

ANNUAL REPORT

DSNA

The French Air Navigation Service Provider



20
17



DSNA



CONTENTS

Foreword	p. 3
2017 - Highlights	p. 4
How the airspace is organised	p. 6

AIR TRAFFIC	p. 7
Increasingly dense air traffic in peak season	

SAFETY & PUBLIC SERVICE	p. 10
Flight safety	
The environment	
Punctuality of flights	

HUMAN & COLLECTIVE	p. 19
Human resources	
The integrated management system	

COMPETITIVENESS & CUSTOMER SERVICE	p. 25
Finance	
The major technical and operational achievements	
“Operational” oriented customer and user relations	

INNOVATION & TECHNOLOGY	p. 33
Modernisation of air traffic management (ATM) systems	
Modernisation of communication, navigation and surveillance (CNS) systems	

THE SINGLE EUROPEAN SKY	p. 37
The SESAR program	
The FAB Europe Central (FABEC)	

Glossary	p. 44
To find out more	p. 45
Organisation charts	p. 48

20
17

French air navigation services controlled more than 3.1 million flights in 2017, with the equivalent of a quarter of a year at more than 10,000 flights a day. Only four years ago, there were no days in France that went beyond this threshold of 10,000 flights. A new traffic peak for one day was also established on July 7, 2017 with 11,016 flights controlled, a European record!

This illustrates the dynamic nature of the air transport market in Europe and the coming challenges in terms of safety, the environment and capacity. To accompany this growth in a durable way, DSNA staff, thanks to their great competence, demonstrate, day after day, their motivation and their attachment to the values of public service, by being innovative in their fields of activity and by ensuring competitive quality services to all of their customers and users.



DSNA can be proud of its numerous technical and operational projects already led to completion during this decade in order to improve performance. It also knows the extent of the works and modernisation actions which remain for it to pursue, in order to meet the challenges of the Single European Sky and the competitiveness of French air transport.

Maurice GEORGES
Director of Air Navigation Services

USERS & CUSTOMERS, EUROPE, PARTNERS, TERRITORIES



OUR CHALLENGES



THE SINGLE EUROPEAN SKY



OUR PILLARS



OUR VALUES

2017 HIGHLIGHTS

DAILY ACTIONS TO BUILD A DSNA CAPABLE OF MEETING THE PERFORMANCE REQUIREMENTS OF TODAY AND TOMORROW IN TERMS OF SAFETY, ENVIRONMENT, CAPACITY AND COST EFFICIENCY

“INNOVATION” DAYS AT THE DTI

400 participants came from all over Europe to dialogue on the theme of the disruptive innovation and its challenges.



4-FLIGHT

January 25 – 00:05 am: first operational evaluation of the future French en-route air traffic management system at the Reims ACC.

RENOVATED TOWER AT CAEN, NEW TOWER AT FIGARI

A higher performing work environment for air traffic controllers.

COFLIGHT FLIGHT SERVICES

Launching of the implementation phase of a first service between the Paris ACC and the Geneva control center.

DSNA CHARTER ON FAIR CULTURE

To ensure a framework of confidence in the work environment which focuses on the continuous improvement of safety.

JANUARY



MODE S RADAR AT PARIS-SACLAY

This latest generation radar serves all of the Paris area, the Reims and Brest ACCs, and can handle up to 800 aircraft simultaneously.

FOR SAFER MANAGEMENT OF FLIGHTS TO TOUSSUS-LE-NOBLE

Creation of a flight information sector to meet the high Friday and Saturday traffic peaks.

APRIL

DEPLOYMENT OF RWSL AT PARIS-CDG

on the South 08L/26R to prevent runway incursions.

MARCH

DSNA AWARDED AT THE WORLD ATM CONGRESS IN MADRID

for implementing the RWSL at Paris-CDG, its participation in the SESAR projects : iStream, RISE, AAL, and the success of the ERATO transition at the Bordeaux ACC.

4-FLIGHT

March 15 – 11:02 pm: first operational evaluation of the Marseille ACC.

THE BREST ACC

A major reorganisation of airspace in the Greater West to the benefit of civil and military traffic

MAY



The Marseille ACC: March 15, 2018 - 11:02 pm.

THE DTI ANALYSES ITS ORGANISATION

In the framework of the DGAC social protocol in order to better prepare for the challenges of 2020 and more.

4-FLIGHT

Installation of 36 control positions (30 civil and 6 military) in the operations room at the Reims ACC until April, 2018.



FABEC: XMAN PROCEDURE FOR FLIGHTS ARRIVING AT ZURICH

At peak periods, flight speed is regulated by the en-route centers of Reims, Langen, Munich and Zurich in order to minimise holding patterns on approach.

JUNE

JULY

AIR TRAFFIC

11,016 flights controlled on July 7, 2017, a European record for one day.

AUGUST

XSTREAM (SESAR)

To smooth out the peak of arrivals at Orly, operational evaluations by the Paris ACC of flight management up to 250NM (450km) upstream allowing for better predictability for approach control.

SEPTEMBER

COOPERATION AGREEMENT WITH IATA

To build collaborative solutions with our customers to meet the challenges of the growth of air traffic.

THE MARSEILLE/ GENEVA ACCs

Innovative management and better performance of upper airspace located in the French-Swiss border area for a higher level of safety and greater flight fluidity.

OVERSEAS AIR NAVIGATION

A meeting in Paris revolving around 5 modernisation axes.

OCTOBER

DECEMBER

SYSAT GROUPE 1

The SAAB-CS consortium selected to modernise the air traffic management system at major Paris airports (Paris-CDG, Orly and Le Bourget).

EGNOS CATEGORY 1 APPROACH PROCEDURES DEPLOYED EVERYWHERE IN FRANCE

An innovative network of category 1 approaches combining conventional ground and satellite approach aids.

NOVEMBER

LYON-SAINT EXUPÉRY LABELLED "AIRPORT-CDM"

An initiative which permits optimising the overall functioning of air operations on the platform thanks to real-time sharing of information.

CDM@DSNA SEMINAR

The annual meeting of various actors to discuss operational questions and to study shared solutions for the next aeronautical summer.

A RENOVATED TOWER FOR ORLY

The beginning of renovation of the watch tower while ensuring air traffic control from a temporary watch tower installed just below.

HOW THE AIRSPACE IS ORGANISED

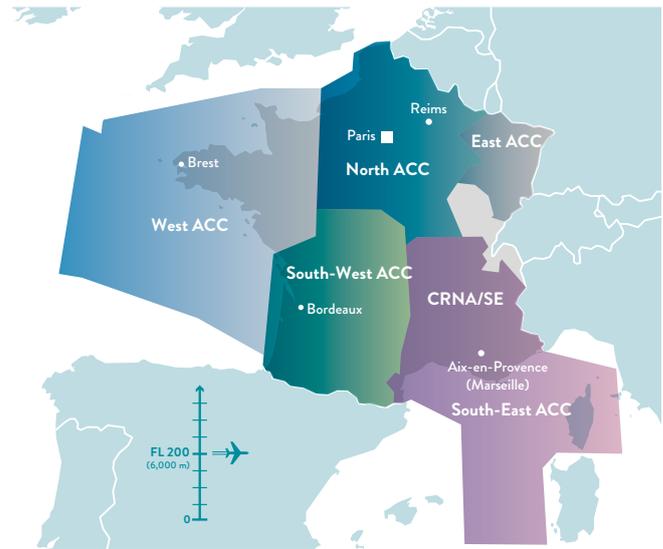
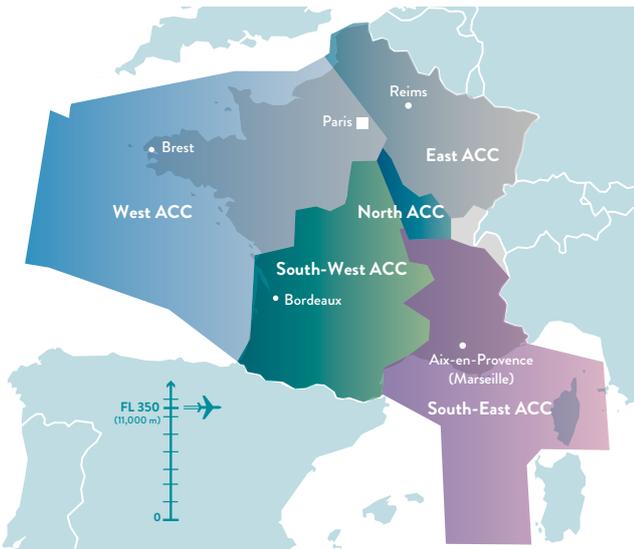
With 1,000,000 sq. kms., French air navigation services manage one of the largest airspaces in Europe.

DSNA has **five en-route control centers (ACCs)** at Brest, Paris, Reims, Aix-en-Provence (Marseille) and Bordeaux, **nine mainland regional structures for approach and airport control (SNAs)** located in Nantes, Lille, Paris, Strasbourg, Lyon, Nice, Marseille, Toulouse and Bordeaux, plus **three overseas regional structures** at

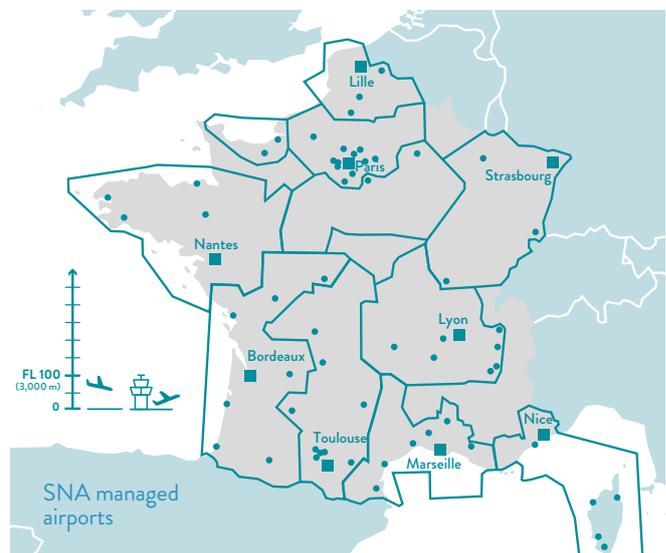
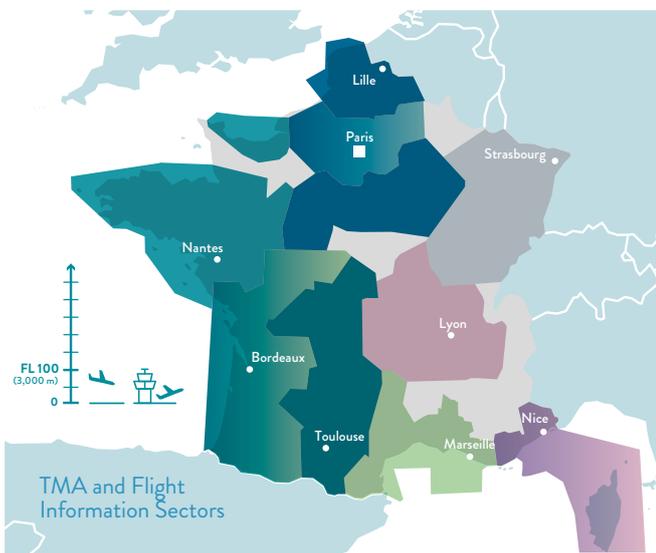
French West Indies-French Guiana, Indian Ocean and Saint-Pierre-and-Miquelon. It provides functional and technical support for the civil aviation services of the Overseas collectivities of the Pacific (Polynesia, New Caledonia, Wallis and Futuna).

On December 31, 2017, DSNA provided air traffic control services to 72 airports in mainland France and Corsica and 6 overseas airports.

UPPER AIRSPACE > AREAS UNDER ACC CONTROL



LOWER AIRSPACE > AREAS UNDER SNA CONTROL



01

AIR
TRAFFIC



INCREASINGLY DENSE AIR TRAFFIC IN PEAK SEASON

French air navigation services controlled **3,135,236 flights in 2017**, an increase of 4% over 2016. It is the equivalent of a summer month more of 2014 traffic. With a daily average of 8,600 flights controlled, the year 2017 constitutes a new record!



Peak season: increasingly dense traffic with 174 days with more than 9,000 flights in 2017, thus nearly six months of the year and 88 days at more than 10,000 flights per day. From April to October, air navigation services controlled 225,000 more flights than 10 years ago.

Off-peak season: average daily traffic of 7,000 flights, constant for the past 10 years.



New peak of weekly traffic with 74,716 flights, an average of 10,675 flights per day.

9 weeks from Monday, June 26 to Sunday September 10, 2017 were among the "Top 10" of busiest traffic weeks.



New peak of daily traffic with 11,016 flights: a European record

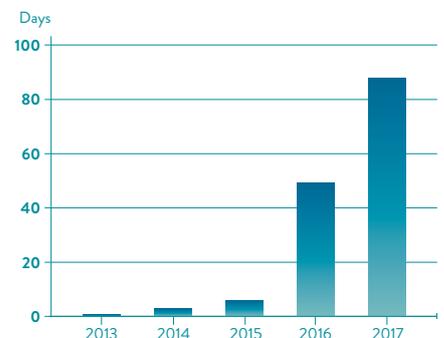
8 days from June 30 to July 29, 2017 were among the "Top 10" of heaviest traffic days.

2017	NUMBER OF CONTROLLED FLIGHTS
1. Air France + Hop!	377,000 ↘
2. easyJet	329,500 ↗
3. Ryanair	307,000 ↗
4. Vueling Airlines	101,000 →
5. British Airways	99,000 ↘
6. Lufthansa	78,500 ↗

Traffic controlled in France consists of 50% of overflights, 36% of international flights (arrivals in France or departures from France) and 14% of domestic flights. In 2017, **overflights** increased by 6% in relation to 2016 notably due to traffic flows with Spain: United Kingdom/Spain (+8%), Germany/Spain (+5%), Benelux Countries/Spain (+9%), Italy/Spain (+7%). Similarly, **international flights** increased by 2% relative to 2016 thanks to traffic with Africa (+7%), the United Kingdom (+3%), Spain (2%) and Germany (+2%). **Domestic traffic** remained constant. France remains the country which controls the most flights in Europe.

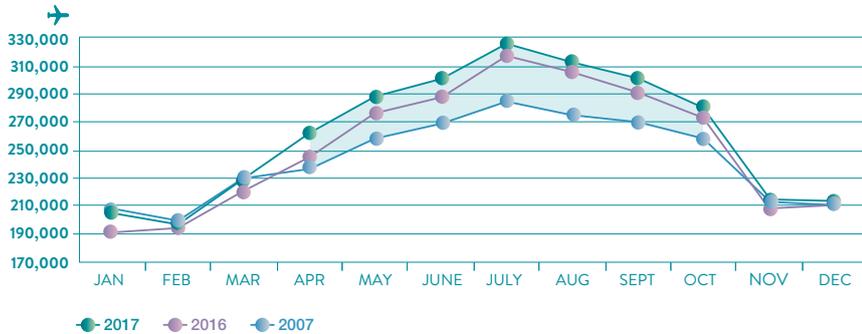
In 2017, 164 million passengers traveled on domestic and international flights serving French airports, an increase of 6% relative to 2016. Domestic connections and traffic between the mainland and its overseas departments registered strong passenger frequentation. Low cost companies consolidated their development on long-haul

Number of days with a traffic > 10,000 flights per day — Source: DSNA

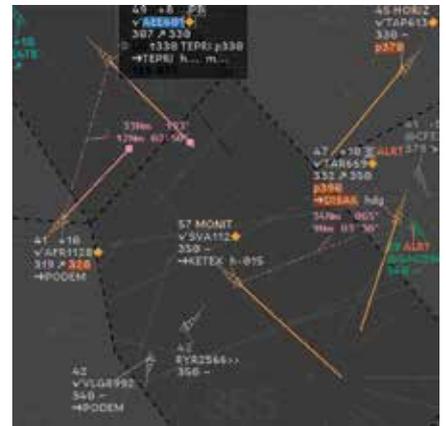
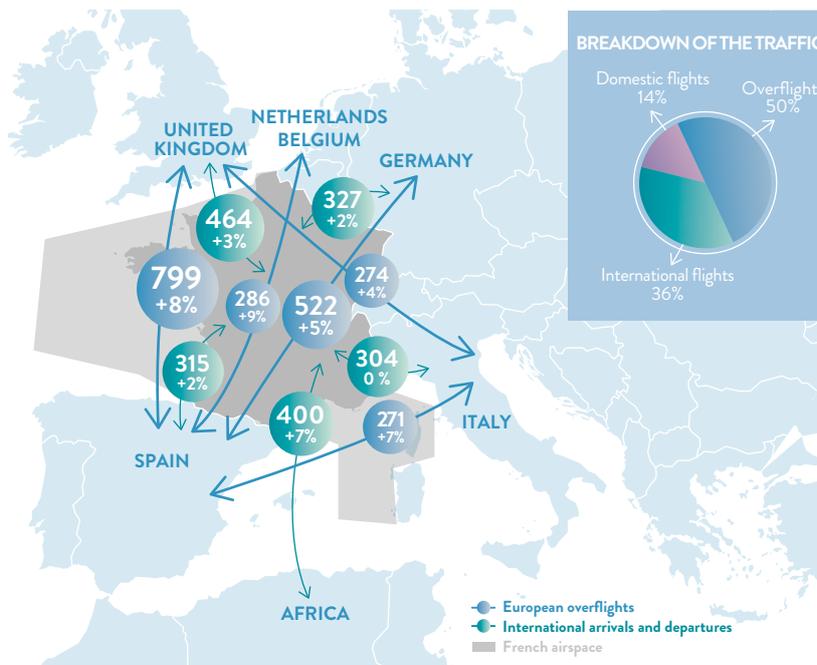


flights. With the exception of Beauvais, greatly affected by the cancelling of Ryanair flights, the major French airports recorded a large increase in their passenger traffic. For the first time, Paris-CDG and Paris-Orly together welcomed over 100 million passengers.

Monthly breakdown of IFR traffic controlled in France — Source: DSNA

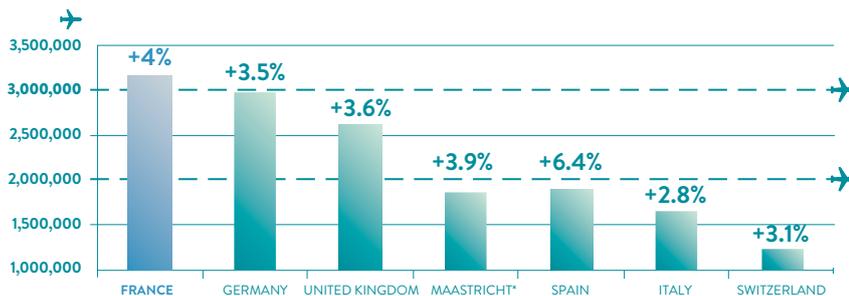


The main traffic flows in France
Average number of flights per day and variation 2016/2015 — Source: DSNA



December 7, 2017: the Brest ACC crossed, for the first time in its history, the threshold of 1,000,000 controlled flights in a year, which makes it one of the busiest en-route centers in Europe.

Air traffic in Europe in 2017 and variation 2017/2016 — Source: EUROCONTROL



* Control Center managing the upper airspace of the Benelux countries and part of Germany.

02

SAFETY & PUBLIC SERVICE



FLIGHT SAFETY



Landing on Paris-CDG airport.

In 2017, in a context of increasing traffic, no accident of commercial aircraft of more than 20 seats was to be deployed in the world. This historic result for air transport can be explained especially by the modernisation of aircraft fleets and better training of operational actors.

Flight safety is the primary mission of DSNA. Far from being a constraint, it is a factor of development. DSNA has undertaken a new, integrated, safety initiative to enhance its professional practices. To this effect, the French air navigation services endeavor to enact all the preventive and corrective measures necessary to ensure its constant improvement, based on a “fair” culture, encouraging feedback and applying the degree-of-gravity classification method (Risk Analysis Tool) required under the European regulation covering performance.

Beyond the 5 events considered important in 2017 and analysed by the authority for processing safety events (ITES), the three major initiatives launched by the “Air navigation safety” committee have progressed well:

Appropriation by the staff of the new air traffic management tools: safety assurance carried out on the start up of the new ERATO system is analysed through observations in the simulator and feedback from controllers (p. 13);

Safety studies: a simplification based on the experience acquired by the services was accepted by the DSAC, the National Supervisory Authority;

On-going training and simulation: some preliminary proposals bearing on all of the components of the training process were formulated.

The integrated safety initiative of DSNA is thus entering into a concrete phase of which the first beneficiaries will be the services and the staff involved in the major technical projects. DSNA is thus laying the foundations for the future evolution of its integrated management system (SMI).

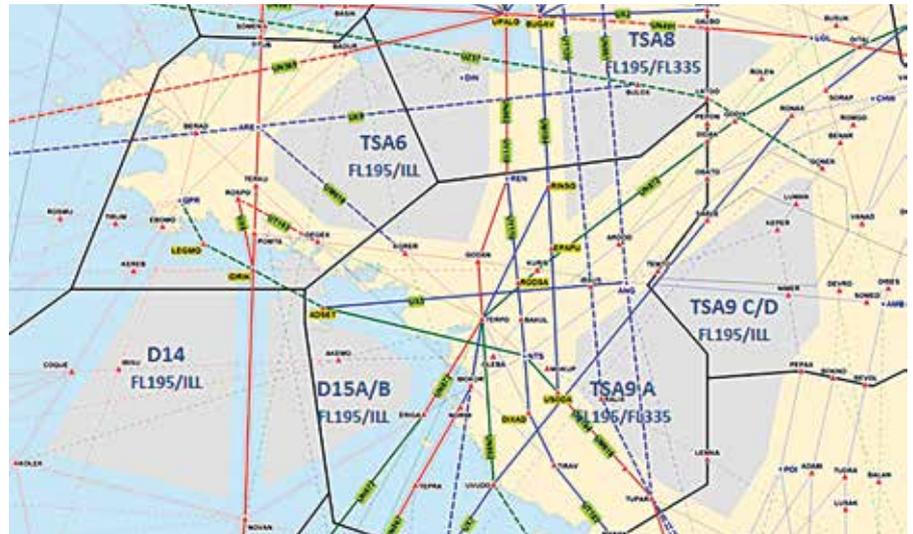
In support of this collaborative initiative, DSNA has elaborated operational safety plans for airport and approach control, air traffic control in the Paris area and en-route control. Concrete actions were begun in 2017, the initiating of civil air traffic controllers into the culture of military air traffic on the conduct to follow when faced with var-

ious situations that they could encounter, the sensitising at ACCs to the risks of crew read back errors. With the deployment of RWSL May 22, 2017 on the inner runway of the South double, Paris-CDG possesses, on its two doubles, a high performing runway incursion prevention system.

DSNA also takes part in the Permanent Group of Airspace Directorate for the safety of air traffic management in charge of examining civil/military incidents, co-presided by DIRCAM, directorate of military air traffic, and DSAC.

The aeronautical information service necessary for the preparation of flights is also one of the missions for which DSNA is certified. As at the annual SIA-UAF (Union of French Airports) seminar, discussions between aeronautical information actors are essential to ensure better harmonisation of supplying data and the quality of the publications. In 2017, the protocols between DSNA (SNA et SIA) and aeronautical operators of IFR airfields, were finalised, and the SIA and its Swiss counterpart signed an agreement to reduce the inconsistencies of data at the border.

In the framework of the SOFIA (Services Oriented to Providing Aeronautical Information) project, SIA has launched a new tool project regarding the pre-flight briefing and another with the SEPIA project, evolving system of aeronautical information production which will allow the end to end numerisation of the processing chain. These tools will eventually replace Olivia and NOPIA.



New organisation of air routes managed by the Brest ACC and military areas.

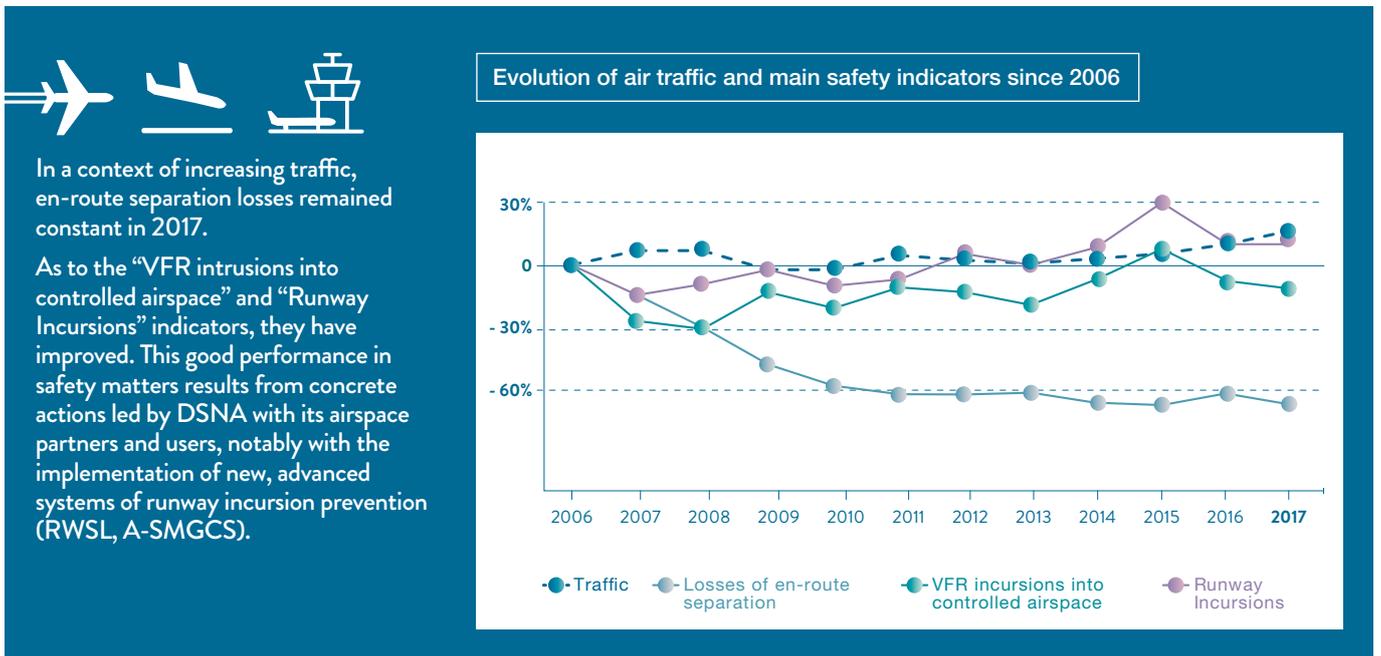
Any reorganisation of airspace results in sustained efforts the success of which is embodied in a framework of collaboration of mutual confidence between the different partners.

Since March 2017, airspace in the Greater West has been rethought, a civil-military project ongoing for about 10 years.

For the national Navy and Air Force, this reorganisation meets the new air fighting training needs with new missiles and has enabled hosting in June a major NATO exercise of inter-operability, mobilising 12 nations. For the civilian part, this reconfiguration of military zones has generated an almost complete remaking of the routes network with major modifications of depar-

ture and arrival trajectories feeding the airports of Brest, Dinard, Jersey, Landivisiau, Lorient, Nantes, Quimper and Rennes. The modified network turns out to be safer with North/South routes divided in upper airspace and with departure and arrival trajectories separated and planable. It also has more capacity potential thanks to a flexible use of the military areas, notably in order to facilitate transatlantic traffic serving Paris-CDG.

This major change is accompanied with sustained training of air traffic controllers.



In a context of increasing traffic, en-route separation losses remained constant in 2017. As to the “VFR intrusions into controlled airspace” and “Runway Incursions” indicators, they have improved. This good performance in safety matters results from concrete actions led by DSNA with its airspace partners and users, notably with the implementation of new, advanced systems of runway incursion prevention (RWSL, A-SMGCS).

CONCRETE ACTIONS IN MATTERS OF SAFETY IN 2017



WHAT ERATO BENEFITS FOR SAFETY

By its advanced functionalities of control assistance of the latest generation and the good use by controllers, the ERATO Electronic Environment (EEE) put into service at the Brest and Bordeaux ACCs, has enabled a gain in performance and a significant improvement in safety: display of the minimal separation between two aircraft (SEP), detection of deviation relative to the clearance in the horizontal and vertical planes (MONA), filtering identifying flights interfering with a given aircraft, trajectory extrapolation.

In 2018, via mode S in enhanced surveillance, the controller will be able to

have aircraft parameters: heading, speed and flight level selected onboard. These new data will allow for integrating alarms if the onboard selection is not consistent with the clearance of the controller.

Finally, safety assurance implemented in the framework of this major change enables identifying technical or work methods adjustments to be made, with the objective of constantly improving safety.

These works contribute to the preparation of the deployment of 4-FLIGHT and eventually to the convergence of these two systems.

The Brest ACC: traffic and losses of separation for 100,000 flights



Since implementing EEE at the Brest ACC on December 18, 2015, controlled traffic has increased of 15%, whereas the number of losses of en-route separation for 100,000 flights fell considerably.



RISKS LINKED TO FATIGUE



Oceanic air traffic control at night in Cayenne.

The scientific bases on fatigue and sleep permit a better understanding of their consequences on the performance and health of an individual.

Several conferences on sensitisation to the risks linked to fatigue took place in 2017 at the ACCs, intended for operational staff. This initiative, animated by outside personnel, is in keeping with a context in complete evolution which will be the subject of European regulatory requirements from AESA applicable in 2020. The conference approaches, in a concrete manner, the individual management of fatigue and strategies to better manage it, before concluding on the aspects of organisational management.

The management system of "Fatigue" risk is an integral part of the safety management system (SMS) of air navigation service providers.



SHARING SAFETY DATA RELATIVE TO AN AIRFIELD

In 2017, DSNA, DSAC and the UAF created a platform on internet intended for pilots in order to assist them in their flight preparation, as a complement to the regulatory aeronautical information. This information permits a better understanding of risks and specificity linked to the aeronautical environment, aerology and geography specific to an airfield.

Objective: reinforce overall flight safety at the airport and in the vicinity. This information, called Collaborative Aero-

drome Safety Highlights (CASH), are defined and validated through a collaborative process involving local representatives of airline operators, airfield managers, Météo France and air navigation services, as well as users.

Six airfields participated with success in the experimental phase: Bastia, Beauvais, Calvi, Nice, Paris-CDG and Toulouse. This initiative will progressively be extended to other airfields.

THE ENVIRONMENT



The reduction of the environmental impact on air navigation is the second strategic priority of DSNA. Taking into account the respect for the environment is integrated into all of the stages of the airspace projects, particularly in the modification of arrival and departure flight paths, on a daily basis, by air traffic controllers, with a clearly defined strategy.

LIMITING THE IMPACT OF NOISE BELOW 2,000 METERS (FL 60) BY OPTIMISING ARRIVAL AND DEPARTURE PROCEDURES

Before any modification of arrival or departure procedures, DSNA carries out impact studies on air traffic (EICA). In 2017, these studies were basically focused on the pursuit of setting up new satellite procedures to become free of ground aids, allowing for a perfect following of the published trajectories in relation to visual maneuvers. They concerned: Avignon, Beauvais, Biarritz, Chambéry, Geneva, Marseille, Nantes, Paris-Orly, Perpignan, Rennes and Saint Nazaire. These studies require environmental impact studies, indeed more complex noise indicators, of counting populations overflown and gas emissions.

These modifications are presented in environmental consultative commission and, for the airports which are affected, to ACNUSA, independent authority.

REDUCING GAS EMISSIONS ABOVE 2,000 METERS (FL 60) BY OPTIMISING FLIGHT PATHS AND HOLDING TIMES PRIOR TO LANDING AT THE MAJOR AIRPORTS

In 2017, through an optimal use of French airspace by giving direct routes to aircraft whenever possible. The action of air traffic controllers allowed for saving about 122,000 tons of fuel, thus a reduction of CO₂ emissions of about 380,000 tons.

In addition, seasonal planning, from November to March, a period where the capacity of the route network is consistent with traffic demand, allows offering more route options in the vertical plane. In the FABEC airspace a hundred or so routes are thus optimised each winter. In 2017, these seasonal procedures allowed for a reduction of CO₂ emissions, about 12,000 tons. DSNA, leader of this initiative, alone contributes two thirds of these gains.

CONCRETE MEASURES REGARDING THE ENVIRONMENT IN 2017



LIMITING THE IMPACT OF NOISE AND REDUCING GAS EMISSIONS

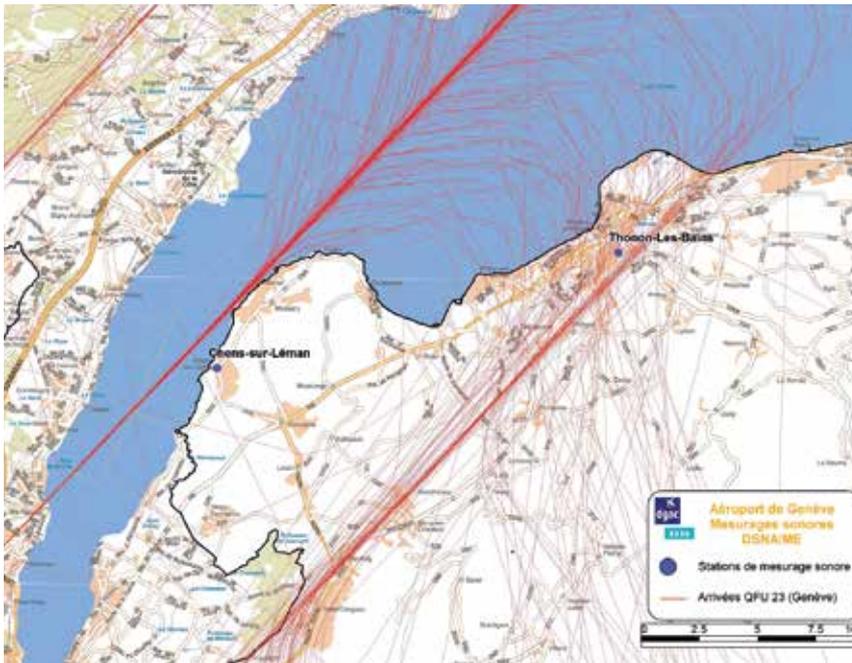
Cooperation between DSNA and Skyguide

The environmental cooperation between DSNA and its Swiss counterpart continued in 2017.

DSNA can take noise abatement measures in situ in order to provide objective elements. Thus, as a complement to the analysis of overflight conditions on the French side of Lake Lemman by aircraft approaching the airport of Geneva, carried out in 2016 and following numerous complaints by local residents and local officials of Haute-Savoie, two stations were established during the last quarter

of 2017 at Chens-sur-Leman and Thonon-les-Bains.

In addition, in the context of local consultations, Skyguide studied the repositioning of the ILS intercept for flights arriving at Geneva in order to limit overflights of Lake Lemman (PETAL project). DSNA carried out a study of noise impact on the peninsula. The results showed that for the population affected, these modifications allow reducing the noise for approximately 10 flights per day.



To valorise the use of our operational data

DSNA is pursuing its rise in competence in the domain of mass data processing (Big Data). It is going to create a laboratory dedicated to this effect, and research synergies with ENAC in order to master, eventually, all the valorisation chain of the datum.

One of the first applications includes a measurement and performance analysis tool **FEAT@DSNA** (Flight Efficiency and

Analysis Tool) based on a platform fed with operational data (notably radar and flight plan) with first scenarios. In partnership with the Sopra-Steria company, DSNA validated the feasibility concept around scenarios on trackings of the Horizontal Flight Efficiency indicators and overflight conditions of urbanised areas.

New air traffic procedures at Chambéry

Chambéry airport is a seasonal airport which has to face high traffic peaks on winter weekends. The flow of North-West arrivals, mainly from the United Kingdom, represents 60% of the arrival flows of the platform.

To ensure better flight safety and a greater capacity, new air traffic procedures were studied. DSNA carried out an impact study of the air traffic comparing the environmental impact (fuel consumption, CO₂ emissions and noise) before and after modification of the measure. The results of this study showed a reduction in flight distance, generating a reduction in gas emissions and fuel consumption (-1.3%)



The Smartski project was put into service in the winter of 2017/2018.

The completion of major infrastructure modernisation work projects at an airport or the implementation of new, increased performance projects, requires modifying, on a temporary or permanent basis, complex operational equilibriums before responding to safety requirements.

In matters of consultation and communication, DSNA is committed to total transparency on its daily actions with regard to elected officials, associations of local residents and the population under flight paths, in order to always inform them better.

VISUALISATION OF FLIGHT PATHS

In the environment centers of Paris-CDG and Paris-Orly, as well as in the 31 city halls of the Paris area, the locals of the three major Paris airports can visualize the aircraft flight paths in quasi real time via the VITRAL (ADP Group) software. DSNA and the ADP Group plan to make VITRAL available on line. For that, DSNA tested then installed a protection device for the diffusion of these radar data in order to ensure a high level of security of these information systems.



Paris-Orly: end of runway 4 resurfacing work / Summer 2017.

The success of this initiative has incited DSNA to start similar work at other major airports in coordination with the managers.

RESURFACING WORK ON RUNWAY 4 AT PARIS-ORLY

At Paris-Orly from July 25 to August 25, 2017 the last phase of the resurfacing of the North runway of the platform, with a length of 3,650 meters, was carried out.

Such a work site is very complex to manage. It requires much professionalism on the part of the teams on the ground and greatly affects the management of air traffic.

This is why, prior to the start-up of these operations, a dialogue is engaged with all of the parties involved: airport manager, airline companies, local residents associations and elected officials. This type of situation fully benefits from the collaborative management process (CDM) between operational actors. It notably contributed to adhering to environmental regulations in matters of curfew through optimising the use of the North/South runway during the day.

OUR PARTNERS TALK ABOUT DSNA...



In 2014, I headed a working group on night noise nuisances caused by the Paris-Charles de Gaulle platform, charged with proposing operational improvements. The committee that I animate, on follow-up

and evaluation of measures enacted, rendered its conclusions.

“I cooperated with DSNA for more than three years on the deepening of knowledge and rigorous and patient

research for measures likely to ensure better control of night nuisances: landing procedures, alternating the North and the South runways, flight path preferences according to time slots, punctuality of arrivals and departures, preventive information of locals...

I met a constant capacity for listening, of analysis and dialogue, the will to improve knowledge of the real situation in order to improve procedures step by step and great professionalism. This cooperation permitted setting up, at certain hours and in certain configurations procedures called “shallow descents” limiting the impact of noise for a greater number of locals.

This cooperation will continue in 2018 within the permanent committee of the Paris-CDG platform.

Regis Guyot, Prefect

PUNCTUALITY OF FLIGHTS

In 2017, 27% of flights were delayed by more than 15 minutes when departing from mainland airports. The breakdown of the causes is the following: rotations in series (9%), airline companies (7%), passengers (4%), airports and security (4%), air navigation (2%), bad weather conditions (1%).

Another indicator allows one to evaluate the punctuality of flights: the average delay due to air traffic regulations, called "ATFCM delays". More technical, it is calculated at takeoff for flights regulated by the difference between the takeoff slot allocated by the Network Manager of EUROCONTROL at Brussels and the takeoff time scheduled on the flight plan.

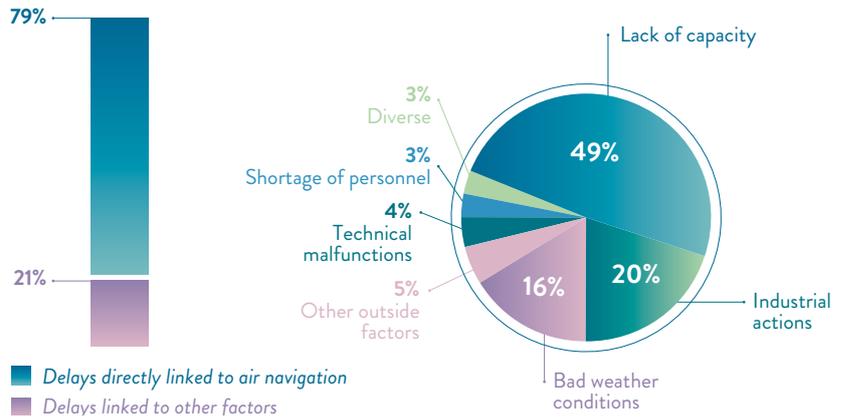
In 2017, the French air navigation services generated 3,550,890 minutes of delays (-15% relative to 2016) including 3,041,941 minutes due to the en-route phase, thus **an average of 1.13 minute delay per flight** (1.37 minute/flight in 2016). Two-thirds of these delays were due to the lack of capacity (a traffic demand much higher than the supply of capacity) and social movements.

Weather phenomena are increasingly violent and can greatly impact air transport. In September, 2017, the islands of Saint Martin and Saint Barthelemy in the Caribbean sea were hit by two hurricanes. In December, 2017, two winter storms swept the mainland creating flight cancellations or long delays (27% of recorded delays in December were caused by weather).

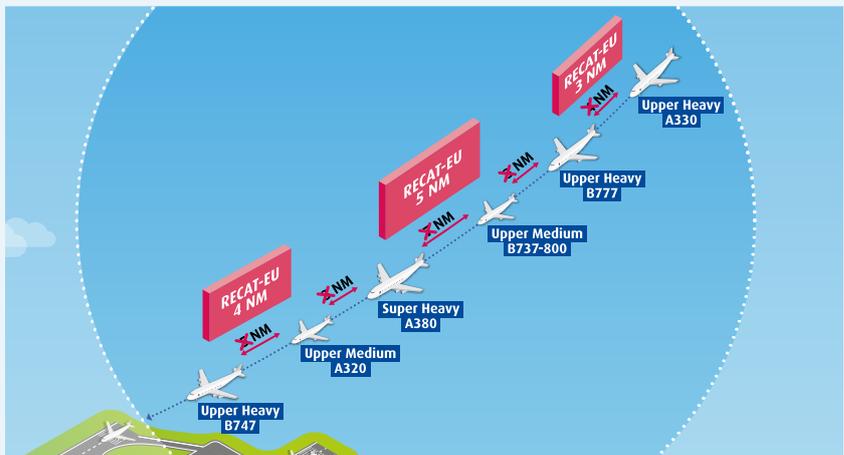


The Brest and Bordeaux ACCs: the ERATO Electronic Environment (EEE) brought a significant increase in capacity.

Breakdown of the causes of delays due to air traffic regulations — Source: DSNA



RECAT-EU@PARIS-CDG & LE BOURGET: SAFER, CLOSER



To optimise flight sequencing of arrivals at the airports of Paris-CDG and Le Bourget, DSNA put RECAT-EU into operation: the approach controller has more optimise separation minima, up to 30% reduction according to the sequencing of aircraft. **A first in Europe!**

On the basis of a safety study carried out by EUROCONTROL and validated by EASA, DSNA has defined six categories adapted to aircraft using the Paris-CDG & Le Bourget platforms with separation minima taking into

account wake turbulence generated by the leading aircraft and the characteristics of the following aircraft.

After two years of operation the benefits are there:

I Safety:
 Separations adhered to: +1.6%
 Events linked to wake turbulence: constant

I Runway throughput:
 Capacity: +10%
 Delays: -10%

JANE'S ATC AWARD 2018

CONCRETE ACTIONS TO IMPROVE PUNCTUALITY IN 2017

In the strategic plan, the airspace reorganisations like those carried out in 2017 in the West and South-West regions played an important role in the fluidity of

air traffic. In the pre-tactical phase, to adapt to new air traffic characteristics and to contribute to the regularity of flights, DSNA works to develop, with air-

line companies and the Network Manager of EUROCONTROL, new operational concepts for a refined management of air traffic flows.



COLLABORATIVE ATFCM MEASURES (MAC)

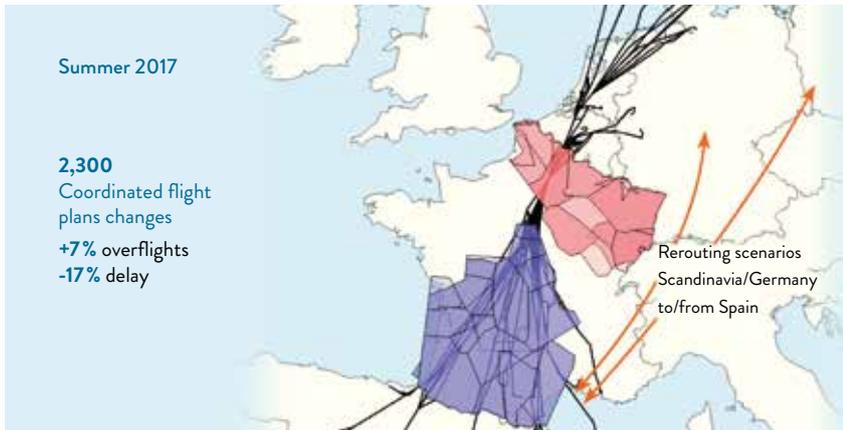


When some air control sectors are saturated due to traffic demand that is too high, flights are regulated for safety reasons. With the collaborative advanced regulation measures (MAC), airline companies know the best route

options to avoid these sectors. The route network turns out to be safer, managed in a balanced way and less penalising in terms of delays. During the summer of 2017, new traffic flows were integrated into this pre-tactical management mode with

the participation of 15 companies and 3 air navigation operators (Spain, France, Switzerland). These operational evaluations were effected in the framework of the SESAR 2020 project "Network Collaborative Management" piloted by the Network Manager.

ATFCM REROUTING SCENARIOS



"Thanks to very positive collaboration with the Paris ACC, ATFCM delay was greatly reduced in the Paris region during the summer of 2017. For our flights, the TE control sector was among our Top 5 of most penalising sectors in 2016 and in 2017, it was not even in our Top 10!"

AIRFRANCE



SAFER AND MORE EFFICIENT MANAGEMENT OF ARRIVING FLIGHTS AT PEAK PERIODS AT PARIS-ORLY

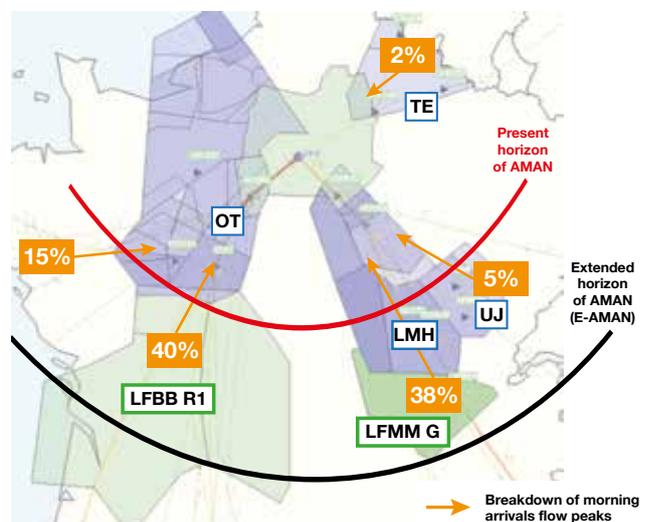


In the framework of the xStream project of the European SESAR 2020 program, a new management procedure for flights arriving at Paris-Orly (p.40) was evaluated with success on real traffic during the work resurfacing runway 4 in the summer of 2017.

To smooth out peak, late morning traffic, thanks to a collaborative process between the controllers of Orly, the Paris and Bordeaux ACCs, nearly 200 arriving flights saw their speed adapted from the North of Bordeaux (South-West flow) or from Lyon (South-East flow). This operational concept called *Extended-AMAN*, extending to 220 NM (400km) from the destination airport, thus enabled reducing the workload of the Paris ACC and Orly approach controllers thanks to a better sharing of the delay with the en-route sectors.

The gains obtained in terms of capacity, compared to the same situation in the summer of 2016 (phase 1 of the runway 4 resurfacing work) are:

! better flight efficiency (delay managed in flight by the Paris and Bordeaux ACCs, no flights in holding patterns on approach);



Management of arriving flights at 250 NM from Orly airport.

03

**HUMAN &
COLLECTIVE**



HUMAN RESOURCES



Training room for 4-FLIGHT, the future DSNA en-route air traffic management system, at the Reims ACC.

MANAGEMENT AND TRAINING OF TECHNICAL PERSONNEL

On December 31, 2017, the workforce of DSNA in mainland France and Corsica and the French overseas territories (West Indies, French Guiana, Indian Ocean, Saint-Pierre-and-Miquelon and French overseas territories in the Pacific: French Polynesia, New Caledonia, Wallis and Futuna) stood at 7,451 employees, with a male/female breakdown of 71%/29%. This workforce is down by 0,9% in comparison to 2016: 93% of employees (6,900) are working in mainland France and Corsica and 7% (551) in the French overseas territories.

For the Pacific air navigation services, DSNA provides operational and technical support in the framework of agreements.

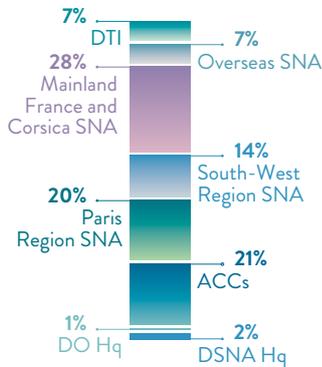
DSNA manages, on behalf of DGAC, the careers of three technical bodies: ICNA (ATCO engineers), IESSA (ATSEP), and TSEEAC (Senior technicians). Management planning for these personnel is the subject of careful attention considering the amount of time it takes to obtain the necessary technical and operational qualifications.

DSNA helps to define the criteria for recruitment, entrusted to ENAC, the French academy for civil aviation, the leading training center in FABEC (p.42). With ENAC, DSNA also decides on the content of the initial training courses for its future technical staff and adapts it according to eventual changes in the professional fields. ATCOs and ATSEPs training courses are delivered alternately between ENAC and the DSNA operational units. They are the equivalent to obtaining an MA (Master's Degree – level Baccalaureate + 5 years).

DSNA manages the job assignments for students enrolled at the school and champions their professional mobility (e.g. transfers) through the creation of new positions, which are examined by joint administrative committees twice a year.

The new European regulatory framework on the management of competencies went into effect on January 1, 2017. Notably it aims to reinforce continuing training in matters of air safety. To be in conformity with European requirements, DSNA has had to adapt its referential in regard to practical and linguistic skills, simulator instructor and on-the-job-training instructor endorsements and procedures relative to temporary incapacitation.

Breakdown of employees by department

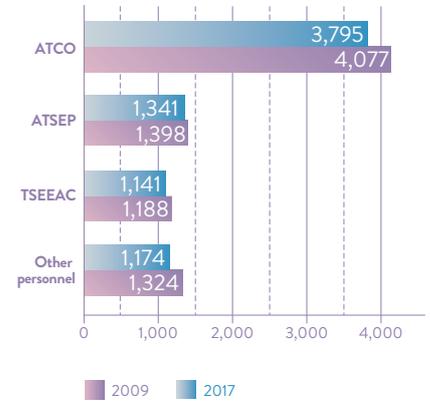


TOTAL
7,451 persons

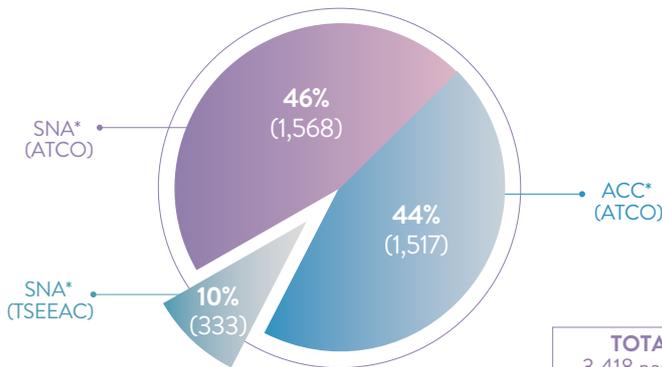
DETAILS BY ENTITIES

Paris region SNA	1,448
South-West region SNA	1,020
South-East ACC (Marseille)	590
East ACC (Reims)	497
West ACC (Brest)	480
South-East SNA	359
South-South-East SNA	346
Center-East SNA	332
West SNA	303
North-East SNA	298
South SNA	244
West Indies/French Guiana SNA	241
North SNA	224
Indian Ocean SNA	75
Saint Pierre-and Miquelon DSNA	37

Evolution of workforce (excluding trainees)



Breakdown of controllers having a valid license by type of entities

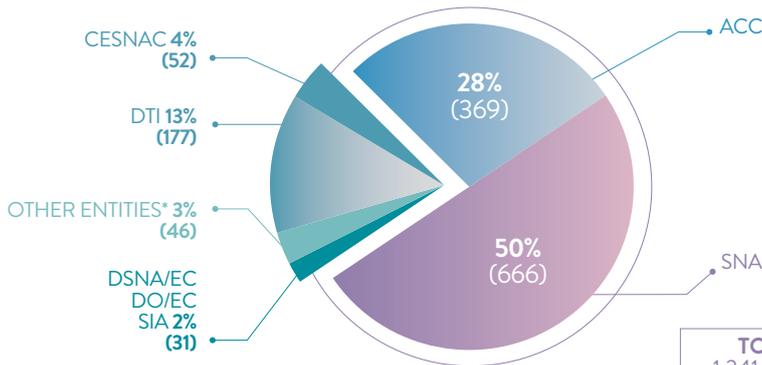


TOTAL
3,418 persons

* Includes mainland and Corsica SNAs and those of Overseas territories



Breakdown of maintenance personnel by service and type of entities



TOTAL
1,341 persons

* DSNA/SPM, French Polynesia, New Caledonia, Wallis and Futuna





4-FLIGHT seminar: a readiness for commitment from all actors.

SOCIAL DIALOGUE

DSNA finds itself in an important structural transitional phase in its history: it is aiming for significant operational and economic improvement on the 2020 horizon to the benefit of its customers and users, in an environment of safe, modern and effective work.

The application of the DGAC 2016-2019 social protocol was continued in 2017. This protocol contains three major performance challenges:

- the improvement of operational and economic performance;
- the optimisation of the organisation and activities of surveillance;
- the continuation of the rationalisation and mutualisation of support functions.

ADAPTING THE ORGANISATION OF SERVICES

The workforce reduction that DSNA has known since 2008 is part of the national context in which it is necessary to control public spending. The qualified workforce will continue to decrease in numbers until the end of the decade but DGAC protocol authorises recruitment which will permit stabilising the workforce.

DSNA is also involved in in-depth evolution of its structures and its professions with the objective of controlling durably the adequacy of the actual workforce in relation to the operational needs of its organisations. DSNA makes sure that the personnel impacted by these reorganisations can benefit from social services.



World ATM Congress in Madrid: DSNA/ENAC booth / March 2017.

To ensure that its present organisation is well adapted to the challenges of the Single European Sky, the technical and innovation directorate (DTI) of DSNA led, in 2017, feedback dialogue in complete transparency with its personnel and partners. Stage 1 was finalised: it permitted establishing precise analysis of the forces and problematic situations called “root causes” of the present organisation. Stage 2 continues on the evolutions and consolidations to bring forth.

TO ACCOMPANY THE MANAGERS

DSNA launched an initiative of accompanying all its managers involved in technical modernisation and the plan for numerical transformation (electronic strip, CPDLC, SWIM, Big Data, AIM...). This approach has as its objective to modernise their work methods and to confederate the different initiatives of transformation underway like feedback on the organisation of DTI, UA3P

(Projects Support Unit, Programs and Portfolios), the initiative of integrated safety, Innovation initiative... Five areas to work on have been identified: security/cybersecurity, handling of programs, engineering and innovation, skills and human resources, confidence.

In 2017, with UA3P, DSNA consolidated a methodological base with the development of tools, training actions and coaching, ground support missions and the animation of a community.

THE INTEGRATED MANAGEMENT SYSTEM

To improve its overall performance in conformity with European requirements, DSNA is involved in setting up a management system integrating safety, security, the environment and quality of service. This initiative aims to improve its internal operation as well as its relations with external interlocutors, mainly with users of the air-space.

The integrated system of management (SMI) contributes to maintaining:

- ▮ the air navigation service provider certification issued by DSAC, the National Supervisory Authority;
- ▮ the ISO 9001 "Systems of quality management" certification of DSNA, which permits ensuring continuous improvement of the products and services provided.
- ▮ adapted protection of DSNA installations in matters of cybersecurity.

In 2017 an update of the SMI procedures and methodologies was launched in order to ensure in 2018 the success of the ISO 9001 certification audit on the basis of the new referential (V.2015). The DSNA has as an objective to integrate these changes in a 'simple' and 'performing' manner, to wit:

- ▮ from the users point of view, the procedure or methodology should be easy to apprehend and use. This initiative enables limiting the requests for outside assistance and contributes to job satisfaction;
- ▮ from the organisational point of view, the procedure or methodology should allow reaching its objective with a minimum of effort required;



These changes bear on:

- ▮ the taking into account of the context to identify the challenges and orient the strategic piloting;
- ▮ adapted follow up on the needs and expectations of our various partners;
- ▮ a management system integrating the risks and opportunities to seize;
- ▮ the management of knowledge;

DSNA will generalise this new approach by risk management, to all of its management processes, beginning with the piloting of its strategic risks.

This evolution is also the occasion for DSNA to bring the SMI closer to users and contributors and to collectively improve the efficiency of services provided.



04

**COMPETITIVENESS
& CUSTOMER
SERVICE**

FINANCE

Purchasing and finance management contribute to the overall performance of DSNA. DSNA's budget is established in a special budgetary framework: the "Aviation Control and Operations" (BACEA) budget annex. The financial accounts are certified annually by an outside service provider.

REVENUE AND EXPENDITURES

In 2017, total DSNA income amounted to 1,678 million euros, an increase of 2% over 2016 due to revenue from charges for en-route and revenue linked to services. Route charges amount to 82% of DSNA revenue and its unit rate is one of the lowest in Western Europe. In addition, the implementation of new IFR satellite overlay procedures led DSNA to keep only the maintenance of a minimal network of Category 1 ILSs on the middle-sized regional airfields. This initiative also goes along with a lowering of the unit rate of charges in terminal areas (RSTCA) on the mainland and Corsica. The deperequation measure that came about on January 1, 2017 (Zone 1: CDG and Orly; Zone 2: other airports) enabled reducing by around 20% the RSTCA rate applicable to zone 1 airports.

2015-2019 PERFORMANCE PLAN

Modern government requires transparency, efficiency and coherence in our capacity to provide answers to our interlocutors.

To improve, on a permanent basis, the effectiveness of our action, DSNA has to satisfy certain performance objectives in terms of safety, capacity, environment and cost control. DSNA's master plan gives a global and coherent vision of the means to reach these objectives by offering quality and competitive services to all of its users, customers and partners, equal to everyone's expectations. DSNA pilots its performance and thus oversees the correct implementation of its strategies. Moreover, it has to meet a performance plan established at FABEC level (p. 42), with an economic part defined at the national level, for the 2015 – 2019 period of reference, called "RP 2".

BETTER ORGANISED PROFESSIONAL- PURCHASES ACTIVITIES

In 2017, in the framework of DGAC modernisation support functions, DSNA reorganised its "purchases" function by creating a single purchases-pole for all of its professional-purchases activities, be they operational or technical.

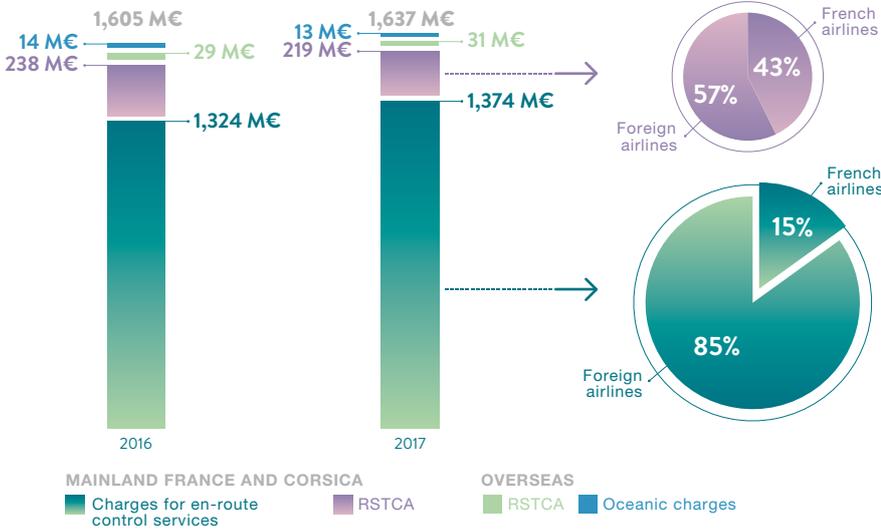
This new organisation aims to reduce delays in signing contracts, reduce financial costs by a volume effect and improve judicial security of purchasing acts and optimise the use of resources.

REVENUE		NUMBER OF SERVICE UNITS	UNIT RATE	AMOUNT
Mainland France and Corsica	En-route charges	20,672,919	67.63 €	1,374 M€ ↗
	Charges in terminal area	1,078,128	Zone 1: 177.69 € Zone 2: 222.28 €	219 M€ ↘
Overseas	Oceanic charges	358,648	35.78 €	13 M€ ↘
	Charges in terminal area	2,620,629	12.00 €	31 M€ ↗
<i>Sub-total: product of air navigation charges</i>				1,637 M€
Revenue other than charges (sales of goods and services)				41 M€ ↗
Total				1,678 M€
EXPENDITURES EXCLUDING PAYROLL			AMOUNT	
Contribution to outside organisations			218 M€ →	
Investments			197 M€ ↗	
Regular operations			162 M€ ↘	
Total			577 M€	

In 2017, DSNA expenditures (577 million euros) were stabilised, the increase due to investments was compensated for by a decrease in the amount linked to regular operations. The contribution to outside organisms (Météo France, EUROCONTROL, delegated airspaces, ADP group, ENAC) remains the largest part (38%).

To maintain the competitiveness of its services, DSNA commits, in its technical program, on average, 300 million euros per year during the period 2015-2019 broken-down as follows: 150 million euros for the major technical projects which prepare the future; 100 million euros to maintain the operational condition (MCO) of existing installations and systems development; 50 million euros for civil engineering.

Receipts from air navigation charges — Source: DSNA



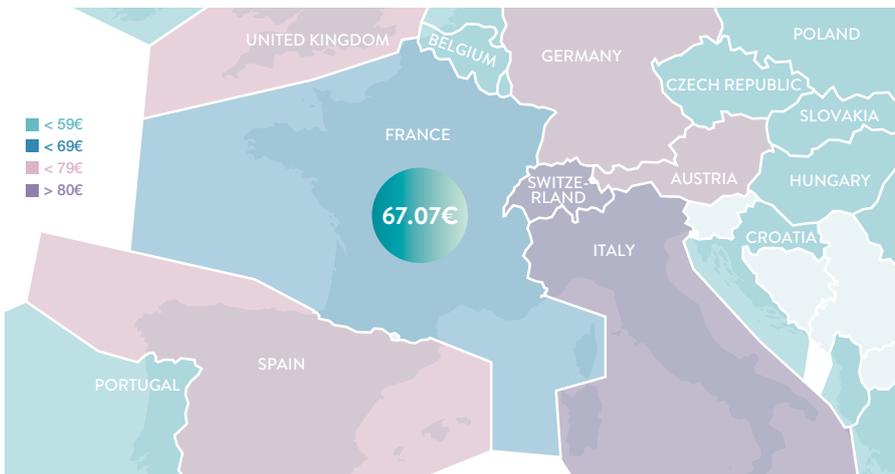
Figari-Southern Corsica: new control tower entered service on April 25, 2017.

Evolution of the technical investments program and of maintaining operational conditions (MCO)



Caen: renovated control tower entered service on March 1, 2017.

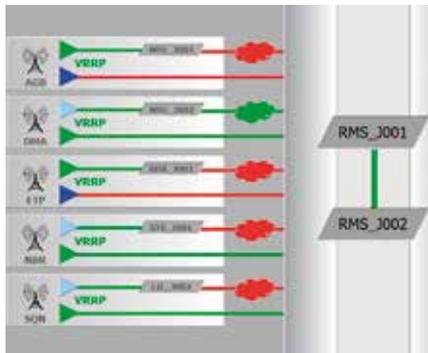
Unit rate of en-route charges in Europe in 2017 — Source: EUROCONTROL



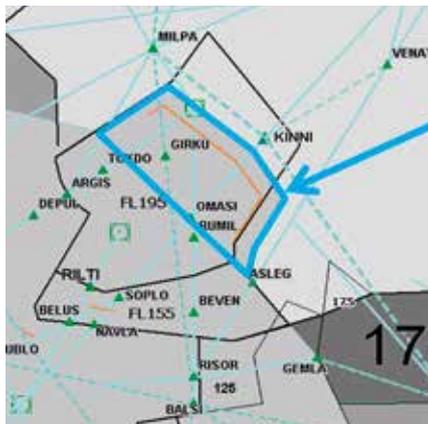
THE MAJOR TECHNICAL AND OPERATIONAL **ACHIEVEMENTS**



Paris-CDG: RWSL put into service on the Southern inner runway on May 23, 2017.



Supervision of RENAR-IP at CESNAC: to identify the breakdown (DIGIVOL radio antenna) and to minimise its impact on operations.



The Marseille and Geneva ACCs: dynamic area of responsibility at the franco-swiss border.

A MODERN INFRASTRUCTURE FOR GROUND-GROUND COMMUNICATIONS

DSNA is the first major European operator to use operational vocal communications through Internet Protocol (IP). The other systems contributing to vocal transmission will be converted progressively (VoIP).

In 2017, DSNA put into service H24 supervision at the national level for technical systems and vital operational functions of its latest generation RENAR-IP network, integrating voice and data. The first service supervised is that of the radio and security telephone. Supervised later will be surveillance data distribution services and supports for new applications (ATM, ATFCM, AIM).

RENAR-IP allows supporting new services, always more demanding in terms of performance and reliability. Connected to the European IP network PENS, it ensures the interoperability of exchanges with adjacent air navigation operators. RENAR-IP is also interconnected with the IP network of Defense (IPD2): the correct functioning of these networks is a prerequisite to putting 4-FLIGHT and new NVCS (p.36) radio equipments into service.



AN INNOVATIVE RESTRUCTURING OF AIRSPACE TO BENEFIT COMPANIES

In the Franco-Swiss transborder zone, within FABEC, a higher performance organisation of upper airspace came into effect on October 12, 2017, guaranteeing the hundred or so daily flights in this airspace a higher level of safety and greater fluidity.

After five years of negotiations and working together, a new system of air navigation for flights departing Geneva to the Marseille ACC was devised and validated by the surveillance authorities of each State. The Geneva TMA limits in French airspace were redefined and the management of the flight information service in the Geneva SIV was better divided between the Marseille and Geneva ACCs. An innovative aspect of the system from the Dynamic Airspace Configuration (SESAR): **a dynamic zone of responsibility**, shared between these two control centers according to the runway in use at Geneva airport, was created.



Saint-Pierre-and-Miquelon: resurfacing work on the runway of 1,800 meters with 400 lights to change. To continue operation of the airfield, temporary satellite overlay approach procedures with vertical guidance (LPV) enabling landing on a displaced threshold were implemented thanks to the North American WAAS (DSNA-FAA cooperation agreement) system / Summer 2017.

NAVIGATION BY SATELLITE

In 2017, DSNA deployed, all over France, new publications on EGNOS approach procedures with performance equal to a category 1 ILS (200 feet ceiling, 500 meters of horizontal visibility) enabling DSNA to offer its users better service at the French mainland airports relying on a mixed and homogeneous network, at lower cost. In cooperation with airport operators. DSNA reworked about thirty EGNOS procedures on fields where the ILSs had been closed down, to offer them as category 1. These procedures of precision are free of ground assistance, rely on a very weak and free signal, but require, however, adapted onboard equipment. The PBN procedures also allow for evaluating new approach trajectories better able to meet environmental and safety challenges.

European leader in matters of deployment of PBN procedures, DSNA is the first European air navigation operator to use an innovative category 1 approach network, combining conventional ground aids and satellite overlay approaches.

In 2017, the contract for the complete renewal of the EGNOS system was granted to Airbus Defense and Space start-up in 2024.

DSNA OVERSEAS

DSNA's strategic challenges for Overseas services:

- ❶ Set-up a CDM organisation to manage crisis situations (cyclones,...).
- ❷ Modernise the air traffic surveillance means.
- ❸ Assure its commitments to ICAO in matters of SAR (Search and Rescue).
- ❹ Modernise the control systems.
- ❺ Improve their attractiveness to the personnel.

These five axes constitute the foundation of development of the overseas air navigation services of DSNA in order to offer quality service. The main activities carried out in 2017 are:

I Cayenne (French Guyana): new ATM "CACAO 2" system certified by the surveillance authority for oceanic control (p.35).

I Dzaoudzi (Mayotte): first study for safer airspace management while waiting for the set-up of approach service operated from La Réunion Island.

I Saint-Pierre-and-Miquelon: continuation of studies on the remote tower of Miquelon. At the end of work on the runway, two category 1 PBN procedures were put into service at Saint-Pierre.



Pointe-à-Pitre: retreat base to transport assistance to the inhabitants of the islands of Saint-Martin and Saint-Barthelemy after the passing of two hurricanes/September 2017.

OUR PARTNERS TALK ABOUT DSNA



The International Air Transport Association (IATA) is the trade association for the world's airlines, representing some 275 airlines or 83% of total air traffic. Its regional office for Europe is based in Madrid with a network of over 15 offices. For Europe, IATA wants to enhance airspace efficiency by developing a national airspace strategy with every ANSP. In 2017, IATA and DSNA agreed to cooperate on the development of a French Air Traffic Management Strategy, whose three main pillars consist of airspace management, human resources management and technical modernisation of its ATM systems.

"This partnership marks a defining moment in the relationship between DSNA and its customer airlines. DSNA has shown real vision to bring airlines into the strategic direction of air navigation service provision. We look forward to working with DSNA to make the French ATM Strategy not only a success for France, but a model for other European ANSPs to follow, so that the work of airspace optimisation can bring benefits to all of Europe's citizens, and the goals of the Single European Sky can be achieved."

A. de Juniac/Director-General and CEO

ATTENTIVE TO OUR USERS

Periodical meetings between DSNA and the National Council of the Aeronautical and Sports Federation (CNFAS) are organised on current operational subjects. In particular, forums on the intrusions of VFR flights in controlled airspace have permitted better informing general aviation pilots and their federations on regulatory evolutions, problematics linked to IFR/VFR compatibility, correct practices in air navigation in controlled and non-controlled airspaces.



In 2017, controllers at the Toussus-le-Noble (Yvelines) airfield experimented a new management of airspace with the creation of a flight information sector. The LOC frequency is less busy, which contributes to improve flight safety and to facilitate the success rate of the certification of trainee controllers.

DRONES WITHIN CIVIL AIR TRAFFIC

DSNA is very much involved in the development of drones activity which will become, in the short term, a real operational challenge for overall performance of air traffic management.

At the national level, DSNA participates in a civil-military group charged with responding to operation management problematics for the large military drones operating in upper airspace. To this effect, an experiment will be carried out at the beginning of 2018 under the control of this type of drone by ACCs. The needs of enterprises operating these drones are going to be integrated in the SOFIA (Services Oriented Provision of Aeronautical Information) project. In Toulouse and at Paris-CDG (HOLOGUIDE project), DSNA evaluates a simplified and innovative service to users to plan their mission in total safety. For protection from malfessant drones at airports, evaluations of new drone detection technology are being carried out at Paris-CDG (HOLOGUARD project in partnership with the ADP Group and Thales.



HARFANG military drone: position of the telepilot. Live trials carried out at Bordeaux TMA in 2017 (SESAR project).

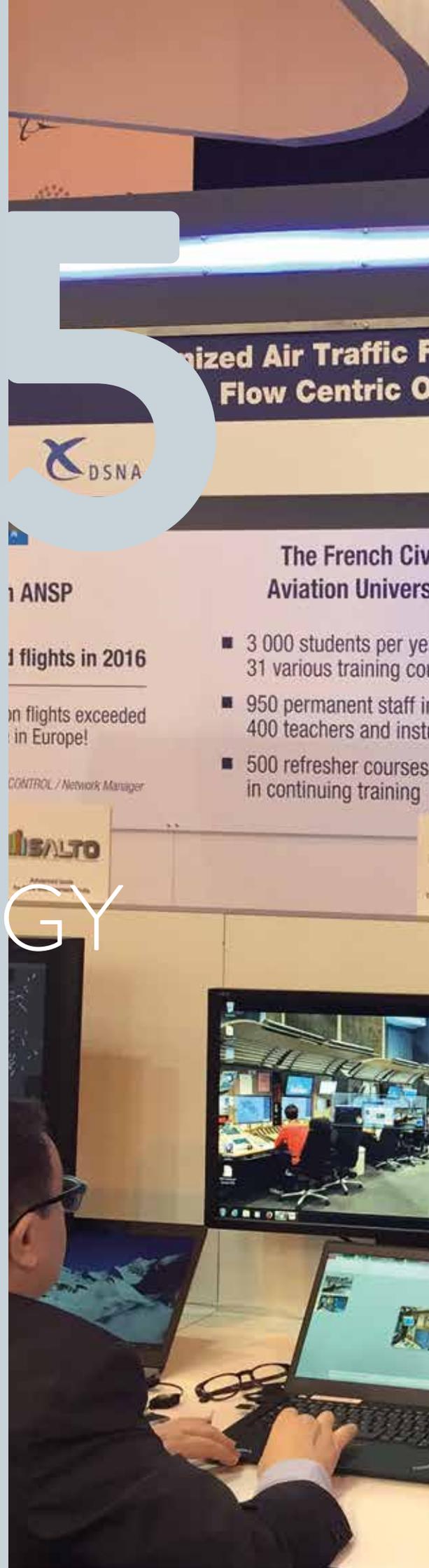
At the European level DSNA is the only air navigation operator to participate in four SESAR projects on drones. As a complement to its contributions to the IFR RPAS Integration and ACAS Xu projects concerning the integration of IFR drones into controlled airspace, DSNA has invested in two projects bearing on U-Space:

ICORUS (Concept of Operations for European Unmanned Systems): definition of operational concepts flight rules applicable to drones in non-controlled airspaces, mainly below 500 feet (150 meters).

IPODIUM (Proving Operations of Drones with initial UTM Management): demonstration and validation of these concepts with experiments in the Paris and Toulouse areas.

05

INNOVATION & TECHNOLOGY



MODERNISATION OF AIR TRAFFIC MANAGEMENT (ATM) SYSTEMS



4-FLIGHT positions are set up in the Reims ACC's operations room.

Coflight eFDP

Developed by DSNA, ENAV and the industrial consortium Thales/Leonardo, the Coflight advanced flight data processing system constitutes a major operational and technological breakthrough. At the core of the future DSNA air traffic management (ATM) system, it will allow controllers to optimise their flight paths, thus reducing fuel consumption and the duration of a flight.

Coflight accompanies the development of 4-FLIGHT. In 2017, a new version was received improving the stability of the base-system, the functionalities allowing the switching of the operational to the backup and taking into account certain modification requirements which came out of the first 4-FLIGHT evaluations.

The cooperation with the COOPANS Alliance continues with the objective of enlarging the base of Coflight users. DSNA and COOPANS signed at the WAC in Madrid, in March 2017, two agreements: one on the participation of COOPANS in the Coflight Agency, the other on the integration of Coflight in the ATM system of COOPANS.

A compact and modular platform based on Coflight data (**BOLT: Big data Operational Live Trajectory**) was developed to supply a high performing 4D trajectory service to applications allowing for flight optimisation (ATFCM, XMAN, xStream...) and those of the Big Data type (surveillance, performance analysis, SWIM services...). BOLT will be used by the Reims ACC in the framework of SESAR live trials (p.43)



Demonstration of Coflight Cloud Services at WAC, 2017

The aim of this project is to deliver a remote, high performing service of flight data based on Coflight. First tests are scheduled in 2018 between the Paris ACC (data supplier) and the Geneva ACC (customer).

4-FLIGHT

The Innovative ATM Solution

Launched in 2011 with the signature of a framework contract with Thales, the 4-FLIGHT program, co-financed by the European Union, constitutes the core element for modernisation of the French ATM en-route system. This new generation, stripless system integrates the Coflight system of advanced processing of flight data, a latest generation java MMI and innovative and high performing aid tools for the management of flight safety.

With 4-FLIGHT, DSNA foresees a 20% increase in capacity. Free Route and more generally the User Preferred Route of the Single European Sky will demonstrate their full operational dimension in dense and complex airspace.

4-FLIGHT constitutes a long-awaited answer, including by our European partners, to the increasing demand of air traffic in Europe. In competition with the iTEC program developed by the industrial Indra, it comprises one of the two building blocks essential to the interoperable European systems of the future.

OUR PARTNERS TALK ABOUT DSNA...



The Air France group, member of the SkyTeam Alliance, including the national company, the regional subsidiary HOP!, the low-cost company Transavia France and since the first of December, 2017, the “new generation” JOON company.

Major company in Europe, Air France represents the leading DSNA customer in terms of air navigation charges.

“90% of our flights are controlled by the air navigation services of the Paris area: CDG, Orly and the Paris ACC. In France the level of flight safety is very good, and we must, together, continue our efforts without letting up.

We have noted the capacity increases achieved by CDG and the French ACCs. And the collaborative processes set up by DSNA in pre-tactical with the airline



Paris-CDG, Air France hub.

companies, including Air France, have given good results. We plan to continue this collaboration in 2018!

However, it remains insufficient in light of the continued growth in traffic.

With great interest, we are looking forward to the modernisation of technical equipment of French control units so that they possess greater operational capacity.”



As a 4-FLIGHT complement, the SYSAT program, co-financed by the European Union, aims to modernise the air traffic management systems of the Towers and approach control centers in mainland France and Corsica operated by DSNA by relying on an existing industrial system adapted to our technical environment.

One of the challenges of this program resides in the number of operational units to equip and in the diversity of customers and users present in lower airspace, which led DSNA to divide acquisition and maintenance markets into two groups.

DSNA chose to entrust the carrying out of SYSAT for Group 1 (Paris CDG/Le Bourget and Paris-Orly) to the SAAB-CS (Communications and Systems) industrial consortium and approved the agreement-framework on December 7, 2017.

Concerning Group 2, the period of temporising on the purchase process was the opportunity to deepen the managerial and operational organisation, very innovative due to the number of units involved, by taking into account the experience acquired with Group 1. Notification of the agreement-framework is expected at the end of 2018.

A MODERN ATM SYSTEM AT CAYENNE

With CACAO 2, the control center at Cayenne equipped itself with a latest generation, electronic stripping tool. The center possesses a homogenous, integrated system which enables it to visualise all the continental and oceanic traffic on the same display (surveillance ADS) and can communicate with the team by satellite in a silent manner (CPDLC). CACAO 2 offers new functions like conflict detection at middle range, which will improve flight safety. The routes are optimised by taking into account weather constraints. The implementation of automatic coordination with adjacent centers is also being studied.

The extension of CACAO 2 to the Tower/Approach positions takes part in the modernisation program of ATM systems on West Indies-French Guyana SNA.



In 2017, the two pilot sites, the Reims and Marseille ACCs, continued the installation and parametering of this new system, to prepare the next evaluations on live traffic as well as the program of transformation of controllers and maintenance personnel. As to the Paris ACC, the platform on site has enabled starting the first work of parametering and the taking over of the operational staff.

Concerning the military aspects, a DSNA/Defense group work together on the interoperability of civil and military systems of air traffic management necessary to the transition phase up to service start-up of 4-FLIGHT in the 5 ACCs, and on the adaptations of 4-FLIGHT to be carried out by the military cells embedded in the ACCs.

The year 2017 has also been the subject of sustained negotiations with Thales bearing on the functional content of the versions, the conformity with assurance-software requirements (conception of the system), delivery schedules...

MODERNISATION OF THE COMMUNICATION, NAVIGATION AND SURVEILLANCE (CNS) SYSTEMS



The temporary watch tower at Paris-Orly with high definition screens for the surveillance of ground movements.

COMMUNICATION

The NVCS project will replace the radio and telephone stations of the 5 ACCs and of Paris-CDG. Developed in the framework of FABEC with the industrial Frequentis, this high technology system will bring major changes:

- end to end communications of the IP network voice (VoIP);
- voice services on our ground to ground long distance communication network under IP (RENAR IP), compatible with the infrastructures of analogical telecommunications;
- integration of the radio and telephone;
- integrated radio and telephone backup system offering a new functional level close to the principle system (in 2017, verification tests on site at Paris-CDG);
- new functionalities permitting notably to supply a VCS service on a remote system.

Another replacement program was defined for aerodromes with less traffic (CLEOPATRE): in 2017, the fields of Chambéry, Figari and Melun were equipped with one of these new generation, radio-telephone stations.

In matters of air-ground radio communications, new, advance antennas were installed. They enable improving the quality of radio coverage for the ACCs and airports.

NAVIGATION

IN-FLIGHT CONTROL OF LANDING PROCEDURES AND RADIONAVIGATION GROUND AIDS

This year was marked by the discontinuing of ATR 42 flights, after 25 years of service, replaced by a Beech 250.

In 2017, DSNA carried out 1,200 hours of in-flight control on the mainland, Overseas and abroad (Lebanon, Tunisia, Belgium and Peru) for the calibration of the means of radionavigation on the ground and the in-flight control of the satellite overlay approach procedures. At Saint-Pierre-and-Miquelon, to prepare for the summer work on the runway, which would mean shutting down the ILS, eight temporary RNAV GNSS procedures were put into service.

In addition, 400 flight hours were carried out by the military calibrators for in-flight control of the means of Defense.



DTI Calibrator operation on the Beech 250.

SURVEILLANCE

MODE S SECONDARY RADAR

The Mode S radar at Saclay (Essonne) was put into service on April 6, 2017. It is one of the radars which feed the control centers of the Paris area. The Mode S radar of Strasbourg was put into service on October 30, 2017. It completes the radar coverage of "Grand Ballon" (Big Ball) in the lower airspace.

The Mode S enriched surveillance program integrates into the en-route air control system, the data supplied by the onboard systems (flight level, heading, speed): this information obtained in real-time will be very useful to the controller. A first stage will be implemented in the 5 ACCs for the summer of 2018.

GROUND SURVEILLANCE

The surveillance system of ground movements (SMGCS) at the Nice airport, which already includes a ground radar for the detection of movements on the platform and a system of multilateration for the identification and position of aircraft on the ground, was completed in 2017 by a server responsible for alerting the controller in case of intrusion on the runway: Nice now possesses a level 2 A-SMGCS.

The renovation of the watch tower at Orly (February 2017 to March 2018) required the adapting of the IFR cursive at the temporary watch tower, located a floor below. To compensate for the loss of visibility of certain areas of the platform, DSNA deployed a system of high technology cameras and screens dedicated to the surveillance of ground movements.

06

THE SINGLE
EUROPEAN SKY



THE SESAR PROGRAM



xStream (the Paris ACC) : live trials on flights to Paris-Orly/August 2017.

The SESAR program, the technological component of the construction of the Single European Sky, has as its objective the modernisation of the air traffic management system (ATM) by developing new, operational concepts in a new generation technological environment with harmonised standards. Within the SESAR program, DSNA is pursuing six essential, strategic objectives:

- ❶ To secure its strategic, industrial choices (in particular, making the most of the operational gains allowed by the interoperability of air traffic management).
- ❷ To define the means necessary for implementing "Free Route" in high density airspace.
- ❸ To promote its operational concepts thanks to a high degree of integration between the pre-tactical phase (ATFCM) and control (ATC).
- ❹ To participate in the development of future solutions for optimisation of incoming flights at saturated airports ("Extended-AMAN", "Extended ATC Planning", "Target Time").
- ❺ To highlight the Virtual Center in the framework of Coflight Cloud Services.
- ❻ To continue the work to modernise controller tools by capitalising on the progress made thanks to the ERATO program (EEE).

DEVELOPMENT (SESAR 2020)

After the first development phase (2009-2016) which ended with a catalogue of 63 SESAR solutions and to which 500 DSNA staff contributed, the second development phase was launched in 2016. It is part of the framework of the European "Horizon 2020" program, which groups the financing of the European Union in matters of research and innovation. Having 585 million euros, it prolongs R&D activities of ATM until 2024. In addition, SESAR JU participation was enlarged to 20 members. After call for tenders, DSNA, in association with ENAC, ONERA, Météo France and SAFRAN was retained for 21 projects for an amount of 14 million euros over the period 2016-2019. A second call for tenders will be made in 2018 to cover the 2019-2021 period.

In the SESAR 2020 program, DSNA participates in:

- ❶ the validation of 32 new SESAR solutions (DSNA is leader of SAFE projects on airport safety nets and ToBeFree on the Free Routing);
- ❷ the activities of 3 transverse projects;
- ❸ the evaluations of 4 large-scale demonstration projects (DSNA is leader of the xStream project, a follow up to the iStream project).

This contribution rotates notably around the following principle themes: trajectory, capacity and flow regulation management (AFTCM), Free Routing and air traffic control tools, Extended-AMAN and Target Time, Virtual Center, drones, airport.

For DSNA, the year 2017 was marked by:

- ❶ the launching of the activities of 21 SESAR 2020 projects;
- ❷ the start-up of the CORUS project on drones (p. 32);
- ❸ the first SESAR 2020 live trials: flights with a Harfang drone, xStream in the Paris area (p. 40) and MAC 2017 (project Network Collaborative Management: p. 18);
- ❹ DSNA's contribution to the preparation of CP 2 (Common Project 2).



OUR PARTNERS TALK ABOUT DSNA...

Upgrading our skies, digitally

The SESAR Joint Undertaking (SESAR JU) was established in 2007 as a public-private partnership. It pools the knowledge and resources of the aviation community in order to define, develop and deliver innovative digital solutions. Founded by the European Union and EUROCONTROL, the SESAR JU has 19 members, who together with their partners represent over 100 companies working in Europe and beyond. The SESAR JU also works closely with staff associations, regulators, airport operators, airspace users, the military and the scientific community. The first SESAR solutions are ready to be deployed and will improve air traffic management performance in Europe.

“Building on its successful contributions to SESAR 1, DSNA, a longstanding SESAR JU member, is playing a critical role in SESAR 2020 research and innovation, bringing its expertise to bear across a wide range of topics, with notable leadership in projects on free routing, safety nets and arrival management.



WAC 2017 in Madrid: the DSNA booth visited by Mr Hololei, Mobility and Transport managing director at the European commission, and Mr Fonck in charge of the execution of the SESAR program at the SESAR JU.

Given that DSNA has to deal with some of the most congested and complex airspace in Europe, we have no doubt of its ability to find novel solutions to manage the expected increase of not just conventional

traffic, but air vehicles like drones too. We look forward to innovating together in 2018 and in the years to come!”

F. Guillermet/Executive Director

DEPLOYMENT

The operational service start-up of these projects is the subject of European financial support of the Connecting Europe Facility (CEF) type endowed with 2.5 billion euros.

A first package of functionalities derived from the SEASAR 1 work was identified in a European regulation in 2014 called Pilot Common Project (PCP) with deadlines spread out from 2018 to 2026. The projects directly linked to PCP are managed via the SESAR Deployment Manager (SDM). The other projects linked to the Single European Sky are managed directly with the INEA European agency.

In 2017, DSNA organised specifically to manage:

8 projects of the CEF 2014 and 9 projects of the CEF 2015; the 3 Coflight projects, iAPOC (Airport Operations Center) and Roadmap IOP (Interoperability) ended with success;

start-up of 6 projects of the CEF 2016 with SDM (cofinanced with 1.5 million euros).

The requirements of the European Commission in matters of accounting and financing traceability for co-financed projects led DSNA to better organised its processes and its tools. It provided itself with a quality procedure for the management of co-financed projects. Beyond the financial aspect, this involvement in the SESAR context ensures the credibility and importance of the major DSNA technological projects.

DSNA also participated in the revision of PCP by proposing desired modifications in the framework of the consultation phases organised by SDM.



22 co-financed DSNA projects

 **NEW OPERATIONAL CONCEPTS**

XSTREAM: TO OPTIMISE CAPACITY TO IMPROVE ARRIVAL FLOWS TO A SATURATED AIRPORT



With the project **xSTREAM**, DSNA and its partners optimise arrival management through the combination of results obtained with the iStream (concept of TTA arrival target-time – Target Time of Arrival) and the XMAN operational concept (p.43): the objective is to improve arrival flow management at peak hours by extending the horizon up to 300 NM (Extended-AMAN) from the destination airport. Generally, AMAN is only used in a horizon of 100 NM (about 200 km). With xStream the concept of delay sharing becomes crossborder between the sectors of en-route control and allows enables improving the environmental effectiveness of flights by offering capacity gains in the terminal sectors. For the company, this procedure allows it also to apply its concept of flight priorities (Arrival Flexibility).

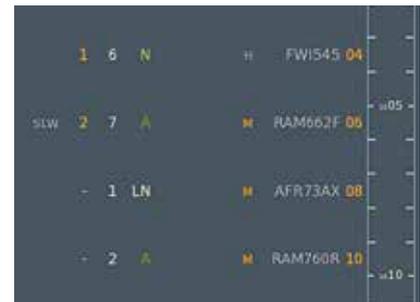
From now to 2019, the project plans live trials in Paris area (CDG and Orly with the Paris ACC), in London (Heathrow and Gatwick), in Zurich and with three en-route centers (Reims, Maastricht, and Karlsruhe) to evaluate the integration of the concept at the crossborder level in a very dense traffic zone.

This greater anticipation of arrival sequences is a key-element of the first modernisation package of ATM in Europe (Pilot Common Project).

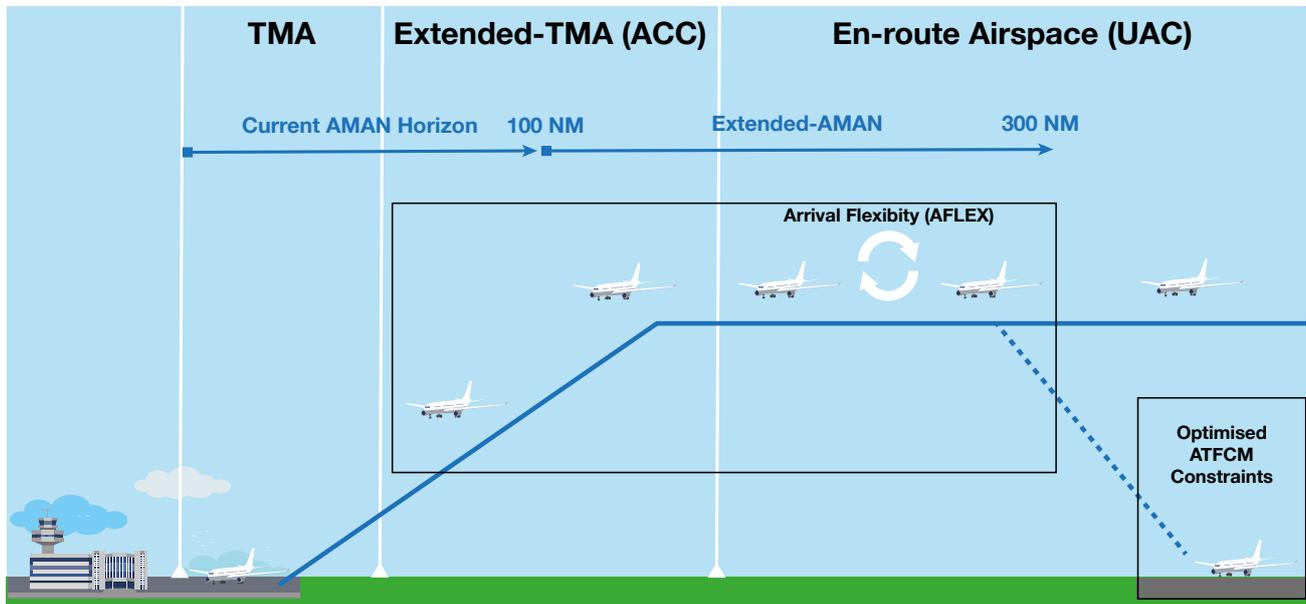
From July 25 to August 25, 2017, nearly 200 commercial flights to Paris-Orly tested this new concept (p. 18). The flow management position (FMP) of the Paris ACC used a tool derived from AMAN (iAMAN) which allowed it to anticipate the arrival sequence at Orly with a horizon of around 300 NM. In function with traffic load, FMP proposes an adjustment of flight speed to the en-route controller, at high altitude, which improves flight efficiency in terms of fuel consumption. During these operational evaluations, the sharing of delays with the en-route sectors of the Bordeaux and the Paris ACCs enable reducing by an average of 90 seconds the delay usually lost in the terminal sectors.



Aircraft landing at Paris-Orly airport.



The iAMAN tool is shared by the approach and en-route control centers: it enables optimising the arrival sequence.



The xStream operational concept: better to take into account local constraints to allocate to the pilot a more precise arrival target-time (Target Time).



RESEARCH AND INNOVATION

SAFE: FOR EVEN SAFER AIRPORT OPERATIONS



The SAFE (**Safer Airports and Flights for Europe**) aims to improve safety at airports – parkings, taxiways, runways – by providing new complementary solutions, ground or embarked.

In SESAR 1, the most extensive studies concerning A-SMGCS-equipped airports (advanced surveillance system of ground movements), delivering concrete solutions to the benefit of pilots, controllers and vehicle drivers.

In SESAR 2020, DSN and its partners (air navigation operators, companies, industrials, builders and EUROCONTROL research centers) complement these works in order to offer the pilot and controller, whatever the size of the airport, new solutions facilitating the detection of risk situations, including runway excursions. The first simulations to test these new concepts will begin in 2018.



To accomplish their missions, vehicle drivers operate alongside aircraft on a platform.

SINAPS: TOWARDS AN ASSISTANCE TO DECISION MAKING TOOL FOR THE DYNAMIC CONFIGURATION OF EN-ROUTE CONTROL SECTORS

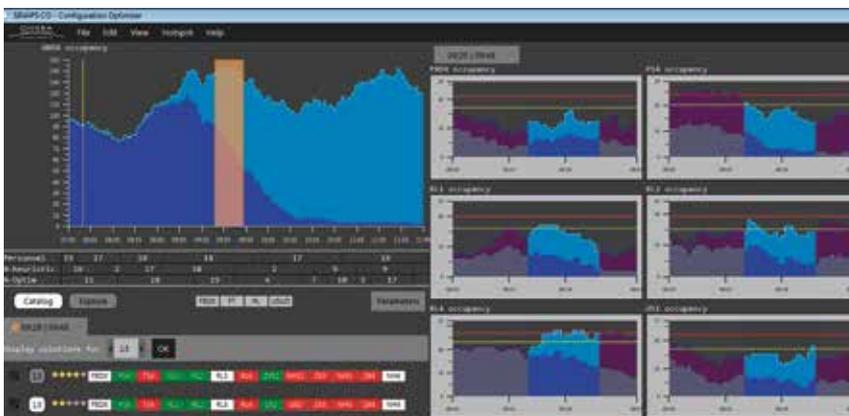
In tactical phase, the room supervisor of the ACC analyses, on a constant basis, supply and demand: on the one hand, the personnel available, the environment (weather, military activity), technical availability; on the other hand, the amount of traffic to control. All these data emanate from several tools.

With his operational expertise, he determines the configuration schema of the sectors to deploy to balance out the work load with the room's capacity (control stations). This schema of opening/grouping is updated regularly in function with the evolutions of these data. But this control room capacity optimisation

manual is costly in terms of time and especially not up to performance in critical periods.

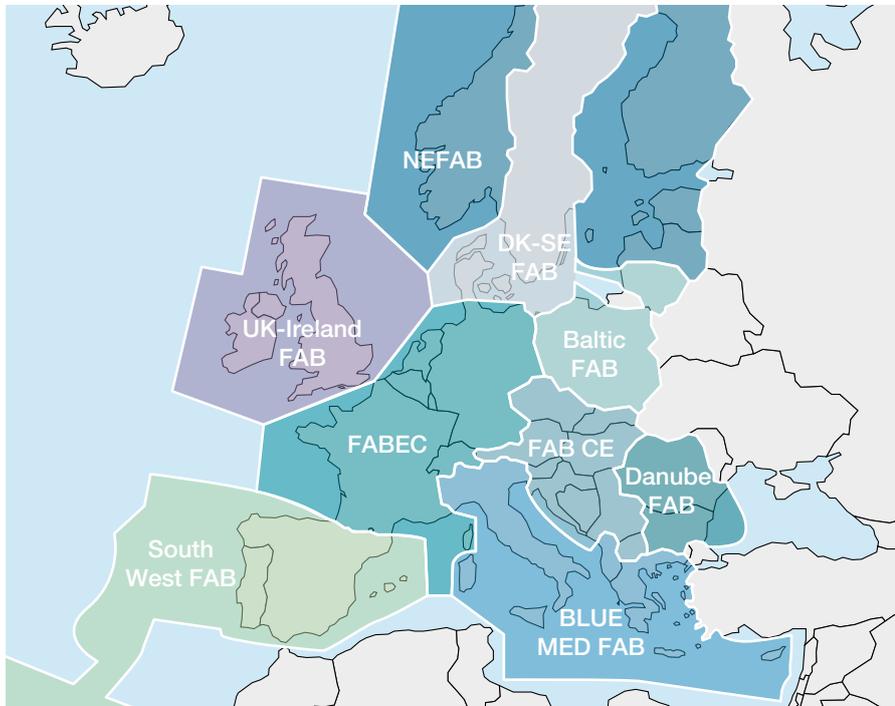
The **SINAPS (SWIM INAP Services)** developed by DSN in collaboration with ONERA in the framework of SESAR Advanced Airspace Management, integrate multiple operational constraints. With this innovative tool, the room supervisor possesses a group of integrated services up to the optimal configuration of deployed sectors. SINAPS can also serve to detect new airspace configurations more adapted to the new flows.

First evaluations will be held with the Bordeaux ACC in 2018.



The SINAPS tool: viewed from a part of the interface developed by ONERA.

THE FAB EUROPE CENTRAL



The 9 functional airspace blocks (FAB) of the Single European Sky.

Top 10 European airports in 2017 for IFR traffic – Source: EUROCONTROL

FAB	AIRPORT	TRAFFIC
FABEC	Amsterdam	508,295
FABEC	Paris-CDG	482,657
UK-Ireland FAB	London-Heathrow	475,965
FABEC	Frankfurt	475,526
FABEC	Munich	401,845
South West FAB	Madrid-Barjas	387,521
South West FAB	Barcelona	323,468
BLUE MED FAB	Rome-Fiumicino	297,393
UK-Ireland FAB	London-Gatwick	285,946
DK-SE FAB	Copenhagen	259,312

France is involved with Germany, Switzerland, Belgium, the Netherlands and Luxembourg within the FAB Europe Central, situated in the heart of Europe. Objective: to create higher performing airspace, that is to say, safer, greater capacity, offering routes that are more direct, optimised flight levels and flight paths, thus enabling airline companies to operate more economical and less polluting flights. Close collaboration with military authorities is a key point in ensuring the success of these performance objectives.

DSNA's major challenges within FABEC coincide with its strategy at the national level:

- 1 **Airspace Strategy:** to provide more direct upper airspace routes, to promote the French method for civil-military coordination, to enhance capacity at the major airports such as Paris-CDG.
- 2 **To develop joint performance objectives.**
- 3 **Strategy for technical systems:** to be coordinated in order to ensure geographical continuity and the harmonisation of SESAR deployments.

2017 PERFORMANCE FOR FABEC AND DSNA	FABEC OBJECTIVE	COMPLETED FABEC	COMPLETED FABEC
Safety: EOSM¹ indicator			
“Safety” culture	Level C	Level B	Level D
Other objectives (risk management, insurance)	Level C	Level B	Level C
Average ATFCM delay under all circumstances			
En-route	0.42 min. per flight	1.15 min. per flight	0.98 min. per flight
In terminal area (objective defined by the State)	0.60 min. per flight	0.85 min. per flight	0.48 min. per flight
Environment			
Horizontal Flight Efficiency (HFE) ²	3.14%	3.26%	3.38%

1. Efficiency of Safety Management: indicator required at the European level, evaluating the maturity of the safety management system used by the air navigation service providers. Scale: level A (0%), level B (25%), level C (50%), level D (75%), level E (100%).
 2. Horizontal Flight Efficiency: this indicator measures the difference between the length of the route actually followed and the shortest theoretical route (orthodromic).



Paris-Orly during the winter/Within FABEC, delays due to adverse weather conditions represent a major cause of air traffic control delays. In order to better understand climate changes in Europe and to anticipate their impact on traffic management, FABEC has mandated a detailed MET Alliance study made up of weather services of 8 European States.

FABEC Operations Planning 2017-2025

The air navigation service providers have elaborated a catalogue of projects, underway and scheduled, contributing to improving operational performance with FABEC: 56 projects make up the operational part and 50, the technological part/SESAR. Each one of them is the subject of a synthetic list, mentioning the expected benefits and the stages of implementation.

Examples: XMAN (crossborder management of arrivals for the airports of Frankfurt, Munich, Berlin, Paris-CDG/Orly, Nice, Amsterdam, London-Heathrow/Gatwick/Stansted), improvement of the interface between the Marseille and Geneva ACCs (p. 28), management of aeronautical information at the FABEC level, new system of communication under IP (N-VCS) for France and the Maastricht control center...

This initiative offers more readability to the activities of each operator and enables better coordination to the benefit of the airline companies.

Deployment of XMAN

Since June 7, 2017, the Reims ACC is applying XMAN (Extended AMAN) operational procedures to flights to Zurich, during peak traffic periods: a strategy of dividing up delay is established between the different ACCs allowing for absorbing the delay in cruise and no longer in low layer holding patterns. The benefits are significant in terms of economy and environment. This new service complements that already supplied to commercial flights with London-Heathrow as destination.

In 2018, evaluations will be conducted with the BOLT compact platform based on Coflight in order to have more precise trajectories.



XMAN: the Reims ACC controller works on a decrease in speed (IAS for Zurich LSZH, Mach number for London EGLL).



FABEC OPS Theater at WAC/March 2018.

A FABEC forum for conferences

At the WAC 2018 in Madrid, the FABEC organised an interFABs conference on the volatility of air traffic and the consequences on management. From geopolitical conflict to climate change, from the service start-up of new Business Models for airline companies to the tactical aspects of control with the non-compliance with filed flight plans or to aberrant filed flight plans, these difficult to foresee causes rapidly impact the performance of air navigation services, in particular when certain control sectors are at their capacity limit.

Solutions have been identified, recalling the key-concept of the CDM and the priority given to flight safety.

GLOSSARY

A

- ACC**
Aera Control Center
- A-CDM**
Airport-Collaborative Decision Making
- ACNUSA**
Airport Noise Control Authority
- ADS**
Automatic Dependent Surveillance
- AIM**
Aeronautical Information Management
- A-SMGCS**
Advanced-Surface Movement Guidance and Control System
- ATCO (ICNA)**
Air Traffic Control Officer
- ATFCM**
Air Traffic Flow and Capacity Management
- ATM**
Air Traffic Management
- ATSEP (IESSA)**
Air Traffic Safety Electronics Personnel

B

- BOLT**
Big Data Operational Live Trajectory

C

- CACAO**
ATM system "CPDLC & ADA" Cayenne Oceanic
- CFSP**
Computerised Flight Plan Service Provider
- COOPANS**
Alliance of 5 European Air Navigation Service Providers (Austria, Croatia, Ireland, Sweden and Denmark)
- CPDLC**
Controller-Pilot Data Link Communications

D

- DSAC**
French National Supervisory Authority

E

- EAD**
European Aeronautical Database
- EASA**
European Agency for Safety Aviation
- EGNOS**
European Geostationary Navigation Overlay System
- ENAC**
National Civil Aviation Academy
- ENAV**
Italian Air Navigation Service Provider
- ERATO**
En-Route Air Traffic Organizer

F

- FABEC**
Functional Airspace Block Europe Central
- FEAT**
Flight Efficiency Analysis Tool

- FL**
Flight Level

I

- IATA**
International Air Transport Association
- IFR**
Instrument Flight Rules
- ILS**
Instrument Landing System
- INEA**
Innovation and Networks Executive Agency
- ISS**
Information systems security



L

- LPV**
Localizer Precision with Vertical guidance

M

- MMI**
Man-Machine Interface

N

- N-VCS**
New Voice Communication System

P

- PBN**
Performance Based Navigation
- PCP**
Pilot Common Project
- PENS**
Pan-European Network Services

R

- RAT**
Risk Analysis Tool
- RECAT EU**
European Wake Vortex Re-categorisation
- RENAR-IP**
Air Navigation Network under Internet Protocol
- RNAV**
Area Navigation
- RSTCA**
Air Navigation Terminal Services Charges
- RWSL**
RunWay Status Lights system

S

- SDM**
SESAR Deployment Manager
- SESAR**
Single European Sky ATM Research
- SKYGUIDE**
Swiss Air Navigation Service Provider
- SNA**
Regional structure in charge of aerodrome and approach control
- SWIM**
System Wide information Management

T

- TMA**
Terminal Maneuvering Area
- TSEEAC**
Senior Technicians

U

- UAF**
Union of French Airports

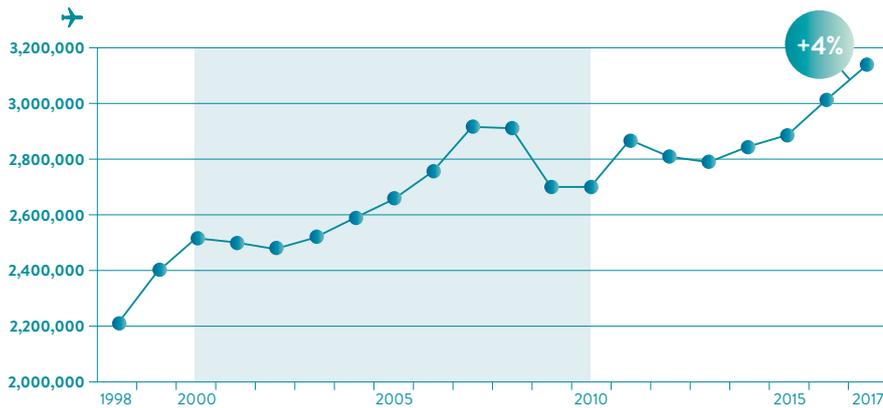
V/W

- VFR**
Visual Flight Rules
- VOIP**
Voice over Internet Protocol technology
- WAC**
World ATM Congress

TO FIND OUT MORE

AIR TRAFFIC

Annual evolution of IFR traffic controlled in France — Source: DSNA



The ten leading mainland and Corsica airports in terms of IFR movements (arrivals and departures).

	2017	Variation
1. Paris-CDG	483,355	↗ +0,7%
2. Paris-Orly	232,055	↘ -2,4%
3. Nice-Côte d'Azur	142,909	↗ +2,2%
4. Lyon-Saint Exupéry	112,462	↗ +1,5%
5. Toulouse-Blagnac	103,691	↗ +8,8%
6. Marseille-Provence	97,994	↗ +1,3%
7. Bâle-Mulhouse	79,722	↗ +2,0%
8. Bordeaux-Mérignac	67,004	↗ +2,5%
9. Nantes-Atlantique	57,877	↗ +8,3%
10. Paris-Le Bourget	54,177	↗ +2,4%

Traffic by operational unit or entity in 2017 and 2017/2016 variation — Source: DSNA

PARIS REGION SNA	IFR	VFR
North ACC (Paris)	1,241,223 ↗ +1,4%	
Paris-CDG & Paris-Le Bourget	627,221 → 0%	4,039 ↗ +10,6%
Paris-Orly & General aviation	269,992 ↘ -1,2%	385,923 ↗ +2,2%

SOUTH-WEST REGION SNA	IFR	VFR
South-West ACC (Bordeaux)	969,229 ↗ +5,8%	
South-West SNA	162,568 ↗ +2,0%	270,243 ↗ +0,1%

ACCs	IFR	VFR
South-East ACC (Marseille)	1,092,612 ↗ +4,7%	
West ACC (Brest)	1,054,233 ↗ +7,6%	
East ACC (Reims)	920,729 ↗ +3,1%	

SNA	IFR	VFR
South-East SNA	251,766 ↗ +1,5%	219,340 ↘ -0,4%
Center-East SNA	204,074 ↘ -0,4%	351,970 ↘ -0,7%
South-South-East SNA	203,226 ↗ +3,0%	383,840 ↘ -0,6%
North-East SNA	178,858 ↗ +4,5%	169,198 ↗ +2,5%
South SNA	170,159 ↗ +8,4%	234,324 ↘ -0,5%
West SNA	155,232 ↗ +3,2%	245,567 ↗ +3,6%
North SNA	109,110 ↘ -4,0%	198,297 ↘ -3,6%

OVERSEAS	IFR	VFR
West Indies-French Guiana SNA	112,709 ↗ +5,2%	75,716 ↗ +0,9%
Indian Ocean SNA	28,050 ↗ +2,5%	29,294 ↘ -3,7%
Saint-Pierre-and-Miquelon SNA	2,082 ↗ +0,5%	2,294 ↗ +0,7%

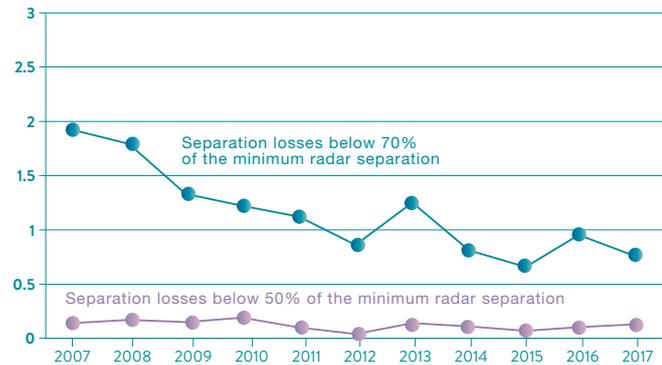
IFR flights: aircraft flying under instrument flight rules (commercial flights, business aircraft...)
 VFR flights: aircraft flying under visual flight rules (light and pleasure aircraft)



SAFETY & PUBLIC SERVICE

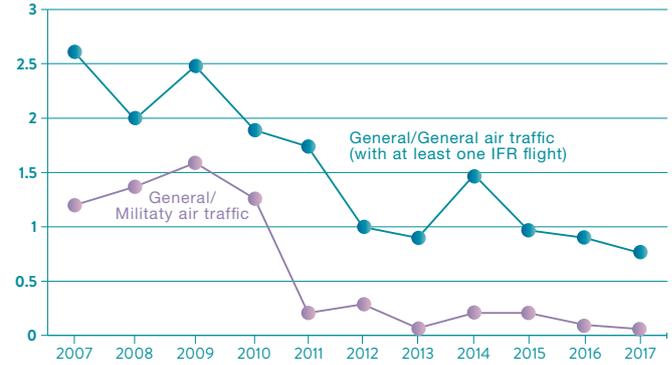
Indicators used to measure safety levels for en-route traffic control — Source: DSNA

Losses of separation per 100,000 flights



The standard minimum en-route radar separation between two aircraft is 5 nm in the horizontal plane and 1,000 ft. in the vertical plane. The safety net informs the controller of the danger of closing aircraft outside the standard norms. Two indicators are tracked: "HN70", which corresponds to aircraft below the norm by 70% and the "HN50" which corresponds to aircraft below the norm by 50%. In 2017, the frequency of loss of separation < 70% was 0.77 flights for around every 100,000 controlled flights and those with a loss of separation < 50% was 0.13 flight for around every 100,000 controlled flights.

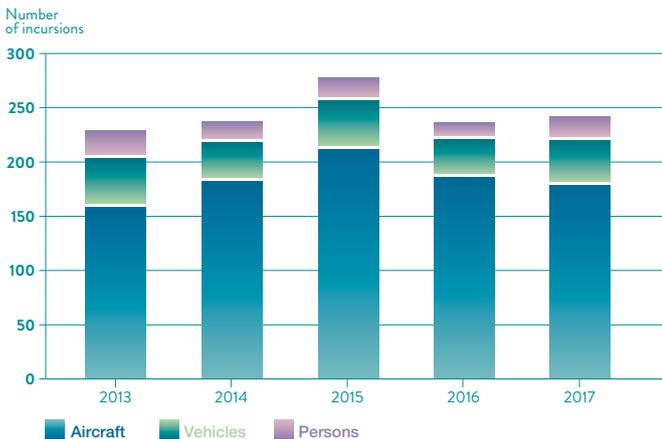
Number of airproxes per 100,000 flights



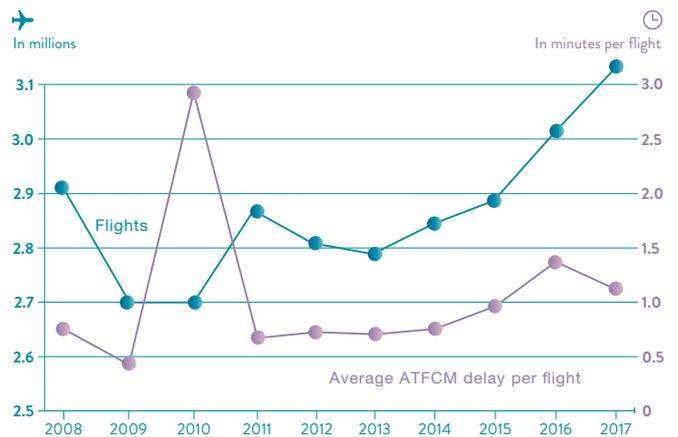
In France, two types of air traffic co-exist: general air traffic (CAG) and military air traffic (CAM).

An airprox is an incident without consequences during which two aircraft find themselves dangerously close to each other. In 2017, pilots reported 0.77 airprox "GAT/GAT", involving at least one IFR flight, every 100,000 flights; and 0.06 airprox "GAT/MAT" every 100,000 flights.

Breakdown of causes of runway incursions — Source: DSNA

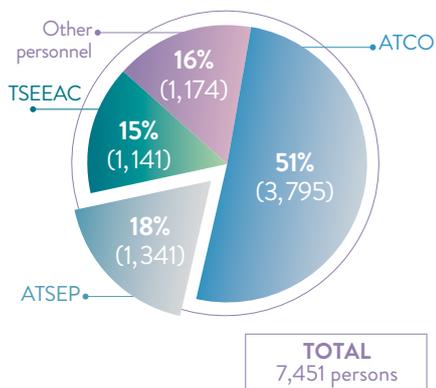


AFTCM delay due to air navigation — Source: DSNA



HUMAN & COLLECTIVE

Breakdown by profession in 2017



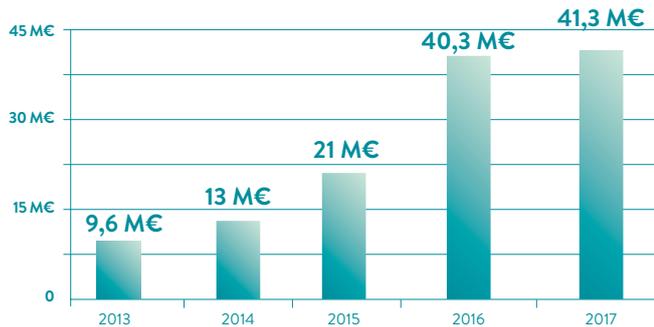
The Bordeaux ACC: technical supervision room.

Provisional management of the technical workforce — Source: DSNA

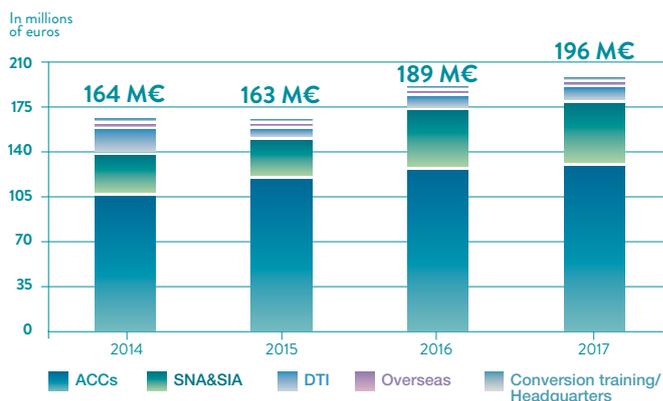


COMPETITIVENESS & CUSTOMER SERVICE

Evolution of revenue outside air navigation charges

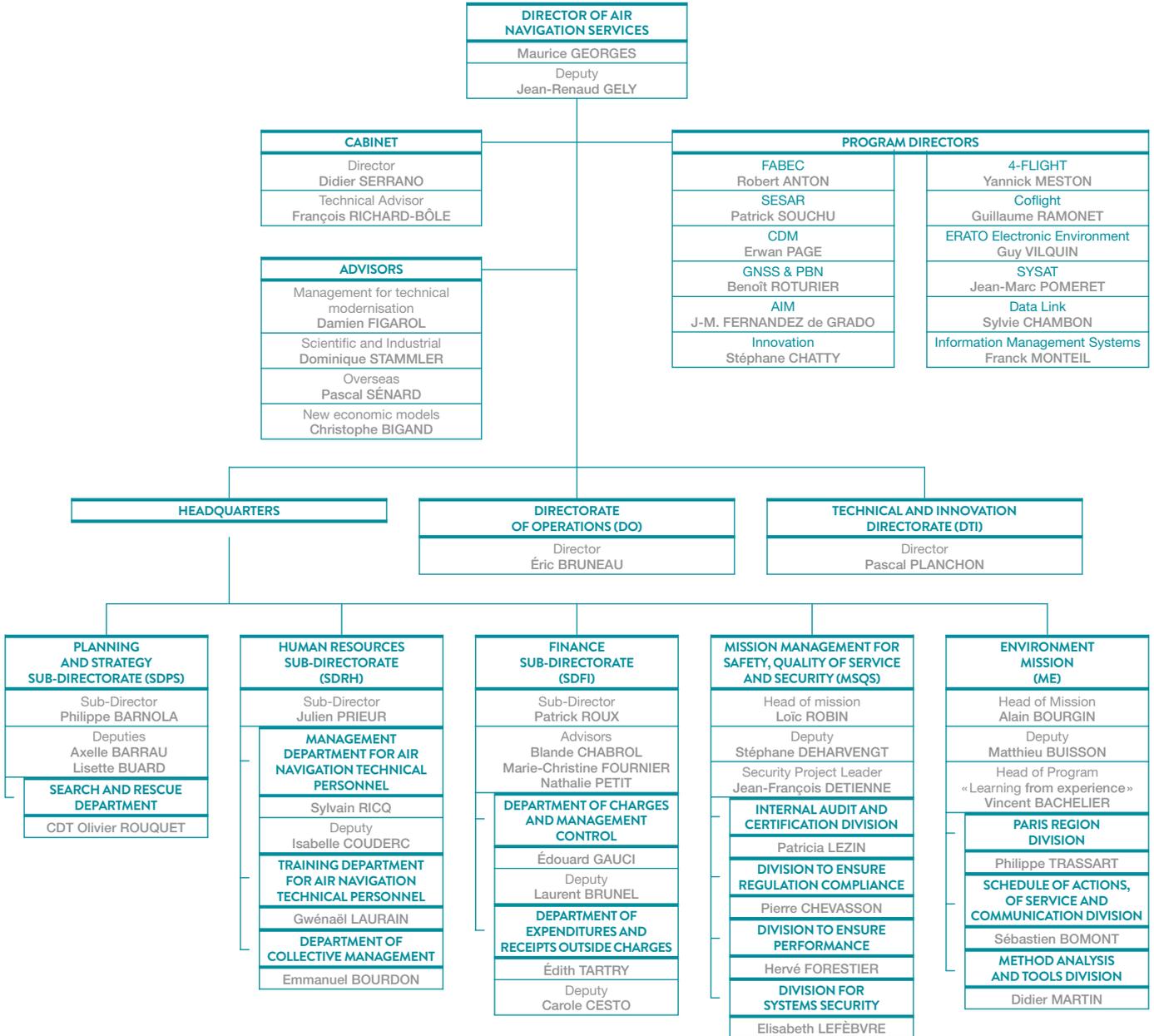


Detail of investment expenditures



DIRECTORATE OF AIR NAVIGATION SERVICE (DSNA)

Organisation chart as of May 1, 2018

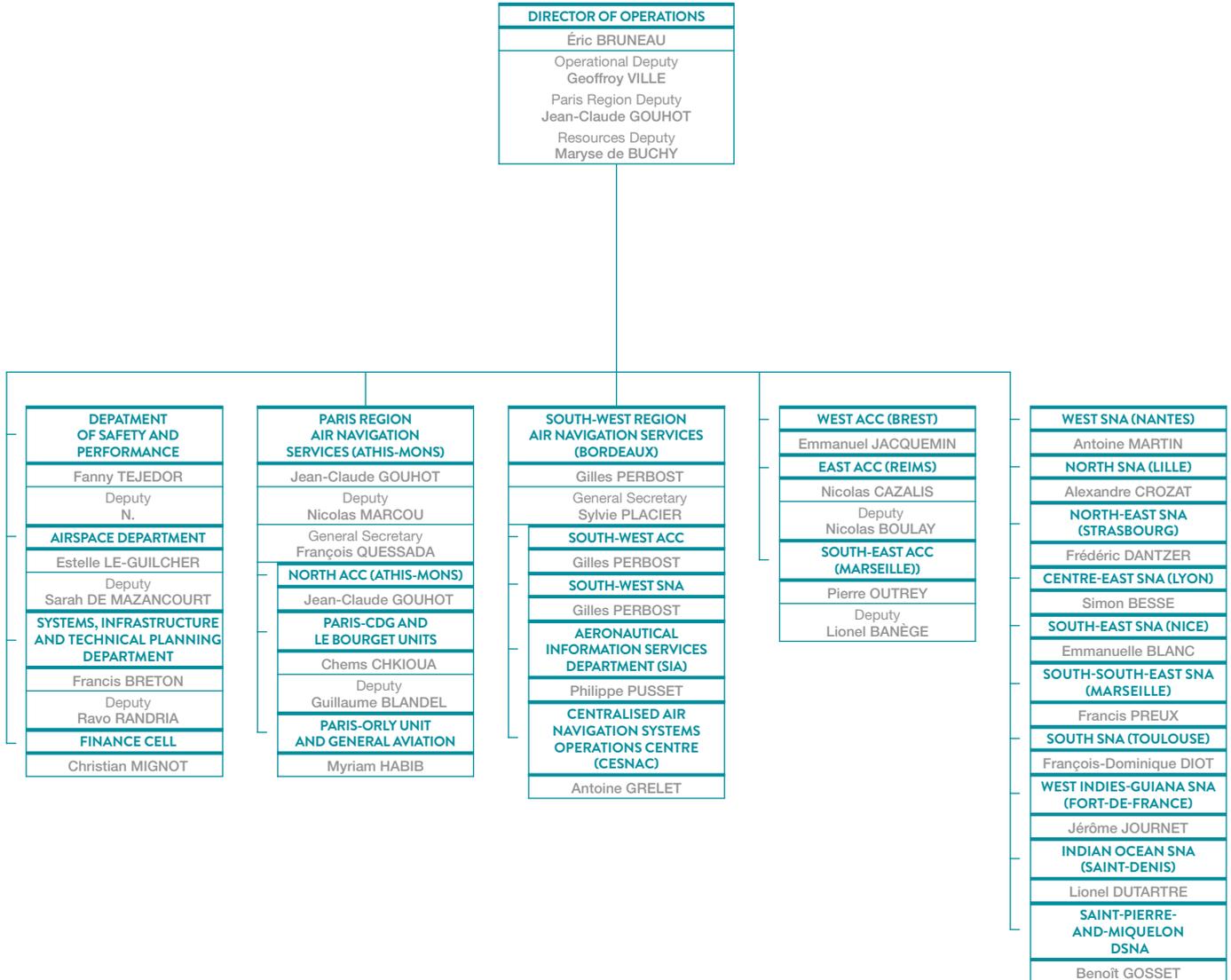


DIRECTORATE OF AIR NAVIGATION SERVICES
50, Rue Henry Farman
75720 Paris Cedex 15

SDRH is located at the Athis-Mons site

DIRECTORATE OF OPERATIONS (DO)

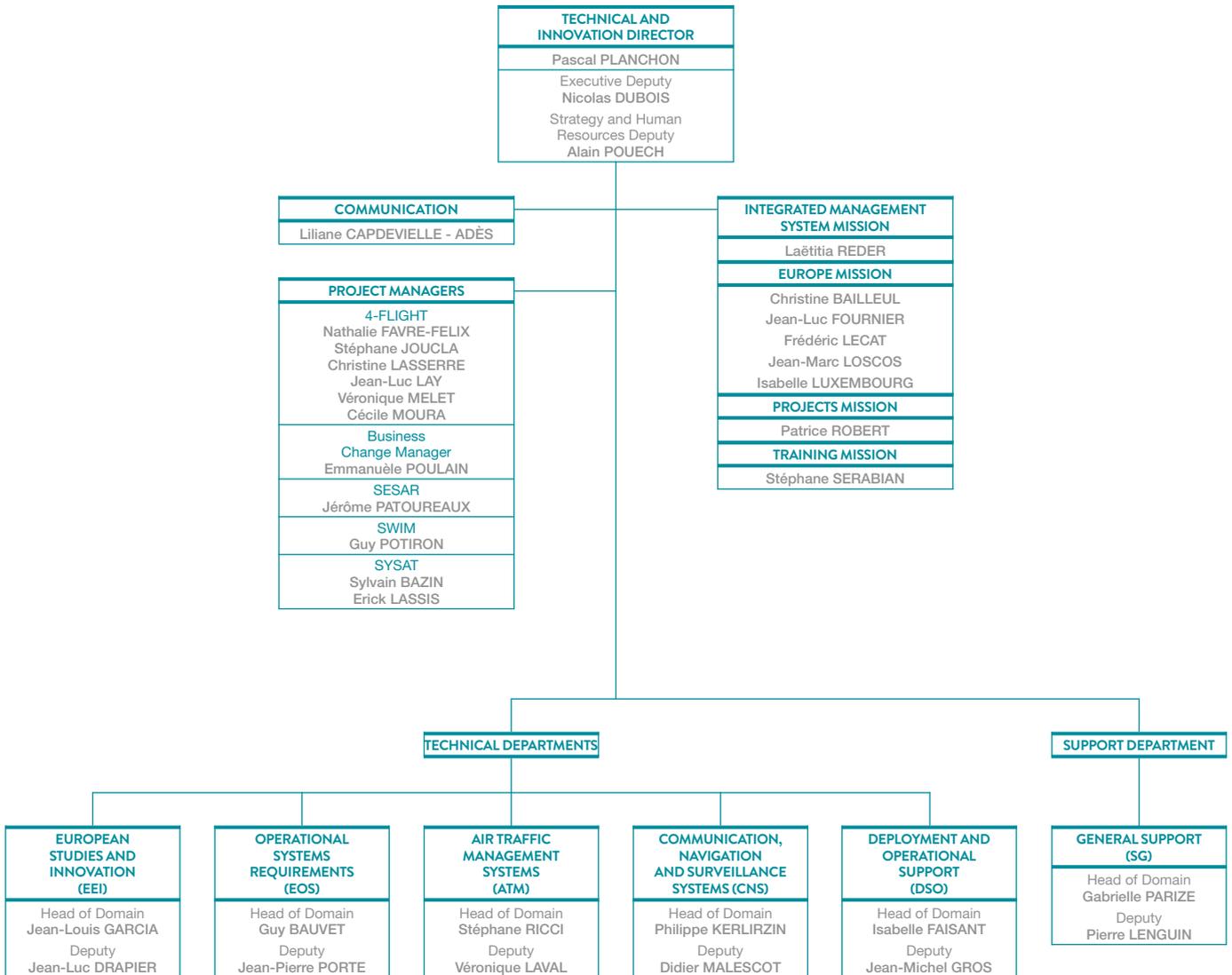
Organisation chart as of May 1, 2017



DIRECTORATE OF OPERATIONS
BP 600
91205 Athis-Mons Cedex

TECHNICAL AND INNOVATION DIRECTORATE (DTI)

Organisation chart as of May 1, 2018



TECHNICAL AND INNOVATION DIRECTORATE
1, avenue du Dr. Maurice Grynfolgel
BP 53584
31035 Toulouse Cedex 1



Director of the Publication: Maurice Georges

Edition: DSNA Cabinet of the Director – June 2018

Photo Credits: F. Verhaegue (p. 10), Groupe ADP – A. Leduc (p. 16), F. Grall (p. 27), H. Binet (p. 29) and DSNA

Design and layout: LUCIOLE

Printed by: Pure Impression

Printed on Balance Silk (60% recycled fibers, 40% virgin fibers (FSC),

FSC certified paper, ISO 14001 and ISO 9001, for a sustainable management of forests.

ISSN: 2112-5163

FRENCH CIVIL AVIATION AUTHORITY (DGAC)
FRENCH AIR NAVIGATION SERVICE PROVIDER (DSNA)

50, rue Henry Farman
75720 Paris Cedex 15

Contact – francois.richard-bole@aviation-civile.gouv.fr

www.ecologique-solidaire.gouv.fr