

2014



ANNUAL REPORT

DSNA

The French Air Navigation Service Provider



DSNA





CONTENTS

2014 - Highlights	p. 4
01→ Air traffic and safety	
Guaranteeing safe and punctual flights	p. 7
02→ The Environment	
Reducing the environmental impact of air navigation	p. 15
03→ Human resources	
Recruiting, training, supervising and supporting the personnel	p. 19
04→ Finances	
Controlling costs and investing in the future	p. 23
05→ Integrated management system	
A global approach to safety, security, the environment and quality	p. 29
06→ The Single European Sky	
Preparing for the future in the new European air navigation environment	p. 33
07→ Main operational and technical achievements	
Investing in the improvement of quality of service	p. 39
08→ Studies and development	
Preparing for the future of the air traffic management system	p. 45

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Glossary

Organisation charts

DSNA, the French Air Navigation Service Provider, is a nationwide organisation that reports to the French Civil Aviation Authority (DGAC). It is certified by the French National Supervisory Authority, (DSAC) to provide air navigation services. Its missions consist in controlling air traffic day and night in a safe, fluid, rapid and environmentally-friendly manner, while keeping costs under control, delivering the associated communication, navigation and surveillance services and supplying and distributing the aeronautical information required to prepare flights.



AIR NAVIGATION IN FRANCE

DSNA (Direction des Services de la Navigation Aérienne) provides air traffic services for flights leaving and arriving at French airports and in French airspace, including airspace areas over the Atlantic and Mediterranean, appointed by the International Civil Aviation Organisation (ICAO), except for zones allocated to the Geneva and Jersey control centres. It also operates in French Overseas Departments and Collectivities. Its priorities are flight safety, environmental protection (reduction of noise and gas emissions), the punctuality of flights and control of the cost of its services.

DSNA has five en-route control centres in Brest, Paris, Reims, Aix-en-Provence and Bordeaux, nine mainland regional structures for approach and airport control located in Nantes, Lille, Paris, Strasbourg, Lyon, Nice, Marseille, Toulouse and Bordeaux, plus three “French West Indies-French Guiana”, “Indian Ocean” and “Saint-Pierre-and-Miquelon” overseas regional structures.

Due to its size and its position at the crossroads of the major European air traffic routes, France, along with Germany, is the country that controls most flights in Europe. In 30 years, the capacity of the French air traffic control system has increased three-fold, with traffic of nearly 3,000,000 flights. The one-day peak was set on 11 July 2014, with 10,141 flights, the highest number ever recorded by a European air navigation services provider.

DSNA's 7,758* highly qualified employees demonstrate their ability to adapt to an ever-changing environment and are committed to providing quality air navigation services day after day.

The future of DSNA is in the Single European Sky, made up of nine major functional airspace blocks that are independent of national frontiers. France, Germany, Switzerland and the Benelux countries form FAB Europe Central (FABEC), located in the heart of Europe in one of the busiest airspaces in the world in terms of traffic.

DSNA, the French Air Navigation Service Provider, is a nationwide organisation that reports to the French Civil Aviation Authority (DGAC). It is certified by the French National Supervisory Authority, (DSAC) to provide air navigation services. Its missions consist in controlling air traffic day and night in a safe, fluid, rapid and environmentally-friendly manner, while keeping costs under control, delivering the associated communication, navigation and surveillance services and supplying and distributing the aeronautical information required to prepare flights.

*On 31 December 2014 (mainland France, Corsica and overseas departments and collectivities)

① Air traffic controllers assessing 4-Flight, DSNA's future en-route air traffic management system / 2014

② Aerodrome controllers / 2011

③ Maintenance personnel / 2011

④ Heavy traffic around Terminal 1 at Paris-CDG airport - View from the central Control tower / 2014

FOREWORD



2,845,477 controlled flights in 2014, of which almost one half were overflights,
More than 9,000 flights per day for three months of the year,
A new record for daily traffic set by a European air navigation service provider,
with 10,141 flights on 11 July 2014,
A top level for safety performance: these are the achievements worth noting in 2014,
more than the 2% increase in traffic compared with 2013. These trends must guide
our actions to continuously improve the quality of our services, in terms of safety,
the environment and capacity.

In readiness for the future, DSNA's strategic plan is in complete harmony with the Single European Sky and also strives to improve the services delivered to airports in France. The plan offers a coherent overview of the means of achieving this goal. Our efforts are supported by five pillars: a new integrated approach to safety, the technical modernisation of our operational tools and infrastructures, training of our operational staff, the optimisation of the organisation of our services and changes in management. Our en-route charges have been supplemented for the next period of DSNA's economic regulation plan in order to make up for under-investment in the past, and the gradual decrease of the unit rate for terminal zone charges (RSTCA) will reflect the efforts to boost productivity, to which DSNA has committed.

I am proud that DSNA is represented in the governance consortium of the SESAR deployments designated by the European Commission. This alliance for collaborative governance is made up of operational stakeholders, from air navigation service providers, to airlines and airports, which are jointly committed to the success of the Single Sky. It will be the guarantor of the coordinated implementation of the numerous projects that have been defined in the regulatory framework.

This new European air navigation environment represents a genuine opportunity to successfully modernise our technical systems more quickly, to adapt the conditions of use of our operational personnel and to rise to the challenge of ever-increasing air traffic. Our management strategy of the en-route airspace will be consolidated in an effort to better meet the expectations of the airlines. I have faith in the motivation of our personnel and in the quality of our exchanges with our customers and partners in order to take up these challenges.

On the strength of its values - safety and public service, people and teams, competitiveness, innovation and technology - DSNA will continue to improve its services day after day and to build a strategic vision of a Single European Sky, where every single customer can perform a perfect flight.



Maurice Georges
Directeur Air Navigation Services



2014 - HIGHLIGHTS



→ February

Integrated approach to safety

This initiative is one of the five pillars of DSNA's strategic plan. With the help of a consultant, DSNA has launched an in-depth investigation to conduct a detailed analysis of its safety management system (SMS).

Reinforced safety of ground traffic

Lyon-Saint Exupéry became the first regional airport to deploy an Advanced-SMGCS. This tool improves the sharing of information between the various players on the platform, thereby increasing safety and the ground traffic capacity.

→ March

The world air navigation show in Madrid

DSNA, ENAC and their EIG "DSNA Services" shared the same stand at the show. An essential action to support the modernisation of our technical projects as part of the Single European Sky.

The SYSAT programme

DSNA invited four industrial manufacturers to present their systems on a site for 1 month in an effort to enrich the technical specifications of the call for tender for the acquisition and maintenance of its future air traffic control system for approaches and control towers.

→ April

Communication

DSNA produced five educational movies in French and English to promote its activities and challenges to the general public.

→ June

Modernisation of DSNA's telecommunications network

All the phone calls between the en-route control centres are now made over the RENAR-IP network, using the Internet Protocol. This new technology allows DSNA to convey operational data flows that meet the European standard.

Human resources: ATCO round table

The government tasked DSNA with a mission on the development of the ICNA's (ATCO engineers) activities in order to meet the targets that have been set and to successfully modernise DSNA's technical systems.

Coflight as a Service

DSNA, ENAV, skyguide and MATS signed a cooperation agreement to demonstrate that the Coflight system can remotely calculate flight plans. The service providers will be DSNA and ENAV, and skyguide and MATS will be the first customers to use the system.



→ July

Friday 11 July: 10,141 controlled flights in France!

The number of days with very heavy traffic has never been so high: 92 days with more than 9,000 flights in 2014.

→ September

Active preparations for the start-up of ERATO

More than 600 air traffic controllers from the pilot en-route centres in Bordeaux and Brest started training on this new electronic environment. ERATO is due to come into active service in December 2015 in Brest ACC.

SESAR: assessment of a new operational procedure

The Reims and Brest en-route control centres took part in the assessment of the XMAN concept for flights into London Heathrow. In the event of delayed arrivals, the en-route controller is informed of the delayed to be made up for each flight and the speed to be applied. The economic (less time spent in the holding patterns to land) and the environmental (less noise on the ground) benefits are significant.

→ October

4-Flight forum

More than 100 contributors to the 4-Flight programme met to prepare the launch phase of the first operational version in the pilot en-route control centres in Reims and Aix-en-Provence. 4-Flight, which has been developed with Thales since October 2011, is DSNA's new air traffic control system for its en-route centres. It will be one of the most innovative systems in Europe.

The CDG 2020 roadmap

Paris-CDG: to progress from 73 to 82 arrivals per hour in 2020, DSNA is investing in latest-generation, high-performance technical equipment, and new working methods will be developed for the controllers.

FABEC: cross-border projects

A new schedule was drawn up for the start-up of airspace design. France is impacted by the project that plans to deploy an optimised routes network at high altitude in north-east France from 31 March 2016 for the north-south routes passing through the FABEC airspace.

Transfer of approach control from Grenoble-Isère to Lyon-Saint Exupéry

This step will help to consolidate DSNA's organisational model of its low-level airspace by making it economically sustainable.

→ December

Governance of SESAR activity

The consortium, which is made up exclusively of operational European players, including DSNA, was selected by the European Commission to manage the deployments of SESAR.

Creation of the Greater South-West Air Navigation Services (SNA/GSO)

This inter-regional organisation brings together five services: the south-west ACC, the south-west airports & régional structure (SNA), the aeronautical information services department (SIA), the centralised air navigation systems operations centre (CESNAC) and the general secretariat, which was created by grouping together all the administrative departments, representing more than 1,000 people. The Pyrénées organisation became part of the SNA/GSO at the same time.



01



AIR TRAFFIC AND SAFETY

.....

Air traffic increased by 2% in 2014 compared with 2013. With 2,845,477 controlled flights, France is the European country that controls the most flights. The French air navigation services succeeded in maintaining high level of safety, while delivering a quality service in terms of flight regularity.



GUARANTEEING SAFE AND PUNCTUAL FLIGHTS

Air Caraibes flies into Paris-Orly airport / 2014



→ Air traffic

The economic context

The traditional European airlines are facing increasingly stiff competition on the European market from low-cost airlines and airlines from the Gulf states. In terms of numbers of passengers, easyJet and Ryanair continue to progress at a faster rate than the major European airlines; the Air France-KLM group ranked as the third airline in Europe, behind Lufthansa and Ryanair,

thanks to its long-haul routes and its low-cost subsidiary, Transavia. Only the IAG group (British Airways – Iberia) achieved stronger growth than the low-cost airlines.

In this context, the major airlines are in a more fragile position and have made ambitious restructuring plans. Their efforts to rationalise their costs and to optimise their flights demand ever higher performance from the air navigation service providers.

Trends in 2014

Against this backdrop, the volume of traffic controlled by the French air navigation services increased by 2%, in comparison with 2013 ^①. A total of 2,845,477 flights were controlled in mainland France and Corsica, representing an average of 7,796 flights per day. Activity was strong between June and October ^②. Moreover, the number of days with very heavy traffic has never been so high: 92 days with more than 9,000 flights ^③. The new record for daily traffic in France was set on 11 July 2014, with 10,141 flights.

2014 confirmed the trends observed since the crisis in 2008, with stagnant air traffic, activity in the second quarter of every year that is one third higher than in the first quarter, an ever higher proportion of overflights and the collapse of domestic flights. These structural changes in terms of seasonality and variations in the course of each week, day or hour, with some significant differences between the control centres, all impact the air traffic controller's workload. However, the air traffic controller must always maintain the same level of safety, irrespective of these variations.

③ Air traffic in France and the number of days of very heavy traffic

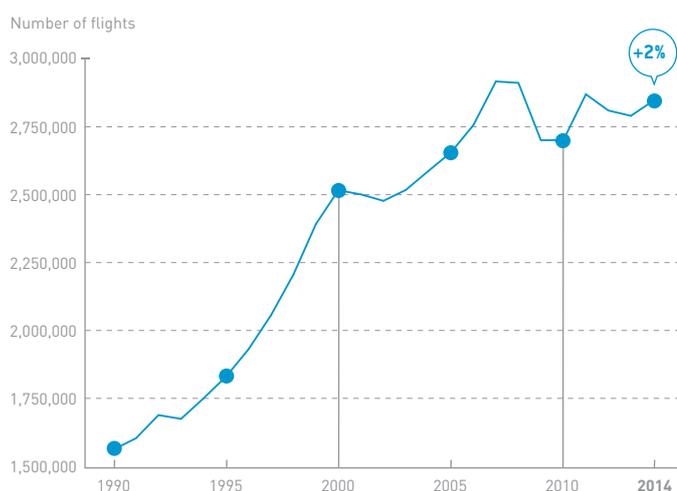
Source: DSNA





① Evolution of annual IFR traffic controlled in France

Source: DSNA



② Breakdown of monthly IFR traffic controlled in France

Source: DSNA



Traffic by operational unit or entity in 2014

2014 vs. 2013 variation — Source: DSNA

ACC	IFR flights		VFR flights	
South-East ACC	987,357	↘ -0.2%		
West ACC	922,951	↗ +4.7%		
South-West ACC	846,054	↗ +1.6%		
East ACC	839,073	↗ +3.6%		

SNA Paris	IFR flights		VFR flights	
North ACC	1,164,870	↗ +1.0%		
Roissy and Le Bourget	614,309	↘ -1.5%		
Orly & General aviation	274,649	↘ -1.3%	529,170	↗ +0.5%

SNA Mainland France and Corsica	IFR flights		VFR flights	
South-East SNA	240,011	↘ -1.1%	216,578	↗ +0.3%
Centre-East SNA	198,705	↘ -5.5%	382,785	↗ +5.8%
South-South-East SNA	195,458	↘ -5.1%	380,734	0.0%
South SNA	173,297	↘ -1.5%	306,177	↗ +5.7%
North-East SNA	172,263	↘ -1.0%	152,654	↗ +7.4%
South-West SNA	152,606	↗ +1.3%	248,760	↗ +2.4%
West SNA	149,867	↘ -3.1%	354,249	↗ +2.9%
North SNA	115,500	↘ -1.8%	241,126	↗ +0.5%
Pyrénées	27,553	↗ +0.8%	58,235	↘ -3.1%

Overseas	IFR flights		VFR flights	
French West Indies-Guiana SNA	99,512	↘ -2.7%	90,609	↗ +6.8%
Indian Ocean SNA	24,308	↗ +2.7%	35,625	↘ -3.8%
DSNA St-Pierre-et-Miquelon	2,926	↘ -0.1%	1,432	↗ +5.1%



Paris-CDG, the Air France hub / 2014

VFR aircraft taxiing at Lyon-Bron / 2011

IFR flights: aircraft flying according to instrument flight rules (commercial flights, business aircraft, etc.)
 VFR flights: aircraft flying according to visual flight rules (light and leisure aircraft)

2.9 million

flights controlled by France
in 2014



Aircraft taxiing / 2014

EasyJet, DSNAs second largest customer /
Brest 2014

The structure of the traffic in 2014 accentuated the trends observed in recent years: 48% of overflights, 37% of international flights (to or from France) and 15% of domestic flights.

Overflights increased by 5% in comparison with 2013, in particular due to the traffic between Germany and Spain (+3%), Benelux and Spain (+7%) and the UK and Italy (+8%).

International flights increased by 1% compared with 2013. The increase in traffic from and to the United Kingdom (+2%) and Spain (+2%) was offset by a drop in traffic from and to Germany (-5%), mainly due to the strikes at Air France and Lufthansa ④ ⑤.

Domestic traffic fell by 5% compared with 2013 ⑤.

In France, the growth in passenger traffic again outstripped the growth in movements, up by 2.9% on 2013. Paris-CDG and Paris-Orly respectively received 64 million and 29 million passengers, both setting new records. The strongest growth was in destinations in the Middle East (+8%) and Europe (+5%). The Basel-Mulhouse and Bordeaux-Mérignac regional airports reported strong growth, up by 11% and 7% respectively, with the opening of new international destinations, fuelled by the low-cost airlines.

Europe

Along with Germany, France remains the country that controls the most flights in Europe. Traffic in Europe increased by 1.8% compared with 2013, the sharpest rise in Western Europe being recorded in Spain (4%). France is the only European country to have controlled more than 10,000 flights per day ⑥.

→ Flight safety

Flight safety remains the core activity of DSNAs. Therefore, the French air navigation services strive to take any preventive and corrective actions required to improve safety on a permanent basis. Following the Safety Round Table in 2012 and the internal survey of the "safety culture", in 2014 DSNAs launched a new **integrated approach to safety** to gain an even stronger hold on its professional practices (p 30).

Event records

When agents performing operational tasks consider that flight safety has been, or could have been, jeopardised, they complete an incident report, while the pilot files an Aviation Safety Report (ASR). DSNAs encourages this event reporting culture. The reports are not necessarily an objective account of safety problems, but they can be analysed in order to gain a clearer view of the good working order of the system and its protective barriers. Technical incidents in connection with ATM that could impact safety, are systematically analysed. All these events are entered in the air navigation incident database (INCA) that is linked to the European ECCAIRS system, for the sharing and analysis of safety data.

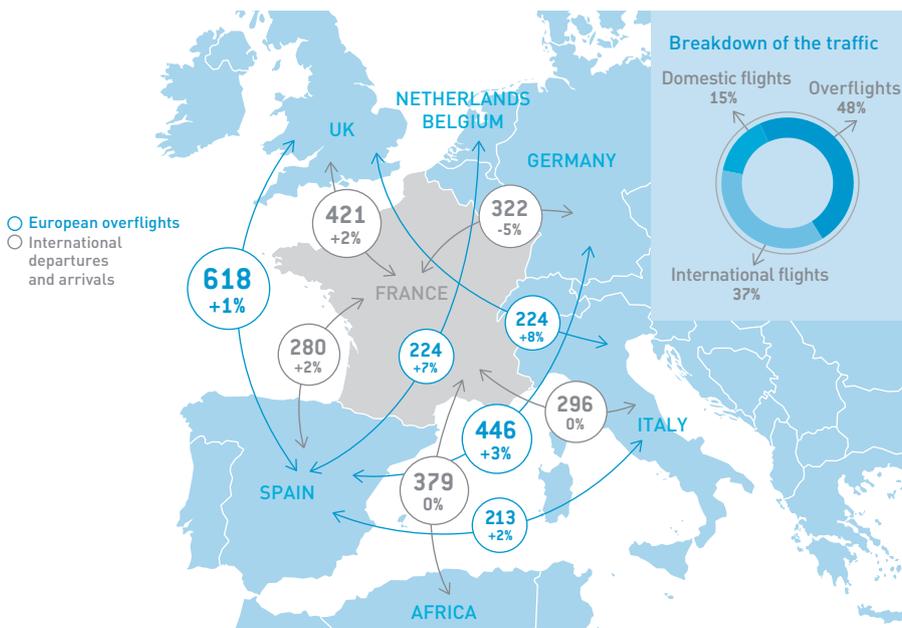
Analysis of incidents

Incidents are first analysed locally by the Quality of Service teams. More serious or informative events are submitted to the Local Safety Commission. The Safety Events Processing Board, chaired by the Directeur Air Navigation Services, analyses the most serious situations in terms of malfunctions of the air navigation services, on the basis of the files submitted by these commissions.



4 Main traffic flows in France

Average number of flights per day and 2014 vs. 2013 variation — Source: DSNA



10,141
controlled flights
in one day

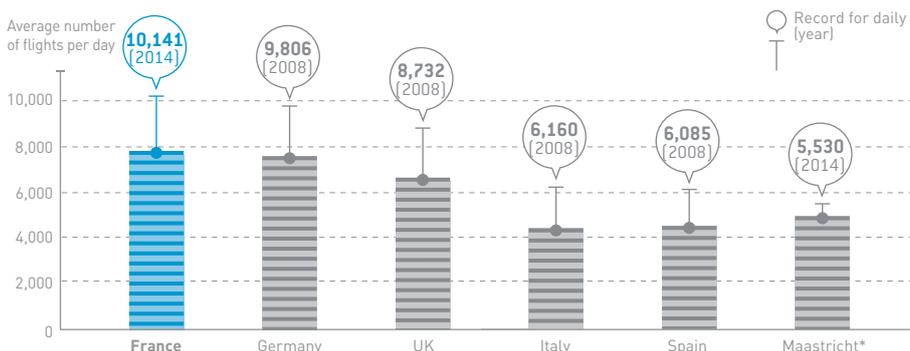
Friday 11 July 2014
A new record for a European air navigation services provider

5 The 10 largest airports in mainland France and Corsica in terms of IFR movements (arrivals and departures) — Source: DSNA

	2014	Trend compared with 2013
1. Paris-CDG	470,797	↘ -1.5%
2. Paris-Orly	231,107	↘ -1.1%
3. Nice-Côte d'Azur	136,879	↘ -2.5%
4. Lyon-Saint Exupéry	108,228	↘ -6.9%
5. Toulouse-Blagnac	93,519	↘ -2.2%
6. Marseille-Provence	90,497	↘ -12.4%
7. Basel-Mulhouse	76,816	↗ +4.4%
8. Bordeaux-Mérignac	54,635	↘ -4.8%
9. Paris-Le Bourget	54,507	↗ +1.3%
10. Nantes-Atlantique	51,415	↗ +1.4%



6 Air traffic in Europe — Average number of daily flights in 2014 and the record for daily traffic — Source: Eurocontrol



Operations room at Bordeaux ACC / 2012

Aerodrome control at Nantes-Atlantique / 2014

* Eurocontrol ACC controlling the upper airspace over the Benelux countries and part of Germany.

The Board analysed 13 events in 2014.

- 3 involved aircraft flying abnormally close to one another (4 losses of IFR/IFR separation en route and 4 losses of IFR/IFR separation during approach ⑦),
- 5 involved aerodrome circulation events, including 5 IFR/VFR incidents,
- 4 involved runway incursions ⑧.

- 1 concerned an aircraft flying abnormally close to the ground during approach.
The tools used by approach controllers to form a safety net are presented on Page 43.

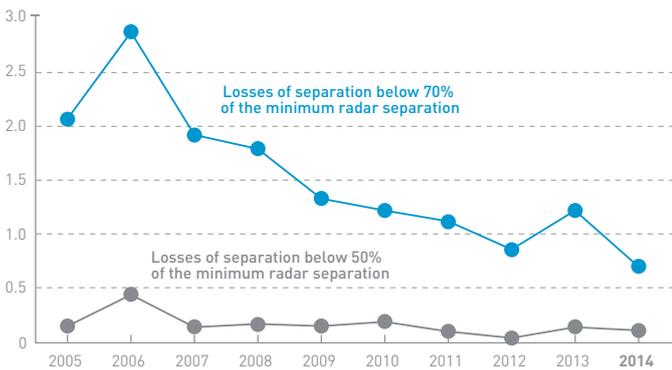
The development of three action plans was launched to improve the global level of safety: one for en-route safety, one for approaches and the third specific to the Paris region. These plans are part of DSNA's integrated approach to safety.

They provide a broader scope than "abnormal" safety incidents and are intended to improve the consistency between local and nationwide actions, and European initiatives. They will be updated on the basis of the context and new topics.

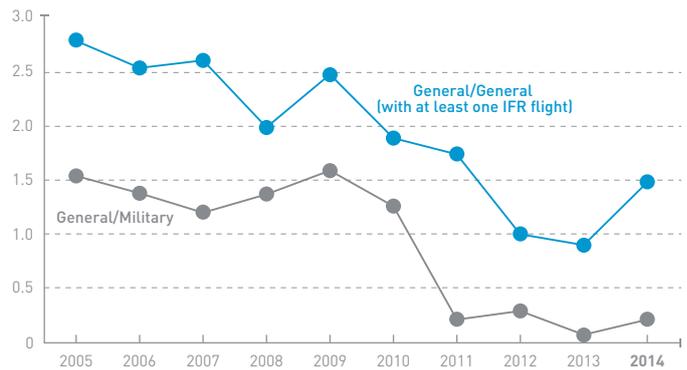
DSNA has also adopted a risk map that is part of the French Air Safety Programme (PSE) in order to improve air traffic control risk management.

⑦ Indicators used to measure safety level for en-route traffic control — Source: DSNA

Losses of separation per 100,000 flights



Number of airprox for 100,000 flights

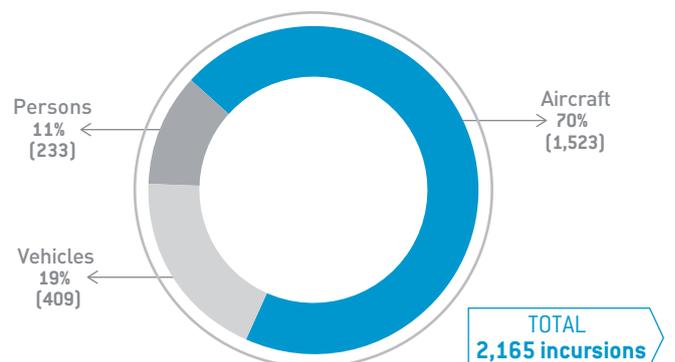


The standard minimum en-route radar separation between two aircraft is 5 Nm in the horizontal plane and 1,000 ft in the vertical plane. The safety net informs the controller of the danger of airprox that does not meet this standard. Two indicators are tracked: HN70, when two aircraft are separated by less than 70% of the standard and HN50, which corresponds to 50% of the standard. In 2014, the frequency of losses of separation < 70% was 0.70 flights for about 100,000 controlled flights and of losses of separation < 50% was 0.11.

Two types of air traffic control co-exist in France: general air traffic (CAG) and military air traffic (CAM). In 2014, pilots reported 1.48 airprox between general traffic, involving at least one IFR flight, for every 100,000 flights and 0.21 airprox between general and military traffic for every 100,000 flights.



⑧ Breakdown of runway incursions per category between 2005 to 2014 — Source: DSNA





DSNA also takes part in the civil/military commission for ATM safety (CMSA), tasked with examining incidents between civil and military aircraft. The latest annual report shows that the CMSA investigated 27 cases and issued 52 recommendations, 14 of which concern DSNA. In 2013, military air traffic control adopted a new tool (RAT) to classify safety incidents. This tool was developed on a European scale and is also used by DSNA. It allows different service providers to apply uniform classification criteria.

→ Delays due to air navigation

The quality of service delivered by air navigation services with regard to the punctuality of flights is measured using two indicators:

- the average delay due to air traffic regulations (ATFCM delays): this highly technical indicator is calculated on take-off for flights that are regulated according to the take-off slot allocated by the Eurocontrol Network Manager in Brussels and the scheduled take-off time in the flight plan. In 2014, DSNA delivered a quality service, with an average delay of 0.76 minutes per flight 9. 87% of the 2,172,706 minutes

of delay occurred en-route and 13% at airports (75% and 25% respectively in 2013). The main causes of these delays are the lack of capacity, strikes and poor weather 10.

External events can also disrupt air traffic control. For example, the international NATO exercise that took place between 14 and 30 October resulted in an average delay of 9.77 minutes per regulated flight in France.

- **breakdown of causes of delays by group of players for commercial flights delayed by more than 15 minutes on take-off.**

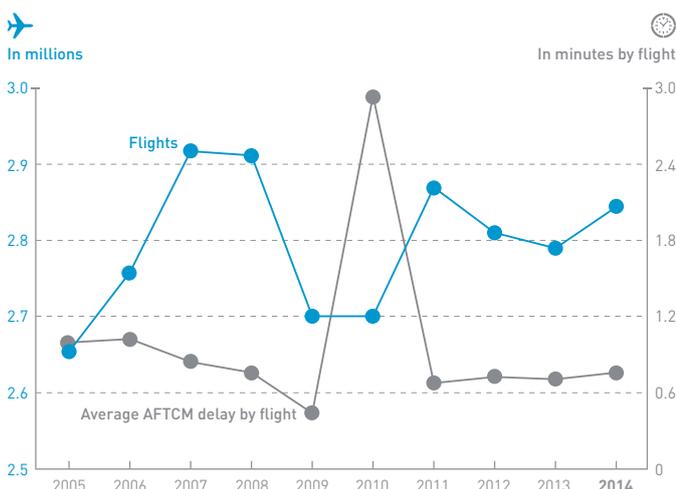
The records cover 130 domestic or international routes with an annual traffic in excess of 100,000 passengers, flying into one of the following nine airports: Paris-CDG, Paris-Orly, Nice, Lyon, Marseille, Toulouse, Bordeaux, Nantes and Beauvais. In 2014, 22% of flights from France were delayed by more than 15 minutes for the following main reasons: 1.3% due to air navigation services, 3.1% due to airports and security and 3.8% due to the airlines. The most important cause remains the reactionary delay due to rotations sequences (9.5%).



De-icing an aircraft before departing from Paris-CDG airport / 2014

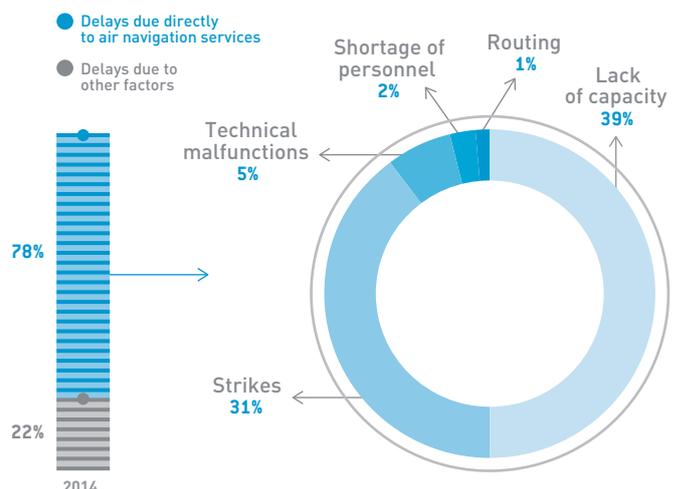
9 Average delay due to air traffic control regulations

Source: DSNA



10 Breakdown of the causes of delays due to air traffic regulations

Source: DSNA





02



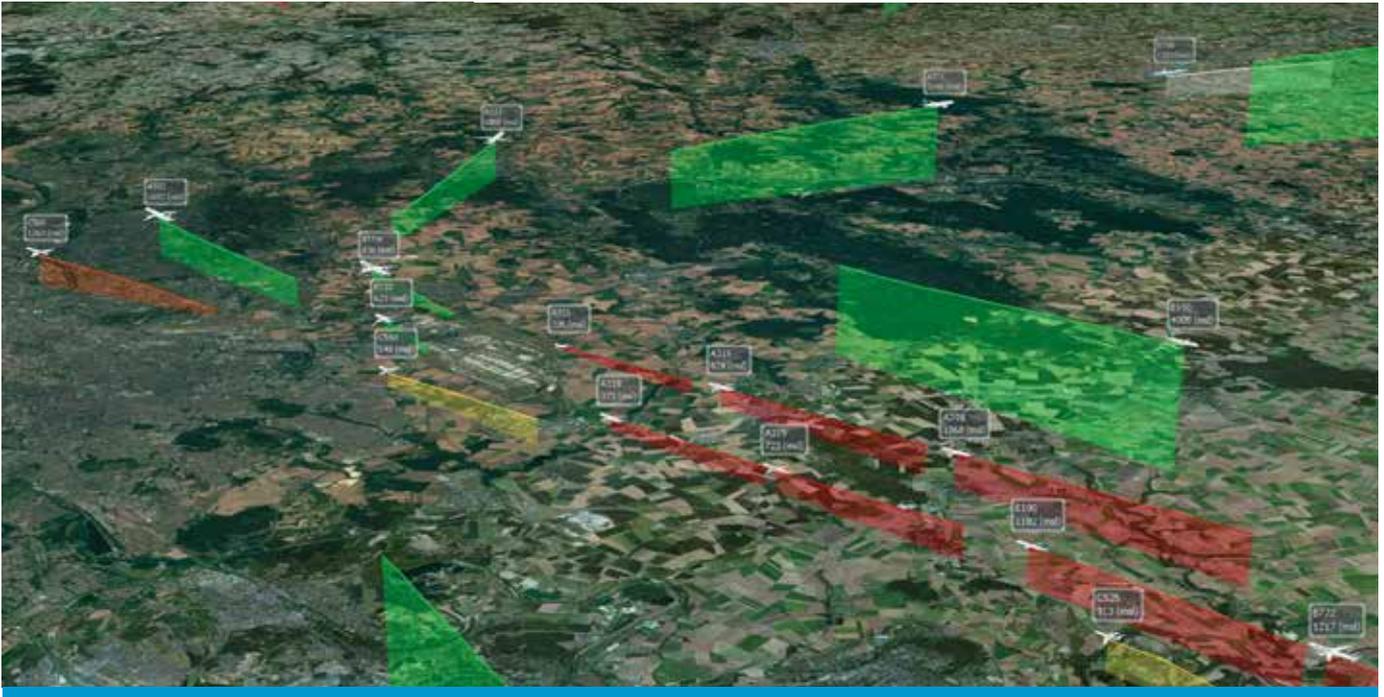
THE ENVIRONMENT

Reducing the environmental impact of air navigation is the second strategic priority of DSNA, which aims at achieving this goal by continuously improving air traffic procedures and training its controllers, in close cooperation with elected representatives, and associations of local residents.



REDUCING THE ENVIRONMENTAL IMPACT OF AIR NAVIGATION

VOLANS: the 3D flight path display tool



→ Limiting the impact of noise

Studying the impact of air traffic (EICA)

Before changing or creating an air traffic procedure at one of France's major airports, DSNA analyses the noise impact. The findings are then submitted to the environmental consultative committee (CCE), then to the independent ACNUSA authority, if the procedure is for a major airport.

In 2014, DSNA conducted eight of these analyses for the creation of satellite procedures (Carcassonne, Chambéry, Lyon, Marseille, Nantes, Poitiers, Saint-Étienne, Toulouse). The new procedures in Nantes for departures and in Marseille for departures and arrivals were also reviewed.

Continuous descent approaches

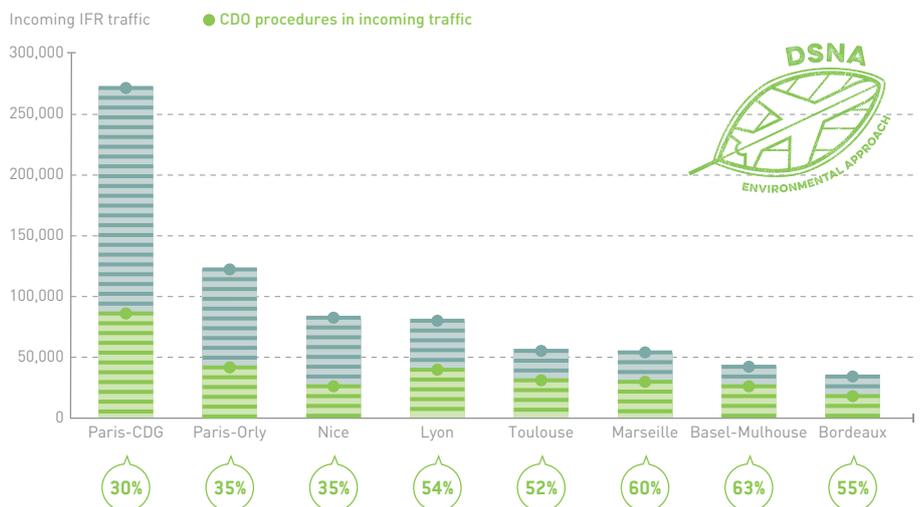
By doing away with the periods of level flight between the start of a descent and the runway, continuous descent approaches avoid variations in engine speed, thereby reducing noise levels in the terminal zone and fuel consumption.

France reports to the European Commission on the state of progress of the deployment of these procedures (CDO) and is continuing to work with its European partners in the FABEC (see Page 35) in order to facilitate future comparisons and analyses.

This type of procedure is already in use at the following airports: Paris-CDG, Paris-Orly, Nice, Lyon, Marseille, Toulouse, Basel-Mulhouse, Bordeaux, Nantes, Strasbourg, Beauvais ①.

① Continuous Descent Operations (CDO) in 2014

Source: DSNA





Work in progress

The EICA guide: the new version of this document will clarify the role of each entity of the DGAC involved in the assessment process, will define the various levels of complexity of the study and will describe the methods and the tools used to analyse fuel consumption and gas emissions.

Public inquiries: DSNA has proposed new criteria for the opening of a public inquiry to its regulator (DTA) for the creation or modification of an air traffic procedure, in order to better target the impacted residents.

Paris-CDG: a work group has been tasked with identifying potential improvements in terms of the noise produced by night flights into the airport.

Paris-Orly: as part of the European SESAR programme (see Page 36), DSNA is looking into the feasibility of RNAV approach procedures for aircraft flying into Paris-Orly facing the west, with an improvement of the vertical flight profiles.

→ Reducing gas emissions

More than 80% of the CO₂ from aircraft flying over mainland France and Corsica is emitted at altitudes higher than 2,000 metres. Consequently, DSNA's efforts to reduce gas emissions are focussing on altitudes above this threshold. To this end, DSNA contributes to all the European efforts that are being made to optimise flight paths and reduce consumption of aviation fuel, and therefore gas emissions, as far as possible by reorganising the airspace.

As part of the SESAR programme, DSNA is taking part in the "Free Solutions" project, which aims to improve the horizontal efficiency of routes by using new direct routes and new methods and procedures that will increase the efficiency and flexibility of airspace management. The various scenarios will be assessed by commercial flights in 2015.

In 2014, DSNA measured the **horizontal environmental efficiency** of its network of routes in upper airspace by comparing ideal routes with actual routes. This indicator stands at 98%. DSNA's flight management actions, between the flight plans submitted by the airlines and the routes actually followed, make annual savings of 81,000 tons of fuel, or a 272,000 ton reduction in CO₂ emissions. In economic terms, this represents annual savings for the airlines of €68 M.

DSNA is also taking part in Air France's project to test various innovations on the Toulouse-Paris Orly city-pair.

→ Communication

Politicians, associations and local residents often look for answers to their questions about the environmental effects of overflights and flight paths. DSNA answers questions about its everyday actions in total transparency.

Flight path displays

In addition to the publication of its quarterly report on traffic in the Paris region and the answers to the letters it receives, DSNA is also present in the environmental centres at Paris-Orly and Paris-CDG. In 2014, DSNA deployed the VOLANS software, which displays outgoing and incoming flows of aircraft at the three major platforms near Paris (CDG, Orly and Le Bourget) in 3D.

Cooperation with the leading residents associations

In 2014, DSNA met several residents associations from the Paris region and the rest of the country to discuss working methods, their demands, communications between the associations, etc. The association UFCNA could eventually become DSNA's preferred national point of contact, like the UAF for airports and the FNAM for airlines.

3.7 litres

per passenger per 100 km

Average fuel consumption in the French air sector. In 2007, it was 4.02 litres per passenger.

Source: FNAM



DSNA is actively engaged in the pursuit of continuous descent operations

Aerodrome controllers at Annecy - Haute-Savoie / 2011



03



HUMAN RESOURCES

The operational, support and management, technical and administrative DSNA personnel stands out by its high levels of skills and expertise, which are maintained by extensive initial and continuous training.



RECRUITING, TRAINING, SUPERVISING AND SUPPORTING THE PERSONNEL

On-the Job-Training-Instruction
in Montpellier / 2014



On 31 December 2014, the headcount of DSNA in mainland France and Corsica and overseas (French West Indies-Guiana, Indian Ocean, Saint-Pierre-et-Miquelon and Pacific overseas territories; French Polynesia, New Caledonia and Wallis-et-Futuna) stood at 7,578, down by 0.8% on 2013. 93% of them (7,020) worked in mainland France and Corsica, and 7% (558) worked overseas ❶.

DSNA has entered agreements to provide functional and technical support for air navigation services in the Pacific.

→ Management and training of technical staff

Within DGAC, DSNA manages the careers of three technical categories: ICNA (ATCO engineers), IESSA (ATSEP) and TSEEAC (senior technicians). In view of the time taken to become technically and operationally qualified, DSNA pays very close attention to the efficient forward personnel planning of these staff members ❷ ❸. DSNA helps to define the criteria for recruitment, for which ENAC takes responsibility. DSNA also manages the assignments of the students at ENAC and their professional mobility through campaigns to create new positions, which are examined by joint administrative committees twice a year.

With ENAC, DSNA determines the content of initial training courses and adapt the curricula to changes in the profession. ATCOs and ATSEPs are trained at the ENAC academy and in the air navigation centres. The qualification is recognised as being the equivalent of a Master's degree: a diploma in "Air Traffic Management and Control" for ATCOs and in "Air Safety Electronic Systems Engineering" for ATSEPs. The national surveillance authority (DSAC) certifies the training courses related to safety that can be followed to obtain the European air traffic controller's licence.

→ Labour relations

The staff reductions that have taken place at DSNA since 1 January 2010 are part of the nationwide effort to cut public spending ❹. DSNA is resolutely committed to restructuring its organisation and activities and to providing a quality of service that meets the needs of its customers and users.

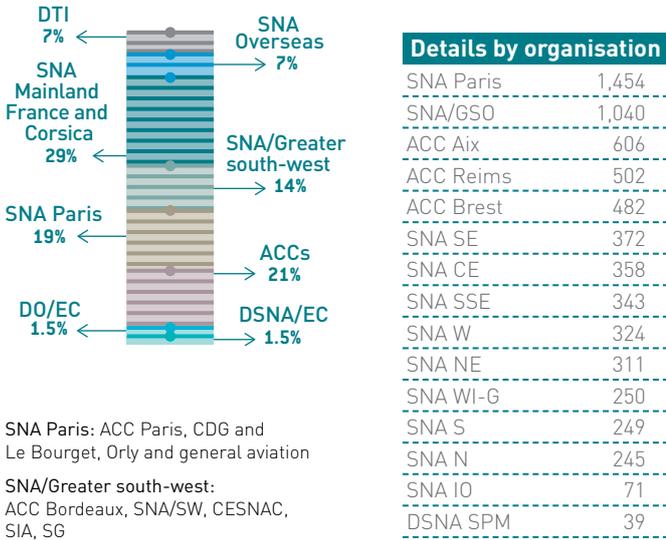
Management and employees are engaged in the gradual improvement of productivity, and in particular:

- A territorial reorganisation: concentration of the service that helps pilots to prepare their flights on four sites.

- The "Control" activity: consolidate the service provided in lower airspace. In 2014 the aerodrome control services at Le Mans, Vannes and Calais were closed down and the approach service for Grenoble-Isère was transferred to Lyon-Saint Exupéry. Anticipate future changes in the activity of ATCOs by 2020 and 2025 (round table).
- The "Technical" activity: reorganisation of the technical departments providing operational maintenance and analysis services, cost controls of the ground infrastructures by keeping a skeleton category 1 ILS network and deploying new satellite approach procedures.
- The "Support" activity: pooling of the functions (HR management, purchasing, logistics, etc.), creation of a new regional entity of a critical mass (the Greater South West Air Navigation Services entity, which combines the south-west ACC, the south-west SNA, the centralised air navigation systems operations centre (CESNAC), the aeronautical information services department (SIA), and a common general secretariat).



1 Breakdown of employees by department



Round table on ATCOs and the modernisation of DSNA

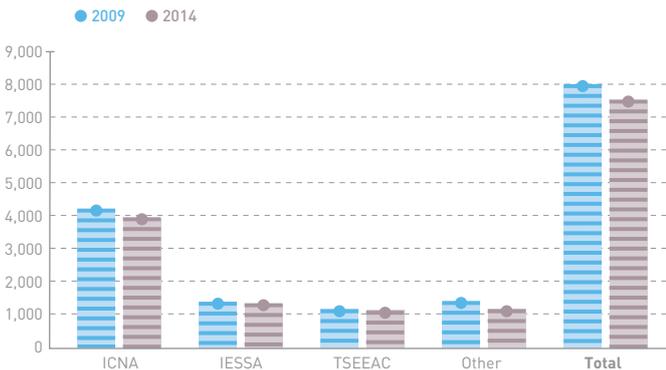
In June 2014, the French government appointed Jean-Michel Verhnes, the president of the executive committee at Toulouse airport, acting as an independent party, to study the future of the activity of ATCOs in order to reach the performance targets and to successfully modernise DSNA's ATM systems.

A challenge that demands the development of new modes of managing time spent on duty and outside the control room in order to meet the goals of the integrated approach to safety and performance targets, training, the introduction of new technical equipment and DSNA's management functions.

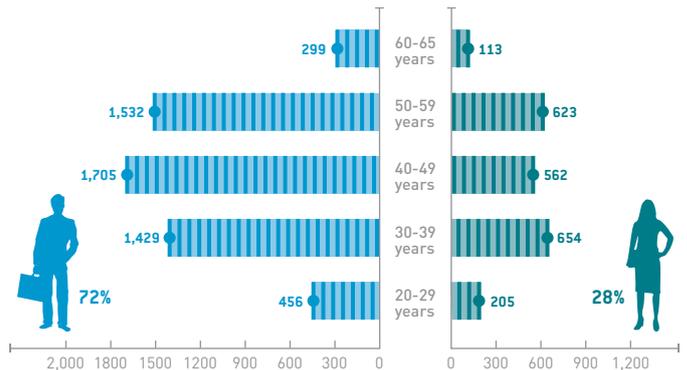
2 Management of technical personnel



3 DSNA staff (excluding trainees)



4 The age pyramid at DSNA (all categories)





04



FINANCES



The budget of DSNA is defined as part of the national Aviation Control and Operations Budget. Income and expenditure identified as part of the same budget and capital outlay can be funded by loans. Financial management is measured by a control process with targets and performance indicators.



CONTROLLING COSTS AND INVESTING IN THE FUTURE

Paris-CDG: north runways. Long-haul flights
landing and taking off / 2012



→ DSNA's funding

DSNA is funded mainly by fees charged for air traffic control services, communication, navigation and surveillance services, the associated aeronautical and meteorological information services and, to a lesser extent, the sale of products and services. The annual financial accounts are certified by the accountant of the Aviation Control and Operations Budget.

€1,478 M

Income from air navigation
charges in 2014

Income from air navigation fees

The route fee and the oceanic fee fund the use of the facilities and the services provided by the French air navigation services for flights over French territory and in the maritime airspace allocated to France by the ICAO, in mainland France and Corsica and overseas. Additionally, the charges for air traffic terminal services (RSTCA) are applied by most of the airports in mainland France and overseas within a 20-km radius before landing and after take-off. This second fee finances the air navigation services provided on take-off and landing ¹.

Income is calculated on the basis of the unit rate and the number of service units. Thanks to its location in the centre of Europe and its size, France is the European country that represents the highest number of en-route services units (18326817) and terminal zone charges (1,009,913).

In France, the unit rate for en route charges (€65.92) increased by 1.8%, compared with 2013. This is one of the lowest rates in western Europe. The rates in Germany and the UK are €77.47 and €83.88 respectively ². In 2014, the unit rate for traffic terminal services (RSTCA) in France was €233.23.

¹ One en-route service unit covers the air traffic control services delivered to a 50-ton aircraft over a distance of 100 km. For a given flight, it is calculated in proportion to the distance covered and the square root of the weight of the aircraft.

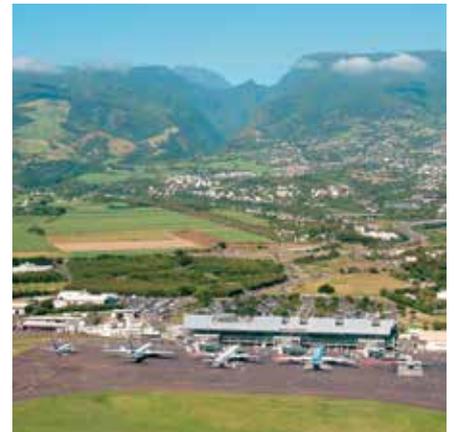
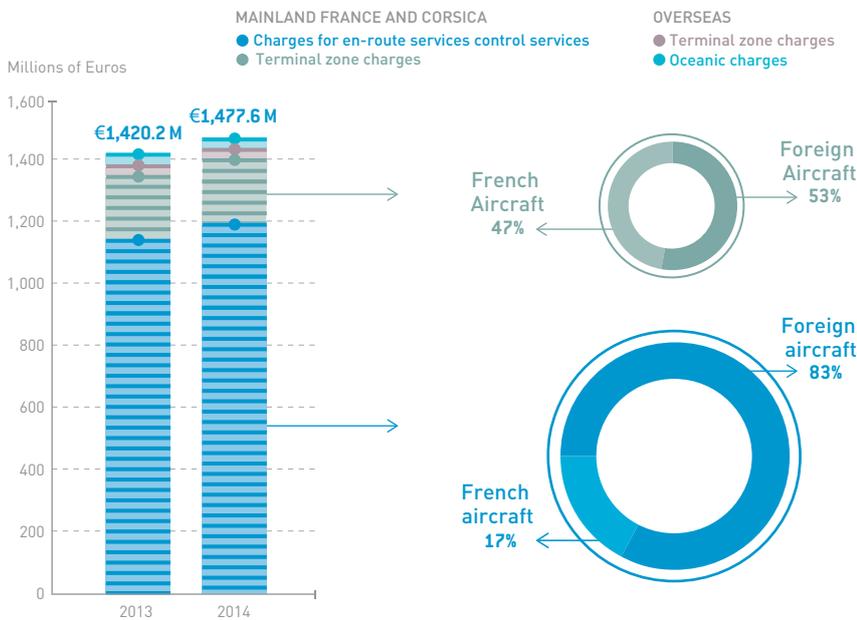
Units for terminal zone services are calculated taking into account the maximum weight of the aircraft on take-off.



In 2014, income from charges overseas totalled €40.6M, compared with €38.1 M in 2013. This income covers about 30% of costs, the rest of which are funded by the Civil Aviation Tax, based on the number of passengers and tons of freight or mail transported on commercial flights in France.

Income, excluding control charges
Other income comes from the sale of products and services, such as aeronautical information and studies or expert analyses for European projects (SESAR, Coflight, etc.) or the calibration of radio-electrical aids. In 2014, it amounted to €13 M, compared with €9.6 M in 2013.

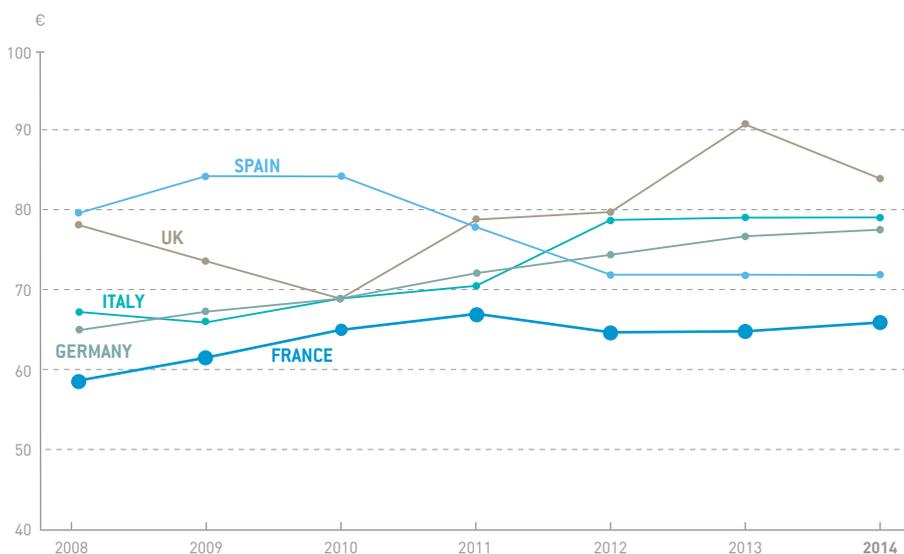
1 Breakdown of income from air navigation charges — Income — Source: DSNA



La Rochelle – Île de Ré: maintenance of the ILS / 2012

Saint-Denis – Roland Garros airport (Indian Ocean SNA) / 2012

2 En-route charge unit rates in Europe





Investments at Paris-CDG “The CDG 2020 roadmap”

There are almost 1,500 movements at Paris-CDG every day. The traffic can be characterised by six concentrated waves of aircraft, with two sharp peaks of arrivals and departures in the morning, including numerous high-capacity planes.

To meet the airlines' needs, including when taxiing, while maintaining a high standard of safety and minimising impacts of air navigation on the environment, as part of the CDM process, DSNA has drawn up the ambitious “Roadmap CDG 2020”. The goal is to increase peak capacity to 78 arrivals per hour in 2017, and to 82 from 2020. To this end, DSNA is investing in latest-generation, high-performance technical equipment, and new working methods will be developed for the controllers.



Control tower at Paris-CDG

→ 2015-2019 performance plan

In an effort to boost the efficiency of its actions, DSNA must meet performance targets in terms of safety, capacity, the environment and cost controls. DSNA's strategic plan provides a coherent overview of the means of reaching these targets, by offering quality, competitive services to all its users, customers and partners, that are in line with their needs.

DSNA controls its performance on the basis of targets, thereby making sure that its strategy is properly implemented.

Moreover, it must also follow FABEC's performance plan, which includes economic targets for each country. In 2014, the member States of FABEC and their air navigation service providers drew up the RP2 performance plan for the second reference period between 2015 and 2019. The plan sets collective global targets for en route traffic. The economic efficiency targets were defined on a national level. France proposed changes to the unit rate of its air navigation charges for this period ³ in view of the need to modernise its air traffic control tools and to meet the new European technical standards in the SESAR programme, in order to deliver a high-performance service in the years to come.

→ Expenditure

2014 saw an increase in expenditure, excluding payroll, of 4% over 2013 to €511.3 M, due to investments ⁴.

DSNA pays a number of external organisations for their services: Météo France, Eurocontrol, skyguide and Jersey (delegated airspace), Aéroports de Paris, Basel-Mulhouse airport and ENAC. These payments amount to almost 45% of its expenditure. In December, DSNA and its Swiss counterpart, skyguide, signed a new financial agreement for 2015 to 2019 that defines the compensation paid to skyguide for the services delegated by DSNA in the region around Geneva.

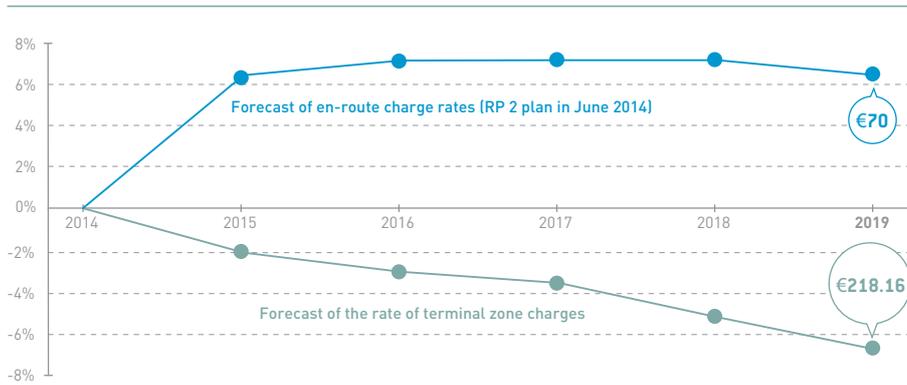
To keep its services competitive, DSNA plans to invest an average of €260 M per year between 2015 and 2019 ⁵. This figure represents a clear reversal of the trend between 2005 and 2013. The investments will be used to modernise the ATM/CNS air navigation systems and to maintain the operational readiness of existing systems. The investments will be broken down as follows:

- 44% for major programmes in preparation for the future,
- 38% for maintaining the operational readiness of systems,
- 18% for civil works and system upgrades.



3 DSN's strategic plan for 2015-2019

Variation in the rates of charges compared with 2014



4 Expenditure, excluding payroll



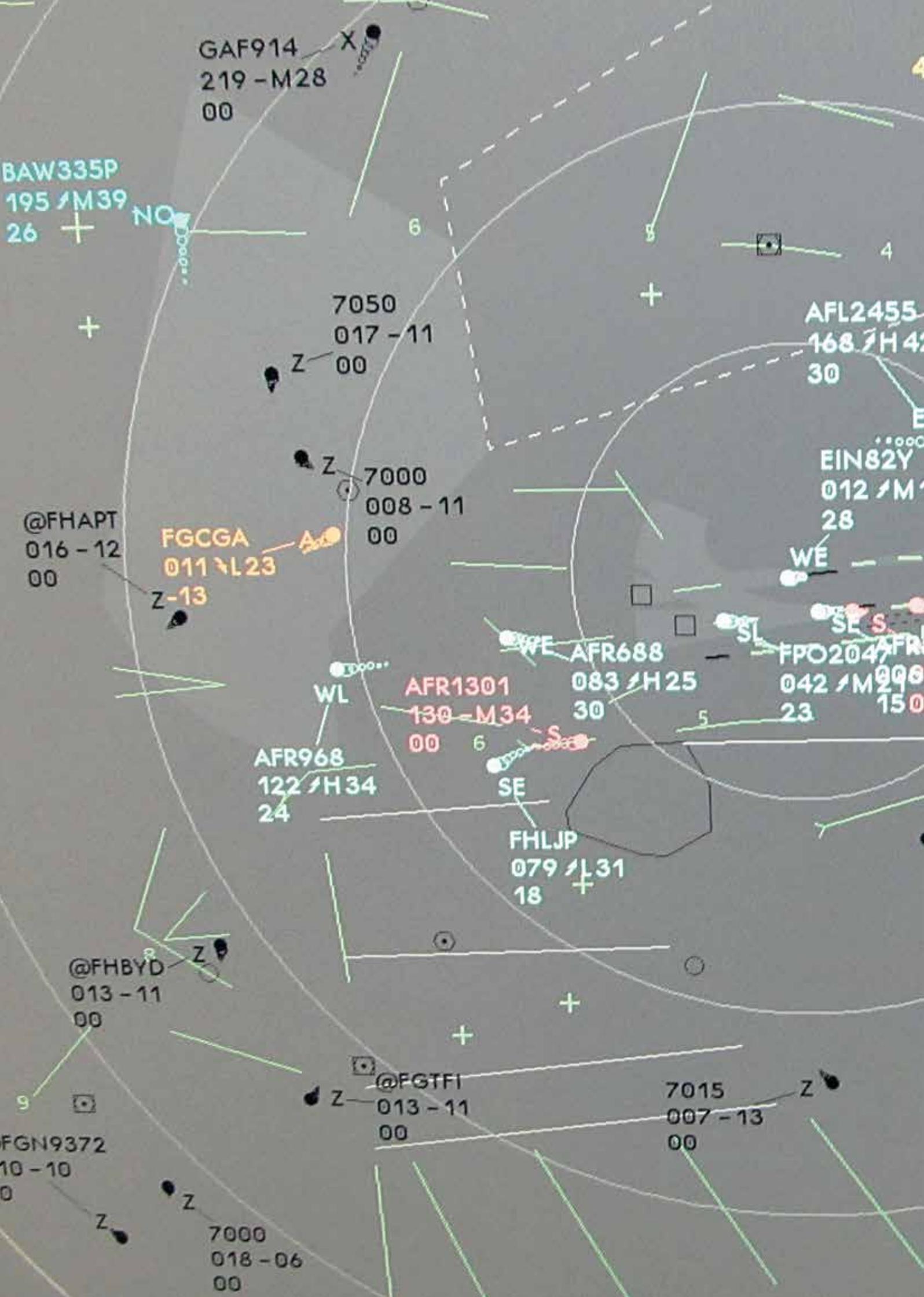
5 Investments of technical programmes and in the maintenance in operation (MCO)



Aerodrome controllers at Pointe-à-Pitre Le Raizet (French West Indies-Guiana SNA) / 2014

Aerodrome controllers at Cayenne-Rochambeau (French West Indies-Guiana SNA) / 2014

Saint-Pierre-et-Miquelon in the winter / 2012



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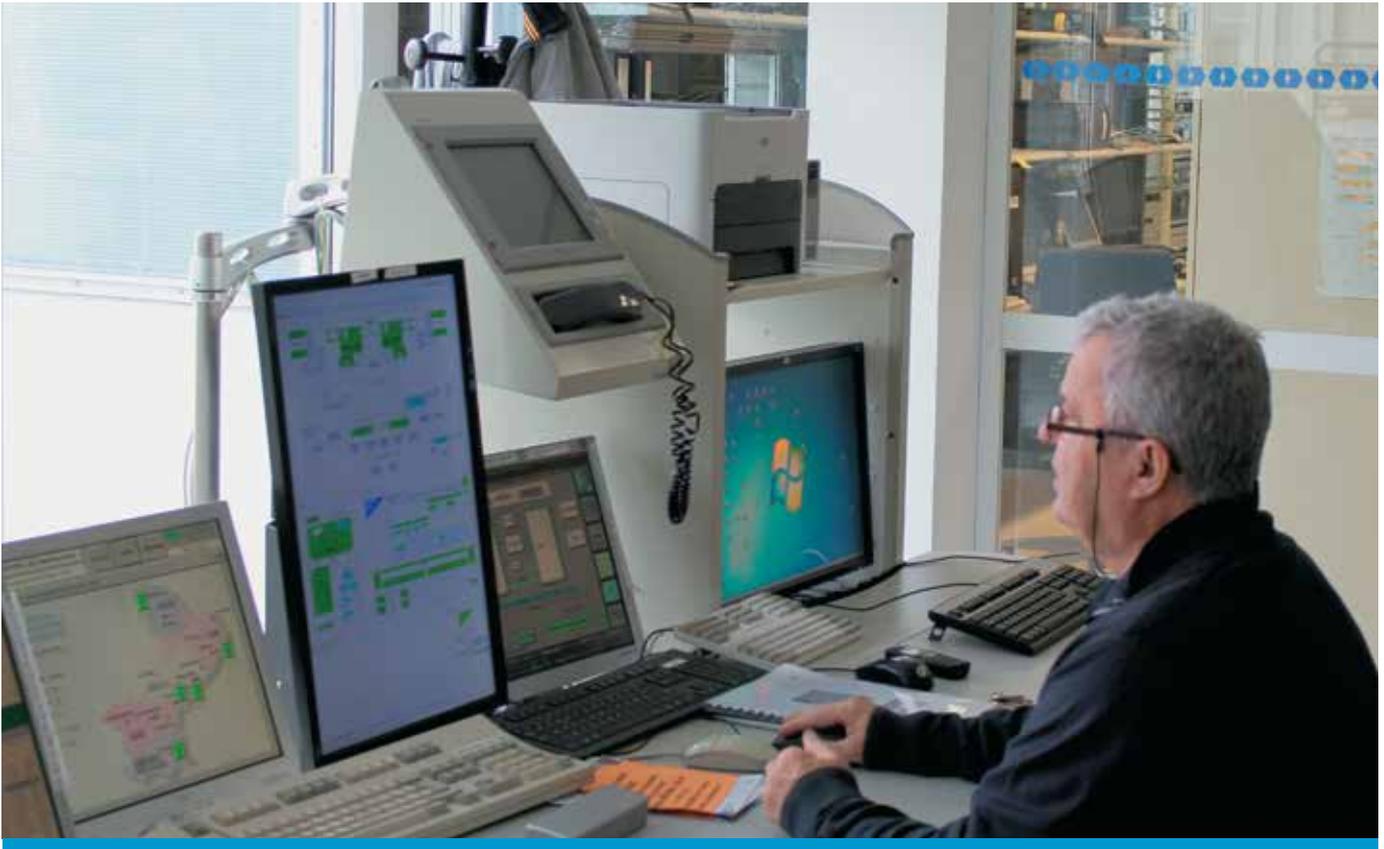
INTEGRATED MANAGEMENT SYSTEM

To improve its overall performance in response to European requirements, DSNA is implementing an integrated management system that covers safety, security, the environment and quality. This initiative aims to improve both internal operations and relations with external contacts, who include essentially the users of the airspace.



A GLOBAL APPROACH TO SAFETY, SECURITY, THE ENVIRONMENT AND QUALITY

— Technical supervision in the Montpellier-Méditerranée operational unit / 2014



DSNA's integrated management system helps exercise better control over safety, security, the environment and quality. It contributes to:

- the renewal of DSNA's air navigation services provider certificate by the National Supervisory Authority (DSAC) for another 6 years, until 14 December 2016. The surveillance actions taken externally by the DSAC and internally by MSQS, contribute to the ongoing improvement of DSNA's working methods and the level of safety achieved,
- DSNA's ISO 9001 "Quality management systems" certification, which was renewed by AFNOR in 2012 for 3 years. This certification covers the supply of air traffic management (ATM), communication / navigation / surveillance (CNS) and aeronautical information services (AIS).

→ An integrated approach to safety for better command of professional practices at every level of the organisation

This initiative is one of the five pillars of DSNA's strategic plan. It is conducted with the participation of the professionals and the help of a consultant specialised in the air sector and in human and organisational factors. The goal of this approach is to make sure that all the actions taken at every level are integrated in the procedures of the safety management system (SMS) that was set up in 2005. 2014 saw the development of a diagnostic that aims to improve the perception and the workings of our SMS ①.

On a European scale, this initiative will allow DSNA to promote an efficient safety culture ("Just Culture") and its

expertise within FABEC (p.35). It will also help to improve its results in terms of the maturity of its SMS, measured by the EoS_M (Efficiency of Safety Management) indicator defined in the regulations of the Single Sky.

→ Risk assessment and reduction

A serious incident occurred in 2013 during works on an airport platform. The feedback prompted DSNA to draw up an inventory of the safety studies for this type of incident in order to promote best practices and identify paths of improvement. The results will be included in the further training courses on safety studies. Moreover, DSNA is working with DSAC with a view to better recognising DSNA's practices in the realm of software quality assurance.



→ Security management

The security of air navigation information systems is at the heart of DSNA's safety strategy. DSNA's policy evolves constantly, in terms of both its technical components and its procedures, organisation and activities. Protecting DSNA's systems is an everyday challenge that is part of a global design to manage risks.

→ Regulatory standard for air navigation services

The European SERA (Standardized European Rules of the Air) regulation came into effect on 4 December 2014 as part of the Single European Sky. Its provisions apply essentially to the uniformisation of air rules applying to special and night VFRs. The corresponding decree published on 11 December 2014 repealed the decree dating back to 3 March 2006 on air rules and air traffic services. To make the new regulations more accessible, DTA and the SIA authored a consolidated document entitled "SERA-RCA" that

summarises the European and national provisions that came into force on 4 December 2014.

→ Increasingly international audit teams

DSNA's safety management processes are audited internally under the responsibility of the MSQS mission from headquarters and by DSAC, with a view to maintaining its air navigation service provider's certificate.

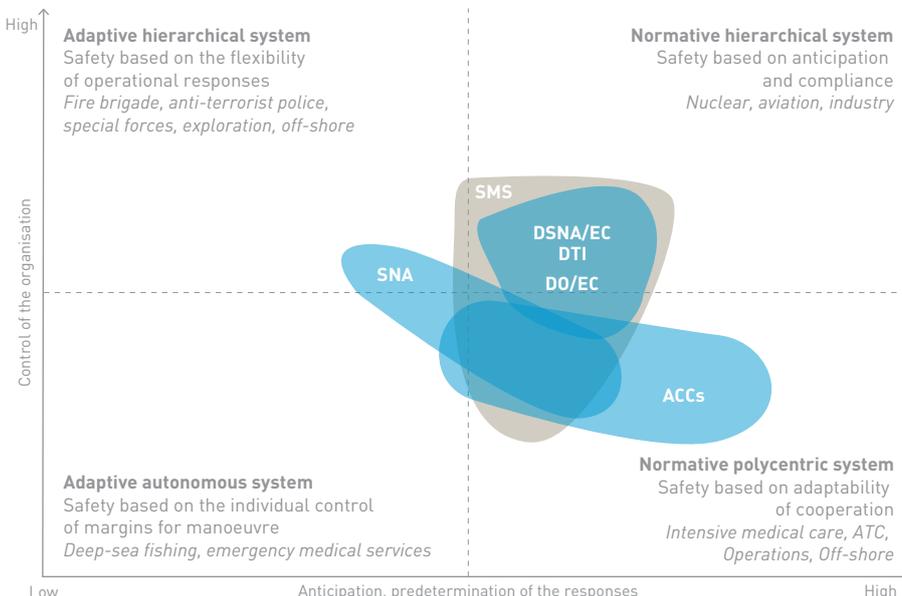
DSNA, DFS and skyguide have conducted reciprocal audits to facilitate the sharing of information and best practices as part of FABEC's INTACT project. The convergence of SMSs is essential in order to take coherent preventive and corrective actions that will improve flight safety. In 2014, three other partners in FABEC took steps to join this cooperative effort. In 2015, all DSNA's air traffic organisations in mainland France and Corsica will be audited by the teams from FABEC at least once.

→ Support tools

Numerous tools are used to manage audits, observations and corrective and preventive actions, to manage and organise documentation and to manage the traceability of safety studies in order to guarantee that IMS functions properly. In 2014:

- the project was launched to replace the INCA software with the TOKAI tool developed by Eurocontrol,
- a new version of the SPIRIT (Safety studies, Performance and Internal audit Real-time Integrated Tool) application was developed to take better account of global safety studies and their local supplements, and the corresponding projects.

① An innovative approach to the safety management mechanisms by organisations to diagnostic DSNA's SMS
Safety management modes



Aerodrome controller / 2012

There are 110 km of taxiways at Paris-CDG / 2014



dgac
DSNA

ENAC

competitive services to all our customers

Innovation and Technology - Single European Sky
Courses in Trainings and in Engineering

4-Flight THALES

A group of approximately 15 people, mostly men in business suits, are gathered around the 4-Flight booth. They appear to be engaged in conversations, some looking at the computer monitors on the desk. The booth is set up with a white desk, several black office chairs, and multiple computer monitors displaying data. The background shows other exhibition booths and the structural elements of the large hall.



06



THE SINGLE EUROPEAN SKY

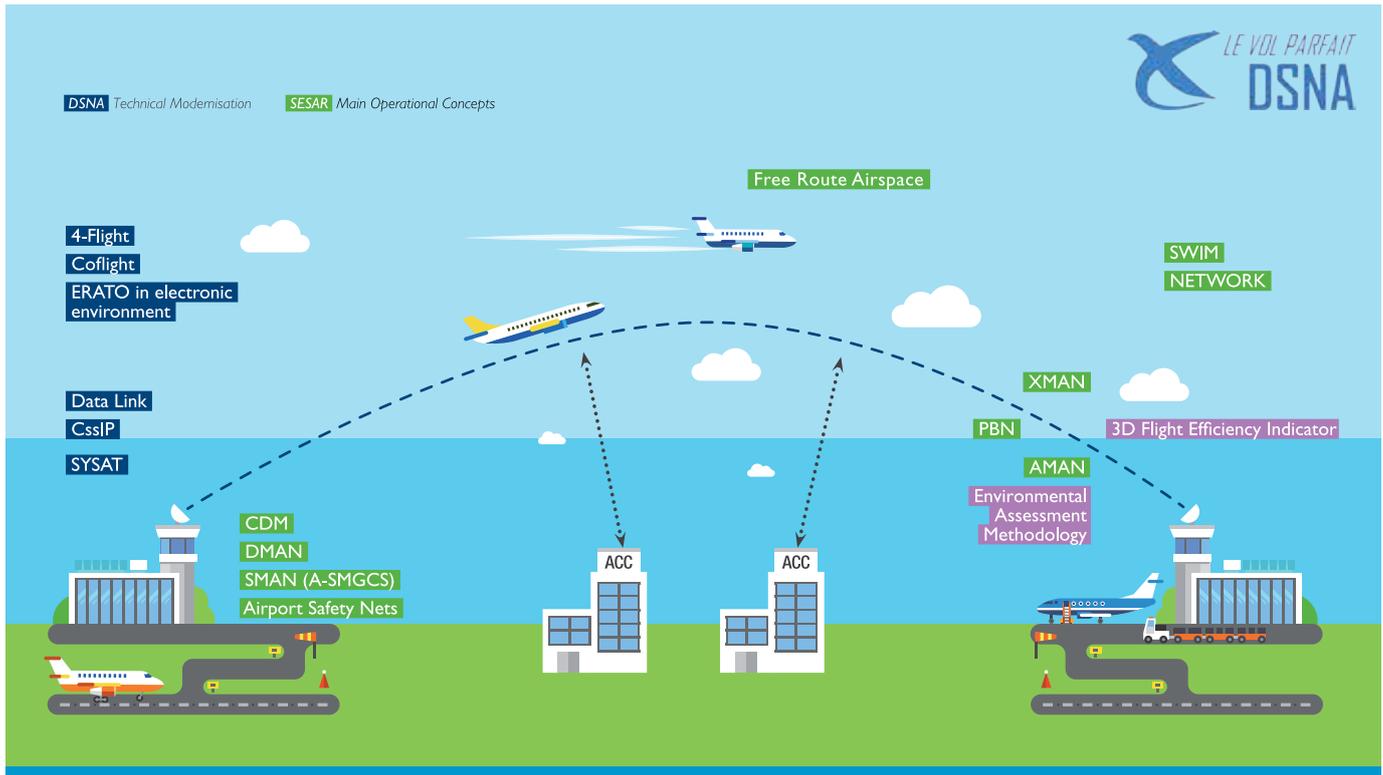
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A Europe-wide air navigation system is gradually emerging as part of the regulations of the Single European Sky. The goal is to build a more efficient airspace, which is safer, offers greater capacity, with more direct flight paths, and optimises flight levels and routes so that airlines can operate more economical and ecological flights.



PREPARING FOR THE FUTURE IN THE NEW EUROPEAN AIR NAVIGATION ENVIRONMENT

Flight Efficiency: "Le vol parfait"



Today, there are more than 30 air navigation services in Europe of various sizes. In an effort to improve these services, in 2004 the European States, under the umbrella of the European Commission, launched the creation of the Single Sky, based on a single regulator (EASA) pillar, a technology (SESAR) pillar and the functional

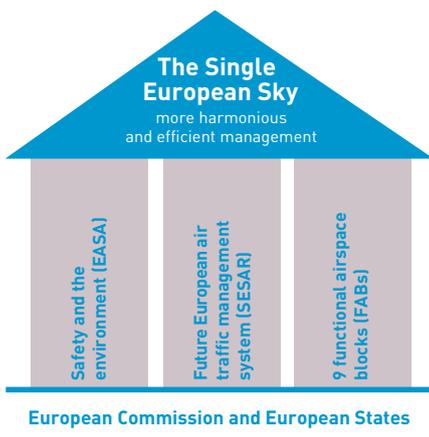
airspace blocks (FABs) pillar, which are organised to meet operational needs by doing away with national frontiers and establishing performance targets. The SESAR programme will introduce the future European air traffic management system.

The European Commission has appointed:

- the Eurocontrol agency as the European Network Manager, in an effort to make the best possible use of this new airspace (network of routes, management of traffic flows, control of rare resources, such as radio frequencies),
- a consortium of operators (air navigation, airlines, airports) to deploy the projects in the SESAR programme in a coordinated manner.

Following the signing of the FABEC Treaty on 2 December 2010, France joined Germany, Switzerland, Belgium, the Netherlands and Luxembourg in the FAB Europe Central (FABEC) environment, located in the heart of Europe. The Treaty came into effect on 1 June 2013:

DSNA is actively participating in the creation of this new European environment, which will usher in technical and operational changes. DSNA is a member of FABEC, SESAR JU, the A6 Alliance and the civil air navigation services organisation (CANSO). It is also represented in the "SESAR Deployment Manager" consortium.



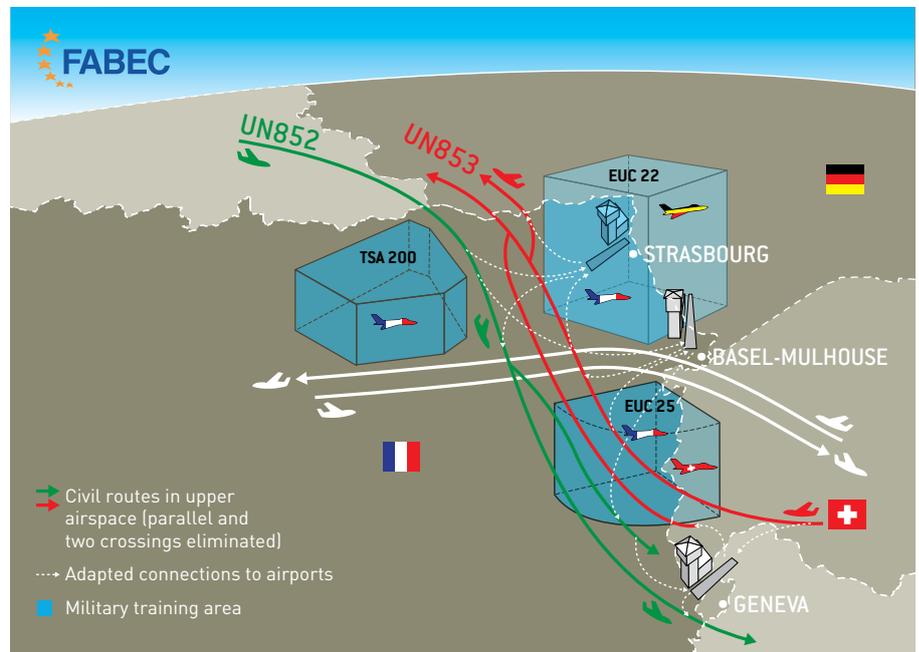


→ FAB Europe Central (FABEC)

FABEC contains Europe's largest connection hubs and is the scene of the busiest air traffic in the world. More than one half of flights in Europe are controlled in FABEC!

The commitment of the military authorities is essential so that FABEC can achieve its performance targets. In 2014, this European cooperation helped a number of projects to make progress, in particular:

- **on the safety front:** continuation of the work on the convergences of safety management systems (SMS). On 4 December 2014, the new European air rules (SERA) came into effect in Europe (Page 31). Ultimately, the air rules and the services delivered by air navigation service providers will be more and more harmonised on a continent-wide scale.
- **the organisation of airspace:** in view of the decisions to postpone for domestic reasons in France and Holland, a new coordinated schedule was necessary for FABEC's cross-border airspace design. France is directly impacted by the project that plans to deploy an optimised routes network at high altitude in north-east France from 31 March 2016 for the north-south routes passing through the FABEC airspace. The goal of this project is to meet the needs of civil and military users. Its very nature, due to the number of players involved, makes this project complex. For the first time, a Franco-German cross-border military training area will be created from existing military areas. Free Route is an expression of the airlines' wishes to programme their best flight plan in terms of "the user's preferred flight path", a concept that is central to SESAR. Airlines want to have the broadest possible choice of possible flight paths, including the shortest routes, but also other options that may be beneficial in terms of punctuality or economic efficiency, depending on the operational conditions at the time. In 2014, DSNA published 13 new direct night routes. DSNA offers airlines the possibility of using 56 direct night routes, at an average altitude that is above FL 285 (8,700 metres).



This cross-border airspace design involves the civil and military authorities in France, Switzerland and Germany.

- **management of airspace capacity and regulation of flows:** FABEC's ATFCM/ASM project focussed on the airspace management (ASM) function. The five domestic airspace management cells (AMC) in Germany, Belgium, France, the Netherlands and Switzerland exchanged data on military activity. Consequently, on 13 November 2014, it was possible to view an image of the occupation of military zones in FABEC for the first time and, therefore, to improve cooperation between AMCs. This cooperation will be strengthened in 2015, with a view to defining ASM solutions that optimise the use of the airspace in FABEC.

7,000

The number of civil air traffic controllers in operational activity in FABEC

€3.8 Bn

The estimated cost of the *Pilot Common Project*, the first SESAR common deployment project



SESAR experiment on the insertion of a drone in civil traffic

A world premier. Between 26 October and 7 November 2014, the industrial manufacturers SAGEM and Rockwell Collins, DSNA and ENAC tested radar approach guidance methods and procedures to manage the loss of the ground-to-air control connection in a series of flights by a Patroller drone (1-ton category) in the Toulouse TMA. An optronic detection and avoidance device installed under the wing of the drone was also assessed.



Drone control station

→ SESAR

The purpose of the SESAR programme is to modernise the air traffic control system in Europe and to improve its operational, economic and environmental performance. New operational concepts are being assessed, some of which will be implemented by the air navigation service providers in 2015, while others demand a new-generation technological environment. This ambitious programme is managed by the SESAR JU, a partnership between the European Commission, Eurocontrol and operational and industrial players from the sector.

First deployment phase

The SESAR programme is entering a new phase. In the first research and development phase, which started in 2008, innovative operational concepts were assessed and their deployment was prepared. The next step now consists in transforming these efforts into concrete, industrial strength functionality that is deemed to be mature in terms of operational needs, technology, standardisation and cost/benefit analysis. The SESAR JU selected eight of DSNA's proposals, representing about €5 million for DSNA over a 2-year period. The projects kicked off in the fourth quarter of 2014.

On 5 December 2014, the European Commission officially launched the SESAR deployment phase and appointed the "SESAR Deployment Alliance" consortium as the SESAR deployment manager following a call for tender. This alliance is made up exclusively of operational European players: air navigation service providers, including DSNA, airlines and airport operators.

The role of the alliance is to collaboratively govern the deployment of the new technical systems and operational concepts, defined in a regulatory framework, in the form of "common projects". The first one, known as the Pilot Common Project, includes six major functionalities judged to be sufficiently mature to go into industrial production and deployed by the operational users.

The European Commission has set up a system of €3 billion of financial incentives, lasting until 2020, to support the players in the modernisation of their technical systems and their engagement in the creation of the European Single Sky. These measures supplement the funding by the charges from DSNA's RP2 economic regulation plan.

This new European air navigation environment is a genuine opportunity to speed up the successful modernisation of DSNA and the changes to its organisation.

SESAR 2020 (phase 2)

The European Commission has decided to finance the extension of ATM research and development beyond the current SESAR programme. Faced with stagnating traffic, phase 2 focusses more closely on cost efficiency than on capacity increases. It is structured around three programmes:

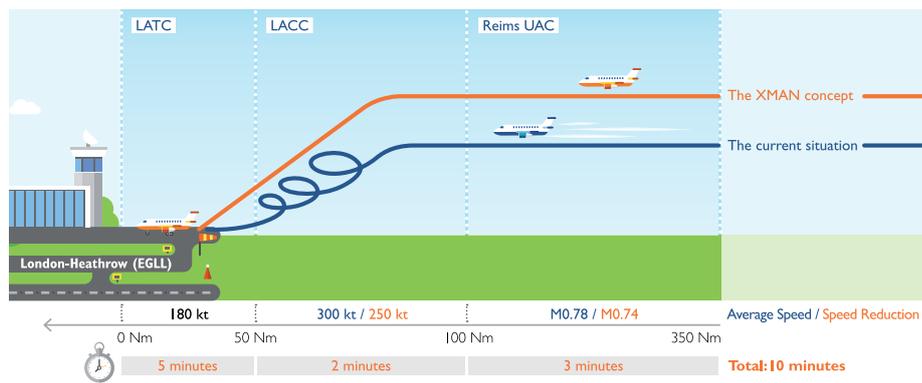
- *The exploratory research programme,*
- *The applied research programme* that integrates the existing operational and system projects. Number of projects: 23,
- *The very large-scale demonstration programme* that establishes the link between the R&D work and the deployment of the SESAR solutions.



SESAR: DSNA takes part in the exercises to validate new operational concepts

XMAN (Extended Arrival Management)

The XMAN Heathrow trials: the delay sharing strategy between London Terminal (LATC), London ACC (LACC) and Reims UAC (En-Route)



In the XMAN concept, flights to very busy airports are slowed down right from the cruising phase.

Between April and December 2014, the ACCs in Reims and Brest took part in evaluations of this procedure for commercial flights into London Heathrow. The various control organisations established a delay distribution strategy capable of absorbing up to 10 minutes.

The absorption of delays in the cruising phase, rather than radar regulation in lower airspace, offers significant economic (fuel, less time spent in the arrivals holding patterns) and environmental (lower noise levels on the ground) advantages.

Dynamic-ATFCM



Flight management position (FMP) at the Brest ACC.

Between 1 and 15 October 2014, a large-scale exercise took place to assess new and highly refined traffic management measures (ATFCM) designed to make traffic flows more fluid.



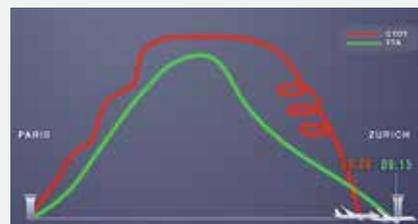
Eurocontrol award for the STAM project team

Participants: 14 FMPs (including the East and West ACCs), two control towers (Gatwick and Geneva) and eight airlines (including Air France-KLM and Lufthansa).

This exercise assessed:

- a support tool for coordination between the FMPs, airlines and the Network Manager (Eurocontrol),
- short-term, operational ATFCM measures (STAM) based on the weather or rerouting.

FAIR STREAM

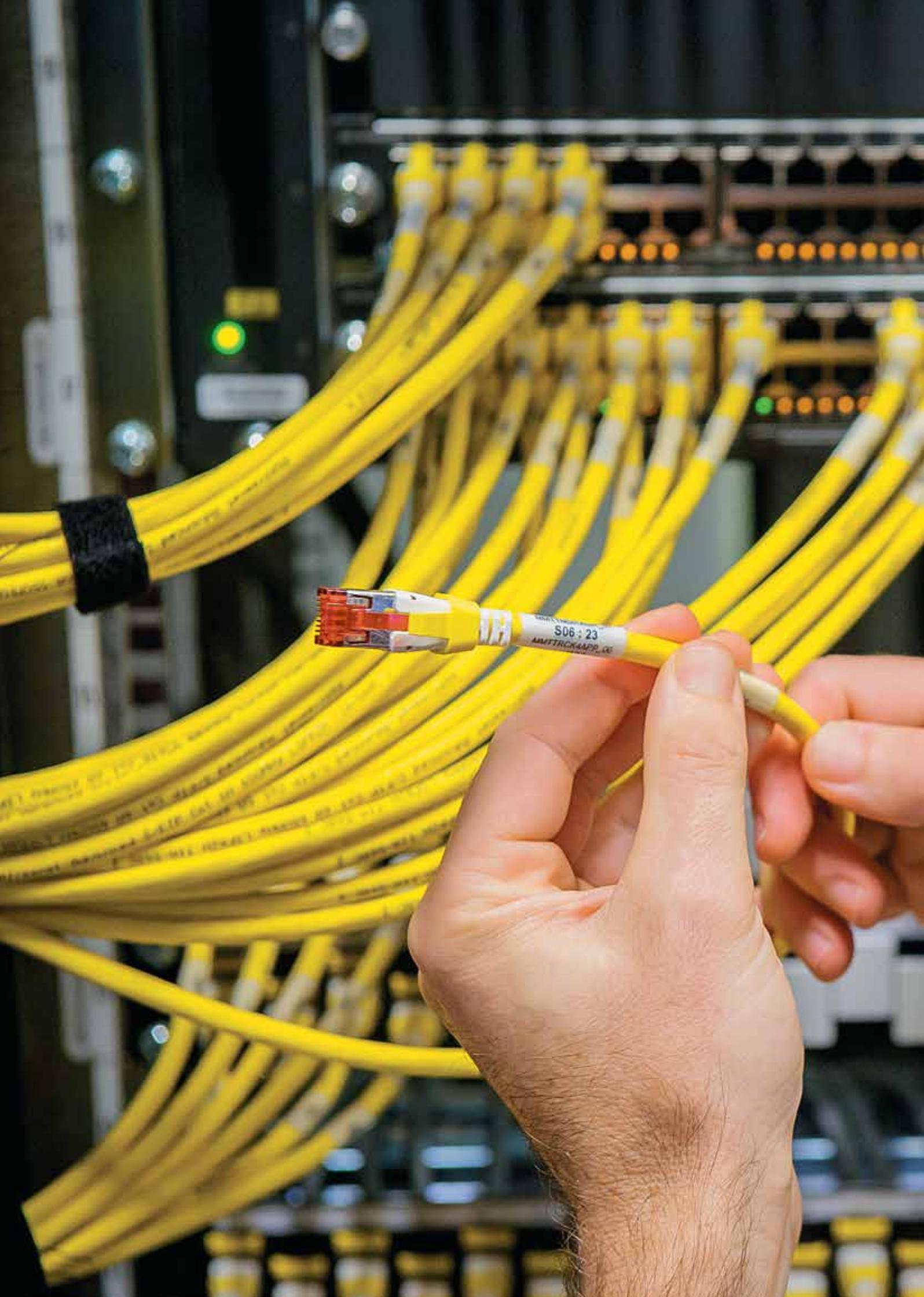


This procedure for the control of incoming flights at very busy airports consists in fixing a target time of arrival (TTA), instead of allocating a calculated take-off time (CTOT). The aim is to make flights more economical, while reducing their environmental impacts.

All the operational players are informed of the aircraft's TTA, thereby improving the efficiency of the network of routes. The pilot can adjust the aircraft's speed during the flight to meet the TTA.

Participants: DSNA, skyguide, DFS, Air France, Swiss, Lufthansa; Airbus, Boeing, Eurocontrol.

In 2013, almost 1,000 commercial flights to Paris-CDG and Zurich successfully tested the feasibility of this concept. The report was published in 2014, and, on the strength of its encouraging results, studies were continued in the iStream project.



07



MAIN OPERATIONAL AND TECHNICAL ACHIEVEMENTS



As part of its 5-year plan, DSNA is rolling out technical projects meeting European standards that are the fruit of several years' work. These projects help optimise air traffic management, with safety and capacity targets while preserving the environment.



INVESTING IN THE IMPROVEMENT OF QUALITY OF SERVICE

Flight arriving at Nice-Côte d'Azur / 2012



→ Infrastructure

In 2014, the extension of the technical and operational rooms, and a new 3000 m² building housing the management's offices, the operations, administrative and medical departments and the simulation centre were completed at Brest ACC.

Reims ACC completed the first phase of the centre's extension. The surface areas of the control and technical rooms were extended by 170 m² and 340 m² respectively, in particular to accommodate 4-Flight (Page 47).

→ Organisation and management of airspace

Upper airspace

The "Interface Bordeaux-Brest-Paris 2012" project: this project was launched to build on the progress made in the

Paris region in the increase of arrival altitudes since November 2011. The purpose of this project is to improve the interface between these ACCs, with a view to making flights more efficient and cutting gas emissions. This project is in perfect harmony with the environmental performance targets of the Single European Sky. The last phase of the project ended in March 2014, with the raising of the arrivals routes from the south-west into Paris-Orly by 2,000 feet (600 metres), to around FL 280 (9,000 metres). By optimising these flight profiles, it is easier to make continuous descent approaches (Page 16).

Lower airspace

The limits of the Paris CTR and TMA were adapted in response to the demands of general aviation users to free up airspace in their favour.

DSNA is continuing its policy to reorganise lower airspace by:

- deploying central approaches (merging the approach controls of several aerodromes). In October 2014, the Grenoble-Isère approach service was transferred to the Lyon-Saint Exupéry organisation. The latter already delivered this service for Lyon-Saint Exupéry, Lyon-Bron and Valence. The organisation in Grenoble now concentrates its activity on the control of the aerodrome,
- delivering flight control and information services. This policy improves safety by enhancing compatibility between IFR and VFR flights. A series of adjacent flight information sectors now covers almost all the low-altitude airspace.



→ Communication - Navigation - Surveillance

Communication

Safety telephone and radio-telephone systems

In 2014, the first VoIP telephone communications between controllers were introduced, thanks to the DIGIVOI project between ACCs and between ACCs and a few major airports.

For radio communications (dialogue between pilots and controllers), 2014 saw the deployment of IP/analogue gateways in the advanced antennas, including overseas. A new radio-telephone chain system for smaller airports was approved. The system, developed by CS-SI, will be tested in Melun in early 2015. The modernisation of ground radio stations continued, with the deployment of latest-generation, IP-compatible Telerad emitters/receivers. This new generation of equipment will allow DSNA to comply with European regulations on the conversion of frequencies in lower airspace to 8.33 kHz spacing.

Ground-to-ground communications links

Since 16 December 2014, flight plan data has been exchanged between the East ACC and the German en route centres in Langen and Karlsruhe using the new IP telecommunications protocol.

Previously, these exchanges took place over connections using X25 technology, which is in the course of being replaced by the telecommunications operators in FABEC. The migration of all the flight plan data connections between the French centres and those in FABEC will continue in 2015, before being extended to other air navigation service providers. This development represents a new step forwards in the modernisation of our infrastructures, as part of the IP ground-to-ground communications programme. Our RENAR-IP telecommunications network now conveys new flows of operational data, joining the inter-ACC telephone calls

and other flows used to control arrivals (AMAN) and departures (DMAN) in the Paris region.

This is also the first operational implementation of DSNA's secure interconnection architecture (SNARE), which is necessary to meet the future requirements for IP exchanges with our partners, and in particular for data links.

By rolling out this project, DSNA will come into line with European regulations on the format of data exchanges with our foreign partners (IR FMTP).

Navigation

Ground radio navigation systems

In 2014, work continued to renew the installed base of conventional radio navigation aids (VOR/DME/ILS), and in particular:

- the programme to renew the three category 1 ILSs in French West Indies-Guiana was completed by the replacement of the ILS in Pointe-à-Pitre,
- the first new-generation DME came into service in Cambrai.

In 2014, DTI maintained the operational readiness of DSNA's ground radio navigation systems for about €1.5 M.

DSNA and ENAC are looking into a tool that models the effects of wind turbines on VORs. Faced with the increase in requests for planning permission to build wind farms around the 90 VOR/DME installations operated by DSNA, it has become necessary to refine the criteria for acceptance or refusal in the event of impacts on these technical facilities.

Satellite-based IFR approach procedures

Technological progress now allows pilots to follow approach and landing procedures on airports without any ground navigation infrastructures.

In its "Performance Based Navigation" plan, ICAO recommends the deployment of satellite approach systems with vertical guidance on all runways by 2016.

For DSNA, this means publishing 200 PBN approach procedures. In 2014, 70% of this target had been reached. 26 new GPS-based arrival flightpaths were created and, when it comes to vertical guidance, 30 EGNOS procedures and 13 BaroVNAV procedures, which meet the needs of commercial aircraft without EGNOS, were published.

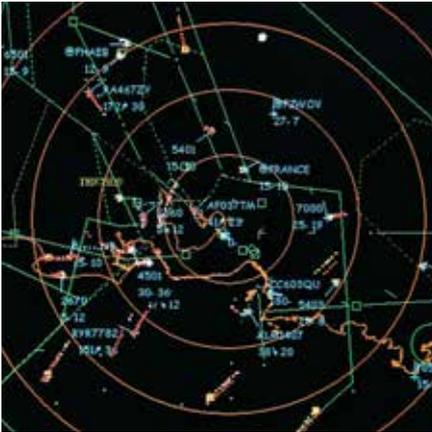
The performance of EGNOS in terms of vertical minima has prompted DSNA to gradually retire around 50 category 1 ILSs, in cooperation with airport operators and users. Maintaining the operational readiness of an EGNOS procedure costs 10 times less than maintaining the equivalent equipment on the ground. Certain ILSs will be returned to operators who want to take over their maintenance, and the others will be dismantled. Nevertheless, DSNA will keep a skeleton network of category 1 ILSs.

GALILEO, the future independent European navigation constellation: the ground station in Saint-Pierre-et-Miquelon started operations on 7 November 2014. Around 40 reception stations are planned to permanently monitor the satellites.

In-flight control

DSNA operates an ATR 42 and a Beech 200 for its calibration flights. The latter is equipped with LPV. Additionally, a private Beech 90, based in the French West Indies, has been modified to perform in-flight tests of radio-electric aids at the French West-Indies-Guiana SNA.

In mainland France and Corsica, as well as overseas, DSNA was called on for some 30 LPV EGNOS satellite approach procedures. Services were also provided in Belgium, Lebanon and Morocco.



Calibration of an ILS at Marseille-Provence by the DTI's in-flight test unit / 2012

Radar display of the Marseille-Provence region / 2011

Surveillance

Mode S Radar

The latest-generation Mode S radar improves the detection of aircraft and can exchange air-to-ground data. Enhanced S Mode surveillance was introduced on a radar in Auch. In this operating mode, flight data (heading, speed, altitude or altitude selected by the pilot) will be used directly with the implementation of 4-Flight (Page 47).

Primary radar

This type of radar is used in particular for major approaches. In February 2014, DSNA completed a programme to protect its equipment against jamming by 4G mobile telephones. Elsewhere, the renovation of the CDG-Mesnil Amelot radar station started, with a view to replacing the existing primary radar by co-located primary and secondary radars by the end of 2016.

ADS-B

The ADS-B is a passive radar capable of decoding the position calculated on board an aircraft that is periodically transmitted to the ground. After La Réunion and New Caledonia, DSNA plans to deploy ADS-B in Guiana and Polynesia.

Ground surveillance

The Paris-CDG and Paris-Orly platforms are equipped with a high-performance ground movements surveillance system called A-SMGCS (Advanced-Surface Management and Ground Control System), which improves standards of safety and increases ground traffic capacity. DSNA will first deploy this type of controller aid on the regional airports in Lyon, Nice, Marseille, Toulouse (airports with dual runways) and Basel-Mulhouse (crossing runways, with sustained traffic). Initially, all these airports will be equipped with level 1 "surveillance" A-SMGCS that allows controllers to identify and position moving vehicles on the ground.

This equipment has been in operation on the pilot site at Lyon-Saint Exupéry since 25 February 2014.

→ Air traffic management systems

A-CDM (Airport-Collaborative Decision Making)

On 16 December 2014, Eurocontrol approved the "Advanced ATC Tower" at Paris-Orly, a major milestone in its bid to obtain the A-CDM label. The CDM concept optimises overall workings of an airport by sharing operational information between the various users in real time.

Thanks to the accurate prediction of taxiing time, the Network Manager, Eurocontrol, is now informed more precisely of the target take-off time when the aircraft leaves its parking spot. As a consequence, the predictability of traffic loads in the en route control sectors will be improved and flights leaving Orly will be protected against the suspension of their flight plan.

Operations will continue in 2015 in collaboration with Aéroports de Paris, with the implementation of the DMAN (Departure Manager) system that allows controllers to interact with the departure sequences in real time. Training in this tool will be developed for technical and operational personnel. Paris-Orly is expected to obtain its "Airport-CDM" label in early 2016.

Saint-Pierre-et-Miquelon

DSNA is continuing its efforts to modernise the control tools on its overseas sites by looking for optimised solutions at the best possible price. For example, since 27 June 2014, the air traffic controllers at Saint-Pierre have received the flight plan data of every flight in the form of electronic strips and the transfer of the radar image and weather information from the Canadian control centre in Gander. Thanks to this new functionality, controllers can better anticipate traffic management and improve the regularity of the flights.

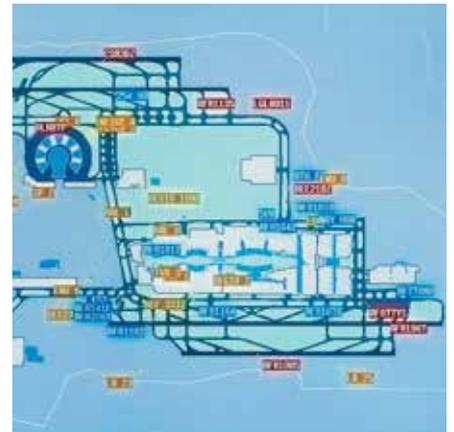


→ **Electronic-AIP**

Publications of the “France” aeronautical information (AIP) have been available in electronic format since September 2014. This electronic document meets the Eurocontrol specifications and the ICAO recommendations. For users, eAIP documents are easier to read and are

more efficient when it comes to looking for information. On the technical front, the updating of eAIP France documents will be largely automated.

These documents will also make it easier to exchange information with our counterparts, for example in the cross-border airspace design.



Controllers can use different types of safety nets to guarantee flight safety

View of the mobile vehicles on the ground at Paris-CDG / 2014

Electronic stripping in the control tower at Saint-Pierre-et-Miquelon / 2014



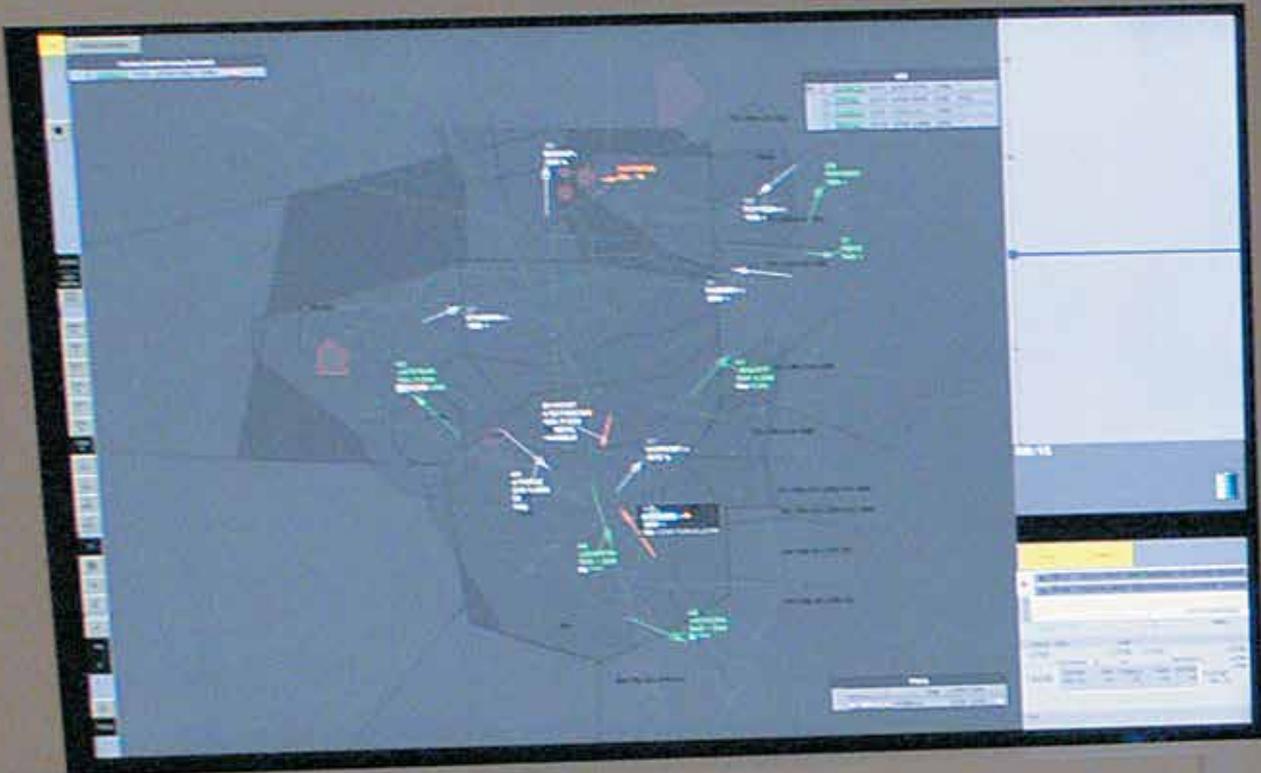
Approach safety nets: equipped airports on 31 December 2014

- **STCA (Short Term Conflict Alert):** this tool is used to inform the controller of dangerous airproxes in flight.
- **MSAW (Minimum Safe Altitude Warning):** this tool is used to inform controllers of abnormal proximity between an aircraft and the ground.
- **APW (Area Proximity Warning):** this tool is used to inform controllers of proximity that an aircraft is getting closer towards a restricted airspace. In 2014, this system came into service at Pau and Pointe-à-Pitre (French West Indies SNA).

	STCA	MSAW	APW
Paris-CDG	X	X	X
Paris-Orly	X	X	X
Nice	X	X	X
Lyon	X	X	X
Toulouse	X	X	X
Marseille	X	X	
Bordeaux	X	X	X
Bâle-Mulhouse	X	X	X
Nantes		X	X
Strasbourg	X	X	X
Montpellier		X	X
Pointe-à-Pitre	X	X	X
Fort-de-France	X	X	X
Lille		X	X
Clermont-Ferrand		X	X
Pau		X	X
Bastia			X
Biarritz		X	X

Propriétés de l'ordinateur			
Processeur	Intel Core 2 Duo	OS	Windows XP
Mémoire	2 Go	Disque dur	500 Go
Carte graphique	NVIDIA GeForce 8800	Carte son	Realtek High Definition Audio
Carte réseau	Realtek RTL8101	Modem	None

Elèves 4 — PC 80



The smaller monitor shows a table with several columns and rows of data. The text is somewhat blurry but appears to be a list or a data table. The table has a light blue header and alternating row colors. The columns likely represent different categories or attributes of the data being presented.

A small printed document, possibly a receipt, with a table. The table has several columns and rows, with some cells containing text and others containing small images or icons. The document is partially visible on the right side of the desk.



08



STUDIES AND DEVELOPMENT

.....

DSNA is demonstrating all the skills and know-how of its personnel by investing in innovative technical projects in close cooperation with the European SESAR programme.



PREPARING THE FUTURE OF THE AIR TRAFFIC MANAGEMENT SYSTEM

DSNA staff at the 4-Flight forum in October 2014



→ The future air traffic management system

Coflight

Coflight will be the core of DSNA's future air traffic management system. Jointly developed by DSNA, ENAV and the Franco-Italian industrial consortium Thales ATM/Selex ES, this new **advanced flight data processing system** will allow controllers to optimise flightpaths, thereby cutting flight times and fuel

consumption. Flight data will be shared and updated in real time between all the workstations involved, in all the units.

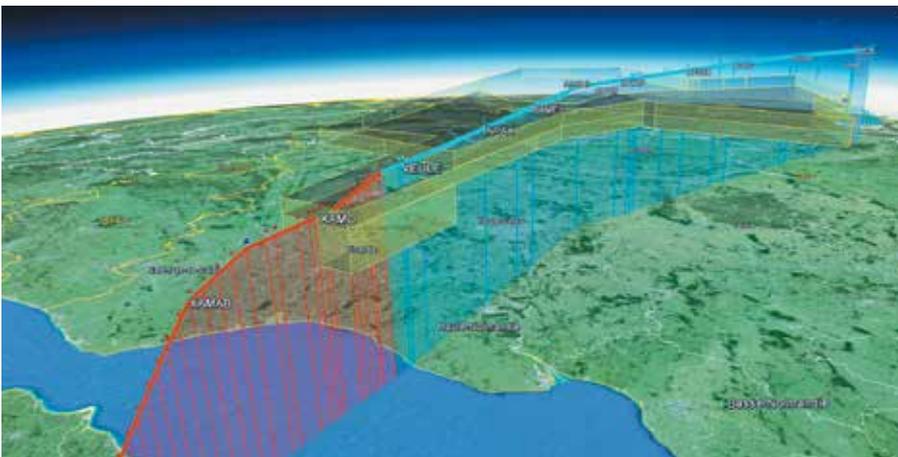
DSNA is also collaborating with ENAV in the management of the "Coflight as a Service" programme. By the end of 2015, the way in which the Coflight system can deliver a service to remotely calculate flight plans will be defined. The first two customers are skyguide and MATS (Malta). The benefits for the customers

are that they will no longer have to invest in and maintain complex technical systems, while the global advantage for the partners is that the development costs can be shared between several operators.

The ERATO electronic environment

In the night between 19 and 20 March 2014, the controllers at Brest ACC successfully tested the ERATO environment on the entire upper airspace in "Shadow Active Mode", which corresponds to the operational use of the system on real traffic. Bordeaux ACC successfully completed operational assessments on adjacent and superimposed sectors for several days.

This new electronic environment, with new control aids, is scheduled to come into active service at the West ACC at the end of 2015, and at the South-West ACC at the start of 2016. More than 600 air traffic controllers have been following training on simulators since September 2014. Each controller will follow 10 days of training before the deployment. The technical departments have started the validation and other works associated with the deployment of the system.



4D representation of a flightpath with Coflight / 2014



The pilot en-route centres in Reims and Aix-en-Provence preparing for the deployment of 4-Flight / 2014

This new DSNA-designed system will offer innovative user interface functionality for air traffic controllers and tools to detect conflicts and to improve cooperation between controllers. ERATO, which Italy has already purchased, will be gradually integrated in the 4-Flight system.

The en-route 4-Flight system

4-Flight is the future air traffic management system for DSNA's en-route centres. It will be one of the most efficient systems in Europe.

The "Build Inter" constitutes a major milestone in the 4-Flight programme. This first version of the advanced system is being used to conduct technical and operational assessments in the two pilot centres in Reims and Aix-en-Provence. It contains most of the important functionality of the 4-Flight system: Coflight, configuration, simulator, user interface, control aids, supervision, enhanced surveillance, Data-Link, etc. In 2014, the specifications of the "Build Inter" were validated in numerous experiments and workshops that involved many controllers and technical staffers from the control centres.

The technical "Build Inter" was shipped to the centres in autumn 2014. The control "Build Inter" will be delivered in 2015. It will be tested in "passive shadow mode" with real data. The results will be incorporated in the first operational version (V-Ops) of 4-Flight, which is due at the end of 2018, following the launch of the development contract in November 2014.

A new working organisation, which brings DSNA and Thales closer together, was set up in order to better integrate the development processes and to gain closer control of costs and deadlines. This initiative will also help to build trustful relations between the different players.

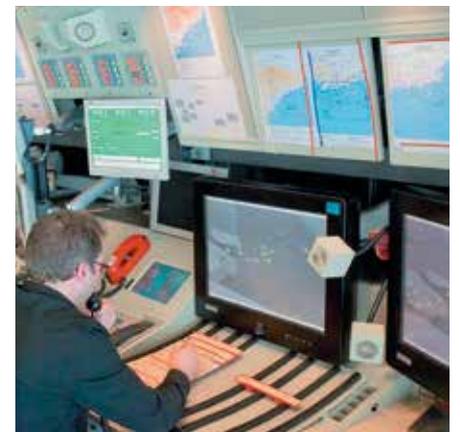
In a project that is partly financed by European funds, DSNA and COOPANS, Alliance, made up of several European air navigation service providers, are looking into how the 4-Flight system and the COOPANS ATM system, which was also developed by Thales, could converge by 2020-2025, in order to share the costs of acquisition and maintenance. This convergence demands the establishment of common procedures and decisions at every stage of the systems' lifetimes, from the specifications, to implementation, operations and maintenance.

The SYSAT "Approaches and Towers System"

Forming a close fit with the 4-Flight programme, SYSAT aims to modernise the air traffic management system of the control towers and approaches in mainland France operated by DSNA by acquiring an existing industrial system and adapting it to DSNA's technical environment. Around 25 approaches, including the Paris region, and 70 towers will be equipped with SYSAT by 2020.

Further to the demonstrations and assessments of four systems on the sites in Lille, Rennes, Lyon and Nice in the spring of 2014, and visits of other European air navigation operators equipped with the very latest systems, DSNA is now fully aware of the state of the art. Programme management is supported by an integrated programme team. This team is made up of around 10 people possessing expert knowledge in the various activities of the Operations Directorate (DO) and the Technical and Innovation Directorate (DTI) in the field of Approaches and Towers.

The call for tenders for the supply, deployment and maintenance of the SYSAT system was issued in December 2014. The contract is made up of two packages: one for the Paris region, requiring an operational start-up between the end of 2017 and the end of 2019, and one for all the other control towers and approaches.



Nice-Côte d'Azur / 2012. The controller's approach tools will be modernised by SYSAT



CMCC workstation in Paris ACC with the civil control sectors / 2014

Apron controller at Paris-CDG testing new remote viewing technologies / 2014

More effective real-time civil-military coordination

In 2014, Paris ACC tested a type 2 military coordination and control centre (CMCC) based on military sectors that are coherent with the civil sectors and that uses the feedback gained at Reims ACC. The introduction into operational service is scheduled for 2015.

The ramp-up of this new civil-military coordination system, which already exists in five en-route centres in order to meet the European demands for direct communications between civil and military controllers, significantly increases flight safety, in comparison with separate control by military detection and control centres (CDC) ❶.

→ **Other major technical projects**

Remote Apron at Paris-CDG

From 3 to 18 December 2014, Apron controllers based at the southern tower at Paris-CDG used latest-generation video cameras to remotely view the movements of 180 aircraft taxiing everyday on Terminal 2G's Apron on a wall of three combined panoramic screens. The trial took place in "shadow" mode, in which the Apron controller followed the instructions given by a colleague in the eastern tower on

real traffic. He was also able to test the system under poor weather conditions, thanks to the thermal cameras in the form of rejects.

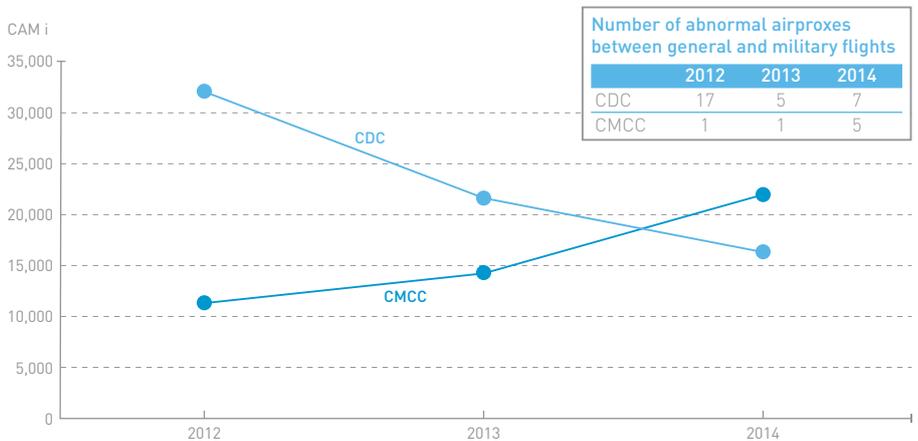
This project, called the "Remote Apron CDG" is a premier in Europe, in terms of size and the technologies used. The trial will allow the benefits of this type of tool in terms of safety to be assessed: viewing blind spots, measures that help to reduce risks for safety analyses, calling on assistance and surveillance personnel when an aircraft arrives in a zone under camera detection.

Satellite navigation

As a member of a consortium led by Airbus Prosky, DSNA was selected to deploy the advanced Performance-Based Navigation (PBN) procedures that will improve accessibility, for equipped airlines, to runways that do not currently have effective means of guidance due to the presence of obstacles, such as Nice.

The agreement with ESSP SAS, in which DSNA is a shareholder, to operate the European satellite navigation system EGNOS in civil aviation and on other markets was extended for 8 more years. DSNA is supporting the projects to deploy EGNOS on export markets, and in particular in the ASECNA zone, Australia and North Korea.

❶ **Ramp-up of the CMCCs: controlled military IFR flights (CAM i)**





GLOSSARY

A

- **ACC**
Area control centre
- **A-CDM**
Airport Collaborative Decision Making
- **ACNUSA**
National Airport Noise Control Authority
- **AIP**
Aeronautical Information Publication
- **ASECNA**
Agency for Air Navigation Safety in Africa and Madagascar
- **A-SMGCS**
Advanced-Surface Movement Guidance and Control System
- **ATCO**
Air Traffic Control Officer
- **ATFCM**
Air Traffic Flow and Capacity Management
- **ATM**
Air Traffic Management
- **ATSEP**
Air Traffic Safety Electronics Personnel

B

- **BACEA**
Budget for air control and operations

C

- **CAG**
General air traffic
- **CAM**
Military air traffic
- **CMCC**
Military Coordination and Control Centre
- **CNS**
Communication, Navigation, Surveillance
- **CDO**
Continuous descent operations
- **COOPANS**
An alliance of five European air navigation service providers (Austria, Croatia, Ireland, Sweden and Denmark)

D

- **DO**
Operations directorate of DSNA
- **DSAC**
French National Supervisory Authority
- **DSNA**
French Air Navigation Service Provider
- **DTA**
National Regulatory and Economic Supervisory Authority
- **DTI**
Technical and innovation directorate of DSNA

E

- **EASA**
European Aviation Safety Agency
- **ECCAIRS**
European Coordination Centre for Accident and Incident Reporting System
- **EGNOS**
European Geostationary Navigation Overlay System
- **ENAC**
French Civil Aviation Academy
- **ENAV**
Italian air navigation service provider
- **ERATO**
En-Route Air Traffic Organizer
- **ESSP**
European Satellite Services Provider

F

- **FABEC**
Functional Airspace Block Europe Central
- **FIR**
Flight Information Region
- **FL**
Flight Level
- **FNAM**
French national merchant aviation federation

I

- **ICAO**
International Civil Aviation Organisation
- **IFR**
Instrument Flight Rules
- **ILS**
Instrument Landing System

L

- **LPV**
Localizer Precision with Vertical guidance

M

- **MATS**
Maltese air navigation service provider

N

- **NATO**
North Atlantic Treaty Alliance

R

- **RAT**
Risk Analysis Tool
- **RENAR-IP**
Internet protocol air navigation network
- **RP 2**
Reference Period 2015-2019
- **RSTCA**
Air traffic terminal zone charges

S

- **SESAR**
Single European Sky ATM Research
- **SESAR JU**
SESAR Joint Undertaking
- **SIA**
Aeronautical information services department
- **SKYGUIDE**
Swiss air navigation service provider
- **SMS**
Safety Management System
- **SNA**
Regional structure in charge of aerodrome and approach control

T

- **TSEEAC**
Aerodrome controllers and operations personnel

U

- **UAF**
Association of French Airports

V

- **VFR**
Visual Flight Rules

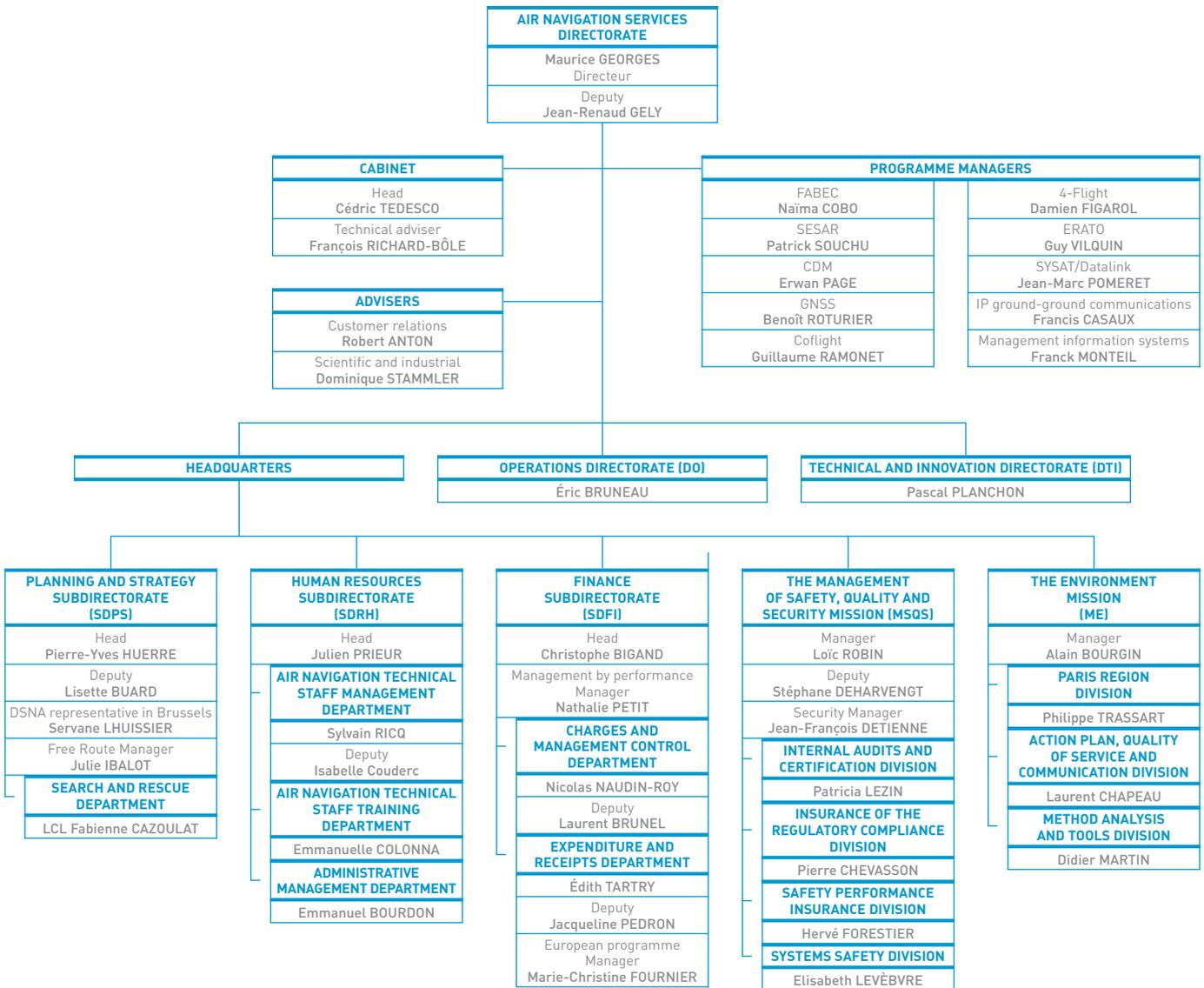


Swiss radar at La Dôle in the Jura region of France that is used in particular to cover the lower airspace around Chambéry airport / 2014



Air Navigation Services Directorate (DSNA)

Organisation chart on 1 May 2015



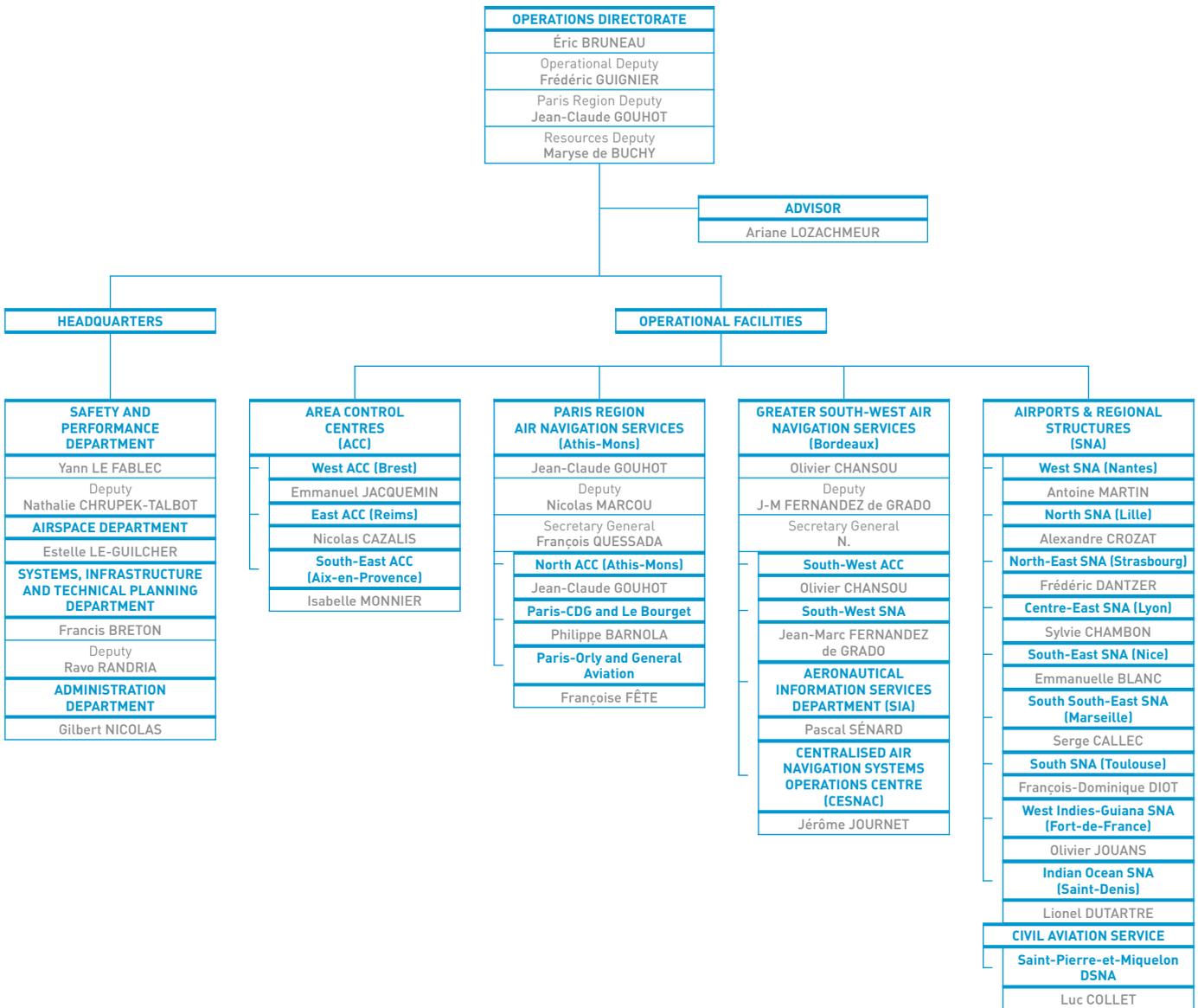
AIR NAVIGATION SERVICES DIRECTORATE
50, rue Henry Farman
75720 Paris Cedex 15

SDRH is located at the Athis-Mons site



Operations Directorate (DO)

Organisation chart on 1 May 2015

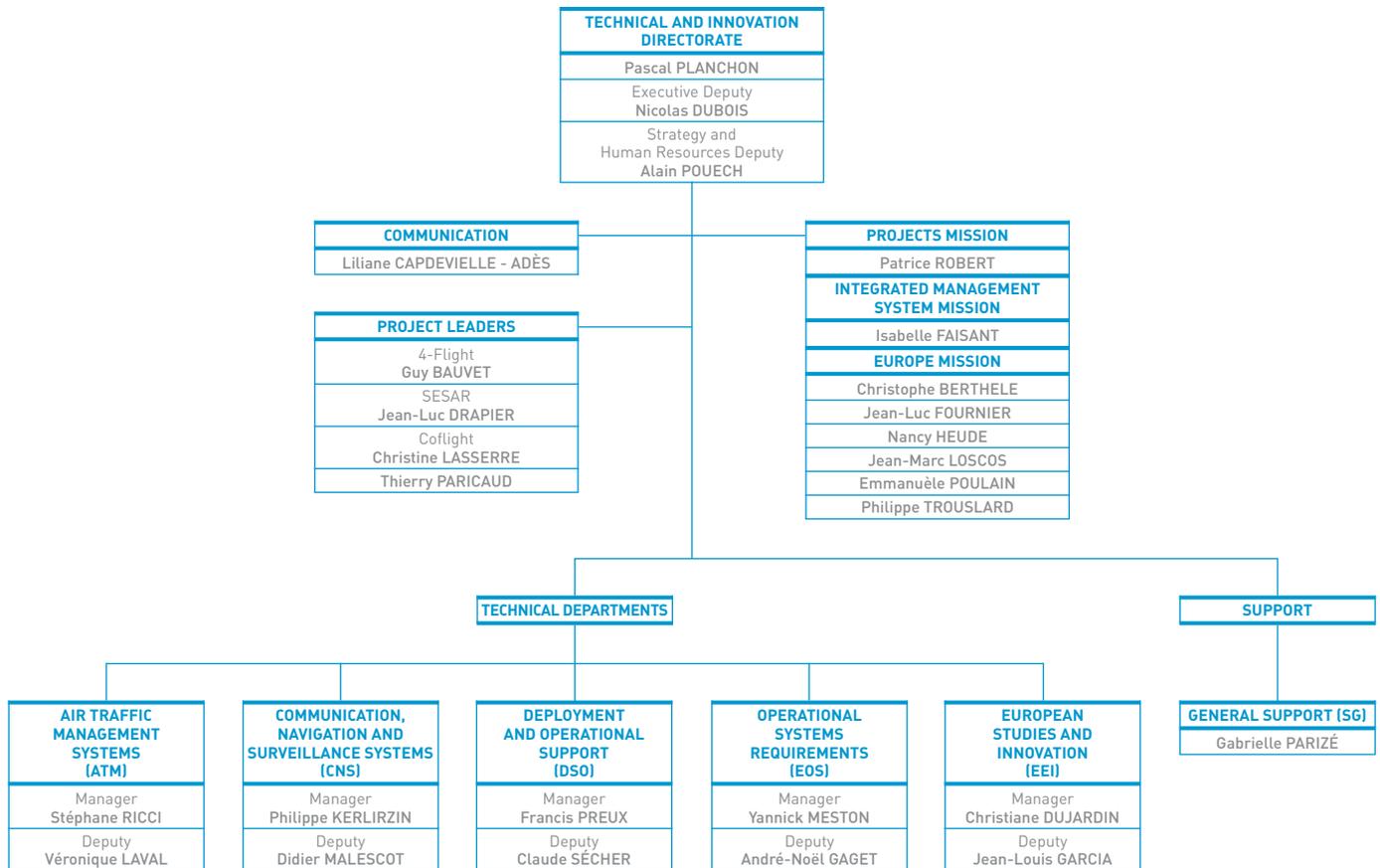


OPERATIONS DIRECTORATE
BP 600
91205 Athis-Mons Cedex, France



Technical and Innovation Directorate (DTI)

Organisation chart on 1 May 2015



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