MINISTÈRE CHARGÉ DES TRANSPORTS
Liberté
Égalité
Fraternité

direction générale de l'Aviation civile
DSNA

ANNUAL REPORT

DSNA
THE FRENCH AIR NAVIGATION SERVICE PROVIDER

2023 / 2022

Florian Guillermet

French Air Navigation Services Director

In 2023, France controlled nearly 3.2 million flights, confirming the recovery of air traffic since 2022, returning to its highest recorded levels. Peaks exceeding 2019 traffic levels were even recorded in certain sectors.

This resilience of the aeronautical sector inspires all DSNA staff, who take pride in successfully driving major achievements in their respective fiels. Transforming DSNA is essential if we are to effectively and sustainably respond to new challenges in the air transport industry such as improving safety and cyber security, enhancing operational efficiency and reducing environmental impact.

This transformation requires an unprecedented modernisation of our infrastructures and technical systems, strategic territorial restructuring to align with available resources while improving resilience and service quality, and adapting our control services to efficiently manage seasonal variations in air traffic, especially during peak periods. For operational staff, these changes will also require adjustments to their working methods.

The future also relies on effective strategic workforce planning for operational staff. The number of recruitments have been validated to prepare for the anticipated wave of retirements by 2030. DSNA, in collaboration with the National Academy for Civil Aviation (ENAC), has already launched initiatives to attract young people to these professions.

Our « DSNA 2030 » strategy embodies this ambitious vision to position DSNA as an efficient, modern and eco-responsible air navigation service provider in Europe !

*As of December 2023, **DSNA Steering Committee** was composed of : Florian Guillermet (Director), Frédéric Guignier (Director of Strategy and Resources), Guillaume Blandel (Director of Operations), Christophe Rouquié (Director of Technology and Innovation), Estelle Le Guilcher (Safety Director), Stéphane Le Foll (Head of Environnement Mission) and Anne-Laure Gaumerais (Chief of Staff).*

Air traffic control in France

Foreword

This 2022-2023 annual report complies with the requirements of the Single European Sky regulation for air navigation operators. It outlines initiatives undertaken by DSNA staff to enhance operational and environmental performance during this period for the benefit of its customers and airspace users.

Given its extensive airspace and its geographical position at the crossroads of major air traffic flows, France controls the largest volume of flights in Europe. It is also the leading contributor to flight delays. This is why DSNA is committed to implementing an ambitious reform of its services. France's capacity to enhance flight performance and contribute to greener aviation relies heavily on its ability to adapt its organisational structure, especially at regional level, and modernise its tools and infrastructure.

For en-route traffic, the 4-FLIGHT control system, in operation at two pilot sites since 2022, is scheduled for deployment across all upper airspace managed by the five ACCs by 2026. In 2023, air traffic controllers at Brest ACC were the first to benefit from a new-generation radio/telephone voice communication system.

The strategy for upgrading the tower control systems has been revised, with the Orly Tower leading the way with the deployment of an off-the-shelf electronic flight strip system. The current organisation requires significant human, technical, and financial resources to operate the regional sites. This situation directly impacts the timeline for upgrading system and infrastructure. Therefore, DSNA has developed a plan to optimise its territorial coverage in line with the European performance plan, deploying advanced tools that meet European technological standards while ensuring sustainable resource management and future growth potential.

To effectively execute this large-scale modernisation project, DSNA is reassessing the overall architecture of its systems and streamlining its infrastructure.

DSNA is also focusing on understanding how to manage its operational capacity and workforce more effectively. For air traffic controllers, this means customising the service to better meet their needs, while for technical staff, the focus is on prioritising essential tasks. A multi-year recruitment plan has been defined to ensure operational workforce stability over the next five years.

Finally, to support the ecological transition of air transport, DSNA is continuing to implement Free Route and satellite-based PBN procedures, explore new ATC methods to optimise trajectories, and improve operational tools for the pre-tactical phase.

In terms of finances, the total charges collected in 2023 amounted to €1,792 million, marking a substantial increase compared to 2022. This rise reflects the dynamic recovery of international flights and overflights. 81% of DSNA's revenue comes from foreign-flag airlines.

In conclusion, DSNA is actively working to ensure consistent, high-quality performance for its customers and airspace users while effectively managing costs, in a context of increasingly seasonal air traffic.

Highlights

2022

▶ JANUARY

Organisation

Restructuring of DSNA's Headquarters with the establishment of a Directorate of Strategy and Resources (DSR) and a Safety Directorate (DSEC).

▶ JUNE

Modernisation

Deployment of the new 4-FLIGHT air traffic control system on 14 June at Reims ACC.
Launch of the iATS2024@ORY project to modernise the Orly air traffic control system by the 2024 Summer Olympics.

▶ OCTOBER

1922 – 2022

Air traffic control, which originated in Europe, celebrates its 100th anniversary.

In the space of a century, the aviation industry has shown remarkable capacity for innovation and resilience. The current challenges of green and high-performance aviation promise to be equally as exciting in the years to come!

▶ DECEMBER

Modernisation

Deployment of the 4-FLIGHT system at Marseille ACC on 6 December.

2023

▶ JANUARY

- **Resources :** inauguration of a high-tech simulator at Basel-Mulhouse Airport to train air traffic controllers in the North-East SNA (six sites in mainland France equipped by the end of 2023).
- **Safety :** implementation of pack#1 (April) and pack#2 (November) to simplify safety studies, track recommendations, and execute action plans.

▶ MARCH

Resources

Negotiations initiated with trade unions for a new DGCA social protocol.

▶ SEPTEMBER

Modernisation

Deployment of CACAO3, the new version of the control system at the oceanic centre in Cayenne (French Guiana).

▶ OCTOBER

Infrastructure

Completion of the first phase of civil engineering works for the new technical block extension in Marseille (South-South-East SNA) to accommodate a new technical room, an IFR room, and an office space.

▶ NOVEMBER

Modernisation

Deployment of the new-generation communications system (air-ground and ground-ground links) at Brest ACC on 21 November.

▶ DECEMBER

- **Organisation**
  A new strategic plan for DSNA outlining objectives up to 2030.
- **Environmental performance**
  Planned deployment of smooth descent procedures (PBN to ILS project) at Orly in April 2025 for aircraft approaching from the west.

PART 1
Operational and environmental performance

Operational performance

A marked recovery in air traffic

With 3,184,246 flights controlled in 2023, air traffic increased by 9.1% compared to 2022. This positive trend, following the sudden and unprecedented period associated with the COVID-19 pandemic, is largely due to overflights and international flights, which now account for 90% of flights controlled by France. Among the main air traffic flows involving France, such as Spain-Germany and Italy-United Kingdom overflights, and flights to/from Germany and the United Kingdom, are still significantly lower than 2019 levels (see chart on page 11).

Traffic in France is characterised by increasingly fluctuating demand with strong seasonal variations and high peaks. In mainland France, traffic varies by 50% between summer (June/July/August) and winter (December/January/February). In 2023, France recorded several days with over 10,000 flights, including the busiest day in Europe, on 7 July 2023, with 11,012 flights. Nearly 170 million passengers (+17% compared to 2022) travelled on international and domestic flights serving airports in mainland France.

In Europe, traffic continued the rebound that started in 2022, with a growth of 9.4%, although significant disparities remain among countries. As Europe's leading air navigation service provider, DSNA is the only operator to have exceeded the threshold of controlling 3 million flights in 2023. France, the United Kingdom and Germany are still at -4%, -7% and -14% of 2019 traffic levels, respectively, while Spain and Italy have returned to their record traffic levels from 2019.

AVERAGE NUMBER OF FLIGHTS PER DAY

2019
8,970

2022
7,998

2023
8,724

ABSOLUTE DAILY TRAFFIC PEAK

SUMMER 2019
11,311 flights

SUMMER 2022
10,551 flights

SUMMER 2023
11,012 flights

Disappointing punctuality

France has the highest number of delays in Europe: in 2023, 7.4 million minutes of delay were recorded (compared to 4.1 million minutes in 2022), resulting in an average delay of 2.31 minutes per flight. With an "en-route" performance of 2.09 minutes per flight and an "aerodrome" performance of 0.70 minutes per flight, France exceeds the performance targets set by the European Commission under the Single European Sky regulation (0.25 and 0.40 minutes respectively).
In 2023, en-route delays accounted for 84% of these delays. The most impacted centres were Reims ACC (+15% traffic compared to 2022), Marseille ACC (+9%) and Paris ACC (+8%).
The four main causes of these delays were: nationwide industrial action (such as pension reform) during the first half of 2023 (40%); insufficient sector openings during peak periods (20%); capacity reductions (17%); and adverse weather conditions (16%).

In a context of increasingly seasonal traffic, DSNA aims to deliver consistent, high-quality performance to optimise its service to its customers. To enhance its performance, DSNA has initiated projects to improve its operational capacity along with actions focused on enhancing human resource management (p. 15).

AVERAGE DELAY PER FLIGHT

2019
1.33 minute

2022
1.42 minute

2023
2.31 minutes

The aim of this work is to:
• quantify the increase in control sector capacity resulting from the implementation of the new systems using a standardised national methodology;
• objectify and standardise the assessment of required control capacity to ensure the smooth flow of traffic demand, achieved through improved anticipation of needs using forecasts from the Network Manager;
• ensure the implementation of an optimised air traffic control service by effectively using new tools that maximise flexibility in work organisation;
• ensure consistency between available capacity and the capacity actually used.

WHAT OUR CUSTOMERS ARE SAYING

At the annual strategy meeting in June, DSNA customers expressed strong expectations regarding strike management, going beyond the immediate operational impact of delays and flight cancellations.
The bill passed in November 2023, which mandates advance notification of strikes, received positive feedback from both airlines and airport operators.
In addition, regulations for air traffic control related to weather conditions are having an increasingly significant impact across Europe. EUROCONTROL, the Network Manager, and operational stakeholders have raised concerns about this issue.
DSNA is actively exploring ways to better manage these challenges, specifically through collaboration with Météo-France and the Network Manager's cross-border initiative.

A high level of operational safety and security

Flight safety is DSNA's top priority. In 2023, three **significant events** were analysed in detail to better understand the current operational context and formulate recommendations:
• In cruise: a dangerous situation involving an aircraft with an undetected faulty transponder in the airspace managed by the Bordeaux ACC;
• On the ground: a collision between a B777 and an A330 on the taxiway at Paris-CDG airport; misalignment on a taxiway at Toulouse airport.

In accordance with European Regulation 2017/373 and following approval by the National Supervisory Authority (DSAC), DSNA has implemented new streamlined procedures for **safety studies**. For the most complex changes, DSNA will strengthen its capabilities by integrating specialised skills and expertise within the team.

In addition, work to reorganise the **safety management system** (SMS) has enhanced its maturity level, enabling an objective assessment of the SMS quality and safety culture. Targeted actions will be carried out in 2024.

Regarding light aviation, the Directorate of Operations organised **VFR forums** at twelve sites in mainland France in June 2023. These forums made it possible to exchange on experiences and ideas, and to develop guidelines aimed at enhancing flight safety, with a particular focus on preventing controlled airspace infringements and runway incursions.

In terms of **security**, the newly established "Safety – Cybersecurity" department within the DSEC is responsible for enhancing DSNA's capability to prevent, detect, and respond to cyber threats. In 2023, DSNA strengthened its **Security Operation Center** (SOC), initiated the enhancement of security measures for staffed sites, and launched the audits required to secure remote sites.

> *“All together now : don’t just think local, think network ! ”*
>
> EUROCONTROL - European Network Managers for operators.

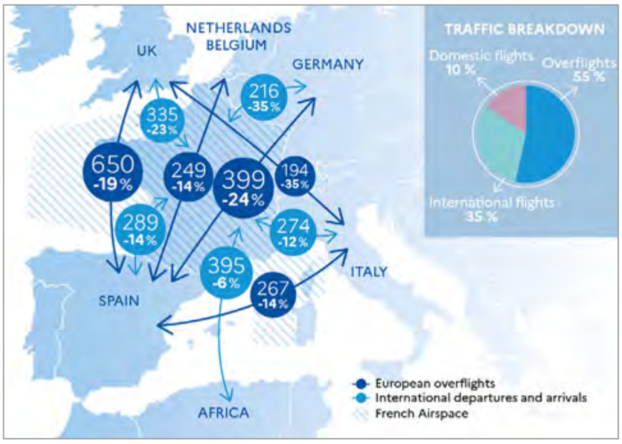
Air Traffic and Flight Punctuality
Key figures

IFR traffic since 1980

(XX %) : change compared to 2019 traffic

Main traffic flows in France

Average daily flights in 2023 and 2023/2019 variation



1,038,555 FLIGHTS
IN 2023

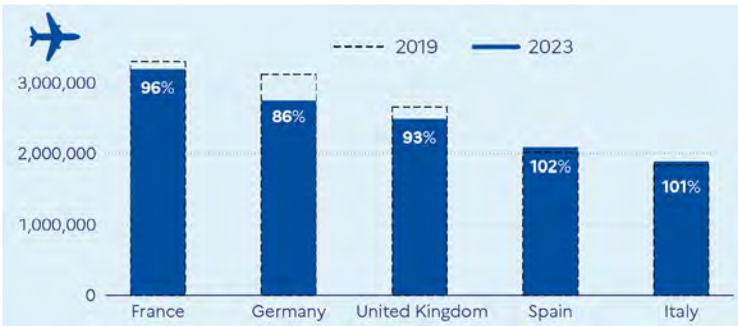
For its 40th anniversary (1983-2023), Reims ACC exceeded the milestone of one million flights in one year for the first time on 8 December 2023.

France : IFR movements in main airports (arrivals and departures)

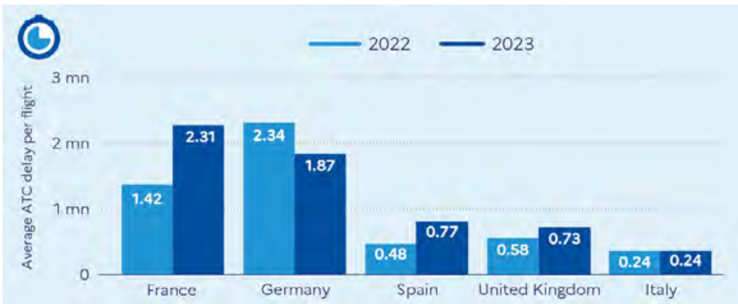
	2019	2023	
Paris - CDG	505,380	454,398	90%
Paris - Orly	221,132	208,329	94%
Nice	145,991	145,559	100%
Marseille	102,617	100,254	98%
Lyon-St Exupéry	116,639	89,270	77%
Toulouse	100,116	76,536	76%
Bâle-Mulhouse	85,382	70,064	82%
Bordeaux	75,524	60,324	80%
Paris-Le Bourget	53,685	58,494	109%
Nantes	65,743	50,621	77%
Pointe-à-Pître	27,711	27,876	101%
Tahiti Faa'a	21,173	27,484	130%
Fort-de-France	17,982	15,684	87%
St Denis La Réunion	13,922	15,127	109%
Cayenne	6,235	6,276	101%
Nouméa	5,163	4,593	89%

XX % 2023 traffic shares compared to 2019 traffic

Air traffic in Europe



Flight punctuality in Europe



Environmental performance

To obtain recognition for its commitment to ecological transition, DSNA has initiated the process to join the **CANSO "Green ATM" environmental accreditation programme.**

Cayenne oceanic airspace transitions to Free Route Airspace. Introduced on 15 April 2023, Free Route facilitates environmental considerations for serving Cayenne (continuous descent, reduced holding, limiting overflights over urban areas) and enhances coordination management with adjacent airspaces.

Each optimisation implemented by the DSNA results in **fuel consumption savings of up to 10% for medium-haul flight phases**, reducing CO_2 emissions by up to 600 kg per flight !

To support the ecological transition of air transport, DSNA is actively collaborating with airlines to improve the environmental performance of flights. This includes adopting new working methods and integrating next-generation tools. DSNA is also committed to improving communication regarding the actions taken and the results achieved.

Continued deployment of Free Route in France

On 21 February 2024, two additional Free Route cells were added within Reims ACC and Marseille ACC airspace, **expanding France's Free Route airspace coverage above FL 195 (6,000 metres) to 70%.** This latest phase, implemented for the first time in a 4-FLIGHT environment, strengthens DSNA's commitment to implementing Free Route across its upper airspace in accordance with European regulations. This new system provides airlines with greater flexibility in route planning and shortens average route lengths, contributing to more environmentally sustainable flights.
The ACC teams, trained in optimising trajectories as part of Free Route airspace design, are applying their new skills to enhance existing flight paths. Brest, Bordeaux, and Paris ACCs have identified and implemented optimisations to existing routes, saving approximately 7 tons of kerosene per day, or 9,000 tons of CO_2 per year.

New control methods to optimise arrival trajectories

In 2022, the Operations Directorate established a consultative body with airlines, aimed at the environmental optimisation of flight trajectories by identifying the most significant inefficiencies in air traffic control. Live trials initiated in 2022 were expanded and reinforced in 2023. As a result, optimised descent procedures were implemented in spring 2023 at Paris-CDG and Lyon airports. A similar system has been in trial in Nice since April 2023. For these sites, this initiative has resulted in **a 5 to 10% increase in the rates of continuous descent operations (CDO) or optimised profiles.**

Further initiatives have been launched with partner airlines **to optimise approach trajectories**. The "PEPAX" trial involving Bordeaux, Brest, and Paris ACCs aims to maintain aircraft at an optimal flight level (FL 360 instead of FL 300) as close as possible to the Top of Descent (TOD). This practice has now been extended to include two additional flight paths, allowing each flight on these paths to save up to 200 kg of fuel per night. For Air France, estimated cumulative total savings amount to around 300 tons of fuel. This experiment has been extended to the interface between Bordeaux and Marseille ACCs for flights to Marseille airport, and the interface between Marseille, Geneva, and Zurich ACCs for flights to Zurich, primarily during winter 2023-2024.

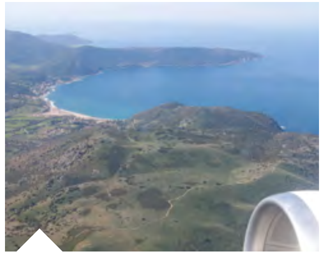
To ensure the long-term viability of this approach, the Directorate of Operations established a Green Operations unit, supported by a network of local experts within the control units. This initiative will enhance the sharing of best practices, coordinate and standardise methods across centres, facilitate the use of common measurement tools, and increase initiatives with airlines.

Implementation of PBN satellite procedures

In satellite navigation, DSNA has two primary objectives:
- ensuring compliance with European Regulation 2018/1048 for the widespread implementation of Performance Based Navigation (PBN) in all flight phases by 2030;
- deploying innovative and more environmentally efficient trajectories.

In 2023, DSNA **prioritised departure and arrival procedures at airports monitored by ACNUSA**. Measures were tested at Lyon-Saint-Exupéry and Nice airports to improve the successful completion rates of continuous descent operations (CDO). In the Paris region, DSNA aims to expand the **"PBN to ILS" project** to promote CDO, which helps reduce environmental impacts such as noise and gas emissions by improving vertical profiles without levelling off. A public consultation on the project for westbound arrivals at Paris-Orly airport was launched in January 2024 following a consultation phase in 2023. Regarding Paris-CDG airport, partial measures to increase CDO rates for existing trajectories are being explored, pending ministerial decisions. One of these measures has been presented to the local environmental advisory committee for potential implementation in 2024.

On an organisational level, in 2022, ESSP – a company in which DSNA holds shares – was selected to continue operating the EGNOS satellite landing system for the next ten years and introduce new services. The introduction of the EGNOS V3 multi-constellation and multi-frequency system marks a significant technological step forward. For European air navigation operators, this achievement validates their strategy to optimise ground infrastructure. Leveraging the performance of the EGNOS signal, DSNA has already decommissioned 51 Category I ILS and 32 VORs. In the future, Category 1 landings will be handled by EGNOS and the remaining Category I ILS will only be used as a backup.



On 4 April 2022, an Air Corsica Airbus A320neo inaugurated a new PBN procedure to approach and land from the north at Ajaccio airport. This advanced procedure, known as **RNP AR**, enables certified crew and aircraft to approach and land facing the sea by overflying a mountainous region in adverse weather conditions.
The procedure delivers significant environmental benefits. The flight time is reduced by around 10 minutes for this specific segment compared with an ILS approach from the south. In addition, this RNP AR approach avoids flying over urban areas and improves airport accessibility by reducing diversions.

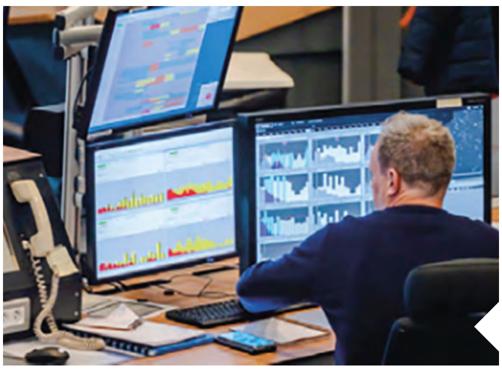
Increasingly sophisticated operational tools

In 2022, DSNA deployed a new version of its **SALTO tool across all five of its ACCs, helping in optimising traffic flow management**. This tool provides precise forecasts of traffic peaks, anticipating potential capacity overruns in control sectors and accurately simulating and measuring the impact of configuration changes. Still in the pre-tactical phase, DSNA enhanced its **CDM@DSNA** portal by integrating a tool for managing adverse weather situations using ATM and weather forecast data.

To measure its environmental performance, DSNA launched the **Big Data** project, which collects data from various sources including radar, 4-FLIGHT, Network Manager, and Aéroports de Paris.

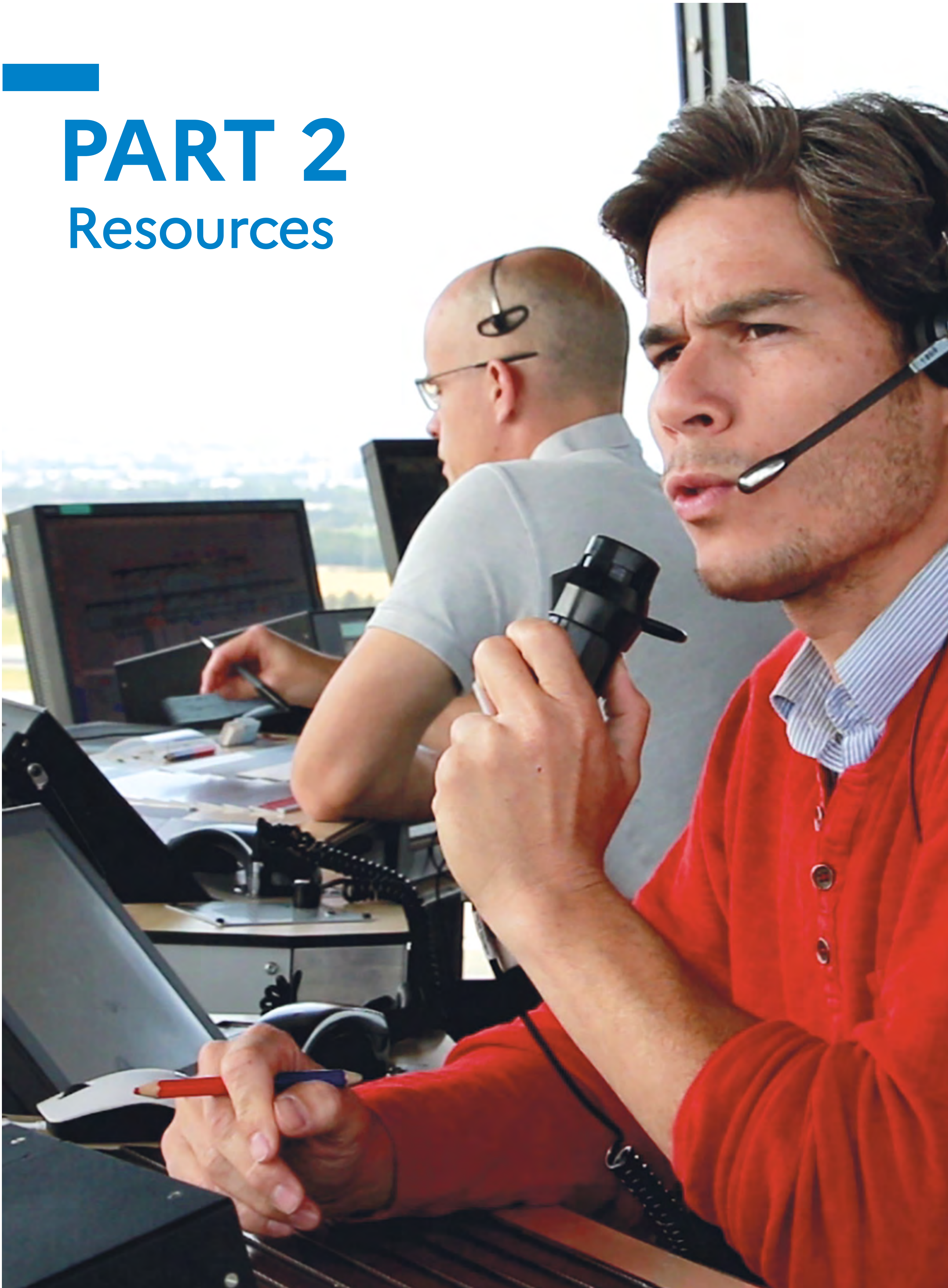
The platform feeds into several applications such as **ACROPOLE**, a tool that uses artificial intelligence techniques to provide flight environmental performance indicators.

On 13 March 2024, DSNA received recognition for its pioneering role in satellite navigation using EGNOS, and for developing the greatest number of satellite-based procedures in Europe for use in adverse weather conditions (LPV).



Flow Management Position using the SALTO tool at an Area Control Center (ACC)

PART 2
Resources



Human Resources

On 31 Decembre 2023, DSNA had 7,007 employees with a male-female distribution of 73 % to 27 % :
92% of agents (6,466) worked in mainland France and 8% (541) in overseas France (West French Indies, Indian Ocean, Saint-Pierre-et-Miquelon and overseas Pacific collectivities: French Polynesia, New Caledonia, and Wallis and Futuna).
DSNA manages the careers of its agents in three technical categories: ATCO (air traffic control engineers), ATSEP (Air Traffic Safety Electronics Personnel) and TSEEAC (Senior technicians). It participates in establishing the criteria for their recruitment, which is managed by the National Academy for Civil Aviation (ENAC) and works with ENAC to develop the content and educational objectives of their initial training programmes. DSNA also manages students' placements and the professional mobility of its technical staff.

A new DGAC protocol

In 2023, DSNA actively contributed to the development of a new social protocol for DGCA. Based on a common understanding of the Annex Budget for air Control and Operations (BACEA) and the key challenges related to the resumption of air traffic and the modernisation needs of DSNA's infrastructure and systems, this protocol aims to provide support for the actions required to achieve significant productivity gains while seeking to improve the performance standards expected by customers and users.

• **Recruitment and initial training**
An essential and ambitious multi-year recruitment plan for ATCO and ATSEP positions has been approved, prompting a collaborative effort with ENAC to reorganise their initial training programmes. In particular, discussions are ongoing to shorten the duration of training for student air traffic controllers, with plans to recruit up to 160 students per year starting from 2025. It will also be necessary to restructure the training of controllers within operational units.

• **Managing operational staff to meet specific needs**
Optimising the management of operational staff is a key priority to improve traffic punctuality and facilitate DSNA's technology modernisation efforts. A more robust management strategy for deploying new ATCO and ATSEP personnel that closely meets the needs of operational units is currently being developed.

STUDENTS IN INITIAL TRAINING

IN 2022
63 ATCO **students**
58 ATSEP **students**
62 TSEEAC **students**

5 years
AVERAGE DURATION
of training for an ATCO student from entry at ENAC until qualification in an ACC

2/3
OF DSNA STAFF
are directly involved in operational activities.

→ *Control workforce: adapting supply to highly fluctuating demand*

To address capacity challenges, starting in summer 2023, DSNA increased the frequency of work shifts at its five ACCs and at the approaches to Paris-CDG, Lyon and the Mediterranean (Montpellier, Marseille and Nice) SNAs, which experience extreme seasonal fluctuations in the summer. At Reims and Marseille ACCs, which experienced a very dynamic recovery in traffic, this intensification of work schedules effectively minimised delays during the peak of summer 2023. Similarly, Paris ACC, despite pressure on its skilled workforce and ongoing preparations for its technological upgrade to 4-FLIGHT, managed to minimise disruptions to traffic flows in the Paris region by optimising the frequency of work schedules.
As part of DGCA protocol project, DSNA continued to revise the 2002 decree concerning the organisation of controllers' work.

→ *Technical workforce: strengthening focus on priority tasks*

The technical workforce includes a wide range of professions, all of which are essential for maintaining safety. These agents play a key role in DSNA's operational performance. The implementation of an extensive programme to modernise technical systems will gradually require these agents to take on new roles.
Despite ENAC increasing its training capacity to 60 ATSEPs per year and a recruitment campaign targeting at least 300 ATSEPs between 2023 and 2027, the number of qualified ATSEP agents in SNA technical services is expected to reach a low point in 2026. As part of DGCA protocol project, DSNA continued to revise the 2002 decree concerning the organisation of work for ATSEP personnel.

81
NUMBER OF A-LEVEL +2 CLASSES
where ENAC and DSNA presented the ATCO and ATSEP professions in preparation for the 2024 recruitment exams.

Enhancing the appeal of operational professions among young people

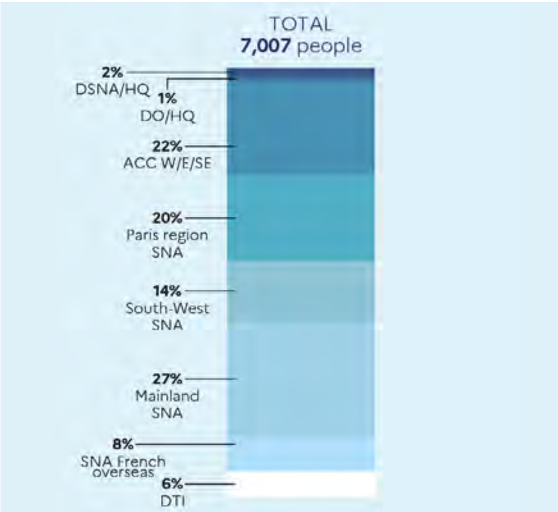
DSNA has collaborated with ENAC to develop new communication materials promoting these professions, which are distributed by DSNA representatives at student fairs and forums. The content was developed as part of a joint effort involving ENAC, staff representatives, and an external consultant. It is designed to appeal to Generation Z candidates - a demographic that places high importance on employer values and the meaningfulness of work.

Control tower in Annecy

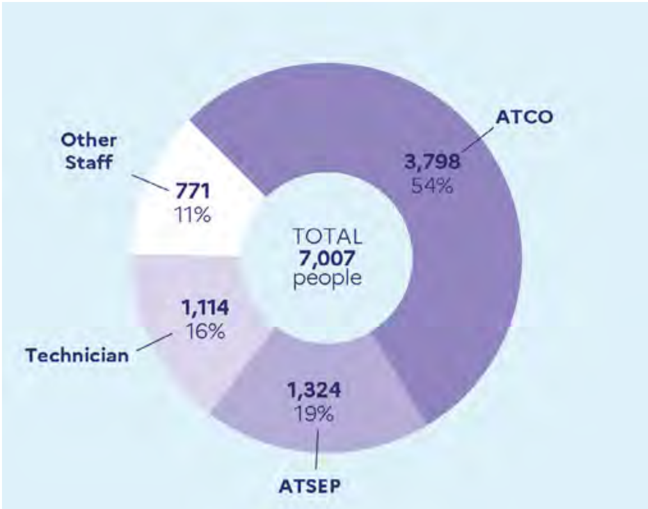
Human resources in figures

Data at 31 december 2023

Staff distribution by service



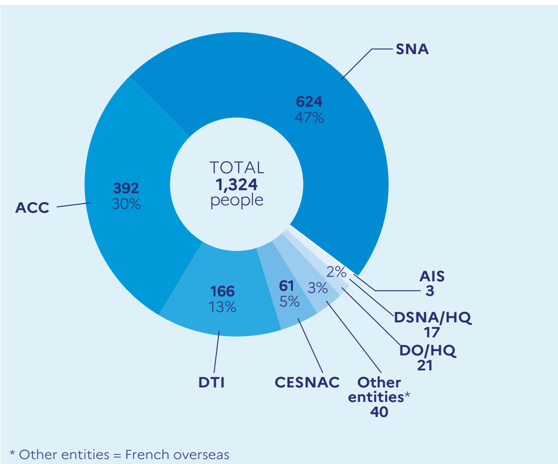
Staff distribution by category



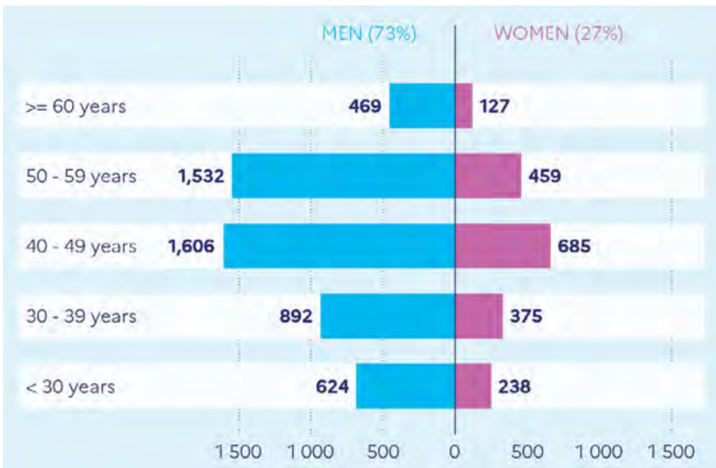
Distribution of controllers holding a valid licence by control unit type

Marseille ACC controllers using the 4-FLIGHT system

Distribution of ATSEP by service and control unit type



Age pyramid



Financial resources

Revenue 2023

DSNA's budget is primarily funded through charges collected from airlines for air traffic control services provided: its revenue is therefore directly dependent on the volume of air traffic controlled. In 2023, 81% of DSNA's revenues came from foreign-flag airlines.

• **Execution compared to the French Budget Bill**
In terms of charges, en-route fees exceeded 2023 projections (€1,519 million compared to €1,482 million budgeted in the Finance Act), reflecting the rebound in international flights. However, terminal charges (RSTCA) were down 2.8% compared to the budgeted amount, despite an increase in traffic. In overseas France, charges amounted to €45.5 million (+4% compared to 2022).

• **Execution compared to the performance plan**
→ ***En-route charges***
The year 2023 ended with the service unit volume achieving 96.8% of 2019 levels, marginally exceeding the forecast of 96.5% in the plan that set the 2023 rates. This resulted in a modest over-recovery of €5 million.

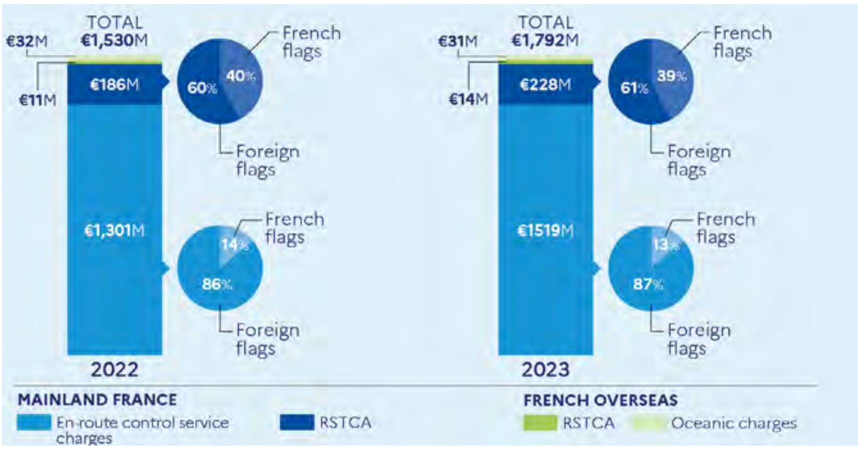
→ ***Terminal Charge***
- Zone 1 (Paris) : the service unit volume for 2023 was projected at 92.8% of 2019 activity levels in the revised RP3 performance plan. Actual performance for 2023 closed at 94.8%, which is 2% higher than planned, resulting in an over-recovery of approximately €2.6 million.
- Zone 2 : the service unit volume for 2023 was projected at 96.8% of 2019 activity levels in the revised RP3 performance plan. Actual performance for 2023 closed at 90.2% of the planned amount, resulting in an under-recovery of approximately €9 million.

These variations will result in adjustments to the RP4 plan in 2025, in accordance with the provisions of European Regulation 2019/317.

DSNA revenues

		Number of service units (USD)		Unit rates	
		2022	2023	2022	2023
Mainland France	En-route charges	18,898,110	21,087,600	73.02 €	73.60 €
	Terminal charges (RSTCA)	977,260	1,066,070	Zone 1: 195.56 € / Zone 2: 192.34 €	Zone 1: 205.45 € / Zone 2: 247.90 €
French overseas	Oceanic charges	433,524	624,645	35.78€	35.78€
	RSTCA	2,784,097	2,993,078	12.00€	12.00€

Air navigation charges (invoice amounts)



DSNA's main customers

Ryanair	13.8 %	Vueling	3.8 %
Easyjet	10.5 %	British Airways	3.5 %
Air France	8.6 %	Transavia France	2.8 %

The increase in revenue also enables DSNA to contribute to the accelerated debt reduction set out in DGCA's Annex Budget for air Control and Operations (BACEA).

Expenditures 2023

The 2023 budget faced significant constraints due to an increase in operating expenses (+€22.9 million compared to the 2022 budget, largely attributable to energy costs) and higher contributions to "External organisations" (+€12.6 million compared to the 2022 budget).
Within this context, resources needed to be allocated for investments to support the technological modernisation of DSNA.

In 2023, investments expenditure related to:
- delivery of the firm tranche of the new technical block in Marseille with installation of the first phase of technical equipment;
- deployment of STARSIM simulators in control units;
- Ongoing upgrade of CNS/ATM systems (N-VCS, 4-FLIGHT, iATS2024@ORY);
- acquisition and implementation of SEPIA tools for the Aeronautical Information Service.

Expenditure excluding payroll

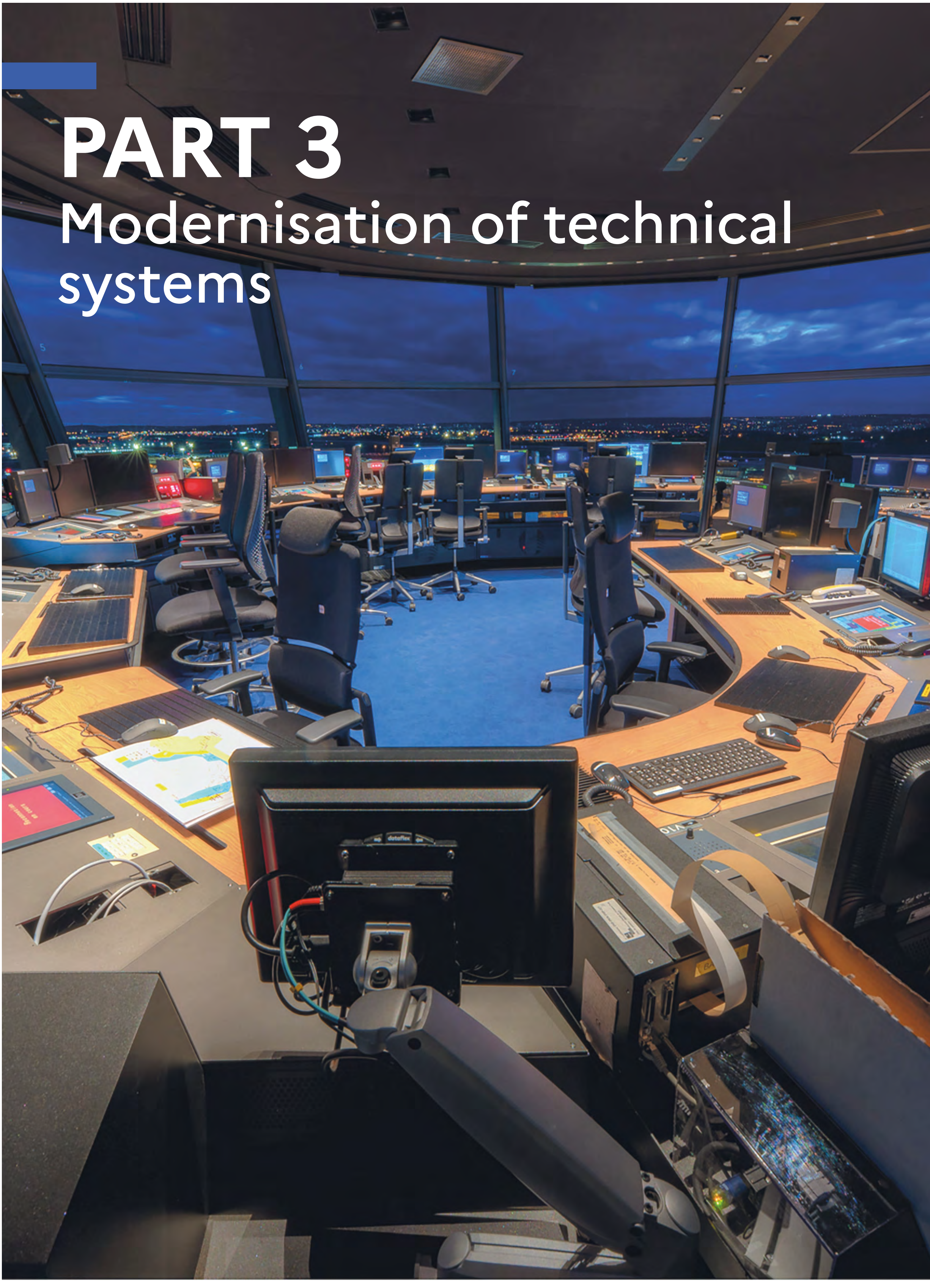
Operating costs		71,635,904 €	12 %
External organisations		232,990,686 €	38 %
Investments		303,749,633 €	50 %
	Infrastructure	133,866,008 €	44 %
	ATC	144,491,743 €	48 %
	Services	25,391,882 €	8 %
	TOTAL	608,376,222 €	

In total, DSNA used €608.4 million in payment appropriations, accounting for 99.9% of payments excluding extra-budgetary resources. This is the result of a continued reduction in outstanding payments (committed contracts that have not been fully paid), demonstrating DSNA's ability to resolve the financial and technical backlog it faced previously. From the beginning of 2022 to the start of 2024, this amount decreased from €308.4 million to €284.6 million, a reduction of 8.4%.
Reducing these outstanding charges has enabled DSNA to increase its operational flexibility. One example of this is the funding of the 4-FLIGHT programme, which has been deployed at Reims and Marseille ACCs and is currently being rolled out in Paris, Brest and Bordeaux ACCs.

IN 2023,
expenditure was evenly distributed throughout the year, facilitating a consistent management of resources without any sudden fluctuations.

Inauguration of 4-FLIGHT at Reims ACC by Clément BEAUNE, Minister Delegate for Transports, on 8 December 2022. The first phase of the 4-FLIGHT programme cost just over €1 billion.

PART 3
Modernisation of technical systems



Modernisation of **air traffic control systems**

4-FLIGHT, the new stripless air traffic control system for ACCs

Developed in partnership with Thales, this air traffic control solution provides air traffic controllers with innovative features and includes an advanced flight data processing system (Coflight). It offers a fresh perspective on air navigation services (ATM) in France. 4-FLIGHT introduces significant changes that require the adoption of new working methods. The system is continuously maturing, with technical and operational enhancements regularly implemented to improve its robustness and efficiency.

• Operational deployment of 4-FLIGHT in 2022

In 2022, 4-FLIGHT was deployed at two pilot sites: Reims ACC on 14 June, and Marseille ACC on 6 December, along with the CESNAC. To ensure safety, the system's implementation involved a temporary reduction in capacity, followed by a phased increase. This process was closely coordinated with the Network Manager (EUROCONTROL) and neighbouring centres to effectively manage reroutings. The technological modernisation of DSNA is now a reality!

Reims ACC : On 5 April 2022, the switch to 4-FLIGHT was initiated with live trials in secure mode, extending until 14 June to ensure a safe transition to the new system. During this phase, a number of incidents and operational difficulties arose, requiring the management of complex situations as traffic increased. These challenges were successfully overcome thanks to the remarkable dedication and collaboration of the teams from DSNA, Thales and the military.

WHAT OUR CUSTOMERS ARE SAYING

During the rollout of 4-FLIGHT at Reims and Marseille ACCs, our customers and partners praised the preparation of the transition plan, the level of information sharing, and coordination with the Network Manager, neighbouring control centres, and airlines.
However, the increase in capacity has been slower than expected and is not yet complete (technical problems still remain in the lower airspace).
The summer of 2024 will be a highly anticipated milestone in terms of delivered capacity.
Regarding the planned implementation of 4-FLIGHT at Paris ACC, adjustments to the timeline were made following detailed discussions at meetings: live trials in secure mode, and deployment scheduled after the Olympic Games.
Ongoing discussions are being held with customers and partners to minimise the impact on flight schedules.

• Preparations at the three remaining ACCs
In 2023, the system was consolidated. In the run-up to the high season, air traffic controllers at Marseille ACC received further simulation training to manage high-density traffic scenarios. At Reims ACC, a significant milestone was reached in the summer of 2023: the number of controlled flights exceeded that of the summer of 2019! This achievement is all the more significant given the implementation of the new 4-FLIGHT system.
At Paris ACC, where overflights account for approximately 30% of the centre's traffic, the prerequisites were validated and live trials in secure mode began in early 2024. The deployment of 4-FLIGHT at Paris ACC is scheduled for winter 2024/2025.
In 2023, DSNA's en-route centres will operate on three systems: 4-FLIGHT for Reims and Marseille, ODS/CAUTRA for Paris, and ERATO/CAUTRA for Brest and Bordeaux. DSNA aims to roll out 4-FLIGHT to the entire upper airspace by 2026. The use of a single tool will facilitate the standardisation of working methods.

Approaches & Towers

The initial phase of upgrading the control systems for Approaches and Towers (SYSAT project) focuses on the largest control towers. Orly is leading this significant technological advancement with the implementation of a new electronic flight strip system, while DSNA is prioritising an upgrade of the existing system at Paris-CDG. In 2023, a tender was launched to purchase a standard industrial product for the main regional sites across mainland France. The contract will be awarded in 2024.

• ORLY, the first electronic flight strip system for Towers in mainland France
The iATS2024@ORY project is deploying a next-generation "off-the-shelf" electronic air traffic control system, designed by SAAB. The system, which does not require any custom software development, is already deployed in European airports of a similar size to Orly, providing advanced air traffic management features to improve safety, coordination and information sharing. It includes an integrated electronic flight strip system, integrates information from the Advanced Surface Movement Guidance and Control System (A-SMGCS), and features a modern, user-friendly interface with comprehensive general information. This project has been a joint effort involving DSNA teams for several years.
In September 2023, the delivery of a training simulator enabled the organisation of training sessions to qualify nearly 110 controllers on the new system in preparation for its deployment in April 2024.

• High-tech simulators for air traffic controller training
The STARSim project manages the nationwide deployment of advanced simulators to train controllers in approaches and towers. These modern tools will shorten training times, better prepare controllers to handle seasonal challenges, and improve operational safety by providing comprehensive training on unusual situations. Following a tender process, DSNA selected UFA to equip its sites with "off-the-shelf" products that can be customised to meet each site's specific requirements.
By the end of 2023, simulators had been installed in six locations: Nantes (pilot site), Basel-Mulhouse (photo), Paris-CDG, Paris-Orly, Nice and Bordeaux.

Infrastructure modernisation

N-VCS, the new radio/telephone system for air traffic controllers

Following a tender process, DSNA selected Frequentis to renew its primary and backup radio and telephone systems at the five ACCs and Paris-CDG (New Voice Communication System project). The safety-critical system, which uses voice over the dedicated air navigation network RENAR-IP (VoIP), incorporates next-generation advancements such as integrated radio/telephone interfaces on a single operator workstation.

The pilot site, Brest ACC, switched to the N-VCS system on 21 November 2023, conducting live trials in secure mode to ensure a safe transition to the new system. The aim of this phase was to strengthen its adoption by operational staff and confirm its reliability in a comprehensive operational setting. This milestone reflects the strong commitment of DSNA's teams. Once the system is fully operational, the old ARTEMIS radio/telephone system will be decommissioned.

N-VCS is a major milestone in the technological modernisation of the ACCs. DSNA currently manages over 15 different voice communication systems, each with its own set of maintenance and update requirements due to ageing infrastructure. To prepare for the integration of these new systems, a working group has been established to recommend solutions that align with industry standards by early 2024. This initiative aims to streamline, harmonise, and standardise processes, while ensuring a smooth integration with existing projects.

A roadmap with **a target system architecture**

DSNA is currently working to replace its primary safety-related technical systems (4-FLIGHT system for en-route traffic, SYSAT for Approaches and Towers, and N-VCS) and gradually phase out the old systems. This extensive modernisation requires a reassessment of the overall system architecture, focusing on simplification and rationalisation while incorporating new technologies like data, cloud, and artificial intelligence. This analysis must also align with the territorial restructuring outlined in the DSNA's strategic plan (p. 27). Any architectural changes should facilitate this transformation.
In 2023, DSNA:
• developed an initial functional mapping;
• participated in the European SESAR programme's architecture study and assessed the impact of the new European regulation on the certification of ground systems (system interoperability);
• conducted a study on streamlining interfaces to prepare for the implementation of the off-the-shelf purchasing strategy and simplify the overall architecture;
• developed a strategic "Architecture" plan to develop a master plan for the evolution of systems up to 2030.

DSNA will also continue to enhance the technical and business architecture skills of its staff and will strengthen its internal governance in terms of architecture management.

PART 4
« DSNA 2030 » strategy

Efficient, modern and eco-responsible management for air traffic

Air traffic control is a non-competitive sector. In return, DSNA carries out its activities within a European regulatory framework. Its responsibilities include implementing technological standards and achieving specific performance targets, under the supervision of DSAC for safety and DTA for economic regulation.

In 2023, DSNA embarked on an ambitious reform to address emerging technological challenges, comply with European regulatory and safety standards, improve the performance of its services, and facilitate the aeronautical sector's ecological transition.

Transforming DSNA into an **efficient, modern and eco-responsible** air navigation service provider is the guiding principle of the new 2030 strategic plan:

→ Efficient by serving its customers and airspace users without compromising flight safety, and demonstrating resilience in the face of uncertainties and crisis situations;

→ Modern by aligning its organisation, fostering the continuous professional development of its agents to address new challenges, and deploying new tools and digital services;

→ Eco-responsible by placing environmental issues at the forefront of its operations, and actively working to reduce the aviation sector's carbon, energy, and noise footprint.

The "DSNA 2030" strategy presents a robust and forward-thinking vision: its objective is to realign resources with future technological developments and the evolving nature of the services provided by adapting the territorial deployment and organisational structure of services (Tower, Approach, ACC). To achieve this, four axes of transformation have been defined:

→ **Enhance operational performance and resilience** to deliver a service in line with the performance plan, improve nationwide performance management, and strengthen our resilience by ensuring safety and continuity of service uniformly across the entire territory;

→ **Modernise technologies: streamline and align** our infrastructure, systems and working methods, **standardise** to reintegrate industrial roadmaps and pool costs, drive planning-based management, and **master** our technical architecture;

→ **Align our organisational structure and professions to the challenges of air navigation** : optimise our territorial footprint, acquire the essential skills to meet future challenges, and foster a common identity and culture within DSNA;

→ **Rise to the challenge of ecological transition** by improving flight trajectories, reducing noise pollution for local residents, and committing to an eco-responsible approach to reducing our ecological footprint.

For each of these areas, transformation plans were defined and initiated in 2023.

Engaging staff in the collective objectives of this strategy and the shared values of DSNA also requires a cultural transformation and the strengthening of the collective culture, starting with the initial training at ENAC.

DSNA CORE VALUES

- **Integrity**
- **Adaptability**
- **Team Spirit**
- **Service orientation**
- **Commitment**

FEEDBACK FROM CUSTOMERS AND PARTNERS

They welcome this strategy and have high expectations for operational performance.

"Streamline, align, standardise, and master"

MODERNISATION OF INFRASTRUCTURES

Faced with a diverse inventory of aging equipment, DSNA is leveraging the development of new technologies to streamline and enhance the resilience of its communication, navigation, and surveillance (CNS) infrastructure. This initiative will involve standardising technologies, which will enable the harmonisation of working methods and facilitate future upgrades. It will also reduce the number of configuration operations required, leading to resource savings. Finally, it aims to free up financial resources, which can be used for new technological investments.

MODERNISATION OF AIR TRAFFIC CONTROL

To improve operational performance, especially flight punctuality (a critical factor for airlines, airports and passengers), DSNA has launched a major project to modernise its air traffic control systems.
Mirroring the approach taken for its infrastructure, this involves streamlining the air navigation systems for both en-route and Approaches and Towers, which will free up essential resources. In parallel, DSNA is working to enhance its operational capacity management. Modernising these systems also contributes to improving the environmental performance of flights.

MODERNISATION OF TRAFFIC MANAGEMENT SERVICES

The modernisation of air traffic management services is part of a Europe-wide initiative to create a safer, more digital, more efficient, and more environmentally responsible European sky. However, regardless of these transformations, maintaining a high level of flight safety remains the priority. In addition, cybersecurity considerations are systematically taken into account when developing new digital services. DSNA is also working to optimise the management of its operational staff, including by adapting air traffic control services to meet increasingly seasonal demand and high traffic peaks.

Cabling network at the North-East SNA headquarters in Strasbourg.

DSNA INFRASTRUCTURE KEY FIGURES

104
MAIN SYSTEMS

400
SUB-SYSTEMS

28,000
SERVERS

69 %
« IN-HOUSE » DEVELOPMENTS

50+
programming LANGUAGES & operating systems

600+
SITES throughout France

SPOTLIGHT: Optimising DSNA's territorial footprint and enhancing service quality

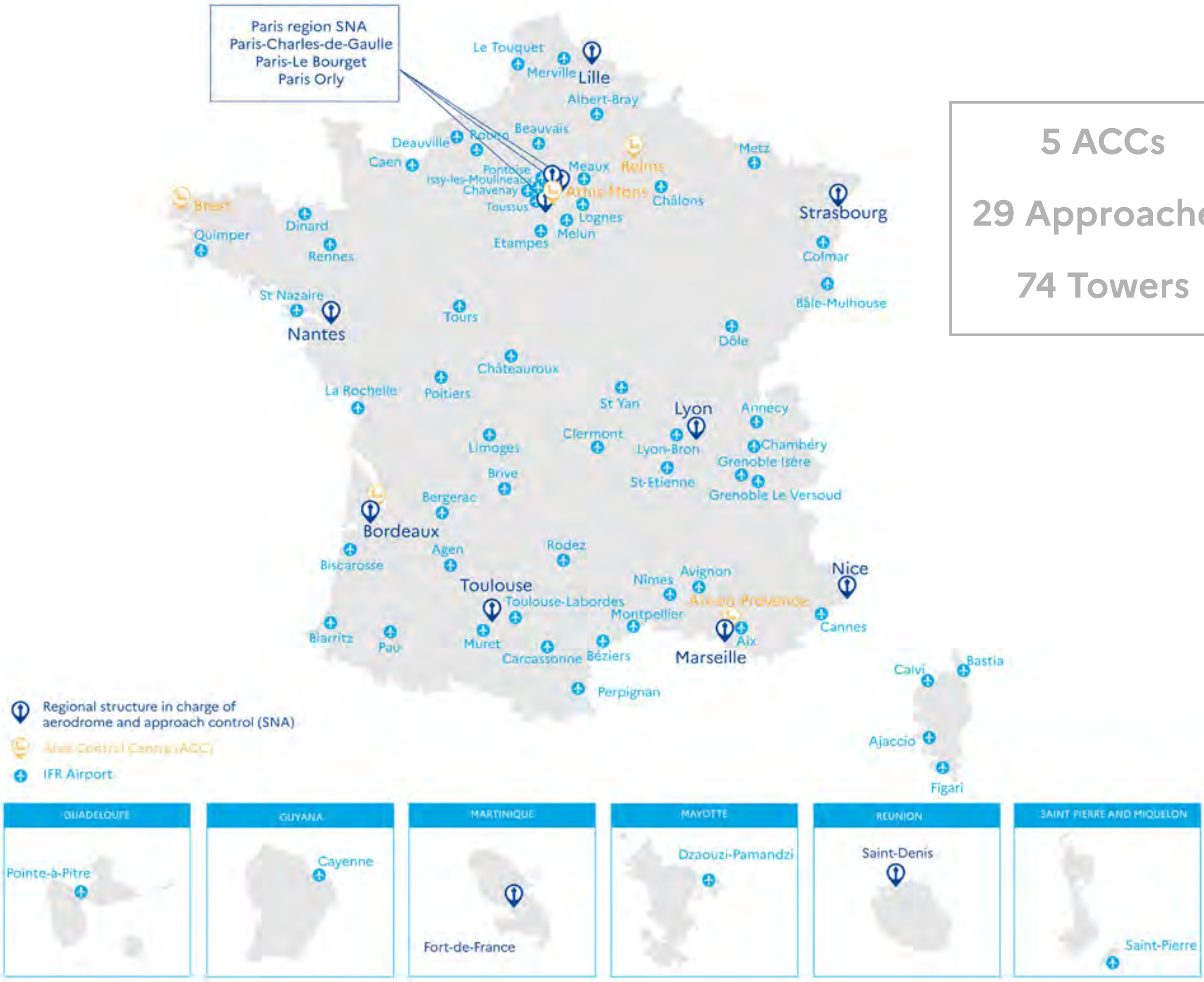
DSNA's existing territorial organisation requires significant human, technical and financial resources.

Despite these investments, it does not consistently meet user expectations or guarantee the sustainability of the services provided. The organisational structure has also led to significant delays in the technical modernisation of systems and a backlog in upgrading our infrastructure.

DSNA has set the goal of optimising its territorial footprint to provide a service that aligns with the European performance plan. This involves adopting modern tools that comply with European technological standards, are designed to meet current traffic volumes, and are sustainable, considering available resources and projected growth. The objective is to enhance service quality in areas where DSNA can significantly improve the safety and efficiency of air transport.

DSNA is also committed to establishing clear agreements with local stakeholders regarding achievable service levels in their regions to ensure transparency. This target has been communicated internally within DSNA, with the accompanying actions currently being negotiated under DGCA protocol. Initial regional restructuring actions have either commenced or been implemented:

- transfer of approach services at Pontoise, Metz-Nancy-Lorraine, Rouen and Deauville, facilitating the comprehensive consolidation of approach control centres capable of providing a 24-hour service ;
- closure of maintenance facilities at Metz-Nancy-Lorraine, Poitiers, Deauville, Athis-Mons and Limoges to optimise the regional distribution of maintenance centres. This restructuring aims to consolidate skills and resources to ensure prompt and efficient service delivery ;
- closure of Information and Flight Support Regional Office in Cayenne.



5 ACCs

29 Approaches

74 Towers

PART 5
Innovation

DSNA participates in the European research and innovation programme, SESAR, which is the technological pillar of the EU's Single European Sky policy. SESAR projects bring together all operational and industrial stakeholders in the sector to shape the future of air navigation in Europe by harmonising procedures to establish common standards. To support this initiative, DSNA has established an internal framework to select projects that align with its strategic priorities. Before deployment, the maturity of new products must be confirmed by validating their technical feasibility and ensuring interoperability with existing systems. The validation process also involves ensuring the sustainability of their production and operational conditions.

SESAR 2020 [2016, 2023]

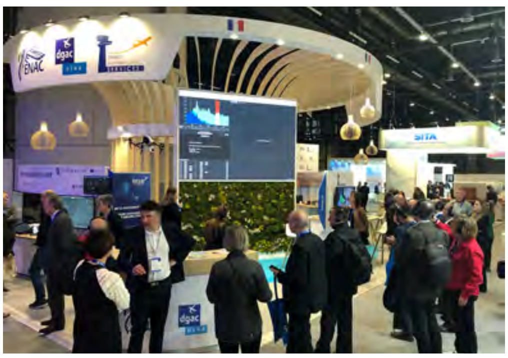
The conclusion of SESAR 2020 provided an opportunity to highlight the significant achievements of the aviation industry in terms of environmental initiatives, the implementation of efficient flight trajectories (TBO: Trajectory Based Operations) within Europe-wide traffic flows, and advancements in architecture, and virtualisation. DSNA actively participated in most of these projects, which were co-funded by the European Union.

SPOTLIGHT ON THE ADSCENSIO PROJECT

This ambitious project, led by DSNA and involving 21 partners, conducted live trials between October 2022 and January 2023. Through the use of on-board data exchange, controllers were able to access information such as the identification of connected flights, display of wind data, Extended Projected Profile (EPP), estimated times and altitudes at points along the trajectory, as well as Top of Climb and Top of Descent. Renamed HERON (Highly Efficient Green Operations) under the SESAR 3 framework, this project focuses on studying how air traffic controllers can leverage onboard information to optimise flight trajectories. For example, controllers will be able to issue clearances to pilots to optimise the Top of Descent for a smoother descent.

In 2023, the Airspace World exhibition in Geneva brought together nearly 200 exhibitors from over 100 countries. This annual gathering of industry professionals has become a pivotal event for understanding the latest innovations and future challenges of air traffic control.

DSNA had a 100 m^2 stand at the exhibition. DSNA agents effectively showcased the modernisation of new ATC tools for en-route operations, highlighting French expertise through promising R&D projects for the rapid development of operational applications. DSNA also presented the SESAR project "ADSCENCIO", which explores the integration of 4D trajectories in ground-based systems. These trajectories are calculated onboard aircraft and transmitted via air-to-ground data links.



POWERED BY SESAR JOINT UNDERTAKING

SESAR 2020

95

TESTS SITES **in Europe**

127

SESAR SOLUTIONS

Realtime **ADS-C data** received on the IODA interface for managing arrival flows at Paris ACC.

AIRSPACE WORLD 2023 (Geneva)

DSNA participated in SESAR Walking Tours to promote its commitment and showcase its role in shaping the future of the Single European Sky to a diverse international audience.

SESAR 3 [2021, 2030]

DSNA is a founding member of SESAR 3. This work programme, which involves even more stakeholders than SESAR 2020, currently includes 58 development projects and eight demonstration projects designed to facilitate the industrialisation of solutions. SESAR 3 builds on the successful outcomes of the previous programme, aiming to develop a "Smart, Sustainable, Resilient" Digital European Sky that is more interconnected, environmentally sustainable, better equipped to manage crises, more efficient, and open to new entrants.
DSNA is engaged in industrial research activities, including the development of green operations (CONCERTO and GEESE projects), optimising trajectory management (ATC-TBO project) and exploring more modular, adaptive and resilient infrastructures.
The ATM Master Plan, a planning tool for air traffic management in Europe, is scheduled for revision at the end of 2024. This update will specifically focus on accelerating the innovation process. The "DSNA 2030" strategic plan will align with this updated vision.

POWERED BY sesar JOINT UNDERTAKING

DSNA AND SESAR 3 (phase 1)

18
PROJECTS
through to 2026

7 M€
IN FUNDING

SPOTLIGHT ON THE CONCERTO PROJECT

Work on expanding various trajectory optimisation methods has commenced as part of the European SESAR research projects. In particular, this includes a reflection on the operational concept known as CONCERTO (Dynamic Collaboration to Generalize Eco-friendly Trajectories) to reduce CO_2 emissions and better understand non-CO_2 impacts, such as condensation trails.
DSNA is jointly coordinating the first solution of this project with seven partners. The aim is to identify optimisation opportunities and coordinate their implementation among the various stakeholders: control centres, airlines, and the European Network Manager. The first trials are scheduled to begin in early 2025.

SPOTLIGHT ON THE GEESE PROJECT

DSNA is actively involved in this innovative and promising project led by Airbus, which is investigating the operational feasibility of formation flying for long-haul civilian flights. This project is expected to generate fuel savings of over 5%.
In June 2023, the project was integrated into the SESAR 3 programme and renamed GEESE. This concept involves using the energy produced by the wake turbulence of the lead aircraft to increase the lift of the aircraft behind. The project aims to refine the operational concept through simulations and operational evaluations scheduled to begin in late 2025.

ARTIFICIAL INTELLIGENCE IN AIR NAVIGATION

Several projects leveraging artificial intelligence (AI) are currently under review at a European level as part of the SESAR 3 programme. Just as AI is reshaping the way the world lives and works, it will inevitably transform the technical landscape of the ATM sector. Encompassing areas such as pre-tactical air traffic flow management (ATFCM), green air operations, optimised trajectory prediction and post-operation analysis, AI facilitates groundbreaking innovations through its Machine Learning and Deep Learning applications.

DSNA has developed SCRIBE, an AI-based voice recognition project that can transcribe and interpret realtime voice exchanges between pilots and controllers across all flight phases. This cloud service was successfully integrated into DSNA's ELVIRA air situation analysis tool in 2023. It is currently being rolled out nationwide to the Service Quality & Safety subdivisions of the Directorate of Operations. It will save several hundred hours of tedious work each year by automating the transcription of safety events!

Glossary

ACC	Area Control Centre
ACNUSA	Airport Noise Pollution Control Authority
ATC	Air Traffic Control
ATCO	Air Traffic Controller (ICNA)
ATFCM	Air Traffic Flow and Capacity Management
ATM	Air Traffic Management
ATSEP	Air Traffic Safety Electronics Personnel (IESSA)
BACEA	Annex Budget for Air Control and Operations
CANSO	Civil Air Navigation Services Organisation
CCO	Continuous Climb Operations
CDM	Collaborative Decision Making
CDO	Continuous Descent Operations
CESNAC	Central Air Navigation Systems Operations Centre
CNS	Communications Navigation Surveillance
DO	Directorate of Operations
DSAC	National Supervisory Authority
DTI	Technical and Innovation Directorate
EGNOS	European Geostationary Navigation Overlay System
ENAC	National Academy for Civil Aviation
EOP	Live trial in secure mode
ESSP	European Satellite Services Provider
FL	Flight Level
FRA	Free Route Airspace
IFR	Instrument Flight Rules
ILS	Instrument Landing System
LVP	Low Visibility Procedure
N-VCS	New Voice Communication System
PBN	Performance Based Navigation
RNP AR	Required Navigation Performance Autorisation Required
RSTCA	Air Traffic Terminal Charge
SBAS	Satellite-Based Augmentation System
SESAR	Single European Sky ATM Research
SMS	Safety Management System
SNA	Regional structure in charge of aerodrome and approach control
SOC	Security Operations Center
SYSAT	Program to modernise approaches and towers control systems in mainland France
TBO	Trajectory Based Operations
TOD	Top Of Descent
TSEEAC	Senior Civil Aviation Technician
UOP	Live trial in secure mode
VFR	Visual Flight Rules

Co-funded by
the European Union

SESAR 2020 : the ADSCENSIO project (No. 101017626) is co-financed by the European Union's Horizon 2020 programme. SESAR 3 : the ATC-TBO (No. 101114808), CONCERTO (No. 101114785) and GEESE (No. 101114611) projects are co-financed by the European Union's Horizon Europe programme.

MINISTÈRE
CHARGÉ
DES TRANSPORTS
Liberté
Égalité
Fraternité

direction générale de l'Aviation civile
DSNA

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