LFV, Swedish Air Navigation Services

www.lfv.se

Institutional arrangements and links (2015)



Status (2015)

- Public Enterprise
- 100% State-owned

National Supervisory Authority (NSA):

Swedish Transport Agency

Body responsible for:

Safety Regulation

Swedish Transport Agency

Airspace Regulation

Swedish Transport Agency

Economic Regulation

Swedish Transport Agency

Corporate governance structure (2015)

BOARD OF DIRECTORS (10 members)
Chairman + DG + 8 members
8 members are appointed by the Government
(Chairman + DG + 6 members)
2 members appointed by Trade Unions

EXECUTIVE BOARD (9 members)
DG + 8 members
DG is appointed by the Government

LFV (2015)

CHAIRMAN OF THE BOARD OF DIRECTORS:

Jan Olson

DIRECTOR GENERAL:

Olle Sundin

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☑ OAT	☑ Lower Airspace	☑ MET

Operational ATS units (2013)

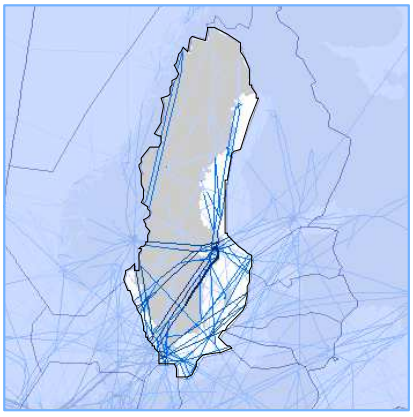
2 ACCs (Stockholm and Malmö)
25 APPs (2 APPs combined with ACCs, 23 APPs combined with TWRs)
30 TWRs
1 AFIS

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	222
Gate-to-gate total costs (M€)	206
Gate-to-gate ATM/CNS provision costs (M€)	202
Gate-to-gate total ATM/CNS assets(M€)	150
Gate-to-gate ANS total capex (M€)	10
ATCOs in OPS	508
Gate-to-gate total staff	1 023
Total IFR flight-hours controlled by ANSP ('000)	419
IFR airport movements controlled by ANSP ('000)	517
En-route sectors	22
Minutes of ATFM delays ('000)	68

Size (2013)

Size of controlled airspace: 626 000 km²

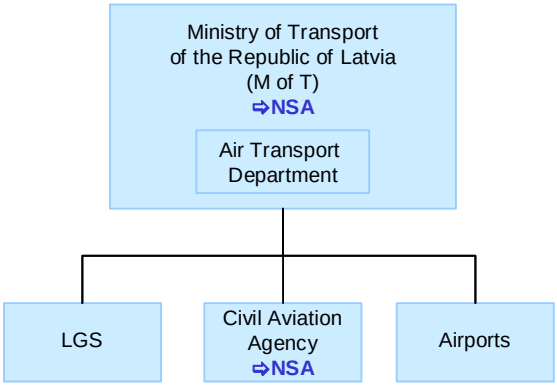


LGS, Latvia

SJSC Latvijas Gaisa Satiksme

www.lgs.lv

Institutional arrangements and links (2015)



Status (2015)

- Joint-stock company since 1997
- 100% State-owned (Ministry of Transport)

National Supervisory Authority (NSA):

- MoT (for policy and economic issues)
- Civil Aviation Agency (for safety, operational aspects, certification and licensing issues)

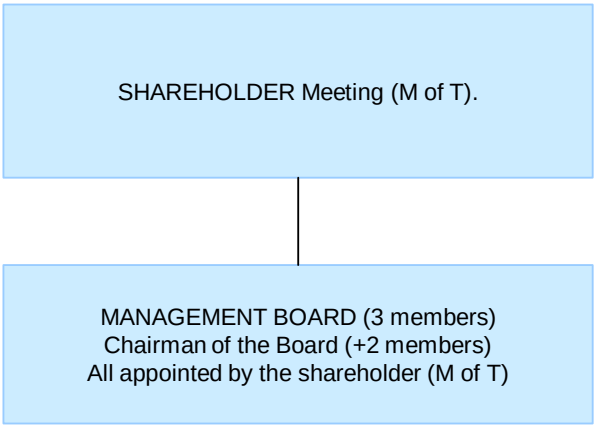
Body responsible for:

Safety Regulation
Civil Aviation Agency

Airspace Regulation
Civil Aviation Agency

Economic Regulation
Air Transport Department and Cabinet of Ministers (Government)

Corporate governance structure (2015)



LGS (2015)

SHAREHOLDER'S REPRESENTATIVE:
Dzineta Innusa (Ministry of Transport, Deputy State Secretary for Legal and Administrative Affairs)

CHAIRMAN OF THE BOARD:
Davids Taurins

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☑ MET

- ATC services delegated to Latvia by Lithuania over a part of the Baltic Sea

Operational ATS units (2013)

1 ACC (Riga)
2 APPs (Riga, Liepaja)
2 TWRs (Riga, Liepaja)
1 AFIS/FIC* (Liepaja)

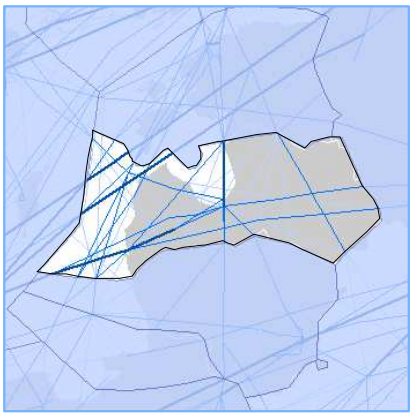
*FIC for western part of Riga FIR

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	24
Gate-to-gate total costs (M€)	25
Gate-to-gate ATM/CNS provision costs (M€)	22
Gate-to-gate total ATM/CNS assets(M€)	21
Gate-to-gate ANS total capex (M€)	4
ATCOs in OPS	88
Gate-to-gate total staff	368
Total IFR flight-hours controlled by ANSP ('000)	74
IFR airport movements controlled by ANSP ('000)	67
En-route sectors	4
Minutes of ATFM delays ('000)	0

Size (2013)

Size of controlled airspace: 95 600 km²

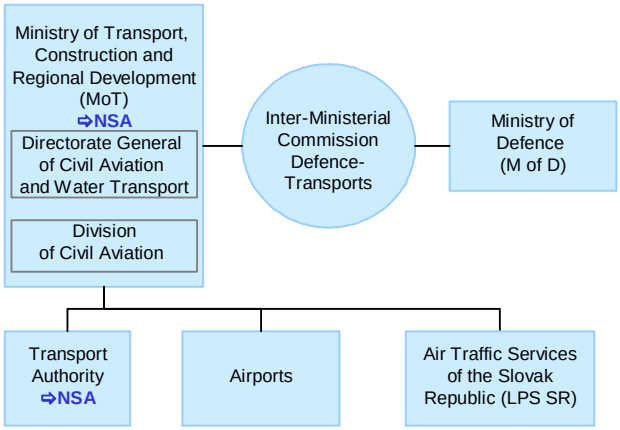


LPS, Slovak Republic

Letové Prevádzkové Služby Slovenskej Republiky

www.lps.sk

Institutional arrangements and links (2015)



Status (2015)

- State-owned enterprise as of January 2000
- 100% State-owned

National Supervisory Authority (NSA):

Transport Authority

Body responsible for:

Safety Regulation

Ministry of Transport, Construction and Regional Development

Airspace Regulation

Ministry of Transport, Construction and Regional Development

Economic Regulation

Ministry of Transport, Construction and Regional Development and other State bodies

Corporate governance structure (2015)

SUPERVISORY BOARD (9 members)
Chairman + 8 members
Members represent: 5 MoT,
3 staff reps., 1 trade union association rep.

EXECUTIVE BOARD (10 members)
CEO + 9 members
The CEO is appointed by the MoT.

LPS (2015)

CHAIRPERSON OF THE SUPERVISORY BOARD:

Martin Čatloš

DIRECTOR GENERAL (CEO):

Miroslav Bartoš

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

With effect from 10 February 2014, the OAT unit was shifted from LPS to the supervision of Ministry of Defence.

Operational ATS units (2013)

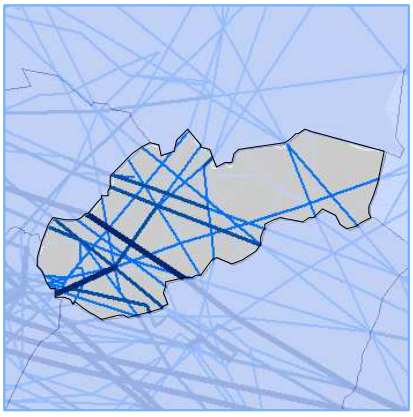
1 ACC (Bratislava)
2 APPs (Bratislava, Kosice)
5 TWRs (Bratislava, Kosice, Piestany, Poprad and Zilina)
1 Central ATS Reporting Office (Bratislava)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	66
Gate-to-gate total costs (M€)	65
Gate-to-gate ATM/CNS provision costs (M€)	58
Gate-to-gate total ATM/CNS assets(M€)	59
Gate-to-gate ANS total capex (M€)	4
ATCOs in OPS	87
Gate-to-gate total staff	466
Total IFR flight-hours controlled by ANSP ('000)	88
IFR airport movements controlled by ANSP ('000)	27
En-route sectors	5
Minutes of ATFM delays ('000)	0

Size (2013)

Size of controlled airspace: 48 700 km²

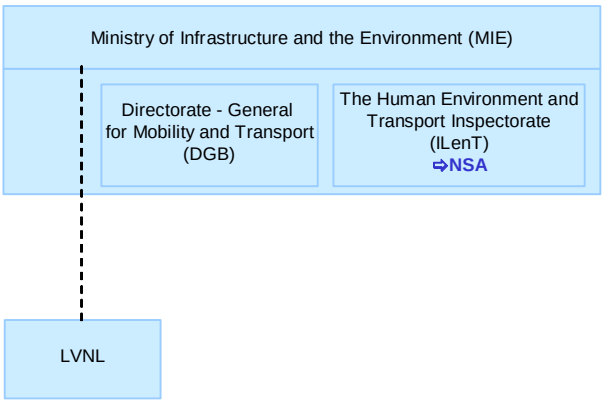


LVNL, Netherlands

Luchtverkeersleiding Nederland

www.lvnl.nl

Institutional arrangements and links (2015)



Status (2015)

- Corporate Entity as of 1993 (by Air Traffic Law)
- 100% State-owned

National Supervisory Authority (NSA):

The Human Environment and Transport Inspectorate (ILenT)

Body responsible for:

Safety Regulation

Directorate-General for Mobility and Transport (DGB)

Airspace Regulation

Directorate-General for Mobility and Transport (DGB)

Economic Regulation

Directorate-General for Mobility and Transport (DGB)

Corporate governance structure (2015)

SUPERVISORY DIRECTORS BOARD (6 members)
Chairman + 5 members + 1 observer
Members comprise representatives from: Ministry of Defence, and members nominated by Dutch scheduled airlines (KLM), Dutch charter airlines (Transavia) and Dutch airports (Amsterdam Schiphol)

EXECUTIVE BOARD (2 members)
Chairman + 1 member
Executive Board of LVNL is appointed by the MIE, on the recommendation of the Supervisory Board.

LVNL (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

G.J.N.H. Cerfontaine

CHAIRMAN OF THE EXECUTIVE BOARD (CEO):

Dr.ir. P. Riemens (CEO)

Scope of services (2013)

☑ GAT	☐ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

- Controls lower airspace up to FL 245

Operational ATS units (2013)

1 ACC (Amsterdam)
3 APPs (Schiphol, Eelde, Beek)
4 TWRs (Schiphol, Rotterdam, Eelde, Beek)

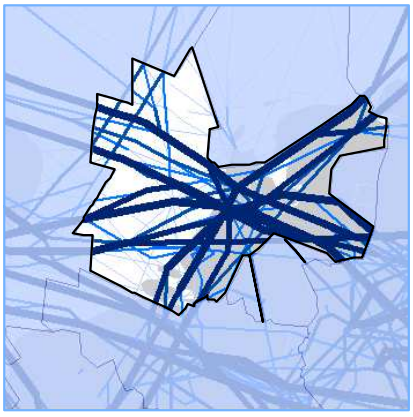
- New Millingen ACC (Military ACC) is not included in ACE data analysis
- Rotterdam APP has been located in Schiphol since 2002

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	185
Gate-to-gate total costs (M€)	172
Gate-to-gate ATM/CNS provision costs (M€)	166
Gate-to-gate total ATM/CNS assets(M€)	106
Gate-to-gate ANS total capex (M€)	14
ATCOs in OPS	203
Gate-to-gate total staff	892
Total IFR flight-hours controlled by ANSP ('000)	151
IFR airport movements controlled by ANSP ('000)	485
En-route sectors	5
Minutes of ATFM delays ('000)	352

Size (2013)

Size of controlled airspace: 52 200 km²

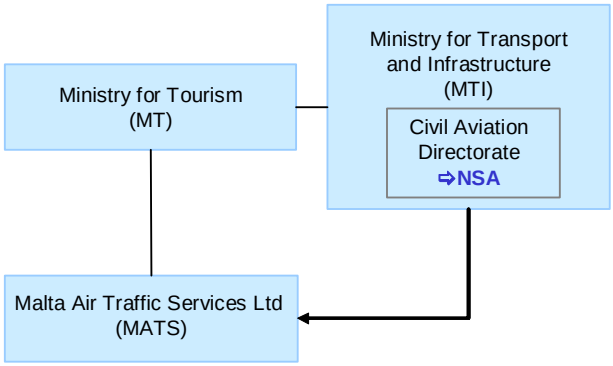


MATS, Malta

Malta Air Traffic Services Limited

www.maltats.com

Institutional arrangements and links (2015)



Status (2015)

- Malta Air Traffic Services Ltd (Reg. no. C27965) is a fully Government owned company. MATS has been operating as the sole ANSP for Malta since the 1st January 2002

National Supervisory Authority (NSA):

Civil Aviation Directorate Malta (CADM)

Body responsible for:

Safety Regulation

Civil Aviation Directorate

Airspace Regulation

Civil Aviation Directorate

Economic Regulation

Civil Aviation Directorate

Corporate governance structure (2015)

BOARD of DIRECTORS (3 members)
Chairman + 2 Directors
Members are appointed by the Government

The Board of Directors appoints the CEO

MATS (2015)

CHAIRMAN OF BOARD OF DIRECTORS:

Maj. Tony Abela

CEO:

Brig. Carmel Vassallo

HEAD OF ATS DIVISION:

Mr. Robert Sant

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

- MATS controls portions of airspace delegated to Malta ACC by Rome ACC

Operational ATS units (2013)

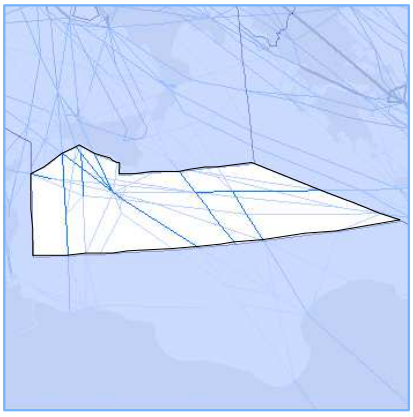
1 ACC/APP (Malta)
1 TWR/APP (Luqa)
1 AFIS

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	22
Gate-to-gate total costs (M€)	16
Gate-to-gate ATM/CNS provision costs (M€)	14
Gate-to-gate total ATM/CNS assets(M€)	13
Gate-to-gate ANS total capex (M€)	9
ATCOs in OPS	54
Gate-to-gate total staff	144
Total IFR flight-hours controlled by ANSP ('000)	68
IFR airport movements controlled by ANSP ('000)	36
En-route sectors	2
Minutes of ATFM delays ('000)	0

Size (2013)

Size of controlled airspace: 231 000 km²

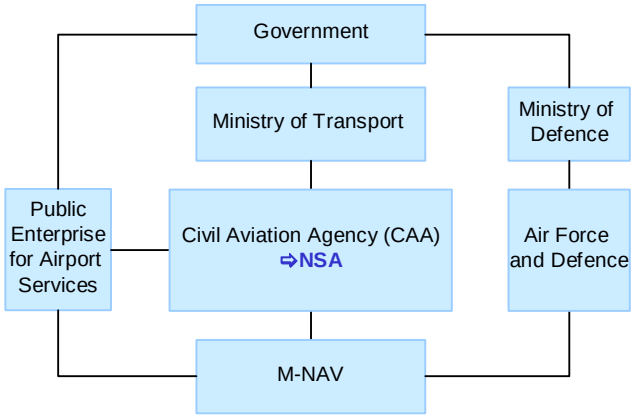


M-NAV, Former Yugoslav Republic of Macedonia

Air Navigation Services

www.mnavigation.mk

Institutional arrangements and links (2015)



Status (2015)

- Joint-stock company
- 100% State-owned

National Supervisory Authority (NSA):

Civil Aviation Agency (CAA)

Body responsible for:

Safety Regulation

Safety Dept. of Civil Aviation Agency

Airspace Regulation

Civil-military Aviation Committee

Economic Regulation

Government, Civil Aviation Agency

Corporate governance structure (2015)

SUPERVISORY BOARD
(3 members appointed by the Government)

MANAGEMENT BOARD
(3 executive directors appointed by the Government)

M-NAV (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Ilir Mehmedi

DIRECTOR GENERAL OF CAA:

Goran Jandreoski

DIRECTOR OF ANS DEPARTEMENT:

Nikolet Tagarinski

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☑ OAT	☑ Lower Airspace	☑ MET

Operational ATS units (2013)

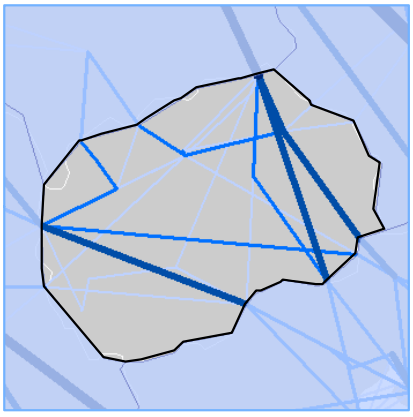
1 ACC (Skopje)
2 APPs (Skopje and Ohrid)
2 TWRs (Skopje and Ohrid)
1 AFIS (Skopje)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	10
Gate-to-gate total costs (M€)	11
Gate-to-gate ATM/CNS provision costs (M€)	10
Gate-to-gate total ATM/CNS assets(M€)	7
Gate-to-gate ANS total capex (M€)	0
ATCOs in OPS	61
Gate-to-gate total staff	267
Total IFR flight-hours controlled by ANSP ('000)	18
IFR airport movements controlled by ANSP ('000)	12
En-route sectors	3
Minutes of ATFM delays ('000)	0

Size (2013)

Size of controlled airspace: 24 700 km²

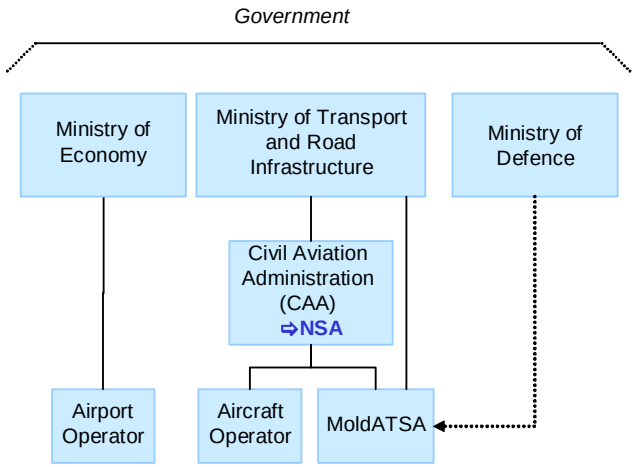


MoldATSA, Moldova

Moldavian Air Traffic Services Authority

www.moldatsa.md

Institutional arrangements and links (2015)



Status (2015)

- State enterprise since 1994 (by Government Regulation Nr.3 from 12.01.1994)
- 100% State-owned

National Supervisory Authority (NSA):

Civil Aviation Administration (CAA)

Body responsible for:

Safety Regulation

Ministry of Transport and Road Infrastructure

Airspace Regulation

Ministry of Transport and Road Infrastructure

Economic Regulation

Ministry of Transport and Road Infrastructure

Corporate governance structure (2015)

SUPERVISORY BOARD (7 members)
Chairman + 6 members
All members are appointed by the Ministry of Transport and Road Infrastructure
Members represent Ministry of Transport and Road Infrastructure (2), MoldATSA management (1), Ministry of Finance (2), Ministry of Economy (2)

Management Board:
Director General MoldATSA

MoldATSA (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Vasile Railean

DIRECTOR GENERAL (CEO):

Veaceslav Frunze

HEAD OF ATM DIVISION:

Sergei Fedoseev

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☑ OAT	☑ Lower Airspace	☑ MET

Operational ATS units (2013)

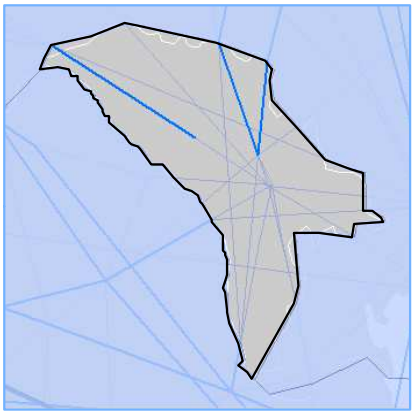
1 ACC (Chisinau)
1 APP (Chisinau)
4 TWRs (Chisinau, Balti, Cahul, Marculesti)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	13
Gate-to-gate total costs (M€)	12
Gate-to-gate ATM/CNS provision costs (M€)	10
Gate-to-gate total ATM/CNS assets(M€)	9
Gate-to-gate ANS total capex (M€)	5
ATCOs in OPS	60
Gate-to-gate total staff	331
Total IFR flight-hours controlled by ANSP ('000)	18
IFR airport movements controlled by ANSP ('000)	17
En-route sectors	2
Minutes of ATFM delays ('000)	0

Size (2013)

Size of controlled airspace: 34 100 km²

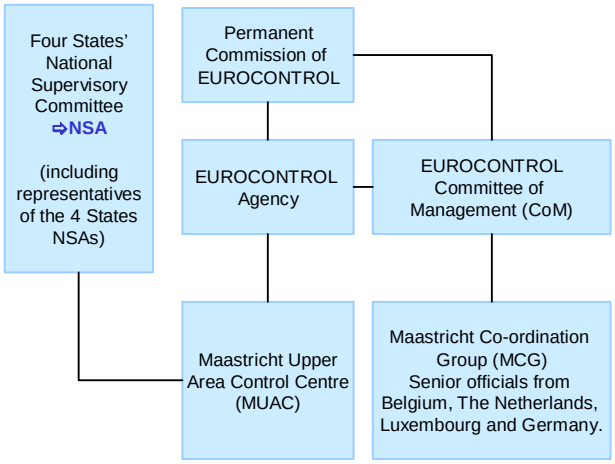


MUAC, Maastricht

Maastricht Upper Area Control Centre

www.eurocontrol.int

Institutional arrangements and links (2015)



Status (2015)

- EUROCONTROL: International Organisation established under the EUROCONTROL Convention of 13.12.1960 and amended on 12.2.1981. At the request of the Benelux States and Germany, MUAC is operated as a EUROCONTROL Agency's Service according to the Maastricht Agreements of 25.11.1986

National Supervisory Authority (NSA):

Four States' National Supervisory Committee

Body responsible for:

Safety Regulation

Maastricht Agreements Art. 1.2: each of the 4 States retains its competence and obligations in respect of regulations

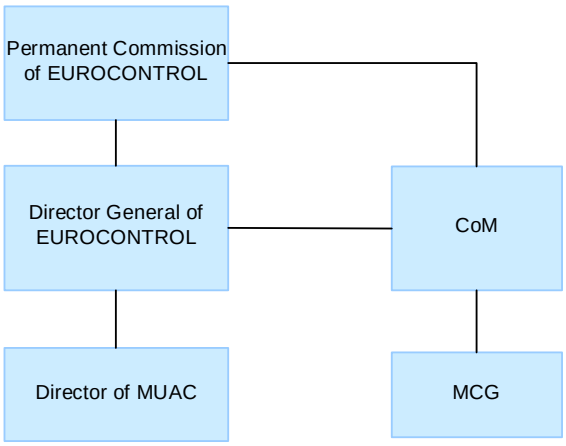
Airspace Regulation

The MCG determines a common position for the 4 States in all matters relating to the operation of ATS by MUAC concerning, inter alia, airspace organisation and sectorisation

Economic Regulation

Financial arrangements for the exploitation of MUAC are adopted by the Committee of Management. EUROCONTROL DG seeks approval of the budget, which contains a special budgetary Annex for MUAC, with the Permanent Commission

Corporate governance structure (2015)



MUAC (2015)

DIRECTOR GENERAL OF EUROCONTROL:

Frank Brenner

DIRECTOR OF MUAC:

Jac Jansen

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☐ Lower Airspace	☐ MET

- Controls GAT in the upper airspace (>FL245) above Benelux and North-Western Germany
- A German ATC unit responsible for handling OAT above North-Western Germany and managed by the DFS is co-located at MUAC

Operational ATS units (2013)

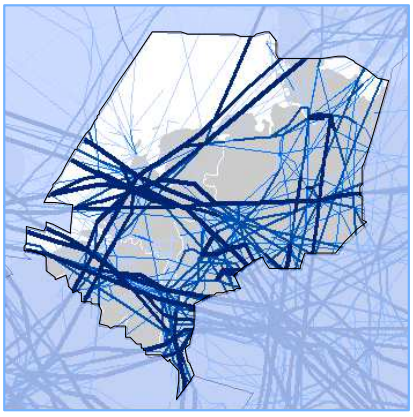
1 ACC (Maastricht)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	
Gate-to-gate total costs (M€)	137
Gate-to-gate ATM/CNS provision costs (M€)	137
Gate-to-gate total ATM/CNS assets(M€)	71
Gate-to-gate ANS total capex (M€)	12
ATCOs in OPS	255
Gate-to-gate total staff	618
Total IFR flight-hours controlled by ANSP ('000)	575
IFR airport movements controlled by ANSP ('000)	n/appl
En-route sectors	20
Minutes of ATFM delays ('000)	117

Size (2013)

Size of controlled airspace: 260 000 km²

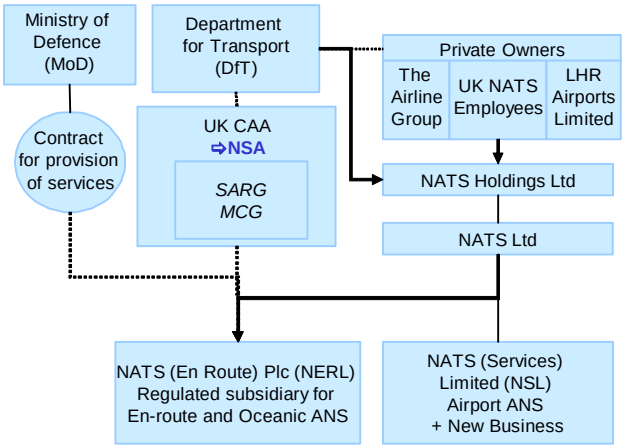


NATS, United Kingdom

NATS Ltd

www.nats.co.uk

Institutional arrangements and links (2015)



Status (2015)

- Public Private Partnership as of 2001
  - 49% State-owned (Govt retains a Golden Share)
  - 51% private-owned (42% by the Airline Group, 4% by LHR Airports Limited and 5% by UK NATS employees)
- The Airline Group comprises 7 airlines: BA, Virgin Atlantic, Lufthansa, EasyJet, Thomas Cook, Thomson Airways, Monarch Airlines. USS Sherwood Limited owns 49.9% of the Airline Group.

National Supervisory Authority (NSA):

UK CAA

Body responsible for:

Safety Regulation

UK CAA, Safety and Airspace Regulation Group (SARG)

Airspace Regulation

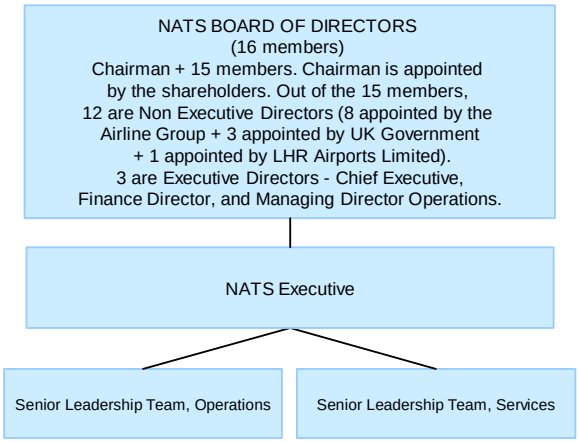
UK CAA, Safety and Airspace Regulation Group (SARG)

Economic Regulation

UK CAA, Markets and Consumers Group (MCG).

Charges control in RP2 linked to CPI (formerly RPI in CP3/RP1)

Corporate governance structure (2015)



NATS (2015)

CHAIRMAN OF THE NATS BOARD:

Paul Golby

CEO of NATS:

Richard Deakin (until 18 May 2015)
Martin Rolfe (acting CEO of NATS as of 19 May 2015)

MANAGING DIRECTOR, NATS SERVICES

Catherine Mason

MANAGING DIRECTOR, NATS OPERATIONS

Martin Rolfe

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☑ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

Operational ATS units (2013)

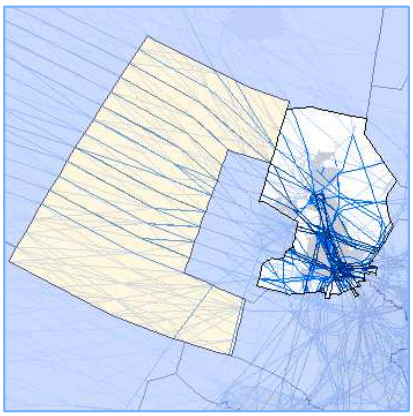
1 OAC (Shanwick)
3 ACCs (London AC, London TC, Prestwick)
16 APPs
16 TWRs (including Gibraltar TWR)
2 AFISs

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	932
Gate-to-gate total costs (M€)	803
Gate-to-gate ATM/CNS provision costs (M€)	793
Gate-to-gate total ATM/CNS assets(M€)	912
Gate-to-gate ANS total capex (M€)	120
ATCOs in OPS	1 435
Gate-to-gate total staff	4 331
Total IFR flight-hours controlled by ANSP ('000)	1 297
IFR airport movements controlled by ANSP ('000)	1 735
En-route sectors	72
Minutes of ATFM delays ('000)	1 046

Size (2013)

Size of controlled airspace: 3 002 000 km²



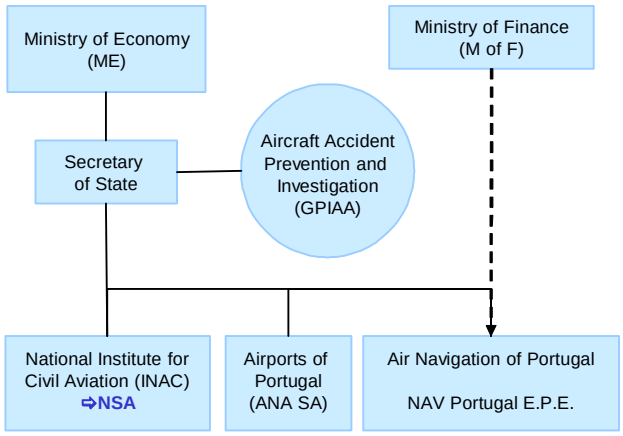
Continental: 882 000 km² - Oceanic: 2 120 000 km²

NAV Portugal, Portugal

Navegação Aérea de Portugal - NAV Portugal, E.P.E.

www.nav.pt

Institutional arrangements and links (2015)



Status (2015)

- Public Entity Corporation as of December 1998
- 100% State-owned

National Supervisory Authority (NSA):

National Institute for Civil Aviation (INAC)

Body responsible for:

Safety Regulation

National Institute of Civil Aviation (INAC)

Airspace Regulation

INAC+FA (Portuguese Air Force) + NAV Portugal in close permanent co-ordination

Economic Regulation

National Institute of Civil Aviation (INAC)

Corporate governance structure (2015)

BOARD OF ADMINISTRATION (3 members)
Chairman + 2 members

All members are appointed by the ME for a 3 year term. Each member has executive functions within NAV Portugal. Each member is responsible to supervise one or several NAV Portugal Directorates and Advisory Bodies to the Board. There are 7 Directorates and 3 Advisory Bodies.

NAV Portugal has also a Board of Auditors composed of 3 members who are appointed by ME for a 3 year term.

NAV Portugal (2015)

CHAIRMAN OF THE BOARD OF ADMINISTRATION:

Luis Ottolini Coimbra

CEO:

Luis Ottolini Coimbra

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☑ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

Operational ATS units (2013)

2 ACCs (Lisboa, Santa Maria)
8 APPs (Lisboa, Porto, Faro, Madeira, Santa Maria, Ponta Delgada, Horta, Flores)
10 TWRs (Lisboa, Cascais, Porto, Faro, Funchal, Porto Santo, Ponta Delgada, Santa Maria, Horta, Flores)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	126
Gate-to-gate total costs (M€)	134
Gate-to-gate ATM/CNS provision costs (M€)	116
Gate-to-gate total ATM/CNS assets(M€)	40
Gate-to-gate ANS total capex (M€)	9
ATCOs in OPS	214
Gate-to-gate total staff	721
Total IFR flight-hours controlled by ANSP ('000)	301
IFR airport movements controlled by ANSP ('000)	275
En-route sectors	8
Minutes of ATFM delays ('000)	181

Size (2013)

Size of controlled airspace: 5 851 000 km²

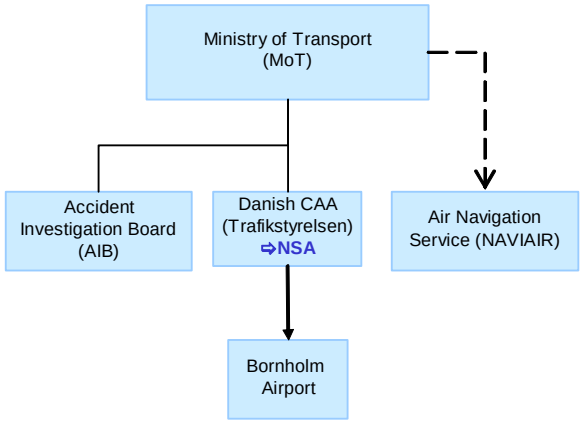
Continental: 671 000 km² - Oceanic: 5 180 000 km²

NAVIAIR, Denmark

Air Navigation Services

www.naviair.dk

Institutional arrangements and links (2015)



Status (2015)

- Company owned by the state
- 100% State-owned

National Supervisory Authority (NSA):

Danish Transport Authority (Trafikstyrelsen)

Body responsible for:

Safety Regulation

Danish Transport Authority (Trafikstyrelsen)

Airspace Regulation

Danish Transport Authority (Trafikstyrelsen)

Economic Regulation

Danish Transport Authority (Trafikstyrelsen)

Corporate governance structure (2015)

BOARD OF DIRECTORS
1 Chairman + 8 Members
(three members elected by the employees)

EXECUTIVE BOARD (2 members)
CEO + CFO
The CEO and CFO are appointed by the Board of Directors.

NAVIAIR (2015)

CHAIRMAN OF BOARD OF DIRECTORS

Anne Birgitte Lundholt

CHIEF EXECUTIVE OFFICER (CEO):

Morten Dambæk

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☑ OAT	☑ Lower Airspace	☐ MET

Note: ANS Greenland upper airspace is delegated to Isavia and NAV Canada

Operational ATS units (2013)

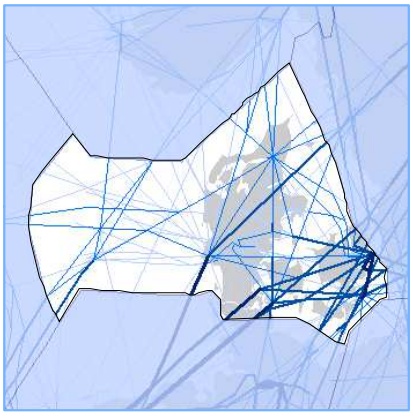
(Excluding Greenland)
1 ACC (Copenhagen)
6 APPs/TWRs (Kastrup, Roskilde, Rønne, Billund, Aarhus, Aalborg)
1 AFIS (Vagar)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	130
Gate-to-gate total costs (M€)	110
Gate-to-gate ATM/CNS provision costs (M€)	110
Gate-to-gate total ATM/CNS assets(M€)	150
Gate-to-gate ANS total capex (M€)	12
ATCOs in OPS	194
Gate-to-gate total staff	637
Total IFR flight-hours controlled by ANSP ('000)	210
IFR airport movements controlled by ANSP ('000)	329
En-route sectors	7
Minutes of ATFM delays ('000)	9

Size (2013)

Size of controlled airspace: 158 000 km²

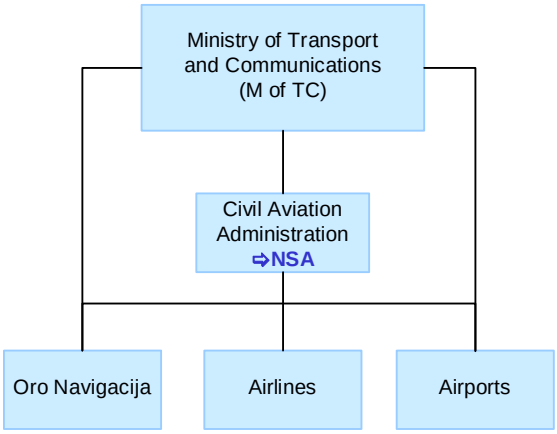


Oro Navigacija, Lithuania

State Enterprise Oro Navigacija

www.ans.lt

Institutional arrangements and links (2015)



Status (2015)

- Since July 2001
- 100% State-owned Enterprise (SOE)

National Supervisory Authority (NSA):

Civil Aviation Administration

Body responsible for:

Safety Regulation

Lithuania CAA

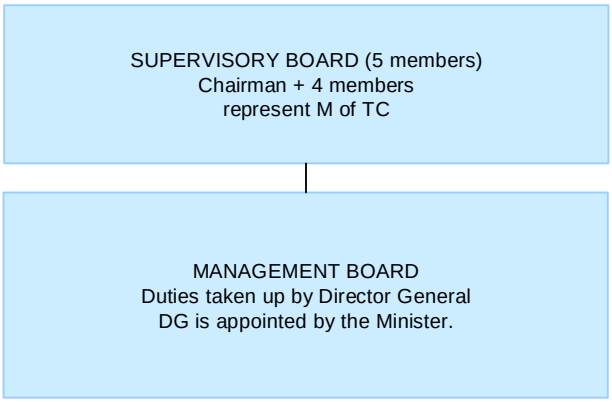
Airspace Regulation

Oro Navigacija in coordination with CAA and M of TC

Economic Regulation

Oro Navigacija in coordination with CAA and M of TC

Corporate governance structure (2015)



Oro Navigacija (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Arijandas Šliupas

DIRECTOR GENERAL (CEO):

Algimantas Raščius

DIRECTOR ATM:

Sergej Smirnov

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

- Air Navigation Services are delegated to LGS (Latvia) above some part of the Baltic sea

Operational ATS units (2013)

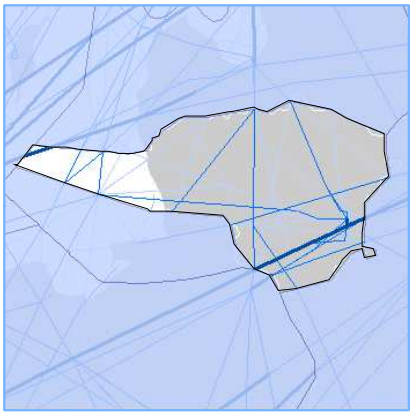
1 ACC (Vilnius)
3 APPs
4 TWRs

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	26
Gate-to-gate total costs (M€)	27
Gate-to-gate ATM/CNS provision costs (M€)	25
Gate-to-gate total ATM/CNS assets(M€)	28
Gate-to-gate ANS total capex (M€)	1
ATCOs in OPS	87
Gate-to-gate total staff	293
Total IFR flight-hours controlled by ANSP ('000)	51
IFR airport movements controlled by ANSP ('000)	43
En-route sectors	3
Minutes of ATFM delays ('000)	0

Size (2013)

Size of controlled airspace: 74 700 km²

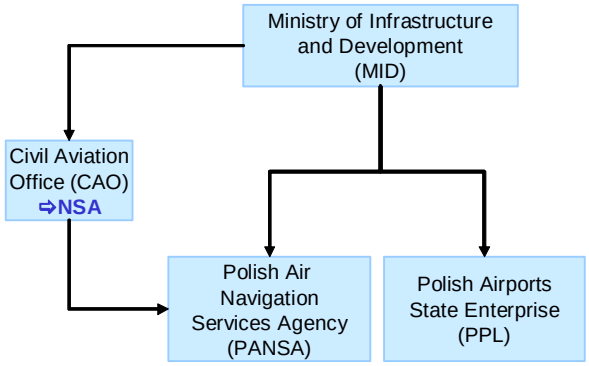


PANSA, Poland

Polish Air Navigation Services Agency (PANSA)

www.pansa.pl

Institutional arrangements and links (2015)



Status (2015)

- PANSA has been operating as an independent entity as from 1st April 2007, separated from the Polish Airports State Enterprise (PPL)
- State body (acting as a legal entity with an autonomous budget)
- 100% State owned

National Supervisory Authority (NSA):

Civil Aviation Office (CAO)

Body responsible for:

Safety Regulation

Civil Aviation Office (CAO)

Airspace Regulation

Civil Aviation Office (CAO)

Economic Regulation

Civil Aviation Office (CAO)

Corporate governance structure (2015)

NO SUPERVISORY BOARD

ADMINISTRATION

According to the Act establishing PANSA, the Agency is managed by the President and his two Vice-Presidents. The President is nominated by the Prime Minister. The two Vice-Presidents are nominated by the MID

PANSA (2015)

PRESIDENT OF PANSA:

Krzysztof Kapis (until 10 February 2015)
Magdalena Jaworska (acting president of PANSA as of 11 February 2015)

VICE PRESIDENT- AIR NAVIGATION DEPARTMENT:

Paweł Babiński (acting vice president as of 24 March 2015)

VICE PRESIDENT - FINANCE AND ADMINISTRATION DEPARTMENT:

Magdalena Jaworska

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☐ MET

- APP Kraków is providing ATC services for Kraków and Katowice
- Katowice TWR is providing only aerodrome control when APP Kraków is providing radar services for Katowice

Operational ATS units (2013)

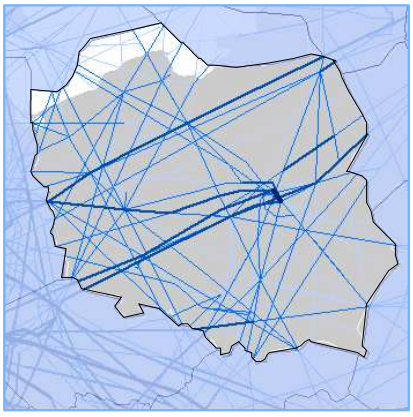
1 ACC with 8 sectors
4 APPs (Warszawa, Gdańsk, Kraków, Poznań) providing radar control
7 TWRs (Warszawa, Modlin, Gdańsk, Kraków, Poznań, Katowice, Wrocław) providing aeodrome control
6 TWRs (Wrocław, Szczecin, Rzeszów, Łódź, Zielona Góra, Bydgoszcz) providing aeodrome control and non-radar approach control
4 FIS units (Warszawa, Kraków, Gdańsk, Poznań)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	173
Gate-to-gate total costs (M€)	162
Gate-to-gate ATM/CNS provision costs (M€)	143
Gate-to-gate total ATM/CNS assets(M€)	148
Gate-to-gate ANS total capex (M€)	14
ATCOs in OPS	478
Gate-to-gate total staff	1 735
Total IFR flight-hours controlled by ANSP ('000)	403
IFR airport movements controlled by ANSP ('000)	310
En-route sectors	8
Minutes of ATFM delays ('000)	358

Size (2013)

Size of controlled airspace: 334 000 km²

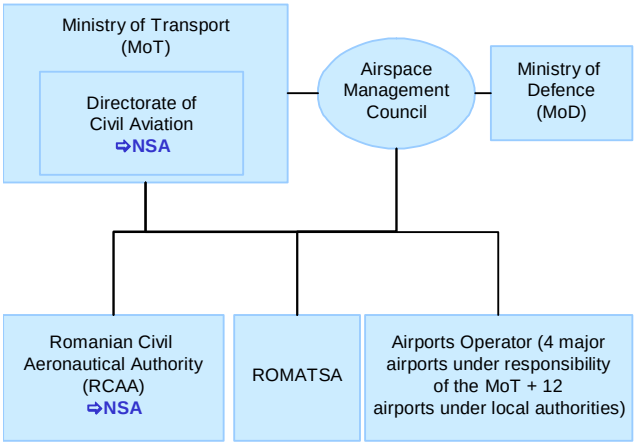


ROMATSA, Romania

Romanian Air Traffic Services Administration

www.romatsa.ro

Institutional arrangements and links (2015)



Status (2015)

- Autonomous and self-financing organisation as of 1991 (Government Resolution GR74/1991 ammended by GR731/1992, GR75/2005, GR1090/2006, GR1251/2007, GR741/2008)
- 100% State-owned

National Supervisory Authority (NSA):

- Directorate of Civil Aviation
- Romanian Civil Aeronautical Authority (RCAA)

Body responsible for:

Safety Regulation

Ministry of Transport (MoT)
Enforcement and safety oversight is delegated and discharged through the RCAA

Airspace Regulation

Both Ministry of Transport (MoT) and Ministry of Defence (MoD), and discharged through the RCAA and Air Force Staff

Economic Regulation

Ministry of Transport (MoT)

Corporate governance structure (2015)

ADMINISTRATION BOARD (8 voting members)
Chairman + 7 members
Members represent: MoT (2 members), M of Public Finance (1 member), ROMATSA (1 member), The Financial Supervisory Authority (1 member), S.C. AVIATIA UTILITARA BUCURESTI S.A (1 member) and Bucharest Airports (1 member) + additional non voting participants representing staff.

STEERING COMMITTEE
Duties taken up by DG.
DG is appointed by the MoT.
DG + other directors.

ROMATSA (2015)

CHAIRMAN OF THE ADMINISTRATION BOARD:

Mircea Jorj

DIRECTOR GENERAL (CEO):

Ion Aurel Stanciu

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☑ MET

Operational ATS units (2013)

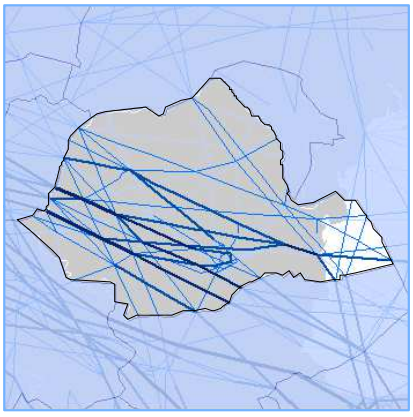
1 ACC (Bucharest)
3 APPs
16 TWRs

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	166
Gate-to-gate total costs (M€)	175
Gate-to-gate ATM/CNS provision costs (M€)	156
Gate-to-gate total ATM/CNS assets(M€)	114
Gate-to-gate ANS total capex (M€)	10
ATCOs in OPS	460
Gate-to-gate total staff	1 533
Total IFR flight-hours controlled by ANSP ('000)	299
IFR airport movements controlled by ANSP ('000)	138
En-route sectors	11
Minutes of ATFM delays ('000)	0

Size (2013)

Size of controlled airspace: 254 000 km²

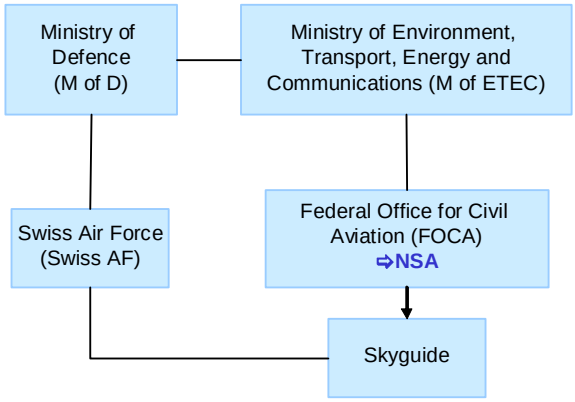


Skyguide, Switzerland

Skyguide

www.skyguide.ch

Institutional arrangements and links (2015)



Status (2015)

- Joint-stock company as of 1996. Currently 14 shareholders; 99,91% is held by the Swiss Confederation which by law must hold at least 51%
- Integrated civil/military as of 2001

National Supervisory Authority (NSA):

Federal Office for Civil Aviation (FOCA)

Body responsible for:

Safety Regulation

Federal Office for Civil Aviation

Airspace Regulation

Federal Office for Civil Aviation

Economic Regulation

The Ministry of the Environment, Transport, Energy and Communications

Corporate governance structure (2015)

GENERAL ASSEMBLY of the Shareholders

SUPERVISORY BOARD (7 members)
Chairman + 6 members
All members are appointed by the General Assembly for their expertise.

EXECUTIVE BOARD (6 members)
CEO + 5 members
The CEO is appointed by the Supervisory Board.

Skyguide (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Guy Emmenegger

DIRECTOR GENERAL (CEO):

Daniel Weder

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☑ OAT	☑ Lower Airspace	☐ MET

- ATC services delegated to Geneva ACC by France

Operational ATS units (2013)

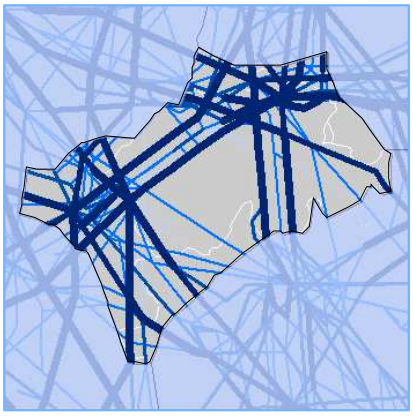
2 ACCs (Geneva, Zurich)
4 APPs (Geneva, Zurich, Lugano, Bern)
7 TWRs (Geneva, Zurich, Lugano, Bern, Buochs, Altenrhein, Grenchen)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	318
Gate-to-gate total costs (M€)	302
Gate-to-gate ATM/CNS provision costs (M€)	279
Gate-to-gate total ATM/CNS assets(M€)	290
Gate-to-gate ANS total capex (M€)	45
ATCOs in OPS	361
Gate-to-gate total staff	1 403
Total IFR flight-hours controlled by ANSP ('000)	319
IFR airport movements controlled by ANSP ('000)	477
En-route sectors	19
Minutes of ATFM delays ('000)	682

Size (2013)

Size of controlled airspace: 69 700 km²

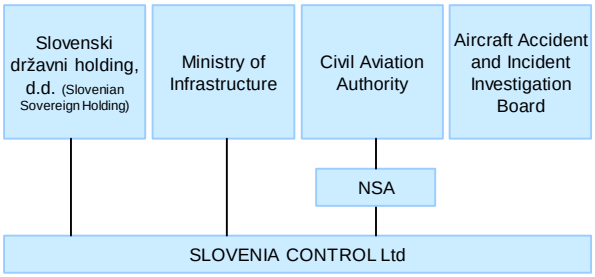


SLOVENIA CONTROL, Slovenia

Slovenia Control Ltd

www.sloveniacontrol.si

Institutional arrangements and links (2015)



Status (2015)

- Since 2004 the Slovenia Control, Slovenian Air Navigation Services Ltd, as a 100% state-owned enterprise is independent of national supervisory authorities.

National Supervisory Authority (NSA):

Civil Aviation Authority

Body responsible for:

Safety Regulation

Ministry of Infrastructure

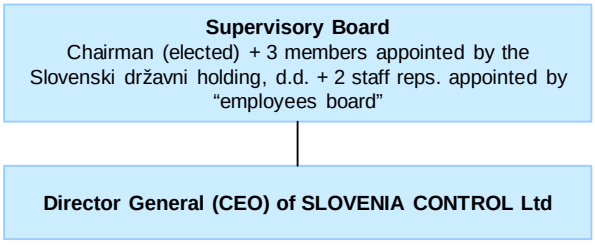
Airspace Regulation

Ministry of Infrastructure

Economic Regulation

Slovenski državni holding, d.d. (Slovenian Sovereign Holding)

Corporate governance structure (2015)



SLOVENIA CONTROL (2015)

CHAIRMAN OF THE SUPERVISORY BOARD:

Dušan Hočevar

DIRECTOR GENERAL (CEO):

Franc Željko Županič, Ph.D.

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☑ OAT	☑ Lower Airspace	☐ MET

Operational ATS units (2013)

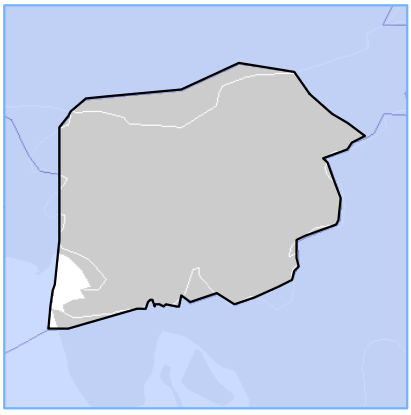
1 ACC (Ljubljana)
3 APPs (Ljubljana, Maribor, Portorož)
3 TWRs (Ljubljana, Maribor, Portorož)

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	33
Gate-to-gate total costs (M€)	33
Gate-to-gate ATM/CNS provision costs (M€)	30
Gate-to-gate total ATM/CNS assets(M€)	35
Gate-to-gate ANS total capex (M€)	31
ATCOs in OPS	93
Gate-to-gate total staff	214
Total IFR flight-hours controlled by ANSP ('000)	46
IFR airport movements controlled by ANSP ('000)	30
En-route sectors	4
Minutes of ATFM delays ('000)	1

Size (2013)

Size of controlled airspace: 20 400 km²

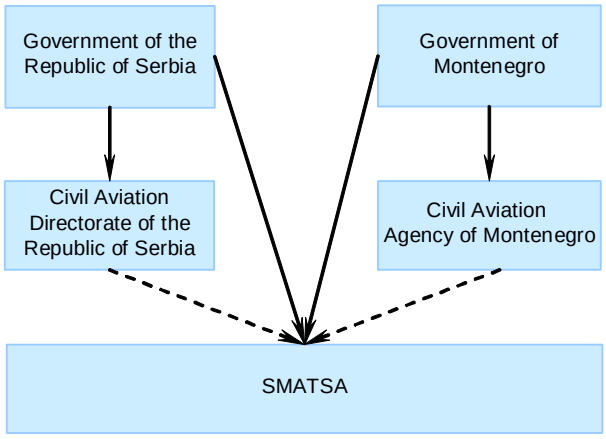


SMATSA, Serbia and Montenegro

Serbia and Montenegro Air Traffic Services SMATSA llc

http://www.smatsa.rs

Institutional arrangements and links (2015)



Status (2015)

- Limited liability company founded in 2003
- 92% owned by Serbia and 8% owned by Montenegro
- Integrated civil/military ANSP

National Supervisory Authority (NSA):

Civil Aviation Directorate of the Republic of Serbia
Civil Aviation Agency of Montenegro

Body responsible for:

Safety Regulation
- Civil Aviation Directorate of the Republic of Serbia
- Civil Aviation Agency of Montenegro

Airspace Regulation
- Civil Aviation Directorate of the Republic of Serbia
- Civil Aviation Agency of Montenegro

Economic Regulation

Ministry of Finance of the Republic of Serbia

Corporate governance structure (2015)

ASSEMBLY

6 members representing founders (Government of the Republic of Serbia and Government of Montenegro) selected from the Ministries in charge of transport, finance, and defence)

SUPERVISORY BOARD

5 members appointed by the Assembly for a period of 4 years, upon proposals of the Government of the Republic of Serbia (4) and Government of Montenegro (1)
CEO is appointed by the Supervisory Board.

SMATSA (2015)

PRESIDENT OF THE ASSEMBLY:

Mirel Radić Ljubisavljević

PRESIDENT OF THE SUPERVISORY BOARD:

Bratislav Grubačić

CEO:

Radojica Rovčanin

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☑ OAT	☑ Lower Airspace	☑ MET

- ANS Services (ATM, CNS, MET, AIS)
- SMATSA provides Air Traffic Services in the 55% of the upper airspace of Bosnia and Herzegovina
- ANS personnel and pilot training, Flight Inspection Services, PANS-OPS and cartography

Operational ATS units (2013)

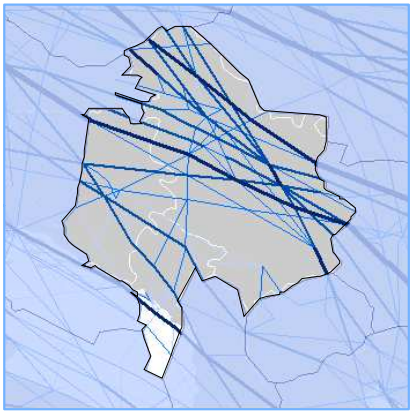
1 ACC (Belgrade)
1 APP collocated with ACC Belgrade
6 APPs/TWRs (Batajnica, Kraljevo, Nis, Vrsac, Podgorica, Tivat)
1 TWR

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	81
Gate-to-gate total costs (M€)	76
Gate-to-gate ATM/CNS provision costs (M€)	68
Gate-to-gate total ATM/CNS assets(M€)	100
Gate-to-gate ANS total capex (M€)	9
ATCOs in OPS	262
Gate-to-gate total staff	868
Total IFR flight-hours controlled by ANSP ('000)	200
IFR airport movements controlled by ANSP ('000)	72
En-route sectors	9
Minutes of ATFM delays ('000)	9

Size (2013)

Size of controlled airspace: 145 566 km²



UkSATSE, Ukraine

Ukrainian State Air Traffic Service Enterprise

www.uksatse.ua

Institutional arrangements and links (2015)

Ministry of Infrastructure of Ukraine
(State Aviation Administration)

Ukrainian State Air Traffic Service Enterprise (UkSATSE)

- Regional branches
- AIS
- Ukraerocenter (Ukrainian Airspace Management and Planning Center)
- Training & Certification Center of UkSATSE
- UkSATSE Flight Calibration Service
- Medical Certification Center

Status (2015)

- Self-financing enterprise
- 100% State-owned

National Supervisory Authority (NSA):

State Aviation Administration (SAAU) acts as NSA

Body responsible for:

Safety Regulation
State Aviation Administration

Airspace Regulation
State Aviation Administration

Economic Regulation
Ministry of Infrastructure of Ukraine

Corporate governance structure (2015)

SUPERVISORY BOARD
(Chairman + 2 members)

DIRECTOR

UkSATSE (2015)

CHAIRMAN OF SUPERVISORY BOARD:
Volodymir Shulmeister

DIRECTOR OF UkSATSE (CEO):
Dmytro Babeichuk

Scope of services (2013)

☑ GAT	☑ Upper Airspace	☐ Oceanic ANS
☐ OAT	☑ Lower Airspace	☑ MET

Operational ATS units (2013)

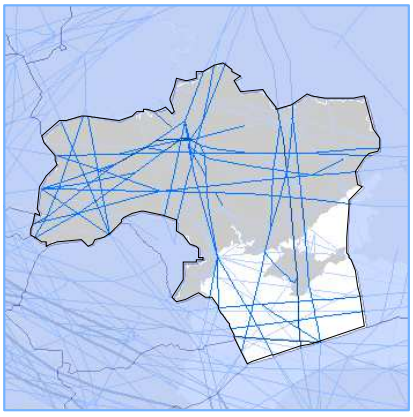
5 ACCs/APPs (Dnipropetrovs'k, Kyiv, L'viv, Odesa, Simferopol')
6 APPs (Donetsk, Ivano-Frankivs'k, Kharkiv, Luhansk, Uzghorod, Zaporizhzhia)
22 TWRs
6 AFISs

Key financial and operational figures (ACE 2013)

Gate-to-gate total revenues (M€)	257
Gate-to-gate total costs (M€)	262
Gate-to-gate ATM/CNS provision costs (M€)	247
Gate-to-gate total ATM/CNS assets(M€)	286
Gate-to-gate ANS total capex (M€)	48
ATCOs in OPS	988
Gate-to-gate total staff	5 890
Total IFR flight-hours controlled by ANSP ('000)	405
IFR airport movements controlled by ANSP ('000)	208
En-route sectors	34
Minutes of ATFM delays ('000)	5

Size (2013)

Size of controlled airspace: 776 442 km²



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GLOSSARY

ACC	Area Control Centre
ACE	Air Traffic Management Cost-Effectiveness
ADS-B	Automatic Dependent Surveillance-Broadcast
Aena	Aeropuertos Españoles y Navegación Aérea, Spain
AFIS	Airport/Aerodrome Flight Information Service
AIS	Aeronautical Information Services
ANS	Air Navigation Services
ANS CR	Air Navigation Services of the Czech Republic
ANSP	Air Navigation Service Provider
APP	Approach Control Unit
ARMATS	Armenian Air Traffic Services
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
BULATSA	Air Traffic Services Authority, Bulgaria
Austro Control	Austro Control Österreichische Gesellschaft für Zivilluftfahrt mbH, Austria
Avinor	Avinor, Norway
B	Billion
Belgocontrol	Belgocontrol, Belgium
CAPEX	Capital Expenditure
CNS	Communications, Navigation and Surveillance
CRCO	Central Route Charges Office
Croatia Control	Hrvatska kontrola zračne plovidbe d.o.o., Croatian Air Navigation Services
DCAC Cyprus	Department of Civil Aviation of Cyprus
DFS	Deutsche Flugsicherung GmbH, Germany
DHMİ	Devlet Hava Meydanları İsletmesi, Turkey
DME	Distance-Measuring Equipment
DSNA	Direction des services de la navigation aérienne, France
EANS	Estonian Air Navigation Services
EC	European Commission
ECAC	European Civil Aviation Conference
ENAV	Ente Nazionale di Assistenza al Volo S.p.A., Italy
ERC	EUROCONTROL Research Centre
ETS	Early Termination of Service
EU	European Union
FAB	Functional Airspace Block
FDP	Flight Data Processing system
Finavia	Finavia, Finland
FIS	Flight Information Service
FL	Flight Level
FTE	Full-Time Equivalent
GDP	Gross Domestic Product
HCAA	Hellenic Civil Aviation Authority, Greece

HMI	Human-Machine Interface
HQ	Headquarters
HungaroControl	HungaroControl, Hungary
IAA	Irish Aviation Authority, Ireland
IFR	Instrument Flight Rules
IFRS	International Financial Reporting Standards
ILS	Instrument Landing System
LFV	Luftfartsverket, Sweden
LGS	Latvijas Gaisa Satiksme, Latvia
LPS	Letové Prevádzkové Služby Slovenskej Republiky, Státny Podnik, Slovak Republik
LVNL	Luchtverkeersleiding Nederland, Netherlands
M	Million
MATS	Malta Air Traffic Services Ltd
MET	Aeronautical Meteorology
M-NAV	Air Navigation Services Provider of the former Yugoslav Republic of Macedonia
MoldATSA	Moldavian Air Traffic Services Authority
MSSR	Monopulse Secondary Surveillance Radar
MUAC	Maastricht Upper Air Centre
NSA	National Supervisory Authority
NATA Albania	National Air Traffic Agency, Albania
NATS	National Air Traffic Services, UK
NAV Portugal	Navegação Aérea de Portugal – NAV Portugal, EPE
NAVIAIR	Air Navigation Services – Flyvesikringstjenesten, Denmark
NBV	Net Book Value
NDB	Non-Directional Beacon
NM	EUROCONTROL Network Manager
OAT	Operational air traffic
OPS	Operations
Oro Navigacija	State Enterprise Oro Navigacija, Lithuania
PANSA	Polish Air Navigation Services Agency
PPPs	Purchasing power parities
PRB	Performance Review Body
PRC	Performance Review Commission
PRR	Performance Review Report
PRU	Performance Review Unit
RDP	Radar Data Processing system
RP1	Reference Period 1
RPI	Retail Price Index
ROMATSA	Romanian Air Traffic Services Administration
SAR	Search and Rescue
SES	Single European Sky
SESAR IP1	Single European Sky ATM Research Implementation Package 1
SEID	Specification for Economic Information Disclosure
Skyguide	Skyguide, Switzerland
Slovenia Control	Slovenia Control, Slovenia
SMATSA	Serbia and Montenegro Air Traffic Services Agency
TC	Terminal Control

TWR	Traffic Controlled Tower
UK CAA	United Kingdom Civil Aviation Authority
UkSATSE	Ukrainian State Air Traffic Service Enterprise
VFR	Visual Flight Rules
VOR	Very high frequency Omni-directional Range

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