BEA

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

Annual Report 2015

www.bea.aero

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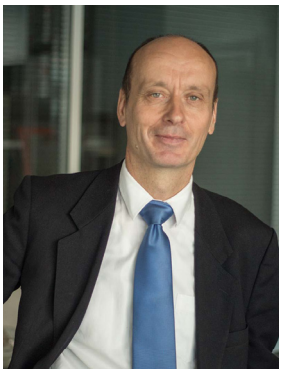
A Message from the Director



2015 was marked in public transport by the accident to a Germanwings A320 on 24 March in the Alpes de Haute Provence, claiming 150 lives, of which 6 were crew members and 144 were passengers. This aviation disaster mobilised much of the BEA's resources for several months. The safety investigation involved, alongside BEA investigators, the investigation authorities from other countries: Germany, Spain, the United States and the United Kingdom. In addition, there were a large number of technical advisors and experts, not only from the field of aviation, but also from fields such as psychiatric medicine, rail transport and electrical power. The final report was published in March 2016.

Regarding public transport, one should also note the publication of the investigation report on the accident to a Hermès Airlines A321, which occurred at Lyon Saint Exupéry on 29 March 2013. This accident claimed no lives but brought to light a certain number of safety messages, which led to 9 recommendations being issued. Furthermore the safety investigation continued into the accident to the Swiftair MD83, on 24 July 2014 in Mali, conducted by the authorities of the Republic of Mali, with a significant contribution from the BEA, and the final report was published in April 2016.

As regards general aviation, the BEA has implemented a new policy that responds to expectations expressed by numerous organisations, including user federations. It is intended to prioritise handling of the most serious events, which are the most instructive, without distinction for the status of the aircraft. Thus, the investigative procedures for minor accidents (mainly damage-only accidents), have been simplified to allow resources to be freed up for investigations into fatal accidents, whether they are accidents to certified aircraft (aeroplanes, helicopters, etc.) or non-certified aircraft (microlights, autogyros, etc).

Though the statistics for general aviation accidents in 2015 show a relative stability in the number of fatal accidents in certified aviation, they indicate an increasing number of fatal microlight accidents, two to three times as many as for certified aviation. This confirms the need to focus on these accidents. However, it is noteworthy that the investigations into the events that occurred in 2015 are not all closed: a first review of the new policy should be completed by the time the next annual report comes out.

Lastly, as in previous years, the BEA's extensive work as Accredited Representative to foreign safety investigation authorities should be noted. The number of investigations in which the BEA participates abroad is much higher than the number of investigations initiated by the BEA. This activity, linked in particular with the considerable and increasing proportion of French-designed aircraft in the world's fleets, therefore mobilises a considerable share of the BEA's resources. It places the BEA in a privileged position to observe safety issues on a global scale. The challenge is then to make its observations as widely known as possible. The new BEA website should contribute to this.

Rémi Jouty

1 - OVERVIEW OF ACCIDENTS, INVESTIGATIONS INITIATED BY THE 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.). European regulation 996/2010 also provides that States may investigate other events, including incidents that do not fit into the category of serious incidents.

Annex 13 to the Convention on International Civil Aviation, known as the Chicago Convention, 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 January 1st 2015, provide that in addition to the investigations it has an obligation to conduct in accordance with European regulation, it also investigates the following events:

- ❒ reported incidents, which are of particular interest for safety;
- ❒ fatal accidents to aircraft listed in EU regulation n° 216/2008 annex 2.

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, investigations initiated by foreign investigation bodies in which the BEA is participating - or participated - by nominating an accredited representative (ACCREP), and the BEA teams sent to accident sites.

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 2015				
	Number of accidents		Number of injuries	
	total[1]	of which fatal	fatal	serious
PUBLIC TRANSPORT				
Aeroplanes	2	1[2]	150	2
Helicopters	2	0	0	0
Public Transport Total	**4**	**1**	**150**	**2**
AERIAL WORK				
Aeroplanes	4	0	0	0
Helicopters	4	2	3	4
Balloons	1	0	0	1
Aerial Work Total	**9**	**2**	**3**	**5**
GENERAL AVIATION				
Aeroplanes	106	10	17	15
Helicopters	7	0	0	0
Gliders (including motorised)	16	3	3	5
Balloons	1	0	0	0
Microlights (including autogyros)	129	33	43	32
General Aviation Total	**259**	**46**	**63**	**52**
Total	**272**	**49**	**216**	**59**

1.2.2 Investigations initiated by the BEA

The table below shows relative stability in the number of investigations initiated in the public transport and aerial work sectors compared to the previous year, and a notable increase in the number of investigations in general aviation (135 compared to 110, that's to say an increase of 23%). This was partly due to a procedure modification, so that an investigation is now initiated for any fatal microlight accident, and also to the fact that 2015 saw a particularly high number of these accidents (33 fatal microlight accidents claiming 44 lives, compared to 13 accidents claiming 21 lives in 2014).

Investigations initiated by the BEA in 2015				
Type of event	Public transport	General aviation	Aerial work	**Total**
Accidents	4	135	8	**147[3]**
Serious incidents	2	4	0	**6**
Incidents	1	2	1	**4**
Total	**7**	**141**	**9**	**157**

[1]It should be noted that the number of accidents reported may differ from the number of accident aircraft because the same accident may involve several aircraft. Thus, in general aviation, there were 107 aeroplanes and 130 microlights involved in accidents.
[2]This was the fatal accident on 24 March to the Germanwings Airbus A320.
[3]The number of investigations initiated by the BEA is lower than the number of accidents, since non-fatal Annex 2 leisure aviation accidents in particular were not subject to an investigation.

1.2.3 Investigations initiated by a foreign investigation body for which the BEA nominated an accredited representative (ACCREP)

The number of investigations conducted by foreign investigation bodies in which the BEA participated by nominating an accredited representative (ACCREP) remained at a similar level to that of previous years (221 versus 216 in 2014 and 205 in 2013). The number of foreign investigations in which the BEA was the accredited representative has for several years greatly exceeded that of investigations initiated in France. This is specifically the result of the success of the European aviation industry of which France is State of Design.

Foreign investigations initiated in 2015 for which the BEA nominated an ACCREP						
Type of event	Public transport	General aviation	Aerial work	State aircraft	Unknown	**Total**
Accidents	36	50	24	5	9	**124**
Serious incidents	59	7	5	2	2	**75**
Incidents	20	1	0	0	1	**22**
Total	**115**	**58**	**29**	**7**	**12**	**221**

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 team (commonly referred to as the go-team) are defined on a case-by-case basis.

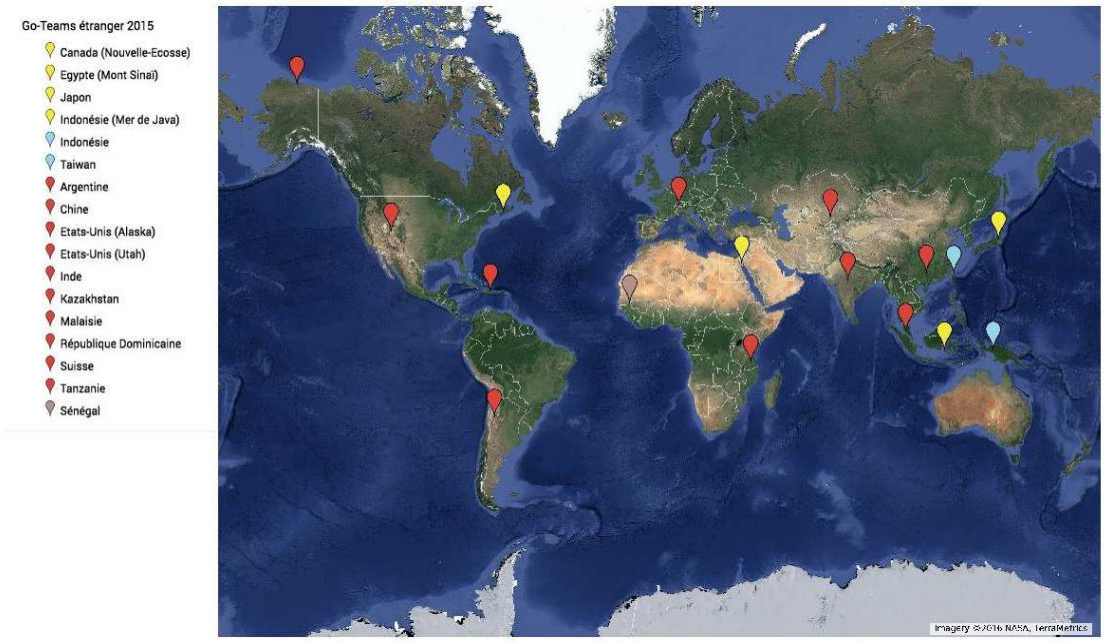
In 2015 the BEA sent sizeable teams to accidents sites after three major events that occurred to commercial aircraft:

- the accident to an Air Asia A320 in Indonesia[4];
- the accident to a Germanwings A320;
- the accident to a Metrojet Airbus A321 in Egypt.

The go-teams sent out by the BEA in 2015 involved a total of 17 accidents abroad and 41 accidents in France (these figures include the three teams mentioned above). For the record, in 2014 the BEA sent seven go-teams abroad and 31 to sites in France.

[4]This go-team, which was sent to the accident site in December 2014, is also mentioned in that year's annual report.

The 17 go-teams sent abroad by the BEA were distributed as follows:



Source Google

Event involving an Airbus

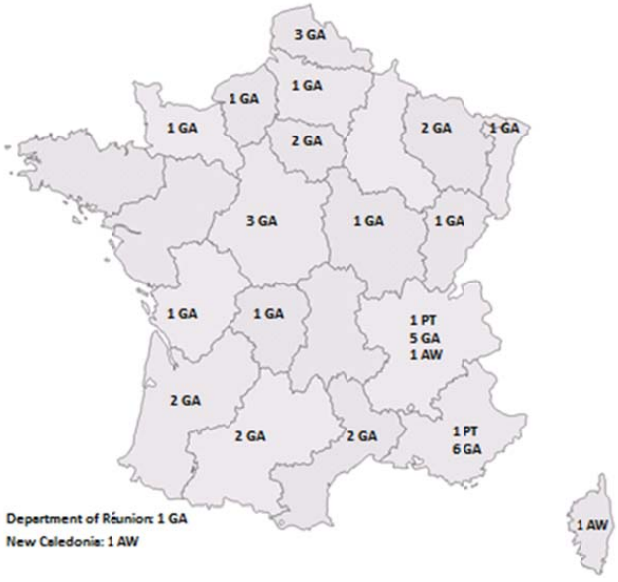
Event involving an ATR

Event involving an Airbus Helicopters

Event not involving a French manufactured aircraft

The 41 go-teams sent by BEA were divided as follows: 39 to Metropolitan France, one to Réunion island and one to New Caledonia.

Among the 39 go-teams sent out in France, 20 were sent from headquarters, located in Le Bourget, 14 from the Sud-Est branch in Aix-en-Provence and 5 from the Sud branch, based in Toulouse.



GA – General Aviation
AW – Aerial Work
PT – Public Transport

2 - INVESTIGATIONS CLOSED, REPORTS PUBLISHED IN 2015

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[5] reports: these reports follow a systematic format, defined by ICAO Annex 13. They are generally reserved for the most important events. In 2015, the BEA published 6 reports of this type (see box);
- Simplified reports: these reports contain only the relevant elements from the plan in Annex 13.They are, specifically, for events such as incidents in public transport or general aviation accidents. In 2015, the BEA published 5 simplified reports relating to public transport, and 122 simplified reports relating to general aviation or aerial work.

Note: in 2015, the BEA also closed three general aviation investigations with a simple data base entry. In addition, one accident and eleven incidents linked to malfunctions in the Thielert engine low pressure fuel pump were the subject of a joint report, published as a study (see 2.2).

Events that led to the publication of an ICAO report in 2015

Registration	Type of aircraft	Place	Date of event	Type of event	Number of recommendations[6]
CN-DAY	PIPER PA34	Saint-Geoirs (38)	5 January 2013	In-flight loss of control in IMC conditions, collision with the ground, fire	0
D-AIPX[7]	AIRBUS A320	Prads-Haute-Bléone (04)	24 March 2015	Commanded descent on autopilot, collision with terrain	0 (preliminary report)
D-GABE	PIPER PA34	Franqueville-Saint-Pierre (76)	4 July 2012	Fuel starvation on final, collision with the ground, during a radio relay flight	0

[5]ICAO : International Civil Aviation Organisation.
[6]Recommendations with multiple addressees are counted as many times as there are addressees.
[7]Preliminary report published in May 2015.

SX-BHS	AIRBUS A321	Lyon Saint-Exupéry Airport (69)	29 March 2013	Unstabilised approach, long landing, longitudinal runway excursion during landing	9
N823GA	GULFSTREAM GIV	Le Castellet airport (83)	13 July 2012	Loss of steering control during taxiing on landing, lateral runway excursion, collision with trees, fire	24
F-HBNI	AIRBUS A320	Near Bordeaux Merignac	2 August 2013	Entering a hail storm during approach, wind shear during approach, stall warning briefly triggered	11

Note: all BEA reports are published in French, but some of them are also published in English. In 2015, the BEA thus translated 5 ICAO public transport final reports (for two of which the original French versions were published in 2014), 1 preliminary public transport report (the accident to the A320 D-AIPX operated by Germanwings on 24 March 2015), and 4 simplified reports on general aviation or aerial work.

European regulation 996/2010 specifies that an investigation report should be published as 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 2015 was 0.46.

The tables below show the number of investigations closed in 2015, 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 2015.

Investigations closed by the BEA in 2015 (by year of occurrence)													
Event year	**Before 2013**			**2013**			**2014**			**2015**			**Total**
	PT	GA	AW	PT	GA	AW	PT	GA	AW	PT	GA	AW	
Accidents	1	9	2	2	26	1	0	45	4	0	33	1	**124**
Serious incidents	1	0	0	2	0	0	0	2	0	0	0	0	**5**
Incidents	4	0	0	2	0	0	0	0	0	0	1	0	**7**
Total	**6**	**9**	**2**	**6**	**26**	**1**	**0**	**47**	**4**	**0**	**34**	**1**	**136**

This table shows an increase in the number of investigations closed (136 in 2015, 107 in 2014). It is notable that the number of investigations closed in 2015 was almost equal to the number of investigations initiated in 2014 (139). One of the BEA's objectives for the coming years is to maintain or reduce the number of annual investigations under way. For this to happen, the number of investigations closed each year must be equal to or greater than the number of investigations opened over the same period.

Investigations undertaken by the BEA that had been open for more than one year as of 31 December 2015				
	Public transport	General aviation	Aerial work	**Total**
Accidents	10	75	2	**87**
Serious incidents	14	7	0	**21**
Incidents	12	4	0	**16**
Total	**36**	**86**	**2**	**124**

There was a slight increase in the number of investigations lasting more than one year (124 as of 31 December 2015 versus 113 one year previously). This can be explained by the fact that the new investigation policy makes it possible to close minor investigations more quickly, while increasing the number of longer investigations.

2.2 Studies published

In June 2015 the BEA published a study on failures to low pressure fuel pumps P/N 05-7312-K007301 on Thielert Aircraft Engines GmbH TAE 125-02-99 engines[8]. This study covers thirteen events that occurred in the south of France between 2009 and 2012. It led to the issuing of two safety recommendations being issued to improve the sturdiness of the pumps and the certification of aviation equipment derived from another industry.

[8]The report is available on the BEA website:
https://www.bea.aero/uploads/tx_scalaetudessecurite/moteurs.thielert.125-02-99_01.pdf

3 - GENERAL CONSIDERATIONS ON AIR SAFETY IN FRANCE IN 2015

3.1 Public transport

As regards public transport, 2015 was mainly marked by the crash of the A320 D-AIPX in the Alps, claiming 150 lives.

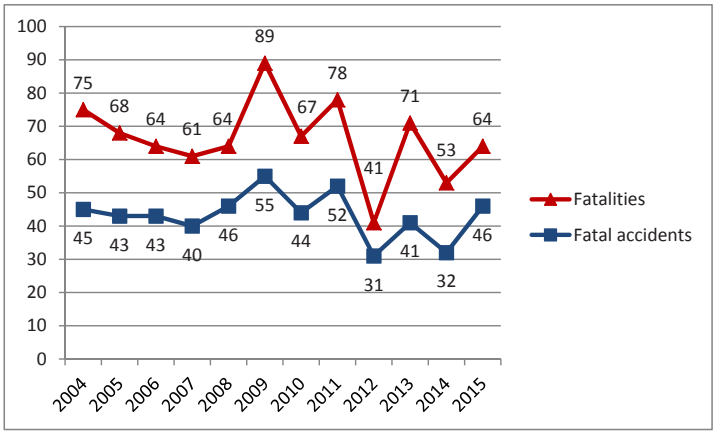
In addition, there were two serious injuries related to in-flight turbulence.

3.2 General aviation

Regarding general aviation (all activities included), 2015 saw an increase in the number of fatal accidents and the number of fatalities not only compared to the previous year but also compared to the average of the three previous years.

There were:

- 46 fatal accidents (versus 32 the previous year and 35 per year on average over the period 2012-2014);
- 64 fatal injuries (versus 53 the previous year and 55 per year on average over the period 2012-2014).

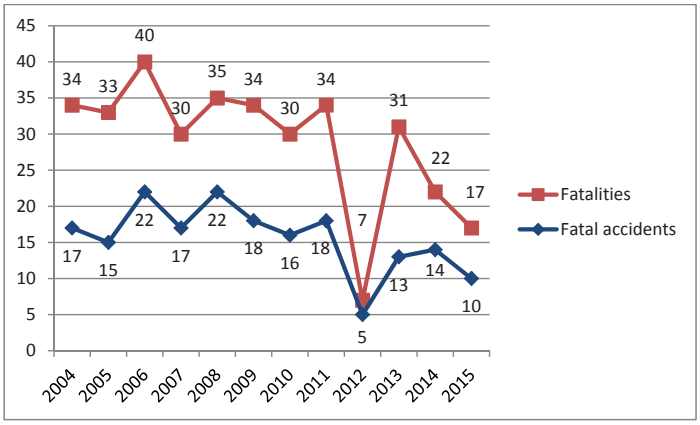


2004-2015 evolution in fatal accidents in general aviation (all activities)

If aeroplane activity alone is considered, there is however a notable decrease in the number of fatal accidents and in the number of fatal injuries in comparison to the previous year. 2015 was the second best year of the last decade after 2012, statistically. The figures below also show a clear trend towards an overall reduction in the last decade.

There were:

- 10 fatal accidents, versus 14 in 2014, 13 in 2013 and 5 in 2012 (and 11 per year on average over the period 2012 – 2014);
- 17 fatal injuries, versus 22 in 2014, 31 in 2013 and 7 in 2012 (and 20 per year on average over the period 2012 – 2014).



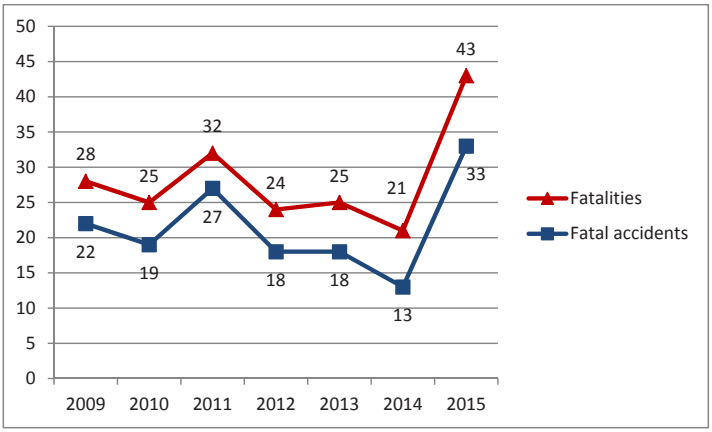
2004-2015 evolution in fatal accidents in general aviation (aeroplanes only)

As regards microlight activity however, 2015 saw a significant increase in the number of fatal accidents as well as the number of fatal injuries.

There were:

- 33 fatal accidents;
- 43 fatal injuries.

These are the worst figures for over five years. From the qualitative perspective, it is still too soon to draw conclusions since a large number of the investigations into these events have not yet been closed. The new BEA investigation policy was not based on the 2015 statistics, since it predates 2015, but it is fully justified by these statistics, the number of microlight accident victims being much higher than those of aeroplane accident victims.



2009-2015 evolution in fatal accidents in general aviation (microlights only)

3.3 Classification of microlight accidents

The facts detailed above led the BEA to classify microlight accidents that occurred in 2015 that were the subject of an investigation. This mainly involved fatal accidents and some accidents with material damage that occurred in a specific operational context (first flights, instruction, etc.) It should be noted that the majority of investigations initiated in 2015 are still ongoing, which makes it impossible to get a definitive overview of the scenarios, factors and lessons to be learned. However, all of the accidents specifically referred to hereafter refer to published investigation reports.

Loss of control in flight

The BEA noticed that a significant proportion of the accidents that occurred in 2015 were linked to in-flight loss of control. Among these accidents, the investigation into the Aiglon identified as 76-WC on 8 November 2015 at Menerval (76) brought to light the risks of taking up flying again after a long period of aeronautical inactivity, associated with taking over a new aircraft.

Technical malfunctions

There were 6 fatal accidents for which a technical malfunction was proven or supposed. Among these accidents, 2 occurred during a paying first flight. The investigation report on the accident to the multi-axis Pioneer 200S microlight identified 86-MN, which occurred on 30 April 2015 at Saint-Vincent-de-Cosse (24) described a collision with trees during an emergency landing following an engine shutdown.

Collision with obstacles

The BEA identified 5 fatal collisions with power lines. Among them, 4 occurred during takeoff or landing phases, 2 of which were during emergency landings with restricted visibility conditions, at dusk or at night. This is illustrated by the investigation into the accident to the Air Création Tanarg 582 ultralight trike identified 37-AFH, which occurred on 11 November 2015 at Verneuil-sur-Indre (37). In relation to flying at a low height, the investigation into the accident to the Cosmos ultralight trike identified 55-KA, which occurred on 12 April 2015 at Haucourt-la-Rigole (55), relates the risks taken to create certain exciting sensations, in particular for a passenger.

Fires after impact

In 13 accidents, a fire broke out after the impact (versus 7 in 2012 and 2013 and 4 in 2014). These included 10 fatal accidents. These accidents involved 8 multi-axis microlights, 3 autogyros and 2 ultralight helicopters. The investigation into the accident to the Tecnam Bravo P2004 identified 13-XE, which occurred on 22 June 2015, at Tournus Cuisery (71), found that the people were fatally burnt in the fire, and that the rigid tanks located under the wings, as well as their connections, fractured on impact with the ground.

Instruction situations

16 accidents, including 3 fatal and 2 with serious injuries, occurred in instruction situations. The investigation into the accident to the Air Création Skypper ultralight trike identified 69-ABU, which occurred on 31 March 2015 at Bellevile Villié-Morgon (69), describes a loss of control that occurred during exercises at low speed and low height during instruction.

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 addresses 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.

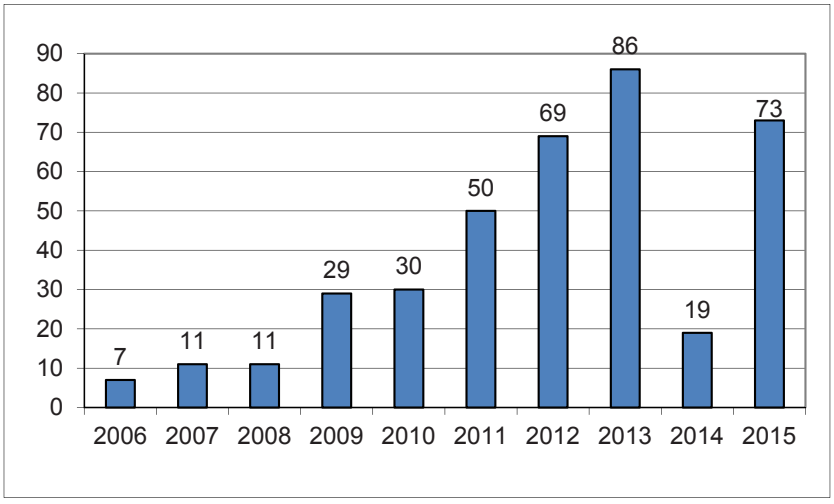
Follow-up on Safety Recommendations

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. This 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 2015, the BEA issued 73 safety recommendations.



Recommendations Issued

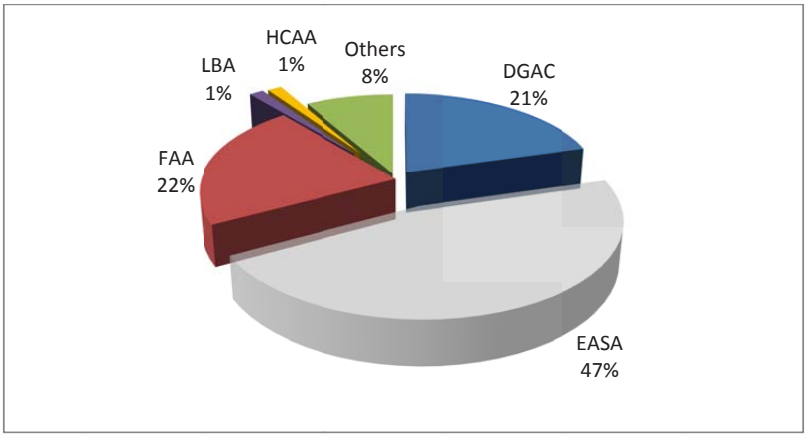
Breakdown by addressee

In 2015, EASA, FAA[9] and DGAC were the main addressees of recommendations.

In addition the BEA addressed two recommendations to the civil aviation authorities of two Member States of the European Union, respectively to the Luftfahrt Bundesamt (LBA - Germany) and to the Hellenic Civil Aviation Authority (HCAA - Greece).

The other addressees were the Direction de la Sécurité Aéronautique d'Etat (DSAÉ), air or airport operators, as well as training centres.

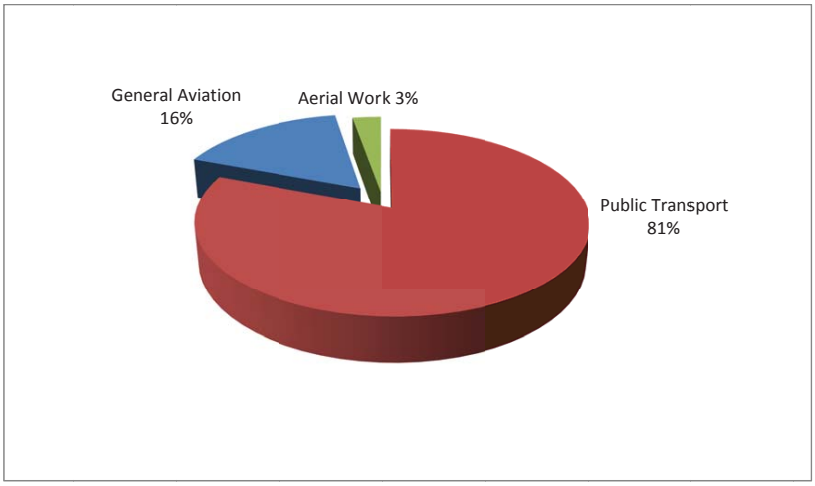
As in the previous year, it should be noted that in 2015, no recommendations were addressed to aviation manufacturers. However, 18 of the recommendations addressed to EASA and 13 of those addressed to the FAA had a direct impact on manufacturers. Thus, in total, there were 31 recommendations involving manufacturers, that is to say 42 % of all recommendations issued in the year.



Breakdown by addressee

Breakdown by type of operation

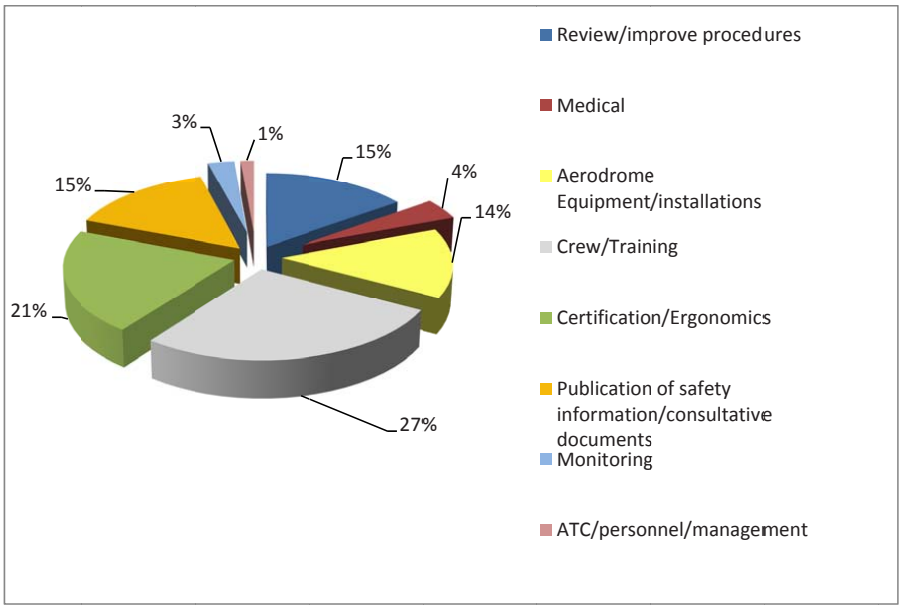
The majority of recommendations issued in 2015 involved events linked to public transport operations (fifty-eight recommendations, that is to say 81% of the total).



Breakdown by type of operation

Recommendation by theme

The breakdown of recommendations by theme issued in 2015 shows eight areas where safety actions were recommended. The breakdown is as follows:



Breakdown by theme

4.3. Responses to Safety Recommendations

As regards follow-up to the 73 recommendations issued by the BEA in 2015:

- 10 recommendations received a favourable answer from the authorities addressed;
- 6 recommendations received a partially favourable answer;
- 3 recommendations received an unfavourable answer;
- 17 recommendations were the subject of a first answer from the authorities addressed stating that the follow-up was still being considered;
- 37 recommendations are awaiting an answer from the authority addressed.

Note: for the last category, the recommendations were sent to their addressees at the end of 2015. The answers to these recommendations will be included in the 2016 Annual Report.

5 - LABORATORY ACTIVITY (ENGINEERING DEPARTMENT)

5.1 Overview of Engineering Department activity in 2015

The volume of activity of the Engineering Department was at a level close to that of previous years.

The department was again in demand in 2015 in the context of accredited representation abroad, in order to participate in work on site and carry out or participate in the readout of flight recorders.

Among the events generating a significant workload were the accident in March to the Germanwings A320 in the Alps, the collision of two AS350s in Argentina, the runway excursion of an A320 in Hiroshima in Japan, the accident to an A320 on landing at Halifax in Canada, the accident to an A321 in Egypt, as well as the accident to an AirAsia A320 in Indonesia at the end of December 2014.

5.2 Flight recorders and avionics systems

In 2015, 22 CVR recordings and 35 flight data recordings were read out and analysed at the BEA. More than half of these recordings related to investigations in which the BEA participated as accredited representative. Some work was also performed within the framework of technical assistance. Finally, about ten CVR readouts were also undertaken to evaluate the quality of the recordings in the context of certification.

The number of recordings handled was close to that of previous years.

	BEA investigation	BEA ACCREP	Technical assistance	Total
CVR recordings handled at the BEA	3	15	4	**22**
FDR recordings handled at the BEA	10	21	4	**35**
Total recordings handled at the BEA	13	36	8	**57**

In 2015, the BEA avionics lab read out 21 GNSS computers and 89 onboard computers, to which must be added work on audio/video recordings and tablets/smartphones.

	BEA investigation	BEA ACCREP	Technical assistance	Total
Avionics systems	35	43	11	**89**
GNSS	21	0	0	**21**
Smartphones / Tablets	13	0	0	**13**
Audio/video recordings	7	6	1	**14**

GNSS: Global Navigation Satellite System

In 2015, 42 events required work on the data relating to air traffic management (ATM), based on radar data or Air Traffic Control (ATC) communications. This type of work mainly related to investigations led by the BEA.

The breakdown of ATM work by type of investigation is as follows:

	BEA investigation	BEA ACCREP	Technical assistance	Total
Number of events	36	4	2	**42**

The Engineering Department developed its ability to handle images and onboard video recordings, in particular in the area of reading out images from recorders installed on helicopters.

The laboratory continued to develop its abilities in flight recorders, with the acquisition of the latest readout equipment associated with new flight recorders equipping aircraft of French manufacture.

Investigators from the laboratory also participated in European and international activities and in the evolution of regulations, particularly in the areas of recorders and avionics systems (mainly EUROCAE[10] standards and EASA and ICAO regulations).

5.3 Structure, equipment and engines

129 examinations were performed in 2015, including 19 in the context of accredited representation.

The examinations performed were divided as follows:

	BEA investigation	BEA ACCREP	Technical assistance
Wreckage examinations	50	7	0
Engine examinations	12	5	0
Equipment examinations	46	7	2
Total	**108**	**19**	**2**

The engineering department launched the development of a piston-engine examination workshop on its premises and rented a hangar, while waiting for the construction of a hangar on the BEA premises, which would allow it to undertake examinations, sampling and temporary storage of wreckage or parts from accident aircraft.

The materials and failure analysis laboratory continued improving its capacities in the field of non-destructive observation, with the acquisition of a digital microscope and new tomography analysis software (RX 3D).

[10] EURopean Organisation for Civil Aviation Equipment

6 - COMMUNICATION, INTERNATIONAL ACTIVITIES AND INFORMATION TO FAMILIES

6.1 Communication - definition and design of a new website

2015 was the year that the BEA was able to proceed with a complete refurbishment of its website www.bea.aero.

In addition to the new design and a new navigation and search system, the whole information access system was redesigned. All publications relating to the same investigation are now grouped together (notification, press releases, mediatheque, reports, recommendations) and presented chronologically.

New content has been added, such as geolocation of events, information on investigations that the BEA is currently undertaking or in which it is participating, as well as press area for the media.

The site is now also accessible via all platforms: PCs, tablets and smartphones.

Further to the website redesign, the BEA has set up its own online YouTube channel, which adds to the channels of communication. The channel makes it possible to broadcast and archive press conferences and to make multimedia investigation content available to web users.

6.2 International activities

The BEA does a lot of work on the European and international scene: participation in international conferences, setting up cooperation with foreign investigation authorities, organising training seminars abroad and participating in working groups in international organisations (in particular the European Union, ECAC[11], and ICAO).

6.2.1 International conferences

In 2015, the BEA participated in the following international conferences:

- International Society of Air Safety Investigators (ISASI), in Munich (Germany);
- AIR meeting (Accident Investigators on Recorders), in Washington (United States);
- AIM meeting (Accident Investigators on Metallurgy), in Moscow (Russian Federation);
- GA-ASI (General Aviation Air Safety Investigators) in Wichita (United States).

The objective of the BEA participation in these conferences is both to make its abilities better known abroad and to present the main reports published, in order to spread its safety message. In 2015, the BEA was thus able to present to ISASI the report on the investigation into the accident 29 March 2013 at Lyon Saint-Exupéry Airport to the Airbus A321 registered SX-BHS[12] and operated by Hermes Airlines, and a study on cable twisting to the GA-ASI.

[11]European Civil Aviation Conference
[12]www.bea.aero/fileadmin/documents/docspa/2013/sx-s130329/pdf/sx-s130329.pdf

6.2.2 Co-operation agreements

Monitoring implementation of ICAO standards and recommended practices leads many States to ask the BEA for advice and assistance. In 2015 the BEA signed co-operation agreements in relation to investigations into civil aviation accidents with Albania, Argentina and Senegal in order to assist them, according to the means available, in case of a major investigation. This brings to 38 the number of States with which the BEA has signed co-operation agreements.

These exchanges and the co-operation agreements that they lead to facilitate the conduct of safety investigations.

6.2.3 Training actions abroad

The BEA organised a training course on investigation methods and techniques. This training course lasted 10 days and was held in the ICAO Regional Office in Dakar. It brought together investigators from 10 francophone African countries. This overall action, which was highly appreciated, made it possible to develop, in accordance with the cooperation agreements signed, the investigatory skills and capacities of each country participating, while optimising the resources provided by the BEA in this field.

6.2.4 Participation in the work of international organisations

ICAO

The BEA participated actively in the work of the ICAO Flight Recorder Panel (FLIRECP-SWG) and is president thereof. New modifications to Annex 6 on tracking of aircraft above oceanic areas have been proposed. All of these modifications are actively supported by the BEA. They correspond to specific recommendations made in the context of the Safety Investigation into the accident to the Rio-Paris flight.

During the ICAO multidisciplinary conference on tracking aeroplanes, in May 2014, an ICAO Ad-Hoc working group (AH-WG) was set up on the localisation of aircraft in normal flight and during an emergency situation. The work of this group, in which the BEA participated actively, led to the writing of a new version of the document defining the general aeronautical distress and safety system (GADSS).

European Union

The European Regulation set up a structure called ENCASIA (European Network of Civil Aviation Safety Investigation Authorities) to coordinate the work and the experiences of the various European Union Safety Investigation Authorities. The BEA participates actively in the work of this network. In this context, the BEA was particularly active in 2014 in setting up a system of peer reviews between European Safety Investigation Authorities, as well as for the identification, formalisation, and the sharing of best European practices in relation to investigations and writing reports.

ECAC

The investigation group of the 44 Member States of ECAC, called ACC, is a very active feedback forum. A workshop was organised in Toulouse in 2015 on relations between investigators and industrial entities in the context of the safety investigation. The BEA participated in writing the best practices document edited by ECAC in 2015 on investigation work at difficult accident sites.

RASG-EUR (Regional Aviation Safety Group Europe)

This group aims at generating coordination with States, regional organisations and the industry, and its main objective is to support the implementation of the GASP (Global Aviation Safety Plan) in the 44 ECAC States. The BEA participates actively in developing common provisions in all States.

APAC/AIG

In June, the BEA participated in the APAC (Asia and the South Pacific regional directors conference) in Colombo (Sri Lanka). Jointly with its Indonesian counterpart, the NTSC, the BEA compared the conduct of investigations by comparing similar accidents in four countries. It also shared its experience on the difficulties of access to wreckage in a mountainous area.

Previously, the APAC member States Accident Investigation Group (AIG), which is a forum for exchanging experiences of which France is a member, held a meeting. During this third meeting of the group, the BEA presented a document on the protection of data and recordings gathered during a safety investigation.

EUROCAE (EURopean Organisation for Civil Aviation Equipment)

This European organisation groups together members of the aviation community and publishes reference documents on specifications for onboard systems. The BEA has participated for several years in the work of a number of EUROCAE working groups, in particular those dealing with updating the specifications for flight recorders (such as image recorders or ejectable recorders). WG-98 is currently headed by the BEA representative: this group aims to define the specifications for triggering position transmission when an emergency situation is detected automatically by the onboard aircraft systems. Some of the specifications come from recommendations of the investigation into the accident to the Rio-Paris flight.

6.3 Information to families of victims

In 2015, nine meetings for the families of victims were held to present the progress and the conclusions of Safety Investigations. Six meetings related to general aviation accidents between 2011 and 2015, and three related to public transport accidents that occurred in 2014.

These meetings concerned two investigations led by the BEA into accidents that occurred in France and five investigations into accidents that occurred abroad in which BEA participated. For the latter, the meetings for the French families of victims were organised with the agreement of the authorities in charge of the Safety Investigations.

7 - HUMAN RESOURCES, FINANCE

7.1 Personnel (as of 31 December 2015)

BEA staff	Public Servants	Contractual employees	Workers	Total
Flight crew	-	1	-	**1**
Engineers	28	14	-	**42**
Senior technicians	12	1	-	**13**
Workers	-	-	13	**13**
Administrative staff	13	5	-	**18**
Total staff	**53**	**21**	**13**	**87**

Note: to the staff listed above should be added 159 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.

7.2 Budget

The BEA budget for 2015 was set in the initial finance law at 2,953 M€ in commitment authorisations (CA) and payment appropriations (CP).

In contrast to the previous year, this budget was not rectified during the year.

7.2.1 Expenditure during the period

SERVICES	OPERATIONS		INVESTMENT	
	CA (€)	PA (€)	CA (€)	PA (€)
Communication	42 916	60 172	0	0
Logistics	1 031 779	968 062	26 940	17 933
Engineering	187 273	188 418	147 756	147 756
Computing	188 812	185 607	148 200	194 801
Training	234 516	223 053	0	0
Travel	888 982	888 801	0	0
Total (€)	**2 574 278**	**2 514 113**	**322 896**	**360 490**

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