



# **Annual Safety Review 2015**



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## Foreword

I am delighted to introduce the AAIB's 2015 Annual Safety Review. It is particularly special this year as you will note a radical change in format and it has also been my last as Chief Inspector.

The most significant change is the presentation of our Safety Recommendations and associated responses. We have moved this information onto our website where they will be published in a timelier manner and the responses included to create a 'living' picture of the actions taken, all in one place. This facility already exists for our most recent investigations and over time will be extended to more and more of our legacy reports.

This has presented us with the opportunity to include more information about our day to day activities and some of the processes we use to investigate aircraft accidents and serious incidents; I trust you find them interesting but please feedback any preference for future articles.

As mentioned earlier, this will be my last Annual Safety Review as Chief Inspector and an opportunity to reflect on my six years in this role. It is undoubtedly a unique role in aviation with a remit that allows an insight into every aspect of the safety agenda unencumbered by legal, commercial or political direction. We have investigated many high profile events including helicopter accidents in the North Sea, Glasgow and London, a ground fire on a B787, fan cowl door loss on an A320 and an ongoing investigation into the loss of 11 lives at the Shoreham airshow. In addition, we have been heavily involved with the disappearance of MH370. Although commercial flying continues to become ever safer, the loss of MH17 and the Metrojet tragedy in Sinai, remind us also to be prepared for non-accidental causes.

Accident investigation is a necessary function of an aviation safety system and I am justly proud of the contribution the AAIB delivers. Ultimately our reputation stands on the quality of our investigators and support staff; their passion, drive and complete objectivity in pursuing the reasons that lie behind every tragic event. I have every confidence that as the organisation enters its second century and appoints its 13<sup>th</sup> Chief Inspector, this will continue undiminished.

Keith Conradi  
Chief Inspector of Air Accidents (2010 - 2016)







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## AAIB Investigations, the Practicalities

### Introduction

*“It’s simple the aircraft crashed because the engine stopped,  
so why is it taking so long to complete the investigation?”*

This is an example of a question often posed to the AAIB during an investigation. True, the cause of the accident appears, at first sight, to be simple and obvious. But the task investigators is to find out ‘why’ and understand the other factors which may have led to the accident. Rarely is an accident caused by one single event, there are usually a number of interlinked events. The purpose of the AAIB is to investigate all of the circumstances leading to an accident or serious incident in order to make sensible and effective Safety Recommendations to continuously improve aviation safety.

A relative of someone killed in an air accident, recently made this comment: “The most important thing is that you [the AAIB] are right, however long it takes”. In effect this person wanted the investigation to be thorough, to establish the exact facts as far as possible and not be constrained by time. It is true that the AAIB investigations are not constrained by time or strict deadlines. However, investigations are conducted to ensure an efficient progression to an accurate conclusion. This article explains how this is carried out and how each aspect affects the time taken to complete an investigation and publish a report.

### Practicalities

The AAIB has a team standing by ready to deploy to an accident large or small anywhere in the world<sup>1</sup> 24 hours a day 365 days a year. The AAIB will be directly informed of an accident from various sources<sup>2</sup>. This information is handled by the AAIB Duty Co-ordinator who will decide on the AAIB response. As general rule all fatal accidents will generate a deployment. Non-fatal accidents and serious incidents are considered on a case by case basis depending on the severity of the potential outcome or whether there is an underlying aviation safety issue which needs to be understood.

A general aviation (GA) light aircraft fatal accident will usually require a small team of three investigators, consisting of an Operations Inspector, an Engineering Inspector and a Flight Data Recorders Inspector led by an Inspector who is the Investigator-in-Charge (IiC). A member of the AAIB engineering support staff will also deploy. For a major accident the team will be expanded. A major accident in this context could be a small aircraft accident having a large adverse effect. For example, the EC135 helicopter, G-SPAO, in Glasgow resulting in multiple fatalities amongst members of the public in a busy city centre location. Conversely, it may be very large commercial aircraft event which requires an AAIB response but no passengers or members of the public are involved. In other words the size of aircraft does not necessarily dictate the size of the investigation. AAIB inspectors deploy from

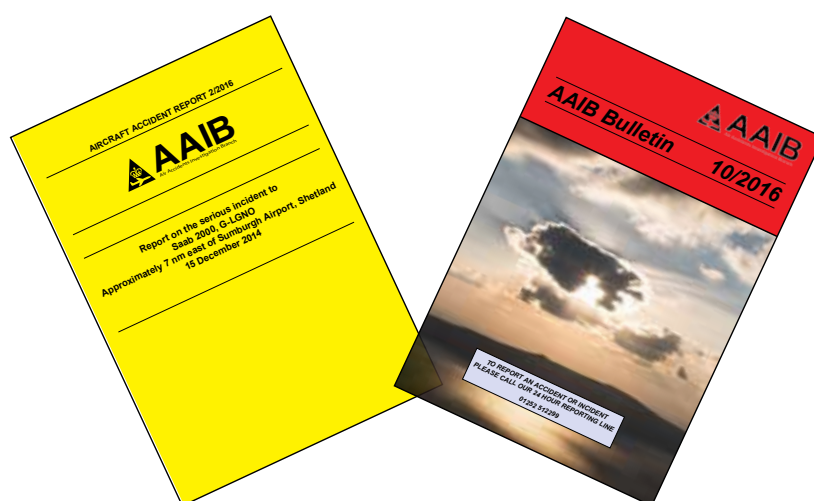
1 The protocols by which the AAIB becomes involved in investigations overseas are set out in ICAO Annex13. As a general rule; the State of occurrence investigative body will lead the investigation and State of registration, operator, design and manufacture of aircraft or engines are entitled to be part of the investigation as Accredited Representatives.

2 Out of office hours the AAIB Duty Co-ordinator will be informed by the DfT Duty Officer based in London.

the HQ at Farnborough and usually aim to arrive on scene within hours of the accident dependent on the time of year and the availability of suitable transport. As a rule, by road in England and Wales and perhaps by a scheduled air service to Scotland.

## Types of investigation

There are three types of investigation carried out by the AAIB. The first and simplest type is the correspondence investigation whereby the circumstances of an incident or accident (non-fatal) are reported to the AAIB by the pilot involved. These may involve some follow up work by inspectors. These low level investigations are carried out throughout the year in the background and usually take very little time to complete. The types of investigation discussed here, which take the majority of AAIB time, are known as 'Field Investigations'. These investigations are published in two forms: as an AAIB Bulletin, or as an AAIB Formal Report. In broad terms the difference between the two is this: the Bulletin presents only the relevant facts and circumstances of the accident and, after analysis of those facts, presents a cause. It may or may not contain Safety Recommendations. As a rule these are accidents which have a small number of causal factors and where the safety message is very straightforward. Nevertheless, there has usually been a large number of steps taken to reach the conclusion but they are not necessarily all described in the report.



The Formal Report is much more involved and will describe all of the steps in the investigation in order to understand and present all of the detailed circumstances leading to an accident. Formal Reports always include a number of Safety Recommendations and are set out in accordance with the Annex 13 protocols and follows a format that is used worldwide.

## On Site and further afield

Once on site the investigators will start to gather and preserve the evidence and try to understand the initial circumstances of the accident. At this stage nothing is ruled out, everything is considered important. The 'site phase', as it known, may only take a couple of days for a GA accident in a rural location or could be a week or more for a major accident in a complex location. Bearing in mind that a large commercial aircraft in the worst case may be an accident site over a vast area and involve several hundred tonnes of wreckage.



The site phase will throw up a number of challenges. The site may be unsafe with heavy and unstable wreckage, contamination or hazardous materials. The safety of all concerned including members of the public will always be of paramount importance. Care has also to be taken not to destroy evidence during work on the site. All of these aspects will take time and to the outside observer work appears to be very slow.



The Inspector will also gather evidence from further afield ie not located with the aircraft or its wreckage. This may be such things as training records, flight plans, aircraft logs and maintenance records. In some cases these items may have to be collected or sent from abroad. Wherever possible all the evidence will be transferred and held at the AAIB, but the practicalities for a very large aircraft may mean a remote dedicated secure hangar may have to be procured.

In order to understand the progression of an accident investigation consider a hypothetical case. A medium sized short haul passenger aircraft with a foreign registration and operating company overruns the runway and onto an arterial road. There are six crew and passenger fatalities out of the 80 on board. Members of the public on the road were injured. The site phase in this example would be at least several days but is more likely to take a couple of weeks.

The aircraft wreckage is, and contains, evidence and will be examined away from the accident site. This is usually done at the AAIB HQ under cover within a hangar. Depending on the nature of the accident the wreckage may consist of a number of rubble sacks of fragmented parts or large sections of aircraft structure, which, although damaged may be relatively intact and recognisable as an aircraft. In most cases several days or even weeks will be spent in laying out and closely examining the wreckage. In the hypothetical case this work is likely to take at least three or four weeks.

At the same time inspectors will continue to interview witnesses. Often where there are tens or even hundreds of witnesses, the key witness evidence has to be prioritised and followed up. Face-to-face interviews are conducted at times of mutual convenience which, with busy lives in our modern society, can in itself take many weeks to carry out.



As soon as practicable after a deployment the inspectors concerned will present the facts, evidence gathered and initial lines of inquiry in the investigation to the Chief Inspector of Air Accidents (CIAA) and the AAIB staff. It is at this stage that the focus and general direction of the investigation is set out and the CIAA decides how the accident will be reported, ie a Bulletin or a Formal.

## Lines of inquiry

The evidence drives the investigation. The significance of any evidence gathered may not be immediately obvious but will have to be explored as a 'line of inquiry'. The number of lines of inquiry varies, for example, in a recent case there were more than 40 separate lines of inquiry. They ranged from simple questions regarding build data to more complex matters that might involve specialist test flights and the construction of test rigs or aircraft systems outside the aircraft.

Throughout an investigation the relevance of various pieces of evidence starts to become clearer and the causal and contributory factors start to emerge. In practice the investigation will not rely on one piece of evidence alone and will take additional steps to verify and double-check. There are some cases where the evidence is very sparse or non-existent which make the investigation particularly difficult. In these cases Inspectors have to carry out work which eliminates systems or actions, in other words identify what 'did not' cause or contribute to the accident. This can be extremely time consuming and frustrating because the Inspectors are effectively trying to prove a negative. It is also often the case that more evidence emerges as the work progresses leading to new lines of inquiry.

Accidents at air shows, for example, produce vast amounts of witness evidence in a variety of forms all of which has to be examined before being ruled in or out. In a recent case the AAIB received more than four hundred witness statements all of which had to be read and reviewed to establish relevance.

Some lines of inquiry result in findings which have no bearing on the accident which only becomes clear after the work is done. Nevertheless, trials or testing regardless of the outcome will take time to arrange, carry out and analyse the results. For example, in the hypothetical case, it may be that an engine power loss is suspected and so both engines will have to be disassembled and examined. This is usually best done at the manufacturer but only under very strict control and supervision of the Inspectors. A task such as this will take a lot of organisation by all the parties concerned. It will need the manufacturer to facilitate work shop space, tooling and manpower, it will require the Accredited Representatives (AccRep) of the State of registration, aircraft/engine manufacture and design, and of the operator to attend. These aspects will often involve complex arrangements to ensure the best and most efficient use of the resources. In addition a lot of thought will be put into the best method by which to carry out the work without destroying or disrupting vital evidence.

Other aspects of the investigation will continue simultaneously. Data held within electronic components and recording devices will be downloaded and analysed. This work may not be straightforward and in some case requires a rebuild of circuitry or the removal of integrated circuits. This work is extremely complex and even after significant effort may not always produce useable data.



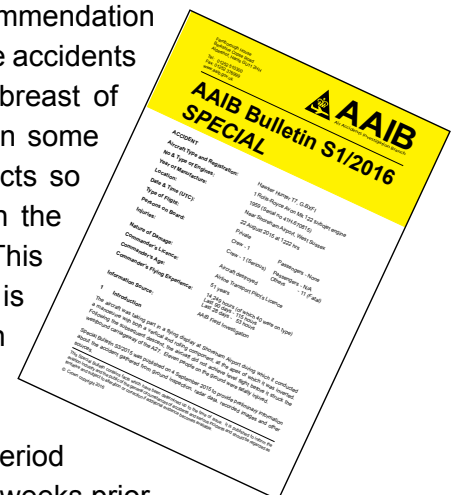
Some aspects of the investigation may require outside expertise. Suitable individuals and organisations have to be found and then contracted accordingly. Their output will usually be in the form of a report and depending on its complexity may require weeks or sometimes months to complete.

Outside expertise also includes the manufacturer of the aircraft or its sub-components. In all cases the manufacturer will work under the direction of the Inspector or AccRep. Many of the manufacturers have safety teams with staff who are trained investigators and fully understand the protocols surrounding an investigation. For their part State investigators are also fully aware of their responsibilities with intellectual property and proprietary information. This can be particularly sensitive where airframe and engine manufacturers are concerned in a very competitive commercial world. Accordingly, reports on the results of test and research take a lot of time and are only released when the manufacturer has satisfied internal legal protocols. This can be a lengthy process and may require the Inspector to commission further independent test and research to verify adding more time to the process.

In the hypothetical case some examples of the lines of inquiry might concern runway conditions, weather, brakes, wheels, tyres, thrust reversers, crew training, procedures, crew fatigue or distraction and air traffic control. Although this list is not exhaustive there is a significant amount of work involved in each example to understand its relevance or not to the accident. Thus in the hypothetical case, we could now be some months into the investigation.

### Concerns during an investigation

Throughout the progression of any investigation the Investigator-in-Charge (IiC) is always considering whether important information needs to be published to inform the aviation industry or the public. There are two basic reasons for considering this course of action. First, when there is an important safety message or Safety Recommendation which needs to be urgently progressed and secondly, in high profile accidents where there is public concern, to inform and keep the public abreast of developments. It also goes some way to prevent unhelpful, or in some cases, destructive speculation. It is usual just to publish the facts so far as the investigation team understand them at that point with the caveat that this may change as the investigation progresses. This information, usually in the early stages of an investigation, is published by AAIB Special Bulletin. When it is decided to publish a Special Bulletin great care is taken not to confuse or mislead the reader and this preparation work can take several days. In a complex investigation a Special Bulletin may be published after a period of time significant to the date of the accident. For example, a few weeks prior to the anniversary of the event. Great care is taken not to be indiscrete or distasteful.



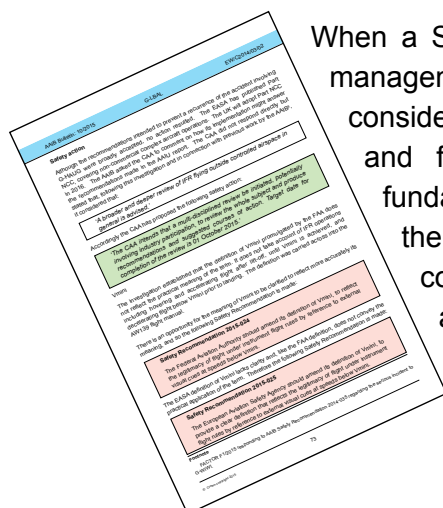
## Collation and analysis

As the investigation progresses the Inspectors piece together the evidence and to understand what it means and how it is related to the accident. Care is taken not to 'make the evidence fit' or to overly rely on assumptions. Throughout the investigation the Inspectors will work as a team in constant dialogue until all aspects of the accident are understood as far as possible. At the same time the report is drafted and the specialist sections drawn together. The team constantly review their findings and consider the effect on aviation safety and whether a Safety Recommendation will need to be made.

To understand the accident the team will analyse the facts and evidence. In the simplest terms this means looking at what should have happened, what actually happened and why it happened. In addition the team will look at what went right and what when wrong. This activity can take a lot of time to reach a plausible scenario. However, in some cases it has to be accepted that the exact cause will never be fully known. It is in these cases that additional work has to be done to demonstrate what did not cause the accident, in other words, prove the negative. AAIB reports will avoid speculation unless compelling evidence has been found to support a hypothesis.

## Report construction

Throughout the investigation process the Inspectors will be writing the report and considering any Safety Recommendations which may arise. The AAIB process for constructing Safety Recommendations runs in parallel with the investigation. When the need for a Safety Recommendation is identified investigators will look carefully and pragmatically at what will be effective and possible and which organisation will be best placed to enact the safety Recommendation. There is no point in making a Safety Recommendation which is unachievable practically or does not address the key issue. Although the investigation team understand the events leading to the accident they are also not always best placed to offer the exact solution. Therefore the team will take care not to 'solutionise'. For example if the cause of an accident was an unexpected material failure investigators will not try to suggest a particular alternative material. To solutionise would compromise the independence of the investigators.



When a Safety Recommendation has been proposed the AAIB senior management discuss and review the proposal. They will take in consideration key factors before agreeing to the proposal. First and foremost, does the Safety Recommendation address the fundamental safety issue. Secondly, is it practical and feasible for the action addressee, in other words can it be done. This particular consideration takes into account preceding discussions with the action addressee. These have usually taken place with the action addressee to ensure that particular organisation understands the Safety Recommendation and is able to take reasonable steps to fulfil the Safety Recommendation.



It is often the case that before a Safety Recommendation has to be made the organisations involved have taken pre-emptive action to solve a problem or address the issue. These actions are recorded as a 'Safety Action' in the AAIB report. They may address matters which are directly causal but can also deal with safety issues which have arisen during the investigation but are not directly related to the accident. They are sometimes carried out before completion of the investigation but should not be considered as an admission or acceptance of liability by the organisation concerned.

The Safety Recommendations process can take a number of weeks in order to achieve a workable and effective Safety Recommendation.

### **Draft reviews**

The draft review process continues throughout the investigation and leads toward the production of a 'draft for comment'. The AAIB tries at all times to be accurate in the facts and circumstances surrounding an accident. Part of this process includes a legal requirement to allow parties or individuals whose reputation may be affected by the report to make formal comment or representation. This is covered by the Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996 Regulation 12(1). On receipt of the draft copy of a report sent in confidence, individuals and organisations have 28 days within which to make formal representation.

If and when representations are received they are considered by the investigation team each on their own merit. If a representation is found to have reasonable grounds for inclusion or amendment of the report the investigation team will act accordingly. An individual or organisation may, in controversial circumstances, object to one or more aspects of the investigation and its findings. However, unless there is strong evidence supporting the objection the report findings will remain as they are. The investigation team is duty bound to be independent. Open impartial investigations can mean information is presented in the public domain which can adversely affect individuals, organisations or government departments.

It should be noted that the report is still in draft and its issue for representations does not imply the completion of an investigation. Even after the consultation process has been carried out draft reports are reviewed and refined and may even change as the strength of evidence is examined by AAIB senior staff.

Once this process is complete it will take a further seven to eight weeks to publish and distribute the final report either in the monthly Bulletin or in a stand alone Air Accident Report. A Bulletin report, depending on its completion date within the rolling monthly publication process can be published within a minimum of four weeks.

The final report is placed in the public domain in hard copy and electronic copy on the AAIB website and released on a pre-arranged date. However, by agreement, entitled parties may receive a confidential pre-publication copy a few days before. Entitled parties are people or organisations directly involved in the accident or have to address matters arising from an accident such as Coroners.

## Summary

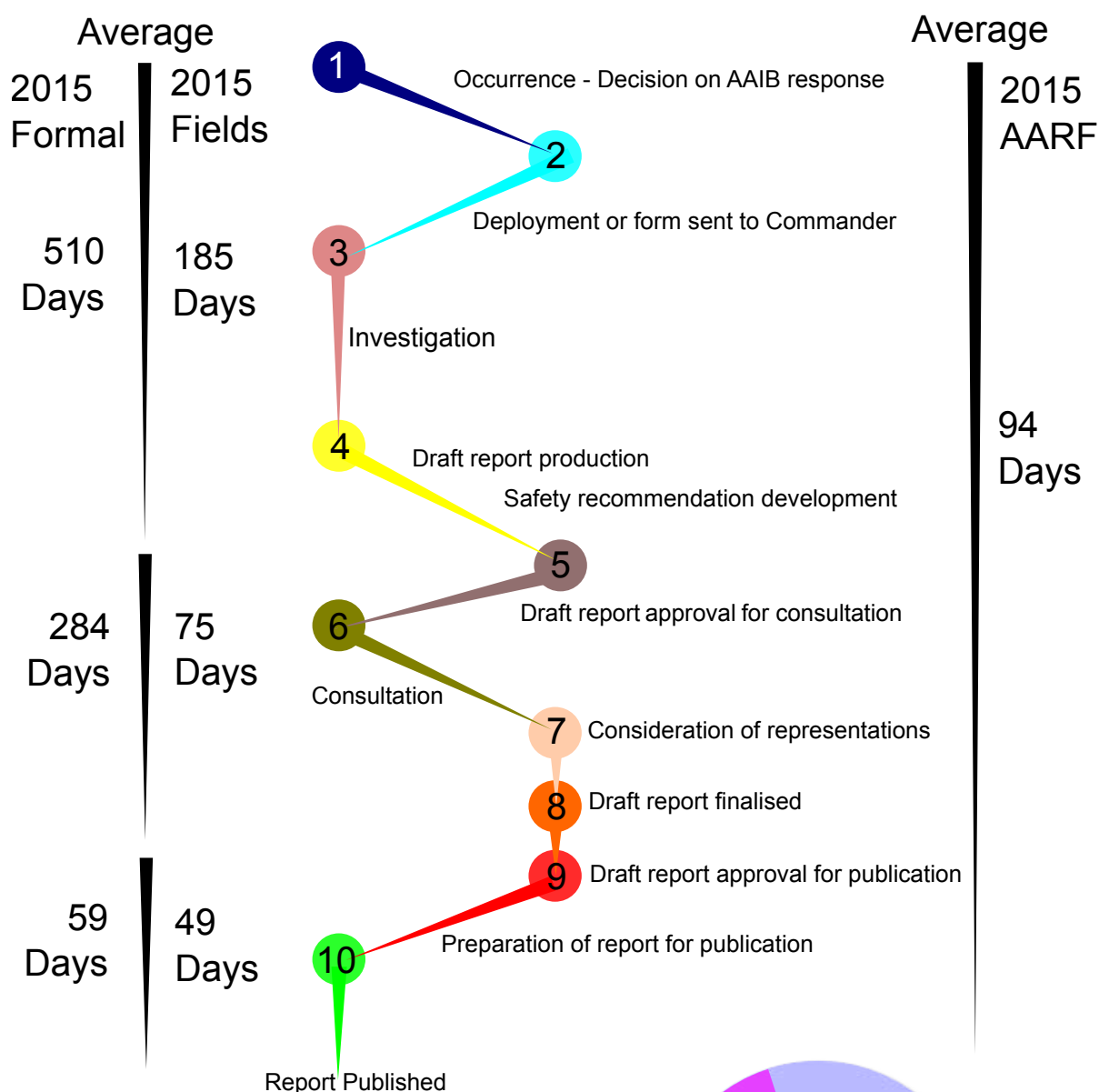
To carry out a thorough and meaningful accident investigation and then report accurately and clearly to improve aviation safety takes time. Evidence which has not been properly examined will result in a flawed investigation with weak ineffective Safety Recommendations. The hypothetical case will take several weeks to gather evidence, several months to follow up the lines of inquiry properly and then analyse clearly and logically to eventually produce findings. Then allow for review and comment before moving into publication three or four months later. Last year 80% of investigations were published within a year. Most importantly, throughout any investigation, the investigation team reserve the right, if necessary, to make immediate recommendations and take swift safety action before an investigation is complete.

## Final thought

A thorough investigation requires a lot of thought and imagination and must be driven by the evidence. Gathering the evidence, analysing it and presentation of the findings to the public in a clear and understandable format without losing the detail takes time to get right. It has to be right for it to be effective in aviation safety.



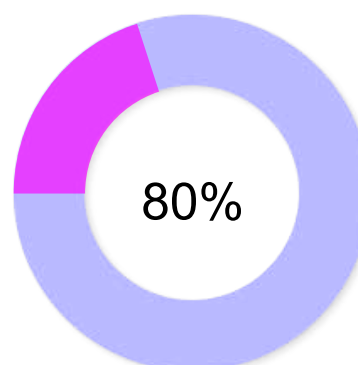
## Investigation Timeline - Based on Recent Investigations



AAIB Investigations,  
the Practicalities

### Reports in 2015

4 Formals  
24 Fields  
162 Correspondence



Reports published within one year





## Into the Future with Drones

### Introduction

Drones. The name can conjure up a plethora of meanings and feelings. The more technical names for these new wave flying machines are, UAV, UAS and RPAS. These stand for Unmanned Air Vehicle, Unmanned Air System and Remotely Piloted Aircraft System. They come in all shapes and sizes from something that will fit in the palm of your hand weighing a few grams that can fly for 10-20 minutes to the Global Hawk that weighs over 6 tonnes and can fly for over 32 hours.



**An example of a micro-UAV**

Flying UAVs is quite simply unlike any other hobby because of the potential risks and dangers involved. While UAVs may be seen as toys to lots of people they are still flying machines that share the airspace above our heads with more traditional forms of aviation. With all forms of aviation there is an appropriate level of rules that need to be followed by UAVs in order that the flying activities undertaken are carried out safely for the pilot, UAV and members of the public. And with all forms of aviation, if something goes wrong then there is generally a requirement to report, and possibly investigate, an event.

## CAA Guidance ...and rules

Guidance for the operation of civilian UASs in UK airspace is contained in Civil Aviation Publication (CAP) 722 *Unmanned Aircraft System Operations in UK Airspace – Guidance*. It outlines the methods by which a permission for aerial work may be obtained, for those wishing to use a UAS for commercial reward, and ensure that the required standards and practices are met by all UAS operators. It can be downloaded via this link:

<http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=415>

Additionally the CAA's 'dronecode' provides advice on how to fly your drone safely and follow the rules at all times. This is primarily focused at the leisure user. You can find more information at: [www.caa.co.uk/droneaware](http://www.caa.co.uk/droneaware).

## Drone Investigations

While CAP 722 details the actions to be taken in the event of an accident / serious incident. The procedure to be followed is the same for that involving any other type of aircraft; dial the AAIB's dedicated 24-hour reporting line on 01252 512299. The details will be taken and a decision made on the level of response. If there is doubt as to whether the pilot believes the event is reportable or not, it is better for it to be reported to the AAIB, rather than a reportable event to not be notified and therefore not investigated.

## Drones in accident investigations

Currently the AAIB has two UASs that it uses for accident investigation purposes. They've been used at more than 20 accident sites to date. Their primary use is to survey the site with still images and video. They can also be used to search for missing parts of wreckage and to conduct a site safety assessment before investigators approach the scene.



## The UK Airprox Board

There have been numerous close encounters between commercial airliners and UAVs, many of which have been reported in the media. In the majority of these cases the UK Airprox Board will investigate these events and subsequently publish a report.

The UK Airprox Board's website has a *Current Drone Count and Information* spreadsheet. It can be found through this link:

<https://www.airproxboard.org.uk/Topical-issues-and-themes/Drones/>



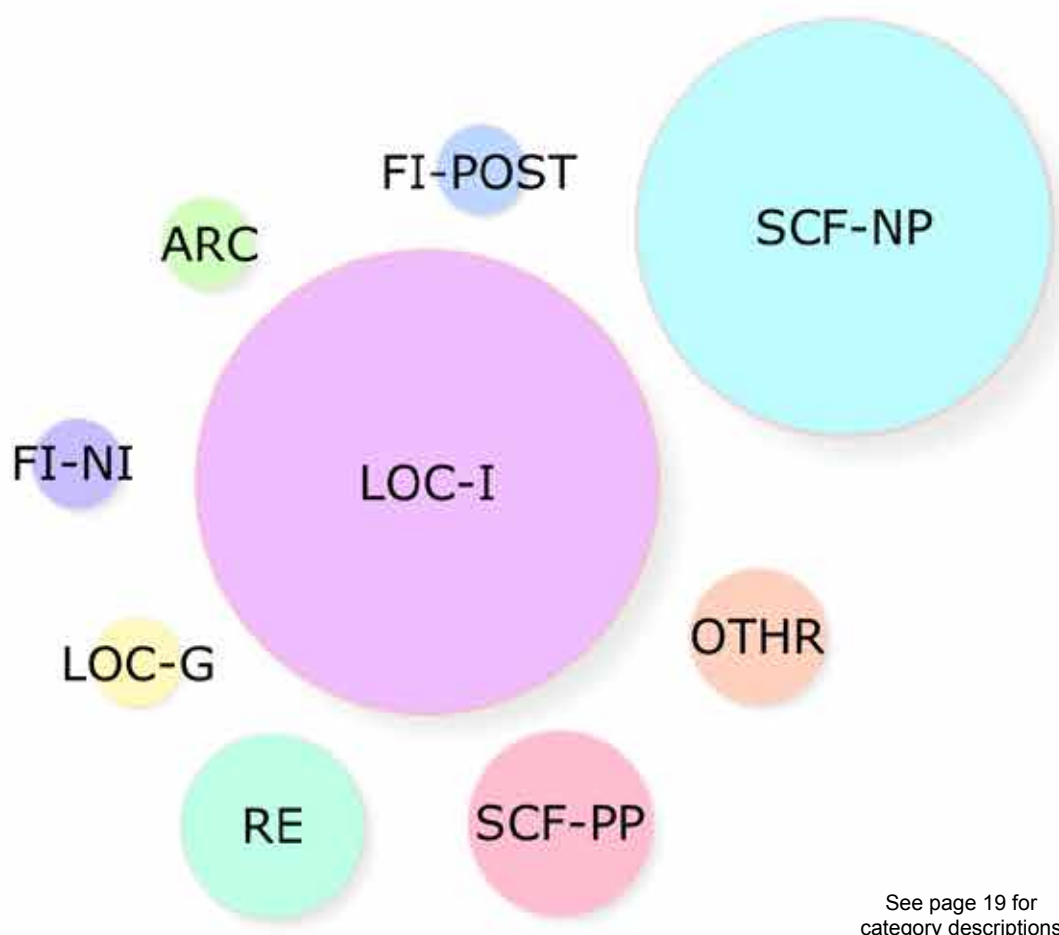
Into the Future  
with Drones





## CICTT Factors on Investigations by the AAIB in 2015

Every occurrence in the UK is recorded on the European Central Repository (ECCAIRS) and is coded using the occurrence taxonomy defined by the CAST/ICAO Common Taxonomy Team (CICTT). This is a worldwide standard taxonomy to permit analysis of data in support of safety initiatives. In the UK the coding of occurrences is carried out by the CAA.

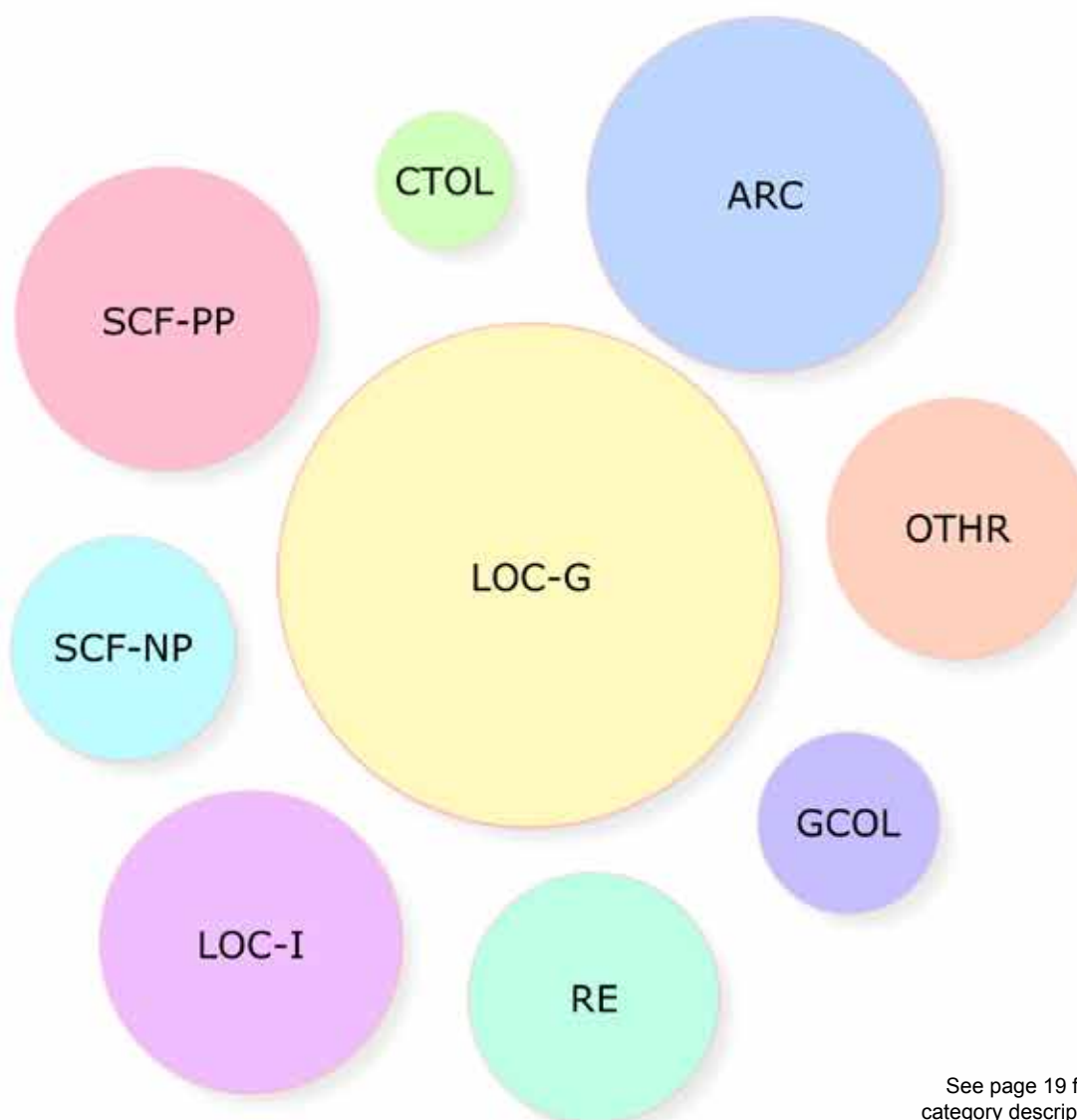


### Factors for field investigations reported on by AAIB in 2015

In 2015 the AAIB reported on 28 field investigations, nine of which were fatal accidents and 19 were non-fatal accidents or serious incidents. The analysis of the CICTT factors for each of these reveal that the overall the major factor in fatal accidents reported on in 2015 was Loss of Control inflight (LOC-I) and the major factor in non-fatal accidents and serious incidents was system or component failure which was not powerplant related (SCF-NP).

Nine of the AAIB's reported field investigations were into accidents involving fatal injuries. Of these fatal accidents, eight were as a result of Loss of Control inflight (LOC-I) and one due to Controlled Flight Into Terrain (CFIT). Other factors recorded were one accident was a mid-air collision (MAC), one had a powerplant failure (SCF-PP) and one related to fuel (FUEL). Two of the fatal accidents suffered post crash fires (F-POST).

The 19 non-fatal field investigations that were reported on in 2015 were mostly on serious incidents to commercial air transport aircraft. The factor in nine of these investigations related to a system or component failure which was not powerplant related (SCF-NP). Four were classified as runway excursions (RE), four had suffered Loss of Control inflight (LOC-I) and two had loss of control on the ground (LOC-G). There were other factors such as powerplant failure (SCF-PP) in three cases, fire in the air (F-IN) in two cases and two associated with abnormal runway contact (ARC).



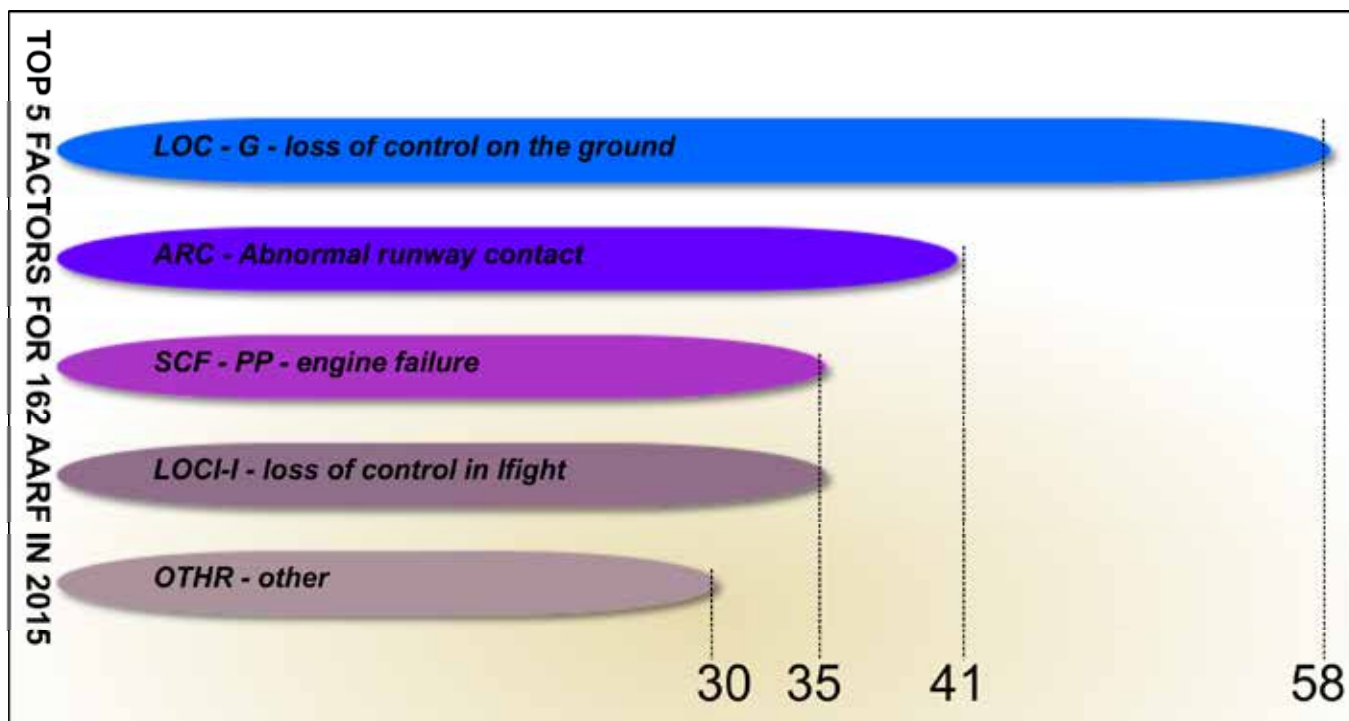
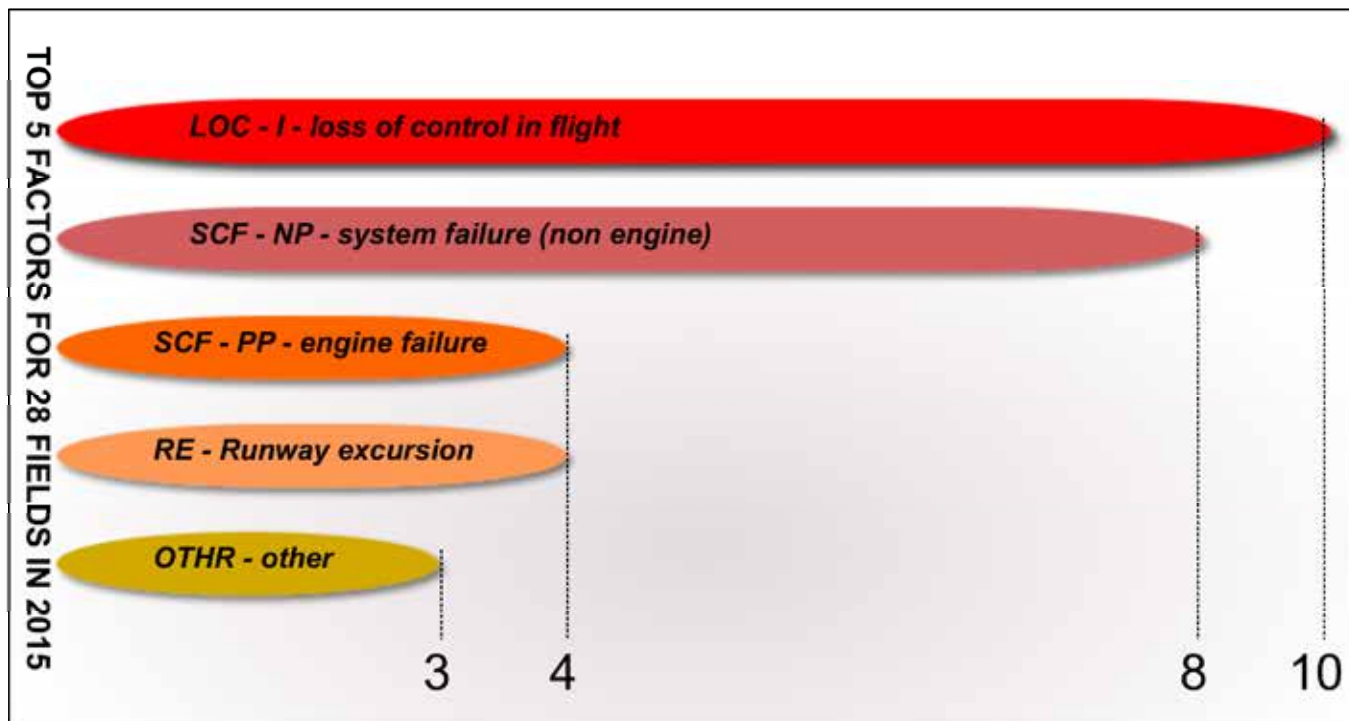
### Factors for correspondence investigations reported on by AAIB in 2015

Correspondence investigations are usually conducted on non-fatal accidents on General Aviation aircraft and to some serious incidents on Commercial Air Transport aircraft. This is reflected in the factors in that the majority of the reports were classified as Loss of Control on the ground (LOC-G) and Abnormal Runway Contact (ARC) as well as powerplant failure (SCF-PP).

## CICITT Occurrence Categories

CODE	DESCRIPTION
ARC	ABNORMAL RUNWAY CONTACT
AMAN	ABRUPT MANEUVER
ADRM	AERODROME
MAC	AIRPROX/TCAS ALERT/LOSS OF SEPARATION/NEAR MIDAIR COLLISIONS/MIDAIR COLLISIONS
ATM	ATM/CNS
BIRD	BIRD
CABIN	CABIN SAFETY EVENTS
CTOL	COLLISION WITH OBSTACLE(S) DURING TAKEOFF AND LANDING
CFIT	CONTROLLED FLIGHT INTO OR TOWARD TERRAIN
EVAC	EVACUATION
EXTL	EXTERNAL LOAD RELATED OCCURRENCES
F-NI	FIRE/SMOKE (NON-IMPACT)
F-POST	FIRE/SMOKE (POST-IMPACT)
FUEL	FUEL RELATED
GTOW	GLIDER TOWING RELATED EVENTS
GCOL	GROUND COLLISION
RAMP	GROUND HANDLING
ICE	ICING
LOC-G	LOSS OF CONTROL-GROUND
LOC-I	LOSS OF CONTROL-INFLIGHT
LOLI	LOSS OF LIFTING CONDITIONS EN ROUTE
LALT	LOW ALTITUDE OPERATIONS
MED	MEDICAL
NAV	NAVIGATION ERRORS
OTHR	OTHER
RE	RUNWAY EXCURSION
RI	RUNWAY INCURSION
SEC	SECURITY RELATED
SCF-NP	SYSTEM/COMPONENT FAILURE OR MALFUNCTION (NON-POWERPLANT)
SCF-PP	SYSTEM/COMPONENT FAILURE OR MALFUNCTION (POWERPLANT)
TURB	TURBULENCE ENCOUNTER
USOS	UNDERSHOOT/OVERSHOOT
UIMC	UNINTENDED FLIGHT IN IMC
UNK	UNKNOWN OR UNDETERMINED
WILD	WILDLIFE
WSTRW	WIND SHEAR OR THUNDERSTORM

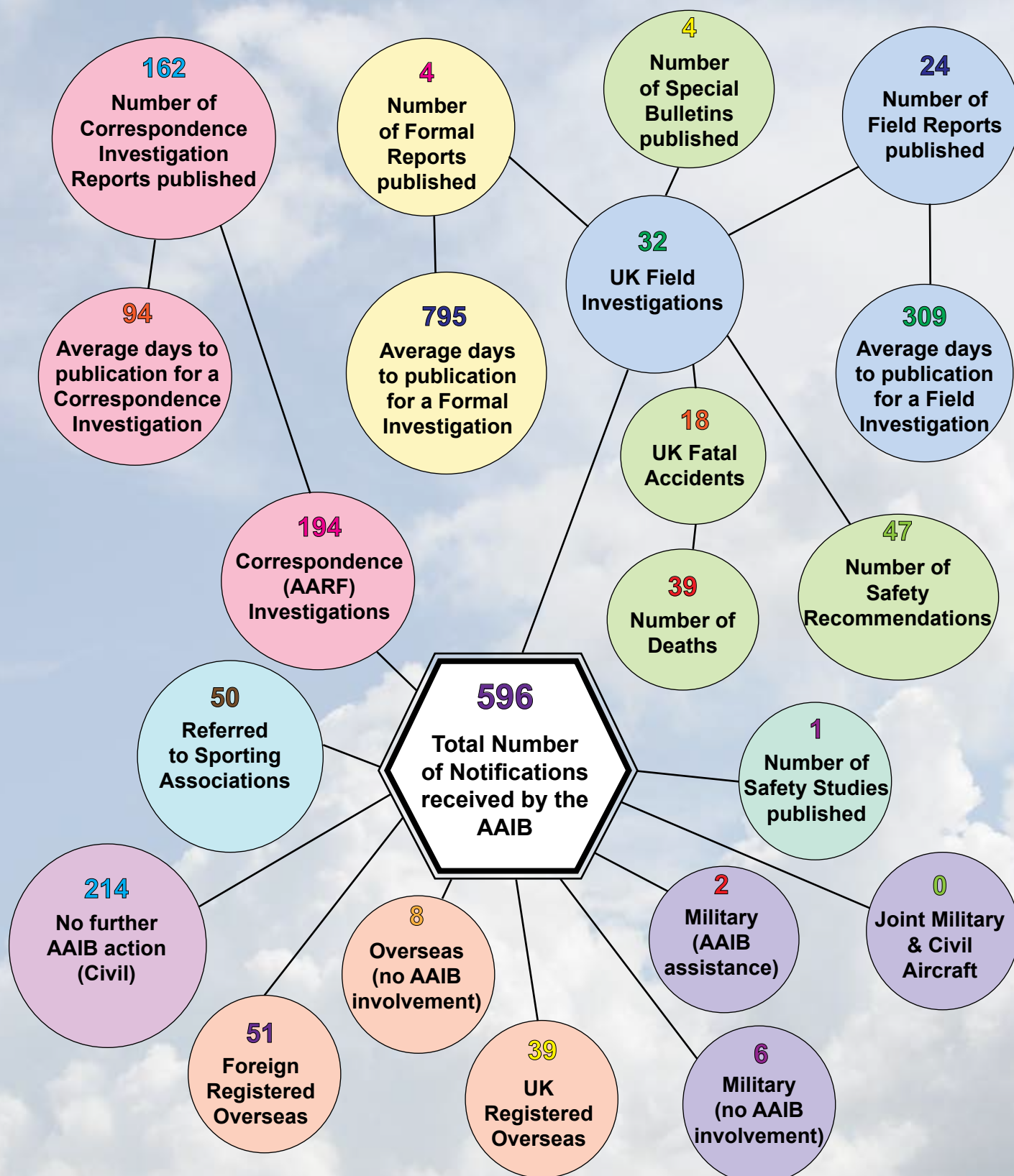
## Top factors for Field and Correspondence (AARF) Investigations in 2015





## Accident Statistics for 2015

An overview of what we were involved with during 2015 can be seen below:



## Introduction

The following pages provide the statistics for 2015, 2014 and 2013, for accidents and serious incidents involving the Air Accidents Investigation Branch.

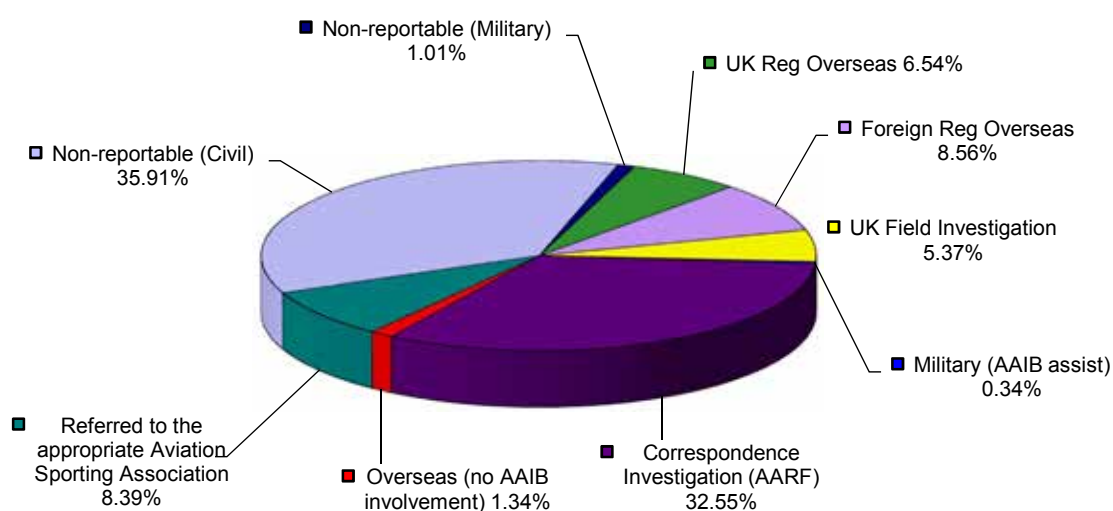
An explanation of the categories is as follows:

### Category Definition

UK Aircraft overseas	Investigations involving UK registered aircraft, or aircraft registered in one of the UK Overseas Territories or Crown Dependencies, occurring in a Foreign State where the AAIB has participated in the capacity as the Accredited Representative in accordance with ICAO Annex 13.
Foreign Aircraft overseas	Accidents and serious incident investigations to Foreign registered aircraft occurring in a Foreign State where the AAIB have participated in the capacity as the Accredited Representative or Expert in accordance with ICAO Annex 13.
UK Field Investigations	Investigations involving the deployment of a 'Field' team within the UK or to one of the UK Overseas Territories or Crown Dependencies and those investigations where a team have not deployed but Safety Recommendations are made. Also includes investigations which have been delegated to the AAIB by another State.
Military with AAIB Assistance	Where an MoD Service Inquiry is convened following an accident / serious incident to a Military aircraft and an AAIB Inspector is appointed to assist.
AARF Investigations	Investigations conducted by correspondence only using an Aircraft Accident Report Form (AARF) completed by the aircraft commander.
Overseas (no AAIB)	Notifications to the AAIB of an overseas event which has no AAIB involvement.
Referrals to Sporting Associations	Investigations referred to the relevant UK Sporting Associations.
No further AAIB action (Civil)	Occurrences notified to the AAIB involving civil registered aircraft which do not satisfy the criteria of an accident or serious incident in accordance with the Regulations.
Military (no AAIB inv)	Notifications to the AAIB concerning Military aircraft with no AAIB involvement.

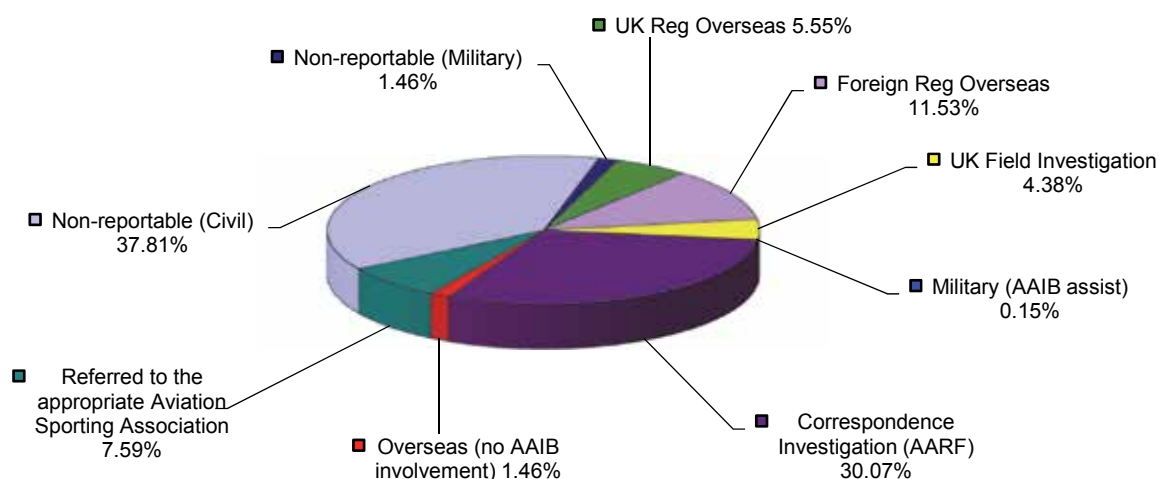
## Notifications 2015

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
UK Registered Overseas	4	1	0	1	6	4	10	4	4	1	1	3	39
Foreign Reg Overseas	5	2	4	3	5	4	8	6	4	3	4	3	51
UK Field Investigations	3	1	1	5	1	5	5	4	2	3	3	1	32
Military (AAIB Assistance)	1	0	0	0	0	0	0	0	0	1	0	0	2
Correspondence Investigations (AARF)	11	7	12	24	16	29	24	20	27	12	7	5	194
Overseas (no AAIB involvement)	1	3	0	0	1	0	0	1	1	1	0	0	8
Referred to the appropriate Aviation Sporting Association	0	5	2	1	7	3	11	11	8	2	0	0	50
No further AAIB action (civil)	24	15	15	24	15	13	21	15	26	16	17	13	214
Military (no AAIB involvement)	0	0	1	0	0	2	0	0	1	2	0	0	6
<b>Total</b>	<b>49</b>	<b>34</b>	<b>35</b>	<b>58</b>	<b>51</b>	<b>58</b>	<b>79</b>	<b>61</b>	<b>73</b>	<b>41</b>	<b>32</b>	<b>25</b>	<b>596</b>
UK Fatal accidents	1	0	0	3	1	3	2	3	1	2	1	1	18
Number of deaths	2	0	0	4	2	3	6	13	1	3	4	1	39



## Notifications 2014

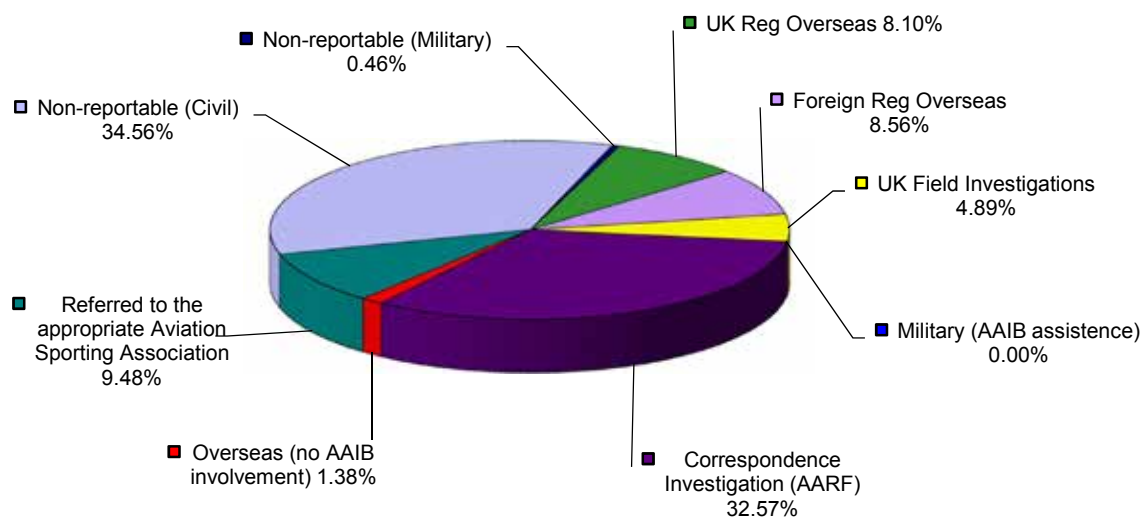
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
UK Registered Overseas	1	2	4	5	4	3	2	5	6	1	3	2	38
Foreign Reg Overseas	5	7	9	6	5	4	7	6	8	12	6	4	79
UK Field Investigations	1	0	3	3	3	4	2	4	3	3	1	3	30
Military (AAIB Assistance)	0	1	0	0	0	0	0	0	0	0	0	0	1
Correspondence Investigations (AARF)	10	4	21	21	18	36	30	17	17	10	13	14	206
Overseas (no AAIB involvement)	1	0	0	0	1	1	3	1	0	2	1	0	10
Referred to the appropriate Aviation Sporting Association	1	3	1	1	5	8	9	7	4	2	3	1	52
No further AAIB action (civil)	16	18	25	25	27	41	26	21	15	16	14	20	259
Military (no AAIB involvement)	1	0	1	1	1	3	1	0	0	2	0	0	10
<b>Total</b>	<b>36</b>	<b>35</b>	<b>64</b>	<b>59</b>	<b>64</b>	<b>100</b>	<b>80</b>	<b>61</b>	<b>53</b>	<b>48</b>	<b>41</b>	<b>44</b>	<b>685</b>
UK Fatal accidents	0	0	2	1	1	2	0	2	2	0	0	0	10
Number of deaths	0	0	6	1	1	3	0	2	3	0	0	0	16





## Notifications 2013

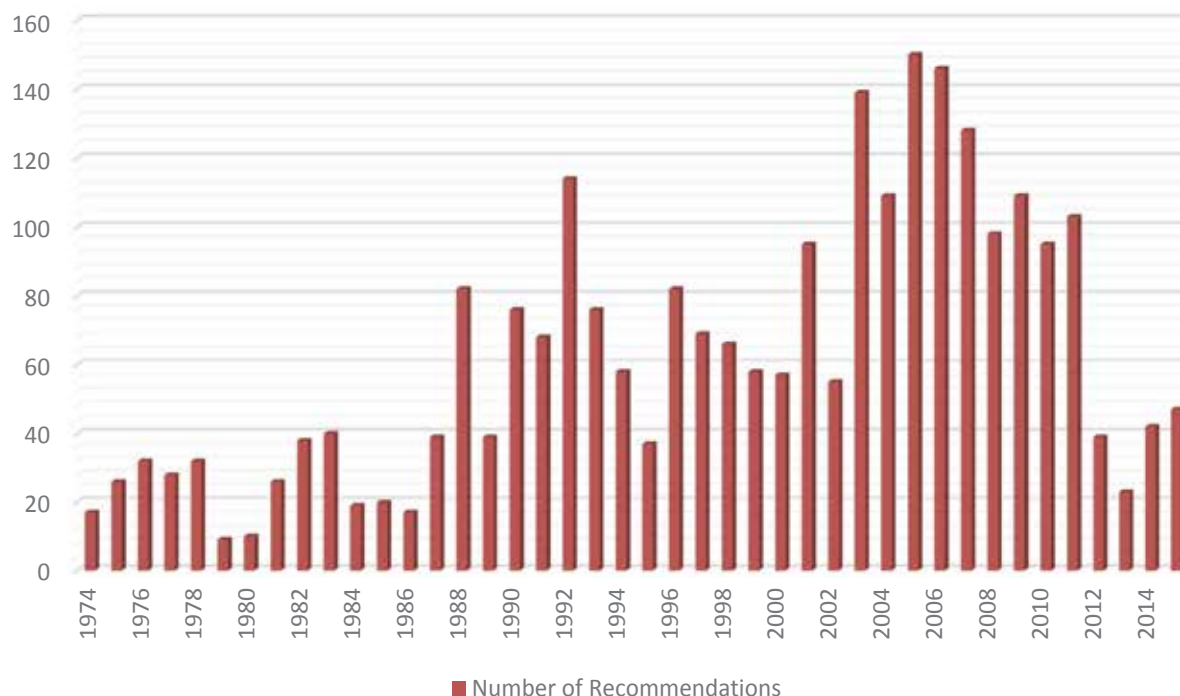
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
UK Registered Overseas	2	1	3	4	10	6	7	7	5	3	2	2	53
Foreign Reg Overseas	1	7	5	1	9	3	6	4	7	6	3	4	56
UK Field Investigations	3	0	1	2	3	2	3	5	2	3	5	3	32
Military (AAIB Assistance)	0	0	0	0	0	0	0	0	0	0	0	0	0
Correspondence Investigations (AARF)	8	11	10	17	20	23	33	37	15	19	11	9	213
Overseas (no AAIB involvement)	2	0	3	0	0	0	0	0	1	3	0	0	9
Referred to the appropriate Aviation Sporting Association	2	4	3	4	11	8	6	11	7	3	0	3	62
No further AAIB action (civil)	18	15	13	26	25	20	21	19	19	16	10	24	226
Military (no AAIB involvement)	1	0	0	0	0	0	0	1	0	1	0	0	3
<b>Total</b>	<b>37</b>	<b>38</b>	<b>38</b>	<b>55</b>	<b>78</b>	<b>62</b>	<b>76</b>	<b>84</b>	<b>56</b>	<b>54</b>	<b>31</b>	<b>45</b>	<b>654</b>
UK Fatal accidents	1	0	0	1	1	0	2	3	2	1	2	0	13
Number of deaths	2	0	0	1	1	0	3	7	3	1	12	0	30





## Safety Recommendations in 2015

In 2015 the AAIB issued 47 Safety Recommendations from 12 investigations.



Each Safety Recommendation is classified using the SR Topic taxonomy defined by the European Network of Safety Investigation Authorities (ENCASIA) Working Group 6 (WG6) which the AAIB is a member. The majority of the Safety Recommendations were dealing with safety issues relating to aircraft certification and aircraft equipment. With issues relating to rescue firefighting services and survivability also featuring.

Each addressee to a Safety Recommendation has to respond within 90 days in accordance with European Regulation EU 996/2010 Article 18 and detail what actions have been taken or are under consideration and the time taken for their completion. If no actions are being considered by the addressee they have to provide their reasoning for the decision.

On receipt the AAIB has 60 days in which to assess the response and to inform the addressee on whether it is adequate. If the reply is not adequate or partially adequate then to provide justification to the addressee.

The responsibility to monitor the progress of action taken in response to a recommendation lies with the addressee including the authorities responsible for civil aviation safety.

The AAIB will keep open Safety Recommendations where it expects to receive responses from the addressee. If no further response is expected the recommendation is Closed. A Closed status does not mean the actions for a Safety Recommendation are complete, nor that the Safety Issue has been addressed.



A 'Not adequate' assessment means that the response does not address the intent of the Safety Recommendation nor does it address the safety issue concerned.

A 'Partially adequate' assessment means the response goes someway to meeting the intent of the Safety Recommendation and the action will address the safety issue to a certain extent, but further action would be required to fully address the issue identified.

An 'Adequate' assessment means that the response fully meets the intent of the Safety Recommendation and the action will address the safety issue.

Of the 47 Safety Recommendations issued in 2015, 11 responses were adequate, 19 were not adequate and 17 partially adequate. As of the end of July 2015, 22 were closed and 25 remain open.

Each Safety Recommendation is also defined as to whether it is a Safety Recommendation of Union Wide Relevance (SRUR) or a Safety Recommendation of Global Concern (SRGC). Of those issued in 2015, 18 were SRUR and 13 were SRGC.

The AAIB, as well as all EU Member States, are required to record on the European Central Repository Safety Recommendation Information System (SRIS) all recommendations it raises and the response that are received. Data from SRIS is available to view publically and can be found here:

[http://eccairsportal.jrc.ec.europa.eu/index.php?id=114&no\\_cache=1](http://eccairsportal.jrc.ec.europa.eu/index.php?id=114&no_cache=1)



## Safety Recommendations issued in 2015

**Note:** Safety Recommendation classification correct at time of printing.

### Safety Recommendation 2015-001 made on 14 July 2015

**G-EUOE AIRBUS A319-131 on 24 May 2013 SRUR**

It is recommended that the European Aviation Safety Agency publishes amended Acceptable Means of Compliance and Guidance Material in Part 145.A.47(b) of European Commission Regulation (EC) No 2042/2003, containing requirements for the implementation of an effective fatigue risk management system within approved maintenance organisations



**Partially adequate - Open**

### Safety Recommendation 2015-002 made on 14 July 2015

**G-EUOE AIRBUS A319-131 on 24 May 2013**

It is recommended that the European Aviation Safety Agency requires Airbus to modify A320-family aircraft to incorporate a reliable means of warning when the fan cowl doors are unlatched.



**Partially adequate - Closed**



### Safety Recommendation 2015-003 made on 14 July 2015

**G-EUOE AIRBUS A319-131 on 24 May 2013 SRUR**

It is recommended that the European Aviation Safety Agency amends Certification Specification 25.901(c), Acceptable Means of Compliance (AMC) 25.901(c) and AMC 25.1193, to include fan cowl doors in the System Safety Assessment for the engine installation and requires compliance with these amended requirements during the certification of modifications to existing products and the initial certification of new designs



**Partially adequate - Open**

### Safety Recommendation 2015-004 made on 14 July 2015

**G-EUOE AIRBUS A319-131 on 24 May 2013**

It is recommended that British Airways Plc reviews, and amends as appropriate, its pilot and cabin crew training, policies and procedures regarding in-flight damage assessments and reporting by cabin crew in light of the lessons learned from the G-EUOE fan cowl door loss event.



**Adequate - Closed**

**Safety Recommendation 2015-005 made on 14 July 2015**

**G-EUOE AIRBUS A319-131 on 24 May 2013**

It is recommended that British Airways Plc reviews its evacuation procedures and training to take account of the potential risks of leaving engines running during on-ground emergencies.



**Partially adequate - Open**

**Safety Recommendation 2015-006 made on 14 May 2015**

**G-EWZZ CZAW SPORTCRUISER on 9 August 2014 SRUR SRGC**

It is recommended that the European Aviation Safety Agency review the requirement for the placarding of aircraft fitted with a Ballistic Parachute Recovery System so that the warning placards contain information on the location of the rocket launcher and the actuating device, and can be read from a safe distance regardless of the stationary attitude of the aircraft.



**Partially adequate - Closed**

**Safety Recommendation 2015-007 made on 14 May 2015**

**G-EWZZ CZAW SPORTCRUISER on 9 August 2014 SRUR SRGC**

It is recommended that the European Aviation Safety Agency introduce the requirement that the rocket-launcher in an aircraft Ballistic Parachute Recovery System is fitted in a position where it can be readily disarmed following an accident.



**Not adequate - Closed**

**Safety Recommendation 2015-008 made on 14 May 2015**

**G-EWZZ CZAW SPORTCRUISER on 9 August 2014 SRUR SRGC**

It is recommended that the European Aviation Safety Agency disseminate information for first responders and accident investigators to allow them to identify if an aircraft is equipped with a Ballistic Parachute Recovery System. This information system should include details on the actions required to make the system safe.



**Not adequate - Closed**

**Safety Recommendation 2015-009 made on 14 May 2015**

**G-EWZZ CZAW SPORTCRUISER on 9 August 2014**

It is recommended that the Civil Aviation Authority review the requirement for the placarding of aircraft referred to in Regulation (EC) 216/2008 Annex II, fitted with a Ballistic Parachute Recovery System, so that the warning placards contain information



on the location of the rocket launcher and the actuating device, and can be read from a safe distance regardless of the stationary attitude of the aircraft.



**Partially adequate - Open**

**Safety Recommendation 2015-010 made on 14 May 2015**

**G-EWZZ CZAW SPORTCRUISER on 9 August 2014**

It is recommended that the Civil Aviation Authority introduce the requirement that, for aircraft referred to in Regulation (EC) 216/2008 Annex II, the rocket-launcher in an aircraft Ballistic Parachute Recovery System is fitted in a position where it can be readily disarmed following an accident.



**Partially adequate - Open**

**Safety Recommendation 2015-011 made on 14 May 2015**

**G-EWZZ CZAW SPORTCRUISER on 9 August 2014**

It is recommended that the Civil Aviation Authority introduce an information system, for aircraft operating in the UK that allows first responders and accident investigators to identify if an aircraft is equipped with a Ballistic Parachute Recovery System. This information system should include details of the type of system fitted, the location of the major components, routing of the actuator cable and the actions required to make the system safe.



**Partially adequate - Open**

**Safety Recommendation 2015-012 made on 14 May 2015**

**G-EWZZ CZAW SPORTCRUISER on 9 August 2014**

It is recommended that the Civil Aviation Authority takes action to ensure that information on the risks from Ballistic Parachute Recovery Systems is disseminated to the emergency services operating in the United Kingdom.



**Partially adequate - Open**

**Safety Recommendation 2015-013 made on 2 July 2015**

**G-GAVA JETSTREAM 3102 on 15 August 2014**

It is recommended that the European Aviation Safety Agency require BAE Systems to expedite the proposed aircraft integration trial, to investigate whether any other mechanisms have the potential to cause mitigation of the special washer or to induce similar damage to the pintle housing.



**Adequate - Closed**

**Safety Recommendation 2015-014 made on 19 August 2015**

**ET-AOP Boeing 787-8 on 12 July 2013**

It is recommended that the Federal Aviation Administration, in conjunction with the European Aviation Safety Agency and Transport Canada, conduct an assessment of the circuit protection offered by the existing Honeywell RESCU 406AF and 406AFN ELT battery, to determine whether the ELT/battery design incorporates an acceptable level of circuit protection to mitigate against external short-circuits and unbalanced discharge.



**Partially adequate - Open**

**Safety Recommendation 2015-015 made on 19 August 2015**

**ET-AOP Boeing 787-8 on 12 July 2013      SRUR   SRGC**

It is recommended that the Federal Aviation Administration, in conjunction with the European Aviation Safety Agency and Transport Canada, conduct a review of installed aircraft equipment on transport category aircraft powered by lithium-metal batteries, which have been approved under TSO-C142 / C142A or by equivalent means, to ensure that the design of such batteries incorporates an acceptable level of circuit protection to mitigate against known failure modes including, but not limited to, external short-circuits and unbalanced discharge.



**Not adequate - Open**

**Safety Recommendation 2015-016 made on 19 August 2015**

**ET-AOP Boeing 787-8 on 12 July 2013      SRUR   SRGC**

It is recommended that the Federal Aviation Administration, in conjunction with the European Aviation Safety Agency and Transport Canada, require equipment manufacturers intending to use lithium-metal batteries in aircraft equipment to demonstrate that the battery design incorporates an acceptable level of circuit protection to mitigate against known failure modes including, but not limited to, external short-circuits and unbalanced discharge.



**Partially adequate - Open**

**Safety Recommendation 2015-017 made on 19 August 2015**

**ET-AOP Boeing 787-8 on 12 July 2013      SRUR   SRGC**

It is recommended that the Federal Aviation Administration, in conjunction with the European Aviation Safety Agency and Transport Canada, require manufacturers intending to use lithium metal batteries in aircraft equipment, to quantify the heat produced by the battery over a range of discharge conditions and demonstrate that the battery and equipment design can adequately dissipate the heat produced



**Partially adequate - Open**



**Safety Recommendation 2015-018 made on 19 August 2015**

**ET-AOP Boeing 787-8 on 12 July 2013      SRUR   SRGC**

It is recommended that the Federal Aviation Administration, in conjunction with the European Aviation Safety Agency and Transport Canada, require the manufacturers of lithium-metal batteries and manufacturers of aircraft equipment powered by lithium-metal batteries, to conduct battery-level and equipment level 'failure mode and effects analyses' to identify failure modes and their effects.



**Partially adequate - Open**

**Safety Recommendation 2015-019 made on 19 August 2015**

**ET-AOP Boeing 787-8 on 12 July 2013      SRUR   SRGC**

It is recommended that the Federal Aviation Administration, in conjunction with the European Aviation Safety Agency and Transport Canada, review all previously-approved aircraft equipment powered by lithium-metal batteries to determine whether they comply with the intent of the 'Toxic Gas Venting Precautions' described in TSO-C142 / TSO-C142a Appendix 1.



**Not adequate - Open**

**Safety Recommendation 2015-020 made on 19 August 2015**

**ET-AOP Boeing 787-8 on 12 July 2013      SRUR   SRGC**

It is recommended that the Federal Aviation Administration, in conjunction with the European Aviation Safety Agency and Transport Canada, review whether the 'Toxic Gas Venting Precautions' described in TSO-C142 / TSO-C142a Appendix 1 should be applied to portable aircraft equipment powered by lithium-metal batteries.



**Not adequate - Open**

**Safety Recommendation 2015-021 made on 19 August 2015**

**ET-AOP Boeing 787-8 on 12 July 2013**

It is recommended that Boeing expedite the modelling of the B787 Environmental Control System, to examine the distribution of ELT battery combustion products through the aircraft cabin, and demonstrate the results of this modelling to the Federal Aviation Administration.



**Adequate - Closed**

**Safety Recommendation 2015-022 made on 5 August 2015**

**G-JMAB BOEING 757-3CQ on 31 October 2014      SRUR   SRGC**

It is recommended that the European Aviation Safety Agency, in conjunction with the Federal Aviation Administration and other regulators, implement a standardised system of door and emergency exit designations to reduce potential misunderstanding between aircraft crews and airport emergency services in the event of an emergency evacuation.



**Not adequate - Closed**

**Safety Recommendation 2015-023 made on 5 August 2015**

**G-JMAB BOEING 757-3CQ on 31 October 2014**

It is recommended that the European Aviation Safety Agency amends the operational requirements for commercial offshore helicopters to require the provision of compressed air emergency breathing systems for all passengers and crew.



**Not adequate - Closed**

**Safety Recommendation 2015-024 made on 6 November 2015**

**G-LBAL AGUSTA AW139 on 13 March 2014      SRUR   SRGC**

The Federal Aviation Authority should amend its definition of Vmini, to reflect the legitimacy of flight under instrument flight rules by reference to external visual cues at speeds below Vmini.



**Not adequate - Open**

**Safety Recommendation 2015-025 made on 6 November 2015**

**G-LBAL AGUSTA AW139 on 13 March 2014      SRUR   SRGC**

The European Aviation Safety Agency should amend its definition of Vmini, to provide a clear definition that reflects the legitimacy of flight under instrument flight rules by reference to external visual cues at speeds below Vmini.



**Not adequate - Open**

**Safety Recommendation 2015-026 made on 6 November 2015**

**G-VROM BOEING 747-443 on 29 December 2014**

It is recommended that Boeing amend the 747-400 Approved Maintenance Manual task for removal and installation of the wing landing gear actuator, to provide clear instructions for the safe manoeuvring of the actuator in or out of its location in the wing landing gear bay.



**Adequate - Closed**

**Safety Recommendation 2015-027 made on 6 November 2015**

**G-VROM BOEING 747-443 on 29 December 2014**

It is recommended that Boeing modify the 747-400 wing landing gear actuator to reduce the likelihood of incorrect installation occurring or remaining undetected.



**Not adequate - Closed**

**Safety Recommendation 2015-028 made on 6 November 2015**

**G-VROM BOEING 747-443 on 29 December 2014**

It is recommended that Boeing modify the design of the 747-400 wing landing gear door mechanism to prevent release of the strike board from the aircraft when the alternate gear extension system is used following a loss of hydraulic fluid.



**Not adequate - Closed**

**Safety Recommendation 2015-029 made on 6 November 2015**

**G-VROM BOEING 747-443 on 29 December 2014**

It is recommended that Boeing amend the 747-400 Quick Reference Handbook to warn flight crews of the potential for, and provide guidance in the event of, an unsuccessful extension of the wing landing gear, when the alternate gear extension system is used following hydraulic system 4 low quantity and pressure warnings.



**Partially adequate - Closed**

**Safety Recommendation 2015-030 made on 19 October 2015**

**G-SPAO EC135 T2+ on 29 November 2013**

It is recommended that, when the European Aviation Safety Agency requires a radio altimeter to be fitted to a helicopter operating under an Air Operator's Certificate, it also stipulates that the equipment is capable of being powered in all phases of flight, including emergency situations, without intervention by the crew.



**Not adequate - Closed**

**Safety Recommendation 2015-031 made on 19 October 2015**

**G-SPAO EC135 T2+ on 29 November 2013**

It is recommended that, when the Civil Aviation Authority require a radio altimeter to be fitted to a helicopter operating under a Police Air Operator's Certificate, it also stipulates that the equipment is capable of being powered in all phases of flight, including emergency situations, without intervention by the crew.



**Adequate - Closed**

**Safety Recommendation 2015-032 made on 19 October 2015**

**G-SPAO EC135 T2+ on 29 November 2013**

It is recommended that the Civil Aviation Authority requires all helicopters operating under a Police Air Operators Certificate, and first issued with an individual Certificate of airworthiness before 1 January 2018, to be equipped with a recording capability that captures data, audio and images in crash-survivable memory. They should, as far as reasonably practicable, record at least the parameters specified in The Air Navigation Order, Schedule 4, Scale SS(1) or SS(3) as appropriate. They should be capable of recording at least the last two hours of (a) communications by the crew, including Police Observers carried in support of the helicopter's operation, and (b) images of the cockpit environment. The image recordings should have sufficient coverage, quality and frame rate characteristics to include actions by the crew, control selections and instrument displays that are not captured by the data recorder. The audio and image recorders should be capable of operating for at least 10 minutes after the loss of the normal electrical supply.




 **Adequate - Closed**

**Safety Recommendation 2015-033 made on 19 October 2015**

**G-SPAO EC135 T2+ on 29 November 2013**


It is recommended that the Civil Aviation Authority requires all helicopters operating under a Police Air Operators Certificate, and first issued with an individual Certificate of Airworthiness on or after 1 January 2018, to be fitted with flight recorders that record data, audio and images in crash-survivable memory. These should record at least the parameters specified in The Air Navigation Order, Schedule 4, Scale SS(1) or SS(3), as appropriate. They should be capable of recording at least the last two hours of (a) communications by the crew, including Police Observers carried in support of the helicopter's operation, and (b) cockpit image recordings. The image recordings should have sufficient coverage, quality and frame rate characteristics to include control selections and instrument displays that are not captured by the other data recorders. The audio and image recorders should be capable of operating for at least 10 minutes after the loss of the normal electrical supply.

 **Adequate - Closed**

**Safety Recommendation 2015-034 made on 19 October 2015**

**G-SPAO EC135 T2+ on 29 November 2013**

It is recommended that the Civil Aviation Authority considers applying the requirements of AAIB Safety Recommendation 2015-032 and AAIB Safety Recommendation 2015 - 033 to State aircraft not already covered by these Safety Recommendations.

 **Adequate - Closed**

**Safety Recommendation 2015-035 made on 19 October 2015**

**G-SPAO EC135 T2+ on 29 November 2013 SRUR**

It is recommended that the European Aviation Safety Agency mandate the ICAO Annex 6 flight recorder requirements for all helicopter emergency medical service operations, regardless of aircraft weight. The last two hours of flight crew communications and cockpit area audio should be recorded. The cockpit area audio recording should continue for 10 minutes after the loss of normal electrical power.



**Partially adequate - Open**

**Safety Recommendation 2015-036 made on 19 October 2015**

**G-SPAO EC135 T2+ on 29 November 2013 SRUR**

It is recommended that the European Aviation Safety Agency mandate image flight recorder requirements for all helicopter emergency medical service operations, regardless of aircraft weight. The image recordings should have sufficient coverage, quality and frame rate characteristics to include actions by the crew, control selections and instrument displays that are not captured by a data recorder. The recording should be of the last two hours of operation, including at least 10 minutes after the loss of normal electrical power to the flight recorder.



**Not adequate - Closed**

**Safety Recommendation 2015-037 made on 5 November 2015**

**G-FRAK Dassault Falcon 20D on 25 April 2015**

It is recommended that the European Aviation Safety Agency, require that Meggitt Defense Systems Inc review the design, maintenance and operation of the RM30 and similar winches to reduce the possibility of an uncommanded target acceleration during recovery.



**Partially adequate - Open**

**Safety Recommendation 2015-038 made on 3 December 2015**

**N103CD Gulfstream III on 24 November 2014 SRUR SRGC**

It is recommended that the International Civil Aviation Organisation initiate the process to develop within Annex 14 Volume 1, 'Aerodrome Design and Operations', a standard for runway edge lights that would allow pilots to identify them specifically, without reference to other lights or other airfield features.



**Not adequate - Open**



**Safety Recommendation 2015-039 made on 14 January 2016**

**AAIB Safety Study - 1/2016 SRUR**

It is recommended that the European Aviation Safety Agency determine the extent to which airworthiness standards of aircraft resident within a Member State but registered elsewhere are being applied consistently across Member States, and publish its findings.



**Not adequate - Open**

**Safety Recommendation 2015-040 made on 14 January 2016**

**AAIB Safety Study - 1/2016**

It is recommended that the United Kingdom Civil Aviation Authority take urgent action to ensure that foreign registered aircraft, permanently based and/or operated in the United Kingdom, comply with the requirements of the Air Navigation Order and their Certificate of Airworthiness.



**Partially adequate - Open**

**Safety Recommendation 2015-041 made on 22 December 2015**

**G-BXFI HAWKER HUNTER T7 on 22 August 2015**

It is recommended that the Civil Aviation Authority require operators of ex-military aircraft fitted with ejection seats or other pyrotechnic devices operating in the United Kingdom, to ensure that hazard information is readily available which includes contact details of a competent organisation or person able to make the devices safe following an accident.



**Adequate - Closed**

**Safety Recommendation 2015-042 made on 22 December 2015**

**G-BXFI HAWKER HUNTER T7 on 22 August 2015**

It is recommended that the Civil Aviation Authority review the guidance in CAP 632 with respect to ejection seats and the means by which operators of ex-military aircraft equipped with them comply with this guidance. This review should include:

- The benefits and hazards of aircrew escape systems in civilian operated aircraft
- The use of time-expired components
- The availability of approved spares
- The seat manufacturer's guidance on deactivating its historic products
- Adoption of a dedicated Maintenance Approval for persons or organisations competent to perform ejection seat maintenance



**Adequate - Closed**

**Safety Recommendation 2015-043 made on 22 December 2015**

**G-BXFI HAWKER HUNTER T7 on 22 August 2015**

It is recommended that the Civil Aviation Authority promote a process for the effective dissemination of ex-military jet aircraft experience and type-specific knowledge between individual maintenance organisations.



**Adequate - Closed**

**Safety Recommendation 2015-044 made on 22 December 2015**

**G-BXFI HAWKER HUNTER T7 on 22 August 2015**

It is recommended that the Civil Aviation Authority establish a minimum amendment standard for the technical publications for each ex-military jet aircraft operated on the United Kingdom civil register.



**Not adequate - Open**

**Safety Recommendation 2015-045 made on 22 December 2015**

**G-BXFI HAWKER HUNTER T7 on 22 August 2015**

It is recommended that the Civil Aviation Authority require that the maintenance programme relating to an ex-military jet aircraft is transferred with the aircraft when it moves to another maintenance organisation to ensure continuity of the aircraft's maintenance.



**Not adequate - Open**

**Safety Recommendation 2015-046 made on 22 December 2015**

**G-BXFI HAWKER HUNTER T7 on 22 August 2015**

It is recommended that the Civil Aviation Authority review the effectiveness of all approved Alternative Means of Compliance to Mandatory Permit Directive 2001-001.



**Not adequate - Open**

**Safety Recommendation 2015-047 made on 22 December 2015**

**G-BXFI HAWKER HUNTER T7 on 22 August 2015**

It is recommended that the Civil Aviation Authority review its procedures to ensure that a 'Permit to Fly-Certificate of Validity' is valid when it is issued.



**Not adequate - Open**

## Safety Actions from investigations reported on in 2015

Early in an investigation the AAIB will engage with authorities and organisations which are directly involved and have the ability to act upon any identified safety issues. The intention is to prevent recurrence and to that end to encourage proactive action whilst the investigation is ongoing and not for those involved to wait for the issue of official Safety Recommendations.

When safety action is taken, it means there is no need to raise a Safety Recommendation as the safety issue has been addressed, however if the issue remains then a Safety Recommendation will be raised. The published report details the safety issues and the safety action that has taken place, usually with a green highlight. In 2015 safety action directly as a result of AAIB investigations was recorded on three formal investigations, nine field investigations and five correspondence investigations.

### FORMAL INSPECTOR'S INVESTIGATIONS

#### Airbus A319-131, G-EUOE

##### Safety Issue - Ensuring closure of fan cowl doors

Operator introduced several maintenance task management actions and introduced mitigations during maintenance especially on multiple engines on one aircraft. The FCOM has been revised to highlight the need to ensure security of fan cowls during walkround. Changes were also made to training of crews and maintenance staff.

The manufacturer has introduced changes to the AMM and MPD. Introduced decals and launched studies on other mitigations.

The regulator has amended the certification requirement in CS-25

The fan cowl door manufacturer issued amendments to the CMM and use of high visibility paint on the latches.

#### Eurocopter (Deutschland)1 EC135 T2+, G-SPAO

##### Safety Issue - Fuel calculations

Operator amended its OM and issued a safety notice

##### Safety Issue - Fuel level indications

Manufacturer issued a revision to the AFM

##### Safety Issue - Time between engine 1 and 2 flameout if both transfer pumps are off

Manufacturer amended the SDS manual

##### Safety Issue - Fuel contamination by cold compressor washing

Cold compression washing suspended

**Boeing B787-8, ET-AOP, 12 July 2013**

**Safety Issue - ELT wiring routing**

Mandatory inspection of ELT introduced

**Safety Issue - ELT fire scenarios**

ELT manufacturer introduced modifications

**Safety Issue - Effect of fire and combustion products**

Aircraft manufacturer reviewing test methodology and environmental airflow models.  
Regulator re-evaluation of flammability and toxicity testing of composite materials.



**Safety Issue - Information to fire service on location of ETL and lithium battery equipment**

Aircraft manufacturer updated guidance material

**FIELD INVESTIGATIONS**

**ATR 72-212 A, EI-FCY on 15 May 2014**

**Safety Issue - Dual failure of MFC**

The aircraft manufacturer issued modifications, amended operational documentation and introduced failure scenarios into training.

**Boeing 737-8AS, EI-ENL and Boeing 737-8AS, EI-DLJ on 28 June 2014**

**Safety Issue - Cabin crew communication**

The Operator introduced new procedures to improve communication between flight crew and cabin crew.

**Safety Issue - Procedures during pushback**

Regulator to review standardisation of pushback procedures and terminology

Operator amended documentation and passed onto to ground handling companies

Ground handling company updated procedures, introduced a guide person, issued notices to highlight changes and updated training



**Safety Issue - Air traffic instructions by ground controllers**

Air traffic services to review available systems to improve ground control and standard pushback procedures. Local procedures were also reviewed

**Gulfstream III (G-1159A), N103CD on 24 November 2014**

**Safety Issue - Taxiway and runway information and delineation**

Airport introduced new lighting to delineate taxi and runway

Chart supplier updated information to reflect the UK AIP

**Boeing 747-443, G-VROM on 29 December 2014**

**Safety Issue - Installation of landing gear actuators**

Operator carried out a review and improved their procedures

**Jetstream 3102 31, G-GAVA on 15 August 2014**

**Safety Issue - Landing gear failure with cylinders fitted with DTD5094**

Operator reduced inspection interval of landing gears and a pre-flight visual inspection  
Manufacturer introduced new inspection requirements and identification of improved gasket material, review failure mechanisms and revise maintenance requirements

**Boeing 737-476(SF), EI-STD on 29 April 2014**

**Safety Issue - Damage to chrome plating on landing gear**

Landing gear overhaul reviewed their plating processes.

**Safety Issue - Airport emergency communications**

Airport operator issued instructions on communication protocols and procedures and plans investment in new equipment.



**Schleicher ASW 20 L, G-LYSA on 18 June 2014**

**Safety Issue - Operation of wrong control when operating the airbrake lever**

Regulator issued a safety alert highlighting the issue

**Safety Issue - security of control column grips**

Regulator issued safety alert on security of grips

**Boeing 737-36Q, G-GDFT on 3 September 2014**

**Safety Issue - Procedures following a battery bus failure**

Operator issued an operating staff instruction to remind crews of procedures issued by the manufacturer



**Dassault Falcon 20D, G-FRAK on 25 April 2015**

**Safety Issue - Target system and operation**

Winch manufacturer issued instructions on maintenance and life of items in the system.

The operator introduced modifications and changes to their procedures

**CORRESPONDENCE INVESTIGATIONS**

**Airbus A321-231, G-ZBAD**

**Safety Issue - Towbar usage**

Handling agent removed towbar from service

**North American T-28A Trojan, N14113**

**Safety Issue - Nose landing forging failure**

Maintenance organisation introduced regular NDT check of forging



**Piper PA-28-161 Cadet, G-BXJJ**

**Safety Issue - Carburettor icing**

Operator highlighted information in CAA Safety Sense Leaflet 14 to members.

**Short SC7 Skyvan 3, G-BEOL on 3 May 2013**

**Safety Issue - NLG sliding tube failure**

Manufacturer introduced NDT inspections mandated by the regulator.

**Pietenpol Air Camper, G-ECVB on 23 July 2014**

**Safety Issue - Mainwheel rod end deterioration**

The regulator issued inspector requirements and introduced a life requirement on rod ends





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