

BEA

Bureau d'Enquêtes et d'Analyses
pour la sécurité de l'aviation civile



ANNUAL REPORT 2017

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A MESSAGE FROM THE DIRECTOR

Last year my introduction to the BEA 2016 Annual Report closed with the words: I hope that 2017 will, by application of the motto “Safety Together”, be the best year possible !

2017 is considered to be the best year ever in safety terms for air transport globally, with no major accidents involving jumbo jets. Pending publication of the official figures by the ICAO, some independent analysts are suggesting accident rates of around one fatal passenger aircraft accident per 7 million departures. It is worth comparing this rate with figures from twenty years ago, when there was around one fatal accident per million departures.

Numerous studies in the early 1990s showed that, if safety levels stayed constant, we could expect around one air disaster per week in the 21st century, taking account of the expected growth in air traffic. This was obviously considered unacceptable. Vast programmes were therefore launched to improve safety. The actions taken include better recognition of human factors, and the introduction by organisations (airlines, maintenance bodies, etc.) of safety management systems.

Action was also taken on many fronts at global, European and national level as regards safety investigations: most investigation bodies have now become “*independent safety investigation authorities*” with an obligation to publish a report on every accident or serious incident. The organisations to which their recommendations are addressed generally have an obligation to respond, stating what measures they are planning to take, or setting out the reasons why they have decided not to take any. At European level, Regulation (EU) No 996/2010 made these changes mandatory for all Member States and, within the ENCASIA network, the Member States’ investigation authorities are setting up mutual support systems to improve their management of major accidents.

Obviously we cannot take the excellent air safety figures for 2017 for granted: complacency should not be allowed to creep in. Nor can we give the credit for these figures to any particular action taken in the past few years. Air safety is the outcome of the actions of all players collectively within the aviation community. The BEA has its part to play, through both the investigations it conducts itself and its participation in the investigations conducted by its foreign counterparts into events involving aircraft operated from or built in France.

In 2017 the BEA decided to draw up a strategic plan to enable it to continue playing its role as effectively as possible in the feedback loop. The plan is split into several project areas, which are designed in particular to address current changes, and most importantly the significant increase in the number of aircraft globally that were built in France. The BEA strategic plan, covering the period 2018-2022, will be presented in more detail in the conclusion to this report.

At the time of publication of this annual report, there have been several major commercial air transport accidents throughout the world. The figures, even for only part of the year, already contrast with those for 2017. Everyone involved in aviation, including the BEA, must therefore keep working hard to improve air safety together.

Rémi Jouty, BEA Director





1 - OVERVIEW OF ACCIDENTS, INVESTIGATIONS INITIATED IN 2017, BY BEA



1.1. GENERAL CONTEXT

In accordance with EU regulation 996/2010, any civil aviation accident or serious incident is the subject of a safety investigation in the Member State of Occurrence. This requirement applies to all aircraft, except those listed in Annex 2 of Regulation 216/2008 (the aircraft listed in this Annex are mainly non-certificated aircraft: microlights, aeroplanes of historic interest, etc.). The regulation also provides that States may investigate other events, including incidents that do not fit into the category of serious incidents.

Annex 13 to the ICAO, also specifies that, when a security investigation is conducted by a State (usually the State of Occurrence of the event), the State of the Operator, the State of Registry and the State of Manufacture of the aircraft involved participate in this investigation, by naming an accredited representative (AccRep).

In France, the BEA is the authority responsible for safety investigations. Its procedures, in place since 1 January 2015, provide that in addition to the investigations it has an obligation to conduct in accordance with European regulations, it also leads investigations into fatal accidents to aircraft listed in annex 2 of regulation 216/2008. This modification was introduced to direct the work of the BEA towards the most serious events, considered as providing the most safety lessons.

1.2. DATA FOR ACCIDENTS AND INVESTIGATIONS INVOLVING THE BEA

The data presented in this first chapter involve accidents that occurred in France, investigations initiated by the BEA in 2017, investigations initiated by foreign investigation bodies in 2017 in which the BEA is participating - or participated - by nominating an accredited representative (ACCRep), and the BEA teams sent to accident sites (**Go teams**).

1.2.1. NUMBER OF ACCIDENTS

The data in the table below come from two sources:

- ◇ investigations conducted by the BEA;
- ◇ information provided by Field Investigators on non-fatal **Annex 2** aircraft accidents that are not the subject of a BEA investigation.

Accidents in France in 2017				
	Number of accidents		Number of injuries	
	Total	Of which fatal	Fatal	Serious
COMMERCIAL AIR TRANSPORT				
Aeroplanes	1	0	0	1
Helicopters	1	0	0	1
Balloons	2	0	0	1
Commercial Air Transport Total	4	0	0	3
AERIAL WORK				
Aeroplanes	6 ^(*)	0	0	1
Microlights	1	1	1	0
Aerial Work Total	7	1	1	1
GENERAL AVIATION				
Aeroplanes	80 ^(*)	3	6	10
Helicopters	7	1	1	1
Gliders (including motorised)	14	6	6	3
Balloons	3 ^(*)	0	0	2
Microlights (including autogyros)	112 ^(*)	22	33	16
General aviation Total	216	32	46	32
TOTAL	227	33	47	36

^(*)It should be noted that the number of accidents reported may differ from the number of damaged aircraft because the same accident may involve several aircraft: the number of aeroplanes, balloons, and microlights in general aviation, and aeroplanes in aerial work involved in accidents in 2017 was thus 81.4, 113 and 8, respectively.

The four commercial air transport accidents listed in the above table are:

- ◇ the collision of a helicopter with the ground during a tourist flight, due to the spatial disorientation of the pilot;
- ◇ a passenger fall when disembarking at the end of a scheduled flight;
- ◇ two collisions between balloons and obstacles during landing, at the end of tourist flights;
- ◇ a fatal accident to a microlight during a flight towing a banner (aerial work) caused by a flight control failure.

Note that carrying a paying passenger in a microlight is not considered in the above figures to constitute commercial air transport. Aside from the absence of certification for microlights, of any specific licence level or of any medical fitness requirements for their pilots, the activity is not subject to any specific operational requirements. In 2017 four microlight accidents occurred during tourist flights, with a paying passenger on board. They are included in the figures for “**general aviation**”. The accident to the microlight identified as 57-BMY, operated by the company Hibisair, in Voh (New Caledonia) on 14 November, caused 2 deaths.

Some additional elements in 2017 general aviation accidentology are presented in chapter 3.

1.2.2 INVESTIGATIONS INITIATED BY BEA

Investigations initiated by the BEA in 2017					
Type of event	Commercial air transport	General aviation	Aerial work	Total	(Total in 2016)
Accidents	5	98	6	109	(98)
Serious incidents	5	5	0	10	(15)
Incidents	2	1	0	3	(3)
TOTAL	12	104	6	122	(116)
(Totals in 2016)	(9)	(103)	(4)	(116)	

The number of investigations initiated by the BEA in 2017 is of the same order as in 2016. The breakdown by type of operation and by class of occurrence is also very similar to the previous year.

Four investigations delegated to the BEA by foreign authorities are listed in the above table. They include:

- ◊ the abnormally long takeoff of an Airbus A340 operated by Air France, which occurred on 11 March in Bogota (Colombia);
- ◊ the uncontained failure of an Engine Alliance GP7270 engine on an Airbus A380 operated by Air France, which occurred on 30 September while cruising above Greenland (Denmark).

The number of investigations initiated by the BEA indicated above is significantly lower than the number of accidents, mainly because non-fatal accidents to “Annex 2” aircraft are only investigated in certain specific cases.

1.2.3. INVESTIGATIONS INITIATED BY A FOREIGN INVESTIGATION BODY FOR WHICH THE BEA NOMINATED AN ACCREDITED REPRESENTATIVE (ACCREP)

Foreign investigations initiated in 2017 for which the BEA nominated an ACCREP							
Type of event	Commercial Air Transport	General Aviation	Aerial Work	State Aircraft	Other (not specified by State of Occurrence)	Total	(Total in 2016)
Accidents	27	52	18	4	13	114	(125)
Serious incidents	130	6	4	1	3	144	(131)
Incidents	19	1	0	1	0	21	(18)
TOTAL	176	59	22	6	16	279	(274)
(Total in 2016)	(167)	(61)	(21)	(10)	(15)	(274)	

In 2017 the number of investigations for which the BEA was called upon as an accredited representative (ACCREP) is very similar to the 2016 figure. Representing more than two thirds of the BEA's activity (in terms of the number of occurrences investigated), this high level continues to be linked to the international success of France's aviation industry.

The breakdown of these ACCREPs by type of operation and class of occurrence is also comparable overall with the previous year, although the upward trend in the number of occurrences classed as "serious incidents" observed in 2016, continued in 2017. As in the previous year, the BEA links the increase in this class of occurrence to a change in the decision-making criteria used by some of its foreign counterparts, which has led to an increase in the number of investigations initiated on incidents or serious incidents, especially in commercial air transport.

Among these ACCREP occurrences, there was only one fatal accident during a scheduled commercial air transport flight. This was the accident to the ATR 42-300 operated by West Wind Aviation on 13 December on takeoff from the Fond-du-Lac aerodrome (Canada). This figure is consistent with the excellent results observed internationally in 2017.

1.2.4. Go-TEAMS

In the case of a particularly serious accident (in France or abroad), the BEA sends a team of investigators to the site without delay. The size and composition of this **go-team** are defined on a case-by-case basis.

43 **go-teams** were dispatched in 2017, three of which were sent abroad: one to Wales and two to Canada. The two sent to Canada were for accidents to scheduled commercial flights:

- ◇ The accident to the Airbus A380 registered F-HPJE operated by Air France, with flight number AF066 between Paris and Los Angeles. The uncontained failure of engine 4 while cruising above Greenland, followed by a diversion to Goose Bay (Canada), triggered the dispatch of a team of investigators from the BEA, accompanied by Air France and Airbus advisers, to the site and to the headquarters of the Transportation Safety Board of Canada (TSB) in Ottawa. Operations to find the pieces lost by the engine were then organised in Greenland.
- ◇ The accident to an ATR42-300 operated by West Wind Aviation Inc at Fond-du-Lac (province of Saskatchewan, Canada) in December 2017. Part of the team, composed of investigators from the BEA and advisers from ATR, was sent to the site, while another part went to the headquarters of the TSB in Ottawa to help with analysing data from the flight recorders. Logistical support from the French consulate played a decisive role in the success of this mission under very unusual conditions, especially of extreme cold at the site.

In 2016, 50 go-teams had been dispatched, of which seven were sent abroad. The 39 **go-teams** sent out by the BEA in France in 2017 can be broken down as follows: 37 to metropolitan France, one to Guadeloupe and one to New Caledonia. Of the 37 go-teams sent to metropolitan France, 19 were sent from the headquarters in Le Bourget and 18 from our branch offices in Toulouse and Aix-en-Provence.



- Plane
- Helicopter
- Ultralight
- Glider







2. INVESTIGATIONS CLOSED, REPORTS PUBLISHED IN 2017



2.1 INVESTIGATIONS CLOSED AND SAFETY INVESTIGATION REPORTS PUBLISHED

Over and above the number of accidents and investigations initiated, the number of investigations closed and reports published are the most relevant indicators of the BEA's activity.

European Regulation 996/2010 specifies that each Safety Investigation must be concluded with a report in a format that is adapted to the type of event. The closing of an investigation is thus marked by BEA with a report that can take two forms:

♦ **ICAO reports:** these reports follow a systematic format, defined by ICAO Annex 13. They are generally reserved for the most important events. In 2017, the BEA published 1 report of this type (see box).

♦ **Simplified reports:** these reports contain only the relevant elements specified in Annex 13. They are, specifically, for events such as incidents in public transport or general aviation accidents. In 2017, the BEA published 4 simplified reports relating to commercial air transport, and 87 simplified reports relating to general aviation or aerial work.

Events that led to the publication of an ICAO report in 2017					
Registration	Type of aircraft	Place	Date of event	Type of event	Number of recommendations
N556MB	CESSNA Riley Turbine Eagle 421 (RT421CP)	AD Lyon-Bron (69)	24 September 2013	Loss of control in flight after take-off, collision with ground, fire	

Note: all BEA reports are published in French, but some of them are also published in English. In 2017, the BEA thus translated 6 final reports.

European Regulation 996/2010 specifies that an investigation report should be published rapidly and if possible within the twelve months following the date of the event. For the BEA, a maximum length of twelve months for each investigation is thus a general objective and a monitoring indicator. This is defined as the ratio of the number of investigations closed within one year among the investigations initiated the previous year. The value of this indicator on 31 December 2017 was 0.695 (that's to say 64/92).

The tables below show the number of investigations closed in 2017, by types of event and operation. They also show the history of the events as well as investigations more than one year old that were not closed as of 31 December 2017.

Investigations closed by the BEA in 2017 (by year of occurrence)													
Event year	Before 2015			2015			2016			2017			Total
	TP	AG	TA	TP	AG	TA	TP	AG	TA	TP	AG	TA	
Accidents	1	10	0	1	19	1	1	39	1	0	15	0	88
Serious incidents	1	0	0	0	1	0	0	1	1	0	0	0	4
Incidents	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	10	0	1	20	1	1	40	2	0	15	0	92

This table shows a fall in the number of investigations closed (92 in 2017 as against 152 in 2016).

Investigations undertaken by the BEA that had been open for more than one year as of 31 December 2017				
	Commercial Air Transport	General Aviation	Aerial Work	Total
Accidents	7	75	2	84
Serious incidents	14	13	0	27
Incidents	11	3	0	14
Total	32	91	2	125

2.2 COMMENTS ON THE BEA'S ACTIVITY AND PERFORMANCE IN 2017

A comparison between the figures given in the 2017 tables and those for previous years reveals:

- ◇ stabilisation of the number of investigations opened;
- ◇ a reduction in the number of investigations closed, reports published and recommendations issued (see chapter 4);
- ◇ stabilisation of the number of investigations in which the BEA participates as ACCREP at a very high level (much higher than the number of investigations conducted by the BEA itself);
- ◇ overall, an increase in the number of investigations in progress, but a stabilisation in the number of these which are lengthy investigations.

For some years, the BEA has been introducing new procedures to improve its performance, i.e. to publish investigation reports within a reasonable time frame while maintaining a high standard.

In 2015 a new policy was developed for general aviation investigations. The aim was to limit the minor accident investigations workload and to reassign the resources released by this to fatal accidents occurring in general aviation, from which the most useful safety lessons are expected to be drawn. We can assume that the stabilisation of the number of investigations open for more than one year (125 in 2017, 125 in 2016, and 124 in 2015) is a positive consequence of this policy. The main aim of this policy was nevertheless to improve safety and not to improve this performance indicator.

The BEA has also gradually introduced procedures in the last few years to develop a collegial approach to proofreading and validating important investigation reports and recommendations, in order to improve their quality and relevance to safety. The BEA's strategic plan, prepared in 2017 (and finalised in 2018) focuses particularly on these investigation process improvement aims. The formalisation of these procedures is a key part of this. It should be noted that these procedures tend to extend the duration of the largest investigations, which – partially – explains the reduction in the number of reports published and recommendations issued in 2017.







3. GENERAL CONSIDERATIONS ON AIR SAFETY IN FRANCE IN 2017



3.1. COMMERCIAL AIR TRANSPORT

The serious incident that occurred on 11 March on departure from Bogota and the accident that occurred on 30 September over Greenland, the investigations of which were delegated to the BEA (see 1.2.2), were the focus of a major part of its activity in 2017. Both occurrences led to the analysis of different safety issues that are the direct responsibility of national or European bodies: aircraft certification, airworthiness monitoring, crew instruction and training, flight analysis, etc.

In France, investigations into other serious incidents involving scheduled commercial flights were opened by the BEA. In particular these include:

- ◇ a near-miss between one aircraft cleared to cross the runway and another taking off;
- ◇ an attempted takeoff on a taxiway that was halted on the controller's instructions;
- ◇ the partial incapacitation in cruise of both pilots, causing the flight to be diverted.

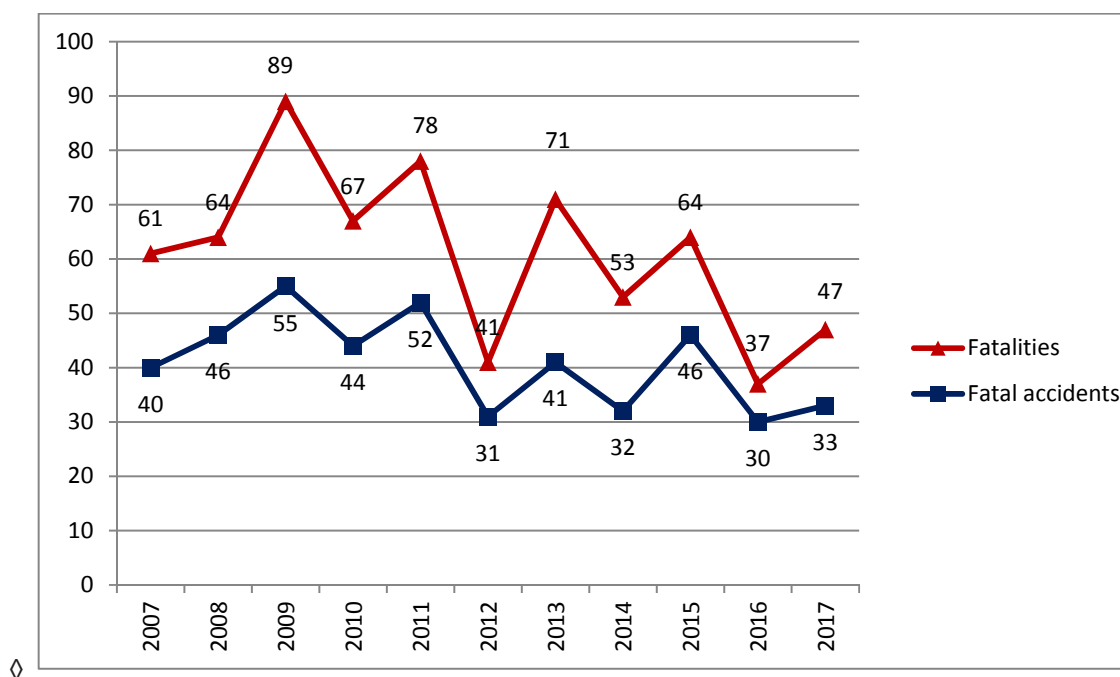
Some of the safety issues highlighted by these occurrences have been taken into account by the aviation community for a long time. Others may still need to be explored in more depth. In all cases, any lessons learned from the BEA's investigations should enable the EASA, the DGAC, and manufacturers, operators and the service providers concerned to improve their safety management systems.

3.2. GENERAL AVIATION

3.2.1. GENERAL AVIATION, ALL ACTIVITIES

Concerning general aviation (all activities together), 2017 saw an increase in the number of fatal accidents compared to 2016. There were:

- ◇ 33 fatal accidents (versus 30 in 2016 and 36 per year on an average from 2014-2016);
- ◇ 47 fatalities (versus 37 in 2016 and 51 per year on an average from 2014-2016).



Evolution from 2007 - 2017 in fatal accidents in general aviation (all activities included)

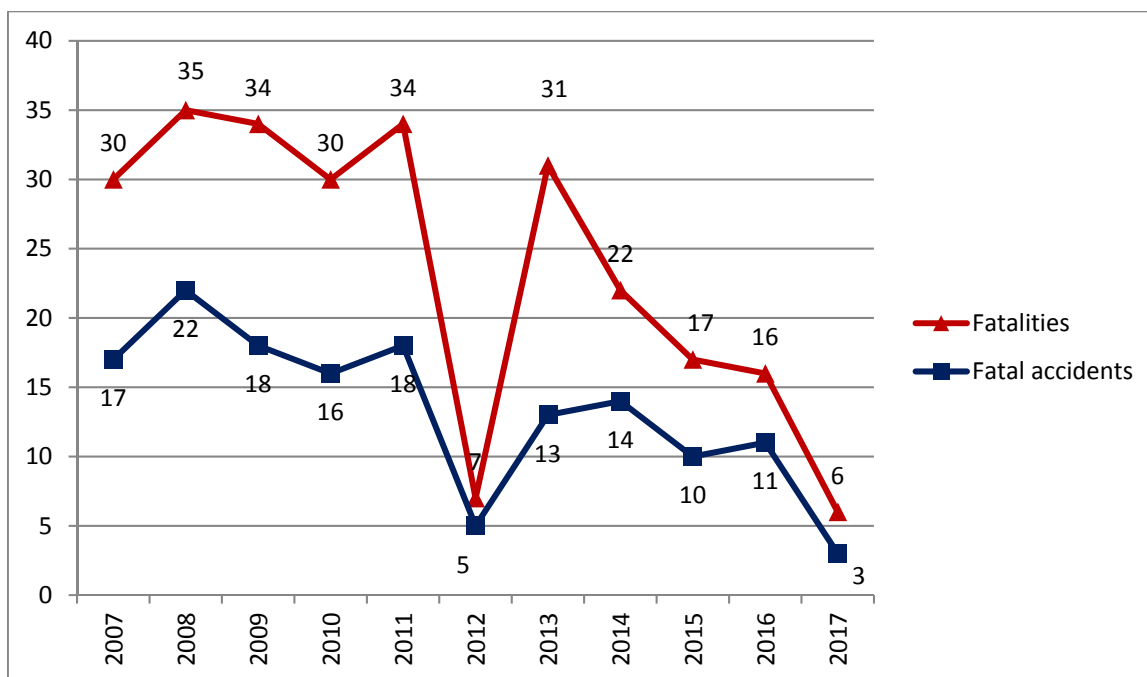
Looking beyond this general picture, it is interesting to note that there are significant differences between categories of aircraft.

3.2.2. GENERAL AVIATION: AEROPLANES

They should therefore not be interpreted as a comparison of the safety of aeroplane and microlight activities (any comparison of safety levels should take into account in particular fleet size, number of flights or flying hours for each activity).

The number of fatal accidents in general aviation involving aeroplanes continues to fall, as has been the case since 2013. The results for number of fatal accidents and number of fatalities are the lowest observed for more than ten years. There were:

- ◇ 3 fatal accidents, versus 11 in 2016, 10 in 2015 and 14 in 2014 (and 12 per year on average over the period from 2014 – 2016);
- ◇ 6 fatalities, versus 16 in 2016, 17 in 2015 and 22 in 2014 (and 18 per year on average over the period from 2014 – 2016).



Evolution from 2007 - 2017 in fatal general aviation accidents (all activities included)

These figures confirm the downward trend in the last three years and are the lowest observed in the last decade.

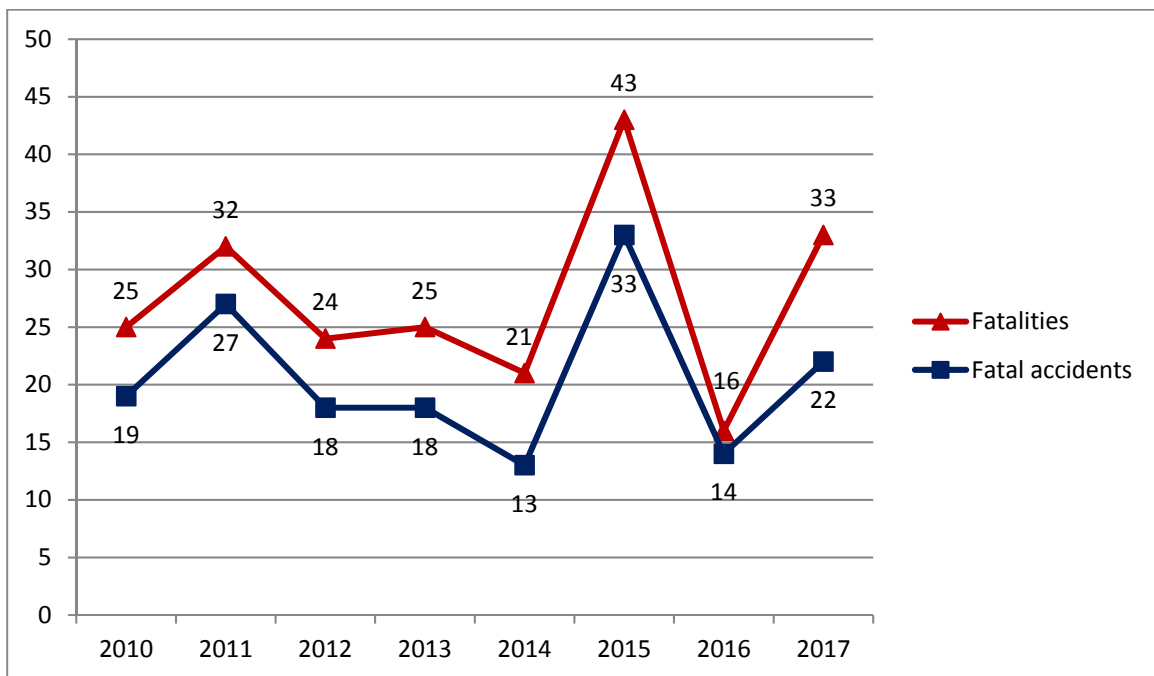
From the qualitative perspective, it is notable that two of the three fatal accidents in France were due to loss of control:

- ◊ one during a go-around following a bounce on landing, during a first solo flight;
- ◊ another while making the last turn during an approach in very turbulent conditions;
- ◊ the third fatal accident occurred during a flight at low altitude.

It is also worth mentioning here that a collision between two aeroplanes on a controlled aerodrome circuit caused one of them to collide with the ground. This accident was not counted as a fatal accident because the pilot, who was seriously injured, died more than 30 days after the accident occurred so is counted as a serious injury.

3.2.3. GENERAL AVIATION: MICROLIGHTS

Unlike with aeroplanes, there was an increase in the number of fatal accidents for microlights. Although there was no repeat of the peak recorded in 2015, the number of deaths recorded was twice the figure for 2016.



Evolution from 2010 - 2017 in fatal general aviation accidents (microlights only)

At this stage, in many cases, not all the circumstances of these accidents have been established. However, it is notable that more than 10 fatal accidents are already associated with an in-flight loss of control. Two occurred after a shutdown or decrease in engine power. In five other cases, the loss of control occurred when particular manoeuvres were being performed.

In 2 other cases of fatal accidents, low flying was observed.







4. SAFETY RECOMMENDATIONS



4.1. BACKGROUND

For the International Civil Aviation Organisation (ICAO), a safety recommendation is a proposal made by an investigation authority on the basis of information gathered from an investigation or a study, in order to prevent accidents or incidents.

The BEA sends most of its recommendations either to the civil aviation authority of a State or to the European Aviation Safety Agency (EASA). Some recommendations may also be sent to operators, manufacturers etc. They must relate to the measures to be taken to prevent occurrences with similar causes.

Follow-up on Safety Recommendations

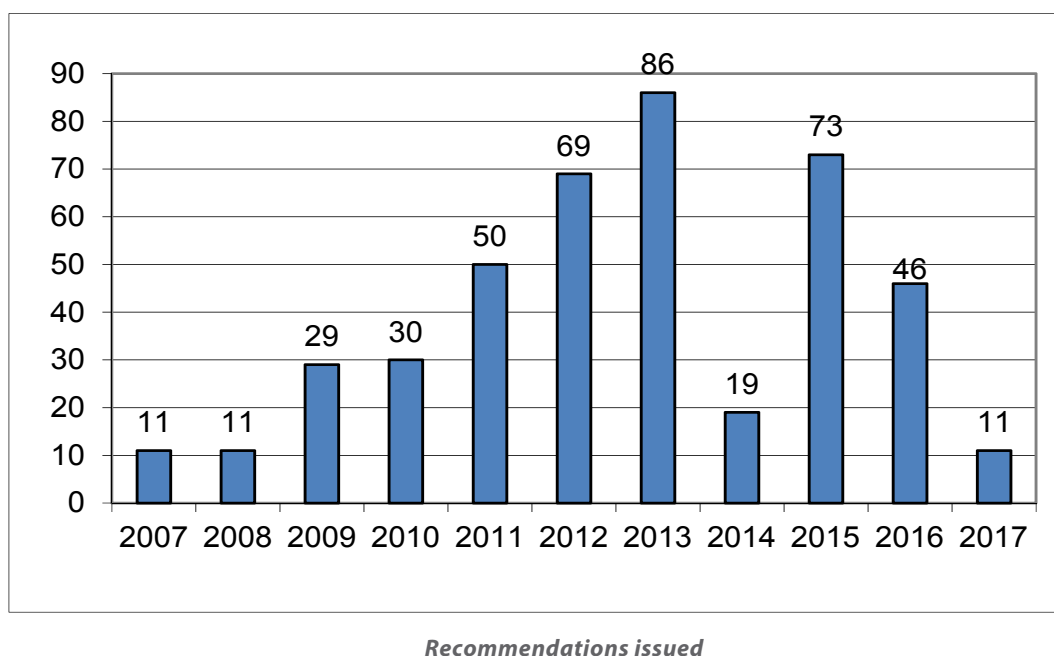
The provisions of European regulation (EU) 996/2010 of the European Parliament and Council of 20 October 2010 on investigations and the prevention of civil aviation accidents and incidents makes mandatory, for Member States, that recipients of safety recommendations acknowledge receipt and inform the issuing authority, responsible for investigations, of the measures taken, or under consideration.

This response must be addressed to the issuing authority within 90 days of receipt of the Safety Recommendation letter.

The investigation authority then has 60 days to make known to the recipient of the Safety Recommendation if it considers its response as adequate or, if it disagrees with the answer, to communicate the reasons for this.

4.2. SAFETY RECOMMENDATIONS ISSUED

In 2017, the BEA issued 11 recommendations.

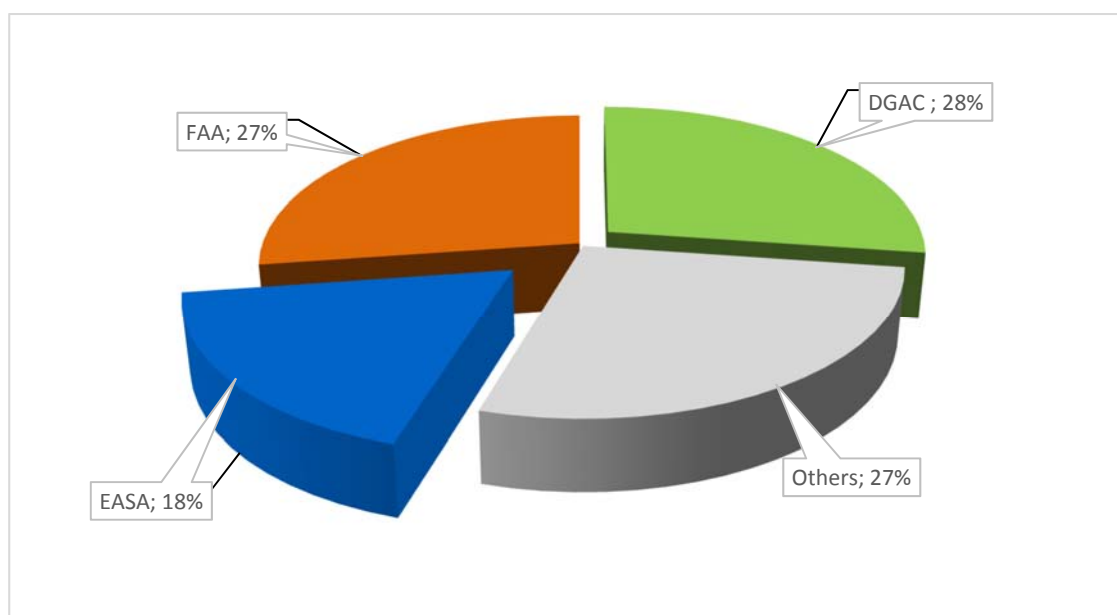


Breakdown by addressee

In 2017, the French Direction Générale de l'Aviation Civile (DGAC), the United States Federal Aviation Administration (FAA) and the European Aviation Safety Agency (EASA) were the main addressees of recommendations.

A few recommendations were made to other organisations such as the French Ministry of Sport, an importer of ultralight aircraft with engines, and the Fédération Française des Planeurs ULM (FFPLUM).

As in the previous year, it should be noted that in 2017, no recommendations were made directly to aeronautical manufacturers.



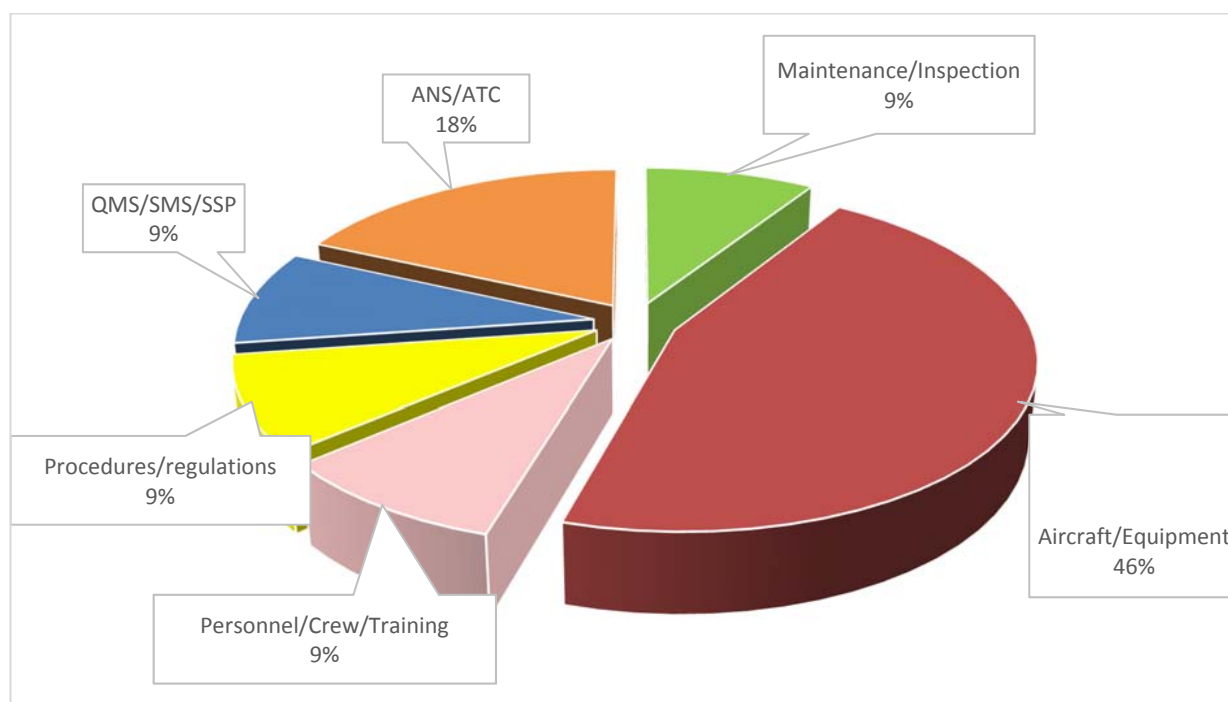
Addressees of recommendations

Distribution by type of operation

The majority (55%) of the recommendations concern events linked to commercial air transport operations, and 45% general aviation events. No recommendations concerning aerial work (AW) were issued.

Themes of recommendations

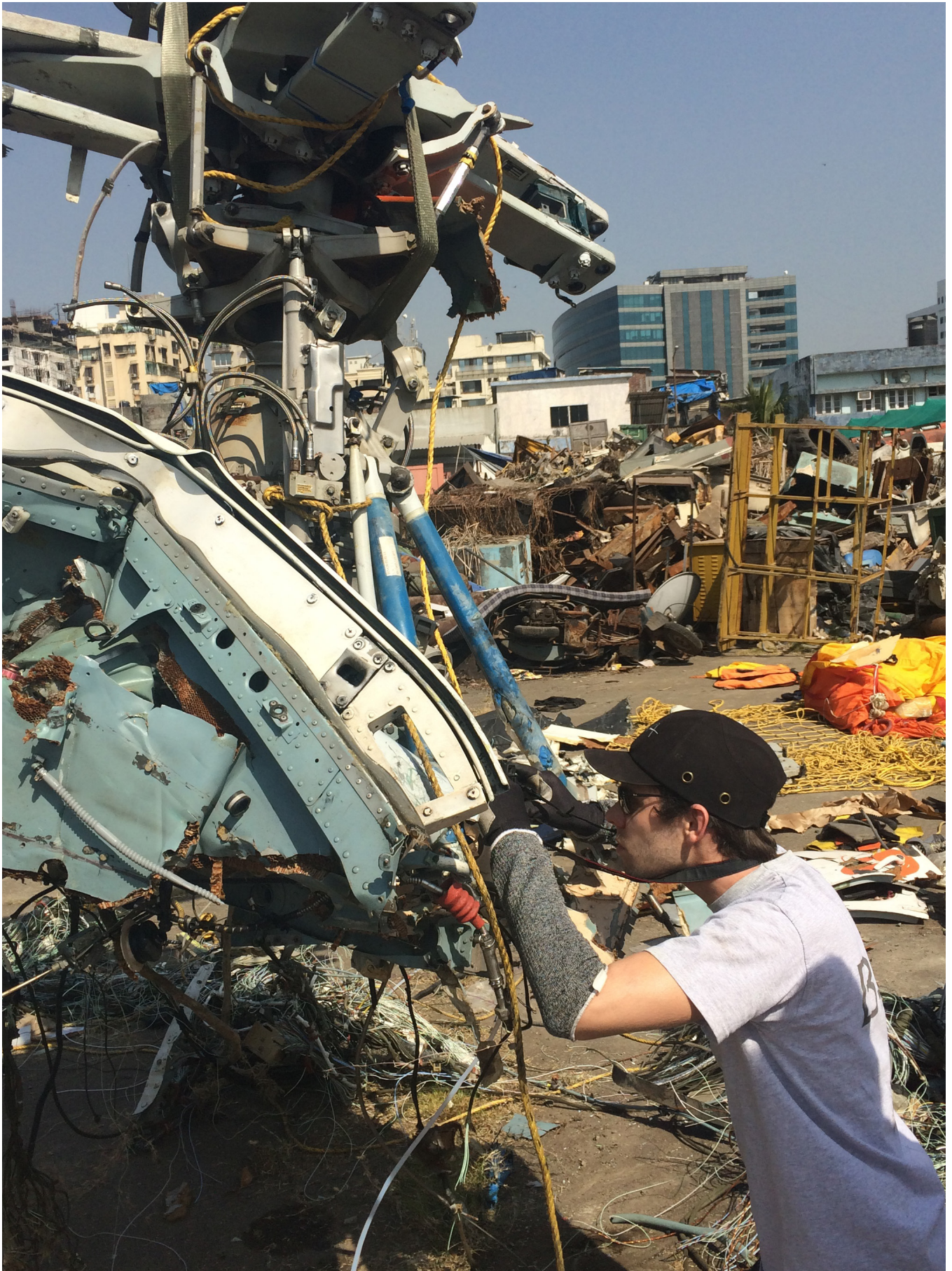
The breakdown of recommendations by theme issued in 2017 indicates six areas in which safety actions were recommended. The breakdown is as follows:



4.3. RESPONSES TO SAFETY RECOMMENDATIONS

As regards follow-up to the 11 recommendations issued by the BEA in 2017:

- ◇ 1 recommendation received a favourable response from the addressee authority;
- ◇ 1 recommendation received a partially favourable response;
- ◇ 1 recommendation received a response indicating that action was under way, by the addressee;
- ◇ 8 recommendations are awaiting a response from the addressee authority.







5. ENGINEERING DEPARTMENT



5.1. OVERVIEW OF ENGINEERING DEPARTMENT ACTIVITY 2017

The volume of activity of the Engineering Department increased in all areas compared to previous years, with a total of 526 examinations (all types included).

Among the events that produced a particularly heavy workload this year were the uncontained failure of an A380 engine above Greenland in September 2017, the accident to an ATR42-500 in Pakistan in December 2016, and the accident to a Super Puma in Norway in April 2016.

5.2. FLIGHT RECORDERS AND AVIONICS SYSTEMS BRANCH

5.2.1. FLIGHT RECORDERS

In 2017, 22 CVR recordings and 72 flight data recordings were read out and analysed at the BEA, which was slightly more than in the previous year. More than half of these recordings concerned investigations in which the BEA participated as an accredited representative. Some work was also done in the context of technical assistance to third countries.

	BEA investigation	BEA Accred	Technical assistance	Total
CVR recordings read out at BEA	8	12	2	22
FDR recordings read out at BEA	22	44	6	72

5.2.2. AVIONICS SYSTEMS

In 2017, the BEA's avionics lab read out and analysed 42 GNSS computers and 105 onboard computers, to which can be added work on audio/video and tablet/smartphone recordings. With a total of 189 examinations (versus 152 in 2016 and 137 in 2015), the activity of the avionics lab increased significantly.

	BEA investigation	BEA Accred	Technical assistance	Total
Avionics systems	65	34	6	105
GNSS	39	0	3	42
Smartphones / Tablets	15	1	4	20
Photo/video recordings	13	9	0	22

GNSS: Global Navigation Satellite System (a satellite positioning system)

5.2.3. ATM RECORDINGS

In 2017, 62 events led to work on ATM (Air Traffic Management) data, based on radar data or ATC (Air Traffic Control) communications. This year, this type of work related solely to investigations led by the BEA, and the level of this activity was significantly higher than in the previous year.

ATM work by type of investigation was split as follows:

	BEA investigation	BEA Accrep	Technical assistance	Total
Technical assistance	62	0	0	62

5.2.4. DEVELOPMENT WORK AT THE FLIGHT RECORDERS AND AVIONICS SYSTEMS BRANCH

In 2017 the BEA acquired equipment for the more frequent production of 3D animations. The laboratory selected and installed the CEFA software for the production of its complex 3D animations consisting of representations of instruments and cockpit views for most aircraft models used in commercial air transport. In parallel, a simplified animation module was developed in the LEA software on a Cesium platform for producing simple animations limited to aircraft trajectory and attitude, usable for any type of aeroplane or helicopter.

As regards image processing, the software developed by the laboratory to process images from Appareo Visio1000-type recordings is now operational. Parts of images linked to single-needle instruments, artificial horizons and indicator lights can now be automatically decoded as engineering values.

5.3. STRUCTURE, EQUIPMENT AND ENGINES BRANCH

5.3.1. EXAMINATIONS

181 examinations were performed in 2017 of which 43 were in the context of accredited representation. These figures show an increase compared to the previous year, when there were 142 examinations of which 27 were in the context of accredited representation. Some events generated multiple examinations in the BEA's materials and failure analysis laboratory. This was particularly the case with the investigation into the uncontained failure of an A380 engine over Greenland, which is counted in these figures as a single examination but actually consisted of 46 examinations of engine parts and equipment.

The examinations performed were split as follows:

	BEA investigation	BEA Accrep	Technical assistance	Total
Wreckage examinations	41	10	1	52
Engine examinations	25	6	0	31
Equipment examinations	71	27	0	98

5.3.2. INVESTMENT

2017 saw the acquisition and first operations of a drone, the main function of which is the observation and referencing of accident sites under investigation by the BEA.

To facilitate its examination of wreckage and aircraft parts, in 2017 the BEA launched the construction of a hangar on the Le Bourget site. Construction was completed in April 2018.


The development work related to test benches for magnetos and spark plugs for the most common piston engines continued in 2017.








6. COMMUNICATION, INTERNATIONAL ACTIVITIES, TRAINING & ASSISTANCE TO FAMILIES





Tweets 237 Abonnements 78 Abonnés 1 456 Listes 0 Moments 0

Éditer le profil

BEA | Bureau d'Enquêtes & d'Analyses

@BEA_Aero

BEA | Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation civile | Civil Aviation Safety Investigation Authority #safetytogether

Le Bourget, France

bea.aero

Inscrit en décembre 2017

97 Photos et vidéos



Tweets Tweets & réponses Médias

BEA | Bureau d'Enquêtes & d'Analyses @BEA_Aero - 27 avr. 16/04 to 22/04/2018: @BEA_Aero has opened investigations into 7 events which occurred in France and @BEA_Aero is participating in investigations into 6 events which occurred abroad.

Traduire le Tweet

Notified events
bea.aero

1

BEA | Bureau d'Enquêtes & d'Analyses @BEA_Aero - 26 avr. 16/04 au 22/04/2018 (8/8) : 6 événements survenus à l'étranger font l'objet d'enquêtes auxquelles @BEA_Aero participe.

Les événements notifiés
bea.aero

1

Suggestions Actualiser · Tout afficher

Lustu @Lustucrew
PILOT Stéphane Gaillard @Stef7...
PilotesAF @pilotes_af

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The BEA undertakes a wide range of activities on the European and international scene: communication activities through its participation in international conferences, setting up cooperation agreements with foreign investigation organisations, leading training seminars abroad and participating in working groups in international organisations (in particular the European Union, ECAC and ICAO).

In addition, the BEA has a duty to inform victims of aviation accidents or their families. This duty is mentioned in European Regulation (EU) 996/2010.

6.1. COMMUNICATION ACTIVITIES

Every year, the BEA participates in several conferences and expert meetings. This allows the BEA not only to spread safety messages that result from investigations that it leads or participates in, but also to make its expertise more widely known abroad. This reputation and keeping close contact with counterparts is an essential tool in succeeding in its interventions during investigations abroad.

In 2017, the BEA participated in the following international conferences:

- ♦ **International Society of Air Safety Investigators (ISASI), in San Diego (USA):** this conference provided an opportunity to give several presentations, particularly on measures taken as a result of major investigations by the BEA (investigations into the flight AF447 and Germanwings accidents), on analysis techniques for studying human and organisational factors (application of the MINOS method used by the BEA), and on the large-scale analysis of flight data to broaden the analysis process in investigations (presentation given in partnership with ATR).
- ♦ **European Society of Air Safety Investigators (ESASI), in Ljubljana (Slovenia):** during the annual seminar of the European branch of ISASI, the BEA presented its work on interpreting ADS-B flight tracking data, which is readily available on the internet and can be over-interpreted. This talk was then published in the safety journal of the United Arab Emirates authority and was used in a workshop by the Asian Society of Air Safety Investigators (AsiaSASI) in Taipei.
- ♦ **AIR meeting (Accident Investigators on Recorders), in Dublin (Ireland):** annual meeting of flight recorder specialists from safety investigation authorities worldwide.
- ♦ **GA-ASI (General Aviation Air Safety Investigators) in Dallas (USA):** during this annual conference, which brings together investigators and industry in the area of general aviation safety, the BEA presented new work done during the investigation into the in-flight failure of the structure of a composite acrobatic aircraft.

◊ **Flight Location & Data Recovery Conference in Hamburg (Germany) in May and Orlando (USA) in October:** the BEA presented work leading to a change in the ICAO standards on locating aircraft in distress and the rapid recovery of data from flight recorders after an accident. The Orlando conference was also chaired by a BEA investigator, confirming the BEA's key role in developments in aircraft location and flight data recovery, as a result of the recommendations issued in the context of the investigation into the flight AF447 accident.

2017 was also an opportunity for the BEA to continue modernising its external communications to better promote its activities in France and internationally.

It opened a Twitter account (https://twitter.com/BEA_Aero) so that it can communicate quickly on its activities throughout the year and communicate in real time in the event of a major crisis.

The development of our website, which was given a new look in 2016, also continued with the addition of new features such as the option to subscribe to a newsletter, with settings configurable by the subscriber.

6.2. COLLABORATION WITH FOREIGN INVESTIGATION ORGANISATIONS

Through its experience and know-how, the BEA is recognized as one of the most important safety investigation authorities. As such, it is regularly consulted by many States for assistance involving oversight of implementation of standards and practices recommended by ICAO. It was in this context that in 2017 the BEA signed seven Declarations of Intent for Cooperation in investigations into civil aviation accidents, respectively with Malta, Chad, Israel, Benin, Iran, the Democratic Republic of Congo and Sri Lanka. This approach proposes assistance, within the bounds of reasonable limits, in case of a major investigation. It should be noted that, with regard to Malta, this principle of cooperation is in keeping with the assistance procedures promoted by ENCASIA (European Network of Civil Aviation Safety Investigation Authorities) and mentioned in article 7 of European Regulation (EU) No 996/2010.

One of the main outcomes of the Declarations of Intent signed by the BEA has been the provision of technical assistance by the Engineering Department: this technical assistance is described in chapter 5.

6.3. PARTICIPATION IN THE WORK OF INTERNATIONAL ORGANISATIONS

6.3.1. ICAO

The BEA plays an active role in several of the ICAO's groups of experts:

- ♦ **The Accident Investigation Group Panel (AIGP)**: this group of experts is responsible for proposing amendments to Annex 13. Work done by this group in 2017 led in particular to proposals, at the BEA's initiative, that address situations where the country of occurrence of an event fails to initiate an investigation or to publish a final report.
- ♦ **ICAO Flight Recorder Specific Working Group (FLIREC-SWG)**: the BEA chairs this group. Recent work has led to proposals for the amendment of ICAO Annex 6 so that the information on the interface between the flight crew and the instruments is recorded.

The BEA is also an active participant in an ICAO Ad Hoc Working Group (AHWG), the aim of which is to propose a new draft of the document defining the GADSS (Global Aeronautical Distress Safety System) concept, taking account in particular of the lessons learned from the AF447 accident (in the Atlantic in 2009) and the MH370 accident (which disappeared in the Indian Ocean in 2014).

Finally, in the context of the work being done by the ICAO's RASG-EUR (Regional Aviation Safety Group – Europe), the BEA is actively involved in IE-REST (ICAO Europe Regional Experts Safety Team) which represents 52 European countries. The work aims in particular to develop methods and introduce shared tools for occurrence reporting and data analysis. IE-REST also offers an opportunity to strengthen contacts with authorities in the Eastern European countries (Russia, Georgia, Ukraine, etc).

6.3.2. EUROPEAN UNION

Regulation (EU) No 996/2010 created the European Network of Civil Aviation Safety Investigation Authorities (ENCASIA) to coordinate the work of and feedback from the EU's various investigation authorities. The BEA's Director was elected chair of ENCASIA in 2017.

In the context of ENCASIA's work, the BEA is a key player in the various permanent working groups and chairs a group on the identification, formalisation and sharing of European best practices for investigations and the drafting of reports. The BEA is also heavily involved in the working group looking at peer review between European investigation authorities, and in the setting up of mutual support systems between the EU Member States' investigation bodies so that major accidents can be managed more effectively regardless of where in Europe they occur.

6.3.3. ECAC (EUROPEAN CIVIL AVIATION CONFERENCE)

The BEA's Director is the vice-chair of the investigation authorities group (ACC) of the 44 Member States of the European Civil Aviation Conference (ECAC), a forum for feedback and exchange. It holds meetings every six months, and in 2017 these provided an opportunity for the BEA to give an update on its investigations initiated in 2016 and to present the work done to locate and recover engine debris that fell on the Greenland ice cap when a fan disk separated from an Air France A380 in September 2017 (the recovery was conducted in collaboration with the Danish authorities).

6.3.4. APAC/AIG AND SAM/AIG

The Accident Investigation Group (AIG) of Member States in South America (SAM-AIG) is a forum for feedback and exchange similar to that of the ACC in Europe. The BEA was invited by Argentina to give multiple presentations at the JIAAC-BEA-Airbus seminar and for the national safety day held in Buenos Aires in 2017.

6.3.5. EUROCAE (EUROPEAN ORGANISATION FOR CIVIL AVIATION EQUIPMENT)

EUROCAE is a European organisation that publishes reference documents on the specifications for onboard systems written by representatives of the aviation community. The BEA has participated for around twenty years in many projects as part of EUROCAE's working groups, particularly WG-98, which it chairs. This working group, which works closely with American experts, aims to develop specifications for flight recorders, recorders for light aircraft flights and emergency locator transmitters (ELT). Some of the specifications have come from recommendations of the investigation into the accident to the Rio-Paris flight AF447. These documents are referenced by ICAO standards and all international regulations (FAA, EASA, etc.). They are an essential component of effective regulatory changes to improve aviation safety.

6.3.6. INTERNATIONAL TRANSPORT SAFETY ASSOCIATION (ITSA)

ITSA is a group that gives independent investigation organisations an opportunity to meet and exchange information. Initially this group was only comprised of the directors of multimodal investigation organisations. Although it is not multimodal, the BEA has participated for several years, in view of its significant international role. The annual meeting in 2017 took place in Tokyo. It is an opportunity for the directors of the major investigation organisations to share their experience.

6.4. TRAINING ORGANISED BY THE BEA

In 2017 the BEA organised, on its premises, two **Basic Investigation Techniques** training courses. These courses, which lasted 2 weeks, took place at the Le Bourget site. They are mainly intended to provide initial training for investigators recently recruited by the BEA and for Field Investigators (DGAC agents approved by the BEA and intervening at its request to gather and preserve evidence in the first few hours or days after a general aviation accident). They are also open, to a lesser extent, to officers from the Gendarmerie and external personnel from foreign investigation authorities or staff with safety-related roles within their organisations.

The BEA also led a training course on the investigation methods and techniques specific to commercial air transport accidents. This “phase 3” training took place on the BEA’s premises over a 3-week period. It was attended mainly by the BEA’s safety investigators and by investigators working for French manufacturers who had already received basic training and field experience. The course will be organised regularly in the future and will form part of a standard training curriculum both for the BEA’s own requirements and for those of international partners and French manufacturers. There are plans to run the course in English in 2018 to open it up to non-French-speaking trainees.

The organisation of these two types of course also makes it possible to offer a response to the many requests received from foreign investigation authorities for the BEA’s assistance with training, without having to organise training sessions abroad, which use up significant resources.

6.5. INFORMATION TO FAMILIES

Information about major accidents is generally given to families at meetings. Depending on the case, these are held on the BEA’s premises or elsewhere, sometimes abroad. In the case of accidents that occurred abroad but in which there were victims who were French or who lived in France, the meetings can be organised by the BEA in collaboration with the foreign investigation authorities responsible for the investigation.

The difficulties experienced by some families travelling to the BEA’s premises led to the offer in 2017 of meetings conducted by telephone, during which details and explanations were given about the investigation and its conclusions. The feedback from this initiative suggests that, although a telephone meeting cannot replace a face-to-face meeting, it can be an alternative if there are physical obstacles to travel.

In 2017, two meetings at the BEA and three telephone meetings were organised for the families of victims to present the progress and the conclusions of safety investigations. These meetings concerned a total of five general aviation accidents that occurred in France and, in one case, abroad in 2015 and 2016.

The BEA also participated in two information meetings for families of victims of the accident to flight MS804 Paris – Cairo on 19 May 2016, organised by the Ministry of State for Victim Support.





7. HUMAN RESOURCES & FINANCE



7.1. PERSONNEL

7.1.1. As of 31 DECEMBER 2017

As of 31 December 2017, the BEA had 96 agents divided as follows:

BEA staff	Civil servants	Contractual employees	Workers	Total
Flight crew	-	1	-	1
Engineers	42	9	-	51
Senior technicians	16	-	-	16
Workers	-	-	11	11
Administrative staff	14	3	-	17
Total staff	72	13	11	96

To the staff listed above should be added 151 Field Investigators. These investigators, trained by the BEA, act at its request and under its control and authority, in general in the context of general aviation accident investigations. They are usually agents from DGAC services, more precisely the inter-regional DSACs. They operate under the aegis of a service contract between the BEA and these services.

7.1.2. PERSONNEL TRAINING

The BEA spends a significant part of its budget on professional training in order to guarantee a high level of skills for its personnel in various areas, indispensable to its activity.

Thus in 2017, the budget devoted to professional training was 222,866 € for the 82 agents involved. This represents 10% of the annual operating budget and close to 8% of the overall annual budget. There were 224 training actions undertaken over 907 days, which meant an average of 11.07 days of training per agent.

The training courses representing more than 30 persons-days a year are in the following areas: language training (mainly English), technical training courses with specialised organisations related to investigations, manufacturers' training courses and flying courses.

The initiative launched in 2016 to enable an agent who is type rated on passenger planes to periodically undertake commercial air transport flights continued in 2017: two new agreements were signed at the end of 2017 between the BEA and airlines, adding to the one signed in 2016. This gives the BEA investigators practical experience of piloting commercial air transport flights, which is valuable for some complex investigations in this area.

7.2. THE BUDGET

7.2.1. ALLOCATIONS

The BEA budget for 2017 was set in the initial finance law at 2,851 M€ in commitment authorisations (CA) and payment appropriations (PA).

This budget received an additional allocation during the year, of a total of 0.15 M€ in CA and in PA: this redistribution of funds within the 614 programme for air transport, oversight and certification, was made in order to partially finance the construction of a wreckage storage hangar on the actual Le Bourget site – operation which cost 524 k€ - to replace the private-sector hangar rented up to this time (see chapter 9). From 2018 this hangar will ensure an annual saving of close to 100 k€ with respect to the operating budget.

Services	Operations		Investment	
	CA (€)	PA (€)	CA (€)	PA (€)
Communication	48,213	51,081	0	0
Logistics	804,092	796,844	523,773	266,095
Engineering	178,658	149,166	95,791	35,000
Investigation support	21,884	3,477		
Computing	240,025	160,719	126,662	122,903
Training	227,061	200,716	0	0
Travel	711,036	709,851	0	0
Total (€)	2,230,969	2,071,854	746,226	423,998

7.2.1. CONSTRUCTION OF THE BEA'S ENGINEERING HANGAR

Regulation (EU) No 996/2010 requires that Member States' safety investigation authorities have premises for the storage and examination of wreckage and parts from aircraft involved in accidents. Until now, the BEA had rented a hangar close to, but not adjoining, the buildings at its headquarters in Le Bourget. However, it was established that the investment cost of constructing a building on the site occupied by the BEA would be depreciated in a few years.

There were many delays to the project, which began in 2014, due to numerous constraints including its proximity to the listed historic airport buildings at Le Bourget, occupied by the Musée de l'Air et de l'Espace. The chosen project is designed to fit harmoniously into the airport area at Le Bourget. The colour and shape of the hangar are therefore reminiscent of its aeronautical vocation but reflect the colours that have forged the BEA's visual identity.

The total build cost is estimated at around 524,000 euros, financed by the BEA's investment credit. The building has an area of around 600 square metres and adjoins other headquarters buildings on the site.

Work began in September 2017 and was completed in April 2018. The official opening is scheduled for June 2018.







CONCLUSION :

BEA'S STRATEGIC PLAN

A key event of 2017 was the development of the BEA's strategic plan for the period 2018-2022 to provide a common framework expressing the BEA's ambitions and objectives. It was based in particular on the 2012 strategic plan, which echoed the implementation of Regulation (EU) No 996/2010.

The development of this new plan benefited from reflections and contributions from all departments within the BEA. The general outlines were prepared collectively with the support of an external facilitator, at workshops attended in the early stages by the senior management team and later by all staff. Additional work, with broad representation of and commitment from the different components of the BEA, was done on the fringe of these workshops to explore four areas in more detail:

- A) Living and working well together*
- B) Improving the structure of our investigation process*
- C) Optimizing the presence of the BEA on the international scene by defining our priorities in this area*
- D) Optimizing our relations with the DGAC*

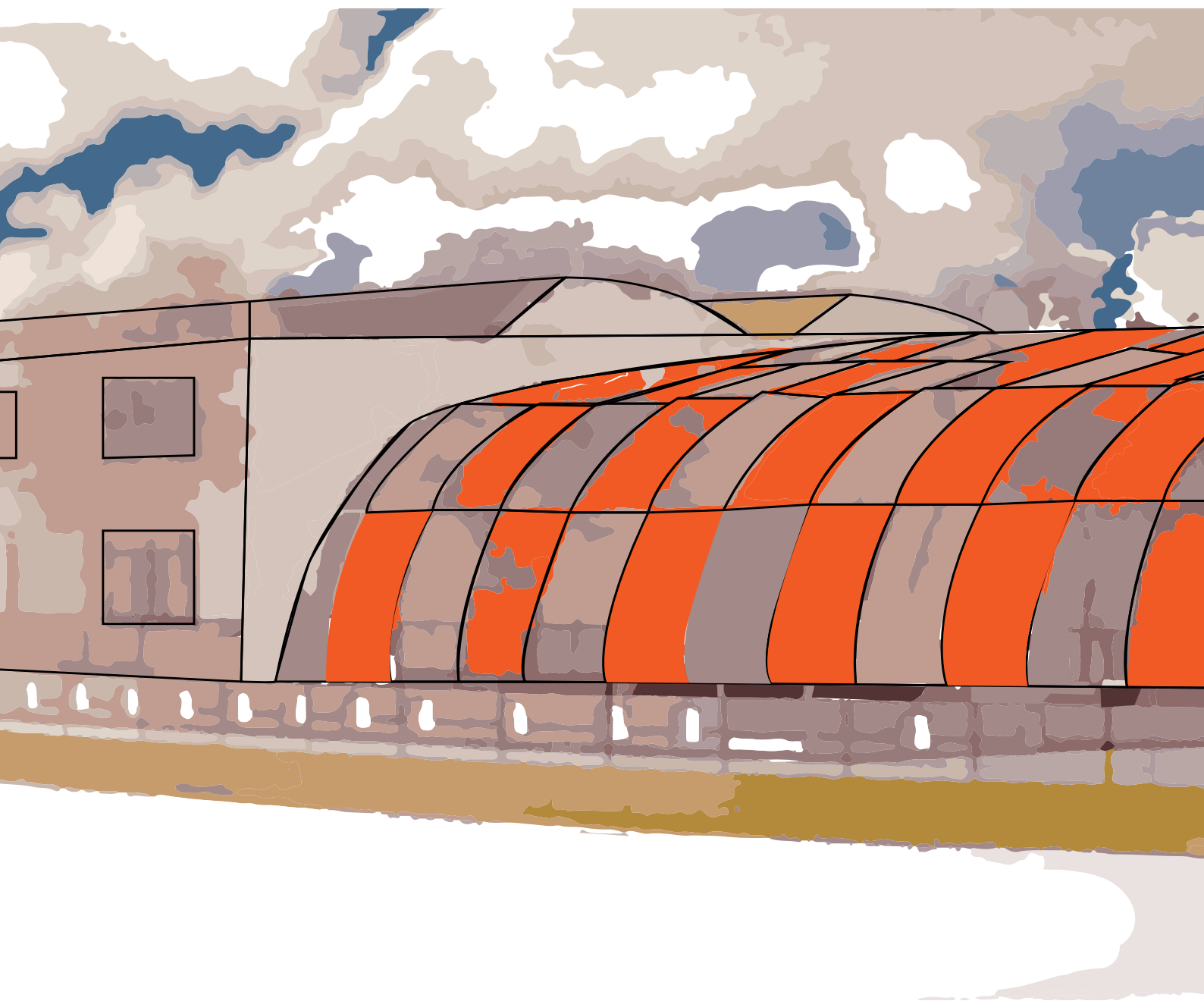
The development of the strategic plan enabled everyone to reconnect with the BEA's mission and to define strategies for the continuous improvement of our various operational processes. These have to take account of a context that is constantly changing due to technological advances and society's expectations.

The strategic plan for 2018-2022 was published in December 2017 in order to share its orientations with the public and with our various national and international stakeholders, while recalling the BEA's main characteristics, accident prevention mission and values.



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Safety together.

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