



GLOBAL AIR NAVIGATION SERVICES PERFORMANCE REPORT

2019 – 2023 ANSP Performance Results

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Acknowledgements

This publication is a product of the CANSO Global Benchmarking Workgroup, produced with the assistance of Egis. The workgroup is grateful for the continued analytical support provided by Egis.

We also thank EUROCONTROL and their Performance Review Unit (PRU) for their collaboration in providing the data from their ANSP Cost Effectiveness (ACE) Report. This has enabled our CANSO Air Navigation Services Performance Report to continue to reflect a broader scope of air navigation service providers.



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Contents

ACKNOWLEDGEMENTS	2
FOREWORD	4
EXECUTIVE SUMMARY	5
INTRODUCTION	11
2023 INDUSTRY TRENDS	13
OPERATIONAL PERFORMANCE	21
2023 GLOBAL ANS REPORT PARTICIPATION	24
2023 PERFORMANCE DATA	31
SUMMARY OF PERFORMANCE TRENDS	61
RELATED CANSO BENCHMARKING ACTIVITIES	62
ANSP FACTSHEETS	70
ANNEX 1: METHODOLOGY	90
ANNEX 2: DATA DEFINITIONS	92
ANNEX 3: KEY PERFORMANCE INDICATORS	95
ANNEX 4: CONTEXTUAL DATA	97
ANNEX 5: KPI DATA	120
ANNEX 6: EXCHANGE RATES	142
ANNEX 7: ACRONYMS AND ABBREVIATIONS	144
ANNEX 8: SOURCES	145

List of tables

TABLE 1: CANSO MONITORED KPIs	21
TABLE 2: TRIAL OPERATIONAL PERFORMANCE KPIs	22
TABLE 3: CANSO GLOBAL ANS REPORT PARTICIPATION	24
TABLE 4: PARTICIPATING ANSPs' REPORTING PERIODS	27
TABLE 5: PARTICIPATING ANSPs' IFR FLIGHT HOURS	29
TABLE 6: LIST OF KEY PERFORMANCE INDICATORS	31
TABLE 7: AVERAGE PERFORMANCE FOR ALL KPIs IN 2022 AND 2023	96

Foreword

As the world emerged from the COVID-19 pandemic, 2023 marked a turning point for many regions across the globe. While air traffic recovery was well underway, new and complex challenges began to surface, which added fresh layers of disruption to an already strained global landscape. The year was shaped by the Russian aggression in Ukraine, periods of economic uncertainty, and rising inflation. This report reflects on a period when the effects of the pandemic were still being felt, even as the industry began to navigate a new set of global pressures.

The year 2023 saw the industry fully recover from the downturn inflicted by the COVID-19 pandemic, with air travel fully reaching and even surpassing pre-2019 levels across most countries and regions. However, even as the industry emerged from the aftermath of one global crisis, it faced further turbulent global economic conditions owing to significant geo-political challenges, such as the Russian aggression in Ukraine. This alongside a new conflict in the Middle-East, further disrupted global financial markets and destabilised regional economies causing significant instability and fluctuations in fuel prices. These external economic conditions contributed to rising inflation levels and exerted inflationary pressures across the globe. Despite these economic headwinds the global air passenger traffic continued its upward trajectory, which saw a 36.9 per cent increase in RPKs compared to 2022, which in terms of global passenger traffic for the 2023 calendar year was at 94.1 per cent of pre-2019 levels.

In 2023, the industry grappled with capacity pressures driven by surging growth in travel post the pandemic and changes in overflight patterns due to unforeseen airspace closures and sanctioned airspace. Further, 2023 illustrated how ANSPs are impacted by external economic conditions outside their immediate sphere of control. Inflationary pressures arising from geopolitical instability not only impact their direct cost bases in the form of increased input costs (utilities, energy, supply chain) but also impact their employment and labour costs paid out in form of inflation linked pension schemes and increased salaries/wages to keep up with prevailing inflation in their respective countries. Therefore to build a comprehensive picture of how ANSPs are performing, robust data and contextual interpretations are essential. This is where the work of the CANSO Global Benchmarking Workgroup (GBWG) proves invaluable.

This year, CANSO presents the fifteenth edition of the Global Air Navigation Services Performance Report, which now includes 48 ANSPs from across the globe. The report is a key output of the GBWG's work and serves as a vital tool for ANSPs to benchmark, compare, and identify good practices and leading efforts in ANS performance.

In this edition, we reflect on performance throughout 2023, examine how participating ANSPs were affected by global developments, and consider how these influences are captured in our key performance indicators.

I extend my sincere thanks to the CANSO GBWG and all participating CANSO members. I also wish to acknowledge EUROCONTROL for their support in broadening the scope, scale, and practical value of this report. Additionally, I thank Egis for thirteen years of dedicated work in data collection and analysis, and for their continued commitment to supporting CANSO and the GBWG in this important endeavour.



Simon Hocquard
President and CEO, CANSO

Executive Summary

Coverage

The CANSO Global Air Navigation Services (ANS) Performance Report is produced annually by CANSO's Global Benchmarking Workgroup (GBWG), with analytical support provided by Egis. Through an ongoing agreement with EUROCONTROL's Performance Review Unit (PRU), data relating to European Air Navigation Service Providers (ANSPs) has been sourced from their ATM Cost-Effectiveness (ACE) Benchmarking Report and has subsequently been incorporated into this ANS performance report. The ACE Report, compiled by the PRU since 2002, provides a consistent and comprehensive dataset that is available in the [ACE dashboard](#).

This year's report presents data for 48 ANSPs and includes performance indicators for the year 2023, along with trend data covering the period from 2019 to 2023. To facilitate a credible comparison of performance, the ANSPs that submitted data to CANSO were grouped into three comparator categories based on the number of IFR hours managed. This approach ensures that the analysis reflects the differing scales and complexities of the participating ANSPs.

In line with CANSO's ambition for the Global ANS Performance Report to present a more comprehensive view of performance, data provided by the CANSO Safety Intelligence Workgroup (SIWG), examining key safety metrics for 2023, has been included. Collaboration between CANSO workgroups is intended to support the analysis of interdependencies across datasets and ultimately generate deeper insights into the factors driving performance trends.

We would also like to express our appreciation to HungaroControl for contributing a case study that explores the impact of the war in Ukraine on their operational performance, particularly in relation to capacity.



Pandemic Recovery, Inflationary Pressures and their Impact on Key Performance Indicators

During 2023, our industry continued its recovery from the unprecedented disruption caused by the COVID-19 pandemic. Passenger volumes climbed to 8.7 billion, reaching 95 per cent of pre-pandemic levels, up from 6.7 billion in 2022. Flight activity surged during 2023, with May 2023 recorded as the busiest month since July 2019, averaging 133,800 flights and 240,900 flight hours daily. By December 2023, we noted that global air traffic flight hours had grown by 13.8 per cent year-on-year in 2023 compared to 2022, with flight volumes and hours having surpassed pre-pandemic 2019 levels.

Despite this robust recovery, the industry faced significant operational and structural challenges. Recovery varied across regions and market segments, highlighting ongoing vulnerabilities. Geopolitical instability had a notable impact on airspace accessibility and routing efficiency. The closure of Ukrainian airspace since February 2022 forced airlines to reroute through congested corridors, particularly in South-East Europe. The outbreak of conflict in Israel in October 2023 further disrupted air traffic flows across the Middle East.

Inflationary pressures continued to affect cost-efficiency across the sector. As noted in EUROCONTROL's 2025 ACE Benchmarking Report several inflation-driven impacts on ANSPs were highlighted. Employment costs rose gradually due to delayed wage adjustments tied to national labour regulations. Non-staff operating costs increased, particularly energy and imported services, driven by inflation and exchange rate fluctuations. Some ANSPs revalued assets to reflect inflation, leading to higher depreciation charges. Additionally, elevated inflation contributed to higher nominal interest rates, increasing the cost of capital. Overall, while the aviation industry made significant strides toward recovery in 2023, it remained exposed to complex and evolving external pressures that continue to challenge its trajectory.

Despite a reported increase in IFR traffic, cost efficiency declined, as evidenced by a 6.7 per cent rise in total cost per IFR flight hour in continental airspace compared to 2022. This was primarily driven by the post-COVID-19 recovery and widespread inflation across countries. However, when compared to 2020, during the height of the pandemic, the 2022 cost per IFR hour remained 34 per cent lower. Among participating ANSPs, 67 per cent experienced an increase in continental total cost per IFR flight hour, while 34 per cent saw a decrease. In oceanic airspace, the trend was reversed, with only 20 per cent of ANSPs reporting an increase and 80 per cent experiencing a decrease in total cost per IFR flight hour.

Another notable change was the significant 16.82 per cent year-over-year increase in employment cost per hour in continental airspace. In contrast, oceanic employment costs per ATCO hour have remained relatively stable, showing only a negligible decrease of 0.53 per cent. Among participating ANSPs, 71 per cent reported an increase and 29 per cent reported a decrease in continental employment costs per ATCO hour. For oceanic airspace, 75 per cent of ANSPs experienced an increase, while 25 per cent reported a decrease.

ATCO productivity continued to show positive growth across both continental and oceanic airspace. This improvement is largely attributed to a rise in IFR flight hours. ATCO productivity increased by 14.41 per cent in continental airspace and 14.57 per cent in oceanic airspace compared to 2022. Among participating ANSPs, 83 per cent reported an increase and 17 per cent reported a decrease in continental ATCO productivity, while 100 per cent of ANSPs reported an increase in oceanic ATCO productivity, with no decreases recorded.

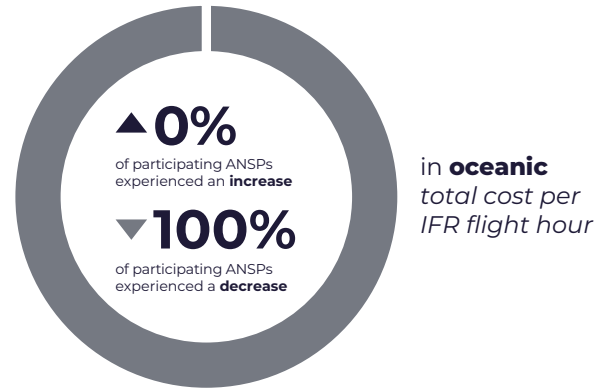
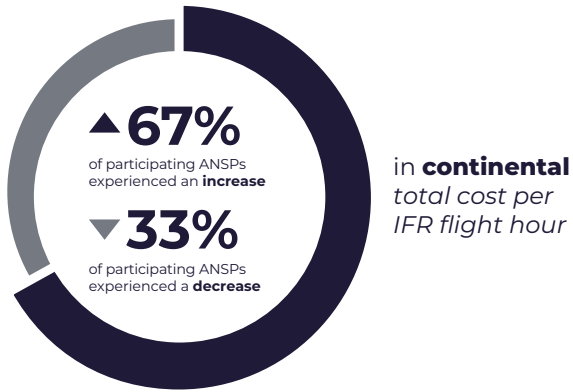
Both continental and oceanic "other costs" showed signs of returning to pre-pandemic levels, though inflation continues to play a significant role. In oceanic airspace, although all participating ANSPs saw an increase in IFR flight hours, the traffic growth was more substantial than the rise in costs, resulting in a 12.53 per cent decrease in other costs per IFR flight hour. Among continental ANSPs, 68 per cent experienced an increase and 32 per cent a decrease in other costs per IFR flight hour. In oceanic airspace, 40 per cent of ANSPs reported an increase, while 60 per cent saw a decrease.

It is important to note that the reporting periods for ANSPs submitting data to CANSO vary. Some ANSPs have provided data corresponding to the 2022 calendar year, while others made submissions for the 2023 calendar year, and a few have included data extending into 2024. The data sourced from EUROCONTROL's Performance Review Unit (PRU) for European ANSPs is aligned specifically with the 2023 calendar year. The variation in reporting periods continues to have a notable impact on this year's report, particularly due to the timing of pandemic-related restrictions and their subsequent lifting. To clearly illustrate this, the graphs representing the key performance indicators (KPIs) are arranged and colour-coded according to the respective reporting periods. The reporting periods span from April 2022 to June 2024.

Key findings of the report¹

Cost Efficiency (Indicator 1)

Inflation and the rise of traffic are affecting the Cost Efficiency



Even though an overall increase in IFR traffic was reported, the KPI 1 total cost per IFR flight hour in continental airspace increased by 6.7 per cent compared to 2022. This trend was driven by the recovery from the COVID-19 Pandemic, with inflation remaining high across countries. Compared to the year 2020, at the peak of the pandemic, the total cost per IFR hour in 2023 was still 34 per cent lower.

The decrease in the global average of 17.6 per cent for KPI 1 in oceanic airspace was driven by an increase in oceanic IFR flight hours, with the most significant growth coming from ATNS, which resumed operations and increased by 596 per cent year over year.

When examining the fiscal years, most ANSPs with oceanic airspace (although there are only a few) do not align with the calendar year 2023. Instead, their reporting periods primarily cover the last third of 2022. The end of 2022 and the beginning of 2023 were significant due to the easing of international restrictions, which likely contributed to increased air traffic, particularly intercontinental flights. This shift probably had a substantial impact on the data for ANSPs in oceanic airspace compared to those in continental airspace. Additionally, a gradual increase in IFR hours was observed over the course of the reporting periods.

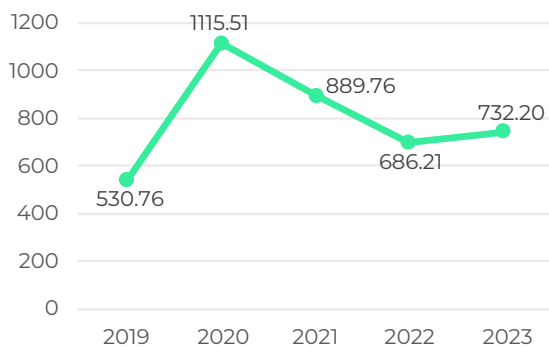
Average global percentage change – Total cost per IFR flight hour (2022-2023):

CONTINENTAL: +6.7%

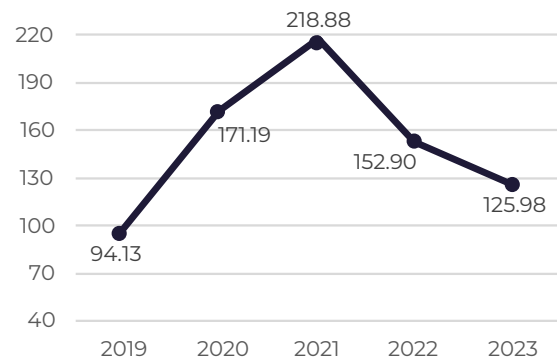
OCEANIC: -17.6%

Average KPI values – Total cost per IFR flight hour (USD) (2019-2023):

CONTINENTAL:



OCEANIC:



¹ For identified results supporting these key findings, see 2023 Performance data section. For this reason, there are also small differences between the numbers presented in both sections

ATCO in OPS employment cost per ATCO hour (Indicator 2A)
Growing trend in ATCO employment costs per ATCO hour in the continental airspace



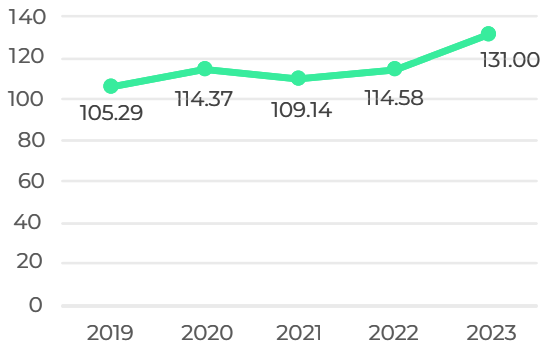
The air transport sector is still slowly recovering from the pandemic crisis and battling inflation. These factors are causing a fluctuation in operational and financial performance. As a result, the employment cost per ATCO hour rose by 14.33 per cent year over year. The oceanic employment cost per ATCO hour has stabilised, with a slight, negligible decrease of 0.53 per cent.

Average global percentage change – Employment cost per ATCO hour (2022-2023):

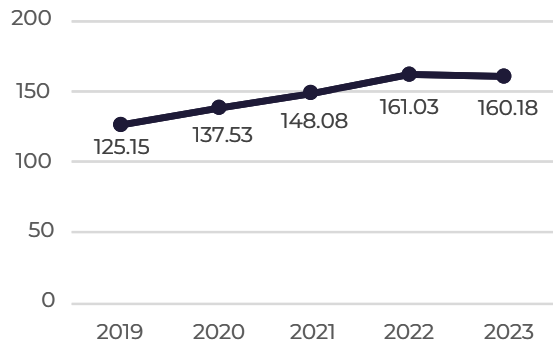
CONTINENTAL: +14.33% **OCEANIC: -0.53%**

Average KPI values – Employment cost per ATCO hour (USD) (2019-2023):

CONTINENTAL:

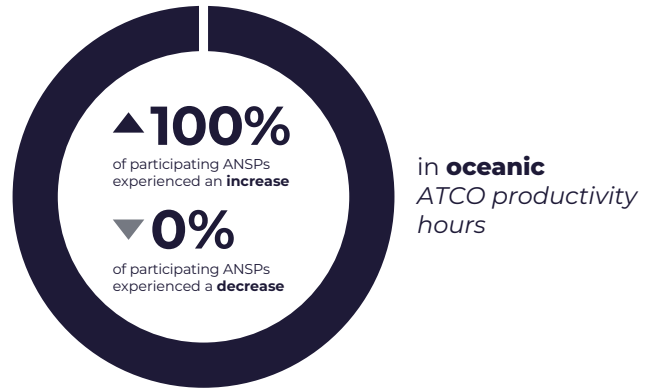
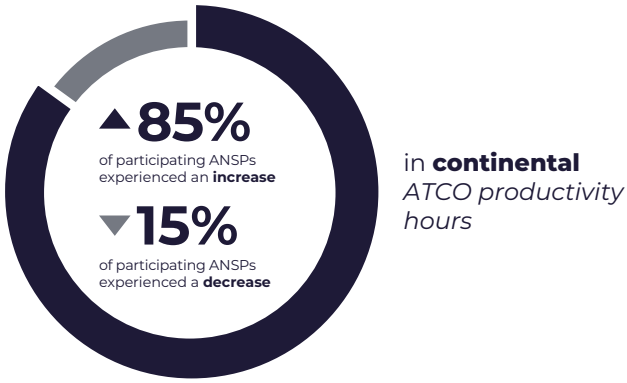


OCEANIC:



ATCO in OPS hour productivity (Indicator 2B)

Productivity continues to grow for both continental and oceanic ANSPs



There was an observed increase in global average KPI 2B ATCO productivity in both oceanic and continental airspace. This improvement was primarily driven by a rise in IFR flight hours which increased across all the participating ANSPs during the reporting period (the only exception is the reduction in continental IFR hours reported by Isavia ANS). The productivity of ATCOs in continental airspace increased by 13.84 per cent and in oceanic airspace by 14.74 per cent compared to the year 2022. Since KPI 2B is directly derived from IFR flight hours, this has led to a significant boost in ATCO productivity in oceanic airspace, surpassing the levels observed before the pandemic.

Average global percentage change – ATCO productivity (2022-2023):

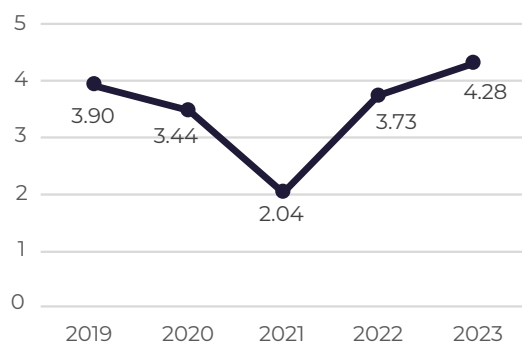
CONTINENTAL: +13.84% **OCEANIC: +14.74%**

Average KPI values – ATCO productivity (2019-2023):

CONTINENTAL:

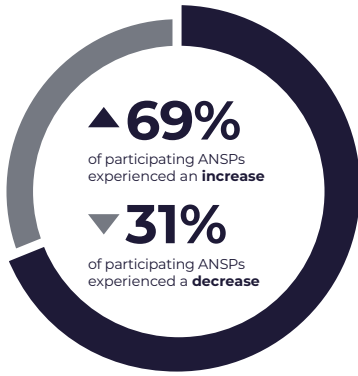


OCEANIC:

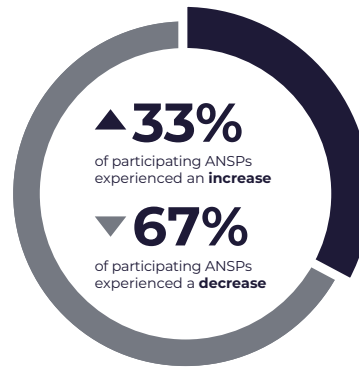


Other costs per IFR flight hour (Indicator 2C)

Continental & oceanic costs show signs of returning to pre-pandemic levels



in **continental** other costs per IFR flight hour



in **oceanic** other costs per IFR flight hour

Most ANSPs in continental airspace saw an increase in KPI 2C (other costs per IFR flight hour), despite an overall decrease in inflation and increase in IFR flight hours. In continental airspace, the other costs per IFR flight hour have risen by 8.36 per cent on average. Notably, the other costs of DCAC Cyprus and DHMI have increased by more than 60 per cent year over year.

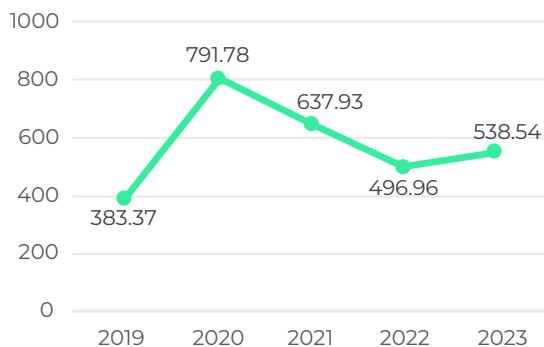
Other costs per IFR flight hour in oceanic airspace decreased for all the ANSPs, driven by an increase in IFR hours. This contributed to an overall decrease of 10 per cent of other costs per IFR flight hour.

Average global percentage change – Other costs per IFR flight hour (2022-2023):

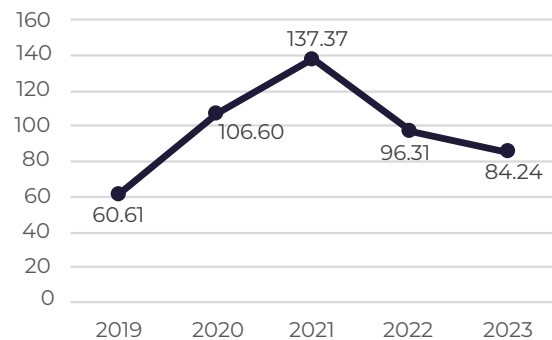
CONTINENTAL: +8.36% **OCEANIC: -12.53%**

Average KPI values – Other costs per IFR flight hour (USD) (2019-2023):

CONTINENTAL:



OCEANIC:



Introduction

Comparing ANSP Performance

Air Navigation Service Providers (ANSPs) are entrusted with the safe, efficient, and cost-effective management of global air traffic. Their responsibilities encompass enhancing airspace capacity through infrastructure and technological advancements, improving operational efficiency through a skilled and productive workforce, and adopting innovative approaches to airspace management.

The performance of the air navigation system has a direct impact on stakeholders across the aviation ecosystem, from airports to airlines to airspace users and ultimately the flying public. From improving connectivity and reducing delays to maintaining the highest standards of aviation safety, the delivery of efficient and effective air navigation services is fundamental to a high-performing aviation sector. In support of this, CANSO conducts this annual benchmarking exercises that consolidate and assess global performance data.

By comparing key financial and productivity indicators, ANSPs are equipped to make informed decisions aimed at improving cost-effectiveness and operational productivity, all while maintaining safety as the industry's foremost priority. Insights gained through the benchmarking exercise enable ANSPs to collaborate in addressing both individual performance and the broader performance of the global Air Traffic Management (ATM) industry. For over 15 years, the annual CANSO Global ANS Performance Report has provided valuable visibility into global performance trends.

Measuring Cost Efficiency and Productivity

The two fundamental indicators for air navigation services, enabling the monitoring and assessment of operational performance, are cost-efficiency and productivity. These indicators reflect how ANSPs deliver value and act as measures of operational effectiveness. The CANSO ANS Performance Framework outlines the key determinants of cost-efficiency and productivity, such as employment costs, hours worked, and other associated expenses. The analysis and comparison of these determinants of cost-efficiency and productivity provides for a consistent, transparent model for interpreting global ANS performance over time and across regions.

Global Air Navigation Services Performance Report

This year's Global Air Navigation Services Performance Report presents performance indicators for the ANSPs who submitted data to CANSO for the year 2023, alongside trend data for the period from 2019 to 2023.

Participating CANSO ANSPs have also submitted contextual commentary, including notes on exceptional events during the reporting year or factors that may affect the comparability of their data. These additional remarks are incorporated into the contextual dataset, offering further insight into the performance outcomes of the contributing CANSO ANSPs.

Comprehensive results for each ANSP are accessible via the CANSO Global Benchmarking Workgroup (GBWG) Performance Dashboard, which is available exclusively to participating CANSO GBWG members.



Introduction

Incorporation of PRU data

A key objective for CANSO and the members of the Global Benchmarking Workgroup (GBWG) is to continually expand the global coverage of data included in the annual Performance Report. To support this aim, since 2013, CANSO, through an agreement with EUROCONTROL, has incorporated publicly available data collected by EUROCONTROL's Performance Review Unit (PRU). This integration ensures a more complete representation of European ANSPs within the dataset and the report.

It is important to note that while the raw data extracted from the PRU ACE Report is directly comparable, the final Key Performance Indicators (KPIs) presented in the CANSO report are not directly aligned with those reported in the PRU ACE Benchmarking Report.

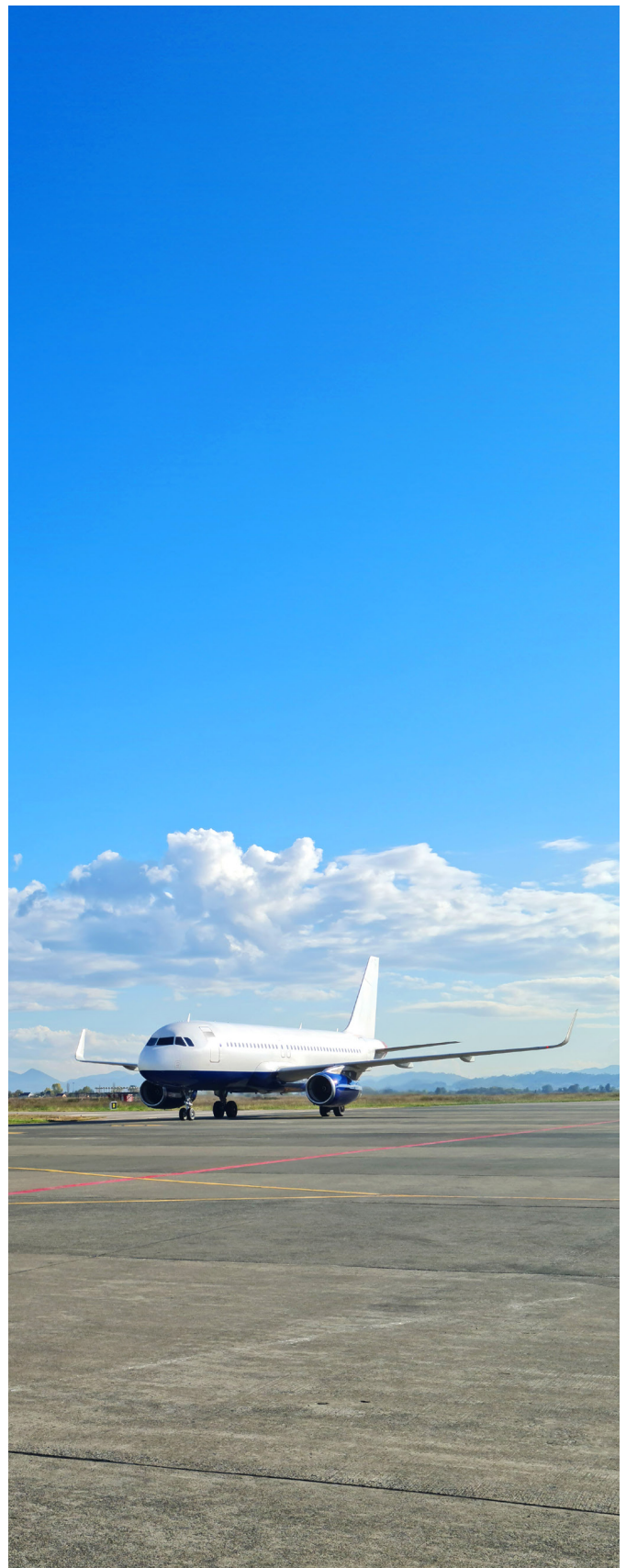
This distinction primarily arises from differences in the input metrics used. Specifically, the CANSO report relies on Instrument Flight Rules (IFR) flight hours and extracts the metric "total flight hours controlled by the ANSP" from the PRU ACE dataset as a comparable data point. The PRU ACE Benchmarking Report uses "composite flight hours" as its basis. These comparable data points were validated through a comparison exercise conducted by Egis, the findings of which were presented in 2020.

Differences in indicators between the CANSO and PRU ACE Benchmarking reports extend beyond the use of distinct flight hour measurements. Two notable examples are outlined below:

- The CANSO Performance Report converts all cost data into US dollars (USD), whereas the PRU ACE Benchmarking Report presents costs in euros (EUR).
- The CANSO report primarily sources exchange rate, inflation rate, and purchasing power parity (PPP) data from the World Bank. In contrast, EUROCONTROL's PRU ACE Benchmarking Report relies on a combination of data from EUROSTAT and the International Monetary Fund (IMF).

European members of the Global Benchmarking Workgroup (GBWG) have been permitted, with appropriate justification, to use their GBWG submission for this benchmarking exercise.

For further details, please see *Global Air Navigation Services Performance Report 2019-2023: Participation*.



2023 Industry Trends²

MOVEMENT AND PASSENGER GROWTH SLOWLY RECOVERS



Global passenger increase of **30.5%** YoY, however 5.13% below 2019 levels



Air cargo volume decreased by **1.8%** in 2023, 4.9% below the 2019 levels

+12.6% in Aircraft Movements in 2023 (-7.2% of 2019)



Domestic passenger numbers surpassed the 2019 levels by **3.9%** increasing by 30.4% YoY



International passenger numbers rose by **88.6%** of 2019 levels, increasing 41.6% YoY



Passenger traffic at the world's 20 busiest airports grew by **26.4%** in 2023, with 12.2% more aircraft movements

CONTINUED ENVIRONMENTAL IMPLICATIONS AND COMMITMENTS



Aviation CO₂ emissions (950Mt) reached more than **90%** of the pre-pandemic levels



Emissions increased in all regions, except Russia. Aviation CO₂ emissions are expected to surpass the 2019 level in 2025



SAF offtake agreements saw a **45.9%** YoY decrease in contracted volume from 22bn litres to 12bn litres in 2023



The number of voluntary CORSIA participants increased from **115 to 126** during 2023



A LTAG for international aviation of net-zero carbon emissions by 2050 in support of the UNFCCC Paris Agreement's temperature goal was adopted by the 1st ICAO Assembly

2023 Industry Trends²

FINANCIAL PERFORMANCE



In 2023, airlines recovered fully and achieved

8.5% higher revenues than in 2019

at \$909bn (\$838bn in 2019), for the first time. Representing a 23.1% YoY increase



The airline industry reported a

\$37.3bn net profit in 2023,

compared to a \$3.5bn net loss in 2022



Passenger revenues increased by

48.3% YoY during 2023,

bringing in \$648bn in revenue, a 6.75% increase since 2019



Jet fuel price remained high at an average of

\$114 per barrel during 2023,

but lower than \$136 per barrel in 2022

Cargo yields revenues decreased by

32.5% YoY during 2023,

turning

\$139bn

in revenue,

still 37.6% more than in 2019

SUPPLY AND DEMAND STARTS TO SHOW SIGNS OF RECOVERY

RPK increased by

62.3%

translating into 5,889 billion RPKs ASK increased by 32.6%



The Middle East had

10.1%

of the total ASK, and load factors were 80.1%

RPK ▲ / ASK ▲ =
passenger load factor of 82%



North America and Latin America represented

23.5% and **5.5%**

of ASK, with load factors of 84.1% and 82.4% respectively



Africa

remained to account for

2.4% of the total ASK,

and had a load factor of 73%



Asia/Pacific

represented the largest

share of total ask at **33%**

with a load factor of 80.1%



Europe accounted for

25.7%

of the total ASK, and load factor was 84.7%

² For sources of 2023 Industry Trends data please refer to Annex 8: Sources

New Geo-Political Challenges amongst Strong Post-Pandemic Recovery

During 2023, the aviation industry continued its recovery from the unprecedented disruption caused by the COVID-19 pandemic. While 2019 marked a historic low in global air travel, the years 2022 and 2023 saw gradual but uneven progress toward pre-pandemic levels. The period between 2022 and 2023 marked a transitional phase for global aviation. Following the progressive lifting of international travel restrictions and the widespread rollout of COVID-19 vaccinations, the aviation industry experienced a marked resurgence in 2022 and 2023.

In 2022, global passenger volumes rebounded significantly, reaching approximately 6.7 billion, which represented 73 per cent of the pre-pandemic levels recorded in 2019 and by 2023, the recovery had accelerated further, with global passenger traffic climbing to 8.7 billion, reaching 95 per cent of the 2019 benchmark.³

As per IATA⁴ the aviation sector demonstrated robust growth in 2023, with global traffic measured in Revenue Passenger Kilometres (RPKs) increasing by 36.9 per cent compared to 2022. This surge brought total annual traffic to 94.1 per cent of pre-pandemic levels (2019), reflecting a strong and sustained recovery across both domestic and international segments. International travel saw a significant rebound in 2023, with traffic increasing 41.6 per cent compared to the previous year, and international volumes reached 88.6 per cent of 2019 levels. The domestic traffic in 2023 rose 30.4 per cent over 2022, exceeding pre-pandemic levels by 3.9 per cent.

Figure 1 is illustrative of global air traffic flight hours growing by 13.8 per cent in 2023 over 2022. The final CANSO ATM Traffic Analysis in December 2023 noted, global commercial passenger volumes were approaching pre-pandemic levels of 2019, and the number of flights and flight hours had already exceeded 2019, partially due to growth in segments outside of commercial passenger flights⁵. May 2023 was noted to be “the busiest month in the skies since July 2019, with an average 133,800 flights and 240,900 flight hours operated daily”⁶.

Per cent change in movements by region

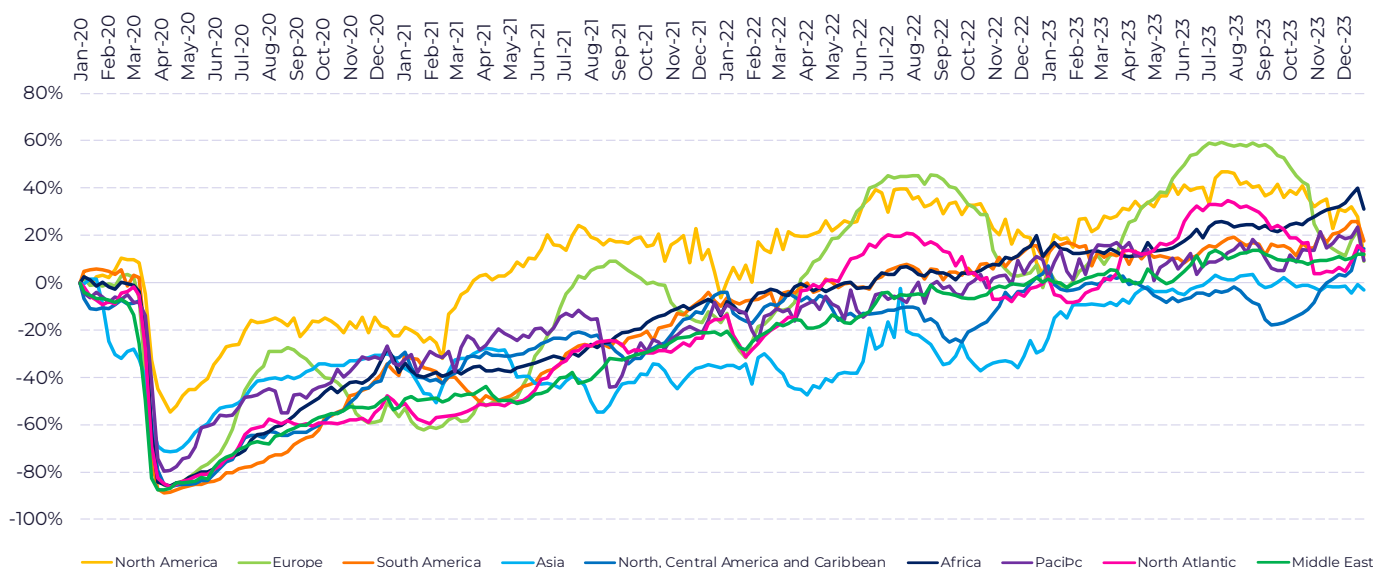


Figure 1 - Percentage change in aircraft movements by region, from Jan 2020 towards Dec 2023. Taken from [CANSO ATM Traffic Analysis Report](#) (December 2023)

The rebound of traffic growth throughout 2023 reflects a strong rebound in air travel driven by the relaxation of travel restrictions and a gradual restoration of consumer confidence. However, the pace and consistency of recovery varied significantly across regions and market segments, underscoring the industry’s continued vulnerability to external pressures.

³ Joint ACI World-ICAO Passenger Traffic Report, Trends, and Outlook

⁴ Global Air Travel Demand Continued Its Bounce Back in 2023

⁵ [CANSO ATM Traffic December 2023](#)

⁶ [CANSO ATM Traffic May 2023](#)

Although inflationary pressures began to ease in several major economies, providing some relief from broader geopolitical instability and structural challenges such as labour shortages and supply-chain disruptions introduced persistent uncertainty that sees the recovery of the industry remain highly complex.

Airspace closures: Rerouting traffic flows

As highlighted by EUROCONTROL⁷ geopolitical instability exerted a significant influence on global air traffic flows throughout 2022 and 2023, with several regional conflicts directly impacting airspace accessibility and routing efficiency. Since the closure of Ukraine's airspace in February 2022, it has been forcing airlines to reroute flights through neighbouring countries. This shift has placed additional pressure on already congested corridors, particularly along the South-East axis, which has had to absorb a substantial volume of diverted traffic. The impact of this airspace closure is illustrated below in the case study provided by HungaroControl.

The outbreak of conflict in Israel in October 2023 further disrupted air traffic flows, with multiple carriers unable to overfly affected zones and necessitating additional rerouting across the Middle East.

HungaroControl Case Study

The war in Ukraine has significantly affected both the operational and economic aspects of air navigation service (ANS) provision in Hungary. The closure of the neighbouring Ukrainian airspace, along with war-related sanctions, has led to major rerouting through Hungarian airspace. These changes have resulted in a net positive and steadily increasing impact on the number of overflights.

While traffic to and from Russia and Ukraine has diminished, alternative routes between Northern Europe and the Gulf hubs and the Far East (as well as other parts of Asia), and between Russia and non-EU countries, have brought a substantial increase in overflight traffic. This trend intensified further in 2023 and 2024 as air traffic between Europe and Asia, particularly China, began to rebound.

HungaroControl (specifically Budapest ACC) has seen a robust recovery, with overflights surpassing 2019 levels by an average of 18 per cent in 2023 and 25 per cent in 2024. While this growth is partly due to rerouted traffic, there has also been a notable rise in organic traffic along the European South-East axis. The summer months, in particular, saw a surge in demand,

largely fuelled by leisure traffic from Western Europe to destinations such as Greece and Türkiye. This seasonal spike created unexpectedly high traffic volumes, placing additional pressure on Hungarian ANS services.

In addition to the already high demand, the provision of ANS was further impacted by the war in another critical way: the activation of military airspace became more frequent than before the war. This reduced available capacity and increased operational complexity within Hungarian airspace.



To respond to the surge in traffic, ATCO training was significantly intensified in 2023. The number of trainees was ramped up to the maximum capacity of the training programme. However, the first ATCOs from this course are not expected to enter the workforce until 2025. In the short term (i.e. through 2023–2024), capacity problems worsened despite all efforts. In summer 2024, Hungary was one of the hotspots of the European network.

HungaroControl began exploring additional measures to secure the necessary number of ATCOs, as the originally planned staffing levels were inadequate and projected to remain so. Without intervention, continued disruptions such as regulations, delays, and even rerouting of already rerouted traffic would have been likely.

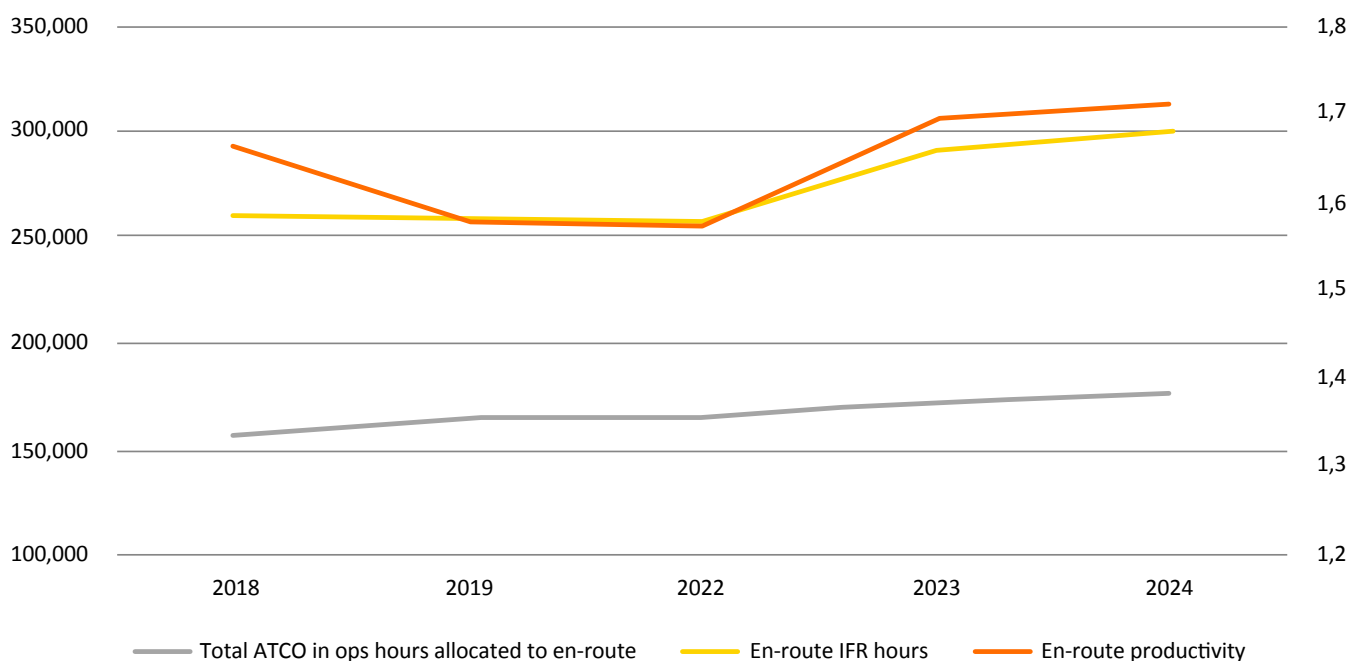
The increase in delays recorded in 2024 prompted HungaroControl to take immediate action. In response, they assessed the impact of the war and sanctions on ATCO availability and identified significant underutilised ATCO capacity in the Baltic Sea region. By leveraging this surplus and implementing a targeted, short-term retraining programme, they successfully increased staffing levels at Budapest ACC by the summer of 2025.

Staffing measures were complemented by changes to the airspace configuration, with sectorisation updated to accommodate the new traffic flows.

⁷ EUROCONTROL European Aviation Overview 2023

These actions, implemented through the end of July 2025, enabled HungaroControl to reduce delays by 88 per cent compared to the previous year, despite continued traffic growth.

ATCO hours, IFR hours and ATCO productivity (2nd axis)



Productivity	2018	2019	2022	2023	2024	2022/18	2024/22
En route productivity	1.7	1.6	1.6	1.7	1.7	-5%	9%
Total ATCO in ops hours allocated to en-route	156,384	163,827	164,946	171,498	175,538	5%	6%
En-route IFR hours	259,900	258,415	259,527	290,693	300,558	0%	16%

In the years 2018, 2019, and 2022, traffic was at a similar level, while the number of ATCO hours increased slightly (+5 per cent in 2022 vs 2018). As a result, ATCO productivity decreased.

In 2023 and 2024, the increase in ATCO hours continued at a similar pace as in the earlier phase; however, traffic in Hungarian airspace grew significantly due to the war (+16 per cent in 2024 vs 2022). Consequently, ATCO productivity rose sharply. However, this increase was not the result of sustainable or balanced organic growth. It came at a cost, leading to controller dissatisfaction, health issues, and eventually some ATCOs leaving the company or losing their licences.

ATCO productivity alone does not determine the performance of an organisation; the underlying context must always be considered. Another key lesson is that ATCO mobility can benefit the entire European network. However, there is a major risk (which would, of course, be welcome) that when the war ends, capacities will need to be reorganised in line with the new traffic structures. Cooperation between ANSPs is very important in this regard.

Inflationary Pressures Continue to Impact Cost-Efficiency

Ongoing geopolitical tensions have not only placed considerable strain on ANSPs, in the form of increased volumes of air traffic being routed through their controlled airspace, but also by impacting the cost-efficiency and financial dynamics of service provision. As noted by EUROCONTROL in their 2025 ACE Benchmarking Report⁸. In 2023, inflation to exert a multifaceted impact on the financial and operational performance of ANSPs, influencing both direct and indirect cost components:

- 1. Employment Costs**, inflation gradually increases staff-related expenses over time. However, the extent and timing of these increases vary depending on national labour regulations and collective bargaining agreements. As a result, inflation recorded within a given year does not always lead to immediate or proportional changes in average staff compensation. This lag effect was observed by several ANSPs in 2023, as wage adjustments often trail behind inflationary trends.
- 2. Non-Staff Operating Costs**, inflation also drives up the cost of essential services and inputs required for air navigation operations. Operating expenses such as utilities, maintenance, and procurement have risen, with energy costs in particular escalating at a rate above general inflation. Additionally, the cost of imported goods and services (inputs) used in the provision of ANSP services is likely to have been influenced by inflation in exporting countries and fluctuations in exchange rates.
- 3. Asset Depreciation**, while depreciation is typically calculated based on historical asset values, some ANSPs may have revalued their fixed assets to reflect inflation. Indexing asset values to inflation ensures more accurate representation of asset worth but also leads to higher depreciation charges and increases reported expenses.
- 4. Cost of Capital**, elevated inflation rates typically lead to higher nominal interest rates, which in turn increase the required return on equity for investments and financing. Though the relationship is not always immediate or proportional. Factors such as fixed-rate debt arrangements and delays in financial recalibrations can create mismatches between actual financing costs and expected returns. Additionally, when loans are contracted at fixed interest rates, ANSPs may experience a lag in cost adjustments.



⁸ [Air Traffic Management Cost-Effectiveness \(ACE\) Benchmarking Report \(2025 edition\)](#)

Impact of COVID-19 resulting in varied reporting periods

While this report primarily focuses on performance data from calendar year 2023, it is important to note that reporting periods vary across ANSPs. Some providers include data from the second half of 2022, while others extend their reporting into early 2024. As a result, the dataset reflects a mix of timeframes, with certain entries covering portions of 2022, others encompassing all of 2023, and some stretching into the first quarter of 2024.

This variation has influenced the observed recovery trends. ANSPs reporting data strictly from 2022 and 2023 generally show stronger signs of recovery, whereas those incorporating early 2024 data often reflect more subdued performance, potentially due to emerging operational or economic challenges. Consequently, the lingering effects of the COVID-19 pandemic are not uniformly represented across all ANSPs, highlighting the importance of contextualising performance within each ANSP's specific reporting period.

Figure 2 illustrates that the reporting periods for ANSPs submitting data to CANSO vary. Some ANSPs submitted data covering the 2022 calendar year, while others reported periods ending in 2024. European ANSPs in particular submitted data spanning the full 2023 calendar year.

As a result, the trends observed in data from ANSPs reporting for 2022 and early 2023 are primarily influenced by the complete lifting of pandemic-related restrictions and the implementation of health and safety measures that were previously in place. In contrast, trends reflecting costs incurred in 2023 are more significantly impacted by inflation⁹ due to the war in Ukraine.

The most notable differences in trends are expected for ANSPs such as ATNS, KCAA, NAV CANADA, and AEROTHAI, as their reporting periods began in 2022 and CAAS and Airways NZ, whose reporting periods begin later in 2023 and extend into 2024. These variations have been taken into account, and accordingly, the KPI graphs have been ordered by reporting period, ranging from the earliest (April 2022 for ATNS) to the latest (June 2024 for Airways NZ).

While the majority of submitting ANSPs have reporting periods within 2023, any anomalies in KPIs may reflect differences in reporting timelines. For example, in the case of Oceanic data, most Oceanic ANSPs operate on financial years that do not align with the 2022 calendar year but include a substantial portion of data from that year. Consequently, the data has a greater impact on Oceanic ANSPs than on Continental ANSPs.



⁹ [The Inflation Crisis | Statista](#)

Fiscal Years

Region	Country	ANSP	Apr 2022 - Jun 2024		
			Start	End	
Africa	South Africa	ATNS	Apr 2022	Mar 2023	Apr 2022 - Mar 2023
	Kenya	KCAA	Jul 2022	Jun 2023	Jul 2022 - Jun 2023
Americas	Canada	NAV CANADA	Sep 2022	Aug 2023	Sep 2022 - Aug 2023
Asia Pacific	Thailand	AEROTHAI	Oct 2022	Sep 2023	Oct 2022 - Sep 2023
Europe	Albania	Albcontrol	Jan 2023	Dec 2023	Jan 2023 - Dec 2023
	Luxembourg	ANA	Jan 2023	Dec 2023	
	Czechia	ANS CR	Jan 2023	Dec 2023	
	Finland	Fintraffic ANS	Jan 2023	Dec 2023	
	Armenia	ARMATS	Jan 2023	Dec 2023	
	Austria	Austro Control	Jan 2023	Dec 2023	
	Norway	Avinor (Continental)	Jan 2023	Dec 2023	
	Bosnia & Herzegovina	BHANSAs	Jan 2023	Dec 2023	
	Bulgaria	BULATSA	Jan 2023	Dec 2023	
	Croatia	Croatia Control	Jan 2023	Dec 2023	
	Cyprus	DCAC Cyprus	Jan 2023	Dec 2023	
	Germany	DFS	Jan 2023	Dec 2023	
	Turkey	DHMI	Jan 2023	Dec 2023	
	France	DSNA	Jan 2023	Dec 2023	
	Estonia	EANS	Jan 2023	Dec 2023	
	Spain	ENAIRe	Jan 2023	Dec 2023	
	Italy	ENAV	Jan 2023	Dec 2023	
	Greece	HASP	Jan 2023	Dec 2023	
	Hungary	HungaroControl	Jan 2023	Dec 2023	
	Ireland	IAA	Jan 2023	Dec 2023	
	Iceland	Isavia ANS	Jan 2023	Dec 2023	
	Sweden	LFV	Jan 2023	Dec 2023	
	Latvia	LGS	Jan 2023	Dec 2023	
	Slovakia	LPS	Jan 2023	Dec 2023	
	Netherlands	LVNL	Jan 2023	Dec 2023	
	Malta	MATS	Jan 2023	Dec 2023	
	Macedonia	M-NAV	Jan 2023	Dec 2023	
	Moldova	MOLDATSA	Jan 2023	Dec 2023	
		MUAC	Jan 2023	Dec 2023	
	United Kingdom	NATS (Continental)	Jan 2023	Dec 2023	
	Portugal	NAV Portugal	Jan 2023	Dec 2023	
	Denmark	NAVIAIR	Jan 2023	Dec 2023	
Lithuania	Oro Navigacija	Jan 2023	Dec 2023		
Poland	PANSA	Jan 2023	Dec 2023		
Romania	ROMATSA	Jan 2023	Dec 2023		
Georgia	Sakaeronavigatsia	Jan 2023	Dec 2023		
Belgium	skeyes	Jan 2023	Dec 2023		
Switzerland	skyguide	Jan 2023	Dec 2023		
Slovenia	Slovenia Control	Jan 2023	Dec 2023		
Serbia	SMATSA	Jan 2023	Dec 2023		
Asia Pacific	Singapore	CAAS	Apr 2023	Mar 2024	Apr 2023 - Mar 2024
	New Zealand	Airways NZ	Jul 2023	Jun 2024	Jul 2023 - Jun 2024

Figure 2 - Reporting Periods

Operational Performance

The CANSO GBWG began collecting data on operational performance metrics in 2023 to explore the potential for expanding the current set of monitored indicators. At the 39th GBWG meeting held in Cape Town in March 2025, discussions centred on improving data quality and increasing participation. A mentor/buddy system was proposed to support new members in data submission and regional groups. Starting with Africa, members were encouraged to facilitate collaboration and increase engagement.

To assess operational performance, a combination of CANSO-monitored KPIs and trial operational KPIs is used. Table 1 and Table 2 below present the evaluated

operational performance indicators for participating ANSPs. In total, twenty-one KPIs are monitored by CANSO, alongside three trial operational KPIs.

For CANSO monitored KPIs, in the Asian region, CAAS and AEROTHAI have actively engaged in measuring operational KPIs. CAAS have monitored fifteen operational KPIs, while AEROTHAI has focused on eleven. In Europe, DSN stands out for its active measurement of 15 operational KPIs, ENAIRE measured 6 KPIs and NAV Portugal measured 5 KPIs. Other European ANSPs have either measured very few KPIs or not submitted any data. In North America, NavCanada have measured 13 operational KPIs and in Africa, ATNS have measured 6 KPIs.

CANSO KPIs	Declared Capacity	Capacity Efficiency	Delay Attributed to Capacity Limits	Gate Departure Delay	Taxi Out Delay	Calculated Take-Off Time Compliance	Terminal Departure Flight Distance/Time Efficiency	Terminal Departure Level Flight Efficiency	En Route Direct Route Extension	Filed Flight Plan En Route Extension	Arrival Flight Distance/Time Efficiency	Arrival Level Flight Efficiency	Arrival Runway Occupancy Time	Taxi in Delay	Gate Arrival Delay	ATM Attributable Delay	Average Flight Time Between City Pairs	Operational Availability	Capacity Variation	Travel Time Variation	Flight Path Variation
AEROTHAI	X	X			X	X			X	X	X		X	X		X					X
Airways NZ																					
ANA																					
ATNS	X		X	X	X	X	X														
CAAS	X	X		X	X	X		X	X	X	X	X	X	X	X			X	X		
DSNA	X	X	X		X	X	X	X	X	X	X	X	X	X		X					X
EANS																					
ENAIRE				X	X	X		X	X		X				X						
FAA-ATO																					
HungaroControl																					
Isavia ANS																					
KCAA																					
NAV CANADA	X	X		X	X		X	X	X	X	X	X	X	X	X						
NAV Portugal			X	X		X			X												X
PANSA	X		X																		
SMATSA																					
BHANSA																					

Table 1 - CANSO Monitored KPIs

Trial Operational KPIs	KPI 1	KPI 2	KPI 3
	Actual en-route extension vs. planned route (in % excess distance). Measured in the percentage excess distance or nautical miles (NM)	Additional time in terminal airspace (in minutes/flight and provided as yearly average). Measured in minutes per flight. Reports for airports above 80k movements, but up to a maximum of the top 5 airports	Additional taxi-out time (in minutes/flight and provided as a yearly average). Measured in minutes per flight. Reports for airports above 80k movements, but up to a maximum of the top 5 airports
AEROTHAI	X	X	X
Airways NZ			
ANA			
ATNS			
CAAS	X	X	X
DSNA	X	X	X
EANS			
ENAIRE	X	X	X
FAA-ATO			
HungaroControl			
Isavia ANS			
KCAA			
NAV CANADA			
NAV Portugal	X	X	X
PANSA	X	X	X
SMATSA			
BHANSA			

Table 2 - Trial Operational Performance KPIs

For trial operational KPIs, only six ANSPs submitted data on these three KPIs.

AEROTHAI monitored all three-trial operational KPIs. For KPI 1, the percentage in excess distance actual route versus great circle distance was 1.84 per cent and the percentage in excess distance between the planned route and great circle distance was 2.46 per cent. For KPI 2, AEROTHAI reported the additional time in terminal airspace of 4.07 minutes for Bangkok Suvarnabhumi Airport and 1.59 minutes for Bangkok Don Mueang International Airport. KPI 3 reported an additional taxi-out time of 3.84 minutes at Bangkok Suvarnabhumi Airport (calculated only during normal conditions, excluding runway closure and IMC).

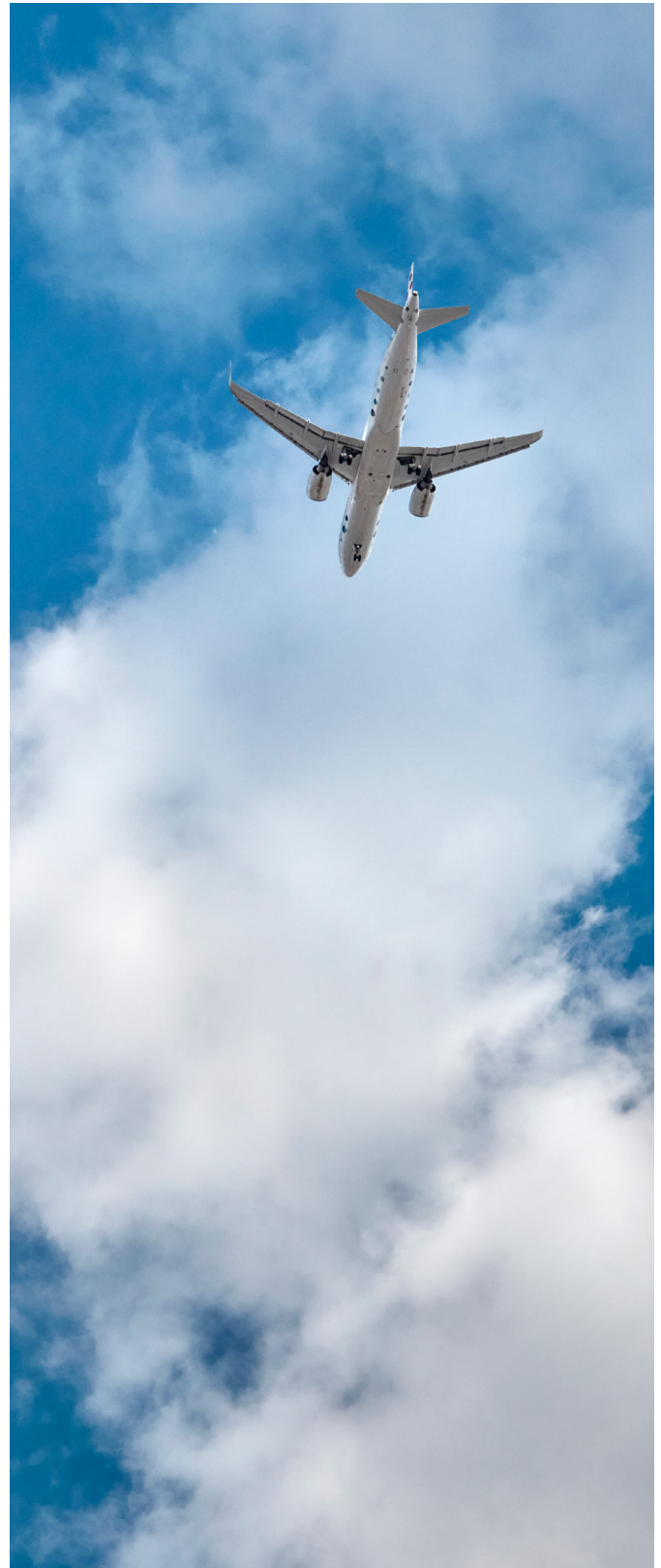
Similarly CAAS, monitored and reported on all three-trial operational KPIs, with KPI 1 being 1.26 per cent in excess of actual versus planned route distance. Singapore Changi Airport reported additional time in terminal airspace (KPI 2) of 2.4 minutes per flight and additional taxi-out time (KPI 3) of 4.03 minutes per flight (based on P20 unimpeded times).

DSNA monitors all three-trial operational KPIs, with KPI 1 being 2.16 per cent in excess distance between actual en-route extension versus the planned route. DSNA reported KPI 2 and KPI 3 figures for Paris Charles de Gaulle, Paris Orly, Nice Côte d'Azur, Marseille Provence and Lyon-Saint Exupéry airports. These airports had KPI 2 figures of 2.32, 2.38, 3.99, 3.51 and 1.86 minutes of additional average additional ASMA time per arrival respectively. The KPI 3 figures were 3.92, 2.81, 2.92, 0 and 2.33 minutes of additional average taxi-out times per departure respectively.

ENAIRES monitors all three-trial operational KPIs with KPI 1 the actual en-route distance flown versus the planned route distance is 0.726 per cent. ENAIRES reported KPI 2 and KPI 3 figures for Adolfo Suárez Madrid-Barajas, Josep Tarradellas Barcelona-El Prat, Palma de Mallorca, Málaga-Costa del Sol and Gran Canaria airports. These airports had additional ASMA times of 2.48, 3.07, 2.55, 2.76 and 3.5 minutes and additional taxi-out times of 3.82, 3.43, 3.66, 3.11 and 2.76 minutes respectively. ENAIRES has measured KPI 2 and KPI 3 times according to the new methodology of Eurocontrol NM.

NAV Portugal monitors all three-trial operational KPIs. For KPI 1, the actual en-route distance flown in excess of the planned route distance was 1.5 per cent. NAV Portugal provided KPI 2 and KPI 3 figures for Humberto Delgado Lisbon, Francisco Sá Carneiro Porto and Faro International airports. The figures reported were 2.12, 0.93, 0.30 minutes of additional time in terminal airspace and 3.82, 1.60 and 0.83 minutes of additional taxi-out time respectively.

PANSA monitors all three-trial operational KPIs. For KPI 1, the actual en-route distance flown was 6.79 per cent in excess versus the planned route distance. At Warsaw Chopin Airport, KPI 2 measured was 1.19 minutes of additional time in terminal airspace (ASMA) per flight and KPI 3 was measured at 2.59 minutes of additional time taxi-out time per flight.



2023 Global ANS Report Participation

CANSO GBWG Submissions

CANSO data submissions for this year's Global ANS Performance Report were received from 18 ANSPs. Together with the data from the PRU from 38 ANSPs, the report provides data for 48 ANSPs. All ANSPs which submitted to PRU, CANSO or both are indicated in the table below.

Note: For those who submitted both CANSO and PRU data, CANSO data has been used as the default in this report.

The 2023 data submission covers¹⁰:

Total IFR flight hours: 48,228,556.36

Total costs: 27,097,158,425.35 USD

Total ATCOs in operations: 33,975

Region	Country/ Territory	Organisation	Acronym	Submitted		
				CANSO	PRU	Both
Africa	Kenya	Kenya Civil Aviation Authority	KCAA	X		
	South Africa	Air Traffic and Navigation Services	ATNS	X		
Americas	Canada	NAV CANADA	NAV CANADA	X		
	USA	FAA-ATO ¹¹	Federal Aviation Administration	X		
Asia Pacific	Australia	Airservices Australia ¹²	Airservices Australia	X		
	New Zealand	Airways New Zealand	Airways NZ	X		
	Singapore	Civil Aviation Authority of Singapore	CAAS	X		
	Thailand	Aeronautical Radio of Thailand	AEROTHAI	X		
Europe	Albania	Air Navigation Services of Albania	Albcontrol		X	
	Armenia	Armenia Air Traffic Services	ARMATS		X	
	Austria	Austro Control	Austro Control		X	

¹⁰ As some ANSPs did not submit data for every field, this is not the total of participating ANSPs rather it's a total of the data submitted.

¹¹ FAA-ATO submitted data that is used to calculate the global trends within this document, but their data is not presented in the graphs included in the rest of this report.

¹² Airservices Australia submitted data that is used to calculate the global trends within this document, but their data is not presented in the graphs included in the rest of this report.

Region	Country/ Territory	Organisation	Acronym	Submitted		
				CANSO	PRU	Both
Europe	Belgium	skeyes	skeyes		X	
	Bosnia and Herzegovina	Bosnia and Herzegovina Air Navigation Services Agency	BHANSA			X
	Bulgaria	Bulgarian Air Traffic Services Authority	BULATSA		X	
	Croatia	Croatia Control Ltd	Croatia Control		X	
	Cyprus	Department of Civil Aviation of Cyprus	DCAC Cyprus		X	
	Czech Republic	Air Navigation Services of the Czech Republic	ANS CR		X	
	Denmark	Navigation Via Air	NAVIAIR		X	
	Estonia	Estonian Air Navigation Services	EANS			X
	Finland	Fintraffic Air Navigation Services	Fintraffic ANS		X	
	France	Direction des Services de la navigation aérienne	DSNA			X
	Georgia	Sakaeronavigatsia Ltd.	Sakaeronavigatsia		X	
	Germany	DFS Aviation Services GmbH	DFS		X	
	Greece	Hellenic Civil Aviation Authority	HASP		X	
	Hungary	HungaroControl Pte. Ltd. Co.	HungaroControl			X
	Iceland	Isavia Air Navigation Services	Isavia ANS			X
	Ireland	Irish Aviation Authority	IAA		X	
	Italy	ENAV S.p.A	ENAV		X	
	Latvia	Latvijas gaisa satiksme	LGS		X	
	Lithuania	SE Oro Navigacija	Oro Navigacija		X	
	Luxembourg	Administration de la navigation aérienne	ANA			X

Region	Country/ Territory	Organisation	Acronym	Submitted		
				CANSO	PRU	Both
Europe	Macedonia	Macedonian Air Navigation Service Provider, GOJSC	M-NAV		X	
	Malta	Malta Air Traffic Services	MATS		X	
	Moldova	Moldovian Air Traffic Services Authority	MOLDATSA		X	
	Netherlands	Luchtverkeersleiding Nederland	LVNL		X	
	Norway	Avinor Air Navigation Services	Avinor (Continental)		X	
	Poland	Polish Air Navigation Services Agency	PANSA			X
	Portugal	Navegação Aérea de Portugal - NAV Portugal, E.P.E.	NAV Portugal			X
	Romania	Romanian Air Traffic Services Administration	ROMATSA		X	
	Serbia and Montenegro	Serbia and Montenegro Air Traffic Services SMATSA Ilc	SMATSA			X
	Slovakia	Letové prevádzkové služby	LPS		X	
	Slovenia	Kontrola zračnega prometa Slovenije	Slovenia Control		X	
	Spain	ENAIRES	ENAIRES			X
	Sweden	Luftfartsverket	LFV		X	
	Switzerland	skyguide	skyguide		X	
	Turkey	General Directorate of State Airports Authority	DHMI		X	
	United Kingdom	NATS Holdings	NATS (Continental)		X	
-	Maastricht Upper Areal Control Centre	MUAC		X		

Table 3 - CANSO Global ANS Report Participation

Reporting Periods

While the GBWG encourages ANSPs with reporting periods that do not run between January and December to submit their most recent dataset, it is noted this is not possible for some providers due to data validation and availability. Readers are therefore encouraged to check reporting periods when comparing individual ANSPs. These are outlined in the table below.

Region	Organisation	Reporting Period
Africa	ATNS	Apr 2022 - Mar 2023
	KCAA	Jul 2022 - Jun 2023
Americas	NAV CANADA	Sep 2022 - Aug 2023
	FAA-ATO	Oct 2022 - Sep 2023
Asia Pacific	Airservices Australia	Jul 2022 - Jun 2023
	AEROTHAI	Oct 2022 - Sep 2023
	CAAS	Apr 2023 - Mar 2024
	Airways NZ	Jul 2023 - June 2024
Europe	Albcontrol	Jan 2023 - Dec 2023
	ANA	Jan 2023 - Dec 2023
	ANS CR	Jan 2023 - Dec 2023
	ARMATS	Jan 2023 - Dec 2023
	Austro Control	Jan 2023 - Dec 2023
	Avinor (Continental)	Jan 2023 - Dec 2023
	BHANSA	Jan 2023 - Dec 2023
	BULATSA	Jan 2023 - Dec 2023
	Croatia Control	Jan 2023 - Dec 2023
	DCAC Cyprus	Jan 2023 - Dec 2023
	DFS	Jan 2023 - Dec 2023
	DHMI	Jan 2023 - Dec 2023
	DSNA	Jan 2023 - Dec 2023
	EANS	Jan 2023 - Dec 2023
	ENAIRE	Jan 2023 - Dec 2023
	ENAV	Jan 2023 - Dec 2023
Fintraffic ANS	Jan 2023 - Dec 2023	
HASP	Jan 2023 - Dec 2023	
HungaroControl	Jan 2023 - Dec 2023	

Region	Organisation	Reporting Period
Europe	IAA	Jan 2023 - Dec 2023
	Isavia ANS	Jan 2023 - Dec 2023
	LFV	Jan 2023 - Dec 2023
	LGS	Jan 2023 - Dec 2023
	LPS	Jan 2023 - Dec 2023
	LVNL	Jan 2023 - Dec 2023
	MATS	Jan 2023 - Dec 2023
	M-NAV	Jan 2023 - Dec 2023
	MOLDATSA	Jan 2023 - Dec 2023
	MUAC	Jan 2023 - Dec 2023
	NATS (Continental)	Jan 2023 - Dec 2023
	NAV Portugal	Jan 2023 - Dec 2023
	NAVIAIR	Jan 2023 - Dec 2023
	Oro Navigacija	Jan 2023 - Dec 2023
	PANSA	Jan 2023 - Dec 2023
	ROMATSA	Jan 2023 - Dec 2023
	Sakaeronavigatsia	Jan 2023 - Dec 2023
	skeyes	Jan 2023 - Dec 2023
	skyguide	Jan 2023 - Dec 2023
	Slovenia Control	Jan 2023 - Dec 2023
SMATSA	Jan 2023 - Dec 2023	

Table 4 - Participating ANSPs' reporting periods

Total IFR Flight Hours

Organisation	Comparator Group ¹³ (based on IFR flight hours)	Total IFR Flight Hours 2023 (Continental)	Growth IFR Flight Hours (Continental)	Total IFR Flight Hours 2023 (Oceanic)	Growth IFR Flight Hours (Oceanic)
AEROTHAI	CG2	582,835	74%	-	-
Airways NZ	CG2	241,653	5%	117,034	26%
Albcontrol	-	62,322	20%	-	-
ANA	CG3	19,112	8%	-	-
ANS CR	-	194,893	9%	-	-
ARMATS	-	20,815	11%	-	-
ATNS	CG2	245,192	22%	2,157	596%
Austro Control	-	359,408	13%	-	-
Avinor (Continental)	-	340,393	2%	-	-
BHANSA	CG3	96,193	13%	-	-
BULATSA	-	342,298	18%	-	-
CAAS	CG2	424,815	32%	-	-
Croatia Control	-	281,231	13%	-	-
DCAC Cyprus	-	191,955	14%	-	-
DFS	-	1,329,631	5%	-	-
DHMI	-	1,613,341	21%	-	-
DSNA	CG1	2,370,000	9%	-	-
EANS	CG3	49,554	2%	-	-
ENAIRES	CG1	1,748,196	10%	-	-
ENAV	-	1,242,479	9%	-	-
Fintraffic ANS	-	97,468	10%	-	-
HASP	-	738,472	14%	-	-
HungaroControl	CG2	313,567	12%	-	-
IAA	-	331,211	15%	-	-
Isavia ANS	CG2	8,666	-9%	310,994	15%
KCAA	CG2	121,585	0%	-	-

¹³ Comparator Group 1: (>1mil IFR flight hours: DHMI, DSNA, ENAIRES, FAA ATO, NAV Canada)

Comparator Group 2: (100k-1mil IFR flight hours: AEROTHAI, Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)

Comparator Group 3: (<100k IFR flight hours: ANA, EANS, Slovenia Control, BHANSA)

Organisation	Comparator Group ¹³ (based on IFR flight hours)	Total IFR Flight Hours 2023 (Continental)	Growth IFR Flight Hours (Continental)	Total IFR Flight Hours 2023 (Oceanic)	Growth IFR Flight Hours (Oceanic)
LFV	-	352,610	6%	-	-
LGS	-	53,662	2%	-	-
LPS	-	93,888	9%	-	-
LVNL	-	150,323	7%	-	-
MATS	-	84,404	35%	-	-
M-NAV	-	46,137	53%	-	-
MOLDATSA	-	4,995	13%	-	-
MUAC	-	605,633	13%	-	-
NATS (Continental)	-	1,419,774	12%	-	-
NAV CANADA	CG1	2,980,239	12%	742,704	23%
NAV Portugal	CG2	444,139	7%	-	-
NAVIAIR	-	201,890	10%	-	-
Oro Navigacija	-	48,220	2%	-	-
PANSA	CG2	391,511	8%	-	-
ROMATSA	-	452,938	18%	-	-
Sakaeronavigatsia	-	88,954	59%	-	-
skeyes	-	100,450	3%	-	-
Skyguide	-	326,789	3%	-	-
Slovenia Control		67,568	10%	-	-
SMATSA	CG2	274.035	14%	-	-

Table 5 - Participating ANSPs' IFR flight hours

2023 Performance Data

The following section presents 2023 performance data and 2019-2023 trend data for both continental and oceanic activities in line with the *CANSO ANS Performance Framework* levels 1-3 (see Figure 35) and the list of KPIs below.

KPI		Numerator	Denominator	Figure	
Cost Efficiency and Productivity Performance Indicators				Continental 2023/Trend	Oceanic 2023
1	Cost per IFR flight hour	Total costs	IFR flight hours	Figure 3	Figure 14
2A	ATCO in OPS employment cost per ATCO in OPS hour	Employment costs for ATCOs in OPS	ATCOs in OPS hours	Figure 4, Figure 5	Figure 15,16
2B	ATCO in OPS hour productivity	IFR flight hours	ATCOs in OPS hours	Figure 6	Figure 17
2C	Cost excluding ATCOs in OPS employment costs per IFR flight hours	Costs excluding employment costs for ATCOs in OPS	IFR flight hours	Figure 7	Figure 18
2D	Employment costs of ATCOs in OPS as a proportion of Total costs	Employment costs for ATCOs in OPS	Total costs	Figure 8	Figure 19
3A	Annual employment cost per ATCO in OPS	Employment cost for ATCOs in OPS	No. of ATCOs in OPS (FTE)	Figure 9, Figure 10	Figure 20, Figure 21
3B	Annual Working hours per ATCO in OPS	ATCOs in OPS hours	No. of ATCOs in OPS (FTE)	Figure 11	Figure 22
3C	Annual IFR hours per ATCO in OPS	IFR flight hours	No. of ATCOs in OPS (FTE)	Figure 12	Figure 23
3D	Ratio of frontline service staff to ATCO in OPS	No. of frontline service support staff (FTE)	No. of ATCOs in OPS (FTE)	Figure 13	Figure 24

The chart for Figure 13 shows a vertical axis labeled 'Ratio of Frontline Service Staff to ATCO in OPS' with tick marks at 0.0, 0.5, 1.0, 1.5, 2.0, and 2.5.

KPI		Numerator	Denominator	Figure
Joint Continental and Oceanic Cost Efficiency Performance Indicators			Continental and Oceanic 2023/Trend	
CO1	Cost per IFR flight hour	Total costs	IFR flight hours	Figure 25
CO2D	Employment costs of ATCOs in OPS as a percentage of Total costs	Employment costs for ATCOs in OPS	Total costs	Figure 26

Table 6 - List of Key Performance Indicators

Note that KPI CO1 is the combination of continental and oceanic metric for KPI 1. Likewise, KPI CO2D is the combination of continental and oceanic metric for KPI 2D.

Continental Cost Efficiency and Productivity: 2023

Indicator 1: Cost per IFR flight hour (USD) (Formula: Total costs/IFR flight hours)

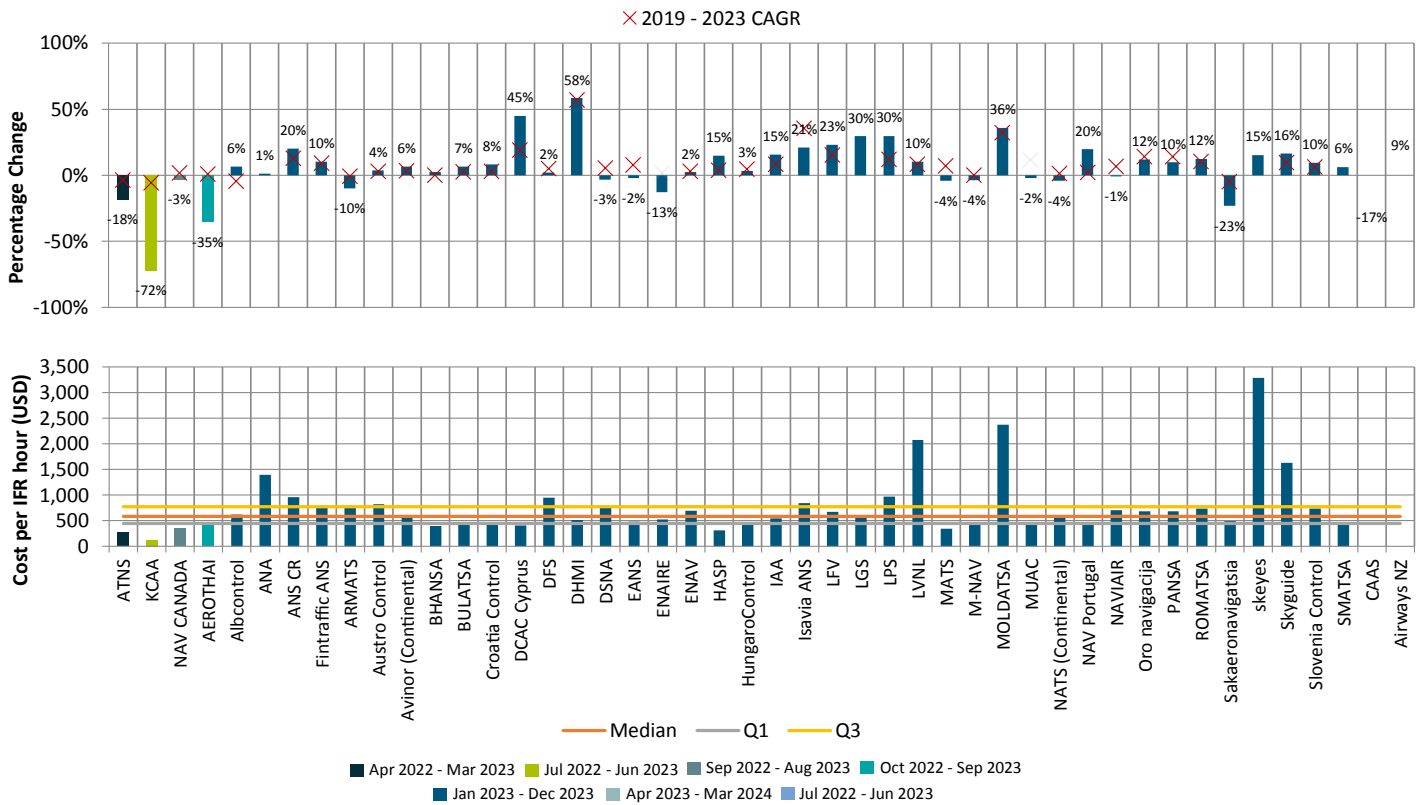


Figure 3 - Cost per IFR flight hour (USD)

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

The 2023 median cost per IFR flight hour in continental airspace was USD 566.57, while the 2023 average calculated based on total continental IFR flight hours per ANSP was USD 732.20. For comparison, the 2022 median for the same set of ANSPs was USD 586.08, with an average of USD 686.21 per IFR flight hour.

In terms of total costs in continental airspace, 67 per cent of ANSPs experienced an increase, with the median declining by 3.33 per cent between 2022 and 2023.

KCAA recorded the most significant change, with a 72 per cent decrease in continental cost per IFR flight hour year-over-year. This followed a 290 per cent increase in the cost per flight hour during the 2022 reporting year. Total costs for KCAA also declined sharply by 72 per cent, with other costs decreasing by 84.3 per cent.

According to the KCAA Strategic Plan 2022/23 – 2027/28, this sudden decrease can be explained by the necessary investments in labour as the recovery from the pandemic and investments in the infrastructure. The second-highest change was reported by DHMI, which saw a 58 per cent increase in cost per IFR flight hour year-over-year, primarily driven by a 91.3 per cent rise in total continental costs. A specific explanation provided by DHMI in the ACE Benchmarking Report is included below this section.

It should be noted that differences in the operational characteristics of ANSPs' airspaces may significantly influence their 'Cost per IFR flight hour'. For example, skeyes and LVNL have delegated control of their upper airspace to MUAC. As a result, skeyes and LVNL have a higher 'Cost per IFR flight hour' than they would if they controlled both upper and lower airspace, as traffic in the lower airspace is generally more complex. MUAC, meanwhile, utilises infrastructure provided by skeyes and LVNL, which contributes to its lower 'Cost per IFR flight hour'.

Furthermore, since the upper airspace does not include VFR flights, MUAC's ATCO-in-OPS productivity is fully reflected in this KPI. In contrast, the values for skeyes and LVNL include VFR workload, which reduces their ATCO-in-OPS productivity.

The total cost per IFR hour (KPI) remains relatively high for ANSPs such as skeyes, LVNL, Skyguide, and ANA, although there has been improvement, largely driven by an increase in IFR flight hours (between 3 and 7 per cent) due to rising traffic levels.

MOLDATSA also recorded a significant increase in its cost per IFR flight hour of 36 per cent despite a 13 per cent rise in IFR flight hours. This increase was caused by the reduction in air traffic reported during the previous year, resulting from the war in Ukraine. Safety concerns led to airspace restrictions, rerouted flights, and heightened military activity. As a result, MOLDATSA's total costs rose year-over-year by 53 per cent.

A specific explanation provided by the ACE Benchmarking Report can be found below this section.

Specific ANSP comments are outlined below. The following justification is taken from the [ACE Benchmarking report \(2025 edition\)](#)

At NAV Portugal, their costs rose by 22.0 per cent (€32.5 million), mainly due to a 21.2 per cent (€25.0 million) increase in staff expenses. This was driven by pension plan changes for ATCOs hired before 2007, reflecting actuarial losses from higher salaries,

pensions, and a lower discount rate. However, in 2022, NAV Portugal had recorded exceptional gains, resulting in unusually low costs.

LFV saw their costs increased by 22.0 per cent (€39.4 million), primarily due to a 33.5 per cent (€41.3 million) rise in staff expenses. This was driven by extraordinary pension fund contributions linked to the indexation of pension liabilities, which significantly impacted staff-related costs and accounted for most of the overall increase.

For MOLDATSA, their costs rose by 15.9 per cent (€1.3 million), mainly due to a 66.5 per cent (€1.0 million) increase in non-staff operating expenses. This was driven by a provision for bad debts owed by airlines. However, this rise followed significant cost reductions between 2019 and 2022, during which provision costs had fallen by 45 per cent (€6.6 million).

LVNL's costs increased by 13.4 per cent (€31.9 million), driven by rises across all major categories. Staff costs grew by 7.8 per cent (€12.7 million), increasing from 2022 levels due to the release of provisions. Non-staff operating expenses rose by 15.4 per cent (€8.4 million), mainly due to higher energy prices, increased outsourcing, and externalised ATCO training. Capital costs also rose by €8.2 million, impacted by rising interest rates, which affected LVNL due to its fully debt-financed structure.

Sakaeronavigatsia's costs rose by 12.3 per cent (€4.2 million), mainly due to a 17.5 per cent (€3.2 million) increase in staff expenses, driven by bonuses and higher remuneration. This increase aligned with a sharp rise in air traffic, which grew by 68 per cent in 2022 and 54 per cent in 2023.

Similarly, LPS's costs increased by 15.5 per cent (€10.2 million), mainly due to a 20.8 per cent (€9.4 million) rise in staff expenses linked to higher basic wages under a collective bargaining agreement. Staff costs were the main driver of the overall increase, reflecting broader labour-related developments affecting LPS's financials.

For ROMATSA, their costs rose by 10.0 per cent (€25.5 million), primarily due to a 12.6 per cent (€26.2 million) increase in staff expenses. This included higher pension costs and salary adjustments to offset 9.7 per cent inflation in 2023, along with bonuses for meeting capacity targets.

While DHMI's costs increased by 14.9 per cent (€92.1 million), driven by a 27.8 per cent (€54.3 million) rise in staff expenses and a 13.2 per cent (€25.3 million) increase in non-staff operating costs. The staff cost increase reflected government measures to counter declining purchasing power, including inflation-linked adjustments and one-off salary increases (54.0 per cent in 2023 and 72.3 per cent in 2022). Non-staff costs rose due to higher energy prices, increased maintenance, and rising insurance premiums related to major earthquakes in south-eastern Türkiye.

Similarly, DFS's costs rose by 1.2 per cent (€14.4 million) in real terms, mainly due to a 20.8 per cent (€27.8 million) increase in non-staff operating expenses. This was driven by higher energy costs, intensified recruitment, and a shift in iCAS maintenance costs from depreciation to operating expenses. Nominal staff costs rose by €45.6 million due to inflation-linked salary adjustments. This increase follows a 13.5 per cent (€180.4 million) cost reduction between 2019 and 2022.

In contrast, ENAIRE's costs decreased due to the absence of exceptional expenses in 2023, compared to €141.7 million in 2022 for retroactive adjustments under the "Special Active Reserve" regime (Law 26/2022). This reduction was partly offset by a 23.8 per cent (€54.8 million) increase in support staff costs, along with rises in depreciation (+11.9 per cent, €11.3 million) and capital costs (+46.3 per cent, €12.1 million). These increases reflect regulatory changes and broader financial pressures.



Indicator 2A: ATCO in OPS employment cost per ATCO in OPS hour (USD) (Formula: ATCOs in OPS employment costs/ATCOs in OPS hours)

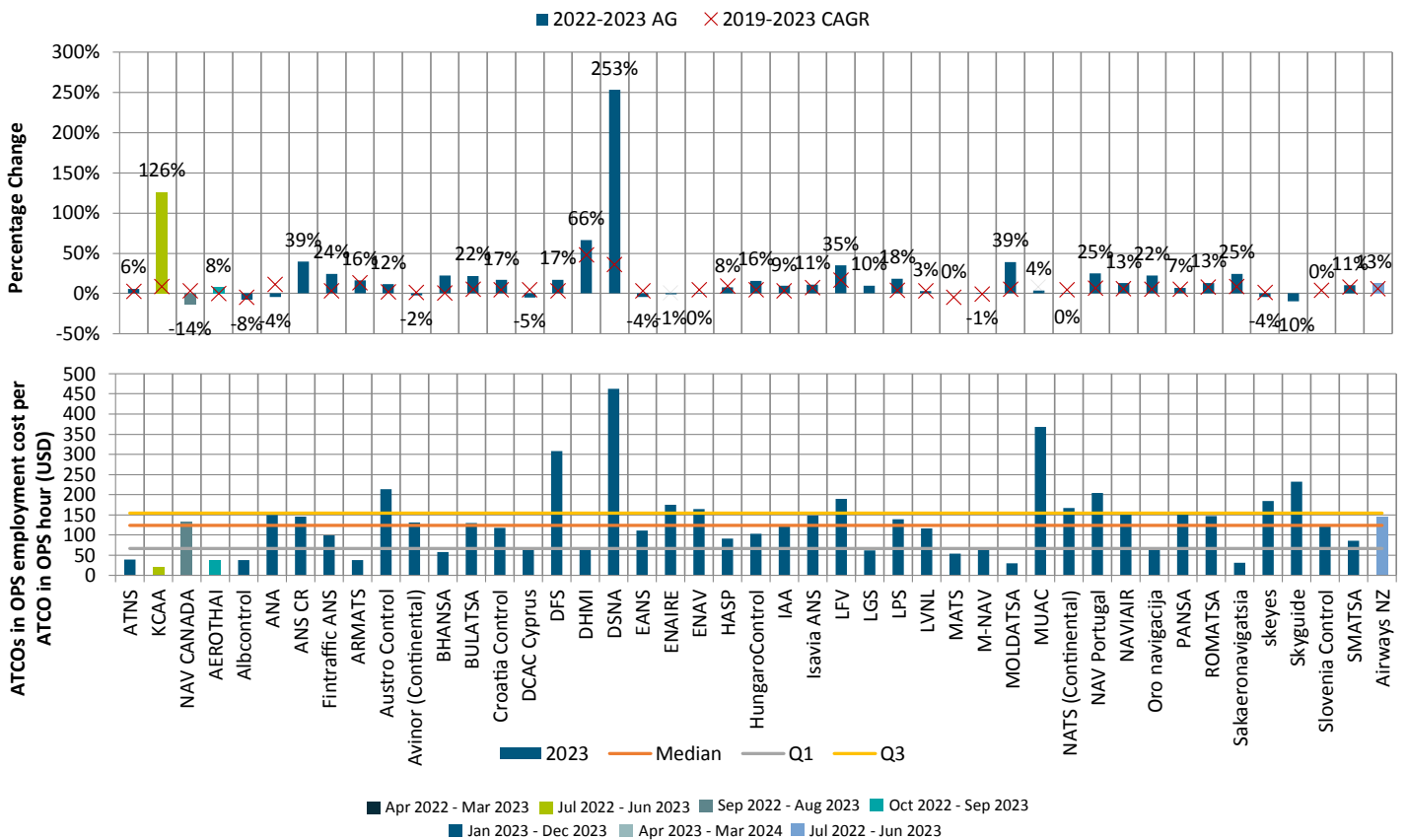


Figure 4 - ATCO in OPS employment cost per ATCO is OPS hour (USD)

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

The 2023 median continental ATCO-in-OPS employment cost per ATCO-in-OPS hour was USD 123.88. For comparison, the same group of ANSPs submitting data in 2022 reported a median of USD 113.31 per ATCO hour.

ANSPs with reporting periods beginning in mid-2022 were likely affected by the recovery from pandemic-related cost-cutting measures, particularly the implementation of part-time work under staffing contracts in previous years. KCAA, which recorded the largest decrease of 55 per cent in ATCO employment costs per ATCO hour in 2022, experienced a 33 per cent increase in these costs in 2023. This may have been driven by a 16 per cent year-over-year decrease in continental ATCO hours, along with other economic factors.

The highest increase of continental ATCO in OPS employment costs per ATCO Ops hour is reported by DSNA, with an increase of 253 per cent year on year.

DHMI recorded the largest increase in this metric based on data reported to PRU, with a 66 per cent rise compared to 2022. This was largely driven by an 80 per cent increase in ATCO employment costs. Further reasoning is provided in the ACE Benchmarking Report, referenced below.

Slovenia Control did not provide data for 2022; however, data for 2023 were submitted to PRU, and therefore, the year-over-year change was not examined.

Specific ANSP comments are outlined below. The following justification is taken from the [ACE Benchmarking report \(2025 edition\)](#)

For DHMI, the cost increase of 29.4 per cent was partly due to a 6.0 per cent rise in operational ATCOs, adding 104 FTEs. Additionally, employment costs per ATCO hour rose by 19.7 per cent, driven by government-wide measures affecting public sector wages. These adjustments significantly contributed to the overall rise in staffing expenses.

For LFV, the costs increased by 23.2 per cent, despite a 2.0 per cent reduction in operational ATCOs (-8 FTEs). This was offset by a 27.6 per cent rise in employment costs per ATCO hour, driven by extraordinary pension fund contributions linked to inflation-based indexation of pension liabilities, which significantly impacted overall employment costs.

Sakaeronavigatsia, saw their costs rise by 21.6 per cent, entirely due to an increase in employment costs per ATCO hour, with no change in ATCO headcount. Higher salaries and bonuses were introduced to support staff amid a 53.7 per cent increase in traffic, which placed greater operational demands on personnel.

Similarly, NAV Portugal had their costs increased by 21.5 per cent, driven by an 18.7 per cent rise in employment costs per ATCO hour and a 3.0 per cent increase in operational ATCOs (+6 FTEs). The higher unit costs stemmed from pension plan changes, contributing to increased staffing expenses alongside workforce expansion.

Finally, at DFS, the employment costs for operational ATCOs rose by 8.0 per cent, mainly due to incentive payments encouraging voluntary extra shifts during staff shortages. These measures helped maintain coverage and directly contributed to higher unit employment costs.



Indicator 2A: ATCO in OPS employment cost per ATCO in OPS hour (USD) – PPP adjusted

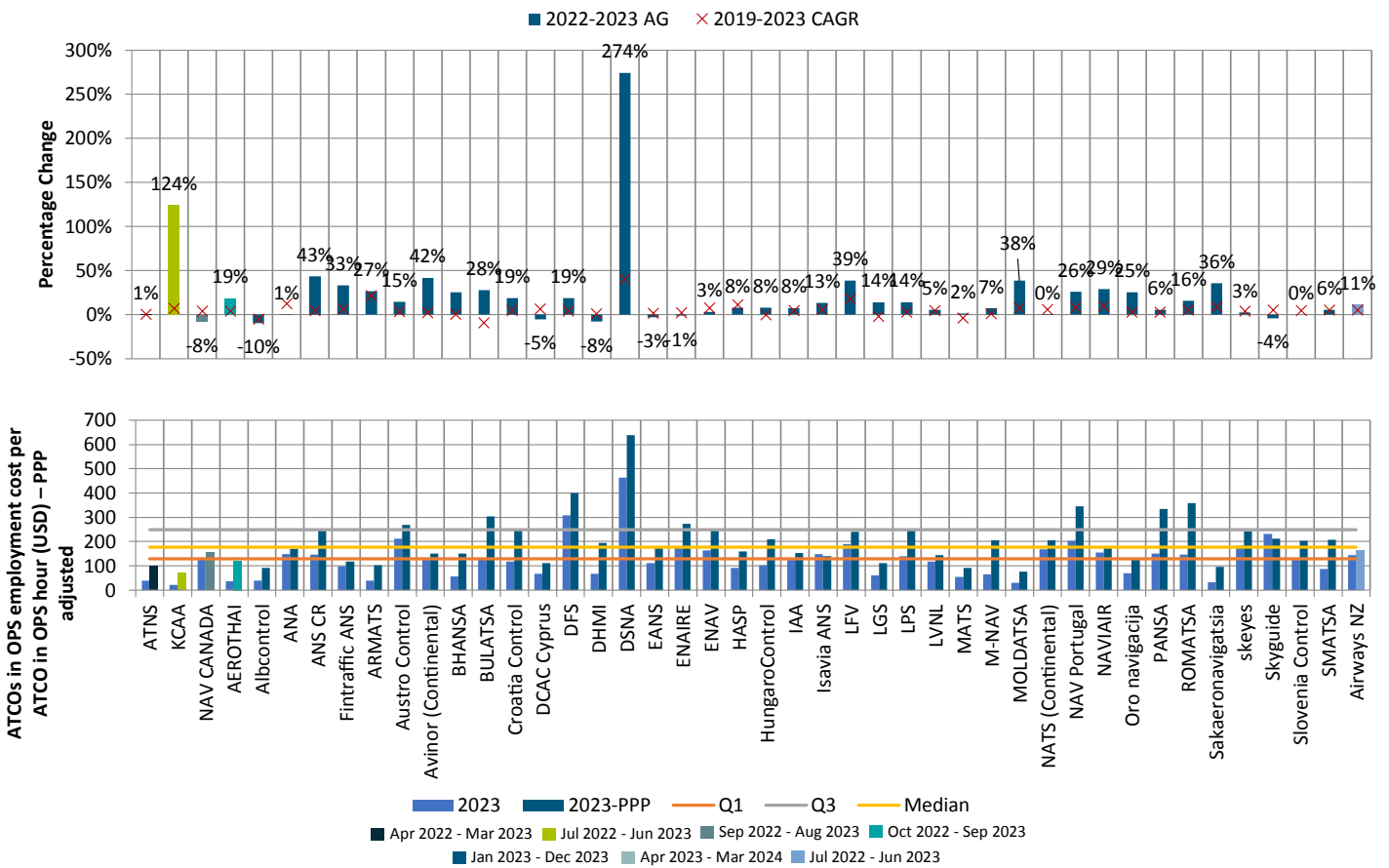


Figure 5 - ATCO in OPS employment cost per ATCO in OPS hour (USD) - PPP adjusted

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

The 2023 median ATCO-in-OPS employment cost per ATCO-in-OPS hour, after PPP adjustment, was USD 172.31. The same ANSPs that submitted continental data for 2022 reported a median of USD 167.58 per ATCO hour.

The largest change in PPP-adjusted continental ATCO-in-OPS employment cost per ATCO-in-OPS hour was reported by DSNA, with a 274 per cent increase year-over-year. Upon examining the data, a significant discrepancy was noted between the CANSO submission and PRU data: the number of ATCO-in-OPS hours reported to CANSO was 72 per cent lower than that reported to PRU. This difference has influenced the graphs and statistics.

KCAA experienced a 124 per cent increase in PPP-adjusted continental ATCO-in-OPS employment cost per ATCO-in-OPS hour in 2023. This was primarily driven by a 90 per cent rise in ATCO employment costs year-over-year and a 15 per cent decrease in ATCO-in-OPS hours. Many ANSPs continued to relax cost containment measures and ease cost reduction strategies that had been implemented during the pandemic, resulting in increased ATCO employment costs in 2022 compared to the previous year.

Significant differences between PPP-adjusted and unadjusted trends in continental ATCO employment costs per ATCO-in-OPS hour were also observed for DHMI and Avinor. Where DHMI reported a 66 per cent increase in ATCO-in-OPS employment cost per ATCO-in-OPS hour; however, after PPP adjustment, the actual year-over-year change accounting for real prices of goods and services was a decrease of 8 per cent. While Avinor's PPP-adjusted figures showed a 42 per cent increase, the unadjusted data indicated a 22 per cent rise.

For other ANSPs, the difference between PPP-adjusted and unadjusted changes for the 2022–2023 period was less than 20 per cent.

Indicator 2B: ATCO in OPS hour productivity (Formula: IFR flight hours/ATCOs in OPS hours)

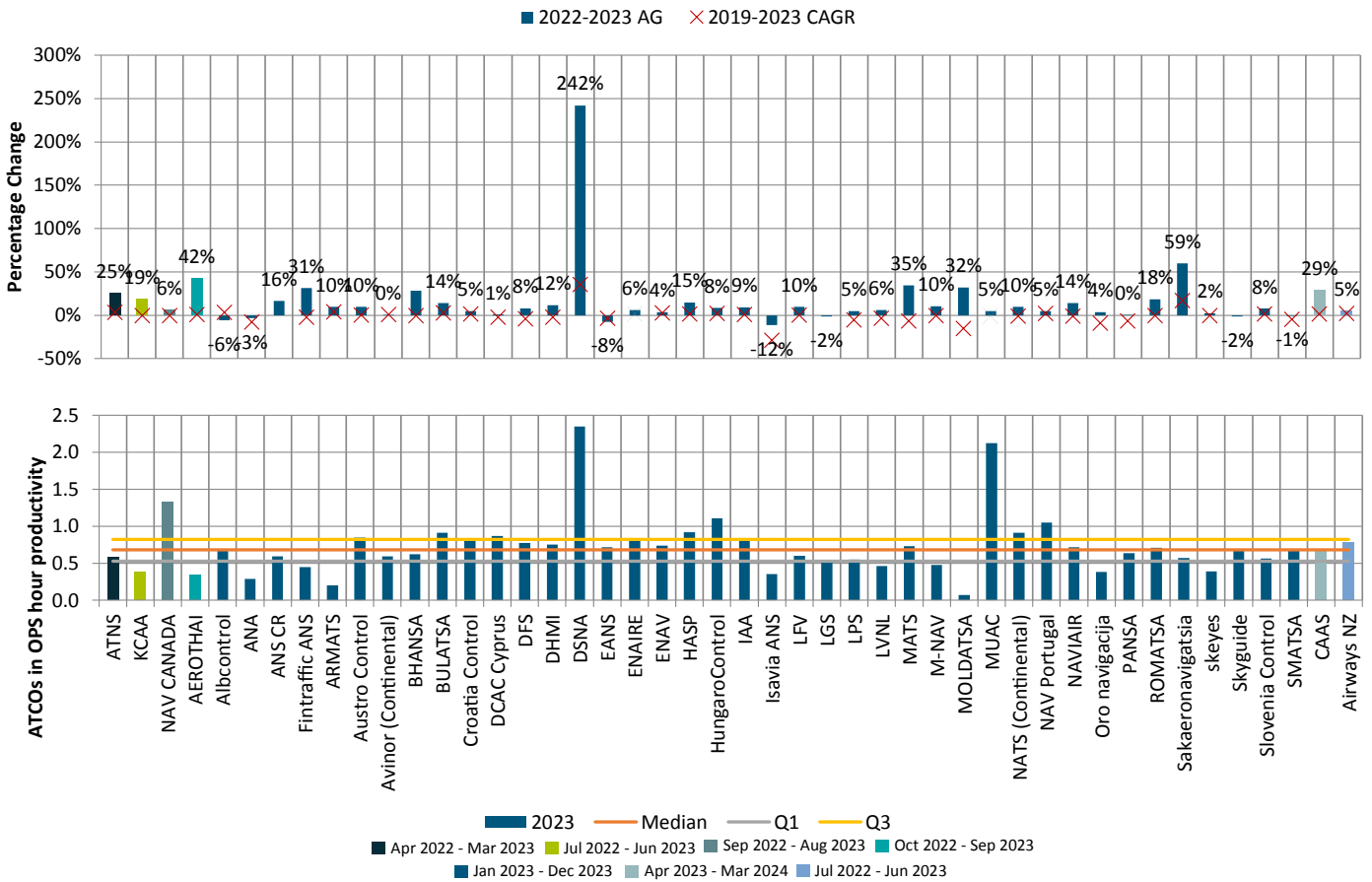


Figure 6 - ATCO in OPS hour productivity

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

The 2023 median ATCO-in-OPS hour productivity was 0.68, compared to a median of 0.63 reported by the same group of ANSPs in 2022.

According to the ATCO productivity graph, the highest year-over-year change of 242 per cent increase was reported by DSNA. Upon review, a significant discrepancy was found between the CANSO submission and PRU data: the number of ATCO-in-OPS hours reported to CANSO was 72 per cent lower than that reported to PRU. This difference has influenced both the graphs and the statistical outcomes.

The second-highest increase in ATCO-in-OPS hour productivity was reported by Sakaeronavigatsia, with a 59 per cent rise, driven by a corresponding 59 per cent increase in continental IFR flight hours within Georgian airspace. However, despite this improvement, the resulting productivity level of 0.36 remains below average.

AEROTHAI, which recorded the largest growth in IFR flight hours, also achieved the second-highest increase in ATCO-in-OPS hour productivity, at 42 per cent, driven by the rise in IFR traffic.

In contrast, Isavia ANS was the only ANSP to report a decline in continental IFR flight hours, with a 10 per cent decrease year-over-year. This led to an 11.56 per cent reduction in ATCO-in-OPS hour productivity.

As highlighted in the 2021 and 2022 reports, MUAC maintained the highest productivity among all submitting ANSPs. It is important to note, however, that MUAC’s scope of services typically excludes the more complex lower airspace, which contributes to its higher productivity levels.

Indicator 2C: Cost excluding ATCOs in OPS employment costs per IFR hours (USD)
 (Formula: Costs excluding ATCOs in OPS employment costs/IFR flight hours)

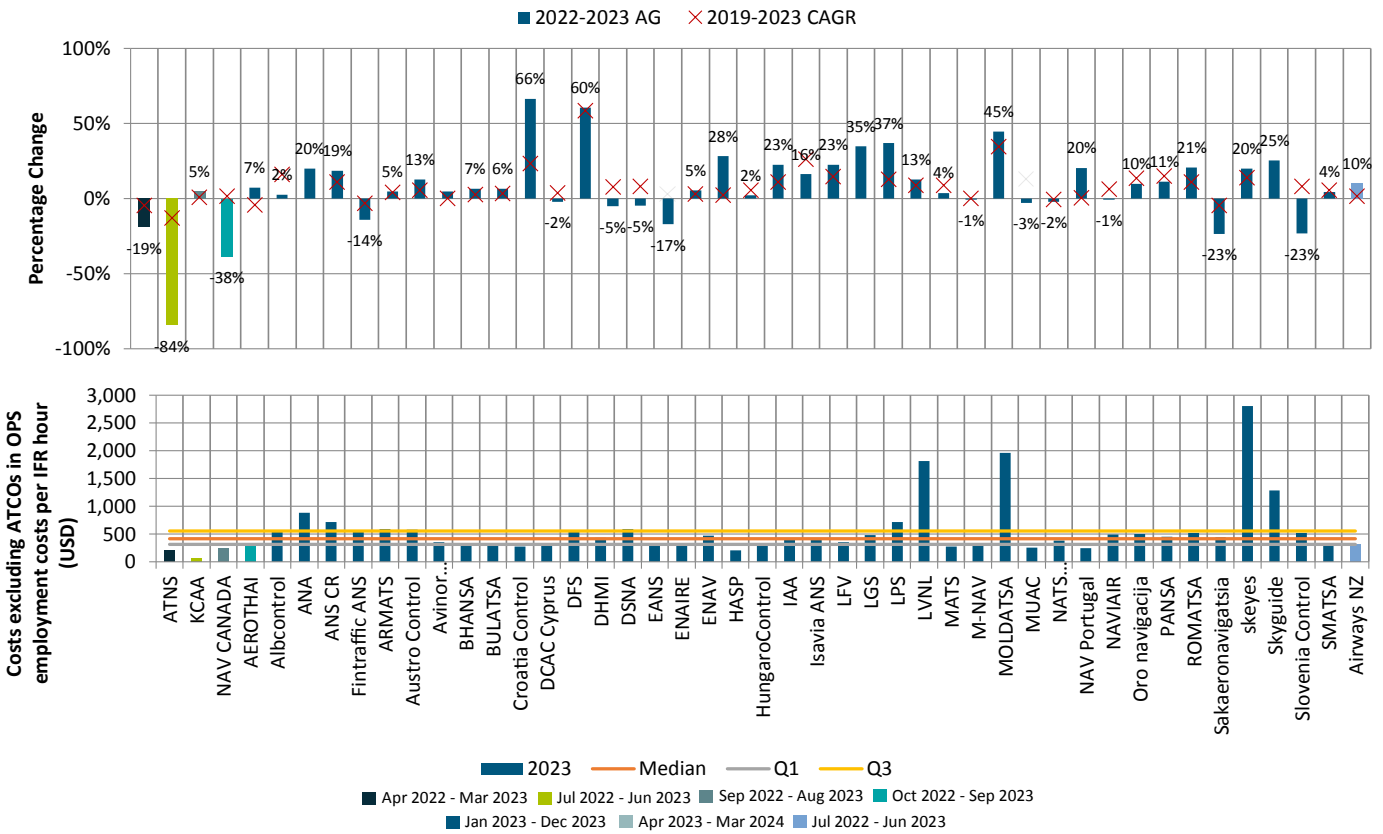


Figure 7 - Cost excluding ATCO in OPS employment costs per IFR hours

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

The 2023 median continental cost excluding ATCO-in-OPS employment cost per IFR flight hour was USD 401.81. The same group of ANSPs submitting data in 2022 reported a median of USD 387.45 per IFR hour.

KCAA experienced a significant 84 per cent decrease in costs per IFR hour (excluding ATCO-in-OPS employment), primarily due to an 84 per cent reduction in other expenses, while IFR flight hours remained stable. In contrast, most other ANSPs reported increases in this metric, largely driven by rising IFR flight hours.

The majority of European ANSPs reported an increase in cost per flight hour, influenced by higher traffic volumes in 2023 and the ongoing recovery from elevated inflation rates across Europe in 2022.

Due to the infrastructure-sharing agreement with MUAC, and the fact that skeyes provides services exclusively in the more complex lower airspace, both skeyes and LVNL typically report higher costs per flight hour.

It should also be noted that, as outlined in the description of Indicator 1 ('Cost per IFR flight hour'), differences in the operational characteristics of ANSPs' airspaces may significantly influence their 'Costs excluding ATCO-in-OPS employment costs per IFR hour'.

Specific ANSP comments are outlined below. The following justification is taken from the [ACE Benchmarking report \(2025 edition\)](#)

DHMI recorded increases across all support cost categories, with support staff costs up 26.0 per cent (€24.2 million) and non-staff operating costs up 13.2 per cent (€25.3 million). The rise in staff costs was driven by inflation-linked adjustments and one-off salary increases for public civil servants, amid exceptionally high inflation. Non-staff costs increased due to higher energy prices, increased maintenance, and elevated insurance premiums following severe earthquakes in southeastern Türkiye.

Similarly, LVNL also recorded increases across all support cost categories: support staff costs rose by 10.0 per cent (€12.9 million), non-staff operating costs by 15.4 per cent (€8.4 million), and cost of capital by 521.6 per cent (€8.2 million). The growth in staff costs partly reflects the release of provisions in 2022, which had previously lowered costs. Non-staff expenses rose due to higher energy prices, outsourcing, and externalised ATCO training. The sharp rise in capital costs was driven by an interest rate increase from 1.9 per cent to 3.9 per cent.

While Skyguide's support staff costs rose by 28.0 per cent (€43.3 million), mainly due to pension fund refinancing. Non-staff operating costs increased by 15.7 per cent (€11.8 million), driven by higher administrative expenses and investments in resilience projects to address obsolete systems and equipment.

ROMATSA's cost increase was mainly driven by a 19.6 per cent (€23.9 million) rise in support staff expenses, due to higher pension costs, inflation-related compensation, and bonuses awarded for meeting performance targets. Increased traffic volumes in 2023 also contributed to the need for these incentives, collectively driving up support staff costs.

In contrast, ENAIRE saw their cost decrease due to the absence of exceptional expenses in 2023, compared to €141.7 million in 2022 for retroactive adjustments under the "Special Active Reserve" regime (Law 26/2022). This reduction was partly offset by a 23.8 per cent (€54.8 million) increase in support staff costs, along with rises in depreciation (+11.9 per cent, €11.3 million) and capital costs (+46.3 per cent, €12.1 million). These increases reflect regulatory changes and broader financial pressures.

While Austro Control recorded a decrease in support costs across all categories in real terms, with support staff costs falling by 10.1 per cent (€10.9 million). This follows sharp increases in 2021 (+26.5 per cent) and 2022 (+19.0 per cent), reflecting a correction after two years of substantial growth.

ENAV recorded real-term decreases across all support cost categories, with modest nominal increases offset by 5.9 per cent inflation. As a result, overall support costs declined when adjusted for inflation.



Indicator 2D: Employment costs of ATCOs in OPS as a proportion of total costs (Formula: ATCO in OPS employment costs/total costs)

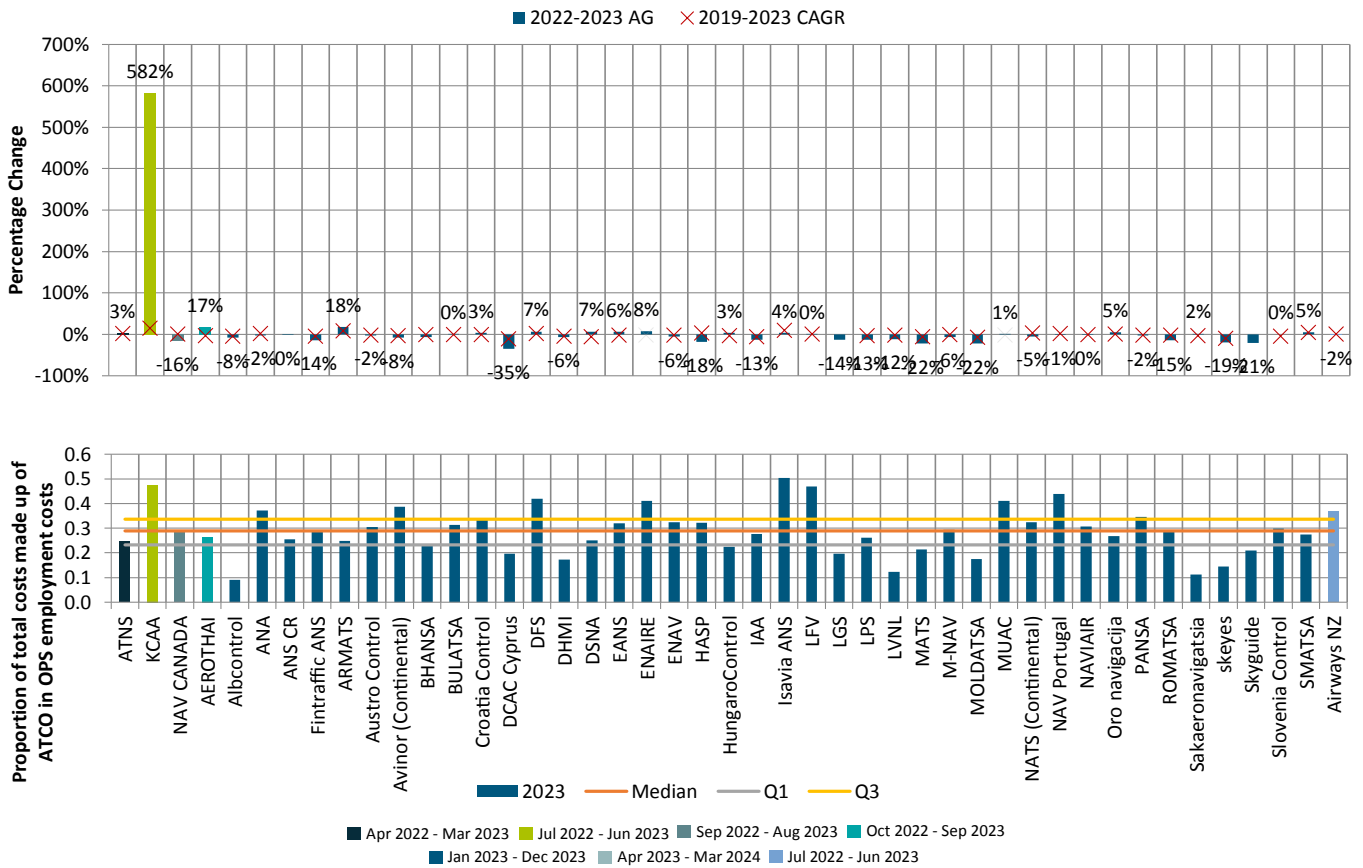


Figure 8 - Employment costs of ATCOs in OPS as a proportion of total costs

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median proportion of continental total costs spent on employing ATCOs in OPS was 29 per cent. The same group of ANSPs submitting data in 2022 reported a median of 30 per cent.

For KCAA, the 582 per cent increase in ATCO-in-OPS employment costs as a proportion of total costs was influenced by an 89 per cent rise in employment costs, alongside a 72 per cent decrease in other costs, both contributing to the overall change in total costs. This increase can be attributed to economic shifts during the recovery from the pandemic and the previously recorded rise in costs excluding ATCO-in-OPS employment.

DCAC Cyprus experienced a 35 per cent decrease in ATCO employment costs as a proportion of total costs. This may be explained by a 90 per cent year-over-year increase in other costs, which outweighed the 8.4 per cent increase in staff costs.

When examining changes in the proportion of ATCO-in-OPS employment costs to total continental costs, most ANSPs maintained a stable proportion, with an average change of 8 per cent.

Figures for Slovenia Control were reported to CANSO in 2022 but not in 2023. Therefore, the year-over-year change is recorded as 0 per cent, as the data sources differ (CANSO vs PRU).

Indicator 3A: Annual employment cost per ATCO in OPS (USD) (Formula: ATCOs in OPS employment costs/No. ATCOs in OPS)

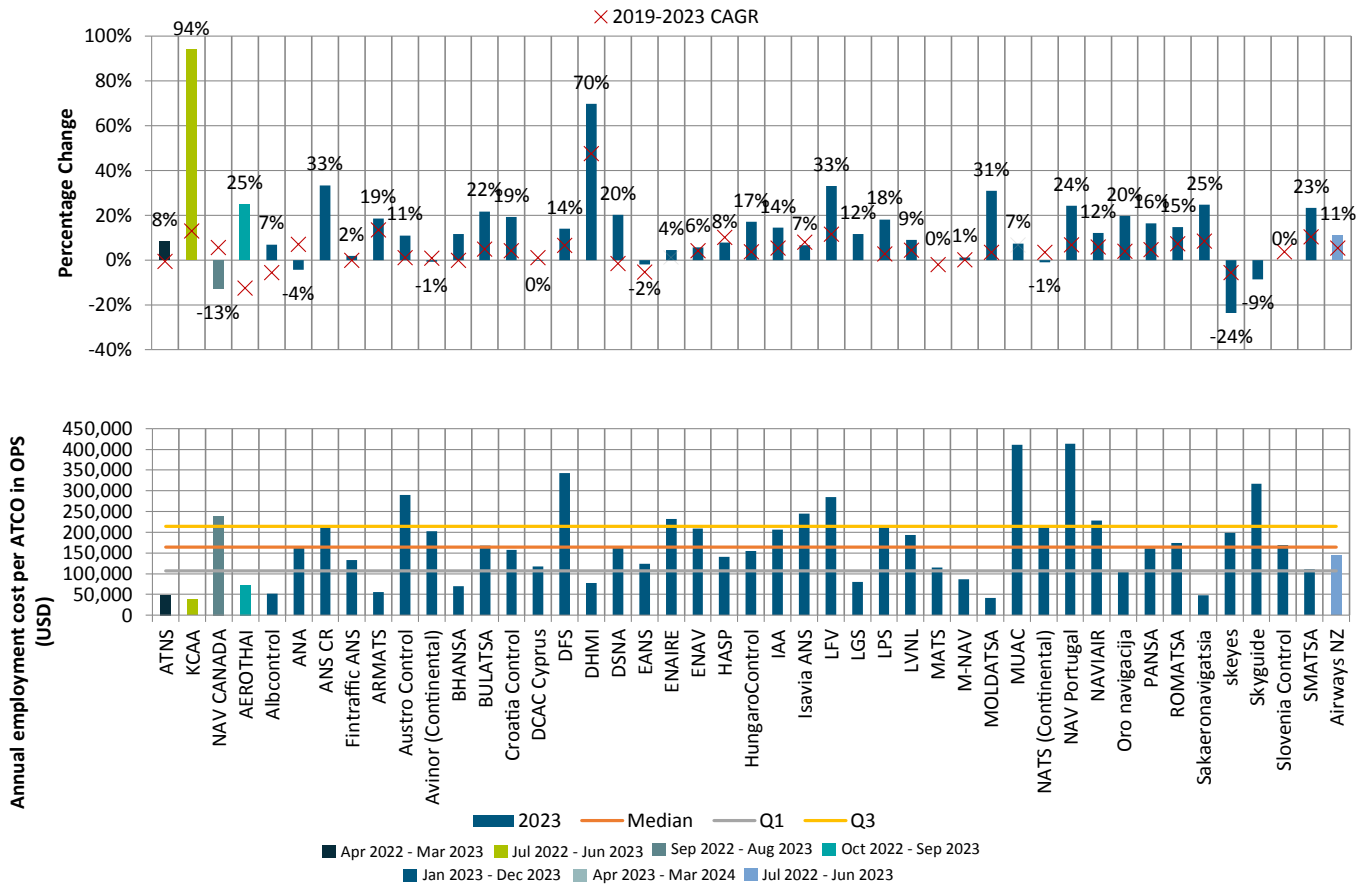


Figure 9 - Annual employment cost per ATCO in OPS

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median unit ATCO-in-OPS employment cost was USD 164,453.10. The same group of ANSPs submitting data in 2022 reported a median of USD 138,266.37 per ATCO.

KCAA recorded the highest increase, with a 94 per cent rise in annual employment cost per ATCO-in-OPS. This was driven by an 89 per cent increase in total employment costs, alongside an 8 per cent increase in ATCO staffing. This change may be attributed to the economic recovery following the pandemic.

DHMI experienced a 70 per cent increase in annual employment cost per ATCO-in-OPS. This was primarily due to an 80 per cent year-over-year rise in ATCO employment costs. Although DHMI added 104 ATCOs, representing a 6 per cent increase in staffing, this was relatively small compared to the rise in employment costs largely driven by inflation and changes to staff pension schemes, making the increase in headcount negligible by comparison.

skeyes experienced a 24 per cent decrease in annual employment cost per ATCO-in-OPS. This was mainly influenced by a 3.2 per cent reduction in employment costs and a 26.7 per cent increase in ATCO staffing.

For Slovenia Control, the required data was not part of the CANSO submission in 2022 but was included in the PRU submission in 2023. Therefore, the year-over-year change is recorded as 0 per cent, as the data sources differ.

Indicator 3A: Annual employment cost per ATCO in OPS (USD) – PPP adjusted

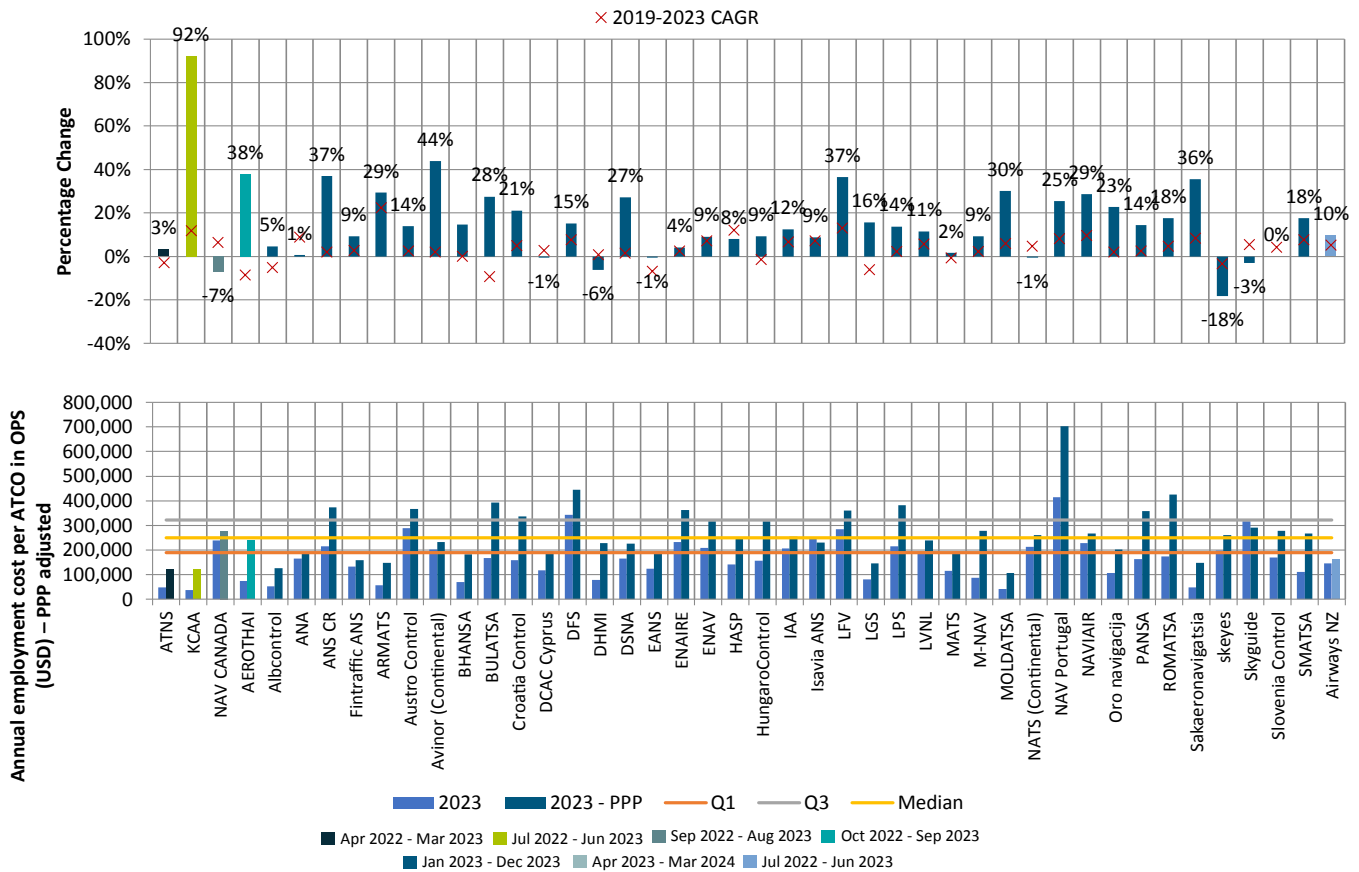


Figure 10 - Annual employment cost per ATCO in OPS (USD)

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median annual ATCO-in-OPS employment cost per ATCO, after PPP adjustment, was USD 249,406.53. The same group of ANSPs submitting data in 2022 reported a median of USD 225,342.08 per ATCO.

When comparing PPP-adjusted and unadjusted changes in annual employment cost per ATCO-in-OPS hour from 2022 to 2023, the most significant difference was observed for AEROTHAI, with a 266.84 per cent variance, largely due to high inflation in the country during the reporting period.

MUAC is also excluded, as PPP data is not available for analysis due to its coverage of airspace across multiple countries.

Slovenia Control did not report the necessary data to CANSO in 2022 but did submit data to PRU in 2023. Therefore, the year-over-year change is recorded as 0 per cent, as the data sources differ.

Indicator 3B: Annual working hours per ATCO in OPS (Formula: ATCOs in OPS hours/No. ATCOs in OPS)

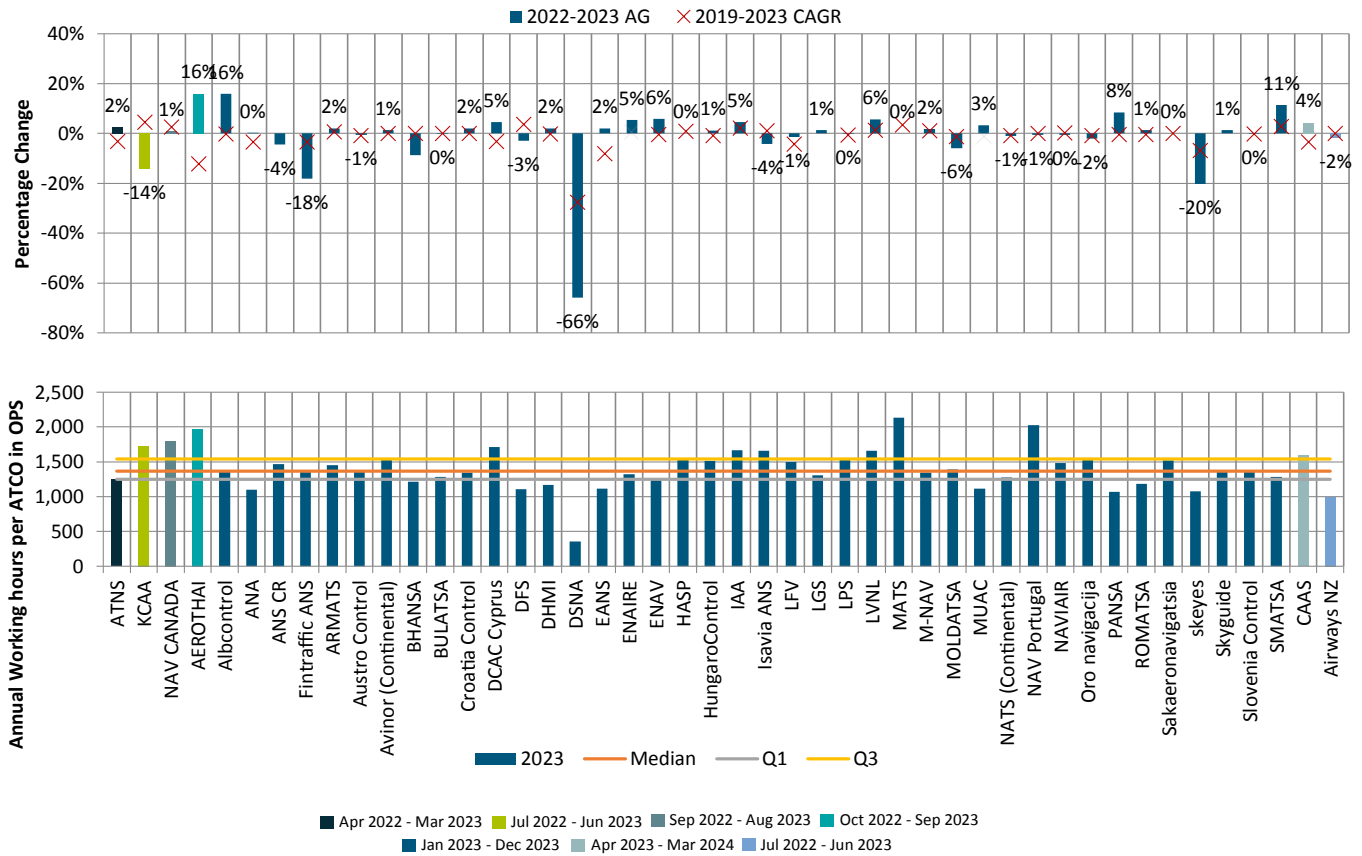


Figure 11 - Annual working hours per ATCO in OPS

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median annual working hours per ATCO-in-OPS were 1,367 hours. The same group of ANSPs submitting data in 2022 reported a median of 1,396 hours per ATCO. The differences recorded for this metric were influenced by the number of staff working full-time.

Most ANSPs reported stable figures, with changes of up to ±5 per cent. With notable exceptions being skeyes, which recorded a 20 per cent decrease in annual working hours per ATCO-in-OPS. This was driven by a 26.7 per cent increase in the number of ATCOs. And Fintraffic ANS, which saw an 18 per cent decrease in annual working hours. This was influenced by a 17 per cent reduction in ATCO-in-OPS hours and an increase of 3 ATCOs, representing nearly 2 per cent of the workforce.

The largest decrease was reported by DSNA, with a 66 per cent drop in annual working hours. Upon review, a significant discrepancy was found between the CANSO and PRU submissions: the number of ATCO-in-OPS hours reported to CANSO was 72 per cent lower than that reported to PRU. This discrepancy has impacted the graphs and statistical outputs.

Indicator 3C: Annual IFR hours per ATCO in OPS (Formula: IFR flight hours/No. ATCOs in OPS)

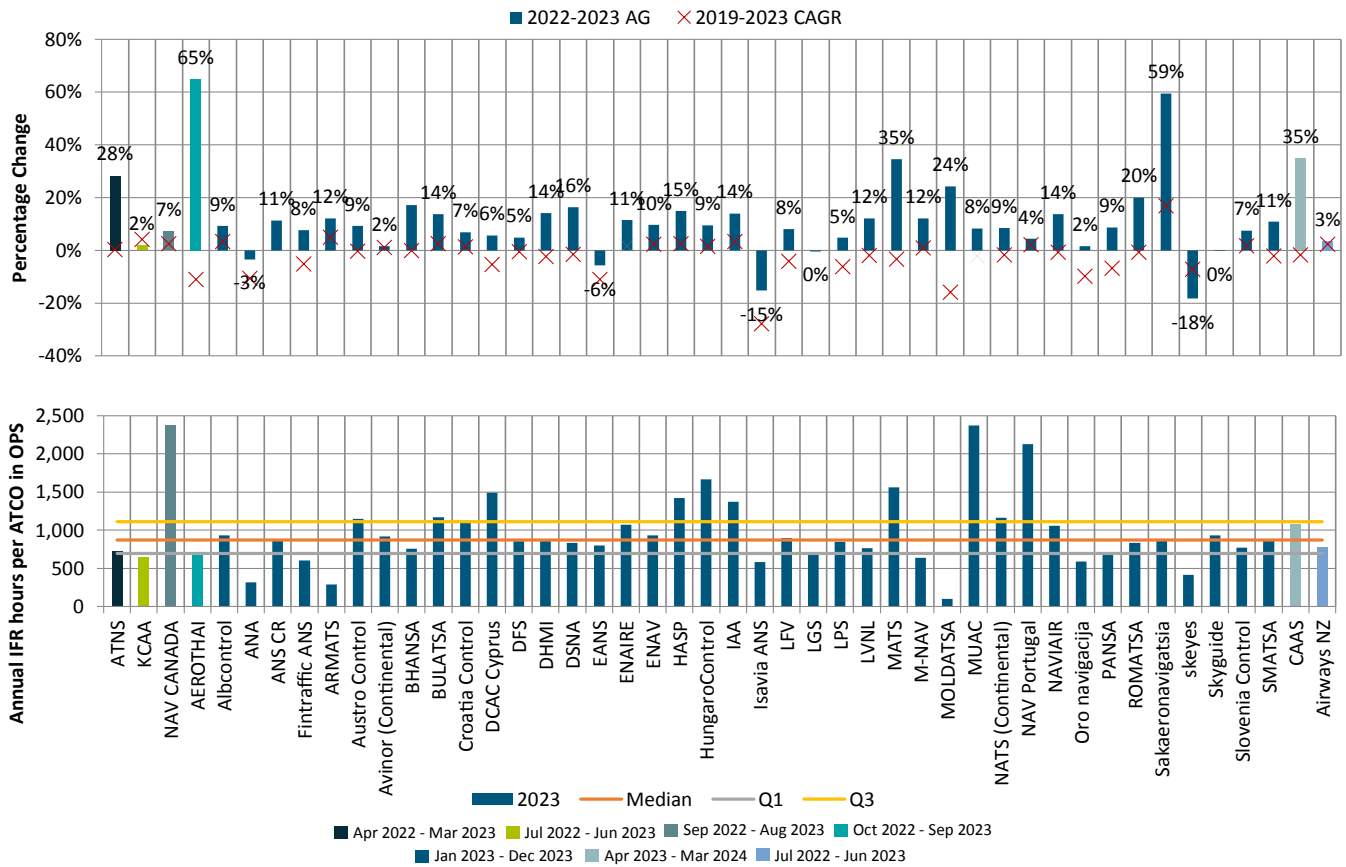


Figure 12 - Annual IFR hours per ATCO in OPS

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median annual IFR hours per ATCO-in-OPS was 873.27 hours. The same group of ANSPs submitting data in 2022 reported a median of 803.39 hours per ATCO.

Nearly all ANSPs with reporting periods covering 2023, except for ANA, EANS, Isavia ANS, and skeyes, recorded continued increases in annual IFR hours per ATCO, reflecting recovery from the pandemic and a subsequent rise in operational activity. Although the average shows an 11 per cent increase in this KPI, the 2023 median has not yet returned to pre-pandemic levels, reaching only 84.2 per cent of the 2019 median.

AEROTHAI recorded the highest increase, with a 65 per cent rise in annual IFR hours per ATCO-in-OPS, reflecting the surge in IFR traffic. A 59 per cent increase was also reported by Sakaeronavigatsia. Other notable increases, each exceeding 30 per cent, were recorded by MATS, and CAAS.

Indicator 3D: Ratio of frontline service staff to ATCO in OPS (Formula: No. frontline service support staff/No. ATCOs in OPS)

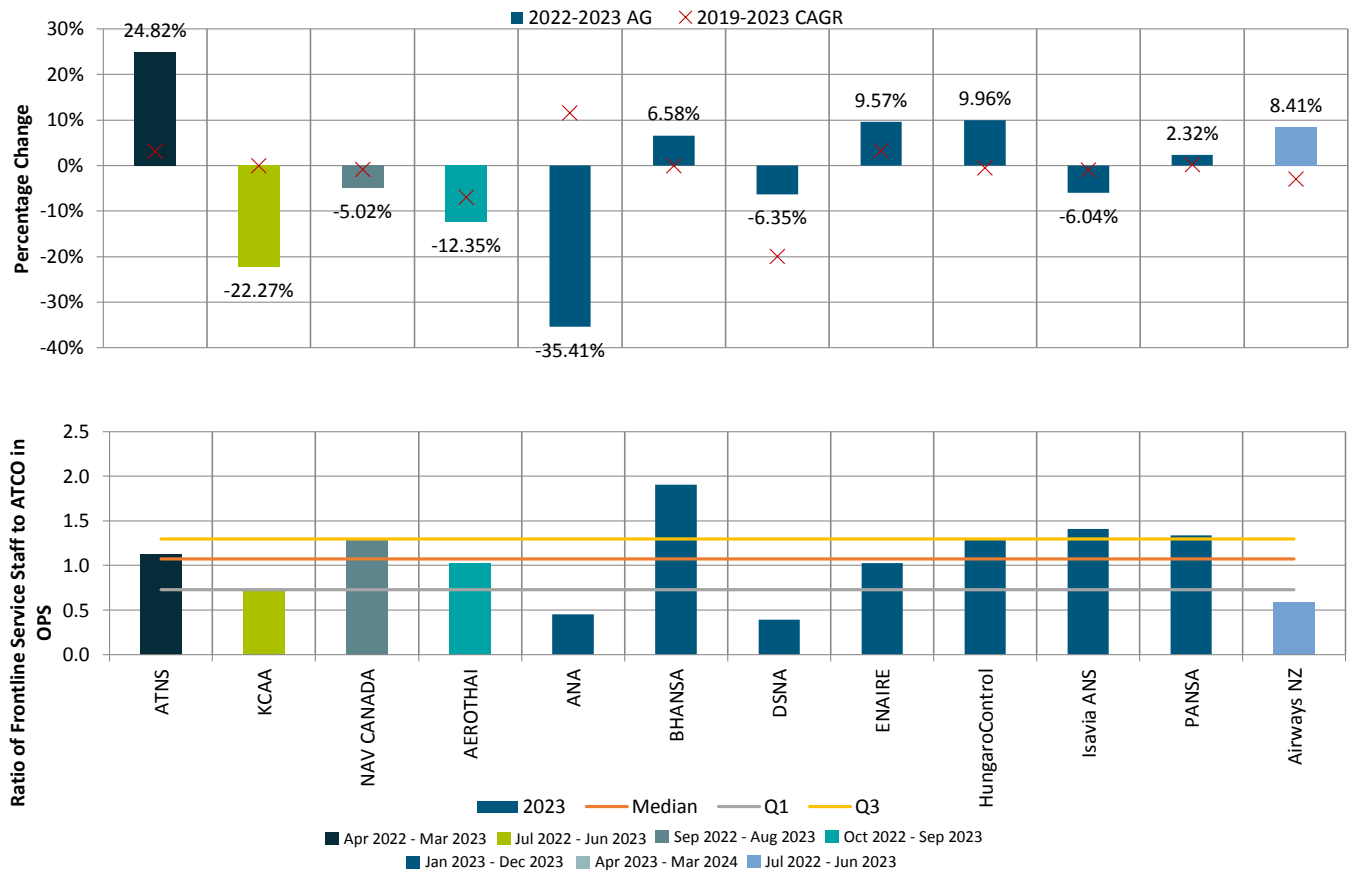


Figure 13 - Ratio of frontline service staff to ATCO in OPS

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median ratio of continental frontline service staff to ATCO-in-OPS was 1.05. The same group of ANSPs submitting data in 2022 reported a median of 1.06.

The largest increase in this ratio was recorded by ATNS, at +24.82 per cent, while the largest decrease was reported by ANA, at negative 35.41 per cent. The previous reporting period saw more pronounced changes in this ratio, likely due to staffing adjustments made during the pandemic years (2020–2022). In contrast, 2023 marked a period of stabilisation for most ANSPs.

Most ANSPs are not displayed on the chart due to missing data required for KPI 3D.

Oceanic Cost Efficiency and Productivity: 2023

Indicator 1: Cost per IFR flight hour (USD) (Formula: Total costs/IFR flight hours)

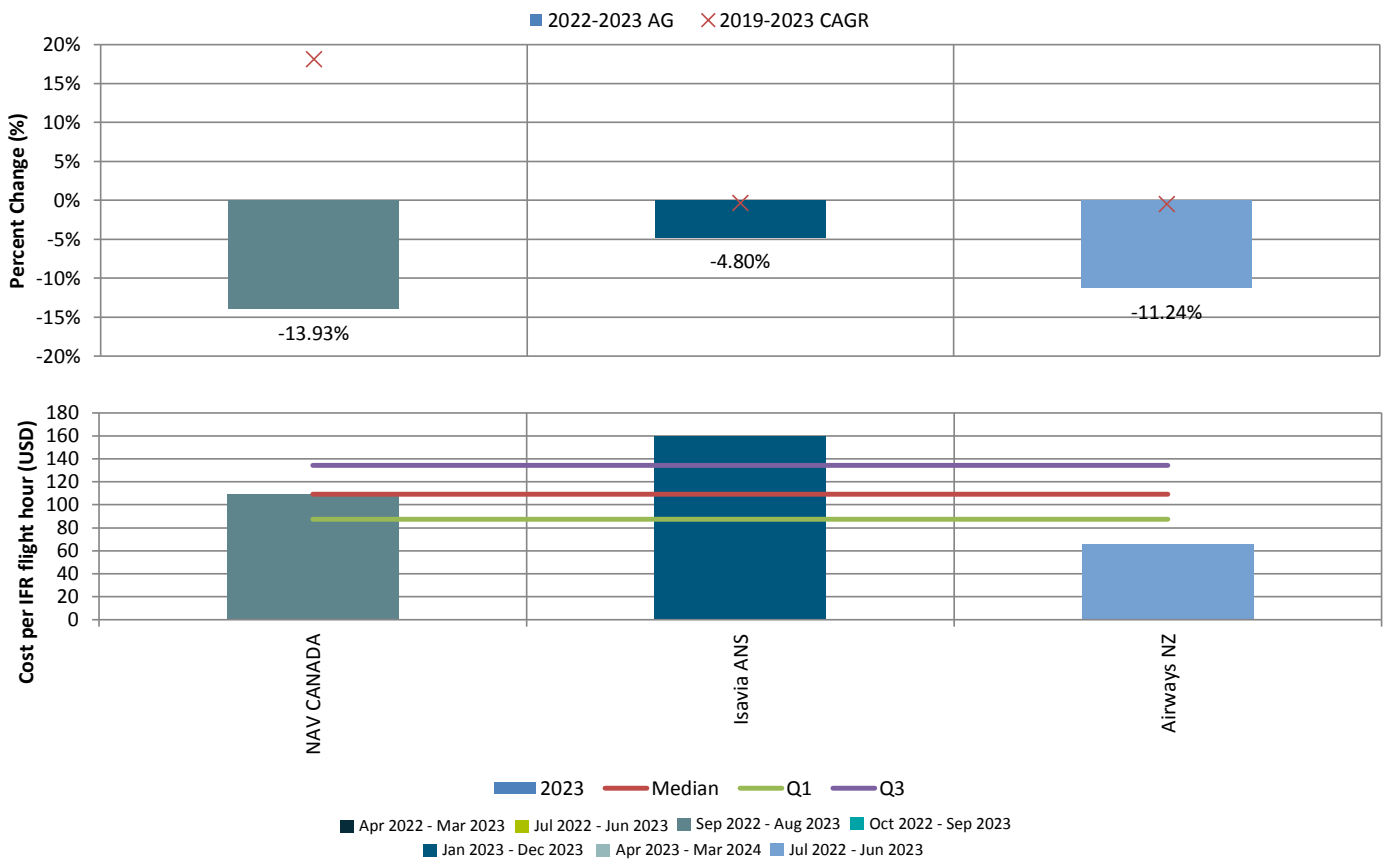


Figure 14 - Cost per IFR flight hour

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median cost per IFR flight hour in oceanic airspace was USD 109.23. The average, based on total oceanic IFR flight hours per ANSP, was USD 125.98, representing an 17.6 per cent decrease compared to the previous year.

The same group of ANSPs submitting data for 2022 reported a median cost of USD 126.91 and an average of USD 152.90 per IFR flight hour.

Oceanic cost efficiency has improved more than continental cost efficiency, primarily due to a greater increase in IFR flight hours in oceanic airspace. The notable reductions were reported by NAV Canada and Airways NZ who saw their IFR flight hours increase by 23 per cent from (604,464 to 742,704) and 26 per cent from (93,122 to 117,034).

ATNS is not displayed on the chart due to missing data required for KPI 1.

Indicator 2A: ATCO in OPS employment cost per ATCO in OPS hour (USD) (Formula: ATCOs in OPS employment costs/ATCOs in OPS hours)

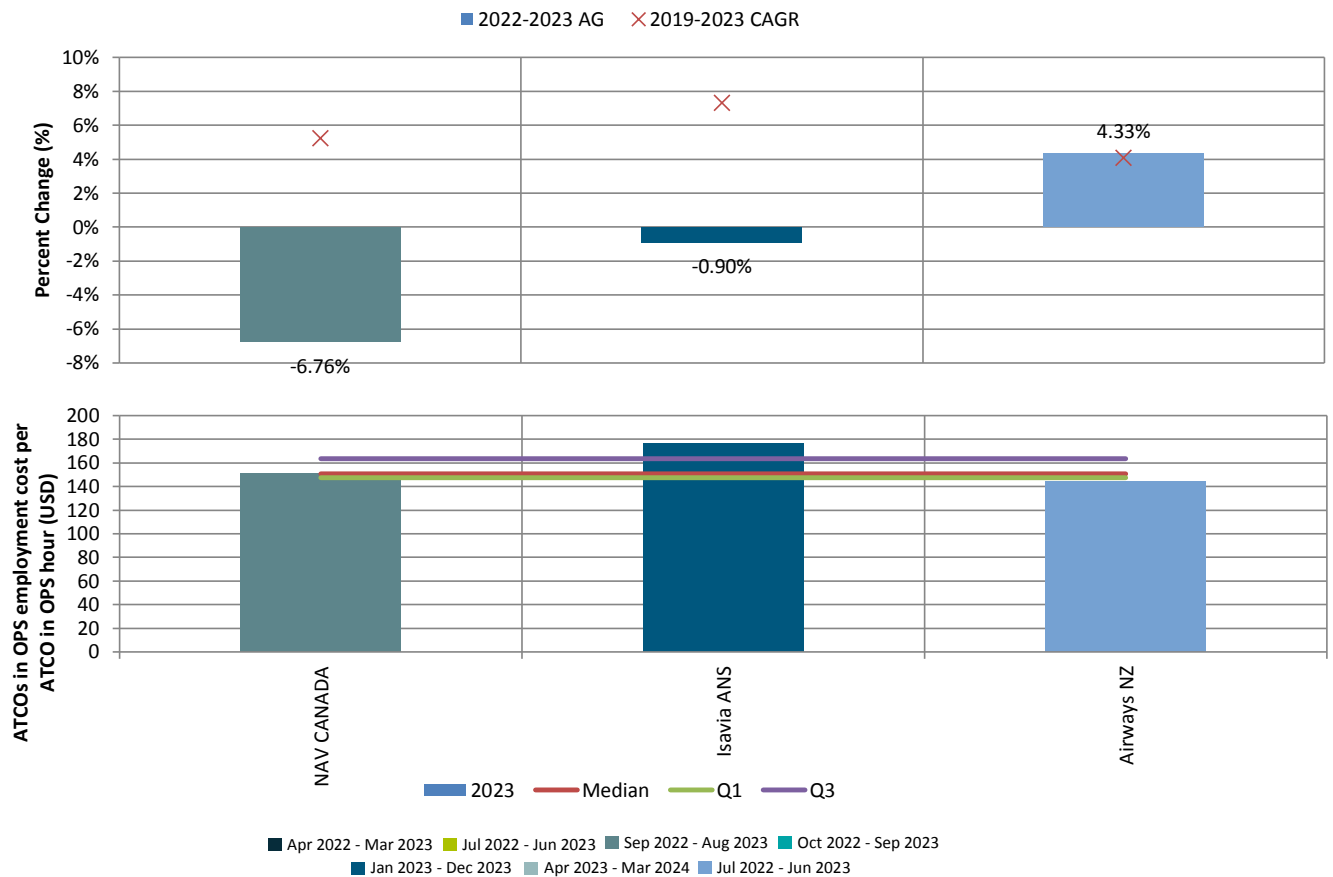


Figure 15 - ATCO in OPS employment cost per ATCO in OPS

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median oceanic employment cost per ATCO-in-OPS hour was USD 150.70. The same group of ANSPs submitting data in 2022 reported a median of USD 161.62, representing a 6.7 per cent year-over-year decrease.

Compared to the previous year, ANSPs saw limited change in this oceanic KPI. For example, NAV Canada recorded a 7 per cent decrease, driven by an 11 per cent increase in oceanic ATCO-in-OPS hours, while employment costs rose only 3.6 per cent year-over-year. And Airways NZ saw a 5.3 per cent increase in oceanic ATCO employment costs, while ATCO hours remained relatively stable, increasing by just 0.5 per cent.

When comparing this KPI to performance in continental airspace, the percentage decrease reflects higher traffic volumes in both Canadian oceanic and continental airspace.

ATNS is not displayed on the chart due to missing data required for KPI 2A.

Indicator 2A: ATCO in OPS employment cost per ATCO in OPS hour (USD) – PPP adjusted

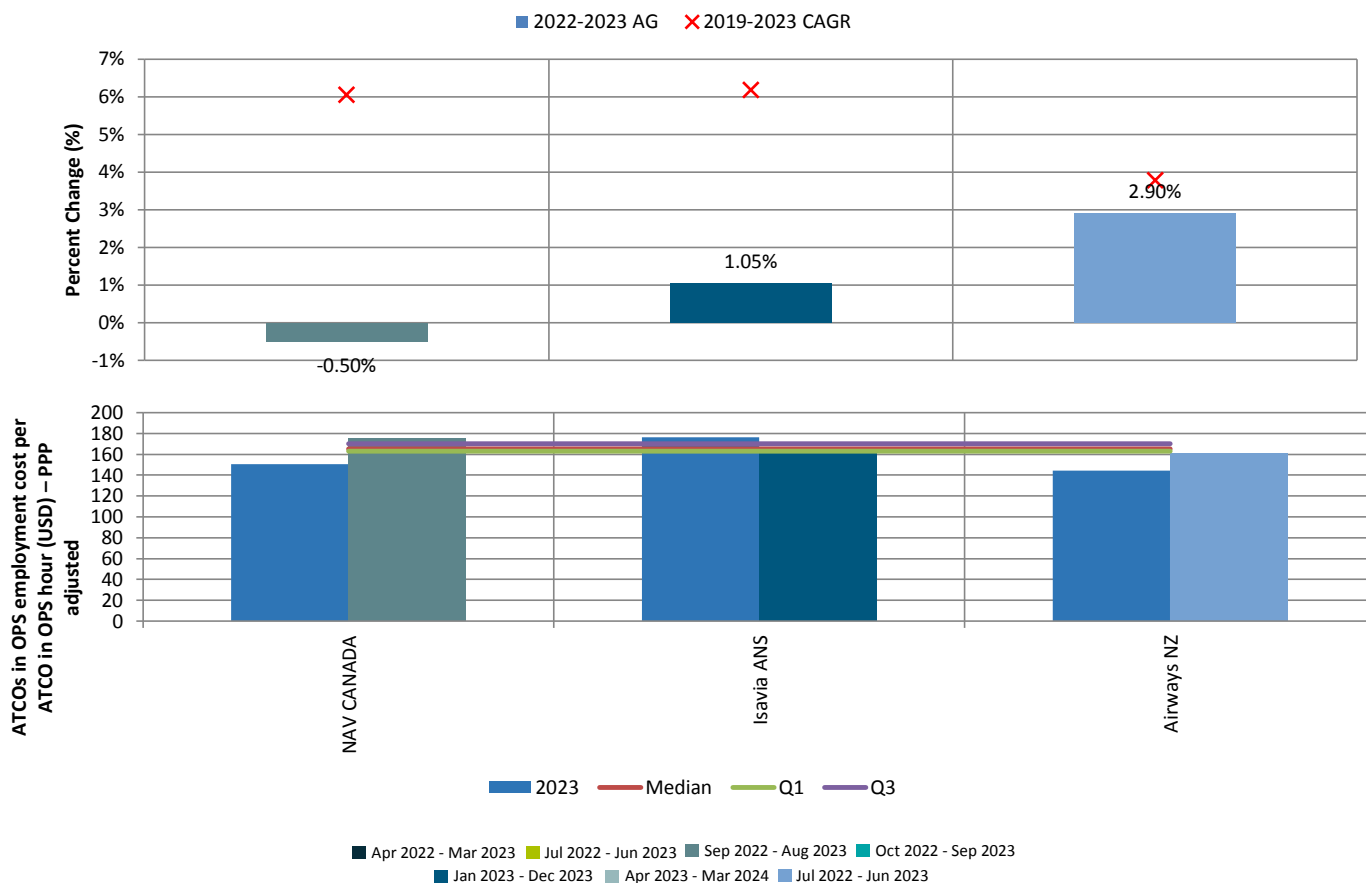


Figure 16 - ATCO in OPS employment cost per ATCO in OPS hour - PPP adjusted

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median PPP-adjusted employment cost per ATCO-in-OPS hour in oceanic airspace was USD 165.26, while the average was USD 167.39 per ATCO hour (PPP-adjusted). For comparison, the same group of ANSPs submitting data in 2022 reported a median of USD 163.54 per ATCO hour (PPP-adjusted) and average of USD 164.41 (PPP-adjusted).

The most significant change was reported by Airways NZ, with a 2.9 per cent increase in KPI 2A – PPP-adjusted, potentially indicating the influence of economic factors as far as New Zealand.

Overall, year-over-year figures for oceanic median employment cost per ATCO remained stable, supporting the view that the oceanic sector has recovered from the pandemic.

ATNS is not displayed on the chart due to missing data required for KPI 2A.

Indicator 2B: ATCO in OPS hour productivity (Formula: IFR flight hours/ATCOs in OPS hours)

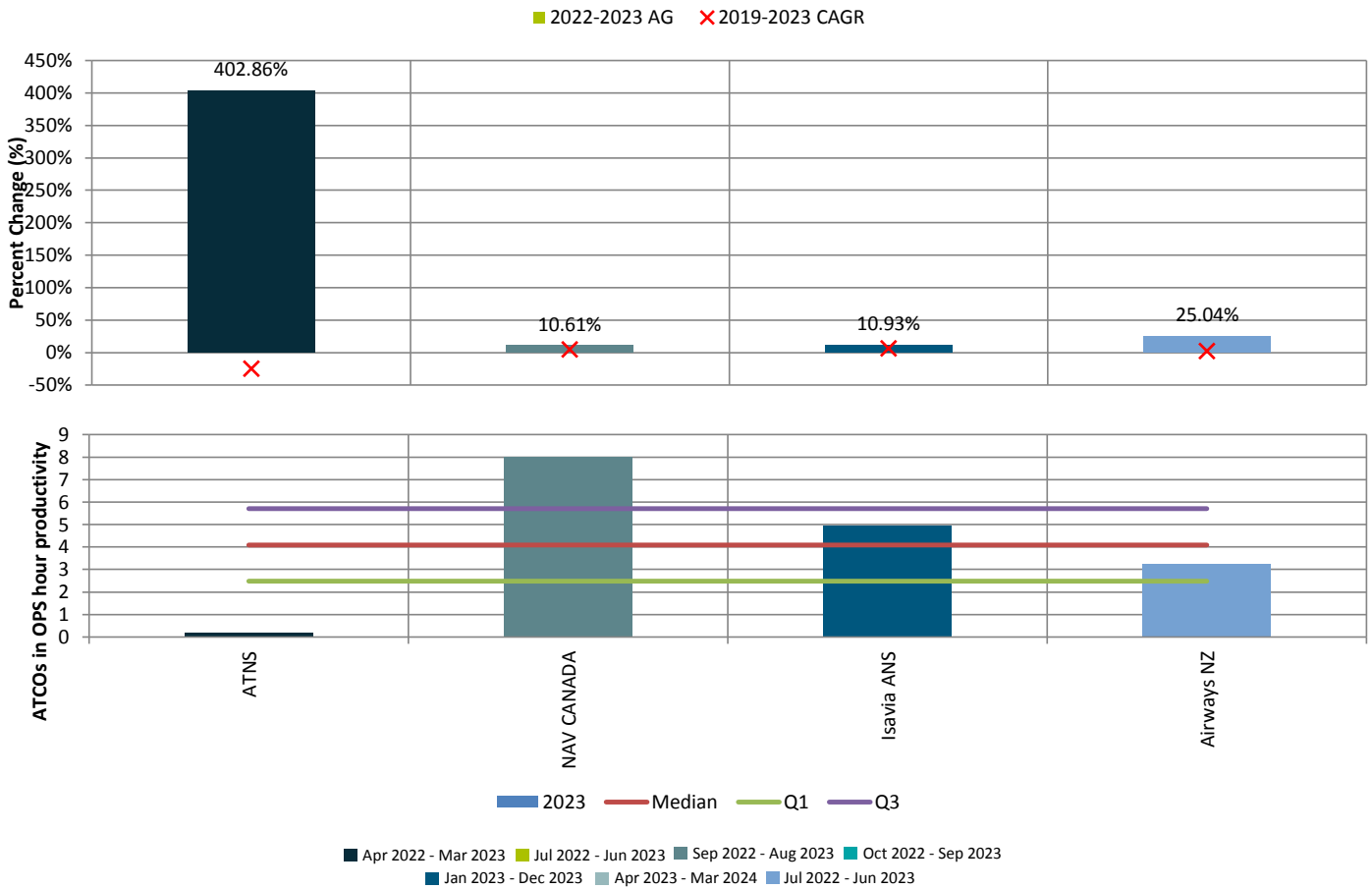


Figure 17 - ATCO in OPS hour productivity

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median ATCO-in-OPS hour productivity in oceanic airspace was 4.09, significantly higher than the continental KPI figure of 0.74. The same group of ANSPs reported a 2022 oceanic median of 3.52. On average, productivity increased by 15 per cent, rising from 3.73 to 4.28 between 2022 and 2023.

All reporting ANSPs experienced an increase in ATCO-in-OPS hour productivity, driven by a rise in IFR hours in oceanic airspace. Notably, ATNS recorded a 402 per cent increase in IFR hours, resulting in an ATCO-in-OPS hour productivity of 0.20. This unusually low figure may be attributed to ATNS's reporting period, which still reflects the pandemic recovery phase. This is supported by the sharp rise in oceanic IFR flight hours, which increased almost sixfold year-over-year.

Indicator 2C: Costs excluding ATCOs in OPS employment costs per IFR flight hours (USD) (Formula: Costs excluding ATCOs in OPS employment costs/IFR flight hours)

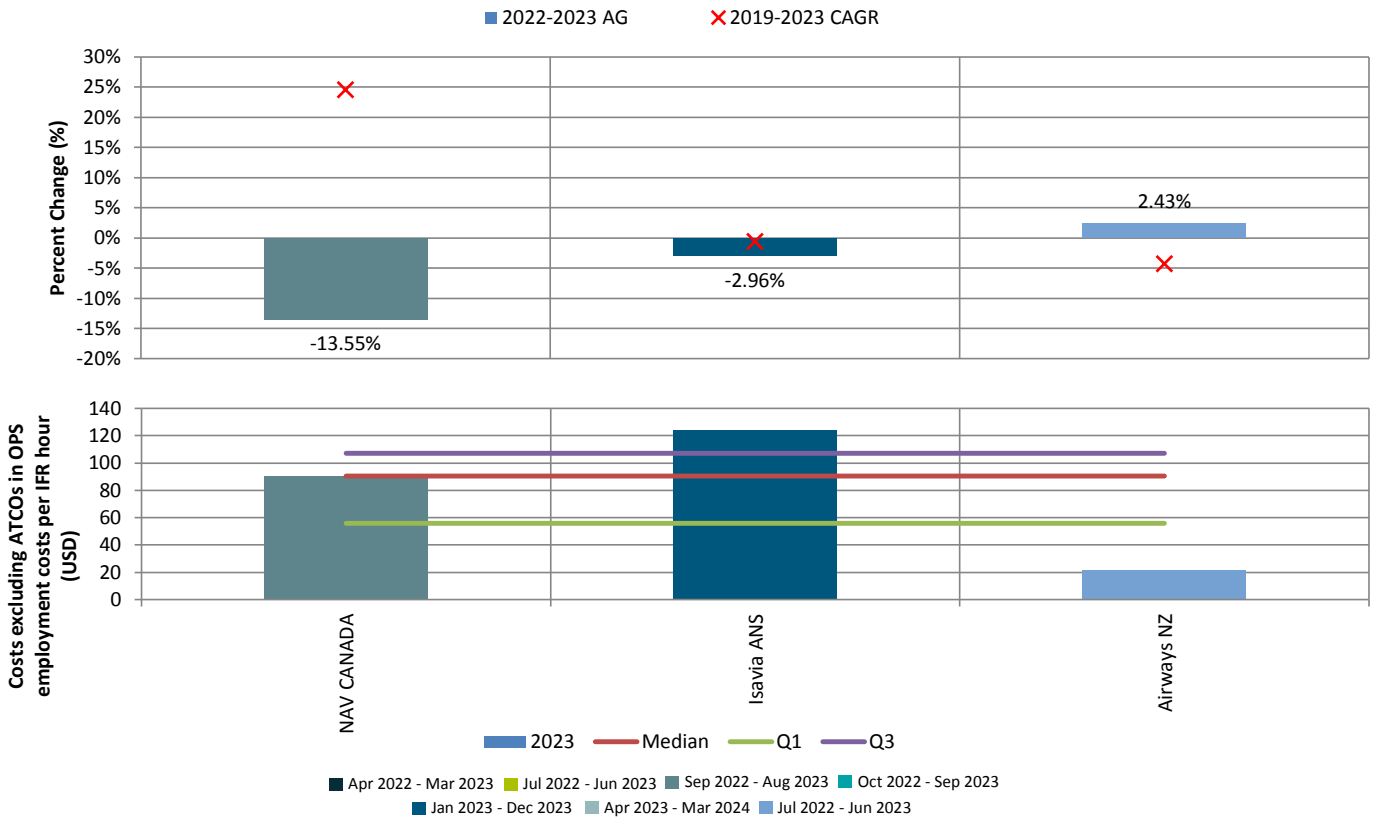


Figure 18 - Costs excluding ATCOs in OPS employment costs per IFR flight hours

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median oceanic cost excluding ATCO-in-OPS employment cost per IFR flight hour was USD 90.45. The same group of ANSPs submitting data in 2022 reported a median of USD 104.63 per IFR hour.

The rise in IFR flight hours in oceanic airspace generally led to a decreasing trend in this metric across all reporting ANSPs.

ATNS is not displayed on the chart due to missing data required for KPI 2C.

Indicator 3A: Annual employment cost per ATCO in OPS (USD)
 (Formula: ATCOs in OPS employment costs/No. ATCOs in OPS)

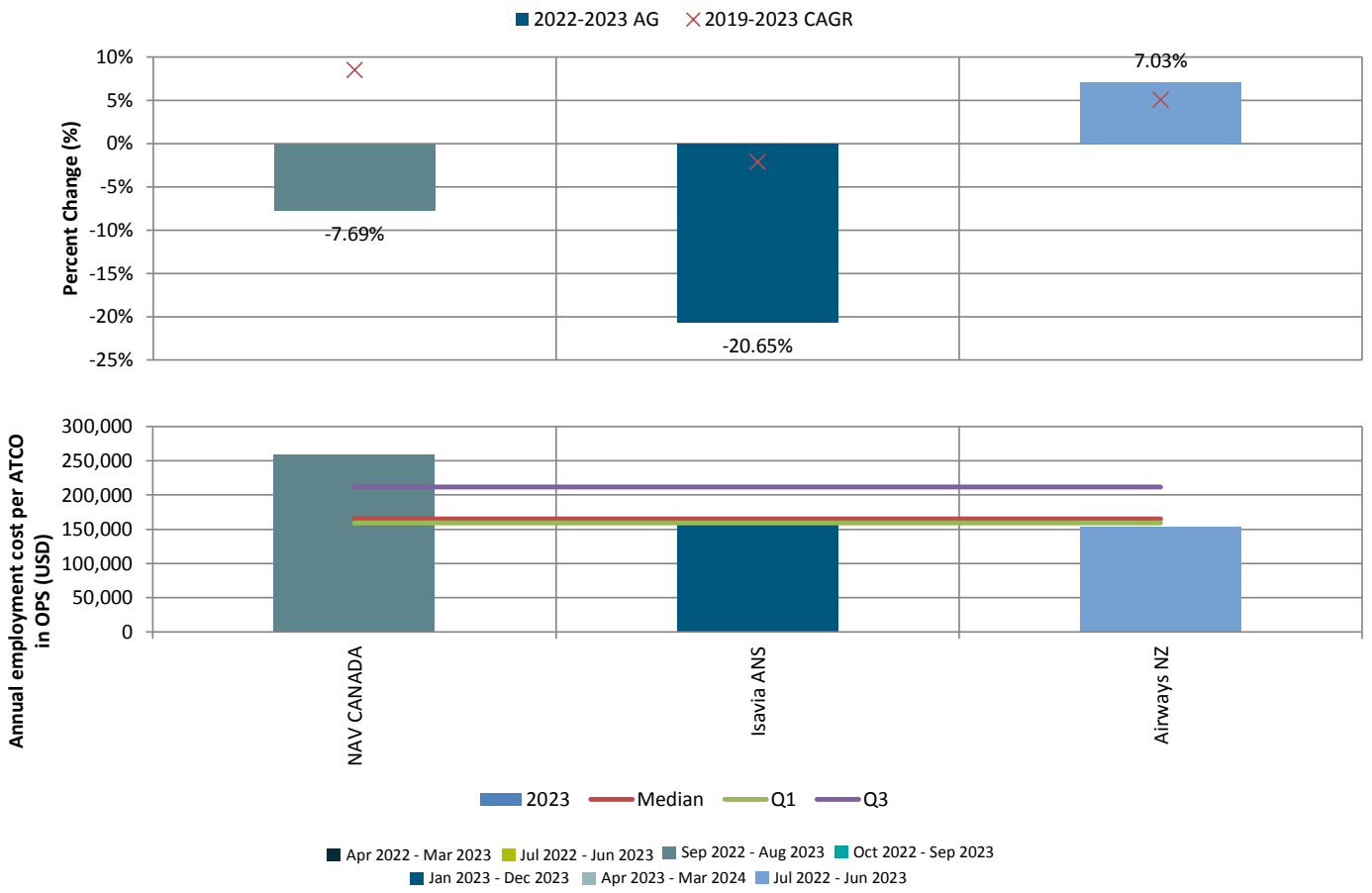


Figure 20 - Annual employment costs per ATCO in OPS

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median annual oceanic ATCO-in-OPS employment cost was USD 173,570.52. For comparison, the 2022 median was USD 208,017.27 per ATCO.

Isavia ANS recorded the largest decrease, at 20.65 per cent, in KPI 3A, despite a 28.8 per cent increase in the number of oceanic ATCOs and a 2.8 per cent rise in total oceanic employment costs.

ATNS is not displayed on the chart due to missing data required for KPI 3A.

Indicator 3A: Annual employment cost per ATCO in OPS (USD) – PPP adjusted

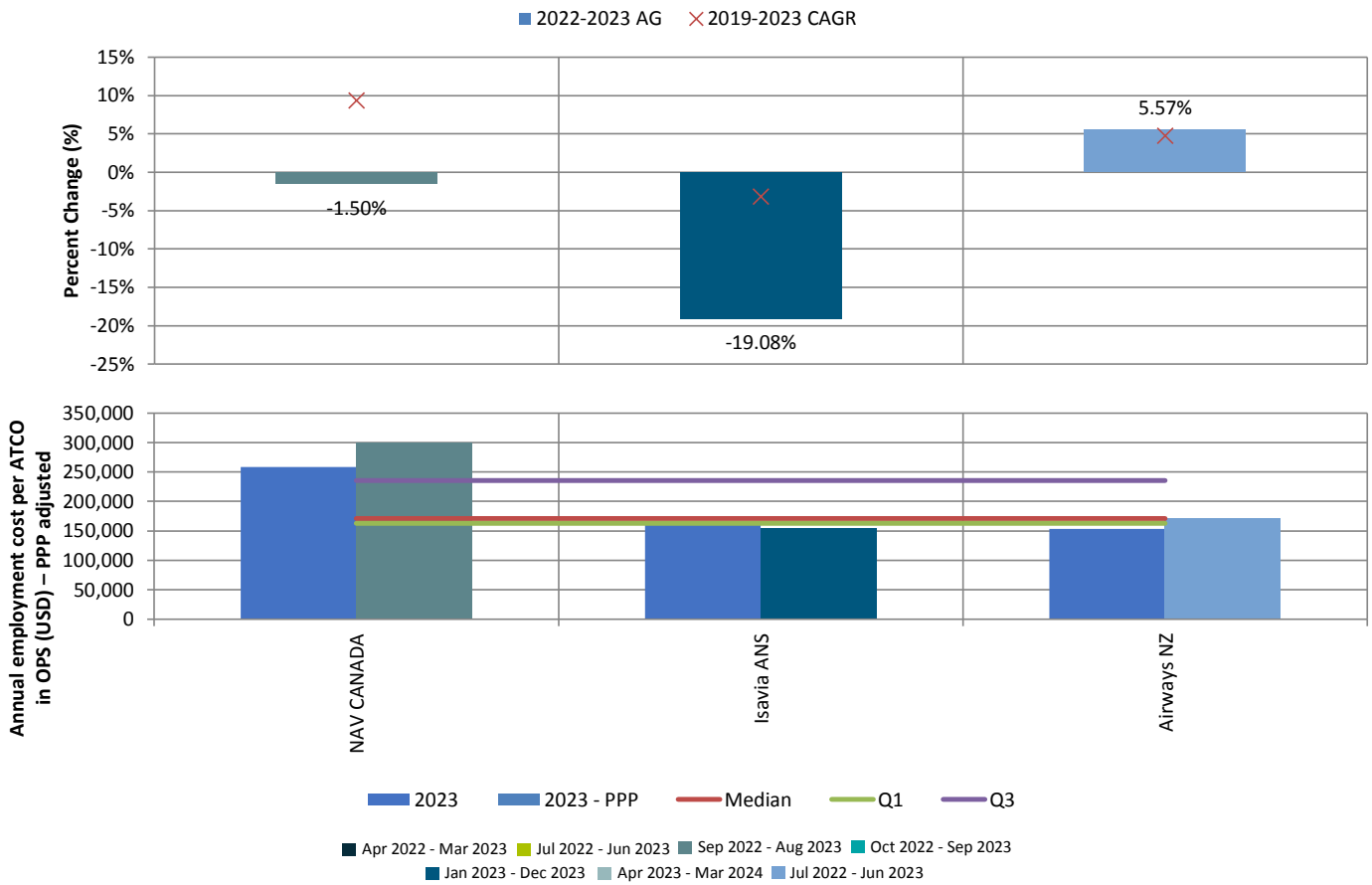


Figure 21 - Annual employment costs per ATCO in OPS - PPP adjusted

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median PPP-adjusted unit cost for ATCO-in-OPS employment in oceanic airspace was USD 182,697.06. The same group of ANSPs submitting data in 2022 reported a median of USD 191,207.54 per ATCO.

ATNS is not displayed on the chart due to missing data required for the KPI 3A (PPP-adjusted).

Indicator 3B: Annual working hours per ATCO in OPS
 (Formula: ATCOs in OPS hours/No. ATCOs in OPS)

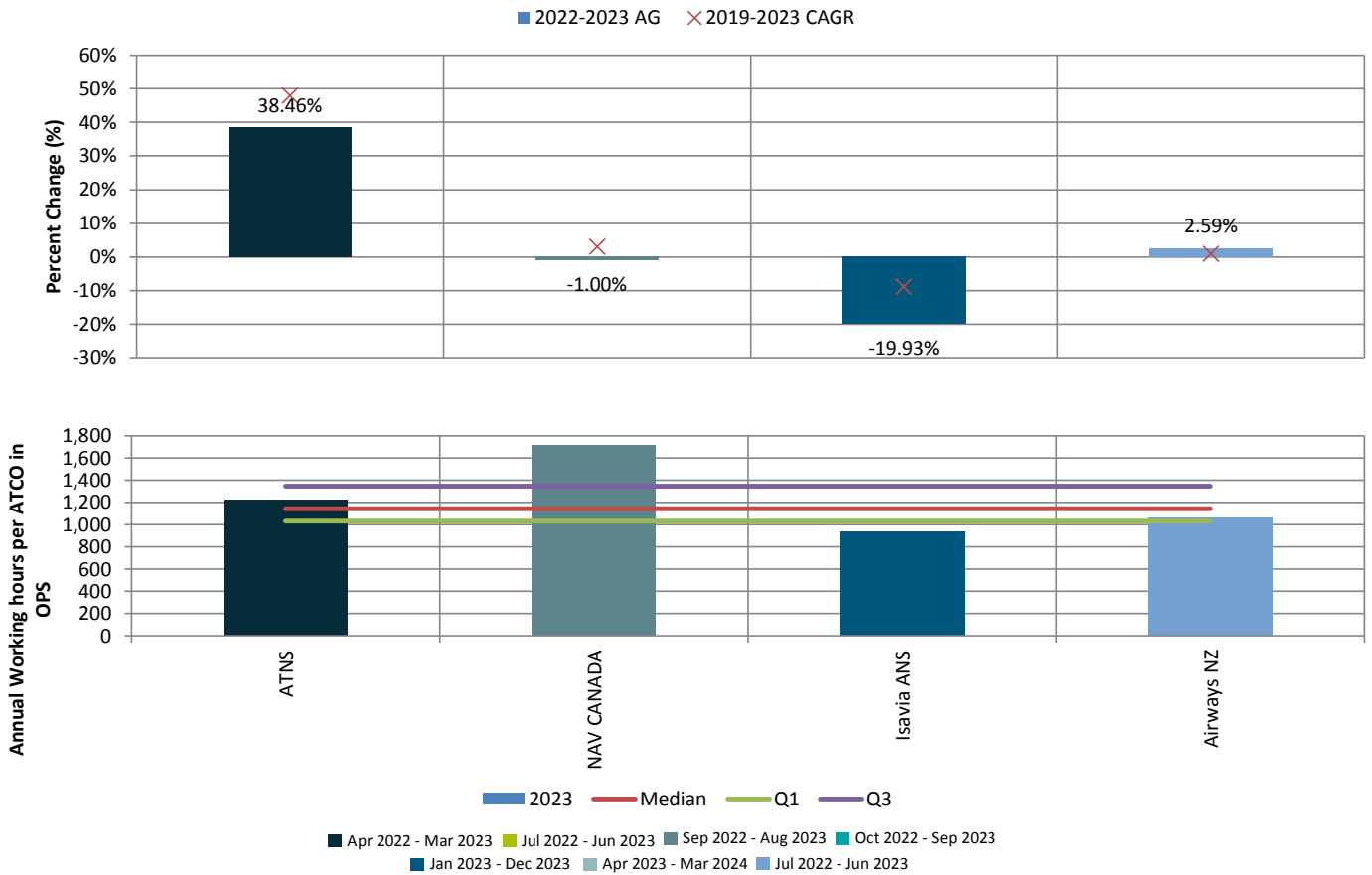


Figure 22 - Annual working hours per ATCO in OPS

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median annual oceanic working hours per ATCO-in-OPS was 1,357.55 hours. The same group of ANSPs submitting data in 2022 reported a median of 1,187.49 hours. Comparing average values, a 6 per cent increase was observed from 1,285.72 hours in 2022 to 1,362.53 hours in 2023.

The highest increase in annual oceanic working hours per ATCO-in-OPS was reported by ATNS, with a 38.48 per cent rise year-over-year. In contrast, Isavia ANS confirmed a declining trend, with a 19.9 per cent decrease in annual oceanic working hours per ATCO-in-OPS.

For other reporting ANSPs, the figures remained generally stable.

Indicator 3C: Annual IFR hours per ATCO in OPS (Formula: IFR flight hours/No. ATCOs in OPS)

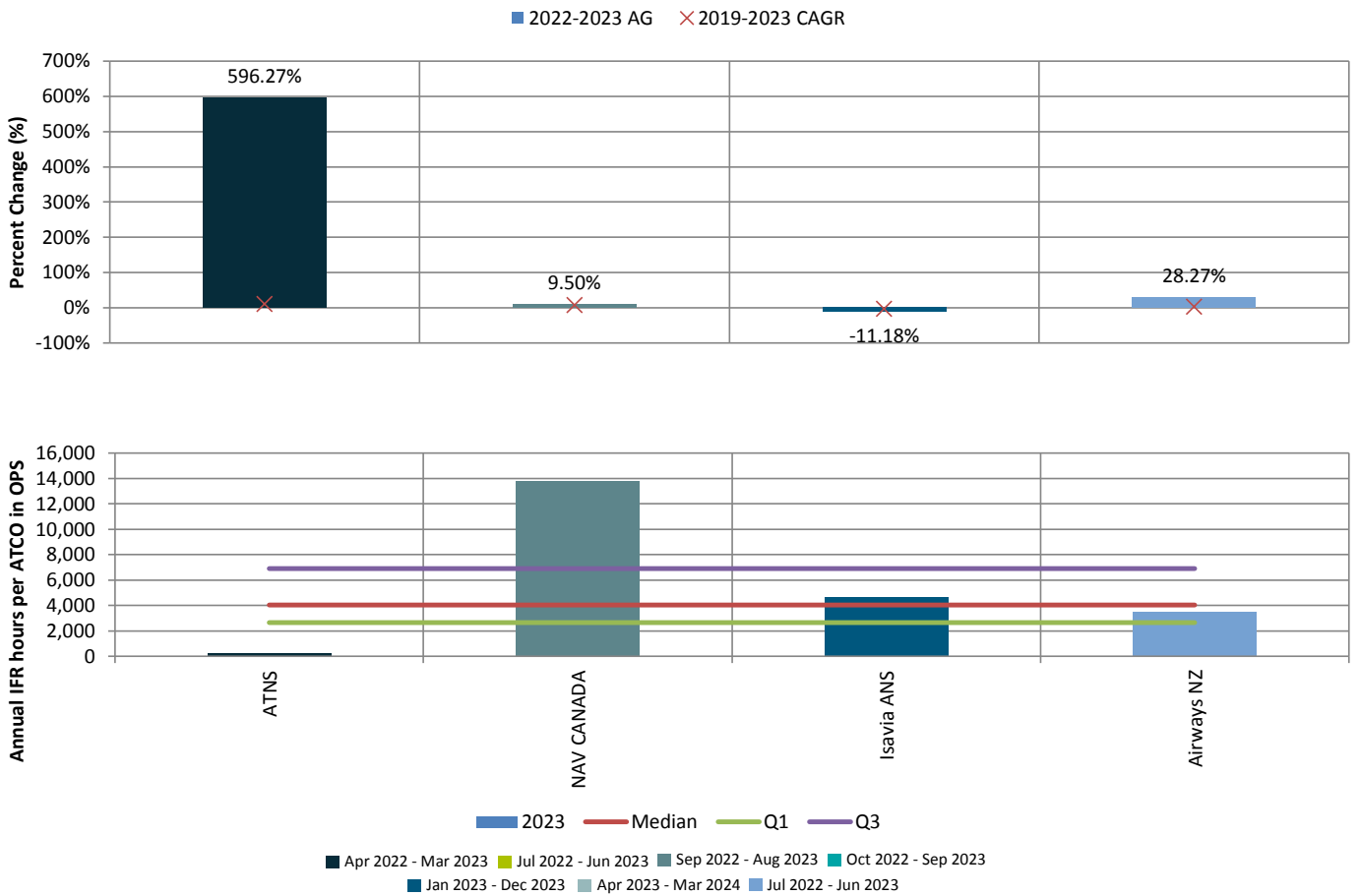


Figure 23 - Annual IFR hours per ATCO in OPS

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

The median number of oceanic annual IFR hours per ATCO in OPS for 2023 was 4,035.64 hours. For comparison, the same group of ANSPs that submitted data in 2022 reported a median of 3,945.79 hours per ATCO. Looking at average values, the average IFR hours per ATCO in 2023 was 6,316.05, representing a 12 per cent year-on-year increase compared to 5,616.23 in 2022.

The fluctuations in the 3C KPI closely reflect the changes in IFR flight hours experienced by ANSPs operating in oceanic airspace, as the number of ATCOs in OPS remained relatively stable. Notable increases in the number of oceanic ATCOs were reported by Isavia ANS.

Among the ANSPs, ATNS reported a significantly low 3C KPI value of 234 IFR hours per ATCO, which is not displayed on the chart. In contrast, NAV CANADA recorded the highest workload in oceanic airspace, with 13,753 IFR hours per ATCO in 2023.

When comparing year-on-year changes, ATNS experienced the largest increase, with a rise of nearly 600 per cent. A slight decrease in the 3C KPI was observed for Isavia ANS, attributed to a 21 per cent increase in staffing levels.

Indicator 3D: Ratio of frontline service staff to ATCO in OPS
 (Formula: No. frontline service support staff/No. ATCOs in OPS)

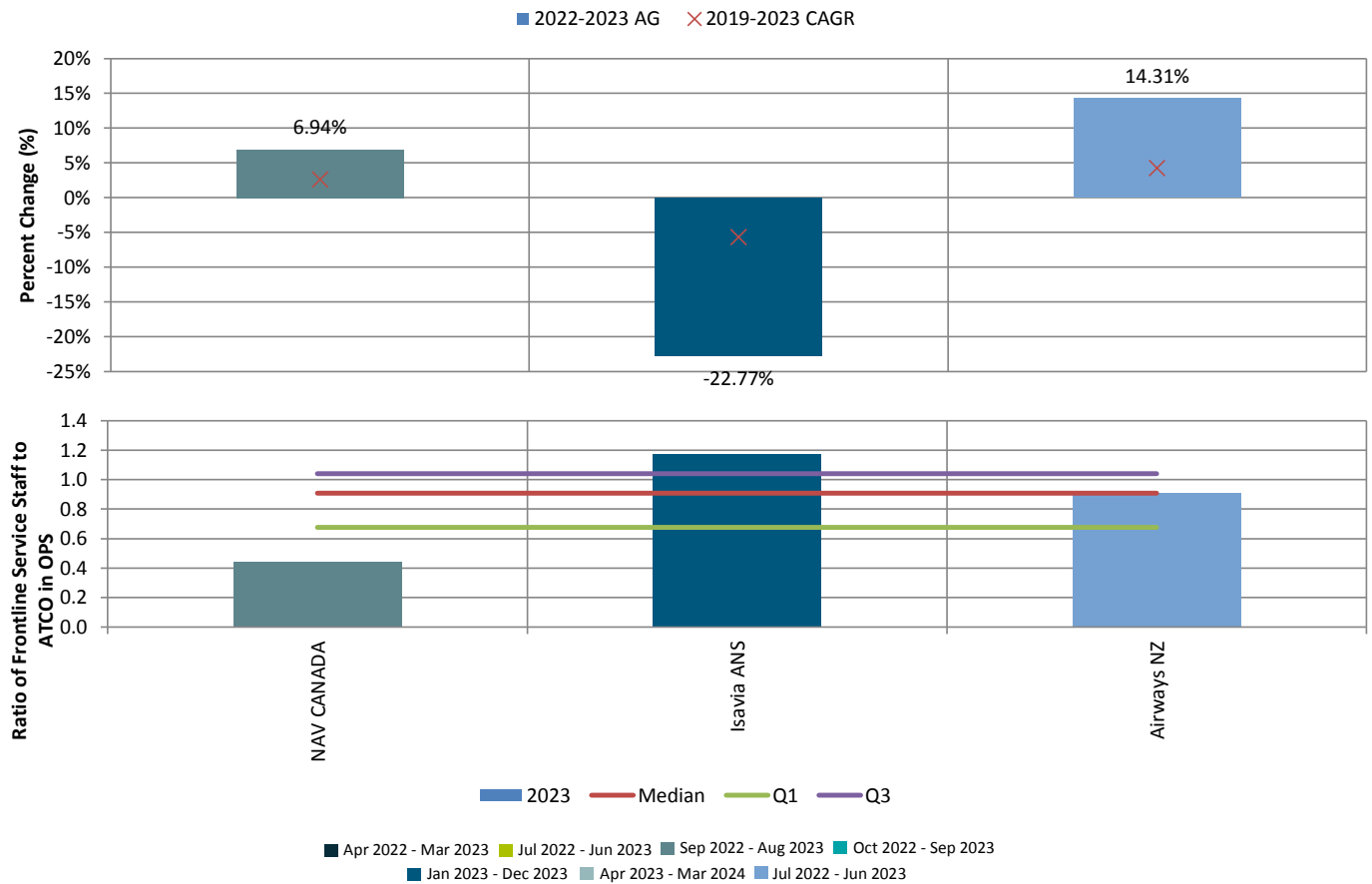


Figure 24 - Ratio of frontline service staff to ATCO in OPS

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

The median ratio of oceanic frontline service staff to ATCOs in OPS for 2023 was 0.91. In comparison, the same group of ANSPs that submitted oceanic data in 2022 reported a median ratio of 0.79.

Among the ANSPs, Airways NZ recorded the largest increase in this ratio during its reporting period, with a rise of 8.97 per cent. For Isavia ANS, whose operations are predominantly oceanic, the ratio of frontline support staff is relatively high compared to other ANSPs, whose continental operations make up a larger share of their overall service provision.

ATNS are not included in the chart, as the required data for the 3D KPI was not available.

Joint Continental and Oceanic Cost Efficiency: 2023

Indicator CO1: Cost per IFR flight hour (USD)
 (Formula: Total costs / IFR flight hours)

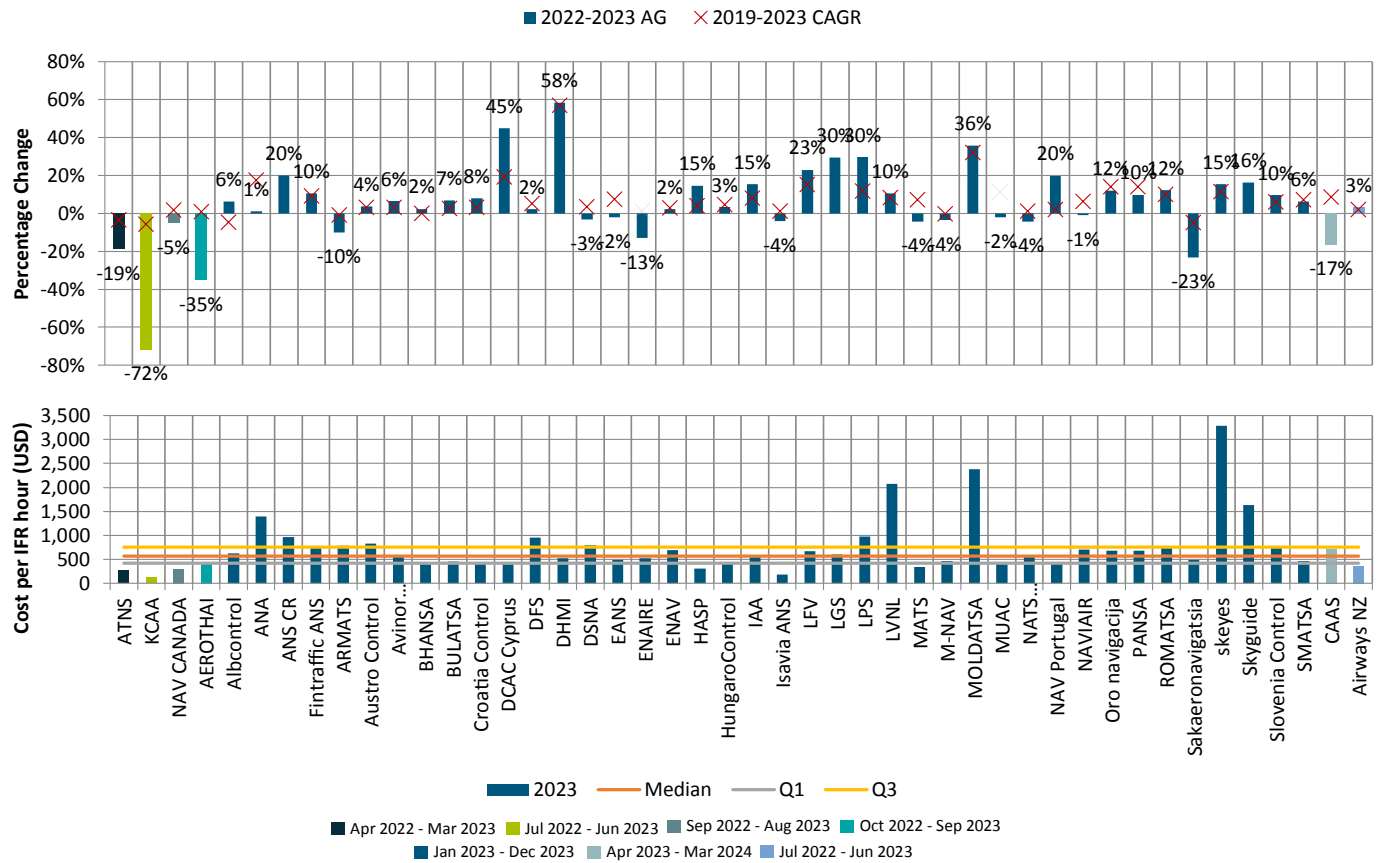


Figure 25 - Cost per IFR flight hour

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median cost per IFR flight hour was USD 553.95. The average cost, combining both continental and oceanic airspace, was USD 713.56 per IFR flight hour. By comparison, in 2022 the median cost stood at USD 565.38, and the average was USD 671.66 per IFR flight hour.

An analysis of Joint KPI 1 – cost per IFR flight hour – highlights a notable shift for Isavia ANS. While total costs increased slightly across both airspace types, traffic volumes diverged: oceanic airspace experienced a 15 per cent increase, whereas continental airspace saw a 10 per cent decrease. This resulted in a net traffic change of 4 per cent between 2022 and 2023, causing KPI 1 for Isavia ANS to fall significantly below the median value.

Indicator CO2D: Employment cost of ATCOs in OPS as a percentage of total costs

Formula: $\text{ATCOs in OPS employment costs} / \text{total costs}$

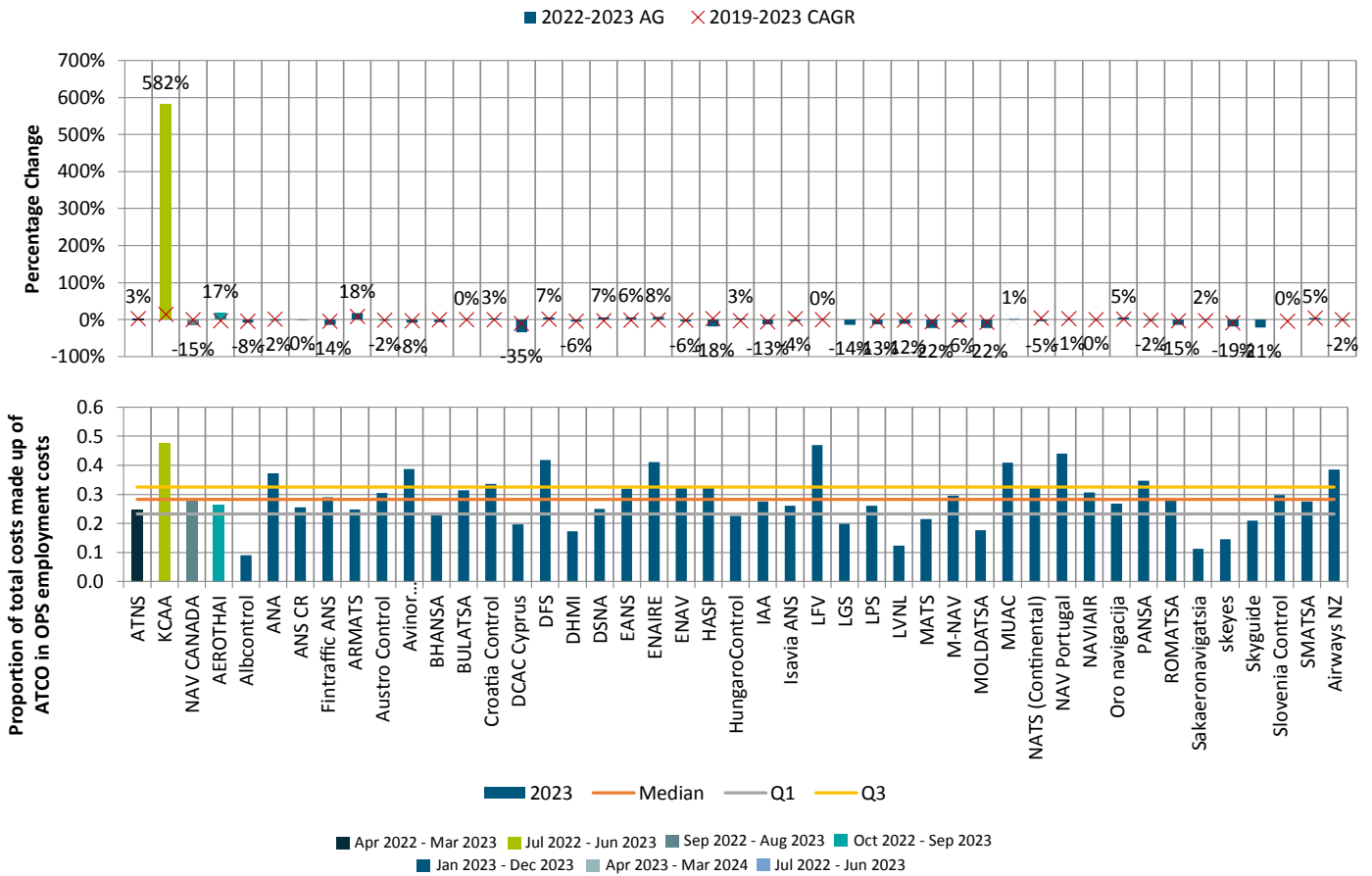


Figure 26 - Employment cost of ATCOs in OPS as a percentage of total costs

Note 1: Due to varied reporting periods, not all ANSPs were impacted equally by the COVID-19 pandemic. The World Health Organization (WHO) declared the end of the global public health emergency on 5 May 2023. As a result, the figures may reflect different stages of post-pandemic economic recovery across countries. The figure above has been colour-coded according to reporting periods to support more accurate analysis.

Note 2: Not all ANSPs that provided data in previous years submitted information for 2023. Accordingly, the metrics have been adjusted, and comparisons are made within the same set of ANSPs.

In 2023, the median employment cost of ATCOs in OPS as a percentage of total costs was 28 per cent, consistent with the 2022 median, which 30 per cent, based on the same pool of ANSPs.

Data is available for only five ANSPs operating in oceanic airspace: NAV CANADA, Isavia ANS, and Airways NZ. For these ANSPs, trends in the CO2D KPI have remained stable. When combining data from both continental and oceanic airspace, the results suggest a year-on-year decrease in the KPI, primarily driven by an increase in traffic volumes.

Summary of Performance Trends

Key findings

- Inflation and rising employment costs have contributed to an increase in total costs for ANSPs operating in both continental and oceanic airspace;
- Cost-efficiency improvements were observed in oceanic traffic, while continental traffic saw a slight decline. ATCO productivity in oceanic airspace has surpassed pre-pandemic levels, whereas productivity in continental airspace has returned to pre-pandemic norms;
- There was a notable rise in ATCO employment costs per hour in continental airspace, while costs in oceanic airspace remained consistent with 2022 levels;
- The majority of ANSPs in continental airspace, and all ANSPs in oceanic airspace, reported an increase in both total costs and costs excluding ATCO in OPS employment costs per IFR flight hour;
- Traffic volumes continued to rise, with total IFR flight hours increasing by 8 per cent year over year.

The year 2023 marked a return to pre-pandemic traffic levels, although challenges linked to the ongoing recovery persisted. The closure of Ukrainian airspace in 2022 had a significant impact on European travel, forcing air operators to re-route flights, which in turn increased traffic density across airspace stretching from the Baltic region through Hungary to Türkiye. This placed additional pressure on ANSPs as they worked to restore operational capacity following the pandemic.

Globally, ANSPs were affected by high inflation and the introduction of new labour pension schemes, which further strained operational budgets. However, the rise in IFR flight hours helped to partially offset these pressures. The overall year-on-year growth in IFR flight hours slowed, reaching 8 per cent in continental airspace and 15 per cent in oceanic airspace.

The analysis also reflects the variation in reporting periods among ANSPs, ranging from 2022 to mid-2024, which influenced the observed trends. While inflation had a more pronounced impact on ANSPs reporting in 2023, the recovery from the pandemic was more evident in data from ANSPs reporting from mid-2022, particularly in driving positive trends in IFR hours and cost efficiency.

Cost Efficiency

Following an analysis of cost efficiency across participating ANSPs, two-thirds reported an increase

in cost per IFR flight hour, while the remaining third reported a decrease. Despite the growth in continental traffic, the combined impact of inflation and new employment schemes meant that this increase in volume was insufficient to significantly improve cost efficiency in continental airspace.

In contrast, oceanic traffic demonstrated a clear trend of improvement, with a reduction of 18 per cent in total costs per IFR flight hour compared to 2022. This suggests that, despite broader economic pressures, cost efficiency gains in oceanic operations were more pronounced and sustained.

Productivity

Out of 48 reporting ANSPs operating in continental airspace, 40 reported an increase in ATCO productivity, while 8 reported a decrease. In oceanic airspace, all 6 ANSPs experienced a rise in ATCO productivity. When comparing the same set of ANSPs to the previous year, ATCO productivity in continental airspace increased by 14.41 per cent, while oceanic airspace saw a slightly higher increase of 14.57 per cent.

Future performance

According to 2023 data, the post-pandemic recovery in air traffic has begun to slow, although several key indicators have successfully returned to pre-pandemic levels. Looking ahead, sustaining recovery and managing continued traffic growth will remain a complex challenge. Contributing factors include inflation, sudden airspace closures, the development of climate change policies, and the ongoing rise in traffic volumes.

To ensure that gains in ATCO productivity and cost efficiency are sustainable, it is essential to implement strategies that strengthen the resilience of ANSPs against future fluctuations in traffic demand.

As the industry progresses, 2019 data will continue to serve as a benchmark for pre-pandemic traffic levels. However, it is important to recognise that the pandemic triggered significant shifts in key operational and financial trends, underscoring the need for ongoing adaptation and strategic planning to address the evolving dynamics of air traffic management. Therefore, this report of 2023 would, in essence, serve as a rest to the 2019 benchmark that was previously set.

If you are interested in participating in next year's report or the CANSO GBWG, then please get in touch via info@canso.org.

Related CANSO Benchmarking Activities

CANSO conducts a variety of benchmarking exercises to examine developments in the industry. Combining these allow for a greater understanding of the current initiatives and trends occurring across the aviation industry, contextualising the ANS performance analysis within this report. The following input has kindly been provided by the CANSO Safety Intelligence Work Group (SIWG).

The CANSO SIWG champions safety measurement and continuous improvement of safety performance. Consisting of representatives from ANSPs across the globe, this group works to analyse, advise, and advance safety performance measurement, and reports to the CANSO Safety Standing Committee.

Measuring Safety Performance

Safety is critical for the trust and confidence of the flying public. As a result, CANSO measures key safety performance indicators to contribute to improvements in safety and efficiency of air traffic control.

When productivity and cost efficiency are measured, it becomes crucial to measure safety benchmarks, which rely on the interdependencies these three facets represent. Improvements in productivity and cost efficiency should never come at the cost of reduced safety.

The aim of the ATM System of Safety is to ensure the safe and efficient movement of aircraft.

Traditional safety management has focused on learning from accidents or incidents. Organisations reactively investigate and analyse when things go wrong and make changes to reduce risk and improve safety. As safety improves, the number of occurrences decreases, along with a reduction in the amount of data available to understand how well the 'system' is performing, and where the vulnerabilities may lay.

Risk management informs the top safety priorities. Within each priority it is critical to understand the reliability of the system, the efficacy of the barriers across the trajectory of an occurrence, and the contributing factors that either had an adverse, or positive impact on the outcome.

2023 Global Insights

IFR-IFR LOS | ATM Ground

1,432

Annual Total Count

99.994%

Traffic without an ATM Ground IFR-IFR LOS

3.81

Quarterly AVG Rate (per 100k IFR flights)

Runway Incursions | ATM Ground

501

Annual Total Count

99.998%

Traffic without an ATM Ground IFR-IFR LOS

1.50

Quarterly AVG Rate (per 100k RWY Mymts)

TCAS-RAs

9.16

Quarterly AVG Rate (per 10k flights)

TCAS-RAs (Above FL180)

1.62

Quarterly AVG Rate (per 10k flights)

Risk of Runway Overrun (High Risk)

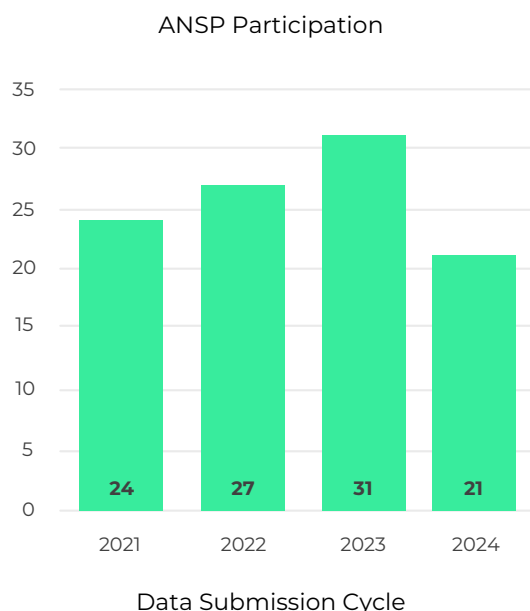
0.08

Quarterly AVG Rate (per 10k flights)

The metrics contained in this report are not exhaustive. The methodology for application of each measure has been agreed through the Safety Intelligence Work Group and applied to regional ANSP cohorts:

Reason	Measure	Intent
Indicators of compliance with the System of Safety	IFR-IFR Losses of Separation	The ANSP's most basic mandate is to keep aircraft apart. This metric reflects how effectively established separation standards are maintained.
	Runway Incursions	This metric reflects the ability of the ANSP and runway users (aircraft, vehicle, pedestrian) to ensure that only authorised aircraft, vehicles, and pedestrians occupy the runway surface.
Indicators of threats to the System of Safety	TCAS RAs	Anecdotally referred to as "the last line of defence". Clusters of TCAS RAs point to potentially vulnerable areas in the airspace.
	Risk of Runway Overrun (RORO)	Monitors the amount of runway remaining when the aircraft slows down to 50kt on landing, providing insights into the aircraft's energy state and deceleration performance. It helps identify potential risk associated with runway excursions.
Measures of System of Safety Resilience	Risk Analysis Tool (RAT)	The RAT severity is a proxy for the effectiveness of tactical barrier management.

Sharing of lessons learned is a must in the aviation community, and this report has also been expanded to include learnings from ANSP-specific safety studies.



CANSO Annual Safety Performance Benchmark

Over the past 10+ years ANSPs have shared data on losses of separation and runway incursions.

Participation has decreased for this year's submission of the report, with 21 ANSPs submitting 2023 safety data in the 2024 data submission cycle.

The data is still very European-biased. CANSO continues to encourage ANSPs to join important safety sharing initiatives like this one for a holistic understanding of the industry performance.

This year, the Annual Safety Performance Benchmark Report is offered to participating ANSPs as an interactive dashboard, enabling better extracting of safety intelligence. The next edition of this dashboard will include the ability for the user to identify airport cohorts and additional data fields.

Aireon Data

Aireon collects high-quality, ADS-B data every day from aircraft all over the globe, which can be used to objectively calculate operational safety metrics. The global scope of reach is unique, helping bridge the gap that often challenges global or regional aviation safety performance benchmark initiatives. For example, while losses of separation and runway incursion data only represent the safety performance of the 21 ANSPs that submitted data, the Aireon metrics represent the safety performance of all CANSO members.

The driving force behind this collaboration between CANSO and Aireon is the desire for proactive and meaningful action, positively influencing safety in our global and regional airspace.

The metrics presented here are the result of extensive and continuous work between the CANSO Safety Intelligence Workgroup and Aireon and are meant to evolve over time. They are aggregated into larger regional cohorts to limit the possibility of ANSP identification.

Aireon also offers a solution for individual ANSPs to access detailed comparative metrics through the AireonINSIGHTS Safety Dashboard. For more information, contact info@aireon.com.

ANSP Lessons Learned Sharing

The report now contains insights from ANSPs who wish to share lessons learned that may be of benefit to the CANSO community. The SIWG is currently working on a framework to allow for safety studies and safety papers to be produced by ANSPs, peer-reviewed, and published on CANSO Coconnect on a regular basis.

This edition of the report explores:

- Airborne vulnerabilities that exist in relation to interactions with light traffic flying under Visual Flight Rules (VFR) and the consequent inadequacies of reliance on 'see and avoid' as a safety net.
- Exposure of unwanted TCAS RA activation due to on-ground transponder/TCAS systems testing.

ATM Ground IFR-IFR Losses of Separation¹⁴

A loss of separation is a key performance indicator for assuring compliance with applicable separation standards. This measure focuses on IFR-IFR losses (both aircraft flying under instrument flight rules). There are multiple measures for safety performance, CANSO has prioritised this measure over others as a benchmark based on the risk profiling around potential loss of life.

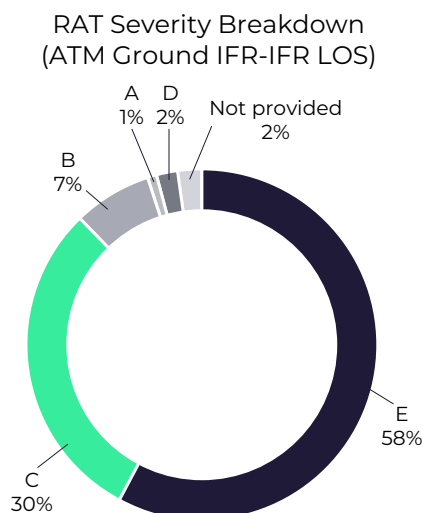
The quarterly average rate for the participating ANSPs, in 2023, was 85.73 IFR-IFR losses of separation per 1 million IFR flight hours and 3.81 per 100,000 IFR flights.

99.994 per cent of IFR traffic was not involved in a loss of separation, which is a testament to the reliability of the global ATM system.

Ten (10), out of 1,432 events, or 0.7 per cent of reported losses, were considered as high severity in the Risk Analysis Tool¹⁵ (RAT) classification. In relation to traffic, this represents 0.00004 per cent of the operation (1 per 2.4 million flights).

The RAT severity classification describes the level of consequences of hazards on the safety of flight operations. It combines the level of loss of separation and the degree of ability to recover from a hazardous situation. The overall severity of one occurrence is composed of risk of collision/proximity (separation and rate of closure) and the degree of controllability over the incident (tactical barrier management performance).

From the diagram above, 58 per cent of the IFR-IFR losses of separation had the lowest RAT severity (E).



¹⁴ ATM Ground IFR-IFR Losses of Separation is a specific term that implies a loss of separation where the ANSP (its systems, personnel actions, processes, etc.) had a level of contribution, either direct or indirect, to the sequence of events leading up to, or recovering from, the occurrence.

¹⁵ Please refer to <https://skybrary.aero/articles/risk-analysis-tool-rat> for a description of the RAT framework.

Runaway Incursions (RIs)

A high proportion of safety events take place around the vicinity of an airport’s runway(s). Again, there are multiple measurements for safety around an aerodrome. Here, CANSO has elected to measure runway incursions due to the increased likelihood that an ANSP may have contributed to the event.

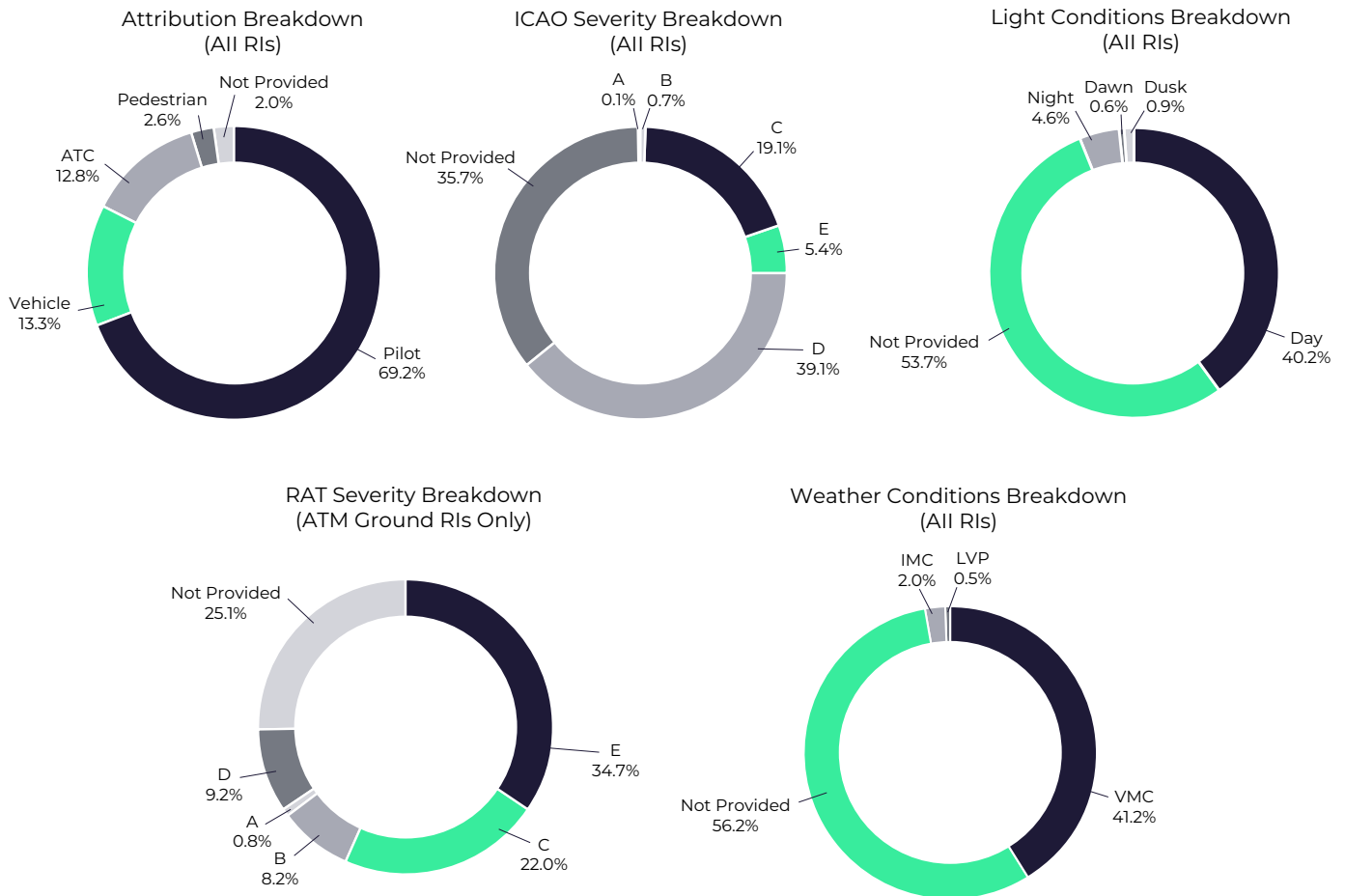
In 2023, the quarterly average rate of runway incursions for the ANSPs who submitted data was 6.34 RIs per 100,000 runway movements (one runway incursion for approx. every 16,000 take offs and landings).

The proportion of traffic that did not experience a Runway Incursion, in 2023, was 99.993 per cent. When focusing on those occurrences that had some level of ATM contribution, this proportion increases to 99.998 per cent, at a quarterly average rate of 1.50 RIs per 100,000 runway movements.

More than half of the reported RIs (51 per cent) did not contain information on the ICAO severity, but for the remaining 49 per cent of events, none reported an occurrence assessed as an ICAO Severity A (the highest ICAO severity). However, 2 occurrences were categorised as RAT A (the highest RAT severity). This shows how the two severity classification schemes, or perhaps their interpretation and application, can vary slightly.

Below are graphs summarising various contextual data related to the reported RIs, including the attribution (the primary causal element), severity (based on ICAO and RAT classification schemes).

Note: for the RAT severity classification scheme, only ATM Ground Runway Incursions are assessed in this report, lighting conditions, and weather.



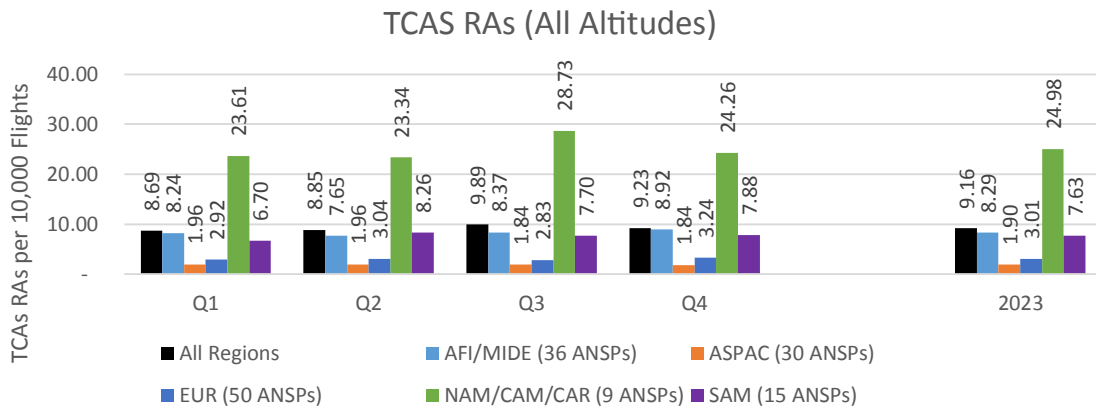
16 Please refer to ICAO Doc 9870 Manual on the Prevention of Runway Incursions for the ICAO Runway Incursion Severity definition: https://www.icao.int/safety/RunwaySafety/Documents%20and%20Toolkits/ICAO_manual_prev_RI.pdf

ADS-B Sourced Safety Data

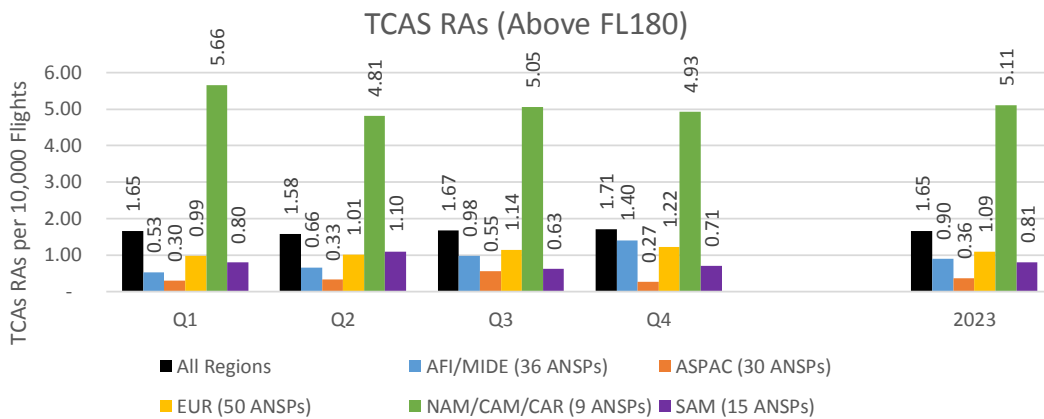
TCAS RAs

In a TCAS (Traffic Collision Avoidance System) Resolution Advisory (RA) event, the pilot is issued an audible command to climb or descend according to automated aircraft conflict detection. This is often considered the last line of defense in avoiding midair collisions. A consistent presence of these events in specific geographic areas may indicate a systemic issue.

The rate of TCAS RAs at all altitudes and for 140 CANSO member ANSPs, in 2023, was 9.16 (per 10,000 flights). The region with highest rate was North America/Caribbean/Central America, comprised of 9 ANSPs. The region with the lowest rate was Asia Pacific (30 ANSPs), at 1.90.



Above FL180, the CANSO global rate was 1.65 TCAS RAs per 10,000 flights, with the North America/Caribbean/Central America region still with the highest rate of 5.11, and Asia Pacific as the lowest with 0.36.



This regional comparison is aligned with an independent analysis IATA¹⁷ performed based on FOQA/FDM¹⁸ data accessible through their Flight Data Exchange (FDX) Program. With the caveat that region definitions vary slightly, and FDX only contains data from participant airlines, the North American region is also identified as a global driver for TCAS RAs.

¹⁷ https://www.iata.org/contentassets/582fbc33f31240938bcf9f33d4b3d0a1/iata_guidance_assessment_of_pilot_compliance_to_tcas.pdf

¹⁸ Flight Operations Quality Assurance/Flight Data Monitoring

Risk of Runway Overrun (RORO)

These are incidents in which aircraft land with limited runway remaining. To capture this metric, Aireon data is used to identify the position on the runway at which the aircraft first slowed to 50 knots during the landing roll. Geographic runway data is then used to determine the distance from that point to the end of the runway, and this value is determined for every landing.

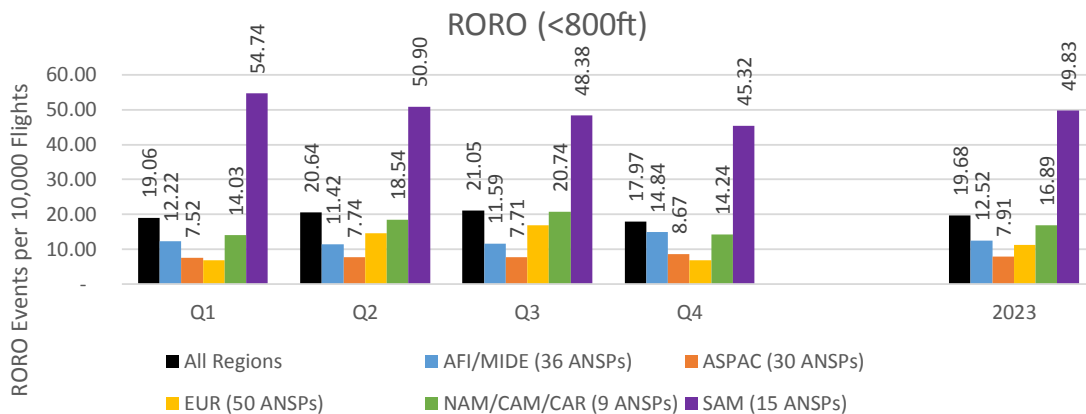


Events are risk-categorised based on the following criteria:

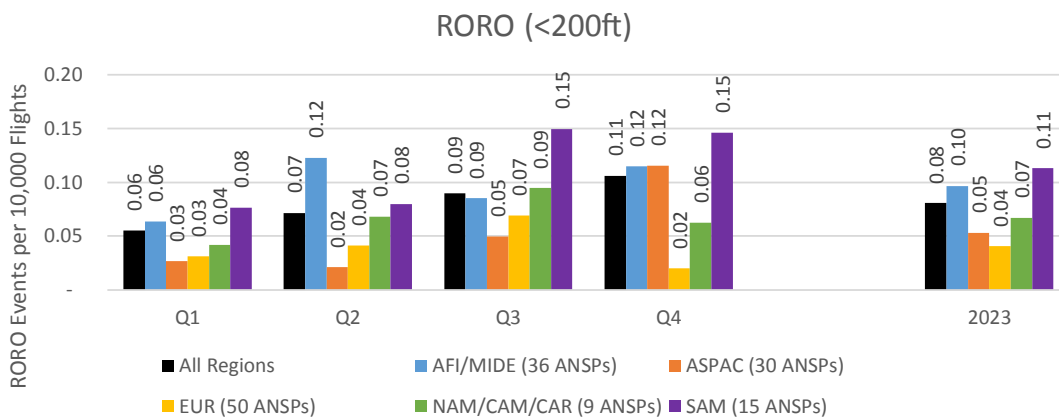
- High: less than 200ft remaining
- Medium: between 200 and 500ft remaining
- Low: between 500 and 800ft remaining

This is a proxy measure for the risk of a runway overrun.

The rate of Risk of Runway Overrun (RORO) events below 800ft of runway remaining for 140 CANSO member ANSPs, in 2023, was 19.68 (per 10,000 flights). The region with highest rate was South America, comprised of 15 ANSPs. The region with the lowest rate was Asia Pacific (30 ANSPs), at 7.91.



For events with 200ft of runway remaining, the CANSO global rate was 0.08 ROROs per 10,000 flights, with the South American region still with the highest rate (0.11), and Europe as the lowest (0.04).



Sharing of Lessons Learned

One ANSP agreed to provide de-identified contextual data relating to TCAS RAs occurring in their airspace.

TCAS RA Conflicts with Light Aircraft and the Inherent Ineffectiveness of See and Avoid

The ANSP performed an analysis of aircraft pairs involved in the TCAS RA encounters, sourced from the AireonINSIGHTS Safety Dashboard. Removing operational outliers, such as fire suppression and military operations, it was found that a high proportion of TCAS RAs involve light traffic, likely flying under Visual Flight Rules (VFR), as the intruder aircraft. The proportion was estimated at 73 per cent.

This triggered further investigations, which expanded into the analysis of mid-air collision (MAC) accidents and near mid-air collision (NMAC) incidents from global sources dating back to the 1950s, particularly on the theme of the effectiveness of “See and Avoid” as a safety net.

The analysis underscored the increasing complexity of the modern air navigation system that must balance the requirements across a vast spectrum of aircraft performance, equipage, and human performance factors, against the tools, whether technical or procedural, available to ensure safety in the airspace.

The nature of many elements that exist in the air navigation system is unpredictable, especially with regards to conflicts with General Aviation (GA) traffic. GA was identified as a particularly complex element due to its varied aircraft types and pilot competencies. In these scenarios, the “See and Avoid” principle is heavily relied upon, whereby the collision avoidance responsibility is placed on pilots.

In many airspace scenarios there is a relative “unrestricted” nature of VFR traffic behaviour, regardless of airspace classification. While the analysis notes the challenges of VFR operations in controlled Class E airspace, where lack of ATC interaction can lead to misunderstandings and conflicts with IFR operations, and where the importance of self-separation and adherence to best practices in communication and situational awareness is crucial, it also identifies that these challenges are not unique to Class E and can also be present in other types of airspace, particularly in Class C and D.

The study made the following observations:

- The prevalence of mid-air collision findings that highlight the inadequacy of “See and Avoid” as a barrier.

- The ineffective nature of “See and Avoid” in Near Mid-Air Collisions or airborne safety events in all classes of airspace where VFR is present.
- The high proportion of TCAS Resolution Advisories (RAs) involving VFR light aircraft as intruders.
- The incompatibility between the TCAS safety envelope and the 500ft separation standard between IFR-VFR, as well as the application of “Visual Separation” in Class C and D airspace.
- The incompatibility between the TCAS safety envelope and the elevated level of VFR “Free Flight” in Class E airspace, and the sometimes-unprotected nature of conflicts in Class E and F airspace, such as those that exist where a transponder is not required.
- Similarities in the general TCAS RA profile between events occurring in Class C and E airspaces, emphasising conflicts with light GA traffic (likely VFR).
- The opportunity for IFR-VFR conflicts in controlled airspace when IFR aircraft do not conform to IFR procedures, infringing on VFR-rich environments, as well as VFR aircraft transiting through IFR procedures.

These are interesting observations when considering the evolution of the global ATM system as expressed in the Complete Air Traffic System (CATS) global vision¹⁹, from the current state, which operates on rules and procedures for air traffic deconfliction that are potentially no longer compatible. These rules are entrenched in the marine environment where vessels often found themselves in conflict at distances and speeds that afforded time to deconflict. This principle, formalized in the International Maritime Organizations (IMO) Collision Regulations (COLREG), served as the foundation for the International Civil Aviation Organization’s (ICAO) collision avoidance and right-of-way principles in use today.

Because of this adaptation of maritime collision avoidance techniques into the realm of flight, the aviation industry today and, most importantly, in the future, must re-evaluate the practical nature and the required evolution of airborne deconfliction rules and practices, focusing on the human performance perspective, where modern aircraft performance and complexity far exceed that of seafaring vessels of old. From an ATM perspective, design of the human-machine interface will be significantly influenced by the ability of Artificial Intelligence to support effective safety decision making in increasingly complex and congested airspace.

¹⁹ <https://canso.org/vision-for-the-skies-of-2045/>

On-Ground TCAS and Transponder Systems Testing

The ANSP also identified a potential hazard of a TCAS RA being generated by an airborne aircraft against an intruder aircraft on the ground performing transponder/TCAS systems testing not in accordance with maintenance guidance. The ICAO Document 9863 – Airborne Collision Avoidance System (ACAS) Manual (section 4.1.5.2 b) states that *“whenever ACAS (or TCAS) receives a transponder reply, it assumes that this is from a real aircraft. Some cases of false RAs have been caused by transponder testing on the ground that simulated in-flight altitudes. Adequate shielding or very high simulated altitudes (>FL700) must be used to avoid such problems during Mode S or Mode C transponder tests.”*

The cases identified by the ANSP were not in relation to airborne aircraft triggering an RA against an aircraft on ground (that is not to say those situations did not occur, they were simply not within the scope of analysis at the time of submission of this report). The ANSP identified, however, the presence of many TCAS generated by aircraft on the ground with a broadcast altitude well within the normal flying range of airborne aircraft, in many cases low altitude and in terminal environment.

The ANSP encourages other ANSPs to engage with their respective regulators to emphasise the importance of maintenance organisations to adhere to proper maintenance test procedures and prevent unwanted activation of TCAS RA alerts by airborne aircraft.



ANSP Factsheets

Continental

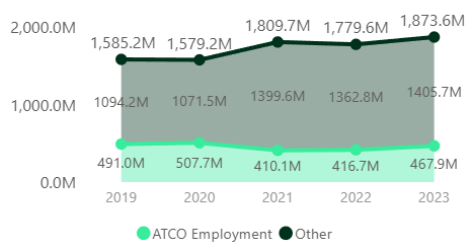


DSNA, France
Continental data

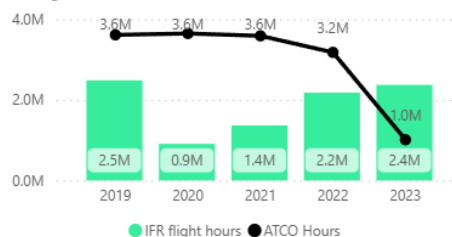


Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

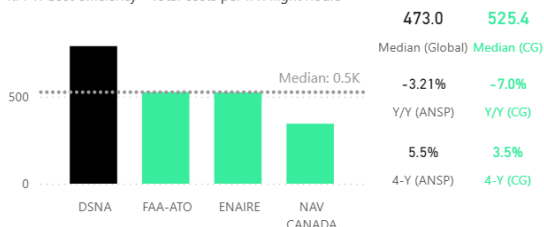


DSNA's Total costs (USD) in 2023 increased by 5.3% compared to 2022 costs. IFR flight hours increased by 8.8% during 2023, remaining only 0.1 million below 2019 levels. ATCO hours decreased by 68.2% in 2023.

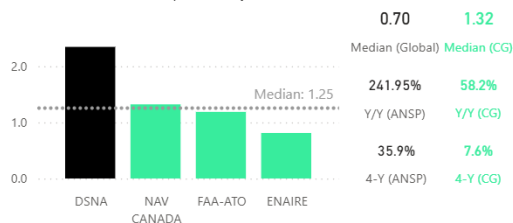
Performance in 2023 (key KPIs compared to CG)

Comparator Group 1 (>1mil IFR flight hours; DSNA, ENAIRE, FAA-ATO, NAV CANADA, Airservices Australia)

KPI 1: Cost efficiency - Total costs per IFR flight hours



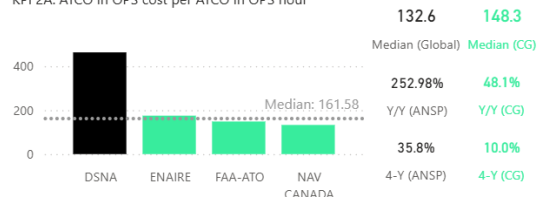
KPI 2B: ATCO in OPS hour productivity



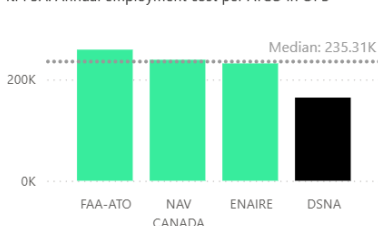
Comparing DSNA with other ANSPs in Comparator Group 1, DSNA's total cost per IFR flight hour was the highest in the comparator group at 790.56 USD. For ATCO in OPS hour productivity, DSNA was 2.34.

For ATCO in OPS cost per ATCO in OPS hour, DSNA was comparator group leader at 462.90 USD.

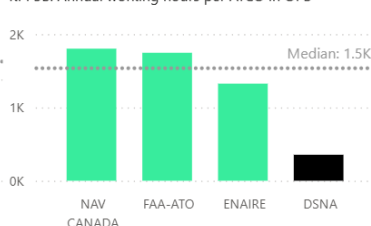
KPI 2A: ATCO in OPS cost per ATCO in OPS hour



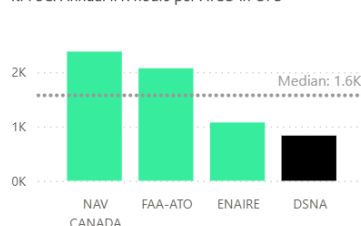
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS

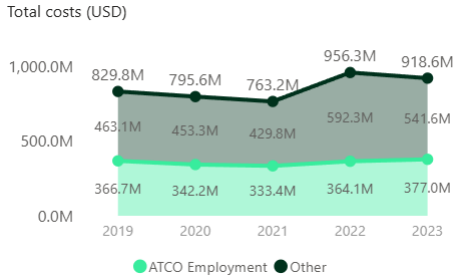


KPI 3C: Annual IFR hours per ATCO in OPS



DSNA's Annual employment cost per ATCO in OPS was 164K USD. Annual working hours per ATCO in OPS were 0.35K. Annual IFR hours per ATCO in OPS was at 0.83K.

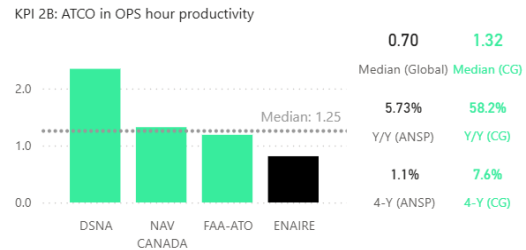
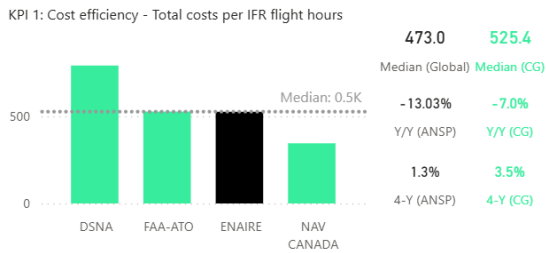
Statistics (2019-2023)



ENAIRe's Total costs (USD) in 2023 decreased by 3.9% compared to 2022 costs. IFR flight hours increased by 10.4% during 2023, achieving 2019 levels. ATCO hours increased by 4.5% in 2023.

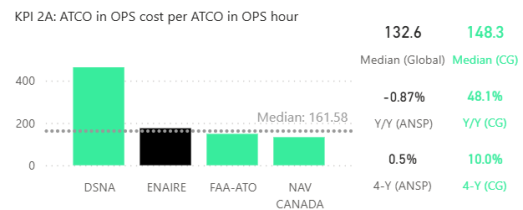
Performance in 2023 (key KPIs compared to CG)

Comparator Group 1 (>1mil IFR flight hours; DSNA, ENAIRE, FAA-ATO, NAV CANADA, Airservices Australia)

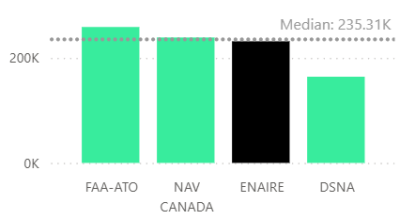


Comparing ENAIRE with other ANSPs in Comparator Group 1, ENAIRE's total cost per IFR flight hour was 525.45 USD, slightly above the median cost of the CG. For ATCO in OPS hour productivity, ENAIRE was 0.81.

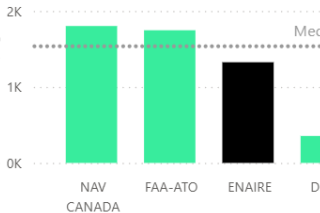
For ATCO in OPS cost per ATCO in OPS hour, ENAIRE was 174.88 USD.



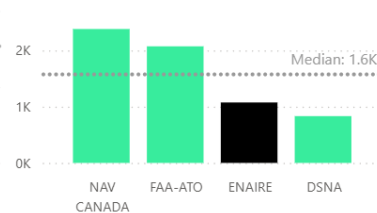
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



KPI 3C: Annual IFR hours per ATCO in OPS



ENAIRe reported an Annual employment cost per ATCO in OPS of 232K USD, slightly below the CG median. Annual working hours per ATCO in OPS were 1.3K, and Annual IFR hours per ATCO in OPS were 1.1K.

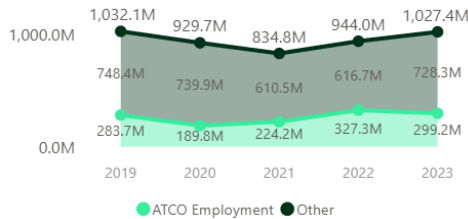


NAV CANADA, Canada
Continental data

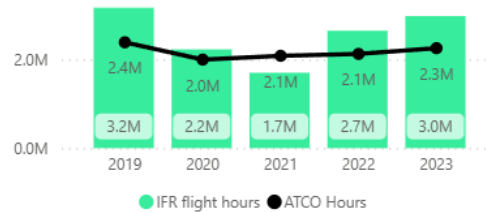


Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

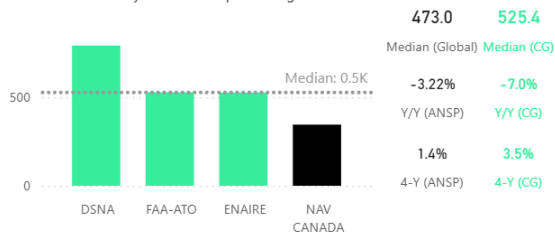


NAV CANADA's total costs (USD) increased by 8.8% in 2023. IFR hours increased by 12.5% compared to 2022 remaining 0.1M below 2019 levels. ATCO hours increased by 6.1% in 2023.

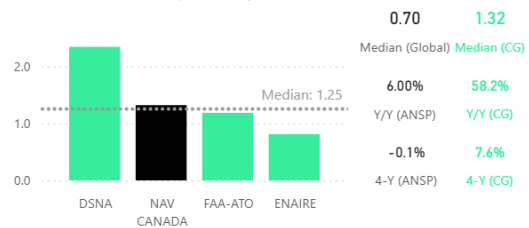
Performance in 2023 (key KPIs compared to CG)

Comparator Group 1 (>1mil IFR flight hours; DSNA, ENAIRE, FAA-ATO, NAV CANADA, Airservices Australia)

KPI 1: Cost efficiency - Total costs per IFR flight hours



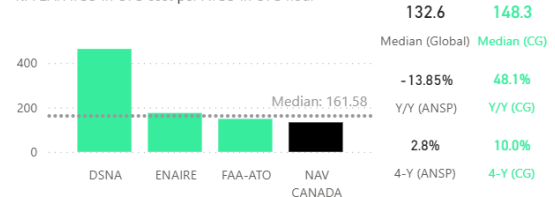
KPI 2B: ATCO in OPS hour productivity



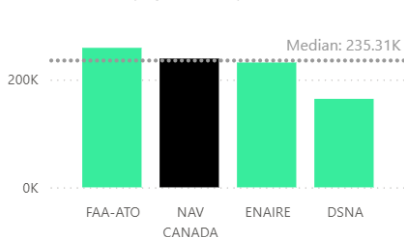
Comparing NAV CANADA with other ANSPs in Comparator Group 1, NAV CANADA had below the median Total cost per IFR flight hour 344.75 USD. For ATCO in OPS hour productivity IFR flight hours per ATCO in OPS hours, NAV CANADA was above the CG's median value of 1.32.

NAV CANADA's ATCO in OPS costs per ATCO in OPS hour was 132.61 USD.

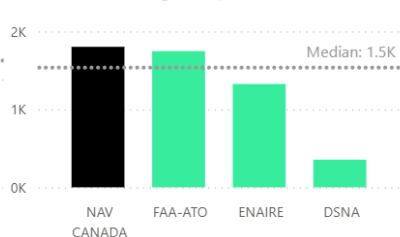
KPI 2A: ATCO in OPS cost per ATCO in OPS hour



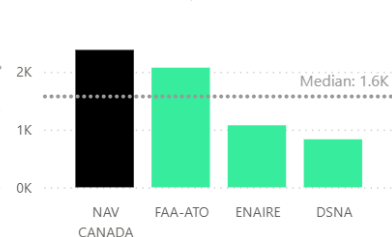
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



KPI 3C: Annual IFR hours per ATCO in OPS



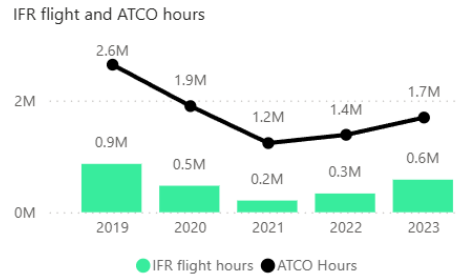
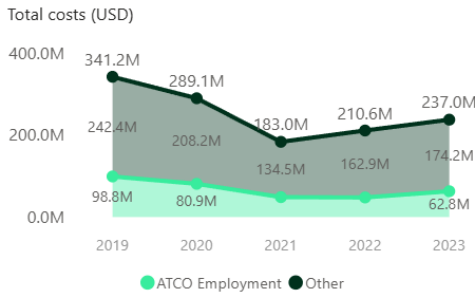
NAV CANADA's Annual employment cost per ATCO in OPS was above the median at 239K USD for 2023. Annual working hours per ATCO in OPS were 1.8K, leading the CG. Annual IFR hours per ATCO in OPS were highest in the CG at 2.4K.



AEROTHAI, Thailand
Continental data



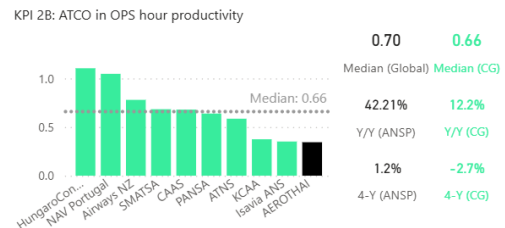
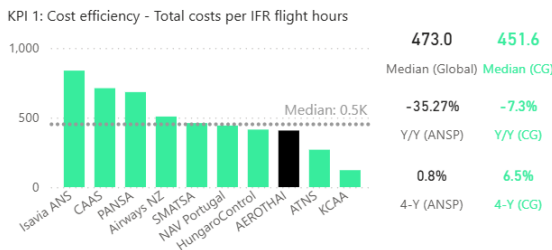
Statistics (2019-2023)



AEROTHAI's Total costs (USD) in 2023 increased by 12.6% compared to 2022 costs. IFR flight hours increased by 73.9% during 2023, remaining 0.3 million below 2019 levels. ATCO hours increased by 22.3% in 2023.

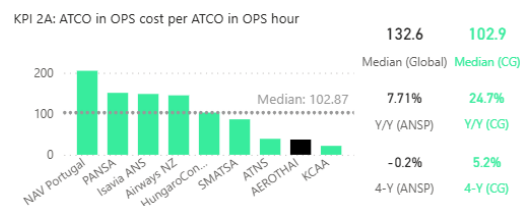
Performance in 2023 (key KPIs compared to CG)

Comparator Group 2 (100k - 1mil IFR flight hours.; AEROTHAI, Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)

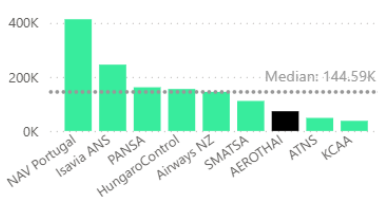


Comparing AEROTHAI with other ANSPs in Comparator Group 2, AEROTHAI's total cost per IFR flight hour was 406.64 USD, below the median cost of the CG. For ATCO in OPS hour productivity, AEROTHAI was the comparator group last at 0.34.

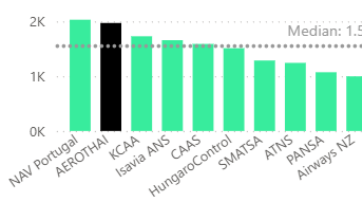
For ATCO in OPS cost per ATCO in OPS hour, AEROTHAI was 37.08 USD.



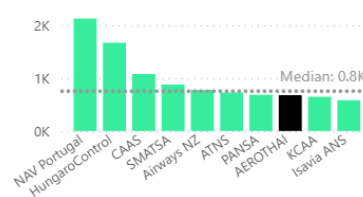
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



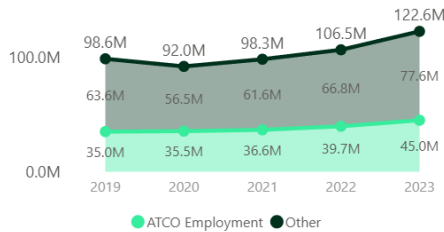
KPI 3C: Annual IFR hours per ATCO in OPS



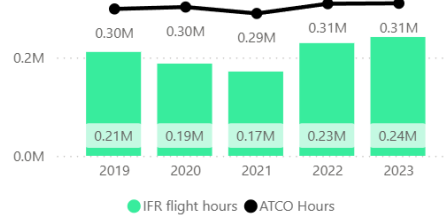
AEROTHAI's Annual employment cost per ATCO in OPS was 73K USD. Annual working hours per ATCO in OPS were 2.0K. Annual IFR hours per ATCO in OPS was at 0.7K.

Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

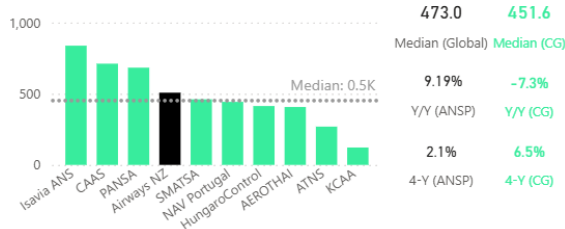


Airways NZ's Total costs (USD) in 2023 increased by 15.1% compared to 2022 costs. IFR flight hours increased by 5.4% during 2023, 0.03 million above 2019 levels. ATCO hours increased by 0.3% in 2023.

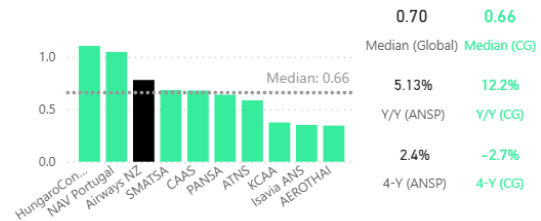
Performance in 2023 (key KPIs compared to CG)

Comparator Group 2 (100k - 1mil IFR flight hours; AEROTHAI, Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)

KPI 1: Cost efficiency - Total costs per IFR flight hours



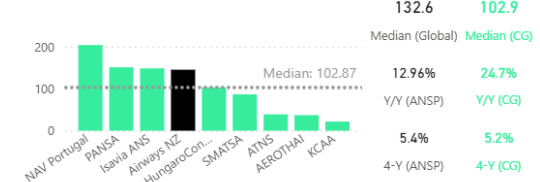
KPI 2B: ATCO in OPS hour productivity



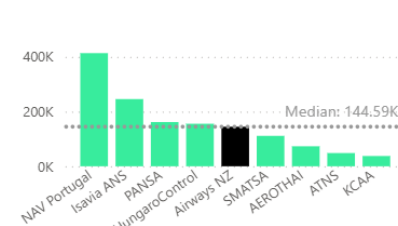
Comparing Airways NZ with other ANSPs in Comparator Group 2, Airways NZ's total cost per IFR flight hour was 507.30 USD, above the median cost of the CG. For ATCO in OPS hour productivity, Airways NZ was at 0.78.

For ATCO in OPS cost per ATCO in OPS hour, Airways NZ was 145.04 USD.

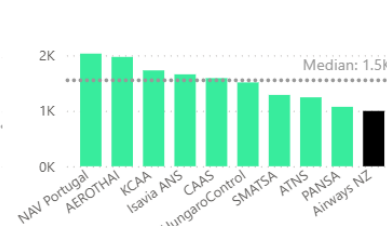
KPI 2A: ATCO in OPS cost per ATCO in OPS hour



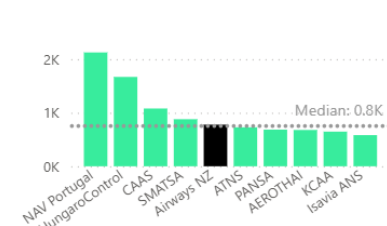
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



KPI 3C: Annual IFR hours per ATCO in OPS



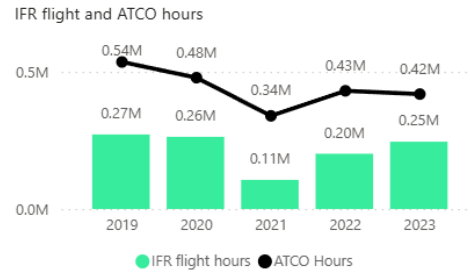
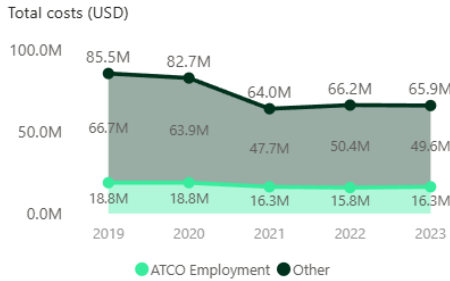
Airways NZ's Annual employment cost per ATCO in OPS was 145K USD. Annual working hours per ATCO in OPS were 1K, the lowest in the CG. Annual IFR hours per ATCO in OPS was at 0.78K.



ATNS, South Africa
Continental data



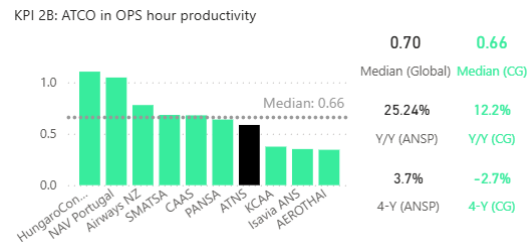
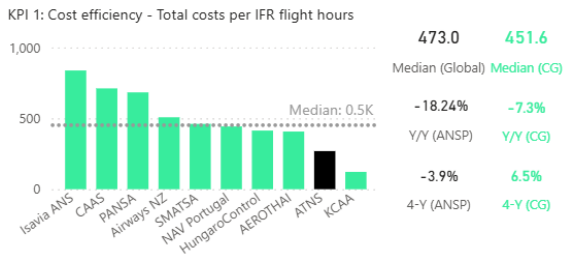
Statistics (2019-2023)



ATNS's Total costs (USD) in 2023 decreased by 0.4% compared to 2022 costs. IFR flight hours increased by 21.8% during 2022, remaining only 0.03 million below 2019 levels. ATCO hours decreased by 2.8% in 2023.

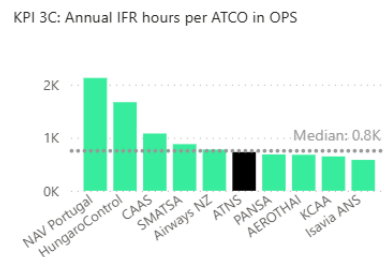
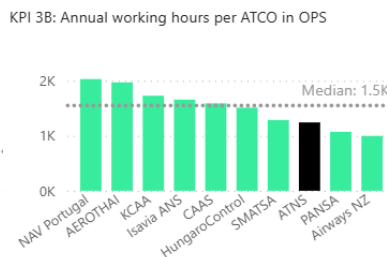
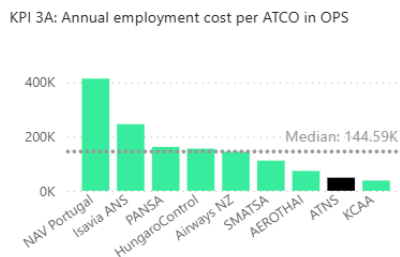
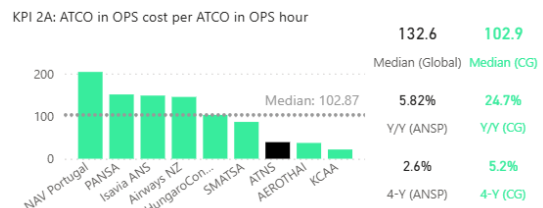
Performance in 2023 (key KPIs compared to CG)

Comparator Group 2 (100k - 1mil IFR flight hours.; AEROTHAI, Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)



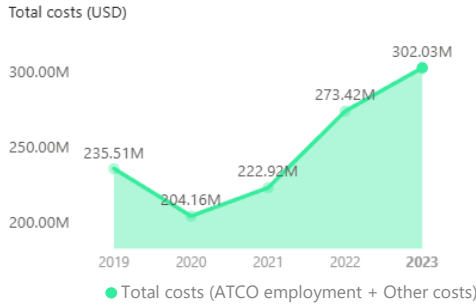
Comparing ATNS with other ANSPs in Comparator Group 2, ATNS's total cost per IFR flight hour was 268.86 USD, below the median cost of the CG. For ATCO in OPS hour productivity, ATNS was at 0.59.

For ATCO in OPS cost per ATCO in OPS hour, ATNS was 38.88 USD.



ATNS's Annual employment cost per ATCO in OPS was 48K USD. Annual working hours per ATCO in OPS were 1.2K. Annual IFR hours per ATCO in OPS was at 0.73K.

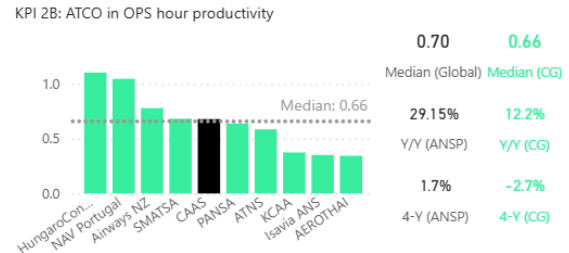
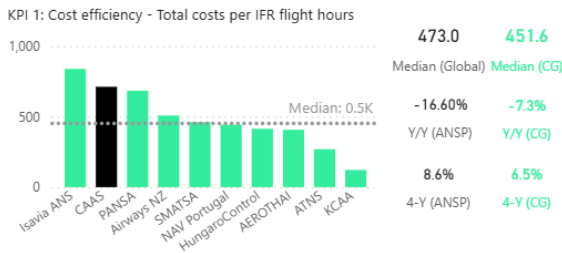
Statistics (2019-2023)



CAAS submitted cost data (as used for KPI 1) but without breakdown into ATCO employment cost and other costs. IFR flight hours increased by 32% during 2023, remaining only 0.04 million below 2019 levels. ATCO hours increased by 2.55% in 2023.

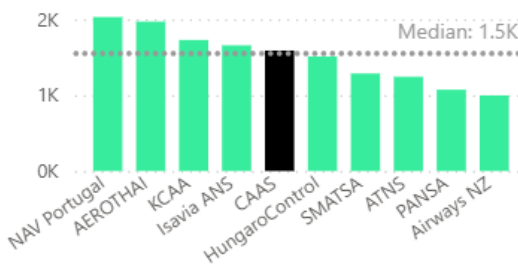
Performance in 2023 (key KPIs compared to CG)

Comparator Group 2 (100k - 1mil IFR flight hours; AEROTHAI, Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)

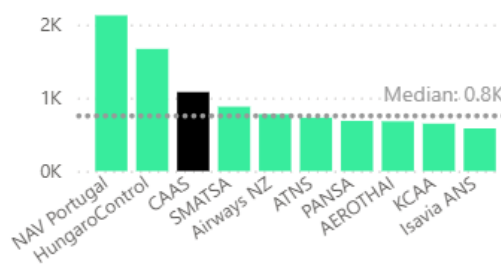


Comparing CAAS with other ANSPs in Comparator Group 2, CAAS's total cost per IFR flight hour, was the second highest at 710.98 USD. For ATCO in OPS hour productivity, CAAS was at 0.68, close to the CG median value.

KPI 3B: Annual working hours per ATCO in OPS



KPI 3C: Annual IFR hours per ATCO in OPS



CAAS's Annual working hours per ATCO in OPS were 1.6K and Annual IFR hours per ATCO in OPS was at 1.1K.

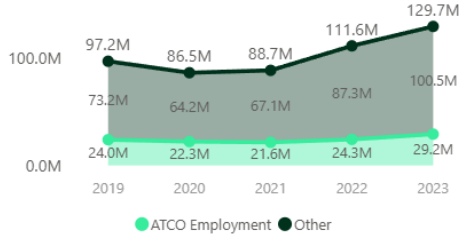


HungaroControl, Hungary Continental data

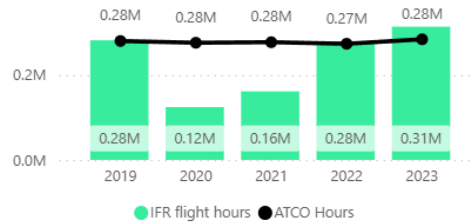


Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

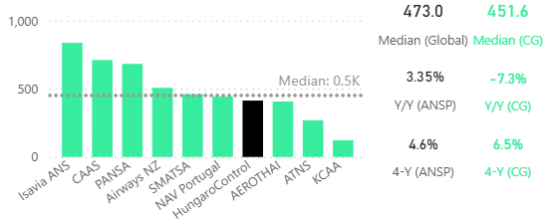


HungaroControl's total costs (USD) in 2023 increased by 16.2%. IFR flight hours saw an increase of 12.5% compared to 2022, 0.03 million above 2019 levels. ATCO employment in operations increased by 3.9% from the previous year.

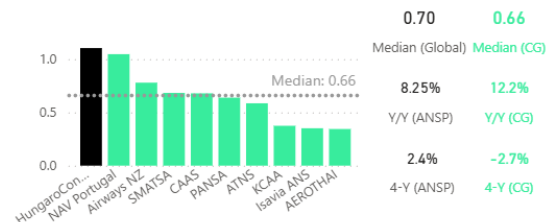
Performance in 2023 (key KPIs compared to CG)

Comparator Group 2 (100k - 1mil IFR flight hours: AEROTHAI, Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)

KPI 1: Cost efficiency - Total costs per IFR flight hours



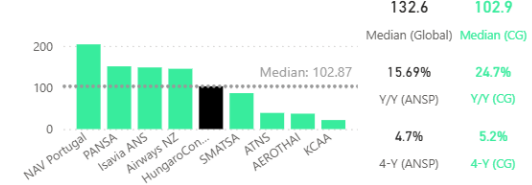
KPI 2B: ATCO in OPS hour productivity



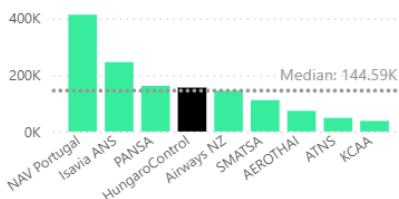
Comparing HungaroControl with other ANSPs in Comparator Group 2, HungaroControl had total costs per IFR flight hour below the median, at 413.55 USD. ATCO in OPS hour productivity (IFR flight hours per ATCO in OPS hours) of HungaroControl was the highest in the comparator group at 1.1.

HungaroControl's ATCO in OPS cost per ATCO in OPS hour was 102.87, matching the median CG value.

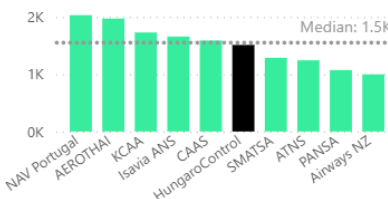
KPI 2A: ATCO in OPS cost per ATCO in OPS hour



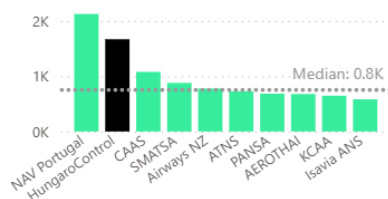
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



KPI 3C: Annual IFR hours per ATCO in OPS

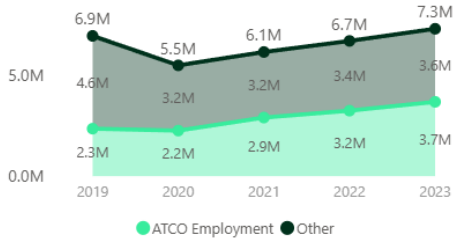


HungaroControl's Annual employment cost per ATCO was 155K and was above the CG median value. Annual working hours per ATCO in OPS matched the median value of 1.5K. HungaroControl's Annual IFR hours per ATCO increased to 1.7K in 2023.

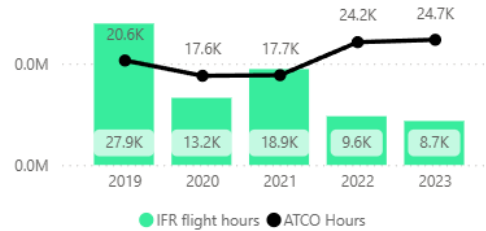


Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

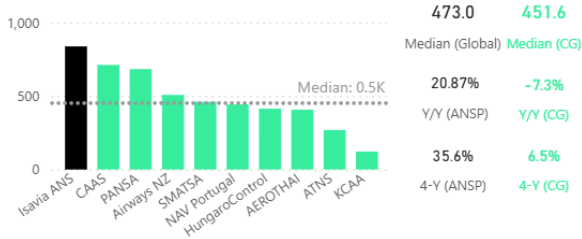


Isavia ANS's total costs (USD) in 2023 increased by 9.0% compared to 2022 costs. IFR flight hours decreased by 9.8% to 8.7K the lowest figure during the five reporting years. ATCO hours for Isavia ANS increased by 1.9% in 2023.

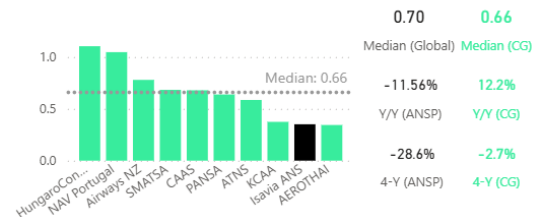
Performance in 2023 (key KPIs compared to CG)

Comparator Group 2 (100k - 1mil IFR flight hours: AEROTHAI, Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)

KPI 1: Cost efficiency - Total costs per IFR flight hours

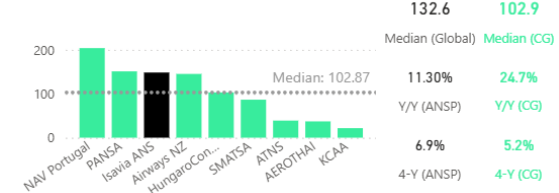


KPI 2B: ATCO in OPS hour productivity



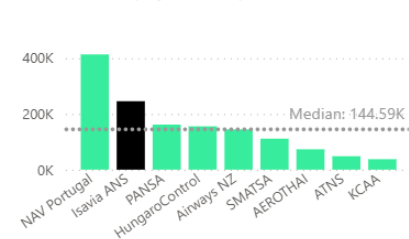
Comparing Isavia ANS with other ANSPs in Comparator Group 2, Isavia ANS' Total cost per IFR flight hours during 2023 was 837.37 USD, highest in the CG. On the other hand, ATCO in OPS hour productivity (IFR flight hours per ATCO in OPS hours) was one of the lowest in the group at 0.35, below the CG median value.

KPI 2A: ATCO in OPS cost per ATCO in OPS hour

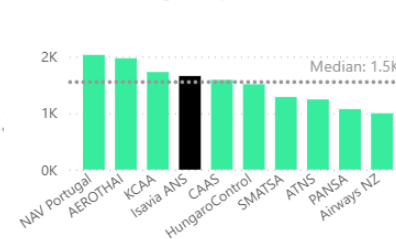


Isavia ANS' ATCO in OPS cost per ATCO in OPS hour was 148.25 USD.

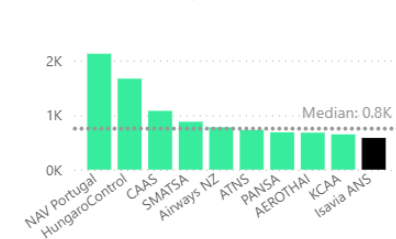
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS

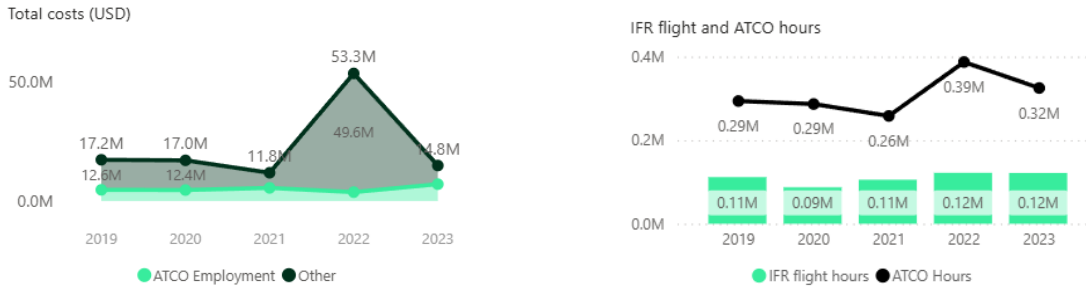


KPI 3C: Annual IFR hours per ATCO in OPS



The Annual employment cost per ATCO in OPS for Isavia ANS in 2023 was 246K USD, above the median for the CG. Annual working hours per ATCO in OPS for Isavia ANS were 1.7K, higher than the CG median value. Isavia ANS Annual IFR hours per ATCO in OPS was at 0.58K in 2023, the lowest in the CG.

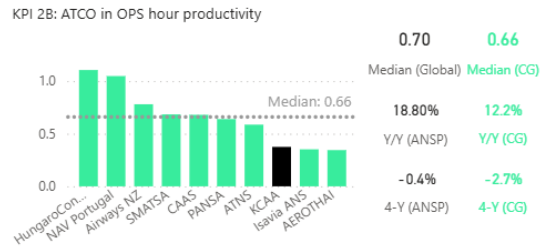
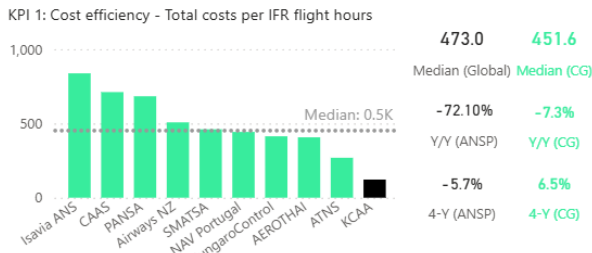
Statistics (2019-2023)



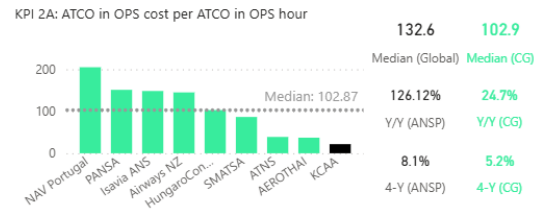
KCAA's total costs (USD) in 2023 decreased significantly by 72.2%, from 53.3M to 14.8M. IFR flight hours slightly decreased by 0.3% from 2022 and exceeded 2019 levels. ATCO hours decreased by 16.1% in 2023.

Performance in 2023 (key KPIs compared to CG)

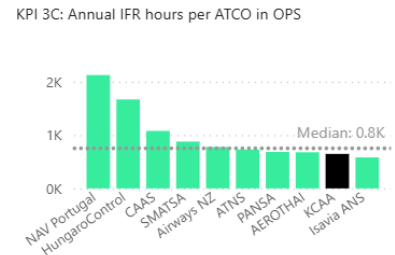
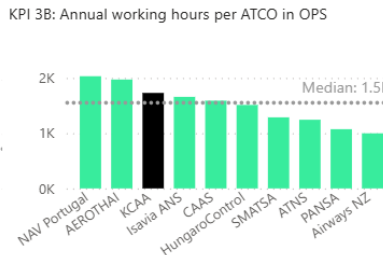
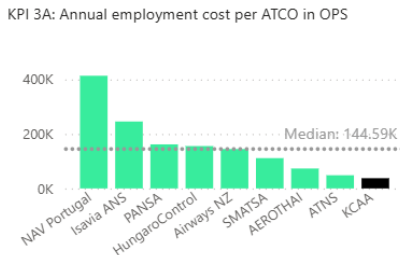
Comparator Group 2 (100k - 1mil IFR flight hours: AEROTHAI, Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)



Comparing KCAA with other ANSPs in Comparator Group 2, KCAA's total cost per IFR flight hour was the lowest in the CG at 122.07 USD, significantly lower than CG median value 452.8 USD. ATCO in OPS hour productivity was 0.37, also lower than the CG median value.



ATCO in OPS cost per ATCO in OPS hour was the lowest of the CG at 21.70 USD.



KCAA's annual employment cost per ATCO in OPS was the lowest in the CG, at 38K USD in 2023. The annual working hours per ATCO in operations for KCAA were above the CG median, totaling 1.7K hours. However, KCAA's annual working IFR hours per ATCO in operations were below the CG median, at 0.6K hours.

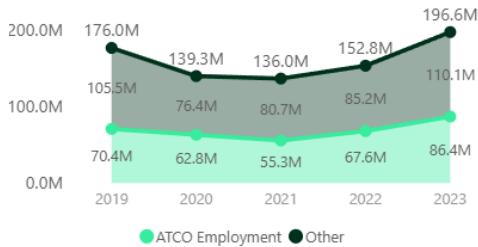


NAV Portugal, Portugal
Continental data

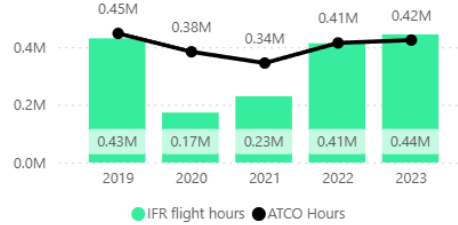


Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

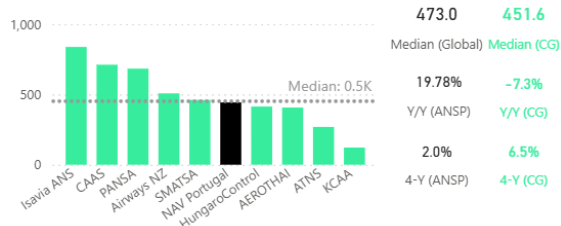


NAV Portugal's total costs in 2023 (USD) increased significantly by 28.7%. ATCO hours increased by 2.4% in 2023. IFR flight hours increased by 7.4% in 2023, slightly exceeding 2019 figures.

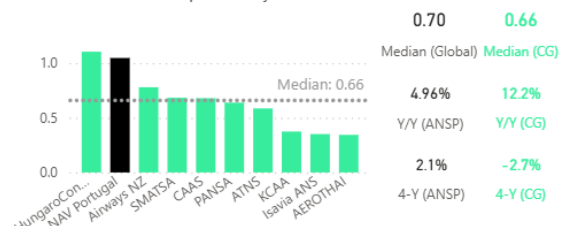
Performance in 2023 (key KPIs compared to CG)

Comparator Group 2 (100k - 1mil IFR flight hours: AEROTHAI, Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)

KPI 1: Cost efficiency - Total costs per IFR flight hours

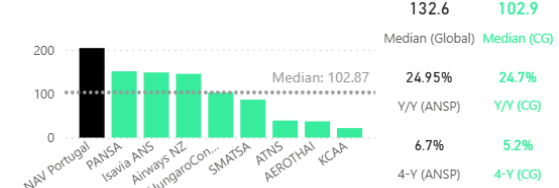


KPI 2B: ATCO in OPS hour productivity



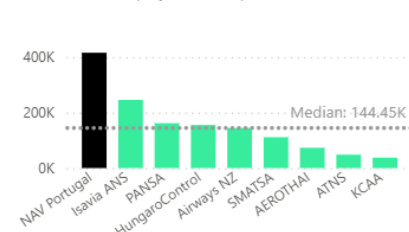
Comparing NAV Portugal with other ANSPs in Comparator Group 2, NAV Portugal had slightly below the median Total costs per IFR flight hour 442.65 USD. ATCO in OPS hour productivity IFR flight hours per ATCO in OPS hours for NAV Portugal was the second highest in the CG, at 1.05.

KPI 2A: ATCO in OPS cost per ATCO in OPS hour

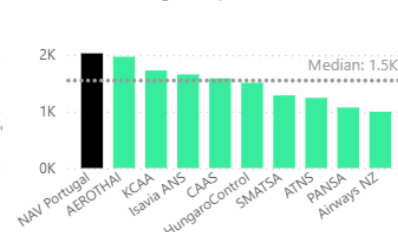


NAV Portugal's ATCO in OPS costs per ATCO in OPS hour were the highest in the CG, at 203.75 USD.

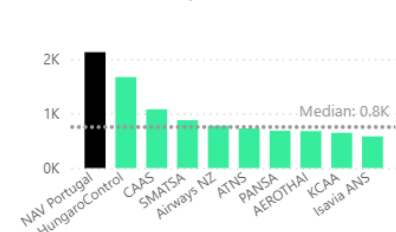
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



KPI 3C: Annual IFR hours per ATCO in OPS



NAV Portugal had the highest annual employment cost per ATCO in operations in the CG, at 414K USD. It also recorded the highest annual working hours per ATCO in operations, at 2K hours. In addition, NAV Portugal reported the highest annual IFR hours per ATCO in operations, at 2.1K.

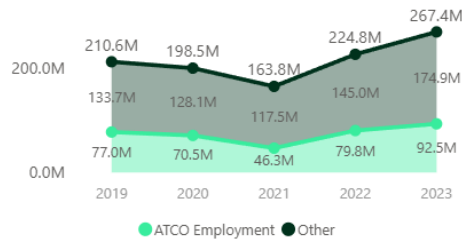


PANSA, Poland
Continental data

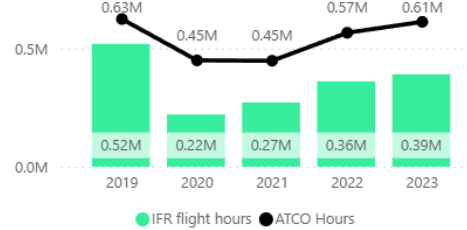


Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

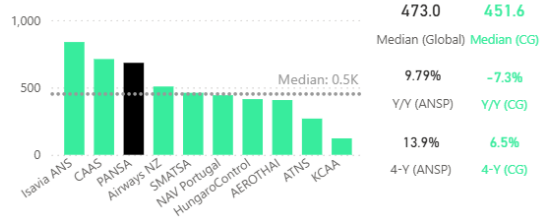


PANSA's total costs (USD) in 2023 increased by 18.9% during the year. IFR flight hours increased by 8.2% in 2023, however these remained 0.13M lower than 2019 levels. ATCO hours increased by 8.3% almost achieving 2019 levels.

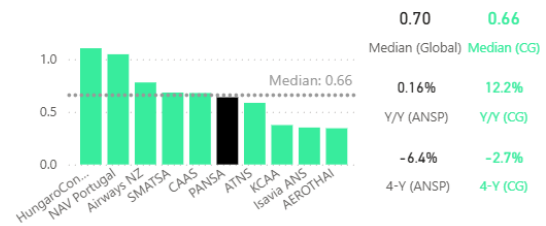
Performance in 2023 (key KPIs compared to CG)

Comparator Group 2 (100k - 1mil IFR flight hours: AEROTHAI, Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)

KPI 1: Cost efficiency - Total costs per IFR flight hours



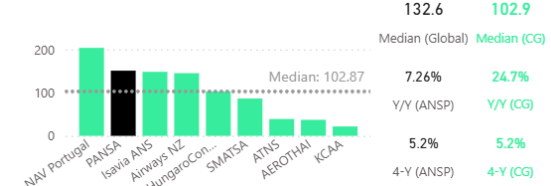
KPI 2B: ATCO in OPS hour productivity



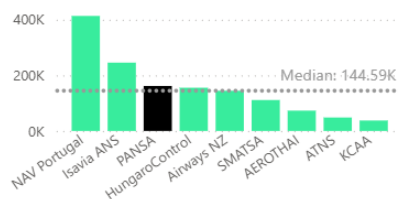
Comparing PANSA with other ANSPs in Comparator Group 2, PANSA had a Total costs per IFR flight hour 682.98 USD higher than CG median value of 451.6 USD. ATCO in OPS hour productivity IFR flight hours per ATCO in OPS hours of PANSA was slightly below than the CG's median at 0.64.

PANSA's ATCO in OPS cost per ATCO in OPS hour was 150.89 USD.

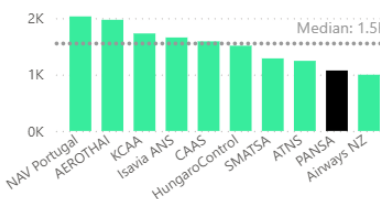
KPI 2A: ATCO in OPS cost per ATCO in OPS hour



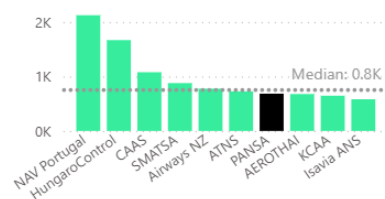
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



KPI 3C: Annual IFR hours per ATCO in OPS

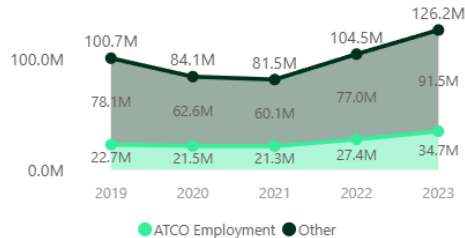


The Annual employment cost per ATCO in OPS for PANSA in 2023 was 162K USD, higher than the median for the CG. Annual working hours per ATCO in OPS for PANSA were the second lowest of the CG at 1.1K. PANSA's Annual IFR hours per ATCO in OPS were below the CG median value at 684K.

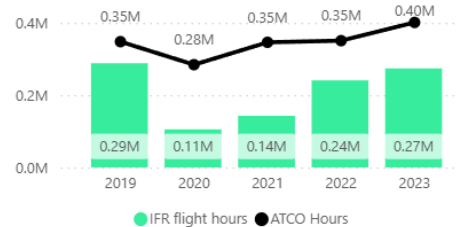


Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

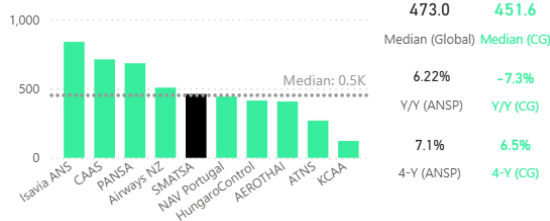


SMATSA's total costs in 2023 increased by 20.8% in comparison to 2022 figures, with ATCO employment costs accounting for 27.5% of total costs during 2023. IFR flight hours showed growth for SMATSA in 2023, increasing by 13.7%, this still remained 0.01M below 2019 levels. ATCO hours increased by 14.4% exceeding the 2019 levels.

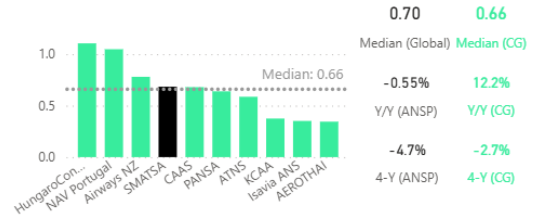
Performance in 2023 (key KPIs compared to CG)

Comparator Group 2 (100k - 1mil IFR flight hours: AEROTHAI, Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)

KPI 1: Cost efficiency - Total costs per IFR flight hours



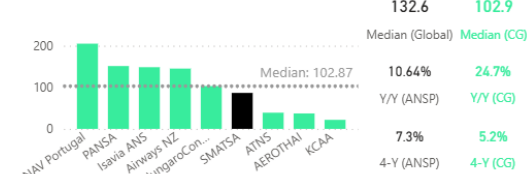
KPI 2B: ATCO in OPS hour productivity



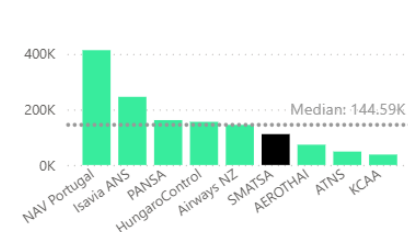
Comparing SMATSA with other ANSPs in Comparator Group 1, SMATSA had Total costs per IFR flight hours at 460.52 USD, slightly above the CG median. For ATCO in OPS hour productivity, SMATSA was above the CG median at 0.68.

In ATCO in OPS cost per ATCO in OPS hour, SMATSA was at 86.46 USD.

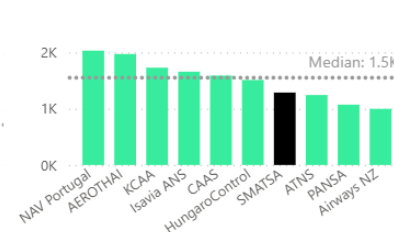
KPI 2A: ATCO in OPS cost per ATCO in OPS hour



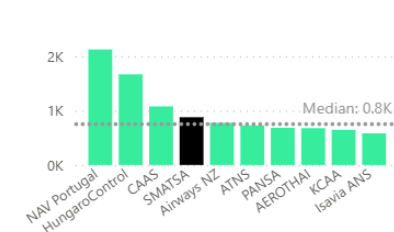
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



KPI 3C: Annual IFR hours per ATCO in OPS



Annual employment cost per ATCO in OPS for SMATSA was at 111.2K USD, below the CG's median. Annual working hours per ATCO in OPS were below the CG's median value at 1.3K. SMATSA was slightly above the CG's median for Annual IFR hours per ATCO in OPS, at 878.3 for 2023.

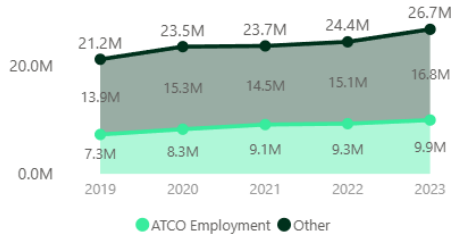


ANA, Luxembourg
Continental data

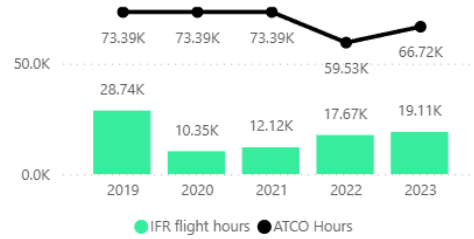


Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

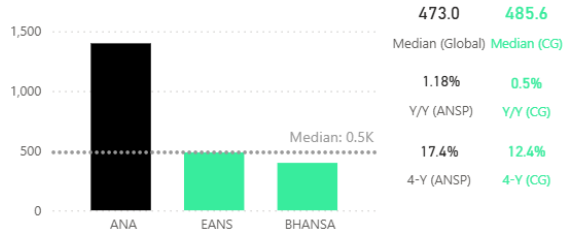


ANA's Total costs (USD) in 2023 increased by 9.5% compared to 2022 costs. IFR flight hours increased by 8.2% during 2023, remaining 9.6K below 2019 levels. ATCO hours increased by 12.1% in 2023.

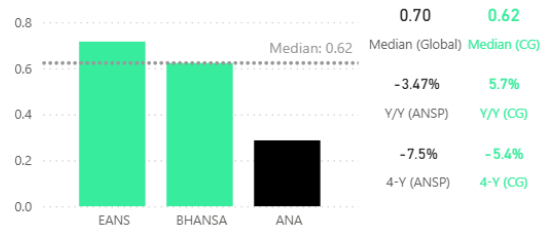
Performance in 2023 (key KPIs compared to CG)

Comparator Group 3 (<100k IFR flight hours: ANA, EANS, BHANSA)

KPI 1: Cost efficiency - Total costs per IFR flight hours

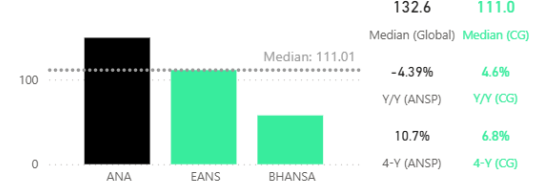


KPI 2B: ATCO in OPS hour productivity



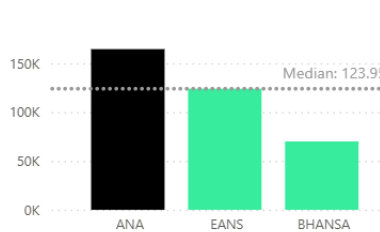
Comparing ANA with other ANSPs in Comparator Group 3, ANA's total cost per IFR flight hour was the highest in the CG, at 1,398.81 USD. For ATCO in OPS hour productivity, ANA had the lowest value in the comparator group at 0.29.

KPI 2A: ATCO in OPS cost per ATCO in OPS hour

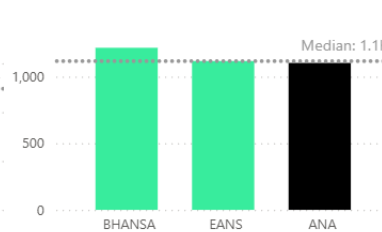


Additionally, for ATCO in OPS cost per ATCO in OPS hour, ANA had the highest value in the CG at 149.13 USD.

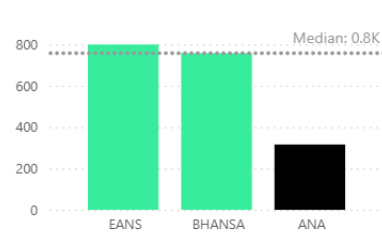
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



KPI 3C: Annual IFR hours per ATCO in OPS



ANA's Annual employment cost per ATCO in OPS was 164K USD. Annual working hours per ATCO in OPS were 1.1K. Annual IFR hours per ATCO in OPS was at 0.3K.

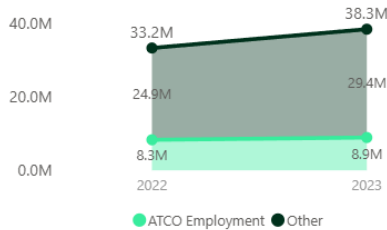


BHANSA, Bosnia & Herzegovina
Continental data

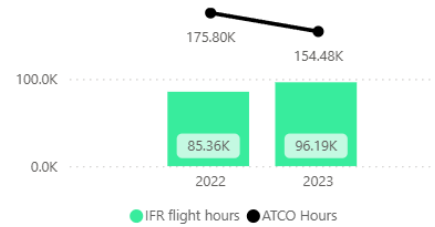


Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

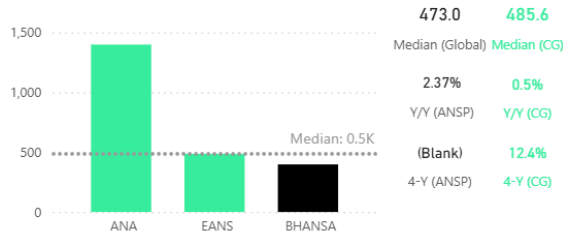


BHANSA's Total costs (USD) in 2023 increased by 15.4% compared to 2022 costs. IFR flight hours increased by 12.7% during 2023. ATCO hours decreased by 12.1% in 2023.

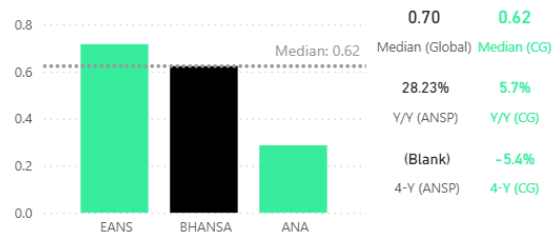
Performance in 2023 (key KPIs compared to CG)

Comparator Group 3 (<100k IFR flight hours: ANA, EANS, BHANSA)

KPI 1: Cost efficiency - Total costs per IFR flight hours



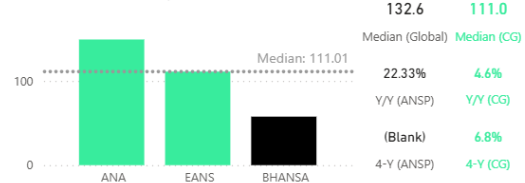
KPI 2B: ATCO in OPS hour productivity



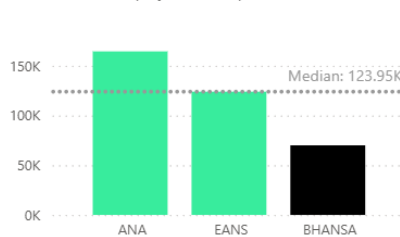
Comparing BHANSA with other ANSPs in Comparator Group 3, BHANSA's total cost per IFR flight hour was the lowest in the CG, at 397.75 USD. For ATCO in OPS hour productivity, BHANSA was 0.62.

For ATCO in OPS cost per ATCO in OPS hour, BHANSA had the lowest value in the CG at 57.56 USD.

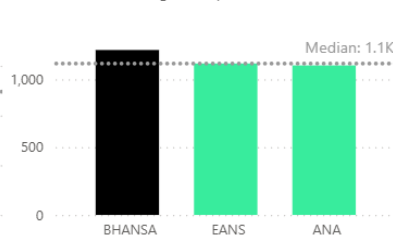
KPI 2A: ATCO in OPS cost per ATCO in OPS hour



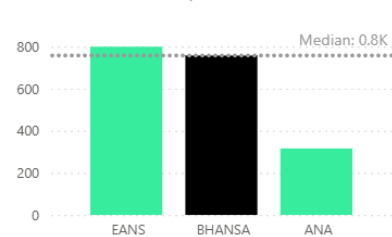
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



KPI 3C: Annual IFR hours per ATCO in OPS



BHANSA's annual employment cost per ATCO in OPS was the lowest in the comparator group, at 70K USD. Annual working hours per ATCO in OPS were the highest in the CG, at 1.2K. Annual IFR hours per ATCO in OPS was at 0.76K.

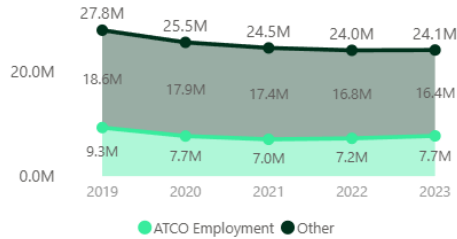


EANS, Estonia
Continental data

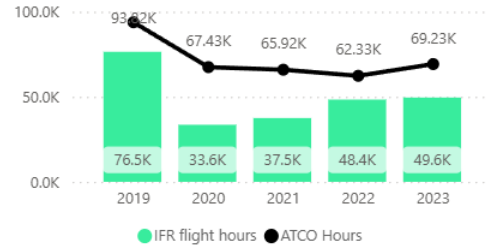


Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

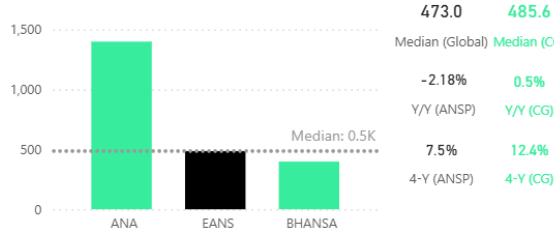


EANS's Total costs (USD) in 2023 slightly increased by 0.2% compared to 2022 costs. IFR flight hours slightly increased by 2.4% during 2023, remaining 27K below 2019 levels. ATCO hours increased by 11.1% in 2023.

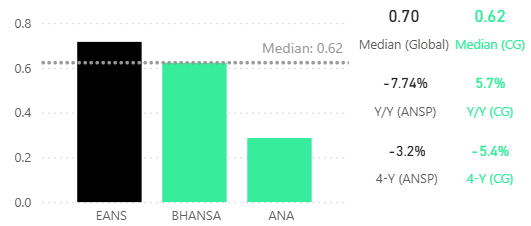
Performance in 2023 (key KPIs compared to CG)

Comparator Group 3 (<100k IFR flight hours: ANA, EANS, BHANSA)

KPI 1: Cost efficiency - Total costs per IFR flight hours



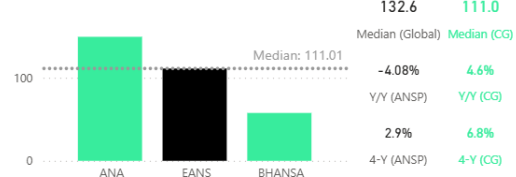
KPI 2B: ATCO in OPS hour productivity



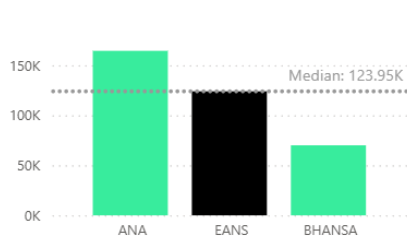
Comparing EANS with other ANSPs in Comparator Group 3, EANS's total cost per IFR flight hour was 485.57 USD, same as the median cost of the CG. For ATCO in OPS hour productivity, EANS had the highest value in the CG at 0.72.

For ATCO in OPS cost per ATCO in OPS hour EANS was 111.01 USD, same as the median cost of the CG.

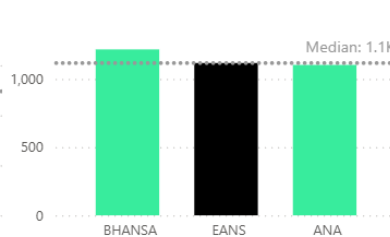
KPI 2A: ATCO in OPS cost per ATCO in OPS hour



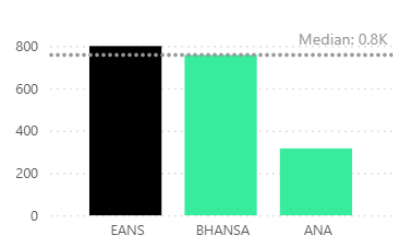
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



KPI 3C: Annual IFR hours per ATCO in OPS



EANS's Annual employment cost per ATCO in OPS was 124K USD. Annual working hours per ATCO in OPS were 1.1K. Annual IFR hours per ATCO in OPS were the highest in the CG, at 0.80K.

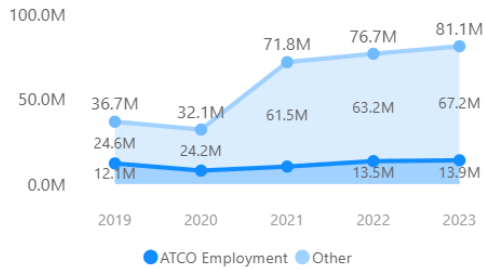


NAV CANADA, Canada
Oceanic data

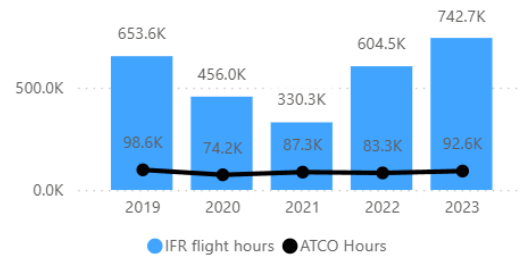


Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

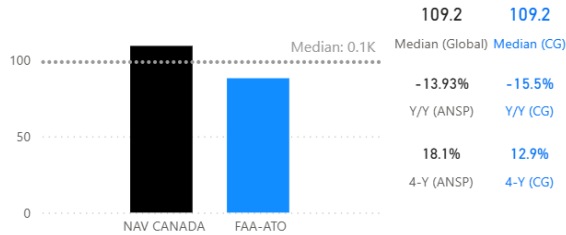


Total costs in USD during 2023 for NAV Canada increased by 5.8% compared to 2022. ATCO hours increased slightly by 11.1% in 2023. IFR flight hours increased by 22.9% from 2022, exceeding 2019 levels.

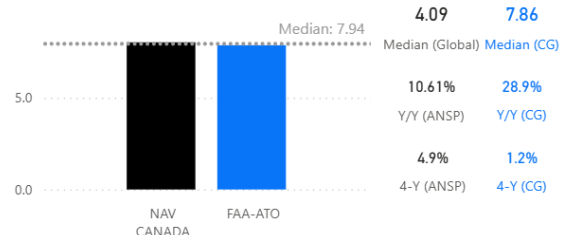
Performance in 2023 (key KPIs compared to CG)

Comparator Group 1 (>1mil IFR flight hours: DHMI, DSNA, ENAIRE, FAA-ATO, NAV CANADA)

KPI 1: Cost efficiency - Total costs per IFR flight hours



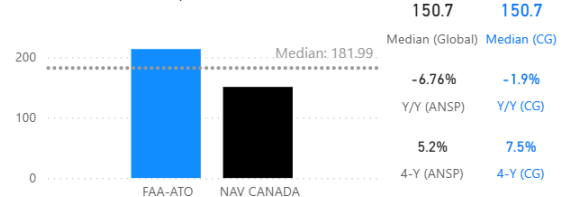
KPI 2B: ATCO in OPS hour productivity



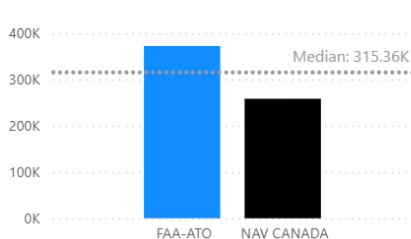
Comparing NAV Canada with other ANSPs in Comparator Group 1, NAV Canada had a Total cost per IFR flight hour above the CG median at 109.23 USD. In ATCO in OPS hour productivity, NAV Canada was at 8.02, the highest in the CG.

NAV Canada's ATCO in OPS cost per ATCO in OPS hour was 150.70 USD.

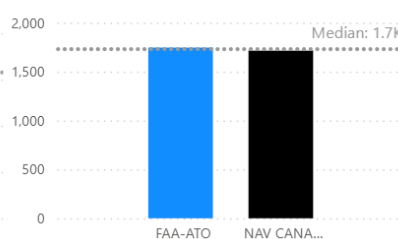
KPI 2A: ATCO in OPS cost per ATCO in OPS hour



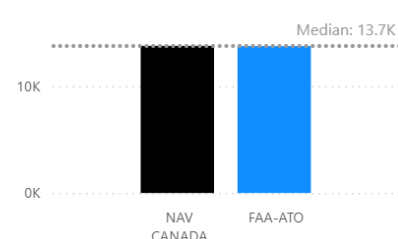
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



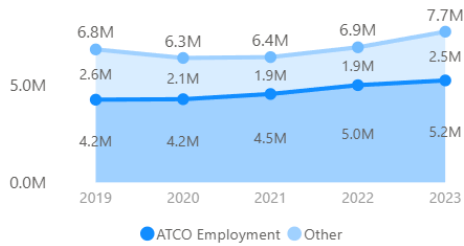
KPI 3C: Annual IFR hours per ATCO in OPS



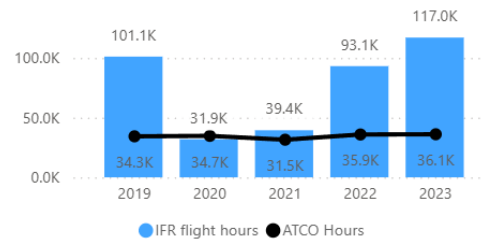
NAV Canada was below the CG median value for annual employment cost per ATCO in OPS. It had the lowest value for annual working hours per ATCO in OPS at 1.7K, while its annual IFR hours per ATCO in OPS were the highest in the group at 13.8K.

Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

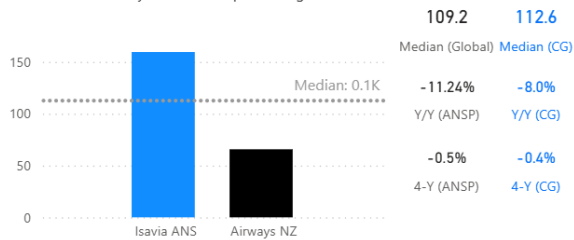


Total costs in USD during 2023 for Airways NZ increased by 11.6% compared to 2022. ATCO hours slightly increased by 0.5% when compared to 2022 levels. IFR flight hours increased by 25.7% in 2023, significantly exceeding 2019 levels.

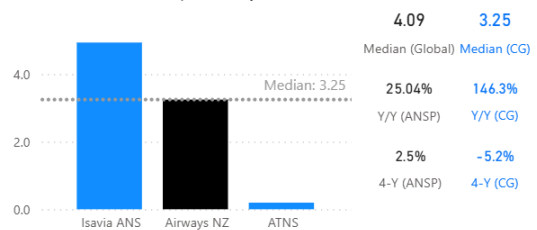
Performance in 2023 (key KPIs compared to CG)

Comparator Group 2 (100k - 1mil IFR flight hours: AEROTHAI, Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)

KPI 1: Cost efficiency - Total costs per IFR flight hours



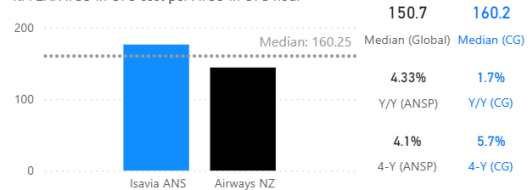
KPI 2B: ATCO in OPS hour productivity



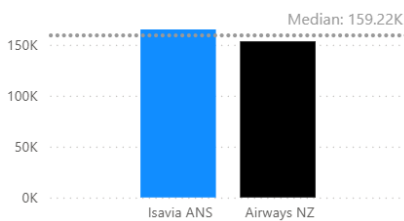
Comparing Airways NZ with other ANSPs in Comparator Group 2, Airways NZ had a lower value for Total cost per IFR flight hour 65.66 USD. In ATCO in OPS hour productivity IFR flight hours per ATCO in OPS hours, Airways NZ was at the CG's median value of 3.25.

Airways NZ's ATCO in OPS cost per ATCO in OPS hour was 144.18 USD.

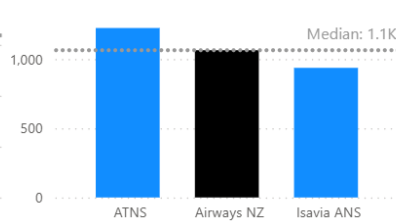
KPI 2A: ATCO in OPS cost per ATCO in OPS hour



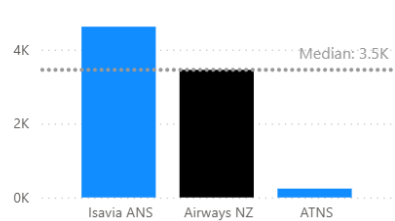
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



KPI 3C: Annual IFR hours per ATCO in OPS



Airways NZ had the lowest annual employment cost per ATCO in OPS at 153K USD. Its annual working hours per ATCO in OPS were 1.1K, and its annual IFR hours per ATCO in OPS were 3.5K, both matching the CG median.

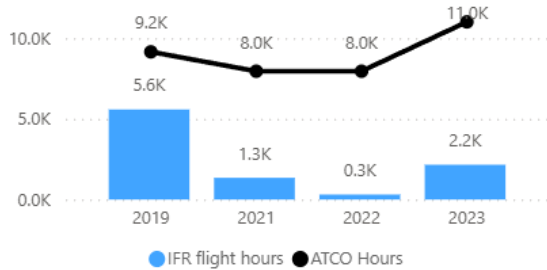


ATNS, South Africa
Oceanic data



Statistics (2019-2023)

IFR flight and ATCO hours



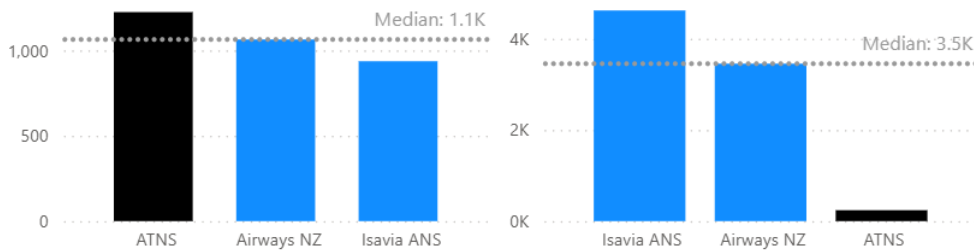
ATNS did not submit data for ATCO in OPS employment costs in 2023. IFR flight hours in 2023 increased by 596.3% from 2022. ATCO hours increased by 38.5% from the previous year.

Performance in 2023 (key KPIs compared to CG)

Comparator Group 2 (100k - 1mil IFR flight hours: AEROTHAI, Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)

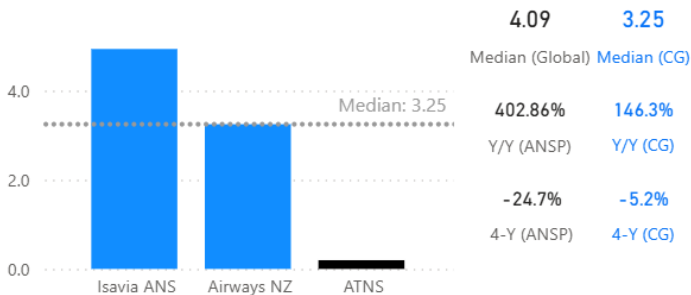
KPI 3B: Annual working hours per ATCO in OPS

KPI 3C: Annual IFR hours per ATCO in OPS



For Annual working hours per ATCO in OPS, ATNS had the highest value at 1.2K. Annual IFR hours per ATCO in OPS at 0.24K. KPI 3A could not be calculated due to insufficient data.

KPI 2B: ATCO in OPS hour productivity



For ATCO in OPS hour productivity, ATNS had the value at 0.20K. KPI 1 and KPI 2A could not be calculated due to insufficient data.

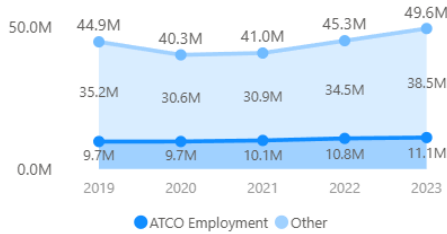


Isavia ANS, Iceland
Oceanic data

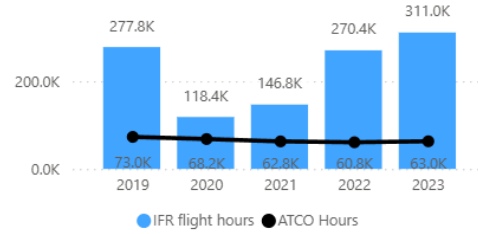


Statistics (2019-2023)

Total costs (USD)



IFR flight and ATCO hours

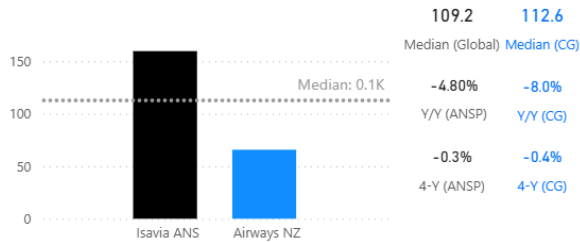


Total costs in USD during 2023 for Isavia ANS increased by 9.5% compared to 2022. IFR flight hours increased by 15.0% from 2022, exceeding 2019 levels. ATCO hours remained at the same level as previous year.

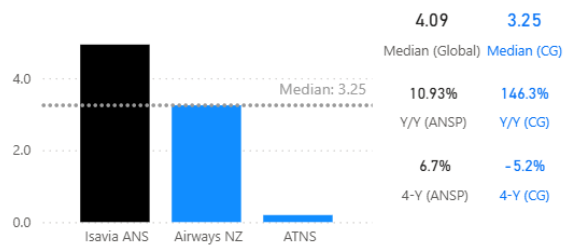
Performance in 2023 (key KPIs compared to CG)

Comparator Group 2 (100k - 1mil IFR flight hours: Airways NZ, ATNS, CAAS, HungaroControl, Isavia ANS, KCAA, NAV Portugal, PANSA, SMATSA)

KPI 1: Cost efficiency - Total costs per IFR flight hours



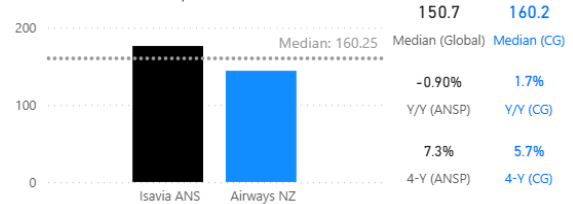
KPI 2B: ATCO in OPS hour productivity



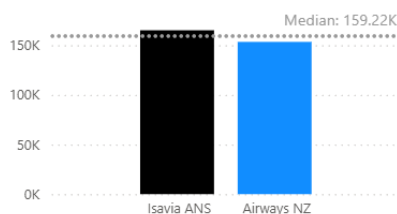
Comparing Isavia ANS with other ANSPs in Comparator Group 2, Isavia ANS had a higher Total cost per IFR flight hour 159.50 USD. ATCO in OPS hour productivity, Isavia ANS was at 4.93, higher than the CG median value.

Isavia ANS's ATCO in OPS cost per ATCO in OPS hour was 176.31 USD.

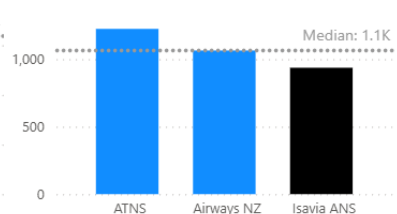
KPI 2A: ATCO in OPS cost per ATCO in OPS hour



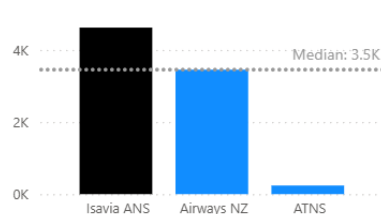
KPI 3A: Annual employment cost per ATCO in OPS



KPI 3B: Annual working hours per ATCO in OPS



KPI 3C: Annual IFR hours per ATCO in OPS



Isavia ANS held the highest value of 165K USD for Annual employment cost per ATCO in OPS. For Annual working hours per ATCO in OPS, Isavia ANS had the lowest value at 0.9K. Isavia ANS had the highest annual IFR hours per ATCO in OPS in the comparator group, at 4.6K.

Annex 1: Methodology

Measuring Performance

Cost efficiency and productivity are two key indicators of measuring the performance of air navigation service provision. They demonstrate how ANSPs are delivering value and serve as indicators of operational efficiency. These KPIs are all part of the *CANSO ANS Performance Framework*.

Cost Efficiency

Cost efficiency provides an indication of the balance between operational effectiveness (i.e. ATCO productivity) and the cost of providing the service.

The simplest indicator of cost efficiency is the **cost of providing ANS services per IFR flight hour**. A lower cost per flight hour, however, is not necessarily indicative of greater overall performance.

Economic differences outside of the control of ANSPs can drive differences in costs. This includes labour contracts, salary scales and working conditions (such as hours), as well as government regulations on pension management and mandatory financial controls. Furthermore, ANSPs do not control the volume of traffic, which is a function of economic activity and other air passenger demands. Where a minimum level of service is required, there is a limit to how activities can be scaled down in response to lower demand. This was particularly evident in 2022, the year considered in this report.

Cost indicators do not reflect external factors, other performance areas or the quality of service. Moreover, there are costs associated with providing a safer and more punctual, predictable, and efficient service, which can deliver savings to air operators flying in the airspace that offset higher ANSP costs.

Costs are broken down into ATCOs in OPS employment and other costs. Other costs include operating costs (excluding ATCO in OPS employment costs), depreciation/amortisation and costs of capital related to providing ATC/ATFM services. They do not include MET costs.

Productivity

The key indicator of ANS productivity is **IFR flight hours per ATCO in OPS hour**, often described as 'ATCO in OPS productivity'.

Although generally reflective of ANSPs' performance, factors beyond the control of the ANSP can cause low levels of productivity – for example a geopolitical event that alters traffic demand.

ATCO in OPS productivity is driven by traffic levels and an ANSP's ability to utilise its ATCOs in operations (OPS) resources. Although they cannot affect traffic demand, ANSPs may improve productivity by utilising flexible rostering and adapting airspace configuration to open and close sectors according to evolving traffic patterns.

Furthermore, advances in technology are now focusing more than ever on reducing the workload of ATCOs in OPS to enable them to safely manage higher levels of traffic in a given volume of airspace. Training associated with the introduction of technology, however, can lead to short-term reductions in productivity.

Airspace complexity also affects ATCO in OPS productivity. Lower airspace will typically have lower levels of ATCO in OPS productivity than upper airspace where aircraft are flying at more consistent altitudes and on non-crossing routes. Therefore, an ANSP operating a high proportion of sectors in lower airspace, or with numerous busy airports with complex approach sectors, is likely to have lower ATCO in OPS productivity than an ANSP with more overflights at higher altitude.

Data Processing

Data collection: ANSPs who are members of the CANSO GBWG provided data for this analysis. ANSPs either submit the minimum dataset required for participation in the report (the basic data), or additional data to inform the analysis of advanced KPIs (*the advanced data*).

ANSPs can also revise data submitted in previous years. The data submission workbook includes validation calculations that ANSPs are encouraged to consult in the data collection phase.

The entire dataset is available to all participating ANSPs to enable closer analysis and evaluation of performance trends. The advanced KPI dataset is only available to ANSPs submitting advanced data.

To extend the spectrum of provided ANSPs' performance data and ensure the validity of any trend analysis, EUROCONTROL has kindly provided 2023 performance data for European ANSPs, alongside data for the years 2019-2022 to facilitate historical trend analysis. European ANSP members of the CANSO GBWG who also submit data to EUROCONTROL have their CANSO data used in this analysis, unless otherwise agreed.

It should be noted that Indicator 2B 'ATCO productivity' is not directly comparable to the ATCO productivity KPI used in the ACE report. This is because the CANSO ANS Performance Framework uses IFR flight hours to calculate this KPI, rather than composite flight hours as used in the ACE report ATCO productivity KPI.

Finally, as part of the data sharing agreement with EUROCONTROL, CANSO data is only available to the core EUROCONTROL analysts and is not shared with the wider ACE report ANSP community.

Data Dashboard: As part of the CANSO 2019-2023 data collection cycle, a Power Bi dashboard was produced in March 2025, which allowed CANSO members a first look at trends in their data. This dashboard and accompanying underlying data document provided members the opportunity to thoroughly review and validate their data submission and notify Egis of any amendments if necessary.

The Data Dashboard additionally offers a more credible comparison of performance between participating ANSPs by dividing them into three comparator groups (CGs) based on the number of IFR hours managed, ensuring that the varying scales of their operations are taken into account.

Data processing: Data has been processed by Egis subject to a data processing agreement with CANSO and in accordance with European data privacy laws. It was subject to a one-step quality check for significant changes, potential errors or omissions and is subject to continued revision by participating ANSPs.

Separation of continental and oceanic data: Information is provided both for continental and oceanic air navigation services, where applicable. Each of these environments has different challenges associated with providing ANS. For example, it is more straightforward to provide ground infrastructure for communications and surveillance services in continental airspace than it is over oceans.

Exchange rate conversion: ANSPs submit data in their chosen currency. For KPI comparison, data is presented in USD. 2023 KPI data is converted using exchange rates gathered from organisation World Bank.

For ANSPs that operate in a currency other than the USD, the assumption of lower cost may be caused in part by the strengthening USD. The change in the relative value of the dollar effectively lowers the price that ANSPs incur in USD.

Growth rates: Data is presented for 2023 and then for the one-year and four-year trends. The trend over four years is calculated as the compound annual growth rate (4 yr. CAGR). This shows the overall trend between 2019 and 2023 but masks the fluctuations that may have taken place over the intervening years. In addition, if 2019 was an outlier, this trend may not be representative of the trend over this timeframe. Individual ANSP results for 4 Year CAGR should therefore be interpreted alongside contextual information.

The trend analysis is presented above the 2023 KPI data and is based on the data submitted in the ANSP's chosen currency.

Inflation: The growth rates are not adjusted for inflation, and local inflation rates should therefore be considered when interpreting CAGR trends.

PPP correction: Salaries and the cost of living vary extensively around the world. One way to correct for this is by using purchasing power parity (PPP). Employment costs for ATCOs in OPS are corrected using World Bank data. There are, of course, limitations to this approach, as the cost of living can vary widely within a country and may be higher or lower in the region where ANS offices are located.

Median: The median is the middle number of the data set.

Q1 and Q3: The first quartile (Q1) is defined as the middle number between the smallest number and the median of the data set. The third quartile (Q3) is the middle value between the median and the highest value of the data set.

Annex 2: Data Definitions

Contextual Data Element Definitions

Data Element	Definitions
IFR hours per sq. km	This is the result of dividing the number of IFR flight hours for the current year of data by surface area (in square kilometres).
Sq. km – oceanic and continental	The size (the surface area) of the airspace for which an ANSP is responsible. This should include the area where ANS have been delegated to the ANSP by another provider and exclude the area in which ANS have been delegated to another ANSP. The sq. km here should be consistent with ACC coverage with respect to total area. Differentiation for facilities controlling only upper or lower airspace will be addressed by item 3 below. (Source: PRU D1).
Percentage surveillance coverage at 30,000ft - Primary radar	Surveillance coverage from primary radar.
Percentage surveillance coverage at 30,000ft - secondary radar	Surveillance coverage from secondary radar.
Percentage surveillance coverage at 30,000ft - ADS-B	Surveillance coverage from ADS-B.
Percentage surveillance coverage at 30,000ft - Space based ADS-B	Surveillance coverage from space-based ADS-B.
Number of FIRs	A Flight Information Region is airspace of defined dimensions within which flight information service and alerting service are provided.
Number of ACC facilities	ACC facilities are the ATC units providing ATC services to en-route traffic in control areas under its jurisdiction. Part of an ACC may also provide approach services.
Number of co-located ACC and approach facilities	An ACC unit is described above. An approach control unit is an ATC unit providing ATC services to arriving, departing and over-flying flights within the airspace in the vicinity of an airport.
Number of stand-alone approach facilities	Definition of an approach control unit is above.
Number of co-located approach and tower facilities	Definition of an approach control unit is above. Tower facilities, or a tower control unit, is an ATC unit at an airport responsible for the provision of ATC services in respect of flights that are landing and taking off and other traffic that is on the active runway(s).
Number of co-located approach, tower, and ACC facilities	For definitions see above.
Number of stand-alone towers	Definition of a tower control unit is above.

Input Data Definitions

Data Element	Definitions
Total costs	The sum of operating costs, depreciation/amortisation and cost of capital related to providing continental and oceanic ATC/ATFM services. Meteorological costs and EUROCONTROL costs (if applicable) are not included.
Total employment cost for ATCOs in operations	Total employment costs (staff costs) including gross wages and salaries, payments for overtime and other bonuses, employer contribution to social security scheme and taxes, pension contributions and other benefits for "ATCOs in operations." This should exclude pension contributions paid by the employee (unless included within employment costs), mission related expenditures, including travel expenditures and training fees, as these should be considered operating costs.
Other costs	Total operating costs minus ATCO in operation employment costs.
IFR flight hours	Total number of controlled IFR flight hours in continental and oceanic airspace.
ATCO in operation hours	Total annual working hours for ATCOs in operations – including breaks and overtime. Holiday is not included. Calculated as average annual working hours for ATCO in operations times the number of total number of ATCOs in operations.
Number of ATCOs in operations (expressed in FTE)	<p>The number (expressed in FTE) of ATCOs who are participating in an activity that is either directly related to the control of traffic or is a necessary requirement for ATCOs to be able to control traffic. Such activities include manning a position, refresher training and supervising on the job trainee controllers, but do not include participating in special projects, teaching at a training academy, or providing instruction in a simulator. Includes first-line supervisors. Does not include on-the-job training. An ATCO in operations should hold a valid ATCO license.</p> <p>The number (expressed in FTE) should be calculated as an average based on the FTE number at the start of the year and the FTE number at the end of the year.</p> <p>Definition of Full Time Equivalent (FTE) (Source: EUROCONTROL Specification for Information Disclosure – Version 2, October 2001): The equivalent of a single person carrying out a particular job or activity working on a full-time basis during a year. A part time ATCO working half the hours of a normal ATCO, should be counted as a 0.5FTE. A full time ATCO working two thirds of his time on duty in OPS and one third of his time on teaching at a training academy would be counted as a 0.67 FTE ATCO in OPS and a 0.33 FTE ATCO on other duties.</p>
Number of Frontline Service Support Staff (expressed in FTE)	Sum of ATC assistants, ops support, OPS support (non-ATCOs), technical support staff for operational maintenance monitoring and control, technical support staff for planning and development, ATCOs on other duties, and outsourced frontline service support.

Trial Operational Performance KPIs

Data Element	Definitions
<p>KPI 1: Actual en-route extension vs. planned route (KEA/KEP)</p>	<p>Definition: Actual en-route distance flown compared to planned route. Might be split in actual vs GCD and planned vs GCD.</p> <p>Measured in: The % excess distance or NM.</p> <p>Data requirements for each actual flight trajectory: Departure and Destination airport; Entry and Exit points in the 'Measured Areas' (for which the KPI is computed, e.g. a State); Entry and Exit point in the 'Reference Area' (defined as a (sub)regional boundary considered, containing all 'Measured areas', e.g. States within the same ICAO Region); Distance flown/actual flight trajectory, derived from surveillance data (radar, ADS-B...).</p> <p>Measurement: From the departure airport 40 NM ring to 40 NM ring around the arrival airport.</p> <p>Alternative metric(s): PRU's Horizontal en-route flight inefficiency in actual flown trajectories (KEA); CANSO's En-Route Direct Route Extension KPI.</p>
<p>KPI 2: Additional time in terminal airspace</p>	<p>Definition: as per ICAO KPI 08: Actual terminal airspace transit time compared to an unimpeded time.</p> <p>Measured in: Minutes/flight (or NM per flight if not possible in min) and provided as yearly average.</p> <p>Required data: Terminal airspace entry time, computed from surveillance data (radar, ADS-B...) and Actual landing time (ALDT) for each arriving flight.</p> <p>Measurement: Provide name of airport(s) and number of movements – report for airports above 80k movements, but up to a maximum of the top 5 airports.</p> <p>Alternative metric(s): PRUs' Additional Arrival Sequencing and Metering Area (ASMA) Time; CANSO's Arrival Flight Distance/Time Efficiency KPI.</p>
<p>KPI 3: Additional taxi-out time</p>	<p>Definition: as per ICAO KPI 02: Actual taxi-out time compared to an unimpeded/reference taxi-out time.</p> <p>Measured in: Minutes/flight and provided as yearly average.</p> <p>Required data: Actual off-block time (AOBT) and Actual take-off time (ATOT) for each departing flight.</p> <p>Measurement: Provide name of airport(s) and number of movements – report for airports above 80k movements, but up to a maximum of the top 5 airports.</p> <p>Alternative metric(s): PRU's Additional Taxi-out Time; CANSO's Taxi-out Delay KPI.</p>

Annex 3: Key Performance Indicators

The detailed metrics for determining the cost efficiency and productivity of continental and oceanic air navigation services are set out in Figure 35. These performance indicators are derived from the *CANSO ANS Performance Framework*.

Determining Performance Metrics

The *CANSO ANS Performance Framework* was established to create common performance indicators for global ANS data. Based on a tiered structure, the framework was developed in 2014 by the CANSO Global Benchmarking Workgroup (GBWG). It aims to demonstrate the drivers of cost efficiency.

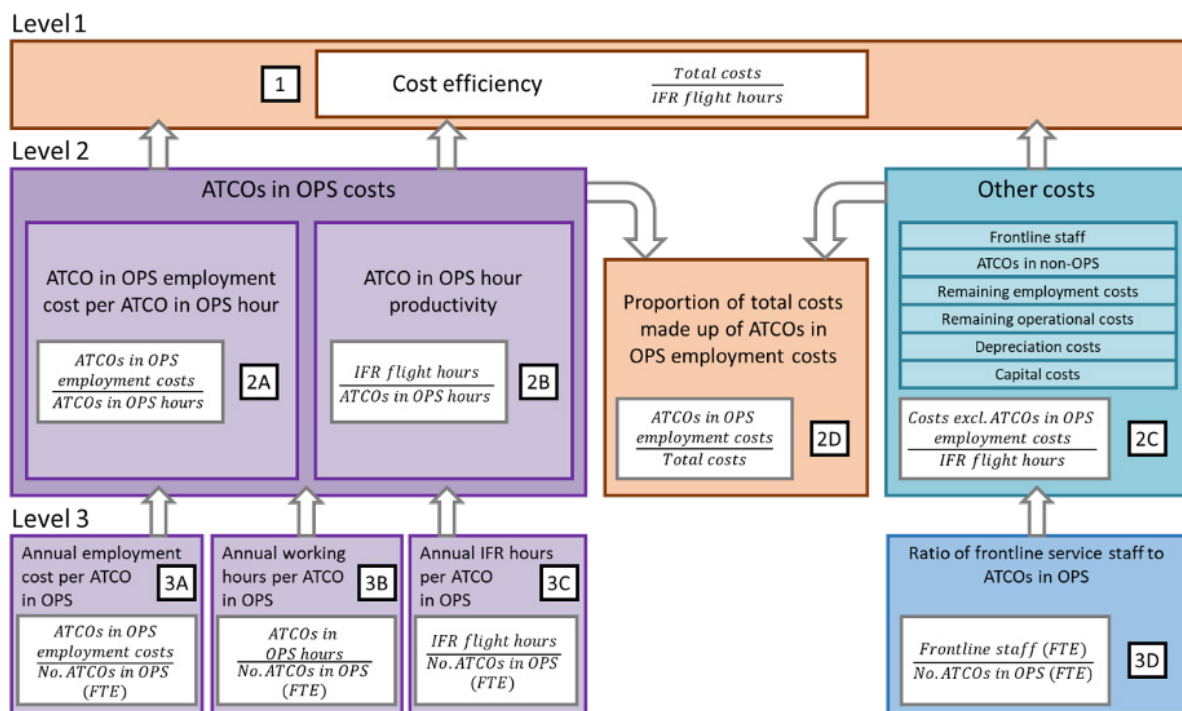


Figure 35 - CANSO ANS Performance Framework

Over the years, the GBWG has worked to identify alternative KPIs to investigate the drivers of the KPIs in the framework, in particular KPI 2C. In 2020, KPI 3D was added to the framework to better understand the proportion of ‘frontline service support staff’ to ATCO in OPS in an ANSP.

It is important to note the dependence of the higher tier metrics on the lower tier. This can be established as follows:

$$\text{KPI 1} = \frac{\text{KPI 2A}}{\text{KPI 2B}} + \text{KPI 2C}$$

$$\text{KPI 2A} = \frac{\text{KPI 3A}}{\text{KPI 3B}}$$

$$\text{KPI 2B} = \frac{\text{KPI 3C}}{\text{KPI 3B}}$$

$$\text{KPI 2D} = \frac{\left(\frac{\text{KPI 2A}}{\text{KPI 2B}}\right)}{\text{KPI 1}} = \frac{\text{KPI 1} - \text{KPI 2C}}{\text{KPI 1}}$$

Overview of Average Performance

The average performance for all the CANSO Key Performance Indicators (KPIs), when comparing 2022 and 2023 ANSP continental (C) and oceanic (O) data, are detailed in the summary table below.

KPI	Continental/ Oceanic	2022 Average	2023 Average	Year-on-Year Change	
Continental and Oceanic Cost Efficiency and Productivity Performance Indicators					
1	Cost per IFR flight hour	C	USD 686.21	USD 732.20	6.7%
		O	USD 152.9	USD 125.98	-18%
2A	ATCO in OPS employment cost per ATCO in OPS hour	C	USD 114.58	USD 131.00	14%
		O	USD 161.03	USD 160.18	-0.5%
2B	ATCO in OPS hour productivity	C	0.65	0.74	14%
		O	3.73	4.28	15%
2C	Cost excluding ATCOs in OPS employment costs per IFR flight hours	C	USD 496.96	USD 538.54	8%
		O	USD 96.31	USD 84.24	-13%
2D	Employment costs of ATCOs in OPS as a percentage of Total costs	C	29%	29%	0.7%
		O	38%	36%	-7%
3A	Annual employment cost per ATCO in OPS	C	USD 158,148.32	USD 172,042.80	9%
		O	USD 225,477.42	USD 224,543.95	-0.4%
3B	Annual Working hours per ATCO in OPS	C	1,425.86	1,413.56	-1%
		O	1285.72	1362.53	6%
3C	Annual IFR hours per ATCO in OPS	C	915.96	1016.21	11%
		O	5616.23	6316.05	12%
3D	Ratio of frontline service staff to ATCO in OPS	C	1.08	1.05	-3%
		O	0.91	0.84	-7%
Joint Continental and Oceanic Cost Efficiency Performance Indicators					
CO1	Cost per IFR flight hour	C + O	USD 671.66	USD 713.56	6%
CO2D	Employment costs of ATCOs in OPS as a percentage of Total costs	C + O	29%	28%	-2%

Table 7 - Average performance for all KPIs in 2022 and 2023

Annex 4: Contextual Data

Please note contextual data is only included for CANSO GBWG submitters.

ANSP: AEROTHAI

Does your ANSP have stated objectives? If so, what are they?	We have 8 strategic objectives supporting our vision of “To Provide Sustainable Air Navigation Services of the Highest Quality Driving Thailand’s Position as a Regional Aviation Hub.”
In your opinion what are the main drivers or issues for performance within your region?	Air traffic recovery after Covid-19 with slow recovery from Chinese international flight.
What are the main initiatives you are undertaking to improve your performance?	AEROTHAI has implemented measures to ensure that each ATCO’s operational hours are limited to a maximum of 200 hours per month in order to maintain safety and comply with CAAT regulations. In addition, AEROTHAI has enhanced its database accuracy to ensure precise calculation of actual ATCO operational hours.
Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic	In 2024, the total number of flights increased by 16 percent compared to the previous year, with international flights recording the highest growth at 30 per cent. Furthermore, the Thai government’s implementation of tourism promotion policies, particularly those supporting air travel, has significantly contributed to the overall increase in flight operations.

Legal status: A company established as a public-private partnership that remains part-owned by the government and provides services on behalf of the government.

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	777,760	0	
Number of FIRs	1	0	
Facilities			
Number of ACC facilities	1	0	
Number of co-located ACC and approach facilities	0	0	
Number of stand-alone approach facilities	1	0	
Number of co-located approach and tower facilities	7	0	
Number of stand-alone towers	14	0	
Number of co-located ACC, approach, and tower facilities	0	0	

Does your ANSP have stated objectives? If so, what are they?

Our stated purpose is to “connect people with their world safely”. In accordance with the Act, our key purposes are to: 1) provide facilities and services for the safety, regularity, and efficiency of air navigation within Australian-administered airspace. 2) Promote and foster civil aviation in Australia and overseas. 3) Carry out activities to protect the environment from the effects of, and the effects associated with, aircraft operations.

In your opinion what are the main drivers or issues for performance within your region?

N/A

What are the main initiatives you are undertaking to improve your performance?

Recruitment initiatives and workforce planning that considers both current and future capability needs. Informed by operational forecasts and technological advancements. We forecast 100 air traffic controller trainees will be recruited and 96 fire fighter rescue trainees will become operational over FY2025-26.

- We are deploying enhanced technology to enable reliable, sustainable and secure services for our customers and stakeholders, and to improve our efficiency and resilience. This technology includes:

1 Aviation rescue fire fighting systems that further enable our value first-responders to effectively monitor and respond to aviation incidents,

2 Air traffic management system enhancements to improve our air traffic controller’s operational efficiency and situational awareness to effectively manage aerodromes.

- Upgrade infrastructure and deliver new services to meet the evolving needs of the aviation industry:

1 Phased roll out of the Civil Military Air Traffic Management System (CMATS) under the OneSKY program to unify civil and military air traffic operations, enhancing interoperability, capacity and resilience.

2 Implementation of the flight information management system (FIMS) to support the entry of uncrewed air traffic management (UTM) frameworks.

3 Investment in infrastructure and services at Western Sydney International and Ballina airports, including new air traffic control, ARFF and digital aerodrome (DAS) services.

Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic

- 1** Severe Weather/Climate Change
- 2** Unavailability of new airframes
- 3** Staffing levels

Legal status: A corporatised entity wholly owned by the government with special status (not governed by normal commercial law but by a specific founding law or statute).

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	7,692,000	44,008,000	
Number of FIRs	2	2	
Facilities			
Number of ACC facilities	2	2	
Number of co-located ACC and approach facilities	2	0	
Number of stand-alone approach facilities	2	0	
Number of co-located approach and tower facilities	12	0	
Number of stand-alone towers	15	0	
Number of co-located ACC, approach, and tower facilities	2	0	

ANSP: Airways New Zealand (NZ)

Does your ANSP have stated objectives? If so, what are they?

Safety - Imbed a safety culture demonstrated through safety performance across the organisation.
 Strengthening Technology Foundations- develop and optimise technology strategy to facilitate future growth.
Sustainability - Develop Airways' sustainability roadmaps focusing on delivering sustainable and inclusive services.
Customer and Stakeholder Engagement - Collaborate with customers to offer fit for purpose services.
People Experience - Improving the people experience, through enhanced learning opportunities, diversity, and workplace safety.

In your opinion what are the main drivers or issues for performance within your region?

Service availability, responsiveness to customer demand and greater focus on sustainability from and for our customers.

What are the main initiatives you are undertaking to improve your performance?

Future services Program - confirming strategic direction and roadmap for Digital Aerodrome Services & Unmanned Traffic Management.
 Developing airspace architecture concept and value proposition.
 Implemented a new Air Traffic Management System, in the new operational facilities on new technology.
 Electronic flight strips into all towers.

Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic

Focus over last couple of years has been increasing ATCOs to provide a more resilient service and pre-empt the expected retirement bubble.
 As we have a high number of individuals training this year, we have seen an increase in FTE but not a corresponding increase in operational hours.

Legal status: A corporatised entity wholly owned by the government with special status (not governed by normal commercial law but by a specific founding law or statute).

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	863,100	28,790,000	
Number of FIRs	1	1	
Facilities			
Number of ACC facilities	0	1	
Number of co-located ACC and approach facilities	1	0	
Number of stand-alone approach facilities	0	0	
Number of co-located approach and tower facilities	6	0	
Number of stand-alone towers	11	1	
Number of co-located ACC, approach, and tower facilities	0	0	

ANSP: Administration de la navigation aérienne (ANA)

Does your ANSP have stated objectives? If so, what are they?	Yes, ST01: Provide En-route and terminal ANS.
In your opinion what are the main drivers or issues for performance within your region?	In 2024, the En route service units increased by 2.7% compared to 2023 actuals, while TNC units increased slightly by 1.5 %.
What are the main initiatives you are undertaking to improve your performance?	We are continuing to try to reduce our costs.
Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic.	Traffic increased again in 2024 compared to 2023 which therefore led to a higher income.

Legal status: A government department or authority that is subject to government accounting and treasury rules, and staff are employed under civil service pay and conditions.

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	4000	0	
Number of FIRs	0	0	
Facilities			
Number of ACC facilities	0	0	
Number of co-located ACC and approach facilities	0	0	
Number of stand-alone approach facilities	0	0	
Number of co-located approach and tower facilities	0	0	
Number of stand-alone towers	1	0	
Number of co-located ACC, approach, and tower facilities	0	0	

ANSP: Air Traffic and Navigation Services, South Africa (ATNS)

Does your ANSP have stated objectives?
If so, what are they?

Traffic increased again in 2024 compared to 2023 which therefore led to a higher income.

In your opinion what are the main drivers or issues for performance within your region?

- The adoption of new technologies can significantly enhance efficiency, safety, and capacity. However, integrating these technologies can be challenging due to high costs, technical complexities, and the need for staff training.
- Maintaining and improving safety standards is paramount. This includes managing air traffic, preventing collisions, and ensuring all operational aspects meet stringent safety criteria.
- Increasing air traffic can strain existing systems, necessitating more efficient airspace management and possibly infrastructure expansion to handle the volume without compromising safety or efficiency.
- Having skilled personnel is crucial. Challenges include recruiting, retaining, and continuously training staff to keep up with technological advancements and regulatory changes.
- Economic conditions affect airline operations, impacting the volume of air traffic and, consequently, the workload and financial health of ANSPs. Economic downturns or upswings can lead to significant fluctuations.
- Addressing noise, emissions, and other environmental impacts is increasingly important. Implementing environmentally friendly practices can be challenging but is becoming a priority.
- Operational Efficiency or constraints.

What are the main initiatives you are undertaking to improve your performance?

- Infrastructure updates.
- Increased investment in ATCO training and development.
- Operational Efficiency Programme.
- Customer Service Enhancements.
- Research and innovation.

Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic

Staffing challenges, including the need for recruitment, training, or retention of skilled personnel, especially in the context of the pandemic's impact on the workforce, has influenced operational effectiveness.

Legal status: A government entity empowered to manage and use the revenues it generates through charges for the services it provides.

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	9,279,080	12,720,920	
Number of FIRs	2	1	
Facilities			
Number of ACC facilities	0	0	
Number of co-located ACC and approach facilities	0	0	
Number of stand-alone approach facilities	0	0	
Number of co-located approach and tower facilities	9	0	
Number of stand-alone towers	10	0	
Number of co-located ACC, approach, and tower facilities	2	1	

ANSP: Bosnia and Herzegovina (BHANSA)

<p>Does your ANSP have stated objectives? If so, what are they?</p>	<p>MISSION:</p> <p>Our mission is to provide air traffic management and air navigation services in the airspace of Bosnia and Herzegovina in a safe and efficient manner, with minimal delays and a commitment to environmental protection. We are dedicated to meeting the needs of our users, developing sustainable partnerships, and creating a highly skilled workforce.</p> <p>VISION:</p> <p>We aim to be a provider of air navigation services recognized for the highest standards of safety, quality, and innovation. Guided by the pursuit of self-sustaining growth, we are determined to become a symbol of excellence and competitiveness in the aviation industry.</p>
<p>In your opinion what are the main drivers or issues for performance within your region?</p>	<p>Main issues: Increase of traffic year by year, staff shortage (ATCOS).</p>
<p>What are the main initiatives you are undertaking to improve your performance?</p>	<p>Main initiatives: improvement of Airspace design, Technical infrastructure, Air Traffic Management (ATM) procedures, Air Traffic Flow Management (ATFM) system and procedures, Recruitment and Training of new ATCOS.</p>
<p>Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic.</p>	<p>Recovery of air traffic from the effects caused by the Covid-19 pandemic faster than average in Europe.</p>

Legal status: A government entity empowered to manage and use the revenues it generates through charges for the services it provides.

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	38,900		
Number of FIRs	1		
Facilities			
Number of ACC facilities	1		
Number of co-located ACC and approach facilities	0		
Number of stand-alone approach facilities	0		
Number of co-located approach and tower facilities	4		
Number of stand-alone towers	0		
Number of co-located ACC, approach, and tower facilities	0		

ANSP: Civil Aviation Authority of Singapore (CAAS)

<p>Does your ANSP have stated objectives? If so, what are they?</p>	<p>CAAS' mission is to grow a safe, vibrant air hub and civil aviation system, making a key contribution to Singapore's success. CAAS does so via six areas of focus, namely:</p> <ul style="list-style-type: none"> • Growing Singapore as a Global Air Hub • Ensuring Safe and Efficient Air Traffic Flows • Upholding a Safe Aviation Environment • Developing the Industry • Contributing to International Aviation • Contingency Planning & Crisis Management
<p>In your opinion what are the main drivers or issues for performance within your region?</p>	<p>Growing air traffic demand.</p>
<p>What are the main initiatives you are undertaking to improve your performance?</p>	<p>Developing and investing in next generation air navigation services systems to enhance the safety and efficiency of ANS services to meet growing air traffic demand.</p>
<p>Were there any factors that impacted your individual ANSP performance in your fiscal year 2020, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic</p>	

Legal status: A government entity empowered to manage and use the revenues it generates through charges for the services it provides.

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	670,000	0	
Number of FIRs	1		
Facilities			
Number of ACC facilities	1	0	
Number of co-located ACC and approach facilities	0	0	
Number of stand-alone approach facilities	1	0	
Number of co-located approach and tower facilities	0	0	
Number of stand-alone towers	3	0	
Number of co-located ACC, approach, and tower facilities	0	0	

ANSP: General Directorate of State Airports Authority (DHMI)

Does your ANSP have stated objectives? If so, what are they?

Yes. Our strategic objectives are aligned with national strategies and contribute to Pan-European performance metrics. Key objectives include: ensuring the highest level of safety, managing capacity dynamically to accommodate the growing East-West traffic flow, improving flight efficiency to reduce emissions, and modernizing CNS/ATM infrastructure to maintain cost-efficiency.

In your opinion what are the main drivers or issues for performance within your region?

The main driver is the rapid growth of traffic, driven by the expansion of Istanbul Airport as a major global hub. The primary issues are geopolitical conflicts in the neighboring regions (North and South), which have led to the closure of adjacent airspaces. This situation shifts significant traffic flows into Turkish airspace, increasing sector complexity and workload.

What are the main initiatives you are undertaking to improve your performance?

We are focusing on three main pillars:

Human Resources: Continuous recruitment and training of ATCOs to meet capacity requirements.

Airspace Management: Implementation and expansion of Free Route Airspace (FRA) to improve flight efficiency.

Technology: Upgrading ATM systems and modernization of radar infrastructure to handle increased traffic density.

Were there any factors that impacted your individual ANSP performance in your fiscal year 2020, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic.

Yes. Geopolitical instability in the region significantly impacted operations. Specifically, the conflict in the Middle East and tensions between Israel and Iran caused major disruptions. The closure of Iranian airspace in April 2024 forced massive rerouting and flight diversions into Turkish airspace. These events, combined with the ongoing unavailability of Ukrainian airspace, required intensive 'dynamic capacity management' to handle the volatile and unplanned traffic demand.

Legal status: A government entity empowered to manage and use the revenues it generates through charges for the services it provides?

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	982,000	0	
Number of FIRs	2	0	
Facilities			
Number of ACC facilities	2	0	
Number of co-located ACC and approach facilities	3	0	
Number of stand-alone approach facilities	0	0	
Number of co-located approach and tower facilities	48	0	
Number of stand-alone towers	4	0	
Number of co-located ACC, approach, and tower facilities	0	0	

ANSP: Lennuliiklusteeninduse Aktsiaselts (EANS)

Does your ANSP have stated objectives?
If so, what are they?

In your opinion what are the main drivers or issues for performance within your region?

What are the main initiatives you are undertaking to improve your performance?

Were there any factors that impacted your individual ANSP performance in your fiscal year 2020, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic

Legal status: A corporatised entity wholly owned by the government, governed by normal commercial law.

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	77,400	0	
Number of FIRs	1	0	
Facilities			
Number of ACC facilities	1	0	
Number of co-located ACC and approach facilities	1	0	
Number of stand-alone approach facilities	0	0	
Number of co-located approach and tower facilities	0	0	
Number of stand-alone towers	1	0	
Number of co-located ACC, approach, and tower facilities	1	0	

ANSP: Kenya Civil Aviation Authority (KCAA)

Does your ANSP have stated objectives? If so, what are they? Enhanced capacity, efficiency, safety and security of air navigation.

In your opinion what are the main drivers or issues for performance within your region?

- Timely project implementation
- Strong revenue base
- Qualified, competent, and productive staff
- Internationally recognized accreditations and approvals by relevant regulatory and certification bodies.

What are the main initiatives you are undertaking to improve your performance?

System Automation and aligning CANS/ATM System Implementation to KCAA Airspace Masterplan and the ICAO ASBU Blocks.

Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic

Government Budget Rationalization.

Legal status: A government entity empowered to manage and use the revenues it generates through charges for the services it provides.

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	77,052	0	
Number of FIRs	1	0	
Facilities			
Number of ACC facilities	1	0	
Number of co-located ACC and approach facilities	1	0	
Number of stand-alone approach facilities	0	0	
Number of co-located approach and tower facilities	2	0	
Number of stand-alone towers	5	0	
Number of co-located ACC, approach, and tower facilities	1	0	

ANSP: Direction des Services de la navigation aérienne (DSNA)

Does your ANSP have stated objectives? If so, what are they?	Objectives provided in the Performance Plan as stated in the EU regulation 2019/317.
In your opinion what are the main drivers or issues for performance within your region?	Traffic congestion
What are the main initiatives you are undertaking to improve your performance?	Improve ATM systems and procedures
Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic	War in Ukraine impacted traffic and routes in Europe

Legal status: A government entity empowered to manage and use the revenues it generates through for the services it provides.

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	1,010,000	15,437,214	
Number of FIRs	5	2	
Facilities			
Number of ACC facilities	5	0	
Number of co-located ACC and approach facilities	0	0	
Number of stand-alone approach facilities	0	0	
Number of co-located approach and tower facilities	20	6	
Number of stand-alone towers	75	4	
Number of co-located ACC, approach, and tower facilities	0	2	

Does your ANSP have stated objectives?
If so, what are they?

Spain (and, therefore, ENAIRE) is subject to regulated performance objectives through the Performance framework (Reg 317/2019; Reg 2020/1627; Decision 2021/891), PRB monitoring dashboards, etc). Additionally ENAIRE establishes, in its strategic plan other objectives for priority areas.

In your opinion what are the main drivers or issues for performance within your region?

Europe is strongly driven by the SES Performance and Charging scheme regulation in the EU, and Eurocontrol vision at wider level (ECAC). In May 2024 the European Commission's Decision on the consistency of the performance targets included in the draft performance plan of Spain for RP4 was published.

What are the main initiatives you are undertaking to improve your performance?

ENAIRE establishes its priorities and main initiatives in its Strategic Plan. Digitalisation, airspace restructuration and an ambitious investment plan are at the core of ENAIRE's expectations to improve future performance.

Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic

The en route Capacity and Environment KPIs failed to meet the targets set in the Spanish Performance Plan (2023) but it should be notice than since May 2023, prepandemic traffic levels have been exceeded and, however KEA values remain below their 2022 equivalents and well below their 2019 equivalents, thus already showing a clear improvement. Regarding en route capacity since March, en route traffic has been higher than the equivalent of 2019. In some regions the recovery regarding pre-pandemic has been faster and already since January they were at values above the 2019 equivalents in Canarias ACC (GCCC), Palma ACC (LECP) and Seville ACC (LECS), while other regions such as Madrid ACC (LECM) exceeded pre-pandemic levels in August. Despite the increase in traffic, national delay levels remained below target until May and ERD values in 2023 have always remained lower than those of 2019 until the end of the year when they equaled it, i.e. an ERD value similar to 2019 has been reached but managing 2 per cent more en-route traffic. On the other hand, due to the Ukraine war, Oceanic traffic is proceeding via the Northern sectors in Madrid ACC, with particular impact on the SAO (Santiago Oceanic) sector. ATFCM procedures have been implemented to control workload on SAN/SAO when the level of oceanic traffic is high, and a new project has been planned to reorganize the Northern sectors and increase delivered capacity.

Legal status: A government entity empowered to manage and use the revenues it generates through charges for the services it provides.

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	2,190,000	0	
Number of FIRs	3		
Facilities			
Number of ACC facilities	5	0	
Number of co-located ACC and approach facilities	0	0	
Number of stand-alone approach facilities	3	0	
Number of co-located approach and tower facilities	14	0	
Number of stand-alone towers	7	0	
Number of co-located ACC, approach, and tower facilities	0	0	

ANSP: Federal Aviation Administration – Air Traffic Organization (FAA-ATO)

Does your ANSP have stated objectives?
If so, what are they?

FAA Mission

In your opinion what are the main drivers or issues for performance within your region?

What are the main initiatives you are undertaking to improve your performance?

Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic

Legal status: A government department or authority that is subject to government accounting and treasury rules, and staff are employed under civil service pay and conditions.

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	14,832,411	60,628,411	
Number of FIRs	0	5	
Facilities			
Number of ACC facilities	21	3	
Number of co-located ACC and approach facilities	3	2	
Number of stand-alone approach facilities	25	0	
Number of co-located approach and tower facilities	124	0	
Number of stand-alone towers	139	0	
Number of co-located ACC, approach, and tower facilities	1	0	

ANSP: HungaroControl

Does your ANSP have stated objectives? If so, what are they?

Cost efficient operation, keeping safety first while improving service quality.

In your opinion what are the main drivers or issues for performance within your region?

The main driver of the European performance is the performance scheme. The main issue in our subregion (South-East Europe) is the variability of traffic due to geopolitical reasons.

What are the main initiatives you are undertaking to improve your performance?

The ANSPs have to bear cost and traffic risk however they do not have influence on traffic. Having incentives on the level of delays as well, HungaroControl is interested in the further development of capacities (technological investments, airspace management procedures, training).

Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic

The war in Ukraine had a significant impact on our traffic and also capacity and environmental performance. ATCO training takes 2.5 years, so the expansion of staff numbers failed to keep pace with the rapid and unexpected increase in traffic.

Legal status: A corporatised entity wholly owned by the government with special status (not governed by normal commercial law but by a specific founding law or statute).

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	104,000	0	
Number of FIRs	1	0	
Facilities			
Number of ACC facilities	1	0	
Number of co-located ACC and approach facilities	1	0	
Number of stand-alone approach facilities	0	0	
Number of co-located approach and tower facilities	0	0	
Number of stand-alone towers	2	0	
Number of co-located ACC, approach, and tower facilities	0	0	

ANSP: Isavia ANS

Does your ANSP have stated objectives? If so, what are they?

Being a known organisation with a positive image, having outstanding core business and happy employees.

In your opinion what are the main drivers or issues for performance within your region?

The main drivers are keeping our capacity to meet the demand at any time, ensuring safety, keeping costs as low as possible while still upholding necessary standards of service and minimizing negative effects on the environment.

What are the main initiatives you are undertaking to improve your performance?

These years our main initiatives are strengthening our partnership and cooperation with companies that we do business with, making our company a family friendly workplace for our employees, promote managers and encourage good team spirit and emphasising a good flow of information.

Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic

Volcanic eruption impacted our performance slightly, changing the traffic organization in the area.

Legal status: A corporatised entity wholly owned by the government with special status (not governed by normal commercial law but by a specific founding law or statute).

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	103,000	5,400,000	
Number of FIRs	1	0	
Facilities			
Number of ACC facilities	1	0	
Number of co-located ACC and approach facilities	1	0	
Number of stand-alone approach facilities	1	0	
Number of co-located approach and tower facilities	0	0	
Number of stand-alone towers	1	2	
Number of co-located ACC, approach, and tower facilities	1	1	

ANSP: NAV CANADA

Does your ANSP have stated objectives?
If so, what are they?

In your opinion what are the main drivers or issues for performance within your region?

What are the main initiatives you are undertaking to improve your performance?

Were there any factors that impacted your individual ANSP performance in your fiscal year 2020, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic

Legal status:

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	0	0	
Number of FIRs	7	1	
Facilities			
Number of ACC facilities	7	1	Gander ACC manages both continental and oceanic airspace and is thus included in both categories.
Number of co-located ACC and approach facilities	0	0	
Number of stand-alone approach facilities	0	0	
Number of co-located approach and tower facilities	0	0	
Number of stand-alone towers	42	0	
Number of co-located ACC, approach, and tower facilities	0	0	

ANSP: NAV Portugal

Does your ANSP have stated objectives? If so, what are they?	Yes. We have a 5-year Business Plan with objectives and targets stemming from EU regulation (EU Reg. 2019/317) for Capacity, Environment, Cost-Efficiency and Safety.
In your opinion what are the main drivers or issues for performance within your region?	SES Regulations and specifically Performance scheme works as the main driver to improve efficiency as well as traffic demand and customer satisfaction.
What are the main initiatives you are undertaking to improve your performance?	Implement new ATM systems to respond to the increase digitalisation of the sector, as well the CNS infrastructure.
Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic	The increase in traffic 7.0% compare to 2023.

Legal status: A corporatised entity wholly owned by the government with special status (not governed by normal commercial law but by a specific founding law or statute).

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	671,000	5,180,000	
Number of FIRs	1	1	
Facilities			
Number of ACC facilities	1	1	
Number of co-located ACC and approach facilities	1	0	
Number of stand-alone approach facilities	0	0	
Number of co-located approach and tower facilities	3	4	
Number of stand-alone towers	3	0	
Number of co-located ACC, approach, and tower facilities	0	0	

ANSP: Polish Air Navigation Services Agency (PANSA)

Does your ANSP have stated objectives? If so, what are they?	Objectives related to the Performance Plan/SES Regulations and 4 Key Performance Areas: Safety, Environment, Capacity, Cost-Efficiency.
In your opinion what are the main drivers or issues for performance within your region?	SES Regulations, Performance Plans requirements, Performance and Charging scheme regulations; Changes in traffic routes/flows due to the war in Ukraine.
What are the main initiatives you are undertaking to improve your performance?	Airspace modernisation; Changes in the sectorization of airspace; Shortening the flight routes; Reducing CO ₂ emissions; Cooperation with the military; and improving the competitiveness offered by the PANSA for users of Polish airspace.
Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic	The aggression of the Russian Federation against Ukraine has a significant impact on the air navigation services in Poland due to the closure of the airspace beyond the eastern border of Poland, changes in air traffic flows and increased military activity in Polish airspace. The war in Ukraine has particularly affected the overflight segment (significant loss of heavy traffic) - we expect these effects to be long-term, meaning they will be felt even after the war is over.

Legal status: A state legal entity empowered to manage and use the revenues it generates through charges for the services it provides.

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	333,000	0	
Number of FIRs	1	0	
Facilities			
Number of ACC facilities	1	0	
Number of co-located ACC and approach facilities	1	0	
Number of stand-alone approach facilities	3	0	
Number of co-located approach and tower facilities	0	0	
Number of stand-alone towers	15	0	
Number of co-located ACC, approach, and tower facilities	1	0	

ANSP: Serbia and Montenegro Air Traffic Services Agency (SMATSA)

Does your ANSP have stated objectives? If so, what are they?	Yes. SMATSA 5 years Strategic Business Plan contains a set of Strategic Objectives. Those were set in order to improve general performance of the company, but basically performance of services provided. The objectives are focused on infrastructure modernization/investments and HR performance improvements.
In your opinion what are the main drivers or issues for performance within your region?	Significant increase in air traffic demand.
What are the main initiatives you are undertaking to improve your performance?	The completion of infrastructure modernization program. At the same time continuation of ATCO and other staff training, and finalization of on-going projects in the ATM/CNS domain.
Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic	Significant increase in air traffic demand.

Legal status: Other.

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	99,400	0	
Number of FIRs	1	0	
Facilities			
Number of ACC facilities	1	0	
Number of co-located ACC and approach facilities	1	0	
Number of stand-alone approach facilities	0	0	
Number of co-located approach and tower facilities	7	0	
Number of stand-alone towers	1	0	
Number of co-located ACC, approach, and tower facilities	0	0	

ANSP: Slovenia Control

Does your ANSP have stated objectives?
If so, what are they?

In your opinion what are the main drivers or issues for performance within your region?

Capacity.

What are the main initiatives you are undertaking to improve your performance?

Carefully planned capacity (staff, technology) and cost efficiency.

Were there any factors that impacted your individual ANSP performance in your fiscal year 2022, as shown in the KPIs in this report? For example, exceptional events in the year related to traffic

Legal status: A corporatised entity wholly owned by the government with special status (not governed by normal commercial law but by a specific founding law or statute)?

Contextual data element	Continental	Oceanic	Comments
Operational Data			
Sq. km. – oceanic and continental	20,000	0	
Number of FIRs	1	0	
Facilities			
Number of ACC facilities	0	0	
Number of co-located ACC and approach facilities	1	0	
Number of stand-alone approach facilities	0	0	
Number of co-located approach and tower facilities	2	0	
Number of stand-alone towers	2	0	
Number of co-located ACC, approach, and tower facilities	0	0	

Annex 5: KPI Data

Continental

1. Continental Cost per IFR hour (USD)

Formula: Total costs (USD) / IFR flight hours.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
AEROTHAI	406.64	-35.27%	0.77%
Airways NZ	507.3	9.19%	2.03%
Albcontrol	620.43	6.39%	- 4.77%
ANA	1398.81	1.18%	17.36%
ANS CR	962.46	19.99%	12.81%
ARMATS	777.00	-10.01%	-0,85%
ATNS	268.86	-18.24%	-3.87%
Austro Control	825.52	3.66%	3.04%
Avinor (Continental)	569.58	6.43%	3.09%
BHANSA	397.75	2.37%	-
BULATSA	456.27	6.74%	2.50%
CAAS	710.98	-16.60%	8.63%
Croatia Control	417.13	8.12%	3.04%
DCAC Cyprus	402.03	44.84%	19.03%
DFS	953.24	2.11%	5.04%
DHMI	515.89	58.28%	56.95%
DSNA	790.56	-3.21%	5.50%
EANS	485.57	-2.18%	7.46%
ENAIRE	525.45	-13.03%	1.30%
ENAV	693.70	2.31%	2.69%
Fintraffic ANS	759.83	10.42%	9.03%
HASP	306.16	14.70%	3.85%
HungaroControl	413.55	3.35%	4.62%
IAA	544.33	15.49%	8.11%
Isavia ANS	837.37	20.87%	35.59%
KCAA	122.07	-72.10%	-5.71%
LFV	673.21	22.95%	15.27%
LGS	598.55	29.59%	17.97%

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
LPS	2070.32	10.44%	8.29%
LVNL	344.73	-4.34%	7.01%
MATS	460.47	-3.58%	-0.21%
M-NAV	2377.66	35.73%	31.94%
MOLDATSA	1683.73	68.25%	22.25%
MUAC	423.91	-2.01%	11.28%
NATS (Continental)	563.57	-4.31%	1.02%
NAV CANADA	344.75	-3.22%	1.42%
NAV Portugal	442.65	19.78%	2.01%
NAVAIR	705.93	-0.81%	6.35%
Oro Navigacija	678.00	11.84%	13.95%
PANSA	682.98	9.79%	13.94%
ROMATSA	731.48	12.33%	10.08%
Sakaeronavigatsia	492.89	-23.23%	-4.83%
skeyes	3284.18	15.33%	11.51%
Skyguide	1626.39	16.38%	9.36%
Slovenia Control	736.06	9.57%	5.98%
SMATSA	460.52	6.22%	7.15%

2a. Continental ATCOs in OPS employment cost per ATCO in OPS hour (USD)

Formula: ATCOs in OPS employment costs / ATCOs in OPS hours.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
AEROTHAI	37.08	7.71%	-0.22%
Airways NZ	145.04	12.96%	5.44%
Albcontrol	38.30	-7.74%	-5.25%
ANA	149.13	-4.39%	10.72%
ANS CR	145.81	39.50%	4.57%
ARMATS	38.38	16.30%	12.79%
ATNS	38.88	5.82%	2.61%
Austro Control	212.99	11.54%	1.84%
Avinor (Continental)	131.00	-2.10%	0.99%
BHANSA	57.56	22.33%	-
BULATSA	130.16	21.75%	4.99%

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
Croatia Control	117.28	16.75%	4.11%
DCAC Cyprus	68.41	-4.72%	4.40%
DFS	308.28	17.34%	2.72%
DHMI	66.58	66.36%	47.97%
DSNA	462.90	252.98%	35.85%
EANS	111.01	-4.08%	2.95%
ENAIRE	174.88	-0.87%	0.51%
ENAV	164.87	-0.17%	4.64%
Fintraffic ANS	98.56	24.23%	3.26%
HASP	90.89	7.70%	9.10%
HungaroControl	102.87	15.69%	4.65%
IAA	123.73	9.45%	3.14%
Isavia ANS	148.25	11.30%	6.90%
KCAA	21.70	126.12%	8.10%
LFV	189.92	35.16%	16.39%
LGS	61.35	9.98%	-1.35%
LPS	139.48	18.38%	3.39%
LVNL	116.89	3.17%	3.09%
MATS	54.16	0.00%	-5.31%
M-NAV	64.54	-0.59%	-1.09%
MOLDATSA	29.50	39.20%	4.81%
MUAC	368.22	3.89%	7.76%
NATS (Continental)	167.39	-0.10%	4.33%
NAV CANADA	132.61	-13.85%	2.78%
NAV Portugal	203.75	24.95%	6.67%
NAVIAIR	154.27	12.74%	5.65%
Oro navigacija	69.56	22.30%	4.67%
PANSA	150.89	7.26%	5.21%
ROMATSA	147.24	13.25%	7.72%
Sakaeronavigatsia	31.63	24.61%	8.50%
skeyes	184.47	-4.19%	1.15%
Skyguide	231.74	-9.73%	1.36%
Slovenia Control	123.88	-	3.94%
SMATSA	86.46	10.64%	7.35%

2a. Continental ATCOs in OPS employment cost per ATCO in OPS hour (USD), PPP adjusted

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
AEROTHAI	121.19	18.76%	4.06%
Airways NZ	161.77	11.41%	5.13%
Albcontrol	91.75	-9.74%	-4.99%
ANA	170.90	0.70%	12.46%
ANS CR	254.50	43.47%	4.43%
ARMATS	101.70	26.74%	21.40%
ATNS	98.10	0.71%	0.26%
Austro Control	269.83	14.59%	3.07%
Avinor (Continental)	149.60	41.92%	1.92%
BHANSA	150.49	25.51%	-
BULATSA	304.59	27.58%	-9.43%
Croatia Control	250.49	18.63%	4.65%
DCAC Cyprus	110.61	-5.05%	6.05%
DFS	400.43	18.66%	3.78%
DHMI	195.14	-7.97%	0.86%
DSNA	638.97	274.05%	39.78%
EANS	173.72	-2.62%	1.16%
ENAIRE	273.21	-1.21%	1.72%
ENAV	249.97	3.10%	7.30%
Fintraffic ANS	117.92	33.39%	6.02%
HASP	159.20	8.10%	10.79%
HungaroControl	209.07	8.04%	-0.70%
IAA	151.97	7.56%	4.12%
Isavia ANS	138.95	13.50%	5.78%
KCAA	70.12	124.41%	6.67%
LFV	239.98	38.59%	17.75%
LGS	111.04	14.07%	-2.08%
LPS	248.55	14.04%	2.69%
LVNL	143.57	5.49%	4.27%
MATS	90.91	1.63%	-4.21%
M-NAV	205.96	7.36%	0.98%
MOLDATSA	77.12	38.42%	7.18%

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
NATS (Continental)	204.98	0.36%	5.58%
NAV CANADA	154.06	-8.07%	3.59%
NAV Portugal	345.75	26.09%	7.87%
NAVIAIR	180.33	29.30%	9.28%
Oro navigacija	131.83	25.31%	2.63%
PANSA	333.67	5.52%	2.85%
ROMATSA	359.40	16.03%	4.99%
Sakaeronavigatsia	96.21	35.57%	8.34%
skeyes	243.37	2.50%	3.50%
Skyguide	212.47	-4.20%	5.21%
Slovenia Control	203.50	-	4.26%
SMATSA	207.02	5.58%	4.69%

2b. Continental ATCOs in OPS hour productivity

Formula: IFR flight hours / ATCOs in OPS hours.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
AEROTHAI	0.34	42.21%	1.22%
Airways NZ	0.78	5.13%	2.45%
Albcontrol	0.68	-5.71%	3.55%
ANA	0.29	-3.47%	-7.52%
ANS CR	0.59	16.47%	-8.43%
ARMATS	0.20	9.83%	4.28%
ATNS	0.59	25.24%	3.67%
Austro Control	0.85	9.83%	0.61%
Avinor (Continental)	0.59	0.27%	1.12%
BHANSA	0.62	28.23%	-
BULATSA	0.91	13.80%	2.56%
CAAS	0.68	29.15%	1.73%
Croatia Control	0.84	4.66%	1.27%
DCAC Cyprus	0.87	0.91%	-2.18%
DFS	0.77	7.86%	-3.98%
DHMI	0.75	11.78%	-2.16%
DSNA	2.34	241.95%	35.89%
EANS	0.72	-7.74%	-3.19%
ENAIRE	0.81	5.73%	1.07%
ENAV	0.73	3.53%	2.69%
Fintraffic ANS	0.45	31.46%	-1.94%
HASP	0.92	14.85%	1.54%
HungaroControl	1.10	8.25%	2.36%
IAA	0.82	9.02%	0.96%
Isavia ANS	0.35	-11.56%	-28.64%
KCAA	0.37	18.80%	-0.37%
LFV	0.60	9.60%	0.12%
LGS	0.52	-1.81%	-10.68%
LPS	0.55	4.95%	-5.51%
LVNL	0.46	6.11%	-3.12%
MATS	0.73	34.62%	-6.58%
M-NAV	0.48	10.02%	-0.31%
MOLDATSA	0.07	32.02%	-14.85%

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
MUAC	2.12	4.76%	-1.26%
NATS (Continental)	0.91	9.51%	-0.86%
NAV CANADA	1.32	6.00%	-0.10%
NAV Portugal	1.05	4.96%	2.13%
NAVIAIR	0.71	14.19%	-0.92%
Oro navigacija	0.38	3.69%	-9.18%
PANSA	0.64	0.16%	-6.40%
ROMATSA	0.70	18.43%	-0.14%
Sakaeronavigatsia	0.57	59.47%	16.87%
skeyes	0.39	2.47%	-0.60%
Skyguide	0.68	-1.57%	-2.70%
Slovenia Control	0.56	7.51%	1.84%
SMATSA	0.68	-0.55%	-4.71%

2c. Continental Costs excluding ATCOs in OPS employment costs per IFR hour (USD)

Formula: Costs excluding ATCOs in OPS employment costs / IFR flight hours.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
AEROTHAI	298.83	-38.49%	1.62%
Airways NZ	321.16	10.23%	1.63%
Albcontrol	564.17	7.32%	-4.35%
ANA	878.23	2.49%	16.07%
ANS CR	716.17	20.06%	12.35%
ARMATS	583.89	-14.26%	-3.12%
ATNS	202.46	-19.09%	-4.72%
Austro Control	574.25	4.61%	3.89%
Avinor (Continental)	349.00	12.87%	5.43%
BHANSA	305.31	4.69%	-
BULATSA	313.24	6.63%	2.56%
Croatia Control	276.75	6.46%	3.16%
DCAC Cyprus	323.38	66.46%	23.36%
DFS	554.41	-2.22%	3.74%
DHMI	426.90	60.40%	58.28%
DSNA	593.13	-5.17%	7.72%

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
EANS	330.48	-4.83%	8.01%
ENAIRE	309.82	-17.19%	2.71%
ENAV	468.99	5.39%	3.08%
Fintraffic ANS	540.18	18.54%	10.75%
HASP	207.47	28.32%	2.34%
HungaroControl	320.37	2.37%	5.37%
IAA	394.25	22.50%	10.90%
Isavia ANS	415.05	16.20%	26.16%
KCAA	64.08	-84.26%	-13.14%
LFV	357.13	22.62%	14.44%
LGS	480.38	34.79%	20.26%
LPS	717.37	36.99%	12.72%
LVNL	1816.01	12.58%	8.57%
MATS	270.85	3.80%	8.85%
M-NAV	324.76	-0.80%	0.03%
MOLDATSA	1959.12	44.61%	34.30%
MUAC	250.17	-2.82%	12.89%
NATS (Continental)	380.39	-2.01%	-0.73%
NAV CANADA	244.37	5.02%	0.85%
NAV Portugal	248.00	20.37%	0.29%
NAVIAIR	489.57	-0.60%	6.22%
Oro navigacija	495.88	9.75%	13.50%
PANSA	446.61	11.27%	14.80%
ROMATSA	522.57	20.76%	11.03%
Sakaeronavigatsia	437.61	-23.40%	-4.51%
skeyes	2807.49	20.09%	13.70%
Skyguide	1285.71	25.32%	10.97%
Slovenia Control	516.66	-23.09%	7.89%
SMATSA	333.94	4.42%	5.38%

2d. Continental Proportion of total costs made up of ATCO in OPS employment costs

Formula: ATCO in OPS employment Costs / Total Costs.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
AEROTHAI	0.26512	17.01%	-2.18%
Airways NZ	0.36693	-1.60%	0.81%
Albcontrol	0.09068	-8.03%	-3.93%
ANA	0.37216	-2.11%	2.01%
ANS CR	0.25590	-0.18%	1.23%
ARMATS	0.24853	17.66%	9.08%
ATNS	0.24699	3.34%	2.96%
Austro Control	0.30437	-2.03%	-1.76%
Avinor (Continental)	0.38727	-8.27%	-3.13%
BHANSA	0.23241	-6.81%	-
BULATSA	0.31347	0.23%	-0.13%
Croatia Control	0.33652	3.17%	-0.23%
DCAC Cyprus	0.19563	-34.81%	-10.34%
DFS	0.41839	6.55%	1.85%
DHMI	0.17250	-5.97%	-3.63%
DSNA	0.24973	6.64%	-5.24%
EANS	0.31939	6.29%	-1.04%
ENAIRE	0.41036	7.79%	-1.84%
ENAV	0.32392	-5.75%	-0.77%
Fintraffic ANS	0.28908	-14.42%	-3.41%
HASP	0.32234	-18.24%	3.46%
HungaroControl	0.22531	3.41%	-2.27%
IAA	0.27572	-13.07%	-5.51%
Isavia ANS	0.50434	4.12%	10.48%
KCAA	0.47507	582.14%	15.06%
LFV	0.46951	0.30%	0.84%
LGS	0.19744	-13.57%	-6.37%
LPS	0.26127	-13.04%	-2.14%
LVNL	0.12284	-11.96%	-1.74%
MATS	0.21433	-22.34%	-5.28%
M-NAV	0.29473	-6.29%	-0.57%
MOLDATSA	0.17603	-22.32%	-6.71%

ANSP	KPI	2021-2022 AGR	2018-2022 CAGR
MUAC	0.40984	1.21%	-1.92%
NATS (Continental)	0.32503	-4.66%	4.17%
NAV CANADA	0.29116	-16.02%	1.45%
NAV Portugal	0.43973	-0.62%	2.38%
NAVIAIR	0.30649	-0.47%	0.27%
Oro navigacija	0.26862	5.46%	1.14%
PANSA	0.34608	-2.46%	-1.35%
ROMATSA	0.28560	-14.87%	-2.01%
Sakaeronavigatsia	0.11215	1.78%	-2.45%
skeyes	0.14515	-18.93%	-8.74%
Skyguide	0.20947	-21.20%	-4.74%
Slovenia Control	0.29807	-	-3.69%
SMATSA	0.27487	4.74%	5.14%

3a. Continental Annual employment cost per ATCO in OPS (USD)

Formula: ATCOs in OPS employment costs / No. ATCOs in OPS.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
AEROTHAI	73063.06	24.96%	-12.33%
Airways NZ	144590.25	11.13%	5.41%
Albcontrol	52335.42	6.91%	-5.49%
ANA	164453.10	-4.36%	6.98%
ANS CR	214288.13	33.33%	2.14%
ARMATS	55827.86	18.65%	13.56%
ATNS	48314.88	8.40%	-0.64%
Austro Control	289440.36	10.93%	1.05%
Avinor (Continental)	202397.75	-0.78%	1.00%
BHANSA	70018.22	11.73%	-
BULATSA	167424.74	21.71%	5.00%
Croatia Control	157592.86	19.18%	4.27%
DCAC Cyprus	117032.58	-0.28%	1.05%
DFS	342359.96	13.98%	6.55%
DHMI	77816.67	69.76%	47.69%
DSNA	164173.34	20.14%	-1.52%
EANS	123953.48	-2.06%	-5.36%
ENAIRE	231686.59	4.49%	1.06%
ENAV	208899.96	5.65%	4.30%
Fintraffic ANS	132975.89	1.73%	-0.11%
HASP	140150.44	7.70%	10.19%
HungaroControl	155412.82	17.00%	3.75%
IAA	206257.60	14.39%	5.53%
Isavia ANS	245622.88	6.62%	8.10%
KCAA	37505.94	93.82%	13.14%
LFV	284316.82	33.14%	11.57%
LGS	80273.93	11.59%	-5.53%
LPS	214357.79	18.11%	2.79%
LVNL	194038.69	9.02%	4.40%
MATS	115486.16	0.00%	-2.03%
M-NAV	86964.10	1.20%	0.13%
MOLDATSA	40992.19	30.95%	3.53%

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
MUAC	411682.08	7.33%	6.45%
NATS (Continental)	213359.60	-1.00%	3.46%
NAV CANADA	238942.20	-12.92%	5.59%
NAV Portugal	413634.30	24.24%	6.74%
NAVIAIR	228391.13	12.18%	5.85%
Oro navigacija	106823.84	19.80%	3.88%
PANSA	161708.38	16.36%	4.76%
ROMATSA	174390.84	14.74%	7.23%
Sakaeronavigatsia	48207.80	24.61%	8.50%
skeyes	198112.64	-23.56%	-5.60%
Skyguide	317169.66	-8.53%	1.41%
Slovenia Control	169142.38	-	3.85%
SMATSA	111181.14	23.30%	10.33%

3a. Continental Annual employment cost per ATCO in OPS (USD), PPP adjusted

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
AEROTHAI	238801.12	37.77%	-8.56%
Airways NZ	161270.94	9.61%	5.10%
Albcontrol	125382.02	4.59%	-5.23%
ANA	188466.83	0.74%	8.66%
ANS CR	374019.95	37.12%	2.00%
ARMATS	147938.09	29.30%	22.23%
ATNS	121895.45	3.16%	-2.92%
Austro Control	366693.01	13.97%	2.27%
Avinor (Continental)	231134.59	43.84%	1.93%
BHANSA	183059.49	14.63%	-
BULATSA	391805.66	27.54%	-9.43%
Croatia Control	336600.71	21.11%	4.81%
DCAC Cyprus	189224.41	-0.63%	2.65%
DFS	444702.30	15.27%	7.64%
DHMI	228084.48	-6.10%	0.66%
DSNA	226617.91	27.31%	1.33%
EANS	193971.37	-0.57%	-7.01%

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
ENAIRE	361947.51	4.14%	2.27%
ENAV	316719.58	9.11%	6.96%
Fintraffic ANS	159096.20	9.23%	2.56%
HASP	245486.12	8.10%	11.89%
HungaroControl	315836.93	9.26%	-1.55%
IAA	253326.94	12.42%	6.53%
Isavia ANS	230221.61	8.72%	6.96%
KCAA	121169.62	92.35%	11.65%
LFV	359252.99	36.52%	12.88%
LGS	145284.75	15.73%	-6.23%
LPS	381977.97	13.78%	2.09%
LVNL	238319.60	11.48%	5.59%
MATS	193840.59	1.63%	-0.90%
M-NAV	277536.49	9.29%	2.22%
MOLDATSA	107149.16	30.22%	5.87%
NATS (Continental)	261272.61	-0.55%	4.70%
NAV CANADA	277581.88	-7.07%	6.42%
NAV Portugal	701918.09	25.38%	7.94%
NAVIAIR	266974.37	28.66%	9.48%
Oro navigacija	202448.58	22.75%	1.86%
PANSA	357584.50	14.46%	2.41%
ROMATSA	425674.80	17.55%	4.51%
Sakaeronavigatsia	146629.74	35.57%	8.34%
skeyes	261372.90	-18.22%	-3.41%
Skyguide	290789.56	-2.93%	5.27%
Slovenia Control	277850.02	-	4.17%
SMATSA	266232.28	17.66%	7.60%

3b. Continental Annual working hours per ATCO in OPS

Formula: ATCOs in OPS hours / No. ATCOs in OPS.

ANSP	KPI	2021-2022 AGR	2018-2022 CAGR
AEROTHAI	1970.46	16.01%	-12.13%
Airways NZ	996.90	-1.62%	-0.02%
Albcontrol	1366.60	15.88%	-0.25%
ANA	1102.77	0.04%	-3.38%
ANS CR	1469.60	-4.42%	-2.33%
ARMATS	1454.58	2.02%	0.69%
ATNS	1242.62	2.43%	-3.17%
Austro Control	1358.96	-0.55%	-0.78%
Avinor (Continental)	1545.03	1.35%	0.02%
BHANSA	1216.40	-8.67%	-
BULATSA	1286.32	-0.03%	0.01%
CAAS	1588.12	4.38%	-3.34%
Croatia Control	1343.75	2.09%	0.16%
DCAC Cyprus	1710.77	4.66%	-3.21%
DFS	1110.56	-2.86%	3.72%
DHMI	1168.81	2.04%	-0.19%
DSNA	354.66	-65.97%	-27.50%
EANS	1116.58	2.10%	-8.07%
ENAIRE	1324.82	5.41%	0.55%
ENAV	1267.05	5.83%	-0.32%
Fintraffic ANS	1349.18	-18.11%	-3.27%
HASP	1542.00	0.00%	1.00%
HungaroControl	1510.70	1.13%	-0.86%
IAA	1667.00	4.51%	2.32%
Isavia ANS	1656.85	-4.21%	1.12%
KCAA	1728.00	-14.29%	4.66%
LFV	1497.04	-1.49%	-4.14%
LGS	1308.46	1.46%	-4.24%
LPS	1536.85	-0.23%	-0.58%
LVNL	1659.97	5.67%	1.27%
MATS	2132.33	0.00%	3.46%
M-NAV	1347.54	1.80%	1.23%
MOLDATSA	1389.33	-5.92%	-1.22%

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
MUAC	1118.02	3.31%	-1.21%
NATS (Continental)	1274.60	-0.91%	-0.83%
NAV CANADA	1801.82	1.08%	2.73%
NAV Portugal	2030.11	-0.57%	0.07%
NAVIAIR	1480.47	-0.49%	0.18%
Oro navigacija	1535.66	-2.05%	-0.75%
PANSA	1071.68	8.48%	-0.43%
ROMATSA	1184.41	1.32%	-0.46%
Sakaeronavigatsia	1524.00	0.00%	0.00%
skeyes	1073.96	-20.21%	-6.68%
Skyguide	1368.62	1.33%	0.06%
Slovenia Control	1365.33	-0.06%	-0.09%
SMATSA	1286.00	11.44%	2.78%

3c. Continental Annual IFR hours per ATCO in OPS

Formula: IFR flight hours / No. ATCOs in OPS.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
AEROTHAI	677.71	64.98%	-11.06%
Airways NZ	776.77	3.43%	2.42%
Albcontrol	930.18	9.26%	3.30%
ANA	315.90	-3.43%	-10.64%
ANS CR	870.06	11.32%	-10.56%
ARMATS	289.10	12.05%	5.00%
ATNS	727.57	28.28%	0.38%
Austro Control	1151.95	9.23%	-0.18%
Avinor (Continental)	917.58	1.63%	1.14%
BHANSA	757.43	17.12%	
BULATSA	1170.58	13.76%	2.57%
CAAS	1078.21	34.80%	-1.67%
Croatia Control	1122.68	6.85%	1.44%
DCAC Cyprus	1488.03	5.61%	-5.31%
DFS	858.41	4.78%	-0.40%
DHMI	874.44	14.06%	-2.35%

ANSP	KPI	2021-2022 AGR	2018-2022 CAGR
DSNA	831.58	16.38%	-1.49%
EANS	799.26	-5.79%	-11.01%
ENAIRE	1074.49	11.46%	1.62%
ENAV	929.67	9.57%	2.35%
Fintraffic ANS	605.39	7.66%	-5.14%
HASP	1420.14	14.85%	2.55%
HungaroControl	1667.91	9.47%	1.48%
IAA	1374.32	13.95%	3.31%
Isavia ANS	581.61	-15.28%	-27.84%
KCAA	646.73	1.83%	4.28%
LFV	899.52	7.96%	-4.02%
LGS	679.27	-0.38%	-14.46%
LPS	844.90	4.71%	-6.06%
LVNL	762.99	12.13%	-1.89%
MATS	1563.04	34.62%	-3.35%
M-NAV	640.79	12.01%	0.92%
MOLDATSA	97.94	24.20%	-15.88%
MUAC	2369.63	8.22%	-2.46%
NATS (Continental)	1164.78	8.51%	-1.68%
NAV CANADA	2380.38	7.14%	2.62%
NAV Portugal	2125.07	4.36%	2.20%
NAVIAIR	1055.61	13.62%	-0.74%
Oro navigacija	586.55	1.57%	-9.86%
PANSA	684.14	8.65%	-6.80%
ROMATSA	834.76	19.99%	-0.59%
Sakaeronavigatsia	872.10	59.47%	16.87%
skeyes	415.60	-18.24%	-7.24%
Skyguide	930.98	-0.26%	-2.65%
Slovenia Control	770.93	7.45%	1.75%
SMATSA	878.32	10.83%	-2.06%

3d. Continental Ratio of Frontline Service Staff to ATCO in OPS

Formula: No. Frontline Service Staff / No. ATCOs in OPS.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
AEROTHAI	1.03	-12.35%	-6.92%
Airways NZ	0.59	8.41%	-2.98%
ANA	0.45	-35.41%	11.59%
ATNS	1.12	24.82%	3.12%
BHANSA	1.91	-6.58%	-
DSNA	0.39	-6.35%	-19.88%
ENAIRE	1.03	9.57%	3.28%
HungaroControl	1.30	9.96%	-0.50%
Isavia ANS	1.41	-6.04%	-0.90%
KCAA	0.73	-22.27%	-
NAV CANADA	1.29	-5.02%	-0.84%
PANSA	1.34	-2.32%	0.18%
SMATSA	1.07	-	-

Oceanic

1. Oceanic Cost per IFR hour (USD)

Formula: Total costs / IFR flight hours.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
Airways NZ	65.66	-11.24%	-0.53%
Isavia ANS	159.50	-4.80%	-0.34%
NAV CANADA	109.23	-13.93%	18.09%

2a. Oceanic ATCO in OPS employment cost per ATCO in OPS hour (USD)

Formula: ATCOs in OPS employment costs / ATCOs in OPS Hours.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
Airways NZ	144.18	4.33%	4.08%
Isavia ANS	176.31	-0.90%	7.30%
NAV CANADA	150.70	-6.76%	5.22%

2a. Oceanic ATCO in OPS employment cost per ATCO in OPS hour (USD), PPP adjusted

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
Airways NZ	160.82	2.90%	3.78%
Isavia ANS	165.26	1.05%	6.18%
NAV CANADA	175.06	-0.50%	6.05%

2b. Oceanic ATCO in OPS hour productivity

Formula: IFR flight hours / ATCOs in OPS hours.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
Airways NZ	3.25	25.04%	2.47%
ATNS	0.20	402.86%	-24.72%
Isavia ANS	4.93	10.93%	6.73%
NAV CANADA	8.02	10.61%	4.88%

2c. Oceanic Costs excluding ATCOs in OPS employment costs per IFR hour (USD)

Formula: Costs excluding ATCOs in OPS employment costs / IFR flight hours.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
Airways NZ	21.24	2.43%	-4.32%
Isavia ANS	123.76	-2.96%	-0.59%
NAV CANADA	90.45	-13.55%	24.51%

2d. Oceanic Proportion of total costs made up of ATCO in OPS employment costs

Formula: ATCO in OPS employment costs / Total Costs.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
Airways NZ	0.68	-6.00%	2.12%
Isavia ANS	0.22	-6.16%	0.89%
NAV CANADA	0.17	-2.06%	-15.04%

3a. Oceanic Annual employment cost per ATCO in OPS (USD)

Formula: ATCOs in OPS employment costs / No. ATCOs in OPS

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
Airways NZ	153365.24	7.03%	5.09%
Isavia ANS	165069.51	-20.65%	-2.13%
NAV CANADA	258330.98	-7.69%	8.50%

3a. Oceanic Annual employment cost per ATCO in OPS (USD), PPP adjusted

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
Airways NZ	171058.26	5.57%	4.79%
Isavia ANS	154719.18	-19.08%	-3.15%
NAV CANADA	300106.04	-1.50%	9.35%

3b. Oceanic Annual working hours per ATCO in OPS

Formula: ATCOs in OPS hours / No. ATCOs in OPS.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
Airways NZ	1063.69	2.59%	0.97%
ATNS	1224.00	38.46%	48.11%
Isavia ANS	936.22	-19.93%	-8.79%
NAV CANADA	1714.26	-1.00%	3.11%

3c. Oceanic Annual IFR hours per ATCO in OPS

Formula: IFR flight hours / No. ATCOs in OPS

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
Airways NZ	3452.33	28.27%	3.46%
ATNS	239.69	596.27%	11.50%
Isavia ANS	4618.95	-11.18%	-2.65%
NAV CANADA	13753.78	9.50%	8.15%

3d. Oceanic Ratio of Frontline Service Staff to ATCOs in OPS

Formula: No. Frontline Service Staff / No. ATCOs in OPS

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
Airways NZ	0.91	14.31%	4.26%
Isavia ANS	1.17	-22.77%	-5.66%
NAV CANADA	0.44	6.94%	2.67%

Joint Continental and Oceanic

COI: Combined Cost per IFR hour (USD)

Formula: Total costs / IFR flight hours.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
AEROTHAI	406.64	-35.27%	0.77%
Airways NZ	363.20	3.25%	1.85%
Albcontrol	620.43	6.39%	-4.77%
ANA	1398.81	1.18%	17.36%
ANS CR	962.46	19.99%	12.81%
ARMATS	777.00	-10.01%	-0.85%
ATNS	266.52	-18.82%	-3.59%
Austro Control	825.52	3.66%	3.04%
Avinor (Continental)	569.58	6.43%	3.09%
BHANSA	397.75	2.37%	-
BULATSA	456.27	6.74%	2.50%
CAAS	710.98	-16.60%	8.63%
Croatia Control	417.13	8.12%	3.04%
DCAC Cyprus	402.03	44.84%	19.03%
DFS	953.24	2.11%	5.04%
DHMI	515.89	58.28%	56.95%
DSNA	790.56	-3.21%	3.26%
EANS	485.57	-2.18%	7.46%
ENAIRE	525.45	-13.03%	1.30%
ENAV	693.70	2.31%	2.69%
Fintraffic ANS	759.83	10.42%	9.03%
HASP	306.16	14.70%	3.85%
HungaroControl	413.55	3.35%	4.62%
IAA	544.33	15.49%	8.11%
Isavia ANS	177.88	-4.14%	1.21%
KCAA	122.07	-72.10%	-5.71%
LFV	673.21	22.95%	15.27%

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
LGS	598.55	29.59%	17.97%
LPS	971.08	29.72%	11.81%
LVNL	2070.32	10.44%	8.29%
MATS	344.73	-4.34%	7.01%
M-NAV	460.47	-3.58%	-0.21%
MOLDATSA	2377.66	35.73%	31.94%
MUAC	423.91	-2.01%	11.28%
NATS (Continental)	563.57	-4.31%	1.02%
NAV CANADA	297.77	-5.06%	1.58%
NAV Portugal	442.65	19.78%	2.01%
NAVIAIR	705.93	-0.81%	6.35%
Oro navigacija	678.00	11.84%	13.95%
PANSA	682.98	9.79%	13.94%
ROMATSA	731.48	12.33%	10.08%
Sakaeronavigatsia	492.89	-23.23%	-4.83%
skeyes	3284.18	15.33%	11.51%
Skyguide	1626.39	16.38%	9.36%
Slovenia Control	736.06	9.57%	5.98%
SMATSA	460.52	6.22%	7.15%

CO2D: Combined Proportion of total costs made up of ATCO in OPS employment costs

Formula: ATCO in OPS employment costs / Total Costs.

ANSP	KPI	2022-2023 AGR	2019-2023 CAGR
AEROTHAI	0.27	17.01%	-2.18%
Airways NZ	0.39	-2.23%	0.84%
Albcontrol	0.09	-8.03%	-3.93%
ANA	0.37	-2.11%	2.01%
ANS CR	0.26	-0.18%	1.23%
ARMATS	0.25	17.66%	9.08%
ATNS	0.25	3.34%	2.96%
Austro Control	0.30	-2.03%	-1.76%
Avinor (Continental)	0.39	-8.27%	-3.13%
BHANSA	0.23	-6.81%	-
BULATSA	0.31	0.23%	-0.13%
Croatia Control	0.34	3.17%	-0.23%

ANSP	KPI	2021-2022 AGR	2018-2022 CAGR
DCAC Cyprus	0.20	-34.81%	-10.34%
DFS	0.42	6.55%	1.85%
DHMI	0.17	-5.97%	-3.63%
DSNA	0.25	6.64%	-3.19%
EANS	0.32	6.29%	-1.04%
ENAIRE	0.41	7.79%	-1.84%
ENAV	0.32	-5.75%	-0.77%
Fintraffic ANS	0.29	-14.42%	-3.41%
HASP	0.32	-18.24%	3.46%
HungaroControl	0.23	3.41%	-2.27%
IAA	0.28	-13.07%	-5.51%
Isavia ANS	0.26	-3.85%	2.81%
KCAA	0.48	582.14%	15.06%
LFV	0.47	0.30%	0.84%
LGS	0.20	-13.57%	-6.37%
LPS	0.26	-13.04%	-2.14%
LVNL	0.12	-11.96%	-1.74%
MATS	0.21	-22.34%	-5.28%
M-NAV	0.29	-6.29%	-0.57%
MOLDATSA	0.18	-22.32%	-6.71%
MUAC	0.41	1.21%	-1.92%
NATS (Continental)	0.33	-4.66%	4.17%
NAV CANADA	0.28	-15.40%	0.51%
NAV Portugal	0.44	-0.62%	2.38%
NAVIAIR	0.31	-0.47%	0.27%
Oro navigacija	0.27	5.46%	1.14%
PANSA	0.35	-2.46%	-1.35%
ROMATSA	0.29	-14.87%	-2.01%
Sakaeronavigatsia	0.11	1.78%	-2.45%
skeyes	0.15	-18.93%	-8.74%
Skyguide	0.21	-21.20%	-4.74%
Slovenia Control	0.30	-	-3.69%
SMATSA	0.27	4.74%	5.14%

Annex 6: Exchange Rates

All exchange rates shown in the table below represent the 2023 National Currency Per U.S. Dollar, Period Average. For sources please see Annex 8.

ANSP	Currency	2023 Exchange Rate
AEROTHAI	THB	34.80
Airservices Australia	AUD	1.51
Airways NZ	NZD	1.63
Albcontrol	ALL	100.65
ANA	EUR	0.92
ANS CR	CZK	22.20
ATNS	ZAR	18.45
Austro Control	EUR	0.92
Avinor (Continental)	NOK	10.56
BHANSA	BAM	1.81
BULATSA	BGN	1.81
CAAS	SGD	1.34
Croatia Control	EUR	0.92
DCAC Cyprus	EUR	0.92
DFS	EUR	0.92
DHMI	TRY	23.74
DSNA	EUR	0.92
EANS	EUR	0.92
ENAIRE	EUR	0.92
ENAV	EUR	0.92
FAA-ATO	USD	1.00
Fintraffic ANS	EUR	0.92
HASP	EUR	0.92
HungaroControl	HUF	353.09
IAA	EUR	0.92
Isavia ANS	ISK	137.94
KCAA	KSH	139.85
LFV	SEK	10.61
LGS	EUR	0.92
LPS	EUR	0.92
LVNL	EUR	0.92
MATS	EUR	0.92

ANSP	Currency	2023 Exchange Rate
M-NAV	MKD	56.95
MOLDATSA	MDL	18.16
MUAC	EUR	0.92
NATS (Continental)	GBP	0.80
NAV CANADA	CDN	1.35
NAV Portugal	EUR	0.92
NAVIAIR	DKK	6.89
Oro Navigacija	EUR	0.92
PANSA	PLN	4.20
ROMATSA	RON	4.57
Sakaeronavigatsia	GEL	2.63
Skeyes	EUR	0.92
Skyguide	CHF	0.90
Slovenia Control	EUR	0.92
SMATSA	RSD	108.40

Annex 7: Acronyms and Abbreviations

ACE	ATM Cost Effectiveness	IMF	International Monetary Fund
ACC	Area Control Centre	KEA	Actual Flown Trajectory
ACI	Airports Council International	KPI	Key Performance Indicator
ADS	Automatic Dependent Surveillance	LTAG	Long Term Global Aspirational Goal
ALDT	Actual Landing Time	MET	Aeronautical Meteorological
ANS	Air Navigation Services	NM	Nautical Mile
ANSP	Air Navigation Service Provider	OECD	Organisation for Economic Co-operation and Development
AOBT	Actual Off-Block Time	OPS	Operations
ASBU	Aviation System Block Upgrade	PPP	Purchasing Power Parity
ASK	Available Seat Kilometres	PRU	Performance Review Unit
ASMA	Arrival Sequencing and Metering Area	RPK	Revenue Passenger Kilometres
ATC	Air Traffic Control	RWY	Runway
ATCO	Air Traffic Controller	SAF	Sustainable Aviation Fuel
ATFM	Air Traffic Flow Management	SES	Single European Sky
ATM	Air traffic management	SIWG	Safety Intelligence Workgroup
ATOT	Actual Take-Off Time	TNSU	Terminal Navigation Service Units
ATS	Air Traffic Service	TMA	Terminal Manoeuvring Area
CAGR	Compound Annual Growth Rate	TWR	Tower
CG	Comparator Group	UN	United Nations
CANSO	Civil Air Navigation Services Organisation	USD	United States Dollar
CNS	Communications, Navigation and Surveillance	VFR	Visual Flight Rules
CORSIA	ICAO Carbon Offsetting and Reduction Scheme for International Aviation	YoY	Year-on-Year
CPDLC	Controller Pilot Data Link Communications		
EU	European Union		
FTE	Full Time Equivalent		
FY	Financial Year		
GBWG	Global Benchmarking Workgroup		
IATA	International Air Transport Association		
ICAO	International Civil Aviation Organisation		
IFR	Instrument Flight Rules		
IFRS	International Financial Reporting Standards		

Annex 8: Sources

Definitions

[EUROCONTROL Specification for Economic Information Disclosure V3.0](#)

ACE benchmarking report data dashboard

[Eurocontrol.int/ACE/ACE-Home.html](https://eurocontrol.int/ACE/ACE-Home.html)

ACE benchmarking report

[ACE benchmarking report \(2025 edition\)](#)

Industry trends

[Global Air Travel Demand Continued Its Bounce Back in 2023](#)

[Joint ACI World-ICAO Passenger Traffic Report, Trends, and Outlook](#)

[Top 20 busiest airports in the world confirmed by ACI World](#)

[IATA Industry Statistics Factsheet](#)

[2022 Jet Fuel Price](#)

[2023 Jet Fuel Price](#)

[The World of Air Transport in 2023](#)

[Aviation Tracking – CO2 Emissions](#)

[SAF Offtake Agreements](#)

[CORSIA Newsletter December 2023](#)

[Long-term global aspirational goal \(LTAG\) for international aviation](#)

Exchange rate data

[Official exchange rate \(LCU per US\\$, period average\) | Data \(worldbank.org\)](#)

PPP rate and inflation data

[Implied PPP conversion rate, National currency per current international dollar | Indicator Profile | Prosperity Data360 \(worldbank.org\)](#)

WHO declared the end of pandemic

<https://news.un.org/en/story/2023/05/1136367>

