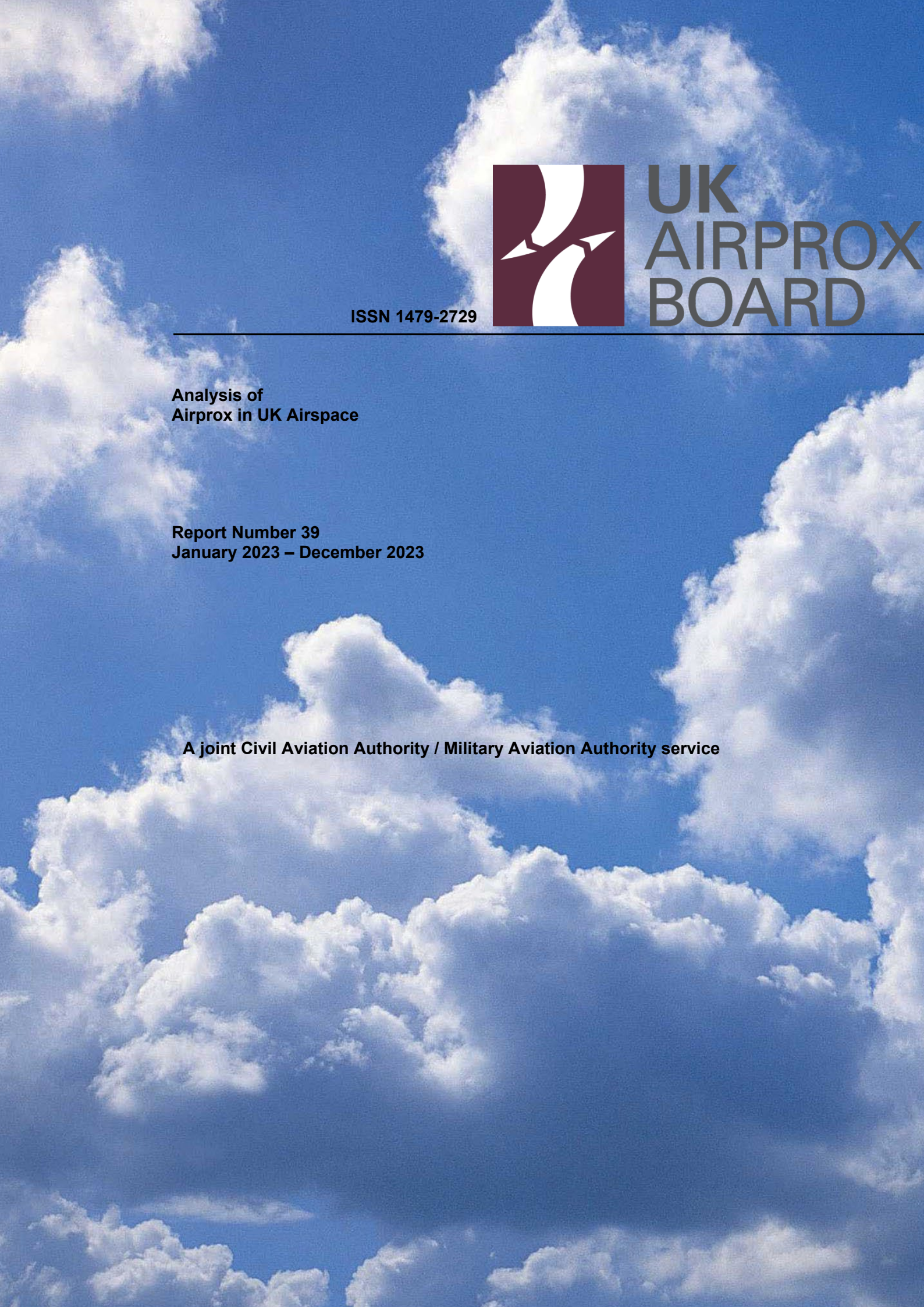

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UK AIRPROX BOARD

Analysis of Airprox in UK Airspace

Report Number 39
January 2023 – December 2023

A joint Civil Aviation Authority / Military Aviation Authority service

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Thirty-Ninth Report by the UK Airprox Board

Analysis of Airprox in UK Airspace
(January 2023 to December 2023)

Compiled by Director UK Airprox Board for

The Chief Executive Officer
UK Civil Aviation Authority

and

The Director
UK Military Aviation Authority

CONTENTS

EXECUTIVE SUMMARY

Airprox reporting in 2022, purely in terms of numbers, saw an overall decrease in the order of 2.5% over the numbers reported in 2022. Within this, aircraft-to-aircraft Airprox reporting shrunk by 4.5%. The impact of COVID-19 restrictions on GA flying in 2020 and early 2021 will clearly have an impact on the 5-year average figures for the next 2-3 years, so comparisons with previous years' levels will give a more coherent indication of reporting trends.

As with previous years, the vast majority (86%) of aircraft-to-aircraft events involved General Aviation Sports and Recreational aircraft. This is only very slightly higher than the 10-year average of 85%, but represents a continuing trend whereby this sector is exerting an increasing influence on overall performance of the safety barriers to mid-air collision. Reinforcing this assertion is the fact that 93% of all risk-bearing aircraft-to-aircraft events involved a General Aviation Sports and Recreational aircraft (which includes those Airprox where the description of an unknown or untraced aircraft fitted this category). Therefore, it is by influencing the performance of this sector – by education and regulation (if appropriate) – where the biggest gains in terms of a enhancing the safety of the contemporary operating environment will be made.

This contemporary operating environment continues to be, essentially, Class G airspace below an altitude of 3000ft. For aircraft-to-aircraft events, 93% occurred in class G airspace and 77% took place at or below 3000ft, so it is here where efforts should be concentrated most on improving matters. With the backdrop of an increase in RPAS BVLOS operations outside segregated airspace on the horizon, this becomes even more important because an already highly-populated sector of UK airspace will include new users in the near future.

Although there has been a decrease in the numbers of Airprox occurring in an ATZ or MATZ, the trendline for these events is still indicating a positive gradient. Occurrences around airfields accounted for about a quarter of all aircraft-to-aircraft events at their peak in 2021, but have shown a reduction over the past 2 years, representing 17% of all Airprox in 2023. Whilst this reduction is welcome, it is still a concern that so many Airprox occur in areas where processes and procedures are in place which should reduce the likelihood of a loss of safe separation. To address this concern, education is the key – there is evidence that published procedures are not being followed and/or that non-standard activity is being undertaken without it being announced, leading to the degradation of the situational awareness of others. Clearly, an aerodrome's procedures are published in order to maintain a degree of 'predictability' to the activity around that airfield, but there does appear to be a reluctance from pilots to speak on the radio when they have chosen – or are obliged – to deviate from those published procedures. That a significant percentage of aircraft-to-aircraft Airprox involving deviation from published procedures is being seen year-on-year indicates that there may be room for pilot training (initial and refresher) to be enhanced in this regard, with more exposure to different types for airfield join and departure, and training in considerations for any necessary deviations from the published procedures.

Airprox involving military aircraft (which includes foreign military aircraft, such as visiting forces or those permanently based in the UK) represented 24% of all aircraft-to-aircraft Airprox in 2023 (including those cases involving RPAS where a full evaluation has been made). With such a small sample size (49) it can be difficult to draw any firm conclusions, but analysis of the factors contributing to these Airprox does draw out a number of recurring themes. It is clear that significant work has been undertaken to enhance the electronic conspicuity capabilities of military aircraft. Many now carry combinations of equipment that will give increased coverage of the myriad solutions that are available to the General Aviation market, but compatibility and/or performance issues are prevalent. Although the UKAB does not have the technical resource to understand why EC interactions do not occur when they would be expected to do so, it is likely that this is down to both the siting in the aircraft of carry-on EC equipment, and the performance of internal equipment antennae, adversely affecting the detectability of the devices concerned. There is also some evidence that the transition to new military air traffic control equipment and a 'hub and spoke' model of regional control centres may be having

previously unexpected impacts of the performance of the Ground Elements – Situational Awareness barrier. The factors contributing to the performance degradation of this barrier are the late or non-passage of Traffic Information, non-detection or late detection of the conflict and the controller being engaged in other tasks, all of which point towards a suggestion that controller workload was high. It is important that any second or third order effects of the continued transition to new equipment and working practices be closely monitored.

For Airprox involving RPAS when a full evaluation has been possible (i.e., where the Airprox was reported by the RPAS operator, or the UKAB has been able to trace the RPAS operator) the weaknesses of all the traditional barriers is concerning. Again, the sample size is extremely small (15) but little has changed from previous years – the Ground Elements are seldom, if ever, aware of the RPAS operations and so add little to the mitigation of the collision risk. For the Flight Elements, pre-flight notification of RPAS activity below 400ft in the Open category is essentially non-existent – the NOTAM system is not a viable method, and RPAS operators use a number of different notification systems for their activity (although there is no requirement for them to do so), none of which are regulated. Given the size of RPAS in the Open category, the See and Avoid barrier is only really viable from the RPAS operator's perspective, so it is difficult to see where effective barrier mitigations to an Airprox with an RPAS once airborne can be made UNLESS interoperable EC equipment is mandated throughout Class G airspace, to increase the effectiveness of the Electronic Warning Systems and Situational Awareness barriers for the Flight Elements. By extension, this should also improve the performance of the See and Avoid barrier, although pilots of crewed aviation need to be aware that, from their perspective, reliance on the See and Avoid barrier in Class G airspace currently offers little defence against an Airprox (or a collision) with an RPAS because, in all instances of this type of Airprox in 2023, the pilot of the crewed aircraft was never aware of the presence of the RPAS.

The dominance of the GA Sports and Recreational community in the Airprox landscape is unsurprising, given the preponderance of Airprox that occur in Class G airspace. The proportion of risk-bearing Airprox which involve the GA community may have peaked – 2023 has seen a decrease in the GA share of risk-bearing Airprox and an increase in the military share. However, the main driver behind the last 10 years' risk picture has been the success of the military sector in reducing their risk. It should also be noted that the commercial sectors' (CAT and Civil Commercial) share of aircraft-to-aircraft risk-bearing Airprox remains very low and relatively steady at around 10%, so changes in the military picture will be reflected in the GA picture and *vice versa*. The Barrier performance and Contributory Factors allow focus on certain areas, but the fact that the observations and the associated Contributory Factors are relatively constant, and have remained so since this data has been collected, continues to indicate that it may be time to look at regulatory intervention to improve the picture from an Airprox perspective. A review of the private pilot training syllabus in the General Aviation Sports and Recreational sector may help to identify areas where this can be expanded, to include additional training in those areas that have been identified as weak by UKAB analysis. Furthermore, an understanding that a lack of currency and recency has an effect on human performance will help individuals to plan to operate within their own personal limitations, but may also indicate that more frequent flights with an instructor, or even a periodic check flight, might be necessary. However, given the expansion into RPAS BVLOS operations outside segregated airspace, and the enablers for this to occur, the single improvement that would have the biggest impact in terms of mid-air collision risk mitigation would be a single – or suite of – interoperable electronic conspicuity protocol(s) being mandated throughout all classes of airspace in the UK.

INTRODUCTION

The UK Airprox Board (UKAB) assessed 270 Airprox that were reported in the calendar year 2023, of which 186 were piloted aircraft-to-aircraft events with 84 involving UA/Other. These figures are more in line with historical norms and have not grown at the rate of the previous 2 years; in fact, the 2023 totals are slightly lower than those for 2022 and only around 9% higher than the 2021 figures. Caution should be exercised, though, as the reasons for the seemingly shallower growth in reporting over the last 2 years are difficult to divine and there are many factors that can affect the rate of Airprox reporting, such as weather, flying rates and consumer demand. It is, however, encouraging to see this slight reduction in numbers of Airprox reports when compared to 2022, and time will tell if the effects of increased UKAB engagement with the stakeholder community over the last 2 years is turning the tide. It will take a number of years for the statistical effects of the COVID-19 restrictions on the aviation sector to be overcome but, when these restrictions are accounted for, the increased Airprox reporting pre- and post-COVID may not indicate a consolidated growth in reporting, rather, brief 'spikes' that would not be unexpected from a statistical standpoint.

Through the assessment of safety barriers and the collection of contributory factors, the insight that can now be achieved is continuing to provide an essential and consistent view of the factors which underpin the reasons behind Airprox; this will be the emphasis of the majority of this report. It is only by directly focussing on and targeting specific areas of the aviation community, and by tackling their specific behaviours, that we can begin to impact the instances of Airprox, mitigate Mid Air Collision (MAC) risk and contribute to augmenting Air Safety for all.

As with the approach adopted in the previous 3 years (since the inception of barrier methodology), this report will cover in detail the 5 weakest performing barriers and examine the observed behaviours behind them to identify areas where interventions can be more effectively focussed to better mitigate against the risk of MAC and enhance air safety. As in previous reports statistics will, of course, be presented, but these need to be taken in the context of the environment from which they are elicited; care must be taken not to draw inaccurate or incomplete conclusions, and comparisons with previous years should not be made apart from in specific and focussed areas.

Although establishing what happened to lead to an Airprox is important in terms of understanding the context of an individual event, no two Airprox will be the same. It is for this reason that it is important to focus on the 'why' and the 'so what' as opposed to just the 'what' and 'how many'; observations from this Airprox year reinforce those of the last annual report in the identification of the areas in which the most difference can be made; by identifying the weakest barriers, understanding the reasons for their poor performance and targeting positive outreach action in these areas, the most tangible difference can be achieved. Notwithstanding, this approach does rely on each of the aviation communities understanding their own context and safety culture, and it is for them to ensure that there are appropriate mechanisms and measures in place to elicit change. Be they a General Aviation flying or gliding club, an airfield, a military unit, a commercial operating authority or an individual General Aviation pilot, the responsibility to exercise the privilege of operating in unregulated airspace and the ability to enjoy the freedoms it gives carries an individual and collective responsibility to continually strive to augment air safety and help to maintain a safe environment that can be enjoyed by all.

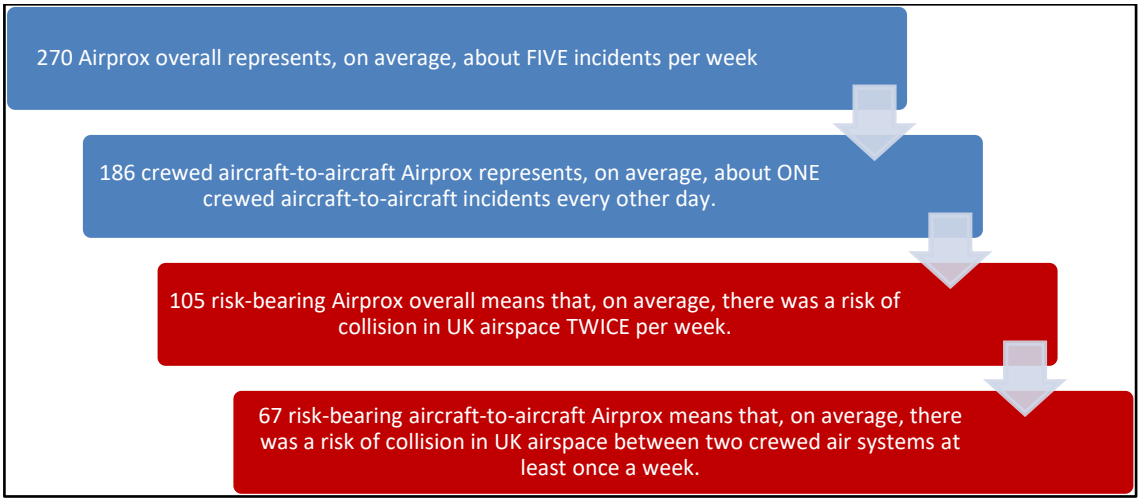
The weakest areas continue to be: situational awareness which is captured in the **Ground Elements – Situational Awareness barrier** and the **Flight Elements – Situational Awareness barrier**; communication, planning and execution which is captured in the **Flight Elements – Tactical Planning and Execution barrier;** Electronic Conspicuity (EC) which is captured in the **Flight Elements – Electronic Warning Systems barrier**, and; the **Flight Elements – See and Avoid barrier**. Within these barriers, the most common Contributory Factors (CF) are generic, inaccurate, late or no situational awareness; planning and communication; incompatibility of EC equipment, and; lookout and visual scanning for potential threat aircraft. There is still a welcome focus within the DfT and CAA on promoting EC, and a common approach will certainly improve situational awareness in

both ground and air elements. Although the latest EC funding initiative was discontinued on 31st March 2024, it is hoped that funding will once again be made available.

Electronic conspicuity devices | Civil Aviation Authority (caa.co.uk)

Whilst there is a technical element to the performance of the barriers (most noticeably the **Flight Elements – Electronic Warning Systems** barrier), it is increased adoption of EC, an understanding of how to best exploit the information it provides and, most importantly, an acknowledgement that there needs to be a consistency in approach which promotes compatibility of equipment which operate to agreed standards that will deliver the most benefit. It is also important to recognise that the performance of all the barriers can be compromised by Human Factors, and that this can be addressed through recognising and accepting the observations, a willingness to learn from the actions of others, a commitment to learning, a sense of personal responsibility with respect to threat and error management and an appreciation of the effects of poor preparation, currency and recency.

HEADLINE FIGURES AND HISTORIC DATA



All Airprox 2013 - 2023

RISK	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	10yr AVERAGE
A	22	28	41	51	45	65	60	17	43	37	27	41
B	43	68	66	72	82	96	86	41	60	77	78	73
C	72	86	78	104	111	120	147	73	118	128	118	108
D	9	9	12	11	12	5	11	3	6	5	13	9
E	26	33	20	27	22	33	24	29	26	30	34	28
Risk Bearing	65	96	107	123	127	161	146	58	103	114	105	114
% Risk Bearing	38%	43%	49%	46%	47%	50%	45%	36%	41%	41%	39%	44%
Total	172	224	217	265	272	319	328	163	253	277	270	259

Table 1: All Airprox 2013–2023 by Risk Category

Once figures have been adjusted to take account of the effects of the COVID-19 restrictions in 2020 and the first three months of 2021, the steady 10% year-on-year increase in the numbers of reported Airprox appears to have reached its zenith. Furthermore, those involving UA/Other appears to have begun to plateau, with a similar number of reports in 2023 to 2022 and 2021. Additionally, the increase in reporting of Airprox by the RPAS community seen in 2021 has continued in 2022, demonstrating an increased belief in the value-added by submitting such reports. This increase in reporting from the RPAS community is encouraging as it allows a full evaluation process to be conducted and extract as many lessons as possible from these events which might otherwise go unreported; in all but 2 cases, the pilot of the other aircraft did not see the UA and in the two cases where they did, it was too late for them to have altered their flightpath. The particular sub-set of the aviation community reporting the most observations of encounters with UA/Other is still the Commercial Air Transport (large carriers) (CAT) category. It is likely that the reasons for this remain related to the stages of flight in which they observe the UA/Other, which are predominantly in the departure or landing phase, a phase typically characterised by high workload and high rates of climb/descent which tend to precipitate a fleeting encounter whereby it is impossible for the pilots to manoeuvre effectively to increase separation. This results in an event which, by its very nature, often presents a risk of collision. As a result, and in order to gain a better appreciation of Airprox and the associated risk of collision, it is useful to think about the 2 areas (aircraft-to-aircraft encounters and UA/Other encounters) separately.

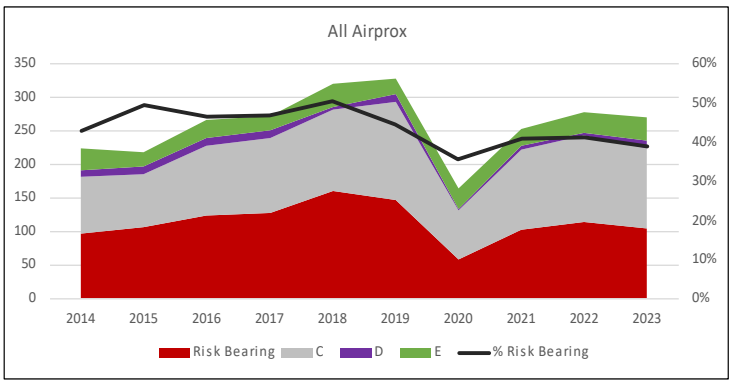


Figure 1: All Airprox 2014–2023 by Risk Category

All Aircraft-to-Aircraft Airprox 2013 - 2023

RISK	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	10yr AVERAGE
A	22	25	27	17	13	20	18	8	22	20	12	18
B	43	64	52	41	49	50	50	32	42	57	55	49
C	72	85	75	79	75	80	106	51	80	91	84	81
D	9	6	5	8	5	2	6	2	5	1	7	5
E	26	33	18	25	20	29	23	25	23	26	27	25
Risk Bearing	65	89	79	58	62	70	68	40	64	77	67	67
% Risk Bearing	38%	42%	45%	34%	38%	39%	33%	34%	37%	39%	36%	38%
Ac-Ac Total	172	213	177	170	162	181	203	118	172	195	185	178

Table 2: All aircraft-to-aircraft Airprox 2013–2023 by Risk Category

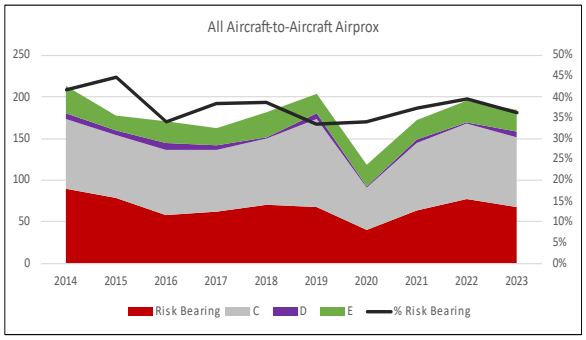


Figure 2: All aircraft-to-aircraft Airprox 2014–2023 by Risk Category

As can be seen in Table 2 and Figure 2, the reported numbers and the associated proportion of Airprox assessed by the Board to have been risk-bearing have remained largely constant over the last 10 years, notwithstanding the sharp drop in numbers of reported Airprox experienced as a direct result of the COVID-19 restrictions in 2020 and early 2021. In fact, the percentage risk-bearing figure for 2023 is only slightly lower than the current 10-year average at 36%. What is more interesting is the sector mix composition of risk-bearing events, where it is evident that the GA Sports and Recreational community has experienced a steady rise in the proportion of risk-bearing Airprox over the 3 years to 2021, but 2022 saw this increase all but arrested. Indeed, the proportion of risk-bearing events involving the GA community has decreased slightly in 2023, with that decline

almost directly transferred to the increased proportion of these events for the military community. This will be explored further in the coming sections.

Turning specifically to Airprox involving UA/Other, the 10-year picture has been included to explicitly demonstrate the surge which started in 2014 as the small drone recreational market, and reports of Airprox with these types of aircraft, increased dramatically.

Airprox Involving UA/OTHER 2012-2022

RISK	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	10yr AVERAGE
A	0	0	3	14	34	32	45	42	9	21	17	22
B	0	0	4	14	31	33	46	36	9	18	20	21
C	1	0	1	3	25	36	40	41	22	38	37	24
D	4	0	3	7	3	7	3	5	1	1	4	3
E	1	0	0	2	2	2	4	1	4	3	4	2
Risk Bearing	0	0	7	28	65	65	91	78	18	39	37	43
% Risk Bearing	0%	0%	64%	70%	68%	59%	66%	62%	40%	48%	45%	52%
Total	6	0	11	40	95	110	138	125	45	81	82	73

Table 3: Airprox Involving UA/Other 2012–2022 by Risk Category

Following the initial increase in reported Airprox involving UA/Other, the picture began to stabilise with the introduction of regulation and registration. The increased and continued focus on this area remains critical as commercial entities seek to exploit technological advances, generating new opportunities which will take larger, non-recreational drones more into the realms of Class G airspace.

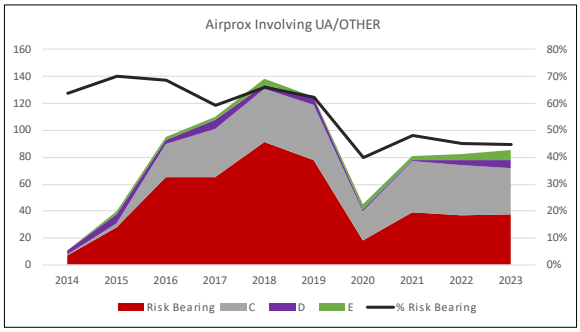


Figure 3:Airprox involving UA/Other 2014–2023 by Risk Category

Airprox observations have reinforced the concern over interactions in the sub-500ft AGL height band, where neither the RPAS flyer (often sub-400ft AGL), nor the piloted aircraft (military or those civilian-regulated aircraft that have been granted a CAA exemption from the '500ft rule' through ORS4) need to gain permission for, or are required to promulgate, their activities. The continued potential for an increased risk picture in this area is concerning; however, the biggest area for potential risk lies in the development of Beyond Visual Line-Of-Sight (BVLOS) capabilities which will most likely see RPAS venturing into Class G airspace above 500ft AGL, and almost certainly in the 0-3000ft altitude band, which is where the majority of all Airprox occur. That said, it is pleasing that there is continued and increasing evidence of RPAS operators taking responsibility to report Airprox. This means that there is an opportunity to thoroughly examine the event, trace the other aircraft, understand the context and fully discuss and evaluate the circumstances surrounding the event. This has led to some interesting insights into Airprox involving UA/Other and raised some previously unknown issues with regard to the performance of the 'traditional' MAC safety barriers and how those performance deficiencies can be mitigated. Please see the UA/Other section for analysis.

SECTOR MIX 2014-2023

Airprox vary by sector. They vary by risk distribution, airspace and altitude and each sector requires specific examination to best understand the Airprox landscape. There are 7 sectors of interest: General Aviation (including Sports and Recreational and PPL/CPL training), Civil Commercial (including air taxis, and commercial rotary); Commercial Air Transport (primarily large air carriers); Military (including Foreign military); Emergency Services (covering air ambulance, fire, police and coastguard); Unknown aircraft (although the aircraft in this category could not be traced, their descriptions are almost exclusively descriptions of general aviation light aircraft or gliders) and finally, UA/Other.

> For the purposes of this report, these sectors will be abbreviated as follows: GA, Civ_Comm, CAT, Mil, Emerg-Servs, Unk ac and UA/OTHER

This section presents the data in graphical and diagrammatic form and describes Airprox in terms of sector mix, altitude, airspace, and risk category. It describes the 'what' and makes no attempt to deduce the 'why' at this point in the report. Observations and insights as to the 'why' will be explored in the Safety Barriers and Contributory Factors sections.

It is important to understand the context around those that operate within certain sector definitions: Civ_Comm, Emerg Servs and Mil sectors are professional pilots operating in primarily Class G airspace; The CAT sector represents professional pilots, primarily operating in Controlled Airspace and the GA and Unk ac (including untraced) sectors represent pilots flying primarily for recreational purposes, operating in Class G airspace and flying the most diverse set of air vehicles including gliders, lighter-than-air vehicles, microlights and light-aircraft of numerous configurations. Figure 4 below depicts these sector interactions from 2014. The areas of interest are any mix which involves GA aircraft, specifically GA-GA, and any involving Military aircraft.

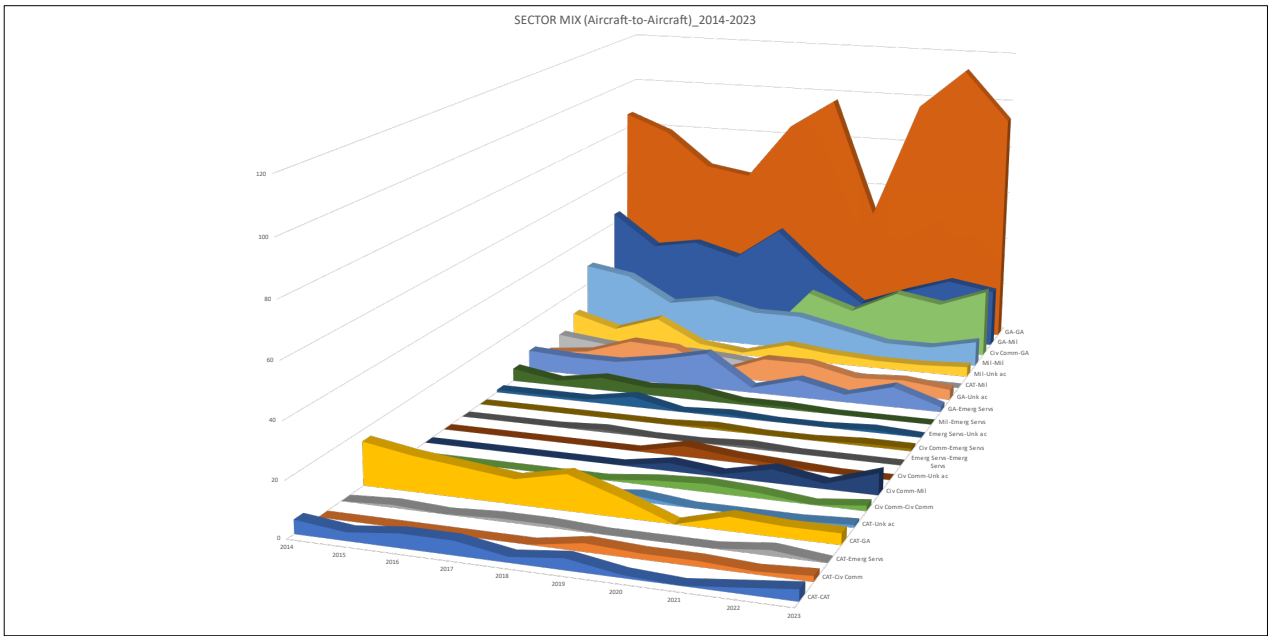


Figure 4: All Aircraft-to-Aircraft Airprox 2014–2023 by Sector Mix

Figure 5 shows the Sector mix interaction as a percentage of the 1776 aircraft-to-aircraft occurrences reported between 2014 and 2023 (note that the small numbers of Emerg Servs and Civ Comm reflect their relatively recent inclusion as a specific category where previously they would have been captured in either CAT or GA). It is striking that only 15% of the chart shows non-GA sector interactions. A similar ratio is also reflected in the 2022 and 2021 distributions.

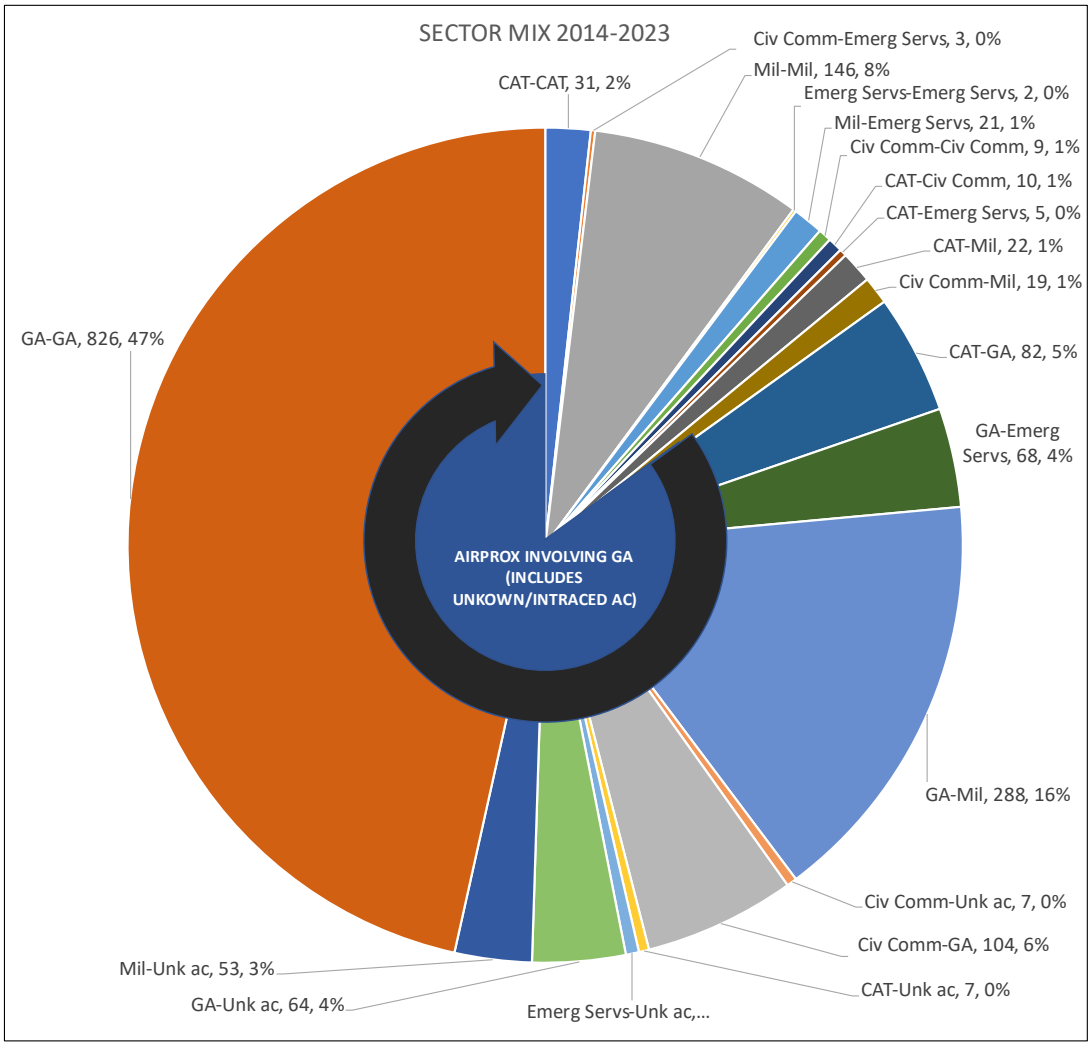


Figure 5: All Aircraft-to-Aircraft Airprox 2014–2023 by Sector Mix

Understanding this picture is important as it describes the significant influence of the GA Sports and Recreational community on the Airprox landscape and emphasises the importance and value of the sectorised approach to understanding Airprox.

2014-2023

85% of aircraft-to-aircraft events involved a GA Sports and Recreational light aircraft (this number includes Unknown_Untraced aircraft where the description fitted this category)

It is also useful to consider the percentage of risk-bearing Airprox, in terms of overall percentage, and percentages of risk-bearing of those events involving GA, Mil and CAT_Civ_Comm.

RISK BEARING TRENDS

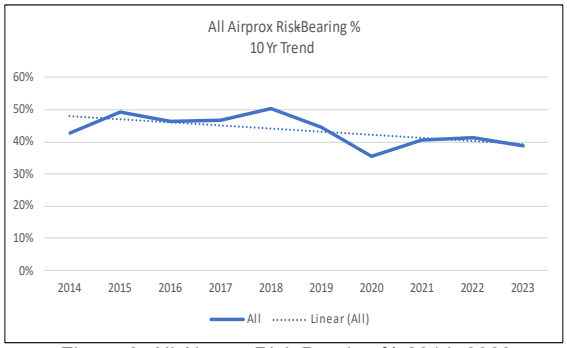


Figure 6: All Airprox Risk Bearing % 2014–2023

The percentage risk-bearing figures for 2023 are 5% lower than the 10-year average, and the overall linear trend does indicate a gradual decline in the percentage of risk bearing Airprox. It should be noted that Airprox involving UA/Other are included in this graphic which will have a more negative influence on the trend-line, given that the majority of UA/Other encounters are within the CAT and Civ_Comm sectors where a higher proportion of events that are determined to be risk-bearing are seen.

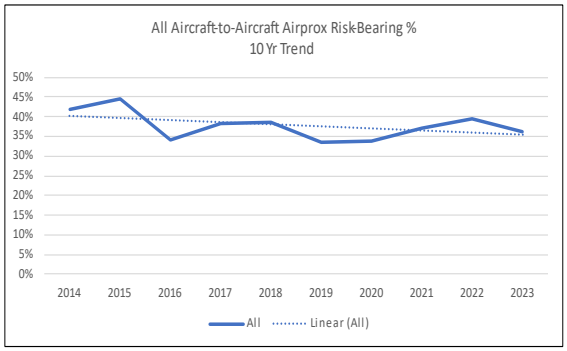


Figure 7: All Aircraft-to-Aircraft Airprox Risk Bearing % 2014–2023

When looking at aircraft-to-aircraft events in isolation – Figure 7 – the picture is not quite as positive; although it also shows a decreasing trend over 10 years, the downward gradient is shallower than the graph at Figure 6. However, to better understand those areas where there has been a change in the percentage of risk-bearing events it is useful to consider the sector distribution: Figure 8 depicts the risk-bearing percentage by sector of all aircraft-to-aircraft Airprox.

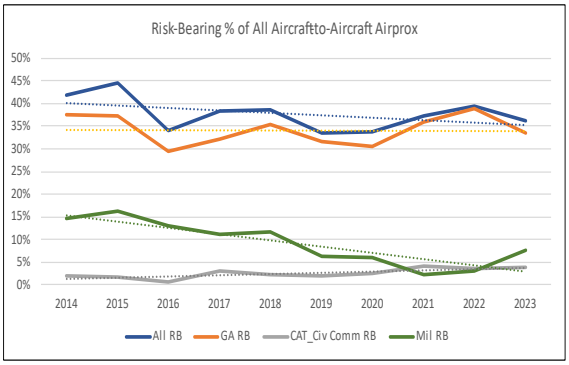


Figure 8: All Aircraft-to-Aircraft Airprox Risk Bearing % by sector 2013–2022

In 2023, risk-bearing Airprox involving Military aircraft represented 8% (up from 3% in 2022) of all aircraft-to-aircraft Airprox and risk-bearing Airprox involving GA aircraft represented 34% (down from 39% in 2022) of all aircraft-to-aircraft Airprox. The steady decline over the last 10 years in those risk-bearing events involving Military aircraft has been encouraging, although it appears likely that this reached its nadir in 2022. Moreover, the military SMS is clearly effective, and the trend in military risk-bearing Airprox remains downward. It is unlikely that the military will be able to eradicate risk-bearing events entirely in the current regulatory landscape.

The final graphs and charts in this section – Figures 9 and 10 – show the *sector risk-bearing percentage* of all risk-bearing aircraft-to-aircraft Airprox. It can be seen that the GA Sports and Recreational community represented around 90% of all risk bearing aircraft-to-aircraft Airprox in 2014 and this has steadily increased over the years to 91% in 2018 and then to a near-total dominance of risk-bearing events at 99% in 2022. Although this has now decreased to a 93% share in 2023, it is clear that the highest risk in terms of Airprox lies with the GA sector. For the military sector, 35% of risk bearing aircraft-to-aircraft Airprox involved military aircraft in 2014, decreasing to 30% in 2018 and now at 21% in 2023. Although this is a marked increase over its lowest point (6% in 2021), the trend is still significantly downwards and so a single year's figures should not be cause for alarm. Note – the percentage totals per year do not combine to give 100%. This is because (at least) 2 aircraft are involved in a single Airprox event, and when those Airprox involve differing sectors, the instance will be counted in the figures for each sector.

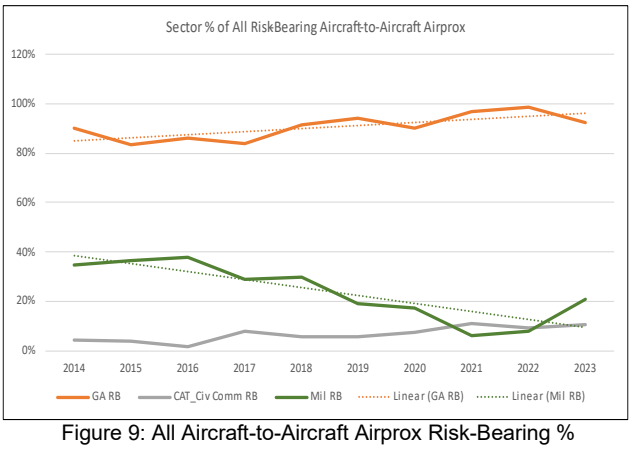


Figure 9: All Aircraft-to-Aircraft Airprox Risk-Bearing % by sector 2014–2023

In 2023, 86% of aircraft-to-aircraft events involved a GA Sports and Recreational light aircraft (this number includes Unknown_Untraced aircraft where the description fitted this category)

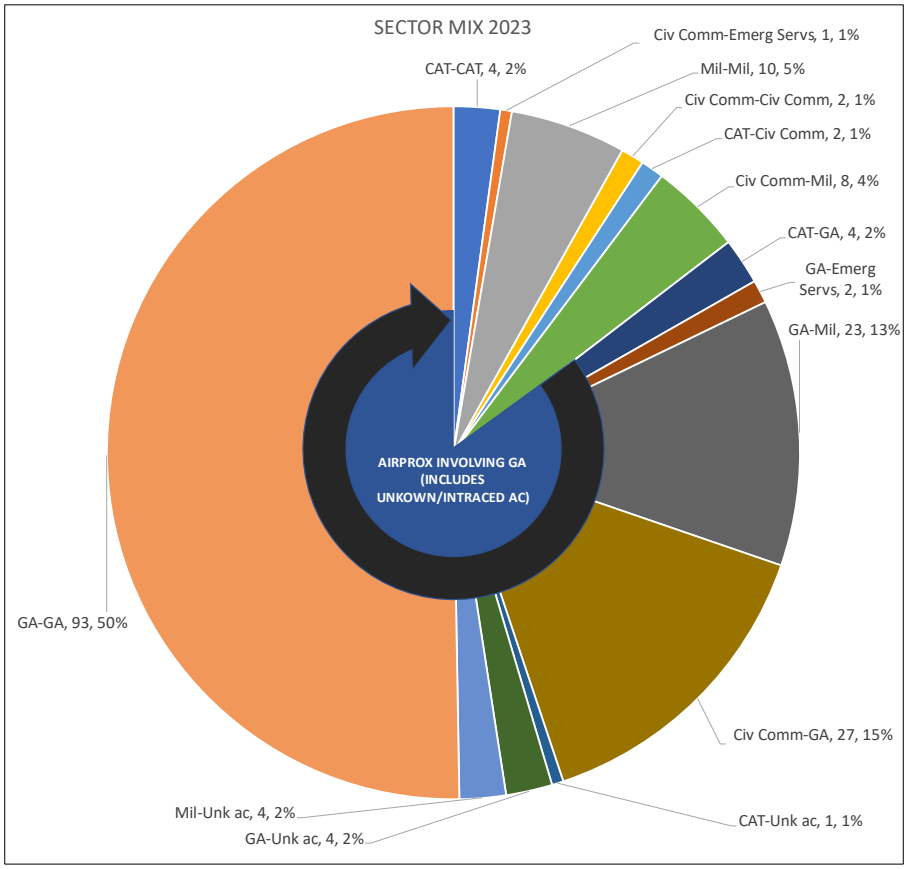


Figure 10: All Aircraft-to-Aircraft Airprox % by Sector 2023

In 2023, 93% of all risk-bearing aircraft-to-aircraft events involved a GA Sports and Recreational light aircraft (this number includes Unknown_Untraced aircraft where the description fitted this category)

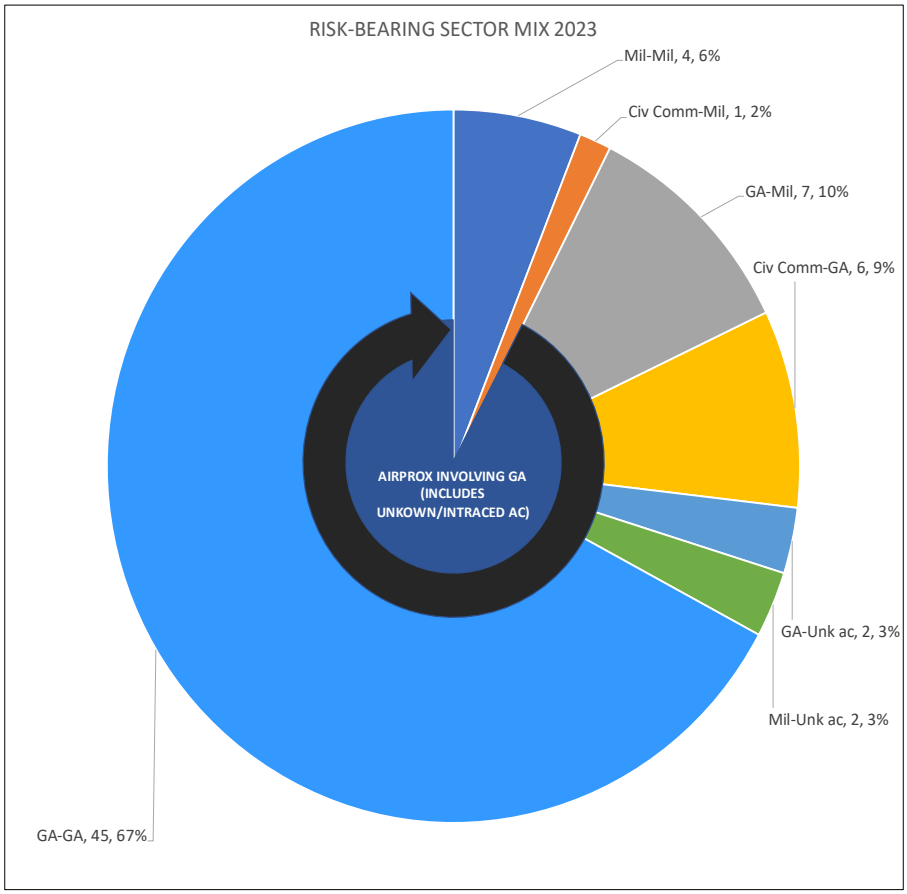


Figure 11: All Risk-Bearing Aircraft-to-Aircraft Airprox % by Sector 2023

ALTITUDE, AIRSPACE AND RISK – 2023 OVERVIEW

The following collection of charts depicts airspace, altitude, and risk combinations for 2023. As previously articulated, 86% of all aircraft-to-aircraft Airprox involved either the GA community or unknown/untraced aircraft; most of these occurred in Class G airspace below 3000ft.

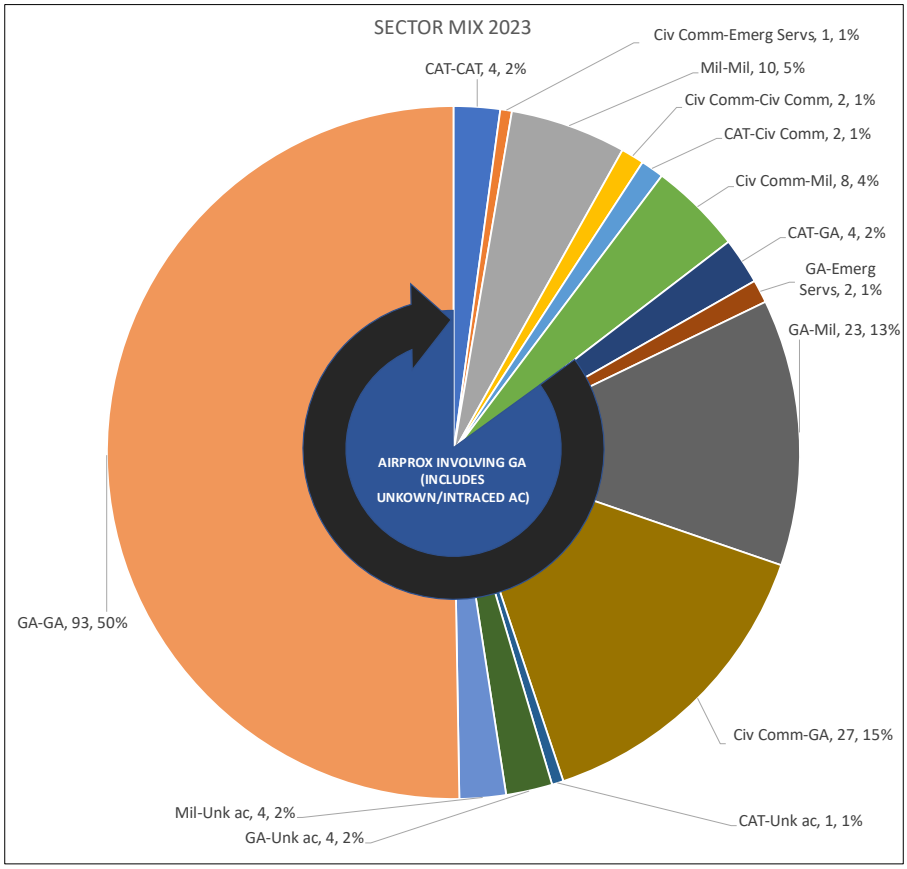


Figure 12: All Aircraft-to-Aircraft Airprox % by Sector 2023

In 2023, 86% of aircraft-to-aircraft events involved a GA Sports and Recreational light aircraft (this number includes Unknown_Untraced aircraft where the description fitted this category)

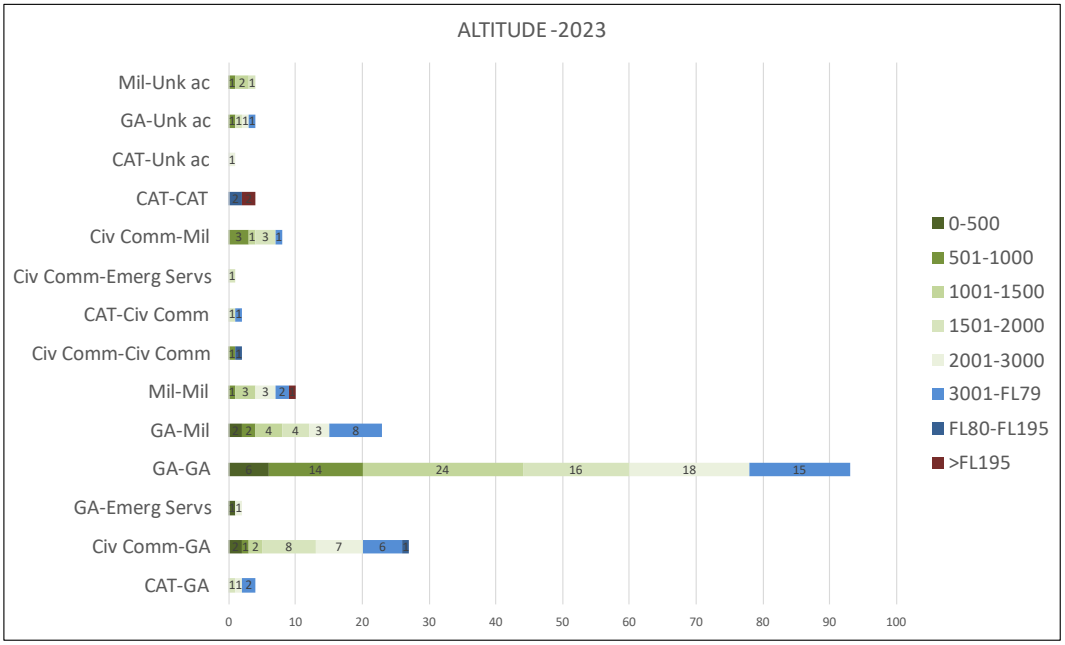


Figure 13: All Aircraft-to-Aircraft Airprox by Sector and Altitude 2023

In 2023, 72% of all events and 77% of all aircraft-to-aircraft events took place at or below an altitude of 3000ft.

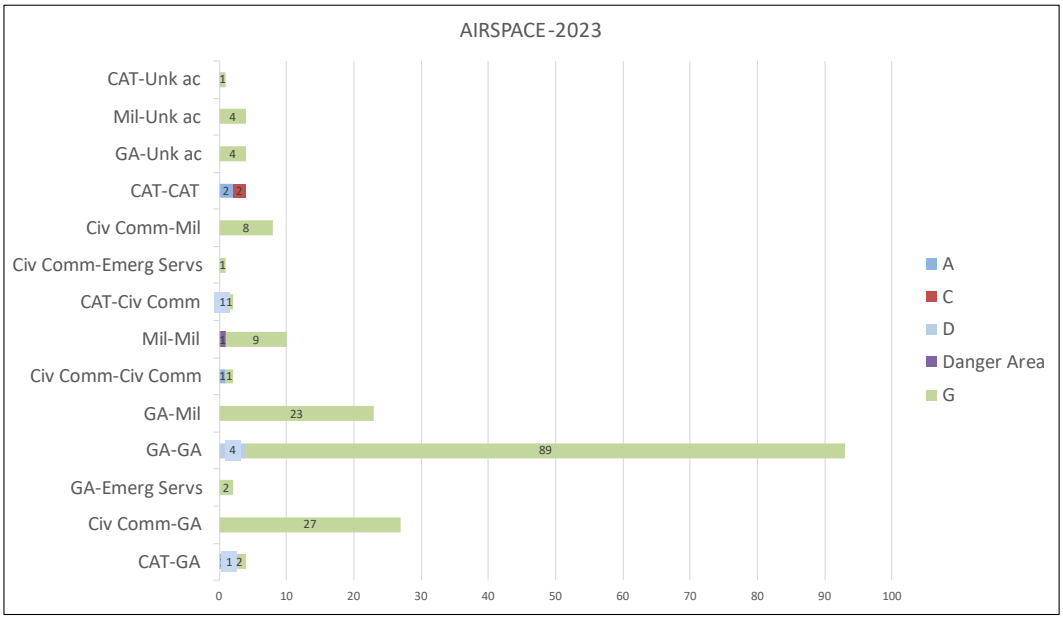


Figure 14: All Aircraft-to-Aircraft Airprox by Sector and Airspace 2023

In 2023, 77% of all events and 93% of all aircraft-to-aircraft events took place in Class G Airspace

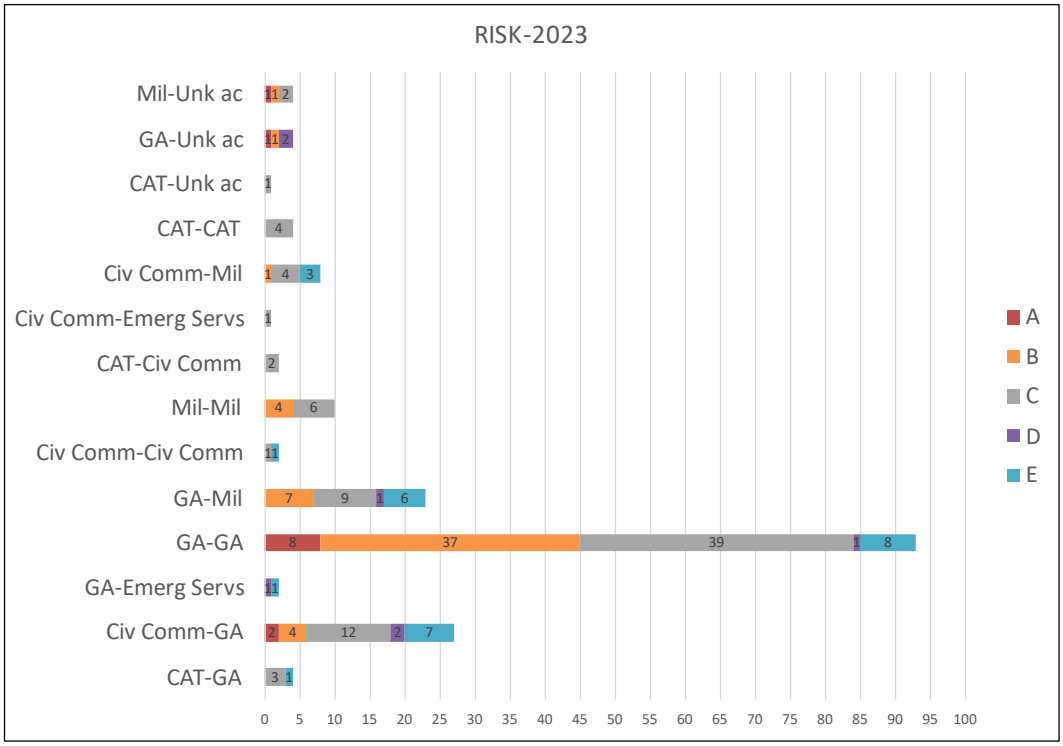


Figure 15: All Aircraft-to-Aircraft Airprox by sector and Risk 2023

It has already been shown that 93% of all risk-bearing aircraft-to-aircraft Airprox occur in the GA Sports and Recreational community, but it is useful to have a graphical breakdown of the specifics. The above chart clearly shows the sector mix distributions, and the levels of risk for each sector combination. Tables 4 and 5 provide links to all aircraft-to-aircraft risk-bearing events.

In 2023, **ALL** Category A aircraft-to-aircraft Airprox involved GA Sports and Recreational light-aircraft.

Airprox No	Year	Alt Block	Risk Category	Sector Mix
2023076	2023	2001-3000	A	GA-GA
2023098	2023	0-500	A	Civ Comm-GA
2023121	2023	1501-2000	A	Mil-Unk ac
2023143	2023	2001-3000	A	GA-GA
2023167	2023	2001-3000	A	GA-GA
2023183	2023	3001-FL79	A	GA-GA
2023186	2023	1501-2000	A	Civ Comm-GA
2023194	2023	1001-1500	A	GA-GA
2023205	2023	1001-1500	A	GA-GA
2023215	2023	501-1000	A	GA-GA
2023223	2023	1001-1500	A	GA-Unk ac
2023252	2023	501-1000	A	GA-GA

Table 4: 2023 Category A Aircraft-to-aircraft Events

Airprox No	Year	Alt Block	Risk Category	Sector Mix
2023003	2023	0-500	B	GA-GA
2023004	2023	2001-3000	B	Civ Comm-GA
2023008	2023	1501-2000	B	Civ Comm-GA
2023016	2023	0-500	B	GA-GA
2023017	2023	2001-3000	B	GA-GA
2023024	2023	1501-2000	B	GA-Mil
2023025	2023	1501-2000	B	GA-GA
2023026	2023	1501-2000	B	Civ Comm-GA
2023027	2023	501-1000	B	Civ Comm-Mil
2023032	2023	1001-1500	B	GA-GA
2023035	2023	2001-3000	B	GA-GA
2023038	2023	3001-FL79	B	GA-GA
2023040	2023	3001-FL79	B	GA-Mil
2023047	2023	1001-1500	B	GA-Mil
2023052	2023	1501-2000	B	GA-GA
2023056	2023	1001-1500	B	GA-GA
2023058	2023	FL80-FL195	B	Mil-Mil
2023063	2023	1001-1500	B	GA-GA
2023070	2023	1501-2000	B	Civ Comm-GA
2023071	2023	3001-FL79	B	GA-Mil
2023072	2023	501-1000	B	GA-GA
2023073	2023	1001-1500	B	GA-GA
2023075	2023	2001-3000	B	GA-GA
2023087	2023	1501-2000	B	GA-GA
2023092	2023	2001-3000	B	GA-GA
2023093	2023	3001-FL79	B	GA-GA
2023101	2023	1001-1500	B	Mil-Unk ac
2023104	2023	1001-1500	B	GA-GA
2023106	2023	1501-2000	B	GA-GA
2023108	2023	2001-3000	B	GA-GA
2023109	2023	1501-2000	B	GA-GA
2023111	2023	1001-1500	B	GA-Mil
2023123	2023	0-500	B	GA-GA
2023124	2023	3001-FL79	B	GA-GA
2023132	2023	1001-1500	B	GA-GA
2023139	2023	2001-3000	B	GA-GA
2023140	2023	501-1000	B	GA-GA
2023147	2023	1001-1500	B	GA-GA
2023157	2023	3001-FL79	B	GA-GA
2023160	2023	2001-3000	B	GA-GA
2023168	2023	3001-FL79	B	GA-GA
2023169	2023	0-500	B	Mil-Mil
2023172	2023	3001-FL79	B	GA-GA
2023182	2023	1001-1500	B	Mil-Mil
2023189	2023	2001-3000	B	GA-GA
2023198	2023	0-500	B	GA-GA
2023200	2023	1501-2000	B	GA-GA
2023202	2023	0-500	B	GA-GA
2023208	2023	3001-FL79	B	GA-Unk ac
2023209	2023	1001-1500	B	GA-GA
2023219	2023	1501-2000	B	GA-Mil
2023238	2023	501-1000	B	GA-GA

2023249	2023	3001-FL79	B	Mil-Mil
2023260	2023	0-500	B	GA-Mil
2023261	2023	501-1000	B	GA-GA

Table 5: 2023 Category B Aircraft-to-aircraft Events

In 2023, **50 out of 55** Category B aircraft-to-aircraft Airprox involved GA Sports and Recreational light-aircraft.

In 2023, there were **13** Category B aircraft-to-aircraft Airprox involving Military aircraft.

ATZ AND MATZ AIRPROX

Purely in terms of numbers, those instances occurring within an ATZ or MATZ has remained relatively constant over the past 10 years, although the trend is a gradual increase year-on-year (Figure 16). That said, the total number is relatively low when taken in the context of all Airprox, and the percentage of risk-bearing events that take place in a MATZ or an ATZ is lower still. All bar 2 of these risk-bearing events involve the GA Sports and Recreational sector and the top 5 Flight Elements' contributory factors (CF) associated with these risk-bearing Airprox are shown in Table 6; interestingly, these top 5 CF are identical to those for 2022. Links to those events occurring in 2023, including the risk and sector mix, are in Table 7 for ease of reference.

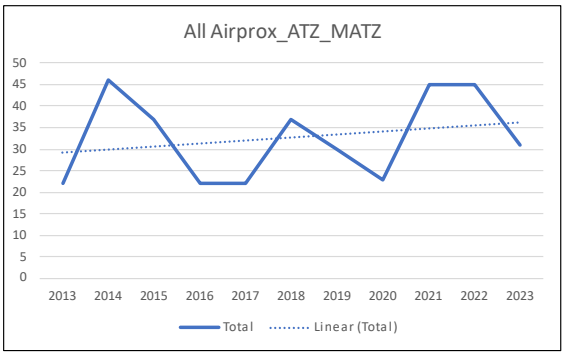


Figure 16: All Aircraft-to-Aircraft Airprox in ATZ_MATZ 2023

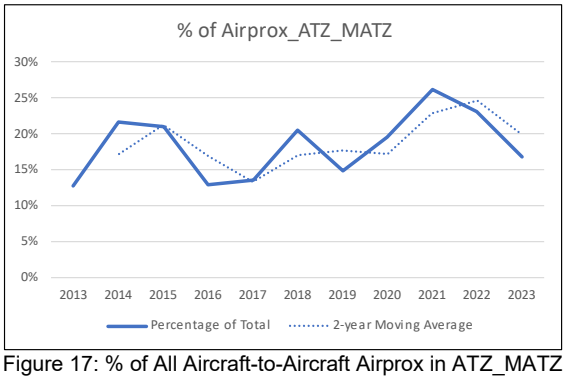


Figure 17: % of All Aircraft-to-Aircraft Airprox in ATZ_MATZ 2023

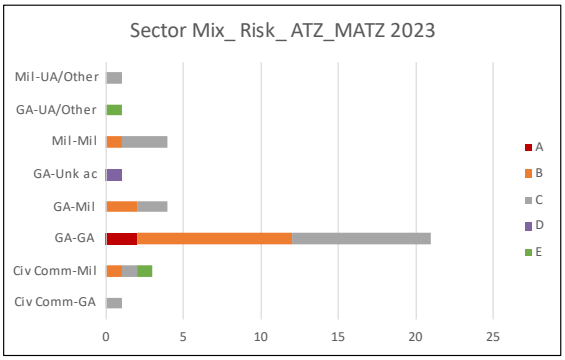


Figure 18: Risk Profile of Aircraft-to-Aircraft Airprox in ATZ_MATZ 2023

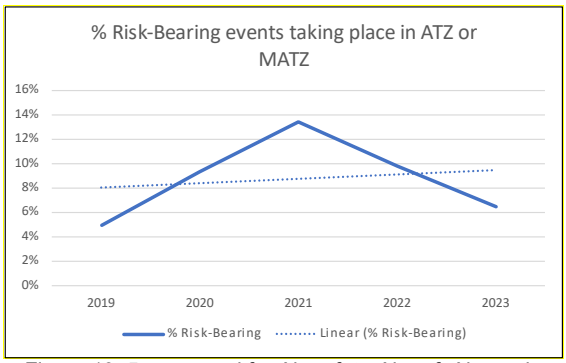


Figure 19: 5-year trend for Aircraft-to-Aircraft Airprox in ATZ_MATZ

Barrier	CF
Regulations, Processes and Procedures	Did not comply with Regulations and/or procedures
Tactical planning and Execution	Did not conform with or avoid the established pattern of traffic
	Incorrect or ineffective execution
See and Avoid	Non-sighting or Effective non-sighting
	Late sighting by one or both pilots

Table 6: Top 5 CF – ATZ_MATZ 2023

Airprox No	Year	Alt Block	Risk Category	Sector Mix
2023003	2023	0-500	B	GA-GA
2023005	2023	1001-1500	C	Mil-Mil
2023010	2023	501-1000	C	GA-GA
2023013	2023	0-500	C	GA-GA
2023024	2023	1501-2000	B	GA-Mil
2023025	2023	1501-2000	B	GA-GA
2023027	2023	501-1000	B	Civ Comm-Mil
2023045	2023	501-1000	C	GA-Mil
2023046	2023	1501-2000	C	Mil-UA/Other
2023050	2023	501-1000	C	Civ Comm-Mil
2023051	2023	1001-1500	C	GA-GA
2023055	2023	501-1000	E	Civ Comm-Mil
2023063	2023	1001-1500	B	GA-GA
2023069	2023	1501-2000	C	GA-GA
2023094	2023	0-500	C	GA-GA
2023104	2023	1001-1500	B	GA-GA
2023123	2023	0-500	B	GA-GA
2023139	2023	2001-3000	B	GA-GA
2023144	2023	2001-3000	C	GA-Mil
2023147	2023	1001-1500	B	GA-GA
2023158	2023	501-1000	C	GA-GA
2023162	2023	501-1000	C	GA-GA
2023177	2023	501-1000	C	GA-GA
2023182	2023	1001-1500	B	Mil-Mil
2023188	2023	501-1000	C	GA-GA
2023193	2023	1001-1500	E	GA-UA/Other
2023200	2023	1501-2000	B	GA-GA
2023215	2023	501-1000	A	GA-GA
2023219	2023	1501-2000	B	GA-Mil
2023232	2023	1501-2000	C	Civ Comm-GA
2023238	2023	501-1000	B	GA-GA
2023243	2023	2001-3000	C	Mil-Mil
2023248	2023	1001-1500	C	Mil-Mil
2023252	2023	501-1000	A	GA-GA
2023255	2023	501-1000	D	GA-Unk ac
2023261	2023	501-1000	B	GA-GA

Table 7: All Aircraft-to-aircraft Airprox in ATZ/MATZ – 2023

SAFETY BARRIERS AND CONTRIBUTORY FACTORS

The conceptual barrier model, which was first presented in the Annual Report for 2020, has undergone stages of development and is now mature. However, it is worth taking some time to explain the depictions below. For completeness, and by way of example, the concept of barrier weighting will be introduced, and the different weightings assigned when in Controlled Airspace will be explained, as it serves to demonstrate a little more of the rationale behind those used for analysis within Uncontrolled Airspace.

In the model developed by the UKAB, there are 9 barriers to Airprox. They interact fluidly and not necessarily sequentially, nor do they all have to be engaged; they are, however, all linked, and a path through them can be drawn for any given occasion by examining their specific performance and Contributory Factors as they are evaluated, on a collective or an individual basis. In addition, there is a recognition that the type of airspace will dictate the relative influence of the barriers on an Airprox – is it in Controlled Airspace, a known traffic environment, or in Uncontrolled Airspace, a normally unknown traffic environment?

An Airprox must be considered as a whole event, where the constituent parts – in terms of barrier performance – add up to 100%. With 9 barriers available to be in play, each makes a hypothetical contribution, but some are more influential than others: the conceptual depictions below have been scaled to represent the relative influence of the Ground Elements and the Flight Elements and the associated barriers within each of the Elements. The first thing to note is that, in Controlled Airspace, the Ground Elements collectively constitute 60% of the total barrier weighting, with Regulations, Processes and Procedures carrying the most weight. This is closely followed by the supporting barriers of Manning and Equipment and Situational Awareness which are then complemented by Electronic Warning Systems. For the Flight Elements, the emphasis is largely on the Electronic Warning Systems barrier. This speaks directly to EC in all its forms and, for operations inside Controlled Airspace – particularly in Classes A and C airspace – the carriage of such equipment is mandatory and required to meet certain standards of accuracy and technical compatibility.

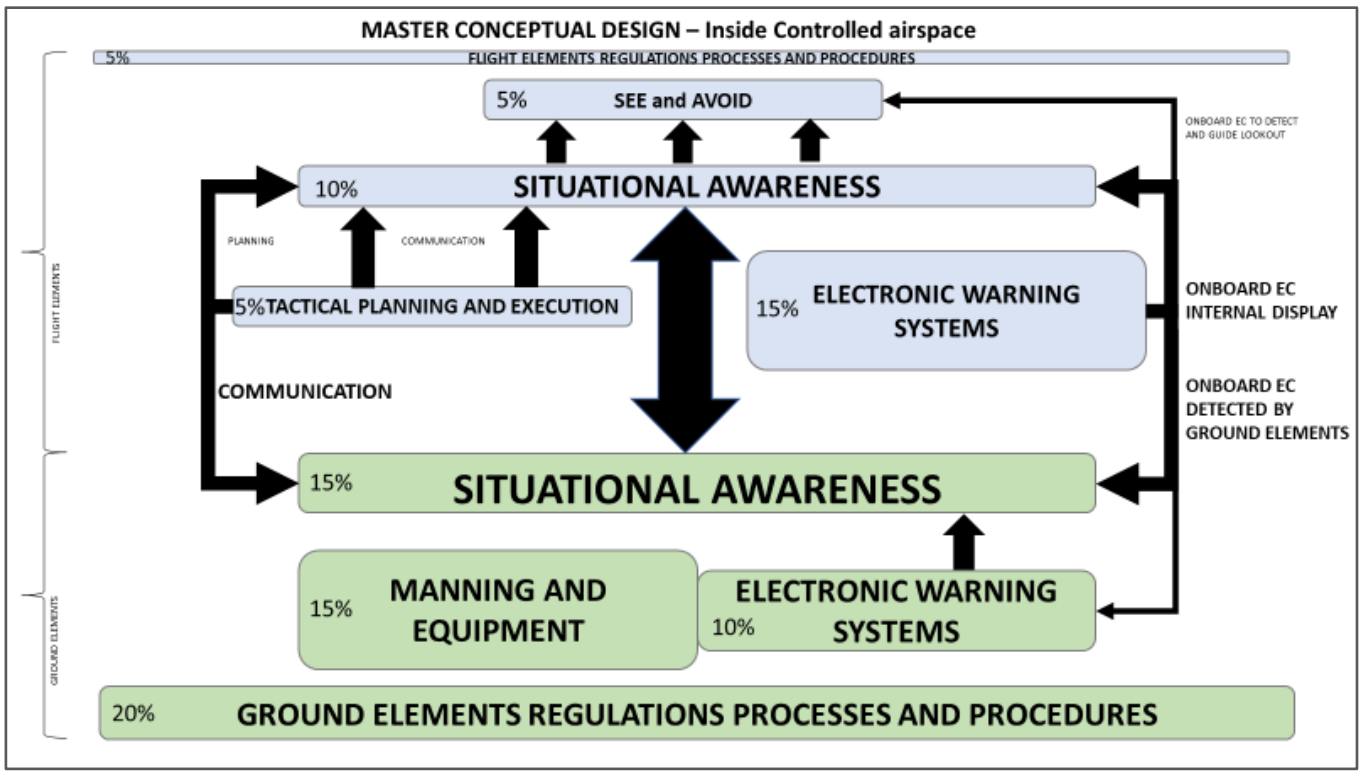


Figure 20: Schematic representation of top-level barrier interactions INSIDE CONTROLLED AIRSPACE

It should be noted that there is minimal emphasis on the See and Avoid barrier, and the reasons for this are obvious – Controlled Airspace is a known traffic environment and is relatively highly regulated. ANSPs conform to traffic separation minima, and it is their responsibility to control the traffic in such a manner as to not compromise these minima. See and Avoid is, therefore, almost redundant and appropriately so, although it should not be discounted altogether because, as is often seen, inadvertent penetrations of Controlled Airspace by other traffic do occasionally occur.

In contrast to the barrier diagram for Inside Controlled Airspace, with that of Outside Controlled Airspace – Class G airspace – the emphasis is almost entirely with the Flight Elements, with 75% of the barrier influence residing in this area. See and Avoid and Situational Awareness are paramount for the Flight Elements and are complemented with Electronic Warning Systems (in the form of EC) and the communication, planning and the execution aspects which are contained in the Tactical Planning and Execution barrier.

Only 25% of the total barrier contribution comes from the Ground Elements and is captured primarily in the Situational Awareness barrier. In Airprox barrier methodology, the only way to augment the Ground Elements Situational Awareness is through communication, the use of an appropriate level of Service and through the use of EC – which for the Ground Elements refers directly to transponding traffic which can be verified and identified on radar displays (although the use of Flight Information Displays (FIDs) – which use information from both assured and unassured sources – is on the increase, supported by appropriate regulation for the use of such devices).

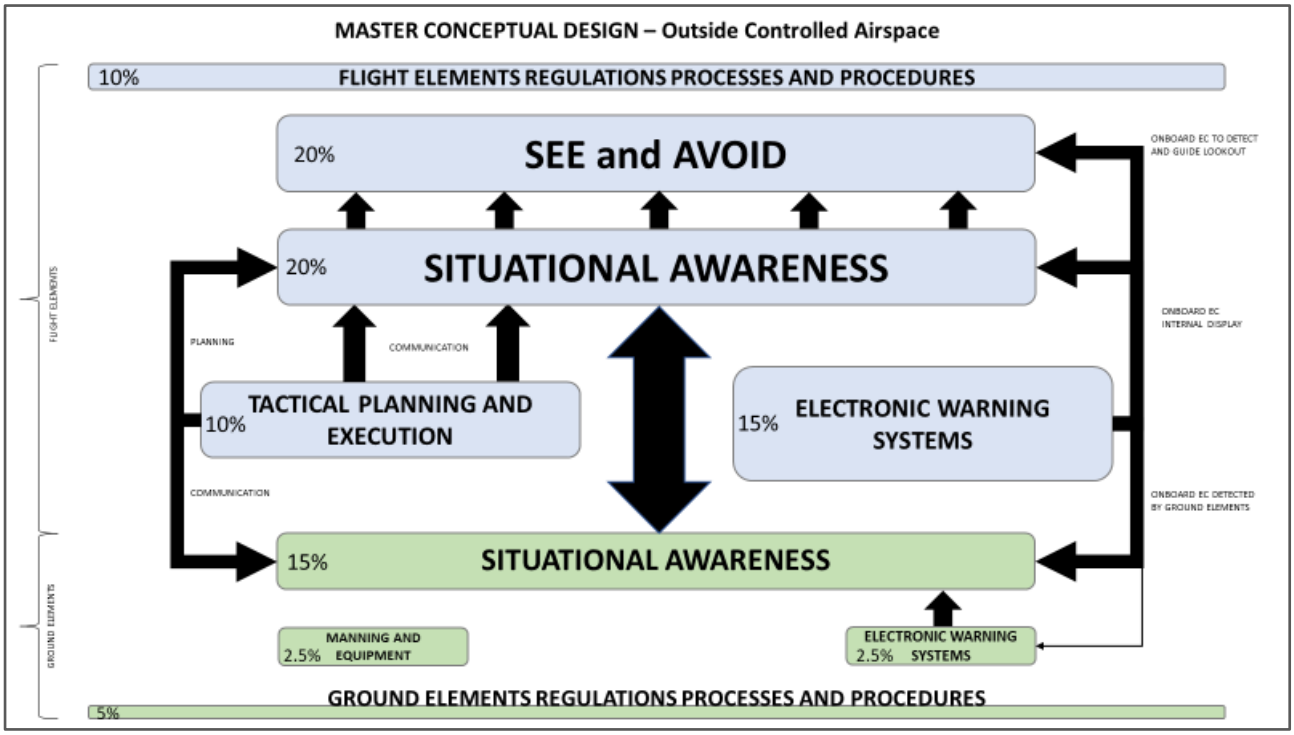


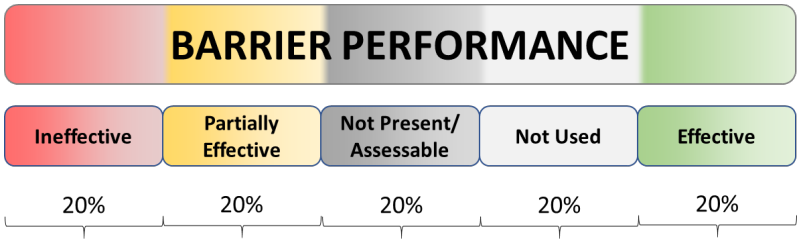
Figure 21: Schematic representation of top-level barrier interactions OUTSIDE CONTROLLED AIRSPACE

The specific weightings are shown in each diagram and assist in focussing on appropriate areas where potentially minimum action will have a proportionately significant effect.

The vast majority of Airprox reported in the UK take place in Uncontrolled Class G Airspace. Therefore, it is the diagrammatic representation in Fig 21 that will be taken forward and developed further. The following section uses colour to indicate the overall performance of each barrier and uses the percentage performance distributions in representative proportions dependent on the risk being examined at the time. This is a continued development of the concept and a way of illustrating the barrier performance and interactions. As with the last 3 years, risk-bearing performance will be

compared with Category E barrier performance and also the Category C events. Category C events are important because they qualify those occurrences where safety has indeed been degraded but where there has not been an actual risk of collision. By comparing the performance of the barriers for these categories, it will be evident that the principle of See and Avoid is the overriding factor in MAC mitigation outside Controlled Airspace. It will also be shown that the effectiveness of the See and Avoid barrier can be enhanced most effectively by focussing effort on promoting the use of compatible EC equipment, carrying a transponder and communicating with an appropriate ANSP whilst engaging the best Service possible. As further mitigation, adopting a considerate, defensive and responsible attitude to flying will strengthen the Tactical Planning and Execution barrier – as long as the rules, regulations and procedures have been followed.

Colouring metric with consistent ordering from left to right:



Each of the following diagrams of this type has accurate barrier colouration and accurate barrier proportion; the GA Sports and Recreational community is used as the example Sector Mix, unless otherwise stated.

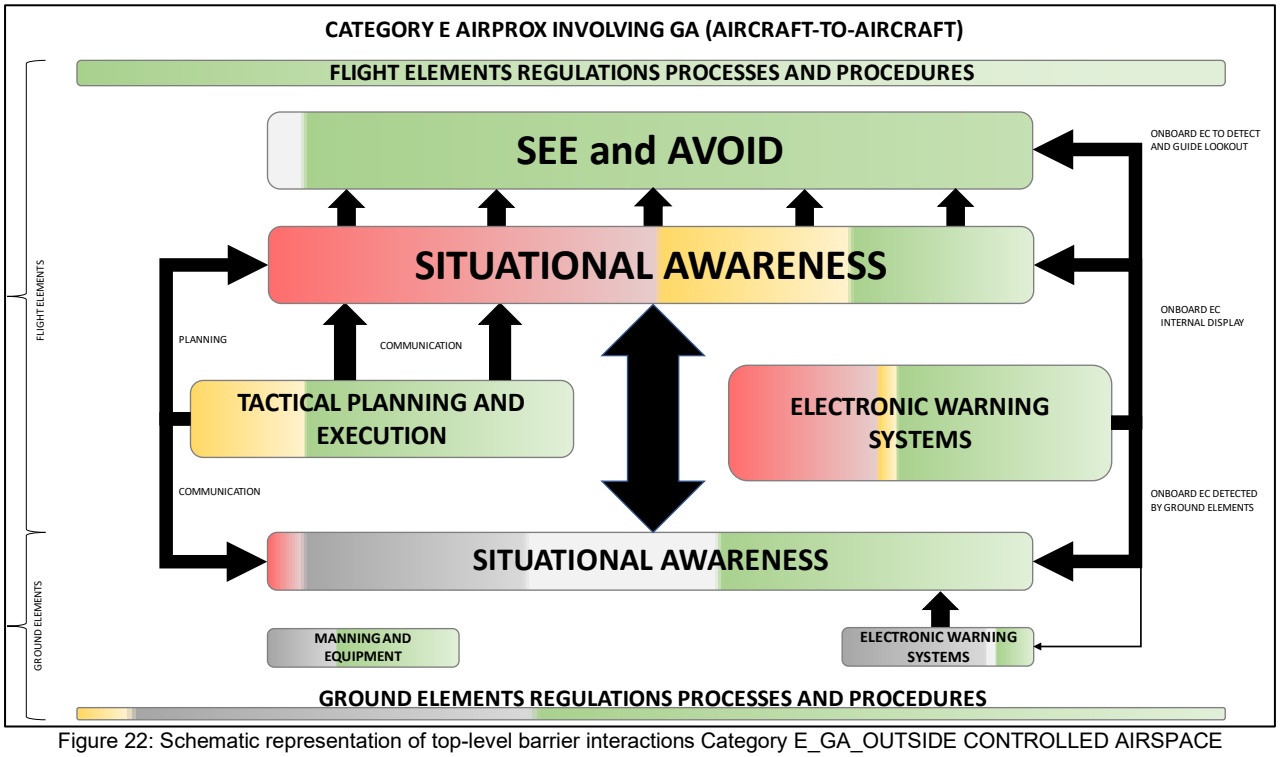


Figure 22: Schematic representation of top-level barrier interactions Category E_GA_OUTSIDE CONTROLLED AIRSPACE

For Category E Airprox:

Figure 22 above depicts barrier performance for all category E events in 2022 that involved GA. These are events in which the Board has determined that there was no degradation of safety and normal safety parameters were met (for the context in which the Airprox took place). Category E

events are useful because information can be collected that details the perspectives of the individuals, the facts and the circumstances of an event which would otherwise not be available. If the performance of the barriers over the set of category E events is analysed, it can be shown what an uneventful encounter looks like and use it as a baseline comparator for Airprox where safety is degraded and where one is risk-bearing.

What is most noteworthy from the examination of Figure 22 is the fragility of the Flight Elements Situational Awareness barrier. Once airborne, this barrier can only be augmented through the use of an appropriate ANSP (coupled with the use of an appropriate service – captured in the Tactical Planning and Execution barrier) or through information gleaned from an EC device. The green portion of the Tactical Planning barrier tells us that, for the most part, the pilots had planned and executed their sortie effectively and that they were talking with an appropriate agency for the majority of the time. However, the white portion of the Ground Elements Situational Awareness barrier tells us that there is still a large percentage of flights where pilots only choose a Basic Service – i.e., the barrier is engaged through communication, but it is Not Used as the pilot(s) are only in receipt of a service where ATC is not required to monitor their aircraft or the controller/FISO is not equipped with surveillance equipment. Where the barrier is green, this represents occasions where a Traffic Service (or higher) is in play or ATC happens to be actively involved in communicating with the pilot(s) of one or both of the aircraft at the time of the Airprox.

Encouragingly, Electronic Warning Systems were employed by the Flight Elements 100% of the time. However, they were only effective for 58% of the Category E Airprox in 2023. Use of compatible EC equipment significantly enhances Flight Elements Situational Awareness and directly influences the See and Avoid barrier. With See and Avoid being the primary (and usually final) barrier to avoiding Airprox, it is essential that any and all tools are employed to strengthen this barrier.

For Category E Airprox, the Flight Elements Electronic Warning Systems barrier was Effective (Green) 67%, Partially Effective (Yellow) 4% and fitted but Ineffective (Red) in 29% of the total aircraft-to-aircraft occurrences in 2023.

For Category E aircraft-to-aircraft Airprox in 2023, the Ground Elements Situational Awareness barrier was Effective (Green) 45% of the time, Not Used (Basic Service) or Not Present at all 48% of the time and Ineffective only 7% of the time.

For Category E aircraft-to-aircraft Airprox in 2023, the Flight Elements Situational Awareness barrier was Effective (Green) 37%, Partially Effective 22% or Ineffective 41% of the time.

For risk-bearing Airprox, the picture is markedly different:

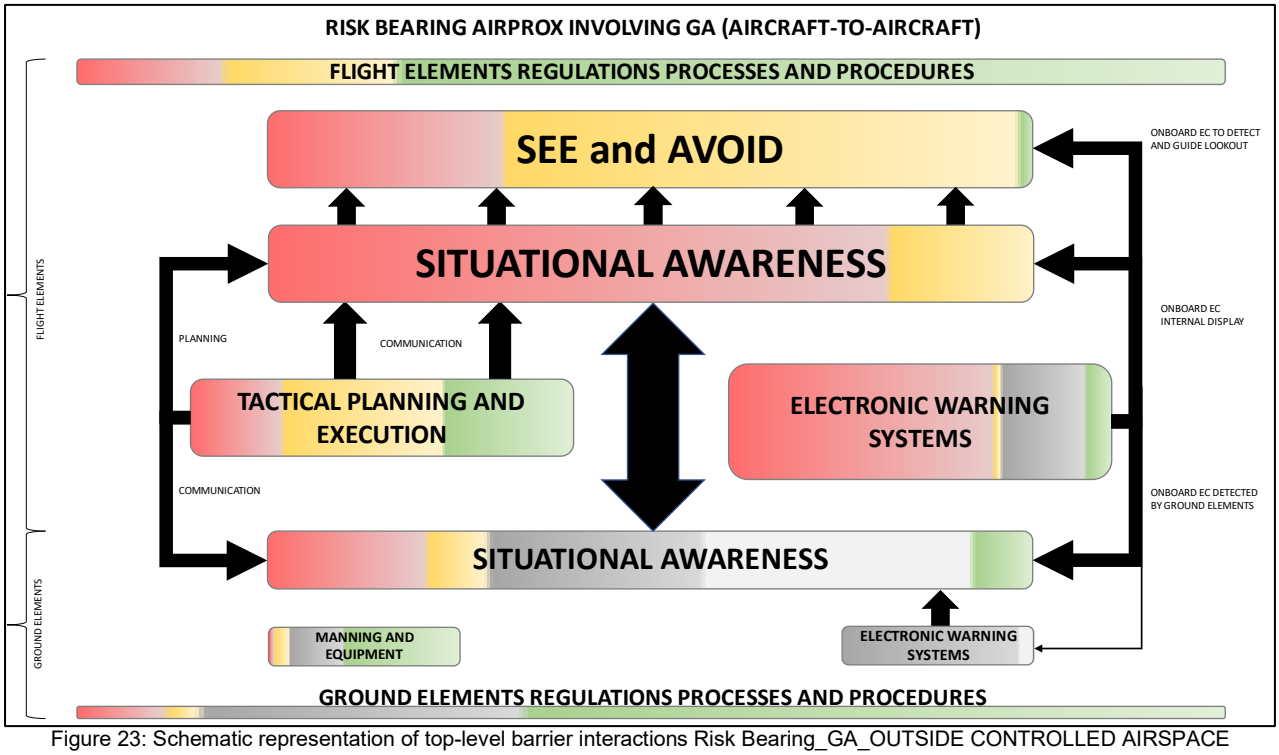


Figure 23: Schematic representation of top-level barrier interactions Risk Bearing_GA_OUTSIDE CONTROLLED AIRSPACE

The changes in the performance of all the Flight Elements barriers, together with that of the Ground Elements Situational Awareness barrier, is evident. The poor performance of the Electronic Warning Systems barrier, through either incompatibility or non-fitment of EC equipment, combined with poor planning and execution and the proportion of the time when the Ground Elements Situational Awareness barrier (normally ATC) was not engaged at all or Not Used (Basic Service), means that the Flight Elements Situational Awareness barrier was NEVER fully effective. With little or no chance of any external influence to guide pilots' lookout, it is purely the quality of an individual's lookout, or indeed providence, which led the outcome to be an Airprox and not a MAC.

For risk-bearing Airprox, the Flight Elements Electronic Warning Systems barrier was Effective (Green) only 10%, Not Present in either aircraft (Grey) for 21%, Partially Effective 2% and fitted in at least one aircraft but Ineffective (Red) 67% of the time.

For risk-bearing Airprox, the Ground Elements Situational Awareness barrier was Effective (Green) 8%, Not Used (Basic Service) 31% or Not Present at all 27%, Partially Effective 7% and Ineffective 27% of the time.

For risk-bearing Airprox, the Flight Elements Situational Awareness barrier was NEVER FULLY EFFECTIVE.

Category C Airprox represent those times where there has been no risk of collision but where safety has been assessed by the Board to have been degraded. The main changes in the barrier performances of this set of occurrences is evidence of an increase in the effectiveness of the Electronic Warning System barrier (albeit the performance of this barrier remains far from satisfactory), a marginal increase in the performance of the Flight Elements Situational Awareness barrier, a marked reduction in the proportion of time that pilots are not communicating at all with an ANSP and a resultant and significant increase in the performance of the See and Avoid barrier. Of course, it could just be that pilots who have Category C Airprox conduct a better lookout or are better served by the application of 'the big sky theory'. However, it is more likely to be as a result of increases in performance of the other critical barriers and their combined influence on the significant, and final, See and Avoid barrier.

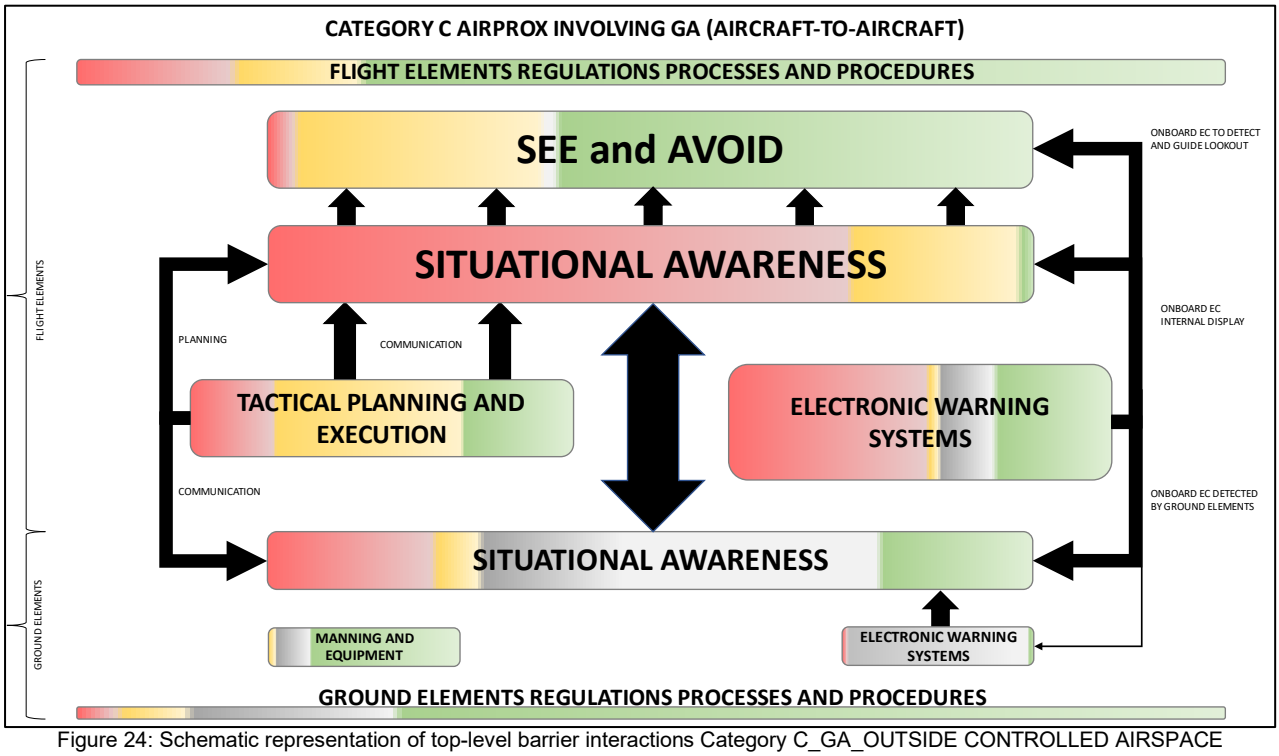


Figure 24: Schematic representation of top-level barrier interactions Category C_GA_OUTSIDE CONTROLLED AIRSPACE

For Category C Airprox, the Flight Elements Electronic Warning System barrier was Effective (Green) 41%, Partially Effective (Yellow) 2%, Not Present in either aircraft (Grey) 11% and fitted in at least one aircraft but Ineffective (Red) 46% of the time.

For Category C Airprox, the Ground Element Situational Awareness barrier was Effective (Green) 20%, Partially Effective 13%, Not Present (Grey) 17%, Not Used 26%, and Ineffective (Red) 24% of the time.

For Category C Airprox, the Flight Elements Situational Awareness barrier was Effective (Green) only 8%, Partially Effective (Yellow) 26% and Ineffective (Red) 66% of the time.

In the 2020 annual report the concept of barrier interactions was introduced, and these interactions were demonstrated by plotting the effectiveness of one barrier against another. Book 36, 2020 annual report can be found at this link: https://www.airproxboard.org.uk/media/oahp00s3/bluebook36.pdf

BARRIERS AND CONTRIBUTORY FACTORS BY SECTOR

Having examined the barrier interactions by scaling the relative influences of each on Airprox outcomes and having used colour to represent the collective performance of the barriers for GA Sports and Recreational instances, it is still useful to examine performance of the specific barriers as individual entities, and to draw out the top five Contributory Factors which have influenced those performances. It is important to remember that Contributory Factors are generally only assigned when the barrier has been compromised, so these Contributory Factors indicate areas for individuals, clubs, operating authorities, or responsible bodies to consider when assessing what can be done to improve either individual or collective performance and help to inform risk mitigation strategies and develop regulation with a view to improving collective safety.

In the following section, the barriers and top 5 Contributory Factors for Airprox involving the GA Sports and Recreational community, those involving the military community and those where the RPAS flyer reported the Airprox will be considered.

Before looking at each of the sectors, it is useful to summarise the key points associated with the five barriers with the weakest performance where Human Factors are the main influence:

Ground Elements Situational Awareness

The Ground Elements Situational Awareness barrier is a two-sided barrier based upon the relationship between an ANS provider (controller/FISO/AGO) and a pilot. For the barrier to be fully effective, the controller/FISO themselves *must* have situational awareness about the 2 aircraft involved in the Airprox. For a large number of Airprox, the type of service provided either did not require the ANS provider to monitor the aircraft on surveillance equipment (Basic Service), was not using surveillance equipment, or was not permitted to manage the traffic in the visual circuit (FISO/AGO i.e., not a controller). In these circumstances, the Board normally assesses the barrier as 'not used'. Furthermore, even when providing a service whereby the controller was required to give Traffic Information, if the controller has no knowledge of the conflicting aircraft, Traffic Information cannot be provided; examples of this might be a glider not displaying on radar or an intermittent primary-only contact. Finally, the controller must be able to pass on the associated information to the pilot, and so 2-way communication is essential to this barrier's function.

Flight Elements Situational Awareness

The Flight Elements Situational Awareness barrier describes all elements of situational awareness available within the cockpit, be that controller-derived from listening-out on a frequency or from EC equipment. The Board may also be of the view that a pilot should have generic situational awareness derived from planning documents: e.g., gliders should be expected to be encountered near a glider site marked on a chart, increased aerial activity can be expected in areas marked on charts as an AIAA.[1]

Flight Elements Tactical Planning and Execution Barrier

The Tactical Planning and Execution barrier involves both pre-flight and in-flight planning, plan adaption, communication and execution and it is available to be used in all Airprox environments. It also forms a fundamental and intrinsic part of Threat and Error Management and should be diligently undertaken prior to every flight. This barrier is primarily concerned with conducting thorough flight preparation on the ground to release capacity in the air, which then enables accurate and effective execution of the task and comprehensive communication with ground agencies and other air users. As such, it should be the easiest barrier for pilots to address. It is, however, the barrier most

[1] Area of Intense Aerial Activity.

susceptible to human performance-driven errors – especially those rooted in inexperience or where there may be gaps in a pilot's knowledge.

Flight Elements Electronic Warning Systems Barrier

The Electronic Warning Systems barrier is available for use in all Airprox and indeed forms a key element in the safety barrier system. Like the Tactical Planning and Execution barrier, it contributes to both the Ground and Flight Elements Situational Awareness barriers, but also contributes to the See and Avoid barrier (through guiding visual acquisition) and additionally to the Ground Elements Electronic Warning Systems barrier. This barrier is slightly different from the others in that it is independent to a very large degree of Human Factors: a system is either fitted (appropriately) or it is not. Of course, its efficacy also depends on the geometry of the Airprox and the familiarity of the user with their equipment (amongst other factors), however, these factors feature less than the presence of EC equipment or its compatibility. It should be noted that the proliferation of carry-on EC equipment has led to a higher proportion of Airprox where the barrier is available, but this may not equate to an improved performance of this barrier.

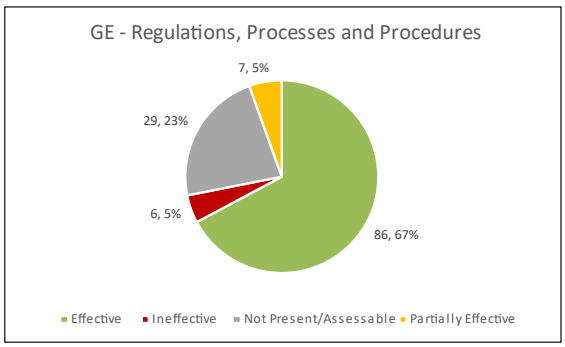
Flight Elements See and Avoid Barrier

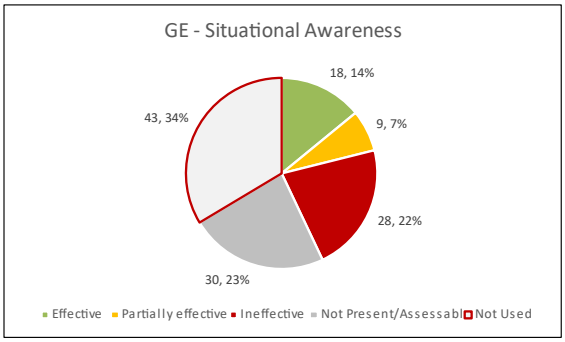
The See and Avoid barrier, according to the conceptual model presented at Figure 21, can be considered to be the last barrier to any Airprox – however, it should be noted that barrier interactions are rarely consecutive in nature and any one of them can be in play at any one time. Additionally, the influence of this barrier overrides the performance of any of the others.

> In 2023, where the Flight Elements See and Avoid barrier was FULLY EFFECTIVE, the result of the encounter was either a Category C or E (i.e., non-risk-bearing) event in **ALL** of those Airprox.

AIRPROX INVOLVING GA SPORTS AND RECREATIONAL AIRCRAFT – RISKS A/B/C

GROUND ELEMENTS



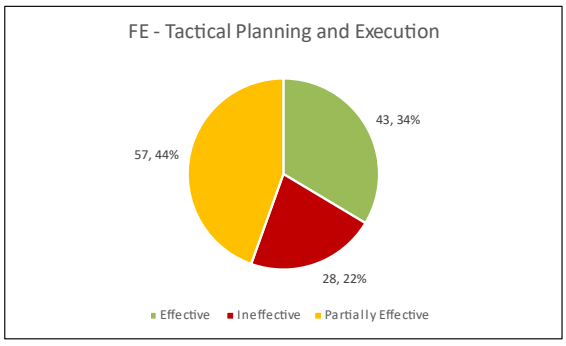


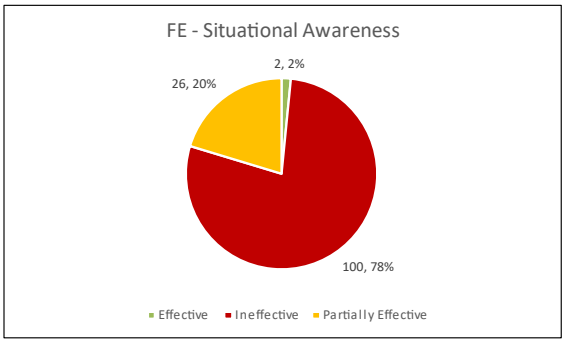
Key Points:

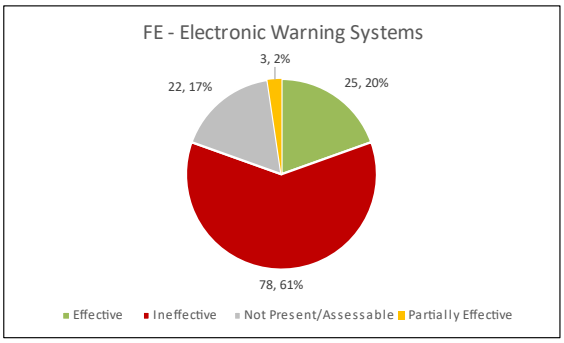
These Barriers were not engaged at all on 29 occasions (23% of the time). This is because neither aircraft's pilot was communicating with an ANSP, or there wasn't one available (e.g., no coverage or away from the environs of an airfield). Where the Regulations, Processes and Procedures barrier was engaged, it was largely effective; however, it is also evident that the Situational Awareness barrier was Not Used 34% of the time – which, disappointingly, is a decline from 2022 – and this shows that either a pilot had only agreed a Basic Service with the controller, or the aircraft was joining/departing an airfield or in a circuit environment with an AGO or AFISO. There was an opportunity for the Ground Elements to play a positive role in the interaction on 77% of occasions, but they were either denied the ability to do so by the Flight Elements, or were unable to do so by virtue of the privileges of their licence, 57% of the time. This has a direct impact on the Flight Element Situational Awareness barrier and is evidenced by its particularly poor performance in Category A/B/C Airprox.

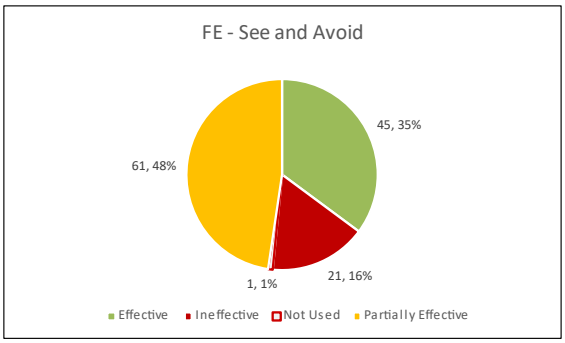
> Agreeing an appropriate level of service (surveillance-based, where available) from an ANSP will markedly increase the performance of the Ground Elements and will directly affect the performance of the Flight Elements Situational Awareness barrier.

FLIGHT ELEMENTS









The key point from this set of charts is that, for 98% of the time, the Flight Elements have only partial or no situational awareness of the evolving scenario, and so reference must be made to the Tactical Planning and Execution and the Electronic Warning Systems barriers to understand why this might be the case. The most prevalent Contributory Factors for the Flight Elements Situational Awareness barrier are:

FLIGHT ELEMENTS SITUATIONAL AWARENESS - AIRPROX INVOLVING GA SPORTS & RECREATIONAL – RISKS A/B/C
Situational Awareness and Sensory Events-Pilot had no, late or only generic, Situational Awareness
Understanding/Comprehension-Pilot did not assimilate conflict information
Lack of Communication-Pilot did not request additional information
Monitoring of Communications
Lack of Action-Pilot flew close enough to cause concern despite Situational Awareness

Table 8: Flight Elements Situational Awareness – Airprox involving GA Sports and Recreational aircraft.

The Board evaluations determined that the Tactical Planning and Execution barrier was only fully effective 34% of the time (broadly similar to this barrier's performance in 2022). The Contributory Factors for this barrier are key and it can be seen from Table 9 that they are, essentially, all aspects of what is known as threat and error management. This barrier includes the checking of NOTAMs (pre-flight and in-flight), planning the route to avoid areas of active airspace (e.g., avoiding overflying gliding sites, where possible), understanding and following the departure/arrival procedures at airfields, recognising personal limitations in terms of currency and recency and finally in the communication plan for the flight.

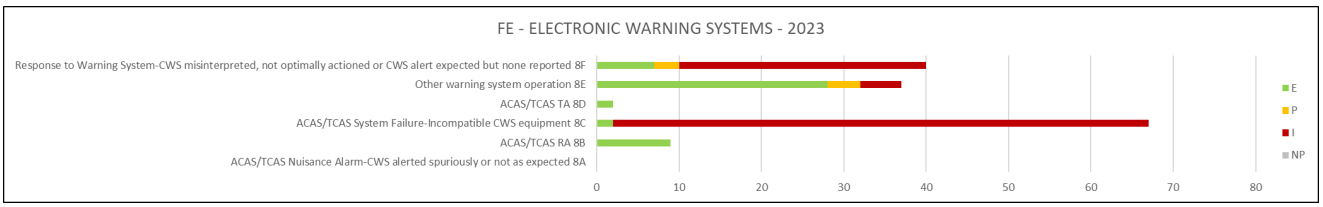
For the Tactical Planning and Execution barrier the following are the Contributory Factors which are worthy of further consideration by all communities:

TACTICAL PLANING AND EXECUTION – AIRPROX INVOLVING GA SPORTS & RECREATIONAL – RISKS A/B/C
Action Performed Incorrectly (Incorrect or ineffective execution)
Monitoring of Other Aircraft (Did not avoid/conform with the pattern of traffic already formed)
Communications by Flight Crew with ANS (Pilot did not communicate with appropriate ATS provider)
Accuracy of Communication (Ineffective communication of intentions)
Insufficient Decision/Plan (Inadequate plan adaption)

Table 9: Tactical Planning and Execution barrier – Airprox involving GA Sports and Recreational aircraft.

Finally, the EWS barrier is either not present or is ineffective 78% of the time. With no equipment fitted the barrier does not contribute in any way to the mitigation of mid-air collision; with incompatible EC equipment fitted it is equally redundant. One key take-away from the work of the UKAB is this area and this specific point. Encouragingly, the percentage of Airprox where there is no EC equipment fitted has been declining year-on-year (34% in 2021, 24% in 2022 and 17% in 2023), and there has been a marked increase in the number of interactions from warning systems other than TCAS/ACAS. However, the current regulatory position regarding EC in Class G has led to myriad systems available to GA pilots, very few of which are compatible with each other, and so the percentage of occasions where incompatibility has been a factor has increased from when the UKAB first started collecting this data (48% in 2021, 63% in 2022 and 61% in 2023). Furthermore, and as a secondary but equally influential factor, training in the interpretation of the information available from the interactions of

compatible equipment is essential. After incompatibility, this is the second most prevalent reason for the failure of the EWS barrier.

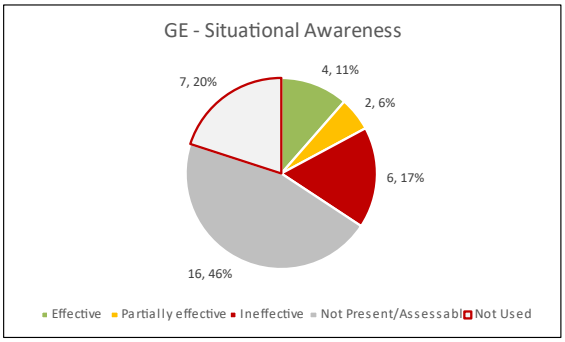


Every opportunity to augment Situational Awareness should be taken; plan, revise if necessary and communicate. Fit EC equipment and understand how it operates. Proper preparation will increase capacity and all of the above will contribute to the ability to concentrate on a robust and thorough LOOKOUT, which is the **final** (but by no means the only) barrier to mid-air collision in Class G Airspace.

AIRPROX INVOLVING GLIDERS – RISKS A/B/C

Probably the largest sub-sector within GA Sport and Recreational aircraft is those Airprox involving Gliders. There are specific challenges which highlight areas of concern with the integration of powered and non-powered aircraft into the same, minimally regulated, regions of the UK FIR that is characterised by operations in Class G airspace.

GROUND ELEMENTS

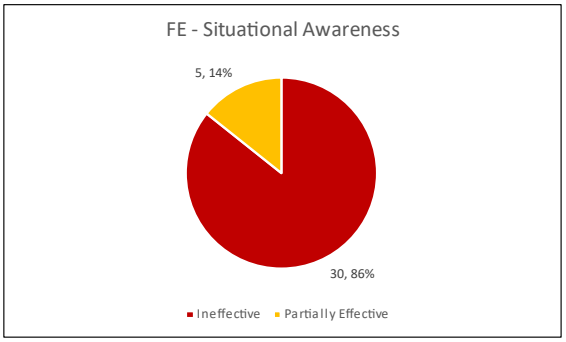


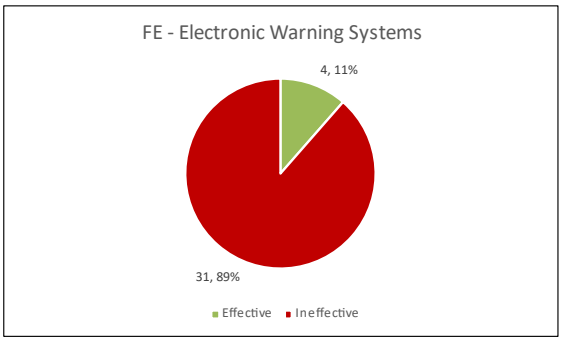
For Airprox involving Gliders, the Ground Elements are only engaged in an active manner 34% of the time, with only a Basic service being provided on 20% of the occasions (almost exclusively by the pilot of the powered aircraft). However, the engagement of the Ground Elements is much improved over 2022 (where the Situational Awareness barrier was NEVER effective) but there remains room for improvement in this regard. It is acknowledged that Flight Radio Telephony Operator's Licences (FRTOL) are not required for glider pilots. However, the utility of communicating with Air Traffic Control cannot be understated and the efforts taken by the BGA in promoting the benefits of obtaining a FRTOL are extremely welcome. It is, however, too early to assess whether this increase in the number of FRTOL-holders in the glider pilot community is the driver for the improvement in the performance of the Ground Elements – Situational Awareness barrier.

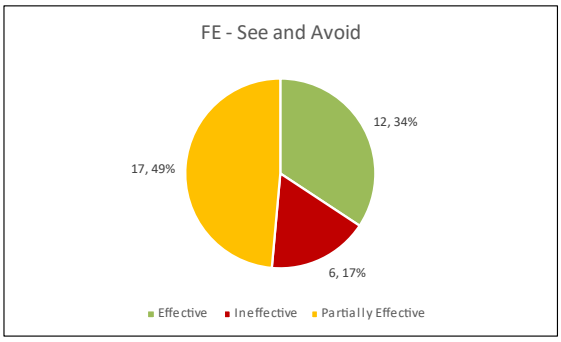
There is little else to comment on with regard to the Ground Elements for Airprox involving Gliders, apart from noting that the majority of gliders do not carry transponders and will only occasionally appear as primary returns with no information on ATC radar equipment, if installed. However, it has become apparent that more glider pilots are carrying devices with an ADS-B-out function to highlight their presence to those capable of receiving an ADS-B signal. It is worth noting, though, that glider pilots tend not to exploit the data from these devices, preferring to use a system designed specifically for the gliding community. As the use of Flight Information Displays (FIDs – harvesting data from sources other than ATC surveillance radar – becomes more prevalent amongst Ground Elements, an improvement in the performance of the Ground Elements – Situational Awareness barrier may follow, but this is also dependant on the ability (and willingness) of pilots to communicate with controllers, FISOs and AGOs.

FLIGHT ELEMENTS

There are, however, a number of significant differences when the barriers pertinent to the Flight Elements are examined, either in the performance of the barriers or, where the performances seem similar, in the contributory factors that underpin them:







Whilst the Tactical Planning and Execution barrier appears to perform markedly better in Airprox involving gliders, the Contributory Factors are noticeably different – for Airprox involving GA Sports and Recreational aircraft (which also includes gliders) the most frequent were 'Action Performed Incorrectly' and 'Monitoring of Other Aircraft'.

For Airprox involving Gliders, the top 5 Contributory Factors are:

TACTICAL PLANING AND EXECUTION – AIRPROX INVOLVING GLIDERS – RISKS A/B/C
Communications by Flight Crew with ANS (Pilot did not communicate with appropriate ATS provider)
Accuracy of Communication (Ineffective communication of intentions)
Insufficient Decision/Plan (Inadequate plan adaption)
Aircraft Navigation-Flew through promulgated and active airspace
Pre-flight briefing and flight preparation

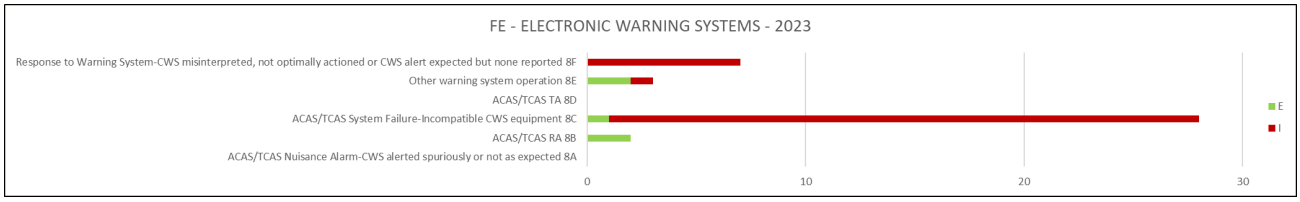
Table 10: Tactical Planning and Execution barrier – Airprox involving Gliders

Not only are the top 2 Contributory Factors entirely different from those arising from the wider GA sector, the communication and plan adaption elements are occurring with greater relative frequency. This supports the observation that very few glider pilots hold a FRTOL and, of those that do, there is a reluctance to contact ATC. It is also an observed fact from the Board's deliberations that there is a degradation in this barrier from what appears to be poor planning leading to pilots of powered aircraft flying through promulgated and active airspace and having an Airprox.

The Situational Awareness barrier is NEVER fully effective – this is normally only observed with risk-bearing Airprox, not with Airprox categorised A to C. Because so few glider pilots are permitted to communicate by radio with ATC (unless they hold a FRTOL), the only other way to positively influence the Situational Awareness barrier in real-time is through EC as captured in the Electronic Warning Systems barrier, which is equally weak. For the See and Avoid barrier, it is the quality of lookout, cued from EC equipment where it is fitted and compatible. It therefore follows that the performance of the EWS barrier is important and intrinsically linked to SA and the See and Avoid barrier.

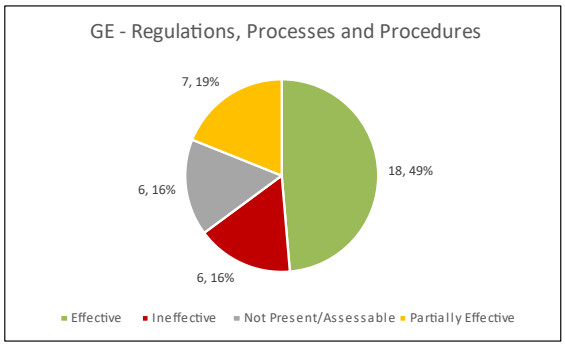
Alarmingly, for the subset of Airprox in the GA Sports and Recreational sector which involve gliders, the Electronic Warning Systems barrier is Ineffective 89% of the time and Effective on the other 11% of occasions. Where the barrier is Ineffective, it is as a result of incompatibility of electronic compatibility equipment on 77% of those occasions.

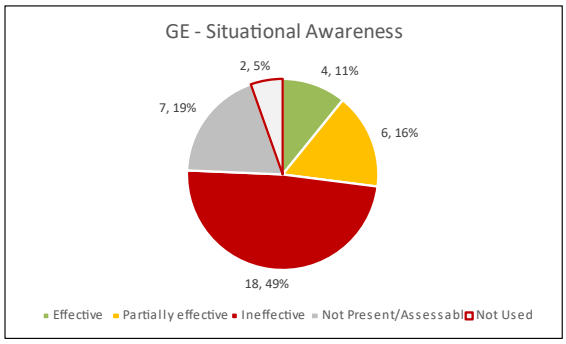
> EC equipment which responds and reacts only to transponding traffic will NOT be effective with Gliders, as the majority of them do not have transponders. Of those that do have them fitted, they are often turned OFF to conserve battery power.



AIRPROX INVOLVING MILITARY AIRCRAFT – RISKS A/B/C

GROUND ELEMENTS





For Airprox involving military aircraft, a markedly different distribution of the performance of these 2 barriers is evident. Note the percentage of time that the Ground Elements Situational Awareness Barrier is not engaged at all – only 19% (compared to 23% for Airprox involving GA). This means that for 81% of the time one or both of the pilots were engaged with ANSPs. Additionally, the barrier is Not Used on only 5% of the occasions (compared to 34% for Airprox involving GA). This means that the ANSPs involved were offering a service greater than a Basic Service for 95% of Airprox involving military aircraft. With Airprox, it is the case that information is collected when something strays from normal operations – it is crucial that the correct conclusions are drawn as it would be easy to conclude that the performance of the Ground Elements Situational Awareness barrier is 'not as bad' when the barrier is not used (as in Airprox involving GA). However, it is noteworthy that, even when the barrier is engaged, it is Ineffective for a much greater proportion of the time than in those Airprox involving GA. The Regulations Processes and Procedures barrier also appears to perform less well than with GA, and the proportions of Partially Effective and Ineffective are larger. Although this may appear to be an overall weaker performance of the Barrier, if the proportions of Ineffective and Not Present for each sector are combined, then it can be seen that the Barrier is at least Partially Effective for a broadly similar proportion of events in both sectors, as will be seen when the performance of the Flight Elements Situational Awareness barrier is scrutinised. What this data reveals are the main areas that compromise a barrier *when that barrier is* engaged. Note that there were only 49 Airprox involving Military aircraft where a full assessment of the barrier performance was possible, and this includes 4 that were reported by the UA/Other operator but were fully evaluated.

Where the Ground Elements Situational Awareness barrier was Ineffective or Partially Effective, the Ground Elements Regulations, Processes and Procedures barrier was also compromised on 48% of occasions (usually due to Traffic Information having not been passed when it should have been – see Table 11 below). Of note, 2023 saw a marked increase in the number of STCA (Short-Term Conflict Alert) events reported – it is assessed that this increase is directly attributable to the STCA feature being available within the equipment delivered by Program Marshall.

GROUND ELEMENTS SITUATIONAL AWARENESS BARRIER – AIRPOX INVOLVING MILITARY AIRCRAFT – RISKS A/B/C
ANS Traffic Information Provision-TI not provided, inaccurate, inadequate, or late
Conflict Detection-Not Detected
Task Monitoring-Controller engaged in other tasks
Conflict Detection-Detected Late
ANS Flight Information Provision-The ATCO/FISO was not required to monitor the flight under a Basic Service

Table 11: Ground Elements Situational Awareness – Airprox involving Military Aircraft

Airprox worthy of further study from the Ground Elements perspective are:

Airprox No	Year	Alt Block	Risk Category	Sector Mix
2023027	2023	501-1000	B	Civ Comm-Mil
2023037	2023	1501-2000	C	Mil-Mil
2023040	2023	3001-FL79	B	GA-Mil
2023041	2023	1001-1500	C	Civ Comm-Mil
2023047	2023	1001-1500	B	GA-Mil
2023050	2023	501-1000	C	Civ Comm-Mil
2023058	2023	FL80-FL195	B	Mil-Mil
2023086	2023	2001-3000	C	Mil-Mil
2023111	2023	1001-1500	B	GA-Mil
2023144	2023	2001-3000	C	GA-Mil
2023145	2023	3001-FL79	E	Civ Comm-Mil
2023171	2023	3001-FL79	C	GA-Mil
2023182	2023	1001-1500	B	Mil-Mil
2023219	2023	1501-2000	B	GA-Mil
2023222	2023	1501-2000	C	Civ Comm-Mil
2023243	2023	2001-3000	C	Mil-Mil
2023249	2023	3001-FL79	B	Mil-Mil

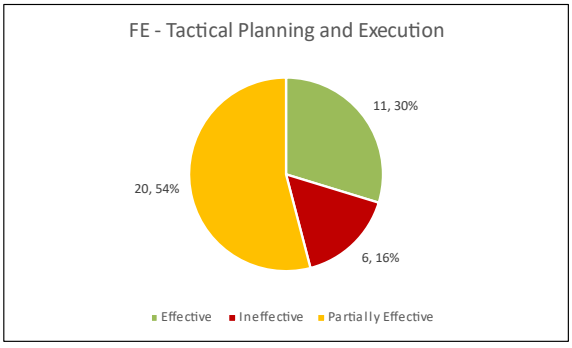
Table 12: Airprox involving Military Aircraft – worthy of study

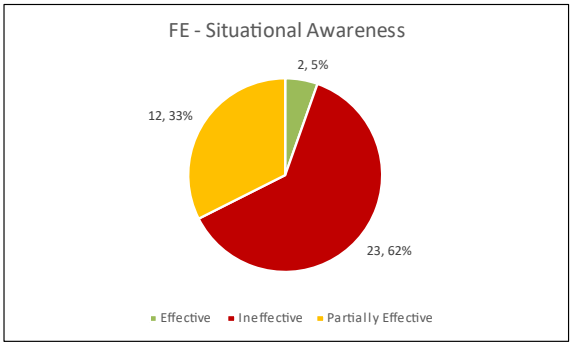
FLIGHT ELEMENTS

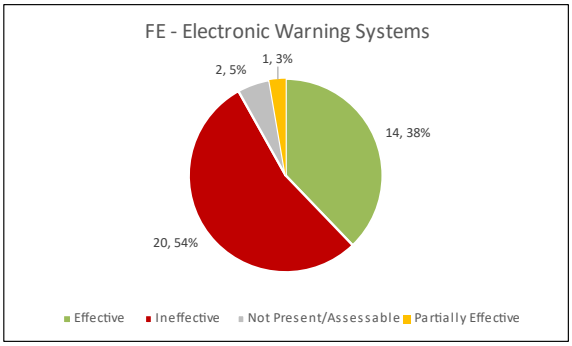
What is noticeable in this set of graphics is the similarity in performance of the Tactical Planning and Execution, Situational Awareness and See and Avoid barriers when compared with the General Aviation sector. This is unsurprising when considering that 60% of aircraft-to-aircraft Airprox involving military aircraft were with the GA sector. However, the Electronic Warning Systems barrier does perform markedly better than for the GA sector, and it is noteworthy that there is a much higher percentage of encounters where EC equipment is fitted, reflecting the extensive work that Defence has undertaken in this regard. Regrettably, Electronic Warning Systems barrier performance will remain weak unless or until a common standard for EC is agreed and mandated for carriage in Class G airspace.

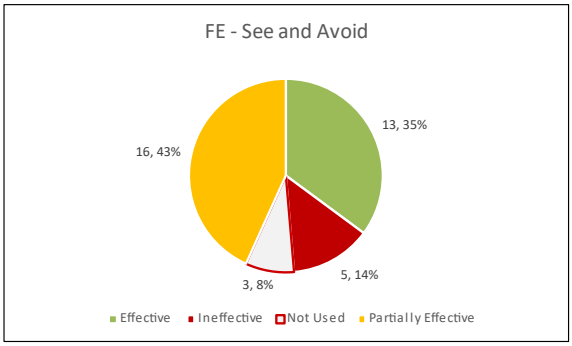
FLIGHT ELEMENTS SITUATIONAL AWARENESS BARRIER – AIRPROX INVOLVING MILITARY AIRCRAFT – RISKS A/B/C
Situational Awareness and Sensory Events-Pilot had no, late or only generic, Situational Awareness
Unnecessary Action-Pilot was concerned by the proximity of the other aircraft
Understanding/Comprehension-Pilot did not assimilate conflict information
Lack of Action-Pilot flew close enough to cause concern despite Situational Awareness
Monitoring of Communications

Table 13: Flight Elements Situational Awareness – Airprox involving Military Aircraft









The Tactical Planning and Execution Barrier performs marginally better than in those Airprox involving GA Sports Recreational aircraft; 3 of the top 5 reasons for barrier compromise are the same as for the GA sector, but note the appearance of Flight Planning Information Sources and Pre-Flight Briefing and Flight Preparation:

TACTICAL PLANING AND EXECUTION – AIRPROX INVOLVING MILITARY AIRCRAFT – RISKS A/B/C
Insufficient Decision/Plan-Inadequate plan adaption
Action Performed Incorrectly-Incorrect or ineffective execution
Flight Planning Information Sources
Pilot did not request appropriate ATS service or communicate with appropriate provider
Pre-flight briefing and flight preparation

Table 14: Tactical Planning and Execution barrier – Airprox involving Military aircraft

Noting that the top 2 contributory factors reflect either not taking the most appropriate course of action or selecting the correct option but not quite executing it correctly, it is perhaps a little concerning that, with dedicated resources to ensure that planning information is available to crews, this barrier is compromised by information being unavailable on the ground prior to flight or being available but not referenced by crews. With so few Airprox involving Military aircraft, it must be said that there is not a very high count of these contributory factors but, nonetheless, it can be seen that a less-than-thorough pre-flight preparation can have an impact on the safe execution of the flight.

Finally, when the Electronic Warning Systems barrier was Ineffective, it was usually a mix of Military and either GA Sports and Recreational aircraft or RPAS, where compatibility and/or carriage of equipment was a significant issue. However, and perhaps disappointingly, there were 5 occasions where the mix was Military-Military.

It should be noted that there were 14 aircraft-to-aircraft risk-bearing Airprox (from a total of 45) that involved Military aircraft. The majority of them were categorised as Category C, where safety was degraded but there was no risk of collision. This distribution is largely down to the performance of the See and Avoid barrier, meaning that the conflicting aircraft (either sector) was seen with sufficient time to introduce deconfliction without the need for emergency or radical avoiding action. It is noteworthy that, in 2023, the performance of the Situational Awareness barrier and the Electronic Warning System barrier are significantly better then in 2022. However, this improved performance has not been reflected in the performance of the See and Avoid barrier, which has seen a decrease in the percentage of encounters where the barrier is Fully Effective and an increase in Partially Effective, meaning that the separation between the aircraft at the point of action being taken has, on average, reduced. It may be that more attention is being paid to EC devices or simply that lookout is not providing an early enough detection of other aircraft; with such a small sample size, it is impossible to draw firm conclusions. However, there are areas which deserve focus, and these are summarised below:

ALL AIRPROX INVOLVING MILITARY AIRCRAFT	
GROUND ELEMENTS	**FLIGHT ELEMENTS**
ANS Traffic Information Provision-TI not provided, inaccurate, inadequate, or late	**Incompatible CWS equipment**
ATM Regulatory Deviation-Regulations and/or procedures not fully complied with	**Monitoring of Other Aircraft-Non-sighting or effectively a non-sighting by one or both pilots**
Expectation/Assumption-Concerned by the proximity of the aircraft	**Identification/Recognition-Late sighting by one or both pilots**
Aeronautical Information Services-The Ground entity's regulations or procedures were inadequate	**Insufficient Decision/Plan-Inadequate plan adaption**
Radar Coverage-Non-functional or unavailable	**Flight Planning Information Sources**

Table 15: General Contributory Factors – Airprox involving Military Aircraft

AIRPROX REPORTED BY RPAS (FULL BOARD EVALUATIONS) – RISKS A/B/C

The final bespoke section concerns the findings relating to interactions between RPAS and piloted air vehicles. Although the numbers are small, these Airprox are significant because the RPAS flyer has reported the occurrence. This simply means that the UKAB Secretariat is invariably able to trace the conflicting aircraft and the Board is therefore able to conduct a full evaluation of the event.

This is not the case with UA/Other Airprox, where the non-piloted vehicle is usually untraceable. As with all sectorised Airprox, it is the differences in the barrier performances which are illuminating, so it is useful to use the barrier conceptualisation diagram to illustrate the dynamics of the situation. For these cases, the See and Avoid barrier qualified from both the perspective of the RPAS flyer and then the Piloted aircraft will be presented.

It is clear that the Ground Elements play very little, if any, part in this type of Airprox, realistically leaving the Flight Elements with the only levers to mitigate against an Airprox or mid-air collision.

It can also be seen that the Regulations, Processes and Procedures barrier generally performs reasonably well.

For the Tactical Planning and Execution barrier the main Contributory Factors to an Ineffective or only Partially Effective barrier are planning, preparation and plan adaption, driven by the difficulties of either party having any prior knowledge during the pre-flight planning stage of the presence of the other, and are therefore unable to modify their plan to take account of this. Additionally, the Situational Awareness barrier is ALWAYS Ineffective, meaning that pilots and RPAS operators are relying on reacting to what they see.

> The Ground Elements are not able to add much, if any, value to RPAS Flyer operations.

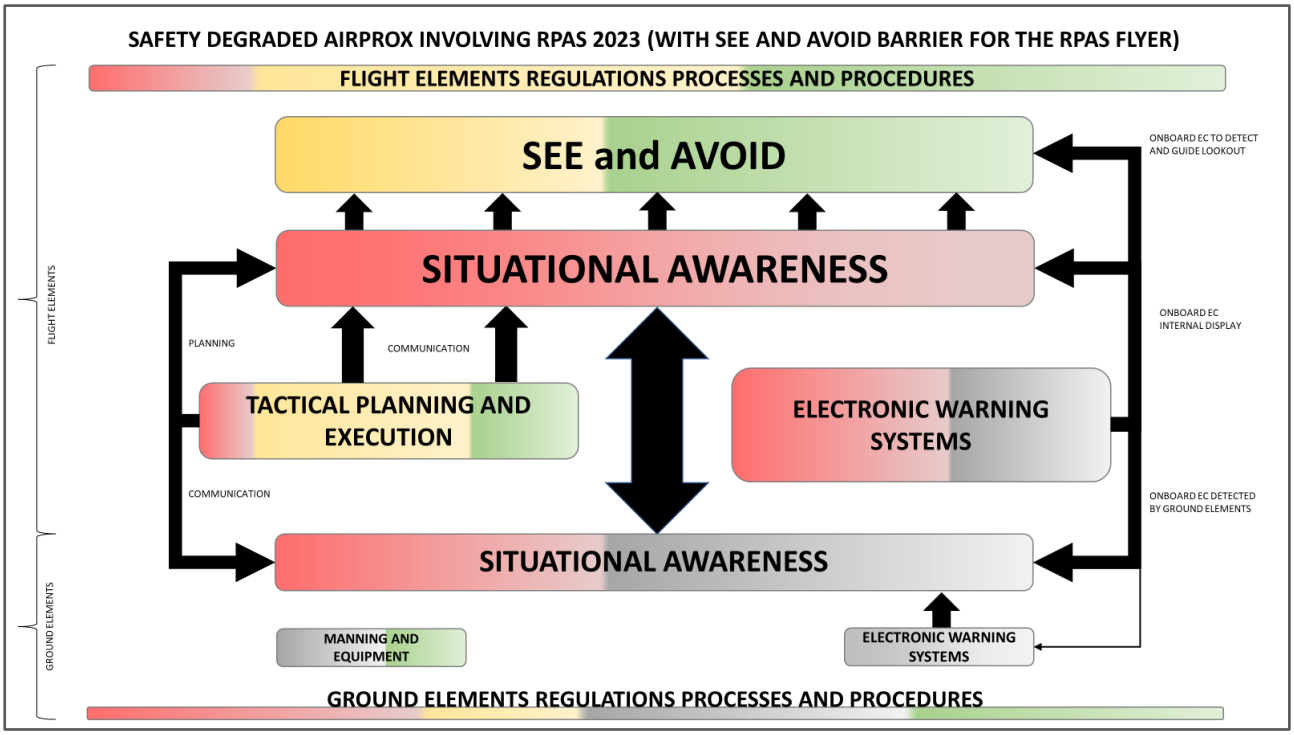


Figure 25: Schematic representation of top-level barrier interactions_RPAS reported_A/B/C_See and Avoid from RPAS operator.

On one occasion the RPAS was fitted with a form of EC which alerted the flyer to the presence of the approaching aircraft; in this case a Risk Category of E was assigned by the Board, indicating the utility

of early warning of an aircraft's presence. In all other cases, it was either Ineffective through incompatibility where a piece of equipment was fitted to the piloted aircraft and not fitted to the RPAS, an alert was not received or there was no equipment fitted to either aircraft.

When all these points are taken into consideration, the feeds into the See and Avoid barrier are degraded significantly. However, looking at Fig 25 the barrier performs quite well. This is because on every occasion where this barrier was fully effective it was the RPAS Flyer who heard an aircraft in the vicinity and was able to acquire it visually and take action to avoid it.

Figure 26 has been constructed using the See and Avoid barrier information from the perspective of the piloted vehicle – the pilots involved only saw the RPAS on 2 occasions, and on both those occasions it was late enough that they could do little to increase the separation.

In all of the cases where the RPAS flyer has reported the Airprox, the pilot of the crewed aircraft was NEVER aware of its presence.

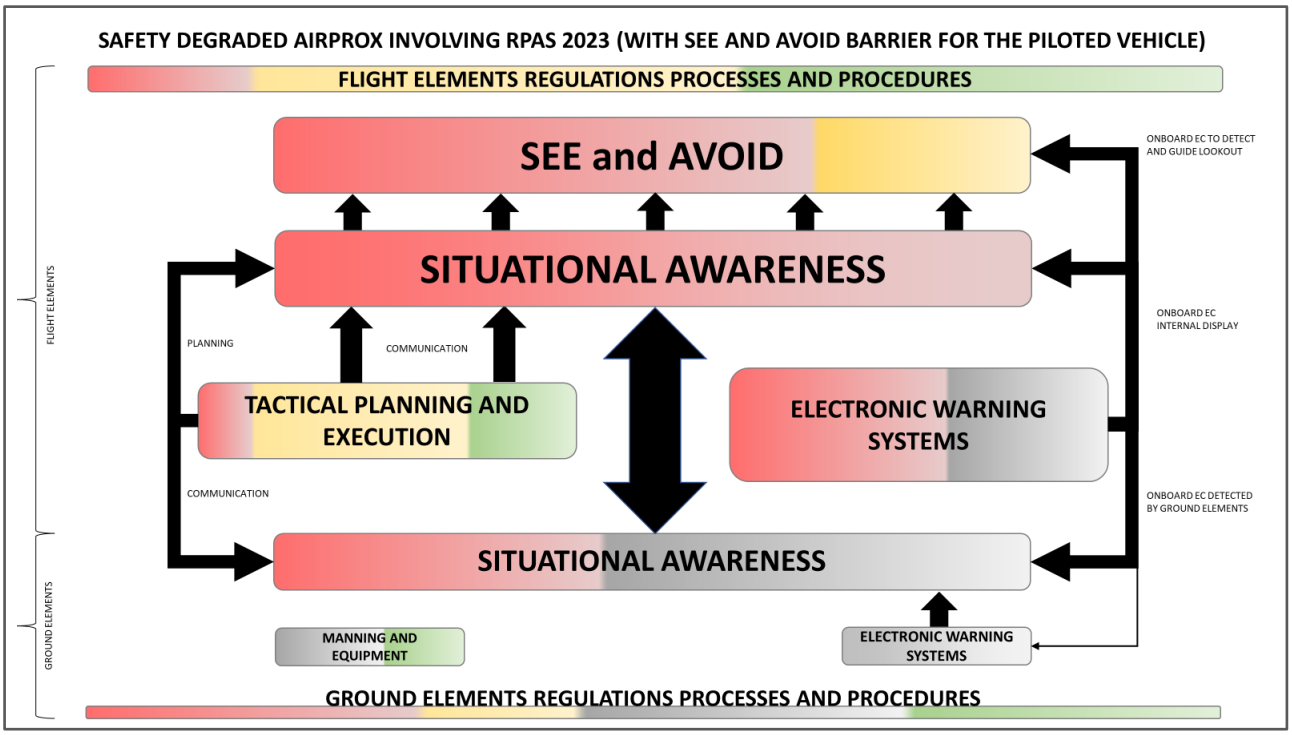


Figure 26: Schematic representation of top-level barrier interactions_RPAS reported_A/B/C_See and Avoid from piloted vehicle.

Although the data set for these occurrences is incredibly small, consisting of only 15 Airprox, these 15 Airprox elicited 4 Safety Recommendations where the Board was seeking to improve the promulgation of planning information for RPAS activity, and to increase awareness amongst pilots and controllers of where RPAS flying (particularly model aircraft) activity can be expected. It is difficult to cater for all circumstances, but there is justifiable apprehension surrounding the regulatory requirements as technological advances bring us ever closer to civilian BVLOS RPAS operations in Class G Airspace. Although BVLOS RPAS are likely to have a larger visual cross section, they will still be significantly smaller than piloted aircraft, rendering the See and Avoid barrier more vulnerable than it already is. For the RPAS, the See and Avoid is likely to be some form of a Sense and Avoid, yet Class G airspace does not require, and the regulations do not support, a known air traffic environment. It is difficult to see where effective barrier mitigations to an Airprox with RPAS once airborne can be made UNLESS interoperable EC equipment is mandated throughout Class G airspace. Pilots of crewed aviation need to be aware that, from their perspective, reliance on the See

and Avoid barrier in Class G airspace offers little defence against an Airprox (or a MAC) with an RPAS.

The table below provides links to the 15 Airprox where the Board was able to conduct a full evaluation:

Airprox No	Year	Alt Block	Risk Category	Sector Mix
2023011	2023	0-500	B	Emerg Servs-UA/Other
2023036	2023	0-500	D	UA/Other-Unk ac
2023057	2023	0-500	C	Civ Comm-UA/Other
2023068	2023	3001-FL79	C	CAT-UA/Other
2023083	2023	501-1000	E	Mil-UA/Other
2023116	2023	1001-1500	C	Mil-UA/Other
2023119	2023	0-500	C	Civ Comm-UA/Other
2023120	2023	0-500	D	UA/Other-Unk ac
2023150	2023	0-500	E	Mil-UA/Other
2023174	2023	0-500	D	UA/Other-Unk ac
2023176	2023	0-500	C	Emerg Servs-UA/Other
2023193	2023	1001-1500	E	GA-UA/Other
2023226	2023	0-500	B	Mil-UA/Other
2023245	2023	0-500	C	GA-UA/Other
2023268	2023	0-500	E	Civ Comm-UA/Other

Table 16: Airprox involving UA/Other – worthy of review.

Final Comments

This report has been compiled in such a way as to highlight the criticality of barrier interactions for all sectors. The dominance of the GA Sports and Recreational community in the Airprox landscape is unsurprising, given the preponderance of Airprox that occur in Class G airspace. The proportion of risk-bearing Airprox which involve the GA community has decreased slightly from the levels of the preceding 2 years, with an associated uptick in the percentage of risk-bearing Airprox involving military aircraft. However, the movement is small, and caution should be exercised in the interpretation of these figures – it may just be a slight 'blip' in what has been a steady decline in military risk-bearing Airprox over the last 10 years.

Airprox analysis has consistently highlighted the key areas:

- Compatibility of EC
- Electronic conspicuity devices | Civil Aviation Authority (caa.co.uk)
- Appropriate selection of available ATC services
- Planning, including choice of routes, NOTAMs, Wx, proximity to CAS etc.
- Understanding the value and use of Basic Service, Listening Squawks, and responsibilities when flying VFR in Class D airspace and/or flying IFR in Class G airspace
- Lack of familiarity with circuit procedures and/or services provided by and responsibilities of AGOs, FISOs and controllers
- Effectiveness of lookout

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ADDITIONAL INFORMATION

The following section is additional data comprising the following:

- A set of 5 charts for each sector where one can easily refer to the Sector Mix, the Altitude, the Airspace and the Risk distributions. These charts provide a quick access overview of the Airprox demographic:

UA/OTHER	CAT Civ Comm	GA Unk ac	Mil

- A summary of Safety Recommendations (2023)
- The 2023 Airprox Catalogue including links to specific reports.

UA/OTHER SECTOR MIX

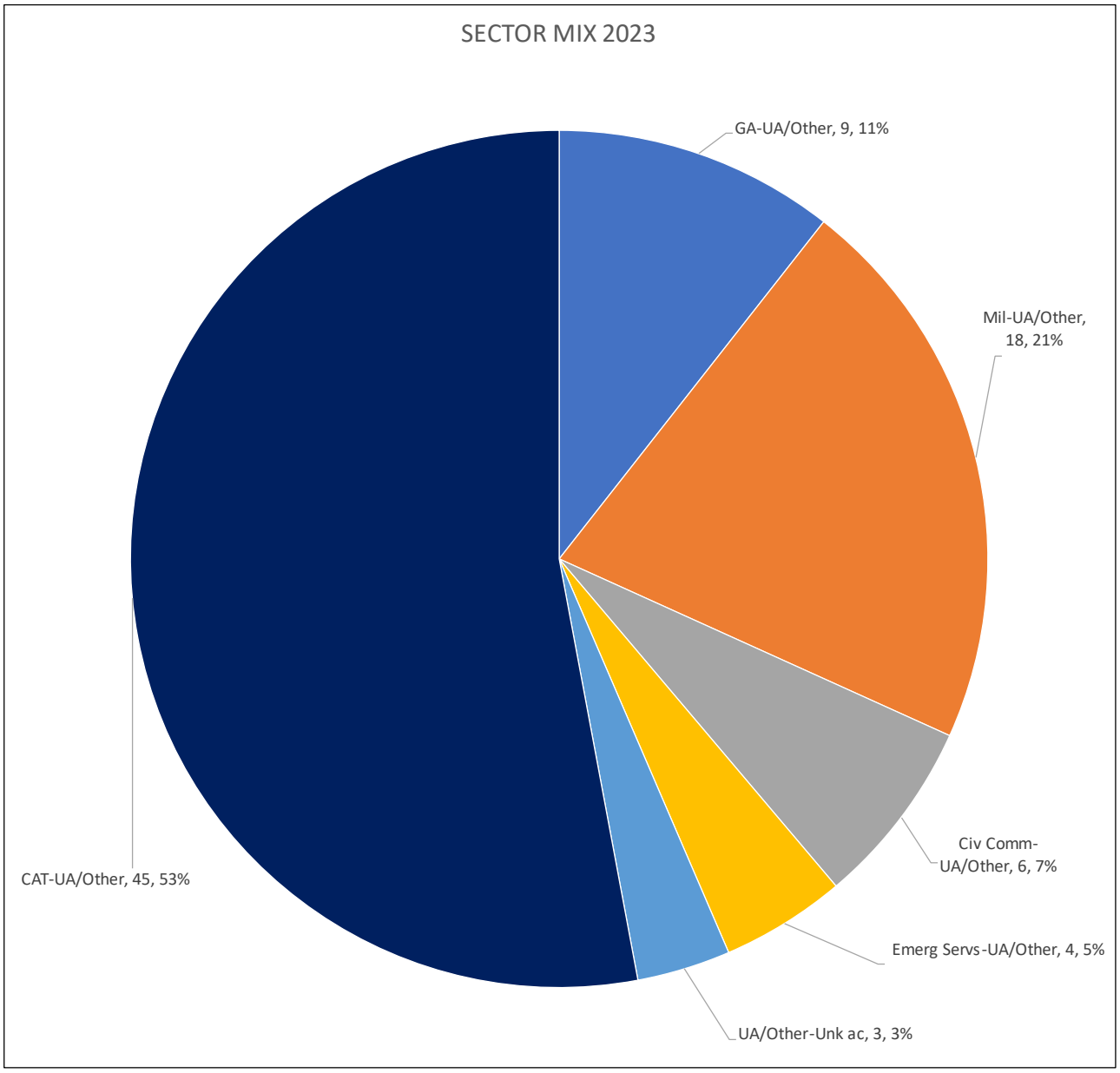

Figure 27: UA/OTHER Sector Mix – 2023

UA/OTHER SECTOR MIX – ALTITUDE

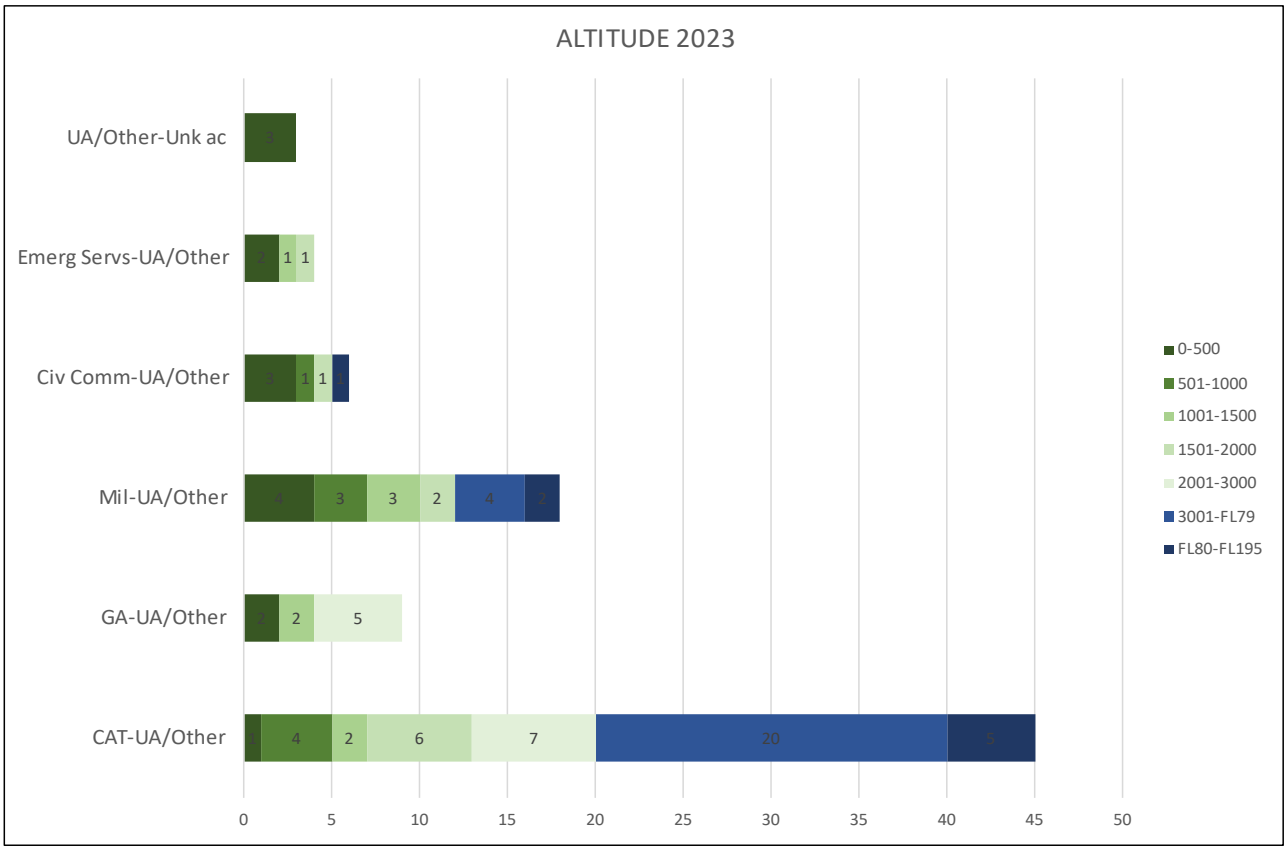

Figure 28: UA/Other Sector Mix – Altitude – 2023

UA/OTHER SECTOR MIX – AIRSPACE

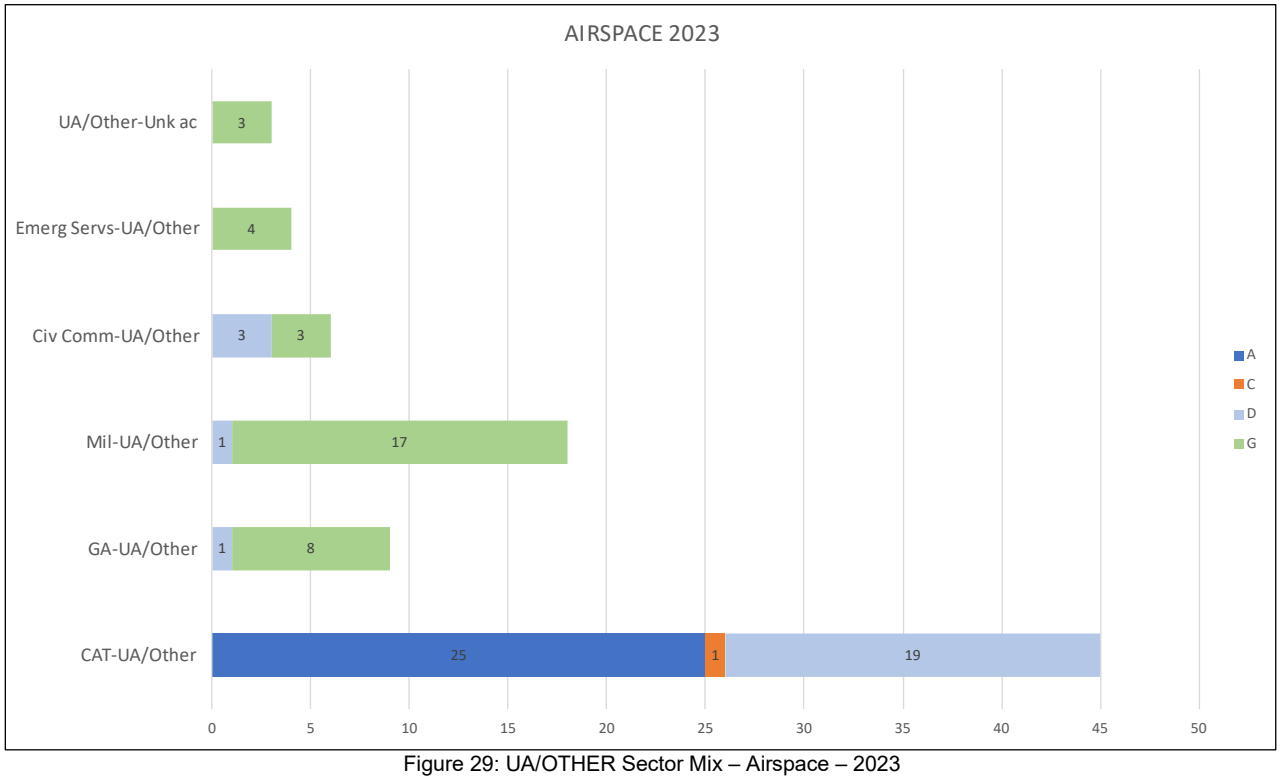

Figure 29: UA/OTHER Sector Mix – Airspace – 2023

UA/OTHER SECTOR MIX – ALTITUDE – RISK-BEARING

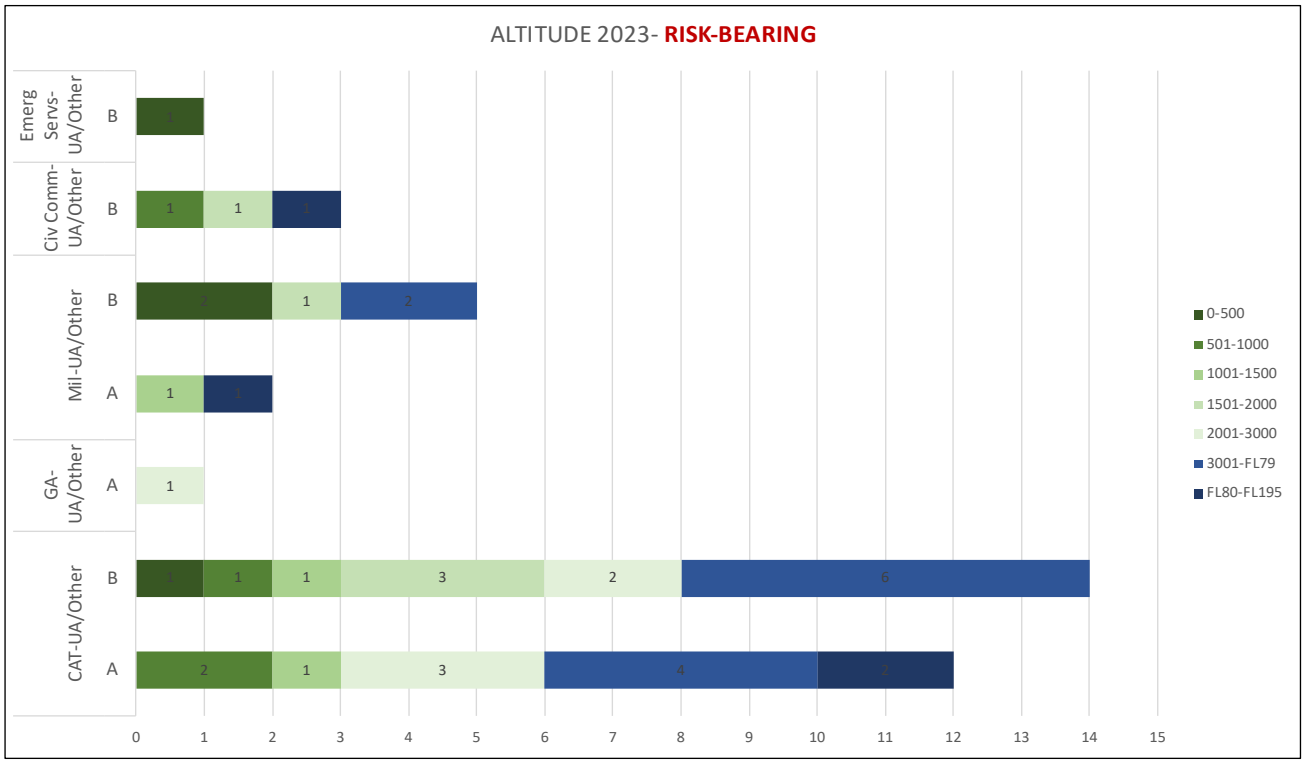

Figure 30: UA/OTHER Sector Mix – Altitude – Risk-Bearing 2023

UA/OTHER SECTOR MIX – RISK

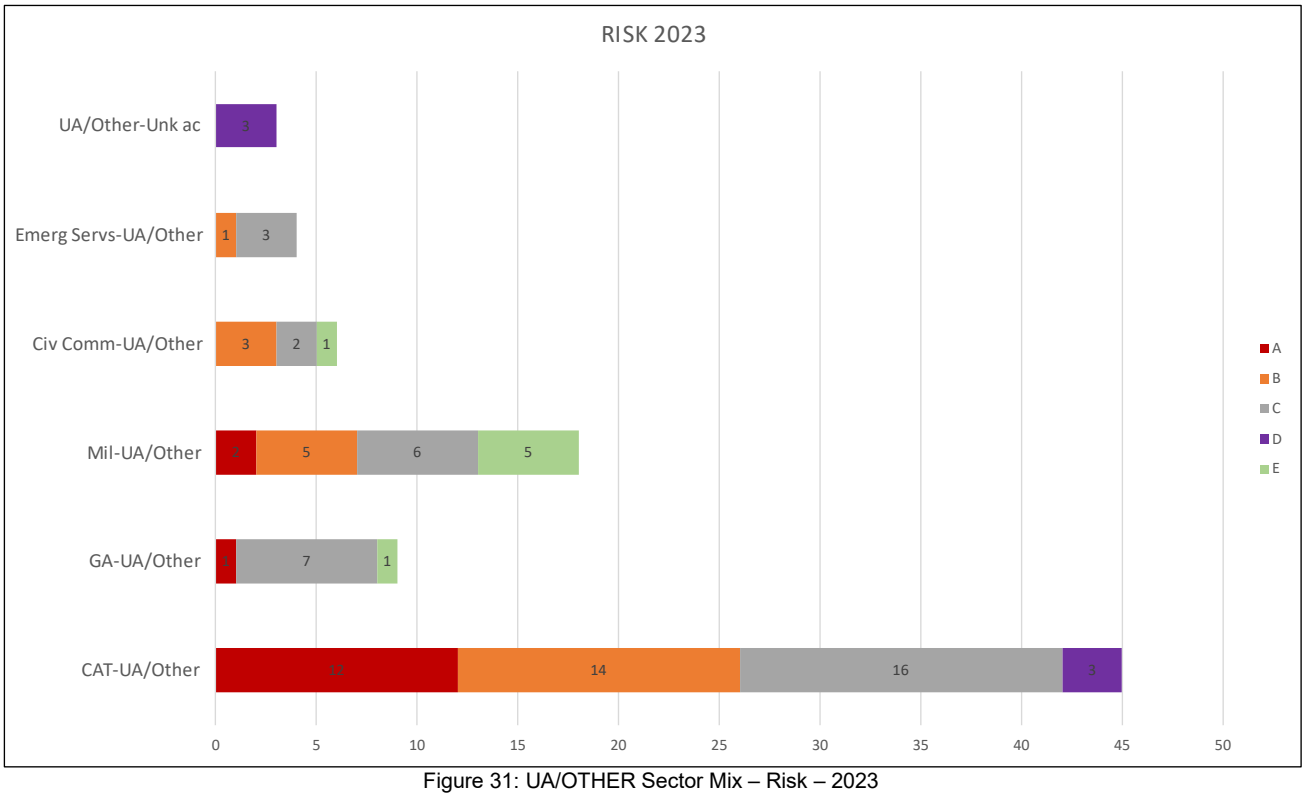

Figure 31: UA/OTHER Sector Mix – Risk – 2023

CAT_CIV COMM SECTOR MIX

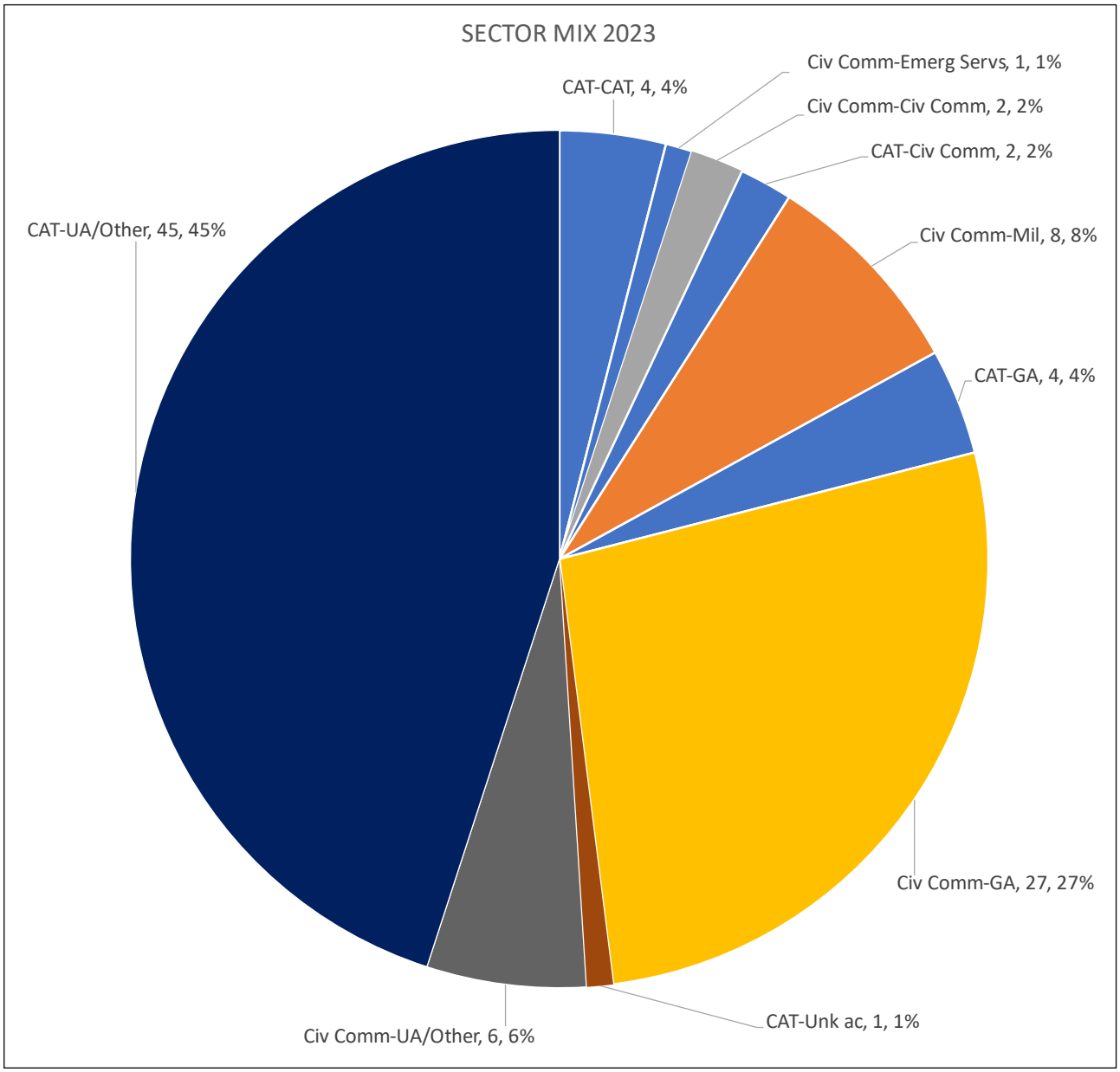

Figure 32: CAT_Civ Comm Sector Mix – 2023

CAT_Civ Comm SECTOR MIX – ALTITUDE

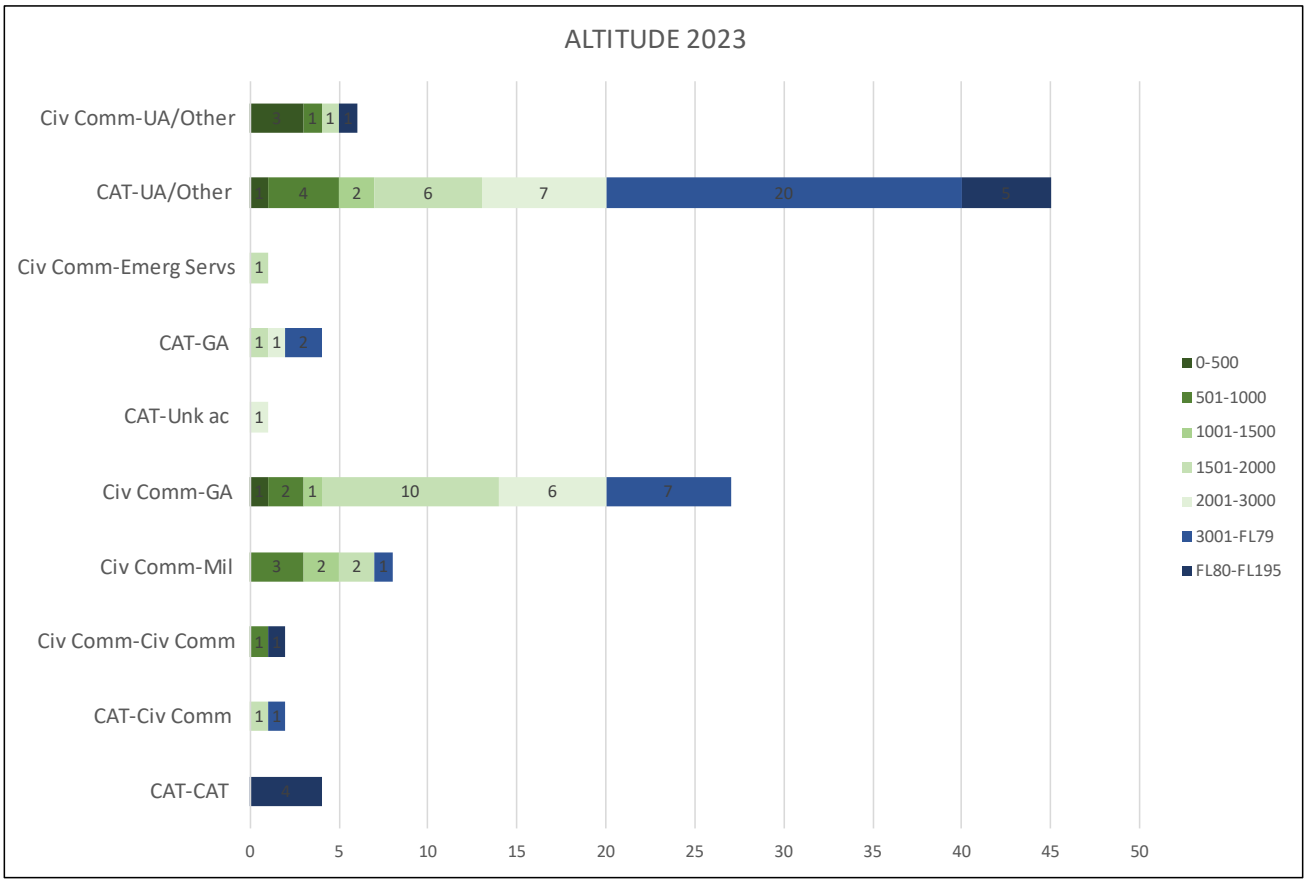

Figure 33: CAT-Civ Comm Sector Mix – Altitude – 2023

CAT_Civ Comm SECTOR MIX – AIRSPACE

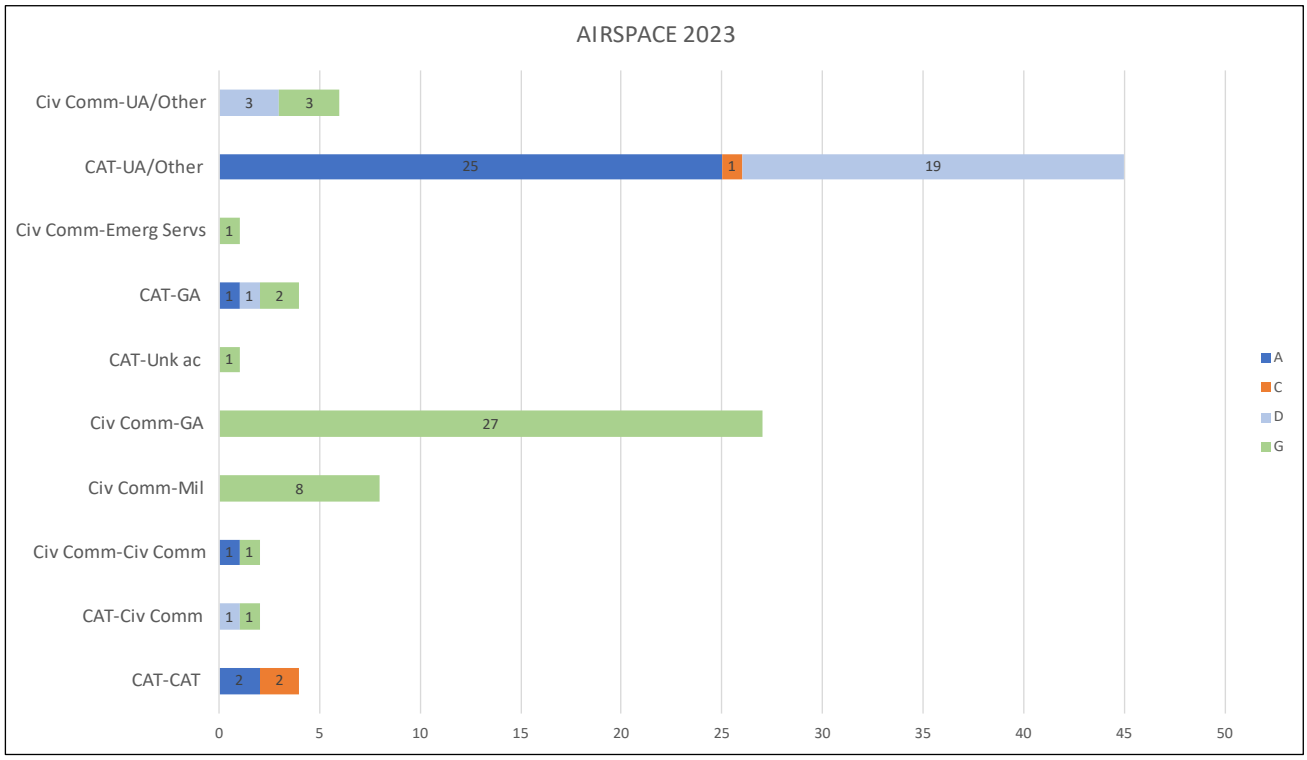

Figure 34: CAT-Civ Comm Sector Mix – Airspace – 2023

CAT_Civ Comm SECTOR MIX – ALTITUDE – RISK-BEARING

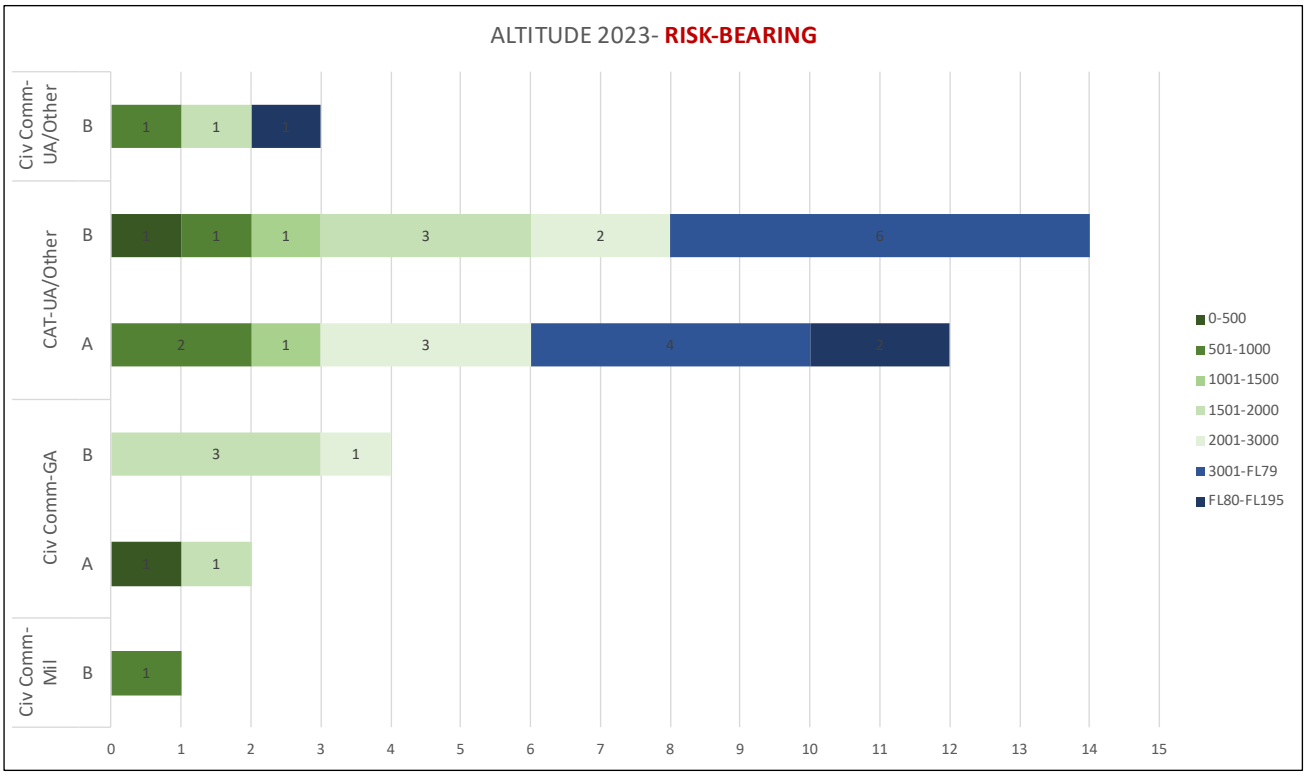

Figure 35: CAT_Civ Comm Sector Mix – Altitude – Risk-Bearing – 2023

CAT_Civ Comm SECTOR MIX – RISK

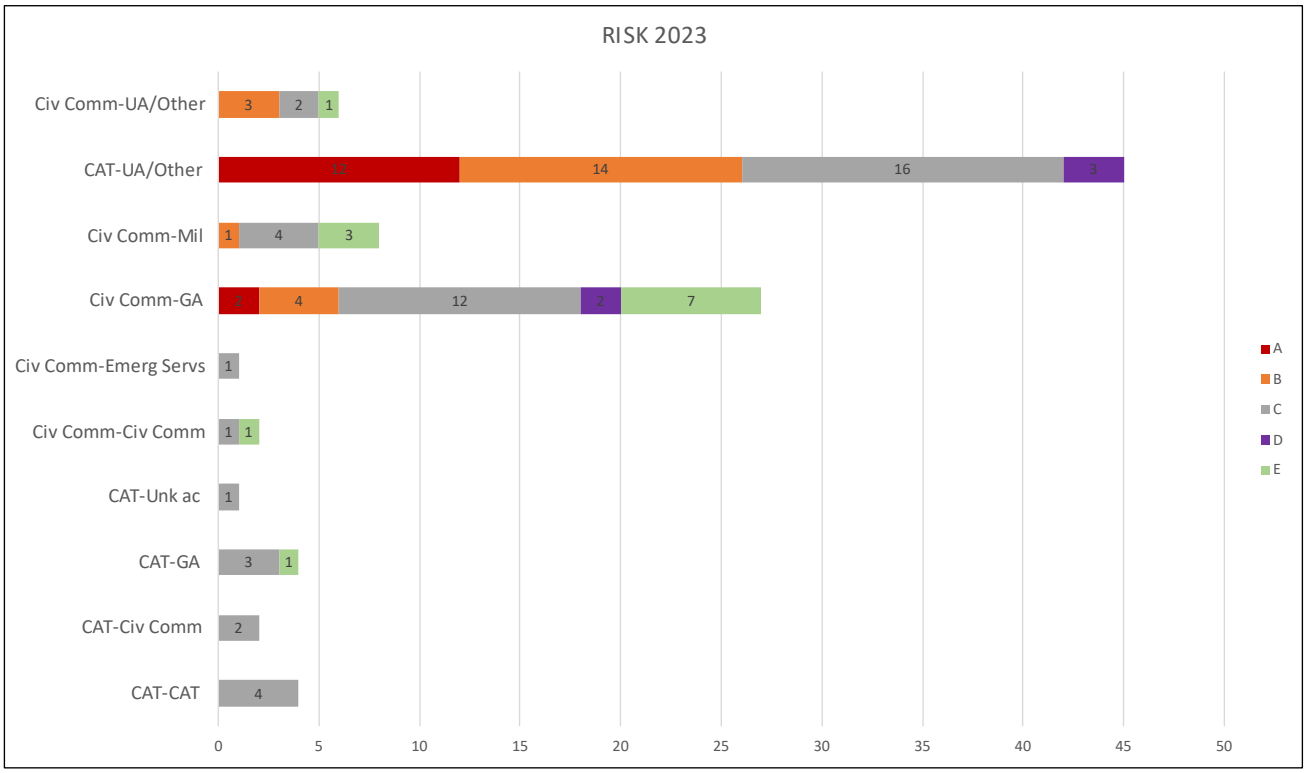

Figure 36: CAT_Civ Comm Sector Mix – Risk – 2023

GA (Sports and Recreational – including Unknown/Untraced) SECTOR MIX

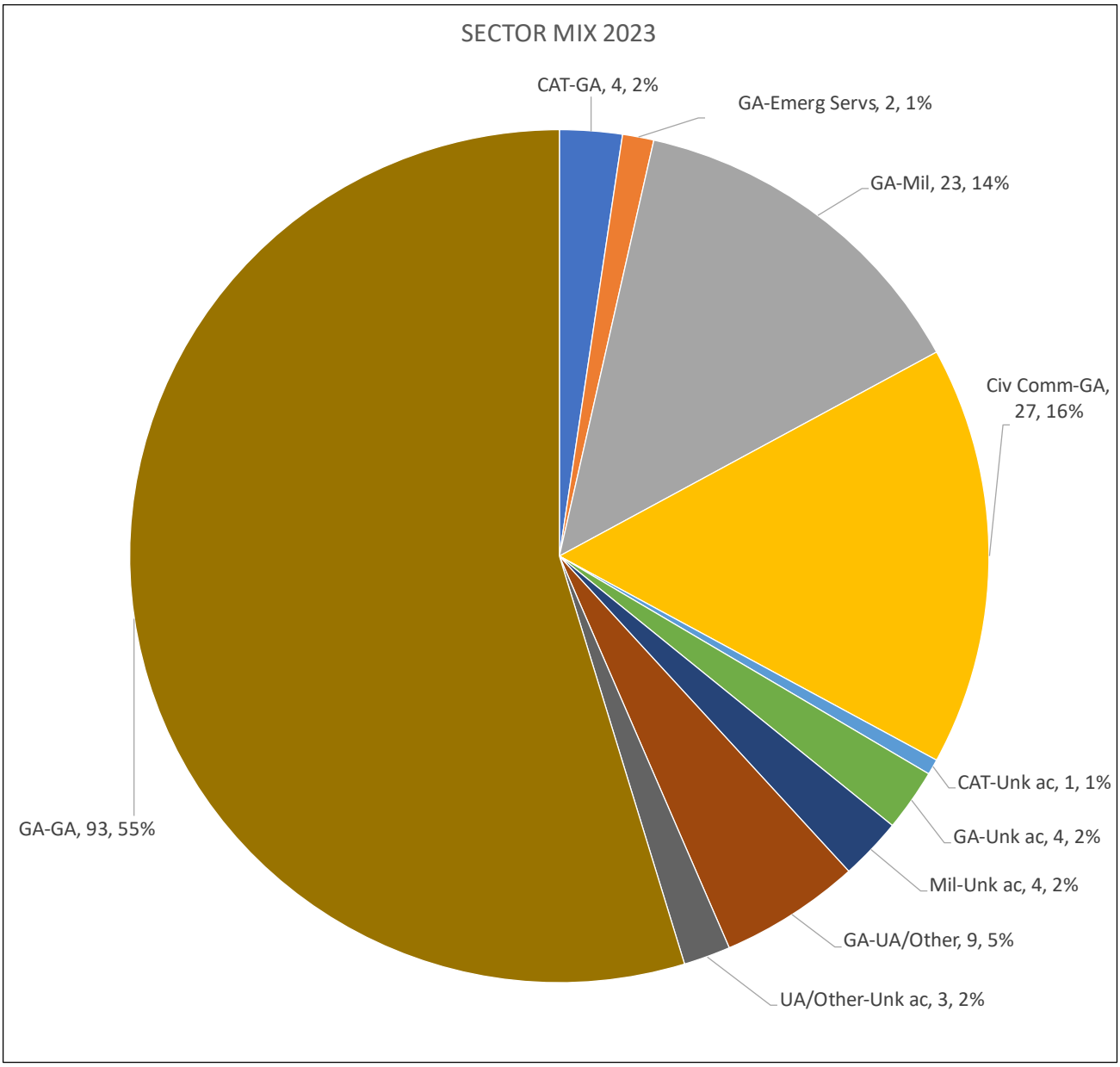

Figure 37: GA_Unk ac Sector Mix – 2023

GA_Unk ac SECTOR MIX – ALTITUDE

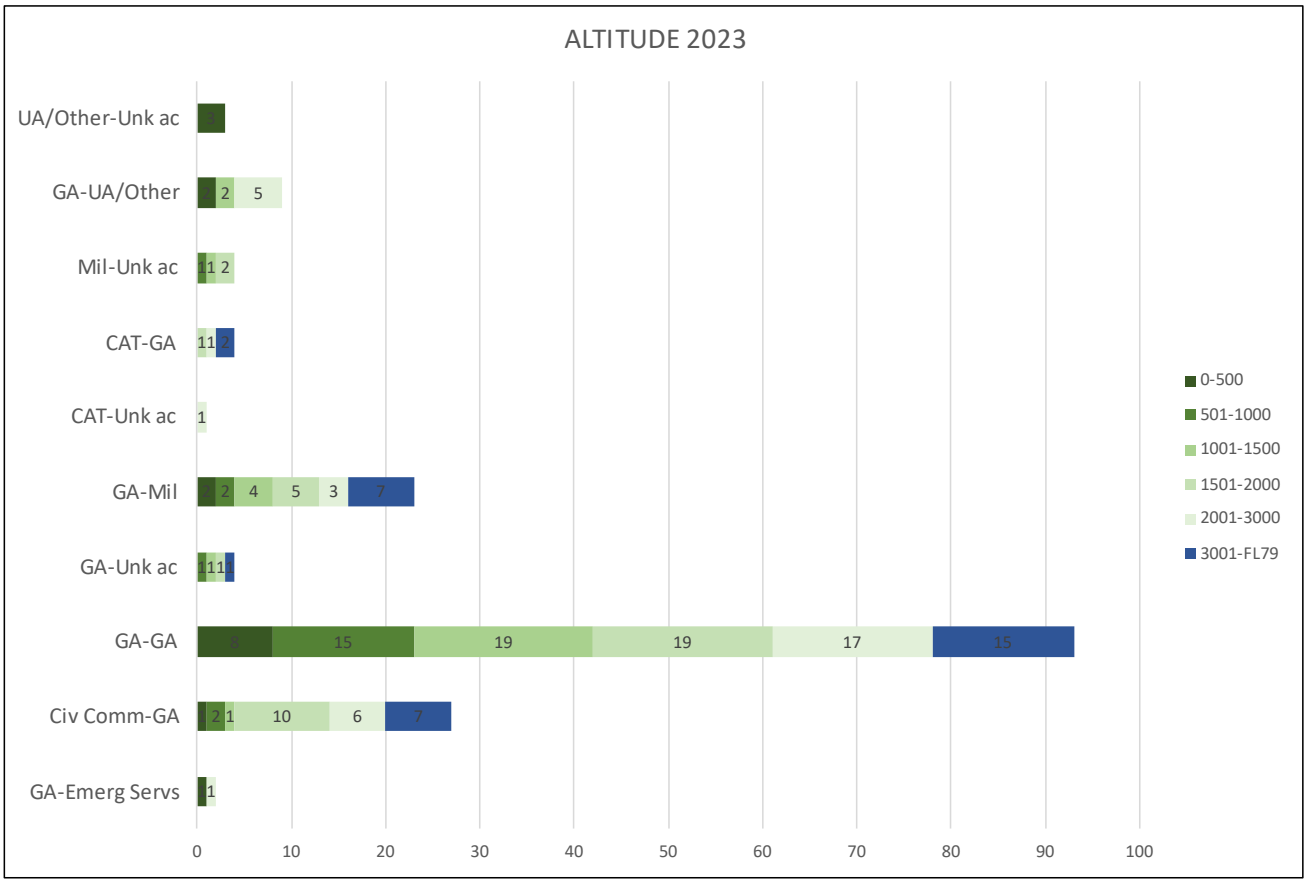

Figure 38: GA_Unk ac Sector Mix – Altitude – 2023

GA_Unk ac SECTOR MIX – AIRSPACE

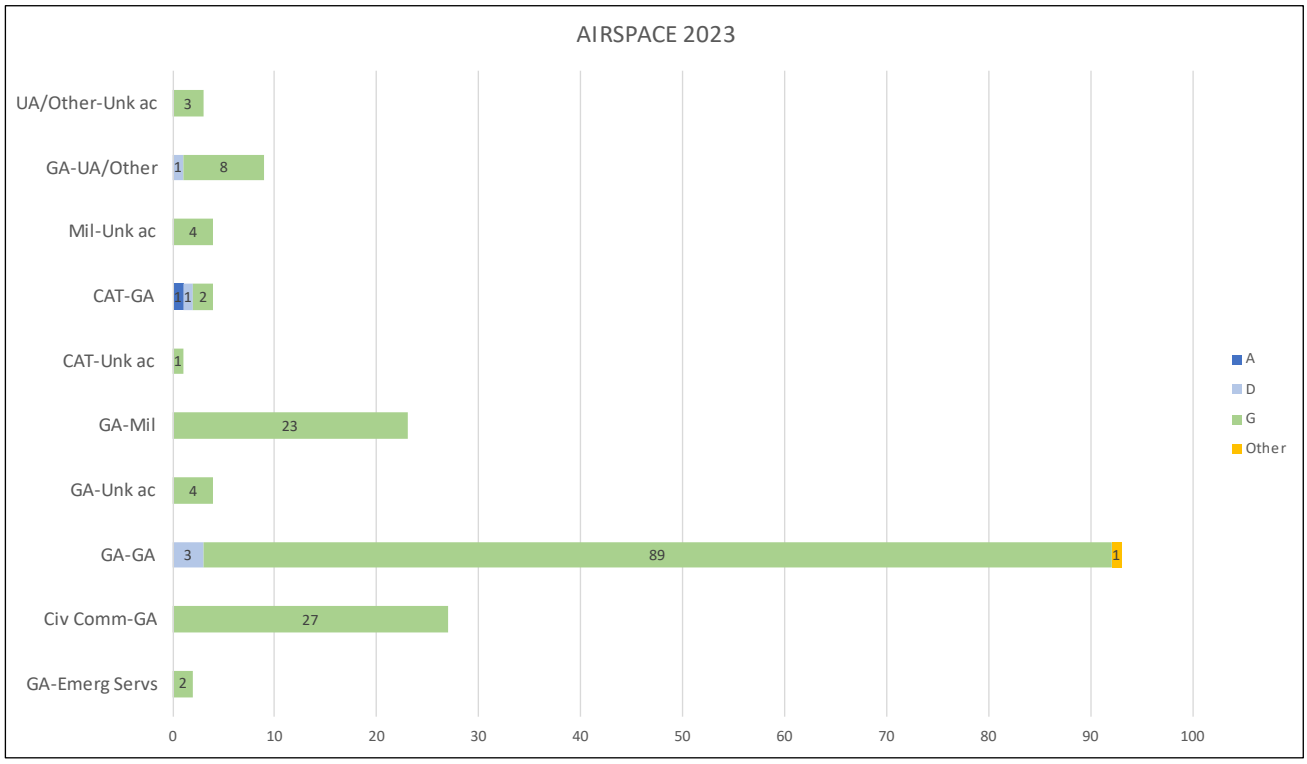

Figure 39: GA_Unk ac Sector Mix – Airspace – 2023

GA_Unk ac SECTOR MIX – ALTITUDE – RISK-BEARING

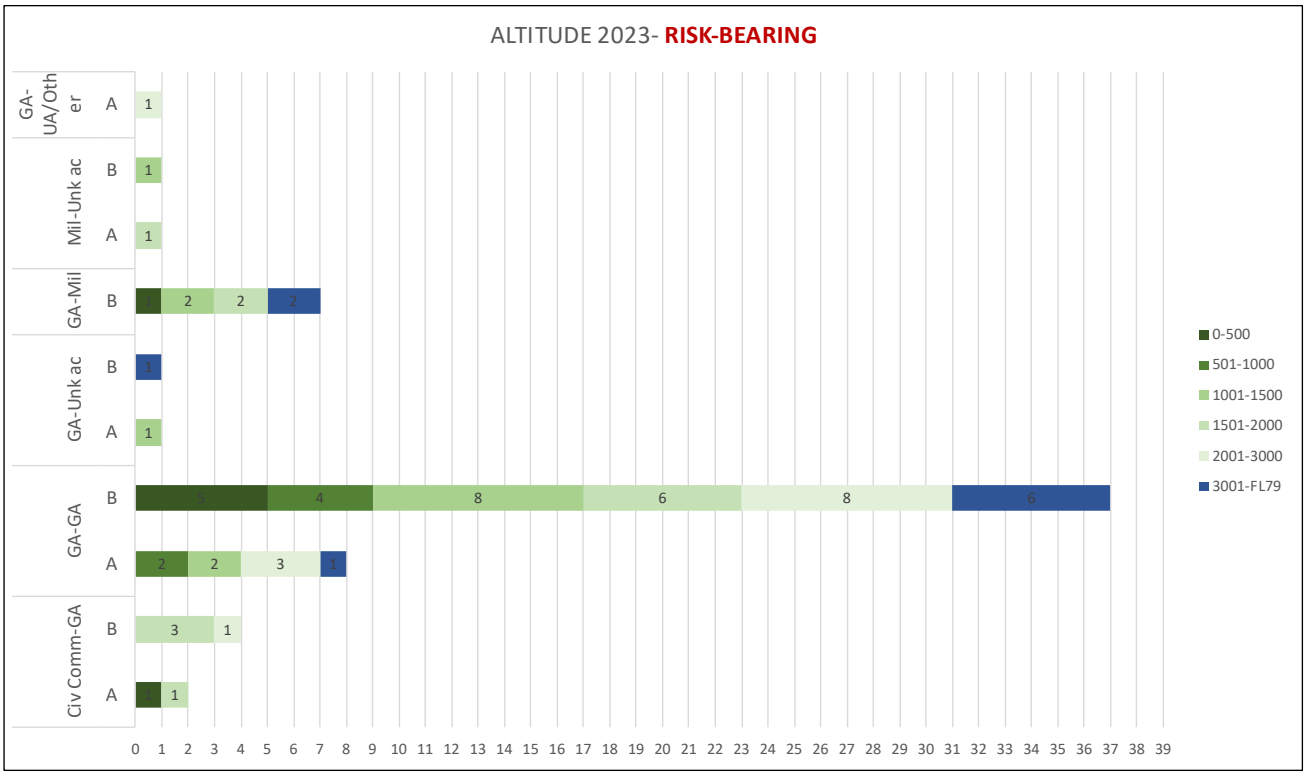

Figure 40: GA_Unk ac Sector Mix – Altitude – Risk-Bearing – 2023

GA_Unk ac SECTOR MIX – RISK

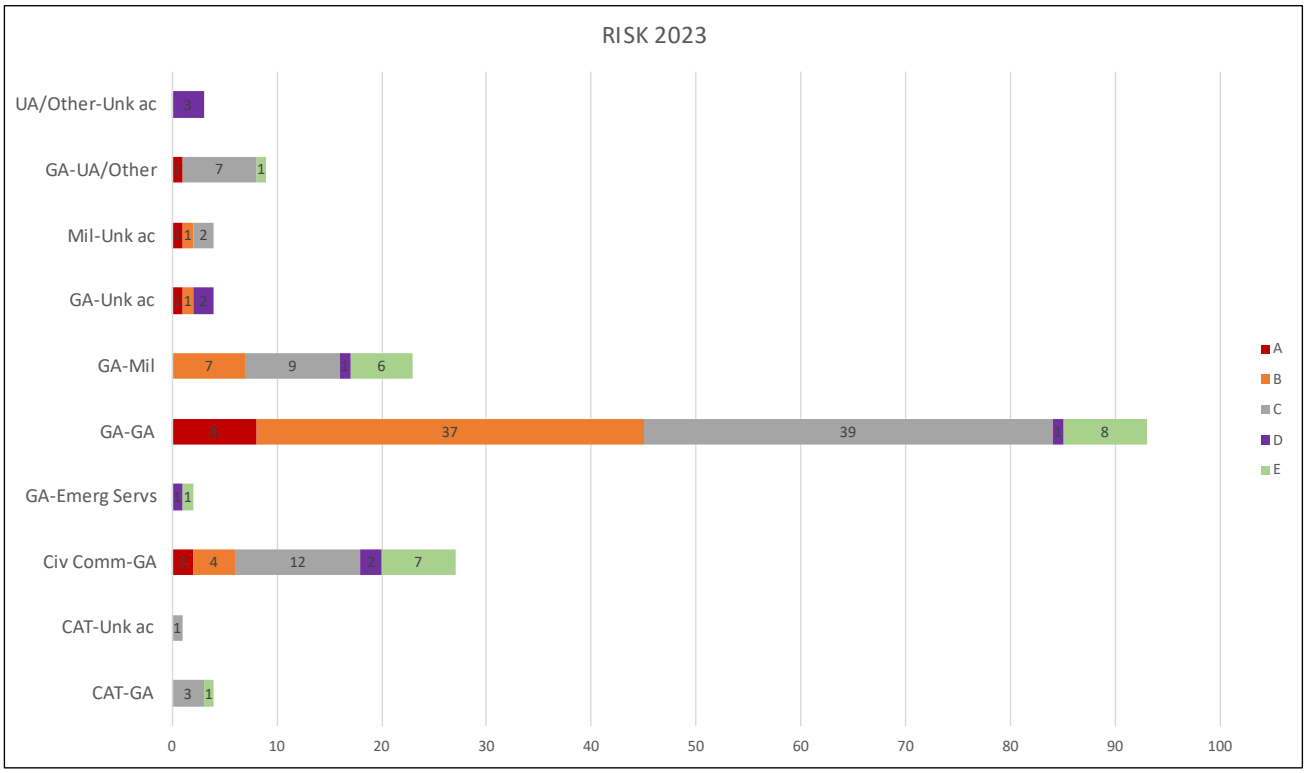

Figure 41: GA_Unk ac Sector Mix – Risk – 2023

MILITARY SECTOR MIX

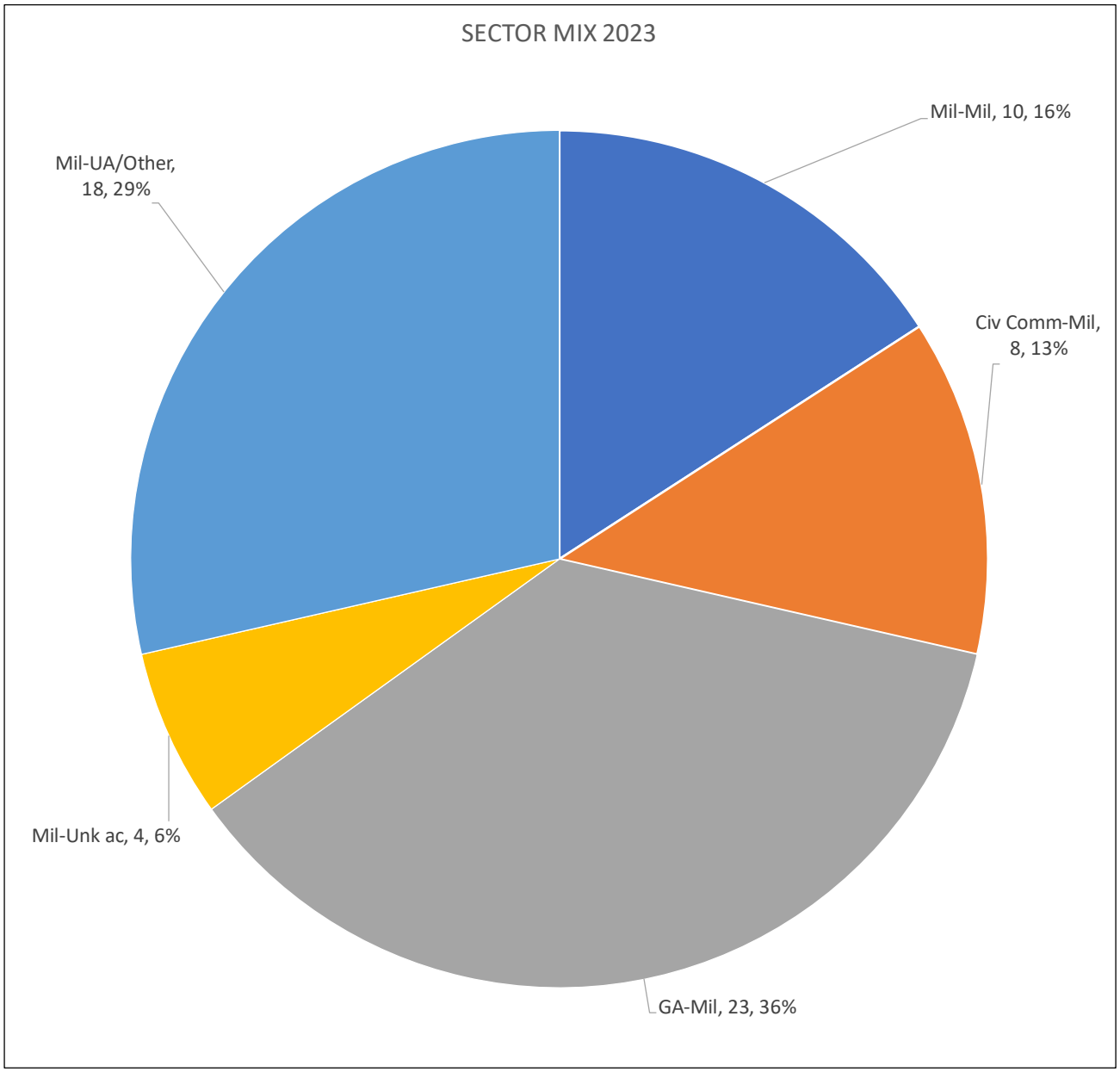

Figure 42: Mil Sector Mix – 2023

MILITARY SECTOR MIX – ALTITUDE

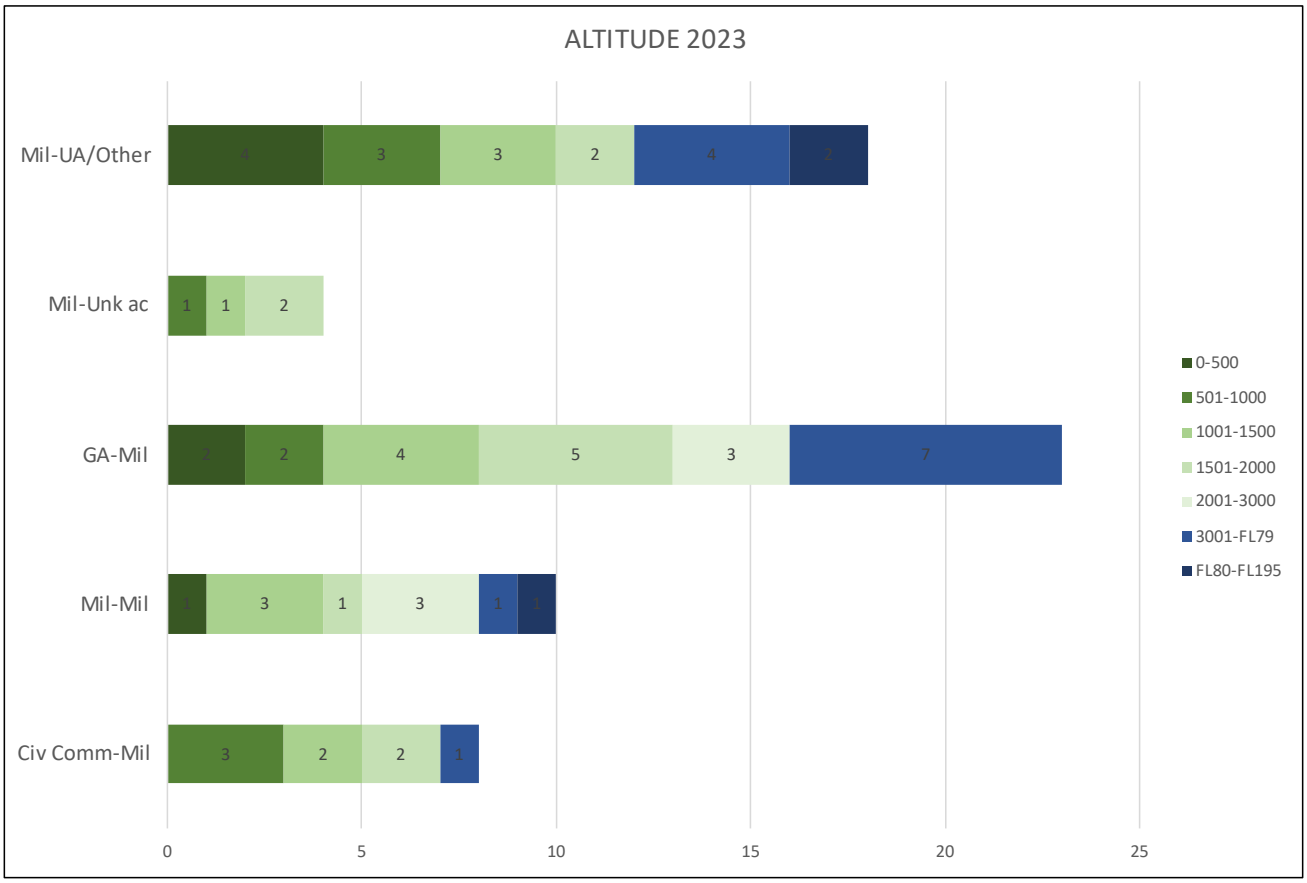

Figure 43: Military Sector Mix – Altitude – 2023

MILITARY SECTOR MIX – AIRSPACE

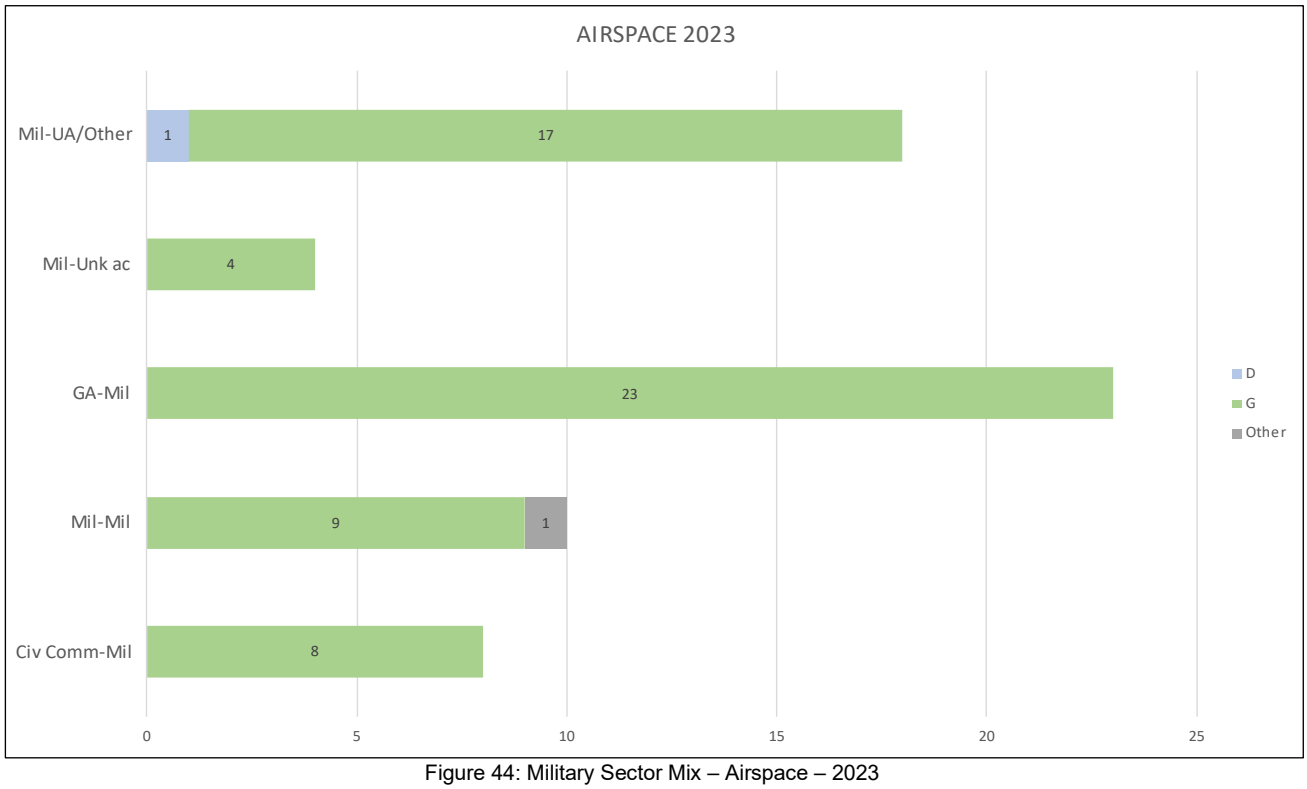

Figure 44: Military Sector Mix – Airspace – 2023

MILTARY SECTOR MIX – ALTITUDE – RISK-BEARING

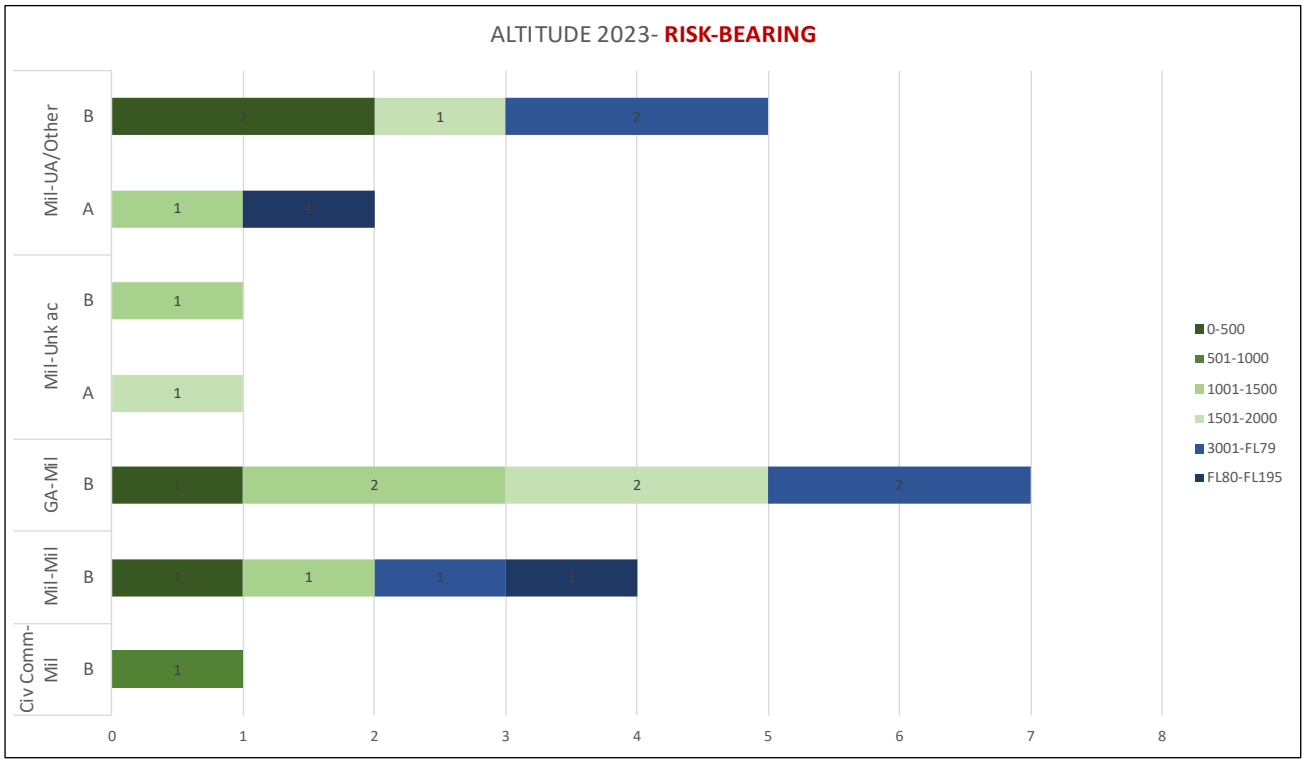

Figure 45: Military Sector Mix – Altitude – Risk-Bearing – 2023

MILTARY SECTOR MIX – RISK

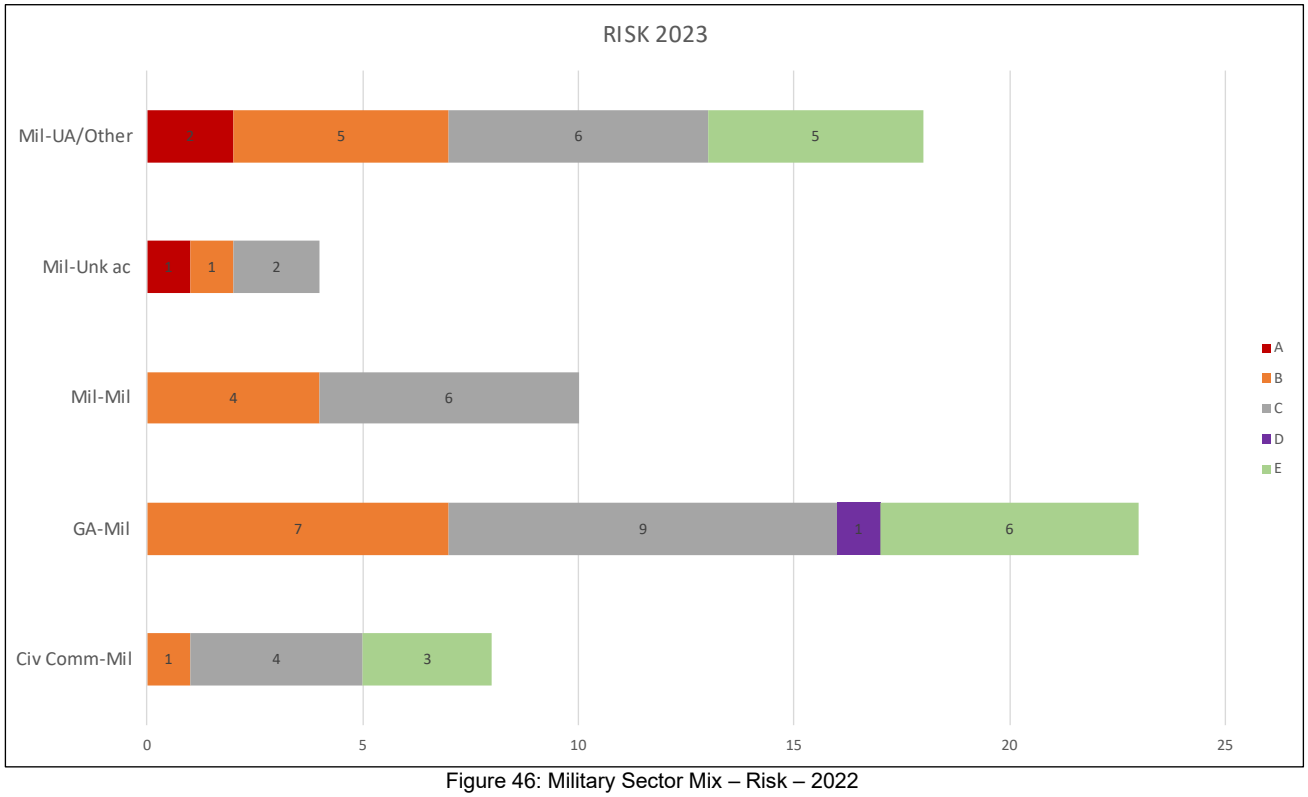

Figure 46: Military Sector Mix – Risk – 2022

UKAB 2023 SAFETY RECOMMENDATIONS

The table below is correct at the time of publication of this report. More up-to-date information on the status of OPEN Recommendations can be found on the UKAB website at https://www.airproxboard.org.uk/reports-and-analysis/safety-recommendations/.

ACCEPTED	PARTIALLY ACCEPTED	REJECTED	OPEN

Airprox	Recommendation	Comments
2023032	Turweston airfield reviews published airfield arrival and departure procedures.	[We] have updated our Aerodrome Rules accordingly. Various other amendments were made during our audit of the rules …. and part b has been changed to read: Standard overhead join. Circuit height 1000 ft QFE. This information is published on our website.
2023058	HQ Air Command considers reviewing kill-removal procedures within Air-to-Air Training Rules.	Following a review of the Air-to-Air Training Rules there was an amendment to kill removal procedures in SPINS [Special Instructions] which was published in July 2024.
2023116	Defence considers the addition of radar overlays for model aircraft operating sites that are notified in the UK AIP ENR 5.5.	Upon review, it was concluded that the decision to consider displaying model sites on radar overlays should be made directly through the Aviation Duty Holding chain via SQEP input from the local ATC Unit Commanders. This action has now been completed at all Tier 1 military aerodromes. The addition of the model aircraft operating site was deemed directly appropriate for one Tier 1 aerodrome.
	Defence considers the addition of VFR chart symbols for model aircraft operating sites that are notified in the UK AIP ENR 5.5.	The recommendation to consider the addition of VFR chart symbols for model aircraft operating sites has been accepted and progressed in its entirety. The 23 model aircraft sites in ENR 5.5 have been added to the UKMLFHB and LFCs with effect from AIRAC 08/23.
	Large Model Association (LMA) considers listing all sites that operate under the 'Over 25kg Scheme' for flight testing, as listed on the LMA website, in the UK AIP.	Under Consideration.
2023119	The CAA reviews the wording of NOTAMs associated with permissions for aircraft inspecting powerlines/pipelines to operate outside the provisions of ORS4 No.1496 to ensure that sufficient detail regarding the specific areas of operation is included.	The NOTAM quoted in the report - 'The Board noted that the EC135 operation had been NOTAM'd' - was for Pipeline operations and not Powerline. The EC135 Powerline Operator does not submit NOTAMs for any of its operations, nor is it required to do so. PINS NOTAMS are acknowledged in design to be broad, as stated in eAIS ENR1.10.
2023124	Kent Gliding Club and Lydd Airport establish a Letter of Agreement to address the risk of concurrent activities in the same volume of airspace.	Under Consideration.
	Lydd Airport includes Challock gliding site on the applicable Instrument Approach Charts.	Under Consideration.

ACCEPTED	PARTIALLY ACCEPTED	REJECTED	OPEN

Airprox	Recommendation	Comments
2023158	The Thruxton airfield operator reviews their website and UK AIP entries to ensure coherence.	Under Consideration.
2023183	The BHPA review training material with a view to including a structured lookout scan technique.	Under Consideration.
2023211	Liverpool and Hawarden review their LoA with a view to affording additional consideration for pilots operating under VFR and conducting Instrument Approaches to Hawarden. Liverpool and Hawarden review their LoA with a view to considering the application of a vertical separation buffer between Liverpool and Hawarden traffic.	Under Consideration.
2023236	Defence to review civilian and military AIP entries to ensure that CMATZ/MATZ hours of operation are specifically defined.	Under Consideration.
	Leeming and Topcliffe review their Letter of Agreement to ensure that authority to grant CMATZ/MATZ penetration is defined whenever either aerodrome is operating.	Under Consideration.
	MAA to review MAGROCC holders' privileges with respect to the authority to grant CMATZ/MATZ penetration.	Under Consideration.

AIRPROX CATALOGUE 2023

The table below is an abbreviated form of the 2022 Airprox Index that is available on the UKAB website - individual reports can also be accessed using the hyperlinks within the table.

Airprox No	Risk Category	Aircraft 1 Type	Aircraft 2 Type	Sector Mix
2023001	C	AIRBUS (A220)	OTHER (RPAS)	CAT-UA/Other
2023002	D	BOEING - 737	UNKNOWN (Object)	CAT-UA/Other
2023003	B	CESSNA - 152	PIPER - PA28	GA-GA
2023004	B	CESSNA - 208	EXTRA - 300 - 200	Civ Comm-GA
2023005	C	OTHER - Military (Phenom)	OTHER - Military (Tutor)	Mil-Mil
2023006	C	CESSNA - 152	CESSNA - 340	GA-GA
2023007	D	OTHER (Pioneer 300)	VANS - RV8	GA-GA
2023008	B	AGUSTA - A109	PIPER - PA28	Civ Comm-GA
2023009	C	SCHLEICHER - ASK21	PIPER - PA28	GA-GA
2023010	C	PIPER - PA28	OTHER (Bristell NG5)	GA-GA
2023011	B	EUROCOPTER - EC135	UNKNOWN (RPAS)	Emerg Servs-UA/Other
2023012	C	CESSNA - 140	PIPER - PA28	GA-GA
2023013	C	COMCO IKARUS - IKARUS C42	FLIGHT DESIGN - CT2K	GA-GA
2023014	C	AIRBUS - A320	UNKNOWN (RPAS)	CAT-UA/Other
2023015	C	ROBINSON - R44	UNKNOWN (RPAS)	GA-UA/Other
2023016	B	OTHER (A32 Vixxen)	CHRISTEN - EAGLE II	GA-GA
2023017	B	SCHEMPP HIRTH - DUO DISCUS	BEECH - 58	GA-GA
2023018	C	AEROSPATIALE - AS355	OTHER (RPAS)	GA-UA/Other
2023019	C	DE HAVILLAND - DHC8	UNKNOWN (RPAS)	CAT-UA/Other
2023020	B	OTHER - Military (Prefect)	UNKNOWN (RPAS)	Mil-UA/Other
2023021	C	SLINGSBY - T67	PIPER - PA28R	GA-GA
2023022	C	OTHER - Military (Prefect)	UNKNOWN (RPAS)	Mil-UA/Other
2023023	A	AIRBUS - A320	UNKNOWN	CAT-UA/Other
2023024	B	OTHER - Military (Hawk)	ROLLADEN SCHNEIDER - LS8	GA-Mil
2023025	B	AVIONS ROBIN - DR400	PIPER - PA28	GA-GA
2023026	B	DIAMOND - DA42	PIPER - PA28	Civ Comm-GA
2023027	B	OTHER - Military (Tutor)	PIPER - PA31	Civ Comm-Mil
2023028	E	OTHER - Military (Tutor)	CESSNA - 172	GA-Mil
2023029	C	AVIONS ROBIN - HR200	UNKNOWN (RPAS)	GA-UA/Other
2023030	E	OTHER - Military (AS365)	JABIRU	GA-Mil
2023031	E	OTHER (H175)	SIKORSKY - S92	Civ Comm-Civ Comm
2023032	B	GROB - G109	PIPER - PA28	GA-GA
2023033	C	AIRBUS - A320	UNKNOWN	CAT-UA/Other
2023034	E	OTHER - Military (Prefect)	YAKOVLEV - YAK18	GA-Mil
2023035	B	SCHLEICHER - ASW27	PIPER - PA28	GA-GA
2023036	D	OTHER (Mavic Pro)	UNKNOWN	UA/Other-Unk ac
2023037	C	OTHER - Military (C130)	OTHER - Military (F35)	Mil-Mil
2023038	B	DIAMOND - DA42	DIAMOND - DA40	GA-GA
2023039	B	AIRBUS - A350	UNKNOWN (RPAS)	CAT-UA/Other
2023040	B	OTHER - Military (Typhoon)	CESSNA - 182	GA-Mil
2023041	C	AGUSTA BELL - AB139	OTHER - Military (Typhoon)	Civ Comm-Mil
2023042	C	BEECH - 200	CESSNA - 150	Civ Comm-GA
2023043	B	BOEING - 787	UNKNOWN (Object)	CAT-UA/Other
2023044	E	BEECH - 200	VANS - RV6	Civ Comm-GA
2023045	C	OTHER - Military (Apache)	SCHEMPP HIRTH (Arcus T)	GA-Mil
2023046	C	OTHER - Military (Typhoon)	UNKNOWN (RPAS)	Mil-UA/Other
2023047	B	OTHER - Military (Viking)	PIPER - PA28	GA-Mil
2023048	A	AIRBUS - A320	UNKNOWN (RPAS)	CAT-UA/Other
2023049	C	PIPER - PA28	OTHER (RPAS)	GA-UA/Other

2023050	C	EMBRAER - EMB145	OTHER - Military (Typhoon)	Civ Comm-Mil
2023051	C	TECNAM (P2008)	CESSNA - 172	GA-GA
2023052	B	DIAMOND - DA40 - D	CESSNA - 150	GA-GA
2023053	E	SCHLEICHER - ASW20	COLUMBIA (400)	GA-GA
2023054	C	BOEING - 737	AIRBUS - A320	CAT-CAT
2023055	E	EMBRAER - EMB145	OTHER - Military (Typhoon)	Civ Comm-Mil
2023056	B	AEROSPATIALE - AS350	CIRRUS - SR22	GA-GA
2023057	C	UNKNOWN (RPAS)	PIPER - PA31	Civ Comm-UA/Other
2023058	B	OTHER - Military (L159)	OTHER - Military (F35)	Mil-Mil
2023059	E	OTHER - Military (MC130)	PIPER - PA28	GA-Mil
2023060	B	OTHER - Military (Chinook)	UNKNOWN (RPAS)	Mil-UA/Other
2023061	C	SCHLEICHER - ASK21	OTHER (AW169)	Civ Comm-GA
2023062	C	OTHER - Military (Texan II)	UNKNOWN (Balloon)	Mil-UA/Other
2023063	B	CESSNA - 152	DIAMOND - DA20	GA-GA
2023064	C	SCHLEICHER - ASH25	PIPER - PA28	GA-GA
2023065	C	DE HAVILLAND - DHC8	UNKNOWN (Object)	CAT-UA/Other
2023066	B	EMBRAER - ERJ190	UNKNOWN (RPAS)	CAT-UA/Other
2023067	C	OTHER - Military (Apache)	JODEL - D11	GA-Mil
2023068	C	AIRBUS - A320	OTHER (Hot Air Balloon)	CAT-UA/Other
2023069	C	PIPER - PA28	PIPER - PA30	GA-GA
2023070	B	ISAACS - SPITFIRE	VANS - RV9	Civ Comm-GA
2023071	B	OTHER - Military (Juno Mk1)	CESSNA - 172	GA-Mil
2023072	B	OTHER (Magni M24)	CESSNA - 152	GA-GA
2023073	B	DIAMOND - DA42	UNKNOWN (Motor glider)	GA-GA
2023074	C	BOEING - 737	UNKNOWN (RPAS)	CAT-UA/Other
2023075	B	LANGE FLUGZEUGBAU - E1	COMCO IKARUS - IKARUS C42	GA-GA
2023076	A	OTHER (Canopy Suspended)	OTHER (CSA Sportcruiser)	GA-GA
2023077	E	PIPER - PA28	OTHER (Arcus)	GA-GA
2023078	A	OTHER - Military (Chinook)	OTHER (RPAS)	Mil-UA/Other
2023079	C	OTHER - Military (Prefect)	ROBINSON - R44	GA-Mil
2023080	B	DASSAULT - FANJET FALCON - E	UNKNOWN (Object)	Civ Comm-UA/Other
2023081	C	OTHER (BRISTELL NG5)	YAKOVLEV - YAK18 - T	GA-GA
2023082	C	OTHER (Canopy Suspended)	MCDONNELL DOUGLAS - 500	GA-GA
2023083	E	UNKNOWN (Drone - DJI M300 RTK)	OTHER - Military (Texan II)	Mil-UA/Other
2023084	B	BOEING - 737	UNKNOWN (RPAS)	CAT-UA/Other
2023085	A	OTHER (Eurofox)	UNKNOWN (RPAS)	GA-UA/Other
2023086	C	OTHER - Military (Juno)	OTHER - Military (Juno)	Mil-Mil
2023087	B	ROBINSON - R44	PIPER - PA28	GA-GA
2023088	E	PIPER - PA31	AVIONS ROBIN - DR400	Civ Comm-GA
2023089	C	AIRBUS - A319	DIAMOND - DA42	CAT-Civ Comm
2023090	E	OTHER (DA62)	OTHER (Bell 505 Jet Ranger)	GA-Emerg Servs
2023091	C	COMCO IKARUS - IKARUS C42	UNKNOWN (RPAS)	GA-UA/Other
2023092	B	VANS - RV8 - A	OTHER (Standard Libelle)	GA-GA
2023093	B	SCHEMPP HIRTH - VENTUS B	EUROPA - EUROPA	GA-GA
2023094	C	ROBINSON - R44	PIPER - PA28	GA-GA
2023095	C	OTHER (DG FLugzeugbau DG800)	CIRRUS - SR22	GA-GA
2023096	C	CENTRAIR - 101 (Pegase)	DORNIER - 328	CAT-GA
2023097	E	OTHER - Military (KC135)	GROB - G115	GA-Mil
2023098	A	BELL - 206	OTHER (Tipsy Nipper T66)	Civ Comm-GA
2023099	C	CENTRAIR - ASW20	CIRRUS - SR22	GA-GA
2023100	C	BOEING - 787	UNKNOWN (Object)	CAT-UA/Other
2023101	B	GROB - G120	UNKNOWN	Mil-Unk ac
2023102	D	AIRBUS - A330	UNKNOWN (Object)	CAT-UA/Other
2023103	C	CESSNA - 152	MOONEY - M20	GA-GA
2023104	B	CESSNA - 152	CESSNA - 152	GA-GA
2023105	C	OTHER (Hawker Beechcraft H25B)	DASSAULT - FALCON7X	Civ Comm-Civ Comm

2023106	B	DIAMOND - DA40 - D	PIPER - PA28 - 161	GA-GA
2023107	C	CESSNA - 172	PIPER - PA28	GA-GA
2023108	B	SCHLEICHER - ASK21	CIRRUS - SR22	GA-GA
2023109	B	PIPER - PA28	CIRRUS	GA-GA
2023110	C	OTHER - Military (Hawk)	OTHER - Military (Prefect)	Mil-Mil
2023111	B	OTHER - Military (AW109)	CHRISTEN - EAGLE II	GA-Mil
2023112	C	CESSNA - 680	OTHER (AW169)	Civ Comm-Emerg Servs
2023113	E	DIAMOND - DA42	CESSNA - 152	Civ Comm-GA
2023114	C	SCHEMPP HIRTH - MINI NIMBUS	PIPER - PA28	GA-GA
2023115	C	ROBINSON - R44	MCDONNELL DOUGLAS - 369 - FF	Civ Comm-Mil
2023116	C	UNKNOWN (Model Aircraft)	OTHER - Military (Hawk)	Mil-UA/Other
2023117	B	AIRBUS - A320	OTHER (RPAS)	CAT-UA/Other
2023118	A	BOEING - 787	UNKNOWN (RPAS)	CAT-UA/Other
2023119	C	OTHER (RPAS)	BOEING - EC135	Civ Comm-UA/Other
2023120	D	OTHER (DJI Inspire)	UNKNOWN	UA/Other-Unk ac
2023121	A	OTHER - Military (Hawk)	UNKNOWN	Mil-Unk ac
2023122	B	OTHER - Military (Chinook)	OTHER (RPAS)	Mil-UA/Other
2023123	B	CESSNA - 152	CESSNA - 152	GA-GA
2023124	B	PZL BIELSKO - SZD50	DIAMOND - DA42	GA-GA
2023125	C	BOEING - 737	PIPER - PA38	CAT-GA
2023126	B	BOEING - 737	UNKNOWN (Object)	CAT-UA/Other
2023127	C	AVIONS ROBIN - DR400	VANS - RV7	GA-GA
2023128	C	AVIONS ROBIN - DR400	BELL - AB206	GA-GA
2023129	E	AEROSPATIALE - AS350	ROLLADEN SCHNEIDER - LS6	Civ Comm-GA
2023130	C	OTHER (Canopy Suspended)	EUROCOPTER	Civ Comm-GA
2023131	C	CESSNA - 152	AGUSTA - A109	Civ Comm-GA
2023132	B	PIPER - PA28	BEAGLE - B121	GA-GA
2023133	C	OTHER (Starduster SA10)	FOURNIER - RF4 - D	GA-GA
2023134	E	PIPER - J3 (Piper Cub)	BAC - JET PROVOST	GA-GA
2023135	C	OTHER (Sky Ranger)	AVIONS ROBIN - DR400	GA-GA
2023136	A	OTHER - Military (Envoy)	UNKNOWN (RPAS)	Mil-UA/Other
2023137	C	AIRBUS - A320	UNKNOWN (Object)	CAT-UA/Other
2023138	C	PARTENAVIA - P68 - A	OTHER (Skyranger)	Civ Comm-GA
2023139	B	SCHLEICHER - ASK21	VANS - RV8	GA-GA
2023140	B	VANS - RV4	FOURNIER - RF4D (Motor Glider)	GA-GA
2023141	C	AIRBUS - A320	AIRBUS - A319	CAT-CAT
2023142	C	BOEING - 777	BOEING - 777	CAT-CAT
2023143	A	OTHER (HPH Shark)	PIPER - PA28	GA-GA
2023144	C	OTHER - Military (Avenger)	GRUMMAN - AA5	GA-Mil
2023145	E	PILATUS - PC21	OTHER - Military (Tutor)	Civ Comm-Mil
2023146	E	EMBRAER - ERJ190	CIRRUS - SR20	CAT-GA
2023147	B	GROB - G115 - A	EVEKTOR AEROTECHNIK - EV97	GA-GA
2023148	C	OTHER (Alpi Aviation)	OTHER (De Havilland Vampire)	GA-GA
2023149	A	AIRBUS - A319	OTHER (Balloon)	CAT-UA/Other
2023150	E	OTHER (Model fixed wing aircraft)	OTHER - Military (Chinook)	Mil-UA/Other
2023151	C	OTHER - Military (Merlin)	OTHER (Microlight)	Mil-Unk ac
2023152	C	AIRBUS - A320	UNKNOWN (Object)	CAT-UA/Other
2023153	E	OTHER (Bristell NG5)	CESSNA - 172	GA-GA
2023154	C	AIRBUS - A320	UNKNOWN (Microlight)	CAT-Unk ac
2023155	C	AIRBUS (A220)	UNKNOWN (RPAS)	CAT-UA/Other
2023156	C	BOEING - 737	SPORTINE AVIACIJA - LAK17 - A	Civ Comm-GA
2023157	B	DIAMOND - DA42	SCHEMPP HIRTH - NIMBUS3	GA-GA
2023158	C	PIPER - PA28	CESSNA - 152	GA-GA
2023159	D	ROLLADEN SCHNEIDER - LS7	OTHER - Military (Texan)	GA-Mil
2023160	B	OTHER (Alpi Pioneer)	JABIRU	GA-GA
2023161	D	GLASER DIRKS - DG100	GIPPSLAND - GA8	Civ Comm-GA

2023162	C	OTHER (SkyRanger Nynja)	PIPER - PA28	GA-GA
2023163	B	BOEING - 737	UNKNOWN (RPAS)	CAT-UA/Other
2023164	B	AIRBUS - A321	UNKNOWN (Object)	CAT-UA/Other
2023165	C	AGUSTA - A109	CESSNA - 182	Civ Comm-GA
2023166	C	OTHER - Military (Texan)	UNKNOWN (RPAS)	Mil-UA/Other
2023167	A	AGUSTA - A109	DIAMOND - DA40	GA-GA
2023168	B	ROLLADEN SCHNEIDER - LS7	DIAMOND - DA42	GA-GA
2023169	B	OTHER - Military (Juno)	OTHER - Military (Typhoon)	Mil-Mil
2023170	C	OTHER - Military (Texan)	EVEKTOR AEROTECHNIK - EV97	GA-Mil
2023171	C	OTHER - Military (Prefect)	COMMANDER - 114	GA-Mil
2023172	B	OTHER (Flugzeugbau)	PAC - 750XL	GA-GA
2023173	A	AIRBUS - A320	UNKNOWN (RPAS)	CAT-UA/Other
2023174	D	UNKNOWN (RPAS)	UNKNOWN (Microlight)	UA/Other-Unk ac
2023175	E	EUROCOPTER (EC75)	OTHER - Military (F15)	Civ Comm-Mil
2023176	C	OTHER (DJI M300)	AGUSTA - A109	Emerg Servs-UA/Other
2023177	C	PIPER - PA28	OTHER (Eurofox 3K)	GA-GA
2023178	E	OTHER (Eurofox)	COMCO IKARUS - IKARUS C42	GA-GA
2023179	C	PZL BIELSKO - SZD50	CIRRUS - SR22	GA-GA
2023180	B	OTHER - Military (Prefect)	UNKNOWN (RPAS)	Mil-UA/Other
2023181	B	AIRBUS - A320	UNKNOWN (RPAS)	CAT-UA/Other
2023182	B	OTHER - Military (Prefect)	OTHER - Military (Phenom)	Mil-Mil
2023183	A	OTHER (Canopy Suspended)	CESSNA - 208	GA-GA
2023184	D	VULCAN - P68	UNKNOWN (Glider)	Civ Comm-GA
2023185	C	GIPPSLAND - GA8	PIPER - PA28	Civ Comm-GA
2023186	A	CESSNA - 172	SUPERMARINE - SPITFIRE	Civ Comm-GA
2023187	C	ROLLADEN SCHNEIDER - LS1	DIAMOND - DA42	GA-GA
2023188	C	OTHER (EV97 Microlight)	OTHER (EV97 Microlight)	GA-GA
2023189	B	BELLANCA (7GCBC Citabria)	DIAMOND - DA42	GA-GA
2023190	C	CIRRUS (Std)	CIRRUS - SR20	GA-GA
2023191	C	ATR - ATR72 - 200 - 212	OTHER (Super Dimona)	CAT-GA
2023192	A	BOEING - 787	UNKNOWN (RPAS)	CAT-UA/Other
2023193	E	OTHER (Phantom 4)	SOCATA - TB20	GA-UA/Other
2023194	A	COMCO IKARUS - IKARUS C42	PIPER - PA28	GA-GA
2023195	A	AIRBUS - A320	UNKNOWN (Toy Balloon)	CAT-UA/Other
2023196	E	OTHER (AW169)	SUPERMARINE - SPITFIRE	Civ Comm-GA
2023197	C	PIPER - PA28	CIRRUS - SR22	GA-GA
2023198	B	PIPER - PA28	EVEKTOR AEROTECHNIK - EV97	GA-GA
2023199	C	CESSNA - 152	COMCO IKARUS - IKARUS C42 - B	GA-GA
2023200	B	SCHLEICHER - ASK21	CESSNA - 208	GA-GA
2023201	E	SCHLEICHER - ASK21	AGUSTA - A109	Civ Comm-GA
2023202	B	PIPER - PA28	TRAVEL AIR - TRAVEL AIR D4000	GA-GA
2023203	C	OTHER (Canopy Suspended)	OTHER (DA50)	GA-GA
2023204	E	DENNEY - KITFOX - III	OTHER (SLING 4 TSI)	GA-GA
2023205	A	ROBINSON - R44	PIPER - PA28	GA-GA
2023206	E	OTHER (EUROFOX 914)	PIPER - PA28R	GA-GA
2023207	C	EUROCOPTER - EC135	UNKNOWN (RPAS)	Emerg Servs-UA/Other
2023208	B	SCHLEICHER - ASH26	UNKNOWN	GA-Unk ac
2023209	B	COMCO IKARUS - IKARUS C42	CESSNA - 172	GA-GA
2023210	E	OTHER - Military (Typhoon)	UNKNOWN (Toy Balloon)	Mil-UA/Other
2023211	C	PIPER - PA38	DIAMOND - DA42	GA-GA
2023212	C	BOEING - 737	UNKNOWN	CAT-UA/Other
2023213	C	CENTRAIR - 101 (Pegasus)	ECLIPSE AVIATION - 500	Civ Comm-GA
2023214	C	ATR - ATR42 - 500 - 500	CESSNA - TU206 - B	CAT-Civ Comm
2023215	A	CESSNA - 152	CESSNA - 172	GA-GA
2023216	C	OTHER - Military (Atlas A400M)	CESSNA - 152	GA-Mil
2023217	C	OTHER (P68)	OTHER (Europa)	Civ Comm-GA

2023218	E	PIPER - PA38	PIPER - PA38	GA-GA
2023219	B	OTHER - Military (Typhoon)	DIAMOND - DA42	GA-Mil
2023220	A	AIRBUS - A320	UNKNOWN	CAT-UA/Other
2023221	C	BOEING - 737	UNKNOWN (Object)	CAT-UA/Other
2023222	C	AEROSPATIALE - AS355	OTHER - Military (F35)	Civ Comm-Mil
2023223	A	OTHER (ASK 21)	UNKNOWN	GA-Unk ac
2023224	C	OTHER (EuroFox)	VANS - RV6	GA-GA
2023225	C	AIRBUS - A320	UNKNOWN (Toy Balloon)	CAT-UA/Other
2023226	B	OTHER (Skymantis Drone)	OTHER - Military (Dauphin)	Mil-UA/Other
2023227	C	CESSNA - 208	COMCO IKARUS - IKARUS C42	Civ Comm-GA
2023228	B	AIRBUS - A320	UNKNOWN (RPAS)	CAT-UA/Other
2023229	C	OTHER - Military (Chinook)	UNKNOWN	Mil-Unk ac
2023230	C	OTHER (EuroFox)	CIRRUS - SR22	GA-GA
2023231	A	BOEING - 787	UNKNOWN (RPAS)	CAT-UA/Other
2023232	C	EMBRAER - EMB505 - PHENOM 300	AERO VODOCHODY - L39 - ZA	Civ Comm-GA
2023233	C	SCHEMPP HIRTH - VENTUS CT	OTHER - Military (Hawk)	GA-Mil
2023234	C	OTHER - Military (Chinook)	FUJI - FA200 - 180	GA-Mil
2023235	D	DIAMOND - DA42	UNKNOWN	GA-Unk ac
2023236	C	SCHLEICHER - ASK21	DIAMOND - DA42	GA-GA
2023237	D	UNKNOWN (Canopy Suspended)	EUROCOPTER (EC145)	GA-Emerg Servs
2023238	B	AVIONS ROBIN - DR400	EVEKTOR AEROTECHNIK - EV97	GA-GA
2023239	C	SCHEMPP HIRTH (Arcus)	CIRRUS - SR22	GA-GA
2023240	A	AIRBUS - A320	UNKNOWN (RPAS)	CAT-UA/Other
2023241	B	BOEING - 737	UNKNOWN	CAT-UA/Other
2023242	C	AIRBUS - A320	UNKNOWN (Object)	CAT-UA/Other
2023243	C	OTHER - Military (Hawk)	OTHER - Military (Tutor)	Mil-Mil
2023244	B	DASSAULT - FANJET FALCON - D	UNKNOWN	Civ Comm-UA/Other
2023245	C	OTHER (Wingtra VTOL Drone)	CESSNA - 310	GA-UA/Other
2023246	C	BOEING - 737	OTHER (RPAS)	CAT-UA/Other
2023247	C	EUROCOPTER - EC135	OTHER (RPAS)	Emerg Servs-UA/Other
2023248	C	OTHER - Military (Texan II)	OTHER - Military (Texan II)	Mil-Mil
2023249	B	OTHER - Military (Prefect)	OTHER - Military (Typhoon)	Mil-Mil
2023250	B	BEECH - 200	UNKNOWN (RPAS)	Civ Comm-UA/Other
2023251	D	AIRBUS - A320	UNKNOWN (Object)	CAT-UA/Other
2023252	A	CESSNA - 150	PIPER - PA32	GA-GA
2023253	C	CESSNA - 172	CESSNA - 172	GA-GA
2023254	E	OTHER (ESCAPADE)	OTHER - Military (A400M)	GA-Mil
2023255	D	SOCATA - TB200	UNKNOWN	GA-Unk ac
2023256	B	EMBRAER - ERJ190	UNKNOWN (RPAS)	CAT-UA/Other
2023257	C	CESSNA - 172	SOCATA - TB20	GA-GA
2023258	E	OTHER (RANS S6)	CESSNA - 152	Civ Comm-GA
2023259	A	AIRBUS - A320	UNKNOWN	CAT-UA/Other
2023260	B	PIPER - PA18	OTHER - Military (Prefect)	GA-Mil
2023261	B	DIAMOND - DA42	PIPER - PA28	GA-GA
2023262	B	AIRBUS - A320	UNKNOWN (object)	CAT-UA/Other
2023263	E	OTHER - Military (Merlin)	OTHER (RPAS)	Mil-UA/Other
2023264	C	OTHER - Military (Chinook)	UNKNOWN (RPAS)	Mil-UA/Other
2023265	B	AIRBUS - A320	OTHER (RPAS)	CAT-UA/Other
2023266	C	AIRBUS - A320	BOEING - 737	CAT-CAT
2023268	E	OTHER (H145)	OTHER (Matrice)	Civ Comm-UA/Other
2023269	C	SIKORSKY - S76	UNKNOWN (RPAS)	GA-UA/Other
2023270	E	OTHER - Military (Wildcat)	UNKNOWN	Mil-UA/Other
2023271	A	BOEING - 737	UNKNOWN (RPAS)	CAT-UA/Other