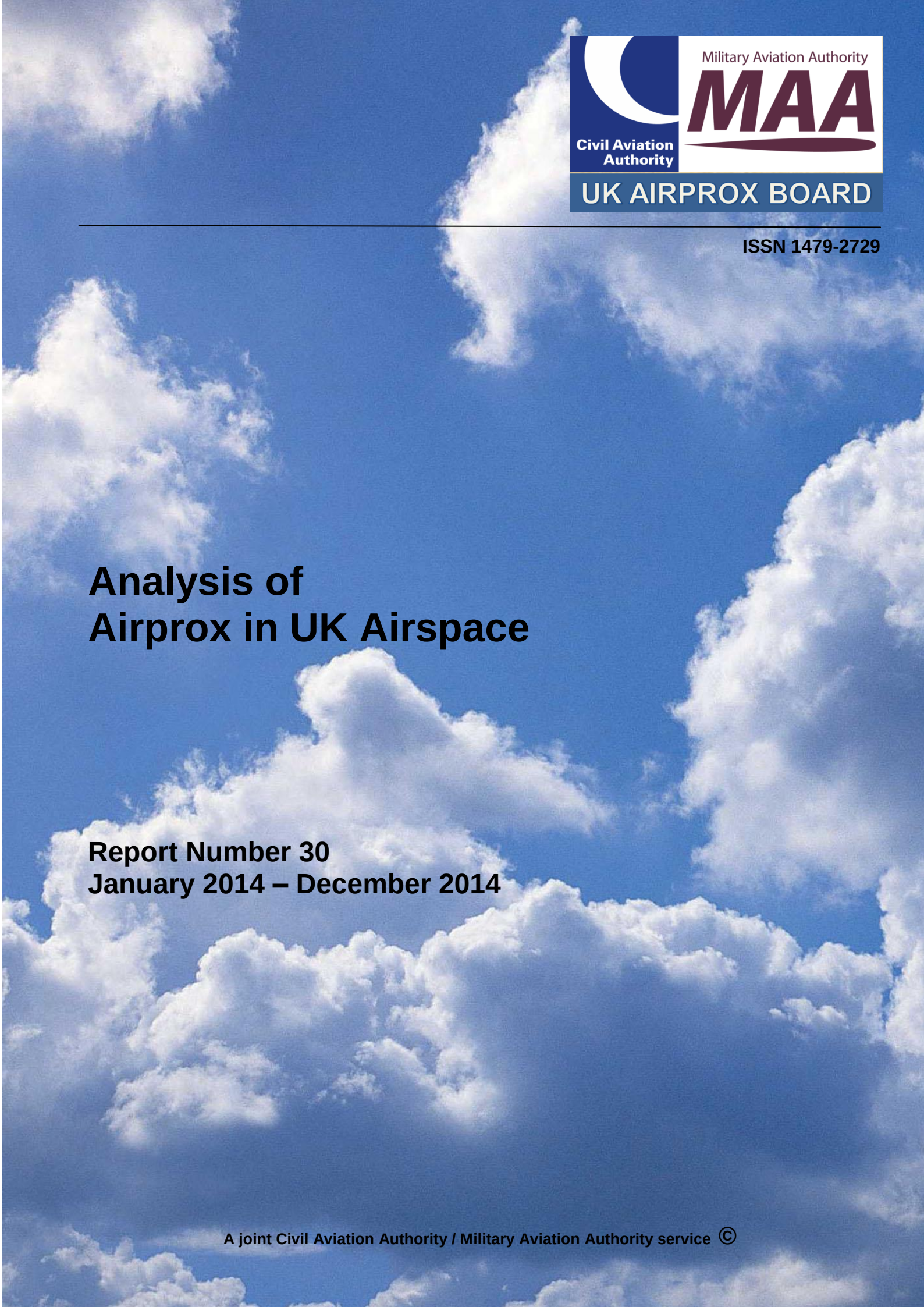

ISSN 1479-2729

Analysis of Airprox in UK Airspace

Report Number 30
January 2014 – December 2014

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Thirtieth Report by the UK Airprox Board

Analysis of Airprox in UK Airspace

(January 2014 to December 2014)

Compiled by Director UK Airprox Board for

The Chief Executive Officer
UK Civil Aviation Authority

and

The Director
UK Military Aviation Authority

CONTENTS

OVERVIEW

Executive Summary

The UK Airprox Board (UKAB) assessed 224 Airprox in 2014, of which 96 (43%) were assessed as risk-bearing events (Risk Categories A & B).[1] This represents an increase of approximately 30% in overall Airprox notifications compared to 2013. Table 1 and Figures 1 & 2 show Airprox statistics and associated risk trends over the last 10 years, wherein it can be seen that 2014 reflects a marked increase in both reporting and in severity of risk. However, taking a somewhat longer-term view, Figure 3 indicates that 2014 may also simply indicate a return to historic norms after previously low numbers in recent years as opposed to being an unusually high number in isolation. Either way, what is noticeable is that the percentage of risk-bearing events in 2014 is the highest it has been in the last 10 years (and in fact the highest since 1997), well above the 10-year average. Of these risk-bearing incidents, Category B incidents are the ones that seem to have spiked – these represent incidents where aircraft proximity resulted in safety margins being much reduced below normal, either due to serendipity, inaction, or where a pilot was only able to take emergency avoiding action to avert a collision at the last moment.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year Average
Category A	19	15	9	13	11	12	23	18	22	**28**	**17**
Category B	51	40	39	38	36	33	36	27	43	**68**	**41**
Category C	116	103	106	100	97	116	88	97	72	**86**	**98**
Category D	2	1	0	4	3	6	2	5	9	**9**	**5**
Category E	0	0	0	0	0	0	12	14	26	**33**	**21**
Annual Totals	188	159	154	155	147	167	161	161	172	**224**	**169**
Risk Bearing	37%	35%	31%	33%	32%	27%	37%	28%	38%	**43%**	**34%**

Table 1. Total Airprox Notifications and Risk Assessment Statistics

As ever with Airprox reporting, caution should be exercised when trying to identify trends and lessons from what is a statistically small sample size compared to the many thousands of flights that are conducted without incident within the UK's airspace every year. In purely numeric terms, 224 incidents represents, on average, an Airprox occurring at least every other day; of these, 96 risk-bearing events reflects that, on average, two aircraft almost collided (or safety margins were at least much reduced) nearly twice a week.

In common with normal Airprox annual trends and monthly reporting statistics, 2014 saw proportionally more incidents in the summer months, when GA are more active, than the rest of the year. However, reported GA total flying hours seem to have been similar to 2013 and so, with that in mind, there appear to be no hard facts or obvious explanations for why Airprox numbers overall, and risk-bearing events specifically should have risen compared to 2013.

[1] Risk categories are defined within the Glossary of definitions and abbreviations at the end of this annual report. Note that Category E was only introduced in 2011, and similar events would probably have previously been classified as Category C: the seeming reduction in Category C occurrences since then should be viewed in this light.

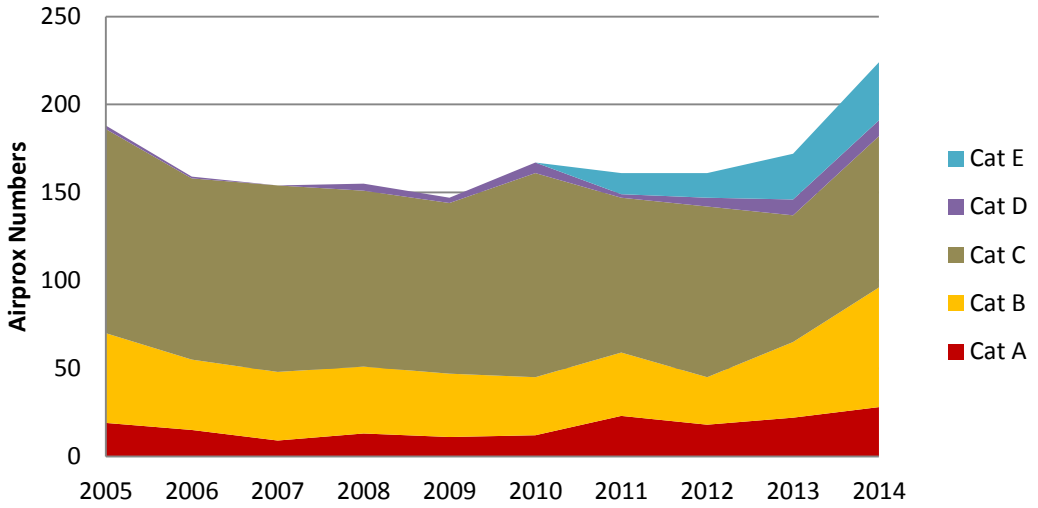

Figure 1. Total Airprox Numbers - 10-year Trend

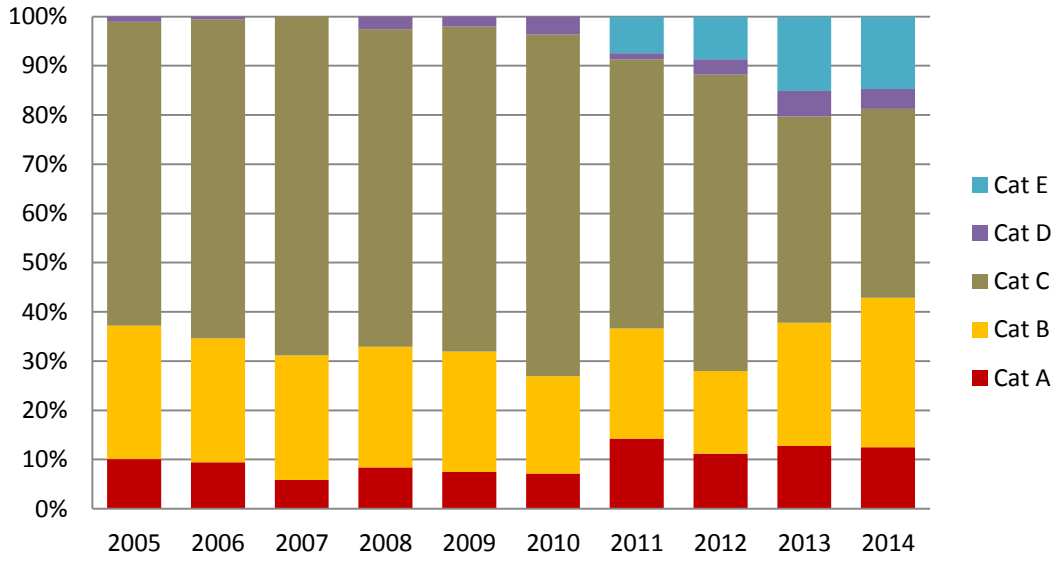

Figure 2. Total Airprox Risk Distribution - 10-year Trend

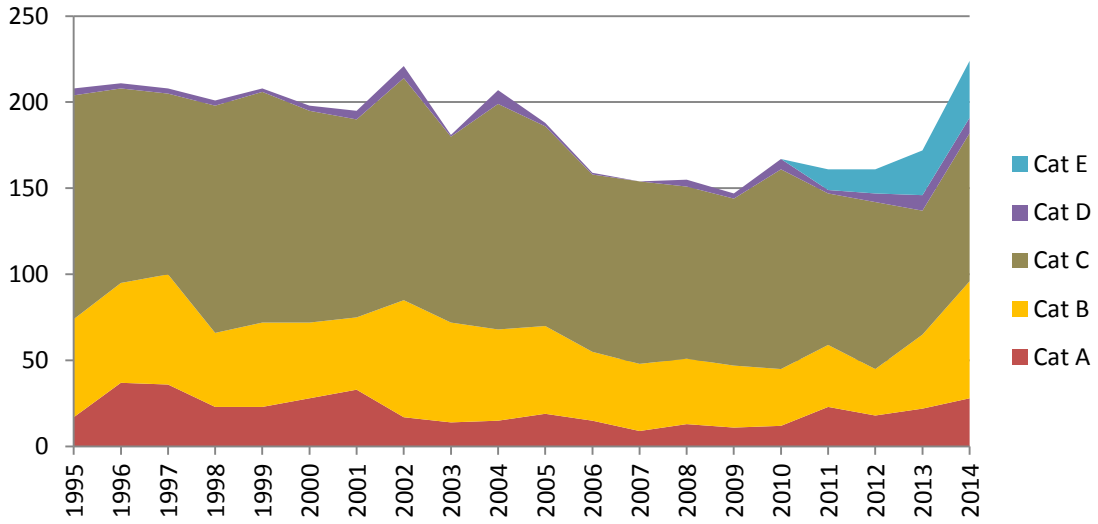

Figure 3. Total Airprox Numbers - 20-year Trend

Collation of reliable flying hours statistics is notoriously difficult due to the fact that much of sports aviation activity is not logged. However, Table 2 shows the best figures I can obtain from CAA and MOD sources, which indicate that, overall, UK flying hours have been pretty stable (average ~2.86M per year) following a marked reduction in 2009/2010 when the UK recession affected GA and CAT hours, and reductions in military aircraft numbers began in UK. Overlain on the 10-year trend graph (Figure 4), it is clear that the increasing trend of Airprox reporting in 2014 does not correlate to hours flown.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CAT Hours x 10K	154.6	160.3	162.0	163.5	149.4	141.6	147.1	145.4	149.0	151.5
GA Hours x 10K	124.9	130.5	134.6	135.1	131.2	113.0	114.4	111.8	110.5	108.3
Mil hrs x10K	44.6	43.1	43.4	40.1	43.2	31.8	31.1	25.6	24.2	27.0
Total Hrs x10K	324.1	333.9	340.0	338.7	323.7	286.4	292.7	282.9	283.8	286.8

Table 2. UK Flying Hours 10-year Statistics

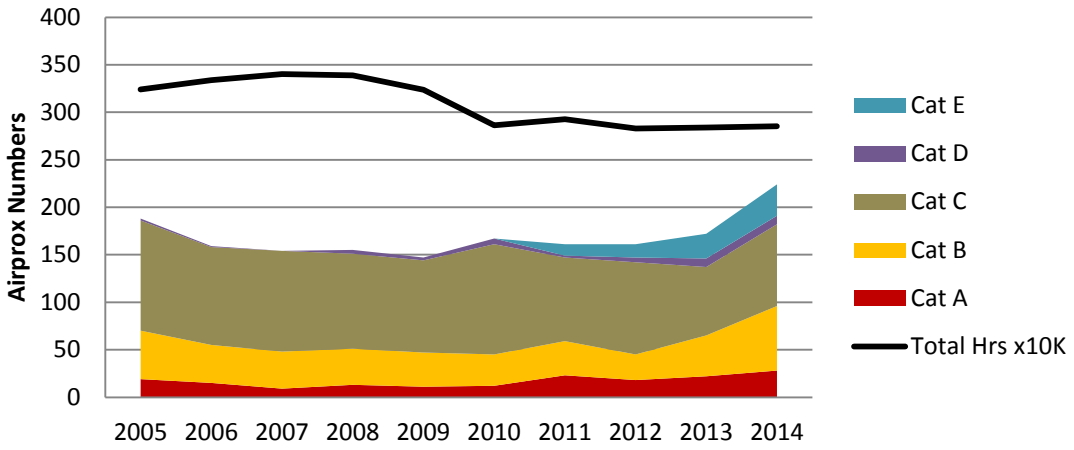

Figure 4. 10-year Trend compared with Flying Hours

Previous analysis has suggested that 2012 may have been an untypically low reporting year due to the effect of the 2012 Olympics (when much more radar control and surveillance was placed over the Southern UK during the summer months, which may have suppressed overall Airprox numbers). Additionally, problems with MOD Tutor training aircraft propellers caused them to be severely restricted in flying from August 2012, and then effectively grounded from January until December 2013[2] (on average, Tutors account for 20-25% of military Airprox (circa 20 per year on average), which will have considerably suppressed 2013 Airprox numbers). Taking both these factors into account, it may be that the underlying increase in Airprox numbers since 2011 would have been even more pronounced as a trend before 2014. Viewed in the context of previously overall declining trends in the fifteen years up to 2010[3] (Figure 3),

[2] After a second propeller failure on 9 Jan 2013, flying was paused for resolution of propeller security issues and subsequent replacement. Following an extended period of non-flying whilst compatibility issues were addressed, a staged return to flight preceded a formal declaration on 20 Dec 13 that full Tutor capability had been regained.

[3] With the exception of a couple of spikes in 2002 and 2004/5.

and given that here appears to be no correlation with flying hours, all of this begs three questions:

- What has changed since 2010/2011 to cause more Airprox notifications?
- Why are more of these risk-bearing by percentage?
- Why has there been a particularly marked increase in 2014?

Looking specifically at the risk-bearing percentages of overall occurrences over 10 years, there is a clear upwards trend in the last 4 years which, as is reflected in Figure 5, shows 2014 at a rate of 43%. This is the highest it has been in the last 10 years (the 10-year average percentage for risk-bearing is 34%) – in short, not only have there been increased Airprox in 2014, but they are also more risky by percentage.

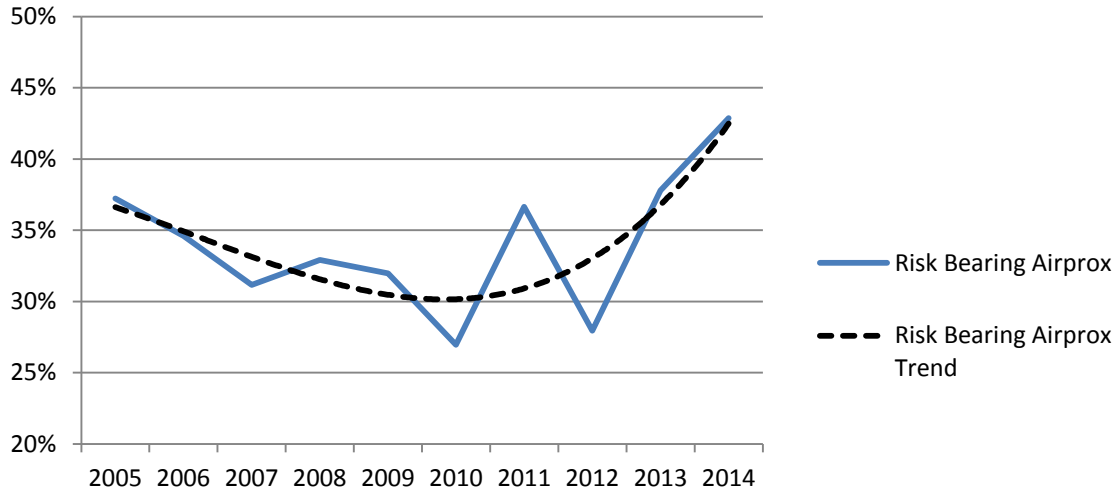

Figure 5. Overall Risk-Bearing Airprox - 10-year Trend

Some vagaries in the classification of risk must be expected because of the subjective nature of both the ICAO Airprox definition and the Board assessment process; both of which are qualitative in nature rather than quantitative. Notwithstanding, as Table 3 and Figure 6 show, sub-categorising the increasing overall risk-bearing trend by respective classes indicates: an increasing trend for General Aviation (GA); a broadly decreasing but levelling trend for Military (Mil) Airprox; and an increasing trend for Commercial Air Transport (CAT)[4].

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
GA Risk-Bearing	45%	46%	38%	44%	30%	29%	38%	38%	42%	47%
Mil Risk-Bearing	44%	40%	33%	39%	44%	26%	36%	30%	34%	33%
CAT Risk-Bearing	9%	8%	8%	3%	3%	0%	5%	3%	12%	19%

Table 3. Percentage Risk-Bearing Airprox By Class Of Aircraft

[4] Albeit CAT percentages are probably skewed by the disproportionate impact of a small number of risk-bearing events within a relatively small number of overall occurrences (2014 - 6 risk-bearing out of 31 events; 2013 - 4 risk-bearing out of 33 events; 2012 - 1 risk-bearing out of 35 events; 2011 - 1 risk-bearing out of 22 events).

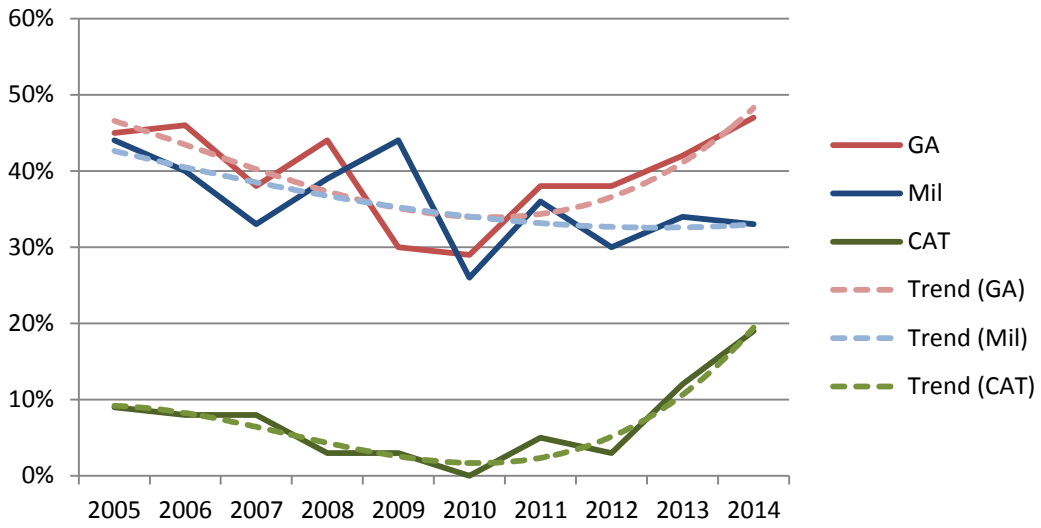

Figure 6. Percentage Risk-Bearing Trends By Class Of Aircraft

Statistics and trends can sometimes mask the overall meaning of the analysis. Bluntly, Airprox are near accidents, and risk-bearing Airprox reflect incidents where aircraft very nearly collided, or safety was much reduced below the norm. Drawing from the main body of the report and the associated class analyses, headline statements for UK airspace in 2014 are:

- 224 Airprox represents, on average, an Airprox at least every other day.
  - 96 risk-bearing Airprox means that, on average, **there was either a risk of collision, or safety was much reduced below norms, about twice a week**.

- 31 CAT Airprox represents about one a fortnight.
  - 6 risk-bearing CAT Airprox means that, on average, **there was either a risk of a collision with CAT, or safety was much reduced below norms, about once every 2 months**.

- 171 GA Airprox represents just over three per week.
  - 81 risk-bearing GA Airprox means that, on average**, there was a risk of GA collision, or safety was much reduced below norms, nearly seven times a month**.

- 99 Mil Airprox represents nearly 2 per week.
  - 33 risk-bearing Mil Airprox means that, on average, **there was a risk of Mil aircraft collision, or safety was much reduced below norms, nearly three times a month**.

Figure 7 illustrates graphically the 2014 Airprox breakdown. The large central pie chart shows the division of all Airprox by class involvement, whilst the smaller satellite pie charts show the sub-division of involvements within each of the classes (i.e. of the 171 Airprox involving GA, 56% were GA-GA, 32% were GA-Mil, 10% were GA-CAT, and 2% were GA-Other). Note that the term 'Other' refers to aircraft such as Air Ambulances, Police Helicopters, unknown

aircraft, model aircraft, drone/UAV/RPAS etc. Of these latter drone Airprox, we saw 6 incidents in 2014 where drones were positively identified and reported as having flown into conflict with other aircraft (there were none reported in 2013). In all of these, the drones appeared to be deliberately or unthinkingly flown in locations that were obviously close to airfields or aircraft operating areas; the seeming disregard for safety, or at best ignorance of risk, of casual drone operators is a cause for concern that is only likely to deepen as drones become more prolific due to their ease of availability and relatively low cost.

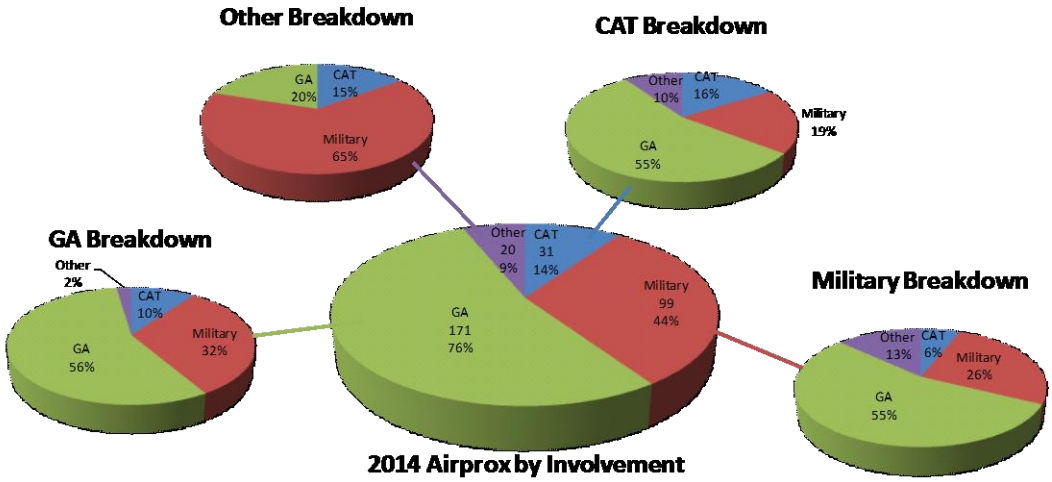

Figure 7. 2014 Airprox by Class Involvement

Finally, as of 2013, 'Blue Book' reports are no longer published in hard-copy format due to distribution costs. This report and associated individual Airprox reports are now only available online (at www.airproxboard.org.uk) or by email on request. In addition, an annual Airprox magazine is published each August which focuses on GA Airprox incidents and issues in a more digestible and relevant format for the wider aviation community. Airprox magazine is also available at the link above, is distributed in hard copy form to major flying clubs and aviation organisations, and is also available at the CAA 'CluedUp' website at http://edition.pagesuite-professional.co.uk//launch.aspx?eid=60b7eab6-10a1-41e3-b6c2-c0ddb0ff0284.

Steve Forward
Director UK Airprox Board

Airprox Reporting Statistics

The UKAB assessed 224 Airprox in 2014, 52 more than in 2013 and 38 above the 10-year average; this rise continues an overall gradual increasing trend in reporting since 2009 (when 147 Airprox were assessed). Figure 8 shows the breakdown of the year's flow of occurrences overlain on bars representing the 5-year rolling average for each of the months. There were consistently high levels of reports throughout most of the year, which only abated to closer to expected average levels in October.

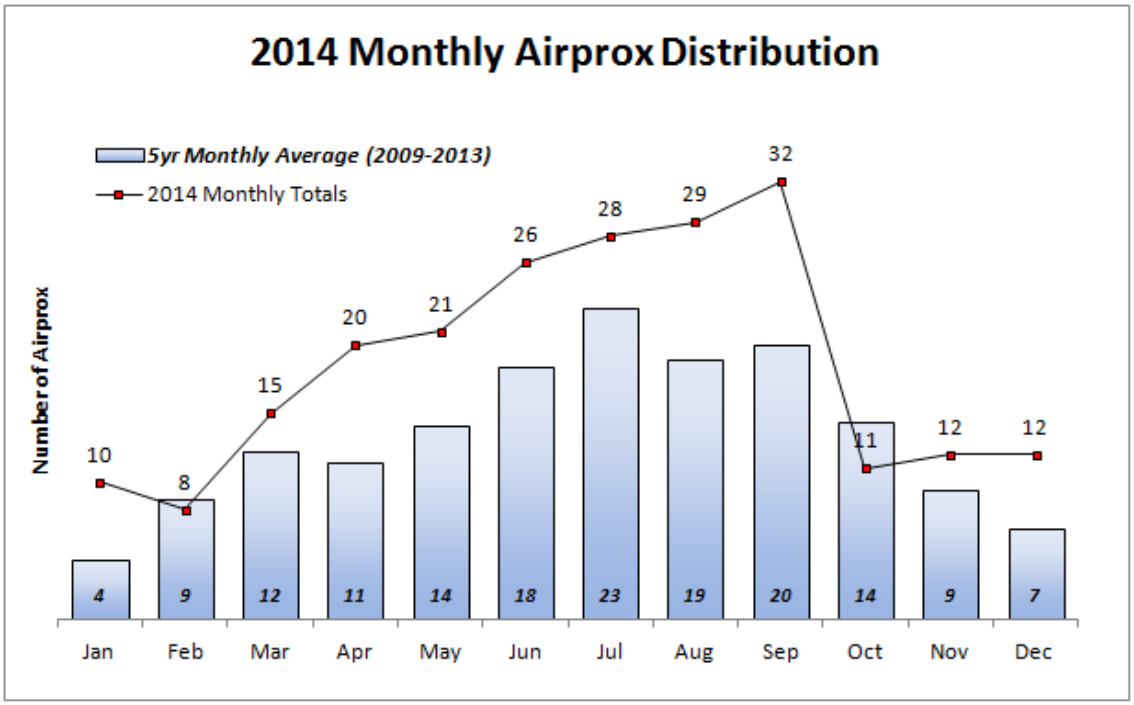

Figure 8. 2014 Airprox Monthly Distribution

Airprox Analysis and Trends

Overview

Although the reasons for the peaks and troughs above will be many and various, they are often associated with weather conditions, which naturally affect GA flying rates. Figure 9 overleaf shows the Met Office seasonal rainfall anomaly charts[5] for 2014 which, although reflecting only one aspect of aviation weather considerations, show that 2014 was a relatively dry year compared to the previous 30-year averages, especially in Summer and Autumn; this is no doubt reflected in the higher Airprox reporting rates for those periods. Not immediately obvious from the charts, January and February were particularly wet months (double their respective months' 30-year rainfall averages) during the end of what was reported as the wettest Winter since 1766; hence probably less GA flying, and therefore less Airprox reporting at the start of the year.

[5] Available at: http://www.metoffice.gov.uk/climate/uk/summaries/anomacts.

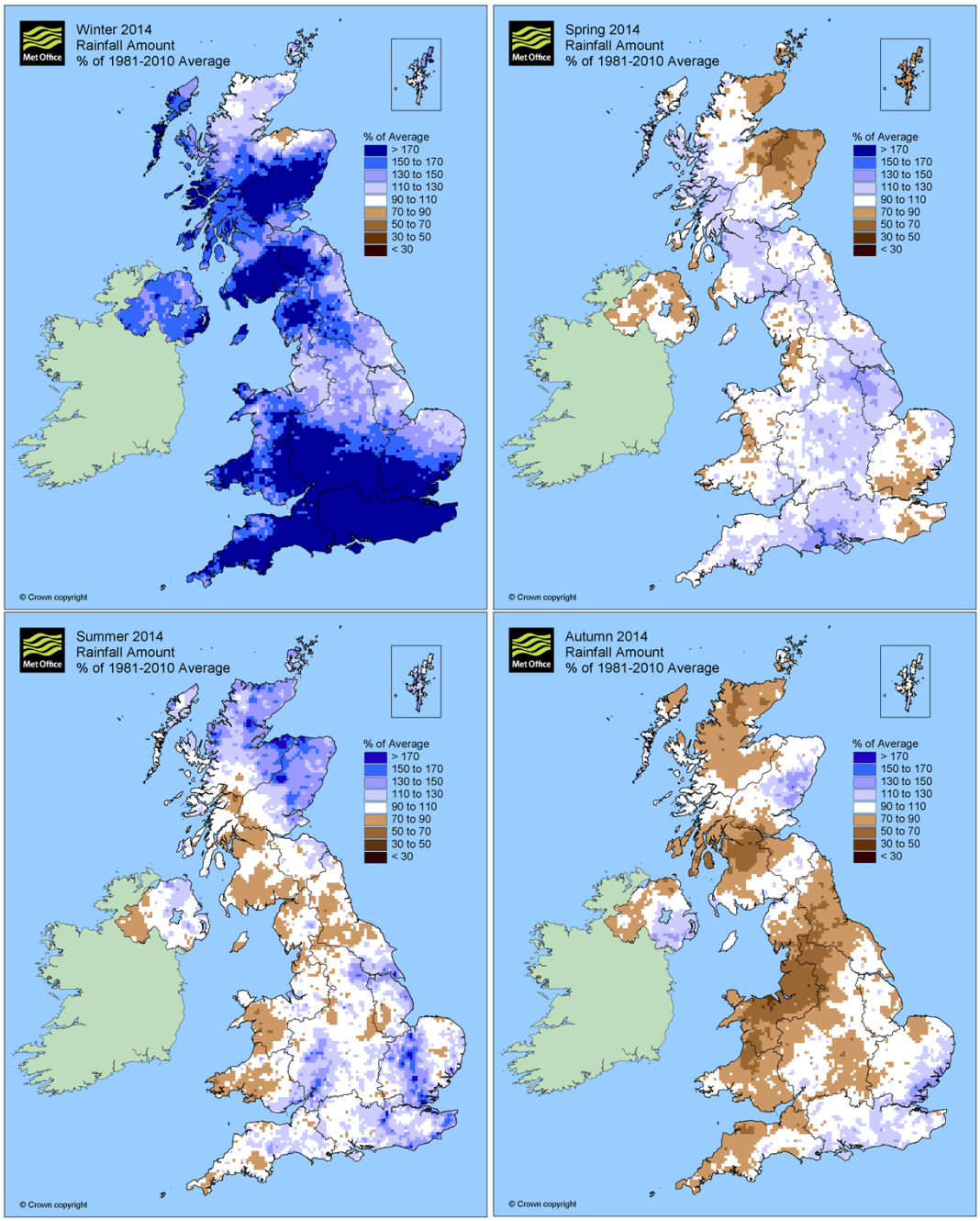

Figure 9. 2014 Seasonal Rainfall Anomaly Charts

Figure 10 overleaf shows the monthly breakdown of Airprox incidents by risk, whilst Figure 11 shows the same data but with risk categories displayed as percentages of monthly occurrences. February, March and April were notable for their very high rates of risk-bearing Airprox (Category A & B) in percentage terms, and in their pure numbers of Category B incidents. One could speculate that this may be down to the GA flying community coming out of 'hibernation' in Spring as the weather improved, and prioritising their focus on refreshing their pure flying skills at the expense of lookout and situational awareness. That the pure numbers of Category A Airprox are highest in the Summer months is usual: this probably primarily reflects the increased flying rates overall (and hence increased exposure since there are more aircraft airborne and therefore

more chances of an encounter). There is also a tendency for those who do not fly regularly, or who are *ab initio* pilots, to focus on the good weather seasons: because they may be less practiced in lookout, or may have 'rusty' flying skills that are absorbing their capacity, they may not see other aircraft either at all, or until the latter stages of an occurrence.

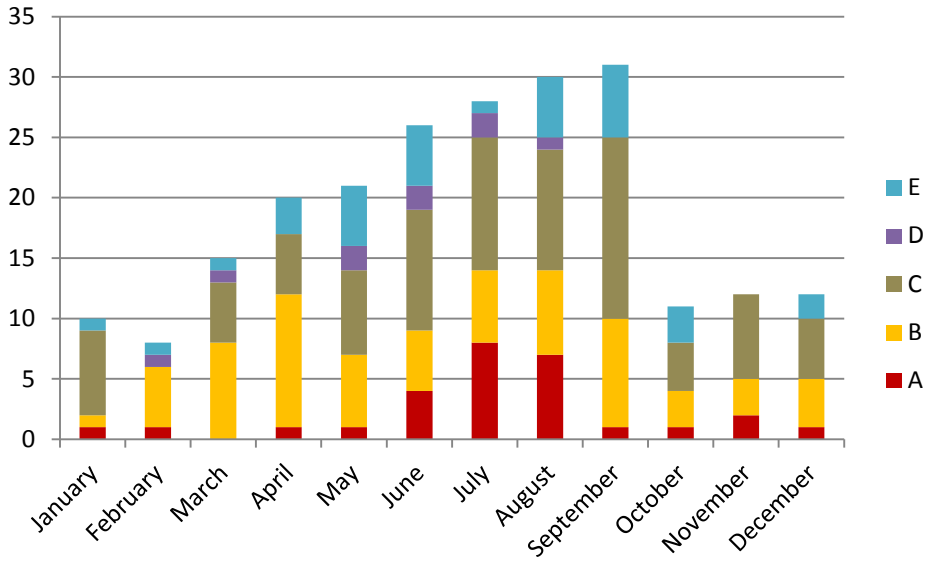

Figure 10. 2014 Airprox Risk Distribution by Month.

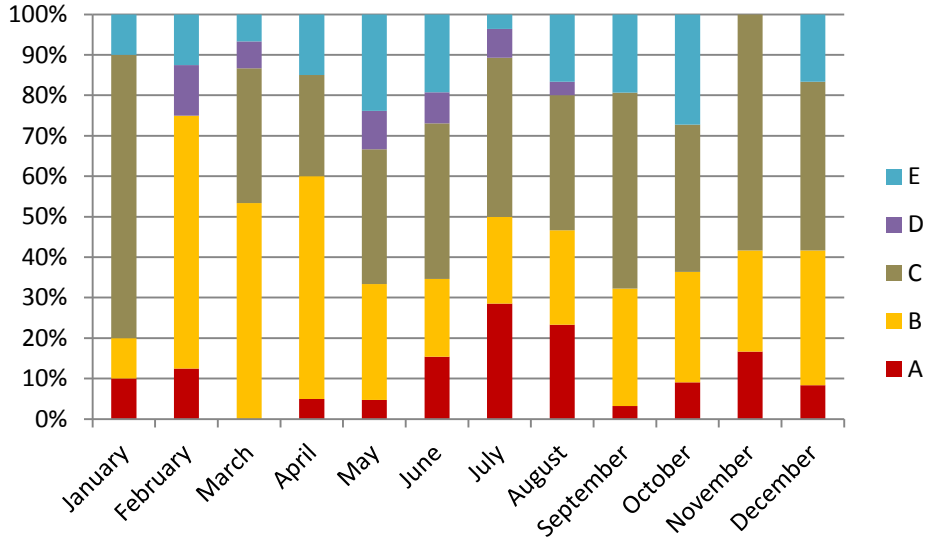

Figure 11. 2014 Airprox Percentage Risk Distribution by Month

Analysis by User Groups

Table 4 and Figure 12 show the overall total Airprox trends by user group interactions over the last 10 years. As can be seen, the numbers of Military-to-Military incidents largely stabilised in recent years, Civil-to-Military increased moderately, and Civil-to-Civil increased markedly in 2014. 'Other' refers to aircraft such as Air Ambulances, Police Helicopters, unknown aircraft, model aircraft and drones etc. That this group is also increasing mostly reflects

greater Air Ambulance and Police Helicopter reporting; however, it is worthy of note that drone Airprox are on the rise as a result of their increased popularity – in 2013 there were no Airprox referring to drones, in 2014 there were 6.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Civil~Civil	99	95	93	93	74	63	73	84	80	118
Civil~Mil	74	46	38	38	36	54	50	39	54	60
Mil~Mil	8	12	12	17	30	34	26	28	19	26
Other	7	6	11	7	7	16	12	10	19	20
Totals:	188	159	154	155	147	167	161	161	172	224

Table 4. 10-year Total Airprox Statistics by User Group

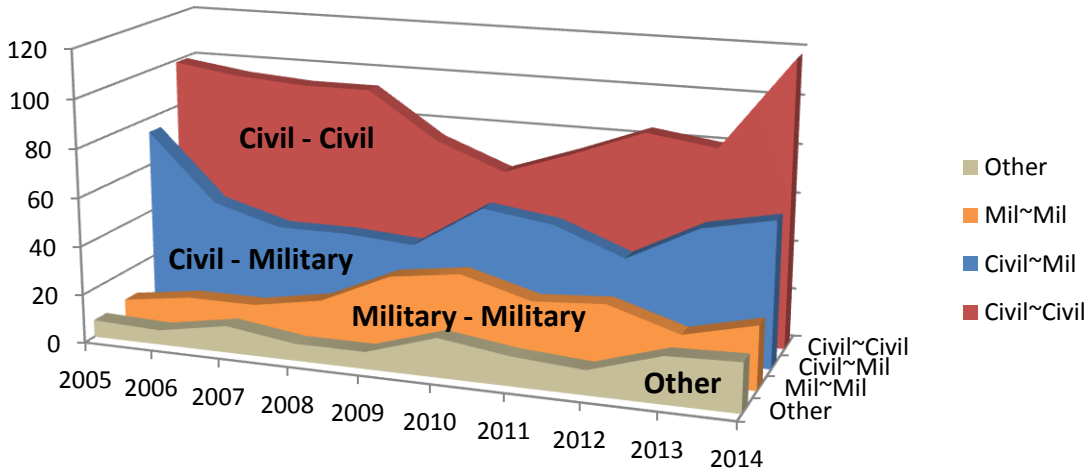

Figure 12. 10-year Total Airprox Trends by User Groups

Analysis by Flight Classification

In order to gain greater granularity of civil Airprox trends, Table 5 and Figure 13 below further break down the above civil user group statistics into classes that distinguish CAT from GA.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
GA~Mil	43	25	25	24	29	40	46	33	48	54
GA~GA	46	44	46	47	46	44	55	59	57	96
CAT~CAT	10	19	19	24	11	5	4	11	9	5
CAT~GA	43	32	28	22	17	14	14	14	14	17
CAT~Mil	31	21	13	14	7	14	4	6	6	6
Mil~Mil	8	12	12	17	30	34	26	28	19	26
Other	7	6	11	7	7	16	12	10	19	20
Total	188	159	154	155	147	167	161	161	172	224

Table 5. 10-year Total Airprox Statistics by Flight Classification

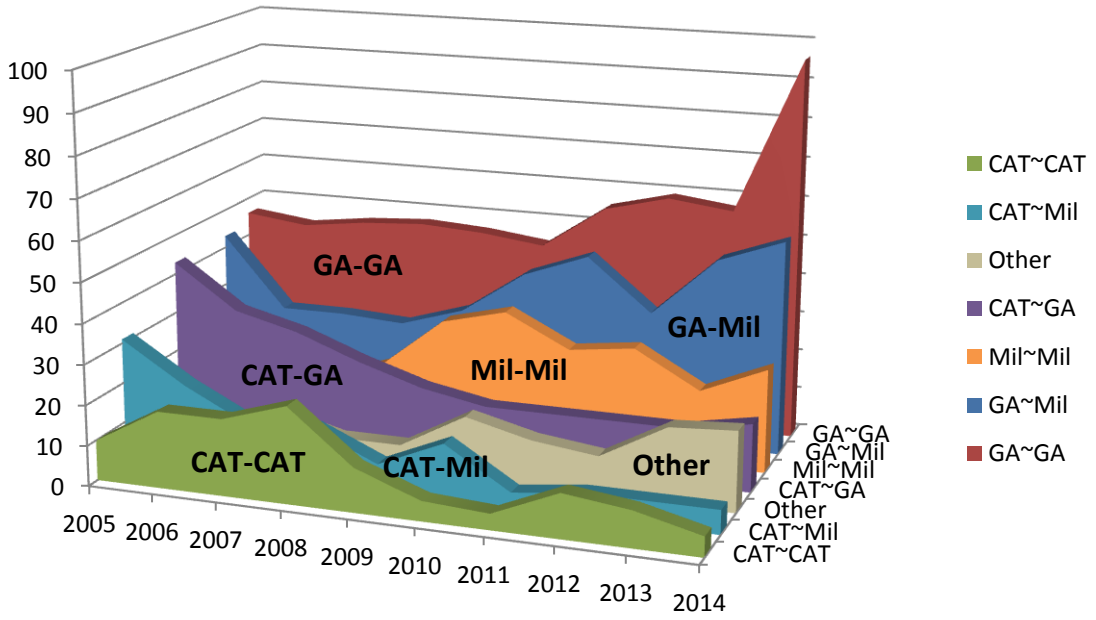

Figure 13. 10-year Total Airprox Trends by Flight Classification

The following observations are pertinent:

- **CAT**: After a marked increase in 2012, CAT-CAT incidents have continued their shallow decline; CAT-Mil incidents remain steady; and CAT-GA incidents also remain steady, but at about 3 times the rate of CAT-CAT and CAT-Mil.

- **Mil**: Notwithstanding an increase in 2014 over 2013's figures, Mil-Mil incidents continue to show an overall decreasing trend over the last 5 years, probably reflecting reduced military aircraft numbers and the introduction of CADS[6] (the military's internal flight notification and coordination system). In contrast, Mil-GA incidents show a noticeably increasing trend in recent years. It is worthy of note that this increasing trend might have been even higher but for the greatly reduced Tutor[7] and VGS glider flying in recent years due to their respective groundings. For both Mil-Mil and Mil-GA, the step increase in 2009 can probably be attributed to the introduction of mandatory military reporting of Airprox following the formal embodiment of ASIMS[8] within the military safety management system.

- **GA**: GA-GA incidents nearly doubled in 2014 compared to 2013. When aggregated with the also increasing GA-Mil figure, GA incidents have

[6] CADS – Centralised Aviation Data Service.
[7] Historically, Tutors account for 20-25% of military Airprox – much of the 'wedge' reduction in 2012 incidents can probably be accounted for by the limited amount of Tutor flying during the last 4 months of 2012 due to propeller issues, and their phased return to flying in the later part of 2013.
[8] ASIMS – Air Safety Information and Management System.

increased by 50% overall compared to 2013. However, caution needs to be exercised in reflecting further on these trends; they may simply show greater willingness to report rather than intrinsically indicating increasing risk or frequency of Airprox in themselves. Nevertheless, such a marked increase seems intuitively to indicate an underlying issue, rather than simply the result of more reporting.

Analysis by Airspace

Figure 14 shows the spread of 2014 Airprox occurrences by Airspace involvement. Reflecting the fact that the majority of Airprox involve GA and Mil aircraft, it is no surprise that most Airprox occur in Class G airspace where see-and-avoid provides the main mitigation (153 incidents (68%) when low-flying areas are included in the Class G numbers). Disappointingly, (but in line with historical trends), the second largest group again occurred within ATZ/MATZ (49 incidents, almost 22%). It might be expected that aircraft would be at their most predictable (and therefore avoidable) within ATZ/MATZ given that there are well-defined rules and procedures within these zones aimed at reducing the risk. However, as ever, rules and procedures are only effective if they are complied with: that this is evidently not the case bears further thought.

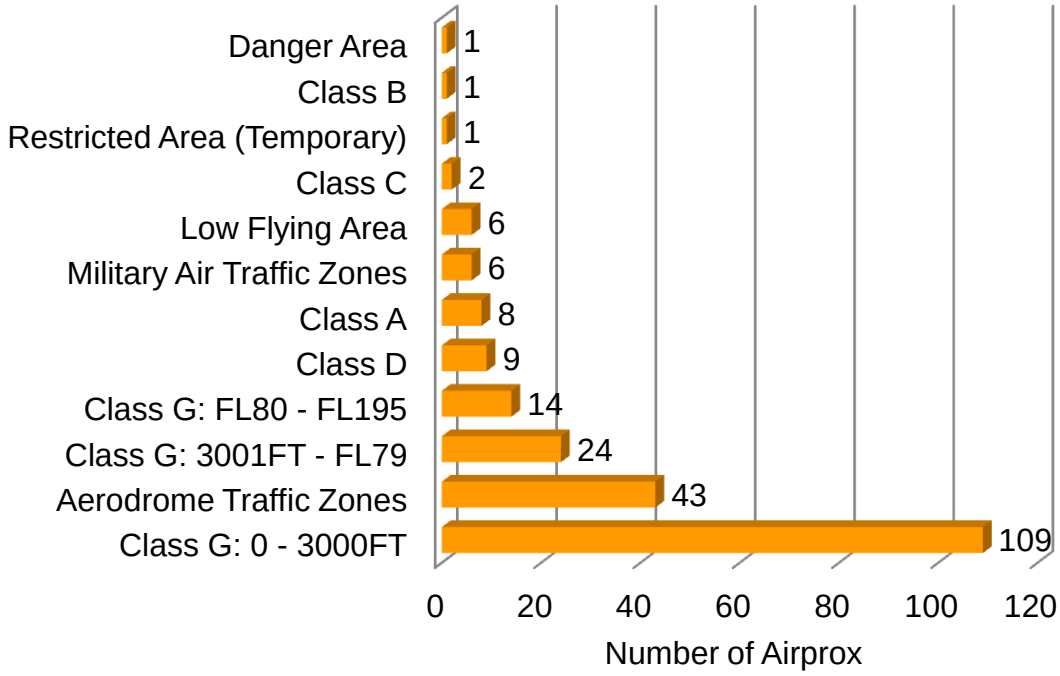

Figure 14. 2014 Airprox by Airspace Involvement

Top Ten Airprox Causes

Figure 15 shows the overall top-10 Airprox causes for 2014, along with the associated risk distributions for each. Again, given that the majority of 2014 Airprox occurred in Class G see-and-avoid airspace, it is unsurprising that 'Did not see traffic / late sighting' features as the primary, and most risky, cause of Airprox given that lookout is the primary barrier for collision avoidance in this environment. The statistics lend weight to arguments for aids to pilot lookout

and traffic awareness as a primary means of avoiding mid-air collisions; be they electronic or visual conspicuity, lookout training, ATC Traffic Information or simply ensuring that someone in the cockpit is looking out at all times. It is disappointing that the next two most prominent causes are 'Flew to close / failure to separate' and 'Did not obey instructions / procedures' given that these two cause groupings are entirely down to pilot and controller adherence to procedures and protocols.

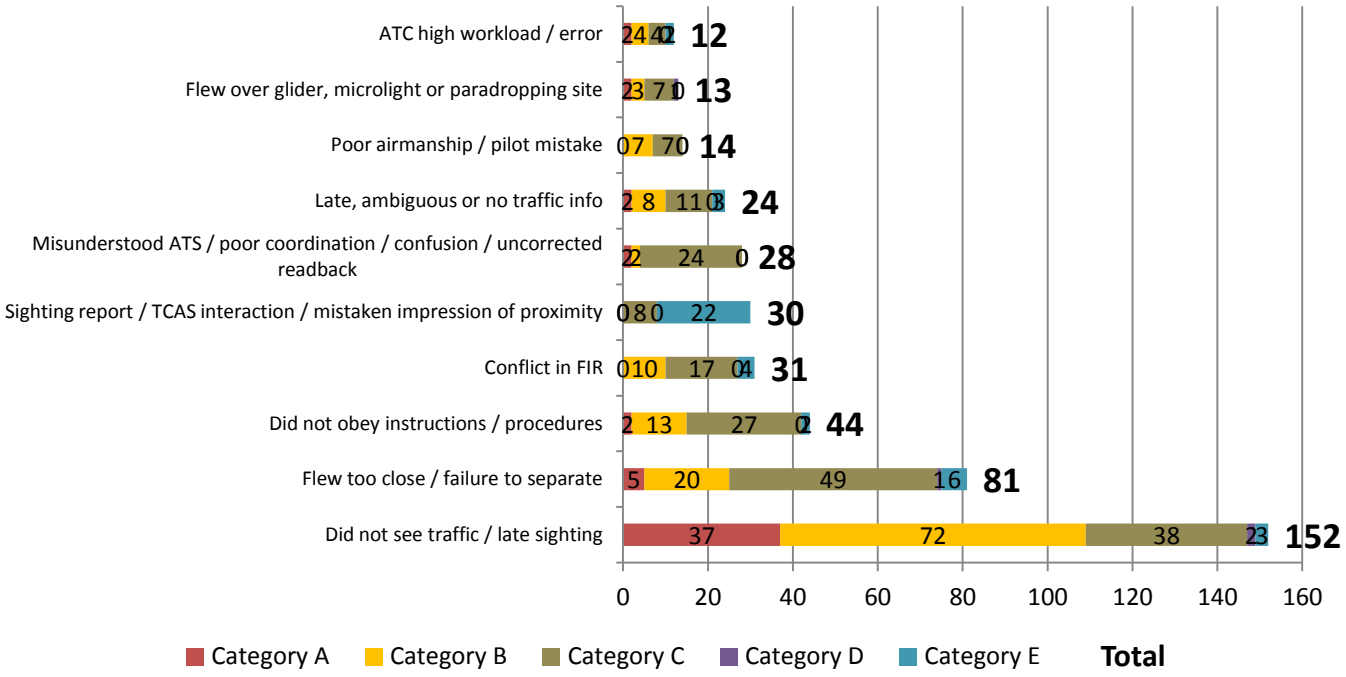

Figure 15. 2014 Top-10 Airprox Causes with Associated Risk Breakdowns

Airprox Themes

Reflecting the causes above, the themes below represent a distillation of the Board's discussions and are based on a qualitative, subjective review of the underlying incidents. Many of these are recurring issues that have also been identified in previous reports. Only the main themes are included, and these are presented broadly in order of frequency of their occurring during the Board's discussions. This gives some idea of the relative importance of each theme but does not bear analytical scrutiny because many Airprox involve multiple discussion themes. Encompassing all of these themes, Board debates consistently returned to the need for pilots to be taught how to look out (vital in a see-and-avoid environment but for which there is surprisingly little time spent in training PPL students either in the physiology of the eye or how to effectively look out); to have consideration for other aviators; and to properly prepare for their flights. Underpinning all of this, 'Airmanship' remains a somewhat elusive quality intended to convey a measure of understanding, experience, or, more succinctly, aviation 'common-sense' gained from: exposure to the experiences and sage advice of other aviators; properly thinking about and understanding the application of rules, procedures and airspace; and a healthy dose of self-preservation. In that vein, healthy debate around Airprox causal themes is one way of adding to an aviator's store of 'Airmanship'. Available to foster such

feedback and debate, all Airprox reports since 2010 are now accessible from the UKAB website (www.airproxboard.org.uk), as are copies of the 2013, 2014 and 2015 annual Airprox Magazines which are largely focussed on GA operations (also available for access from the CAA's CluedUp magazine archive http://edition.pagesuite-professional.co.uk//launch.aspx?eid=60b7eab6-10a1-41e3-b6c2-c0ddb0ff0284).

- **Visual Circuit.** It seems that there is much to be done to educate pilots in basic circuit procedures and consideration for others when flying in or near to ATZs. Flying in the circuit should be one of the most regimented and predictable of activities that a pilot conducts yet we saw all sorts of *ad hoc* profiles and much 'pressing-on' when situational awareness (SA) had not been achieved. All of which was often exacerbated by a seeming unwillingness to use the radio properly, clearly and in a timely manner in order to clarify and coordinate with other aircraft or controllers. Particular problems were: poor SA when joining, operating within, or departing the visual circuit; failing to follow standard joining procedures; joining the circuit downwind, crosswind or base leg rather than from an overhead join when the circuit was busy; failing to clearly pass intentions; poor integration, sequencing or separation with other aircraft already in the circuit; a general lack of regard to those already within the visual and instrument patterns; becoming task-focussed to the detriment of lookout; assumption of 'protection' when within an ATZ; and incurious pilots not questioning unclear instructions or seeking further clarification.

- **Lookout**. As might be expected in predominantly see-and-avoid Class G airspace where the well-known failings of the human eye have to be compensated for by pro-active lookout (especially in detecting objects with little relative movement), late/non-sighting featured in the majority of incidents. This again highlighted the point that, even in good VMC, great attention and appropriate prioritisation needs to be given to visual lookout over other in-cockpit tasks. The fact that there were a number of incidents where aircraft turned into conflict (and sometimes even towards aircraft on which they had been given Traffic Information), suggests that lookout techniques could be usefully emphasised. Allied to lookout, not requesting a Traffic Service when conditions militated otherwise was also a factor in many Airprox.

- **Inaction.** This theme encompasses those situations when either ATC provided Traffic Information but the pilot did not act upon it, or when a pilot sighted another aircraft that was required to give way to him and assumed that its pilot had also seen him and would avoid. Assumption of right of way or that the other pilot has seen you is a flawed mind-set: even if not technically required to give way, positively responding at an early stage to developing conflict situations as soon as they are detected (for self-preservation reasons if nothing else) might easily have resolved many conflicts where pilots' inaction or acceptance of a close miss-distance meant that aircraft came into proximity when they didn't need to. Interestingly, studies have shown that pilots tend to prefer avoiding other

aircraft in the horizontal plane, whilst ATC tend to separate aircraft by applying a vertical avoiding manoeuvre.

- **Understanding and Knowledge.** There were a disappointing number of Airprox demonstrating poor pilot understanding of UK FIS (especially amongst foreign pilots). In particular: selecting an inappropriate ATS for the flight conditions or activity; assumed protection from other aircraft whilst in receipt of an ATS; and pilots' lack of understanding of their continued collision avoidance responsibilities when in receipt of an ATS (even when IMC). Anecdotally, much of the confusion surrounding UK FIS comes from its nomenclature; the word 'Service' within Basic Service, Traffic Service, Deconfliction Service and Procedural Service all lend the impression that ATC will be 'looking after' the pilot through a 'service' that includes radar surveillance. That this is not so is fundamental within their definitions, but often not appreciated by many inexperienced pilots. Other problems that recurred in Board discussions included: insufficient or incomplete Traffic Information; poor adherence to procedures (see the visual circuit theme in particular); conducting IFR training outside ATS coverage but in intermittent IMC; poor knowledge of others' aviation requirements and operating modes (specifically, gliders, parachuting, microlights, hang-gliders etc); poor awareness and consideration for glider/microlight sites, winch-launching and glider towing; soaring in areas of intensive air activity or airfield approach lanes due to lack of knowledge and appreciation of procedures; and poor pilot awareness of IFR procedures and associated holds/routing that might be affected by their own VFR operations.

- **Courtesy and Consideration**: The perception of 'how close is close?' varies with aircraft classes and individual pilots; however, all aviators should be considerate of other airspace users and not assume that others have the same risk appetite as they. Moreover, it is clearly not possible to know the mindset or experience of other aviators when one encounters them in the air, and so a healthy dose of caution is required to keep out of others' way. Particular problems were: assumption of right of way; poor judgement of separation with other aircraft (especially in the circuit); failure to follow procedures; sub-optimal ATC control or coordination; overtaking too close; indecision, uncertainty, poor anticipation or inaction in busy airspace; poor cooperation or information flow; *laissez faire*, self-interest and pressing-on without knowing (or seemingly caring) where other aircraft might be flying; poor adherence to procedures and Rules of the Air; failure to avoid known glider sites and para-dropping locations; not considering the consequences of their actions on other aviators; and generally unthinking or casual operations (especially within or around ATZ).

- **Flight Planning.** Inadequate (or lack of) flight planning featured in a number of Airprox, and this was notably exacerbated by a lack of familiarity amongst VFR-only operators about IFR procedures and their implications. Pilots spinning or conducting GH above IFR holds; soaring in approach lanes or the 'feathers' of airfields; and transiting (VFR)

through the overhead of busy commercial airport IFR holds and approach paths were all demonstrations of an apparent lack of knowledge within the GA, glider and micro-light communities of where these approach paths, holds and reporting/navigation points might be located. This is not helped by the fact that there is no consolidated source of such information other than by examining individual approach plates for the airfields concerned; UKAB made a recommendation in this respect to the CAA to seek a consolidated chart showing these locations. Other issues included: poor airspace understanding; poor NOTAM awareness/understanding; poor choice of ATC agency, operating area, routing and waypoints; routing too close to, or through, ATZs, minor strips and glider/microlight/parachuting sites; lack of thoroughness of pre-flight self-briefing; and lack of contingency planning for actions on becoming lost or experiencing other eventualities.

- **R/T**. Poor radio frequency management and ineffective (or lack of) passage of information to ATC meant that some Airprox could have been directly avoided if at least one pilot had passed information to ATC such that they could have provided Traffic Information to the other pilot involved. In this respect, specific issues were: lack of communication of intentions to ATC (and/or other aircraft involved); reluctance for pilots to talk to airfields as they pass close by (where a simple information call would help immensely but it seems that pilots are fearful that once in contact they will be 'harassed' by ATC into altering their route or activities); not using the radio to confirm theirs or others' intentions; failure to communicate a change of intentions; poor or casual R/T discipline and failure to use pro-words; undetected incorrect read-backs, or failure to read back instructions; imprecise routing or reporting instructions; interpretation of unclear transmissions based on assumptions or standard routines rather than request a retransmission; clipped, garbled, blocked or simultaneous 'double' transmissions; and failure to clearly and simply articulate intentions or instructions.

- **Technical.** There is no doubt about the value of electronic conspicuity in assisting lookout. However, although knowledge of electronic systems and traffic avoidance equipment is slowly increasing amongst the GA/Mil communities, we still saw many incidents of: poor understanding of TCAS/TAS mechanisation; lack of awareness of own flight vector on other TCAS equipped aircraft; problems with the use of TCAS in mixed VFR/IFR traffic conditions; inappropriately responding to TCAS TAs; and poor understanding of TCAS azimuth unreliability. There were also examples of false expectations or over-reliance on TCAS/TAS; the value of FLARM/P-FLARM in preventing Airprox;[9] the value of SSR Mode S in

[9] Many glider pilots and clubs have voluntarily installed FLARM equipment and a network of ground-based stations is being developed that can display the FLARM tracks via the internet (http://live.glidernet.org). Although not a formally accredited system for use by ATC, the information that can be gleaned from its displays provides very useful, if latent, information that could be used to good effect as an SA builder for controllers. Military units are already considering its utility in identifying areas of intensive activity, and the Board recommended that the CAA should also consider its value.

helping ATC detect anomalies between cleared altitudes and those selected by pilots; and not selecting SSR transponder Mode C/Alt (and therefore negating ATC's ability to separate aircraft by altitude and TCAS/TAS equipment in other aircraft to react). The difficulty in detecting modern gliders by radar has been a constant thread in recent years, and 2014's crop of Airprox again raised the issue of installing light-weight, low-complexity radar reflectors within gliders – the UKAB has urged the BGA to consider their fitment, but to no effect at present. Likewise, although FLARM has gained much acceptance in the gliding community, the use of SSR is still resisted due to cost and power requirements.

- **Supervision.** Lapses in, or absent, supervision played a part in a number of Airprox. These included sub-optimal monitoring, information flow and coordination within and between ATC units; lack of effective supervision (both within ATC and by flying instructors of solo students); reduced capacity of instructors whilst mentoring trainees meaning that they overlooked other priorities; duty pilots/instructors not stepping in to assist or resolve uncertainty in the visual circuit when a student becomes swamped or fails to recognise a developing conflict situation (primarily a military issue where a duty pilot is often positioned in the tower during *ab initio* student flying periods); and flying instructors allowing their students to undertake solo training sorties either when conditions might not be wholly suitable, or when they were not fully briefed on possible contingencies.

Helios Class G Airprox Report Analysis.

Lastly with respect to Airprox themes and causes, a study was commissioned in 2014 by the CAA to conduct a full analysis of all Airprox reports occurring in Class G airspace from 2000-2013. Conducted by a Helios consultancy team, the resulting report reviewed specific contributory risk factors that increase the likelihood of a mid-air collision (MAC) within Class G airspace, and can be viewed at the link at footnote.[10] The report broadly confirmed the annual analysis conducted by the UKAB, and recognised the top three overall most frequent causes of Airprox in Class G airspace over the 13 years as: scan (i.e. lookout); inaction; and poor situational awareness. The 5 most prevalent contributory factors for each of the main user groups are depicted in Table 6 below. The percentages relate to the proportion of the individual user groups' total contributory factors.

GA	Military	CAT
Scan (20.4%)	Scan (20%)	Scan (16.1%)
Airmanship (7.7%)	Low-flying (7.4%)	Situational Awareness (9.6%)
Conflict Geometry (6.9%)	Situational Awareness (6.4%)	Conflict Assessment (9.1%)
Situational Awareness (6.8%)	Conflict Geometry (6.3%)	Visibility (5.7%)
Navigation (3%)	Airmanship (4.6%)	Conflict Geometry (5.2%)

Table 6. Class G Top-5 Contributory Factors by Flight Classification 2000-2013

[10] http://www.airproxboard.org.uk/docs/423/20150107%20-%20Class%20G%20airprox%20reports%20analysis.pdf.

COMMERCIAL AIR TRANSPORT

CAT Airprox by Airspace

Figure 16 shows the breakdown of CAT Airprox by airspace type. Of the 31 Airprox involving CAT: 6 occurred in Class A, IFR-only, controlled airspace; 8 occurred in Class B/C/D, mixed IFR/VFR, controlled airspace; and 15 occurred in Class G uncontrolled airspace. The latter figure reinforces the need for commercial companies to conduct a thorough risk assessment before operating CAT outside controlled airspace.

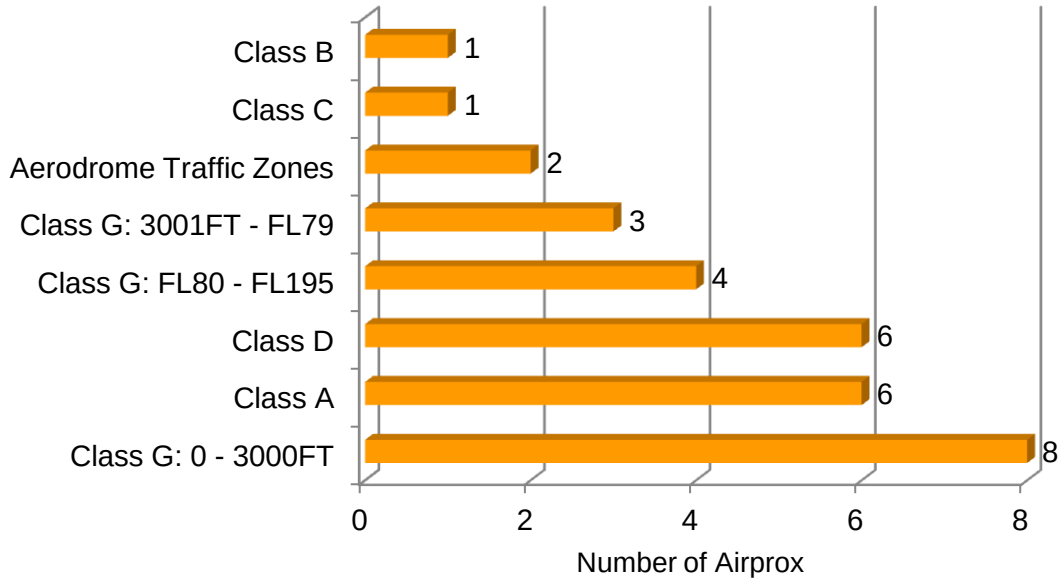

Figure 16. 2014 CAT Airprox by Airspace Involvement

CAT Risk Distribution

Table 7 and Figure 17 show the 10-year CAT Airprox totals and associated risk distributions. The overall trend appears to be reasonably flat in the 6 years since 2009 with circa 30-35 CAT Airprox total per year; this is about half the rate of the prior 4 years (2005 to 2008). That being said, the CAT risk-bearing trend appears to be increasing in the last few years – in 2014, 6 incidents (19% of the CAT total) were risk-bearing; these were:

- 2014076 – Category A: L410 vs Mini Nimbus Sailplane in Class G.
- 2014117 – Category A: A320 vs UAV at LHR in Class A.
- 2014051 – Category B: B737 vs B737 at LBA in Class D.
- 2014056 – Category B: B757 vs ATP in Class A.
- 2014188 – Category B: B737 vs PA28 at Liverpool in Class D.
- 2014194 – Category B: AW139 helo vs UAV at Norwich in Class D.

Details of these Airprox can be found in the 2014 Airprox catalogue at the end of this report, and on the UKAB website at www.airproxboard.org.uk. Of note, 5 of the 6 risk-bearing CAT Airprox occurred in controlled airspace, 2 of which were against RPAS/UAVs.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CAT Risk A	1	0	0	0	0	0	0	1	1	2
CAT Risk B	7	6	5	2	1	0	1	0	3	4
CAT Risk C	78	68	60	58	33	33	18	23	14	15
CAT Risk D	1	0	0	1	1	2	0	4	3	2
CAT Risk E	0	0	0	0	0	0	3	7	12	8
CAT Total	87	74	65	61	35	35	22	35	33	31

Table 7. 10-year CAT Airprox Statistics by Risk Classification

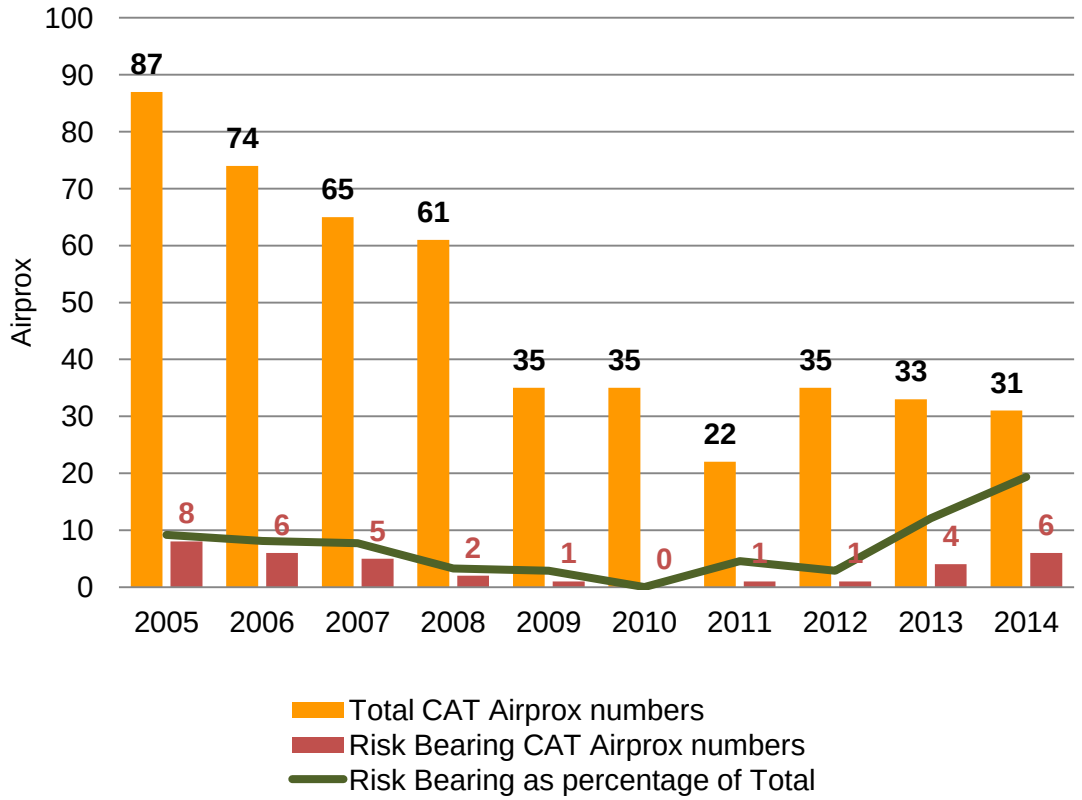

Figure 17. 2014 CAT Airprox Risk Bearing Distribution

CAT Airprox Rates

Table 8, along with Figures 18 and 19, further illustrate the CAT Airprox risk distributions and rates over the last 10 years. The trend for overall numbers of CAT Airprox per million flying hours (mfh) remains stabilised in the region of 20/mfh over the last 6 years. In contrast, the number of risk-bearing Airprox per mfh rose again this year to 4/mfh. Prior to 2013, this rate had decreased to a steady ~1/mfh. Similar to other Airprox analysis, it should be noted that, statistically, the numbers for CAT Airprox are especially small and so care must be taken in attempting to identify trends. However, even bearing this in mind, it is evident that 2013's and 2014's risk-bearing rates show a trending return to pre-2008 levels. In examining this increasing trend, it is informative to note that 2 of the 2014 risk-bearing events were against drones/UAVs; this has elevated the statistics compared to 2013, and may be an indicator of a potentially emerging future risk to CAT as drones become increasingly popular.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total CAT Airprox	87	74	65	61	35	35	22	35	33	31
Risk Bearing CAT Airprox	8	6	5	2	1	0	1	1	4	6
CAT Hours x 10K	154.6	160.3	162.0	163.5	149.4	141.6	147.1	145.4	149.0	151.5
Total per Million hrs	56	46	40	37	23	25	15	24	22	20
Risk Bearing per Million hrs	5	4	3	1	1	0	1	1	3	4

Table 8. 10-year CAT Airprox Statistics versus CAT hours flown

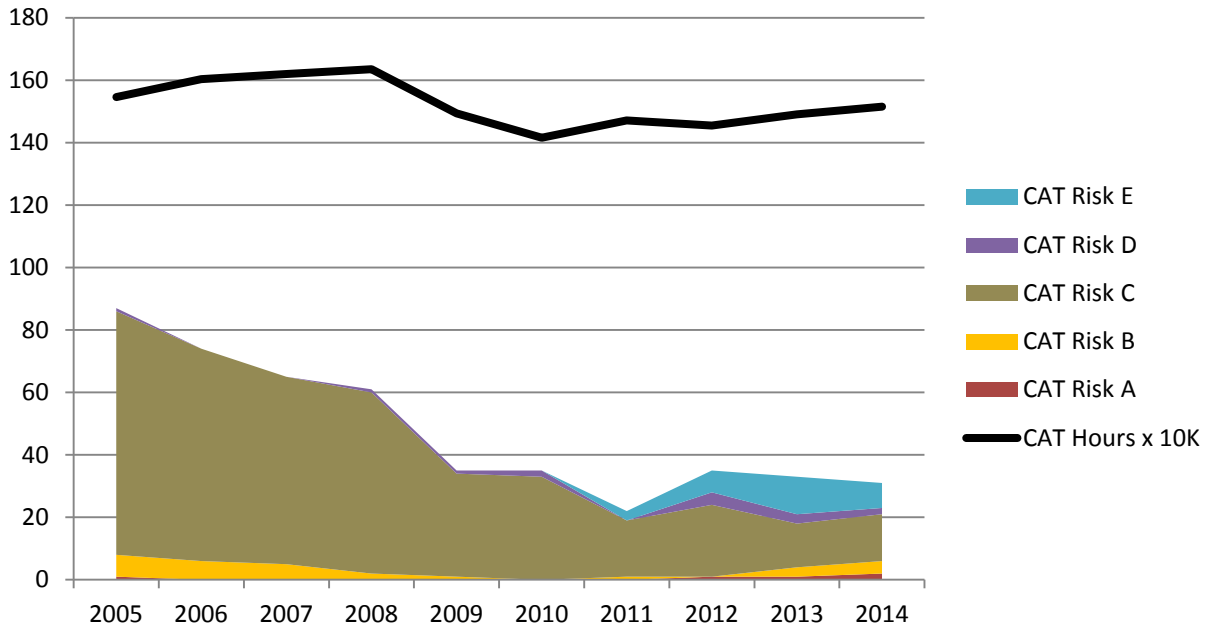

Figure 18. 10-year CAT Airprox Risk Distribution vs CAT hours

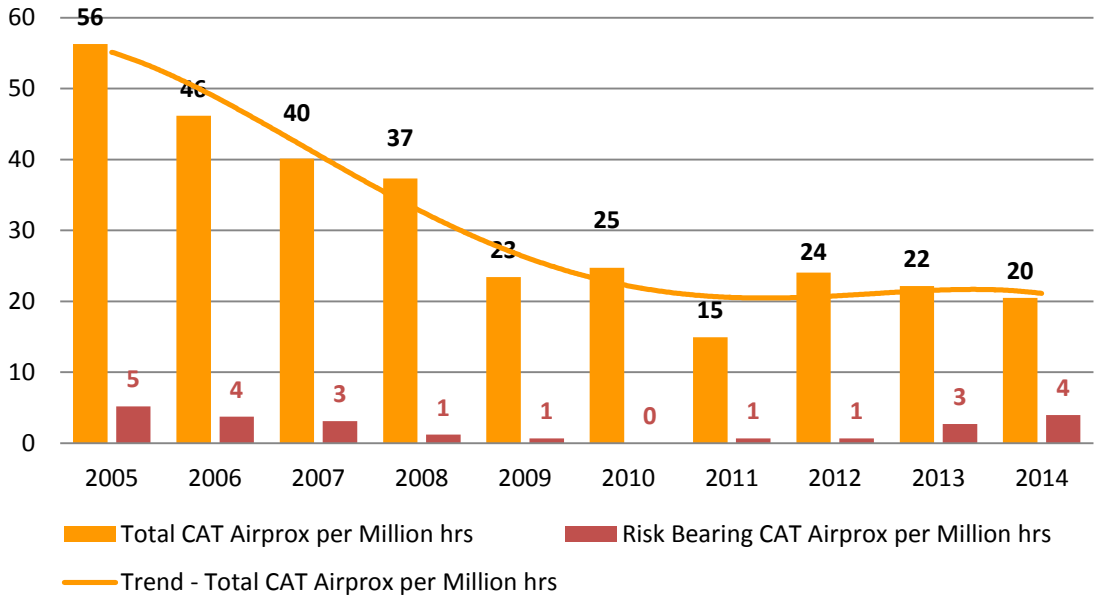

Figure 19. 10-year CAT Airprox Rates per Million Flying Hours

CAT Causal Factors

Airprox rarely occur because of a single reason; there are often several contributory causal factors relevant to each. Nevertheless, within the Airprox assessment process, a single 'cause' statement can often be useful in focusing attention on what was the top-level reason that the Airprox occurred. The list at Table 9 and Figure 20 represents the 10 most commonly assigned causes for CAT in 2014.

Serial	Cause	Totals
1	Not obeying ATC / poor airmanship / pilot mistake	16
2	ATC did not adequately separate traffic, or late / no TI	14
3	Lack of / breach of ATC coordination	8
4	High Controller workload / distraction / inadequate supervision	6
5	Sighting report / TCAS / FIR conflict	6
7	Ambiguous / misunderstood ATC instructions or degraded comms	5
8	Failure to see conflicting traffic / late sighting	5
9	Mistaken impression of loss of separation	5
10	Other cause / unknown	4

Table 9. 2014 CAT Top-10 Airprox Causal Factors

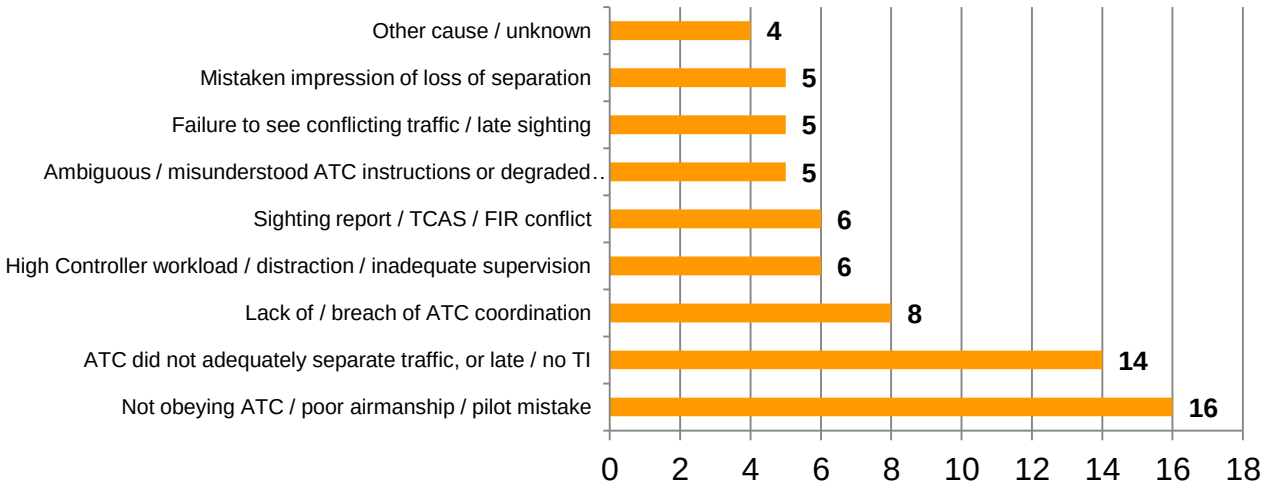

Figure 20. 2014 CAT Top-10 Airprox Causal Factors

'Not obeying ATC / poor airmanship / pilot mistake' is a catch-all for a number of factors including *inter alia* inadequate avoiding action, flying too close to other aircraft, faulty/incorrect transponder operations, penetration of CAS/ATZ without clearance, poor airmanship, and 'flight causing ATC concern'. That is not to say that CAT pilots were necessarily the perpetrators of the causes, often it was the other pilot concerned who had the cause attributed to them rather than the CAT pilot. This year again saw a number of 'Sighting Report / TCAS' categorizations that were largely benign in terms of actual collision risk but represented an important issue regarding mandatory avoiding actions by CAT

crews on receipt of some TCAS Resolution Alerts (RA). These Airprox were often encounters in Class G or D airspace where CAT crews were concerned by the TCAS-reported Traffic Alert (TA) proximity of other aircraft, or responded to a TCAS RA. There are lessons for both CAT crews and other aviators: CAT crews need to be aware that the TCAS is mechanised for IFR separation criteria and so will offer alerts and avoidance information based on this despite the fact that there are no set separation criteria against VFR traffic in Class G and D airspace (where pilots are at liberty to fly much closer); as for other aviators, they need to be aware that CAT crews have specific mandatory actions that require them to manoeuvre on receipt of certain TCAS RAs, and should therefore try to give CAT aircraft as wide a berth as possible to avoid triggering 'emergency' manoeuvres caused by them flying close to or pointing their flight vector at CAT aircraft. Figure 21 shows two illustrative representations of the TCAS TA/RA co-altitude trigger envelopes for an airliner at the origin: the first being at 240kts TAS (pattern speed) with an intruder at 100kts TAS (representative GA speed) in the altitude band 1000-2350ft; the second being at 420kts TAS for both aircraft (representative military fast-jet intruder) above FL200.

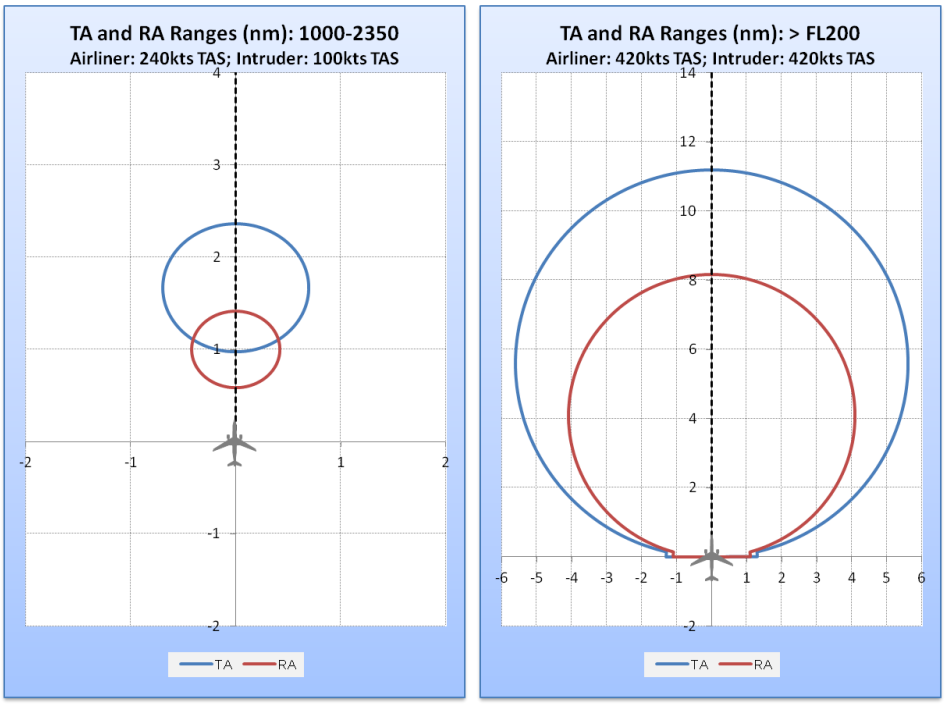

Figure 21. Representative TCAS TA/RA envelopes (note the different scales for each diagram)

GENERAL AVIATION

GA Airprox by Airspace

There were 171 Airprox in 2014 in which at least one aircraft was GA (76% of the total 224). Although this is the highest absolute number of GA Airprox we have seen in the last 10 years, the annual percentage of Airprox that involve GA has remained fairly consistent in the last 10 years at between 61% to 76%. In other words, historically, 2/3 to 3/4 of UK Airprox routinely involve GA, and this reflects the fact that GA represents the majority of flying activity in Class G see-and-avoid airspace. Of the 2014 incidents, the clear majority occur below 3000ft as shown in Figure 22. However, of concern, the second most common airspace for Airprox is within Aerodrome Traffic Zones which should provide a highly structured and known environment, but still accounts for a significant number of events largely resulting from poor airmanship, situational awareness or lack of consideration for other airspace users. This has doubled compared to 2013 (when there were 16 incidents in ATZ), which may be indicative of either a lack of understanding of ATZ procedures or a casual approach to their application.

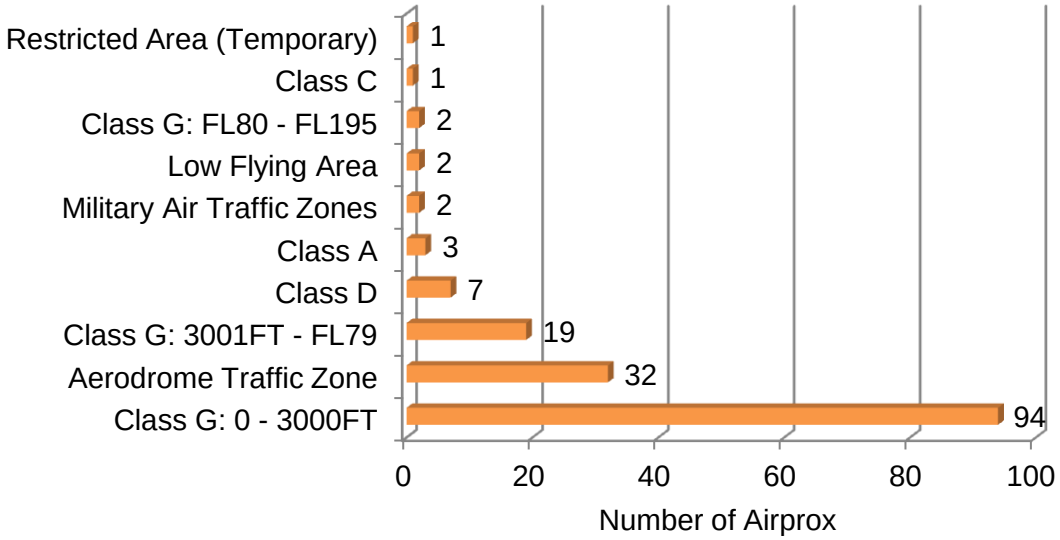

Figure 22. 2014 GA Airprox by Airspace Involvement

GA Risk Distribution

The GA Airprox risk distribution figures at Table 10 show that, in 2014, not only was there an increase in GA Airprox numbers overall but, percentage-wise, more were risk-bearing compared to previous years; Figures 23 and 24 illustrate this graphically. This increasing number of risk-bearing incidents seems to indicate an underlying trend towards more serious encounters. Without extensive Human Factors information it is hard to explain this increase other than to speculate about: the effects of introducing more electronic cockpit displays (with the likely concomitant reduction in lookout); potentially increasing numbers of inexperienced GA pilots (with less capacity to lookout properly) coming into aviation as the UK comes out of recession; or simply more reporting of Airprox as the GA community embraces safety reporting.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
GA Risk A	16	10	8	8	8	5	19	13	18	23
GA Risk B	41	36	30	31	20	25	27	21	34	58
GA Risk C	75	57	65	55	66	70	63	62	53	62
GA Risk D	1	0	0	4	1	2	2	1	2	3
GA Risk E	0	0	0	0	0	0	8	11	18	25
GA Totals	**133**	**103**	**103**	**98**	**95**	**102**	**119**	**108**	**125**	**171**

Table 10. 10-year GA Airprox Statistics by Risk Classification

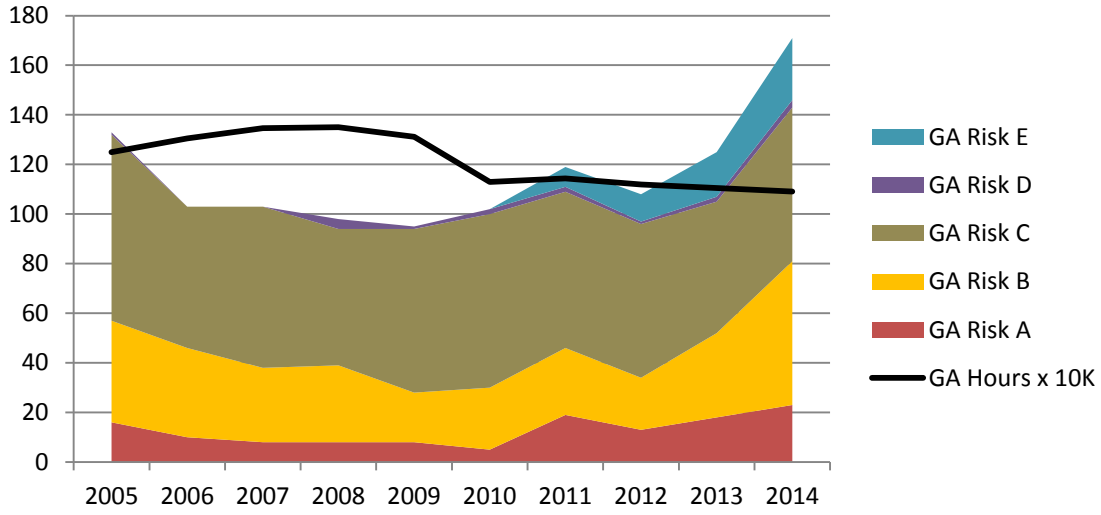

Figure 23. 10-year GA Airprox Risk Distribution and GA hours

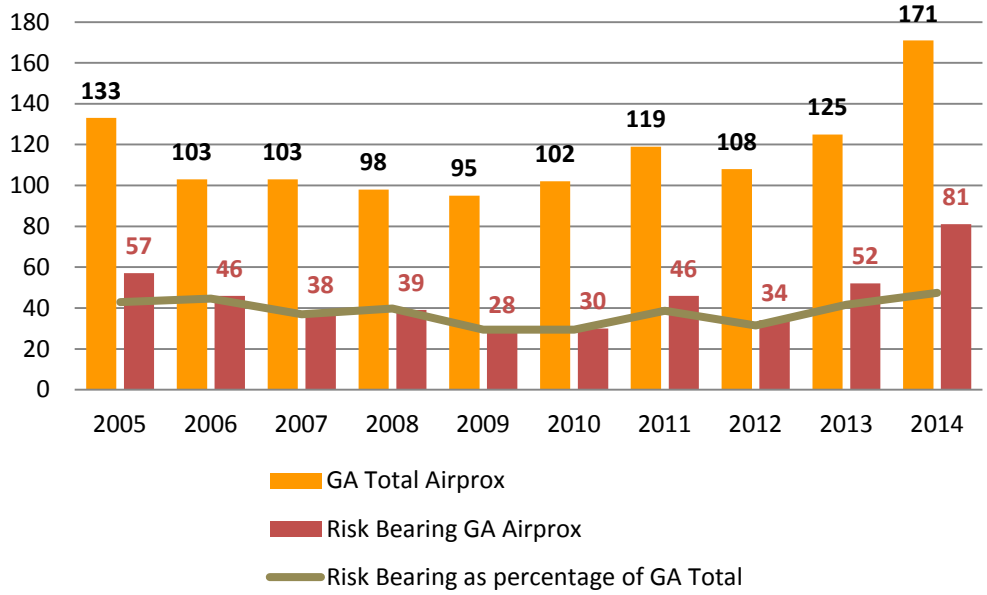

Figure 24. 10-year GA Airprox Risk Bearing Distribution

GA Airprox Rates

In an effort to normalise GA Airprox statistics, Table 11 and Figure 25 show Airprox numbers in relation to hours flown. It is stressed that the statistics for GA hours flown are notoriously hard to estimate given that a significant portion of sports aviation hours are not formally recorded (especially hang-glider, paraglider, para-motor hours etc). Notwithstanding, light-aircraft and glider hours are reported fairly consistently over the years and so headline rates can be used as an indicator. As also reflected in the pure numbers, the normalised statistics (per Million flying hours) show a rising overall rate in recent years. Similarly, the risk-bearing rate per Million flying hours also indicates an increasing trend since 2008 that has now exceeded previous levels.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
GA Total Airprox	133	103	103	98	95	102	119	108	125	171
Risk Bearing GA Airprox	57	46	38	39	28	30	46	34	52	81
GA Hours x 10K	124.9	130.5	134.6	135.1	131.2	113.0	114.4	111.8	110.5	108.3
GA Total per Million hrs	106	79	77	73	72	90	104	97	113	157
GA Risk Bearing per Million hrs	46	35	28	29	21	27	40	30	47	74

Table 11. 10-year GA Airprox Statistics versus GA hours flown

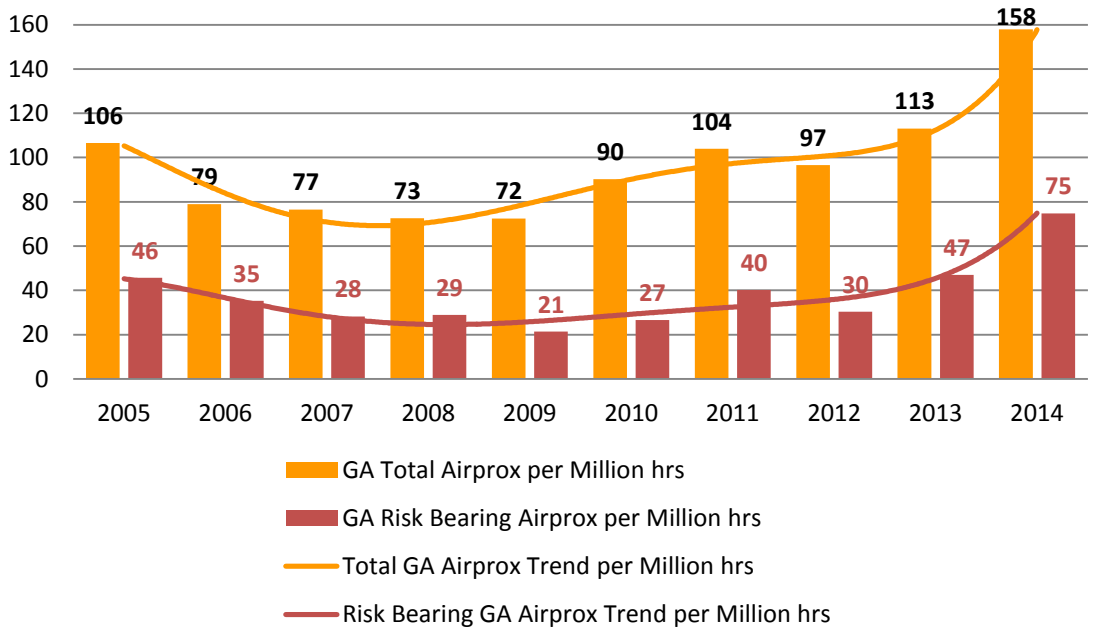

Figure 25. 10-year GA Airprox Rates per Million Flying Hours

GA Causal Factors

Of the 343 causal factors assigned to GA Airprox incidents in 2014 (an Airprox often has more than one causal factor), Table 12 and Figure 26 show the top-ten rankings. The most common cause of 'Did not see traffic/late sighting' featured in 131 incidents and is perhaps to be expected in an environment where see-and-avoid is the primary barrier to Airprox incidents – if the other aircraft is not seen then it cannot be avoided. The 2nd most common cause of 'Flew too close/failure to separate' remains the same as for 2013 and reflects a general concern about poor airmanship, situational awareness or lack of consideration for other airspace users who have been sighted or detected but not properly avoided. The 3rd most common cause 'Did not obey instructions / procedures' perhaps gives a hint at why there were so many Airprox within ATZ in 2014: in 2013 only 10 incidents were attributed to this cause (and it ranked 8th most common cause last year), whereas there were 35 in 2014.

Serial	Cause	Totals
1	Did not see traffic / late sighting	131
2	Flew too close / failure to separate	52
3	Did not obey instructions / procedures	35
4	Conflict in FIR	25
5	Sighting report / TCAS interaction / mistaken impression of proximity	23
6	Late, ambiguous or no traffic info	19
7	Flew over glider, microlight or paradropping site	13
8	Misunderstood ATS / poor coordination / confusion / uncorrected readback	11
9	Poor airmanship / pilot mistake	11
10	ATC high workload	6

Table 12. 2014 GA Top-10 Airprox Causal Factors

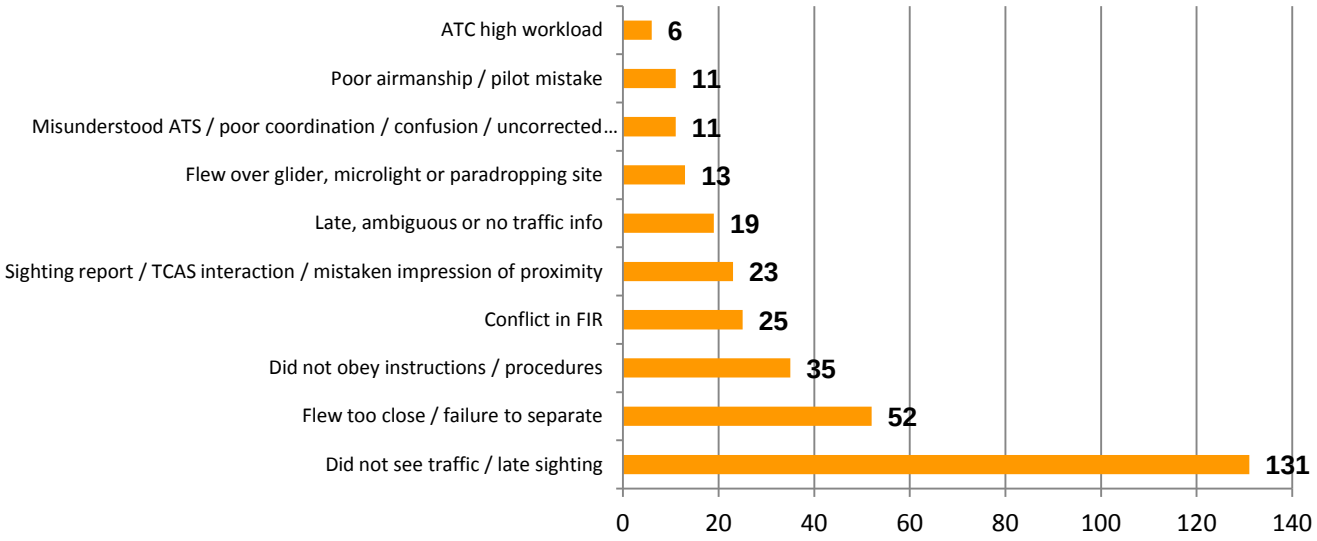

Figure 26. 2014 GA Top-10 Airprox Causal Factors

MILITARY AVIATION

Military Airprox by Airspace

There were 99 Airprox involving the military in 2014. Care should be exercised when making direct comparisons of Airprox rates between classes of aircraft given that military crews have a mandatory requirement to report incidents, whereas the GA community reports on a voluntary basis so there are likely to be a significant number of unreported GA events as a result. Similar though to GA, the majority of military Airprox occur below 3000ft or in low-flying areas, and most of these were interactions with GA. Again common with GA, the 2nd most common airspace for Airprox was in the ATZ/MATZ (21 incidents - 21%). Figure 27 shows the distribution of military Airprox in 2014 by airspace type.

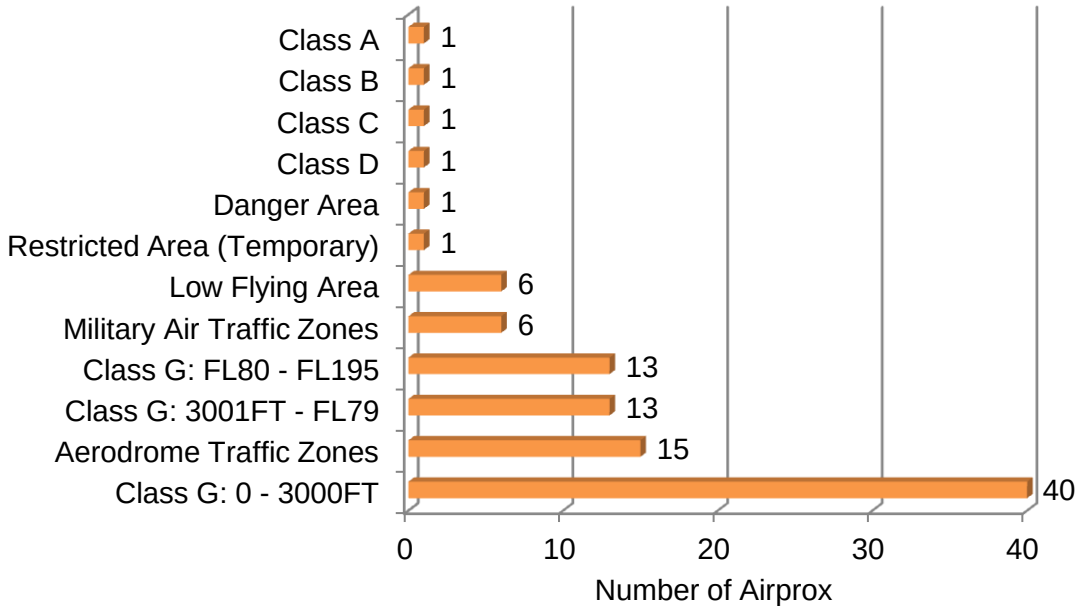

Figure 27. 2014 Military Airprox by Airspace Involvement

Military Risk Distribution

Table 13, Figure 28 and Figure 29 illustrate the military Airprox statistics and risk distribution for the last 10 years. As can be seen, despite only slightly increasing flying hours, in 2014 the pure numbers of military Airprox incidents returned to their previous peak 2010 levels. As predicted in 2013, the return to flying of the Tutor fleet[11] saw increased incidents involving these aircraft in 2014 (19 Airprox) and this was undoubtedly a factor in the return to previous Airprox levels – Tutors have historically accounted for 20-25% of military Airprox. Similarly, the military gliding fleet was also temporarily suspended from flying in 2013-2014, and, at the time of writing, has still to resume operations; we may

[11] After a second propeller failure on 9 Jan 2013, flying was paused for resolution of propeller security issues and subsequent replacement. Following an extended period of non-flying whilst compatibility issues were addressed, a staged return to flight preceded a formal declaration on 20 Dec 13 that full Tutor capability had been regained.

expect even further increases in numbers once they do. Overall, the percentage of military Airprox that were risk-bearing has remained fairly steady at about 30-35% over the last few years.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Mil Risk A	10	7	2	7	8	7	9	8	8	7
Mil Risk B	27	17	15	15	23	18	21	13	20	26
Mil Risk C	48	35	35	34	38	70	44	43	38	43
Mil Risk D	0	1	0	0	1	3	1	0	4	6
Mil Risk E	0	0	0	0	0	0	8	7	12	17
Total	85	60	52	56	70	98	83	71	82	99

Table 13. 10-year Military Airprox Statistics by Risk Classification

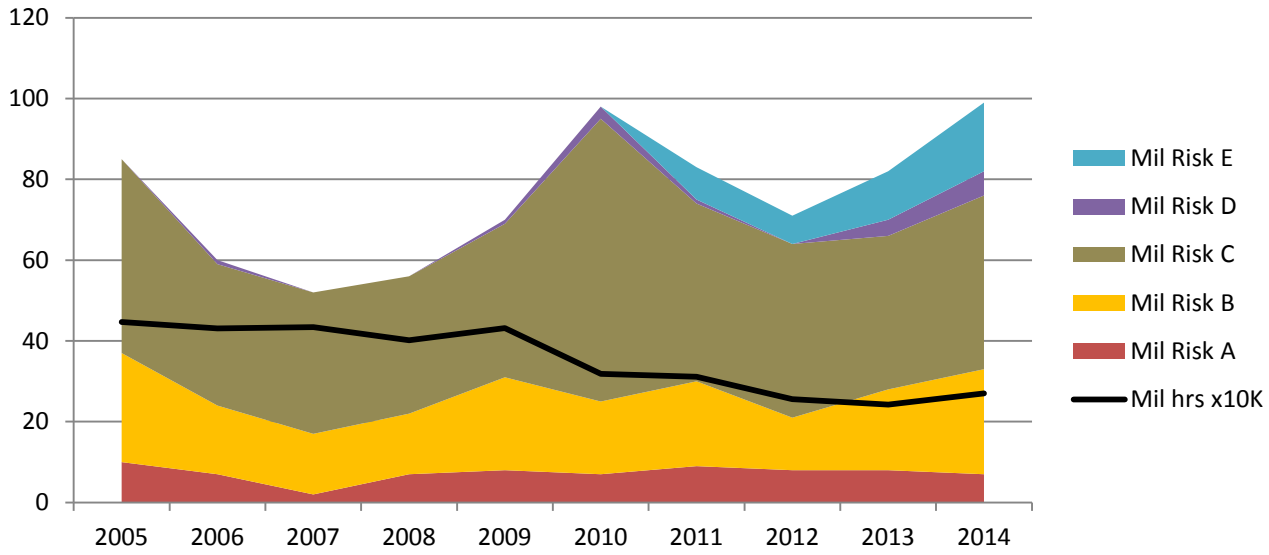

Figure 28. 10-year Military Airprox Risk Distribution and Military hours

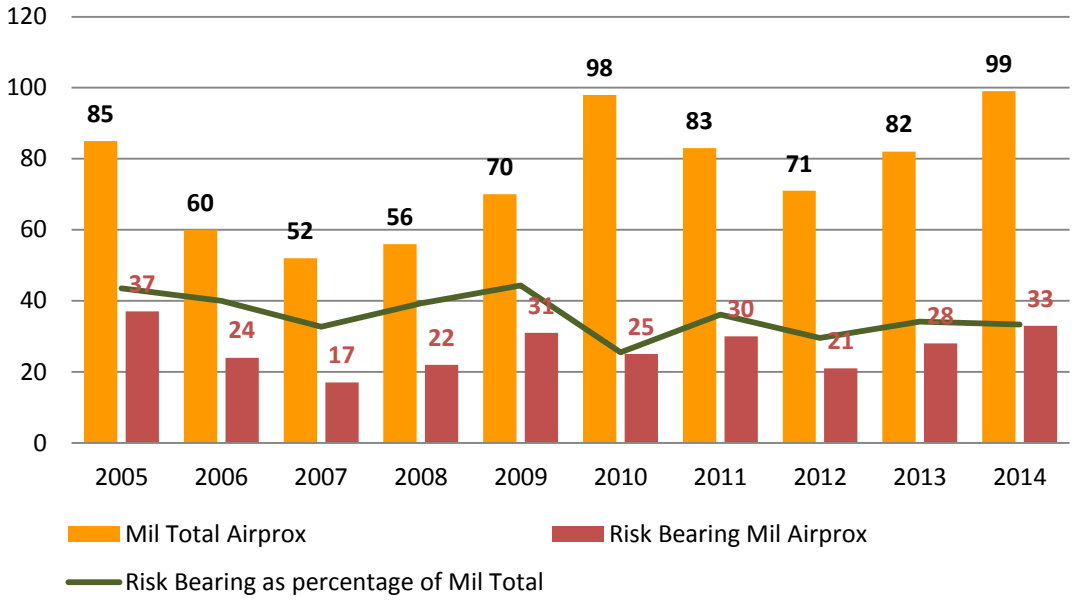

Figure 29. 10-year Military Airprox Risk Bearing Distribution

Military Airprox Rates

Normalising military Airprox figures for flying hours flown[12] indicates that 2014 continued the increasing trend over the last few years as shown in Table 14 and Figure 30. Overall, in 2014, there were 366 Airprox per Million flying hours (mfh), up from 339 in 2013, and compared to an annual average of about 311 over the last 5 years. Similarly, risk-bearing incidents also showed an increase to 122 per mfh (up from 116 in 2013, with an annual average of 99 in the last 5 years). In other words, 2014 saw an increase of about 8% in overall Airprox rates per mfh compared to 2013, and about 5% increase in risk-bearing rates per mfh. The step increase in Airprox rates in 2010 is likely to be accounted for by the introduction of formalised Air Safety Management processes and mandatory Airprox reporting; however, the steady increases since then, and particularly 2013/2014's rise, are harder to explain. They could simply be evidence of increasing confidence in 'Just Culture' reporting processes over the last 5 years; they could genuinely reflect increasing risk in military flying; or 2014 might simply reflect a change in overall sortie profile due to the return of the Tutors to flying, with their predominantly *ab initio* training focus.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total Mil Airprox	85	60	52	56	70	98	83	71	82	99
Risk Bearing Mil Airprox	37	24	17	22	31	25	30	21	28	33
Mil hrs x10K	44.6	43.1	43.4	40.1	43.2	31.8	31.1	25.6	24.2	27.0
Total Mil per Million hrs	190	139	120	140	162	308	266	278	339	366
Risk Bearing Mil per Million hrs	83	56	39	55	72	78	96	82	116	122

Table 14. 10-year Military Airprox Statistics versus Military hours flown

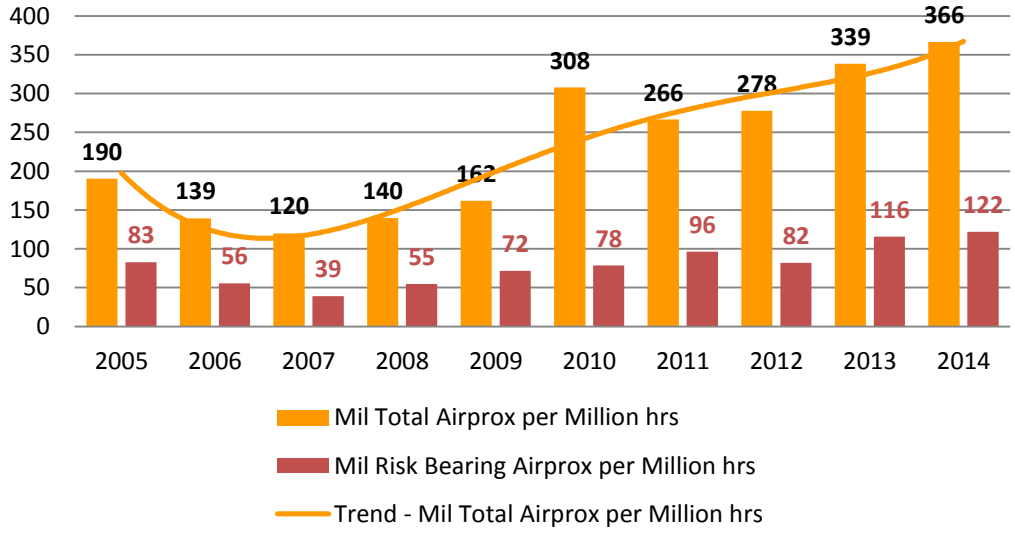

Figure 30. 10-year Military Airprox Rates per Million Flying Hours

[12] UK military flying hours increased slightly in 2014 (about 29,000hrs more in 2014 compared with 2013), of which rotary-wing increased by about 16,000hrs and fixed-wing by about 12,000hrs. These increases are likely attributable to the return of helicopters from operations in Afghanistan to UK, and the return to flying of the Tutor fleet in 2014.

In 2014, the military experienced about twice the GA Airprox rate per mfh. Superficially, it might be tempting to conclude that, hour for hour, military flying is therefore twice as risky as GA flying. However, as previously noted, account must be taken of the fact that military reporting is mandatory compared to GA voluntary, reporting (there may therefore be numerous GA incidents that are not reported whereas all military ones are). Also, paradoxically, the military's focus on lookout training techniques may well also mean that they simply see and report more aircraft than their hobbyist GA counterparts who probably have relatively less proficiency in pro-active scanning techniques. That being said, the routinely higher speeds at which some elements of the military fly may well also pre-dispose them to encounters brought on by reduced time to react in a see-and-avoid environment, as may the effects of terrain screening at low-level.

As with GA, 2014 saw an increase in military Airprox within the visual circuit, often between mixed aircraft types with greatly differing performance characteristics. The military hierarchy is alive to this, and have conducted studies to determine whether the collocation of multi-type aircraft is a factor. In addition, as more military flying is replaced by simulation, there is a concern that 'real life' friction within the circuit environment is not being experienced by pilots in simulators who more often than not are focused towards aircraft-specific recovery and circuit training procedures that may neglect the day-to-day realities of encountering other aircraft in the circuit with either differing performance characteristics or which may do unexpected things at critical times (such as MATZ-crossers, *ab-initio* students in the circuit in training aircraft, or aircraft ignoring the MATZ etc). Simulation needs to provide this wealth of experience in addition to simply rehearsing procedures and emergencies.

A welcome initiative in 2014 was the trial introduction of a VHF low-level common frequency in Scotland. Previously, military aircraft used UHF for communication with other military aircraft, but which was not accessible by civilian VHF-only equipped aircraft. The intention being to provide a means for civil aircraft to gain SA as military aircraft broadcast their intentions, and to enable direct communications, if time permits, to resolve conflictions.

Military Causal Factors

Of the 99 reported Airprox that had military involvement in 2014, 206 cause factors were assigned;[13] Table 15 and Figure 31 show the top-10 causes. Similar to GA, and unsurprising in what is primarily a see-and-avoid operating environment for Class G / Low-level operations, 'Did not see traffic/late sighting/poor lookout' was the most frequent cause. As discussed previously, the routinely higher speeds at which some elements of the military fly may well pre-dispose them to encounters brought on by reduced time to react in a see-and-avoid environment, as may the effects of terrain screening at low-level. In this respect, the planned installation of TCAS to the Tornado fleet in 2015 is a welcome measure; although there will undoubtedly be limitations due to terrain screening at low-level, TCAS will significantly improve situational awareness of other aircraft, especially when outside visual range.

[13] Individual Airprox often have more than one causal factor.

The 2nd most frequent cause was 'Flew too close/failure to separate'. Incidents of this nature involve inadequate avoiding action by pilots, or controllers failing to separate aircraft. For example, on avoiding another aircraft, a fast-jet military crew may ensure that sufficient VFR separation has been achieved, but a commercial crew or GA pilot operating in Class G airspace may be used to greater separation, or more leisurely closure rates, and may file an Airprox as a result of being startled by the unexpected closure or proximity of the fast-jet. In 2014, a number of these incidents also involved aircraft either not sequencing appropriately in the visual circuit, or controllers not applying sufficient separation against conflicting traffic under a radar service.

The 3rd most frequent cause was, disappointingly, 'Did not adhere to procedures / follow instructions.' Self-evidently, Airprox that result from not obeying the rules are wholly avoidable 'own goals' that, in 2014, included penetration of CAS/ATZ without clearance, poor position reporting, and level infringements. Not that all of these incidents occurred because of poor discipline by military pilots, they also include events where the other (often non-military) pilot did not follow procedures or instructions and thereby came close to military aircraft through no fault of the military crews.

Serial	Cause	Totals:
1	Did not see traffic / late sighting / poor lookout	52
2	Flew too close / failure to separate	38
3	Did not adhere to procedures / follow instructions	19
4	Sighting report / TCAS interaction / mistaken perception of separation	16
5	Misunderstood ATS / poor coordination / confusion	16
6	Late, ambiguous or no traffic info	15
7	Conflict in FIR	15
8	Distraction / high workload / kit interpretation or operation error	7
9	Poor airmanship	6
10	Poor U/T supervision or U/T error	2

Table 15. 2014 Military Top-10 Airprox Causal Factors

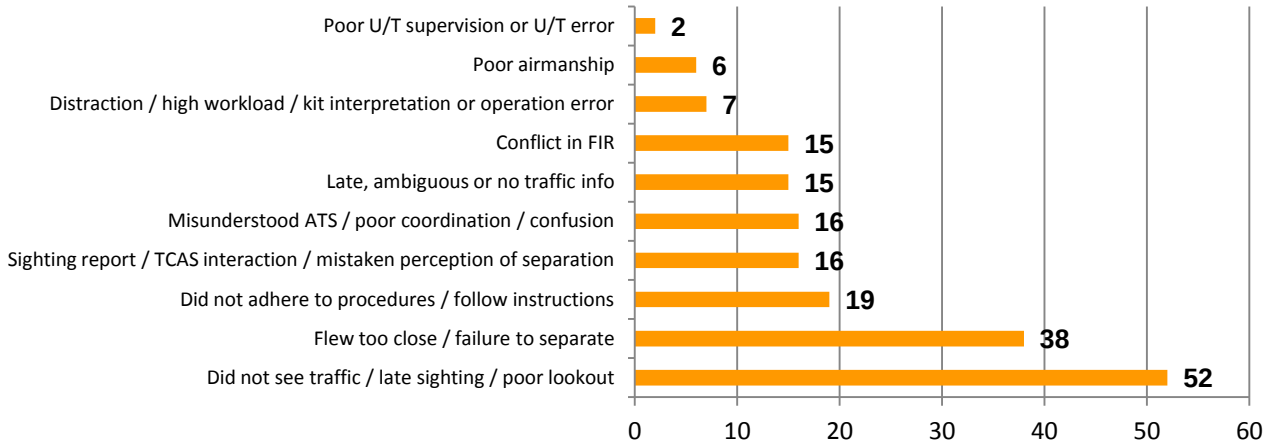

Figure 31. 2014 Military Top-10 Airprox Causal Factors

UKAB 2014 SAFETY RECOMMENDATIONS

Accepted Recommendations

Airprox	Recommendation	Comments
2014006	The BGA reviews the education of glider pilots regarding IFR procedures and operations.	BGA published a news letter and is pursuing access to data which will allow glider pilots to display ILS paths on maps
2014013	The CAA considers use of Instructor Seminars to enhance GA understanding of glider operations.	The CAA will include glider operations in future Instructor Seminars and an article in Clued Up
2014017	HQ Air Command raises awareness of flight vector on generation of other aircraft TCAS RA.	HQ 1Gp ATM produced an article highlighting how the flight vector of a fast-jet ac may generate a warning to the crew of a TCAS-equipped ac. This article was published in Air Clues in the June 2015 Edition
2014021	HQ JHC consider the robustness of RPAS operations / coordination.	Cause identified as human error and airspace coordination measures were robust.
2014025	HQ JHC consider investigating Puma SSR and NATS radar compatibility.	Cause was an ICAO code incorrectly loaded in to the transponder. AI issued to check other transponders. Issue resolved and closed.
2014029	The CAA consider reviewing the charting and definition of 'disused aerodromes' where aerial sporting activity takes place.	The CAA requested that the VFR chart is be amended to indicate that Hibaldstow is an active airfield with an active DZ.
2014034	Arbroath review their notification procedures, including NOTAM issue and coordination with Dundee and RAF Leuchars.	NOTAM procedures have been reviewed and are still extant. Dundee and Leuchars will be contacted to inform them outside of normal routine activity by 662 VGS.
2014038	HQ Air Command considers installation of FLARM on VGS fleets.	The current pause in VGS flying presented the opportunity to review the provision of ACAS on the Viking and Vigilant fleets. Funding lines have been identified for the fitment of FLARM to all Viking and P-FLARM to all Vigilant gliders (the latter having the ability to satisfy the power requirement of the P-FLARM system). A timeline for embodiment is still being developed.
2014043	The CAA considers publishing guidance and information on the meaning and use of priority flights.	The CAA will consider the flight priorities, how associated guidance is presented in MATS Part 1, identify any need to communicate the priorities outside the ATS domain and determine the most appropriate means of undertaking any wider communication to industry.
2014052	1. Air Command consider liaising with CAA to publicise military fast jet behaviours near coast-lines.	The RAF Safety Centre has engaged with the CAA and offered its services to assist in the update of CAA Safety Sense Leaflet 18: Military Low Flying. The update will describe what all users of class G airspace below 2,000ft AGL can expect to see from military fast jets in the vicinity of coastlines around the UK. Furthermore, it includes other common operating protocols of all military fleets to increase understanding within the GA community of military low level operations.
	2. CAA consider the inclusion of Railway Surveys Flights in their PINS review.	CAA PINS review is underway and includes Network Rail

Airprox	Recommendation	Comments
2014059	DA42 Operating Company consider reviewing use of IF screens.	The report was reviewed by their Safety Action Group and recommendation was accepted. A proposal was put to the CAA to use the 'foggles' instead of screens. Working in conjunction with Licensing Standards Inspector and the CAA Chief Examiner, an amendment has appeared in CAA SRG Standards Document 1 to enable them to introduce them.
2014063	1. MoD and CAA investigate use of FLARM displays to aid SA in ATC.	MOD - HQ Air Command Air Traffic Management (ATM) Force Command (FC) is currently monitoring the trial of FLARM-derived information to mil units. Individual unit commanders have been empowered to decide exactly where this information resides according to specific local requirements though it is envisaged that, for the most part, it is likely to be available in sqn operations rooms or similar environments. For those units that include FLARM-derived information in an ATC environment the ATM FC is preparing draft guidelines for its use. Furthermore, the benefits of using FLARM-derived information will be promoted to the mil flying and ATC communities through individual Group safety organisations. RAF Linton-on Ouse is currently one of the most advanced units on the integration of FLARM-derived information and ATM FC visited this unit at the end of March in order to identify possible pitfalls and areas of best practice.
	2. RAF Benson conducts coordination with local airspace users.	RAF Benson have instituted a comprehensive engagement plan with local airspace users
2014074	The CAA consider reviewing the use of the word 'crosswind' for both joining the visual circuit and visual circuit position.	The CAA has reviewed the use of the term "crosswind" and accept that there is a possibility for confusion. Whilst they are unwillingly to change the adopted terminology for fear of introducing further ambiguity they will consider how to address the issue, possibly by enhancing the CAP413 circuit diagrams.
2014090	The CAA investigate the use of the phrase 'minimum fuel' and its application.	The CAA will consider how to further align MATS Part 1 and CAP413 in-flight fuel management content with ICAO Doc 4444 PANS-ATM text, and will also raise awareness of the term 'minimum fuel' within the industry as part of its general safety awareness activities.
2014100	Goodwood reviews the procedures for high traffic density events.	RS spoke with Rob Wildeboer 27/1/15. Meetings arranged with ATC, and procedures being reviewed, expect formal response in the next few weeks. 27 Mar 15: Changes to procedures received, largely strengthening the guidance on routing and making fixed wing and rotary circuit heights and routes clearer. They have chosen not to use an Air Traffic Controller.
2014103	Oxford reviews the Letter of Agreement with BZN and their MATS Part 2, in light of their recent radar installation.	The revised MATS 2 more clearly reflects the current procedures in use. Also, on the 12th Aug, I hope to meet with representatives from all sectors to discuss the most appropriate procedures applicable to Oxford a/c joining and leaving CTR.

Airprox	Recommendation	Comments
2014120	The CAA and HQ Air Command review the utility of hosting PINS on CADS	CAA did not see this as their issue and deferred a response to HQ Air Command. PINS routings are now depicted on CADS. This has also been dictated by the CAA as part of their agreement for PINS operators to be granted a licence to operate. This now allows accurate detailed planned routings for deconfliction rather than relying solely on the very broad NOTAM. Alongside CADS, the 'Y' NOTAM is still issued on receipt of information from PINS Operators as CADS is not assured for the generation of Aeronautical Information. With the 'Y' Series NOTAM cessation pending this is likely to migrate to a 'H' Series issued by AIS, but requires agreement from NATS.
2014121	The MAA review the provision of Aerodrome Control Service at military airfields	MAA carried out review and does not wish to adopt Aerodrome Control Service. Units were directed to review visual circuit procedures and enforce compliance.
2014133	GASCo consider ways of improving pilot's understanding of RMZs.	GASCo have included educational pieces about RMZs in their Safety Evening presentations.
2014159	Dundee considers reviewing their departure and arrival procedures and phraseology to ensure traffic deconfliction.	Local procedures amended in AIP.
2014167	HQ Air Command reviews GA education with regard to flow arrows.	A similar UKAB recommendation in Airprox Report 2013065 requested that the 'CAA review the education of GA pilots to improve understanding of the implications of military low flying 'flow arrows''. The response provided to the UKAB from the CAA indicates that 'military low-flying arrows are only depicted on military low-flying charts and are therefore not available to the general public'. This is incorrect as the UK AIP details military flow arrows within section ENR 6. The information contained within the UK Military Low Flying Handbook (UKMLFHB) is accessible for inclusion in civilian publications and charts if required. The RAF Safety Centre has engaged with the CAA and offered its services to assist in the update of CAA Safety Sense Leaflet 18: Military Low Flying and is still awaiting a response from the CAA.
2014207	GASCo educate GA on TCAS envelopes and the implication of flight vectors.	GASCo have included educational pieces about TCAS envelopes and flight vector considerations in their Safety Evening presentations.

Partially Accepted Recommendations

Airprox	Recommendation	Comments
2014016	The CAA considers reviewing the criteria for deconfliction minima under a Deconfliction Service.	CAA considers that the key issue is ATCO and unit management understanding of the intent (which is the requirement to attempt to achieve the deconfliction minima), but that, due to the nature of the environment, it will not always be possible to achieve. Consequently, they will remind controllers of this and point out that in some circumstances it may be better to provide the DS, with its limitations, than to defer to a Traffic Service. .
2014040	BGA consider reviewing the feasibility of fitting radar reflectors in gliders.	The BGA sought a review of any technical assessment that had informed the recommendation for reflectors in gliders and noted that any changes to gliders would likely result in formal modification action. In response, the UKAB advised that there was no formal technical assessment as yet, and that this was the point of the recommendation. Although unable to allocate resources themselves, in response to a suggestion from UKAB that the RAF may be able to assist the trialing reflectors, the BGA stated they would be happy to assist including with RAFGSA input. Action now awaits the RAF glider fleet return to flying.
2014041	BGA consider reviewing the feasibility of fitting radar reflectors in gliders.	As above.
2014060	Shoreham consider reviewing integration of IFR traffic with joining and transiting VFR traffic.	Options were limited due to airspace/fiscal/operating constraints. ATCOs were rebriefed by Unit Training Officer, Airprox discussed during TRUCE (Training in Unusual Circumstances and Aircraft Emergencies) exercises, GNSS redesign currently being undertaken.
2014136	That the CAA review progress on delivery of the 'Skyway Code'.	CAA continues to support the Skyway Code project and will consult on this as part of their GA Review of ANO 2009 later in 2015 after which plans for the Code will be drawn up at some point in the future.
2014154	Air Command consider reviewing the entry and exit procedures for the Machynlleth loop.	Partially accepted in recognition of the fact that the RAF did conduct a review and therefore satisfied the wording of the recommendation to do so, but their review did not accept the need to amend the procedures for the Machynlleth loop and so the intent of the recommendation was rejected. RAF response was: "RAF Flight Safety staff have conducted a review of the entry and exit procedures for the Machynlleth Loop and have found that the current regulation of flow around the loop is fit for purpose. Indeed, the introduction of entry and exit points may induce undesirable two-way traffic in certain areas. However, since this potential issue may not be restricted to the Machynlleth Loop, and also as Air Command has no influence over civilian flow in areas depicted as such on military low flying charts, entries have been made in the UK Military Low Flying Handbook highlighting that crews should exercise caution when entering and exiting the Loop and that opposite flow civilian traffic may be encountered in any flow depicted on military charts. This course of action has 2* support".

2014180	CAA investigates procedures to permit 'out of hours' access for emergency services aircraft to sites within Government airfield ATZs.	The CAA is not minded to make an amendment to the Rules of the Air and had no oversight of what activity (permitted by the airspace operator/authority) occurs within any specific 'active outside-of-hours' ATZ. Notwithstanding, they are reviewing, with MoD, the appropriateness of a ATZ being established at locations outside of the hours of ATC service provision.

Rejected Recommendations

Airprox	Recommendation	Comments
2014047	BHPA consider producing a catalogue of paraglider launch sites, including usage under given wind conditions.	The BHPA rejected this recommendation on the grounds that there are too many sites and variables to chart all of them and, only including some may mislead pilots into believing this is an exhaustive list. Furthermore, some sites may be extremely active in favourable weather conditions but then not used for the majority of the time, again misleading pilots into believing it is an unused site. The BHPA notes that the number of Airprox involving its members is an extremely small percentage and the members themselves view the risk of MAC as low.
2014063	MoD and CAA investigate use of FLARM displays to aid SA in ATC.	The CAA currently has no plans to consider the use of FLARM displays to aid situational awareness at ATS units, nor to bring such displays into the scope of CAP670.
2014100	Goodwood considers using an Air Traffic Controller for high traffic density events.	Meetings were arranged with ATC and procedures were reviewed. Changes to procedures were made, largely strengthening the guidance on routing and making fixed wing and rotary circuit heights and routes clearer. However, they have chosen not to use an Air Traffic Controller.
2014232	Stapleford and the CAA review the suitability of the Stapleford A/G Service.	The CAA does not consider it viable for Stapleford to offer an upgraded service, but offered comments on how Stapleford might improve adherence to current procedures in order to avoid recurrence of incidents of this type.

Recommendations remaining unresolved

Airprox	Recommendation	Comments
2014097	The CAA considers producing a chart of UK airfield IFR holding pattern positions (see also 2014126)	Initial review conducted, detailed further CAA response awaited.
2014126	The CAA considers producing a chart of UK airfield IFR holding pattern positions (see also 2014097)	Initial review conducted, detailed further CAA response awaited.
2014155	Gloucester considers reviewing their mixed runway procedures.	Response awaited.

AIRPROX CATALOGUE 2014

The table below is an abbreviated form of the full 2014 Airprox catalogue available on the UKAB Website at 2014 Airprox Catalogue: individual reports can be accessed through the 'Airprox No' links in the table. Note that report numbers do not always run consecutively because Airprox that were withdrawn, or whose investigations were terminated, are not listed.

Airprox No	Date	Risk Category	Aircraft 1 Type	Aircraft 2 Type
2014001	07/01/2014	C	EC135	TECHNAM P92E, P92G, SEASKY
2014002	10/01/2014	C	PUMA SA 330	TB10 TOBAGO
2014003	14/01/2014	A	ECUREUIL SA 350	EUROPA
2014004	15/01/2014	C	GROB 115, TUTOR	F15 EAGLE
2014005	15/01/2014	E	EC135	CESSNA 172
2014006	23/01/2014	C	TECNAM P2006T	GLIDER (UNSPECIFIED)
2014007	27/01/2014	B	FALCON 20FJF/20C/20D/20E/20F/2	HAWK
2014008	30/01/2014	C	TORNADO GR, IDS	HELICOPTER (TYPE UNKNOWN)
2014009	04/02/2014	B	GROB 115, TUTOR	MODEL AIRCRAFT
2014010	16/01/2014	C	SUPER KING AIR 200/300/350	EUROFIGHTER TYPHOON
2014011	28/01/2014	C	CHINOOK CH47	EC135
2014012	16/02/2014	B	CESSNA 152	JABIRU - ALL VARIANTS
2014013	22/02/2014	A	ASK21 GLIDER	CHEROKEE / WARRIOR / ARROW
2014014	16/02/2014	B	CHEROKEE / WARRIOR / ARROW	DA40,DA40D DIAMOND STAR
2014015	16/02/2014	B	ZENAIR ZODIAC	TOMAHAWK
2014016	28/02/2014	B	AGUSTA A109	525 CITATIONJET
2014017	24/02/2014	E	BAE 146-100	HAWK
2014018	01/03/2014	B	CESSNA 152	TB20 / TB21 TRINIDAD
2014020	05/03/2014	B	HAWK	HAWK
2014021	27/02/2014	D	UAV DESERT HAWK	MERLIN, EH-101
2014022	09/03/2014	B	CHEROKEE / WARRIOR / ARROW	EUROPA
2014023	11/03/2014	D	SIKORSKY S76	F15 EAGLE
2014024	19/03/2014	C	RJ REGIONAL JET	ALPHA JET
2014025	24/03/2014	B	PUMA SA 330	CHEROKEE / WARRIOR / ARROW
2014026	24/03/2014	C	RJ REGIONAL JET	CESSNA 172
2014027	05/03/2014	C	BN2T TURBINE ISLANDER	ASK21 GLIDER
2014028	28/03/2014	B	BELL 412 (MOD - GRIFFIN)	PIONEER 200
2014029	23/03/2014	C	PARACHUTIST	TAYLOR MONOPLANE JT1/2
2014030	28/03/2014	B	CT SERIES (FLIGHT DESIGN)	PARTENAVIA P68, VICTOR
2014031	31/03/2014	B	AGUSTA A109	UNTRACED LIGHT AC
2014032	24/03/2014	E	SIKORSKY S92 HELIBUS	SIKORSKY S92 HELIBUS
2014033	27/03/2014	C	SAAB 2000	PIPER APACHE
2014034	07/04/2014	C	VIKING GLIDER (103 ACRO)	CHEROKEE / WARRIOR / ARROW
2014035	08/04/2014	B	GAZELLE SA 341	CHEROKEE / WARRIOR / ARROW
2014036	04/04/2014	B	DA42 TWIN STAR	CHEROKEE / WARRIOR / ARROW
2014037	10/04/2014	B	TORNADO GR, IDS	ECUREUIL SA 350
2014038	14/04/2014	B	VIKING GLIDER (103 ACRO)	UNKNOWN NON-POWERED OBJECT
2014039	14/04/2014	C	TUCANO	TUCANO
2014040	14/04/2014	B	EUROFIGHTER TYPHOON	ASW 20 GLIDER
2014041	15/04/2014	A	ALPHA JET	GLIDER (UNSPECIFIED)

Airprox No	Date	Risk Category	Aircraft 1 Type	Aircraft 2 Type
2014042	14/04/2014	B	VENTUS GLIDER	DR 400/180,400/180R
2014043	17/04/2014	E	EC155	SEA KING, S-61 (MIL MODELS)
2014044	17/04/2014	B	SEA KING, S-61 (MIL MODELS)	CESSNA 172
2014045	10/04/2014	B	ROBINSON R22	CHEROKEE / WARRIOR / ARROW
2014046	15/04/2014	B	EC135	MICROLIGHT (UNSPECIFIED TYPE)
2014047	26/03/2014	B	SEA KING, S-61 (MIL MODELS)	PARAGLIDER - UNSPECIFIED
2014048	18/04/2014	E	REGIONAL JET (RJ)-70,-85,-100	MICROLIGHT (UNSPECIFIED TYPE)
2014049	08/04/2014	C	GROB 115, TUTOR	EUROCOPTER EC145
2014050	30/04/2014	E	BOEING 707/1-2-3-400	TORNADO GR, IDS
2014051	01/05/2014	B	BOEING B737	BOEING B737
2014052	29/04/2014	B	TORNADO GR, IDS	ECUREUIL SA 350
2014053	30/04/2014	B	MERLIN, EH-101	CHEROKEE / WARRIOR / ARROW
2014054	07/04/2014	C	BOEING B737	F15 EAGLE
2014056	10/05/2014	B	BOEING B757	ADVANCED TURBO PROP
2014057	06/05/2014	E	TORNADO GR, IDS	EC135
2014058	28/04/2014	C	FOKKER 70/100	HAWK
2014059	07/05/2014	B	DA42 TWIN STAR	DA40,DA40D DIAMOND STAR
2014060	07/05/2014	B	DA42 TWIN STAR	CESSNA 172
2014061	13/05/2014	E	TWIN OTTER DHC-6	HAWK
2014062	15/05/2014	C	GROB 115, TUTOR	PARAGLIDER - UNSPECIFIED
2014063	14/05/2014	C	GROB 115, TUTOR	GLIDER (UNSPECIFIED)
2014064	15/05/2014	A	SF25 "MOTORFALKE" A,B,C,E	CESSNA 182 SKYLANE
2014065	16/05/2014	C	PIPER SENECA	RV4, RV6, RV6A, RV8 HOMEBUILT
2014066	21/05/2014	C	ECUREUIL SA 350	CESSNA 152
2014067	28/05/2014	E	LET410 TURBOLET	SUPER KING AIR 200/300/350
2014068	18/05/2014	C	TWIN OTTER DHC-6	MALIBU
2014069	20/05/2014	E	PIPER SENECA	BONANZA 35 (V-TAIL)
2014070	31/05/2014	B	CHIPMUNK DHC-1	RV4, RV6, RV6A, RV8 HOMEBUILT
2014071	01/06/2014	B	CT SERIES (FLIGHT DESIGN)	CHEROKEE / WARRIOR / ARROW
2014072	26/05/2014	C	PARACHUTIST	BO209 MONSUN
2014073	30/05/2014	D	ATR42, -72	MODEL AIRCRAFT
2014074	31/05/2014	C	CESSNA 152	CHEROKEE / WARRIOR / ARROW
2014075	30/05/2014	B	CESSNA 152	ZENAIR ZODIAC
2014076	01/06/2014	A	NIMBUS	LET410 TURBOLET
2014077	03/06/2014	B	DA42 TWIN STAR	TORNADO GR, IDS
2014078	05/06/2014	E	AIRBUS A330	SIKORSKY S76
2014079	06/06/2014	C	GROB 115, TUTOR	GLIDER (UNSPECIFIED)
2014080	09/06/2014	E	PIPER SENECA	DR 100,105,1050,1051
2014081	20/05/2014	E	MERLIN, EH-101	SEA KING, S-61 (MIL MODELS)
2014082	09/06/2014	C	GROB 115, TUTOR	CHEROKEE SIX
2014083	12/06/2014	B	TORNADO F3	GLIDER (UNSPECIFIED)
2014084	01/06/2014	C	BOEING B737	DO 328
2014085	08/06/2014	A	CHIPMUNK DHC-1	DR 400/140,400/140B
2014086	07/06/2014	C	CITATION 550, 551,560 (II - V)	ATR42, -72
2014087	09/06/2014	E	PC-12 EAGLE	CHEROKEE / WARRIOR / ARROW
2014088	15/06/2014	B	MICROLIGHT (UNSPECIFIED TYPE)	TRAVELER
2014089	13/06/2014	D	AIRBUS A320, A321	PARACHUTIST
2014090	13/06/2014	E	EMBRAER 170/175	DA40,DA40D DIAMOND STAR

Airprox No	Date	Risk Category	Aircraft 1 Type	Aircraft 2 Type
2014091	08/06/2014	B	DRUINE D31 TURBULENT	CESSNA 152
2014092	14/06/2014	E	FOKKER 50	TECHNAM P92E, P92G, SEASKY
2014093	13/06/2014	C	SEA KING, S-61 (MIL MODELS)	HAWK
2014094	17/06/2014	A	GLIDER (UNSPECIFIED)	RV4, RV6, RV6A, RV8 HOMEBUILT
2014095	19/06/2014	C	MERLIN, EH-101	PIPER SENECA
2014096	21/06/2014	C	DG1000 SERIES	CHEROKEE / WARRIOR / ARROW
2014097	25/06/2014	D	PUMA SA 330	GLIDER (UNSPECIFIED)
2014098	25/06/2014	C	JETSTREAM 41	EUROFIGHTER TYPHOON
2014099	26/06/2014	C	CESSNA 150	CHEROKEE / WARRIOR / ARROW
2014100	28/06/2014	C	EC155	CHEROKEE SIX
2014101	29/06/2014	A	DR 400/140,400/140B	ZENAIR ZODIAC
2014102	03/07/2014	C	EC135	TWIN ECUREUIL
2014103	01/07/2014	C	PC-12 EAGLE	KING AIR 90/100
2014104	03/07/2014	D	TUCANO	UNKNOWN
2014105	08/07/2014	C	THRUSTER T600N SPRINT M/LIGHT	HERCULES C130
2014106	14/05/2014	D	CESSNA 182 SKYLANE	GLIDER (UNSPECIFIED)
2014107	06/07/2014	A	ASK21 GLIDER	TRAVELER
2014108	13/07/2014	B	DC3	CHEROKEE / WARRIOR / ARROW
2014109	12/07/2014	A	MD520N, MD600N, MD902 EXPLORER	EXTRA 200, 300 SERIES
2014110	16/07/2014	C	HAWK	TORNADO GR, IDS
2014112	17/07/2014	B	CESSNA 152	TORNADO GR, IDS
2014113	16/07/2014	B	GROB 115, TUTOR	GROB 115, TUTOR
2014114	13/07/2014	A	CESSNA 152	CESSNA 172
2014115	09/07/2014	C	CHIPMUNK DHC-1	CESSNA 310
2014116	12/07/2014	B	CESSNA 152	CESSNA 152
2014117	22/07/2014	A	AIRBUS A320, A321	UAV UNSPECIFIED
2014118	24/07/2014	D	MERLIN, EH-101	UNKNOWN
2014119	23/07/2014	E	TURBO COMMANDER 690	JET PROVOST
2014120	29/07/2014	A	HAWK	ECUREUIL SA 350
2014121	21/07/2014	C	GROB 115, TUTOR	KING AIR 90/100
2014122	25/07/2014	B	CHEROKEE / WARRIOR / ARROW	CHEROKEE / WARRIOR / ARROW
2014123	26/07/2014	C	LYNX HAS/HMA MK8	JETRANGER 206
2014124	29/07/2014	A	HAWK	GROB 115, TUTOR
2014126	30/07/2014	C	JETSTREAM SC4, BAE 31, 32	GLIDER (UNSPECIFIED)
2014127	30/07/2014	A	EXTRA 200, 300 SERIES	DISCUS GLIDER
2014128	31/07/2014	A	EUROFIGHTER TYPHOON	CESSNA 172
2014129	26/07/2014	B	BULLDOG SC3	DR 400/2+2
2014130	31/07/2014	C	GROB 115, TUTOR	KING AIR 90/100
2014131	11/07/2014	C	ROBINSON R22	PIPER SENECA
2014132	05/08/2014	B	LYNX WILDCAT AH1 (AW159)	CHEROKEE / WARRIOR / ARROW
2014133	03/08/2014	A	FOURNIER RF3,4,5 PWRD GLIDER	CHEROKEE / WARRIOR / ARROW
2014134	07/08/2014	E	CITATION 550, 551,560 (II - V)	MICROLIGHT (UNSPECIFIED TYPE)
2014136	08/08/2014	B	CHEROKEE / WARRIOR / ARROW	CHEROKEE / WARRIOR / ARROW
2014137	07/08/2014	C	GROB 115, TUTOR	PARIS MS760
2014138	16/08/2014	C	ATR42, -72	PAC750XL, PAL P-750XSTOL
2014139	15/08/2014	A	HR 200/100,200/1005	DA40,DA40D DIAMOND STAR
2014140	09/08/2014	B	ROBIN R3000/3100/3120/3140	CHEROKEE / WARRIOR / ARROW
2014141	09/08/2014	C	CITATION 550, 551,560 (II - V)	GLIDER (UNSPECIFIED)

Airprox No	Date	Risk Category	Aircraft 1 Type	Aircraft 2 Type
2014142	09/08/2014	C	ATR42, -72	GLIDER (UNSPECIFIED)
2014143	18/08/2014	E	PUMA SA 330	GLIDER (UNSPECIFIED)
2014144	19/08/2014	C	GROB 115, TUTOR	EC-120 COLIBRI
2014145	17/08/2014	A	CHIPMUNK DHC-1	SF25 "MOTORFALKE" A,B,C,E
2014147	22/08/2014	B	CESSNA 172	EUROFIGHTER TYPHOON
2014148	15/07/2014	C	JABIRU - ALL VARIANTS	DA42 TWIN STAR
2014149	22/08/2014	A	GLIDER (UNSPECIFIED)	DUCHESS 76
2014151	14/08/2014	E	RV9, RV9A	PIPER SENECA
2014152	22/08/2014	C	SEA KING, S-61 (MIL MODELS)	GLIDER (UNSPECIFIED)
2014153	20/08/2014	C	GROB 115, TUTOR	CESSNA 150
2014154	27/08/2014	C	HAWK	EUROFIGHTER TYPHOON
2014155	28/08/2014	C	EC135	IKARUS C42 MICROLIGHT
2014157	21/08/2014	A	DOMINIE HS 125	UNKNOWN
2014158	31/08/2014	B	EUROPA	UNKNOWN
2014159	31/08/2014	A	CHEROKEE / WARRIOR / ARROW	CESSNA 152
2014160	02/09/2014	C	VENTUS GLIDER	C-208 CARAVAN
2014161	16/08/2014	B	R44 ASTRO (ROBINSON)	PIPER PA12 SUPER CRUISER
2014162	02/09/2014	A	HAWK	HAWK
2014163	07/09/2014	C	TECNAM P2002	CHEROKEE / WARRIOR / ARROW
2014164	02/09/2014	C	ROBIN R3000/3100/3120/3140	JABIRU - ALL VARIANTS
2014165	07/09/2014	B	EC135	QUIK GT450 M/LIGHT
2014166	29/08/2014	C	GROB 115, TUTOR	ROCKWELL (BOEING) B1B LANCER
2014167	09/09/2014	C	EUROFIGHTER TYPHOON	HELICOPTER (TYPE UNKNOWN)
2014168	07/09/2014	E	EXTRA 200, 300 SERIES	CHEROKEE / WARRIOR / ARROW
2014169	10/09/2014	B	ECUREUIL SA 350	DR 400/140,400/140B
2014170	11/09/2014	C	SIKORSKY S76	FALCON 50, FALCON 900
2014171	07/09/2014	E	EMBRAER 190/195	CHEROKEE / WARRIOR / ARROW
2014172	13/09/2014	C	IKARUS C42 MICROLIGHT	CESSNA 182 SKYLANE
2014173	07/08/2014	A	R44 ASTRO (ROBINSON)	CHEROKEE / WARRIOR / ARROW
2014174	12/09/2014	C	AIRBUS A-300	A319
2014175	29/08/2014	E	SF340, 340A (SAAB)	NAVAJO, CHIEFTAIN
2014176	14/09/2014	C	CHEROKEE / WARRIOR / ARROW	AGUSTA A109
2014177	06/09/2014	B	DR 400/140,400/140B	BONANZA A36
2014178	21/09/2014	C	KITFOX	CESSNA 172
2014179	24/09/2014	B	SEA KING, S-61 (MIL MODELS)	EV97 EUROSTAR
2014180	19/09/2014	C	GARDAN (SOCATA) GY80 HORIZON	EC135
2014181	24/09/2014	E	MERLIN, EH-101	CHEROKEE / WARRIOR / ARROW
2014182	21/09/2014	C	GLIDER (UNSPECIFIED)	CESSNA 172
2014183	17/09/2014	C	MD520N, MD600N, MD902 EXPLORER	ECUREUIL SA 350
2014184	27/09/2014	B	DR 100,105,1050,1051	CHEROKEE / WARRIOR / ARROW
2014185	09/09/2014	C	ATR42, -72	TORNADO F3
2014186	21/09/2014	E	GROB 115, TUTOR	GLIDER (UNSPECIFIED)
2014187	16/09/2014	B	MTO SPORT GYROPLANE	MODEL AIRCRAFT
2014188	21/09/2014	B	BOEING B737	CHEROKEE / WARRIOR / ARROW
2014189	07/09/2014	C	ATR42, -72	CHEROKEE / WARRIOR / ARROW
2014190	15/08/2014	D	GROB 115, TUTOR	UNTRACED LIGHT AC
2014191	12/08/2014	B	NAVAJO, CHIEFTAIN	CHEROKEE / WARRIOR / ARROW
2014192	28/09/2014	B	YAK 50, 52	GLIDER (UNSPECIFIED)

Airprox No	Date	Risk Category	Aircraft 1 Type	Aircraft 2 Type
2014193	24/08/2014	E	SUPER CUB	HELICOPTER (TYPE UNKNOWN)
2014194	30/09/2014	B	AGUSTA 139	UAV UNSPECIFIED
2014195	30/09/2014	E	EUROFIGHTER TYPHOON	HARVARD
2014196	03/10/2014	B	CHEROKEE / WARRIOR / ARROW	DUCHESS 76
2014197	28/09/2014	E	CITATION 550, 551,560 (II - V)	COMANCHE
2014198	02/10/2014	A	PARAGLIDER - UNSPECIFIED	UAV UNSPECIFIED
2014199	07/10/2014	C	CHINOOK CH47	GLIDER (UNSPECIFIED)
2014200	01/10/2014	E	GROB 115, TUTOR	GROB 115, TUTOR
2014201	27/09/2014	C	SAAB 2000	CESSNA 170
2014204	01/10/2014	E	VOYAGER 105/108	CESSNA 182 SKYLANE
2014205	17/10/2014	C	EV97 EUROSTAR	CESSNA 152
2014206	22/10/2014	C	AGUSTA A109	APACHE HELICOPTER
2014207	24/10/2014	E	DO 328	GROB 115, TUTOR
2014208	23/10/2014	C	B777	PIRAT SZD-30C SAILPLANE
2014209	28/10/2014	B	HAWK	LYNX WILDCAT AH1 (AW159)
2014210	30/10/2014	B	AGUSTA A109	CHEROKEE / WARRIOR / ARROW
2014211	08/11/2014	A	ASK21 GLIDER	AGUSTA A109
2014212	10/11/2014	C	FALCON 20FJF/20C/20D/20E/20F/2	TORNADO GR, IDS
2014213	10/11/2014	C	CESSNA C510 MUSTANG	CHIPMUNK DHC-1
2014215	14/11/2014	C	GROB 115, TUTOR	DA42 TWIN STAR
2014216	13/11/2014	C	TORNADO F3	STRATOTANKER KC135
2014217	11/11/2014	C	MERLIN, EH-101	EC135
2014218	15/11/2014	A	IKARUS C42 MICROLIGHT	TB20 / TB21 TRINIDAD
2014219	21/11/2014	B	GROB 115, TUTOR	TUCANO
2014220	19/11/2014	C	CESSNA 150	TUCANO
2014221	19/11/2014	B	CESSNA 150	TUCANO
2014222	26/11/2014	B	TORNADO F3	TORNADO F3
2014223	29/11/2014	C	CESSNA 182 SKYLANE	CHEROKEE / WARRIOR / ARROW
2014224	05/12/2014	B	DAUPHIN SA 365	DA40,DA40D DIAMOND STAR
2014225	08/12/2014	E	KING AIR 90/100	F15 EAGLE
2014226	08/12/2014	B	AGUSTA A109	EXTRA 200, 300 SERIES
2014227	11/12/2014	C	TORNADO F3	EUROFIGHTER TYPHOON
2014228	13/12/2014	B	RV4, RV6, RV6A, RV8 HOMEBUILT	CHEROKEE / WARRIOR / ARROW
2014229	08/12/2014	E	HAWK	HAWK
2014230	14/12/2014	B	EC135	GLIDER (UNSPECIFIED)
2014231	16/12/2014	C	TORNADO GR, IDS	HAWK
2014232	14/12/2014	A	CESSNA 152	CHEROKEE / WARRIOR / ARROW
2014233	15/12/2014	C	EMB-135,145	UAV UNSPECIFIED
2014234	30/12/2014	C	CHEROKEE / WARRIOR / ARROW	DA42 TWIN STAR
2014235	28/12/2014	C	AIRBUS A320, A321	AIRBUS A320, A321

GLOSSARY OF DEFINITIONS AND ABBREVIATIONS

Risk Categories

Risk Category	ICAO 4444 PANS-ATM AIRPROX risk classification	Eurocontrol severity classification scheme (ESARR 2)[14]	UKAB Board Guidelines word picture	Proposed UKAB collision risk descriptor and word picture (not yet adopted or approved)
A	Risk of Collision: ...aircraft proximity in which serious risk of collision has existed.	Serious incident.	Situations that stop short of an actual collision, where separation is reduced to the minimum and / or where chance played a major part in events and nothing more could have been done to improve matters. Late sightings frequently attach to these cases.	**Providence**. Situations where separation was reduced to the bare minimum and which only stopped short of an actual collision because chance played a major part in events: the pilots were either unaware of the other aircraft or did not make any inputs that materially improved matters.
B	Safety not assured: ...aircraft proximity in which the safety of the aircraft may have been compromised.	Major incident.	Those cases, often involving late sightings, where avoiding action may have been taken to prevent a collision, but still resulted in safety margins much reduced below the normal.	**Safety much reduced**. Situations where aircraft proximity resulted in safety margins being much reduced below the normal either due to serendipity, inaction, or emergency avoiding action taken at the last minute to avert a collision.
C	No risk of collision: ...aircraft proximity in which no risk of collision has existed.	Significant incident	By far the most common outcome where effective and timely actions were taken to prevent aircraft colliding.	**Safety degraded**. Situations where safety was reduced from normal but either fortuitous circumstances or early enough sighting/action allowed one or both of the pilots to either monitor the situation or take controlled avoiding action to avert the aircraft from coming into close proximity.
D	Risk not determined: aircraft proximity in which insufficient information was available to determine the risk involved, or inconclusive or conflicting evidence precluded such determination.	Not determined.	Reserved for those cases where a dearth of information renders impossible any meaningful finding.	**Non-assessable**. Situations where insufficient information was available to determine the risk involved, or inconclusive/conflicting evidence precluded such determination.
E	No ICAO risk classification	No safety effect: occurrences which have no safety significance.	Met the criteria for reporting but, by analysis, it was determined that normal procedures, safety standards and parameters pertained.	**Non-proximate**. Met the criteria for reporting but normal procedures, safety standards and/or separation parameters pertained.

[14] ESARR - **E**UROCONTROL **Sa**fety **R**egulatory **R**equirement.

Abbreviations

aal	**above aerodrome level**
ac	aircraft
ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ACN	Airspace Co-ordination Notice
ACR	Approach Control Room
A/D	aerodrome
ADC	Aerodrome Control(ler)
ADR	Advisory Route
AEF	Air Experience Flight
AEW	Airborne Early Warning
AFIS(O)	Aerodrome Flight Information Service (Officer)
A/F	Airfield
agl	above ground level
AIAA	Area of Intense Aerial Activity
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Services
alt	altitude
amsl	above mean sea level
ANSP	Air Navigation Service Provider
AOB	Angle of Bank
A/P	Autopilot
APP	Approach Control(ler)
APR	Approach Radar Control(ler)
ARP	Aerodrome Reference Point
ASR	Airfield Surveillance Radar
ATC	Air Traffic Control
ATCC	Air Traffic Control Centre
ATCO	Air Traffic Control Officer
ATCRU	Air Traffic Control Radar Unit
ATIS	Automatic Terminal Information Service
ATM	Aerodrome Traffic Monitor
ATS	Air Traffic Service
ATSA	Air Traffic Service Assistant
ATSOCAS	ATS Outside Controlled Airspace
ATSI	Air Traffic Services Investigations
ATSU	Air Traffic Service Unit
ATZ	Aerodrome Traffic Zone
AWACS	Airborne Warning and Control System
AWR	Air Weapons Range
AWY	Airway
BGA	**British Gliding Association**
BHPA	British Hang Gliding and Paragliding Association
BMAA	British Microlight Aircraft Association
BMFA	British Model Flying Association
BS	Basic Service
CANP	**Civil Air Notification Procedure**
CAS	Controlled Airspace
CAT	Commercial Air Transport
CAVOK	Visibility and cloud above prescribed values
CC	Colour Code - Aerodrome Weather State
cct	Circuit
CFI	Chief Flying Instructor
CLAC	Clear Above Cloud
CLAH	Clear Above Haze
CLBC	Clear Below Cloud
CLBL	Clear Between Layers
CLNC	Clear No Cloud
CLOC	Clear of Cloud
CMATZ	Combined MATZ
CPA	Closest Point of Approach
C/S	Callsign
CTA	Control Area
CTR/CTZ	Control Zone
CWS	Collision Warning System
DA	**Decision Altitude**
DAP	Directorate of Airspace Policy CAA
DF	Direction Finding (Finder)
DH	Decision Height
DME	Distance Measuring Equipment
DS	Deconfliction Service
DW	Downwind
E	**East**
EAT	Expected Approach Time
elev	elevation
ERS	En Route Supplement
est	estimated
FAT	**Final Approach Track**
FIR	Flight Information Region
FIS	Flight Information Service
FISO	Flight Information Service Officer
FMS	Flight Management System
FO	First Officer
FOB	Flying Order Book
FPL	Filed Flight Plan
fpm	Feet per Minute
FPS	Flight Progress Strip
FW	Fixed Wing
GAT	**General Air Traffic**
GCA	Ground Controlled Approach
GH	General Handling
GMC	Ground Movement Controller
GP	Glide Path
GS	Groundspeed
G/S	Glider Site
H	**Horizontal**
hdg	Heading
HISL	High Intensity Strobe Light
HLS	Helicopter Landing Site
HMR	Helicopter Main Route
hPa	Hectopascals (previously millibars)
HPZ	Helicopter Protected Zone
HQ Air	HQ Air Command
HUD	Head-Up Display
IAS	**Indicated Air Speed**
iaw	In accordance with
ICF	Initial Contact Frequency
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
ivo	In the vicinity of
JSP	**Joint Services Publication**
KHz	**Kilohertz**
km	Kilometres
kt	Knots
L	**Left**
LACC	London Area Control Centre (Swanwick)
LARS	Lower Airspace Radar Service
LATCC(Mil)	London Air Traffic Control Centre (Military)
LFA	Low Flying Area

LFC	Low Flying Chart
LH	Left Hand
LJAO	London Joint Area Organisation
LoA	Letter of Agreement
LOC	Localizer
LTMA	London TMA
MATS	**Manual of Air Traffic Services**
MATZ	Military Aerodrome Traffic Zone
METAR	Aviation routine weather report
MHz	Megahertz
M/L	Microlight
MOD	Ministry of Defence
MRP	Military Regulatory Publication
MSD	Minimum Separation Distance
N	**North**
NATS	National Air Traffic Services
NDB	Non-Directional Beacon
NK	Not Known
nm	Nautical Miles
NMC	No Mode C
NR	Not Recorded
NVD	Night Vision Devices
NVG	Night Vision Goggles
OACC	**Oceanic Area Control Centre**
OAT	Operational Air Traffic
O/H	Overhead
OJTI	On-the-Job Training Instructor
Oo	Out of
OOS	Out of Service
PAR	**Precision Approach Radar**
PCAS	Portable Collision Avoidance System
PD	Practice Diversion
PF	Pilot Flying
PFL	Practice Forced Landing
PI	Practice Interception
PIC	Pilot-in-Command
PINS	Pipeline Inspection Notification System
PNF	Pilot Non-flying
PS	Procedural Service
QFE	**Atmospheric pressure at aerodrome elevation**
QFI	Qualified Flying Instructor
QHI	Qualified Helicopter Instructor
QNH	Atmospheric pressure altimeter setting to obtain elevation when on the ground
R	**Right**
RA	Resolution Advisory (TCAS)
RAT	Restricted Area (Temporary)
RCO	Range Control Officer
RCS	Radar Control Service
RH	Right Hand
ROC	Rate of Climb
ROD	Rate of Descent
RMZ	Radio Mandatory Zone
RP	Reporting Point
RPAR	Replacement PAR
RPAS	Remotely Piloted Air Vehicle
RPS	Regional Pressure Setting
RT	Radio Telephony
RTB	Return to base
RTF	Radio Telephony Frequency
RVR	Runway Visual Range
RVSM	Reduced Vertical Separation Minimum
RW	Rotary Wing
RWxx	Runway xx, e.g. RW09
S	**South**
SA	Situational Awareness
SAP	Simulated Attack Profile
SAS	Standard Altimeter Setting
ScACC	Scottish Area Control Centre (Prestwick)
ScATCC(Mil)	Scottish Air Traffic Control Centre (Military)
SERA	Standardised European Rules of the Air
SFL	Selected Flight Level [Mode S]
SID	Standard Instrument Departure
SMF	Separation Monitoring Function
SOPs	Standard Operating Procedures
SRA	Surveillance Radar Approach
SSR	Secondary Surveillance Radar
STAR	Standard Instrument Arrival Route
STCA	Short Term Conflict Alert
SUP	Supervisor
SVFR	Special VFR
TA	**Traffic Advisory (TCAS)**
TAS	True Air Speed
TC	Terminal Control
TCAS	Traffic Alert & Collision Avoidance System
TDN	Talkdown Control(ler)
TFR	Terrain Following Radar
TI	Traffic Information
TMA	Terminal Control Area
TMZ	Transponder Mandatory Zone
TP	Turn Point
TRA	Temporary Restricted Area
TRUCE	Training in Unusual Circumstances and Emergencies
TS	Traffic Service
TWR	ATC Tower
UAR	**Upper Air Route**
UAS	Unmanned Air System
UAV	Unmanned Air Vehicle
UHF	Ultra High Frequency
UIR	Upper Flight Information Region
UKDLFS	United Kingdom Day Low Flying System
UK FIS	UK Flight Information Services
UKNLFS	United Kingdom Night Low Flying System
unk	unknown
unltd	unlimited
USAF(E)	United States Air Force (Europe)
U/S	Unserviceable
UT	Under Training
UTC	Co-ordinated Universal Time
UW	Upwind
V	**Vertical**
VCR	Visual Control Room
VDF	Very High Frequency Direction Finder
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VOR	Very High Frequency Omni Range
VRP	Visual Reporting Point
W	**West**
Wx	Weather
XXXX	**Unknown or deliberately dis-identified**