EUROCONTROL

REPORT COMMISSIONED BY THE PERFORMANCE REVIEW COMMISSION

ATM Cost-Effectiveness (ACE) 2005 Benchmarking Report

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

June 2007

BACKGROUND

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

The PRC was established in 1998 by the 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*."

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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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ATM Cost-Effectiveness (ACE) 2005 Benchmarking Report

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ABSTRACT

This report is the fifth in a series of annual reports based on mandatory information disclosure provided by 35 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 the 35 ANSPs for the year 2005, including high-level trend analysis for the years 2002-2005. 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 presents detailed productivity comparisons for 66 Area Control Centres (ACCs) grouped in 4 clusters of different traffic complexity characteristics. Finally, the report analyses forward-looking information for the years 2006-2010, drawing inferences with respect to future financial cost-effectiveness performance at both system and ANSP levels, and displaying future capital expenditures.

Keywords

EUROCONTROL Performance Review Commission - Economic information disclosure – ATM/CNS cost-effectiveness comparisons - European Air Navigation Services Providers (ANSPs) - Gate-to-gate - En-route – Terminal ANS - Inputs and outputs metrics – Aeronautical MET costs – Regulatory costs - Performance framework - Quality of service - 2005 data - Factual analysis – Trend analysis - Costs drivers - Productivity – Employment costs - Support costs – Area Control Centres (ACCs) productivity comparisons – Complexity metrics – Current and future capital expenditures – Future trends in cost-effectiveness performance.

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Introduction

This Air Traffic Management Cost-Effectiveness (ACE) 2005 Report presents a benchmarking analysis of ATM cost-effectiveness for 35 Air Navigation Service Providers (ANSPs) in Europe. The analysis focuses on costs that are under their direct control, namely ATM/CNS provision costs. The benchmarking analysis is based on information provided by ANSPs in compliance with Decision No. 88 of the Permanent Commission of EUROCONTROL.

ACE 2005 is the fifth in this series of benchmarking reports. It presents information on performance indicators relating to cost-effectiveness and productivity for 2005. It also examines changes over time, since there is now enough historical information to draw conclusions about cost-effectiveness trends, both for individual ANSPs and for the European ATM/CNS system as a whole. In addition, ACE 2005 presents an analysis of the forward-looking information presented by ANSPs covering the 2006-2010 period.

The data validation, processing, analysis and reporting were conducted with the assistance of the ACE Working Group, which comprises representatives from the participating ANSPs, airspace users and the PRU. This working method enabled the participants to share experiences and gain an improved common understanding of the underlying assumptions and limitations of the data.

The information provided in this report is intended for use by ANSP management, airspace users and those interested in the overall cost-effectiveness of the European ANS system.

In order to provide the continuity requested by stakeholders, this report uses the same analytical framework for cost-effectiveness as previous ACE reports. This framework has been used extensively or adapted by ANSPs, airspace users, and regulators as a basis for performance measurement. Several ANSPs have used factors mentioned in ACE reports to optimise their own performance.

As in previous years, the analysis undertaken is a purely **factual** analysis of the cost-effectiveness indicators – measuring what the indicators **are**. The present analysis does not reflect the diversity of the operational and economic characteristics of European ANSPs to the extent that a **normative** analysis could be carried out – comparing one with another and determining what the performance **should be**.

Framework for cost-effectiveness analysis

Figure 0.1 shows the conceptual framework used to assess ANSP cost-effectiveness.

ACE 2005 first considers the total costs at State level of providing Air Navigation Services (ANS). Since several of the costs involved in ANS provision are outside the control of individual ANSPs (for example payments to government and regulatory authorities, contribution to EUROCONTROL costs), it then concentrates on the specific costs of providing ATM/CNS. This ensures greater comparability across ANSPs, since it normalises the scope of the services under consideration, as the services provided are not the same everywhere.

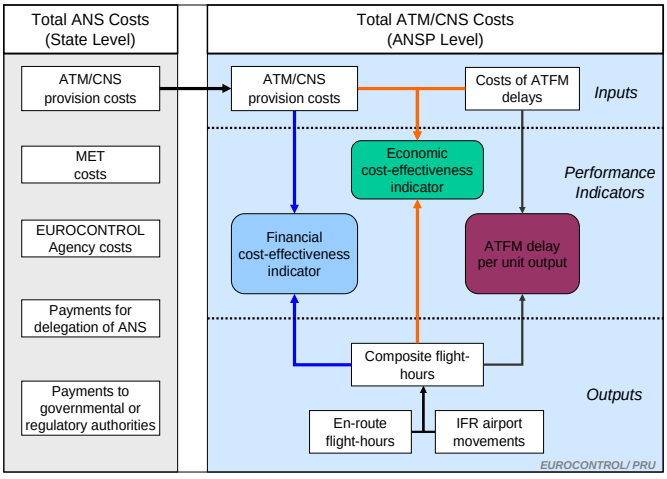


Figure 0.1: Conceptual framework for analysis of ATM/CNS cost-effectiveness

The analysis of **financial cost-effectiveness** is based on the ATM/CNS provision costs and its associated measures of outputs. These ATM/CNS provision costs are not, however, the only way in which the service provided by an ANSP affects airspace users. The quality of service provided by ANSPs has an impact on the efficiency of aircraft operations. Less efficient aircraft operations impose additional costs, which need to be taken into consideration for a full economic assessment of ANSP performance. To capture those additional costs, an analysis of **economic cost-effectiveness** has been introduced.

As a consequence of limitations on data availability, the quality of service supplied by ANSPs is, for the time being, only assessed in terms of ATFM ground delays, which can be measured consistently and expressed in monetary terms. For the longer term, means of including the wider costs of quality of service (airborne delays, horizontal and vertical flight-efficiency) should be sought.

Exogenous factors, which are outside the control of an ANSP and can vary significantly between ANSPs, should also be taken into account when comparing ANSP performance. Analysis of exogenous factors in ACE 2005 has focused on three elements: cost of living, seasonal traffic variability and traffic complexity.

For both economic and financial cost-effectiveness indicators, the output measure is composite flight-hours, a combination of en-route flight-hours controlled and IFR airport movements controlled. The allocation of costs between en-route and terminal ANS is not carried out consistently across all the European ANSPs. This lack of consistency distorts performance comparisons at the en-route and terminal ANS levels. Therefore, as in previous ACE reports, the focus of the analysis of cost-effectiveness is “gate-to-gate”.

Data submission

This year, the data used includes for the first time data provided by the Polish ANSP, PPL/PATA. The sample analysed in detail therefore now comprises 35 ANSPs (see Figure 0.2).

Trend analysis since 2002 has been done using the sample of 32 ANSPs for which data has been consistently available over that period. Trend analysis will grow increasingly robust as experience in reporting increases and the quality and consistency of the data improves each year.

Regrettably, the quantity and quality of data provided by HCAA continues to be inadequate for cost-effectiveness performance measurement, which raises an issue of lack of commitment and concerns about transparency.

Figure 0.2: Geographic coverage of ACE 2005 data

Although there has been a small improvement over 2004, timely data submission is still an issue in several ANSPs, with only 16 out of 35 submissions received by the deadline of 15 July 2006. Inevitably, this affects the timely analysis and production of the ACE reports.

Data validation

Once the data was received, an extensive validation of the data was necessary to ensure high data quality standards and to establish a common understanding of the data submitted. The process leading to the production of the ACE report, which comprises the PRU data validation, analysis and consultation, is summarised in Figure 0.3.

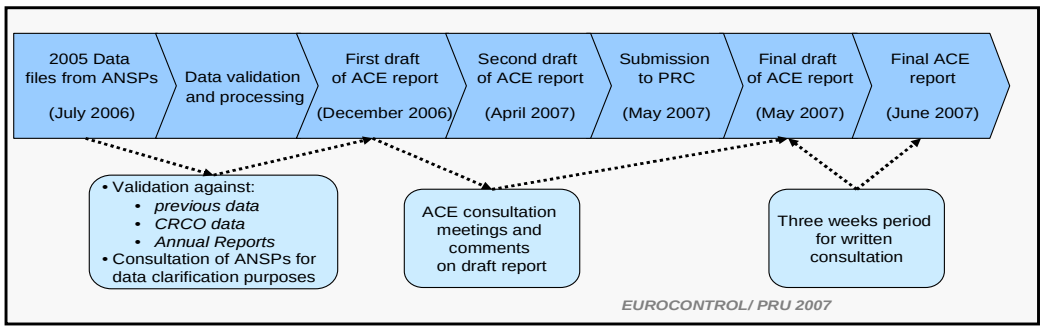


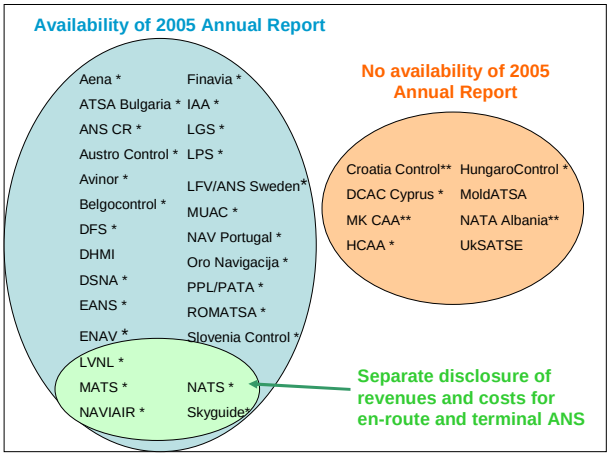
Figure 0.3: Data validation, processing and reporting

Consistent provision of Annual Reports, with separate disclosure of non-ANS activities and separation of en-route and terminal ANS costs and revenues by all ANSPs would provide a valuable means of validating the 2005 information disclosure data and improve transparency and comparability of the financial data across the ANSPs.

The SES Service Provision Regulation (SPR) (EC No 550/2004) came into force on 20 April 2004 and is applicable to 2005 Financial Accounts in all EU Member States (including Switzerland and Norway) and to associated ANSPs. This Regulation is also expected to be soon applicable to States which have signed the ECAA Agreement.

Eight ANSPs (including three who are subject to EU rules) have not published annual reports for 2005. Note that, for the first time, financial accounts from ATSA Bulgaria and Slovenia Control have been provided (Figure 0.4).

As best practice, annual reports should comprise a Management Report, Financial Accounts and an Audit Report.



* ANSPs covered by the SES Regulations (see also Table 1.1)

** ANSPs operating in States member of ECAA (see also Table 1.1)

Figure 0.4: Status of 2005 Annual Reports

The European ANS system under study: key economic data

The European system analysed in this report comprises the system operated by the 35 participating ANSPs, excluding costs that are related to services provided to military operational air traffic (OAT) and/or oceanic ANS, and landside airport management operations. Key data for the European ANS system are summarised in Table 0.1.

Total ANS costs for the European system in 2005 are around €7 400M, of which €6 470M (87%) relate directly to the provision of gate-to-gate ATM/CNS. The European ANSPs employed some 55 000 staff, of which some 16 500 (30%) are air traffic controllers working on operational duty (ATCOs in OPS). On average, 2.3 additional staff are required for every ATCO in OPS.

Key Data for the European ANS system	2004	2005
ANSPs	34	35
Area Control Centres (ACCs)	66	66
En-route sectors at maximum configuration	613	638
Approach Units (APPs)	202	209
Towers (TWRs)	408	420
AFIS units	94	96
Flight-hours controlled (M)	11.8	12.6
Distance controlled (km) in charging area (M)	7 680	8 293
IFR airport movements (M)	14.1	14.8
Total Air Navigation Service Providers (ANSPs) staff	53 631	55 239
Air Traffic Controllers in Operational duty (ATCOs in OPS)	15 689	16 507
Gate-to-gate ANS costs (€ M)	**7 108**	**7 418**
Gate-to-gate ANS revenues (€ M)	7 332	7 280
Gate-to-gate ATM/CNS capital employed (€ M)	7 643	7 571

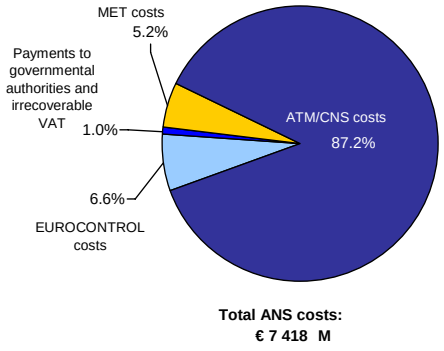


Table 0.1 Key system data for 2004 and 2005 (figures expressed in €2005)

Operating costs account for nearly 80% of total ATM/CNS provision costs, with over three-quarters of these being staff related, indicating that ATM/CNS is a labour intensive activity (Figure 0.5).

However, the cost structure for individual ANSPs varies greatly. Employment costs tend to follow the local cost of living; outsourcing may be used for some support services, and the investment cycle for each ANSP may differ.

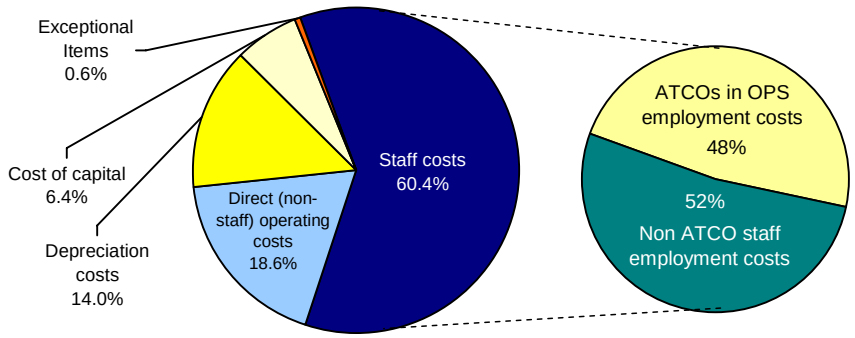


Figure 0.5: Breakdown of ATM/CNS provision costs (2005)

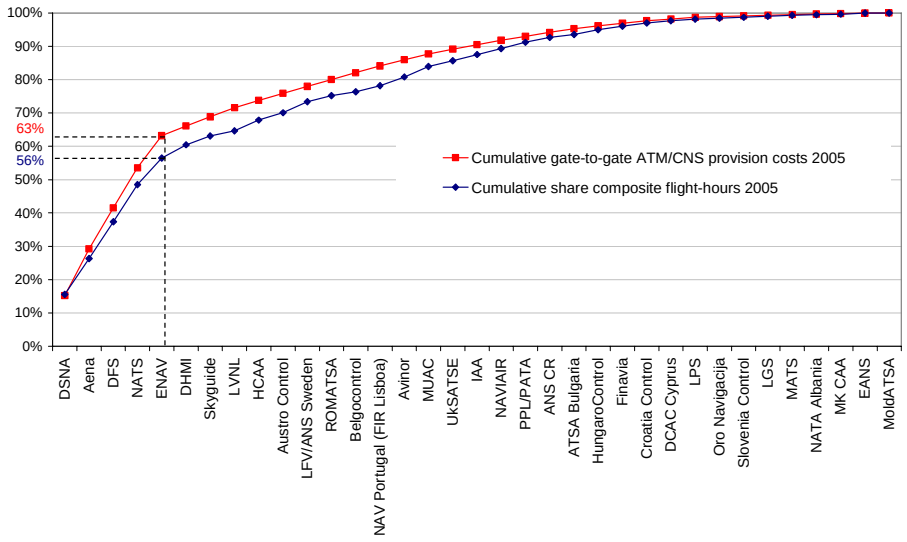


Figure 0.6: Gate-to-gate ATM/CNS provision costs in 2005

Figure 0.6 shows that the largest five ANSPs bear 63% of the total provision costs, and handle 56% of the traffic.

Inevitably, these five ANSPs have a great influence on the cost of the system, although all stakeholders can impact the cost-effectiveness of the total system.

Note that Aena, for which data includes ANS services for both mainland Spain and Canarias, now ranks fourth in terms of traffic and second in terms of costs. In 2002, Aena ranked fourth in terms of both costs and traffic.

In 2005, the EUROCONTROL Agency cost base (Parts I and IX) represents around 8.4% of total European en-route ANS costs, which is higher than in 2004. The main driver for this increase is due to the progressive increase of pensions in charge of the budget (Pension Scheme) and the implementation of the Pension reform with the reconstruction of the Projected Benefit Obligations (PBO) as indicated in Figure 0.7. The share of EUROCONTROL Agency costs is expected to stabilise in 2007 around the 8% threshold.

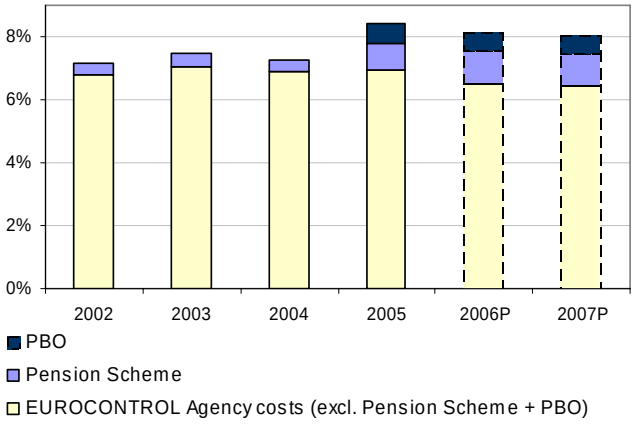


Figure 0.7: Share of EUROCONTROL Agency costs relative to total European en-route ANS costs

Since no genuine measure of output(s) is available for the EUROCONTROL Agency, no proper cost-effectiveness KPIs can be presented at this stage.

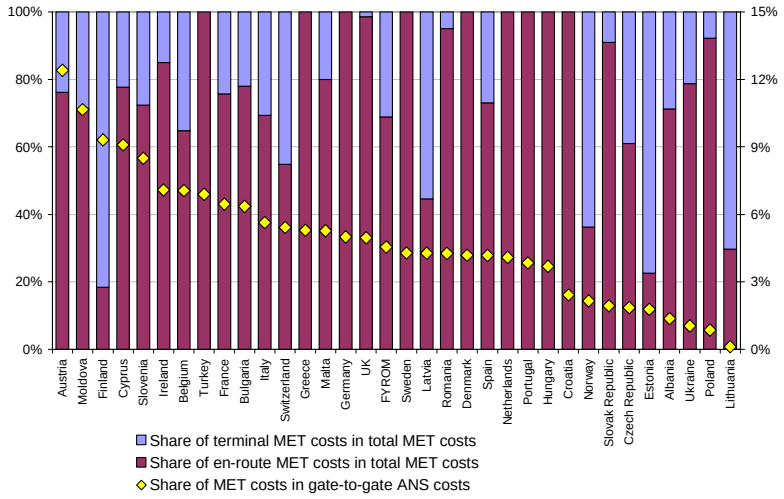


Figure 0.8: Share of MET costs in gate-to-gate ANS costs

In 2005, MET costs amounted to some €380M, a decrease of some -3% since 2002. Significant reductions in MET costs are observed for Germany and Austria. There is a wide variation in the way MET costs are allocated between en-route and terminal ANS, which raises an issue of consistency (see Figure 0.8). However, this has not been investigated further.

Since no genuine measure of MET output(s) is available, no proper cost-effectiveness KPIs can be presented at this stage.

Exogenous factors affecting performance

Many factors contribute to differences in costs between ANSPs and ideally would have to be taken into account in order to make fair performance comparisons. Many of these factors are exogenous in the sense that they are outside the control of an ANSP. **Measurable** factors affecting performance include in particular cost of living, traffic complexity and seasonal traffic variability. The former two items are shown in Figure 0.9.

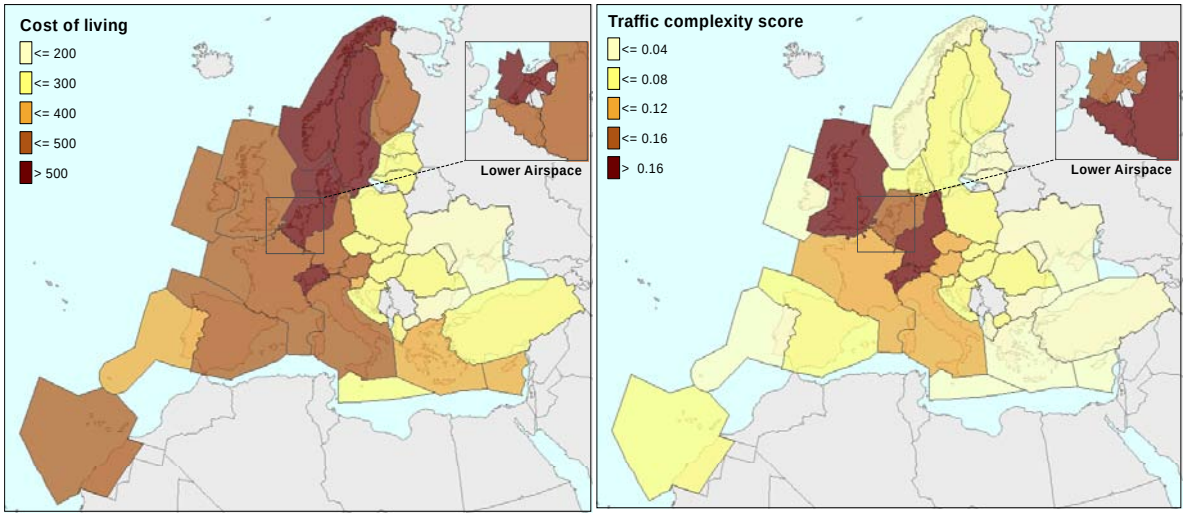


Figure 0.9: Cost of living and aggregate complexity score per ANSP (2005)

Cost of living tends to be significantly lower in the Eastern part of Europe and particularly high in the "Core Area" and in the Nordic part of Europe. The ten most "complex" ANSPs comprise the largest ANSPs, except for Aena. Incidentally, this group of ANSPs also tends to have higher cost of living than the average. A strong driver of traffic complexity is traffic density. Higher traffic density enables better utilisation of resources/infrastructure, but may also entail higher ATCO workload and/or investment in more sophisticated systems.

On the other hand, seasonal traffic variability tends to be significantly higher where cost of living and traffic complexity are lower (Figure 0.10).

The three exogenous factors are interrelated and all impact both the cost-effectiveness and productivity performance of ANSPs. These relationships are complex to analyse.

There are other factors, which are currently not measurable, which could have an important impact on an ANSP performance.

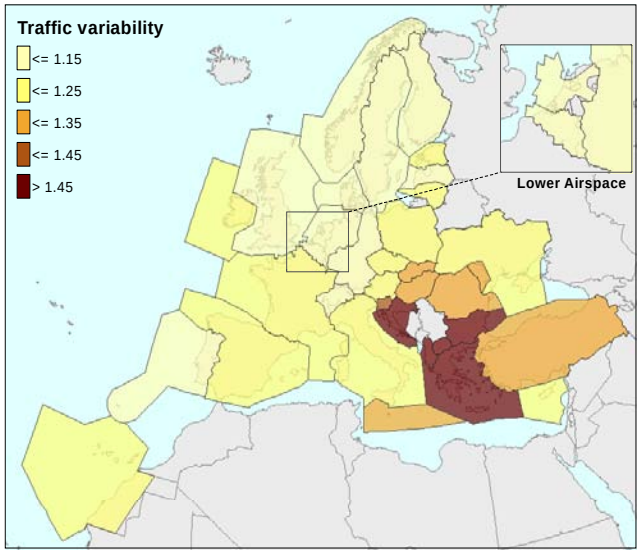


Figure 0.10: Seasonal traffic variability (2005)

It is beyond the scope of ACE 2005 to relate these measurable exogenous factors quantitatively to ANSPs unit costs and productivity, essentially because the small size of the ACE data sample does not allow any firm conclusions to be drawn on the magnitude of the impact of these factors. Nevertheless, all the benchmarking results presented in this report should be seen in the context of these factors.

Financial cost-effectiveness KPI

The European system financial cost-effectiveness indicator (ATM/CNS provision costs per composite flight-hour) for 2005 is €395. Figure 0.11 shows that there remains a large variation between individual ANSPs. Nine ANSPs have unit costs above the third quartile (i.e. €420 per composite flight-hour), amongst which are large ANSPs such as Aena, ENAV, DFS and NATS. Together these nine ANSPs account for 48% of the traffic. A unit cost reduction for these nine would therefore have a major positive impact on the cost-effectiveness of the European ATM/CNS. It should be noted that costs reported for MUAC do not include costs of the CNS infrastructure which is made available for joint use and provided free of charges by the ANSPs (Belgocontrol, LVNL, and DFS) operating in the Four States airspace (Benelux and Germany).

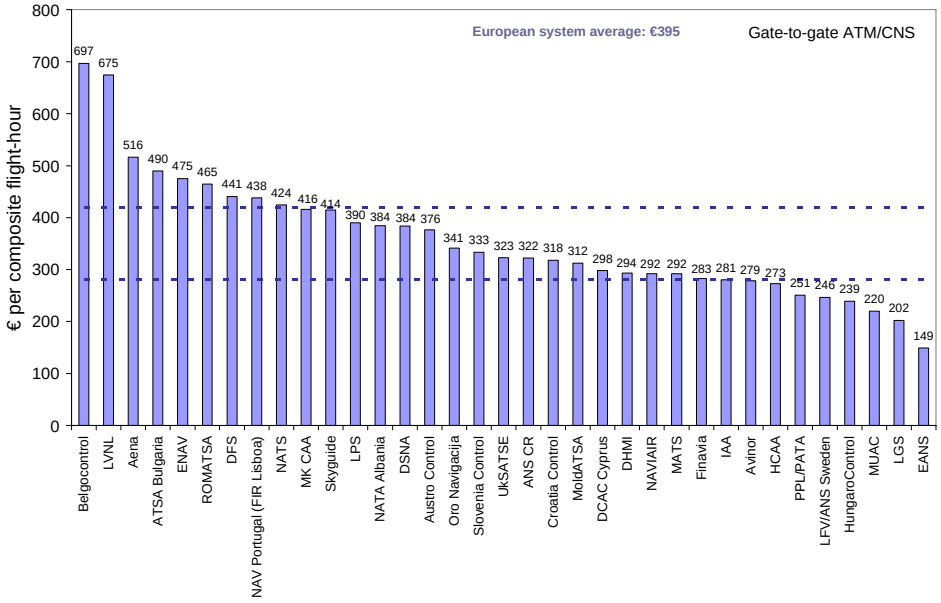


Figure 0.11: Financial cost-effectiveness indicators, 2005

The financial cost-effectiveness KPI at the European level improved in 2005 compared to 2002, with unit ATM/CNS costs falling by -4.7% overall in real terms. This results from traffic growing faster (+11.5%) than total costs (+6.2%) over the period.

This is definitively an encouraging trend, which indicates an improvement in the cost-effectiveness of the European ATM/CNS system. Each percentage point improvement in cost-effectiveness is worth some €65M in terms of "savings" for airspace users.

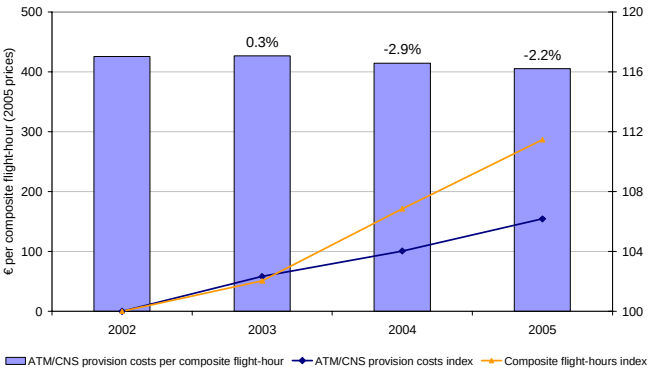


Figure 0.12: Trends in financial cost-effectiveness KPIs (2002-2005, real terms)

Overall trends in financial cost-effectiveness at the European level are sensitive to changes in the five largest ANSPs; these ANSPs account for 63% of costs and can mask quite large changes in other individual ANSPs. Three of the largest ANSPs, DSNA, NATS and DFS have decreased their unit costs in real terms between 2002 and 2005, significantly contributing to the overall -4.7% decrease observed at European system level. However, the other two large ANSPs, Aena and ENAV, increased their unit ATM/CNS provision costs, effectively negating the efforts of 18 "smaller" ANSPs who decreased their unit costs between 2002 and 2005.

Components of the financial cost-effectiveness KPI

Figure 0.13 shows how cost-effectiveness is further broken down into components, allowing examination of underlying economic drivers such as employment costs per ATCO-hour, ATCO-hour productivity and support cost ratio. Two additional ratios (ATCO employment costs and support costs per unit of output) have been added to complement the analysis.

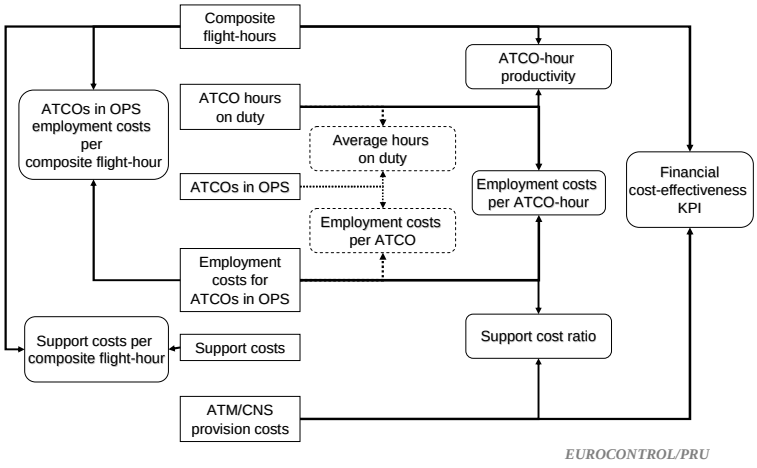


Figure 0.13: Performance framework for gate-to-gate cost-effectiveness analysis

Figure 0.14 shows how the various component ratios contributed to the overall -4.7% decrease in unit ATM/CNS costs at European level during 2002-2005. The improvement in cost-effectiveness at the European level results from an increase in ATCO-hour productivity (+4.4%) combined with a fall in the support cost ratio (-17.0%), which together more than compensate the increase in employment costs per ATCO-hour (+19.8%). Figure 0.14 also indicates how ATCOs employment costs and support costs per unit of output varied. Support costs represent some 71% of total ATM/CNS provision costs, so the relative weight of the latter component is some 2.5 times larger than the former.

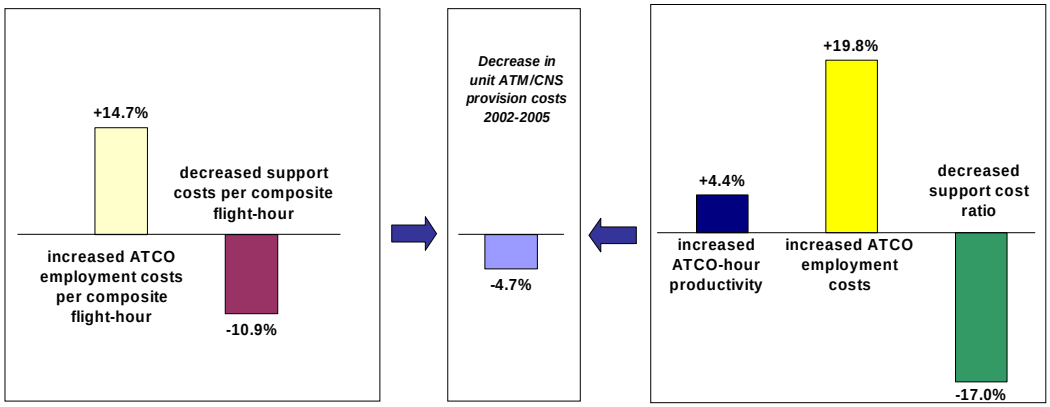


Figure 0.14: Breakdown of changes in financial cost-effectiveness, 2002-2005 (real terms)

This report analyses the 2005 levels and 2002-2005 trends of the various component ratios for all the ANSPs.

ATCO-hour productivity demonstrates the efficiency with which an ANSP deploys and makes use of its ATCO resource. Productivity improvements can be achieved by optimising the processes for ATM/CNS provision, more effective OPS room management, better use of existing resources, and adapting sector opening times to traffic demand patterns.

DFS, NATS and Skyguide, which belong to the most complex grouping of ANSPs, achieve ATCO-hour productivity within the top 25% quartile. DSNA, ENAV and Aena, which are comparable in terms of size with DFS and NATS but with less complexity, achieve lower levels of ATCO-hour productivity. There are clearly several forces at play in the achieved level of ATCO-hour productivity: traffic complexity is an important, but not necessarily the only factor affecting performance.

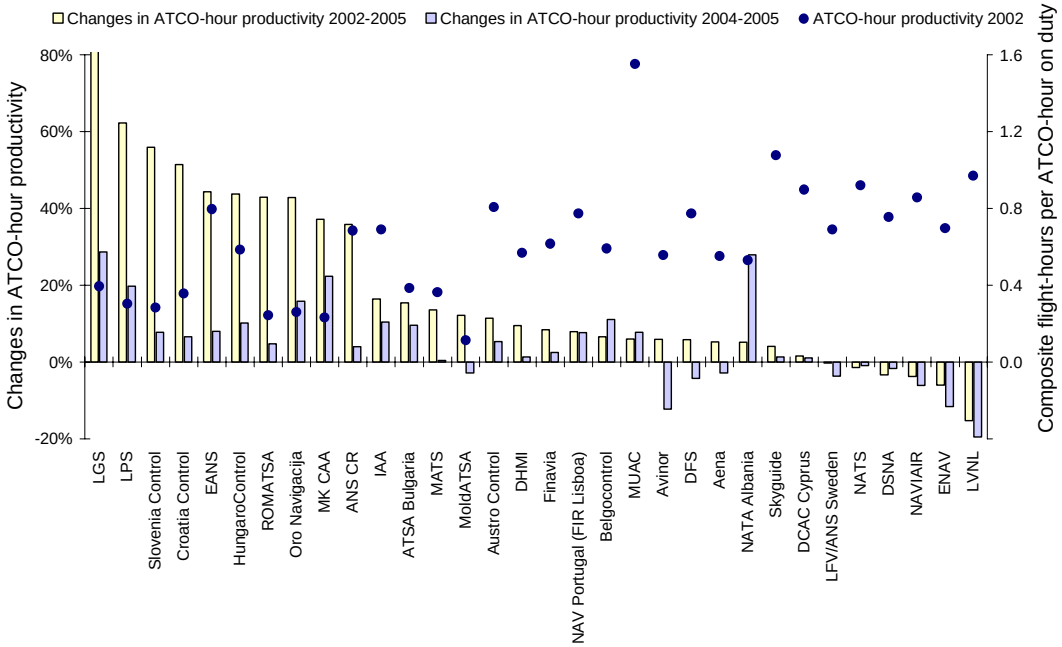


Figure 0.15 Trends in ATCO-hour productivity at ANSP level (2002-2005 and 2004-2005)

Productivity improvements since 2002 are principally due to traffic increasing at a faster rate than the number of ATCO-hours worked. Figure 0.15 shows that productivity

improved for 26 out of the 32 ANSPs that have been reporting since 2002. The largest productivity increases are observed for ANSPs starting with a relatively low base in 2002: these increases were often achieved in a context of high traffic growth and more effective use of spare capacity.

However, ATCO-hour productivity fell by -2% at the European level between 2004 and 2005, primarily because of falling productivity in the five largest ANSPs, DSNA, DFS, NATS, Aena and ENAV. Due to their relative weight, productivity improvements for these five ANSPs (especially in DSNA, ENAV and Aena who achieve lower productivity than DFS and NATS) would have a major impact on the productivity, and hence on the cost-effectiveness, of the European system as a whole.

Employment costs per ATCO-hour rose in real terms for 25 out of 32 ANSPs between 2002 and 2005 (Figure 0.16). When ATCOs in OPS employment costs rise faster than productivity, as they have done between 2002 and 2005, cost-effectiveness will fall unless support costs also fall: hence the importance of effectively managing employment costs.

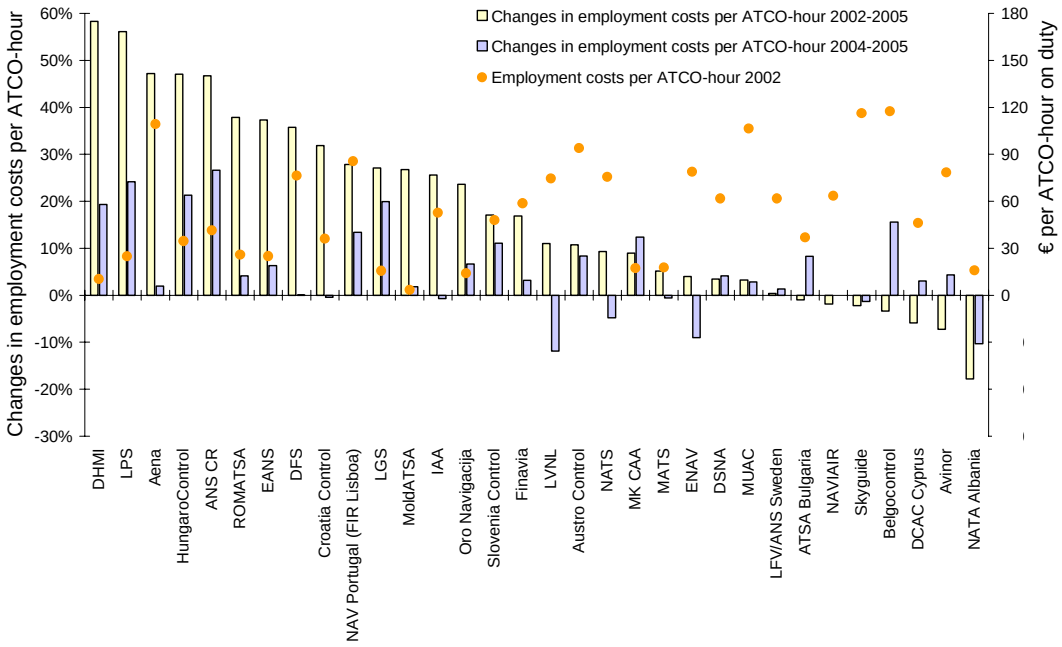


Figure 0.16: Changes in employment costs per ATCO-hour (2002-2005 and 2004-2005, real terms)

The highest growth in ATCO-hour employment costs since 2002 has been in DHMI and LPS. However, both these ANSPs were starting from a very low base. Of the five largest ANSPs, both Aena and DFS have shown substantial increases in ATCO-hour employments costs, and Aena's is now by far the highest in Europe.

Of the ten ANSPs with the **highest** ATCO-hour employment costs in 2002, the average growth in ATCO-hour employment costs has been 23% (12% excluding Aena). The growth amongst the ten ANSPs with the **lowest** ATCO-hour employment costs has been 35%. This would suggest a degree of upwards convergence between ANSPs. Many Eastern European ANSPs now show Purchasing Power Parities-adjusted employment costs per ATCO-hour comparable with Western European ANSPs.

For several ANSPs, such as LVNL, DFS, a major reason for rising employment costs is the implementation of Early Retirement Schemes (for both operational and non-operational staff) and/or additional costs for top-up of the pension fund, often resulting from the requirement to comply with IFRS.

High ATCO-hour employment costs may be compensated for by high productivity, resulting in reduced ATCO employments cost per composite flight-hour. MUAC and Skyguide, which have among the highest ATCO-hour employment costs, have ATCO employment costs per composite flight-hour in the mid-range for Europe, as a result of high ATCO-hour productivity. Aena, with higher employment costs and lower ATCO-hour productivity, has an ATCO employment cost per composite flight-hour which is twice that of the other four largest ANSPs.

The support cost ratio shows the balance between money spent on ATCOs in OPS and all other expenditure including capital costs, support staff costs (total staff costs excluding ATCOs in OPS) and direct operating costs. The average support cost ratio for the European system is 3.5. In other words, for every Euro spent on employing ATCOs in OPS in the European system, an additional €2.5 is spent on other costs. Support cost ratios decreased for 24 of the 32 ANSPs between 2002 and 2005 (Figure 0.17). In some cases the decrease results from the (mechanical) increase in ATCO employment costs, in other cases it results from a genuine decrease in support costs.

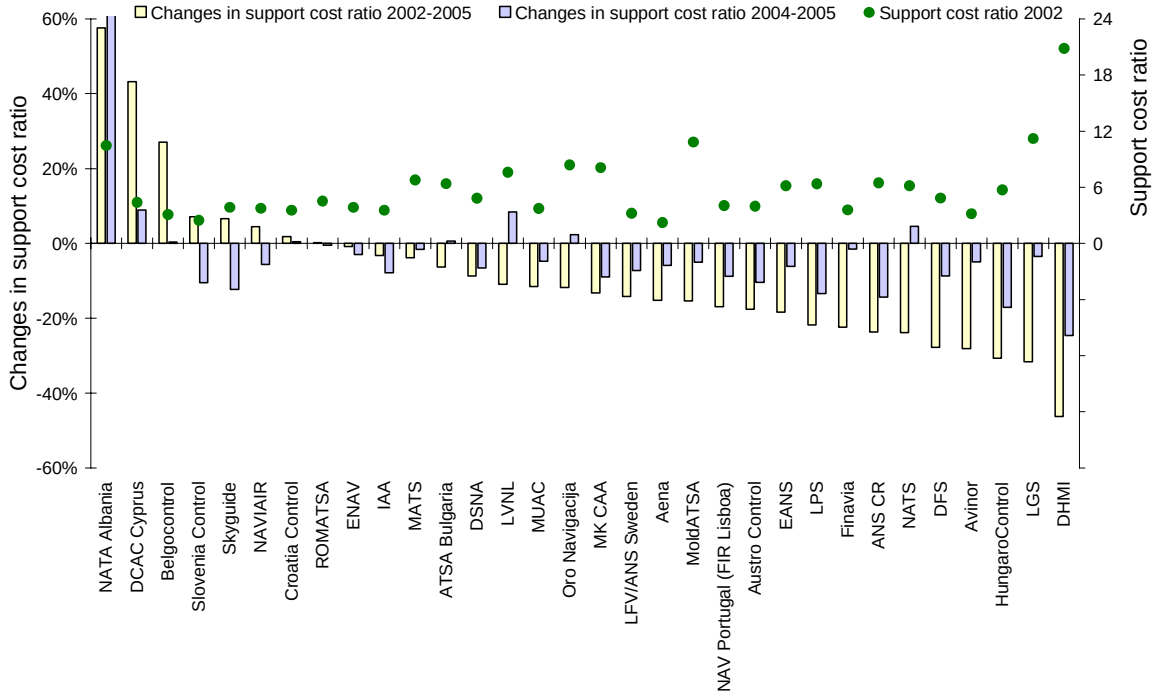


Figure 0.17: Change in support cost ratio at ANSP level, (2002-2005 and 2004-2005, real terms)

High support ratios tend to be observed in Eastern European ANSPs where ATCO employment costs remain comparatively low and/or significant capital-related costs have been incurred due to important investment programmes. "Smaller" ANSPs in terms of traffic volume tend to show higher support cost ratios than the larger ANSPs (although there are exceptions).

Support costs per unit of output is the ratio of support costs to the output. Due to the high proportion of fixed costs in ATM/CNS provision, this ratio can give additional insights to the analysis of support costs and traffic volume/scale effects.

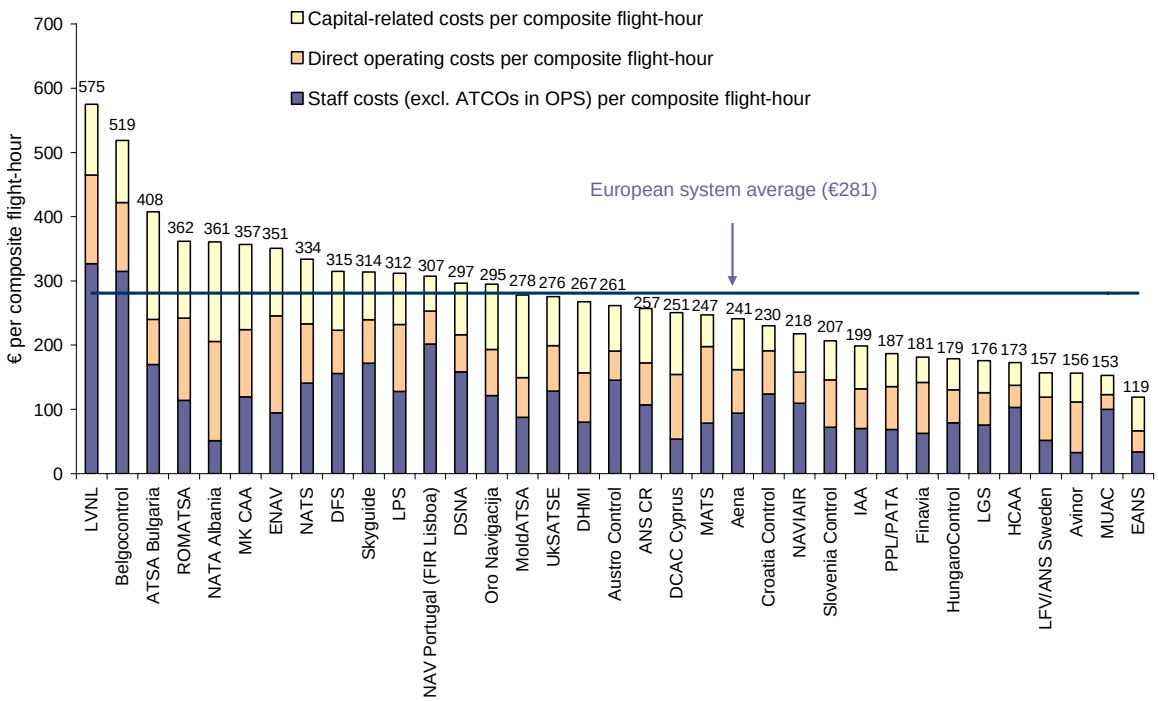


Figure 0.18: Support costs per composite flight-hour, 2005

There are also quite noticeable differences between the largest five ANSPs, which are relatively similar in terms of traffic volume, traffic complexity, and cost of living. Sharing Aena's best practice in terms of unit support costs could potentially be very valuable.

Since support costs represent on average 71% of total ATM/CNS provision costs, reducing these costs would have a major impact on cost-effectiveness; hence the importance of understanding the components of support costs and its drivers.

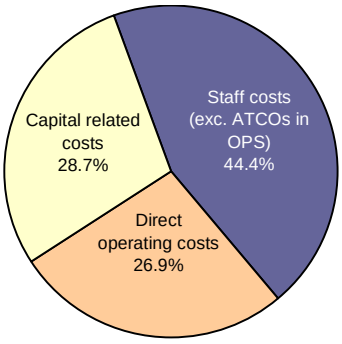


Figure 0.19: Breakdown of support costs (2005)

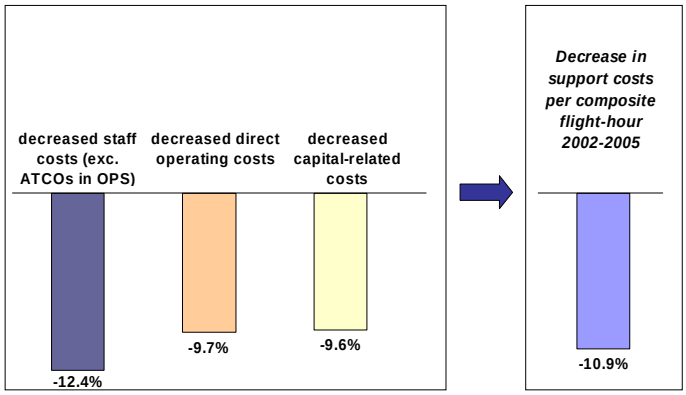


Figure 0.20: Trends in components of support costs per composite flight-hour (2002-2005)

On average across the European sample staff costs (exc. ATCOs in OPS) represent 44% of the support costs (Figure 0.19), although this can vary among ANSPs given the substitution that takes place through outsourcing of support functions. Countries with low employment costs compared to the European average can keep support costs down despite employing large numbers of support staff per composite flight-hour. As variation in cost of living across Europe decreases, these ANSPs will need to reduce in particular their support staff costs per composite flight-hour.

At the European level, reductions in all the components of support cost contributed to the overall reduction in support costs per composite flight-hour since 2002 (Figure 0.20). Of the five largest ANSPs, ENAV has increased its support costs per unit of output since 2002, and is now the highest among the largest five ANSPs. Aena has held its unit

support costs constant by compensating the increase in capital-related costs with a reduction in direct operating costs, and it now has the lowest unit support costs among the largest five ANSPs. DSNA, DFS and NATS all reduced their unit support costs, but these are still above the European average.

Forward-looking financial cost-effectiveness KPI (2006-2010)

Figure 0.21 shows the aggregate projections of gate-to-gate unit ATM/CNS costs for the ANSPs that provided forward-looking information until 2010.

The gate-to-gate unit costs at the European system level are planned to gradually decrease until 2010, although the magnitude of the decrease is moderate (an average rate of some -1.4% per annum). This decrease results from gate-to-gate ATM/CNS provision costs planned to grow at a slower rate than traffic until 2010.

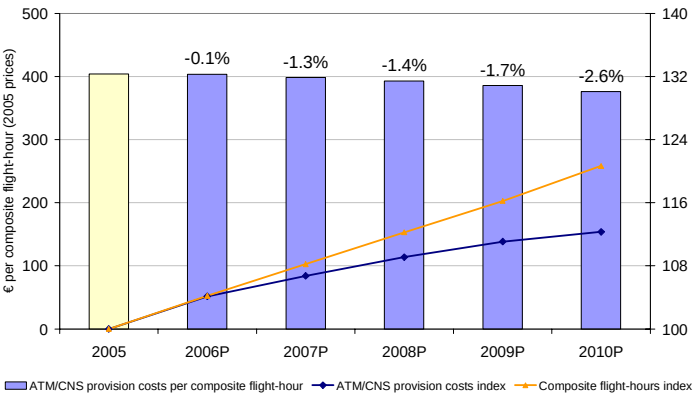


Figure 0.21: Forward-looking cost-effectiveness at European system level (2005-2010, real terms)

This is definitively an encouraging trend in terms of cost-effectiveness performance which confirms the decreasing trend in gate-to-gate unit costs which started in 2003. On the other hand, this decreasing trend is less marked than the trend published in the Performance Review Report 2006 in which the **en-route unit ANS costs** are expected to decrease at an average rate of some -2.5% per annum (closer to the PRC's -3% notional objective). This difference can be clearly traced to different planning assumptions and different scope of services considered in the PRR 2006 (national en-route ANS costs, including MET, EUROCONTROL and regulatory costs) and in this ACE 2005 Report (gate-to-gate ATM/CNS provision costs which are controllable by ANSPs).

The overall decreasing trend in planned gate-to-gate unit costs at European level is not uniform across Europe. While most ANSPs show stable or falling unit costs, some plan for increases, in some cases very substantial ones (Figure 0.22). In some of these cases, the unit cost increases can be clearly linked to pressing needs for new capacity to deal with rapidly growing traffic; in others it is not so clear (ANSPs highlighted in a pale colour did not provide sufficient information to derive a gate-to-gate unit ATM/CNS provision costs profile for the 2005-2010 period).

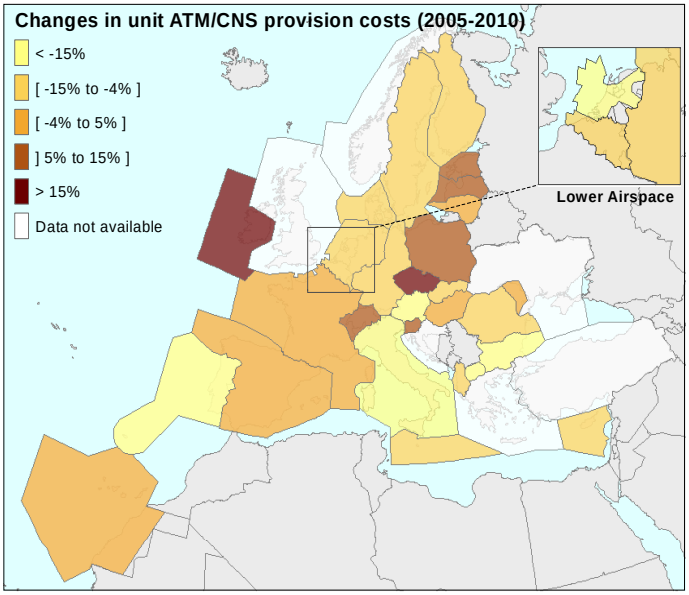


Figure 0.22: ANSPs planned changes in gate-to-gate unit costs (2005-2010, real terms)

This report provides details on the cost-effectiveness performance projections of each of the ANSPs disclosing information, including comprehensive information on past and planned ATM capital expenditures making it a unique source for understanding the investment cycles. At European level, capex are planned to increase until 2007 (and reach some €1300M). Some 66% of the total capex in 2005 originated from the five largest ANSPs. ENAV and NATS have the most ambitious capex programme for the 2006-2010 period (around €1000M).

In future years it is expected that the quality and coverage of this forward-looking information will improve further, and that the consistency with other planned and projected information will be clearer. Most importantly, further years' analysis will allow the quality of ANSPs' achievement of planned outcomes to be assessed.

Comparison of ATCO productivity at ACC level

The ACE 2005 data set comprises 66 ACCs, the same figure as for 2004 (given the addition of Warszawa ACC and the decommissioning of Sundsvall ACC). No cost data are available at the ACC level and so the full cost-effectiveness framework could not be applied. The analysis has focused, therefore, on average ATCO-hour productivity at each of the 66 ACCs.

Average ATCO-hour productivity in an ACC ranges from 2.4 flight-hours per ATCO-hour to 0.07 flight-hour per ATCO-hour. The wide dispersion among ACCs and the fact that at European system level ATCO-hour productivity is less than one (0.86) suggest that there is scope for productivity improvement in the en-route environment.

For 44 ACCs out of the 66 ACCs, the average ATCO-hour productivity is less than one. However, the European ACCs operate in very different operational environments across Europe, in particular in terms of traffic complexity and traffic variability. Therefore productivity at ACC levels has also been discussed in the context of some traffic complexity characteristics which have been quantified and deemed important for benchmarking purposes. This has led to the identification of four different ACCs groupings (clusters): from the high traffic complexity ACCs operating in a lower airspace environment to the low complexity ACCs operating with four sectors or fewer. Intra and inter-cluster differences in ACC productivity are noticeable (Figure 0.23). Not surprisingly, the ten ACCs providing services predominantly in lower airspace with high structural complexity (Cluster 1) display the lowest average productivity, while the ten ACCs with the highest adjusted density and operating at mid to high flight levels (Cluster 2), display the highest overall productivity.

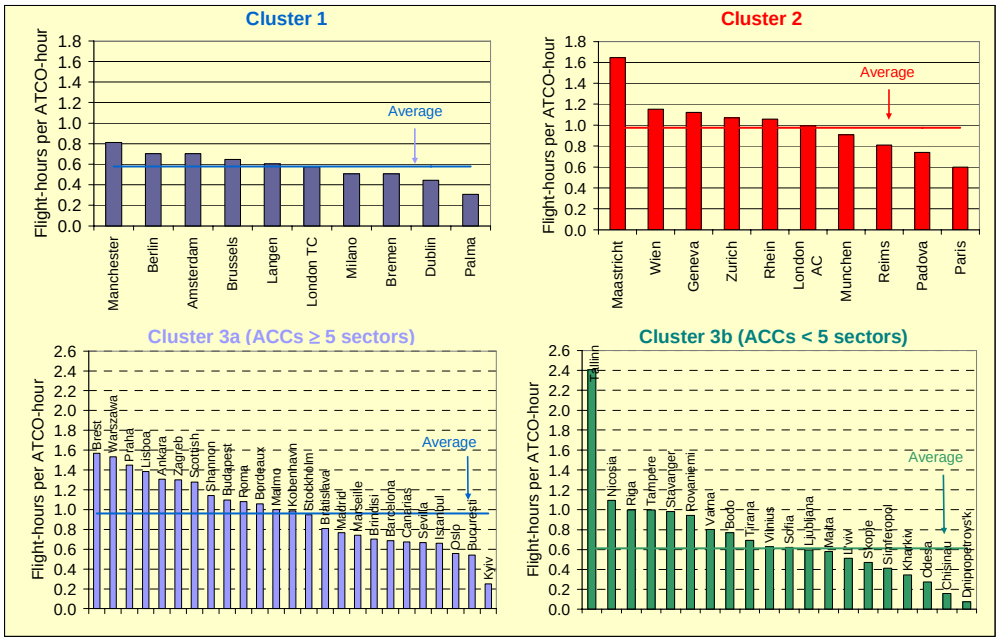


Figure 0.23: Summary of productivity results for each cluster, 2005

The analysis of ATCO-hour productivity at ACC level indicates that, whilst complexity measures are helpful in providing a way of clustering ACCs into broadly consistent groups, there are still large differences in productivity performance across individual ACCs within these clusters. Several factors are likely to affect ATCO-hour productivity within the various clusters, in particular an ACC's capability to adapt its resources to handle the traffic. Low productivity might be due to spare capacity and low utilisation of the available resources, especially in the less dense, less complex, ACCs. Incidentally, the latter ACCs tend to also experience higher seasonal traffic variability.

Other factors as yet unidentified (and not measured) could also affect ATCO productivity performance and further work would be needed to establish an empirical relationship between productivity and its drivers. The analysis of average sector productivity and average staffing per sector - two sub-components of ATCO-hour productivity - provides useful insights into the different productivity performance achieved by the various ACCs and is a tool to identify best practices and areas where potential improvements are possible.

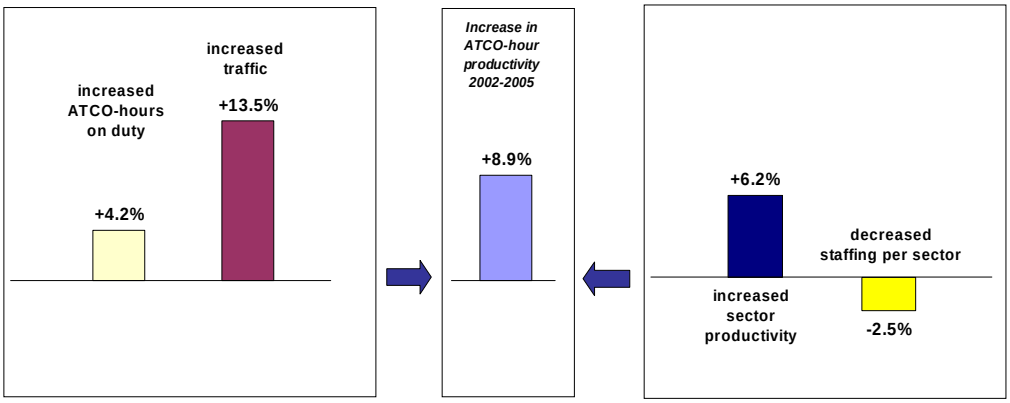


Figure 0.24: Breakdown of changes in ACC ATCO-hour productivity, 2002-2005

Overall, for the 32 ANSPs for whom ACC data has been consistently available since 2002, there has been a +8.9% improvement in ACC ATCO-hour productivity since 2002, driven by a 13.5% increase in traffic, offset by a +4.2% increase in the number of ATCO-hours worked (Figure 0.24 – left-hand side). From a different perspective, the increase in ACC ATCO productivity at European level results from a +6.2% increase in average

sector productivity coupled with a -2.5% reduction in staffing per sector (Figure 0.24 – right-hand side).

Many ACCs experienced an increase in ATCO-hour productivity since 2002. This is most significant in the low complexity ACCs which benefited over the period from strong traffic growth increases (>25%), allowing more effective use of spare capacity and existing resources. The dispersion in the level of ACC ATCO-hour productivity across ACCs has tended to reduce over time, implying some convergence in the level of ATCO-hour productivity within European ACCs.

Economic cost-effectiveness KPI

The economic-cost-effectiveness indicator takes into account the economic cost to airspace users of (ground-based) ATFM delays which can result from both en-route and terminal service provision. There are other, significant costs to airspace users (such as horizontal route extension, non-optimal vertical profile, airborne delay) that have not been considered due to lack of data.

One minute of ATFM delay has been assessed at €76 (for delays greater than 15 minutes). Unavoidably, there is some uncertainty in this estimate and, hence, corresponding cost estimates should be viewed with care.

The European economic cost-effectiveness KPI for 2005 is €457. ATFM delays contributed 14% (i.e. €63) to the total economic cost-effectiveness in 2005, with airport ATFM delays now contributing over half (52%) of the total cost of delays (Figure 0.25).

The European economic cost-effectiveness KPI improved in 2005 compared to 2002, falling by -5.7% overall in real terms, which is a positive performance improvement. This results from a significant reduction of delays (2002 and 2003) and improvement in financial cost-effectiveness (2004 and 2005).

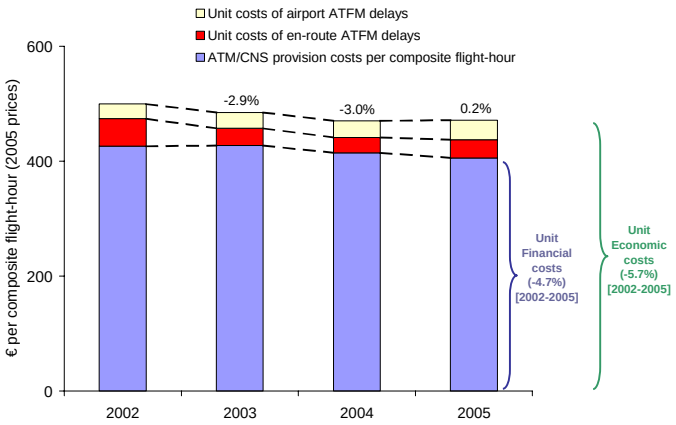


Figure 0.25: Trend in gate-to-gate economic cost-effectiveness KPI (2002-2005, real terms)

The decrease in the economic cost per unit output at European level between 2002-2005 masks contrasting levels and trends across the 32 ANSPs which comprise the sample: the economic cost per composite flight-hour fell for 19 of the 32 ANSPs. Differences in the investment cycle can affect the economic cost-effectiveness either through high levels of delay **prior** to a major ATM investment, or through high capital-related costs **after** the major ATM investment. This indicates the need to look at a longer time period than the currently available four years, which will be possible in the future as the series builds up.

The ten most "complex" ANSPs all experienced some ATFM delays in 2002 and 2005 (Figure 0.26). DFS and especially NATS and MUAC show a marked improvement in economic cost-effectiveness. For these ANSPs the improvement results from reductions in both unit ATM/CNS provision costs and ATFM delays. Due to its relative weight, NATS reduction of ATFM delays contributed greatly to the overall decrease observed at European system level.

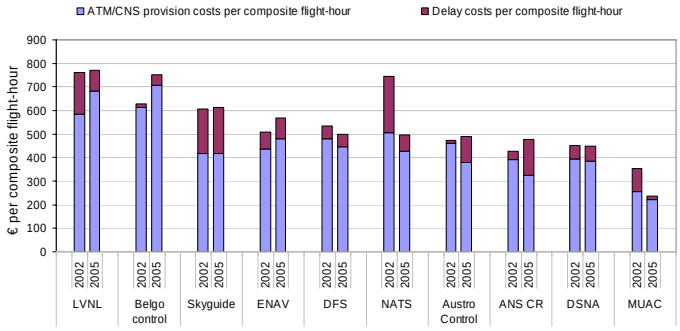


Figure 0.26: Comparison of economic gate-to-gate cost-effectiveness for the ten most "complex" ANSPs (2002-2005)

Increases in ATFM delays visibly contributed to an increase in the unit economic costs for ANS CR and Austro Control (Figure 0.26). Similar contrasted levels and trends are observed for the 25 less "complex" ANSPs (Figure 0.27).

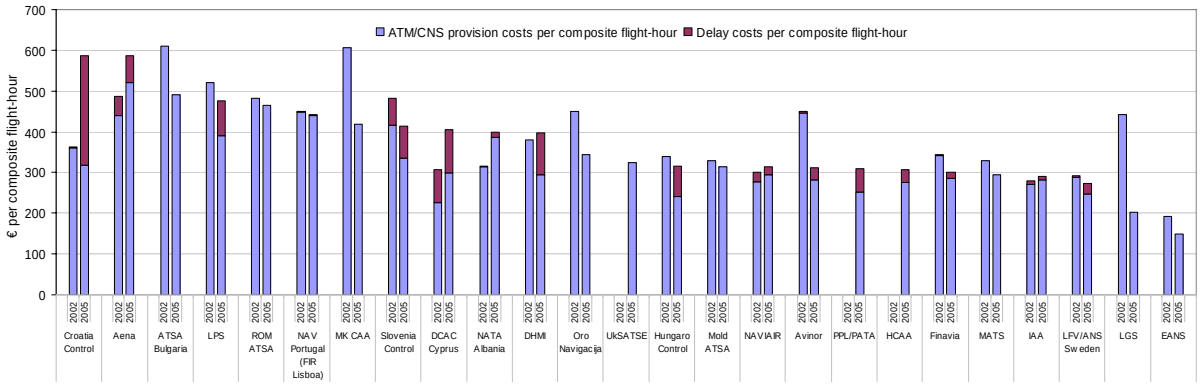


Figure 0.27: Comparison of economic gate-to-gate cost-effectiveness for the 25 less "complex" ANSPs (2002-2005)

Several ANSPs did not experience ATFM delays in 2002 and 2005, despite high traffic growth. The ANSPs which experienced little or no ATFM delays all reduced their ATM/CNS provision costs (LGS, EANS, MATS, MoldATSA, Oro Navigacija, MK CAA, ROMATSA, ATSA Bulgaria and NAV Portugal). For all these ANSPs it is important to continue to provide ATC capacity in line with a growing demand before ATFM delays start to cause problems of economic cost-effectiveness.

For several other ANSPs (e.g., LFV/ANS Sweden, Avinor, Finavia, HungaroControl, LPS and Slovenia Control) the fall in unit ATM/CNS provision costs more than compensated for the rise in ATFM delays, illustrating the potential trade-off existing between quality of service and financial cost-effectiveness. Croatia Control, DHMI, HungaroControl and LPS experienced high delays in 2005, compared to little or no delays in 2002. All four of these ANSPs experienced large traffic growth between 2002 and 2005. Of these, only Croatia Control and DHMI experienced an increase in its unit economic costs, which for Croatia Control are now equivalent to those of Aena.

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1 INTRODUCTION

The Air Traffic Management Cost-Effectiveness (ACE) 2005 Benchmarking Report commissioned by EUROCONTROL's independent Performance Review Commission (PRC) is the fifth in a series of reports comparing the ATM cost-effectiveness of EUROCONTROL Member States' air navigation service providers (ANSPs)[1].

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 Information Disclosure[2], in all EUROCONTROL Member States.

The ANSPs analysed in this report are very diverse in terms of airspace controlled, scope of ANS services provided, and organisational structure. So that the sample is consistent for the comparison of ATM performance, and also because 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 the report is primarily a cross-sectional analysis of ANSPs for the year 2005. However, the aviation community is interested in measuring cost-effectiveness trends at the European and ANSP level and in understanding the reasons why differences occur. Hence, this report makes use of previous years' data to examine changes over time, where relevant and valid. In this context, the report provides an indication of the responsiveness of the European ATM industry to the general upturn in traffic since 2002, a year which corresponds to the start of a new business cycle in the industry, as shown in Figure 1.1 below. In 2005, the upturn in traffic seen in 2003 and 2004 continued.

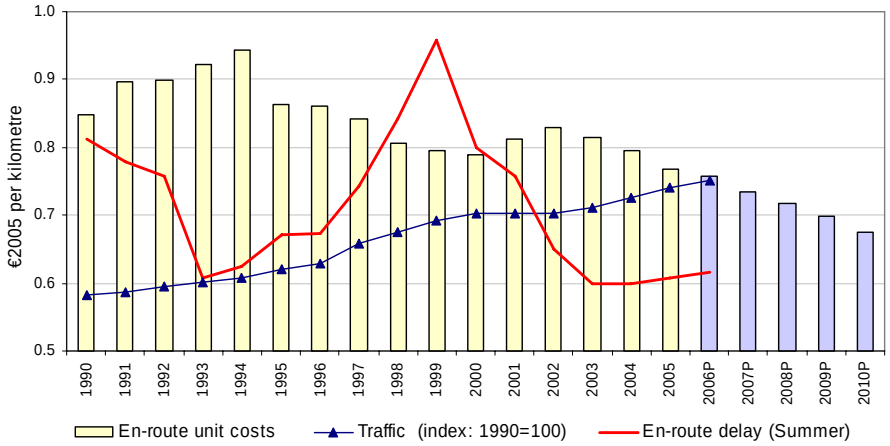


Figure 1.1: The development of en-route ANS unit costs, traffic, and en-route delays (1990-2010), real terms

[1] Previous reports in the series were ACE 2001, published in September 2003; ACE 2002, published in May 2004; ACE 2003, published in April 2005 and ACE 2004 published in June 2005. All can be found on the PRC web site at http://www.eurocontrol.int/prc/.

[2] PRC Specification for Information Disclosure - Version 2.5, June 2006, can be found on the PRC web site.

1.1 Organisation of the report

This report follows a slightly different structure to that used in the previous ACE reports. The main areas of analysis remain the same as in the 2004 report, which will allow for traceability and comparability of results. However, the organisation of the report has been altered to assist understanding and clarity, particularly for the new reader.

Chapter 1 provides an overview of the participating ANSPs and outlines the processes involved in the production of this report. Following this, the report is divided into three parts.

Part I provides an overview of the economics of the European ATM system with a focus on the supply side.

- Chapter 2 presents the key 2005 data for the European ATM system;
- Chapter 3 reviews the components of ANS costs and the relationships between them at ANSP level. It also explains how the PRU makes the data adjustments to ensure comparability of ANSPs cost-effectiveness performance;
- Chapter 4 considers the importance of both quality of service and exogenous factors (such as cost of living, traffic variability and traffic complexity) when assessing and benchmarking the performance of an ANSP.

Part II focuses on the financial cost-effectiveness of ANSPs, based on their gate-to-gate ATM/CNS costs per unit of traffic output.

- Chapter 5 compares ANSPs' financial cost-effectiveness and the various components of cost-effectiveness (productivity, employment costs, and support costs);
- Chapter 6 looks at how financial cost-effectiveness and its components have changed over time;
- Chapter 7 analyses ANSPs' five-year data projections, as disclosed to the PRU, and makes inferences with respect to future financial cost-effectiveness performance. It also displays and considers current average accounting life of assets in operations, depreciation and future capital expenditure for each ANSP;
- Chapter 8 offers a detailed analysis of productivity at ACC level, how this relates to traffic characteristics, and how it has changed over time.

Part III looks at economic cost-effectiveness, which includes a quality of service measure which currently focuses only on the ATFM delays attributable to ANSPs. Given the likely trade-offs at play, a measure of quality of service is important in considering the performance of an ANSP. This analysis is expected to expand in future years, as more data becomes available for analysis.

- Chapter 9 compares ANSPs' economic cost-effectiveness and considers how it has changed over time.

1.2 Overview of participating ANSPs

In total, 35 ANSPs reported 2005 information 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 three Baltic States provided data on a voluntary basis for inclusion in the analysis. The 35 include a full information disclosure from the Polish ANSP, PPL/PATA. This information will be included for the first time in the ACE data analysis. With the exception of NATS[3], all the reported information relates to the calendar year 2005.

[3] For NATS, the disclosed data relate to the financial year 1 April 2005 to 31 March 2006.

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

(*) States covered by the SES Regulations
(**) States part of the ECAA

Table 1.1: States and ANSPs participating in ACE 2005[4]

Table 1.1 shows the organisational structure and the scope of ANS services provided by each of the ANSPs. It shows (as of 1st of January 2007) which ANSPs are part of the Single European Sky (SES), and hence subject to relevant SES regulations and obligations. Furthermore, it should be noted that on 9 June 2006, the Council of the European Union approved the signing of an Agreement relating to the establishment of a European Common Aviation Area (ECAA)[5]. Article 13 of this Agreement stipulates that "the contracting parties shall cooperate in the field of air traffic management with a view to extending the Single European Sky to the ECAA". The rules which are applicable in the scope of this Agreement comprise the SES regulations[6]. As observed in Table 1.1 only Moldova, Turkey and Ukraine are not covered by the SES regulations.

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

[4] Note that as of 1 January 2006 and following the separation between service provision and regulation, the ANS division of Finland CAA became Finavia. Similarly, as of 1 April 2007, the Polish Air Navigation Services Agency (PANSA) shall be established as an independent entity separated from the "Polish Airports" State Enterprise PPL.

[5] Decision 2006/682/EC published on 16 October 2006 in the Official Journal of the European Union. States which have signed this Agreement comprise the Republic of Albania, Bosnia and Herzegovina, the Republic of Bulgaria, the Republic of Croatia, the former Yugoslav Republic of Macedonia, the Republic of Iceland, the Republic of Montenegro, the Kingdom of Norway, Romania and the Republic of Serbia.

[6] For the time being, the framework regulation (EC No 549/2004), the service provision regulation (EC No 550/2004), the airspace regulation (EC No 551/2004), the interoperability regulation (EC No 552/2004), the common requirements for the provision of ANS (EC No 2096/2005) and the common rules for the flexible use of airspace (EC No 2150/2005).

across ANSPs, such costs, relating to oceanic ANS, military operational air traffic (OAT), airport management operations and payment for delegation of ATM services[7] were excluded to the maximum possible extent. More detailed information on each ANSP can be found in individual Fact Sheets in Annex 7.

1.3 Data submission, validation, processing and reporting

The Specification for Information Disclosure (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. Unfortunately, by 15 July 2006 only 16 out of 35 submissions had been received, as indicated in Figure 1.2 below. It is important that the ACE benchmarking exercise is seen as timely since several stakeholders, most notably ANSPs' management, have a keen interest in receiving the information in the ACE reports as early as possible. Clearly, the timescale of production of a benchmarking report is inevitably delayed if data is not submitted on time.

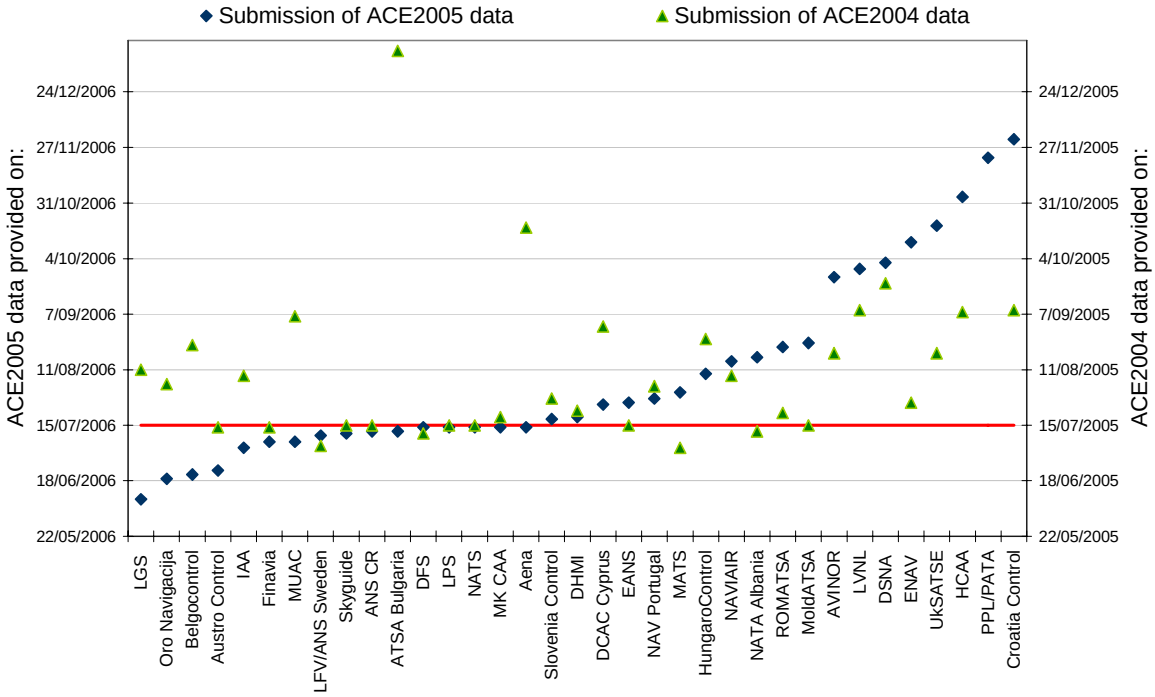


Figure 1.2: Progress with submission of 2005 data

Figure 1.2 compares the dates of 2004 and 2005 data submissions. It is noteworthy that for some ANSPs such as Croatia Control, DSNA, HCAA and LVNL there are recurrent delays in the provision of data. On the other hand, Aena and ATSA Bulgaria, who both delivered 2004 data quite late, provided 2005 data on time.

HCAA Greece did not provide a complete and consistent set of data for 2005. It should be noted that both the quantity and quality of data provided by HCAA are currently not adequate for cost-effectiveness performance measurement. Key operational data, such as the number of air traffic controllers, were not made available to the PRU. On the financial data, neither terminal ANS costs, nor the value of fixed assets could be provided. The overall reporting has not improved since 2001 data. This raises an issue of lack of commitment and concerns about transparency. As a result, only high level figures for HCAA could be included in this report.

However, the process for collecting cost-effectiveness related data is maturing and the data is becoming more consistent from year to year. Once the data was received, it was

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

necessary to undertake an extensive validation of the data, to ensure high data quality standards and to establish a common understanding of the data submitted. The Performance Review Unit (PRU) is now able to use experience from earlier years to validate the data more effectively, although this still remains a labour-intensive process given the number of ANSPs and the different maturity level of data reporting.

The PRU is supported by a dedicated ACE Working Group (WG), comprising regulatory authorities, ANSPs and airspace users' representatives. The process leading to the production of the ACE report, which comprises data validation, analysis and consultation, is summarised in Figure 1.3 below.

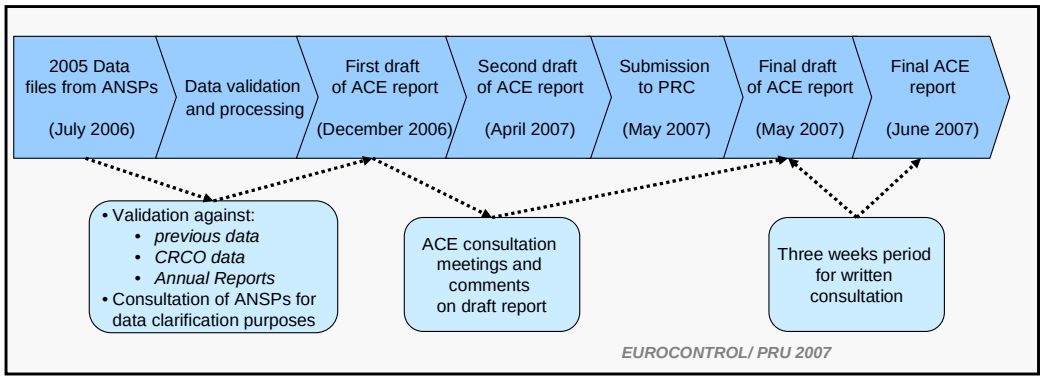


Figure 1.3: Data validation, processing and reporting

CFMU data is used to obtain the output metrics. This ensures that the figures used in the analysis are comparable and consistent across ANSPs[8].

The quality of the financial data remains problematic in some areas, particularly in the allocation of costs between en-route ANS and terminal ANS:

- Annual Reports with disclosure of financial accounts are not available for some ANSPs (see Section 1.4 below), which 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 the 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 validated;
- HCAA Greece is still unable to identify terminal ANS costs, as it did not use a cost accounting system in 2005. Therefore, not only is an important share of ANS costs missing, but also the confidence in the submitted en-route costs is reduced;
- HungaroControl, DCAC Cyprus and Croatia Control recover both their en-route and terminal ANS costs through en-route charges, and therefore appear not to be compliant with the Principles for establishing the cost-base for route facility charges and the calculation of the unit rate[9]. This affects their en-route cost-effectiveness performance measurement. DCAC Cyprus and HungaroControl were able to provide an estimate and a disclosure of their terminal ANS costs. It should be

[8] At the time of writing this Report, a discrepancy appeared between CFMU data and DHMI output figure. This difference is investigated by the CFMU and DHMI. As this investigation is not completed, CFMU figures are used in this Report.
[9] EUROCONTROL, Central Route Charges Office, Doc. Number 04.60.01, Nov. 2004.

noted that a terminal ANS charge has been introduced in Hungary on January 2006. On the other hand, Croatia Control was not able to provide terminal ANS costs despite plans to introduce a terminal ANS charge during 2006.

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, some of these shortcomings should be overcome (see also Section 1.4 below).

At the time of writing this report, the PRU has been working to develop a revised version of the Specification for Information Disclosure (SID). The revised version was necessitated by the new requirements for performance review in the SES legislation (Art 11, Framework Regulation) and for consistency with the Common Charging Scheme Regulation which was adopted on 6 December 2006. The revised SID is an opportunity both to improve the quality and usefulness of performance review. It will also facilitate enhanced comparability among ANSPs, as this is an important element which emerged during the five years' experience in the use of the SID. The revised SID is expected to apply for the ACE 2008 data submission in 2009.

1.4 ANSPs' Annual Reports

ANSPs' Annual Reports provide a valuable means of validating the 2005 information disclosure data.

The SES Service Provision Regulation (SPR) (EC No 550/2004) came into force on 20 April 2004 and is applicable to 2005 Financial Accounts in all EU Member States (including Switzerland and Norway) and to associated ANSPs. This Regulation is also expected to be soon applicable to States which have signed the ECAA Agreement (see section 1.2). Among other provisions, the SPR requires that ANSPs meet certain standards of information disclosure (transparency) and reporting, and in particular that:

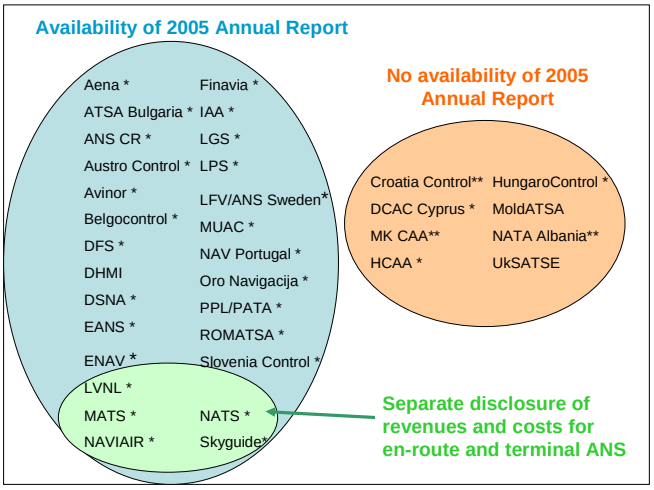
- ANSPs should draw up, submit to audit and publish their Financial Accounts (Art.12.1);
- In all cases, ANSPs should publish an Annual Report and regularly undergo an independent audit (Art 12.2);
- ANSPs should, in their internal accounting, identify the relevant costs and income for ANS broken down 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 own, manage and operate airports, such as Aena, LFV, Avinor, Finavia, HCAA, PPL/PATA[10] and DHMI[11].

[10] This issue will be addressed since, as of 1 April 2007, the Polish Air Navigation Services Agency (PANSA) shall be established as an independent entity separated from the "Polish Airports" State Enterprise PPL.
[11] Although it should be noted that DHMI is not covered by the SES Regulations.

Only 27 out of 35 participating ANSPs have published an Annual Report for the year 2005.

The PRU considers that an Annual Report produced according to "best practice" should comprise the three main components: a Management Report, Annual Financial Accounts with relevant notes and an independent Audit Report. Figure 1.4 displays the status of ANSPs 2005 Annual Reports.

Eight ANSPs (including 3 who are subject to SES Regulations) have not published annual reports for 2005.



* ANSPs covered by the SES Regulations (see also Table 1.1)

** ANSPs operating in States member of ECAA (see also Table 1.1)

Figure 1.4: Status of 2005 Annual Reports

1.5 Use of published ACE data and reports

It is evident from discussions in the ACE WG and through the PRU's knowledge of projects occurring throughout European ANS that ANSP management, airspace users and regulators are starting to make use of the ACE data and the underlying analytical framework in the course of their own work. More specifically, the PRU is aware that:

- Several ANSPs are using the various ACE indicators to monitor and plan their cost-effectiveness performance, for example to identify the various performance objectives to be reported as part of the Common Requirements Regulation (EC No 2096/2005);
- ICAO ANSEP economic performance framework heavily draws upon the framework developed by the ACE WG;
- European ANSPs are encouraging world-wide CANSO members to use, for benchmarking purposes, the same KPIs as developed by the ACE WG;
- National economic regulators have used the data and findings from ACE to inform their judgement as to how to economically regulate the performance of ANSPs or to set "Management Contract";
- Airspace users' representatives are using the data and findings from ACE to conduct more effective and informed bilateral consultation with the ANSPs.

1.6 Conclusions

The information provided in the ACE reports is being used strategically by a number of stakeholders, most noticeably ANSP management and airspace users. It is also being used, increasingly, by those interested in the overall cost-effectiveness of the European ANS system.

This year for the first time, the Polish ANSP, PPL/PATA, has provided full disclosure of data for 2005 and is included in the analysis. Overall, the quality of the data received is improving. However, submission of data for the report is not satisfactory since more than half of the respondents missed the deadline. This affects the timely analysis of the data and production of the ACE report. Scope for improvement is expected so that the PRU can receive the data submission in a timely manner.

HCAA was not in a position to provide a complete and consistent set of data for 2005: both the quantity and quality of data are currently not adequate for cost-effectiveness performance measurement. As a result, only high-level figures for HCAA could be included in this report. Scope for improvement is expected so that HCAA can fully comply with the requirement from Decision No. 88 of the Permanent Commission of EUROCONTROL.

Eight ANSPs (including three who are subject to the SES Regulations) have not published annual reports for 2005. Transparency on financial information is particularly relevant for the ANSPs which own, manage and operate airports, such as Aena, LFV, Avinor, Finavia, HCAA, PPL/PATA and DHMI. Art 12.3 of the SES Service Provision Regulation requires ANSPs to 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. The quality, consistency and comparability of the financial data for the ACE submission are expected to greatly enhance with the implementation of this requirement.

PART I: EUROPEAN ANS DATA AND INTRODUCTION TO ANSP BENCHMARKING

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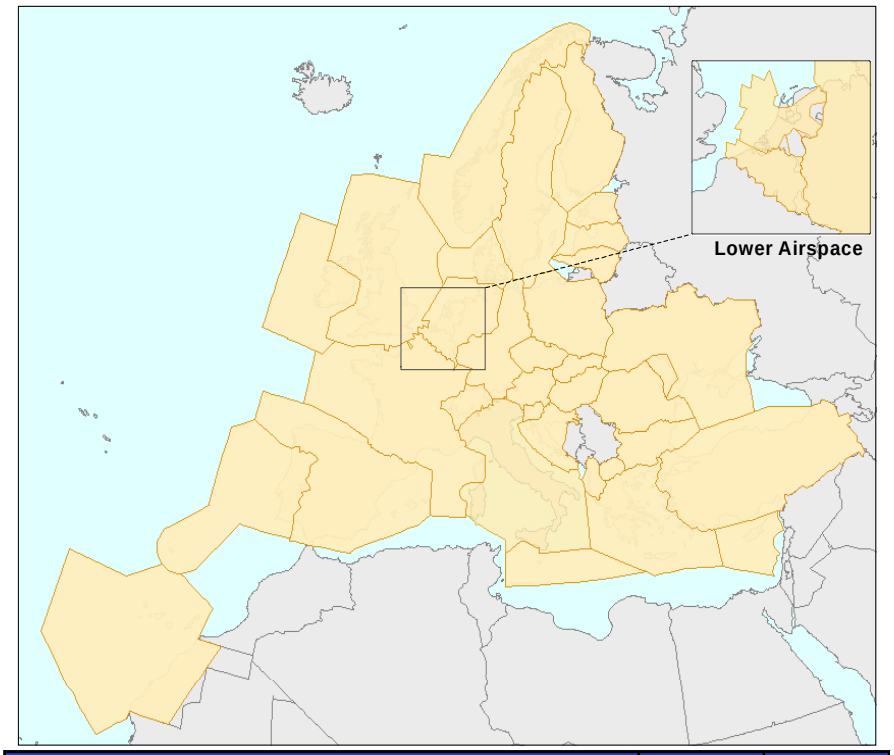
2 EUROPEAN ANS SYSTEM DATA

This chapter provides aggregate information on the European ANS system[12] reported, in compliance with the Specification for Information Disclosure for the year 2005.

This includes all EUROCONTROL Member States as of 1 January 2005, with the exception of Bosnia-Herzegovina, for which information was not requested[13]. In addition, it includes the three Baltic States (Estonia, Latvia and Lithuania), which provided information on a voluntary basis. For the purpose of this report, oceanic airspace was excluded. The area covered by the information disclosed is shown in Figure 2.1. It should be noted that for the first time, data from the Polish ANSP, PPL/PATA, has been included.



Key Data for the European ANS system	2004	2005
ANSPs	34	35
Area Control Centres (ACCs)	66	66
En-route sectors at maximum configuration	613	638
Approach Units (APPs)	202	209
Towers (TWRs)	408	420
AFIS units	94	96
Flight-hours controlled (M)	11.8	12.6
Distance controlled (km) in charging area (M)	7 680	8 293
IFR airport movements (M)	14.1	14.8
Total Air Navigation Service Providers (ANSPs) staff	53 631	55 239
Air Traffic Controllers in Operational duty (ATCOs in OPS)	15 689	16 507
Gate-to-gate ANS costs (€ M)	7 108	7 418
Gate-to-gate ANS revenues (€ M)	7 332	7 280
Gate-to-gate ATM/CNS capital employed (€ M)	7 643	7 571

Figure 2.1: Geographic coverage of ACE 2005 data & key data

[12] For the purpose of this report, the "European ANS system" includes all 35 ANSPs that submitted data following the requirement from Decision No. 88 of the Permanent Commission of EUROCONTROL. This chapter includes some high-level figures for HCAA.

[13] Indeed, en-route ATM/CNS provision is delegated to Croatia Control and to the Serbian ANSP (Smatsa).

Over the five years of the production of ACE reports, ACE has provided increasing coverage of a growing system, as demonstrated in Figure 2.2 which illustrates the size of the system using total IFR flight-hours controlled.

Following an initial small decline between 2001 and 2002, the output of the system has resumed its increase and is now 11% higher than in 2001. At the same time, more ANSPs have been participating in information disclosure, and that has increased the coverage of ACE by around 10%.

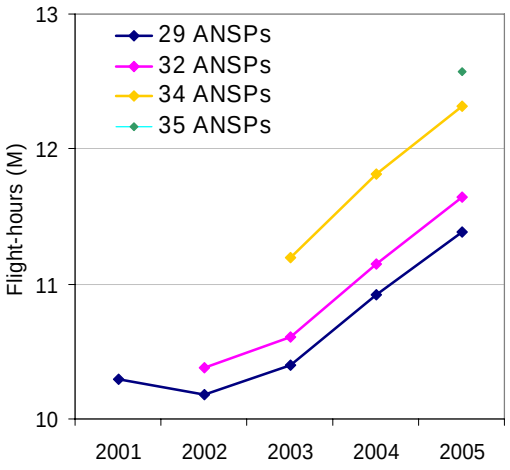


Figure 2.2: Trends in output and size of the system under ACE review

2.1 System outputs

In 2005, European ATC operational units controlled 12.6M flight-hours over a total distance of 8 293M kilometres[14]. The various TWR units handled 14.8M IFR airport movements and 3.7M VFR airport movements.

In ACE 2001 (Chapter 4) the concept of "composite flight-hours" was introduced, to reflect the fact that the service provided by ANSPs is "gate-to-gate" and that difference in the boundaries used by different ANSPs between terminal and en-route ANS could distort the picture obtained if they were considered individually. Composite gate-to-gate flight-hours were defined as en-route flight-hours **plus** IFR airport movements weighted by a factor that reflected the relative (monetary) importance of terminal and en-route costs in the cost base. Details of the calculation are shown in Annex 2, and the definition[15] is:

Composite gate-to-gate flight-hours = (en-route flight-hours) + (0.26 x IFR airport movements)

En-route flight-hours are computed from the filed flight plan provided to the EUROCONTROL CFMU (so-called "CFMU Model III") and do not therefore include any airborne holding[16].

On the basis of the above definition, composite gate-to-gate flight-hours amounted to 16.4M in 2005.

The definition of composite flight-hours implies that the relative weights of the components can change marginally from year to year. Until 2004, they appeared to be on an increasing trend; the weight in 2001 was 0.22 en-route flight-hours per IFR aircraft movement; this increased to 0.24 in 2002, 0.26 in 2003 and 0.27 in 2004. The weighting factor appears to stabilise since 2003, given that the value in 2005 is around 0.26.

Comparisons of results from year to year are valuable and, now that a consistent time series of ACE data is available, they should become increasingly meaningful. To allow

[14] Distance excludes the 20 km of flight closest to the airport at each end of the flight leg.
[15] The rationale behind the definition is explained in Annex 1 of the ACE 2002 Benchmarking Report – reference in footnote 1. Further details can also be found in Annex 2 of the ACE 2004 Benchmarking Report.
[16] In the Model III, the flight plan is updated with the actual position of the flight.

time series comparisons using the composite output measure, an approach has been adopted of using a weighting factor based on the total monetary value of the outputs over the whole period considered[17] (rather than a different weighting factor for each year).

2.2 Staff

ANSPs are required to disclose information about a number of staff categories for which precise definitions are provided in the Specification for Information Disclosure[18]. The staff numbers are reported as Full Time Equivalents (FTEs).

The 35 European ANSPs employ 55 239 staff (including MUAC staff[19]). Of these, some 48% are directly related to operational duties (blue colours in Figure 2.3 below).

The largest share (30%) relates to air traffic controllers working on operational duty (ATCOs in OPS). 58% of ATCOs in OPS work in ACCs and 42% in terminal ATC (APP and TWR units), as illustrated in Figure 2.3 below.

In addition to operational duties, some 1 950 ATCOs (3.5% of the total workforce) participate in activities outside the operations room (providing training or working on special projects) which are not directly related to the control of traffic.

The second and third largest categories are technical support staff (29%) and administration staff (14%) (see Figure 2.3 below).

For the purpose of this report, "support staff" are defined as those staff who are not ATCOs in OPS, and the "support staff ratio" is defined as:

$$\text{Support Staff Ratio} = \frac{\text{Total Staff}}{\text{Total ATCOs in OPS}} = \frac{55\,239}{16\,507} = 3.3$$

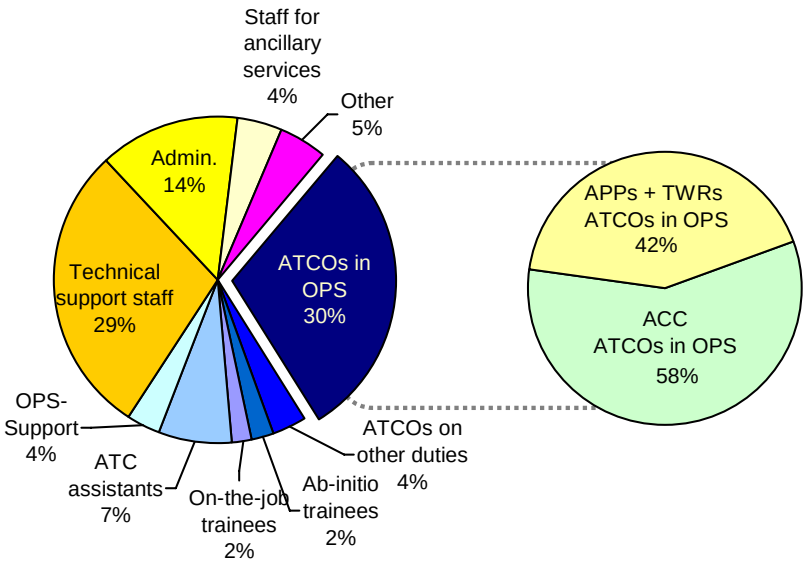
That means that for every ATCO in OPS there are 2.3 **additional** staff needed for support. This would correspond to a "broad" definition of support staff.

Because other staff categories directly participate in operations, an alternative, narrower definition of "support staff ratio" would be to extend the concept of non-support staff to include ATCOs on other duties, ab-initio trainees, on-the-job trainees, ATC assistants and OPS support, i.e. all the staff categories shown in blue in Figure 2.3. In this case the support staff ratio would be:

$$\text{Support Staff Ratio (narrow)} = \frac{\text{Total Staff}}{\text{Total staff in OPS}} = \frac{55\,239}{26\,589} = 2.1$$

This means that for every person in OPS, on average 1.1 additional staff are needed for support. *This definition has not been used further in this report.*

[17] This approach is consistent with the methodology used for multilateral comparisons of indices such as Total Factor Productivity (TFP).
[18] See footnote 2.
[19] But excluding the other EUROCONTROL Agency staff (FTE filled posts in 2005 amounted to some 2 171).



Staff	2005	% total
Number of ANSPs	35	
ATCOs in OPS:	16 507	29.9%
ACC ATCOs in OPS	*9 529*	*57.7%*
APPs + TWRs ATCOs in OPS	*6 978*	*42.3%*
ATCOs on other duties	1 947	3.5%
Ab-initio trainees	1 170	2.1%
On-the-job trainees	1 108	2.0%
ATC assistants	3 910	7.1%
OPS-Support	1 946	3.5%
Technical support staff	15 968	28.9%
Administration	7 676	13.9%
Staff for ancillary services	2 438	4.4%
Other	2 569	4.7%
Gate-to-gate ANS Staff	55 239	100%

Figure 2.3: Breakdown of European ANS system staff in 2005

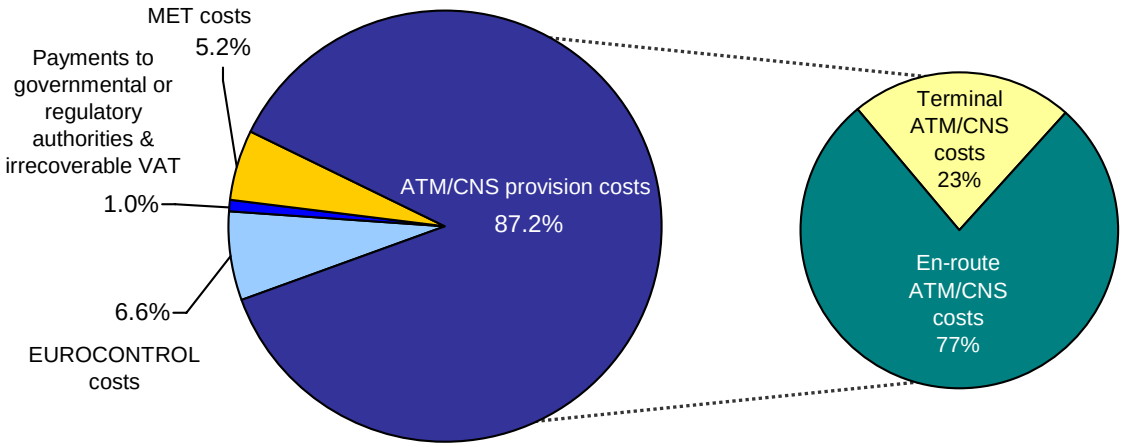
2.3 ANS costs

Total ANS costs for the European system amounted to €7 418M in 2005, which can be broken down into the following four cost categories[20] (see Figure 2.4):

- ATM/CNS provision costs[21] (including MUAC[22]);
- Aeronautical Meteorological costs (MET)[23];
- EUROCONTROL costs[24]; and
- Payments to governmental or regulatory authorities[25] (such as ministries and CAAs).

The largest share of ANS costs (87.2%) relates directly to the provision of ATM/CNS, and is under the direct control and responsibility of the ANSP. These ATM/CNS provision costs amounted to €6 470M in 2005, and form the basis for the analysis of ATM cost-effectiveness in Part II and Part III of this report.

[20] Detailed definitions of these costs are given in the Specification for Information Disclosure.
[21] The costs of providing Air Traffic Management services and the Communication, Navigation and Surveillance infrastructure. For the purpose of this report this includes the costs for Aeronautical Information Services (AIS) and, if any, Search and Rescue Services (SAR).
[22] Costs for MUAC are included in the ATM/CNS costs in Figure 2.4 as MUAC is an operational ANSP in its own right and therefore included in the cost-effectiveness analysis.
[23] Including MET costs reported by the UK and Danish CAAs.
[24] Excluding MUAC, CEATS, and CRCO administrative costs.
[25] Mostly comprising regulatory costs.



Total ANS costs
€ 7 418 M

Total ATM/CNS provision costs
€ 6 470 M

Gate-to-gate ANS costs (€ M)	2005	% total
ATM/CNS provision costs (including AIS, SAR & MUAC)	6 470	87.2%
MET costs	384	5.2%
EUROCONTROL costs	490	6.6%
Payment to governmental or regulatory authorities and irrecoverable VAT	74	1.0%
Gate-to-gate ANS costs	7 418	100.0%

Figure 2.4: Breakdown of total ANS costs at system level in 2005

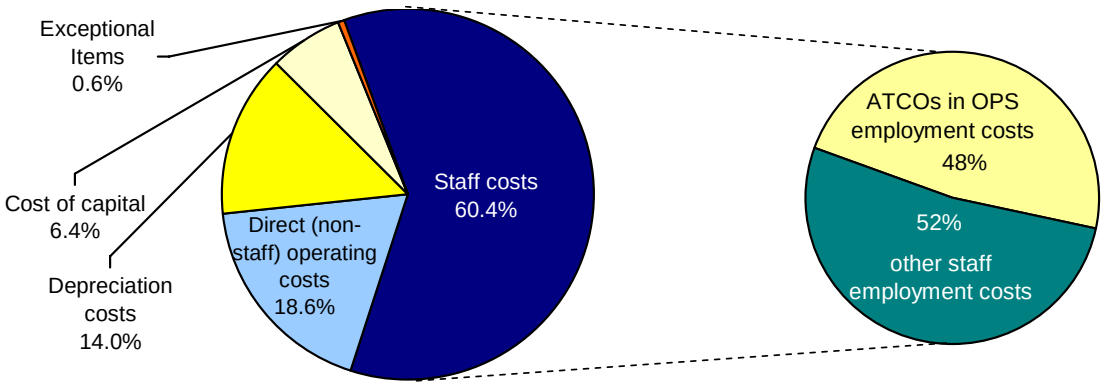
ATM/CNS provision costs can be further broken down into the following cost types[26]:

- staff costs, comprising:
  - ATCOs in OPS employment costs;
  - employment costs of all other staff;
- direct operating costs[27];
- capital-related costs comprising:
  - depreciation;
  - the cost of capital;
- exceptional items.

The distribution of costs between these categories is shown in Figure 2.5 below. Staff costs are the main element of costs, followed by direct operating costs, depreciation costs and cost of capital.

In general, operating costs (including staff costs) account for more than three quarters of total ATM/CNS provision costs (79%). Capital-related costs (cost of capital and depreciation) amount to 20%.

[26] Detailed definitions of these costs are given in the Specification for Information Disclosure.
[27] For the purposes of this Report, direct operating costs do not comprise staff costs.



Total ATM/CNS provision costs: € 6 470 M

ATM/CNS provision costs (€ M)	En-route	%	Terminal	%	Gate-to-gate	%
Staff costs	2 973	59.5%	936	63.6%	3 909	60.4%
ATCOs in OPS employment costs	n.a.	n.a.	n.a.	n.a.	1 863	-
other staff employment costs	n.a.	n.a.	n.a.	n.a.	2 046	-
Direct (non-staff) operating costs	939	18.8%	263	17.9%	1 203	18.6%
Depreciation costs	729	14.6%	177	12.0%	906	14.0%
Cost of capital	335	6.7%	78	5.3%	414	6.4%
Exceptional Items	20	0.4%	18	1.2%	38	0.6%
Total	4 997	100.0%	1 473	100.0%	6 470	100.0%

Figure 2.5: Breakdown of European ATM/CNS provision costs in 2005

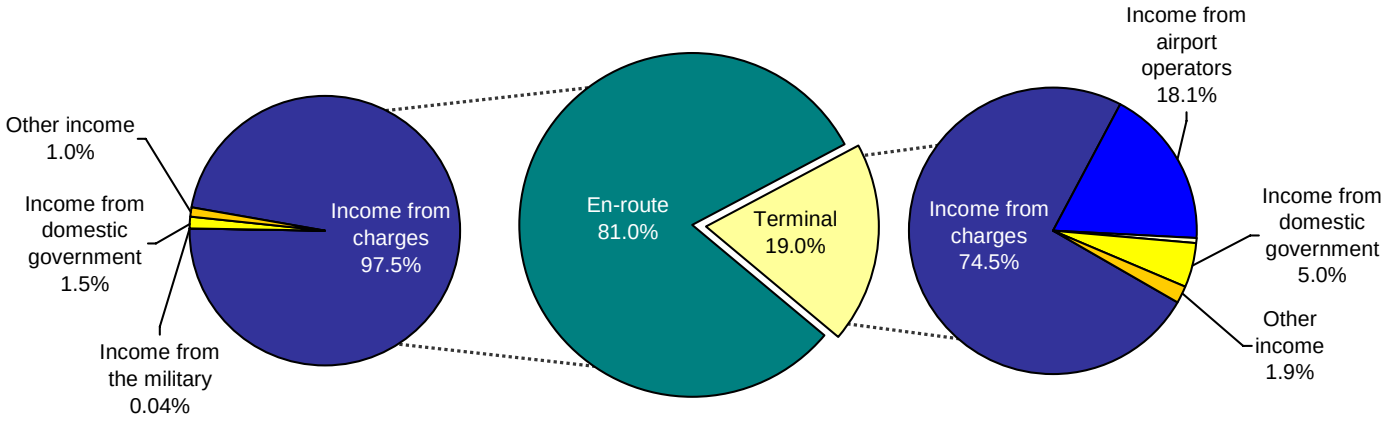
The cost structure of ANSPs is analysed in more detail in Chapter 3.

2.4 ANS revenues

Total ANS revenues amounted to €7 280M in 2005. The breakdown of this revenue is shown in Figure 2.6. The main share (81%) was collected for en-route ANS services and the remainder (19%) for services relating to the terminal area. This share has remained fairly stable over the recent years. The relative shares could change with the recent adoption of the Common Charging Scheme Regulation (EC No. 1794/2006), which *inter alia*, will harmonize the computation of the terminal service units and will enhance the transparency on the financing of those terminal costs.

Almost all en-route revenue (97.5%, see left pie chart) comes from the collection of charges. The proportion is lower for terminal revenue (74.5%, see right pie chart), as additional income may come from airport operators (18.1%, much of which is subsequently recovered from users) and from domestic governments (5.0% compared with 1.5% for en-route).

Whereas the vast majority of revenue for ANS en-route services is recovered through the EUROCONTROL Route Charges System, the methods used for the collection of terminal revenues vary between States. DCAC Cyprus, Croatia Control, HCAA and HungaroControl did not collect separate revenues for terminal ANS in 2005, although Croatia Control and HungaroControl have plans to do so in 2006. Some other ANSPs obtained their revenue from the airports and or government subsidies rather than directly from the users.



Total en-route revenue: **€ 5 896 M**

Gate-to-gate ANS revenue: **€ 7 280 M**

Total terminal revenue: **€ 1 384 M**

En-route	%	Gate-to-gate revenues (€ M)	Terminal	%
5 746	97.5%	Income from charges	1 032	74.5%
n/appl	n/appl	Income from airport operators	250	18.1%
2.2	0.04%	Income from the military	6	0.4%
87	1.5%	Income from domestic government	70	5.0%
60	1.0%	Other income (incl. exceptional revenue item)	26	1.9%
5 896	100.0%		1 384	100.0%

Figure 2.6: Breakdown of gate-to-gate ANS revenues in 2005

2.5 Assets and liabilities

For the comparison of ATM performance across ANSPs, only the capital employed by the ANSPs that is directly related to the provision of en-route and terminal ANS has been used. Therefore, assets were excluded when related to:

- ANS activities reported under the "Other" column of the Specification for Information Disclosure, such as Oceanic and OAT, and;
- Financial long-term assets (items such as investments in other companies and special assets for the staff pension fund) which are reported as "Other assets" in the Specification for Information Disclosure).

The disclosure of consistent and reliable ANS assets and liabilities data proves to be particularly difficult for ANSPs which own, manage and operate airports. The quality, consistency and comparability of the balance sheet data for the ACE submission are expected to greatly enhance with the implementation of the SES SPR (Art 12.3) requirement.

The capital employed to provide ANS in 2005 amounts to €7 571M and can be broken down into (see Figure 2.7)[28]:

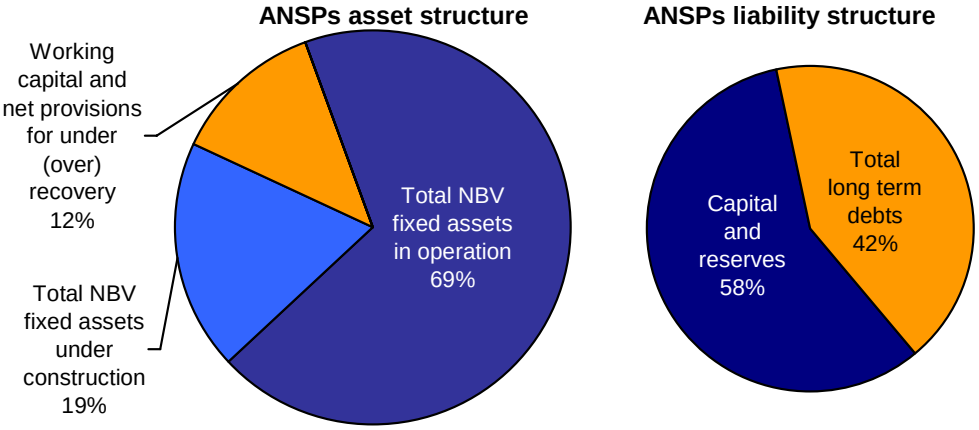
- the net book value (NBV) of fixed assets in operation[29];
- the NBV of fixed assets under construction;
- working capital; and,
- net provisions for under-recovery.

Figure 2.7 also provides details on the liability side of the balance sheet for those ANSPs that report a full balance sheet.

[28] Detailed definitions are provided in the Specification for Information Disclosure.
[29] The Net Book Value (NBV) is the value of the asset net of depreciation.

Most of the capital employed (some 88%) relates to fixed assets already in operation and to assets under construction. The working capital usually represents the funds that are required to operate a business. From an accounting point of view, it is defined as the difference between current assets and current liabilities. From an economic point of view, the ANSP working capital should not include significant amounts of surplus cash/financial investments; such investments should earn returns in their own rights, and should therefore be excluded from the part of the ANS capital employed which is remunerated through the cost of capital element of route charges.

Note that the negative value for the net provision for under/over recovery implies that at the end of 2005, ANSPs produced a net over-recovery of €280M which will have to be reimbursed to airspace users over the next two years.



Total capital employed (gate-to-gate ANS)
€ 7 571 M

ANSP Asset Structure (€ M)	Gate-to-gate ANS
Total NBV fixed assets in operation	5 201
Land & Buildings	*1 614*
Systems & Equipments	*3 587*
Total NBV fixed assets under construction	1 428
Land & Buildings	*342*
Systems & Equipments	*1 087*
Working capital	1 222
Net provisions for under (over) recovery	-280
Total capital employed	7 571

Figure 2.7: ANSP asset structure, 2005

The asset structure of ANSPs, in particular trends of the NBV fixed assets in operation and under construction, and planned capital expenditures (capex) are analysed in more detail in Chapter 7 and in Annex 3.

2.6 Summary data for the European system, 2004 and 2005

Table 2.1 shows summary data for the European ANS system in 2004 and 2005, all expressed in 2005 prices.

Over the 2004-2005 period, for the 34 ANSPs that consistently reported in both years, gate-to-gate ATM/CNS provision costs rose by some 3.0%, which is less than the increase to the volume of traffic controlled, hence a decrease in unit costs and an improvement of the cost-effectiveness KPI.

Total gate-to-gate ANS staff for the 34 ANSPs reporting in both years increased by 1.0%.

MET costs increased by 0.8% compared to 2004. Further details are available in Chapter 3, Section 3.2.1.

EUROCONTROL Agency costs borne by the 34 ANSPs included in the analysis for 2004 and 2005 rose by some 14.7% compared to 2004. Further details on total EUROCONTROL costs are available in Chapter 3, Section 3.2.3.

	2004	2005	05/04
	34 ANSPs	35 ANSPs	34 ANSPs
Gate-to-gate ANS revenues (not adjusted by over/under recoveries) (in € M):	**7 332.0**	**7 279.9**	**-2.2%**
En-route ANS revenues	5 954.7	5 895.9	-2.8%
Terminal ANS revenues	1 377.3	1 384.0	0.2%
Gate-to-gate ANS costs (in € M):	**7 107.7**	**7 418.2**	**3.0%**
ATM/CNS provision costs	6 237.4	6 469.6	2.5%
MET costs	380.3	384.2	0.8%
EUROCONTROL Agency costs	423.2	490.4	14.7%
Payment to national government and irrecoverable VAT	66.8	74.1	-5.5%
Gate-to-gate ATM/CNS costs (in € M):	**6 237.4**	**6 469.6**	**2.5%**
En-route ATM/CNS costs	4 809.6	4 996.6	2.4%
Terminal ATM/CNS costs	1 427.8	1 473.0	2.7%
Gate-to-gate ANS staff:	**53 631**	**55 239**	**1.0%**
ATCOs in OPS	15 689	16 507	3.1%
ACC ATCOs	8 669	9 529	8.6%
APPs + TWRs ATCOs	7 020	6 978	-3.7%
Gate-to-gate ATM/CNS capital employed (in € M)	**7 643**	**7 571**	**-2.1%**
Outputs (in M)			
Distance controlled (km) in charging area	7 680	8 293	5.7%
ACC flight-hours controlled	10.3	11.0	5.3%
Total flight-hours controlled	11.8	12.6	4.2%
IFR airport movements controlled	14.1	14.8	3.7%

Table 2.1: Summary data for the European ANS system (figures expressed in €2005)

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3 TOTAL ANS COSTS VERSUS ANSPs' CONTROLLABLE COSTS

3.1 Introduction

This chapter describes how a subset of the cost data submitted by ANSPs is extracted and adjusted so that it can be used meaningfully to compare performance across ANSPs and across time. In essence, costs are excluded wherever:

- they are not related to the provision of ATM/CNS services for airspace users operating as GAT; or
- they relate to services provided to military OAT or Oceanic ANS, reported under the "Other" column in the Specification for Information Disclosure; or
- they are not under the direct control of an ANSP.

3.2 ANS cost categories

In Section 2.3, ANS costs for the whole system were divided into four main categories. For the comparison of ATM/CNS cost-effectiveness across individual ANSPs, it is necessary to identify, in addition, payments for delegation of ANS (which, of course, sum to zero across the system as a whole). For this reason, ANS costs are broken down into the following cost categories:

1. MET costs (internal or external provision);
2. Payments to governmental or regulatory authorities;
3. EUROCONTROL costs[30];
4. Payment to other ANSP or States for delegated services, including payments for MUAC & CEATS; and
5. ATM/CNS provision costs (including AIS & SAR).

Categories (4) relates to payments by States/ANSPs in the "Maastricht States" (Benelux and Germany) for the costs of MUAC, by CEATS members for CEATS, and payments to other ANSPs or States where operational ATM responsibility has been delegated.

ANS cost categories other than ATM/CNS, excluded from the analysis in subsequent chapters, are described briefly in the following sections. The consolidated breakdown for the system as a whole is shown in Table 3.1.

Gate-to-gate ANS costs (€ M)	2005	% total
ATM/CNS provision costs (including AIS, SAR & MUAC)	6 470	87.2%
MET costs	384	5.2%
EUROCONTROL costs	490	6.6%
Payment to governmental or regulatory authorities and irrecoverable VAT	74	1.0%
Gate-to-gate ANS costs	7 418	100.0%

Table 3.1: Breakdown of total ANS costs by category

Table 3.2 shows the ANS cost categories as a proportion of total en-route and terminal ANS costs for individual ANSPs/States. The en-route and terminal ATM/CNS costs as shown in Table 3.2 are then used for the comparison of ATM/CNS cost-effectiveness at ANSP level in Part II and Part III.

[30] Excluding MUAC, CEATS and CRCO administration costs.

ANSP	Country	EN-ROUTE ANS COSTS									TERMINAL ANS COSTS							Gate-to-gate ATM/CNS costs (in € '000)
		Total ANS costs (in € '000)	MET costs (%)	Payment to governmental authorities (%)	EUROCONTROL Costs (%)	Irrecoverable value added tax (VAT)	Payment to other ANSP/States (%)	Payments to MUAC/ CEATS (%)	ATM/CNS en-route costs (%)	ATM/CNS en-route costs (in € '000)	Total ANS costs (in € '000)	MET costs (%)	Payment to governmental authorities (%)	Irrecoverable value added tax (VAT)	Payment to other ANSP/States (%)	ATM/CNS terminal costs (%)	ATM/CNS terminal costs (in € '000)	
Aena	Spain	690 095	4.4%	0.6%	6.5%				88.4%	610 281	308 722	3.6%				96.4%	297 496	907 777
ANS CR	Czech Republic	57 890	1.7%		6.4%			4.5%	87.4%	50 620	27 320	2.3%				97.7%	26 702	77 322
ATSA Bulgaria	Bulgaria	73 799	5.7%	1.3%	7.2%	0.4%			85.3%	62 951	11 474	10.4%	5.3%	0.3%		84.0%	9 634	72 585
Austro Control	Austria	134 040	11.9%		7.6%			1.9%	78.6%	105 355	35 111	14.2%				85.8%	30 108	135 463
Avinor	Norway	73 300	1.4%		8.7%				89.9%	65 916	57 373	3.1%				96.9%	55 579	121 494
Belgocontrol	Belgium	160 828	5.6%		8.5%	0.0%		23.3%	62.7%	100 788	35 832	13.6%		0.0%		86.4%	30 943	131 731
Croatia Control	Croatia	55 743	2.4%		5.5%		0.4%	2.5%	89.1%	49 688								49 688
DCAC Cyprus	Cyprus	31 585	8.9%	1.7%	5.9%				83.5%	26 381	8 104	9.9%	3.9%			86.1%	6 980	33 361
DFS	Germany	825 899	6.0%		10.6%			6.3%	77.1%	636 457	162 178					100.0%	162 178	798 635
DHMI	Turkey	173 802	8.9%	2.9%	7.9%				80.3%	139 616	50 760					100.0%	50 760	190 376
DSNA	France	958 457	6.0%		8.3%		4.2%		81.4%	780 649	219 633	8.4%				91.6%	201 130	981 779
EANS	Estonia	4 160	0.7%						99.3%	4 130	3 460	3.0%				97.0%	3 355	7 485
ENAV	Italia	595 564	4.7%		n/appl			0.3%	86.6%	515 675	119 636	10.3%				89.7%	107 286	622 961
Finavia	Finland	28 079	3.7%		12.7%		0.8%		82.7%	23 231	32 508	14.2%				85.8%	27 906	51 137
HCAA	Greece	162 528	5.3%		5.9%				88.8%	144 268								144 268
HungaroControl	Hungary	49 886	4.7%	2.3%	9.4%			3.2%	80.4%	40 084	14 103					100.0%	14 103	54 187
IAA	Ireland	86 117	7.2%	1.5%	7.2%				84.2%	72 541	16 138	6.7%	1.4%			91.9%	14 827	87 368
LFV/ANS Sweden + Sweden CAA	Sweden	118 747	5.1%	4.6%	10.6%				94.8%	112 621	22 626		0.3%			99.7%	22 550	135 171
LGS	Latvia	10 057	2.5%						97.5%	9 807	3 075	10.1%				89.9%	2 764	12 570
LPS	Slovak Republic	28 953	2.2%		n/appl			3.1%	86.9%	25 151	6 447	1.0%				99.0%	6 386	31 536
LVNL	Netherlands	130 779	7.3%		10.9%	2.8%		19.0%	60.1%	78 587	100 998			3.8%		96.2%	97 133	175 720
MATS	Malta	10 575	5.2%		6.5%				88.3%	9 335	2 399	5.7%				94.3%	2 262	11 597
MK CAA	F.Y.R Macedonia	10 081	3.6%		5.6%				90.8%	9 154	1 596	10.4%				89.6%	1 430	10 584
MoldATSA	Moldova	2 430	11.0%		4.3%				84.7%	2 059	1 095	9.9%				90.1%	987	3 046
MUAC		112 141			n/appl				100.0%	112 141	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	112 141
NATA Albania	Albania	11 587	1.1%	1.5%	6.0%	6.6%			84.7%	9 817	1 988	2.7%		8.2%		89.1%	1 773	11 590
NATS + UK CAA	United Kingdom	742 294	5.2%	2.3%	8.9%				83.6%	620 553	154 815	0.4%	0.1%			99.6%	154 130	774 683
NAV Portugal (FIR Lisboa)	Portugal	120 853	4.6%		8.0%				87.4%	105 622	24 182					100.0%	24 182	129 805
NAVIAIR + Denmark CAA	Denmark	77 715	5.7%	6.7%	9.2%	4.7%			73.7%	57 299	27 609		0.3%			99.7%	27 539	84 839
Oro Navigacija	Lithuania	12 556	0.04%	4.9%	n/appl				95.0%	11 932	2 364	0.6%	3.8%			95.7%	2 261	14 193
PPL/PATA	Poland	87 247	0.9%	12.2%	5.8%				81.1%	70 788	7 401	0.9%	4.4%			94.7%	7 008	77 796
ROMATSA	Romania	140 203	4.5%	4.9%	5.8%				84.8%	118 846	16 250	2.1%				97.9%	15 916	134 763
Skyguide	Switzerland	136 366	4.1%	0.1%	8.8%				94.7%	129 128	52 947	8.8%	0.1%		0.3%	90.8%	48 099	177 228
Slovenia Control	Slovenia	14 900	6.9%	1.1%	7.8%			2.2%	82.1%	12 230	1 886	20.9%				79.1%	1 492	13 722
UkSATSE	Ukraine	78 652	1.0%		6.4%				92.6%	72 855	18 354	1.2%				98.8%	18 138	90 993
										4 996 555							1 473 037	6 469 592

Table 3.2: Breakdown of en-route and terminal ANS costs, 2005

3.2.1 MET costs

The organisational and operational responsibility for the provision of MET services varies by State. Most ANSPs use their national meteorological institution as the provider of MET services. Some, however, provide MET services internally (in part or completely). For comparison purposes, all costs (whether internally provided or outsourced) relating to MET were identified in Table 3.2 and excluded from the ATM/CNS costs used in the cost-effectiveness analysis in the following chapters.

Differences in the institutional arrangements for MET provision were:

- ATSA Bulgaria, Austro Control, Belgocontrol, Croatia Control, ENAV, Finavia, MK CAA, HungaroControl, LFV/ANS Sweden, LGS, MoldATSA, NATA Albania, ROMATSA and UkSATSE provided MET services either wholly or partially internally[31] (see also Table 1.1 in Section 1.2);
- in all other cases, MET services are provided by the national meteorological institution.

Table 3.2 indicates that Austria (11.9%), Moldova (11.0%), Cyprus (8.9%) and Turkey (8.9%) reported the highest MET-related cost share in their en-route ANS costs.

Figure 3.1 shows that there is a wide variation in the way MET costs are allocated between en-route and terminal ANS. In most cases, MET costs are mainly allocated to en-route ANS and in nine no MET costs were allocated to terminal ANS[32]. On the other hand, a few ANSPs allocated most of their MET costs to terminal ANS, in some cases up to 80% (e.g. Finland and Estonia). There is clearly an issue of consistency in this area; however, in the context of ACE, it has not been investigated further.

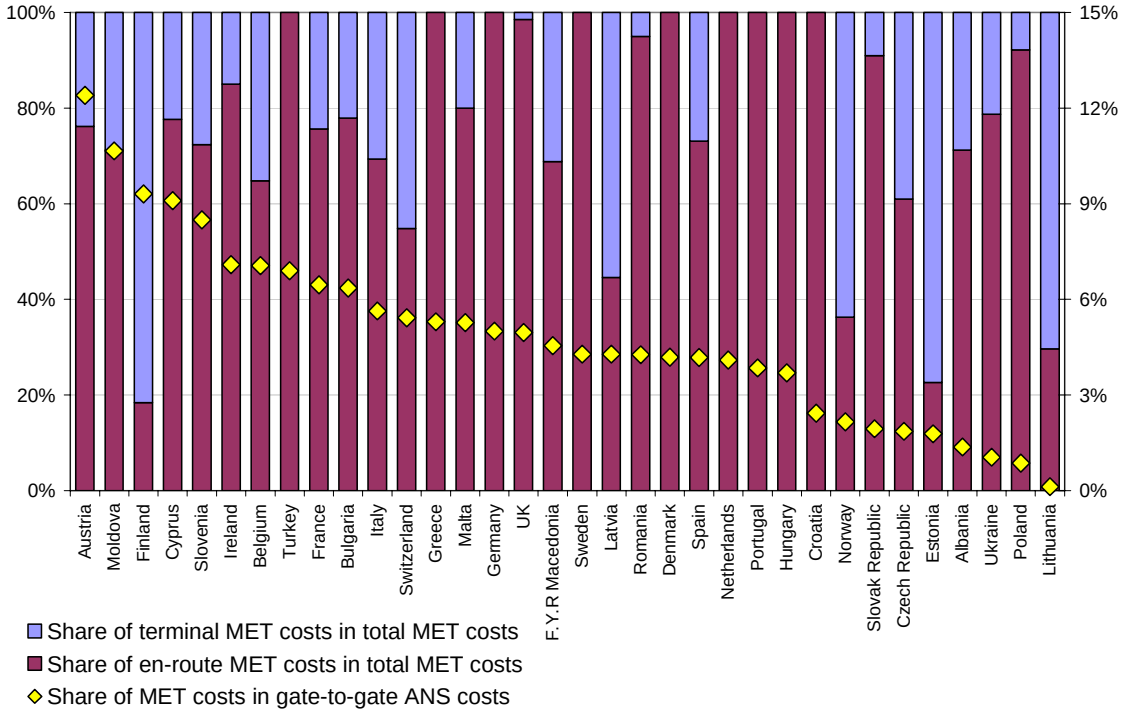
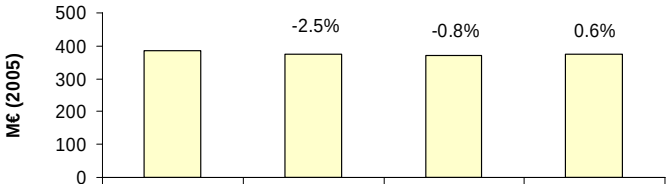


Figure 3.1: Share of MET costs in total gate-to-gate ANS costs

[31] ENAV provides some MET services internally. For Finavia, HungaroControl, MoldATSA, ROMATSA and UkSATSE, some MET services are also outsourced.

[32] Turkey/DHMI does not report MET costs for Terminal ANS. These are provided free of charge by the National MET authority.

Figure 3.2 shows that for the 31 States for which data over time are available, MET costs have decreased by some -2.7% since 2002 in real terms.



	2002	2003	2004	2005
ANSPs	31	31	31	31
MET costs (M€)	359.8	358.2	363.1	373.8
MET costs (M€ 2005)	384.2	374.7	371.6	373.8

Figure 3.2: Trends in gate-to-gate MET costs (2002-2005)

Figure 3.3 below shows that the reduction in MET costs at European system level is unevenly distributed among European States. There are major falls in some States along with massive percentage rises in others. However, the overall picture is encouraging. The large increases are for the most part in States where the MET cost base was "small" to start with such as Moldova, Slovenia, Cyprus, F.Y.R. Macedonia, Czech Republic, Lithuania or Hungary. The significant increase in Moldova is mainly due to a more accurate assessment of MET costs in 2005. The MET costs increase in DCAC Cyprus is mainly driven by the identification of terminal MET costs in 2004.

On the other hand, in the States with a higher MET cost base such as Germany, UK and Austria, there have mostly been falls, sometimes very substantial. Germany which reassessed its cost allocation and rationalised its MET service provision significantly decreased its MET costs. Furthermore, it should be noted that, as of 2007, a part of Germany MET costs will be reallocated from en-route ANS to terminal ANS and recovered through Terminal Navigation Charges (TNC). These changes significantly contribute to the decrease of MET costs at European system level.

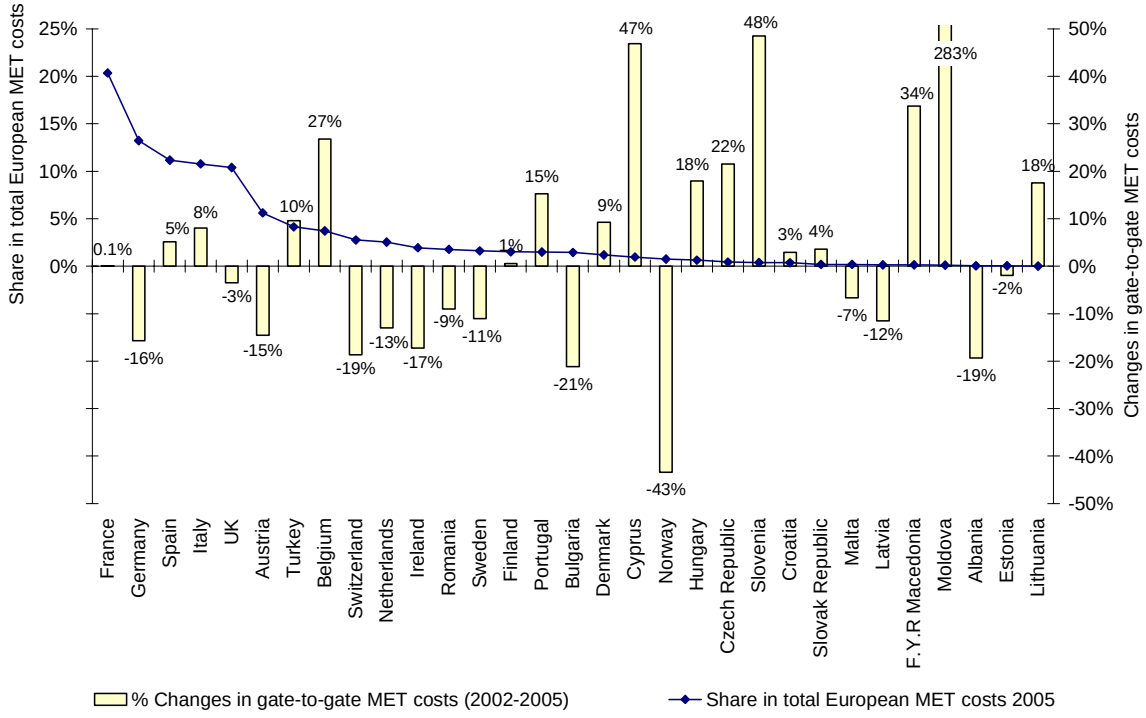


Figure 3.3: Trends in gate-to-gate MET costs (State level, 2002-2005, real terms)

Since no genuine measure of MET output(s) is available, no proper cost-effectiveness KPIs can be presented at this stage.

3.2.2 Payments to governmental and regulatory authorities

Payments to governmental and regulatory authorities amounted to €62M in 2005, 0.8% of total ANS costs. Such payments usually comprise costs for regulatory services (safety, airspace, economic regulation) provided by the State. As these costs are not directly related to the provision of ATM/CNS services, they have been excluded from the ANSP cost-effectiveness analysis.

Caution is needed when comparing ANSPs since:

- there are differences in the scope of the regulatory activity among the various States;
- in some cases ANSPs are entrusted with regulatory duties on behalf of the State; and,
- in many cases ANSPs/States did not report costs for regulatory services, either because the regulatory costs are borne by taxpayers rather than airspace users - or because the regulatory costs could not be identified separately and are therefore reported as part of the ATM/CNS provision costs.

The regulatory framework laid down by the SES regulations provides for the designation of National Supervisory Authorities (NSAs) in charge of certifying ANSPs as well as ensuring the proper implementation of the SES regulations. When the costs of such authorities (or other governmental costs related to the provision of ANS) are recovered through ANS charges, Member States must establish and allocate their costs according to principles laid down in the Common Charging Scheme Regulation (EC No. 1794/2006). Those costs must be part of the consultation process with airspace users and must be made transparent through specific reporting tables that are filed separately. In principle, this should allow the PRU to take those regulatory and supervisory costs into account as part of overall ANS performance measurement of 2007 data.

In 2005, 15 ANSPs reported payments to governmental and regulatory authorities as part of their en-route ANS costs ranging from 12% for PPL/PATA to less than 1% for Aena and Skyguide (see Table 3.2). The high percentage for PPL/PATA relates to a 10% levy on the en-route turnover that PPL/PATA paid to the State in 2005. Sweden reports a payment of 5% of its en-route ANS costs for the regulatory function of the newly created Sweden CAA/NSA (which also includes SAR costs).

Note that in 2005 the levy paid to the State by NATA Albania (i.e. 20% of income from route charges) has been abrogated and therefore the payment to governmental and regulatory authorities reported by NATA Albania in 2005 (i.e. 1.5% of en-route ANS costs, see Table 3.2) exclusively relates to regulatory costs.

3.2.3 EUROCONTROL Agency costs (excluding MUAC & CEATS)

It is not appropriate to include EUROCONTROL Agency costs in the ATM/CNS cost-effectiveness analysis of individual ANSPs since:

- EUROCONTROL Agency costs are not under the control of the individual ANSPs as they are based on national en-route costs and GDP levels; and,
- Estonia, Latvia, and Lithuania are not EUROCONTROL Member States and therefore do not bear EUROCONTROL Agency costs.

EUROCONTROL Agency costs can be split into two main categories: the EUROCONTROL cost base (Parts I and IX, €492.7M in 2005) and the CRCO costs (Part II, €17.7M in 2005). Note that these costs here are not comparable to those given in

Section 2.6, as the data there show total EUROCONTROL costs, as opposed to the share of costs borne by a set of ANSPs.

In 2005, the EUROCONTROL Agency cost base (Parts I and IX) represents around 8.4% of total European en-route ANS costs, which is higher than in 2004. The main driver for this increase is due to the progressive increase of pensions in charge of the budget (Pension Scheme) and the implementation of the Pension reform with the reconstruction of the Projected Benefit Obligations (PBO) as indicated in Figure 3.4. The relative share of EUROCONTROL Agency costs is expected to stabilise in 2007 around the 8% threshold.

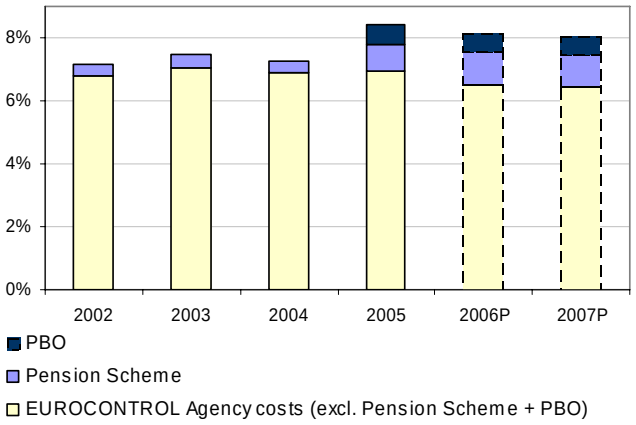


Figure 3.4: Share of EUROCONTROL Agency costs relative to total European en-route ANS costs

Table 3.3 displays the breakdown of EUROCONTROL Agency costs per establishment and expenditure between 2002 and 2005.

Establishment	Yearly costs (M€)					
	2002	2003	2004	2005	% 05/02	% 05/04
EATM/ASRO/MIL	106.2	110.9	119.7	126.3	19%	5%
EAD	9.2	9.5	8.0	9.7	5%	22%
Logistics	62.3	65.5	68.2	73.5	18%	8%
CFMU	86.0	91.9	91.9	103.8	21%	13%
EEC	66.9	70.7	72.7	75.6	13%	4%
IANS	13.4	12.2	13.3	13.5	0%	2%
Institutional bodies	4.4	6.2	6.4	6.4	46%	0%
Other (mainly pensions)	15.2	20.0	20.7	48.6	220%	135%
PBO	-	-	-	35.4	-	-
Total Parts I & IX	363.5	386.9	400.8	492.7	36%	23%
Price Index	1.109	1.132	1.157	1.184	7%	2%
Real costs (€2005) Total Parts I & IX	388.1	404.7	410.1	492.7	27%	20%

Type of expenditure	Yearly costs (M€)					
	2002	2003	2004	2005	% 05/02	% 05/04
Staff costs	168.7	176.1	188.1	192.9	14%	3%
PBO	-	-	-	35.4	-	-
Pensions	18.3	20.0	20.7	48.6	165%	135%
Operating costs	66.8	71.1	89.2	99.5	49%	11%
Depreciation costs	96.9	108.1	93.0	107.8	11%	16%
Interest	12.8	11.6	9.7	8.6	-33%	-12%
Total Parts I & IX	363.5	386.9	400.8	492.7	36%	23%
Price Index	1.109	1.132	1.157	1.184	7%	2%
Real costs (€2005) Total Parts I & IX	388.1	404.7	410.1	492.7	27%	20%

Table 3.3: Breakdown of EUROCONTROL Agency costs per establishment & expenditure (Parts I & IX)[33]

Table 3.3 above indicates that between 2002 and 2005, EUROCONTROL Agency costs have grown in real terms by +27%, which can be broken down as follows:

- +17% due to pension related-costs (pension charged to the budget and PBO) which are non-discretionary costs for the EUROCONTROL Agency; and
- +10% in discretionary costs which are controlled by the EUROCONTROL Agency.

The right-hand side of Table 3.3 indicates that, between 2004 and 2005, besides the pension-related costs, the increases in operating costs (+€10M) and depreciation costs (+€15M) significantly contributed to increase the total EUROCONTROL cost-base. The increase in the 2005 operating costs is mainly driven by an anticipation of the introduction of IAS 38 in 2006, which requires external effort to be reported as operating costs rather than investments. Similarly, the increase in the 2005 depreciation costs results from the reduction of the depreciation period for some investments from three to one year (accelerated depreciation).

[33] In Table 3.3 and Figure 3.5, the item "Pensions" corresponds to the pensions charged to EUROCONTROL budget.

EUROCONTROL Agency actual costs for 2005 (i.e. €492.7M) are some €8.7M less than the initial forecast cost-base established in November 2005 (i.e. €501.4M). This is lower than the savings achieved the previous year, since the EUROCONTROL Agency actual costs for 2004 were €15.1M less than the planned costs submitted in November 2004 to the Enlarged Committee for Route Charges. The main drivers for these savings are a tighter cost control by the Agency, lower interest costs than forecasted, and the postponement of some projects.

Figure 3.5 below displays the forward-looking projections of EUROCONTROL Agency costs (Parts I and IX) between 2005 and 2010. It should be noted that according to a decision of the Provisional Council through the Standing Committee on Finance, the total EUROCONTROL cost-base for 2007 will be limited at 98% of the planned costs. This is not reflected in Figure 3.5.

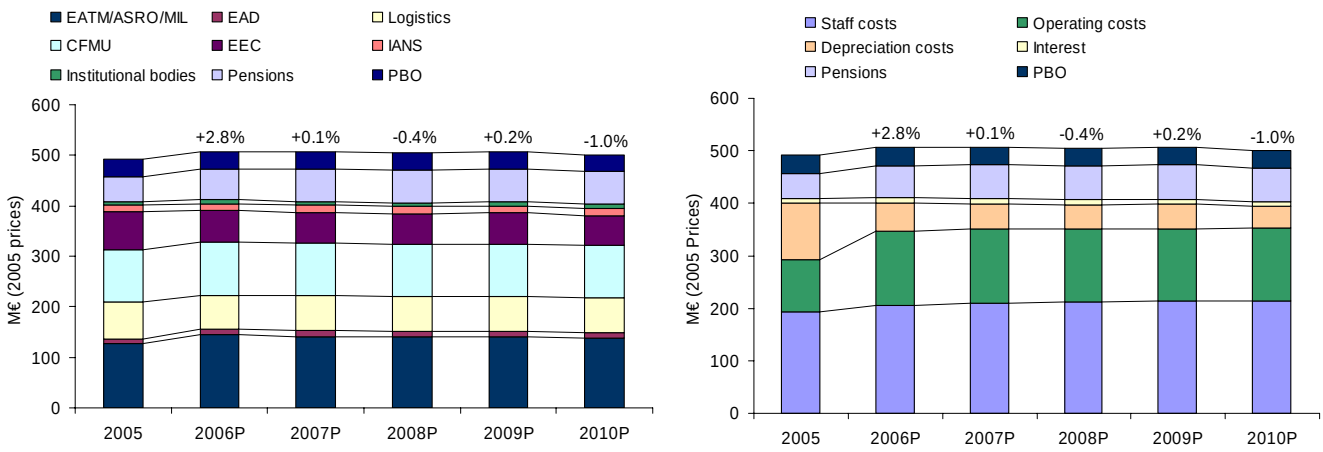


Figure 3.5: Forward-looking projections of EUROCONTROL Agency costs

Figure 3.5 indicates that after a 2.8% increase in 2006, EUROCONTROL costs are planned to remain stable in real terms until 2010.

The left-hand side of Figure 3.5 shows that in 2006 EATM costs are planned to increase (+14%). On the other hand, the reduction in EEC costs (-18%) contributes to the stabilising of the overall discretionary costs. The pensions charged to EUROCONTROL budget are expected to increase further in 2006 (+24%).

The right-hand side of Figure 3.5 emphasises the reallocation from depreciation costs to operating costs as of 2006. The main driver for these changes is the introduction of IAS 38, which induces a shift of the costs of external effort (previously considered as investments i.e. capitalised and subsequently depreciated) to operating costs from 2006 onwards.

Since no genuine measure of output(s) is available for EUROCONTROL Agency, no proper cost-effectiveness KPIs can be presented at this stage.

3.2.4 Payment to other ANSP or States for delegated services

Payments for delegation of ATM have not been included in the ATM performance comparison of ANSPs because the corresponding outputs, and hence the costs, were reported by the ANSP providing the service. Significant financial compensations comprise:

- DSNA payments to Skyguide and to Jersey for delegated ATM, representing 4.2% of DSNA's total en-route ANS costs;

- Finavia payments for delegation of ATM to LFV/ANS Sweden representing 0.8% of Finavia's en-route ANS costs; and,
- Croatia Control payments for delegation of ATM to Serbia & Montenegro representing 0.4% of Croatia Control's en-route ANS costs.

There are also numerous examples where ATM services are delegated but costs are not recovered, such as Skyguide services over southern Germany, NAVIAIR services over southern Sweden, DFS services over the Austrian Tyrol, and Austro Control services over Eastern Slovenia.

Payments to MUAC and CEATS are State obligations for delegation of ANS and thus outside the direct control of ANSPs. MUAC is treated as an ANSP and included in the ATM/CNS cost-effectiveness analysis[34].

3.2.5 Irrecoverable Value Added Tax (VAT)

As disclosed in Table 3.2 above two ANSPs, NAVIAIR and NATA Albania reported significant amount of irrecoverable VAT as part of their costs. VAT on purchased goods by ANSPs is treated differently in Member States. In most cases the VAT can be recovered from the State, and is therefore not part of the costs chargeable to airspace users, but in some cases ANSPs cannot do this, as reported by NAVIAIR and NATA Albania:

- NATA Albania pays a 20% VAT on its investments;
- NAVIAIR can recover VAT on goods relating to terminal ANS whereas VAT on goods relating to en-route ANS cannot be recovered.

For the purposes of comparing cost-effectiveness performance across ANSPs irrecoverable VAT costs is not part of the controllable ATM/CNS provision costs as described below.

3.2.6 ATM/CNS provision costs

Figure 3.6 shows the cumulative distribution of ATM/CNS provision costs in 2005. These costs are used in subsequent chapters of Part II and Part III for the purposes of comparing ATM/CNS cost-effectiveness at ANSP level.

Figure 3.6 also shows that in 2005, the costs of DSNA, Aena, DFS, NATS and ENAV represents 63% of the gate-to-gate ATM/CNS provision costs of the European system. It is noteworthy that Aena, which provides ANS for both mainland Spain and Canarias, now ranks fourth in terms of traffic and second in terms of costs. In 2002, Aena ranked fourth in terms of both costs and traffic. Since then, their total ATM/CNS provision costs have grown by 41%, while traffic has grown by 19%. More detailed analysis is presented in Part II, in particular Chapter 5 and Chapter 6.

[34] Total payments to MUAC are equal to the MUAC ATM/CNS provision costs.

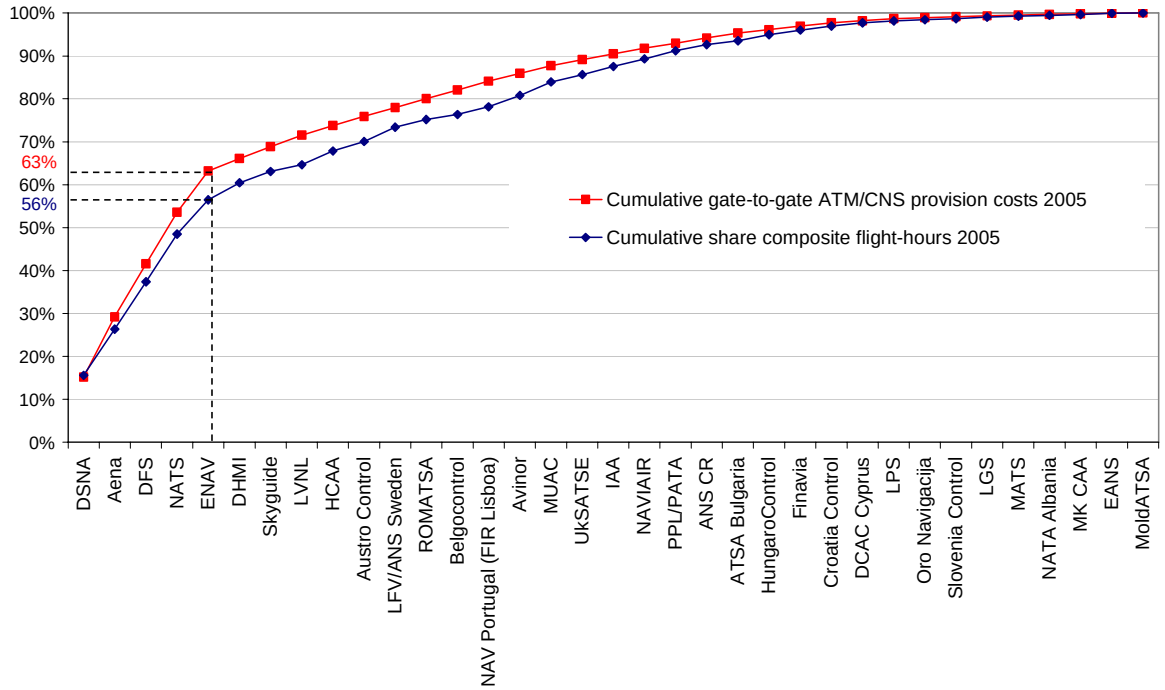


Figure 3.6: Gate-to-gate ATM/CNS provision costs in 2005[35]

Figure 3.7 provides a detailed breakdown of ATM/CNS provision costs (staff costs, direct operating costs, depreciation costs and cost of capital). Figure 3.7 shows that the cost structure greatly varies among ANSPs.

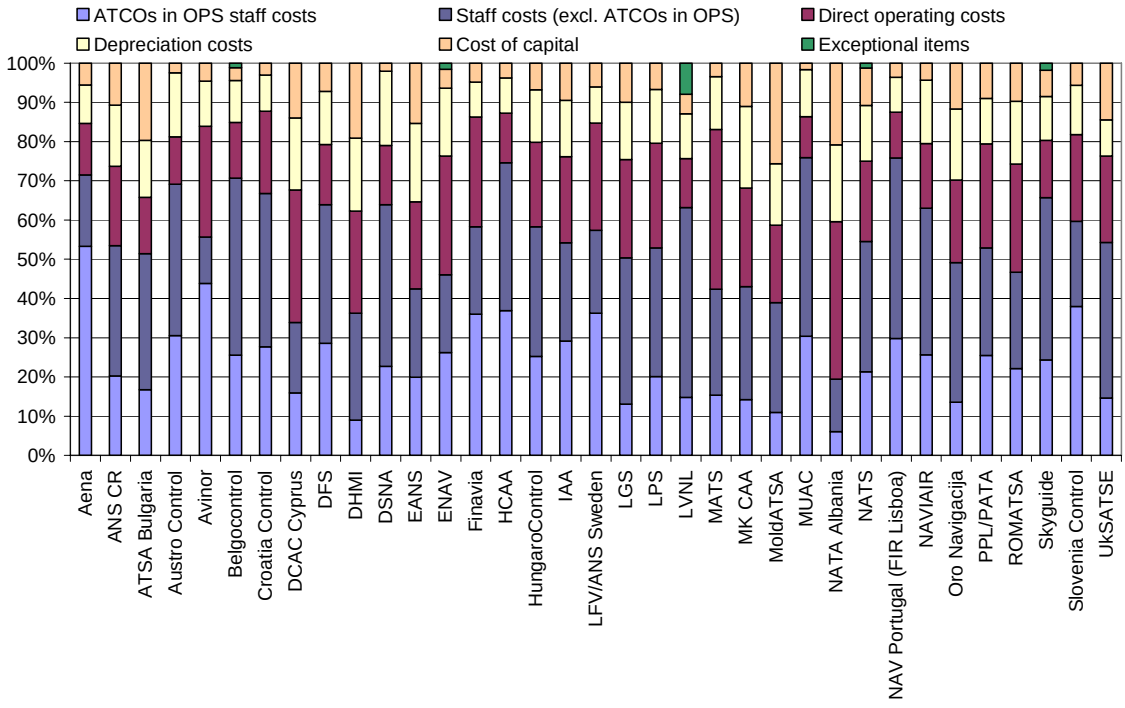


Figure 3.7: Breakdown of ATM/CNS provision costs

[35] Costs reported for MUAC do not include costs of the CNS infrastructure which is made available for joint use and provided free of charges by the ANSPs (Belgocontrol, LVNL, and DFS) operating in the Four States airspace (Benelux and Germany).

Staff costs (ATCOs in OPS and non-ATCOs in OPS) account for by far the largest share (60%) of ATM/CNS provision costs. The percentage varies in the range 19%-76% across ANSPs. Staff costs for ATCOs in OPS account for, on average, 29% of total ATM/CNS costs, with staff costs excluding ATCOs in OPS being slightly higher at an average of 32% of total costs. Staff costs tend to constitute a lower proportion of costs in Central and Eastern Europe. To a large extent staff costs follow the (local) cost of living while capital-related costs often reflect international market prices. Another factor affecting the proportion of staff costs (exc. ATCOs in OPS) is the extent to which support services have been outsourced. This issue is further examined in Section 6.4.5.

For five ANSPs (Aena, Belgocontrol, HCAA, MUAC and NAV Portugal), total staff costs represent over 70% of the total ATM/CNS provision costs.

Four ANSPs (DCAC Cyprus, DHMI, MoldATSA and NATA Albania) indicate that less than 40% of their total ATM/CNS costs are due to staff costs. NATA Albania is the most significant of these – staff costs represent only 19% of the total ATM/CNS costs.

Figure 3.7 above indicates that the direct operating costs, which account for 19% of the ATM/CNS provision costs, are in the range of 10%-41% for individual ANSPs.

Depreciation costs and cost of capital account for 14% and 6% of the ATM/CNS provision costs, respectively. These costs are influenced by the investment cycle proper to each ANSP (higher depreciation follows from high investment) and by its remuneration policy for the capital employed.

Under the full cost recovery principle, ANSPs are allowed, to include, as part of their costs to be charged to the airspace users, a fair remuneration of their capital employed. In effect, this means that ANSP returns money to users once costs have been recovered and an ‘‘agreed profit’’ has been considered. This rate-of-return is usually subject to some form of explicit or implicit regulation.

As part of the data validation, each ANSP reported which interest rate was used to compute the (notional) cost of capital and on which asset base it was applied. This information is factually reported in Table 3.4 below.

ANSPs	Comments
Aena	An average rate of 5.7% is applied on the average value of capital employed.
ANS CR	Comprises the tax on profit and an amount which is the product of ANS CR equity and an average rate of 6.3%.
ATSA Bulgaria	Net cost of capital which is computed as the product of the total capital employed and an average rate of 6.7%.
Austro Control	Corresponds to the product of the NBV of fixed assets, excluding the land and financial assets, and an average rate of 2.9%.
Avinor	Not available.
Belgocontrol	Gross cost of capital which comprises the financial cost of debt and the product of the yearly average Belgian OLO rate (linear bonds, 2.5%) and the NBV fixed assets less the borrowings.
Croatia Control	Not available.
DCAC Cyprus	Comprises both the cost of debt and the return on investments. An average rate of 9% is applied to the NBV of fixed assets.
DFS	Computed as the product of an average rate of 8% (set by the Federal Ministry of Transport, Building and Urban Development) and an asset base comprising the NBV of fixed assets in operation and the net working capital.
DHMİ	Computed as the product of an average rate of 8% and an asset base comprising the total NBV of fixed assets and the working capital net of provision for over/under recovery.
DSNA	Corresponds to the product of the NBV fixed assets and an average rate of 2.7%, plus the interest on the working capital.

EANS	Net cost of capital which is computed as the sum of the cost of equity (8% required return on equity) and the cost of debt (6.8% multiplied by the outstanding debt on the EIB loan) less the financial income.
ENAV	Gross cost of capital computed as the product of an average rate of 3.5% and the NBV of fixed assets.
Finavia	Gross cost of capital computed on total NBV fixed assets using average rate of 3.3% for en-route ANS and 6% for terminal ANS.
HCAA	Not available
HungaroControl	Gross cost of capital computed by multiplying an average rate of 7.5% to the NBV of fixed assets in operation.
IAA	Computed by multiplying an average rate of 6.5% (5-10 years government Gilt rate) by the NBV tangible fixed assets in operation.
LFV/ANS Sweden	Product of the average NBV of fixed assets and an average rate of 5.0%.
LGS	Corresponds to the product of the total NBV fixed assets (B1+B4) with an average rate of 8%.
LPS	Corresponds to the product of equity with an average rate of 4%, plus the cost of loan (interests).
LVNL	Gross financial cost of capital. Do not comprise the cost of equity.
MATS	Corresponds to the product of the NBV of total fixed assets with an average rate of 4.7%.
MK CAA	Computed on the NBV of fixed assets in operation using an average rate of 10%.
MoldATSA	Product of an average rate of 15% with the NBV of fixed assets.
MUAC	Product of the actual interest paid by EUROCONTROL to the banks with the proportion of EUROCONTROL NBV assets belonging to MUAC.
NATA Albania	Computed as the product of the NBV of total fixed assets and an average rate of 12%.
NATS	The cost of capital corresponds to the net interest payable and similar charges.
NAV Portugal (FIR Lisboa)	Gross cost of capital computed as the product of an average rate of 8% and an asset base comprising the NBV of fixed assets and a part of the working capital.
NAVIAIR	Gross cost of capital computed on total NBV of fixed assets using an average rate of 3.8%.
Oro Navigacija	Gross cost of capital computed by multiplying an average rate of 4.5% with the average capital employed (average NBV of fixed assets plus average net current assets).
PPL/PATA	Gross cost of capital computed by multiplying an average rate of 8.2% with the total capital employed (NBV of fixed assets plus working capital).
ROMATSA	Corresponds to the sum of the cost of debt and the cost of equity (8% applied to equity).
Skyguide	Corresponds to the product of the average book value of fixed assets and an average rate of 4.5% (including both cost of debt and cost of equity).
Slovenia Control	Corresponds to the product of an average rate of 5% and an asset base comprising the NBV of fixed assets and the net current assets.
UkSATSE	Not available.

Table 3.4: Comments on the cost of capital reported by the ANSPs

According to the principles laid down in the Common Charging Scheme Regulation (EC No. 1794/2006), ANSPs subject to the SES regulations will be required to explicitly identify and report which interest rate was used to compute the cost of capital and on which asset base it was applied. This requirement will further enhance transparency with respect to that part of the chargeable costs which comprises an “agreed profit”.

It should be noted from Table 3.4 that NATS reported net financial costs for the cost of capital. For en-route ANS (i.e. some 80% of its gate-to-gate ANS activity) NATS is subject to economic regulation and operates under a price cap regime. In 2005, NATS accounting operating profit significantly exceeded the net financial costs and as a result a dividend was distributed to its shareholders and an income tax was paid to the State. In order to ensure comparability with the other ANSPs, NATS cost of capital should

reflect the economic cost of capital and therefore comprise the remuneration of equity (that is part of the difference between the operating profit and the net financial costs). For the purposes of this report it was not possible for NATS to compute an estimate of the economic cost of capital, but work is in progress to provide such a figure for the ACE 2006 data analysis.

Finally, Figure 3.7 shows that in 2005, LVNL reported exceptional costs that represent 8% of its ATM/CNS provision costs. These are mostly related to restructuring costs for services provided at the small regional airports. Four other ANSPs (i.e. Belgocontrol, ENAV, NATS and Skyguide) reported exceptional costs that represent less than 2% of their ATM/CNS provision costs.

3.3 Conclusions

Total gate-to-gate ANS costs amount to some €7 400M in 2005. For the purposes of the ACE analysis only those costs which relate to the provision of ATM/CNS services, and which are under an ANSP's direct control, are used. These account for some 87% of the total gate-to-gate ANS costs in 2005. The aeronautical MET costs, EUROCONTROL Agency costs and payments to government and regulatory authorities which represent 13% of gate-to-gate ANS costs are excluded from the benchmarking analysis:. For these three costs items, no output measures are currently available, hence no cost-effectiveness KPIs are applied.

MET costs account for a little over 5% of the gate-to-gate ANS costs. At the European level, MET costs over 2002-2005 decreased by -2.7% in real terms. This decrease is unevenly distributed among European States. In fact, in States with relatively high MET cost-base there have mostly been falls, sometimes very substantial, while the large increase in the MET cost-base are mainly in States where the costs were "small" to start with. Tighter cost management measures, rationalisation, renegotiation of contract, and the use of different cost allocation practices have been identified as reasons for the fall in the MET cost-base.

EUROCONTROL costs account for almost 7% of the gate-to-gate ANS costs (8.4% of en-route ANS costs). These costs increased by +27% in real terms between 2002-2005. Of this +27% increase, +17% is due to pension related costs and +10% relates to discretionary costs which are controlled by the EUROCONTROL Agency. After this large one-off increase in 2005, EUROCONTROL Agency costs are expected to remain constant (in real terms) until 2010.

Payments to government and regulatory authorities account for 1% of the gate-to-gate ANS costs. Among the various States there exist differences in the scope of regulatory activity and how these costs are covered. Moreover, several ANSPs did not report costs for regulatory services, often because they were unable to identify these costs separately from the ATM/CNS provision costs. The regulatory framework laid down by the SES regulations provides for the designation of NSAs in charge of certifying ANSPs as well as ensuring the proper implementation of the SES regulations. When the costs of such authorities (or other governmental costs related to the provision of ANS) are recovered through ANS charges, Member States must establish and allocate their costs according to principles laid down in the Common Charging Scheme Regulation (EC No. 1794/2006). This will increase transparency and comparability.

Finally, this chapter presents a high-level view of ATM/CNS provision costs, which are analysed in detail in later chapters. There are significant differences across ANSPs in terms of size and structure of ATM/CNS provision costs. The largest five ANSPs (DSNA, Aena, DFS, NATS and ENAV) bear 63% of the total ATM/CNS provision costs, and handle 56% of the traffic. Staff costs account by far for the largest share (60%) of ATM/CNS provision costs. Direct operating costs account for 19% while depreciation costs and costs of capital represent 14% and 6% of the ATM/CNS costs, respectively.

4 FACTORS AFFECTING PERFORMANCE

4.1 Introduction

Many factors contribute to differences in costs between ANSPs and ideally would have to be taken into account in order to make fair performance comparisons. For this reason, this chapter is introduced before the cost-effectiveness analysis presented in Part II and Part III of the report. Therefore, it is important to stress that all the ANSPs cost-effectiveness benchmarking results presented in this report should be seen in the context of this chapter.

There are obviously several elements which can affect ANSPs cost-effectiveness performance. The ANSP size in terms of traffic volumes can be an important factor in presence of scale effects. This is briefly introduced in Section 4.2.

An assessment of the performance of an ANSP should take into account the **quality of service** provided. For example, in an effort to control costs and improve its cost-effectiveness, an ANSP might postpone critical capacity investments which could result in significant delays incurred by airspace users. In order to reflect this trade-off, ACE 2001 introduced the concepts of "economic" and "financial" measures of cost-effectiveness. The measure of economic cost-effectiveness includes a measure of quality of service. This is discussed further in Section 4.3.

An assessment of the performance of an ANSP should also take into account the **exogenous factors** which are outside the control of an ANSP and which can highly impact on the level of performance achieved. These factors are discussed further in Section 4.4.

There are also unobserved factors (exogenous or endogenous) which can impact ANSPs cost-effectiveness performance (such as differences in the institutional and governance arrangements, and the overall social, economic and business environment in which the ANSP operates).

4.2 ANSP size

The sheer volume of traffic or size of operations is expected to impact cost-effectiveness and productivity. In the European ANS system, 56% of traffic volume is concentrated over the five largest ANSPs (see Figure 3.6 and Annex 6 – Table 0.6) with a large dispersion across the sample (e.g, there is a factor of 256 in terms of traffic volume between DSNA and MoldATSA).

As ATM/CNS is both a capital and a labour intensive industry, there are inevitably fixed costs (typically capital-related costs for the ATM systems and CNS infrastructure) which in the short term do not necessarily increase proportionally with the traffic. Therefore, it is expected that larger ANSPs should potentially benefit from these scale effects and, all else equal, have higher productivity and lower unit cost. In practice, the measurement of these scale effects is not straightforward. This could be done through appropriate quantitative methods once the data set will become sufficiently large.

4.3 Quality of service

The analysis of financial cost-effectiveness is based on the ATM/CNS costs provided by the ANSPs, and is reported in Part II of this report (Chapters 5-8).

These financial costs are not, however, the only way in which the service provided by an ANSP affects airspace users. 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. To capture those additional costs, the concept of “economic" cost-effectiveness is presented in this chapter and further detailed in Part III, Chapter 9.

A number of factors affect aircraft operations and contribute to the quality of service that is provided to airspace users by an ANSP. These include:

- ATFM ground delays;
- Airborne holding (although these are mostly a consequence of airport constraints);
- Horizontal flight-efficiency (route length extension);
- Vertical flight-efficiency (deviation from optimal vertical flight profile).

PRC/PRU work is currently in progress to assess and assign values to ATM costs such as route length extension which are borne by the airspace users. However, although the analyses can be done at the European network level as suggested in PRR8 and PRR2005, it is not obvious how to assign flight inefficiency to specific ANSPs. Furthermore, although airborne delays can be substantial around certain large hub airports, they are not currently measured in a consistent manner throughout Europe.

As a consequence of these limitations, the quality of service supplied by ANSPs is, for the time being, assessed only in terms of ATFM ground delays, which can be measured consistently and expressed in monetary terms. For the longer term, means should be sought of including the wider costs of quality of service (airborne delays, flight efficiency).

The indicator of economic cost-effectiveness is therefore defined as ATM/CNS provision costs plus the costs of ATFM ground delay, all expressed per composite flight-hour[36]. As with financial cost-effectiveness, economic cost-effectiveness is measured gate-to-gate, with the unit of output being “composite flight-hours”. The conceptual framework is illustrated in Figure 4.1 below.

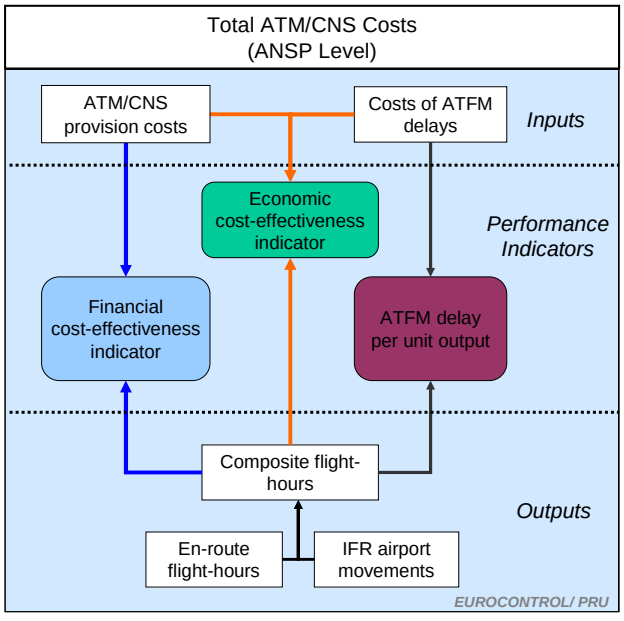


Figure 4.1: Conceptual framework for the analysis economic cost-effectiveness

A detailed analysis of economic cost-effectiveness measures is contained in Part III, Chapter 9.

[36] As defined in Section 2.1 and Annex 1 of the ACE 2002 Benchmarking Report.

4.4 Exogenous factors affecting performance

Exogenous factors are those factors which are outside the direct control of an ANSP. They can arise from the institutional, economic and operational environments within which the ANSP has to provide a service.

Factors relating to the institutional and economic environments include, *inter alia*:

- Regulatory constraints: For example, an economic regulator will exert an influence on the charges that can be made for services provided and will restrict the rate at which these charges can be raised;
- Legal constraints: For example, labour laws may prescribe the contractual number of hours that should be worked each week, which has an impact on cost of employment;
- Government control: For example, performance might be reduced when an ANSP is required by a Government to provide an uneconomic service (e.g. maintain standard service levels at small community airports);
- Local economic conditions and fiscal policy: For example, local cost of living which impacts on employment costs, and taxation/levy policy on turnover and/or on profit. For States not part of the European Monetary Union the volatility of exchanges rates and inflation rates are additional factors which affect costs and therefore performance.

Factors related to the operational environment include, *inter alia*:

- Size of airspace;
- Spatial and temporal variability of traffic demand (in particular seasonal variability);
- Traffic complexity;
- Traffic mix.

Factors related to legal, regulatory or government constraints are very difficult, if not impossible, to measure. Economic factors such as the cost of living can be more easily measured from readily available statistics such as EUROSTAT.

Factors related to the operational environment can also be quantified. The recent work from the ACE Working Group on complexity has defined high-level indicators of traffic complexity to be used in the analysis of cost-effectiveness and productivity.

In theory, those exogenous factors which are measurable can be related to unit costs through appropriate quantitative methods such as econometric analysis. In collaboration with NERA, the PRU recently developed an econometric methodology for ANSPs' cost benchmarking[37]. The main advantage of this approach would be that the impact of exogenous factors on ANSPs costs could be directly inferred from the results of the analysis. This implies that one could make a distinction between the **factual** measure of cost-effectiveness (as described in Figure 4.1) and the **normative** level of cost (in)efficiency of an ANSP . Unfortunately, at this stage, owing to the small size of the ACE data sample (4 years), it proved difficult to draw firm conclusions from the econometric analysis.

In the meantime, analysis of exogenous factors has focused on three elements: cost of living, traffic complexity, and variability of traffic demand. These are discussed further in sections 4.4.1, 4.4.2, and 4.4.3. Analysis of financial cost-effectiveness and productivity in the light of these three exogenous factors is further contained in Part II of the report.

[37] See technical note on "Cost Benchmarking of Air Navigation Service Providers: A stochastic frontier analysis", NERA Economic Consulting, November 2006 which is available on PRC website.

4.4.1 Cost of living

Differences in cost of living between European states will impact on costs in a number of ways. The clearest direct impact is on employment costs – both ATCO and support staff costs will be affected by cost of living. There may also be an impact on direct operating costs if support functions have been outsourced, particularly if outsourced staff are paid in local currency.

The cost of living index, calculated as the ratio between the GDP and the GDP adjusted by the Purchasing Power Parities[38] (PPPs), is shown in Figure 4.2 below. There is a factor greater than six between the cost of living faced by Skyguide in Switzerland and the cost of living that UkSATSE is subject to in Ukraine.

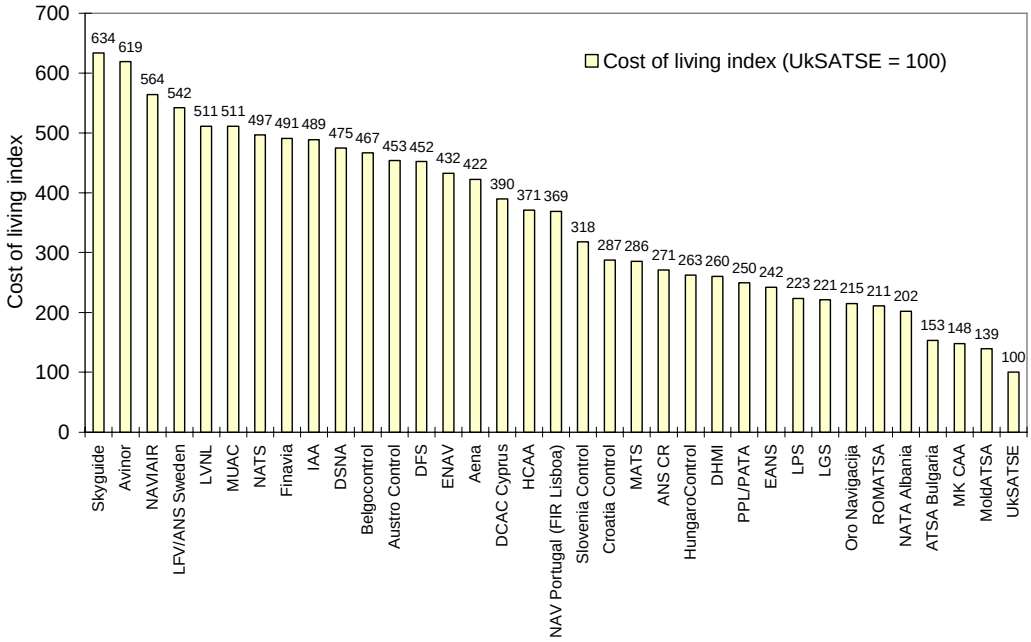


Figure 4.2: Cost of living index (2005 data)

It is apparent from Figure 4.3 below that cost of living tends to be significantly lower in the Eastern part of Europe and particularly higher in the "Core Area" and in the Nordic part of Europe[39].

Given these large differences, for the purposes of international comparisons, it is useful to examine employment cost as adjusted by the PPPs. This is further detailed in Part II.

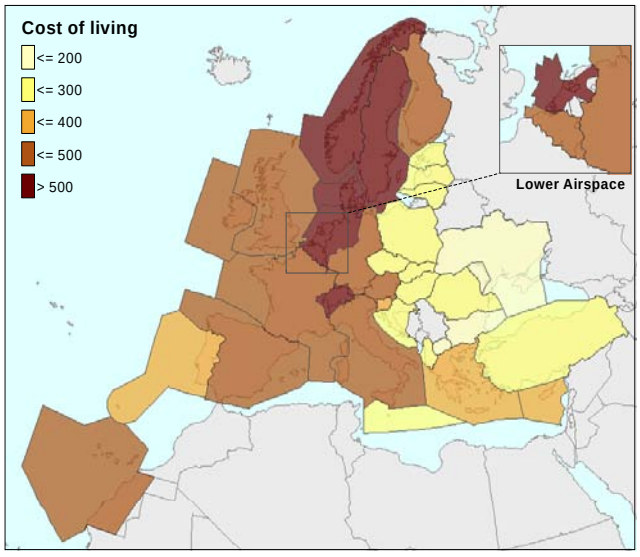


Figure 4.3: Cost of living index (2005)

[38] PPPs are currency conversion factors that can be used to transform economic indicators (expressed in national currency) to a common purchasing power. PPPs are the ratios of the prices, in different countries expressed in national currency, of a defined basket of goods and services as published by EUROSTAT.

[39] Data available from the International Monetary fund (IMF) database.

4.4.2 Traffic complexity

ANSPs and ACCs operate in very different operational environments across Europe. For a fair comparison to be made of cost-effectiveness performance and productivity, due account must be taken of differences in traffic complexity. This includes both the spatial complexity of the traffic and its variability over time. Traffic complexity can influence either costs or quality of service, depending on an ANSP's response to it.

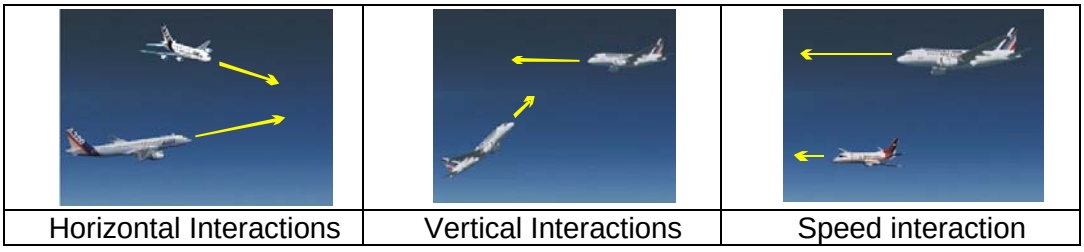
An ACE Working Group (WG) on complexity was set up with the objective to define high-level indicators of complexity to be used to inform the analysis of cost-effectiveness and productivity. The WG[40] concluded that the issues generally grouped together under the heading of "traffic complexity" could be divided into two:

- Structural complexity: the traffic in some areas is **structurally** more complex; the traffic can contain more ascending and descending routes, more crossing routes, and variable speeds;
- Adjusted density: a measure of the concentration of traffic in a given volume of airspace, and defined as the hours of interaction (with the ANSP/ACC) per flight-hour.

A key insight of the group was that these two impacts were independent. Traffic in an area could be dense, but structurally simple; equally, traffic could be structurally complex but sparse. Furthermore, the two impacts were **multiplicative**; the impact of structural complexity was greater, the more dense the traffic.

Aggregated complexity score = Adjusted density × Structural complexity

The indicator of structural complexity was set up, taking into account three types of possible **interactions**: vertical interactions; horizontal interactions, and in-line interactions caused by different speeds. These interactions are illustrated in Figure 4.4 below.



Horizontal Interactions	Vertical Interactions	Speed interaction

Figure 4.4: Structural complexity indicators

For the purposes of this analysis, these three structural indicators have been summed to obtain a **structural complexity indicator**. Multiplying this by the adjusted density gives an overall **aggregated traffic complexity** score.

The relationship between complexity and ATM performance is not straightforward. The effects of complexity on ATM performance can be two-fold:

- Positive effects: Higher density is expected to contribute to a better utilisation of resources and to more effective exploitation of economies of scale (up to the point when resources become fully utilised);
- Negative effects: Higher structural complexity entails higher ATCO workload and/or more sophisticated systems for the same volume of traffic.

[40] "Complexity metrics for ANSP benchmarking analysis" by the ACE Working Group on Complexity. Final Report, April 2006.

The structural complexity index and adjusted density metric computed at ANSP level (one year of data) are shown in Figure 4.5. ANSPs with the greatest traffic complexity (e.g., Belgocontrol, NATS) are shown in the area close to the top right corner. Moving left shows ANSPs (like Avinor) with high structural complexity but low density. Moving down shows ANSPs with relatively high density but lower structural complexity (such as ATSA Bulgaria).

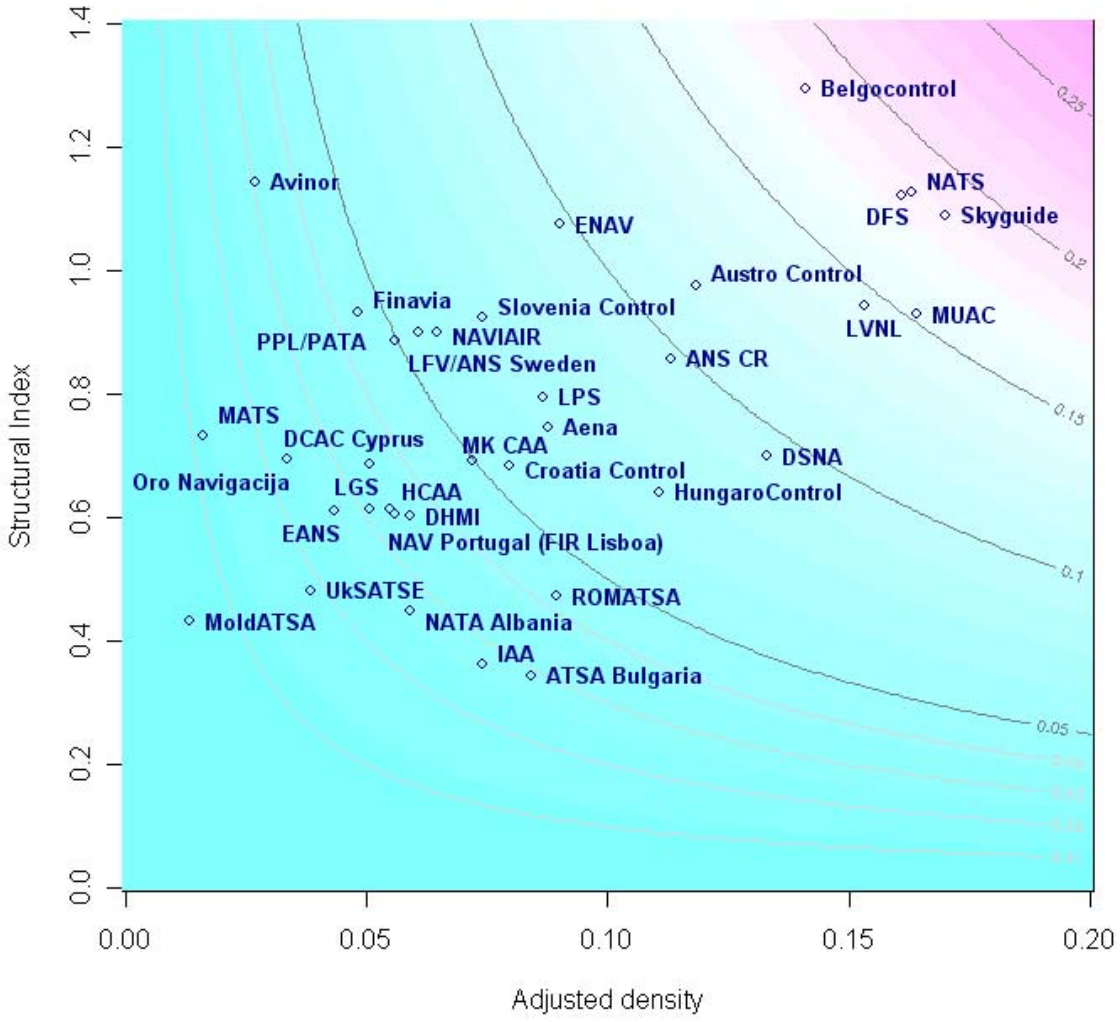


Figure 4.5: Traffic complexity metrics for ANSPs, 2005

Figure 4.6 below represents the aggregated complexity scores for each ANSP[41]. Five different groupings of ANSPs have been identified according to the aggregated complexity scores. Belgocontrol, DFS, NATS and Skyguide show the highest complexity score at 0.18 hour of interaction per flight-hour. In other words, for each flight-hour in these airspace there are on average some 11 minutes of potential interactions[42] amongst aircraft. The average complexity score for the European system is close to 0.1 hour (six minutes) of interaction per flight-hour and roughly speaking corresponds to the complexity score of the third grouping in Figure 4.6.

[41] See Annex 4, for a table displaying the traffic complexity indicators for each ANSP.
[42] The concept of interactions is defined as the simultaneous presence of two aircraft in a cell of 20x20 Nautical Miles and 3 000 feet in height.

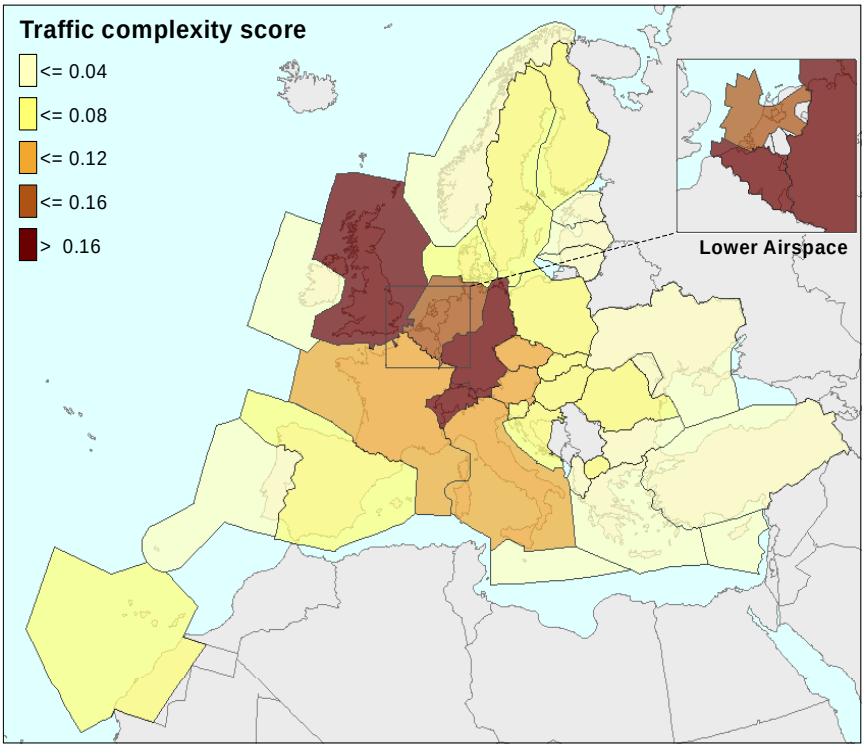


Figure 4.6: Aggregated complexity scores at ANSP level, 2005

It is interesting to note that the ten most "complex" ANSPs (i.e. those with an aggregated complexity score higher than 0.08 hour of interaction per flight-hour) comprise the largest ANSPs, with the exception of Aena. Incidentally, this group of ANSPs (with the exception of ANS CR) also tends to face higher cost of living than the average (see Figure 4.2).

4.4.3 Traffic demand variability

Traffic demand variability is an important issue in comparative performance, as it can be a source of allocative inefficiency; if traffic is highly variable, resources may be underutilised, or made available when there is little demand for them. Therefore traffic demand variability is likely to impact productivity, cost-effectiveness and quality of service. Different types of variability require different types of management practices to ensure that an ANSP/ACC can operate flexibly in the face of variable traffic demand. The different types of temporal traffic demand variability[43] are:

- the **seasonal** variability; that is, the difference in traffic levels between different times of the year;
- the **within-week** variability; that is, the difference in traffic levels between different days of the week; and
- the **hourly** variability; that is, the variation of traffic through the day.

Because seasonal variability is an area of variability that is particularly difficult for an ANSP/ACC to adapt to, previous ACE reports (e.g. ACE2002) have attempted to analyse the relationship between seasonal variability and productivity. A useful indicator of differences in seasonal variability is the ratio of traffic in the peak week to the average weekly traffic. Seasonal traffic variability tends to be significantly higher where cost of living and traffic complexity are lower (Figure 4.7).

[43] Geographical/spatial variability within the ANSP/ACC's airspace can also be an area of variability that creates difficulties in adapting to (e.g. the North Atlantic Tracks).

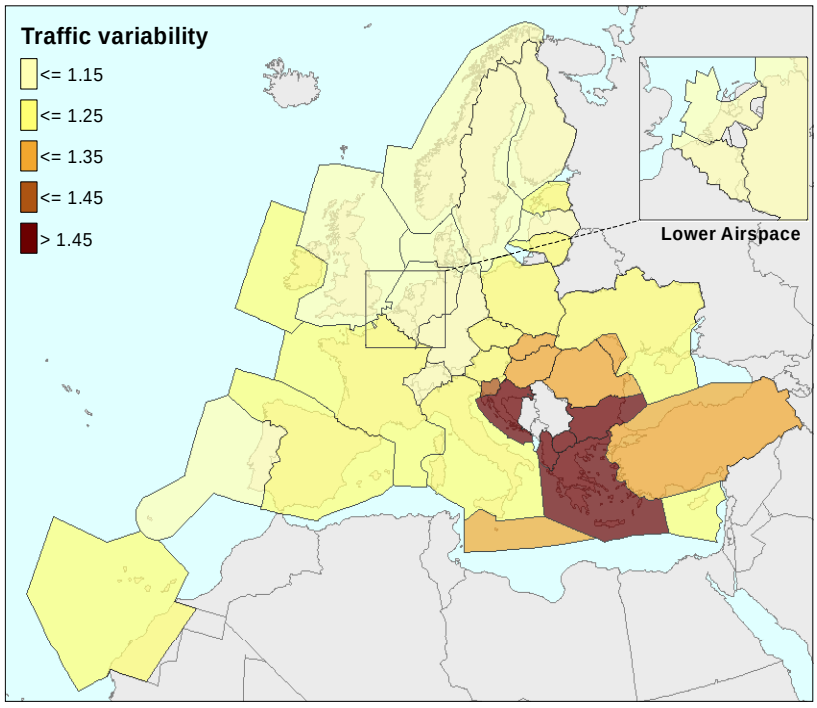


Figure 4.7: Seasonal traffic variations (2005 data)

4.4.4 Correlations among factors affecting performance

Table 4.1 displays the matrix of statistical (partial) correlation between the three factors affecting ANSPs performance which are identified in this Chapter.

	Variable description	A	B	C	D
A	Output size	1.0			
B	Aggregated complexity score	**0.5**	1.0		
C	Cost of living	**0.4**	**0.6**	1.0	
D	Traffic variability	**-0.3**	**-0.4**	**-0.6**	1.0

Table 4.1: Correlations between factors affecting performance (ANSP level)

It is worth highlighting that there is a positive relationship between the aggregated complexity scores and the cost of living (correlation coefficient of 0.6). In general, there is a link between growth in air transport and a strong economy, which means that ANSPs with higher cost of living tend also to operate in countries with high traffic complexity. However, there are exceptions: IAA and the Nordic ANSPs have high cost of living but low complexity. This may be because they are located on the boundary of ECAC airspace, adjacent to the Oceanic airspace, and therefore tend to have a less complex airspace than those in the "Core Area" of Europe, where major traffic flows intersect.

Table 4.1 also statistically confirms that traffic variability is negatively correlated with the cost of living (correlation coefficient of -0.6).

No hard conclusions can be inferred from these partial correlations. As the NERA report has shown, the partial correlations between these factors are part of the reason why it is difficult, with the limited sample of data, to obtain statistically meaningful cost inefficiency measurements.

PART II: FINANCIAL COST-EFFECTIVENESS

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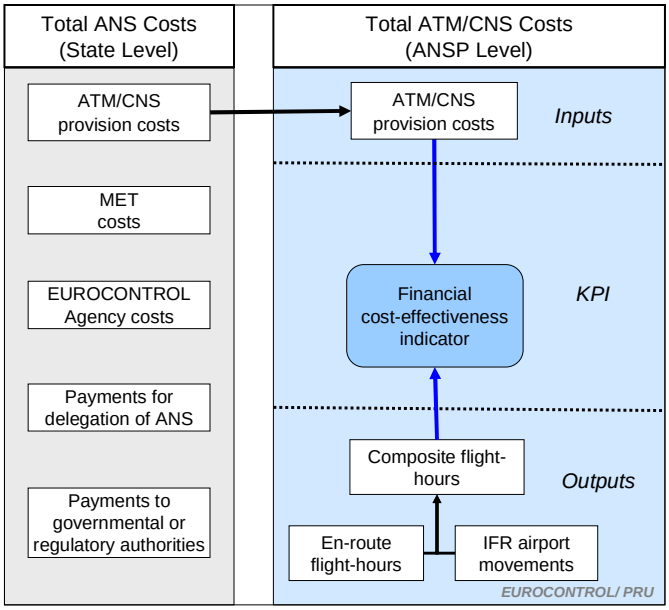
5 FINANCIAL COST-EFFECTIVENESS (2005)

5.1 Introduction

This chapter examines and compares ANSPs' financial cost-effectiveness, in terms of the ATM/CNS provision costs per composite flight-hour[44]. Figure 5.1 shows the framework for the development of an indicator of financial cost-effectiveness. As discussed in Chapter 3 costs outside the control of the ANSP are removed so that the focus is directly on the cost of providing an ATM/CNS service to airspace users. These ATM/CNS provision costs are then expressed per unit of output as described in Figure 5.1.



The cost-effectiveness KPI computed in this report is a factual indicator. A genuine measurement of **cost inefficiencies** would require full account to be taken of identified and **measurable** exogenous factors such as cost of living, traffic complexity, and traffic variability (as described in Chapter 4). Obviously, identified but non measurable exogenous factors cannot easily be taken into account in a normative econometric analysis. Due to the small size of the ACE data sample it is currently difficult to draw firm conclusions from an econometric analysis. More work will be required in future years.

Figure 5.1: Conceptual framework for the analysis of financial cost-effectiveness

As in previous ACE reports, the focus of the cost-effectiveness analysis is "gate-to-gate" because the allocation of costs between en-route and terminal ANS is not done consistently across the European ANSPs. This lack of consistency tends to distort performance comparisons at the level of en-route and terminal ANS.

Section 5.2 presents a comparison between the cost-effectiveness of individual ANSPs. Section 5.3 presents the analytical framework developed to break down cost-effectiveness into component parts. Sections 5.4 gives the results obtained from applying this framework to the financial cost-effectiveness indicator, providing insights into differences in ATCO productivity, ATCO employment costs and support costs. Section 5.5 presents partial correlations between the various performance indicators analysed in this Chapter and the exogenous factors identified in Chapter 4. Finally, Section 5.6 provides conclusions.

Analysis of trends over time in financial cost-effectiveness is given in Chapter 6.

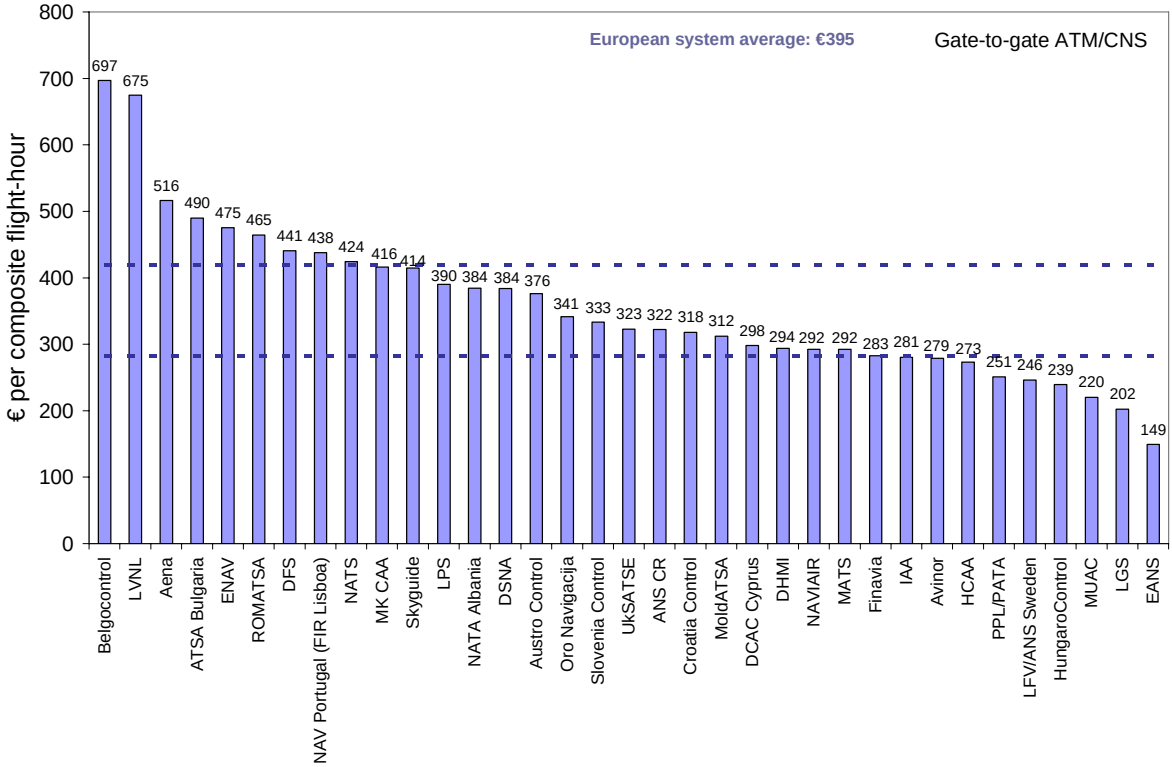
5.2 Comparison at ANSP level

The European system average ATM/CNS cost per composite flight-hour for 2005 is €395. The financial cost-effectiveness indicators for each ANSP are shown in Figure 5.2. The financial cost per composite flight-hour varies between €697 for Belgocontrol and €149 for EANS, a factor of more than four. The two dotted lines in Figure 5.2 represent the first and

[44] The unit of output used is composite flight-hours as defined in Section 2.1 and Annex 1 of the ACE 2002 Benchmarking Report

third quartiles[45] and provide an indication of the dispersion. There is a difference of some €138 per composite flight-hours between the two quartiles, compared to €163 in 2004. Prima facie, this implies that there is some convergence in the level of cost-effectiveness performance within European ANSPs. Figure 5.2 shows that nine ANSPs have unit costs above the third quartile (i.e. €420 per composite flight-hours), among which some large ANSPs such as Aena, ENAV, DFS and NATS; together they account for 48% of the traffic. A unit cost reduction for these ANSPs would therefore have a major impact on the cost-effectiveness of the European ATM/CNS.

The two ANSPs with highest unit costs, Belgocontrol and LVNL, operate in the complex lower airspace below MUAC and also face relatively high costs of living (see Section 4.4.1). As highlighted in footnote 35, costs reported for MUAC do not include the costs of the CNS infrastructure which is provided free of charges by Belgocontrol, LVNL, and DFS: these ANSPs providing the infrastructure to MUAC should be encouraged to identify the portion of costs attributable to MUAC in order to remove this distortion.



This financial cost-effectiveness KPI is a factual indicator. A genuine measurement of **cost inefficiencies** would require full account to be taken of identified and **measurable** exogenous factors such as cost of living, traffic complexity, and traffic variability (as described in Chapter 4).

Figure 5.2: Comparison of the financial cost-effectiveness KPI, 2005

While some of the more detailed analysis of the components of costs presented later in the chapter may contain some inconsistencies, the financial cost-effectiveness KPI itself is robust for each ANSP since, in most cases, it is based on financial numbers that are reconcilable with audited accounts from Annual Reports and output data collected by EUROCONTROL.

The gate-to-gate financial cost-effectiveness KPI in Figure 5.2 can be broken down into en-route and terminal components. This is done in Figure 5.3 below. There are cases where a

[45] 25% of observations lie below the first quartile, whilst 75% lie below the third quartile. Thus in Figure 5.2, 75% of ANSPs have ATM/CNS costs per composite flight-hour less than €420.

high en-route cost per flight-hour (top graph) corresponds to a low terminal cost per IFR airport movement (bottom graph) and vice versa. For example:

- ANS CR has a relatively high unit cost in terminal service provision but a relatively low unit cost in en-route;
- Belgocontrol has a relatively high unit cost in en-route service provision but a relatively low terminal unit cost, while the opposite is true for LVNL, although the two ANSPs share similar operational and economic characteristics.

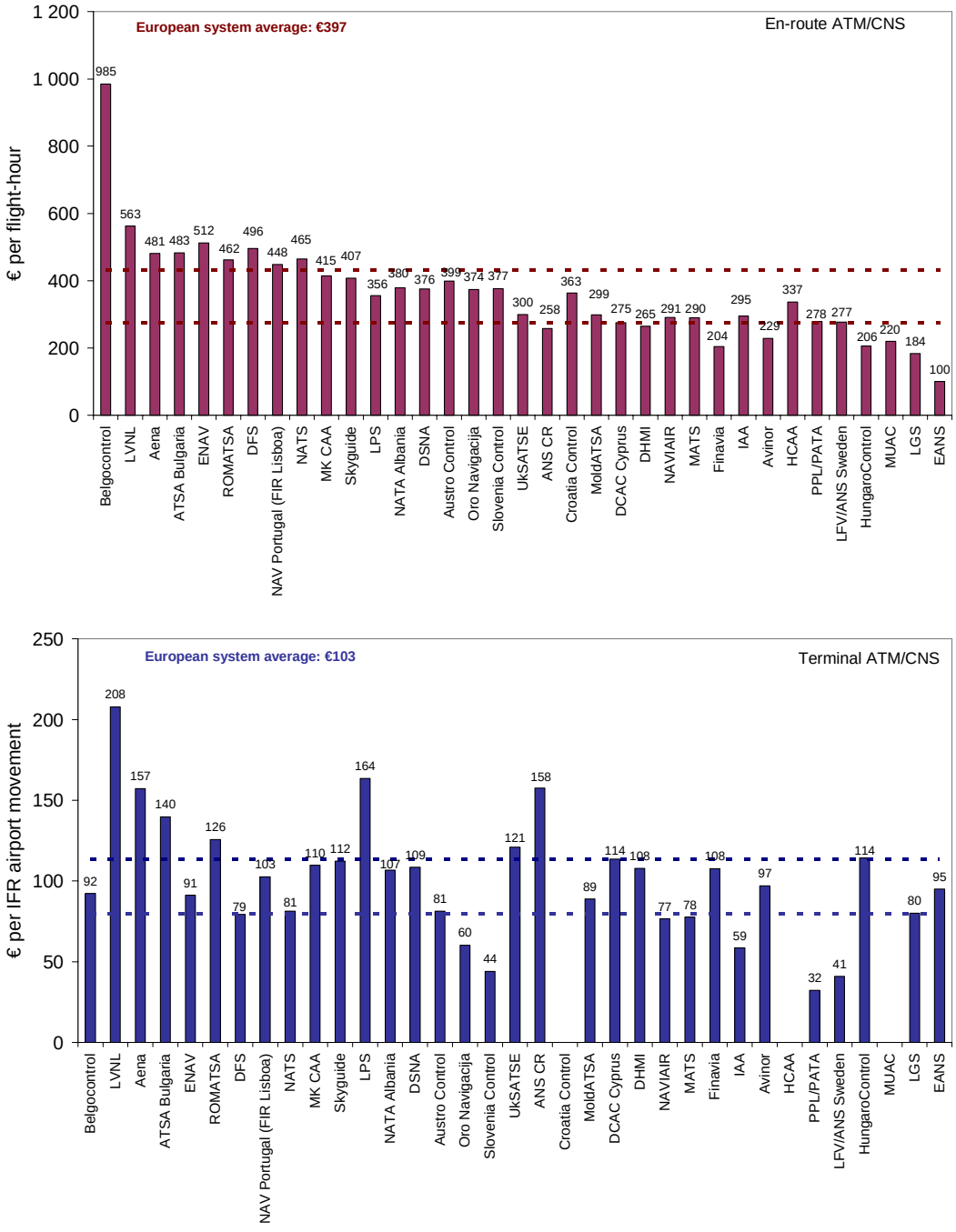


Figure 5.3: Breakdown of financial cost-effectiveness into en-route and terminal, 2005[46]

It is difficult to determine whether such differences are driven by economic and operational factors (for example, size of operations, economies of scale, or traffic complexity), or purely cost-allocation differences.

[46] The dotted lines on the graphs represent the 1st and 3rd quartiles.

The rather low terminal unit cost for LFV/ANS Sweden also potentially illustrates the difficulty of fair terminal cost comparisons in the case where an ANSP owns, manages and operates airports: the difference with comparable ANSPs such as Avinor and Finavia (who also own and operate a large number airports – see Table 1.1) is puzzling. If it is a genuine cost-effectiveness performance difference then it will be important to identify the best practices that lead to this superior performance.

The bottom chart of Figure 5.3 shows that the unit costs of terminal ANS provision could not be computed for Croatia Control, HCAA and MUAC:

- Croatia Control recovers both en-route and terminal costs through the route charges and could not provide an estimate of its terminal ANS costs. However, a Terminal Navigation Charge (TNC) has entered into force in Croatia in September 2006. As a consequence terminal ANS costs should be reported in Croatia Control 2006 data submission;
- HCAA is still unable to identify terminal ANS costs as it did not use a cost accounting system in 2005.
- MUAC is an ANSP operating exclusively in upper airspace and therefore has no terminal ANS costs;

5.3 Framework for gate-to-gate cost-effectiveness and productivity analysis

The PRU has developed an analytical framework that allows cost-effectiveness to be broken down into a number of key components. This framework helps in understanding differences in cost-effectiveness by allowing examination of the detailed factors underlying it. The framework is displayed in Figure 5.4 below.

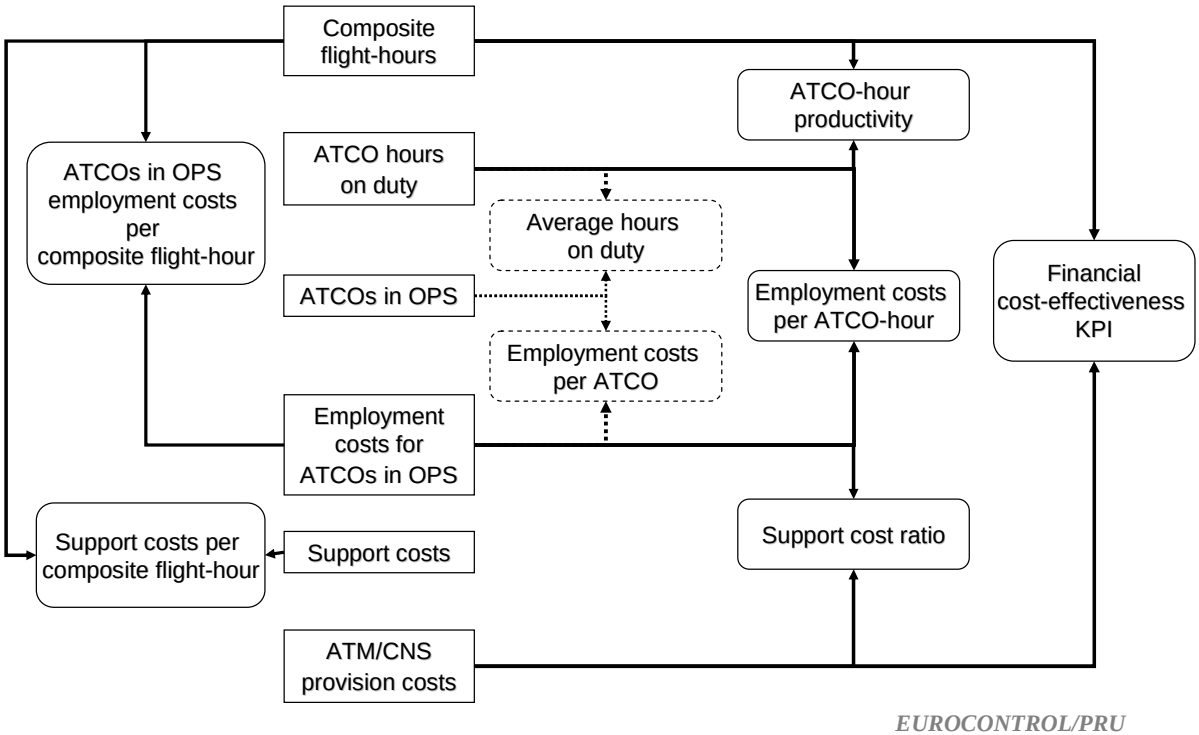


Figure 5.4: Performance framework for gate-to-gate cost-effectiveness analysis

The right-hand side of Figure 5.4 shows that the financial cost-effectiveness indicator (ATM/CNS provision costs per composite flight-hour) is made up of three component performance ratios:

- higher **ATCO-hour productivity** (composite flight-hours per ATCO-hour) improves cost-effectiveness; and

- lower **employment costs per ATCO-hour** improve cost-effectiveness;
- all other things being equal, a lower **support cost ratio** improves cost-effectiveness.

These three ratios multiplied together give the overall financial cost-effectiveness KPI. These components were examined in the ACE reports for 2001 to 2004.

For the first time this year, two additional components have been added to the original performance framework. The left-hand side of Figure 5.4 also shows that the financial cost-effectiveness indicator can be decomposed into two additive factors:

- **Employment costs for ATCOs in OPS per unit of output** is the ratio of the employment costs for the ATCOs in OPS to the output (measured in composite flight-hours). All other things being equal, lower ATCOs in OPS employment costs per unit of output will improve financial cost-effectiveness. (Note that, at European level, the relative weight of this component is some 29% of the overall financial cost-effectiveness indicator);
- **Support costs per unit of output** is the ratio of support costs[47] to the output. All other things being equal, lower support costs per unit of output will improve financial cost-effectiveness. (Note that at European level the relative weight of this component is some 71% of the overall financial cost-effectiveness indicator).

The latter indicator is complementary to the **support cost ratio** for two main reasons. First, the support cost ratio cannot be viewed in isolation since a low ratio may simply be a symptom of high ATCOs in OPS employment costs. Second, given that there are fixed costs in the provision of ATM/CNS (infrastructure, ATM systems), the "support costs per unit of output" can give additional insights to the analysis of support costs and scale effects.

Because of the critical importance of ATCOs in OPS in the provision of ATC services, the framework presented in Figure 5.4 puts a clear focus on this key resource. Other important support functions (with and without operational characteristics) are currently embedded in the so-called "support staff". Therefore support staff (and associated support costs) should not automatically be perceived as a burden. It should be seen as an important driver for cost-effectiveness performance.

5.4 Breakdown of gate-to-gate cost-effectiveness for individual ANSPs

The overall indicator for each ANSP is illustrated in Figure 5.2, and its breakdown into the various component drivers (ATCO-hour productivity, employment costs per ATCO-hour, ATCO employment costs per composite flight-hour, support cost ratio and support costs per composite flight-hour) is shown below in Figure 5.5, Figure 5.6, Figure 5.8, Figure 5.9, and Figure 5.10, respectively. In some of the figures, two dotted lines represent the first and third quartiles[48] for the three component performance drivers.

In the bottom right of each figure a miniature replica of Figure 5.4 is displayed to guide the reader through the framework.

Finally, to summarize and facilitate the interpretation of the results, the concept of "performance ratio" has been introduced and presented in Section 5.4.6. Performance ratios are a simple way to capture the (relative) comparative advantages and weaknesses of an ANSP compared to the European average value.

[47] Support costs are defined as the sum of staff costs (exc. ATCOs in OPS), direct operating costs and capital-related costs.

[48] 25% of observations lie below the first quartile, whilst 75% lie below the third quartile. (Thus, in Figure 5.5, 75% of ANSPs have ATCO-hour productivity less than 0.85).

5.4.1 ATCO-hour productivity (2005)

ATCO-hour productivity should be seen as the efficiency with which an ANSP deploys and makes use of its ATCO resource. Productivity improvements can be achieved not only by optimising and rationalising the actual processes for ATM/CNS provision, but also by more effective OPS room management, making better use of existing resources (for example by adaptation of rosters and shift times, and adaptation of sector opening times to traffic demand patterns).

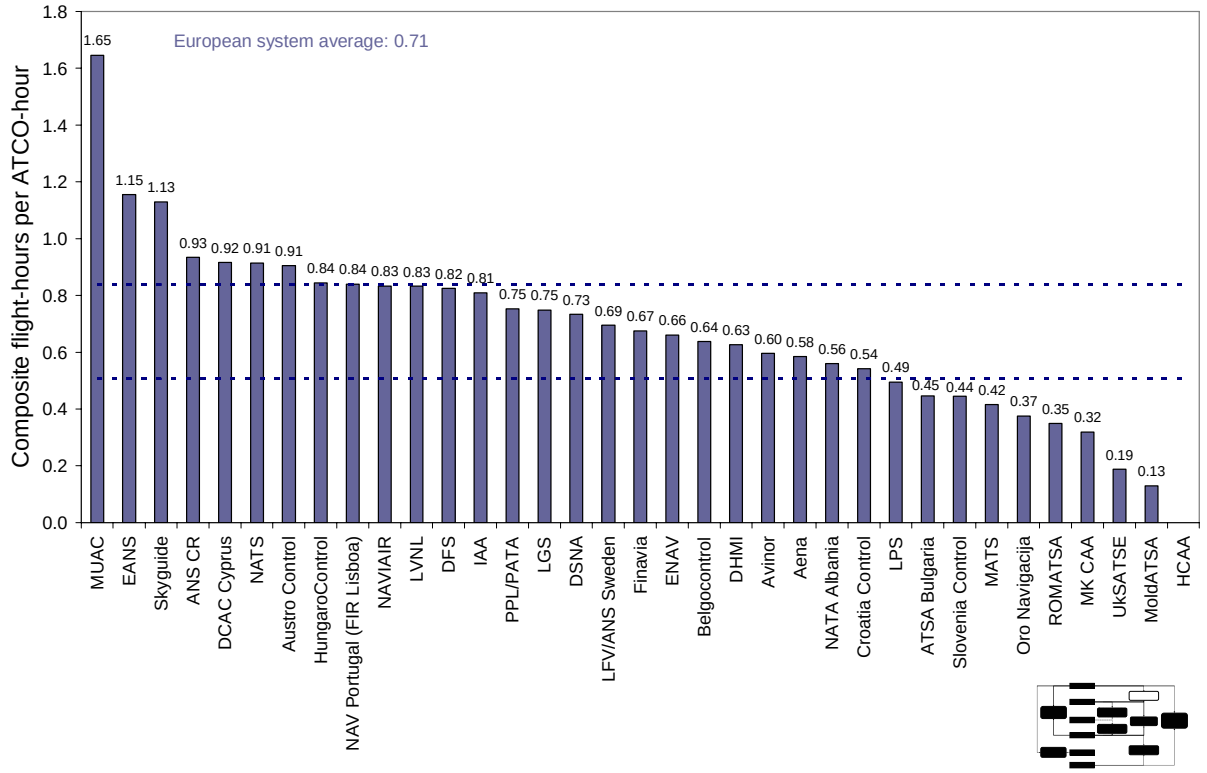


Figure 5.5: ATCO-hour productivity (gate-to-gate), 2005[49]

In 2005, the European system as a whole handled 0.71 composite flight-hours per ATCO-hour. Figure 5.5 shows the variability of this indicator across ANSPs. The upper quartile line indicates that 25% of ANSPs had an ATCO-hour productivity equal to or greater than 0.84. MUAC which exclusively provides ATC services in upper services shows the highest productivity. Note that Chapter 8 further analyses productivity at ACC level and therefore provides a more relevant comparison for MUAC.

Raising the European average productivity (0.71) to the level of the top 25% (0.84) would bring significant gains in cost-effectiveness. However, achieving large improvements in ATCO-hour productivity could have an impact on the other components of cost-effectiveness (for example, if technical solutions are required, support costs may rise).

Clearly, ATCO-hour productivity should be seen in the light of exogenous factors such as traffic complexity (see Chapter 4). DFS, NATS and Skyguide which belong to the most complex grouping in Figure 4.6 also manage to achieve ATCO-hour productivity to the level of the top 25% quartile (see Figure 5.5). On the other hand, MATS, MoldATSA and UkSATSE, which belong to the least complex grouping in Figure 4.6, are at the bottom quartile of the ATCO-hour productivity. Higher seasonal variability and too low volume of traffic compared to the available capacity can explain some of the low productivity levels.

[49] It should be noted that HCAA did not provide the information which is needed to compute the ATCO-hour productivity indicator.

Note also that DSNA, ENAV and Aena, which are comparable in terms of size with DFS and NATS and which belong to a less complex grouping than DFS and NATS, nevertheless achieve lower levels of ATCO-hour productivity. There are obviously several forces at play in the achieved level of ATCO-hour productivity: traffic complexity is an important but not necessarily the only factor impacting productivity.

The relationship between ATCO-hour productivity and traffic complexity is further examined at ACC level in Chapter 8.

5.4.2 Employment costs per ATCO-hour (2005)

The average unit ATCO employment costs in the European system amount to €81 per ATCO-hour. Figure 5.6 shows the values for this indicator for all the ANSPs.

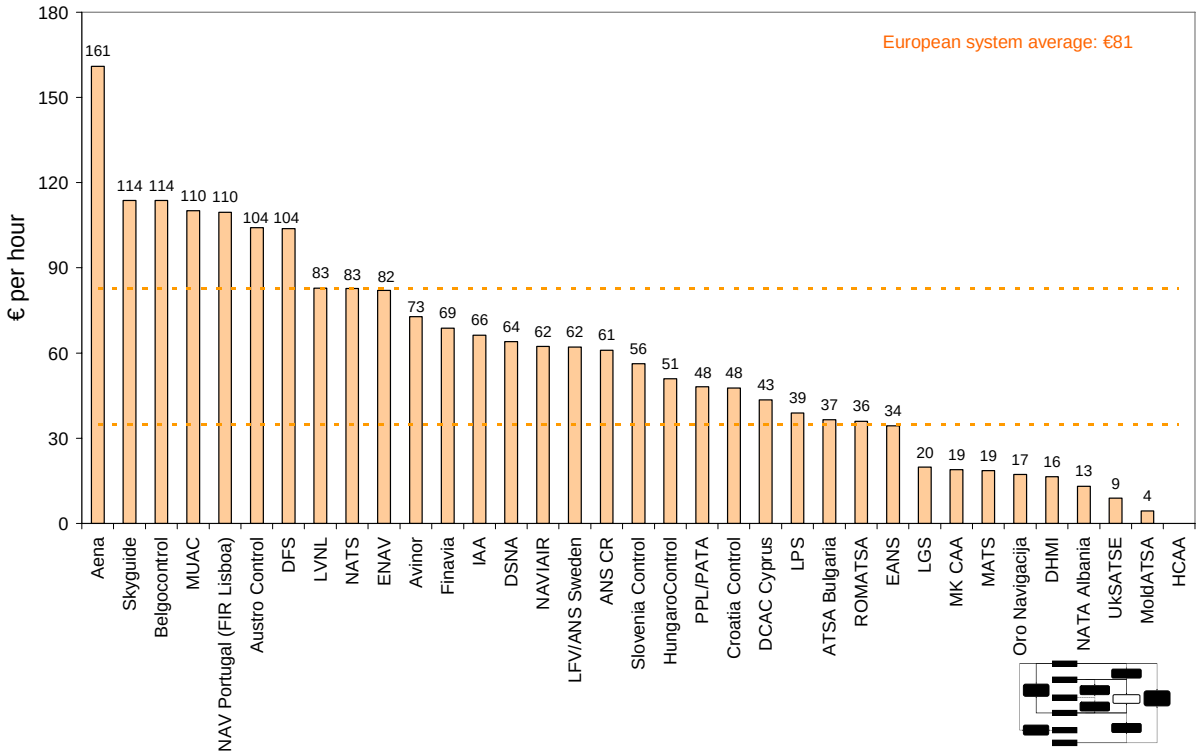


Figure 5.6: Employment costs per ATCO-hour (gate-to-gate), 2005[50]

Aena has the highest ATCO-hour employment costs (€161). UkSATSE and MoldATSA have employment cost per ATCO-hour less than €10. The wide dispersion reflects, to some extent, the variations in the prevailing wage rates in different European countries, which are reflected in ATCO wage rates. It is therefore interesting to put the employment costs per ATCO-hour in relation to the differences in the cost of living as discussed in Chapter 4. This is done in Figure 5.7 below where the differences in employment costs are examined in the context of Purchasing Power Parities (PPPs).

First, the use of PPPs tends to smooth out differences, although large differences still persist in the sample. The European system average with PPPs adjustment is €87 per ATCO-hour compared to €81 without adjustment.

Second, as noticeable in Figure 5.7, employment costs per ATCO-hour in Aena are high with or without PPPs adjustment, and seem somewhat disconnected with the cost of living and the level of productivity (see Figure 5.5).

[50] It should be noted that HCAA did not provide the information which is needed to compute the employment costs per ATCO-hour indicator.

Third, many Eastern European ANSPs, in particular ANS CR, ATSA Bulgaria, PPL/PATA, and ROMATSA, show adjusted employment costs per ATCO-hour that are comparable to those of Western European ANSPs.

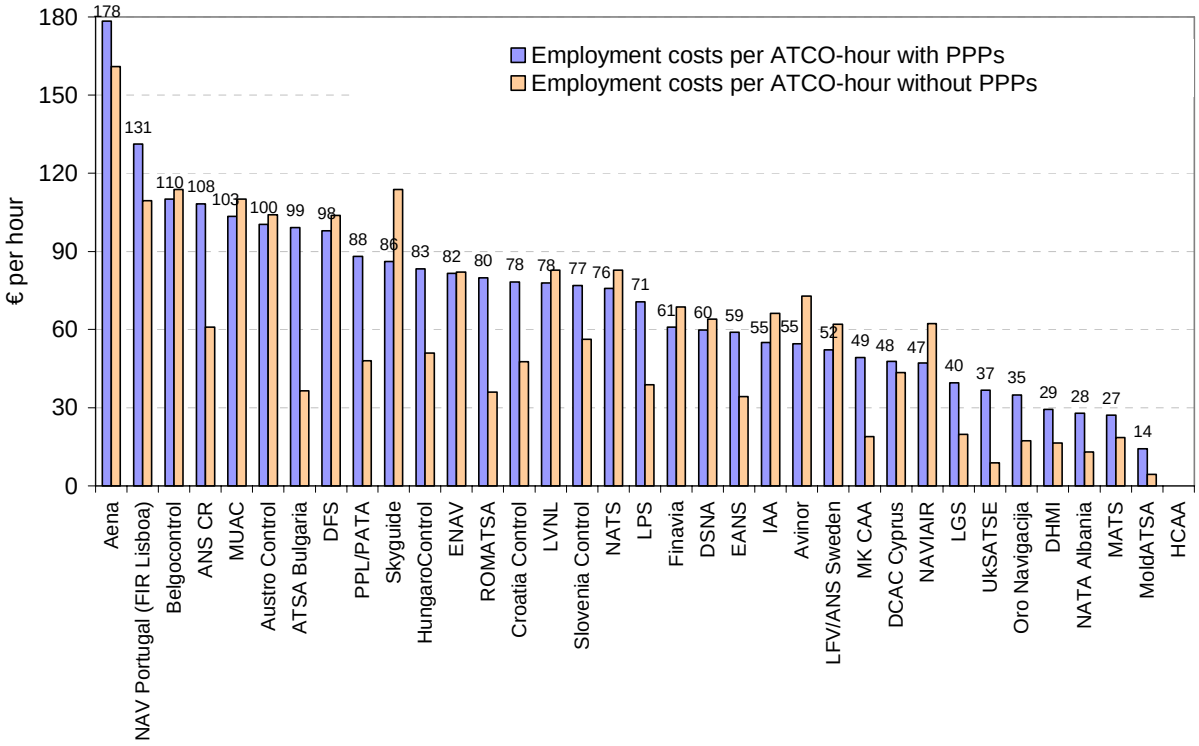


Figure 5.7: Employment costs per ATCO-hour with and without PPPs, 2005[51, 52]

Finally, employment costs are typically subject to complex bargaining agreements, in most cases resulting in collective agreements covering several years, hence the importance of effectively managing employment costs.

5.4.3 ATCO employment costs per composite flight-hour (2005)

The ATCO employment costs per composite flight-hour are the combination of the previous two components, namely ATCO-hour productivity and ATCO-hour employment costs.

Because productivity and employment costs are expected to be intrinsically related it is informative to combine the two components and illustrate the results as shown in Figure 5.8 below. All other things being equal, lower ATCOs in OPS employment costs per unit of output will contribute to improve financial cost-effectiveness. Figure 5.8 also shows the relationship between ATCO employment costs per composite flight-hour and employment costs per ATCO-hour.

[51] It should be noted that HCAA did not provide the information which is needed to compute the employment costs per ATCO-hour indicator.
[52] Data available from EUROSTAT and from the International Monetary fund (IMF) databases.

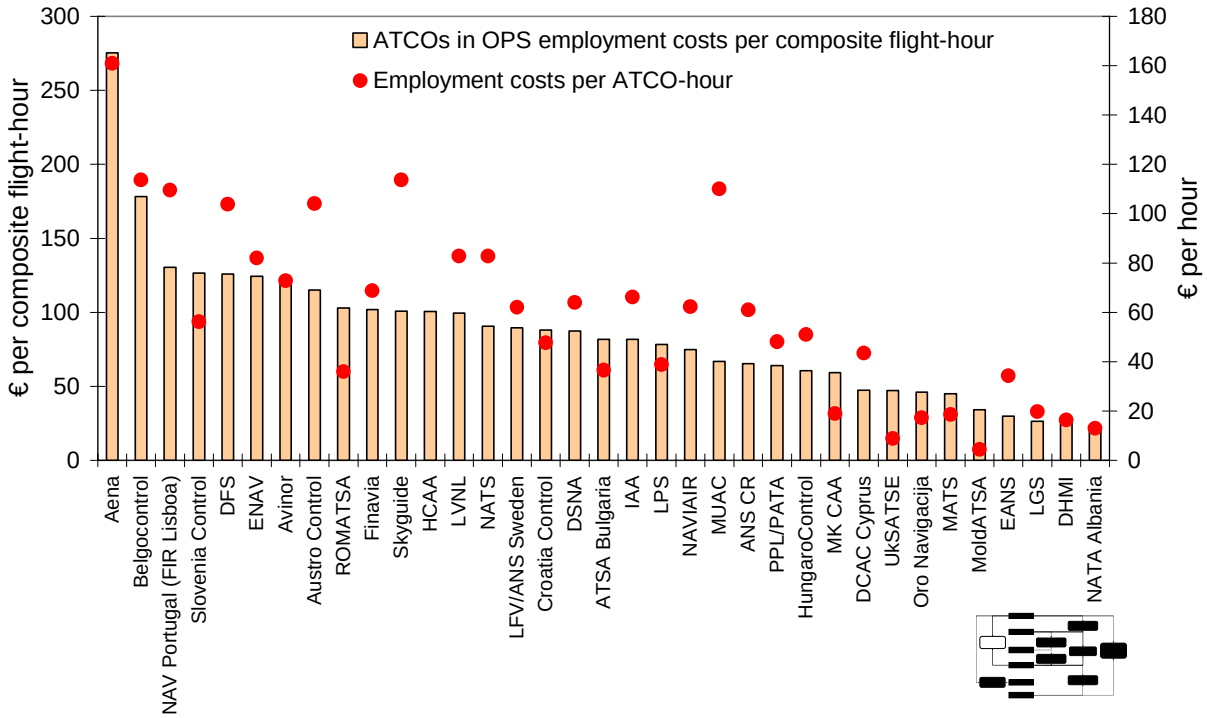


Figure 5.8: ATCO employment costs par composite flight-hour and employment costs per ATCO-hour, 2005

In 2005, the ATCO employment costs per composite flight-hour range from Aena €275 to NATA Albania €23. If we compare these with ATCO-hour employment costs, which take no account of output, we can see how ATCO productivity impacts on employment costs, and hence on cost-effectiveness. An ANSP may have high employment costs per ATCO-hour but if its ATCOs are highly productive then it will have lower ATCO employment costs per composite flight-hour. Thus, for example, Skyguide and MUAC have among the highest ATCO-hour employment costs; however, their ATCO employment costs per composite flight-hour are mid-range, indicating high productivity.

5.4.4 Support cost ratio (2005)

The support cost ratio shows the balance between money spent on ATCOs in OPS and all other expenditure, including capital costs, support staff and direct operating costs. The average support cost ratio for the European system is 3.5. In other words, for every Euro spent on employing ATCOs in OPS in the European system, an additional €2.5 is spent on other costs. This ratio is shown for each ANSP in Figure 5.9 below and ranges from 16.5 for NATA Albania to 1.9 for Aena. The European system average is highly influenced by the low support cost ratio of Aena (1.9). Removing the latter from the sample would result in an increase of the average support cost ratio for the European system from 3.5 to 4.0.

High support cost ratios (see, for example, the third quartile in Figure 5.9) tend to be observed in Eastern European ANSPs where ATCO in OPS employment costs remain comparatively low (e.g, DHMI). In other words, the support cost ratio cannot be viewed in isolation since a high (low) ratio may simply be a symptom of low (high) ATCOs in OPS employment costs.

Second, high support cost ratios are observed where significant capital-related costs have been incurred due to important investment programmes (e.g., DHMI, MK CAA, LGS, MoldATSA, NATA Albania, Oro Navigacija).

Third, ANSPs that are "smaller" in terms of traffic volume tend to show higher support cost ratios than the larger ANSPs (although there are exceptions). Due to the high proportion of fixed costs in ATM/CNS provision, the support costs ratio can be affected by traffic volumes/scale effects.

Finally, there are also quite noticeable differences between the largest five ANSPs (DSNA, Aena, DFS, NATS and ENAV) which are relatively similar in terms of traffic volume, traffic complexity, and cost of living.

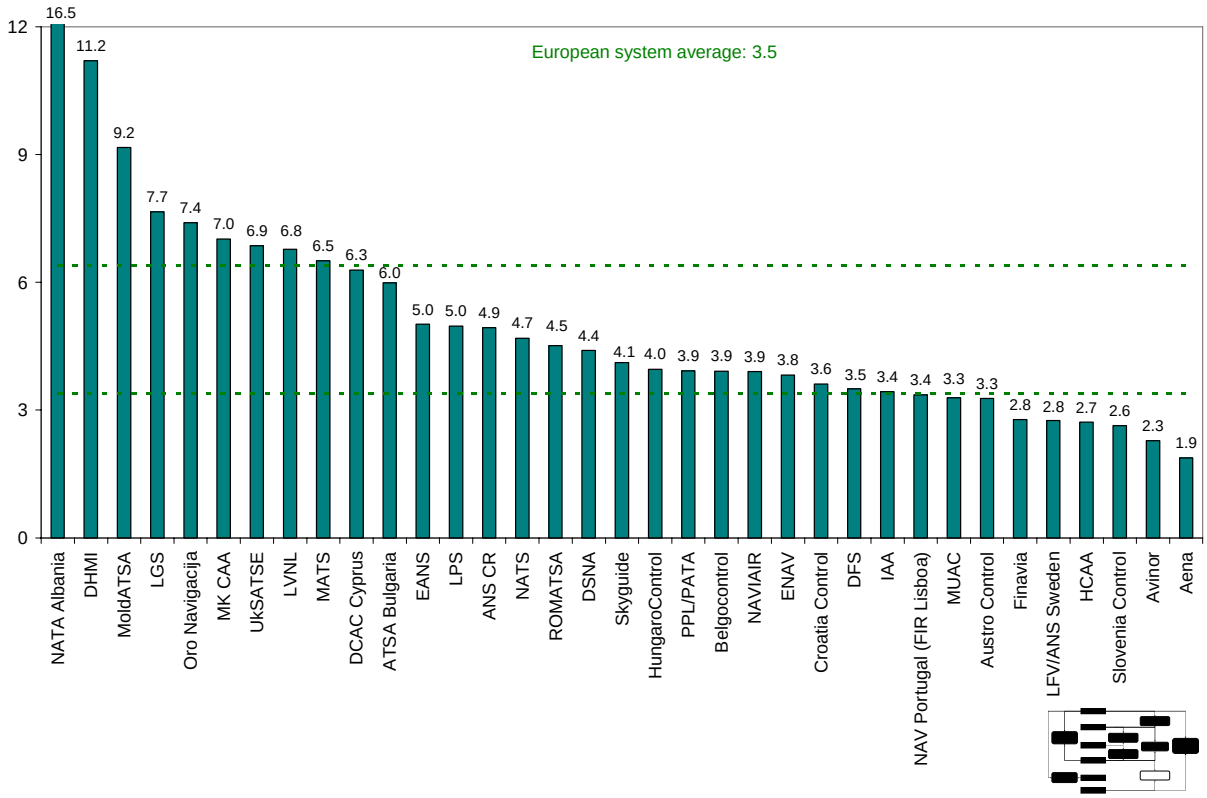


Figure 5.9: Support cost ratio (gate to gate), 2005

In order to further explore the reasons for such differences, a complementary indicator to the support cost ratio, the "support costs per composite flight-hour" is discussed in the next section.

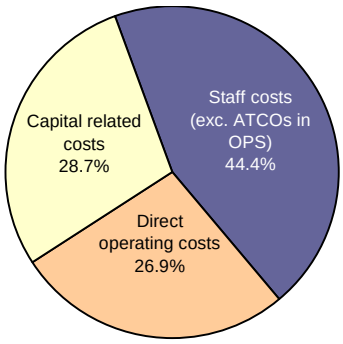
5.4.5 The support costs per composite flight-hour (2005)

Support costs represent on average 71% of total ATM/CNS provision costs. Clearly reducing these costs would have a major impact on cost-effectiveness; therefore understanding the components of support costs and the drivers behind them is important. ATM/CNS fragmentation throughout Europe contributes to higher support costs[53]. Reducing the current level of fragmentation therefore has the potential to reduce support costs and improve cost-effectiveness.

The European average support cost per composite flight-hour is €281. As shown in Figure 5.10 support costs per composite flight-hour can be broken down into three separate components that provide further insight into the nature of support costs, namely:

[53] The impact of fragmentation in European ATM/CNS, Report commissioned by the EUROCONTROL PRC, April 2006. The report is available on the PRC website at the following address: http://www.eurocontrol.int/prc/public/standard_page/doc_other_reports.html.

- Staff costs (exc. ATCOs in OPS), mostly comprised of technical support and administrative staff costs (on average 44% of support costs);
- Direct operating costs, mostly comprised of expenses for energy, communications, contracted services, insurance, taxes, etc. (on average 27% of support costs);
- Capital-related costs, comprising depreciation and financing costs for the capital employed (on average 29% of support costs).



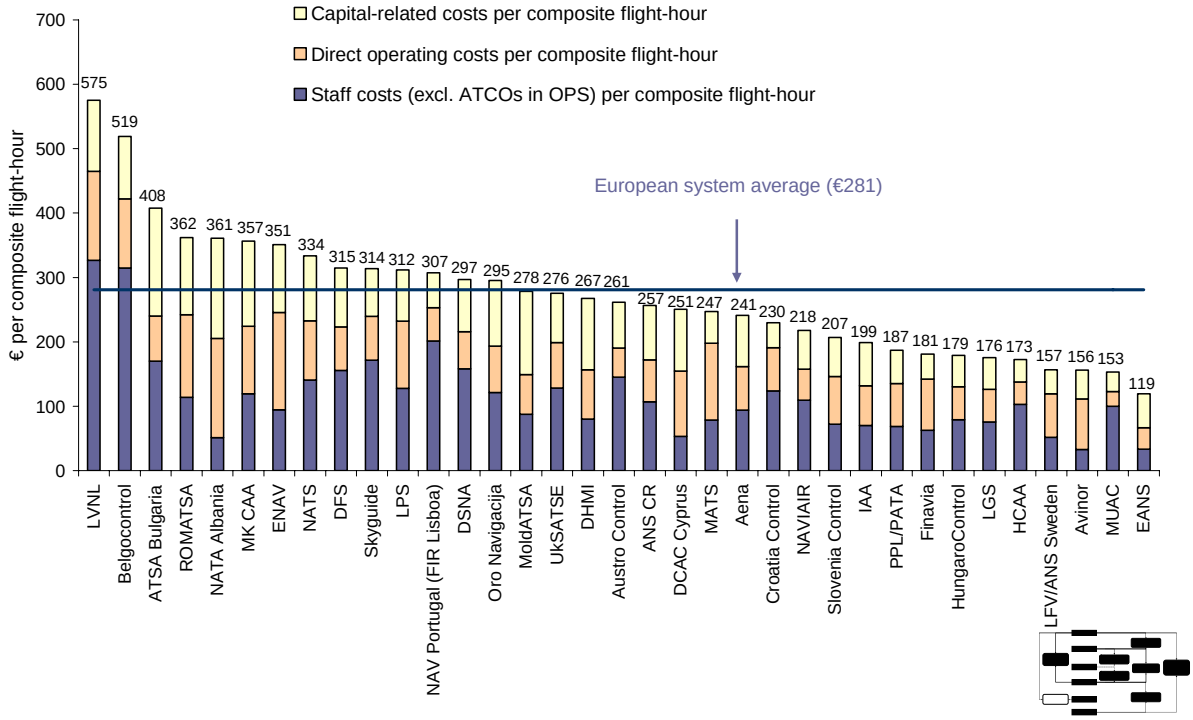


Figure 5.10: Support costs per composite flight-hour, 2005

Figure 5.10 shows that both Aena, with the lowest support cost ratio of any ANSP, and DHMI, with the highest support cost ratio, have similar support costs per composite flight-hour (slightly below the European average). Thus, very different traffic volumes within the organisations can result in similar support costs per composite flight-hour.

Figure 5.10 also highlights noticeable differences between the largest five ANSPs (DSNA, Aena, DFS, NATS and ENAV) which are relatively similar in terms of traffic volume, traffic complexity, and cost of living: there is a difference of €110 per flight-hour between ENAV and Aena. This is an area where sharing Aena's best practice in terms of support costs with DSNA, DFS, ENAV and NATS could potentially be very valuable. One of the likely reason which explains why the support costs are lower for Aena is leaner **support staff** (the support staff ratio is 2.0 compared to an average of 3.1 for the four largest ANSPs) as shown in Figure 5.11 below. Note that the data for Aena does not indicate a massive outsourcing of support functions given the relatively low share of direct operating costs per composite flight-hour in Figure 5.10 above.

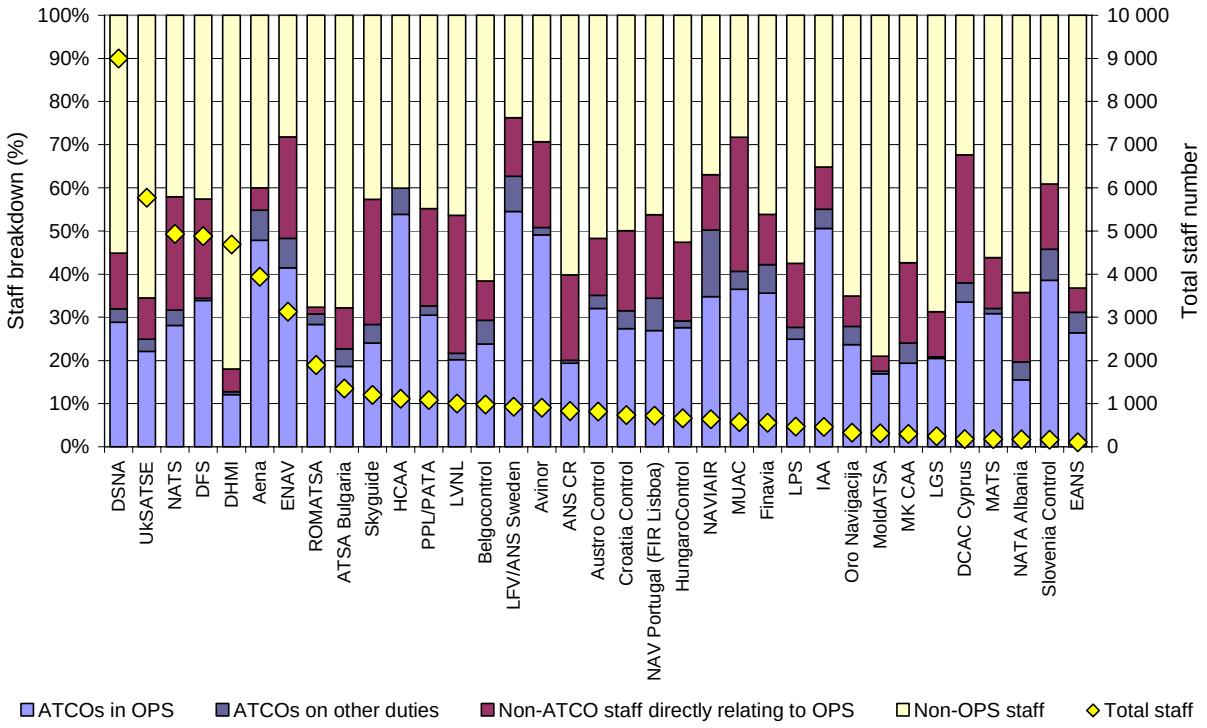


Figure 5.11 Breakdown of ANSPs total staff, 2005

Figure 5.10 also illustrates the substitution that can take place through outsourcing support functions (i.e. between labour and contracted-out services). For example, although the support costs per unit output are similar for LPS and NAV Portugal, the relative shares of direct operating costs and staff costs (exc. ATCOs in OPS) differ significantly. Thus, very different cost structures within the organisations can result in similar support costs per composite flight-hour. Similarly, the low share of non-OPS staff for ENAV in Figure 5.11 reflects the fact that in 2005 ENAV maintenance and ATM systems development activities were outsourced to an external company.

Finally, the absolute level and proportion of capital-related costs seem high for ANSPs like ATSA Bulgaria, MK CAA, MoldATSA and NATA Albania. This could be the result of the current investment cycle for these organisations and/or may reflect the fact that direct operating costs and staff costs (exc. ATCOs in OPS) are paid for in local currency whereas investment is made in foreign currency (usually € and/or US$).

It should be noted that, as for ATCOs in OPS employment costs, staff costs (exc. ATCOs in OPS) are affected by the cost of living[54]. Using the same methodology as in Figure 5.7, Figure 5.12 shows the impact of PPPs on staff costs (exc. ATCOs in OPS) per composite flight-hour. The PPPs adjustment shows some interesting effects. Some of the Western European states with particularly high staff costs (exc. ATCOs in OPS), such as Belgocontrol, LVNL and NAV Portugal still show adjusted employment costs per composite flight-hour well above the average. However, many Eastern European ANSPs, such as ANS CR, ATSA Bulgaria, Croatia Control, LPS, MoldATSA, Oro Navigacija, ROMATSA and UkSATSE, now also show comparatively high adjusted staff costs (exc. ATCOs in OPS) per composite flight-hour. These ANSPs have high levels of support staff (see also Figure 5.11 above).

[54] There may also be an impact on non-staff operating costs if support functions have been outsourced, particularly if outsourced staff are paid in local currency. However, this relationship is less clear and for the purposes of this analysis we will concentrate on employment costs.

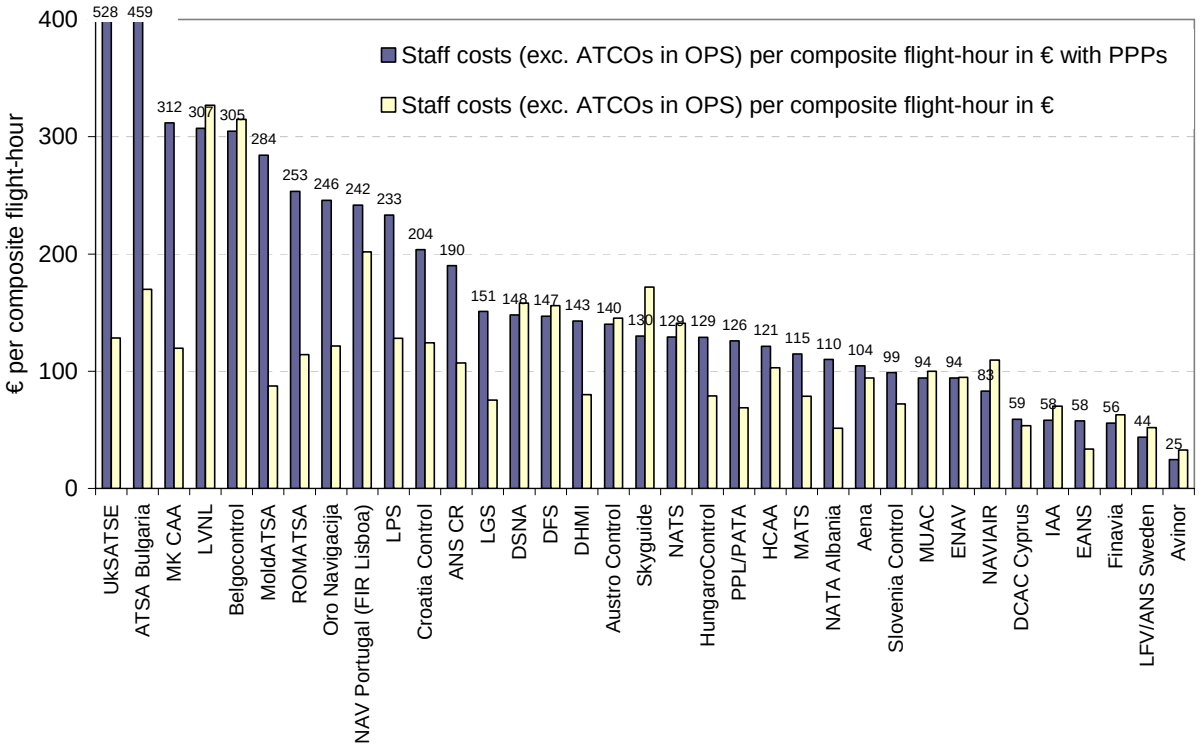


Figure 5.12 Staff costs (exc. ATCOs in OPS) per composite flight-hour[55] with and without adjustment for PPPs, 2005

This illustrates that, although the unit ATM/CNS provision costs in these ANSPs are not currently particularly high (see Figure 5.2), as cost of living (and employment costs) variations across Europe are reduced, these ANSPs will need to decrease in particular their staff costs (exc. ATCOs in OPS) per composite flight-hour. For technical support and administrative staff in particular, there is a significant element of fixed costs which will not grow as traffic grows. Thus, although cost of living may increase, staff costs (exc. ATCOs in OPS) per composite flight-hour would not grow at the same rate – there would in effect be a productivity improvement.

Clearly, it would be important that future traffic growth is not limited by a lack of capacity, so that these scale effects can be fully exploited by Eastern European ANSPs which show comparatively high adjusted staff costs (exc. ATCOs in OPS) per composite flight-hour. Whether traffic growth in these areas will be sufficient to achieve scale effects this remains to be seen. If traffic growth does not keep pace with rising cost of living in these areas, there is a risk of a significant negative impact on the cost-effectiveness of some ANSPs[56]. (See also Chapter 9 for further discussion of the impact of delays on cost-effectiveness).

The trend analysis presented in Chapter 6 provides further insights on changes of these components of cost-effectiveness.

[55] Note that in compliance with IAS 16, NATS and Skyguide capitalise a significant amount of staff costs related to projects developments (i.e. support staff). Therefore for comparability purposes, the data in Figure 5.12 has been adjusted accordingly.

[56] Note that this analysis overlooks the impact of local cost of living on those ANSPs who have chosen to outsource a significant element of their support activities. Assuming staff costs are paid in local currency, rising cost of living would also affect the costs of these outsourced elements.

5.4.6 Performance ratios (2005)

Table 5.1 summarises the relationship between the three multiplicative components (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) of financial cost effectiveness, as show in Section 5.4). 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 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 European system will have a performance ratio of **one**.

ANSPs	Country	Financial cost-effectiveness KPI indexes*	Performance ratios			Performance ratios	
			ATCO-hour productivity	Hourly employment cost*	Support cost ratio*	ATCOs in OPS employment costs per composite flight-hour*	Support costs per composite flight-hour*
Aena	ES	0.76	0.82	0.50	1.85	0.41	1.17
ANS CR	CZ	1.22	1.32	1.32	0.70	1.74	1.09
ATSA Bulgaria	BG	0.81	0.63	2.21	0.58	1.39	0.69
Austro Control	AT	1.05	1.28	0.77	1.06	0.99	1.07
Avinor	NO	1.42	0.84	1.11	1.52	0.93	1.80
Belgocontrol	BE	0.57	0.90	0.71	0.89	0.64	0.54
Croatia Control	HR	1.24	0.76	1.69	0.96	1.29	1.22
DCAC Cyprus	CY	1.32	1.29	1.86	0.55	2.39	1.12
DFS	DE	0.90	1.16	0.78	0.99	0.90	0.89
DHMI	TR	1.34	0.88	4.91	0.31	4.33	1.05
DSNA	FR	1.03	1.03	1.26	0.79	1.30	0.95
EANS	EE	2.65	1.63	2.35	0.69	3.82	2.36
ENAV	IT	0.83	0.93	0.98	0.91	0.91	0.80
Finavia	FI	1.39	0.95	1.17	1.25	1.12	1.55
HCAA	GR	1.44			1.28	1.13	1.63
HungaroControl	HU	1.65	1.19	1.58	0.88	1.88	1.57
IAA	IE	1.41	1.14	1.22	1.01	1.39	1.41
LFV/ANS Sweden	SE	1.60	0.98	1.30	1.26	1.27	1.79
LGS	LV	1.95	1.05	4.08	0.45	4.30	1.60
LPS	SK	1.01	0.70	2.08	0.70	1.45	0.90
LVNL	NL	0.58	1.17	0.97	0.51	1.14	0.49
MATS	MT	1.35	0.58	4.33	0.53	2.53	1.14
MK CAA	MK	0.95	0.45	4.27	0.49	1.92	0.79
MoldATSA	MD	1.26	0.18	18.36	0.38	3.33	1.01
MUAC		1.79	2.32	0.73	1.06	1.70	1.84
NATA Albania	AL	1.03	0.79	6.18	0.21	4.87	0.78
NATS	UK	0.93	1.29	0.97	0.74	1.26	0.84
NAV Portugal (FIR Lisboa)	PT	0.90	1.18	0.74	1.03	0.87	0.91
NAVIAIR	DK	1.35	1.17	1.29	0.89	1.52	1.29
Oro Navigacija	LT	1.16	0.53	4.67	0.47	2.46	0.95
PPL/PATA	PL	1.57	1.06	1.68	0.89	1.78	1.50
ROMATSA	RO	0.85	0.49	2.24	0.77	1.10	0.78
Skyguide	CH	0.95	1.59	0.71	0.84	1.13	0.90
Slovenia Control	SI	1.18	0.63	1.43	1.32	0.90	1.36
UkSATSE	UA	1.22	0.26	9.13	0.51	2.41	1.02
Total European System		1.00	1.00	1.00	1.00	1.00	1.00

Table 5.1: The components of gate-to-gate cost-effectiveness, 2005[57]

[57] For the hourly employment costs ratio and support costs ratio (asterisked in 1), the inverse ratio is used, since **higher** unit employment costs and **higher** support costs imply **lower** cost-effectiveness.

In Table 5.1 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).

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 in Table 5.1). The following example for ANS CR illustrates the interpretation of the performance ratios:

1.22	ANS CR's gate-to-gate cost-effectiveness is some 1.2 times greater than the European average.
= 1.32	Its ATCO-hour productivity is 1.3 times greater than the European average, and
x 1.32	the ATCOs hourly employment costs of ANS CR are only 76% (1/1.32) of the sample average. These more than compensate for
x 0.70	higher support costs, which are 1.4 (1/0.70) times the sample 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):

1.74	ANS CR's ATCOs in OPS employment costs per composite flight-hour are 57% (1/1.74) of the European average. This more than compensate for
1.09	the support costs per composite flight-hour which are 9% higher than the sample average.

5.5 Correlation matrix

Table 5.2 displays the matrix of statistical correlation between the performance indicators which are analysed in this Chapter and the exogenous factors identified in Chapter 4.

	Variable description	A	B	C	D	E
A	Output size	1.0				
B	Aggregated complexity score	**0.5**	1.0			
C	Cost of living	**0.4**	**0.6**	1.0		
D	Traffic variability	**-0.3**	**-0.4**	**-0.6**	1.0	
E	ATM/CNS provision costs per composite flight-hour	**0.2**	**0.5**	**0.1**	**0.0**	1.0

Table 5.2: Correlations between performance indicators and exogenous factors

There is no clear relationship between the aggregated traffic complexity score and the financial cost-effectiveness KPI at ANSP level (correlation coefficient of 0.5). Given the highly complex and interrelated relationships among the various factors that influence cost-effectiveness performance, the analysis of partial correlations, although informative, cannot shed an ultimate clear-cut light on the effects of traffic complexity. Complexity at an ACC level is further considered in Chapter 8.

5.6 Conclusions

The cost-effectiveness KPI computed in this chapter is a factual indicator. A genuine measurement of **cost inefficiencies** would require full account to be taken of identified and **measurable** exogenous factors such as cost of living, traffic complexity, and traffic variability (as described in Chapter 4). Due to data limitations, this is beyond the scope of this report.

The European system average ATM/CNS cost per composite flight-hour for 2005 is €395 and varies between €697 for Belgocontrol and €149 for EANS, a factor of more than four. Nine ANSPs have unit costs above the European average, among which some large ANSPs such as Aena, ENAV, DFS and NATS; together they account for 48% of the traffic. A reduction of the gate-to-gate unit ATM/CNS provision costs for these nine ANSPs would therefore have a major impact on the cost-effectiveness of the European system.

A number of component factors can be seen to drive cost-effectiveness, specifically ATCO-hour productivity, ATCO-hour employment costs and support costs.

The average ATCO-hour productivity of 0.71 composite flight-hours per ATCO comprises a wide range of performance from 0.13 to 1.65. Productivity improvements can be achieved by optimising and rationalising the actual processes for ATM/CNS provision and by more effective OPS room management, making better use of existing resources. DFS, NATS and Skyguide which belong to the most complex ANSPs grouping manage to achieve ATCO-hour productivity to the level of the top 25% quartile. On the other hand, MATS, MoldATSA and UkSATSE which belong to the least complex ANSPs grouping are at the bottom quartile of the ATCO-hour productivity. Higher seasonal variability and a low volume of traffic compared to the available capacity can explain some of the low productivity levels. Note also that DSNA, ENAV and Aena, which are comparable in terms of size with DFS and NATS but with less complexity, nevertheless achieve lower levels of ATCO-hour productivity. There are obviously several forces at play in the achieved level of ATCO-hour productivity: traffic complexity is an important, but not necessarily the only factor impacting productivity.

The average ATCO-hour employment costs in the European system amount to €81 per ATCO-hour. There is a wide variation from €4 to €161, with a number of Eastern European states having ATCO-hour employment costs less than €20. Differences in cost of living undoubtedly impact on the observed differences in employment costs. Many Eastern European ANSPs in fact show adjusted employment costs per ATCO-hour comparable with those of the Western European ANSPs. With or without PPPs adjustment, employment costs per ATCO-hour in Aena are high and seem somewhat disconnected with the cost of living and the level of productivity. Employment costs are typically subject to complex bargaining agreements, in most cases resulting in collective agreements covering several years, hence the importance of effectively managing employment costs.

High ATCO-hour employment costs may be compensated for by high productivity, resulting in reduced ATCOs in OPS employment costs per composite flight-hour. For example, MUAC and Skyguide, which have among the highest ATCO-hour employment costs, have ATCO employment costs per composite flight-hour in the mid-range for Europe, as a result of high ATCO-hour productivity.

Support costs represent on average 71% of total ATM/CNS provision costs. Clearly reducing these costs would have a major impact on cost-effectiveness; therefore understanding the components of support costs and the drivers behind them is important. High support ratios tend to be observed in Eastern European ANSPs where ATCO employment costs remain comparatively low and/or significant capital-related costs are incurred due to important investment programmes. “Smaller” ANSPs in terms of traffic volume tend to show higher support cost ratios than the larger ANSPs (although there are exceptions). Due to the high proportion of fixed costs in ATM/CNS provision, the support costs ratio can be affected by traffic volume/scale effects. There are also quite noticeable differences between the largest five ANSPs (DSNA, Aena, DFS, NATS and ENAV) which are relatively similar in terms of traffic volume, traffic complexity, and cost of living: here sharing Aena’s best practice in terms of support costs per unit of output could potentially be very valuable.

Staff costs (exc. ATCOs in OPS) represent the largest share of the support costs (44%). In areas where cost of living is currently low, several ANSPs are able to keep their unit ATM/CNS provision costs relatively low, despite high support staff levels. Many Eastern European ANSPs show comparatively high staff costs (exc. ATCOs in OPS) per composite flight-hour when adjusted for PPPs. This illustrates that, as economic conditions (cost of living and employment costs) across Europe converge, it is likely that staff costs in these ANSPs will increase over time. In particular, the staff costs (exc. ATCOs in OPS) per composite flight-hour will need to be effectively managed, otherwise there is a risk of a significant negative impact on their cost-effectiveness.

The trend analysis presented in Chapter 6 provides further insights on changes of these components of cost-effectiveness.

Given the highly complex and interrelated relationships among the (measurable) exogenous factors that influence cost-effectiveness performance, the analysis of partial correlations, although informative, cannot shed an ultimate clear-cut light on the effects of these factors on the various components of cost-effectiveness discussed in this chapter.

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6 TRENDS IN FINANCIAL COST-EFFECTIVENESS (2002-2005)

6.1 Introduction

This section examines the trends in financial cost-effectiveness between 2002-2005, at European system level and at ANSP level. Note that the indicators presented in this section will not be directly comparable to those in individual ACE reports (including this one), for the following reasons:

- for the purposes of comparison over time, the weighting in the definition of composite flight-hours must be fixed at the appropriate level for the whole sample of observations (see Section 2.1);
- the sample of ANSPs must be consistent; this has to be the 32 who disclosed information in 2002[58] (not a serious limitation, since as shown above, they constitute 93% of the 2005 sample in terms of output (composite flight-hours);
- the monetary values in previous years' calculations have been restated in 2005 prices;
- as part of the experience and understanding gained from the last data validation process, the PRU has made some data adjustment in order to ensure time comparability. These adjustments have been made in a fully transparent way with the cooperation of the participating ANSPs.

6.2 Trends in financial cost-effectiveness at European level

Figure 5.1 shows how the financial cost-effectiveness KPI has varied over time at system level. To allow trend comparability, all the financial figures are expressed in real terms (2005 prices).

The indicator shows that financial costs per composite flight-hour at European level rose slightly from 2002 to 2003, but then declined in 2004 and 2005, so that financial cost-effectiveness at the European level improved in 2005 compared to 2002 (unit ATM/CNS provision costs falling by -4.7% overall in real terms).

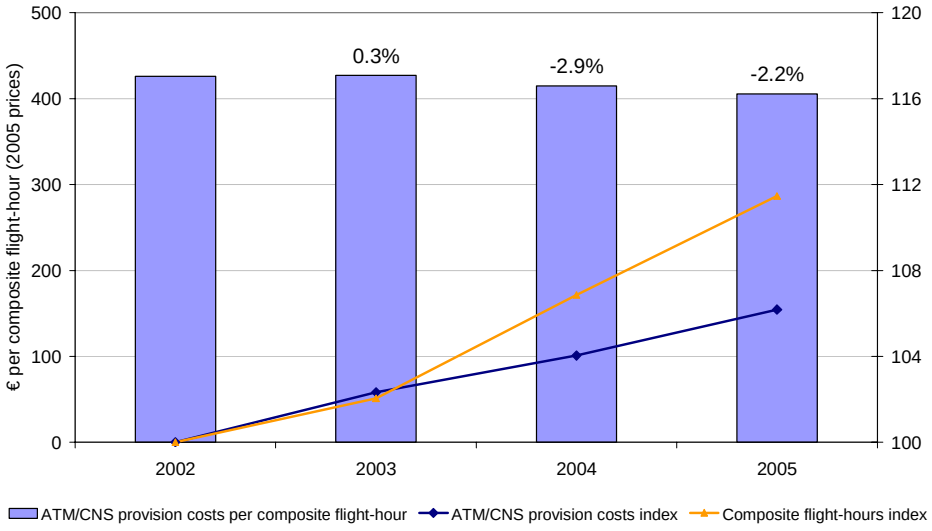

Figure 6.1: Trends in financial cost-effectiveness KPI (2002-2005, real terms)

[58] Ukraine and Poland became EUROCONTROL Member States in 2004 and therefore UkSATSE and PPL/PATA did not provide ACE 2002 data. On the other hand, the data submitted by HCAA in 2002 was not sufficiently mature and complete to be included in the analysis.

Figure 6.1 also indicates that the reduction of the unit costs at European level results from traffic growing faster than total costs **since 2003**[59].

This is an encouraging trend given the relatively high level of unit costs in Europe compared to similar ATM systems. Each percentage point improvement in cost-effectiveness (i.e. reduction in ATM/CNS unit costs) is worth some €65M in terms of "savings" for airspace users.

6.3 Trends in financial cost-effectiveness at ANSP level

The decrease in unit ATM/CNS provision costs (costs per composite flight-hour) between 2002 and 2005 for the European system described in Figure 6.1 masks quite large changes in individual ANSPs, as illustrated in Figure 6.2 below.

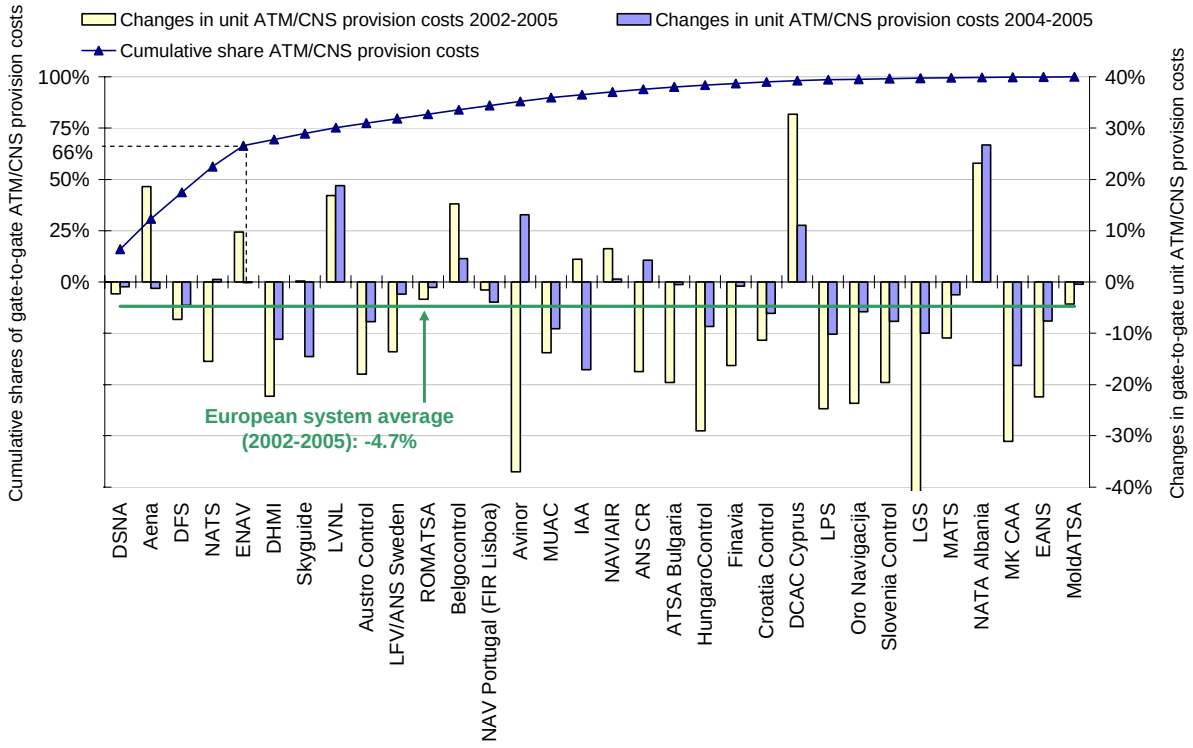

Figure 6.2 Changes in gate-to-gate ATM/CNS provision costs per composite flight-hour, 2002-2005 (real terms)

The blue line in Figure 6.2 gives the cumulative share of total ATM/CNS provision costs generated by the ANSPs. This shows that 66% of these costs are generated by the five largest ANSPs, namely DSNA, NATS, DFS, AENA and ENAV. Of these, three decreased their unit costs in real terms between 2002 and 2005: DSNA (-2%), DFS (-7%), and NATS (-16%), (see the yellow bars in Figure 6.2). The improvements in cost-effectiveness for these three ANSPs significantly contributed to the overall real unit ATM/CNS provision costs decrease observed at European system level (-4.7 %).

On the other hand, the increases of unit cost in Aena (+19%) and ENAV[60] (+10%) – the next two largest ANSPs – effectively cancel efforts made by 18 "smaller" ANSPs to decrease their unit ATM/CNS provision costs between 2002 and 2005.

[59] Between 2002 and 2003, the increase in costs exceeded the growth in traffic.

[60] Since 2003 ENAV has been given the objective to stabilise the en-route unit rate for Italy. This has been achieved, however, through the reduction of the cost base in 2004 and 2005 by a contribution from ENAV's reserves. Further similar reductions are planned for the future. This policy has essentially decoupled, for the period until the reserves are used up, the charges paid by airspace users from the actual costs incurred by ENAV for ATM/CNS provision.

Clearly, tight cost management is required from all stakeholders to improve European ATM cost-effectiveness, and in particular from the largest whose actions potentially have the greatest impact on European cost-effectiveness.

Seven other ANSPs have also increased their ATM/CNS provision costs per composite flight-hour since 2002. The large increases for Belgocontrol and LVNL occur in a context of already high unit costs. As described in Table 6.1 below, these two ANSPs have experienced a loss of traffic volume during the period. ATM/CNS provision costs per composite flight-hour have also increased for DCAC Cyprus[61], IAA, NATA Albania, NAVIAIR and to a lesser extent Skyguide.

Figure 6.2 also shows the changes between 2004 and 2005 (see blue bars). Unit ATM/CNS provision costs for IAA and Skyguide significantly decreased in 2005 compared to 2004. For IAA, this reduction contrasts with the longer term trend, picking up the end of the large investment cycle. For Skyguide, the reduction in 2005 is due to high exceptional costs in 2004 and deferred labour costs in 2005 which have been capitalised in order to comply with IAS 16. Aena and to a lesser extent ENAV have also slightly decreased their unit costs in 2005, in contrast to a longer term trend, which may indicate that these ANSPs are at a turning point (this is confirmed in Chapter 7 and in Annex 3).

For Avinor, ANS CR and NATS, unit ATM/CNS provision costs have either increased or remained at the same level since 2004, although the longer term trend has been for costs to decrease since 2002. This may indicate that unit cost reductions are becoming more difficult for these ANSPs to maintain. For LVNL and Belgocontrol, ATM/CNS provision costs per composite flight-hour continue to increase in 2005, as do those for DCAC Cyprus and NATA Albania.

As is the case for the European-level indicator, the change in each ANSP's cost-effectiveness indicator can be broken down into a "cost effect" and a "traffic volume effect". Table 6.1 below shows why the observed changes in the cost-effectiveness indicator have occurred, in terms of cost and traffic volume changes, for each ANSP.

[61] The large increases in costs for DCAC Cyprus since 2002 are primarily as a result of the fact the Terminal ANS costs were not originally included in their data submission.

ANSPs	Country	(A) Changes in gate-to-gate cost-effectiveness 2002-2005	(B) "Cost effect"	(C) "Traffic effect"
DCAC Cyprus	CY	33%	47%	11%
NATA Albania	AL	23%	44%	17%
Aena	ES	19%	41%	19%
LVNL	NL	17%	10%	-6%
Belgocontrol	BE	15%	6%	-8%
ENAV	IT	10%	14%	4%
NAVIAIR	DK	7%	6%	0%
IAA	IE	4%	32%	26%
Skyguide	CH	0%	3%	2%
NAV Portugal (FIR Lisboa)	PT	-2%	7%	8%
DSNA	FR	-2%	1%	3%
ROMATSA	RO	-3%	37%	41%
MoldATSA	MD	-4%	23%	29%
DFS	DE	-7%	0%	8%
MATS	MT	-11%	6%	19%
Croatia Control	HR	-11%	30%	46%
LFV/ANS Sweden	SE	-14%	-11%	3%
MUAC		-14%	3%	19%
NATS	UK	-16%	-8%	8%
Finavia	FI	-16%	-12%	5%
ANS CR	CZ	-18%	23%	50%
Austro Control	AT	-18%	1%	23%
Slovenia Control	SI	-20%	10%	36%
ATSA Bulgaria	BG	-20%	-10%	12%
DHMI	TR	-22%	7%	38%
EANS	EE	-22%	7%	38%
Oro Navigacija	LT	-24%	12%	47%
LPS	SK	-25%	16%	55%
HungaroControl	HU	-29%	2%	43%
MK CAA	MK	-31%	-14%	25%
Avinor	NO	-37%	-27%	17%
LGS	LV	-54%	-18%	77%
Total European System (32 ANSPs)		-4.7%	6.2%	11.5%

Positive values in column (A) mean that unit ATM/CNS provision costs rose between 2002 and 2005.

Positive values in column (B) mean that costs rose between 2002 and 2005.

Positive values in column (C) mean that the output rose between 2002 and 2005.

For example: DFS's 2005 unit costs are 7% lower than in 2002. This is due to the fact that DFS's output rose faster than its costs.

Note: By mathematical construction, the % variation in unit costs (A) can be approximated as the difference between the "cost-effect" (B) and the "output 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).

Table 6.1: Cost and traffic volume changes, 2002-2005 (real terms)

Overall, for the 32 ANSPs for whom data has been consistently available since 2002, there has been a -4.7% decrease in unit ATM/CNS provision costs since 2002, driven by a 6.2% increase in overall ATM/CNS costs, off-set by a 11.5% increase in traffic.

Out of the 23 ANSPs for which unit costs of ATM/CNS provision decreased, seven (LFV/ANS Sweden, ATSA Bulgaria, Avinor, Finavia, MK CAA, LGS and NATS) have reduced gate-to-gate ATM/CNS provision costs in the face of rising traffic, through tight cost control. The remaining 16 ANSPs have seen traffic rising faster than costs. These include a number of ANSPs who have shown large increases in ATM/CNS provision costs compensated for by larger increases in traffic, in particular ANS CR, ROMATSA[62], Croatia Control, and MoldATSA.

Unit costs increased for nine ANSPs. The largest increases have been Aena (+19%), NATA Albania (+23%) and DCAC Cyprus[63] (+33%). The increase for Aena has been driven by very large increases in ATCO-hour employment costs (further details are available in Section 6.4.3).

[62] It should be noted that the 11% appreciation of the Romanian currency with respect to the Euro between 2002 and 2005, negatively affected ROMATSA costs.
[63] See footnote 61.

The increase in unit ATM/CNS provision costs for Belgocontrol and LVNL between 2002 and 2005, is due to the combined impact of an increase in ATM/CNS provision costs and a fall in the volume of traffic.

6.4 Trends in financial cost-effectiveness components (2002-2005)

This section compares changes in the components of financial cost-effectiveness between 2002-2005 for the 32 ANSPs that reported ACE data since 2002.

It should be noted that year-by-year changes that can be observed in the charts could be due to genuine changes in performance, to differences in data definitions that were used when reporting each year, or to known errors that were made in data submissions in earlier years.

Inevitably, the maturity in reporting has improved since 2002. Some, but not all, ANSPs have been able to revise their 2002 and 2003 data to be consistent with the data definition used in 2004 and 2005. Therefore some caution is needed with the interpretation of these comparisons, since the results can be affected by changes in data reporting. As more data will become available in the future, the trend analysis will become more robust and will be able to account for the typical business/investment cycle proper to each ANSP.

6.4.1 Trends at European system level (2002-2005)

Figure 6.3 shows how the various component ratios have contributed to the overall change at European level (-4.7%). The increase of employment costs per ATCO-hour (+19.8%) is not wholly compensated for by the increase in ATCO-hour productivity (+4.4%). However the fall in the support cost ratio (-17.0%) contributes to an overall decrease in unit ATM/CNS provision costs. Similarly, the left-hand side of Figure 6.3 indicates that at European level the ATCO in OPS employment costs per composite flight-hour increased by +14.7% while the support costs per composite flight-hour decreased by -10.9%. Support costs represent some 71% of total ATM/CNS provision costs, so the relative weight of the latter component is some 2.5 times larger than the former.

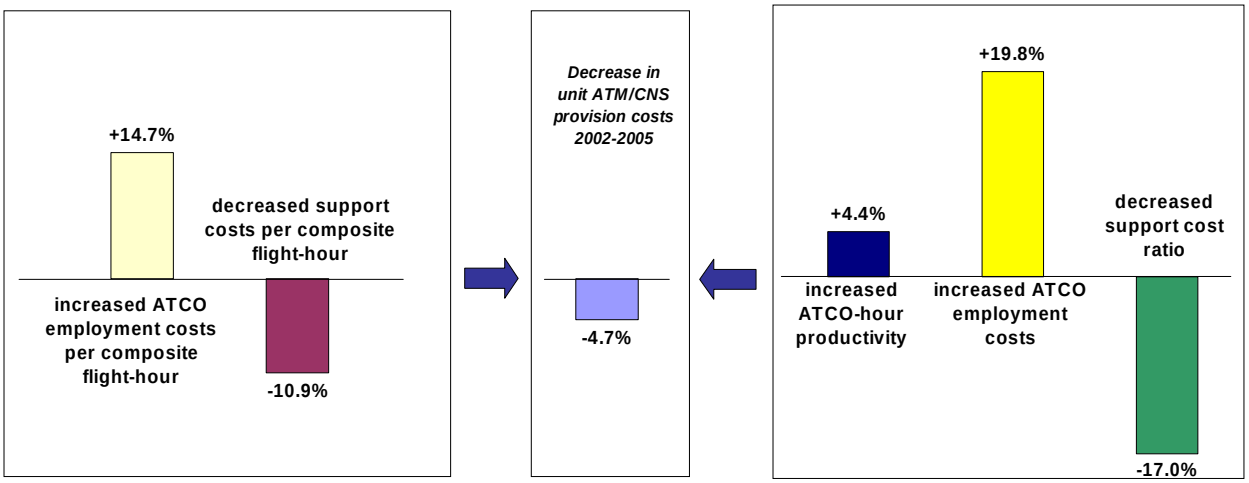

Figure 6.3: Breakdown of changes in financial cost-effectiveness, 2002-2005 (real terms)

6.4.2 Trends in ATCO-hour productivity at ANSP level (2002-2005)

Overall, for the 32 ANSPs for whom data has been consistently available since 2002, there has been a 4.4% improvement in productivity since 2002, driven by a 11.5% increase in traffic, off-set by a 6.8% increase in the number of ATCO-hours worked.

Figure 6.4 shows the changes in ATCO-hour productivity for each ANSP, between 2002 and 2005 (yellow bars) and between 2004 and 2005 (blue bars).

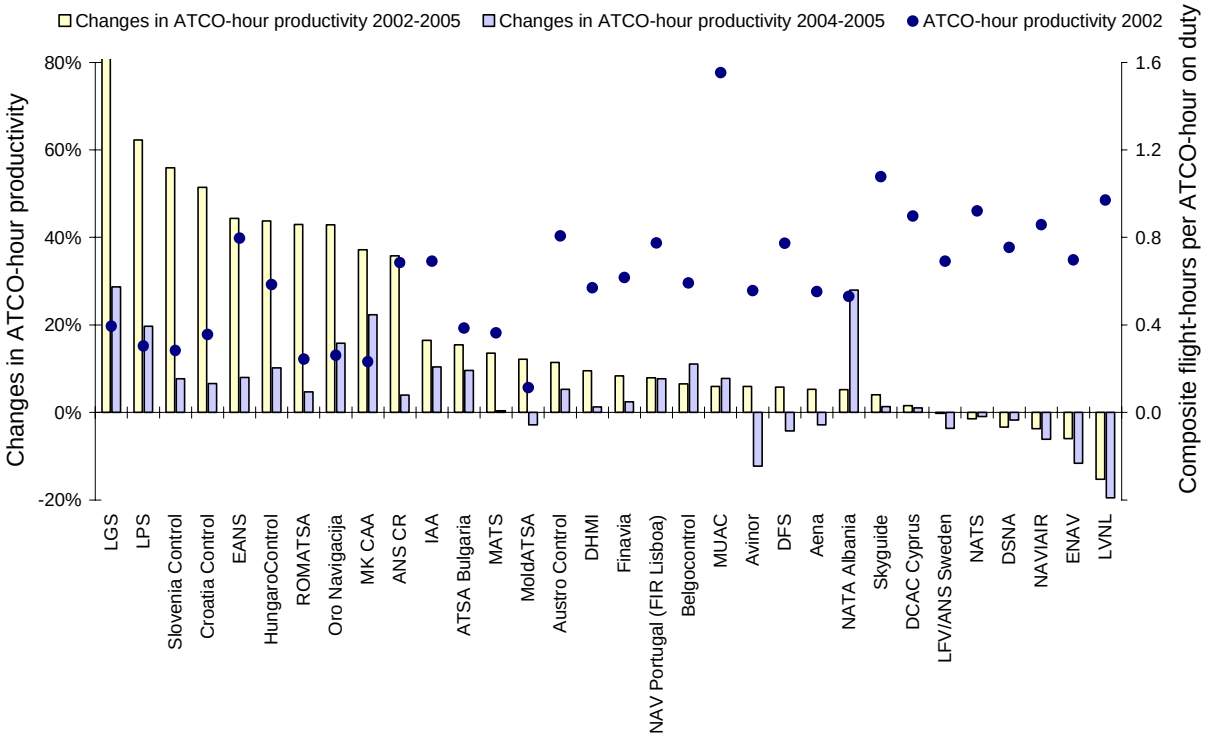

Figure 6.4 Trends in ATCO-hour productivity at ANSP level (2002-2005 and 2004-2005)

Figure 6.4 indicates that between 2002 and 2005, ATCO-hour productivity increased for 26 out of 32 ANSPs. Strong productivity increases were achieved between 2002 and 2005 by Eastern European and Baltic ANSPs such as LGS (+89%), LPS (+62%), Slovenia Control (+56%), Croatia Control (+51%), EANS (+44%), HungaroControl (+44%), ROMATSA (+43%), and Oro Navigacija (+43%). In most of the cases, these productivity increases were achieved in a context of high traffic growth and more effective use of spare capacity and existing resources.

Whilst ATCO-hour productivity has increased between 2002 and 2005, it fell at the European level by -2% between 2004 and 2005. This is primarily because of falling productivity between 2004 and 2005 in the five largest ANSPs: Aena (-3%), DFS (-4%), DSNA (-2%), ENAV (-12%) and NATS (-1%), albeit from a higher base. For these five ANSPs, along with four others, the number of ATCO-hours on duty increased a faster rate than the growth in traffic. Due to their relative weight, further productivity improvement for these ANSPs, especially in DSNA, ENAV and Aena who achieve lower productivity than DFS and NATS (see also Section 5.4.1), would significantly contribute to raising the productivity at European system level.

In order to understand the drivers behind productivity changes during 2002-2005, each ANSP's productivity indicator has been broken down, in Table 6.2 below, into a traffic volume effect - productivity rises when traffic grows - and an ATCO-hours effect – productivity rises when ATCO-hours decline. Note that changes in ATCO-hours can arise from:

- Changes in the number of FTE ATCOs in OPS (e.g. new recruitment, activation of an early retirement scheme, etc);
- Changes in the number of contractual working hours (e.g. following a new collective agreement);
- Changes in the number of hours not on duty (e.g. increase in average sickness or increase in refresher training time); and

- Changes in overtime.

ANSPs	Country	(A) Changes in ATCO-hour productivity 2002-2005	(B) "Traffic effect"	(C) "ATCO-hour effect"
LGS	LV	89%	77%	-6%
LPS	SK	62%	55%	-5%
Slovenia Control	SI	56%	36%	-13%
Croatia Control	HR	51%	46%	-3%
EANS	EE	44%	38%	-5%
HungaroControl	HU	44%	43%	0%
ROMATSA	RO	43%	41%	-1%
Oro Navigacija	LT	43%	47%	3%
MK CAA	MK	37%	25%	-9%
ANS CR	CZ	36%	50%	10%
IAA	IE	16%	26%	8%
ATSA Bulgaria	BG	15%	12%	-3%
MATS	MT	14%	19%	5%
MoldATSA	MD	12%	29%	15%
Austro Control	AT	11%	23%	11%
DHMI	TR	10%	38%	26%
Finavia	FI	8%	5%	-3%
NAV Portugal (FIR Lisboa)	PT	8%	8%	0%
Belgocontrol	BE	7%	-8%	-14%
MUAC		6%	19%	12%
Avinor	NO	6%	17%	10%
DFS	DE	6%	8%	2%
Aena	ES	5%	19%	13%
NATA Albania	AL	5%	17%	11%
Skyguide	CH	4%	2%	-2%
DCAC Cyprus	CY	2%	11%	9%
LFV/ANS Sweden	SE	0%	3%	3%
NATS	UK	-1%	8%	10%
DSNA	FR	-3%	3%	7%
NAVIAIR	DK	-4%	0%	3%
ENAV	IT	-6%	4%	10%
LVNL	NL	-15%	-6%	11%
Total European System (32 ANSPs)		4.4%	11.5%	6.8%

Positive values in column (A) mean that productivity improved between 2002 and 2005.

Positive values in column (B) mean that traffic volumes rose between 2002 and 2005.

Positive values in column (C) mean that the number of ATCO-hours rose between 2002 and 2005.

Productivity can improve if traffic grows more than the increase in hours worked.

For example: LPS's 2005 productivity is 62% better than in 2002 because the traffic rose while the number of recorded ATCO-hours decreased.

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).

Table 6.2: Breakdown of ATCO-hour productivity changes (2002-2005)

Table 6.2 indicates that for 12 ANSPs, the number of ATCO-hours on duty decreased at the same time as the traffic handled increased. The most significant example of these is LGS, which has seen traffic increases of more than 70% but still managed to reduce the number of ATCO-hours worked. It is however possible that some of the ANSPs showing particularly high productivity improvements have recorded ATCO-hours on duty inconsistently across the years 2002 to 2005. It should be noted that ATCO-hours on duty are often estimated figures, or figures used for planning purposes, which may deviate from actual hours on duty.

Of the six ANSPs whose productivity has worsened since 2002, only LVNL has seen traffic decline at the same time as increasing the number of ATCO-hours on duty. Belgocontrol experienced a fall in traffic since 2002, but this decrease has been more than matched by a decrease in the number of ATCO-hours on duty, leading to an improvement in productivity.

Changes in ATCO-hour productivity should also be seen in the context of changes in ATCO-hour employment costs as discussed in Section 6.4.3 below.

6.4.3 Trends in ATCO employment costs at ANSP level (2002-2005)

Figure 6.5 shows the changes in employment costs per ATCO-hour for each ANSP between 2002 and 2005 (yellow bars), and between 2004 and 2005 (blue bars). Figure 6.5 illustrates that employment costs per ATCO-hour rose in real terms for 25 out of 32 ANSPs between 2002 and 2005.

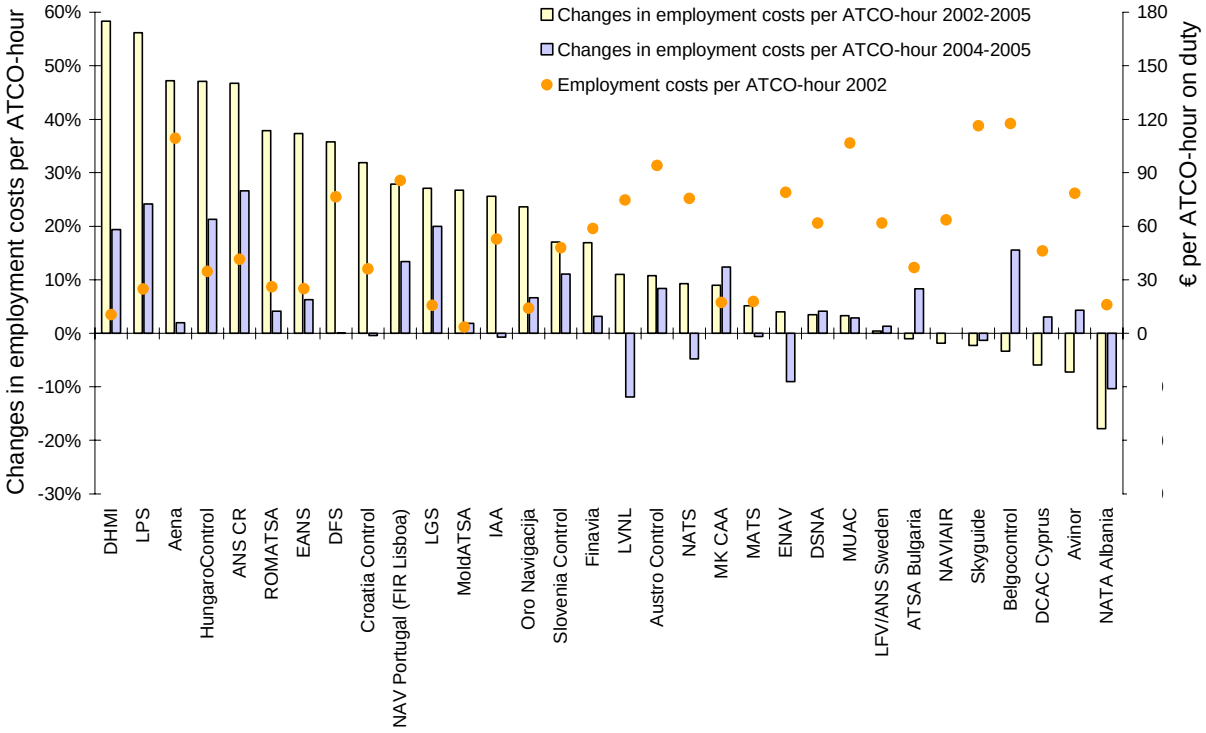

Figure 6.5: Changes in employment costs per ATCO-hour, 2002-2005 and 2004-2005 (real terms)

The highest growth in ATCO-hour employment costs since 2002 has been in DHMI and LPS[64]. However, both these ANSPs were starting from a very low base. Of the five largest ANSPs, both Aena (+47%) and DFS (+36%) have shown substantial increases in ATCO-hour employments costs. On the other hand, DSNA, NATS and ENAV have shown a lower growth.

Note that the large increases in Aena take place in a context where employment costs per ATCO-hour were already high in 2002. The collective agreement (1999-2003) between Aena and ATCOs foresaw a decrease in the number of contractual working hours and more overtime hours. This lead to a rise in Aena ATCO-hour employment costs which are now by far the highest in Europe.

The increase in employment costs per ATCO-hour for DFS was caused mainly by the inclusion, for the first time in 2003, of specific contractual pre-retirement obligations for ATCOs.

Of the ten ANSPs with the **highest** ATCO-hour employment costs in 2002, the average growth in ATCO-hour employment costs has been 23% (12% excluding Aena). The growth amongst the ten ANSPs with the **lowest** ATCO-hour employment costs has been 35%. This would seem to indicate a degree of upwards convergence between ANSPs.

[64] It should be noted that the 11% appreciation of the Slovak currency with respect to the Euro between 2002 and 2005 negatively affected LPS costs.

Over time[65], changes in productivity are expected to be reflected in ATCO employment costs changes. This is illustrated in Figure 6.6 below.

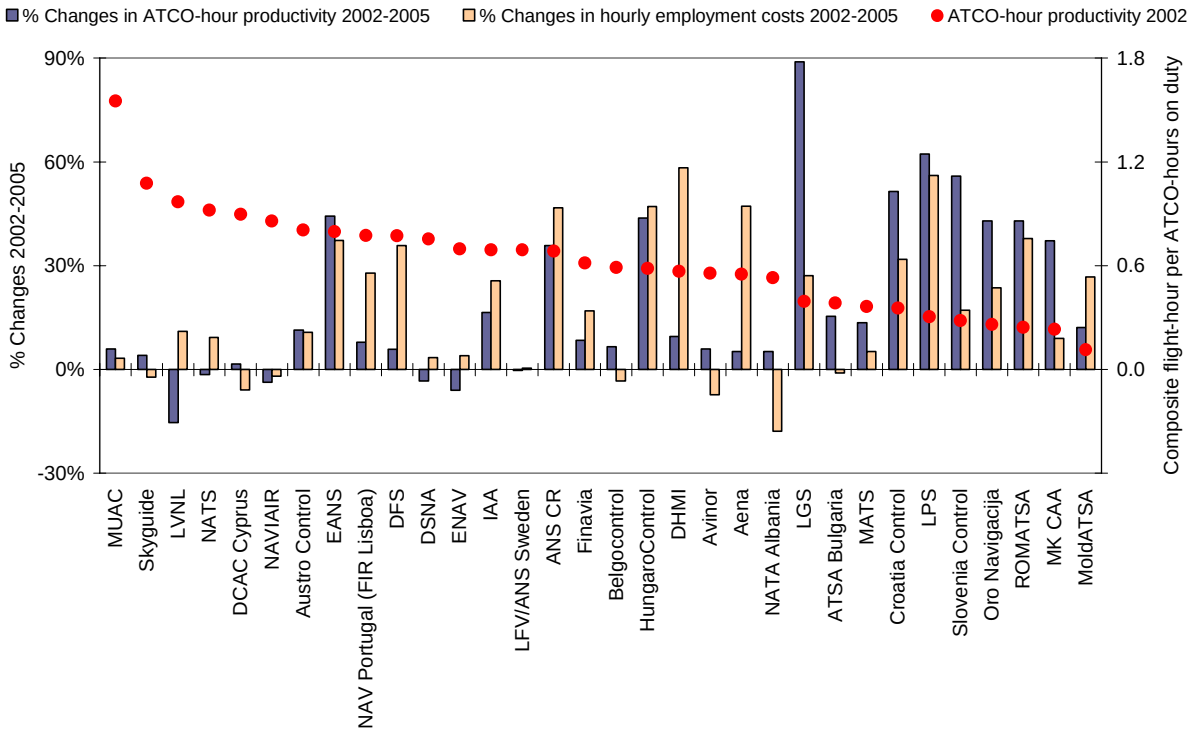

Figure 6.6: Change in ATCO-hour productivity and employment costs, 2002-2005 (real terms)

When ATCO employment costs rise significantly more than productivity, all other things being equal, cost-effectiveness falls, hence the importance of effectively managing employment costs. In fact, in several cases, employment costs per ATCO-hour rose by far more than ATCO-hour productivity.

Although some caution is needed with the interpretation of these comparisons, since the results can be affected by changes in data reporting, they are nevertheless informative. In some cases these trends are traceable to specific circumstances.

There have been a number of very large increases in productivity accompanied by relatively modest increases in ATCOs in OPS employments costs (notably in LGS and Slovenia Control). On the other hand, there have been some large increases in ATCOs in OPS employment costs accompanied by only a small increase in productivity (Aena and DFS).

Over recent years several ANSPs reported "exceptional" pension-related costs and/or costs relating to the implementation of Early Retirement Schemes which are significant drivers for staff cost increases. For the purpose of this analysis some effort was devoted to better identify the treatment of these pension-related costs. These costs have been variously reported as staff costs, operating costs, depreciation, or exceptional costs. To ensure greater comparability across ANSPs and across time, where possible some cost items have been reclassified as part of the data validation process. Also, as part of the data validation process, specific information was requested on the pension arrangements made in respect of the ANSPs' staff, since these differ greatly among ANSPs and potentially affect comparisons. A summary of this information is provided in Annex 5.

[65] Typically medium-term, especially for pluri-annual collective agreements (e.g. 4 years).

6.4.4 Trends in support cost ratio at ANSP level (2002-2005)

The change in support cost ratio is shown in Figure 6.7 for each ANSP, between 2002 and 2005 (yellow bars) and between 2004 and 2005 (blue bars). Support cost ratios decreased for 24 of the 32 ANSPs between 2002 and 2005.

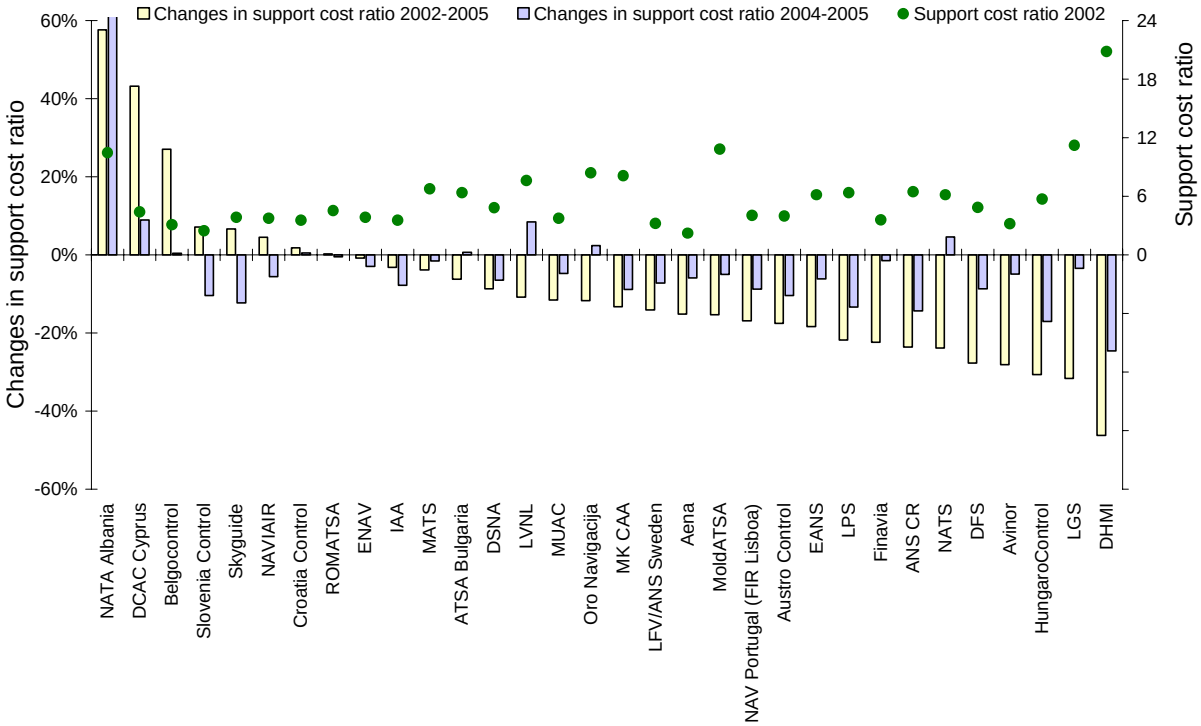

Figure 6.7: Change in support cost ratio at ANSP level, 2002-2005 and 2004-2005 (real terms)

There are some striking changes over the period considered, although some caution is needed with the interpretation of these comparisons, since the results can be affected by changes in data reporting. Figure 6.7 above shows that between 2002 and 2005, the largest support cost ratio decreases were achieved by DHMI and LGS. These falls occurred where support costs ratios were the largest in 2002. Changes in the support cost ratio cannot be viewed in isolation since a significant decrease may mainly mirror a large increase in ATCO-hour employment costs (as illustrated in Figure 6.5 above). In fact, DHMI, Hungarocontrol, ANS CR, DFS and LPS all show increases in ATCO employment costs above 35% during 2002-2005 and this mechanically contributes to reduce the support cost ratio. This argument does not apply to NATS and Austro Control which show a lower increase in ATCO-hour employment costs and a significant reduction in their support cost ratio.

Since there are several forces at play, establishing the right diagnostic for the drivers behind these changes is important: understanding the drivers will allow best practice to be identified and shared among ANSPs. To this end, Section 6.4.5 below provides further insights into the drivers for changes in the support cost ratios.

6.4.5 Trends in support costs per composite flight-hour (2002-2005)

Section 6.4.1 (Figure 6.3) showed that, at European level, there has been an -10.9% reduction in support costs per composite flight-hour since 2002. Figure 6.8 shows how change in overall support costs per composite flight-hour is driven by changes in the three components of support costs:

- staff costs (exc. ATCOs in OPS);
- direct operating costs; and
- capital-related costs.

Note that, whilst the values of these components in any one year can be added to give the value for overall support costs, the percentage changes in the components are not additive.

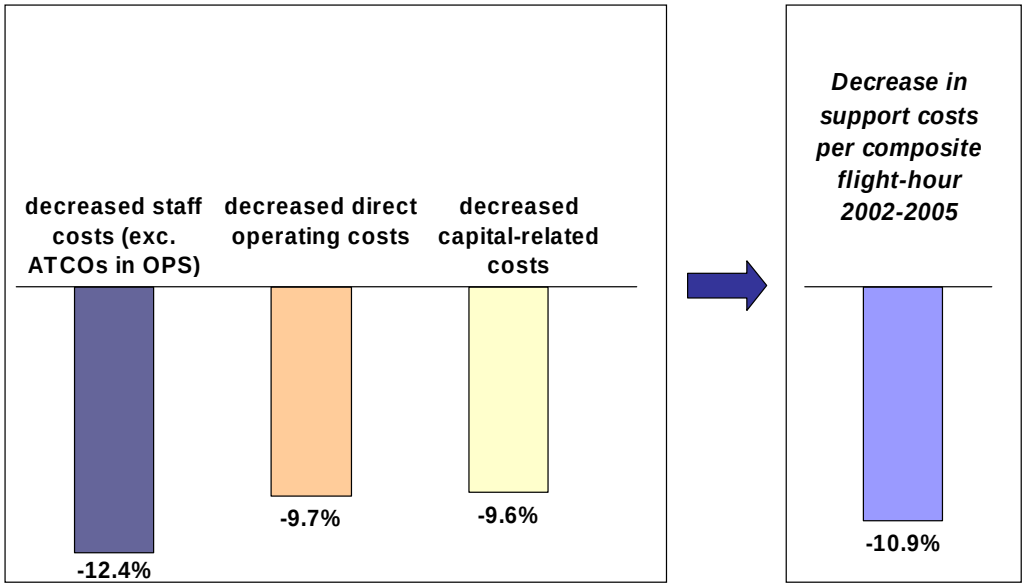

Figure 6.8: Trends in components of support costs per composite flight-hour, 2002-2005 (real terms)

At European system level, reductions in all three components contributed to the overall reduction in support costs per composite flight-hour. Figure 6.9 shows the changes in support costs per composite flight-hour for each ANSP, between 2002 and 2005 (yellow bars) and between 2004 and 2005 (blue bars).

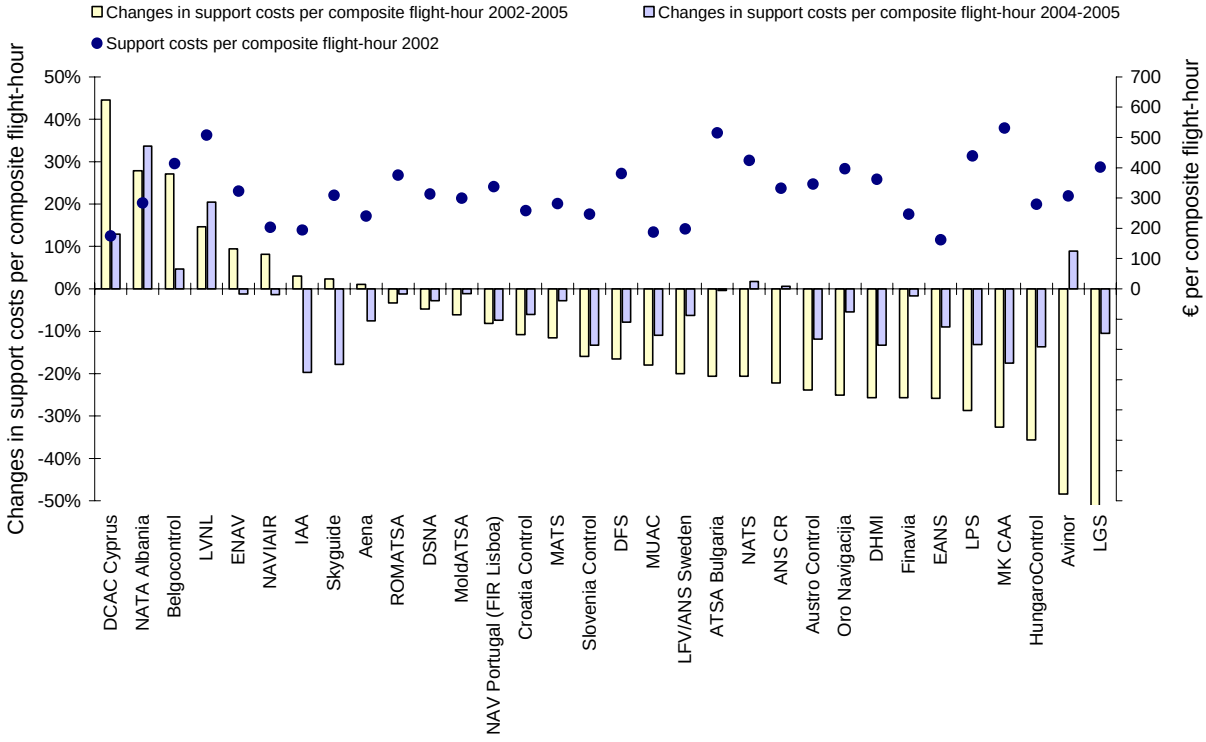

Figure 6.9: Change in support cost per composite flight-hour at ANSP level, 2002-2005 and 2004-2005 (real terms)

Between 2002 and 2005, support costs per composite flight-hour increased for nine ANSPs, the largest increases being in DCAC Cyprus (+45%), NATA Albania (+28%) and

Belgocontrol (+27%). On the other hand, the largest decreases are observed for MK CAA (-33%), HungaroControl (-36%), Avinor (-48%) and LGS (-56%).

Since 2004, several ANSPs show changes in support costs per composite flight-hour significantly different to the trend they have shown since 2002:

- IAA (-20%) and Skyguide (-18%) are showing large decreases in support costs per composite flight-hour since 2004 which have brought them back close to their level in 2002;
- Avinor is showing an increase (+9%) in unit support costs since 2004, reversing previous large decreases.
- NAVIAIR is showing a slight decrease (-1%) in unit support costs since 2004 which is partly driven by a -16% decrease of administration staff in 2005.

Table 6.3 shows the various drivers behind changes support costs per composite flight-hour since 2002 for individual ANSPs. The right hand part of Table 6.3 shows how the three components of support costs per unit of output (staff costs (exc. ATCOs in OPS), direct operating costs and capital-related costs) have changed over time for individual ANSPs.

ANSPs	Country	Changes in support costs per composite flight-hour 2002-2005	Changes in staff costs (exc. ATCOs in OPS) per composite flight-hour 2002-2005	Changes in direct operating costs per composite flight-hour 2002-2005	Changes in capital related costs per composite flight-hour 2002-2005
DCAC Cyprus	CY	44.5%	90%	3%	104%
NATA Albania	AL	27.9%	-26%	-1%	170%
Belgocontrol	BE	27.1%	26%	22%	36%
LVNL	NL	14.7%	13%	50%	-8%
ENAV	IT	9.4%	-6%	2%	46%
NAVIAIR	DK	8.2%	1%	-9%	49%
IAA	IE	3.0%	-22%	-26%	224%
Skyguide	CH	2.3%	-11%	52%	7%
Aena	ES	1.1%	8%	-21%	21%
ROMATSA	RO	-3.3%	-9%	6%	-6%
DSNA	FR	-4.7%	-4%	-6%	-5%
MoldATSA	MD	-6.1%	43%	-43%	2%
NAV Portugal (FIR Lisboa)	PT	-8.2%	-6%	5%	-23%
Croatia Control	HR	-10.8%	-12%	-4%	-17%
MATS	MT	-11.5%	-43%	69%	-31%
Slovenia Control	SI	-15.9%	46%	-33%	-30%
DFS	DE	-16.5%	-26%	21%	-18%
MUAC		-18.0%	-21%	-36%	24%
LFV/ANS Sweden	SE	-20.0%	-29%	-24%	9%
ATSA Bulgaria	BG	-20.6%	-7%	-61%	12%
NATS	UK	-20.6%	-11%	-22%	-30%
ANS CR	CZ	-22.2%	6%	-22%	-42%
Austro Control	AT	-23.9%	-25%	-17%	-27%
Oro Navigacija	LT	-25.0%	-6%	-43%	-27%
DHMI	TR	-25.7%	-23%	-11%	-35%
Finavia	FI	-25.7%	-36%	-6%	-36%
EANS	EE	-25.8%	-11%	-11%	-38%
LPS	SK	-28.6%	-15%	-14%	-51%
MK CAA	MK	-32.6%	11%	-27%	-52%
HungaroControl	HU	-35.7%	-18%	-55%	-29%
Avinor	NO	-48.4%	-62%	-23%	-61%
LGS	LV	-56.1%	24%	-75%	-65%
Total European System (32 ANSPs)		-10.9%	-12.4%	-9.7%	-9.6%

Table 6.3: Breakdown in support cost changes, 2002-2005 (real terms)

For the top five largest increases in support costs per composite flight-hour, as shown in Table 6.3, the following qualitative comments can be made:

- In the case of DCAC Cyprus, the large increase is largely due to terminal data not being included in the 2002 data submission; since 2004, there have also been increasing capital-related costs in relation to the modernisation of its ATM infrastructure/equipment;
- NATA Albania has reduced both staff costs (exc. ATCOs in OPS) per composite flight-hour and direct operating costs per composite flight-hour, but these decreases have been outweighed by an increase of +170% in capital costs per composite flight-hour. This significant increase is in relation with the national airspace modernization projects;
- In the case of Belgocontrol, there has been an increase in every aspect of unit support costs, but particularly in capital-related costs where major investments took place since 2004 (new HQ site, new tower building at Brussels and upgrade of its ATC system);
- LVNL has increased its direct operating costs per unit of output by some +50%: these are mostly related to exceptional restructuring costs for services provided at the small regional airports. The +13% increase in staff costs (exc. ATCOs in OPS) is partly driven by the implementation of an early retirement scheme (i.e. 58+ scheme).
- For ENAV, the increase in unit support costs is mainly due to a significant increase in capital-related costs (i.e. +46%) mainly arising from the implementation of new systems and equipments for airports and ACCs.

Similarly, for the top five largest decreases in support costs per composite flight-hour the following qualitative comments can be made:

- All five ANSPs have also experienced strong traffic growth in this period (see e.g., "traffic effect" in Table 6.2);
- LGS and MK CAA have both increased staff costs (exc. ATCOs in OPS) per composite flight-hour, but significantly decreased both direct operating costs and capital-related costs per composite flight-hour. For LGS this reflects the internalisation of support staff which took effect in 2003. For MK CAA, the decrease in capital-related costs mainly relates to a change in the method used to compute depreciation costs in 2005 and to a change in the allocation of assets between terminal ANS and non-ANS airport activities;
- For LPS, HungaroControl and Avinor there has been a decrease in every aspect of unit support costs, but particularly in capital-related costs for LPS and Avinor.

Finally, of the five largest ANSPs, ENAV has increased its support costs per unit of output by +9% since 2002. Aena has held its unit support costs roughly constant by compensating the increase in capital-related costs with a reduction in direct operating costs. DSNA has reduced its unit support costs by -5%, DFS by -17% and NATS by -21%. For DSNA and NATS there has been a decrease in every aspect of unit support costs. DFS, on the other hand, experienced an increase in direct operating costs.

6.5 Conclusions

Overall, for the 32 ANSPs for whom data has been consistently available there has been a -4.7% decrease in real ATM/CNS unit costs since 2002, driven by a 6.2% increase in overall ATM/CNS costs, off-set by a 11.5% increase in traffic. Compared to 2004, there has been a -2.2% reduction in unit ATM/CNS provision costs. This is an encouraging trend. Each percentage point improvement in cost-effectiveness (i.e. reduction in unit ATM/CNS provision costs) is worth some €65M in terms of "savings" for airspace users.

The improvement in cost-effectiveness at the European level results from an increase in ATCO-hour productivity (+4.4%) combined with a fall in the support cost ratio (-17.0%), which together more than compensate the increase in unit ATCO employment costs (+19.8%).

The overall improvement in financial cost-effectiveness at European level is sensitive to changes in the five largest ANSPs, which account for 66% of costs. Of these, three (DSNA, DFS and NATS) decreased their unit costs in real terms since 2002. On the other hand, the unit ATM/CNS provision costs for Aena and ENAV effectively cancelled out the efforts made by 18 smaller ANSPs to reduce their unit costs.

Although some caution is needed with the interpretation of the trends at ANSP level since the changes in productivity, employment costs and support costs can be affected by changes in data reporting, they are nevertheless informative. In many cases these trends are traceable to specific circumstances which are briefly identified in this chapter.

The 4.4% increase in productivity since 2002 is driven by a 11.5% increase in traffic, off-set by a 6.8% increase in the number of ATCO-hours on duty. Strong productivity increases were achieved between 2002 and 2005 by Eastern European and Baltic ANSPs: in most of the cases, these productivity increases were achieved in a context of high traffic growth and more effective use of spare capacity and existing resources. However, it is possible that some of the ANSPs showing particularly high productivity improvements have recorded ATCO-hours on duty inconsistently across the years 2002 to 2005.

Although many Western European ANSPs have also seen productivity improvements, ATCO-hour productivity decreased between 2002 and 2005 for three out of the largest five ANSPs and all have shown reductions in 2005 compared to 2004. DSNA, NATS and ENAV had all experienced traffic growth, but the number of ATCO-hours on duty has increased proportionally more. If productivity improvements could be made in these five ANSPs, especially in DSNA, ENAV and Aena who achieve lower productivity than DFS and NATS, it would have a major impact on the productivity, and hence the cost-effectiveness, of the European system as a whole.

Employment costs per ATCO-hour rose in real terms for 25 out of 32 ANSPs between 2002 and 2005. Of the ten ANSPs with the **highest** ATCO-hour employment costs in 2002, the average growth in ATCO-hour employment costs has been 23% (12% excluding Aena). The growth amongst the ten ANSPs with the **lowest** ATCO-hour employment costs has been 35%. This would seem to indicate a degree of upwards convergence between ANSPs. Of the five largest ANSPs, both Aena and DFS have shown substantial increases in ATCO-hour employments costs, and Aena's is now by far the highest in Europe. DSNA, NATS and ENAV have shown more modest growth.

Over time, changes in productivity are expected to be reflected in changes in ATCO employment costs. In several cases employment costs per ATCO-hour rose by far more than ATCO-hour productivity. Employment costs are typically subject to complex bargaining agreements in most cases resulting in collective agreements covering several years, hence the importance of effectively managing employment costs. This is particularly important in a context of increasing pension-related costs. For several ANSPs a major reason for rising employment costs is the implementation of Early Retirement Schemes (for both operational and non-operational staff) and/or additional costs for top-up of the pension fund, often resulting from the requirement to comply with IFRS.

Support cost ratios decreased for 24 of the 32 ANSPs between 2002 and 2005. Overall since 2002, the average support cost per composite flight-hour has fallen by -10.9%. This is made up of a -12.4% fall in staff costs (exc. ATCOs in OPS) per composite flight-hour, a -9.7% fall in both direct operating costs per composite flight-hour and a -9.6% fall in capital-related costs per composite flight-hour. Most ANSPs have achieved a drop in unit support costs showing that there is continued pressure to manage these costs. Overall, the primary driver behind the reductions in unit support costs has been continued traffic growth and hence better exploitation of scale effects.

Finally, of the five largest ANSPs, ENAV has increased its support costs per unit of output by +9% since 2002, driven by increases in capital-related costs per composite flight-hour. Aena has held its unit support costs roughly constant by compensating the increase in capital-related costs with a reduction in direct operating costs. DSNA has reduced its unit support costs by -5%, DFS by -17% and NATS by -21%. For DSNA and NATS there has been a decrease in every aspect of unit support costs.

Since there are several forces at play in changes of unit support costs, establishing the right diagnostic for the drivers behind these changes is important. Better understanding the drivers will allow identifying and sharing best practices among ANSPs.

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7 FORWARD-LOOKING FINANCIAL COST-EFFECTIVENESS

7.1 Introduction

Forward-looking financial cost-effectiveness was addressed for the first time in the ACE 2004 Benchmarking Report. The disclosure of forward-looking information covering the 2005-2009 period was incomplete but judged sufficient to start analysing the profiles of cost-effectiveness both at European system and ANSP level.

The ACE 2005 forward-looking data disclosure, covering the 2006-2010 period, is still incomplete but the number of ANSPs not reporting a complete set of data is slightly lower than for ACE 2004 data analysis (six instead of seven). Of the 35 ANSPs providing information for ACE 2005, 29 have provided the required forward-looking information in full. Two ANSPs (Croatia Control and UkSATSE) disclosed all information until 2007 only. Three ANSPs (Avinor, DHMI and NATS) have difficulty to provide the required terminal ANS-related data (see right-hand side of Figure 7.1) which limits the ability to compute forward-looking gate-to-gate financial cost-effectiveness KPIs in a consistent manner as done in the previous chapters. Finally HCAA did not provide either planned costs or expected traffic data.

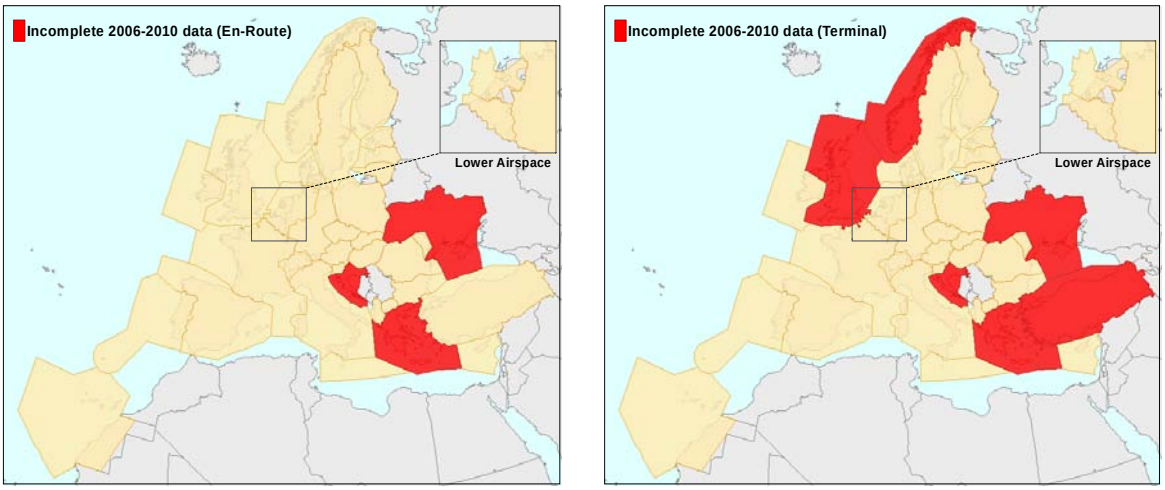


Figure 7.1: ANSPs with incomplete forward-looking data

The production of realistic and complete plans is an important element of ANSPs' performance. As the quantity of forward-looking information varies across ANSPs the European system forward-looking analysis presented in this chapter had to be limited to the smallest common denominator, which tends to blur the vision on the future cost-effectiveness levels. Disclosure of complete and consistent forward looking plans is certainly an area where there is still room for improvement.

Pursuant to Article 11 of the Framework Regulation (EC No 549/2004) a Commission Regulation for the examination and evaluation of air navigation performance is being prepared. It will, *inter alia*, identify a relevant set of information to be provided on a mandatory basis, covering historical and forward-looking information. This regulation will enhance the quantity and quality of forward-looking plans submitted to the Performance Review Unit, which will in turn increase the robustness of the analysis being made on forward-looking financial cost-effectiveness.

The objective of this chapter is to aggregate ANSP forward-looking plans in order to assess the implications for the cost-effectiveness of the European ATM system as a whole over the 2006-2010 period (Section 7.2). This analysis is also set in the context of planned capital expenditures (capex) which are an important driver for future economic performance. The

cost-effectiveness projections of each of the ANSPs disclosing information are further examined in Section 7.3 and additional details are provided in Annex 3.

Since the forward-looking projections made by the ANSPs for ACE 2004 are available, it could be informative to:

a. assess ANSPs' performance in achieving their plans by comparing the 2005 outcome in terms of financial cost-effectiveness and capex with previous year's (i.e., 2004) plans;

b. compare the temporal profile of the financial cost-effectiveness and capex for the period 2006-2009 as reported in ACE 2004 with the forward-looking information reported for the purposes of ACE 2005, and identify reasons for adjustments, if any.

However, due to time constraint for a timely publication of this ACE Report, it is beyond the scope of this chapter to examine points (a) and (b) above. This should be done in future years as the robustness and completeness of forward-looking data develop.

7.2 Forward-looking financial cost-effectiveness at European system level

This section describes the aggregate situation for the European system as a whole. The projections of gate-to gate unit ATM/CNS provision costs for the ANSPs that provided forward looking information are shown on the top of Figure 7.2.

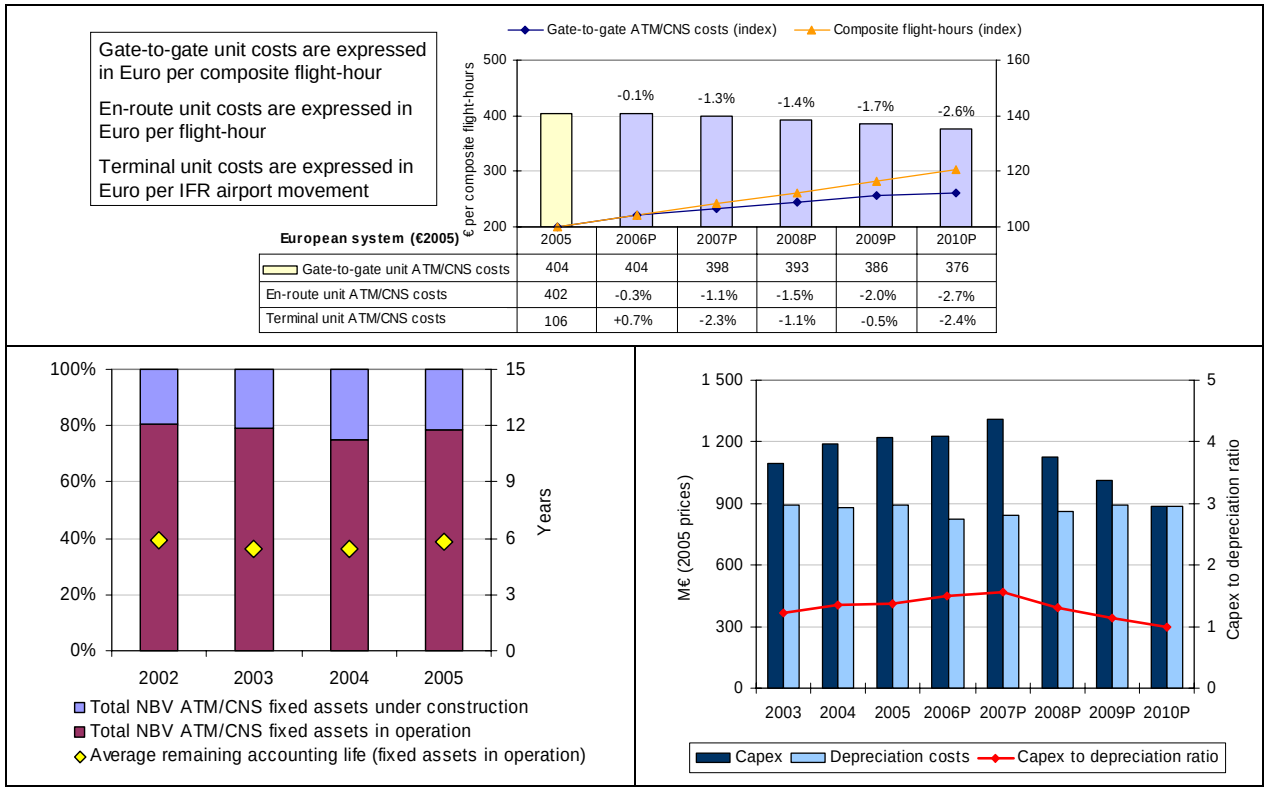


Figure 7.2: Forward-looking cost-effectiveness at European system level (2005-2010, real terms)

The data set used from 2005 onwards comprises the ANSPs that consistently reported planned gate-to-gate forward-looking information until 2010 (see Figure 7.1) but also takes into account the planned en-route data provided by Avinor, DHMI and NATS. For this reason, the gate-to-gate unit ATM/CNS provision cost reported in Figure 7.2 for 2005 (i.e. €404 per composite flight-hour) slightly differs from the figure presented in Chapter 5 (i.e. €395 per composite flight-hour).

At European system level, real unit ATM/CNS provision costs are planned to gradually decrease until 2010, although the magnitude of the decrease is moderate (-6.9% during the five years period, i.e., an average rate of some -1.4% per annum). This is definitively an

encouraging trend in terms of cost-effectiveness performance which confirms the decreasing trend in gate-to-gate unit costs which started in 2003 (see Chapter 6).

The bottom-left graph in Figure 7.2 shows the average remaining accounting life of the asset base. Between 2004 and 2005, the share of assets under construction slightly decreased from 25% to 22%. This indicates that in 2005, some of the assets which were under construction entered in operation. The average remaining accounting life of fixed assets in operation shows a slight increase (from 5 to 6 years) which is consistent with the previous observation since assets in operations are younger in 2005 than in 2004.

The bottom-right graph in Figure 7.2 shows the capital expenditures (capex) and depreciation at European system level. The 2003-2005 figures are actuals while the 2006-2010 are planned data. The capex at European system level increased between 2004 and 2005, and it is planned to further increase in 2007 to reach some €1 300M. It is noteworthy that some 66% of the total capex in 2005 originated from the five largest ANSPs (Aena, DFS, DSNA, ENAV and NATS). It should be noted that the apparent capex decrease in 2008-2010 is due to the fact that only 29 ANSPs reported planned capex data for these years (instead of 32 for the years 2006 and 2007).

It should also be noted that throughout the 2006-2009 period the capex to depreciation ratio is planned to be greater than one which indicates that ANSPs as a whole plan to increase their asset base. Additional details on the capex profile for each ANSPs are provided in Annex 3.

As already noticed in the ACE 2004 Benchmarking Report, the decrease in the planned gate-to-gate financial unit costs between 2006 and 2010 shown on top of Figure 7.2 is less marked than the trend published in the Performance Review Report 2006 (see PRR2006, Figure 79), in which the en-route unit ANS costs are expected to decrease at a faster rate (an average rate of some -2.5% per annum which is close to the PRC's -3% notional objective). A first attempt at quantifying the sources and impacts of this difference has been made. This reconciliation is illustrated in Figure 7.3 below. In fact, Figure 7.3 indicates that in 2010, there are 5.1 index points difference between the unit costs reported in the PRR 2006 and in this ACE 2005 Report (indices base 100 in 2005).

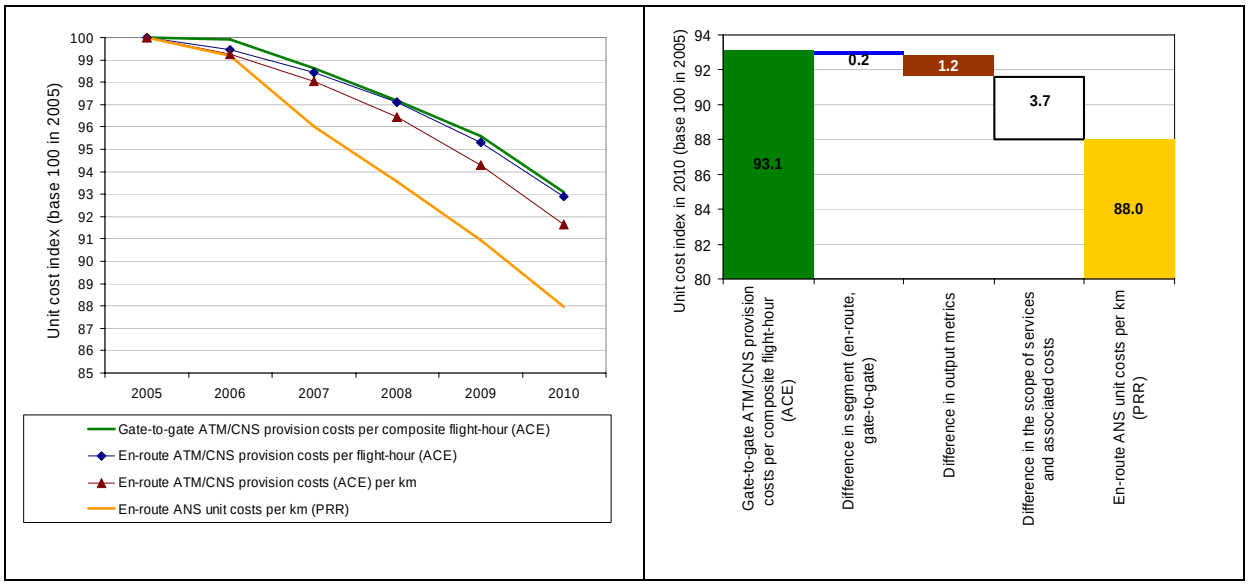


Figure 7.3: Comparison of PRR 2006 and ACE unit cost projections

At the end of the projection period (i.e. in 2010), the unit cost index from the subset of consistent ANSPs is equal to 93.1 (compared to 100 in 2005) while the unit cost index reported for en-route ANS in PRR 2006 is equal to 88 (compared to 100 in 2005), hence the

difference of 5.1 index points (see Figure 7.3, right-hand side). This difference can be broken down into the following three elements:

- Difference in segment (en-route, gate-to-gate): the unit cost indicator which is published in the PRR is computed using en-route data (costs and output). The information analysed in the ACE report exclusively focus on gate-to-gate (both en-route and terminal). Figure 7.3 shows that the difference in segment is not the main driver for the discrepancy between the two unit cost indicators. Indeed, if only en-route data were used to compute cost-effectiveness in the ACE reports, the unit costs difference in 2010 would only be reduced by 0.2 index point (i.e. 4.9 instead of 5.1);
- Difference in output metrics: in the PRR, the en-route costs are expressed per kilometre charged whereas in the ACE report, the output metric is the composite flight-hour. Figure 7.3 indicates that if the costs used in the ACE analysis were divided by the number of kilometres charged, the unit costs difference in 2010 would decrease by 1.2 index points (i.e. 3.9 instead of 5.1 index points);
- Difference in the scope of services and associated costs[66]: the definition of costs used in the PRR and in the ACE reports to compute the unit cost is not the same. The data used in the PRR is based on States submissions to the Enlarged Committee for Route Charges: these figures comprise all the ANS costs including those which are not under the direct control of the ANSPs (e.g. MET costs, EUROCONTROL, regulatory costs, etc.). On the other hand, the ACE data analysis exclusively focuses on the (ATM/CNS provision) costs directly controllable for the ANSP (some 87% of the total ANS costs). As shown in Figure 7.3 this item is the main driver for the unit cost indices discrepancy in 2010 (3.7 out of 5.1 index points difference).

7.3 Forward-looking financial cost-effectiveness at ANSP level

The overall trend in planned gate-to-gate cost-effectiveness KPI at European level (displayed in Figure 7.2 for the years 2006-2010) is not uniform across Europe.

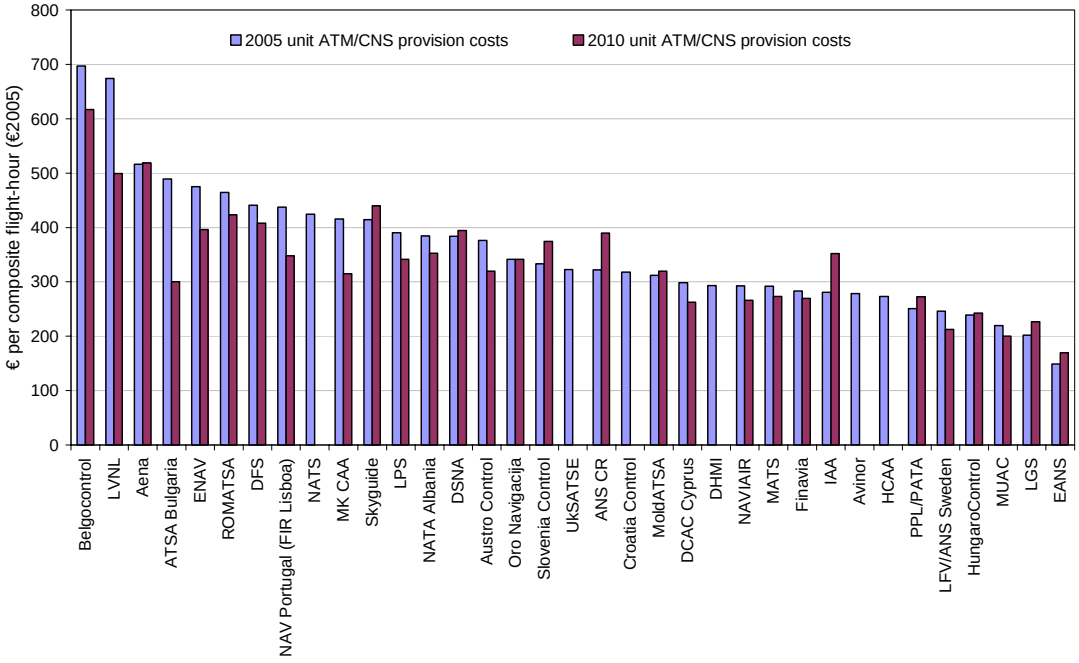


Figure 7.4: 2005 actuals vs 2010 planned gate-to-gate unit costs (real terms)

Figure 7.4 above compares, for those ANSPs providing information, the actual 2005 financial cost-effectiveness KPI and its planned value for 2010. The same information is illustrated in

[66] It also captures the fact that cost projections made by the States for the purposes of the Enlarged Committee for Route Charges can differ from the planned figures reported by the ANSPs in the Specification for Information Disclosure.

Figure 7.5 below where the planned changes in real unit costs are expressed in percentage points.

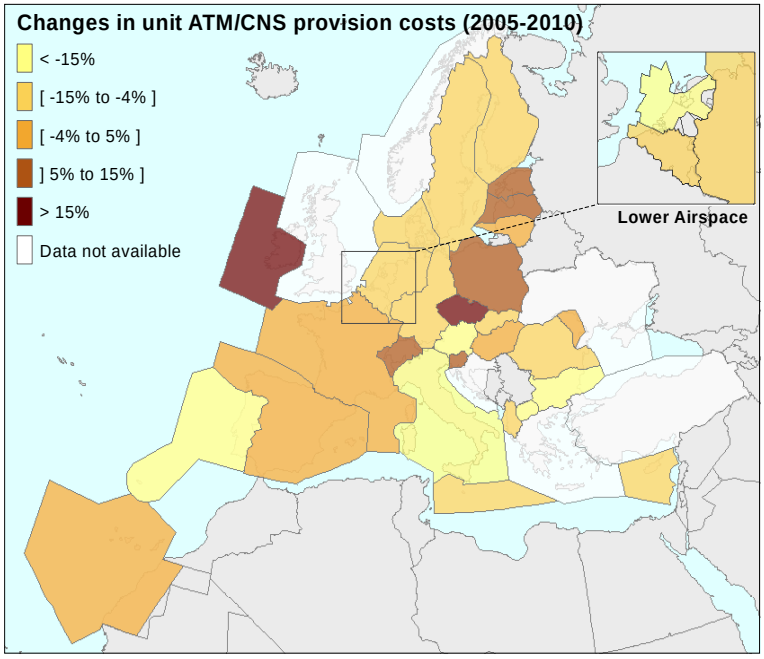
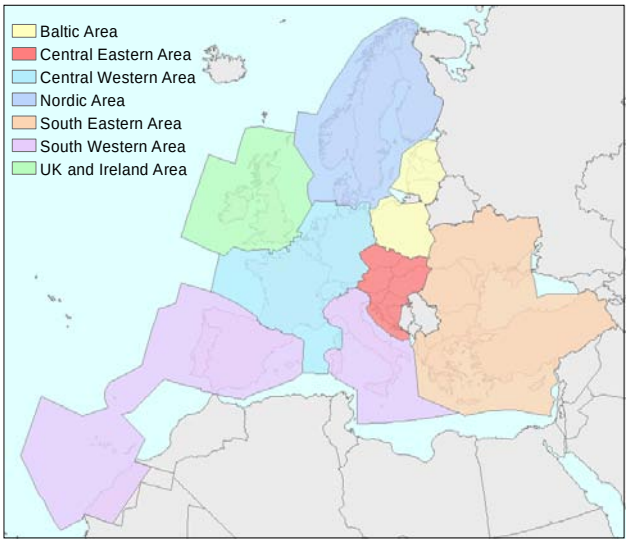


Figure 7.5: ANSPs planned changes in gate-to-gate unit costs (2005-2010, real terms)

While most ANSPs show stable or falling unit costs, 11 ANSPs plan for increases, in some cases very substantial ones. Unit costs are planned to significantly increase for IAA (+26%), ANS CR (+21%), EANS (+14%) and Slovenia Control (+12%). In some of these cases, the unit cost increases can be clearly linked to pressing needs for new capacity to deal with rapidly growing traffic. This is in particular the case for ANS CR where major capital expenditures are planned.

Drivers for increase in planned unit costs are further developed in Annex 3 where more detailed cost-effectiveness projections are examined for each ANSP. The projections are also set in the context of planned capex. For convenience the ANSPs are grouped in seven geographical areas which tend to face similar characteristics in terms of traffic growth forecast, traffic complexity and variability, and cost of living:

1. The Nordic Area;
2. The Baltic Area (including Poland);
3. The Central Eastern European Area;
4. The South Eastern European Area;
5. The Central Western European Area;
6. The South Western European Area;
7. The UK and Ireland Area.



In some cases, these geographical areas correspond to projects/initiatives for Functional Airspace Blocks (FABs).

7.4 Conclusions

This chapter has analysed for the second time in an ACE report the forward-looking information provided by ANSPs on their plans and projections. The analysis has focused on the implications of those plans and projections for future performance, in particular the gate-to-gate financial unit cost of ATM/CNS provision, as analysed in Chapter 5.

The gate-to-gate unit costs at the European system level are planned to gradually decrease until 2010, although the magnitude of the decrease is moderate (-6.9% during the five years period, i.e., an average rate of some -1.4% per annum). This decrease results from gate-to-gate ATM/CNS provision costs planned to grow at a slower rate than traffic until 2010.

This is definitively an encouraging trend in terms of cost-effectiveness performance which confirms the decreasing trend in gate-to-gate unit costs which started in 2003. On the other hand, this decreasing trend is less marked than the trend published in the Performance Review Report 2006 in which the en-route unit ANS costs are expected to decrease at an average rate of some -2.5% per annum, closer to the PRC's -3% notional objective. This difference can be clearly traced to different planning assumptions and different scope of services considered in the PRR 2006 (national en-route ANS costs, including MET, EUROCONTROL and regulatory costs) and in this ACE 2005 Report (gate-to-gate ATM/CNS provision costs which are controllable by ANSPs).

The overall decreasing trend in planned gate-to-gate unit costs at European level is not uniform across Europe. While most ANSPs show stable or falling unit costs, some plan for increases, in some cases very substantial ones. In some of these cases, the cost increases can be clearly linked to pressing needs for new capacity to deal with rapidly growing traffic; in others it is not so clear.

This chapter (and its Annex 3) comprises comprehensive information on past and planned ATM capital expenditures making it a unique source for understanding the investment cycles. At European level, capex are planned to increase until 2007 (and reach some €1.3B). Some 66% of the total capex in 2005 originated from the five largest ANSPs (Aena, DFS, DSNA, ENAV and NATS). Many of the ANSPs plan capex programmes that are substantial in relation to their existing size. Capex is typically required to (a) improve safety, (b) replace/upgrade ageing assets which are becoming obsolete; (c) provide new ATC capacity and improve quality of service; (d) bring about productivity improvements. However, the need for the capex cannot always be clearly linked to these main causes.

In future years it is expected that the quality and coverage of this forward-looking information will improve further, and that the consistency with other planned and projected information will be clearer. Most importantly, further years' analysis will allow the quality of ANSPs' achievement of planned outcomes to be assessed.

8 COMPARISON OF ATCO PRODUCTIVITY AT ACC LEVEL

8.1 Introduction

This section examines ATCO productivity at Area Control Centre (ACC) level. It also attempts to classify ACCs statistically to determine whether productivity can be related to generic variables describing the ACCs and, in particular, variables that are linked to the traffic complexity metrics introduced in Chapter 4.

Figure 8.1 shows the areas controlled from each of Europe's ACCs. Because some ACCs are confined to upper or lower airspace in part or all of their area of control, the map below also shows lower airspace areas when necessary.

Figure 8.1: Areas controlled by the European ACCs in the ACE 2005 data set

8.2 ACC data

Table 8.1 presents key ACC data that is collected as part of the Specification for Information Disclosure (Table E).

For comparability, we wished to include only area control sectors and area control ATCOs. However, in particular cases[67], it was not possible to split the data into area control and approach control. For those ACCs, approach control related data from Information Disclosure have been included in the input figures for ATCOs, ATCO-hours, sectors, sector-hours, and also in the output figure (flight-hours controlled). This ensures consistency between the output and the input used to compute performance ratios.

[67] Sevilla, Canarias, Madrid, Barcelona, Berlin, Bremen, Langen, München, Istanbul, Ankara, Milano, Padova, Roma, Malmö, Oslo, London TC, Tirana, and Ljubljana ACCs.

Data were obtained for 66 ACCs, the same figure as for 2004. However, this takes into account both the addition of Warszawa ACC and the decommissioning of Sundsvall ACC (where the airspace was incorporated into Stockholm ACC).

There are wide variations in the area controlled among the 66 ACCs (see Table 8.1). The largest, Canarias ACC, controls 1.36M km², whereas Ljubljana ACC controls around 0.018M km² - a factor of nearly 75. The average ACC surface is around 0.2M km², and the average volume is around 79M km² x 100 feet. The average transit time varies between 44 minutes for Ankara ACC and 9 minutes for Skopje, Brussels and Amsterdam ACCs. The average transit time for a European ACC is some 21 minutes, a similar value than in 2003 and 2004.

The right-hand side of Figure 8.2 displays the trend of ACC data at European system level between 2002 and 2005. The left-hand side of Figure 8.2 provides further insights on the distribution of key ACC data for the sample of 66 ACCs in 2005. It is noteworthy that in 2005, there were 30 ACCs (out of a total of 66) with 100 ATCOs in OPS or fewer. Similarly, Figure 8.2 indicates that in 2005, there were 43 ACCs out of 66 which operated 10 sectors or fewer at maximum configuration.

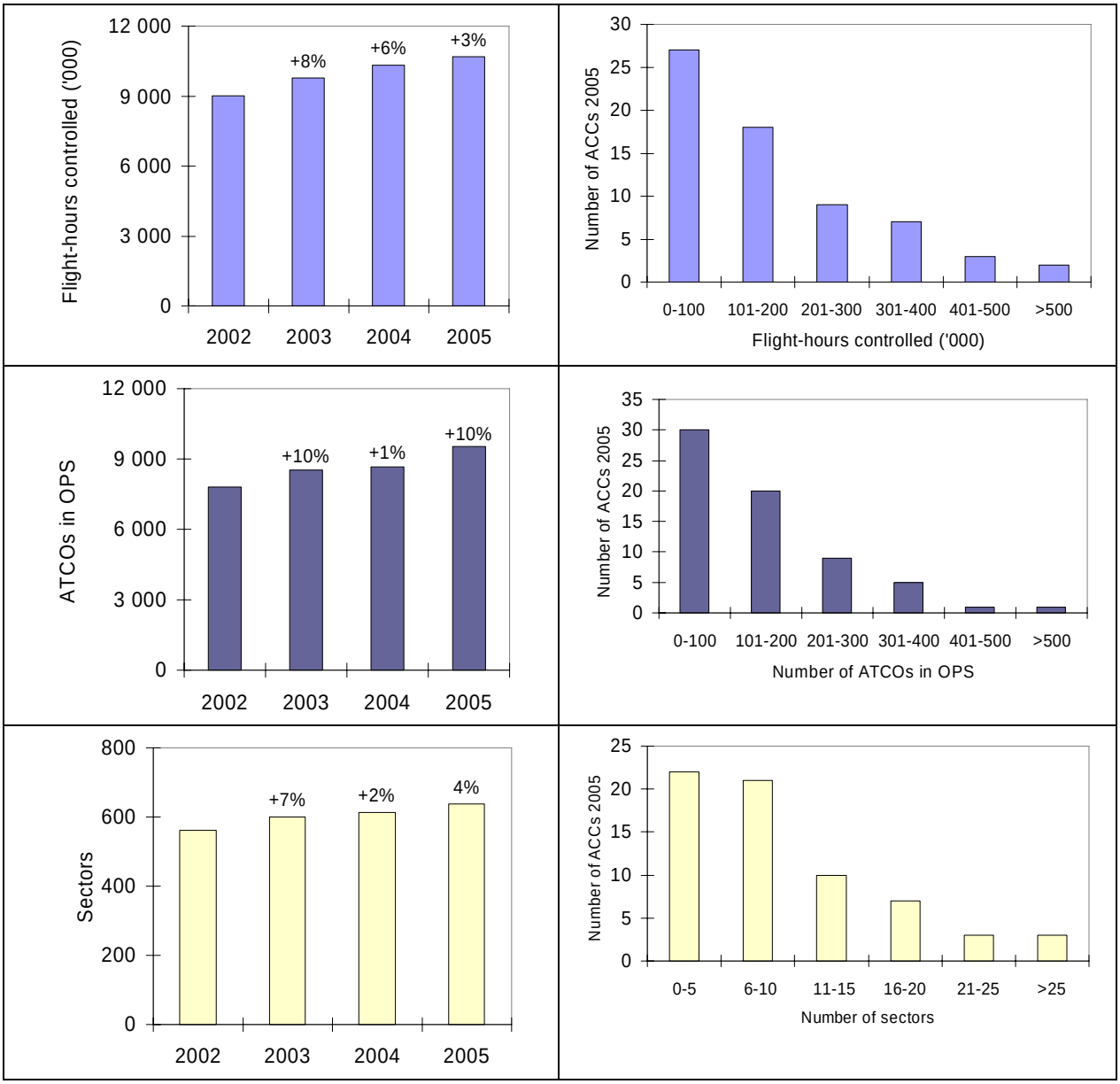


Figure 8.2: High level ACC data at European system level

ANSPs	ACCs	Size of the controlled area (km²)	ATCOs in OPS	ATCO-hours on duty	Number of sectors	Sum of sector-hours	IFR ACC Movements	Average transit time in minutes	Flight-hours controlled
Aena	Canarias	1 360 000	151	246 188	7	43 619	291 105	34	166 191
Aena	Barcelona	267 000	284	436 336	13	85 425	696 555	26	300 068
Aena	Madrid	440 000	367	637 165	20	132 277	936 291	31	488 510
Aena	Palma	50 700	118	193 636	5	33 871	243 910	15	59 431
Aena	Sevilla	179 000	142	223 603	7	41 325	356 382	25	149 545
ANS CR	Praha	78 600	72	117 144	7	34 130	571 203	18	169 729
ATSA Bulgaria	Sofia	83 790	90	117 720	4	24 136	222 283	20	73 019
ATSA Bulgaria	Varna	61 330	45	58 860	3	13 896	158 138	18	47 205
Austro Control	Wien	79 800	115	170 200	12	51 495	664 109	18	196 046
Avinor	Bodo	399 000	51	84 099	4	18 992	183 802	21	64 709
Avinor	Oslo	115 000	104	171 496	8	63 020	280 150	20	95 660
Avinor	Stavanger	205 000	35	57 715	3	23 500	174 719	19	56 603
Belgocontrol	Brussels	39 500	97	121 847	7	38 584	548 094	9	78 762
Croatia Control	Zagreb	158 000	67	92 460	7	32 120	298 589	24	120 356
DCAC Cyprus	Nicosia	173 000	38	82 118	3	20 710	208 490	26	89 803
DFS	Berlin	121 000	161	218 068	10	89 738	527 546	17	153 313
DFS	Langen	108 000	450	603 215	33	246 297	1 242 938	18	363 564
DFS	Munchen	67 900	246	324 274	24	133 225	1 073 080	16	294 253
DFS	Rhein	200 000	276	350 691	20	128 741	1 222 511	18	371 303
DFS	Bremen	101 000	155	199 017	11	79 231	346 339	17	100 614
DHMI	Ankara	755 930	135	247 050	7	61 320	436 452	44	322 544
DHMI	Istanbul	226 168	146	267 180	9	78 840	522 141	20	176 510
DSNA	Bordeaux	211 541	270	362 880	18	104 819	753 017	31	383 428
DSNA	Reims	98 057	192	258 048	12	72 650	776 390	16	209 068
DSNA	Paris	156 280	358	481 152	20	125 036	1 228 424	14	288 596
DSNA	Marseille	303 953	341	458 304	26	137 350	928 944	22	340 004
DSNA	Brest	389 516	200	268 800	15	80 736	805 499	31	421 408
EANS	Tallinn	77 102	10	15 600	3	10 900	110 282	20	37 550
ENAV	Brindisi	244 000	106	161 014	6	33 178	274 390	25	112 993
ENAV	Milano	67 800	231	350 889	16	112 000	621 650	17	178 119
ENAV	Padova	95 800	164	249 116	9	57 427	598 091	18	184 175
ENAV	Roma	507 000	299	454 181	22	126 054	880 567	33	490 115
Finavia	Tampere	246 000	48	66 844	4	16 060	180 492	22	66 614
Finavia	Rovaniemi	169 000	10	8 820	1	8 760	33 329	15	8 332
HCAA	Athinai+Macedonia	537 000	599	n/a	12	n/a	530 255	41	361 092
HungaroControl	Budapest	92 800	103	151 616	6	22 735	538 853	19	166 324
IAA	Dublin	23 000	43	70 477	2	14 600	196 832	10	31 204
IAA	Shannon	447 000	108	177 012	10	49 165	401 858	30	202 416
LFV/ANS Sweden	Malmo	221 000	125	194 875	12	65 000	467 728	25	195 238
LFV/ANS Sweden	Stockholm	459 000	93	144 987	11	60 225	395 327	21	137 376
LGS	Riga	95 600	29	46 438	3	18 220	140 812	21	46 400
LPS	Bratislava	48 800	59	80 358	5	20 251	306 608	13	65 073
LVNL	Amsterdam	51 200	71	110 050	5	29 526	500 641	9	77 234
MATS	Malta	231 000	27	46 958	2	11 680	75 391	22	27 249
MK CAA	Skopje	24 800	26	35 776	3	9 700	107 290	9	16 834
MoldATSA	Chisinau	37 300	25	35 700	2	17 520	25 426	13	5 693
MUAC	Maastricht	260 000	210	309 819	16	65 212	1 450 200	21	509 703
NATA Albania	Tirana	36 000	18	37 314	3	13 310	116 040	13	25 867
NATS	Manchester	39 300	107	154 187	8	40 173	586 968	13	125 256
NATS	Scottish	598 000	146	210 386	14	91 462	620 179	26	269 005
NATS	London AC	282 000	361	520 201	24	137 293	1 893 608	16	517 221
NATS	London TC	39 800	293	422 213	26	185 510	1 322 474	11	243 192
NAV Portugal (FIR Lisboa)	Lisboa	666 000	81	148 635	7	41 528	359 320	34	205 856
NAVIAIR	Kobenhavn	158 600	96	151 296	8	61 152	502 789	18	149 177
Oro Navigacija	Vilnius	75 409	32	45 632	2	14 600	120 611	14	28 572
PPL/PATA	Warszawa	331 000	112	135 296	8	22 752	390 766	32	207 180
ROMATSA	Bucuresti	254 000	313	453 850	17	113 640	409 281	36	246 105
Skyguide	Geneva	35 100	85	111 408	8	34 785	601 381	12	125 235
Skyguide	Zurich	38 800	96	126 732	9	47 553	727 969	11	135 751
Slovenia Control	Ljubljana	18 300	35	50 680	3	14 097	189 743	10	30 141
UkSATSE	Kyiv	185 000	229	269 100	11	76 285	131 912	31	67 487
UkSATSE	Dnipropetrovs'k	46 500	81	95 295	2	17 520	20 372	21	7 061
UkSATSE	Simferopol	209 000	150	176 470	7	57 305	153 370	28	72 662
UkSATSE	Kharkiv	165 000	76	89 413	6	44 530	73 080	25	30 737
UkSATSE	L'viv	133 000	72	84 704	5	35 770	96 498	27	43 387
UkSATSE	Odesa	81 000	54	63 530	5	39 785	48 651	21	17 277
European system			9 529	12 906 138	638	3 832 345			11 047 146

Table 8.1: ACC 2005 data

8.3 Framework for ATCO productivity analysis at ACC level

As no cost data are available at ACC level, it was not possible to apply in full the cost-effectiveness framework presented in Chapter 5 (see Figure 5.4). Figure 8.3 displays the framework used for the productivity analysis at ACC level. This shows that ATCO productivity, defined as (en-route) flight-hours controlled per ATCO-hour on duty, can also be split into two components:

- **Sector productivity**: This is the ratio of the output, measured by the (en-route) flight-hours controlled, to (area control) sector-hours open. This indicator shows, on average, how many aircraft are simultaneously in a sector for a given ACC. All else being equal, higher sector productivity will improve ATCO-hour productivity.
- **Staffing per sector**: This is the ratio of ATCO-hours on duty to sector-hours open. This indicator shows, on average, how many ATCOs are available per sector. All else being equal, a reduction in the staffing per sector will increase ATCO-hour productivity.

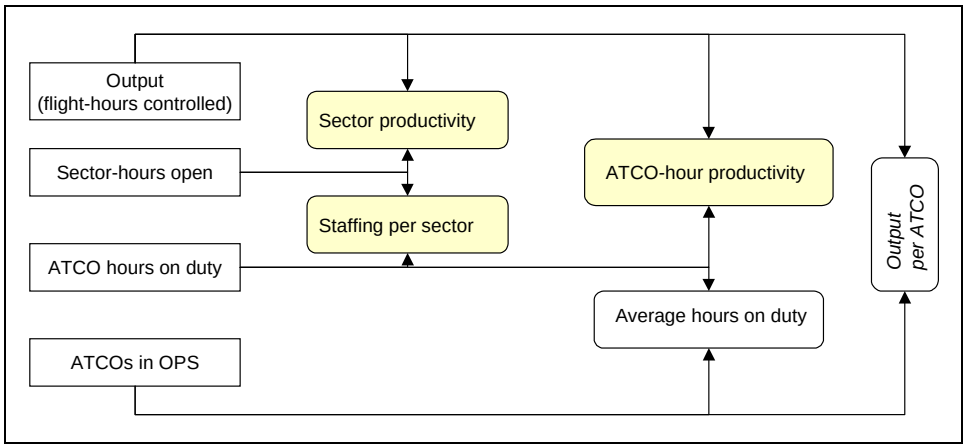


Figure 8.3: Performance framework for ACC productivity analysis

ATCO-hour productivity can be more easily compared in an international benchmarking environment. The **average number of hours on duty** is not a performance indicator per se and is mostly determined by the social bargaining and regulatory framework that prevails in each ANSP and State. Moreover, average hours on duty should be seen in the context of the employment costs.

8.4 Trend in ACC ATCO productivity at European level (2002-2005)

Figure 8.4 below shows the trend in ACC ATCO-hour productivity at European level. Overall, for the 32 ANSPs for whom ACC data has been consistently available since 2002, there has been a 8.9% improvement in ACC ATCO-hour productivity since 2002.

Figure 8.4 below indicates that the increase in ATCO-hour productivity is driven by a 13.5% increase in traffic, off-set by a 4.2% increase in the number of ATCO-hours worked on duty. Similarly, Figure 8.4 also shows that the increase in ATCO-hour productivity at European level results from a 6.2% increase in average sector productivity coupled with a -2.5% reduction in staffing per sector.

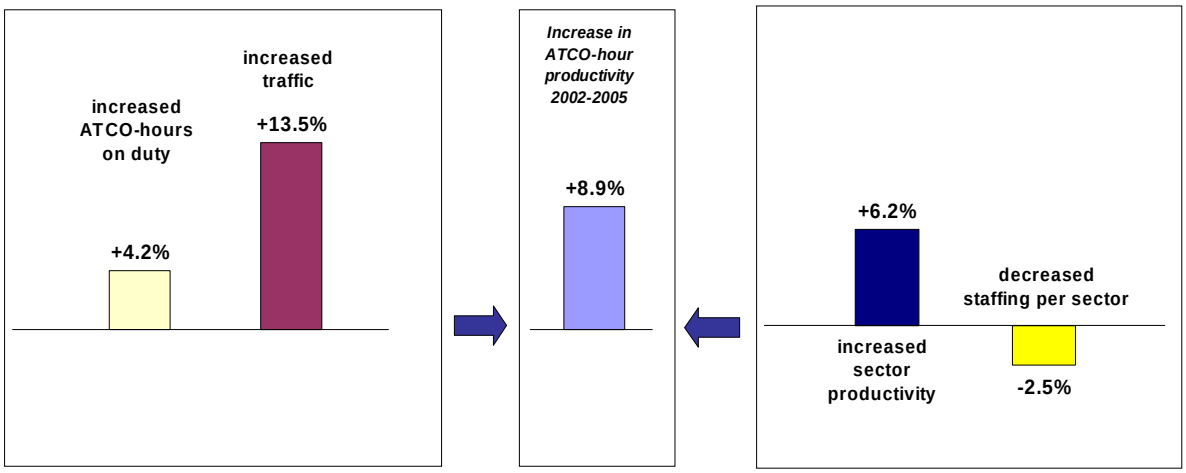


Figure 8.4: Breakdown of changes in ACC ATCO productivity at European level, 2002-2005

8.5 ATCO-hour productivity results at ACC level level (2005)

Figure 8.5 below shows the ATCO-hour productivity for each ACC, ordered with the most productive on the right-hand side. Note that this includes only data on en-route ACCs, and is therefore not comparable with the ANSP gate-to-gate productivity data given in Section 5.4.1. The average value for the European sample corresponds to 0.86 flight-hour per ATCO-hour.

The results range from 2.4 flight-hours per ATCO-hour to 0.07 flight-hour per ATCO-hour. There is a factor of 32 between the highest and the lowest ATCO-hour productivity. This wide dispersion among ACCs, and the fact that at European system level ATCO-hour productivity is less than one (0.86), suggest that there is scope for productivity improvement in the en-route environment. For 44 ACCs out of 66, the average ATCO-hour productivity is less than one. In other words, for two thirds of the European ACCs, there is, on average, less than one aircraft per ATCO on duty in OPS. The two red dotted lines in Figure 8.5 represent the first and third quartiles[68] and provide an indication of the dispersion. There is a difference of some 0.5 in ATCO-hour productivity between the two quartiles, compared to 0.7 in 2004. Prima facie, this implies that there is some convergence in the level of ATCO-hour productivity within European ACCs.

The particularly low ATCO-hour productivity achieved by the Ukrainian ACC of Dnipropetrovs' k (see Figure 8.5) raises a question of data reporting which would need to be considered[69].

Subsequent sections examine the measurable characteristics of the various ACCs that might be associated with traffic complexity, and assess whether these factors could be behind some of the observed productivity differences highlighted in Figure 8.5.

[68] 25% of observations lie below the first quartile, whilst 75% lie below the third quartile. Thus, in Figure 8.5, 75% of ACCs have ATCO-hour productivity less than 1.1.

[69] At the same time it should be noted that Dnipropetrovs'k is currently described as an 'auxiliary ACC' and has 1 en-route sector and 2 approach sectors. However, there are plans to replace the current Kharkiv ACC (which has 4 en-route and 2 approach sectors) with a new centre at Dnipropetrovs'k in 2007.

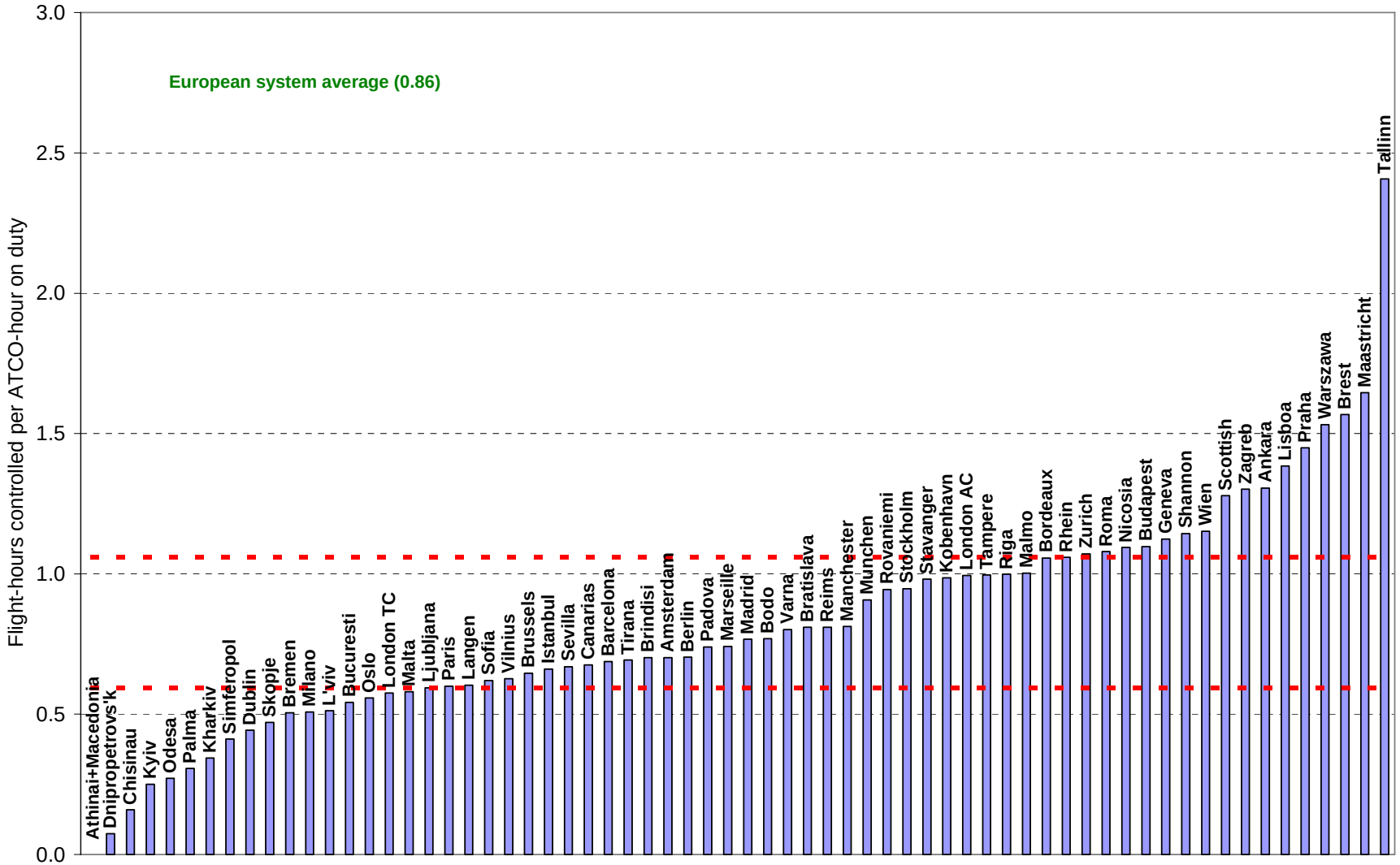


Figure 8.5: ATCO-hour productivity indicator at ACC level, 2005

8.6 Exogenous factors: traffic variability and complexity measures for ACCs

As noted in Chapter 4, and in particular Sections 4.4.2 and 4.4.3, ANSPs and ACCs operate in very different environments across Europe. For a fair comparison to be made of ACCs' performance, due account must be taken of differences in traffic complexity. This includes both the spatial complexity of the traffic and its variability over time.

Table 8.2 below displays the different measures of complexity that were derived for each ACC. It should be noted that the calculations showed in this report are based on one year of data, instead of two weeks as was the case for the traffic complexity figures used for the ACE 2004 data analysis. For the purposes of this analysis, the three structural indicators (horizontal, vertical and speed interactions) have been summed (with equal weight) and the resultant indicator is termed the structural complexity index. Multiplying this by the adjusted density gives an overall **aggregate complexity** score at ACC level. The indicator varies from 0.496 for London TC to 0.006 for Chisinau ACC, i.e., a factor larger than 80 (London TC is a "statistical" outlier in this sample, removing it would still give rise to a factor of 40).

The map on the left-hand side of Figure 8.6 below displays how traffic complexity is geographically distributed across the sample of ACCs. Not surprisingly, it is in the "core area" of Europe that traffic complexity is the highest and, in particular, in lower airspace ACCs. The map on the right-hand side of Figure 8.6 shows how seasonal traffic variability is geographically distributed across the sample of ACCs. It is in the South Eastern part of Europe that traffic variability is the highest.

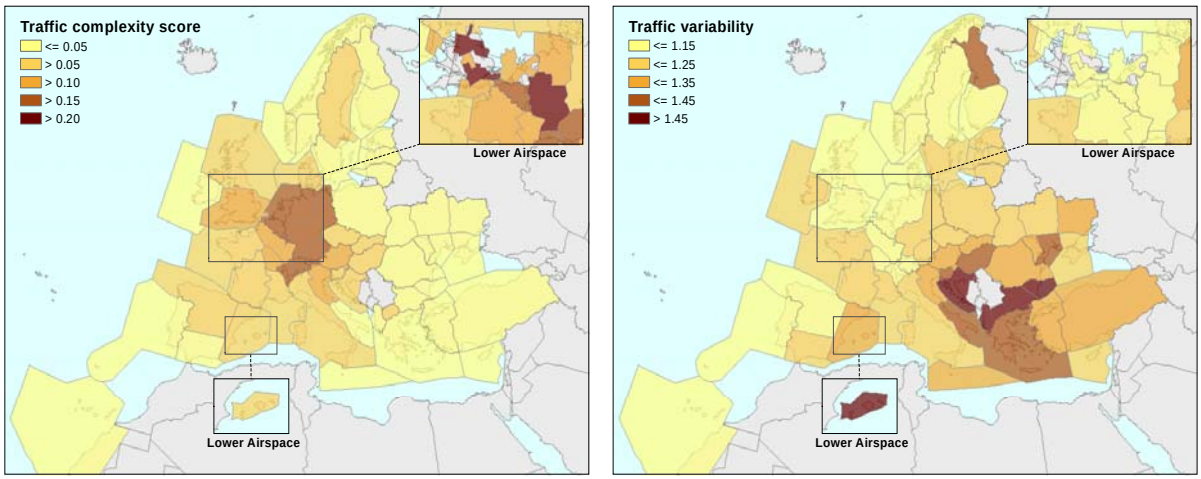


Figure 8.6: Aggregate complexity score per ACC and seasonal traffic variability (2005)

Finally, Table 8.2 also shows the average used flight level for each ACC. This metric provides information on where the traffic actually flew. Indeed, even if the flight levels available within each ACC are similar, the use of the prevalent flight levels by aircraft can be significantly different. This metric provides further insights for the comparison between ACCs above and beyond the aggregate complexity score metric, and it is therefore used for clustering ACCs (see Section 8.7 below).

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
Aena	Canarias	0.039	0.223	0.290	0.136	0.649	0.025	225
Aena	Barcelona	0.087	0.231	0.404	0.117	0.753	0.065	313
Aena	Madrid	0.090	0.138	0.382	0.097	0.617	0.056	316
Aena	Palma	0.094	0.263	0.361	0.245	0.869	0.082	113
Aena	Sevilla	0.068	0.218	0.311	0.108	0.637	0.043	263
ANS CR	Praha	0.113	0.170	0.477	0.191	0.838	0.095	314
ATSA Bulgaria	Sofia	0.102	0.016	0.248	0.051	0.315	0.032	347
ATSA Bulgaria	Varna	0.060	0.083	0.215	0.101	0.398	0.024	338
Austro Control	Wien	0.117	0.206	0.492	0.199	0.897	0.105	308
Avinor	Bodo	0.014	0.406	0.431	0.331	1.167	0.017	168
Avinor	Oslo	0.041	0.340	0.460	0.267	1.067	0.043	176
Avinor	Stavanger	0.013	0.310	0.505	0.280	1.095	0.014	170
Belgocontrol	Brussels	0.141	0.400	0.492	0.402	1.294	0.182	163
Croatia Control	Zagreb	0.082	0.074	0.494	0.104	0.671	0.055	327
DCAC Cyprus	Nicosia	0.051	0.204	0.362	0.119	0.684	0.035	304
DFS	Berlin	0.074	0.328	0.530	0.378	1.237	0.092	160
DFS	Langen	0.166	0.424	0.533	0.432	1.389	0.231	150
DFS	Munchen	0.175	0.348	0.479	0.276	1.103	0.193	218
DFS	Rhein	0.185	0.222	0.563	0.163	0.949	0.175	342
DFS	Bremen	0.075	0.472	0.614	0.493	1.579	0.119	128
DHMI	Ankara	0.052	0.101	0.374	0.082	0.557	0.029	332
DHMI	Istanbul	0.079	0.185	0.262	0.130	0.576	0.045	305
DSNA	Bordeaux	0.130	0.111	0.408	0.104	0.623	0.081	321
DSNA	Reims	0.145	0.212	0.392	0.172	0.776	0.112	315
DSNA	Paris	0.133	0.225	0.292	0.289	0.807	0.107	239
DSNA	Marseille	0.115	0.180	0.405	0.159	0.744	0.086	308
DSNA	Brest	0.139	0.104	0.418	0.072	0.594	0.082	344
EANS	Tallinn	0.044	0.187	0.284	0.136	0.607	0.026	313
ENAV	Brindisi	0.055	0.106	0.456	0.107	0.669	0.037	309
ENAV	Milano	0.131	0.425	0.574	0.384	1.384	0.181	166
ENAV	Padova	0.099	0.315	0.625	0.261	1.201	0.119	281
ENAV	Roma	0.083	0.257	0.495	0.180	0.933	0.078	275
Finavia	Tampere	0.039	0.286	0.260	0.301	0.847	0.033	241
Finavia	Rovaniemi	0.009	0.380	0.379	0.204	0.964	0.009	228
HCAA	Athinai+Macedonia	0.055	0.109	0.341	0.082	0.532	0.029	308
HungaroControl	Budapest	0.108	0.081	0.377	0.131	0.589	0.063	325
IAA	Dublin	0.095	0.422	0.448	0.374	1.244	0.119	131
IAA	Shannon	0.072	0.041	0.165	0.034	0.239	0.017	336
LFV/ANS Sweden	Malmo	0.063	0.164	0.416	0.183	0.763	0.048	288
LFV/ANS Sweden	Stockholm	0.050	0.329	0.357	0.388	1.074	0.053	221
LGS	Riga	0.053	0.089	0.399	0.116	0.604	0.032	342
LPS	Bratislava	0.087	0.149	0.465	0.177	0.790	0.069	310
LVNL	Amsterdam	0.153	0.246	0.374	0.322	0.942	0.145	166
MATS	Malta	0.014	0.155	0.304	0.089	0.548	0.007	323
MK CAA	Skopje	0.074	0.125	0.466	0.089	0.681	0.051	311
MoldATSA	Chisinau	0.013	0.072	0.273	0.087	0.432	0.006	298
MUAC	Maastricht	0.164	0.259	0.504	0.165	0.928	0.152	340
NATA Albania	Tirana	0.059	0.072	0.300	0.078	0.450	0.027	308
NATS	Manchester	0.156	0.483	0.554	0.530	1.567	0.245	166
NATS	Scottish	0.082	0.291	0.316	0.321	0.929	0.076	245
NATS	London AC	0.147	0.338	0.347	0.233	0.919	0.135	304
NATS	London TC	0.378	0.482	0.506	0.323	1.311	0.496	118
NAV Portugal (FIR Lisboa)	Lisboa	0.056	0.131	0.395	0.078	0.603	0.034	307
NAVIAIR	Kobenhavn	0.060	0.176	0.512	0.183	0.872	0.053	287
Oro Navigacija	Vilnius	0.033	0.105	0.431	0.158	0.694	0.023	302
PATA	Warszawa	0.053	0.127	0.510	0.191	0.827	0.044	313
ROMATSA	Bucuresti	0.090	0.045	0.319	0.104	0.468	0.042	329
Skyguide	Geneva	0.172	0.256	0.548	0.199	1.003	0.172	305
Skyguide	Zurich	0.160	0.349	0.527	0.262	1.138	0.182	280
Slovenia Control	Ljubljana	0.075	0.188	0.530	0.205	0.923	0.069	268
UkSATSE	Kyiv	0.025	0.115	0.271	0.192	0.578	0.015	291
UkSATSE	Dnipropetrovs'k	0.013	0.296	0.294	0.444	1.034	0.014	190
UkSATSE	Simferopol	0.065	0.013	0.288	0.059	0.361	0.023	342
UkSATSE	Kharkiv	0.027	0.053	0.247	0.079	0.379	0.010	331
UkSATSE	L'viv	0.029	0.030	0.443	0.132	0.606	0.018	319
UkSATSE	Odesa	0.021	0.043	0.330	0.114	0.487	0.010	291
European system average		0.108	0.238	0.439	0.201	0.878	0.095	280

Table 8.2: Traffic complexity indicators, 2005

8.7 ATCO-hour productivity for the different clusters (2005)

Figure 8.5 shows that there is a significant variation in ATCO-productivity between ACCs. At the same time, there are considerable differences in traffic complexity (Figure 8.6 and Table 8.2) and in traffic variability. So far, no clear-cut statistical relationship between ATCO productivity, traffic complexity and traffic variability could be inferred because the relationships are not directly causal or straightforward. Nevertheless, it is useful to compare the ATCO productivity of ACCs that share similar "operational" characteristics.

Therefore, for the purpose of this analysis, and in order to remain consistent with previous years' reports, ACCs have been clustered (i.e. grouped in more or less similar families) on the basis of two characteristics[70]: the **aggregated complexity score** and the **average used flight level**. The results are shown in Figure 8.7 below. The average used flight level provides an indication of the nature of the traffic controlled. ACCs with a lower average used flight level tend to handle more flights in vertical/horizontal evolution and less overflights. Note that the aggregate complexity score for London TC (0.496) is very much higher than any of the others, for this reason it could not be accurately displayed in Figure 8.7.

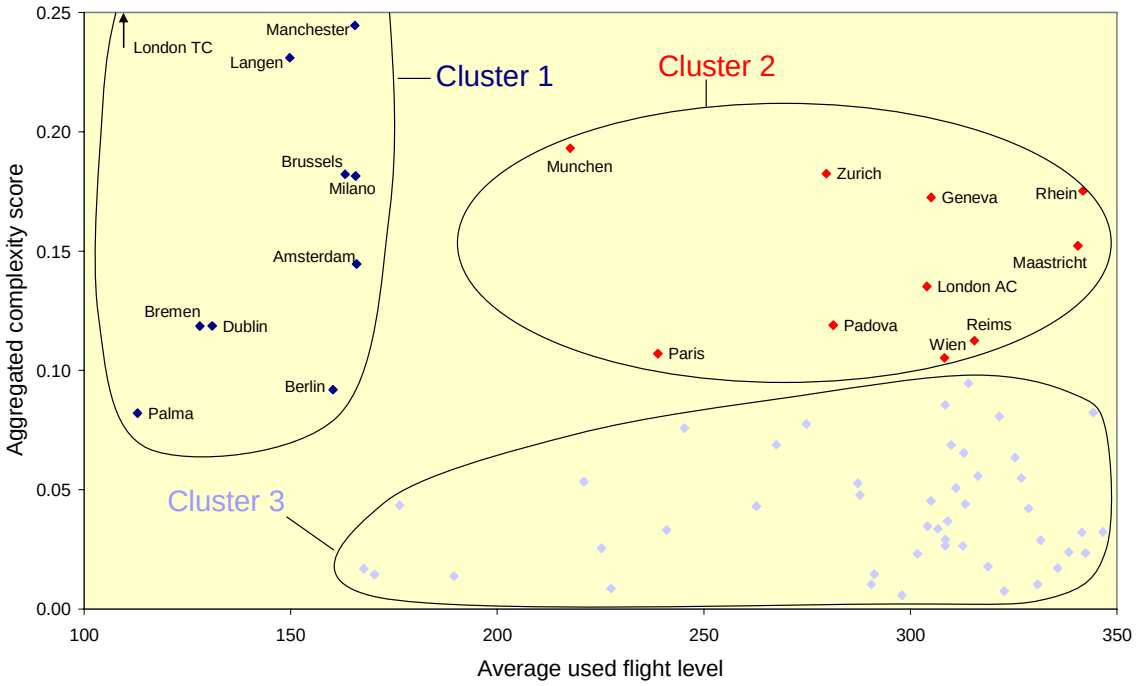


Figure 8.7: The complexity classification of ACCs, 2005

- **Cluster 1** comprises ten ACCs: Amsterdam, Brussels, Berlin, Bremen, Dublin, Langen[71], London TC, Manchester, Milano and Palma. These ACCs provide services predominantly in lower airspace. Berlin which was in the previous ACE Reports part of Cluster 3 is now in Cluster 1. In 2005, Berlin ACC only provided services in lower airspace (i.e. until FL 285). This change is resulting from the reorganisation of the German airspace. Cluster 1 has the highest overall average structural complexity (1.3). Its average adjusted density is 0.17 (0.13 if London TC is excluded). Its resulting aggregated complexity score (around 0.22 hour of interaction per flight-hour) is significantly higher than the European average (around 0.10 hour of interaction per flight-hour);

[70] Several additonnal dimensions could be conceptually added to the cluster analysis (such as traffic variability, etc), however the additional complexity would not allow for a "simple" two-dimension representation as in Figure 8.7.

[71] Formerly Düsseldorf and Frankfurt, combined together since 2004.

- **Cluster 2** comprises ten ACCs: Geneva, London AC, Maastricht, München, Padova, Paris, Reims, Rhein, Zürich and Wien with aggregated complexity scores (0.15 hour of interaction per flight-hour) higher than the European average. This sector has adjusted density comparable to Cluster 1 (0.15), but its structural complexity is lower (0.95);

- **Cluster 3** comprises the remaining 46 ACCs with relatively low aggregated complexity. It was observed that this cluster varied widely, particularly with regard to the size of the controlled area, so for analysis purposes it was further divided into two sub-clusters: (Cluster 3a), 26 relatively large ACCs with five sectors or more, and (Cluster 3b), 20 very small ACCs with four sectors or fewer. Both Cluster 3a and Cluster 3b have markedly lower adjusted density and lower structural complexity than Cluster 1 and Cluster 2. Cluster 3a has marginally higher structural complexity (0.68) than Cluster 3b (0.59).

Figure 8.8 below shows the ATCO-hour productivity for the ACCs in each cluster.

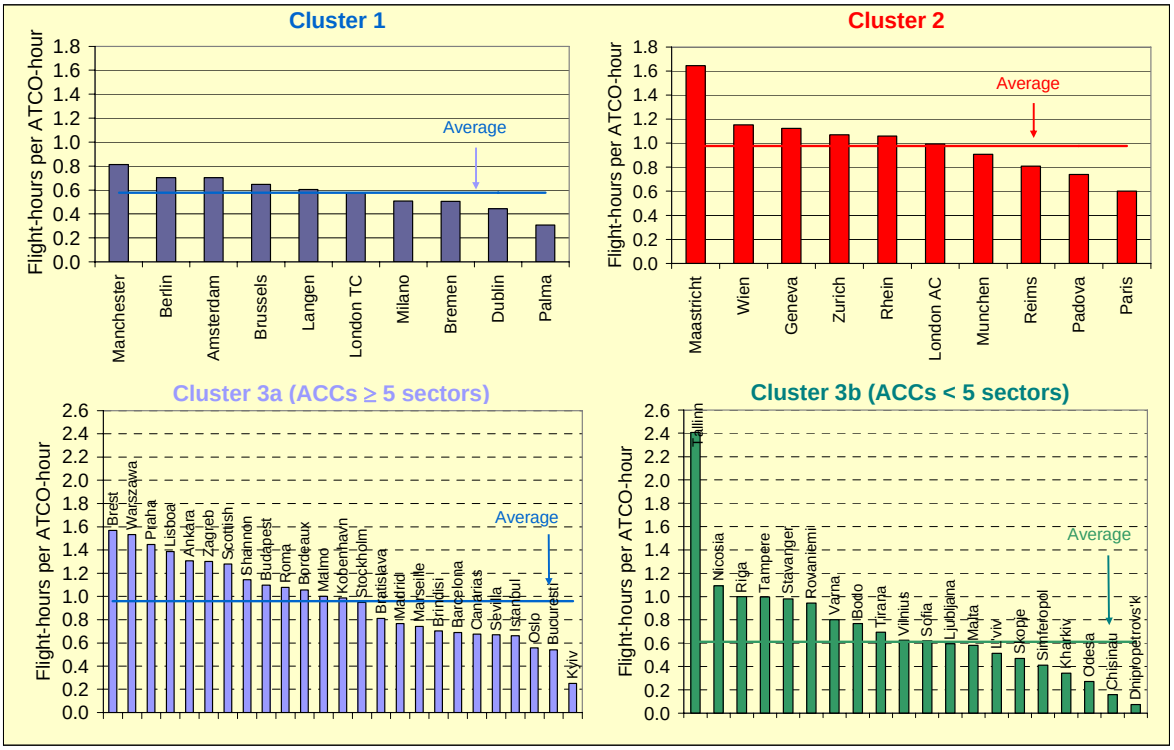


Figure 8.8: Summary of productivity results for each cluster, 2005

- **Cluster 1** has the lowest average productivity of any of the clusters (less than 0.6 flight-hour per ATCO-hour). It should be noted that Palma (with the lowest productivity) has the lowest aggregated complexity score in the cluster, whilst Manchester has the second highest (after London TC, which is exceptional). On the other hand, it should also be noted that Palma has the highest seasonal traffic variability of Cluster 1 (see Figure 8.6 above);

- **Cluster 2** has the highest overall productivity, at around one flight-hour per ATCO-hour. Within this cluster, Maastricht has exceptionally high productivity (over 1.6 flight-hours per ATCO-hour);

- **Cluster 3a** has an average productivity just below one flight-hour per ATCO-hour, quite similar to Cluster 2. Within Cluster 3a, Praha and Marseille have the highest aggregated complexity, and Canarias, Shannon and Kyiv the lowest. Warszawa, with the highest productivity, has comparatively low adjusted density but high structural complexity.

- **Cluster 3b** has an average productivity around 0.6, similar to Cluster 1 but exhibits a much wider variation. Three ACCs in Cluster 3b (Bodo, Stavanger and Dnipropetrovs'k) have structural complexity scores greater than 1, and comparable with those in Cluster 2, but coupled with extremely low density. In Cluster 3b, five of the nine ACCs with below average productivity (Lviv, Simferepol, Kharkiv, Odesa and Dnipropetrovs'k) belong to UkSATSE (as is Kyiv, in Cluster 3a)[72]. These six ACCs have among the twelve lowest aggregated complexity scores across all the ACCs. As noted in their current LCIP, for each of the UkSATSE ACCs, demand remained significantly below the capacity baseline in 2005; this is reflected in their low productivity.

Cluster 3b also includes Tallinn, the ACC with the highest overall productivity. Compared to its two Baltic neighbours, Tallinn has an aggregated complexity score slightly lower than Riga and slightly higher than Vilnius[73]. All three ACCs have also similar seasonal traffic variability. However, the productivity at Tallinn ACC is 2.4 higher than at Riga and over three times higher than at Vilnius. Clearly either Tallinn ACC is an example of best practices which would be worth to be shared among other ACCs, or there are differences in data reporting which are influencing the productivity results and which would need to be considered (see also further insights provided in Section 8.8).

8.8 The breakdown of ATCO-hour productivity (2005)

Figure 8.9 below displays the breakdown of ATCO-hour productivity into sector productivity and staffing per sector (see also framework in Figure 8.3) for each cluster. It also displays a line showing the average ATCO-hour productivity achieved by the ACCs in the cluster: the greater the slope of the line, the higher the average ATCO-hour productivity. ACCs below the line have a worse than average ATCO-hour productivity for the cluster and ACCs above the line have a better than average ATCO-hour productivity.

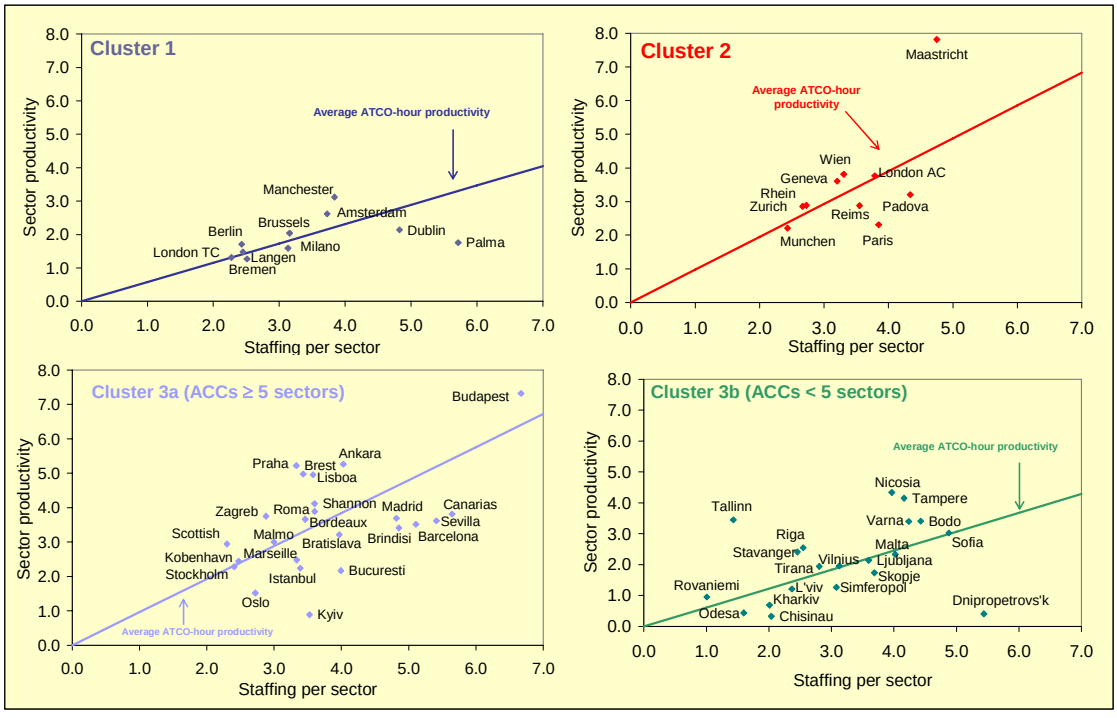


Figure 8.9: Sector productivity and staffing per sector, 2005

[72] With the exception of Simferopol, UkSATSE ACCs have very low adjusted density (less than 0.03). With the exception of Dnipropetrovs'k (which, as noted above, has structural complexity greater than one), they also have structural complexity well below average.

[73] Note that neither Estonia nor its two Baltic neighbours were part of the CFMU area in 2005. When these States will be part, this will have an impact on their traffic complexity scores. This will be the case for Lithuania as of 2006.

The graphs for Cluster 1 and Cluster 2 give an indication of the range of possible staffing configurations/practices that can deliver the same ATCO productivity, in ACCs with similar characteristics. Thus in Cluster 1, Langen and London TC both operate with just over two ATCOs per sector, while Amsterdam and Manchester operate with manning of nearly four per sector. A similar comparison can be made between Munchen and London AC in Cluster 2. Both achieve a similar level of ATCO-hour productivity but with a very different mix of sector productivity and average staffing per sector.

Note that Figure 8.9 indicates that the superior ATCO-hour productivity in Maastricht (Cluster 2) is mainly driven by significantly higher sector productivity (almost 8 aircraft on average simultaneously present in a sector).

Similarly, Figure 8.9 also indicates that the higher than average ATCO-hour productivity of Ankara, Brest and Lisboa in Cluster 3a is mainly driven by significantly higher sector productivity (more than 5 aircraft on average simultaneously present in a sector). Not surprisingly these ACCs have high average ACC transit time (above 30 minutes) with large/long sectors.

On the other hand, the graphs for Cluster 3a and Cluster 3b show that in these clusters, similar levels of sector productivity are achieved with very different staffing configuration/practices, or alternatively similar levels of staffing are delivering a wide range of sector productivity. Several factors are likely to affect ATCO productivity in these clusters. One explanation might be due to spare capacity and low utilisation of the available resources. Another explanation might be due to higher seasonal traffic variability or other factors, as yet unidentified. In any case, the analysis of the two sub-components of ATCO-hour productivity provide useful insights into the different productivity performance achieved by the various ACCs and are a tool to identify where potential improvements are possible.

8.9 Trends in ATCO-hour productivity at ACC level (2002-2005)

Figure 8.10, Figure 8.11 and Figure 8.12 below show the trends in ATCO-hour productivity between 2002-2005 for the ACCs within each cluster. The analysis of changes over time presented in this section has identified some fairly impressive year-to-year improvements or declines. Some caution is needed with these results since it is not always clear whether these changes are due to genuine productivity variations or improved data reporting that is part of the learning process. Moreover, as part of the experience and understanding gained from the last data validation process the PRU has made some data adjustment, where relevant, in order to ensure comparability over time.

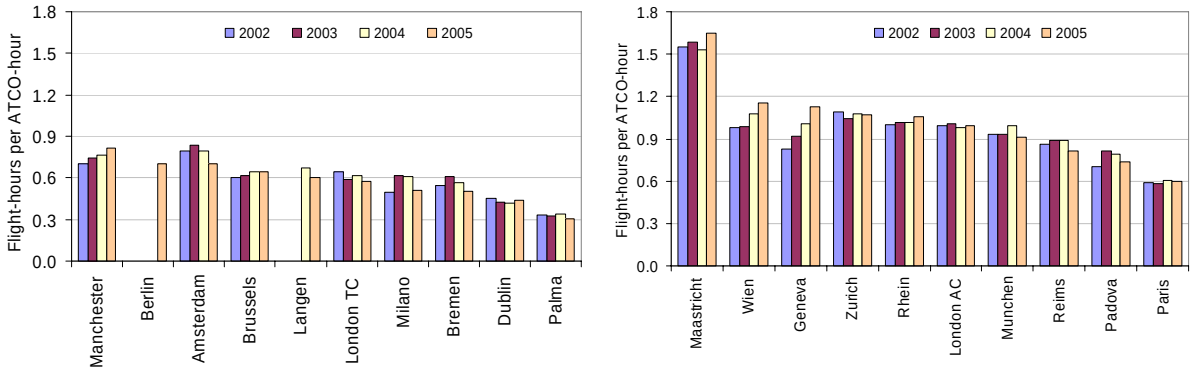


Figure 8.10: Changes in ATCO-hour productivity for Clusters 1 & 2

For Cluster 1 the overall change in ATCO-hour productivity has been -1% over 2002-2005. Of the ACCs in Cluster 1, only Manchester has shown consistent growth in productivity over the period. The productivity of Brussels ACC increased until 2004, but remained constant in 2005. Similarly, the productivity of Milano ACC increased until 2003 but decreased in 2004 and 2005. All the other ACCs in the cluster now have lower

productivity than in 2002; in these structurally complex ACCs, the increase in the number of ATCO-hours worked was higher than the increase in traffic. All else being equal, this should translate into lower en-route ATFM delays per flight and hence higher quality of service (see Chapter 9, and for more details PRR 2005, Chapter 5).

For Cluster 2 the overall change in ATCO-hour productivity has been +5% over 2002-2005. Productivity has increased in Cluster 2 for Maastricht, Wien, Geneva, Rhein, Padova and Paris. London AC ATCO-productivity remained roughly constant. Productivity peaked in Padova in 2003 and has declined since. The remaining ACCs (Zurich, Munchen and Reims) have lower productivity now than in 2002. Note that in 2005 all the ACCs in Cluster 2 experienced some en-route ATFM delays, in particular Geneva ACC with an average ATFM delay per flight close to 1 minute (see PRR 2005, Chapter 5).

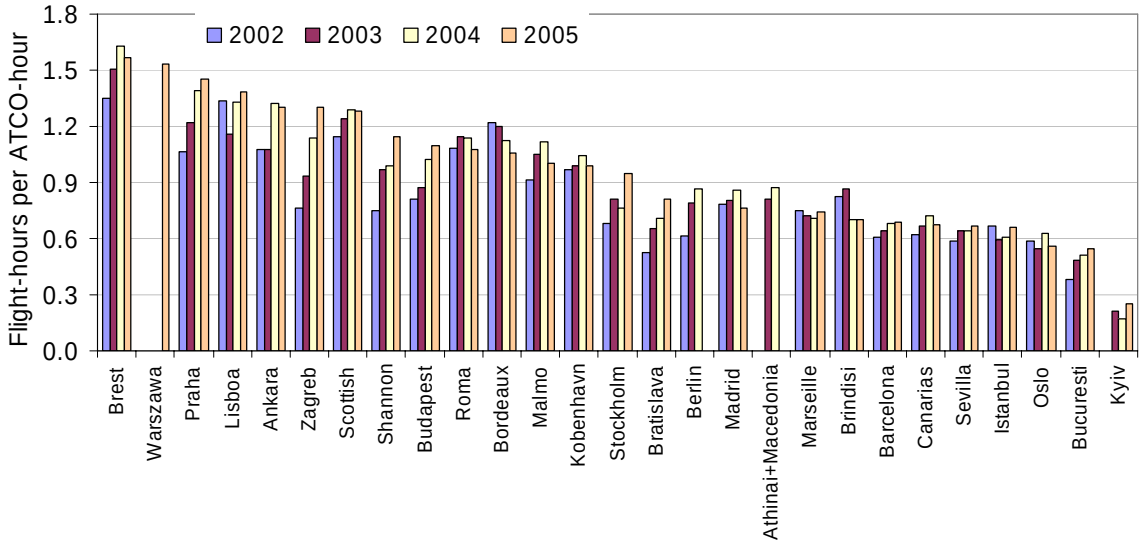


Figure 8.11: Changes in ATCO-hour productivity for Cluster 3a

For Cluster 3a[74] the overall change in ATCO-hour productivity has been +10% over 2002-2005. Indeed, there has been marked productivity increases in a number of ACCs in Cluster 3a over the period, including Ankara, Praha, Shannon, Budapest, Bratislava, Zagreb, Stockholm and Bucuresti. The increase in ATCO-hour productivity for Shannon in 2005 is mainly due to the additional traffic controlled in the Northern Atlantic Transition Area (NOTA). The other ACCs have experienced strong traffic growth which resulted in an increase of ATCO-hour productivity through a more effective use of spare capacity and existing resources. Of the ACCs in this cluster, only Bordeaux is showing consistently decreasing productivity. The productivity decrease in Zagreb in 2005 follows a strong increase during the 2002-2004 period: 2005 was a year of transition towards the new ACC in Zagreb and as a result high en-route ATFM delays were recorded in Zagreb.

[74] Note that following the airspace reorganisation in Germany, as of 2005 Berlin ACC is reported in Cluster 1.

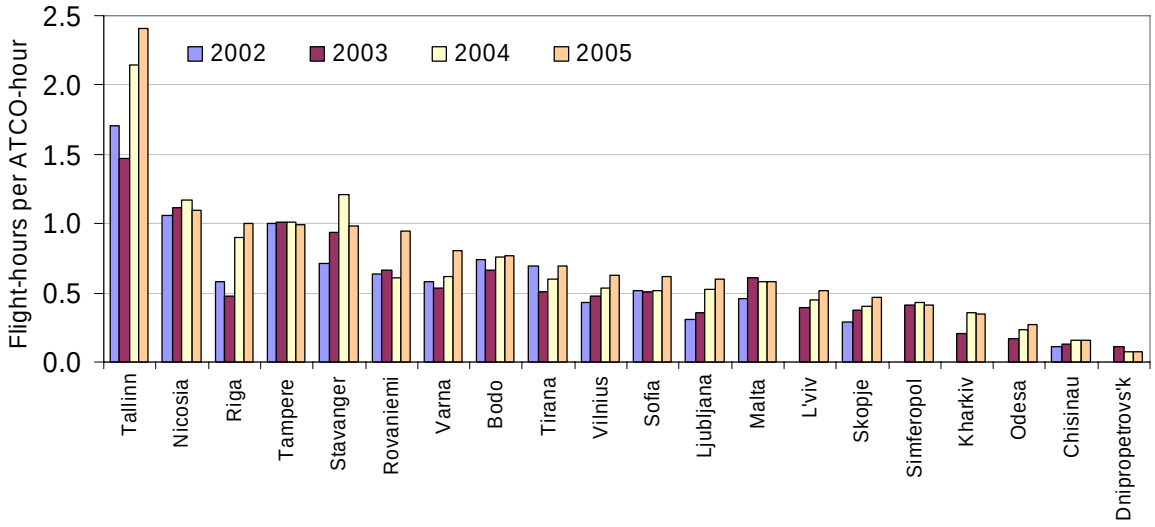


Figure 8.12: Changes in ATCO-hour productivity for Cluster 3b

For Cluster 3b the overall change in ATCO-hour productivity has been +28% over 2002-2005. Cluster 3b has experienced an average traffic growth increase of +25% compared to +19% in Cluster 3a. Tallinn ACC has shown a strong increase in productivity over this period, starting from a high base. With the exception of Simferopol and Dnipropetrovs'k[75], the ACCs in this cluster with very low productivity (less than 0.4) are showing small but steady increases in productivity as previously spare capacity begins to be utilised.

8.10 Conclusions

This chapter provides detailed comparisons of ACCs' performance. The ACE 2005 data set comprises 66 ACCs, the same figure as for 2004, however this takes into account both the addition of Warszawa ACC and the decommissioning of Sundsvall ACC. No cost data is available at the ACC level and so the full cost-effectiveness framework could not be applied and the analysis has focussed on average ATCO-hour productivity at each of 66 ACCs.

Average ATCO-hour productivity in an ACC ranges from 2.4 flight-hours per ATCO-hour to 0.07. There is a factor of 32 between the highest and the lowest ATCO-hour productivity. This wide dispersion among ACCs and the fact that at European system level ATCO-hour productivity is less than one (0.86) suggest that there is scope for productivity improvement in the en-route environment. For 44 ACCs out of 66 ACCs, the average ATCO-hour productivity is less than one. The analysis of the two sub-components of ATCO-hour productivity (average sector productivity and average staffing per sector) provide useful insights into the different productivity performance achieved by the various ACCs and are a tool to identify best practices and area where potential improvements are possible.

However, ACCs operate in very different operational environments across Europe, in particular traffic complexity and traffic variability, and for a fair comparison to be made of ACCs' performance, due account must be taken of these differences. Therefore in this chapter productivity at ACC levels have also been discussed in the context of some traffic complexity characteristics which have been quantified and deemed important for benchmarking purposes. This has led to the identification of four different ACCs groupings (clusters): from the high traffic complexity ACCs operating in a lower airspace environment to the low complexity ACCs operating with four sectors or fewer.

[75] See note on UkSATSE in Section 8.7

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. Several factors are likely to affect ATCO productivity in the various clusters and in particular its capability to adapt its resources to handle the traffic. Low productivity might be due to spare capacity and low utilisation of the available resources, especially in the less dense/complex ACCs. Another explanation might be due to higher seasonal traffic variability. Other factors as yet unidentified (and not measured) could also affect ATCO productivity performance and further work would be needed to establish an empirical relationship between productivity and its drivers.

The chapter also analyses changes over time since 2002. For the 32 ANSPs for whom ACC data has been consistently available since 2002, there has been a 8.9% improvement in ACC ATCO-hour productivity at European level driven by a 6.2% increase in average sector productivity coupled with a -2.5% reduction in staffing per sector. At ACC level, many ACCs experienced an increase in ATCO-hour productivity since 2002, most significantly in the low complexity ACCs which benefited over the period from strong traffic growth increases (>25%), allowing more effective use of spare capacity and existing resources. In fact, the dispersion across the ACC productivity tends to reduce over time, which would imply some convergence in the level of ATCO-hour productivity within European ACCs.

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PART III: ECONOMIC COST-EFFECTIVENESS

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9 ECONOMIC COST-EFFECTIVENESS

9.1 Economic and financial cost-effectiveness

The importance of the inclusion of an assessment of quality of service in the evaluation of an ANSP's cost-effectiveness has been discussed in Chapter 4, as well as the limitation of the data available for measuring quality of service.

The indicator of economic cost-effectiveness used in this report is ATM/CNS provision costs plus the costs of ATFM ground delay, all expressed per composite flight-hour. As with financial cost-effectiveness, economic cost-effectiveness is measured gate-to-gate.

In order for delays to be added to the measure of cost-effectiveness, a value must be assigned to the cost of delays. In the ACE 2002 Benchmarking Report, the cost of ATFM delays (on the ground – engine off) longer than 15 minutes was assessed at €71 per minute on average[76], and that of delays less than 15 minutes at zero[77]. Unavoidably, there is some uncertainty in this estimate and, hence, corresponding cost estimates should be viewed with care. For the purpose of this report the same assessment has been used but the figure has been adjusted to €76 to take inflation into account. This will enhance comparability of results over time.

ATFM delays and the associated costs for the users can result from both en-route and terminal service provision. The results should be interpreted with a degree of caution, especially in cases where ATFM delays largely arise in the terminal environment. Terminal-related ATFM delays, and associated costs, can be due to airport constraints which are outside the direct control of the respective ANSP (such as compliance with environmental constraints). Because of the complex interactions among stakeholders around airports and TMAs this is not a straightforward issue (see more details in Section 9.3).

9.2 Economic gate-to-gate cost-effectiveness

Table 9.1 shows how the economic cost-effectiveness indicator has been calculated; the costs of ATFM delay are added to the ATM/CNS costs of service provision to give the economic costs of service provision. The indicator of economic cost-effectiveness is the economic cost per composite gate-to-gate unit of output[78].

Estimates of delay are based on CFMU figures. For a number of ANSPs these are very small. For the three Baltic ANSPs, EANS, LGS, and Oro Navigacija, the CFMU does not record ATFM delays and therefore no estimates of delay are available[79]. For the purposes of this analysis, it has been assumed that delays in these three ANSPs are zero[80].

[76] These costs mainly arise from crew costs, passenger compensation and passengers opportunity costs.
[77] This was based on a report commissioned by the PRC on the cost of delay (cf. University of Westminster "Evaluating the true cost to airlines of one minute of airborne or ground delay" (2003). This report can be found on the PRC web site.
[78] As defined in Section 2.1.
[79] Ukraine is a EUROCONTROL Member State since 1 May 2005. As of 2005, AFTM delays attributed to UkSATSE, if any, are recorded by the CFMU.
[80] This is a fair assumption given that these ANSPs did not experience a lack of capacity in 2005 (see European ATM network capacity plan for summer 2005, EUROCONTROL, Dec. 2005).

ANSPs	Country	(1) Gate-to-gate ATM/CNS provision costs (in €'000)	(2) ATFM delays < 15 min. ('000 minutes)	(3) ATFM delays > 15 min. ('000 minutes)	(4)=(3)x€76 Costs of ATFM delays > 15 min. (in €'000)	(5) Composite flight-hours (in '000)	(6)=(1)/(5) Financial gate-to-gate cost-effectiveness	(7)=(4)/(5) Cost of delay per composite flight-hour	(8)=(6)+(7) Economic cost per composite flight-hour
Aena	ES	907 777	607	1 513	114 963	1 758	516	65	582
ANS CR	CZ	77 322	219	482	36 654	240	322	153	475
ATSA Bulgaria	BG	72 585	0	0	0	148	490	0	490
Austro Control	AT	135 463	168	525	39 904	360	376	111	487
Avinor	NO	121 494	34	166	12 616	436	279	29	308
Belgocontrol	BE	131 731	16	115	8 705	189	697	46	743
Croatia Control	HR	49 688	174	548	41 672	156	318	267	584
DCAC Cyprus	CY	33 361	27	155	11 764	112	298	105	404
DFS	DE	798 635	322	1 258	95 641	1 812	441	53	494
DHMI	TR	190 376	119	857	65 095	649	294	100	394
DSNA	FR	981 779	510	2 127	161 648	2 556	384	63	447
EANS	EE	7 485	n/a	n/a	n/a	50	149	n/a	149
ENAV	IT	622 961	405	1 520	115 493	1 311	475	88	563
Finavia	FI	51 137	18	33	2 545	181	283	14	297
HCAA	GR	144 268	23	221	16 780	528	273	32	305
HungaroControl	HU	54 187	55	227	17 237	227	239	76	315
IAA	IE	87 368	9	32	2 466	311	281	8	288
LFV/ANS Sweden	SE	135 171	77	183	13 908	549	246	25	272
LGS	LV	12 570	n/a	n/a	n/a	62	202	n/a	202
LPS	SK	31 536	39	90	6 828	81	390	84	475
LVNL	NL	175 720	49	297	22 590	260	675	87	761
MATS	MT	11 597	0	0	0	40	292	0	292
MK CAA	MK	10 584	0	0	0	25	416	0	416
MoldATSA	MD	3 046	0	0	0	10	312	0	312
MUAC		112 141	68	106	8 094	510	220	16	236
NATA Albania	AL	11 590	1	5	411	30	384	14	398
NATS	UK	774 683	405	1 635	124 297	1 826	424	68	492
NAV Portugal (FIR Lisboa)	PT	129 805	1	6	452	296	438	2	439
NAVIAIR	DK	84 839	13	67	5 114	290	292	18	310
Oro Navigacija	LT	14 193	n/a	n/a	n/a	42	341	n/a	341
PPL/PATA	PL	77 796	70	237	18 035	310	251	58	309
ROMATSA	RO	134 763	0	0	0	290	465	0	465
Skyguide	CH	177 228	447	1 087	82 647	428	414	193	608
Slovenia Control	SI	13 722	16	42	3 197	41	333	78	411
UkSATSE	UA	90 993	0	0	0	282	323	0	323
Total European System		6 469 592	3 893	13 536	1 028 757	16 396	395	63	457

Table 9.1: The calculation of economic cost-effectiveness indicators, 2005

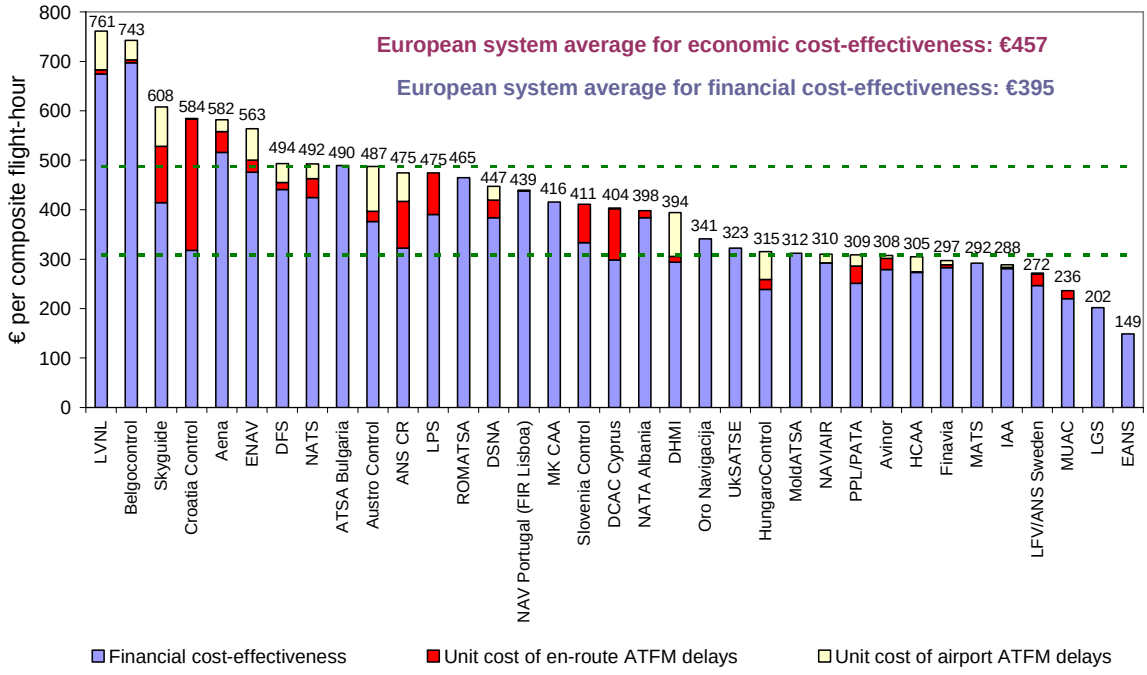
9.3 Comparison of economic cost-effectiveness (2005)

Figure 9.1 displays the comparison of the economic gate-to-gate cost-effectiveness indicator (economic cost per composite flight-hour) between ANSPs.

The average, economic cost-effectiveness indicator for the European system is around €457. The two dotted lines displayed in the Figure 9.1 represent the first and third quartiles[81] and provide an indication of the dispersion. There is a difference of some €180, this is similar to 2004 but lower than in 2003 (€200). This indicates that the range of unit economic costs is reducing (i.e. there is some convergence in the level of economic cost-effectiveness performance within European ANSPs), although clearly there is still a great disparity among ANSPs.

The economic cost-effectiveness indicator ranges from €761 (LVNL) to €149 (EANS) a factor of more than five. Costs reported for MUAC do not include the costs of the CNS infrastructure which is provided free of charges by Belgocontrol, LVNL, and DFS (see also Section 5.2 and footnote 35).

[81] See footnote 45.



This economic cost-effectiveness KPI is a factual indicator. A genuine measurement of **cost inefficiencies** would require full account to be taken of identified and **measurable** exogenous factors such as cost of living, traffic complexity, and traffic variability (as described in Chapter 4).

Figure 9.1: Economic gate-to-gate cost-effectiveness KPI, 2005

Although on average across Europe, ATFM delays contributed 14% to total economic cost-effectiveness KPI in 2005, in individual ANSPs, this varies from 0% to 46%. Figure 9.1 indicates that for seven ANSPs which experienced significant lack of ATC capacity (ANS CR, Austro Control, DCAC Cyprus, Croatia Control, DHMI, HungaroControl and Skyguide), ATFM delays contributed more than 20% to their economic cost of ATM/CNS provision.

Six ANSPs (Aena, Croatia Control, DSNA, ENAV, NATS and Skyguide) contribute more than a third of the total cost of delays through their en-route delays. Meanwhile, six ANSPs (DFS, DHMI, DSNA, ENAV, NATS and Skyguide) between them contribute more than a third of the total cost of delays through their airport delays.

Airport ATFM delays now contribute slightly over half (52%) the total cost of ATFM delays. Overall, nearly half (46%) of all airport ATFM delays are caused by weather and environment issues which may be difficult for the ANSP to influence. However, another 44% of airport delays result from aerodrome or ATC capacity problems, and this can rise to over 75% in individual ANSPs (see Figure 9.2 below).

Figure 9.2 shows the distribution of delays by cause for those ANSPs with more than 100,000 minutes of ATFM delays greater than 15 minutes.

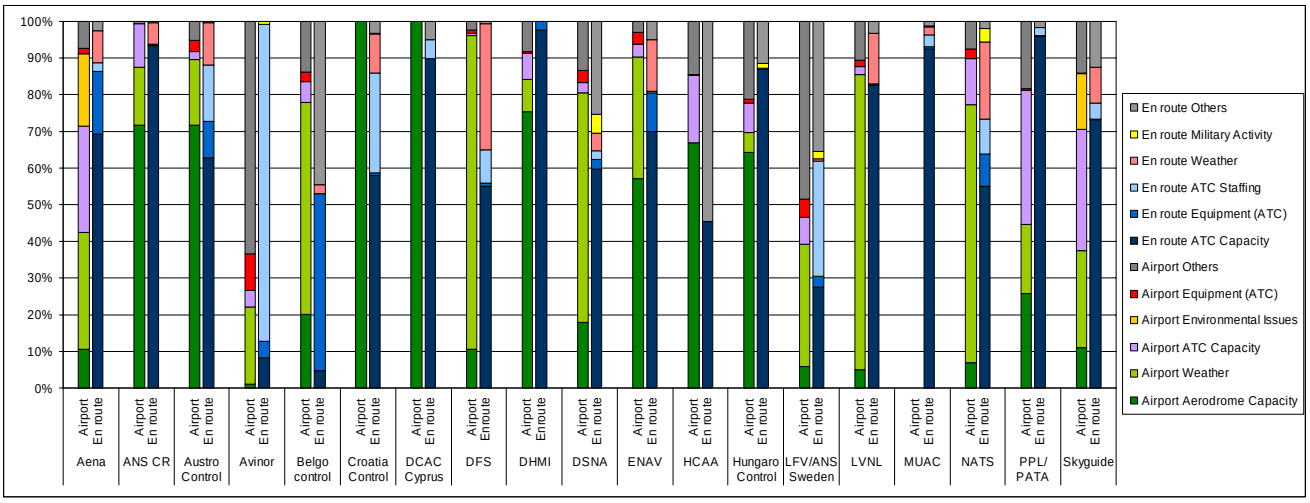


Figure 9.2: Distribution of en-route and airport ATFM delays per cause, 2005

The airport ATFM delays for LVNL and Belgocontrol are mostly associated with bad weather conditions (light green bar). The issue of the extent to which certain delays, such as weather-related ATFM delay and delay caused by environmental constraints due to noise management practices, are outside the control of the ANSP deserves further investigation.

On the other hand, the airport ATFM delays for Austro Control, ANS CR, DHMI and HungaroControl are mostly relating to aerodrome capacity issues (dark green bar).

9.4 Trends in economic cost-effectiveness (2002-2005)

This section analyses the changes in economic cost-effectiveness between 2002 and 2005 at European system level. Note that (for the reasons given in Section 6.1) the indicators presented in this section will not be directly comparable to those in previous ACE reports.

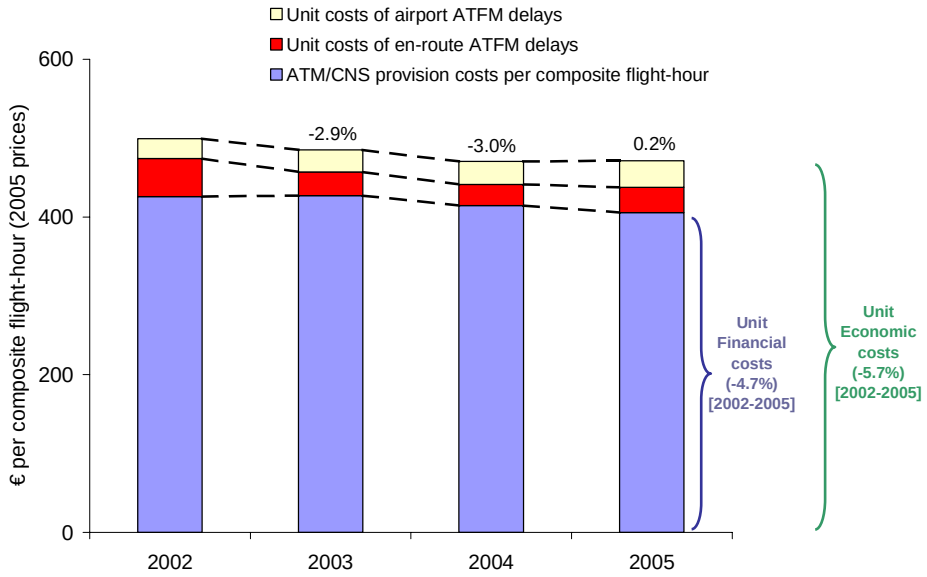


Figure 9.3: Trend in gate-to-gate economic cost-effectiveness KPI (2002-2005, real terms)

Figure 9.3 shows the trend in the economic cost per composite flight-hour since 2002. The economic cost per composite flight-hour has fallen by -5.7%, which represents an appreciable improvement in economic cost-effectiveness. Between 2002 and 2003, this trend was driven by decreases in the unit cost of en-route ATFM delays. The decrease in en-route ATFM delays continued into 2004, although at a reduced level, and

improvements in financial cost-effectiveness (-2.9%) led to a continued overall improvement to economic cost-effectiveness. Between 2004 and 2005, the improvements in financial cost-effectiveness further continued (-2.2%) but were offset by the significant increase in ATFM delays (+18%), resulting in an increase of the economic cost per composite flight-hour (0.2%).

The decrease in the economic cost per unit output at European level between 2002-2005 masks contrasting levels and trends across the 32 ANSPs which comprise the sample: the economic cost per composite flight-hour fell (i.e. economic cost-effectiveness was improved) for 19 of the 32 ANSPs. It is important to note that differences in the investment cycle can affect the economic cost-effectiveness either through high levels of delay **prior** to a major ATM investment, or through high capital-related costs (depreciation, cost of capital) **after** the major ATM investment. This argument would favour the need to look at a slightly longer time period than the currently available four years[82]. This will be possible in the future as the time series builds up.

For the purpose of illustration and building on the analysis of exogenous factors affecting performance (see Chapter 4, Section 4.4.2), Figure 9.4 below shows the changes in economic cost-effectiveness for the ten most "complex" ANSPs (i.e. those with an aggregated complexity score higher than 0.08 hour of interaction per flight-hour[83]), while Figure 9.5 shows the changes in economic cost-effectiveness for the 25 less "complex" ANSPs (i.e. those with an aggregated complexity score lower than 0.08 hour of interaction per flight-hour). Incidentally, the ANSPs in Figure 9.4 also tend to face higher cost of living than the average[84], with the exception of ANS CR.

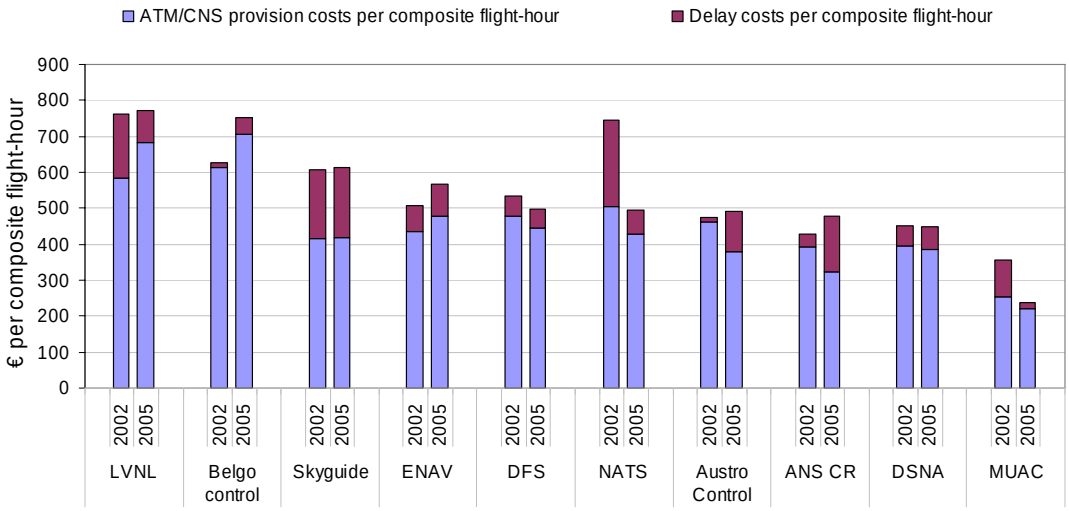


Figure 9.4: Comparison of economic gate-to-gate cost-effectiveness for the ten most complex ANSPs (2002-2005)

Figure 9.4 suggests the following comments:

- First, all the 10 ANSPs experienced some ATFM delays in 2002 and 2005;
- Second, among the ten most "complex" ANSPs only DFS, NATS, and MUAC show a marked improvement in economic cost-effectiveness (i.e. reduction of the economic

[82] With an average depreciation rate of 12%, the typical investment cycle is approximately eight years.
[83] See also Figure 4.6 on page 39.
[84] See also Figure 4.2 on page 36.

cost per composite flight-hour). For these three ANSPs this performance improvement results from reductions in **both** unit ATM/CNS provision costs and ATFM delays;

- Third, increases in ATFM delays contributed to raise the unit economic costs for ANS CR, and Austro Control;

- Fourth, for Belgocontrol and ENAV, a rise in unit ATM/CNS provision costs combined with a rise in ATFM delays led to an overall rise in the unit economic costs;

- Fifth, for LVNL the decrease in ATFM delays almost exactly compensates the increase in the unit ATM/CNS provision costs;

- Finally, no significant changes are apparent for DSNA and Skyguide.

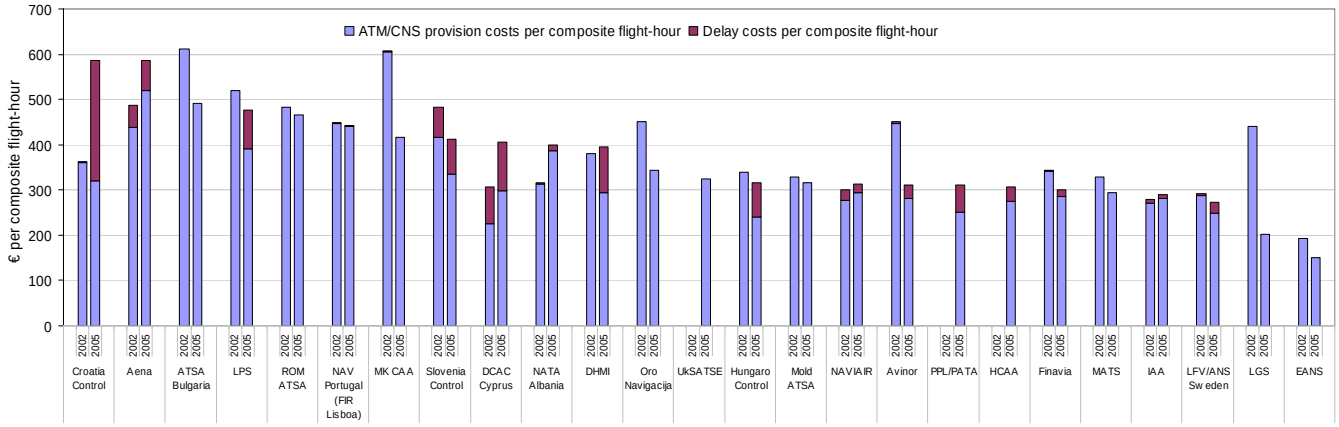


Figure 9.5: Comparison of economic gate-to-gate cost-effectiveness for the 25 less "complex" ANSPs (2002-2005)

Similarly, Figure 9.5 suggests the following comments:

- Nine ANSPs out of 25 did not experience ATFM delays in 2002 and 2005, despite high traffic growth in many of these ANSPs. These nine ANSPs reduced their ATM/CNS provision costs (LGS, EANS, MATS, MoldATSA, Oro Navigacija, MK CAA, ROMATSA, ATSA Bulgaria and NAV Portugal). For all these ANSPs it is important to continue to provide ATC capacity in line with a growing demand before ATFM delays start to cause problems of economic cost-effectiveness;

- For LFV/ANS Sweden, Avinor, Finavia, HungaroControl, LPS and Slovenia Control, the fall in unit ATM/CNS provision costs more than compensated for the rise in ATFM delays;

- It is worth noting that Croatia Control, DHMI, HungaroControl and LPS experienced high delays in 2005 compared to little or no delays in 2002. All four of these ANSPs experienced large traffic growth between 2002 and 2005. Of these, only Croatia Control and DHMI experienced an increased of their unit economic costs. In the other two ANSPs, improvements in financial cost-effectiveness compensated for the growth in delays;

- For Aena, DCAC Cyprus, and NATA Albania, a rise in ATM/CNS provision costs combined with a rise in ATFM delays led to an overall rise in the unit economic costs.

9.5 Conclusions

This analysis of economic cost-effectiveness includes the cost of (ground-based) ATFM delays. There are other, significant costs to airspace users' flight efficiency (such as horizontal route extension, non-optimal vertical profile and airborne delay) that have not yet been taken into account. One minute of ATFM delay has been assessed at €76 (for delays greater than 15 minutes). Unavoidably, there is some uncertainty in this estimate and, hence, corresponding cost estimates should be viewed with care.

The average economic cost-effectiveness KPI for the European system is around €457. There is a difference of some €180 between the upper and lower quartiles, this is similar to 2004 but lower than in 2003 (€200). This indicates that the range of unit economic costs is reducing, although clearly there is still a great disparity among ANSPs. The economic cost-effectiveness KPI ranges from €761 (LVNL) to €149 (EANS) a factor of more than five.

This economic cost-effectiveness KPI is a factual indicator. A genuine measurement of ANSPs cost inefficiencies would require full account to be taken of identified and measurable exogenous factors such as cost of living, traffic complexity, and traffic variability. This is beyond the scope of this report. Previous analysis suggested that there is no clear relationship between the overall traffic complexity scores and the economic cost-effectiveness KPI at ANSP level.

On average across Europe, ATFM delays contribute 14% to total economic cost-effectiveness KPI in 2005. In individual ANSPs, this varies from 0% to 46%. For seven ANSPs (ANS CR, Austro Control, DCAC Cyprus, Croatia Control, DHMI, HungaroControl and Skyguide) which experienced significant lack of ATC capacity, ATFM delays contributed more than 20% to the economic cost per composite flight-hour.

Airport ATFM delays contribute in 2005 slightly over half (52%) the total cost of ATFM delays, of which 46% are caused by weather and environment issues, which may be difficult for the ANSP to influence. However, another 44% of airport delays result from aerodrome or ATC capacity problems, and this can rise to over 75% in individual ANSPs. Eight ANSPs contribute more than a third of the total cost of delays though their airport delays.

At European system level over the period 2002-2005, there has been a 5.7% improvement in economic cost-effectiveness. Up until 2004, this was largely driven by a reduction in ATFM delays. This year, for the first time, there has been a significant reduction in financial cost-effectiveness, coupled with an increase in delays.

There are contrasted levels and trends across ANSPs in this period:

- There was an increase of the economic unit costs among ANSPs experiencing lack of capacity, for example ANS CR and Croatia Control;
- There was a decrease of the economic unit costs among ANSPs which significantly reduced ATFM delays, for example NATS and MUAC;
- There was an increase in ATFM delays in some ANSPs which almost cancelled the improvement in financial cost-effectiveness: e.g. LPS and HungaroControl.

Differences in the investment cycle can affect the economic cost-effectiveness either through high levels of delay prior to a major ATM investment, or through high capital-

related costs (depreciation, cost of capital) after the major ATM investment. The latter argument would favour the need to look at a slightly longer time period than the currently available four years.

ANNEX 1 – STATUS ON ANSPs YEAR 2005 ANNUAL REPORTS

	Availability of a public Annual Reports (AR)	Availability of Management Report	Availability of Annual Accounts	Independent audited accounts	Separate accounts for en-route and terminal ANS costs	Information provided in English	PRU comments
Aena	✔	✔	✔	✔	No	✔	Includes airport activities. No cash flow statement.
ANS CR	✔	✔	✔	✔	No	✔	
LFV/ANS Sweden	✔	✔	✔	✔	No	✔	Detailed accounts for total LFV.
ATSA Bulgaria	✔	No	✔	✔	No	No	
Austro Control	✔	✔	✔	✔	No	✔	
Avinor	✔	✔	✔	✔	No	✔	AR mainly in Norwegian, except a five-page summary in English.
Belgocontrol	✔	✔	✔	✔	No	No	Audit performed by the "Collège des Commissaires". No cash flow statement.
Croatia Control	No	No	No	No	No	No	
DCAC Cyprus	No	No	No	No	No	No	
DFS	✔	✔	✔	✔	No	✔	Separate accounts are used for internal reporting purposes and charges calculation.
DHMİ	✔	✔	✔	✔	No	✔	
DSNA	✔	✔	No	✔	No	✔	Limited financial information in AR.
EANS	✔	✔	✔	✔	No	✔	
ENAV	No	✔	✔	No	No	No	Publication of Activity Report ("Bilancio di esercizio") comprising financial information on accounts.
Finavia	✔	✔	✔	✔	No	✔	Detailed accounts only available for total Finavia.
MK CAA	No	No	No	No	No	No	
HCAA	No	No	No	No	No	No	
HungaroControl	No	✔	No	No	No	✔	Publication of Activity Report.
IAA	✔	✔	✔	✔	No	✔	
LGS	✔	✔	✔	✔	No	✔	
LPS	✔	✔	✔	✔	No	✔	
LVNL	✔	✔	✔	✔	✔	✔	Separate Income Statement for en-route and terminal ANS
MATS	✔	No	✔	✔	✔	✔	Separate Income Statement for en-route and terminal ANS.
MoldATSA	No	No	No	No	No	No	
MUAC	✔	✔	✔	✔	n/appl	✔	.
NATA Albania	No	No	No	No	No	No	
NATS	✔	✔	✔	✔	✔	✔	Several ARs for individual group companies.
NAV Portugal (FIR Lisboa)	✔	✔	✔	✔	No	✔	
NAVIAIR	✔	✔	✔	No	✔	No	
Oro Navigacija	✔	✔	✔	✔	No	✔	
PPL/PATA	✔	No	✔	✔	No	✔	Detailed accounts only available for total PPL.
ROMATSA	✔	✔	✔	✔	No	✔	
Skyguide	✔	✔	✔	✔	✔	✔	Separate accounts for military OAT services.
Slovenia Control	✔	✔	✔	✔	No	✔	
UkSATSE	No	No	No	No	No	No	

Annex 1 - Table 0.1: Status on ANSP's 2005 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[85] and, for terminal ANS, the number of IFR airport movements controlled. Those output measures can be derived from the EUROCONTROL database and therefore readily available and consistent across the ANSPs included in the analysis.

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[86].

For this reason, an indicator combining the two separate output measures for en-route and terminal ANS provision has been calculated[87]. 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 European system (see Annex 2 - Table 0.1).

Total European System	
En-route ATM/CNS provision costs	€ 4 997 M
Total flight-hours controlled	12.6 M
Average en-route ATM/CNS provision costs per flight-hour	€ 397

Terminal ATM/CNS provision costs	€ 1 473 M
IFR Airport movements	14.3 M
Average terminal ATM/CNS provision costs per IFR airport movement	€ 103

Composite flight-hour weight factor:	€ 103 / € 397 = 0.26

Annex 2 - Table 0.1: Calculation of the composite flight-hour weight factor

The value of "IFR terminal movements" - expressed in flight-hours controlled - is then calculated by applying a calculated weight factor (see Annex 2 - Table 0.1). The composite gate-to-gate flight-hours are consequently defined as:

Composite gate-to-gate flight-hours	=	En-route flight-hours	+	(0.26 x IFR airport movements)

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[88].

The following table displays the complete ATM/CNS provision costs and output measures used to determine the financial cost-effectiveness indicator for en-route, terminal and 'gate-to-gate' ANS service provision.

[85] Controlled flight-hours are calculated by the CFMU 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 CFMU (filed model, regulated model and current model). The data used for the cost-effectiveness analysis is based on the current model (model 3 or CFTM) and includes flight-hours controlled in the ACC, APP and FIS operational units which are described in the CFMU environment.

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

[87] This is consistent with the methodology used in the previous ACE Reports.

[88] Further details on the theoretical background to producing composite indicators can be found in a working paper on "Productivity of European ANSPs: basic concepts and application" (Sept. 2003).

		En-route ATM/CNS provision costs (in € '000)	Total flight-hours controlled (in '000)	En-route ATM/CNS provision costs per flight-hour	Terminal ATM/CNS provision costs (in € '000)	IFR Airport movements (in '000)	Terminal ATM/CNS provision costs per airport movement	Gate-to-gate ATM/CNS provision costs (in € '000)	Composite flight-hours (in '000)	Gate-to-gate ATM/CNS provision costs per composite flight-hour
Aena	ES	610 281	1 269	481	297 496	1 892	157	907 777	1 758	516
ANS CR	CZ	50 620	196	258	26 702	169	158	77 322	240	322
ATSA Bulgaria	BG	62 951	130	483	9 634	69	140	72 585	148	490
Austro Control	AT	105 355	264	399	30 108	370	81	135 463	360	376
Avinor	NO	65 916	288	229	55 579	572	97	121 494	436	279
Belgocontrol	BE	100 788	102	985	30 943	335	92	131 731	189	697
Croatia Control	HR	49 688	137	363				49 688	156	318
DCAC Cyprus	CY	26 381	96	275	6 980	61	114	33 361	112	298
DFS	DE	636 457	1 283	496	162 178	2 045	79	798 635	1 812	441
DHMI	TR	139 616	527	265	50 760	471	108	190 376	649	294
DSNA	FR	780 649	2 077	376	201 130	1 852	109	981 779	2 556	384
EANS	EE	4 130	41	100	3 355	35	95	7 485	50	149
ENAV	IT	515 675	1 006	512	107 286	1 176	91	622 961	1 311	475
Finavia	FI	23 231	114	204	27 906	259	108	51 137	181	283
HCAA	GR	144 268	428	337				144 268	528	273
HungaroControl	HU	40 084	195	206	14 103	123	114	54 187	227	239
IAA	IE	72 541	246	295	14 827	253	59	87 368	311	281
LFV/ANS Sweden	SE	112 621	406	277	22 550	551	41	135 171	549	246
LGS	LV	9 807	53	184	2 764	35	80	12 570	62	202
LPS	SK	25 151	71	356	6 386	39	164	31 536	81	390
LVNL	NL	78 587	140	563	97 133	467	208	175 720	260	675
MATS	MT	9 335	32	290	2 262	29	78	11 597	40	292
MK CAA	MK	9 154	22	415	1 430	13	110	10 584	25	416
MoldATSA	MD	2 059	7	299	987	11	89	3 046	10	312
MUAC		112 141	510	220	n/appl	n/appl	n/appl	112 141	510	220
NATA Albania	AL	9 817	26	380	1 773	17	107	11 590	30	384
NATS	UK	620 553	1 335	465	154 130	1 897	81	774 683	1 826	424
NAV Portugal (FIR Lisboa)	PT	105 622	236	448	24 182	236	103	129 805	296	438
NAVIAIR	DK	57 299	197	291	27 539	360	77	84 839	290	292
Oro Navigacija	LT	11 932	32	374	2 261	38	60	14 193	42	341
PPL/PATA	PL	70 788	254	278	7 008	217	32	77 796	310	251
ROMATSA	RO	118 846	257	462	15 916	127	126	134 763	290	465
Skyguide	CH	129 128	317	407	48 099	428	112	177 228	428	414
Slovenia Control	SI	12 230	32	377	1 492	34	44	13 722	41	333
UkSATSE	UA	72 855	243	300	18 138	150	121	90 993	282	323
Total European System		4 996 555	12 571	397	1 473 037	14 331	103	6 469 592	16 396	395

Annex 2 - Table 0.2: Costs, output and cost-effectiveness indicators for en-route, terminal and gate-to-gate

Note that terminal ATM/CNS provision costs for Croatia Control and HCAA were not separately available. However, a gate-to-gate composite flight-hour value has been computed for those two ANSPs using the weight factor for the European system (0.26).

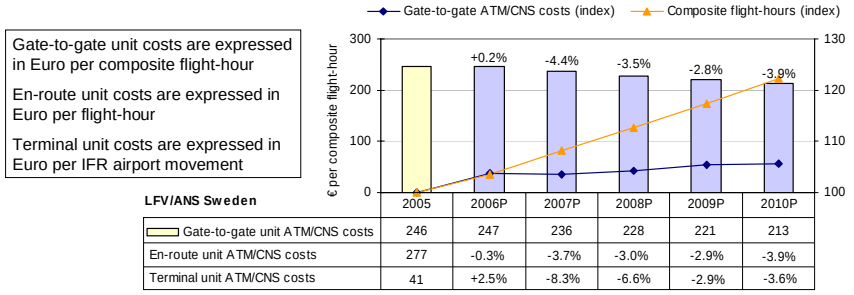
ANNEX 3 – FORWARD-LOOKING COST-EFFECTIVENESS (ANSP LEVEL)

The Nordic European Area: (all financial data expressed in €2005)

LFV/ANS Sweden: Gate-to-gate unit ATM/CNS provision costs in Sweden are projected to fall in 2007, as traffic is expected to rise faster than costs. Over the 2005-2010 period unit costs are expected to decrease by -14% (i.e., around -2.9% per annum). Note that for the year 2006-2010 only en-route depreciation costs are reported in the figure below.

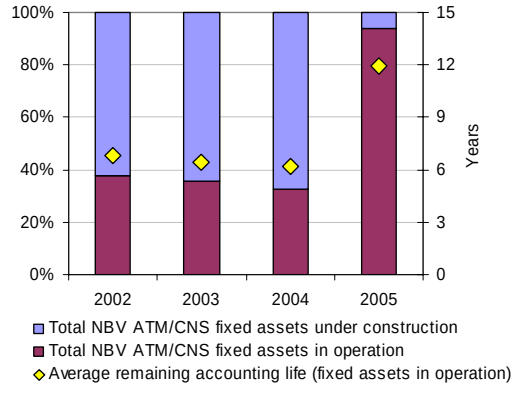
The average remaining accounting life of the fixed assets is significantly higher in 2005 (around 12 years) which reflects the recent renewal of the Swedish ATC systems (comprising EUROCAT 2000E, buildings and a new communication system). It should be noted that the terminal ANS assets are owned by the airport divisions of LFV. Main future capex relate to:

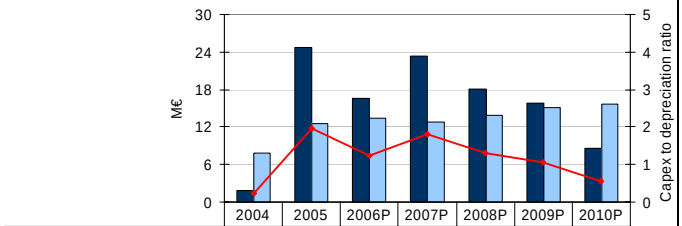
- the upgrading of the ATC-system in co-operation with NAVIAIR, IAA and Thales in the COOPANS programme which will be ongoing for many years;
- a RAMP programme consisting of for instance CNS Ground stations and Green approaches (€7M until 2012);
- upgrading some buildings (mainly ATCC Malmö) (€4.3M until 2008);
- replacement of radar stations (€4.4M until 2012);
- VHF/UHF/8,33 programme (€3.8M until 2012).



LFV/ANS Sweden

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	246	247	236	228	221	213
En-route unit ATM/CNS costs	277	-0.3%	-3.7%	-3.0%	-2.9%	-3.9%
Terminal unit ATM/CNS costs	41	+2.5%	-8.3%	-6.6%	-2.9%	-3.6%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	1.7	24.7	16.6	23.4	18.1	15.9	8.6
Depreciation (M€)	7.9	12.5	13.4	12.9	13.9	15.1	15.6
Capex to depreciation ratio	0.2	2.0	1.2	1.8	1.3	1.1	0.5

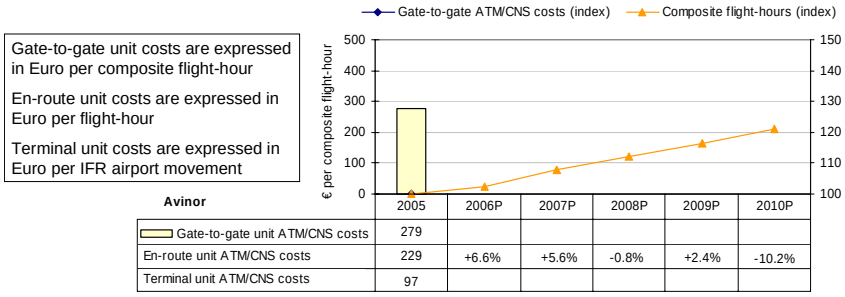
Avinor (Norway): Gate-to-gate unit ATM/CNS provision costs could not be computed due to non-reporting forward-looking costs on terminal ANS. Avinor's overall objective is to improve efficiency and productivity (-30% of staff from 2003 to 2006). In this context, Trondheim ACC closed in September 2004 and operations have been transferred to Bodo. The transfer of Oslo ACC to Stavanger ACC will not take place before 2011 (contrary to last year plan which indicated a target date for end of 2008). On the other hand, the restructuring process has created internal problems (with increases in ATFM delays) which resulted in an expensive wage-settlement which will impact staff costs in 2006 and 2007. Hence, en-route unit ATM/CNS costs are expected to increase in 2006 and 2007.

It should be noted that except for Oslo ACC, land and building assets are owned by the airport division of Avinor. Similarly, the building and equipment assets relating to Oslo TWR are owned by a subsidiary of Avinor.

Avinor forecasts a capex of some €100M for the years 2006-2010. The main investments are related to:

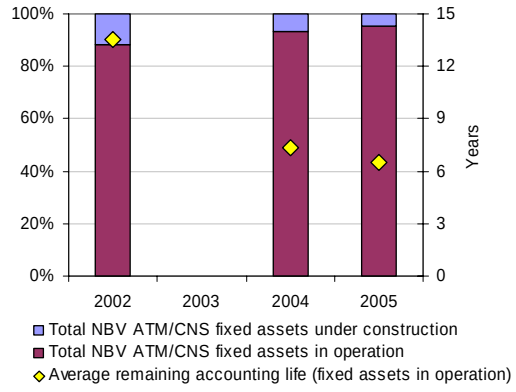
- the radar programme (MSSR);
- the Norwegian Air Traffic Control System (Natcon);
- the transfer of Oslo ACC to Stavanger ACC;
- the automation equipment/ systems in TWR units;
- the Oslo Advanced sectorisation and automation project (ASAP) with an arrival manager (AMAN).

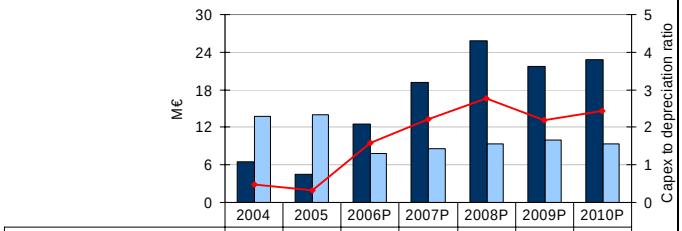
Note that for the years 2006-2010 only en-route depreciation costs are reported in the figure below.



Avinor

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	279					
En-route unit ATM/CNS costs	229	+6.6%	+5.6%	-0.8%	+2.4%	-10.2%
Terminal unit ATM/CNS costs	97					





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	6.5	4.5	12.4	19.2	25.8	21.7	22.7
Depreciation (M€)	13.7	14.0	7.9	8.6	9.4	9.9	9.3
Capex to depreciation ratio	0.5	0.3	1.6	2.2	2.8	2.2	2.4

Finavia: Gate-to-gate unit ATM/CNS provision costs are planned to moderately fall between 2005 and 2010 (a decrease of -5%, i.e., -0.9% per annum). This performance improvement results from both expected traffic growth and of tighter cost management. Finavia's new strategy and explicit aim is to have competitive en-route and terminal ANS charges.

A significant capex (mainly upgrade of ATM systems) is planned in 2007. The main capex from 2005 to 2010 were/are the following:

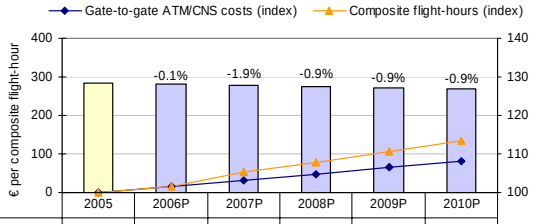
- From 2004 to 2006 three ILS/DME per year were renewed;
- From 2007 to 2008 two ILS/DME per year will probably be renewed;
- In 2004 and 2005 four MSSR were renewed;
- From 2006 to 2008 four medium-sized ATC units will be renewed. This includes tower-building and ATM equipment and VCS;
- Improvement of SMGCS (service movement guidance control system) at Helsinki-Vantaa airport in 2005-2007;
- AIS briefing data-system;
- EUROCAT system updates.

New ATC tower at Helsinki-Vantaa has been postponed to 2010-2011.

Gate-to-gate unit costs are expressed in Euro per composite flight-hour

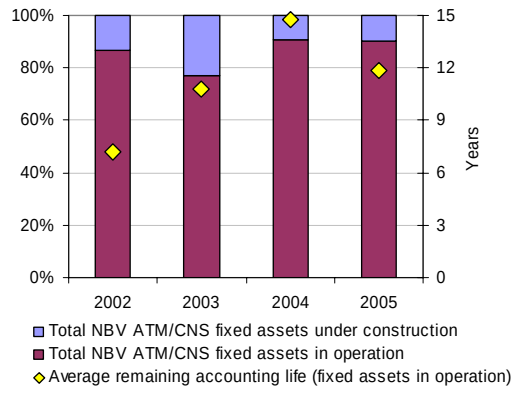
En-route unit costs are expressed in Euro per flight-hour

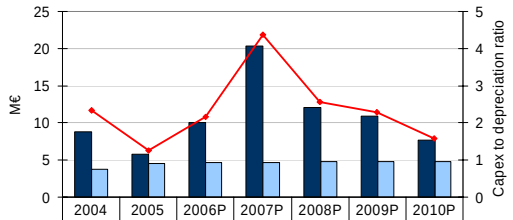
Terminal unit costs are expressed in Euro per IFR airport movement



Finavia

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	283	283	277	275	272	270
En-route unit ATM/CNS costs	204	-0.2%	-2.0%	-1.1%	-1.1%	-1.1%
Terminal unit ATM/CNS costs	108	+0.1%	-1.8%	-0.8%	-0.8%	-0.8%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	8.9	5.7	10.0	20.3	12.1	10.9	7.7
Depreciation (M€)	3.8	4.6	4.6	4.7	4.7	4.8	4.8
Capex to depreciation ratio	2.3	1.3	2.2	4.4	2.6	2.3	1.6

NAVIAIR (Denmark): Gate-to-gate unit ATM/CNS provision costs are expected to decrease by -9% in real terms during the 2005-2010 period (i.e., around -1.9% per annum). This planned performance improvement results from planned falls in real ATM/CNS provision costs in (2006 and 2007) combined with moderate traffic increase. Depreciation costs are expected to significantly decrease as of 2006 following a new accounting policy in line with EUROCONTROL principles.

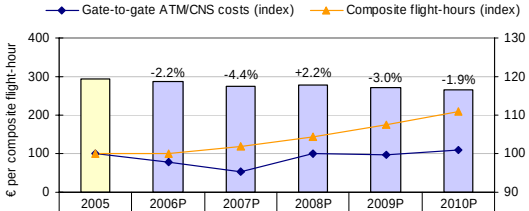
The average remaining accounting life of NAVIAIR's fixed assets significantly increased in 2005 (from below three years in 2004 to some seven years in 2005). This partly reflects the fact that some assets relating to replacement of CASIMO (Copenhagen ATS & SImulators MOdernisation) are now in operation and partly the accounting reclassification of assets under construction for which depreciation had commenced.

NAVIAIR's decrease in unit costs occurs in a context of significant capex expected in 2006, and consequently higher capital-related costs thereafter. The full implementation of the new Danish ATM system is expected on 28 December 2007.

Gate-to-gate unit costs are expressed in Euro per composite flight-hour

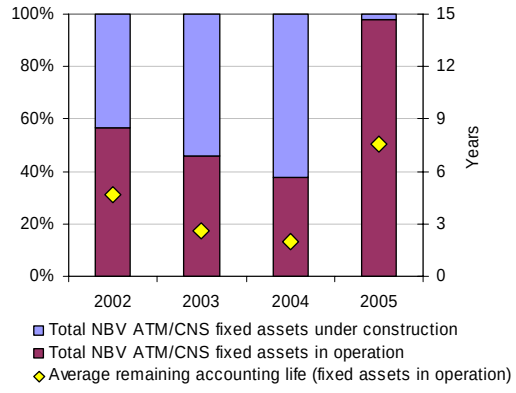
En-route unit costs are expressed in Euro per flight-hour

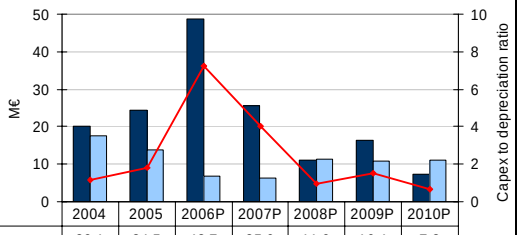
Terminal unit costs are expressed in Euro per IFR airport movement



NAVIAIR

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	292	286	274	279	271	266
En-route unit ATM/CNS costs	291	-0.2%	-0.2%	+1.4%	-3.1%	-1.3%
Terminal unit ATM/CNS costs	77	-6.4%	-14.2%	+4.2%	-2.8%	-3.5%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	20.1	24.5	48.7	25.6	11.0	16.4	7.2
Depreciation (M€)	17.7	13.7	6.7	6.4	11.4	10.9	11.2
Capex to depreciation ratio	1.1	1.8	7.3	4.0	1.0	1.5	0.6

The Baltic Area, including Poland: (all financial data expressed in €2005)

Estonia ANS: Gate-to-gate unit ATM/CNS provision costs are expected to increase by +14% between 2005 and 2010 (i.e., around +2.7% per annum). The ATM/CNS provision costs are increasing at a larger rate than traffic. Relative high increases of employment costs in Estonia are expected during the 2006-2010 period.

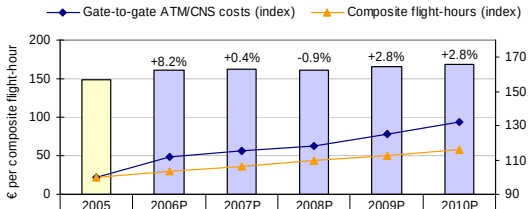
Capex in 2005 was insignificant. The capex in 2006 and 2007 relates mainly to:

- the upgrade of the ATM system (such as the FDP and invoicing system - LATAS);
- the expansion of the ATCC centre premises in order to ensure enhanced safety;
- EANS is also preparing for migration to the European AIS Database (EAD).

Gate-to-gate unit costs are expressed in Euro per composite flight-hour

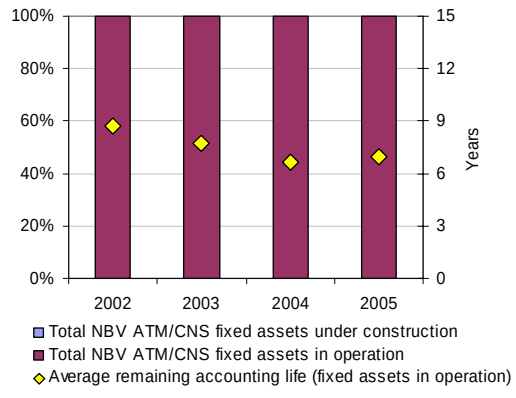
En-route unit costs are expressed in Euro per flight-hour

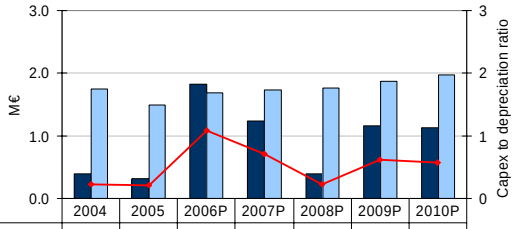
Terminal unit costs are expressed in Euro per IFR airport movement



EANS

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	149	161	162	160	165	170
En-route unit ATM/CNS costs	100	+13.4%	-4.0%	-0.9%	+2.8%	+2.8%
Terminal unit ATM/CNS costs	95	+1.2%	+6.4%	-0.9%	+2.8%	+2.8%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	0.4	0.3	1.8	1.2	0.4	1.2	1.1
Depreciation (M€)	1.7	1.5	1.7	1.7	1.8	1.9	2.0
Capex to depreciation ratio	0.2	0.2	1.1	0.7	0.2	0.6	0.6

PPL/PATA: Gate-to-gate unit ATM/CNS provision costs are planned to significantly increase in 2006. This results from both the separation from PPL and the implementation of a Terminal Navigation Charge. Traffic growth is expected to be significant during the 2005-2010 period (+60%). Over the 2005-2010 period unit costs are expected to increase by +9% (i.e., around +1.7% per annum).

On 8th December 2006 the President of Poland has signed the Bill of Law establishing the Polish Air Navigation Services Agency as an entity separated from the organizational structure of the "Polish Airports" State Enterprise. By virtue of this law, on 1 April 2007, the Polish Air Navigation Services Agency (PANSA) shall be established as an independent entity separated from the "Polish Airports" State Enterprise.

The most significant capex in 2005 (some €16M) include:

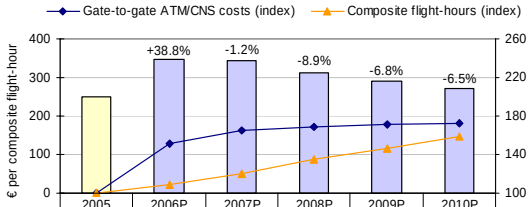
- Construction of APP/en-route radar stations at Katowice airport (€5.4M);
- Construction of ATC tower at Szczecin-Goleniow airport (€3.5 M);
- Integrated Safety System at Warsaw airport (€1M);
- FIS information system (€1.4M);
- Transmitters at PATA communication centres (€1.3M);
- ACC/OAT transmitter (€1.3M);
- RDP, FDP at ATM Poznan (€1.1M);
- Equipment for ATC Szczecin-Goleniow airport (€1.2M).

The new ATM system is planned to be operational in 2009.

Gate-to-gate unit costs are expressed in Euro per composite flight-hour

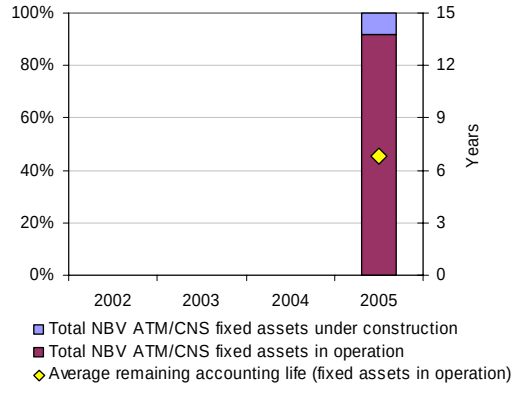
En-route unit costs are expressed in Euro per flight-hour

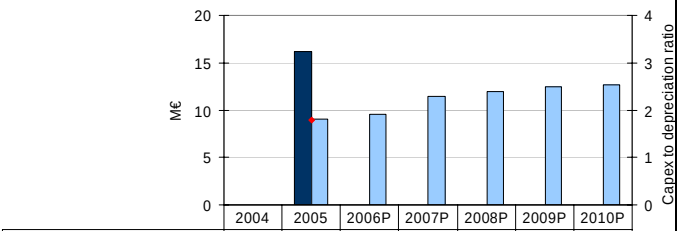
Terminal unit costs are expressed in Euro per IFR airport movement



PPL/PATA

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	251	348	344	313	292	273
En-route unit ATM/CNS costs	278	+15.0%	-0.9%	-8.4%	-6.9%	-6.7%
Terminal unit ATM/CNS costs	32	+294.7%	-2.6%	-11.3%	-6.7%	-5.8%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)		16.2					
Depreciation (M€)		9.0	9.6	11.5	11.9	12.4	12.6
Capex to depreciation ratio		1.8					

LGS (Latvia): Gate-to-gate unit ATM/CNS provision costs are expected to rise until 2007, driven by large increase in terminal-related depreciation costs following previous investments. Over the 2005-2010 period unit costs are expected to increase by +12% (i.e., around +2.3% per annum).

The 2005 capex (€8M) was related to the following investments:

- automated weather observation system;
- AFTN/NOTAM/OPMET system;
- modernisation of navigation aids; and,
- improvements to ATRACC (the current ATC system).

Over the years 2006-2010 LGS capex is connected with:

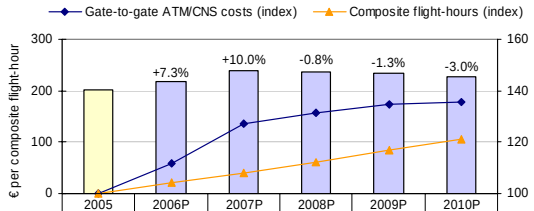
- replacement of three existing radars;
- modernization of communication systems, including VHF communication facilities;
- modernization of RCMS and replacement of telephone exchange;
- replacement of lighthouses VOR/DME, including reconstruction of VOR/DME power supply systems and installation of a new ILS (two directions) at Airport Riga;
- National plan to integrate civil-military.

CASCADE (CNS/ATM Applications Staged Implementation and Conventional Airspace Development) is the major driver for the 2006 capex.

Gate-to-gate unit costs are expressed in Euro per composite flight-hour

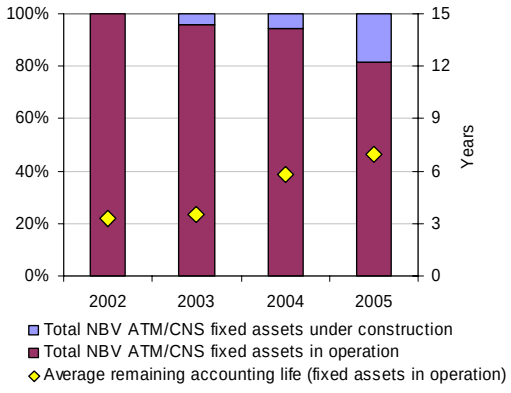
En-route unit costs are expressed in Euro per flight-hour

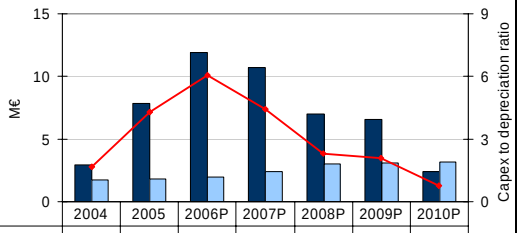
Terminal unit costs are expressed in Euro per IFR airport movement



LGS

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	202	217	239	237	234	227
En-route unit ATM/CNS costs	184	+9.0%	+2.6%	-0.5%	+0.1%	-1.9%
Terminal unit ATM/CNS costs	80	+1.5%	+38.6%	-0.7%	-5.0%	-5.9%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	2.9	7.9	11.9	10.7	7.0	6.5	2.4
Depreciation (M€)	1.8	1.8	2.0	2.4	3.0	3.1	3.2
Capex to depreciation ratio	1.7	4.3	6.0	4.4	2.3	2.1	0.8

Oro Navigacija (Lithuania): Gate-to-gate unit ATM/CNS provision costs are expected to remain constant over the 2005-2010 period, with an increase in 2006 which is planned to be cancelled by a gradual decrease until 2010.

The average remaining accounting life of Oro Navigacija's fixed assets increased in 2005 (almost nine years in 2005). This reflects the entering into operation of new assets relating to the modernisation of the ATM equipment.

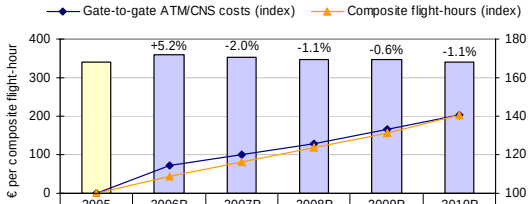
The capex profile for 2006-2010 indicates a continuous addition of fixed assets to Oro Navigacija's asset base. The main elements of capex between 2006 and 2010 are related to:

- the modernisation of the ATM/CNS equipment (modernisation of Vilnius ACC);
- new ILS at Palanga and Vilnius airports;
- new communication circuit control system at Vilnius airport and ATC centres;
- replacement of AFTN and NOTAM equipments.

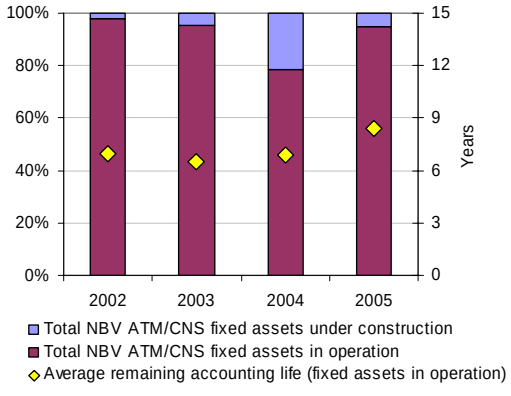
Gate-to-gate unit costs are expressed in Euro per composite flight-hour

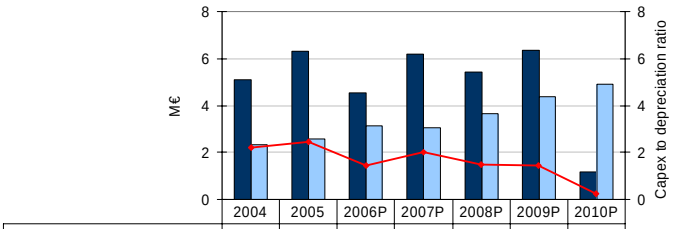
En-route unit costs are expressed in Euro per flight-hour

Terminal unit costs are expressed in Euro per IFR airport movement



Oro Navigacija	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	341	359	352	348	346	342
En-route unit ATM/CNS costs	374	+10.4%	-2.0%	-1.0%	-0.2%	-1.1%
Terminal unit ATM/CNS costs	60	-14.1%	+0.1%	-1.7%	-1.9%	-1.6%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	5.1	6.3	4.6	6.2	5.4	6.4	1.2
Depreciation (M€)	2.3	2.6	3.1	3.1	3.7	4.4	4.9
Capex to depreciation ratio	2.2	2.5	1.5	2.0	1.5	1.5	0.2

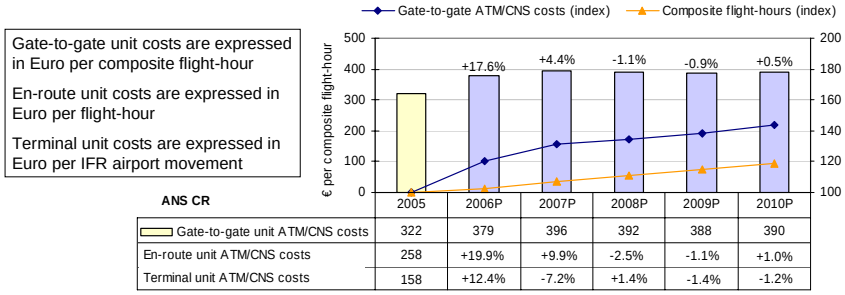
The Central Eastern European Area: (all financial data expressed in €2005)

ANS Czech Republic: Gate-to-gate unit ATM/CNS provision costs are expected to increase by +21% between 2005 and 2010 (i.e., around +3.9% per annum). The gate-to-gate ATM/CNS provision costs are expected to rise significantly faster than the traffic (expressed in composite flight-hours). Part of this increase is caused by the current ANS CR remuneration and staffing policy to face the current and expected traffic levels, and the rest arises from the construction of the new IATCC Prague started in 2004 (hence higher capital-related costs). The total capex for the project amounted to around €117M and the new centre started operations on 17 February 2007.

The total capex for 2005 (i.e. €35M) comprise the following main investments:

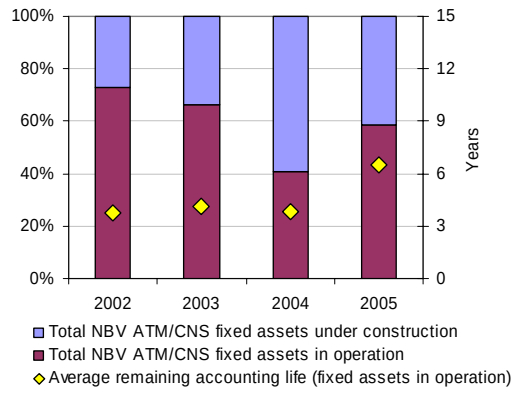
- IATCC building (€28M);
- Power equipment in IATCC building (€2.4M);
- Secondary radar (€1.7M), and;
- Primary radar (€0.6M).

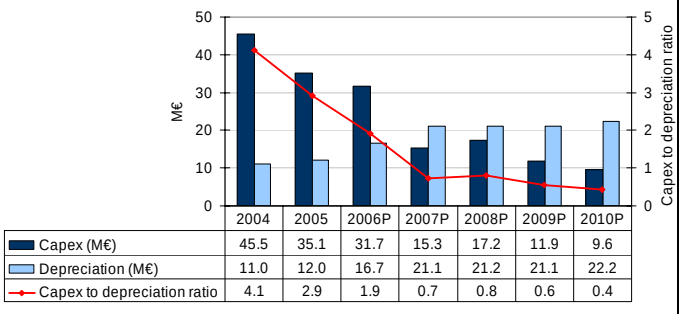
After 2006, capex is planned to significantly decrease, while depreciation will continue to increase.



ANS CR

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	322	379	396	392	388	390
En-route unit ATM/CNS costs	258	+19.9%	+9.9%	-2.5%	-1.1%	+1.0%
Terminal unit ATM/CNS costs	158	+12.4%	-7.2%	+1.4%	-1.4%	-1.2%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	45.5	35.1	31.7	15.3	17.2	11.9	9.6
Depreciation (M€)	11.0	12.0	16.7	21.1	21.2	21.1	22.2
Capex to depreciation ratio	4.1	2.9	1.9	0.7	0.8	0.6	0.4

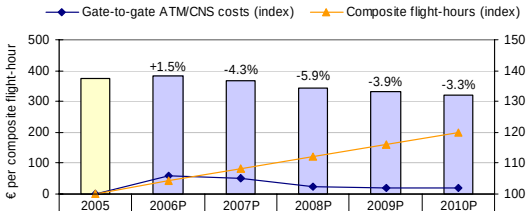
Austro Control: Gate-to-gate unit ATM/CNS provision costs are expected to decrease by -15% between 2005 and 2010 (i.e., around -3.2% per annum), although in 2006 unit costs are expected to increase due to an increase in operating costs (both staff costs and non-staff costs). The performance improvement over the 2005-2010 period results from both tighter cost management (since real ATM/CNS provision costs are expected to remain constant) and from a moderate increase in traffic.

The total capex of 2005 (€38M) comprises an intangible asset of €12M for the right to use the new Tower in Vienna. This explains the high figure in the right-hand side graph below.

Gate-to-gate unit costs are expressed in Euro per composite flight-hour

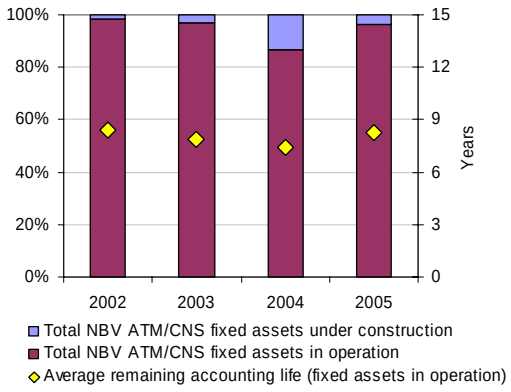
En-route unit costs are expressed in Euro per flight-hour

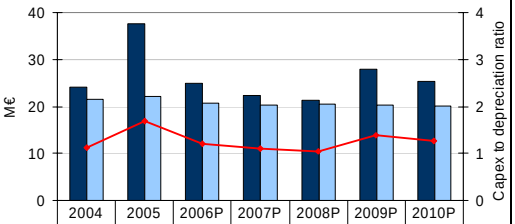
Terminal unit costs are expressed in Euro per IFR airport movement



Austro Control

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	376	382	366	344	330	320
En-route unit ATM/CNS costs	399	+2.1%	-4.1%	-6.0%	-4.2%	-3.4%
Terminal unit ATM/CNS costs	81	-1.6%	-5.2%	-5.9%	-3.1%	-3.1%



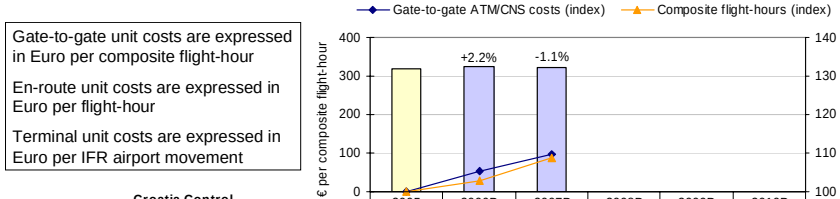


	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	24.2	37.6	24.9	22.4	21.3	27.9	25.4
Depreciation (M€)	21.5	22.2	20.8	20.4	20.5	20.2	20.2
Capex to depreciation ratio	1.1	1.7	1.2	1.1	1.0	1.4	1.3

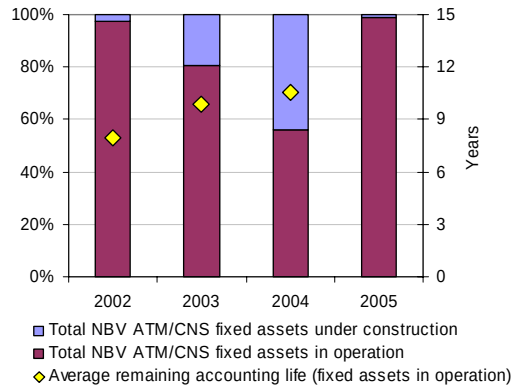
Croatia Control did not provide sufficient information to derive a five-year projection of the unit gate-to-gate ATM/CNS provision costs since Croatia Control disclosed planned output and costs until 2007 only. It should be noted that following the implementation of a Terminal Navigation Charge (TNC), Croatia Control provided planned terminal ANS costs for 2006 and 2007.

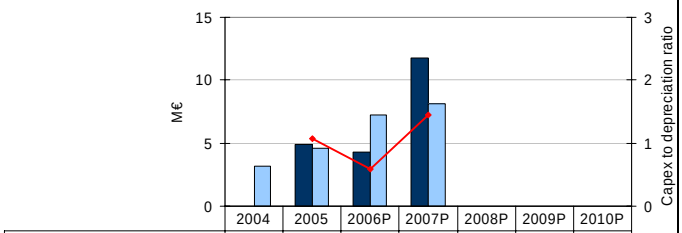
The average remaining accounting life of Croatia Control's fixed assets significantly increased in 2005 (close to 16 years). This reflects the transfer of assets under construction into assets in operation following the start of the operations of the new Zagreb ACC on December 2005 which also includes the new ATM system and equipments.

Significant capex is planned for 2007 despite already high average remaining accounting life of fixed assets. No details are available on the drivers for this capex. Croatia Control did not report capex information for the years 2008-2010.



Croatia Control	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	318	325	321			
En-route unit ATM/CNS costs	363	-1.2%	-4.5%			
Terminal unit ATM/CNS costs	0	25	+85.0%			





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)		4.9	4.3	11.8			
Depreciation (M€)	3.2	4.6	7.2	8.2			
Capex to depreciation ratio		1.1	0.6	1.4			

HungaroControl: Gate-to-gate unit ATM/CNS provision costs are expected to significantly increase in 2006, but over the 2005-2010 period unit costs are expected to increase by +1%. Higher depreciation costs as of 2006 are an important driver for the increase in ATM/CNS provision costs.

The average remaining accounting life of HungaroControl's fixed assets significantly increased in 2005 (from some four years in 2004 to some seven years in 2005). This reflects a shift from fixed assets under construction to assets in operation following the successful implementation in 2005 of the TMA project and the upgrade of MATIAS (Magyar Automated and Integrated Air Traffic Control System).

The 2005 capex resulted mainly from the following projects:

- MATIAS ATM system software (€22M); and
- TWR communication system (€1.5M);

During 2006-2010 the cumulative capex amounts to some €80M. The main projects comprise:

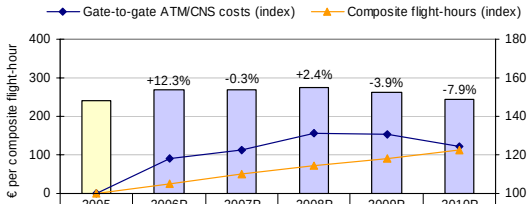
- changes of radar stations to Mode S (€10M);
- Mode S upgrade of the MATIAS ATC system (€14M);
- Contingency centre and simulator building (€11M);
- Air-ground data link (€16M).

Finally, in December 2006 HungaroControl has been converted from a budget-funded institution into a limited share company and transferred to the State Privatization and Holding Company (APV). As a result, the Ministry of Economics and Transportation will exercise ownership rights over HungaroControl.

Gate-to-gate unit costs are expressed in Euro per composite flight-hour

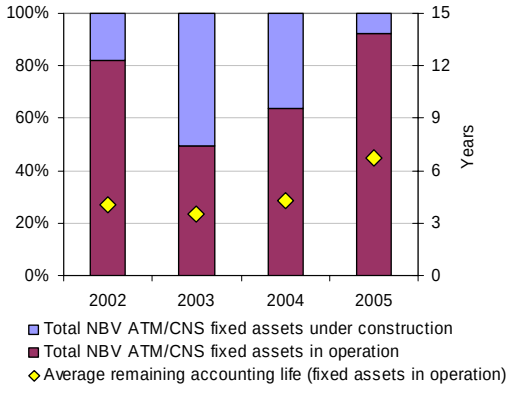
En-route unit costs are expressed in Euro per flight-hour

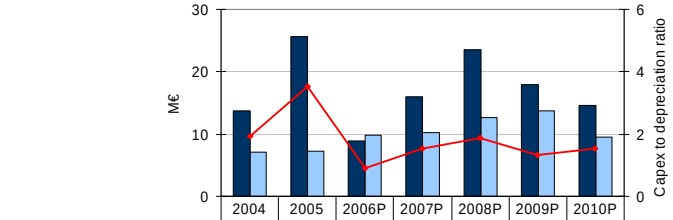
Terminal unit costs are expressed in Euro per IFR airport movement



HungaroControl

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	239	269	268	274	263	243
En-route unit ATM/CNS costs	206	+12.4%	+1.3%	+2.2%	-3.9%	-9.8%
Terminal unit ATM/CNS costs	114	+12.9%	-4.0%	+3.2%	-3.7%	-1.9%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	13.7	25.6	8.9	16.0	23.5	18.0	14.6
Depreciation (M€)	7.1	7.3	9.7	10.3	12.6	13.7	9.5
Capex to depreciation ratio	1.9	3.5	0.9	1.6	1.9	1.3	1.5

Slovenia Control: Gate-to-gate unit ATM/CNS provision costs are expected to increase by +12% between 2005 and 2010 (i.e., around +2.4% per annum) due to ATM/CNS provision costs planned to rise faster than traffic volumes. A TNC has been implemented in October 2006.

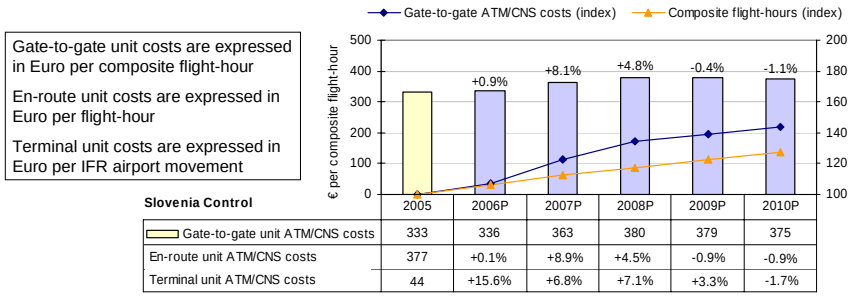
In December 2005, assets that were owned by the Slovenian State were transferred to Slovenia Control and from 1 January 2007 onwards all fixed assets used will be in Slovenia Control books. Therefore, the figures for the average remaining accounting life of assets should be interpreted with caution.

The 2005 capex mainly related to the following investments:

- Projects on new ACC (with new FDP/RDP systems and safety net) which began in 2005 (total investment of some €30M);
- Replacement of COM stations which has been completed;
- Replacement of monitors in Ljubljana ACC which have been replaced; and,
- Upgrade of off-line system which was completed.

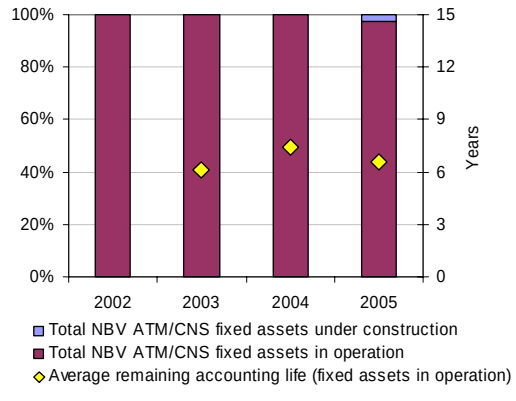
An investment cycle is planned to start in 2006. The main drivers for the 2006-2010 capex relate to:

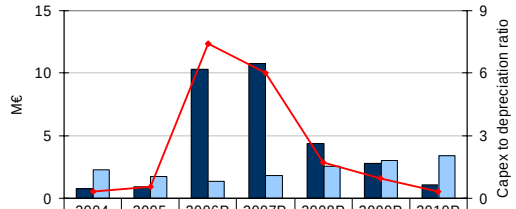
- Implementation of ARTAS tracker (operational in August 2006);
- Implementation of safety net STCA (operational in August 2006);
- New Radar Data Recording simulator (operational in November 2006);
- New FDP system (operational in March 2007);
- New ACC in Ljubljana planned to start operations in March 2008 with 8 physical sectors;
- Multilateration of whole Ljubljana FIR (operational in August 2008); and
- Upgrade of Brnik radar to Mode S (operational in November 2009).



Slovenia Control

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	333	336	363	380	379	375
En-route unit ATM/CNS costs	377	+0.1%	+8.9%	+4.5%	-0.9%	-0.9%
Terminal unit ATM/CNS costs	44	+15.6%	+6.8%	+7.1%	+3.3%	-1.7%





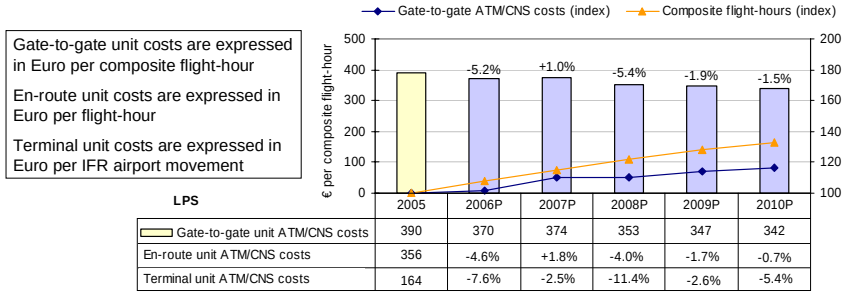
	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	0.7	0.9	10.3	10.8	4.4	2.8	1.1
Depreciation (M€)	2.2	1.7	1.4	1.8	2.6	3.0	3.4
Capex to depreciation ratio	0.3	0.5	7.4	6.0	1.7	0.9	0.3

LPS (Slovakia): Gate-to-gate unit ATM/CNS provision costs are expected to decrease by -12% between 2005 and 2010 (i.e., around -2.6% per annum). Traffic volumes are planned to rise faster than ATM/CNS provision costs, despite the significant capex planned after 2007.

The average remaining accounting life of LPS's fixed assets significantly increased in 2005 (from some four years in 2004 to six years in 2005). This reflects a shift from fixed assets under construction to assets in operation following the implementation in May 2005 of a new EUROCAT ATM system.

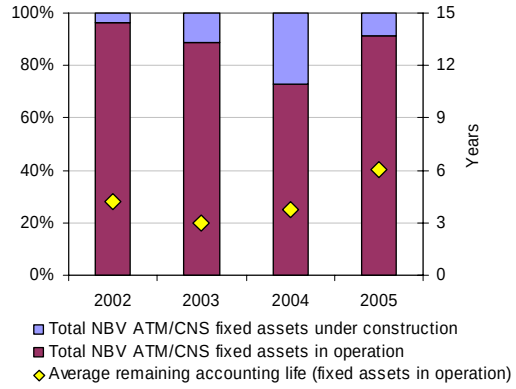
A new investment cycle is planned after 2007. The capex increases mainly relate to:

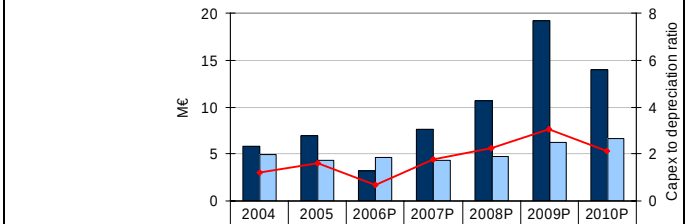
- the construction of the new ACC building in Bratislava;
- Investments in communications systems;
- RDP and FDP systems;
- Navigation systems, and;
- Modernised system of backup power supply.



LPS

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	390	370	374	353	347	342
En-route unit ATM/CNS costs	356	-4.6%	+1.8%	-4.0%	-1.7%	-0.7%
Terminal unit ATM/CNS costs	164	-7.6%	-2.5%	-11.4%	-2.6%	-5.4%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	5.9	6.9	3.2	7.6	10.7	19.2	14.0
Depreciation (M€)	4.9	4.3	4.7	4.3	4.7	6.3	6.6
Capex to depreciation ratio	1.2	1.6	0.7	1.8	2.3	3.1	2.1

The South Eastern European Area: (all data expressed in €2005)

ATSA Bulgaria: Gate-to-gate unit ATM/CNS provision costs are expected to decrease by -39% between 2005 and 2010 (i.e. around -9.3% per annum). While traffic volumes are planned to increase by some +27%, ATM/CNS provision costs are planned to significantly decrease as of 2007. ATSA Bulgaria's overall objective is to improve efficiency and in particular it has set explicit targets in terms of costs per composite flight-hours controlled for the period 2007-2011.

The average remaining accounting life of ATSA Bulgaria's fixed assets remain high (some 12 years), an indication of a recent investment cycle.

The main drivers for the 2005 capex (some €5.8M) are the projects under the ATSA programme, mainly:

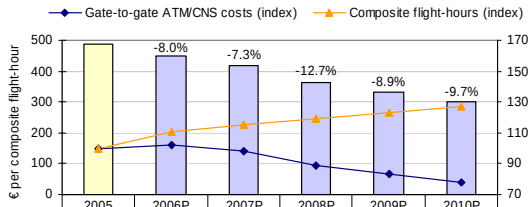
- ANS equipment at the new Sofia runway;
- communication network;
- RMCDE; and
- new equipment for the training centre.

In 2007, there are plans to transfer area control sectors from Varna ACC to Sofia ACC, so that the Varna operational unit will either provide exclusively approach control services or area control services in a lower airspace sector.

Gate-to-gate unit costs are expressed in Euro per composite flight-hour

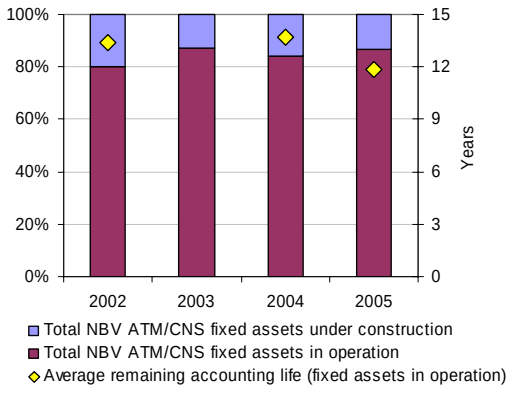
En-route unit costs are expressed in Euro per flight-hour

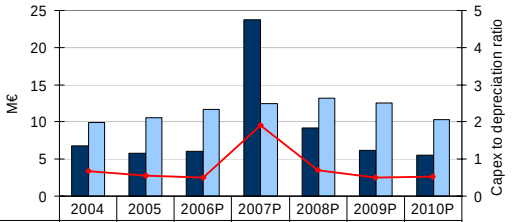
Terminal unit costs are expressed in Euro per IFR airport movement



ATSA Bulgaria

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	490	450	418	365	333	300
En-route unit ATM/CNS costs	483	-7.5%	-7.0%	-12.2%	-7.6%	-8.4%
Terminal unit ATM/CNS costs	140	-10.9%	-9.8%	-15.6%	-15.7%	-16.9%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	6.8	5.8	6.0	23.7	9.2	6.1	5.6
Depreciation (M€)	9.9	10.5	11.7	12.4	13.2	12.5	10.3
Capex to depreciation ratio	0.7	0.5	0.5	1.9	0.7	0.5	0.5

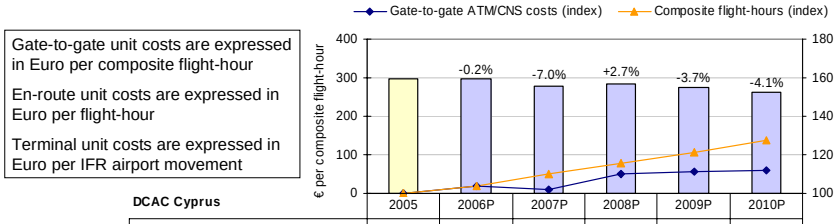
DCAC Cyprus: Gate-to-gate unit ATM/CNS provision costs are expected to decrease by -12% between 2005 and 2010 (around -2.5% per annum). Traffic volumes are expected to increase faster (+27%) than ATM/CNS provision costs (+12%).

DCAC is a governmental department and as such the assets under construction are not capitalised, whereas they are capitalised once they are in operation. Therefore the figures for the average remaining accounting life of assets should be interpreted with caution. In fact in 2005 depreciation costs significantly increased reflecting new assets put in operation. This shift is not visible in the figures for the average remaining accounting life of assets.

DCAC Cyprus is upgrading the ATM systems/equipment (for Nicosia ACC and Larnaca and Paphos TWR operational units) which is expected to be delivered within the first half of 2006. The construction of a new ATCC building, initially planned early 2006, will take place in the second half of 2006. It is planned to be operational in 2008.

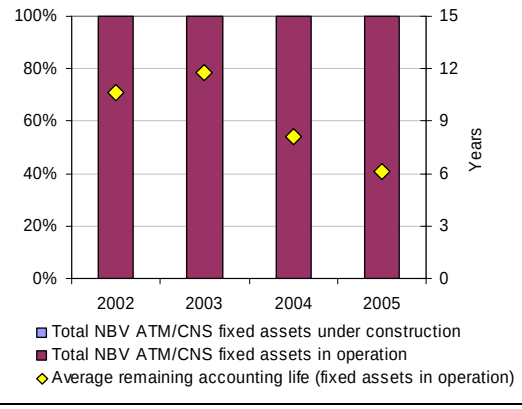
The main drivers for the 2005-2007 capex mainly relates to the following projects:

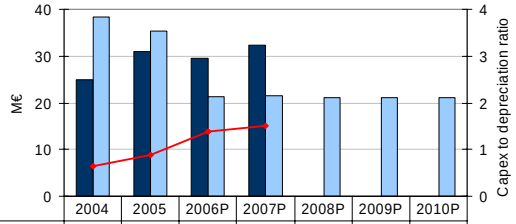
- New ACC building in Nicosia (total investment of around €11M);
- New ATM system and equipment;
- New equipment for Larnaca and Paphos TWR operational units, and;
- New training facility.



DCAC Cyprus

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	298	298	277	284	274	263
En-route unit ATM/CNS costs	275	+0.5%	-7.2%	+2.5%	-4.0%	-4.2%
Terminal unit ATM/CNS costs	114	-2.7%	-5.6%	+3.0%	-1.9%	-4.1%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	24.8	31.0	29.6	32.3			
Depreciation (M€)	38.5	35.4	21.3	21.6	21.2	21.1	21.2
Capex to depreciation ratio	0.6	0.9	1.4	1.5			

DHMI (Turkey): Gate-to-gate unit ATM/CNS provision costs could not be computed due to non-reporting of forward-looking costs related to terminal ANS. However, DHMI disclosed planned output and costs for the en-route activity until 2010. DHMI's en-route unit ATM/CNS costs are planned to significantly decrease until 2010. Note that for the years 2006-2010 only en-route depreciation costs are reported in the figures below.

The figures for the average remaining accounting life of assets should be interpreted with caution. Depreciation periods have been revised in 2004 by law and as a result; DHMI has begun to apply expected operating lives for the calculation of 2005 actual figures. Moreover, DHMI reported a significant decrease in the value of fixed assets following the mutation/sales of some land in 2005. With the current investment cycle, higher values for the average remaining accounting life of assets are foreseen in future disclosure.

DHMI is responsible for the improvements of Turkey's ATM infrastructure plans:

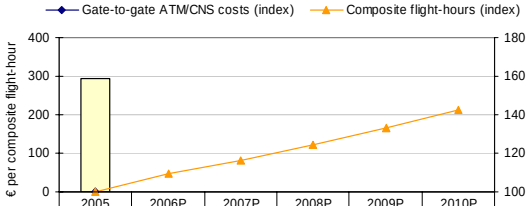
- SMART Project which includes the new centralised Ankara ACC building and other new buildings for the APPs and TWRs. It will modernise the ATM systems and it is planned to be finalised by the end of 2010.
- an early implementation of interim upgrade for the existing ACCs and APPs units is also going on in connection with SMART Project and it is planned to be finalised by the end of 2007. Together with these, upgrading of simulator systems will be housed in the Esenboğa Training Centre and it is also planned to be finalised by the end of 2007.

In parallel, DHMI's intention is to increase the number of ATCOs by at least 50 FTEs each year until 2010 (some 600 in 2005).

Gate-to-gate unit costs are expressed in Euro per composite flight-hour

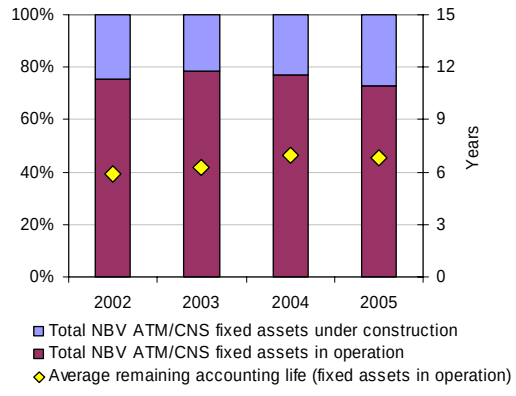
En-route unit costs are expressed in Euro per flight-hour

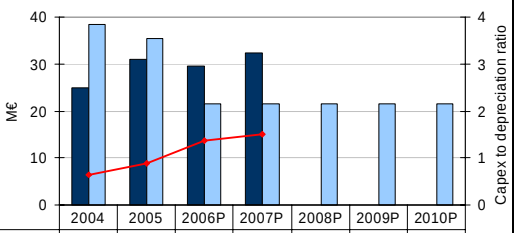
Terminal unit costs are expressed in Euro per IFR airport movement



DHMI

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	294					
En-route unit ATM/CNS costs	265	-1.8%	-8.2%	-7.7%	-7.1%	-6.8%
Terminal unit ATM/CNS costs	108					





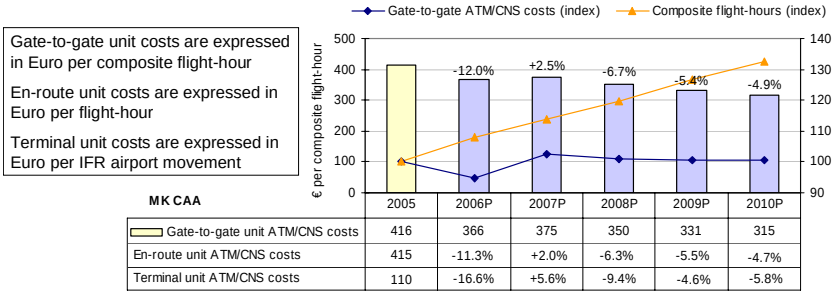
	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	24.8	31.0	29.6	32.3			
Depreciation (M€)	38.5	35.4	21.6	21.6	21.6	21.6	21.6
Capex to depreciation ratio	0.6	0.9	1.4	1.5			

MK CAA (F.Y.R. Macedonia): Gate-to-gate unit ATM/CNS provision costs are expected to decrease by -24% between 2005 and 2010 (i.e., around -5.4% per annum). ATM/CNS provision costs are planned to be relatively constant (with a decrease in 2006), while traffic volumes are planned to rise by some +30%.

At the end of 2006 the separation between the service provider and the regulator was not yet effective. The Aviation Act was amended in the beginning of 2007 to provide for the establishment of an independent CAA (Civil Aviation Agency), acting as a sector regulator and to be funded by navigation, licence and inspection charges. This will entail the transformation of the CAA (Civil Aviation Administration) and a transfer of operational functions for ATM to a separate entity. The next phase should be the preparation of a Division report by the Government commission for the separation of assets, personnel, rights and obligations between those two entities. This process should be finished by 1 July 2007.

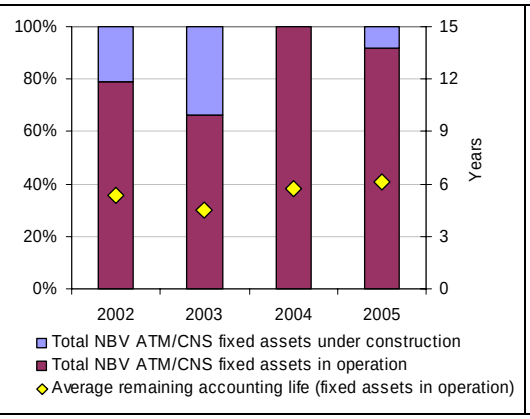
The 2005 capex relates to the upgrade of the simulator and the acquisition of additional hardware and software. The main drivers for the 2006-2010 capex relate to the following investments:

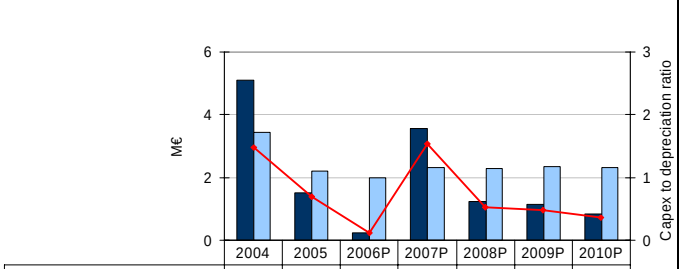
- Procurement, installation and commissioning of new MSSR radar (estimated costs around €3 M);
- New AFTN switch with ATS Message Handling System (AMHS) capabilities (estimated costs around €1 M);
- Back-up power supply for Skopje ACC (estimated costs around €0.15 M);
- Upgrade of the existing ATM system (SDP-ARTAS, FDP, ODS);
- Back-up Voice Communication System;
- ARO system and RCO system; and,
- Replacement of the existing AWOS/ATIS/VOLMET system for Skopje and Ohrid airports.



MK CAA

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	416	366	375	350	331	315
En-route unit ATM/CNS costs	415	-11.3%	+2.0%	-6.3%	-5.5%	-4.7%
Terminal unit ATM/CNS costs	110	-16.6%	+5.6%	-9.4%	-4.6%	-5.8%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	5.1	1.5	0.2	3.5	1.2	1.1	0.9
Depreciation (M€)	3.4	2.2	2.0	2.3	2.3	2.4	2.3
Capex to depreciation ratio	1.5	0.7	0.1	1.5	0.5	0.5	0.4

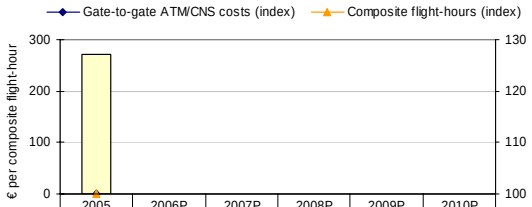
HCAA (Greece): Gate-to-gate unit ATM/CNS provision costs could not be computed due to non-reporting forward-looking costs.

HCAA does not use a cost-accounting system which allows for providing balance sheet data. Therefore the average remaining accounting life of assets can not be computed. Similarly, HCAA did not provide actual 2005 and planned capex for the period 2006-2010.

Gate-to-gate unit costs are expressed in Euro per composite flight-hour

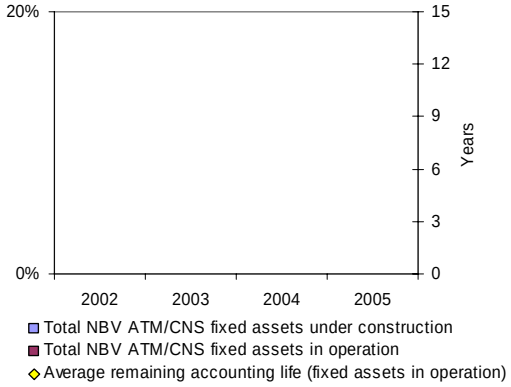
En-route unit costs are expressed in Euro per flight-hour

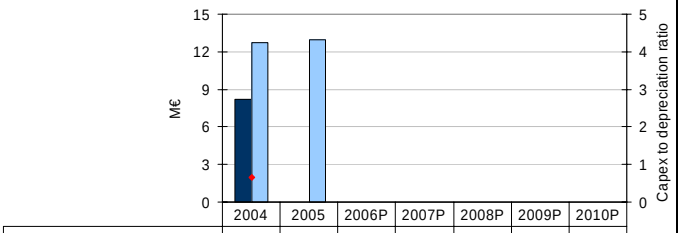
Terminal unit costs are expressed in Euro per IFR airport movement



HCAA

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	273					
En-route unit ATM/CNS costs	337					
Terminal unit ATM/CNS costs						





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	8.2						
Depreciation (M€)	12.7	13.0					
Capex to depreciation ratio	0.6						

MoldATSA (Moldova): Gate-to-gate unit ATM/CNS provision costs are expected to increase by +3% over the 2005-2010 period. This results from a significant increase foreseen in 2006 and 2007 (driven by higher staff costs following a Government decision to increase the minimal level of salary), followed by significant decrease in the subsequent periods.

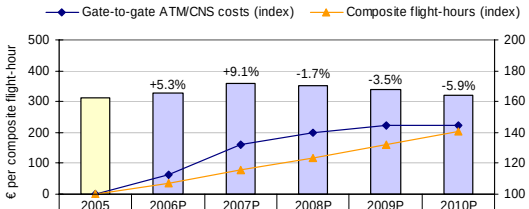
As there was little addition of assets in 2005 and an increase of depreciation, the average remaining accounting life of MoldATSA's fixed assets reduced from some 10 years in 2004 to 7 years in 2005. This follows the introduction into operation of the THALES DVOR/DME equipment at the end of year 2004.

As of 2007, modernisation of VHF equipment, ATCO's training center, and purchasing of Primary Surveillance Radar (PSR) are the major investments planned for MoldATSA.

Gate-to-gate unit costs are expressed in Euro per composite flight-hour

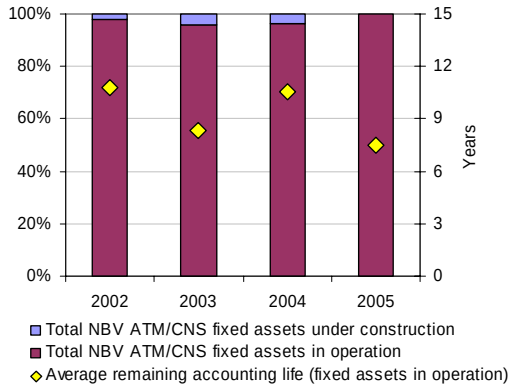
En-route unit costs are expressed in Euro per flight-hour

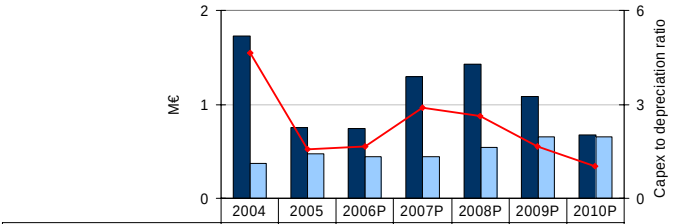
Terminal unit costs are expressed in Euro per IFR airport movement



MoldATSA

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	312	329	358	352	340	320
En-route unit ATM/CNS costs	299	+3.1%	+18.4%	+0.1%	-2.3%	-5.9%
Terminal unit ATM/CNS costs	89	+10.2%	-9.6%	-6.4%	-6.8%	-6.0%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	1.7	0.8	0.7	1.3	1.4	1.1	0.7
Depreciation (M€)	0.4	0.5	0.4	0.4	0.5	0.7	0.6
Capex to depreciation ratio	4.6	1.6	1.7	2.9	2.6	1.7	1.0

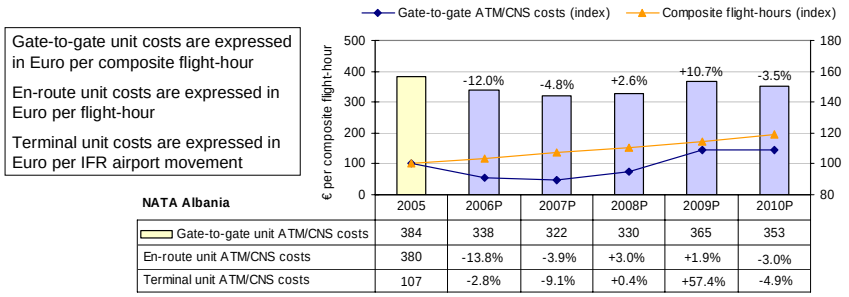
NATA Albania: Gate-to-gate unit ATM/CNS provision costs are expected to decrease by -8% over the 2005-2010 period (i.e., around -1.7% per annum). ATM/CNS provision costs are expected to decrease in 2006, 2007 and 2008, while traffic is expected to continue rising. Lower direct operating costs and lower cost of capital are the main drivers for the planned decrease of ATM/CNS provision costs. At the same time, NATA Albania also plans costs increases driven by the current Albanian National Airspace Modernization Project (NAMP), which includes a €40M contract with Lockheed-Martin for the construction of a new building for the ACC in 2007/2008.

The average remaining accounting life of NATA Albania's fixed assets significantly increased in 2005 (from three years in 2004 to six years in 2005). This reflects a shift from fixed assets under construction to assets in operation following the implementation of an interim ATM system which is part of the NAMP.

The main capex for the years 2006-2010 relate to:

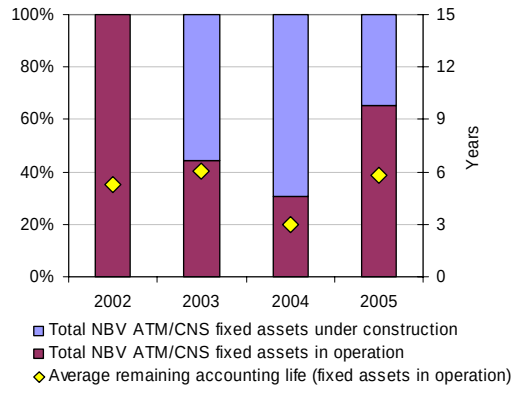
- the second phase of the NAMP consisting of the delivery of a new joint ACC/APP/TWR building at Mother Teresa Tirana Airport with fully compliant EUROCONTROL RDP and FDP Systems; and
- a new Voice Communication System and all related equipment and facilities.

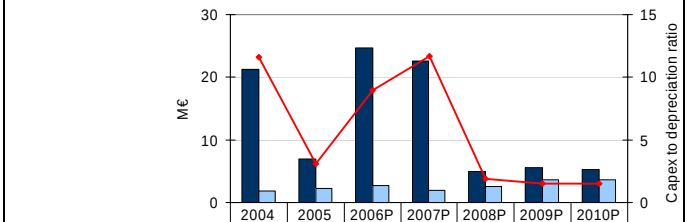
The main investments concerning the delivery of the new joint ACC/APP/TWR building is foreseen for the year 2006 and 2007 as can be seen from the figure below.



NATA Albania

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	384	338	322	330	365	353
En-route unit ATM/CNS costs	380	-13.8%	-3.9%	+3.0%	+1.9%	-3.0%
Terminal unit ATM/CNS costs	107	-2.8%	-9.1%	+0.4%	+57.4%	-4.9%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	21.3	7.0	24.7	22.5	4.9	5.6	5.2
Depreciation (M€)	1.8	2.3	2.7	1.9	2.6	3.6	3.6
Capex to depreciation ratio	11.6	3.1	9.0	11.7	1.9	1.5	1.5

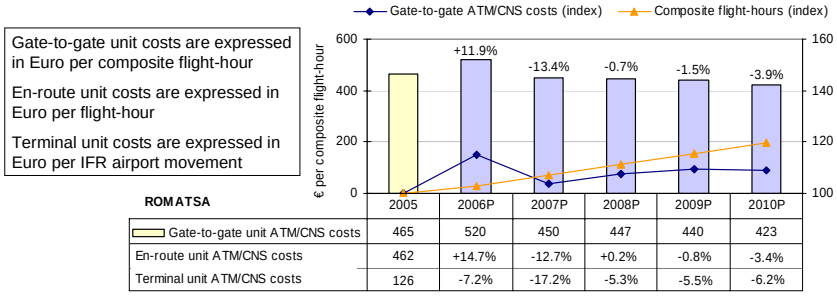
ROMATSA (Romania): Gate-to-gate unit ATM/CNS provision costs are planned to decrease by -9% between 2005 and 2010 (i.e., around -1.8% per annum). From 2007 onwards, traffic volumes are expected to rise faster than ATM/CNS provision costs.

A new ATM system was put in operation at the end of 2003 which reflects a relatively high average remaining accounting life of ROMATSA's fixed assets in 2003 (more than 12 years). The significant depreciation in 2004 and 2005, compared to a relatively low capex, resulted in an average remaining accounting life of fixed assets at around five years in 2005 (see figures below).

The main drivers for the 2005 capex include:

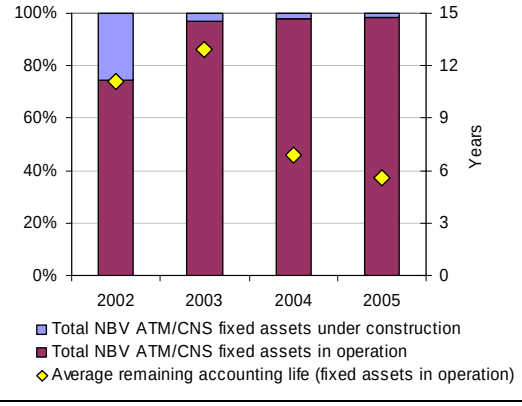
- Navaids equipments (4 VOR-DMEs and 6 ILS-DMEs);
- 9 (ROM)AWOSs;
- 13 voice recording systems;
- MESSIR upgrade.

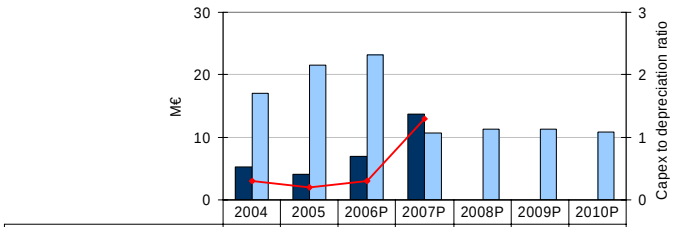
Major investments are planned for 2007 (some €14M) to upgrade the ATM system. Staff costs will also increase to cover additional training and relocation of staff required for putting in operation the upgraded system and for consolidating the number of ACCs. No capex figures could be provided for 2008-2010.



ROMATSA

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	465	520	450	447	440	423
En-route unit ATM/CNS costs	462	+14.7%	-12.7%	+0.2%	-0.8%	-3.4%
Terminal unit ATM/CNS costs	126	-7.2%	-17.2%	-5.3%	-5.5%	-6.2%





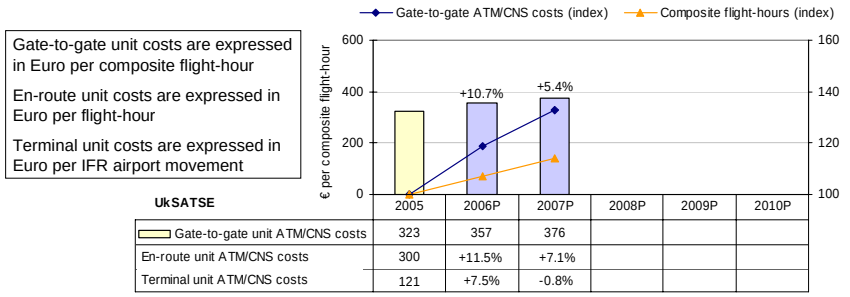
	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	5.2	4.1	7.0	13.8			
Depreciation (M€)	17.1	21.6	23.2	10.7	11.2	11.3	10.9
Capex to depreciation ratio	0.3	0.2	0.3	1.3			

UkSATSE (Ukraine): Gate-to-gate unit ATM/CNS provision costs could not be computed due to non-reporting forward-looking costs after 2007. Unit costs are expected to rise significantly in 2006 and 2007. The main drivers for this increase are higher staff costs (increase of staff number and salaries, consistent with the national legislation), and higher operating costs and cost of capital.

UkSATSE planned capex over the period 2006-2010 amount to around €80M, even though current capacity is expected to cope with future traffic demand. The main investments relate to:

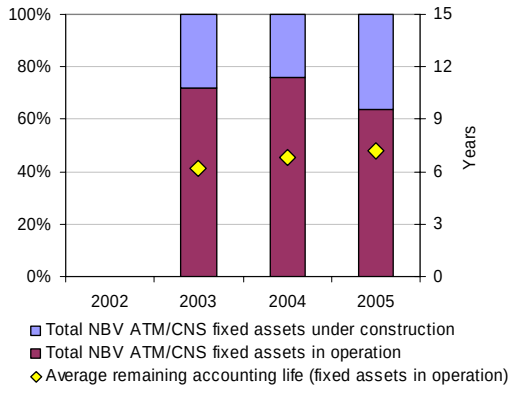
- Construction of the new Dnipropetrovs'k ACC and modernisation/renovation of the Simferopol' ACC (in operation in 2006);
- Installation of the Ukrainian AMC System in "Ukraerocentre" (in operation in 2006);
- Installation of modern digital Voice Communication Control Systems (VCCS) in Dnipropetrovs'k ACC, L'viv ACC, Odesa ACC and Simferopol' ACC (in operation in 2006);
- Installation of PSR/MSSRs in the airports of Dnipropetrovs'k, Donets'k, L'viv, Odesa and Simferopol'(in operation in 2006-2008);
- Modernisation of hardware and software of Satellite Distribution System (SADIS) in Kyiv ACC and introduction of SADIS-based centralised Meteorology Service for ACCs of Kyiv, Odesa, L'viv, Simferopol' and Dnipropetrovs'k (in operation in 2006-2008);

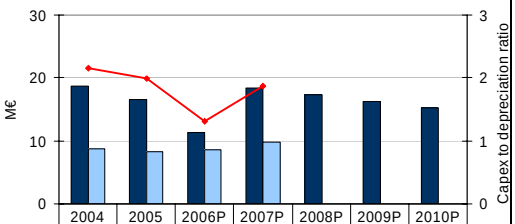
In 2007 Kharkiv ACC will be replaced by the new ACC in Dnipropetrovs'k.



UkSATSE

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	323	357	376			
En-route unit ATM/CNS costs	300	+11.5%	+7.1%			
Terminal unit ATM/CNS costs	121	+7.5%	-0.8%			





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	18.7	16.6	11.3	18.4	17.3	16.3	15.3
Depreciation (M€)	8.7	8.4	8.6	9.9			
Capex to depreciation ratio	2.1	2.0	1.3	1.9			

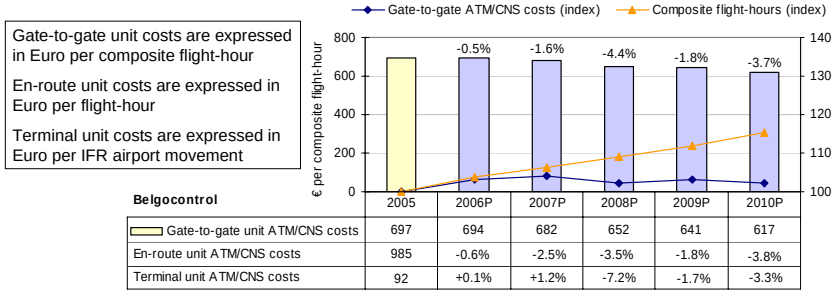
The Central Western European Area: (all financial data expressed in €2005)

Belgocontrol: Gate-to-gate unit ATM/CNS provision costs are expected to decrease by -11% between 2005 and 2010 (i.e., around -2.4% per annum). Traffic volumes are planned to rise by some +15% while ATM/CNS provision costs are planned to remain relatively stable.

Significant investment took place in Belgocontrol in years prior, and up, to 2005 (new tower at Brussels in 2004, new HQ site and upgrade of the ATC system (CANAC) in 2005 for a total capex of some €100M). This is reflected in the relatively high average remaining accounting life of Belgocontrol's fixed assets in 2005 (around 10 years, see figure below).

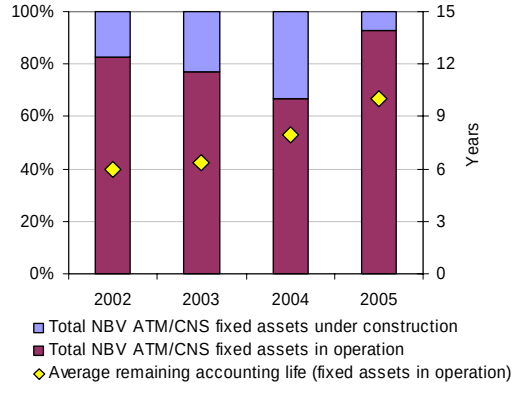
The investment cycle still continues until 2009 (see figure below). A further capex of around €115M is planned for the years 2006-2010. The main investments relate to:

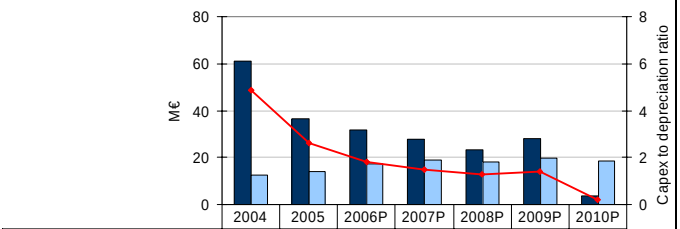
- CANAC upgrade 2006-2010;
- Mode S radars 2006-2008 (some €9.5M);
- Approach radars 2006-2009 (some €12.7M);
- ILS 2006-2010 (some €7.1M);
- New buildings and site 2006-2008 (€9.5M).



Belgocontrol

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	697	694	682	652	641	617
En-route unit ATM/CNS costs	985	-0.6%	-2.5%	-3.5%	-1.8%	-3.8%
Terminal unit ATM/CNS costs	92	+0.1%	+1.2%	-7.2%	-1.7%	-3.3%





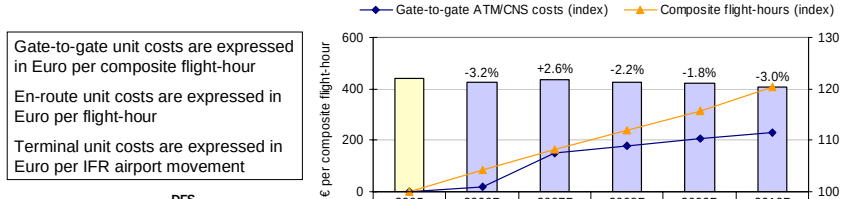
	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	61.2	36.6	31.6	27.9	23.4	27.9	3.8
Depreciation (M€)	12.6	14.1	17.3	18.8	18.2	19.8	18.6
Capex to depreciation ratio	4.8	2.6	1.8	1.5	1.3	1.4	0.2

DFS (Germany): Gate-to-gate unit ATM/CNS provision costs are expected to decrease by -7% between 2005 and 2010 (i.e., around -1.5% per annum). Traffic volumes are planned to rise faster (some +20%) than ATM/CNS provision costs.

The privatisation of DFS will not take place in 2007 as planned last year since the President of the FRG did not pass the legislation. There are changes to the constitution necessary before any shares can be sold. It is assumed that privatisation will not start before 2008.

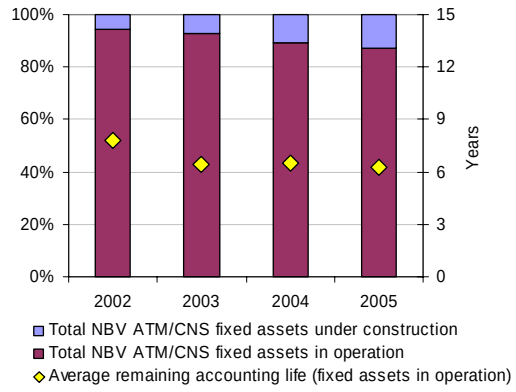
Since the late 1990s DFS has set up the "Control Centres Reorganisation Programme", which involves the merging of control centres and significant restructuring of the airspace. The number of ACCs is planned be reduced to four (Bremen, Langen, Munich, and Karlsruhe-Rhein).

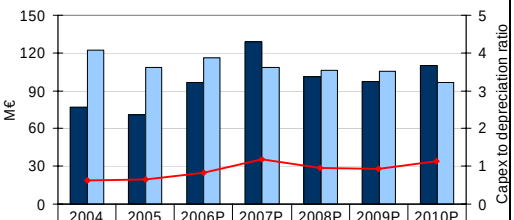
Cumulative planned capex for the period 2006-2010 is planned to be some €530M, cruising at around €100M per year.



DFS

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	441	427	438	428	421	408
En-route unit ATM/CNS costs	496	-4.6%	+2.6%	-2.1%	-1.8%	-2.9%
Terminal unit ATM/CNS costs	79	+2.5%	+2.4%	-2.2%	-1.9%	-3.1%





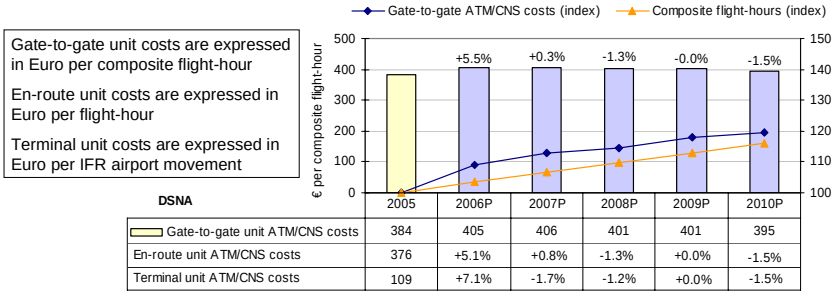
	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	77.1	71.1	96.4	128.8	100.7	97.5	109.7
Depreciation (M€)	122.1	108.4	115.9	108.4	106.3	105.5	96.8
Capex to depreciation ratio	0.6	0.7	0.8	1.2	0.9	0.9	1.1

DSNA (France): Gate-to-gate unit ATM/CNS provision costs are expected to increase by +3% over the 2005-2010 period, with a clear increase in 2006 resulting from higher staff costs following a State decision to increase the state contribution rate for civil servants' pensions from 23% to 53%. The increase will be imposed gradually with a 10 percentage point increase each year from 2006 to 2008. New contractual arrangements for ATCOs, planned for in the 2007-2009 collective agreement, will also contribute to higher staff costs. A higher cost of capital is also foreseen as a result of a transfer to the State of assets previously allocated to Aéroport de Paris (ADP).

Over the years, there is a remarkable stability between capex and depreciation so that the average remaining accounting life of DSNA's fixed assets has remained constant at some four years (see figure below). Note that for the year 2006-2010 only en-route depreciation costs are reported in the figure below.

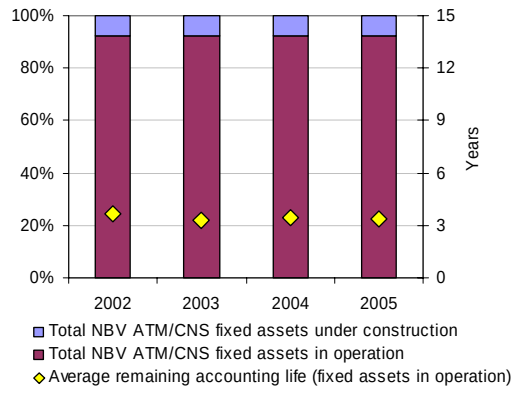
DSNA plans a capex program of some €805M over the whole period 2006-2010. This capex, inter alia, include:

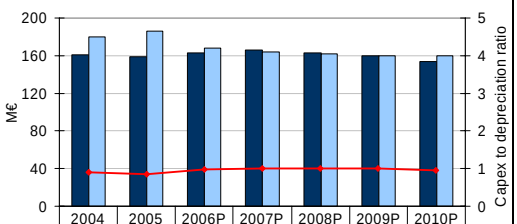
- Ongoing upgrade and systematic maintenance of ATM systems;
- Development of the operational computer system CAUTRA/ODS and development of the Coflight programme (FDP);
- Replacement of the data exchange network X25 (RENAR);
- Acquisition of 17 Mode S radar stations;
- Development and deployment of the control simulation systems at the ENAC (Ecole Nationale de l'Aviation Civile) and of the en-route ACCs;
- Extension of Brest ACC aimed at adding new area control sectors, and;
- Purchase of a second "Beech 200" for monitoring of radio aids during flights.



DSNA

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	384	405	406	401	401	395
En-route unit ATM/CNS costs	376	+5.1%	+0.8%	-1.3%	+0.0%	-1.5%
Terminal unit ATM/CNS costs	109	+7.1%	-1.7%	-1.2%	+0.0%	-1.5%

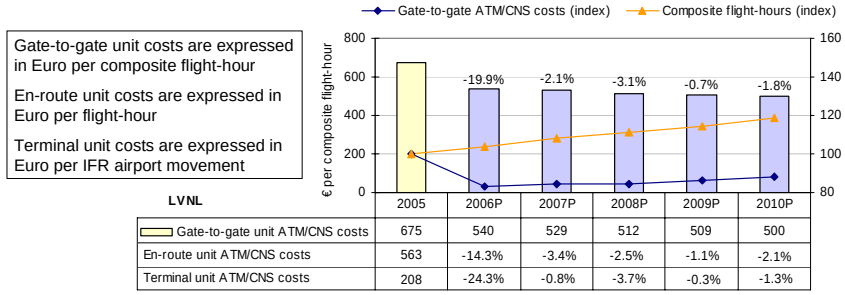




	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	161.3	158.9	162.8	165.5	162.9	159.7	154.0
Depreciation (M€)	179.4	186.2	167.9	163.8	161.9	159.4	160.2
Capex to depreciation ratio	0.9	0.9	1.0	1.0	1.0	1.0	1.0

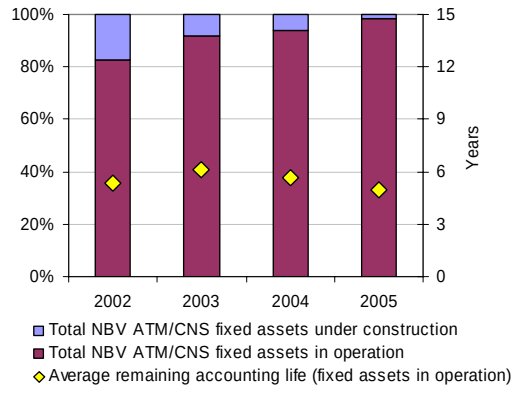
LVNL (Netherlands): Gate-to-gate unit ATM/CNS provision costs are expected to decrease by -26% between 2005 and 2010 (i.e., around -5.8% per annum). Traffic volumes are planned to rise by some +19% while ATM/CNS provision costs are planned to decrease markedly in 2006 and remain lower until 2010 (see figure). Lower depreciation costs (due to reaching the end of the depreciation periods for some parts of the Amsterdam Advanced ATC system) and reduced restructuring costs (in particular for terminal ANS) are the drivers for this improved cost-effectiveness. It should be noted that the planned unit costs reported in the figure below do not fully reflect the impact of the Common Charging Implementing Rules and of the implementation of IFRS.

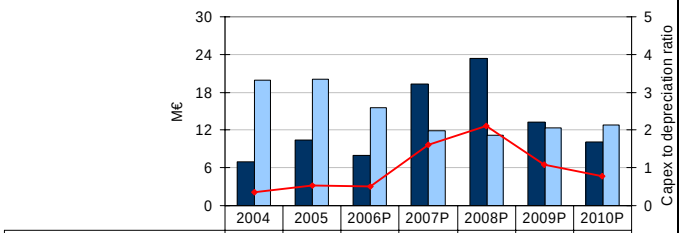
Compared to previous years, a larger capex is planned for 2007 and 2008. Main investments include, inter alia, replacements and upgrades of ATC systems and radars.



LVNL

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	675	540	529	512	509	500
En-route unit ATM/CNS costs	563	-14.3%	-3.4%	-2.5%	-1.1%	-2.1%
Terminal unit ATM/CNS costs	208	-24.3%	-0.8%	-3.7%	-0.3%	-1.3%



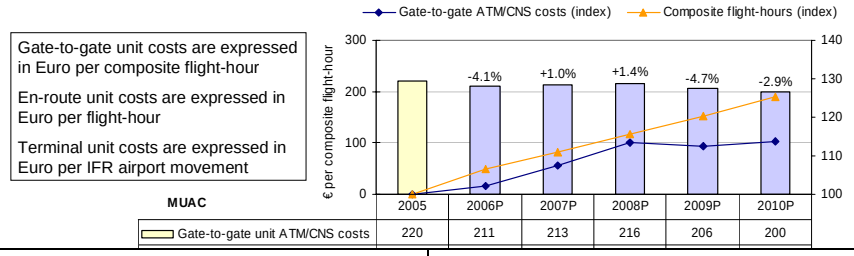


	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	7.0	10.4	8.0	19.3	23.4	13.3	10.1
Depreciation (M€)	19.8	20.0	15.5	11.9	11.1	12.3	12.8
Capex to depreciation ratio	0.4	0.5	0.5	1.6	2.1	1.1	0.8

Maastricht UAC: En-route unit ATM/CNS provision costs are expected to decrease by -9% between 2005 and 2010 (i.e., around -1.9% per annum). MUAC has set an explicit performance target in terms of the total economic cost per flight-hour (including delay); the target for 2006 is set to be lower than €289 (actual in 2005 was €236).

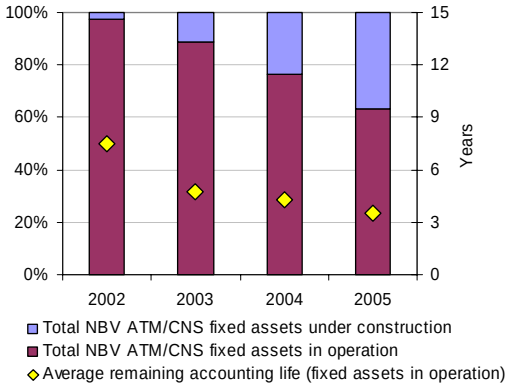
In 2005 the main capex related to the MUAC building extension (in operation in February 2006) and to the FDP system (to be operational in 2007). As a result the relative share of assets under construction is increasing and the average remaining accounting life of MUAC's fixed assets in operation is decreasing (some four years in 2005, see figure below). By 2008, after completion of the current investment cycle, the average remaining accounting life of MUAC's fixed assets is expected to be significantly higher.

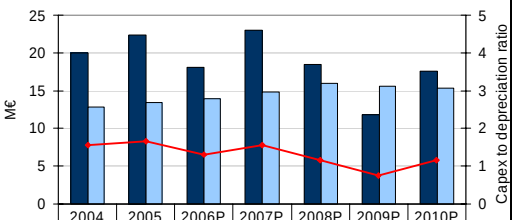
Note that MUAC do not own the CNS infrastructure which is made available for joint use and provided free of charges by the ANSPs (Belgocontrol, LVNL, and DFS) operating in the Four States airspace (Benelux and Germany).



MUAC

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	220	211	213	216	206	200





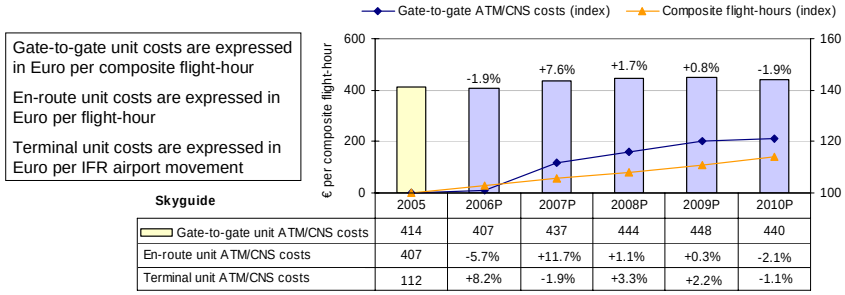
	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	20.0	22.4	18.1	23.0	18.4	11.9	17.6
Depreciation (M€)	12.8	13.5	14.0	14.8	15.9	15.6	15.3
Capex to depreciation ratio	1.6	1.7	1.3	1.6	1.2	0.8	1.2

Skyguide (Switzerland): Gate-to-gate unit ATM/CNS provision costs are expected to increase by +6% between 2005 and 2010 (i.e., around +1.2% per annum). ATM/CNS provision costs are planned to remain constant in 2006, but followed by a significant increase in 2007.

The implementation of a single UAC through the transfer of control of upper airspace from Zurich to Geneva although planned to be operational in 2006 has been postponed in March 2007 until further notice.

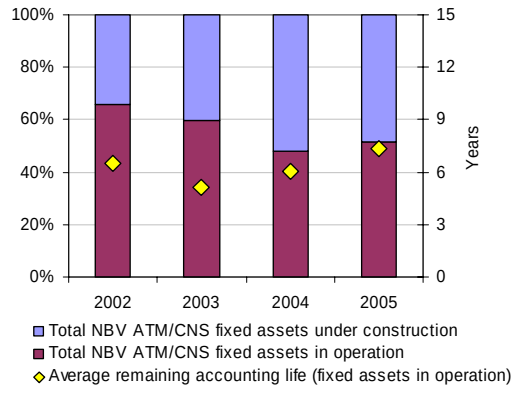
Since 2003 the share of assets under construction has remained quite significant (>40%). This reflects (1) Skyguide's large scale investments (e.g., some €80M in 2004 mostly related to the new centre near Zurich that will combine military control with approach and lower airspace) and (2) the fact that some of these assets have not yet been put into operation. The average remaining accounting life of Skyguide's fixed assets in operation is increasing since 2003 (some seven years in 2005, see figure below). When the assets under construction will enter into operation, the average remaining accounting life of Skyguide's fixed assets is expected to be significantly higher.

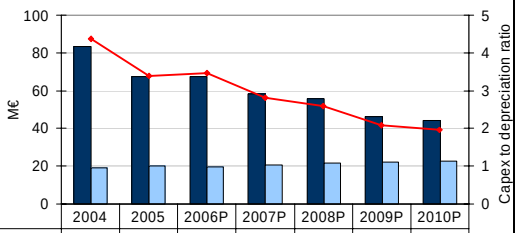
It should be noted that for the 2006-2010 period, cumulative capex of some €270M is planned, mostly for new ATM systems (planned to be operational in 2009) and equipment for the provision of new capacity. Given the current capex profile, the stable depreciation costs (see figure below) are, prima facie, unsustainable and likely to be higher in future.



Skyguide

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	414	407	437	444	448	440
En-route unit ATM/CNS costs	407	-5.7%	+11.7%	+1.1%	+0.3%	-2.1%
Terminal unit ATM/CNS costs	112	+8.2%	-1.9%	+3.3%	+2.2%	-1.1%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	83.2	67.1	67.3	58.3	55.8	46.3	44.4
Depreciation (M€)	19.0	19.8	19.4	20.8	21.6	22.3	22.5
Capex to depreciation ratio	4.4	3.4	3.5	2.8	2.6	2.1	2.0

The South Western European Area: (all financial data expressed in €2005)

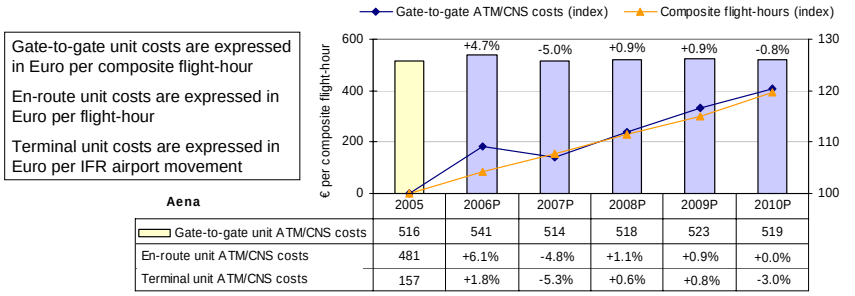
Aena (Spain): Gate-to-gate unit ATM/CNS provision costs are expected to remain stable between 2005 and 2010. ATM/CNS provision costs are planned to increase in 2006 but immediately decrease in 2007, so that over the 2006-2010 period costs are planned to increase at the same rate as traffic. This outcome is conditioned by the favourable expectations of the negotiations with ATCO staff which are still in progress in early 2007.

Significant capex took place in Aena in years prior, and up, to 2005. The main investments in 2005 relate to:

- new ACC building in Barcelona-Gavá in operation since February 2005;
- installation of two additional MSSRs in Espiñeiras and Paracuellos;
- development of the ATM system SATCA.
- Adaptation of Voice Communications Systems (VCSs) to SACTA III;
- Radar facilities in Montaña Blanca (Lanzarote) and Taborno (Tenerife Norte), and;
- Supply of four MSSR (Phase IV).

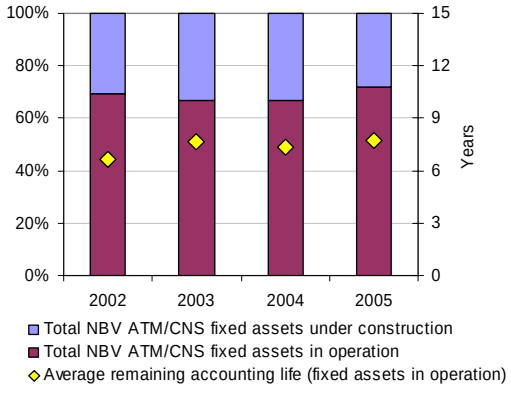
The relatively high average remaining accounting life of Aena's fixed assets in 2005 (around eight years, see figure below) reflects, to some extent, this investment cycle. When the assets under construction will enter into operation, the average remaining accounting life of fixed assets is expected to be even higher. Note that a lower capex profile, although still sizeable, is planned for 2006-2010 period. This include inter alia:

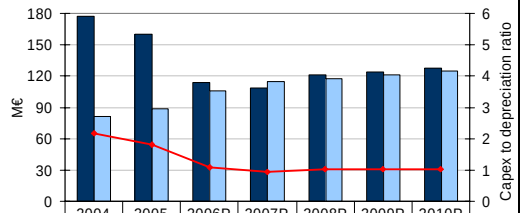
- Installation of a SACTA dynamic simulation and contingency system in the new Barcelona-Gavá ACC;
- Installation equipment and hardware and software update through homogenization of the VCSs in the Spanish ACCs;
- MSSR installation in Sierra de Loja, Torremanzanas (Alicante), Gran Canaria, Tenerife Sur and Valencia, plus MSSR radars supply (Phase V);
- Update of the SACTA system facilities currently in service in the ACCs.



Aena

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	516	541	514	518	523	519
En-route unit ATM/CNS costs	481	+6.1%	-4.8%	+1.1%	+0.9%	+0.0%
Terminal unit ATM/CNS costs	157	+1.8%	-5.3%	+0.6%	+0.8%	-3.0%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	177.2	160.3	113.5	108.2	120.9	123.5	127.6
Depreciation (M€)	81.2	88.8	105.9	114.6	118.0	121.3	124.7
Capex to depreciation ratio	2.2	1.8	1.1	0.9	1.0	1.0	1.0

ENAV (Italy): Gate-to-gate unit ATM/CNS provision costs are expected to decrease by -17% between 2005 and 2010 (i.e., around -3.6% per annum). Traffic volumes are planned to rise by some +17% while ATM/CNS provision costs are planned to decrease markedly in 2006 (due to significantly lower depreciation costs, see figure below) and remain lower until 2010 (see figure). A three-year collective agreement defining contractual arrangements for staff and management was signed by ENAV in 2004. This "Contract Programme 2004/06" for ENAV foresees an explicit efficiency objective of a 2% annual reduction in operating costs (including staff costs) during the three-year period, plus an allowance of a 0.35% increase in operating costs for each 1% increase in traffic.

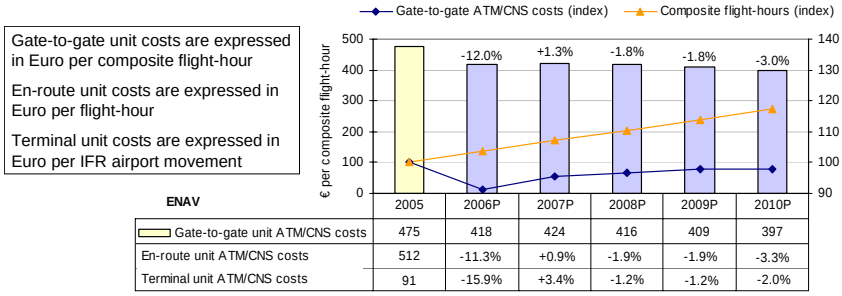
Significant capex took place in ENAV in years in 2004 and 2005. The main investments in 2005 relate to:

- new systems and equipments for airports and ACCs;
- the development of the computer network and of the HQ infrastructure.

The increasing average remaining accounting life of ENAV's fixed assets (around six years in 2005 compared to four year in 2003, see figure below) reflects, to some extent, this investment cycle. When the assets under construction will enter into operation, the average remaining accounting life of fixed assets is expected to be even higher.

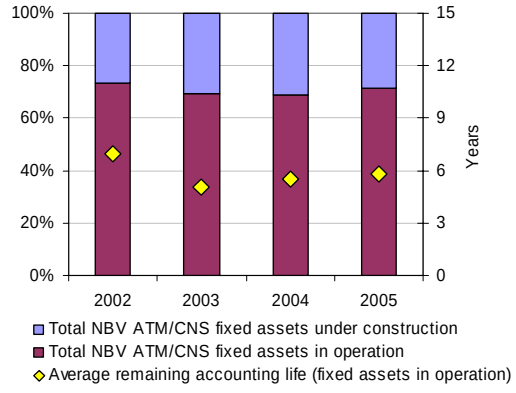
Note that ENAV planned capex profile for 2006-2010 period amounts to some €910M and it is the most significant among the five largest ANSPs. This include inter alia:

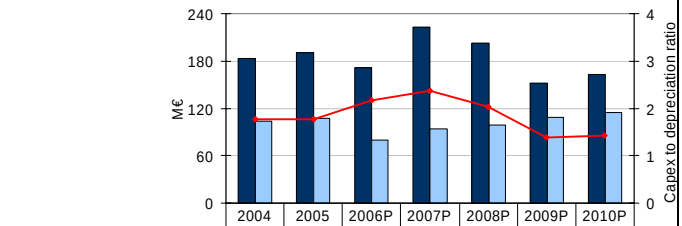
- upgrade of ATM systems;
- SSR systems replacement for Mode-S technology; and
- airport surface radars.



ENAV

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	475	418	424	416	409	397
En-route unit ATM/CNS costs	512	-11.3%	+0.9%	-1.9%	-1.9%	-3.3%
Terminal unit ATM/CNS costs	91	-15.9%	+3.4%	-1.2%	-1.2%	-2.0%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	183.6	190.8	171.6	222.5	202.9	152.1	163.4
Depreciation (M€)	103.5	107.7	79.2	93.5	99.5	109.0	114.5
Capex to depreciation ratio	1.8	1.8	2.2	2.4	2.0	1.4	1.4

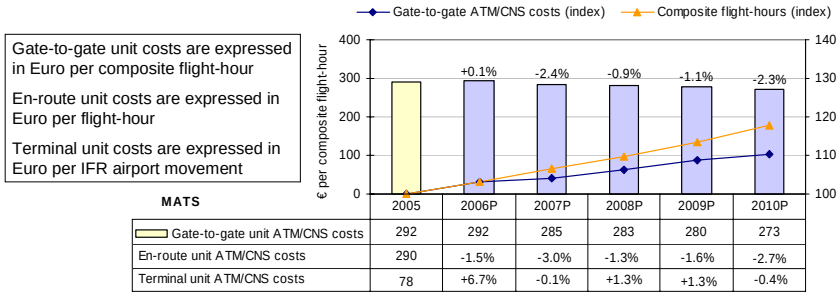
MATS (Malta): Gate-to-gate unit ATM/CNS provision costs are expected to decrease by -7% between 2005 and 2010 (i.e., around -1.5% per annum). Traffic volumes are planned to rise faster than ATM/CNS provision costs (see figure below).

Although new equipments (hardware and software) were put in operation in 2005, the average remaining accounting life of fixed assets slightly decreased in 2005 compared to 2004. This reduction results from increased depreciation costs (see figures below).

2005 capex mainly relates to new radar equipment, system upgrades, and to the Safety Back-up System (SBS) project. Planned capex for the 2006-2010 period mainly include:

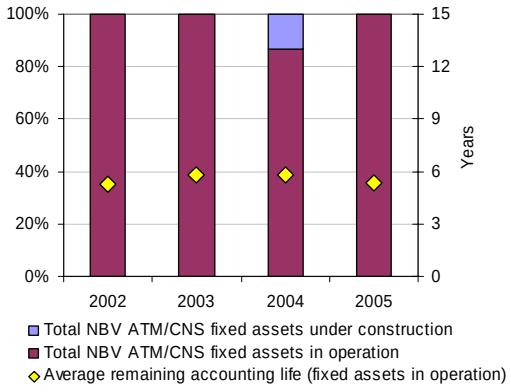
- Selex ATM system upgrades;
- Replacement of aeronautical fixed telecommunication network and ATS message handling system;
- Building of new administration block and equipment storage area.

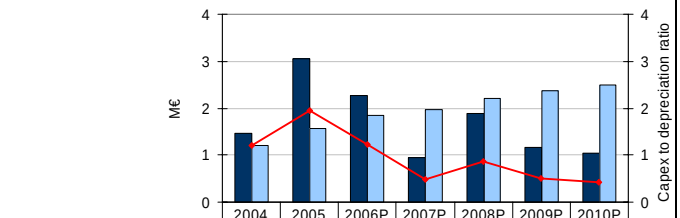
MATS does not own the land & building assets but rather leases the facilities (long term operating and financial leases).



MATS

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	292	292	285	283	280	273
En-route unit ATM/CNS costs	290	-1.5%	-3.0%	-1.3%	-1.6%	-2.7%
Terminal unit ATM/CNS costs	78	+6.7%	-0.1%	+1.3%	+1.3%	-0.4%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	1.5	3.1	2.3	1.0	1.9	1.2	1.1
Depreciation (M€)	1.2	1.6	1.9	2.0	2.2	2.4	2.5
Capex to depreciation ratio	1.2	2.0	1.2	0.5	0.9	0.5	0.4

NAV Portugal: Gate-to-gate unit ATM/CNS provision costs are expected to decrease by -21% between 2005 and 2010 (i.e., around -4.5% per annum). Traffic volumes are planned to rise by some +20% while ATM/CNS provision costs are planned to slightly decrease during the period (see figure), which is a clear indication of tight cost control.

No major ATCO recruitment is planned over the coming years; the traffic increase is expected to be mainly absorbed by higher productivity, resulting in a significant improvement in cost-effectiveness.

Higher depreciation compared to capex in years prior, and up, to 2005 contribute to a relatively low average remaining accounting life of NAV Portugal's fixed assets in operation (some two years in 2005, see figure below). When the assets under construction will enter into operation (in particular investments relating to the new OPS room in Lisboa ACC which is planned to be operational in 2007), the average remaining accounting life of NAV Portugal' s fixed assets is expected to increase.

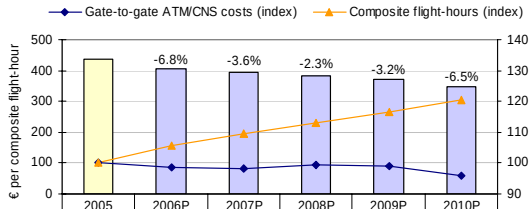
Compared to previous years, a larger capex is planned for 2007 and 2008. Main investments include, inter alia,:

- ATM system developments
- New VHF/UHF for Lisbon ACC;
- NAVAIDS replacements and upgrades;
- ASC/North MSSR radars.

Gate-to-gate unit costs are expressed in Euro per composite flight-hour

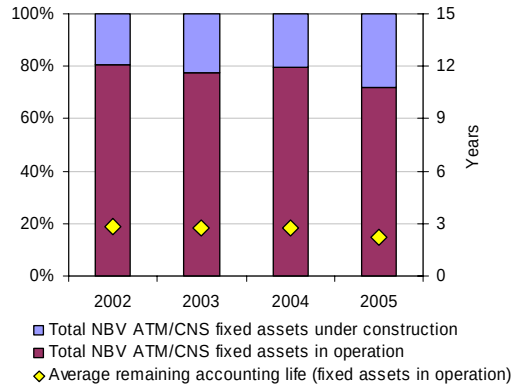
En-route unit costs are expressed in Euro per flight-hour

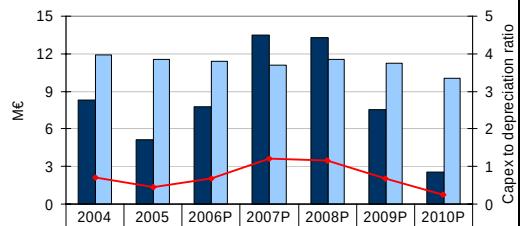
Terminal unit costs are expressed in Euro per IFR airport movement



NAV Portugal

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	438	408	394	384	372	348
En-route unit ATM/CNS costs	448	-7.2%	-2.7%	-2.8%	-3.3%	-7.0%
Terminal unit ATM/CNS costs	103	-5.2%	-7.1%	-0.4%	-2.7%	-4.5%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	8.3	5.1	7.8	13.5	13.2	7.6	2.5
Depreciation (M€)	11.9	11.6	11.4	11.1	11.5	11.2	10.0
Capex to depreciation ratio	0.7	0.4	0.7	1.2	1.1	0.7	0.3

The UK and Ireland Area: (all financial data expressed in €2005)

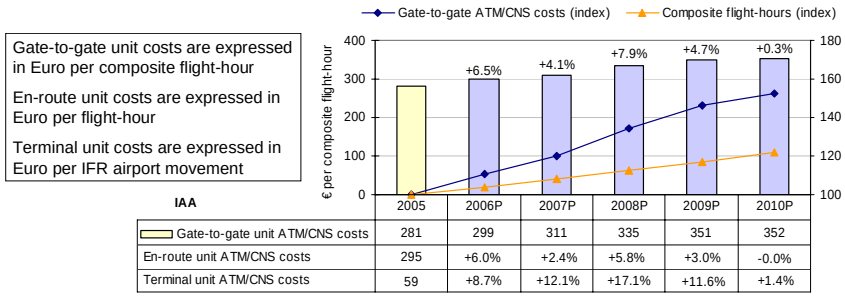
Irish Aviation Authority: Gate-to-gate unit ATM/CNS provision costs are expected to increase by +26% between 2005 and 2010 (i.e., around +4.7% per annum). Traffic volumes are planned to rise by some +20% while ATM/CNS provision costs are planned to increase by some +50% over the 2005-2010 period (see figure). This sharply contrasts with last year profile for IAA gate-to-gate unit ATM/CNS provision costs which were planned to remain stable.

The average remaining accounting life of IAA's fixed assets in operation is decreasing (some seven years in 2005 compared to nine years in 2004, see figure below). This reflects increased depreciation costs following the completion of the investment cycle in 2003/04 (new Shannon ACC, the extension of Dublin ACC, and the new ATM system).

Compared to previous years, a larger capex is planned for the 2006-2009 period (see figure below). Main investments include, inter alia:

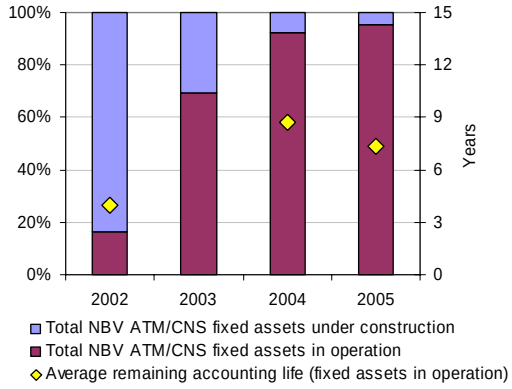
- Navaids replacement program which is underway until 2007;
- Replacement of all SSR systems between 2006 and 2008.
- Upgrades to the ATM systems (under a joint procurement agreement - COOPANS - with NAVIAIR, LFV, and Thales).

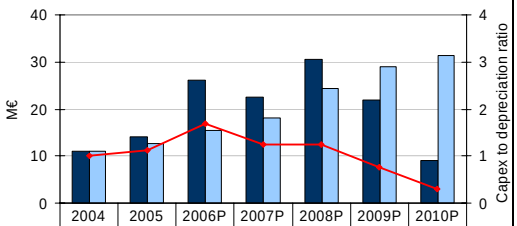
This will give rise to further rises in capital-related costs, and in particular depreciation (see the right-hand side figure below).



IAA

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	281	299	311	335	351	352
En-route unit ATM/CNS costs	295	+6.0%	+2.4%	+5.8%	+3.0%	-0.0%
Terminal unit ATM/CNS costs	59	+8.7%	+12.1%	+17.1%	+11.6%	+1.4%





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	11.1	14.1	26.2	22.4	30.5	22.0	9.1
Depreciation (M€)	11.0	12.6	15.4	18.1	24.4	29.0	31.3
Capex to depreciation ratio	1.0	1.1	1.7	1.2	1.3	0.8	0.3

NATS (UK): Gate-to-gate unit ATM/CNS provision costs could not be computed due to non-reporting of forward-looking costs related to terminal ANS. However, NATS disclosed planned output and costs for the en-route activity until 2010. NATS's en-route unit ATM/CNS costs are planned to decrease throughout the 2005-2010 period, which is in line with the efficiency factor set up by the regulator for the second Price Control review for 2006-2010 (average change in price of RPI-3.4 per year).

Despite a capex larger than depreciation costs in 2004 and 2005, the average remaining accounting life of NATS's fixed assets in operation has remained fairly stable (some four years in 2004 and 2005, see figures below), and the (share of) assets under construction increased during 2005. A significant capex programme was implemented in 2005 (above €200M). The main investments for 2005 related to:

- Prestwick/Manchester programme (€54M);
- Swanwick/ West Drayton programme (€40M);
- Business systems and relocation to CTC (€34M);
- Current software systems (€33M);
- CNS (€25M);
- Radar site services (€23M);
- Upgrade of ATM systems and future centres programme (CASPIAN) (€20M).

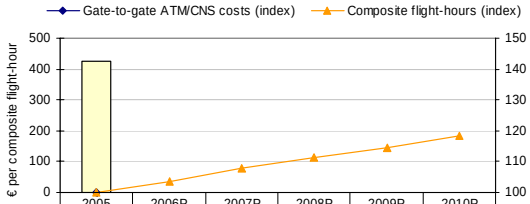
The investment cycle is planned to continue at least until 2009. The planned cumulative capex program over the 2006-2010 period amounts to some €912M (see figure below). These investments relate mainly to:

- the construction of the new Scottish ACC building at Prestwick (December 2006) plus the new SATCA systems (in operation on March 09) are planned to cost some €240M;
- IFACTS operational at Swanwick in March 2008;
- TC operational at Swanwick on October 2007.

Gate-to-gate unit costs are expressed in Euro per composite flight-hour

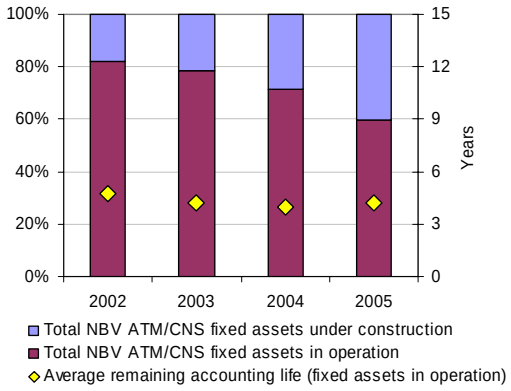
En-route unit costs are expressed in Euro per flight-hour

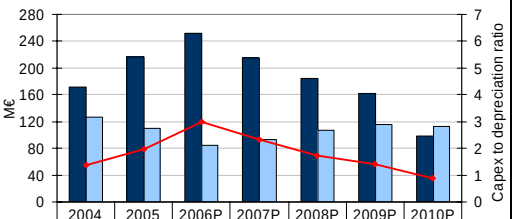
Terminal unit costs are expressed in Euro per IFR airport movement



NATS

	2005	2006P	2007P	2008P	2009P	2010P
Gate-to-gate unit ATM/CNS costs	424					
En-route unit ATM/CNS costs	465	-1.8%	-2.5%	-0.3%	-4.9%	-1.4%
Terminal unit ATM/CNS costs	81					





	2004	2005	2006P	2007P	2008P	2009P	2010P
Capex (M€)	172.0	216.6	251.8	215.7	184.5	161.9	98.4
Depreciation (M€)	126.1	110.2	84.5	93.5	107.4	115.1	112.7
Capex to depreciation ratio	1.4	2.0	3.0	2.3	1.7	1.4	0.9

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ANNEX 4 – TRAFFIC COMPLEXITY INDICATORS AT ANSP LEVEL

ANSPs	[1] Adjusted density	[2] Vertical interactions	[3] Horizontal interactions	[4] Speed interactions	[5] = [2]+[3]+[4] Structural complexity indicator	[6] = [1]x[5] Aggregated complexity score
Aena	0.09	0.20	0.40	0.15	0.75	0.07
ANS CR	0.11	0.18	0.48	0.20	0.86	0.10
ATSA Bulgaria	0.08	0.04	0.24	0.07	0.34	0.03
Austro Control	0.12	0.24	0.50	0.24	0.98	0.12
Avinor	0.03	0.36	0.47	0.30	1.14	0.03
Belgocontrol	0.14	0.40	0.49	0.40	1.29	0.18
Croatia Control	0.08	0.08	0.50	0.11	0.68	0.05
DCAC Cyprus	0.05	0.21	0.36	0.12	0.69	0.03
DFS	0.16	0.32	0.53	0.27	1.12	0.18
DHMI	0.06	0.15	0.34	0.10	0.60	0.04
DSNA	0.13	0.16	0.39	0.15	0.70	0.09
EANS	0.04	0.19	0.29	0.14	0.61	0.03
ENAV	0.09	0.30	0.54	0.24	1.07	0.10
Finavia	0.05	0.27	0.31	0.35	0.93	0.04
HCAA	0.06	0.14	0.35	0.11	0.61	0.03
HungaroControl	0.11	0.11	0.38	0.14	0.64	0.07
IAA	0.07	0.09	0.20	0.08	0.36	0.03
LFV/ANS Sweden	0.06	0.23	0.40	0.27	0.90	0.05
LGS	0.05	0.10	0.40	0.12	0.61	0.03
LPS	0.09	0.15	0.47	0.18	0.79	0.07
LVNL	0.15	0.25	0.37	0.32	0.94	0.14
MATS	0.02	0.23	0.37	0.13	0.73	0.01
MK CAA	0.07	0.13	0.47	0.10	0.69	0.05
MoldATSA	0.01	0.07	0.27	0.09	0.43	0.01
MUAC	0.16	0.26	0.50	0.17	0.93	0.15
NATA Albania	0.06	0.07	0.30	0.08	0.45	0.03
NATS	0.16	0.40	0.42	0.31	1.13	0.18
NAV Portugal (FIR Lisboa)	0.05	0.14	0.40	0.08	0.61	0.03
NAVIAIR	0.06	0.19	0.50	0.21	0.90	0.06
Oro Navigacija	0.03	0.11	0.43	0.16	0.69	0.02
PPL/PATA	0.06	0.15	0.49	0.25	0.89	0.05
ROMATSA	0.09	0.05	0.32	0.11	0.47	0.04
Skyguide	0.17	0.31	0.54	0.24	1.09	0.18
Slovenia Control	0.07	0.19	0.53	0.21	0.92	0.07
UkSATSE	0.04	0.05	0.31	0.12	0.48	0.02
Average	0.11	0.24	0.44	0.21	0.89	0.10

Annex 3 - Table 0.1: Traffic complexity indicators at ANSP level, 2005

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ANNEX 5 – ANSPs PENSION ARRANGEMENTS AND PENSION-RELATED COSTS

ANSPs	Arrangements relating to ANSPs staff pension			Legal retirement age men(women)	Comments
	State pension	Defined contribution plan	Defined benefit plan		
Aena	✔	✔		65	Employees can benefit from early retirement from the age of 60, but ATCOs can leave on pre-retirement at the age of 52
ANS CR	✔	✔		63	
ATSA Bulgaria	✔			57 for ATCOs	ATSA Bulgaria also contribute to private pension funds
Austro Control				55 for ATCOs and 65(60) for non-ATCOs	
Avinor	✔		✔	67	Under certain conditions, ATCOs can retire from the age of 62
Belgocontrol	✔			60	According to a Royal Decree, ATCOs have to cease operational activities at the age of 55 and until the legal retirement age (60) they are still part of the payroll as "at disposal of the company"
Croatia Control	✔	✔		58(53) for ATCOs and 65(60) for non- ATCOs	Under certain conditions ATCOs can retire earlier e.g. 1 year earlier for every 4 years of service for ATCOs working in ACC and APP operational units
DCAC Cyprus	✔			63	ATCOs can retire earlier from the age of 55
DFS			✔	55 for ATCOs and between 58 and 65 for non-ATCOs	Implementation of early retirement schemes mainly relating to non-ATCO staff
DHMİ	✔			65(58)	
DSNA	✔			57 for ATCOs	ATCOs can retire earlier from the age of 50
EANS	✔			53(49.5) for ATCOs and 63(59.5) for non-ATCOs	EANS employees have also the possibility to contribute to private pension funds
ENAV	✔			60 for ATCOs and 65 for non-ATCOs	ENAV also contribute to private pension funds. Implementation of early retirement scheme for senior managers
Finavia	✔			55 for ATCOs and between 63 and 68 for non-ATCOs	The legal retirement age for ATCOs recruited after 1/07/1989 is the same than for non-ATCO staff (between 63 and 68). Staff can benefit from early retirement from the age of 62
MK CAA	✔	✔		55 for ATCOs and 64(62) for non-ATCOs	
HCAA	n.a.	n.a.	n.a.	n.a.	
HungaroControl	✔	✔		62 for ATCOs	ATCOs have 1 year reduction after each five years period they have spent in operations
IAA			✔	65 for ATCOs	Under certain conditions, ATCOs can retire from the age of 60

LFV/ANS Sweden		✔	✔	60 for ATCOs and 65 for non-ATCOs	Non-ATCO staff have the right to work until the age of 67 if they wish.
LGS	✔			63.5 for ATCOs and non-ATCOs	
LPS	✔	✔		62	
LVNL			✔	Between 61 and 65	Under specific conditions, possibility of early retirement from 55 for ATCOs and from 60 for non-ATCOs operational staff
MATS	✔			Between 61 and 65 for ATCOs	Under specific conditions ATCOs can retire at 55
MoldATSA	✔			54 for ATCOs and 64(57) for non-ATCOs	
MUAC			✔	65	ATCOs recruited before May 1990 can go on Early Termination of Service (ETS) at the age of 55. They are obliged to leave on pension at the age of 57.
NATA Albania	✔			60 for ATCOs and 65 for non-ATCOs	
NATS			✔	60 for ATCOs	Under specific conditions ATCOs can retire from the age of 50.
NAV Portugal (FIR Lisboa)	✔		✔	60 for ATCOs	According to a State decision, ATCOs cease operational activities at the age of 55 and until the legal retirement age (60) they are still part of the payroll under the status of “remunerated inactivity”.
NAVIAIR		✔		55 for ATCOs and 65 for non-ATCOs	
Oro Navigacija	✔	✔		62.5(60)	
PPL/PATA	✔	✔	✔	65(60)	ATCOs are not entitled to work in the OPS room after 60
ROMATSA	✔			65(60)	
Skyguide		✔		55 for ATCOs and 62 for non-ATCOs	Under certain conditions, non-ATCO staff can retire from the age of 58
Slovenia Control	✔	✔	✔	53(48) for ATCOs and 63 (58) for non-ATCOs	
UkSATSE	✔			50(45) for ATCOs and 60(55) for non-ATCOs	

Annex 5 - Table 0.1: Pension arrangements and ANSPs pension-related costs

ANNEX 6 - 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 from domestic government	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 from domestic government	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 from domestic government	Other income	Exceptional revenue item	**Total revenues**
Aena	673 440	0	0	0	16 552	0	0	689 992	168 437	0	0	0	0	0	0	168 437	841 877	0	0	0	16 552	0	0	858 430
ANS CR	50 047	0	0	0	0	0	0	50 047	28 178	0	0	0	0	0	0	28 178	78 225	0	0	0	0	0	0	78 225
ATSA Bulgaria	77 929	0	0	0	535	0	0	78 464	2 270	0	0	0	2 203	118	0	4 591	80 199	0	0	0	2 738	118	0	83 055
Austro Control	147 246	0	0	0	0	0	0	147 246	36 504	0	0	0	0	0	0	36 504	183 750	0	0	0	0	0	0	183 750
Avinor	73 224	0	0	0	0	0	0	73 224	0	55 579	0	0	0	0	0	55 579	73 224	55 579	0	0	0	0	0	128 803
Belgocontrol	157 768	0	0	0	10 334	5 279	31	173 412	0	30 204	0	0	0	1 475	11	31 690	157 768	30 204	0	0	10 334	6 754	42	205 102
Croatia Control	47 442	0	5 688	0	0	0	0	53 130	0	0	0	0	0	0	0	0	47 442	0	5 688	0	0	0	0	53 130
DCAC Cyprus	34 061	0	0	0	0	0	0	34 061	10 163	0	0	0	0	0	0	10 163	44 224	0	0	0	0	0	0	44 224
DFS	784 868	0	0	0	0	0	0	784 868	154 173	0	0	0	0	0	0	154 173	939 041	0	0	0	0	0	0	939 041
DHMI	170 751	0	0	0	1 351	0	0	172 102	0	80 874	0	0	0	0	0	80 874	170 751	80 874	0	0	1 351	0	0	252 976
DSNA	974 776	0	0	0	17 592	3 591	0	995 959	195 349	0	0	0	32 725	3 591	0	231 665	1 170 125	0	0	0	50 317	7 182	0	1 227 624
EANS	11 219	0	0	0	0	0	0	11 219	1 029	0	0	0	0	0	0	1 029	12 248	0	0	0	0	0	0	12 248
ENAV	525 852	0	0	0	27 568	22 609	5 768	581 796	74 055	0	0	0	22 494	17 604	2 121	116 274	599 907	0	0	0	50 062	40 213	7 888	698 070
Finavia	27 444	0	0	448	452	0	0	28 344	14 959	0	0	0	0	0	0	14 959	42 403	0	0	448	452	0	0	43 303
HCAA	134 000	0	0	0	0	0	0	134 000	0	0	0	0	0	0	0	0	134 000	0	0	0	0	0	0	134 000
HungaroControl	67 211	0	0	0	249	0	0	67 460	0	0	0	0	0	0	0	0	67 211	0	0	0	249	0	0	67 460
IAA	90 869	0	0	0	1 868	16	0	92 752	17 310	0	0	0	0	5	0	17 315	108 179	0	0	0	1 868	20	0	110 067
LFV/ANS Sweden	117 007	0	479	1 027	0	191	0	118 704	0	22 713	0	5 715	0	0	0	28 427	117 007	22 713	479	6 741	0	191	0	147 131
LGS	12 884	0	0	0	0	1 380	0	14 264	1 686	0	0	0	0	181	0	1 867	14 570	0	0	0	0	1 561	0	16 131
LPS	27 635	0	0	696	215	2 246	0	30 794	3 349	0	0	0	0	222	0	3 571	30 985	0	0	696	215	2 469	0	34 365
LVNL	125 491	0	0	0	4 315	0	0	129 806	72 798	0	0	0	8 778	0	0	81 576	198 289	0	0	0	13 093	0	0	211 382
MATS	9 525	0	0	0	670	0	0	10 195	0	0	0	0	1 928	0	0	1 928	9 525	0	0	0	2 598	0	0	12 123
MK CAA	10 305	0	0	0	0	0	0	10 305	682	0	0	0	0	0	0	682	10 987	0	0	0	0	0	0	10 987
MoldATSA	2 407	0	0	0	46	0	0	2 453	1 062	0	0	0	0	0	0	1 062	3 469	0	0	0	46	0	0	3 514
MUAC	0	0	112 141	0	0	0	0	112 141	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	0	0	112 141	0	0	0	0	112 141
NATA Albania	12 287	0	0	0	0	931	0	13 218	841	0	0	0	0	63	0	904	13 129	0	0	0	0	993	0	14 122
NATS	714 311	0	0	0	0	17 614	0	731 924	115 482	58 259	0	0	0	0	0	173 741	829 793	58 259	0	0	0	17 614	0	905 666
NAV Portugal (FIR Lisboa)	115 096	0	0	0	0	0	0	115 096	22 563	0	0	0	0	533	0	23 097	137 660	0	0	0	0	533	0	138 193
NAVIAIR	74 438	0	0	0	1 867	0	0	76 305	22 136	2 692	0	0	0	0	0	24 829	96 574	2 692	0	0	1 867	0	0	101 134
Oro navigacija	15 613	0	0	0	0	160	0	15 773	2 271	0	0	0	0	23	0	2 295	17 885	0	0	0	0	183	0	18 068
PPL/PATA	107 565	0	0	0	0	0	0	107 565	4 469	0	0	0	0	0	0	4 469	112 035	0	0	0	0	0	0	112 035
ROMATSA	128 581	0	0	0	787	169	0	129 537	11 457	0	0	0	0	444	0	11 901	140 039	0	0	0	787	612	0	141 439
Skyguide	109 061	0	34 334	0	2 606	0	0	146 000	61 862	0	0	0	0	0	0	61 862	170 923	0	34 334	0	2 606	0	0	207 862
Slovenia Control	15 921	0	0	0	192	13	1	16 127	0	0	0	0	1 740	0	0	1 740	15 921	0	0	0	1 933	13	1	17 868
UkSATSE	100 224	0	0	0	0	0	0	100 224	8 611	0	0	0	0	0	0	8 611	108 835	0	0	0	0	0	0	108 835

Annex 6 - Table 0.1: Breakdown of total ANS revenues (en-route, terminal and gate-to-gate), 2005

	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 to national government	Eurocontrol costs	Irrecoverable value added tax (VAT)	Payment to other ANSPs/States	Payment to Maastricht/CEATS Costs	**Total costs**	ATM/CNS provision costs	MET costs	Payment to national government	Eurocontrol costs	Irrecoverable value added tax (VAT)	Payment to other ANSPs/States	Payment to Maastricht/CEATS Costs	**Total costs**	ATM/CNS provision costs	MET costs	Payment to national government	Eurocontrol costs	Irrecoverable value added tax (VAT)	Payment to other ANSPs/States	Payment to Maastricht/CEATS Costs	**Total costs**
Aena	610 281	30 471	4 257	45 085	0	0	0	690 095	297 496	11 226	0	0	0	0	0	308 722	907 777	41 697	4 257	45 085	0	0	0	998 817
ANS CR	50 620	967	0	3 691	0	0	2 612	57 890	26 702	618	0	0	0	0	0	27 320	77 322	1 585	0	3 691	0	0	2 612	85 210
ATSA Bulgaria	62 951	4 225	994	5 309	320	0	0	73 799	9 634	1 195	606	0	39	0	0	11 474	72 585	5 420	1 600	5 309	359	0	0	85 273
Austro Control	105 355	15 978	0	10 129	0	0	2 578	134 040	30 108	5 003	0	0	0	0	0	35 111	135 463	20 981	0	10 129	0	0	2 578	169 151
Avinor	65 916	1 022	0	6 362	0	0	0	73 300	55 579	1 795	0	0	0	0	0	57 373	121 494	2 817	0	6 362	0	0	0	130 673
Belgocontrol	100 788	8 997	0	13 594	16	0	37 433	160 828	30 943	4 883	0	0	6	0	0	35 832	131 731	13 880	0	13 594	22	0	37 433	196 660
Croatia Control	49 688	1 351	0	3 062	0	237	1 406	55 743	0	0	0	0	0	0	0	0	49 688	1 351	0	3 062	0	237	1 406	55 743
DCAC Cyprus	26 381	2 803	551	1 851	0	0	0	31 585	6 980	806	318	0	0	0	0	8 104	33 361	3 609	869	1 851	0	0	0	39 689
DFS	636 457	49 446	0	87 861	0	0	52 135	825 899	162 178	0	0	0	0	0	0	162 178	798 635	49 446	0	87 861	0	0	52 135	988 077
DHMI	139 616	15 481	5 042	13 663	0	0	0	173 802	50 760	0	0	0	0	0	0	50 760	190 376	15 481	5 042	13 663	0	0	0	224 562
DSNA	780 649	57 579	0	79 990	0	40 240	0	958 457	201 130	18 503	0	0	0	0	0	219 633	981 779	76 082	0	79 990	0	40 240	0	1 178 090
EANS	4 130	31	0	0	0	0	0	4 160	3 355	105	0	0	0	0	0	3 460	7 485	136	0	0	0	0	0	7 621
ENAV	515 675	27 951	0	50 116	0	0	1 822	595 564	107 286	12 350	0	0	0	0	0	119 636	622 961	40 301	0	50 116	0	0	1 822	715 200
Finavia	23 231	1 039	0	3 574	0	235	0	28 079	27 906	4 602	0	0	0	0	0	32 508	51 137	5 641	0	3 574	0	235	0	60 587
HCAA	144 268	8 605	0	9 655	0	0	0	162 528	0	0	0	0	0	0	0	0	144 268	8 605	0	9 655	0	0	0	162 528
HungaroControl	40 084	2 364	1 170	4 675	0	0	1 593	49 886	14 103	0	0	0	0	0	0	14 103	54 187	2 364	1 170	4 675	0	0	1 593	63 989
IAA	72 541	6 160	1 250	6 167	0	0	0	86 117	14 827	1 087	224	0	0	0	0	16 138	87 368	7 247	1 474	6 167	0	0	0	102 256
LFV/ANS Sweden	112 621	5 757	369	0	0	0	0	118 747	22 550	0	76	0	0	0	0	22 626	135 171	5 757	445	0	0	0	0	141 373
LGS	9 807	250	0	0	0	0	0	10 057	2 764	312	0	0	0	0	0	3 075	12 570	562	0	0	0	0	0	13 132
LPS	25 151	625	0	2 279	0	0	898	28 953	6 386	62	0	0	0	0	0	6 447	31 536	687	0	2 279	0	0	898	35 400
LVNL	78 587	9 483	0	14 192	3 635	0	24 882	130 779	97 133	0	0	0	3 865	0	0	100 998	175 720	9 483	0	14 192	7 500	0	24 882	231 777
MATS	9 335	547	0	692	0	0	0	10 575	2 262	137	0	0	0	0	0	2 399	11 597	684	0	692	0	0	0	12 974
MK CAA	9 154	366	0	561	0	0	0	10 081	1 430	166	0	0	0	0	0	1 596	10 584	531	0	561	0	0	0	11 676
MoldATSA	2 059	268	0	103	0	0	0	2 430	987	108	0	0	0	0	0	1 095	3 046	376	0	103	0	0	0	3 525
MUAC	112 141	0	0	0	0	0	0	112 141	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	112 141	0	0	0	0	0	0	112 141
NATA Albania	9 817	132	178	691	768	0	0	11 587	1 773	53	0	0	162	0	0	1 988	11 590	186	178	691	930	0	0	13 575
NATS	620 553	865	6 028	0	0	0	0	627 447	154 130	567	118	0	0	0	0	154 815	774 683	1 432	6 146	0	0	0	0	782 261
NAV Portugal (FIR Lisboa)	105 622	5 578	0	9 652	0	0	0	120 853	24 182	0	0	0	0	0	0	24 182	129 805	5 578	0	9 652	0	0	0	145 035
NAVIAIR	57 299	4 411	5 194	7 180	3 632	0	0	77 715	27 539	0	69	0	0	0	0	27 609	84 839	4 411	5 263	7 180	3 632	0	0	105 324
Oro navigacija	11 932	6	618	0	0	0	0	12 556	2 261	13	90	0	0	0	0	2 364	14 193	19	708	0	0	0	0	14 920
PPL/PATA	70 788	754	10 645	5 060	0	0	0	87 247	7 008	64	329	0	0	0	0	7 401	77 796	818	10 974	5 060	0	0	0	94 648
ROMATSA	118 846	6 338	6 835	8 184	0	0	0	140 203	15 916	334	0	0	0	0	0	16 250	134 763	6 672	6 835	8 184	0	0	0	156 453
Skyguide	129 128	5 627	109	1 501	0	0	0	136 366	48 099	4 637	49	0	0	161	0	52 947	177 228	10 264	158	1 501	0	161	0	189 312
Slovenia Control	12 230	1 031	160	1 157	0	0	321	14 900	1 492	394	0	0	0	0	0	1 886	13 722	1 426	160	1 157	0	0	321	16 786
UkSATSE	72 855	800	0	4 997	0	0	0	78 652	18 138	216	0	0	0	0	0	18 354	90 993	1 016	0	4 997	0	0	0	97 006

Annex 6 - Table 0.2: Breakdown of total ANS costs (en-route, terminal and gate-to-gate), 2005

ANSPs	En-route ATM/CNS costs (in €'000)						Terminal ATM/CNS costs (in €'000)						Gate-to-gate ATM/CNS costs (in €'000)					
	Staff costs	Direct operating costs	Depreciation costs	Cost of capital	Exceptional items	**ATM/CNS provision costs**	Staff costs	Direct operating costs	Depreciation costs	Cost of capital	Exceptional items	**ATM/CNS provision costs**	Staff costs	Direct operating costs	Depreciation costs	Cost of capital	Exceptional items	**ATM/CNS provision costs**
Aena	432 561	84 034	60 241	33 445	0	610 281	216 821	34 979	28 600	17 096	0	297 496	649 382	119 013	88 841	50 541	0	907 777
ANS CR	23 768	11 509	8 995	6 349	0	50 620	17 585	4 149	3 021	1 947	0	26 702	41 352	15 657	12 016	8 296	0	77 322
ATSA Bulgaria	30 993	9 075	9 297	13 586	0	62 951	6 343	1 346	1 236	709	0	9 634	37 336	10 421	10 533	14 295	0	72 585
Austro Control	74 712	12 213	16 346	2 084	0	105 355	18 987	4 125	5 827	1 169	0	30 108	93 699	16 338	22 173	3 253	0	135 463
Avinor	39 718	14 690	8 612	2 896	0	65 916	27 881	19 698	5 344	2 656	0	55 579	67 599	34 388	13 955	5 552	0	121 494
Belgocontrol	71 096	14 171	10 232	3 720	1 569	100 788	22 053	4 508	3 873	503	6	30 943	93 149	18 679	14 105	4 223	1 575	131 731
Croatia Control	33 158	10 453	4 575	1 502	0	49 688	0	0	0	0	0	0	33 158	10 453	4 575	1 502	0	49 688
DCAC Cyprus	8 162	9 833	4 801	3 585	0	26 381	3 131	1 463	1 314	1 072	0	6 980	11 293	11 296	6 115	4 657	0	33 361
DFS	397 198	100 263	91 202	47 794	0	636 457	113 206	22 088	17 224	9 660	0	162 178	510 404	122 351	108 426	57 454	0	798 635
DHMI	53 900	38 130	21 837	25 749	0	139 616	15 011	11 600	13 521	10 628	0	50 760	68 911	49 730	35 358	36 377	0	190 376
DSNA	505 422	103 703	156 031	15 493	0	780 649	121 828	44 820	30 173	4 309	0	201 130	627 250	148 523	186 204	19 802	0	981 779
EANS	1 575	1 039	867	648	0	4 130	1 602	622	629	503	0	3 355	3 177	1 661	1 497	1 150	0	7 485
ENAV	241 458	160 096	82 511	24 318	7 292	515 675	45 474	28 498	25 169	6 039	2 107	107 286	286 932	188 595	107 679	30 357	9 399	622 961
Finavia	9 922	9 491	2 677	1 141	0	23 231	19 856	4 850	1 898	1 302	0	27 906	29 778	14 341	4 575	2 443	0	51 137
HCAA	107 604	18 275	12 990	5 399	0	144 268	0	0	0	0	0	0	107 604	18 275	12 990	5 399	0	144 268
HungaroControl	23 927	7 818	5 546	2 793	0	40 084	7 640	3 858	1 733	872	0	14 103	31 567	11 676	7 279	3 664	0	54 187
IAA	40 169	16 210	9 597	6 565	0	72 541	7 173	2 971	2 973	1 710	0	14 827	47 342	19 181	12 570	8 275	0	87 368
LFV/ANS Sweden	59 098	34 851	11 212	7 459	0	112 621	18 411	2 146	1 325	668	0	22 550	77 509	36 997	12 538	8 128	0	135 171
LGS	4 889	2 521	1 494	902	0	9 807	1 446	626	340	352	0	2 764	6 335	3 147	1 834	1 254	0	12 570
LPS	12 802	6 745	3 647	1 956	0	25 151	3 884	1 666	665	170	0	6 386	16 686	8 412	4 313	2 125	0	31 536
LVNL	55 632	10 558	9 853	2 544	0	78 587	55 409	11 426	10 173	6 125	14 000	97 133	111 041	21 984	20 026	8 669	14 000	175 720
MATS	3 955	3 813	1 253	315	0	9 335	957	913	313	79	0	2 262	4 912	4 726	1 566	394	0	11 597
MK CAA	3 896	2 203	1 996	1 058	0	9 154	653	459	207	110	0	1 430	4 550	2 662	2 204	1 168	0	10 584
MoldATSA	823	416	277	544	0	2 059	362	187	200	237	0	987	1 186	603	476	781	0	3 046
MUAC	85 091	11 755	13 491	1 804	0	112 141	n/appl	n/appl	n/appl	n/appl	n/appl	n/appl	85 091	11 755	13 491	1 804	0	112 141
NATA Albania	1 714	3 840	2 084	2 179	0	9 817	539	812	186	236	0	1 773	2 253	4 652	2 270	2 415	0	11 590
NATS	309 333	123 214	106 286	73 639	8 080	620 553	113 399	35 190	3 893	240	1 408	154 130	422 732	158 404	110 179	73 879	9 489	774 683
NAV Portugal (FIR Lisboa)	78 791	13 968	8 808	4 056	0	105 622	19 667	1 149	2 758	609	0	24 182	98 458	15 117	11 566	4 664	0	129 805
NAVIAIR	35 068	10 713	9 233	2 285	0	57 299	18 406	3 272	4 479	1 382	0	27 539	53 474	13 985	13 712	3 667	0	84 839
Oro navigacija	5 450	2 695	2 306	1 481	0	11 932	1 518	297	262	184	0	2 261	6 968	2 993	2 568	1 665	0	14 193
PPL/PATA	38 194	19 123	7 594	5 877	0	70 788	2 985	1 495	1 425	1 103	0	7 008	41 179	20 618	9 019	6 980	0	77 796
ROMATSA	53 771	33 469	19 685	11 921	0	118 846	9 165	3 740	1 893	1 119	0	15 916	62 936	37 209	21 578	13 040	0	134 763
Skyguide	83 126	19 244	14 752	8 858	3 148	129 128	33 354	6 599	5 097	3 049	0	48 099	116 480	25 843	19 849	11 907	3 148	177 228
Slovenia Control	7 140	2 823	1 578	689	0	12 230	1 042	222	146	82	0	1 492	8 182	3 045	1 724	771	0	13 722
UkSATSE	38 917	16 413	6 922	10 603	0	72 855	10 502	3 627	1 430	2 579	0	18 138	49 419	20 040	8 352	13 182	0	90 993
Total	2 973 032	939 370	728 828	335 236	20 089	4 996 555	936 291	263 401	177 326	78 497	17 521	1 473 037	3 909 323	1 202 771	906 155	413 733	37 610	6 469 592

Annex 6 - Table 0.3: Breakdown of ATM/CNS provision costs (en-route, terminal and gate-to-gate), 2005

ANSPs	ANSP BALANCE SHEET in (€'000)							
	Total NBV fixed assets in operation	Total NBV fixed assets under construction	Working capital	Net provisions for under (over) recovery	**Total capital employed**	Other assets	**Capital and reserves**	**Total long term liabilities**
Aena	683 479	267 294	0	39 154	989 927	-2 179	328 507	105 769
ANS CR	78 055	55 010	28 103	-9 336	151 832	0	123 204	28 628
ATSA Bulgaria	124 565	18 841	81 780	0	225 186	0	213 951	11 235
Austro Control	200 347	7 564	-13 352	-7 130	187 429	82 875	97 228	173 077
Avinor	90 648	4 546	37 464	-2 526	130 132	0	22 031	108 101
Belgocontrol	170 266	11 763	226	-17 100	165 155	87 521	193 382	59 294
Croatia Control	73 152	637	16 560	-989	89 361	1 881	53 513	37 728
DCAC Cyprus	213 397	0	0	1 027	214 424	0	0	0
DFS	798 159	114 844	192 655	-133 398	972 260	22 505	256 546	738 219
DHMI	241 052	89 004	76 031	-30 627	375 460	871	376 250	81
DSNA	629 687	53 191	145 027	-102 605	725 300	0	505 093	739 971
EANS	10 548	6	6 551	0	17 105	0	15 646	1 459
ENAV	677 964	270 887	248 677	16 001	1 213 530	105 238	1 210 255	108 512
Finavia	574 271	12 023	24 421	2 213	612 928	57 635	548 749	121 814
HCAA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
HungaroControl	49 081	3 945	41 788	-16 773	78 041	259	78 300	0
IAA	91 982	4 297	36 994	-4 454	128 819	0	72 870	55 949
LFV/ANS Sweden	150 618	9 480	-14 551	-21 308	124 240	0	123 342	897
LGS	12 759	2 917	7 500	0	23 176	2 277	25 178	275
LPS	25 976	2 461	18 645	0	47 083	1 245	41 861	6 466
LVNL	118 062	1 622	-2 797	8 332	125 219	84 521	27 094	182 646
MATS	8 400	0	-423	679	8 655	0	1 436	7 219
MK CAA	53 178	1 243	297	4 335	59 053	0	52 561	6 492
MoldATSA	3 568	1	884	63	4 516	123	4 040	599
MUAC	53 291	31 258	1 211	0	85 760	0	1 211	84 549
NATA Albania	13 132	6 992	8 605	-1 040	27 688	0	26 701	987
NATS	534 327	365 415	134 774	0	1 034 516	818 460	538 492	1 314 484
NAV Portugal (FIR Lisboa)	49 309	15 662	56 625	2 060	123 656	103 002	73 516	153 141
NAVIAIR	105 013	2 081	3 879	-577	110 397	0	96 415	13 983
Oro navigacija	21 659	1 189	10 609	0	33 457	1 844	35 301	1
PPL/PATA	256 136	124 241	38 195	0	418 572	99 554	460 980	57 145
ROMATSA	119 836	2 070	43 685	0	165 590	593	148 446	17 738
Skyguide	148 862	139 340	65 568	-11 080	342 689	0	148 279	194 410
Slovenia Control	11 308	289	2 060	420	14 077	0	2 087	11 990
UkSATSE	60 353	33 722	26 498	0	120 573	3 416	110 896	13 093
Total	6 452 439	1 653 835	1 324 188	-284 657	9 145 805	1 471 640	6 013 363	4 355 951

Annex 6 - Table 0.4: Balance Sheet data at ANSP level, 2005

ANSPs	Total ATCOs in OPS	ATCOs on other duties	Ab-initio trainies	On-the-job trainees	ATC assistants	OPS support (non-ATCO)	Technical support staff	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	1 884	272	0	3	169	33	674	397	23	481	3 936	1 062	1 736 928	822	1 270 238	483 899
ANS CR	160	6	22	17	85	40	141	268	28	61	828	72	117 144	88	139 920	15 667
ATSA Bulgaria	252	55	17	36	59	17	550	121	168	78	1 353	135	176 580	117	155 844	12 134
Austro Control	261	25	20	20	20	48	210	97	115	0	816	115	170 200	146	227 468	41 391
Avinor	444	15	10	1	169	0	200	36	29	0	904	190	313 310	254	418 846	53 312
Belgocontrol	233	54	0	27	49	13	214	172	129	88	979	97	121 847	135	174 402	33 675
Croatia Control	201	31	12	5	119	0	136	140	91	0	735	67	92 460	134	196 176	13 756
DCAC Cyprus	60	8	8	3	41	1	3	27	28	0	179	38	82 118	22	40 062	5 305
DFS	1 655	27	72	166	439	442	1 161	447	196	275	4 880	1 288	1 695 265	367	502 365	228 143
DHMI	566	30	14	19	31	185	1 279	1 129	375	1 060	4 688	281	514 230	285	521 550	17 002
DSNA	2 595	280	541	354	84	178	3 768	1 074	120	0	8 994	1 361	1 829 184	1 234	1 658 496	223 250
EANS	28	5	0	2	2	2	23	26	18	0	106	10	15 600	18	27 900	1 492
ENAV	1 297	214	122	0	614	0	274	552	56	0	3 129	800	1 215 200	497	771 344	162 988
Finavia	199	37	0	4	34	27	127	22	109	0	559	58	75 664	141	192 348	18 415
HCAA	599	68	0	0	0	0	380	60	6	0	1 113	599	n/a	n/a	n/a	53 149
HungaroControl	183	10	0	12	92	17	107	127	90	24	662	103	151 616	80	116 960	13 688
IAA	234	21	0	20	25	0	58	88	17	0	463	151	247 489	83	137 282	25 483
LFV/ANS Sweden	505	76	0	5	68	53	70	95	55	0	927	218	339 862	287	450 303	49 051
LGS	51	1	0	3	0	23	111	31	29	0	249	29	46 438	22	36 681	1 642
LPS	116	13	5	5	55	4	130	109	29	0	466	59	80 358	57	83 009	6 339
LVNL	202	15	45	18	112	145	304	132	8	21	1 002	71	110 050	131	203 050	25 944
MATS	55	2	0	0	21	0	73	18	2	7	178	27	46 958	28	48 692	1 782
MK CAA	58	14	20	19	9	8	52	54	51	15	300	26	35 776	32	44 032	1 508
MoldATSA	53	2	0	1	10	0	84	35	53	76	314	25	35 700	28	39 984	332
MUAC	210	24	32	27	53	67	115	39	0	9	576	210	309 819	n/appl	n/appl	34 100
NATA Albania	26	7	12	6	9	0	35	21	28	24	168	18	37 314	8	16 584	703
NATS	1 387	176	129	160	884	120	1 197	862	18	0	4 932	907	1 306 987	480	690 720	165 274
NAV Portugal (FIR Lisboa)	195	54	0	1	139	0	120	182	0	32	723	81	148 635	114	204 402	38 668
NAVIAIR	221	98	11	2	68	0	122	102	11	0	635	96	151 296	125	197 000	21 699
Oro navigacija	77	14	0	0	1	22	99	87	26	0	326	32	45 632	45	65 430	1 919
PPL/PATA	332	23	23	11	45	166	330	71	86	0	1 087	112	135 296	220	276 980	19 830
ROMATSA	537	47	0	4	0	25	470	438	242	133	1 896	313	453 850	224	376 320	29 847
Skyguide	290	51	49	79	81	140	314	101	99	0	1 203	181	238 140	109	140 582	43 070
Slovenia Control	64	12	7	6	12	0	29	12	24	0	166	35	50 680	29	41 992	5 209
UkSATSE	1 278	160	0	72	311	170	3 008	504	80	185	5 768	662	778 512	616	724 416	13 274
Total	16 507	1 947	1 170	1 108	3 910	1 946	15 968	7 676	2 438	2 569	55 239	9 529	12 906 138	6 978	10 191 378	1 862 941

Annex 6 - Table 0.5: Total staff and ATCOs in OPS data, 2005

ANSPs	Size of controlled airspace	Number of ACC operational units	Number of APP operational units	Number of TWR operational units	Number of AFIS	Total distance in charging area	Total IFR flights controlled by the ANSP	Total flight-hours controlled by the ANSP	IFR Airport mov controlled by the ANSP	Composite flight-hours
Aena	2 190 000	5	22	35	0	784 394 163	1 645 708	1 268 914	1 891 583	1 758 080
ANS CR	78 600	1	4	4	0	136 639 427	576 956	196 208	169 463	240 031
ATSA Bulgaria	145 120	2	3	5	0	99 537 599	398 539	130 427	68 941	148 255
Austro Control	82 300	1	6	6	0	184 127 815	831 441	264 120	370 470	359 924
Avinor	719 000	3	16	19	29	119 151 540	486 066	287 845	572 469	435 886
Belgocontrol	39 500	1	3	5	0	153 416 293	553 945	102 347	335 245	189 042
Croatia Control	158 000	1	7	10	0	84 152 522	322 663	136 695	75 878	156 317
DCAC Cyprus	172 058	1	2	2	0	68 448 991	208 490	95 940	61 432	111 826
DFS	389 895	5	0	17	0	925 396 968	2 651 315	1 283 046	2 045 362	1 811 979
DHMI	982 099	2	15	30	12	369 182 900	614 784	526 813	470 944	648 600
DSNA	1 159 347	5	11	77	0	1 361 906 111	2 655 494	2 077 416	1 852 204	2 556 398
EANS	77 102	1	1	1	0	32 076 896	123 294	41 098	35 326	50 233
ENAV	734 000	4	15	15	12	658 730 554	1 488 570	1 006 498	1 175 862	1 310 577
Finavia	415 000	2	5	19	6	60 026 748	230 880	113 737	259 163	180 757
HCAA	537 000	1	15	18	16	273 266 488	547 911	428 460	385 736	528 212
HungaroControl	92 800	1	1	1	2	135 303 535	579 113	194 635	123 301	226 521
IAA	454 000	2	3	3	0	156 407 874	542 425	246 079	252 864	311 470
LFV/ANS Sweden	626 000	2	26	35	2	228 946 605	662 210	406 232	550 507	548 594
LGS	95 300	1	2	2	1	33 264 312	154 260	53 286	34 520	62 213
LPS	48 800	1	2	6	9	50 853 122	317 703	70 730	39 044	80 827
LVNL	51 200	1	3	4	0	179 140 795	540 145	139 669	467 208	260 490
MATS	231 000	1	1	1	1	18 694 008	75 417	32 179	29 105	39 706
MK CAA	24 800	1	1	2	0	12 814 176	110 562	22 077	13 022	25 445
MoldATSA	37 300	1	1	3	0	4 316 606	25 883	6 885	11 105	9 757
MUAC	260 000	1	0	0	0	434 650 937	1 450 200	509 703	0	509 703
NATA Albania	36 000	1	1	1	1	19 091 045	116 040	25 867	16 614	30 163
NATS	880 000	4	13	15	0	746 274 197	2 414 587	1 335 030	1 897 133	1 825 631
NAV Portugal (FIR Lisboa)	666 000	1	4	6	0	166 342 794	374 882	235 519	235 540	296 430
NAVIAIR	158 000	1	8	7	1	112 218 511	614 476	197 144	359 638	290 147
Oro navigacija	75 409	1	3	4	0	20 822 586	120 611	31 880	37 516	41 582
PPL/PATA	334 000	1	3	11	0	174 982 093	403 834	254 259	216 795	310 322
ROMATSA	254 000	1	1	17	0	195 035 745	410 530	257 286	126 663	290 041
Skyguide	73 100	2	2	4	4	119 726 388	1 137 287	316 912	428 003	427 594
Slovenia Control	17 800	1	3	3	0	22 466 792	193 002	32 443	33 867	41 201
UkSATSE	773 000	6	6	32	0	151 657 758	312 053	243 243	149 845	281 993
Total		66	209	420	96	8 293 464 894		12 570 622	14 792 368	16 395 947

Annex 6 - Table 0.6: Operational data (ANSP and State level), 2005

ANNEX 7 - ANSP FACT SHEETS

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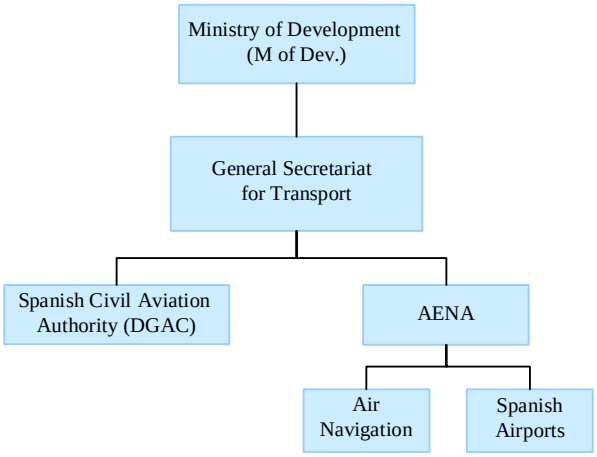
Aena, Spain

Aeropuertos Españoles y Navegación Aérea

www.aena.es

Institutional arrangements and links (2007)



Status (2007)

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.

Body responsible for:

Safety Regulation
Spanish Civil Aviation Authority - Government

Airspace Regulation
Spanish Civil Aviation Authority - Government

Economic Regulation
Government

Corporate governance structure (2007)

BOARD OF DIRECTORS (16 members)
Chairman + 14 members + Secretary
Chairman is the CEO.

EXECUTIVE COMMITTEE (13 members)
Chairman + 11 members + Secretary
Chairman is the CEO.

Aena (2007)

CHAIRMAN OF THE BOARD OF DIRECTORS:
Manuel Azuaga Moreno

DIRECTOR GENERAL (CEO):
Manuel Azuaga Moreno

DIRECTOR OF AIR NAVIGATION:
Francisco Quereda Rubio

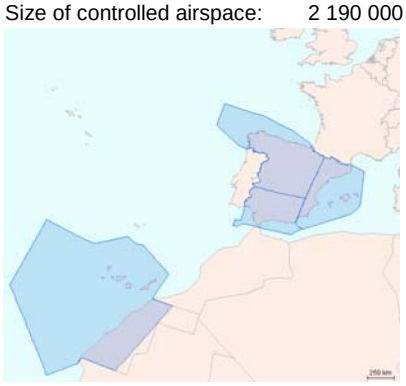
Scope of services

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

- Operation of 47 airports in Spain.
- Participation in the management of 12 airports in Mexico, 3 in Colombia, 1 in Cuba, 3 in United Kingdom and 1 in Sweden.

Size

Size of controlled airspace: 2 190 000 km²



Notes

Total flights in charging area: 1 645 708

Operational ATS units:

5 ACCs (Barcelona, Madrid, Canarias, Sevilla, Palma)
22 APPs
35 TWRs

Aena, Spain

Aeropuertos Españoles y Navegación Aérea

www.aena.es

Revenues 2005 in (€)	**En-route**	**Terminal**	**Other**	**Total**
Income from charges	673 439 889	168 437 399		841 877 288
Other revenues	16 552 452			16 552 452
Over/under recovery*	-3 846 728			-3 846 728
Total revenues net of over/under recovery	693 839 069	168 437 399		862 276 468

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	**En-route**	**Terminal**	**Other**	**Total**
Total costs	690 094 872	308 722 405		998 817 277
- MET costs	30 471 218	11 226 079		41 697 297
- Payment to national government	4 257 407			4 257 407
- EUROCONTROL costs	45 085 112			45 085 112
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**610 281 136**	**297 496 325**		**907 777 462**
Staff costs	432 561 205	216 821 272		649 382 478
Direct operating costs	84 033 798	34 978 847		119 012 646
Exceptional items				
Depreciation	60 240 971	28 600 068		88 841 039
Cost of capital	33 445 162	17 096 137		50 541 299

Capital employed 2005 in (€)	**En-route**	**Terminal**	**Other**	**Total**
Fixed assets in operation (NVB)	466 775 846	216 703 411		683 479 256
Fixed assets under construction	183 797 490	83 496 053		267 293 543
Working capital				
Net provision for over/under recovery	39 154 391			39 154 391
Total capital employed	689 727 727	300 199 464		989 927 190
Other assets				-2 179 046

Staff 2005	**En-route +Terminal**	**Other**	**Total**
Total staff	3 936		3 936
ATCOs in OPS	1 884		1 884
ATCOs hours on duty	3 007 166		3 007 166
Staff costs for ATCOs in OPS	483 899 085		483 899 085

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	1 163 746
ATCOs in OPS	1 062
ATCOs hours on duty	1 736 928
Number of sectors	52
Sum of sector-hours	336 517

En-route output data 2005	
Total IFR flights controlled by the ANSP	1 645 708
Total flight-hours controlled by ANSP	1 268 914

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	1 891 583
ATCOs in OPS	822
ATCOs hours on duty	1 270 238

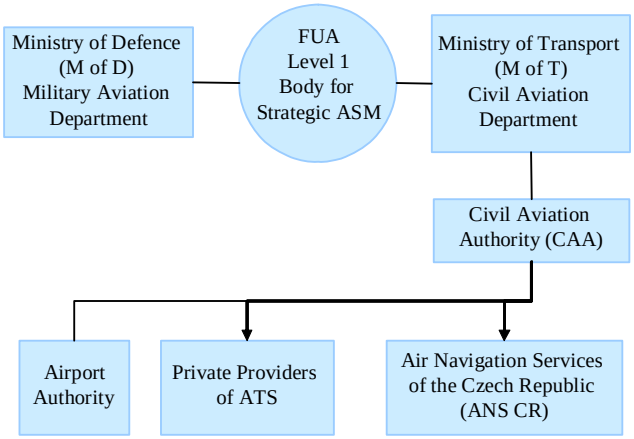
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	610 281 136	11%	-2%	4%	4%	3%
Total flight-hours controlled by ANSP	1 268 914	4%	3%	3%	3%	3%
ATCOs in OPS:	1 884	3%	3%	3%	3%	3%
ATCOs in OPS (ACC)	1 062					
ATCOs in OPS (APPs+TWRs)	822					
Total number of sectors (ACC)	52	21%	3%	3%		
Sum of sector-hours (ACC)	336 517	7%	6%	5%		

ANS CR, Czech Republic

Air Navigation Services of the Czech Republic

www.rlp.cz

Institutional arrangements and links (2007)



Status (2007)

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

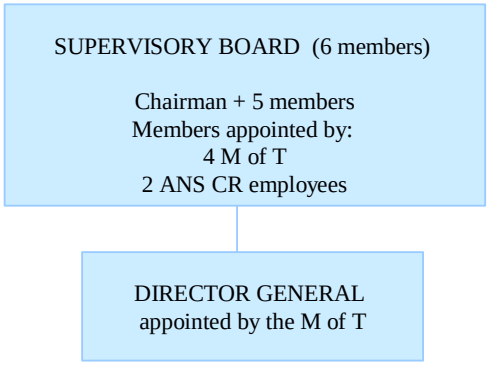
Body responsible for:

Safety Regulation
Civil Aviation Authority

Airspace Regulation
Body for Strategic ASM

Economic Regulation
Ministry of Transport

Corporate governance structure (2007)



ANS CR (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:
Ivan Krakora

DIRECTOR GENERAL (CEO):
Petr Materna

Scope of services

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

Size

Size of controlled airspace: 78 600 km²

Notes

Operational ATS units:

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

ANS CR, Czech Republic

Air Navigation Services of the Czech Republic

www.rlp.cz

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	50 047 145	28 177 532		78 224 677
Other revenues			3 254 971	3 254 971
Over/under recovery*	-5 333 999	1 691 651		-3 642 348
Total revenues net of over/under recovery	55 381 144	26 485 882	3 254 971	85 121 996

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	57 890 259	27 320 147		85 210 406
- MET costs	966 797	618 130		1 584 927
- Payment to national government				
- EUROCONTROL costs	3 690 837			3 690 837
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services	2 612 344			2 612 344
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**50 620 281**	**26 702 017**		**77 322 298**
Staff costs	23 767 688	17 584 806		41 352 494
Direct operating costs	11 508 749	4 148 681		15 657 429
Exceptional items				
Depreciation	8 994 896	3 021 395		12 016 291
Cost of capital	6 348 949	1 947 135		8 296 084

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	59 111 163	18 943 987		78 055 150
Fixed assets under construction	41 615 405	13 394 357		55 009 762
Working capital	23 131 311	4 971 353		28 102 664
Net provision for over/under recovery	-7 644 384	-1 691 583		-9 335 968
Total capital employed	116 213 494	35 618 113		151 831 608
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	828		828
ATCOs in OPS	160		160
ATCOs hours on duty	257 064		257 064
Staff costs for ATCOs in OPS	15 667 241		15 667 241

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	169 729
ATCOs in OPS	72
ATCOs hours on duty	117 144
Number of sectors	7
Sum of sector-hours	34 130

En-route output data 2005	
Total IFR flights controlled by the ANSP	576 956
Total flight-hours controlled by ANSP	196 208

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	169 463
ATCOs in OPS	88
ATCOs hours on duty	139 920

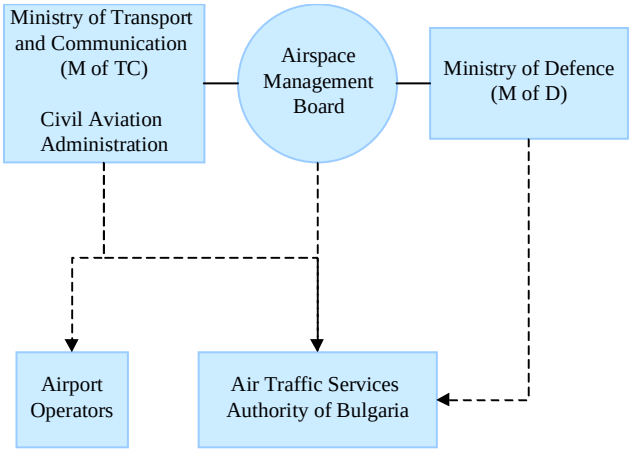
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	50 620 281	22%	14%	1%	2%	4%
Total flight-hours controlled by ANSP	196 208	2%	4%	3%	3%	3%
ATCOs in OPS:	160	9%	11%	6%	4%	5%
ATCOs in OPS (ACC)	72	13%	16%	7%	6%	7%
ATCOs in OPS (APPs+TWRs)	88	6%	6%	5%	2%	2%
Total number of sectors (ACC)	7	0%	29%	11%	0%	0%
Sum of sector-hours (ACC)	34 130	23%	6%	6%	8%	7%

ATSA Bulgaria, Bulgaria

Air Traffic Services Authority of Bulgaria

www.bulatsa.com

Institutional arrangements and links (2007)



Status (2007)

State enterprise as of April 2001 (Art 53 §1 of the Civil Aviation Law).

100% State-owned.

Body responsible for:

Safety Regulation

Civil Aviation Administration (Ministry of Transport and Communication)

Airspace Regulation

Airspace Management Board

Economic Regulation

Ministry of Transport and Communication

Corporate governance structure (2007)

CONTROL BOARD (3 members)
Chairman + 2 members
All members appointed by the M of TC.
The 3 members represent National Coordinator of the Stability Pact, Deputy Minister of Finance and Director of the Legal Directorate of the Ministry of Economy.

MANAGEMENT BOARD (5 members)
DG + 4 members
All members appointed by the M of TC.

ATSA Bulgaria (2007)

CHAIRMAN OF THE CONTROL BOARD:

Lyubomir Datzov

DIRECTOR GENERAL (CEO):

Emanuil Radev

Scope of services

- [x] GAT
- [ ] OAT
- [x] Upper Airspace
- [x] Lower Airspace
- [ ] Oceanic ANS

- Internal MET provision
- Training of ATCOs

Size

Size of controlled airspace: 145 120 km²

117 000 km² plus 28 120 km² over the Black Sea.

Notes

Operational ATS units:

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

ATSA Bulgaria, Bulgaria

Air Traffic Services Authority of Bulgaria

www.bulatsa.com

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	77 929 000	2 270 000		80 199 000
Other revenues	535 000	2 320 645		2 855 645
Over/under recovery*	4 707 000			4 707 000
Total revenues net of over/under recovery	73 757 000	4 590 645		78 347 645

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	73 799 000	11 474 000		85 273 000
- MET costs	4 225 000	1 195 000		5 420 000
- Payment to national government	994 000	606 000		1 600 000
- EUROCONTROL costs	5 309 000			5 309 000
- Irrecoverable value added tax (VAT)	320 000	39 000		359 000
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**62 951 000**	**9 634 000**		**72 585 000**
Staff costs	30 993 000	6 343 000		37 336 000
Direct operating costs	9 075 000	1 346 000		10 421 000
Exceptional items				
Depreciation	9 297 000	1 236 000		10 533 000
Cost of capital	13 586 000	709 000		14 295 000

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	112 954 000	11 611 000		124 565 000
Fixed assets under construction	17 393 000	1 448 000		18 841 000
Working capital	79 851 000	1 929 000		81 780 000
Net provision for over/under recovery				
Total capital employed	210 198 000	14 988 000		225 186 000
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	1 353		1 353
ATCOs in OPS	252		252
ATCOs hours on duty	332 424		332 424
Staff costs for ATCOs in OPS	12 134 000		12 134 000

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	120 224
ATCOs in OPS	135
ATCOs hours on duty	176 580
Number of sectors	7
Sum of sector-hours	38 032

En-route output data 2005	
Total IFR flights controlled by the ANSP	398 539
Total flight-hours controlled by ANSP	130 427

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	68 941
ATCOs in OPS	117
ATCOs hours on duty	155 844

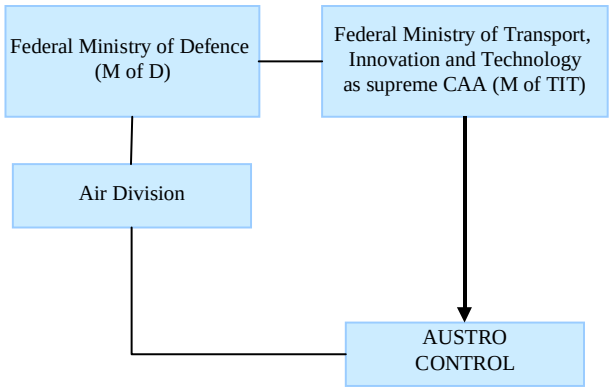
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	62 951 000	3%	-4%	-10%	-6%	-7%
Total flight-hours controlled by ANSP	130 427	11%	3%	2%	2%	2%
ATCOs in OPS:	252	-1%	-2%	-3%	0%	0%
ATCOs in OPS (ACC)	135	-1%	-2%	-2%	2%	2%
ATCOs in OPS (APPs+TWRs)	117	-2%	-3%	-4%	-2%	-2%
Total number of sectors (ACC)	7	0%	14%	0%	0%	0%
Sum of sector-hours (ACC)	38 032	0%	4%	0%	7%	0%

Austro Control, Austria

Österreichische Gesellschaft für Zivilluftfahrt mbH

www.austrocontrol.at

Institutional arrangements and links (2007)



Status (2007)

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

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 Commercialisation Act, the Managing Board, and Federal Acts relating to procurement and accounting.

Corporate governance structure (2007)

GENERAL ASSEMBLY - M of TIT

SUPERVISORY BOARD (9 members)
Chairman + 8 members
All members are appointed by M of TIT.
Members represent: 1 from M of Finance,1 from M of TIT, 2 from the field of aviation, 1 from the field of consulting, 3 from works council.

MANAGING BOARD (2 members)
CEO + 1 member
Members appointed by M of TIT.

Austro Control (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:
Gaston Glock

DIRECTOR GENERAL (CEO):
Dr. Christoph Baubin

Scope of services

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

- Internal MET provision.

Size

Size of controlled airspace: 82 300 km²

Notes

Operational ATS units:

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

Austro Control, Austria

Österreichische Gesellschaft für Zivilluftfahrt mbH

www.austrocontrol.at

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	147 246 000	36 504 000		183 750 000
Other revenues			22 305 000	22 305 000
Over/under recovery*	13 268 000	1 590 000		14 858 000
Total revenues net of over/under recovery	133 978 000	34 914 000	22 305 000	191 197 000

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	134 040 000	35 111 000	31 110 000	200 261 000
- MET costs	15 978 000	5 003 000		20 981 000
- Payment to national government				
- EUROCONTROL costs	10 129 000			10 129 000
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services	2 578 000			2 578 000
- Costs for other services provided	n/appl	n/appl	31 110 000	31 110 000
ATM/CNS provision costs:	**105 355 000**	**30 108 000**		**135 463 000**
Staff costs	74 712 000	18 987 000		93 699 000
Direct operating costs	12 213 000	4 125 000		16 338 000
Exceptional items				
Depreciation	16 346 000	5 827 000		22 173 000
Cost of capital	2 084 000	1 169 000		3 253 000

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	133 690 681	48 888 358	17 767 962	200 347 000
Fixed assets under construction	5 047 424	1 845 755	670 820	7 564 000
Working capital	-8 909 731	-3 258 134	-1 184 135	-13 352 000
Net provision for over/under recovery	-6 286 000	-844 000		-7 130 000
Total capital employed	123 542 373	46 631 979	17 254 648	187 429 000
Other assets				82 875 000

Staff 2005	En-route +Terminal	Other	Total
Total staff	816	107	923
ATCOs in OPS	261		261
ATCOs hours on duty	397 668		397 668
Staff costs for ATCOs in OPS	41 391 000		41 391 000

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	196 046
ATCOs in OPS	115
ATCOs hours on duty	170 200
Number of sectors	12
Sum of sector-hours	51 495

En-route output data 2005	
Total IFR flights controlled by the ANSP	831 441
Total flight-hours controlled by ANSP	264 120

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	370 470
ATCOs in OPS	146
ATCOs hours on duty	227 468

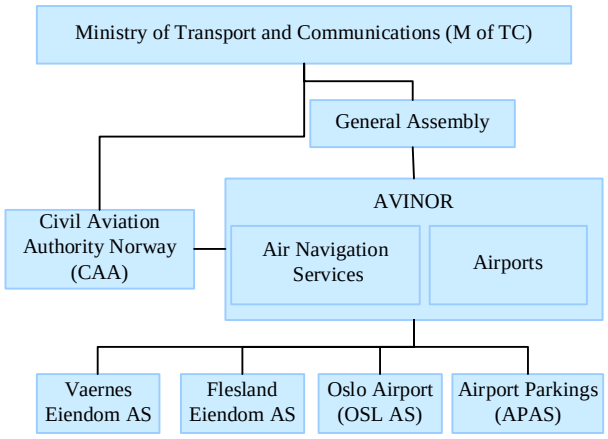
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	105 355 000	8%	0%	-2%	0%	0%
Total flight-hours controlled by ANSP	264 120	6%	4%	4%	4%	4%
ATCOs in OPS:	261	0%	0%	0%	0%	0%
ATCOs in OPS (ACC)	115	-2%	6%	2%	4%	2%
ATCOs in OPS (APPs+TWRs)	146	-3%	9%	0%	1%	3%
Total number of sectors (ACC)	12	17%	14%	0%	6%	0%
Sum of sector-hours (ACC)	51 495	3%	3%	1%	4%	0%

Avinor, Norway

AVINOR

www.avinor.no

Institutional arrangements and links (2007)



Status (2007)

State owned limited company.Civil ANSP and airport owner/ operator. Independent of 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 (2007)

SUPERVISORY BOARD (9 members)
Chairman + 8 members
Members represent: 6 M of TC, 3 staff.

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

Avinor (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:

Inge K. Hansen

CHIEF EXECUTIVE OFFICER:

Sverre Quale

Scope of services

- ☑ GAT
- ☑ OAT
- ☑ Upper Airspace
- ☑ Lower Airspace
- ☑ Oceanic ANS

AVINOR owns and operates 46 airports, 11 in association with Armed Forces.

Size

Size of controlled airspace: 2 029 000 km²

Continental: 719 000 km² - Oceanic:1 310 000 km²

Notes

Operational ATS units:

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

Avinor, Norway

AVINOR

www.avinor.no

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	73 224 125		4 130 125	77 354 250
Other revenues		55 578 500	7 287 375	62 865 875
Over/under recovery*	-2 514 375			-2 514 375
Total revenues net of over/under recovery	75 738 500	55 578 500	11 417 500	142 734 500

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	73 300 000	57 373 000	23 382 500	154 055 500
- MET costs	1 022 125	1 794 500	1 726 250	4 542 875
- Payment to national government				
- EUROCONTROL costs	6 362 250			6 362 250
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	21 656 250	21 656 250
ATM/CNS provision costs:	**65 915 625**	**55 578 500**		**121 494 125**
Staff costs	39 717 500	27 881 375		67 598 875
Direct operating costs	14 690 125	19 697 875		34 388 000
Exceptional items				
Depreciation	8 611 625	5 343 750		13 955 375
Cost of capital	2 896 375	2 655 500		5 551 875

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	50 746 125	39 901 500		90 647 625
Fixed assets under construction	2 545 125	2 001 125		4 546 250
Working capital	20 717 250	16 746 500		37 463 750
Net provision for over/under recovery	-2 525 625			-2 525 625
Total capital employed	71 482 875	58 649 125		130 132 000
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	904	119	1 023
ATCOs in OPS	444	8	452
ATCOs hours on duty	732 156		732 156
Staff costs for ATCOs in OPS	53 311 500		53 311 500

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	216 972
ATCOs in OPS	190
ATCOs hours on duty	313 310
Number of sectors	15
Sum of sector-hours	105 512

En-route output data 2005	
Total IFR flights controlled by the ANSP	486 066
Total flight-hours controlled by ANSP	287 845

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	572 469
ATCOs in OPS	254
ATCOs hours on duty	418 846

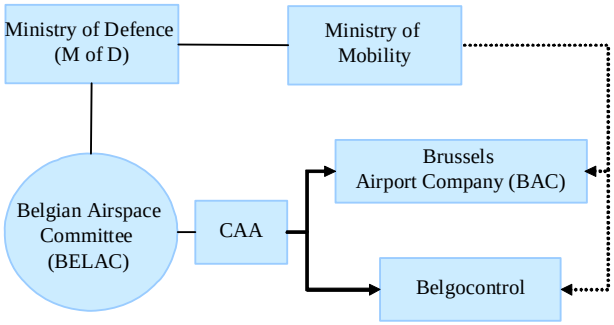
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	65 915 625	9%	11%	3%	6%	-7%
Total flight-hours controlled by ANSP	287 845	2%	5%	4%	4%	4%
ATCOs in OPS:	444	-6%	1%	2%	6%	2%
ATCOs in OPS (ACC)	190	-7%	4%	5%	5%	2%
ATCOs in OPS (APPs+TWRs)	254	-4%	-1%	-1%	6%	2%
Total number of sectors (ACC)	15	-20%				
Sum of sector-hours (ACC)	105 512					

Belgocontrol, Belgium

Belgocontrol

www.belgocontrol.be

Institutional arrangements and links (2007)



Status (2007)

Public Autonomous Enterprise as of 1998 under a management contract.

100% State-owned.

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 (2007)

SUPERVISORY BOARD (10 members)
Chairman + CEO + 8 members
Members appointed by Ministry of Mobility
CEO represents staff.

EXECUTIVE BOARD (4 members)
CEO + 3 members

Belgocontrol (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:
Charles-Louis d'Arenberg

DIRECTOR GENERAL (CEO):
Jean-Claude Tintin

Scope of services

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

Belgocontrol controls lower airspace up to FL 245, including Luxembourg airspace above FL 135.

Upper airspace (> FL 245) is controlled by Maastricht UAC.

Size

Size of controlled airspace: 39 500 km²

Notes

Operational ATS units:

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

Belgocontrol, Belgium

Belgocontrol

www.belgocontrol.be

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	157 768 000			157 768 000
Other revenues	15 644 000	31 690 000	2 946 000	50 280 000
Over/under recovery*	4 008 000			4 008 000
Total revenues net of over/under recovery	169 404 000	31 690 000	2 946 000	204 040 000

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	160 828 000	35 832 000	5 195 000	201 855 000
- MET costs	8 997 000	4 883 000		13 880 000
- Payment to national government				
- EUROCONTROL costs	13 594 000			13 594 000
- Irrecoverable value added tax (VAT)	16 000	6 000		22 000
- Costs for delegation of services	37 433 000			37 433 000
- Costs for other services provided	n/appl	n/appl	5 195 000	5 195 000
ATM/CNS provision costs:	**100 788 000**	**30 943 000**		**131 731 000**
Staff costs	71 096 000	22 053 000		93 149 000
Direct operating costs	14 171 000	4 508 000		18 679 000
Exceptional items	1 569 000	6 000		1 575 000
Depreciation	10 232 000	3 873 000		14 105 000
Cost of capital	3 720 000	503 000		4 223 000

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	99 500 000	42 378 000	28 388 000	170 266 000
Fixed assets under construction	7 642 000	3 015 000	1 106 000	11 763 000
Working capital	188 375	34 424	3 200	226 000
Net provision for over/under recovery	-17 100 000			-17 100 000
Total capital employed	90 230 375	45 427 424	29 497 200	165 155 000
Other assets				87 521 000

Staff 2005	En-route +Terminal	Other	Total
Total staff	979	23	1 002
ATCOs in OPS	233		233
ATCOs hours on duty	296 249		296 249
Staff costs for ATCOs in OPS	33 675 000		33 675 000

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	78 762
ATCOs in OPS	97
ATCOs hours on duty	121 847
Number of sectors	7
Sum of sector-hours	38 584

En-route output data 2005	
Total IFR flights controlled by the ANSP	553 945
Total flight-hours controlled by ANSP	102 347

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	335 245
ATCOs in OPS	135
ATCOs hours on duty	174 402

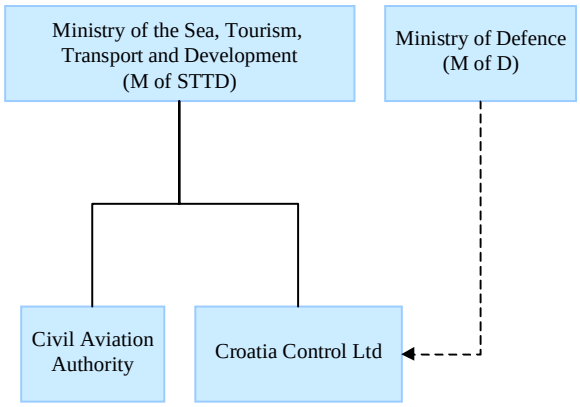
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	100 788 000	3%	0%	-1%	1%	-1%
Total flight-hours controlled by ANSP	102 347	4%	2%	3%	3%	3%
ATCOs in OPS:	233	0%	-2%	0%	-3%	-1%
ATCOs in OPS (ACC)	97	-2%	-3%	-1%	-3%	-2%
ATCOs in OPS (APPs+TWRs)	135	1%	-1%	0%	-2%	0%
Total number of sectors (ACC)	7	0%	0%	0%	0%	0%
Sum of sector-hours (ACC)	38 584	-2%	0%	0%	0%	0%

Croatia Control, Croatia

Croatia Control Ltd, Croatian Air Navigation Services

www.crocontrol.hr

Institutional arrangements and links (2007)



Status (2007)

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

Body responsible for:

Safety Regulation
Croatian Civil Aviation Authority

Airspace Regulation
Croatia Control Ltd and Military Authorities

Economic Regulation
State Law and Croatia Control Ltd

Corporate governance structure (2007)

ASSEMBLY (3 members)
The President represents M of STTD (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 STTD, 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 (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:
Ante Cajic

DIRECTOR GENERAL:
Dražen Ramljak

Scope of services

- [x] GAT
- [x] OAT
- [x] Upper Airspace
- [x] Lower Airspace
- [ ] Oceanic ANS

ATS provision in Sarajevo FIR (Bosnia & Herzegovina) within FL 100 to FL 285 and FL 285 to FL 460.

Size

Size of controlled airspace: 158 000 km²

Notes

Operational ATS units:

1	ACC	(Zagreb)
7	APPs	(Zagreb, Pula, Split, Dubrovnik, Rijeka, Zadar, Osijek)
2	TWR/APP	(Brac, Losinj)
8	TWRs	(Zagreb, Pula, Split, Dubrovnik, Rijeka, Zadar, Osijek, Lucko)
1	AFIS	(to be opened soon and located as a sector at Zagreb ACC)

Croatia Control, Croatia

Croatia Control Ltd, Croatian Air Navigation Services

www.crocontrol.hr

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	47 442 126			47 442 126
Other revenues	5 688 236		2 480 330	8 168 566
Over/under recovery*	-960 952			-960 952
Total revenues net of over/under recovery	54 091 314		2 480 330	56 571 644

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	55 743 470			55 743 470
- MET costs	1 350 768			1 350 768
- Payment to national government				
- EUROCONTROL costs	3 061 607			3 061 607
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services	1 643 503			1 643 503
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**49 687 593**			**49 687 593**
Staff costs	33 158 189			33 158 189
Direct operating costs	10 453 244			10 453 244
Exceptional items				
Depreciation	4 574 630			4 574 630
Cost of capital	1 501 530			1 501 530

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	73 152 023			73 152 023
Fixed assets under construction	637 119			637 119
Working capital	16 560 097			16 560 097
Net provision for over/under recovery	-988 535			-988 535
Total capital employed	89 360 704			89 360 704
Other assets				1 881 070

Staff 2005	En-route +Terminal	Other	Total
Total staff	735		735
ATCOs in OPS	201		201
ATCOs hours on duty	288 636		288 636
Staff costs for ATCOs in OPS	13 756 475		13 756 475

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	120 356
ATCOs in OPS	67
ATCOs hours on duty	92 460
Number of sectors	7
Sum of sector-hours	32 120

En-route output data 2005	
Total IFR flights controlled by the ANSP	322 663
Total flight-hours controlled by ANSP	136 695

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	75 878
ATCOs in OPS	134
ATCOs hours on duty	196 176

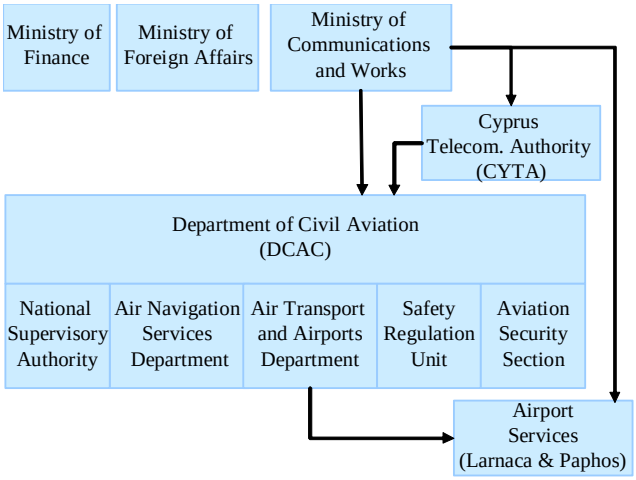
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	49 687 593	1%	1%			
Total flight-hours controlled by ANSP	136 695	2%	5%	5%	5%	5%
ATCOs in OPS:	201	3%				
ATCOs in OPS (ACC)	67	4%	17%	6%		
ATCOs in OPS (APPs+TWRs)	134	4%				
Total number of sectors (ACC)	7	14%	13%	0%	0%	11%
Sum of sector-hours (ACC)	32 120					

DCAC Cyprus, Cyprus

Department of Civil Aviation of Cyprus

www.mcw.gov.cy

Institutional arrangements and links (2007)



Status (2007)

State body.

100% State-owned.

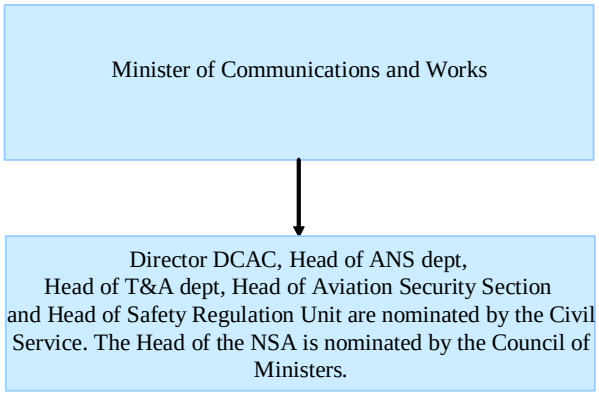
Body responsible for:

Safety Regulation
Department of Civil Aviation of Cyprus

Airspace Regulation
Department of Civil Aviation of Cyprus

Economic Regulation
Ministry of Finance

Corporate governance structure (2007)



DCAC Cyprus (2007)

DIRECTOR OF DCAC:
Leonidas Leonidhou

HEAD OF NSA:
Panayiota Demetriou

HEAD OF ANS DEPARTMENT (COO):
Nicos Nicolaou

HEAD OF AIR TRANSPORT AND AIRPORTS DEPARTMENT:
Iacovos Demetriou

Scope of services

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

DCAC Cyprus owns and operates 2 airports.

Size

Size of controlled airspace: 172 058 km²

Notes

Operational ATS units:

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

DCAC Cyprus, Cyprus

Department of Civil Aviation of Cyprus

www.mcw.gov.cy

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	34 060 817	10 163 336	62 700 261	106 924 414
Other revenues				
Over/under recovery*	1 025 195			1 025 195
Total revenues net of over/under recovery	33 035 621	10 163 336	62 700 261	105 899 218

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	31 584 709	8 104 257	7 486 360	47 175 326
- MET costs	2 802 780	806 255		3 609 036
- Payment to national government	550 825	317 984		868 810
- EUROCONTROL costs	1 850 565			1 850 565
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	7 486 360	7 486 360
ATM/CNS provision costs:	**26 380 539**	**6 980 017**		**33 360 556**
Staff costs	8 161 599	3 131 190		11 292 789
Direct operating costs	9 833 189	1 463 076		11 296 264
Exceptional items				
Depreciation	4 801 043	1 313 640		6 114 683
Cost of capital	3 584 709	1 072 111		4 656 820

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	37 607 298		175 789 748	213 397 046
Fixed assets under construction				
Working capital				
Net provision for over/under recovery	1 026 933			1 026 933
Total capital employed	38 634 231		175 789 748	214 423 979
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	179	90	269
ATCOs in OPS	60		60
ATCOs hours on duty	122 180		122 180
Staff costs for ATCOs in OPS	5 305 238		5 305 238

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	89 803
ATCOs in OPS	38
ATCOs hours on duty	82 118
Number of sectors	3
Sum of sector-hours	20 710

En-route output data 2005	
Total IFR flights controlled by the ANSP	208 490
Total flight-hours controlled by ANSP	95 940

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	61 432
ATCOs in OPS	22
ATCOs hours on duty	40 062

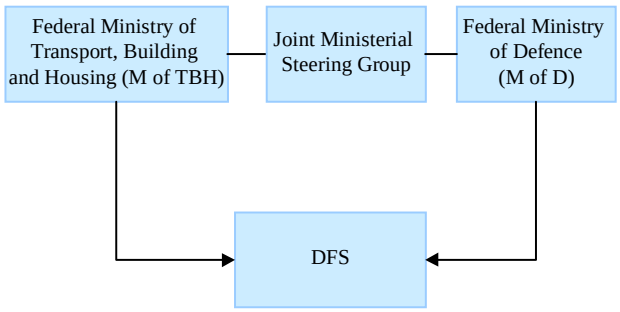
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	26 380 539	5%	-2%	8%	1%	1%
Total flight-hours controlled by ANSP	95 940	4%	6%	5%	5%	5%
ATCOs in OPS:	60	8%	-2%	0%	11%	11%
ATCOs in OPS (ACC)	38	11%	12%	0%	6%	8%
ATCOs in OPS (APPs+TWRs)	22	5%	-26%	0%	24%	19%
Total number of sectors (ACC)	3	0%	0%	33%	0%	25%
Sum of sector-hours (ACC)	20 710	0%	0%	3%	2%	5%

DFS, Germany

Deutsche Flugsicherung GmbH

www.dfs.de

Institutional arrangements and links (2007)



Status (2007)

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

Body responsible for:

Safety Regulation
Federal Ministry of Transport, Building and Housing

Airspace Regulation
Federal Ministry of Transport, Building and Housing

Economic Regulation
Federal Ministry of Transport, Building and Housing

Corporate governance structure (2007)

SHAREHOLDER Meeting with M of TBH

SUPERVISORY BOARD (12 Members)
Chairman + 11 members
Chairman appointed by the Government.
Members represent: 1 (Chairman) from M of TBH
2 M of TBH
2 M of D, 1 M of F, 1 M of I, 6 staff reps.
Chairman has a casting vote.

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

DFS (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:
Jorg Hennerkes

CHAIRMAN OF THE EXECUTIVE BOARD:
Dieter Kaden

Scope of services

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

- DFS controls both upper and lower airspace, except GAT for the upper airspace in North-Western Germany.

- Other ANS.

- Consulting, training, engineering & maintenance services.

Size

Size of controlled airspace: 389 895 km²

Notes

Operational ATS units:

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

17 TWRs

DFS, Germany

Deutsche Flugsicherung GmbH

www.dfs.de

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	784 868 000	154 173 000	6 353 000	945 394 000
Other revenues			107 489 000	107 489 000
Over/under recovery*	-18 194 683	-8 004 801		-26 199 484
Total revenues net of over/under recovery	803 062 683	162 177 801	113 842 000	1 079 082 484

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	825 899 000	162 178 000	110 041 000	1 098 118 000
- MET costs	49 446 000			49 446 000
- Payment to national government				
- EUROCONTROL costs	87 861 490			87 861 490
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services	52 134 510			52 134 510
- Costs for other services provided	n/appl	n/appl	110 041 000	110 041 000
ATM/CNS provision costs:	**636 457 000**	**162 178 000**		**798 635 000**
Staff costs	397 198 000	113 206 000		510 404 000
Direct operating costs	100 263 000	22 088 000		122 351 000
Exceptional items				
Depreciation	91 202 000	17 224 000		108 426 000
Cost of capital	47 794 000	9 660 000		57 454 000

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	570 523 760	107 746 554	119 888 685	798 159 000
Fixed assets under construction	82 090 449	15 503 233	17 250 317	114 844 000
Working capital	137 709 580	26 007 213	28 938 007	192 654 800
Net provision for over/under recovery	-94 500 317	-38 897 199		-133 397 516
Total capital employed	695 823 473	110 359 802	166 077 010	972 260 284
Other assets				22 505 000

Staff 2005	En-route +Terminal	Other	Total
Total staff	4 880	218	5 098
ATCOs in OPS	1 655	84	1 739
ATCOs hours on duty	2 197 630		2 197 630
Staff costs for ATCOs in OPS	228 143 000		228 143 000

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	1 283 047
ATCOs in OPS	1 288
ATCOs hours on duty	1 695 265
Number of sectors	98
Sum of sector-hours	677 232

En-route output data 2005	
Total IFR flights controlled by the ANSP	2 651 315
Total flight-hours controlled by ANSP	1 283 046

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	2 045 362
ATCOs in OPS	367
ATCOs hours on duty	502 365

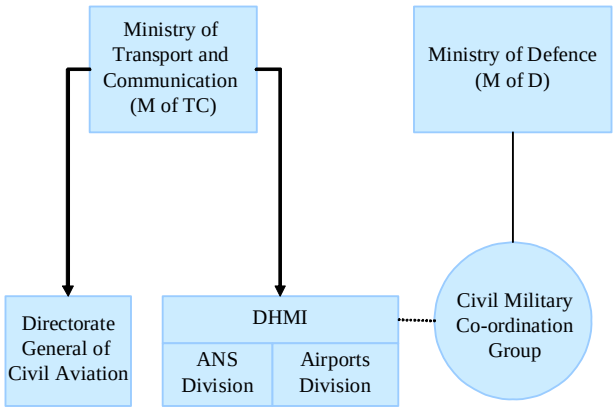
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	636 457 000	-1%	6%	1%	1%	1%
Total flight-hours controlled by ANSP	1 283 046	4%	4%	4%	3%	4%
ATCOs in OPS:	1 655	4%	1%	2%	-1%	-1%
ATCOs in OPS (ACC)	1 288	4%	1%	2%	-1%	-1%
ATCOs in OPS (APPs+TWRs)	367	2%	0%	3%	-1%	0%
Total number of sectors (ACC)	98	1%	2%	1%	1%	0%
Sum of sector-hours (ACC)	677 232					

DHMI, Turkey

General Directorate of State Airports Authority

www.dhmi.gov.tr

Institutional arrangements and links (2007)



Status (2007)

Autonomous State body - 100% State-owned.

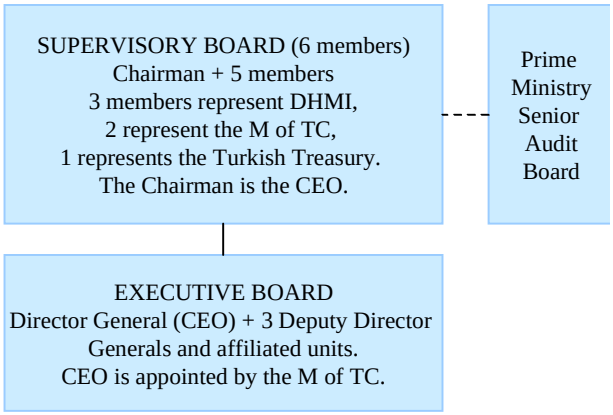
Body responsible for:

Safety Regulation
Directorate General of Civil Aviation

Airspace Regulation
General Directorate of DHMI

Economic Regulation
General Directorate of DHMI

Corporate governance structure (2007)



DHMI (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:
Mr. Mahmut Tekin

DIRECTOR GENERAL (CEO):
Mr. Mahmut Tekin

DIRECTOR ANS DIVISION:
Mr. Mustafa Kiliç

Scope of services

- [x] GAT
- [x] OAT
- [x] Upper Airspace
- [x] Lower Airspace
- [ ] Oceanic ANS

- DHMI is responsible for the administration of 37 State airports. ATS services are provided by DHMI in 32 State airports.

Size

Size of controlled airspace: 982 099 km²

Notes

Operational ATS units:

2 ACCs (Ankara, Istanbul)
15 APPs
32 TWRs
12 AFISs

DHMI, Turkey

General Directorate of State Airports Authority

www.dhmi.gov.tr

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	170 751 000			170 751 000
Other revenues	1 351 000	80 874 000	1 148 000	83 373 000
Over/under recovery*	5 618 000			5 618 000
Total revenues net of over/under recovery	166 484 000	80 874 000	1 148 000	248 506 000

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	173 802 000	50 760 160		224 562 160
- MET costs	15 481 000			15 481 000
- Payment to national government	5 042 000			5 042 000
- EUROCONTROL costs	13 663 000			13 663 000
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**139 616 000**	**50 760 160**		**190 376 160**
Staff costs	53 900 000	15 011 000		68 911 000
Direct operating costs	38 130 000	11 600 000		49 730 000
Exceptional items				
Depreciation	21 837 000	13 521 000		35 358 000
Cost of capital	25 749 000	10 628 160		36 377 160

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	174 432 600	66 139 000	480 000	241 051 600
Fixed assets under construction	42 778 300	46 042 000	184 000	89 004 300
Working capital	55 290 000	20 671 000	70 000	76 031 000
Net provision for over/under recovery	-30 627 000			-30 627 000
Total capital employed	241 873 900	132 852 000	734 000	375 459 900
Other assets				871 000

Staff 2005	En-route +Terminal	Other	Total
Total staff	4 688	47	4 735
ATCOs in OPS	566		566
ATCOs hours on duty	1 035 780		1 035 780
Staff costs for ATCOs in OPS	17 002 000		17 002 000

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	499 054
ATCOs in OPS	281
ATCOs hours on duty	514 230
Number of sectors	16
Sum of sector-hours	140 160

En-route output data 2005	
Total IFR flights controlled by the ANSP	614 784
Total flight-hours controlled by ANSP	526 813

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	470 944
ATCOs in OPS	285
ATCOs hours on duty	521 550

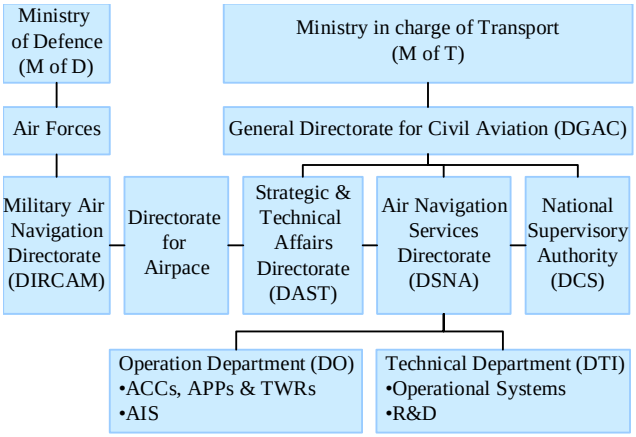
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	139 616 000	7%	-3%	-2%	0%	0%
Total flight-hours controlled by ANSP	526 813	9%	6%	6%	7%	8%
ATCOs in OPS:	566	8%	8%	7%	7%	6%
ATCOs in OPS (ACC)	281	8%	8%	7%	7%	6%
ATCOs in OPS (APPs+TWRs)	285	8%	7%	7%	6%	6%
Total number of sectors (ACC)	16	0%	0%	25%	0%	50%
Sum of sector-hours (ACC)	140 160	0%	0%	25%	0%	50%

DSNA, France

Directorate of Air Navigation Services

www.aviation-civile.gouv.fr

Institutional arrangements and links (2007)



Status (2007)

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

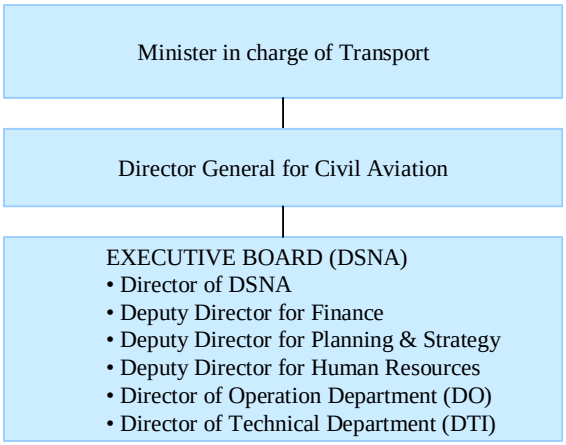
Body responsible for:

Safety Regulation
DAST

Airspace Regulation
DAST + DIRCAM

Economic Regulation
The Parliament votes each year the "Loi de Finances" the French budget, to which the additive budget of the civil aviation service providers (BACEA) is attached. Since 1995, a yearly BACEA assessment report is issued. The report reviews the balance of accounts, revenues and expenditures and contains an appraisal of the current situation. As any French civil service administration, the DSNA is subject to random and frequent oversight from the "Cour des Comptes".

Corporate governance structure (2007)



DSNA (2007)

DIRECTOR OF DSNA :
M. Hamy

DIRECTOR OF OPERATION DEPARTEMENT (DO):
F. Deygout

DIRECTOR OF TECHNICAL DEPARTEMENT (DTI):
P. Merlot

Scope of services

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

Delegation of airspace to Skyguide and Jersey.

Size

Size of controlled airspace: 1 159 347 km²

Notes

Operational ATS units:

5 ACCs (Paris, Bordeaux, Marseille, Brest, Reims)
11 APPs/TWRs
65 TWRs

DSNA, France

Directorate of Air Navigation Services

www.aviation-civile.gouv.fr

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	974 775 619	195 349 281		1 170 124 900
Other revenues	21 183 389	36 316 142		57 499 531
Over/under recovery*	37 502 229	12 032 545		49 534 774
Total revenues net of over/under recovery	958 456 779	219 632 877		1 178 089 657

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	958 456 779	219 632 877		1 178 089 657
- MET costs	57 578 640	18 503 073		76 081 713
- Payment to national government				
- EUROCONTROL costs	79 989 540			79 989 540
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services	40 239 522			40 239 522
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**780 649 077**	**201 129 805**		**981 778 882**
Staff costs	505 421 827	121 828 150		627 249 976
Direct operating costs	103 703 391	44 820 038		148 523 429
Exceptional items				
Depreciation	156 030 572	30 173 093		186 203 665
Cost of capital	15 493 288	4 308 524		19 801 811

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	495 834 920	133 852 277		629 687 197
Fixed assets under construction	43 116 080	10 074 903		53 190 983
Working capital	119 462 272	25 564 515		145 026 788
Net provision for over/under recovery	-94 945 966	-7 659 048		-102 605 014
Total capital employed	563 467 306	161 832 647		725 299 953
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	8 994		8 994
ATCOs in OPS	2 595		2 595
ATCOs hours on duty	3 487 680		3 487 680
Staff costs for ATCOs in OPS	223 250 016		223 250 016

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	1 642 504
ATCOs in OPS	1 361
ATCOs hours on duty	1 829 184
Number of sectors	91
Sum of sector-hours	520 590

En-route output data 2005	
Total IFR flights controlled by the ANSP	2 655 494
Total flight-hours controlled by ANSP	2 077 416

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	1 852 204
ATCOs in OPS	1 234
ATCOs hours on duty	1 658 496

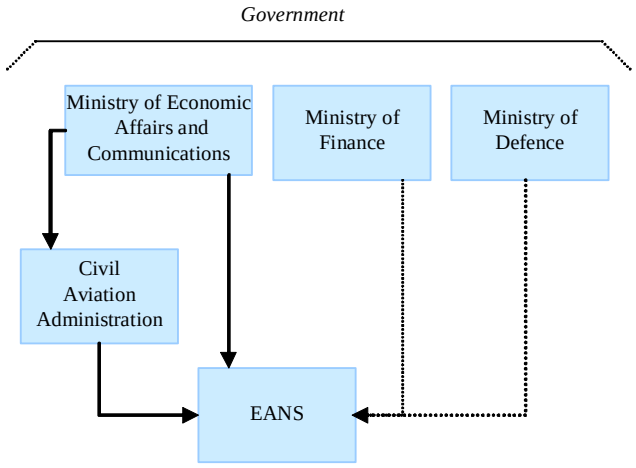
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	780 649 077	9%	4%	2%	3%	1%
Total flight-hours controlled by ANSP	2 077 416	3%	3%	3%	3%	3%
ATCOs in OPS:	2 595	1%	1%	1%	1%	1%
ATCOs in OPS (ACC)	1 361	1%	1%	1%	1%	1%
ATCOs in OPS (APPs+TWRs)	1 234	1%	1%	1%	1%	1%
Total number of sectors (ACC)	91	1%	1%	1%	1%	1%
Sum of sector-hours (ACC)	520 590	1%	1%	1%	1%	1%

EANS, Estonia

Estonian Air Navigation Services

www.eans.ee

Institutional arrangements and links (2007)



Status (2007)

Joint-stock company as of 1998.

100% State-owned.

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 (2007)

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

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

EANS (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:
Andres Uusma

CHAIRMAN OF THE MANAGEMENT BOARD & CEO:
Tanel Rautits

Scope of services

- [x] GAT
- [ ] OAT
- [x] Upper Airspace
- [x] Lower Airspace
- [ ] Oceanic ANS

- technical services (NAV/COMM/SUR)
- aeronautical information services
- consultancy services
- control Tallinn Aerodrome

Size

Size of controlled airspace: 77 102 km²

Notes

Estonia is not member of EUROCONTROL.
Estonia does not belong to IFPS zone.

Operational ATS units:

1 ACC (Tallinn)
1 APP (Tallinn)
1 TWR (Tallinn)

EANS, Estonia

Estonian Air Navigation Services

www.eans.ee

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	11 219 020	1 028 823		12 247 843
Other revenues			118 873	118 873
Over/under recovery*				
Total revenues net of over/under recovery	11 219 020	1 028 823	118 873	12 366 716

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	4 160 329	3 460 219	183 743	7 804 290
- MET costs	30 741	105 132		135 873
- Payment to national government				
- EUROCONTROL costs				
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	183 743	183 743
ATM/CNS provision costs:	**4 129 588**	**3 355 087**		**7 484 675**
Staff costs	1 575 126	1 601 649		3 176 775
Direct operating costs	1 039 432	621 589		1 661 021
Exceptional items				
Depreciation	867 323	629 194		1 496 517
Cost of capital	647 706	502 655		1 150 361

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	6 017 064	4 365 054	165 846	10 547 964
Fixed assets under construction	3 451	2 556	64	6 071
Working capital	6 015 850	473 573	61 098	6 550 521
Net provision for over/under recovery				
Total capital employed	12 036 365	4 841 184	227 008	17 104 557
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	106	5	111
ATCOs in OPS	28		28
ATCOs hours on duty	43 500		43 500
Staff costs for ATCOs in OPS	1 492 235		1 492 235

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	37 550
ATCOs in OPS	10
ATCOs hours on duty	15 600
Number of sectors	3
Sum of sector-hours	10 900

En-route output data 2005	
Total IFR flights controlled by the ANSP	123 294
Total flight-hours controlled by ANSP	41 098

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	35 326
ATCOs in OPS	18
ATCOs hours on duty	27 900

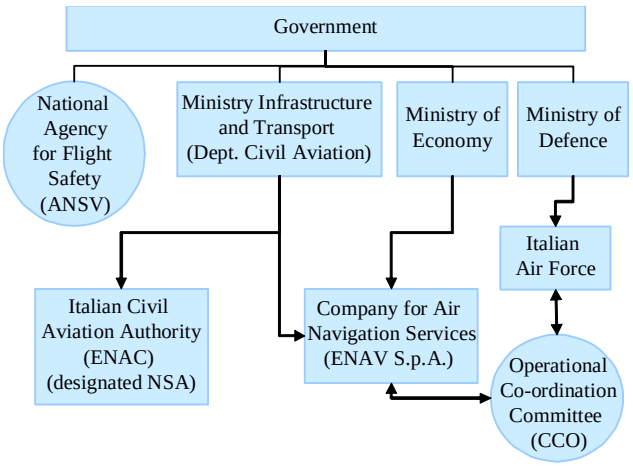
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	4 129 588	17%	-1%	2%	6%	6%
Total flight-hours controlled by ANSP	41 098	3%	3%	3%	3%	3%
ATCOs in OPS:	28	11%	6%	6%	6%	5%
ATCOs in OPS (ACC)	10	20%	8%	8%	7%	7%
ATCOs in OPS (APPs+TWRs)	18	6%	5%	5%	5%	5%
Total number of sectors (ACC)	3	0%	0%	0%	0%	0%
Sum of sector-hours (ACC)	10 900	19%	0%	0%	0%	0%

ENAV, Italy

Company for Air Navigation Services

www.enav.it

Institutional arrangements and links (2007)



Status (2007)

Joint-Stock Public Corporation as of 2000 under contract management.

100% State-owned by Ministry of Economy.

Body responsible for:

Safety Regulation

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

Airspace Regulation

Department of Civil Aviation, Italian Air Force, ENAC

Economic Regulation

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

Corporate governance structure (2007)

ADMINISTRATION BOARD:
Chairman + CEO + 6 members.
The Administration Board has been appointed by the Ministry of Economy 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 (2007)

CHAIRMAN OF ADMINISTRATION BOARD:

Gen. Bruno Nieddu

CEO:

Guido Pugliesi

DIRECTOR GENERAL:

Nadio di Rienzo

Scope of services

- [x] GAT
- [ ] OAT
- [x] Upper Airspace
- [x] Lower Airspace
- [ ] Oceanic ANS

- Aeronautical Information service
- Training and licensing of ATCO's
- R&D consultancy services
- Aerodrome weather services
- Flight inspection

Size

Size of controlled airspace: 734 000 km²

Notes

Operational ATS units:

4 ACCs (Milan, Padua, Rome, Brindisi)
14 APPs
30 TWRs
14 AFISs

ENAV, Italy

Company for Air Navigation Services

www.enav.it

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	525 851 737	74 054 994		599 906 731
Other revenues	55 944 346	42 219 129	86 122 616	184 286 091
Over/under recovery*	-19 799 875			-19 799 875
Total revenues net of over/under recovery	601 595 958	116 274 124	86 122 616	803 992 697

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	595 563 721	119 636 325	74 246 156	789 446 202
- MET costs	27 951 000	12 350 000		40 301 000
- Payment to national government				
- EUROCONTROL costs	50 115 675			50 115 675
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services	1 821 920			1 821 920
- Costs for other services provided	n/appl	n/appl	74 246 156	74 246 156
ATM/CNS provision costs:	**515 675 126**	**107 286 325**		**622 961 451**
Staff costs	241 457 905	45 473 763		286 931 668
Direct operating costs	160 096 200	28 498 421		188 594 621
Exceptional items	7 291 931	2 106 710		9 398 641
Depreciation	82 510 687	25 168 796		107 679 482
Cost of capital	24 318 403	6 038 636		30 357 039

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	500 676 676	123 276 288	54 011 390	677 964 354
Fixed assets under construction	200 049 944	49 256 168	21 580 745	270 886 858
Working capital	183 648 277	45 217 760	19 811 386	248 677 424
Net provision for over/under recovery	16 001 071			16 001 071
Total capital employed	900 375 968	217 750 217	95 403 521	1 213 529 707
Other assets				105 237 752

Staff 2005	En-route +Terminal	Other	Total
Total staff	3 129	272	3 401
ATCOs in OPS	1 297	146	1 443
ATCOs hours on duty	1 986 544		1 986 544
Staff costs for ATCOs in OPS	162 988 189		162 988 189

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	965 402
ATCOs in OPS	800
ATCOs hours on duty	1 215 200
Number of sectors	53
Sum of sector-hours	328 659

En-route output data 2005	
Total IFR flights controlled by the ANSP	1 488 570
Total flight-hours controlled by ANSP	1 006 498

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	1 175 862
ATCOs in OPS	497
ATCOs hours on duty	771 344

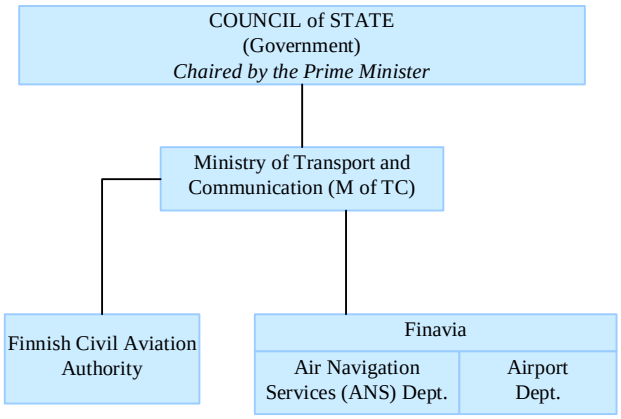
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	515 675 126	-8%	4%	1%	1%	0%
Total flight-hours controlled by ANSP	1 006 498	4%	3%	3%	3%	3%
ATCOs in OPS:	1 297					
ATCOs in OPS (ACC)	800					
ATCOs in OPS (APPs+TWRs)	497					
Total number of sectors (ACC)	53					
Sum of sector-hours (ACC)	328 659					

Finavia, Finland

Finavia

www.finavia.fi

Institutional arrangements and links (2007)



Status (2007)

- Commercial State Enterprise as of 1991.
- Integrated civil/military ANSP.
- 100% State-owned.

Body responsible for:

Safety Regulation
Finnish Civil Aviation Authority

Airspace Regulation
Finnish Civil Aviation Authority

Economic Regulation
Ministry of Transport and Communications Finland sets service, operational and profit objectives for Finavia.

Corporate governance structure (2007)

The BOARD (7 members)
Chairman + 6 members (1 member represents staff)
All members are appointed by the Council of State.

DG of Finavia is not a member of the Board.

Director General

Finavia (2007)

CHAIRMAN OF THE FINAVIA BOARD:
Jussi Järventaus

DIRECTOR GENERAL (CEO):
Samuli Haapasalo

DIRECTOR OF THE ANS DEPARTMENT:
Heikki Jaakkola

Scope of services

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

- Finavia owns and operates 25 airports.
- Internal MET provision.
- Delegation of ATS in certain areas to LFV (Sweden) and Avinor (Norway).

Size

Size of controlled airspace: 415 000 km²

Notes

Operational ATS units:

2 ACCs (Rovaniemi, Tampere)
5 APPs (Helsinki, Jyväskylä, Kuopio, Tampere-Pirkkala, Rovaniemi)
2 Mil-APPs (Halli, Kauhava)
19 TWRs
6 AFISs (Enontekiö, Kittilä, Ivalo, Kajaani, Savonlinna, Kuusamo)

Finavia, Finland

Finavia

www.finavia.fi

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	27 443 700	14 959 000	111 788 300	154 191 000
Other revenues	900 000		91 260 000	92 160 000
Over/under recovery*	-2 056			-2 056
Total revenues net of over/under recovery	28 345 756	14 959 000	203 048 300	246 353 056

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	28 079 000	32 508 000	162 712 000	223 299 000
- MET costs	1 039 000	4 602 000		5 641 000
- Payment to national government				
- EUROCONTROL costs	3 574 000			3 574 000
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services	235 000			235 000
- Costs for other services provided	n/appl	n/appl	162 712 000	162 712 000
ATM/CNS provision costs:	**23 231 000**	**27 906 000**		**51 137 000**
Staff costs	9 922 000	19 856 000		29 778 000
Direct operating costs	9 491 000	4 850 000		14 341 000
Exceptional items				
Depreciation	2 677 000	1 898 000		4 575 000
Cost of capital	1 141 000	1 302 000		2 443 000

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	27 400 000	26 695 000	520 176 000	574 271 000
Fixed assets under construction	376 000	5 595 000	6 052 000	12 023 000
Working capital	2 744 000	1 537 000	20 140 000	24 421 000
Net provision for over/under recovery	2 213 000			2 213 000
Total capital employed	32 733 000	33 827 000	546 368 000	612 928 000
Other assets				57 635 000

Staff 2005	En-route +Terminal	Other	Total
Total staff	559	1 289	1 848
ATCOs in OPS	199	35	234
ATCOs hours on duty	268 012		268 012
Staff costs for ATCOs in OPS	18 414 513		18 414 513

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	74 946
ATCOs in OPS	58
ATCOs hours on duty	75 664
Number of sectors	5
Sum of sector-hours	24 820

En-route output data 2005	
Total IFR flights controlled by the ANSP	230 880
Total flight-hours controlled by ANSP	113 737

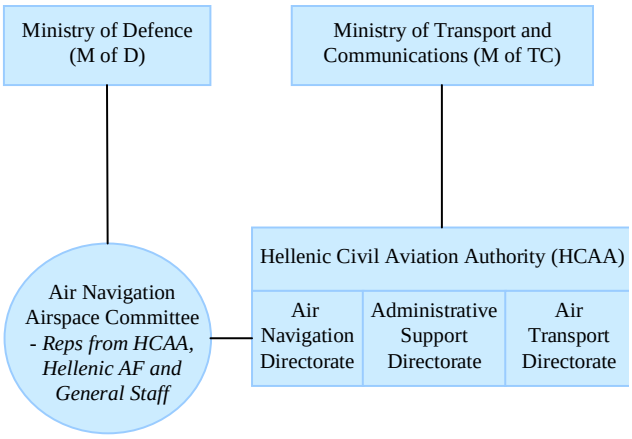
APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	259 163
ATCOs in OPS	141
ATCOs hours on duty	192 348

Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	23 231 000	1%	1%	1%	1%	1%
Total flight-hours controlled by ANSP	113 737	2%	4%	3%	3%	3%
ATCOs in OPS:	199	3%	3%	1%	1%	1%
ATCOs in OPS (ACC)	58	3%	3%	3%	3%	3%
ATCOs in OPS (APPs+TWRs)	141	2%	3%	0%	0%	0%
Total number of sectors (ACC)	5	0%	0%	0%	0%	0%
Sum of sector-hours (ACC)	24 820	0%	0%	0%	0%	0%

HCAA, Greece

Hellenic Civil Aviation Authority

Institutional arrangements and links (2007)



Status (2007)

State body - 100% State-owned.

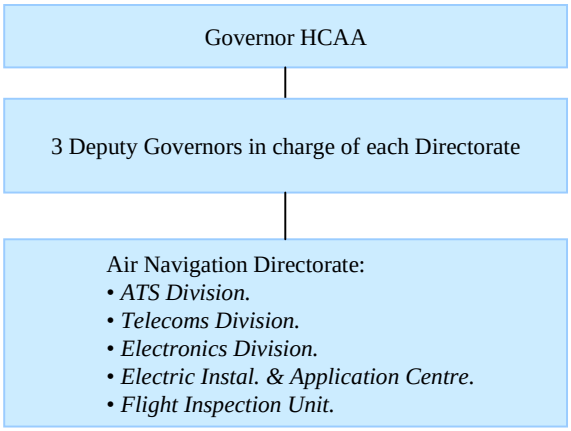
Body responsible for:

Safety Regulation
Hellenic Civil Aviation Authority

Airspace Regulation
Air Navigation Airspace Committee

Economic Regulation
Ministry of Finance is responsible for HCAA Budget

Corporate governance structure (2007)



HCAA (2007)

DIRECTOR GENERAL (GOVERNOR) OF HCAA:
Ioannis Andrianopoulos

DEPUTY GOVERNOR OF HCAA:
Evangelos Vasilakos

DIRECTOR GENERAL OF AIR NAVIGATION:
Vasilios Iliou

DIRECTOR OF AIR NAVIGATION:
Vasilios Tagalos

Scope of services

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

HCAA owns and operates 41 airports.

Size

Size of controlled airspace: 537 000 km²

Notes

Operational ATS units:

1 ACC
15 APPs
18 TWRs
16 AFISs

HCAA, Greece

Hellenic Civil Aviation Authority

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	134 000 000			134 000 000
Other revenues				
Over/under recovery*	-6 998 693			-6 998 693
Total revenues net of over/under recovery	140 998 693			140 998 693

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	162 528 221			162 528 221
- MET costs	8 605 000			8 605 000
- Payment to national government				
- EUROCONTROL costs	9 655 221			9 655 221
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**144 268 000**			**144 268 000**
Staff costs	107 604 000			107 604 000
Direct operating costs	18 275 000			18 275 000
Exceptional items				
Depreciation	12 990 000			12 990 000
Cost of capital	5 399 000			5 399 000

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)				
Fixed assets under construction				
Working capital				
Net provision for over/under recovery				
Total capital employed				
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	1 113	2 414	3 527
ATCOs in OPS	599		599
ATCOs hours on duty			
Staff costs for ATCOs in OPS	53 149 000		53 149 000

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	361 092
ATCOs in OPS	599
ATCOs hours on duty	
Number of sectors	12
Sum of sector-hours	

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	385 736
ATCOs in OPS	
ATCOs hours on duty	

En-route output data 2005	
Total IFR flights controlled by the ANSP	547 911
Total flight-hours controlled by ANSP	428 460

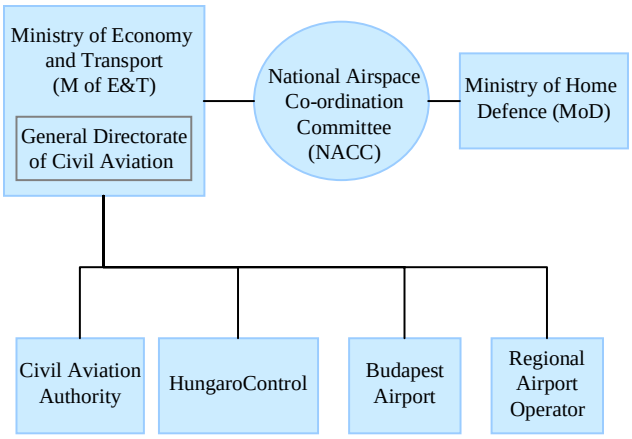
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	144 268 000	11%	-3%	-1%		
Total flight-hours controlled by ANSP	428 460					
ATCOs in OPS:	599					
ATCOs in OPS (ACC)	599					
ATCOs in OPS (APPs+TWRs)						
Total number of sectors (ACC)	12					
Sum of sector-hours (ACC)						

HungaroControl, Hungary

Hungarian Air Navigation Services

www.hungarocontrol.hu

Institutional arrangements and links (2007)



Status (2007)

- HungaroControl was set up on January 1st 2002.
- Private Limited Company as of 22 November 2006.
- 100% State-owned.

Body responsible for:

Safety Regulation
M of E&T

Airspace Regulation
Govt., M of E&T

Economic Regulation
Govt., M of E&T

Corporate governance structure (2007)

The M of E&T exercises the rights of the shareholder on behalf of the State

SUPERVISORY BOARD
Chairman + 7 members.
Chairman and members are appointed by the M of E&T.
3 members are staff representatives.

BOARD OF DIRECTORS
Chairman + 6 members (including CEO)
All members appointed by the M of E&T

HungaroControl (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:
Dr. Dénes Bots

CHAIRMAN OF THE BOARD OF DIRECTORS:
Dr. Károly Lotz

DIRECTOR GENERAL (CEO) :
Dr. Lázló Kiss

Scope of services

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

- Internal MET provision.
- HungaroControl provides Training activities (ATM training courses, language courses) in its Civil Aviation Training Centre (CATC).

Size

Size of controlled airspace: 92 800 km²

Notes

Operational ATS units:

1 ACC (Budapest)
1 APP (Budapest)
1 TWR (LHBP)
1 FIS (Budapest)
2 AFISs (regional aerodromes: LHSM, LHDC)

HungaroControl, Hungary

Hungarian Air Navigation Services

www.hungarocontrol.hu

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	67 210 846			67 210 846
Other revenues	249 254			249 254
Over/under recovery*	4 719 044			4 719 044
Total revenues net of over/under recovery	62 741 056			62 741 056

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	49 885 890	14 103 071		63 988 962
- MET costs	2 363 751			2 363 751
- Payment to national government	1 169 802			1 169 802
- EUROCONTROL costs	4 675 242			4 675 242
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services	1 593 424			1 593 424
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**40 083 671**	**14 103 071**		**54 186 743**
Staff costs	23 927 008	7 640 484		31 567 492
Direct operating costs	7 817 783	3 858 161		11 675 945
Exceptional items				
Depreciation	5 546 319	1 732 763		7 279 083
Cost of capital	2 792 561	871 663		3 664 224

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	39 755 296	9 325 319		49 080 615
Fixed assets under construction	3 195 233	749 498		3 944 732
Working capital	31 884 602	9 903 869		41 788 472
Net provision for over/under recovery	-16 773 024			-16 773 024
Total capital employed	58 062 108	19 978 686		78 040 794
Other assets				258 758

Staff 2005	En-route +Terminal	Other	Total
Total staff	662		662
ATCOs in OPS	183		183
ATCOs hours on duty	268 576		268 576
Staff costs for ATCOs in OPS	13 687 742		13 687 742

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	166 324
ATCOs in OPS	103
ATCOs hours on duty	151 616
Number of sectors	6
Sum of sector-hours	22 735

En-route output data 2005	
Total IFR flights controlled by the ANSP	579 113
Total flight-hours controlled by ANSP	194 635

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	123 301
ATCOs in OPS	80
ATCOs hours on duty	116 960

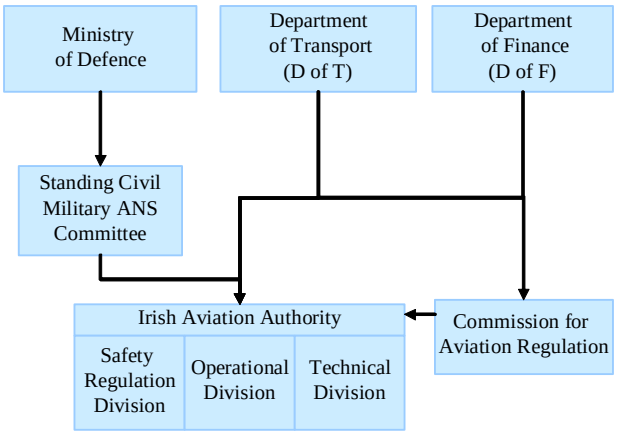
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	40 083 671	18%	6%	6%	-1%	-7%
Total flight-hours controlled by ANSP	194 635	5%	5%	4%	4%	3%
ATCOs in OPS:	183	-3%	12%	4%	4%	4%
ATCOs in OPS (ACC)	103	-2%	-2%	4%	4%	4%
ATCOs in OPS (APPs+TWRs)	80	-5%	32%	4%	4%	4%
Total number of sectors (ACC)	6	17%	0%	0%	14%	0%
Sum of sector-hours (ACC)	22 735	6%	5%	5%	4%	4%

IAA, Ireland

Irish Aviation Authority

www.iaa.ie

Institutional arrangements and links (2007)



Status (2007)

Commercial company as of 1994 governed by Companies Acts, 1963 to 2006.

100% State-owned (Ministry of Finance)

Body responsible for:

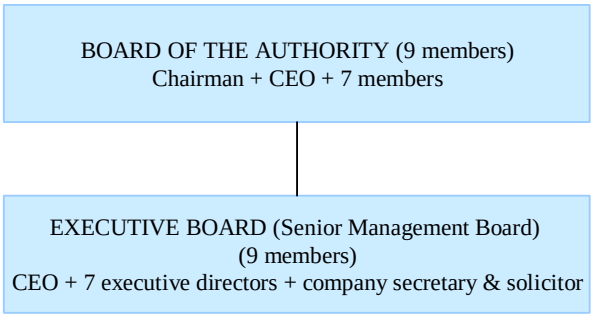
Safety Regulation
IAA Safety Regulation Division

Airspace Regulation
IAA Safety Regulation Division

Economic Regulation
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 (2007)



IAA (2007)

CHAIRMAN OF THE BOARD OF AUTHORITY:
Jerry V. Liston

CEO:
Eamonn Brennan

DIRECTOR OF ANS DIVISION:
Patrick Ryan

DIRECTOR OF TECHNICAL DIVISION:
Michael Weldon

Scope of services

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

Size

Size of controlled airspace: 454 000 km²

Notes

Operational ATS units:

2 ACCs (Dublin, Shannon)
3 APPs (Dublin, Shannon, Cork)
3 TWRs (Dublin, Shannon, Cork)

IAA, Ireland

Irish Aviation Authority

www.iaa.ie

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	90 869 094	17 310 204		108 179 298
Other revenues	1 883 035	4 645		1 887 680
Over/under recovery*	6 619 186	1 170 288		7 789 474
Total revenues net of over/under recovery	86 132 943	16 144 561		102 277 504

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	86 117 391	16 138 316		102 255 707
- MET costs	6 159 950	1 087 050		7 247 000
- Payment to national government	1 249 774	224 296		1 474 070
- EUROCONTROL costs	6 166 648			6 166 648
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**72 541 019**	**14 826 970**		**87 367 989**
Staff costs	40 169 137	7 172 808		47 341 945
Direct operating costs	16 210 276	2 971 137		19 181 413
Exceptional items				
Depreciation	9 596 613	2 973 050		12 569 663
Cost of capital	6 564 993	1 709 975		8 274 968

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	73 479 000	18 503 000		91 982 000
Fixed assets under construction	2 059 000	2 238 000		4 297 000
Working capital	31 760 167	5 234 000		36 994 167
Net provision for over/under recovery	-7 368 167	2 914 000		-4 454 167
Total capital employed	99 930 000	28 889 000		128 819 000
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	463	187	650
ATCOs in OPS	234		234
ATCOs hours on duty	384 771		384 771
Staff costs for ATCOs in OPS	25 483 400		25 483 400

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	233 620
ATCOs in OPS	151
ATCOs hours on duty	247 489
Number of sectors	12
Sum of sector-hours	63 765

En-route output data 2005	
Total IFR flights controlled by the ANSP	542 425
Total flight-hours controlled by ANSP	246 079

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	252 864
ATCOs in OPS	83
ATCOs hours on duty	137 282

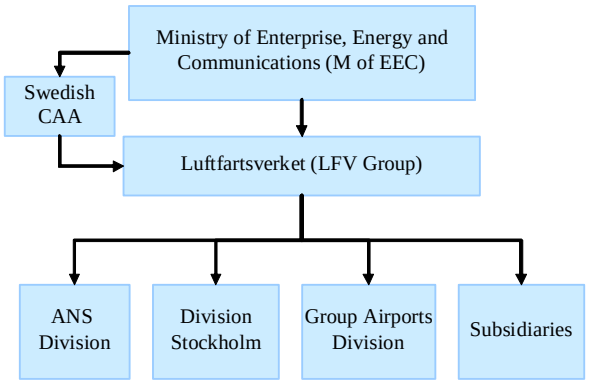
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	72 541 019	10%	6%	10%	7%	4%
Total flight-hours controlled by ANSP	246 079	4%	4%	4%	4%	4%
ATCOs in OPS:	234	2%	0%	0%	-3%	0%
ATCOs in OPS (ACC)	151	2%	0%	0%	-3%	0%
ATCOs in OPS (APPs+TWRs)	83	1%	0%	0%	-2%	0%
Total number of sectors (ACC)	12	8%	0%	0%	0%	38%
Sum of sector-hours (ACC)	63 765	5%	3%	11%	0%	28%

LFV/ANS Sweden, Sweden

LFV, Swedish Airports and Navigation Services

www.lfv.se

Institutional arrangements and links (2007)



Status (2007)

Public Authority - 100% State-owned.

Body responsible for:

Safety Regulation
Swedish Civil Aviation Authority

Airspace Regulation
Swedish Civil Aviation Authority

Economic Regulation
Swedish Civil Aviation Authority

Corporate governance structure (2007)

BOARD OF DIRECTORS (11 members)
Chairman + DG + 9 members
9 members (Chairman + DG + 7 members) are appointed by the Government; 2 members are appointed by Trade Unions.

EXECUTIVE BOARD (10 members)
DG + 9 members
DG appointed by the Government

LFV/ANS Sweden (2007)

CHAIRMAN OF THE BOARD OF DIRECTORS:
Göran Tunhammar

DIRECTOR GENERAL:
Lars Rekke

DIRECTOR OF THE ANS DIVISION:
Thomas Allard

Scope of services

- [x] GAT
- [x] OAT
- [x] Upper Airspace
- [x] Lower Airspace
- [ ] Oceanic ANS

LFV is managing 16 airports, including 2 military airports where LFV is responsible for the passenger and terminal services only.

Size

Size of controlled airspace: 626 000 km²

Notes

LFV is also responsible for the provision of ANS to military airspace users.

The 1st January 2005, the Swedish Civil Aviation Authority was established as the National Supervisory Authority for Air Navigation Services and Air Transport.

The government directs LFV's overall objectives and long-term targets on return on equity (after tax) and equity/assets ratio.

Operational ATS units:

2 ACCs (Stockholm and Malmö) (Situation as of December 2005)
36 APPs/TWRs
2 AFISs

LFV/ANS Sweden, Sweden

LFV, Swedish Airports and Navigation Services

www.lfv.se

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	117 007 144			117 007 144
Other revenues	1 696 849	28 427 299	6 950 264	37 074 412
Over/under recovery*	-963 208			-963 208
Total revenues net of over/under recovery	119 667 202	28 427 299	6 950 264	155 044 765

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	118 746 653	22 626 455	10 800 065	152 213 506
- MET costs	5 756 871			5 756 871
- Payment to national government	368 960	75 970		444 929
- EUROCONTROL costs				
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	10 800 065	10 800 065
ATM/CNS provision costs:	**112 620 822**	**22 550 485**		**135 171 307**
Staff costs	59 097 539	18 411 368		77 508 907
Direct operating costs	34 851 458	2 145 512		36 996 971
Exceptional items				
Depreciation	11 212 456	1 325 431		12 537 887
Cost of capital	7 459 370	668 174		8 127 544

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	136 543 143	13 317 076	757 963	150 618 182
Fixed assets under construction	9 480 178			9 480 178
Working capital	-12 934 960	-1 529 049	-87 028	-14 551 038
Net provision for over/under recovery	-21 307 502			-21 307 502
Total capital employed	111 780 859	11 788 027	670 934	124 239 821
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	927	124	1 051
ATCOs in OPS	505	75	580
ATCOs hours on duty	790 165		790 165
Staff costs for ATCOs in OPS	49 051 144		49 051 144

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	332 614
ATCOs in OPS	218
ATCOs hours on duty	339 862
Number of sectors	23
Sum of sector-hours	125 225

En-route output data 2005	
Total IFR flights controlled by the ANSP	662 210
Total flight-hours controlled by ANSP	406 232

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	550 507
ATCOs in OPS	287
ATCOs hours on duty	450 303

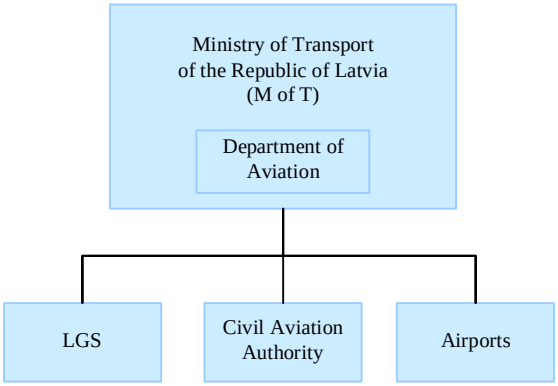
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	112 620 822	3%	1%	1%	1%	0%
Total flight-hours controlled by ANSP	406 232	3%	5%	5%	4%	4%
ATCOs in OPS:	505	1%	-1%	2%	4%	5%
ATCOs in OPS (ACC)	218	0%	2%	4%	6%	7%
ATCOs in OPS (APPs+TWRs)	287	1%	-4%	1%	2%	5%
Total number of sectors (ACC)	23	4%	-8%	-5%	0%	5%
Sum of sector-hours (ACC)	125 225	0%	0%	0%	0%	0%

LGS, Latvia

SJSC Latvijas Gaisa Satiksme

www.lgs.lv

Institutional arrangements and links (2007)



Status (2007)

Joint-stock company since 1997 - 100% State-owned.

Body responsible for:

Safety Regulation
Civil Aviation Agency

Airspace Regulation
Civil Aviation Agency

Economic Regulation
Department of Aviation

Corporate governance structure (2007)

SHAREHOLDER Meeting (M of T).

SUPERVISORY COUNCIL (7 members)
Chairman + 6 members
All appointed by the Shareholder (M of T)
Chairman is director of Aviation Department, M of T.

MANAGEMENT BOARD (3 members)
Chairman of the Board + 2 members
All appointed by the shareholder (M of T).

LGS (2007)

CHAIRMAN OF THE SUPERVISORY COUNCIL:
Arnis Muiznieks

CHAIRMAN OF THE BOARD:
Zinta Zalite-Rukmane

Scope of services

- [x] GAT
- [x] OAT
- [x] Upper Airspace
- [x] Lower Airspace
- [ ] Oceanic ANS

ATC services delegated to Latvia by Lithuania over a part of the Baltic Sea.

Size

Size of controlled airspace: 95 300 km²

Notes

Latvia not member of EUROCONTROL.

Operational ATS units:

1 ACC (Riga)
1 APP (Riga)
2 TWRs (Riga, Liepaja)
1 AFIS (Ventspils)

LGS, Latvia

SJSC Latvijas Gaisa Satiksme

www.lgs.lv

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	12 884 104	1 686 103		14 570 207
Other revenues	1 380 186	180 705	159 362	1 720 252
Over/under recovery*				
Total revenues net of over/under recovery	14 264 290	1 866 808	159 362	16 290 459

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	10 057 086	3 075 111	106 715	13 238 912
- MET costs	250 425	311 609		562 034
- Payment to national government				
- EUROCONTROL costs				
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	106 715	106 715
ATM/CNS provision costs:	**9 806 660**	**2 763 502**		**12 570 162**
Staff costs	4 888 988	1 445 638		6 334 625
Direct operating costs	2 521 329	626 064		3 147 392
Exceptional items				
Depreciation	1 494 015	340 066		1 834 082
Cost of capital	902 328	351 734		1 254 062

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	11 279 105	1 479 787		12 758 892
Fixed assets under construction		2 916 887		2 916 887
Working capital	6 630 583	869 375		7 499 957
Net provision for over/under recovery				
Total capital employed	17 909 687	5 266 049		23 175 736
Other assets				2 276 595

Staff 2005	En-route +Terminal	Other	Total
Total staff	249		249
ATCOs in OPS	51		51
ATCOs hours on duty	83 119		83 119
Staff costs for ATCOs in OPS	1 641 994		1 641 994

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	46 400
ATCOs in OPS	29
ATCOs hours on duty	46 438
Number of sectors	3
Sum of sector-hours	18 220

En-route output data 2005	
Total IFR flights controlled by the ANSP	154 260
Total flight-hours controlled by ANSP	53 286

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	34 520
ATCOs in OPS	22
ATCOs hours on duty	36 681

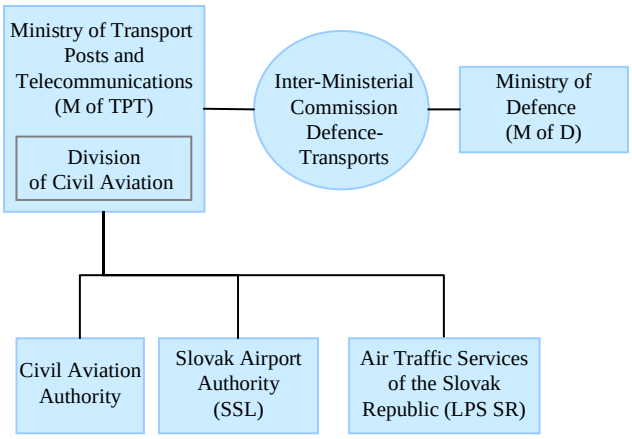
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	9 806 660	13%	6%	4%	4%	2%
Total flight-hours controlled by ANSP	53 286	4%	4%	4%	4%	4%
ATCOs in OPS:	51	6%	11%	15%	7%	-5%
ATCOs in OPS (ACC)	29	10%	0%	19%	5%	-8%
ATCOs in OPS (APPs+TWRs)	22	0%	27%	11%	10%	-3%
Total number of sectors (ACC)	3	0%	0%	0%	0%	0%
Sum of sector-hours (ACC)	18 220	0%	0%	0%	0%	0%

LPS, Slovak Republic

Letové Prevádzkové Služby Slovenskej Republiky

www.lps.sk

Institutional arrangements and links (2007)



Status (2007)

State-owned enterprise as of January 2000.

100% State-owned.

Body responsible for:

Safety Regulation
Civil Aviation Authority

Airspace Regulation
Ministry of Transport, Posts and Telecommunications

Economic Regulation
Ministry of Transport, Posts and Telecommunications

Corporate governance structure (2007)

SUPERVISORY BOARD (9 members)
Chairman + 8 members
Members represent: 5 M of TPT,
3 staff reps., 1 trade union association rep.
Chairman is also the DG of the Division of Civil Aviation.

EXECUTIVE BOARD (9 members)
CEO + 8 members
The CEO is appointed by the M of TPT.

LPS (2007)

CHAIRPERSON OF THE SUPERVISORY BOARD:
František Perutka

DIRECTOR GENERAL (CEO) :
Roman Bíro

Scope of services

- [x] GAT
- [x] OAT
- [x] Upper Airspace
- [x] Lower Airspace
- [ ] Oceanic ANS

Size

Size of controlled airspace: 48 800 km²

Notes

Operational ATS units:

1 ACC (Bratislava)
2 APPs (Bratislava, Kosice)
6 TWRs (Bratislava, Kosice, Piestany, Poprad, Sliac, Zilina)
1 Central ATS Reporting Office (Bratislava)

LPS, Slovak Republic

Letové Prevádzkové Služby Slovenskej Republiky

www.lps.sk

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	27 635 362	3 349 207		30 984 570
Other revenues	3 158 150	222 182	398 128	3 778 461
Over/under recovery*	-87 125			-87 125
Total revenues net of over/under recovery	30 880 637	3 571 390	398 128	34 850 155

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	28 952 739	6 447 363		35 400 102
- MET costs	625 488	61 861		687 349
- Payment to national government				
- EUROCONTROL costs	2 278 732			2 278 732
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services	897 808			897 808
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**25 150 711**	**6 385 502**		**31 536 213**
Staff costs	12 801 921	3 884 406		16 686 327
Direct operating costs	6 745 440	1 666 161		8 411 600
Exceptional items				
Depreciation	3 647 361	665 432		4 312 793
Cost of capital	1 955 989	169 503		2 125 492

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	23 638 309	2 337 844		25 976 153
Fixed assets under construction	2 239 908	221 529		2 461 437
Working capital	16 966 948	1 678 040		18 644 988
Net provision for over/under recovery				
Total capital employed	42 845 164	4 237 414		47 082 578
Other assets				1 245 140

Staff 2005	En-route +Terminal	Other	Total
Total staff	466		466
ATCOs in OPS	116		116
ATCOs hours on duty	163 367		163 367
Staff costs for ATCOs in OPS	6 339 151		6 339 151

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	65 073
ATCOs in OPS	59
ATCOs hours on duty	80 358
Number of sectors	5
Sum of sector-hours	20 251

En-route output data 2005	
Total IFR flights controlled by the ANSP	317 703
Total flight-hours controlled by ANSP	70 730

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	39 044
ATCOs in OPS	57
ATCOs hours on duty	83 009

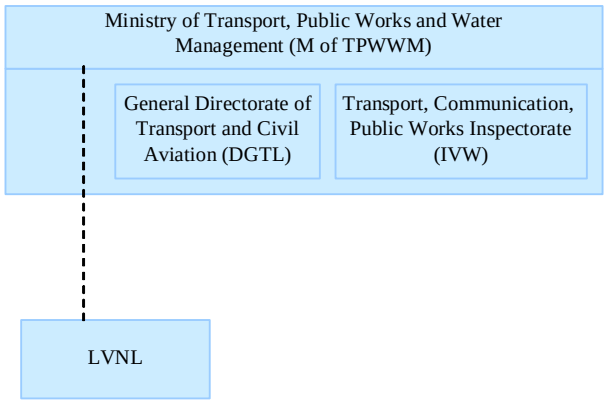
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	25 150 711	2%	9%	2%	3%	2%
Total flight-hours controlled by ANSP	70 730	7%	7%	6%	5%	3%
ATCOs in OPS:	116	8%	0%	0%	0%	0%
ATCOs in OPS (ACC)	59	10%	0%	0%	0%	0%
ATCOs in OPS (APPs+TWRs)	57	5%	0%	0%	0%	0%
Total number of sectors (ACC)	5	20%	0%	0%	0%	0%
Sum of sector-hours (ACC)	20 251	9%	4%	1%	0%	0%

LVNL, Netherlands

Luchtverkeersleiding Nederland

www.lvnl.nl

Institutional arrangements and links (2007)



Status (2007)

Corporate Entity as of 1993 (by Air Traffic Law).
100% State-owned

Body responsible for:

Safety Regulation
General Directorate of Transport and Civil Aviation (DGTL)

Airspace Regulation
General Directorate of Transport and Civil Aviation (DGTL)

Economic Regulation
General Directorate of Transport and Civil Aviation (DGTL)

Corporate governance structure (2007)

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 is appointed by the M of TPWWM, on the recommendation of the Supervisory Board.

LVNL (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:
H.F. Dijkstal

CHAIRMAN OF THE EXECUTIVE BOARD (CEO):
G .H. Kroese

Scope of services

- [x] GAT
- [ ] OAT
- [ ] Upper Airspace
- [ ] Lower Airspace
- [ ] Oceanic ANS

- controls lower airspace up to FL 245

Size

Size of controlled airspace: 51 200 km²

Notes

Size of controlled airspace does not include the airspace controlled by New Millingen ACC (Military ACC).

Rotterdam APP has been located in Schiphol since 2002.

Operational ATS units:

1 ACC (Amsterdam)
3 APPs (Schiphol, Eelde, Beek)
4 TWRs (Schiphol, Rotterdam, Eelde, Beek)

LVNL, Netherlands

Luchtverkeersleiding Nederland

www.lvnl.nl

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	125 491 000	72 798 000	977 000	199 266 000
Other revenues	4 315 000	8 778 000	5 766 000	18 859 000
Over/under recovery*	-993 000	-15 282 000	91 000	-16 184 000
Total revenues net of over/under recovery	130 799 000	96 858 000	6 652 000	234 309 000

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	130 779 000	100 998 000	858 000	232 635 000
- MET costs	9 483 000			9 483 000
- Payment to national government				
- EUROCONTROL costs	14 192 000			14 192 000
- Irrecoverable value added tax (VAT)	3 635 000	3 865 000		7 500 000
- Costs for delegation of services	24 882 000			24 882 000
- Costs for other services provided	n/appl	n/appl	858 000	858 000
ATM/CNS provision costs:	**78 587 000**	**97 133 000**		**175 720 000**
Staff costs	55 632 000	55 409 000		111 041 000
Direct operating costs	10 557 774	11 426 413		21 984 187
Exceptional items		14 000 000		14 000 000
Depreciation	9 853 226	10 172 587		20 025 813
Cost of capital	2 544 000	6 125 000		8 669 000

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	58 208 566	59 853 434		118 062 000
Fixed assets under construction	986 000	636 000		1 622 000
Working capital	-1 398 500	-1 398 500		-2 797 000
Net provision for over/under recovery	-9 232 000	17 984 000	-420 000	8 332 000
Total capital employed	48 564 066	77 074 934	-420 000	125 219 000
Other assets				84 521 000

Staff 2005	En-route +Terminal	Other	Total
Total staff	1 002		1 002
ATCOs in OPS	202		202
ATCOs hours on duty	313 100		313 100
Staff costs for ATCOs in OPS	25 943 544		25 943 544

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	77 234
ATCOs in OPS	71
ATCOs hours on duty	110 050
Number of sectors	5
Sum of sector-hours	29 526

En-route output data 2005	
Total IFR flights controlled by the ANSP	540 145
Total flight-hours controlled by ANSP	139 669

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	467 208
ATCOs in OPS	131
ATCOs hours on duty	203 050

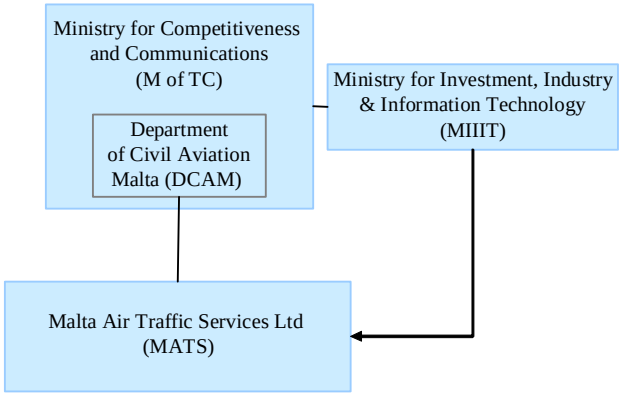
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	78 587 000	-11%	1%	0%	2%	2%
Total flight-hours controlled by ANSP	139 669	4%	5%	3%	3%	4%
ATCOs in OPS:	202	2%	2%	2%	3%	2%
ATCOs in OPS (ACC)	71	6%	4%	1%	4%	2%
ATCOs in OPS (APPs+TWRs)	131	1%	1%	3%	2%	1%
Total number of sectors (ACC)	5	20%	0%	0%	0%	0%
Sum of sector-hours (ACC)	29 526					

MATS, Malta

Malta Air Traffic Services Limited

www.maltats.com

Institutional arrangements and links (2007)



Status (2007)

In March 2001, the Govt. set up a new company, Malta Air Traffic Services Ltd (Reg. no. C 27965) which became responsible for ANS provision as of Jan. 2002. Government-owned company since 2002.

As of January 2002 MATS became the ANSP. Previously ANS had been provided by DCAM & MIA. 100% State-owned

Body responsible for:

Safety Regulation
Department of Civil Aviation

Airspace Regulation
Department of Civil Aviation

Economic Regulation
Department of Civil Aviation

Corporate governance structure (2007)

BOARD of DIRECTORS (4 members)
Chairman + 3 Directors
Members appointed by the Government, representing the MIIIT.

The Board of Directors appoints the CEO.

MATS (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:
Maj. Vanni Ganado

CEO & HEAD OF THE ATS DIVISION:
Lawrence Fenech

Scope of services

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

MATS controls portions of airspace delegated to Malta ACC by Rome ACC.

Size

Size of controlled airspace: 231 000 km²

Notes

Operational ATS units:

1 ACC (Malta East and Malta West)
1 APP (Malta)
1 TWR (Luqa)

MATS, Malta

Malta Air Traffic Services Limited

www.maltats.com

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	9 525 282			9 525 282
Other revenues	669 909	1 928 098	1 336 806	3 934 813
Over/under recovery*	-534 742			-534 742
Total revenues net of over/under recovery	10 729 933	1 928 098	1 336 806	13 994 837

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	10 575 087	2 398 527		12 973 614
- MET costs	547 244	136 811		684 055
- Payment to national government				
- EUROCONTROL costs	692 441			692 441
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**9 335 402**	**2 261 716**		**11 597 119**
Staff costs	3 955 105	956 738		4 911 843
Direct operating costs	3 812 908	913 129		4 726 037
Exceptional items				
Depreciation	1 252 573	313 144		1 565 717
Cost of capital	314 816	78 704		393 521

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	6 719 667	1 679 919		8 399 586
Fixed assets under construction				
Working capital	-474 059	51 135		-422 924
Net provision for over/under recovery	678 598			678 598
Total capital employed	6 924 206	1 731 054		8 655 260
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	178		178
ATCOs in OPS	55		55
ATCOs hours on duty	95 650		95 650
Staff costs for ATCOs in OPS	1 782 177		1 782 177

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	27 249
ATCOs in OPS	27
ATCOs hours on duty	46 958
Number of sectors	2
Sum of sector-hours	11 680

En-route output data 2005	
Total IFR flights controlled by the ANSP	75 417
Total flight-hours controlled by ANSP	32 179

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	29 105
ATCOs in OPS	28
ATCOs hours on duty	48 692

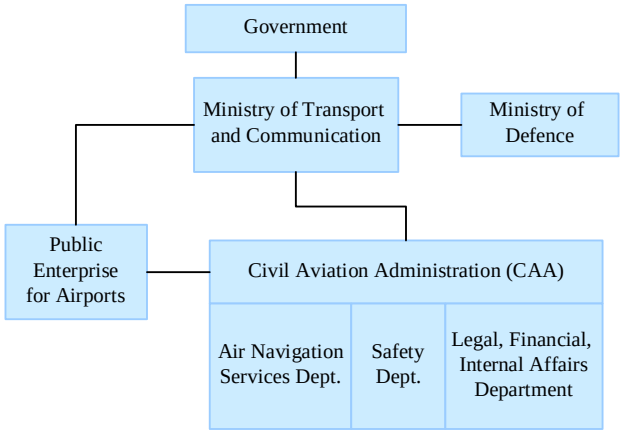
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	9 335 402	2%	1%	2%	2%	1%
Total flight-hours controlled by ANSP	32 179	4%	4%	4%	4%	4%
ATCOs in OPS:	55	0%	-2%	0%	0%	0%
ATCOs in OPS (ACC)	27	0%	-4%	0%	0%	0%
ATCOs in OPS (APPs+TWRs)	28	0%	0%	0%	0%	0%
Total number of sectors (ACC)	2	0%	0%	0%	0%	0%
Sum of sector-hours (ACC)	11 680	0%	0%	0%	0%	0%

MK CAA, Former Yugoslav Republic of Macedonia

Civil Aviation Authority

www.dgca.gov.mk

Institutional arrangements and links (2007)



Status (2007)

State body (acting as a legal entity) - 100% State-owned

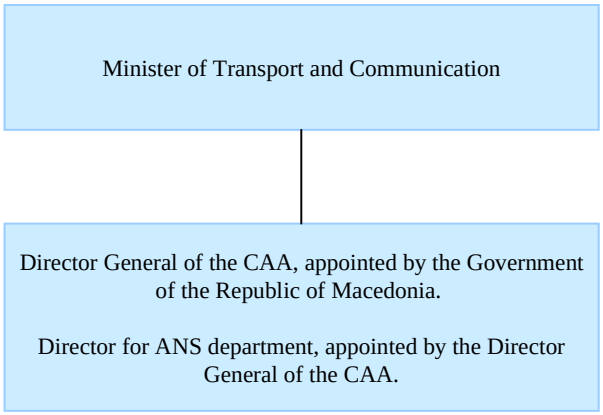
Body responsible for:

Safety Regulation
Safety Dept. of Civil Aviation Administration

Airspace Regulation
ATM Dept. of Civil Aviation Administration

Economic Regulation
Government, Civil Aviation Administration

Corporate governance structure (2007)



MK CAA (2007)

DIRECTOR GENERAL OF CAA:
Mr. Ernad Fejzulahu

DIRECTOR OF ANS DEPARTEMENT:
Mr. Toni Prgomet

Scope of services

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

- Internal MET provision.

Size

Size of controlled airspace: 24 800 km²

Notes

ANS department does not include technical, MET, AIS and SAR divisions.

Operational ATS units:

1 ACC (Skopje)
2 APPs (Skopje and Ohrid)
2 TWRs (Skopje and Ohrid)
1 AFIS (Skopje)

MK CAA, Former Yugoslav Republic of Macedonia

Civil Aviation Authority

www.dgca.gov.mk

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	10 304 868	682 018		10 986 886
Other revenues			1 714 414	1 714 414
Over/under recovery*	175 239			175 239
Total revenues net of over/under recovery	10 129 629	682 018	1 714 414	12 526 061

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	10 080 872	1 595 517	2 383 607	14 059 996
- MET costs	365 580	165 595		531 175
- Payment to national government				
- EUROCONTROL costs	561 230			561 230
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	2 383 607	2 383 607
ATM/CNS provision costs:	**9 154 062**	**1 429 923**		**10 583 984**
Staff costs	3 896 461	653 169		4 549 630
Direct operating costs	2 203 060	459 194		2 662 254
Exceptional items				
Depreciation	1 996 377	207 320		2 203 696
Cost of capital	1 058 164	110 240		1 168 404

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	12 122 892	1 445 109	39 609 940	53 177 941
Fixed assets under construction	1 242 980			1 242 980
Working capital	267 078	29 670		296 747
Net provision for over/under recovery	4 334 976			4 334 976
Total capital employed	17 967 926	1 474 779	39 609 940	59 052 645
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	300	44	344
ATCOs in OPS	58		58
ATCOs hours on duty	79 808		79 808
Staff costs for ATCOs in OPS	1 508 350		1 508 350

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	16 834
ATCOs in OPS	26
ATCOs hours on duty	35 776
Number of sectors	3
Sum of sector-hours	9 700

En-route output data 2005	
Total IFR flights controlled by the ANSP	110 562
Total flight-hours controlled by ANSP	22 077

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	13 022
ATCOs in OPS	32
ATCOs hours on duty	44 032

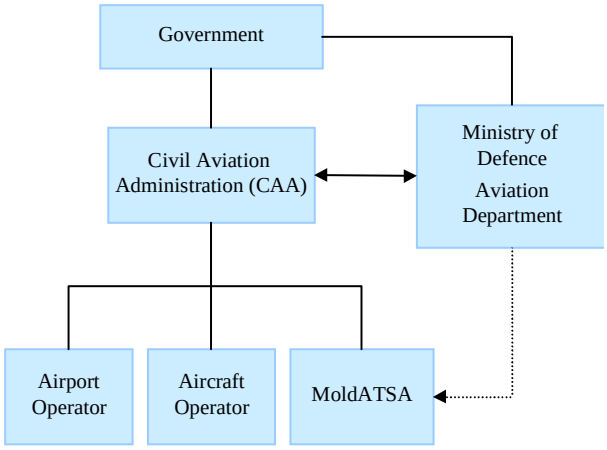
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	9 154 062	-4%	8%	-1%	0%	0%
Total flight-hours controlled by ANSP	22 077	8%	5%	6%	5%	5%
ATCOs in OPS:	58	7%	11%	6%	7%	0%
ATCOs in OPS (ACC)	26	15%	20%	17%	14%	0%
ATCOs in OPS (APPs+TWRs)	32	0%	3%	-6%	-3%	0%
Total number of sectors (ACC)	3	0%	0%	0%	0%	0%
Sum of sector-hours (ACC)	9 700	0%	2%	2%	1%	0%

MoldATSA, Moldova

Moldavian Air Traffic Services Authority

www.moldatsa.md

Institutional arrangements and links (2007)



Status (2007)

State enterprise since 1994 (by Government Regulation Nr.3 from 12.01.1994).

100% State-owned

Body responsible for:

Safety Regulation
Civil Aviation Administration

Airspace Regulation
Civil Aviation Administration

Economic Regulation
Civil Aviation Administration

Corporate governance structure (2007)

SUPERVISORY BOARD (7 members)
Chairman + 6 members
All members are appointed by CAA
Members represent CAA (3), MoldATSA management (2)
MoldATSA staff (2)

Management Board:
Director General MoldATSA

MoldATSA (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:
Natalia Vrabie

DIRECTOR GENERAL (CEO):
Valerian Vartic

HEAD OF ATM Division:
Andrei Istrati

Scope of services

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

- Internal MET provision.

Size

Size of controlled airspace: 37 300 km²

Notes

Operational ATS units:

1 ACC (Chisinau)
1 APP (Chisinau)
3 TWRs (Chisinau, Balti, Cahul)

MoldATSA, Moldova

Moldavian Air Traffic Services Authority

www.moldatsa.md

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	2 407 176	1 061 528		3 468 705
Other revenues	45 636			45 636
Over/under recovery*	-15 553			-15 553
Total revenues net of over/under recovery	2 468 365	1 061 528		3 529 894

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	2 430 282	1 094 939		3 525 221
- MET costs	267 798	107 977		375 775
- Payment to national government				
- EUROCONTROL costs	103 497			103 497
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**2 058 987**	**986 962**		**3 045 949**
Staff costs	823 044	362 462		1 185 507
Direct operating costs	415 651	187 344		602 994
Exceptional items				
Depreciation	276 631	199 697		476 328
Cost of capital	543 661	237 460		781 121

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	2 425 994	1 141 727		3 567 721
Fixed assets under construction	448	256		704
Working capital	613 811	270 038		883 850
Net provision for over/under recovery	63 237			63 237
Total capital employed	3 103 490	1 412 021		4 515 512
Other assets				123 274

Staff 2005	En-route +Terminal	Other	Total
Total staff	314		314
ATCOs in OPS	53		53
ATCOs hours on duty	75 684		75 684
Staff costs for ATCOs in OPS	332 444		332 444

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	5 693
ATCOs in OPS	25
ATCOs hours on duty	35 700
Number of sectors	2
Sum of sector-hours	17 520

En-route output data 2005	
Total IFR flights controlled by the ANSP	25 883
Total flight-hours controlled by ANSP	6 885

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	11 105
ATCOs in OPS	28
ATCOs hours on duty	39 984

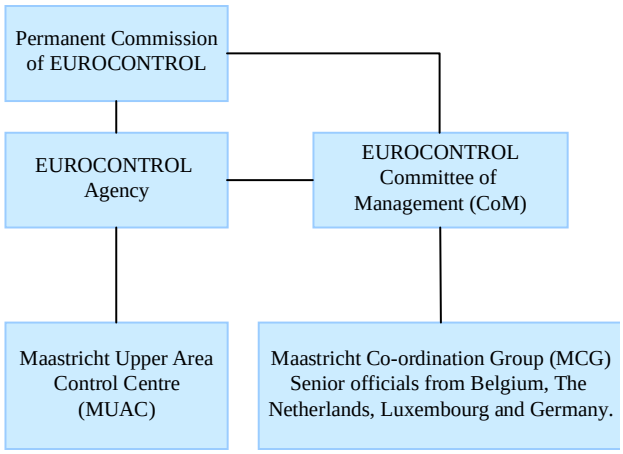
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	2 058 987	11%	28%	7%	4%	0%
Total flight-hours controlled by ANSP	6 885	8%	8%	7%	7%	6%
ATCOs in OPS:	53	0%	0%	8%	0%	0%
ATCOs in OPS (ACC)	25	0%	0%	8%	0%	0%
ATCOs in OPS (APPs+TWRs)	28	0%	0%	7%	0%	0%
Total number of sectors (ACC)	2	0%	0%	0%	0%	0%
Sum of sector-hours (ACC)	17 520	0%	0%	0%	0%	0%

MUAC, Maastricht

Maastricht Upper Area Control Centre

www.eurocontrol.int

Institutional arrangements and links (2007)



Status (2007)

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.

Body responsible for:

Safety Regulation

Under Article 1.2 of the Maastricht Agreements, each of the 4 States retains its competence and obligations in respect of regulations.

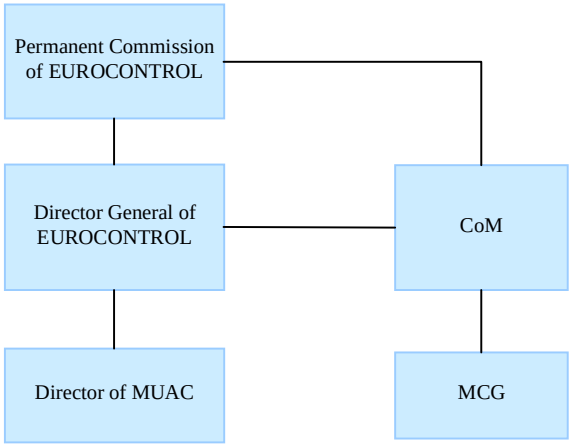
Airspace Regulation

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 (2007)



MUAC (2007)

DIRECTOR GENERAL OF EUROCONTROL:

Victor M. Aguado

DIRECTOR OF MUAC:

Karl - Heinz Kloos

Scope of services

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

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.

Size

Size of controlled airspace: 260 000 km²

Notes

Operational ATS units:

1 ACC (Maastricht)

MUAC, Maastricht

Maastricht Upper Area Control Centre

www.eurocontrol.int

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges				
Other revenues	112 141 000		5 306 000	117 447 000
Over/under recovery*				
Total revenues net of over/under recovery	112 141 000		5 306 000	117 447 000

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	112 141 000		5 306 000	117 447 000
- MET costs				
- Payment to national government				
- EUROCONTROL costs				
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	5 306 000	5 306 000
ATM/CNS provision costs:	**112 141 000**			**112 141 000**
Staff costs	85 091 000			85 091 000
Direct operating costs	11 755 000			11 755 000
Exceptional items				
Depreciation	13 491 000			13 491 000
Cost of capital	1 804 000			1 804 000

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	47 995 000		5 296 000	53 291 000
Fixed assets under construction	28 152 000		3 106 000	31 258 000
Working capital	1 211 000			1 211 000
Net provision for over/under recovery				
Total capital employed	77 358 000		8 402 000	85 760 000
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	576	21	597
ATCOs in OPS	210		210
ATCOs hours on duty	309 819		309 819
Staff costs for ATCOs in OPS	34 100 000		34 100 000

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	509 703
ATCOs in OPS	210
ATCOs hours on duty	309 819
Number of sectors	16
Sum of sector-hours	65 212

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	
ATCOs in OPS	
ATCOs hours on duty	

En-route output data 2005	
Total IFR flights controlled by the ANSP	1 450 200
Total flight-hours controlled by ANSP	509 703

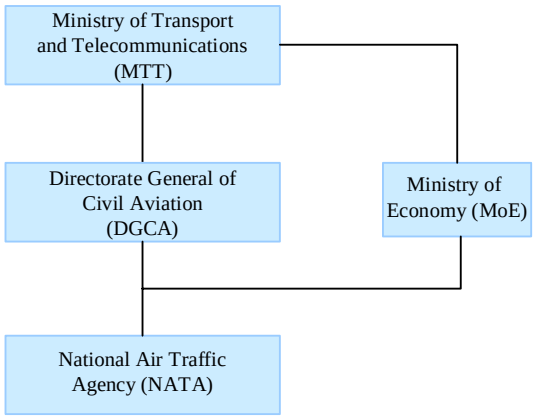
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	112 141 000	2%	5%	6%	-1%	1%
Total flight-hours controlled by ANSP	509 703	7%	4%	4%	4%	4%
ATCOs in OPS:	210	1%	6%	4%	6%	6%
ATCOs in OPS (ACC)	210	1%	6%	4%	6%	6%
ATCOs in OPS (APPs+TWRs)						
Total number of sectors (ACC)	16	13%	0%	17%	5%	18%
Sum of sector-hours (ACC)	65 212	8%	-1%	4%	4%	4%

NATA Albania, Albania

National Air Traffic Agency

www.anta.altirana.com

Institutional arrangements and links (2007)



Status (2007)

Since May 1999 NATA is a joint-stock company.
100% State owned.

Body responsible for:

Safety Regulation
MTT and Directorate General of Civil Aviation (DGCA)

Airspace Regulation
MTT and Directorate General of Civil Aviation (DGCA)

Economic Regulation
Ministry of Economy

Corporate governance structure (2007)

SUPERVISORY BOARD (6 members)
Chairman + 5 members
Chairman is the Director General of DGCA
All 6 members are nominated by the MoE,
4 members are proposed by the MTT, 2 members by the MoE.

MANAGEMENT BOARD (3 members)
Director General + 2 Directors

Director General appointed by MTT
through the Supervisory Board of NATA

NATA Albania (2007)

CHAIRMAN OF SUPERVISORY BOARD:
Ervin Minarolli

DIRECTOR GENERAL (CEO) OF NATA:
Arben Xhiku

DIRECTOR OF THE ATS DEPARTMENT:
Maksim Et'hemaj

Scope of services

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

- Internal MET provision.

Size

Size of controlled airspace: 36 000 km²

Notes

Operational ATS units:

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

NATA Albania, Albania

National Air Traffic Agency

www.anta.altirana.com

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	12 287 145	841 378		13 128 522
Other revenues	930 781	62 582		993 363
Over/under recovery*	1 217 490			1 217 490
Total revenues net of over/under recovery	12 000 436	903 960		12 904 395

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	11 586 654	1 988 438		13 588 212
- MET costs	132 188	53 418		185 606
- Payment to national government	178 250			178 250
- EUROCONTROL costs	691 330			691 330
- Irrecoverable value added tax (VAT)	768 025	162 361		943 506
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**9 816 861**	**1 772 660**		**11 589 520**
Staff costs	1 713 881	538 731		2 252 612
Direct operating costs	3 840 126	811 843		4 651 969
Exceptional items				
Depreciation	2 084 151	185 929		2 270 080
Cost of capital	2 178 702	236 157		2 414 859

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	12 562 202	569 566		13 131 768
Fixed assets under construction	5 593 634	1 398 405		6 992 039
Working capital	7 313 983	1 290 705		8 604 688
Net provision for over/under recovery	-1 040 201			-1 040 201
Total capital employed	24 429 619	3 258 676		27 688 294
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	168		168
ATCOs in OPS	26		26
ATCOs hours on duty	53 898		53 898
Staff costs for ATCOs in OPS	703 312		703 312

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	25 867
ATCOs in OPS	18
ATCOs hours on duty	37 314
Number of sectors	3
Sum of sector-hours	13 310

En-route output data 2005	
Total IFR flights controlled by the ANSP	116 040
Total flight-hours controlled by ANSP	25 867

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	16 614
ATCOs in OPS	8
ATCOs hours on duty	16 584

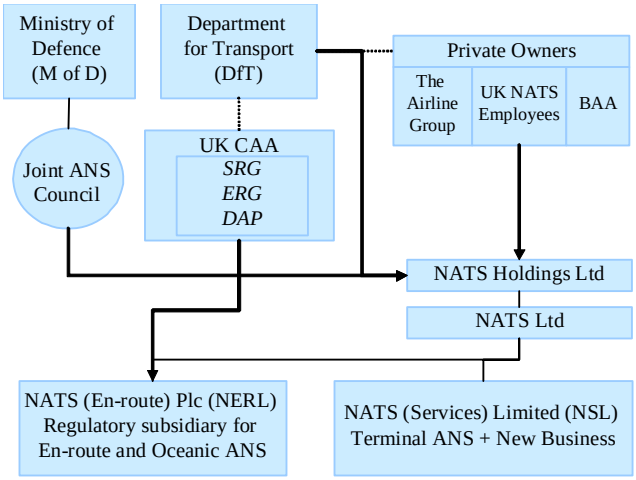
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	9 816 861	-11%	0%	7%	6%	1%
Total flight-hours controlled by ANSP	25 867	3%	4%	4%	4%	4%
ATCOs in OPS:	26	38%	19%	23%	0%	4%
ATCOs in OPS (ACC)	18	44%	19%	29%	-3%	3%
ATCOs in OPS (APPs+TWRs)	8	25%	20%	8%	8%	7%
Total number of sectors (ACC)	3	0%	0%	33%	0%	0%
Sum of sector-hours (ACC)	13 310	7%	0%	14%	0%	0%

NATS, United Kingdom

National Air Traffic Services Ltd

www.nats.co.uk

Institutional arrangements and links (2007)



Status (2007)

Public Private Partnership as of 2001.
- 49% State-owned (Govt retains a Golden Share).
- 51% private-owned (42% by the Airline Group, 4% by BAA and 5% by UK NATS employees).

The Airline Group comprises 7 UK airlines: BA, Virgin Atlantic, bmi British Midland, EasyJet, My Travel, ThomsonFly and Monarch Airlines.

Body responsible for:

Safety Regulation

UK CAA, Safety Regulation Group (SRG)

Airspace Regulation

UK CAA, Directorate of Airspace Policy (DAP)

Economic Regulation

UK CAA, Economic Regulation Group (ERG) which sets charges through a formula linked to the Retail Price Index (RPI) where "RPI minus X" targets for En-route and Oceanic Charges are set for 5 years at a time.

Corporate governance structure (2007)

SUPERVISORY DIRECTORS BOARD
(14 members)
Chairman + 13 members. Chairman is appointed by the Supervisory Board. Out of the 13 members, 9 are non-executive directors (5 appointed by the Airline Group +3 partnership directors appointed by the Govt + 1 by BAA);
4 are executive directors (CEO, Finance Director, Managing Director, Director Operational Performance).

STAKEHOLDERS COUNCIL
Reps of M of D + DfT + various parts of aviation industry (e.g. Air Transp. Users Council, BALPA, GAMTA, Royal Aeronautical Soc).

EXECUTIVE COMMITTEE of NATS Ltd
(10 members)
The current CEO was appointed by the Board.

NATS (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:

John Devaney

DIRECTOR GENERAL (CEO):

Paul Barron

Scope of services

- [x] GAT
- [ ] OAT
- [x] Upper Airspace
- [x] Lower Airspace
- [x] Oceanic ANS

Size

Size of controlled airspace: 3 110 000 km²

Continental: 880 000 km² - Oceanic: 2 230 000 km²

Notes

Operational ATS units:

1	OAC (Shanwick)
4	ACCs (London AC, London TC, Manchester, Scottish)
12	APPs
15	TWRs
2	AFISs

NATS, United Kingdom

National Air Traffic Services Ltd

www.nats.co.uk

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	714 310 608	115 482 067	31 616 063	861 408 738
Other revenues	17 613 815	58 259 128	69 820 962	145 693 904
Over/under recovery*				
Total revenues net of over/under recovery	731 924 423	173 741 195	101 437 024	1 007 102 642

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	627 446 629	154 814 593	107 383 873	889 645 095
- MET costs	865 334	567 025	31 326	1 463 684
- Payment to national government	6 028 389	117 757		6 146 146
- EUROCONTROL costs				
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	107 352 548	107 352 548
ATM/CNS provision costs:	**620 552 906**	**154 129 811**		**774 682 716**
Staff costs	309 332 915	113 399 016		422 731 932
Direct operating costs	123 214 455	35 189 566		158 404 021
Exceptional items	8 080 413	1 408 200		9 488 613
Depreciation	106 285 785	3 892 928		110 178 713
Cost of capital	73 639 337	240 100		73 879 437

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	449 439 718	18 194 485	66 692 578	534 326 782
Fixed assets under construction	311 129 363	5 759 754	48 525 961	365 415 078
Working capital	115 755 353	17 371 663	1 647 111	134 774 127
Net provision for over/under recovery				
Total capital employed	876 324 435	41 325 902	116 865 650	1 034 515 987
Other assets				818 459 959

Staff 2005	En-route +Terminal	Other	Total
Total staff	4 932	117	5 049
ATCOs in OPS	1 387	51	1 438
ATCOs hours on duty	1 997 707		1 997 707
Staff costs for ATCOs in OPS	165 273 740		165 273 740

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	1 154 674
ATCOs in OPS	907
ATCOs hours on duty	1 306 987
Number of sectors	72
Sum of sector-hours	454 438

En-route output data 2005	
Total IFR flights controlled by the ANSP	2 414 587
Total flight-hours controlled by ANSP	1 335 030

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	1 897 133
ATCOs in OPS	480
ATCOs hours on duty	690 720

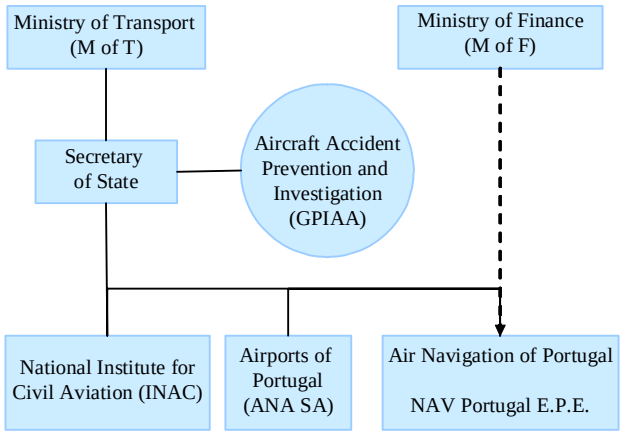
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	620 552 906	2%	2%	3%	-2%	2%
Total flight-hours controlled by ANSP	1 335 030	4%	4%	3%	3%	3%
ATCOs in OPS:	1 387					
ATCOs in OPS (ACC)	907	3%	2%	3%	2%	4%
ATCOs in OPS (APPs+TWRs)	480					
Total number of sectors (ACC)	72	10%	1%	1%	5%	2%
Sum of sector-hours (ACC)	454 438	10%	1%	1%	5%	2%

NAV Portugal, Portugal

Navegaçao Aérea de Portugal, E.P.E.

www.nav.pt

Institutional arrangements and links (2007)



Status (2007)

Public Entity Corporation as of December 1998.

100% State-owned.

Body responsible for:

Safety Regulation
National Institute of Civil Aviation (INAC)

Airspace Regulation
INAC+FAP (Portuguese Air Force) + NAV Portugal in close permanent co-ordination

Economic Regulation
National Institute of Civil Aviation (INAC)

Corporate governance structure (2007)

BOARD OF ADMINISTRATION (5 members)
Chairman + 4 members

All members are appointed by the M of T 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 9 Directorates and 5 Advisory Bodies.

NAV Portugal has also a Board of Auditors composed of 3 members who are appointed by M of T for a 3 year term.

NAV Portugal (2007)

CHAIRMAN OF THE BOARD OF ADMINISTRATION:
Not yet appointed

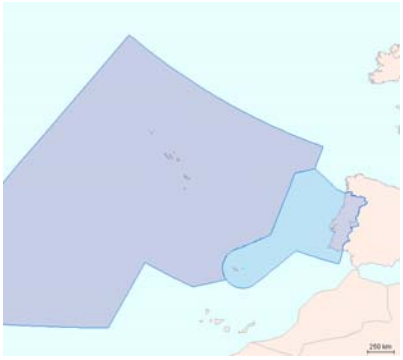
CEO:
Not yet appointed

Scope of services

- [x] GAT
- [ ] OAT
- [x] Upper Airspace
- [x] Lower Airspace
- [x] Oceanic ANS

Size

Size of controlled airspace: 5 856 000 km²



Continental: 666 000 km² - Oceanic: 5 190 000 km²

Notes

Operational ATS units:

2 ACCs (Lisboa, Santa Maria)
7 APPs (Lisboa, Porto, Faro, Madeira, Ponta Delgada, Santa Maria, Horta)
10 TWRs (Lisboa, Cascais, Porto, Faro, Funchal, Porto Santo, Ponta Delgada, Santa Maria, Horta, Flores)

NAV Portugal, Portugal

Navegaçao Aérea de Portugal, E.P.E.

www.nav.pt

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	115 096 252	22 563 375	47 115 759	184 775 386
Other revenues		533 128	6 569 174	7 102 302
Over/under recovery*	-3 223 937			-3 223 937
Total revenues net of over/under recovery	118 320 189	23 096 503	53 684 933	195 101 625

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	120 852 722	24 182 266	46 510 410	191 545 399
- MET costs	5 578 476			5 578 476
- Payment to national government				
- EUROCONTROL costs	9 651 819			9 651 819
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	46 510 410	46 510 410
ATM/CNS provision costs:	**105 622 428**	**24 182 266**		**129 804 694**
Staff costs	78 790 866	19 667 086		98 457 952
Direct operating costs	13 967 713	1 148 946		15 116 659
Exceptional items				
Depreciation	8 808 125	2 757 615		11 565 740
Cost of capital	4 055 724	608 618		4 664 343

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	19 985 272	5 771 374	23 552 821	49 309 467
Fixed assets under construction	8 391 465	1 645 056	5 625 016	15 661 537
Working capital	35 271 544	6 914 605	14 438 746	56 624 895
Net provision for over/under recovery	4 817 838		-2 757 857	2 059 981
Total capital employed	68 466 119	14 331 035	40 858 726	123 655 880
Other assets				103 001 647

Staff 2005	En-route +Terminal	Other	Total
Total staff	723	285	1 008
ATCOs in OPS	195		195
ATCOs hours on duty	353 037		353 037
Staff costs for ATCOs in OPS	38 667 559		38 667 559

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	205 856
ATCOs in OPS	81
ATCOs hours on duty	148 635
Number of sectors	7
Sum of sector-hours	41 528

En-route output data 2005	
Total IFR flights controlled by the ANSP	374 882
Total flight-hours controlled by ANSP	235 519

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	235 540
ATCOs in OPS	114
ATCOs hours on duty	204 402

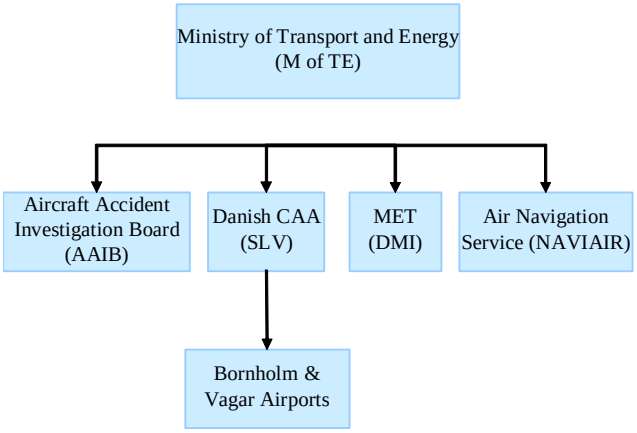
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	105 622 428	-2%	1%	0%	0%	-4%
Total flight-hours controlled by ANSP	235 519	6%	3%	3%	3%	3%
ATCOs in OPS:	195	3%	1%	3%	2%	3%
ATCOs in OPS (ACC)	81	0%	1%	5%	3%	4%
ATCOs in OPS (APPs+TWRs)	114	4%	1%	2%	2%	2%
Total number of sectors (ACC)	7	0%	14%	0%	0%	0%
Sum of sector-hours (ACC)	41 528	0%	0%	0%	0%	0%

NAVIAIR, Denmark

Air Navigation Services

www.naviair.dk

Institutional arrangements and links (2007)



Status (2007)

State enterprise - 100% State-owned.

Body responsible for:

Safety Regulation
Civil Aviation Administration (SLV)

Airspace Regulation
Civil Aviation Administration (SLV)

Economic Regulation
Civil Aviation Administration (SLV)

Corporate governance structure (2007)

EXECUTIVE BOARD (5 members)
CEO + 4 members
The CEO is appointed by the M of TE.

NAVIAIR (2007)

NO SUPERVISORY BOARD

DIRECTOR GENERAL (CEO):
Morten Dambæk

Scope of services

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

ANS Greenland upper airspace is delegated to Iceland ANSP and NAV Canada.

Size

Size of controlled airspace: 158 000 km²

Notes

Operational ATS units:

(excluding Greenland)
1 ACC (Copenhagen)
7 APPs
7 TWRs
1 AFIS

NAVIAIR, Denmark

Air Navigation Services

www.naviair.dk

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	74 437 556	22 136 326	3 923 387	100 497 270
Other revenues	1 867 145	2 692 489	4 323 621	8 883 256
Over/under recovery*	-1 410 470	-2 801 710	2 005 076	-2 207 104
Total revenues net of over/under recovery	77 715 172	27 630 525	6 241 933	111 587 629

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	77 715 172	27 608 754	6 263 703	111 725 766
- MET costs	4 410 558			4 410 558
- Payment to national government	5 193 606	69 271		5 262 878
- EUROCONTROL costs	7 179 641			7 179 641
- Irrecoverable value added tax (VAT)	3 632 040			3 770 176
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	6 263 703	6 263 703
ATM/CNS provision costs:	**57 299 326**	**27 539 483**		**84 838 808**
Staff costs	35 067 605	18 406 387		53 473 991
Direct operating costs	10 713 366	3 272 110		13 985 476
Exceptional items				
Depreciation	9 233 211	4 479 123		13 712 333
Cost of capital	2 285 144	1 381 863		3 667 007

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	72 029 088	31 673 548	1 310 767	105 013 403
Fixed assets under construction	1 560 445	426 216	94 761	2 081 422
Working capital	2 706 177	880 564	292 483	3 879 224
Net provision for over/under recovery	-4 633 805	5 191 182	-1 133 952	-576 574
Total capital employed	71 661 905	38 171 510	564 059	110 397 475
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	635	26	661
ATCOs in OPS	221		221
ATCOs hours on duty	348 296		348 296
Staff costs for ATCOs in OPS	21 698 928		21 698 928

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	149 177
ATCOs in OPS	96
ATCOs hours on duty	151 296
Number of sectors	8
Sum of sector-hours	61 152

En-route output data 2005	
Total IFR flights controlled by the ANSP	614 476
Total flight-hours controlled by ANSP	197 144

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	359 638
ATCOs in OPS	125
ATCOs hours on duty	197 000

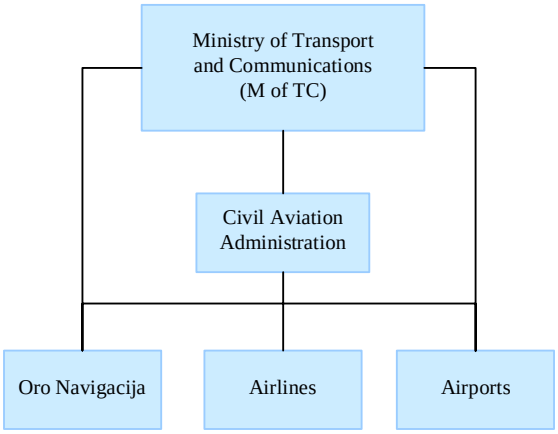
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	57 299 326	2%	2%	4%	0%	2%
Total flight-hours controlled by ANSP	197 144	2%	2%	3%	3%	3%
ATCOs in OPS:	221	2%	0%	2%	0%	-2%
ATCOs in OPS (ACC)	96	2%	4%	8%	0%	0%
ATCOs in OPS (APPs+TWRs)	125	2%	-3%	-3%	-1%	-3%
Total number of sectors (ACC)	8	0%	0%	0%	0%	0%
Sum of sector-hours (ACC)	61 152	0%	0%	0%	0%	0%

Oro Navigacija, Lithuania

State Enterprise Oro Navigacija

www.ans.lt/en/

Institutional arrangements and links (2007)



Status (2007)

Since July 2001, 100% State-owned Enterprise (SOE)

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 (2007)

SUPERVISORY BOARD (5 members)
Chairman + 4 members
(Chairman + 3) represent M of TC
1 represent Oro Navigacija.

MANAGEMENT BOARD
Duties taken up by Director General
DG is appointed by Minister.

Oro Navigacija (2007)

CHAIRMAN OF THE SUPERVISORY BOARD
Valdemaras Šalauskas

DIRECTOR GENERAL (CEO):
Algimantas Raščius

DIRECTOR ATM:
Sergej Smirnov

Scope of services

- [x] GAT
- [ ] OAT
- [x] Upper Airspace
- [x] Lower Airspace
- [ ] Oceanic ANS

- Air Navigation Services are delegated to LGS (Latvia) above some part of the Baltic sea.

Size

Size of controlled airspace: 75 409 km²

Notes

Lithuania not member of EUROCONTROL.

Operational ATS units:

1 ACC (Vilnius)
3 APPs
4 TWRs
0 AFIS

Oro Navigacija, Lithuania

State Enterprise Oro Navigacija

www.ans.lt/en/

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	15 613 126	2 271 490		17 884 615
Other revenues	160 160	23 170	286 434	469 764
Over/under recovery*				
Total revenues net of over/under recovery	15 773 285	2 294 659	286 434	18 354 379

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	12 555 607	2 364 168	250 811	15 170 586
- MET costs	5 503	13 033		18 536
- Payment to national government	618 339	89 782		708 121
- EUROCONTROL costs				
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	250 811	250 811
ATM/CNS provision costs:	**11 931 766**	**2 261 353**		**14 193 119**
Staff costs	5 450 070	1 517 609		6 967 678
Direct operating costs	2 695 494	297 150		2 992 644
Exceptional items				
Depreciation	2 305 665	262 106		2 567 771
Cost of capital	1 480 538	184 488		1 665 025

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	19 370 656	2 232 101	55 897	21 658 654
Fixed assets under construction	1 063 485	122 509	3 186	1 189 180
Working capital	9 117 238	1 326 460	165 663	10 609 361
Net provision for over/under recovery				
Total capital employed	29 551 379	3 681 070	224 745	33 457 194
Other assets				1 844 300

Staff 2005	En-route +Terminal	Other	Total
Total staff	326	2	328
ATCOs in OPS	77		77
ATCOs hours on duty	111 062		111 062
Staff costs for ATCOs in OPS	1 918 733		1 918 733

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	28 572
ATCOs in OPS	32
ATCOs hours on duty	45 632
Number of sectors	2
Sum of sector-hours	14 600

En-route output data 2005	
Total IFR flights controlled by the ANSP	120 611
Total flight-hours controlled by ANSP	31 880

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	37 516
ATCOs in OPS	45
ATCOs hours on duty	65 430

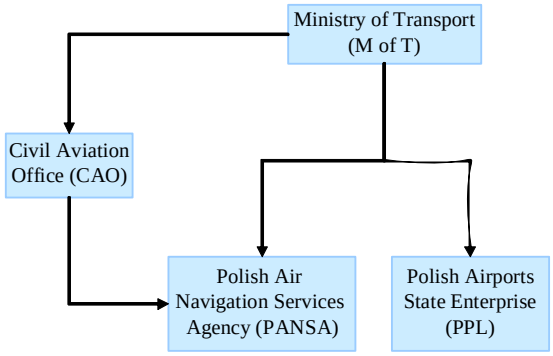
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	11 931 766	17%	4%	5%	6%	6%
Total flight-hours controlled by ANSP	31 880	6%	6%	6%	6%	7%
ATCOs in OPS:	77	1%	3%	1%	1%	2%
ATCOs in OPS (ACC)	32	0%	3%	0%	3%	3%
ATCOs in OPS (APPs+TWRs)	45	2%	2%	2%	0%	2%
Total number of sectors (ACC)	2	0%	0%	0%	50%	0%
Sum of sector-hours (ACC)	14 600	0%	0%	0%	40%	0%

PPL/PATA - PANSA, Poland

Polish Air Navigation Services Agency (PANSA)

www.pansa.pl

Institutional arrangements and links (2007)



Status (2007)

National legal entity. 100% State owned.

Body responsible for:

Safety Regulation
Civil Aviation Office (CAO)

Airspace Regulation
Civil Aviation Office (CAO)

Economic Regulation
Civil Aviation Office (CAO)

Corporate governance structure (2007)

NO SUPERVISORY BOARD

MANAGEMENT BOARD (3 members)
Chairman + 2 members.
Chairman is PANSA Director General.

PPL/PATA - PANSA (2007)

NO SUPERVISORY BOARD

DIRECTOR GENERAL (PRESIDENT) OF PANSA:
Maciej Rodack

HEAD OPERATIONAL DIVISION:
Witold Kamocki

HEAD ADMINISTRATIVE AND FINANCIAL DIVISION:
Stanislaw Skoczylas

Scope of services

- [x] GAT
- [x] OAT
- [x] Upper Airspace
- [x] Lower Airspace
- [ ] Oceanic ANS

Size

Size of controlled airspace: 334 000 km²

Notes

This Fact-Sheet reflects the situation as of 1st of April 2007.

Operational ATS units:

1 ACC with 8 sectors
3 APPs (Warszawa, Gdańsk, Kraków) providing radar control
3 TWRs (Warszawa, Gdańsk, Kraków) providing aerodrome control
8 TWRs (Katowice, Wrocław, Poznań, Szczecin, Rzeszów, Łódź, Zielona Góra, Bydgoszcz) providing aerodrome control and non-radar approach control
4 FIS units (Warszawa, Kraków, Gdańsk, Poznań)

PPL/PATA - PANSA, Poland

Polish Air Navigation Services Agency (PANSA)

www.pansa.pl

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	107 565 335	4 469 418	101 087 358	213 122 111
Other revenues			15 142 407	15 142 407
Over/under recovery*				
Total revenues net of over/under recovery	107 565 335	4 469 418	116 229 765	228 264 518

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	87 246 762	7 400 769	114 462 739	209 110 270
- MET costs	754 069	63 964		818 033
- Payment to national government	10 644 717	329 218		10 973 935
- EUROCONTROL costs	5 059 641			5 059 641
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	114 462 739	114 462 739
ATM/CNS provision costs:	**70 788 335**	**7 007 586**		**77 795 921**
Staff costs	38 194 071	2 985 144		41 179 215
Direct operating costs	19 123 198	1 494 617		20 617 815
Exceptional items				
Depreciation	7 594 287	1 425 056		9 019 343
Cost of capital	5 876 780	1 102 769		6 979 549

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	37 873 997	23 814 664	194 447 554	256 136 216
Fixed assets under construction	5 527 474		118 713 543	124 241 017
Working capital	19 190 801	5 993 977	13 010 016	38 194 794
Net provision for over/under recovery				
Total capital employed	62 592 273	29 808 641	326 171 113	418 572 027
Other assets				99 553 853

Staff 2005	En-route +Terminal	Other	Total
Total staff	1 087	1 911	2 998
ATCOs in OPS	332		332
ATCOs hours on duty	412 276		412 276
Staff costs for ATCOs in OPS	19 830 253		19 830 253

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	207 180
ATCOs in OPS	112
ATCOs hours on duty	135 296
Number of sectors	8
Sum of sector-hours	22 752

En-route output data 2005	
Total IFR flights controlled by the ANSP	403 834
Total flight-hours controlled by ANSP	254 259

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	216 795
ATCOs in OPS	220
ATCOs hours on duty	276 980

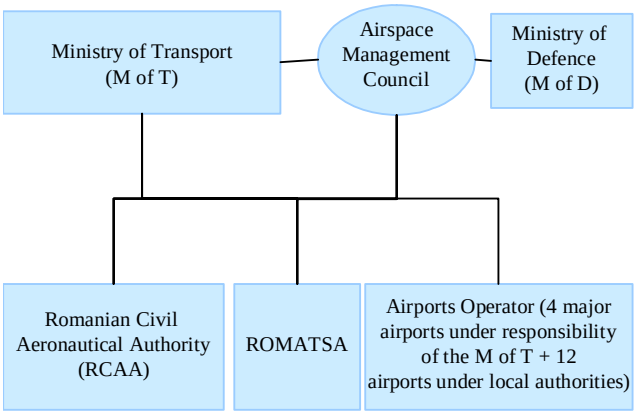
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	70 788 335	29%	9%	3%	1%	1%
Total flight-hours controlled by ANSP	254 259	12%	10%	12%	9%	8%
ATCOs in OPS:	332	7%	6%	5%	5%	4%
ATCOs in OPS (ACC)	112	6%	6%	5%	4%	4%
ATCOs in OPS (APPs+TWRs)	220	8%	-1%	0%	0%	0%
Total number of sectors (ACC)	8	0%	0%	0%	13%	33%
Sum of sector-hours (ACC)	22 752	31%				

ROMATSA, Romania

Romanian Air Traffic Services Administration

www.romatsa.ro

Institutional arrangements and links (2007)



Status (2007)

Autonomous and self-financing organisation as of 1991 (Government Resolution GR74/1991 and GR731/1992).

100% State-owned.

Body responsible for:

Safety Regulation

Ministry of Transport.
Enforcement and safety oversight is delegated and discharged through the RCAA.

Airspace Regulation

Both Ministry of Transport and Ministry of Defence, and discharged through the RCAA and Air Force Staff.

Economic Regulation

Ministry of Transport

Corporate governance structure (2007)

ADMINISTRATION BOARD (9 voting members)
Chairman + 8 members
Chairman is CEO.
Members represent: M of T, M of E&F, M of D and other members.
There are also additional non voting members representing staff.

CONSULTATIVE BOARD
Duties taken up by DG.
DG is appointed by the M of T.

Consultative (advisory) Committee
DG + 3 members (deputies of the DG).

ROMATSA (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:

Aleodor Francu

DIRECTOR GENERAL (CEO):

Aleodor Francu

Scope of services

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

- Internal MET provision.

Size

Size of controlled airspace: 254 000 km²

Notes

Operational ATS units:

1 ACC (Bucharest + 2 secondary locations - Arad and Constanta)
1 APP
16 TWRs or APP/TWRs

ROMATSA, Romania

Romanian Air Traffic Services Administration

www.romatsa.ro

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	128 581 286	11 457 356	206 459	140 245 101
Other revenues	956 114	443 831	7 891 250	9 291 195
Over/under recovery*	-5 722 054			-5 722 054
Total revenues net of over/under recovery	135 259 453	11 901 187	8 097 709	155 258 349

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	140 203 147	16 250 014	6 176 373	162 629 534
- MET costs	6 337 842	333 701		6 671 543
- Payment to national government	6 835 219			6 835 219
- EUROCONTROL costs	8 183 826			8 183 826
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	6 176 373	6 176 373
ATM/CNS provision costs:	**118 846 260**	**15 916 312**		**134 762 572**
Staff costs	53 770 632	9 165 057		62 935 689
Direct operating costs	33 469 224	3 739 718		37 208 943
Exceptional items				
Depreciation	19 685 344	1 892 906		21 578 250
Cost of capital	11 921 060	1 118 631		13 039 691

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	109 603 919	10 232 128		119 836 047
Fixed assets under construction	1 892 906	176 649		2 069 556
Working capital	40 110 682	3 574 110		43 684 792
Net provision for over/under recovery				
Total capital employed	151 607 508	13 982 887		165 590 395
Other assets				593 155

Staff 2005	En-route +Terminal	Other	Total
Total staff	1 896		1 896
ATCOs in OPS	537		537
ATCOs hours on duty	830 170		830 170
Staff costs for ATCOs in OPS	29 847 088		29 847 088

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	246 105
ATCOs in OPS	313
ATCOs hours on duty	453 850
Number of sectors	17
Sum of sector-hours	113 640

En-route output data 2005	
Total IFR flights controlled by the ANSP	410 530
Total flight-hours controlled by ANSP	257 286

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	126 663
ATCOs in OPS	224
ATCOs hours on duty	376 320

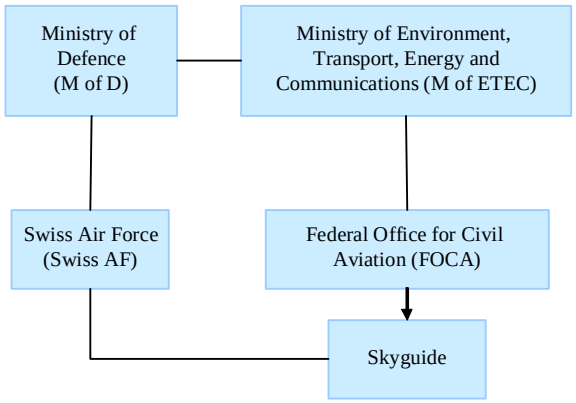
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	118 846 260	16%	-10%	3%	2%	-1%
Total flight-hours controlled by ANSP	257 286	1%	3%	3%	3%	3%
ATCOs in OPS:	537	0%	0%	0%	0%	0%
ATCOs in OPS (ACC)	313	0%	0%	0%	0%	0%
ATCOs in OPS (APPs+TWRs)	224	0%	0%	0%	0%	0%
Total number of sectors (ACC)	17	6%				
Sum of sector-hours (ACC)	113 640	6%				

Skyguide, Switzerland

Skyguide

www.skyguide.ch

Institutional arrangements and links (2007)



Status (2007)

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.

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 (2007)

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 (5 members)
CEO + 4 members
The CEO is appointed by the Supervisory Board.

Skyguide (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:
Guy Emmenegger

DIRECTOR GENERAL (CEO):
Francis Schubert, CEO a.i.

Scope of services

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

ATC services delegated to Geneva ACC by France.

Size

Size of controlled airspace: 73 100 km²

Notes

Operational ATS units:

2 ACCs (Geneva, Zurich)
2 APPs (Geneva, Zurich)
7 TWRs (Geneva, Zurich, Lugano, Bern, Buochs, Altenrhein, Grenchen)
5 AFISs (Geneva, Zurich, Lugano, Bern, Buochs)

Skyguide, Switzerland

Skyguide

www.skyguide.ch

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	109 060 761	61 862 184		170 922 945
Other revenues	36 939 485		23 021 163	59 960 648
Over/under recovery*	9 634 944	8 915 134		18 550 078
Total revenues net of over/under recovery	136 365 303	52 947 050	23 021 163	212 333 516

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	136 365 624	52 946 845	21 695 642	211 008 112
- MET costs	5 627 037	4 636 861	881 789	11 145 687
- Payment to national government	109 072	49 003		158 075
- EUROCONTROL costs	1 501 386			1 501 386
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services		161 500		161 500
- Costs for other services provided	n/appl	n/appl	20 813 853	20 813 853
ATM/CNS provision costs:	**129 128 130**	**48 099 482**		**177 227 612**
Staff costs	83 126 150	33 354 048		116 480 198
Direct operating costs	19 243 889	6 599 478		25 843 367
Exceptional items	3 147 953			3 147 953
Depreciation	14 752 456	5 096 823		19 849 279
Cost of capital	8 857 681	3 049 133		11 906 814

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	108 698 614	37 557 738	2 605 314	148 861 666
Fixed assets under construction	101 745 631	35 155 331	2 438 646	139 339 608
Working capital	47 877 938	16 542 870	1 147 444	65 568 253
Net provision for over/under recovery	-8 946 699	-2 133 735		-11 080 433
Total capital employed	249 375 484	87 122 204	6 191 405	342 689 094
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	1 203	132	1 335
ATCOs in OPS	290		290
ATCOs hours on duty	378 722		378 722
Staff costs for ATCOs in OPS	43 070 055		43 070 055

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	260 985
ATCOs in OPS	181
ATCOs hours on duty	238 140
Number of sectors	17
Sum of sector-hours	82 338

En-route output data 2005	
Total IFR flights controlled by the ANSP	1 137 287
Total flight-hours controlled by ANSP	316 912

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	428 003
ATCOs in OPS	109
ATCOs hours on duty	140 582

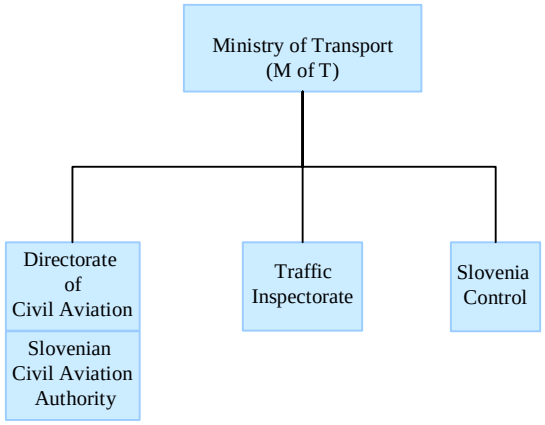
Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	129 128 130	-3%	15%	3%	3%	1%
Total flight-hours controlled by ANSP	316 912	3%	3%	2%	3%	3%
ATCOs in OPS:	290	1%	5%	7%	1%	0%
ATCOs in OPS (ACC)	181	-1%	4%	8%	1%	0%
ATCOs in OPS (APPs+TWRs)	109	4%	6%	4%	0%	0%
Total number of sectors (ACC)	17	6%	0%	11%	0%	0%
Sum of sector-hours (ACC)	82 338	1%	0%	6%	4%	2%

Slovenia Control, Slovenia

Slovenia Control Ltd

www.sloveniacontrol.si

Institutional arrangements and links (2007)



Status (2007)

Since May 2004, ANS is separated from the Slovenian Civil Aviation Authority (SCAA) and became a 100% State-owned Enterprise, Slovenia Control Ltd.

Body responsible for:

Safety Regulation
Ministry of Transport

Airspace Regulation
Ministry of Transport

Economic Regulation
Ministry of Finance

Corporate governance structure (2007)

MINISTER OF TRANSPORT

SUPERVISORY BOARD (6 members)
Chairman (M of T) + 3 members (M of T, M of F and M of D) appointed by the Government.
2 staff reps. appointed by "employees board".

Director General (CEO) of Slovenia Control

Appointed by the government for a period of 5 years

Slovenia Control (2007)

CHAIRPERSON OF SUPERVISORY BOARD:
Marija Kozinc

DIRECTOR GENERAL (CEO):
Srecko Jansa

Scope of services

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

Size

Size of controlled airspace: 17 800 km²

Notes

Operational ATS units:

1 ACC (Ljubljana)
3 APPs (Ljubljana, Portoroz, Maribor)
3 TWRs (Ljubljana, Portoroz, Maribor)

Slovenia Control, Slovenia

Slovenia Control Ltd

www.sloveniacontrol.si

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	15 921 371			15 921 371
Other revenues	205 836	1 740 421		1 946 257
Over/under recovery*	1 213 866			1 213 866
Total revenues net of over/under recovery	14 913 340	1 740 421		16 653 761

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	14 899 923	1 886 000		16 785 923
- MET costs	1 031 391	394 377		1 425 768
- Payment to national government	160 135			160 135
- EUROCONTROL costs	1 156 863			1 156 863
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services	321 434			321 434
- Costs for other services provided	n/appl	n/appl		
ATM/CNS provision costs:	**12 230 100**	**1 491 622**		**13 721 722**
Staff costs	7 140 243	1 041 716		8 181 959
Direct operating costs	2 822 893	222 208		3 045 101
Exceptional items				
Depreciation	1 578 106	145 579		1 723 685
Cost of capital	688 858	82 120		770 978

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	9 967 511	1 340 337		11 307 848
Fixed assets under construction	281 830	7 456		289 287
Working capital	1 853 887	205 989		2 059 876
Net provision for over/under recovery	420 404			420 404
Total capital employed	12 523 632	1 553 783		14 077 415
Other assets				

Staff 2005	En-route +Terminal	Other	Total
Total staff	166		166
ATCOs in OPS	64		64
ATCOs hours on duty	92 672		92 672
Staff costs for ATCOs in OPS	5 208 898		5 208 898

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	30 141
ATCOs in OPS	35
ATCOs hours on duty	50 680
Number of sectors	3
Sum of sector-hours	14 097

En-route output data 2005	
Total IFR flights controlled by the ANSP	193 002
Total flight-hours controlled by ANSP	32 443

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	33 867
ATCOs in OPS	29
ATCOs hours on duty	41 992

Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	12 230 100	4%	14%	9%	3%	3%
Total flight-hours controlled by ANSP	32 443	4%	5%	4%	4%	4%
ATCOs in OPS:	64	11%	7%	3%	3%	1%
ATCOs in OPS (ACC)	35	9%	16%	7%	4%	2%
ATCOs in OPS (APPs+TWRs)	29	14%	-3%	-3%	0%	0%
Total number of sectors (ACC)	3	0%	33%	0%	0%	25%
Sum of sector-hours (ACC)	14 097	0%	1%	3%	2%	2%

UkSATSE, Ukraine

Ukrainian State Air Traffic Service Enterprise

www.uksatse.ua

Institutional arrangements and links (2007)

Ministry of Transport and Communications (M of T&C)

State Aviation Administration

Ukrainian State Air Traffic Service Enterprise (UkSATSE)

- Regional branches
- AIS
- Ukraerocenter (civil/military integration)
- Training Center
- Medical Certification Center

Status (2007)

Self-financing enterprise since the end of 1992.

100% State-owned.

Body responsible for:

Safety Regulation
State Aviation Administration

Airspace Regulation
State Aviation Administration

Economic Regulation
State Aviation Administration

Corporate governance structure (2007)

No Supervisory Board

MANAGEMENT BOARD

DIRECTOR GENERAL

UkSATSE (2007)

CHAIRMAN OF THE SUPERVISORY BOARD:
None

DIRECTOR GENERAL OF UkSATSE:
Mr. Yuri Cherednichenko

Scope of services

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

Size

Size of controlled airspace: 773 000 km²

Notes

Operational ATS units:

6 ACCs (Kyiv, Simpferopol', Kharkiv, Odesa, L'viv and Dnipropetrovs'k as auxiliary ACC)
6 APPs
32 TWRs

UkSATSE, Ukraine

Ukrainian State Air Traffic Service Enterprise

www.uksatse.ua

Revenues 2005 in (€)	En-route	Terminal	Other	Total
Income from charges	100 224 000	8 611 000		108 835 000
Other revenues			1 969 000	1 969 000
Over/under recovery*				
Total revenues net of over/under recovery	100 224 000	8 611 000	1 969 000	110 804 000

** Under recoveries are shown as a negative value and consequently subtracted to calculate the total revenues.*

Costs 2005 in (€)	En-route	Terminal	Other	Total
Total costs	78 652 000	18 353 620	1 096 000	98 101 620
- MET costs	800 000	215 620		1 015 620
- Payment to national government				
- EUROCONTROL costs	4 997 000			4 997 000
- Irrecoverable value added tax (VAT)				
- Costs for delegation of services				
- Costs for other services provided	n/appl	n/appl	1 096 000	1 096 000
ATM/CNS provision costs:	**72 855 000**	**18 138 000**		**90 993 000**
Staff costs	38 917 000	10 502 000		49 419 000
Direct operating costs	16 413 000	3 627 000		20 040 000
Exceptional items				
Depreciation	6 922 000	1 430 000		8 352 000
Cost of capital	10 603 000	2 579 000		13 182 000

Capital employed 2005 in (€)	En-route	Terminal	Other	Total
Fixed assets in operation (NVB)	49 028 988	10 762 144	562 206	60 353 338
Fixed assets under construction	25 617 048	8 104 983		33 722 031
Working capital	20 827 484	1 907 866	3 762 770	26 498 120
Net provision for over/under recovery				
Total capital employed	95 473 519	20 774 992	4 324 976	120 573 488
Other assets				3 415 544

Staff 2005	En-route +Terminal	Other	Total
Total staff	5 768		5 768
ATCOs in OPS	1 278		1 278
ATCOs hours on duty	1 502 928		1 502 928
Staff costs for ATCOs in OPS	13 273 692		13 273 692

ACCs operational data 2005	
Sum of flight-hours controlled by ACCs	238 611
ATCOs in OPS	662
ATCOs hours on duty	778 512
Number of sectors	36
Sum of sector-hours	271 195

En-route output data 2005	
Total IFR flights controlled by the ANSP	312 053
Total flight-hours controlled by ANSP	243 243

APPs + TWRs operational data 2005	
Sum of IFR airport movements controlled	149 845
ATCOs in OPS	616
ATCOs hours on duty	724 416

Forward looking information	2005	2006	2007	2008	2009	2010
En-route ATM/CNS provision costs (€ 2005)	72 855 000	19%	15%			
Total flight-hours controlled by ANSP	243 243	7%	7%	7%	7%	7%
ATCOs in OPS:	1 278	0%	0%	0%	0%	0%
ATCOs in OPS (ACC)	662	0%	0%	0%	0%	0%
ATCOs in OPS (APPs+TWRs)	616	0%	0%	0%	0%	0%
Total number of sectors (ACC)	36	0%	0%	0%	0%	0%
Sum of sector-hours (ACC)	271 195	0%	0%	0%	0%	0%

GLOSSARY

ACC	Area Control Centre
ACE	Air Traffic Management Cost-Effectiveness
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
LFV/ANS Sweden	ANS department of Luftfartsverket, the LFV group – Swedish airports and Air Navigation Services
ANSP	Air Navigation Service Provider
APP	Approach Control Unit
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATSA Bulgaria	Air Traffic Services Authority, Bulgaria
Austro Control	Austro Control Österreichische Gesellschaft für Zivilluftfahrt mbH, Austria
Avinor	Avinor, Norway
Belgocontrol	Belgocontrol, Belgium
CAPEX	Capital Expenditure
CEATS	Central European Air Traffic Services
CFMU	Central Flow Management Unit
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
DSNA	Direction des services de la navigation aérienne, France
EANS	Estonian Air Navigation Services
ECAC	European Civil Aviation Conference
ENAV	Ente Nazionale di Assistenza al Volo S.p.A., Italy
ERC	EUROCONTROL Research Centre
EU	European Union
Finavia	Finavia, Finland
FL	Flight Level
FTE	Full-Time Equivalent
GDP	Gross Domestic Product
HCAA	Hellenic Civil Aviation Authority, Greece
HQ	Headquarters
HungaroControl	HungaroControl, Hungary
IAA	Irish Aviation Authority, Ireland
IFR	Instrument Flight Rules
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
MK CAA	Civil Aviation Authority of the former Yugoslav Republic of Macedonia
MoldATSA	Moldavian Air Traffic Services Authority
MUAC	Maastricht Upper Air Centre
NATA Albania	National Air Traffic Agency, Albania
NATS	National Air Traffic Services, UK
NAV Portugal	Navegação Aérea de Portugal, EPE
NAVIAIR	Air Navigation Services – Flyvesikringstjenesten, Denmark
NBV	Net Book Value
OAT	Operational air traffic
OPS	Operations
Oro Navigacija	State Enterprise Oro Navigacija, Lithuania
PPL/PATA	Polish Airports State Enterprise/Polish Air Traffic Agency
PPP	Purchasing power parities
PRC	Performance Review Commission
PRR	Performance Review Report
PRU	Performance Review Unit
ROMATSA	Romanian Air Traffic Services Administration
SAR	Search and Rescue
Skyguide	Skyguide, Switzerland
Slovenia Control	Slovenia Control, Slovenia
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

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