MINISTÈRE
DES TRANSPORTS
Liberté
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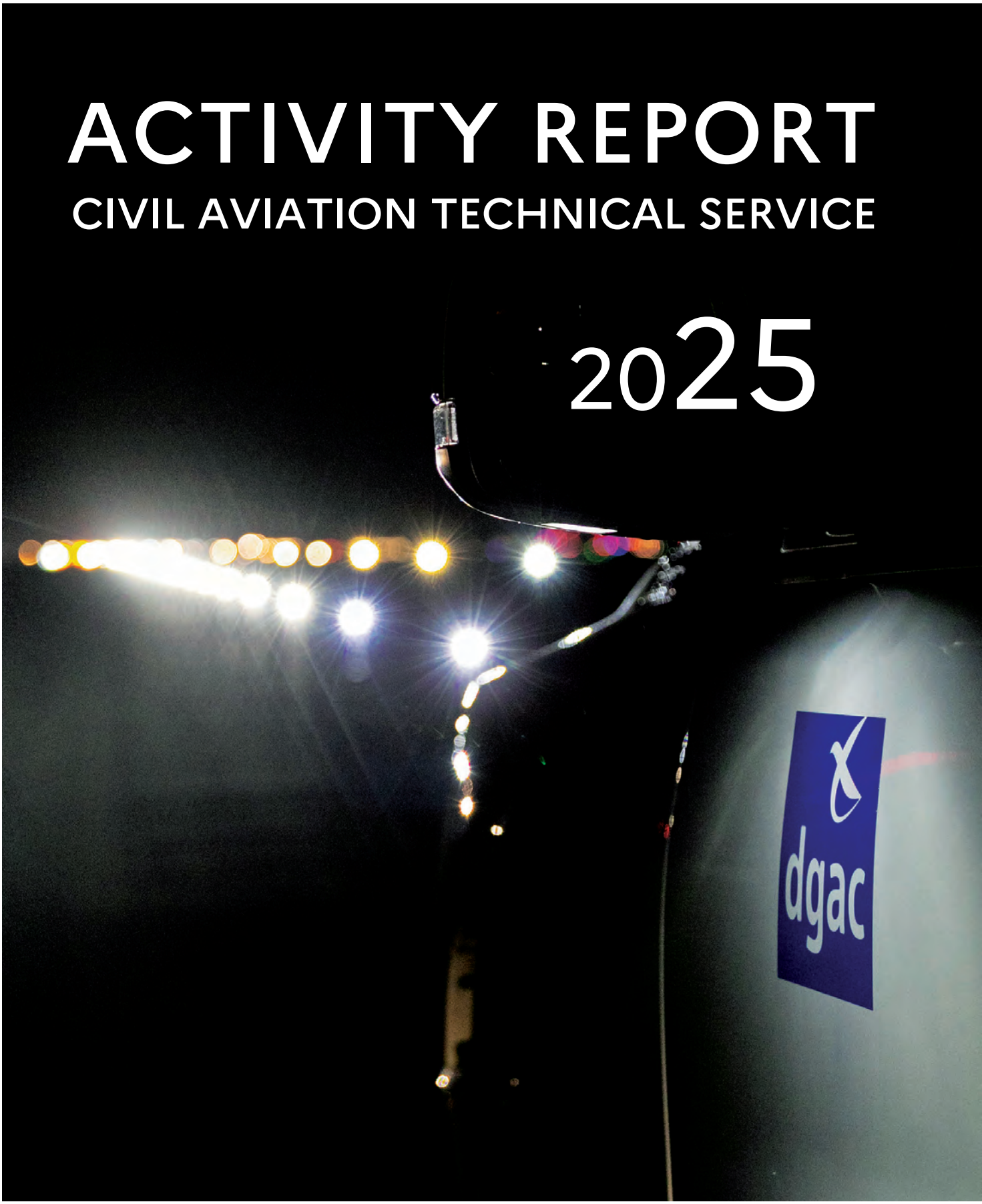
Fraternité

dgac direction générale de l'Aviation civile

ACTIVITY REPORT

CIVIL AVIATION TECHNICAL SERVICE

2025



SUMMARY

Editorial

by Gervais **GAUDIÈRE**, director of **STAC**

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The 2025 STAC Technical Days were a great success both in terms of the relevance and quality of the topics covered and the organisation and welcome provided. My congratulations go to all STAC teams who invested so much time and energy over several months to make this event a meeting that lived up to the expectations of our many partners.

Despite the budgetary uncertainty at the start of the year, linked to the absence of a Finance Act at the beginning of the fiscal year, STAC's activity was maintained across all its fields of responsibility in 2025. International work particularly within ADOP and CAEP therefore continued, helping to prepare for tomorrow's regulatory and standardisation developments. The re-election of STAC's Scientific Adviser for a third and final term as President of the EUROCAE standardisation organisation also reflects the strong international engagement of STAC. In addition, the first certification activities for Air Traffic Management (ATM) systems were launched for EASA, in partnership with the DSAC. STAC also delivered a very large number of training courses.

STAC must be able to demonstrate the robustness of its work to its clients and partners. In this context, STAC's ISO 9001 certification was renewed in May 2025 for a further three-year period. COFRAC ISO 17043 accreditation covering our capability to conduct inter-laboratory comparisons was also renewed this year, confirming the accuracy of the procedures implemented within STAC.

In 2025, STAC decided to equip itself with a trusted and secure Artificial Intelligence solution to support the analysis of highly complex technical issues subject to a high level of confidentiality. This tool, a DGAC first, was successfully deployed for initial trials thanks to the major contribution of the IT teams from SIR GP and DNUM.

Lastly, the Director General has asked that, during 2026, options be assessed for a potential consolidation of the STAC teams currently based in Bonneuil-sur-Marne with the teams in Toulouse. The aim of this review is to propose a solution to the persistent recruitment difficulties experienced for several years at the Paris-region site. A move to Toulouse would be a major multi-year project intended to secure the long-term future of the service.

These few highlights reveal only a small part of the breadth of STAC's work in 2025 whether in safety, security, environment or cybersecurity. I invite you to explore this diversity of expertise and projects throughout the pages of this activity report.

Should you enjoy reading it!

KEYS FACTS

Mission Saint-Pierre-et-Miquelon

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Miquelon Airport (CT of Saint Pierre and Miquelon) is located south of the village of Miquelon, near the Grand Étang de Miquelon. It has a 1,000-meter-long paved runway and its highest point is at an altitude of approximately 3 meters. It is at risk of rising water levels due to global warming. A project to relocate the village of Miquelon to higher ground, east of the runway, is planned in the medium term and has already begun.

At the request of the DGAC, the STAC carried out an on-site mission in early May 2025 to assess the situation at the aerodrome and make recommendations to address this flood risk.

The only destination offered by the airport is the route to Saint-Pierre, operated by Air Saint Pierre. The journey to Saint-Pierre in a CESSNA F408 takes 15 minutes, compared to 1 hour 30 minutes by ferry. However, the future of this route is uncertain in the short to medium term.

At the end of the visit, the STAC submitted its assessment and recommended that two studies be launched quickly:

◎ A study concerning the choice of the most appropriate air link in the short, medium, and long term (needs analysis, costs) to meet the community's needs (mobility, EVASAN, civil security, etc.).

◎ An in-depth study to determine the actual condition of the runway and the options available for the coming years (e.g., maintaining the current runway with protection, replacing the runway at the current site with a helipad/heliport, rebuilding a suitable infrastructure in a location that is better protected from rising water levels, etc.).

Technical analysis of the cayenne airport tender procedure

The year 2025 represented a key milestone in the procurement process for the renewal of the operating concession of Cayenne Félix Eboué Airport, following a competitive tender procedure initiated in 2022.

The 30-year concession was awarded to the Société Concessionnaire de l'Aéroport de Cayenne (SCAC) after a two phase technical and financial assessment of the proposals submitted by four competing bidders.

Upstream of the tender, the STAC, through the ATMOCA mission, carried out a comprehensive technical audit of the existing airport infrastructure and systems. It defined the performance requirements, compliance criteria, and technical specifications to be included in the tender documentation.

STAC subsequently performed the detailed technical evaluation of the bids, contributed to the negotiation rounds, and supported the contractual alignment and finalization phase.

Following contract award, the Initial Works Control Authority (ACTI), under ATMOCA's supervision, will be responsible during the first 42 months of the concession for monitoring and validating the concessionaire's implementation of the prescribed development works. This oversight aims to ensure continuity of airport operations, compliance with safety and performance obligations, and progressive enhancement of the service quality delivered to users.

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RESOURCES

Staff

WORKFORCE AT 31 DECEMBER 2025	
TECHNICAL STAFF	
ICNA	1
IPEF	2
IEEAC	24
ITPE	23
IESSA	5
TSEEAC	31
TSDD	12
Contract agents and RIN	15
TOTAL TECHNICAL STAFF	113

ADMINISTRATIVE STAFF	
ADAAC	6
ASAAC	6
ATTAE	3
TOTAL ADMINISTRATIVE STAFF	15

BLUE-COLLAR STAFF	
AC workers	11
GENERAL TOTAL	139

ORGANISATION CHART
May 2026

ORG/STAC/DIR/NAME CHART VERSION 01

DIRECTION

Director : Gervais GAUDIÈRE

CHIEF OF STAFF	Dimitri CANO
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INNOVATION MISSION MANAGER	Julie SAINT-LOT
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INFORMATION SYSTEMS SECURITY OFFICER	Laurent FELGINES

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Project Assistance and Information Management Division
Laurent FELGINES

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Aerodrome Safety Division
Lionel MAZZELLA

ATM-ANS Safety
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Aeronautical Easement Plans Activity
Mauro BORTOLOTTO

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Safety - Skid Resistance Division
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Measuring Equipment and Innovation Officer
Gabrielle LEHUREAU

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- Auscultation
- Lift/IS

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Deputy Director: Francis BRANGIER

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Francis BRANGIER

SCIENTIFIC AND INTERNATIONAL ADVISOR DELEGATE COORDINATOR OF THE TRANSPORT INNOVATION AGENCY

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Social dialogue & training

Social dialogue

In 2025, with the support of the Administration, Information Systems, and Dissemination Department, STAC convened its Social Administration Committee (CSA) three times in plenary session, as well as once in its specialized session (FS) dedicated to health, safety, and working conditions.

On **April 3**, the CSA examined the simplified local social report for 2024, the training plan for 2024-2025, the financial situation, the possibility of relocating STAC Bonneuil to Toulouse, and the arrival of a new prevention assistant.

On **July 8**, it continued discussions on this possible relocation and put the closure of the naval aviation unit to a vote.

On **October 16**, the FS presented the health and safety records, the work carried out or planned, and an update on the AST conducted in Biscarrosse.

Training courses attended by STAC staff

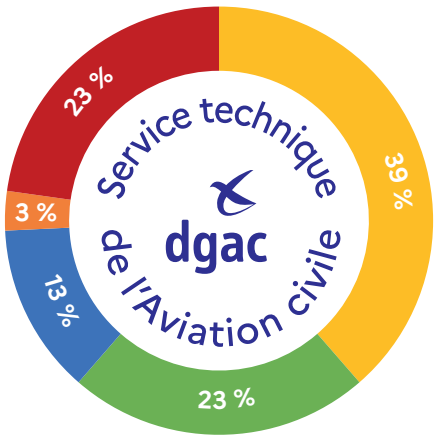
As part of its efforts to enhance the skills of its teams and meet the specific requirements of its business lines, STAC implements a structured technical training plan each year. This programme is one of the key drivers of the department's skills development policy. It ensures that all staff have access to professional training aligned with their development plans and operational needs in terms of business expertise.

In 2025, the Administration and Skills Capitalisation Division signed **23 training agreements** with training organisations recognised for their expertise.

A total of 75 employees benefited from these specialised training courses, representing an investment **of €80,000** for the 2025 financial year.

Breakdown of technical training by department:

- SE: Safety and Equipment Department
- SA: Structure and Adhesion Department
- ESSOP: Environment, Systems and Operations Safety, Planning Department
- ASID: Administration, Information Systems, Dissemination Department
- AN: Naval Aviation Unit



Training provided

Training courses on environmental issues

In 2025, the Environment Division conducted several training courses for ENAC. Specialists taught the environment module of the "Airport Techniques Induction" training course, covering topics such as air quality, noise pollution, de-icing products, wildlife hazard and biodiversity.

Other sessions focused on noise for ENAC and Air Force engineering students, with lessons on the basics of acoustics and modeling methods. STAC agents also serve as trainers for the DGAC modeling network.

Regarding wildlife risk management, RISKAN and ADR ORNI training courses were offered to civil airport and air base personnel. In 2025, they were organized for the first time on the ENAC campus in Toulouse and at the Toulouse Natural History Museum. Agents from the wildlife hazard and biodiversity management subdivision also provide training modules for professionals, air traffic controllers, IENAC students, and students in specialized master's programs.

Training courses delivered in the field of safety

The Safety, Performance and Planning division continued one of its main missions by disseminating expert knowledge in its area of responsibility, namely safety, but also airport planning and capacity.

This is done through teaching provided in various training organisations and universities, foremost among which ENAC.

The audience is very broad:

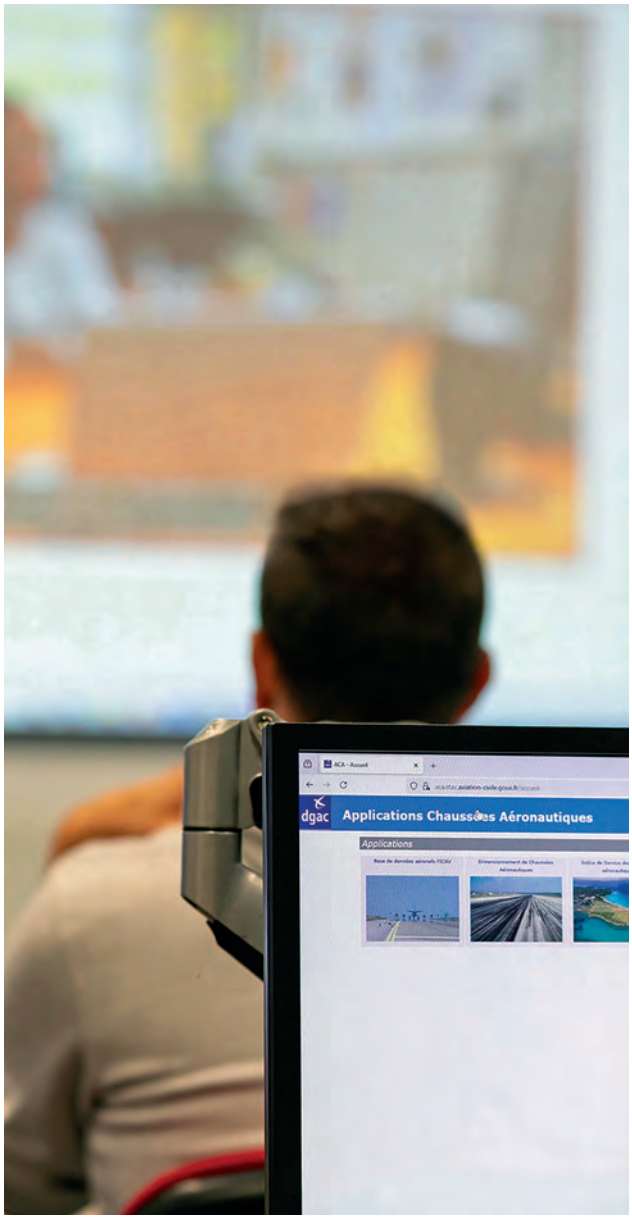
◎ Student engineers or technicians, specialised master's students, air traffic controllers and professionals.

The topics covered include aerodrome safety, infrastructure planning, heliports, the development of aeronautical safeguarding plans as well as the assessment of airport capacity, both for terminal buildings and runway infrastructures

Provided training on airfield pavement

In line with previous years, the Airfield Pavement department provided courses in the frame of the ENTPE and ENAC Ministry engineering schools initial training, but also in the frame of continuing education training sessions, on behalf of ENAC and the French Ministry of Armed Forces.

In 2025 the continuing education training offer around airfield pavements topic proposed by ENAC has been increased. Indeed, a new session, relative to pavement management using distress survey and calculation of a dedicated pavement condition index called “Indice de Service” was set up and held for the first time. Considering the very positive feedback from ENAC and attendees, this training session will be renewed in the coming years.



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Security training delivered

At the core of STAC's mission, technical knowledge transfer is a key performance driver. This year, our experts shared their expertise through the SURET and SURSIMSEQU modules.

Blending regulatory theory with operational reality, these sessions focused on the fundamentals:

◎ Equipment certification and operational concepts, image quality analysis, and performance maintenance checks (CMP).

Open to DGAC staff and airport operators alike, this training initiative guarantees collective upskilling, essential to the robustness of aviation security.

Training courses offered in the areas of the equipment division

In 2025, the STAC "Energy and Lighting Aids" subdivision continued its training activities in the fields of design and maintenance of aeronautical ground lighting systems and their electrical power supplies. These activities target both institutional stakeholders and aerodrome operators, in France and internationally.

Over the year, seven training sessions were delivered. Three sessions were organized on behalf of the Ministry of the Armed Forces to address specific needs related to military aerodrome infrastructure. The STAC also contributed to the initial training program for DSAC surveillance inspectors through a dedicated session, complemented by an "EB auditor" refresher course for inspectors already in post. In addition, two sessions were provided for maintenance personnel from French aerodrome operators.

The training approach of the "Energy and Lighting Aids" subdivision places strong emphasis on practical learning. Whenever possible, training courses include hands-on exercises carried out either at the STAC VISU laboratory in Toulouse or directly on operational aeronautical ground lighting installations. This operational immersion enables trainees to acquire concrete, immediately applicable skills, in line with regulatory requirements and field realities.

Lastly, STAC expertise was also deployed internationally through the organisation of two training courses in Casablanca:

◎ One, delivered by the "Energy and Lighting Aids" subdivision, focused on aeronautical ground lighting for maintenance personnel of the Moroccan airport operator; the other, delivered by the LIA subdivision, was dedicated to aircraft firefighting training for SSLIA personnel.

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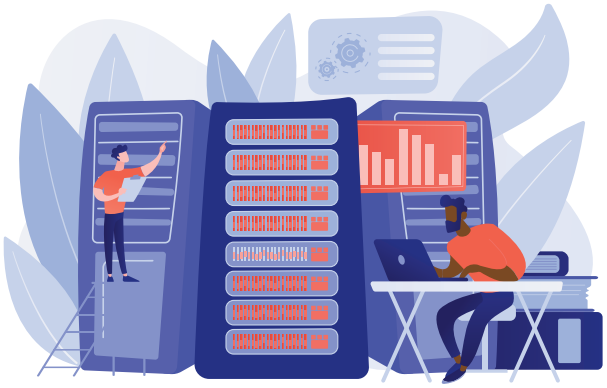
Developments IT

More accessible applications

In 2025, our company strengthened its commitment to digital accessibility by conducting RGAA audits of the PIAF and NoiseDB applications. These assessments made it possible to identify non compliance issues, target priority improvements, and support the teams in implementing the necessary corrections. This approach reinforces our determination to integrate accessibility sustainably at the heart of our projects and to guarantee truly inclusive services for all our users.



Preparing the Transition to 4You

The STAC took part in the HRA 4you project, led by the DGAC's HR IT Mission, which aims to replace the Gestor time management system, now outdated and difficult to maintain. Initially scheduled for deployment in 2025, the STAC chose to wait for the new product to be fully stabilised before adopting it.

Specific work was also carried out to ensure the unification of the access badge and the time tracking badge, thereby improving coherence and ease of use.

New communication tools

The STAC has upgraded its internal communication tool, STAC TV. The new version offers a more user friendly layout and a wider range of content, now including practical information for staff. A satisfaction and improvement survey was launched to help optimise this system.

The new platform was deployed by the IT unit of SIR GP Informatique, which also defined the structure of the information modules in this modernised version.

Finance

DTA - BOP 614-1	k€
Environmental and security studies	241
Heritage - aeronautical pavements	680
Airport access control management system and various security	4
Laboratory for the detection of liquid and homemade explosives	445
How the service works	1 082
AIT	36
TOTAL	2 489

DSAC - BOP 614-2	
Safety and environmental studies	70
Aeronautical pavements	131
Beacon and SSLIA Test Centers	174
How security testing centres operate	641
Quality - Metrology	51
TOTAL	1 068

DCSID - BUDGET MILITAIRE BOP 212	
Maintenance of BAN/Auscultation/PEB stop strands	783
Logistics	53
TOTAL	836

DTA - CIVIL BUDGET P203 - Nantes Atlantique	
Technical Assistance to Project Management for Airport Concessions	1 358
RECETTES	
Certification and surveillance fees	748
ADP (product allocation)	205
TOTAL	953

Works

Renovation of perimeter protection

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The renovation work on the perimeter fence of the Bonneuil sur Marne site, carried out by the company Saniez and overseen by the SNIA, has made it possible to address all identified vulnerability points.

This intervention significantly strengthens the site's external protection and is fully aligned with the overall programme to enhance the safety level of our facilities

RESEARCH, INNOVATION & PARTNERSHIPS

Support for innovation

AIT activities

Since 2021, the Transport Innovation Agency (AIT) has established itself as a unifying force within the transport and mobility ecosystem. It addresses challenges such as decarbonisation, digital transition, service quality, territorial cohesion and resilience. By bringing together the DGITM, DGAC and DGAMPA, the AIT identifies innovations, supports projects, facilitates experimentation and then scaling up, and ensures their visibility at specialised events. In particular, it co-organised the Meet'Up Greentech Innovation, which brought together nearly 3,000 participants at Station F.

In 2025, the AIT continued to support the winners of the fourth Propulse edition and to run the alumni network. The fifth edition, launched in July 2025, introduced the theme of Service Quality, in addition to Sustainable Transport and Inter-multimodality. It attracted a record number of applications (≈100 files). The selection took place in December 2025 and support for the 21 winners will begin in March 2026 for a period of nine months.

The examination of applications, support and selection involve experts from the directorates general, including many DGAC agents.

Agence de l'Innovation pour les Transports

To complement Propulse and support innovation in the territories, the Minister of Transport has entrusted the AIT, together with the RETIS network, with "Propulse Detection", which is designed to identify and assist projects in the early stages. An initial panel of 10 projects will be tested in 2026.

At the end of 2025, the AIT launched an evaluation of Propulse and signed a research partnership with the "Bauhaus des Transitions" of the École des Mines to develop a Research & Innovation roadmap design approach.

Internally at the DGAC, the AIT's work is coordinated by a bi-monthly operational committee comprising representatives from all DGAC departments.

In just a few years, the AIT has demonstrated its ability to mobilise the ecosystem, accelerate projects and make an impact despite limited resources.

PROPULSE

PROPULSE DETECTION

Standardization

EUROCAE: Reelection to the Presidency, Standardisation, and European Challenges

In April 2025, the Scientific and International Adviser of the STAC was re-elected for a third year as President of EUROCAE.

EUROCAE is the European leader in creating and disseminating globally recognised industrial standards for aviation. Founded in Lucerne in 1963 under the name "European Organization for Civil Aviation Equipment", EUROCAE quickly established itself in the Paris region.

Over its 60 years of existence, EUROCAE has become a major actor in the European aeronautical landscape, with 5,000 experts belonging to nearly 500 member organisations, including manufacturers, service providers, regulators, research institutes, and international organisations. Nearly 20% of the members are organisations based in France, and almost 70% are located in the ECAC region. More than 50 working groups are currently active in defining new standards. EUROCAE is recognised by major European civil aviation institutions (EASA, EUROCONTROL, SESAR JU,...) and by ICAO, which are also members.

EUROCAE is involved in all current topics and challenges facing the aeronautical industry. It thus plays an important role in implementing public policies related to aviation. To this end, it has developed a broad network of partners, particularly among other standardisation bodies (CEN, ISO, SAE, RTCA, ASTM...).

Most EUROCAE standards are directly recognised by EASA as means of compliance with EASA regulations, and more than 100 are referenced by ICAO. Faced with an American industry supported by many standardisation bodies and the rapid rise of Chinese competition, EUROCAE plays a major role in defending European and French economic interests.

The presidency of the EUROCAE Council makes it possible to steer EUROCAE's strategy and to take an active part in managing major issues for the building of the Single European Sky, such as sustainable air transport, the digitalisation of the Single European Sky, a new certification framework for ATM/ANS ground equipment, service-oriented architectures for ATM, new aerial mobilities, radio spectrum, and many others.

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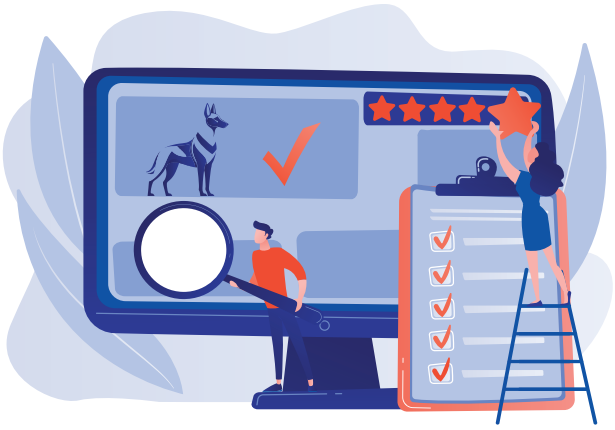
Agreements & partnerships

International Partnership in explosive detection dog team certification and technics



Since 2024, the Irish authorities have initiated a process aimed at implementing a national certification methodology for explosive detection dogs in airport environments. In this context, they have sought STAC's expertise to support them in the development of this framework.

During the summer of 2025, the Irish authorities proposed that the certification of their canine teams could be carried out within the LCEP facilities, while remaining under Ireland's responsibility. CDE's laboratory acts solely as a technical support, providing access to facilities and operational expertise, handling explosive materials.

In October 2025, three of the nine total teams were evaluated for certification. Although the preparatory work was considered promising, an incomplete understanding of the operational requirements led to difficulties during the tests, resulting in an unsuccessful outcome. Nevertheless, this initial experience enabled the handlers to become familiar with the examination conditions and to identify areas for improvement, with a view to a future certification attempt under optimized conditions.

Cooperation has also been initiated with the Portuguese authorities to conduct exercises under real conditions, focusing on various types of threats. This approach aims to enable the STAC to assess and validate the quality of certain canine training aids, with the objective of offering reliable, tested training solutions that meet operational detection requirements. In this context, the Canine Training Center of the 17th Artillery Regiment in Biscarrosse contributes by providing three handler-dog teams, mobilized to carry out these tests and the operational evaluation of the training systems concerned.

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Signing of a research partnership agreement with AIRBUS

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The French Civil Aviation Technical Center (STAC) signed a research partnership agreement with AIRBUS, allowing the Airfield Pavements Department to access aerodynamic and braking data for different types of aircraft. These data make it possible to expand and consolidate a physical model aimed at translating friction measurements, obtained using a continuous friction measuring devices, into braking distances on dry or wet runways. The model is part of an ongoing thesis and prepares the development of a decision-support tool for airport operators.

The tool will ultimately translate descriptive data on runway surface conditions (texture, friction, weather contamination) into operational braking distances, thereby making friction-related issues and challenges more directly understandable by STAC's stakeholders.

Signing of a research partnership agreement with the Brazilian Civil Aviation Authority

The STAC has concluded a research partnership agreement with ANAC, the Brazilian civil aviation authority. This partnership is of strategic interest due to ANAC's participation in international working groups to which the STAC contributes. It facilitates technical and regulatory discussions and provides support in Latin America for defending shared positions within national and international organizations and promoting research activities.

The partnership is structured around two main work themes:

◎ Improving diagnostic practices for surface properties of airfield pavements, particularly macrotexture, and considering national regulatory specificities; and improving methods for the design and structural monitoring of airfield pavements. In addition to pooling research efforts, this agreement facilitates the hosting of students on work placements, helping to recognise their international mobility and enrich their education, whilst promoting technical exchanges on cross-disciplinary topics.

The partnership also includes the Federal University of Ceará (UFC), on which ANAC relies for conducting its expertise in aeronautical and airport fields.

In addition to pooling research efforts, this agreement facilitates the hosting of student interns, contributing to the validation of their international mobility and the enrichment of their training, while promoting technical exchanges on cross-cutting themes. A STAC work-study student was thus able to complete his end-of-study project within UFC's infrastructure department in the summer of 2025.

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Quality Management

Renewal of the STAC's ISO 9001 Certification

On 16 June 2025, the French Standardization Association (AFNOR) confirmed, following a certification audit conducted in May, that the Quality Management System (QMS) implemented by the STAC across its three sites has been assessed and found to be compliant with the NF EN ISO 9001:2015 standard.

As the national reference body for standardization, serving approximately 69,000 clients in more than 100 countries, AFNOR is duly accredited to perform the regular surveillance of our QMS through June 2028, ensuring the maintenance of its conformity and the monitoring of its continual improvement.

Transition to the 2023 Version of the ISO/IEC 17043 Standard for L2E

On 2 December 2025, the French Accreditation Committee (COFRAC) confirmed, following a successful assessment, that the Proficiency Testing Body of the Essai Expertise Laboratory (L2E) in Bonneuil sur Marne had implemented the necessary provisions to transpose its interlaboratory comparison scheme for self wetting continuous friction measurement devices used on aeronautical pavements into the 2023 edition of the NF EN ISO/IEC 17043 standard. This standard specifies the competence requirements applicable to proficiency testing providers operating within conformity assessment activities.

ISO standards are subject to systematic review to ensure their continued relevance and alignment with sectoral developments. The NF EN ISO/IEC 17043 standard, in place since 2010, was revised in May 2023 to incorporate the new ISO high level structure, thereby harmonizing its requirements with those of NF EN ISO/IEC 17025—another accreditation standard applied by STAC—and to reinforce the integration of risk based approaches.

Prior to this transition, L2E personnel sought expert guidance from a recognized proficiency testing specialist to ensure the appropriate adaptation of their practices to the revised framework.

Ensuring the validity of the results of the Acoustic Measurements Laboratory

The Acoustic Measurements Laboratory (MACOUS) of the Civil Aviation Technical Service is accredited according to the ISO/IEC 17025:2017 standard. As such, it must implement activities designed to guarantee the validity of its results.

One method is to participate in Interlaboratory Comparisons (CIL), which enable it to:

◎ Verify the technical competence of the MACOUS laboratory,

◎ Compare the performance of laboratories,

◎ Detect any biases, drifts or methodological problems.

For the past 10 years, the MACOUS laboratory and the ADP Paris group's acoustic unit, accredited according to ISO/CEI 17025:2017, have been conducting interlaboratory comparisons every two years. At the end of each measurement campaign, a report is drawn up by one of the two laboratories. This document presents the acoustic measurement results of two participants in this CIL. An expanded overall uncertainty is calculated from that of the two laboratories in order to assess the conformity of the results.

This report, recognised by accreditation bodies, strengthens customer confidence, attests to the laboratories' competence and meets the requirement to guarantee the quality of test results.

Emerging areas

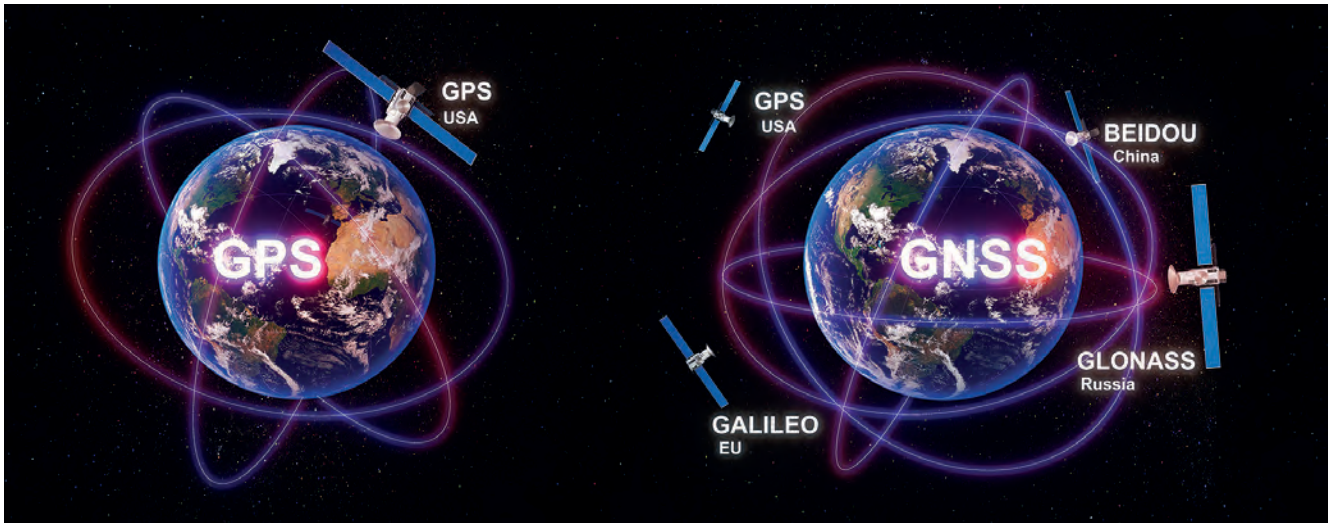
Cybersecurity

GNSS Interference: adapting operations and systems

Interference affecting Global Navigation Satellite Systems (GNSS), whether through jamming or spoofing, is increasingly impacting civil aviation operations. STAC contributes to several international initiatives aimed at characterizing this threat and supporting the adaptation of systems and operations.

GNSS systems (GPS, Galileo, GLONASS, BeiDou) have become essential for navigation and for the synchronization of aeronautical systems.

The weakness of signals received from space makes them vulnerable to intentional interference. Jamming consists of saturating the radiofrequency spectrum to prevent signal reception, while spoofing relies on the transmission of falsified signals intended to mislead receivers regarding their position or timing. Historically limited to military use, these phenomena have intensified since 2023, notably in the context of certain regional conflicts.



Within ICAO, STAC contributes to work aimed at characterizing the threat and assessing the level of risk for civil aviation (impact, likelihood, and vulnerabilities at the global level). This work notably results in the production of an international risk mapping document.

Building on this risk analysis, ICAO is exploring developments aimed at strengthening the robustness of navigation systems. In this context, the use of SBAS (Satellite-Based Augmentation System) is being studied to improve GNSS signal integrity and anomaly detection. STAC contributes through the ICAO Trust Framework Panel, in support of the Navigation Systems Panel (NSP), with the objective of evolving a system that currently lacks authentication mechanisms toward solutions capable of ensuring the authenticity and integrity of the information transmitted to receivers.

Finally, in France, CCTA/CT-R, co-chaired by STAC, initiated exchanges in 2025 with neighboring countries to share information and feedback on detection, alerting, operational response, and crisis exercises related to GNSS interference. This work will continue in 2026.

Drones

Radiosounding by drone as part of the CALIPSO protocol

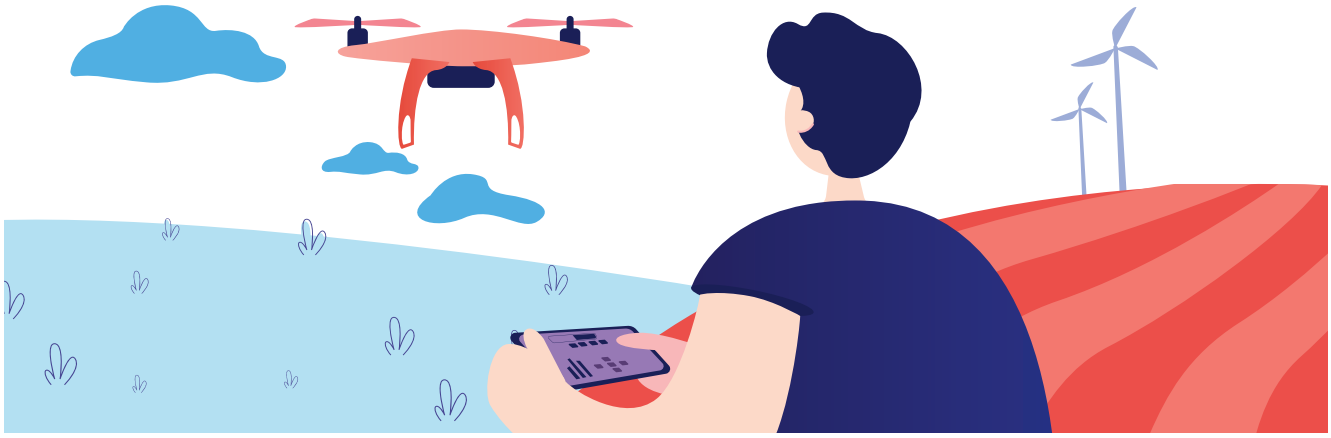
In order to meet the requirements of ICAO Annex 16 (Chapters 6, 10 and 11) and the CALIPSO protocol, the STAC's Acoustic Measurements Laboratory (MACOUS) systematically characterises atmospheric conditions during aircraft acoustic measurement campaigns. These characterisations cover temperature, humidity, pressure and wind at ground level, as well as vertical temperature and humidity profiles. All of this data is essential to ensure the reliability and comparability of measurement results.

Currently, altitude measurements are carried out by the MACOUS laboratory using a Modem M10 radiosonde suspended from a helium-filled tethered balloon, capable of reaching a height of approximately 450 m. The balloon is held to the ground by a rope connected to an electric winch. This solution allows several radiosondes to be carried out per day without additional gas consumption, but remains complex to implement, costly and particularly sensitive to wind variations, which can disrupt the stability of the device.

In this context, replacing the tethered balloon with a drone was considered. Preliminary feasibility tests were first conducted up to 120 m, the maximum height authorised in the open category. Additional tests were then conducted within a dedicated Temporary Restricted Zone (TRZ) in order to reach a height of 450 m. The tests carried out in November 2025 confirmed the operational feasibility of this deployment method.

One of the major advantages of the drone is its flight stability: flying in a vertical cylinder, it is not affected by wind and can directly obtain the wind speed profile at different altitudes. This stability improves the quality of the data collected and simplifies the analysis of the results. In addition, the deployment of the drone offers greater operational flexibility and reduces the logistical constraints of implementation.

A SORA study specifically designed to assess the operational risks associated with the use of drones in this context is currently being reviewed by the DSAC in order to determine whether it is feasible to permanently replace the tethered balloon with a drone.



Biodiversity & Sustainable Development

Studies & Research

Carbon sequestration and photovoltaic experimentation

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The Wildlife hazard and Biodiversity Management subdivision is continuing its work on airport grassland vegetation cover including a section on carbon sequestration, which began in 2023 at Francazal airport.

In 2025, in collaboration with EGIS and the Technical Innovation Department (DTI), the subdivision will launch a new study on a DTI plot on which a photovoltaic power plant is currently being installed. The results obtained will enable recommendations to be made to airport operators wishing to implement similar projects on their grasslands.

Study on Emissions Reductions from Alternatives to APU

The APU (Auxiliary Power Unit) is a significant source of CO_2 emissions and air pollutants during aircraft ground operations. To limit these impacts, alternative solutions exist, including 400 Hz power supply, Pre-Conditioned Air (PCA), and the use of electric or diesel Ground Power Units (GPU).

STAC conducted a study to quantify the environmental benefits associated with the use of these systems at French airports. The analysis is based on operational data, APU usage profiles, and referenced emission factors. Various scenarios were examined based on aircraft type, turnaround duration, and the nature of the alternative systems.

The results show that the use of alternative power sources enables a very significant reduction in CO_2 emissions and local pollutants during the turnaround phase, and even a near-total elimination of APU-related emissions when these sources are powered by electricity.

This study confirms the major environmental benefits of implementing APU alternatives, in line with recent regulatory developments and the goals of reducing the carbon footprint of air transport.

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EN-ICCA, a European group dedicated to climate change in aviation

The EASA EN-ICCA (European Network on Impact of Climate Change on Aviation) working group, whose objective is to assess and anticipate the effects of climate change on aviation, met on October 14th and 15th, 2025.

An initial report on "atmospheric icing risks induced by climate change" was produced, and a second study was launched on the subject of clear-air turbulence, convective phenomena, and strong winds.

The STAC participates in this group as part of its assessment of climate change vulnerabilities tool and methodology (VULCLIM).

Impact study of global warming on airport infrastructure

The increase in average temperature intensifies and accelerates degradation mechanisms and cumulative in-depth damage to airfield pavement structures and reduces their service life. The Airfield Pavement and Friction Department aims to improve knowledge of temperature in these structures across a representative set of geographical areas.

Two main objectives are pursued:

◎ On the one hand, to assess pavement vulnerability to climate change and, on the other hand, to identify and prioritize necessary adaptation measures. The analyses aim to accurately quantify the impact of global warming on pavement design and infrastructure service life, an impact still insufficiently accounted for in current damage models. To this end, at each instrumentation site, temperature sensors are installed at various depths within the pavement structure following coring operations carried out along the edges of runways or taxiways.

The temperature data recorded continuously can be used for operational purposes by airport operators, such as forecasting the risk of negative pavement surface temperatures in winter or, conversely, excessively high temperatures in asphalt layers that, during certain summer periods, may justify limiting the use of rapid exit taxiways or turning pads.

To date, several sites have already been instrumented:

◎ Orly Airport, Lyon–Saint Exupéry Airport, the Bonneuil-sur-Marne site, as well as in New Caledonia, La Tontouta Airport. In order to ensure the representativeness and robustness of the analyses to be carried out, the department wishes to multiply case studies; several new sites are therefore planned to be instrumented both in France and abroad.

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Standardization & Regulation

Example of contribution to international work

STAC is involved in several working groups within ICAO. This article presents some examples.

STAC participates in the Wildlife Hazard Management Expert Group (WHMEG) which recently completed the update of Doc 9332. This new ICAO Bird Strike Information System (IBIS) manual provides recommendations on the collection of wildlife strike data and describes the process for transmitting this data to ICAO.

STAC is also involved in the WG2, WG3 and MDG groups of the ICAO Committee on Aviation Environmental Protection (CAEP), particularly in the areas of pollutant emissions, noise and climate change.

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CAEP Cycle 13 ended at the beginning of 2025 with the adoption of the dual CO2 and noise standard. The Cycle 14 work has begun for 3 years and STAC has organized the first meeting of the MDG (Modeling Databases Group) in Toulouse in April 2025.

Within the WG2 (Airports and Operations), this cycle has enabled STAC to promote the actions carried out by DGAC in terms of the preservation of biodiversity in airports, in particular through the publication of a dedicated sheet in the "EcoAirport Toolkit Ecollection" collection.

The WG3 work (Emissions Technical) mainly concerns a revision of the NOx standard, as the current version does not sufficiently limit emissions from turbojet engines with a high overall pressure ratio. Lubricating oil emissions are also beginning to be studied for their role in the formation of particles at the engine exhaust.

STAC is also involved in SAE G-12 on issues related to aircraft de-icing. In this capacity, he participates in the new working group dedicated to environmental issues, set up at the end of the 2025 plenary held in Montreal.

Measurement of APU Operating Time

The APU (Auxiliary Power Unit), an auxiliary engine located at the rear of the fuselage, provides electricity, air conditioning, and compressed air on the ground, which are necessary for engine start. It can also provide air conditioning during take-off and serve as a backup system in the event of an in-flight failure.

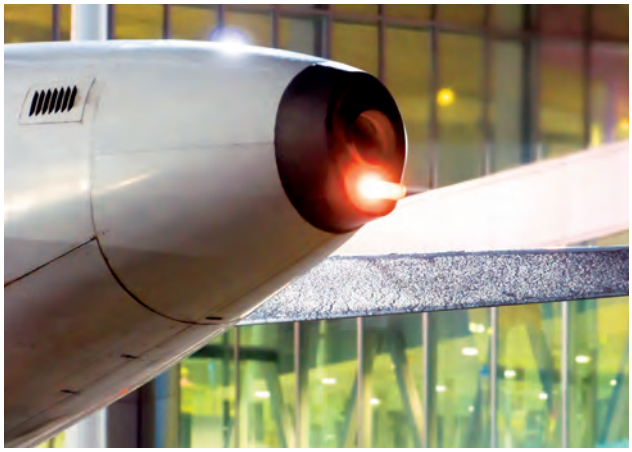
According to 2023 data from the TARMAAC model (Processing and Analysis of Emissions Released into the Atmosphere by Civil Aviation), the contribution of APU to CO_2 emissions at airports is significant, particularly at airports handling a large number of short-haul flights. APU emissions account for 1.2% of total aircraft emissions (LTO cycle, half-cruise and turnaround), 11% of emissions from the LTO cycle and turnaround, and up to 26% of ground emissions.

Significant reductions are possible through the use of alternative means, such as 400 Hz electrical ground power or air conditioning supplied by airport facilities.

Regulations that came into force in December 2023 now require the use of these alternative means at several major French airports. The use of APU there is limited both before departure and after arrival at the parking stand.

For several years, STAC has been developing, in support of the Air Transport Gendarmerie, methods for monitoring APU operating time during ground operations. A measurement campaign conducted in 2023 and 2024 at Toulouse-Blagnac confirmed, for various aircraft types and under different conditions, the technical feasibility of monitoring using thermal cameras.

In 2026, the experimentation will continue with tests on automated processing using fixed cameras at Toulouse-Blagnac.



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ACNUSA methodological guide on monitoring aircraft around aerodromes

Before the creation of the Airport Noise Control Authority (ACNUSA) in 1999, few airports had noise measurement systems and there was no specific framework to guarantee the reliability of the data produced. The founding law entrusted ACNUSA with defining the technical and operational requirements applicable to measurement networks at major airports. In the early 2000s, the first recommendations on noise measurement and flight path monitoring were established.

Between 2006 and 2015, data quality monitoring was strengthened:

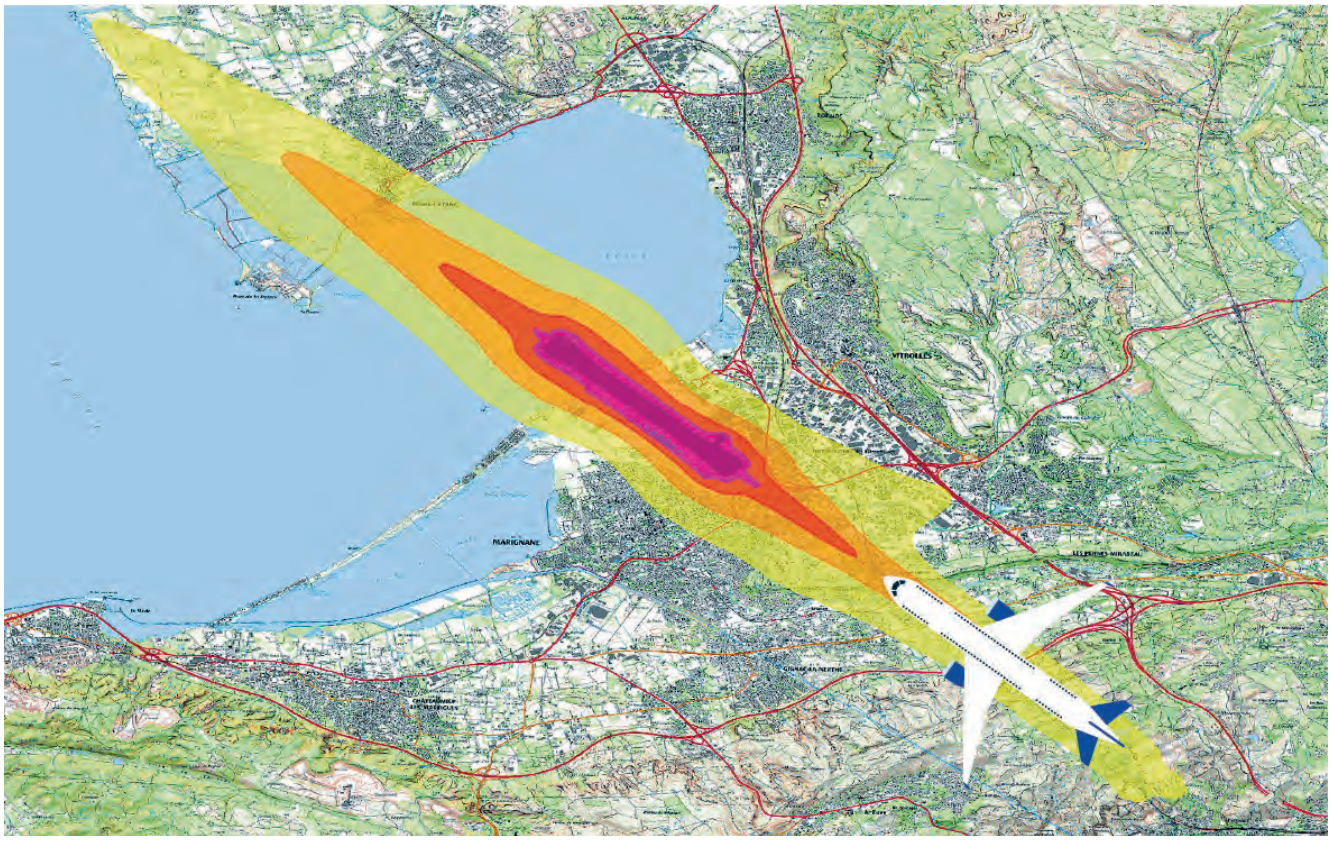
◎ Continuous monitoring of approved systems, audits and integration of regulatory changes into the approval process. In 2025, a working group involving STAC was launched to develop a reference methodology guide by 2027.

Implementation in application

Acoustic modelling activities

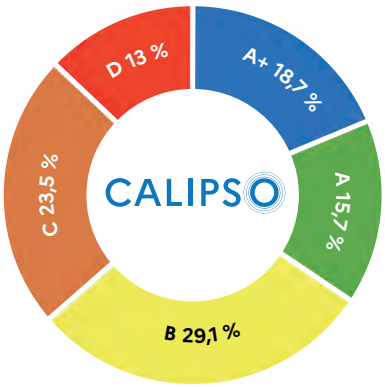
Acoustic modelling makes it possible to estimate the noise levels generated by a source over a larger area than that covered by measurements alone. It is used to produce the noise maps required by European Directive 2002/49/EC on the assessment and management of environmental noise.

This regulation requires the development of strategic noise maps and prevention plans around airports that fall under the jurisdiction of ACNUSA. STAC produces these maps for government departments. By 2025, around 30 maps had been produced, in particular for the airports of Marseille, Nantes and Lyon.



2025 annual review of the CALIPSO system

The Classification of Light Aircraft according to their Noise Performance Index (CALIPSO) aims to promote dialogue between airport residents and aviation users. This classification assigns an acoustic class of A+, A, B, C or D to each aircraft based on its noise performance. This classification is determined by measurement, equivalence or approximation.



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Currently, more than 1,600 aircraft with a Certificate of Airworthiness have been classified according to the CALIPSO protocol.

The classification of these aircraft can be consulted on the CALIPSO web portal:

https://calipso.dta.aviation-civile.gouv.fr/application-externe/

In 2025, the STAC's Acoustic Measurements Laboratory (MACOUS) planned nine measurement campaigns at different sites (Aubenas, Montargis, Mauléon, Moissac, Montceau). Seven of these were carried out; the other two were cancelled due to bad weather conditions.

In 2025, several projects were launched to examine ways of expanding the scope of the CALIPSO system:

◎ **Assessment of the extension of the system to class 3 microlights:** (ultra-light motorised aircraft with a gross weight of less than 500 kg for two-seaters): two microlights were measured in 2025, providing an initial database.

◎ **Analysis of the extension of the system to electric aircraft:** a preliminary study, based on the use of on-board data from an electric aircraft's computer, was conducted to better characterise the engine power management specific to this type of aircraft.

◎ **Identification of a measurement site in Savoie:** research has led to the selection of a location that should be operational by the end of 2026.

On 4 September, the CALIPSO monitoring committee met at STAC in Toulouse with representatives of the French Aeronautics Federation and local residents' associations.

Teams from the STAC's Acoustic Measurements Laboratory (MACOUS) gave a full-scale demonstration illustrating the main stages of an acoustic measurement campaign:

◎ Preparation of equipment, organisation of measurements, CALIPSO simulation and processing of measurement results.

This presentation highlighted STAC's expertise and reinforced the transparency surrounding the CALIPSO system.

Publication of the foam concentrates selection guide

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In October 2025, STAC published the Guide to selecting foam concentrates for Fighting Aircraft Fires at Airports. This document aims to assist aerodrome operators and SSLIA services in choosing foam concentrates suited to their operational needs, in a context of significant regulatory and environmental changes, marked in particular by the gradual ban on certain fluorinated substances (PFAS) and the replacement of traditional foam concentrates with fluorine-free products.

The guide supports services engaged in this transition by providing insight into the technical characteristics and fire performance to be taken into account to ensure the effectiveness of the airport response in the event of an aircraft fire or accident.

https://www.stac.aviation-civile.gouv.fr/fr/publications/selection-des-emulseurs-destines-la-lutte-contre-les-incendies-daeronefs

Operational application of the grass management guide by ENAC TSEEAC students

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As part of their training, ENAC TSEEAC students carried out a project at Muret-Lherm airfield with technical support from an agent from the wildlife hazard and biodiversity management subdivision.

This platform, which had no structured management plan, provided an opportunity to test the application of the STAC's grass management guide. After conducting an assessment and a naturalist inventory, the students proposed a differentiated management plan for green spaces that reconciles aviation safety and biodiversity.

This project illustrates the STAC's professional support in concrete approaches to the sustainable management of airport spaces.

https://www.stac.aviation-civile.gouv.fr/fr/publications/fauche-sur-aeroports

Publications related to wildlife hazard and biodiversity management

In 2025, the wildlife hazard and biodiversity management subdivision continued its efforts to provide technical documentation tailored to stakeholders in the airport sector.

Regarding biodiversity, a new technical data sheet on Invasive Alien Species was added to the series launched in 2024.

Regarding wildlife hazard management, as every year, professionals in the sector will be able to consult the statistical bulletin on wildlife collisions, which presents the main trends observed in 2024 and analyses focused on certain species.

https://www.stac.aviation-civile.gouv.fr/fr/publications/collisions-animalieres-annee-2024-bulletin-statistique

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Biodiversity finds its way into our infrastructure

As part of the DGAC's eco-friendly public service, and particularly the "Biodiversity" project, STAC Toulouse participated in several initiatives to raise awareness of biodiversity among DGAC employees. This initiative aims to highlight the richness of life in the workplace, the challenges of preserving biodiversity, and to implement actions to promote it.

In particular, an exhibition of the winning photos from 2024 competition was presented to STAC Toulouse staff. In addition, two agents from the wildlife hazard and biodiversity management subdivision led conferences and outings at the DGAC site in Athis-Mons as part of the "Nature week", and at the DTI site as part of the "Venez c'est tout vert" week. After a short lecture, participants were able to discover the species found in their green spaces and the sustainable management initiatives that have been put in place. Using binoculars, butterfly nets, botanical magnifying glasses, and digital applications for recognizing botanical and zoological species, participants were able to discover multiple ways to learn about observing and recognizing species.

The agents will continue their involvement next year.

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A technical information note to support airfield pavement managers in the implementation process

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In 2014, the ICAO launched a task force within its APEG (Airfield pavement expert group) in order to optimize airfield pavement admissibility methodology and assess management. This working group involving experts from the STAC, FAA, Airbus and Boeing entities, developed new admissibility methods, called "ACR-PCR" aiming at replacing the previous ACN-PCN method by a rational one, based on new models already adopted for design and pavement testing. These new methods enable a finer and more reliable evaluation of aircraft aggressivity regarding pavements bearing capacity.

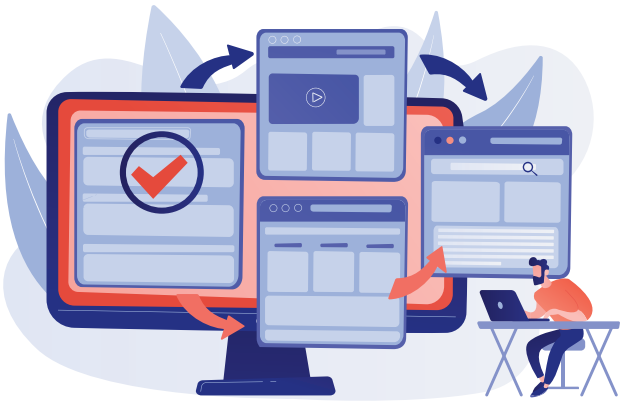
A generic method was then developed by the ICAO who published in 2020 the Amendment 15 to the Annex 14, initiating a transition period between former ACN/PCN and ACR/PCR systems. This transition was initially planned to last until November 2024 but was postponed by the EASA in the EU area for at least 6 months. At the date of this article (January 2026), this transition period is still ongoing. The French civil aviation administration has started updating the French regulatory corpus (Arrêté TAC), integrating the change of methodology, which will be published after the EASA update.

Thanks to the STAC's efforts, French state practices were integrated into the ADM Doc 9157 Part 3, chapter 4, allowing both taking into account French fatigue law for flexible pavements and the actual rigid pavement behavior (fatigue and brittle failure). Besides, a user-friendly software was developed by the STAC and the Gustave Eiffel University. This software, free of charge and easily available, will, in coordination with the technical information note, support a good implementation of the ACR/PCR.

The French civil aviation technical center will continue to accompany the airfield community, especially providing training sessions on this new methodology and its implementation using the dedicated software.

Monitoring

Environmental noise measurements on La Reunion Island



In response to concerns raised by local residents, noise measurements were carried out on La Reunion Island to assess the impact of air traffic on the island's sound environment.

The situation varies depending on the area. In quiet areas, located at high altitude or far from traffic routes, aircraft noise remains highly noticeable due to low residual noise levels. Conversely, in areas already more exposed to noise, the acoustic impact is reduced without eliminating the noise nuisance associated with the most significant events.

Noise exposure also varies according to the frequency and duration of overflights. Some areas, located near flight paths or enclosed terrain, suffer from a combination of unfavourable factors, while others benefit from a wider dispersion of flight paths. Helicopters are the main source of aircraft noise pollution identified, ahead of other types of aircraft.

The study highlights the importance of a territorial approach, based on field measurements and flight path monitoring, in order to better reconcile aviation activity with the quality of life of local residents.

Acoustic monitoring at Beauvais-Tillé Airport

In accordance with the decree of 20 July 2004, devices used to measure noise and track aircraft trajectories must be certified. Thanks to its expertise, the STAC acoustic laboratory is approved by ACNUSA to verify the compliance of these devices.

In 2025, a new measuring station was commissioned in Troissereux, north of Beauvais. STAC has assessed this installation and the results of this assessment will be presented to ACNUSA in 2026. This approach guarantees the reliability of the noise data used to inform the public.

SAFETY

Studies & Research

Study on the operational impact of TaxiBot deployment at Paris-Charles de Gaulle airport

STAC was tasked by DSNA in 2024 to assess, through fast-time simulations, the operational impact of deploying a fleet of TaxiBots (towing vehicles that make it possible to avoid using aircraft engines during the taxi phase) at Paris Charles de Gaulle airport by 2030.

The study carried out by the STAC capacity team highlighted particularly significant management difficulties for air traffic control during departure peaks, due to the routings of aircraft towed by a TaxiBot to the disconnection areas and the reintegration of these departures into the main flow.

This study provides a basis for discussions and further work for DSNA and Aéroports de Paris to adapt procedures and traffic management tools so as to make the implementation of such a solution operationally sustainable.

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Study on language proficiency

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Requirement ADR.OPS.B.029 of Regulation (EU) No 139/2014 as amended stipulates that all staff holding a driving authorisation on the manoeuvring area of certified European aerodromes must demonstrate an English language level at least equivalent to the operational level, i.e. at a minimum ICAO level 4.

In this context, STAC published in September 2025 a study analysing the safety impact of such an English level for drivers operating on the manoeuvring area. The study is based on the analysis of runway incursions, traffic data and feedback from professionals (operators, controllers, authorities). The results show that issues of incursions linked to English language proficiency are rare, but that understanding radio exchanges in English can help drivers increase their situational awareness.

https://www.stac.aviation-civile.gouv.fr/fr/publications/etude-de-securite-relative-lexigence-adropsb029

Development of a take-off and landing distance prediction model

The Airfield Pavements and Friction Department has developed an initial version of a take-off and landing distance prediction model ; an aircraft performance calculation tool that characterizes their ground behavior based on recorded or recalculated parameters.

Based on simplified aerodynamic modelling, the model nevertheless ensures improved consideration of runway surface conditions and thus allows a more representative estimation of ground reaction. The model will ultimately enable parametric studies (including sensitivity of aircraft performance to runway friction characteristics) and the assessment of the relevance and operational usefulness of friction measurements, as well as the conduct of targeted safety studies. Within the framework of the Global Reporting Format (GRF), it will constitute a decision-support tool for estimating the Runway Condition Code (RWYCC).

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Infrastructure macrotexture study

Macrotexture plays a key role in surface water drainage, increasing the tire-pavement contact area and, consequently, runway friction, particularly under wet conditions.

The work aims to analyse the evolution of texture at early age and over several years, to explore correlations between volumetric and profilometric texture measurement methods, and to study the relationships between the materials used, macrotexture, and friction.

The Airfield Pavements and Friction Department has recently acquired a dynamic texture measurement device (RUGOBOX). This equipment, operating within an established regulatory framework, enables the analysis of the temporal evolution of macrotexture on airfield pavements and understanding of the influence of surface characteristics on aircraft performance beyond the friction alone measured by CFMD.

Drift study of friction measurement devices

At the request of the French Civil Aviation Safety Directorate, the Airfield Pavements and Friction Department studied the drift of continuous friction measuring devices (CFMD). Therefore, data from the certification campaigns for these devices, carried out three to four times a year by the Testing and Expertise Laboratory between April 2014 and June 2025 on the dedicated test sections at Gustave Eiffel University in Nantes, were analysed.

The drift over time of the friction coefficient was mathematically modelled. The conclusions of the study showed a notable drift beyond two years.

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Study on snow removal at the altiport

In 2025, at the request of DSAC and in cooperation with BEA, STAC conducted a technical study on the trial of new snow removal methods at Courchevel altiport. This study includes an analysis of existing practices and operational constraints, as well as an assessment of two configurations for managing snow banks along the runway strip.

Following an analysis in terms of compliance, safety and feasibility, STAC issued a technical opinion on the practicability and acceptability of these new snow-clearance methods.

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Traffic simulations at the limits of infrastructure capacity at Beauvais

In a context of gradual traffic growth at Beauvais, DSNA's Operations Directorate requested STAC's support to analyse the capacity of the airport and assess its margins for development. This approach is part of a broader objective to provide an evidence-based view of current operating conditions and to anticipate future needs.

The simulations carried out made it possible to assess the theoretical capacity of ground infrastructures, taking into account usual operational configurations. They also showed that the implementation of published standard procedures, as well as the characteristics of the volumes of airspace managed by the local air traffic control unit, are key parameters in assessing the level of operational capacity that can be achieved.

Infrared radiation

In 2025, the Visual Aids Laboratory continued its work on studying infrared (IR) emissions from lighting systems, which are critical devices for the visual detection of obstacles.

With the rise of enhanced flight vision systems and night vision devices, analysing the IR signatures of beaconing devices is a strategic issue for aviation safety. The work aims to assess the impact of these emissions on pilots' night vision and to collaborate with manufacturers to propose an appropriate standard. As part of this study, the laboratory is cooperating with the French army authority:

◎ Direction Générale de l'Armement.

Expertise in innovative lighting and energy systems

As part of its missions and proactive approach to integrating emerging technologies, STAC conducts studies on innovative systems, particularly in the fields of energy and lighting. In this area, 2025 saw the launch of two studies and the completion of a technical notice.

The first study concerns autonomous airport lights powered by solar energy. Following a documentary analysis, a series of tests was carried out at Chartres aerodrome, which is equipped with these devices. A follow-up visit to the manufacturer will finalise this study, the aim of which is to develop a guide dedicated to the installation of solar lights on airport platforms.

The second study focuses on a system for managing stop bar and taxiway lights, based on a dedicated fibre optic network. The examination of technical documentation, supplemented by a visit to the manufacturer's laboratories, enabled tests to be carried out and preparations to be made for an upcoming evaluation of the system at Casablanca airport.

The technical notice concerns a device that allows remote activation of lighting for helipads and helistations via a web interface, while providing access to local data (weather, visualisation, mapping). This system aims to ensure optimal landing conditions for SAMU and Civil Security helicopters. Tests of the interface were carried out remotely and on site during a visit to the helipad at Vesoul Hospital.

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Standardization & Regulation

Contribution to international work on safety

In 2025, STAC strengthened its engagement within international bodies responsible for the design, operation and safety of aerodromes and the ATM/ANS domain.

Within ICAO, through groups reporting to the Aerodrome Design and Operations Panel (ADOP), STAC contributed to regulatory developments relating to Obstacle Limitation Surfaces and to requirements applicable to the physical characteristics of aerodromes.

It also contributed to technical frameworks concerning heliports, vertiports and altiports. On the operational side, it took part in the work of the Ground Handling Task Force (GHTF), the A-SMGCS (Advanced Surface Movement Guidance and Control Systems) groups, as well as in the deliberations of the Rescue and Fire Fighting Working Group on emerging issues, in particular battery fires and the integration of drones.

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At European level, the year was marked by a strong contribution to EASA's work:

◎ Publication of a report on the transition to fluorine-free firefighting foams and the launch of work related to the certification of airport equipment (RMT.0161), in particular airfield lighting. STAC also continued its involvement in developing technical certification specifications for ATM/ANS equipment.

Finally, it chaired the plenary meeting of IEC Technical Committee TC 97 in Helsinki, dedicated to international standards for aerodrome ground lighting. These activities confirm STAC's role as a leading technical expert and major contributor to the development of European and international regulatory frameworks.

ICAO/ADOP – The panel of experts on aerodromes design and operation

The Air Navigation Commission (ANC) of ICAO considers and recommends Standards and Recommended Practices (SARPs), as well as Procedures for Air Navigation Services (PANS) for adoption or approval by the ICAO Council. The ANC works through established panels of experts in various disciplines who are assigned specific tasks from the overall work program. Each ANC Panel is supported in its work by the ICAO Secretariat.

In the area of aerodrome design and operations, this work is conducted under the responsibility of the ADOP (Aerodrome Design and Operation Panel). In this context, the ADOP is currently in charge of developing and maintaining SARPs, procedures, guidance materials and/or manuals mainly for:

- Aerodromes design issues, including aerodrome reference codes, arresting systems, runway turnpads, runway starter extension and altiports,
- Airport operational management activities, including airfield maintenance and management, wildlife hazards management as well as ground handling activities,
- Global reporting format (GRF) for runway surface condition reporting, as well as ACR/PCR implementation,
- Airport emergency response including rescue and firefighting,
- Airport collaborative decision making (A-CDM) and industry best practices,
- Advanced surface movement guidance and control systems (A-SMGCS),
- Visual aids,
- Water aerodromes,
- Vertical flight infrastructures supporting helicopters and advanced vertical air mobility aircraft (eVTOL),
- Obstacle limitation surfaces.

The work of the ADOP essentially impacts Annex 14 (Vol 1 Aerodromes and 2 Heliports) of the ICAO Convention as well as the PANS-Aerodromes document (Doc 9981), although other annexes (e.g. Annex 6, Annex 15, various aerodromes related manuals) may also be impacted.

The ADOP is supported in its works by a structured set of Working-Groups (WG)/Expert Groups (EG)/Task-Forces (TF). The current working structure is depicted in the figure below and shows the participation of STAC experts. Please note that other DGAC experts, notably DSAC experts, are also involved in various ADOP groups.

ADOP is one of the largest panels under the ANC, responsible for 29 primary job cards. Currently, ADOP comprises 489 experts provided by the set of represented States and international organizations around the world.

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Lighting working group

In collaboration with the DTA/MCU, the STAC proposed, through the Lighting working group, various amendments that could be made to the decree of 23 April 2018 relating to the lighting of obstacles to air navigation.

The requests made are based on feedback from the STAC during the certification of obstacle lighting or during discussions with wind farm operators, air operators and aerodrome operators, local residents, owners of other types of obstacles and lighting equipment suppliers

The objectives of this working group are to clarify certain concepts in Volume 1 of ICAO Annex 14, to promote the reduction of light pollution caused by obstacle lighting, to introduce maximum light intensity levels, to improve the operation and efficiency of obstacle lighting, and to study pragmatic solutions to specific situations (high-voltage power lines) and new user requirements (infrared, slackline).

Updating standards certification of lights

STAC has been working on a complete revision of its internal document on the technical specifications for aeronautical lighting and luminescent signs for landing and take-off areas.

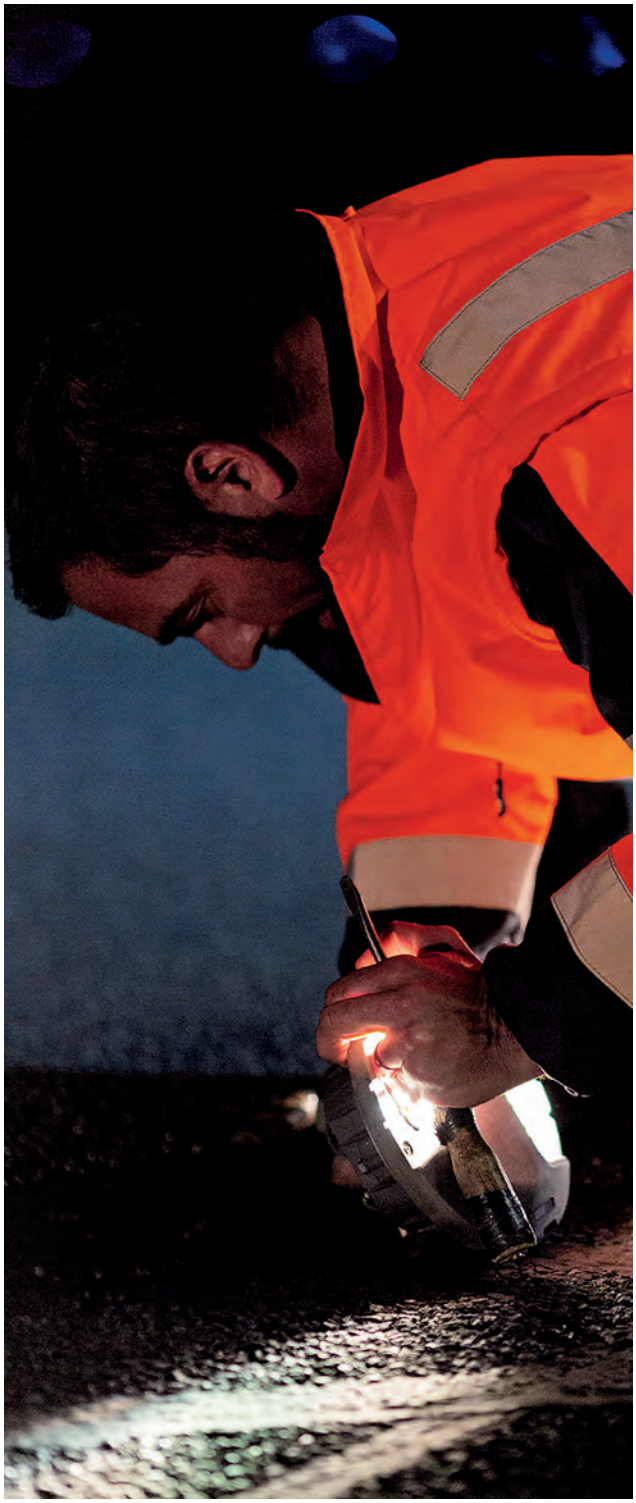
This substantial work aims to clarify and supplement the international standards in force applicable to the certification of lighting devices. All of this work is being carried out at EASA level, in particular within the framework of the RMT 0161 working group, whose objective is to develop European standards for the certification of airport equipment with a direct impact on safety. As the only photometry laboratory contributing to this work, STAC is actively working with the agency on this subject. This work, which began in 2025, will carry on in 2026.

Protection of workers involved in airfield lighting systems

The EBA subdivision, in cooperation with the Labour Law and Social Affairs Unit of the Directorate of Air Transport, is contributing to the finalisation of a draft decree and ministerial order introducing a derogation from certain provisions of the French Labour Code applicable to electrical installations.

Initiated at the request of the French Airports Union (UAF), this regulatory development addresses the specific characteristics of aeronautical ground lighting systems, whose series-powered electrical architecture and performance requirements set by ICAO and EASA are incompatible with conventional protective devices.

An equivalent level of safety for maintenance personnel is ensured through dedicated installation and maintenance rules set out in STAC technical guides, the introduction of specific electrical authorisations and strengthened periodic inspections. The project was approved by the Directorate General for Labour in December 2025 and could be published in spring 2026.



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Implementation in application

Simulation Lighting Platform

In 2025, STAC continued to develop the lighting platform that will be installed at its Toulouse site.

The SIMBA (SIMulation de BAlisage) platform will serve as a reference tool and offer a wide range of uses:

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- Analysis of various lighting power supply and monitoring technologies under real-world conditions;
- Evaluations of new verification methods (measuring devices);
- Periodic calibrations and verifications of PAPI systems
- Practical training courses, both internal and external, in a suitable environment, thereby contributing to the maintenance and development of skills in the field of aeronautical lighting.

This year was devoted to carrying out essential preparatory work, including the fitting out of an electrical room to house the constant current regulators, as well as an in-depth network detection campaign to ensure the safe and controlled installation of the future platform.

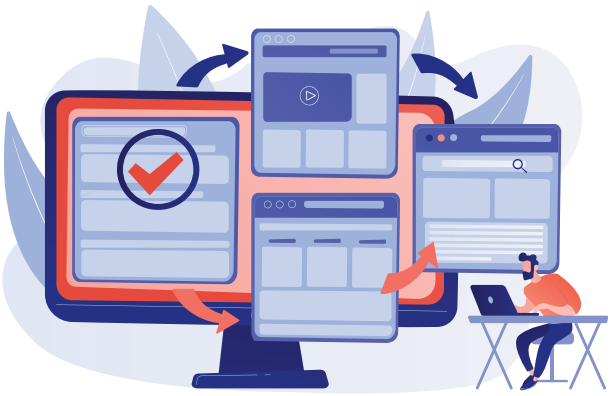
The project received support from several institutional and industrial partners.

Lighting manufacturers and airport operators have supplied new or used equipments. In addition, four manufacturers have confirmed their commitment and will provide high-end equipment for lighting chambers and associated extension. This package helps to ensure the technical reliability of the installation.

SNIA is the project manager and has been providing STAC with highly effective support since the preliminary design phase.

Monitoring

Participation in the certification process of ATM equipment



STAC's long-standing expertise in ATM/ANS equipment compliance and interoperability, developed over many years in support of DSAC, was recognised at European level by EASA.

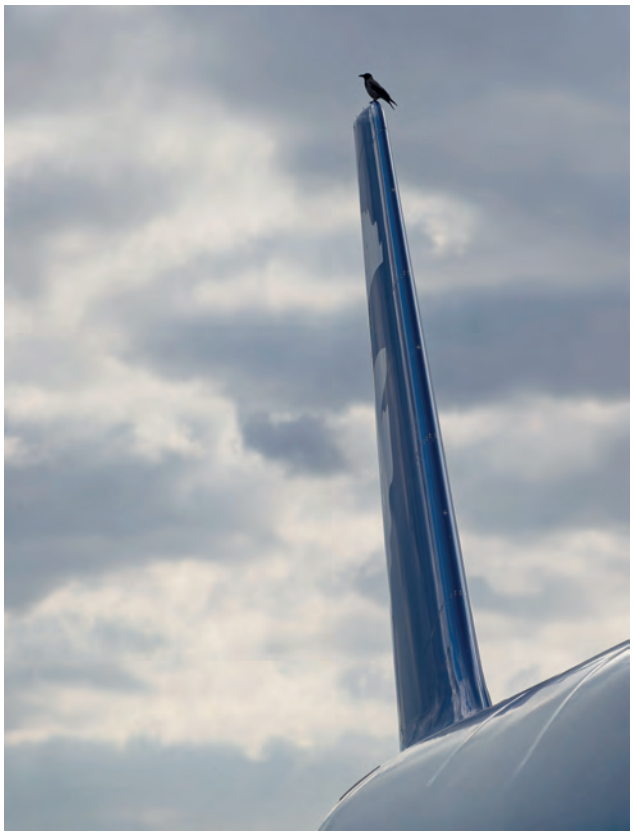
Four STAC staff members were thus designated as experts by the agency. They have now joined the pool of European inspectors responsible for applying regulations related to the certification of ATM/ANS equipment. Since autumn 2025, they have taken part in audits of equipment manufacturers located in several European Union countries. This new activity is expected to grow in the coming years, thereby contributing, at its own level, to the much-needed modernisation of air traffic control systems in Europe.

Wildlife risk assessments carried out

In 2025, STAC continued its wildlife risk management expertise missions on civilian and military airports.

To this purpose, STAC agents went to airports of Nouméa (Magenta and La Tontouta), Wallis-Hihifo, Futuna Pointe-Vele and Figari-Sud Corse, as well as the Lann-Bihoué and the Orange-Caritat bases.

At the end of each assessment, an evaluation of the wildlife risk at the airport is carried out according to STAC methodology and recommendations are made to improve the effectiveness of wildlife hazard management programs at the airport or military base.



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SECURITY

Studies & Research

“Made by STAC” Performance Kits to Test Security Equipment

The Service Technique de l'Aviation Civile (STAC) is responsible for monitoring the performance of airport security equipment through Performance Maintenance Checks (CMP).

One of the kits currently under development focuses on the evaluation of cabin Explosive Detection Systems (EDS), which are gradually replacing conventional X-ray systems. Now in the R&D phase and building on the work carried out by the Joint Research Centre (JRC), this kit will notably rely on the use of explosive simulants. It will enable verification of the detection capabilities of these illicit substances, as well as concealment techniques within cabin baggage.

At the same time, a test kit for Explosive Trace Detectors (ETD) is being designed to address the current lack of physical performance checks during operations. Until now, ETD assessments during CMP have been conducted solely through documentation reviews. This new kit will consist of pre-loaded test swabs containing threat substances and false alarm compounds, prepared in advance in the laboratory, then transported and introduced into the ETD systems. Further developments of the kit may be considered in the coming years to align with evolving standards related to chemical threats.

These initiatives fully reflect STAC’s ongoing adaptation to the rapid evolution of airport security technologies.

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3DIQ test kit: image quality objectification for EDS hold and Cabin luggage

3 Dimensional X-ray characterization machines (EDS) provides a detailed volumetric image of luggage content that is key for prohibited items detection.

STAC had initiated a project to be able to assess the image quality provided by such equipment and also define the minimal expected quality standard for such equipment in order to update the legal framework at European and national level.

Following an initial analysis phase that gathered the expectations of the various stakeholders involved, STAC has defined several image quality criteria for volumetric imaging applicable to airport security.

STAC then developed a tool composed of test modules that provide measurable scales for objectively scoring these criteria.

A reproducible testing methodology, compatible with all equipment models, was subsequently introduced into equipment certification protocols.

The phase dedicated to defining image quality standards is nearing completion. An in depth study, aimed at scientifically correlating image quality levels with actual detection performance, is expected to be released soon.

Finally, to anticipate future challenges, the development of automatic analysis modules for these criteria—based on advanced artificial intelligence techniques—will further strengthen STAC's expertise on this strategic topic. The suitcase has been the subject of a patent application filed by STAC.

Cooperation: STAC's Expertise Supporting Prison Security

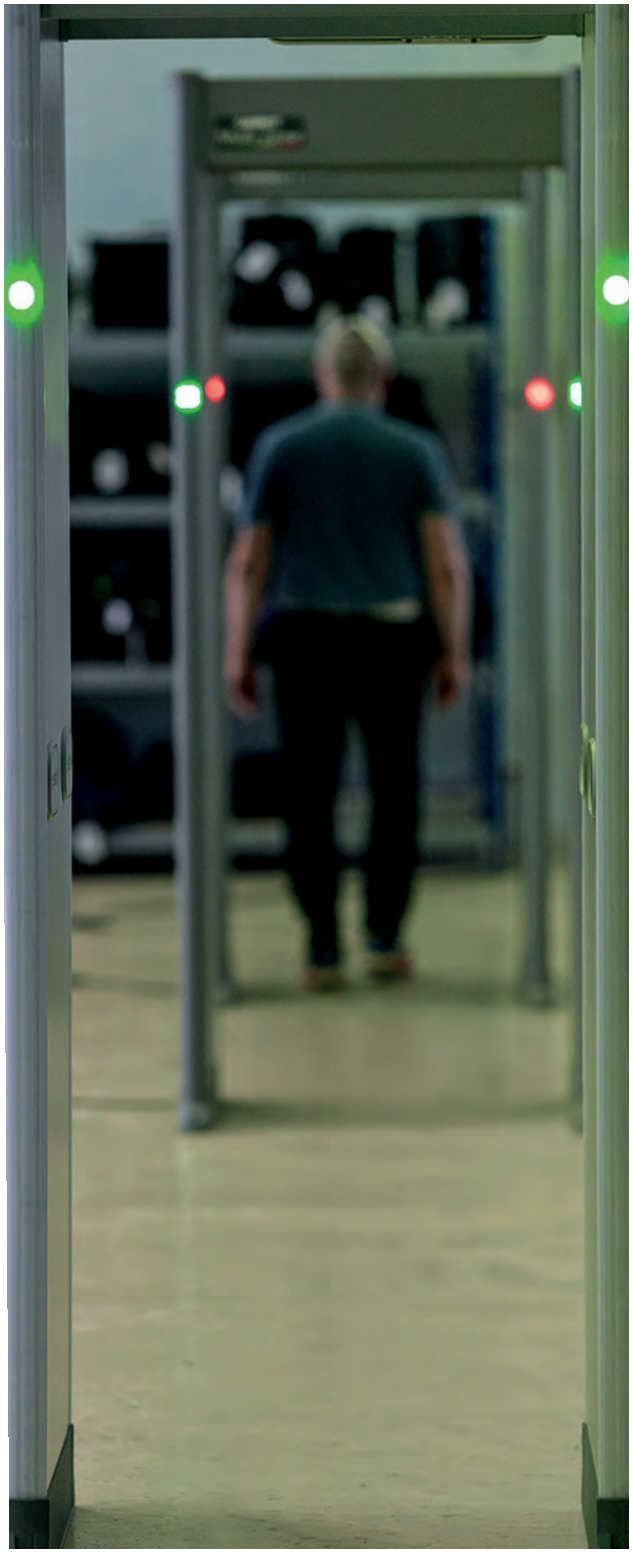
In 2025, STAC made its technical expertise available to the Directorate of Prison Administration (DAP), a fruitful collaboration that, in turn, enhances its understanding of the airport security technologies of tomorrow.

A first testing campaign was conducted in March on millimeter wave portals, followed in July by a second campaign dedicated to walk through metal detectors. For both series of tests, the experimental framework was defined based on the knowledge and needs expressed by the prison administration, and the protocols were then adapted to the specific threats and constraints of the prison environment.

These tests played a key role in the DAP's procurement strategy. By observing the equipment in real world conditions—equipped for the occasion with software adjustments made by manufacturers—the administration was able to select its future suppliers based on objective operational performance criteria.

For STAC, this venture outside of airport terminals has been highly instructive. Observing millimeter wave portals in such a demanding context provided invaluable feedback, especially as these systems are to become widespread across French airport platforms. This interministerial cooperation demonstrates the relevance of breaking down silos within the State and reflects STAC's commitment to sharing its technical know how beyond its original mission.

Building on this success, STAC has already identified several similar partnership opportunities for 2026, confirming its willingness to extend its technical expertise beyond its initial scope.



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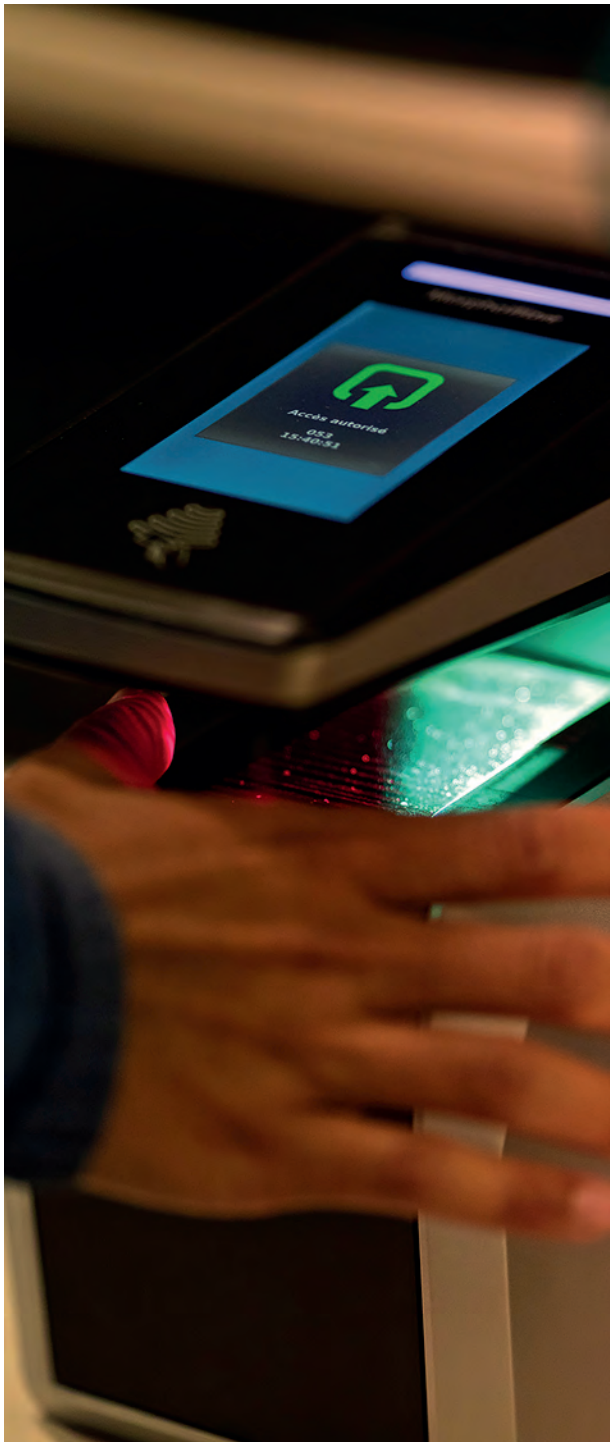
Biometric system in airports: STAC's contribution to tomorrow's standards



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Biometrics, and facial recognition in particular, is being increasingly rolled out in airports to strengthen security and streamline access control. While the technology is already widely used for staff access, extending it to improve the passenger journey brings new challenges, such as stricter operational requirements, remote enrolment, personal data protection, and integration with boarding systems.

The STAC therefore set out to develop an improved performance justification protocol (JUS) along with a dedicated lab evaluation kit, making it easier to verify that systems are compliant and reliable before they get operated. This involved looking at regulatory, technical and operational requirements, reviewing existing practices around biometric staff checks, and then building a set of tests and documents specifically tailored to passenger screening. The updated protocol was developed in real conditions, taking into account the practical issues and unexpected challenges encountered in the field, with the aim of producing a robust, relevant version that also addresses the latest cyber-security concerns.

This clear, workable methodological framework can be used by our lab to ensure a thorough assessment of biometric systems, helping to strengthen security while staying within regulatory and ethical boundaries.

Security Equipment Standardization: International Actions

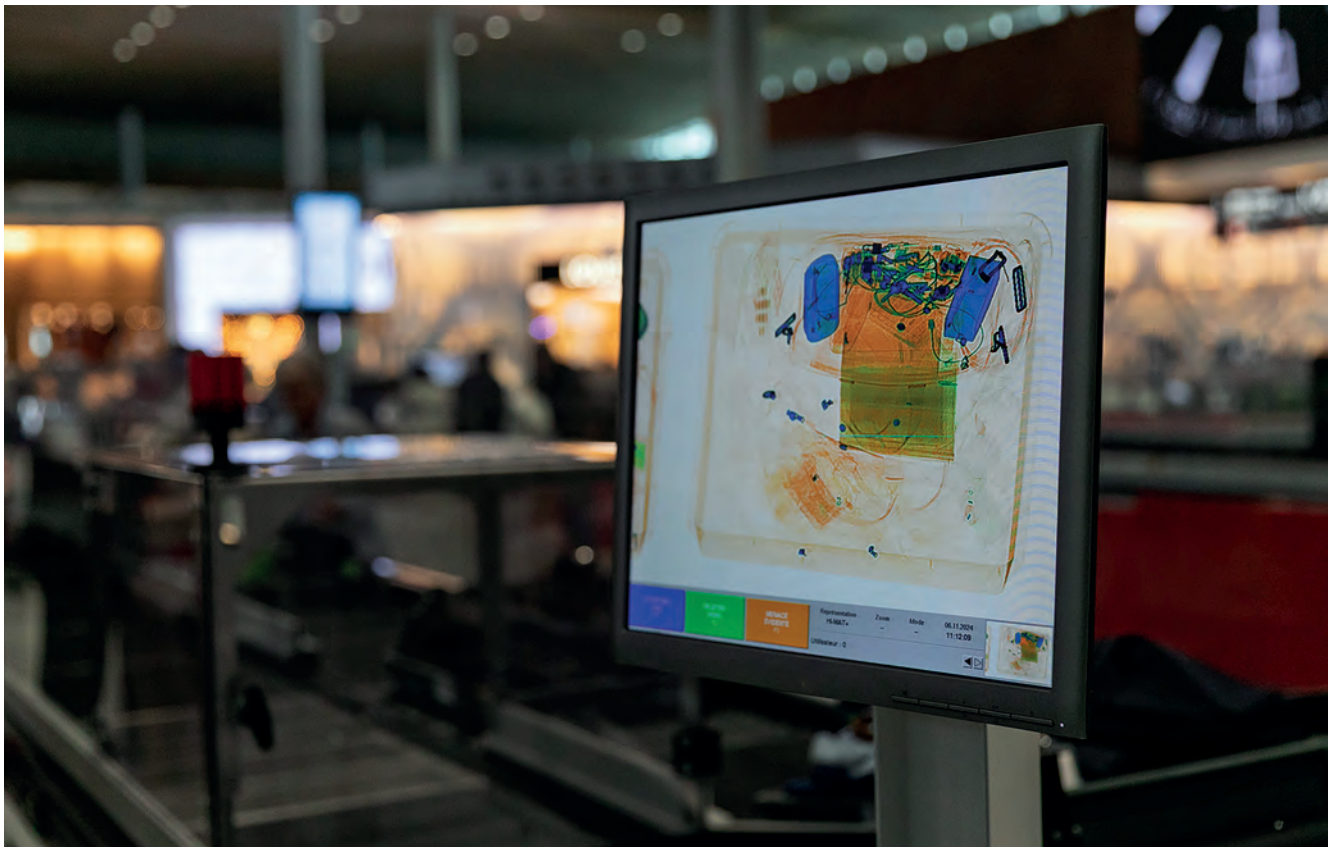
The Transportation Security Administration (TSA) and the European Civil Aviation Conference (ECAC) are the two main authorities responsible for airport security equipment evaluation. Although they pursue common objectives, their standards differ in terms of testing methodologies and capabilities for detecting explosives and other threats.

This heterogeneity in testing and certification procedures creates fragmentation in regulatory requirements, complicating manufacturers' understanding, increasing development costs, and delaying the deployment of new technologies in airports.

Testing consists of an in-depth technical evaluation of equipment to verify compliance with expected performance under simulated conditions representative of operational use. In France, this testing phase is conducted by the STAC within specialized laboratories.

In 2024, a technical weakness related to the detection of liquids, aerosols, and gels (LAGs) highlighted the need to strengthen international coordination on standards, testing, and certification. In this context, the Technology Alignment Group (TAG) was created to implement common testing methods that meet the standards of both authorities. It initially brought together Germany, the Netherlands, the United Kingdom, and the United States, and then expanded to include France and Spain in early 2025.

Within several dedicated expert groups, STAC teams contribute their expertise in close collaboration with DTA/SRD2. Their work focuses on updating the common threat list, harmonizing detection requirements, developing testing methodologies, creating testing tools, and producing the associated technical reports.



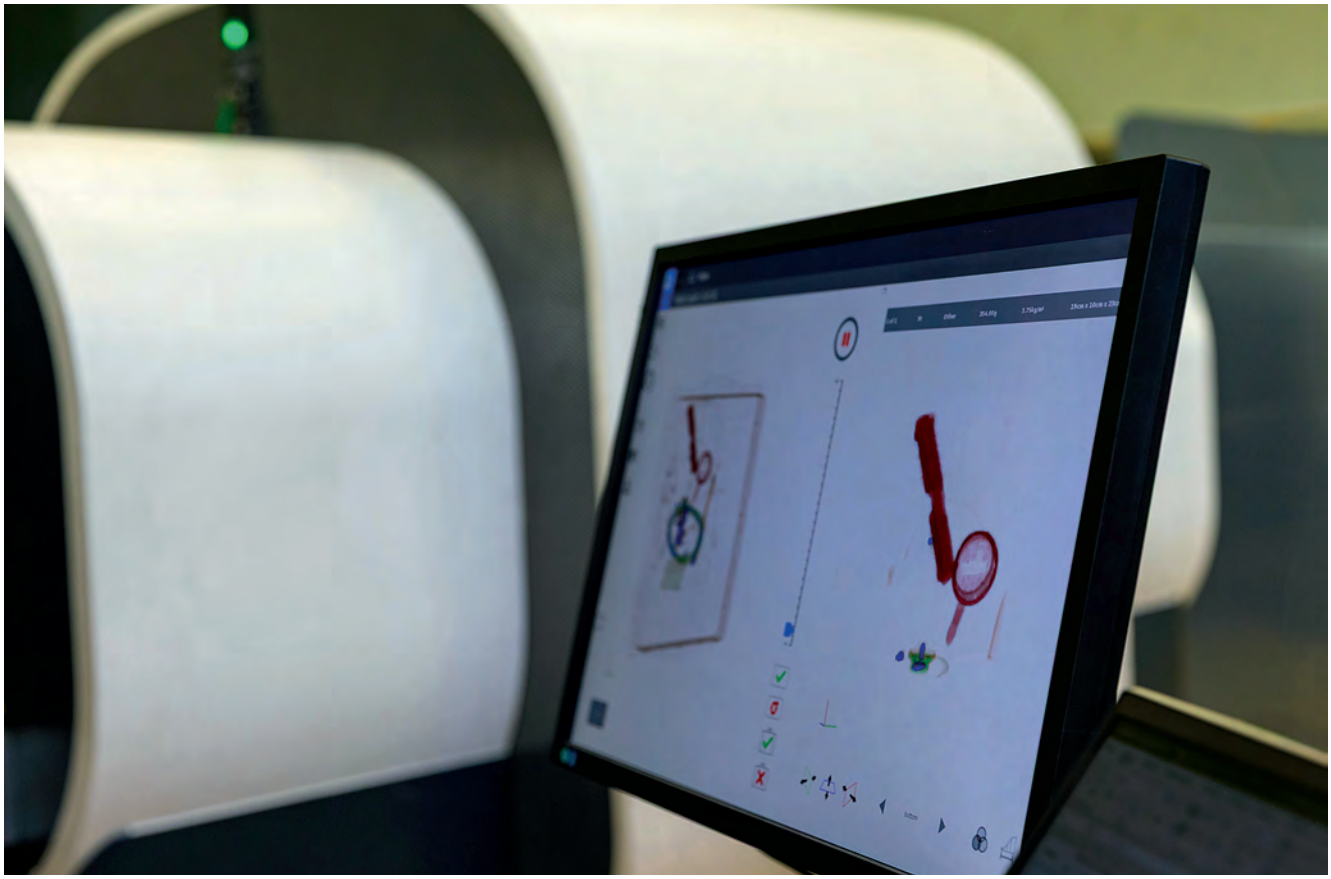
Evaluating physical properties of lower atomic number and density materials

Radioscopic systems for hold or cabin luggage use internal software to analyze and automatically detect dangerous threats material as well as indicate shielding objects. The data that feed this software are characteristic of the physical and chemical intrinsic properties of the actual material inside of the luggage. More precisely this data corresponds to the density and average atomic number of the objects found in the luggage at a small volumetric scale called a voxel.

STAC security research laboratory has teamed up with the University of "Pau et des Pays de l'Adour" (UPPA) laboratory to better characterize density and atomic number of organic materials through Xray technology in order to facilitate the creation of simulant material. This will help replace known explosive threat with harmless material. This work is done on a micro CT (Xray emission device associated with a micro Computed Tomograph) at high precision level.

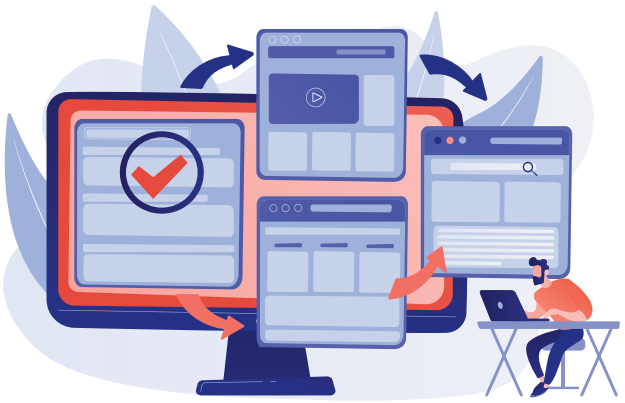
Operationally the work is done with dual energy emission Xray beams on known standardized materials: the emitted x rays having two different energies, their penetration across the material is variable and the signal treatment leads to the creation of predictive model. This model is then applied on sample materials for which the density and atomic number is unknown, allowing our research team to determine these characteristics with great precision.

The results and methodology is shared with our partner security laboratories across Europe and the USA in order to validate with our peers the results, the characterized materials can then be used widely on both sides of the Atlantic.



Monitoring

Technical evolution of passenger screening: a new guidance material



In the context of the ongoing modernization of airport security systems, STAC has developed a new guide dedicated to Passenger and Cabin Baggage Screening (IFPBC). This document aims to support airport operators in integrating new screening technologies, particularly next-generation detection equipment, as well as in designing and dimensioning screening checkpoints.

The guide provides an operational approach for implementing technologies such as EDS-CB systems for cabin baggage or Security Scanners for passengers within existing screening checkpoints or those currently being designed. It addresses the technical, organizational and human impacts of these developments, while taking into account national and European regulatory requirements.

Designed as a support tool for planning and design, the IFPBC guide is intended for airport operators, competent authorities and security stakeholders. It provides common reference points, conceptual layouts and recommendations to help structure projects, optimize passenger flows and maintain a high level of security.

Through this publication, STAC reaffirms its role as a partner to airport platforms. It supports a controlled technological transition, ensuring that the security systems of tomorrow remain consistent with operational constraints and fully compliant with national and European regulatory requirements.

https://www.stac.aviation-civile.gouv.fr/fr/publications/guide-technique-de-conception-des-lignes-difpbc-cabine

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ETD G1 Certification: Detector Testing Campaign

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In response to the constant evolution of threats, civil aviation must demonstrate unwavering adaptability. Under the leadership of the European Civil Aviation Conference (ECAC), European nations have recently reached a significant milestone with the "G1" certification, successfully mitigating a complex chemical risk through exemplary technical cooperation.

In recent years, compliance with the G1 standard has been a key priority for Member States. This technical designation targets a very specific threat:

- Chemical substances that react upon contact with water, releasing gases that are hazardous to humans.

The challenge was considerable:

- it required the development of a robust standard and testing methodologies capable of validating new trace detection (ETD) algorithms, all within a tight timeline set by the European Commission.

The main difficulty lays in designing harmonised protocols for a threat with physical characteristics significantly different from those of conventional explosives. In 2025, a genuine technical alliance was formed:

- France, Germany, Spain, the United Kingdom, and the Netherlands worked closely together to assess industrial equipment. The objective was critical: to enable manufacturers to obtain certification swiftly and ensure the operational continuity of screening checkpoints.

The outcome of this collective effort has been highly positive. The vast majority of ETD systems across Europe have successfully passed the evaluation. As for the remaining equipment, testing slots have already been secured for 2026 to complete their compliance process.

International Industrial Partnerships Dedicated to Private Testing Campaigns on X-ray Equipment

The technical excellence of STAC continues to attract manufacturers from around the world. This year, activity in the automatic explosive detection systems (EDS) laboratory has been particularly strong. From private test campaigns to full European certification processes, teams have evaluated cutting-edge technologies developed by leading international manufacturers such as Smiths Detection (United Kingdom), as well as by new entrants to the European market, including Hikrayin (China), Vehant and Krystalvision (India), and VMI Security (Brazil). These collaborations confirm France's central position in the international security sector.

Prior to submitting a certification application, manufacturers may request private testing from the testing center. These private tests take the form of data-collection exercises conducted under bilateral agreements, outside the ECAC common evaluation process. Their main objective is to support manufacturers in developing and optimizing their detection algorithms.

Data relating to threats, baggage and their contents, the different tests, as well as concealment and masking techniques, are provided by the requesting manufacturer, then validated or adapted by the testing center depending on the availability of the required elements.

In total, four private tests were carried out this year at the Biscarrosse laboratory for cabin baggage explosive detection systems. Among them, three highlighted the need for improvements to detection algorithms.

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Glossary

A

A-SMGCS
Advanced Surface Movement Guidance and Control System

ACNUSA
French Authority for Airport Noise Control

ACR
Aircraft Classification Rating

ACTI
Initial Works Supervisory Authority

ADM
Aerodrome Design Manual (ICAO)

ADOP
Aerodrome Design and Operations Panel (ICAO)

ADP
Paris Airports Group

AESA / EASA
European Union Aviation Safety Agency

AFIS
Aerodrome Flight Information Service

AIT
Transport Innovation Agency

ANC
Air Navigation Commission (ICAO)

APIDS
Automated Prohibited Items Detection System

APU
Auxiliary Power Unit

ASTM International
American Society for Testing and Materials

ATMOCA
Technical Assistance to the Contracting Authority

ATM/ANS
Air Traffic Management / Air Navigation Services

B

BGTA
Air Transport Gendarmerie Brigade

BNAE
Aeronautics and Space Standardization Bureau

C

CAEP
Committee on Aviation Environmental Protection (ICAO)

CALIPSO
Classification of Light Aircraft According to Noise Index

CCTA
Aeronautical Technical Coordination Committee

CDE
Explosive Detection Dogs

CEAC (ECAC)
European Civil Aviation Conference

CEN-CENELEC
European Committee for Standardization in Electrotechnics

CEP
Pyrotechnic Certification and Evaluation

CFMD
Continuous Friction Measuring Device

CFL
Longitudinal Friction Coefficient

CIL
Interlaboratory Comparison

CMP
Continued Performance Monitoring

COFRAC
French Accreditation Committee

CSA
Administrative Social Committee

CTR
Network Technical Cell

D

DAP
Prison Administration Directorate

DCSID
Central Directorate of the Defence Infrastructure Service

DGAC
French Civil Aviation Authority

DGAMPA
Directorate-General for Maritime Affairs, Fisheries and Aquaculture

DGITM
Directorate-General for Infrastructure, Transport and Mobility

DPO
Design Organisation / Production Organisation

DSAC
Directorate for Civil Aviation Safetye

DSNA
Air Navigation Services Directorate

DTA
Air Transport Directorate

E

EASA
European Union Aviation Safety Agency

EDS
Explosives Detection System

EG
Expert Group

ENAC
French Civil Aviation University

EN-ICCA
European Network on Impact of Climate Change on Aviation

ENTPE
National School of State Public Works

ESSOP
Environment, Systems and Operations Safety and Planning

ETD
Explosive Trace Detection

EUROCAE
European Organisation for Civil Aviation Equipment

EUROCONTROL
European Organisation for the Safety of Air Navigation

F

FAA
Federal Aviation Administration

FS
Specialised Training in Health, Safety and Working Conditions

G

GHTF
Ground Handling Task Force

GNSS
Global Navigation Satellite System

GPU
Ground Power Unit

GRF
Global Reporting Format

H

HRA 4you
DGAC Human Resources Management Tool

I

IBIS
ICAO Bird Strike Information System

IEC
International Electrotechnical Commission

IEEAC
Civil Aviation Operations and Studies Engineer

IESSA
Electronic Systems Engineer for Aviation Safety

IFBS
Hold Baggage Screening

IMAG
Automatic Friction Measurement Device

IPEF
Engineer of Bridges, Water and Forests

ISO
International Organization for Standardization

ITPE
State Public Works Engineer

J

JRC
Joint Research Centre (European Commission)

JUS
Performance Justification

L

L2E
Testing and Expertise Laboratory

LAG
Liquids, Aerosols and Gels

LCEP
Chemistry and Explosives Laboratory

LEDS
Liquid Explosives Detection System

LRST
Local Runway Safety Team

LTO
Landing and Take-Off Cycle

M

MACOUS
Acoustics Measurement Laboratory

MDG
Modelling and Databases Group (CAEP)

Glossary

N

NoiseDB
Noise Database

NOx
Nitrogen Oxides

NSP
Navigation Systems Panel

NvPM
Non-Volatile Particulate Matter

O

OACI / ICAO
International Civil Aviation Organization

OLGA
Holistic Green Airport

P

PANS
Procedures for Air Navigation Services

PAPI
Precision Approach Path Indicator

PCA
Pre-Conditioned Air

PCN
Pavement Classification Number

PCR
Pavement Classification Rating

PIAF
French Aeronautical Information Platform

PSNA / ANSP
Air Navigation Service Provider

R

RGAA
General Accessibility Improvement Framework

RMT 0161
Rulemaking Task 0161

RTCA
Radio Technical Commission for Aeronautics

RWYCC
Runway Condition Code

RUGOBOX
Dynamic Surface Texture Measurement Device

S

SAE International
Society of Automotive Engineers

SARPs
Standards and Recommended Practices

SBAS
Satellite-Based Augmentation System

SCAC
Cayenne Airport Concession Company

SESAR JU
Single European Sky ATM Research Joint Undertaking

SID
Defence Infrastructure Service

SIMBA
Aeronautical Lighting Simulation Tool

SMQ
Quality Management System

SMUH
Helicopter Emergency Medical Service

SNARP
Paris Region Air Navigation Service

SNIA
National Airport Engineering Service

SORA
Specific Operations Risk Assessment

SSLIA (ARFF)
Aircraft Rescue and Firefighting Service

T

TAG
Technology Alignment Group

TARMAAC
Civil Aviation Atmospheric Emissions Analysis and Monitoring Unit

TaxiBot
Semi-Robotic Aircraft Towing Vehicle

TF
Task Force

TFP
Trust Framework Panel

TSEEAC
Senior Technician for Civil Aviation Operations

TSDD
Senior Technician for Sustainable Development

U

UAF
Union of French and Francophone Airports

UFC
Federal University of Ceará

ULM
Ultralight Motorised Aircraft

V

VAWG
Visual Aids Working Group

VISU
Visual Aids Laboratory

Voxel
Volumetric Pixel (3D Image Element)

VULCLIM
Assessment of Climate Change-Related Vulnerabilities

W

WG
Working Group

WHMEG
Wildlife Hazard Management Expert Group

Notes

Activity report designed and produced by the Civil Aviation Technical Department

Composition and production: Franck DUJARDIN (DGAC/STAC/ASID-APGI)

Photo research: Franck DUJARDIN (DGAC/STAC/ASID-APGI)
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Legal Deposit: 2nd quarter 2026

May 2026

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ISSN 1956-3868