# **ACTIVITY REPORT**

CIVIL AVIATION TECHNICAL CENTRE

# 2017



MINISTÈRE DE LA TRANSITION ÉCOLOGIQUE ET SOLIDAIRE

dgac

STAC

Ministry for an Ecological and Solidary Transition

AIRFRANCE

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# EDITORIAL

he year 2017 has been marked by communication. Following the STAC technical day, which brought together almost 200 people in the DGAC's amphitheatre, the biodiversity network's kick-off meeting was an event warmly welcomed by the managers of French airports present.

On an international level, the presence of STAC experts, in working groups and conferences, has been noted more and more for their often decisive contributions. In addition, the "Women in Aviation 2017" prize was awarded for the first time by EUROCAE to Catherine BONARI as a symbolic gesture, recognising the work carried out by her team over several years.

The guides and reports published this year and mentioned in this activity report are a further demonstration of the variety of subjects tackled and the quality of STAC's output.

I invite you to take a look at the report on a study examining the benefits of maintaining the use of both French and English for air/ground radio communications, which can be found on the new STAC website. This study provided the basis for France's decision to continue using French in radio communications between air traffic control and aircraft.

The events organised to share our expertise and provide you with the results of our studies only touch on a small part of the subjects, analyses and studies we have handled this year. Mentioning all of the STAC's activities in one editorial is a challenge. But you can discover them in detail in the following pages.



Richard METZGER DGAC/STAC

Last but not least, our activity report is now translated into English, for the first time this year, showing the STAC personnel willingness to continue to participate actively to the sustainable development of the civil aviation industry at international level.

I hope that you enjoy reading this document just as much as I have enjoyed presenting the work of STAC's personnel to you.

Olivier JOUANS STAC Director

### STAC2017 ACTIVITY REPORT

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### STAC2017 ACTIVITY REPORT



# **STUDIES & RESEARCH**

#### MOSART STUDY

In 2017, the Air Navigation division conducted a study of analysis by dysfunctional modelling applied to a Remote Tower, carried out with the expertise of the "DGA Techniques Aéronautiques" test centre. The study relies on software developed by Dassault Aviation. Dysfunctional modelling makes it possible to review the method for evaluating a remote tower by linking the operating concept with the requirements of air traffic control. The study describes the first version of the system designed for the Saint-Pierre and Miquelon remote tower.

It integrates both the human aspect and the procedures, and accordingly proposes a link with the requirements resulting from the European SESAR project. Analysis using dysfunctional modelling makes it possible to show the impact of one component's failure mode on the other components and, ultimately, on the service provided. This modelling logically leads to consideration of modifications to the system and procedures in order to improve either the cost or the level of safety. Multiple stage modelling also makes it possible to highlight the key points of the system to which particular attention should be paid throughout its life cycle.

#### ► FABEC, THE WAY AHEAD

To meet the European performance plan for reference period 2024-2020(3), FABEC has initiated a "strategic plan" approach, known as "FABEC, the way ahead". In terms of the monitoring authority, it is the sub-group Change Task Force (TF) headed by STAC which guided discussions. While monitoring authorities have previously supported the projects led by air navigation service providers, the new plan proactively provides for greater coordination between monitoring authorities. The RBO concept (Risk Based Oversight) included in appendix 19 of the ICAO and reiterated in the new European Regulation on ATM (EU 2017/373) is at the heart of the new plan. The Change TF subgroup will be involved in creating a common picture of risk. The authorities will also focus on strengthening links with service providers and will ensure coordination between them. This coordination, which is more difficult due to the lack of a major project, is a way of ensuring that a high level of safety is maintained.



#### OPHELIA FEEDBACK IN LYON

In collaboration with CEREMA and IFSTTAR, STAC has developed software to forecast water heights on runways linked to aeronautical information (OPHELIA). An operational validation phase for this software took place at Lyon Saint-Exupéry airport. Between March 2013 and May 2017, 128water height measurements were taken by the airport. These measurements show a positive correlation with the OPHELIA forecasts, which helps to show the relevance of the concept. A second trial is being carried out at Strasbourg airport.

#### ► TRAINING ON THE ATM/ANS IR

Published in the Official Journal of the European Union on 8 March 2017 under reference (EU) 373/2017, the ATM/ANS IR Regulation in its corrected form will require a major training effort for all personnel in the Air Navigation division of the SINA department. It introduces new concepts for carrying out safety assessments and for monitoring activities, the mastery of which will provide new expertise for the division for years to come. In 2017, two agents have already taken the required training at Eurocontrol in Luxembourg. This effort will continue in 2018 with the training of two more of the seven agents who make up STAC's Air Navigation division.



#### THESIS ON FORECASTING AIRCRAFT BRAKING PERFORMANCE BASED ON FRICTION MEASUREMENTS

On 14 September 2017, STAC engineer Jonathan GERTHOFFERT successfully defended his doctoral thesis on forecasting aircraft braking performance on wet runways based on friction measurements.

This research made it possible to compile, calibrate and validate physical modelling of contact between a tyre and a wet pavement, whether it is an aircraft or Continuous Friction measurement equipment (CFME).

The model developed in this way makes it possible to overcome some of the limits on attempts to find direct correlation between the CFME friction measurements and the perceived adhesion of the aircraft. It therefore constitutes a critical development in studies concerning the updating of minimum friction thresholds and the use of CFME in an operational context.

The completion of this thesis rewards the progress in significant collaborative work begun in 2013 between the STAC Airport infrastructures division and IFSTTAR (which provided scientific support for the thesis), with the support of several partners, including Cerema and Airbus.

#### HWD STUDIES

#### DOWNWARD FRICTION

In 2016 and 2017, Toulouse Blagnac airport observed the sudden appearance of cracks in runway 14R-32L, which is an old hydraulic concrete pavement reinforced with bituminous materials. Core drilling showed that there was cracking from the top at the level of the underlying concrete slabs and therefore a new type of deterioration.

Since this phenomenon was of scientific interest, on 3 October 2017 Toulouse Blagnac airport, CEREMA, Airbus and STAC conducted an experiment, unique in its field, consisting of studying and comparing the behaviour of the pavement under a Heavy Weight Deflectometer load (HWD) and under an A319 Test landing gear chartered by Airbus.

Modelling work is now under way at STAC, integrating visco-elastic behaviours in the bituminious materials, in order to understand what is causing cracks in the pavement surface. The model will be adjusted and validated using the results of these combined tests.



The abundant information gained as a result of this 1:1 scale experiment should ultimately bring about changes in French methods for dimensioning and reinforcing aeronautical pavements by taking account of new damage mechanisms.

## STAC2017 ACTIVITY REPORT

#### EUROPEAN FRICTION WORKSHOP



The first European Pavement Friction Workshop (EPFW) was held on 29 and 30 May 2017 at IFSTTAR in Nantes. During this event, adhesion measurement tests were carried out using static and dynamic equipment, with the aim of comparing and correlating these different technologies. The STAC testing and analysis laboratory participated with two pieces of equipment: an IMAG and a SARSYS. This event also provided an opportunity to present the thesis work of Jonathan GERTHOFFERT (STAC - airport infrastructures department) and his model for evaluating adhesion to runways when they are contaminated with water

#### ► FACTORS DETERMINING SUSTAINABLE CAPACITY AT PARIS -CHARLES DE GAULLE

In the first quarter of 2017, the Aerodromes Safety and Capacity division carried out a study for the Paris - Charles de Gaulle Air Navigation Service Provider (SNA) with a view to providing a better understanding of factors constraining sustainable capacity (capacity that can be provided in a reproducible way and can be maintained at this level for long periods of time) in the airport's approach terminal maneuvering area.

To carry out this study, modelling of the airport and its approach airspace was performed using CAST aircraft fast-time simulation software. This modelling was used to simulate a large number of scenarios by changing different parameters that influence the airport's level of sustainable capacity. This made it possible to evaluate the influence of parameters such as geographic distribution of flows, the proportion of wide-body and narrow-body aircraft, or even the headwind intensity, in an objective manner.

By making it possible to quantify capacity reductions that would occur due to variations in different variables, this study provided crucial information to adjust the airport's coordination parameters.

#### ► NEW VERSION OF CAPACITY GUIDE

In 2017, the Aerodrome Safety and Capacity division set about updating the airport capacity guide ("Determination of airport capacity"), which would have been 13 years old in 2018, in order to adapt the content to reflect the development of air transport standards and practices. The new guide will be more general, examining all issues surrounding capacity. It should allow all actors in the field of aviation to develop a shared view of airport infrastructure capacity and to use a common vocabulary. This guide will be available in mid-2018.





#### CAPACITY STUDY OF FIGARI SOUTH CORSICA AIRPORT

As part of the implementation of schedule facilitation at Figari South Corsica Airport for the summer seasons, the Airport sub-directorate of the Directorate for Air Transport asked STAC to carry out a capacity study of the entire airport, covering both airside and the landside. This study highlights elements negatively impacting the capacity of the infrastructure, and evaluates the benefits in terms of flow and level of service achieved by the various changes projected in the short and medium term by the Chamber of Commerce and Industry of Ajaccio and South Corsica (CCI2A) and the Corsican regional authorities. In this context, modelling of the entire airport was carried out using CAST Aircraft and CAST Terminal software (fast-time simulation software) with the help of local stakeholders, the Ajaccio Figari air navigation service provider and the CCI2A.





#### ACQUISITION OF AIRTOP SIMULATION SOFTWARE



In summer 2017, the Aerodrome Safety and Capacity division acquired the fast-time simulation software, AirTOp, under the terms of a call for tender. The Division already owns the CAST software, which allows detailed modelling of traffic management in terminal buildings and aircraft traffic on the ground within the airport movement areas. In addition, the AirTop software makes it possible to improve modelling possibilities for terminal maneuvering areas. This new tool provides one of the most accurate reproductions of aircraft performance and air traffic control systems.

# STANDARDISATION & REGULATION

#### ► LAUNCH OF FRENCH STEERING COMMITTEE FOR DEPLOYMENT OF THE GLOBAL REPORTING FORMAT

The improved global format for evaluation and communication of runway surface conditions (Global Reporting Format or GRF) is to be implemented on 5 November 2020. Developed by the ICAO, it aims to objectively establish the relationship between an aircraft's performances and information about runway surface conditions, in order to reduce the number of runway excursions worldwide.

DSAC instructed the STAC to guide French implementation of this new regulation, and a great deal of work has been undertaken to this effect in 2017. Various messages have been sent to our partners (UAF, SIA, the French High Council for Meteorology, DGAC technical departments, etc.). A steering committee composed of representatives of all the stakeholders involved in implementation of these texts met for the first time on 4 December 2017 at STAC in Bonneuil-sur-Marne. The steering committee members will be creating several thematic groups, with a call for wider participation. The work of these groups will be carried out in close cooperation with that of the EASA Rule Making Tasks (RMT 0296 and RMT 0704) and of the ICAO Friction Task Force.

#### ► FRICTION TASK FORCE (ICAO) AND RULE MAKING TASK 0704 (EASA)

STAC participated in two meetings of the Friction Task Force of the ICAO organised in 2017. The work primarily involved finalisation of the new circular 329 relating to evaluation, measurement and reporting on the condition of runway surfaces.

This document will be submitted to the ADOP in March 2018. Meanwhile, STAC has been selected to represent DSAC at the EASA Rule Making Task 0704, created at the end of 2017. The aim of this group is to suggest an update to regulatory requirements for EASA certified airports within the scope of implementation of the ICAO Global Reporting Format (GRF).



#### ► CATHERINE BONARI WOMEN IN AVIATION 2017 EUROCAE

Catherine BONARI, assistant head of the STAC Aerodrome Safety and Capacity division, is the secretary of the EUROCAE working group WG 83 "Foreign Object Debris (FOD) Detection Systems".

As recognition for her contribution to the creation of the EUROCAE standard, published in 2016, establishing specifications for FOD detection equipment, in 2017 Catherine BONARI received the "WOMEN IN AVIATION" prize awarded by EUROCAE for the first time.

The prize-giving ceremony took place on 27 April 2017 at the Royal Aeronautical Society in London, at EUROCAE's annual general meeting.

#### **OLS TASK FORCE**

In 2017, STAC continued its work within the Obstacle Limitation Surfaces Task Force (OLSTF) aiming to revise obstacle limitation surfaces. STAC was able to study the aircraft trajectories provided by the FAA in detail and will be in a position to provide its findings during the first part of 2018.

In November 2017, EASA invited STAC to present the guidelines and progress of the OLSTF at the meeting of the Technical Body (TeB). In December 2017, at the Global Air Navigation Industry Symposium (GANIS) organised by ICAO in Montreal, STAC was also able to present the work of the OLSTF.

#### ► THE ICAO AERODROME PANEL (ADOP) : FOCUS ON THE HDWG

The ICAO panel responsible for aerodromes (ADOP) will be chaired by Jean-Louis PIRAT, scientific and international adviser at STAC until April 2018. The ADOP brings together experts from 23 states and 10 international organisations.

The ADOP programme comprises 18 tasks, the most emblematic of which are revision of the aerodrome reference code and associated runway and taxiway specifications, total revision of obstacle limitation surfaces, the strategic review of Annex 14 and related documentation following an operational, risk-based approach, development of specifications for ground handling services, ASMGCS and the A-CDM, and continuation of the drafting of PANS-Aerodromes.

The Panel is divided into 5 working groups and 13 subgroups, made up of over 200 experts from every continent except for Antarctica.

There are 14 experts from STAC, including Jean-Louis PIRAT, responsible for tasks relating to movement areas, heliports, obstacle limitation surfaces, visual aids, aeronautical pavements, ARFF, wildlife hazard, prevention of Foreign Objects Debris (FOD), ground handling, A-SMGCS, A-CDM, airport planning and new categories of approaches to instruments.

The studies and guides produced by STAC will also naturally contribute to ADOP technical propositions.

The year 2017 was primarily dedicated to the implementation of amendments adopted by the Panel in November 2016 that relate to the aerodrome reference code method, physical characteristics of runways and taxiways, as well as parallel separations of runways and taxiways.

The amendments include reductions in recommended widths for runways and taxiways, for their strips and verges and parallel separations of runways and taxiways. It has been estimated that cost savings will be in the tens of billions of euros, while maintaining safety and improving capacity and environmental impact.

The second step, which is under way and already showing promising results, is linked to the revision of obstacle limitation surfaces around aerodromes led by the OLSTF. In the field of heliports, the STAC represents the DGAC within the ICAO working group: HDWG (Heliport Design Working Group). This group has completed most of the revision of Annex 14, Volume II on the design and use of heliports, which will be proposed to the ADOP in March 2018 for approval.

The main aim is to revise chapter 3, which deals with the physical characteristics of heliports and chapter 6 on the ARFF according to a performance-based approach. This revision should propose standards and recommendations providing greater flexibility to States while ensuring an optimum level of safety.

Significant work has also been carried out with the reform of the ICAO guide on heliports in order to provide better support to States, operators and designers of heliports.



#### ► DAY ORGANISED BY THE VISUAL AIDS LABORATORY FOR AERODROME OPERATORS

On 20 October 2017, the Visual Aids laboratory of the STAC Equipment division organised a technical day at its Toulouse site for aerodrome operators to present the different services the laboratory offers them (expertise, technical advice, performance evaluation in the field of airport marker lighting) and to better identify their current needs and issues.

Various topics were raised, including the insufficient omnidirectional component of LED runway edge lights, the defects of runway edge light polycarbonate glass, loosening of screws and bolts in built-in marker lighting, the limited service life and issues with electromagnetic compatibility (EMC) of LED electronic cards, the proposed regulation on the protection of workers carrying out repairs on series circuits for marker lighting, photometric measurements taken using dynamic measurement systems, and the compliance monitoring work carried out by operators in order to conform to requirements set out by the EASA.

The STAC Visual Aids laboratory and Equipment division aim to offer their technical competences to aerodrome operators in order to find technical solutions to these different issues.

#### ► THE WORK OF THE ICAO VAWG

STAC is participating in the work of the ICAO Visual Aids Working Group (VAWG), which is the group responsible for developments in terms of visual aids in Annex 14 and associated documentation (Doc 9981,9137,9157, etc.).

On the one hand, STAC communicated about an experiment conducted by ADP and the FAA on the use of orange boards to provide temporary information during works. The aim of these signs is to improve the safety of airport operations during works on the infrastructure while providing information to crews as close as possible to the place where this information is necessary.

These signs are used to reduce risks and are in addition to aeronautical information. Discussions are ongoing to insert these signs in the future chapter relating to works at aerodromes in Doc 9981 (PANS-Aerodrome).

On the other hand, characteristics of aircraft published in Doc 9157 part 4 for the PAPI positioning calculation are not up to date and only cover a small part of the aircraft fleet used in public transport.

STAC has proposed to implement a system common to all aircraft manufacturers to provide States with up-to-date values, covering a wider range of aircraft.

A meeting to present a training package took place in Tunis on 16 and 17 January 2018.

#### **STAC PARTICIPATES IN THE TWINNING WITH TUNISIA**

Launched in 2016 by the European Union, twinning with Tunisia in the civil aviation sector contributes, among other things, to increasing the security and safety of civil aviation. It brings together the Tunisian Ministry of Transport's Civil Aviation Authority (DGAC) and the French Civil Aviation Authority.

It is in this context that DSAC has asked the Equipment division of STAC to provide a series of training courses in the field of airports to the Tunisian DGAC.

At this meeting, STAC gave representatives of the Tunisian DGAC and the Civil Aviation and Airports Authority (OACA) a presentation of training programmes aimed at airport monitoring inspectors for the Energy and Airfield Ground Lighting and Air Rescue and Firefighting (ARFF) fields, as well as training aimed more towards operators on the prevention of wildlife risk and on airport pavement infrastructure.

The selected courses should be carried out before the end of August 2018, when the twinning will come to an end.

#### STUDY ON THE AGEING OF LED LIGHTS

In 2015, in partnership with Brest Bretagne and Roissy CDG airports, the Visual Aids laboratory initiated a study on the ageing of LED airport marker lights. Every 6 months, the lights are removed for photometric and colorimetric measurements by the Visual Aids laboratory, and are then re-installed. The aim of this study, which will continue for several more years, is to evaluate how well photometric and colorimetric performance of LED airport marker lights is maintained over time when used in normal operating conditions.

#### ► VALIDATION OF PHOTOMETRIC MEASUREMENTS TAKEN BY AERODROME OPERATORS

In 2017, at the request of Toulouse Blagnac and Marseille Provence airports, the STAC Visual Aids laboratory took photometric measurements of several airport marker lights removed from the site. The aim was to provide a technical opinion on the measurements taken by the operator using a dynamic measurement system (measurements taken when checking their maintenance objectives are met). This method satisfied operators and made it possible to ensure consistency between their measurements and those of the Visual Aids laboratory.



#### EVALUATION OF LOAD-BEARING CAPACITY

**NEW ACR/PCR METHOD** 

The STAC Airport Infrastructures division has participated in two meetings of the ACN/PCN Task Force of the ICAO in 2017. This is a subgroup of the Airfield Pavement Expert Group (APEG) which has the objective of revising the standard evaluation of the load-bearing capacity of the infrastructures in order to adapt them to new, "rational", methods of dimensioning and reinforcing aeronautical pavements.

STAC, the FAA, Airbus and Boeing are part of this Task Force. These meetings have made it possible to finalise the technical procedure for determining new indicators, which will be known as Aircraft/Pavement Classification Ratings (ACR/PCR), in order to distinguish them from the old ACN/PCN indicators with which they are not compatible. The amendments to be made to the ICAO reference documents, Annex 14 and the Aerodrome Manual (ADM), as well as Annex 15 on aeronautical information, were also proposed to the ICAO Aerodrome Panel.

The provisional date to start the transition from the current method to the new method is set for 2020, with final implementation in 2022.

STAC aims to organise an international symposium on the subject in 2019, along with the other parties making up the ACN/PCN Task Force.



#### ► ICAO GANIS-SANIS – STAC RECOGNISED ON A WORLDWIDE

Early in December 2017, ICAO organised two conferences as part of the preparations for the 13th Air Navigation Conference, which at the end of 2018 will determine the main strategic recommendations relating to Air Navigation Safety and Capacity.

The aim of the Global Air Navigation Industry Symposium (GANIS) and the Safety and Air Navigation Industry Symposium (SANIS) was also to take stock of the developments scheduled in the ICAO's global plans: the Global Air Navigation Plan (GANP) and the Global Aviation Safety Plan (GASP) and on new industry requirements, most notably drones, new spatial perspectives and cybersecurity. STAC was quite rightly represented first and foremost in the subjects where it is recognised for its knowledge and its expertise at an international level and where it supports and organises ICAO work.

During GANIS Aubin LOPEZ gave a presentation on the ongoing project to overhaul Obstacle Limitation Surfaces and Nicolas TURCOT gave a presentation on the issue of ground Handling during SANIS.

Finally, the STAC has now become an indispensable contributor on the Aerodrome Design and Operating Panel (ADOP) and has been invited to moderate and summarise the debates relating to airport operations as part of GANIS.

These two events made it possible to highlight the contributions made by STAC and its expertise on an international level.



# **IMPLEMENTATION**

#### LITHIUM BATTERIES

Portable electronic devices (PED) which are now regularly carried by passengers are often fitted with lithium ion batteries. These fall under the Dangerous Goods (DG) classification for air transport and are not entirely free from faults and disadvantages in terms of security and safety. Therefore, in response to ICAO queries, and pressure from EASA and DSAC, in 2017 STAC launched two studies concerning the impact of PED on safety and security.

The first study, carried out by the STAC security division, primarily consisted of a survey of the state of the art on the subject, in France and internationally. To this end, STAC carried out an appraisal mission in China in order to carry out initial tests on Nuctech's equipment and to meet the operator of Beijing airport in order to gather information relating to the security checks in place.

From a safety perspective, a second study led by the Equipment division, aims to examine fire propagation factors in the event of battery thermal run-away to improve the conditions for prevention, transport and, if necessary, fire-extinguishing in-flight or on the ground by airport firefighters. This study is carried out in partnership with the "DGA Techniques Aéronautiques" test centre in Toulouse. The first tests on different electronic devices were carried out in 2017. They will be completed in 2018 with tests on luggage and containers.

#### STAC USES DRONES

With five image capturing devices, STAC is a drone operator authorised to conduct internal training and to fly on sight, if necessary in populated areas, in compliance with scenarios S1, S2 and S3.

Three STAC agents are now licensed remote pilots and several others are completing their theoretical training in order to achieve this license too.

From 2018, missions will be carried out for communication purposes and to support performance of tests in several STAC fields of competence.



#### STAC VALIDATES THE TECHNICAL ASPECT OF PAPI SETTING ANGLES CHECKING USING A DRONE

In December 2017, the STAC Equipment division started experimentation of setting angles checking on a Precision Approach Path Indicator (PAPI) units by using a drone with the ADP CDG services.

This method developed by CANARD Drones company has the advantage of being quicker and easier to implement than other methods.

After setting up a measurement protocol created by STAC (principle, quantity and distances of measurement points), this method was validated by comparing measurement results obtained using the drone method with those obtained using the "aerial bucket" reference method recognised by the national oversight authority.

Analysis of the compared measurement results, whether in terms of accuracy of the measurement, repeatability or constancy, made it possible to validate this in situ inspection concept developed by the CANARD Drones company for use of the type of drone listed in their technical document and with their operators trained in this methodology.

Validation of a method setting angles checking of PAPI units is always combined with a methodology that includes drones, operators and procedures.



#### ENERGY/LIGHTING OVERSIGHT

As part of their oversight and airport certification work, the civil oversight authorities (Directorate for Civil Aviation Safety - DSAC) and military oversight authorities (State Directorate for Aeronautical Safety -DSAE) made use of STAC's expertise to carry out 17 audits in the fields of airfield ground lighting and the associated energy required. These audits involved a large panel of aerodromes, ranging from Hao (nonprecision approach) to Paris Charles de Gaulle (CAT III approach).

In 2017, STAC also carried out a technical study on the Tours Val de Loire runway at the request of the Directorate for Civil Aviation Safety West. This study was carried out based on analysis of failure modes of lighting and power supply installations and equipment, their effects and their criticality.





### STAC2017 ACTIVITY REPORT



# **STUDIES & RESEARCH**

#### OUR PROJECTS

Study on the packaging and durability of odorology filters

 Cabin baggage expert report Flight ms 804

► Laboratory assessment of the impact of the number of simultaneously sampled electronic devices on the performance of ETDs

 Alarm resolution protocol for 3D fluoroscopic images of automatic CTX 9800 explosives detection equipment



#### VISION SURETE » PROGRAMME

2017 was a year of transition from the end of the first phase to preparation for the second phase of the *Vision Sûreté*.

This has made it possible to consolidate recommendations from around 20 trials carried out over three years on five French platforms (Lyon Saint Exupéry, Nice Côte d'Azur, Paris Charles de Gaulle, Paris Orly and Toulouse Blagnac). Among these recommendations, the STAC has finalised a complete evaluation process for automated and multiplexed lines the purpose of which is to extend the current monitoring scope to include these new configurations of screening stations deployed as part of the Vision Sûreté.

The results from the remote multiplex analysis, both for the DGAC and for aerodrome operators, were also presented at the STAC at a seminar bringing together around fifty representatives from the airport world and from the industry in June 2017. The STAC also assisted the security and defence department of the Air Transport Directorate (DTA), which is leading the programme in collaboration with the DSAC's technical security directorate in order to shape the framework for the second phase of the *Vision Sûreté* programme. This second phase is particularly ambitious and will expand the programme into new domains, such as screening of hold baggage and personnel, and also to involve new stakeholders, while at the same time continuing the work that has been ongoing since 2014.

#### SCREENING OF HOLD BAGGAGE

Security measures have undergone huge changes over the last fifteen years, which have resulted in continuous strengthening of control systems at airports. In light of this, binding regulatory changes have been instigated on a supranational level, requiring screening stations for hold baggage to be brought into conformity.

In order to assist aerodrome operators in bringing their screening stations for hold baggage into line with regulations, the STAC has created a technical guide.

It provides decision support and an updated methodological approach with the aim of rethinking the design of hold luggage screening systems and installing standard 3 EDSs at the first control level, whether this is to update an existing installation or create a new one.

It is the result of two years of studies and experimentation at airports to evaluate the operational characteristics of hold luggage security, monitoring and conveying equipment and system



Richard METZGER DGAC/STAC

It suggests different hold luggage screening architectures alongside optimised dimensioning elements to meet major security and operational challenges faced by aerodrome operators.

# **STANDARDISATION &** REGULATION

#### INTERNATIONAL WORKING GROUPS

In 2017, STAC security division experts actively participated in 18 meetings of the European Civil Aviation Conference (ECAC) working groups in order to draw up new technical specifications, specifically for evaluating Explosive Detection System (EDS).



At these events, STAC presented the results of several expert reports concerning new threats which enriched the discussions between our relevant foreign and industrial counterparts. Worthy of mention in this context is the work carried out on the detectability of threats when using equipment to detect traces of explosives in a polluted environment, and the work aiming to improve the performance of solid explosive detection systems (EDS).

This work was the result of successful collaboration between STAC and manufacturers in the field, as well as our foreign partners. It paves the way for numerous research opportunities.

#### CYBERSECURITY

#### STAC WORKING TO IMPLEMENT THE DGAC STRATEGY

2017 provided an opportunity to restructure the STAC cybersecurity strategy. This was coordinated by Farid ZIZI, scientific and international adviser.

Thanks to its "information systems" division, the STAC was already fully integrated into the DGAC ISS policy, but had not necessarily developed a methodological approach to risk analysis relating to cybersecurity or test facilities able to support the upskilling of its various teams in cybersecurity. Thanks to the development and implementation at the end of 2017 of a cybersecurity platform based on the CNS laboratory by the Air Navigation division in collaboration with DSNA-DTI,

it should be possible starting in 2018 to evaluate software systems and networks for DGAC, whether they are for specialised applications, office automation or information management. This platform will make it possible to develop cybersecurity knowledge and skills within STAC, in particular for the field linked to ATM/ANS where the international regulatory context is constantly changing and where the STAC will be able to support DSAC in its monitoring of the cybersecurity domain. The Cyber entity should complete configuration of the room by mid-2018. After this, the first tests will be implemented to analyse the Public Key Infrastructure (PKI) on the DGAC's office equipment. The next step will be to analyse cyber risks for ATM/ANS systems.

In terms of methodology, the work conducted by STAC on methods for dysfunctional risk analysis should help to define a common approach to the validation of changes in air navigation and airport navigation, combining safety analysis and analysis of cybersecurity vulnerabilities.

In 2017 STAC also joined a number of think tanks on the topic of cybersecurity in aviation. STAC represents the DGAC on the executive committee of the EASA Strategic Coordination Platform (ESCP) on the subject of cybersecurity and also in various subgroups: strategy, regulation and soon risk analysis. STAC is also a member of the EUROCAE WG72, which deals with ATM system IT security. Finally, the STAC represents France in ICAO activities relating to cybersecurity (Secretariat Study Group on Cybersecurity) and is participating in ECAC work in this field.

Both on an ICAO and EASA level, 2017 has been a year for launching work, with the definition of different mandates and the forming of working groups. In all these groups, STAC promotes the search for synergies between safety management, cybersecurity and information security management processes, the use of industry standards, ISO 27000 in particular, and certification, possibly for processes, but certainly not for systems, in particular in the ATM.

As well as work carried out on a strategic and regulatory level, STAC is gradually incorporating the cybersecurity component into different disciplines. This was already the case for information management and office automation systems, in accordance with the DGAC ISS policy.

2017 has seen the development of concrete measures in terms of deploying STITCH and execution of detailed risk analyses, to which the STAC has contributed on the vulnerability points of airports facing the risks of cyberattacks





#### **SECURITY LABORATORIES - NATIONAL LABORATORY AND ROBOT**



In order to implement the new evaluation method for walk-through metal detectors of the European Civil Aviation Conference, the STAC has acquired a new robot, which can guarantee the direction of threats, the exact position in all crossing points, the correct location of threats by the walk-through metal detection equipment, and therefore a thorough evaluation of the performance of this type of equipment.

The STAC security laboratories, located in Bonneuil-sur-Marne, will start the first evaluations of walkthrough detectors in the first quarter of 2018 using this new method, within the scope of the ECAC common evaluation process for security equipment.

#### ► MISSION TO SUPPORT THE CAMEROON CIVIL AVIATION AUTHORITY

The European Commission appointed the European Civil Aviation Conference as leader of the Case project, devoted to optimising the use of security technologies installed in the international airports of Douala and Yaoundé. The work was implemented by two experts from the STAC security division, Salim MAMMAR and Gaël WEIDMANN.

The aim of this activity is to review the security equipment used and the operational procedures associated with it, to share best practices for their effective use in different fields (performance, procedures, settings, maintenance, etc.) and finally to issue recommendations on selection, approval and acquisition procedures.



Nsandou Aboubakar. Autorité aéronautique du Camere

### STAC2017 ACTIVITY REPORT

#### ▶ PASSENGER CHECKPOINT EXPERTISE IN DUBLIN FOR THE IRISH CAA

Following the deployment of fifteen lines equipped with centralised image processing (CIP) on the inspection screening station at Dublin airport's Terminal 1, the Irish Aviation Authority (IAA) wanted to carry out a technical evaluation to ensure that the security level was not degraded.

Without an ad hoc service in Ireland, the IAA sought a partner on the European level. With the experience gained from the four RMA tests carried out as part of the *Vision Sûreté*, the STAC responded to this call.



The evaluation of these lines according to the new performance justification protocol showed that the security levelwas not affected by this deployment. It also allowed the STAC to confront the reality of a screening station fully equipped with RMA.



#### **STITCH**

SUPPORT FOR DEPLOYMENT AND DEVELOPED SOFTWARE, ACCESS CONTROL PLATFORMS AND VERIFICATION OF STITCH COMPATIBILITY

In order to replace the now obsolete Computerised Access Rights Management System (SGITA) with the System for Computerised Processing of Access Rights and Authorisations (STITCH), in 2017 the STAC started installation and configuration of the STITCH system on 13 airport platforms or DGAC sites.

This work consisted in installing the new system, providing support for connection of the access control system and decommissioning the old SGITA system.

2018 looks to have just as much in store for this project, as this replacement process will now take place on the Parisian platforms and the deployment rate will increase to two or three airport sites per month.

In connection with the STITCH project, the STAC has undertaken the task of verifying the compatibility of the new access control system gateways with STITCH.

The new gateways were developed by the access control providers to enable them to electronically obtain the AICs created by STITCH in accordance with the enriched protocol (all badge information).

In order to conduct this work, STAC has obtained installation of six (physical or software) platforms representative of the systems deployed in airports (Omnitech/SEAL, Gunnebo/SMI Server, TIL/Microsesame, Synchronic/PC Pass, Nedap/AEOS, IdTech/UniPass).





#### **ACTIVITY IN FIGURES**

#### EQUIPMENT EVALUATED

► Explosive-detection dogs tested: In 2017 STAC carried out 694 evaluation tests. These evaluations were carried out in the different working environments established by the regulation: free running freight, screening of hold baggage, inspection of security restricted areas (SRA), screening of vehicles - screening of airport supplies, checking freight using the remote detection method.

#### CONTINUED PERFORMANCE TEST CARRIED OUT

▶ 10 controlled platforms

#### CERTIFICATIONS

► 13 X-Ray screening Systems, 6 EDS, 8 threat image protection (TIP) libraries, 3 security scanners

Richard METZGER/STAC



# BIODIVERSITY AND SUSTAINABLE DEVELOPMENT

### STAC2017 ACTIVITY REPORT



# **STUDIES & RESEARCH**



#### CLIMATE CHANGE

Following work associated with the French National Plan for Adapting to Climate Change, the STAC has made progress in creating a tool for assessing the vulnerability of airports to climate change, using free online survey software.

Thanks to the collaboration of four volunteer aerodromes, the questions entered in the software for aerodrome operators to assess the vulnerability of the platforms have been improved. Aerodromes have also guided the STAC in making the tool simple and efficient for future users. The tool was presented to the DTA at the beginning of 2018.

#### CEREMA INNOVATION PRIZE ON HEATING PAVEMENTS

Between 2014 and 2017, the STAC participated in an innovative pavement heating project as part of a working group made up of the IFSTTAR, Cerema, the TOTAL Group and the French Public Works School (EATP). The original idea is to implement a draining asphalt bonding layer, so as to allow autonomous circulation of a heat transfer fluid along the pavement, without having to pass through pipelines.

A demonstration of this concept was carried out at the end of 2014 on the EATP site in Égletons, and the working group was awarded a Cerema innovation prize on 31 January 2017.

In the long term, the coupling between this circulation process and a geothermal storage system could make it possible to autonomously ensure the winter viability of pavements in sensitive situations, particularly in the airport environment.



#### ► WELCOMING THE ALFA-ACI INFRAS WG AND THE RST GEORADAR WG

LAUNCHING THE ALFA-ACI MARKER LIGHTING WG

As part of the strengthening of our partnerships with airport operators, on 14 and 15 June 2017, for the very first time, STAC welcomed the French-speaking airports associated with the ACI's "INFRAS WG" working group. This very active group meets three times a year and unites the forces of airport platforms of all sizes to discuss the issues of airport design, maintenance and also certification. STAC and the DCSID Airport Reference Centre are active members. One of the WG's flagship projects is the production of practical guides based on feedback, the first of which have of course been included on the www platform. Libelaero.fr.

Following this success, the INFRAS WG has diversified with the creation of a "marker lighting" working group whose work started in 2017.

The STAC has also been part of the "radars" WG since 2015, which brings together users of georadars, such as Cerema, the IFSTTAR and the Belgian CRR. The last meeting of this group took place at the STAC in October 2017. It provided an opportunity to test different georadar technologies on the STAC instrument board in Bonneuil-sur-Marne.

#### WINTER OPERATION

A DECISION SUPPORT PROTOTYPE

A growing number of de-icers are used in airports.

For many years, the STAC, along with the French Centre for Studies and Expertise on Risks, Environment, Mobility, and Planning (Cerema) has sought to develop tools and methods to optimise winter operation. There are numerous issues related to safety, finance and the environment.

In 2017, in partnership with the Centre for Prototype Study and Design (CECP) and the University of Lorraine, a prototype was developed to measure the remaining de-icing concentration after an intervention.

The measurement method underpinning this device is based on multivariate analyses of data which provide very good results in just a few seconds.

This prototype will now have to be tested in realworld conditions in order to validate the operating mode and integration into an operational chain.

#### BILATERAL COOPERATION WITH THE FAA IN ATLANTIC CITY

On 19 and 20 July 2017, a delegation from STAC met with the FAA at the Atlantic City Technical Center for the annual cooperation meeting between the two bodies on the subject of aeronautical pavements.



Valérie GOUDEAU DGAC/STAC

Working meetings were held to discuss various topics of common interest such as dimensioning of new pavements, dimensioning of pavement reinforcements, auscultation, warm asphalt, heating pavements, or even runway adhesion.

Visits of the aeronautical pavement fatigue testing equipment (National Airfield Pavement Test Facility) and instrumented aircraft dedicated to adhesion tests were organised. This annual meeting also provided an opportunity to begin exchanges of students between the two organisations.





#### **COMMITTEE ON AVIATION ENVIRONMENTAL PROTECTION (CAEP)**

The Commitee on Aviation Environmental Protection (CAEP) is a technical body of the International Civil Aviation Organisation (ICAO), created in 1983. The CAEP brings its expertise to the ICAO Council by carrying out specific activities relating to the control of aircraft noise, gaseous emissions from aircraft engines and more generally relating to the environmental impact of aviation.

Its scope of activity includes noise, air quality, and planned measures to reduce  $CO_2$  emissions, including aeronautical technology, operational improvements, alternative fuels and market-based measures.

It is composed of experts from state certification bodies, manufacturers, airlines, airport operators and observers, divided into different working groups.

France is present on several working groups emanating from CAEP. Thus, within the Working Group 1 "Aircraft Noise Technical Issues", STAC, as well as the DTA's sub-directorate for sustainable development, is in charge of statistical analysis of helicopter noise studies. The main objective of WG1 is the maintenance, in an up-to-date and reliable manner, of the OACI's acoustic certification standards (Annex 16, Volume i) while ensuring simplification and reduction of the cost of the procedures.

It takes into account the monitoring and evaluation of Member States' research programmes on noise technologies. WG1 is also working on the development of acoustic certification standards for take-off, en-route and landing of future supersonic aircraft.

In the same context, WG1 is also examining the state of acoustic certification of drones and is reviewing and requalifying levels of certification of noise generated by helicopters.

The various CAEP working groups are working together to harmonise the ICAO's environmental standards and recommended practices (SARP). To this end, WG1 provides advice on acoustic aspects and the development of ICAO standards for carbon dioxide ( $CO_2$ ) emitted by aircraft

#### ► ICAO WILDLIFE HAZARD CONFERENCE

In May 2017, the ICAO and ACI organised the first conference on the reduction of wildlife hazards. This international event was an opportunity for STAC to present the functionalities and developments of PICA Wildlife Collision Information Program), a software developed by STAC for archiving and analysing birdstrike data.

Before the symposium, STAC participated in the first meeting of the ICAO Wildlife Hazard Management Expert Group.

The group brings together around twenty European, American and Canadian representatives, representing IFALPA and IFATCA with the aim of updating Part 3 of the ICAO airport services manual relating to the prevention of wildlife hazards.





# **IMPLEMENTATION**



#### ► THE FIRST TECHNICAL BIODIVERSITY DAY DEDICATED TO MOWING

On average, 75% of land alongside airports is made up of green spaces. Management of these vast areas incurs significant costs and has an impact on both safety and the environment.

On 20 January 2017, the STAC took part in a day of exchanges dedicated to mowing in airports, organised by HOP! Biodiversité for its members.

At the request of HOP! Biodiversité and in collaboration with the DTA, the STAC gave a presentation of current airport practices and best practice for vegetation cover management.

The discussions were enriched by feedback from several airports and by the presence of a CNRS researcher and a pilot from Hop! Biodiversité.

#### "AIRPORTS AND BIODIVERSITY" DAY ON 12 OCTOBER 2017

On 12 October 2017, the DGAC held the first national "Airports and Biodiversity" day organised by STAC.

Opened by Odile CHEREL, chief of staff of the Director General for Civil Aviation, this "Airports and Biodiversity" conference was about taking into account biodiversity in the airport world. There was particular focus on the operational aspect of the airports' implementation of measures in favour of biodiversity without prejudice to aviation safety.

Thanks to six presentations, around one hundred participants, including aerodrome managers, nature protection associations, research departments, and state departments (DGAC, DGALN, etc.) were able to gain a better understanding of the possible link between airports and biodiversity.

STAC first gave some contextual information concerning, on the one hand, the challenge for air transport because of the safety issues relating to the risk of wildlife collisions and, on the other hand, the current state of biodiversity, and the challenge of preserving it.

Several airports then presented the steps implemented on their platform, demonstrating that many airport managers have already taken steps in favour of biodiversity.

Here are some of the actions taken by airports in favour of biodiversity:

carrying out audits of habitat, fauna and flora,

• implementing an environmental management plan for the platform,

 developing a method for evaluating biodiversity, which forms a decision support tool,

 implementing participatory science protocols from Vigie Nature through membership of HoP! Biodiversity,

partnering with local nature protection associations.

Finally, in order to pool existing best practice and improve knowledge in this area, STAC announced the creation of a national "Airports and Biodiversity" network. This forum for meetings and exchanges between partners on airport biodiversity will make it possible to build the national action programme on biodiversity and to launch studies, feedback and research leading to publication of technical documents, training and technical days.



### STAC2017 ACTIVITY REPORT

#### ► NOISE MONITORING

The French decree of 20 July 2004 relating to devices for noise measurement and tracking of aircraft trajectories requires large French airports to have a device for measuring noise and tracking the trajectories of aircraft, also called a monitoring system. These systems must comply with the requirements defined by the Authority for Airport Nuisance Control (ACNUSA) and be appraised by an organisation approved by this authority.



The expertise and technical resources of the STAC Acoustic Measurement Laboratory and its experience in verifying these systems have earned it the first approval for these compliance checks from the ACNUSA.

The controls carried out by STAC consist of a verification in the form of a literature review, tests, and comparative acoustic and meteorological measurements. The STAC agreement was renewed for five years on 15 November 2017.

In addition to ensuring the conformity of monitoring systems, the STAC Acoustic Measurement Laboratory also offers an information and advice service to certain operators, in particular through a best practice guide for maintaining and monitoring proper functioning of the monitoring systems.

#### ► MEASURING THE USE TIME OF THE APU AT ORLY AIRPORT

The Auxilliary Power Unit (APU), the auxiliary engine often housed in the rear tip of aircraft, is used to provide the power supply necessary for heating and cooling the aircraft when its engines are not running.

To reduce its use time, alternative means (ground power unit, 400 Hz connection, etc.) present on the parking stations can be used.

To continue its study on the environmental impact of APUs, in June 2017 STAC was able to attend the inspections carried out by GTA at Orly airport, in the presence of the DTA. This experience has shown that a discussion on the methods and tools for measuring the duration of use of the APU should be launched. This discussion, involving all stakeholders, will take place in 2018.



#### EMISSION AND DISPERSION INVENTORIES

STAC is evaluating two software solutions for calculating pollutant dispersion around airports: Open-ALAQS, developed by Eurocontrol, and LASPORT, developed by Janicke Consulting.

These two applications make it possible to calculate the quantities of pollutants emitted by a large number of airport sources, and the concentrations of the same pollutants in the ambient air following their dispersion.

This evaluation was carried out in collaboration with ATB (Toulouse-Blagnac airport) and the ORAMIP (Midi-Pyrénées Regional Air Observatory). The year selected for this evaluation is 2009, which the ORAMIP has already had the opportunity to study as part of the Midi-Pyrénées PPA (Atmospheric Protection Plan). The polluting sources taken into account are air traffic and road traffic. One of the ORAMIP'S two measurement stations used to validate the concentrations is located in a reserved zone near the aircraft parking areas, and the other is in a public zone near a relatively busy road.

The initial results show that background concentrations, which come from sources of emissions that are not taken into account in this study, play an important role in the quality of the concentrations calculated by the two applications, and that their evaluation is still to be improved.







# **KNOWLEDGE SHARING**

STAC publications are classified in three categories: technical guidance, technical information and study reports, according to their contribution to the technical doctrine of civil aviation. STAC publications can be found on the STAC website.

They can be read, downloaded and ordered if they are published in paper format.

STAC published seven publications in 2017. Below is the summary and front cover of each publication.

#### AERODROMES IN FRANCE FACED WITH THE REQUIREMENT TO EXCLUSIVELY USE THE ENGLISH LANGUAGE

"AIR FRANCE 1407, DE GAULLE APPROACH, good morning". This phrase did not become widespread from October 12th, 2017, as DGAC decided not to apply the requirement to use the English language at the main French international aerodromes, on the basis of this report.







#### PAPI

#### Implantation, installation and maintenance

Visual aids are an essential contributing factor to the safety and regularity of air transport, as well as to general aviation. Consequently, special attention must be paid to their design and implementation.

The Precision Approach Path Indicator (PAPI) is designed to provide pilots with information for the slope of the approach.

The aim of this guide is to provide aerodrome operators with the information necessary to implement the PAPI.



#### HAPI - USE, INSTALLATION AND MAINTENANCE

Visual aids are an essential contributing factor to the safety and regularity of air transport, as well as to general aviation. Consequently, special attention must be paid to their design and implementation.

The Helicopter Approach Path Indicator (HAPI) provides the pilot with the necessary visual information to place the helicopter on the defined approach slope for the helistation.

The aim of this guide is to provide aerodromes operators with the information necessary to install and adjust the HAPI.



#### **BIRDSTRIKES & LIGHT AVIATION**

Each year in France more than 800 birdstrikes are notified to the Civil Aviation Authority and 8% of them are classified as serious, jeopardising the continuation of flights.

Birds of prey represent the main threat to aviation safety in France. More than 30% of birdstrikes are attributed to this large family of birds, especially during take-off and landing phases. Although the number of collisions at cruising altitude remains significantly lower than at low altitudes, their consequences are usually very serious for aircraft and crews, especially in the case of light aircraft.

Following the accidents that occurred in Spain in 2016 involving griffon vultures and light aircraft, this air safety document provides a reminder of the main guidelines to abide by in order to reduce the number and severity of these collisions.

#### ANALYSIS OF WILDLIFE RISK IN FRANCE 2010-2013

The aim of this study is to assess the wildlife hazard on civil aerodromes in France between 2010 and 2013. It provides :

▶ a national statement of the changing trend in wildlife hazard as a function of time, making it possible to compare France with other European States,

▶ a detailed list of wildlife strikes on aerodromes reflecting the efforts made by airport operators and the improvements to be made to achieve an acceptable risk of events (equal to or lower than international averages for total serious events).

This report is mainly intended for the French Civil Aviation Authority and aerodrome managers in charge of wildlife hazard prevention and ANSP. However, airlines, whose pilots provide some of the information analysed, will also be interested in reading this document.

This report may also be used to improve engine and airframe certification standards relating to wildlife impacts.

#### **PREVENTION OF WILDLIFE RISK**

#### Pyrotechnic shooting incidents

Over the last few years, more than half of airport operators have had to deal with pyrotechnic shooting incidents during bird dispersal operations. The majority of these incidents were caused by failure of launchers, primers or rockets.

These malfunctions, leading sometimes to detrimental consequences for flight safety and also for the safety of airport wildlife control personnel, could be brought under control by respecting certain guidelines and recommendations.

The first part of the technical note on pyrotechnic shooting incidents in the field of wildlife hazard prevention presents an inventory of the safety problems associated with pyrotechnic materials. The second part, dedicated to recommendations for reducing the occurrence of shooting incidents, should help aerodrome operators faced with this problem by providing them with information on how to manage the risk of these incidents.

#### **CLASSIFICATION OF RUNWAY DE-ICERS**

This study report presents the physical, chemical, environmental and performance characteristics of the deicing products marketed in France.

This document corroborates the existing data and uses a series of harmonised and standardised tests to compare products. It can therefore be used by airport operators, who are responsible for the implementation of winter viability operations at aerodromes, to help them choose the product best suited to their platform.

FIND ALL OF OUR PUBLICATIONS ON OUR WEBSITE: www.stac.aviation-civile.gouv.fr









# THE DGAC - STAC PHOTO LIBRARY

Created in 1972, the DGAC photo library has been accessible on the STAC website since 1995. Until now, it was managed manually. As at the end of 2017, this photo library contains over 80,000 digital or digitalised photos and 4,067 reports. Almost 30,000 photos can be found on the STAC website. The other photos can be viewed on request.

Once again this year, the photo library has been enhanced by integrating new reports from a part of the old collection dating from 1945 to 1978. The most recent collection was augmented by 80 reports, consisting of around 2,000 photographs, taken by the photo library's photographer and by the STAC study officers to document the activities of civil aviation. All the images in these photographic collections underwent referencing document processing in order to facilitate their dissemination. The images from the photo library are used to illustrate the publications of the DGCA and the STAC, both for communication purposes and technical and scientific purposes. The photo library contributes to the memory of civil aviation and bears witness to its development. In 2017, the STAC photo library received 92 release requests and made 3,500 images available.

It should also be noted that at the technical day on 13 June 2017, the STAC put together a photographic exhibition with images from its collections in the hall of the DGAC headquarters in order to illustrate all of the service's technical activities.







The 5th STAC Technical Day took place on 13 June 2017 and brought together 180 participants at the DGAC headquarters.

#### EMISSION AND DISPERSION INVENTORIES:

- Safety
- Security
- Biodiversity and sustainable development
- Infrastructure and marker lighting

In addition, a photographic exhibition in the reception hall of the DGAC headquarters provided an illustration of the diversity of the activities of the Civil Aviation Technical Centre.



Richard METZGER DGAC/STAC

These presentations can be found on the STAC website: www.stac.aviation-civile.gouv.fr.

#### ► NEW STAC WEBSITE

STAC decided to review the management of its website and improve its visibility by developing a new website.

The aim was to find a practical technical solution and simplify administration. This development also offered the opportunity to update the useability of the site and add a more accurate search engine that can search all digital media used by website visitors: computer, tablet or smartphone.

STAC outsourced creation of the new site to the Mamasam company.

For better functionality, it was decided to select the Drupal content manager, a solution already adopted on the site libelaero.fr, also administered by STAC. Drupal has the advantage of being in "open source code" with a responsive community and editor updates accessible to a large number of users. This means that agents can write and create an initial layout of their article autonomously, with the editorial department then intervening to finalise and launch the publication. For the visual part, we ensured conformity with the ministry's graphic charter.

Our readers continue to communicate with STAC via the website using forms and may suggest improvements or obtain details on events, articles or standards.

Major improvements are planned in 2018, including continued translation of the site into English, the use of https to secure exchanges and improve referencing, and an online payment solution for payment of royalties owed by manufacturers and purchase of STAC publications in paper format.



#### ► AIRPORT LIBRARY WWW.LIBELAERO.FR



The editorial committee of the LIBELEAERO.fr, website, which includes the Union of French Airports, STAC and DSAC has decided to enhance this informative site with two new sections dedicated to "event notification" and "aeronautical information".

These sections enrich the site, which allows the entire airport community to access all relevant airport technical documentation, whatever its source.

You can take a look at the site at : www.libelaero.fr.

#### SCIENTIFIC AND TECHNICAL

The Scientific and Technical Watchdog (STW) is a strategic mission of the STAC that is set out in the decree for the creation of STAC.

The aim of this watchdog is to help keep the experts in the technical departments at the forefront of the state of the art in their fields of activity. To do so, the STAC watchdog monitor uses a specialised software that scans the internet every night to unearth the information and documents most relevant to each subject.

To carry out this STW, information is automatically gathered from source links and queries. STAC engineers, selected as expert advisers, check the relevance of the gathered information. The information gathered can be consulted in real time on the STAC intranet and via the daily or weekly topical bulletins sent selectively to various experts. The scientific and technical aspects of the watchdog are complemented by a regulatory and normative watchdog carried out using the same tool, backed up by systematic monitoring of the Official Journal.

It should be noted that in 2017, at the request of the DGAC's legal affairs sub-directorate, the STAC put in place a daily legal watchdog for its benefit.

This year, 3,051 articles were published in the weekly bulletins to subscribers. These have enriched the database, which has reached a total of 19,141 published articles and 27,128 articles proposed to the watchdog monitor since 2010.

The number of articles collected each day is between 20 and 45. The watchdog monitor refines the automatic watchdog monitoring according to the relevance of the articles and as a librarian also adds to it manually using alternative sources.

#### REVIEW OF STAC MORNING SESSIONS

Since 2013, "STAC morning sessions" have been organised by its multimedia library every quarter for the benefit of all technical and administrative personnel at STAC. These sessions are an opportunity to present reviews of studies, ongoing projects and activities. They are a forum for sharing, experience and creating a real social connection between personnel from different departments within STAC. In February 2017, STAC published a review of all of the STAC sessions held between 2013 and 2016. This review has taken the form of a portfolio of all of the posters announcing the STAC sessions. These posters are created by the DTP unit of the documentation and knowledge sharing group of the STAC SINA department.



#### **STAC MORNING SESSIONS IN 2017**

The 2017 season of STAC sessions continued with the organisation of four presentations. These four sessions all contributed to the sharing of knowledge within the service and enriching aviation culture.



#### PAVEMENT CONDITION INDEX

What are the main factors involved in the damage caused to a pavement and what are the operational consequences of a deteriorated pavement? In 1986, the STBA developed a number of methodologies, including the "French Pavement Condition Index" for assessing the surface condition of a pavement and intervening if necessary.

#### SEARCHING FOR EXPLOSIVES ON PEOPLE - NEW AREA OF EMPLOYMENT

The presentation focused on :

- the use made of explosive-detection dogs in French airports,
- the central position of STAC in the scheme,
- the issue of searching people,
- the work done by STAC relating to this matter,
- follow-up.

#### DYNAMIC TRAFFIC SIMULATION

Dynamic traffic simulation has many advantages for study and analysis of airport infrastructure and traffic regulation systems in airspace. Simulation makes it possible to identify the stress points of an airport system, to visualise traffic flow and the build-up of congestion at key points, and even to test critical scenarios, before an incident occurs during actual operation. By simulating movements of passengers, aircraft or airport vehicles, simulation makes it possible not only to quantitatively estimate performance levels by calculating indicators such as average waiting times or flows, but also to qualitatively evaluate conditions in which traffic flows thanks to detailed imaging. The possibilities offered by dynamic simulation are illustrated using multiple examples covering the modelling of airport passengers, aircraft movement areas and airspace approaches.

#### ► ICAO

The International Civil Aviation Organisation (ICAO) is a specialised agency of the United Nations established by the states in 1944 to manage and administer the Convention on International Civil Aviation (Chicago Convention).



# **CONTRIBUTION TO TRAINING**



STAC's knowledge sharing effort also involves a strong contribution to training, which is very diverse in form and covers all areas of STAC's expertise.

#### STAC PROVIDES TRAINING

As in previous years, the Equipment division conducted training courses in the fields of airport energy/marker lighting and aircraft firefighting:

 continuous training on behalf of ENAC: ENERBALEX<sup>1</sup> (EBA<sup>2</sup> et VIS<sup>3</sup>), INGEAIRES (EBA), PPTA<sup>4</sup> (LIA<sup>5</sup>)

on behalf of DSAC, at ENAC: INFRA EXP2<sup>6</sup> (EBA et VIS), OPS SERV<sup>7</sup> (LIA)

▶ for defence, INGEAA (at ENAC, EBA and LIA) and two internships in Bordeaux, in collaboration with the STAC Airport Infrastructures and Development, Capacity, Environment Departments, for the operators of defence aerodromes and their supervision (EBA).

These courses make up 110 hours of training for around 130 people on various programmes (technicians, engineers, technical executives).

In the field of safety, the STAC conducts various training modules in courses organised by the ENAC (SURET; SURSEQ, AÉROGARE training).

STAC also organised training on security equipment monitoring for a delegation of nine African countries in the UEMOA in collaboration with ADP.

- $^{\rm 1}$  ENERBALEX : Energy and marker lighting for aerodrome operators.
- <sup>2</sup> EBA: Subdivision for energy and marker lighting.
- <sup>3</sup> VIS: Visual aids laboratory.
- <sup>4</sup> PPTA: Taking up technical airport positions.
- <sup>5</sup> LIA: Subdivision for aircraft firefighting.
- <sup>6</sup> INFRA EXP2: Monitoring of infrastructures and operation of aerodromes.
- <sup>7</sup> OPS SERV: Aerodrome safety service (monitoring).

#### STAC AND ITS INTERNS

In 2017, the STAC welcomed sixteen university or engineering school students to complete internships within its technical departments from one to four months.

These internships involved students from the French National School of Public Works (ENTPE), Aurillac IUT and Créteil IUT, Universities Jean JAURÈS -Toulouse, Paris East Créteil-Vitry, Bordeaux, Paris Sud and Paris Est Marne la Vallée and the following schools: École de l'Institut MinesTélécom; École supérieure des techniques aéronautiques et de construction automobile de Montigny le Bretonneux; École des Mines de Nancy; École Internationale des Sciences du Traitement de l'Information de Cergy; Institut national des sciences appliquées de Lyon.

#### ► NEW PAVEMENT TRAINING: ENTPE AND PFC

In 2017, the STAC added two new training modules on aeronautical pavements. A first module of 27 hours provides initial training for engineers in their final year at the ENTPE, in the subjects of design, auscultation and maintenance of aeronautical pavements.

A second module of 14 hours, delivered by Ponts Formation Conseil, provides training for airport engineering professionals in the emerging, "rational" methods of dimensioning, auscultation and evaluation of load-bearing capacity of aeronautical pavements. These methods were developed by STAC in partnership with other scientific and technical research organisations of the Ministry for an Ecological and Solidary Transition, in particular the IFSTTAR.

#### TRAINING FOR TUNISIAN WILDLIFE CONTROL AGENTS

As part of cooperation dating back more than a decade between France and Tunisia, from 13 to 17 November 2017 two STAC experts provided qualifying training for agents on the prevention of wildlife risk at Tunis aerodrome for the benefit of the Civil Aviation Authority and Airports (OACA), under the auspices of the National Civil Aviation Academy.

Twenty interns from the main Tunisian aerodromes were then trained in the different techniques and strategies of prevention and wildlife control, as well as in the fields of ornithology and mammalogy (mammal study) in airports.

#### THESIS HOSTING AT STAC

True to its mission of supporting innovation and developing new methods and tools for air transport, the STAC welcomes and supports young researchers whose project is convergent with the scientific and technical objectives of the centre.

Two PhD students now benefit from this scheme: a student from the University of Limoges has been working on the auscultation of rigid pavements since 2016, and a student from the National School of Public Works (ENTPE) has been working on the integration of viscoelastic behaviour in the auscultation of flexible pavements since 2017.

Two PhD theses conducted in partnership with the IFSTTAR have also been supported in recent years: one in 2017 on the prediction of aircraft braking performance on wet runways using friction measurements; and the other, in 2010, on auscultation of flexible pavements using Heavy Weight Deflectometer (HWD) equipment.

#### SPECIALISATION FOR PUBLIC WORKS

As part of its recruitment policy, the STAC relies in particular on the specialisation system put in place by the National School of Public Works (ENTPE). This scheme allows some young engineers to complete a year of additional training, known as "4A", to acquire specialist skills (expert or researcher) in a given field.

As in previous years, in October 2017 STAC participated in the scientific and technical careers forum organised at the ENTPE.

In 2017, a new recruit joined the STAC after a year of training in airport civil engineering at the University of Nottingham in the United Kingdom. In the same year, STAC invited the ENTPE to finance two new specialised training courses, in France or abroad, on the subject of the human factor in airport safety, and optimised management of infrastructure assets.



direction générale de l'Aviation civile service technique de l'Aviation civile





# **WORKING WITH STAC**



#### **STAC CAN PERFORM PRIVATE** TRIALS IN ITS TESTING PLATFORMS



**STAC CAN BE INVOLVED IN PARTNERSHIPS THROUGH NATIONAL OR** INTERNATIONAL CALLS FOR PROJECTS OR FOR RESEARCHES



#### ► STAC CONDUCTS PRIVATE STUDIES RELATED TO ITS EXPERTISE FIELDS

- Airport runways: conception and maintenance plans
- Airport management and airport planning
- Airport safety systems
- Evaluation of environmental impacts: biodiversity and wildlife hazards, noise, quality of air
- Air traffic management safety systems
- Civil aviation security systems



#### STAC CAN PERFORM COOPERATIVE ACTIONS THROUGH NATIONAL BILATERAL AGREEMENTS OR UPON REQUEST



STAC EXPERTS CAN ALSO SHARE THEIR KNOWLEDGE THROUGH THEIR PARTICIPATION IN INTERNATIONAL WORKING GROUPS OR TECHNICAL SYMPOSIUMS, OR THE ELABORATION OF TECHNICAL TRAININGS



#### STAC2017 ACTIVITY REPORT

## ► NEW ELECTRIC VEHICLE CHARGING POINTS

In order to move towards cleaner and quieter new technology, the STAC has set up new charging stations for electric vehicles located near the administrative building and the A9 hangar on its Bonneuil-sur-Marne site. Modernisation of the STAC vehicle fleet is continuing with the aim of acquiring a new Renault ZOE electric car in 2018.



#### METEOROLOGY

COMMON MARKET FOR ALL LABORATORIES

The STAC has five laboratories at three sites in Bonneuil-sur-Marne, Biscarosse and Toulouse. Until 2016, each laboratory ordered meteorological servicing of its equipment and measurement instruments independently from the others.

Given the total amount of these metrological services ordered each year by the STAC, and with the aim of simplifying procurement of these services, both for laboratories and for companies, in August 2016 STAC issued a call for tenders for the metrological services for its entire range of measuring instruments. This invitation to tender comprised sixteen lots, each corresponding to a typology of physical size. The analysis of the offers required all the laboratories to determine the technical value of each of the proposed offers.

In mid-2017, each of the corresponding markets was notified and may have a maximum execution time of four years.



#### CARPENTRY

The tables in the STAC administrative canteen have been replaced. This furniture was made by the STAC support department's carpentry unit in order to meet specific requirements, in addition to economic considerations. This work, which is still ongoing in order to replace the rest of the furniture, could not have taken place without the skills of the "carpentry" unit.

The STAC carpentry unit also fulfils the requirements of STAC laboratories by providing specific furniture for carrying out certain tests.

#### FARID ZIZI HONOURED

By decree of the French President, on 2 May 2017, Farid Zizi, STAC scientific and international adviser to the STAC was promoted to the rank of Knight of the National Order of Merit.

This decoration recognises his work leading to the permanent representation of France on the Council of the International Civil Aviation Organisation, as well as his entire career within the DGAC.

This medal was presented to him on 19 January 2018 by Michel WACKENHEIM, former Director General for Civil Aviation at the French National Civil Aviation Academy (ENAC).



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#### MIGRATION TO THE INTERMINISTERIAL GOVERNMENT NETWORK

Until 2017, STAC was connected to the network of DGAC companies called Régis.

In 2017, the three STAC sites have been connected, like most of the DGAC sites, to the new Interministerial State Network (RIE). This network constitutes a unified and secured network for the State. It must allow reinforced and simplified exchanges, security, controlled costs and offer new services.



As part of this migration, the Bonneuil-sur-Marne site will benefit from increased bandwidth, making the use of network resources much more comfortable.

# CREATION OF A CYBERSECURITY PLATFORM

In 2017, the Air Navigation division transformed the CNS laboratory in Toulouse into a Cyber entity in order to develop its knowledge and skills when it comes to cybersecurity activities, in particular for the field linked to ATM/ANS where the international regulatory context is constantly changing and where STAC can support DSAC in monitoring the cybersecurity domain.

Since its creation, the laboratory's basic activities have changed considerably. This led to the development of an exchange and experimentation platform in collaboration with DTI and DSAC agents.

The end of 2017 has defined the outlines of this cooperation and the architecture of the laboratory has been redesigned to focus on network security.

The cyber entity should finish room configuration by mid2018-. After this, the first tests will be implemented to analyse the Public Key Infrastructure (PKI) on the DGAC's different office equipment.

The next step will be to analyse cyber risks for ATM/ANS systems.



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### STAC2017 ACTIVITY REPORT

#### **>** A

CA Civil Aviation A-CDM

Airport Collaborative Decision Making **ACE** 

STAC Development, Capacity, Environment Department

ACI Airports council international

French airport Noise control authority

ACR Aircraft Classification Rating

ADOP Aerodromes Design and Operations Panel ADP

Airports of Paris

ADWG Aerodrome design working group AIC

Airport Identification Card

The French Agency for Standardisation

#### ALFA-ACI

Association of French-speaking Airports associated with Airport Council International

**APU** Auxiliary Power Unit, groupe auxiliaire de puissance

**ARC TF** Aerodrome Reference code Tash Force

A-SMGCS Advanced Surfaced Movement Guidance and Control System

#### **ASECNA**

Agency for Aerial Navigation Safety in Africa and Madagascar

APEG

Airfield Pavement Expert Group

Auxiliary Power Unit

**ARFF** Aircraft Rescue and Firefighting

ASPAG Airside simulation and Performance Assesment Group

ATB Toulouse-Blagnac Airport

ATM/ANS Air traffic management/air navigation service

#### <u>> B</u>

**BOP** Programme Operational Budget

#### **>** C

CAEP

Committee on Aviation Environmental Protection

French classification of light aircraft according to their sound performance index

#### CASE

Civil Aviation Security in Africa and the Arabian Peninsula

CECP Centre for Prototype Study and Design CEN

European Committee of Standardization

CEREMA Centre for Experimentation and Research in Rouen

#### CEREMA

French Centre for Studies and Expertise on Risks, Environment, Mobility, and Planning

#### CFME

Device for continuous measurement of friction **CIP** 

Centralised image processing

CNRS French National Centre for Scientific Research CNS

Communications, Navigation and Surveillance

French Accreditation Committee

**COP** Conference of the Parties

#### CREL

French Centre for Research and Logistic Analysis CRR Belgian road research centre

CSTB

Scientific and Technical Building Centre

#### <u>≻ D</u>

DGA General Directorate of Armaments DGAC French Civil Aviation Authority

#### DGALN

General Directorate of Planning, Housing and Nature DSAC French Directorate for Civil Aviation Safety DSAC-EC DSAC central level

#### DSAC-IR DSAC regional location

**DSAE** French State Directorate for Aeronautical Safety

#### **DSNA**

French Directorate for Air Navigation Services

French Directorate of Air Transport **DTA/SRD** 

French Directorate for Air Transport/Subdirectorate for Security and Defence DTI

French Directorate for Research and Innovation



EASA European Aviation Safety Agency ECAC

European Civil Aviation Conference **ENAC** 

National civil Aviation Academy **EDS** 

Explosives Detection System **EMC** 

Electromagnetic compatibility

ENTPE French National School of Public Works ETD

Explosives trace detector

#### **≻** F

FAA Federal Aviation administration FABEC

Functional Airspace Block Europe Central FOD Foreign object debris

#### **>** G

GTA Air Transport Gendarmerie GHTF Ground handling task force GRF Global reporting format

≻ H

HAPI Heliport approach path indicator HDWG Helicopter design working group HIRO High Intensity Runway Operations HOSI High Output Service Index HWD heavy weight deflectometer



# GLOSSARY

#### > |

IAA Irish Aviation Authority **IATA** International Air Transport Association **ICAO** International Civil aviation Organisation IEC International Electrotechnical Commission **IFALPA** International Federation of Air Line Pilots Associations **IFATCA** International Federation of Air Traffic Controllers Associations **IFBS** Screening of hold baggage **IFSTTAR** French Institute of Science and Technology for Transport, Planning and Networks II S Instrument landing system **IMAG** Device for automatically measuring skidding PI Performance Index (sound) IS Service Index

#### L2E

STAC Testing and Expertise Laboratory (Airport Infrastructures Department)

LIBELaéro Airport library (www.libelaero.fr)

<u>≻ M</u>

MAPS Minimum aviation system performance specification

#### > N

NPA Notice of proposed Amendment

#### > 0

OACA Civil Aviation and Airports Authority (Tunisia) OLS

Obstacles limitation surfaces

OLSTF Obstacles limitation surfaces Task Force OPA

Parks and workshop workers **ORAMIP** 

Midi-Pyrénées Regional Air Observatory

#### **≻** P

PANS Procedures for Air Navigation Services PAPI

Precision approach Path Indicator

#### PCN

Pavement classification number

#### PCNS

Provider of Communications, Navigation and Surveillance

PCR Pavement Classification Rating

PEB Noise Exposure Plan

**PICA** 

Wildlife Collision Information Programme (STAC) **PKI** Public Key Infrastructure

PNACC

French National Plan for Adapting to Climate Change

PPA French Atmospheric Protection Plan PSA

French Aeronautical Constraints Plan

#### **>** R

**RBO** Risk Based Oversight

#### RCAM

Runway condition assessment matrix **RCR** 

Runway Condition Report

RGA (25e) French 25th Air Engineering Regiment RMA

Remote Multiplex Analysis

Runway condition code

#### SARPs

Standards and recommended Practices SESAR Sigle Europen Sky ATM research SGITA Computerised Access Rights Management System SIA Aeronautical Information Service SID Defence Infrastructure Service

#### SINA

STAC Systems Information and Air Navigation Department

#### SNA

French Air Navigation Service **SNIA** French National Airport Infrastructure Service **SRA** Security restricted areas **STAC** Civil Aviation Technical Centre **STITCH** 

System for Computerised Processing of Access Rights and Authorisations

#### **>** T

TALPA Takeoff and Landing Performance Assessment

Technical committee

TF

Task Force

Transport Research Arena

**UAF** Union of French Airports

UE European Union UEMOA

West African Economic and Monetary Union USID

Defence Infrastructure Support Unit

≻ V

VAWG Visual Aids Working Group VRF Visual flight rules

≻ W

WG Working group

# STAC RAPPORT D'ACTIVITÉ 2017

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