



HORIZON 2023

STRATEGIC SAFETY ENHANCEMENT PLAN



Ministère de la Transition écologique et solidaire



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INTRODUCTION

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Globally, over the past ten years, the improvement in air safety has been particularly significant, as shown, for example, by the annual air safety reports published by DGAC. These results are all the more notable as they were obtained against the backdrop of strong growth in air traffic worldwide.

Are these the first benefits of the implementation of safety management systems (SMS) by operators and State Safety Programmes (SSPs) by States? It is not possible to give a definitive yes, but it is legitimately possible to believe that it is due to the development of a stronger safety culture among the actors in aviation, while now being entrusted with a greater responsibility for the management of their own safety. It cannot be excluded that the stagnation in the levels of safety observed in the early 2000s reflected wear and tear on a process based solely on regulatory compliance, which had been successful in the 1990s, but which seemed to have reached its limits at the turn of the new century.

In this context, French operators have not experienced any fatal accidents since 2009 for planes with over 19 passenger seats. France has thus confirmed its position at the head of the pack of the main European states, a high-level goal that our country set itself a decade ago, when the State Safety Programme was implemented. This is much

more than a formal process designed to meet international requirements; it is a truly operational process, as confirmed by the ICAO after its “test” audit of the French SSP, carried out in March 2017, whose international organisation highlighted its high degree of maturity.

In light aviation, the previous strategic plan (2014-2018) was marked by a slight decrease in the average number of annual fatal accidents, but also by an increase in the share of microlight accidents within the total, compared to aircraft accidents. The attractiveness of microlights to certified aviation users partially explains this situation. In order to respond to this quasi-stagnation, work has been initiated on identifying risk factors, notably technical and behavioural ones; these are now taken into account in the actions carried out by DGAC, in close cooperation with federations of users.

It is this pragmatic, collaborative and evidence-based approach which France is now adopting in the choice of its orientations in the field of aviation safety. In particular, this approach was chosen to establish this Horizon 2023 strategic safety enhancement plan, aimed at succeeding the “Horizon 2018” plan, which has now expired. This document, which identifies the priority topics to be addressed, will serve as a roadmap for the next five years for DGAC and other State entities concerned with aviation safety.



FOREWORD

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- This strategic plan has been developed taking into account the EPAS¹ plan, established by EASA, and is in line with those of other national partners (in particular, state actors²), as well as international bodies (ICAO, ECAC, etc.)
- It is based on safety data collected by DGAC and BEA, in France and elsewhere, and is in continuity with the previous plan, Horizon 2018.
- French operators also helped to draw up this plan via a questionnaire, which invited them to share their opinions about priority risks, a questionnaire to which over 80 of them responded.
- Compliance with the regulations by the actors being a prerequisite, the current tools which make it possible to ensure this (certification, continuous oversight, enforcement measures, and even sanctions) are not addressed in this document.
- The topic of cybersecurity, and the risks it poses to flight safety, will be given the necessary attention, but this will be handled by DGAC within a framework outside of this plan. The same applies to future regulations which will impose a security management system on certain types of operators.
- Throughout the duration of this plan, DGAC will support the development of innovative projects, with a cost-benefit approach to the safety of the project and its impact on the entire aeronautical system.
- Chapters 1 and 2 primarily concern the safety of commercial flights and aerial work, whether by plane or helicopter; Chapter 3 is dedicated to risks in light aviation.

In line with the previous plans, in order to present the priorities for actions to combat certain types of events, safety risk portfolios were developed in the operational fields of commercial air transport by aircraft, helicopters, aerodrome operation, ground handling, and continuing airworthiness. These risk portfolios do not prejudice those of operators, and are, by their nature, evolutive. The current version can be downloaded from DGAC website: www.ecologique-solidaire.gouv.fr/programme-securite-letat

¹ The European Plan for Aviation Safety can be consulted at the following address: https://www.easa.europa.eu/sites/default/files/dfu/EPAS_2017-2021.pdf
² Armed forces, Directorate General of Armaments, State emergency response service etc.



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1. SAFETY MANAGEMENT

THE OBJECTIVE OF THIS FIRST CHAPTER IS TO PROMOTE AN OPERATIONAL CONTEXT, WHERE EACH ACTOR IS POSITIVELY INVOLVED IN SAFETY MANAGEMENT

1.1. PROMOTING EFFECTIVE AND DYNAMIC SAFETY OCCURRENCE REPORTING AND ANALYSIS

The process of reporting safety occurrences to the Authority has reached a high level of maturity in France, judging by the annual number of notifications (over 73,000 in 2017), placing our country at the top of European states in this domain. These reports are a valuable asset, because they feed into the Authority's risk management thinking, and guide the actions carried out by operators within the framework of their SMS.

However, this overall satisfaction hides disparities that must be eliminated, if a vision of risks that is as complete as possible is desired. To this end, it is important for all operators to be convinced of the usefulness of occurrence reports, which must not be seen solely from the point of view of regulatory requirement. This conviction, an integral part of the safety culture, must be introduced from initial training, for example during pilots' basic training. It must also be established in areas of activity where it has not yet fully taken root, such as with professional drone operators, small operators, and NCCs (non commercial complex operators).

And in addition to this quest for comprehensiveness, the quality of the information reported must also be added. **DSAC wants to ensure that the analysis of the facts carried out by the operators involved becomes systematic, and is accompanied by a sound and pragmatic risk assessment.**

Moreover, in line with the conclusions of the 2016 DSAC symposium, "Risk Management and Control of Flight", **DGAC will continue and reinforce actions undertaken to better identify and quantify the risk of loss of control in flight in the occurrence reports by crews.**

All of these developments will be fostered by the introduction of a just culture environment. **DSAC will ensure that just culture processes are implemented in all areas, and are known by everyone, including differentiating between acceptable and unacceptable behaviours. The role and existence of the Just Culture Observatory, a body independent from DGAC, established at the end of 2017, will be highlighted.**

With regard to the provisions of national texts, and the European regulations on drones, DSAC will define the practical provisions for the notification and analysis of occurrences, with supporting guides, notably for operations in the "specific" category of European Union regulation, and for operators choosing the certification, thus submitting to safety management system requirements.



1.2. MAKING SMS THE CORNERSTONE OF SAFETY ENHANCEMENT

In recent years, the implementation of effective safety management systems has been identified as a priority for improving safety, and SMS is now a regulatory requirement for almost all operators. Via its oversight and/or safety promotion initiatives, conducted in contact with operators, **DSAC will promote the development of the maturity of existing systems, with particular attention paid to interfaces between operators, including in the case of sub-contracting.**

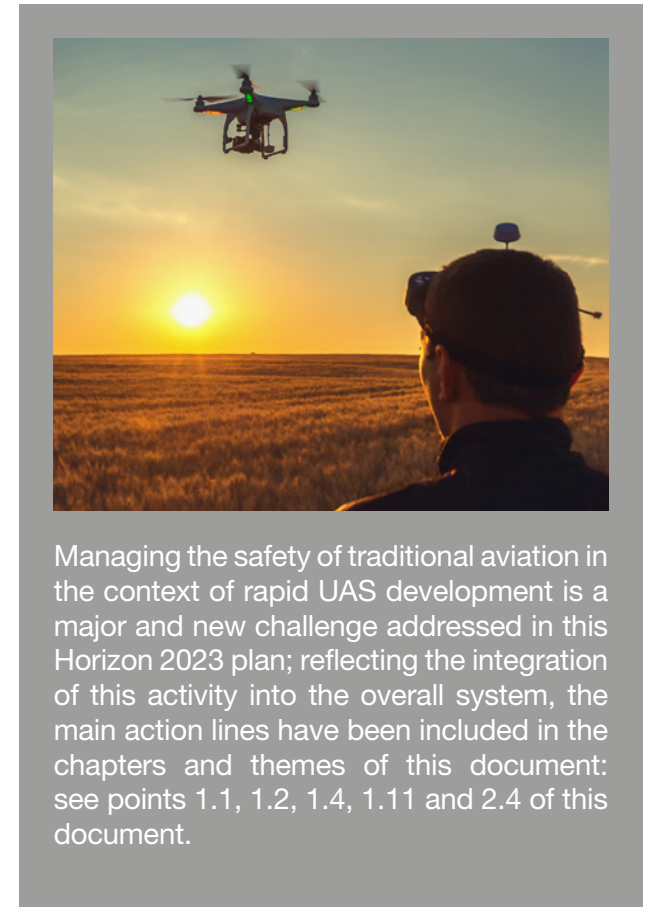
Safety promotion actions already carried out, such as the dissemination of SGS implementation guides, or holding national and local symposia, will be continued. In some sectors, where the overall performance of SMSs is considered insufficient, actions will be strengthened.

Actions for the benefit of aeronautical maintenance organisations, helicopter operators, or training organisations, will be given priority.

For all operators, DSAC considers it important that all operational actors have an understanding of the risks and accidentology in their area of intervention, as well as the risks specific to the actors with whom they have strong interfaces. Risk awareness is one of the key building blocks of safety culture, and allows for the development of positive attitudes towards safety. In addition, on the organisational level, the SMS risk management processes of operators may still progress. **Reinforcing the training of DSAC agents in the awareness and management of risks will help support and verify the consolidation of this collective ability to identify and monitor risks in aviation safety.**

For air operators not subject to a regulatory obligation to implement a SMS (ground-handlers, non-certified aerodromes, etc.), **DSAC will encourage the reinforcement of their safety management capacity**, notably in terms of risk management, taking into account their size and complexity. DSAC will focus on ensuring that their interface with certified operators creates an environment that is conducive to these safety management capabilities.

As far as drones are concerned, with regard to the provisions laid down in the European Regulation on the “specific” category, **DSAC will seek to develop a framework (oversight and support), that is conducive to the quality of risk assessments for operators in this category, and the quality of safety management systems for certificate applicants;** it will notably ensure that risks relating to the airworthiness of drones are properly taken into account.



Managing the safety of traditional aviation in the context of rapid UAS development is a major and new challenge addressed in this Horizon 2023 plan; reflecting the integration of this activity into the overall system, the main action lines have been included in the chapters and themes of this document: see points 1.1, 1.2, 1.4, 1.11 and 2.4 of this document.



1.3. ENCOURAGING SHARING OF SAFETY INFORMATION BETWEEN OPERATORS

The local safety coordination bodies, between actors at the same aerodrome, made mandatory by the regulations, are a privileged area for the identification of local risks, and for transversal consideration of actions for improvement to be implemented. Aerodrome operators are responsible for the soundness and relevance of these discussions, for which they depend on other actors, particularly Air Navigation Service providers. **DSAC will support operators in their mission, by facilitating a sharing of experience at national level, by intensifying its oversight on these aspects, so as to ensure that the conditions for identifying local risks and effective communication about safety are well established.**

In order to share relevant safety information from this local safety coordination with the entire aeronautical community, particularly all pilots using an aerodrome, DGAC set up the CASH tool (Collaborative Aerodrome Safety Highlights) in 2018. **This tool will be supported before operators so that an increasing number of aerodromes can use it to disseminate information of interest in terms of local safety,** in addition to official aeronautical information, and to pilots and air operators who are the target recipients.

DGAC will continue its efforts in growing the French Flight Safety Network (Réseau sécurité des vols France, RSVF), which brings together the entities responsible for the safety of French operators (airlines, helicopter operators, maintenance workshops, airports, air navigation service providers, etc.), and allowing direct exchanges between these entities, not only during regular meetings, but also within the framework of a private “social” network.

The sharing of safety information between operators is the main role of the Réseau Sécurité des Vols France (French Flight Safety Network). Initially established to promote safety exchanges between airline flight safety officers, this network has expanded to cover almost every aspect of aviation, and is increasingly dynamic. Specific network meetings are held for airlines, maintenance operators and helicopter operators. They are complemented by cross-domain meetings, bringing together airlines, aerodrome operators and air navigation service providers. **DSAC will establish the conditions for the exchange of safety information between ATOs and between aerodrome operators.** These meetings will be an opportunity to reinforce the mutual understanding of operating modes, and knowledge of the operational constraints of the interfacing partners. State aviation representatives will continue to be invited to attend information-sharing events, as has been the case since 2017.

1.4. STRENGTHENING THE DISSEMINATION OF SAFETY INFORMATION TO OPERATORS

With over 73,000 occurrence reports sent to DSAC by French operators in 2017, the reporting culture seems to be well established in France, although some categories of operators are showing less well developed maturity. Some operators believe that the use of this valuable information for safety by DSAC is not visible enough. **DSAC will strive to evolve its methods towards more complete safety communications, allowing for the dissemination of the right information at the right moment, to the right actors, and via channels suited to needs.**

In particular, the current methods do not permit rapid enough communication of information to operators potentially affected by a major safety problem identified by a particular actor, and communicated to DSAC. **A short loop for the transmission of factual information will be put in place.**

In addition to the “Objectif Sécurité” publication, initiatives such as the “Tarmac” safety bulletin for ground-handlers make it easier to disseminate occurrence reports in this area, and are useful to the targeted people in order to better take into account risks relating to their activities. **DSAC will study the possibility of setting up this type of dissemination for helicopter and aerodrome operators in particular, who have expressed their wish to be informed of the occurrences experienced by other operators of the same type.**

Lastly, when the level of notifications of safety occurrences by professional drone operators allows, the safety occurrences they report will also be shared.

DGAC will continue to produce or contribute to the production of training and informational materials about topics where the interface between different operators plays a major role, either as a protection barrier, or as a recovery barrier following an adverse event; understanding of the accidentology corresponding to the failure of these interfaces must form part of training/informational objectives.





The agenda will include the following topics:

- Unstabilised approaches, non-compliant approaches (ATC/cockpit/weather interface)
- ATC-cockpit interference during take-off or landing
- Improved ground-cockpit interface for contaminated runways
- Improved ground-cockpit interface with promotion of PIREPs
- Management of adverse weather situations (ATC/flight preparation/cockpit links)
- Detailed knowledge by ATC of the crew's planned route
- Strengthening of interfaces between manufacturers, air operators, and maintenance workshops
- Strengthening interfaces between airports, air operators, and ATC, with in particular the invigoration of local safety bodies

DSAC will continue its informational and awareness raising operations for drone operators, including hobbyists, moving towards the safe integration of the activity within piloted air operations. Particular emphasis will be placed on the use and improvement of “Alpha Tango” (the portal for remotely piloted aviation), on the improvement of the “Geoportal” map, describing authorised zones, as well as on training tutorials for drone pilots.

The implementation of a single exchange platform between the supervised organisations and the authority will improve day-to-day oversight relationships. In addition, it will facilitate the dissemination of safety information to operators.

1.5. SUPPORTING THE IMPLEMENTATION OF THE DATA4SAFETY (D4S) PROGRAM

While each actor in the air transport industry uses the data at its disposal to manage safety at their own level, in 2015 EASA launched a cross-domain initiative, via a major collaborative data sharing and analysis program, which could prove useful for improving safety. This program is called Data4Safety. Its objective is to define how modern techniques and tools for mass data collection and analysis from multiple sources can contribute to the assessment and overall improvement of the level of safety at European scale.

In an initial validation phase of the concept, over three years, flight analysis data from a few volunteer airlines, as well as the European database of safety occurrence reports will be processed. This sharing will subsequently be planned to be extended to other voluntary actors (European airlines, ATC services, meteorological services, etc.). DSAC is one of the founding members of the project, as are Airbus, Boeing, and of course the airlines and other participating civil aviation authorities; it is represented in the steering committee, as well as in the technical bodies of this program. **Beyond its direct contribution to these bodies, and with a view to enriching their SMS, DSAC will encourage French operators to participate in this data sharing and analysis initiative.**



1.6. CONTINUING TO PROMOTE FDM (FLIGHT DATA MONITORING)

Within the framework of management by airlines of their flight data analysis, EASA holds working groups and produces guides for the optimal use of their flight data analysis. **DGAC will work towards promoting these guides, notably for operators who operate a small number of aircraft, and will continue to promote meetings between the FDM services of national operators.**

1.7. RAISING AWARENESS AMONG FRONT LINE ACTORS ABOUT THE IMPORTANCE OF RESPECTING STANDARD OPERATING PROCEDURES

DGAC will continue its promotional activities aimed at compliance with the procedures by frontline actors. While the analysis of occurrence reports, as well as the recording of data on board or on the ground will remain means of identifying deviations from procedures, **DGAC will encourage operators to set up anonymous observations in normal operational situations** (such as LOSA type methods for pilots, or OSP for air traffic controllers). These observations will enable operators to better identify operational constraints that lead to adaptations of procedures and unmanaged risks. These observations should also help operators to differentiate between acceptable and unacceptable deviations, to document them, and, where necessary, to modify their procedures. This may particularly be the case when it is considered that the observed practices actually enhance safety.

In partnership with operators, via knowledge about incidents and information obtained within the framework of the “Réseau Sécurité des Vols France” (French Flight Safety Network), **DGAC will seek to identify difficulties in the implementation of the regulations** (including routine regulatory violations, or systematic exemption requests), **and to determine corrective actions**, either by proposing regulatory amendments, or by adopting measures to reduce discrepancies.

1.8. IMPLEMENTING RELEVANT SAFETY PERFORMANCE MEASUREMENT

For the Authority, the maturity of the SSP is the key element in its safety performance measurement. This is determined via self-assessment processes, as well as by the results of all the audits conducted by ICAO or EASA, and, in particular, those relating to the implementation of standards contained in Annex 19 to the Chicago Convention.

Furthermore, efforts to assess the level of the safety performance of operators via indicators will be pursued. Based on operators’ SMS indicators, and indicators based on the notifications and analysis of incidents reported by these operators, the objective under this plan will not only be to establish criteria that are as objective as possible to measure the safety performance of each operator, but also to establish indicators summarising this performance at national level. These indicators will thus supplement the two high level indicators representing fatal accidents in commercial transport and general aviation that DGAC has published since 2008 in its annual reports on aviation safety.

1.9. CONSOLIDATING THE IMPLEMENTATION OF RISK-BASED OVERSIGHT

Risk Based Oversight (RBO), is designed to go beyond the limits of systematic verification of regulatory compliance, in order to better deploy oversight resources to where they will have the greatest impact on flight safety level.

As part of the Horizon 2018 plan, DSAC implemented a process for adapting the oversight level for each operator, based on its risk exposure and the performance of its safety management system. The agreed adaptations were discussed with the affected operators, in order to present the process and the results of the method.

By 2023, and on the basis of different experience based feedback, this method will be consolidated and enriched. Thus, data allowing for risk and performance assessment will be diversified, so as to gain a more complete overview of the strengths and weaknesses of each operator. Oversight resources will also be adapted so as to better integrate identified risks, and focus oversight onto where it has the greatest added value.

Beyond the aspects strictly relating to audits, regular discussions between authorities and operators about risks and performance will progressively enrich knowledge and skills, both in terms of the operator’s SMS, as well as in terms of the Authority’s SSP.



1.10. CONSOLIDATING LINKS BETWEEN OVERSIGHT AND THE RISK MANAGEMENT PROCESS OF THE SSP

The links between DSAC entity responsible for coordinating the implementation of the SSP and the entities responsible for operators oversight will be strengthened and formalised within the framework of this plan. Thus, risks identified via audits will be better integrated into the SSP, and will notably make it possible to maintain risk portfolios as up-to-date as possible (the risk portfolios are useful to both DSAC and operators).

1.11. A NEW ASPECT OF OVERSIGHT: DRONE OPERATORS

Oversight of **drone operators** is a new area for DSAC. With regard to the provisions of the European Regulation, **DSAC will define and implement its oversight actions, aiming from the outset to give them a risk-based orientation.**

1.12. CONTINUING AIRWORTHINESS OF AIRCRAFT

Continuing airworthiness is an important element in the operation of aircraft. Continuing airworthiness management and maintenance activities are characterised by the complexity, variety, and quantity of tasks to be planned, as well as their documentation and monitoring. These activities must be carried out in accordance with demanding regulations and standards, which set expectations in terms of organisation, supervision, resources, facilities and qualified personnel. These activities require high level expertise within a very challenging environment (operational constraints, proportion of activities that cannot be planned, workload variability, work environment, distance between organisations, multiple actors, outsourcing, international environment, etc.)

The reliability of aircraft, the implementation of rigorous rules, the establishment of organisations structured around quality systems, the consideration of human factors, and the integration of safety management systems in a large proportion of these organisations have had a positive effect on safety in this field.

Moreover, the analysis of occurrences reported by the certified organisations in this field makes it possible to identify recurring safety issues in continuing airworthiness, for example:

- the monitoring of deadlines for mandatory tasks,
- tracking the completion of tasks/sub-tasks of work cards,
- the deferred maintenance tasks and their follow-up,
- checking the absence of tools on board the aircraft at the end of works,
- identification and checking critical tasks.

The reactive and proactive identification and consideration of risks via the safety management systems of the continuing airworthiness organisations thus make it possible to:

- implement immediate safety actions in case of actual risk and appropriate corrective actions,
- contribute to the dissemination of best practices in the area concerned,
- enhance the quality of occurrence analyses, so as to better identify risks, threats, and the origins of incidents,
- provide actors with the principles guaranteed by the just culture of the process of overall safety enhancement.

In a context of a significant increase in aircraft fleets over the coming years, **DSAC will support the implementation of enhancement** initiatives to support the organisations and actors in continuing airworthiness, by acting upon the following elements:

- promoting reporting of occurrences under Regulation (EU) No 376/2014, in order to assist in the understanding of the occurrences relating to continuing airworthiness,
- fostering exchanges within the “maintenance

safety” network with continuing airworthiness management organisations, maintenance organisations, and representatives of these organisations, in order to better understand issues and encourage collective support,

- setting up safety promotion campaigns that respond to the need for the reporting feedback and best practices,
- publishing guides and materials so as to continue to assist organisations in addressing human factors and risk management issues in the continuing airworthiness management process and maintenance processes,
- encouraging closer ties between the fields of air operations, continuing airworthiness management and maintenance, notably on cross-domain themes, such as SMS, pre-flight checks, Technical Logbook (TLB), maintenance release and aircraft acceptance, management of Minimum Equipment Lists (MELs),
- continuing to support organisations in the implementation of new management tools (electronic TLB, electronic signature of work/maintenance release, digital archiving, etc.)



2. OPERATIONAL AXES

IN ADDITION TO THE ESTABLISHMENT OF AN ENVIRONMENT FAVOURABLE TO AVIATION SAFETY, AS ADDRESSED IN PART 1, ACTIONS HAVE TO BE DEFINED IN THE OPERATIONAL AREA

2.1. STRENGTHENING PILOT SKILLS

2.1.1. KNOW-HOW: TAKING FULL ADVANTAGE OF CHANGES IN TRAINING METHODS TO ENHANCE PILOTS' ABILITY AND CONTROL OF FLIGHT

The study of air incidents and accidents reveals the appearance of inappropriate crew reactions when facing sudden and unexplained situations. Coping is a controlled behaviour comprising three phases: protection, analysis and action. In the context of crew teamwork, synergy makes it possible to recover from a situation in a way which is more effective due to the thorough preparation of each pilot on these subjects.

- protection: in the event of an automated system failure, knowing how to revert to simpler modes (pitch holding, for example), or, depending on the situation, knowing how to control the situation in manual mode,
- analysis: detecting the origin of the failure,
- action: considering recovery actions, or starting a procedure from memory, making it possible to respond to the issue.

Following work carried out on control of flight, at ICAO, EASA, and in France, notably at December 2016 DSAC symposium, "Risk management and control of flight", DGAC will focus on the following points, during its audits and flight ops inspections, and for its safety promotion initiatives:

→ UPRT THEORETICAL TRAINING (UPSET PREVENTION AND RECOVERY TRAINING)

In 2016 DSAC published a guide for the implementation of UPRT training: (https://www.ecologique-solidaire.gouv.fr/sites/default/files/Guide_UPRT_Ed1_V0_mars_16_0.pdf). On the theoretical level, in-depth knowledge of environmental factors, the principles of aerodynamics, the impact of modern profiles, flight technique, aircraft design and human factors are essential for the effective prevention of "Upset" (loss of control).

For a given type of aircraft, knowledge of rough values of VMO/MMO, stall speeds, reference pitch attitude and level flight thrusts enable rapid understanding and reaction to systems failure situations.

→ ANTICIPATING

Anticipation is a key element in guaranteeing a safe flight. This anticipation requires a thorough evaluation of any current threats, if necessary by the application of the “Threat & Error Management” (TEM) method. This of course begins during preparations for flight, during which the main threats of the day, and responses to them, are examined. Sound anticipation is just as effective during the flight. This includes active tracking of flight conditions and resulting aircraft performance, combined with optimised use of the Flight Management Systems (FMS) and Weather Radar (the expression “keeping ahead of the aircraft” is widely taught). A typical example is storm cell avoidance, which is all the more efficient as it is anticipated, not only by using the weather radar the most appropriate way, but also by using forecast maps, PIREPs from the other planes in the area, and information from ATC.

→ KNOWING HOW TO REACT

The analysis of a number of accidents shows that emergency procedures are not always strictly applied, notably when these procedures are not subject to systematic simulator training. Knowledge of the elements of these procedures, and applying them from memory, is therefore essential for optimal response to events. In many cases, being able to take over from automated systems and return to manual flight makes it possible to better manage situations.

Feedback, and notably the study of incidents and accidents, during RTC (Recurrent Training and Checkings) or CRM sessions, for example, and the resulting discussions, are a key element in increasing awareness of risk among crews: the startle effect is thus strongly mitigated in case of failure, even if it has not been the subject of specific training, unlike engine failure, for example.

Studying these occurrences often makes it possible to better understand the functioning of automated systems in abnormal/emergency situations, and gives indications towards the points where greater vigilance is necessary, notably during the cruise phase. Moreover, the term “PM”, for “Pilot Monitoring”, replacing the term “PNF” for “Pilot Not in Function” better explains the role of the pilot who is not directly in control. He must also be attentive, and detect any abnormal situation, so as to better contribute to the resolution of any incidents, making the right callouts, and, if necessary, taking over the controls, all these topics can be addressed in “Crew Resource Management” (CRM) sessions. **DGAC will endeavour to ensure that in spirit and by letter, the replacement of the term “PNF” by “PM” is effective.**

2.1.2. FIT FOR THE DAY'S FLIGHT

DGAC will be particularly attentive to consideration of fatigue risk as part of the air operator safety management system. Thus, awareness of fatigue risk, and the implementation of specific feedback channels for operators will be a favoured area for progress. Special attention will be given to operators whose operations require deviations from the European standard rules, and who must therefore implement an explicit fatigue risk management system (FRMS) as part of their SMS.

Fatigue risk management within air traffic organisations will also be given special attention as part of this plan.

Since the Germanwings A320 accident in the Southern Alps in 2015, **EASA has been developing a series of measures focusing on the psychological health of crews, and on a better understanding of this field by standard-based medicine. DGAC will place high priority on monitoring the implementation of the corresponding regulations,** adapting the elements already in place prior to this accident and reinforced after it, as required.



2.2. FLIGHT PREPARATION

2.2.1. OPTIMISING METEOROLOGICAL INFORMATION AVAILABLE TO USERS

Beyond the major airlines, which generally have specific meteorological tools for flight preparation, DGAC has found that pilots, whether in the aerial work sector, or working for small air operators, are not familiar with the meteorological forecasting services offered by Météo-France, even though some of these tools could meet their needs. **Promotional initiatives for enhancing awareness of existing meteorological tools available to operators will be carried out.**

In its 2017-2021 target statement, Météo-France committed to making the most of technological improvements, in particular, fine-scale digital forecasting systems, in order to improve the prediction of dangerous weather phenomena for end-users in aviation. Thus, storm forecasts, currently available at 30 minutes in advance, will be extended to 1 hour and 3 hour forecasts.

2.2.2. COMBATTING LOOSE LOADS IN HOLDS

DGAC will promote best practices for loading aircraft, notably the topic of weight and balance. One point of focus will be the topics of

load securing and locking pallets and containers in holds, reducing the risk of shift of balance or damage to the aircraft resulting from loose loads in the hold. This theme will be the main focus of DGAC safety promotion for ground-handlers.

2.2.3. LIMITING THE RISKS ASSOCIATED WITH WORKS AT AERODROMES

DSAC symposium of December 7th, 2017 “Runway works: building safety together”, made it possible to analyse the main risks associated with works affecting the airside of airports, and to define ways of reducing these risks with operators. The presence of construction equipment and temporary operational changes caused by works constitute the main dangers. This analysis led to the development of a new version of the guide to aerodrome works, which was published at the 2017 symposium. The symposium paper emphasises the importance of effective communication about works (starting from the “project” stage), and coordination between all the actors concerned. The symposium was also an opportunity to update the guidelines for French-speaking airports regarding temporary aerodrome marks and signs. **The factoring in by operators of these best practices will be monitored within the framework of the SSP.**

2.2.4. CONTROLLING RISKS GENERATED BY PASSENGERS

In some areas, safety, as well as security, is based on passenger risk awareness. Traditionally, security work is poorly connected to work on safety. A more global approach is already underway, and will be reinforced.

In terms of the transport of lithium batteries, several areas of work have been identified, with the aim of reducing the risk of fires on board or in holds.

DGAC will focus on improving passenger information about prohibited or restricted items in baggage prior to their arrival at the airport, notably including the promotion of a clear and modern tool aimed at the general public.

DGAC will also evaluate the possibility of upgrading the roles of screening checkpoints, so as to help detect certain products, including lithium batteries.

The phenomenon of **unruly passengers**, who may threaten flight safety, was taken into consideration by DGAC as early as 2016. An action plan has been drawn up in close collaboration with the operators and authorities concerned. **The work focuses on the legal aspects that might be improved, proposing new procedures for operators, and a collaborative approach between airlines, airports, ground-handlers, and relevant State services.** These will be pursued in France, as well as internationally.



2.3. MANOEUVRING/TAKEOFF/ LANDING AREA

2.3.1. FOCUSING ON MONITORING THE IMPLEMENTATION OF EUROPEAN RECOMMENDATIONS ON PREVENTING RUNWAY INCURSIONS

Preventing runway incursions is still a priority for improving safety. The third edition of the European action plan for the prevention of runway incursions (EAPPRI V3), published in 2017, includes recommendations aimed at all operators concerned, as well as the authorities. Most of these recommendations already existed in EAPPRI V2. **Within the framework of the French State Safety Programme, the implementation of all the recommendations of this plan, which were drawn up in close cooperation between Eurocontrol, the authorities and operators concerned, will be closely monitored, via oversight and safety promotion initiatives.**



2.3.2. IMPROVING CREWS' KNOWLEDGE ABOUT AERODROME LIGHTING

In line with the EAPPRI V3 plan, **DGAC will implement oversight and safety promotion actions in order to ensure that pilots receive suitable training about aerodrome lighting, and in particular on the operational use of markings specifically designed to prevent runway incursions (controlled systems, such as stop bars or standalone systems such as "Runway Status Lights" (RWSL).**

2.3.3. IMPROVING SAFETY AT HOSPITAL HELIPORTS

The risks associated with the operation of hospital heliports are identified as priorities by the operators concerned. Despite the initiative conducted by DGAC, such as the creation of a design and operating guide, posters, and the dissemination of safety information, the technical departments of hospitals appear to have little awareness of the need to manage risks, particularly relating to rotor-draft during the manoeuvres of helicopters on hospitals' helipads. **DGAC, in conjunction with the operators concerned, will carry out initiatives whose objective will be to reinforce the aeronautical safety culture within hospital environments.**

2.4. APPROACH

2.4.1. SECURING OPERATION OF LITTLE-USED APPROACHES

In the 2013-2018 edition of the strategic safety enhancement plan, improving the management of approach and landing phases was the identified objective of this operational line of action. The actions undertaken within this framework, for example, via the detection of non-compliant approaches, led to increased awareness among all actors concerned during this phase of flight.

This notably revealed a greater risk of non-stabilisation exposure whilst carrying out certain approach procedures which are less and less used by crews, such as non-precision approaches based on radio-navigation aids, or visual approaches.

Inclusion of this specific risk by operators will be a DGAC safety promotion action initiative via, for example, the identification of a need to reinforce the regular training of crews in performing little-used approaches in the operator's network. The implementation of the Info Sécurité 2018/01 recommendations for dealing with this issue will be the subject of special attention by DGAC, as well as all incidents reported concerning the subject.

From a technical point of view, the new GNSS navigation aids have offered additional approach procedures at most aerodromes, with vertical guidance based on the GNSS altitude measurement, with improved error tolerance and performance comparable to the vertical guidance of an ILS. Within the framework of the implementation of the "Performance Based Navigation" (PBN) plan, DGAC has focused on the publication of this type

of approach with vertical guidance, and almost all French approaches include it, as of 2018.

Nevertheless, the low rate of LPV capacity among aircraft used in public transport does not contribute significantly to the increase in the rate of approaches using this type of vertical guidance. **Therefore DGAC will encourage the implementation of this capacity on aircraft not yet equipped with it, operated by airlines.**

2.4.2. REDUCING THE RISK OF AN IN-FLIGHT COLLISION INVOLVING AIRCRAFT IN COMMERCIAL TRANSPORT OR AERIAL WORK

In line with the Horizon 2018 plan, vigilance concerning loss of separation occurrences is maintained. For the commercial aviation or aerial work component, the objective is focused on preventing the risk of collisions involving aircraft in commercial transport or aerial work activities.



Several initiatives have been launched, and will be continued. In particular, **a policy of implementing buffer zones, in which transponders and/or radio communications with ATC are mandatory, has been defined (RMZ/TMZ). The deployment of these zones will continue.**

Having observed that pilots, professionals in particular, are not always **aware of the class of airspace** in which they are flying, or the risk of the presence of light aircraft in the same airspace, notably class E and G, **DGAC will implement safety promotion initiatives in order to strengthen this understanding.**

Safety promotion campaigns designed to prevent the risk of infringement into controlled airspace by light aircraft will also be pursued.

The risk of collision with **drones** is seen as an emerging risk which is insufficiently assessed. **DSAC will continue to develop its understanding of this risk, via the follow up of indicators, monitoring work on the subject, discussions with operators.** The understanding of this risk will be shared with the actors concerned.

2.5. CRUISE

2.5.1. KNOWLEDGE OF WEATHER PHENOMENA

Improved knowledge of meteorological phenomena encountered at cruise altitudes is a key element for the improvement of safety during this phase of flight. There are currently very few studies about the development in the number and intensity of these phenomena. The only signal that seems to have emerged to date, is a change in wind patterns. As for dangerous phenomena, it is still too early to provide a definitive statement. This current lack of knowledge can largely be explained by the absence at high altitude of reliable measurements over a long period of time.

Crews' knowledge of their presence thanks to improved detection and forecasting resources, information updated in real time and accessible on board during the flight, as well as better use of the on-board weather radar, are important areas for improving safety. **DGAC will ensure that operators use the most suitable and effective tools.**

In particular, the implementation of a tool that provides crews with diagnostics relating to the presence of ice crystals will be studied (a wish of the 2018 Aviation Transport commission of the Conseil Supérieur de la Météo).

2.5.2. MONITORING THE RISKS RELATING TO HIGH ALTITUDE FLIGHTS

High altitude flights, at the limit of the flight envelope, are becoming more frequent, whether related to optimising fuel consumption, or airspace



availability. Although meeting certification criteria, the margins for stall are reduced, notably during the manoeuvres (climbing to reach the desired altitude, or during turns). At these altitudes, horizontal or vertical wind shears regularly lead to reports of incidents indicating that speed limits have been reached, and, in some cases, the aircraft being unable to remain at this level.

DGAC will continue to monitor the risks associated with high-altitude flights in turbulent atmosphere, and will continue with safety promotion activities about this topic aimed at aircraft operators and air navigation service providers.

2.5.3. ENCOURAGING CREWS TO MAINTAIN VIGILANCE DURING THE CRUISING PHASE

Numerous occurrence reports, and sometimes even accidents, can be related to the startle effect during the cruising phase, when an unforeseen situation arises. Indeed, given automated systems, the crew is not truly involved in the short-term piloting loop of the aircraft. The startle effect

combined with emerging from possibly reduced vigilance, lead to a delay in the understanding and control of events that might be longer than that expected by manufacturers, and required by the Certifying Authority. While it is not possible for crews to have the same level of vigilance throughout the flight, especially during long flights, certain procedures or briefings can have a positive impact on vigilance, and improved integration of the crew into the aircraft "system". **DGAC will ensure that the lessons drawn from these situations are taken into account during operations.**



LIGHT AVIATION

3. LIGHT AVIATION

Statistical data over the past ten years show that the numbers and severity of light aviation accidents are overall decreasing. However, the level of accidents in the microlight sector remains worrying, with significant annual variations.

The objective of this new plan is to consolidate the results of certified light aviation (airplanes, helicopters, gliders, and balloons), and to raise microlights to this level, by further promoting safety.

Light aviation activity volumes are difficult to assess, particularly declared organisations. Because the level of safety can only be established in terms of the volume of activity, **DGAC will seek to determine meaningful and accessible indicators.**

This plan is in line with the previous one, with particular emphasis on improving the coordination of actors in the management of light aviation safety, EASA, DSAC, BEA, SIA, ENAC, OSAC, DSNA, and federations of users, as well as on improving communication to users.

Three principles have been retained: usefulness, clarity, and proximity.

The usefulness of initiatives, **the clarity** of communication, and **proximity** to the activities.

IN CONTINUITY WITH THE HORIZON 2018 PLAN

3.1. SUPPORTING FEDERATIONS IN THE IMPLEMENTATION OF NEW REGULATIONS

DSAC will support federations of users for the implementation of the regulations impacting the declared training organisations (DTO), as well as in the implementation of the decree relating to ultralight pilot instructors, so that they are able to assist and advise their own bodies.

In addition, DGAC will contribute to EASA's regulatory change projects, with the aim of promoting the inclusion of safety and compliance issues at the relevant levels, and without excessive complexity.

3.2. SAFETY MANAGEMENT AND PROMOTION OF A JUST CULTURE VIA THE ANALYSIS AND UTILISATION OF REPORTED OCCURRENCES

The reporting, analysis and the utilisation of occurrences form part of the inclusion by pilots of light aviation of a true safety culture, without which an optimal safety level cannot be achieved.

DSAC will work with the federations on increasing the rate and quality of safety occurrence reporting, in order to improve their analysis and to ensure that their utilisation has a significant impact on pilots.

In this context, the “Just Culture” will be clarified via communicating the implementation of its fundamental principles: the guaranteed transparency of activities thanks to the protection of actors in good faith, without failing to sanction gross negligence, deliberate violations, and indiscipline.

3.3. IDENTIFYING, MONITORING AND PROMOTING TECHNOLOGIES LIABLE TO CONTRIBUTE TO IMPROVED SAFETY

The digital revolution particularly concerns aviation, in terms of access to aeronautical information, in flight preparation, as well as for their use via mobile devices. All of these are remarkable resources, but which may however represent risks. **DSAC will be attentive to these developments, in order to support them, to detect possible risks, and to ensure that they are well managed.**

The development of anti-collision devices designed for light aviation, compatible with commercial aviation and inexpensive, is already considered a major issue for the coming years.



3.4. SUPPORTING SAFETY ACTIONS UNDERTAKEN BY LIGHT AVIATION ACTORS

Safety initiatives by the federations of users mainly concern equipment, the training of pilots and instructors, maintenance of skills, safety promotion, and assistance to pilots in order to prevent risk taking. **DGAC, via its support for light aviation, will continue to support these initiatives, and will participate in their orientation.**

Thus, in terms of microlights, DGAC is committed to supporting, via a multi-year agreement of objectives, the actions of the pilots federation (FFPLUM) for encouraging pilot owners and instructors to meet up in order to fly together for one hour with their microlight (an initiative called “remise en vol”, back to flight”: REV).

3.5. MONITORING THE DEVELOPMENT OF LIGHT AVIATION ACTIVITIES OPEN TO THE GENERAL PUBLIC

Cost-sharing flights, recreational flights, and tourist activities in microlights or balloons, are aimed at people unfamiliar with specifics of light aviation, and who are often unaware of risks. **DGAC will implement means of informing the users and customers of these activities, in order to help them in their decisions.**

3.5.1. COST-SHARING FLIGHTS

Cost-sharing flights are designed to share the costs directly relating to a flight, between the pilot and passengers, connected via dedicated web platforms. **The development of cost-sharing flights will be subject to special safety monitoring by DSAC.**

3.5.2. LIGHT AVIATION ACTIVITIES WITH A COMMERCIAL COMPONENT

Commercial activities in balloons, non-typical public transport activities, generally operated outside aerodromes, will also be very closely monitored by DSAC.

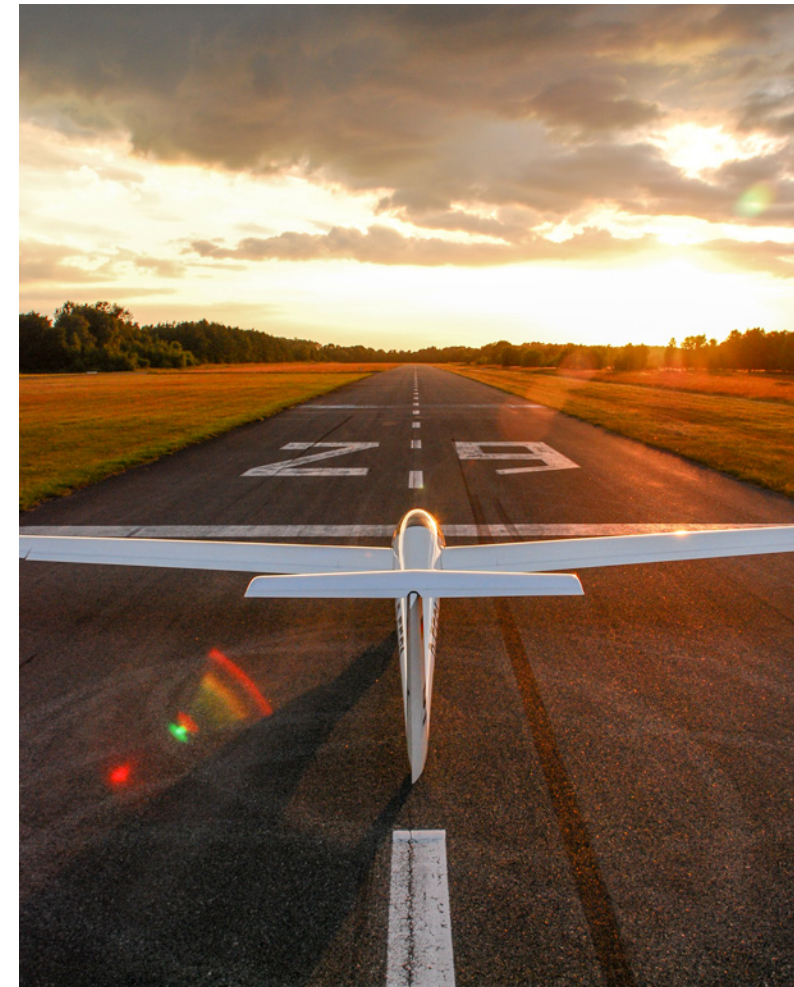
For professional tourist activities in microlights, in addition to the continued promotion of best practices, DSAC will study the possibility of establishing a specific regulatory framework, including public informational campaigns and the installation of technical resources designed to mitigate the consequences of an accident, such as emergency locator transmitters and airframe emergency parachutes.

COORDINATION/COMMUNICATION

3.6. CREATION, MONITORING AND MODERATING A “LIGHT AVIATION SAFETY PORTAL” WITH CNFAS

There are numerous initiatives for safety enhancement, generated by federations, authorities, and operators.

A web portal project aims to make them accessible, all in one single place. This portal is designed to become the focal point for coordinating light aviation safety in France. Driven by the CNFAS, and moderated and updated by DSAC, it will gradually be fitted with all the necessary functionalities for reaching out widely and rapidly to users who wish to sign up, and make it into an effective communication and coordination tool. It will be launched right from the start of the implementation of this plan.



3.7. SYSTEMATICALLY USING BEA INVESTIGATION REPORTS TO DRAW PRACTICAL LESSONS AND DISSEMINATE THEM

The BEA investigation reports are a solid source of information and analysis, available to light aviation users. Processing of these reports by expert pilots and trainers will allow them to be broken down into communication and training initiatives aimed at pilots and instructors.

This approach will also aim to develop risk-based and accidentology-based questions for exam question databases.

GLOSSARY

4. GLOSSARY

ATC: Air Traffic Control

ATO: Approved Training Organisation

BEA: Bureau d'enquêtes et d'analyses pour la sécurité de l'aviation civile (French Accident Investigation Authority)

CASH: Collaborative Aerodrome Safety Highlights

CNFAS: Conseil National des Fédérations Aéronautiques et Sportives (National Council of Aeronautical and Sports Federations of users)

CRM: Crew Resource Management

DGAC: Direction générale de l'aviation civile (French Civil Aviation Directorate)

DSAC: Direction de la sécurité de l'aviation civile (French Civil Aviation Authority)

DSNA: Direction des services de la Navigation aérienne (French Air Navigation Service Provider)

DTO: Declared Training Organisation

EAPPRI: European Action Plan for the Prevention of Runway Incursions

EASA: European Union Aviation Safety Agency

ECAC: European Civil Aviation Conference

ENAC: École Nationale de l'Aviation Civile (French Civil Aviation University)

EPAS: European Plan for Aviation Safety

FDM: Flight Data Monitoring

FFPLUM: Fédération Française d'ULM (French Microlight Federation of users)

FMS: Flight Management System

FRMS: Fatigue Risk Management System

GNSS: Global Navigation Satellite System

ILS: Instrument Landing System

LOSA: Line Oriented Safety Audit

LPV: Localiser Performance with Vertical guidance

MEL: Minimum Equipment List

NCC: Non Commercial Complex

ICAO: International Civil Aviation Organisation

OPERATORS: Term encompassing all air transport actors outside authorities, generally subject to oversight and/or being obliged to implementing risk management. This includes air carriers, NCC operators, ATOs, DTOs, maintenance organisations, ground-handlers, air navigation service providers, etc.

OSAC: Organisme pour la sécurité de l'aviation civile (French Civil Aviation maintenance oversight body)

OSP: Observation sur position (Observation in Position)

PBN: Performance-Based Navigation

PNF: Pilot Not in Function

PIREP: Pilot Report

PM: Pilot Monitoring

RBO: Risk Based Oversight

RMZ/TMZ: Radio/Transponder Mandatory Zone

RSVF: Réseau Sécurité des Vols France (French Flight Safety Network)

RTC: Recurrent Training and Checkings

RWSL: Runway Status Lights

SIA: Service de l'Information Aéronautique (Aeronautical Information Service)

SMS: Safety Management System

SSP: State Safety Programme

TEM: Threat and Error Management

UAS: Unmanned Aircraft Systems

UPRT: Upset Prevention and Recovery Training

VMO/MMO: Vitesse Maximale en Opérations (Maximum operating speed/Mach)

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