EUROCONTROL

# High-level Summary Report on Preliminary ACE 2023 Data

Prepared by the EUROCONTROL Performance Review Unit

**Important note**
Data contained in this document are preliminary and subject to changes before the publication of the final ACE benchmarking report in May 2025.

December 2024

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# 1 Introduction

The ACE benchmarking work is commissioned by the Performance Review Commission (PRC) and carried out by the EUROCONTROL Performance Review Unit (PRU) using information provided by Air Navigation Services Providers (ANSPs) in compliance with Decision No. 88 of the Permanent Commission of EUROCONTROL on economic information disclosure[1].

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

The objective of this document is to provide a first insight on the level of 2023 cost-effectiveness performance both for the Pan-European system and for individual ANSPs before the release of the final ACE benchmarking report, which is planned end of May 2025. This document also presents financial indicators extracted from the ANSPs Financial Indicators Dashboard and monitoring ANSPs' cash holdings and liquidity.

Economic information disclosure by ANSPs takes time as it is depending on the publication of their financial statements, which can be a lengthy process. Indeed, after the finalisation of their financial accounts, ANSPs have to follow official procedures which include, inter alia, the preparation of an independent audit report and the formal approval for publication which is granted by the relevant authorities (sometimes at Ministry level).

The final ACE benchmarking report will provide more detailed information on observed changes for selected performance indicators both at pan-European system level and at ANSP level. This detailed analysis will particularly focus on ANSPs for which significant differences in costs are observed. The report will present the main drivers underlying these differences.

Figure 1.1 illustrates the timeline to produce the next ACE benchmarking report.

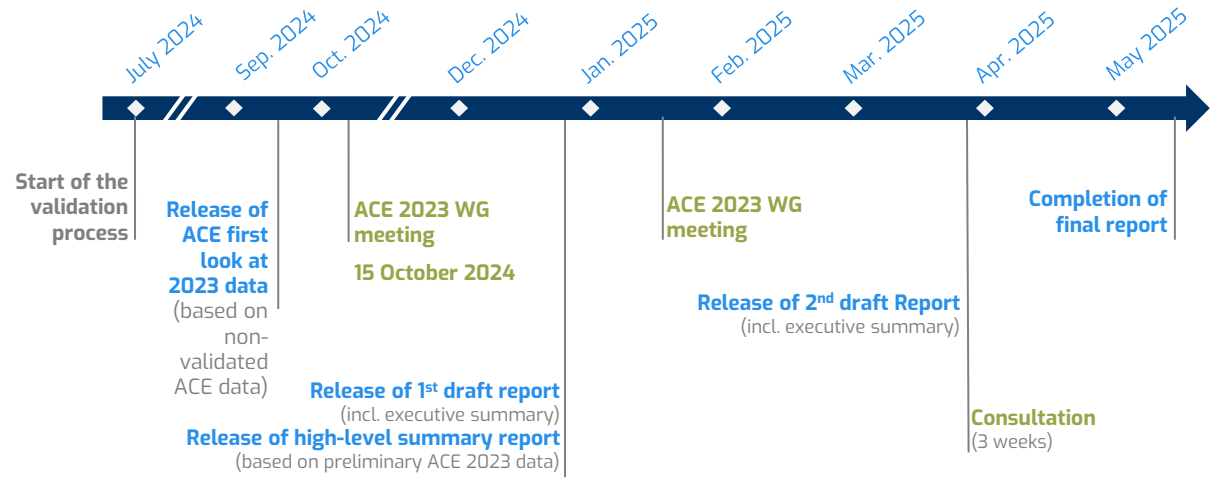



**Figure 1.1: Timeline to produce the next ACE benchmarking report**

[1] Due to the on-going war in Ukraine, UkSATSE has been excluded from the ACE analysis.

It is important that robust ACE benchmarking analysis is available in a timely manner since several stakeholders, most notably ANSPs' management, regulatory authorities (e.g. NSAs) and airspace users, have a keen interest in receiving the information in the ACE reports as early as possible.

Fifteen out of 38 ANSPs submitted their ACE 2023 data on time by the 1st of July 2024 and all data submissions were received by early September 2024. For ANSPs operating under Single European Sky regulations, the ACE data submission process was carried out at the same time as the preparation of performance plans for the 4th Reference Period (RP4) covering 2025-2029. However, clearly the timescale to produce the ACE benchmarking report is inevitably delayed if data are not submitted on time.

It should be noted that the data presented in this document are still **preliminary and not yet fully validated**. Indeed, the data submission milestone is just the first step of a process which comprises a thorough verification and analysis of individual ANSP submissions. This validation exercise also includes a formal round of exchange between the PRU and each ANSP in order to ensure a common understanding of the data submitted by the ANSP.

The data used in this document reflects the information received by the 12th of November 2024. Figure 1.2 shows the status of the ACE data validation process for the data presented in this document.

| | | | | |
|---|---|---|---|---|
| Airnav Ireland (Ireland) | Croatia Control ✔ (Croatia) | Fintraffic ANS ✔ (Finland) | MATS (Malta) | ROMATSA (Romania) |
| Albcontrol (Albania) | DCAC Cyprus ✔ (Cyprus) | HASP ✔ (Greece) | MOLDATSA (Moldova) | Sakaeronavigatsia ✔ (Georgia) |
| ANS CR ✔ (Czech Republic) | DFS ✔ (Germany) | HungaroControl ✔ (Hungary) | MUAC ✔ (EUROCONTROL) | skeyes (Belgium) |
| ARMATS ✔ (Armenia) | DHMI ✔ (Türkiye) | LFV ✔ (Sweden) | NATS (Continental) ✔ (United Kingdom) | Skyguide ✔ (Switzerland) |
| Austro Control ✔ (Austria) | DSNA (France) | LGS ✔ (Latvia) | NAV Portugal (Continental) (Portugal) | Slovenia Control (Slovenia) |
| Avinor (Continental) (Norway) | EANS (Estonia) | LPS (Slovakia) | NAVIAIR ✔ (Denmark) | SMATSA (Serbia/Montenegro) |
| BHANSA ✔ (Bosnia and Herzegovina) | ENAIRE ✔ (Spain) | LVNL (Netherlands) | Oro Navigacija ✔ (Lithuania) | |
| BULATSA (Bulgaria) | ENAV ✔ (Italy) | M-NAV ✔ (North Macedonia) | PANSA (Poland) | |

✔ Data submission has been reviewed

**Figure 1.2: Status of 2023 data validation process**

The data contained in this report is therefore subject to changes before the release of the final ACE benchmarking report in May 2025.

The remainder of this report is structured as follows:

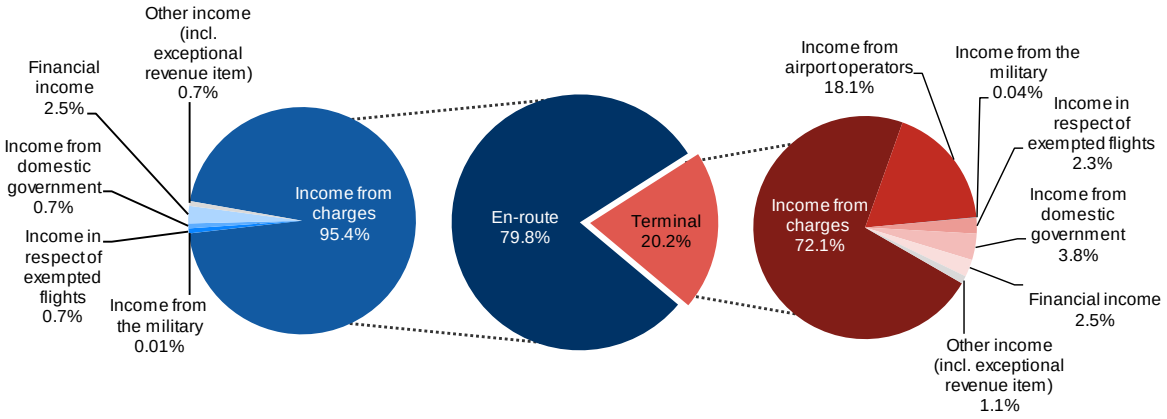
- **Chapter 2**: provides a high-level presentation of 2023 revenues, costs, staff and balance sheet data.
- **Chapter 3**: presents a preliminary analysis of economic cost-effectiveness at Pan-European and ANSP level.
- **Chapter 4**: presents a preliminary analysis of financial cost-effectiveness at Pan-European and ANSP level, and underlying components.
- **Chapter 5**: presents a preliminary analysis of specific financial indicators at Pan-European level.

# 2 High-level revenues, costs, staff and balance sheet data

## 2.1 Revenues and traffic

This chapter provides a preliminary overview of high-level revenues, costs and staff data provided in ANSPs ACE 2023 data submissions.

Total ANS revenues in 2023 amounted to €10 784M. Most en-route revenues come from the collection of en-route charges (95.4%, see left pie chart). The proportion of terminal revenues from charges is lower (72.1%, see right pie chart), as additional income may directly come from airport operators (18.1%) through, for example, a contractual arrangement between the ANSP and the airport operator.




**Total en-route revenue: € 8 610 M** | **Gate-to-gate ANS revenue: € 10 784 M** | **Total terminal revenue: € 2 174 M**

| En-route | % | Gate-to-gate revenues (€ M) | Terminal | % |
|---|---|---|---|---|
| 8 216 | 95.4% | Income from charges | 1 567 | 72.1% |
| n.a. | n.a. | Income from airport operators | 393 | 18.1% |
| 1.0 | 0.01% | Income from the military | 0.9 | 0.04% |
| 61 | 0.7% | Income in respect of exempted flights | 51 | 2.3% |
| 60 | 0.7% | Income from domestic government | 83 | 3.8% |
| 213 | 2.5% | Financial income | 55 | 2.5% |
| 59 | 0.7% | Other income (incl. exceptional revenue item) | 24 | 1.1% |
| 8 610 | 100.0% | | 2 174 | 100.0% |

**Figure 2.1: Breakdown of gate-to-gate ANS revenues, 2023**

Across the Pan-European system, traffic in 2023 (measured in composite flight-hours) was +11.0% higher than in 2022 but remained -3.7% lower than in 2019. In the meantime, total gate-to-gate revenues increased slightly more than traffic (+12.9%, or +€1 229M) and remained -3.8% lower than in 2019.

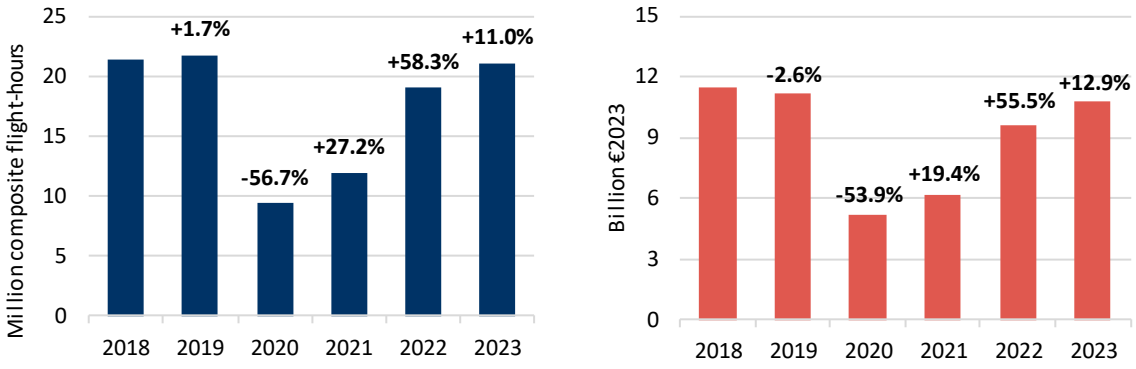



**Figure 2.2: Composite flight-hours (left) and gate-to-gate ANS revenues (right) of the Pan-European system, 2018-2023 (real terms)**

At ANSP level, traffic in 2023 recovered to varying degrees from the crisis caused by the COVID-19 pandemic (see Figure 2.3). At the higher end, composite flight-hours were +63% and +38% above 2019 levels for Sakaeronavigatsia and Albcontrol respectively. While at the lower end, traffic remained -43% and -39% below 2019 levels for MOLDATSA and LGS respectively. The war in Ukraine continued to cause

airspace closures and reciprocal sanctions on air carriers, which impacted traffic flows in Europe. This inevitably impacted the levels and trends of ACE indicators for the most affected ANSPs.

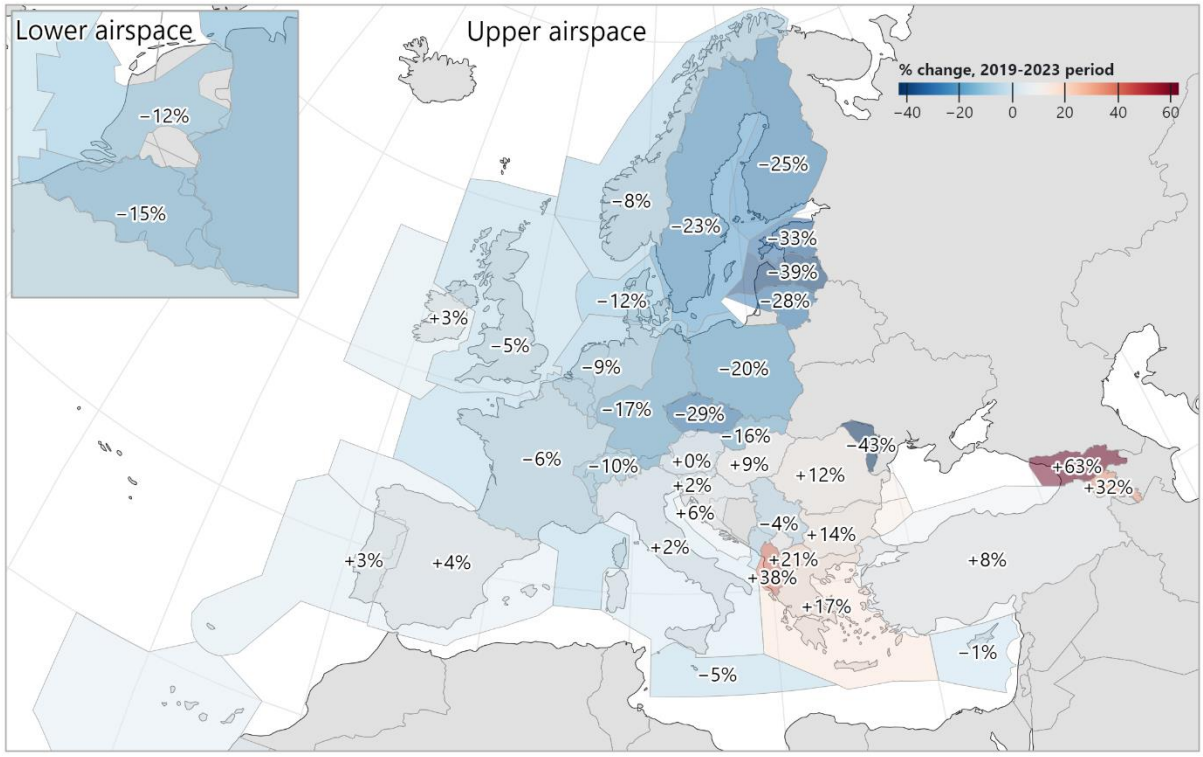
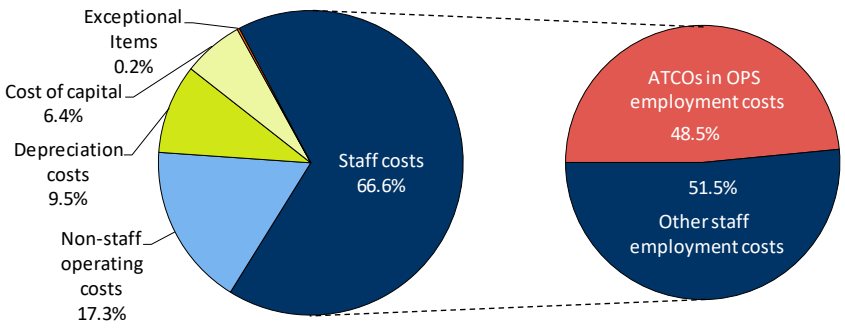



**Figure 2.3: Changes in composite flight-hours between 2019 and 2023**

Looking forward, the recent EUROCONTROL Seven-Year Forecast shows that traffic may remain below pre-pandemic levels until at least 2025.

## 2.2 Costs

The ACE benchmarking analysis focuses on the specific costs of providing gate-to-gate ATM/CNS services, which amounted to €9 697M in 2023. Operating costs (including staff costs, non-staff operating costs and exceptional cost items) accounted for some 84% of total ATM/CNS provision costs, while depreciation costs and the cost of capital represented around 16%.




**Total ATM/CNS provision costs: € 9 697 M**

| | En-route | | Terminal | | Gate-to-gate | |
|---|---|---|---|---|---|---|
| | € M | % | € M | % | € M | % |
| Staff costs | 5 027 | 66.2% | 1 434 | 68.1% | 6 461 | 66.6% |
| *ATCOs in OPS employment costs* | 2 442 | n/appl | 689 | n/appl | 3 131 | n/appl |
| *Other staff employment costs* | 2 585 | n/appl | 745 | n/appl | 3 330 | n/appl |
| Non-staff operating costs | 1 304 | 17.2% | 368 | 17.5% | 1 673 | 17.3% |
| Depreciation costs | 745 | 9.8% | 176 | 8.3% | 921 | 9.5% |
| Cost of capital | 499 | 6.6% | 121 | 5.8% | 621 | 6.4% |
| Exceptional Items | 15 | 0.2% | 7 | 0.3% | 22 | 0.2% |
| Total ATM/CNS provision costs | 7 591 | 100.0% | 2 107 | 100.0% | 9 697 | 100.0% |

**Figure 2.4: Gate-to-gate ATM/CNS provision costs at Pan-European system level, 2023**

Total ATM/CNS provision costs rose by +2.9% (+€272M) in 2023, reflecting cost increases for 27 out of 38 ANSPs. A rise in staff costs (+€309M) was the main source of the increase in 2023, with six ANSPs accounting for 76% of the overall change in staff costs (ENAIRE, DHMI, LFV, Skyguide, ROMATSA and NAV Portugal). However, staff costs remain -3.0% lower than 2019 levels and as such total costs are - 3.6% lower given the large proportion for which staff costs account.

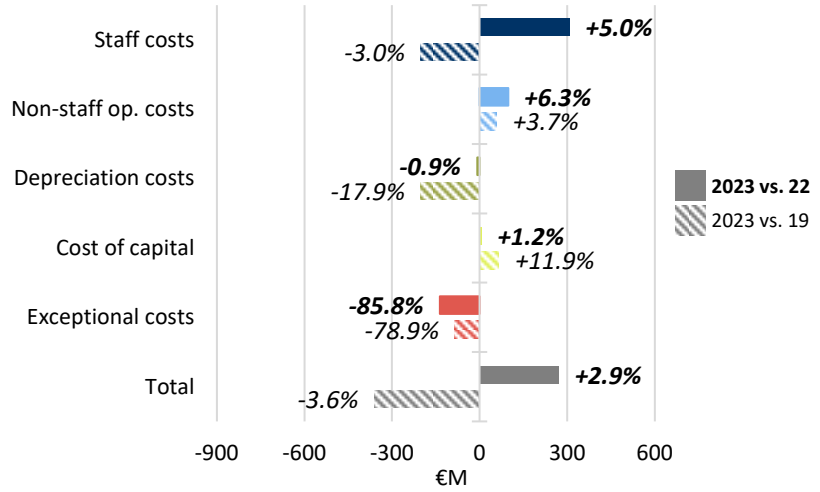



**Figure 2.5: Changes in gate-to-gate ATM/CNS provision cost categories (real terms)**

In 2023, the six largest ANSPs in terms of costs (DSNA, DFS, ENAIRE, NATS, ENAV and DHMI) bore some 58% of the total Pan-European gate-to-gate ATM/CNS provision costs, while the six smallest ANSPs accounted for some 1% (see bottom left part of Figure 2.6).

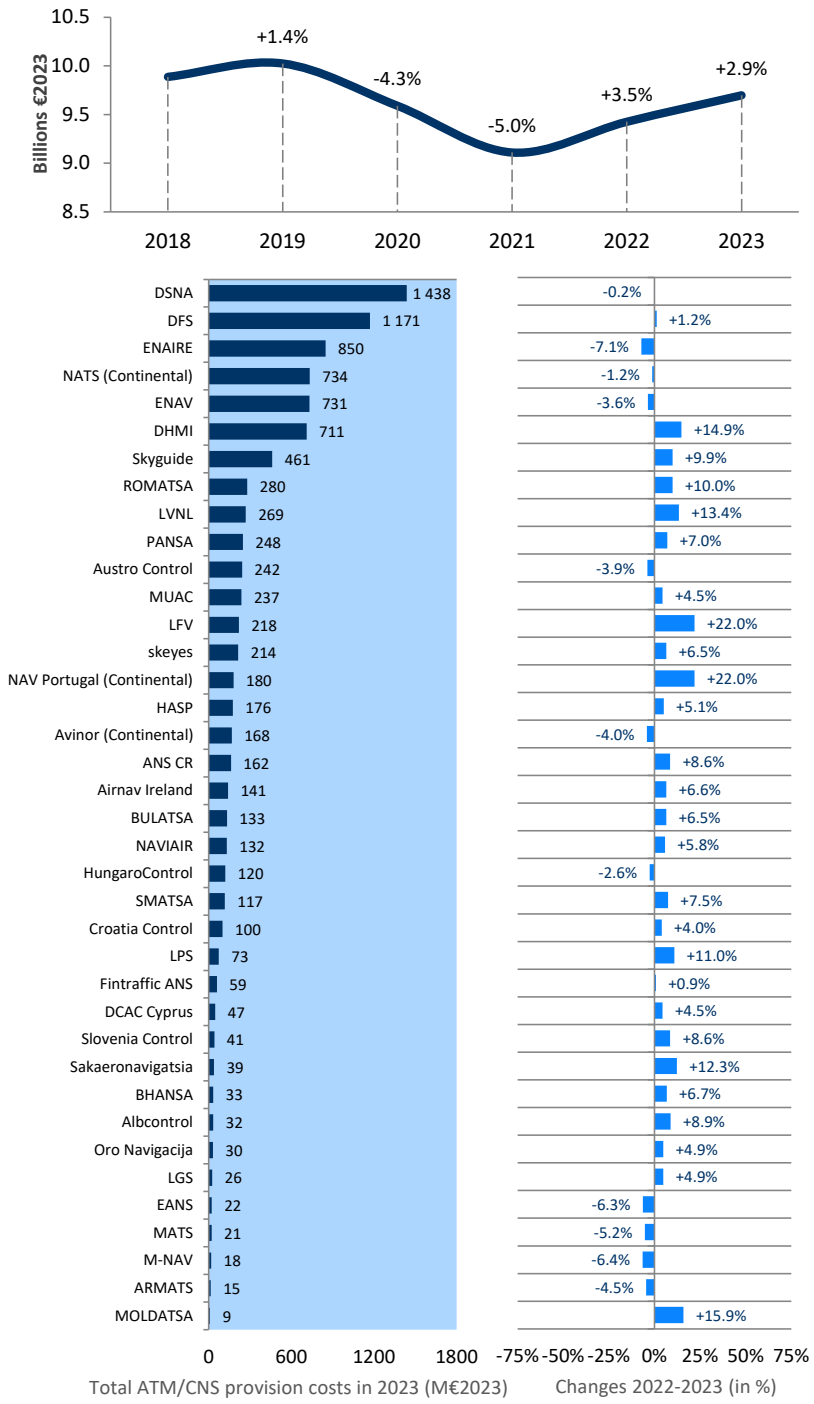



**Figure 2.6: Changes in ATM/CNS provision costs (real terms)**

## 2.3 Staff

The Pan-European ANSPs employed a total of 53 060 staff in 2023 (comprising 52 221 staff providing ATM/CNS services and 839 internal MET staff). Some 17 368 staff (33%) were ATCOs working on operational duties, split between ACCs (55%) and APP/TWR facilities (45%). On average, 2.0 additional staff are required for every ATCO in OPS in Europe.

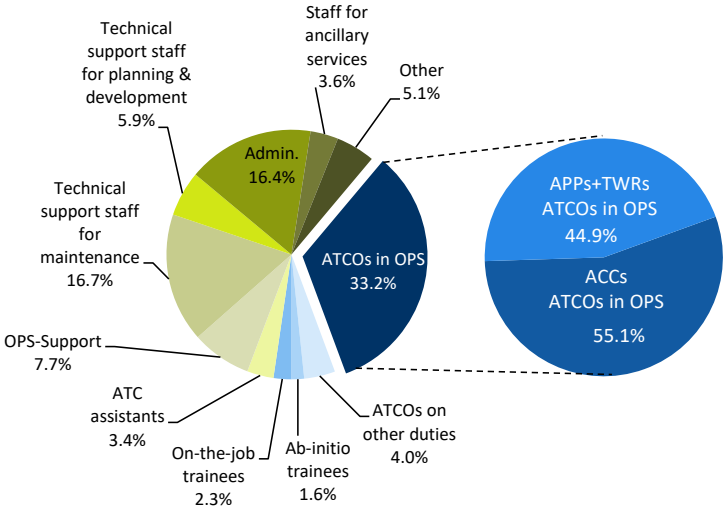



**Figure 2.7: Breakdown of total gate-to-gate ATM/CNS staff at Pan-European system level, 2023**

In 2023, the number of ATM/CNS staff increased by +1.0% or +537 FTEs compared to 2022. It however remained -1.5% lower than in 2019.

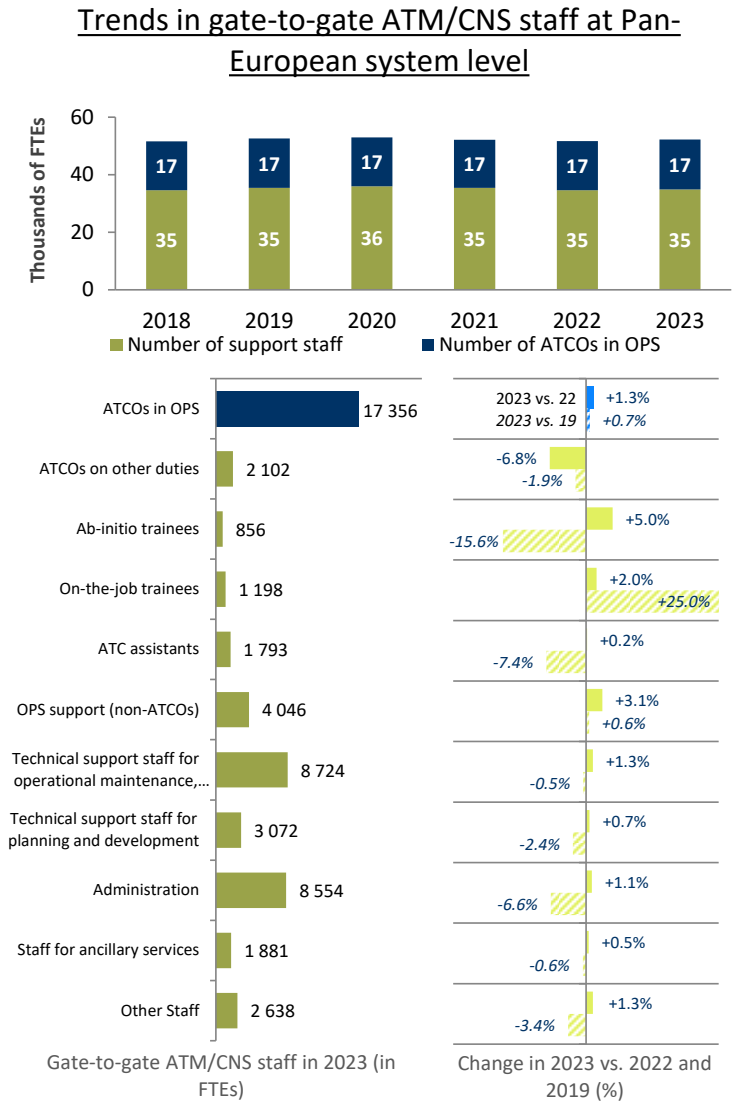



**Figure 2.8: Total gate-to-gate ATM/CNS staff per staff category**

The overall change in staff numbers observed between 2022 and 2023 mainly reflects changes in the following staff categories:

- ATCOs in OPS (+231 FTEs, or +1.3%), although this increase is partly offset by a reduction in ATCOs on other duties (-154 FTEs, or -6.8%);
- OPS support (non-ATCOs) (+122 FTEs, or +3.1%); and,
- Technical support staff for operational maintenance, monitoring and control (+112 FTEs, or +1.3%).

All other staff categories showed an increase in reported staff numbers, as shown in Figure 2.8. The highest proportional increase (+5.0%) was in ab-initio trainees, suggesting that some ANSPs increased recruitment of trainees for ATCO positions in 2023.

Compared to 2019, the number of ATCOs in OPS was +0.7% higher in 2023, while the number of support staff was -2.5% lower. The overall reduction in support staff was mainly driven by a -6.6% decrease in administrative staff (-600 FTEs), partly compensated by a +25.0% increase in the number of on-the-job trainees (+240 FTEs).

## 2.4 Balance sheet structure and capital expenditures

ANSP balance sheets in 2023 comprised €9 159M in capital and reserves and €5 891M in borrowings. Capital expenditure amounted to €1 186M in 2023.

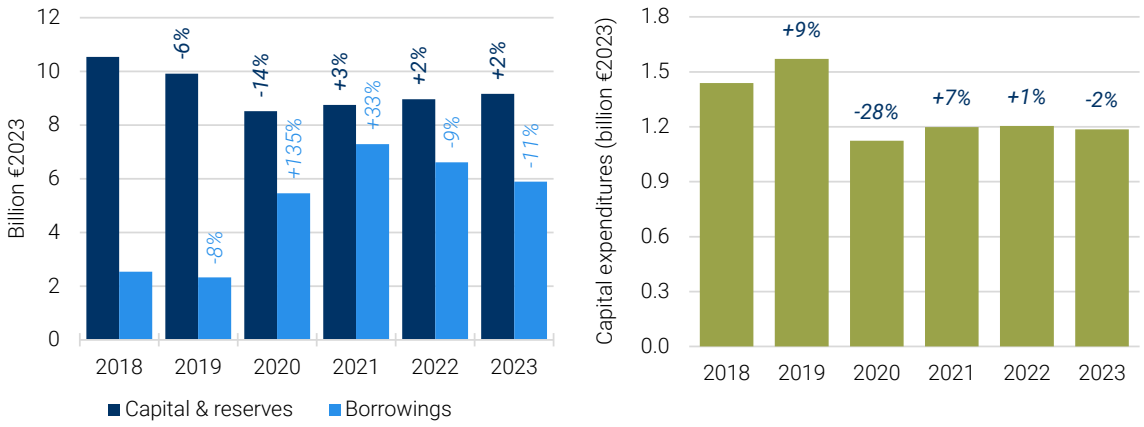



**Figure 2.9: Capital & reserves and borrowings (left) and capital expenditures (right) of the Pan-European system, 2018-2023 (real terms)**

As shown in previous sub-sections, the increase in revenue (+€1 229M) outpaced the increase in provision costs (+€272M) by +€958M in 2023. It appears that this amount has been predominantly used to reduce debt by -11% (-€721M) and, to a lesser extent, increase capital and reserves by +2% (+€193M) relative to 2022.

On the other hand, capital expenditures, which were scaled down in 2020 and 2021 due to liquidity issues and uncertainty as a result of the COVID-19 pandemic, remained at a relatively low level compared with 2018-2019.

ANSPs' cash and liquidity situation is outlined in more detail in Chapter 5.

# 3 Economic cost-effectiveness

The concept of economic cost-effectiveness, developed by the PRC, is defined as the sum of gate-to-gate ATM/CNS provision costs and the costs of ground ATFM delays for both en-route and airport, all expressed per composite flight-hour. This economic performance indicator is meant to capture trade-offs between quality of service provided and costs[2].

Figure 3.1 shows preliminary results on the changes in economic cost-effectiveness over 2018-2023 at Pan-European system level. The left-hand side shows the changes in unit economic costs, while the chart on the right-hand side provides complementary information on the year-on-year changes in ATM/CNS provision costs, composite flight-hours and unit costs of ATFM delays. Unit economic costs fell for the third consecutive year in 2023 (-2.4%). This reduction resulted from a decrease in ATM/CNS provision costs per composite flight-hour (-7.3%), partly offset by an increase in the unit cost of ATFM delays (+17.1%). Despite this decrease, 2023 unit economic costs remain +2.1% higher than in 2019.

In 2023, ATFM delays increased +30.1% to some 24.5M minutes. As a result, the share of ATFM delays in the 2023 unit economic costs increased to 24.3% from 20.3% in 2022. This is slightly higher than the shares observed in 2018 and 2019, which were both years marked by significant capacity issues for several ANSPs.

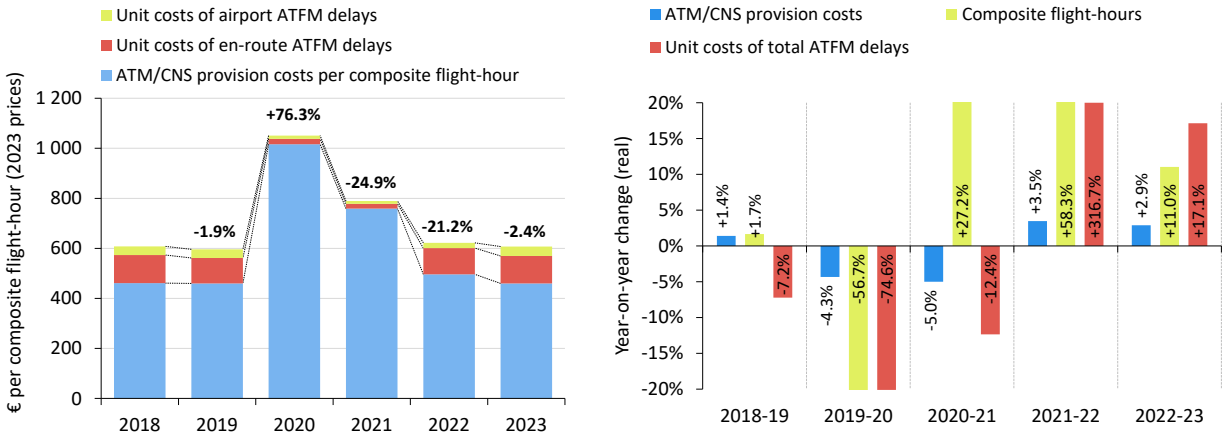



**Figure 3.1: Trend of unit economic costs at Pan-European system level, 2018-2023 (real terms)**

[2] See https://ansperformance.eu/economics/ace/ace-handbook/ for more information on the methodology used to compute composite flight-hours and economic costs.

Figure 3.2 shows preliminary results at ANSP level for 2023 cost-effectiveness (dotted lines represent the 1st and 3rd quartiles, €405 and €629, respectively).

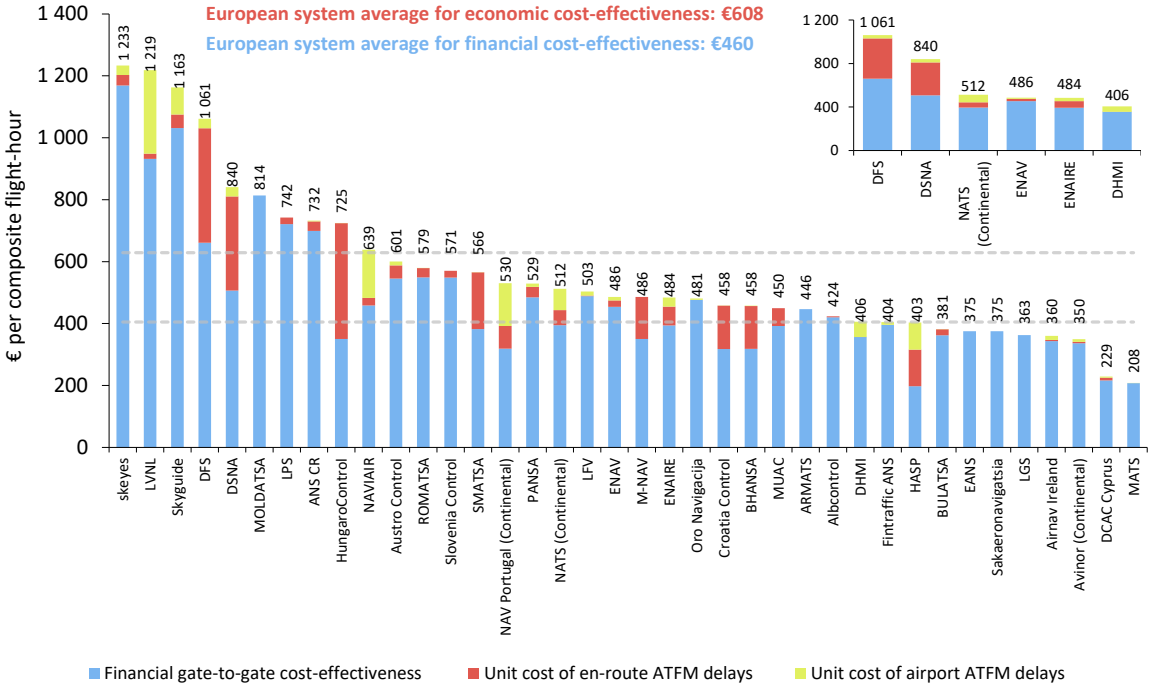



**Figure 3.2: Economic gate-to-gate cost-effectiveness, 2023**

For 12 ANSPs ATFM delays represented more than 20% of their unit economic costs (see ANSPs with the largest red and yellow portions, e.g. HungaroControl, HASP, NAV Portugal, DSNA, DFS, etc.). In absolute terms (cumulative ATFM delays in minutes) DSNA, DFS, NATS, ENAIRE and HASP were the ANSPs generating the highest levels of ATFM delays in 2023 (72.3% of the pan-European system total ATFM delays).

The most common factors in ATFM delays were capacity and staffing, followed by weather. Individual ANSPs were impacted by other factors, such as ATC industrial action (DSNA), implementation of capacity improvement projects (4-Flight for DSNA, iCAS for DFS) and ongoing effects of the war in Ukraine (HungaroControl, DFS)[3].

Further analysis of the relationship between changes in ANSPs costs, traffic and unit costs will be analysed in detail in the forthcoming ACE report.

[3] See https://www.eurocontrol.int/publication/performance-review-report-prr-2023 for more information on ATFM delays in 2023.

# 4 Financial cost-effectiveness

This chapter provides a preliminary analysis of financial cost-effectiveness.

## 4.1 Pan-European system level

Figure 4.1 shows that in 2023 the unit ATM/CNS provision costs fell by -7.3% compared to 2022, reaching an amount of €460. This is the result of traffic increase (+11.0%) being partly offset by growth of ATM/CNS provision costs (+2.9%).

Unit ATM/CNS provision costs in 2023 returned to the level of financial cost-effectiveness achieved in 2019, itself the lowest unit cost achieved since the inception of the ACE benchmarking in 2002.

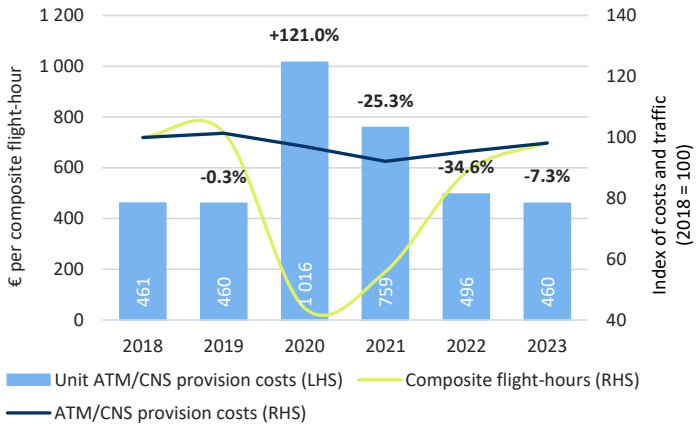



**Figure 4.1: Changes in unit ATM/CNS provision costs, 2018-2023 (real terms)**

The analytical framework used in the ACE analysis to break down the financial cost-effectiveness indicator into relevant economic drivers is presented in Figure 4.2. These key drivers include:

a) ATCO-hour productivity (0.97 composite flight-hours per ATCO-hour);

b) ATCO employment costs per ATCO-hour (€144); and,

c) support costs per unit output (€311).

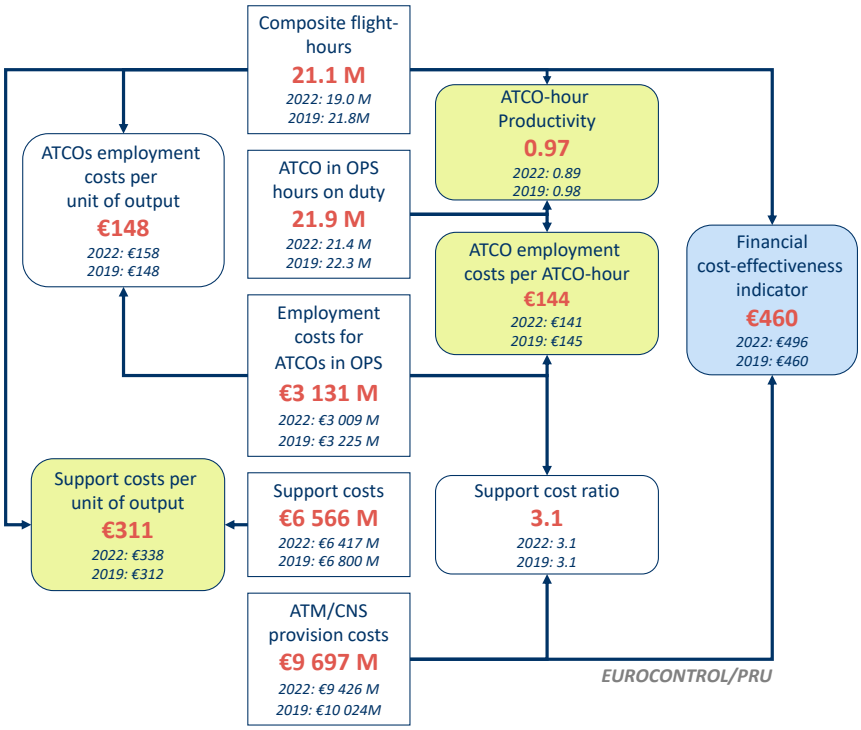



**Figure 4.2: ACE performance framework, 2023 (real terms)**

Figure 4.3 shows that in 2023, ATCO employment costs per ATCO-hour rose by +2.2% while ATCO-hour productivity rose by +9.0% compared to 2022. As a result, ATCO employment costs per composite flight-hour decreased (-6.3%). In the meantime, unit support costs fell by -7.8% due to an increase in composite flight-hours (+11.0%) being partly offset by an increase in support costs (+2.3%). Consequently, in 2023, unit ATM/CNS provision costs fell by -7.3% at the Pan-European system level compared to 2022, taking into account the relative weighting of ATCO employment and support costs based on their shares of total ATM/CNS provision costs.

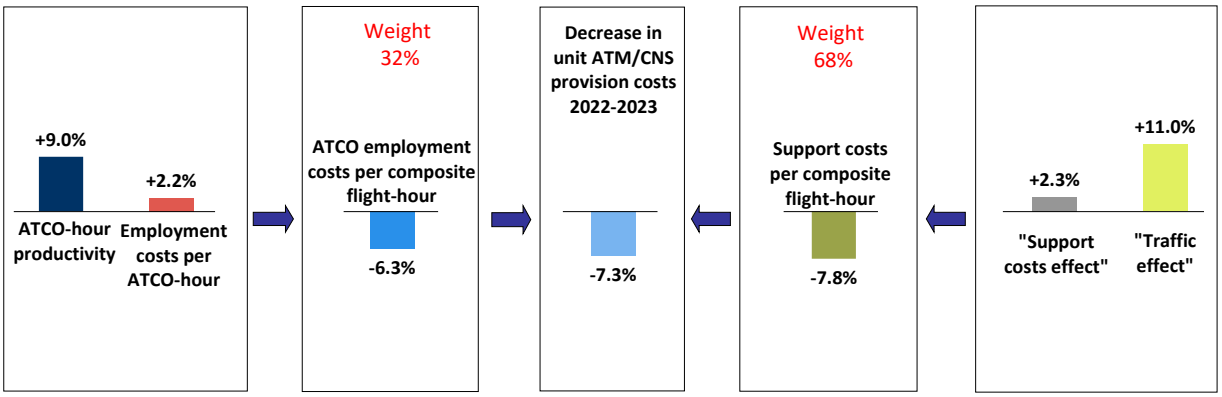



**Figure 4.3: Breakdown of changes in unit ATM/CNS provision costs, 2022-2023 (real terms)**

As the values of the 2022 indicators were affected by the persistent consequences of the COVID-19 crisis, Figure 4.4 below provides an additional analysis using 2019 as a reference year. It shows that in 2023 traffic was still -3.7% below its 2019 level. However, an equivalent reduction in total support costs (-3.8%) means that unit support costs in 2023 were all but level with 2019 (-0.1%). ATCO employment costs were also very close to their 2019 value (+0.6%) as both employment costs per ATCO-hour and ATCO-hour productivity remained marginally below pre-pandemic levels (-0.3% and -0.9% respectively). Overall, the unit cost in 2023 was +0.1% higher than in 2019.

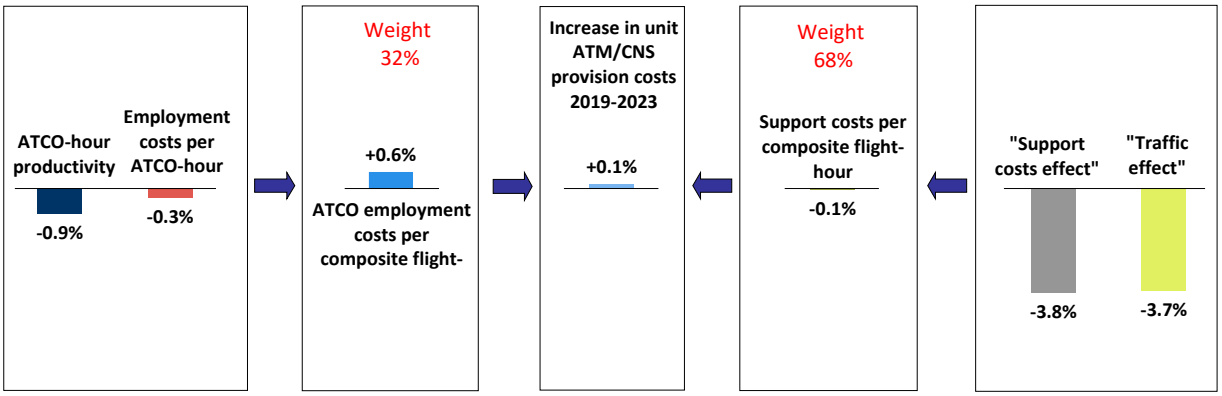



**Figure 4.4: Breakdown of changes in unit ATM/CNS provision costs, 2019-2023 (real terms)**

## 4.2 ANSP level

All figures presented in this section present the preliminary benchmarking results for the 38 ANSPs. Because of their weight in the Pan-European system, the six largest ANSPs by cost (DFS, DHMI, DSNA, ENAIRE, ENAV and NATS) are also shown in a miniature replica of the chart (top right corner of the figures). Compared to previous years' report, DHMI is now part of this group since its share in the total Pan-European system costs is now reaching 7%, which is close to ENAV and NATS shares. The 1st and 3rd quartiles for each indicator are also shown in all figures. The gap between these two quartiles provides additional insight on the dispersion of the values.

Figure 4.5 presents the financial gate-to-gate cost-effectiveness indicator at ANSP level for the year 2023. The dotted lines represent the 1st and 3rd quartiles (€352 and €536, respectively).

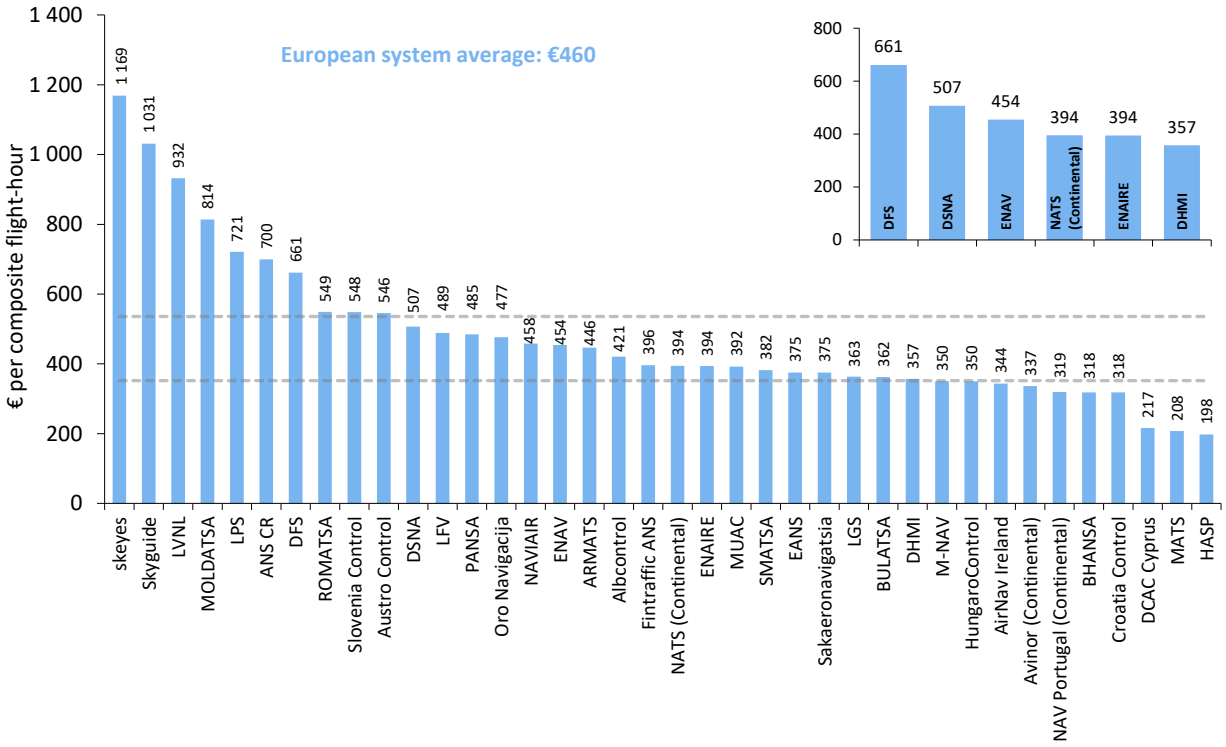



**Figure 4.5: Financial gate-to-gate cost-effectiveness, 2023**

Figure 4.6 presents the ATCO-hour productivity indicator at ANSP level for the year 2023. The dotted lines represent the 1st and 3rd quartiles (0.70 and 1.00, respectively).

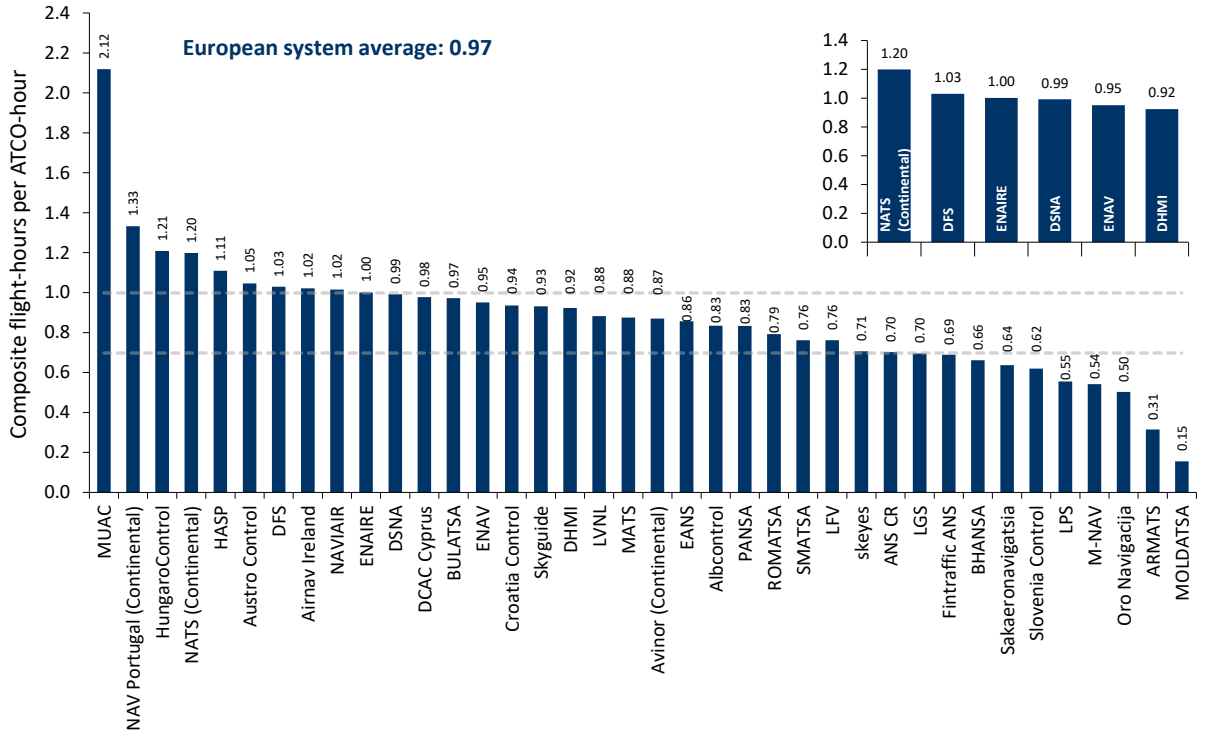



**Figure 4.6: ATCO-hour productivity, 2023**

Figure 4.7 presents the employment costs per ATCO in OPS indicator at ANSP level for the year 2023. The dotted lines represent the 1st and 3rd quartiles (€64 and €151, respectively).

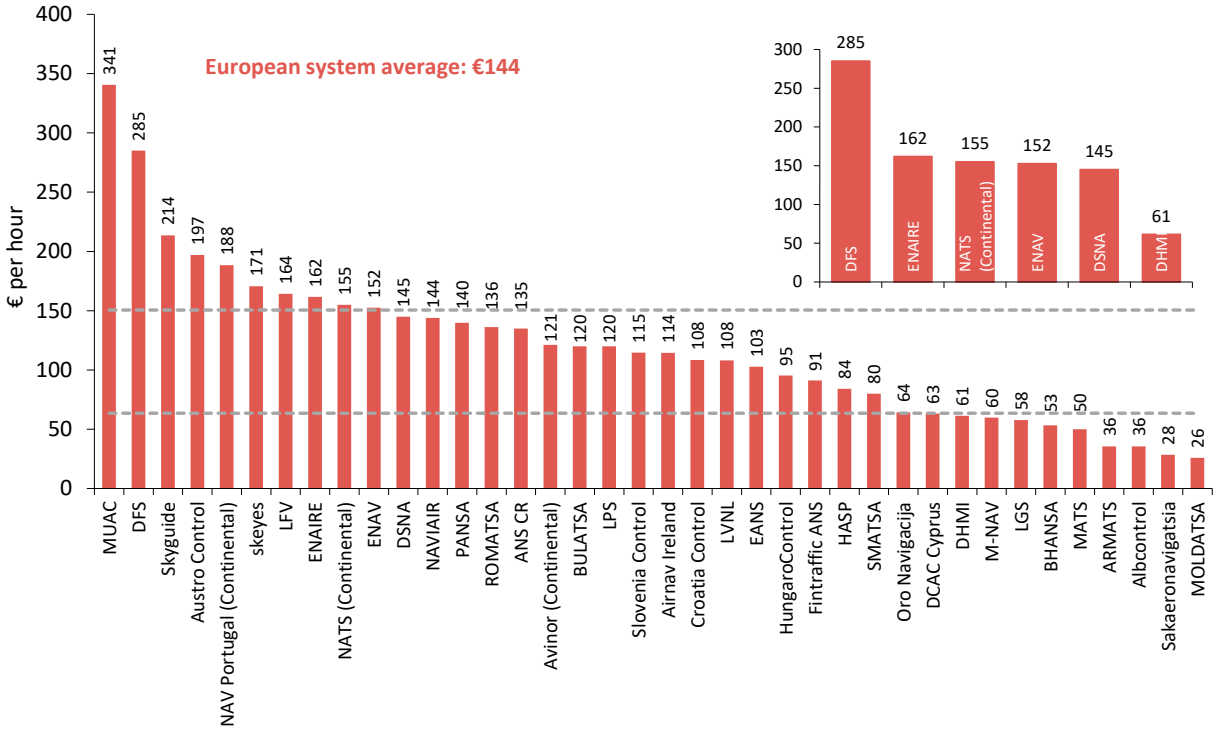



**Figure 4.7: Employment costs per ATCO-hour, 2023**

Figure 4.8 presents the support costs per composite flight-hour indicator at ANSP level for the year 2023. The dotted lines represent the 1st and 3rd quartiles (€238 and €363, respectively).

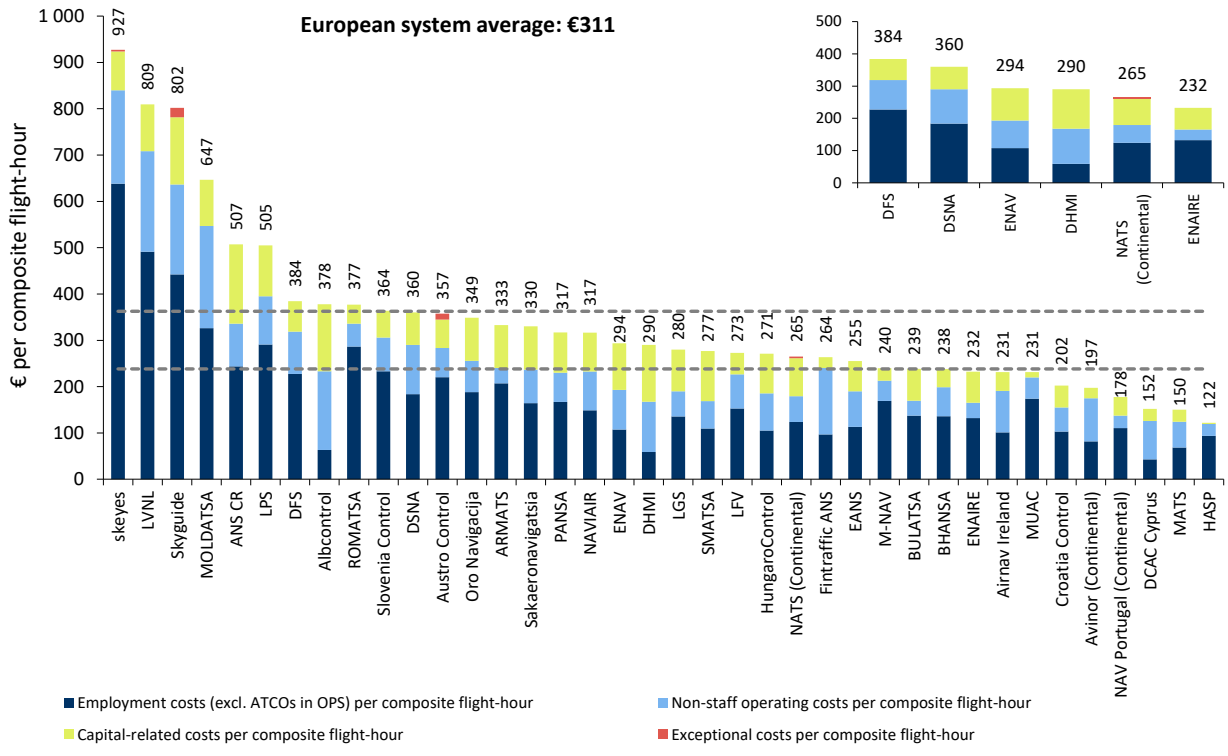



**Figure 4.8: Breakdown of support costs per composite flight-hour, 2023**

A more detailed analysis of the changes in cost-effectiveness, ATCO-hour productivity, ATCO employment costs per ATCO-hour and unit support costs will be available in the final ACE benchmarking report.

# 5 Monitoring of ANSPs' Cash and Liquidity situation

This chapter provides an overview of ANSPs' financial situation over the 2018-2023 period, using two indicators: the current ratio and the cash-on-hand days. These indicators have been calculated at pan-European system level using the information provided in the ANSPs' Financial Statements which were available at the time of publishing this report (35 for the 2018-2022 period and 27 in 2023). The indicators are therefore consistent with those published at individual ANSP level in the EUROCONTROL Aviation Intelligence Unit ANSPs Financial Dashboard.

Depending on the organisational set up of different ANSPs, the information reported in their financial statements covers a different scope of activities (e.g. it may include airport management operations, commercial activities, etc.) which does not always correspond with the ACE gate-to-gate scope. Additionally, due to specific organisational and financial set up, DCAC Cyprus, HASP, LVNL and MUAC, are excluded from the analysis presented in this chapter.

Figure 5.1 presents the changes in the average current ratio between 2018 and 2023 as well as the 1st and 3rd quartiles. The current ratio (current assets divided by current liabilities) measures the ability of a company to pay its short-term debt obligations with its current assets.

Figure 5.1 shows that the average current ratio for ANSPs declined from 2018 to a low point in 2021, due to pandemic related revenue drops, but has since improved, reaching 3.82 in 2023. This recovery reflects an overall strengthening of liquidity across the sector, yet there is substantial variability in financial resilience. Both the 1st and the 3rd quartiles have increased in 2023, however, while the former reached a level in line with that observed in 2018, the latter remains lower than pre-crisis levels.

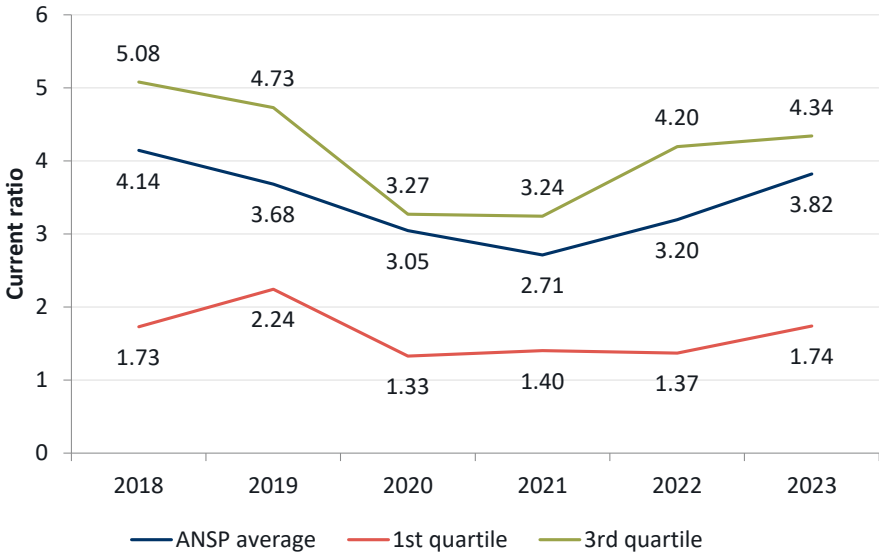



**Figure 5.1: Trends in ANSPs current ratio, 2018-2023**

Figure 5.2 shows the changes in cash-on-hand days at Pan-European system level over the 2018-2023 period as well as the 1st quartile and the 3rd quartile of these indicators. The cash-on-hand days indicator (cash & cash equivalents divided by operating costs x 365) measures the length of time a company can pay its operating costs from its cash reserves.

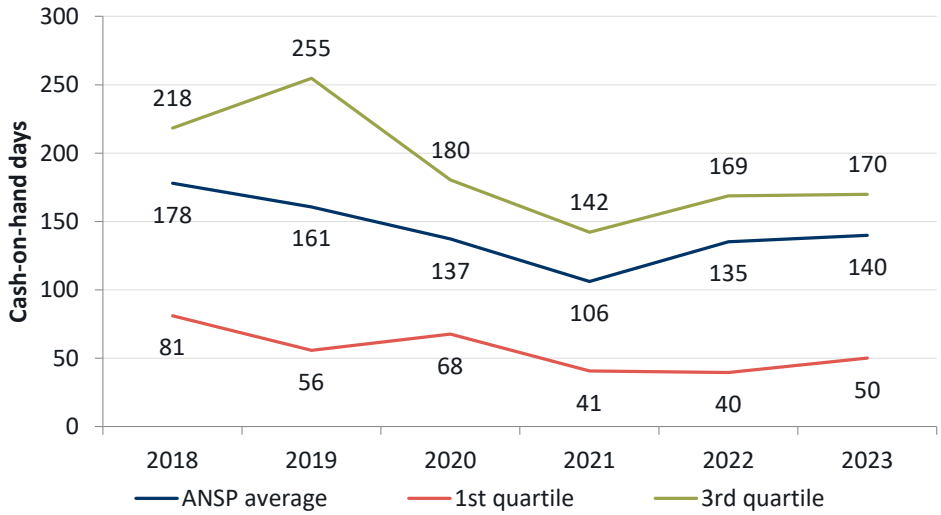



**Figure 5.2: Trends in cash-on-hand days at Pan-European system level, 2018-2023**

Figure 5.2 illustrates that while the average has increased to 140 days in 2023 (up from 135 days in 2022), it remains below pre-pandemic levels. This gradual recovery indicates improved liquidity for many ANSPs, yet there is a clear disparity between those with stronger and weaker liquidity positions.

More detailed analysis on these financial indicators will be available in the forthcoming ACE report.

## Important note

Data contained in this document are preliminary and subject to changes before the publication of the final ACE benchmarking report in May 2025.

## Disclaimer

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-support@eurocontrol.int