



UK Approach to Recreational General Aviation Safety:

An Independent Review



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Foreward by Geoffrey Podger – Independent Chair

It has been a privilege to be asked to Chair the 2019/2020 Independent Review into the UK Approach to General Aviation Safety and to present this draft outcome Report for consultation with interested parties, most noticeably members of the General Aviation Community.

Whilst my own contribution relates, as was the intention, to my wider regulatory safety experience and background, I could not have undertaken the task without the unfailing expertise, assistance and industry of Tony Rapson, until recently Head of the CAA General Aviation Unit. The report is therefore very much a jointly written document whilst I of course take the responsibility for the wider safety and contextual perspective.

The Report could also not have been written without the involvement of a large number of bodies representing the recreational aviation community who gave very freely of their time and expert knowledge. Similarly, the various Regulatory Bodies interviewed, both here and overseas, were generous in their involvement. The details of those we interviewed are at Annex A and they deserve our gratitude.

Finally, Tony and I would like to record our thanks to two CAA colleagues: John Dobbe who arranged our stakeholder engagements and Andrew Robinson who programme managed the task.

Geoffrey Podger

Consultation Response

This review was published for consultation between 25th February and 24th April 2020. Although we received many positive informal comments welcoming the Review, its conclusions and recommendations we only received 8 formal responses to the consultation. One response stating the report would “do nothing to improve standards and just rubber stamp the current low standards of UK flight training”. Two responses asking specific questions which were answered. Four response which welcomed the Review acknowledging it as comprehensive readable and very balanced. Finally, one response from the CAA’s Head of GA welcoming the review as a timely and thought-provoking piece which she accepts as presented and mapped out her current and future work for her team against the Reviews recommendations – that work and appropriate updates will be available to the GA Community via the normal channels.

Taking all the responses into account, as well as our engagement throughout this work, there is nothing in the consultation responses that needs us to reconsider the work set out in the Review or its conclusions and recommendations. This is therefore, the final version of the review which can be used for reference to support safety work and improvement. We have taken the opportunity of republication to update some of the statistics in Annex F these changes to not alter the overall work and conclusions.

Following the consultation, the Review was considered by Minister Tolhurst, Parliamentary Under-Secretary of State at the Department for Transport with responsibility for aviation, who said:

“This Government is committed to supporting the General Aviation sector, and fully acknowledges the valuable contribution it makes to the UK economy. A strong GA sector is central to the health of UK aviation, providing jobs and skills and helping to reach out to bring a new, more diverse generation into GA. As such, I wholeheartedly welcome the approach taken by this independent review, and its conclusions and recommendations.

The Government commissioned the review in order to understand the current level of risk to all parties from recreational GA, to map out the current system, and to make recommendations to ensure that safety standards are fit-for-purpose and proportionate.

The approach here is both comprehensive, in terms of its approach to understanding views from across the recreational GA landscape, and sensitive to the diverse range of interests and risk appetites represented by its stakeholders. While safety will never be ‘a job done’, it is extremely encouraging to see the good work already done to ensure that General Aviation is readily safety focused. The review found that the current safety level of recreational GA is acceptable, and indeed compares favourably with other voluntary high-risk activities.

Moreover, in emphasising the role of individual participants in recreational GA in ensuring the safety of the sector as a whole, I believe the review has identified practical areas where safety can be improved, without resorting to burdensome and disproportionate regulation and targets.

As the aviation sector faces the unprecedented challenge of recovering from the impact of the Covid-19 pandemic, a strong GA sector is a key pillar, supporting its future efficacy. This review will go a long way towards ensuring confidence in the ability of participants in GA to fulfil this role, and I look forward to seeing its recommendations being put into practice.”

Executive Summary

This work concludes that the current safety level of recreational General Aviation in the UK is acceptable viewed in terms of its unavoidably greater risk than commercial aviation, the much higher risk acceptability of voluntary activities and in comparison, with other high-risk activities. Nevertheless, it is important that current and new safety initiatives are pursued to seek to reduce further the current level of serious accidents. Additional regulation is not justified and is unlikely to significantly improve safety. Alongside safety initiatives it is also important that pilots are encouraged to undertake periodic training throughout their flying careers.

The Review was completed in accordance with the Terms of Reference and as committed to by Government in the “Aviation 2050: The Future of Aviation” Green Paper including extensive consultation with the General Aviation Community and an open consultation. The Review considered the assessment, management and the control of risk in the General Aviation Sector both in general and in three key areas; third parties, non-pilot participants and pilots. Comparisons were completed with other countries and other activities before considering recent activities and changes within the regulatory framework for General Aviation and how that framework influences the safety of sport, recreational and personal transport aviation.

It will remain important that the CAA continues to monitor safety trends in this sector so that if the long-term fatal accident trend were to significantly increase then appropriate and proportionate action can be considered. Much time was spent looking at the risk to uninvolved third parties from recreational General Aviation, ultimately when third parties, who were uninvolved in the aviation activity are considered then casualties, whilst still very regrettable, are in fact very low and may be considered tolerable in terms of the involuntary risks from the mistakes of others to which we are all exposed. It is vital, as well as a requirement in aviation law, that fatal aviation accidents are fully investigated, lessons learned, and appropriate safety actions taken. The approach of targeted specific and effective safety actions following detailed investigations should remain the preferred option for safety improvement, rather than blanket regulation.

There has been significant change in the regulation of sport, recreational and personal transport aviation both at the national and European level, we found no evidence that these changes had had an adverse impact on safety levels. We did find an appetite in the General Aviation community to consider further delegation of activities carried out by the CAA but there was also an acceptance that such changes could be managed through the normal channels of discussion with the CAA.

Lastly, and not least, we need to acknowledge that safety will never be “a job done”. There will always be a need for reinforcement and revision of the excellent safety messages already highlighted by the regulator and community alike. Such reinforcement needs to be undertaken not least by the sector itself both through the associations but also through an openness to peer comment and informal appraisal by individual pilots so that safety is a consideration always in the mind of those engaged in flying and supporting them.

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1.0. Introduction

- 1.1. This Independent Review was commissioned and funded by the Department for Transport following a commitment to do so in the "Aviation 2050: The Future of Aviation" green paper which set out for public consultation a number of policy options to improve aviation safety. The review was initiated in July 2019 and will be completed with a response to this consultation on our work and conclusions set out in this document.
- 1.2. A copy of the full Terms of Reference for this review, together with short biographies for Geoffrey Podger and Tony Rapson, can be found at Annex B. We should stress at the outset that we are considering non-commercial operations focusing on sport, recreational and personal transport elements of General Aviation.
- 1.3. One thing that was apparent from the very start of this review was the extensive amount of work that has and continues to take place to maintain and enhance safety within the general aviation community as well as the development of a proportionate regulatory system for general aviation. It has not been possible to use anything but a small proportion of this work but where possible it has been referenced and links provided in the appropriate footnote.
- 1.4. The principles and detail of this review were discussed with and presented to stakeholders in the General Aviation community. A list of engagement activity is at Annex A. As required by the ToR we have set out the national and international regulatory framework at Annex C.
- 1.5. At the time of writing the new Government has taken up office and confirmed as its principle objective leaving the European Union on 31 January 2020. It will be a matter of political decision as to how the safety regulatory regime will be managed from 2021 onwards and the nature, if any, of future cooperation with the European Aviation Safety Agency (EASA) but it would seem likely at the very least that the UK will become responsible for more of EASA's current tasks and responsibilities for the General Aviation Fleet.
- 2.3. Faced with the generally agreed propositions outlined above, regulators have tended to take a more relaxed view of risky activities which are entered into on a generally voluntary basis. Thus, the Health and Safety Executive issues guidance on the organisation of sporting activities but does not seek to inhibit individuals who wish to engage in high risk activity which does not put others at risk. Similarly, the Maritime and Coastguard agency operate a much less constrained regulatory regime for pleasure boats than for commercial shipping.
- 2.4. There are however two important caveats to the approach to high risk activities outlined above. The issue of third-party injuries and fatalities from any recreational activity does however raise very different issue of acceptability. Clearly it is one thing to voluntarily accept a risk and quite another to sustain death or a life changing injury as a result of an activity with which one has no commitment or interest. In assessing the measure of this problem, it is important to define precisely who is to be classified as a third party. Our view is that the proper approach in recreational civil aviation is that those who have chosen to be passengers or are otherwise voluntarily present in a known recreational higher-risk environment are considered participants and not uninvolved third parties. Our view is that the risk context should be apparent to those who choose to board planes used for recreational aviation. If this view is accepted, it should be noted that the actual level of third-party accidents is extremely low with 5 accidents in the last 40 years resulting in 16 fatalities with 11 of these being the result of one accident. That one accident was the Shoreham Air Display tragedy of 22 August 2015 when 11 people died. Significant further enhancements to civil air display regulation were introduced following Shoreham. We heard evidence that this has resulted in unwelcome restrictions on air displays (The restrictions being sometimes of a wholly voluntary character), but we consider that these are justified by the enhanced protection given to third parties. Hence, we have not considered any regulation relaxation in this area.
- 2.5. Secondly and in our view very importantly we need to recognise that the whole concept of "acceptable risk" is unavoidable for the decisions which public and private bodies, including regulators, must take. It does not mean however that we can simply "sweep under the carpet" the human tragedy of lives cut short or plagued by life changing injury even if the risk overall is managed at levels reasonably regarded as "acceptable" in the round by society as a whole. Hence, we have deliberately looked at the common features of recent accidents and considered whether further preventive measures are possible and if so whether these should be regulatory or voluntary in character.

2.0. Recreational General Aviation: the approach to risk and safety

- 2.1. The motivation of the present Review is above all concerned with assessing the current level of risk in recreational aviation, whether this is acceptable, and whether further regulation or other measures are called for. It is clearly proper to do so given that recreational operation in the UK currently results in a number of deaths each year whereas UK large commercial air transport aviation operating on a much larger scale reports no deaths at all - a considerable achievement by the industry and the Civil Aviation Authority (CAA) as regulator.
- 2.2. However, as our Terms of Reference recognise the two aviation sectors are hardly comparable and "applying the same standard to private or non-commercial flying would, in effect, eliminate private flying as it would be impossible to achieve the levels of safety achieved by Commercial Air Transport in the modern age".² We found no evidence in discussion with both the aviation communities and the regulators here and internationally to contradict this statement. However, the main risks of general aviation are borne by those who voluntarily undertake the activity which inherently alters the acceptability of the risks which are incurred. Previous work around high-risk sporting activity³ has shown that such risks have a level of acceptability which can be about 1,000 times as high as that of involuntary chosen societal risks. Moreover, it is clear that there is a higher tolerance of risks which the individual can control and indeed where at least a part of the attraction of the activity lies in being challenged by and overcoming the risks. Both the last two factors are clearly present in recreational general aviation.
- 2.6. Finally, we were asked to look at the comparative risk between recreational aviation and other high-risk sports activity in the context of best practice and regulation. The outcome of our research into this area is again set out below. It is however important to sound a warning note at the outset into reading too much into such comparisons. People do not approach risk on a mathematical basis and in consequence the level of risk which occurs in one field may be regarded as acceptable whereas the same level of risk in another will not be. Acceptability will very often be determined by other factors such as the history of a particular activity, its traditions and practice and changes in acceptability will very often result from serious accidents whose wider impact is such as to result in new restrictions.

²Study Terms of Reference para 3.5

³Fischhoff et al 1981

3.0. Assessment and Management of Risk in the General Aviation Sector

3.1. In this section we consider in detail the risk involved in general aviation to those who participate in it, both pilots and non-pilots and third parties not directly involved in general aviation activity.

3.2. In January 2018, under the State Safety Programme, the UK Aviation Safety Review for 2016⁴ was published. The report intends to provide information about the level of safety in civil aviation and to promote aviation safety. The review compares aviation to other transport modes. Nevertheless, the General Aviation section stood in stark contrast at 21 fatalities for 2016 when compared to the zero for large commercial air transport or indeed for any other commercial section. Concern about this difference led to the statistics being highlighted in the Government's "Aviation 2050 – The future of UK aviation"⁵ Green Paper consultation in December 2018 leading to the commitment:

"Given the accident rate in GA compared to the rest of the aviation system, the government is committed to continually seeking new and innovative ways to improve the UK's safety record across the entire aviation system..."

"...The government proposes to:

Review the UK approach to General Aviation safety to re-evaluate the risk picture and risk appetite..."

It is this link through the State Safety Programme with the requirement to set an Acceptable Level of Safety Performance (ALoSP) and the need to understand if general aviation is acceptably safe that has led to this review. The review enables general aviation to be compared to other recreational activities, so we can understand if its safety performance is more comparable to those activities rather than commercial air transport.

3.3. Control of Risk and Risk Hierarchy.

An EASA Working Paper – "Roadmap for Regulation of General Aviation"⁶ was presented to the EASA Management Board in September 2012 and did much to pave the way for the regulatory changes that followed in the EASA programme of activity to deliver "Simpler, Lighter, Better" General Aviation regulation. Amongst other things the paper included a risk hierarchy:

- > Uninvolved third parties
- > Fare-paying passengers in commercial air transport (CAT)
- > Involved third parties (eg airport ground workers)
- > Aerial work participants / Air crew involved in aviation as workers
- > Passengers ("participants") on non-commercial flights
- > Private pilots on non-commercial flights

This hierarchy of risk is not so much the risk to each party but more about how those risks are managed and by whom. For the first two, the aviation system must provide an acceptable level of safety and this is achieved through extensive regulation and compliance. Not least the EASA regulatory framework and the UK Air Navigation Order through to the Rules of the Air which applies to all pilots and aircraft. After that the level of involvement in the management of risk which individuals can accept increases with the ability to choose whether or not to take part in that activity. In general aviation both pilots and passengers (participants) can choose not to undertake the activity / flight and either just forego the activity or travel by other means. The passenger of a general aviation flight, having elected to take part in the general aviation activity then has less control over the management of risk / conduct of the flight than the pilot and hence the pilot has both the greatest informed choice as to whether or not to take part in the activity and also the greatest involvement in the conduct of the flight and any and all risk associated with it. In keeping with the risk hierarchy above, this review will consider three groups, uninvolved third parties, non-pilot participants in general aviation activity (passengers) and the pilots⁷.

3.4. Third Parties.

Most importantly the level of risk of any activity should not place members of the public at unacceptable risk.

3.4.1. Accidents remain inevitable as can be seen in part by the 235 pedestrians who lost their lives in transport accidents in 2018⁸. We have reviewed the 687 general aviation accidents⁹ between 1978 and July 2019 to identify where there were uninvolved third-party fatalities. Over the 40-year period 5 accidents merited further consideration:

- > 1985 Fordingbridge, Hampshire 1 third party fatality
- > 1987 Solent, Hampshire 5 fatalities (2 third party)
- > 1998 Long Mynd, Shropshire 1 third party fatality
- > 2009 Long Marston, Warwickshire 1 third party fatality (Police investigation only)
- > 2015 Shoreham, West Sussex 11 fatalities

More detail on each of the above, including links to appropriate reports and investigations can be found at Annex D.

3.4.2. In terms of general aviation accidents there is nothing else on the scale of the tragic Shoreham Air Show crash and it is only right that the aviation system responded with detailed investigations and regulatory change to enhance the system to reduce even further the likelihood of similar accidents. Looking at the list in general there is no link between the 5 accidents that would suggest a trend. Whilst recognising the extensive work carried out in the aftermath of the Shoreham tragedy, it is very rare for general aviation activity to result in the death of uninvolved third parties. Recognising the significant work that went into the investigation and follow up of all these tragic accidents we have concluded that there is otherwise no need for additional work and/or mitigations to manage the general aviation risk to third parties but equally the enhancements put in place must be maintained.

⁴ CAP 1595 UK Aviation Safety Review for 2016:

<http://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=8153>

⁵ Aviation 2050: the future of UK aviation: <https://www.gov.uk/government/consultations/aviation-2050-the-future-of-uk-aviation>

⁶ Working Paper – Roadmap for Regulation of General Aviation: https://www.easa.europa.eu/sites/default/files/dfu/EASA%20MB%2004-2012%20WP09a%20GA-roadmap_mb.pdf

⁷ As required by the ToR this review does not consider attendance at Air Shows further as this has been fully covered by the CAA's Air Display Review, the AAIB accident investigation and the DfT commissioned Review of UK Civil Flying Display and Special Event Governance. The last of these is linked: <https://www.gov.uk/government/publications/review-of-uk-civil-flying-display-and-special-event-governance>

⁸ ONS Cause of Death V01 -V09 Pedestrians injured in transport accidents. ONS Searchable dataset: <https://www.nomisweb.co.uk/query/servlet/gettablebyname.asp?opt=3&theme=&subgrp=>

⁹ Scope of accidents consider: Non-commercial operations involving non-complex motor-powered aircraft: Fixed-wing aeroplanes with a certificated maximum take-off mass not exceeding 5,700kg; helicopters with a certificated maximum take-off mass not exceeding 3,175kg; Ex-military or historic aircraft. The following categories not included in the above: Gliders; gyroplanes; microlights; airships and all ballooning operations.

3.5. Passengers – Non-Pilot Participants

3.5.1. In recreational or personal transport aviation that we are looking at here, passengers (participants) can choose not to undertake the activity / flight and either just forego the activity or travel by other means. Having elected to take part in general aviation activity then the passenger has less control over the management of risk / conduct of the flight than the pilot, this is reflected in the hierarchy of risk at 3.3. Passengers are required to be briefed by the pilot in command but are reliant on that information being correct if they are to be better informed over and above the self-evident fact that a GA aircraft and pilot is not presenting the same level of risk as a commercial air transport aircraft and commercial pilot. It is right that passengers are placed above pilots as they are different from the pilot on non-commercial flights because in general they do not have the same ability to assess and control the risk as the pilot. But aircraft occupants (other than the pilot) include a broad spectrum of stakeholders of different ability to assess and control risk. eg the occupant may be a friend of the pilot, or it may be an aircraft co-owner who is equally qualified to be pilot-in-command of the aircraft. Without being present at the pilot briefing or other exchanges between pilots and passengers, it is not possible to make an assessment of the quality of that exchange. The exception to this is where cost sharing flights are arranged via an internet platform operating in accordance with the EASA Charter where significant and clear information is 'pushed' to the passengers / participants.

3.5.2. We considered a recommendation around briefing and/or providing written material with a signature requirement to passengers on non-commercial flights but in the end concluded this would be a protection of the regulator rather than providing any additional practical protection to passengers. A well-managed and correct flight will already include the necessary information to enable a passenger to decide as to whether or not to participate, and the addition of formal generic briefing from the regulator will add little and likely be just a 'tick box' exercise. For poorly conducted flights, or flights where the pilot is already operating outside the law, any guidance is likely to be ignored. Providing more information on the CAA Website is highly unlikely to lead to significant improvement on the assumption that if a passenger already knows enough to check the CAA Website they are already better informed than average! For now, it is appropriate that the situation on non-commercial flights continues to be monitored and if any trends are identified specific action is taken.

3.6. Pilots

3.6.1. The pilot of a non-commercial general aviation flight is the best informed to understand the risks of their flight in their aircraft as well as being the person who can manage that risk most effectively. We have not identified any additional regulatory action that would lead to a further improvement of the management of risk but more and even better education and training can lead to improvements. Whilst we do not believe it appropriate to mandate more training given the current level of risk within this recreational activity, the benefits of post ab initio training, whether that is formal ratings such as the Instrument Rating or via one of the associations' post qualification development programmes, has considerable merit in raising experience and awareness above the basic level achieved at the end of initial training.

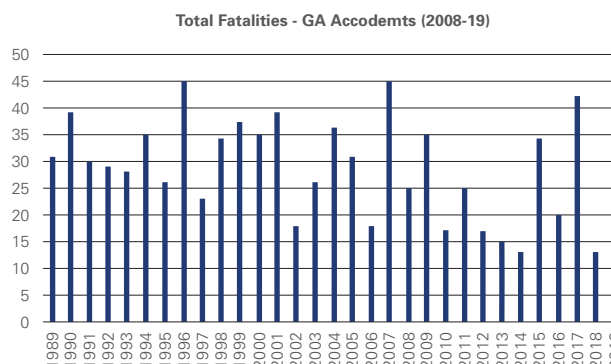
3.6.2. We recognise the importance of continuous training and skills development for private pilots, to improve the safety standards of flying. This can be arranged between individuals or via training organisation and associations. The CAA has developed the Pilot Recognition for Operational Up-Skilling and Development (PROUD) scheme¹⁰ to highlight some of the opportunities and the organisation providing them for ongoing improvement. Other training and development could involve obtaining more ratings or attending safety events. Whatever the activity, the benefits of investing time in further training and skills development and indeed taking on board comments from fellow flyers, will improve experience and decision making.

3.6.3. Whilst general aviation has undoubtedly benefited from safety enhancements from the technical advancements in aviation, the other eras of aviation evolution apply much less to general aviation. We must continue to work to maintain and where possible improve safety in general aviation. Safety needs to be improved in a proportionate way that does not just stop the activity through making it too difficult or too complex to do or just too expensive. Whilst commercial aviation rightly focuses, amongst other things, on "...understanding the interplay of organizational and managerial factors in accident causation... ... to protect against fluctuations in human performance or decisions at all levels of the system"¹¹ for general aviation it is often only the pilot, their experience, currency and competency that forms the barrier between normal operations and an accident. It is important that general aviation focuses on active failures which are the actions, including errors and violations, which have a significant adverse effect. Such failures are generally associated with front-line personnel (pilots, air traffic controllers, aircraft mechanical engineers etc) and can result in accidents and leads to the conclusion that the majority of GA accidents are as a result of pilot decision making and actions.

3.7. Safety Record:

For this section we considered the fatal accidents in general aviation¹² from 1989 to 2019 to give 30 full years of data, prior to 1989 confidence levels in the data available reflecting the true picture decreases. This gives an average annual fatal accident rate of 17.

3.7.1. The CAA tracks a ten-year moving average fatal accident number to compare in year accidents. The current annual 10 year moving average fatal accident rate is 1.33 per 100,000 flying hours. The graph below shows the fatalities (rather than the fatal accidents) over that 30-year period.



¹⁰<https://www.caa.co.uk/General-aviation/Safety-information/Be-PROUD-and-keep-learning/>

¹¹ICAO Doc 9869 para 2.3.4

¹²Scope of accidents considered: Non-commercial operations involving non-complex motor-powered aircraft: Fixed-wing aeroplanes with a certificated maximum take-off mass not exceeding 5,700kg; helicopters with a certificated maximum take-off mass not exceeding 3,175kg; Ex-military or historic aircraft. The following categories not included in the above: Gliders; gyroplanes; microlights; airships and all ballooning operations.

¹³Link to GASCo Website: <https://www.gasco.org.uk/about>

3.7.2. There can be significant difference from year to year and this is not just down to the number of fatal accidents in a given year but also how many people were on board the aircraft involved in the accident. The General Aviation Safety Council (GASCo)¹³ and all the other general aviation associations track and monitor accidents to identify trends, learn lessons and publish any findings. This is in addition to any work, reporting and recommendations made by the Air Accidents Investigation Branch (AAIB). Similarly, the CAA considers carefully all accidents and works to identify any trends.

3.7.3. It remains difficult to identify or rule out trends in what, despite the individual tragedy of each accident, is a relatively small number of accidents overall. This challenge increases even further when it is spilt out into the subsectors of the GA community: aeroplane, helicopter, ballooning, gliding, gyroplanes and microlights. To consider the context of the general aviation safety record we considered information provided by the Office of National Statistics (ONS). The searchable ONS data set for the 10-year period 2008 to 2017 was considered and looking at this data general aviation fatalities were less than 0.2% of all UK accidents and 1.2% of all transport accidents. Using the ONS¹⁴ statistic and searchable datasets it was difficult to find a simple comparator to general aviation. The ONS does record deaths by submersion in water (swimming pool and natural water) as deaths as a result of falling into water are recorded separately it can be assumed that the vast majority of these deaths are individuals who chose to enter the water for swimming or other recreational purposes. The ONS dataset covers the period 2013 to 2018 inclusive recording 367 fatalities. For general aviation accidents the number of fatalities were 137 (37.3% of those for submersion in water). The Insurance Information Institute (for the USA), sets out the risk ("odds of death") in the United States by selected cause of injury which further highlights the relatively lower risk associated with aviation compared to other factors of life¹⁵.

3.7.4. Whichever set of statistics are considered, or comparisons used general aviation does not appear to be any more dangerous than other recreational activities that people choose to take part in. It follows that as long as participants are reasonably informed there is no reason to further restrict access to general aviation for those participating in this activity as pilots or passengers.

3.8. The effect of Red Tape Challenge / Regulatory change for GA.

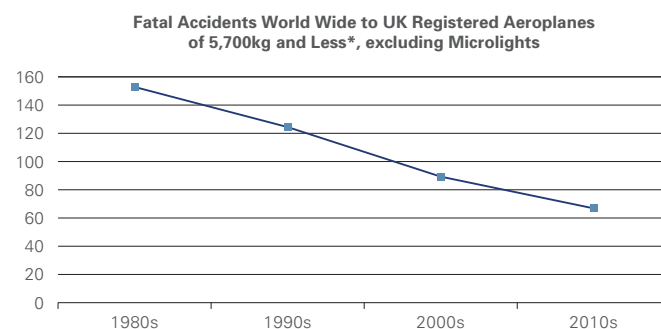
Changes as a result of the Red Tape Challenge and from the EASA GA Roadmap started to be made in 2014. Looking at the ten-year average for fatalities they are 2009 to 2018 – 23.1, 1999 to 2008 – 32.6 and 1989 to 1998 – 32. Although there were peaks in 2015 and 2017 the overall trend for the last decade is downwards but this trend should be monitored. There was no evidence of the recent regulatory changes leading to an increase in the fatality rate although we would have to acknowledge that the time period between change and effect is currently very small, it will therefore, be important to monitor the accident rate over time to establish if there is any change in trends either positive or negative.

3.9. USA Study into fatality risks in transportation.

In January 2013 the Department of Economics and the Transportation Centre, Northwestern University, published its comparison of "the fatality risks in United States transportation across modes and over times".¹⁶ Although it would be wrong to assume the results in the UK would be exactly the same, the broad trends are the same, as can be seen from the information

on the Office of National Statistics website and database. The USA study is helpful in that it sets out the risk of aviation (both commercial and private) compared to other transportation means and concludes aviation, particularly commercial aviation, remains one of the safest ways to travel.

3.9.1. In response to the work on this GA Safety Review, John Thorpe supported by GASCo submitted his review of GA fatal accidents. The full paper can be seen at Annex E. Amongst other things, using four decades of data the number of fatal aeroplane accidents per decade reduces between 17% and 25% as shown in the table below. These figures further support the view that the recent regulatory changes and alleviations have not had a negative impact on safety. The paper concludes that the steady downward trend reflected in the table below almost certainly reflects the safety influence resulting from the work, individually and working together, of the CAA, the relevant organisations and associations and others including the General Aviation Safety Council (GASCo) and supports continued work on the many safety initiatives to continue this safety improvement. The paper also suggests that changes in legislation are unlikely to have any effect and that it would appear that education is the best way to influence safety. The above view aligns with the approach to GA Safety promotion taken in (not least) the USA, Australia and by EASA.



*Includes self launching (touring) motor gliders

3.10. A Fatal Injury Accident Comparison by State – 2008-19¹⁷ was completed by the CAA. The full comparison, which can be seen at Annex F, includes a comparison of fatal injury accidents rates, expressed as a rate per 100,000 flying hours for General Aviation non-commercial activity between 2008 and 2019. The fatal accident rates are:

Australia	1.86
New Zealand	1.40
UK	1.20
USA	0.91

In all the comparators used the UK compared favourably with other regulatory regimes for general aviation. Additionally, the UK also compared favourably in terms of a wide range and delivery of safety initiatives and safety actions by both the regulator and associations.

3.11. Safety Initiatives and Safety Action

There are a vast array of safety initiatives and actions at the international, national, association and local level and it would be impossible to cover them all in this review. Where appropriate links to websites have been provided in the footnotes throughout this review to the various safety initiatives. This section covers some of the key work and examples.

¹⁴<https://www.ons.gov.uk/>

¹⁵Insurance Information Institute – Facts + Statistics: Mortality Risk: <https://www.iii.org/fact-statistic/facts-statistics-mortality-risk>

¹⁶Comparing the fatality risks in United States Transportation across modes over time: <http://faculty.wcas.northwestern.edu/~ipsavage/436.pdf>

¹⁷Date Range used 1 January 2008 to 31 August 2019 (where available).

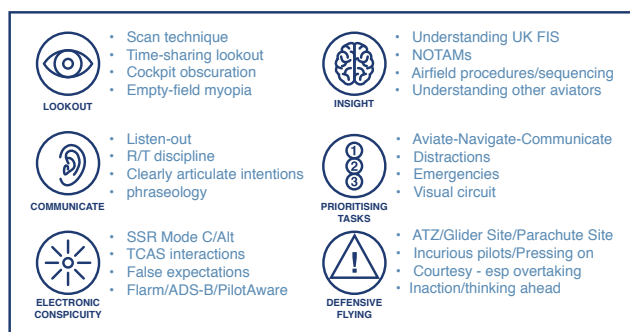
¹⁸AAIB Website: <https://www.gov.uk/government/organisations/air-accidents-investigation-branch>

3.11.1. Air Accident Investigation Branch

The work of the Air Accident Investigation Branch has been and remains crucial to the ongoing education and lesson learning from accidents. Broadly speaking our work and thinking during this review aligned with the Branch's work and conclusions. In this area of GA, we are often dealing with relatively inexperienced pilots operating in a relatively low regulatory environment making continued education and development important. They also highlighted, amongst other things, that there were a significant number of accidents involving short or narrow strips and often involving pilots who had not flown at that location before. This is one example of the wider challenge we have found of supporting pilots better in their decision-making process. It was suggested that general aviation pilots might benefit from a simple tool to support their pre-flight risk assessment. Such tools are available in the commercial world and could probably be adapted for the non-commercial environment. The positive contribution that new technology can make and the need to use it was acknowledged, as was the need to manage new risks such technology may introduce. Our engagement with the Branch confirmed that there was a common set of safety information and we had identified the right cause of accidents. They also highlighted the importance of good, simple, clear safety information particularly mentioning the CAA Safety Sense leaflets. More information can be found on the Air Accident Investigation Branch Website¹⁸ which is an invaluable source of safety information both individual accident reports and Annual Safety Reviews – on their website follow the links to “AAIB Publications”.

3.11.2. United Kingdom Airprox Board (UKAB)

The UK Airprox Board's primary objective, as taken from their website¹⁹, is to enhance air safety in the UK, particularly in respect of lessons to be learned from Airprox occurrences reported within UK airspace. An Airprox is a situation in which, in the opinion of a pilot or air traffic services personnel, the distance between aircraft as well as their relative positions and speed have been such that the safety of the aircraft involved may have been compromised. Amongst other things they publish the 'Blue Book' which is the Annual Airprox Summary Report. The report for 2018²⁰ includes a section on Airprox Education Themes and sets out 6 key safety themes at page 14, the table for which is reproduced below, and page 24 where more detail is set out.



3.11.3. UK Flight Safety Committee²¹ and CHIRP²²

Both the UK Flight Safety Committee and CHIRP (Aviation and Maritime Confidential Incident Report) play key roles in the safety system for general aviation. Both were comfortable with the overall levels of safety achieved but highlighted particular safety initiatives and areas of activity for them and others. Both mentioned airspace in the context of mid-air collisions risk and electronic conspicuity which are being considered and managed under the DfT and CAA Airspace Modernisation Strategy so are not addressed in this report.

3.11.4. Associations

All the associations have a safety focus and all of their magazines and other publications include one or more safety features. A lot of this work is brought together and considered by the General Aviation Safety Council (GASCo)²³ who continue to do considerable work on general aviation safety. GASCo uses information from all the associations and the CAA and EASA on Safety issues and emerging themes to ensure their work remains focused on current issues. More detail can be found on the GASCo website linked in the footnote. Of note is their work under contract to the CAA to deliver safety evenings as part of its safety advice and its delivery of safety education and training. Such an approach aligns with best practice in other states as can be seen by the Aviation Safety Advisors (ASA) role set up by the Australian Government's Civil Aviation Safety Authority (CASA)²⁴ which shares many of the same goals and deliverables of GASCo.

3.11.5. Gliding Safety

One example of a good safety approach is that achieved by the British Gliding Association (BGA). (This has been included as an example, there will be other examples equally worthwhile, but they have not all been covered here.) One of the BGA's specific safety initiatives was Safe Winch Launching which was introduced nationally in 2006 and included the following new methodology:

- > Establish a comprehensive accident and incident database (the BGA database contains all 7000 reports since 1974)
- > Identify the major hazards from the accident data
- > Fill gaps in the theory
- > Create simple and universal guidance for keeping safe
- > Educate all pilots and instructors
- > Measure results
- > Feedback results to everyone

3.11.5.1. This methodology was subsequently applied to other gliding safety initiatives. The tables below show how BGA overall and winch accidents have diminished since 2006.

3.11.5.2. These safety improvements are not down to regulation but occurred through non-regulatory expert intervention and education. The involvement of recognised experts is one of the factors that makes it easier to get buy-in and change behaviour rather than just setting more rules.

3.11.5.3. The BGA provided a historic review that the European Gliding Union (EGU) completed some ten years ago showing where the UK (BGA) sat in the overall rankings. The summary table is included below, and the full review linked in the footnote²⁵. The UK's performance has improved much in the past ten years.

¹⁹UK Airprox Board website: <https://www.airproxboard.org.uk/home/>

²⁰Analysis of Airprox in UK Airspace Report Number 34 Jan – Dec 2018: https://www.airproxboard.org.uk/uploadedFiles/Content/Standard_content/Analysis_files/Book%2034-final.pdf

²¹UK FSC Website: <https://www.ukfsc.co.uk/>

²²UK FSC Website: <https://www.ukfsc.co.uk/>

²³GASCo Website: <https://www.gasco.org.uk/>

²⁴Civil Aviation Safety Authority – Aviation Safety Advisors: <https://www.casa.gov.au/education/aviation-safety-advisors-asa>

²⁵European Gliding Union Accident Statistics dated 2008: https://www.alter.si/tabla/files/753901-EGU_ACC-Note-09.pdf

3.11.5.4 BGA fatalities in 14-year periods (glider, Touring Motor Glider, towing aircraft)

14-year period	Fatalities
1978-1991	84
1992-2005	72
2006-2019	30

3.11.5.4. BGA fatal and serious winch injuries in 14-year periods

14-year period	Fatalities	Serious injuries
1978-1991	18	38
1992-2005	13	28
2006-2019	4	5

Fatal Accident rates - Gliding

The following table shows in descending order, the number of fatal accidents per 100,000 launches over the ten year period 1989-2007 (but Austria is a 9-year average 1997-2005, and Finland is 10 years 1997-2006). Ireland and Serbia are excluded due to a statistically low 'populations'.

Fatal Accident rate order		1998-2007 10 year	1998-2007 10 year	1998-2007 10 year	1998-2007 10 year
		Total Fatal Accidents	Average Fatal Accidents p.a.	Average Launches p.a.	Average Fatal Accident Rate per 100k launches
Switzerland		32	3.20	97,274	3.39
Poland		10	1.00	29,703	3.37
New Zealand	5 years 2003-2007	6	0.60	21,738	2.76
France		46	4.60	187,215	2.46
Austria	9-year average 1997-2005	21	2.33	97,275	2.40
Belgium	Part of Belgium only	4	0.40	20,261	1.97
USA Rough	Rough estimated launch #s	59	5.90	440,000	1.34
Germany	Estimated launch numbers	136	13.60	1,019,878	1.33
UK		37	3.70	338,673	1.09
Norway	Estimated launch numbers	1	0.10	11,550	0.87
Denmark		5	0.50	60,268	0.83
Sweden		4	0.40	54,936	0.73
Czech Republic		5	0.50	82,019	0.61
Slovakia		1	0.10	17,098	0.58
Netherlands	Estimated launch numbers	7	0.70	132,800	0.53
Finland	10 years 1997-2006	0	0	34,072	0.00
Overall totals		375	37.73	2,641,759	1.76

Apart from Poland, the five highest fatal accident rate European countries (and New Zealand) all have alpine mountain flying, which indicated a possible correlation in terms of risk. They are also areas which visitors from other 'flat' countries go, and the visitor fatal accidents are included in the analyses.

The nordic countries. Czech Republic, Slovakia and The Netherlands have the lowest Fatal accident rates at <1.0 per 100k Launches.

4.0. Delegation and Deregulation

4.1. In November 2013 the CAA set out its response to the Government's General Aviation Red Tape Challenge heralding a change in approach to the regulation of GA and setting up a GA Unit to focus "entirely on the GA sector to ensure that the regulatory regime for the GA sector will take a different path and be less onerous to that applied to the commercial aviation sector".²⁶ It was in that document that the CAA set out its intentions for the regulation of GA that is now articulated as the 4 guiding principles for the work of the GA Unit and the CAA to:

- > Only regulate directly when necessary and do so proportionately
- > Deregulate where we can
- > Delegate where appropriate
- > Not to gold-plate, and quickly and efficiently remove gold-plating that already exists

4.2. There has been significant progress in all these areas, both for the regulation the CAA is directly responsible for and progress achieved within in the EASA GA Roadmap work to ensure all UK pilots, whether operating under direct UK Regulation or EASA Regulation get the benefits they deserve. There is a need to ensure that any new rules are proportionate and effective for general aviation. More delegation is possible, and both the CAA and Government are open to further delegation if desired as set out in the Aviation 2050: The Future of UK Aviation.²⁷ There was an appetite for further delegation, mostly within existing approvals but these were either already in hand or yet to be scoped out by the associations. It was recognised that there may be some scope under the new Basic Regulation for formation of Qualified Entities. The community was confident if they wanted more delegation or wanted to pursue specific rule changes that this can and should be initiated via the GA Partnership or direct with the CAA. It is important that the DfT, the CAA and the GA community remain open to the possibilities of greater delegation.

²⁶CAP 1123 CAA Response to the GA Red Tape Challenge: <http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=5838>

²⁷Aviation 2050: The future of UK Aviation, Para 7.33: <https://www.gov.uk/government/consultations/aviation-2050-the-future-of-uk-aviation>

4.3. Deregulation.

There has been significant success in the last 5 years with deregulation, taken here as the removal and/or the significant reduction of regulatory requirements but ultimately what is possible is in part limited by the UK's need to comply with international agreements and treaties. The highlights in this area include:

- > The deregulation of single seat microlights under 300kg from all airworthiness requirements.
- > The removal from the Commercial Air Transport Rules for paid for flight in historic aircraft under the CAA's Safety Standards Acknowledgement and Consent framework and approval.
- > The removal of the requirement to hold a medical certificate provided the pilot meets the DVLA Ordinary Driving Licence standard and makes a declaration to that effect.
- > A lifting of the absolute ban on Permit to Fly aircraft not being able to fly in IMC. This is now permitted provided the aircraft is assessed as appropriate via the Light Aircraft Associations process.
- > Allowing paid for flight training in group owned aircraft
- > The introduction of "E Conditions" to allow aircraft development and improvement without complying with all the airworthiness requirements during the development stage.

4.4. Delegation.

There has also been significant progress in this area

- > Gyroplane Certificate of Validity issues delegated by CAA
- > Reduced requirements for weighing of microlights
- > Delegations to BMAA and LAA via A8-26 approvals
- > Delegation of issue of Initial Permits to Fly to BMAA
- > The issuing of National Private Pilot's Licences on behalf of the CAA by the British Microlight Aircraft Association (BMAA)
- > LAA undertaking of airworthiness oversight of Yak and Nanchang aircraft.

Perhaps more importantly for the future is the the CAA Approval of Organisations Supporting Recreational Aviation – the A8-26 Approval which can be found in CAP 553 British Civil Airworthiness Requirements Section A (Chapter A8-26 on page 601 of 612).²⁸ It is this approval, now held by both the British Light Aircraft Association (BMAA) and the Light Aircraft Association (LAA) that underpins any delegations and key in demonstrating that the organisations are both appropriate and have the necessary competence to carry out the delegations.

4.5. Qualified Entities.

The new EU/EASA Basic Regulation updated the rules on Qualified Entities meaning that sport and recreational aviation associations could become Qualified Entities (QE) and take on certain roles and responsibilities. (As part of the Brexit process these rules will transition into UK law so will be available post the UK exit from the European Union.) Previously organisations that had a financial interest in the activity were barred from being QEs – something that did and still does make sense in commercial aviation but was an unnecessary blocker of non-commercial flying.

5.0. Regulatory Oversight

5.1. Function and scope.

Over the last 5 years the CAA, including the GA Unit, has been transitioning to Performance Based Regulation and away from a pure compliance model. It is this change that has helped support the implementation of the approval of organisations supporting recreational aviation set out above. It also included the setting up of the CAA's Regulatory Safety Management System (RSMS) and the associated Safety Review Panels including one for General Aviation and chaired by the Head of the GA Unit. More information on the RSMS can be found on the CAA's Website.²⁹

5.2. Regulatory Intervention.

Where evidence comes to light, either through routine regulatory oversight, or by other means that organisations or individuals are not complying with the regulations then the CAA has to consider what actions are appropriate. In terms of routine oversight of organisations then there is a tried and tested system of highlighting and discussing the issues, agreeing the corrective actions and then completing the same in a reasonable timescale. In the GA Sector it is very rare that approvals have to be suspended and is very much a last resort. Similarly, in its intervention concerning individuals, suspension and/or revocation of licenses was rare and only after clear evidence had been gathered. Even where such action was taken the individual still has a right to request a review of any and all decision making via the CAA's Regulation 6 review process.³⁰

5.3. Enforcement.

The main purpose of the CAA's enforcement role is to protect consumers and the public through compliance with the rules applicable to civil aviation and to deter non-compliance. Although enforcement can include regulatory action and/or a prosecution, prosecutions have to meet the same evidential standard and public interest test as any other criminal prosecution as well as the charge needing to be proved to the court beyond reasonable doubt. No prosecution is undertaken lightly but such action remains an important tool of last resort in the CAA regulatory approach. More detail on the CAA's enforcement activity can be found on the CAA Website.³¹ There has been recent public and media interest, as well as ongoing challenge from the Business Aviation / Air Charter market concerning illegal public transport and the role of cost sharing flights in that narrative. Given this more detail on cost share flights has been set out and discussed at Annex G. We have not recommended any change to the present requirements.

²⁸CAP 553 BCAR Section A – A8-26: <https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=220>

²⁹CAA Website – CAA Regulatory Safety Management System: <https://www.caa.co.uk/Safety-initiatives-and-resources/How-we-regulate/Safety-Plan/Enhancing-CAA-oversight/CAA-regulatory-safety-management-system/>

³⁰CAP 1048 Guidance for applicant: Conduct of reviews of decisions or proposals made by the CAA Safety and Airspace Regulation Group: <http://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=5616>

³¹CAA Website – Enforcement and Prosecutions: <http://www.caa.co.uk/Our-work/About-us/Enforcement-and-prosecutions/>